

UPS2000-H-(6 kVA-10 kVA)

User Manual

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About This Document

Purpose

This document describes the UPS2000-H in terms of their overview, technical specifications, installation, cable connections, power-on commissioning, and maintenance.

Figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Technical support engineers
- Hardware installation engineers
- Commissioning engineers
- Maintenance engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Symbol	Description
 NOTICE	<p>Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.</p> <p>NOTICE is used to address practices not related to personal injury.</p>
 NOTE	<p>Supplements the important information in the main text.</p> <p>NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.</p>

Change History

Issue	Date	Description
04	2024-01-30	<p>Updated 2.6.4 SNMP Card.</p> <p>Updated 5.2.1 Rack-Mounted Installation.</p> <p>Updated 5.2.3 Installing Cables.</p> <p>Updated 5.3.1 Rack-Mounted Installation.</p> <p>Updated 5.3.3 Installing Cables.</p> <p>Added 8.9 How Do I View Battery Specifications?.</p>
03	2023-08-20	<ul style="list-style-type: none"> Added information about the rPDU. Added information about cloud access through FE. Added information about installing guide rails.
02	2023-04-20	Deleted the content related to lithium batteries.
01	2022-06-30	This issue is the first official release.

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1 Safety Information

Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The **Danger, Warning, Caution, and Notice** statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.**

The equipment shall be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- Equipment damage due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and extreme weather conditions
- Operation beyond the conditions specified in this document

- Installation or use in environments that do not comply with international, national, or regional standards
- Installation or use by unqualified personnel
- Failure to follow the operation instructions and safety precautions on the product and in the document
- Unauthorized modifications to the product or software code or removal of the product
- Damage caused during transportation by you or a third party authorized by you
- Storage conditions that do not meet the requirements specified in the product document
- Failure to comply with local laws, regulations, or related standards due to the materials and tools prepared by you
- Damage caused by your or a third party's negligence, intentional breach, gross negligence, or improper operations or damage not caused by the Company

1.1 Personal Safety

 **DANGER**

Do not work with power on during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will generate electric arcs or sparks, which may cause a fire or personal injury.

 **DANGER**

Non-standard and improper operations on the energized equipment may cause fire or electric shocks, resulting in property damage, personal injury, or even death.

 **DANGER**

Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

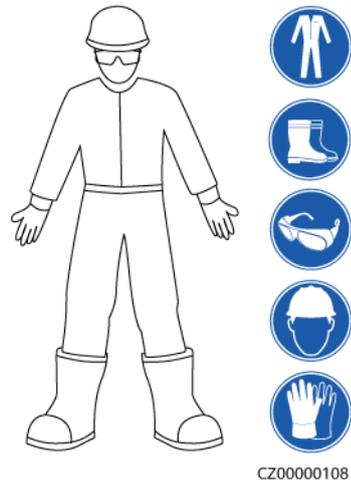
 **DANGER**

During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The insulation and voltage resistance must comply with local laws, regulations, standards, and specifications.

WARNING

During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

Figure 1-1 Personal protective equipment



General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- Do not touch the power supply equipment directly or with conductors such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock.
- Do not touch a running fan with your hands, components, screws, tools, or boards. Otherwise, personal injury or equipment damage may occur.
- In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

Personnel Requirements

- Only professionals and trained personnel are allowed to operate the equipment.
 - Professionals: personnel who are familiar with the working principles and structure of the equipment, 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 trained in technology and safety, 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

- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- 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 perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Equipment Safety

1.2.1 UPS Safety

General Requirements

NOTICE

This is a category C2 UPS product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures.

- 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, 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.
- The UPS operating environment must meet the requirements for the climate indicator, mechanically active substance indicator, and chemically active substance indicator specified by ETSI EN 300 019-1 class 3.6.
- The UPS shall not be located in non-confined environments within 0–3.7 km away from the ocean or indoor or semi-indoor environments where the temperature and humidity are not controllable, such as shelters, civil houses, garages, corridors, and direct ventilation cabinets near the ocean; or houses with only roofs, railway station platforms, gymnasiums, and aquariums.

- It is recommended that the UPS be powered on as soon as possible after it is unpacked.
- The UPS can be used to serve resistive-capacitive loads, resistive loads, and micro-inductive loads. It is recommended that the UPS not be used for pure capacitive loads, pure inductive loads, or half-wave rectification loads. The UPS does not apply to regeneration loads.
- 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, attach 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.
- The upstream power distribution of the UPS must meet the requirements of protection against electric shock specified in IEC 60364-4-41.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protective ground point.
- A circuit breaker equipped with a residual current device (RCD) is not recommended.
- If the root mean square (RMS) of a phase voltage of the utility power exceeds 320 V AC, the UPS may be damaged.
- To ensure power supply to loads during UPS upgrade, set the output to maintenance bypass mode. To avoid power failure or load damage, ensure that the bypass input is within the specified power supply range.
- Exercise caution when manually shutting down the UPS inverter for transferring to bypass mode, or when adjusting the UPS output voltage level or output frequency. Doing so may affect the power supply to equipment.

1.2.2 Battery Safety

 **DANGER**

Do not connect the positive and negative poles of a battery or battery string together. Otherwise, the battery may be short-circuited. Battery short circuits can generate high instantaneous current and releases a large amount of energy, which may cause battery leakage, smoke, flammable gas release, thermal runaway, fire, or explosion. To avoid battery short circuits, do not maintain batteries with power on.

 **DANGER**

Do not expose batteries at high temperatures or around heat sources, such as scorching sunlight, fire sources, transformers, and heaters. Battery overheating may cause leakage, smoke, flammable gas release, thermal runaway, fire, or explosion.

 **DANGER**

Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire.

 **DANGER**

To avoid leakage, smoke, flammable gas release, thermal runaway, fire, or explosion, do not disassemble, alter, or damage batteries, for example, insert foreign matter into batteries, squeeze batteries, or immerse batteries in water or other liquids.

 **DANGER**

There is a risk of fire or explosion if the model of the battery in use or used for replacement is incorrect. Use a battery of the model recommended by the vendor.

 **DANGER**

Battery electrolyte is toxic and volatile. Do not get contact with leaked liquids or gases in the case of battery leakage or emission of abnormal odor. In such cases, stay away from the battery and contact professionals immediately. Professionals shall wear safety goggles, rubber gloves, gas masks, and protective clothing, power off the equipment, remove the battery, and contact technical engineers.

 **DANGER**

The gases generated by a burning battery may irritate your eyes, skin, and throat. Take protective measures.

 **WARNING**

Install batteries in a dry area. Do not install them below areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.

 **WARNING**

Before installing and commissioning batteries, prepare fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers, according to construction standards and regulations. Before putting the battery room into operation, ensure that it is equipped with a fire extinguishing system that complies with local laws and regulations, has been constructed and commissioned, and can work in automatic or manual control mode.

 **WARNING**

Before unpacking, storage, and transportation, ensure that the packing cases are intact and correctly placed according to the labels on the packing cases. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cases. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

 **WARNING**

After unpacking batteries, place them in the required direction. Do not place a battery with its front panel facing upwards, put it upside down, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

 **WARNING**

Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.

 **WARNING**

After batteries are discharged, charge them in time to avoid damage due to overdischarge.

 **WARNING**

If the electrolyte leaks, absorb and neutralize the electrolyte immediately. Exercise caution when moving or handling a lead-acid battery with electrolyte leakage to avoid electrolyte hazards.

 **WARNING**

Lead-acid batteries in use emit flammable gas. Ensure that batteries are installed in a well-ventilated area and fireproof measures are taken.

 **WARNING**

Do not use unsealed lead-acid batteries.

Statement

The Company shall not be liable for any battery damage, personal injury, death, property loss, and/or other consequences caused by the following reasons:

- Force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions
- The battery warranty period has expired.
- Actions that do not follow instructions in the user manual or direct advice from the Company, including but not limited to the following scenarios:
 - The onsite equipment operating environment or external power parameters do not meet the environment requirements for normal operation, for example, the actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.
 - Batteries are dropped or incorrectly operated or connected.
 - Batteries are overdischarged due to delayed acceptance or power-on after battery installation.
 - Battery running parameters are incorrectly set.
 - Different types of batteries, for example, batteries of different brands or rated capacities, are used together without prior approval from the Company.
 - Batteries are frequently overdischarged due to improper battery maintenance.
 - Battery use scenarios are changed without prior approval from the Company.
 - Battery maintenance is not performed according to the instructions in the user manual, for example, failing to check battery terminals regularly.
 - Batteries are not transported, stored, or charged according to the instructions in the user manual.
 - Instructions from the Company are not followed during battery relocation or reinstallation.

General Requirements

NOTICE

This is a category C2 battery product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures.

NOTICE

To ensure battery safety and battery management accuracy, use batteries provided by the Company. The Company is not responsible for any faults of batteries provided by other vendors.

- Before installing, operating, and maintaining batteries, read the battery vendor's instructions and comply with their requirements. The safety precautions specified in this document are highly important and require special attention. For additional safety precautions, see the instructions provided by the battery vendors.
- Use batteries within the specified temperature range. When the ambient temperature of the batteries is lower than the allowed range, do not charge the batteries to prevent internal short circuits caused during low-temperature charging.
- Do not reversely connect the positive and negative battery terminals. Otherwise, a battery alarm will be generated and batteries may be damaged.
- Before unpacking batteries, check whether the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.
- In an indoor scenario, you are advised to power on a battery within seven days after unpacking. If the battery cannot be powered on in time, put it in the original packing case and place it in a dry indoor environment without corrosive gas.
- Do not use a damaged battery (such as damage caused when a battery is dropped, bumped, bulged, or dented on the enclosure), because the damage may cause electrolyte leakage or flammable gas release. In the case of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other devices or flammable materials and keep it away from non-professionals.
- Before working on a battery, ensure that there is no irritating or burning smell around the battery.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.
- If a battery is accidentally exposed to water, do not install it. Move it to a safe place for isolation and contact technical engineers in a timely manner.
- Check whether the positive and negative battery terminals are grounded unexpectedly. If so, disconnect the battery terminals from the ground.

- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.
- If batteries will not be used for a long period of time, store and charge them according to the battery requirements.
- Do not charge or discharge batteries by using a device that does not comply with local laws and regulations.
- Keep the battery loop disconnected during installation and maintenance.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.
- If a battery is faulty, its surface temperature may be high. Do not touch the battery to avoid scalds.

Short-Circuit Protection

- When installing and maintaining batteries, wrap the exposed cable terminals on the batteries with insulation tape.
- Avoid foreign objects (such as conductive objects, screws, and liquids) from entering a battery, as this may cause short circuits.

Leakage Handling

NOTICE

Electrolyte overflow may damage the equipment. It will corrode metal parts and boards, and ultimately damage the boards.

Electrolyte is corrosive and can cause irritation and chemical burns. If you come into direct contact with the battery electrolyte, do as follows:

- Inhalation: Evacuate from contaminated areas, get fresh air immediately, and seek immediate medical attention.
- Eye contact: Immediately wash your eyes with water for at least 15 minutes, do not rub your eyes, and seek immediate medical attention.
- Skin contact: Wash the affected areas immediately with soap and water and seek immediate medical attention.
- Intake: Seek immediate medical attention.

Special requirements for lead-acid batteries:

NOTICE

When the battery temperature exceeds 60°C, check whether the electrolyte leaks. If the electrolyte leaks, take proper measures promptly.

NOTICE

If the electrolyte leaks, follow the instructions of the battery manufacturer or use sodium bicarbonate (NaHCO_3) or sodium carbonate (Na_2CO_3) to neutralize the electrolyte.

Recycling

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries may result in environmental pollution or an explosion.
- If a battery leaks or is damaged, contact technical support or a battery recycling company for disposal.
- If batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose waste batteries to high temperatures or direct sunlight.
- Do not place waste batteries in environments with high humidity or corrosive substances.
- Do not use faulty batteries. Contact a battery recycling company to scrap them as soon as possible to avoid environmental pollution.

1.3 Electrical Safety

⚠ DANGER

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fires may occur.

⚠ DANGER

Non-standard and improper operations may result in fire or electric shocks.

⚠ DANGER

Prevent foreign matter from entering the equipment during operations. Otherwise, equipment damage, load power derating, power failure, or personal injury may occur.

⚠ WARNING

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.

⚠ CAUTION

Do not route cables near the air intake or exhaust vents of the equipment.

⚠ CAUTION

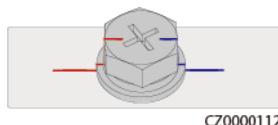
Do not directly connect aluminum cables to prevent electrochemical corrosion of copper and aluminum.

⚠ CAUTION

Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Install temporary fences or warning ropes and hang "No Entry" signs around the operation area to keep unauthorized personnel away from the area.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.
- Ensure that bolts are tightened with a torque tool and marked in red and blue after double-check. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm that the bolts are tightened and then mark them in red. (The marks must cross the edges of the bolts.)



- After the installation is complete, ensure that protective cases, insulation tubes, and other necessary items for all electrical components are in position to avoid electric shocks.

- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- Before maintaining a downstream electrical or power distribution device, turn off the output switch on the power supply equipment.
- During equipment maintenance, attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers as well as warning signs to prevent accidental connection. The equipment can be powered on only after troubleshooting is complete.
- If fault diagnosis and troubleshooting need to be performed after power-off, take the following safety measures: Disconnect the power supply. Check whether the equipment is live. Install a ground cable. Hang warning signs and set up fences.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not use wet cloth to clean exposed copper bars or other conductive parts.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.
- Ensure that the protective ground point of the equipment is reliably connected to the ground screw of the metal enclosure (connection resistance: ≤ 0.1 ohms).
- Ensure that the ground resistance of the system for lightning protection is less than or equal to 10 ohms.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- If high touch current may occur on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the power supply; otherwise, electric shock as a result of touch current may occur.

Cabling

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- The flame spread rating of cables shall meet the UL 1581 VW-1 or IEC 60332-3-22 (ZB) or higher requirements.

- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated, and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- If a 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.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- If the external conditions (such as the cable layout or ambient temperature) change, verify the cable usage in accordance with the IEC-60364-5-52 or local laws and regulations. For example, check that the current-carrying capacity meets requirements.
- When routing cables, reserve at least 30 mm clearance between the cables and heat-generating components or areas. This prevents deterioration or damage to the cable insulation layer.
- 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 below 0°C must be stored at room temperature for more than 24 hours before they are laid out.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle. Otherwise, the cable performance may deteriorate due to cable damage, which affects the current-carrying capacity and temperature rise.

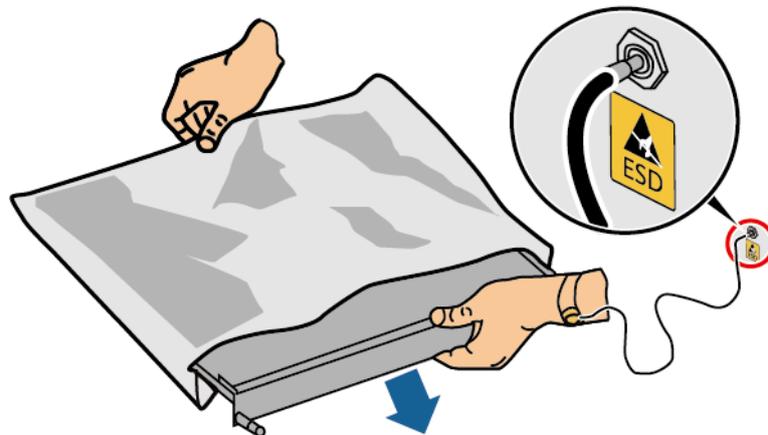
ESD

NOTICE

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

- When touching the equipment and handling boards, modules with exposed circuit boards, or application-specific integrated circuits (ASICs), observe ESD protection regulations and wear ESD clothing and ESD gloves or a well-grounded ESD wrist strap.

Figure 1-2 Wearing an ESD wrist strap



- When holding a board or a module with exposed circuit boards, hold its edge without touching any components. Do not touch the components with bare hands.
- Package boards or modules with ESD packaging materials before storing or transporting them.

1.4 Environmental Requirements

⚠ DANGER

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

⚠ DANGER

Do not store any flammable or explosive materials in the equipment area.

⚠ DANGER

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

⚠ WARNING

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.

 **WARNING**

To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

General Requirements

- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- 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, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must be above the highest water level of that area in history.
- Before opening doors during the installation, operation, and maintenance of the equipment, clean up any water, ice, snow, or other foreign objects on the top of the equipment to prevent foreign objects from falling into the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- Ensure that the equipment room provides good heat insulation, and that the walls and floor are dampproof.
- Install protective devices at the door of the equipment room to prevent rodents and insects from entering the room.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.5 Mechanical Safety

 **WARNING**

Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

 **WARNING**

Before installing equipment in a cabinet, ensure that the cabinet is securely fastened with a balanced center of gravity. Otherwise, tipping or falling cabinets may cause bodily injury and equipment damage.

 **WARNING**

When pulling equipment out of a cabinet, be aware of unstable or heavy objects in the cabinet to prevent injury.

 **WARNING**

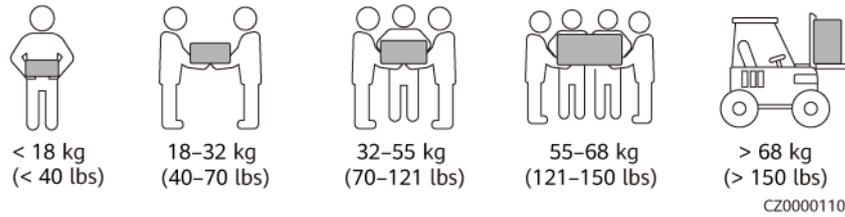
Do not drill holes into the equipment. Doing so may affect the sealing and electromagnetic interference shield performance of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

General Requirements

- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed for an extended period of time.
- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.
- When performing operations above the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.



- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is evenly distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach the object, squat down, and then lift the object slowly and stably by the force of the legs instead of your back. Do not lift it suddenly or turn or twist your body.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Slowly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop that may cause scratches on the surface of the equipment or damage to the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of twisting your waist. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- When transporting the equipment using a forklift truck, ensure that the forks are properly positioned so 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 sea or roads in good conditions for transportation. Do not transport batteries by railway or air. Avoid tilt or jolt during transportation.

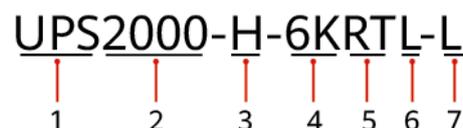
2 Product Overview

2.1 Model Description

This document describes the following UPS models.

Model	Abbreviation
UPS2000-H-6KRTL-L	6 kVA
UPS2000-H-10KRTL-L	10 kVA

Figure 2-1 Model number

UPS2000-H-6KRTL-L


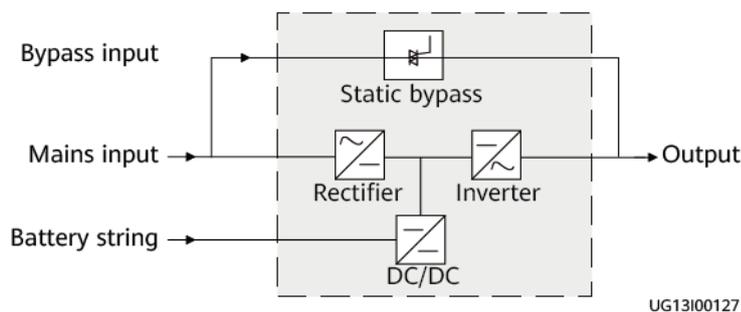
No.	Meaning	Description
1	Product category	UPS: uninterruptible power system
2	Product family	2000
3	Product series	H: high power density and high efficiency
4	Rated capacity	6K: 6 kVA output 10K: 10 kVA output
5	UPS type	RT: rack-mounted or tower-mounted
6	Built-in battery (optional)	L: long backup time model, using external large-capacity batteries to provide long backup time
7	Voltage system	L: single-phase/three-phase input

2.2 Working Principle

The UPS2000-H system can form a minimum uninterruptible power supply system (with batteries). The UPS contains main power circuits such as rectifier, inverter, bypass, charge, and discharge, as well as extra-low voltage (ELV) circuits such as the monitoring circuit and parallel control circuit.

The UPS is not equipped with a monitoring screen. It communicates with a mobile phone (running Android 8.0, HarmonyOS 2.0, or iOS 9.0, or their later versions) app over WiFi. It can also be equipped with optional components such as an SNMP card, dry contact card, and 4G module.

Figure 2-2 Conceptual diagram



2.3 Working Modes

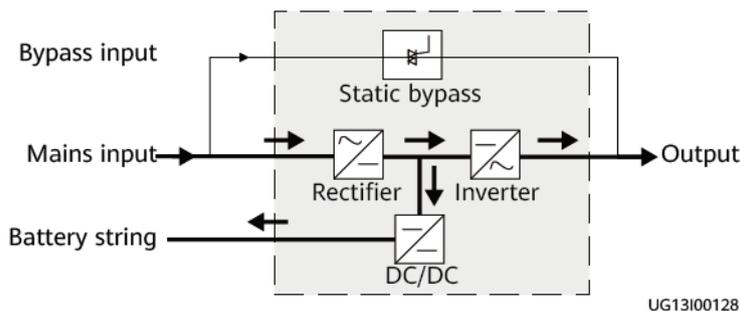
UPS working modes: normal mode, battery mode, bypass mode, ECO mode, and source-share mode

NOTE

- → indicates an input mode.
- ➔ indicates the direction of energy flow.
- Normal mode

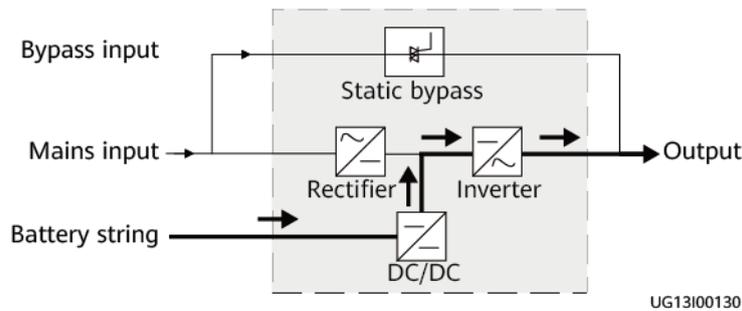
When the mains is normal, the rectifier boosts the mains input voltage to a stable DC voltage, which is then supplied to the inverter. At the same time, the mains charges batteries using a charger, and the inverter converts the DC power into stable AC power to supply loads.

Figure 2-3 Normal mode



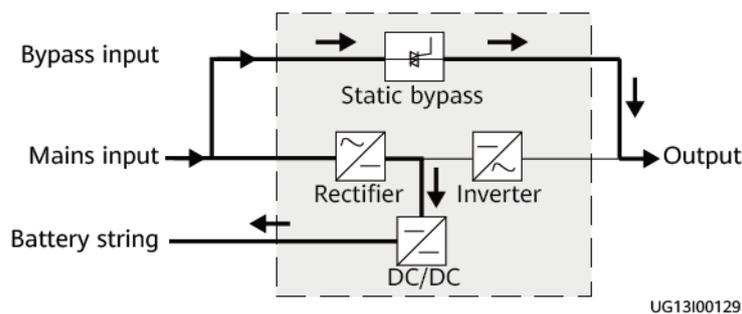
- Battery mode**
 When the mains is abnormal or disconnected, the DC-DC step-up transformer boosts the DC power supplied by batteries, which is then supplied to the inverter. Then the inverter converts the DC power into stable AC power to supply loads.

Figure 2-4 Battery mode



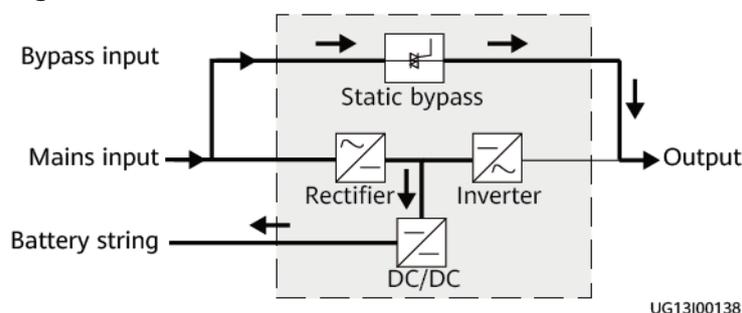
- Bypass mode**
 The mains supplies power to loads after filtering. When the UPS is overloaded, overheated, or faulty, it automatically transfers to bypass mode. In this mode, the backup capability of batteries is unavailable.

Figure 2-5 Bypass mode



- 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.

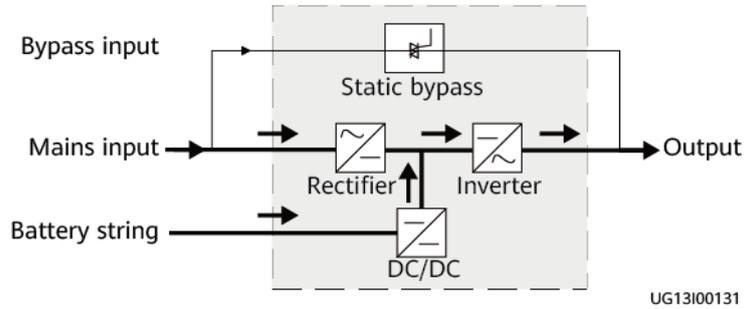
Figure 2-6 ECO mode



- Source-share mode**
 When the UPS works properly but the mains input power of the rectifier is insufficient, the UPS transfers to source-share mode. In this mode, both the

mains and batteries supply power, which is converted into AC outputs by the inverter.

Figure 2-7 Source-share mode



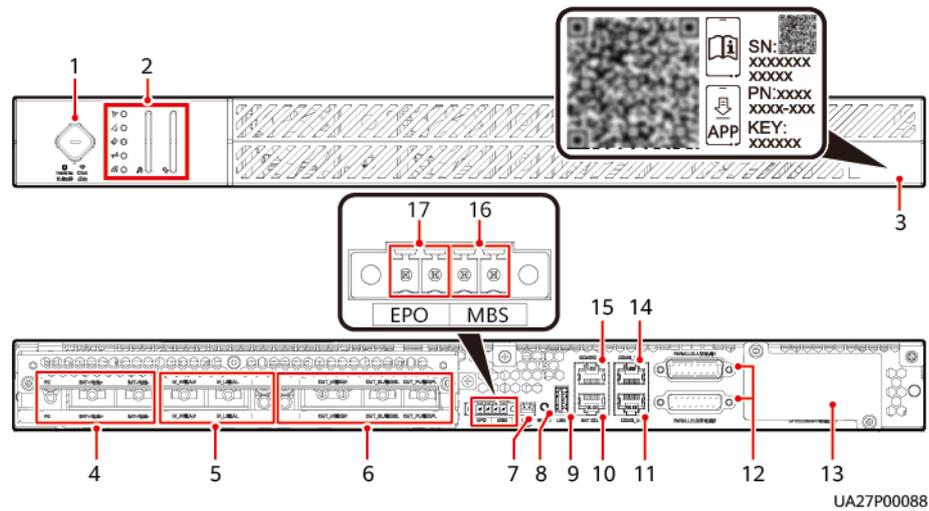
2.4 Product Description

2.4.1 6 kVA UPS Appearance

Figure 2-8 6 kVA front and rear



Figure 2-9 6 kVA UPS



- | | | |
|-------------------------------------|--------------------------------------|------------------------|
| (1) Button | (2) Indicators | (3) Label ^a |
| (4) Battery ports | (5) AC input ports | (6) AC output ports |
| (7) Battery temperature sensor port | (8) RESET button | (9) USB port |
| (10) BATT.COM1 port | (11) COM3_IN port | (12) Parallel ports |
| (13) Optional card slot | (14) COM3_OUT port | (15) COM2/CAN port |
| (16) Maintenance bypass ports (MBS) | (17) Emergency power-off (EPO) ports | |

NOTE

a: The label contains the SN, QR codes, and KEY (reserved). Scan the QR codes to download the app, connect to the WiFi network, and view documents such as user manual and quick guide. The information on the label is for reference only. The actual parameters may vary.

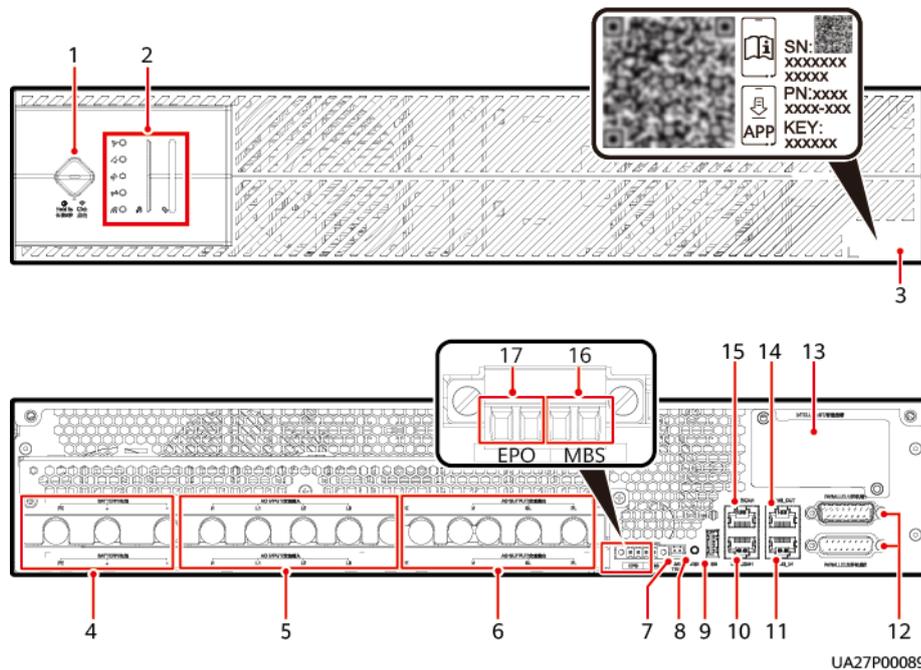
2.4.2 10 kVA UPS Appearance

Figure 2-10 10 kVA front and rear



UG13100084

Figure 2-11 10 kVA UPS



UA27P00089

- | | | |
|--------------------------------|--------------------|------------------------|
| (1) Button | (2) Indicators | (3) Label ^a |
| (4) Battery ports | (5) AC input ports | (6) AC output ports |
| (7) Battery temperature sensor | (8) RESET button | (9) USB port |

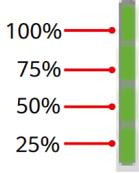
- (10) BATT.COM1 port
- (11) COM3_IN port
- (12) Parallel ports
- (13) Optional card slot
- (14) COM3_OUT port
- (15) COM2/CAN port
- (16) Maintenance bypass port (MBS)
- (17) EPO ports

 **NOTE**

a: The label contains the SN, QR codes, and KEY (reserved). Scan the QR codes to download the app, connect to the WiFi network, and view documents such as user manual and quick guide. The information on the label is for reference only. The actual parameters may vary.

2.4.3 UPS Indicators

Table 2-1 Indicator description

Icon	Name	Color	Status	Description
	Fault indicator	Green	Steady on	The UPS is normal.
			Blinking	A minor alarm is generated.
			Steady on	A critical alarm is generated.
	Bypass indicator	Yellow	Steady on	Bypass mode
			Off	Non-bypass mode
	Battery indicator	Yellow	Steady on	Battery mode
			Off	Non-battery mode
			Blinking	Battery state of charge (SOC): < 25%
	Inverter indicator	Green	Steady on	Inverter mode
			Off	Non-inverter mode
			Blinking	The inverter is starting up or shutting down.
	WiFi indicator	Green	Steady on	WiFi is enabled.
			Blinking	The mobile phone is connected to the WiFi network of the UPS.
			Off	WiFi is disabled.
	Battery SOC indicator	Green		When the battery SOC is 0%, the four indicators are off. 0% < Battery SOC < 25% 25% indicator: blinking Other indicators: off

Icon	Name	Color	Status	Description
				<p>25% ≤ Battery SOC < 50% 25% indicator: steady on 50% indicator: When the battery SOC is 25%, the indicator is off. When the battery SOC is greater than 25%, the indicator blinks. Other indicators: off</p> <p>50% ≤ Battery SOC < 75% 25% indicator: steady on 50% indicator: steady on 75% indicator: When the battery SOC is 50%, the indicator is off. When the battery SOC is greater than 50%, the indicator blinks. Other indicators: off</p> <p>75% ≤ Battery SOC < 100% 25% indicator: steady on 50% indicator: steady on 75% indicator: steady on 100% indicator: When the battery SOC is 75%, the indicator is off. When the battery SOC is greater than 75%, the indicator blinks. Battery SOC: 100% The four indicators are steady on.</p>
	Load rate indicator	Green		<p>When the load rate is 0%, the four indicators are off. 0% < Load rate < 25% 25% indicator: blinking Other indicators: off</p> <p>25% ≤ Load rate < 50% 25% indicator: steady on 50% indicator: When the load rate is 25%, the indicator is off. When the load rate is greater than 25%, the indicator blinks. Other indicators: off</p>

Icon	Name	Color	Status	Description
				<p>50% ≤ Load rate < 75%</p> <p>25% indicator: steady on</p> <p>50% indicator: steady on</p> <p>75% indicator: When the load rate is 50%, the indicator is off. When the load rate is greater than 50%, the indicator blinks.</p> <p>Other indicators: off</p>
				<p>75% ≤ Load rate < 100%</p> <p>25% indicator: steady on</p> <p>50% indicator: steady on</p> <p>75% indicator: steady on</p> <p>100% indicator: When the load rate is 75%, the indicator is off. When the load rate is greater than 75%, the indicator blinks.</p> <p>Load rate ≥ 100%</p> <p>The four indicators are steady on.</p>

2.4.4 UPS Button Functions

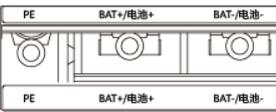
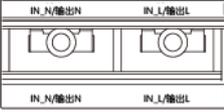
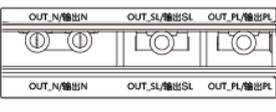
Table 2-2 UPS button functions

Button	Function	Description
	Starting the inverter	When the UPS works in bypass mode (the bypass indicator is on), hold down the button on the UPS for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do not press any button during inverter startup. When the startup command is successfully delivered, and the inverter indicator is steady on, the UPS enters normal mode.
	Shutting down the inverter	When the UPS works in inverter mode, hold down the button on the UPS for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do not press any button during inverter shutdown. When the shutdown command is successfully delivered, and the inverter indicator is off, the UPS shuts down the inverter output and enters bypass mode.

Button	Function	Description
	Enabling WiFi	When the WiFi is disabled, hold down the button for less than 0.5s to enable the WiFi (the WiFi indicator turns on).
	Disabling WiFi	When the WiFi is enabled, hold down the button for less than 0.5s to disable the WiFi (the WiFi indicator turns off).
	Cold-starting the UPS using batteries	<ol style="list-style-type: none"> Hold down the UPS button for 3s. The UPS starts in battery mode and enters the standby state. The bypass indicator, battery indicator, and inverter indicator turn on at the same time. The UPS starts and enters the initialization state (about 10s). The indicator status changes. The WiFi indicator turns on, the fault indicator blinks, and the UPS enters the standby state. Hold down UPS button for more than 5s to start the UPS inverter. The UPS enters battery mode. <p>NOTE When the mains is abnormal or disconnected, start the UPS using batteries.</p>
 RESET	Resetting the UPS	Hold down the RESET button on the UPS rear panel for about 10s (all indicators turn off and then work properly) to restore the preset WiFi password, preset user password, and SNMP card (if any) IP address. Other parameters will not be restored.

2.4.5 Port Functions

Table 2-3 Functions of ports on the 6 kVA UPS

Port	Silk Screen	Function
	PE	Connect battery cables.
	BAT+/Battery +	
	BAT-/Battery -	
	IN_N/Input N	Connect input cables.
	IN_L/Input L	
	OUT_N/Output N	Connect output cables. The output (OUT) SL port connects to primary loads, and the output (OUT) PL port connects to secondary loads.
	OUT_SL/Output SL	
	OUT_PL/Output PL	
	EPO	Emergency power-off

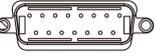
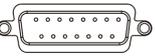
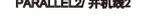
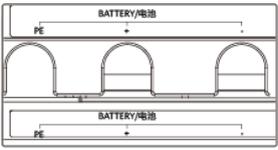
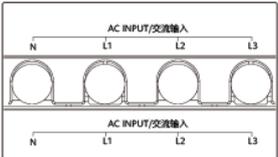
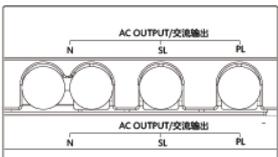
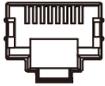
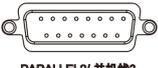
Port	Silk Screen	Function
 	MBS	Maintenance bypass mode
 	BATT TEMP	Connects the battery temperature sensor.
 	USB	Supports the serial port communications protocol. The USB port can be used to export logs and send serial port commissioning commands.
 	BATT.COM1	Used for battery communication
 	COM2/CAN	Used for ECC800 communication
 	COM3_IN	<ul style="list-style-type: none"> Support the Modbus-RTU communications protocol. Used for communication between parallel UPSs
 	COM3_OUT	
 	PARALLEL1/Parallel cable 1	Connect UPS parallel cables.
 	PARALLEL2/Parallel cable 2	
 	INTELLISLOT/Intelligent slot	Reserved for an optional card

Table 2-4 Functions of ports on the 10 kVA UPS

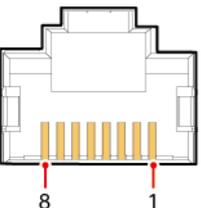
Port	Silk Screen	Function
	BATTERY/Battery PE	Connect battery cables.
	BATTERY/Battery +	
	BATTERY/Battery -	
	AC INPUT/AC input N	Connect input cables.
	AC INPUT/AC input L1	
	AC INPUT/AC input L2	
	AC INPUT/AC input L3	
	AC OUTPUT/AC output N	Connect output cables. The AC OUTPUT/AC output SL port connects to primary loads, and the AC OUTPUT/AC output PL port connects to secondary loads.
	AC OUTPUT/AC output SL	
	AC OUTPUT/AC output PL	
	EPO	Emergency power-off
	MBS	Maintenance bypass mode
	BATT TEMP	Connects the battery temperature sensor.
	USB	Supports the serial port communications protocol. The USB port can be used to export logs and send serial port commissioning commands.
	BATT.COM1	Used for battery communication
	COM2/CAN	Used for ECC800 communication

Port	Silk Screen	Function
 COM3_IN	COM3_IN	<ul style="list-style-type: none"> Support the Modbus-RTU communications protocol. Used for communication between parallel UPSs
 COM3_OUT	COM3_OUT	
 PARALLEL1/ 并机线1	PARALLEL1/Parallel cable 1	Connect UPS parallel cables.
 PARALLEL2/ 并机线2	PARALLEL2/Parallel cable 2	
 INTELLISLOT	INTELLISLOT/Intelligent slot	Reserved for an optional card

 **NOTE**

The COM2/CAN, COM3_IN, and COM3_OUT ports can be connected to the network management system (NMS) that supports only one protocol at a time.

Table 2-5 Port pin definitions

Appearance	Pin	BATT.COM1 Port	COM2/CAN Port	COM3_IN Port	COM3_OUT Port
 UG13100046	1	RS485+	-	RS485+	RS485+
	2	RS485-	-	RS485-	RS485-
	3	-	-	-	-
	4	RS485+	-	RS485+	RS485+
	5	RS485-	-	RS485-	RS485-
	6	-	-	-	-
	7	CANH3	CANH2	CANH2	CANH2
	8	CANL3	CANL2	CANL2	CANL2

 **NOTE**

Shielded network cables must be used as communications cables for the BATT.COM1, COM2/CAN, COM3_IN, COM3_OUT, and USB ports.

2.5 Product Configurations

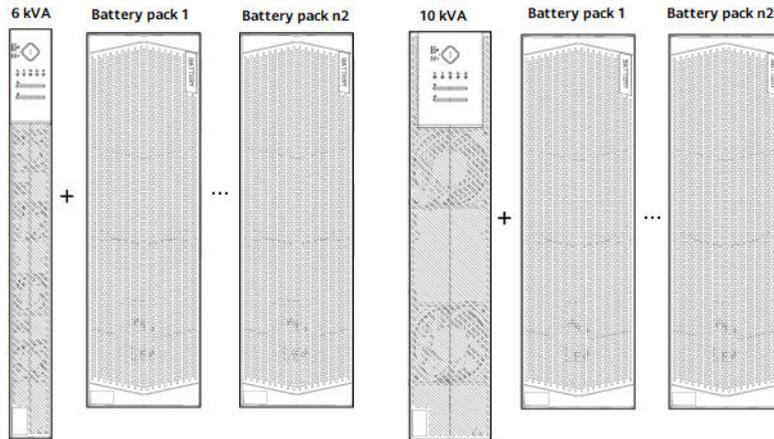
Table 2-6 Typical UPS configurations

Configuration	Application Scenario	Description
Single UPS	Supplies power to common loads.	6 kVA/10 kVA UPS: A maximum of four lead-acid battery packs can be connected in parallel.
Parallel system	Supplies power to large-sized data centers or important loads. It features high reliability and strong transient overload resistance capability.	<ul style="list-style-type: none"> A maximum of four UPSs can be connected in parallel. 6 kVA/10 kVA UPS: A maximum of four lead-acid battery packs can be connected in parallel. <p>NOTE Only single-phase and three-phase inputs support parallel connection.</p>

Table 2-7 Configuration relationship between UPSs and battery packs

UPS Model	Number of Parallel UPSs (n1)	Number of Battery Packs (n2)
6 kVA	1 (single)	1-4
	2	1-4
	3	1-4
	4	1-4
10 kVA	1 (single)	1-4
	2	1-4
	3	1-4
	4	1-4

Figure 2-12 Configuration of a single UPS (lead-acid batteries)

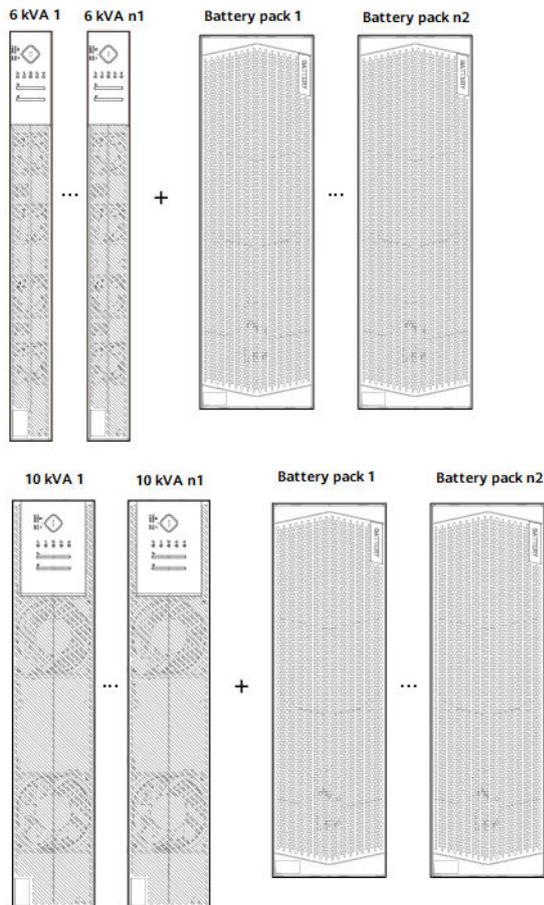


UG13100147

NOTE

- Single 6 kVA UPS (lead-acid batteries): The typical configuration is $n2 = 1$.
- Single 10 kVA UPS (lead-acid batteries): The typical configuration is $n2 = 1$.
- 6 kVA/10 kVA UPS (lead-acid batteries): The maximum value of $n2$ is 4.

Figure 2-13 Configuration of parallel UPSs (lead-acid batteries)



UG13100148

 NOTE

- Parallel 6 kVA UPSs (lead-acid batteries): The typical configuration is n1 = 2 and n2 = 2.
- Parallel 10 kVA UPSs (lead-acid batteries): The typical configuration is n1 = 2 and n2 = 2.
- Parallel 6 kVA/10 kVA UPSs (lead-acid batteries): The maximum values of n1 and n2 are both 4.

2.6 Optional Components

2.6.1 List of Optional Components

Table 2-8 List of UPS2000 optional components

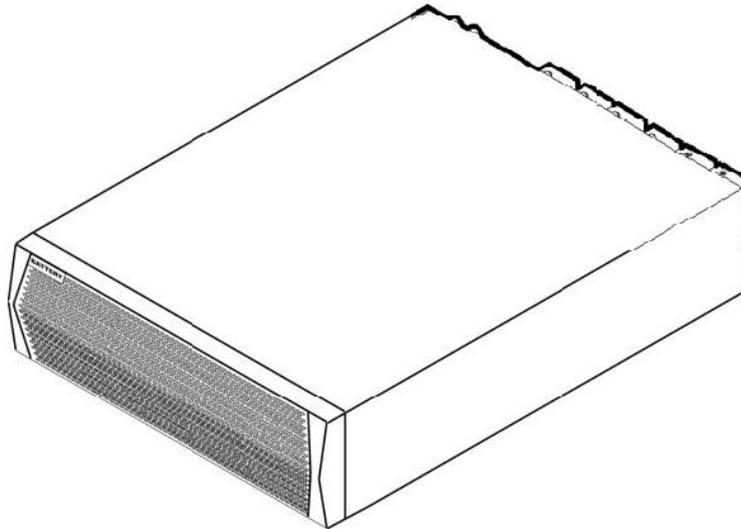
Optional Component	Model	Function	Remarks
Lead-acid battery pack (7 Ah, 20 batteries)	ESS-240V12-7AhBP VBA04	A battery pack consists of 20 built-in 12 V, 7 Ah/9 Ah VRLA batteries connected in series and is configured for the 6 kVA and 10 kVA UPSs. A maximum of four battery packs can be connected in parallel.	For details, see <i>ESS-240V12-(9AhBPVB A04, 7AhBPVBA04) Battery Pack Quick Guide</i> .
Lead-acid battery pack (9 Ah, 20 batteries)	ESS-240V12-9AhBP VBA04		
Ambient T/H sensor	-	Monitors ambient temperature and humidity.	<ul style="list-style-type: none"> • Used together with an SNMP card. • For details, see <i>Temperature and Humidity Sensor Quick Guide (02312PBL)</i>.
SNMP card	EN83CTLA	Monitors the UPS, provides the Ethernet networking solution, and enables ambient temperature and humidity detection. The SNMP card can be used to connect to the NMS.	<ul style="list-style-type: none"> • The BOM number of the SNMP card is 02354GJL. • For details, see <i>EN83CTLA SNMP Card User Manual</i>.
Dry contact card	EN83CTLC	Provides six dry contact outputs (normal mode, battery mode, bypass mode, low battery voltage, bypass backfeed, and UPS faults), as well as two dry contact control inputs (one is the shutdown signal input, and the other is reserved).	<ul style="list-style-type: none"> • The BOM number of the dry contact card is 02354GJK. • For details, see <i>EN83CTLC Dry Contact Card User Manual</i>.

Optional Component	Model	Function	Remarks
4G module	iIOT-WAC0411	Reports alarms and signals to the network management device (cloud NMS) in wireless mode.	Used together with an SNMP card. <ul style="list-style-type: none"> European standards or LTE FDD: B1/B2/B3/B4/B5/B7/B8/B20 DC-HSPA+/HSPA+/HSPA/UMTS: 850/900/1900/2100 MHz GSM/GPRS/EDGE: 850/900/1800/1900 MHz Used together with an SNMP card.
	iIOT-WAC0412		
PDU	PDC-0091V2ACIOA	Controls and protects input and output power flow, increases output sockets, and distributes input and output power of the 1+1 parallel systems.	-
Parallel cable	-	Connects UPSs in parallel.	A parallel cable is 1.5 meters long.
PDU parallel power cable	-	Serves as the input and output power cables for a parallel UPS system.	-
rPDU	PDU2000-16-1PH-8/0-B1	A professional cabinet-level power distribution unit. It can be widely used in various network cabinets and server cabinets to provide stable and reliable power distribution for IT devices in the cabinets.	-
	PDU2000-63-1PH-16/8-B1		
PG connection box	-	Used to provide cable inlets and outlets and secure the cables.	-
Guide rail	CA-RGR	Used in rack-mounted installation scenarios.	-
Footer and footer connector	<ul style="list-style-type: none"> Footer: UPSM00FOOT01 Footer connector: UPSM00FOOT00 	Used in tower-mounted installation scenarios.	-

2.6.2 Lead-Acid Battery Pack

A battery pack consists of 20 built-in 12 V, 7 Ah/9 Ah VRLA batteries connected in series and is configured for the 6 kVA and 10 kVA UPSs. A maximum of four battery packs can be connected in parallel.

Figure 2-14 Battery pack



NOTICE

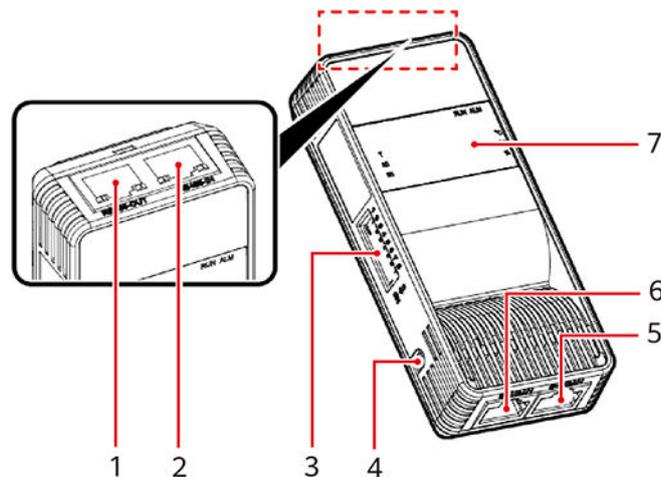
- The ESS-240V12-7AhBPVBA04 battery BOM number is 02313SBB.
- The ESS-240V12-9AhBPVBA04 battery BOM number is 02313SBA.
- When battery packs are connected in series or parallel, only battery packs of the same model and specifications can be added or used for replacement. Do not use battery packs of different models or specifications together. For details, see the battery pack nameplate. The following figures are for reference only.

<p style="text-align: center;"></p> <p style="text-align: center;">型号 Model: ESS-240V12-7AhBPVBA04</p> <p>电池包 Battery Pack: ≡ 240 V, 7 Ah 电池类型 Battery Type: VRLA Battery 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">CE   </p>	<p style="text-align: center;"></p> <p style="text-align: center;">型号 Model: ESS-240V12-7Ah PVBA04</p> <p>电池包 Battery Pack: ≡ 240 V, 7 Ah 电池类型 Battery Type: VRLA Battery 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">CE   </p>	<p style="text-align: center;"></p> <p style="text-align: center;">型号 Model: ESS-240V12-7AhBPVBA01</p> <p>电池包 Battery Pack: ≡ 240 V, 7 Ah 电池类型 Battery Type: VRLA Battery 电池规格 Battery Specification: ≡ 12 V, 7 Ah 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">EAC CE   </p>
<p style="text-align: center;">型号 Model: ESS-240V12-7AhBPVBA04</p> <p>电池包 Battery Pack: ≡ 240 V, 7 Ah 电池类型 Battery Type: VRLA Battery 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">CE   </p>	<p style="text-align: center;">型号 Model: ESS-240V12-9Ah PVBA04</p> <p>电池包 Battery Pack: ≡ 240 V, 9 Ah 电池类型 Battery Type: VRLA Battery 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">CE   </p>	<p style="text-align: center;">型号 Model: ESS-240V12-7AhBPVBA04</p> <p>电池包 Battery Pack: ≡ 240 V, 7 Ah 电池类型 Battery Type: VRLA Battery 电池数量 Battery Quantity: 20 PCS</p> <p style="text-align: center;">CE   </p>

2.6.3 Ambient T/H Sensor

Monitors ambient temperature and humidity.

Figure 2-15 Ambient T/H sensor



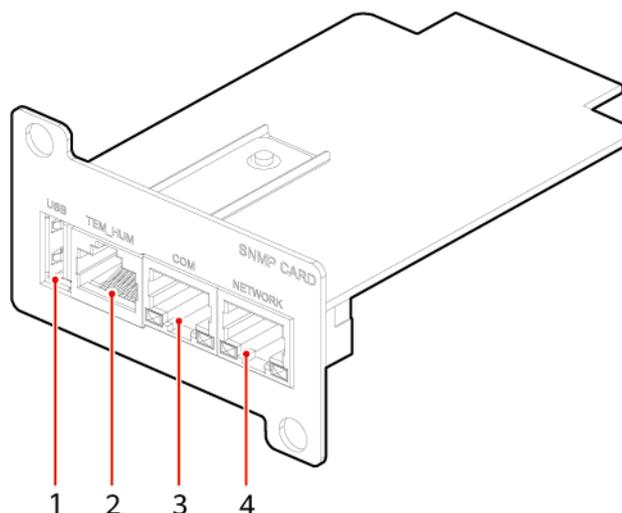
DF02W00023

- | | | | |
|---------------|--------------|----------------|------------|
| (1) RS485-OUT | (2) RS485-IN | (3) DIP switch | (4) Button |
| (5) Reserved | (6) Reserved | (7) Display | |

2.6.4 SNMP Card

The SNMP card is an optional monitoring component of the UPS. It provides SNMP agent and web management functions.

Figure 2-16 SNMP card



UG12W00003

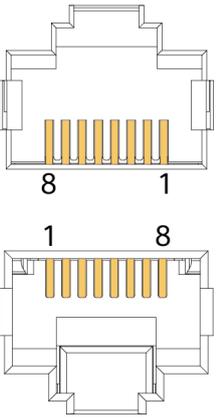
- | | |
|----------------|--|
| (1) USB port | (2) Signal detection port for the T/H sensor |
| (3) RS485 port | (4) Ethernet port |

The SNMP Ethernet port is a standard RJ45 port and can be connected to the Ethernet (10 Mbit/s or 100 Mbit/s) through a standard network cable. You can determine the communication status between the SNMP card and the Ethernet by observing the indicators, as described in the following table.

Table 2-9 Port function

Silk Screen	Name	Function
USB	USB port	Connects to the 4G module.
TEM_HUM	Signal detection port for the T/H sensor (ENR1DETA MODULE)	Connects to a T/H sensor.
COM	RS485 southbound port	Reserved
NETWORK	Ethernet port	<ul style="list-style-type: none"> Connects to the Ethernet through a standard network cable. Green off: No network cable is connected to the port. Steady yellow: A network cable is connected to the port. Blinking green: The network communication is normal.

Table 2-10 Port pin definitions

Appearance	Pin	TEM_HUM Port	COM Port	NETWORK Port
	1	RS485+	RS485+	CFG_TX+
	2	RS485-	RS485-	CFG_TX-
	3	12V_OUT	-	CFG_RX+
	4	RS485+	RS485+	-
	5	RS485-	RS485-	-
	6	-	-	CFG_RX-
	7	-	-	-
	8	GND	-	-

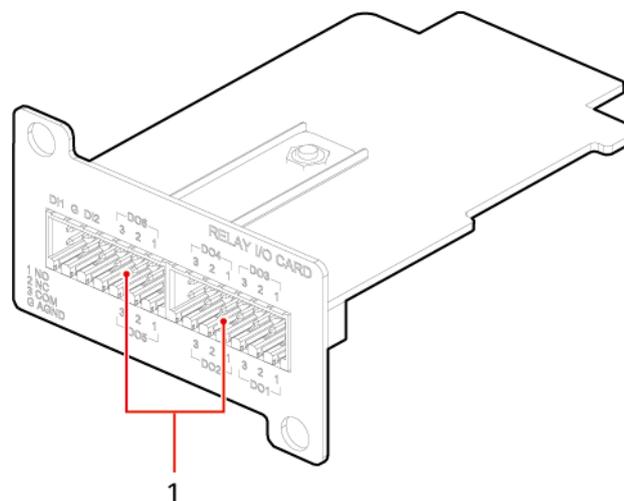
NOTE

- A CAN communications port on the UPS can be connected only to a single device that communicates over CAN, including in a parallel system. The UPS communicates with the SNMP card over CAN. The SNMP card and CAN communications ports (COM2/CAN) cannot be used at the same time.
- Shielded network cables must be used as communications cables for the TEM_HUM, COM, NETWORK, and USB ports.

2.6.5 Dry Contact Card

The dry contact card provides six alarm outputs which can be viewed and set on the app after the card is connected, as described in the following table. Specific alarms can be set for each dry contact through the monitoring board.

Figure 2-17 Dry contact card



UG12W00004

(1) Dry contact ports

Table 2-11 Functions of the dry contact card

Type	Function	Silk Screen	Definition
Output	Normal mode	DO1	Normal mode
	Battery mode	DO2	Battery mode
	Bypass mode	DO3	Bypass mode
	Low battery voltage	DO4	The monitoring system determines that the battery voltage is low based on the battery management solution.

Type	Function	Silk Screen	Definition
	Bypass backfeed	DO5	The power module reports a bypass backfeed alarm.
	The UPS is faulty.	DO6	An active critical alarm exists.
Input	Shutdown	DI1	An inverter shutdown command is issued.
	Reserved	DI2	Reserved

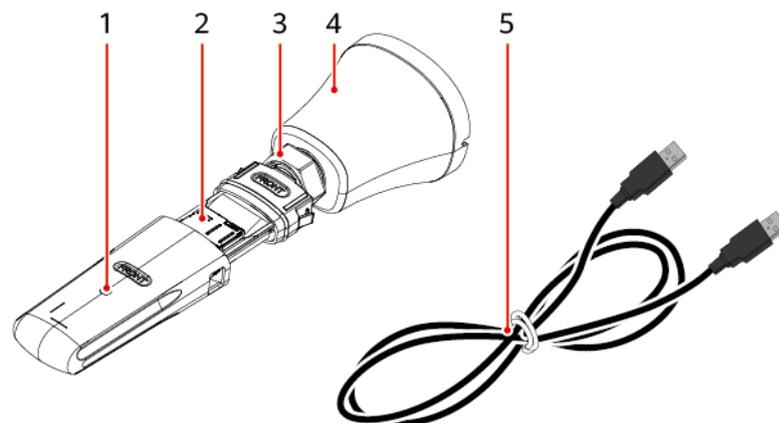
2.6.6 4G Module

NOTICE

- The 4G module requires high communication signal strength. Before using the 4G module, survey the signal strength.
- The mobile data transmission function of the 4G module cannot be used in a shielding equipment room.

After connecting to the USB port on the SNMP card using a USB 2.0 extension cable, the 4G module can report alarms and signals to the network management device (cloud NMS) in wireless mode.

Figure 2-18 4G module



UF02W00015

(1) Indicator

(2) SIM card installation position

(3) Module installation port

(4) Base

(5) USB cable

NOTE

The length of the USB cable can be 1 m or 4 m. Select a proper length based on the site requirements.

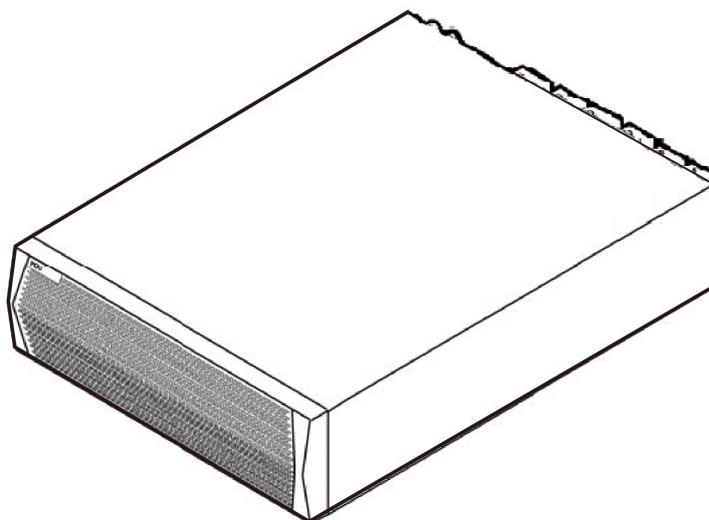
Table 2-12 Indicator description

Indicator Color	Indicator Status	Description
Green	Blinking slowly: at an interval of 2s, on for 0.2s and off for 1.8s alternately	The backhaul module has no service, the service is restricted, or the network is being searched.
	Blinking slowly: at an interval of 2s, on for 1.8s and off for 0.2s alternately	The backhaul module has successfully registered with the network or is in the standby state.
	Blinking fast: on for 0.125s and off for 0.125s	The backhaul module has set up a dialup connection or data is being transmitted.

2.6.7 PDU

The PDU controls and protects input and output power flow, increases output sockets, and distributes input and output power of the 1+1 parallel systems.

Figure 2-19 PDU



2.6.8 rPDU

The rPDU is a professional cabinet-level power distribution unit. It can be widely used in various network cabinets and server cabinets to provide stable and reliable power distribution for IT devices in the cabinets.

Figure 2-20 Horizontal PDU2000-16-1PH-8/0-B1 (unit: mm)

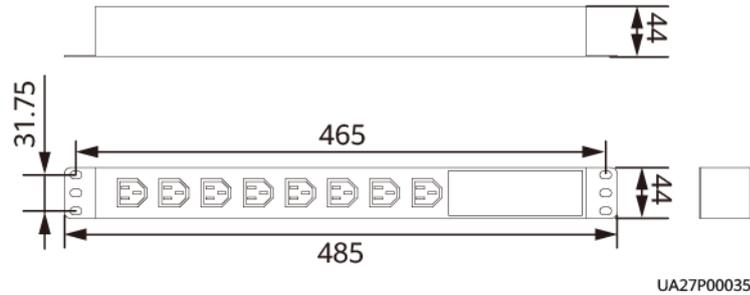
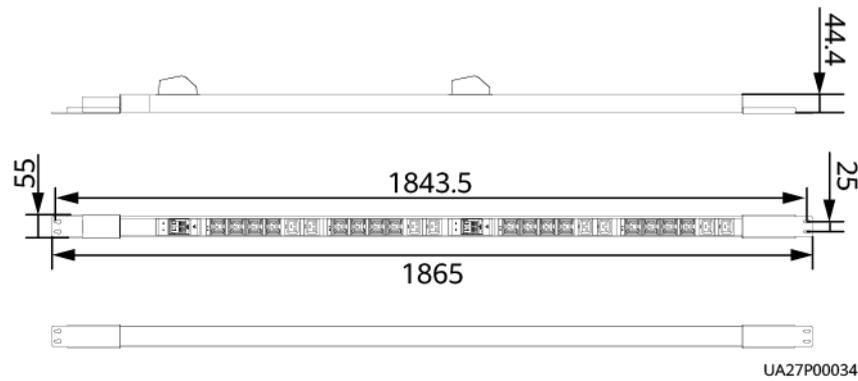


Figure 2-21 Vertical PDU2000-63-1PH-16/8-B1 (unit: mm)



NOTE

Figures provided in this document are for reference only.

Table 2-13 rPDU technical specifications

Type	Model	Output Port
IEC	PDU2000-16-1PH-8/0-B1	8 x C13
IEC	PDU2000-63-1PH-16/8-B1	16 x C13 + 8 x C19

2.6.9 PG Box

Figure 2-22 6 kVA PG box

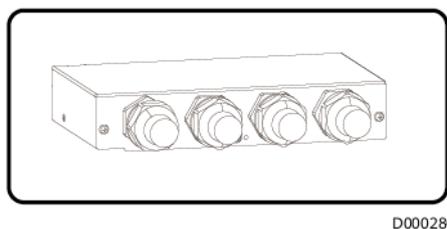
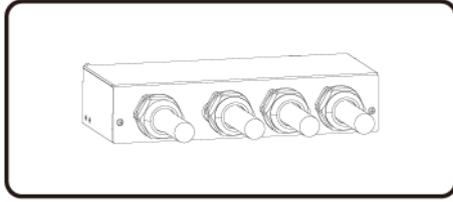


Figure 2-23 10 kVA PG box



D000281

3 Technical Specifications

Table 3-1 Physical specifications

Item	6 kVA	10 kVA
Dimensions (H x W x D)	43 mm x 442 mm x 505 mm	86 mm x 442 mm x 505 mm
Weight	11 kg	16 kg
IP rating	IP20	

Table 3-2 Environmental specifications

Item	Specifications
Operating temperature	-5°C to +50°C Temperature derating coefficient: -5°C ≤ T ≤ +40°C: not derated; 41°C < T ≤ 45°C: derated to 0.9 times of rated output power; 46°C < T ≤ 50°C: derated to 0.8 times of rated output power
Relative humidity	0%-95% RH (non-condensing)
Altitude	0-4000 m When the altitude is greater than 1000 m, the power is derated as described in IEC 62040-3. The highest operating altitude is 4000 m.
Storage and transportation temperature	-40°C to +70°C

Table 3-3 Mains input electrical specifications

Item	6 kVA	10 kVA	
	Single-Phase Input	Single-Phase Input	Three-Phase Input
Power system	1Ph (L/N) + PE	1Ph (L/N) + PE	3Ph (L1/L2/L3/N) + PE
Rated input voltage	220 V AC/230 V AC/240 V AC	220 V AC/230 V AC/240 V AC	380 V AC/400 V AC/415 V AC
Input voltage range	Phase voltage: 80 V AC to 280 V AC (When the ambient temperature ranges from -5°C to +40°C, the load is linearly derated from 100% to 40% when the voltage ranges from 176 V AC to 80 V AC.)	Phase voltage: 80 V AC to 280 V AC (When the ambient temperature ranges from -5°C to +40°C, the load is linearly derated from 100% to 40% when the voltage ranges from 176 V AC to 80 V AC.)	Line voltage: 138 V AC to 484 V AC (When the ambient temperature ranges from -5°C to +40°C, the load is linearly derated from 100% to 40% when the voltage ranges from 176 V AC to 80 V AC.)
Rated frequency	50 Hz/60 Hz		
Frequency range	40-70 Hz		
Input power factor	≥ 0.99 (100% resistive load)		
Generator input capacity	Minimum: 1.35 times of the UPS rated capacity		
Overvoltage category	OVC II		

Table 3-4 Bypass input electrical specifications

Item	Specifications
Power system	Single-phase, three-wire
Input voltage	220 V AC/230 V AC/240 V AC

Item	Specifications
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%
Rated frequency	50 Hz/60 Hz
Frequency range	50/60±6 Hz (adjustable with a tolerance of 0.5-6 Hz, ±2 Hz by default)
Input system	Supports only one power source.
Overvoltage category	OVC II

Table 3-5 Output electrical specifications

Item	Specifications
Power system	Single-phase, three-wire
Rated output voltage	220 V AC/230 V AC/240 V AC
Output power factor	1
Output voltage tolerance	±1%
Output short-circuit current	<ul style="list-style-type: none"> • 6K: I_{peak}: 3.5 kA; I_{rms}: 2.5 kA • 10K: I_{peak}: 4.0 kA; I_{rms}: 3.0 kA
Voltage distortion	<ul style="list-style-type: none"> • Linear load THD < 1% @ Input voltage THD_v < 5% • Non-linear load THD < 3% @ Input voltage THD_v < 5%

Item	Specifications
Inverter overload capability	<ul style="list-style-type: none"> ● Normal mode: <ul style="list-style-type: none"> - 105% < load ≤ 125%: transfers to bypass mode after 10 min - 125% < load ≤ 150%: transfers to bypass mode after 60s - Load > 150%: transfers to bypass mode after 200 ms ● Battery mode: <ul style="list-style-type: none"> - 100% ≤ load < 105%: loaded for a long time - 105% ≤ load < 125%: for 30s - Load ≥ 125%: for 200 ms <p>NOTE In battery mode, with the rated input voltage, the UPS transfers to the bypass mode if the bypass is normal and stops supplying power if the bypass is abnormal.</p>
Bypass overload capability	When the ambient temperature is below 40°C: <ul style="list-style-type: none"> ● Load ≤ 125%: overload for extended periods ● 125%–150% load: no output after 60s ● Load > 150%: no output after 200 ms
Dynamic voltage transient	≤ ±5%
Average frequency tracking rate	0.1–2 Hz/s, 2 Hz/s for a single UPS, 1 Hz/s for a parallel system
Load adaptability	Resistive load, resistive-capacitive load, inductive load (50%), rectification load, capacitive load, half-wave load, and half-wave rectification load

Table 3-6 Battery electrical specifications

Item	Specifications
Battery voltage	Lead-acid battery: 12 V battery, 12–20 batteries, 0 batteries by default If there are 16 or more batteries, the output power is not derated. If there are fewer than 16 batteries, the output power is derated by 10% each time one battery is removed.
Battery cold start	If a mains outage occurs, batteries can start the UPS to supply power to loads.
Charger output power	Rated full load, maximum charge power: 1.8 kW (for 6 kVA), 3 kW (for 10 kVA)

Item	Specifications
Charge voltage	Lead-acid battery: <ul style="list-style-type: none"> Equalized charging voltage range: 2.3–2.4 V/cell; default voltage: 2.35 V/cell Float charging voltage range: 2.23–2.3 V/cell; default voltage: 2.25 V/cell
Battery type	VRLA (lead-acid battery)
Battery string sharing	Supported

Table 3-7 System electrical specifications

Item	Specifications
Number of parallel UPSs	4
No-load loss	<ul style="list-style-type: none"> 6 kVA: < 60 W 10 kVA: < 90 W Note: rated input, rated output, no load, no battery connected, no optional card
Power distribution system	TN, TN-C, TN-CS, TT

Table 3-8 Safety compliance

Safety Certification	Standard
CE	EN 62040-1
CB	IEC 62040-1
TUV	EN 62040-1
CQC	CQC 3108
TLC	YD/T 2165

Table 3-9 EMC

Item	Standards Compliance
Conducted emission (CE)	EN/IEC 62040-2, C2
Radiated emission (RE)	EN/IEC 62040-2, C2
Low-frequency signal immunity	IEC 61000-2-2

Item	Standards Compliance
Electrostatic discharge (ESD) immunity	IEC 61000-4-2
Conducted susceptibility (CS)	EN/IEC 62040-2 EN/IEC 61000-4-6
Radiated susceptibility (RS)	EN/IEC 62040-2 EN/IEC 61000-4-3
Electrical fast transient	EN/IEC 62040-2 IEC 61000-4-4
Power frequency magnetic field	IEC 61000-4-8
Voltage dip	IEC 61000-4-11
Surge	IEC 61000-4-5, AC input port: 6 kV in differential mode, 6 kV in common mode
Lightning protection	AC input port: 5 kA in common mode

4 Transportation and Storage

4.1 General Requirements

The requirements for moving heavy objects are as follows:

- Be cautious to avoid injury when moving heavy objects.
- When moving the equipment by hand, wear protective gloves to prevent injuries.
- When moving or lifting the equipment, hold the handle or bottom of the equipment.
- Avoid scratching the cabinet surface or damaging cabinet components or cables during equipment transportation.

4.2 Transportation Requirements

The equipment can be transported to the site by land and water. The transportation requirements are as follows:

- Choose sea or a road with good conditions for transportation to ensure equipment safety and avoid tilt or jolt.
- The packing case must be secured for transportation, and printed with signs such as anti-collision and moisture prevention in compliance with local regulations.
- The packing case cannot be placed upside down or tilted, and must be protected against falling down, mechanical impact, rains, snows, and falling into water during transportation.

4.3 Storage Requirements

- The storage environment must meet the following requirements:
 - Be dry, ventilated, clean, and free from conductive metal dust.
 - Be free from direct sunlight, rain, and infrared radiation.

- Be free from corrosive materials, such as organic solvents and corrosive gases.
- Be at least 2 m away from heat sources (such as a heating device) and away from fire sources, water sources, and flammable and explosive materials.
- Storage temperature: -40°C to $+70^{\circ}\text{C}$
- Relative humidity: $\leq 95\%$ RH
- The equipment packing case must be intact.
- The equipment storage duration should not exceed the warranty period. If the warranty period expires, dispose of the equipment.

5 Installation and Cable Connection

5.1 Installation Preparations

NOTICE

- A circuit breaker needs to be installed in the upstream of the UPS to facilitate maintenance.
- If a single UPS is configured with lead-acid batteries, the leakage current of the 6 kVA UPS and 10 kVA UPS is less than or equal to 50 mA, respectively. When selecting a residual current circuit breaker, consider the leakage current of the UPS and its downstream loads.
- When UPSs are connected in parallel, the output parallel power cables of each UPS must be at least 1 m long and the length deviation must be less than $\pm 10\%$. The four cables must be connected at the remote end.
- Check the lead-acid battery voltage range: Use a multimeter to measure the voltage between the positive and negative battery terminals. Voltage range: $9.6 \text{ V} \times \text{Number of batteries}$ to $14.4 \text{ V} \times \text{Number of batteries}$. For example, if 20 batteries are installed, the voltage between the positive and negative battery terminals should range from 192 V ($20 \times 9.6 \text{ V}$) to 288 V ($20 \times 14.4 \text{ V}$).
- If the upstream input switch of the UPS is equipped with a residual current circuit breaker, you are advised to check the leakage current before installing the UPS. The leakage current of the UPS is less than or equal to 50 mA. Ensure that the system leakage current does not exceed the rated value of the upstream residual current circuit breaker after the UPS is installed. Otherwise, the circuit breaker may trip for protection. Example: The upstream residual current circuit breaker for the UPS has a rated leakage current of 300 mA. The system leakage current reaches 250 mA before UPS installation. The leakage current of the UPS is less than or equal to 50 mA. After the UPS is installed, the leakage current of the system may be greater than 300 mA ($250 \text{ mA} + 50 \text{ mA}$). In this case, the upstream circuit breaker will trip for protection.

5.1.1 Site Planning

Floor Loading Capacity

Ensure that the floor can bear the weight of the UPS and its optional components.

Installation Environment

- Do not install the UPS in a hot, cold, or damp place that is beyond the technical 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.

Clearances

NOTICE

Ensure that the distance between UPS air vents and a wall or obstacle is greater than or equal to 500 mm.

Clearances should be reserved around the chassis to facilitate ventilation and operations. Clearances of at least 500 mm should be reserved in front of and behind the chassis.

Figure 5-1 Clearances for the 6 kVA model (unit: mm)

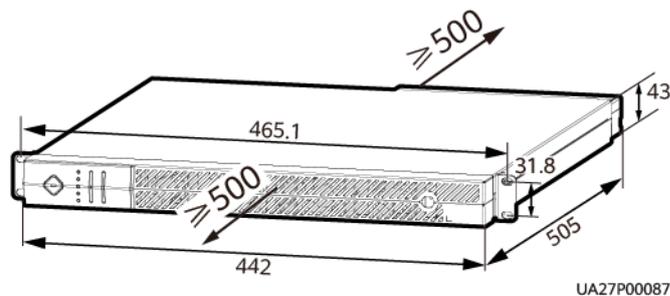
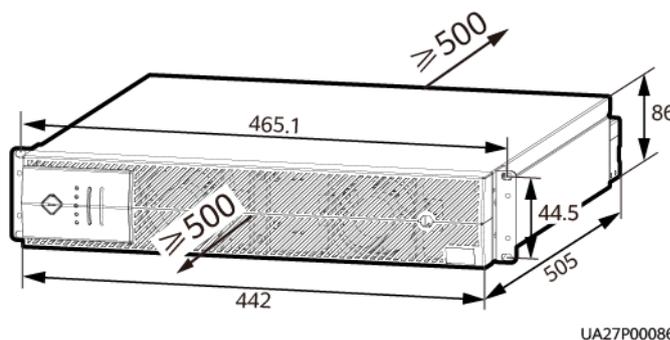


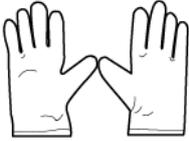
Figure 5-2 Clearances for the 10 kVA model (unit: mm)



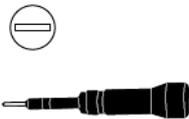
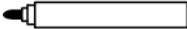
5.1.2 Tools

The onsite operation personnel can select tools based on the site requirements.

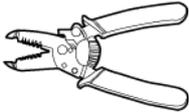
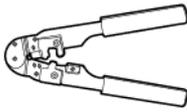
Personal protective equipment

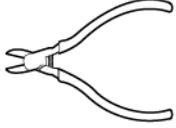
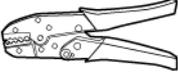
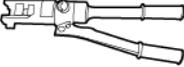
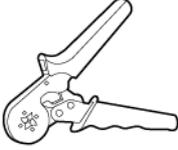
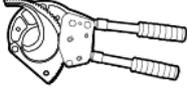
			
Safety helmet	Goggles	Protective shoes	Reflective vest
			-
ESD gloves	Insulated gloves	Protective gloves	

Hardware installation tools

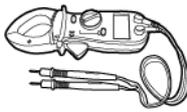
			
Flat-head insulated torque screwdriver (2 mm)	Phillips insulated torque screwdriver (M4/M6)	Utility knife	Marker

Cable installation tools

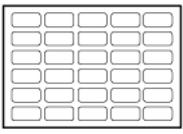
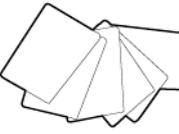
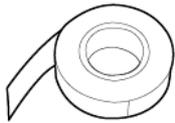
			
Wire stripper	RJ45 crimping tool	Electro-hydraulic pliers	Heat gun

 <p>Diagonal pliers</p>	 <p>Crimping tool</p>	 <p>Hydraulic pliers</p>	 <p>Cord end terminal crimping tool</p>
 <p>Cable cutter</p>	-	-	-

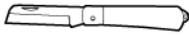
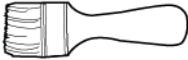
Measurement instruments

 <p>Clamp meter</p>	 <p>Multimeter</p>	 <p>Network tester</p>	-
---	--	---	---

Engineering auxiliary materials

 <p>Label</p>	 <p>Cable tie</p>	 <p>Cotton cloth</p>	 <p>Heat-shrink tubing</p>
 <p>Insulation tape</p>	-	-	-

Other tools

			
Electrician's knife	Tweezers	Brush	Vacuum cleaner

5.1.3 Materials

Item	Description	Type
Standard material	This type of materials is delivered with the equipment and can be obtained from the fittings bag.	Materials in the packing list
Auxiliary material	Customers can purchase this type of materials from the supplier or other vendors.	Power cable
Optional material	Customers can purchase this type of materials from the supplier based on application scenarios.	Battery

5.1.4 Power Cables

- The cables need to be selected according to the site survey data. The cable recommendation is for your reference only.
- The cables must be flame-retardant, and the flame spread rating of the cables must meet the UL 1581 VW-1, IEC 60332-3-22 (ZB), or higher requirements.
- When selecting, connecting, and routing cables, follow local safety regulations and rules.
- When the external conditions such as cable routing or ambient temperature change, perform verification in accordance with the IEC 60364-5-52 or local regulations.
- Cable type: copper flexible cable whose conductor supports the maximum operating temperature of 90°C

NOTICE

- A circuit breaker needs to be installed in the upstream of the UPS to facilitate maintenance.
- The UPS can generate large leakage currents. An RCD is not recommended. If leakage protection is required, select a recommended circuit breaker.
- If a single UPS is configured with lead-acid batteries, the leakage current of the 6 kVA UPS and 10 kVA UPS is less than or equal to 50 mA, respectively. When selecting a residual current circuit breaker, consider the leakage current of the UPS and its downstream loads.
- If battery cables and output cables are too long, line loss, failure points, and interference to other electrical devices will increase. It is recommended that the cable length be less than or equal to 10 m.
- In a parallel system, the length and specifications of power cables on each UPS should be the same to achieve current equalization in bypass mode. The power cables include bypass input power cables and UPS output power cables.

Table 5-1 Recommended power cable specifications (6 kVA UPS, single-phase input and single-phase output)

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
6 kVA (single-phase input, single-phase output)	Input	IN_N/ Input N	1	220 V AC/230 V AC/240 V AC	50 A/2 P (characteristic D)	6 mm ²	OT-6 mm ² -M4-90° bending
		IN_L/ Input L					
		PE	-	-	-	10 mm ²	OT-10 mm ² -M4-90° bending
	Output	OUT_N/ Output N	1	220 V AC/230 V AC/240 V AC	40 A/2 P (characteristic C)	6 mm ²	OT-6 mm ² -M4-90° bending
OUT_SL/ Output SL							
		OUT_PL/ Output PL					
		PE	-	-	-	10 mm ²	OT-10 mm ² -M4-90° bending

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
	Battery (lead-acid battery)	BAT+/ Battery+/ BAT-/ Battery-/PE	-	144 V DC to 240 V DC (12-20 PCS of 12 V batteries)	50 A/2 P (characteristic D)	2 x 4 mm ²	OT-10 mm ² -M4-90° bending
Torque for tightening M4 screws: 1.2 N·m							

Table 5-2 Recommended power cable specifications (10 kVA UPS, single-phase input single-phase output)

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
10 kVA (single-phase input single-phase output)	Input	AC INPUT/AC input L2	1	220 V AC/230 V AC/240 V AC	80 A/2 P (characteristic D)	16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input N				16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input PE				16 mm ²	OT-16 mm ² -M6-90° bending
	Output	AC OUTPUT/AC output SL	1	220 V AC/230 V AC/240 V AC	63 A/2 P (characteristic C)	16 mm ²	OT-16 mm ² -M6-90° bending
		AC OUTPUT/AC output PL				16 mm ²	OT-16 mm ² -M6-90° bending
		AC OUTPUT/AC output N				16 mm ²	OT-16 mm ² -M6-90° bending
		AC OUTPUT/AC output PE				16 mm ²	OT-16 mm ² -M6-90° bending

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
	Battery (lead-acid battery)	BATTERY/Battery +	-	144 V DC to 240 V DC (12–20 PCS of 12 V batteries)	100 A/2 P (characteristic D)	2 x 6 mm ²	OT-16 mm ² -M6-90° bending
		BATTERY/Battery -				2 x 6 mm ²	OT-16 mm ² -M6-90° bending
		BATTERY/Battery PE				2 x 6 mm ²	OT-16 mm ² -M6-90° bending
Torque for tightening M6 screws: 4.8 N·m							

Table 5-3 Recommended power cable specifications (10 kVA UPS, three-phase input single-phase output)

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
10 kVA (three-phase input single-phase output)	Input	AC INPUT/AC input L1	3	380 V AC/400 V AC/415 V AC	80 A ^a /4 P (characteristic D)	16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input L2				16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input L3				16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input N				16 mm ²	OT-16 mm ² -M6-90° bending
		AC INPUT/AC input PE				16 mm ²	OT-16 mm ² -M6-90° bending
	Output	AC OUTPUT/AC output SL	1	220 V AC/230 V AC/240 V AC	63 A/2 P (characteristic C)	16 mm ²	OT-16 mm ² -M6-90° bending

Model	Wiring Terminal		Number of Phases	Rated Voltage	External Circuit Breaker	Cable Cross-Sectional Area	Terminal Type
		AC OUTPUT/AC output PL				16 mm ²	OT-16 mm ² -M6-90° bending
		AC OUTPUT/AC output N				16 mm ²	OT-16 mm ² -M6-90° bending
		AC OUTPUT/AC output PE				16 mm ²	OT-16 mm ² -M6-90° bending
	Battery (lead-acid battery)	BATTERY/Battery +	-	144 V DC to 240 V DC (12–20 PCS of 12 V batteries)	100 A/2 P (characteristic D)	2 x 6 mm ²	OT-16 mm ² -M6-90° bending
		BATTERY/Battery -				2 x 6 mm ²	OT-16 mm ² -M6-90° bending
		BATTERY/Battery PE				2 x 6 mm ²	OT-16 mm ² -M6-90° bending
<ul style="list-style-type: none"> • a: In bypass mode, the UPS obtains power from phase A, and the input current is the total three-phase current. • Torque for tightening M6 screws: 4.8 N·m 							

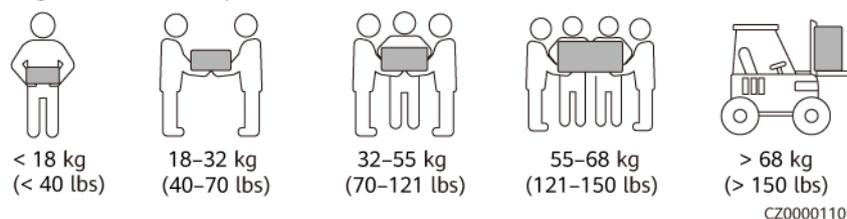
 NOTE

- Purchase input and output power cables based on site requirements. You are advised to use cables that comply with standards such as UL 758 or IEC 60228.
- Use power cables made of soft conductors that work at 90°C or even softer conductors. If you use power cables made of solid conductors or twisted conductors, the cables may fail to be connected.

5.1.5 Unpacking and Checking

Context

Figure 5-3 Transportation rules



NOTICE

- Only trained personnel are allowed to move the equipment.
- Do not move the equipment by holding its mounting ears, front panel, wiring terminal cover, or control panel.
- Move the chassis with caution. Any bumping or falling may damage the equipment. After placing the equipment, unpack it carefully to prevent scratches.

Procedure

- Step 1** Verify that the UPS packaging is intact. If any damage is found, notify the carrier immediately.
- Step 2** Move the equipment to the specified position.
- Step 3** Remove the packing materials. Check whether the UPS exterior is in good condition and free of collision marks or scratches. If any damage is found, notify the carrier immediately.
- Step 4** Check the type and quantity of fittings against the packing list. If some fittings are missing or do not match the models in the packing list, record the information and contact the supplier immediately.

----End

5.2 Installing a Single UPS

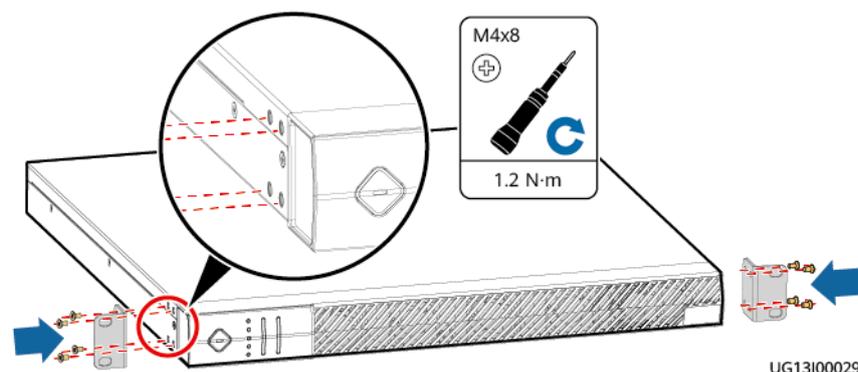
5.2.1 Rack-Mounted Installation

5.2.1.1 Installing the UPS and Lead-Acid Batteries

Procedure

- Step 1** Install mounting ears on both sides of the UPS.

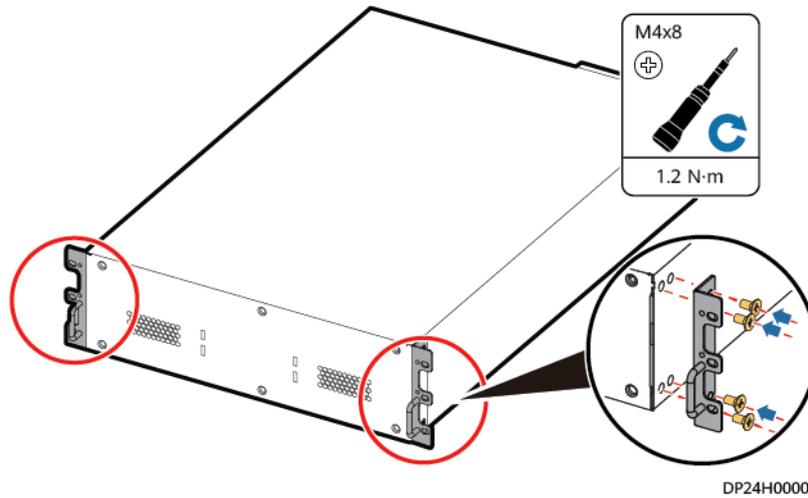
Figure 5-4 Installing UPS mounting ears



UG13100029

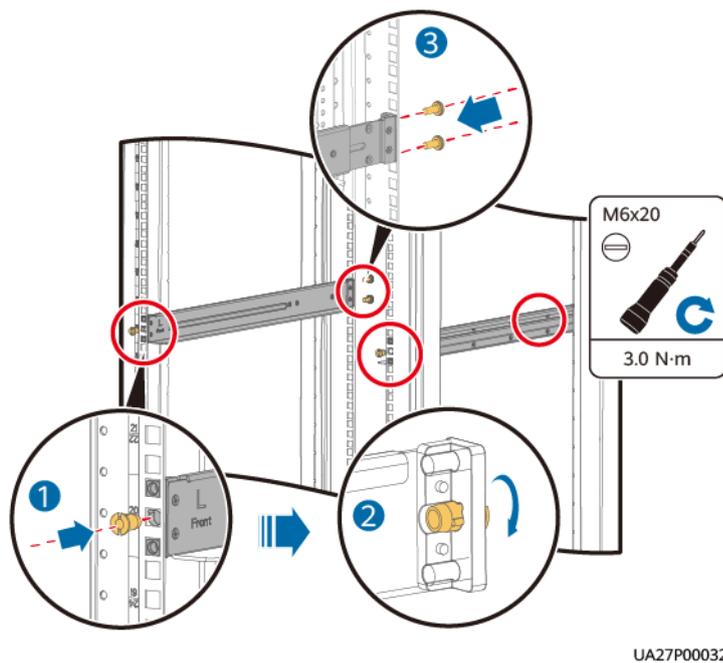
Step 2 Install mounting ears on both sides of the battery.

Figure 5-5 Installing battery mounting ears



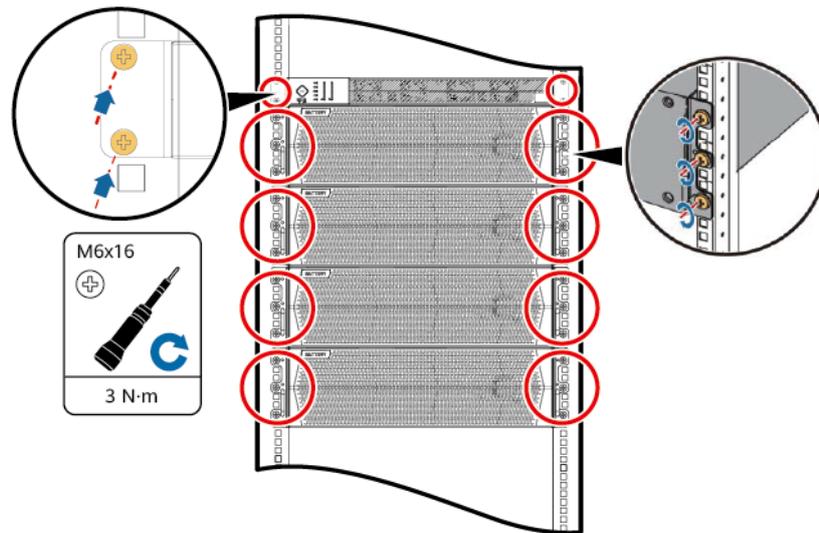
Step 3 Take out the guide rails from the fittings and install them on the rack.

Figure 5-6 Installing the guide rails



Step 4 Install the UPS and batteries with mounting ears on the rack, and then install the battery front panels.

Figure 5-7 Installing the UPS and batteries



UG13H00001

----End

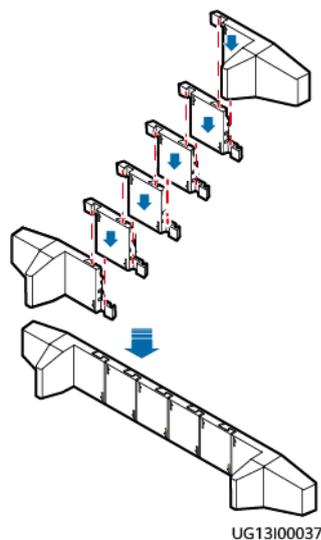
5.2.2 Tower-Mounted Installation

5.2.2.1 Installing the UPS and Lead-Acid Batteries

Procedure

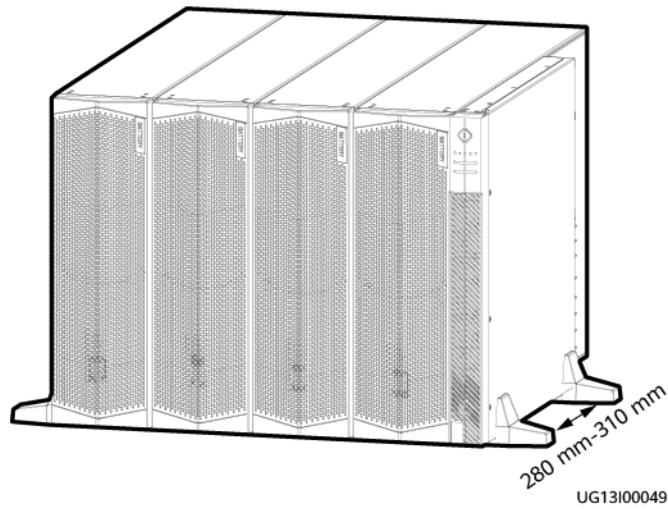
Step 1 Assemble the support bases.

Figure 5-8 Assembling a support base



Step 2 Place the UPS and batteries on the support bases.

Figure 5-9 Placing the UPS and batteries

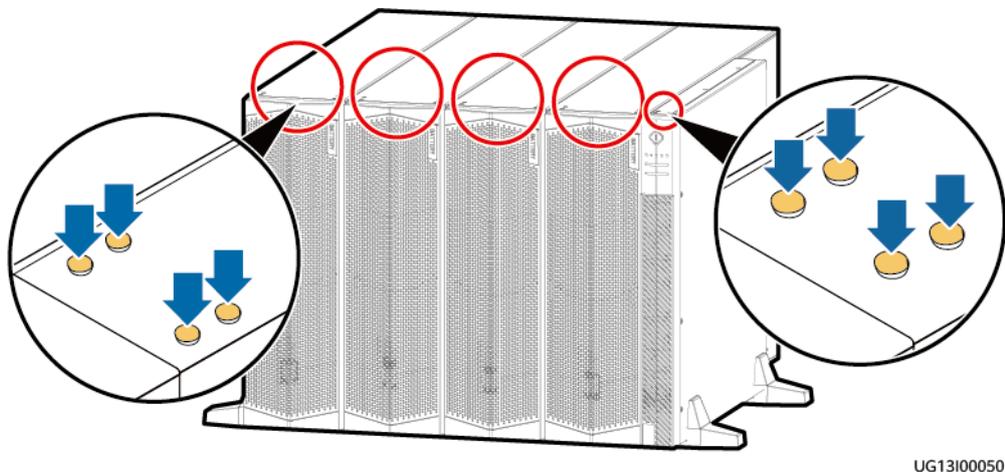


NOTE

For tower-mounted installation, you are advised to place batteries on the left side of the UPSs, as shown in the figure.

Step 3 Install rubber plugs.

Figure 5-10 Installing rubber plugs



----End

5.2.3 Installing Cables

NOTICE

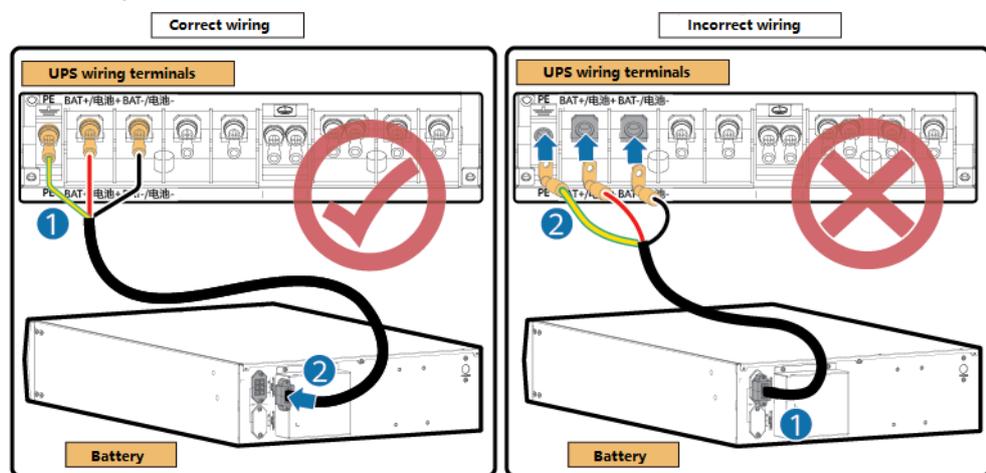
- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks during power-on and result in personal injury and equipment damage.
- Use the terminals delivered with the UPSs or purchase right-angle terminals. Do not bend common terminals to prepare cables.
- Prepare terminals onsite. The stripped length of the cable insulation layer should be the same as that of the part of the terminal that covers the conductor.
- When stripping the insulation layer of the power cable, do not damage the conductor of the power cable.
- Do not use a heat gun to heat the heat shrink tubing for an extended period. Ensure that the heat shrink tubing is tightly connected to the connector to avoid damaging the insulation layer.
- After installing cables, clean the top, bottom, and wiring terminals of the UPSs. Ensure that there is no dust or scraps around the UPSs.

Cables are installed in the same way for the 6 kVA and 10 kVA models. This section uses the 6 kVA model as an example.

5.2.3.1 Cable Routes

NOTICE

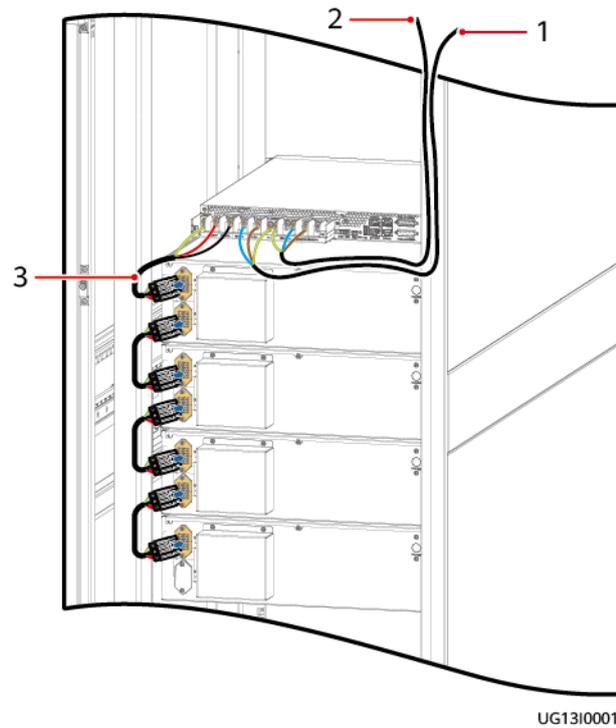
- It is recommended that switches be installed for battery cables. Customers need to purchase switches by themselves. For details about the battery circuit breaker specifications, see [5.1.4 Power Cables](#).
- Install battery cables in the following sequence: 1. Install cables at the battery terminals on the UPS side. 2. Install cables at the battery terminals on the battery side.



UA27P00093

Cable Routes for the UPSs and Lead-Acid Batteries

Figure 5-11 Cable routes for a single UPS (rack-mounted)

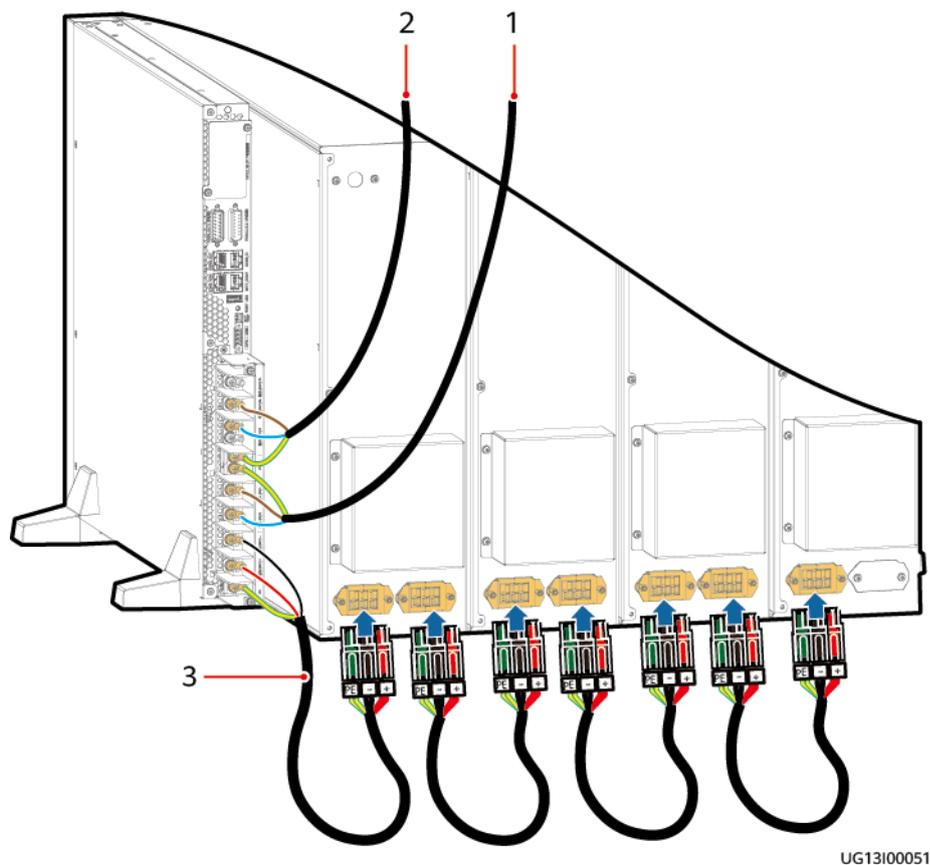


(1) AC input power cable

(2) AC output power cable

(3) Battery cable

Figure 5-12 Cable routes for a single UPS (tower-mounted)



UG13100051

(1) AC input power cable (2) AC output power cable (3) Battery cable

5.2.3.2 Precautions

NOTICE

- Connect UPS AC input and output power cables in the same phase sequence. Connect battery ports correctly.
- Before connecting cables to the UPS, ensure that the input circuit breaker and output circuit breaker are OFF to prevent operations with power on.
- If the input or output power cables have to be changed, contact the technical support if you are not familiar with the operation. Do not power on the UPS directly after the replacement.
- If the input or output system is changed, ensure that the short-circuit copper bar status and cable connections at input and output ports are correct.
- For a single UPS, connect loads to AC OUTPUT SL and PL terminals. Connect primary loads to the SL terminal and secondary loads to the PL terminal.

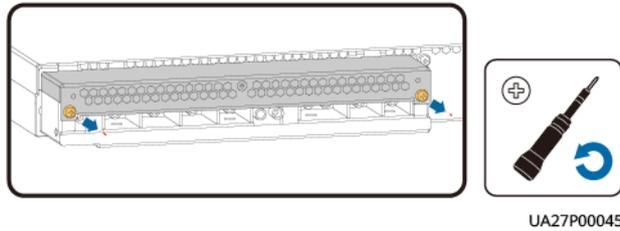
5.2.3.3 Installing Cables (with a PG Connection Box)

5.2.3.3.1 6 kVA

Step 1 Switch off the upstream AC circuit breaker for the UPS.

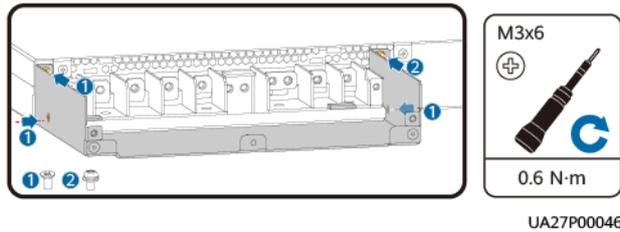
Step 2 Remove the top cover from the connection box.

Figure 5-13 Removing the top cover from the connection box



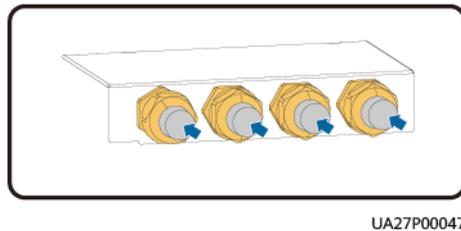
Step 3 Install the lower shell of the PG box.

Figure 5-14 Installing the lower shell of the PG box



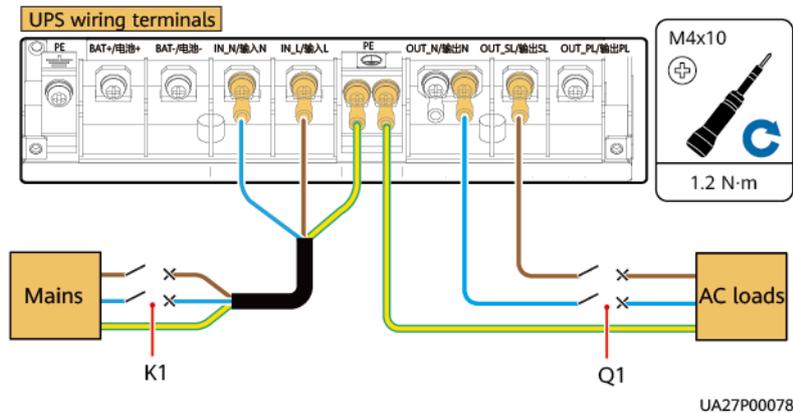
Step 4 Route the cable through the gland.

Figure 5-15 Routing the cable through the gland



Step 5 Install AC output power cables and then AC input power cables in sequence.

Figure 5-16 Installing AC power cables



Step 6 Install battery cables.

1. Install battery terminals on the UPS side.
2. Install battery terminals on the battery side.

Figure 5-17 Installing battery cables (two battery packs)

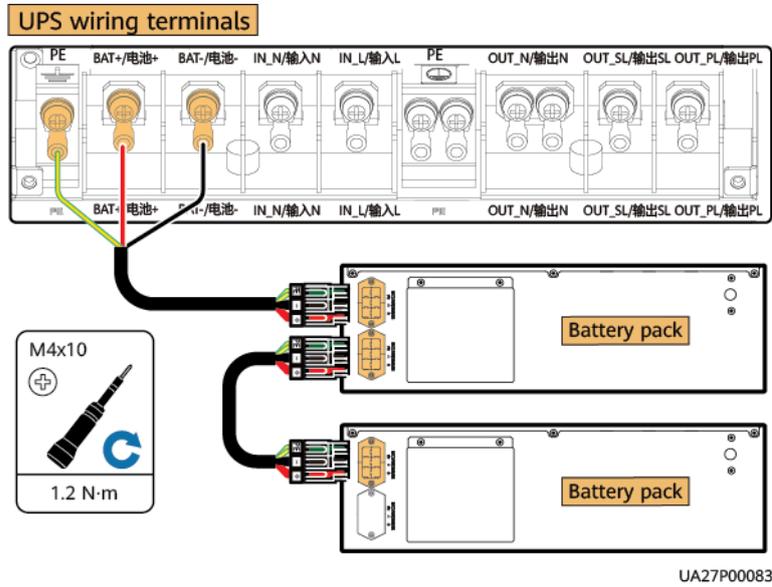
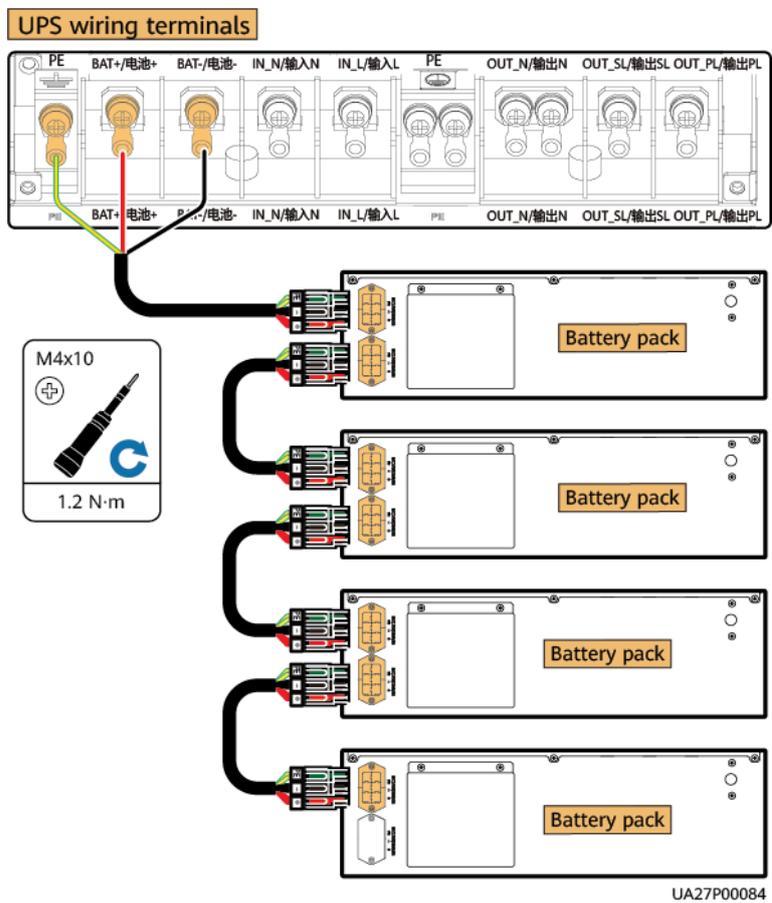


Figure 5-18 Installing battery cables (four battery packs)

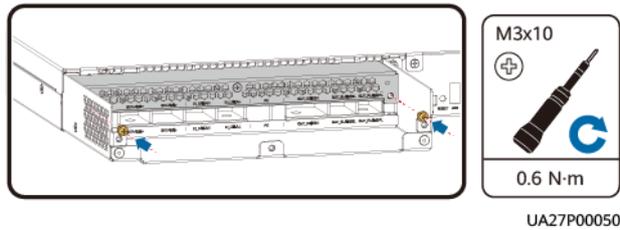


NOTE

It is recommended that switches be installed for battery cables. Customers need to purchase switches by themselves. For details about the battery circuit breaker specifications, see [5.1.4 Power Cables](#).

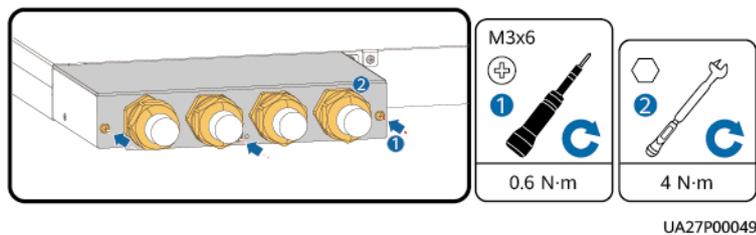
Step 7 Install the top cover from the connection box.

Figure 5-19 Installing the top cover from the connection box



Step 8 Move the top cover of the PG box to the assembly position and tighten the PG connector.

Figure 5-20 Reinstalling the PG box cover



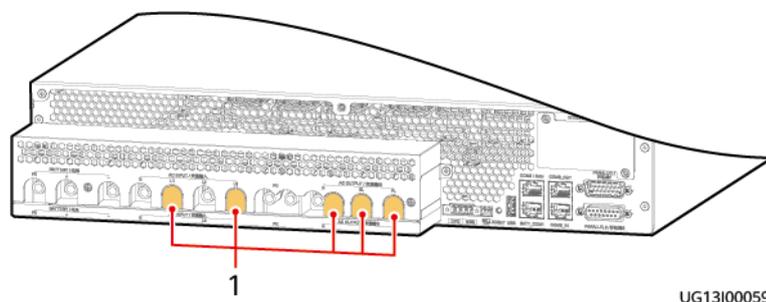
----End

5.2.3.3.2 10 kVA

Context

Use diagonal pliers to cut off the port baffle plates based on the actual situation.

Figure 5-21 Port baffle plates

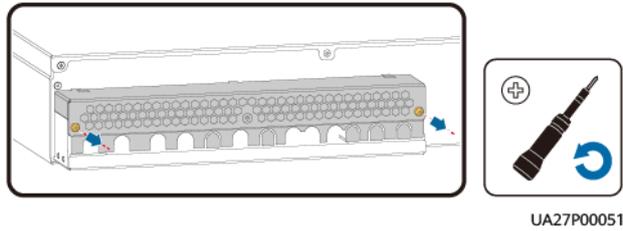


(1) Port baffle plates

Step 1 Switch off the upstream AC circuit breaker for the UPS.

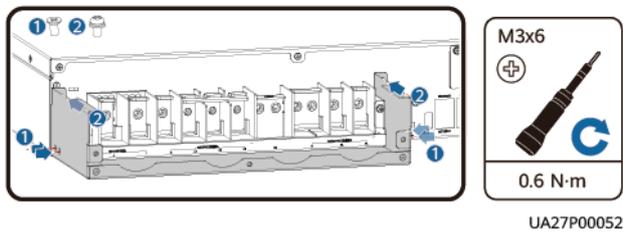
Step 2 Remove the top cover from the connection box.

Figure 5-22 Removing the top cover from the connection box



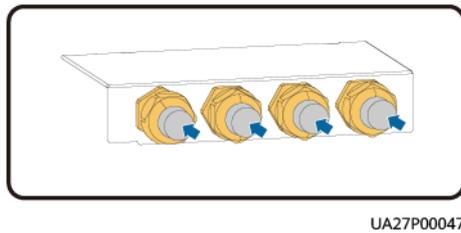
Step 3 Install the lower shell of the PG box.

Figure 5-23 Installing the lower shell of the PG box



Step 4 Route the cable through the gland.

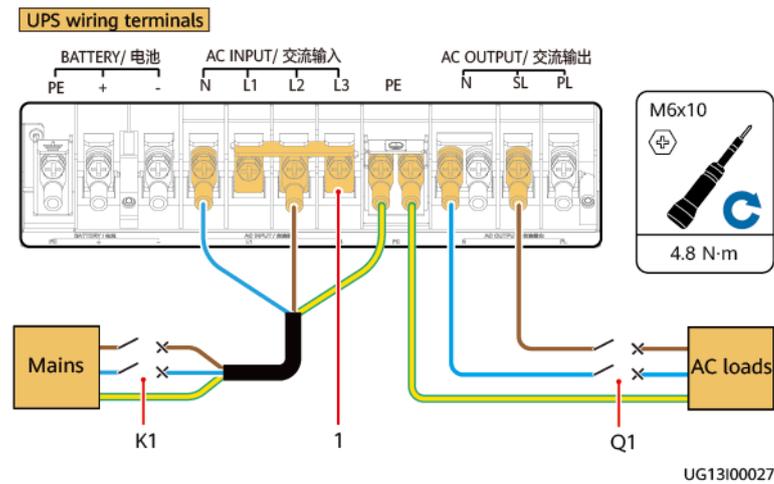
Figure 5-24 Routing the cable through the gland



Step 5 Install AC output power cables and then AC input power cables in sequence.

- Single-phase input single-phase output
 - a. Take out a short-circuit copper bar from the fitting bag and short-circuit L1, L2, and L3 using the short-circuit copper bar.
 - b. Secure the AC power cables to the wiring ports.

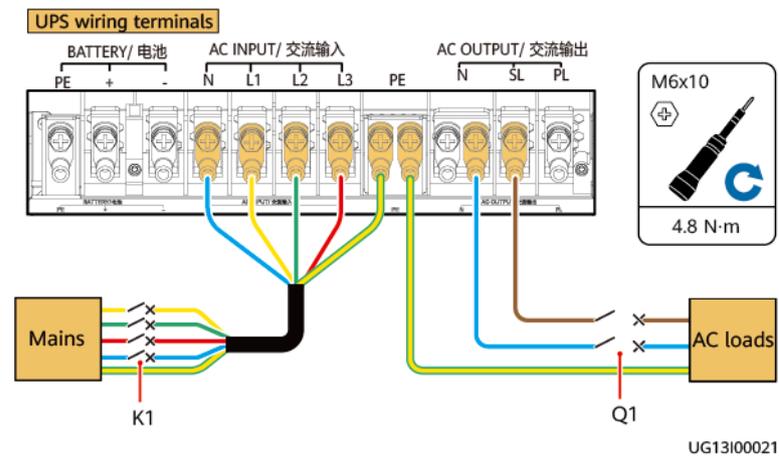
Figure 5-25 Installing AC power cables



(1) Short-circuit copper bar

- Three-phase input single-phase output

Figure 5-26 Installing AC power cables



Step 6 Install battery cables.

1. Install battery terminals on the UPS side.
2. Install battery terminals on the battery side.

Figure 5-27 Installing battery cables (two battery packs)

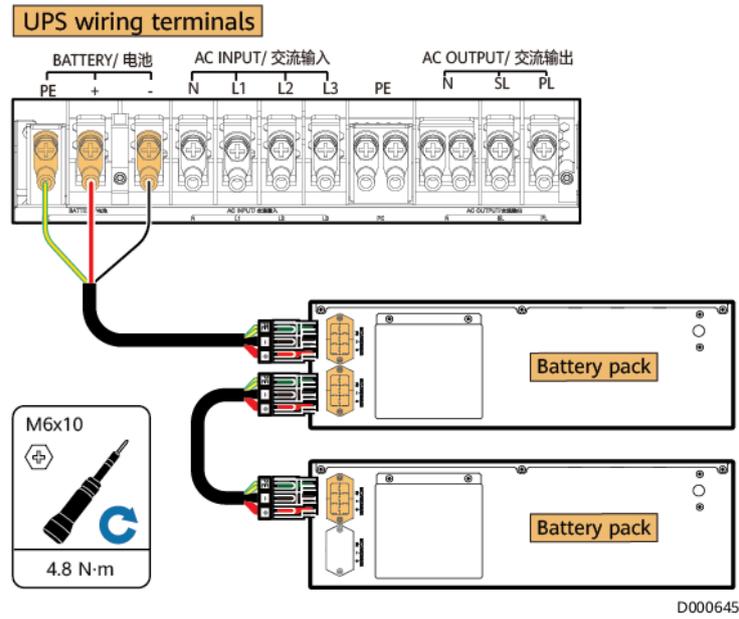
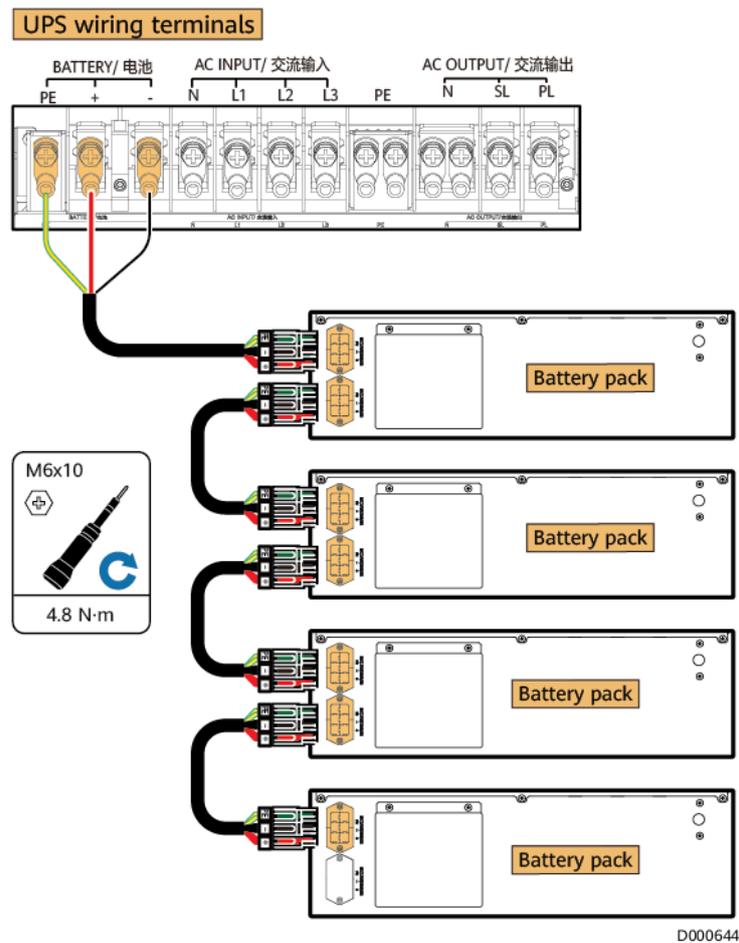


Figure 5-28 Installing battery cables (four battery packs)

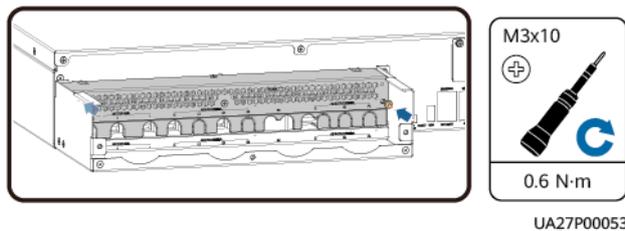


 **NOTE**

It is recommended that switches be installed for battery cables. Customers need to purchase switches by themselves. For details about the battery circuit breaker specifications, see [5.1.4 Power Cables](#).

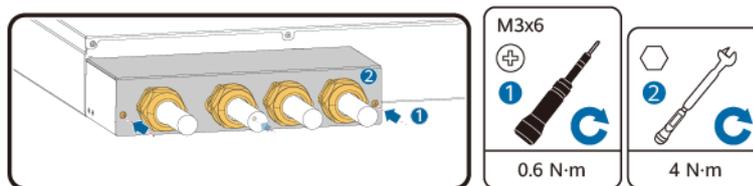
Step 7 Install the top cover from the connection box.

Figure 5-29 Installing the top cover from the connection box



Step 8 Move the top cover of the PG box to the assembly position and tighten the PG connector.

Figure 5-30 Reinstalling the PG box cover



----End

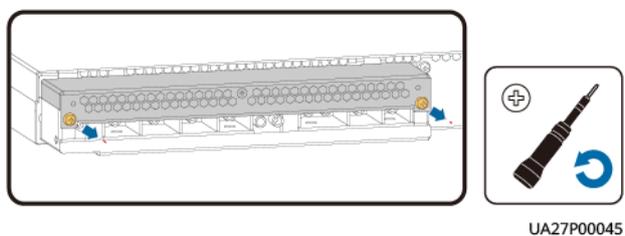
5.2.3.4 Installing Cables (Without a PG Connection Box)

5.2.3.4.1 6 kVA

Step 1 Switch off the upstream AC circuit breaker for the UPS.

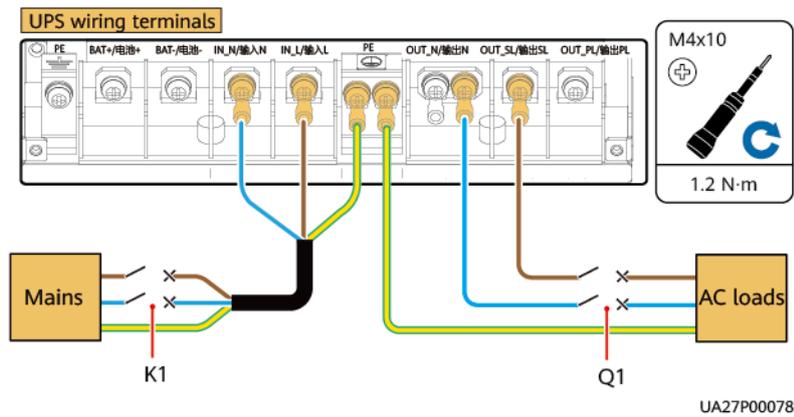
Step 2 Remove the top cover from the connection box.

Figure 5-31 Removing the top cover from the connection box



Step 3 Install AC output power cables and then AC input power cables in sequence.

Figure 5-32 Installing AC power cables



Step 4 Install battery cables.

1. Install battery terminals on the UPS side.
2. Install battery terminals on the battery side.

Figure 5-33 Installing battery cables (two battery packs)

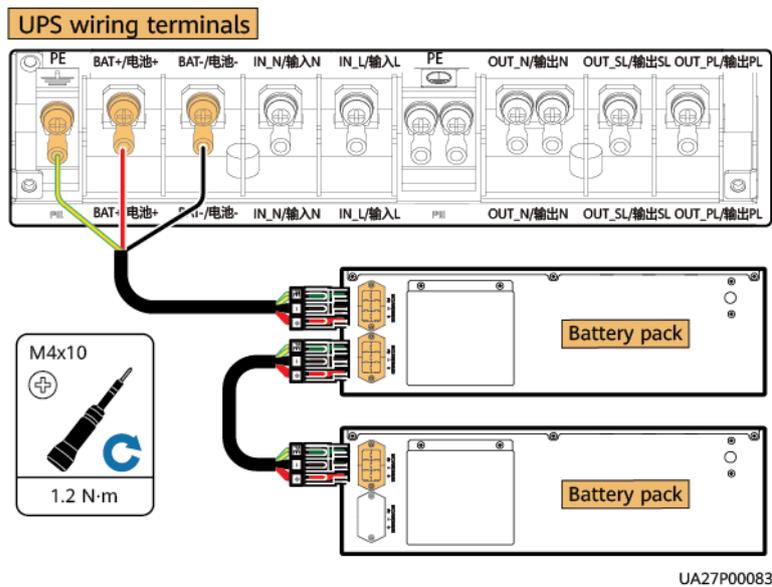
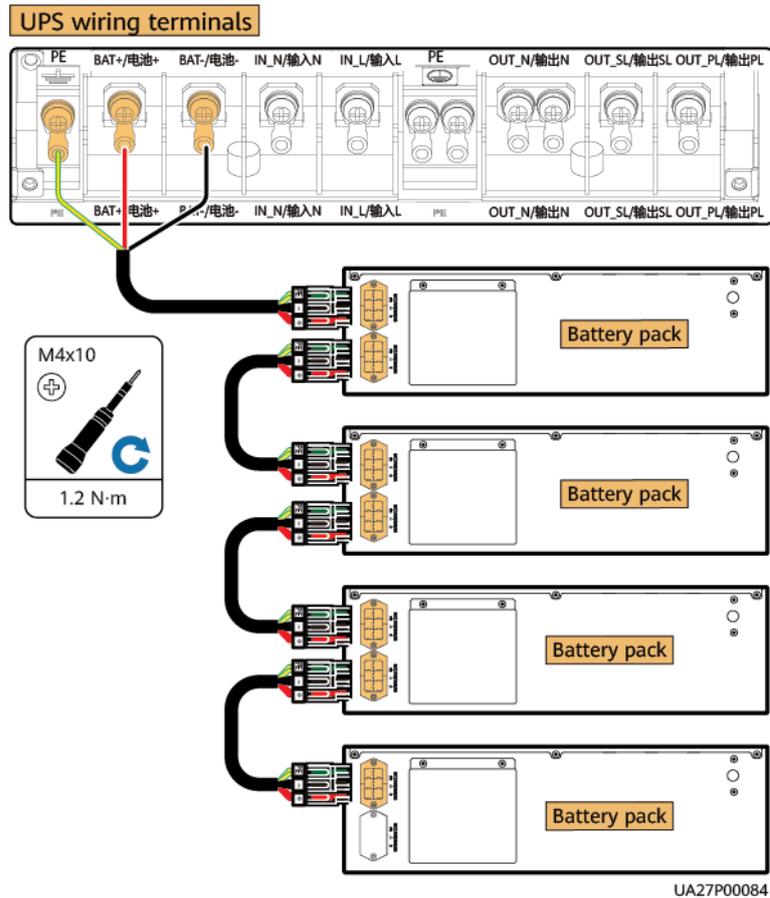


Figure 5-34 Installing battery cables (four battery packs)

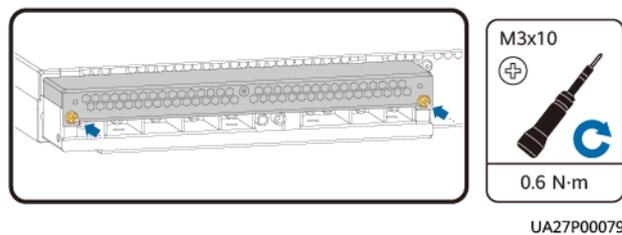


NOTE

It is recommended that switches be installed for battery cables. Customers need to purchase switches by themselves. For details about the battery circuit breaker specifications, see [5.1.4 Power Cables](#).

Step 5 Install the top cover from the connection box.

Figure 5-35 Installing the top cover from the connection box



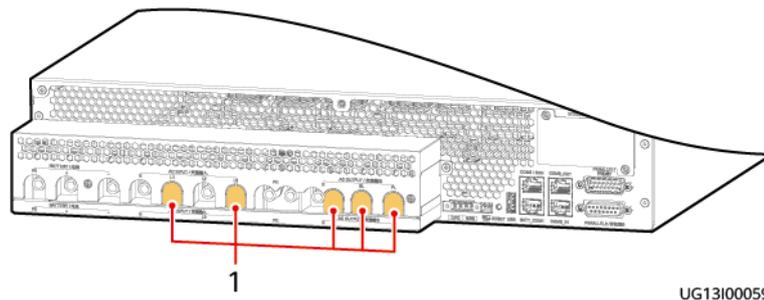
----End

5.2.3.4.2 10 kVA

Context

Use diagonal pliers to cut off the port baffle plates based on the actual situation.

Figure 5-36 Port baffle plates



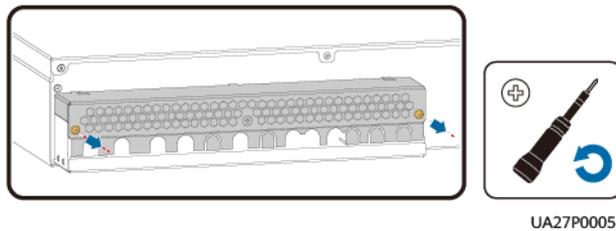
UG13100059

(1) Port baffle plates

Step 1 Switch off the upstream AC circuit breaker for the UPS.

Step 2 Remove the top cover from the connection box.

Figure 5-37 Removing the top cover from the connection box

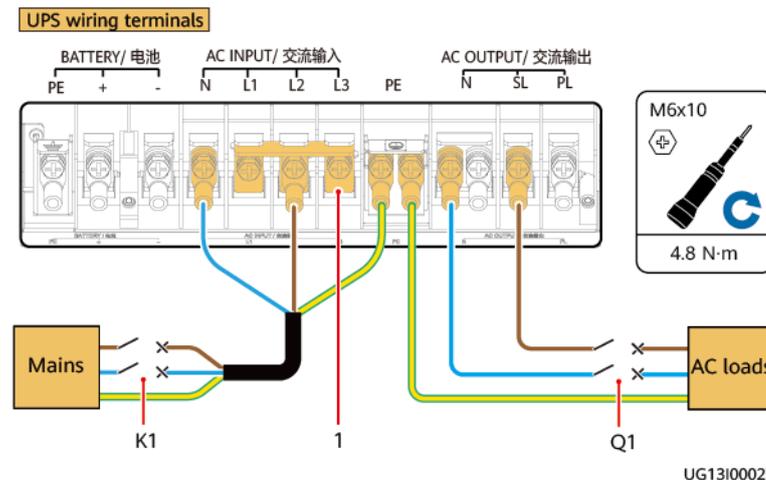


UA27P00051

Step 3 Install AC output power cables and then AC input power cables in sequence.

- Single-phase input single-phase output
 - a. Take out a short-circuit copper bar from the fitting bag and short-circuit L1, L2, and L3 using the short-circuit copper bar.
 - b. Secure the AC power cables to the wiring ports.

Figure 5-38 Installing AC power cables

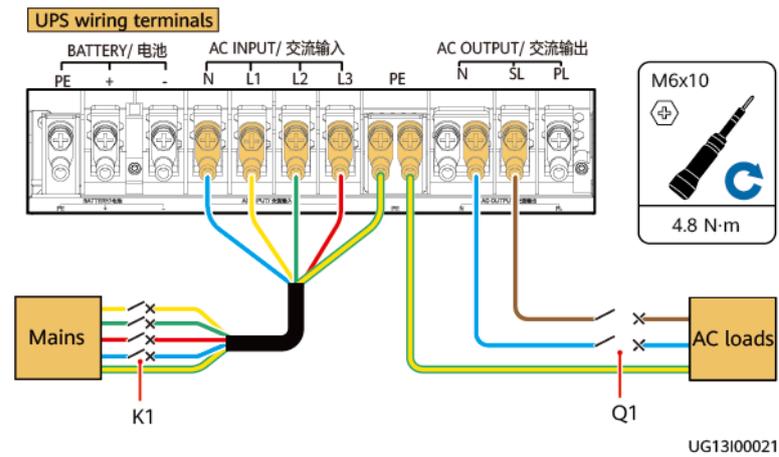


UG13100027

(1) Short-circuit copper bar

- Three-phase input single-phase output

Figure 5-39 Installing AC power cables



Step 4 Install battery cables.

1. Install battery terminals on the UPS side.
2. Install battery terminals on the battery side.

Figure 5-40 Installing battery cables (two battery packs)

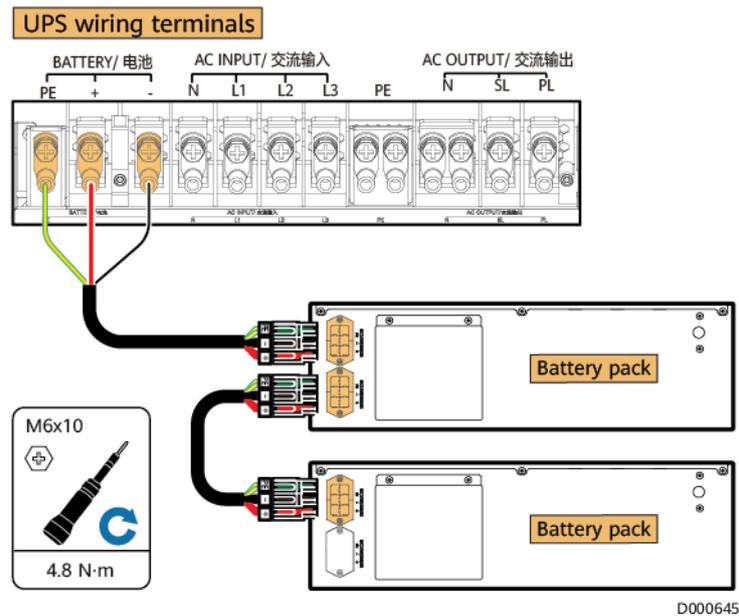
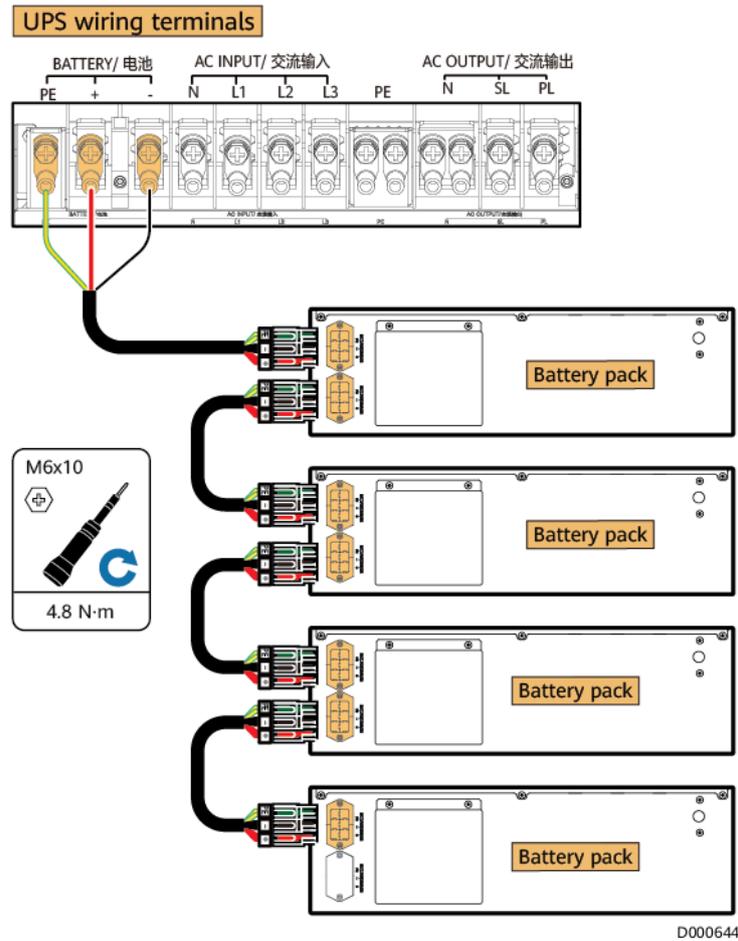


Figure 5-41 Installing battery cables (four battery packs)

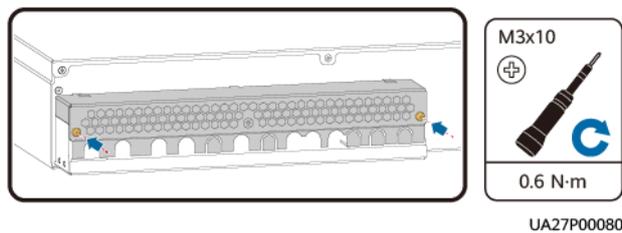


NOTE

It is recommended that switches be installed for battery cables. Customers need to purchase switches by themselves. For details about the battery circuit breaker specifications, see [5.1.4 Power Cables](#).

Step 5 Install the top cover from the connection box.

Figure 5-42 Installing the top cover from the connection box



----End

5.3 Installing a Parallel System

Prerequisites

Only single-phase and three-phase inputs support parallel connection.

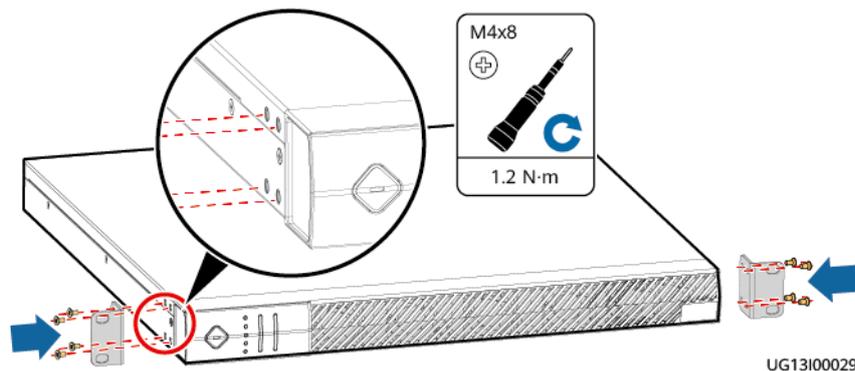
5.3.1 Rack-Mounted Installation

5.3.1.1 Installing the UPSs and Lead-Acid Batteries

Procedure

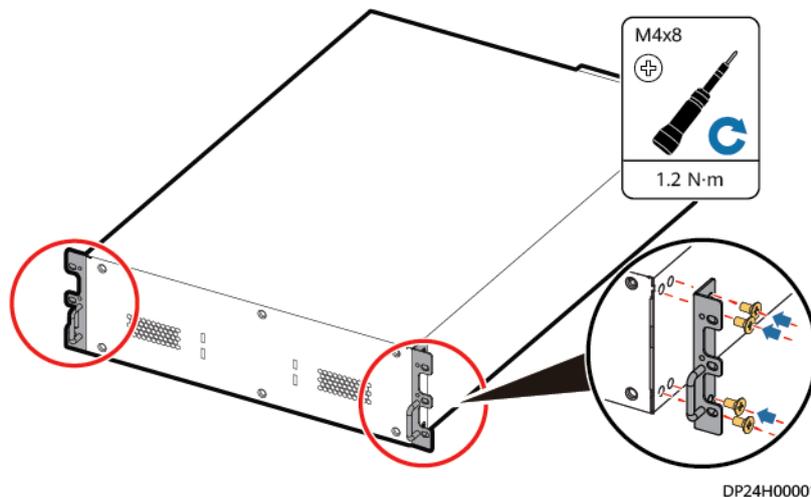
Step 1 Install mounting ears on both sides of the UPS.

Figure 5-43 Installing mounting ears



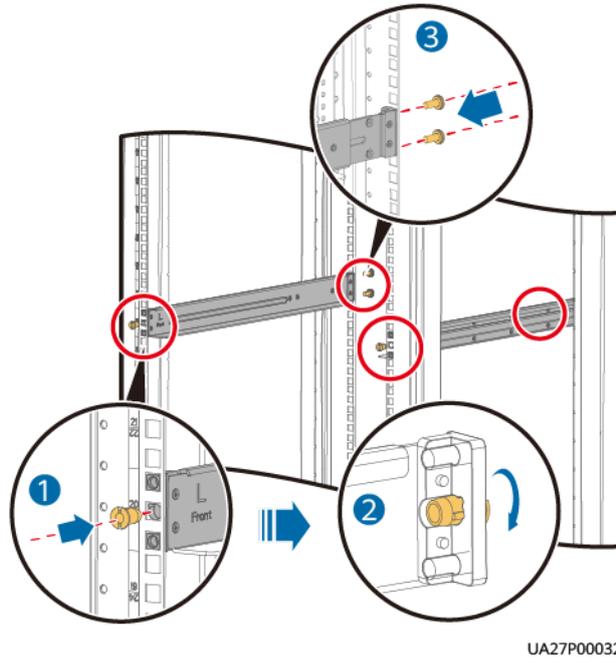
Step 2 Install mounting ears on both sides of the battery.

Figure 5-44 Installing battery mounting ears



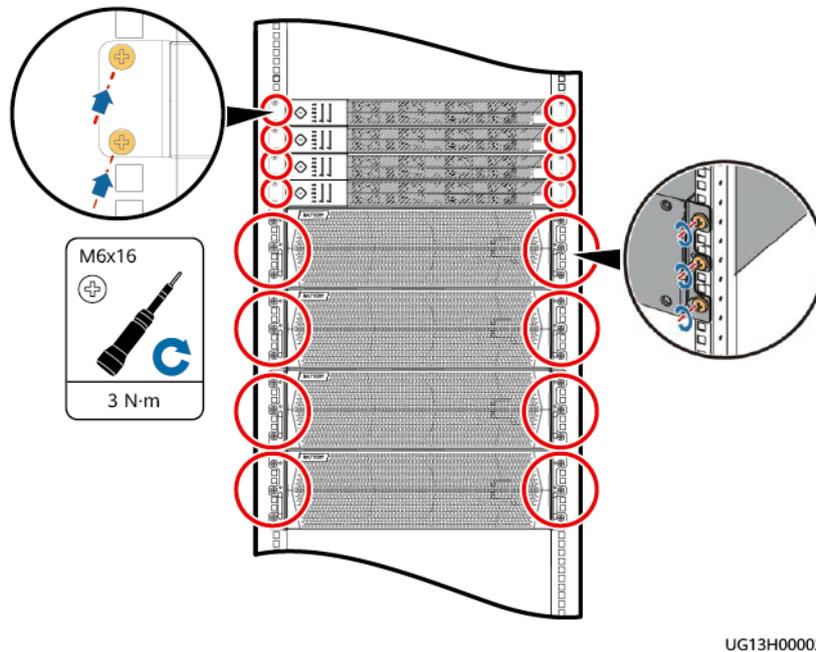
Step 3 Take out the guide rails from the fittings and install them on the rack.

Figure 5-45 Installing the guide rails



Step 4 Install the UPSs and batteries with mounting ears on the rack, and then install the battery front panels.

Figure 5-46 Installing the UPSs and batteries



----End

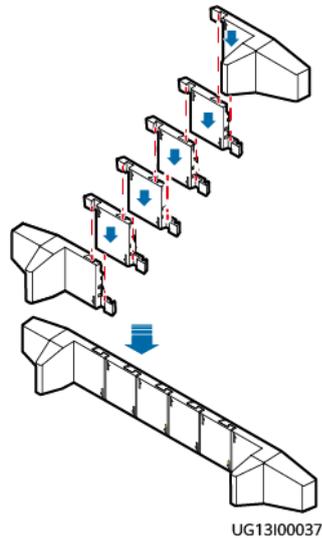
5.3.2 Tower-Mounted Installation

5.3.2.1 Installing the UPSs and Lead-Acid Batteries

Procedure

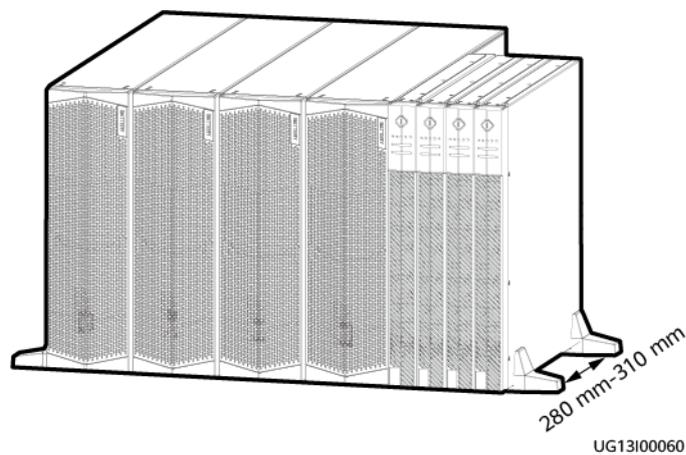
Step 1 Assemble the support bases.

Figure 5-47 Assembling a support base



Step 2 Place the UPSs and batteries on the support bases.

Figure 5-48 Placing the UPSs and batteries

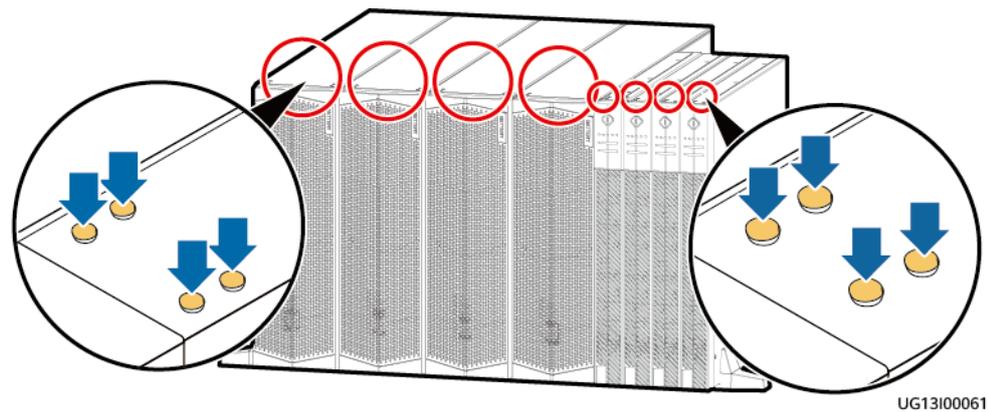


NOTE

For tower-mounted installation, you are advised to place batteries on the left side of the UPSs, as shown in the figure.

Step 3 Install rubber plugs.

Figure 5-49 Installing rubber plugs



----End

5.3.3 Installing Cables

NOTICE

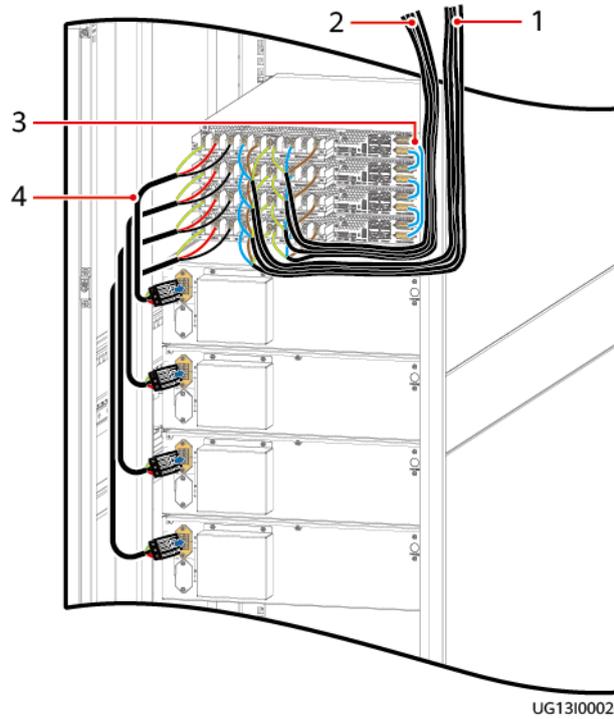
- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks during power-on and result in personal injury and equipment damage.
- Use the terminals delivered with the UPSs or purchase right-angle terminals. Do not bend common terminals to prepare cables.
- Prepare terminals onsite. The stripped length of the cable insulation layer should be the same as that of the part of the terminal that covers the conductor.
- When stripping the insulation layer of the power cable, do not damage the conductor of the power cable.
- Do not use a heat gun to heat the heat shrink tubing for an extended period. Ensure that the heat shrink tubing is tightly connected to the connector to avoid damaging the insulation layer.
- After installing cables, clean the top, bottom, and wiring terminals of the UPSs. Ensure that there is no dust or scraps around the UPSs.

Cables are installed in the same way for the 6 kVA and 10 kVA models. This section uses the 6 kVA model as an example.

5.3.3.1 Cable Routes

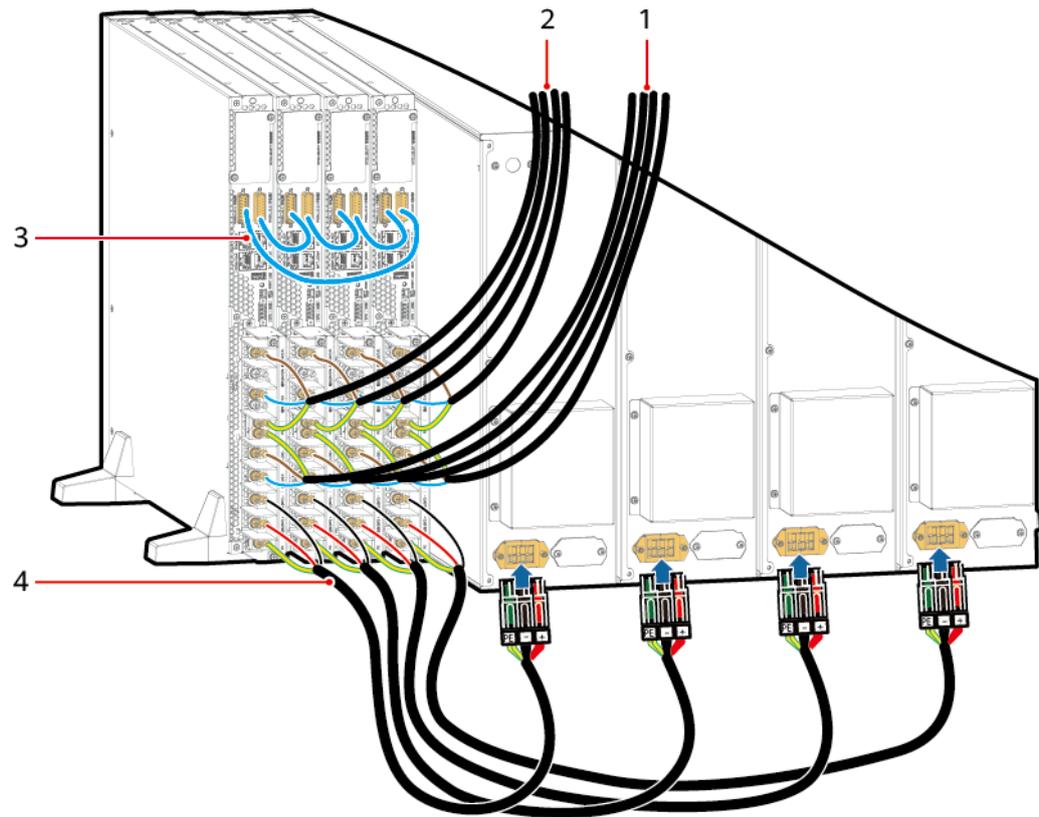
Cable Routes for the UPSs and Lead-Acid Batteries

Figure 5-50 Cable routes for four parallel UPSs (rack-mounted)



- (1) AC input power cable
- (2) AC output power cable
- (3) Communications cable
- (4) Battery cable

Figure 5-51 Cable routes for four parallel UPSs (tower-mounted)



UG13100062

- (1) AC input power cable (2) AC output power cable (3) Communications cable
(4) Battery cable

5.3.3.2 Installing Cables

Context

NOTICE

- In a parallel system, connect loads to the AC OUTPUT PL terminal, instead of the SL terminal (no output voltage).
- If a PG connection box is configured, install it by referring to [5.2.3.3 Installing Cables \(with a PG Connection Box\)](#).

Procedure

- Step 1** Switch off the upstream AC circuit breaker for the UPS.
- Step 2** Remove the covers from the UPS wiring ports.
- Step 3** Install AC output power cables and then AC input power cables in sequence.

Figure 5-52 Connecting single-phase input and single-phase output cables (6 kVA)

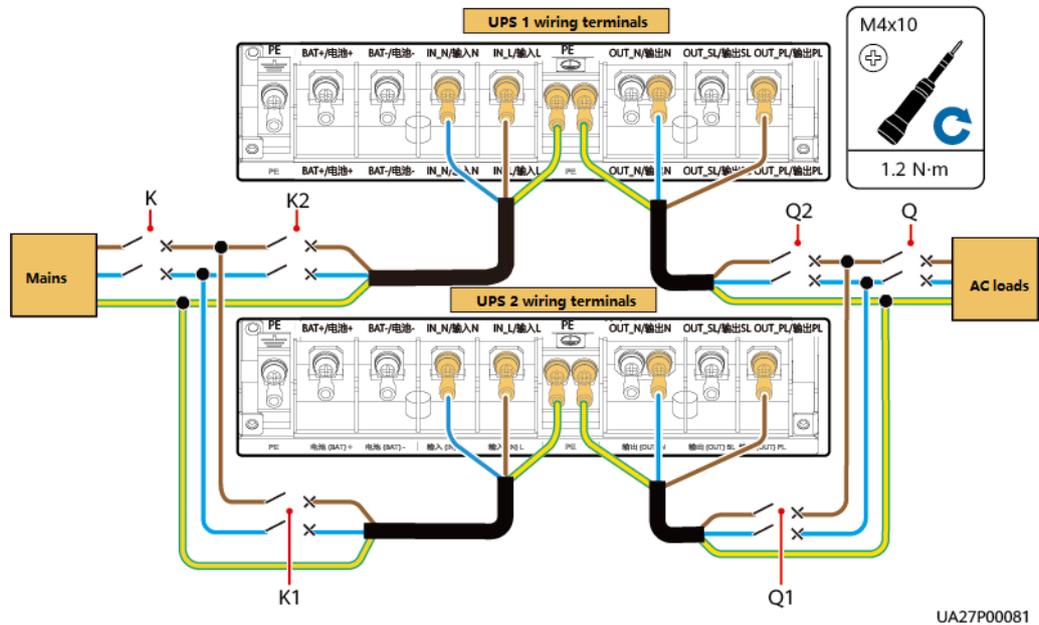


Figure 5-53 Connecting single-phase input and single-phase output cables (10 kVA)

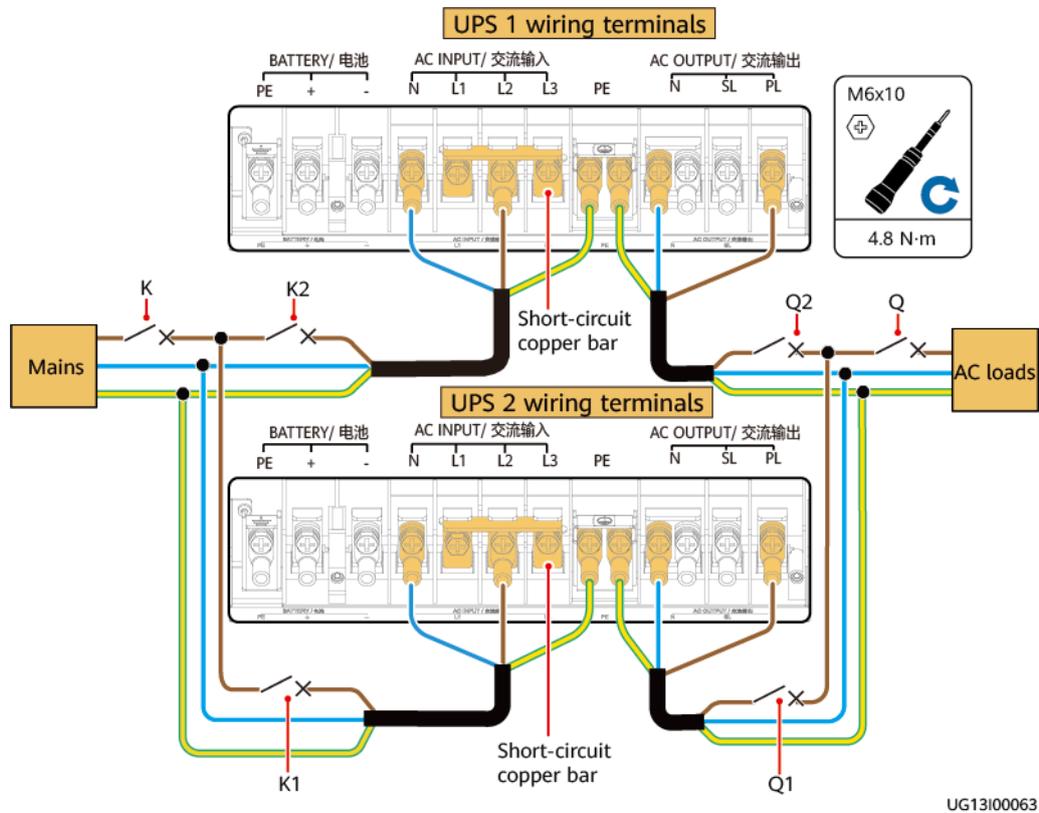
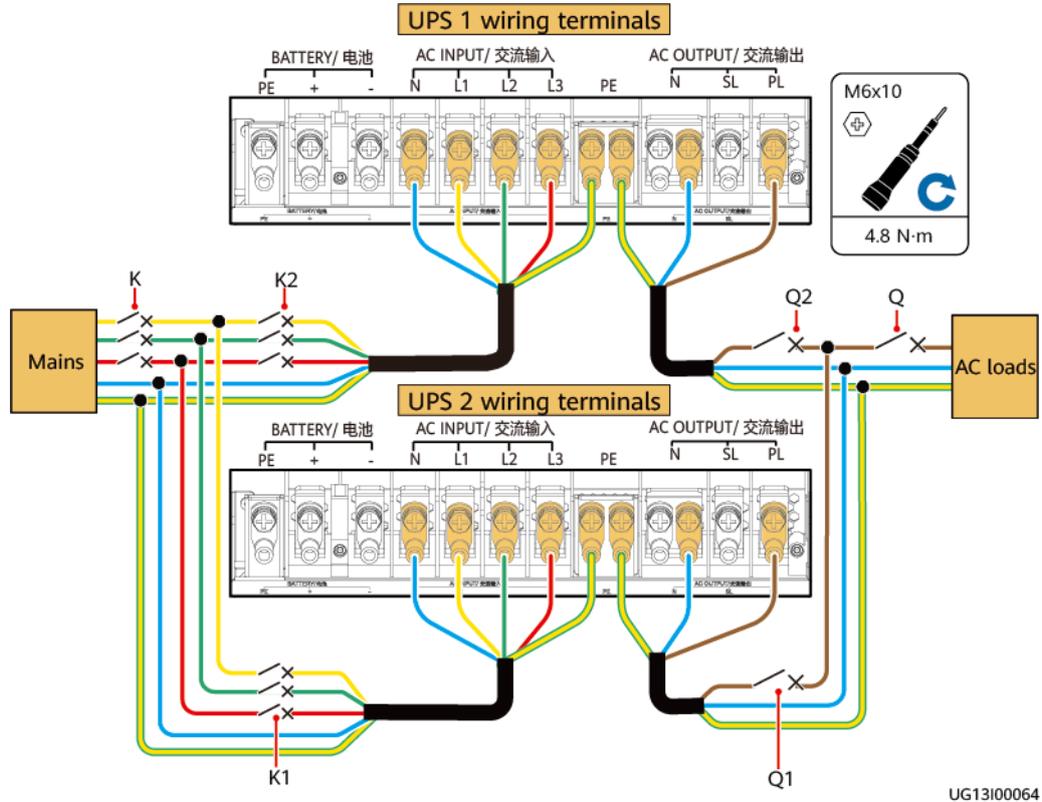
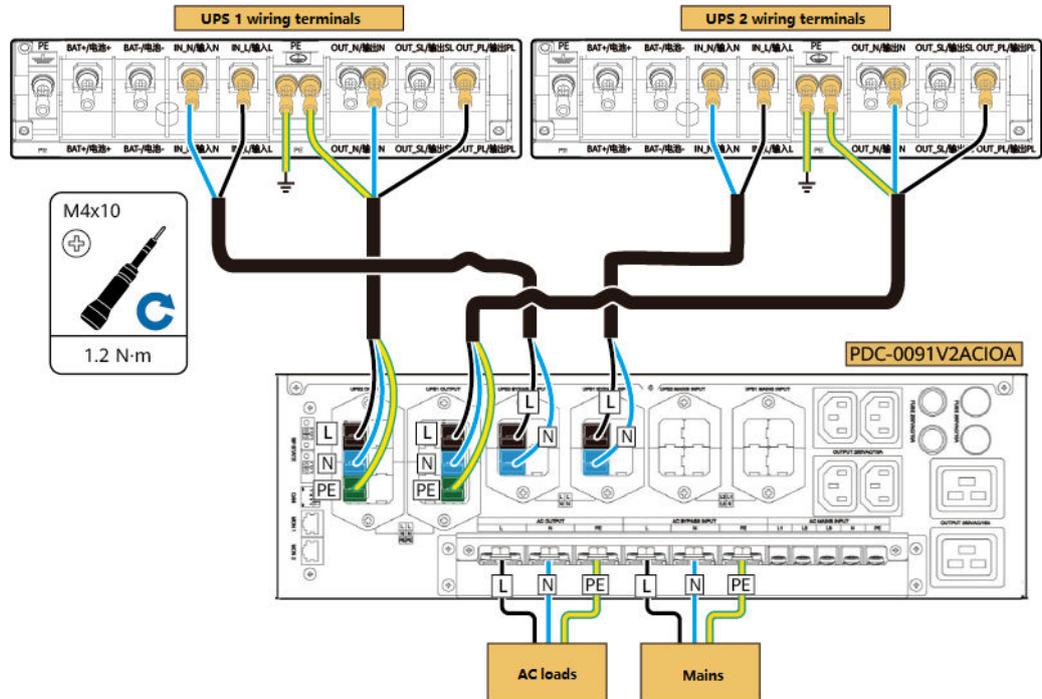


Figure 5-54 Connecting three-phase input and single-phase output cables (10 kVA)



UG13100064

Figure 5-55 Connecting AC input and output cables (with a PDU)

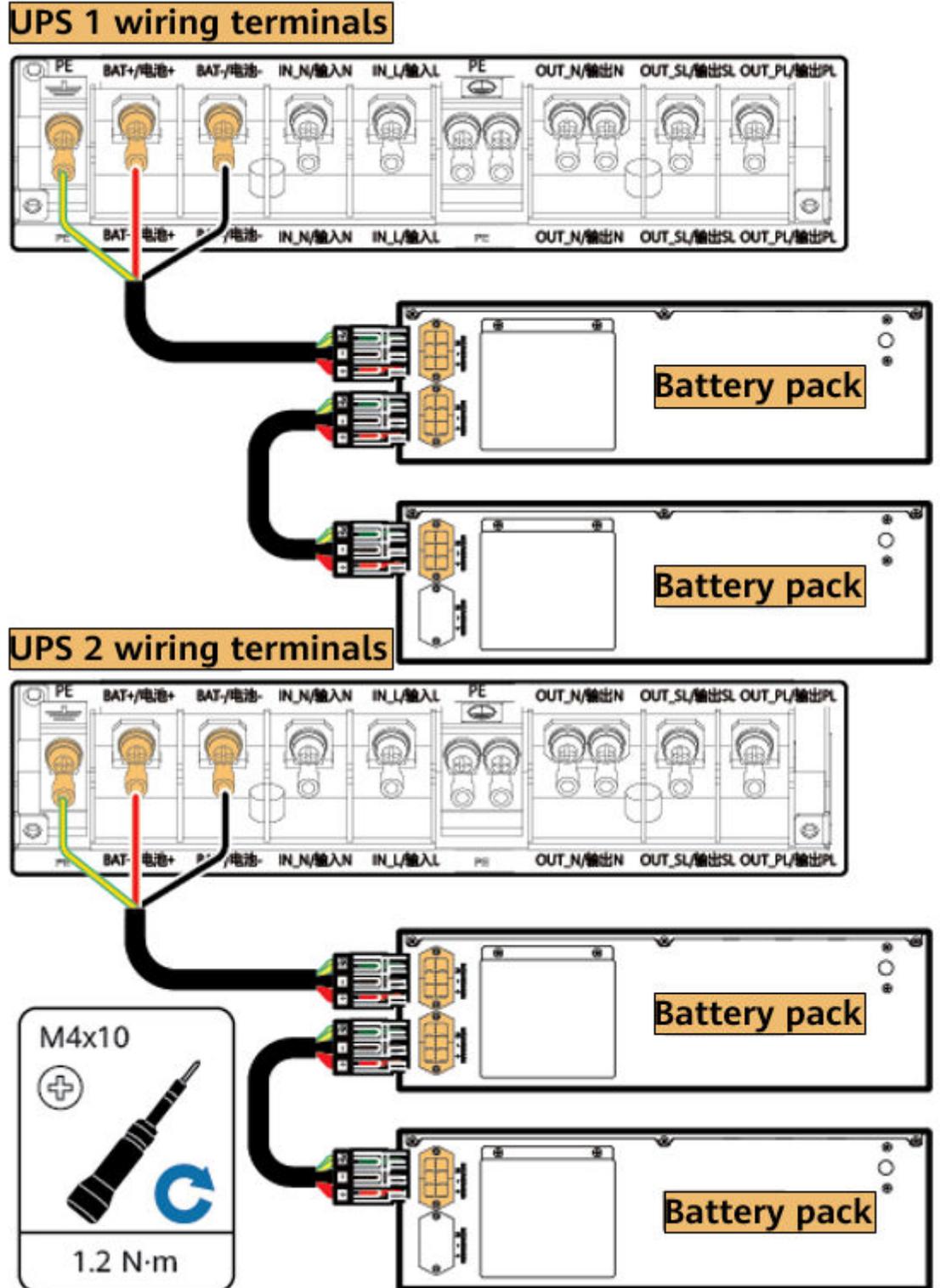


UA27P00082

Step 4 Install battery cables.

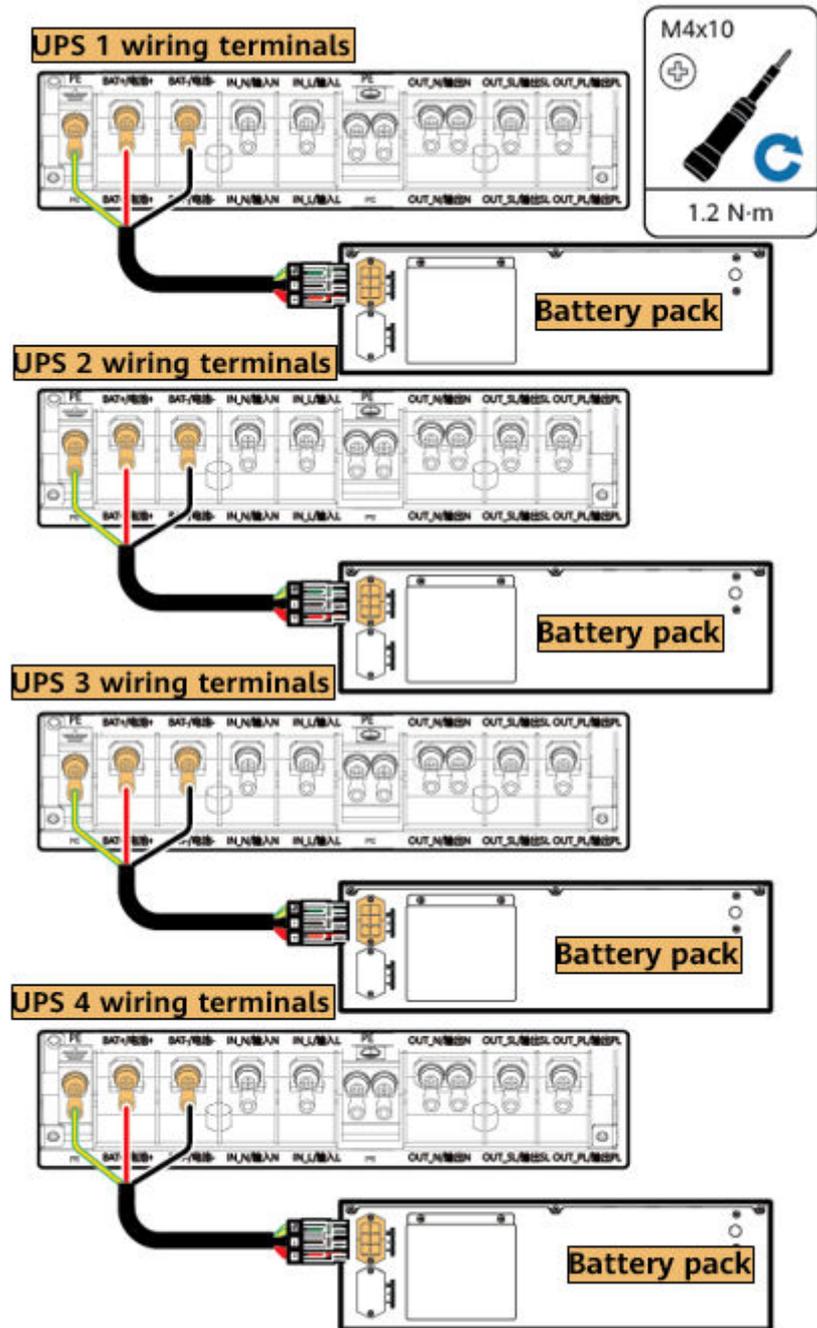
1. Install battery terminals on the UPS side.
2. Install battery terminals on the battery side.

Figure 5-56 Two parallel UPSs + four battery packs



UA27P00085

Figure 5-57 Four parallel UPSs + four battery packs



UA27P00086

Step 5 Install the top cover from the connection box.

----End

5.3.3.3 Installing UPS Communications Cables

Procedure

Step 1 Installing parallel communications cables

Figure 5-58 Installing communications cables (two parallel UPSs)

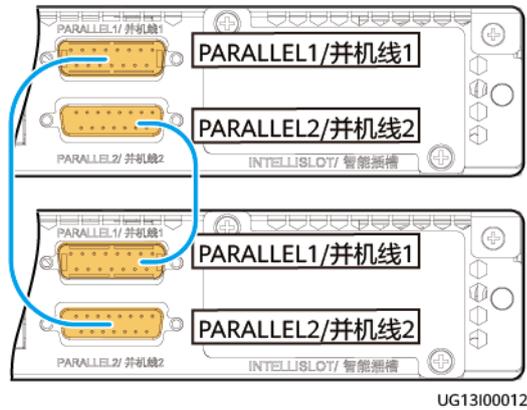
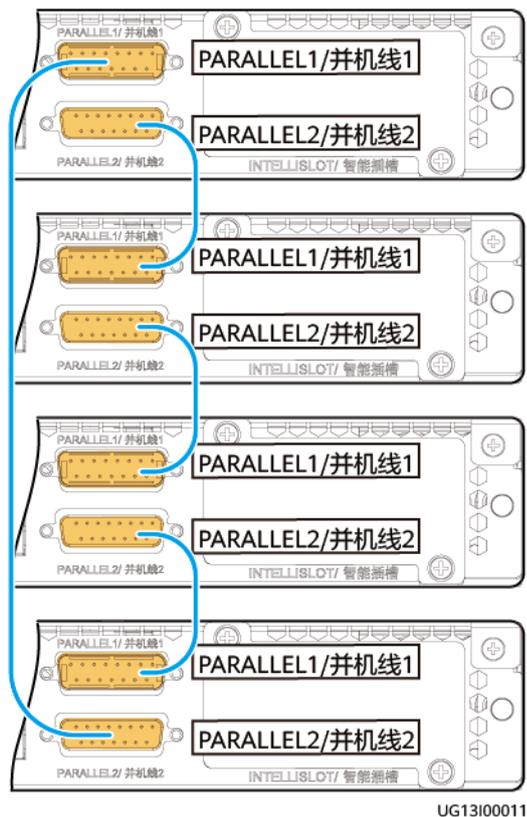


Figure 5-59 Installing communications cables (four parallel UPSs)



----End

5.4 Connecting a Backfeed Protection Device

5.4.1 Backfeed Protection Device Specifications

NOTICE

This equipment does not have a built-in backfeed protection device. You can add a backfeed protection device for the input. The protection solution is as follows: If you do not install a backfeed protection device for the input, add a warning label on the main power disconnection device that supplies power to the UPS to warn electrical maintenance personnel. The warning label contains information similar to the following: "This circuit supplies power to the UPS. Disconnect the UPS before cable connection." In addition, check whether dangerous voltages exist on all main power connection terminals.

When battery mode is unavailable or the mains fails, certain voltage or energy in the UPS may flow back directly, or through a leakage path, to an input terminal. To minimize the risk of electric shocks caused by reverse feeding, install a backfeed protection device for the UPS input.

Table 5-4 Rated voltage and current of contacts of the backfeed protection contactor

Model	Rated Voltage and Rated Current	Recommended Backfeed Protection Device Model (Schneider Contactor)
UPS2000-H-6KRTL-L	220 V AC/230 V AC/240 V AC, 50 A	Contactor LC1-D50A
UPS2000-H-10KRTL-L	220 V AC/230 V AC/240 V AC, 80 A	Contactor LC1-D80A

Table 5-5 Control relay parameters

Recommended Model	Requirements
HONGFA: HF18FF/012	Contact type: normally closed (NC) Breaking capacity: 250 V AC, 5 A Coil specifications: 12 V, rated current < 1 A
OMRON: MY2N-J DC12V	
Panasonic: HJ2-L-DC12V	

5.4.2 Feedback Protection Connections (With Dry Contract Control)

Figure 5-60 Bypass backfeed protection connections for the 6 kVA/10 kVA models (single-phase input single-phase output)

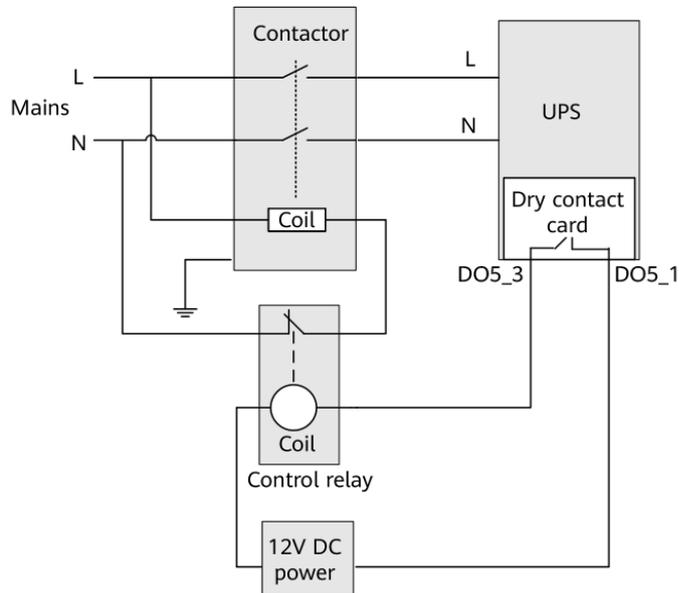
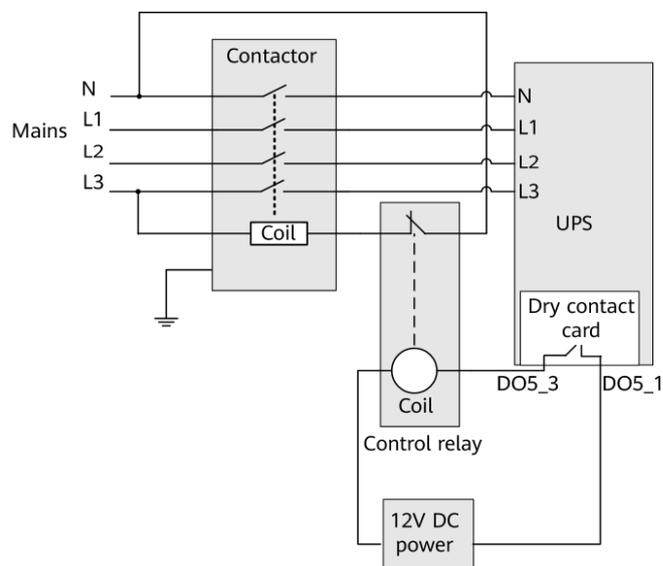


Figure 5-61 Bypass backfeed protection connections for the 10 kVA model (three-phase input single-phase output)



5.5 Installing an SNMP Card

The SNMP cards for UPSs purchased from the supplier can be installed in the same way. They need to be installed behind the optional card slot cover labeled INTELLISLOT on the rear panel of the UPS. The actual installation position may vary with product models.

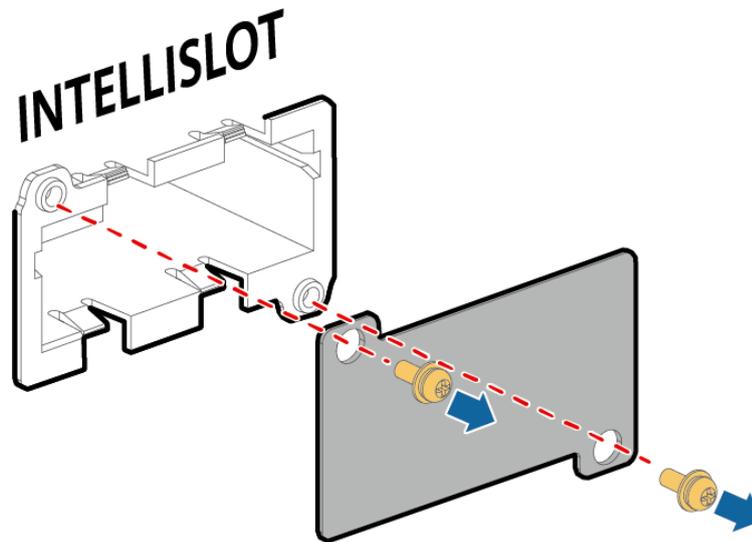
NOTICE

- The SNMP card is hot-swappable.
- Some electronic components in the SNMP card are sensitive to ESD. Do not use your hands or electrical objects to touch electronic components or circuits in the SNMP card, preventing ESD from damaging the SNMP card. Hold the edges of the SNMP card when you move or install it.

Procedure

Step 1 Remove the cover of the optional card slot on the rear panel of the UPS.

Figure 5-62 Removing the optional card slot cover

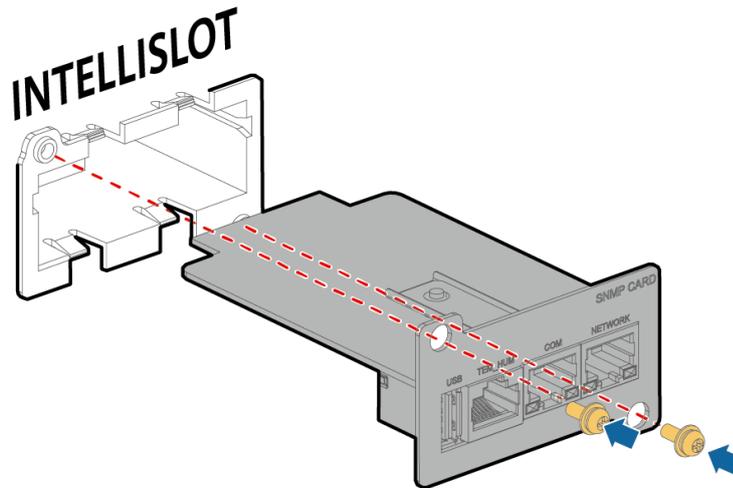


NOTE

Keep the cover for later use.

Step 2 Insert the SNMP card into the slot, and tighten screws.

Figure 5-63 Inserting the SNMP card into the optional card slot

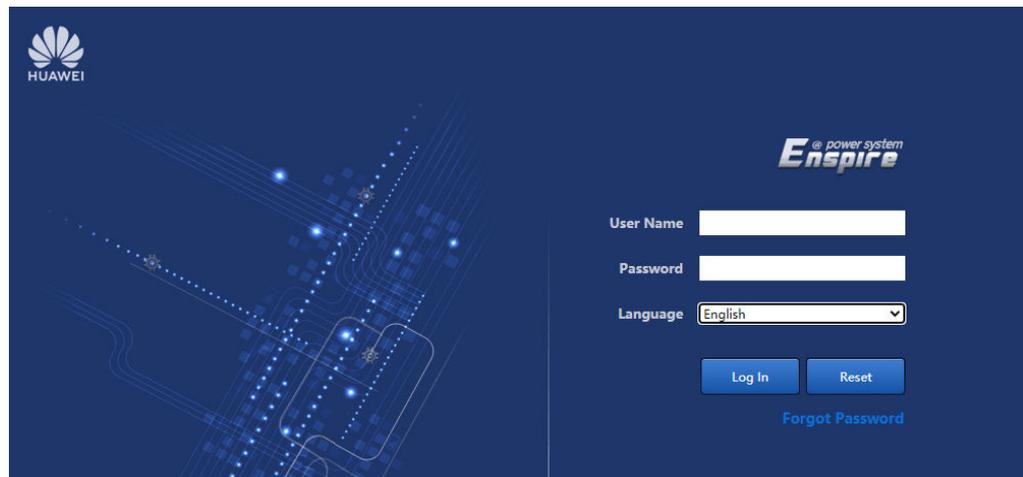


 NOTE

M3 screws are used to install the optional card. The recommended torque is 0.5 N·m.

- Step 3** Connect one end of the network cable to the NETWORK port on the SNMP card and the other end to the network port on the customer's device.
- Step 4** Enter **https://SNMP card IP address** in the address box of the browser, select a language, and enter the correct **User Name** and **Password**. The default user name is **admin**, and the preset password is **Changeme**.

Figure 5-64 Logging in to the WebUI



- Step 5** Click **Login**. The home page is displayed.
- Step 6** On the WebUI, choose **System Settings > Comm. Settings** and set the IP address of the DNS server.
- Step 7** Set and test domain name parameters.
 - 1. Choose **System Settings > NMS Application > BIN > Communication Parameters** on the WebUI. Set parameters as follows:

- **Address type: Domain name**
 - **Server domain name and Port number:** Retain the default values.
 - **Connection test link setup port: FE**
2. Click **Test Connect**. After the test is successful, click **Submit**.
- End

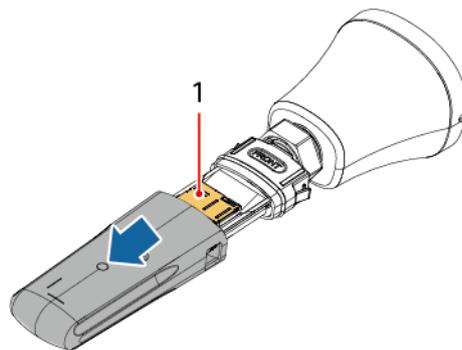
5.6 Installing a 4G Module

Procedure

Step 1 Install the SNMP card in the optional card slot of the UPS and power on the UPS.

Step 2 Pull the 4G module enclosure backwards, and then install the SIM card.

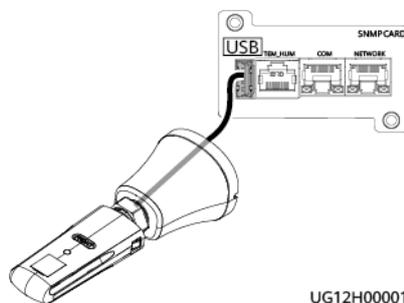
Figure 5-65 Installing a SIM card



(1) SIM card installation position

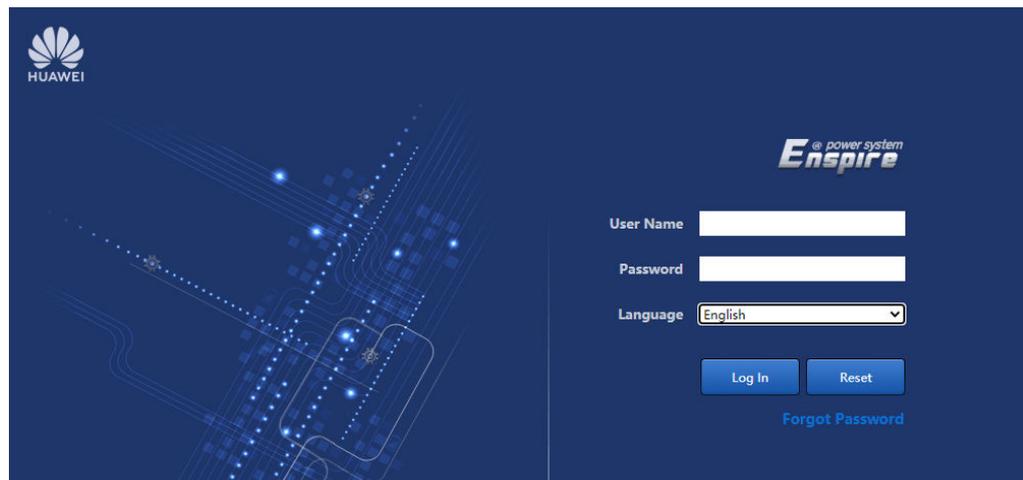
Step 3 Connect the 4G module to the USB port of the SNMP card using a USB2.0 extension cable. Install the magnetic 4G module on the nearby cabinet.

Figure 5-66 Installing a 4G module



Step 4 Enter **<https://SNMP card IP address>** in the address box of the browser, select a language, and enter the correct **User Name** and **Password**. The default user name is **admin**, and the preset password is **Changeme**.

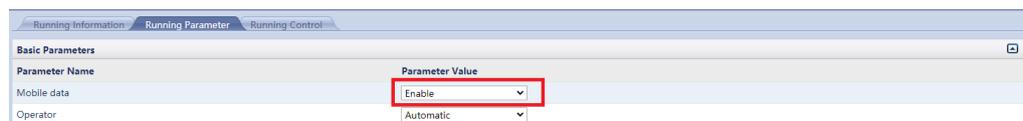
Figure 5-67 Logging in to the WebUI



Step 5 Click **Login**. The home page is displayed.

Step 6 Choose **Monitoring > Wireless Module > Running Parameter > Basic Parameters**, and set **Mobile data** to **Enable**.

Figure 5-68 Setting the 4G module



Step 7 Choose **Monitoring > Wireless Module > Running Information > Basic Information** to check that the 4G module dialup is successful.

Figure 5-69 Dialup succeeded



Step 8 Set and test domain name parameters.

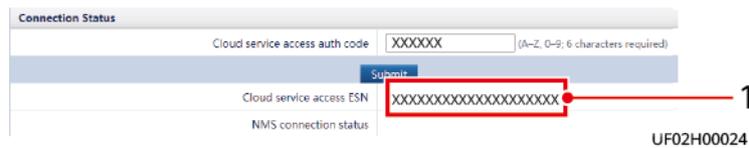
1. Choose **System Settings > NMS Application > BIN > Communication Parameters** on the WebUI. Set parameters as follows:
 - **Address type: Domain name**
 - **Server domain name** and **Port number**: Retain the default values.
 - **Connection test link setup port: 4G**
2. Click **Test Connect**. After the test is successful, click **Submit**.

Step 9 Connect the device by referring to the instructions in [Edge Data Center Management](#).

You can obtain the ESN in either of the following ways:

- Scan the documentation QR code on the device to obtain the ESN.
- Obtain the ESN on the **About** page of the WebUI.

Figure 5-70 About



(1) ESN

----End

5.7 Installing an rPDU and rPDU Cables

Step 1 Install the rPDU in an appropriate position based on site requirements.

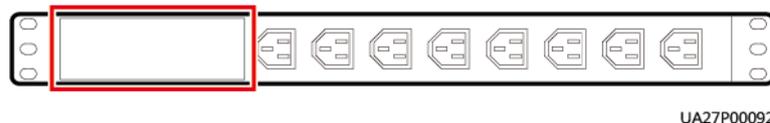
Step 2 Install rPDU cables.

1. Connect the rPDU ground cable to the nearest ground point on the rack.
2. Connect one end of the power cable to the rPDU wiring port.

NOTICE

- If rPDU cables have been connected onsite, skip this step.
- Connect cables to the rPDU based on the type of the rPDU and the silk screen on the wiring port. The following cable connection is for reference only.

Figure 5-71 Connection position in horizontal PDU2000-16-1PH-8/0-B1



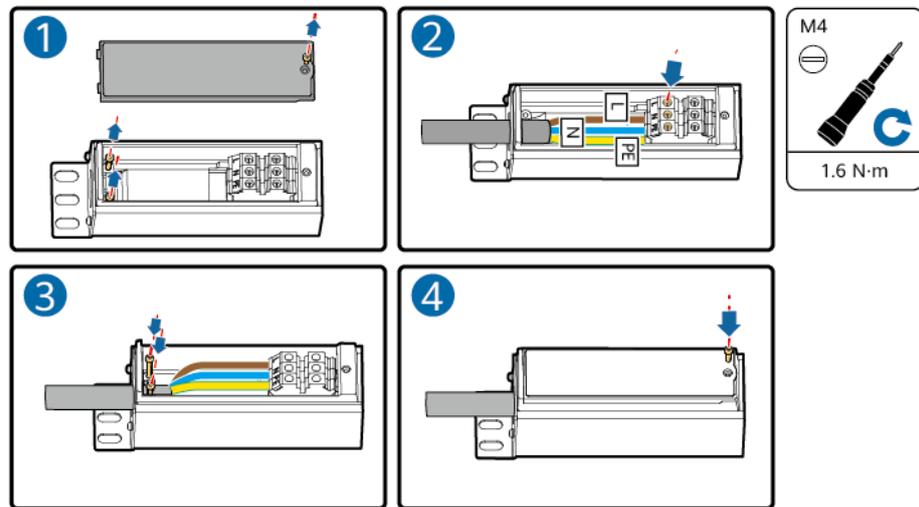
UA27P00092

Figure 5-72 Connection position in vertical PDU2000-63-1PH-16/8-B1



UA27P00091

Figure 5-73 Connecting cables to rPDUs

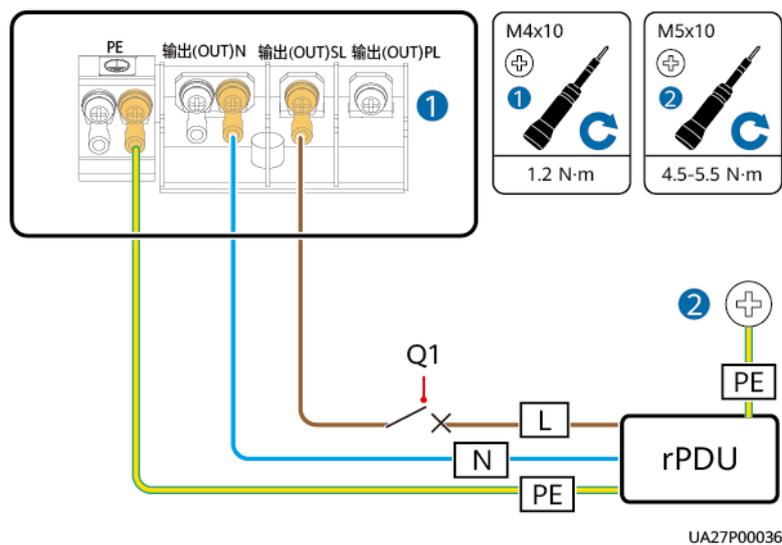


DP18I00001

3. Connect the other end of the power cable to the UPS output port.

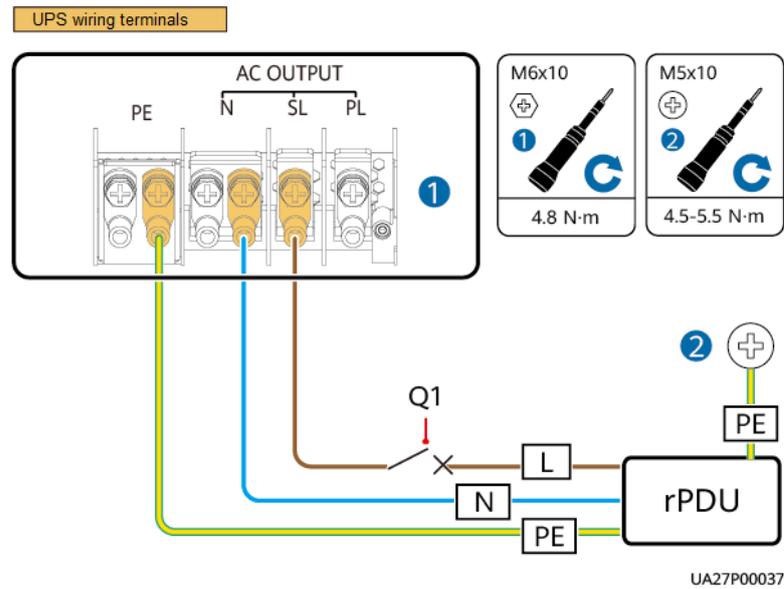
Figure 5-74 Installing power cables (6 kVA UPS)

UPS wiring terminals



UA27P00036

Figure 5-75 Installing power cables (10 kVA UPS)



----End

5.8 Checking the Installation

Table 5-6 Installation checklist

No.	Check Item	Acceptance Criteria
1	Cable routing	Cables are routed properly according to engineering requirements.
2	Cable connections	Input power cables, output power cables, and battery cables are tightened to the specified torque 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	Labels	Both ends of a cable are labeled. Labels are concise and easy to understand.
5	Ground cable connections	The UPS ground cable is securely connected to the ground bar in the equipment room. Use a multimeter to measure the resistance between the UPS ground cable and the equipment room ground bar. The resistance must be less than 0.1 ohm.

No.	Check Item	Acceptance Criteria
6	Distances between cable ties	Distances between cable ties are the same, and no burr exists.
7	Operating environment	The inside and outside of the cabinet are free from conductive dust or other sundries.
8	Cable short circuits	Check that cables are open-circuited using a multimeter or an insulation resistance tester.

6 Power-On Commissioning

6.1 Checking Before Power-On

- AC power cable colors comply with local regulations.
- The input and output are not short-circuited.
- Cables and terminals are securely connected.
- Battery cables and terminals are connected correctly, and voltages comply with industry standards.
- The UPSs are properly connected to battery strings.
- Input circuit breakers and load circuit breakers are OFF.
- Power cables and signal cables are correctly identified.
- The phase sequence of the input power is correct.
- Cables are neatly routed and securely bound according to requirements.
- Device installation and cabling facilitate subsequent system maintenance, capacity expansion, and reconstruction.
- Parallel cables in a parallel system are properly connected.
- Devices are properly grounded.
- The voltage range of the UPS upstream input circuit breaker is 80–280 V AC (phase voltage), and the rated frequency is 50 Hz/60 Hz.
- If the upstream input switch of the UPS is equipped with a residual current circuit breaker, you are advised to check the leakage current before installing the UPS. The leakage current of the UPS is less than or equal to 100 mA. Ensure that the system leakage current does not exceed the rated value of the upstream residual current circuit breaker after the UPS is installed. Otherwise, the circuit breaker may trip for protection.

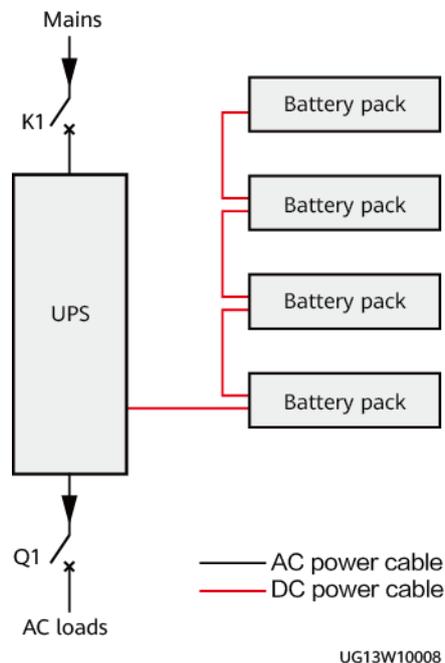
NOTE

Example: The upstream residual current circuit breaker for the UPS has a rated leakage current of 300 mA. The system leakage current reaches 250 mA before UPS installation. The leakage current of the UPS is less than or equal to 100 mA. After the UPS is installed, the leakage current of the system may be 250 mA + 100 mA > 300 mA. In this case, the upstream circuit breaker will trip for protection.

6.2 Lead-Acid Battery

6.2.1 Single UPS Operations

Figure 6-1 Conceptual diagram (one UPS + four battery packs)



6.2.1.1 Power-On

Procedure

- Step 1** Switch on the external battery circuit breaker (if any) or connect battery cables.
- Step 2** Switch on the mains AC input circuit breaker K1 of the UPS. When the mains is normal, the UPS works in bypass mode. The SL terminal outputs bypass voltage, and the PL terminal has no voltage output.

NOTE

When the mains is abnormal, the bypass output is disabled. As a result, the UPS SL terminal has no output voltage.

----End

6.2.1.2 Initial Startup

6.2.1.2.1 Installing the App

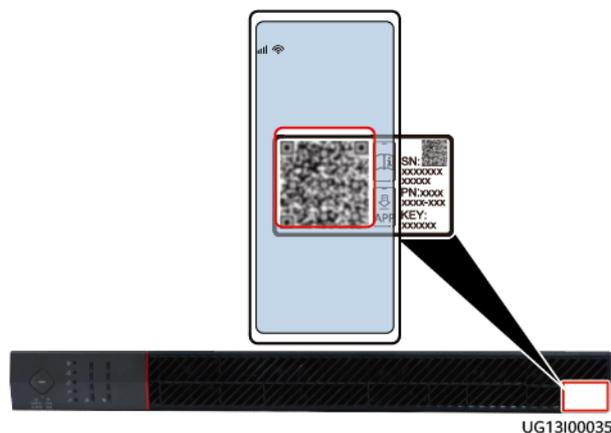
Prerequisites

- A mobile phone running Android 8.0, Harmony 2.0, or iOS 9.0 or later is available.
- The mobile phone can connect to the Internet.
- The mobile phone is within 10 m of the UPS.

Procedure

Step 1 Scan the QR code on the UPS panel using the mobile phone.

Figure 6-2 Scanning the UPS QR code



Step 2 (Optional) Select a display language.

Step 3 Download and install the app using either of the following methods.

- Download and install the **NetEco** app using a web browser.
- Download and install the **NetEco** app from Huawei AppGallery.

----End

6.2.1.2.2 Logging In to the App

NOTE

- A maximum of two mobile phones can be connected to the WiFi network, and only one mobile phone can be used to log in to the app.
- When logging in to the app, select **Allow** for all permission dialog boxes displayed on the mobile phone.
- When connecting the mobile phone to the WiFi network of the UPS, it is recommended that you disable the WLAN+ function on the phone. Enabling the WLAN+ function will let the mobile phone automatically connect to the network with the strongest signal, which may result in UPS WiFi connection failure.
- GPS should be enabled on the mobile phone to obtain the WiFi name.
- For the first login, you need to enter the WiFi password.
- After the UPS is powered on, the WiFi indicator turns on, and WiFi is enabled by default.

Step 1 Enable WiFi on your phone. (The WiFi icon turns on.)

Figure 6-3 Enabling WiFi



Step 2 Disable mobile data on your phone. (The mobile data icon turns gray.)

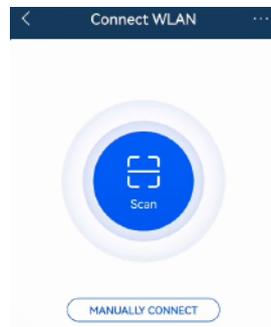
Figure 6-4 Disabling mobile data



Step 3 Open the **NetEco** app on the mobile phone. The **Select Application** screen is displayed.

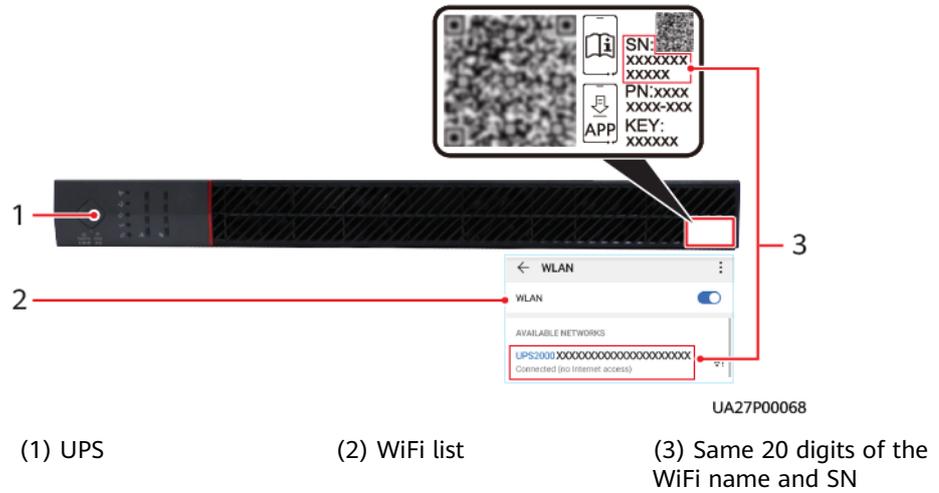
Step 4 Tap **UPS/SmartLi**. The **Connect WLAN** screen is displayed. Use either of the following methods to connect to the WiFi network.

Figure 6-5 Connect WLAN screen



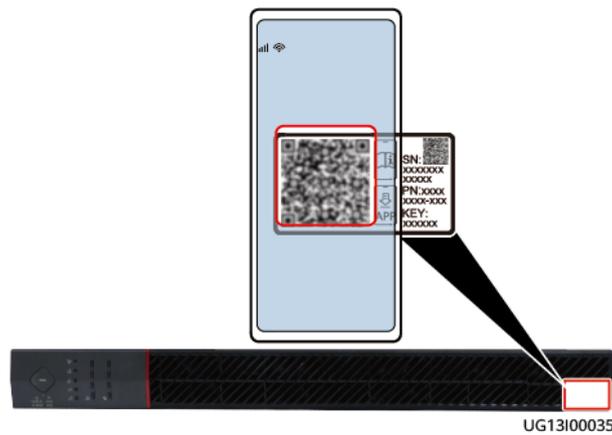
- **Manually connect to WLAN**
 - a. Tap **Manually connect to WLAN**. The **Select WLAN network** screen is displayed.
 - b. Select the UPS WiFi name whose last 20 digits are the same as the SN.

Figure 6-6 Manually connecting to WLAN



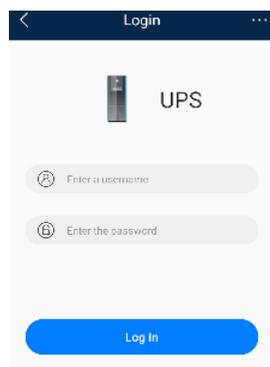
- c. Enter the WiFi password. (The preset WiFi password is **Changeme.**)
- **Scan to connect to WLAN**
 - a. Tap **Scan to connect to WLAN.**
 - b. Scan the QR code on the UPS panel.

Figure 6-7 Scanning the UPS QR code



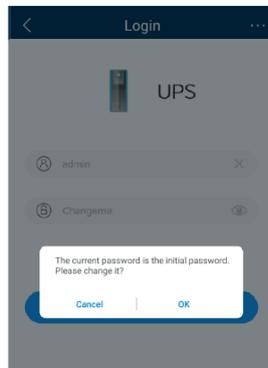
Step 5 Enter the user name and password and tap **Log In.** (The preset user name is **admin** and the preset password is **Changeme.**)

Figure 6-8 Login screen



Step 6 Tap **OK** as prompted. The **Change Password** screen is displayed. After the preset password is changed successfully, use the new password to log in to the app.

Figure 6-9 Changing password prompt



CAUTION

- After the initial login, change the password in time to improve account security and prevent data tampering.
- Hold down the RESET button on the UPS rear panel for about 10s to restore the preset WiFi password, preset user password, and SNMP card (if any) IP address. Other parameters will not be restored.

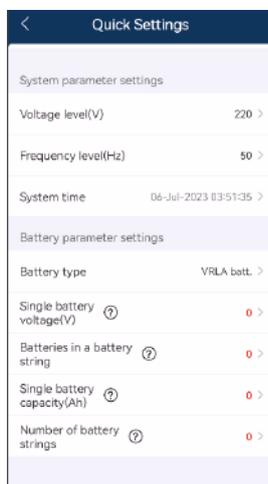
----End

6.2.1.2.3 Quick Settings

Step 1 After the login is successful, set parameters on the displayed **Quick Settings** screen.

1. Verify the voltage level and frequency level based on site requirements.
2. Set the battery type, single battery voltage, number of batteries in a battery string, single battery capacity, and number of battery strings based on site requirements.

Figure 6-10 Quick Settings



Step 2 Tap **OK**. The app home screen is displayed.

----End

6.2.1.3 Starting the Inverter

Prerequisites

1. The UPS has been powered on.
2. You have installed and logged in to the app.

Procedure

Step 1 If the alarm indicator on the UPS panel is blinking, view the alarm details on the app and handle the alarm.

Step 2 Choose **Config > Quick Settings**.

- Set the voltage level and frequency level based on site requirements.
- Set the battery type, single battery voltage, number of batteries in a battery string, single battery capacity, and number of battery strings based on site requirements.

Figure 6-11 Quick Settings



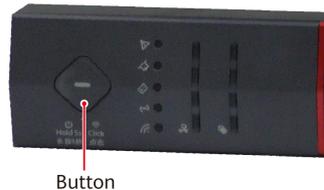
Table 6-1 Quick Settings

Item	Description	Setting	Value Range
Voltage level(V)	Specifies the system output voltage level. This parameter is configurable only after the inverter is shut down.	Set as required.	-
Frequency level(Hz)	Specifies the system output frequency level. This parameter is configurable only after the inverter is shut down.	Set as required.	50, 60, and automatic. The default value is 50.
System time	Synchronizes the system time to the UPS.	-	-
Battery type	Specifies the type of batteries connected to the UPS.	VRLA batt.	VRLA batt., Lithium batt. The default value is VRLA batt.
Single battery voltage (V)	Specifies the voltage of each battery in a battery string connected in series. Set this parameter based on the actual configuration. This parameter is configurable in non-battery mode.	Set as required.	2, 6, and 12. The default value is 0.
Batteries in a battery string	Specifies the number of batteries in a battery string. Set this parameter based on the actual configuration. This parameter is configurable in non-battery mode.	Set as required.	The value range depends on the voltage of a single battery. The default value is 0.
Single battery capacity (Ah)	Specifies the capacity of each battery in a battery string connected in series. This parameter is configurable in non-battery mode.	Set as required.	7-1000. The default value is 0.
Number of battery strings	Specifies the number of battery strings connected in parallel. This parameter is configurable in non-battery mode.	Set as required.	1-4. The default value is 0.

Step 3 Start the UPS in normal mode using one of the following methods.

- **Method 1:** When the UPS works in bypass mode, hold down the button on the UPS panel for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do not press any button during inverter startup. When the startup command is successfully delivered, and the inverter indicator is steady on, the UPS enters normal mode.

Figure 6-12 Button position



- **Method 2:** In bypass mode, choose **Config > Control > Power-on/off** on the app to start the UPS. After successful startup, the UPS enters normal mode.
- **Method 3:** On the WebUI, choose **Monitoring > UPS > Running Control** to start the UPS.

NOTE

- Method 3 is used only when the SNMP card is configured.
- For details about how to start the UPS on the WebUI, see the *EN83CTLA SNMP Card User Manual*.

----End

6.2.1.4 Powering On Loads

Procedure

Step 1 When the UPS runs properly, switch on the UPS AC output circuit breaker Q1 and rPDU (optional) switch to supply power to loads.

NOTE

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

----End

6.2.1.5 Shutting Down the UPS

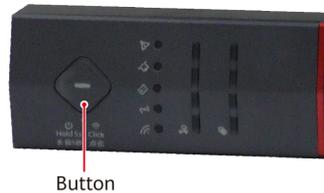
Shutting Down the Inverter to Transfer the UPS to Bypass Mode

Step 1 Shut down the UPS using one of the following methods. After you shut down a UPS in the parallel system, the UPS has no output, and another UPS continues to work.

- **Method 1:** Hold down the button on the UPS panel for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do

not press any button during inverter shutdown. When the shutdown command is successfully delivered, and the inverter indicator is off, the UPS shuts down the inverter output and enters bypass mode.

Figure 6-13 Button position



- **Method 2:** Choose **Config > Control > Power-on/off** on the app to shut down the inverter. After successful shutdown, the UPS enters bypass mode.
- **Method 3:** On the WebUI, choose **Monitoring > UPS > Running Control** to power off the UPS.

 **NOTE**

- Method 3 is used only when the SNMP card is configured.
- For details about how to shut down the UPS on the WebUI, see the *EN83CTLA SNMP Card User Manual*.

----End

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

- Step 1** Shut down loads.
- Step 2** Select one method to shut down the inverter.
- Step 3** Switch off the external battery circuit breaker (if any) or disconnect battery cables.
- Step 4** Switch off the mains AC input circuit breaker K1 and output circuit breaker Q1 of the UPS. After all indicators turn off and fans stop, the UPS shuts down, and the loads are powered off.

----End

6.2.1.6 Cold-Starting the UPS Using Batteries

Procedure

- Step 1** Switch on the external battery circuit breaker (if any) or connect battery cables.
- Step 2** Hold down the UPS button for 3s (the bypass indicator, battery indicator, and inverter indicator are on at the same time), and the UPS is powered on. After the UPS initialization is complete (about 10s), the indicator status changes and the UPS enters the standby state (the WiFi indicator is on and the fault indicator blinks). Hold down the UPS button for more than 5s, and the UPS enters battery mode.
- Step 3** When the UPS runs properly, switch on the UPS AC output circuit breaker Q1 to supply power to loads.

 NOTE

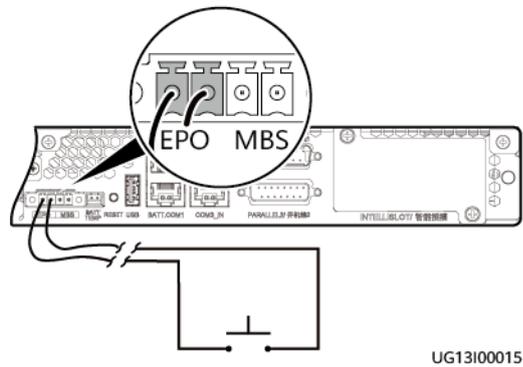
To prevent triggering overload protection, start the loads with higher power and then loads with lower power.

----End

6.2.1.7 Performing EPO

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

Figure 6-14 EPO cable connection on a single UPS

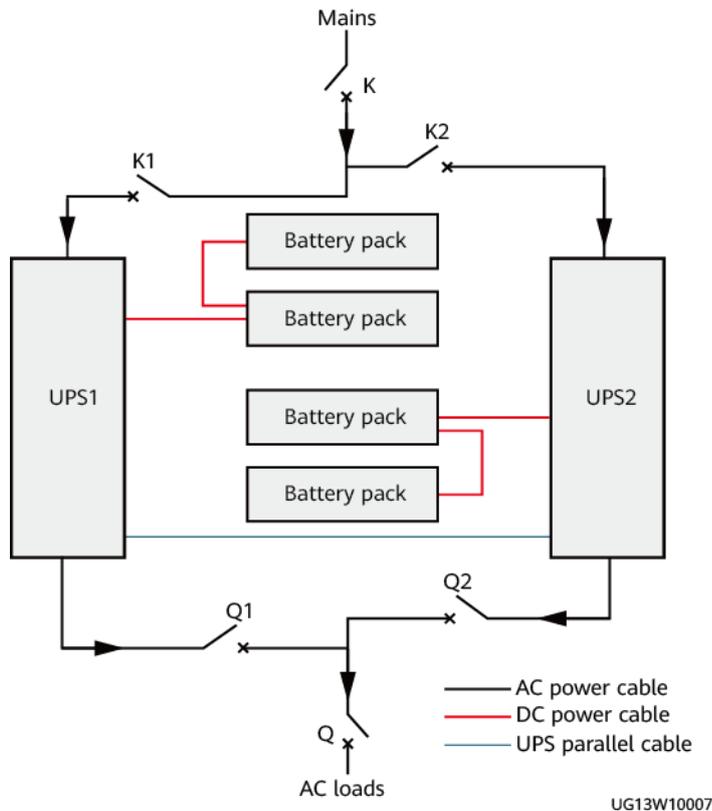


 NOTE

- Connect an external switch to the EPO ports of the UPS. After you turn on the switch in the case of emergency, the inverter stops and the UPS does not transfer to bypass mode. In this way, the UPS stops supplying power through the output terminals immediately.
- The external EPO switch (switch or dry contact signal controlled by a switch) is provided by the customer.

6.2.2 Parallel System Operations

Figure 6-15 Conceptual diagram (two parallel UPSs + four battery packs)



6.2.2.1 Power-On

Prerequisites

- The checking before power-on is complete.
- Check whether the software version is consistent with the current one. If they are inconsistent, download the current software from the technical support website and upgrade the software.
- Check that the software versions in the parallel system are consistent. If they are inconsistent, contact technical support to perform an upgrade.

Procedure

Step 1 Switch on the external battery circuit breaker (if any) or connect battery cables.

Step 2 Switch on the UPS mains AC input circuit breakers K1 and K2, and the general mains AC input circuit breaker K. The parallel system has no output.

----End

6.2.2.2 Starting the Inverters

Prerequisites

1. The UPSs have been powered on.
2. You have installed and logged in to the app.

Procedure

Step 1 If the alarm indicator on the UPS panel is blinking, view the alarm details on the app and handle the alarm.

Step 2 Choose **Config > Quick Settings**.

1. Set the voltage level and frequency level based on site requirements.
2. Set the battery type, single battery voltage, number of batteries in a battery string, single battery capacity, and number of battery strings based on site requirements.

Figure 6-16 Quick Settings

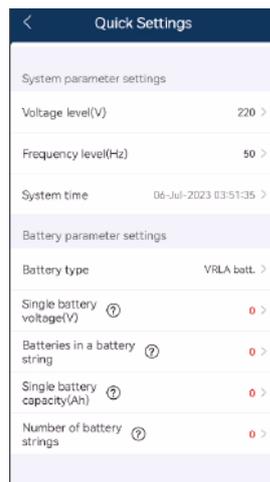


Table 6-2 Quick Settings

Item	Description	Setting	Value Range
Voltage level(V)	Specifies the system output voltage level. This parameter is configurable only after the inverter is shut down.	Set as required.	220, 230, and 240. The default value is 220.
Frequency level(Hz)	Specifies the system output frequency level. This parameter is configurable only after the inverter is shut down.	Set as required.	50, 60, and automatic. The default value is 50.

Item	Description	Setting	Value Range
System time	Synchronizes the system time to the UPS.	-	-
Battery type	Specifies the type of batteries connected to the UPS.	VRLA batt.	VRLA batt., Lithium batt. The default value is VRLA batt.
Single battery voltage (V)	Specifies the voltage of each battery in a battery string connected in series. Set this parameter based on the actual configuration. This parameter is configurable in non-battery mode.	Set as required.	2, 6, and 12. The default value is 0.
Batteries in a battery string	Specifies the number of batteries in a battery string. Set this parameter based on the actual configuration. This parameter is configurable in non-battery mode.	Set as required.	The value range depends on the voltage of a single battery. The default value is 0.
Single battery capacity (Ah)	Specifies the capacity of each battery in a battery string connected in series. This parameter is configurable in non-battery mode.	Set as required.	7–1000. The default value is 0.
Number of battery strings	Specifies the number of battery strings connected in parallel. This parameter is configurable in non-battery mode.	Set as required.	1–4. The default value is 0.

Step 3 The parallel configuration parameters are adaptive. Choose **Config > System Parameters > Parallel system** to manually set the parameters as required.

Figure 6-17 System Parameters

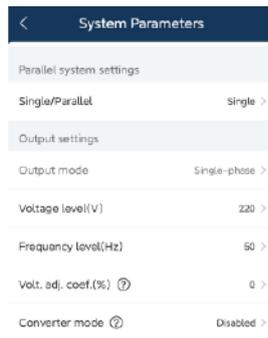
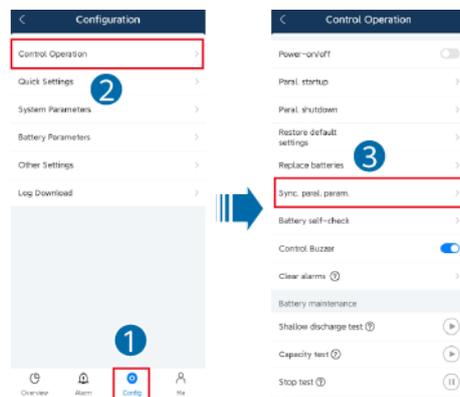


Table 6-3 Parallel system settings

Item	Description	Setting	Value Range
Single/Parallel	Specifies whether the UPS works in single mode or parallel mode. This parameter is configurable only after the inverter is shut down.	Parallel	Single, parallel. The default value is Single.
Redundant UPSs	Set this parameter based on load capacity and redundancy requirements. This parameter is configurable only after the inverter is shut down.	Set as required.	0-3. The default value is 0.
Parallel ID	Specifies the parallel IDs.	Set as required.	1-4. The default value is 1.

Step 4 Check that parameters of the current UPS are automatically synchronized to the other UPSs in the parallel system.

Figure 6-18 Synchronizing parallel parameters



Step 5 Start the UPS in normal mode using one of the following methods.

- **Method 1:** When the UPS works in bypass mode, hold down the button on the UPS panel for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do not press any button during inverter startup. When the startup command is successfully delivered, and the inverter indicator is steady on, the UPS enters normal mode.

Figure 6-19 Button



Button

- **Method 2:** In bypass mode, choose **Config > Control > Power-on/off** on the app to start the UPS. After successful startup, the UPS enters normal mode.
- **Method 3:** On the WebUI, choose **Monitoring > UPS > Running Control** to start the UPS.

NOTE

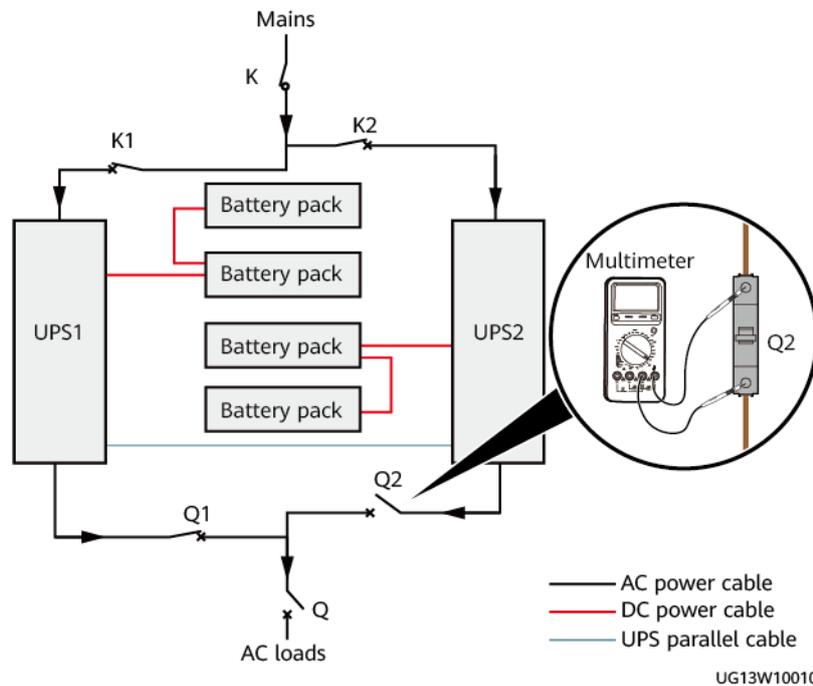
- Method 3 is used only when the SNMP card is configured.
- For details about how to start the UPS on the WebUI, see the *EN83CTLA SNMP Card User Manual*.

Step 6 Switch on output circuit breaker Q1 (provided by the customer), switch off output circuit breaker Q2 (provided by the customer), and check that the voltage difference between the two ends of output circuit breaker Q2 does not exceed 2 V.

NOTE

If the voltage difference between the two ends of the output circuit breaker Q2 exceeds 2 V, the input or output wire sequence is incorrect.

Figure 6-20 Measuring the voltage of circuit breaker Q2



Step 7 Switch on the output circuit breaker Q2.

Step 8 Perform the startup operation on each UPS. The UPS parallel system transfers to normal mode.

----End

6.2.2.3 Powering On Loads

Procedure

Step 1 When the parallel system runs properly, switch on the general output circuit breaker Q (provided by the customer), and start loads one by one.

NOTE

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

----End

6.2.2.4 Shutting Down the UPS

Shutting Down a Single UPS in the Parallel System

Step 1 Shut down the UPS using one of the following methods. After you shut down a UPS in the parallel system, the UPS has no output, and another UPS continues to work.

- **Method 1:** Hold down the button on the UPS panel for more than 5s. Release the button when the inverter indicator blinks and you hear a beep sound. Do

not press any button during inverter shutdown. When the shutdown command is successfully delivered, and the inverter indicator is off, the UPS shuts down the inverter output and enters bypass mode.

Figure 6-21 Button position



- **Method 2:** Choose **Config > Control > Power-on/off** on the app to shut down the inverter. After successful shutdown, the UPS enters bypass mode.
- **Method 3:** On the WebUI, choose **Monitoring > UPS > Running Control** to start the UPS.

 **NOTE**

- Method 3 is used only when the SNMP card is configured.
- For details about how to shut down the UPS on the WebUI, see the *EN83CTLA SNMP Card User Manual*.
- When one UPS in the parallel system is shut down while another UPS is still working, the UPS that has been shut down has no output.

Step 2 Switch off the AC input circuit breaker K1 and AC output circuit breaker Q1 for the UPS. After all indicators turn off and fans stop, the UPS shuts down.

Step 3 Exit the UPS from the parallel system.

 **NOTE**

To shut down a UPS without removing it from the system, perform only step 1.

----End

Transferring the Parallel System to Bypass Mode

Step 1 Select one method. After the UPSs shut down one by one, all inverters shut down at the same time and the UPSs transfer to bypass mode.

----End

Transferring the Parallel System to No Output State

Step 1 Shut down loads.

Step 2 Select one method. After the UPSs shut down one by one, all inverters shut down at the same time and the UPSs transfer to bypass mode.

Step 3 Switch off the external battery circuit breaker (if any) or disconnect battery cables.

Step 4 Switch off the mains AC input circuit breakers K1 and K2 and the general mains AC input circuit breaker K for the UPS system. Switch off the UPS AC output circuit breakers Q1 and Q2 and the general AC output circuit breaker Q for the UPS

system. After all indicators turn off and fans stop, the UPS shuts down, and the loads are powered off.

----End

6.2.2.5 Cold-Starting the UPS Using Batteries

Procedure

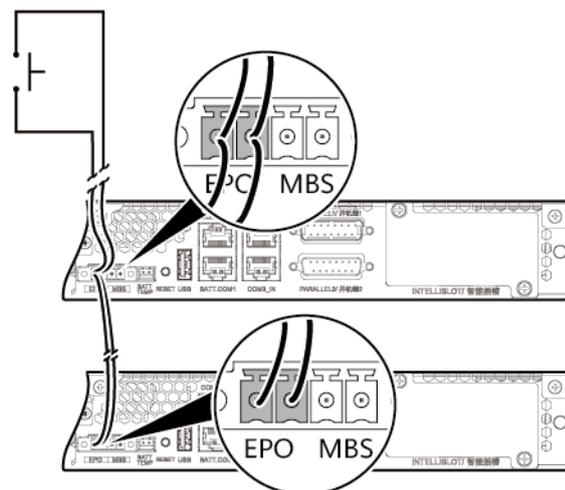
- Step 1** Switch on the external battery circuit breaker (if any) or connect battery cables.
- Step 2** Hold down the button of the UPSs in the parallel system for 3s (the bypass indicator, battery indicator, and inverter indicator are on at the same time), and the UPS is powered on. After the UPS initialization is complete (about 10s), the indicator status changes and the UPS enters the standby state (the WiFi indicator is on and the fault indicator blinks). Hold down the UPS button for more than 5s, and the UPS enters battery mode.
- Step 3** When the parallel system runs properly, switch on the AC output circuit breakers Q1 and Q2, and the general output circuit breaker Q (provided by the customer), and start loads one by one.

----End

6.2.2.6 Performing EPO

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

Figure 6-22 EPO cable connection in a parallel system



UG13100016

 **NOTE**

- Connect an external switch to the EPO ports of the UPS. After you turn on the switch in the case of emergency, the inverter stops and the UPS does not transfer to bypass mode. In this way, the UPS stops supplying power through the output terminals immediately.
- The external EPO switch (switch or dry contact signal controlled by a switch) is provided by the customer.

7 Maintenance

7.1 UPS Maintenance

NOTICE

- Only trained personnel are allowed to perform maintenance tasks. Before performing operations on devices, wear ESD clothes, ESD gloves, and an ESD wrist strap. Remove conductive objects such as jewelry and watches to avoid electric shocks or burns.
 - Use insulated tools when maintaining components inside 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 checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Operating environment	<ul style="list-style-type: none"> • Ambient temperature: – 5°C to +50°C; temperature derating coefficient: not derated from – 5°C to +40°C; 0.9 from 41°C to 45°C; 0.8 from 46°C to 50°C • Humidity: 0–95% RH (non-condensing) 	<ul style="list-style-type: none"> • If the temperature or humidity is abnormal, check the air conditioner status. • If the input voltage is abnormal, check the power grid and input cable connection. 	Monthly
Power grid environment	220 V AC/230 V AC/240 V AC (phase voltage)	<ul style="list-style-type: none"> • If the input voltage is abnormal, check the power grid and input cable connection. • If the output voltage is abnormal, check the UPS running status and check whether an alarm is generated. 	Monthly

7.1.2 Quarterly Maintenance

Table 7-2 Quarterly maintenance checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Power cables and terminals	The insulation layers of cables are intact and terminals are free from signs of sparks.	<ul style="list-style-type: none"> • Replace cables. • Secure all output terminals. 	Quarterly
Cleanliness	Wipe the device surface using a white paper and the paper does not turn black.	Clean the dust, especially from the front panel.	Quarterly
Power cables and terminals (between the UPS and the PDF)	The insulation layers of cables are intact and terminals are free from signs of sparks.	<ul style="list-style-type: none"> • Replace cables. • Secure all output terminals. 	Quarterly

7.1.3 Annual Maintenance

Table 7-3 Annual maintenance checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Grounding	Ground cables are connected securely.	Tighten the screws.	Annually
Cable and circuit breaker through-current capacity	The circuit breakers and cables meet load requirements. The actual cable through-current capacity is greater than the circuit breaker specifications.	<ul style="list-style-type: none"> • Replace the circuit breakers. • Replace cables. 	Annually

Item	Expected Result	Troubleshooting	Maintenance Interval
EPO (if configured)	The EPO signal cable is connected reliably.	Secure all wiring terminals.	Annually

7.2 Lead-Acid Battery Maintenance

Battery Maintenance Precautions

- Before maintaining batteries, insulate tools such as wrenches. Do not place any objects on the top of batteries.
- Do not use any organic solvent to clean batteries.
- Do not remove the safety valve or fill anything into batteries.
- Do not smoke or use an open flame around batteries.
- After batteries are discharged, charge them in time to avoid affecting their lifespan.
- Only professionals are allowed to perform the maintenance tasks.
- If batteries have not been discharged for a long time, charge them in equalized mode at least once every three months to activate them. Each charge should last at least 4 hours.
- Normally, discharge and charge batteries once every four to six months. Each charge should last at least four hours.
- In high-temperature areas, discharge and charge batteries once every two months. Each charge should last at least four hours.
- Do not overdischarge batteries. After discharging batteries, fully charge them immediately (or within 24 hours) to avoid affecting the battery capacity.
- The maximum battery discharge duration can be set to 0 hours to 24 hours. The default value is **16Hour**. If you set the value to **0Hour**, the discharge time is not limited.
- The battery module consists of VRLA batteries. The battery service life depends on the ambient temperature and number of charge and discharge times. Using batteries in hot environment or deep discharge will shorten the battery service life.
- The standard operating temperature for batteries is 25°C. Running batteries at a temperature higher than 25°C will shorten the battery service life; running batteries at a temperature lower than 25°C will reduce the battery capacity.
- To maintain the battery service life, ensure that the ambient temperature is between 15°C and 25°C.
- Keep batteries away from heat sources and air vents.

7.2.1 Monthly Maintenance

Table 7-4 Monthly maintenance checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Battery management alarm	No battery management alarm is generated.	Identify the alarm cause based on the alarm information.	Monthly
Battery appearance	<ol style="list-style-type: none"> 1. The surface is clean and free of stains. 2. The battery terminals are intact. 3. Batteries are free from damage and cracks. 4. Batteries are free from acid leakage. 5. Batteries are not deformed or bulged. 	If an exception occurs, contact technical support.	Monthly
Battery operating temperature	<ol style="list-style-type: none"> 1. The standard battery operating temperature is 25°C. 2. Battery charge and discharge conditions meet the requirements specified in the battery specifications. 	<ol style="list-style-type: none"> 1. Identify the cause of the abnormal battery operating temperature. 2. If the fault persists, contact technical support. 	Monthly

Item	Expected Result	Troubleshooting	Maintenance Interval
Battery string charging voltage	<ul style="list-style-type: none"> Equalized charging voltage (2.35 V/cell±0.02 V/cell) x Voltage of a single battery/2 x Number of batteries in a battery string Float charging voltage (2.25 V/cell±0.02 V/cell) x Voltage of a single battery/2 x Number of batteries in a battery string 	<ol style="list-style-type: none"> If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than 1% of the battery string voltage, check whether the cable between the battery string and the UPS is excessively long, or the cable diameter is excessively small. Check whether the equalized charging voltage and float charging voltage are correctly set for the UPS. If the fault persists, contact technical support. 	Monthly

7.2.2 Quarterly Maintenance

Table 7-5 Quarterly maintenance checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Battery temperature sensor precision	The deviation between the detected temperature and the displayed temperature is less than 3°C.	<ol style="list-style-type: none"> Install the battery temperature sensor in the correct position. Replace the battery temperature sensor. 	Quarterly
Battery management parameter settings	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.	Quarterly

Item	Expected Result	Troubleshooting	Maintenance Interval
Tightness of battery screws	The torque marks on battery terminal screws indicating tight connections do not change.	Take photos from multiple angles and contact technical support in a timely manner.	Quarterly
Cables between batteries	No cable deteriorates and the insulation layer does not crack.	Replace the faulty cable.	Quarterly
Battery voltage	<ul style="list-style-type: none"> • Equalized charging voltage: 2.35 V/cell±0.02 V/cell • Float charging voltage: 2.25 V/cell ± 0.02 V/cell 	<ol style="list-style-type: none"> 1. Check whether the equalized charging voltage and float charging voltage of a battery are normal. 2. If the charging voltage of a battery exceeds the specifications, perform a complete forcible equalized charging for the battery, and check again whether the battery string voltage is normal. 3. If the fault persists, contact technical support. 	Quarterly
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge properly.	<ol style="list-style-type: none"> 1. Locate the fault cause. 2. If the fault persists, contact technical support. 	Quarterly

7.2.3 Annual Maintenance

Table 7-6 Annual maintenance checklist

Item	Expected Result	Troubleshooting	Maintenance Interval
Capacity test (recommended)	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold to refresh the capacity of the battery.	<ol style="list-style-type: none"> 1. Locate the fault cause. 2. If the fault persists, contact technical support. 	Annually
Battery connection	<ol style="list-style-type: none"> 1. When battery strings are powered off, check the reliability of each connection point from positive terminals to negative terminals. All points must be connected reliably. 2. Use a torque wrench to check the tightening torque for each battery screw. The torque must meet the requirements of the battery manufacturer. After checking that the battery screws meet the requirements, mark the screws for later check. 	<ol style="list-style-type: none"> 1. Rectify any abnormal connection. 2. If the fault persists, contact technical support. 	Annually

7.3 Lead-Acid Battery Test

7.3.1 Shallow Discharge Test

NOTICE

Before performing a battery shallow discharge test, ensure that:

- No high temperature, charger fault, or discharger fault has occurred.
- The load fluctuation is less than 10%.

Automatic Shallow Discharge Test

Step 1 On the app, choose **Config > Battery Parameters**, and set **Shallow discharge test** to **Enable**.

Step 2 Set the **Scheduled shallow discharge test interval(Day)** as required. After the setting is complete, the system will perform an automatic shallow discharge test based on the settings.

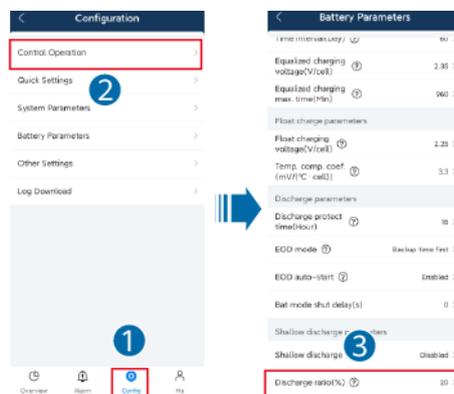
----End

Manual Shallow Discharge Test

Step 1 Adjust the discharge ratio for the shallow discharge test.

On the app, choose **Config > Battery Parameters > Discharge ratio(%)** to check and adjust the discharge ratio as required.

Figure 7-1 Adjusting the shallow discharge ratio



Discharge ratio: specifies the percentage of discharge capacity to the total dischargeable capacity. This parameter can be set to a value between 10% and 50%, and the default value is 20%. It is configurable in any mode.

Step 2 On the app, choose **Config > Control**.

Step 3 Set the **Shallow discharge test** after all conditions are met. Tap the **Shallow discharge test**, the test starts after about 5s.

Step 4 Tap **Stop test** to forcibly stop the battery shallow discharge test.

----End

7.3.2 Capacity Test

Context

NOTICE

Before performing a capacity test, ensure that:

- The UPS works in normal mode, and the battery SOC has reached 100% for two hours.
- No high temperature, charger fault, or discharger fault has occurred.
- The load rate ranges from 5% to 100%, and the load fluctuation is less than 10%.

Procedure

Step 1 On the app, choose **Config > Control**.

Step 2 Set the **Capacity test** after all conditions are met. Tap **Capacity test** and the test starts after about 5s.

Step 3 Tap **Stop test** to forcibly stop the capacity test.

----End

7.3.3 Test Data Download

Procedure

Step 1 On the WebUI, choose **Query > Battery Test Records**, choose logs that need to be queried from the **Log** drop-down list, and click **Query**.

Figure 7-2 Battery Test Records



No.	Generated	Cleared	Test Start Reason	Test End Reason	End (V)	Avg. (A)	Dis. (Ah)	Batt. temp. (°C)
No battery test records to display.								

Step 2 Choose logs that have been queried from the **Log** drop-down list, and click **Export**.

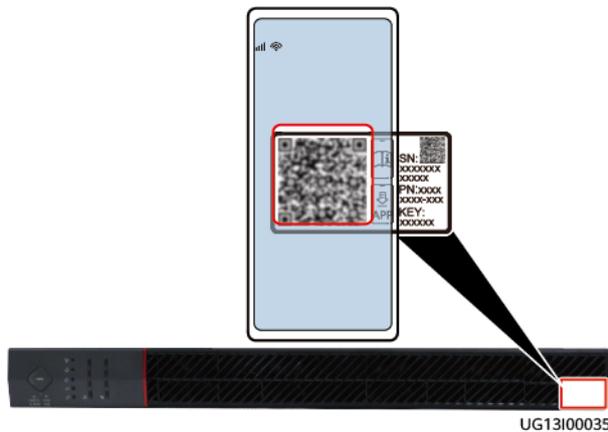
----End

8 FAQs

8.1 How Do I Obtain the Preset App Account and Password?

Procedure

Step 1 Scan the QR code on the UPS panel using the mobile phone.



Step 2 Find the preset account and password in the quick guide.

----End

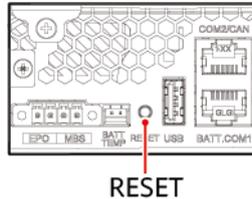
8.2 How Do I Obtain the WiFi Network Connected to the UPS?

Procedure

Step 1 Check the SN on the label in the lower right corner of the UPS. The UPS WiFi name is in the format of UPS2000H-SN.

Procedure

- Step 1** You can hold down the reset button on the UPS monitoring device to restore the preset login account and password. If an SNMP card is configured, only the IP address of the SNMP card will be restored.



----End

8.5 What Can I Do If My Phone Frequently Switches Between WiFi Networks?

Procedure

- Step 1** On your phone, choose **Settings** > **WLAN**.
- Step 2** Disable **WLAN+**.



NOTE

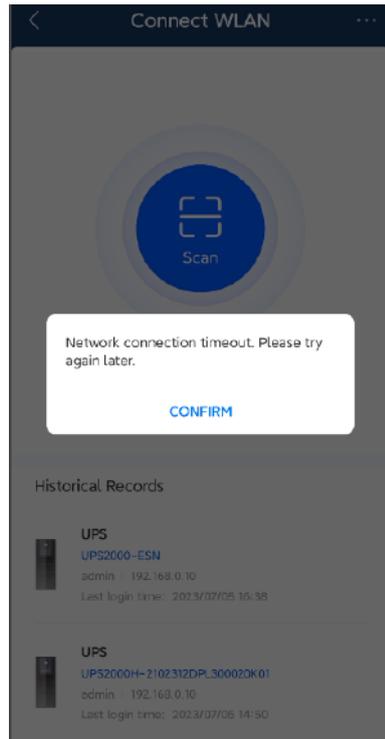
WLAN+ can intelligently select and connect to the optimal network, which will cause frequent WLAN network switching and affect the normal connection between your phone and the UPS WLAN network.

----End

8.6 How Do I Handle a Device Connection Failure?

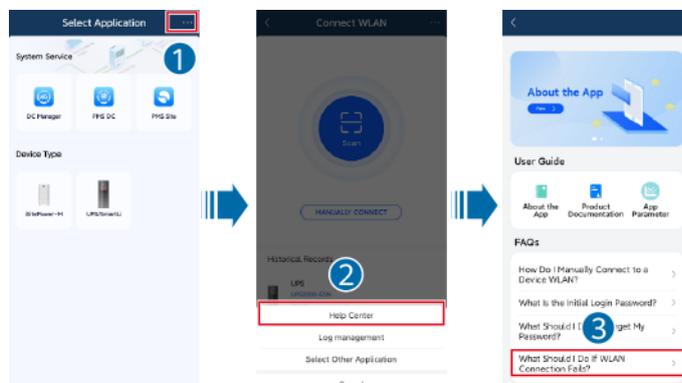
Procedure

- Step 1** When the information shown in the following figure is displayed, go to the help center.



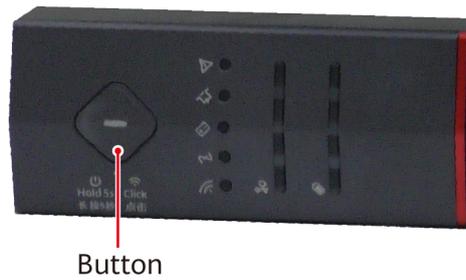
- If yes, tap **Manually connect to WIFI** to connect the mobile phone to the correct UPS WiFi, and tap **Next**.
- If not, go to step 2.

Step 2 Check whether **Mobile data** is lit on.



- If yes, tap **Mobile data** to turn off the mobile data network, and then tap **Next**.
- If not, go to step 3.

Step 3 Press the button to restart the WiFi of the UPS, and then tap **Next**.



----End

8.7 How Do I Configure SMS Notifications Through the 4G Module?

Prerequisites

- You have logged in to the WebUI.
- The 4G module has been installed. For details about how to install a 4G module, see [5.6 Installing a 4G Module](#).

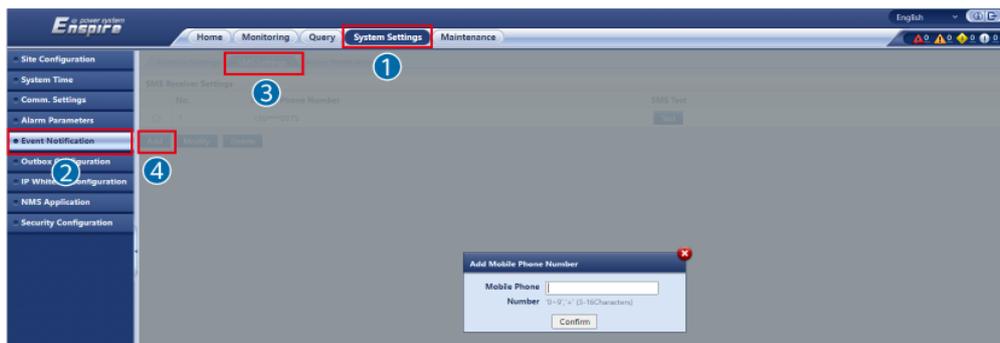
NOTE

For details about the WebUI login, see the *EN83CTLA SNMP Card User Manual*.

Procedure

- Step 1** Choose **System Settings** > **Event Notification**. On the **SMS Settings** page, add a mobile number for receiving notifications.

Figure 8-1 Adding a mobile number



- Step 2** Click **Test** to check whether the added mobile number is available. If it is available, **Successfully sent the test short message.** is displayed.

Figure 8-2 Testing the SMS function



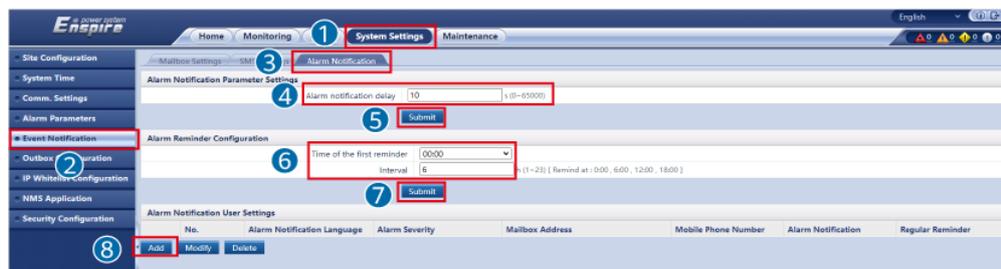
NOTE

If the test fails, **Failed to send the test short message.** is displayed. Check whether the 4G module is properly connected or whether the SIM card is working properly.

Step 3 Set alarm notification parameters.

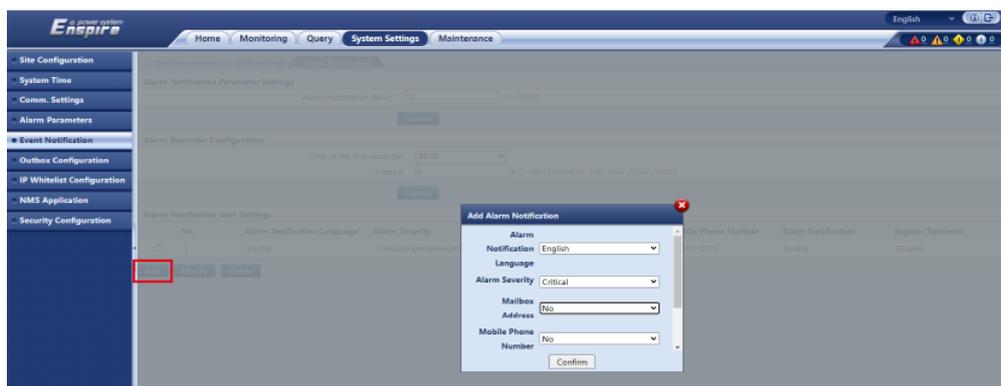
Set **Alarm notification delay**, **Time of the first reminder**, and **Interval**, and add alarm notification based on site requirements.

Figure 8-3 Setting the alarm notification parameters



Set the **Alarm Notification Language**, **Alarm Severity**, **Mobile Phone Number**, **Alarm Notification**, and **Regular Reminder** based on site requirements.

Figure 8-4 Adding an alarm notification



NOTICE

- The **Mobile Phone Number** in **Alarm Notification** can be selected only after it is added in **SMS Settings**.
- If you enable alarm notification by SMS message, when there is an alarm, the system will send SMS messages to the receiver at 00:00, 06:00, 12:00, and 18:00. If the SNMP card is powered on within one hour after any of those six time points, the system will check whether the alarm notification has been sent at the previous time point after power-on. If the notification has not been sent, the system will send it. If the notification has been sent, the system will not send it again. If the SNMP card is powered on more than one hour after any of those six time points, the alarm notification will not be sent until reaching the next time point.
- Alarm sending example: If the SNMP card is powered on between 6:00 and 6:59, the system will check whether the alarm notification has been sent at 6:00. If it has been sent, the system will not send it again. If it has not been sent, the SNMP card will send it. If the SNMP card is powered on between 7:00 and 11:59, the alarm notification will not be sent until 12:00.

----End

8.8 How Do I View Alarms?

Tap . The **Current Alarms** screen is displayed.

Figure 8-5 Alarms screen

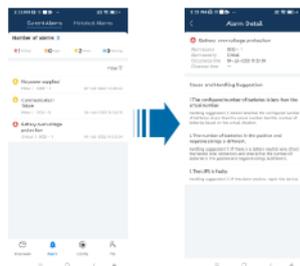


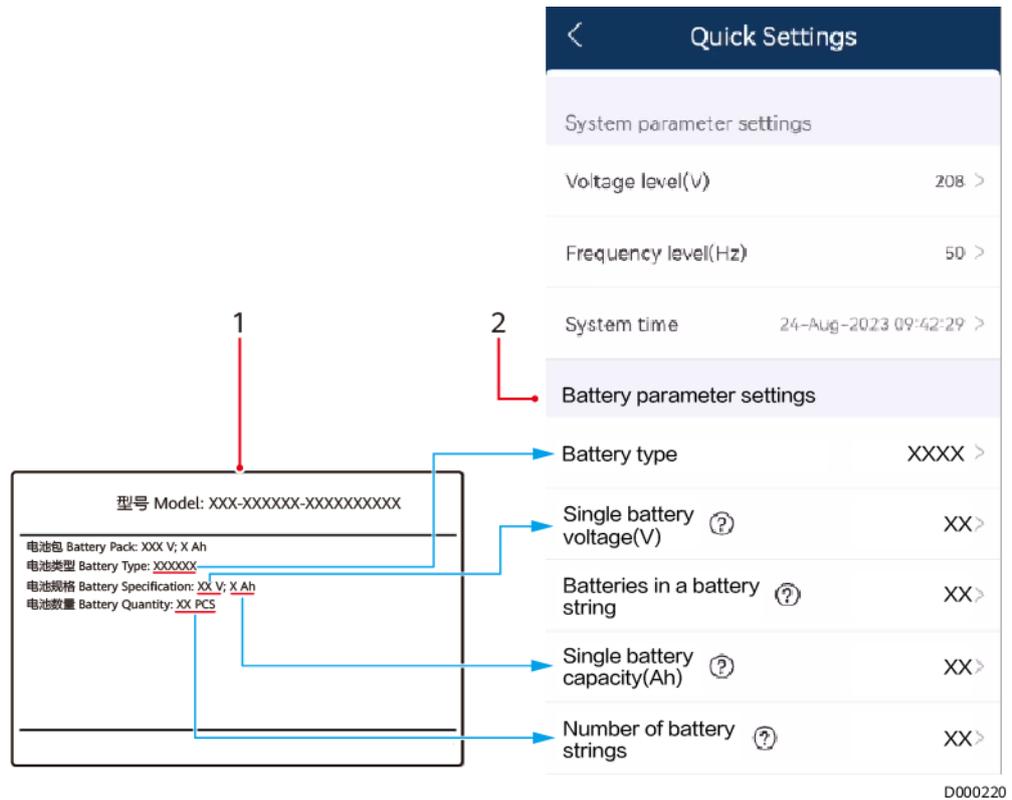
Table 8-1 Alarm

Item	Description
Current Alarms	Current alarms in the system are filtered by date. You can tap an alarm to view alarm details, such as the alarm cause and repair suggestion.
Historical Alarms	Historical alarms in the system are filtered by date. You can tap an alarm to view the alarm details, such as the alarm cause and repair suggestion.

8.9 How Do I View Battery Specifications?

For details about battery specifications, see the battery pack nameplate. The following figure is for reference only.

Figure 8-6 Mapping



(1) Battery pack nameplate

(2) Battery specifications

A Alarm List

 NOTE

For details about alarms, see the *UPS2000 and SmartLi Alarm Reference*.

B Lead-Acid Battery Backup Time

 NOTE

The following table lists the backup time upon factory delivery, which decreases with the battery capacity. The table is for reference only.

Table B-1 Backup time parameters for the battery pack ESS-240V12-7AhBPVA04 (6 kVA UPS; calculated based on 90% battery efficiency)

Load (%)	Load (W)	One Battery Pack (min)	Two Battery Packs (min)	Three Battery Packs (min)	Four Battery Packs (min)
100	6000	5	15	27	35
80	4800	8	20	36	49
50	3000	15	35	59	83
30	1800	30	65	110	164

Table B-2 Backup time parameters for the battery pack ESS-240V12-9AhBPVBA04 (6 kVA UPS; calculated based on 90% battery efficiency)

Load (%)	Load (W)	One Battery Pack (min)	Two Battery Packs (min)	Three Battery Packs (min)	Four Battery Packs (min)
100	6000	8	19	33	42
80	4800	9	29	44	58
50	3000	19	44	78	110
30	1800	36	87	147	206

Table B-3 Backup time parameters for the battery pack ESS-240V12-7AhBPVBA04 (10 kVA UPS; calculated based on 90% battery efficiency)

Load (%)	Load (W)	One Battery Pack (min)	Two Battery Packs (min)	Three Battery Packs (min)	Four Battery Packs (min)
100	10000	3	6	13	19
80	8000	4	10	17	27
50	5000	6	19	32	43
30	3000	15	36	52	83

Table B-4 Backup time parameters for the battery pack ESS-240V12-9AhBPVBA04 (10 kVA UPS; calculated based on 90% battery efficiency)

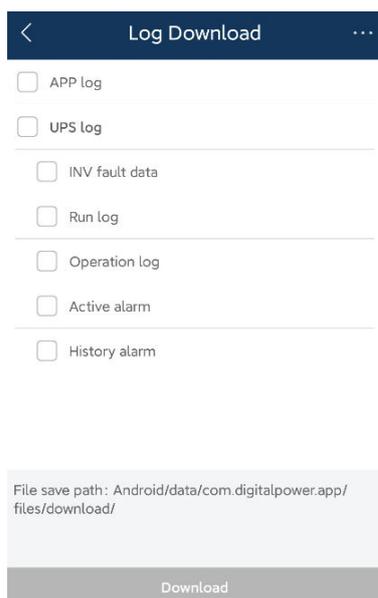
Load (%)	Load (W)	One Battery Pack (min)	Two Battery Packs (min)	Three Battery Packs (min)	Four Battery Packs (min)
100	10000	4	9	17	27
80	8000	5	13	25	33
50	5000	9	26	38	50
30	3000	19	42	75	105

C Exporting Logs on the App

Context

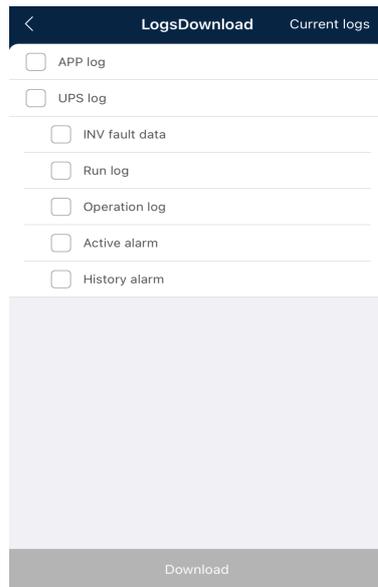
- If your phone runs Android or HarmonyOS, tap  in the upper right corner to view historical downloaded logs.

Figure C-1 Log Download



- If your phone runs iOS, tap  in the upper right corner to view historical downloaded logs.

Figure C-2 Log Download



Procedure

Step 1 Log in to the app.

Step 2 Export logs from the app.

1. Tap **Config > Log Download**.
2. Select **App log** and tap **Download**.
3. The logs are downloaded and saved in the default path.

Step 3 Export UPS logs.

1. Tap **Config > Log Download**.
2. Select **UPS log** and tap **Download**.
3. The INV fault data, run logs, operation logs, active alarms, and historical alarms are downloaded and saved in the default path.

Step 4 Export the inverter fault data.

1. Tap **Config > Log Download**.
2. Select **INV fault data** and tap **Download**.
3. The logs are downloaded and saved in the default path.

Step 5 Export the UPS run logs.

1. Tap **Config > Log Download**.
2. Select **Run log** and tap **Download**.
3. The logs are downloaded and saved in the default path.

Step 6 Export operation logs.

1. Tap **Config > Log Download**.
2. Select **Operation log** and tap **Download**.
3. The logs are downloaded and saved in the default path.

Step 7 Export active alarms.

1. Tap **Config > Log Download**.
2. Select **Active alarm** and tap **Download**.
3. The active alarms are downloaded and saved in the default path.

Step 8 Export historical alarms.

1. Tap **Config > Log Download**.
2. Select **History alarm** and tap **Download**.
3. The historical alarms are downloaded and saved in the default path.

----End

D Lifting Trolley

If a lifting trolley is required during installation and maintenance, you need to prepare it by yourself.

Function

The tool is used to facilitate module installation and removal.

It is recommended that a lifting trolley be configured for each site to facilitate the maintenance of modules. You can decide whether to choose it based on site requirements.

Appearance

Figure D-1 Lifting trolley



UF01H00041

- | | | |
|---------------------|----------------|---------------------|
| (1) Tabletop | (2) Handle | (3) Lowering switch |
| (4) Elevating pedal | (5) Foot brake | - |

Specifications

Item	Specifications
Weight	115 kg
Load-bearing capacity	350 kg
Minimum height	360 mm
Maximum height	1580 mm
Tabletop dimensions (length x width)	900 mm x 700 mm

Usage

 **CAUTION**

- Overloading is prohibited.
- Keep hands or feet away from the coverage area of the tabletop.
- When placing a module, brake the lifting trolley to prevent it from moving.
- Keep the lifting trolley properly for future maintenance.

-
- Step 1** Release the brake of the lifting trolley and push the trolley to the required position.
- Step 2** Brake the lifting trolley to stop it and check that it will not move.
- Step 3** Repeatedly step on the elevating pedal to raise the tabletop to a proper height.
- Step 4** Lift the lowering switch to slowly lower the tabletop to the required height.

----End

E Acronyms and Abbreviations

A

ASIC application-specific integrated circuit

C

CAN controller area network

CPLD complex programmable logical device

E

EPO emergency power-off

EOD end of discharge

ESN equipment serial number

H

HTTPS Hypertext Transfer Protocol Secure

P

PFC power factor correction

PE protective earthing

PL	parallel load
R	
RS232	Recommended Standard 232
RS485	Recommended Standard 485
S	
SELV	safety extra-low voltage
SOC	state of charge
SSH	Secure Shell
T	
THD_v	total harmonic distortion of output voltage
TNV	telecommunication network voltage
U	
UPS	uninterruptible power system
USB	universal serial bus