

UPS2000-G-(1 kVA-3 kVA)

User Manual

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About This Document

Purpose

This document describes the UPS2000-G-1KRTS, UPS2000-G-1KRTL, UPS2000-G-2KRTS, UPS2000-G-2KRTL, UPS2000-G-3KRTS, and UPS2000-G-3KRTL in terms of their features, performance specifications, appearance, structures, working principles, installation, and operation and maintenance (O&M).

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

Change History

Issue	Date	Description
17	2024-11-10	- Updated 2.4 Optional Components. - Updated 3.3 Mains Input Electrical Specifications. - Updated 6.1 Checking Before Power-On.
16	2022-12-28	Added no-load loss in 3.8 System Electrical Specifications .
15	2019-12-19	Added descriptions about the USB port of the product.
14	2019-07-01	Updated the device running environment.
13	2019-05-05	Updated the device running environment.
12	2019-02-26	Updated the output electrical specifications.
11	2018-08-29	- Updated the button description. - Updated the content about alarm handling.
10	2018-01-16	Added descriptions about the device application scenarios.
09	2017-11-27	Updated the device running environment.
08	2017-08-04	Updated the description about alarm handling.

Issue	Date	Description
07	2017-01-19	- Added the DHCP feature. - Added an external dry contact card.
06	2016-05-15	- Updated electrical specifications. - Updated the function of the ON/MUTE button. - Added the automatic startup setting. - Updated the display of battery backup time.
05	2016-01-25	- Updated the battery capacity and discharge time limit settings in 5.5 Setting Parameters. - Added the description about bypass overload.
04	2015-11-23	- Updated the voltage range in ECO mode. - Added the shortcut keys for exiting the setting screen and alarm screen.
03	2015-10-12	Added the 2 kVA UPS.
02	2015-08-10	Updated the weight of the 1 kVA UPS.
01	2015-06-25	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.

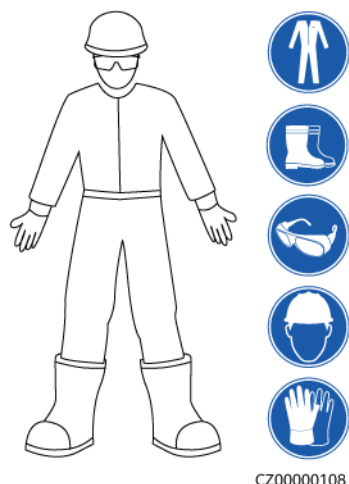
DANGER

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 short-circuits or 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

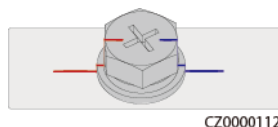
Do not directly connect aluminum cables to prevent electrochemical corrosion of copper and aluminum.

 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.

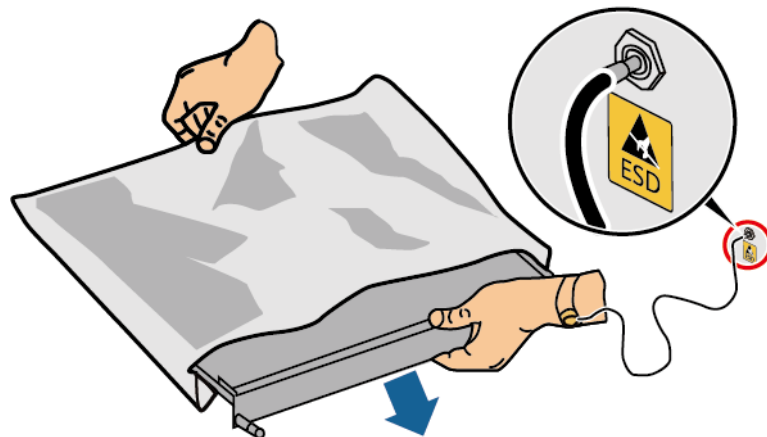
ESD

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



DC15000001

- 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.
- Do not perform construction that will adversely affect the operating environment of the equipment during equipment operation, such as

construction that generates dust, scraps, water mist, strong vibration, and corrosive materials. If such construction cannot be avoided, power off the equipment and take protective measures before the construction. Power on the equipment after the construction is complete and the construction site is cleaned up.

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.

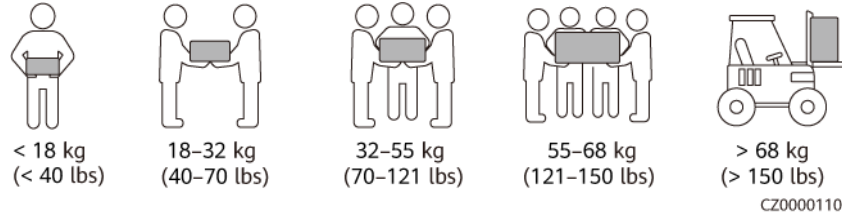
General Requirements

- 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

Table 2-1 lists the product models involved in this document.

Table 2-1 UPS models

Model	Represented By	Remarks
UPS2000-G-1KRTS	1K-standard backup time model-rack mounted-IEC	The standard and long backup time models are abbreviated to 1 kVA when their common features or parameters need to be described.
UPS2000-G-1KRTL	1K-long backup time model-rack mounted-IEC	
UPS2000-G-2KRTS	2K-standard backup time model-rack mounted-IEC	The standard and long backup time models are abbreviated to 2 kVA when their common features or parameters need to be described.
UPS2000-G-2KRTL	2K-long backup time model-rack mounted-IEC	
UPS2000-G-3KRTS	3K-standard backup time model-rack mounted-IEC	The standard and long backup time models are abbreviated to 3 kVA when their common features or parameters need to be described.
UPS2000-G-3KRTL	3K-long backup time model-rack mounted-IEC	

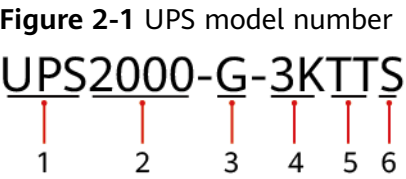


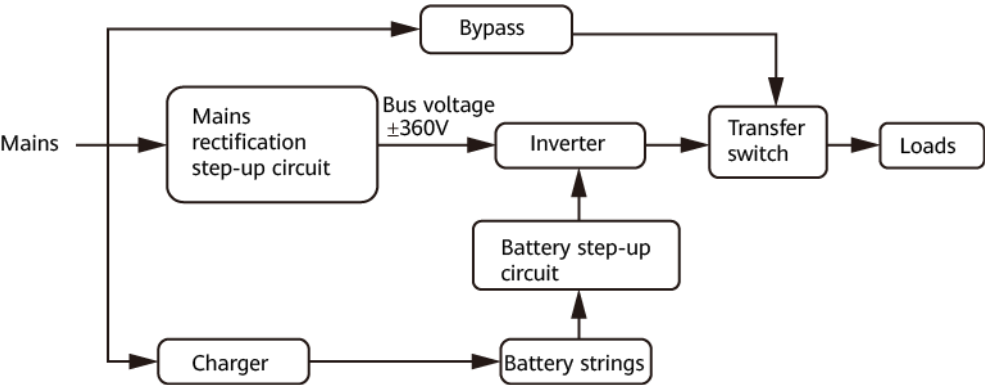
Table 2-2 UPS model number details

No.	Meaning	Description
1	Product category	UPS: uninterruptible power system
2	Product family	2000: P (capacity) ≤ 20 kVA
3	Product series	• A: tower-mounted UPS • G: rack-mounted UPS
4	Output capacity Unit: VA	• 1K: 1 kVA • 2K: 2 kVA • 3K: 3 kVA
5	UPS type	• RT: rack- or tower-mounted UPS • TT: tower-mounted UPS
6	Built-in battery pack (optional)	• S: standard backup time model, providing only standard battery packs that have standard backup time • L: long backup time model, using external large-capacity battery packs that provide long backup time

2.2 Working Principle

Figure 2-2 shows the UPS conceptual diagram.

Figure 2-2 Conceptual diagram

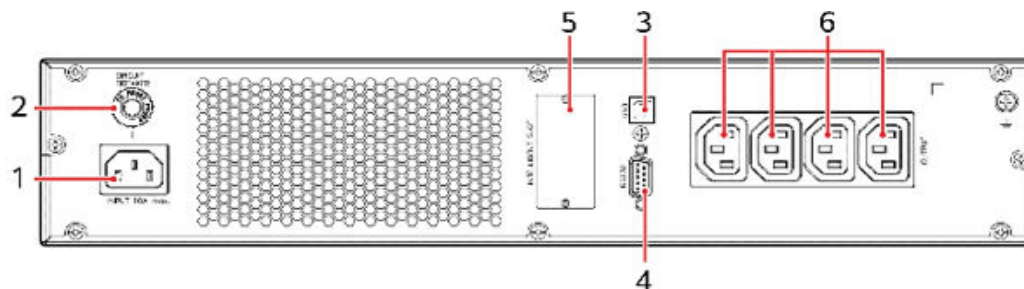


UG02S00018

2.3 Product Structure

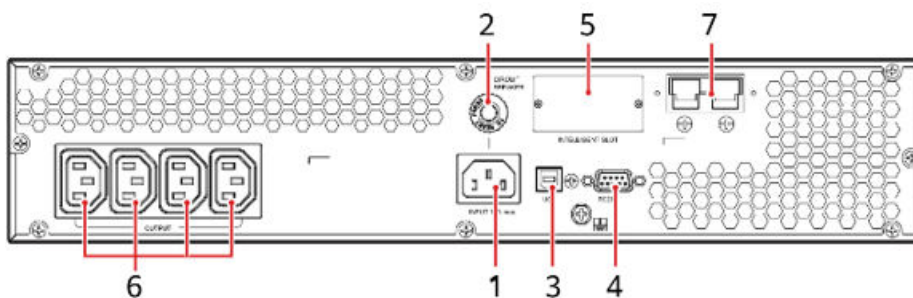
Figure 2-3 to Figure 2-8 show the rear view of the 1 kVA, 2 kVA, and 3 kVA UPSs.

Figure 2-3 Rear view of a 1 kVA UPS with standard backup time



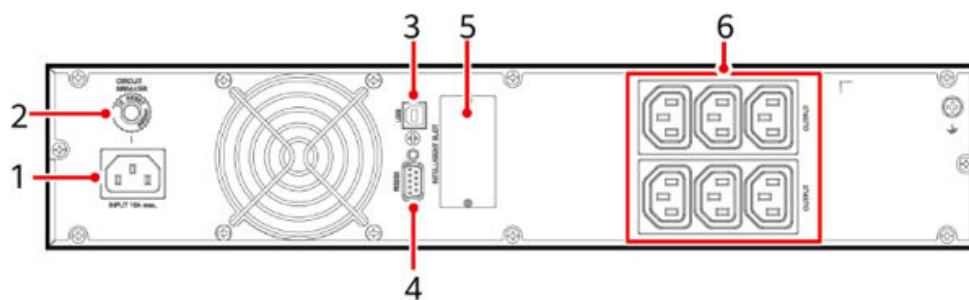
- | | |
|---|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) USB port ^a (protected by a security mechanism) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |

Figure 2-4 Rear view of a 1 kVA UPS with long backup time



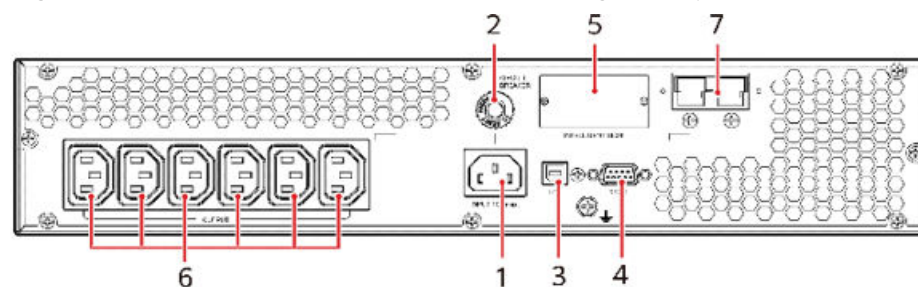
- | | |
|---|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) USB port ^a (protected by a security mechanism) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |
| (7) External battery connector (only for long backup time models) | |

Figure 2-5 Rear view of a 2 kVA UPS with standard backup time



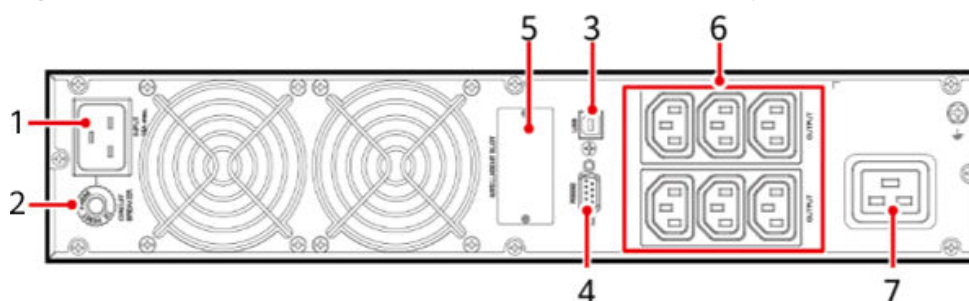
- | | |
|---|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) USB port ^a (protected by a security mechanism) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |

Figure 2-6 Rear view of a 2 kVA UPS with long backup time



- | | |
|---|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) USB port ^a (protected by a security mechanism) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |
| (7) External battery connector (only for long backup time models) | |

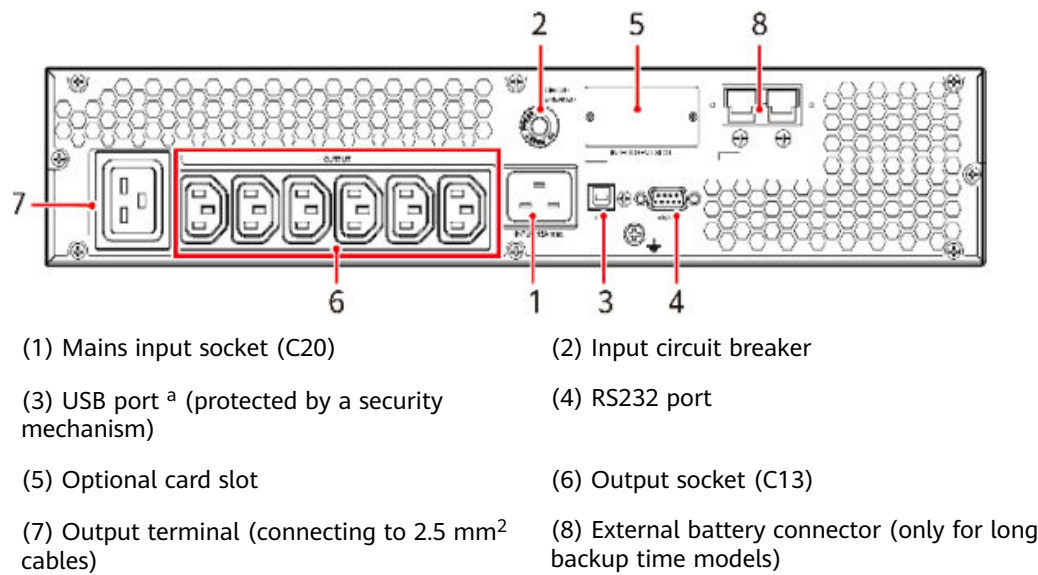
Figure 2-7 Rear view of a 3 kVA UPS with standard backup time



- | | |
|---|---------------------------|
| (1) Mains input socket (C20) | (2) Input circuit breaker |
| (3) USB port ^a (protected by a security mechanism) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |
| | (7) Output socket (C13) |

(7) Output terminal (connecting to 2.5 mm² cables)

Figure 2-8 Rear view of a 3 kVA UPS with long backup time



NOTE

a: The USB port supports the standard Modbus protocol and can be connected to the network management system (NMS) through a USB cable.

2.4 Optional Components

Optional Component	Model	Function	Remarks
Ambient temperature and humidity sensor	-	Measures the ambient temperature (0–50°C) and humidity (0%–100% RH).	Used together with an SNMP card.
Battery pack	ESS-36V12-9*2AHBPV BB01	Contains two battery strings. Each string contains three 9 Ah/12 V DC batteries. The output voltage of the battery pack is 36 V DC.	Applicable to the 1 kVA UPS with long backup time.

Optional Component	Model	Function	Remarks
	ESS-72V12-9AHBPVBB 01	Contains one battery string with six 9 Ah/12 V DC batteries. The output voltage of the battery pack is 72 V DC.	Applicable to the 2 kVA UPS with long backup time.
	ESS-96V12-9AHBPVBB 02	Contains one battery string with eight 9 Ah/12 V DC batteries. The output voltage of the battery pack is 96 V DC.	Applicable to the 3 kVA UPS with long backup time.
SNMP card	RMS-SNMP01B	Monitors the UPS, provides the Ethernet networking solution, and enables ambient temperature and humidity detection.	-
Modbus card	RMS-MODBUS01B	Provides two cascaded RS485 ports to implement networking over the Modbus or YDN-23 protocol.	-
Dry contact card	RMS-RELAY01B	Provides dry contact signals and manages the UPS remotely.	-
External dry contact card	RMS-RELAY02B	Provides dry contact signals and manages the UPS remotely.	Used together with an SNMP card.
External charger	CHG-36V15A-01B	Connects the battery pack or rack to the mains and charges the batteries or battery pack.	Applicable to the 1 kVA UPS with long backup time.
	CHG-72V12A-01B		Applicable to the 2 kVA UPS with long backup time.
	CHG-96V10A-01B		Applicable to the 3 kVA UPS with long backup time.

Optional Component	Model	Function	Remarks
High-voltage protector	OVCD-230V16A-01B	The OVCD is connected between the mains and the UPS input. If the mains voltage is abnormally high, the OVCD actively disconnects the L wire between the mains input and UPS to prevent the abnormally high voltage from flowing into the UPS and damaging the UPS. In addition, the OVCD provides extra input surge voltage absorbing capability and input filtering capability.	-
Guide rail component	None	Secures the UPS or battery pack.	Configured in rack-mounted scenarios.

3 Technical Specifications

3.1 Physical Specifications

Table 3-1 Physical specifications

Model	Net Dimensions (H x W x D)	Net Weight
UPS2000-G-1KRTS	88 mm x 438 mm x 310 mm	10.7 kg
UPS2000-G-1KRTL	88 mm x 438 mm x 310 mm	5.9 kg
UPS2000-G-2KRTS	88 mm x 438 mm x 410 mm	18.5 kg
UPS2000-G-2KRTL	88 mm x 438 mm x 410 mm	8.6 kg
UPS2000-G-3KRTS	88 mm x 438 mm x 630 mm	27.9 kg
UPS2000-G-3KRTL	88 mm x 438 mm x 410 mm	9.2 kg

3.2 Environmental Specifications

Table 3-2 Environment specifications

Item	1 kVA	2 kVA	3 kVA
Operating temperature	0–40°C		

Item	1 kVA	2 kVA	3 kVA
Humidity	0%–95% RH (non-condensing)		
Altitude	< 1000 m		
Storage and transportation temperature	–40°C to +70°C (battery pack: –20°C to +40°C)		
Noise	< 50 dBA @ 1 m		
IP rating	IP20		

3.3 Mains Input Electrical Specifications

Table 3-3 Mains input electrical specifications

Item	1 kVA	2 kVA	3 kVA
Input power cable	Single-phase (L/N) input +PE cable		
Rated input voltage	220 V AC/230 V AC/240 V AC		
Operating voltage range	110–300 V AC		
Input frequency range	40–70 Hz		
Input power factor (100% resistive load)	> 0.99		
Startup voltage	120–280 V AC		
Generator input capacity	Minimum 1.5 times the UPS rated capacity		

3.4 Bypass Input Electrical Specifications

Table 3-4 Bypass Input Electrical Specifications

Item	1 kVA	2 kVA	3 kVA
Bypass voltage tolerance	170 V –264 V AC		
Bypass frequency tolerance	47–53 Hz or 57–63 Hz		

Item	1 kVA	2 kVA	3 kVA
Bypass overload capability	110%–120%, 30 minutes 120%–130%, 10 minutes 130%–150%, 1 minute		
Input mode	One mains input		

 NOTE

The upper and lower thresholds of bypass voltage tolerance are configurable on the LCD.

3.5 Output Electrical Specifications

Table 3-5 Output electrical specifications

Item	1 kVA	2 kVA	3 kVA
Rated capacity	1000 VA/800 W	2000 VA/1600 W	3000 VA/2400 W
Output power factor (PF)	0.8		
Rated output voltage	220 V AC/230 V AC/240 V AC		
Output voltage tolerance	±1%		
Output frequency range	- In normal mode, the UPS output frequency is consistent with the input frequency, which is 50 Hz or 60 Hz with the tolerance of ±3 Hz. - In battery mode, the frequency is 50 Hz or 60 Hz (tolerance ±0.05%).		
Total distortion of output voltage waveform (THDv)	< 6% (non-resistive load) < 3% (resistive load)		
Crest factor	A maximum of 3:1		

Item		1 kVA	2 kVA	3 kVA
Inverter overload capability		- When the ambient temperature is 0–35°C: 105%–110%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 10 min. 110%–130%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 1 min. 130%–150%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 3s. > 150%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after no more than 0.5s. - When the ambient temperature is 35–40°C: 105%–110%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 5 min. 110%–130%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 30s. 130%–150%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after 1.5s. > 150%: The UPS transfers to bypass mode (from normal mode) or shuts down automatically (from battery mode) after no more than 0.5s.		
Dynamic voltage transient		±5%		
Average frequency tracking rate		1 Hz/s		
Transfer time	Transferring from normal mode to battery mode	0		
	Bypass to ECO or ECO to bypass	4 ms (100% resistive load)		

Item	1 kVA	2 kVA	3 kVA
Waveform (battery mode)	Sine wave		

 NOTE

In converter mode, the output load is derated to 80% of the rated capacity when the ambient temperature is less than 40°C.

3.6 Battery Electrical Specifications

Table 3-6 Battery electrical specifications

Item		1 kVA	2 kVA	3 kVA
Rate d batte ry volta ge	Standar d backup time model	24 V DC	48 V DC	72 V DC
	Long backup time model	36 V DC	72 V DC	96 V DC
Num ber of batte ries	Standar d backup time model	2	4	6
	Long backup time model	3	6	8
Batte ry leaka ge curre nt	Standar d backup time model	17 μ A	25.7 μ A	27.4 μ A
	Long backup time model	25.4 μ A	28.5 μ A	32.8 μ A
Battery type		12 V DC VRLA battery		

Item		1 kVA	2 kVA	3 kVA
Battery capacity	Standard backup time model	9 Ah		
	Long backup time model	18 Ah		
Battery EOD voltage	Standard backup time model	1.6–1.88 V/cell		
	Long backup time model	1.75 V/cell		
Backup time	Standard backup time model	≥ 4 minutes (at full rated load), factory test		
	Long backup time model	Depending on the capacity of external batteries.		
Charger rated charge current	Standard backup time model	1 A		
	Long backup time model	4 A		
Float charging voltage	Standard backup time model	27.3 V DC±1%	54.7 V DC±1%	82.1 V DC±1%

Item		1 kVA	2 kVA	3 kVA
	Long backup time model	41.0 V DC±1%	82.1 V DC±1%	109.4 V DC±1%
Equalized charging voltage	Standard backup time model	28.3 V DC±1%	56.6 V DC±1%	84.9 V DC±1%
	Long backup time model	42.5 V DC±1%	84.9 V DC±1%	113.3 V DC±1%

Table 3-7 Power backup specifications of the battery pack

Battery Pack	Load	1 kVA Rack-mounted UPS with Long Backup Time (min)	2 kVA Rack-mounted UPS with Long Backup Time (min)	3 kVA Rack-mounted UPS with Long Backup Time (min)
One battery pack	100%	15.0	6.5	7.0
	75%	21.0	10.0	11.0
	50%	39.0	18.0	17.0
	25%	77.0	37.0	45.0
Two battery packs	100%	36.0	17.0	16.0
	75%	47.0	25.0	25.0
	50%	83.0	45.0	45.0
	25%	159.0	85.0	85.0
Three battery packs	-	-	39.0	27.0
	-	-	55.0	40.0
	-	-	95.0	70.0
	-	-	175.0	130.0
Four battery packs	-	-	63.0	39.0
	-	-	87.0	55.0
	-	-	147.0	95.0

Battery Pack	Load	1 kVA Rack-mounted UPS with Long Backup Time (min)	2 kVA Rack-mounted UPS with Long Backup Time (min)	3 kVA Rack-mounted UPS with Long Backup Time (min)
	-	-	267.0	175.0

NOTE

- The preceding tables list the backup time upon factory delivery, which decreases with the battery capacity. The tables are for reference only.
- The battery pack (ESS-36V12-9*2AHBPVBB01) of the 1 kVA UPS with long backup time contains two battery strings connected in parallel. The battery pack (ESS-72V12-9AHBPVBB01) of the 2 kVA UPS with long backup time and the battery pack (ESS-96V12-9AHBPVBB02) of the 3 kVA UPS with long backup time contain only one battery string respectively.
- A maximum of two battery packs (ESS-36V12-9*2AHBPVBB01) can be connected in parallel for the 1 kVA UPS with long backup time. A maximum of four battery packs (ESS-72V12-9AHBPVBB01) can be connected in parallel for the 2 kVA UPS with long backup time. A maximum of four battery packs (ESS-96V12-9AHBPVBB02) can be connected in parallel for the 3 kVA UPS with long backup time.

3.7 ECO Feature

Table 3-8 ECO feature

Item	1 kVA	2 kVA	3 kVA
ECO voltage tolerance	Default value: ± 22 V A (configurable on the LCD) The range is $\pm(13$ V AC-24 V AC)		
ECO frequency tolerance	± 3 Hz		

3.8 System Electrical Specifications

Table 3-9 System electrical specifications

Item	1 kVA	2 kVA	3 kVA
Number of UPSs connected in parallel	Parallel connection is not supported.		
System efficiency	88%	88%	90%
System leakage current	Max. 3.5 mA		

Item		1 kVA	2 kVA	3 kVA
No-load loss	Standard backup time model	28.22 W	46.91 W	32.58 W
	Long backup time model	34.38 W	50.27 W	39.17 W

3.9 Safety Regulations and EMC

Table 3-10 Safety regulations and EMC

Item	Standards Compliance
Conducted emission (CE)	IEC 62040-2, C2
Radiated emission (RE)	IEC 62040-2, C2
Low frequency signal	IEC 61000-2-2
ESD immunity	IEC 61000-4-2
Conducted susceptibility (CS)	IEC 61000-4-6
Radiated susceptibility (RS)	IEC 61000-4-3
Electrical fast transient/burst (EFT/B)	IEC 61000-4-4
Surge	IEC 61000-4-5
Power magnetic susceptibility (PMS)	IEC 61000-4-8
Harmonic current	IEC 61000-3-12
Flicker	IEC 61000-3-11 (input current > 16 A)
Impact current (lightning protection)	• IEC/EN 60240-2 • IEC/EN 61000-4-5 • YD/T 1095-2000 • YD/T 944-2007

 NOTE

The preceding test results are generated when the UPS works with Huawei battery packs.

4 Installation and Cable Connection

4.1 Installation Preparations

Floor Loading Capacity

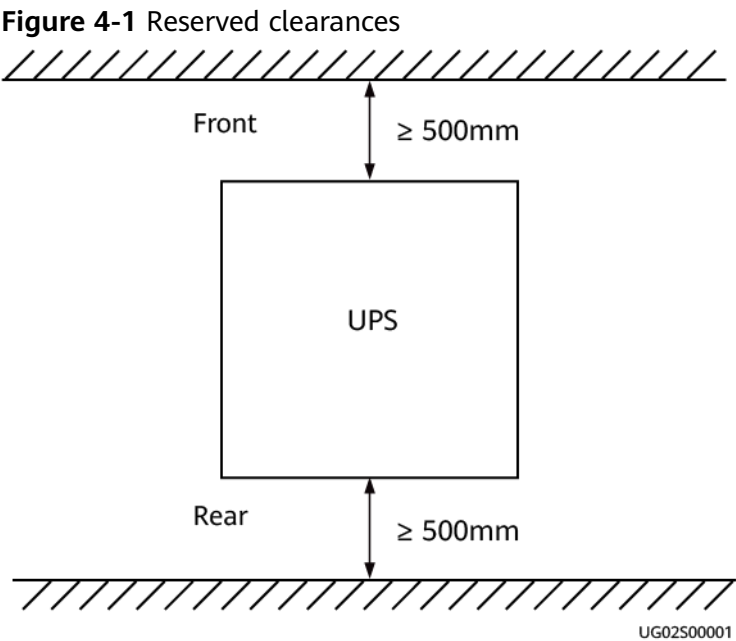
The floor must be able to bear the weight of the UPS and its optional components. In the case of rack-mounted installation, ensure that the floor can also bear the weight of the rack.

Installation Environment

- Do not install the UPS in a high-temperature, low-temperature, 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.
- The optimal operating temperatures for batteries are 20–30°C. Operating temperatures higher than 30°C shorten the battery lifespan, and operating temperatures lower than 20°C reduce the battery backup time.

Installation Clearances

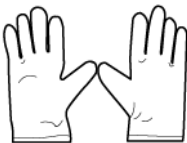
- Reserve a clearance of about 100 mm based on the UPS installation dimensions for the input and output plugs on the rear backplane of the UPS.
- Reserve a clearance of at least 500 mm from the front and rear of the chassis.



4.2 Tools

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

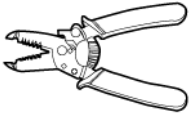
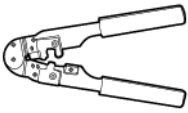
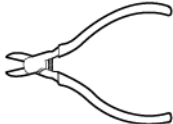
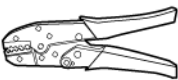
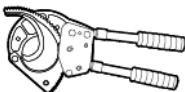
Personal protective equipment

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

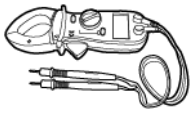
Hardware installation tools

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

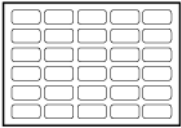
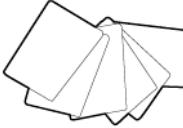
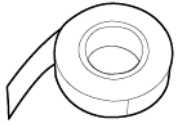
Cable installation tools

			
Wire stripper	RJ45 crimping tool	Electro-hydraulic pliers	Heat gun
			
Diagonal pliers	Crimping tool	Hydraulic pliers	Cord end terminal crimping tool
	-	-	-
Cable cutter			

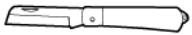
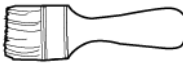
Measurement instruments

			-
Clamp meter	Multimeter	Network tester	

Engineering auxiliary materials

			
Label	Cable tie	Cotton cloth	Heat-shrink tubing
	-	-	-
Insulation tape			

Other tools

			
Electrician's knife	Tweezers	Brush	Vacuum cleaner

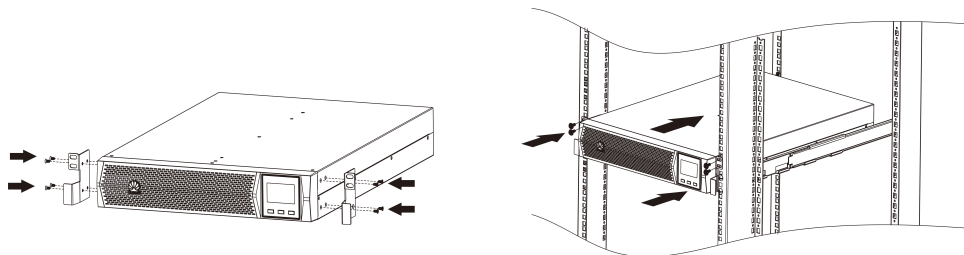
4.3 Installing a UPS

The UPS can be installed on a desk or in a 19-inch rack. 1 kVA UPS, 2 kVA UPS, and 3 kVA UPS need 2 U space separately. The installation method for 1 kVA UPS, 2 kVA UPS, and 3 kVA UPS are the same. This section uses a 3 kVA UPS as an example.

Rack-mounting a UPS

1. Install the mounting ears on both sides of the UPS.
2. Install the guide rails on the rack, and then install the UPS with mounting ears on the rack.

Figure 4-2 Rack-mounting the UPS



Tower-mounting a UPS

1. Remove the UPS front panel.
2. Rotate the control panel 90 degrees clockwise.
3. Rotate the logo 90 degrees clockwise on the front panel. Reinstall the front panel.
4. Install the UPS bases with a clearance of at least 150 mm between them.
5. Place the UPS on the bases.
6. Adjust the positions of the UPS and its bases to ensure that the UPS is horizontally placed.

Figure 4-3 Tower-mounting the UPS

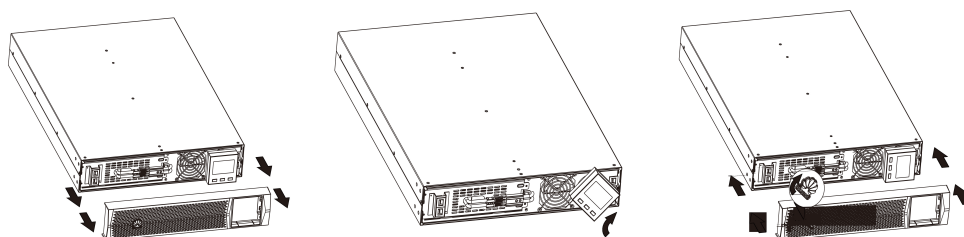
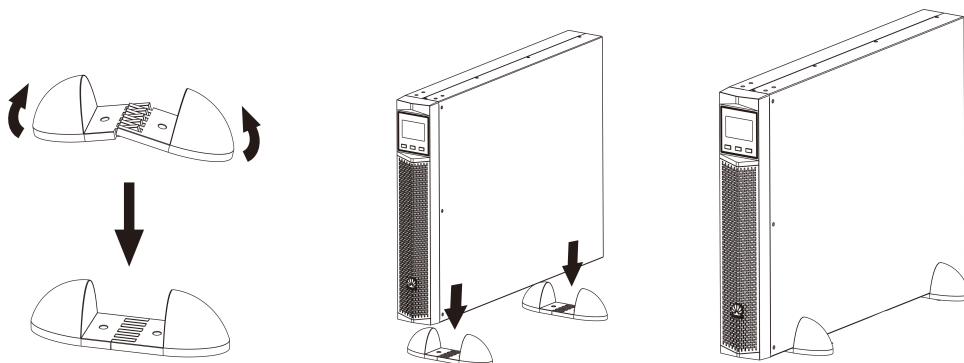


Figure 4-4 Tower-mounting the UPS



4.4 Installing Cables

NOTE

- Never connect a device that will overload the UPS, such as a laser printer, to the output socket of the UPS.
- When routing cables, keep them away from the place where they are easily to be stepped on or make someone stumble.
- Never connect household appliances, such as a hair drier, to the output socket of the UPS.
- The socket connected to the UPS must be a grounded shockproof socket and be close to the UPS for easy access.
- Use power cables that comply with Verband Deutscher Electrotechniker (VDE) test standards and Conformité Européenne (CE) certification to connect the UPS to an indoor shockproof socket. The power cable can be the main power cable for a PC.
- Use power cables that comply with VDE test standards and CE certification to connect a load to the UPS.
- When installing the UPS, ensure that the total leakage current of the UPS and connected loads does not exceed 3.5 mA. The recommended upstream earth leakage circuit breaker (ELCB) is more than 30 mA.

Procedure

1. Connect the UPS output power cable.
 - For output by sockets, connect loads to the UPS output sockets. When a power failure occurs, the UPS automatically supplies power to the loads.
 - For output by terminals, perform the following steps to connect cables:
 - a. Remove the small protective cover from the wiring terminal.
 - b. You are advised to use 2.5 mm² power cables.
 - c. Check that all cable connections are correct.
 - d. Reinstall the small protective cover on the rear panel.

Figure 4-5 UPS2000-G-1KRTS output cable connection

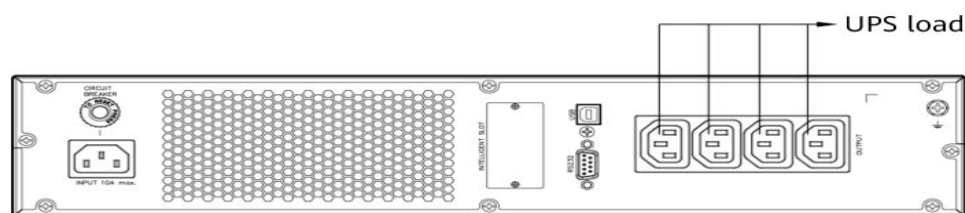


Figure 4-6 UPS2000-G-1KRTL output cable connection

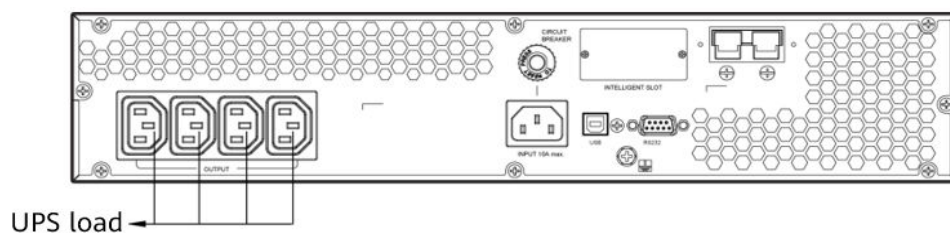


Figure 4-7 UPS2000-G-2KRTS output cable connection

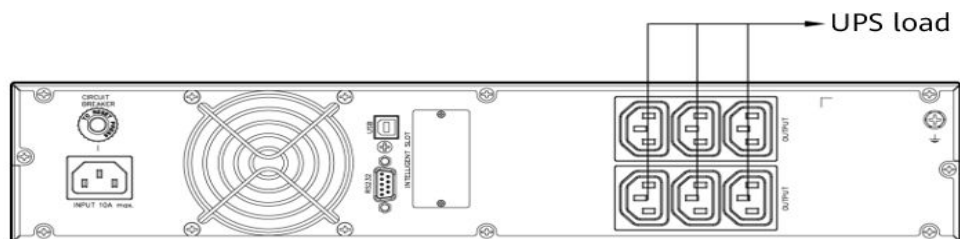


Figure 4-8 UPS2000-G-2KRTL output cable connection

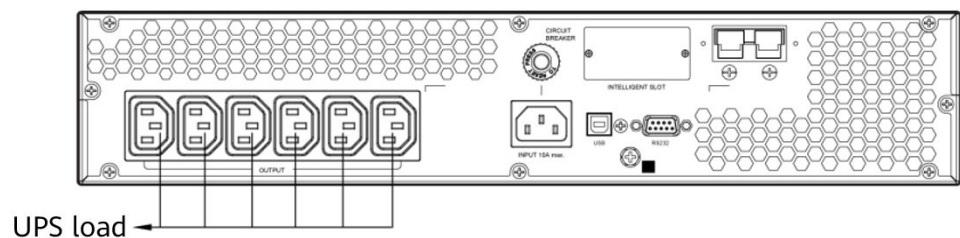


Figure 4-9 UPS2000-G-3KRTS output cable connection

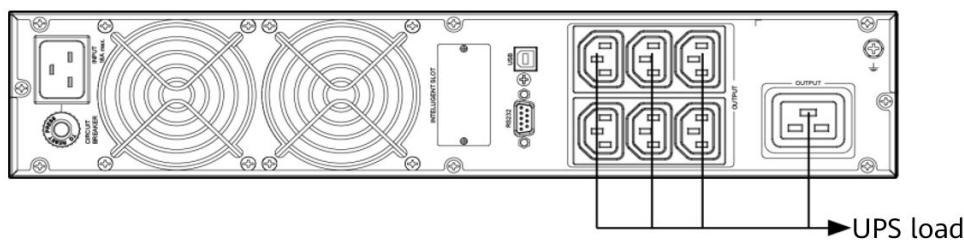
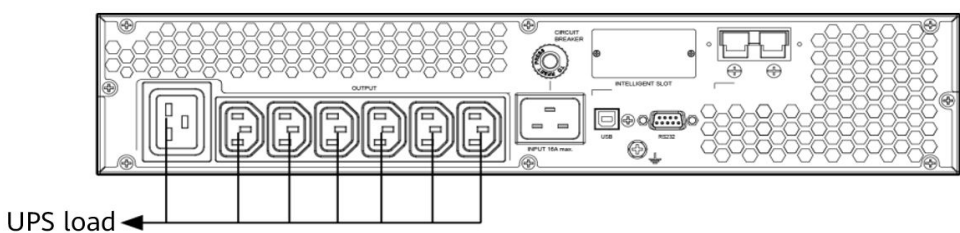
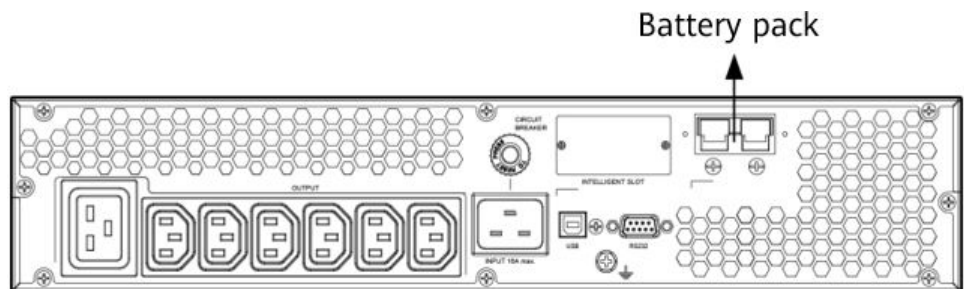


Figure 4-10 UPS2000-G-3KRTL output cable connection



2. Connect battery cables. (This step is for the UPS with long backup time. The UPS with standard backup time has built-in batteries and does not have external battery ports.)

Figure 4-11 UPS2000-G-3KRTL battery pack cable connection



 NOTE

- When connecting external batteries to the 1 kVA UPS with long backup time, connect three 12 V batteries in series for each battery string. When connecting external batteries to the 2 kVA UPS with long backup time, connect six 12 V batteries in series for each battery string. When connecting external batteries to the 3 kVA UPS with long backup time, connect eight 12 V batteries in series for each battery string.
 - If the UPS needs to connect to external battery packs or battery strings, the total battery capacity must exceed 18 Ah. Otherwise, batteries may be damaged. If the UPS needs to connect to external battery packs or battery strings, the total battery capacity must exceed 18 Ah. Otherwise, batteries may be damaged. If the capacity of external battery packs or battery strings to be connected exceeds 40 Ah, it is recommended that external chargers be purchased and added to increase the charge current. Otherwise, the charge time will be prolonged.
 - The battery pack (ESS-36V12-9*2AHBPVBB01) of the 1 kVA UPS with long backup time contains two battery strings connected in parallel. The battery pack (ESS-72V12-9AHBPVBB01) of the 2 kVA UPS with long backup time and the battery pack (ESS-96V12-9AHBPVBB02) of the 3 kVA UPS with long backup time contain only one battery string respectively.
 - A maximum of two battery packs (ESS-36V12-9*2AHBPVBB01) can be connected in parallel for the 1 kVA UPS with long backup time. A maximum of four battery packs (ESS-72V12-9AHBPVBB01) can be connected in parallel for the 2 kVA UPS with long backup time. A maximum of four battery packs (ESS-96V12-9AHBPVBB02) can be connected in parallel for the 3 kVA UPS with long backup time.
3. Install an optional card. The optional cards are installed in the same way for the 1 kVA, 2 kVA, and 3 kVA UPSs. This document uses the 3 kVA UPS as an example.

Figure 4-12 Position for installing an optional card for the UPS2000-G-3KRTS

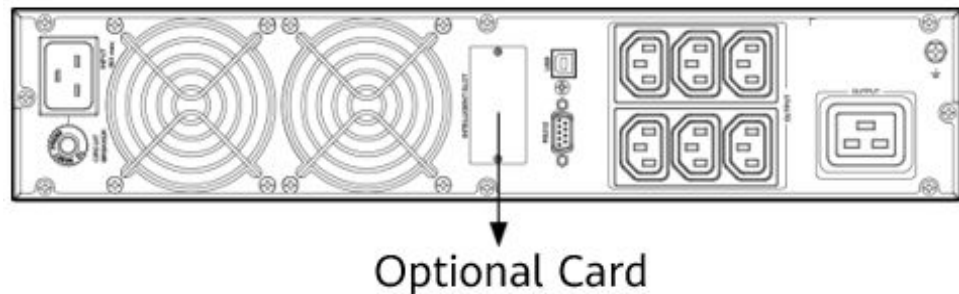
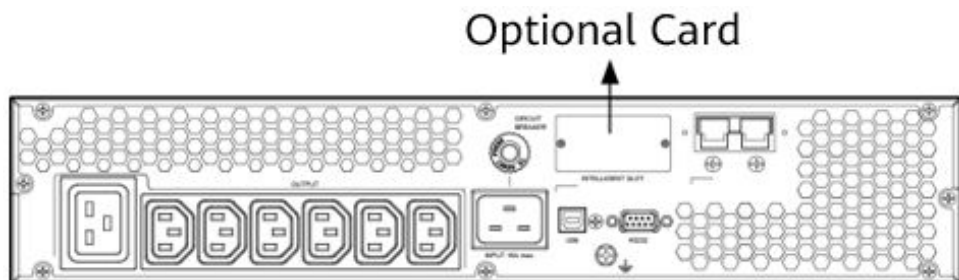


Figure 4-13 Position for installing an optional card for the UPS2000-G-3KRTL



 NOTE

The UPS provides an optional intelligent slot for installing an SNMP card, a dry contact card, or a Modbus card. No matter which card is installed, the communication function and multiple monitoring options are supported.

4. Connect communications cables.

Connect the UPS to a PC over a USB or RS232 port to monitor the UPS running status. Communications cables are connected in the same way for the 1 kVA, 2 kVA, and 3 kVA UPSs. This document uses the 3 kVA UPS as an example.

Figure 4-14 Connecting communications cables to the UPS2000-G-3KRTS

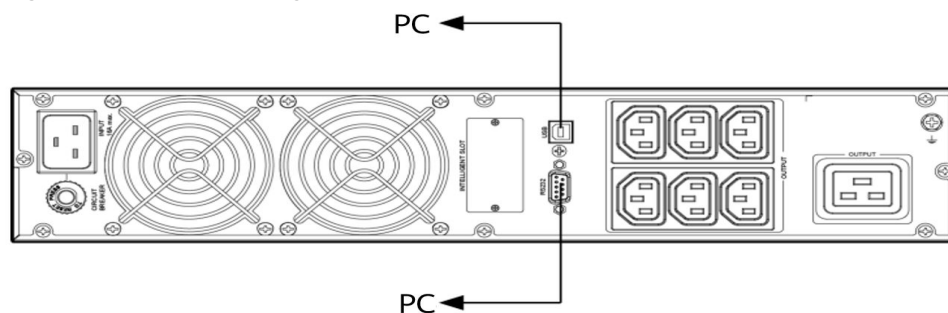
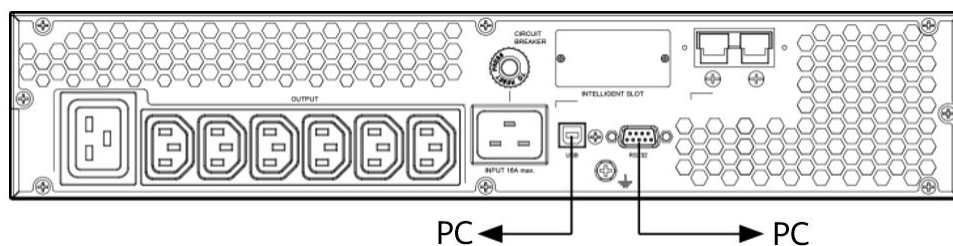


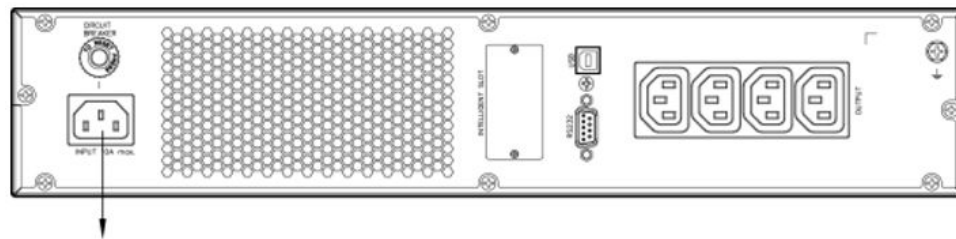
Figure 4-15 Connecting communications cables to the UPS2000-G-3KRTL



 NOTE

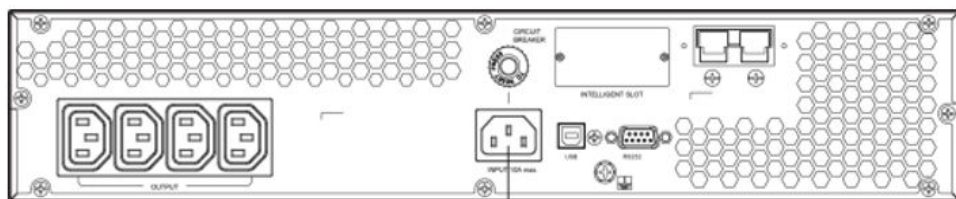
- The USB channel supports serial data communications between the UPS and the PC.
 - The RS232 port supports serial data communications between the UPS and the PC over the DB9 port.
 - You can use only either USB or RS232.
 - To monitor the UPS on a PC, you need to install the monitoring software iManager NetEco 1000U.
5. Take out the input power cable from the delivery accessories and connect the mains input power cable to the UPS.

Figure 4-16 UPS2000-G-1KRTS input cable connection



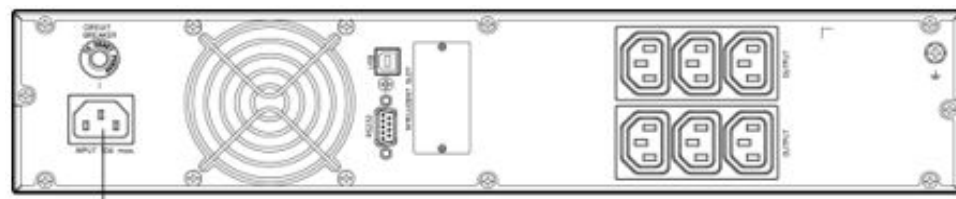
Mains input

Figure 4-17 UPS2000-G-1KRTL input cable connection



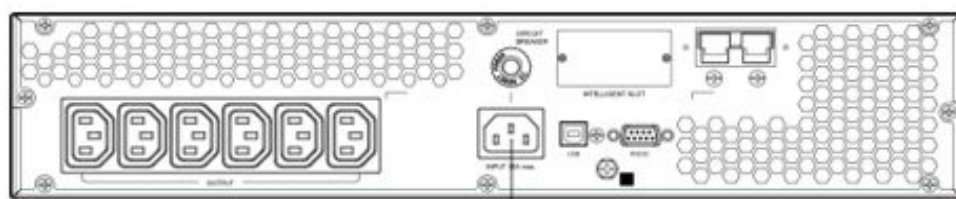
Mains input

Figure 4-18 UPS2000-G-2KRTS input cable connection



Mains input

Figure 4-19 UPS2000-G-2KRTL input cable connection



Mains input

Figure 4-20 UPS2000-G-3KRTS input cable connection

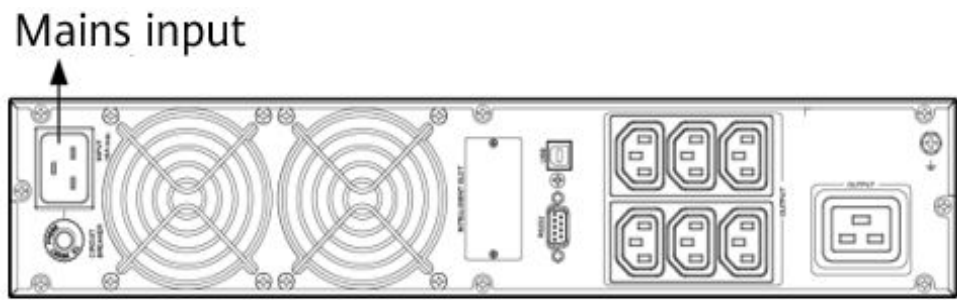
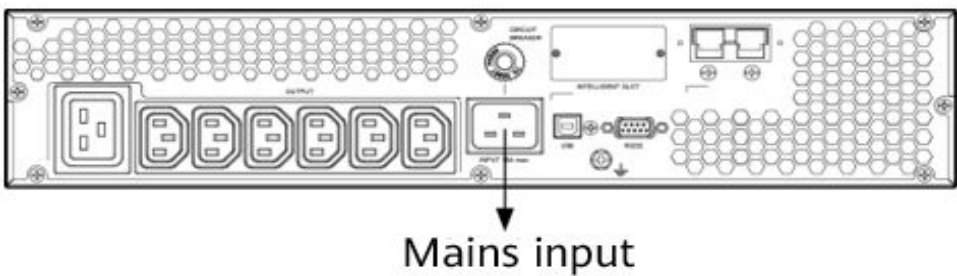


Figure 4-21 UPS2000-G-3KRTL input cable connection



4.5 Installation Verification

Table 4-1 gives the installation verification checklist.

Table 4-1 Installation verification checklist

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

No.	Item	Acceptance Criterion
7	Operating environment	The inside and outside of the cabinet are free from conductive dust or other foreign matter.

5 Setting Control Panel

5.1 LCD Panel

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

Figure 5-1 LCD panel

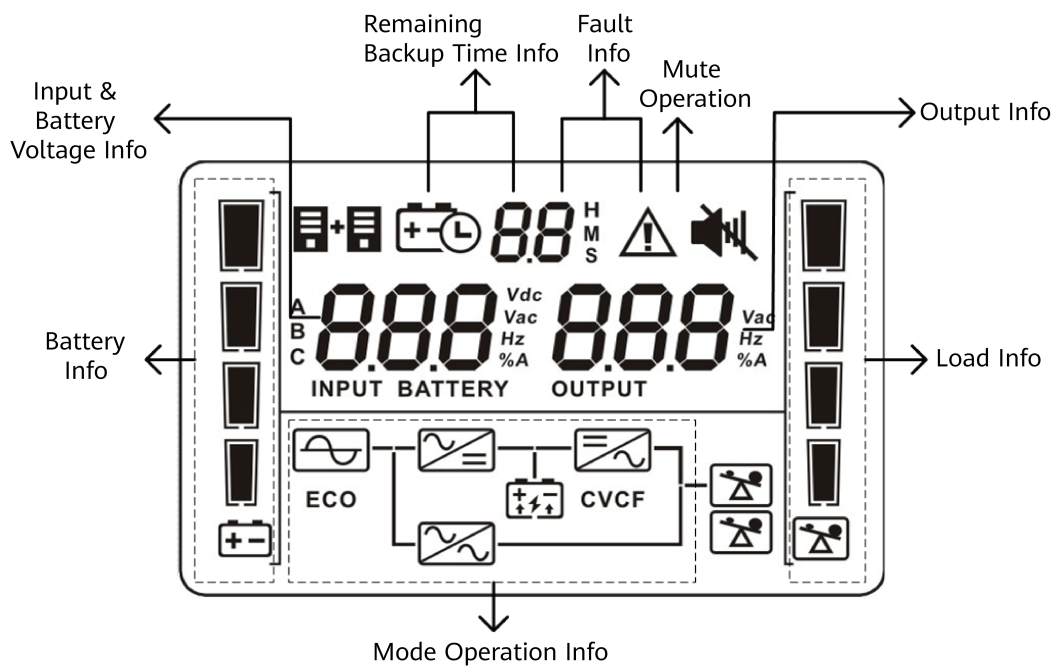
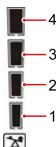
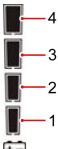


Table 5-1 Icon description

Icon	Function
	Backup time information

Icon	Function
	Indicates the backup time, alarm ID, and CF (only displayed in converter mode) cyclically in digits. H: hour; M: minute; S: second
Converter mode information	
	Indicates that the UPS is in converter mode.
Alarm information	
	Indicates that an alarm occurs.
	Indicates the warning or alarm ID.
Muting	
	Indicates that the UPS is muted.
Output information	
	Indicates the output voltage, frequency, or load rate. Vac: output voltage; Hz: output frequency; %: load rate; A: output current
Load information	
	 Displays the current load percentage by level: • [0–25%]: Indicator 1 is steady on. • (25%–50%]: Indicators 1 and 2 are steady on. • (50%–75%]: Indicators 1, 2 and 3 are steady on. • (75%–100%]: Indicators 1, 2, 3 and 4 are steady on. • > 100%: Indicators 1, 2, 3, and 4 are blinking.
Working mode information	
	Indicates that the UPS works in normal mode.
	Indicates that the UPS works in battery mode.
	Indicates that batteries are being charged.
	Indicates that the UPS is in bypass mode.

Icon	Function
ECO	Indicates that the UPS is in ECO mode.
	Indicates that the converter circuit is working.
	Indicates that the output socket is delivering power.
Battery information	
	 Indicates the current battery state of charge (SOC) by level: • [0–25%]: Indicator 1 is steady on. • (25%–50%]: Indicators 1 and 2 are steady on. • (50%–75%]: Indicators 1, 2 and 3 are steady on. • (75%–100%]: Indicators 1, 2, 3 and 4 are steady on. • > 100%: Indicators 1, 2, 3, and 4 are blinking.
Input voltage information	
	Indicates the mains input voltage, battery input voltage, mains input frequency, or input current percentage. Vac: mains input voltage; Vdc: battery voltage; Hz: mains input frequency; %A: battery SOC

5.2 Buzzer Alarm Tones

Table 5-2 Buzzer alarm tones

Alarm Type	Buzzer Alarm Tone
Battery mode	Beeps once every four seconds.
Minor alarm	Beeps once every second.
Overload	Beeps twice every second.
Critical alarm	Continuously buzzes.
Bypass mode	Beeps once every 10 seconds.

5.3 Character Display

Table 5-3 Character display description

Acronym	Display	Description
ENA	ENR	Enable
DIS	di S	Disable
ESC	ESC	Escape
CF	CF	Frequency conversion
TP	tP	Temperature
CH	CH	Charging
FU	FU	Bypass frequency unstable
EE	EE	EEPROM error
VOT	uOt	Voltage
FRE	FrE	Frequency
BVU	bUu	Bypass overvoltage
BVL	bUL	Bypass undervoltage
CAP	CAP	Capacity
DT	dt	Discharge time
ECO	ECO	ECO mode
VU	uU	High voltage
VL	uL	Low voltage
AUT	Aut	Converter mode
BUZ	bUz	Buzzer off
AST	ASt	Automatic startup

Acronym	Display	Description
DHP	<i>DHP</i>	Dynamic Host Configuration Protocol (DHCP)
IP ADS	<i>1 PAdS</i>	IP address
SUB NET	<i>SUBnEt</i>	Subnet mask
GAT UAY	<i>GATUAY</i>	Gateway
NBA	<i>nBA</i>	No battery alarm disabled

5.4 Buttons

The control panel provides three buttons to start and shut down the UPS, and view and set parameters.

Figure 5-2 Buttons on the UPS control panel



Table 5-4 Button description

Button	Function
ON/MUTE	- Starting the inverter: Hold down the ON/MUTE button for more than 5s to start the UPS inverter. - Cold-starting the UPS using batteries: Hold down the ON/MUTE button for less than 15s to start the UPS inverter. - Disabling the buzzer: Hold down the ON/MUTE button for 2–5s to disable or enable the buzzer. When the UPS reports a new alarm, the buzzer buzzes. To mute the buzzer, perform the operation again. - Previous option: In UPS setting mode, hold down the ON/MUTE button for more than 3s to go to the previous option after hearing a beep sound. - Switching to battery self-check: In normal mode, ECO mode, or converter mode, hold down the ON/MUTE button for more than 5s to perform the battery self-check.
OFF/ENTER	- Shutting down the inverter: Hold down the OFF/ENTER button for more than 2s to turn off the UPS in battery mode. If the UPS is originally in normal mode, hold down this button will enable the UPS to enter the standby mode or bypass mode (if set or enabled before). - Confirming the setting: When the UPS is in setting mode, hold down the OFF/ENTER button for more than 3s to confirm the setting. - Manually clearing alarms: When alarms that can be manually cleared exist, hold down the OFF/ENTER button for more than 2s to manually clear the alarms.

Button	Function
SELECT	• Setting mode: – When the UPS is in standby mode or bypass mode, hold down the SELECT button for 5s to enter UPS setting mode. In this case, all parameters can be set. In setting mode, press the ON/MUTE button or the SELECT button to switch parameters. Release the button for more than 10s to restore the default display. – When the UPS is in normal mode or battery mode, hold down the SELECT button for 5s to enable or disable the buzzer off function (BUZ), set the DHCP function (DHP), and view the IP address (IP), subnet mask (SUB), and gateway (GAT). • Next option: In UPS setting mode, hold down the SELECT button for more than 3s to go to the next option after hearing a beep sound. • In normal mode, press the SELECT button twice and release the button within 3s each time. Then you can view the input, output, and battery information.

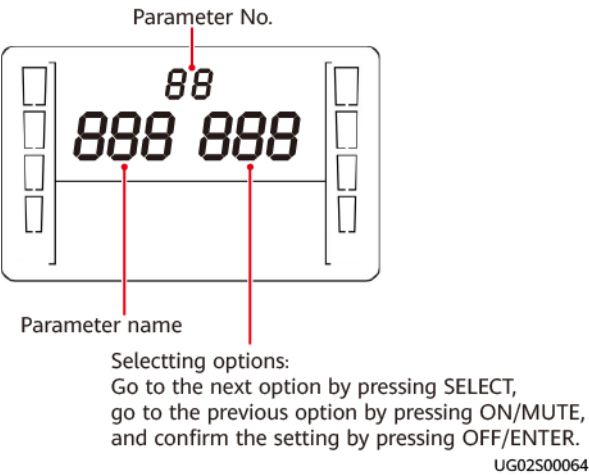
Button	Function
ON/MUTE+SELECT	- Transferring to bypass mode: When the input power is normal and the UPS works in normal mode, hold down the ON/MUTE and SELECT buttons at the same time for 5s, the UPS transfers to bypass mode. If the input voltage exceeds the allowed range, the UPS does not transfer to bypass mode. In converter mode, the UPS does not transfer to bypass mode. - Bypass mode: In bypass mode, hold down the ON/MUTE and SELECT buttons at the same time for 5s, the UPS exits bypass mode and enters inverter mode. - Exiting the parameter setting screen: On the UPS parameter setting screen, hold down the ON/MUTE and SELECT buttons at the same time for 0.5s to exit the parameter setting screen. - Exiting the alarm cause ID screen: On the UPS alarm cause ID screen, hold down the ON/MUTE and SELECT buttons at the same time for 0.5s to exit the alarm cause ID screen.
SELECT+OFF/ENTER	Viewing the alarm cause ID screen: Hold down the SELECT and OFF/ENTER buttons at the same time for 5s to enter the alarm cause ID screen. You can view the previous alarm and the next alarm through the ON/MUTE button and the SELECT button respectively.

5.5 Setting Parameters

NOTICE

The user interface (UI) snapshots in this document are taken from the software version UPS2000V200R001C01SPC300 (V2R1C1SPC30 is displayed on the NetEco; you can query the version information by choosing **Maintenance** > **Current Version**).

Figure 5-3 Setting parameters on the LCD



When the UPS is in standby mode or bypass mode, hold down the SELECT button for 5s to enter UPS setting mode. In this case, all parameters can be set.

When the UPS is in normal mode or battery mode, hold down the SELECT button for 5s to enable or disable the buzzer off function (BUZ), set the DHCP function (DHP), and view the IP address (IP), subnet mask (SUB), and gateway (GAT).

In UPS setting mode, hold down the ON/MUTE button for more than 3s to go to the previous option after a beep sound, and hold down the SELECT button for more than 3s to go to the next option after a beep sound. When the UPS is in setting mode, hold down the OFF/ENTER button for more than 3s to confirm the setting.

The following figures show parameter setting screens.

- Output voltage setting

Display	Setting
	The output voltage can be set as follows: 220: The output voltage is 220 V AC (default). 230: The output voltage is 230 V AC. 240: The output voltage is 240 V AC.

- Converter mode enable/disable

Display	Setting
	Enable or disable the converter mode: 50: The output frequency is fixed at 50 Hz, and the converter mode is enabled. 60: The output frequency is fixed at 60 Hz, and the converter mode is enabled. AUT: The converter mode is disabled (default).

 NOTE

The CF converter mode has a higher priority than the ECO mode. Therefore, if the CF converter mode is set, the ECO mode becomes unavailable.

- Bypass mode enable/disable

Display	Setting
	Enable or disable the bypass mode: ENA: The bypass mode is enabled. DIS: The bypass mode is disabled (default).

- Setting the maximum input voltage in bypass mode

Display	Setting
	You can adjust the maximum input voltage in bypass mode using ▲ and ▼. 230-264: The voltage can be set from 230 V AC to 264 V AC (default).

 NOTE

The maximum input voltage in bypass mode must be higher than the maximum voltage allowed in ECO mode.

- Setting the minimum input voltage in bypass mode

Display	Setting
	You can adjust the minimum input voltage in bypass mode using ▲ and ▼. 170-220: The voltage can be set from 170 V AC (default) to 220 V AC.

NOTE

The minimum input voltage in bypass mode must be lower than the minimum voltage allowed in ECO mode.

- Battery capacity setting

Display	Setting
	You can adjust and set the UPS battery capacity using ▲ and ▼. 18-999: The capacity can be set from 18 Ah to 999 Ah. (The value is fixed at 9 Ah for the UPS with standard backup time, and the default value is 18 Ah for the UPS with long backup time.)

- Discharge time limit setting

Display	Setting
	Set the discharge time limit: 0-999: The time can be set from 0 minutes to 999 minutes. 0: The backup time is not limited (default).

- ECO mode enable/disable

Display	Setting
	Enable or disable the ECO function: ENA: The ECO mode is enabled. DIS: The ECO mode is disabled (default).

- Setting the maximum allowable voltage in ECO mode

Display	Setting
	You can adjust the maximum input voltage in ECO mode using ▲ and ▼. 13–24: The voltage can be set based on the preset output voltage from +13 V AC to +24 V AC (+22 V AC by default).

- Setting the minimum allowable voltage in ECO mode

Display	Setting
	You can adjust the minimum input voltage in ECO mode using ▲ and ▼. 13–24: The voltage can be set based on the preset output voltage from –13 V AC to –24 V AC (–22 V AC by default).

- Buzzer off setting

Display	Setting
	Enable or disable the buzzer off function: ENA: The buzzer is muted. DIS: The buzzer is unmuted (default).

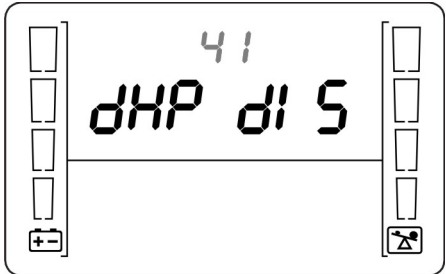
- Automatic startup setting

Display	Setting
	Automatic startup upon power-on: ENA: The function of automatic startup upon power-on is enabled. DIS: The function of automatic startup upon power-on is disabled (default).

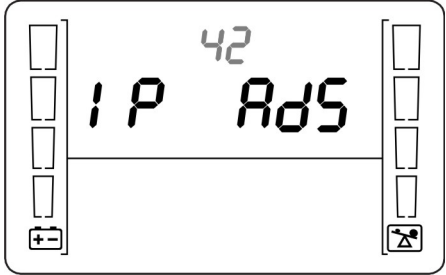
NOTICE

The DHCP function setting, IP address display, subnet mask display, and gateway display are available only when an SNMP card is configured. If no SNMP card is connected, default values are displayed for the IP address, subnet mask, and gateway. If an SNMP card is connected, the IP address, subnet mask, and gateway need to be set on the WebUI of the SNMP card.

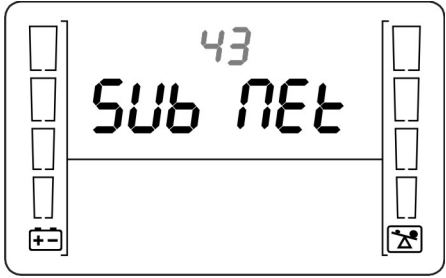
- DHCP function setting

Display	Setting
	Set the address allocation mode: ENA: enabled DIS: disabled (default)

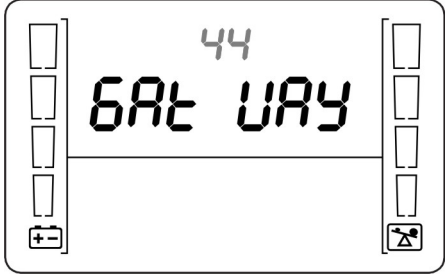
- IP address display

Display	Setting
	UPS IP address: The displayed parameter cannot be set. Press ▲ or ▼ to switch between different screens. On the ESC screen, press the OFF/ENTER button to exit. (The default value is 192.168.0.10.)

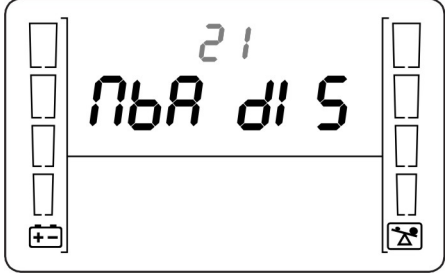
- Subnet mask display

Display	Setting
	Subnet mask: The displayed parameter cannot be set. Press ▲ or ▼ to switch between different screens. On the ESC screen, press the OFF/ENTER button to exit. (The default value is 255.255.255.0.)

• Gateway display

Display	Setting
	Gateway: The displayed parameter cannot be set. Press ▲ or ▼ to switch between different screens. On the ESC screen, press the OFF/ENTER button to exit. (The default value is 192.168.0.1.)

• Setting the no battery alarm function

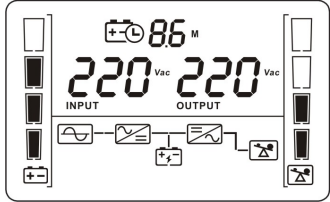
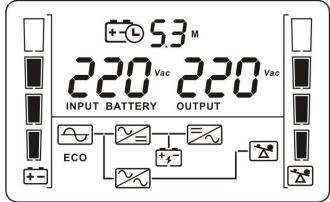
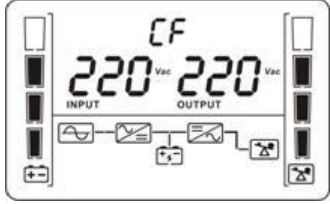
Display	Setting
	Set the no battery alarm function: ENA: The no battery alarm is not reported. DIS: The no battery alarm is reported (default).

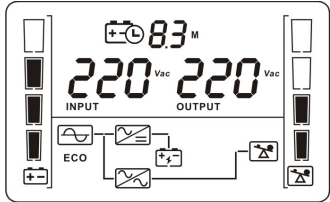
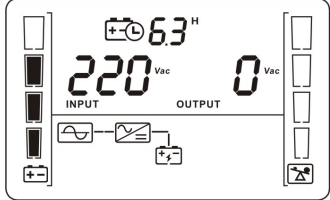
• Exit setting

Display	Setting
	Exit from the parameter settings screen.

5.6 Operating Modes

Table 5-5 Operating mode description

Operating Mode	Description	Display
Normal mode	When the input voltage is within the allowed range, the inverter starts and the UPS works in normal mode. The UPS provides stable sine wave AC output and charges batteries.	
ECO mode	When the input voltage is within the preset ECO range, the UPS transfers to bypass to save energy.	
Converter mode	When the input frequency is within the allowed range, the UPS sets the output frequency to 50 Hz or 60 Hz and charges batteries.	
Battery mode	When the input voltage is abnormal or an outage occurs, the UPS transfers to battery mode, the buzzer beeps once every 4 seconds, and the UPS uses batteries to supply power.	

Operating Mode	Description	Display
Bypass mode	When the UPS is overloaded in normal mode, it automatically transfers to bypass mode if the input voltage is within the allowed range. When the bypass mode is enabled, the UPS automatically transfers to bypass mode after connecting to the mains. When the UPS works in bypass mode, the buzzer beeps once every 10 seconds.	
Standby mode	When the UPS is connected to the mains, the inverter is not started, and the bypass mode is not enabled, the UPS works in standby mode, charges only batteries, and provides no output.	

5.7 Alarm Handling

 NOTE

When an alarm can be manually cleared, hold down the OFF/ENTER button for more than 2 seconds to manually clear the alarm.

Table 5-6 Alarms

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
10	1	Bypass voltage abnormal	Minor	This alarm is automatically cleared.	The bypass voltage is beyond the allowed range (170–264 V).	The UPS remains in the original working state. If the UPS is in bypass mode, it transfers to standby mode and supplies no power.	Possible cause: The bypass input voltage is out of the specified range. Measure: Check whether the bypass input voltage is out of the specified range. If yes, change the bypass voltage range or wait until the bypass input voltage recovers.
10	2	Bypass frequency abnormal	Minor	This alarm is automatically cleared.	The bypass frequency is out of the bypass frequency range 47–53 Hz (rated frequency: 50 Hz) or 57–63 Hz (rated frequency: 60 Hz).	The UPS remains in the original working state. If the UPS is in bypass mode, it transfers to standby mode and supplies no power.	Possible cause: The bypass frequency is out of the specified range. Measure: Check the bypass input frequency. If the frequency is out of the normal range, wait for the mains input to recover.
14	1	Start up time out	Critical	This alarm must be manually cleared.	The inverter output voltage is not within the range of the rated output voltage ± 2 V.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The bypass load capacity exceeds the rated load capacity of the inverter. Measure: Reduce the output load, manually clear the alarm, and restart the UPS. • Possible cause: An internal fault has occurred. Measure: Contact the dealer or Huawei technical support.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
			Minor	This alarm is automatically cleared.	Discharge ends for the UPS in battery mode, or the battery voltage is lower than the minimum startup voltage (11.28 V) for the UPS in normal mode.	The UPS fails to start.	Possible cause: The battery voltage is low after end of discharge (EOD) or the battery is damaged. Solution: Wait until the battery is charged properly or contact the dealer or Huawei technical support to replace the battery.
22	1	Battery disconnected	Minor	This alarm is automatically cleared.	Batteries are not connected, connected improperly, or damaged.	The power supply from the UPS is not affected.	• Possible cause: No batteries are connected. Measure: Connect batteries. • Possible cause: The batteries are in poor contact. Measure: Check the battery cable connection. If battery cables are loose, connect them securely.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
25	1	Battery overvoltage	Critical	This alarm must be manually cleared.	The voltage of each battery exceeds 15 V (when the UPS is started).	This alarm is generated because there are more batteries than required. The impact is as follows: • If batteries are connected before the startup, the UPS fails to start. • If batteries are connected when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The actual number of batteries does not meet requirements. Measure: Check that the actual number of batteries meets requirements. • Possible cause: The charger is abnormal. Measure: Check that the charger voltage is normal immediately after the batteries are disconnected.
			Minor	This alarm is automatically cleared after the UPS transfers to battery mode.	The voltage of each battery exceeds 14.7 V.	The UPS automatically transfers to battery mode. When the battery undervoltage alarm is generated, the UPS automatically transfers to normal mode and starts the charger for charging.	

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
26	1	Battery undervoltage	Critical	This alarm must be manually cleared.	The voltage of each battery is lower than 5 V (when the UPS is started).	This alarm is generated because there are more batteries than required. The impact is as follows: • If batteries are connected before the startup, the UPS fails to start. • If batteries are connected when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The actual number of batteries does not meet requirements. Measure: Check that the actual number of batteries meets requirements. • Possible cause: The mains is abnormal, and the batteries are overdischarged. Measure: Connect to the mains in non-battery test state.
			Minor	This alarm is automatically cleared.	For a standard backup time model, the voltage of each battery is lower than 11.28 V. For a long backup time model, the voltage of each battery is lower than 10.9 V.	A UPS low voltage alarm will be generated.	

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
29	1	Battery requiring maintenance	Minor	This alarm is automatically cleared.	The battery voltage is lower than the battery replacement voltage (11 V) when batteries are in self-check mode.	The power supply from the UPS is not affected.	- Possible cause: The actual number of batteries does not meet requirements. Measure: Check that the actual number of batteries meets requirements. - Possible cause: The battery is damaged. Measure: Contact the dealer or Huawei technical support to replace batteries.
			Minor	This alarm is automatically cleared.	The voltage of each battery is lower than 5 V, or is higher than 15 V (when the UPS is not started).	The power supply to the system is not affected, but the UPS cannot be started.	
30	1	High ambient temperature	Minor	The alarm is automatically cleared.	The ambient temperature exceeds 40°C.	The power supply to the system is not affected, but the UPS cannot be started.	Possible cause: The ambient temperature exceeds 40°C when the UPS is in standby mode. As a result, the UPS cannot start. Measure: Lower the ambient temperature at which the UPS works.
42	15	Internal fault	Critical	This alarm must be manually cleared.	The bus voltage is lower than 320 V.	The UPS cannot start if this alarm is generated during startup.	Possible cause: The soft-start resistor is damaged. Measure: Contact the dealer or Huawei technical support.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
42	17	Internal fault	Critical	This alarm must be manually cleared.	The bus voltage is higher than 450 V.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The mains has experienced a transient high voltage. Measure: Rectify the fault and restart the UPS. • Possible cause: The output supplies power to special loads such as the inductive and rectification loads. Measure: Check that the load types are supported by the UPS. • Possible cause: The hardware is damaged. Measure: Contact the dealer or Huawei technical support.
42	18	Internal fault	Critical	This alarm must be manually cleared.	The bus voltage is lower than 260 V.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The hardware is damaged. Measure: Contact the dealer or technical support. • Possible cause: An overload occurred when the input voltage was low. Measure: Rectify the fault and restart the UPS.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
42	24	Internal fault	Minor	This alarm is automatically cleared.	An error occurs in the EEPROM.	All UPS parameters are restored to the factory settings. If this alarm is generated, the customer needs to replace the UPS.	Possible cause: The EEPROM is faulty. Measure: Contact the dealer or Huawei technical support.
42	27	Internal fault	Critical	This alarm must be manually cleared.	The inverter voltage is higher than 1.15 times the rated output voltage.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	Possible cause: The inverter is faulty. Measure: Contact the dealer or Huawei technical support.
		Internal fault	Critical	This alarm must be manually cleared.	The inverter output voltage is lower than 75% of the rated output voltage, and the output current is lower than 60% of the rated output current.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
42	28	Internal fault	Critical	The first three alarms are cleared automatically in 10 minutes. Later alarms, if generated, must be cleared manually.	The inverter output voltage is lower than 100 V.	If this alarm is generated when the UPS is running, the UPS supplies no output. After 10 minutes, the UPS automatically starts the inverter. If this alarm persists, the UPS then supplies no output again. After the UPS transfers to no output for three times, the alarm needs to be manually cleared.	• Possible cause: The output load types are not supported or the load exceeds the specifications. Measure: Check whether the load types are supported and reduce the output load. Then, manually clear the alarm and restart the UPS. • Possible cause: The inverter is faulty. Measure: Contact the dealer or Huawei technical support. • Possible cause: The output is short-circuited. Measure: Check whether the output is short-circuited.
42	31	Internal fault	Critical	This alarm must be manually cleared.	The difference between the absolute value of the positive bus voltage and that of the negative bus voltage is 100 V.	If this alarm is generated when the UPS is running, the UPS transfers to bypass mode.	• Possible cause: The hardware is damaged. Measure: Contact the dealer or Huawei technical support. • Possible cause: The UPS supplies power to half-wave loads. Measure: Check that the load types are supported by the UPS.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
42	32	Internal fault	Critical	This alarm must be manually cleared.	The ambient temperature exceeds 50°C	The UPS transfers to bypass mode. When the temperature decreases, the UPS automatically starts and clears this alarm. If this alarm is generated three times within 3 hours, the UPS does not start or clear the fault.	• Possible cause: The ambient temperature exceeds 50°C. Measure: Lower the ambient temperature. • Possible cause: Air channels are blocked. Measure: Keep the air intake and exhaust vents of the UPS unblocked. • Possible cause: The fan is abnormal. Measure: Clean up the foreign matter around the fan. If the alarm persists, contact the dealer or Huawei technical support.
42	36	Internal fault	Minor	This alarm is automatically cleared.	The charger has no output.	The power supply from the UPS is not affected.	Possible cause: The internal connection of the charger is abnormal. Measure: Contact the dealer or Huawei technical support.
42	42	Internal fault	Critical	This alarm must be manually cleared.	The voltage of each battery decreases to below 10 V when the charger has no output and the UPS inverter is started.	The UPS transfers to bypass mode.	Possible cause: The charger switching transistor is faulty. Measure: Contact the dealer or Huawei technical support.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
66	1	Output overload	Minor	This alarm is automatically cleared.	The inverter output load is more than 105% of the rated load.	The power supply from the UPS is not affected.	Possible cause: The load exceeds the rated load capacity of the inverter. Measure: Lower the load or replace the UPS with a larger-capacity UPS.
66	2	Output overload	Minor	This alarm is automatically cleared.	The bypass output load is more than 110% of the rated load.	The power supply from the UPS is not affected.	Possible cause: The load exceeds the rated load capacity of the bypass. Measure: Lower the load or replace the UPS with a larger-capacity UPS.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
66	3	Output overload	Critical	This alarm must be manually cleared.	- In battery mode, this alarm is generated when the load exceeds the rated load. - In normal mode, when the bypass input is normal, this alarm is generated when the UPS transfers to normal mode three times within 20 minutes after the UPS transfers from normal mode to bypass mode. - In normal mode, when the bypass input is abnormal, this alarm is generated when the UPS	- In battery mode, the UPS transfers to no output. - If the UPS transfers from normal mode to bypass mode three times within 20 minutes, the UPS is locked in bypass mode. - In normal mode, the UPS transfers to no output.	Possible cause: The load exceeds the rated load capacity of the inverter. Measure: Lower the load or replace the UPS with a larger-capacity UPS.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
					transfers to no output mode.		
66	4	Output overload	Critical	This alarm must be manually cleared.	The bypass overload exceeds the time limit.	The UPS transfers to no output.	Possible cause: The load exceeds the rated load capacity of the bypass. Measure: Lower the load or replace the UPS with a larger-capacity UPS.
158	1	On bypass	Minor	The alarm is automatically cleared.	The UPS transfers to bypass mode.	The UPS transfers to bypass mode.	• Possible cause: The inverter is not started. • Measure: Check whether other alarms are reported. • If an alarm is generated, clear the alarm by referring to the handling procedure. If no alarm is generated, start the UPS manually. • Possible cause: The load exceeds the rated load capacity of the inverter. • Measure: Lower the load or replace the UPS with a larger-capacity UPS.

Alarm ID	Cause ID	Name	Severity	Clearance Mode	Trigger Condition	Impact on the System	Solution
159	1	On battery	Minor	The alarm is automatically cleared.	The UPS transfers to battery mode.	The UPS transfers to battery mode.	• Possible cause: The mains input is abnormal. • Measure: Check the mains input. If the mains input is abnormal, wait for the mains to recover. • Possible cause: The battery self-check is in progress. • Measure: Check whether the battery self-check is in progress.
9E	1	On bypass	Minor	This alarm is automatically cleared.	• The inverter is not started. • The load power exceeds the rated inverter loading capability. • The temperature exceeds the rated temperature.	If the bypass is abnormal, the UPS may power off.	• Check whether other alarms are generated. If other alarms are generated, clear them. • If there are no other alarms, start the inverter manually.
9F	1	On battery	Minor	This alarm is automatically cleared.	The mains input is abnormal.	When the UPS works in battery mode, the UPS may power off if the batteries are abnormal.	Check the mains input. If the mains input is abnormal, wait until the mains input recovers.

5.8 Alarm Indication

Table 5-7 Alarm indication

Alarm	Display (Blinking)	Buzzer
Insufficient battery capacity		Beeps once every second.
Overload		Beeps twice every second.
Battery disconnection		Beeps once every second.
Overcharge		Beeps once every second.

6 Operations

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 correctly connected, and voltages comply with industry standards.
- The UPSs are properly connected to battery strings.
- Power cables and signal cables are correctly labeled.
- Cables are neatly routed and securely bound according to requirements.
- The equipment is installed and cables are routed in ways that facilitate modification, capacity expansion, and maintenance.
- The equipment is properly grounded.
- The environment complies with the requirements. The torque of the installation tool is correct.
- The voltage difference between the neutral wire and the ground cable is less than 5 V AC.
- The input voltage range for the mains to start the UPS is 120-280 V AC. The input voltage range for batteries to start the UPS is (Number of batteries x 10.8 V DC) to (Number of batteries x 14 V DC).

6.2 Starting the UPS

NOTICE

- If no buttons are pressed for more than 10s in UPS setting mode, the LCD home screen is displayed.
- If the long backup time model is not connected to an external battery pack, the buzzer keeps buzzing.
- Charge the batteries for 5 hours before using them for the first time. Otherwise, the battery discharge time will decrease.
- The UPS automatically checks the batteries once every week, and generates alarms if any faults are detected.
- When the mains is connected and the UPS with long backup time is connected to battery packs or batteries for the first time, perform a battery self-check manually by holding down the ON/MUTE button on the front panel for 5s. Then, the UPS transfers to battery mode and performs a battery shallow discharge test. After 10s, the UPS automatically transfers back to normal mode.
- The charge current is fixed at 4 A for the UPS with long backup time. If the UPS needs to connect to battery packs or battery strings, the total battery capacity must exceed 18 Ah. Otherwise, batteries may be damaged. If the capacity of external battery packs or battery strings to be connected exceeds 40 Ah, it is recommended that external chargers be purchased and added to increase the charge current. Otherwise, the charge time will be prolonged.
- The number of batteries are fixed: 2 built-in batteries for the 1 kVA UPS with standard backup time, 4 built-in batteries for the 2 kVA UPS with standard backup time, 6 built-in batteries for the 3 kVA UPS with standard backup time, 3 external batteries in each string for the 1 kVA UPS with long backup time, 6 external batteries in each string for the 2 kVA UPS with long backup time, and 8 external batteries in each string for the 3 kVA UPS with long backup time.
- For a UPS with standard backup time, the battery capacity is fixed at 9 Ah by default, and the charge current is fixed at 1 A. The battery capacity of a UPS with long backup time is the total capacity of all battery strings. Set the battery capacity based on site requirements. The default battery capacity is 18 Ah. For example, if the 3 kVA UPS with long backup time is connected to two parallel 9 Ah/12 V battery strings each with eight batteries connected in series, the battery capacity is $9\text{ Ah} + 9\text{ Ah} = 18\text{ Ah}$. This parameter affects the backup time calculation. Incorrect setting will cause incorrect display of the backup time on the LCD.

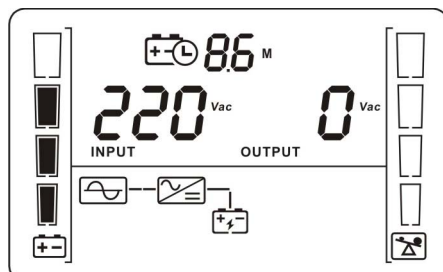
NOTE

In UPS setting mode, hold down the ON/MUTE button for more than 3s to go to the previous option after a beep sound; hold down the SELECT button for more than 3s to go to the next option after a beep sound; and hold down the OFF/ENTER button for more than 3s to confirm the setting.

Procedure:

1. After power-on, the UPS transfers to standby mode, as shown in [Figure 6-1](#). Hold down the SELECT button for 5s to enter UPS setting mode.

Figure 6-1 Default screen after UPS power-on



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

Figure 6-2 Setting the voltage level



3. Set the output frequency based on the actual value. The frequency can be set to 50 Hz, 60 Hz, or AUT (automatic, default).

Figure 6-3 Setting the voltage frequency



4. (Only for the UPS with long backup time) Set the battery capacity based on the actual total capacity of all battery strings. The default value for the UPS with long backup time is 18 Ah. The capacity can be set in the range of 18–999 Ah.

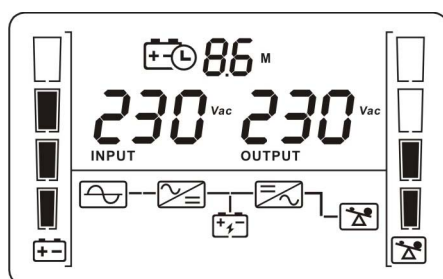
Figure 6-4 Setting the battery capacity



5. Start the inverter.

After power-on, the UPS generates no output by default. Hold down the ON/MUTE button on the front panel for more than 5s to start the UPS inverter. Then the system transfers to the inverter output state. The default output voltage is 220 V.

Figure 6-5 LCD screen after UPS inverter startup



NOTE

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

6.3 Shutting Down the UPS

Normal Mode

If the UPS is originally in normal mode, hold down **OFF/ENTER** for over 2 seconds will enable the UPS to enter the standby mode or bypass mode (if set or enabled before).

Battery Mode

Hold down **OFF/ENTER** for over 2 seconds to turn off the UPS in battery mode.

6.4 Transferring to Bypass Mode

When the input power supply is normal and the UPS is started in normal mode, hold down **ON/MUTE** and **SELECT** both for 5 seconds to enable the UPS enter the bypass mode. If the input voltage exceeds the acceptable range, the UPS will not enter the bypass mode.

6.5 Transferring from Bypass Mode to Normal Mode

When the UPS is in bypass mode, hold down **ON/MUTE** and **SELECT** both for 5 seconds to enable the UPS enter the invert mode.

6.6 Transferring to Battery Self-check

In normal mode, ECO mode, or converter mode, hold down the **ON/MUTE** button for more than 5s to perform the battery self-check.

6.7 Enabling or Disabling the Buzzer Off

- LCD operation:

When the UPS is in standby mode or bypass mode, hold down the **SELECT** button for 5s to enter UPS setting mode. In this case, all parameters can be set. Parameter 11 is used to enable or disable the buzzer off function. If the buzzer off function is enabled on the LCD, you need to disable the function on the LCD to restore the alarm sound. Otherwise, if a new alarm is generated, there is no alarm sound. If the UPS is shut down and powered on again, the buzzer restores to the on status.

When the UPS is in normal or battery mode, if you hold down the **SELECT** button for 5s, only parameter 11 (buzzer off enabled/disabled) can be set.

NOTE

In UPS setting mode, hold down the **ON/MUTE** button for more than 3s to go to the previous option after a beep sound, and hold down the **SELECT** button for more than 3s to go to the next option after a beep sound. When the UPS is in setting mode, hold down the **OFF/ENTER** button for more than 3s to confirm the setting.

- Button control:

Hold down the **ON/MUTE** button for 2–5s to disable or enable the buzzer. When the UPS reports a new alarm, the buzzer buzzes. To mute the buzzer, perform the operation again.

6.8 Manually Clearing Alarms

When an alarm that can be manually cleared exists, hold down **OFF/ENTER** for over 2 seconds to manually clear the alarm.

6.9 Entering Alarm Cause ID Screen

Hold down **SELECT** and **OFF/ENTER** both for 5 seconds to enter the alarm cause ID screen. Press **ON/MUTE** to view the previous option. Press **SELECT** to view the next option.

7 Maintenance and Storage

7.1 Maintenance

The UPS must be maintained or replaced by professionals. Common users are not allowed to perform such a task. If the UPS need to be replaced, contact the dealer.

 NOTE

Hand over used batteries to recyclers or pack them with the package for new batteries and send them to the dealer.

7.2 Storage

The correct way of storing the UPS is standing the UPS without unpacking in a dry place. For a standard model, charge it for 5 hours before storage. During storage, charge and maintain it according to the following table.

Table 7-1 UPS storage specifications

Storage Temperature	Charge Interval	Charge Duration
-25°C to +40°C	Three months	1-2 hours
40°C to 45°C	Two months	1-2 hours

8 Routine Maintenance

8.1 UPS Maintenance

NOTICE

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

Table 8-1 Routine maintenance items for UPSs

Check Item	Expected Result	Troubleshooting	Maintenance Interval
Operating environment	- Ambient temperature: 0–40°C - Humidity: 0–95% RH (non-condensing)	- If the humidity and temperature are abnormal, check the air conditioner status. - If the input voltage is abnormal, check the power grid status and input cable connection.	Monthly
Control panel	Check that all units are operating properly by observing the status icons on the LCD, and no fault or alarm information is displayed in active alarm or historical alarms.	If an alarm is present, rectify the fault by checking the device status and parameters.	Monthly
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Clean the dust, especially in the front panel.	Quarterly
Parameter	Check the output voltage level and frequency, the number of batteries and the actual battery capacity.	Reset the parameters.	Quarterly
Power cables and terminals (between the UPS and external power distribution equipment)	The insulation layers of cables are intact and terminals are free from noticeable sparks.	- Replace the cables. - Secure the output terminals.	Quarterly

Check Item	Expected Result	Troubleshooting	Maintenance Interval
Battery self-check	No battery alarm is generated.	If an alarm is present, rectify the fault.	Yearly

8.2 Battery Maintenance

NOTICE

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

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

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

Precautions

- Before battery maintenance, get the tools, such as handles, insulated. Do not place metal tools on exposed battery terminals.
- Never use any organic solvent to clean batteries.
- Never try to remove the safety valve or fill anything into batteries.
- Never smoke or use fire around batteries.
- After battery discharge, charge batteries to ensure a required battery capacity.
- Only professionals are allowed to perform maintenance tasks.
- If batteries have not been discharged for a long time, discharge and 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 4 hours.
- In high-temperature areas, discharge and charge batteries once every two months. Each charge should last at least 4 hours.
- Do not overdischarge batteries. After discharging batteries, fully charge them within 24 hours.
- Ensure that the battery discharge duration is 999 minutes at most and 0 minutes by default. If you set the value to 0 minutes, the discharge time is not limited.

Routine maintenance items for batteries

Table 8-2 Routine maintenance items for batteries

Item	Expected Result	Measures	Maintenance Interval
Battery alarm	No battery alarm is generated.	Identify the cause based on the alarm information.	Monthly
Battery appearance	1. The surface is clean and tidy without stains. 2. The battery terminals are intact. 3. Batteries are free from damage and cracks. 4. Batteries are free from acid leakage. 5. Batteries are not deformed or bulged.	If the battery appearance is abnormal, contact Huawei technical support.	Monthly
Battery operating temperature	1. The ambient battery temperature is 25±5°C. 2. The battery operating temperature is lower than battery temperature + 20°C. 3. Battery charge and discharge conditions meet the requirements specified in the battery specifications.	1. Identify the cause of the abnormal battery operating temperature. 2. If the fault persists, contact Huawei technical support.	Monthly

Item	Expected Result	Measures	Maintenance Interval
Charge voltage of battery string	- Equalized voltage 14.16 V x Number of batteries (tolerance $\pm 1\%$) - Float voltage 13.68 V x Number of batteries (tolerance $\pm 1\%$)	- If the voltage drop between the battery string output terminals and the battery input terminals at the UPS side is greater than 1% of the battery string voltage, check whether the cable between the battery string and the UPS is excessively long, or the cable diameter is excessively small. - Check whether the equalized charging voltage and float charging voltage are correctly set for the UPS. - If the fault persists, contact Huawei technical support.	Monthly
Battery temperature sensor measurement accuracy	The difference between the temperature measured by the temperature sensor and the temperature displayed on the LCD is less than 3°C.	- Install the temperature sensor in the correct position. - Replace the battery temperature sensor.	Quarterly

Item	Expected Result	Measures	Maintenance Interval
Battery specifications	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.	Quarterly
Tightness of bolts on battery terminals	The location of the signs marked on battery terminals indicating tight connections does not change.	Take photos from multiple angles and contact Huawei technical support.	Quarterly
Cables between batteries	No cable deteriorates and the insulation layer does not crack.	Replace the faulty cable.	Quarterly

Item	Expected Result	Measures	Maintenance Interval
Battery voltage	- Equalized charging voltage: 14.16 V±0.1 V - Float charging voltage: 13.68 V±0.1 V	- Check whether the equalized charging voltage and float charging voltage of a battery are normal. - If the charging voltage of a battery exceeds the specifications requirement, perform a complete forcible equalized charging for the battery, and check again whether the voltage is normal. - If the fault persists, contact Huawei technical support.	Quarterly

Item	Expected Result	Measures	Maintenance Interval
Battery connection reliability	1. Each battery terminal is connected reliably. (When battery strings are powered off, check the reliability of each terminal in the order from positive terminals to negative terminals.) 2. The tightening torque of each battery screw meets the requirements of the battery manufacturer. (A torque wrench is used for checking the torque. After checking that the battery screws meet the requirements, mark the screws for later check.)	1. Rectify any abnormal connection. 2. If the fault persists, contact Huawei technical support.	Yearly

9 Troubleshooting

If a UPS runs abnormally, rectify the fault by referring to the following table.

Table 9-1 Faults and troubleshooting measures

Symptom	Possible Cause	Measures
The active power supply is normal, but the LCD is off and no buzzer beeps.	The mains input power cable may be loose.	Check that the input power cable is connected.
	The mains input power cable is mistakenly connected to the output terminal of the UPS.	Correctly connect the mains input power cable to the UPS mains input terminal.
 and  blink on the LCD and the buzzer beeps once every second.	The external or internal batteries are incorrectly connected.	Check that all batteries are connected correctly.
 and  blink on the LCD and the buzzer beeps twice every second.	The UPS is overloaded.	Remove excess load from the UPS output.
	The UPS is overloaded and now it is supplying grid power to loads in bypass mode.	Remove excess load from the UPS output.
	The UPS is overloaded for many times in a short period. The UPS works in bypass mode, and it directly connects the equipment to the active power supply.	Remove excess load from the UPS output, and then shut down and restart the UPS.

Symptom	Possible Cause	Measures
Batteries provide backup power for a shorter period than the specified time.	Batteries are not fully charged.	Charge batteries for at least 5 hours and then check the battery SOC. If the battery SOC is still low, contact the dealer or Huawei technical support.
	Batteries are faulty.	Contact the dealer or Huawei technical support to replace batteries.

A Acronyms and Abbreviations

E

ECO

economy control operation

EEPROM

electrically erasable programmable
read-only memory

H

HTTP

HTTP-Hypertext Transfer Protocol

L

LCD

liquid crystal display

P

PFC

power factor correction

R

RS232

Recommended Standard 232

S

SNMP

Simple Network Management Protocol

T	
THDv	total harmonic distortion of output voltage
U	
UPS	uninterruptible power system