

UPS2000-A-(6 kVA-10 kVA)-RTL

User Manual

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About This Document

Purpose

This document describes the UPS2000-A-(6 kVA–10 kVA)-RTL in terms of its features, performance specifications, appearance, structure, working principles, installation, operation, and maintenance. UPS is short for uninterruptible power system.





Intended Audience


This document is intended for:

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

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.

Symbol	Description
	NOTICE is used to address practices not related to personal injury.
 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 the UPS port description for the new product structure.

Added the USB port description.

Updated the safety information.

Issue 06 (2019-05-05)

Updated the section "Operating Environment".

Issue 05 (2018-08-21)

Updated the section "Battery pack cable connections".

Issue 04 (2018-01-16)

Added the description of device application scenarios.

Issue 03 (2017-11-27)

Updated the section "Operating Environment".

Issue 02 (2017-06-09)

Added the description about the MBS port.

Issue 01 (2017-03-15)

This is the first release.

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1 Safety Information

1.1 General Safety

Statement

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

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

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

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

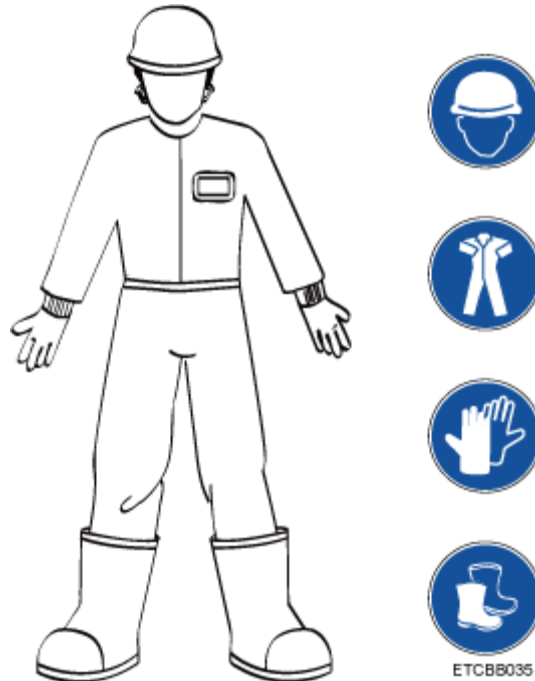
Huawei will not be liable for any consequences of the following circumstances:

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

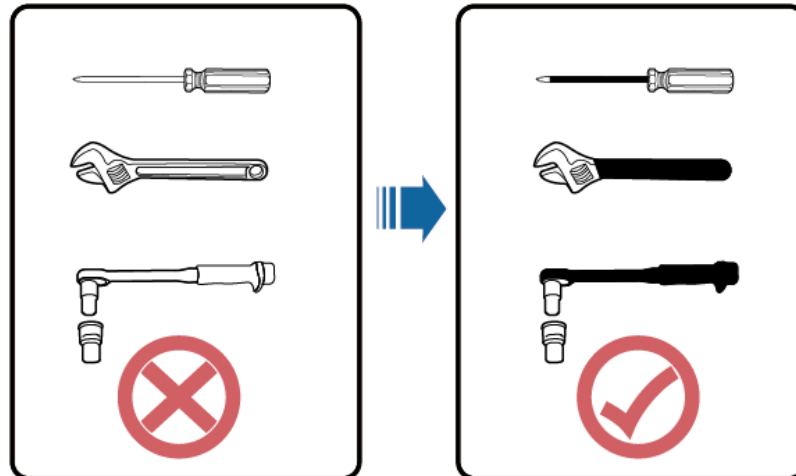
General Requirements

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

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

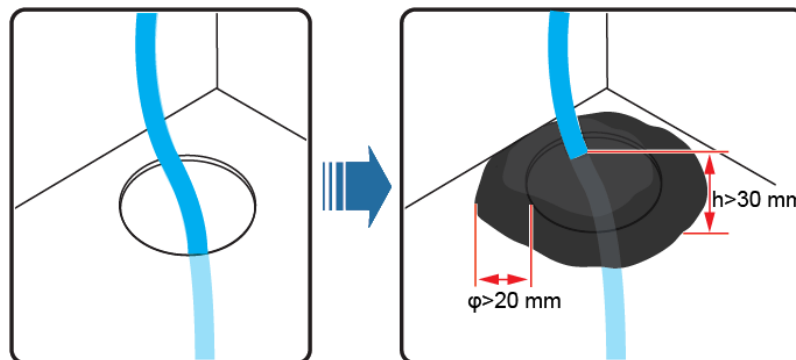


- Follow the specified procedures for installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- After installing the equipment, remove idle packing materials such as cartons, foam,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



TN01H00005

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



TN01H00006

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

Personal Safety

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

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

1.2 Personnel Requirements

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

1.3 Electrical Safety

Grounding

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

General Requirements

Use dedicated insulated tools when performing high-voltage operations.

AC and DC Power

 **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.

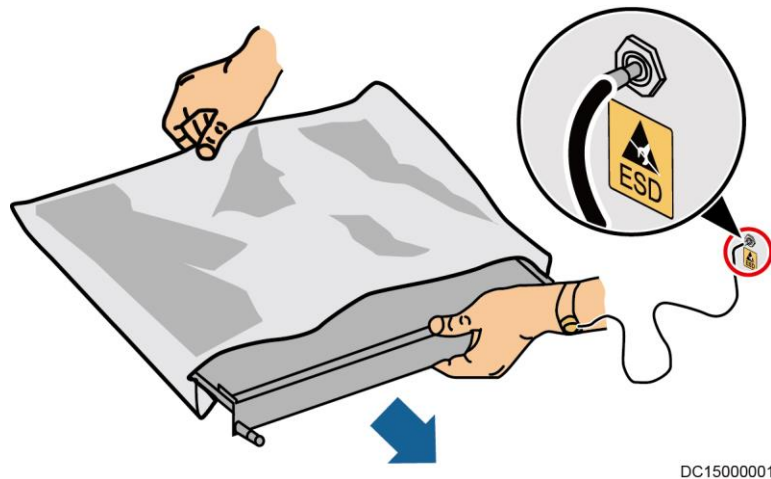
ESD

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.

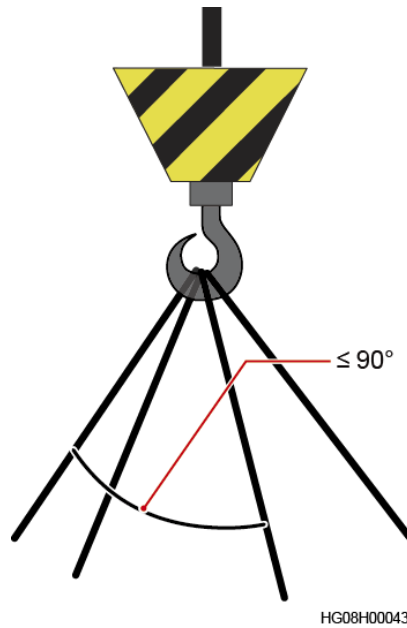
Installation at Heights

- 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

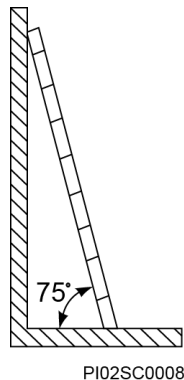
- Do not walk under hoisted objects.
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the 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.

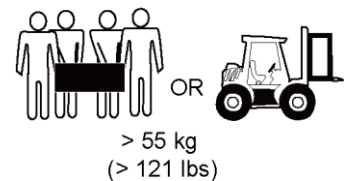
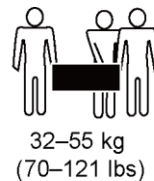
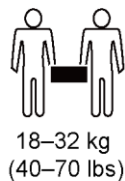
- Obtain the consent from the customer, subcontractor, and Huawei before drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

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.



NH01H00144

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

1.6 Device Running Safety

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

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

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

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

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 Number Description

This document involves the following UPS models.

Model	Remarks
UPS2000-A-6KRTL	This version is abbreviated to 6 kVA in this document.
UPS2000-A-10KRTL	This version is abbreviated to 10 kVA in this document.

Figure 2-1 shows a UPS model number.

Figure 2-1 UPS model number

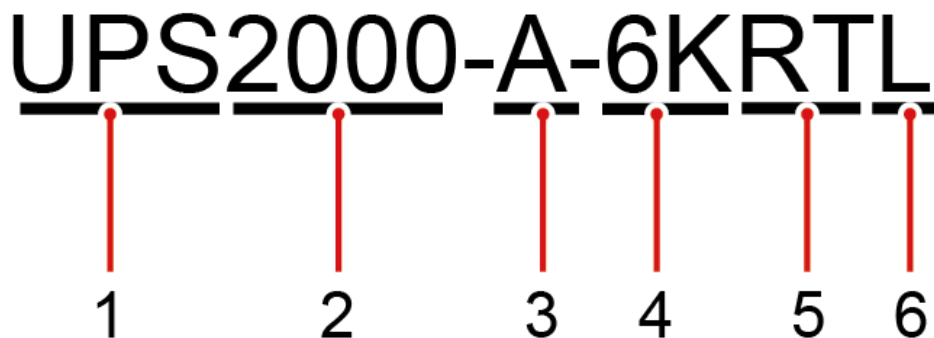


Table 2-1 describes the UPS model number.

Table 2-1 UPS model number details

No.	Meaning	Description
1	Product category	UPS, short for uninterruptible power system
2	Product series	2000

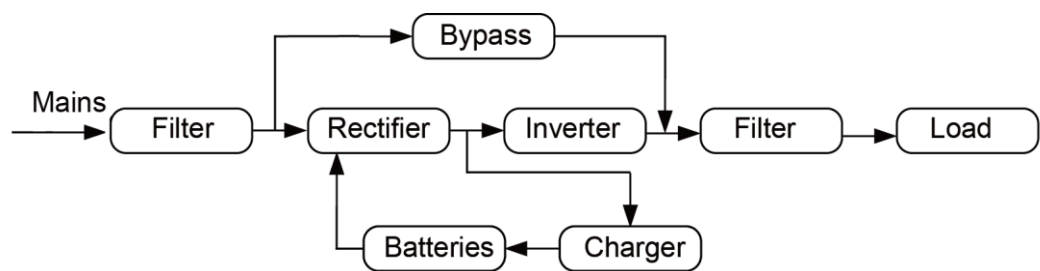
No.	Meaning	Description
3	UPS subcategory	A series
4	Output capacity	<ul style="list-style-type: none"> • 6K: 6 kVA • 10K: 10 kVA
5	UPS type	RT: rack-mounted or tower-mounted
6	Long backup time model	L: long backup time model, using external large-capacity batteries that provide long backup time.

2.2 Working Principle

2.2.1 Conceptual Diagram

Figure 2-2 shows the UPS conceptual diagram.

Figure 2-2 UPS conceptual diagram



2.2.2 Working Modes

The UPS has the following working modes:

- Normal mode
When the mains is normal, the rectifier boosts the mains input voltage and converts the AC power into stable DC power for the inverter, and the mains charges batteries over a charger. Then the inverter converts the DC power into stable AC power, which is supplied to loads.
- Battery mode
When the mains is abnormal or disconnected, the rectifier step-up transformer boosts the DC power supplied from batteries. Then the inverter converts the DC power into stable AC power for powering loads.
- Bypass mode
The mains supplies power directly to loads after filtering. The UPS transfers to bypass mode when overload, overtemperature, or faults occur. This mode does not provide battery backup capability.
- ECO mode

If the bypass voltage and frequency are in the specified range, the UPS supplies power to loads over the bypass. If the bypass voltage and frequency are outside the range, the UPS transfers to normal or battery mode. ECO is short for economy control operation.

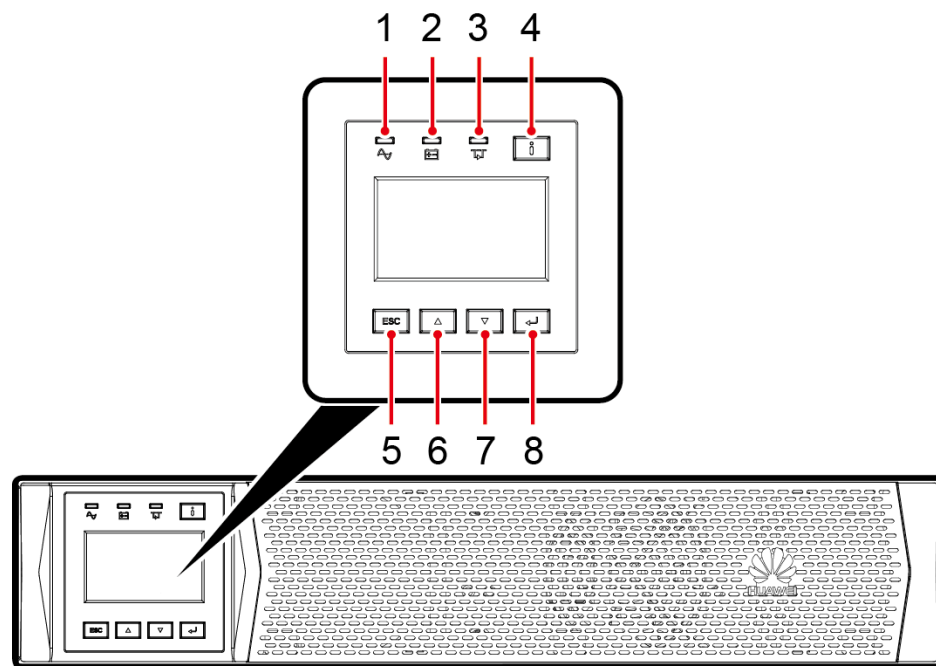
NOTE

By default, ECO mode described in this document refers to mains ECO mode.

2.3 Product Structure

Figure 2-3 shows the front view of a 6 kVA/10 kVA UPS.

Figure 2-3 6 kVA/10 kVA front view

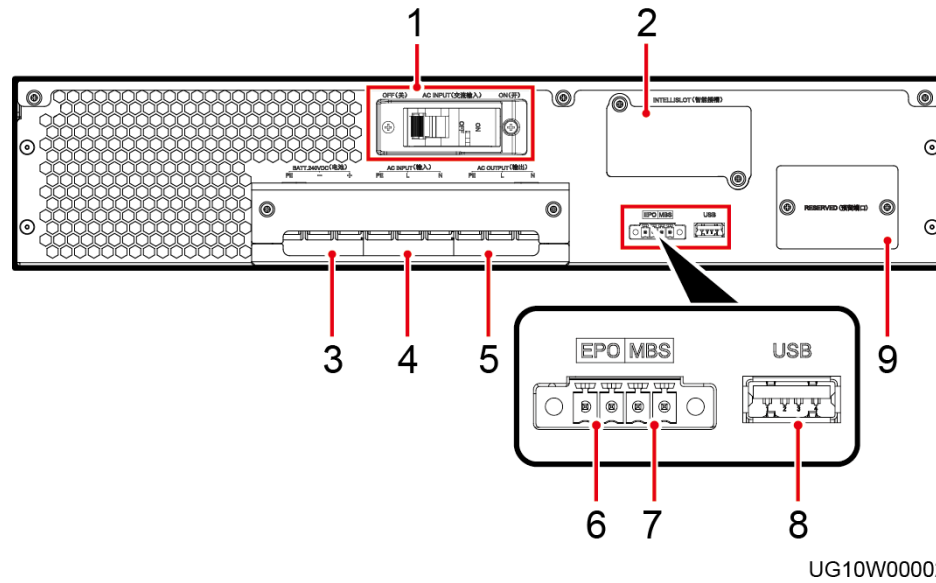


UG10W00001

- | | | | |
|--------------------------|-----------------------|----------------------|--------------------------|
| (1) Mains indicator | (2) Battery indicator | (3) Bypass indicator | (4) Fault indicator |
| (5) Back/Shutdown button | (6) Up button | (7) Down button | (8) Confirm/Start button |

Figure 2-4 shows the rear view of a 6 kVA/10 kVA UPS.

Figure 2-4 6 kVA/10 kVA rear view



UG10W00002

- | | | |
|--|---|--|
| (1) AC input circuit breaker | (2) Optional card slot (behind the cover) | (3) Battery wiring terminal (behind the cover) |
| (4) AC input terminal (behind the cover) | (5) AC output terminal (behind the cover) | (6) EPO port |
| (7) Maintenance bypass status port (MBS) | (8) USB port ^a (protected by a security mechanism) | (9) Reserved |

NOTE

a: The USB port supports the standard Modbus protocol and connects to a PC through a USB cable so that you can access the NMS, configure parameters, export data, and upgrade software.

Table 2-2 Port definitions

Port	Status	Function
EPO	NO	Connect an external switch to the EPO port on the UPS. After you turn on the switch, the inverter shuts down, and the UPS will not transfer to bypass mode. Output terminals completely power off, which meets the EPO purpose.
MBS	NO	If the UPS is equipped with an external maintenance bypass switch, the MBS port can be used to detect the on-off status of the external maintenance bypass. If the port is closed, it indicates that the UPS has detected that the external maintenance bypass switch is closed. At this time, the UPS will generate a maintenance bypass switch closed alarm and the system will transfer to bypass mode.

2.4 Optional Components

Table 2-3 Optional components

Component	Model	Function	Remarks
Standard battery pack (7 Ah, 20 batteries)	ESS-240V12-7AhBPVBA01 ESS-240V12-7AhBPVBA02	Consists of twenty 12 V/7 Ah lead-acid batteries connected in series. It is a standard configuration for the 6 kVA UPS. A maximum of four battery packs can be connected in parallel.	N/A
Standard battery pack (9 Ah, 20 batteries)	ESS-240V12-9AhBPVBA01 ESS-240V12-9AhBPVBA02	Consists of twenty 12 V/9 Ah lead-acid batteries connected in series. It is a standard configuration for the 10 kVA UPS. A maximum of four battery packs can be connected in parallel.	
Cable between the UPS and battery packs	N/A	Used to connect the long backup time model and the battery pack.	1.5 m, one end is PP45 terminals (connected to the battery pack), and the other end is OT terminals (connected to the UPS).
Battery breaker box	PDC-0063DC0440BBB	The battery breaker box controls the connection between battery strings and the UPS when multiple battery strings are connected in parallel.	The battery breaker box must be configured when battery racks are configured. The number of battery breaker boxes is the same as the number of battery racks.
SNMP card	RMS-SNMP01A	Monitors the UPS and provides the Ethernet networking solution. It can also monitor ambient temperatures	The communication ports of the SNMP card include an

Component	Model	Function	Remarks
		and humidity.	Ethernet port and a USB port (used for connecting a GSM modem, which is a Huawei product). A temperature and humidity sensor is optional. The SNMP card can also be used for web monitoring. It can be accessed through Internet Explorer and applies to large-scale and remote monitoring.
Modbus card	RMS-MOVBUS01A	Provides two cascaded RJ45 ports to implement networking over the Modbus or YDN-23 protocol.	N/A
Dry contact card	RMS-RELAY01A	Provides six alarm dry contact outputs (normal mode, battery mode, bypass mode, low battery voltage, bypass backfeed, and UPS faults) and two dry contract control inputs (one is the shutdown signal input, and the other is reserved).	N/A
GSM modem	Select a GSM modem provided by Huawei based on site requirements.	Provide the GSM modem functions by working with the SNMP card.	The GSM modem is used with the SNMP card. The number of GSM modems is the same as the number of SNMP cards.
Modem	TD-8013	The modem and NetEco work together to provide the SMS alarm notification function. One modem needs to be	N/A

Component	Model	Function	Remarks
		configured. The input port of the power adapter of the modem complies with international standards.	
Ambient temperature and humidity sensor	WS302M2A-5 ENR1DETA MODULE	The ambient temperature ranges from 0–50°C. The ambient humidity ranges from 0%–100% RH.	It is used together with a Simple Network Management Protocol (SNMP) card. The cable is delivered with the SNMP card by default and is 1.5 m long.

3 Installation

3.1 Preparations

3.1.1 Site

Floor Bearing

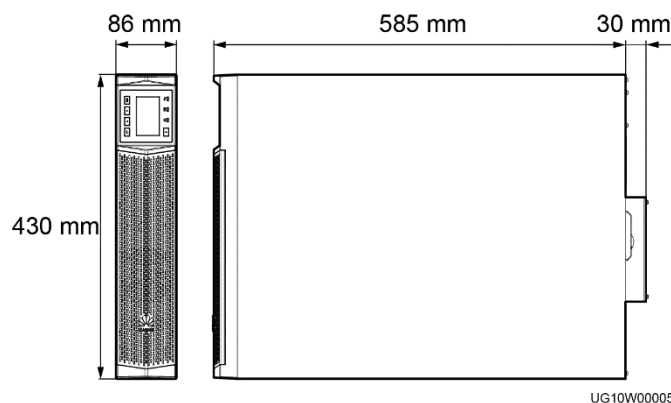
The floor can bear the weight of the UPS and its optional components. In the case of rack installation, ensure that the floor can also bear the weight of the rack.

Environment

- Do not install the UPS in an environment outside the specifications.
- Keep the UPS far away from water, heat sources, and flammable and explosive substances. Install the UPS in an environment free of dust, volatile gas, salt, and corrosive materials. Avoid direct sunlight.
- Do not install the UPS in environments with conductive metal scraps in the air.
- The ideal operating temperature for batteries is 20–30°C. Temperatures higher than 30°C shorten the battery lifespan and temperatures lower than 20°C reduces the backup time.

UPS2000-A-6 kVA/10 kVA Dimensions

Figure 3-1 UPS2000-A-6 kVA/10 kVA installation dimensions (Unit: mm)



UG10W00005

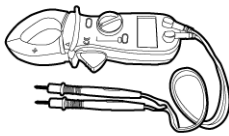
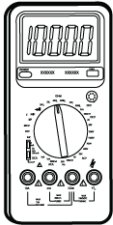
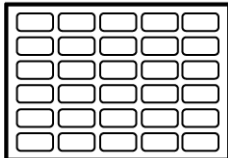


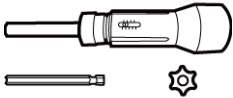
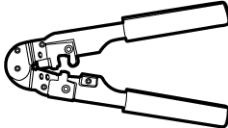
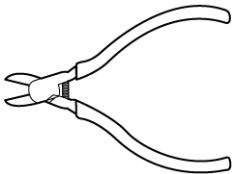
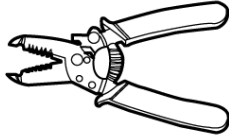
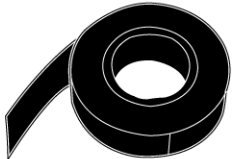
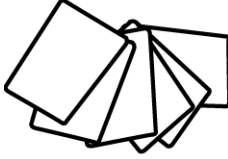

3.1.2 Tools

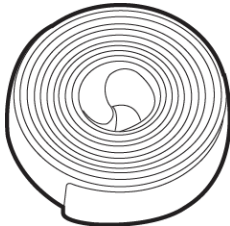
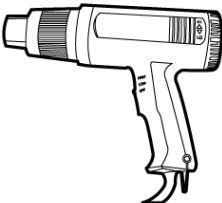


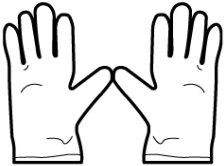

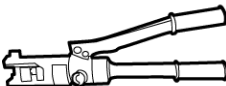

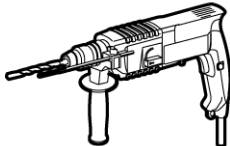



NOTICE

Get installation tools insulated to prevent electric shocks.

Table 3-1 lists the installation tools.

Table 3-1 Tools

Tools			
Clamp meter	Multimeter	Label	Phillips screwdriver (PH 2 mm x 150 mm or PH 3 mm x 250 mm)
			
Flat-head screwdriver (2 mm x 80 mm)	Torque screwdriver	COAX crimping tool	Diagonal pliers
			
Wire stripper	Polyvinyl chloride (PVC) insulation tape	Cotton cloth	Brush
			
Heat shrink tubing	Heat gun	Electrician's knife	Protective gloves

Tools			
			
ESD gloves	Insulated gloves	Hydraulic pliers	Cable tie
			
Hammer drill and drill bit φ16	Rubber mallet	N/A	N/A
			
		N/A	N/A

3.1.3 Preparing Power Cables

NOTICE

- In the case of single-phase input, you are advised to install a disconnecter.
- When used to power IT system, the UPS (single-phase output) should provide 2-pole disconnectors.
- The UPS is a large leakage current device. Do not configure a circuit breaker that has the leakage current protection function. If you need the leakage current protection function, use the earth leakage circuit breaker recommended. If multiple UPSs share an earth leakage circuit breaker (ELCB), increase the leakage current accordingly.
- The battery cable cannot be longer than 10 m.
- You can install linked circuit breakers for both the N wire and L wire. No independent circuit breaker is allowed for only the N wire.
- For the 6 kVA model, use ground cables that have a cross-sectional area of 6 mm² and M6 OT terminals that have a cross-sectional area of 10 mm².
- For the 10 kVA model, use ground cables that have a cross-sectional area of 10 mm² and M6 OT terminals that have a cross-sectional area of 10 mm².

Table 3-2 lists the recommended power cable specifications for the 6 kVA and 10 kVA UPS.

Table 3-2 Recommended power cable specifications

Model	Wiring Terminal	Rated Voltage	External Circuit Breaker	Cross-sectional Area	Terminal Type	Torque for Tightening Bolts
6 kVA	Input	220 V AC, 230 V AC, or 240 V AC	50 A (feature D)	6 mm ²	OT-10 mm ² - M6 terminal	2.8 N·m
	Output		50 A (feature D)			
	Battery	240 V DC	50 A	6 mm ²		
10 kVA	Input	220 V AC, 230 V AC, or 240 V AC	63 A (feature D)	10 mm ²	OT-10 mm ² - M6 terminal	2.8 N·m
	Output		63 A (feature D)			
	Battery	240 V DC	63 A	10 mm ²		

NOTE

If customers purchase input and output power cables by themselves, use the cables that comply with standards proposed by Underwriters Laboratories (UL) or International Electrotechnical Commission (IEC).

3.1.4 Unpacking and Checking

Figure 3-2 shows the transportation safety requirements.

Figure 3-2 Transportation safety requirements



NOTICE

- Only trained personnel are allowed to move the UPS.
- Do not move the UPS by holding its mounting brackets, front panel, terminal cover, or monitoring module.
- Built-in batteries are used for 6 kVA/10 kVA standard version with standard backup time. Exercise caution when moving them. Prevent the UPS from falling over; otherwise, fire accidents may occur. Remove rings, watches, and other metal objects when you move the UPS with built-in batteries.
- Do not turn over the UPS during transportation.
- To prevent shocks or falls, move the UPS gently. After placing the UPS in the installation position, unpack it carefully to prevent scratches.

Procedure

- Step 1** Visually inspect the UPS appearance for shipping damage. If any shipping damage is found, report it to the carrier immediately.
- Step 2** Move the UPS to the installation position.
- Step 3** Unpack the case.
- Step 4** Check the UPS.
1. Visually inspect the UPS appearance for shipping damage. If any shipping damage is found, report it to the carrier immediately.
 2. Check the UPS bar code, which is at the top of the UPS, and ensure that it complies with the order. If there is any discrepancy, contact your local Huawei office immediately.
 3. 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.

----End

3.2 Single UPS Installation

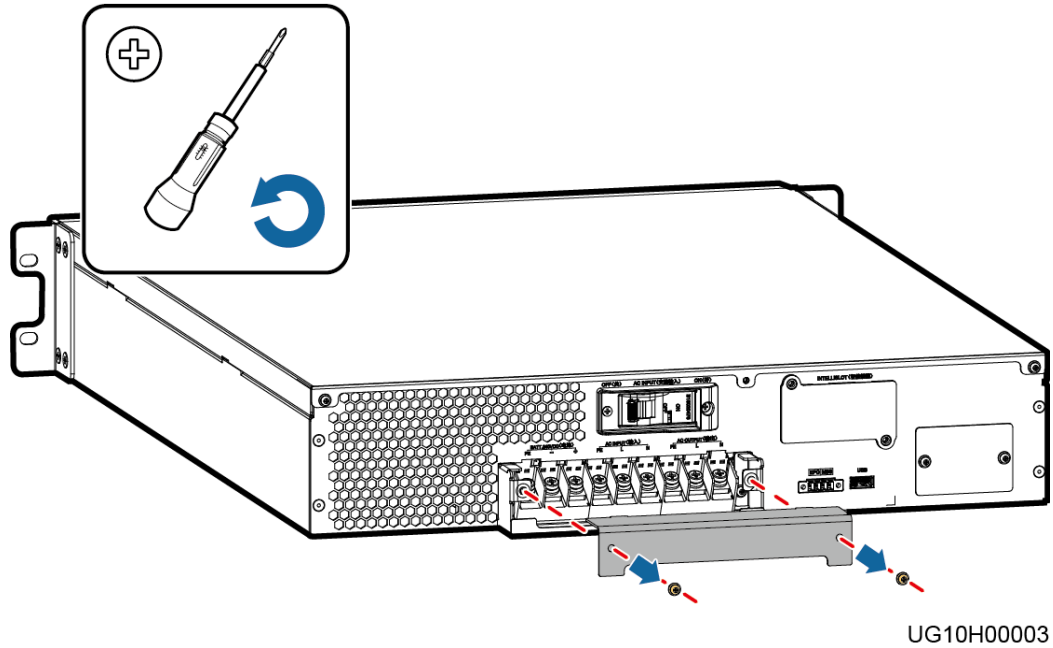
The UPS installation process covers installing devices, routing cables, and connecting cables.

3.2.1 Installing Devices

3.2.1.1 Tower Mounting

Procedure

- Step 1** Unscrew and remove the wiring terminal cover.



Step 2 Connect cables. For details, refer to the section "Connecting Cables."

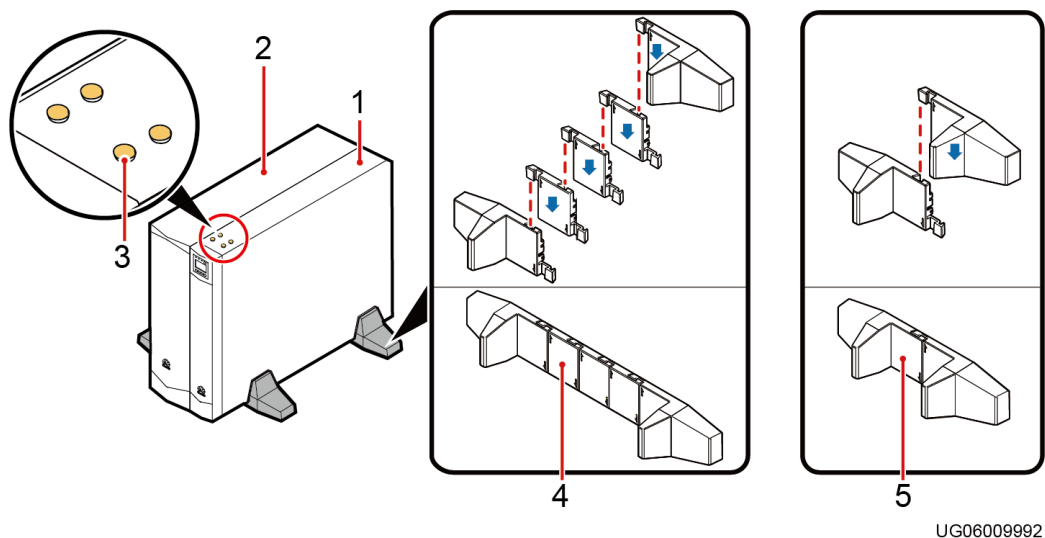
Step 3 Adjust the control panel and logo directions.

1. Take out the UPS front panel from the fitting bag.
2. Rotate the control panel 90 degrees anticlockwise.
3. Install the front panel on the UPS. Rotate the logo on the front panel 90 degrees anticlockwise.

Step 4 Assemble the base. When you assemble two modules, align the connecting buckles with the hole, as shown in the following figure.

Step 5 A set of devices require two bases (front and rear). Place bases on a floor and ensure that the distance between the two bases is at least 280 mm. Place devices on the two bases in sequence.

Step 6 Use rubber plugs delivered with the UPS to block the four tapped holes on the top of the UPS.



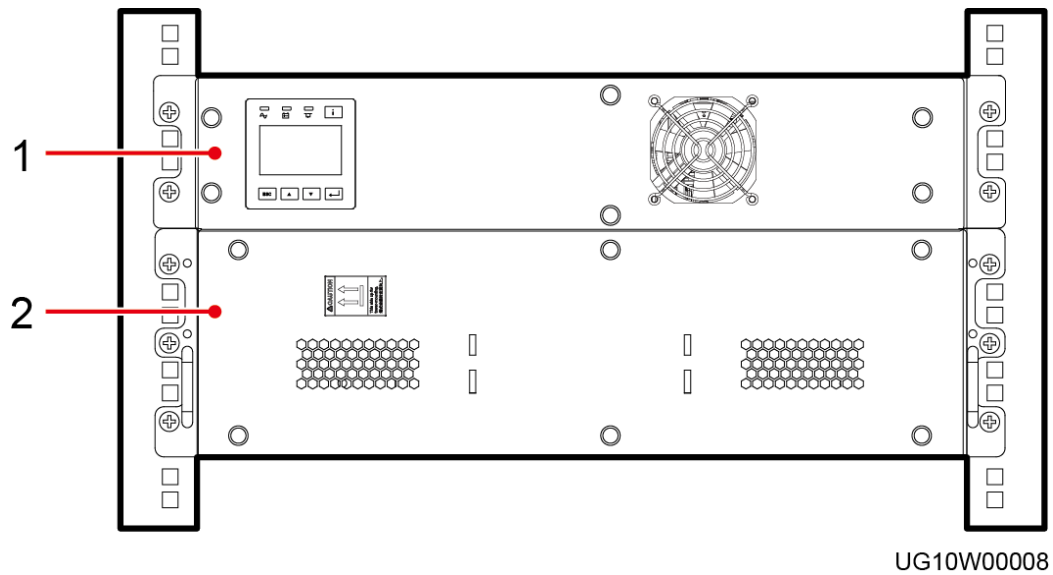
- (1) UPS
- (2) Battery pack
- (3) Rubber plug
- (4) UPS+battery pack base
- (5) UPS base

----End

3.2.1.2 Rack Mounting

Procedure

Step 1 Determine the installation dimensions.



(1) UPS (2 U)

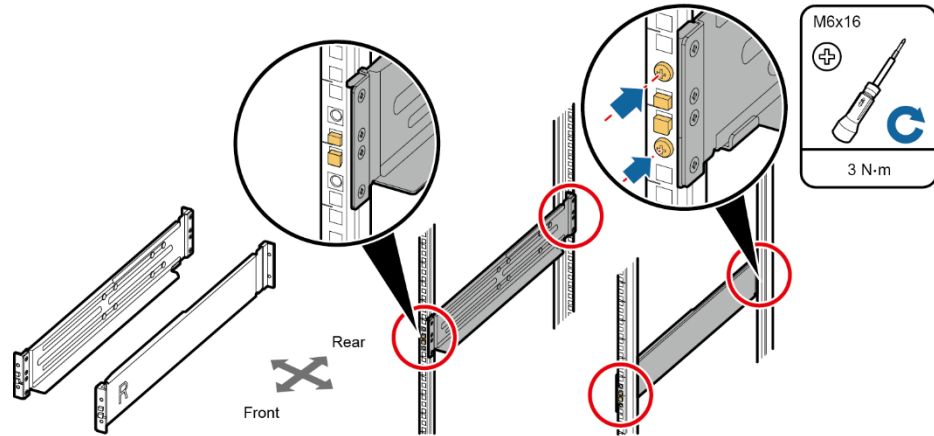
(2) Battery pack (3 U)

Step 2 If adjustable guide rails are configured, install them and floating nuts. If no adjustable guide rail is required, install only four floating nuts.

NOTICE

Do not push the guide rail out of the rack when putting the UPS into the rack, as the front end of the guide rail is not screwed.

1. Clamp the mounting ears of the adjustable guide rail to mounting bars.
2. Install floating nuts by using a flat-head screwdriver.

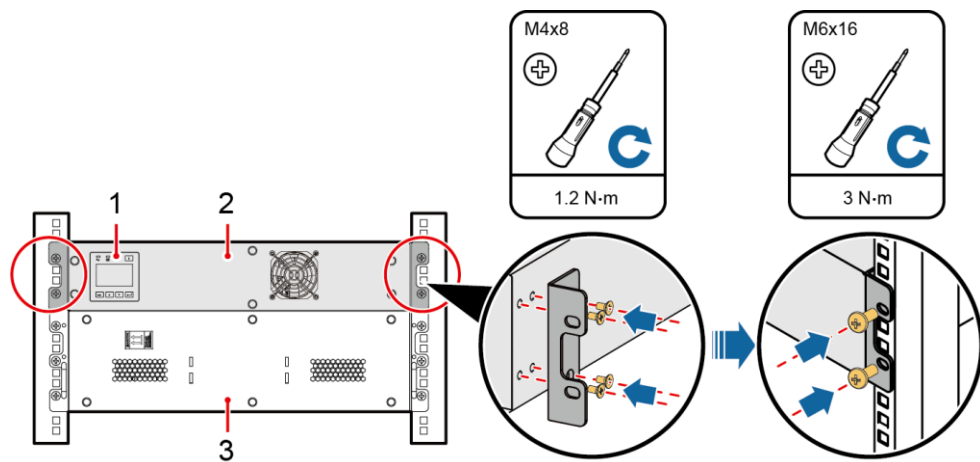


UG10H00005

NOTE

Adjustable guide rails are optional. You are advised to use adjustable guide rails if the UPS is rack-mounted. If a 2 U device is to be installed, use M6x16 screws to secure the adjustable guide rails. If a 3 U device is to be installed, use two floating nuts and M6x16 screws to secure the adjustable guide rails. The floating nuts are delivered with the UPS.

Step 3 Install mounting ears and devices from bottom up, as shown in the following figure.



UG10H00001

- (1) LCD
- (2) UPS
- (3) Battery pack

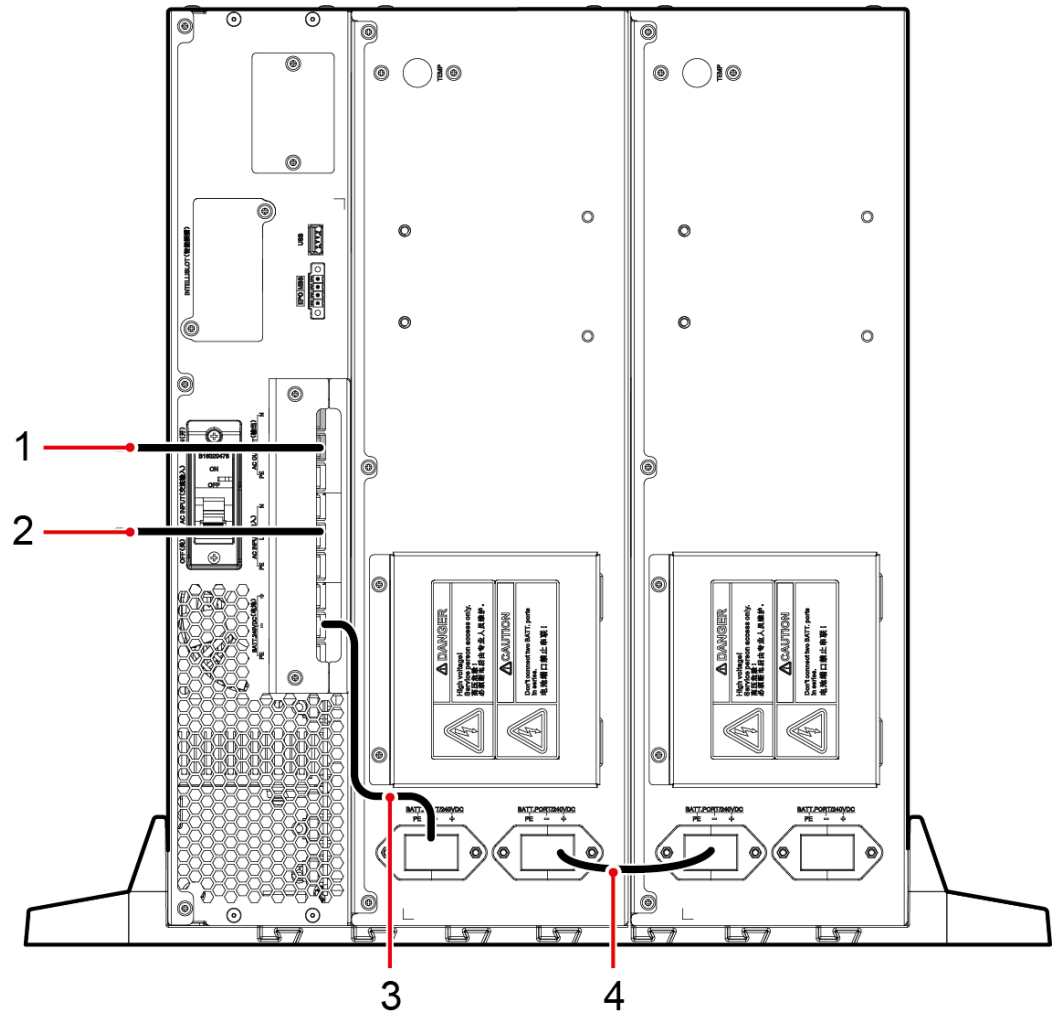
Step 4 Connect cables. For details, refer to the section "Connecting Cables."

----End

3.2.2 Routing Cables

Determine the installation positions and route cables. The UPS can be tower-mounted or rack-mounted. A maximum of four battery packs can be configured. Place the battery packs together based on site requirements. If the UPS is tower-mounted, place the battery packs on the left or right of the UPS. If the UPS is rack-mounted, place the battery packs over or under the UPS. This section describes how to route cables for two battery packs and is for reference only. [Figure 3-3](#) and [Figure 3-4](#) respectively show the cable routes for a tower-mounted UPS and a rack-mounted UPS.

Figure 3-3 Cable routes for a tower-mounted UPS



UG10110002

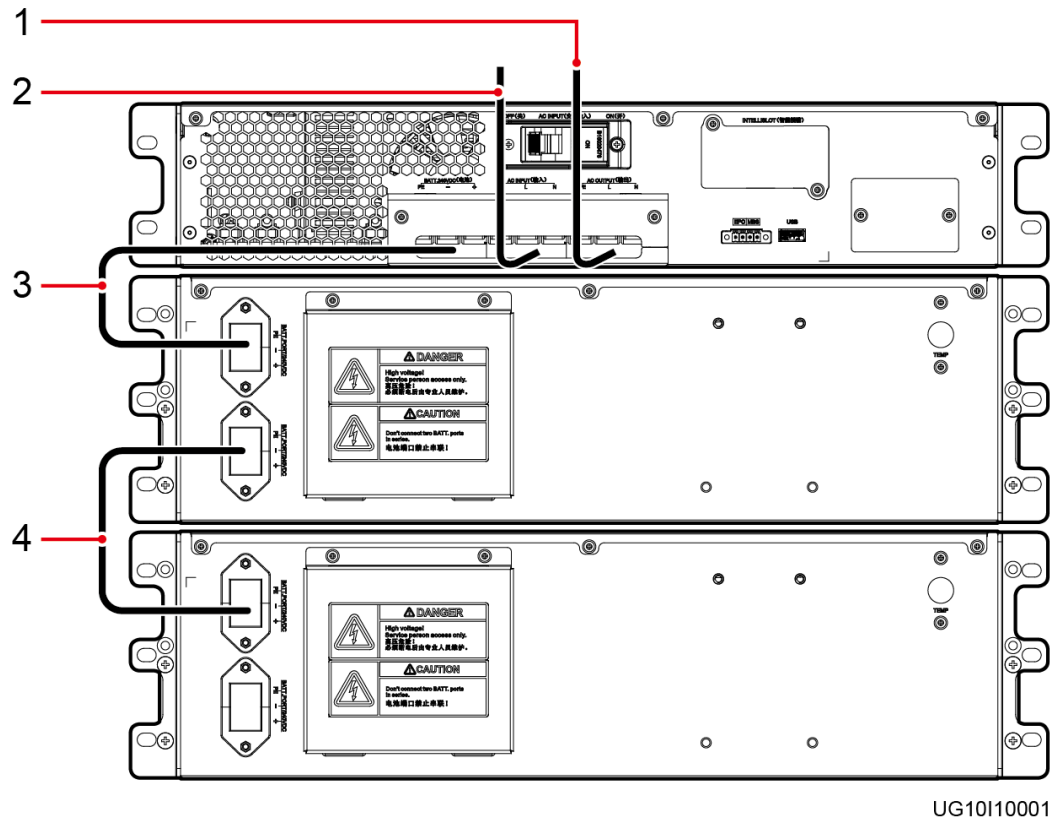
(1) AC output power cable

(2) AC input power cable

(3) Cable between the UPS and the battery pack

(4) Cable between the battery packs

Figure 3-4 Cable routes for a rack-mounted UPS



- (1) AC output power cable (2) AC input power cable (3) Cable between the UPS and the battery pack (4) Cable between the battery packs

3.2.3 Connecting Cables

Prerequisites

⚠ DANGER

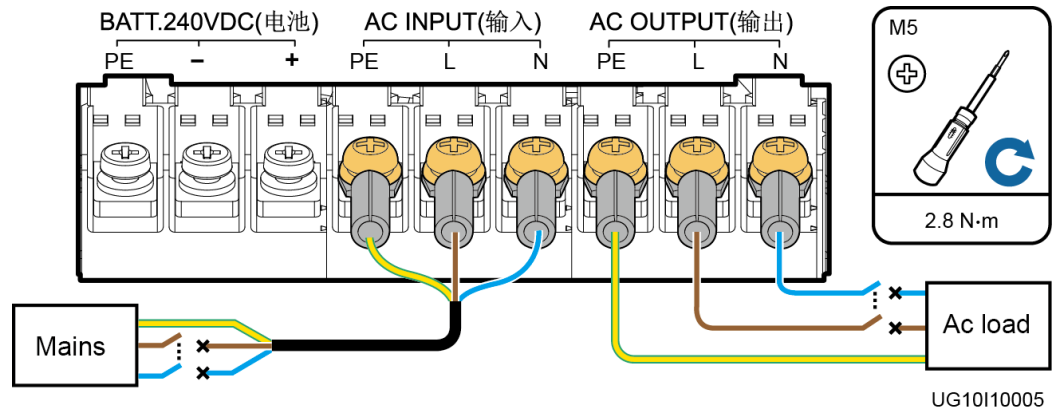
- Ensure that the L and N wires of UPS AC input and output power cables are connected correctly. Ensure that battery terminals are connected correctly.
- Before connecting cables, ensure that the input circuit breaker, external output circuit breaker (if any), and battery circuit breaker are OFF to avoid operations with power on.

Procedure

- Step 1** Turn off the AC input circuit breaker on the rear of the UPS, external output circuit breaker (if any), and battery circuit breaker.
- Step 2** Remove the cover of the AC input, output, and battery wiring terminals from the UPS.

Step 3 Connect AC output power cables and then AC input power cables in sequence, as shown in Figure 3-5.

Figure 3-5 Connecting AC output and input power cables



Step 4 Connect the battery cable to the external battery string or battery packs. Figure 3-6 shows the wiring diagram if a battery string is connected. Figure 3-7 shows the wiring diagram if battery packs are connected.

NOTE

- Install a DC circuit breaker between the battery string and the UPS (50 A, 300 V DC circuit breaker for the 6 kVA UPS, and 63 A, 300 V DC circuit breaker for the 10 kVA UPS).
- The number of batteries in the external battery string can be set to a value in the range of 16–20 (16 by default; set the number based on the actual number of connected batteries).
- One to four standard battery packs can be connected. For details, see *ESS-240V12-(9AhBPVBA, 7AhBPVBA) Quick Installation Guide*. If longer backup time is required, configure a battery rack to house battery strings.

Figure 3-6 Battery string cable connections

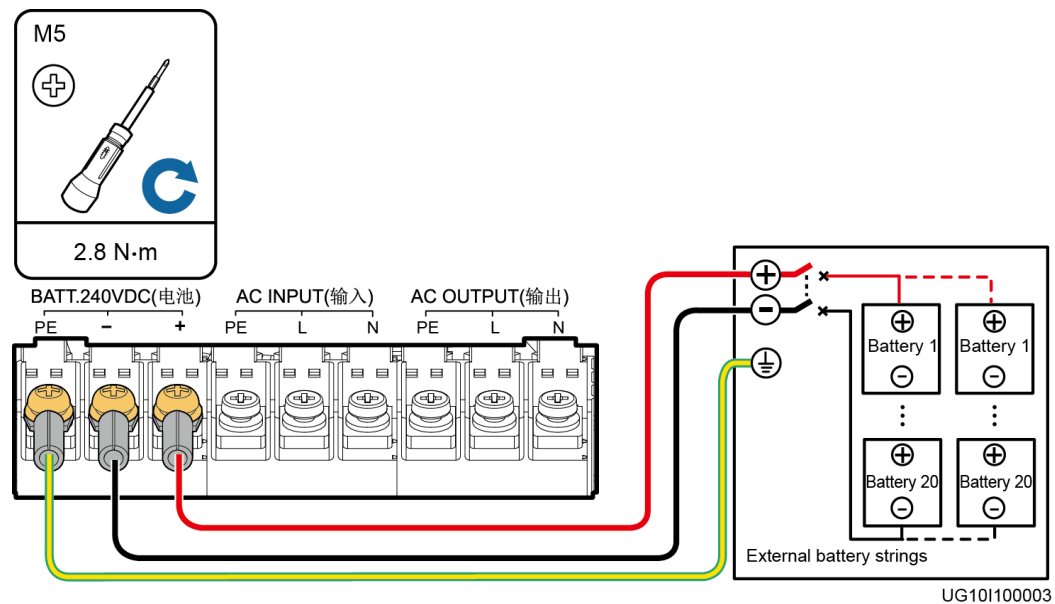
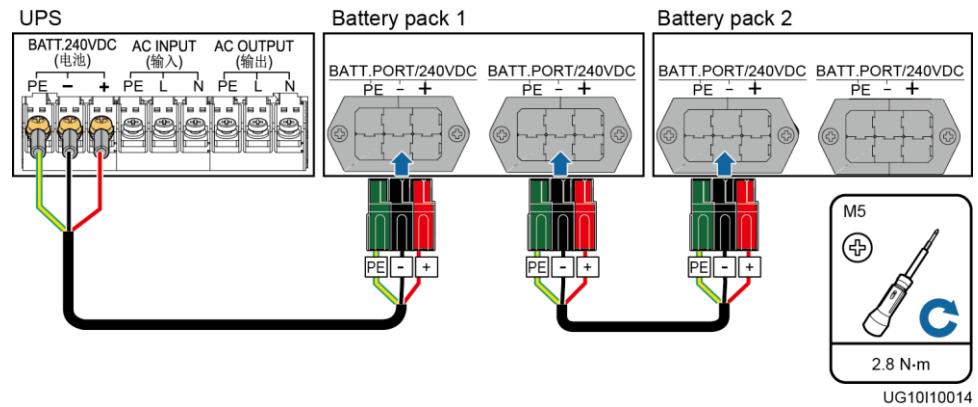


Figure 3-7 Battery pack cable connections



Step 5 Reinstall the cover of the AC input, output, and battery wiring terminals on the UPS.

----End

3.3 Installing a Backfeed Protection Device

3.3.1 Backfeed Protection Device Specifications

NOTICE

The UPS has no built-in backfeed protection device. It is advised to install a backfeed protection device on the input front side.

If you do not install a backfeed protection device on the input front side, attach a warning label to the main power isolation device. The label reads like this: "This circuit supplies power to the UPS. Before cable connection, disconnect the UPS, and check the voltage across wiring terminals."

When battery mode is unavailable or the mains fails, the UPS internal voltages or energy may flow back directly, or through a leakage path, to an input terminal. To minimize the risk of electric shocks, install a backfeed protection device on the input side.

[Table 3-3](#) lists the rated voltages and currents for backfeed protection contactors on the UPSs.

Table 3-3 Rated voltages and currents for backfeed protection contactors

Model	Rated Voltage/Current of Contacts of the Backfeed Protection Contactor	Recommended Backfeed Protection Device Model
UPS2000-A-6KRTL	220, 230, or 240 V AC, 40 A	LC1-D40A (Schneider contactor)
UPS2000-A-10KRTL	220, 230, or 240 V AC, 65 A	LC1-D50A (Schneider contactor)

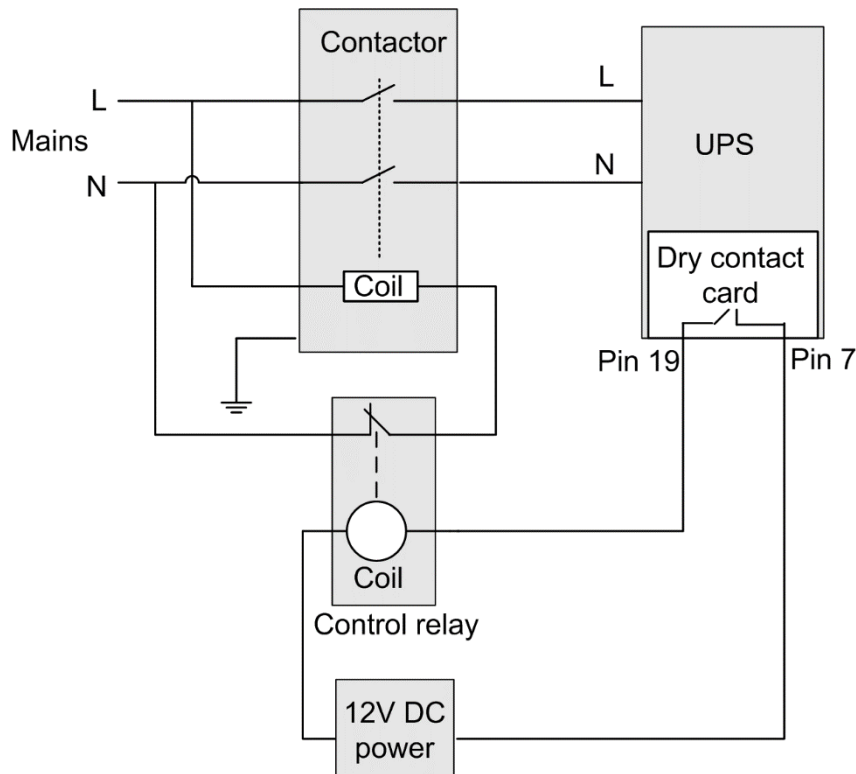
Table 3-4 Control relay parameters

Recommended Model	Parameters
HF18FF/012 (HONGFA control relay)	Dry contact: NC
MY2N-J DC12V (OMRON control relay)	Breaking capability: 250 V AC, 5 A
HJ2-L-DC12V (Panasonic control relay)	Coil: 12 V rated voltage; rated current of less than 1 A

3.3.2 Backfeed Protection Wiring Diagram (with Dry Contact Control)

Figure 3-8 shows the backfeed protection wiring diagram (with dry contact control).

Figure 3-8 Bypass backfeed protection wiring diagram for the 6 kVA/10 kVA (single-phase input single-phase output)



3.4 Check After Installation

Table 3-5 lists check items after installation.

Table 3-5 Post-installation check items

No.	Item	Expected Result
1	Cable routing	Cable routing meets engineering requirements.
2	Cable connections	Power cables and battery cables are tightened to specified torques using a torque wrench, connected correctly, and free of damage.
3	Cable connections for USB ports and network ports	Cables to USB ports and network ports are connected correctly and securely.
4	Cable labels	Labels are neatly attached to both ends of each cable, and the information on the labels is concise and understandable.
5	Ground cable connection	The ground cable is securely connected to the equipment room ground bar. Measure the resistance between the UPS ground cable and the equipment room ground bar, which must be less than 0.1 ohm.
6	Distances between cable ties	Distances between cable ties are the same, and no burr exists.
7	Operating environment	Clean the conductive air and other sundries.

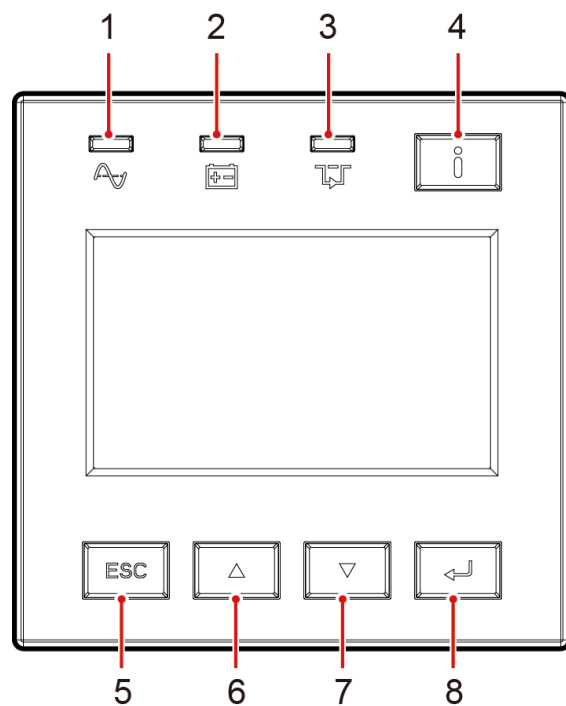
4 Control Panel

4.1 Panel Description

The UPS control panel is on the front panel. The control panel allows you to control and operate the UPS, view the running status, set parameters, and view alarms.

Figure 4-1 shows a control panel.

Figure 4-1 Control panel



UG10W00006

- | | | | |
|--------------------------|-----------------------|----------------------|--------------------------|
| (1) Mains indicator | (2) Battery indicator | (3) Bypass indicator | (4) Fault indicator |
| (5) Back/Shutdown button | (6) Up button | (7) Down button | (8) Confirm/Start button |

4.2 Indicators

Table 4-1 describes the indicators on the control panel.

Table 4-1 Indicator description

Indicator	Color	Status	Meaning
Mains indicator	Green	On	The UPS is in normal mode.
		Off	The UPS is not in normal mode.
Battery indicator	Yellow	On	The UPS is in battery mode.
		Off	The UPS is not in battery mode.
		Blinking	The remaining battery capacity is less than 25%.
Bypass indicator	Yellow	On	The UPS is in bypass mode.
		Off	The UPS is not in bypass mode.
Fault indicator	Red	On	The UPS generates an critical alarm.
		Blinking	The UPS generates an minor alarm.
		Off	The UPS is running properly.

NOTE







The UPS is in ECO mode when the mains indicator and bypass indicator are both on.

4.3 Functional Buttons

The control panel provides four buttons to start and shut down the UPS and set parameters. Table 4-2 describes the buttons.

Table 4-2 Button description

Button	Meaning	Description
ESC	Shutdown/Back	<ul style="list-style-type: none"> On the default screen, press ESC for more than 5 seconds. Release the button when you hear a beep sound. The inverter shuts down. On any other screen, press ESC to return to the upper-level menu (the default screen is the upper-level screen for the main menu screen).
▲	Up	Press ▲ or ▼ to scroll upward or downward.
▼	Down	You can set a value by using the list or step increase or decrease.

Button	Meaning	Description
	Enter/Startup/Battery Self-Check/Mute	<ul style="list-style-type: none"> On the default screen in bypass mode, hold down  for more than 5 seconds. Release the button when you hear a beep sound. The UPS starts. On the default screen, press . The main menu is displayed. On any menu screen, press . The lower-level menu is displayed. If the menu is the last level, an information screen is displayed. On the default screen in normal mode, hold down  for more than 5 seconds. Release the button when you hear a beep sound. The battery test starts. When the buzzer buzzes, hold down  for 2–5 seconds. The buzzer is muted when you release the button.

 **NOTE**


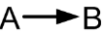
- Battery self-check: After the UPS starts in normal mode, it transfers to battery mode for 10 seconds to check that the battery status (if no battery is connected, **16-1** no battery alarm is displayed) and that the UPS can transfer to battery mode. The purpose is to prevent power backup failure when the UPS needs to transfer to battery mode.
- If you do not press any button within 60 seconds, the default screen is displayed.

4.4 LCD

The LCD displays the UPS running data and alarm information, and allows you to set parameters and control operation. The backlight turns off if you do not press any button within 30 seconds.

4.5 LCD Startup Screens

Table 4-3 Symbol conventions

Symbol	Description
	Press A.
	Press B after you press A.

NOTE

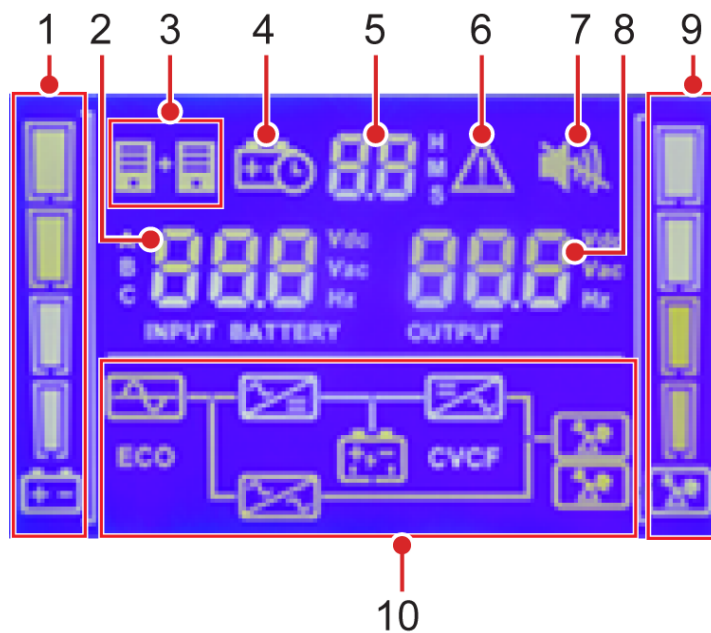
The symbol conventions apply to all chapters in this document.

NOTICE

- The LCD snapshots in this document correspond to the software version V100. If any LCD changes are made, contact Huawei technical support to obtain the latest snapshots.
- The information in the menu pictures is for reference only.

Figure 4-2 shows a startup screen.


Figure 4-2 Description of the startup screen







UG10000018

Table 4-4 describes the menu icons, and Table 4-5 describes the working mode icons.

Table 4-4 Icons on the screen

No.	Meaning	Remarks
1	Battery information	Battery capacity  <ul style="list-style-type: none"> • Battery discharge status <ul style="list-style-type: none"> - (75%–100%]: Indicators 1, 2, and 3 are steady on, and indicator 4 blinks.

No.	Meaning	Remarks			
		<ul style="list-style-type: none"> - (50%–75%]: Indicators 1 and 2 are steady on, and indicator 3 blinks. - (25%–50%]: Indicator 1 is steady on, and indicator 2 blinks. - (0%–25%]: Indicator 1 blinks. - 0%: Indicators 1, 2, 3, and 4 are off. <ul style="list-style-type: none"> • Battery charge status <ul style="list-style-type: none"> - (95%–100%]: Indicators 1, 2, 3, and 4 are steady on. - (75%–95%]: Indicators 1, 2, and 3 are steady on, and indicator 4 blinks. - (50%–75%]: Indicators 1 and 2 are steady on, and indicator 3 blinks. - (25%–50%]: Indicator 1 is steady on, and indicator 2 blinks. - (0%–25%]: Indicator 1 blinks. 			
2	Input and battery voltages	Displays the input voltage, frequency, or battery voltage based on the power supply mode.			
4	Backup time	The indicator is on only when batteries discharge.			
5	Backup time or fault ID	Backup time or alarm ID.			
6	Alarm status	The indicator is steady on when a critical alarm is generated, blinks when a minor alarm is generated, and is off when no alarm is generated.			
7	Mute indicator	If the indicator is on, the buzzer is muted. If the indicator is off, the buzzer is not muted.			
8	Output voltage and frequency	Displays the output voltage and frequency based on the power supply mode.			
9	Load information	<p>Load rate</p>  <ul style="list-style-type: none"> • > 95%: Indicators 1, 2, 3, and 4 blink. • (75%–95%]: Indicators 1, 2, 3, and 4 are steady on. • (50%–75%]: Indicators 1, 2, and 3 are steady on. • (25%–50%]: Indicators 1 and 2 are steady on. • (0%–25%](excluding 0%): Indicator 1 is steady on. • 0%: Indicators 1, 2, 3, and 4 are off. 			
10	Working mode	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">No power supply (mains connected)</td> <td style="width: 33%;">Battery charging</td> <td style="width: 33%; text-align: center;">  </td> </tr> </table>	No power supply (mains connected)	Battery charging	
No power supply (mains connected)	Battery charging				








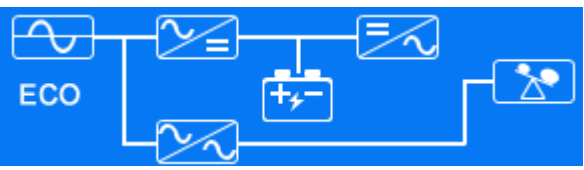










No.	Meaning	Remarks	
			Others 
	No power is supplied (batteries connected)	Battery discharging	
	Bypass mode	Battery charging	
		Others	
	Normal mode	Battery charging	
		Others	
	Battery mode	N/A	
	ECO mode	Battery charging	
		Others	

Table 4-5 Description of working mode icons

Symbol	Meaning
	Mains input
	Rectifier/PFC working
	Battery mode
	Battery charging
	Battery hibernation
	Inverter mode
	Bypass mode
	Load
	Energy-saving mode

4.5.1 Starting the UPS in Normal Mode

After the UPS is powered on, the LCD screen lights up for 1 second, and then initialization starts.

After the progress bar is complete, the default screen is displayed, as shown in [Figure 4-3](#).

Figure 4-3 Power-on and default screen



UG10000028


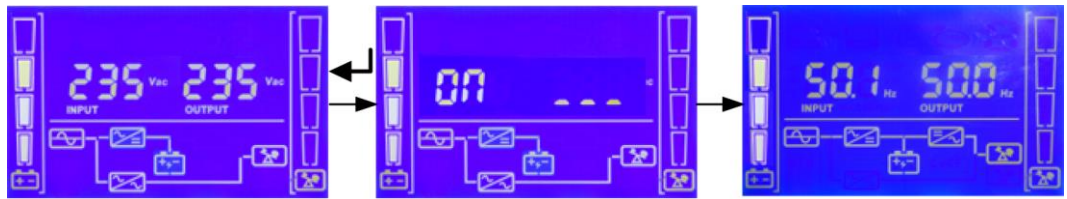
Press  for 5 seconds. Release the button when you hear a beep sound. The startup screen is displayed. After the UPS starts successfully, it enters normal mode, as shown in [Figure 4-4](#).

Figure 4-4 Normal mode



UG10000029

4.5.2 Starting the UPS in Battery Mode

After the UPS is powered on, press . Then, the LCD screen lights up. After the screen lights up for 1 second, initialization starts. After the initialization progress is complete, the default screen is displayed, as shown in [Figure 4-5](#).

Figure 4-5 Power-on and default screen



UG10000031

Press for 5 seconds. Release the button when you hear a beep sound. The startup screen is displayed. After the UPS starts successfully, it enters battery mode, as shown in [Figure 4-6](#).

Figure 4-6 Battery mode



UG10000030

4.6 LCD Menu Hierarchy

Letter and LCD display mapping

[Table 4-6](#) lists the mapping between letters and the LCD display.

Table 4-6 Letter and LCD display mapping

Letter	LCD Display	Letter	LCD Display	Letter	LCD Display	Letter	LCD Display
A	<i>A</i>	F	<i>F</i>	N	<i>N</i>	T	<i>T</i>
B	<i>b</i>	G	<i>G</i>	O	<i>O</i>	U	<i>U</i>
C	<i>C</i>	H	<i>H</i>	P	<i>P</i>	V	<i>V</i>
D	<i>d</i>	I	<i>I</i>	R	<i>r</i>	Y	<i>Y</i>
E	<i>E</i>	L	<i>L</i>	S	<i>S</i>	N/A	N/A

Number and LCD display mapping

Table 4-7 lists the mapping between numbers and the LCD display.





Table 4-7 Number and LCD display mapping

Number	LCD Display	Number	LCD Display	Number	LCD Display	Number	LCD Display
0	<i>0</i>	3	<i>3</i>	6	<i>6</i>	9	<i>9</i>
1	<i>1</i>	4	<i>4</i>	7	<i>7</i>	N/A	N/A
2	<i>2</i>	5	<i>5</i>	8	<i>8</i>	N/A	N/A

LCD Main Menus

The LCD main menus include the control menu, setting menu, active alarm display menu, and historical alarm display menu. Table 4-8 lists the display mapping.






Table 4-8 LCD main menus

LCD Display No.	Actual Display	Acronym and Abbreviation	Meaning
01		CTR	Control menu
02		SET	Setting menu
03		ACT ALR	Active alarm display menu
04		HIS ALR	Historical alarm display menu

Control Menu

Table 4-9 lists the mapping between the control menu and the LCD display.








Table 4-9 Control menu









LCD Display No.	Actual Display	Acronym and Abbreviation	Meaning
01		INV ON	Starts the UPS.
02		INV OFF	Shuts down the UPS.
03		ALR CLR	Clears ADMC alarms.
04		BAT RPL	Replaces batteries.
05		DEF RST	Restores default settings.

Setting Menu

Table 4-10 lists the mapping between the setting menu and the LCD display.

Table 4-10 Setting menu

LCD Display No.	Actual Display	Acronym and Abbreviation	Meaning
01		VOT	Output voltage level
02		FRE	Output frequency system
03		BVU	Maximum bypass voltage
04		BVL	Minimum bypass voltage
05		NO.	Number of batteries
06		CAP	Total battery capacity
07		CL	Charge current limit

LCD Display No.	Actual Display	Acronym and Abbreviation	Meaning
08		EOD	EOD mode
09		DT	Discharge time protection setting
10		ECO	ECO mode enabling
11		VU	Maximum ECO voltage
12		VL	Minimum ECO voltage
13		FR	ECO frequency range
14		DSP	DSP version number
15		CPL	CPLD version number

4.6.1 Control Menu


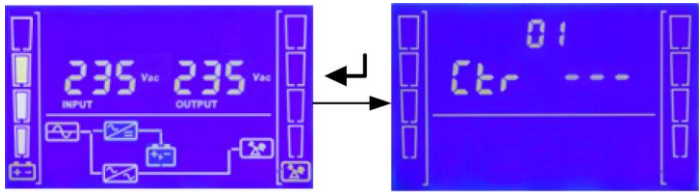
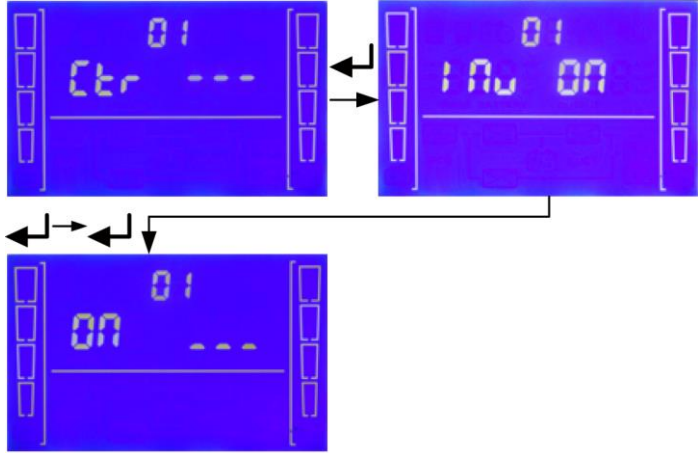
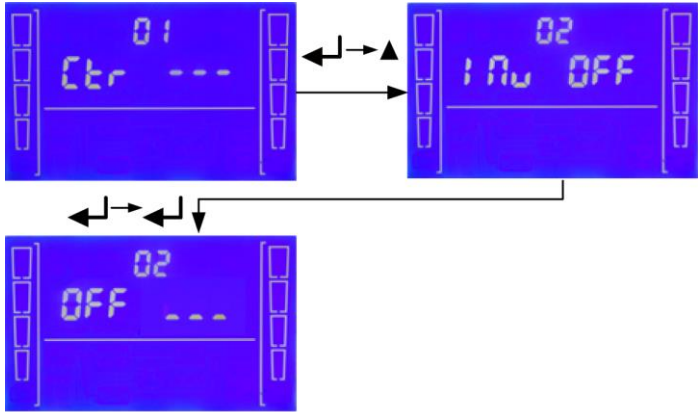
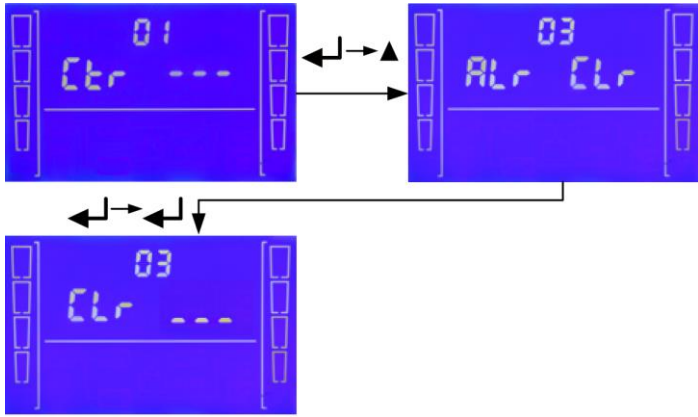
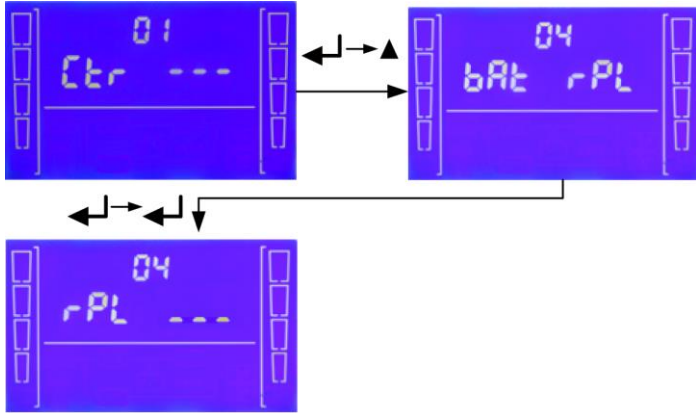
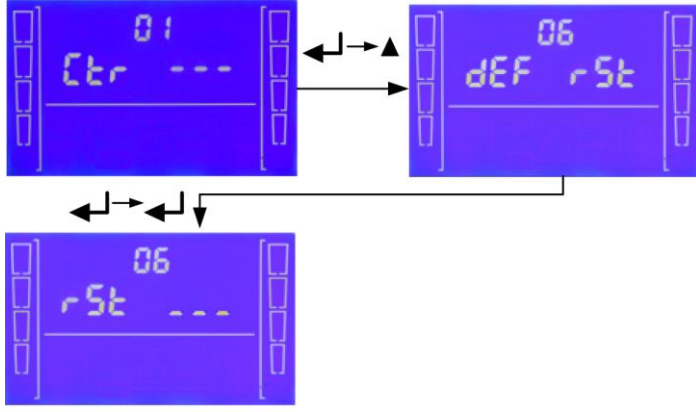
On the default screen, press  to enter the control menu, as shown in [Table 4-11](#).

Table 4-11 Control menu and parameters

Name	LCD	Function
Control menu	 <p style="text-align: right; font-size: small;">UG10000019</p>	Starts or shuts down the inverter, clears ADMC alarms, replaces batteries, and restores default settings.

Name	LCD	Function
Start	 <p>The LCD sequence for starting the inverter consists of three screens. Screen 01 displays 'Ctr ---'. Screen 02 displays 'Inu ON'. Screen 03 displays 'ON ---'. Arrows indicate the sequence from 01 to 02, and then 02 to 03.</p> <p style="text-align: right;">UG10000020</p>	Starts the inverter manually.
Shutdown	 <p>The LCD sequence for shutting down the inverter consists of three screens. Screen 01 displays 'Ctr ---'. Screen 02 displays 'Inu OFF'. Screen 03 displays 'OFF ---'. Arrows indicate the sequence from 01 to 02, and then 02 to 03.</p> <p style="text-align: right;">UG10000021</p>	Shuts down the inverter manually.
Clear ADMC Alarms	 <p>The LCD sequence for clearing ADMC alarms consists of three screens. Screen 01 displays 'Ctr ---'. Screen 03 displays 'ALr CLR'. Screen 04 displays 'CLR ---'. Arrows indicate the sequence from 01 to 03, and then 03 to 04.</p> <p style="text-align: right;">UG10000022</p>	Clears ADMC alarms.

Name	LCD	Function
Replace Batteries	 <p style="text-align: right; font-size: small;">UG10000023</p>	Clears all the battery data after you replace batteries.
Restore Default Settings	 <p style="text-align: right; font-size: small;">UG10000025</p>	Restores default settings after you shut down the inverter.

4.6.2 Setting Menu

⚠ CAUTION

The configured number of batteries must match the actual number. When the actual number changes, change the configured number. If the configured number is less than the actual number, the battery lifespan is shortened. If the configured number is greater than the actual number, battery leakage may cause a fire.






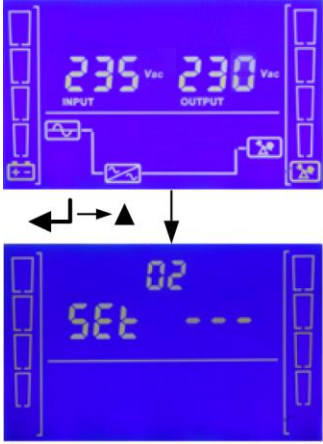
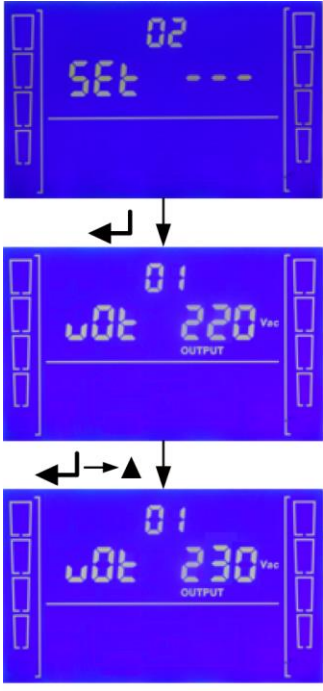
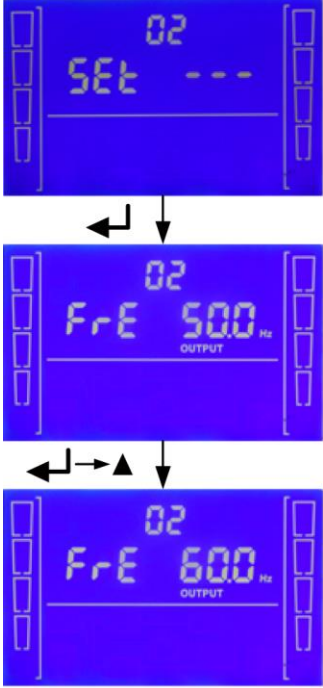
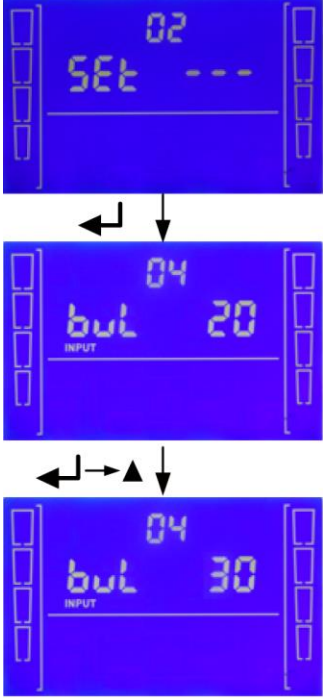
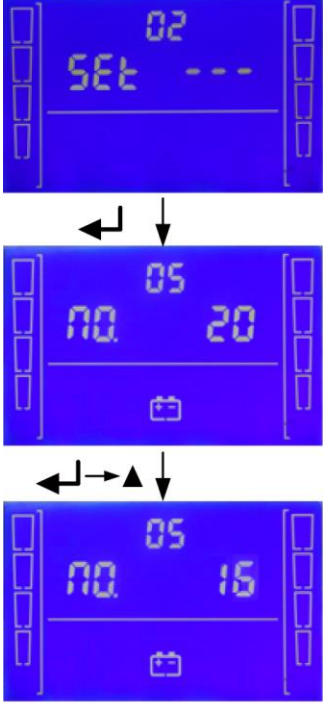
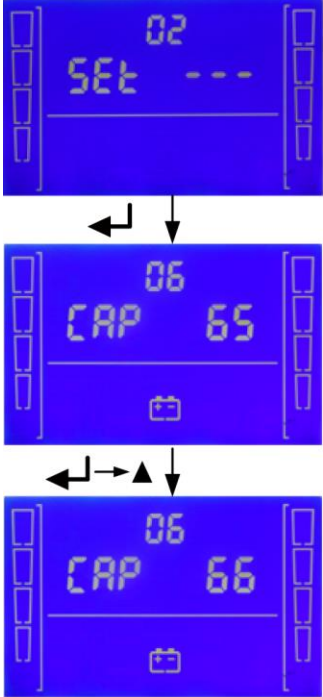
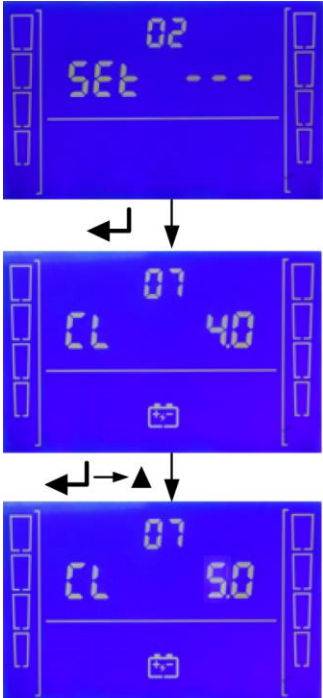
On the default screen, press  and then  to enter the setting menu, as shown in [Table 4-12](#). On the parameter setting screen, press  and then  to select a parameter and press .

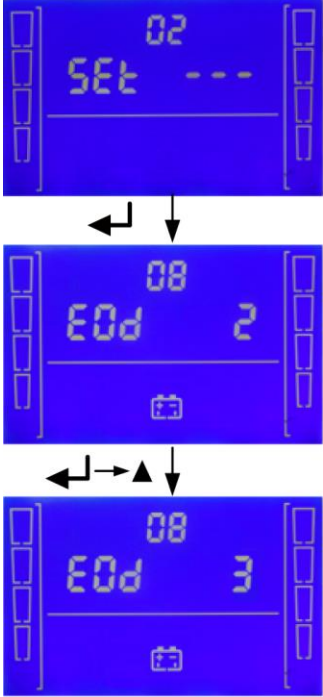
Table 4-12 Parameter settings

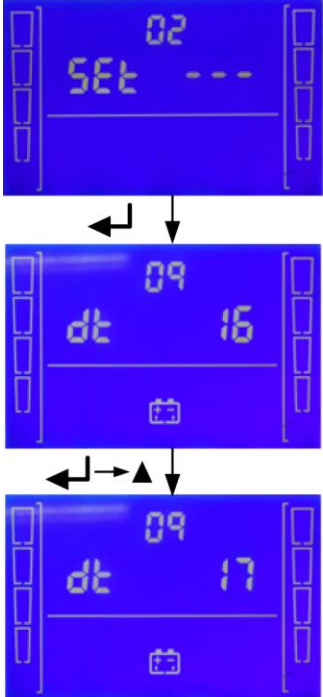
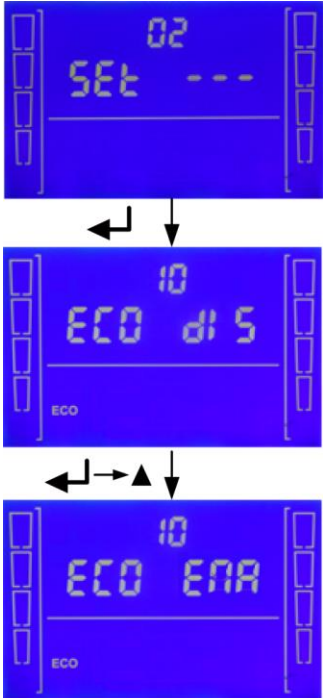
Name	Screen	Function	Value Range	Preset Value	Remarks
Setting menu	 <p style="text-align: right; font-size: small;">UG10000037</p>	Set parameters.	N/A	N/A	N/A
Output voltage level	 <p style="text-align: right; font-size: small;">UG10000038</p>	Set the system output voltage level. After you change the voltage level, the upper bypass voltage threshold is restored to the default value 15%.	220 V, 230 V, and 240 V	220 V	The value is configurable only after the inverter shuts down.

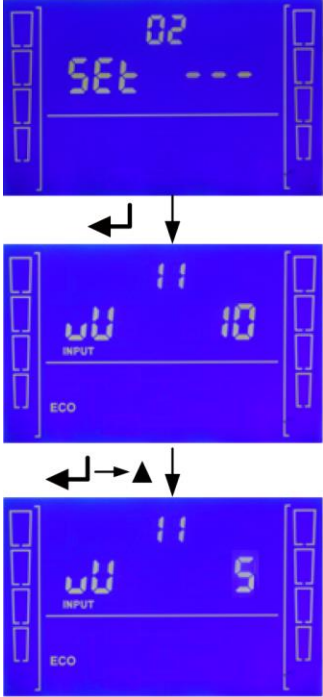
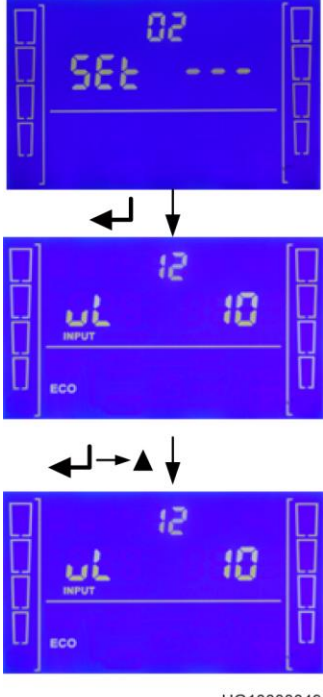
Name	Screen	Function	Value Range	Preset Value	Remarks
Output frequency system	 <p style="text-align: right; font-size: small;">UG10000039</p>	<p>Set the system output frequency level. If the value is Automatic, the power-on bypass frequency ranges from 45 Hz to 55 Hz, and the system output frequency is 50 Hz; if the power-on bypass frequency ranges from 55 Hz to 65 Hz (excluding 55 Hz), the system output frequency is 60 Hz.</p>	<p>50 Hz, 60 Hz, and AUT (automatic)</p>	<p>50 Hz</p>	<p>The value is configurable only after the inverter shuts down.</p>
Upper voltage threshold	 <p style="text-align: right; font-size: small;">UG10000040</p>	<p>Upper threshold for the bypass voltage. When the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable. This parameter is associated with the system voltage level.</p>	<ul style="list-style-type: none"> • If the voltage system is 220 V, the values include 10%, 15%, 20%, and 25%. • If the voltage system is 230 V, the values include 10%, 15%, and 20%. • If the voltage system is 240 V, the 	<p>15%</p>	<p>The value is configurable only after the inverter shuts down.</p>

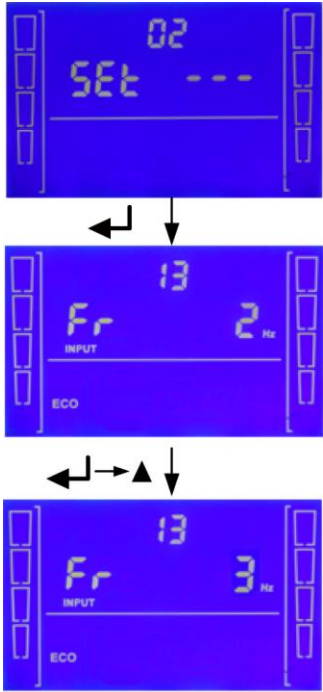


Name	Screen	Function	Value Range	Preset Value	Remarks
Lower voltage threshold	 <p style="text-align: center;">UG10000041</p>	<p>Lower threshold for the bypass voltage. When the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable.</p>	<p>values include 10% and 15%. 10%, 20%, 30%, 40%, 50%, and 60%</p>	<p>20%</p>	<p>The value is configurable only after the inverter shuts down.</p>
Number of batteries	 <p style="text-align: center;">UG10000042</p>	<p>Set the number of batteries.</p>	<p>16–20</p>	<p>16</p>	<p>The value is configurable in non-battery mode or non-battery ECO mode.</p>

Name	Screen	Function	Value Range	Preset Value	Remarks
Total battery capacity	 <p style="text-align: right; font-size: small;">UG10000043</p>	Set the battery capacity. (The battery capacity is the total capacity of battery strings and is set based on the actual capacity.)	7–999 Ah	<ul style="list-style-type: none"> • 6 kVA with long backup time: 40 Ah • 10 kVA with long backup time: 65 Ah 	The value is configurable in non-battery mode or non-battery ECO mode.
Charge current limit	 <p style="text-align: right; font-size: small;">UG10000044</p>	Maximum charge current in equalized charge mode. The interval is 0.5 A.	1.0–12.0 A	2.0 A	The parameter is configurable in any mode.

Name	Screen	Function	Value Range	Preset Value	Remarks
EOD mode	 <p style="text-align: right; font-size: small;">UG10000045</p>	Determines the power backup time	<ul style="list-style-type: none"> • 1 (Backup time first: protect key services first and provide a long backup time) • 2 (Battery first: protect batteries and extend the battery lifespan) • 3 (Balance mode) The default value is Backup time first. 	2	The value is configurable in non-battery mode or non-battery ECO mode.

Name	Screen	Function	Value Range	Preset Value	Remarks
Discharge time protection setting	 <p style="text-align: right; font-size: small;">UG10000046</p>	Set the maximum discharge time. When the discharge time reaches the value, the system powers off. If you set the value to 0, the discharge time is not limited.	0–24 hours	16 hours	The value is configurable in non-battery mode or non-battery ECO mode.
ECO mode enabling	 <p style="text-align: right; font-size: small;">UG10000047</p>	Indicates whether to allow a single UPS to work in ECO mode.	DIS (disabled) and ENA (enabled)	DIS	The value is configurable only after the inverter shuts down.

Name	Screen	Function	Value Range	Preset Value	Remarks
Upper voltage threshold	 <p style="text-align: right; font-size: small;">UG10000048</p>	<p>Upper threshold for the ECO voltage. In ECO mode, when the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the ECO voltage is abnormal and transfers to normal mode.</p>	<p>5%, 6%, 7%, 8%, 9%, and 10%</p>	<p>10%</p>	<p>The value is configurable only after the inverter shuts down.</p>
Lower voltage threshold	 <p style="text-align: right; font-size: small;">UG10000049</p>	<p>Lower threshold for the ECO voltage. In ECO mode, when the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the ECO voltage is abnormal and transfers to normal mode.</p>	<p>5%, 6%, 7%, 8%, 9%, and 10%</p>	<p>10%</p>	<p>The value is configurable only after the inverter shuts down.</p>

Name	Screen	Function	Value Range	Preset Value	Remarks
Frequency range	 <p style="text-align: center;">UG10000050</p>	<p>ECO frequency range. In ECO mode, when the difference between the bypass frequency and the rated frequency is greater than this range, the system determines that the ECO frequency is abnormal and transfers to normal mode.</p> <p>The frequency range must be less than the bypass frequency range.</p>	±0.5 Hz, ±1 Hz, ±2 Hz, and ±3 Hz	2 Hz	The value is configurable only after the inverter shuts down.
DSP version number		DSP version number, which can be viewed and cannot be set	N/A	N/A	The version number only can be viewed and cannot be set.
CPLD version number		CPLD version number, which can be viewed and cannot be set	N/A	N/A	The version number only can be viewed and cannot be set.

4.6.3 Active Alarm Display Menu




On the default screen, press  and then  to enter the active alarm display menu, as shown in [Figure 4-7](#).

Figure 4-7 Active alarm display menu



NOTE

When the buzzer buzzes, hold down  for 2–5 seconds, and then release the button to mute the buzzer. After the buzzer is muted, the alarm tone is unrecoverable unless a new alarm is generated.




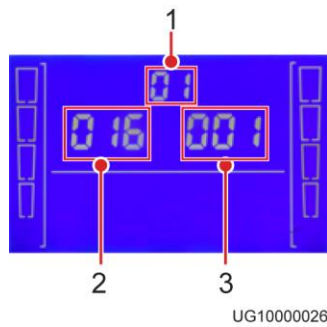
Alarms are classified into critical alarms and minor alarms. On the active alarm display menu, press  and then  or  to view active alarm information, including the alarm No, alarm ID, and alarm cause ID, as shown in [Figure 4-8](#).

Figure 4-8 Active Alarms Screen



(1) Active alarm No.

(2) Alarm ID

(3) Alarm cause ID

4.6.4 Historical Alarms Display Menu



On the default screen, press  and then  to enter the historical alarm display menu, as shown in [Figure 4-9](#).

Figure 4-9 Historical alarm display menu






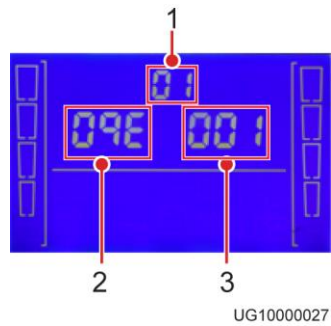
On the historical alarm display menu, press  and then  or  to view the latest 10 alarms, including the alarm No, alarm ID, and alarm cause ID, as shown in [Figure 4-10](#).

Figure 4-10 Historical alarms



(1) Historical alarm No.

(2) Alarm ID

(3) Alarm cause ID

5 Operations

5.1 Checking Before Powering On the UPS

- AC power cable colors comply with local electrical regulations.
- No short circuits occur in inputs and outputs.
- Cables are securely connected.
- Battery cables are correctly connected to battery terminals. The battery voltage meets the requirements.
- Cables are properly connected between the UPS and batteries.
- Input circuit breakers and load circuit breakers are OFF.
- Power cables and signal cables are correctly identified.
- The input phase sequence is correct.
- Cables are neatly routed and securely bound.
- Devices are installed and cables are routed in ways that facilitate modification, capacity expansion, and maintenance.
- Parallel cables are properly connected.
- The UPS is properly grounded.
- The voltage between the neutral wire and the ground cable is less than 5 V AC.
- The input voltage rang for the mains to start the UPS is 120–280 V AC (or 80–280 V AC after the UPS powers on). The battery voltage range is (Number of batteries x 10.8)–280 V DC.

5.2 Single UPS Operations

5.2.1 Starting the UPS





CAUTION

The number of batteries set on the LCD for the UPS with long backup time should be consistent with the actual number. If batteries are added or removed, change the related parameters on the LCD accordingly. The battery lifespan will be shortened if the value on the LCD is less than the actual number, or a battery leakage or even a fire disaster may occur if the value is greater.

NOTICE

- The parameter values in the screenshots are for reference only. Set the parameters as required.
- Set the voltage level and frequency based on the rated voltage and frequency. In the case of single-phase output, set the voltage level to 220 V (default), 230 V, or 240 V.
- Battery parameters are configurable for the UPS with long backup time in non-battery mode or non-battery ECO mode.
- Set the number of batteries based on the actual battery capacity. The default value is 16 and the value range is 16 to 20.
- Set the battery capacity to the total capacity of all battery strings. The default values for the 6 kVA UPS with long backup time and 10 kVA UPS with long backup time is 40 Ah and 65 Ah respectively. The value range is 7 Ah to 999 Ah.

NOTE

To set a parameter, on the parameter setting screen, press  and then  or , and press  to confirm.

Starting the UPS in Normal Mode

- Step 1** If the battery circuit has a circuit breaker, switch on the external battery circuit breaker. If the battery circuit does not have a circuit breaker, connect battery cables.
- Step 2** Close the UPS upstream AC input circuit breaker and the AC input circuit breaker on the rear panel of the UPS.
- Step 3** After the LCD screen lights up for 1s, the initialization screen is displayed. After the progress bar is complete, the default screen is displayed, as shown in [Figure 5-1](#).

Figure 5-1 Power-on and default screen



UG10000028

- Step 4** Set the voltage level based on the actual output voltage. The voltage level can be set to 220 V (default), 230 V, or 240 V.

Figure 5-2 Setting the voltage level



UG10000054

Step 5 Set the system output frequency level based on the rated frequency. The values include 50 Hz (default), 60 Hz, and Automatic.

Figure 5-3 Setting the output frequency level



UG10000055

Step 6 Set the number of batteries. The default value is 16 for the 6 kVA/10 kVA UPS with long backup time. The value range is 16 to 20. Set the parameter to the actual number of batteries.

Figure 5-4 Setting the number of batteries



UG10000056

Step 7 Set the battery capacity to the total capacity of all battery strings. The default values for the 6 kVA UPS with long backup time and 10 kVA UPS with long backup time is 40 Ah and 65 Ah respectively. The value range is 7 Ah to 999 Ah. Set the parameter to the actual battery capacity.

Figure 5-5 Setting the battery capacity



UG10000057

Step 8 Set the charge current limit. The default value for the 6 kVA/10 kVA UPS with long backup time is 2 A. The value range is 1 A to 12 A with an interval of 0.5 A. Set this parameter based on the actual situation.

Figure 5-6 Setting the charge current limit



UG10000076

Step 9 Start the UPS to work in normal mode by using one of the following methods.


- On the default screen, hold down  for more than 5 seconds. Release the button when you hear a beep sound. If the UPS starts successfully, it enters normal mode, as shown in [Figure 5-7](#).

Figure 5-7 Normal mode



UG10000029


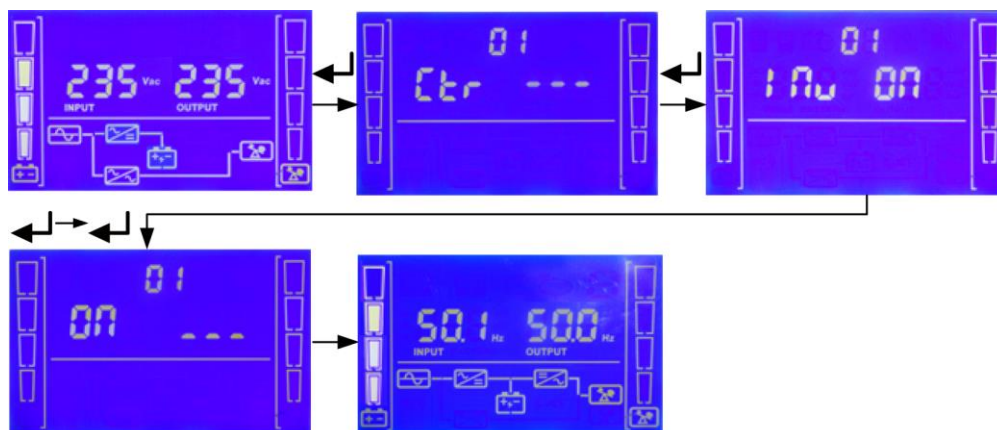
- On the standby screen, hold down  to enter the CTR menu. Select INV ON in the CTR menu. If the UPS starts successfully, it enters normal mode, as shown in [Figure 5-8](#).

Figure 5-8 Normal mode



UG10000032

Step 10 After checking that the system is running properly, turn on the load switch to start the load.


NOTE

To prevent triggering overload protection, start the loads with higher power and then loads with lower power.

----End

Starting the UPS in Battery Mode

Step 1 Close the external battery circuit breakers (if any), or connect battery cables.

Step 2 Press  on each control panel.

Step 3 After the LCD screen lights up for 1s, the initialization screen is displayed. After the progress bar is complete, the default screen is displayed, as shown in [Figure 5-9](#).

Figure 5-9 Power-on and default screen



UG10000031

Step 4 Set the voltage level based on the actual output voltage. The voltage level can be set to 220 V (default), 230 V, or 240 V.

Figure 5-10 Setting the voltage level



UG10000059

Step 5 Set the system output frequency level based on the rated frequency. The values include 50 Hz (default), 60 Hz, and Automatic.

Figure 5-11 Setting the voltage and frequency



Step 6 Set the number of batteries based on the actual battery capacity. The default value is 16 for the UPS with long backup time, and the value can range from 16 to 20.

Figure 5-12 Setting the number of batteries



Step 7 Set the battery capacity to the total capacity of all batteries actually connected. The default value is 40 Ah for the 6 kVA UPS with long backup time. The default value is 65 Ah for the 10 kVA UPS with long backup time, and the value can range from 7 Ah to 999 Ah.

Figure 5-13 Setting the battery capacity



Step 8 Set the charge current limit based on actual conditions. The default value is 2.0 A for the UPS with long backup time, and the value can range from 1.0 A to 12.0 A, the interval is 0.5 A.

Figure 5-14 Setting the charge current limit



Step 9 Start the UPS in normal mode by using one of the following methods:


- On the default screen, hold down  for more than 5 seconds. Release the button when you hear a beep sound. If the UPS starts successfully, it enters normal mode, as shown in [Figure 5-15](#).

Figure 5-15 Battery mode




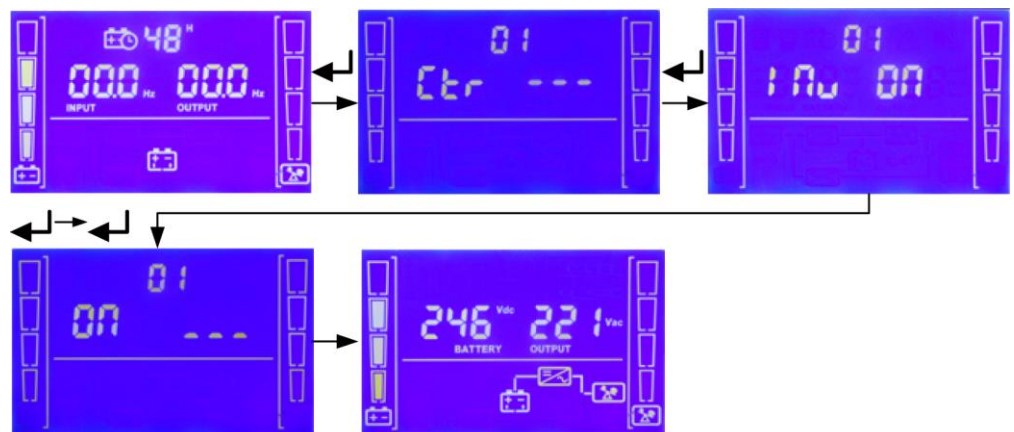
- On the standby screen, hold down  to enter the **CTR** menu. Select **INV ON** in the **CTR** menu. If the UPS starts successfully, it enters normal mode, as shown in [Figure 5-16](#).

Figure 5-16 Battery mode



Step 10 After checking that the system is running properly, turn on the load switch to start the load.

 **NOTE**

To prevent triggering overload protection, start the loads with higher power and then loads with lower power.

----End

5.2.2 Shutting Down the UPS

Shutting Down the Inverter to Transfer the UPS to Bypass Mode

To shut down the inverter, perform any of the following operations:

- On the default screen, hold down ESC for more than 5 seconds. Release the button when you hear a beep sound. The inverter shuts down, and the UPS transfers to bypass mode.


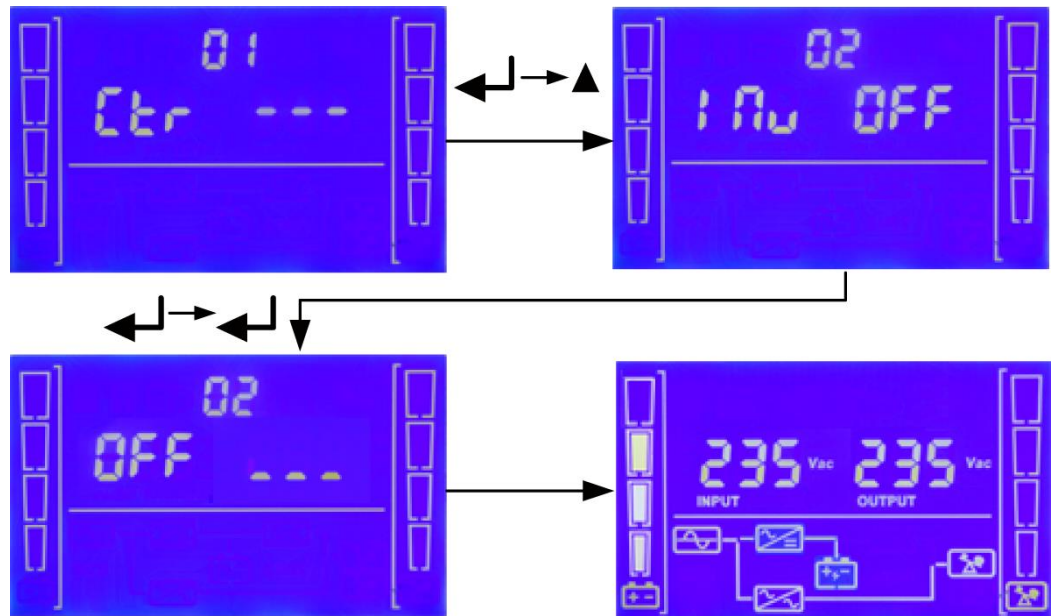
- On the default screen, press  to enter the **CTR** menu. Choose **INV OFF** to shut down the inverter. The UPS transfers to bypass mode, as shown in [Figure 5-17](#).

Figure 5-17 Shutting down the inverter



UG10000021

 **NOTE**

The two methods are called "shutdown operations" in this section.

Shutting Down the Inverter to Transfer the UPS to No Output State

- Step 1** Shut down the loads.
- Step 2** Perform "shutdown operations" on the UPS. The inverter shuts down, and the UPS transfers to bypass mode.
- Step 3** Turn off the UPS upstream AC input circuit breaker and the AC input circuit breaker on the rear of the UPS. After all indicators turn off and fans stop, the UPS shuts down and stops supplying power to loads.
- Step 4** If the battery circuit has a circuit breaker, turn off the external battery circuit breaker; if the battery circuit does not have a circuit breaker, disconnect battery cables.

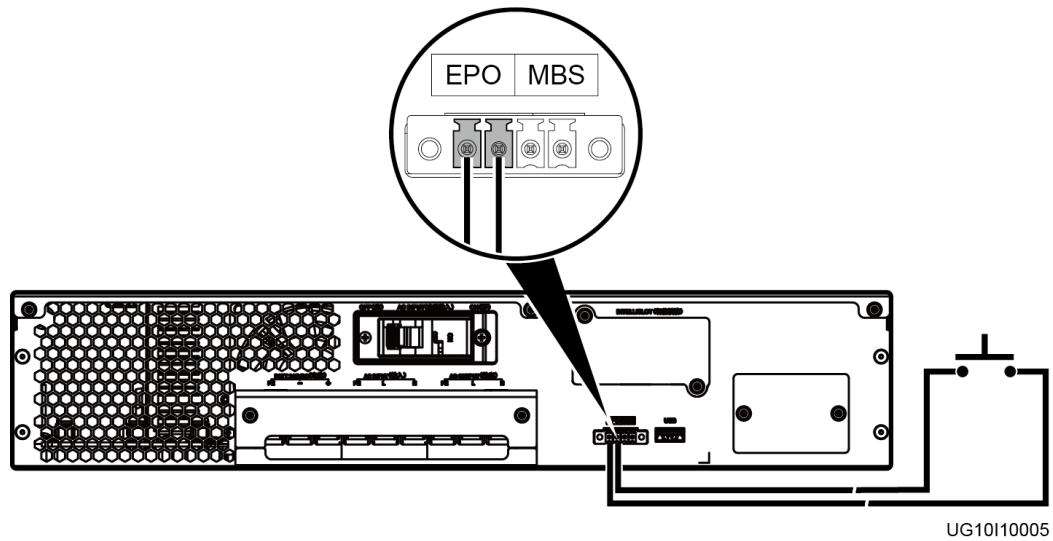
----End

5.2.3 Performing EPO

Turn on the EPO switch (provided by the customer). The UPS enters the EPO state. That is, the inverter shuts down, and the UPS will not transfer to bypass mode.

[Figure 5-18](#) shows the EPO cable connection on a single UPS.

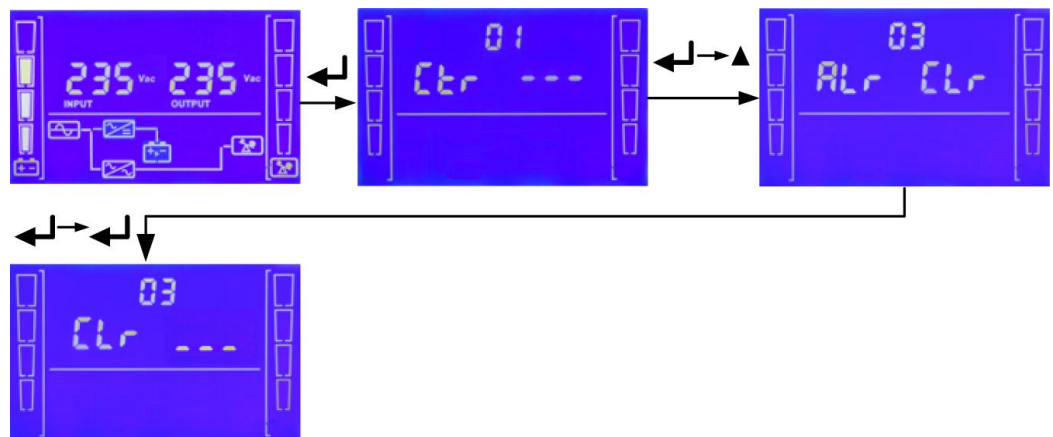
Figure 5-18 EPO cable connection on a single UPS



NOTE

- Connect an external switch to the EPO port on the UPS. After you turn on the switch, the inverter shuts down, and the UPS will not transfer to bypass mode. Output terminals completely power off, which meets the EPO purpose.
- The external EPO switch (switch or dry contact signals controlled by a switch) is provided by the customer.
- After performing EPO, 55-1 critical alarm generated. When EPO expired, choose **CTR > ALR CLR** clears ADMC alarms on LCD, as shown in [Figure 5-19](#).

Figure 5-19 Clears ADMC alarms



6 Communications

6.1 Optional Communications Components

The optional communications components include the SNMP card, Modbus card, and dry contact card.

6.2 SNMP Card

The SNMP card is an optional monitoring component of the UPS. It provides SNMP agent and web management functions. The SNMP card allows users to remotely manage the UPS by using an NMS, NetEco, or a web browser on a computer network. A maximum of 16 users can manage the UPS online.

The SNMP card has an exquisite, advanced, and unique design, and features high performance and reliability. It has the following functions and features:

- Supports hot swap.
- Supports UPS2000-A.
- Adapts to the 10/100 Mbit/s fast Ethernet (FE).
- Supports SNMP, HTTP (you are advised to use HTTPS because HTTP has potential risks), HTTPS, and SSH.
- Supports SNMP agent V1, V2c, and V3. The UPS MIB library can be downloaded from its own web page, instead of any CD-ROM.
- Enables remote management on Windows or Linux using a web browser. The supported web browsers include Internet Explorer 8, Internet Explorer 9, Internet Explorer 10, Internet Explorer 11, Firefox 17.0.1, and Chrome 23.0.1271.97.
- Provides an access security mechanism, assigns rights to users based on roles, and implements IP address control over HTTPS, SNMPv3, and SNMP access to prevent unauthorized access.
- Provides comprehensive UPS management, such as producing a current diagram, displaying alarms, controlling UPS running, collecting performance data statistics, as well as allowing users to view, retrieve, and export historical alarms and operation logs.
- Supports optional components such as temperature and humidity modules.
- Supports connection to a GSM modem so that information including the UPS operating status and fault alarms can be sent and received via short message service (SMS).

- Works with NetShutdown, a computer and server security shutdown program developed by Huawei, to automatically shut down the computers and servers where NetShutdown is installed to protect customer data and reduce loss.

For details about the SNMP card, see the *RMS-SNMP01A V100R002 User Manual*.

6.3 Modbus Card

The RMS-MODBUS01A provides an RS485 networking solution to remotely manage the UPS.

The card implements the following functions by setting the DIP switches:

- Selects the Modbus protocol by using a DIP switch over the RS485 communications protocol.
- Uses a DIP switch to select a two-wire or four-wire system.
- Provides a DIP switch to select a build-out resistor.
- Provides a DIP switch for setting the optional card address.
- Supports hot swap.

For details about the Modbus card, see the *RMS-Modbus01A User Manual*.

6.4 Dry Contact Card

The RMS-RELAY01A is installed in an optional card slot and supports hot swap.

The dry contact card provides six alarm dry contact outputs (normal mode, battery mode, bypass mode, low battery voltage, bypass backfeed, and UPS faults) and two dry contract control inputs (one is the shutdown signal input, and the other is reserved).

For details about the dry contact card, see the *RMS-RELAY01A User Manual*.

7 Routine Maintenance

7.1 UPS Maintenance

NOTICE

- Only trained personnel are allowed to perform maintenance. Before performing operations on a device, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Do not wear jewelry or watches during the operation to avoid electric shocks or burns.
- Use insulated tools when maintaining internal devices. Only trained personnel are allowed to perform maintenance.
- Maintain UPSs regularly based on the following requirements. Otherwise, the UPSs may fail to operate properly and the lifespan may be shortened.

7.1.1 Monthly Maintenance

Table 7-1 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)	<ul style="list-style-type: none">• If the humidity and temperature are abnormal, check the air conditioner status.• If the input voltage is abnormal, check the power grid status and input cable connection.
Control panel	Check that all units are operating properly by observing the status icons on the LCD, all operating parameters are within their normal ranges, and no fault or alarm information is displayed.	If an alarm is present, rectify the fault by checking the device status and parameters.

7.1.2 Quarterly Maintenance

Table 7-2 Quarterly 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) 	<ul style="list-style-type: none"> If the humidity and temperature are abnormal, check the air conditioner status. If the input voltage is abnormal, check the power grid status and input cable connection.
Control panel	Check that all units are operating properly by observing the status icons on the LCD, all operating parameters are within their normal ranges, and no fault or alarm information is displayed in active alarm or historical alarms.	If an alarm is present, rectify the fault by checking the device status and parameters.
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Clean the dust, especially in the front panel.
Parameter	Check the output voltage level and frequency, the number of batteries and the actual battery capacity.	Reset the parameters.
Power cables and terminals (between the UPS and external power distribution equipment)	The insulation layer of cables are intact and terminals are free from noticeable sparks.	<ul style="list-style-type: none"> Replace the cables. Secure the output terminals.

7.1.3 Yearly Maintenance

Table 7-3 Yearly 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) 	<ul style="list-style-type: none"> If the humidity and temperature are abnormal, check the air conditioner status. If the input voltage is abnormal, check the power grid status and

Check Item	Expected Result	Troubleshooting
		input cable connection.
Control panel	Check that all units are operating properly by observing the status icons on the LCD, all operating parameters are within their normal ranges, and no fault or alarm information is displayed in active alarm or historical alarms.	If an alarm is present, rectify the fault by checking the device status and parameters.
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Clean the dust, especially in the front panel.
Parameter	Check the output voltage level and frequency, the number of batteries and the actual battery capacity.	Reset the parameters.
Power cables and terminals (between the UPS and external power distribution equipment)	The insulation layer of cables are intact and terminals are free from noticeable sparks.	<ul style="list-style-type: none"> • Replace the cables. • Secure the output terminals.
EPO (if configured)	Check the reliability of the EPO cable connection.	Secure the terminals.

7.2 Battery Maintenance

NOTICE

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

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

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

7.2.1 Precautions

- Before battery maintenance, get the tools, such as handles, insulated. Do not place metal tools on exposed battery terminals.
- Never use any organic solvent to clean batteries.
- Never try to remove the safety valve or fill anything into batteries.
- Never smoke or use fire around batteries.
- After battery discharge, charge batteries within 24 hours to ensure a required battery capacity.
- Only professionals are allowed to perform maintenance tasks.

7.2.2 Monthly Maintenance

Table 7-4 Monthly maintenance tasks

Item	Expected Result	Measures
Battery alarm	No battery alarm is generated.	Identify the cause based on the alarm information.
Battery appearance	<ol style="list-style-type: none"> 1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt. 	<ol style="list-style-type: none"> 1. Take photos of any deformed or faulty parts of batteries. 2. Check and record the charge voltage and current of the battery string as well as the voltage of each battery. 3. Check the battery surface temperature. 4. Keep deformed and bulged faulty batteries still for 30 minutes and then check and record open-circuit voltage of the faulty battery. 5. If the fault persists, contact Huawei technical support.
Battery operating temperature	<ol style="list-style-type: none"> 1. The service temperature of a working battery does not exceed 45°C. 2. The battery ambient temperature is 25±5°C. 	<ol style="list-style-type: none"> 1. Identify the cause of the abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.

7.2.3 Quarterly Maintenance

Table 7-5 Quarterly maintenance tasks

Item	Expected Result	Measures
Battery alarm	No battery alarm is generated.	Identify the cause based on the alarm information.

Item	Expected Result	Measures
Battery appearance	<ol style="list-style-type: none"> 1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt. 	<ol style="list-style-type: none"> 1. Take photos of any deformed or faulty parts of batteries. 2. Check and record the charge voltage and current of the battery string as well as the voltage of each battery. 3. Check the battery surface temperature. 4. Keep deformed and bulged faulty batteries still for 30 minutes and then check and record open-circuit voltage of the faulty battery. 5. If the fault persists, contact Huawei technical support.
Battery operating temperature	<ol style="list-style-type: none"> 1. The service temperature of a working battery does not exceed 45°C. 2. The battery ambient temperature is 25±5°C. 	<ol style="list-style-type: none"> 1. Identify the cause of the abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.
Battery specifications	Parameters settings of battery capacity, battery number, battery charge current limit setting values meet requirements and match the actual value.	Set parameters correctly

7.2.4 Yearly Maintenance

Table 7-6 Yearly maintenance tasks

Item	Expected Result	Measures
Battery alarm	No battery alarm is generated.	Identify the cause based on the alarm information.
Battery appearance	<ol style="list-style-type: none"> 1. The battery shell is intact, without acid leaks, deformation, or bulges. 2. The battery is free from dust or dirt. 	<ol style="list-style-type: none"> 1. Take photos of any deformed or faulty parts of batteries. 2. Check and record the charge voltage and current of the battery string as well as the voltage of each battery. 3. Check the battery surface temperature. 4. Keep deformed and bulged faulty batteries

Item	Expected Result	Measures
		<p>still for 30 minutes and then check and record open-circuit voltage of the faulty battery.</p> <p>5. If the fault persists, contact Huawei technical support.</p>
Battery operating temperature	<ol style="list-style-type: none"> 1. The service temperature of a working battery does not exceed 45°C. 2. The battery ambient temperature is 25±5°C. 	<ol style="list-style-type: none"> 1. Identify the cause of the abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.
Battery specifications	Parameters settings of battery capacity, battery number, battery charge current limit setting values meet requirements and match the actual value.	Set parameters correctly
Tightness of bolts on battery terminals	Battery terminals and cables are in good contact. (A torque wrench is used for checking the contact)	Tighten the terminals and ensure that battery terminals and cables are in good contact.
Battery voltage	<ul style="list-style-type: none"> • Equalized charging voltage: 14.1 V/cell ± 0.1 V/cell • Float charging voltage: 13.5 V/cell ± 0.1 V/cell 	<ol style="list-style-type: none"> 1. Check whether the equalized charging voltage and float charging voltage of a battery is 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.




8 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.

Table 8-1 lists the solutions to common faults.

Table 8-1 Solutions to common faults

No.	Symptom	Possible Cause	Measure
1	The mains switch is ON. The LCD does not display anything. The system does not perform self-tests.	<ul style="list-style-type: none"> The input power supply is not connected. The input voltage exceeds the limit. 	<ul style="list-style-type: none"> Check the input power cable connection. Use a multimeter to check that the UPS input voltage meets specifications.
2	The mains is normal, but the bypass indicator is off. The UPS runs in battery mode.	<ul style="list-style-type: none"> The mains switch is OFF. The input power cable is not securely connected. 	<ul style="list-style-type: none"> Turn on the mains switch. Check the input power cable connection.
3	The UPS does not report faults, but has no output voltage.	The output power cable is not securely connected.	Check the output power cable connection.
4	The UPS does not start after you press 	<ul style="list-style-type: none">  is not pressed long enough. 	<ul style="list-style-type: none"> Press  for more than 5 seconds until you hear a beep sound.

No.	Symptom	Possible Cause	Measure
		<ul style="list-style-type: none"> Overload occurs. 	<ul style="list-style-type: none"> Disconnect all loads, and restart the UPS.
5	The Mains indicator is off.	The mains voltage or frequency exceeds the UPS input range.	Use a multimeter to check that the input voltage and frequency meet specifications.
6	The battery discharge time is much less than the standard time.	<ul style="list-style-type: none"> Batteries are not fully charged. The battery performance deteriorates. 	<ul style="list-style-type: none"> Charge batteries for more than 8 hours when the mains is normal. Test the discharge time again. Contact local Huawei technical support to replace batteries.
7	Abnormal noises or smell is generated in the UPS cabinet.	The UPS is faulty.	Shut down the UPS immediately and cut off the input power supply. Contact local Huawei technical support.
8	The battery indicator is blinking yellow. The buzzer buzzes 1 second and then stops 1 second. The battery capacity is insufficient. The UPS is shutting down.	The remaining battery capacity is insufficient. The UPS is shutting down, and the loads are powering off.	<ul style="list-style-type: none"> Save load data immediately and power off critical loads. Connect UPS input terminals to the backup AC power supply.

9 Technical Specifications

9.1 Physical Parameters

Physical Parameters	Net weight	Dimensions (H x W x D)
6 kVA	11 kg	86 mm x 430 mm x 615 mm
10 kVA	11.5 kg	

9.2 Environmental Specifications

Item	6 kVA/10 kVA
Operating temperature	0–40°C
Humidity	0%–95% RH (non-condensing)
Altitude	< 1000 meters When the altitude is 1000–4000 meters, see IEC62040–3 to check how the UPS power is derated.
Storage and transportation temperature	–40°C to +70°C

9.3 Mains Input Electrical Specifications

Item	6 kVA/10 kVA
Input power cable	Single-phase (L/N) input + PE cable

Item	6 kVA/10 kVA
Rated input voltage	220 V AC, 230 V AC, or 240 V AC
Input voltage	80–280 V AC (When the voltage is 80–176 V AC, the load power is linearly derated to 40%–100%.)
Input frequency	45–55 Hz/55–65 Hz
Input power factor (100% load)	> 0.99
No-load loss	<ul style="list-style-type: none"> 6 kVA: < 54 W 10 kVA: < 90 W
Startup voltage	120–280 V AC
Diesel	Minimum: 1.5 times the UPS rated capacity

9.4 Bypass Input Electrical Specifications

Item	6 kVA/10 kVA
Bypass voltage range	<ul style="list-style-type: none"> Upper threshold: 10%, 15%, 20%, or 25% at 220 V AC Upper threshold: 10%, 15%, or 20% at 230 V AC Upper threshold: 10%, or 15% at 240 V AC Lower threshold: 10%, 20%, 30%, 40%, 50%, or 60%
Bypass frequency range	Maximum ± 5 Hz
Bypass overload capability	<ul style="list-style-type: none"> Load < 125%: The UPS continuously works. The input circuit breaker may trip in advance. 125% \leq load < 150%: The UPS stops power output after 1 minute. The input circuit breaker may trip in advance. Load \geq 150%: The UPS stops power output after 200 ms. The input circuit breaker may trip in advance (load is calculated based on the bypass currents).
Input mode	Single mains

9.5 Output Electrical Specifications

Item	6 kVA/10 kVA
Rated capacity	6 kVA/10 kVA

Item	6 kVA/10 kVA
Output power factor	0.9 (When the power factor ranges from 0.5 to 1, the UPS2000-A with inductive load is not derated. When the power factor ranges from 0.5 to 1, the UPS2000-A with 80%–100% capacitive load is linearly derated.)
Rated output voltage	220 V AC/230 V AC/240 V AC (selected by setting a voltage level on the LCD.)
Output voltage precision	±1%
Total harmonic distortion of the output voltage waveform (THDv)	<ul style="list-style-type: none"> ≤ 5% (configured with a residual current device (RCD) with a 0.7 power factor, and specified in the IEC62040 standards of THDv.) ≤ 2% (resistive load. Each harmonic meets the limit specified by the IEC62040.)
Crest factor	A maximum of 3:1
Overload capacity	<ul style="list-style-type: none"> Normal mode, 105%–125% load: The UPS transfers to bypass mode in 5 minutes if the bypass is normal or disconnects the output if the bypass is abnormal. Normal mode, 125%–150% load: The UPS transfers to bypass mode in 1 minute if the bypass is normal or disconnects the output if the bypass is abnormal. Normal mode, ≥ 150% load: The UPS transfers to bypass mode in 0.2 second if the bypass is normal or disconnects the output if the bypass is abnormal.
Dynamic voltage transient	±5%
Average frequency tracking rate	0.5–2 Hz/s for a single UPS

9.6 Battery Electrical Specifications

Item	6 kVA/10 kVA
Rated battery voltage	192–240 V DC
Number of batteries	12 V lead-acid batteries; a long backup time model connects to external battery packs with 16–20 batteries configured.
Leakage current	≤ 500 μA
Power backup time	<p>Determined by the battery capacity.</p> <ul style="list-style-type: none"> For the power backup time of the battery pack for the 6 kVA UPS, see Table 9-1.

Item	6 kVA/10 kVA
	<ul style="list-style-type: none"> For the power backup time of the battery pack for the 10 kVA UPS, see Table 9-2.
Parallel feature	A maximum of four battery strings are connected in parallel. That is, a maximum of four battery packs are installed.
Rated charger charge current	2 A by default; 1–12 A configurable, tolerance ± 0.5 A
Charger charge time	Determined by the battery capacity.
Rated charger charge voltage	<ul style="list-style-type: none"> 2.35 V/cell, equalized voltage 2.25 V/cell, float voltage

NOTE

- The backup time in the preceding table is for reference only.
- The BOM number of the ESS-240V12-7AhBPVBA01 battery pack is 02310PFD.
- The BOM number of the ESS-240V12-9AhBPVBA01 battery pack is 02310MWN.

Table 9-1 Backup time of the ESS-240V12-7AhBPVBA01 battery pack (6 kVA UPS; calculated based on 94% battery efficiency)

Load (%)	Load (W)	One Battery Pack (Min.)	Two Battery Packs (Min.)	Three Battery Packs (Min.)	Four Battery Packs (Min.)
100%	5400	6	19	29	46
80%	4320	9	25	43	57
50%	2700	19	46	68	92
30%	1620	36	77	120	174

Figure 9-1 Backup time curve of the ESS-240V12-7AhBPVBA01 battery pack (6 kVA UPS; calculated based on 94% battery efficiency)

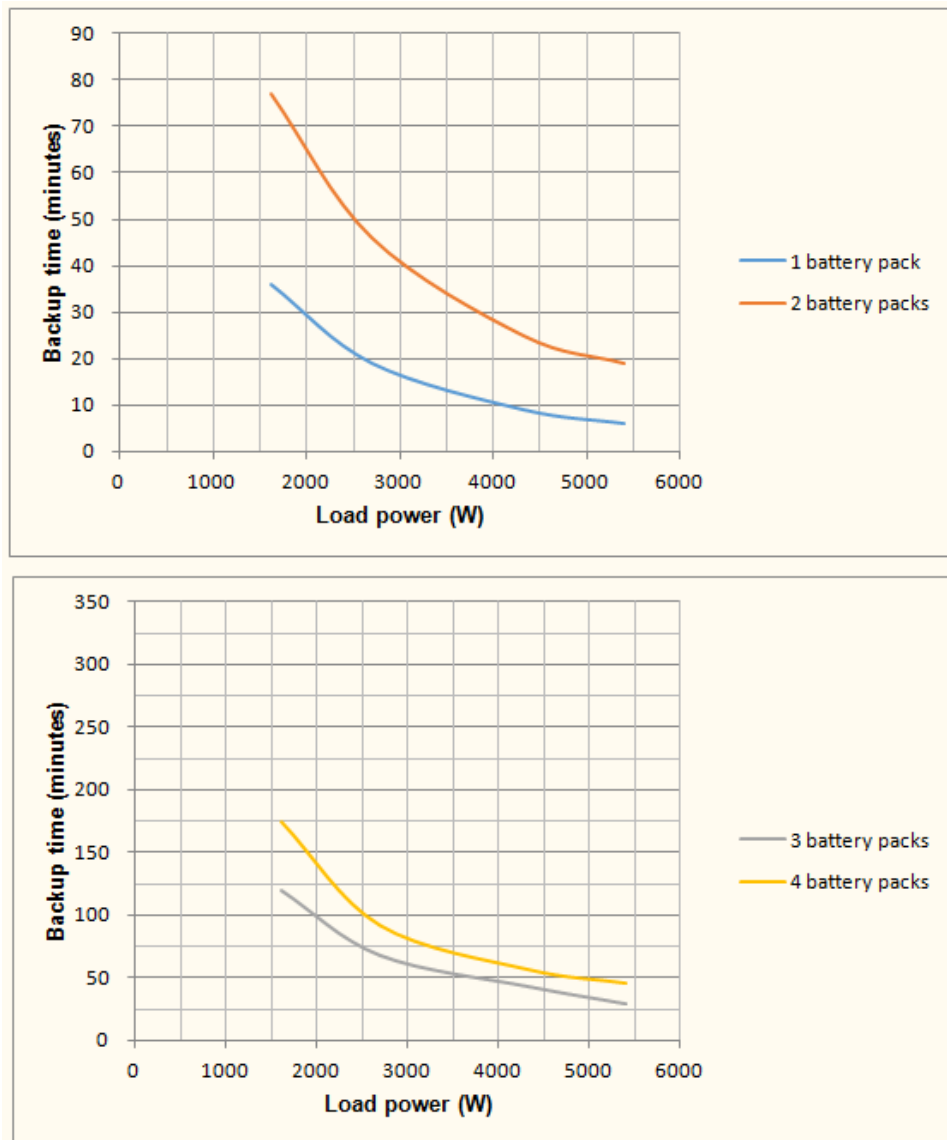
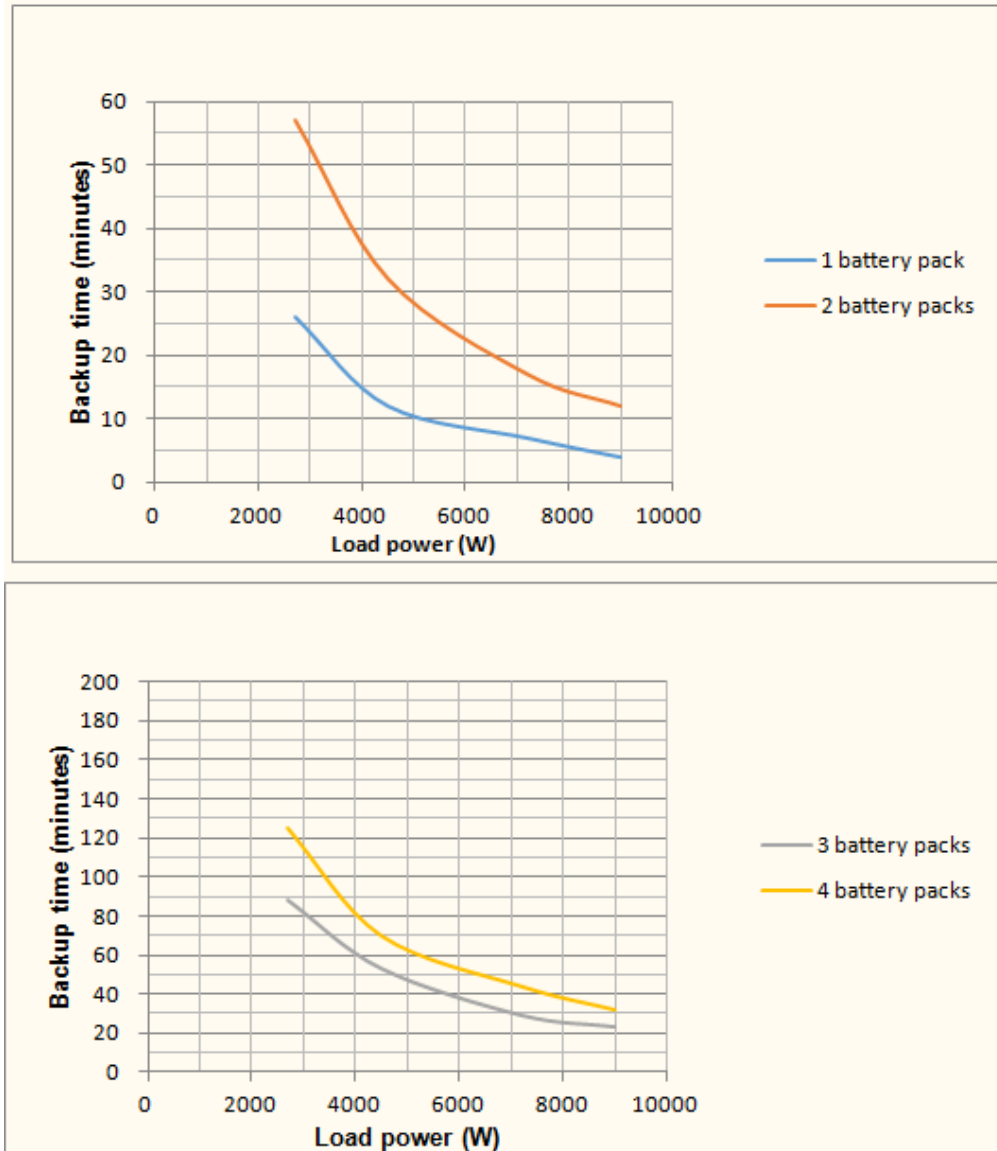


Table 9-2 Backup time of the ESS-240V12-9AhBPVBA01 battery pack (10 kVA UPS; calculated based on 94% battery efficiency)

Load (%)	Load (W)	One Battery Pack (Min.)	Two Battery Packs (Min.)	Three Battery Packs (Min.)	Four Battery Packs (Min.)
100%	9000	4	12	23	32
80%	7200	7	17	29	44
50%	4500	12	32	53	70
30%	2700	26	57	88	125

Figure 9-2 Backup time curve of the ESS-240V12-9AhBPVBA01 battery pack (10 kVA UPS; calculated based on 94% battery efficiency)



9.7 ECO Feature

Item	6 kVA/10 kVA
ECO voltage tolerance	Default value: $\pm 10\%$ (configurable on the LCD). The range is $\pm(5-10)\%$
ECO frequency tolerance	Default value: ± 2 Hz (configurable on the LCD). The range is $\pm(0.5-3)$ Hz

9.8 Safety and EMC

Item		Standards Compliance
EMC	Conducted emission	IEC 62040-2, C3
	Radiated emission (RE)	IEC 62040-2, C3
	Susceptibility of low-frequency signals	IEC61000-2-2
	Electrostatic discharge immunity	IEC 61000-4-2, class 3
	Conducted susceptibility	IEC 61000-4-6
	Radiated susceptibility	IEC 61000-4-3, class 3
	Electrical fast transient/burst	IEC 61000-4-4, class 4
	Surge protection	IEC 61000-4-5, class 4
	Power magnetic susceptibility	IEC 61000-4-8
	Harmonic current	IEC61000-3-12
	Blinking	IEC61000-3-11 (input current > 16 A)
	Impact current (lightning protection)	YD/T1095
Safety compliance		EN62040-1: 2013
		IEC62040-1: 2013
		YD/T1095-2008 GB/T14715-93
		CQC3108-2011/GB7260.1-2008

A Alarm Handling

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
Abnormal mains volt.	01	1	Minor	Automatic clear	<ul style="list-style-type: none"> The UPS transfers to battery mode. If no battery is equipped, the UPS shuts down. The UPS changes the working mode or shuts down. 	Possible cause: The mains voltage exceeds 280 V. Measure: Check whether the mains input voltage exceeds 272 V. If the voltage exceeds 272 V, wait for the mains to recover.
Abnormal mains volt.	01	2	Minor			<ul style="list-style-type: none"> Possible cause: The mains voltage is lower than 80 V. Measure: Check whether the mains input voltage is lower than 88 V. If the voltage is lower than 88 V, wait for the mains to recover. Possible cause: The input fuse is blown. Measure: Check the status of the input fuse.
Abnormal mains volt.	01	3	Minor			<ul style="list-style-type: none"> Possible cause: The mains frequency is out of the 45–55 Hz range (for the rated frequency of 50 Hz) or out of the 55–65 Hz range (for the rated frequency of 60

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						Hz). <ul style="list-style-type: none"> • Measure: Check the mains input frequency. If the frequency is out of the normal range, wait for the mains to recover. • Possible cause: The input fuse is blown. • Measure: Check the status of input fuses.
Abnormal mains volt.	01	4	Minor	Manual clear/Power-off clear	The rectifier is locked in battery mode.	Possible cause: The mains voltage is frequently abnormal. Measure: Check the mains input voltage. If the voltage is abnormal, wait for the mains voltage to become normal and manually clear the alarm.
Abnormal BPS volt.	0A	1	Minor	Automatic clear	The UPS cannot transfer to bypass mode. If the bypass is supplying power, the UPS changes the working mode.	Possible cause: The bypass input voltage is abnormal. Measure: Check whether the bypass input voltage is out of the specified range. If the voltage is out of the specified range, change the range setting or wait for the bypass input to recover.
Abnormal BPS volt.	0A	2	Minor			Possible cause: The bypass frequency is out of the 45-55 Hz (mapping to 50 Hz) or 55-65 Hz (mapping to 60 Hz) range. Measure: Check the bypass input frequency. If the frequency is out of the normal range, wait for the bypass power supply to recover.
Startup	0E	1	Critical	Manual	The inverter shuts	<ul style="list-style-type: none"> • Possible cause: The

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
timeout			1	clear/Power-off clear	down.	<p>bypass loading capacity exceeds the rated load of the inverter.</p> <ul style="list-style-type: none"> • Measure: Reduce the output load, manually clear the alarm, and restart the UPS. • Possible cause: An internal fault has occurred. • Measure: Contact Huawei technical support.
Batt. reverse	14	1	Critical	Automatic clear	This alarm does not affect the UPS or the power supply.	<p>Possible cause: The positive and negative battery terminals are reversely connected.</p> <p>Measure: Check the battery installation, and install batteries again.</p>
No battery	16	1	Minor	Automatic clear	This alarm does not affect the power supply.	<ul style="list-style-type: none"> • Possible cause: No batteries are connected. • Measure: Connect batteries. • Possible cause: The batteries are in poor contact. • Measure: Check the battery cable connection. If battery cables are loose, connect them securely.
Battery overtemperature	17	1	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	<p>Possible cause: The temperature inside the UPS or the ambient temperature exceeds the battery overtemperature alarm threshold (default value: 50°C).</p> <p>Measure: Reduce the ambient temperature and keep the air intake and exhaust vents of the UPS</p>

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						unblocked.
Battery overvoltage	19	1	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	<ul style="list-style-type: none"> • Possible cause: The battery voltage reaches the alarm threshold due to continuous charge. • Measure: When batteries are in charge mode, wait for 2 minutes and check whether the alarm is cleared. • Possible cause: The number of batteries configured is less than the actual number of batteries. • Measure: Check whether the number of batteries is correctly set.
Battery low voltage	1A	1	Minor	Automatic clear	An alarm is generated, and the system may shut down due to EOD.	<p>Possible cause: The mains is abnormal, and the batteries are overdischarged.</p> <p>Measure: Connect to the mains in non-battery test state.</p>
Battery overvoltage protection	20	1	Critical	Automatic clear	An alarm is generated, and the battery lifespan is affected.	<ul style="list-style-type: none"> • Possible cause: The number of batteries configured is less than the actual number of batteries. • Measure: Check that the configured number of batteries is consistent with the actual number. • Possible cause: The actual number of batteries does not meet requirements. • Measure: Check that the actual number of batteries meets requirements.

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						<ul style="list-style-type: none"> • Possible cause: The charger is abnormal. • Measure: Check that the charger voltage is normal immediately after the batteries are disconnected.
Remaining cap. warning	22	1	Minor	Automatic clear	If no action is taken, continued discharge will result in system shutdown due to EOD.	<ul style="list-style-type: none"> • Possible cause: The battery discharge lasts too long. • Measure: Check the mains, and charge batteries in a timely manner. • Possible cause: The mains input is abnormal. • Measure: Check the mains, and charge batteries in a timely manner. • Possible cause: The number of batteries or battery capacity is incorrectly set. • Measure: Check the configured battery capacity.
Battery overcurrent	1B	1	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	<p>Possible cause: The charger is abnormal.</p> <p>Measure: Contact Huawei technical support.</p>
Battery maintenance required	1D	1	Minor	Manual clear	The battery backup time is affected.	<ul style="list-style-type: none"> • Possible cause: The battery capacity is incorrectly configured. • Measure: Check that the configured battery capacity is consistent with the actual battery capacity. • Possible cause: The battery circuit cannot discharge currents. • Measure: Check the

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						battery cable connection and the status of each battery. <ul style="list-style-type: none"> • Possible cause: The battery capacity is lower than normal. • Measure: Replace battery strings. If the alarm persists, manually clear the alarm.
Internal overtemperature	1E	1	Minor	Automatic clear	The power supply is not affected.	<ul style="list-style-type: none"> • Possible cause: The ambient temperature exceeds 40°C. • Measure: Lower the ambient temperature. • Possible cause: Air channels are blocked. • Measure: Keep the air intake and exhaust vents of the UPS unblocked. • Possible cause: The fan is abnormal. • Measure: Clean up the foreign matter around the fan. If the alarm persists, contact Huawei technical support.
Internal fault	2A	2	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The battery relay or soft-start resistor is damaged. Measure: Contact Huawei technical support.
Internal fault	2A	3	Minor	Automatic clear	The power supply is not affected.	Possible cause: The NTC is not connected or is damaged. Measure: Contact Huawei technical support.
Internal fault	2A	9	Critical	Automatic clear	The inverter is shut down.	Possible cause: The self-load cable connection is incorrect.

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						Measure: Reconnect the self-load cables.
Internal fault	2A	0E	Critical	Manual clear/Power-off clear	The UPS shuts down or transfers to another working mode.	Possible cause: The soft-start resistor is damaged. Measure: Contact Huawei technical support.
Internal fault	2A	0F	Critical	Manual clear/Power-off clear	The UPS cannot start.	Possible cause: The rectifier circuits are damaged. Measure: Contact Huawei technical support.
Internal fault	2A	11	Critical	Manual clear/Power-off clear	The UPS shuts down or transfers to another working mode.	<ul style="list-style-type: none"> • Possible cause: The mains has experienced a transient high voltage. • Measure: Rectify the fault and restart the UPS. • Possible cause: The output supplies power to special loads such as the inductive and rectification loads. • Measure: Check that the load types are supported by the UPS. • Possible cause: The hardware is damaged. • Measure: Contact Huawei technical support.
Internal fault	2A	12	Critical	Manual clear/Power-off clear	The UPS shuts down or transfers to another working mode.	<ul style="list-style-type: none"> • Possible cause: The hardware is damaged. • Measure: Contact Huawei technical support. • Possible cause: An overload occurred when the input voltage was low. • Measure: Rectify the

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						fault and restart the UPS.
Internal fault	2A	13	Critical	Power-off clear	The UPS shuts down or transfers to another working mode.	Possible cause: The hardware is damaged. Measure: Contact Huawei technical support.
Internal fault	2A	14	Critical	Automatic clear	The UPS shuts down or transfers to working mode; the charger stops working.	<ul style="list-style-type: none"> • Possible cause: The ambient temperature exceeds 40°C. • Measure: Lower the ambient temperature. • Possible cause: Air channels are blocked. • Measure: Keep the air intake and exhaust vents of the UPS unblocked. • Possible cause: The fan is abnormal. • Measure: Clean up the foreign matter around the fan. If the alarm persists, contact Huawei technical support.
Internal fault	2A	17	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The M4 or CPLD chip is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	18	Critical	Manual clear/Power-off clear	N/A	Possible cause: The EEPROM chip is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	1B	Critical	Power-off clear	The inverter shuts down. The UPS transfers to bypass mode or has no output.	Possible cause: The inverter is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	1C	Critical	Power-off clear	The UPS shuts down or transfers to another working	Possible cause: The inversion relay is faulty.

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
					mode.	Measure: Contact Huawei technical support.
Internal fault	2A	1D	Critical	Power-off clear	The UPS shuts down or transfers to another working mode.	Possible cause: The inversion relay is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	1E	Critical	Power-off clear	The UPS shuts down or transfers to another working mode.	Possible cause: The inverter output is short-circuited. Measure: Resolve the short-circuit issue (if any) for the output terminal, clear the alarm, and restart the UPS. If the alarm persists, contact Huawei technical support.
Internal fault	2A	1F	Critical	Automatic clear	The UPS shuts down or transfers to another working mode.	<ul style="list-style-type: none"> • Possible cause: The mains has experienced a transient high voltage. • Measure: Handle the high voltage and restart the UPS. • Possible cause: The output supplies power to special loads such as the inductive and rectification loads. • Measure: Check that the load types are supported by the UPS. • Possible cause: The hardware is damaged. • Measure: Contact Huawei technical support.
Internal fault	2A	20	Critical	Automatic clear	The UPS shuts down or transfers to another working mode.	<ul style="list-style-type: none"> • Possible cause: The ambient temperature exceeds 40°C. • Measure: Lower the

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						ambient temperature. <ul style="list-style-type: none"> • Possible cause: Air channels are blocked. • Measure: Keep the air intake and exhaust vents of the UPS unblocked. • Possible cause: The fan is abnormal. • Measure: Clean up the foreign matter around the fan. If the alarm persists, contact Huawei technical support.
Internal fault	2A	24	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	25	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger output is short-circuited. Measure: Resolve the short-circuit issue (if any) for the battery wiring terminal, clear the alarm, and restart the UPS. If the alarm persists, contact Huawei technical support.
Internal fault	2A	26	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	27	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	28	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						support.
Internal fault	2A	29	Critical	Manual clear/Power-off clear	The power supply is not affected.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	2A	Critical	Manual clear/Power-off clear	The charger stops working.	Possible cause: The charger is faulty. Measure: Contact Huawei technical support.
Internal fault	2A	30	Critical	Manual clear/Power-off clear	The UPS cannot start.	Possible cause: The software and hardware versions do not match. Measure: Contact Huawei technical support.
Internal fault	2A	31	Minor	Manual clear/Power-off clear	The UPS cannot start.	Possible cause: The software and hardware versions do not match. Measure: Contact Huawei technical support.
Internal fault	2A	37	Minor	Automatic clear	If the inverter of the UPS is not started, starting the inverter is prohibited. If the inverter is started, this alarm does not affect the running of the UPS.	Possible cause: The UPS is abnormal. Measure: Contact Huawei technical support.
Internal fault	2A	3C	Critical	Power-off clear	The UPS shuts down.	Possible cause: The battery switching transistor is faulty. Measure: Contact Huawei technical support.
Fan exception	2B	1	Critical	Automatic clear	The power supply is not affected.	Possible cause: The fan is abnormal. Measure: Clean up the foreign matter around the fan. If the alarm persists, contact Huawei technical support.

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
Fan exception	2B	2	Critical	Automatic clear	The power supply is not affected.	<p>Possible cause: The fan is abnormal.</p> <p>Measure: Clean up the foreign matter around the fan. If the alarm persists, contact Huawei technical support.</p>
Battery qty. wrong	31	1	Minor	Manual clear/Power-off clear/Automatic clear	An alarm is displayed, and the battery service life may be shortened.	<ul style="list-style-type: none"> • Possible cause: The number of batteries is incorrectly set. • Measure: Check whether the number of batteries is correctly set. • Possible cause: Batteries are damaged. • Measure: Check whether batteries are damaged. • Possible cause: If batteries are fully charged, reconnect the batteries as soon as the system powers off. • Measure: After ensuring that the number of batteries is correct, clear the alarm.
Flash memory fault	3A	1	Critical	The flash memory is unrecoverable.	Files may be damaged	<p>Possible cause: The flash memory cannot be properly read or written.</p> <p>Measure: Contact Huawei technical support.</p>
Output overload	42	1	Minor	Automatic clear	The UPS transfers to bypass mode or has no output if it is overloaded for a long time.	<p>Possible cause: The load exceeds the rated loading capacity of the inverter.</p> <p>Measure: Lower the load or replace the UPS with a UPS with a larger capacity.</p>
Output	42	2	Minor	Automatic	Continuous	Possible cause: The load

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
overload				clear	overload causes the UPS to supply no power.	exceeds the rated loading capacity of the bypass. Measure: Lower the load or replace the UPS with a UPS with a larger capacity.
Output overload	42	3	Critical	Automatic clear	The UPS starts automatically after it shuts down; the UPS transfers to another working mode or shuts down.	Possible cause: The load exceeds the rated loading capacity of the inverter. Measure: Lower the load or replace the UPS with a UPS with a larger capacity.
Output overload	42	4	Critical	Manual clear/Power-off clear	The UPS cannot start.	Possible cause: The load exceeds the rated loading capacity of the bypass. Measure: Lower the load or replace the UPS with a UPS with a larger capacity.
Output overload	42	5	Critical	Manual clear/Power-off clear	The UPS has no output when the load is excessively heavy.	Possible cause: The load is faulty, the load capacity is large, or the load is short-circuited. Measure: Check whether the load is faulty.
Bypass backfeed	47	1	Critical	Power-off clear	The bypass input circuit breaker in the PDU is OFF.	Possible cause: Bypass components are faulty. Measure: Contact Huawei technical support.
EPO	55	1	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: You have pressed the EPO switch. Measure: Restore the EPO switch status, clear the alarm, and restart the UPS.
Bypass transfer times limit	56	1	Minor	Manual clear/Power-off clear	The UPS cannot transfer to an unsteady side.	Possible cause: The output is transferred more than three times within 30 minutes. Measure: Clear the alarm and restart the UPS.

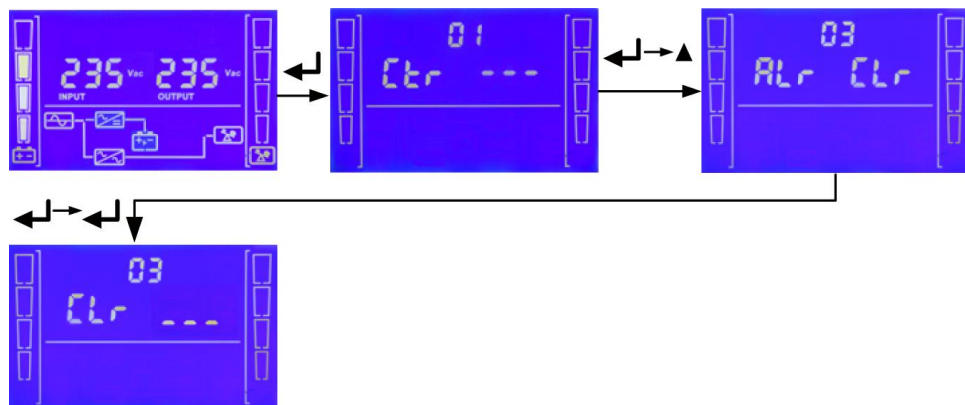
Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
ECO voltage exception	60	1	Minor	Automatic clear	The UPS cannot transfer to ECO mode. If the UPS is working in bypass mode, it transfers to another working mode.	<p>Possible cause: The ECO input is abnormal.</p> <p>Measure: Check whether the ECO input voltage or frequency is out of the specified range. If the voltage or frequency is out of the specified range, change the range setting or wait for the bypass input to recover.</p>
Bypass mode	9E	1	Minor	Automatic clear	If the bypass is abnormal, the UPS may shut down.	<ul style="list-style-type: none"> • Possible cause: The inverter is not started. • Measure: Check whether other alarms are generated. If other alarms are generated, handle these alarms according to the handling methods. • Possible cause: The load exceeds the rated loading capacity of the inverter. • Measure: If other alarms are not generated, manually start the UPS. • Possible cause: The inverter is faulty. • Measure: Contact Huawei technical support.
Battery mode	9F	1	Minor	Automatic clear	If batteries are abnormal, the UPS may shut down.	<ul style="list-style-type: none"> • Possible cause: The mains input is abnormal. • Measure: Check the mains input. If the mains input is abnormal, wait for the mains to recover. • Possible cause: The battery self-check is in progress. • Measure: Check whether the battery

Alarm Name	Alarm ID	Alarm Cause ID	Alarm level	Alarm Clear Mode	Impact on the System	Repair Proposal
						self-check is in progress. • Possible cause: The mains loading capacity is insufficient. • Measure: Lower the load or replace the UPS with a UPS with a larger capacity.
Maintenance circuit breaker ON	3B	1	Minor	Automatic clear	The UPS transfers to maintenance bypass mode.	Possible cause: The maintenance bypass switch is ON during UPS maintenance. Measure: Set the maintenance bypass switch to OFF after maintenance.

NOTE

After handling alarms in the preceding table, manually clear automatically detected and manually cleared (ADMC) alarms on the LCD.

Figure A-1 Clearing an ADCM alarm



UG10000078

B Acronyms and Abbreviations

A

ADMC Automatically detected and manually cleared

C

CPLD Complex programmable logical device

D

DSP Digital signal processing

E

EPO Emergency power-off

ECO Economy control operation

EOD End of discharge

L

LCD Liquid crystal display

P

PFC Power factor correction

PE Protective earthing

T

THD_v Total harmonic distortion of output voltage

U

UPS Uninterruptible power system

USB Universal Serial Bus

V

VRLA Valve regulated lead acid