

UPS2000-G-6KRTLL Quick Guide

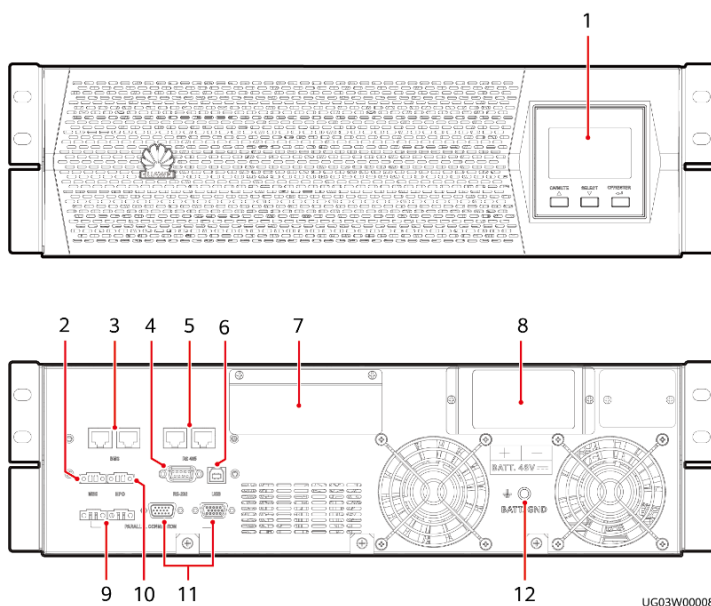
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1 Overview

UPS Model	Represented By	Weight	Dimensions (H x W x D)
UPS2000-G-6KRTLL	6 kVA	15 kg	131 mm x 438 mm x 480 mm



- | | | |
|--|--|---|
| (1) LCD | (2) MBS port | (3) BMS ports |
| (4) RS232 communications port | (5) RS485 communications ports (connect to northbound devices) | (6) USB port |
| (7) AC input and output terminals (behind the cover) | (8) Battery input terminal (behind the cover) | (9) Parallel current equalization ports |
| (10) EPO port | (11) Parallel communications ports | (12) Battery PE terminal ports |

NOTE

The RS485 ports support only the Modbus RTU protocol. For details, see the Modbus development guide and Modbus user manual.

2 Installing a UPS

NOTICE

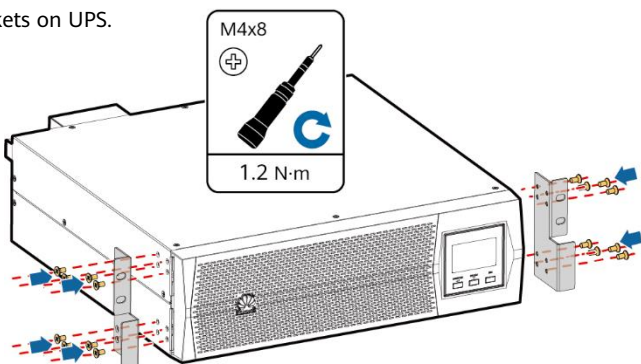
1. Carefully read the *UPS2000-G-6KRTLL User Manual* prior to installation to get familiar with product information and safety precautions.
2. Use fully insulated tools during installation and operation.
3. Only engineers certified by the manufacturer or its agent are allowed to install, commission, and maintain the UPS. Otherwise, personal injury or equipment damage may occur, and the UPS faults caused are beyond the warranty scope of Huawei.

Scenario Rack-Mounting the UPS2000-G

NOTE

1. Reserve a space of 1 U in the middle of four batteries for routing battery power cables.
2. Reserve a space of 5 cm between the battery communications port and the cabinet for installing a communications cable.
3. Reserve a space of 44 mm between the battery edge and the rack edge for installing battery power cables.
4. In rack-mounted installation scenarios, the front panels of the UPS and lithium batteries are not on the same plane.
5. The guide rails for the UPS2000-G-6KRTLL are 592.37 mm to 807.37 mm long, 30 mm wide, and 87 mm high. The guide rails are scalable and support Huawei M-shaped cabinets.

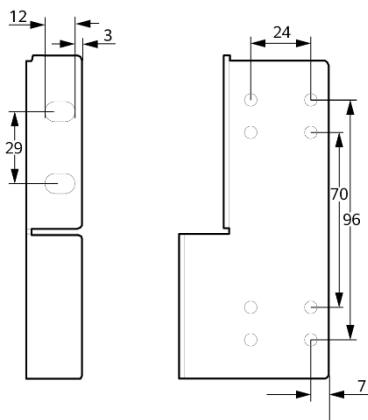
1. Install mounting brackets on UPS.



UG03H00005

NOTE

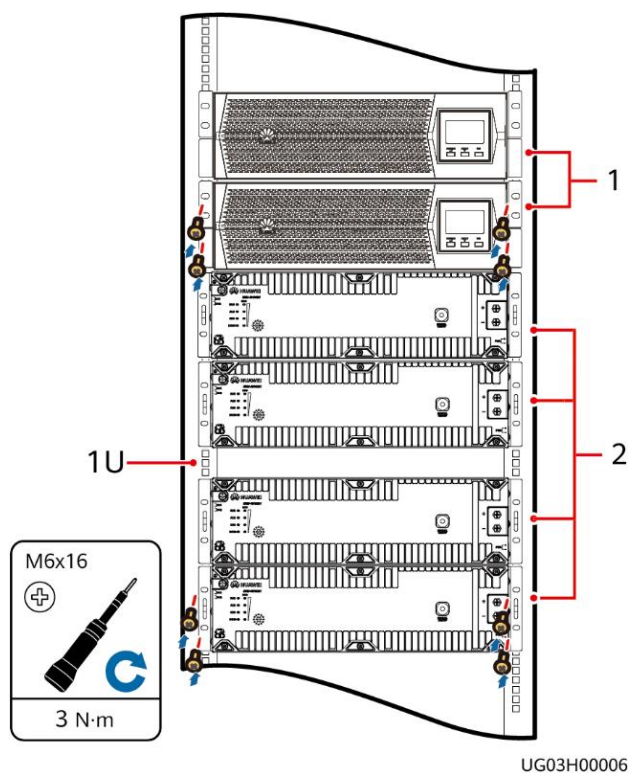
UPS mounting ear dimensions (unit: mm)



Front view

Side view

2. Install devices from bottom to top, as shown in the figures.



(1) UPS

(2) Lithium batteries

3 Installing Cables

WARNING

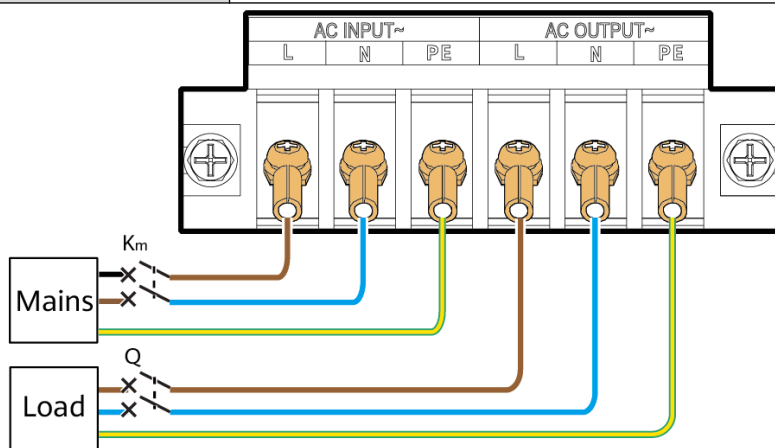
- Connect UPS AC input and output power cables in the same phase sequence. Connect battery terminals correctly.
- Before connecting cables to the UPS, ensure that the input, output, and battery circuit breakers are OFF to prevent operations with power applied.

3.1 Installing Power Cables

Scenario 1 Installing Cables for a Single UPS

1. Install AC input and output power cables.

Wiring Terminal	Input (AC INPUT)	Output (AC OUTPUT)
External Circuit Breaker	32 A	
Earth Leakage Circuit Breaker	100 mA	-
Cable Cross-sectional Area	6 mm ²	
Terminal Type	OT-6 mm ² -M5 terminal	
Torque for Tightening Bolts	2 N·m	



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2. Install battery cables.

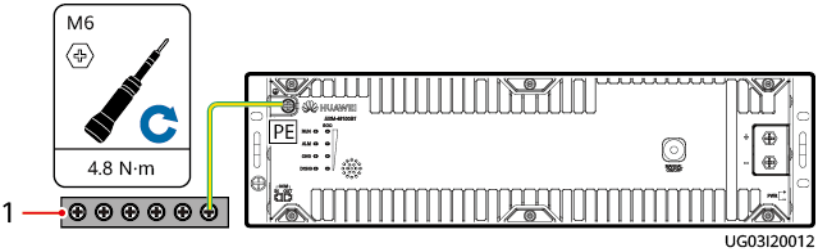
NOTE

1. The UPS2000-G-6KRTLL needs to connect to external lithium batteries ESM-48100B1 or ESM-48150B1. Each UPS supports a maximum of 16 batteries connected in parallel. This document uses four lithium batteries connected in parallel as an example.
2. When lithium batteries are connected, it is recommended that a DC circuit breaker (150 A 80 V DC circuit breaker for the 6 kVA UPS) be installed between the lithium batteries and the UPS.
3. Before connecting cables to the UPS, ensure that the battery circuit breakers are OFF to prevent operations with power applied.
4. If the UPS shares a battery string, the PE bar and battery busbar are configured.

Recommended power cable specifications

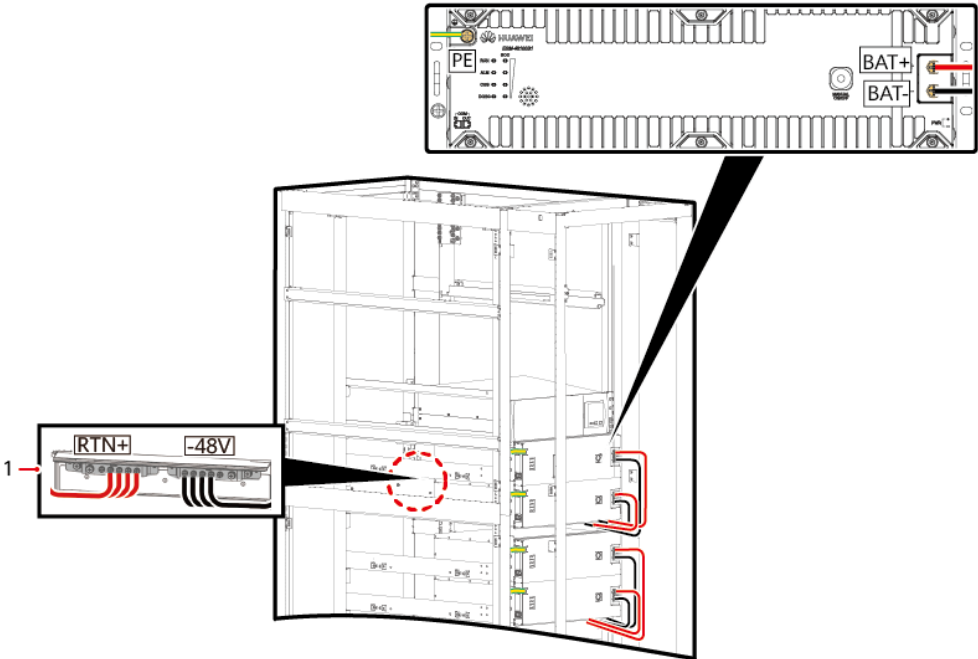
Wiring Terminal	Battery (BATT. 48VDC)
External Circuit Breaker	125 A (type D)
Cable Cross-sectional Area	25 mm ²
Terminal Type	OT-25 mm ² -M8 terminal
Torque for Tightening Bolts	7 N·m

Installing the battery PE cable



(1) Ground bar

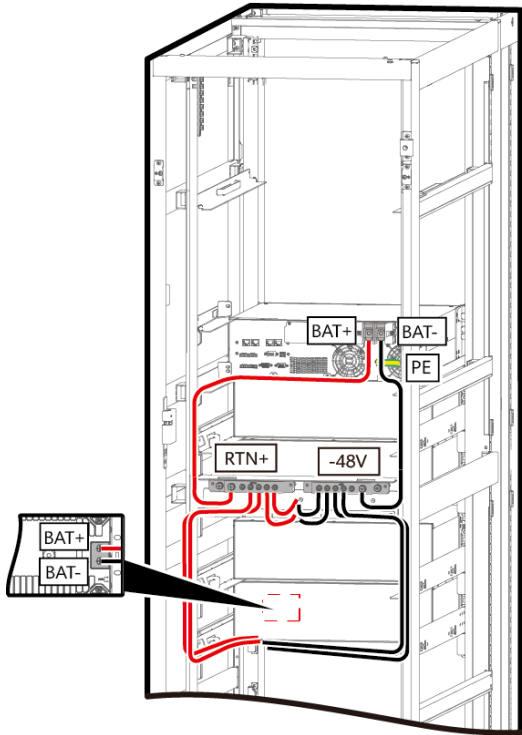
Installing battery cables (rack-mounted, front view)



(1) Busbar

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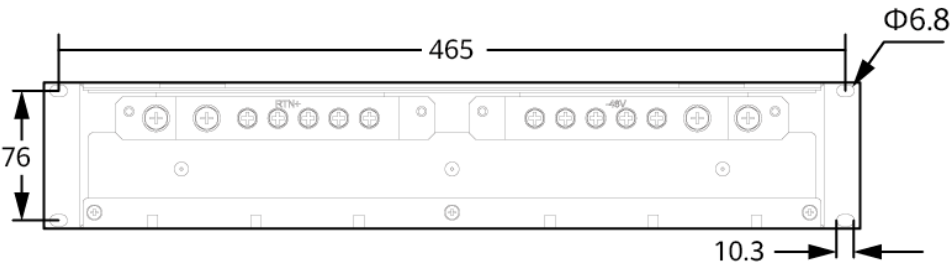
Installing battery cables (rack-mounted, rear view)



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 NOTE

Busbar mounting hole dimensions (unit: mm)

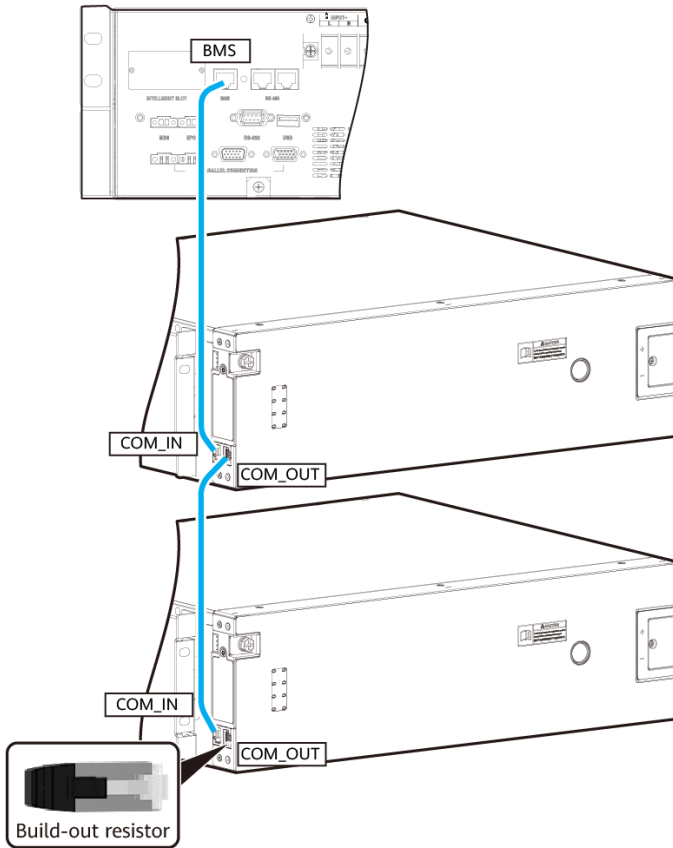


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3. Install battery communications cables.

NOTICE

Install a build-out resistor at the COM_OUT port on the last lithium battery.



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Scenario 2 Installing Cables for Parallel UPSs

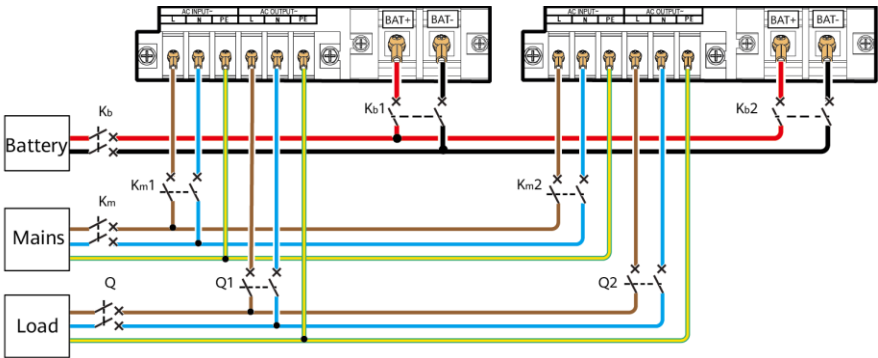
NOTICE

- Before parallel running, ensure that all output circuit breakers for each UPS are ON. Otherwise, a UPS fault (error code #72) will occur.
- Batteries must be connected for parallel running.

1. Install AC input and output power cables.

 **NOTE**

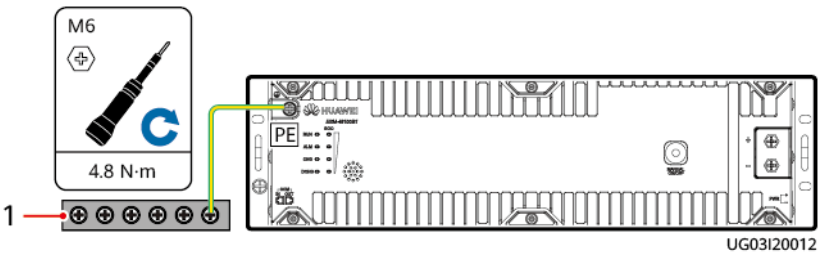
Two UPSs connected in parallel are used as an example.



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2. Install battery cables.

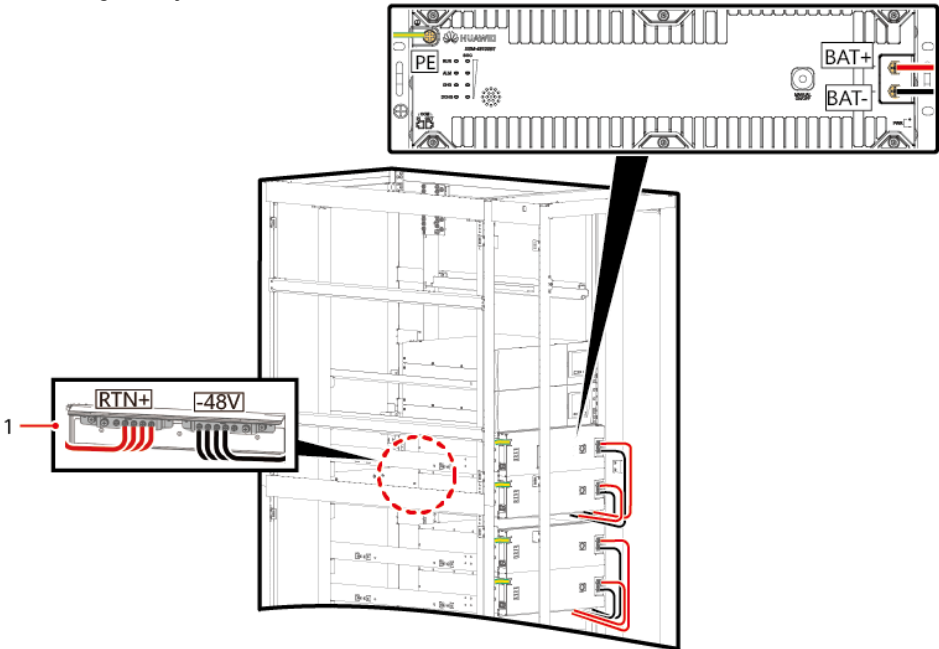
Installing the battery PE cable



UG03120012

(1) Ground bar

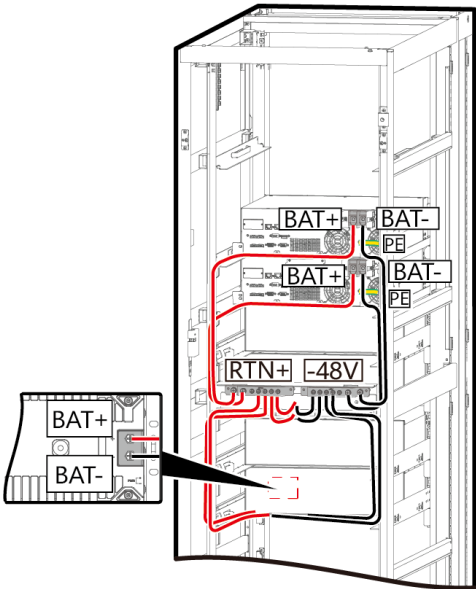
Installing battery cables (rack-mounted, front view)



(1) Busbar

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Installing battery cables (rack-mounted, rear view)

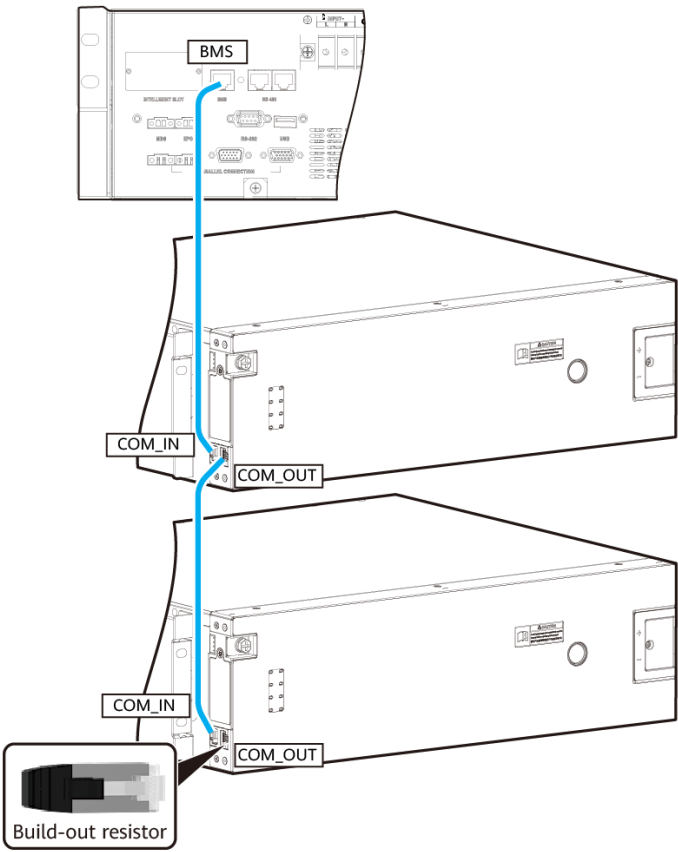


UG03I30005

3. Install battery communications cables.

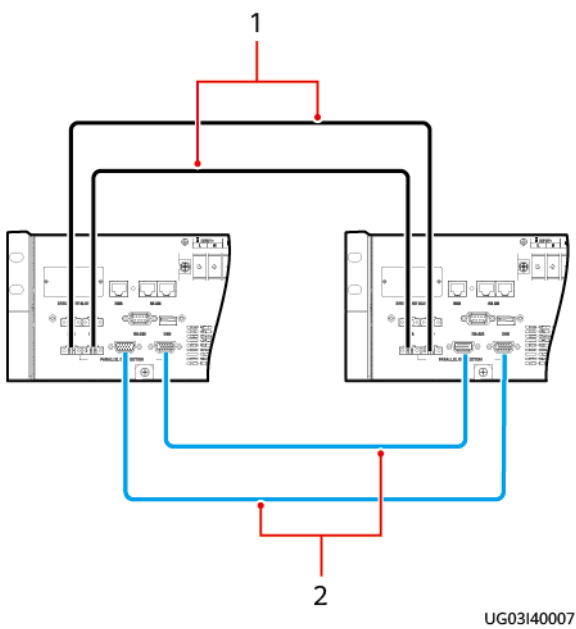
NOTICE

Install a build-out resistor at the COM_OUT port on the last lithium battery.



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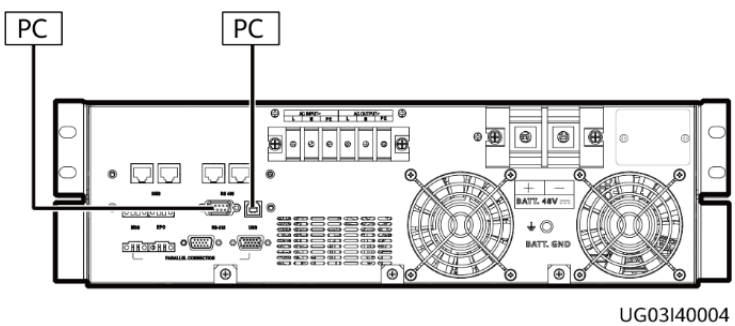
4. Install parallel communications cables and parallel current equalization cables. In this example, two UPSs are connected in parallel.



(1) Parallel current equalization cables (2) Parallel communications cables

3.2 Installing Communications Cables

- NOTE**
1. The USB channel supports a serial data communications protocol between the UPS and a PC.
 2. If you connect a DB9 connector to the RS232 port, the UPS can exchange data with the PC over serial communication.
 3. You can use only either USB or RS232.



4 Verifying the Installation

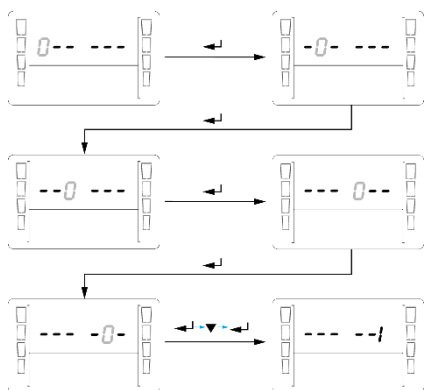
No.	Item	Expected Result
1	Cable routing	Cables are routed properly according to engineering requirements.
2	Cable connection	All cables are connected securely and correctly, and they are free of damage. Bolts are tightened to specified torque using a torque wrench.
3	Cable connection to USB, network, and other ports	Signal cables to USB, network, and other ports are connected securely and correctly.
4	Cable labels	Labels are neatly attached to both ends of each cable, and the information on the labels is concise and legible.
5	Ground cable connection	The UPS ground cable is securely connected to the equipment room ground bar. Use a multimeter to measure the resistance between the UPS ground cable and the equipment room ground bar. The resistance is less than 0.1 ohm.
6	Spacing between cable ties	Distances between cable ties are the same, and no burr exists.
7	Operating environment	The inside and outside of the cabinet are free from conductive dust or other sundries.

5 Operations

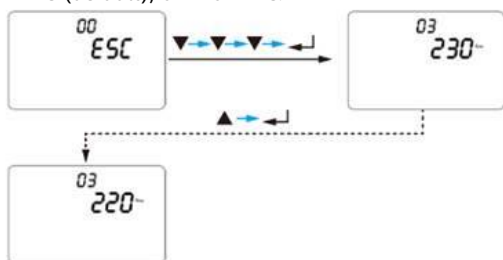


5.1 Setting Key UPS Parameters

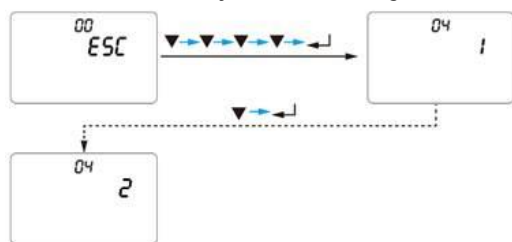
1. Switch on the external battery circuit breaker (if any).
2. Switch on the external AC input circuit breaker (if any) of the UPS. The UPS transfers to the standby mode.
3. Press and hold SELECT for 1s on a non-setting screen to access the login screen for parameter settings. The initial password is 000001. Enter the correct password to enter the UPS setting mode.



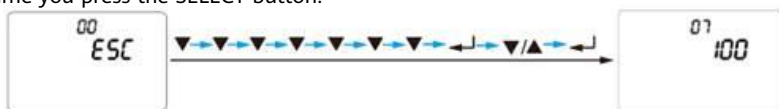
4. Set the output voltage to 220 V AC or other values based on site requirements. The value can be 220 V AC, 230 V AC (default), or 240 V AC.



5. In a parallel system, set the number of parallel UPSs to 2 or other values on each UPS based on site requirements. The value is 1 by default and range from 1 to 4.



6. Set the battery capacity to 100 Ah or other values based on site requirements. The value is 100 Ah by default and can range from 50 Ah to 2400 Ah. The value increases by 50 Ah each time you press the SELECT button.

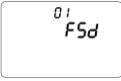
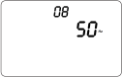
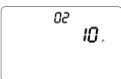
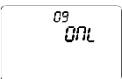
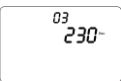
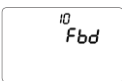
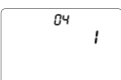
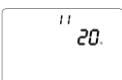
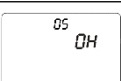
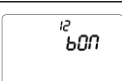
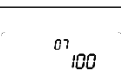
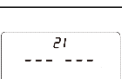


7. Press ON/MUTE+SELECT to return to the standby screen.

NOTE

For details about parameter settings, see the *UPS2000-G-6KRTLL User Manual*.

Common Settings

Code	Display	Description	Code	Display	Description
01		Forcibly exit the fault mode (disabled by default)	08		Output frequency
02		Maximum charge current	09		Online mode (default)
03		Output voltage	10		Disable battery discharge test (default).
04		Number of parallel UPSs	11		SOC percentage
05		Battery discharge time	12		Buzzer on (default)
07		Battery capacity setting	21		Password setting

5.2 Starting the Inverter

On the standby screen, press and hold down **ON/MUTE** for more than 5 seconds. Release the button when you hear a beep tone. If the UPS starts successfully, it enters the normal mode. After you ensure that the UPS runs properly, switch on the AC output circuit breaker on the UPS and start loads.

5.3 Shutting Down the Inverter

1. Shut down loads.
2. Press and hold down **OFF/ENTER** for more than 5s. Release the button when you hear the buzzer buzzing. The UPS shuts down the inverter and transfers to bypass mode. If mains parameters are inconsistent with bypass parameters, the UPS transfers to standby mode.
3. Switch off the UPS AC input circuit breaker (on the power distribution cabinet or external switch) and output circuit breaker (if any) based on site requirements.
4. Switch off the external battery circuit breaker (if any), or disconnect battery power cables (if there is no external battery circuit breaker).

6 Alarm Handling

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
01	Fan blocked	Minor	The fan automatically recovers from blockage.	The fan blockage signal is at low level for 15s within 30s.	The current working status is not affected. If overtemperature protection is triggered, the system may transfer to bypass mode.	•Possible cause: The fan is blocked. Measure: Check the fan and remove sundries. •Possible cause: The fan is faulty. Measure: Replace the fan.
02	Overtemperature	Critical	Fan blocked: The highest temperature of internal components is lower than 65° C. Fan not blocked: The highest temperature of internal components is lower than 50° C. After the temperature is restored to normal, the alarm can be automatically cleared for three times. After that, you need to manually clear the alarm.	Fan blocked: The highest temperature of internal components exceeds 80° C for 100 ms. Fan not blocked: The highest temperature of internal components exceeds 90° C for 100 ms.	The system shuts down the inverter and transfers to bypass mode.	•Possible cause: The temperature is too high. Measure: Decrease the ambient temperature or load. •Possible cause: The temperature sensor is faulty. Measure: Send the device to the maintenance center.

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
03	High battery voltage	Critical	The alarm is automatically cleared when the battery voltage is lower than 58 V.	The battery voltage is greater than 60 V for 3s.	The system shuts down the inverter and transfers to bypass mode.	•Possible cause: The battery is faulty. Measure: Replace the battery or discharge the battery to a normal voltage. •Possible cause: The sampling is faulty due to environmental factors. Measure: Send the device to the maintenance center.
04	Very low battery voltage	Minor	The battery voltage is higher than 42 V and the mains is connected properly.	The battery voltage is lower than 42 V.	The system cannot supply power in battery mode. If this alarm is generated in battery mode, the power output will be disconnected.	•Possible cause: The battery is faulty. Measure: Replace the battery or charge the battery to a normal voltage. •Possible cause: The sampling is faulty due to environmental factors. Measure: Send the device to the maintenance center.
05	Output short-circuit	Critical	The alarm can be automatically cleared for three times. After that, you need to manually clear the alarm or restart the device.	The output voltage is lower than 50 V and the current is higher than 20 A for more than five cycles of time.	The system disconnects the power output.	Possible cause: The load or cable is short-circuited. Measure: Locate and rectify the short-circuit fault.
06	High output voltage	Critical	You need to manually rectify the fault or power off and restart the device.	The output voltage exceeds the rated voltage by 20 V for 3s.	The system shuts down the inverter and transfers to bypass mode.	•Possible cause: Load energy backfeed occurs. Measure: Locate the load and remove it. •Possible cause: The circuit is faulty. Measure: Send the device to the maintenance center.

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
07	Overload	Critical	You need to manually rectify the fault or power off and restart the device.	The output overload time exceeds the specification.	The system disconnects the power output.	Possible cause: The load exceeds the UPS capacity. Measure: Reduce the load.
08	High bus voltage	Critical	When the bus voltage is lower than 360 V, the alarm can be automatically cleared for two times. After that, you need to manually clear the fault or power off and restart the device.	The bus voltage is greater than 450 V for 200 ms or greater than 470 V for 1 ms.	The system shuts down the inverter and transfers to bypass mode.	•Possible cause: Power grid surge occurs. Measure: Improve the power grid quality. •Possible cause: The parallel cable is disconnected when UPSs are connected in parallel. Measure: Check that the parallel cable and current equalization cable are properly connected. •Possible cause: The circuit is faulty. Measure: Send the device to the maintenance center.
09	Bus short-circuit	Critical	You need to manually rectify the fault or power off and restart the device.	The bus soft-start time exceeds 15s.	The system cannot start inverter output and transfers to bypass mode.	Possible cause: The circuit is faulty. Measure: Send the device to the maintenance center.
12	Manual bypass activated	Minor	The open-circuit status of the manual bypass is restored.	The manual bypass port is short-circuited.	The system transfers to bypass mode.	Restore the open-circuit status of the manual bypass port.

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
13	Phase lock failure	Minor	Phase locking is successful or the bypass is missing.	The inverter fails in phase locking within 10s.	The system cannot start PFC or enter normal mode.	Possible cause: The power grid frequency is unstable.
17	Bypass abnormal	Minor	The bypass voltage or frequency recovers to the normal range.	The bypass voltage or frequency is out of the normal range.	•The system cannot transfer to bypass mode when a critical alarm is generated. •In bypass mode, the power output is disconnected.	•Check that the bypass connection is normal. •Check that the bypass voltage and frequency are within their normal ranges.
18	Low lithium battery level	Minor	The battery voltage or SOC rises above the alarm threshold.	Communication is normal, but the SOC is lower than 20%. Communication is abnormal, and the battery voltage falls to 47 V DC.	The battery level is close to the cutoff threshold. If there is no mains input, the system will shut down after working for a period of time.	Possible cause: The battery charge level is low. Measure: Charge the battery.
19	Abnormal mains voltage	Minor	The mains voltage input recovers.	•The mains is disconnected or fails. •The mains input voltage harmonic exceeds 10% (square wave input is not supported). •The mains frequency change rate exceeds the phase lock rate defined in the specifications (2 Hz/s for a single UPS and 1 Hz/s for a parallel system).	The system cannot work in normal mode. If this alarm is generated in normal mode, the system transfers to battery mode.	Check whether the mains voltage input is normal. If the circuit is faulty, send the device to the maintenance center.

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
20	Lithium battery high temperature protection	Minor	The cell temperature drops below the protection threshold.	•Charge high temperature protection: The maximum cell temperature is greater than 60° C. •Discharge high temperature protection: The maximum cell temperature is greater than 65° C.	The internal switch circuit of the lithium battery is disconnected, and the battery cannot be charged or discharged.	Possible cause: The ambient temperature of the lithium battery is too high. There are abnormal heat sources around the lithium battery. Measure: If the lithium battery cannot be recovered due to protection against abnormality, contact local Huawei engineers to rectify the fault.
21	Lithium battery low temperature protection	Minor	The cell temperature rises above the protection threshold.	•Charge low temperature protection: The minimum cell temperature is less than 0° C. •Discharge low temperature protection: The minimum cell temperature is less than -20° C.	The internal switch circuit of the lithium battery is disconnected, and the battery cannot be charged or discharged.	Possible cause: The ambient temperature of the lithium battery is too low. The heater cannot work properly. Measure: If the lithium battery cannot be recovered due to protection against abnormality, contact local Huawei engineers to rectify the fault.
23	Lithium battery low voltage protection	Minor	The cell or battery string voltage rises above the protection threshold.	The lithium battery voltage is less than 44 V. The minimum cell voltage is less than 2.5 V.	The internal switch circuit of the lithium battery is disconnected, and the battery cannot be charged or discharged.	Possible cause: The mains power has failed and not been recovered for a long time. The cell consistency is abnormal. The capacity attenuation is too fast or the internal resistance is too large. Measure: If the lithium battery cannot be recovered due to protection against abnormality, contact local Huawei engineers to rectify the fault.

Alarm ID	Alarm Name	Severity	Clearance Condition	Trigger Condition	Impact on the System	Suggestion
24	Lithium battery overcurrent protection	Minor	The battery discharge current drops below the protection threshold.	Discharge current ≥ 0.93 times of the current limit and $V_{bus} \leq 40$ V for 15s Discharge current ≥ 0.98 times of the current limit and $V_{bus} < 17$ V for 8s	The internal switch circuit of the lithium battery is disconnected, and the battery cannot be charged or discharged.	Possible cause: The UPS is overloaded. The number of working batteries is insufficient. Measure: Reduce the load. Add batteries.
27	Battery discharge test function enabled	Minor	The battery discharge test is complete.	Battery discharge test is enabled manually.	The system transfers to battery mode.	Measure: Turn off the battery discharge test mode switch.
28	The battery discharge time reaches the maximum.	Minor	Set item 05 battery discharge time to 0 or restart the inverter.	The battery discharge time reaches the preset value.	The system cannot supply power in battery mode. If this alarm is generated in battery mode, the power output will be disconnected.	Check whether the mains input is normal.

Huawei Technologies Co., Ltd.

Huawei Industrial Base, Bantian, Longgang
Shenzhen 518129 People's Republic of China
www.huawei.com