



User Manual

KR-RM Series(1~3kVA) UPS

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Foreword

Summaries








Thank you for choosing the Kehua KR-RM series(1~3kVA) UPS product!

This document gives a description of the KR-RM series(1~3kVA) UPS, including the features, performance, appearance, structure, working principles, installation, operation and maintenance, etc.

Please save the manual after reading, in order to consult in the future.

Symbol Conventions

The manual quotes the safety symbols, these symbols used to prompt users to comply with safety matters during installation, operation and maintenance. Safety symbol meaning as follows.

| Symbol | Description |
|--|---|
|  DANGER | Alerts you to a high risk hazard that could, if not avoided, result in serious injury or death. |
|  WARNING | Alerts you to a medium or low risk hazard that could, if not avoided, result in moderate or minor injury. |
|  CAUTION | Alerts you to a potentially hazardous situation that could, if not avoided, result in equipment damage, data loss, performance deterioration, or unanticipated results. |
|  | Anti-static prompting. |
|  | Be care electric shock prompting. |
|  TIP | Provides a tip that may help you solve a problem or save time. |
|  NOTE | Provides additional information to emphasize or supplement important points in the main text. |

Product standard: Q-ZZKJ 001

Change History

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

Issue 001 (2016-08-29)

First issue.

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1 Safety Description

This chapter mainly describes the safety announcements. Prior to performing any work on the UPS, please read the user manual carefully to avoid human injury and device damage by irregular operations.

1.1 Safety Announcements

There exists high temperature and high voltage inside UPS. Please comply with the relevant safety regulations and operation procedures during installation, operation and maintenance, or it will lead to human injury or device damage. The safety announcements mentioned in the user manual is only as a supplement to the local safety regulations. The manufacturer shall not be held liable for any breach or violation of general requirements.

The required charging voltage of different brands and different types of battery are different. Make sure that the charging voltage of UPS is suitable for battery. If any doubt, please consult the manufacturer for support. Any change of system configuration, structure or components will affect the performance of UPS. If the user wants to make any change, please consult the manufacturer in advance.



Danger of high voltage!

Touching high voltage or mains directly or through damp objects will lead to lethal risk.

1. Only authorized professionals are allowed to open the UPS chassis! The input and output of the UPS are dangerous high voltage. Touching high voltage will lead to lethal risk.
2. Before maintenance, disconnect the AC power and battery to isolate power input and measure the output terminal bar by a voltmeter, which is to ensure that the input power is turned off and in a safe condition.

3. Even if all external power are disconnected, there still exists residual electricity inside UPS, and the output terminal bar may exist high voltage which may cause human injury. It is necessary to put UPS aside for enough time(≥ 10 min) to release charge completely, then open the UPS chassis.
4. If the battery wires are not isolated with AC input, there may exist dangerous voltage between battery terminal and ground terminal. The batteries exist high voltage, which may cause human injury, pay attention to insulation when installing and using them.
5. During operation, take off conductive objects, such as watch, bracelet, ring, etc.
6. Personnel installing UPS should have the qualification of high voltage and AC power operation. Power system only can be maintained and repaired by professionals.
7. Danger of electric leakage! UPS should be grounded prior to doing electrical connection. The ground terminal must be connected with the ground.



Do not connect with the unbalance load, half-wave rectification load or inductive load.

Do not connect with unbalance load, half-wave rectification load or inductive load in the output of UPS, such as air-condition, blower, starter, electric drill, motor, daylight lamp, etc.



Drilling holes on the cabinet is prohibited!

Inappropriate drilling will damage components inside the cabinet. If metal debris generated by drilling drops into the cabinet, circuit board may be short-circuit.



It is dangerous to operate during lightning storm!

During a lightning storm, it is prohibited to perform high voltage and AC power, as well as in the tower or the mast. The atmosphere will generate a strong electromagnetic field. Therefore, in order to avoid equipment struck by lightning, it is necessary to do the lightning protection and grounding in time.



Be careful of electrostatic!

To prevent human electrostatic from damaging sensitive components, it must wear an anti-static wrist strap before touching sensitive components (such as the flapper, circuit board, IC chip, etc.), and the other end of anti-static wrist strap should be grounded well.



When UPS powers on, it is dangerous to mount or dismantle power wires.

When UPS powers on, it is dangerous to mount or dismantle power wires. Before performing the operation, it must switch off the power switch. Before performing wiring, it should make sure that the wire connection, wire labels are in accordance with the practical installation.



Do not connect the grounding wire and the neutral wire, the live wire and the neutral wire reversely to avoid electrical short-circuit.

It should be grounded well and the voltage between the grounding wire and the neutral wire should be less than 5V.



Please use the specified battery!

Non-specified battery will damage UPS.



Battery operation must be based on specifications!

Battery operation must be based on the battery instruction, especially battery wiring. Irregular operation will cause battery damage, even human injury.

8. It is prohibited to short circuit the anode and cathode of the battery. The battery wires must be fastened. It is prohibited to touch the two wiring terminals of battery or exposed end of wires simultaneously, or it may cause battery damage or human injury.

9. Prevent battery electrolyte from overflowing. The overflowing electrolyte will corrode the metal objects and circuit board, which will lead to device damage and circuit board short-circuit.
10. Battery should be placed far away from fire source and all electrical equipments which easily cause sparks, which is to avoid human injury or unnecessary loss.



Be careful of the rotating fan!

When dismantling fan, if the fan hasn't stopped rotating, do not put fingers or tools into the rotating fan, which is to avoid device damage or human injury.



Keep good ventilation for the equipment!

Ensure that there is no object in the air inlet, air outlet, as well as in the front of fan, which is to keep good ventilation.



The UPS is class A product!

When UPS is applied to residential building, additional measures should be took to inhibit the harassment.

2 Overview

This chapter mainly describes the product model meaning, performance and features, etc.

2.1 Product Intro

KR1000-RM, KR2000-RM, KR3000-RM series UPS are the single-phase AC input and the single-phase AC output, which are with all high frequency, pure online, double-conversion, intelligent features. They are the perfect power protection for file server, enterprise server, center server, mirco-computer, concentrator, telecom system, data center, medical device and others that require high quality power protection. They are widely applied to the many key business areas, such as post, finance, network, stock, railway, etc.

2.2 Model Meaning

The model meaning of KR-RM series(1~3kVA) is as shown in Figure2-1.

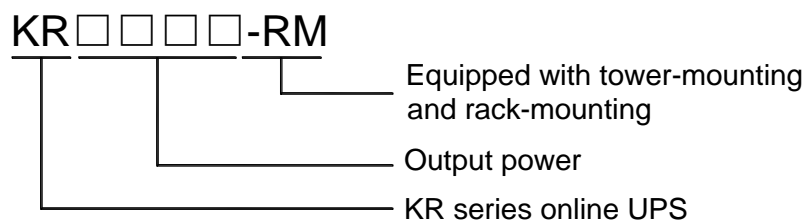


Figure2-1 The model meaning of KR-RM series(1~3kVA)

As shown in Figure2-1, "KR" means the product is the KR series online UPS. "□□□□" means the rated output power, when "□□□□" is "1000", it means the output power is 1kVA; when "□□□□" is "3000", it means the output power is 3kVA. "RM" means the product is equipped with tower-mounting and rack-mounting.

2.3 Features

Intelligent RS232 and USB communication

Through RS232 or USB standard data port and UPS power management software, it can realize the three remote function between the computer and UPS, monitor the running and electrical data of UPS on the computer, perform ON/OFF operation remotely and support SNMP network adaptor (external, connect with UPS through RS232), which makes UPS be a network new member.

High input power factor

UPS adopts the advanced active PFC technology, which eases load in the power grid. It is the new generation green power.

High cost performance

UPS adopts many kinds of power conversations and high frequency PWM technologies, which is with high efficiency, small volume, light weight, improves the running reliability and reduces cost.

Perfect protection

Equipped with the functions, such as output over-voltage protection, battery under-voltage protection, input over-voltage protection, triple over-current protection, etc. and solve the problems of the high frequency UPS, such as poor adaptability in the power grid and weak anti-impact ability.

Low mains input voltage

Adopt the independent rapid detection technology. When the mains input voltage is 120V, which is the lower limit, the battery still doesn't discharge. Therefore, in the mains mode, all output power gets from the power grid, which is to ensure the battery is still in the 100% energy storage status, reduce the battery discharge times and prolong working life.

3 Basic Principle and Structure

This chapter mainly describes the working principle and structure of the product, including the meaning of indicators on the panel and the definition of external port.

3.1 Basic Principle

When the mains is normal, the input of KR-RM series UPS converts into the steady DC voltage through PFC, which supplies for DC/AC inverter to output steady 220V AC and charges the battery at the time. When the mains is abnormal, the battery will boost into the DC voltage for DC/AC inverter through DC/DC.

The working principle of KR-RM series(1~3kVA) UPS is as shown in Figure3-1.

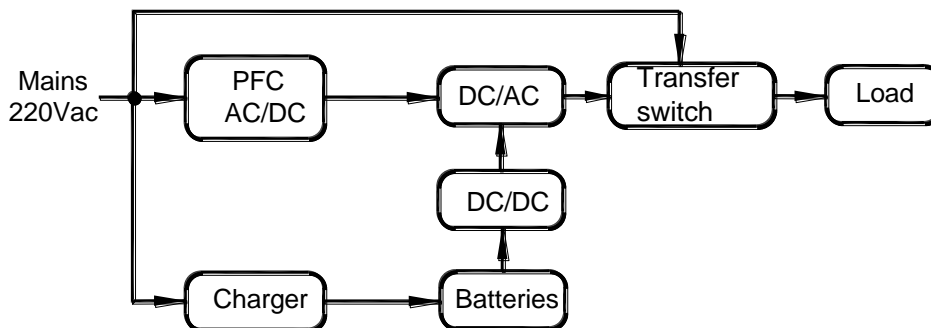


Figure3-1 Working principle of KR-RM series(1~3kVA) UPS

The pin corresponding relationship between RS232 port of UPS and RS232 port of PC is as shown in Table3-1.

Table3-1 The pin corresponding relationship between RS232 port of UPS and RS232 port of PC

| RS232 port of UPS | RS232 port of PC |
|-------------------|---------------------|
| 9(3) | 2(receiving end) |
| 6(2) | 3(transmitting end) |

| | |
|-------------------|------------------|
| RS232 port of UPS | RS232 port of PC |
| 7(5) | 5(grounding end) |

3.2 Structure

3.2.1 Display Interface of the KR-RM Series(1~3kVA) UPS

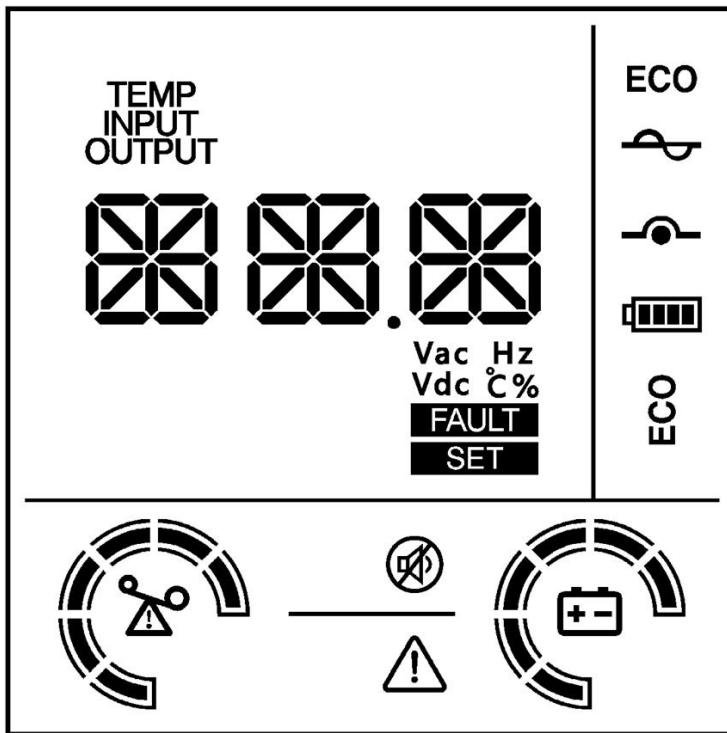







Figure3-2 The display interface of the KR-RM series(1~3kVA) UPS(rack-mounting)

Icon Illustration

The icon illustration is as shown in Table3-2.

Table3-2 Icon illustration

| Icon | Illustration |
|---|------------------------------|
|  | UPS works in the mains mode |
|  | UPS works in the bypass mode |

| Icon | Illustration |
|---|---|
|  | UPS works in the battery mode |
| ECO | UPS works in the ECO mode |
|  | Buzzer is in the silence status |
|  | UPS failure |
| Vac/Vdc /Hz/°C/% | Stand for each unit respectively: AC voltage/DC voltage/frequency/temperature/load percentage |

Operation instructions of buttons on the panel

- " | " button
 - When UPS is off, long press " | " button for 1s, the UPS will be on.
 - When UPS is on and in the mains mode, long press " | " button for 3s, it will do the battery test.
 - When UPS is on and in the battery mode, long press " | " button for 3s to silence the buzzer (remove the mains abnormal alarm); then long press " | " button for 3s again, it will cancel the silence.
 - When UPS is on and in the battery mode and with the battery low-voltage alarm, long press " | " button for 3s to silence the buzzer; then long press " | " button for 3s again, it will cancel the silence.
- " ○ " button
 - When UPS is on, long press " ○ " button for 1s, the UPS will be off.
- " ■■ " button

- Short press "■ ■" button, it will transfer the display information among output voltage, output frequency, input voltage, input frequency, battery voltage, inner temperature, output load percentage, fault prompting(when UPS failure), etc.
- Long press "■ ■" button for more than 5s, it will enter the setting page. Transfer the setting options by the selection button and then long press " | " button to confirm the setting. It can set the display ways, rack-mounting or tower-mounting: " TWR " is tower-mounting, " RCK " is rack-mounting, the default setting is "RCK". It can also set ECO mode, output 208/220/230/240V mode.

3.2.2 Structure of the Front Panel and Rear Panel of KR1000-RM

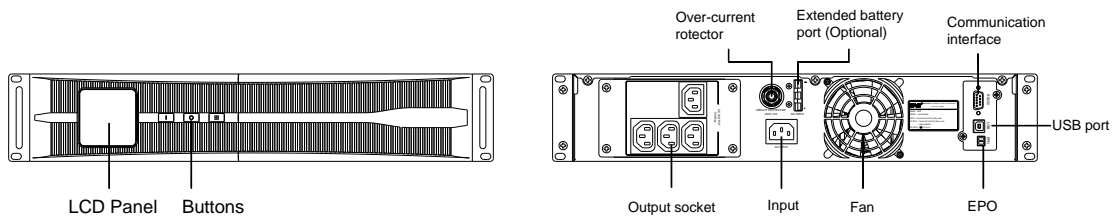


Figure3-3 Structure of the Front Panel and Rear Panel of KR1000-RM

3.2.3 Structure of the Front Panel and Rear Panel of KR2000-RM

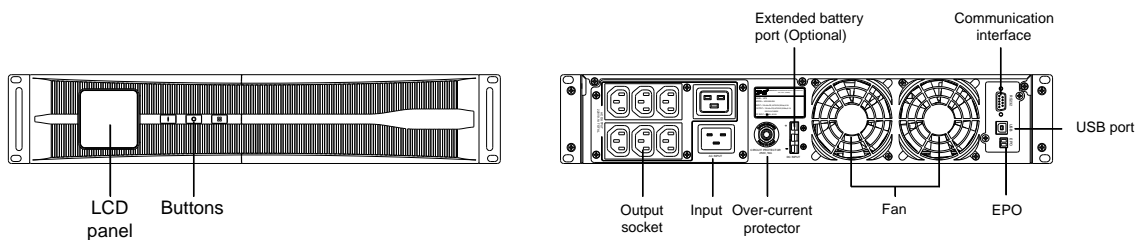


Figure3-4 Structure of the Front Panel and Rear Panel of KR2000-RM

3.2.4 Structure of the Front Panel and Rear Panel of KR3000-RM

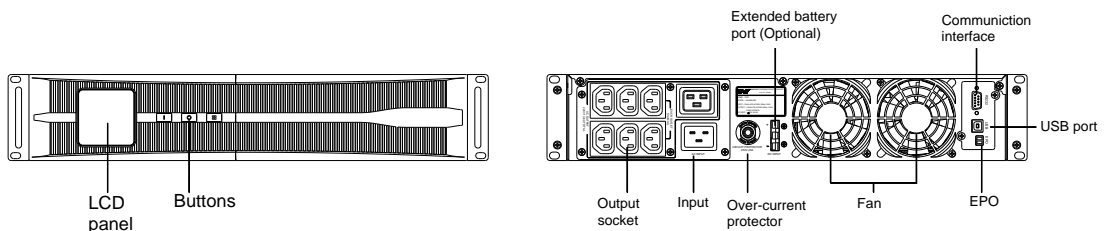


Figure3-5 Structure of the Front Panel and Rear Panel of KR3000-RM

4 Installation

This chapter mainly describes the product installation, including the installation place and environment requirements, packing, installation procedures, wire selection, electrical connection, etc.

4.1 Installation Place and Environment Requirements

Before installing UPS, the installation place and environment should meet the basic requirements of normal running, which describes in this chapter. If the installation place conditions don't meet the minimum requirements of normal running, it should do the corresponding change. When it meets the requirements of normal running, install UPS.

4.1.1 Installation Place Requirements

The installation place should meet the basic requirements of normal running as below.

- The machine room must be equipped with the suitable and effective fire fighting equipments.
- The mains supplying power for UPS should be equipped with specified air switches or multi-functional sockets.
- It is prohibited to put the dangerous objects that are flammable and explosive in the machine room.
- Before installing UPS, it should do the grounding preparation. The voltage between the neutral wire and the grounding wire of mains should be less than 5V.
- The construction of the machine room should all have been finished and the floor has been hardened. The installation place should be clean and without dust.

4.1.2 Environment Requirements

The UPS installation environment should meet the following requirements:

- Environment temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$.
- Relative humidity: 0%RH~95%RH, non-condensing.
- Cooling method: air cooling.

- Altitude: meet the provisions of GB3859.2-93.
- Verticality: without vibration and the vertical gradient should be less than 5°.
- Pollution grade: grade II.



CAUTION

UPS should be installed in the environment where is with good ventilation, cool, proper humidity and without dust. The recommended working temperature is 20°C~25°C, and the humidity should be about 50%.

Do not install UPS in the environment with metal conductive dust. UPS is only suitable to use in the non-tropical climate conditions.

4.2 Unpacking

When installing UPS, it should carry the UPS to the installation place and then unpacking the package. The package of UPS and accessories (battery, etc.) are carton or wooden box. Check whether the UPS and accessories are correct according to the delivery list.

If there is any shipping damage to UPS or accessories or there is any discrepancy with ordering contact, take notes in time and contact the local office or distributor immediately.

Random configuration is as shown in Table4-1.

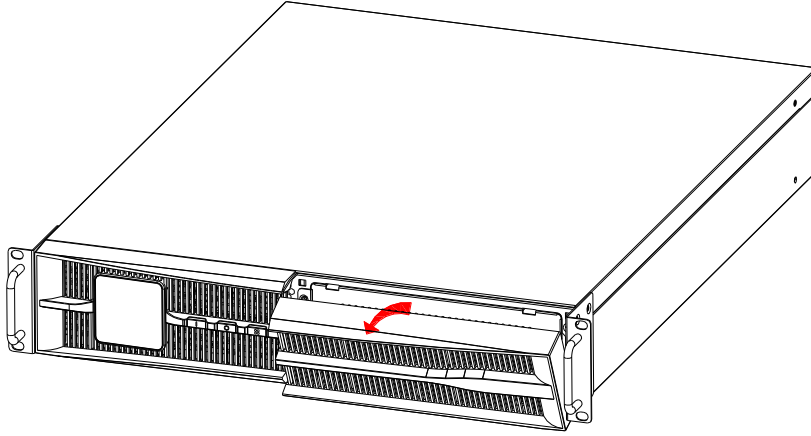
Table4-1 Random configuration list

| No. | Name | Unit | Number | Remark |
|-----|---------------|------|--------|--------------------|
| 1 | Software | Set | 1 | Optional component |
| 2 | User manual | Copy | 1 | In the sealing bag |
| 3 | Warranty card | Copy | 1 | In the sealing bag |
| 4 | Packing list | Copy | 1 | In the sealing bag |
| 5 | Certification | Copy | 1 | In the sealing bag |

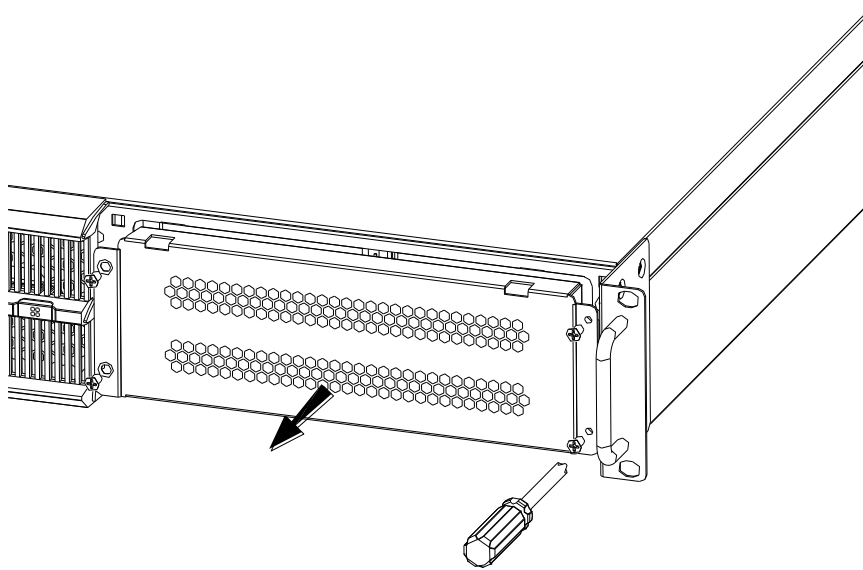
4.3 Installation Procedures

The battery of KR-RM series UPS is hot-pluggable, the installation procedures is as below.

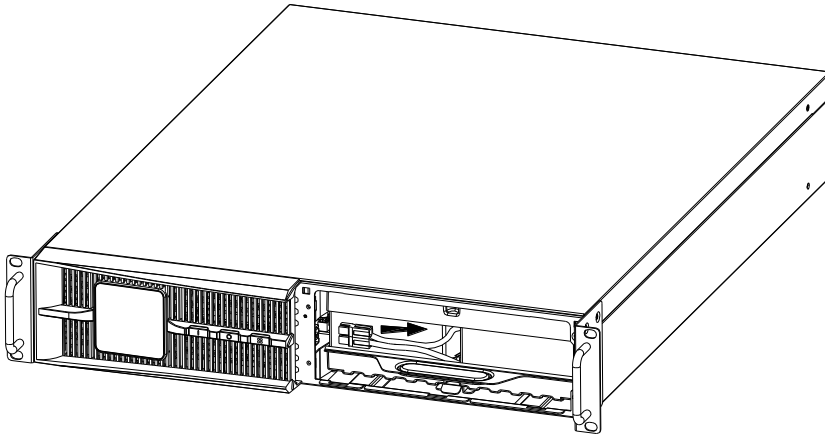
Step 1 Dismantle the plastic panel.



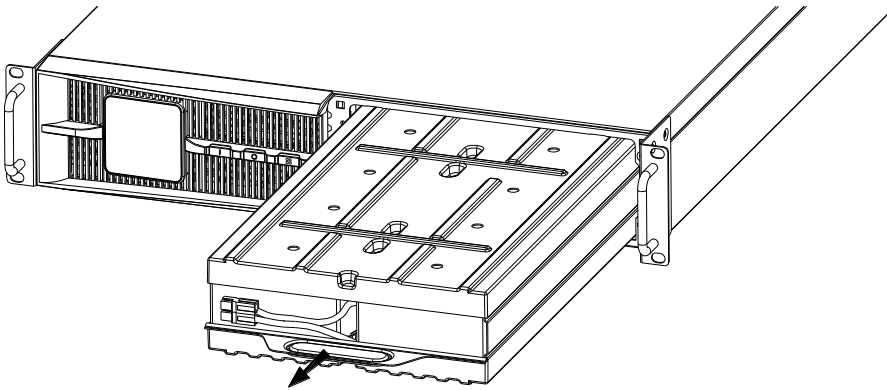
Step 2 Dismantle the battery baffle.



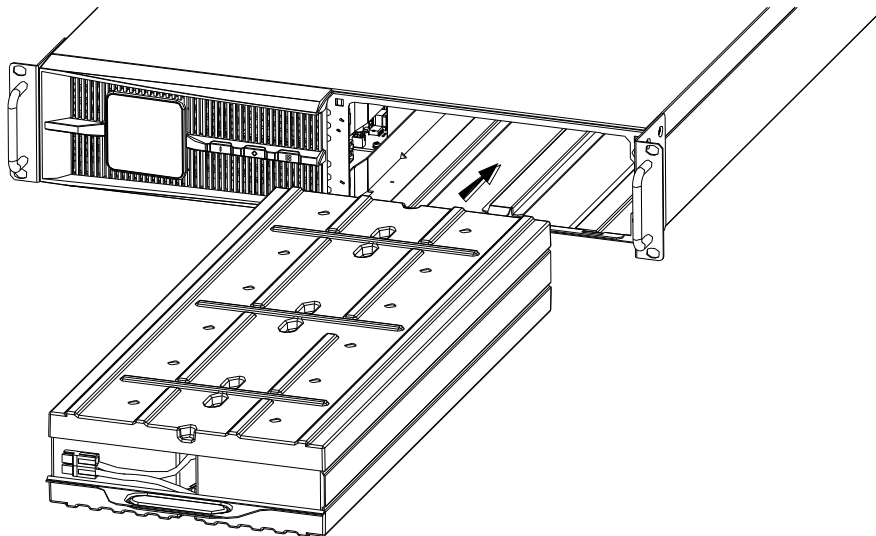
Step 3 Unplug the battery wire.



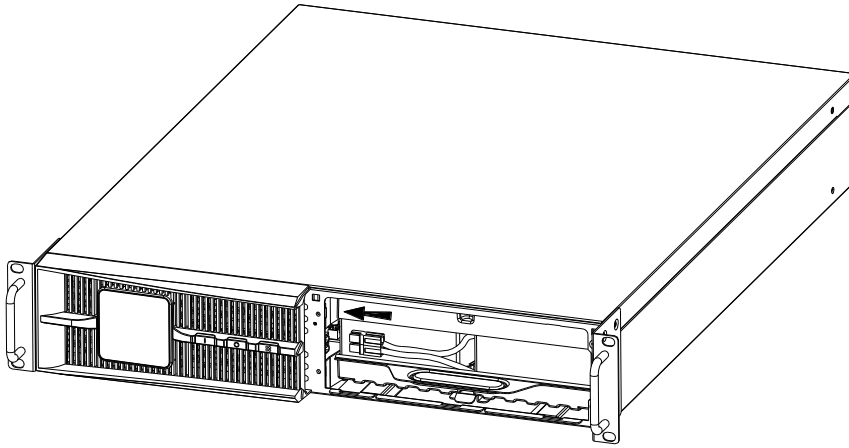
Step 4 Pull out the battery pack.



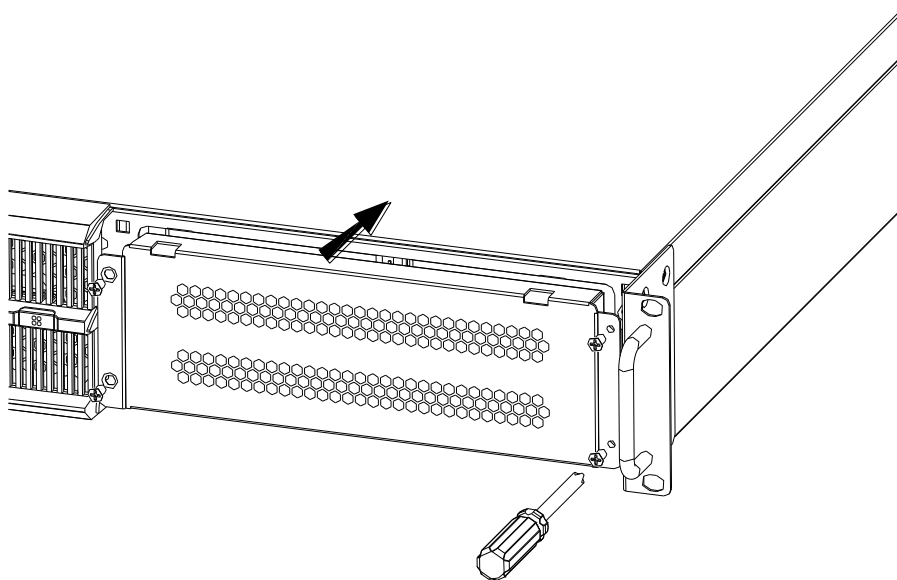
Step 5 Replace the battery pack and insert the new battery pack into UPS.



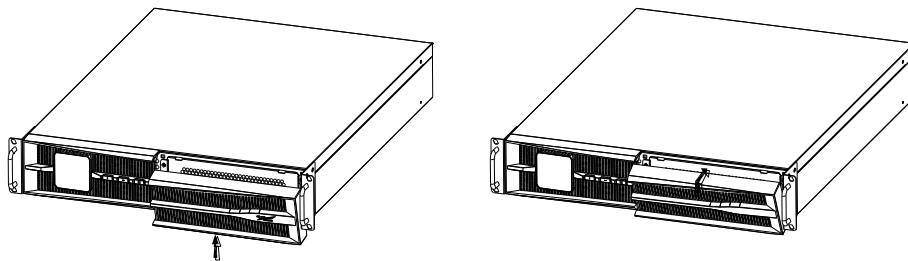
Step 6 Plug the battery wire.



Step 7 Install the battery baffle and lock the bolts.



Step 8 Install the plastic panel.



 **NOTE**

Generally, the new purchased UPS has installed battery pack and battery baffle. User can install the plastic panel refers to Step 8.

As the KR-RM series UPS is small, it can put UPS on the flat surface directly without other fixed or installation. In consideration of the convenient operation and maintenance and heat dissipation, keep a clearance at least 30cm~50cm around the UPS and 50cm on the top of UPS. Keep the indoor with good ventilation. In the room temperature(20°C), the working life of battery is the longest. Therefore, if conditions allow, it is recommended to install the air-condition. The installation announcements for UPS is as shown in Figure4-1.

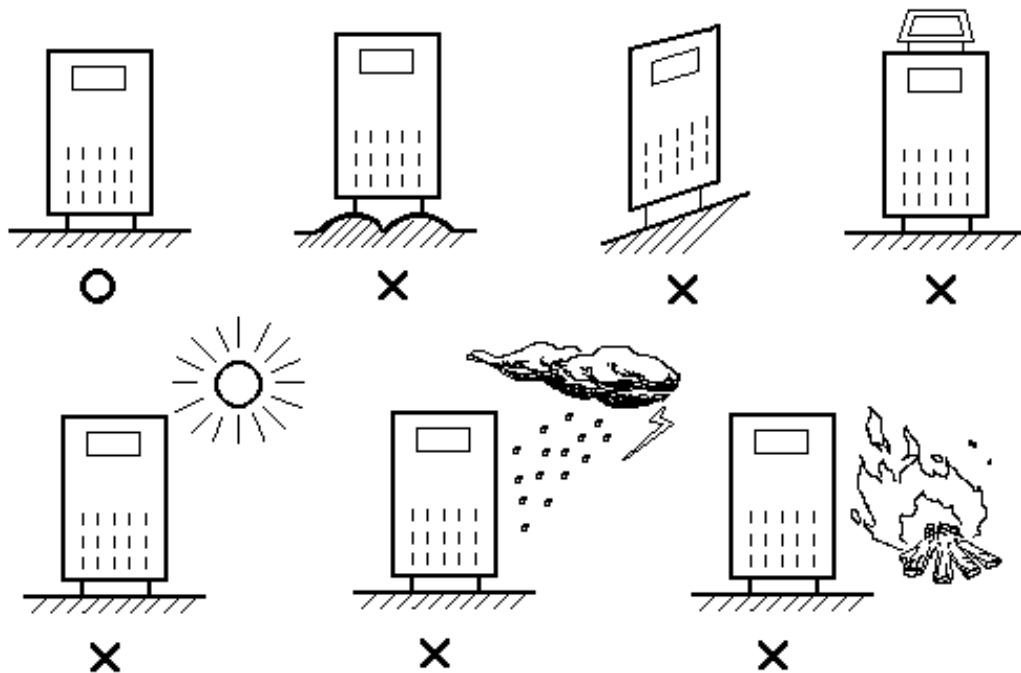


Figure4-1 The installation announcements for UPS

- Put UPS on the flat floor(do not put it on the tilted or uneven floor).
- Keep good ventilation. The clearance between the rear surface and the side surface to wall should be at least 30cm~50cm, which is good for heat dissipation.
- Avoid putting UPS in the direct sunshine, rain or damp place.
- Do not put UPS in the place with corrosive gas.
- Do not put objects on the top of UPS or around UPS to avoid blocking the air vent. People can't sit on the top of UPS.

4.4 Wire Selection

4.4.1 Selection of Input Air Switch

Add an air switch or power distribution box which matches with the power of UPS before the input wire of UPS to isolate the mains. In consideration of the charging power of UPS and the inrush current at the power on moment, the current of the selected air switch should be 1.5~2 times of the maximum input current of UPS. Besides, the selected air switch should be without the power leakage protection to mis-operation. The power distribution box is better to be made by the professional company. The selection of air switch refers to Table4-2.

Table4-2 The recommended list for the input air switch of KR-RM series

| Model | KR1000-RM | | KR2000-RM | | KR3000-RM | |
|-------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| | Max. current | Recommended air switch | Max. current | Recommended air switch | Max. current | Recommended air switch |
| AC input(A) | 6 | 10 | 12 | 20 | 18 | 32 |

4.4.2 Selection of the Cross-sectional Area of Output Power Wire

For the selection of the cross-sectional areas of AC output wire and battery wire of UPS, please refer to Table4-3 for the corresponding recommended value and choose upwards.

Table4-3 The ampacity of the recommended cross-sectional areas of wire of UPS

| Cross-sectional area(mm ²) | | 1 | 1.5 | 2.5 | 4 | 6 | 10 | 16 | 25 |
|--|-------------------|---|-----|-----|----|----|----|----|-----|
| Ampacity(A) | Rubber (25°C) | 8 | 12 | 20 | 28 | 42 | 70 | 96 | 125 |
| | Plastic (25°C) | 6 | 9 | 15 | 20 | 30 | 50 | 64 | 100 |

4.5 Electrical Connection

Ensure all air switches of UPS are switched off and place UPS well, do the electrical connection.

Use sockets in the AC input and output of KR-RM series(1~3kVA)UPS. Connect the AC input socket with the mains socket by the power wire and the load power wire plugs in the output socket.

4.5.1 KR1000-RM

The wiring for the input and output of KR1000-RM is as shown in Figure4-2.

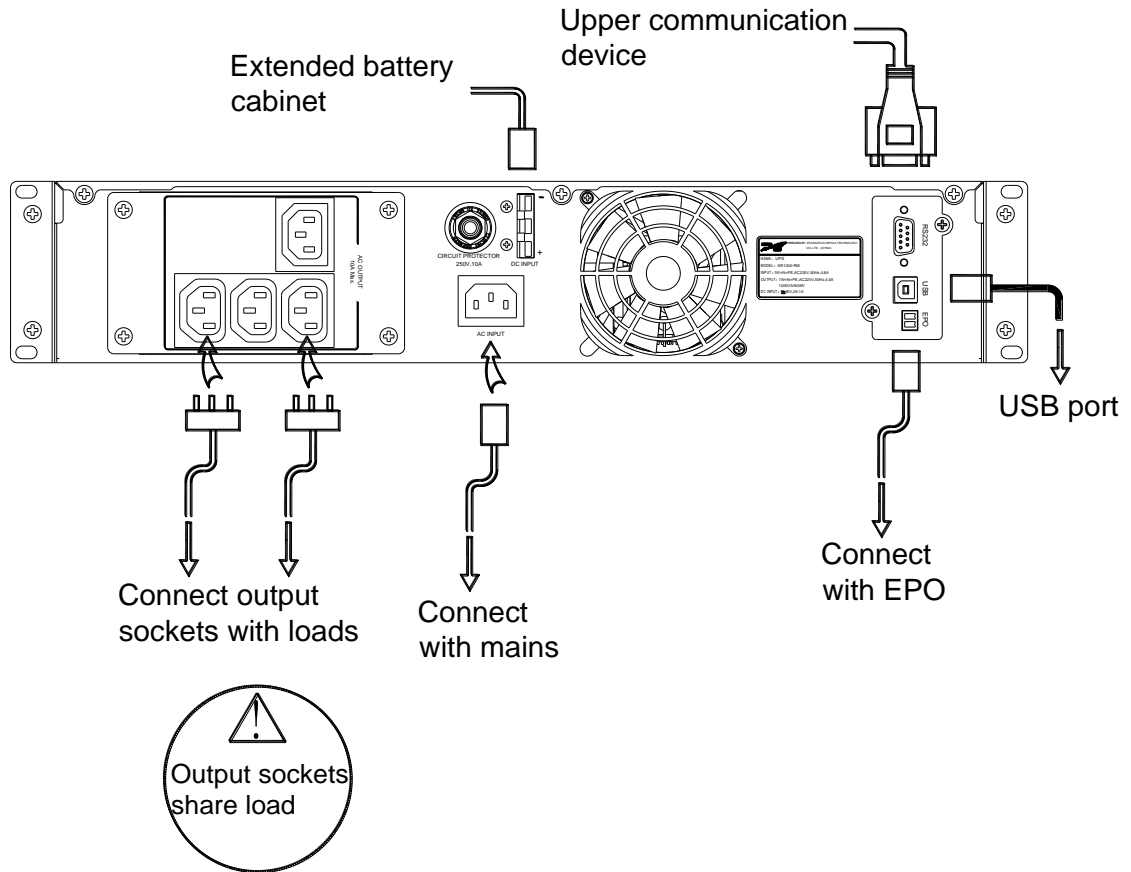


Figure4-2 Wiring diagram of KR1000-RM

4.5.2 KR2000-RM

The wiring for the input and output of KR2000-RM is as shown in Figure4-3.

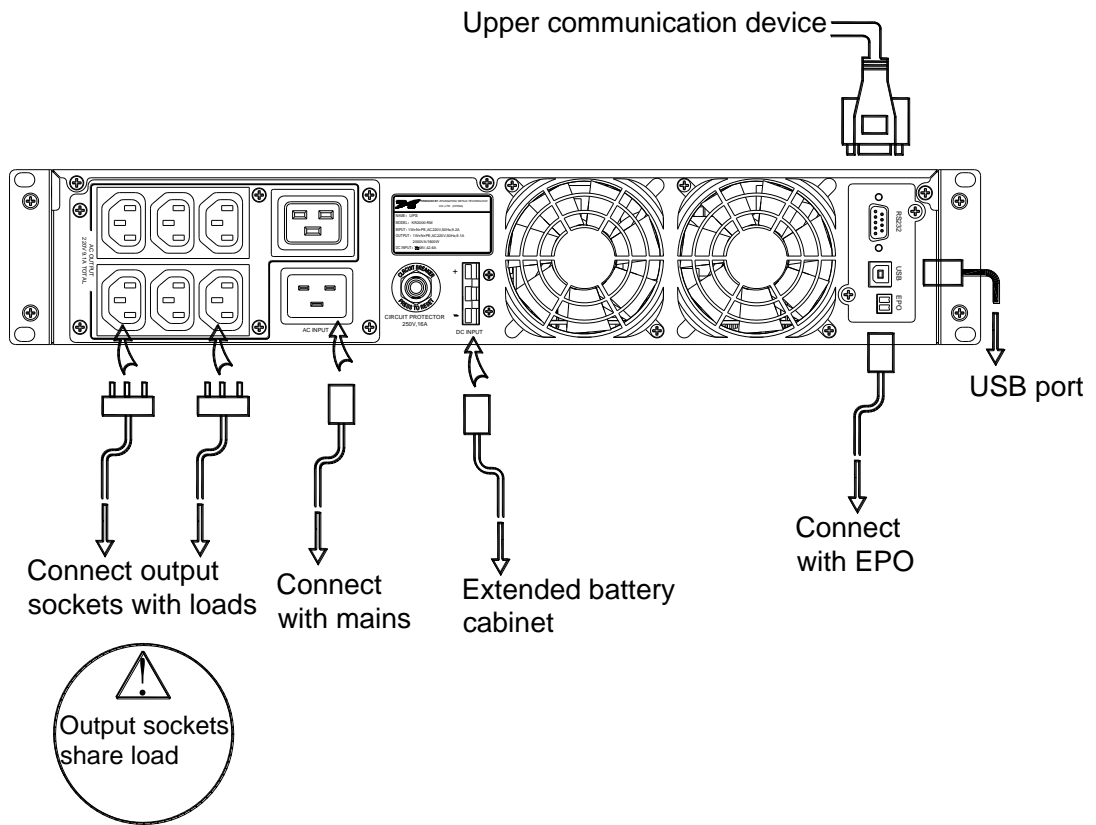


Figure4-3 Wiring diagram of KR2000-RM

4.5.3 KR3000-RM

The wiring for the input and output of KR3000-RM is as shown in Figure4-4.

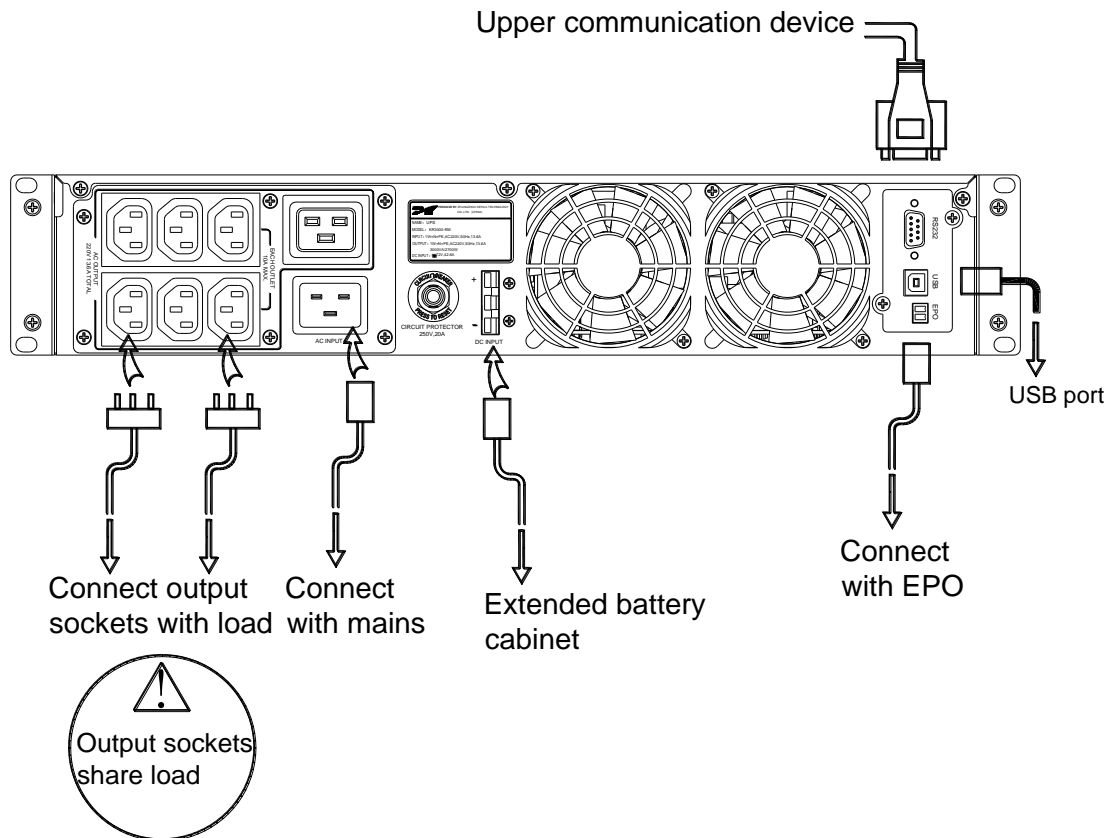


Figure4-4 Wiring diagram of KR3000-RM



CAUTION

1. The mains socket should be installed near UPS and it is convenient to operate.
2. Generally, the load current of each output socket with 10A should be less than 5A.

4.6 Check the Electrical Connection

| No. | Check items |
|-----|--|
| 1 | Check whether the connection of AC input power wire is firm. |
| 2 | Check the AC output wire: whether the color of AC output wire is in accordance with the specification, whether the cross-sectional area of AC output wire is suitable, whether the connection of the live wire(L), the neutral wire(N), the grounding wire(PE) is correct, whether the connection of AC output wire is firm. |

| No. | Check items |
|-----|--|
| 3 | Check the grounding wire: whether the grounding wire of UPS connects with the grounding terminal bar of the machine room reliably. |
| 4 | Check whether the voltage between the neutral wire and the grounding wire is less than 5Vac. |
| 5 | If the user configuration is the long delay model, check whether the battery wire between UPS and the battery cabinet connects correctly and reliably. |
| 6 | If UPS installs the remote monitoring device, check whether the related RS232 port connects correctly. |
| 7 | Check whether the wiring is neat and the wire binding is in accordance with the process specification. |
| 8 | Check whether the installation and wiring are good for system reformation, expansion and maintenance in future. |

5 Use and Maintenance

This chapter mainly describes the operation process, operation method, daily maintenance and troubleshooting, etc.


5.1 Preparation for Startup at the First Time

Before using UPS, check the following items to ensure that UPS works normally.

- The installation of input and output are correct.
- The input power connects with the rated input power.
- There is no short-circuit in the output and the load capacity is not beyond the UPS capacity.
- Whether computer or other equipments are switched off.
- Whether the battery voltage is normal.
- It isn't recommended to connect with the inductive load in the output. Generally, power grid supplies power for the inductive load directly.

5.2 Startup Sequence

If the items above are all OK, start UPS according to the following method:



Step 1 Press "  " button on the panel for more than 1s, it will start UPS. About 10s later, UPS has output voltage.

Step 2 Start computer or other devices. Start load with the sequence that "high power device → small power device". Start the high power device first, and start the smaller power successively.

----End

5.3 ON/OFF

In the daily use, start or shut down UPS according to the following method:

- Step 1 Press "  " button on the panel to start UPS. About 10s later, it can start computer or other devices.
- Step 2 When UPS works steadily, it can switch on the power switch of load device. Start the high power device first, and start the small power device. Some devices generate large current when startup(e.g. some brand display), and it may take overload protection (e.g. bypass action). It is better to start them first.
- Step 3 Before shutdown, turn off computer or other devices first and keep UPS running without load for 10 minutes to exhaust heat, and then press "  " button on the panel.

----End

5.4 Battery Maintenance

- If battery hasn't been used for a long time, it should charge battery more than ten hours every three months.
- Charge battery for ten hours before using it. During charging, it can use the battery. If the battery and charger power off at the same time, the discharging time will be less than the standard value.
- Generally, charge and discharge battery once every four or six months. Discharge battery till the battery is under-voltage and then charge it. The charging time for the standard battery should be more than ten hours every time.
- In the high temperature area, charge and discharge battery once every two months. The charging time for the standard battery should be more than ten hours every time.
- It's prohibited to use the battery with different capacities, different types and different manufacturers.
- When cleaning battery crust, use rag with the water, do not use oil substance or organic solvent, such as gasoline and thinner, etc.
- Battery and batteries should be kept away from fire source as well as all electrical equipments which may easily cause spark to avoid unnecessary loss.
- When using the batteries that connect with UPS, it should check whether the charger is OK periodically. Avoid that the battery is in the over-charge or partial charge status for a long time. Avoid the battery is over-discharge. After discharging, it should fully charge battery immediately(it should not be more than twenty-four hours) and then it allows discharging again. It is prohibited to discharge again if the battery doesn't fully charge. Otherwise, it will reduce the battery capacity, even damage battery.

- Press "○" button on the panel to shut down UPS, which avoids that battery discharges for a long time when the mains powers off. If the UPS stops working for a long time, it should charge and discharge battery periodically, which is to avoid battery damage for self-discharge.

5.5 Battery Replacement

Observe the following announcements when replacing a battery:

- Don't put battery into the fire to avoid explosion.
- Don't open or dismantle the battery. Electrolyte is harmful to our skin and eyes.
- Do the appropriate recycling according to the battery illustration.
- Replace battery with the same type and the same level.
- Consult professional engineers about battery replacement.
- There may exist dangerous voltage between the battery terminal and ground. Check the voltage before touching.

5.6 Maintenance Guide

Proper maintenance includes the preventive maintenance and the remedial maintenance, which is the key to operate UPS in the best status and ensures that UPS is with a longer service life. The preventive maintenance includes some programs that often work. The programs are to prevent system failure and get the maximum running efficiency. The remedial maintenance is to find the system failure, which is good for effective maintenance.

5.6.1 Safety Announcements

To do the system maintenance safely and successfully, observe the related safety prevention knowledge, use the necessary tools and test devices, maintain by qualified professionals and pay attention to the following safety operation regulations:

- Remember that there always exists dangerous voltage inside UPS, even though UPS doesn't work.
- Ensure that UPS operator and the maintenance personnel should be familiar with this UPS and the content in the user manual.
- Before operating UPS, take off the gold and silver ornaments, such as rings, watches, etc.

- Observe the safety operation regulations. If any doubt, consult the person who is familiar with UPS.
- Remember that there always exists dangerous voltage inside UPS. Before maintenance and adjustment, use a voltmeter to check the power is turned off and in a safety condition.

5.6.2 Periodic Preventative Maintenance


To improve the efficiency and reliability of UPS, please complete the following preventative maintenance operations periodically:

- Keep environment clean to avoid dust or chemical pollution to UPS.
- Carefully check whether the input and output wiring terminals are with good contact once every half an year.
- Check the working status of fans periodically, which is for heat dissipation. Prevent sundries from blocking the air outlet. If any damage, please replace it in time.
- Check the battery voltage and the working status of UPS periodically.

5.6.3 Common Abnormal Problem Analysis

When starting UPS, if it can't works normally, don't regard it as the UPS failure directly, solve the problems referring to the following methods.

Table5-1 Common abnormal problem analysis

| Phenomenon | Possible reasons |
|---|--|
| The mains is normal. When starting UPS, it can output AC 220V. But it is in the battery inverting status, and the buzzer beeps intermittently. | The grid feeding circuit that connects with UPS is not firmly connected, including each connection point and connection socket, which make the AC power input blocked. |
| When finishing the UPS installation, switch on the switch or long press the startup button " I ", it will fuse the fuse or switch off the switch. | The wiring of the three-phase in the input is wrong, such as connect the neutral wire or the live wire with the grounding wire of UPS(enclosure). or the wiring of the three-phase in the output is wrong. |
| When starting UPS, it has output. But UPS works in the bypass status("  " indicator is always on.) | The load is too heavy, which is beyond the rated power of UPS. It should reduce load or select UPS with larger power capacity. It is normal that UPS works in the bypass status temporarily for load startup impact and then |

| Phenomenon | Possible reasons |
|---|---|
| | recover automatically |
| When starting UPS, the display and output are normal. But when connecting with load, it will stop outputting immediately. | <p>UPS is serious over-load or the output circuit is short-circuit. It should reduce load to the proper capacity or find the short-circuit reason. The common reason is that the output changeover socket is short-circuit or when UPS damages, the input is short-circuit.</p> <p>It doesn't follow the startup sequence that "high power device → small power device" to start load. Restart UPS. When UPS works steadily, start the high power device first, and start the smaller power successively.</p> |
| When starting UPS, it works normally. After some time, UPS will shut down automatically. | <p>As batteries has not been charged in time and UPS works in the battery status(mains powers off or it doesn't connect with mains), UPS takes the battery under-voltage protection.</p> <p>Warning: when UPS takes the battery under-voltage protection, switch off all switches in time. When the mains works normally again, restart UPS to fully charge battery. If the battery in the under-voltage status for a long time, it will affect the working life.</p> |
| When starting UPS, it works normally. When mains grid powers down, UPS has no output. | Batteries have not connected with UPS or batteries has damaged seriously. |

5.7 Troubleshooting

5.7.1 Overview

When there has a fault, find the obvious damage first and determine whether the fault is made by system or external environment(e.g. temperature, humidity and load). Check the external factors every time before judging the UPS is damaged.

5.7.2 Troubleshooting

As shown in Table5-2, it only includes some easy fault diagnosis. If the solution isn't clear or the obtained information isn't enough to solve problems, contact the local office or distributor for details.

Table5-2 UPS fault phenomenon and its possible reason

| Fault phenomenon | Possible reason |
|---|---|
| Buzzer long beeps, the fault indicator is on, UPS works in the bypass status and the inverter is fault. | 1) The output load is overload or short-circuit, UPS will shut down automatically. 2) Drive or power tube fault. 3) Main control board fault. 4) UPS over-temperature protection |
| Usually, UPS works normally. When powering off, UPS can't work. | 1) Battery fault. 2) Battery charger fault. Usually, it can't charge battery. 3) Battery wire doesn't connect well or the terminals aren't firmly connected. |
| The input is normal, but the buzzer still beeps intermittently. | The input voltage is abnormal, which is beyond the UPS allowable range of the mains input voltage, and the input frequency is abnormal. |
| When the load is computer, everything works normally. But when powering off, the computer halts. | The grounding is unreliable for the floating voltage between the neutral wire and the grounding wire is too high. |
| Indicators on the panel are all off. | The wiring for the display board is unreliable or fault. |

If UPS failure, short press "■ ■" button. It can view the UPS failure prompting on the LCD, which is good for finding the fault source quickly.

The meaning of fault symbol is as shown in Table5-3.

Table5-3 The meaning of fault symbol

| Fault symbol | Meaning |
|--------------|---|
| BUS FAULT | Bus over-voltage or under-voltage fault/bus buffering fault |
| BAT FAULT | Battery over-voltage or under-voltage fault/battery discharging time-limited protection |
| OUT FAULT | Inverter over-voltage or under-voltage fault/output short-circuit/output overload |
| TMP FAULT | Over-temperature protection fault |
| FAN FAULT | Fan fault |
| EPO FAULT | EPO fault |

6 Package, Transportation, Storage

This chapter mainly describes the announcements about the package, transportation, storage.

6.1 Package

The package of product is carton. When packing, pay attention to the placing direction requirements. On one side of the carton, it should print warning icons, including keep dry, handle with care, this end up, stacking layer limit, etc. On the other side of carton, paste the model type, etc.

6.2 Transportation

When transportation, UPS should be handled with care. Don't impact it severely. It should strictly follow the placement direction that shows on the carton to avoid UPS damage.

6.3 Storage

UPS should be stored in the dry warehouse. Don't put it under the sunshine or in the rain. It should follow the placement direction that shows on the carton. The storage environment temperature is $-25^{\circ}\text{C} \sim +55^{\circ}\text{C}$ (no battery). If it is the standard UPS or the storage batteries, the recommended storage temperature is $0 \sim 40^{\circ}\text{C}$, the relative humidity is 20%~80%. In warehouse, It's prohibited that there has poisonous gas, objects that inflammable and explosive, corrosive chemical objects. Besides, it shouldn't have too strong mechanical shaking, impact and strong magnetic field. Under the storage conditions above, the storage period is six months. If it is long time storage ,it should charge the storage battery every three months.

A Technical Specifications

| Index | | Model | | |
|-----------------|--|---|-----------|-----------|
| | | KR1000-RM | KR2000-RM | KR3000-RM |
| Input features | Voltage range(V) | When the voltage range is 176Vac~295Vac, it can connect with more than 75% load; when the voltage range is 154Vac~176Vac, it can connect with 50~75% load; when the voltage range is 120Vac~154Vac, it can connect with less than 50% load. | | |
| | Frequency range(Hz) | 50/60±10%(50/60 self-adaption) | | |
| | Phase | Single phase three wire | | |
| | Battery voltage(V) | 36 | 48 | 72 |
| Output features | Power capacity(VA/W) | 1000/900 | 2000/1800 | 3000/2700 |
| | Voltage(V) | 208/220/230/240±1%(settable) | | |
| | Frequency(Hz) | 50/60±0.1(battery mode) | | |
| | Wave | Sine-wave | | |
| | Voltage distortion | THD <3%(linear load) | | |
| | Power factor | 0.9(if the environment temperature is lower than 30℃, it can reach to 1.0, optional) | | |
| | Transfer time between battery mode and mains | 0 | | |

| Index | | Model | KR1000-RM | KR2000-RM | KR3000-RM |
|------------------|-------------------------|---|---|-----------|-------------------------------------|
| | | mode(ms) | | | |
| Overload ability | Low overload for 1min | 1000VA/900W < Load ≤1300VA/1040W | 2000VA/1800W < Load 2600VA/2080W | < | 3000VA/2700W < Load 3900VA/3120W |
| | Medium overload for 1s | 1300VA/1040W < Load ≤1500VA/1200W | 2600VA/2080W < Load 3000VA/2400W | < | 3900VA/3120W < Load 4500VA/3600W |
| | High overload for 200ms | 1500VA/1200W < Load | 3000VA/2400W < Load | < | 4500VA/3600W < Load |
| | Output receptacles | Four IEC sockets with 10A. | Six IEC sockets with 10A, one IEC socket with 16A | | |
| Other features | Backup time | 3mins | | | |
| | Charge recovery time | <10 hours | | | |
| | Communication interface | Standard: RS232 and USB port support UPS power management software Optional: dry contact, SNMP adapter | | | |
| | Display | LCD displays the running status of UPS. | | | |
| | Alarm function | Battery low-voltage, mains abnormal, UPS fault, output overload | | | |
| | Protection function | Battery under-voltage protection, overload protection, short-circuit protection, over-temperature protection, input over-voltage protection | | | |
| | Noise(dB) | <50 | <55 | | |
| | Working temperature(°C) | -5~40 | | | |
| | Relative humidity | 0~95%, non-condensing | | | |

| Index | | Model | | |
|-------|--|------------|------------|-----------|
| | | KR1000-RM | KR2000-RM | KR3000-RM |
| | Dimensions(mm) (width*depth*height) | 438*420*87 | 438*570*87 | |
| | Weight(kg) | 13.2 | 19.9 | 24.8 |

- Specifications are subject to change without prior notice.

B Acronyms and Abbreviations

A

AC Alternating Current

D

DC Direct Current

E

ECO Energy Control Operation

EPO Emergency Power Off

I

IEC International Electrotechnical Commission

L

LCD Liquid Crystal Display

P

PE Protective Earthing

R**RS232** Recommend Standard232**S****SNMP** Simple Network Management Protocol**U****UPS** Uninterruptible Power System**USB** Universal Serial Bus



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