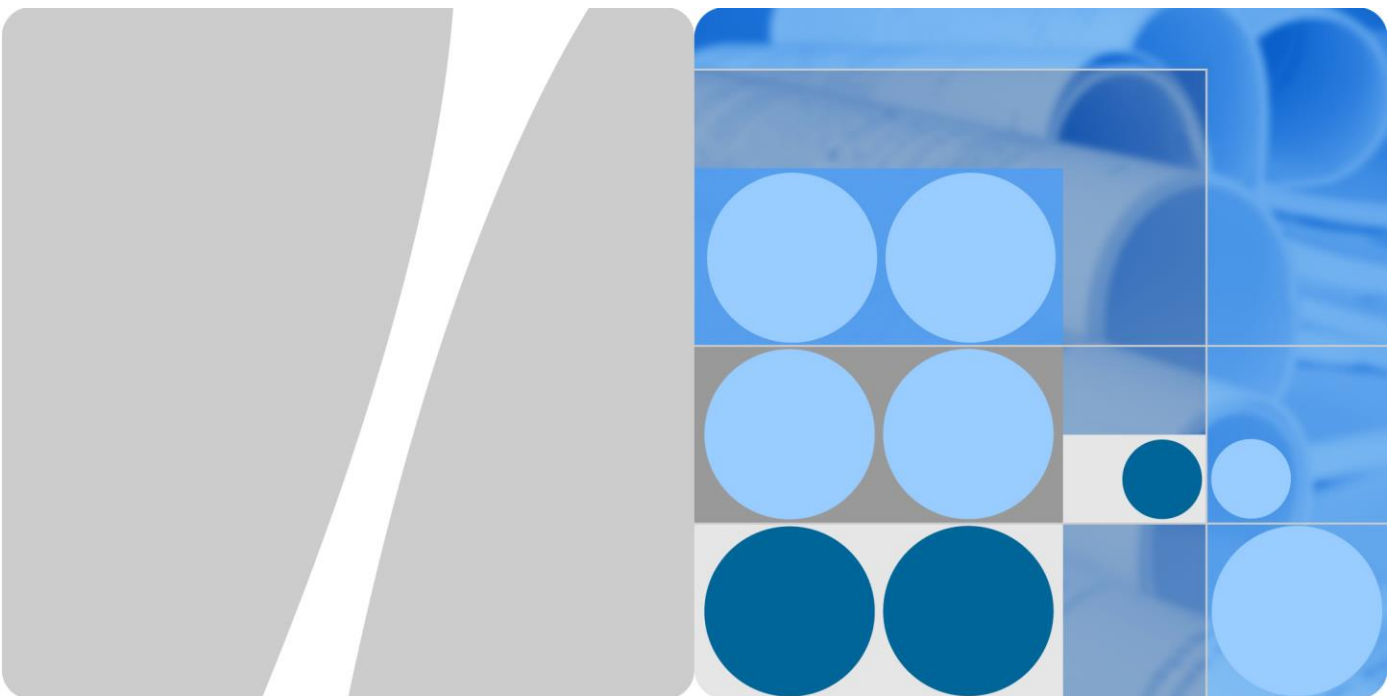




UPS2000-G-(1 kVA-3 kVA)

User Manual (2016, Russia)

Issue 02
Date 2016-07-28

HUAWEI TECHNOLOGIES CO., LTD.



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About This Document

Purpose

This document describes the UPS2000-G-(1 kVA-3 kVA) in terms of features, performance, appearance, structure, working principle, installation, use, operation, and maintenance. UPS is short for uninterruptible power supply. Unless otherwise specified, UPS refers to all the models discussed in this document.



NOTE

- The UPS applies only to commercial and industrial use, rather than medical facilities and life support equipment.
- The UPS is of level A. It may produce radio interference when being used for residential electricity. In this case, measures are required to reduce the interference.

Intended Audience

This document is intended for:

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

Symbol Conventions

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

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Symbol	Description
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 02 (2016-07-28)

Added 2 kVA UPS.

Issue 01 (2016-06-28)

This issue is the first official release.

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1 Precautions

1.1 Transportation

Before transporting the UPS, pack it with original packing materials to protect it from collision.

1.2 Preparation

- The UPS may have condensation inside after it is moved from a cold environment to a warm environment, such as an indoor environment. In this case, install the UPS after it is completely dry. Therefore, install the UPS at least 2 hours after it is placed in the target place.
- Never install the UPS in a damp environment or a place with water nearby.
- Never install the UPS in a place exposed to sunlight or with a heater nearby.
- Never block or shield the air vents on the UPS shell.

1.3 Operating Environment



DANGER

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

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

Keep the UPS away from the following environments:

- Places where the temperature and humidity are beyond the range of 0–40 °C and 0%–95% RH respectively

- Indoor environments in which the ambient temperature and humidity are not controlled or common outdoor environments (including those with simple shelters such as awnings, and where the humidity can reach 100%)
- Places in direct sunlight or near heat sources
- Places subject to vibrations or shocks
- Dusty places, or places exposed to corrosive substances, salts, or flammable gases
- Outdoor land environments (with simple shielding measures) near pollution sources. If a site is near a pollution source, it is at most:
 - 3.7 km away from saline water areas such as the ocean and salinas
 - 3 km away from serious pollution sources, such as metallurgic plants, coal mines, and heat and power plants
 - 2 km away from secondary pollution sources, such as chemical factories, rubber plants, and electroplating factories
 - 1 km away from light pollution sources, such as food factories, tanneries, and heating boilers

1.4 Installation

- 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 power to the UPS must come from a near grounded cushion socket.
- Use only power cables that comply with Verband Deutscher Electrotechniker (VDE) test standards and Conformité Européenne (CE) certification to connect the UPS to the indoor cushion socket. The power cable can be the main power cable for your PC.
- Use only 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.

1.5 Operation

- Never disconnect the main power cable for the UPS or use the indoor cushion socket when the UPS is running. Otherwise, the grounding for the UPS and connected loads will become invalid.
- Since the UPS contains embedded batteries, its output sockets and output terminals are energized even if the UPS is not connected to a socket.
- To completely disconnect the UPS, shut down the UPS and then unplug the power cable.
- Prevent liquid or any other foreign objects entering the UPS.

1.6 Servicing, Maintenance, and Troubleshooting

- Since the UPS uses dangerous voltages, only qualified personnel are allowed to maintain the UPS.
- Before any maintenance or servicing, remove embedded batteries and ensure that no current exists, especially that no voltage exists between bus capacitors.
- Batteries are allowed to be replaced only by or under the instructions of the personnel that are familiar with batteries under safe conditions. Unauthorized personnel are not allowed to get close to batteries.
- Batteries may generate an extremely high short-circuit current due to short circuits. Therefore, take the following preventive measures before maintaining batteries:
 - Remove any metal objects from yourself, such as watches and rings.
 - Use only insulated tools.
- When replacing batteries, install the batteries of the same quantity and model as the old ones.
- Do not throw batteries into fire, which may cause explosion.
- Do not break down or damage batteries. The electrolyte will damage your skin and eyes once it leaks.
- When replacing fuses, use the fuses with the same model and specifications as the old ones to avoid fire disaster.
- Do not disassemble the UPS.



NOTICE

- Electric shock risk. The UPS is still energized even if it is disconnected from the socket, because its internal components are still connected to embedded batteries.
 - Electric shock risk. The battery circuit is not disconnected from the input voltage. It is possible to have a dangerous voltage between the battery terminal and the ground cable. Therefore, ensure that no voltage exists before touching the UPS interior.
-

2 Overview

2.1 Model Description

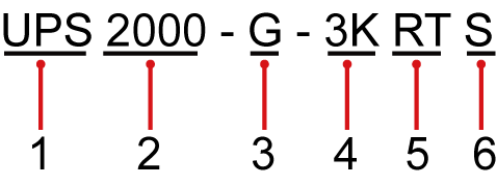
This document discusses the following UPS models, as shown in [Table 2-1](#).

Table 2-1 UPS models

Model	Represented By	Remarks
UPS2000-G-1KRTS	1 K-standard model-rack mounted-IEC	1 kVA for short
UPS2000-G-2KRTS	2 K-standard model-rack mounted-IEC	2 kVA for short
UPS2000-G-3KRTS	3 K-standard model-rack mounted-IEC	3 kVA for short

[Figure 2-1](#) shows the UPS model number.

Figure 2-1 UPS model number



[Table 2-2](#) describes the UPS model number.

Table 2-2 UPS model number details

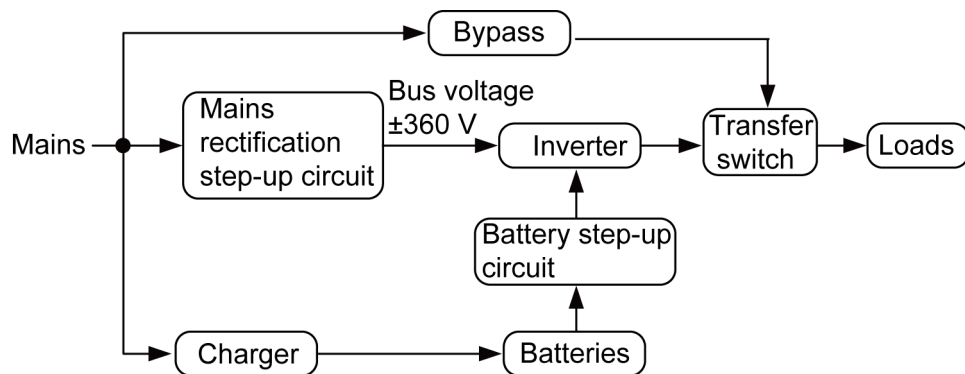
No.	Item	Description
1	Product category	UPS
2	Product family	2000: P (capacity) ≤ 20 kVA

No.	Item	Description
3	Product series	- A: tower series - G: rack series
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, which provides only a standard battery pack

2.2 Working Principle

Figure 2-2 shows the UPS conceptual diagram.

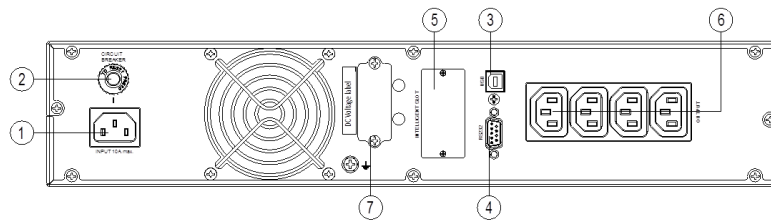
Figure 2-2 UPS conceptual diagram



2.3 Product Structure

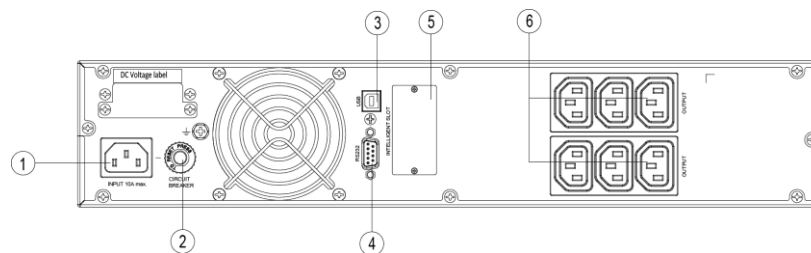
Figure 2-3 to Figure 2-5 show the rear view of the 1 kVA, 2 kVA and 3 kVA UPSs.

Figure 2-3 Rear view of UPS2000-G-1KRTS



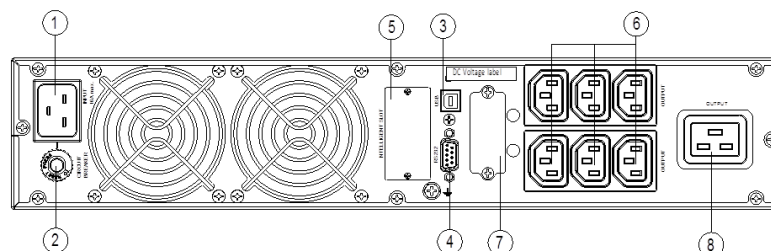
- | | |
|---|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) Universal serial bus (USB) port (security protection mechanism supported) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |
| (7) External battery connector | |

Figure 2-4 Rear view of UPS2000-G-2KRTS



- | | |
|--|---------------------------|
| (1) Mains input socket (C14) | (2) Input circuit breaker |
| (3) USB port (security protection mechanism supported) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |
| (7) External battery connector | |

Figure 2-5 Rear view of UPS2000-G-3KRTS



- | | |
|--|---------------------------|
| (1) Mains input socket (C20) | (2) Input circuit breaker |
| (3) USB port (security protection mechanism supported) | (4) RS232 port |
| (5) Optional card slot | (6) Output socket (C13) |

(7) External battery connector

(8) Output socket (C19)

3 Installing the UPS

3.1 Installation Preparations

Floor Loading Capacity

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

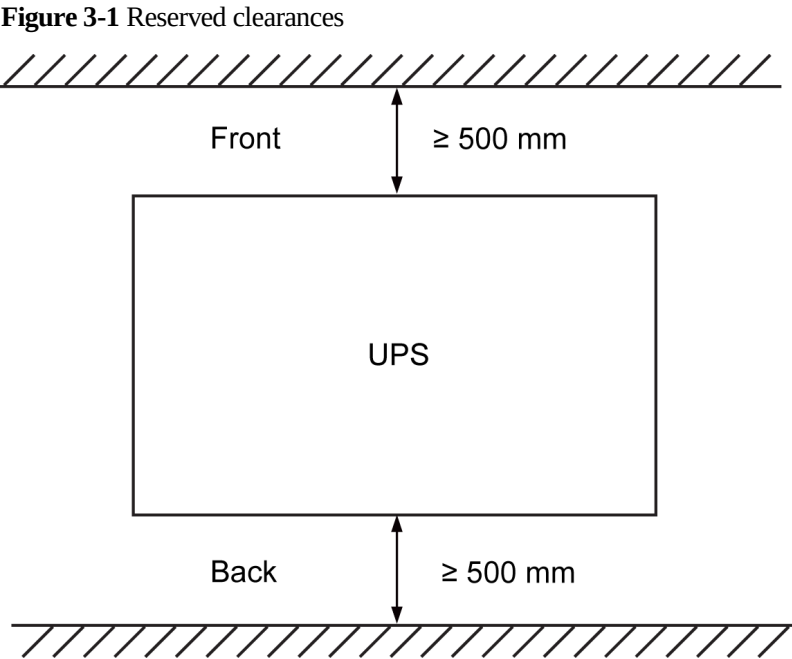
For the UPS weight, see chapter [9 Specifications](#).

Installation Requirements

- Do not install the UPS in high temperature, low temperature, and damp areas. For details about environmental specifications, see chapter [9 Specifications](#).
- The installation position is far away from water sources, heat sources, and inflammable materials. The UPS is free from direct sunlight, dust, volatile gases, corrosive materials, and salty air.
- Do not install the UPS in environments with conductive metal scraps in the air.
- The optimal operating temperatures for 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.

Dimensions

- The space allocated for UPS installation has the combined dimensions of the UPS and its input and output socket installed on the rear panel. The depth of the space is the depth of the UPS plus about 100 mm.
- Reserve a clearance of at least 500 mm respectively from the front and rear panels of the UPS to the wall or adjacent equipment to facilitate ventilation and heat dissipation, as shown in [Figure 3-1](#).

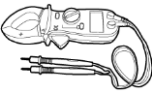
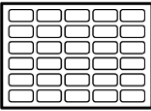
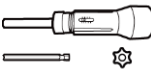
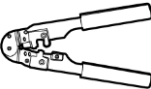
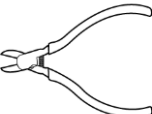


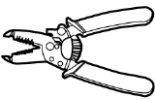
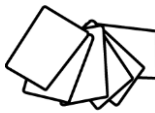
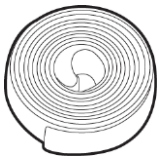
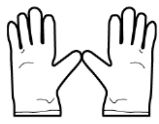
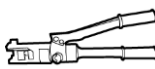
3.2 Tools

 **NOTE**
Get tools insulated to prevent electric shocks.

Table 3-1 lists the tools that may be used during installation.

Table 3-1 Tools

Appearance, Specifications, and Name			
Clamp meter	Multimeter	Labels	Phillips screwdriver (PH2 x 150 mm or PH3 x 250 mm)
			
Flat-head screwdriver (2 mm x 80 mm)	Torque screwdriver	Crimping tool	Diagonal pliers
			
Wire stripper	Polyvinyl chloride	Cotton cloth	Brush

Appearance, Specifications, and Name			
	(PVC) insulation tape		
			
Heat shrink tubing	Heat gun	Electrician's knife	Protective gloves
			
Electrostatic discharge (ESD) gloves	Insulation gloves	Hydraulic pliers	Cable tie
			

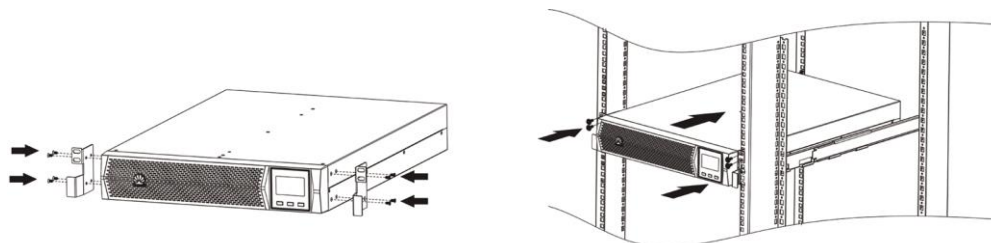
3.3 Installing UPS

The UPS can be installed on a desk or in a 19-inch rack. 1 kVA UPS, and 3 kVA UPS need 2 U space separately. The installation method for 1 kVA UPS, and 3 kVA UPS are the same. The figures in this chapter based on the 3 kVA UPS. Install the UPS in appropriate mode by performing the following steps.

Rack-mounting a UPS

1. Take out mounting brackets from the fitting bag, and install mounting brackets on UPS.
2. Install guide (2 U) on the Cabinet. Then Place the UPS on the guide rails. For details about how to install guide and UPS on the cabinet, see the *UPS2000-G-(1 kVA-3 kVA) Rail Assembly Quick Installation Guide*.

Figure 3-2 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. Assemble support bases. The minimum distance between two support bases should be 150 mm.
5. Place UPS on the support bases in sequence.
6. Adjust the UPS and the support bases to be horizontally.

Figure 3-3 Tower-mounting the UPS

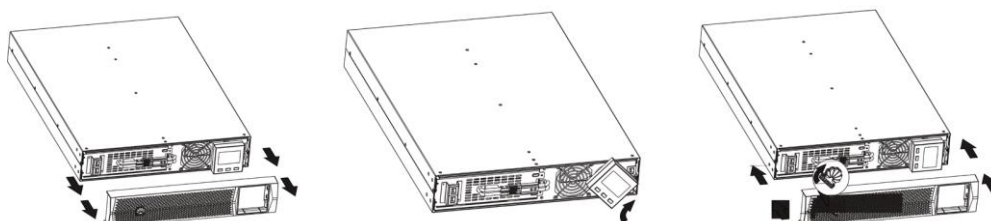
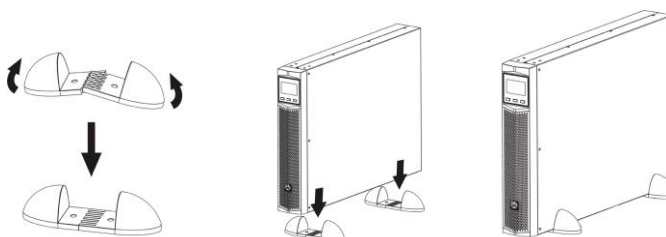


Figure 3-4 Tower-mounting the UPS



3.4 Installing Cables

1. Connect the UPS output power cable.
For socket-type output, connect loads to the UPS output sockets. When a power failure occurs, the UPS automatically supplies power to the loads.

Figure 3-5 Connecting cables to the 1KRTS UPS output

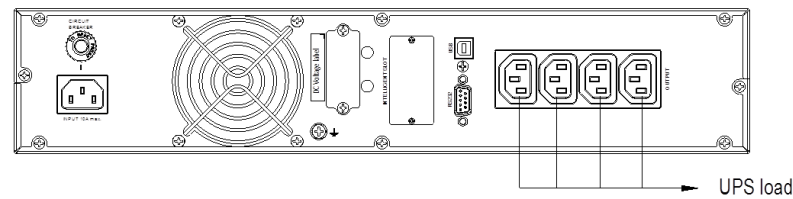


Figure 3-6 Connecting cables to the 2KRTS UPS output

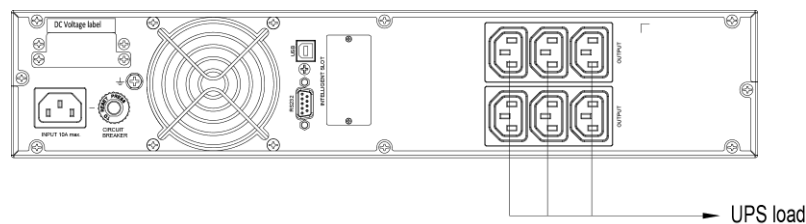
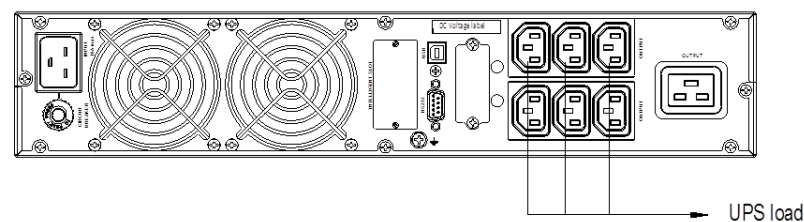


Figure 3-7 Connecting cables to the 3KRTS UPS output

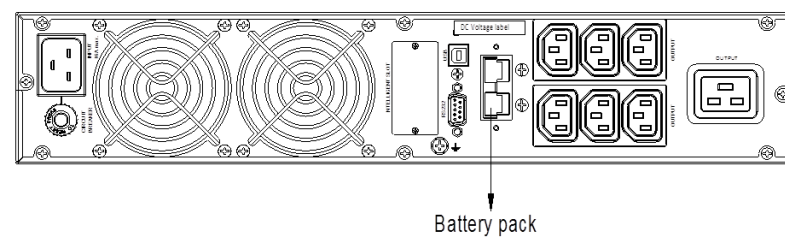


2. Connecting battery power cables.

For details about battery pack installation, see the *UPS2000-G-(1 kVA-3 kVA) Battery Pack Quick Installation Guide (2016, Russia)*.

The installation method for 1 kVA UPS, 2 kVA UPS, and 3 kVA UPS are the same. The figure below is based on the 3 kVA UPS.

Figure 3-8 Connecting cables to the 3 kVA UPS battery pack.



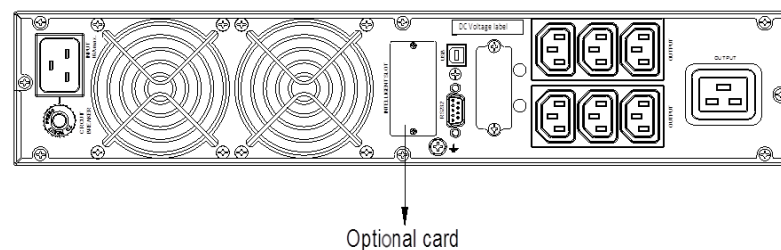
 NOTE

- If the 1 kVA UPS needs to connect to external battery strings, each battery string must consist of two 12 V batteries connected in series. If the 2 kVA UPS needs to connect to external battery strings, each battery string must consist of four 12 V batteries connected in series. If the 3 kVA UPS needs to connect to external battery strings, each battery string must consist of six 12 V batteries connected in series.
- The UPS provides a charge current of 1 A. If the UPS needs to connect to battery packs or battery strings it is recommended that an external charger be purchased to increase the charge current. If an external charger is not purchased, the charge time will be long.
- The battery pack (ESS-24V12-9*3AHBPVBB01) for 1 kVA UPS contain three group battery strings. The battery pack (ESS-48V12-9*2AHBPVBB01) for 2 kVA UPS contain two group battery strings. The battery pack (ESS-72V12-9AHBPVBB01) for 3 kVA UPS only contain one group battery strings.
- The 1 kVA UPS is allowed a maximum of one battery pack (ESS-24V12-9*3AHBPVBB01) in parallel. The 2 kVA UPS is allowed a maximum of one battery pack (ESS-48V12-9*2AHBPVBB01) in parallel. The 3 kVA UPS is allowed a maximum of three battery packs (ESS-72V12-9AHBPVBB01) in parallel.

3. Install the optional communication card to the UPS.

For the installation procedure, see the *RMS-SNMP01B User Manual*, *RMS-RELAY01B User Manual*, *RMS-MODBUS01B User Manual*. The installation method for 1 kVA UPS, 2 kVA UPS, and 3 kVA UPS are the same. The figure below is based on the 3 kVA UPS.

Figure 3-9 Installing an optional card on the 3KRTS UPS



 NOTE

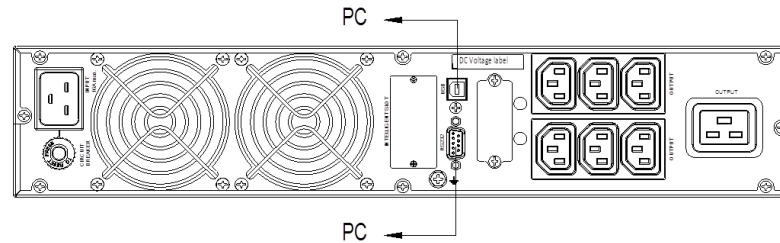
The UPS provides an optional smart slot to support the SNMP card, dry contact card, or Modbus card. Any of the three types of cards offers advanced communication functions and various monitoring options.

4. Connect the UPS to a PC.

Connect the UPS to the RS232 or USB port on a PC. Then you can monitor the UPS status using the PC as long as you have installed the monitoring software.

The installation method for 1 kVA UPS, 2 kVA UPS, and 3 kVA UPS are the same. The figure below is based on the 3 kVA UPS.

Figure 3-10 Connecting communications cables to the 3KRTS UPS



NOTE

- The USB channel supports a serial data communications protocol between the UPS and the PC.
- If you connect a DB9 connector to the RS232 port, the UPS can communicate with the PC over serial data.
- The UPS support either USB or RS232.
- To monitor the UPS over a PC, also need to install the monitoring software iManager NetEco 1000U. For details about how to install and use the iManager NetEco 1000U, see the *iManager NetEco 1000U User Manual*. The software and the user manual are available at <http://support.huawei.com/enterprise>.

5. Connect the UPS input power cable.

Take out input power cables from the fitting bag, and connect mains input power cables to the UPS.

Figure 3-11 Connecting cables to the 1KRTS UPS input

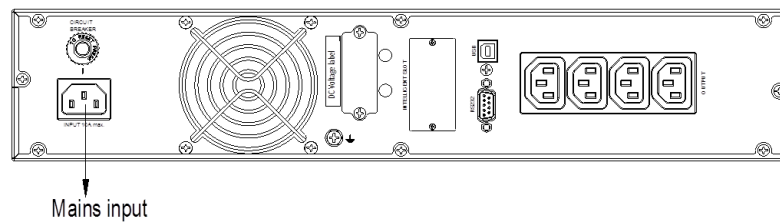


Figure 3-12 Connecting cables to the 2KRTS UPS input

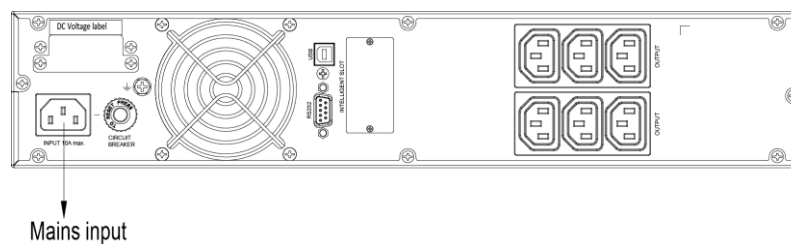
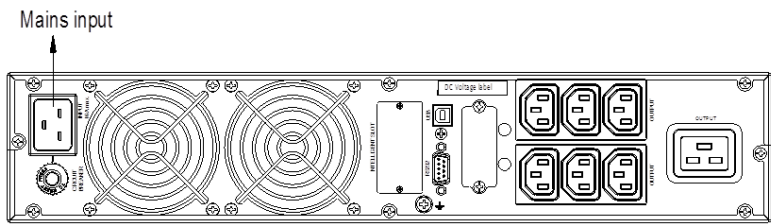


Figure 3-13 Connecting cables to the 3KRTS UPS input



3.5 Installation Verification

Table 3-2 gives the installation verification checklist.

Table 3-2 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 1 ohm.
6	Distances between cable ties	Distances between cable ties are the same, and no burr exists.
7	Operating environment	Clean the conductive air and other sundries.

4 Setting Control Panel

4.1 LCD Panel

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

Figure 4-1 LCD panel

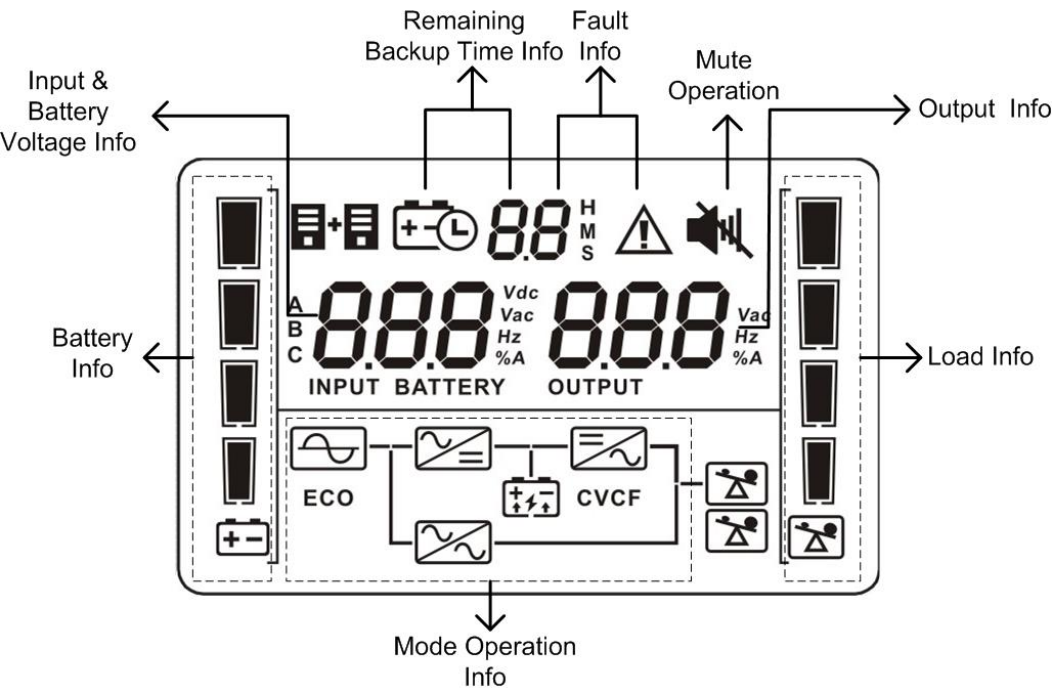
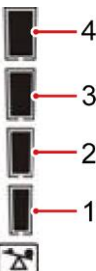
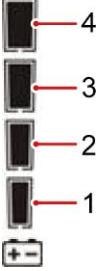


Table 4-1 Icon description

Icon	Function
Backup time information	
	Alternately displays the remaining power backup time, alarm ID, and CF (only displays in frequency conversion mode) in

Icon	Function
	digits. H: hour; M: minute; S: second
Frequency conversion mode information	
	Displays that the UPS is in frequency conversion mode.
Alarm information	
	Indicates that an alarm occurs.
	Indicates the warning or alarm ID. For the code meaning, see section 4.7 Alarm Handling .
Muting	
	Mutes the UPS.
Output information	
	Displays the output voltage, frequency, or battery voltage. Vac: output voltage; Hz: output frequency; %: output load ratio; 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 blink.
Mode operating information	
	Indicates that the UPS has connected to the mains.
	Indicates that batteries are supplying power.
	Indicates that batteries are being charged.
	Displays that the UPS is in bypass mode.
ECO	Displays that the UPS is in ECO mode.

Icon	Function
	Indicates that the frequency conversion circuit is working.
	Displays that the output socket is delivering power output.
Battery information	
	 Displays the current battery capacity 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 blink.
Input voltage information	
	Displays the input voltage, frequency, battery voltage, or input current percentage. Vac: input voltage; Vdc: battery voltage; Hz: input frequency; %A: battery capacity percentage.

4.2 Buzzer Alarm Tones

Table 4-2 describes the buzzer alarm tones.

Table 4-2 Buzzer alarm tone description

Alarm type	Buzzer alarm tone
Battery mode	Beeps once every 4 seconds.
Minor alarm	Beeps once every second.
Overload	Beeps twice every second.
Critical alarm	Buzzes continuously.
Bypass mode	Beeps once every 10 seconds.

4.3 Character Display

Table 4-3 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	Constant-frequency mode
BUZ	buZ	Buzzer off
AST	ASt	Automatic startup

4.4 Buttons

The control panel provides three buttons to start and shut down the UPS, and view and set parameters. [Table 4-4](#) describes the three buttons.

Figure 4-2 Schematic Buttons



Table 4-4 Button description

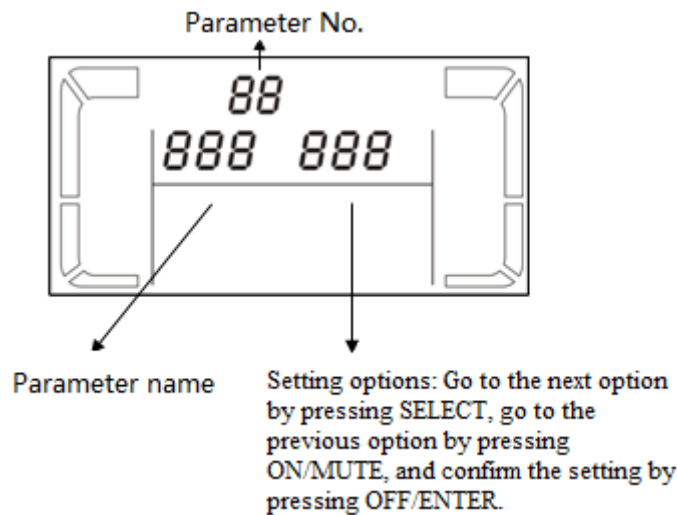
Button	Function
ON/MUTE	- Starting the UPS: Hold down ON/MUTE for over 5 seconds to connect the UPS power supply. - Enabling or disabling the buzzer: Hold down ON/MUTE for 2–5 seconds to enable or disable the buzzer. However, when the UPS sends a new alarm, the mute function is unavailable, you need to disable the buzzer again. - Selecting the previous option: During the setting of UPS parameters, press ON/MUTE for more than 3 seconds. Release the button when you hear a beep sound to select the previous option. - Transferring to battery self-check: In normal mode, ECO mode, or frequency conversion mode, hold down ON/MUTE for more than 5 seconds to enter the battery self-check test.
OFF/ENTER	- Shutting down the UPS: Hold down OFF/ENTER for over 2 seconds 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 setting: During the setting of UPS parameters, press OFF/ENTER for more than 3 seconds to confirm the setting. - 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.

Button	Function
SELECT	- Setting UPS parameters: - When the UPS is in standby mode or bypass mode, hold down SELECT for 5 seconds to start setting UPS parameters. Press ON/MUTE or SELECT to switching LCD display. 10 seconds after the button is released, the default display returns. - When the UPS is in normal mode or battery mode, hold down SELECT for 5 seconds to start setting only for 11 UPS buzzer parameters. - Selecting the next option: During the setting of UPS parameters, press SELECT for more than 3 seconds. Release the button when you hear a beep sound to select the next option.
ON/MUTE+SELECT	- 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 or the UPS is in frequency conversion mode, the UPS will not enter the bypass mode. - Bypass 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. - Exiting parameter setting screens: Hold down ON/MUTE and SELECT both for 0.5 seconds to exit parameter setting screens. - Exiting cause ID screen: Hold down ON/MUTE and SELECT both for 0.5 seconds to exit alarm cause ID screen.
SELECT+OFF/ENTER	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.

4.5 Setting Parameters

There are twelve configurable parameters on the LCD. The following figures show the parameter setting screens.

Figure 4-3 Setting parameters on the LCD



When the UPS is in standby mode or bypass mode, hold down **SELECT** for 5 seconds to start setting UPS parameters.

When the UPS is in normal mode or battery mode, hold down **SELECT** for 5 seconds to start setting only for 11 UPS buzzer parameters.

During the setting of UPS parameters, press **ON/MUTE** for more than 3 seconds. Release the button when you hear a beep sound to select the previous option. During the setting of UPS parameters, press **SELECT** for more than 3 seconds. Release the button when you hear a beep sound to select the next option. Press **OFF/ENTER** for more than 3 seconds to confirm the setting.

The following figures show the twelve parameter setting screens.

- 01: Set the output voltage.

Display	Setting
	The output voltage can be set as follows: 200: The output voltage is 200 V AC. 208: The output voltage is 208 V AC. 220: The output voltage is 220 V AC. 230: The output voltage is 230 V AC (default value). 240: The output voltage is 240 V AC.

- 02: Enable or disable the frequency conversion mode.

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



NOTE

The CF frequency conversion mode takes priority over the ECO mode. If the CF frequency conversion mode is enabled, the ECO mode cannot be enabled.

- 03: Enable or disable the bypass mode.

Display	Setting
	Enable or disable the bypass function. ENA: Enables the bypass mode. DIS: Disables the bypass mode (default value).

- 04: Set the highest input voltage in bypass mode.

Display	Setting
	Press ▼ or ▲ to adjust and set the highest input voltage in bypass mode. 230–264: The value range is 230 V AC to 264 V AC, the default value is 264 V AC.



NOTE

The highest input voltage in bypass mode should be higher than the highest input voltage in ECO mode.

- 05: Set the lowest input voltage in bypass mode.

Display	Setting
	Press ▼ or ▲ to adjust and set the lowest input voltage in bypass mode. 170–220: The value range is 170 V AC to 220 V AC, the default value is 170 V AC.



NOTE

The lowest input voltage in bypass mode should be lower than the lowest input voltage in ECO mode.

- 06: Set the battery capacity.

Display	Setting
	Press ▼ or ▲ to adjust and set the UPS battery capacity. 9–999: Set the UPS battery capacity in the range of 9 Ah to 999 Ah. (The default value is 9 Ah and up configurable.)

- 07: Set the discharge time limit.

Display	Setting
	Set the backup time limit. 0–999: Set the battery backup time in battery mode. The value ranges from 0 minutes to 999 minutes. 0: The backup time limit is canceled (default value).

- 08: Enable or disable the ECO mode.

Display	Setting
	Enable or disable the ECO function. ENA: Enables the ECO mode. DIS: Disables the ECO mode (default value).

- 09: Set the highest allowable voltage in ECO mode.

Display	Setting
	Press ▼ or ▲ to adjust and set the highest input voltage in ECO mode. 13–24: Set the parameter based on the preset output voltage. The value range is in +13 V AC to +24 V AC. (The default value is +22 V AC.)

- 10: Set the lowest allowable voltage in ECO mode.

Display	Setting
	Press ▼ or ▲ to adjust and set the lowest input voltage in ECO mode. 13–24: Set the parameter based on the preset output voltage. The value range is –13 V AC to –24 V AC. (The default value is –22 V AC.)

- 11: Set the buzzer off function.

Display	Setting
	Enable or disable the buzzer off function. ENA: used to enable the buzzer off function. DIS: used to disable the buzzer off function. By default, the buzzer off function is disabled.

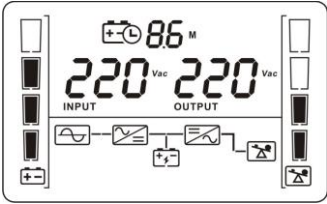
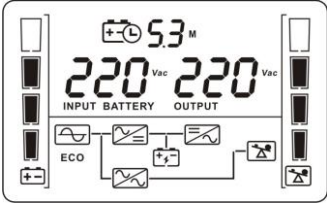
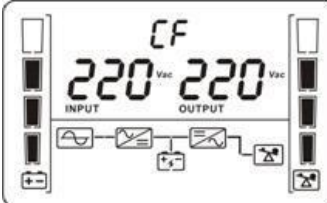
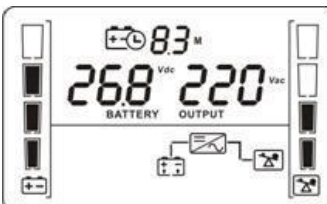
- 12: Set the automatic startup function.

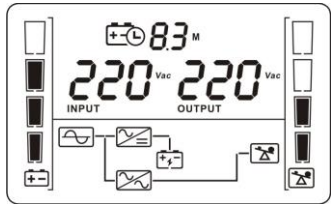
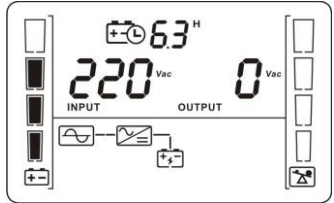
Display	Setting
	Enable or disable the automatic startup function. ENA: Enables the automatic startup function. DIS: Disables the automatic startup function (default value).

- 00: Exit setting.

4.6 Operating Modes

Table 4-5 Operating mode description

Operating Mode	Description	Display
Normal mode	When the input voltage is in the acceptable range, the UPS works in normal mode, supplies stable sine wave AC output current, while charging batteries.	
ECO mode	When the input voltage is in the preset range, the UPS transfers to bypass mode to save energy.	
Frequency conversion mode	When the input frequency is in the acceptable range, the UPS sets the output frequency to 50 Hz or 60 Hz and, while charging 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. The UPS uses batteries to supply power.	

Operating Mode	Description	Display
Bypass mode	When the UPS works in online mode and is overloaded, it will enter the bypass mode if the input voltage is in an acceptable range. If the UPS is set to be enables the bypass mode, 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 connects to the mains but is not started in normal mode or not enables the bypass mode, the UPS works in standby mode, in which it only charges batteries but does not deliver output.	

4.7 Alarm Handing



NOTE

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

Table 4-6 Alarms

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
10	1	Bypass voltage abnormal	Minor	This alarm is automatically cleared.	The bypass voltage is outside the scope.	The UPS remains in the current state. If the UPS works in bypass mode, it transfers to standby mode and has no output.	Possible cause: The bypass input voltage is abnormal. Measure: Check whether the bypass input voltage exceeds the configured range. If yes, change the range or wait until

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
							the bypass input recovers.
	2	Bypass frequency abnormal	Minor	This alarm is automatically cleared.	The bypass frequency is outside the bypass frequency range.	The UPS remains in the current state. If the UPS works in bypass mode, it transfers to standby mode and has no output.	Possible cause: The bypass input frequency is abnormal. Measure: Check whether the bypass input frequency exceeds the configured range. If yes, change the range or wait until the bypass input recovers.
14	1	Startup timeout	Critical	This alarm must be manually cleared.	The inverter output voltage is not within ± 2 V of the rated output.	If this alarm is generated during the running of the UPS, the UPS transfers to bypass mode.	- Possible cause: The bypass loading capacity exceeds the rated load 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.
			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	The UPS fails to start.	Possible cause: The battery voltage is low or the batteries are damaged after EOD. Measure: Wait for the batteries to recover or contact the battery supplier to replace the batteries.

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
					normal mode.		
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.
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 battery packs are connected before the startup, the UPS fails to start. • If battery packs are connected during the running of the UPS, 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	The voltage of each battery exceeds	The UPS automatically transfers to battery mode. When the	

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
				after the UPS transfers to battery mode.	14.7 V.	battery undervoltage alarm is generated, the UPS automatically transfers to normal mode and starts the charger for charging.	
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 battery packs are connected before the startup, the UPS fails to start. - If battery packs are connected during the running of the UPS, 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.	The voltage of each battery is lower than 11.28 V.	The power supply from the UPS is not affected.	
		Battery time low warning	Minor	This alarm is automatically cleared.	Indicate battery discharge time remain is short, the	The power supply from the UPS is not affected.	Possible cause: The mains is abnormal, and the batteries discharge time is coming.

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
					warning will start while the discharge time only remain 3 mins.		Measure: Connect to the mains in non-battery test state.
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 UPS remains in the current state and cannot start.	
30	1	Internal overtemperature	Minor	This alarm is automatically cleared.	The ambient temperature exceeds 50 °C.	The UPS remains in the current state and cannot start.	Possible cause: The ambient temperature exceeds 50 °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.	This alarm is generated during the startup of the UPS. If this alarm is generated, the	Possible cause: The soft-start resistor is damaged. Measure: Contact the dealer or Huawei technical support for

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
						UPS fails to start.	repair.
42	17	Internal fault	Critical	This alarm must be manually cleared.	The bus voltage is higher than 450 V.	If this alarm is generated during the running of the UPS, 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 during the running of the UPS, 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.
42	24	Internal	Minor	This alarm is	An error occurs in	All UPS parameters are	Possible cause: The

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
		Internal fault		automatically cleared.	the EEPROM.	restored to the factory settings. If this alarm is generated, the customer needs to replace the UPS.	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 during the running of the UPS, 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 during the running of the UPS, the UPS transfers to bypass mode.	
42	28	Internal fault	Critical	The first three alarms are cleared automatically. Later alarms, if generated, must be cleared manually.	The inverter output voltage is lower than 100 V.	If this alarm is generated during the running of the UPS, the UPS transfers to no output. After 20 minutes, the UPS automatically starts the inverter. If this alarm persists, the UPS then transfers to no	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

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
						output again. After the UPS transfers to no output three times, the alarm needs to be manually cleared.	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 during the running of the UPS, 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.
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	• 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.

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
						not start or clear the fault.	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.
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 loading capacity of the inverter. Measure: Lower the load or replace the UPS with a UPS with a larger capacity.
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 loading capacity of the bypass. Measure: Lower the

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
							load or replace the UPS with a UPS with a larger capacity.
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	- For battery mode, the UPS transfers to no output mode. - If the UPS transfers from normal mode to bypass mode three times within 20 minutes, the UPS is locked in bypass mode. - For normal mode, the UPS transfers to no output mode.	Possible cause: The load exceeds the rated loading capacity of the inverter. Measure: Lower the load or replace the UPS with a UPS with a larger capacity.

Alarm ID	Alarm Cause ID	Alarm Name	Alarm Severity	Alarm Clear Mode	Trigger Condition	Impact on the System	Repair Proposal
					mode, when the bypass input is abnormal, this alarm is generated when the UPS 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 of the bypass. Measure: Reduce the load or replace the UPS with a UPS with a larger capacity.

4.8 Alarm Indication

Table 4-7 Alarm indication

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

Alarm	Display (Blinking)	Buzzer
Overcharge		Beeps once every second.

5 Operations

5.1 Checking Before Powering On the UPS

- AC power cable colors comply with local electrical regulations.
- No short circuits occur in inputs and outputs.
- Cables are securely connected.
- Battery cables are correctly connected to battery terminals. The battery voltage meets the requirements.
- Cables are properly connected between the UPS and batteries.
- Power cables and signal cables are correctly identified.
- Cables are neatly routed and securely bound.
- Devices are installed and cables are routed in ways that facilitate modification, capacity expansion, and maintenance.
- The UPS is properly grounded.
- The voltage between the neutral wire and the ground cable is less than 5 V AC.
- The input voltage rang for the mains to start the UPS is 120–280 V AC (or 80–280 V AC after the UPS powers on). The battery voltage range is (Number of batteries x 10.8) to (Number of batteries x 14) V DC.

5.2 Starting the UPS



NOTICE

- In the preset mode, LCD will return to the main page with 10 seconds of no operation.
- Charge the batteries used for the first time for 5 hours. Otherwise, the battery discharge time will decrease.
- The UPS performs a battery self-check automatically once a week. If batteries are faulty, an alarm is generated.
- If the UPS is connected to the mains, when the battery packs or battery strings connect to the UPS for the first time, you must do a battery self-check manually, in order to confirm the battery connection is normal. The method is: hold down the **ON/MUTE** button on the front panel for 5 seconds, then the UPS transfer to battery mode to do a shallow discharge test, after 10 seconds it automatically back to line mode.
- The UPS provides a charge current of 1 A, and it can be configured according to the capacity of external battery packs. If the UPS needs to connect to battery packs or battery strings, it is recommended that an external charger be purchased to increase the charge current. If an external charger is not purchased, the charge time will be long.
- The 1 kVA UPS with standard backup time has two built-in batteries, the 2 kVA UPS with standard backup time has four built-in batteries, the 3 kVA UPS with standard backup time have six built-in batteries. If the 1 kVA UPS needs to connect to external battery strings, each battery string must consist of two 12 V batteries connected in series. If the 2 kVA UPS needs to connect to external battery strings, each battery string must consist of four 12 V batteries connected in series. If the 3 kVA UPS needs to connect to external battery strings, each battery string must consist of six 12 V batteries connected in series.
- Set the battery capacity to the total capacity of all batteries actually connected. The default value is 9 Ah. For example, if six batteries (9 Ah, 12 V) are connected in series to form a battery string, and two of such battery strings are connected in parallel and then to the 3 kVA UPS, set battery capacity to 27 Ah (9 Ah + 9 Ah + 9 Ah). This parameter affects the backup time calculation. Incorrect setting will cause incorrect display of the backup time on the LCD.



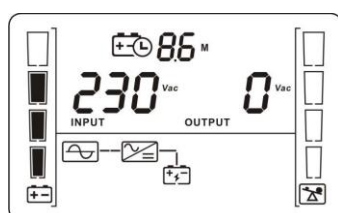
NOTE

During the setting of UPS parameters, press **ON/MUTE** for more than 3 seconds. Release the button when you hear a beep sound to select the previous option. During the setting of UPS parameters, press **SELECT** for more than 3 seconds. Release the button when you hear a beep sound to select the next option. During the setting of UPS parameters, press **OFF/ENTER** for more than 3 seconds to confirm the setting. For the meaning of LCD display character, see the [4.3 Character Display](#). For details of the parameters, see [4.5 Setting Parameters](#).

Procedure:

1. After power on the UPS, it enters standby mode, as shown in [Figure 5-1](#). Hold down the **SELECT** button for 5 seconds. The UPS enters the preset mode.

Figure 5-1 Power-on and standby screen



2. Set the voltage level based on the actual output voltage. The voltage level can be set to 200 V, 208 V, 220 V, 230 V (default), or 240 V.

Figure 5-2 Setting the output voltage



3. Set the system output frequency based on the rated frequency. The values include 50 Hz, 60 Hz, and AUT (default).

Figure 5-3 Setting the system output frequency



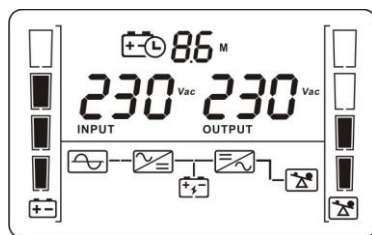
4. Set the battery capacity to the total capacity of all batteries actually connected. The default value is 9 Ah for the UPS, and the value can range from 9 Ah to 999 Ah.

Figure 5-4 Setting the battery capacity



5. Start the UPS to inverter mode.
Hold down the **ON/MUTE** button on the front panel for over 5 seconds to make the UPS transfer to inverter mode output. The default value is 230 V.

Figure 5-5 LCD display after the UPS starts to inverter mode



NOTE

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

5.3 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.

5.4 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.

5.5 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.

5.6 Transferring to Battery Self-check

In normal mode, ECO mode, or frequency conversion mode, hold down **ON/MUTE** for more than 5 seconds to enter the battery self-check test.

5.7 Enabling or Disabling the Buzzer

- LCD control:

When the UPS is in standby mode or bypass mode, hold down **SELECT** for 5 seconds to start setting UPS parameters. The parameter 11 can enable or disable the buzzer off function.

When the UPS is in normal mode or battery mode, hold down **SELECT** for 5 seconds to start setting only for parameter 11 to enable or disable the buzzer off function.



NOTE

During the setting of UPS parameters, press **ON/MUTE** for more than 3 seconds. Release the button when you hear a beep sound to select the previous option. During the setting of UPS parameters, press **SELECT** for more than 3 seconds. Release the button when you hear a beep sound to select the next option. Press **OFF/ENTER** for more than 3 seconds to confirm the setting.

- Button control:

Hold down **ON/MUTE** for 2–5 seconds when the UPS is in battery mode to enable or disable the buzzer. However, when the UPS sends a new alarm, the mute function is unavailable, you need to disable the buzzer again.

5.8 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.

5.9 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.

6 Maintenance and Storage

6.1 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.

6.2 Storage

Before storing the UPS, charge it for 5 hours. The correct way of storing the UPS is standing the UPS without unpacking in a dry place. During the storage period, maintain the UPS by charging its batteries as follows:

Table 6-1 UPS charging during storage

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

7

Routine Maintenance

7.1 UPS Maintenance



NOTICE

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

Table 7-1 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	If an alarm is present, rectify the fault by checking the device status and	Monthly

Check Item	Expected Result	Troubleshooting	Maintenance Interval
	icons on the LCD, and no fault or alarm information is displayed in active alarm or historical alarms.	parameters.	
Cleanliness	Wipe the cabinet surface using a white paper and the paper does not turn black.	Clean the dust, especially in the front panel.	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
Battery self-check	No battery alarm is generated.	If an alarm is present, rectify the fault.	Yearly

7.2 Battery Maintenance



NOTICE

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

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

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

- Keep the battery switch off when installing or maintaining the batteries.

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.

Routine maintenance items for batteries

Table 7-2 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	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
	the requirements specified in the battery specifications.		
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
Battery specifications	The settings of battery management parameters meet the requirements in the user manual.	Set parameters correctly.	Quarterly

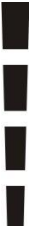
Item	Expected Result	Measures	Maintenance Interval
Tightness of bolts on battery terminals	The location of the signs marked on battery terminals indicating tight connections does not change.	Take photos from multiple angles and contact Huawei technical support.	Quarterly
Cables between batteries	No cable deteriorates and the insulation layer does not crack.	Replace the faulty cable.	Quarterly
Battery voltage	- Equalized charging voltage: $14.16\text{ V} \pm 0.1\text{ V}$ - Float charging voltage: $13.68\text{ V} \pm 0.1\text{ V}$	1. Check whether the equalized charging voltage and float charging voltage of a battery are normal. 2. If the charging voltage of a battery exceeds the specifications requirement, perform a complete forcible equalized charging for the battery, and check again whether the voltage is normal. 3. If the fault persists, contact Huawei technical support.	Quarterly
Shallow discharge test (recommended)	Conduct a shallow discharge test when the UPS is backed up to verify that the batteries can discharge normally.	1. Locate the cause when an exception is identified. 2. If the fault persists, contact Huawei technical support.	Quarterly
Capacity Test (recommended)	When the UPS is backed up, discharge a battery to the undervoltage alarm threshold, to refresh the capacity of the	1. Locate the cause when an exception is identified. 2. If the fault persists, contact	Yearly

Item	Expected Result	Measures	Maintenance Interval
	battery.	Huawei technical support.	
Battery connection reliability	- 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.) - 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.)	- Rectify any abnormal connection. - If the fault persists, contact Huawei technical support.	Yearly

8 Troubleshooting

When the UPS works abnormally, rectify the fault by referring to the following table.

Table 8-1 Faults and troubleshooting measures

Symptom	Possible Cause	Measures
The main power is normal, but no indicator turns on and the buzzer generates no tone.	The mains input power cable is disconnected.	Check the input power cable.
	The mains input power cable is incorrectly connected to the UPS output end.	Correctly connect the mains input power cable to the UPS 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 surplus load from the UPS output end.
	The UPS is overloaded and supplying power to devices in bypass mode.	Remove surplus load from the UPS output end.
	The UPS is overloaded server times within a short period of time. The UPS is locked in bypass mode and loads are directly connected to the main power source.	Remove surplus load from the UPS output end, and then shut down and restart the UPS.
The battery backup time is shorter than the time given in	Batteries are not fully charged.	Charge batteries for at least 5 hours and then check the battery capacity. If the battery capacity is still insufficient, contact the dealer

Symptom	Possible Cause	Measures
specifications.		or Huawei technical support.
	Batteries are faulty.	Contact the dealer or Huawei technical support to replace batteries.

9 Specifications

Table 9-1 Rack-mounted UPS specifications

Specifications		1 kVA	2 kVA	3 kVA
Capacity		1000 VA/800 W	2000 VA/1600 W	3000 VA/2400 W
Input				
Voltage range	Lowest conversion voltage	- When the ambient temperature is 0–35 °C: 160/140/120/110 V AC (tolerance $\pm 5\%$) (Ratio of actual load to rated load: 100%–80%/80%–70%/70%–60%/60%–0) - When the ambient temperature is 35–40 °C: 175/155/135/125 V AC (tolerance $\pm 5\%$) (Ratio of actual load to rated load: 100%–80%/80%–70%/70%–60%/60%–0)		
	Lowest recovery voltage	- When the ambient temperature is 0–35 °C: 175/155/135/125 V AC (tolerance $\pm 5\%$) (Ratio of actual load to rated load: 100%–80%/80%–70%/70%–60%/60%–0) - When the ambient temperature is 35–40 °C: 190/170/150/140 V AC (tolerance $\pm 5\%$) (Ratio of actual load to rated load: 100%–80%/80%–70%/70%–60%/60%–0)		
	Highest conversion voltage	300 V AC (tolerance $\pm 5\%$, load percentage < 80%) 280 V AC (tolerance $\pm 5\%$, 80% < load percentage < 100%, after 15 minutes to battery mode)		
	Highest recovery voltage	290 V AC (tolerance $\pm 5\%$, load percentage < 80%) 270 V AC (tolerance $\pm 5\%$, 80% < load percentage < 100%)		
Frequency range		40–70 Hz		
Phase		Single-phase, grounded		

Specifications		1 kVA	2 kVA	3 kVA
Output				
Output voltage		200 V AC, 208 V AC, 220 V AC, 230 V AC, 240 V AC		
Mains voltage range		±1% (battery mode)		
Frequency range (synchronization range)		47–53 Hz or 57–63 Hz		
Frequency range (battery mode)		50 Hz (tolerance ±0.25 Hz) or 60 Hz (tolerance ±0.3 Hz)		
Inverter overload capability		- When the ambient temperature is 0–35 °C: 105%–110%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 10 minutes. 110%–130%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 1 minutes. 130%–150%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 3 seconds. > 150%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 0.5 seconds max. - When the ambient temperature is 35–40 °C: 105%–110%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 5 minutes. 110%–130%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 30 seconds. 130%–150%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 1.5 seconds. > 150%: The UPS automatically shuts down (in battery mode) or transfers to bypass mode (in line mode) after 0.5 seconds max.		
Bypass overload capability		110%–120%, 30 minutes 120%–130%, 10 minutes 130%–150%, 1 minute		
Harmonic distortion		≤ 3% THDv (linear load) ≤ 6% THDv (non-linear load)		
Transfer time	Transferri ng from normal mode to battery	0		

Specifications		1 kVA	2 kVA	3 kVA
	mode			
	Bypass to ECO or ECO to bypass	4 ms (100% R Load)		
Waveform (battery mode)		Sine wave		
Battery				
Standard model	Battery model	12 V/9 Ah		
	Number of batteries	2	4	6
	Charge current	1 A		
	Float charging voltage	27.3 V DC ±1%	54.7 V DC ±1%	82.1 V DC ±1%
	Equalized charging voltage	28.3 V DC ±1%	56.6 V DC ±1%	84.9 V DC ±1%
	Backup time	Depending on the capacity of external batteries, for details, see Table 9-2 .		
Appearance				
Standard model	Dimensions (H x W x D)	88 mm x 438 mm x 310 mm	88 mm x 438 mm x 410 mm	88 mm x 438 mm x 630 mm
	Net weight	10.7 kg	18.5	27.9 kg
Environment				
Operating Temperature		0–40 °C		
Storage Temperature		–40 °C to +70 °C (battery pack: –20 °C to +40 °C)		
Altitude		< 1000 m		
Operating humidity		20%–90% RH @ 0–40 °C (non-condensing)		
Noise		< 50 dB @ 1 m		
Defend Level		IP20		



NOTE

- In frequency conversion mode, the load should be derated to 80%.
- If the output voltage is 200 V AC or 208 V AC, the load should be derated to 80%.

Table 9-2 Power backup specifications

Item	Load	UPS2000-G-1KR TS (min)	UPS2000-G-2KR TS (min)	UPS2000-G-3K RTS (min)
One internal battery string for one UPS	100%	4.0	4.0	4.5
	75%	6.5	6.5	7.3
	50%	12.5	11.5	13.0
	25%	24.5	26.0	29.9
One internal battery string + one external battery pack for one UPS	100%	24	14.0	11.0
	75%	38.5	22.5	17.5
	50%	65	36	28.0
	25%	127.4	85.5	58.8
One internal battery string + two external battery packs for one UPS	100%	N/A	N/A	17.5
	75%	N/A	N/A	28.5
	50%	N/A	N/A	47.0
	25%	N/A	N/A	104.0
One internal battery string + three external battery packs for one UPS	100%	N/A	N/A	27.0
	75%	N/A	N/A	41.5
	50%	N/A	N/A	68.0
	25%	N/A	N/A	141.0

 NOTE

- The battery pack (ESS-24V12-9*3AHBPVBB01) for 1 kVA UPS contain three group battery strings. The battery pack (ESS-48V12-9*2AHBPVBB01) for 2 kVA UPS contain two group battery strings. The battery pack (ESS-72V12-9AHBPVBB01) for 3 kVA UPS only contain one group battery string.
- The 1 kVA UPS is allowed a maximum of one battery pack (ESS-24V12-9*3AHBPVBB01) in parallel. The 2 kVA UPS is allowed a maximum of one battery pack (ESS-48V12-9*2AHBPVBB01) in parallel. The 3 kVA UPS is allowed a maximum of three battery packs (ESS-72V12-9AHBPVBB01) in parallel.

A Acronyms and Abbreviations

C

CE Conformit  Europ  enne

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 Recommend Standard 232

S

SNMP Simple Network Management Protocol

T

THD_v total harmonic distortion of output voltage

U

UPS uninterruptible power system