UPS2000-G-3 kVA

User Manual (CTC)

Issue	**02**
Date	**2019-05-05**

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About This Document

Purpose

This document describes the UPS2000-G-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 C2 (class A). If a C2 (class A) UPS is used in residential areas, additional measures must be taken to prevent radio frequency interferences.

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
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
	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 earlier issues.

Issue 02 (2019-05-05)

Updated the section "Operating Environment."

Issue 01 (2019-03-15)

This issue is the first official release.

Contents

1 Safety Precautions

1.1 General Safety

This section describes safety precautions to consider before installing, maintaining, and operating the UPS.

NOTICE

- To minimize the risk of personal injury and damage to equipment, read and follow all the precautions in this document before performing any operation. The "DANGER", "WARNING", "CAUTION", and "NOTICE" statements in this document are only supplemental and do not represent all the safety instructions.
- Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment.

Follow the precautions and special safety instructions provided by Huawei when operating Huawei products. Huawei will not be liable for any consequences that are caused due to violations regarding general safety regulations and equipment design, production, and usage safety standards.

Declaration

Huawei does not take responsibilities for the following situations:

- Operation under severe environments that are not specified in this document.
- Installation or use in environments that are not specified in related international standards.
- Unauthorized product changes and software code modification.
- Operations not complying with the operation instructions and safety precautions in this document.
- Damage caused by extreme natural environments.
- Damage caused by using batteries provided by Huawei for non-Huawei UPSs.
- Damage caused by using batteries not provided by Huawei.

Power Grid Requirements

A standard UPS can connect to a three-phase, five-wire (L1, L2, L3, N, PE) TT, TN-C, TN-S, and TN-C-S AC power distribution system (IEC60364-1).

Local Laws and Regulations

Equipment operations must comply with local laws and regulations. The safety instructions in this document are only supplemental to local safety regulations.

Personal Requirements

DANGER

Only Huawei engineers or engineers certified by Huawei are allowed to perform UPS commissioning and maintenance. Otherwise, human injury or equipment damage may occur, and any resulting UPS faults will be beyond warranty scope.

Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and master the correct operation methods. Trained and qualified personnel, or personnel certified or authorized by Huawei are:

- Allowed to install, operate, and maintain the equipment.
- Allowed to remove safety facilities and inspect the equipment.
- Allowed to replace or change the devices or components (including software).
- Operation personnel must report faults or errors that might cause serious safety issues to related owners.
- This product should be installed and used according to the installation and technical, specification requirements found in this manual. Otherwise, the product may be damaged, and the resulting product exceptions or component damage will be beyond the warranty scope.

Grounding Requirements

Devices to be grounded (excluding the energy storage unit) must meet the following requirements:

- When installing a device, install the ground cable first. When removing a device, remove the ground cable at the very end.
- Do not damage the ground conductor.
- Do not operate devices if the ground conductor is not installed. Before operating a device, check the electrical connection of the device to ensure that it is securely grounded.

Personal Safety

- Do not operate the product, or handle cables, during thunderstorms.
- To avoid electric shocks, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Before operating a device, wear electrostatic discharge (ESD) clothes, ESD gloves, and an ESD wrist strap. Remove any conductors (such as jewelry or watches) before the operation to avoid electric shocks or burns.

- In the case of fire, leave the building or the equipment room immediately, and turn on the fire alarm bell or make an emergency call. Never enter the building on fire in any case.
- If the cabinet provides an ESD jack, wear an ESD wrist strap and insert the ground terminal of the ESD wrist strap into the jack.
- Ensure all switches are turned to OFF during device installation.
- Power on the UPS only after authorized engineers arrive at the site.
- If a C2 UPS is used in residential areas, additional measures must be taken to prevent radio frequency interferences.
- If the UPS is used for life-supporting medical apparatus and facilities such as lifts where adequate care has to be taken to ensure personal safety, discuss with the manufacturer in advance about the applicability, settings, management, and maintenance of the UPS, which require special considerations during design.

Device Safety

- Before operation, ensure that the device is firmly anchored to the floor or other solid objects, such as a wall or an installation rack.
- Ensure ventilation vents are unblocked while the system is operating.
- Before powering on the device, ensure that all the screws inside it are securely tightened and will not fall off during operation.
- After the installation, remove packing materials from the equipment area.
- Replace danger signs that have worn out or are unreadable.
- A UPS can be used to serve resistive-capacitive loads, resistive loads, and micro-inductive loads. It is recommended that a UPS not be used for pure capacitive loads, pure inductive loads, and half-wave rectification loads. It does not apply to energy feedback loads.
- Do not alter the UPS internal structure or installation procedure unless consent from the manufacturer is given.
- Never use water to clean electrical components inside or outside the UPS.
- Do not drill holes into a cabinet.

1.2 Electrical Safety

High Voltage

DANGER

- The high voltage power supply provides power for the device operation. Direct or indirect contact with high voltage power sources may result in fatal injury.
- Non-standard or incorrect high voltage operations may result in fire and electric shocks.

- The personnel who install the AC facility must be qualified to perform high voltage and AC operations.
- When selecting, connecting, and routing power cables, ensure compliance with local laws and regulations.

- When operating the AC power supply facility, ensure compliance with local laws and regulations.
- Before connecting cables to the UPS, ensure that the input power and mains power distribution switches and output power distribution switch are turned off.
- Use only dedicated tools during high voltage and AC operations.
- If the operation is performed in a damp environment, ensure that the device is dry. When water is found in the rack or the rack is damp, switch off the power supply immediately.

High Leakage Current

DANGER

- Ground a device before powering it on. Otherwise, personal injury or device damage may occur.
- If a "high leakage current" tag is attached to the panel of the device, ground the protective ground terminal on the device enclosure before connecting the AC power supply to prevent electric shocks.
- The UPS can generate high leakage currents. Using a circuit breaker that has the leakage current protection function is not recommended.
- The leakage current of the 3 kVA UPS is less than or equal to 70 mA.
- When selecting the earth leakage circuit breaker (ELCB), consider the leakage current of the UPS and downstream loads.

Power Cable

DANGER

Do not install or remove power cables when the device is on. Transient contact between the core of the power cable and the conductor may generate electric arcs or sparks, which may cause fire or damage eyesight.

- Before moving or reconnecting the UPS, disconnect the mains and batteries, open the output power distribution switch, and wait a period of at least 5 minutes after the UPS completely powers off. Otherwise, electric shocks may occur.
- Before installing or removing the power cable, open the power switch.
- Before connecting a power cable, check that its label is correct.

Fuse

NOTICE

If a fuse needs replacing, ensure the new fuse is of the same type and specifications so that the system runs safely.

Electrostatic Discharge

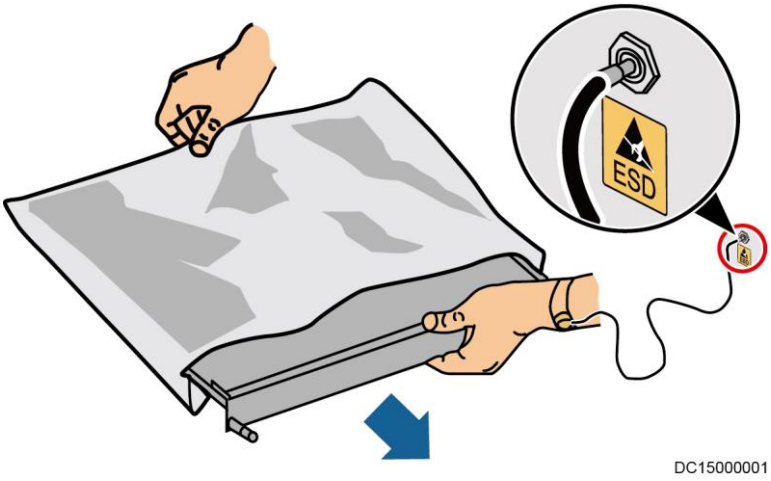
NOTICE

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

- Wear a pair of ESD gloves or a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).
- When holding a board, hold its edge without touching any components, especially chips.
- Package boards with ESD packaging materials before storing or transporting them.

Figure 1-1 shows how to wear an ESD wrist strap.

Figure 1-1 Wearing an ESD wrist strap



Liquid Prevention

- Do not place the product under areas prone to water leakage, such as near air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that there is no condensation inside the product or equipment room. Ensure that no liquid enters the product. Otherwise, short circuits will occur and may result in serious injury or death.
- If any liquid is detected inside the product, immediately disconnect the power supply and contact the administrator.

1.3 Operating Environment

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

The TIER4 or TIER3 power supply architecture specified in TIA942, that is, dual power supply routes, must be used in the power supply systems that are crucial to major economic interests or order of public places, such as the national computing center, military command system, emergency command center, railway signal system and control center, civil aviation

air traffic control center, airport command center, financial clearing center, and transaction center.

Ensure that the product is used in an environment that meets the product design specifications (including power grid, temperature, and humidity) to avoid causing malfunctions, damaging components, or voiding the warranty.

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

NOTICE

- After unpacking the UPS, you are advised to power on the UPS as soon as possible. If you temporarily do not use the UPS, take appropriate measures to prevent moisture, dust, and foreign matter from entering the UPS.
- After unpacking batteries, you are advised to connect the battery supply as soon as possible. If you temporarily do not use the batteries, store them in dry and clean environments. If batteries are stored for more than 90 days, charge them in time. Otherwise, the battery lifespan may be affected.

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.

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

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.

Do not place the UPS in the following environments:

- The environment that is close to flammable or explosive materials, dust, corrosive gases or dust, conductive or magnetic dust, abnormal vibration, or collision.
- Rooms or outdoor environments where temperature and humidity are not controlled (with high temperature, low temperature, moisture, direct sunlight, or heat sources).
- Non-confined environment near the ocean (0–3.7 km) and indoor or semi-indoor environment where the temperature and humidity are not controllable, such as a simple equipment room near the ocean, citizen house, garage, corridor, direct ventilation cabinet, house with only the roof, railway station platform, gymnasium, aquarium, and so on.
- The environment that is conducive for the growth of microorganisms such as fungus or mildew.
- The environment where rodents (such as mice) and insects exist.

1.4 Mechanical Safety

Moving Sharp Objects

⚠ CAUTION

Wear protective gloves when moving sharp objects.

Moving Heavy Objects

⚠ DANGER

- Perform operations in accordance with all instructional symbols on the device.
- Take caution to avoid injury when moving heavy objects.

- When moving or lifting a device, hold the handle or bottom of the device.
- Move the cabinet with caution. Any bumping or falling may damage the device.

Handling Fans

Do not insert fingers or boards into the operating fans until the fans are switched off, and have stopped running.

1.5 Laying Out Cables

Binding Signal Cables

NOTICE

Signal cables must be bound separately from strong-current cables and high-voltage cables.

Laying Out Cables

When the temperature is low, a violent strike or vibrations may damage the cable sheathing. To ensure cable safety, comply with the following requirements:

- Cables can be laid, or installed, only when the temperature is higher than 0°C (32°F). Handle cables with caution, especially at lower temperatures.
- Before laying out cables that have been stored in temperatures lower than 0°C (32°F), move the cables to an environment that is at the requisite ambient temperature. Store them in this environment for at least 24 hours.
- Do not drop the cables directly from the vehicle.

- As the insulation layer of a cable may age, or be damaged from high temperatures, ensure a sufficient distance between cables and the DC busbars, shunts, and fuses. Cables prepared by the customer should be flame resistant. Cables must not be routed behind the air exhaust vent of the cabinet. The air exhaust vent should not be blocked by any object.

Before connecting a cable, ensure that the cable and cable label to be used meet the actual installation requirements.

2 Quick Introduction

2.1 Model Description

Figure 2-1 Model number

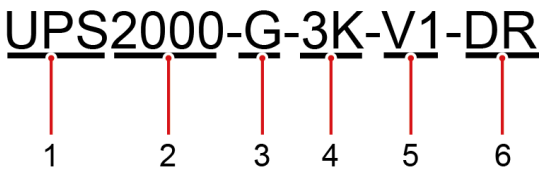


Table 2-1 Model number details

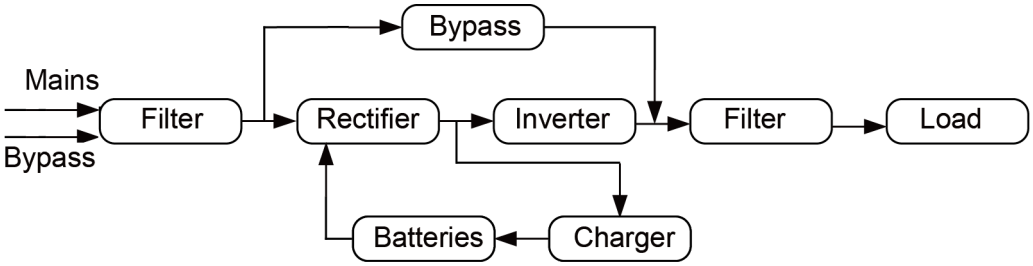
No.	Item	Description
1	Product category	UPS
2	Product family	2000: Power ≤ 20 kVA
3	UPS subcategory	G: series name
4	Output capacity	3K: 3 kVA
5	Input system	V1: 100V
6	Machine type	DR: The standard model is derated.

2.2 Working Principle

2.2.1 Conceptual Diagram

Figure 2-2 shows the UPS conceptual diagram.

Figure 2-2 Conceptual diagram



2.2.2 Working Modes

The UPS has the following working modes:

- Normal mode

  When the mains is normal, the rectifier boosts the mains input voltage and converts the AC power into stable DC power for the inverter, and the mains charges batteries over a charger. Then the inverter converts the DC power into stable AC power, which is supplied to loads.

- Battery mode

  When the mains is abnormal or disconnected, the DC-DC step-up transformer boosts the DC power supplied from batteries. Then the inverter converts the DC power into stable AC power for powering loads.

- Bypass mode

  The mains supplies power directly to loads after filtering. The UPS transfers to bypass mode when overload, overtemperature, or faults occur. This mode does not provide battery backup capability.

- Economy control operation (ECO) mode

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

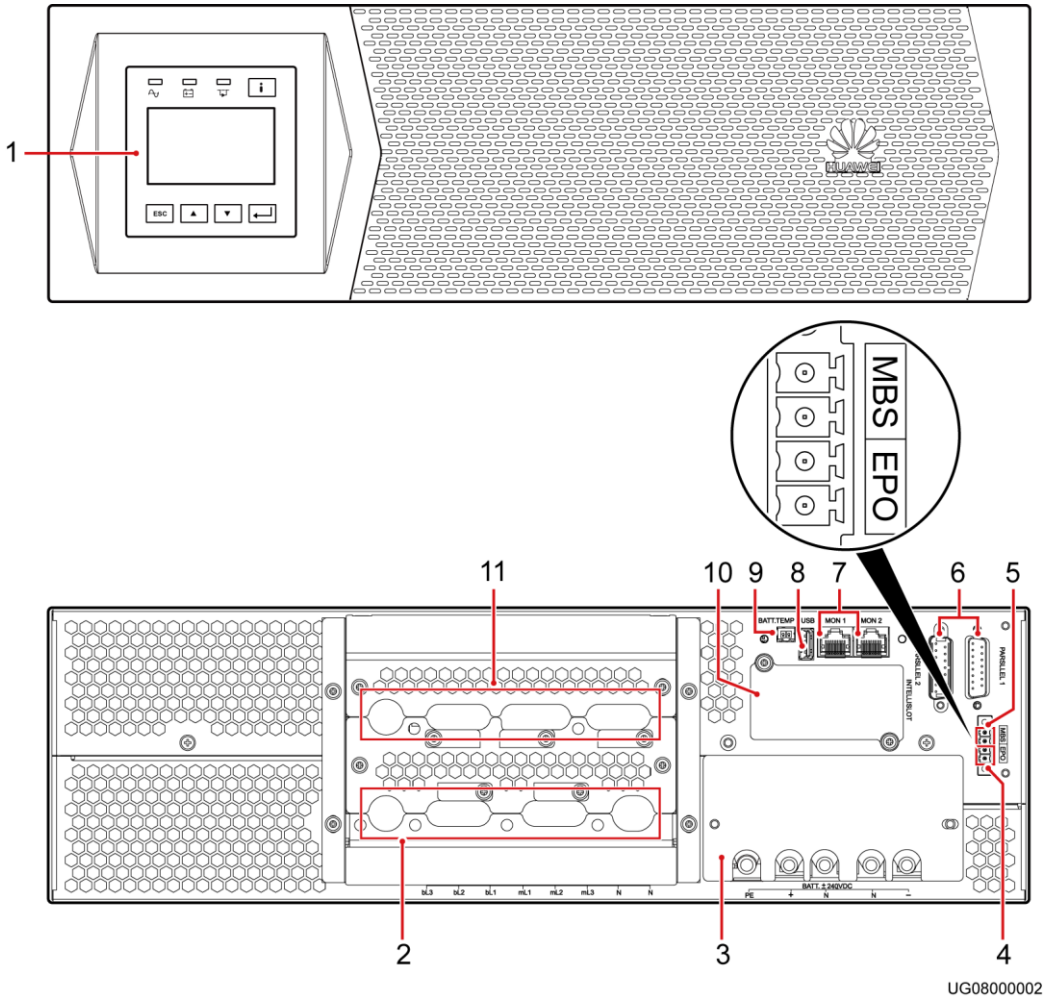
NOTE

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

2.3 Appearance

UPS

Figure 2-3 UPS Front and rear views



(1) Control panel	(2) AC input ports (mains and bypass)	(3) Battery terminals	(4) EPO port
(5) Maintenance bypass port (MBS)	(6) Parallel ports	(7) CAN communications ports (MON1 and MON2)	(8) USB port
(9) Battery temperature sensor port	(10) Optional card slot	(11) AC output ports (pL and sL)	

BoostLi Energy Storage Module

Figure 2-4 ESM panel and ports

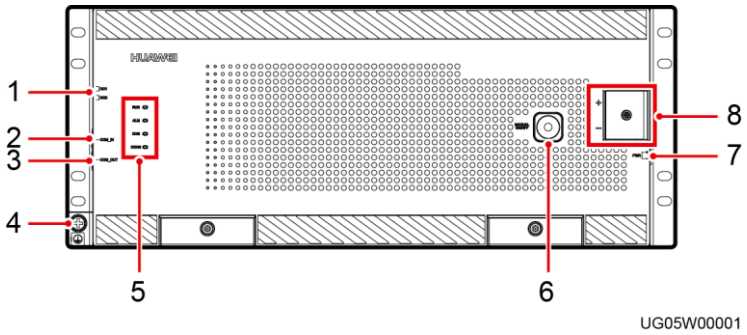


Table 2-2 Panel port definitions

No.	Silk Screen	Name	Description
1	DO1 DO2	ESM dry contact output	Alarm output dry contact, configurable (If the dry contact is closed, an alarm is reported by default).
2	COM_ IN	Communications port	Information reporting and communication cascading The port uses an RJ45 terminal and provides the 1000 A surge protection capability.
3	COM_ OUT	Communications port	
4	GND	Protective ground	M6 screw
5	RUN	Running indicator	For details, see Table 2-5.
	ALM	Alarm indicator	
	CHG	Charge indicator	
	DCHG	Discharge indicator	
6	MANUAL ON/OFF	Button for manual power-on/off	This is a contact button used for manual power-on/off and maintenance.
7	PWR	ESMU port for connecting to an external power source	The ESM can be activated if the PWR port is supplied with a voltage of 43.2–58 V.
8	+	ESM positive terminal	Positive and negative ports of the ESM. They are secured by M6 screws. Appropriate OT terminals should be used. Required torque: 4 N·m; recommended cable size: ≥ 16 mm^2. If the ESM is used at a temperature below 45°C, the cable size can be smaller but should be at least 10 mm^2.
	-	ESM negative terminal	

Figure 2-5 RJ45 pins

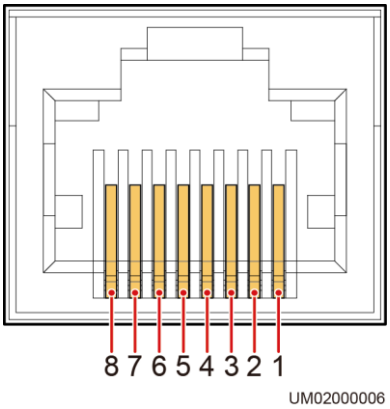


Table 2-3 Communications port pin definitions

RJ45 Pin	Signal	Meaning	Description
1	RS485 T+	RS485 transmit +	4-wire RS485 communication, complying with the Modbus protocol
2	RS485 T-	RS485 transmit –	
3	NC	Reserved	
4	RS485 R+	RS485 receive +	
5	RS485 R-	RS485 reception –	
6	NC	Reserved	N/A
7	CANH	Positive terminal for CAN communication	Used to report alarms to a monitoring unit and exchange data between ESMs connected in parallel.
8	CANL	Negative terminal for CAN communication	

Table 2-4 DO1 and DO2 port definitions

Silk Screen	Definition	Description	Alarm Status
DO1	Fault, major alarm	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Cell voltage sampling fault, cell temperature sampling fault, charge converter output short circuit, relay coil short circuit, charge low temperature protection, discharge low temperature protection, charge high temperature protection, discharge high temperature protection, power module internal overtemperature protection, discharge converter output short circuit, input reverse connection, BMU anti-theft lock, overload lockout due to component failure, serial number conflict, input/output discharge	Configurable (If the dry contact is closed, an alarm is reported by default.)

Silk Screen	Definition	Description	Alarm Status
		overvoltage lockout, discharge overcurrent lockout, discharge overcurrent protection, and cell 1–*N* fault alarm	
DO2	Overload warning, overdischarge protection, overdischarge	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Discharge undervoltage alarm, discharge undervoltage protection, discharge due to single-ESM cell low voltage disconnection, and heavy load warning	

Table 2-5 Indicator description

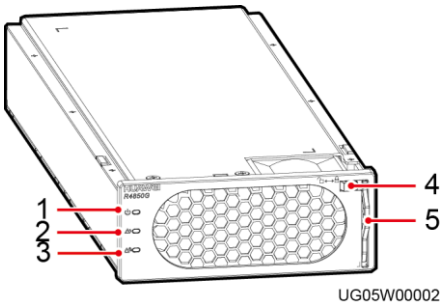
Silk Screen	Indicator	Color	Status	Description
RUN	Running indicator	Green	Steady on	Communication is normal (including board startup, self-check, software loading, and board power-on when not loaded; excluding sleep when the power port or PWR port is energized).
			Off	The ESM is in sleep mode.
			Blinking at 0.5 Hz	The LCD user interface (LUI) is querying data.
			Blinking at 4 Hz	Communication is disconnected.
ALM	Fault indicator	Red	Steady on	There is a fault or major alarm.
			Off	There is no fault or major alarm.
CHG	Charge indicator	Green	Steady on	The ESM is being charged.
			Off	The ESM is open-circuited or discharging.
DCHG	Discharge indicator	Green	Steady on	The ESM is discharging.
			Off	The ESM is open-circuited or being charged.

NOTE

- Major alarm: The ESM needs to be maintained immediately.
- Minor alarm: The ESM does not require maintenance, but sends a reminder to remote maintenance personnel.
- Blinking at long intervals: on for 1s and then off for 1s
- Blinking at short intervals: on for 0.125s and then off for 0.125s
- All indicators are blinking: The ESM has entered the maintenance mode.
- When the ESM is in sleep mode, the fault indicator is off except for reverse-connection protection.

Rectifier

Figure 2-6 Rectifier in the PDU



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) Locking latch (5) Handle

Table 2-6 Indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The rectifier has an AC power input.
		Off	The rectifier has no AC power input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4 Hz	The rectifier is loading an application program.
Alarm indicator	Yellow	Steady on	• The rectifier generates an alarm for power limiting due to ambient overtemperature. • The rectifier generates an alarm for shutdown due to ambient overtemperature or undertemperature. • The rectifier shuts down due to overcharge. • The rectifier shuts down due to system current limiting.
			The rectifier protects against AC input overvoltage or undervoltage.
			The rectifier is hibernating.
		Off	No alarm is generated.
		Blinking at 0.5 Hz	The communication between the rectifier and the external equipment is interrupted.
Fault indicator	Red	Steady on	The rectifier locks out due to output overvoltage.
			The rectifier has no output due to an internal fault.

Indicator	Color	Status	Description
		Off	The rectifier is running properly.

2.4 Optional Components

Table 2-7 Optional components

Component	Model	Function	Remarks
Dry contact card	RMS-RELAY01A	Provides six alarm dry contact outputs (normal mode, battery mode, bypass mode, low battery voltage, bypass backfeed, and UPS faults) and two dry contract control inputs (one is the shutdown signal input, and the other is reserved).	N/A

3 Installation

3.1 Preparations

3.1.1 Site

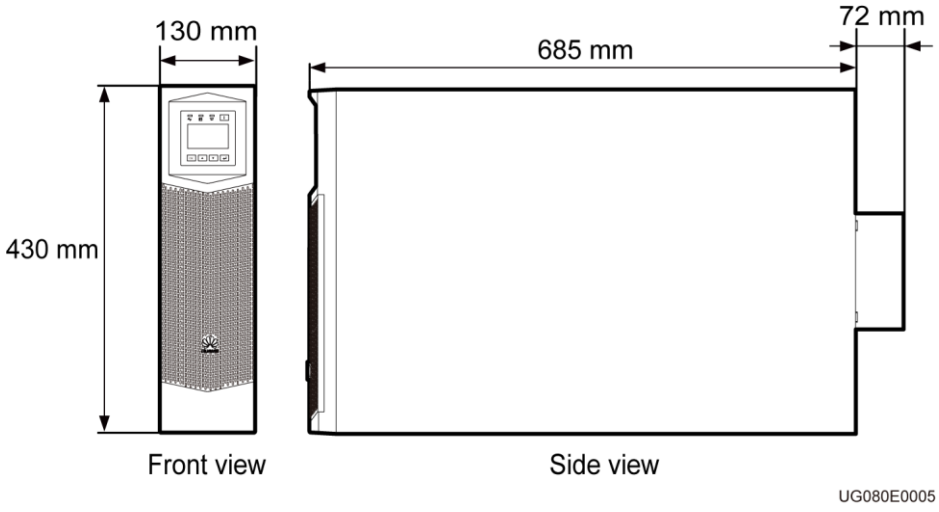
Floor Bearing

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

Environment

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

Installation dimensions



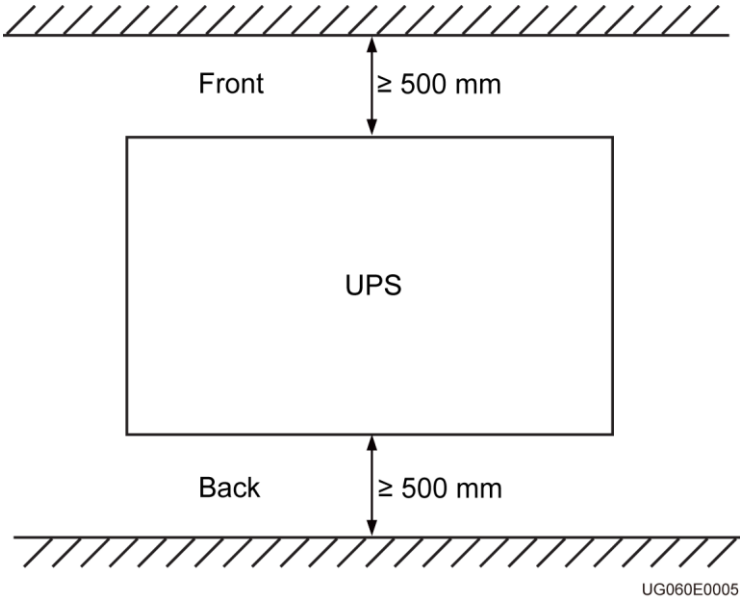
Clearances

NOTICE

The distance between UPS air vents and the wall or obstacle is greater than or equal to 500 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.

Figure 3-1 Reserved clearances



3.1.2 Tools

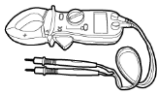
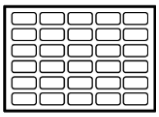
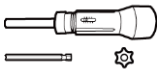
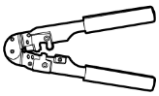
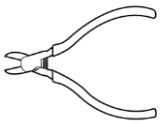
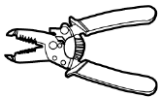
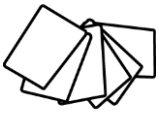
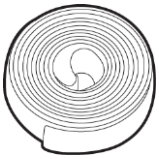
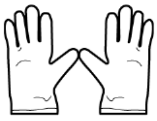
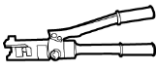
NOTICE

Get installation tools insulated to prevent electric shocks.

Table 3-1 lists the installation tools.

Table 3-1 Tools

Tools			
Clamp meter	Multimeter	Label	Phillips screwdriver (PH 2 x 150 mm or PH 3 x 250 mm)

Tools			
			
Flat-head screwdriver (2 mm x 80 mm)	Torque screwdriver	Crimping tool	Diagonal pliers
			
Wire stripper	Polyvinyl chloride (PVC) insulation tape	Cotton cloth	Brush
			
Heat shrink tubing	Heat gun	Electrician's knife	Protective gloves
			
ESD gloves	Insulated gloves	Hydraulic pliers	Cable tie
			

3.1.3 Power Cables

NOTICE

- The UPS is a large leakage current device. Do not configure a circuit breaker that has the leakage current protection function. If you need leakage current protection function, use the earth leakage circuit breaker recommended.
- The battery cable cannot be longer than 10 m.

Table 3-2 Recommended power cable specifications

Type	Cross-sectional Area	Terminal Type	Torque for Tightening Bolts
PDU AC input power cable (L/N/PE)	25 mm^2	25 mm^2 M6 OT terminal	4.8 N·m
PDU AC output power cable (L/N/PE)	6 mm^2	6 mm^2 M4 OT terminal	2.8 N·m
UPS output power cable (sL/N/PE)	6 mm^2	OT-6 mm^2-M4 terminal/OT-6 mm^2-M6 terminal/OT-6 mm^2-M6 90° terminal	2.8 N·m
UPS input power cable (L/N/PE)	6 mm^2	OT-6 mm^2-M4 terminal/6 mm^2 M6 OT terminal	2.8 N·m
UPS battery cable (+, N, N, –, PE)	6 mm^2	OT-6 mm^2-M6 terminal /OT-6 mm^2-M6 90° terminal /OT-16 mm^2-M6 terminal	2.8 N·m
Battery cable (+, –)	6 mm^2	OT-6 mm^2-M6 terminal /OT-6 mm^2-M4 terminal	2.8 N·m
UPS CAN communications cable	Ethernet cable	RJ45 terminal	-
Battery CAN communications cable	Ethernet cable	RJ45 terminal	-
PDU PE	25 mm^2	25 mm2 M6 OT terminal	4.8 N·m
Battery PE	6 mm^2	6 mm2 M6 OT terminal	4.8 N·m

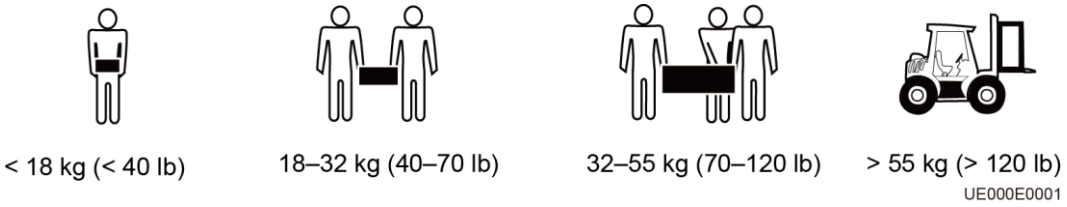
NOTE

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

3.1.4 Unpacking and Checking

Figure 3-2 shows the transportation safety requirements.

Figure 3-2 Transportation safety requirements



NOTICE

- Only trained personnel are allowed to move the UPS.
- Do not move the UPS by holding its mounting ears, front panel, terminal cover, or monitoring module.
- At least two persons are required to move the battery pack and transformer because they are heavy. Exercise caution when moving them. Prevent the battery pack from falling over; otherwise, fire accidents may occur. Remove rings, watches, and other metal objects when you move the battery pack.
- To prevent shocks or falls, move the UPS gently. After placing the UPS in the installation position, unpack it carefully to prevent scratches.

Procedure

Step 1 Visually inspect the UPS appearance for shipping damage. If any shipping damage is found, report it to the carrier immediately.

Step 2 Move the UPS to the installation position.

Step 3 Unpack the case.

Step 4 Check the UPS packing.

1. Check the UPS bar code (which is at the rear panel of the UPS, near the air exhaust vent), and ensure that it complies with the order.
2. If there is any discrepancy, contact your local Huawei office immediately.

----End

3.2 Installation Procedure

For details, see the *UPS2000-G-3 kVA Quick Guide (CTC)*.

3.3 Installing a Backfeed Protection Device

3.3.1 Backfeed Protection Device Specifications

NOTICE

The UPS has no built-in backfeed protection device. You can install a backfeed protection device on the input front side.

If you do no install a backfeed protection device on the input front side, attach a warning label to the main power isolation device. The label reads like this: "This circuit supplies power to the UPS. Before cable connection, disconnect the UPS, and check the voltage across wiring terminals."

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

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

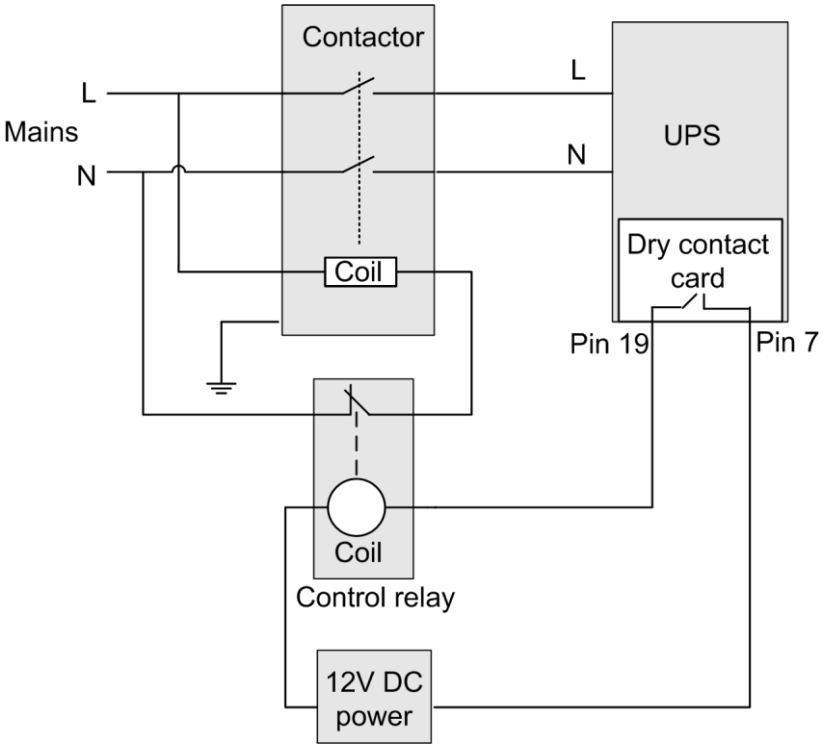
Model	Rated Voltage and Current	Recommended Contactor Models (Schneider contactors)
UPS2000-G-3K-V1-DR	100/110/120 V AC, 65 A	LC1-D50A for single-phase input

Table 3-4 Control relay parameters

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

3.3.2 Feedback Prevention Connections (With Dry Contract Control)

Figure 3-3 Bypass backfeed protection connections



3.4 Check After Installation

Table 3-5 lists the check items.

Table 3-5 Post-installation check items

No.	Item	Expected Result
1	Cable routing	Cable routing meets engineering requirements.
2	Cable connections	Input cables, output 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	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

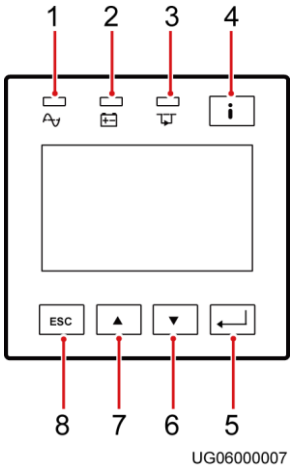
No.	Item	Expected Result
		resistance between the UPS ground cable and the equipment room ground bar, which must be less than 0.1 ohm.
6	Distances between cable ties	Distances between cable ties are the same, and no burr exists.
7	Operating environment	Clean the conductive air and other sundries.

4 Control Panel

4.1 Introduction

The control panel, located on the front panel of the UPS, controls UPS running, displays running data, and allows you to set parameters and view alarms. Figure 4-1 shows the control panel.

Figure 4-1 Control panel



(1) Mains indicator	(2) Battery indicator	(3) Bypass indicator	(4) Fault indicator/INFO button
(5) Startup/Enter/Battery Self-Check/Mute button	(6) Down button	(7) Up button	(8) Shutdown/Back button

4.2 Indicators

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

Table 4-1 Indicator description

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

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

4.3 Functional Buttons

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

Table 4-2 Button description

Button	Meaning	Description
ESC	Shutdown/Back	• On the default screen, press ESC for more than 5 seconds. Release the button when you hear a beep sound. The inverter shuts down. • On any other screen, press ESC to return to the upper-level menu (the default screen is the upper-level screen for the main menu screen).
▲	Up	Press ▲ or ▼ to scroll upward or downward. You can set a value by using the list or step increase or decrease.
▼	Down	
↵	Enter/Startup/Battery Self-Check/Mute	• On the default screen in bypass mode, hold down ↵ for more than 5 seconds. Release the button when you hear a beep sound. The UPS starts.

Button	Meaning	Description
		• On the default screen, press ↵. The main menu is displayed. • On any menu screen, press ↵. The lower-level menu is displayed. If the menu is the last level, an information screen is displayed. • On the default screen in normal mode, hold down ↵ for more than 5 seconds. Release the button when you hear a beep sound. The battery test starts. • When the buzzer buzzes, hold down ↵ for 2–5 seconds. The buzzer is muted when you release the button.
i	Fault indicator/INFO button	• When an alarm is generated, press i to view the active alarm information. • When no alarm is generated, press i to return to the default screen.

NOTE

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

4.4 LCD

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

4.5 LCD Startup Screens

Table 4-3 Symbol conventions

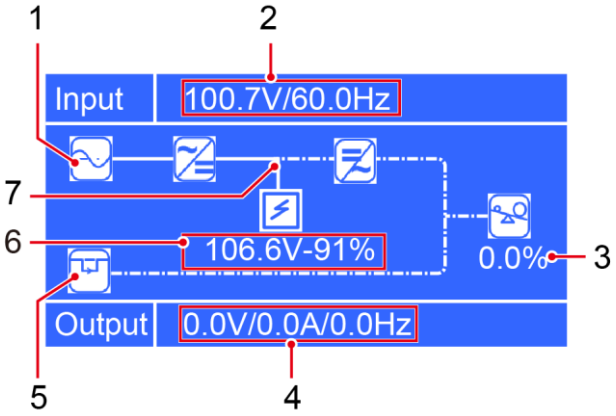
Symbol	Description
A →	Press A.
A → B	Press B after you press A.
– – – ►	Indicates omitted screens.

NOTE
The symbol conventions apply to all chapters in this document.

NOTICE

The LCD figures in this document correspond to V200R001C91SPC070. The LCD updated without notice. If the LCD is updated, contact Huawei for the latest LCD figures.

Figure 4-2 Description of the startup screen



(1) Normal mode (The solid line indicates normal mode. The dotted line indicates non-normal mode.)

(2) Input voltage and frequency

(3) Load power

(4) Output voltage, current, and frequency

(5) Bypass mode (The solid line indicates bypass mode. The dotted line indicates non-bypass mode.)

(6) Battery voltage and capacity displayed during charge; Battery discharge time and capacity displayed during discharge.

(7) Battery mode (The solid line indicates battery in charge or discharge mode. The dotted line indicates non-battery mode.)

Table 4-4 Icons on the screen

Icon	Meaning	Icon	Meaning
	Mains input		Rectifier/Power factor correction (PFC) working
	Inverter working		Bypass mode

Icon	Meaning	Icon	Meaning
	Load power		Battery charging
	Battery discharging	N/A	N/A

4.6 LCD Menu Hierarchy

Figure 4-3 Main Menu screen

Table 4-5 LCD menu hierarchy

Main Menu	Second-Level Menu	Third-Level Menu
Status	Mains Input	N/A
	Bypass Input	N/A
	Battery Status	N/A
	Inverter Output	N/A
	UPS Output	N/A
	Local-UPS Load	N/A
	Parallel-System Load	N/A
	Environment Monitoring	N/A
	Runtime	N/A
Alarms	Active Alarms	N/A
	Historical Alarms	N/A
	Sort Alarms	N/A

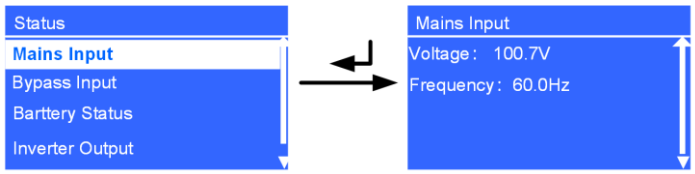
Main Menu	Second-Level Menu	Third-Level Menu
	Clear Alarms	N/A
Settings	Basic Settings	Language
		Change Password
		Change Feature Code
	Communication Card	N/A
	System Parameters	Parallel
		Output
		Bypass
		ECO
		Self-Load
		Others
	Battery Parameters	N/A
	Settings wizard	Language
		System Parameters
		Battery Parameters
	Restore Default Settings	N/A
Control	Startup	N/A
	Shutdown	N/A
	Replace Batteries	N/A
	Maintain Batteries	N/A
	Sync Paral. Param.	N/A
	Reset Password	N/A
About	Model	N/A
	ESN	N/A
	Version	N/A

4.6.1 Status Screen

On the **Main Menu** screen, select **Status**, and press ↵. The **Status** screen is displayed.

Mains Input Screen

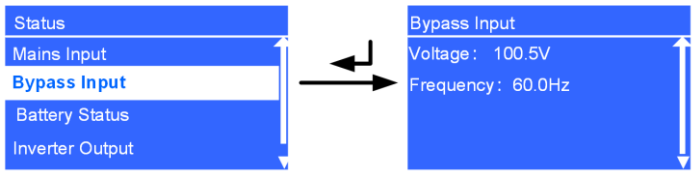
Figure 4-4 Mains Input screen



- **Voltage** parameter
  Voltage displayed on the **Mains Input** screen.
- **Frequency** parameter
  Frequency displayed on the **Mains Input** screen.

Bypass Input Screen

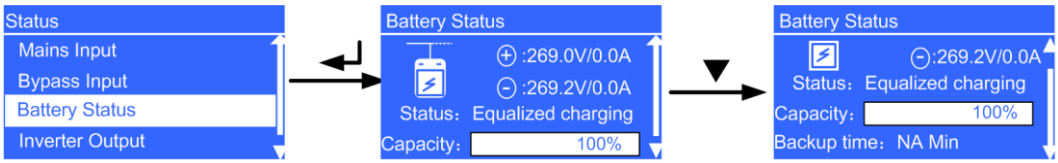
Figure 4-5 Bypass Input screen



- **Voltage** parameter
  Voltage displayed on the **Bypass Input** screen.
- **Frequency** parameter
  Frequency displayed on the **Bypass Input** screen.

Battery Status Screen

Figure 4-6 Battery Status screen



- **Battery voltage** parameter
  Battery string voltage
- **Battery current** parameter
  Battery string current. + is displayed during battery charge, and – is displayed during battery discharge.
- **Status** parameter

The battery status is **NA** (battery not connected or reversely connected), **Equalized charging**, **Float charging**, **Hibernating**, or **Discharging**.

- **Capacity** parameter

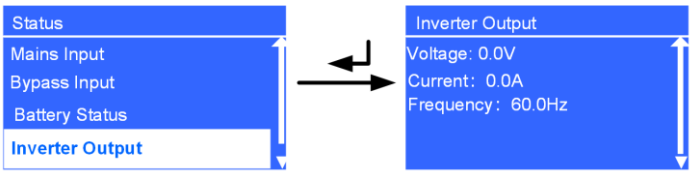
  Remaining battery capacity

- **Backup time** parameter

  Estimated backup time. The value is **NA** during battery charge.

Inverter Output Screen

Figure 4-7 Inverter Output screen



- **Voltage** parameter

  Voltage displayed on the **Inverter Output** screen.

- **Current** parameter

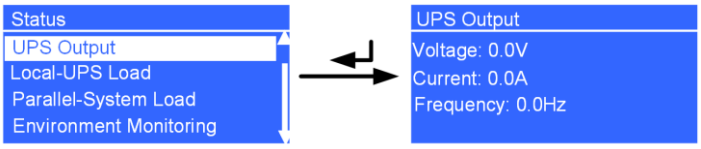
  Current displayed on the **Inverter Output** screen.

- **Frequency** parameter

  Frequency displayed on the **Inverter Output** screen.

UPS Output Screen

Figure 4-8 UPS Output screen



- **Voltage** parameter

  Voltage on the **UPS Output** screen.

- **Current** parameter

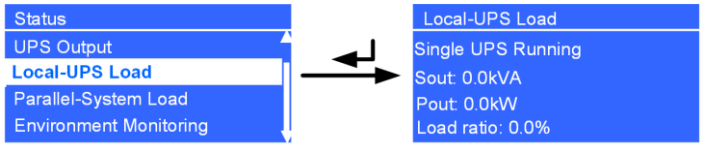
  Current displayed on the **UPS Output** screen

- **Frequency** parameter

  Frequency on displayed the **UPS Output** screen.

Local-UPS Load Screen

Figure 4-9 Local-UPS Load screen



- **Single UPS Running** screen

  A single UPS is running.
- **Sout** parameter

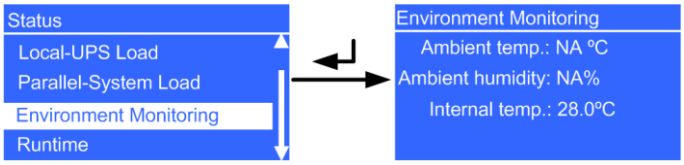
  Sout displayed on the **Local-UPS Load** screen.
- **Pout** parameter

  Pout displayed on the **Local-UPS Load** screen.
- **Load ratio** parameter

  Load ratio displayed on the **Local-UPS Load** screen.

Environment Monitoring Screen

Figure 4-10 Environment Monitoring screen



- **Ambient temp.** parameter

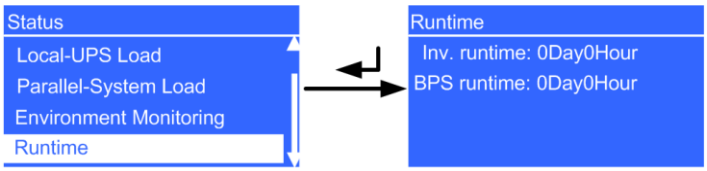
  Temperature detected by the ambient temperature and humidity sensor (used together with an SNMP card; if the sensor is not connected, **NA** is displayed.)
- **Ambient humidity** parameter

  Temperature and humidity sensor humidity (Install an SNMP card and a temperature and humidity sensor; if they are not installed, NA is displayed.)
- **Internal temp.** parameter

  Temperature in the UPS cabinet

Runtime Screen

Figure 4-11 Runtime screen



- **Inv. runtime** parameter

  Time during which the UPS runs in inverter output state
- **BPS runtime** parameter

  UPS bypass running duration

4.6.2 Alarms Screen

On the **Main Menu** screen, select **Alarms**, and press ↵. The **Alarms** screen is displayed.

NOTE

When the buzzer buzzes, hold down ↵ for 2–5 seconds to mute it. The buzzer is muted when you release the button. When the buzzer is mute, it can not be buzzes again, until a new alarm is generated.

Active Alarms Screen

The **Active Alarms** screen displays the active alarm information, such as the alarm serial number, severity, ID, and name.

Figure 4-12 Active Alarms screen

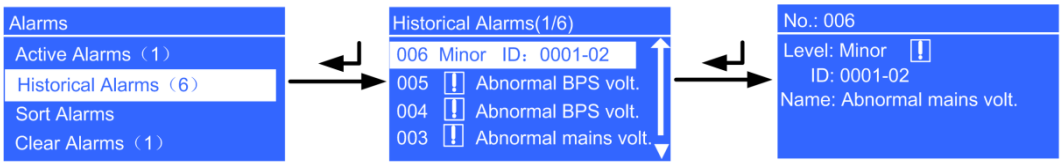
NOTE

If an alarm is generated, press the INFO button on the default screen. On the **Active Alarms** screen, view the active alarms.

Historical Alarms Screen

The **Historical Alarms** screen displays the historical alarm information, such as the alarm serial number, severity, ID, and name.

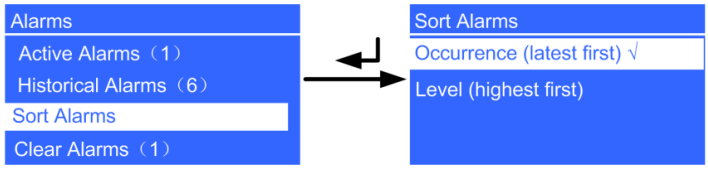
Figure 4-13 Historical Alarms screen



Sort Alarms Screen

The **Sort Alarms** screen allows you to view alarms by occurrence time or severity.

Figure 4-14 Sort Alarms screen



- **Occurrence (latest first)** parameter

  Alarms are sorted by occurrence time. The latest alarms are listed first.
- **Level (highest first)** parameter

  Active alarms are displayed by severity. The most critical alarms are listed first.

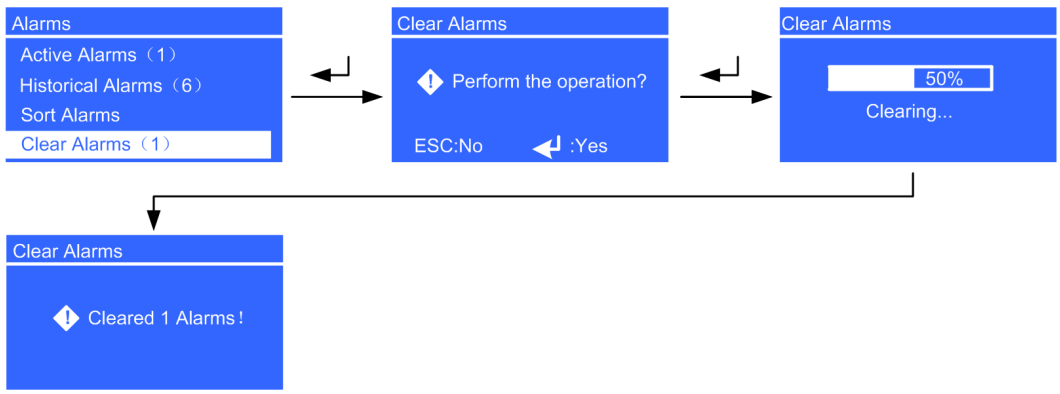
NOTE

√ is displayed next to a selected **Sort Alarms**.

Clear Alarms Screen

Clear the alarms that you can clear manually.

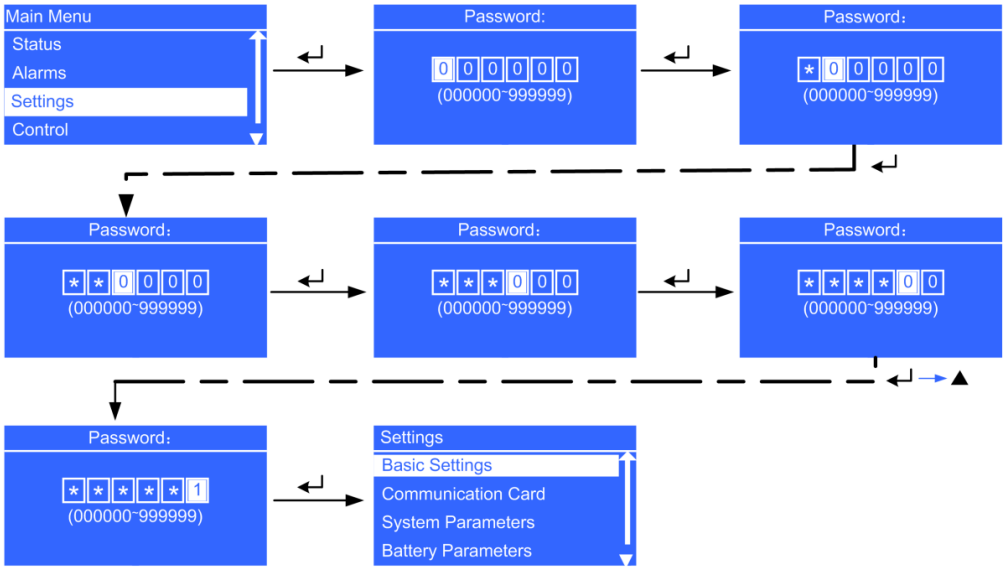
Figure 4-15 Clear Alarms screen



4.6.3 Settings Screen

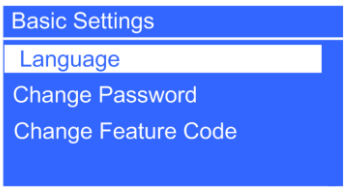
On the **Main Menu** screen, select **Settings**, and press ↵. The Settings login screen is displayed. The preset password is **000001**. After you enter a password, press ↵.

Figure 4-16 Settings screen



Basic Settings Screen

Figure 4-17 Basic Settings screen



- **Language** parameter

  You can select **Chinese**, **English** (preset), **Turkish**, **French**, and **Russian**.
- **Change Password** parameter

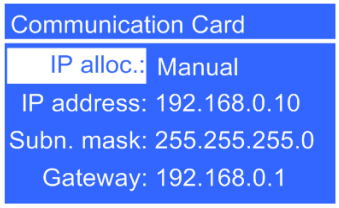
  You can change the password by choosing **Settings** > **Basic Settings** > **Change Password**. The preset password is **000001**. The password allows you to enter the **Settings** screen.
- **Change Feature Code** parameter

  You can change the feature code by choosing **Settings** > **Basic Settings** > **Change Feature Code**. The preset feature code is **999999**. The feature code is used to restore the preset password.

Communication Card Screen

1. If an SNMP card is connected, set the following parameters:

Figure 4-18 SNMP card settings



- **IP alloc.** parameter

  Specifies the DHCP address allocating mode. The options include **Manual** and **Automatic**. The default value is **Manual**. After the allocating mode is set to **Automatic**, an **Allocating** dialog box is displayed on the screen. If allocation succeeds, the new IP address is displayed. If allocation fails, the IP address restores to the default one: 192.168.0.10. If the allocating mode is set to **Automatic**, you can only query the IP address but cannot set the IP address manually.

NOTE

If the UPS monitor does not support the DHCP function, after the DHCP is selected for the SNMP card, you cannot set the IP address of the SNMP card on the UPS monitor. You are advised to update the version of the UPS monitor.

- **IP address** parameter

  Set an IP address for the SNMP card. The value ranges from **1.0.0.0** to **223.255.255.255**. The default value is **192.168.0.10**.

- **Subn. mask** parameter

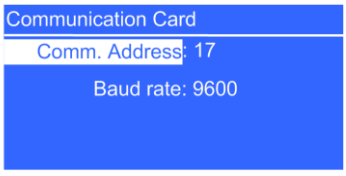
  Set a subnet mask for the SNMP card. The value ranges from **0.0.0.0** to **255.255.255.255**. The default value is **255.255.255.0**.

- **Gateway** parameter

  Set a gateway address for the SNMP card. The value ranges from **1.0.0.0** to **223.255.255.255**. The default value is **192.168.0.1**.

2. If a Modbus card is connected, the following parameters are displayed:

Figure 4-19 Modbus card settings



- **Comm. address** parameter

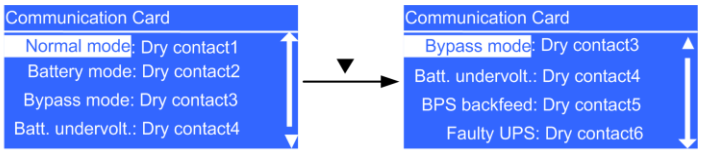
  Set a communications address for the Modbus card over the dual in-line package (DIP) switch on the Modbus card. The value cannot be changed on the LCD.

- **Baud rate** parameter

  Set a baud rate for the Modbus card over the DIP switch on the Modbus card. The value cannot be changed on the LCD.

3. If a dry contact card is connected, set the following parameters:

Figure 4-20 Dry contact card settings



NOTE

Multiple statuses can be associated with one dry contact, but one status cannot be associated with multiple dry contacts.

- **Normal mode** parameter

  Set the output dry contact associated with normal mode. When the UPS is in normal or ECO mode, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact1**.

- **Battery mode** parameter

  Set the output dry contact associated with battery mode. When the UPS is in battery or ECO mode, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact2**.

- **Bypass mode** parameter

  Set the output dry contact associated with bypass mode. When the UPS is in bypass or ECO mode, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact3**.

- **Batt. undervolt** parameter

  Set the output dry contact associated with low battery voltages. When the system battery voltage is low, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact4**.

- **BPS backfeed** parameter

  Set the output dry contact associated with bypass backfeed. When a bypass backfeed alarm is generated, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact5**.

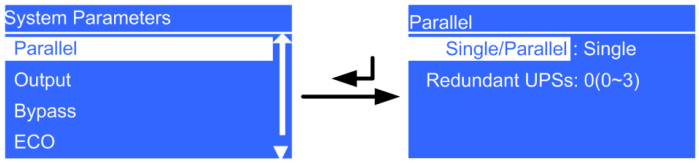
- **Faulty UPS** parameter

  Set the output dry contact associated with UPS faults. When a critical alarm is generated, this dry contact is enabled. The value ranges from **Dry contact1** to **Dry contact6**. The default value is **Dry contact6**.

System Parameters Screen

- **Parallel** screen

Figure 4-21 Parallel screen



- **Single/Parallel** parameter

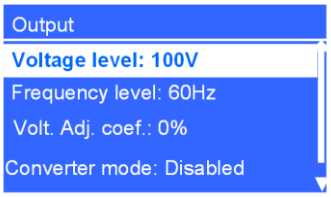
  The values include **Single** and **Parallel**. The default value is **Single**. The parameter is configurable after the inverter shuts down.

- **Redundant UPSs** parameter

  Set the number of redundant UPSs. The value ranges from 0 to 3. The default value is 0. The parameter is configurable after the inverter shuts down.

- **Output** screen

Figure 4-22 Output screen



- **Voltage level** parameter

  Set the system output voltage level. The values include 100 V (default), 110 V, and 120 V for single-phase output. Set it based on site requirements. The parameter is configurable after the inverter shuts down.

- **Frequency level** parameter

  Set the system output frequency level. The values include 50 Hz, 60 Hz (default), and **Automatic**. If the value is **Automatic**, the power-on bypass frequency ranges from 40 Hz to 55 Hz, and the system output frequency is 50 Hz; if the power-on bypass frequency ranges from 55 Hz to 70 Hz (excluding 55 Hz), and the system output frequency is 60 Hz. The parameter is configurable after the inverter shuts down.

- **Volt. adj. coef.** parameter

  You can adjust the inverter rated output voltage. The values include ±5%, ±4%, ±3%, ±2%, ±1%, and 0% (default). Press + or – to increase or decrease the output voltage. The parameter is configurable after the inverter shuts down.

NOTICE

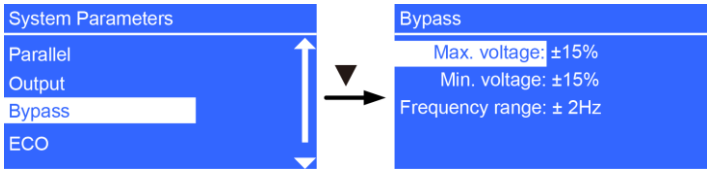
If you set **Converter mode** to **Enabled**, the UPS cannot transfer to bypass mode or maintenance bypass mode. If you shut down the inverter, the loads power off.

- **Converter mode** parameter

  Determine whether to enable inverter mode. The values include **Disabled** and **Enabled**. The default value is **Disabled**. In converter mode, the output voltage and frequency are fixed at the specified values. The parameter is configurable after the inverter shuts down.

- **Bypass** screen

Figure 4-23 Bypass screen



- **Max. voltage** parameter

  Upper threshold for the bypass voltage. If the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable.

  The **Max. voltage** parameter is associated with the system voltage level. The default value is 15%.

  If the voltage system is 100 V, the values include 10%, 15%, 20%, 25%, 30%, and 35%.

  If the voltage system is 110 V, the values include 10%, 15%, 20%, and 25%.

  If the voltage system is 120 V, the values include 10% and 15%.

  The parameter is configurable after the inverter shuts down.

- **Min. voltage** parameter

  Lower threshold for the bypass voltage. If the difference between the bypass voltage and the rated output voltage exceeds this value, the system determines that the bypass voltage is abnormal and that the bypass is unavailable.

  The **Min. voltage** parameter is associated with the system voltage level. The default value is 15%.

  If the voltage system is 100 V, the values include 10% and 15%.

  If the voltage system is 110 V, the values include 10%, 15%, and 20%.

  If the voltage system is 120 V, the values include 10%, 15%, 20%, and 25%.

  The parameter is configurable after the inverter shuts down.

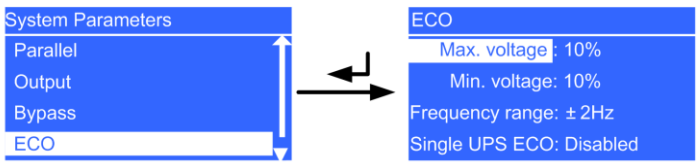
- **Frequency range** parameter

  Bypass frequency range. When the difference between the bypass input frequency and the rated frequency is greater than this value, the system determines that the bypass frequency is abnormal and that the bypass is unavailable.

  The frequency range must be greater than the ECO frequency range. The values include ±0.5 Hz, ±1 Hz, ±2 Hz (default), ±3 Hz, ±4 Hz, ±5 Hz, and ±6 Hz. The parameter is configurable after the inverter shuts down.

- **ECO** screen

Figure 4-24 ECO screen



NOTE

You can use the ECO function only if power grid conditions are good and the voltage and frequency fluctuation is within the specified ECO voltage and frequency range.

- **Max. voltage** parameter

  Upper threshold for the ECO voltage. In ECO mode, when the difference between the bypass voltage and the rated voltage is greater than this value, the system determines that the ECO voltage is abnormal and transfers to normal mode. The values include 5%, 6%, 7%, 8%, 9%, and 10% (default). The parameter is configurable after the inverter shuts down.

- **Min. voltage** parameter

  Lower threshold for the ECO voltage. In ECO mode, when the difference between the bypass voltage and the rated voltage is greater than this value, the system determines that the ECO voltage is abnormal and transfers to normal mode. The values include 5%, 6%, 7%, 8%, 9%, and 10% (default). The parameter is configurable after the inverter shuts down.

- **Frequency range** parameter

  ECO frequency range. In ECO mode, when the difference between the bypass frequency and the rated frequency is greater than this range, the system determines that the ECO frequency is abnormal and transfers to normal mode.

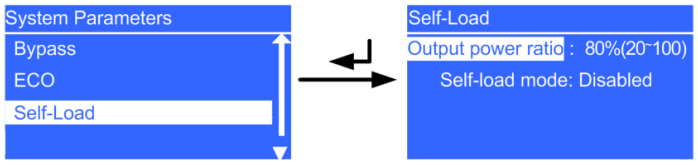
  The frequency range must be less than the current bypass frequency range. The values include ±0.5 Hz, ±1 Hz, ±2 Hz (default), and ±3 Hz. The parameter is configurable after the inverter shuts down.

- **Single UPS ECO** parameter

  Determine whether to support ECO mode on a single UPS (ECO mode is not supported in a parallel system). The values include **Disabled** and **Enabled**. The default value is **Disabled**. The parameter is configurable after the inverter shuts down.

- **Self-Load** screen

Figure 4-25 Self-Load screen



- **Output power ratio** parameter

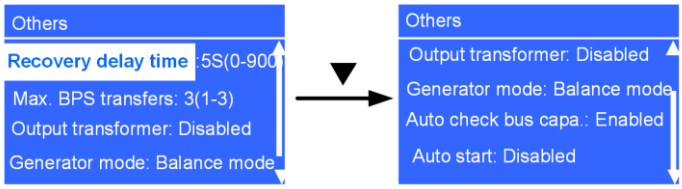
  This parameter is used during the tests before shipment. The value ranges from 20% to 100%. The default value is 80%. The parameter is configurable after the inverter shuts down.

- **Self-load mode** parameter

  This parameter is used during the tests before shipment. The values include **Disabled** and **Enabled**. The default value is **Disabled**. The parameter is configurable after the inverter shuts down.

- **Others** screen

Figure 4-26 Others screen



- **Recovery delay time** parameter

  Delay time that the UPS takes in transferring from battery mode to normal mode when the mains recovers. The value ranges from **0S** to **900S**. The default value is **5S**. The parameter is configurable after the inverter shuts down.

NOTE

If **Recovery delay time** is set to **0S**, the actual recovery delay time is 1 second.

- **Max. BPS transfers** parameter

  Maximum number of bypass transfers within 30 minutes. The value ranges from 1 to 3. The default value is 3. When the number of bypass transfers exceeds the maximum, the UPS keeps running is bypass mode (in ECO mode, the UPS keeps running in normal mode). The parameter is configurable after the inverter shuts down.

NOTICE

Do not set the UPS to ECO mode when the system output connects to an isolated transformer.

- **Output transformer** parameter

  If an output transformer is connected, set the parameter to **Enabled**; otherwise, set it to **Disabled**. The values include **Disabled** and **Enabled**. The default value is **Disabled**. The parameter is configurable after the inverter shuts down.

NOTE

When you install a transformer on the output side, you must connect the load to the pL terminal and disable power segment.

- **Generator mode** parameter

  The values include **Weak adaptability mode**, **Balance mode**, and **Strong adaptability mode**. The default value is **Balance mode**. When the mains input voltage quality is good, select **Weak adaptability mode**; when the quality is average (for example, the mains input is from a high-performance generator or a common power grid), select **Balance mode**; when the quality is poor (for example, the mains input is from a common generator), select **Strong adaptability mode**. The parameter is configurable after the inverter shuts down.

- **Auto check bus capa.** parameter

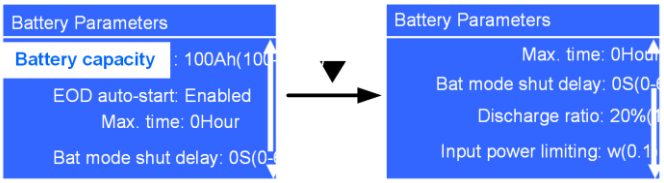
  Determine whether to automatically check the bus capacitance upon power-on and generate capacitance failure warnings. The values include **Disabled** and **Enabled**. The default value is **Enabled**. If the value is **Enabled**, UPS startup takes additional 30–180 seconds. The parameter is configurable after the inverter shuts down.

- **Auto start** parameter

Determine whether to automatically start inverter output after the UPS connects to the mains. The values include **Disabled** and **Enabled**. The default value is **Disabled**. The parameter is configurable after the inverter shuts down.

Battery Parameters Screen

Figure 4-27 Battery parameters screen



- **Battery capacity** parameter

  Set the battery string capacity. The value ranges from 100 Ah to 1000 Ah. Battery capacity is the sum of all battery capacities, set the parameters based on the actual battery capacity. The parameter is configurable in non-battery mode or non-battery ECO mode.

- **EOD auto-start** parameter

  Determine whether to automatically start inverter output after the mains becomes normal. The values include **Disabled** and **Enabled**. The default value is **Enabled**. The parameter is configurable after the inverter shuts down.

- **Max. time** parameter

  Set the maximum discharge time. When the discharge time reaches the value, the UPS powers off. The value ranges from **0Hour** to **24Hour**. The default value is **0Hour**. If you set the value to **0Hour**, the discharge time is not limited. The parameter is configurable in non-battery mode or non-battery ECO mode.

NOTE

- If you expect the battery discharge time to be greater than 24 hours, set **Max. time** to 0 hour. Otherwise, the system may power off.
- If you set **Max. time** to 0 hour, the battery string may remain in the small-current discharge state according to the proportion of the battery capacity to the load power, which affects the battery lifecycle.

- **Bat mode shut delay** parameter

  When the delay time reaches the value after UPS transfers to battery mode, the UPS powers off. The value ranges from 0S to 600S. The default value is 0S. The value interval is 30S. For example, the value can be 0S, 30S, 60S, and 90S. If the delay time is set to 0S, the shutdown delay function is disabled. If the delay time is set to other values, ensure that backup time is greater than shutdown delay time. Otherwise, the power supply to loads may be disconnected. The parameter is configurable in non-battery mode or non-battery ECO mode.

NOTE

Bat mode shut delay parameters are asynchronous in a parallel system. When used in a parallel system, set the same **Bat mode shut delay** parameter for different UPSs.

- **Discharge ratio** parameter

  Set the proportion of the discharge capacity to the total discharge capacity. The value ranges from 10% to 50%. The default value is 20%. The parameter is configurable in any mode.

- **Input power limiting** parameter

Set the UPS input power limiting parameters, so that the UPS input current does not exceed the upstream power distribution specifications. After this parameter is set, the input power of the UPS cannot exceed the threshold. Default value: 5 kW, value range 0.1–10 kW.

Restoring Factory Settings

You can restore factory settings after the inverter shuts down.

4.6.4 Control Screen

On the **Main Menu** screen, select **Control**, and press ↵. The **Control** screen is displayed.

Startup Menu

The **Startup** menu allows you to restart the inverter.

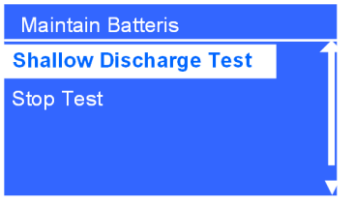
Shutdown Menu

The **Shutdown** menu allows you to shut down the inverter.

Maintain Batteries Menu

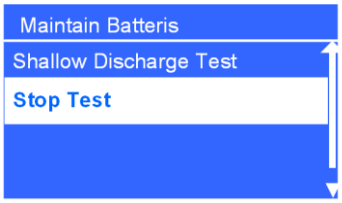
- **Shallow Discharge Test** menu

Figure 4-28 Shallow Discharge Test screen



- **Stop Test** menu

Figure 4-29 Stop Test screen



Stop the shallow discharge test or capacity test.

Sync Paral. Param. Menu

The menu allows you to synchronize the parameters from one UPS to the other UPSs in the parallel system. The UPS running in inverter output state cannot be synchronized.

Resetting the Password

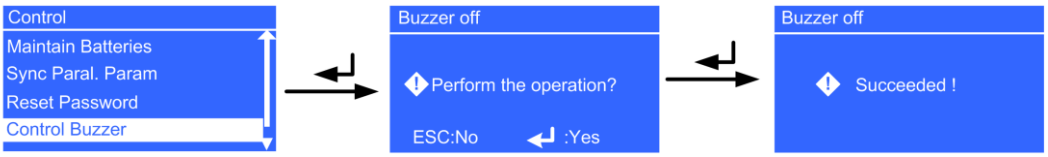
Enter a feature code to restore the preset password.

Figure 4-30 Resetting the password

Control Buzzer

Control Buzzer control the buzzer on/off. If the buzzer on, click **Control Buzzer** transfer to **Buzzer off**.

Figure 4-31 Buzzer off screen

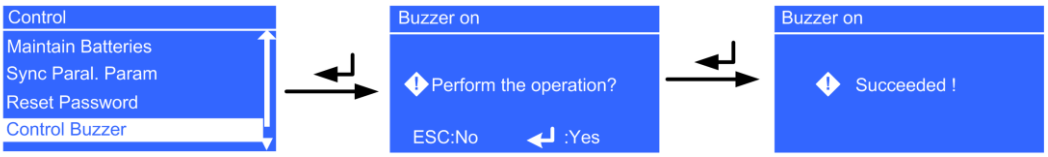


NOTE

If Control Buzzer is used for muting the alarm tone, the alarm tone should be unmuted by using Control Buzzer or power on the UPS again. Otherwise, when a new alarm is generated, it cannot buzz again.

If the buzzer off, click **Control Buzzer** transfer to **Buzzer on**.

Figure 4-32 Buzzer on screen



4.6.5 About Screen

On the **Main Menu** screen, select **About**, and press .

You can view the UPS model, equipment serial number (ESN), and version number.

Figure 4-33 About screen

NOTE

MU1MSW1, PU1RSW1, PU1RSW2, PU1ISW1, and PU1ISW2 is the version for the component. When the component does not exist, NA is displayed for Version. PU1ISW1 and PU1ISW2 are not available for the UPS 6 kVA and UPS 10 kVA.

- **Model** parameter

  The UPS model is **3K UPS**.
- **ESN** parameter

  This item provides the UPS ESN.
- **Version** parameter

  This item provides the UPS version.
- **MU1MSW1** parameter

  This item provides the main monitoring software version.
- **PU1RSW1** parameter

  This item provides rectifier power software version.
- **PU1RSW2** parameter

  This item provides the rectifier logic software version.
- **PU1ISW1** parameter

  This item provides the inverter power software version.
- **PU1ISW2** parameter

  This item provides the inverter logic software version.

5 Operations

5.1 Checking Before Powering On the UPS

- AC power cable colors comply with local electrical regulations.
- No short circuits occur in inputs and outputs.
- Cables are securely connected.
- Battery cables are correctly connected to battery terminals. The battery voltage meets the requirements.
- Cables are properly connected between the UPS and batteries.
- Input circuit breakers and load circuit breakers are OFF.
- Power cables and signal cables are correctly identified.
- The input phase sequence is correct.
- Cables are neatly routed and securely bound.
- Devices are installed and cables are routed in ways that facilitate modification, capacity expansion, and maintenance.
- Parallel cables are properly connected.
- The UPS is properly grounded.
- The voltage between the neutral wire and the ground cable is less than 5 V AC.
- The mains supply voltage is 80–144 V AC during power-on (80–144 V AC after power-on). The battery voltage is greater than 46.5V DC.

5.2 Starting the UPS

NOTICE

- Set **Voltage level** and **Frequency level** based on the rated voltage and frequency. In the case of single-phase output, set **Voltage level** to 100 V (default), 110 V, or 120 V.
- Battery parameters are configurable in non-battery mode or non-battery ECO mode.
- Set **Battery capacity** to the total capacity of all batteries actually connected. The value ranges from 100 Ah to 1000 Ah. The default value is 100 Ah.
- The preset password is **000001**, used to enter the **Settings** menu.
- The default feature code is **999999**, used to restore the preset password.

5.2.1 Starting the UPS in Normal Mode

Procedure

Step 1 Press and hold the MANUAL ON/OFF button on each lithium battery for at least 5s and less than 15s to activate the lithium battery.

Step 2 Close the upstream AC input circuit breaker for the UPS based on site requirements.

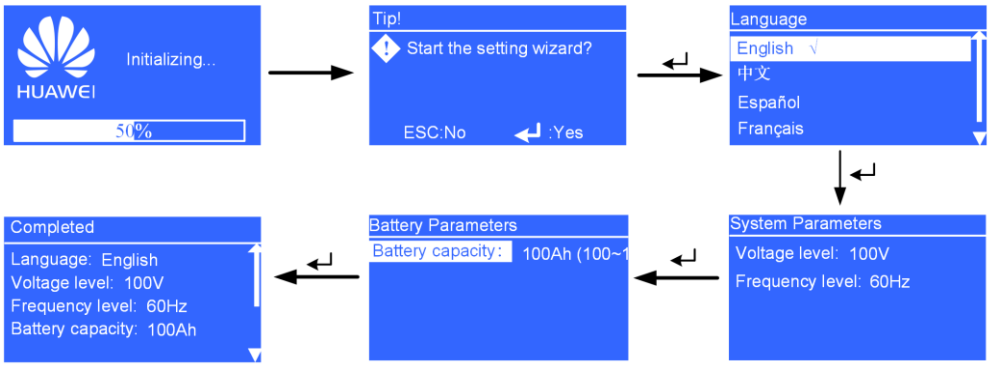
The initialization screen is displayed.

Step 3 The UPS enters bypass mode. When the initialization is complete, perform the following operations:

- Initial startup

  On the **Settings wizard** screen, set the language (the preset language is English), system parameters, and battery parameters. Press ↵. The standby screen is displayed.

  Figure 5-1 Settings wizard

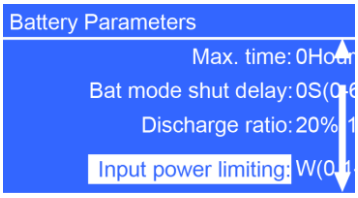


- Non-initial startup

  When the initialization is complete, the standby screen is displayed. On the standby screen, press ↵ to enter the main menu. Choose **Main Menu** > **Settings** > **System Parameters** > **Output** to view output settings.

Step 4 Choose **Settings > Battery Parameters**, and set the **Input power limiting** based on the actual situation.

Figure 5-2 Input power limit



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

- On the standby screen, hold down ↵ more than 5 seconds. Release the button when you hear a beep sound. The startup screen is displayed. If the UPS starts successfully, it enters normal mode.
- On the standby screen, hold down ↵ to enter the main menu. Select **Startup** in the **Control** menu, and press ↵. The **Starting** message is displayed. If the UPS starts successfully, it enters normal mode.

Step 6 When the UPS runs properly, close the UPS downstream AC output switch to start loads.

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

----End

5.2.2 Starting the UPS in Battery Mode

Procedure

Step 1 Press and hold the MANUAL ON/OFF button on each lithium battery for at least 5s and less than 15s to activate the lithium battery.

Step 2 Press ↵ on the control panel.

The LCD starts. The initialization screen is displayed.

- Initial startup

  When the initialization is complete, the **Settings wizard** screen is displayed. Set the language (the preset language is English), system parameters, and battery parameters, and press ↵. The standby screen is displayed.
- Non-initial startup

  When the initialization is complete, the standby screen is displayed. On the standby screen, press ↵ to enter the main menu. Choose **Main Menu** > **Settings** > **System Parameters** > **Output** to view output settings.

Step 3 Perform **startup operations** on the UPS. The UPS runs in battery mode.

Step 4 When the UPS runs properly, close the UPS downstream AC output switch to start loads.

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

----End

5.3 Shutting down the UPS

Shutting down the Inverter

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

- On the default screen, hold down **ESC** for more than 5 seconds. Release the button when you hear a beep sound. The inverter shuts down, and the UPS transfers to bypass mode.
- On the default screen, press ↵ to enter the main menu. Choose **Shutdown** to shut down the inverter. The UPS transfers to bypass mode.

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

Shutting down the UPS

Step 1 Shut down the loads.

Step 2 Perform "shutdown operations" on the UPS. The inverter shuts down. The UPS transfers to bypass mode.

Step 3 Open the upstream AC input circuit breaker for the UPS based on site requirements, the UPS downstream AC output switch.

Step 4 Press and hold the **MANUAL ON/OFF** button on each lithium battery for at least 5s and less than 15s to power off the lithium battery. After all indicators turn off and fans stop, the UPS shuts down and loads power off.

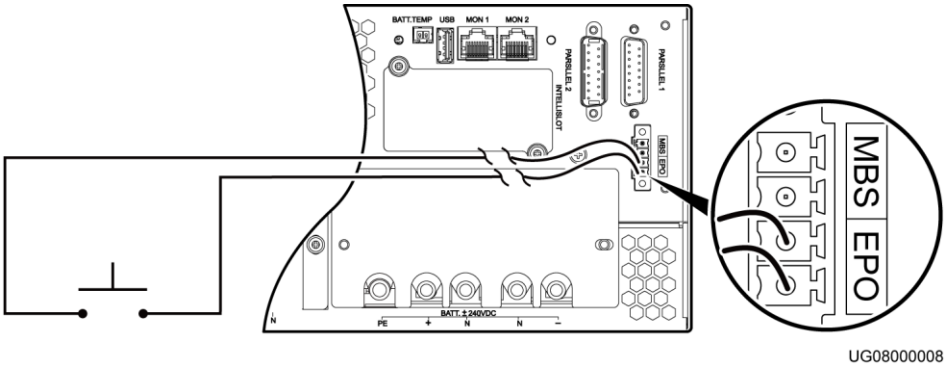
----End

5.4 Performing EPO

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

Figure 5-3 shows the EPO cable connection on a single UPS.

Figure 5-3 EPO cable connection on a single UPS



NOTE

- Connect an external switch to the EPO port on the UPS. After you turn on the switch, the inverter shuts down, and the UPS will not transfer to bypass mode. Output terminals completely power off, which meets the EPO purpose.
- The external EPO switch (switch or dry contact signals controlled by a switch) is provided by the customer.

6 Communications

Dry Contact Card

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

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

7 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 icons on the LCD, and no fault or alarm information is	If any alarm is present, rectify the fault by checking the device status and parameters.	Monthly

Check Item	Expected Result	Troubleshooting	Maintenance Interval
	displayed in active alarm or historical alarms.		
Cleanliness	Wipe the UPS 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 the power distribution cabinet)	The insulation layers of cables are intact and terminals are free from noticeable sparks.	• Replace the cables. • Secure the output terminals.	Quarterly
EPO (if configured)	Check the reliability of the EPO cable connection.	Secure the terminals.	Yearly

8 Troubleshooting

CAUTION

When a UPS is faulty, alarm information is displayed on the LCD. Critical alarms must be processed before the UPS is powered on again. Otherwise, the fault may be extended, or the UPS may be damaged.

Table 8-1 Solutions to common faults

No.	Symptom	Possible Cause	Measure
1	The mains switch is ON. The LCD does not display anything. The system does not perform self-tests.	The input power supply is not connected.	Check the input power cable connection.
		The input voltage exceeds the limit.	Use a multimeter to check that the UPS input voltage meets specifications.
2	The mains is normal, but the AC input indicator is off. The UPS runs in battery mode.	The mains switch is OFF.	Turn on the mains switch.
		The input power cable is not securely connected.	Check the input power cable connection.
3	The UPS does not report faults, but has no output voltage.	The output power cable is not securely connected.	Check the output power cable connection.
4	The UPS does not start after you press ↵.	↵ is not pressed long enough.	Press ↵ for more than 5 seconds until you hear a beep sound.
		Overload occurs.	Disconnect all loads, and restart the UPS.

No.	Symptom	Possible Cause	Measure
5	The Mains indicator is off.	The mains voltage or frequency exceeds the UPS input range.	Use a multimeter to check that the input voltage and frequency meet specifications.
6	The battery discharge time is much less than the standard time.	Batteries are not fully charged.	Charge batteries for more than 8 hours when the mains is normal. Test the discharge time again.
		The battery performance deteriorates.	Contact local Huawei technical support to replace batteries.
7	Abnormal noises or smell is generated in the UPS cabinet.	The UPS is faulty.	Shut down the UPS immediately and cut off the input power supply. Contact local Huawei technical support.
8	The battery indicator is blinking yellow. The buzzer buzzes 1 second and then stops 1 second. The battery capacity is insufficient. The UPS is shutting down.	• The remaining battery capacity is insufficient. The UPS is shutting down, and the loads are powering off. • Parameters settings of battery number or battery capacity is not correct.	• Save load data immediately and power off critical loads. • Connect UPS input terminals to the backup AC power supply. • Set parameters of battery number and battery capacity correctly.
9	You forget the password.	N/A	• If you forget only the LCD password (the preset password is **000001**), use the feature code (the preset feature code is **999999**) to activate the LCD password. • If you forget both the password and the feature code, contact local Huawei technical support.

9 Technical Specifications

Table 9-1 UPS technical specifications

Item		**UPS2000-G-3K-V1-DR**
Physical parameters	Dimensions (H x W x D)	130 mm x 430 mm x 757 mm
	Weight	32 kg
	IP rating	IP20
Environment parameters	Operating temperature	0°C - 40 °C
	Storage and transportation temperatures	–40°C to +70°C (optional components for the UPS and non-battery box)
	Humidity	0%–95% RH (non-condensing)
Mains input electrical specifications	Power input and output system	Single-phase input single-phase output
	Rated input voltage	100 V/110 V/120 V
	Input voltage range	73–144 V (mains startup voltage 80 V)
	Input frequency range	40–70 Hz
	Total harmonic distortion (current) (THDi)	< 5% (linear full load) < 8% (non-linear full load)
	Input power factor	> 0.98 (full load)
Bypass input electrical specifications	Bypass voltage range	The upper and lower thresholds can be adjusted. The default value is –15%/+15%. Upper threshold: 10%, 15%, 20%, 25%, 30%, or 35% at 100 V Upper threshold: 10%, 15%, 20%, or 25% at 110 V Upper threshold: 10% or 15% at 120 V Lower threshold: 10% or 15% at 100 V Lower threshold: 10%, 15%, or 20% at 110 V Lower threshold: 10%, 15%, 20%, or 25% at 120

Item		UPS2000-G-3K-V1-DR
		V
	Bypass frequency range	Max. ±6 Hz
	Input system	Single mains
Output electrical specifications	Output frequency range (mains inverter mode)	When the UPS works in mains inverter mode, the output frequency is consistent with the input frequency, which is 50 Hz or 60 Hz with the tolerance of ±6 Hz.
	Output frequency range (battery mode)	50/60 Hz ± 0.05%
	Rated output voltage	100 V/110 V/120 V
	Output voltage precision	±1%
	Total harmonic distortion of output voltage (THDv)	< 5% (non-resistive loads)
		< 2% (resistive loads)
	Output current peak factor	3:1
	Dynamic voltage transient	±5%
	Output dynamic response recovery time	• 60 ms (non-linear load) • 20 ms (linear load)
	Output power factor	1
	Automatic overload recovery	Supported
	Overload capability	Mains inverter mode: • When the UPS is overloaded to a range between 105% and 125%, the UPS transfers to bypass mode in 5 minutes if the bypass line is normal, or disconnects the power output if the bypass line is abnormal. • When the UPS is overloaded to a range between 125% and 150%, the UPS transfers to bypass mode in 1 minute if the bypass line is normal, or disconnects the power output if the bypass line is abnormal. • When the UPS is overloaded to more than 150%, the UPS transfers to bypass mode in 0.1 second if the bypass line is normal, or disconnects the power output if the bypass line is abnormal. Bypass mode: • If the UPS2000 is overloaded to less than 125%, it continues to work. • If the UPS2000 is overloaded to a range between 125% and 150%, it runs for 1 minute.

Item		UPS2000-G-3K-V1-DR
		• If the UPS2000 is overloaded to more than 150%, it runs for 0.1s.
Battery electrical specifications	Rated battery voltage	±48 V DC
	Battery string sharing	Supported
	Battery type	Lithium battery
ECO parameters	ECO voltage range	±(5–10)%
	ECO frequency range	Max. ±2 Hz
	ECO efficiency	95%
Safety regulations and EMC	Conducted emission	IEC 62040-2 Category C3
	Radiated interference	IEC 62040-2 Category C3
	Susceptibility of low-frequency signals	IEC61000-2-2
	Electrostatic discharge immunity	IEC 61000-4-2
	Conducted susceptibility	IEC 61000-4-6
	Radiated susceptibility	IEC 61000-4-3
	Electrical fast transient/burst	IEC 61000-4-4
	Surge	IEC 61000-4-5
	Power frequency magnetic field	IEC 61000-4-8
	Harmonic current	IEC61000-3-12
	Flashing	IEC61000-3-11 (input current > 16 A) IEC61000-3-3 (input current ≤ 16 A)
	Inrush current (lightning protection)	IEC/EN60240-2 IEC/EN61000-4-5 YD/T1095-2000 YD/T944-2007

Table 9-2 ESM technical specifications

Item	Description
Dimensions (W x D x H)	• 442 mm x 560 mm x 190 mm (excluding mounting ears) • 482 mm x 560 mm x 190 mm (including mounting ears)
Weight	70 kg
Installation mode	Installed in a 19-inch rack

Item	Description
Maintenance mode	Maintained from the front
Humidity	5%–95%
Altitude	0–4000 m (When the altitude ranges from 2000 m to 4000 m, the highest operating temperature decreases by 1°C for each additional 200 m.)
Ripple and noise	≤ 200 mV
IP rating	IP40
Other requirements	Indoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 3.1 requirements in ETSI EN 300 019-1-3 (V2.3.2 or a later version). Outdoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

A Alarm Handling

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
0001-01	Abnormal mains volt.	Minor	Automatic clear	• The UPS transfers to battery mode. • If no battery is equipped, the UPS shuts down.	Possible causes: • The mains voltage exceeds 144 V. • The mains voltage is less than 73 V. • The mains frequency is not in the range of 40 Hz to 70 Hz. Measures: • Check whether the mains input voltage is less than 139 V. If not, wait until the mains recovers. • Check whether the mains input voltage is greater than 80 V. If not, wait until the mains recovers. • Check the mains input frequency. If the mains input frequency is abnormal, wait until the mains input recovers.
0001-02		Minor			
0001-03		Minor			
0004-01	Mains phase reverse	Minor	Automatic clear	• The rectifier transfers to battery mode, without affecting the power supply. • If no batteries are	Possible cause: The mains input three-phase sequence is incorrect. Measure: Check that mains input power cables are

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
				installed, the UPS shuts down. • The UPS may transfer to another working mode or shut down.	correctly connected.
0005-01	Mains neutral loss	Minor	Automatic clear	• The UPS transfers to battery mode. • If no battery is equipped, the UPS shuts down. • The UPS changes the working mode or shuts down.	Possible cause: The mains input neutral wire is not connected. Measure: Check that mains input power cables are correctly connected.
0007-01	Batt. trans. overlimit	Minor	Manual clear/Power-off clear/Automatic clear	The UPS does not transfer back to normal mode even when the mains is normal.	Possible cause: The mains voltage fluctuates frequently. The UPS has transferred from normal mode to battery mode within 2 minutes for 10 consecutive times. The rectifier locks out in battery mode. Measure: Check the mains.
0008-01	Rect. start overlimit	Minor	Manual clear/Power-off clear	The UPS cannot start.	Possible cause: The mains voltage frequently becomes abnormal during startup. Measure: Check the mains input voltage. If the voltage becomes normal, clear the alarm and restart the UPS.
0010-01	Abnormal BPS volt.	Minor	Automatic clear	The UPS cannot transfer to bypass mode. If the bypass is supplying power, the UPS changes the working mode.	Possible causes: • The bypass input voltage is abnormal. • The bypass input frequency is abnormal. Measures: • Check whether the bypass input voltage exceeds the configured range. If yes, change the range or wait until the bypass input recovers. • Check whether the
0010-02		Minor			

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					bypass input frequency exceeds the configured range. If yes, change the range or wait until the bypass input recovers.
0011-01	BPS phase reverse	Minor	Automatic clear	• If the inverter has not started, the system has no output, and inverter startup is prohibited. • If the inverter has started, the inverter still works properly, but the system cannot transfer to bypass mode.	Possible cause: The bypass input three-phase sequence is incorrect. Measure: Check that bypass input power cables are correctly connected.
0012-01	BPS neutral loss	Minor	Automatic clear	If the inverter has not started, the system has no output, and inverter startup is prohibited. If the inverter has started, the inverter still works properly, but the system cannot transfer to bypass mode.	Possible cause: The bypass input neutral wire is not connected. Measures: Check that bypass input power cables are correctly connected.
0014-01	Start timeout	Critical	Manual clear/Power-off clear	The UPS cannot start.	Possible causes: • The bypass load exceeds the rated inverter load. • An internal fault occurs in the UPS. Measures: • Reduce the output load, manually clear the alarm, and restart the UPS. • Contact Huawei technical support for repair.
0020-01	Batt. reverse	Critical	Automatic clear	The power supply from the UPS and system is not affected.	Possible cause: Batteries are reversely connected. Measure: Check the battery installation, and reinstall the batteries.
0022-01	No	Minor	Automatic	The power supply from the UPS and system is not	Possible causes:

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
	battery		clear	affected.	• Batteries are not connected. • Batteries are not securely connected. Measures: • Connect batteries. • Check that batteries are securely connected.
0023-01	Batt. overtemp.	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	Possible causes: • The ambient temperature exceeds the battery high temperature alarm threshold (default value: 50ºC) • The battery charge/discharge current exceeds the upper threshold. Measures: • Install more cooling equipment such as air conditioners. • Control the battery charge/discharge current by reducing loads.
0025-01	Batt. overvolt.	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	Possible causes: • The configured number of batteries is less than the actual number. • The battery string charge voltage exceeds the upper threshold. Measures: • Check battery parameter settings. • Disconnected the external battery charger, check whether the alarm is cleared. If not, contact Huawei

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					technical support for repair.
0026-01	Batt. undervolt.	Minor	Automatic clear	An alarm is generated, and the system may shut down due to EOD.	Possible cause: The mains input is abnormal. Battery discharge results in a low battery voltage. Measure: If possible, connect to the mains power when the UPS is in non-battery test state.
0027-01	Batt. overcurrent	Minor	Automatic clear	An alarm is generated, and the battery lifespan is affected.	Possible causes: The charger is abnormal. Measure: Contact Huawei technical support for repair.
0028-01	Breaker OFF	Critical	Automatic clear	N/A	Possible causes: • The mains input power cables are incorrectly connected. • The mains input circuit breaker is OFF. Measure: Check whether mains input power cables are correctly connected. If yes, switch on the mains input circuit breaker.
0028-02	Breaker OFF	Critical	Automatic clear	N/A	Possible causes: • The bypass is short-circuited or the bypass input experiences overcurrent. • The bypass input circuit breaker is OFF. Measures: • Check whether the bypass output load is short-circuited using a multimeter. • Check whether cable connections are correct. If yes, switch on the bypass input circuit

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					breaker.
0028-03	Breaker OFF	Critical	Automatic clear	N/A	Possible causes: • The bypass is short-circuited or the bypass input experiences overcurrent. • The bypass input circuit breaker is OFF. Measures: • Check whether the circuit breaker downstream load is short-circuited using a multimeter. • Check whether cable connections are correct. If yes, switch on the output circuit breaker.
0029-01	Maintain batt.	Minor	Automatic clear	The battery backup time is affected.	Possible causes: • The battery loop cannot be discharged. • The battery module generates an alarm or is faulty. Measures: • Check battery connections and the status of each battery. • Contact Huawei technical support for repair.
0030-01	UPS inter overtemp.	Minor	Automatic clear	The power supply from the UPS and system is not affected.	Possible causes: • The ambient temperature exceeds 40°C. • The air channel is blocked. • The fan is abnormal. Measures: • Decrease the ambient

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					temperature. • Keep the air intake and exhaust vents of the UPS unobstructed. • Clean off the foreign objects around the fan. If the alarm persists, contact Huawei technical support for repair.
0032-01	Batt. OVP	Critical	Automatic clear	An alarm is generated, and the battery lifespan is affected.	Possible causes: • The configured number of batteries is less than the actual number. • The actual number of batteries does not meet specifications. • The charger is abnormal. Measures: • Check that the configured number of batteries matches the actual number. • Check that the actual number of batteries meets requirements. • Disconnected the external battery charger, check whether the alarm is cleared. If not, contact Huawei technical support for repair.
0034-01	Remaining cap. warning	Minor	Automatic clear	If no action is taken, continued discharge will result in system shutdown due to EOD.	Possible cause: • The battery discharge lasts too long. • The mains input is abnormal. • The number of batteries or battery capacity is incorrectly set.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					Measure: • Check the mains, and charge batteries in a timely manner. • Check the configured battery capacity.
0040-01	Rectifier fault	Critical	Manual clear/Power-off clear	The UPS shuts down. The UPS transfers to another working mode or shuts down.	Possible cause: The soft-start resistor is damaged. Measure: Contact Huawei technical support for repair.
0040-02	Rectifier fault	Critical	Manual clear/Power-off clear	The UPS cannot be started.	Possible causes: • The mains input harmonic is large. • The rectifier startup circuit is damaged. Measures: • After you rectify the fault, restart the UPS. • Contact Huawei technical support for repair.
0040-04	Rectifier fault	Critical	Manual clear/Power-off clear/Automatic clear	The UPS shuts down. The UPS transfers to another working mode or shuts down.	Possible causes: • The mains experiences instantaneous high-voltage impact. • The output has special loads such as inductive loads and rectification loads. • The output has transformer loads but the transformer mode is not set. • The hardware is damaged. Measures: • After you rectify the fault, restart the UPS. • Check whether the load type is supported by the

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					UPS. • Enable the transformer mode. • Contact Huawei technical support for repair.
0040-05	Rectifier fault	Critical	Manual clear/Power-off clear/Automatic clear	The UPS shuts down. The UPS transfers to another working mode or shuts down.	Possible cause: The hardware is damaged. Measure: Contact Huawei technical support for repair.
0040-06	Rectifier fault	Critical	Power-off clear	The UPS shuts down. The UPS transfers to another working mode or shuts down.	Possible cause: The hardware is damaged. Measure: Contact Huawei technical support for repair.
0040-07	Rectifier fault	Critical	Automatic clear	The UPS shuts down. The UPS transfers to another working mode or shuts down. The charger stops working.	Possible causes: • The ambient temperature exceeds 40°C. • The air channel is blocked. • The fan is abnormal. Measures: • Decrease the ambient temperature. • Keep the air intake and exhaust vents of the UPS unobstructed. • Clean off the foreign objects around the fan. If the alarm persists, contact Huawei technical support for repair.
0040-09	Rectifier fault	Critical	Power-off clear	The rectifier transfers to battery mode, and the power supply is not affected. If no battery is installed, the UPS shuts down. The UPS transfers to another working mode or shuts down.	Possible cause: The rectifier is faulty. Measure: Contact Huawei technical support for repair.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
0040-10	Rectifier fault	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The digital signal processing (DSP) or complex programmable logical device (CPLD) chip is faulty. Measure: Contact Huawei technical support for repair.
0041-01	Rectifier alarm	Minor	Manual clear/Power-off clear	N/A	Possible cause: The EEPROM chip is faulty. Measure: Contact Huawei technical support for repair.
0041-02	Rectifier alarm	Minor	Automatic clear	The UPS shuts down. The UPS may transfer to another working mode or shut down.	Possible cause: The single-side bus capacitor is faulty. Measure: Contact Huawei technical support for repair.
0041-03	Rectifier alarm	Minor	Manual clear/Power-off clear	The power supply from the UPS and system is not affected.	Possible cause: The bus capacitor is faulty. Measure: Contact Huawei technical support for repair.
0041-10	Rectifier alarm	Minor	Automatic clear	N/A	Possible cause: The load power exceeds the loading capacity of the batteries. Measure: Reduce the load power or verify the number of batteries.
0042-01	Internal fault	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The auxiliary power source is faulty. Measure: Contact Huawei technical support for repair.
0042-02	Internal fault	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The soft-start resistor is damaged. Measure: Contact Huawei technical support for repair.
0042-03	Internal fault	Minor	Automatic clear	The power supply from the UPS and system is not affected.	Possible cause: The NTC is not connected or is damaged. Measure: Contact Huawei

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					technical support for repair.
0042-09	Internal fault	Critical	Automatic clear	The inverter shuts down.	Possible cause: Self-load cable connections are incorrect. Measure: Reconnect cables.
0042-10	Internal fault	Critical	Automatic clear	If the inverter has not started, the UPS has no output, and inverter startup is not allowed. If the inverter has started, inverter operation is not affected, but transfer to bypass mode is not allowed.	Possible cause: The bypass input cable connections do not match the output system. Measure: Ensure that the bypass input cable connections match the output system.
0042-11	Internal fault	Critical	Power-off clear	After the parallel system is powered on, an incorrect bypass phase sequence is detected on a UPS. The parallel system has not output. The parallel system works in inverter mode. The newly added UPS has no output because bypass cables are incorrectly connected. The parallel system works in bypass mode. The parallel system has no output because bypass cables for the newly added UPS are incorrectly connected.	Possible cause: The bypass phase sequences in the parallel system do not match. Measure: Check bypass input phase sequences in the parallel system.
0042-12	Internal fault	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: The three-phase power cable lengths vary greatly. Measure: Ensure that the lengths of three-phase power cables vary within a difference of 5%.
0042-13	Internal fault	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: The inverter is faulty. Measure: Contact Huawei technical support for repair.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
0043-01	Fan fault	Critical	Automatic clear	The power supply from the UPS and system is not affected.	Possible cause: The fan is abnormal. Measure: Clean off the foreign objects around the fan. If the alarm persists, contact Huawei technical support for repair.
0043-06	Fan fault	Critical	Automatic clear	The power supply from the UPS and system is not affected.	Possible cause: The fan is abnormal. Measure: Clean off the foreign objects around the fan. If the alarm persists, contact Huawei technical support for repair.
0044-01	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: An error occurred during software loading. Measure: Contact the manufacturer to load software.
0044-02	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: Software and hardware versions do not match. Measure: Contact the manufacturer to load software.
0044-03	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: Software and hardware versions do not match. Measure: Contact the manufacturer to load software.
0044-04	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: An error occurred during software loading. Measure: Contact the manufacturer to load software.
0044-05	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: Software and hardware versions do not match.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					Measure: Contact the manufacturer to load software.
0044-06	Incompatible ver.	Critical	Manual clear/Power-off clear	The UPS startup is not allowed.	Possible cause: Software and hardware versions do not match. Measure: Contact the manufacturer to load software.
0045-03	Charger alarm	Critical	Manual clear/Power-off clear	The charger in the UPS stops.	Possible cause: The charger capacitor is faulty. Measure: Contact Huawei technical support for repair.
0045-04		Critical			Possible cause: The charger output is short-circuited. Measure: Rectify battery port short circuits. After you clear the alarm, restart the UPS. If the alarm persists, contact Huawei technical support for repair.
0045-06		Critical	Automatic clear		Possible cause: The rectifier R4850G2 is faulty. Measure: Contact Huawei technical support for repair.
0045-07		Critical	Manual clear/Power-off clear	The charger in the UPS stops. (The 20 kVA has no action.)	Possible cause: The charger is faulty. Measure: Contact Huawei technical support for repair.
0045-08		Critical	Manual clear/Power-off clear/Automatic clear	The charger in the UPS stops.	
0045-09		Critical	Manual clear/Power-off clear		
0045-10		Critical			
0060-01	Inverter fault	Critical	Power-off clear	The inverter shuts down. The UPS transfers to bypass mode or has no output based on the transfer logic.	Possible cause: The inverter is faulty. Measure: Contact Huawei technical support for repair.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
0060-02	Inverter fault	Critical	Power-off clear	The UPS shuts down. The UPS may transfer to another working mode or shut down.	Possible cause: The inverter relay is faulty. Measure: Contact Huawei technical support for repair.
0060-03	Inverter fault	Critical	Power-off clear		
0060-04	Inverter fault	Critical	Power-off clear		Possible cause: The inverter output is short-circuited. Measure: Rectify output port short circuits. After you clear the alarm, restart the UPS. If the alarm persists, contact Huawei technical support for repair.
0060-05	Inverter fault	Critical	Automatic clear		Possible causes: • The mains experiences instantaneous high-voltage impact. • The output has special loads such as sensitive loads and rectification loads. • The output has transformer loads but the transformer mode is not set. • The hardware is faulty. Measures: • After you rectify the fault, restart the UPS. • Check whether the load type is supported by the UPS. • Enable the transformer mode. • Contact Huawei technical support for repair.
0060-07	Inverter fault	Critical	Automatic clear	The UPS starts upon shutdown. The UPS may transfer to another working mode or	Possible causes: • The ambient temperature exceeds 40ºC.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
				shut down.	• The air channel is blocked. • The fan is abnormal. Measures: • Decrease the ambient temperature. • Keep the air intake and exhaust vents of the UPS unobstructed. • Clean off the foreign objects around the fan. If the alarm persists, contact Huawei technical support for repair.
0060-08	Inverter fault	Critical	Manual clear/Power-off clear	The UPS shuts down.	Possible cause: The DSP or CPLD chip is faulty. Measure: Contact Huawei technical support for repair.
0061-01	Inverter alarm	Minor	Manual clear/Power-off clear/Automatic clear	The UPS shuts down. The UPS may transfer to another working mode or shut down.	Possible causes: • Parallel cables are incorrectly connected. • The lengths of parallel cables vary greatly. Measures: • Reconnect cables. • The lengths of parallel cables vary within a range of 5%.
0061-02	Inverter alarm	Minor	Manual clear/Power-off clear	N/A	Possible cause: The EEPROM chip is faulty. Measure: Contact Huawei technical support for repair.
0064-01	OL timeout	Critical	Automatic clear	The UPS automatically starts after shutdown. The UPS transfers to another working mode or shuts down.	Possible cause: The load exceeds the rated inverter loading capacity. Measure: Reduce the load or replace the UPS with a larger-capacity UPS.
0064-02	OL	Critical	Manual	The UPS startup is not	Possible cause: The load

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
	timeout		clear/Power-off clear	allowed.	exceeds the rated bypass loading capacity. Measure: Reduce the load or replace the UPS with a larger-capacity UPS.
0065-01	Power segment	Minor	Manual clear/Power-off clear	In single UPS mode, the loads connected to pL power off.	Possible cause: The load exceeds the rated loading capacity. Measure: Reduce the load or replace the UPS with a larger-capacity UPS.
0065-02		Minor	Automatic clear/Manual clear		Possible causes: • The battery voltage is below the battery protection voltage. • The battery discharge time exceeds the battery protection time. Measures: • Check the battery voltage. • Modify the power segment settings on the LCD.
0066-01	Output overload	Minor	Automatic clear	Continuous overload causes the UPS to transfer to bypass mode or supply no power.	Possible cause: The load exceeds the rated loading capacity. Measure: Reduce the load or replace the UPS with a larger-capacity UPS.
0066-02		Minor	Automatic clear	Continuous overload causes the UPS to supply no power.	Possible cause: The load exceeds the rated bypass loading capacity. Measure: Reduce the load or replace the UPS with a larger-capacity UPS.
0067-01	Paral. set failure	Minor	Automatic clear	UPS startup is not allowed.	Possible cause: The single UPS and parallel system settings do not match cable connections. Measures:

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					• Check the single UPS and parallel system settings. • Check that parallel cable connections match the settings.
0071-01	BPS backfeed	Critical	Power-off clear	The bypass input circuit breaker in the PDU is OFF.	Possible cause: The bypass component is faulty. Measure: Contact Huawei technical support for repair.
0083-01	Paral. cable fault	Critical	Manual clear/Power-off clear	The UPS shuts down. The parallel system shuts down.	Possible causes: • The parallel cable is loose. • The parallel cable is damaged. Measures: • Check that the parallel cable is securely connected. • Replace the parallel cable. • Contact Huawei technical support for repair.
0083-02		Critical			
0083-04		Critical	Manual clear/Power-off clear/Automatic clear	The UPS shuts down. The parallel system transfers to another working mode.	
0083-05		Critical			
0084-02	Paral. cable alarm	Minor	Automatic clear	N/A	Possible causes: • The parallel cable is loose. • The parallel cable is damaged. Measures: • Check that the parallel cable is securely connected. • Replace the parallel cable. • Contact Huawei technical support for repair.
0084-03		Minor			
0085-01	EPO	Critical	Manual clear/Power	The UPS shuts down.	Possible cause: The EPO button is pressed.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
			-off clear		Measure: Restore the EPO button status. Start the UPS after the alarm is cleared.
0086-01	BPS trans. overlimit	Minor	Manual clear/Power -off clear	Transfer to an unstable side is not allowed.	Possible cause: The output transfer times within 30 minutes exceed the configured value (3 by default). Measure: Restart the UPS after the alarm is cleared.
0094-01	Redundancy failure	Minor	Automatic clear	N/A	Possible causes: • The configured number of redundant UPSs exceeds the maximum allowed value. • The load exceeds the rated loading capacity of the requisite UPSs in the parallel system. Measures: • Reduce the number of redundant UPSs or set the system to be non-redundant. • Reduce the load or replace the UPS with a larger-capacity UPS.
0096-01	Abnormal ECO volt.	Minor	Automatic clear	Transfer to bypass mode is prohibited. If the bypass is supplying power, the UPS transfers to another working mode.	Possible cause: The ECO input is abnormal. Measure: Check whether the ECO input voltage or frequency exceeds the configured range. If yes, change the range or wait until the bypass input recovers.
0105-05	Comm. failed.	Minor	Automatic clear	The monitoring module cannot monitor the digital signal processor (DSP) of the power module.	Possible causes: • The communications cable is faulty. • An internal fault occurs in the UPS.

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					Measures: • Check the communications cable. • Contact Huawei technical support for repair.
0125-01	Incon. paral. param.	Critical	Automatic clear	An alarm is generated, and all the UPSs in the parallel system cannot start inverters.	Possible cause: The settings of parallel synchronization parameters of each UPS are different. Measure: Set the parallel parameters consistently, or perform parallel parameter synchronization. **NOTE** After you perform parallel parameter synchronization, contact Huawei technical support if some parallel parameters are still inconsistent.
0131-01	Ambient overtemperature	Minor	Automatic clear	An alarm is generated.	Possible causes: • The ambient temperature in the UPS equipment room exceeds the alarm threshold (default value: 40°C). • The temperature and humidity transducer is faulty. Measures: • Check the ambient temperature in the UPS equipment room. • Replace the temperature and humidity transducer.
0133-01	Ambient undertemperature	Minor			Possible causes: • The ambient temperature in the UPS equipment room is below the alarm

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					threshold (default value: 0ºC). • The temperature and humidity transducer is faulty. Measures: • Check the ambient temperature in the UPS equipment room. • Replace the temperature and humidity transducer.
0134-01	Ambient overhumidity	Minor			Possible causes: • The ambient humidity in the UPS equipment room exceeds the alarm threshold (default value: 90%). • The temperature and humidity transducer is faulty. Measures: • Check the ambient humidity of the UPS equipment room. • Replace the temperature and humidity transducer.
0135-01	Ambient underhumidity	Minor			Possible causes: • The ambient humidity in the UPS equipment room is below the alarm threshold (default value: 10%). • The temperature and humidity transducer is faulty. Measures: • Check the ambient humidity of the UPS equipment room. • Replace the temperature

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					and humidity transducer.
0136-01	Faulty temperature and humidity module	Minor			Possible causes: The temperature and humidity module is faulty. Measures: • Check parameter settings of the temperature and humidity transducer. • Replace the temperature and humidity transducer.
0158-01	On bypass	Minor	Automatic clear	If the bypass is abnormal, the UPS may power off.	Possible causes: • The inverter is not started. • The load exceeds the rated inverter loading capacity. • The inverter is faulty. Measures: • Check whether other alarms are generated. If yes, see the other handling methods. • If no, start the UPS manually.
0159-01	On battery	Minor	Automatic clear	The UPS may power off if batteries are abnormal.	Possible causes: • The mains input is abnormal. • The UPS is in battery self-check state. • The mains loading capability is insufficient. Measures: • Check the mains input. If the mains input is abnormal, wait until the mains input recovers. • Check whether the UPS

Alarm ID (Alarm ID-Alarm Cause)	Alarm Name	Alarm Level	Alarm Clear Mode	Impact on the System	Repair Proposal
					is in battery self-check state. • Reduce the load or replace the UPS with a larger-capacity UPS.
0340-01	Maint. breaker ON	Minor	Automatic clear	The UPS transfers to bypass mode.	Possible cause: The maintenance circuit breaker is ON during UPS maintenance. Measure: Switch off the maintenance circuit breaker after maintenance.
61440-01	Flash fault	Critical	Automatic clear	Files may be damaged.	Possible cause: The flash memory cannot be properly read or written. Measure: Contact Huawei technical support for repair.

B Acronyms and Abbreviations

A

ASIC	application-specific integrated circuit

C

CAN	control area network
CPLD	complex programmable logical device

D

DIP	dual in-line package
DOD	depth of discharge
DSP	digital signal processing

E

EPO	emergency power-off
ECO	economy control operation
EOD	end of discharge
ESD	electrostatic discharge
ESN	equipment serial number

H

HTTPS	Hypertext Transfer Protocol Secure

L

LCD	liquid crystal display

LSI	large-scale integrated
M	
MIB	management information base
N	
NMS	network management system
P	
PFC	power factor correction
PE	protective earthing
PL	parallel load
PVC	polyvinyl chloride
R	
RS232	Recommend Standard 232
RS485	Recommend Standard 485
S	
SELV	safety extra-low voltage
SNMP	Simple Network Management Protocol
T	
THDv	total harmonic distortion of output voltage
TNV	telecommunication network voltage
U	
UPS	uninterruptible power system
USB	Universal Serial Bus
V	
VRLA	valve regulated lead acid

