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# **Liebert ITA 6kVA** *User Manual*



# Liebert® ITA 6kVA UPS

## Inatallation & Commissioning Manual

Version	V1.0
Revision date	December 7, 2010
BOM	31012296

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# Safety Precautions

To ensure smooth installation and operation, please read this manual carefully before installing and operating the Liebert® ITA 6kVA UPS (UPS for short). For detailed product information, refer to the *Liebert® ITA 6kVA UPS User Manual* in the VCD delivered with the product.

The UPS must be installed and commissioned by engineers designated by the manufacturer or its agent. Failure to observe this could result in personnel safety risk, UPS malfunction and invalidation of warranty.

The UPS has been designed for commercial and industrial use only, and is not recommended for use in life support applications.

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



Note

Non-authorized personnel are prohibited from installing or commissioning the Liebert® ITA 6kVA UPS.

## Earth Connection



Warning

Earth connection is essential before connecting the input and output cables. This equipment must be earthed in accordance with the local electrical regulations.

## Maintainable Components



Warning

All internal maintenance and servicing procedures of the equipment should be carried out only by trained personnel with tools. Components (including the components behind the protective cover) which can only be removed by using a tool are restricted to service personnel.

The UPS meets the safety requirements completely in operator access area. Only service personnel can touch the hazardous voltage components inside the UPS and battery module. However, the risk of touching these voltages is minimized as the components with hazardous voltage may be touched only uses a tool to remove the protective cover. No risk will exist if you follow the general norms and in accordance with the procedures recommended in this manual on equipment operation.

## Battery High Voltage



Warning

Tools or keys must be used for all batteries maintenance, which should be carried out by trained personnel. Battery use requires special care. After the battery is connected, the battery terminal will output DC high voltage, and physical contact would be fatal.

Battery manufacturer provides the precautions to be observed when working on the battery string. These precautions should be followed implicitly at all times. Particular attention should be paid to the recommendations concerning local environmental conditions and the provision of protective clothing, first aid and fire-fighting facilities.

# Contents

Chapter 1 Product Introduction .....	1
1.1 Appearance .....	1
1.2 Specification .....	1
Chapter 2 Single UPS Installation And Commissioning .....	2
2.1 Installation Preparation .....	2
2.2 Mechanical Installation.....	2
2.2.1 Tower Installation .....	2
2.2.2 Rack Installation .....	4
2.3 Connecting Power Cables .....	6
2.3.1 Connecting I/O Cables.....	7
2.3.2 Connecting Battery Cables.....	9
2.3.3 Connecting External 10A Charger Cables .....	11
2.4 Single UPS Commissioning .....	12
2.4.1 Check Before Startup .....	12
2.4.2 Single UPS Parameters Setting.....	12
2.4.3 Normal Mode Startup.....	16
2.4.4 Battery Mode Startup.....	17
Chapter 3 Parallel UPS Installation And Commissioning .....	18
3.1 Mechanical Installation.....	18
3.2 Connecting Power Cables .....	18
3.2.1 Connecting I/O Cables.....	18
3.2.2 Connecting Parallel Cables .....	19
3.3 Parallel System Commissioning.....	20
3.3.1 Check Before Startup .....	20
3.3.2 Startup Commissioning For Parallel System .....	20
Chapter 4 Communication.....	22
4.1 Connecting USB Communication Cable .....	22
4.2 Installing Communication Devices (Optional) .....	22
Chapter 5 Troubleshooting.....	23

## Chapter 1 Product Introduction

Liebert® ITA 6kVA UPS (UPS for short) is an intelligent online UPS system with sine wave output developed by Emerson Network Power Co., Ltd. The UPS offers reliable and high quality AC power to the precision instrument.

The UPS adopts modular design, and rack/tower installation can be used depending on your requirements. It is applicable to supplying AC power to small scale computer center, network, communication system, automatic control system and precision instrument.

### 1.1 Appearance

The front panel of the UPS is shown in Figure 1-1.

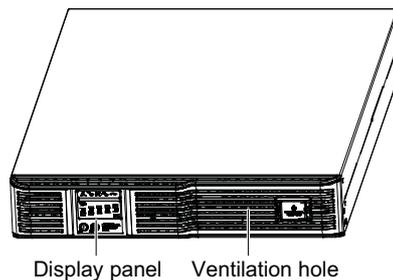


Figure 1-1 Front panel of the UPS

The rear panel of the UPS is shown in Figure 1-2.

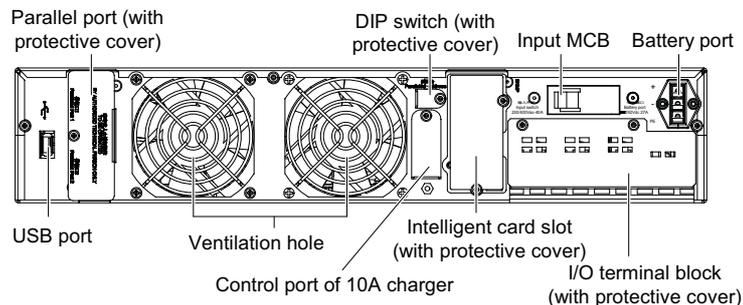


Figure 1-2 Rear panel of the UPS



Note

Non-authorized personnel are prohibited from opening the UPS chassis cover.

### 1.2 Specification

As shown in Table 1-1, two models are available: standard model and long-time delaying model.

Table 1-1 Product specification

Type	Dimension (W × H × D, mm)	Weight (net weight/gross weight)	Model
UHA1R-0060/ 01200456	435 × 88 × 630	17kg/20.5kg	Standard UPS
UHA1R-0060L/ 01200461	435 × 88 × 630	18kg/21.5kg	Long-time delaying UPS

## Chapter 2 Single UPS Installation And Commissioning

This chapter introduces the single UPS installation, power cable connection and commissioning.

### 2.1 Installation Preparation

#### Installation environment

- Well-ventilated; far away from water, heat source, flammables and explosive substances.
- Avoid direct sunlight.
- Free of dust, volatile gas, corrosive materials and excessive salt.

If necessary, an indoor exhaust fan should be installed to keep the indoor temperature from rising. An air filter should be used where the UPS is to operate in a dusty environment.

#### Installation clearances

The internal fans provide forced air cooling for the UPS. The hot air will be exhausted through the ventilation holes of the UPS rear panel. Therefore, do not obstruct the ventilation holes.

Maintain at least 200mm clearances between the UPS and the wall or adjacent equipment, so as not to obstruct the UPS ventilation and heat dissipation. Otherwise, the UPS internal temperature will rise, which will shorten the UPS life.

#### Installation tools

- Cross head screwdriver (EJ5100mm): Remove the screws of the UPS top plate, or open the chassis.
- Slotted screwdriver (EJ375mm): Connect input and output cables.
- Diagonal plier (MTC3C): Make input and output cables.
- Wire-pressure plier (YT-12): Press wires for I/O terminal block.

#### Unpacking inspection

After the UPS arrival, you should unpack it and check the following items:

1. Visually inspect the UPS appearance for transportation damage. If any problem is found, please notify the carrier immediately.
2. Check the accessories and models against the delivery list.

### 2.2 Mechanical Installation

Two installation modes are available: tower installation and rack installation. You can select an appropriate installation mode according to the actual conditions.

#### 2.2.1 Tower Installation

1. Adjust the display panel.



#### Note

1. For the tower installation, you need to adjust the display panel; for the rack installation, ignore this step.
  2. When adjusting the display panel, there is no need to open the chassis of the UPS.
- 

- 1) Take off the fixing screws (2 pcs), and hold the left side of the display panel to pull it out.
- 2) Turn the display panel 90° counter clockwise, and then put it to its original place.
- 3) Tighten the fixing screws.

Taking the rack installation for example, when switching from rack installation to tower installation, adjust the display panel as the following procedures shown in Figure 2-1.

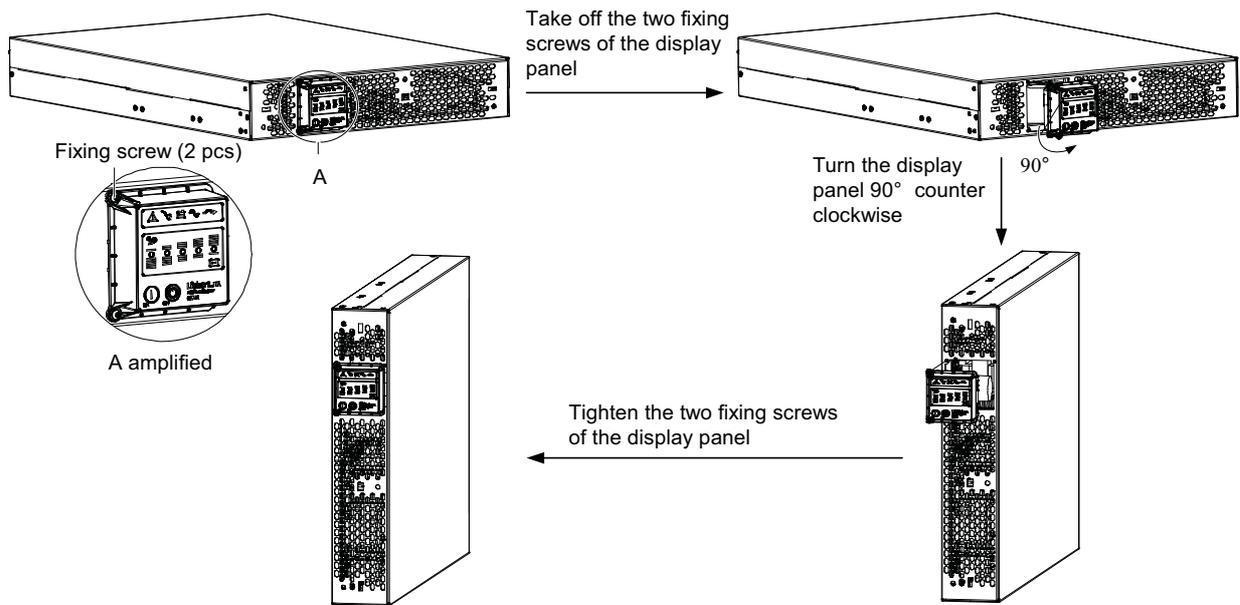


Figure 2-1 Adjusting the display panel

2. Install the plastic panel.

1) Take out the plastic panel from the package of the UPS.

2) Align the plastic panel with the display panel of the UPS, and press the metal buckles at both sides of the plastic panel into the square holes on the front panel of the UPS according to the arrow direction, as shown in Figure 2-2.

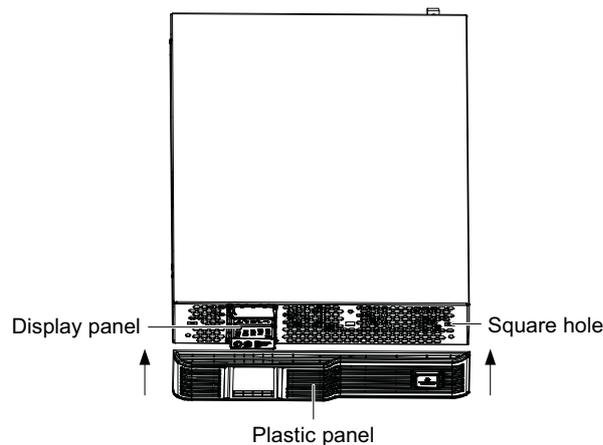


Figure 2-2 Installing the plastic panel



#### Note

You do not need to remove UPS when removing the plastic panel. Press the two ends of the plastic panel by hands, and gently pull the plastic panel outwards to remove it.

3. Take out the support bases from the accessories, assemble a pair of support bases through fastenings, as shown in Figure 2-3, and put them onto the flat installation table.

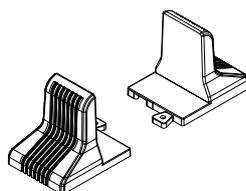


Figure 2-3 Installing the support base

4. If the battery module is necessary, take out the support base extensions delivered with the battery module, and then assemble the support base extensions and the support bases through fastenings, as shown in Figure 2-4.

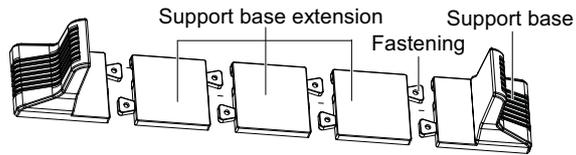


Figure 2-4 Connecting the support base with support base extension

5. Place the UPS and the battery module (if necessary) on the support bases and support base extensions. Each UPS needs two pairs of support bases to install, as shown in Figure 2-5.

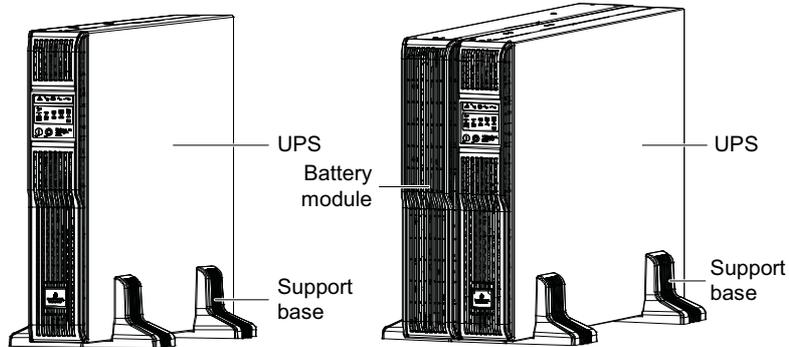


Figure 2-5 Installing the UPS and the battery module

### 2.2.2 Rack Installation

#### Installation procedures for UPS

1. Install the plastic panel, refer to 2.2.1 Tower Installation for the method.
2. Take out the brackets and eight M4 × 10 screws from the accessories. Through the installation hole 1, use M4 × 10 screws to fix the two brackets respectively on both sides of the UPS front panel, as shown in Figure 2-6.

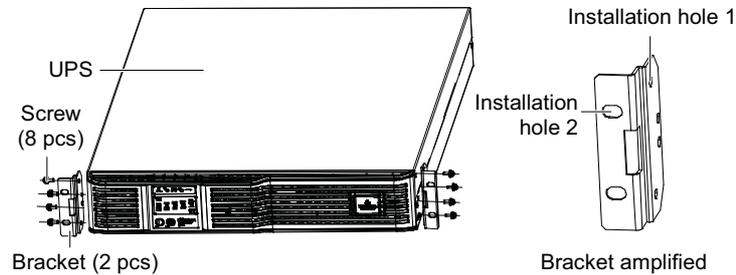


Figure 2-6 Installing brackets

 **Note**

Moving the UPS through brackets is prohibited.

3. Install the guide rails.

You need to use guide rails when selecting Liebert® ITA series UPS and its options, and the rack installation.

The installation procedures of the guide rails are as follows:

- 1) Take out the guide rails (one left guide rail and one right guide rail), guide rail screws and panel screws from the package, distinguish the left and right guide rail according to Figure 2-7, and confirm its retractable function respectively.

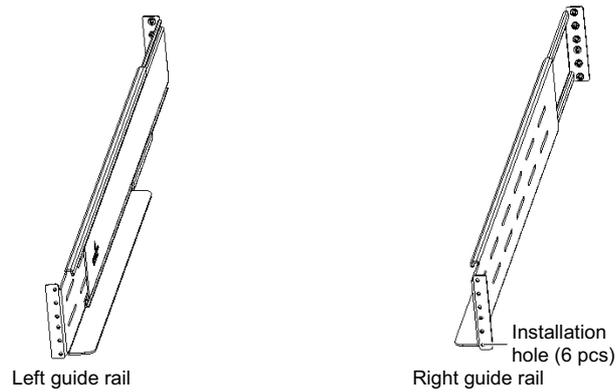


Figure 2-7 Guide rail

Distinguish the guide rail screw and panel screw according to Figure 2-8.

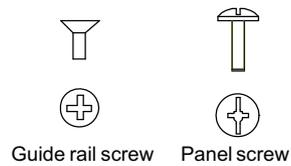


Figure 2-8 Appearance of screw

2) Adjust the guide rail length according to the rack dimensions.

3) Align the installation holes of the guide rail with the square holes of the rack, fix the guide rail to the rack through the guide rail screws (a total of eight), each left and right guide rail needs four guide rail screws, as shown in Figure 2-9.

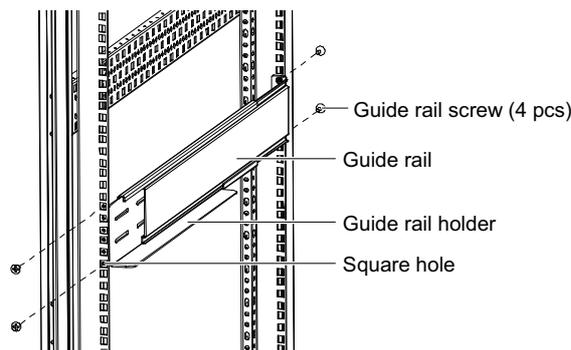


Figure 2-9 Installing guide rail



Note

1. The guide rail holder must be close to the front of the rack.
2. Each guide rail has six installation holes (as shown in Figure 2-7), do not use the two installation holes in the middle when fixing the guide rail. It is recommended to use the top and bottom installation holes (from top to bottom, installation hole 1 and installation hole 6).

The guide rail installation is finished, as shown in Figure 2-10.

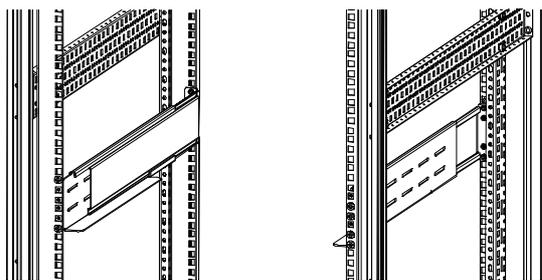


Figure 2-10 Guide rail installation complete

4. Place the UPS on the guide rails in the rack, and push it completely into the rack. Use four M6 × 16 screws to fix the UPS in the rack through the installation hole 2, as shown in Figure 2-11.

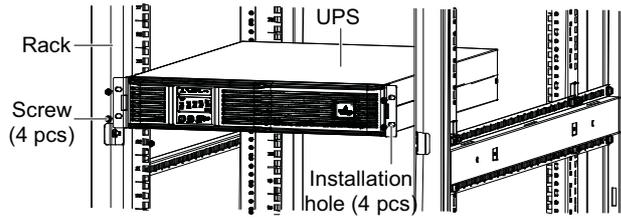


Figure 2-11 Installing UPS

**Installation procedures for UPS with battery modules**

The installation method of the battery module is the same as that of the UPS. Repeat the preceding procedures to install and fix the battery module and UPS into the rack one by one, as shown in Figure 2-12.

As the battery module is heavy, pay attention to the following items in installation:

- Install the battery modules first, start the installation from the bottom, and then place the UPS onto the top, as shown in Figure 2-12.
- Moving the UPS and battery modules through brackets is prohibited.
- Two persons or more are required for the installation.

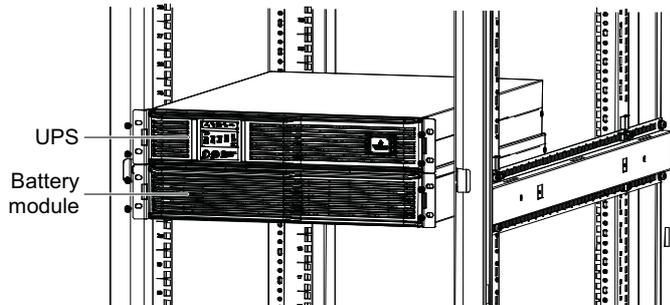


Figure 2-12 Installation of UPS with battery module

**2.3 Connecting Power Cables**

I/O cables, battery cables and external 10A charger cable (optional) are required for connection. When connecting the cables, you should follow the local wiring regulations, take the environment situation into account, and refer to Table 3B of IEC60950-1.

The max. current in different operating modes is listed in Table 2-1, and the recommended min. cable CSAs for users are listed in Table 2-2. Select appropriate cables according to Table 2-1 and Table 2-2.

Table 2-1 Max. steady state AC and DC current

Model	Rated current (A)				Battery discharging current upon min. battery voltage
	Mains input current <sup>1, 2</sup> upon battery charging with max. ability		Gross output current <sup>2</sup> at full load		
	220V	230V	220V	230V	
6kVA (1-in 1-out)	31	31	27	26	38
6kVA (3-in 1-out)	13	13	27	26	38

Note:

When selecting the battery cables, according to the current value shown in table, the max. allowable voltage drop is 4Vdc. Do not ring the cables to avoid increasing the electromagnetic interference (EMI).

1: The mains current input of the rectifier and bypass.

2: Non-linear load (switch power) affects the neutral cable design of output and bypass. The neutral cable current may exceed the rated phase current, in general, 1.732 times as large as the rated current

Table 2-2 Single UPS cable CSA (unit: mm<sup>2</sup>, ambient temperature: 25°C )

Model	Input	Output	Neutral line	PE	Battery
6kVA (1-in 1-out)	6	6	6	6	6
6kVA (3-in 3-out)	6	6	6	6	6

The recommended capability of the UPS I/O MCB is listed in Table 2-3, select appropriate I/O MCB according to your requirements.

Table 2-3 UPS I/O MCB selection

Model	Input interface	Recommended capability of input external MCB	Battery MCB	Output interface	Recommended capability of output external MCB
6kVA (1-in 1-out)	Terminal block	63A	DC63A	Terminal block	40A
6kVA (3-in 1-out)	Terminal block	63A	DC63A	Terminal block	40A

 Note
1. The UPS is high leakage current equipment, it is not recommended to configure the MCB with leakage current protection function. 2. To ensure the reliable connection, the pipe type connection terminal (accessory of the UPS) is required for all cable connections.

### 2.3.1 Connecting I/O Cables

**Notes**

1. Do not reverse the input neutral line and live line!
2. Do not use a wall socket to feed power to the UPS. Otherwise, the socket may be burned.
3. Connect the output neutral line, live line and ground line correctly and reliably. For the sake of safety, the output ground line must be connected before the output neutral line and live line.
4. Install a three-pole or quadrupole linkage breaker on the mains input neutral line and live line to facilitate cutting power in emergency. Adopt correct power distribution method (see Figure 2-13) to ensure safety of the UPS and loads.

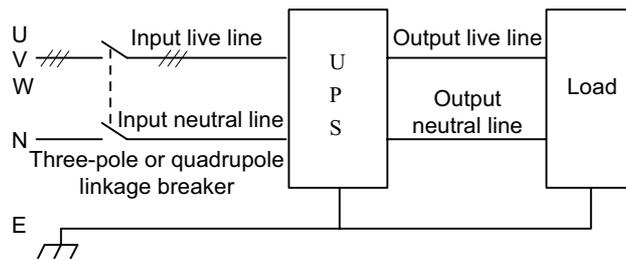


Figure 2-13 Correct power distribution method

The power cables of the UPS should be connected through the I/O terminal block located on the UPS rear panel. Remove the protective cover of the I/O terminal block, you will see layout of the I/O terminal block shown in Figure 2-14

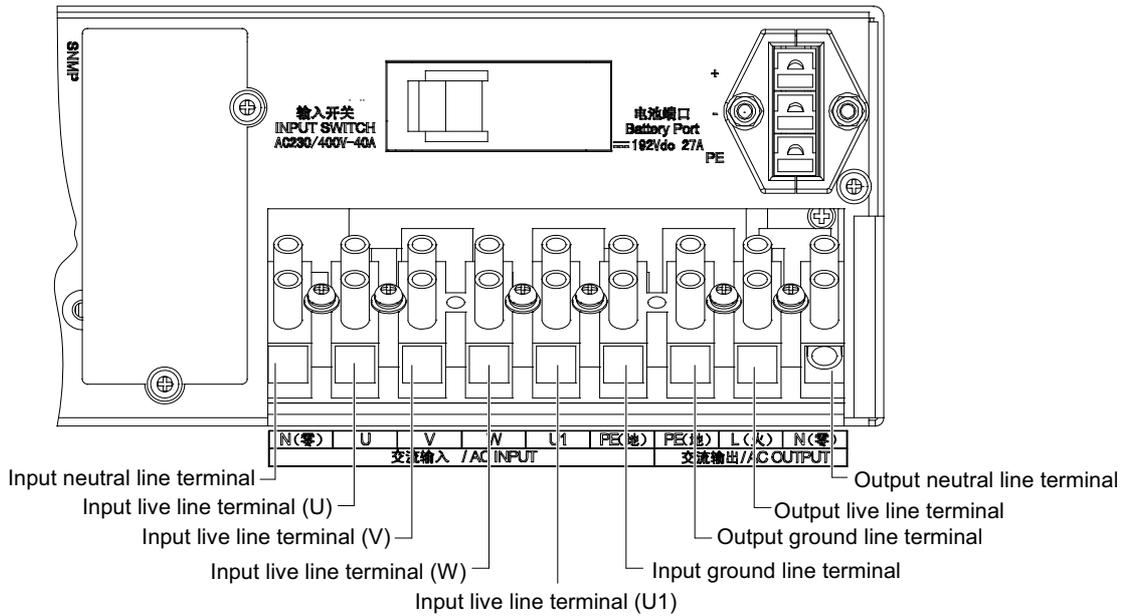


Figure 2-14 Terminals layout of the I/O terminal block

**Power distribution mode**

According to the user’s requirements, the I/O cable connections are divided into two types: 1-in 1-out (default) and 3-in 1-out.

The connection procedures of the preceding two types are described in the following.

● 1-in 1-out (default)

1. Make sure that all the external I/O MCBs of the UPS are open.
2. Remove the protective cover of the I/O terminal block.
3. Connect the mains input N line, L line and PE line respectively to the input neutral line terminal, input live line terminal (U), input ground line terminal of the UPS I/O terminal block, and tighten the fixing screws. Short the input live line terminal (V), input live line terminal (W) and input live line terminal (U1) using the shorting line (label: W01), as shown in Figure 2-15.
4. Connect the output L line, N line and PE line respectively to the output live line terminal, output neutral line terminal and output ground line terminal of the UPS I/O terminal block, and tighten the fixing screws, as shown in Figure 2-15.
5. Restore the protective cover of the I/O terminal block.

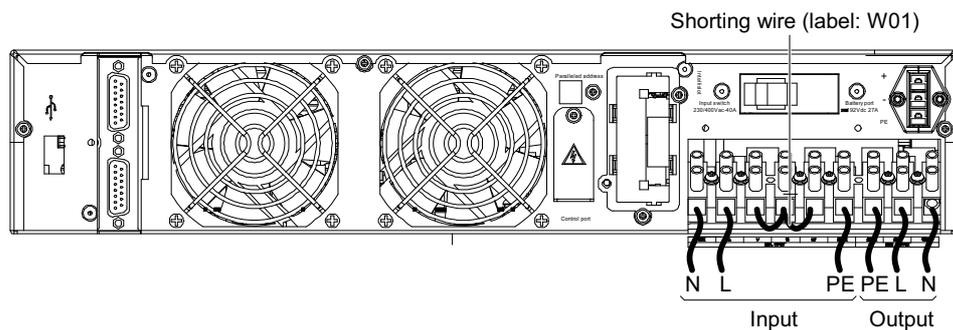


Figure 2-15 Cable connection for 1-in 1-out

● 3-in 1-out


Warning

The default power distribution mode of this UPS is 1-in 1-out. If 3-in 1-out is needed, you should switch from 1-in 1-out to 3-in 1-out according to the following steps, and then continue the installation and commissioning.

1. Remove the shorting line (label: W01, see Figure 2-15) from the I/O terminal block of UPS.

2. Connect the mains input live line (phase A, phase B and phase C), N line and PE line respectively to the input live line terminal (U), input live line terminal (V), input live line terminal (W), input neutral line terminal and input ground line terminal of the UPS I/O terminal block. The input live line terminal (U1) is not connected, as shown in Figure 2-16.

3. Connect the output L line, N line and PE line respectively to the output live line terminal, output neutral line terminal and output ground line terminal of the UPS I/O terminal block, as shown in Figure 2-16.

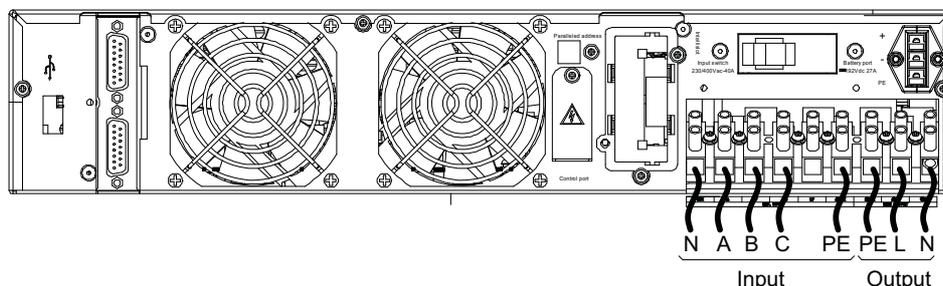


Figure 2-16 Cable connection for 3-in 1-out

### 2.3.2 Connecting Battery Cables

#### External battery module connection principle diagram of the power distribution by user

The default battery number of UPS is 16-cell. The principle diagram is shown in Figure 2-17.

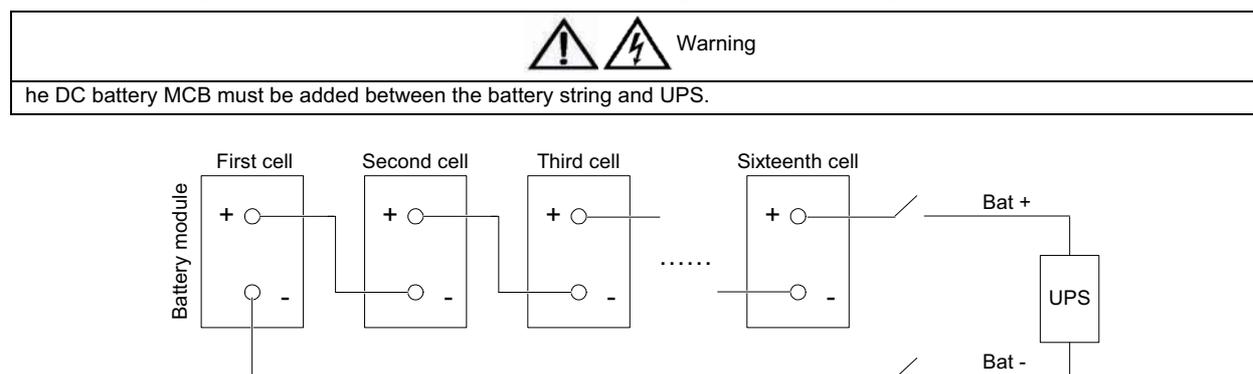


Figure 2-17 Battery module connection principle diagram

#### Notes

Before connecting the battery cable, check that:

1. The battery string comprises batteries of the same manufacturer, same model, and same use state.
2. The battery number complies with the UPS specifications, that is, sixteen 12V batteries are connected in series.
3. Confirm with a voltmeter that the battery string voltage is about 200Vdc after the series connection.

⚠ Note
<ol style="list-style-type: none"> <li>1. Non-authorized personels are prohibited from connecting the battery cable.</li> <li>2. It is prohibited to reverse the positive pole and negative pole of the battery.</li> <li>3. Different UPSs cannot use the same battery module. Otherwise, the UPS will be damaged.</li> <li>4. The length of the battery cable configured with standard UPS is 0.5m, and that of the long-time delaying UPS is 1.5m. It cannot be extended unlimitedly (<math>\leq 3</math>m).</li> <li>5. Shut down the UPS before replacing the battery and connecting the battery cable.</li> </ol>

#### Battery cable connection for standard UPS

Standard UPS provides a battery cable A, which is used to connect the battery module with the UPS, as shown in Figure 2-18.

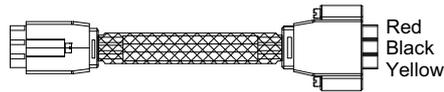


Figure 2-18 Battery cable A

The connection procedures are as follows:

1. Make sure that all the external I/O MCBs of the UPS are open.
2. Confirm with a voltmeter that no DC voltage is present on the battery ports shown in Figure 1-2 on the rear panel of the UPS.
3. Take out the battery cable A from the UPS accessories, connect the red, black and yellow terminal of one end of the battery cable A to the corresponding terminal of the battery port located on the rear panel of the UPS, and connect the other end of the battery cable A to one of the battery ports of the battery module, as shown in Figure 2-19.

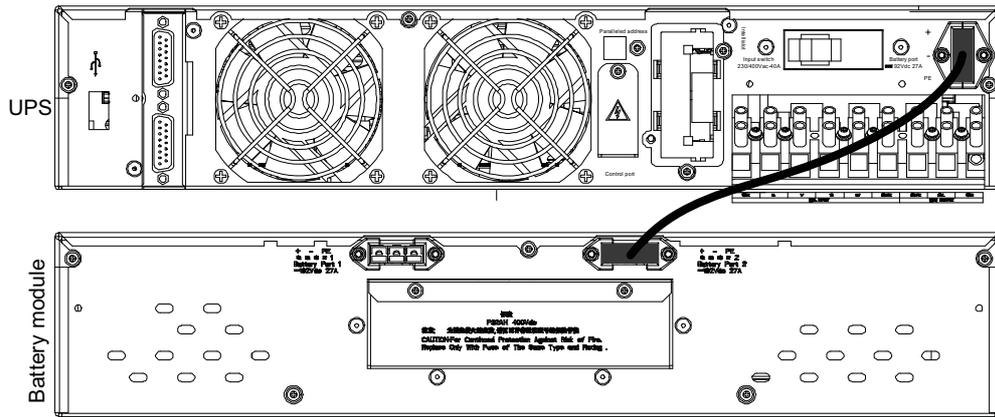


Figure 2-19 Battery cable connection for standard UPS

**Battery cable connection for long-time delaying UPS (battery cabinet is used)**

Long-time delaying UPS provides a battery cable B, which has a PP45 plug on one end, and three OT terminals on the other end, as shown in Figure 2-20. It is used to connect the battery cabinet to the UPS.

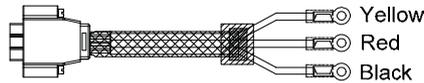


Figure 2-20 Battery cable B

The connection procedures are as follows:

1. Disconnect the input MCB of the external battery cabinet.
2. Connect the red line and black line of the OT terminals to the positive pole and the negative pole of the battery input MCB respectively, and connect the yellow line to the PE terminal of the battery cabinet.

<b>Note</b>
<p>If the OT terminal does not match the connection terminals of the battery input MCB, cut the OT terminals and peel the battery cable B to an appropriate length of the copper core and then connect it to the battery input MCB.</p>

3. Use the user-prepared red line and black line to connect the positive pole and the negative pole of the battery input MCB to the positive pole and the negative pole of the battery string respectively.
4. Insert the PP45 plug into the battery port on the rear panel of the UPS, as shown in Figure 2-21.

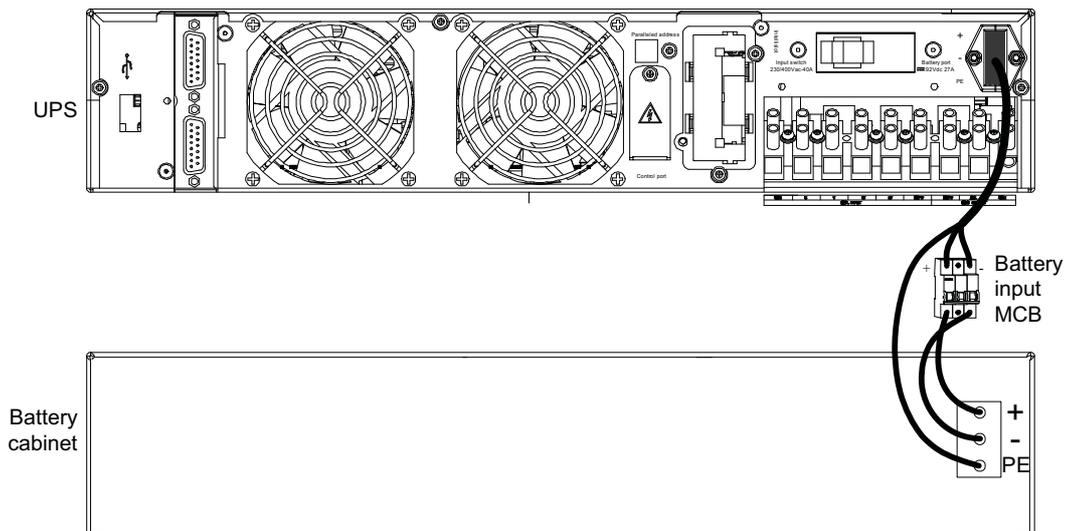


Figure 2-21 Battery cable connection for long-time delaying UPS

### 2.3.3 Connecting External 10A Charger Cables

The external 10A charger is optional; its cable connection procedures are as follows:

1. Take out the external 10A charger cable (DB9) from its package, remove the protective cover of the control port on the rear panel of the external 10A charger (see Figure 2-22), and insert one end of the cable into the control port.
2. Remove the protective cover of the control port on the rear panel of the UPS, and insert the other end of the cable into the control port of 10A charger, as shown in Figure 2-22.

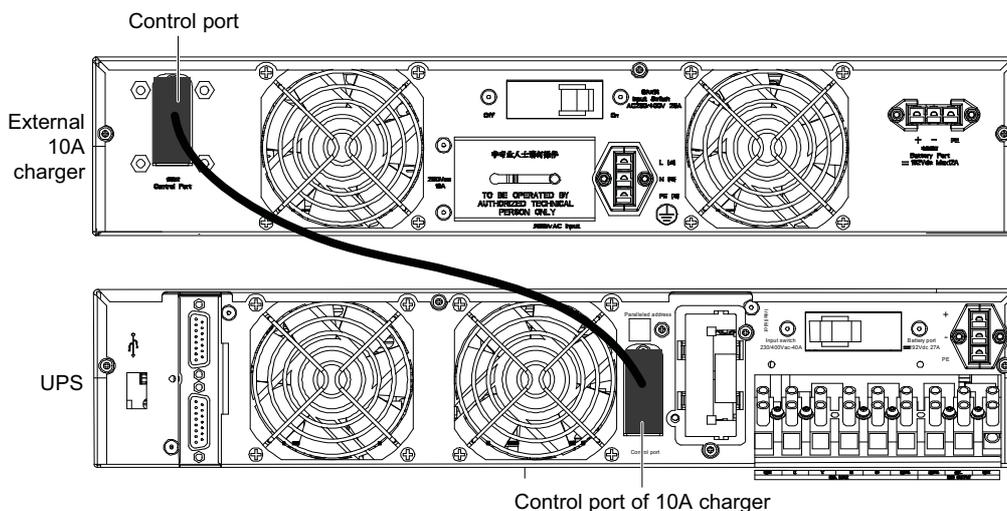


Figure 2-22 External 10A charger cable connection

3. Use a screwdriver to tighten the fixing screws of the cable ports.



Note

1. Refer to *UF-BCH192/10 Charger Module User Manual* for other connections between the external 10A charger and the UPS.
2. After removing the protective cover of the control port, please take care of the protective cover. When the control port is not used, restore the protective cover to its original place to avoid electric shock.

After the cable connection, find the label shown in Figure 2-23 on the enclosure of the UPS and click “√” after “AC INPUT” according to the actual situation for easy maintenance.

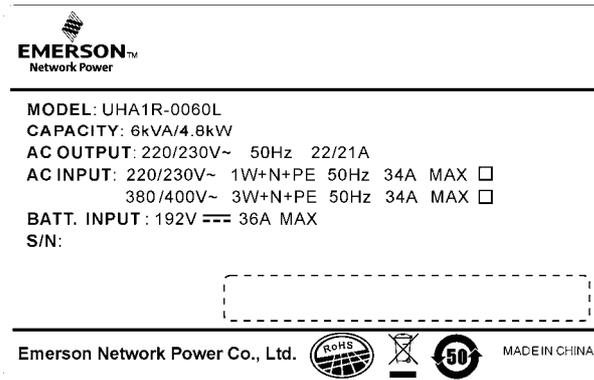


Figure 2-23 Label

## 2.4 Single UPS Commissioning

### 2.4.1 Check Before Startup

1. Check and confirm that the power distribution mode of the main UPS is correct; that the connections of the power cables and signal cables are correct and there is no short circuit.
2. Check and confirm that the battery installation and cable connection are correct and battery polarity is correct.
3. Measure and confirm that the mains voltage and frequency are normal.
4. The output terminals of the UPS are energized upon power-on. If the load is connected with the output terminals, make sure that the power to the load is safe.

### 2.4.2 Single UPS Parameters Setting

#### Parameters setting of the standard LED display panel

There are LED indicators and functional keys on the LED display panel, as shown in Figure 2-24.

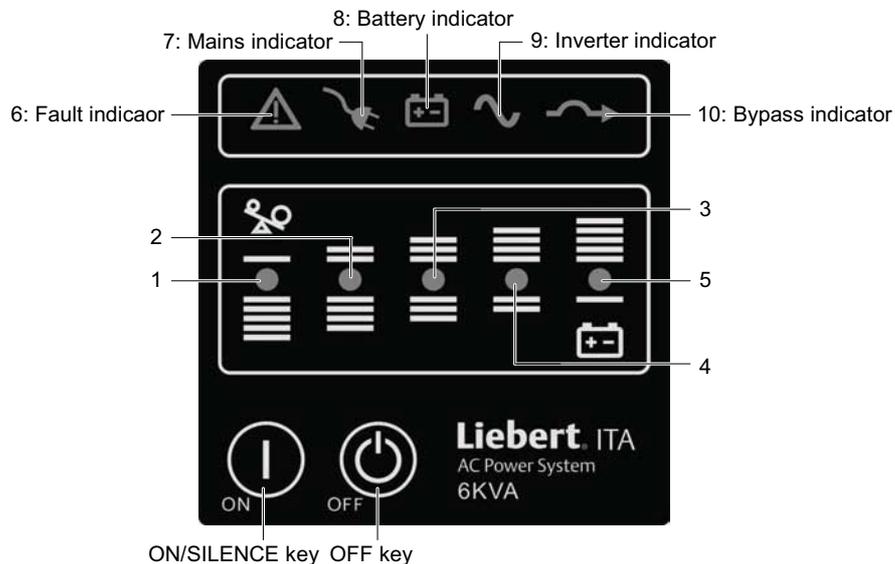


Figure 2-24 LED display panel

The ten indicators can be divided into two groups according to the applications.

1. UPS state indicators: Including fault indicator (red), mains indicator (green), battery indicator (green), inverter indicator (green) and bypass indicator (green).
2. UPS load battery capacity and fault orientation indicator: Including five indicators, of which four indicators are green and one indicator is yellow. The yellow indicator indicates the UPS load over-capacity or battery capacity too-low. The UPS load battery capacity and fault orientation indicator is used to indicate the load capacity of the UPS. In Battery

mode, it indicates the battery capacity. Upon UPS failure, it works with the UPS state indicators to indicate the fault type of the UPS. The details are described in Table 2-4.

Table 2-4 Indicators combining to indicate the fault type of the UPS

Operation state		Indicator No. (see Figure 2-24)										Alarm
		1	2	3	4	5	6	7	8	9	10	
Normal mode	5% ~ 25% load capacity	●						●		●		
	26% ~ 50% load capacity	●	●					●		●		
	51% ~ 75% load capacity	●	●	●				●		●		
	76%~ 95% load capacity	●	●	●	●			●		●		
	96% ~ 105% load capacity	●	●	●	●	●		●		●		
	> 105% load capacity	●	●	●	●	●		●		●		□2Hz
Battery mode	0% ~ 25% battery capacity					●			●	●		□1Hz
	26% ~ 50% battery capacity				●				●	●		□1/3Hz
	51% ~ 75% battery capacity			●	●				●	●		□1/3Hz
	76% ~ 95% battery capacity		●	●	●				●	●		□1/3Hz
	> 96% battery capacity	●	●	●	●				●	●		□1/3Hz
Bypass mode	< 105% load capacity	⊙	⊙	⊙	⊙	⊙		●			●	
	> 105% load capacity	●	●	●	●	●		●			●	□2Hz
Inverter standby	< 105% load capacity	⊙	⊙	⊙	⊙	⊙		●		▣	●	
	> 105% load capacity	●	●	●	●	●		●		▣	●	□2Hz
Non-operation mode								⊙				
Short fault						▣	●					◇
Charger failure					▣		●	⊙	⊙	⊙	⊙	◇
Fan/over-temperature fault				▣			●	⊙	⊙	⊙	⊙	◇
Parallel current sharing failure			▣				●	⊙	⊙	⊙	⊙	◇
Rectifier failure (bus voltage abnormal)		▣					●	⊙	⊙	⊙	⊙	◇
Battery fault (high voltage)		⊙	⊙	⊙	⊙	⊙		⊙	▣	⊙	⊙	
Battery fault (no battery, reverse connection)		⊙	⊙	⊙	⊙	⊙	●	⊙	▣	⊙	⊙	◇
Other failures (auxiliary power supply failure and inverter failure)		⊙	⊙	⊙	⊙	⊙	●	⊙	⊙	⊙	⊙	◇
Note: ○ : off; ● : on; ▣ : flashes; ⊙ : ensures according to the current operation mode of the UPS; ◇ : alarm lasting; □ : alarm; when the UPS is in normal mode, the mains indicator and inverter indicator are on												

### 1. Output voltage level setting

The UPS can set the level of the output voltage (220V and 230V are optional), and the default value is 220V. It is prohibited to set by yourself, if the setting needs to be changed, please contact the agents.

### 2. Other settings

Set other parameters through Sitemonitor software. Refer to the Sitemonitor guideline attached in the VCD for its installation and usage. The settable parameters are listed in Table 2-5.

Table 2-5 Settable parameters

Parameter	Description	Default
Self-test cycle	Set the self-test cycle of the battery	Disabled
ECO function	Set whether ECO function is enabled	Enabled
EOD startup	Set whether startup is automatic	Enabled

**Parameters setting of the optional LCD display panel**

There are LED indicators, LED display screen and functional keys on the LCD display panel, as shown in Figure 2-25.

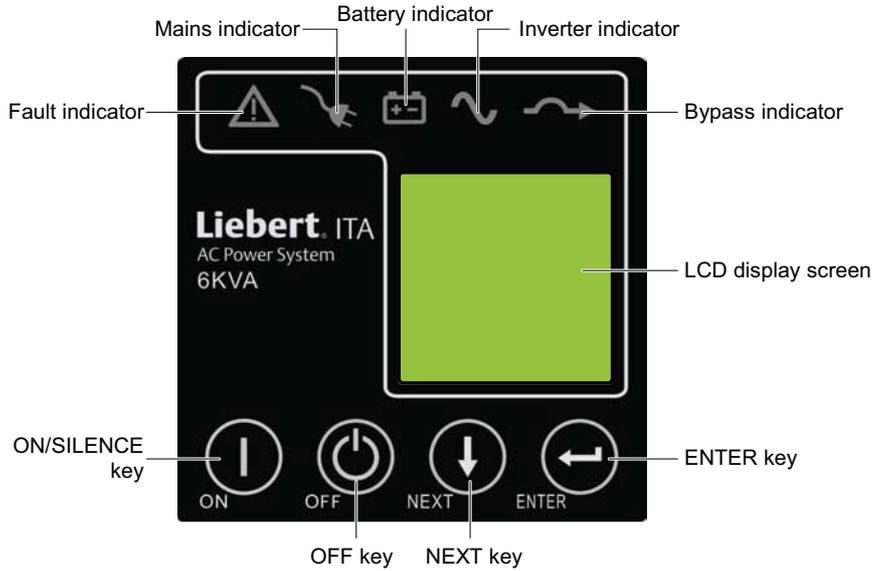


Figure 2-25 LCD display panel

The descriptions of the functional keys are listed in Table 2-6.

Table 2-6 Descriptions of the functional keys

Keys	Description
ON/SILENCE key	1. Starting inverter: When the inverter is off, pressing and holding this key for one second starts the inverter. 2. Silencing alarm: When the UPS has an audible alarm, pressing and holding this key for one second silences the alarm. 3. Initiating battery self-test: When the UPS is in normal mode, pressing and holding this key for four seconds initiates battery self-test
OFFkey	1. Turning off inverter: When the UPS is in normal mode or battery mode, pressing and holding this key for one second turns off the inverter, then the UPS turns to the bypass mode. 2. UPS accessing to standby state: When the UPS is in bypass mode, pressing and holding this key for ten seconds turns off the UPS bypass output, then the UPS accesses to standby state
NEXT key	Pressing and holding this key for less than one second shifts between menu items on the same level and selects parameters. Pressing and holding this key for more than one second turns on/turns off the backlight on the LCD display screen
ENTER key	Pressing and holding this key for less than one second opens the selected menu. Pressing and holding this key for more than one second returns to previous menu

The interfaces of the LCD display screen include power-on interface and menu interface.

1. Power-on interface

The power-on interface displays the UPS series, product type and company name for about 20 seconds, as shown in Figure 2-26.

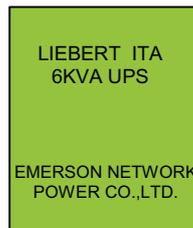


Figure 2-26 Power-on interface

2. Menu interface

The menu interface includes running interface, alarm message interface and setting interface, the main menu interface is shown in Figure 2-27.

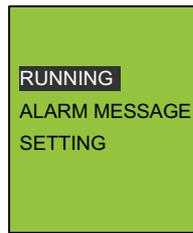
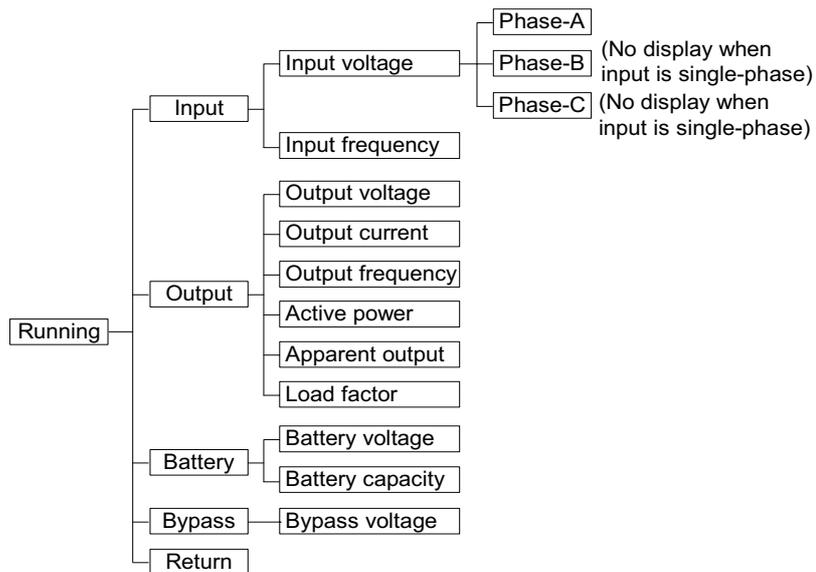
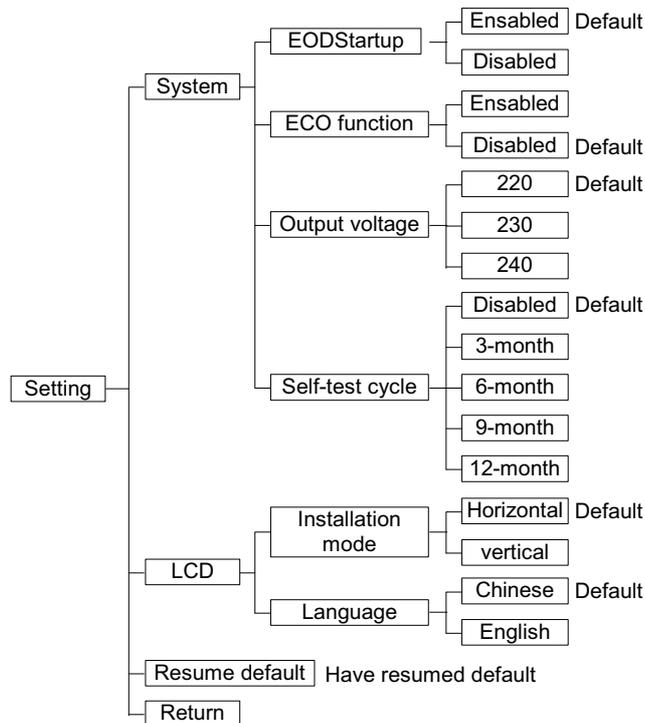


Figure 2-27 Main menu interface

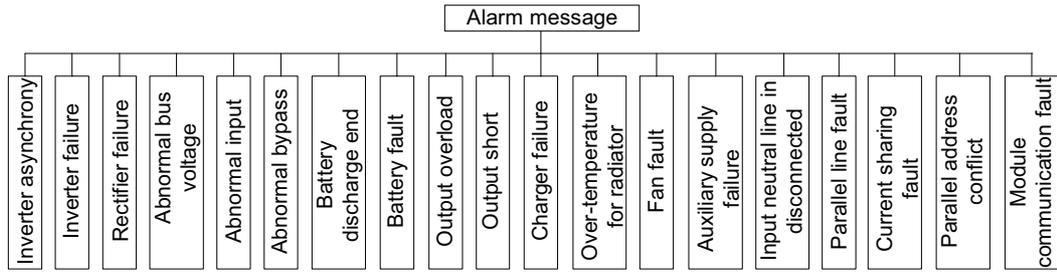
You can enter the corresponding interfaces through the functional keys on the LCD display panel. The structure diagrams of each level menu are shown in Figure 2-28; the interfaces are refreshed every other second.



Running menu



Setting menu



Alarm message menu

Figure 2-28 Structure diagram of the menu interface

The parameters of the single UPS can be set through the LCD display panel; the parameters are listed in Table 2-7.

Table 2-7 Setting parameter of the single UPS

Parameter	Description	Default
Output voltage	Set the level of the output voltage (240V is disabled)	220V
Self-test cycle	Set the self-test cycle of the battery	Disabled
ECO function	Set whether the ECO function is active	Disabled
EOD startup	Set whether startup is automatic	Enabled
Language	Set the LCD displayed language	Chinese

**Note**

1. Two output frequencies of the UPS are available: 50Hz and 60Hz. Select the appropriate output frequency according to the input frequency, there is no need to set.
2. When power on at the first time, you should adopt normal mode to confirm the output frequency, otherwise the UPS will output 50Hz (default).

### 2.4.3 Normal Mode Startup

1. Close the external input MCB, output MCB and the input MCB on the rear panel of the UPS (see Figure 1-2) on by one, and make sure that the battery connection is reliable.

**Warning**

After closing the external output MCB, the UPS output terminal block and power distribution end of the load will be live, pay attention to the personnel safety to avoid electric shock. Check whether the power supply to the load is safe.

2. Power on the UPS to enter the self-test status (including the battery self-test), all the LED indicators blink, and the buzzer beeps at intervals. After the self-test, the UPS enters the standby mode, and the mains indicator turns on, as shown in Figure 2-29.

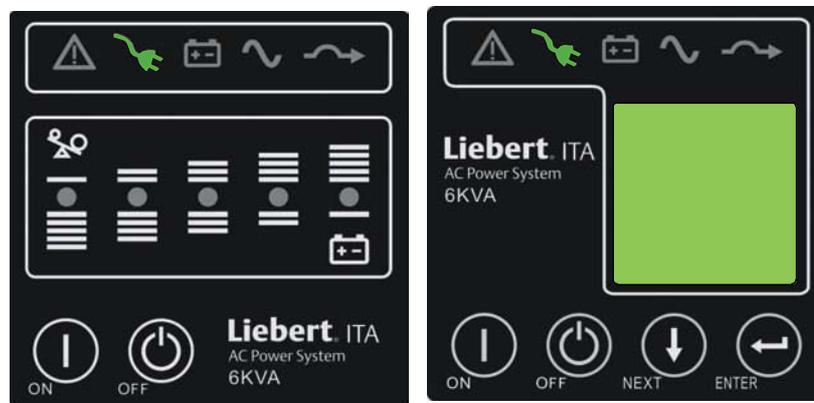


Figure 2-29 Indicators' status

3. Press the ON/SILENCE key for more than one second, and wait for thirty seconds, the UPS will enter the inverter standby mode automatically, at this time, the inverter indicator blinks. After the UPS has output, the inverter indicator will be on, as shown in Figure 2-30.

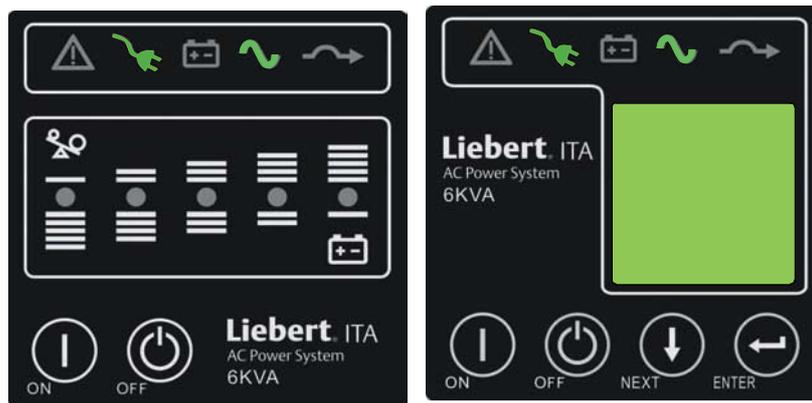


Figure 2-30 Indicators' status

4. Measure whether the inverter output voltage is normal.

#### 2.4.4 Battery Mode Startup

1. Close the battery MCB, press the ON/SILENCE key for more than one second, the UPS will start up and enter the self-test status (including battery self-test). All LED indicators blink, the buzzer beeps at intervals. After the self-test, the UPS will enter the standby mode.
2. Press the ON/SILENCE key for more than one second, and wait for thirty seconds, the UPS will enter the inverter standby mode automatically, the inverter indicator blinks. After the UPS has output, the inverter indicator will be on, as shown in Figure 2-31.

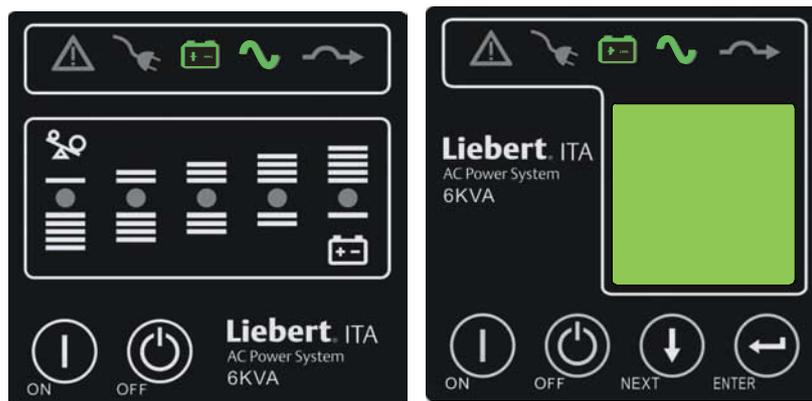


Figure 2-31 Indicators' status

## Chapter 3 Parallel UPS Installation And Commissioning

The UPS parallel system provides the user with  $N + 1$  ( $1 \leq N \leq 3$ ) parallel configuration,  $N$  stands for the basic parallel sets, 1 stands for the redundant sets.

The parallel output power distribution unit (POD for short) which can provide safe and reliable power distribution function is compulsory for UPS parallel system. The UPS parallel system provides the user with 1 + 1 parallel POD and 3 + 1 parallel POD.

This chapter introduces the mechanical installation, setting parallel address, connecting parallel cables and POD cables.

### 3.1 Mechanical Installation

Taking the rack installation of the 3 + 1 parallel system with battery module for example, the mechanical installation of the parallel system is as follows:

1. The UPS installation method of 3 + 1 parallel UPS is the same as that of the single UPS. Refer to 2.2 *Mechanical Installation* for details.
2. As shown in Figure 3-1, the battery module should be installed at the bottom; the UPS should be installed in the middle, and the 3 + 1 parallel POD should be installed on the top, so as to facilitate the cable connection and operation.
3. The installation method of 3 + 1 parallel POD is the same as that of the UPS.

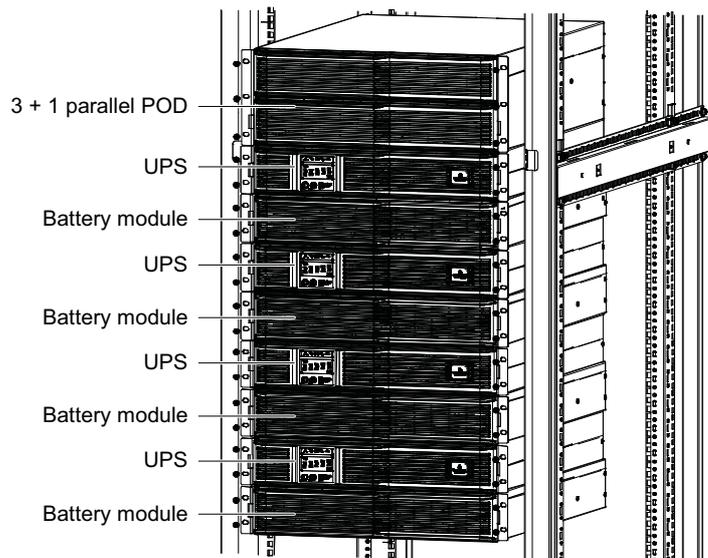


Figure 3-1 3 + 1 parallel system including battery modules installation

### 3.2 Connecting Power Cables

In UPS parallel system, each single UPS needs to configure the MCBs and cables respectively, refer to Table 2-2 and Table 2-3 for the specification.

#### 3.2.1 Connecting I/O Cables

There are two modes for UPS parallel power distribution: using the POD (optional) provided by Emerson and power distribution by the user.

According to the user's requirements, the I/O cable connections are divided into two types: 1-in 1-out (default) and 3-in 1-out.

### Using the parallel POD power distribution

In UPS parallel system, it is recommended to use POD provided by Emerson to perform power distribution. Refer to *Liebert® ITA 5kVA And 6kVA UPS Power Output Distribution Unit User Manual* for the cable connection.

### Power distribution by the user

The block diagram of four-UPS parallel system is shown in Figure 3-2. Refer to 2.3.1 *Connecting I/O Cables* for the cable connection of each UPS. When using the power distribution by the user, refer to Table 2-2 and Table 2-3 for MCBs and cables.

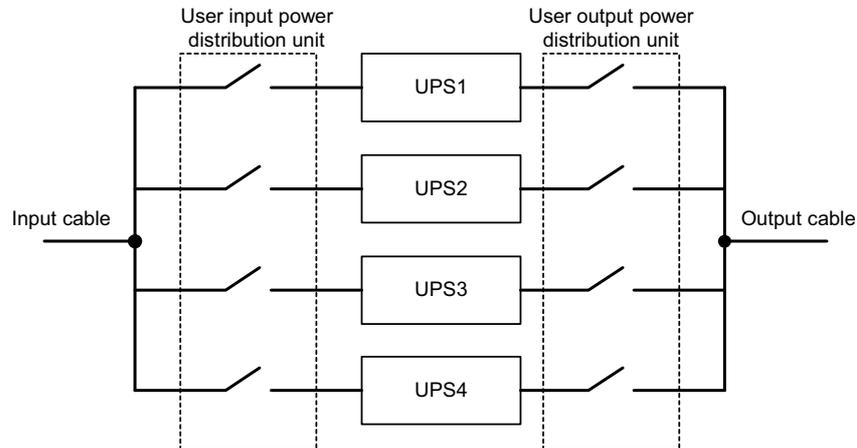


Figure 3-2 Block diagram of four-UPS parallel system

### 3.2.2 Connecting Parallel Cables

The parallel system provides parallel cables. The parallel cables form a ring connection through the parallel ports on the UPS rear panel. The cable connection schematic diagram of 3 + 1 parallel system is shown in Figure 3-3. The parallel port of the UPS is DB15 male port (needle shape), and the parallel cable port is DB15 female port (hole shape).

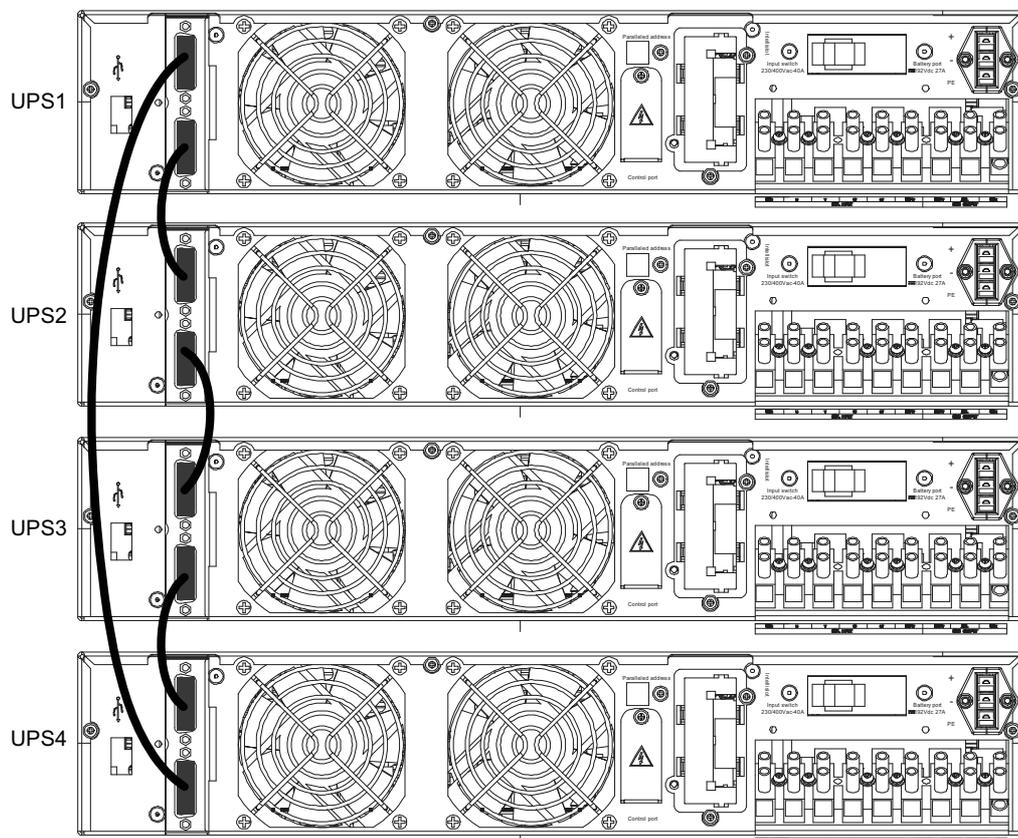


Figure 3-3 Cable connection schematic diagram of 3 + 1 parallel system

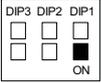
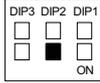
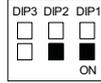
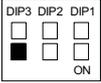
 Note

The parallel cable provided by Emerson must be used for the parallel system.

**Setting parallel address**

The parallel addresses for all the single UPSs in parallel system should be set. The parallel addresses can be set through the DIP switch on the UPS rear panel (see Figure 1-2). Remove the DIP switch cover, and set the DIP switch according to Table 3-1.

Table 3-1 DIP switch settings

Parallel address	Parallel 1#	Parallel 2#	Parallel 3#	Parallel 4#
DIP switch position				

 Warning

- The DIP switch position must be unique for each UPS.
- The default setting for DIP switch is 'OFF'. However, you should set the DIP switch position for the parallel system according to the description listed in Table 3-1. Otherwise, the UPS fault will occur.

### 3.3 Parallel System Commissioning

The parallel system commissioning in this section is the basic operation. Refer to *Liebert® ITA 5kVA And 6kVA UPS Power Output Distribution Unit User Manual* for details.

#### 3.3.1 Check Before Startup

- Check and confirm that the power distribution mode of the main UPS is correct; that the connections of the power cable and signal cable are correct and there is no short circuit. Check that the power distribution mode of the POD and the cable connection are correct and there is no short circuit.
- Check that the battery installation and cable connection are correct and there is no short circuit, and that battery polarity is correct.
- Check that the phase sequence of the mains, bypass and output of each UPS is correct and accordant. Ensure that the parallel cable connection is reliable, and that the user load is not connected during power-on, so as to check all the working status of the parallel system.
- Measure and confirm that the mains voltage and frequency are normal.
- The output terminals of the UPS and POD are energized upon power-on. If the load is connected with the output terminals, make sure that it is safe to feed power to load.

#### 3.3.2 Startup Commissioning For Parallel System

1. Power-on and commission each UPS of the parallel system respectively, namely power on one UPS each time, and other UPSs are in the shutdown status, the specific commissioning procedures are as follows:

- 1) Close the external input MCB, output MCB, battery MCB and input MCB of one UPS, the UPS is powered on. Ensure that other UPSs are in the shutdown status. (If 1 + 1 or 3 + 1 parallel POD is configured, close the corresponding input MCB and output MCB of the POD.)

 Warning

After closing the POD output MCB, the UPS output terminal block, POD output terminal block and load will be live, pay attention to personnel safety to avoid electric shock. Confirm that it is safe to feed power to load.

- 2) Power on the UPS to enter self-test status (including battery self-test), all LED indicators blink, and the buzzer beeps at intervals. After the self-test, the UPS will enter the standby mode, and the mains indicator will be on.

- 3) Press the ON/SILENCE key for more than one second, and wait about thirty seconds, the UPS will switch to the inverter standby mode automatically, the inverter indicator blinks. After the UPS has output, the inverter indicator will be on.
- 4) Measure and confirm that the inverter output voltage is normal.
- 5) If the UPS is working normally, turn off the UPS.
- 6) Repeat the preceding step1) ~ step5) to power on and commission the other UPSs respectively.



Carry out the parallel commissioning after each UPS is working normally.

2. After each UPS has been powered on and working normally, you can commission the parallel system, the specific procedures are as follows:

- 1) Close the external input MCB, output MCB and battery MCB and input MCB of one UPS (if 1 + 1 parallel POD is configured, close the corresponding input MCB and output MCB of the POD), the UPS is powered on, at the same time, make sure that other UPSs are in the shutdown status. After the self-test, press the ON/SILENCE key for one second, and wait about thirty seconds, after the UPS has output, the inverter indicator will be on. Measure that the inverter output voltage is normal.
- 2) Close the input MCB, external input MCB, output MCB and battery MCB of the second UPS (if 1 + 1 or 3 + 1 parallel POD is configured, close the corresponding input MCB and output MCB of the POD). Follow the preceding steps to start the inverter of the second UPS, check that there is no alarm on the LCD display screen, and confirm that the UPS parallel works normally.
- 3) Follow the preceding methods to start up the inverter of the third or the fourth UPS to connect the UPS into the parallel system.



During the parallel startup, confirm that the external output MCB of each UPS has been closed, and that all the inverter output of the UPSs are parallel connected.

## Chapter 4 Communication

This chapter briefly introduces the communication of the UPS.

The communication ports include USB port and intelligent card port, but they cannot be used at the same time.

### 4.1 Connecting USB Communication Cable

The USB port is located on the rear panel of the UPS, as shown in Figure 1-2.

Connection procedures of the USB communication cable are as follows:

1. Take out the USB communication cable from the accessories.
2. Insert one end of the USB communication cable into the USB port on the rear panel of the UPS.
3. Insert the other end of the USB communication cable into the USB port of the computer.

Before communication, you need to install USB drive program delivered in the installation disk.

The USB port can connect the standalone license Sitemonitor monitoring software. Refer to the user manual delivered in the VCD for the installation setting and usage.

### 4.2 Installing Communication Devices (Optional)

The UPS provides an intelligent card port (see Figure 4-1), which is used to install the communication devices, including SIC-SNMP card, dry contact card, dry contact extension card, RS485 card, RS232 card and MODBUS card.

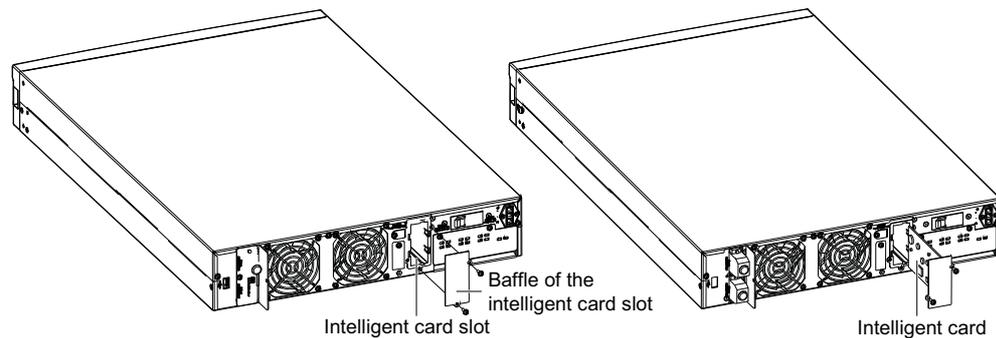


Figure 4-1 Intelligent card installation

For the installation and usage of the communication device, refer to the user manual delivered with the communication device.

## Chapter 5 Troubleshooting

In the event of a UPS fault, shoot the trouble in the first instance following the instructions provided in Table 5-1. If the fault persists, seek technical assistance from the local dealer.

Table 5-1 Troubleshooting table

No.	Fault phenomenal	Possible cause	Handling
1	The mains MCB is closed, but the UPS provides no display on the display panel, and the UPS does not conduct self-test	No power supply is fed to the UPS	Check that the UPS input cables are connected properly
		Input voltage is lower	Use a voltmeter to confirm that the UPS input voltage is within specifications
2	Mains supply is normal, but the mains indicator is off, and the UPS is in battery mode	UPS mains MCB open	Close the UPS mains MCB
		Input cables improperly connected	Connect the UPS input cables properly
3	No UPS alarm, but no UPS output voltage	Output cables improperly connected	Make sure the output cables are properly connected
4	After pressing the ON/SILENCE key, the UPS does not start	The key holding time is too short	Press and hold the ON/SILENCE key for more than one second till the buzzer beeps
		Overload	Close all load and restart the UPS
5	The mains indicator flashes	Mains voltage or frequency exceeds UPS input range	If the UPS is operating in battery mode, pay attention to the battery back-up time
6	The buzzer beeps every other 0.5 second, and the LCD displays OVERLOAD	Overload	Remove some non-priority loads
7	The fault indicator illuminates, the LED displays BATTERY FAIL	External battery MCB open	Close the external battery MCB
		External battery cables improperly connected	Check that the external battery cables are properly connected
		External battery polarity reversed	Check that the external battery cables are not reverse-connected
		Battery damaged	Contact the dealer to replace the battery
8	The fault indicator illuminates, and the LED displays CHARGER FAIL	Charger failed	Contact the dealer to replace or repair the charger
9	The discharge time of battery is shorter than the standard time	Battery not fully charged	When the mains power is normal, charge the battery for more than eight hours, and then test the battery discharge time
		Battery capacity has been wore down	Contact the dealer to replace the battery
10	The buzzer beeps for a long time, the fault indicator illuminates, and the LED displays TEMP OVER	Internal over-temperature	<ol style="list-style-type: none"> <li>1. Check that air blows out from the ventilation hole on the rear panel.</li> <li>2. Check that the clearances on both sides and at the back of the UPS are greater than 20cm.</li> <li>3. Check that the ventilation holes on the front panel, side panels, base plate and rear panel of the UPS are unobstructed.</li> <li>4. Wait for ten minutes and restart the UPS</li> </ol>
11	The buzzer beeps for a long time, the fault indicator illuminates, and the LED displays OUTPUT SHORT	UPS output short circuit	Eliminate the output short circuit fault and restart the UPS
12	The buzzer beeps for a long time, the fault indicator illuminates, and the LED displays RECTIFIER FAIL, INVERTER FAIL, AUX SUPPLY FAIL, or OUTPUT FAIL	UPS has internal fault	The UPS needs repair. Seek technical assistance from the dealer
13	Abnormal sound or smell in UPS	UPS has internal fault	Turn off the UPS and cut off the power input immediately. Seek technical assistance from the dealer

No.	Fault phenomenal	Possible cause	Handling
14	Shutdown due to low battery capacity	Battery capacity is too low result in the UPS shutdown and the interrupt of load power	1. Save the load data immediately and turn off the priority load to avoid data loss or damage. 2. Connect the backup AC power to the UPS input
15	The fault indicator illuminates, and the buzzer beeps for a long time	The parallel address is wrong	1. Open the UPS mains switch. 2. Reset the parallel address
16	The fault indicator illuminates, the buzzer beeps for a long time, and the LED displays RECTIFIER FAIL, BUS VOLTAGE ABNORMAL	Overload	Remove some loads, restart UPS after five minutes
		UPS has internal fault	Turn off UPS, cut off the input power, and contact the dealer

When reporting the UPS fault to Emerson or dealer, please inform the UPS model and machine No. (the bar code on the rear panel of the UPS). If the UPS is long-time delaying UPS, you should also provide the battery configuration information.

#### Emerson Network Power Asia Pacific

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