POWER SOLID

600KVA UPS

PS-POU600K3#44BC0K

USER MANUAL

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Foreword

Summaries

Thank you for choosing the PS series UPS!

This document gives a description of the PS series 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.

Applicable Models

- PS300KVA, PS400KVA
- PS500KVA, PS600KVA
- PS800KVA
- PS1000KVA、PS1200KVA

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.

Symbol	Description
	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.

Change History

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

Issue 001 (2019-12-30)

First issue.

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1 Safety Description

This chapter introduces the safety announcements. Please read this user manual carefully prior to installing the device. It provides important information on safe and efficient installation.

1.1 Safety Announcements

This section introduces the safety announcements that must be complied with and pay special attention while installing, using, maintenance and other relative operations.

CAUTION

Before operating, please read the announcements and operation instructions in this section carefully to avoid accident.

The DANGER, WARNING, CAUTION instructions in the manual are not all the safety announcements that you must abide by, there are just the supplements for the safety announcements during operating.

NOTE

Our Company does not undertake the responsibility caused by violating common safety operation requirements or the safety standard of design, manufacture and use.

1.1.1 Safety Instructions

CAUTION

The input and output of the UPS is dangerous high voltage, once operate improperly, it may endanger human safety. Please read this manual carefully before installing or operating, and pay attention to the warning labels. Do not dismantle the cover plate of the UPS unless authorized person.

DANGER

It is prohibited to touching any terminal or conductor that connected with grid circuit, or, it may cause deadly danger.

DANGER

The damaged device or device fault may cause electric shock or firing!

- Before operating, please inspect the device and see if there is any damage or exist other danger.
- Check if the external devices or circuit connection is safe.

DANGER

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

WARNING

If the output load is impact feedback device, please consult the engineer of our company.

WARNING

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

It should be well grounded and the voltage between grounding wire and neutral wire should be not more than 5V.

WARNING

Please do not put fingers or tools into rotating fans to avoid endangering the human safety or damaging the device.

WARNING

In case of fire, please use dry power fire extinguisher. If using liquid fire extinguisher, it may cause electric shock.

CAUTION

Keep good ventilation for the device. Ensure that the air inlet and outlet and the fan are not blocked.

CAUTION

No liquid or other objects are allowed to enter the UPS.

CAUTION

The UPS is class C3 device. If used in resident living, it may cause wireless interference. User should take additional actions to avoid the interference.

CAUTION

Warning label should be affixed on the area away from UPS location!

When UPS is power off, the input of the UPS still may exist dangerous voltage. please affix warning labels on the area away from UPS location and the warning labels should include: 1. It supplies power for UPS. 2. Please disconnect the UPS before wiring.

1.1.2 Use Announcements for Battery

WARNING

Each machine must be equipped with the correct fuse or trip protection device.

CAUTION

Please use specified battery. Non-specified battery will damage the UPS.

The charging voltage of different brands and different models' battery is different. Before using, ensure that the charging voltage of the UPS matches that of the battery. If doubted, please consult the manufacturer for support.

WARNING

Battery operation must be done according to the instructions, especially battery wiring. Irregular operation will cause battery damage, even endanger human safety.

- It is prohibited to short circuit the anode and cathode of the battery. The battery wiring must be tightened. It is strictly prohibited to touch any two wiring terminals of battery or the bare terminals of wires simultaneously, or it may cause battery damage or human injury.
- Prevent electrolyte leaking from batteries. The metal objects and circuit board will be corroded by the overflowing electrolyte and it will result in equipment damage and circuit board short circuit.
- Keep the battery away from fire source and all device that easy cause spark to avoid danger or unnecessary lose.

1.1.3 Anti-Static Protection

CAUTION

The static generated by human bodies may damage the electrostatic-sensitive components on PCB. Before touching the sensitive component, please wear anti-static rings and well connect the other end of the anti-static rings to ground.

1.1.4 Grounding Requirements

WARNING

High leakage risk! The device must be grounded before electrical connection. The grounding terminal must be connected to earth.

- When installing, connect the grounding wire first; when dismantling, the grounding wire must be removed at last.
- It is prohibited to damage the grounding conductor.
- The UPS must be connected with protection earthing permanently. Before operating, please check the electric connection and ensure the device has been connected to earth reliably.

1.1.5 Safety Warning Label Setting

To avoid irrelevant person close to or misoperate the UPS, during installation or daily maintenance, please comply with the related standards.

- Set warning labels at the switches of input end and output end to avoid wrongly close and even cause accident.
- Set warning label or safety warning area to avoid irrelevant person entering and cause human injury or device damage.
- After maintenance, ensure that pull out the key of the UPS and save it properly.

1.1.6 Measure with Electricity

CAUTION

There is dangerous high voltage, contacting by accident may lead to deadly danger. So, when measure with electricity, it is necessary to do the protection (such as wear insulated gloves, etc.).

The measure meter must accord with the following requirements.

- The range and use condition of the measure meter should conform to the site requirements.
- Ensure that connection of the measure meter is proper and normative, which is to avoid the danger of electric arc, etc.

1.2 Operation and Maintenance Requirements

There exists high temperature and high voltage inside the UPS. Please comply with the relevant safety regulations and operation procedures during installation, operation and maintenance to avoid human injury or device damage. The safety precautions mentioned in the user manual are just as a supplement to the local safety regulations.

CAUTION

The related operation and wiring for the UPS should be performed by qualified professionals, and ensure the electric installation accord with the electricity installation standards.

The installation and maintenance man should be trained and know about each safety announcements and get the right operation method, and then, the installation, operation and maintenance can be done.

DANGER

Mounting and dismantling power cables is prohibited when power on. Please switch off the power switches before mounting or dismantling power cables. Before connecting, make sure the cable connection, cable labels are in accordance with the actual installation.

WARNING

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

- Only authorized professionals are allowed to open the UPS! The input and output of the UPS are dangerous high voltage. Touching high voltage will lead to lethal risk.
- Before maintenance, please disconnect the AC power and battery to isolate the power input. It is better to measure the input, output and battery terminals by a voltmeter to ensure the input power is disconnected and in a safe condition.
- Even if all external power are disconnected, there still exists residual electric charge on the capacitance inside the UPS, and the output terminals may exists high voltage which may endangers human life. It is necessary to set the UPS aside for enough time (≥20 min) to release all charge before opening the UPS chassis.
- The battery cables are not isolated with AC input. There may exist dangerous voltage between battery terminals and grounding terminals. Pay attention to the insulation when installing and using the battery.
- Do not wear conductive objects, such as watches, bracelets and rings during operating.
- The installing man should have the qualification of high voltage and AC power operation. The maintenance and repair for the power system only can be done by professional persons.
- Leakage risk! Before performing electrical connection, the UPS should be grounded. The grounding terminal must be connected to the ground.

WARNING

Drilling holes on the cabinet is prohibited! Inappropriate drilling will damage the components inside the UPS. Metal debris generated by drilling will lead to circuit board short circuit.

NOTE

Changing the UPS configuration, structure or assembly will affect the performance of the UPS. If user needs to do like this, please consult the manufacturer in advance.

1.3 Environment Requirements

The used environment may influence the service life and reliability of the device. So, please avoid using the device in the following environment for long time.

- The place where beyond the specification (normal work temperature: -5℃～40℃, relative humidity: 0%-95%).
- The place where has direct sunshine and rain.
- The place where has vibration or easy impacted.
- The place where has dust, corrosive material, salty or flammable gas.
- The place where without good ventilation or closed.

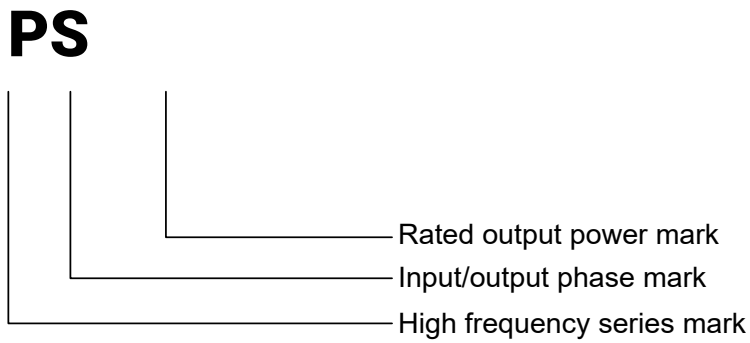
2 Overview

This chapter introduces the UPS model meaning, product features, configuration, appearance and structure, work principle, etc.

2.1 Product Intro

The PS series UPS are equipped with smart control system, friendly human-computer interface. They are special suitable for the IDC/EDC data center, operator, IT company, financial, government, education, medical treatment, communication etc.

2.1.1 Model Meaning



2.1.2 Features

IGBT rectifier green input

Adopt IGBT rectification technology to achieve bidirectional protection of the UPS, it protects the load, as well as grid. This kind of current rectifier guarantees the total input harmonic current distortion (THDI) less than 3% and the input power factor (PF) more than 0.99.

Real double conversion online UPS

Adopts high-efficient IGBT power component, which thoroughly solves the electric system problems, such as impulse and interference of power grid, and ensure the load works normally.

Precise mains synchronization system

The output and power grid realizes the accurate zero-phase synchronization, which meets the high requirement for the synchronization of power supply and power grid and enhances the performance and reliability of bypass switch.

Digitalized DSP control technique and none-principle-subordinate and self-adaptive parallel technique

The DSP controls the UPS's inverting, phase synchronization, input rectification, logics with high precision, high speed and perfect whole system performance. The digitalized none-principle-subordinate and self-adaptive parallel technique make the multi-parallel and the reliable redundancy come true and ensure the high requirement of the device for power supply.

Full function Chinese/English touch screen

Adopts hommization touch screen display module to show the operating status and parameters. And also, it can record historical data for easy engineering maintenance. The touch screen supports Chinese/English display flexibly.

Allow 100% three-phase unbalanced load

The three-phase output is allowed with the 100% unbalanced load.

Flexible network monitoring

This series UPS can achieve the smart monitor for the UPS from computer by RS232, and make the online monitor for the UPS by SNMP come true, besides, they can also select independent long-distance monitor to manage the power. The monitor can be one-to-one or one-to-many.

Designed with manual bypass maintenance

This series UPS are designed with bypass maintenance channel to ensure supply power for load when maintenance.

Reliable EMC performance

The UPS pass the authority institution and professional test on EMC, including conducting disturbance, radioactive disturbance, conducting anti-disturbance, radioactive anti-disturbance, power falling, mass impulse, static discharging, surge, etc. The EMC characteristics are excellent and it can be applied to high frequency communication, broadcasting audio and video system.

Wide voltage input range

The UPS can adapt to different voltage ranges, which make the UPS have a strong adaptability for grid.

Smart battery charging and testing

The UPS uses professional battery management technologies to control battery charging, discharging and test the battery performance automatically, which improves battery reliability and extends the battery lifespan.

Redundancy design for key circuit

The working power of the UPS adopts standby redundancy design, which effectively enhances the reliability of the system.

Smart fan control

The fan adjusts rotating speed automatically in accordance with the load status to prolong fan life and reduce noise. It can also alarm when fans fault.

2.2 Operating Principle

2.2.1 Single-unit

This series UPS are made up of input switch, filter, rectifier, inverter, static switch, bypass switch, output transformer and batteries, etc. when the AC input is normal, the AC power will be converted into DC power by rectifier to supply power for inverter, and charge the batteries with enough power to supply pour power for load without transfer time when mains disconnects. The basic structure is as shown in Figure2-2.

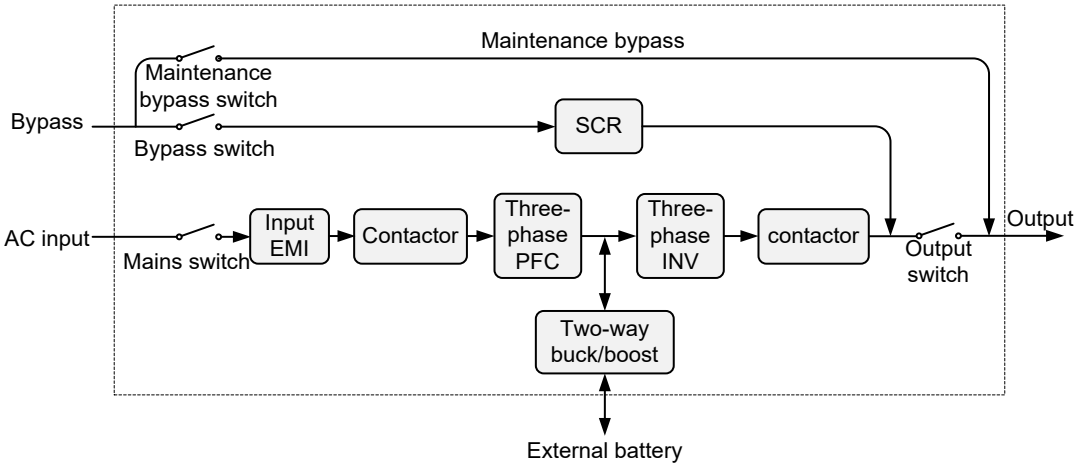


Figure2-2 Operating principle of single-unit

2.2.2 Series System

Connect the bypass input of UPS2 to the output of UPS1 instead of mains, it constitutes series hot-standby working mode.

When UPS2 fault, it will turn to bypass mode automatically. At this time, the UPS1 supply power for load, the load stay on UPS1 inverting protection status to ensure safety work. If the UPS2 stay on bypass mode, and the UPS1 fault at the same time, the mains will supply for load directly.

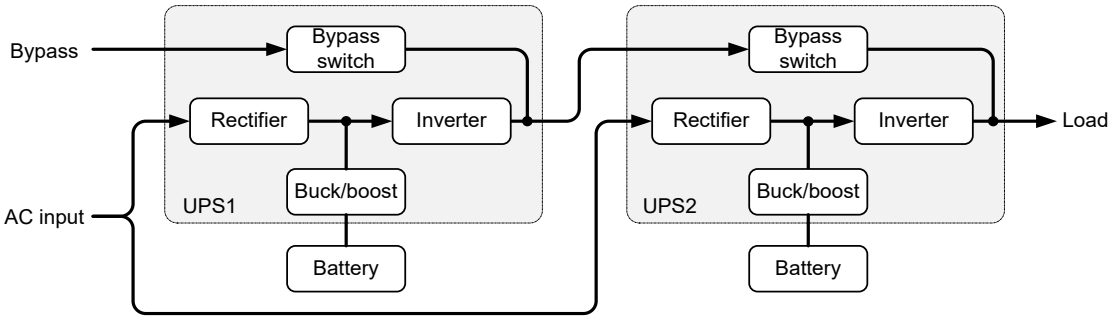


Figure2-3 Operating principle of series hot-standby system

2.2.3 Parallel System

The parallel equalized current of AC power works by quickly adjusting the AC output waveform, amplitude and phase of parallel single-units and in accordance with each other strictly. Any difference of amplitude or phase of voltage may generate large loop current, even overload or inverter damage. The parallel system has strong anti-interference, which is to ensure reliable running of system.

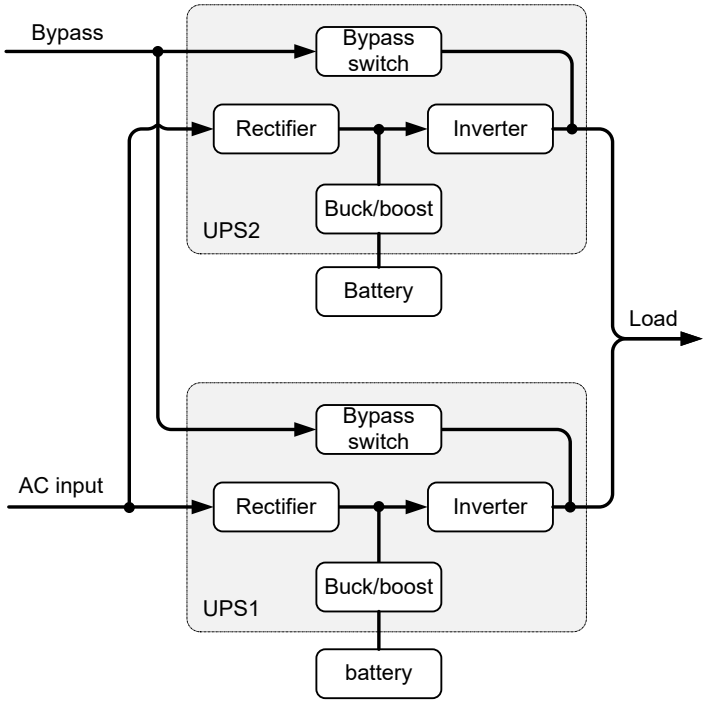


Figure2-4 Operating principle of parallel system

2.3 Work Mode

The UPS has 6 working modes: mains mode, battery mode, bypass mode, ECO mode, Smart ECO mode and maintenance bypass mode.

Mains mode

When mains normal, the rectifier will convert the AC power into DC power to charge battery and supply power for inverter to provide pure AC for load.

Battery mode

When AC input abnormal or rectifier stop working, the battery boost the voltage by DC/DC to provide power for inverter, and the AC output won't be broke off, and then protect the load.

Bypass mode

When the inverter abnormal (such as over-temperature, short circuit, output voltage abnormal or overload and exceed the range that the inverter can withstand), the inverter will shut down automatically to avoid damage. If the mains still normal at this moment, bypass power will instead of mains power to supply power for load by static switch.

ECO mode

If the UPS is set to ECO mode, when bypass voltage and frequency within the ECO operating range, and the UPS works in ECO mode, at this time, the bypass provide power for load, when bypass voltage, frequency abnormal, the inverter starts and provide power for load.

Smart ECO mode

If the UPS is set to smart ECO mode, when bypass voltage and frequency within the ECO operating range, and UPS works in smart ECO mode, at this time, the inverter operates in harmonic compensation and power factor correction states, and the bypass provide power for load. When bypass voltage, frequency abnormal, the inverter change to normal output state, and the inverter provide power for load. The smart ECO mode can give consideration to the requirements of energy saving and power quality management.

Maintenance bypass mode

When the UPS needs to be maintained or the battery needs to be replaced and at the same time, the power supply for load cannot be interrupted, shut down the UPS firstly, then close the maintenance bypass switch and then switch off the switches of mains, bypass, output and external battery cabinet. During switching to maintenance bypass manually, AC power supplies power for load through maintenance bypass switch. Meanwhile, there is no electricity inside UPS (except N), and maintainer can carry out the maintenance safely.

2.4 Appearance and Structure

The appearance of PS(300-1200) as shown in Figure2-5, Figure2-6, Figure2-7 and Figure2-8.

Figure2-5 Appearance of PS300KVA, PS400KVA

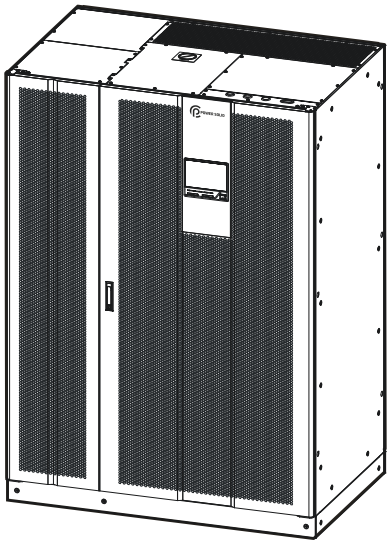


Figure2-6 Appearance of PS500KVA, PS600KVA

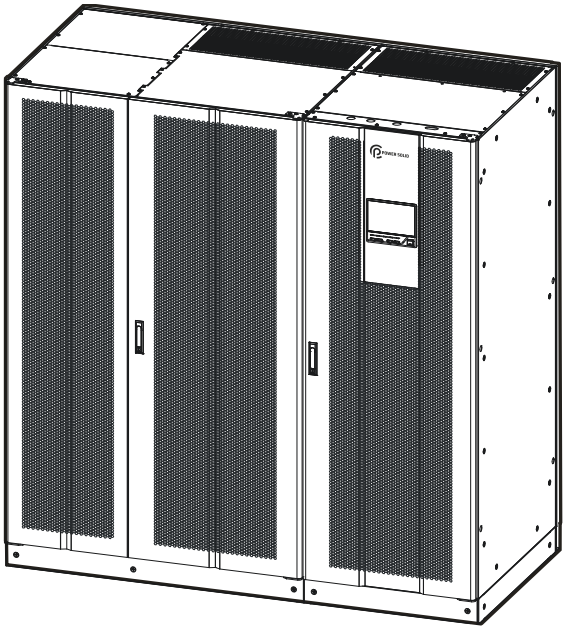


Figure2-7 Appearance of PS800KVA

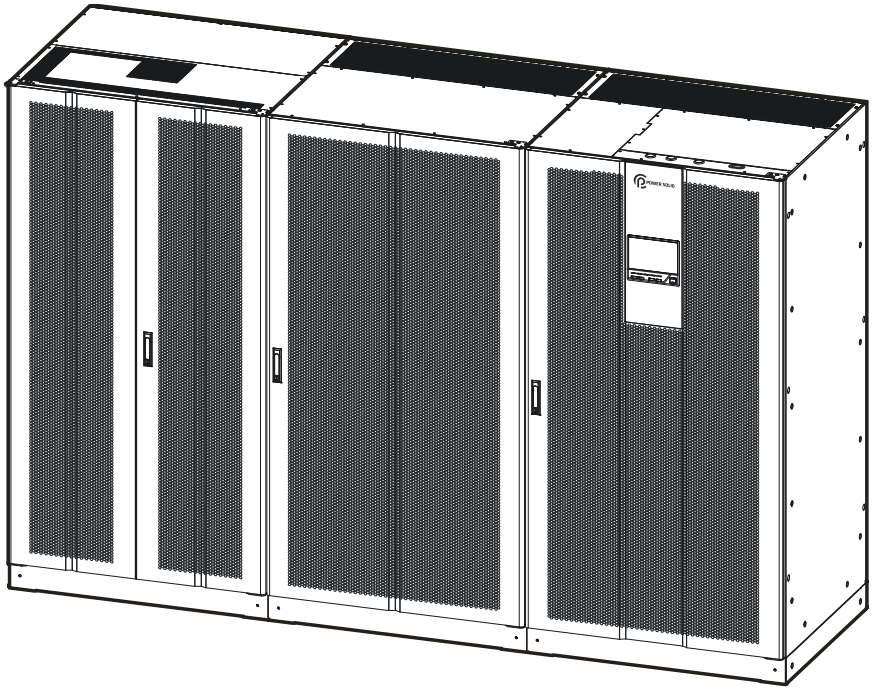


Figure2-8 Appearance of PS1000KVA, PS1200KVA

2.4.1 Operation Panel

The operation panel of the UPS is as shown in Figure2-9.

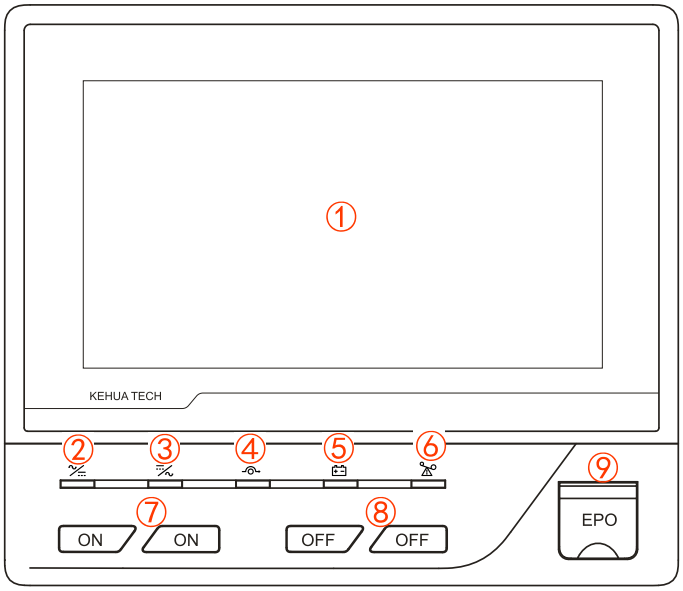


Figure2-9 Operation panel

Table2-1 Illustration for the operation panel

No.	Name	Description
①	Touch screen	Display the operating parameters and status (Such as voltage, current, load capacity, etc.)
②	AC/DC indicator	Red indicator on: Rectifier works abnormally Green indicator on: Rectifier works normally Off: Rectifier does not work
③	DC/AC indicator	Red indicator on: Inverter works abnormally Green indicator on: Inverter works normally Off: Inverter does not work
④	Bypass indicator	Red indicator on: Bypass abnormal Green indicator on: Bypass output Off: Bypass with no output

No.	Name	Description
⑤	Battery indicator	Red indicator on: Battery low-voltage protection Red indicator flickers: battery loop abnormal (such as battery disconnected, low-voltage alarm) Green indicator on: battery charges/ discharges normally. Off: Battery loop normal
⑥	Load alarm indicator	Red indicator on: Overload Green indicator on: Output normally Off: Without output
⑦	ON button	Press the two buttons simultaneously.
⑧	OFF button	Press the two buttons simultaneously.
⑨	EPO button	In emergency, press EPO button, the UPS will have no output.

2.4.2 Structure Layout (Open Door)

The layout of the UPS after opening door is as shown in Figure2-10, Figure2-11, Figure2-12 and Figure2-13.

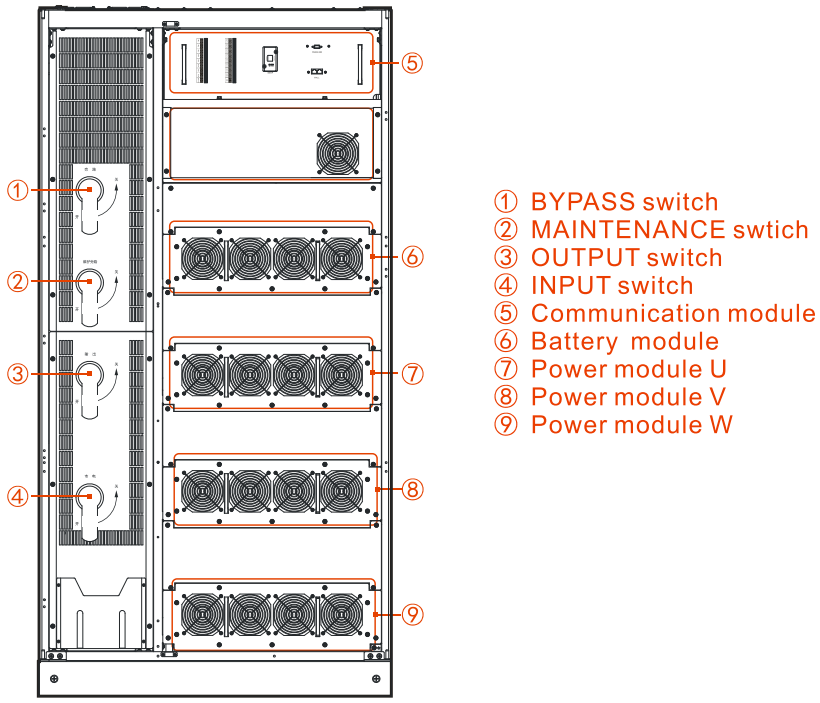


Figure2-10 Structure layout of PS300KVA, PS400KVA

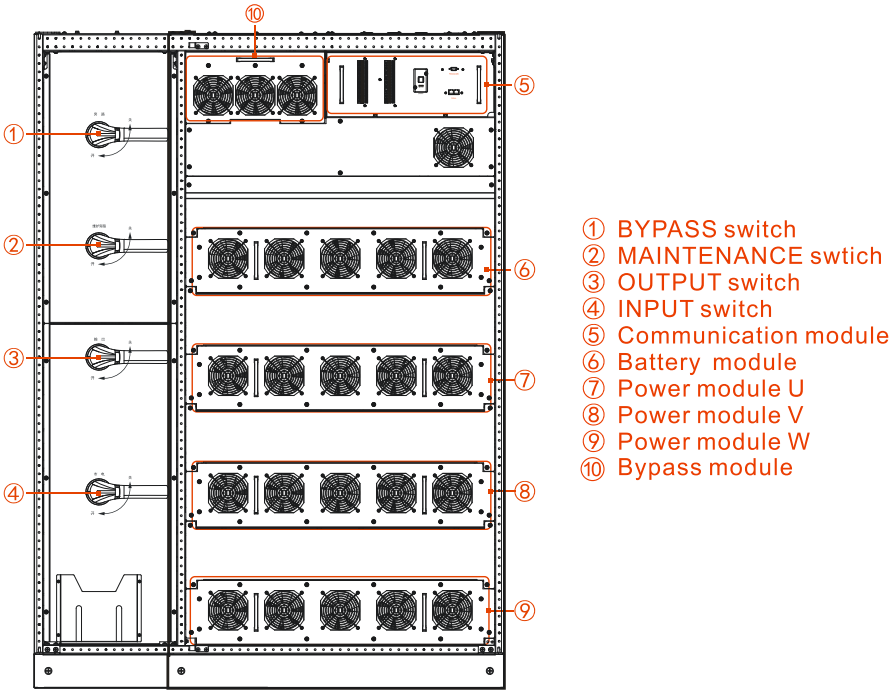


Figure2-11 Structure layout of PS500KVA, PS600KVA (open door)

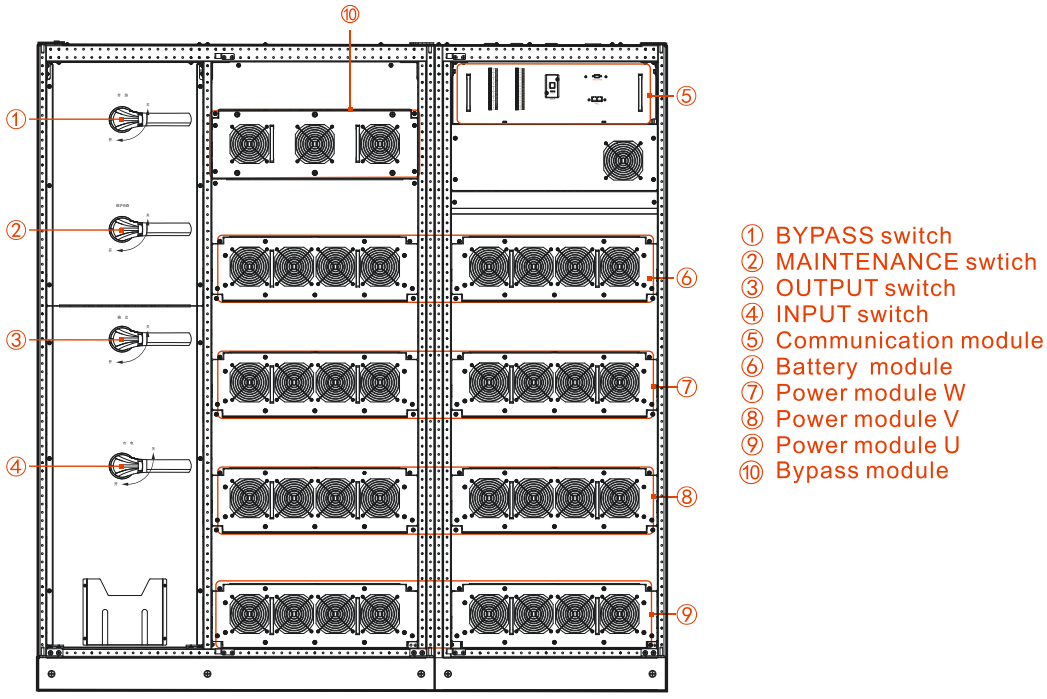


Figure2-12 Structure layout of PS800KVA (open door)

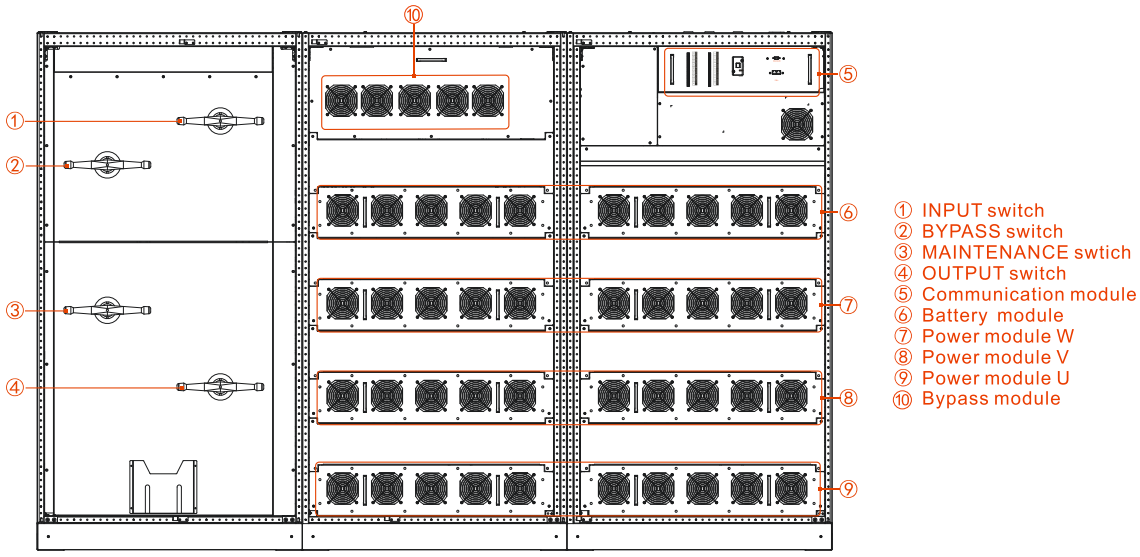


Figure2-13 Structure layout of PS1000KVA, PS1200KVA (open door)

2.5 Communicaiton

NOTE

PS series UPS communication are similar, this section takes PS400KVA as an example.

This series UPS supports RS232, RS485, SNMP, ModBus and dry contactor communication.

NOTE

The communication method can be RS232 or RS485 or SNMP or ModBus. The corresponding relation among communication method, communication port and communication protocol is as shown in Table2-2.

Table2-2 The corresponding relation among communication way, port and protocol

Communication method	Communication port	Communication protocol
RS232	RS232	SNMP
RS485	RS485	SNMP
SNMP	SNMP card (optional)	SNMP
ModBus	RS485	ModBus

2.5.1 RS232/RS485

The UPS is equipped with a RS232/RS485 port (as shown in Figure2-14). The RS232/RS485 port supports short distance communication (generally, not exceed 10m).

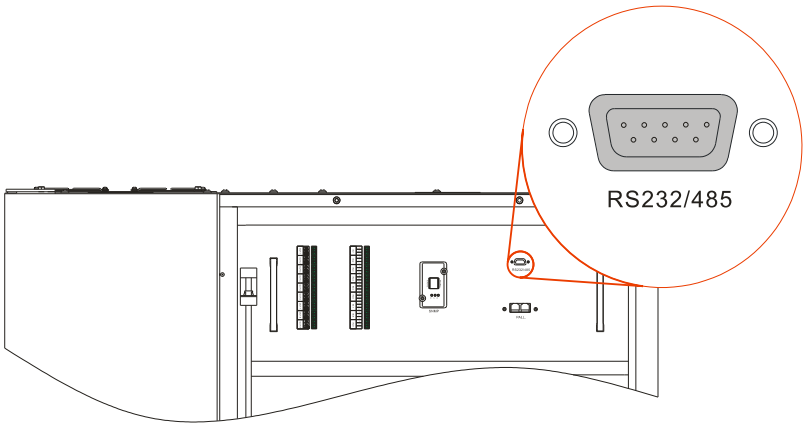


Figure2-14 RS232/RS485 port

The pin of RS232/RS485 is as shown in Figure2-15.

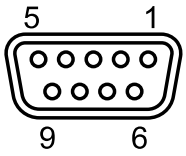


Figure2-15 Pin of RS232/RS485

Table2-3 Pin definition of RS232/RS485 port

Pin	Illustration
1—4	Reserved
5	RS485: B
6	Receive end of RS232 data communication (RS232 communication)
7	Common end of RS232 data communication (RS232 communication)
8	RS485: A
9	Sending end of RS232 data communication (RS232 communication)

2.5.2 SNMP Card (Optional)

This series UPS reserves the slot of SNMP card, as shown in Figure2-16. By the SNMP card, user can remote monitor the input voltage and frequency, output voltage and frequency, load, etc. of the UPS and perform ON/OFF operation.

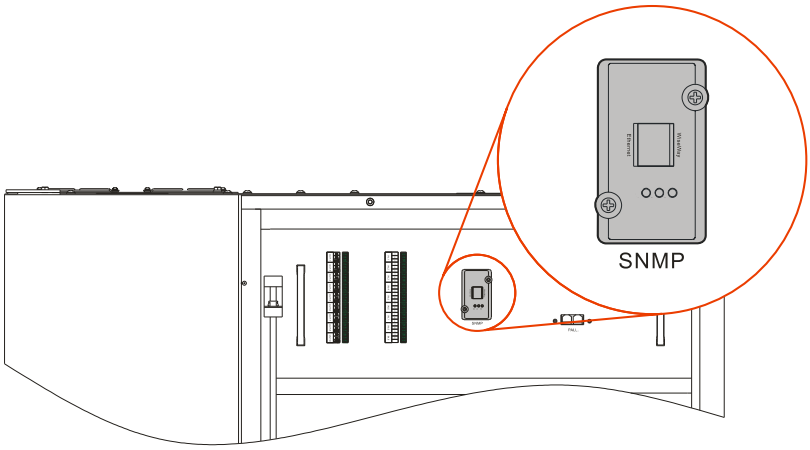


Figure2-16 SNMP card

2.5.3 Dry Dontact

This series UPS are equipped with dry contact port (as shown in Figure2-17), which can realize the control for the dry contact signal and the transmission of alarm information.

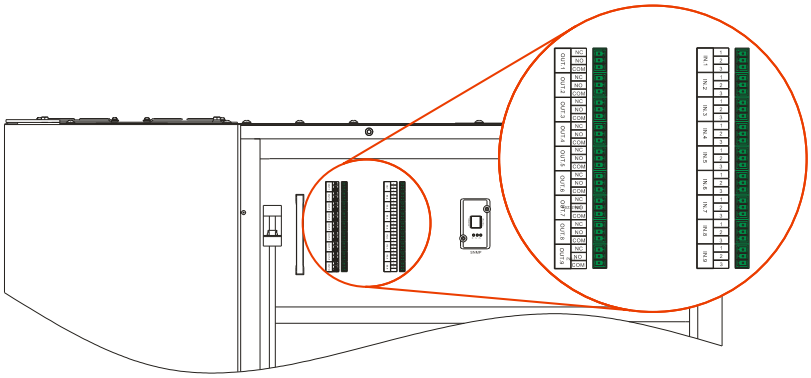


Figure2-17 Dry contact port

CAUTION

The capacity of relay dry contact is 24VDC/1A, the voltage of relay coil is 12V.

Table2-4 Output dry contact signal illustration

Mark	Signal	Illustration	Remarks
OUT1	Output overload signal	LED1 on: output overload LED1off: output normally	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT2	Bypass operation signal	LED2 on: bypass output LED2 off: not bypass output	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT3	Inverter fault signal	LED3 on: inverter fault LED3 off: inverter normal	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT4	Maintenance bypass enable signal	LED4 on: maintenance is on LED4 off: maintenance is off	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT5	Inverter operation signal	LED5 on: inverter output LED5 off: not inverter output	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT6	Fan fault signal	LED6 on: fan fault LED6 off: fan works normally	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.
OUT7	ECO signal	LED7 on: ECO mode LED7 off: ECO is not enabled	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.

Mark	Signal	Illustration	Remarks
OUT8	Inverter output signal	LED8 on: inverter output LED8 off: not inverter output	Output port, programmable Pin1 and pin2 is normally closed, pin1 and pin3 is normal opened.

NOTE
There are 11 touch screen input dry contact signal types, they can be set on the basis of needs, 8 signal can be selected at most.
The input dry contacts are set to disable in default.

2.6 Other Optionals

This series UPS can configure the optional to meet different requirements.

2.6.1 Battery Switch Box

The battery switches in the battery switch box can configure DC breaker or (disconnector + DC fuse). For specific selection, please consult our company.

The switch specification of corresponding model is as shown in Table2-5.

Table2-5 Configuration of the battery switch box

Model	Specification	Wire diameter (mm^2)	Recommended terminal
PS300KVA	700VDC/1000A	185*2	DT-M12
PS400KVA	700VDC/1000A	185*3	DT-M12
PS500KVA	700VDC/1600A	240*3	DT-M16
PS600KVA	700VDC/1600A	240*3	DT-M16
PS800KVA	700VDC/1600A	240*4	DT-M16
PS1000KVA	700VDC/2500A	240*6	DT-M16
PS1200KVA	700VDC/2500A	240*7	DT-M16

2.6.2 Battery Cabinet/ Rack

The standard battery cabinet/ rack of PS300KVA, PS400KVA is equipped with 40 pieces of battery (the battery can be set to 32~44 pieces. When the battery amount is no less than 38 pieces, it can work with full load, when the battery amount is less than 38 pieces, the battery configuration should be decrease to use according to actual battery amount).

The standard battery cabinet/ rack of PS500KVA, PS600KVA is equipped with 40 pieces of battery (the battery can be set to 32~44 pieces. When the battery amount is no less than 38 pieces, it can work with full load, when the battery amount is less than 38 pieces, the battery configuration should be decrease to use according to actual battery amount).

The standard battery cabinet/ rack of PS800KVA, PS1000KVA, PS1200KVA is equipped with 44 pieces of battery (the battery can be set to 32~48 pieces. When the battery amount is no less than 40 pieces, it can work with full load, when the battery amount is less than 40 pieces, the battery configuration should be decrease to use according to actual battery amount).

The battery cabinet/ rack can be configured according to backup time. For specific selection, please consult our company.

2.6.3 Top Waterproof Cover

The top waterproof cover meets the protection requirements of IP21. The protection grade of the UPS is IP20, when the UPS is used where may be the risk of drip at vertical direction, please select the top waterproof cover. The height after equipped with the top waterproof cover is more than 2200mm, and the vertical space should be more than 2600mm. For specific selection, please consult our company.

3 Installation

This chapter introduces the installation for the UPS, including installation preparation, unpacking and checking, installation process, mechanical installation, electrical connection, etc.

CAUTION

Only trained professionals who are with high voltage and AC qualification can install UPS.

The UPS is just suitable to install on the flat ground that is concrete or non-flammable.

3.1 Installation Annuncements

- When installing the UPS, please check whether the grid feeding circuit of UPS is unblocked, including the connection of all contacts and sockets, which is to avoid open circuit or short circuit.
- While wiring, don't reversely or wrongly connect the neutral wire, live wire and ground wire in the input and output, avoid short circuit. Meanwhile, measure the mains voltage and see if the voltage is normal.
- When installing the batteries, please connect the battery according to the installation instruction. The wires must be fastened. It is strictly forbidden to short circuit the anode and cathode of the battery or touch any two wiring pillars or bare wire, otherwise, it may cause battery damage or human injury. When connect the battery to the UPS, please ensure that the settings on the battery manage page of touch screen (see ***4.5.2* Battery Manage Page**) is in accordance with real battery amount, equalized charge/ floating charge voltage etc.
- UPS installation requirements:
  - Put the UPS on the flat floor and keep it upright (Do not tilt or put it on the uneven floor).
  - Don't put things onto the UPS or someone sit on it.
  - Keep the UPS away from the direct sunlight, rain or wet environment.

- Keep installation place with good ventilation for heat dissipation.
- Put UPS in the environment with no corrosive gas.

3.2 Installation Process

The installation process of the UPS is as shown in Figure3-1.

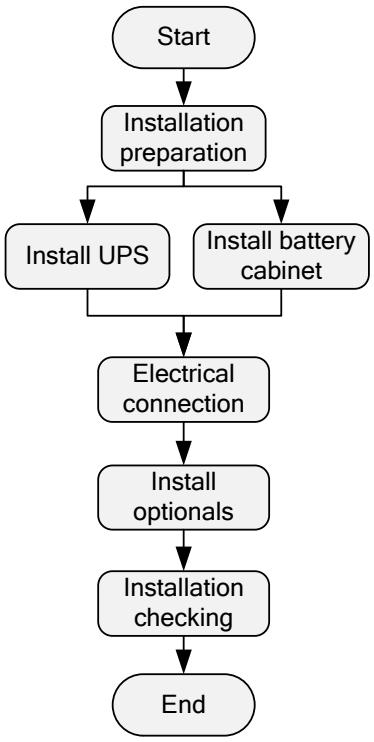
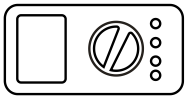
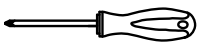
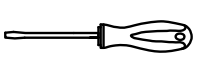
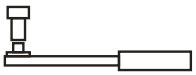
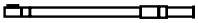
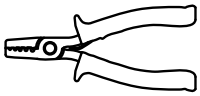
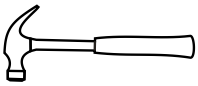
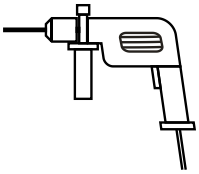
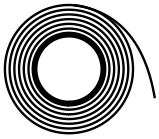
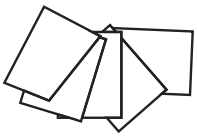
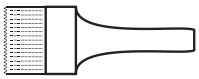
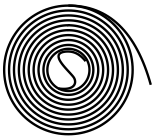
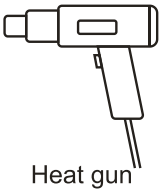
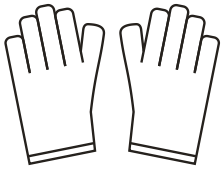
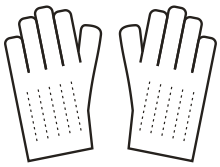
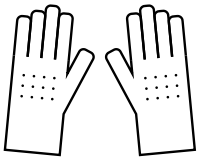
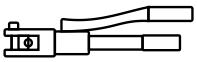


Figure3-1 UPS installation process

3.3 Installation Preparation

3.3.1 Tools

Tools			
 Clamp meter	 Multi-meter	 Label paper	 Phillips screwdriver

Tools			
 Flat-headscrewdriver	 Socket wrench	 Adjustable wrench	 Torque wrench
 COAX crimping tool	 Diagonal pliers	 Wire stripper	 Claw hammer
 Hammer drill	 Insulation tape	 Cotton cloth	 Brush
 Heat shrink tubing	 Heat gun	 Electrician's knife	 Protective gloves
 ESD gloves	 Insulated gloves	 Hydraulic pliers	 Cable tie

CAUTION

The installation tools must be insulated to avoid electric shock.

3.3.2 Installation Environment

CAUTION

Before installing the UPS, the installation environment should meet the basic condition for safety and normal running. If not, please do corresponding change. If the basic conditions are all met, and then install the UPS.

The UPS installation environment should meet the following requirements:

- The temperature and humidity are within the range of -5℃ ~40°C and 0%–95% respectively.
- It is prohibited to install the UPS in the environment where has metal conductive dust.
- Do not install the UPS in the open air. The installation environment should meet the specifications of the UPS.
- Install the UPS in the environment where with good ventilation and free of dust, volatile gas, salt, and corrosive materials. Keep the UPS far away from water, heat source, flammable and explosive substances. Avoid direct sunlight.

CAUTION

The optimal operating temperature for battery is 20°C~30°C. The temperature beyond 30°C will shorten the battery's lifespan and lower than 20°C will shorten the backup time.

For safety consideration, please ensure the external DC distribution circuit is with bipolar breaker.

3.3.3 Installation Clearance

- The installation site must have enough space to place the UPS.
- Keep at least 1000mm from the front panel of the UPS to the wall or adjacent device, keep at least 700mm from the rear panel of the UPS to the wall or adjacent device for heat dissipation and maintenance. The minimum installation space of the UPS is as shown in Figure3-2. If allowable, it is suggested to keep larger space to ensure the UPS working stably and efficiently.

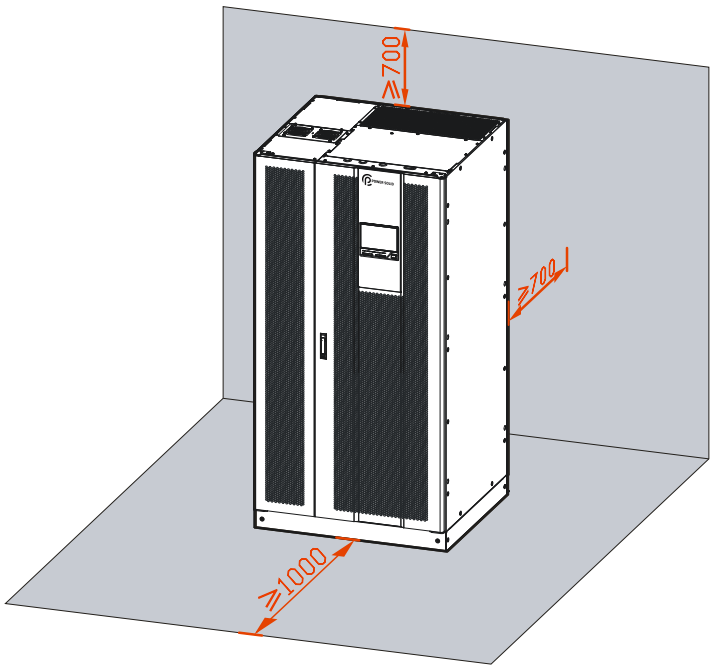


Figure3-2 Installation space

NOTE

The installation space requirement of PS series UPS is the same, in above figure, we take PS400KVA as an example to illustrate.

- When the UPS is used in parallel system, the whole space after paralleled should meet the space requirement in Figure3-2.
- Keep the air vents on the front panel and top panel of the UPS unblocked to facilitate ventilation and heat dissipation. Otherwise, the UPS internal temperature will rise, even shorten UPS lifetime.

3.3.4 Selection of Input and Output Cables

For the cable selection of AC input and output cables of the UPS, please refer to Table3-1 for corresponding recommended values, and choose upwards

Table3-1 Input and Output cable specification

Power (kVA)	Live wire cross-sectional area (mm^2)	Neutral wire cross-sectional area (mm^2)	Grounding wire cross-sectional area (mm^2)	Recommended terminal model
300	150*2	150*2	150	DT-M12

Power (kVA)	Live wire cross-sectional area (mm^2)	Neutral wire cross-sectional area (mm^2)	Grounding wire cross-sectional area (mm^2)	Recommended terminal model
400	185*2	185*2	185	DT-M12
500	185*3	185*3	185*2	DT-M12
600	240*3	240*3	240*2	DT-M16
800	240*4	240*4	240*2	DT-M16
1000	240*5	240*5	240*3	DT-M16
1200	240*6	240*6	240*3	DT-M16

NOTE

- The wires prepared by our company have passed the GB or UL certification. The wires quality is excellent and all meet the production compliance. The cross-sectional areas above are recommended for 5 meters long wires. Longer wires require larger cross-sectional areas.
- For the cable selection of AC input and output cables of the UPS, please refer to above table for corresponding recommended values, and choose upwards. Recommend using RV single core multi-strand cables or YJV single core power cables.
- Refer to Table3-1 for cable capacity of each model. If the site selected cables exceed the specification shown above or more wiring space is needed, please consult out company.

3.3.5 Surge Protection Device

If the UPS is installed in a lightning-prone area, install multiple surge protection devices at the AC input end to ensure UPS works safely.

3.3.6 Check Power Source

Before installation, please confirm whether the grid capacity can meet the requirements of new device, whether the mains meet the voltage and frequency in the nameplate, whether the wire current-carrying descend caused by wire ageing. If any doubt, please consult the local power supply department to solve.

3.4 Transportation and Unpacking

CAUTION

Please select suitable freight elevator to lift the UPS. If the weight exceeds the capacity of the elevator, please contact the professional server to provide rational transporting way.

3.4.1 Transportation

CAUTION

- The UPS must be transported by trained professionals.
- While transporting, please move gently and avoid impacting or dropping.
- If the UPS needs to be stored for long time after unpacking, it is suggested to pack the UPS by original plastic bag.

WARNING

During transporting, it is prohibited to tilting the UPS, or, the inner components will bear strong stress and even damage the UPS and affect its performance.

The UPS can be transported by motor forklift (as shown in Figure3-3) or manual forklift (as shown in Figure3-4). When lifting the UPS, the UPS' center of gravity should be at the centre of the forklift arm. Keep the UPS moving slowly and stably.

Figure3-3 Motor forklift

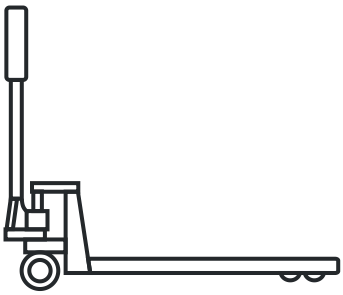


Figure3-4 manual forklift

CAUTION

While lifting the UPS, please keep stable and balanced.

During moving, keep the UPS vertical. Avoid put down or put up the UPS suddenly.

During transporting, pay attention to the corner, uphill and downhill, avoid collision.

3.4.2 Unpacking

NOTE

The package of the UPS is large, please select the unpacking place in advance. In theory, the unpacking place should be as close as possible to the installation place.

Step 1 Check if the package appearance is in good condition and if there has any transportation damage. If damaged, please inform the carrier immediately.

Step 2 Transport the UPS to assigned site.

CAUTION

To avoid tilting during transportation, keep the forklift arm exceed the wooden bracket.

Step 3 Unpack the external package. Remove the foam pad and plastic bag, take out the accessories and built-in data.

Step 4 Check the UPS.

- Inspect the appearance of the UPS and check if there has any damage caused by transportation. If damaged, please inform the carrier immediately.

- Compare with the packing list and check if the accessories mode is complete and proper. If the accessories lack or model wrong, please take note and contact the Power Solid Company or local agency of our company.

Step 5 After checking, unscrew the bolts that connected with device and fixed part by socket wrench, the bolt position is as shown in Figure3-6. (Here take the PS400KVA as an example.)

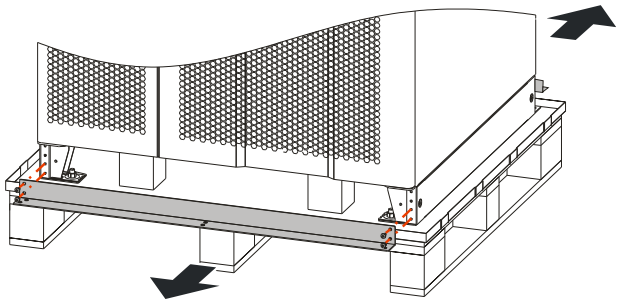


Figure3-5 Remove the fixed part

Step 6 After checking, unscrew the bolts that connected with device and wooden bracket by socket wrench, the bolt position is as shown in Figure3-6. (Here take the PS400KVA as an example.)

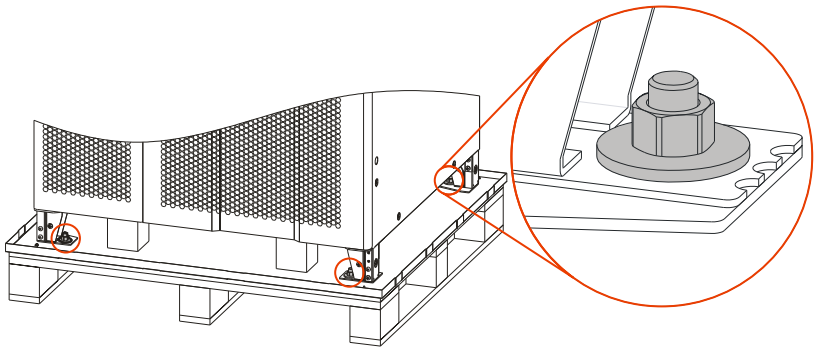


Figure3-6 Bolts position

----End

3.5 Install UPS

The ground installation steps are as follows:

Step 1 Determine and plan the installation position according to the UPS size (as shown in Figure3-7, Figure3-8, Figure3-9, Figure3-10) and installation clearance requirement (see *3.3.3 Installation* Clearance).

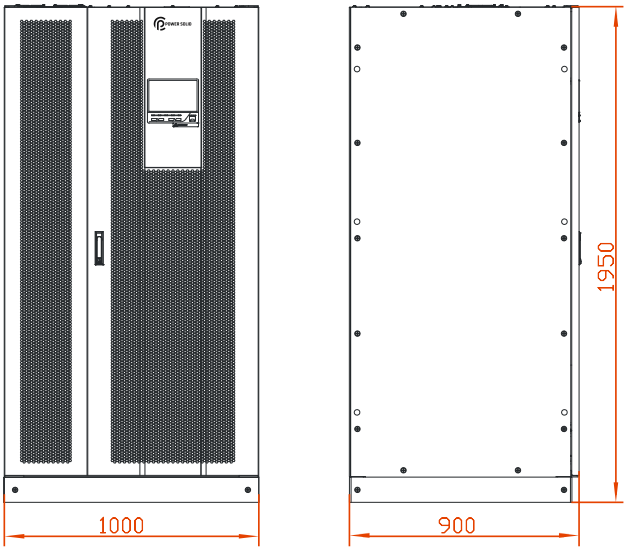


Figure3-7 Size of PS300KVA, PS400KVA (unit: mm)

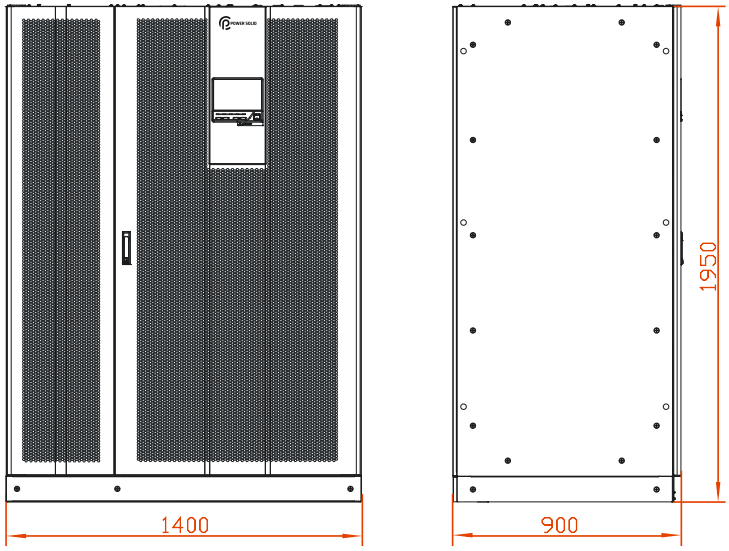


Figure3-8 Size of PS500KVA, PS600KVA (unit: mm)

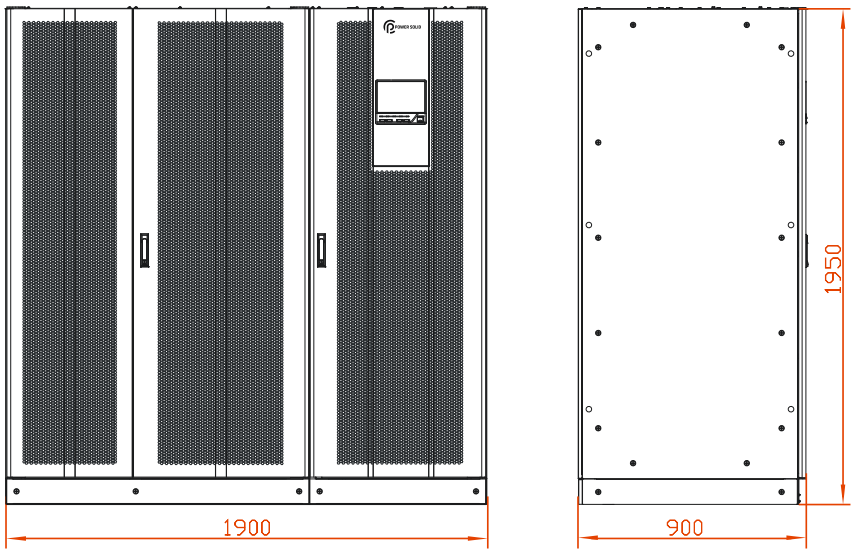


Figure3-9 Size of PS800KVA (unit: mm)

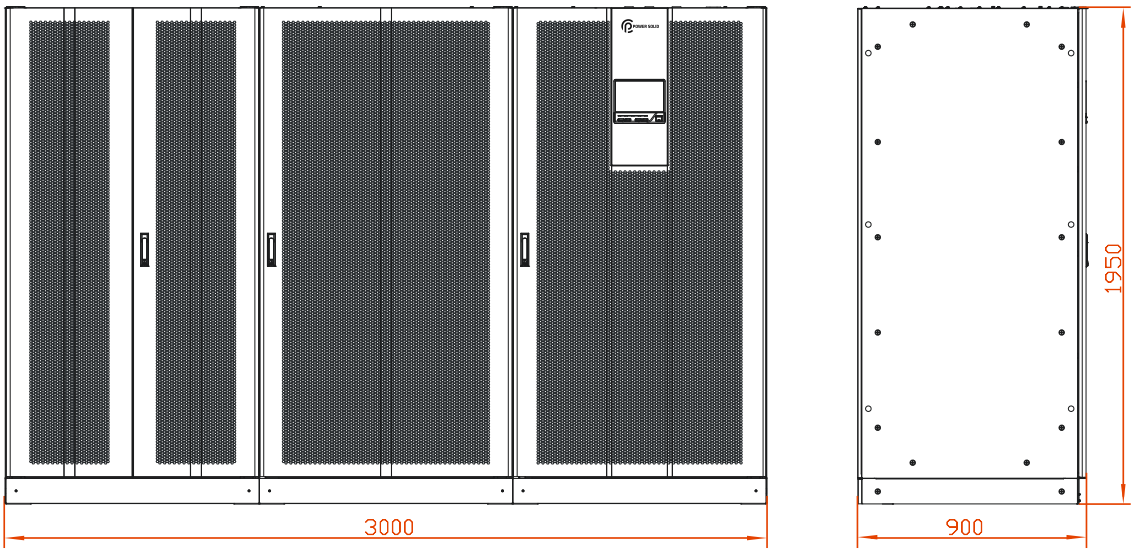


Figure3-10 Size of PS1000KVAKR331200 (unit: mm)

Step 2 Drill six Φ16.5 holes on the ground by impact drill according to the installation hole size of pedestal (as shown in Figure3-11, Figure3-12, Figure3-13, Figure3-14).

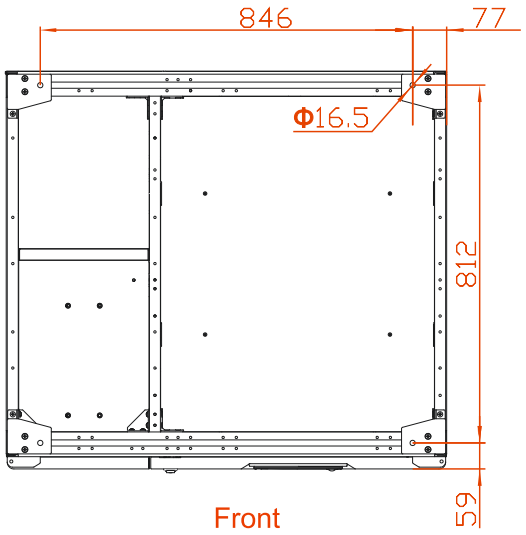


Figure3-11 Pedestal installation size of PS300KVA, PS400KVA (unit: mm)

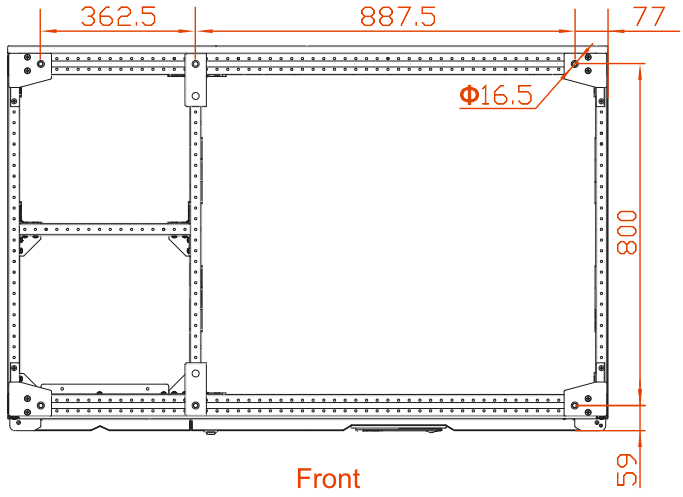


Figure3-12 Pedestal installation size of PS500KVA, PS600KVA (unit: mm)

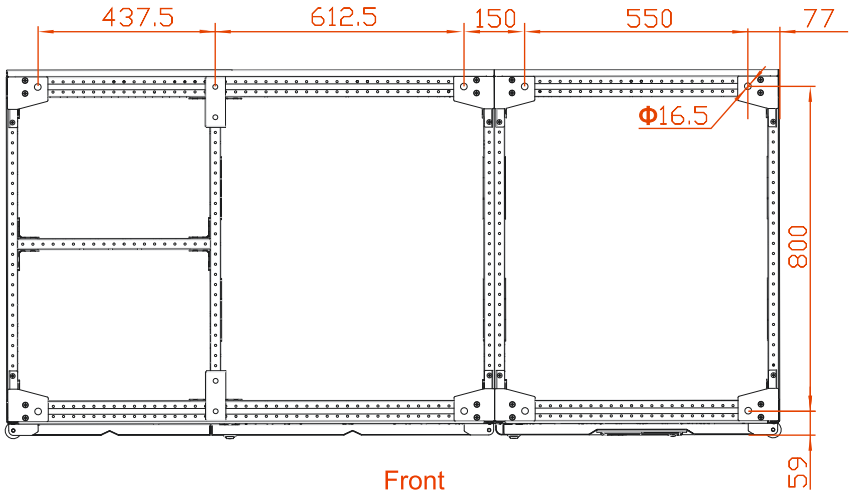


Figure3-13 Pedestal installation size of PS800KVA (unit: mm)

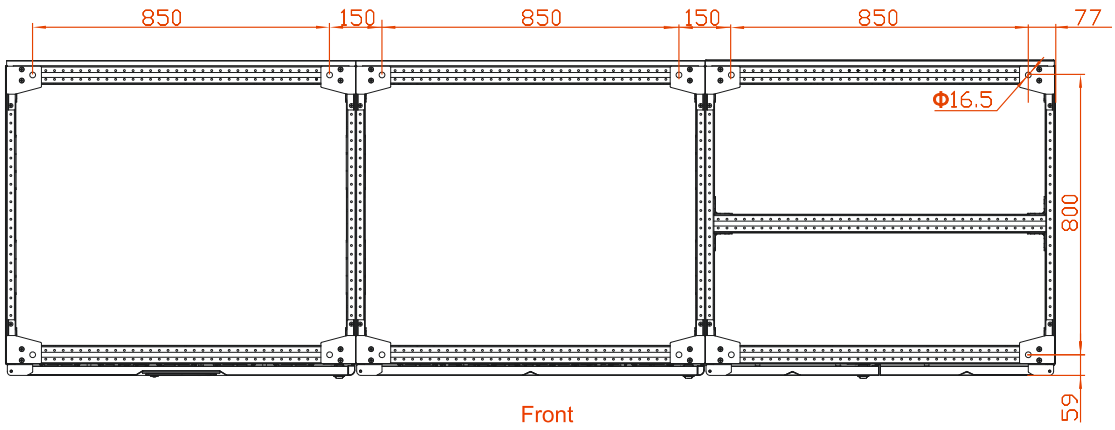
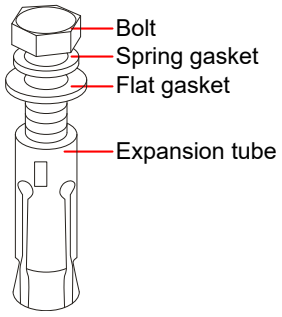


Figure3-14 Pedestal installation size of PS1000KVA PS1200KVA (unit: mm)

Step 3 Install expansion bolts M12. The structure and installation for the expansion bolt is as shown in Figure3-15.



1. Drill holes on the installation ground by hammer drill.
2. Tighten The expansion bolts mildly, and put it to the hole vertically, and then knock the expansion bolt by rubber hammer till all the expansion tube into the hole.
3. Pre tighten the expansion bolt.
4. Screw out the bolt , take down the spring gasket and flat gasket.

Figure3-15 Expansion bolt structure and installation

CAUTION

The expansion tube shouldn't be higher than the ground, which is to avoid affecting the cabinet installation.

NOTE

The exposed height of expansion bolt must be within 50mm.

PS300KVA, PS400KVA equipped with 4 expansion bolts.PS500KVA, PS600KVA equipped with 6 expansion bolts.PS800KVA equipped with 8 expansion bolts.PS1000KVA, PS1200KVA equipped with 12 expansion bolts.

Step 4 Move the UPS from wooden bracket to the ground, and align the bottom installation hole with the expansion bolt. Install the flat gasket (Φ12), spring gasket (Φ12), and screw the bolts.

NOTE

Move the PS1000KVA or PS1200KVA UPS from the wooden bracket to the ground and place it on the floor where expansion bolts have been made. Pay attention to the close alignment between cabinets on the left and right. The three sub-cabinets of UPS shall be operated in parallel. For specific installation methods, please refer to “PS1000KVA&PS1200KVA Quick Cabinet Installation Guide”. Lock the expansion bolts after the cabinet installation is finished.

Step 5 Take out the bottom cover plates and install them to the front, rear, left and right with provided screw M6, as shown in Figure3-16. (Here take the PS400KVA as an example.)

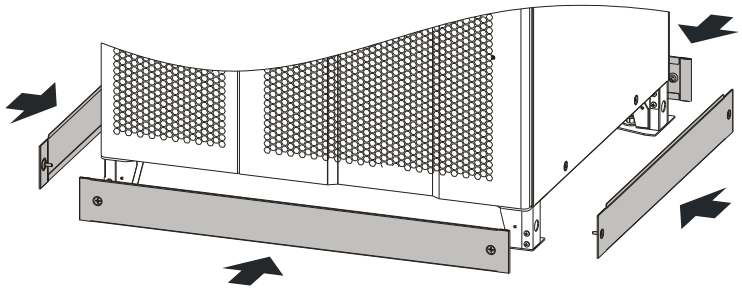


Figure3-16 Install bottom cover plates

----End

3.6 Electrical Connection

3.6.1 Cable laying Requirements

Table3-2 Cable lashing requirements

NO.	Requirement
1	The power wire and the signal cable shall be tied separately and the spacing shall be more than 150mm.
2	Both ends of the cable should be labeled, and the label should be clear and easy to understood.
3	The belt should be without sharp angle, uniform spacing, moderate tightness, buckle as far as possible in one direction.
4	When the binding is done, each strand shall not exceed 15 pieces, and keep straight and neat.
5	The redundant cables should be coiled neatly to find easily.
6	Please avoid cables crossing.

NO.	Requirement
7	When different colored cables are tied together, it should be well-arranged and do not allow for avoidable intersections. When the strapping standard of diameter standard and the color standard conflict, the strapping standard shall prevail.
8	Cables need reliable binded, and the strand spacing requirement is shown in Table3-4.

Table3-3 Cable spacing requirements

Cable diameter（mm）	Binding spacing（mm）
＜10	150
10～30	200
＞30	300

Table3-4 Cable wiring requirements

NO.	Cabling specification
1	Armored layer of armor cable needs to be grounded.
2	Distinguish the phase sequence of the cable, the wire should be firm and reliable, and it is strictly prohibited to reverse the phase sequence installation.
3	Arrange the cables neatly and do not damage the cable sheath.
4	Please separate all types of cables, do not mixed.
5	Please choose the cable terminal that easy to maintain and routing for future expansion.
6	The cable terminal should be standardized, firm, reliable.
7	The connection of power wires, grounding wires and communication wires should be firm and reliable.
8	When installing cables, the N-wire, PE-wire and each switch's wires should be bundled separately, and connected to the beam and tied with a tie to fix the group.

3.6.2 Single-unit

PS300KVA、PS400KVA

PS300KVA、PS400KVA UPS is compatible with the upper downside wiring modes. The input, bypass, output, battery and ground wires are located at the left rear of the UPS. The communication wires are located at the right front of the UPS.

CAUTION

- When wiring, make sure that wires are connected with terminals tightly. Do not make any poor connection or connect wires reversely.
- While wiring, the input neutral wire and output neutral wire should be connected to respective input and output neutral terminal bar. Do not connect them to the same terminal bar.
- The connection of battery anode and cathode must be right and firm. The grounding wire must be connected firmly.

Step 1 Use the cross screwdriver to remove the screws from the wiring block, and dismantle wiring cover plates, as shown in Figure3-17.

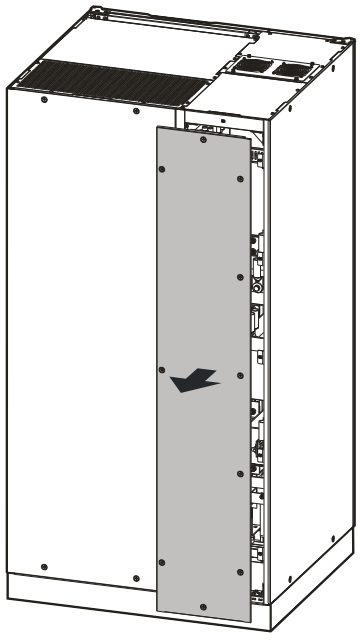


Figure3-17 Dismantle wiring cover plates of PS300KVA、PS400KVA

Step 2 Unscrew the fasten bolts of top wiring cover plate (as shown in Figure3-18) by screwdriver and take them down.

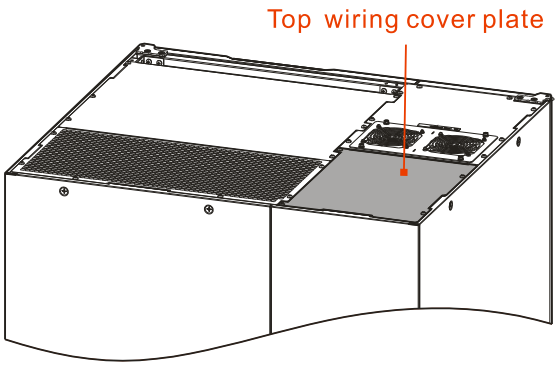


Figure3-18 Top wiring cover plate position of PS300KVA, PS400KVA

Step 3 Connect the bypass input wires.

Lead bypass input wires go through the top wiring hole to the bypass copper bar of UPS, as shown in Figure3-19.

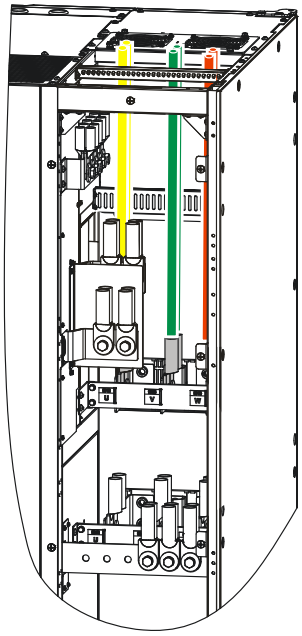


Figure3-19 The PS300KVA, PS400KVA bypass input wiring diagram

Step 4 Connect the output wires.

Lead the output cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown in Figure3-20.

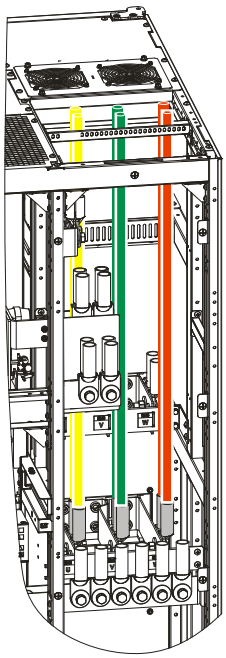


Figure3-20 The PS300KVA, PS400KVA AC output wiring diagram

Step 5 Connect the input wires

Lead the input cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown in Figure3-21.

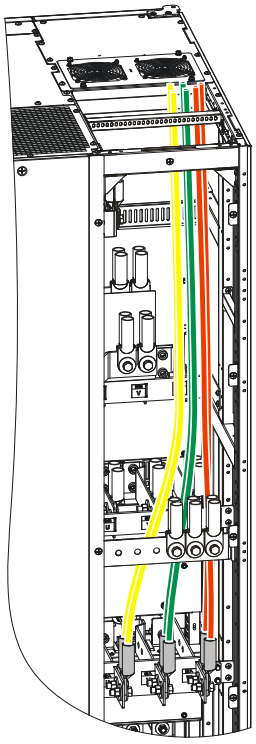


Figure3-21 The PS300KVA, PS400KVA AC input wiring diagram

Step 6 Connect the protective grounding wires.

Lead the protective grounding wires go through the top wiring hole to grounding terminal at the back of UPS, as shown in Figure3-22.

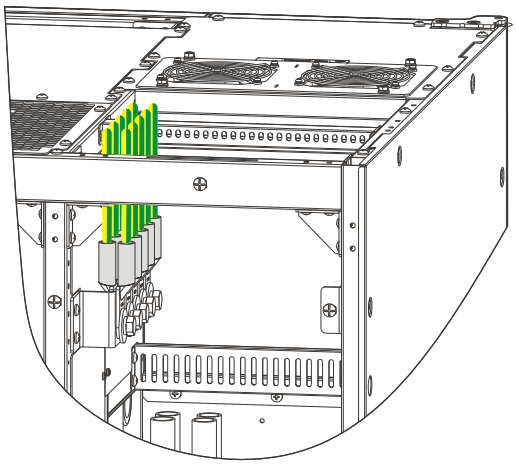


Figure3-22 The PS300KVA, PS400KVA grounding wiring diagram

CAUTION

The UPS must be connected with user grounding.

The grounding wire of UPS cannot be the same with the lightning conductor grounding wire of installed building, the two must be separated.

Step 7 Connect the battery wires

Lead the battery wires go through the top wiring hole to corresponding terminal at the back of UPS, as shown in Figure3-23.

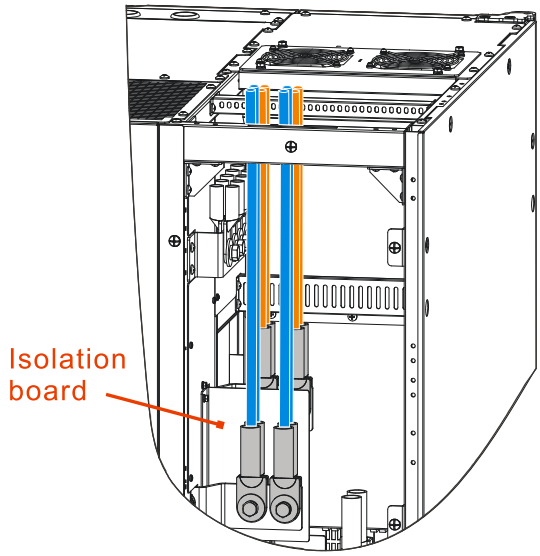


Figure3-23 The PS300KVA, PS400KVA battery wiring diagram

NOTE

When wiring, first remove the isolation plate, then connect the positive battery wires (brown), then install the isolation plate, and finally connect the negative battery wires (blue).

In battery pack mode, you need to connect the battery midpoint wire through the top wiring hole to the neutral copper bar of the UPS.

Step 8 Connect the output neutral wire.

Lead output neutral wire go through the top wiring hole to the output neutral copper bar of UPS, as shown in Figure3-24.

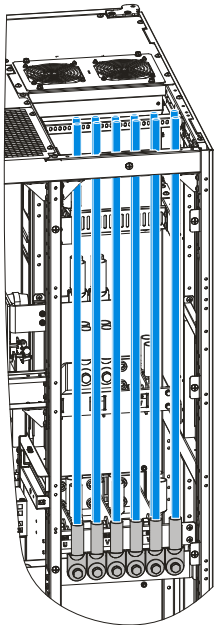


Figure3-24 The PS300KVA, PS400KVA output neutral wiring diagram

CAUTION

The three-phase live wires are marked by U, V, W, they are corresponding the phase-A, phase-B, phase-C or phase-R, phase-S, phase-T respectively.

NOTE

PS300KVA, PS400KVA output neutral copper bar can be installed in the form of back to back, the specific installation method is subject to the actual situation.

When AC input and bypass are from the same power source, the power wires number of each phase for AC input should be even 2n, connect the n pieces of wires to one phase copper bar of AC input, connect the other n pieces of wires to the same phase cooper bar of bypass input, and then, short connect the AC input copper bar and bypass input of the same phase. This kind of wiring is very simple and the system is reliable.

Step 9 Connect the communication wires.

Open the front door, lead the wires of dry contact signal, SNMP, RS232/RS485 go through the top wiring hole, and then insert them to the corresponding ports on the communication board. The communication board is as shown in Figure3-25.

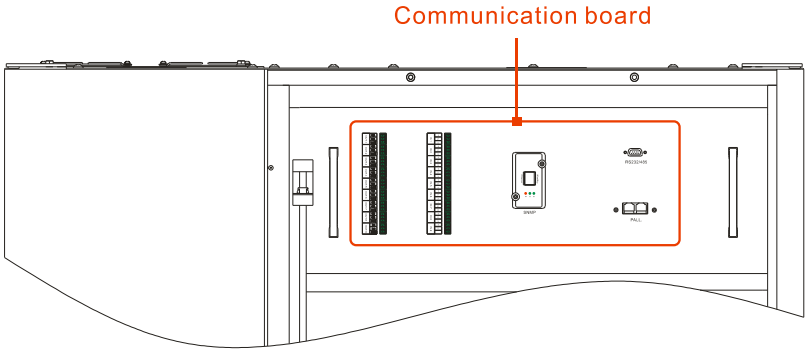


Figure3-25 Communication board of PS300KVA, PS400KVA

Step 10 Fill the empty part of the bottom wiring hole with fireproofing mud.

Step 11 Reinstall the front and rear wiring cover plates to their original places.

----End

PS500KVA, PS600KVA

PS500KVA、PS600KVA UPS is compatible with the upper wiring modes. The input, bypass, output, battery and ground wires are located at the left rear of the UPS. The communication wires are located at the right front of the UPS.

CAUTION

- When wiring, make sure that wires are connected with terminals tightly. Do not make any poor connection or connect wires reversely.
- While wiring, the input neutral wire and output neutral wire should be connected to respective input and output neutral terminal bar. Do not connect them to the same terminal bar.
- The connection of battery anode and cathode must be right and firm. The grounding wire must be connected firmly.

Step 1 Use the cross screwdriver to remove the screws from the wiring block, and dismantle wiring cover plates, as shown in Figure3-26.

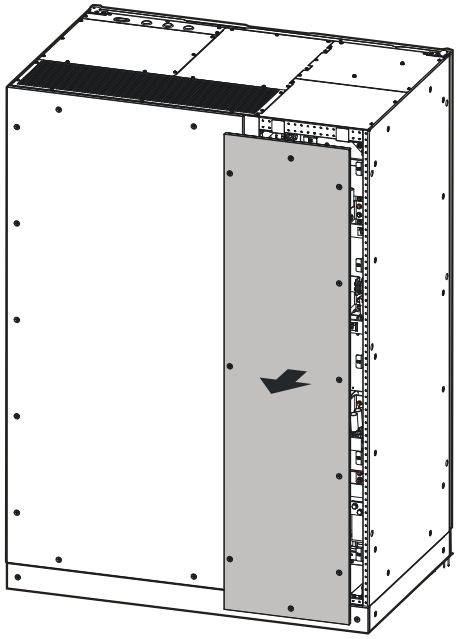


Figure3-26 Dismantle wiring cover plates of PS500KVA、PS600KVA

Step 2 Unscrew the fasten bolts of top wiring cover plate (as shown in Figure3-27) by screwdriver and take them down.

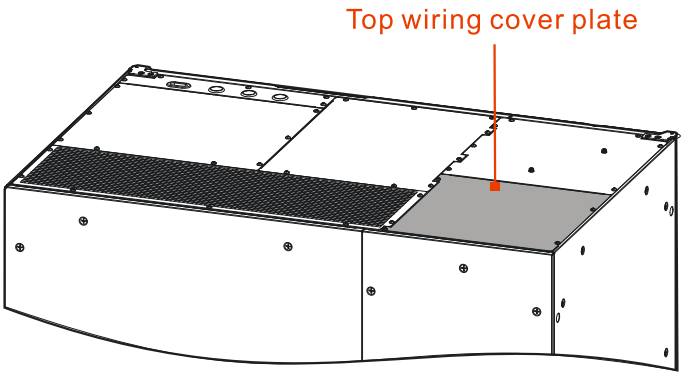


Figure3-27 Top wiring cover plate position of PS500KVA、PS600KVA

Step 3 Connect the bypass input wires.

Lead bypass input wires go through the top wiring hole to the bypass copper bar of UPS, as shown inFigure3-28.

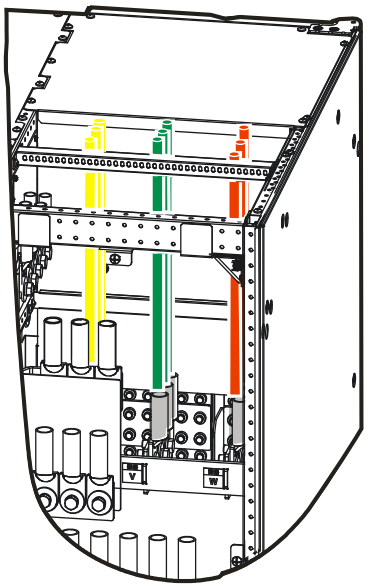


Figure3-28 The PS500KVA、PS600KVA bypass input wiring diagram

Step 4 Connect the output wires.

Lead the output cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown inFigure3-29.

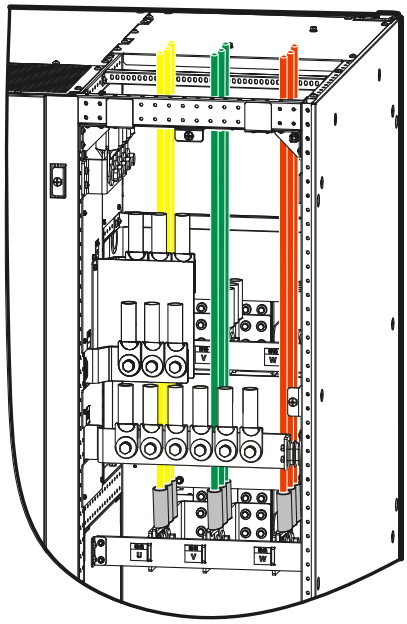


Figure3-29 The PS500KVA、PS600KVA AC output wiring diagram

Step 5 Connect the input wires

Lead the input cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown in Figure3-30.

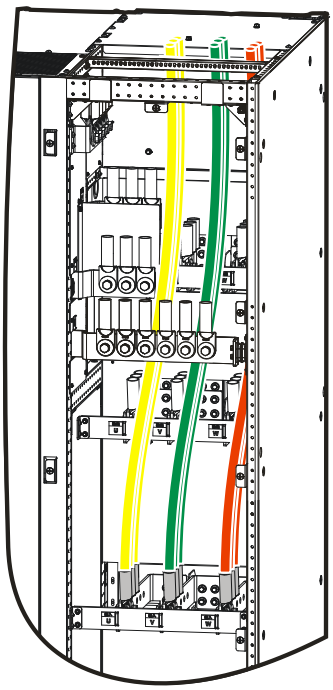


Figure3-30 The PS500KVA、PS600KVA AC input wiring diagram

Step 6 Connect the protective grounding wires.

Lead the protective grounding wires go through the top wiring hole to grounding terminal at the back of UPS, as shown in Figure3-31.

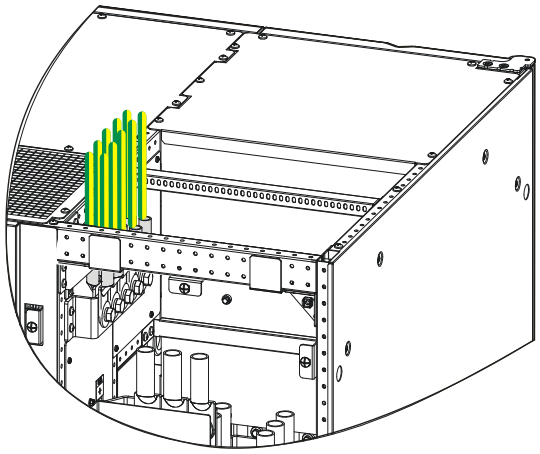


Figure3-31 The PS500KVA、PS600KVA grounding wiring diagram

CAUTION

The UPS must be connected with user grounding.

The grounding wire of UPS cannot be the same with the lightning conductor grounding wire of installed building, the two must be separated.

Step 7 Connect the battery wires

Lead the battery wires go through the top wiring hole to corresponding terminal at the back of UPS, as shown in Figure3-32.

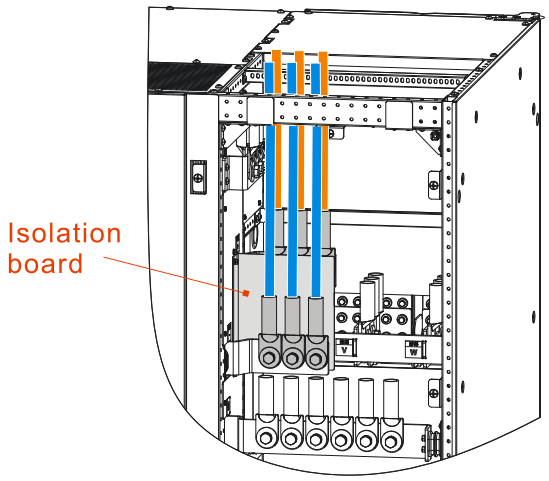


Figure3-32 The PS500KVA、PS600KVA battery wiring diagram

NOTE

When wiring, first remove the isolation plate, then connect the positive battery wires (brown), then install the isolation plate, and finally connect the negative battery wires (bule).

In battery pack mode, you need to connect the battery midpoint wire through the top wiring hole to the neutral copper bar of the UPS.

Step 8 Connect the output neutral wire

Lead output neutral wire go through the top wiring hole to the output neutral copper bar of UPS, as shown in Figure3-33.

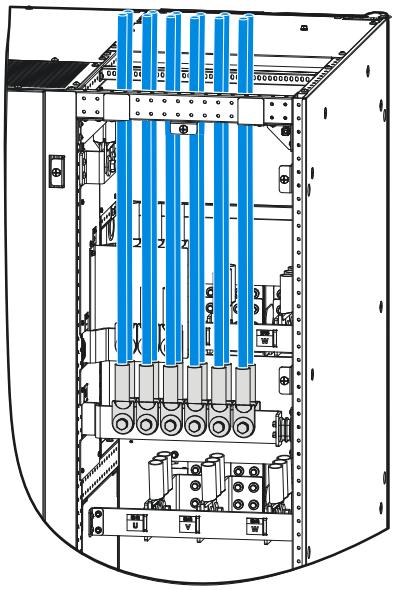


Figure3-33 The PS500KVA、PS600KVA output neutral wiring diagram

NOTE

Figure3-33 is illustrated with full matching as an example, and the number of specific output neutral wires is determined according to the actual situation.

When AC input and bypass are from the same power source, the power wires number of each phase for AC input should be even 2n, connect the n pieces of wires to one phase copper bar of AC input, connect the other n pieces of wires to the same phase cooper bar of bypass input, and then, short connect the AC input copper bar and bypass input of the same phase. This kind of wiring is very simple and the system is reliable.

CAUTION

The three-phase live wires are marked by U, V, W, they are corresponding the phase-A, phase-B, phase-C or phase-R, phase-S, phase-T respectively.

Step 9 Connect the communication wires

Open the front door, lead the wires of dry contact signal, SNMP, RS232/RS485 go through the top wiring hole, and then insert them to the corresponding ports on the communication board. The communication board is as shown in Figure3-34.

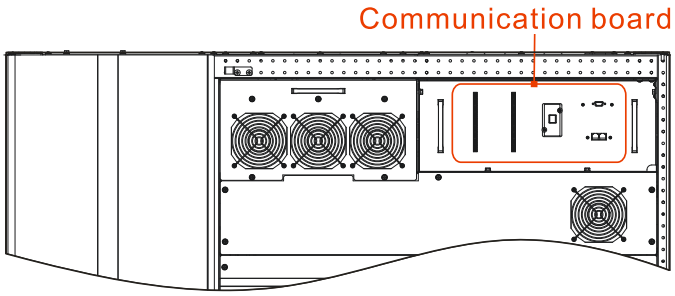


Figure3-34 Communication board of PS500KVA, PS600KVA

Step 10 Fill the empty part of the bottom wiring hole with fireproofing mud.

Step 11 Reinstall the front and rear wiring cover plates to their original places.

----End

PS800KVA

PS800KVA UPS is compatible with the upper wiring modes. The input, bypass, output, battery and ground wires are located at the left rear of the UPS. The communication wires are located at the right front of the UPS.

CAUTION

- When wiring, make sure that wires are connected with terminals tightly. Do not make any poor connection or connect wires reversely.
- While wiring, the input neutral wire and output neutral wire should be connected to respective input and output neutral terminal bar. Do not connect them to the same terminal bar.
- The connection of battery anode and cathode must be right and firm. The grounding wire must be connected firmly.

Step 1 Use the cross screwdriver to remove the screws from the wiring block, and dismantle wiring cover plates, as shown in Figure3-35.

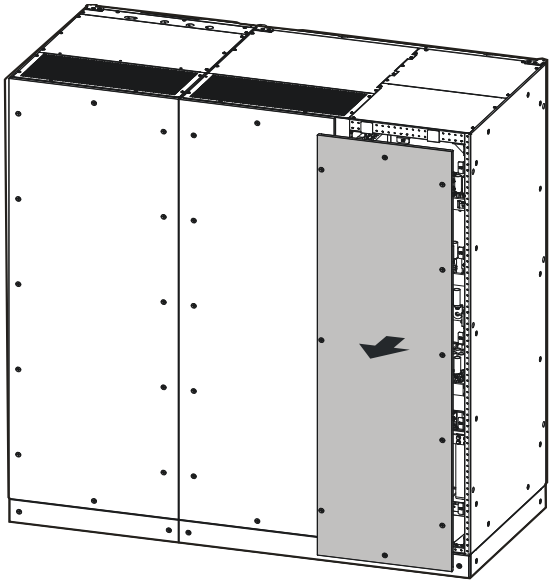


Figure3-35 Dismantle wiring cover plates of PS800KVA

Step 2 Unscrew the fasten bolts of top wiring cover plate (as shown in Figure3-36) by screwdriver and take them down.

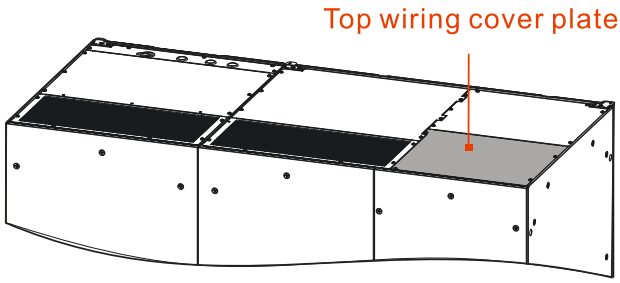


Figure3-36 Top wiring cover plate position of PS800KVA

Step 3 Connect the bypass input wires.

Lead bypass input wires go through the top wiring hole to the bypass copper bar of UPS, as shown in Figure3-37.

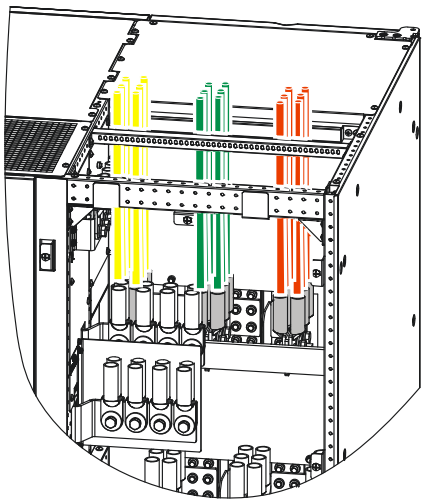


Figure3-37 The PS800KVA bypass input wiring diagram

Step 4 Connect the output wires.

Lead the output cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown in Figure3-38.

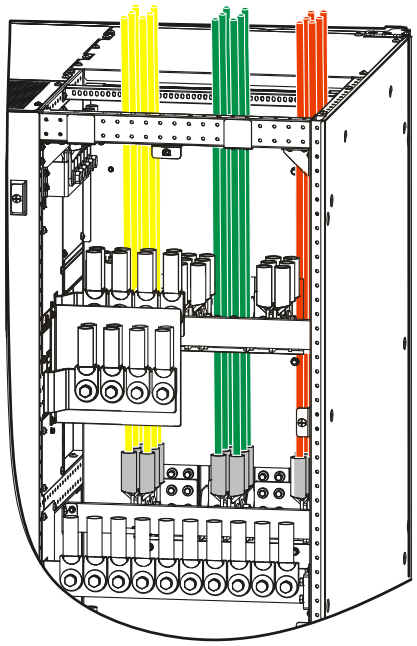


Figure3-38 The PS800KVA AC output wiring diagram

Step 5 Connect the input wires

Lead the input cables go through the top wiring hole and connect them with corresponding wiring terminal of the UPS. The input terminals are as shown in Figure3-39.

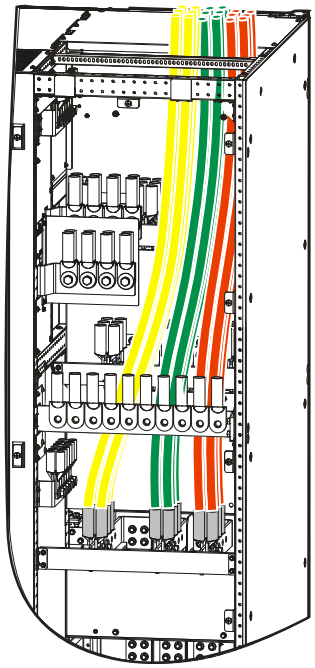


Figure3-39 The PS800KVA AC input wiring diagram

Step 6 Connect the protective grounding wires.

Lead the protective grounding wires go through the top wiring hole to grounding terminal at the back of UPS, as shown in Figure3-40.

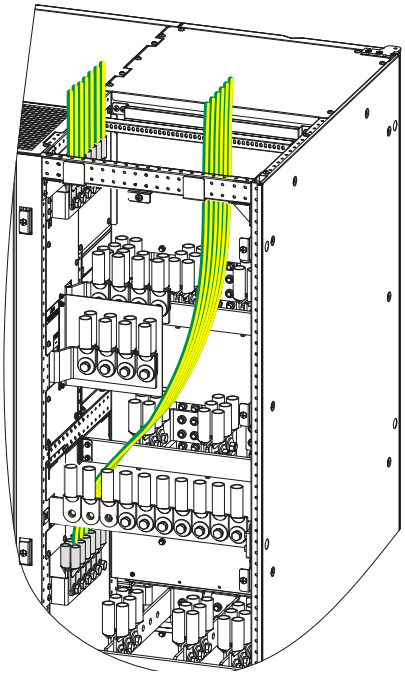


Figure3-40 The PS800KVA grounding wiring diagram

NOTE

The specific wiring quantity is subject to the actual situation.

CAUTION

The UPS must be connected with user grounding.

The grounding wire of UPS cannot be the same with the lightning conductor grounding wire of installed building, the two must be separated.

Step 7 Connect the battery wires

Lead the battery wires go through the top wiring hole to corresponding terminal at the back of UPS, as shown in Figure3-41.

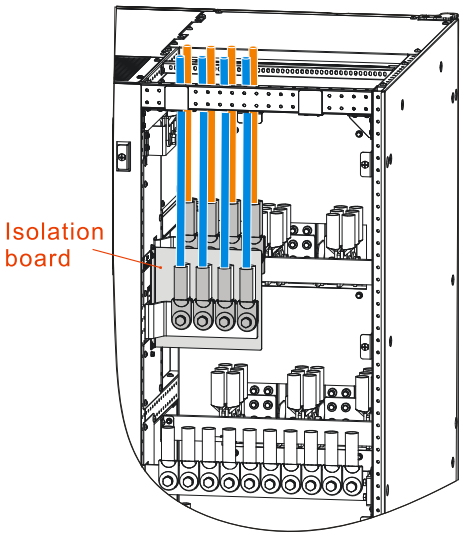


Figure3-41 The PS800KVA battery wiring diagram

WARNING

Each machine must be equipped with the correct fuse or trip protection device.

NOTE

When wiring, first remove the isolation plate, then connect the positive battery wires (brown), then install the isolation plate, and finally connect the negative battery wires (blue).

In battery pack mode, you need to connect the battery midpoint wire through the top wiring hole to the neutral copper bar of the UPS.

Step 8 Connect the output neutral wire

Lead output neutral wire go through the top wiring hole to the output neutral copper bar of UPS, as shown in Figure3-42.

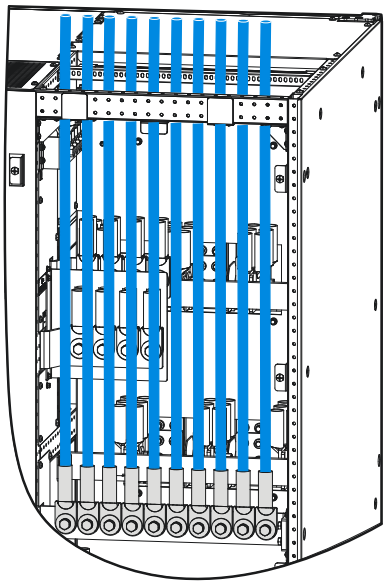


Figure3-42 The PS800KVA output neutral wiring diagram

CAUTION

The three-phase live wires are marked by U, V, W, they are corresponding the phase-A, phase-B, phase-C or phase-R, phase-S, phase-T respectively.

NOTE

PS800KVA output neutral copper bar can be installed in the form of back to back, the specific installation method is subject to the actual situation

When AC input and bypass are from the same power source, the power wires number of each phase for AC input should be even 2n, connect the n pieces of wires to one phase copper bar of AC input, connect the other n pieces of wires to the same phase cooper bar of bypass input, and then, short connect the AC input copper bar and bypass input of the same phase. This kind of wiring is very simple and the system is reliable.

Step 9 Connect the communication wires

Open the front door, lead the wires of dry contact signal, SNMP, RS232/RS485 go through the top wiring hole, and then insert them to the corresponding ports on the communication board. The communication board is as shown in Figure3-43.

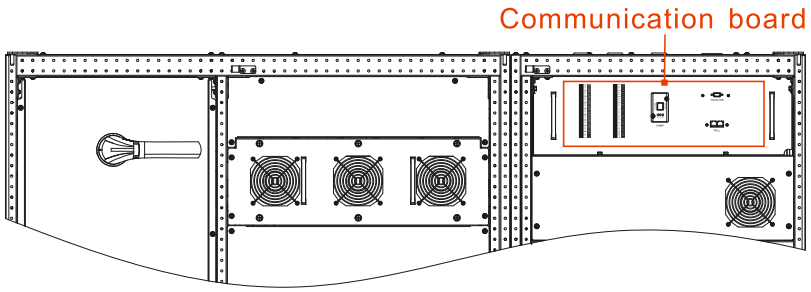


Figure3-43 Communication board of PS800KVA

Step 10 Fill the empty part of the bottom wiring hole with fireproofing mud.

Step 11 Reinstall the front and rear wiring cover plates to their original places.

----End

PS1000KVA, PS1200KVA

PS1000KVA, PS1200KVA UPS is compatible with the upper wiring modes. The input, bypass, output, battery and ground wires are located at the left rear of the UPS. The communication wires are located at the right front of the UPS.

CAUTION

- When wiring, make sure that wires are connected with terminals tightly. Do not make any poor connection or connect wires reversely.
- While wiring, the input neutral wire and output neutral wire should be connected to respective input and output neutral terminal bar. Do not connect them to the same terminal bar.
- The connection of battery anode and cathode must be right and firm. The grounding wire must be connected firmly.

Step 1 Use the cross screwdriver to remove the screws from the wiring block, and dismantle wiring cover plates, as shown inFigure3-44.

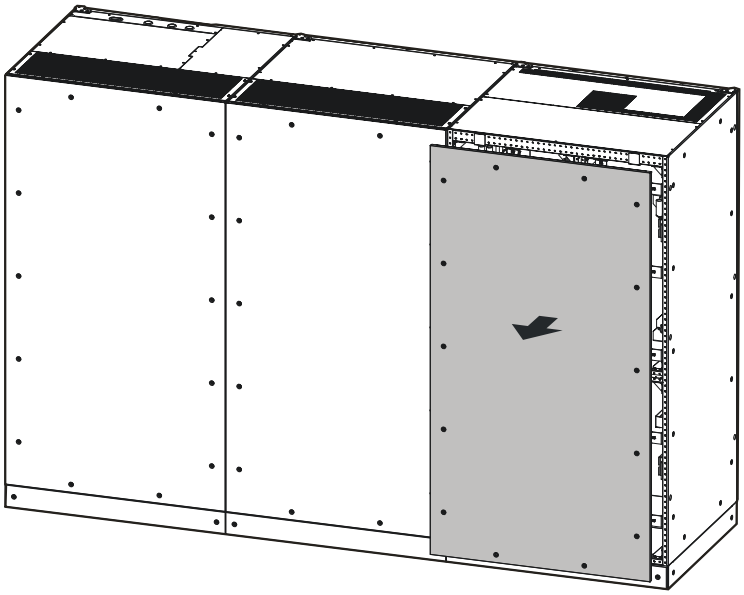


Figure3-44 Dismantle wiring cover plates of PS1000KVA, PS1200KVA

Step 2 Unscrew the fasten bolts of top wiring cover plate (as shown in Figure3-45) by screwdriver and take them down.

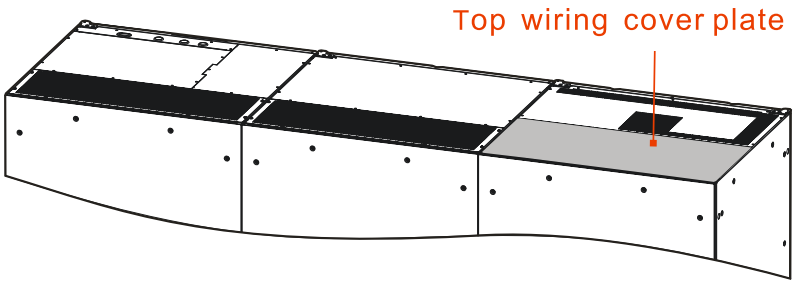


Figure3-45 Top wiring cover plate position of PS1000KVA, PS1200KVA

Step 3 Connect wiring

The wiring diagram of battery wires, neutral wires, ground wires, input and output wires and bypass wires is shown in Figure3-46, please connect in the following order: battery negative cable-battery positive cable- input cable-neutral wires-ground wires-bypass input wires-output wires.

WARNING

Each machine must be equipped with the correct fuse or trip protection device.

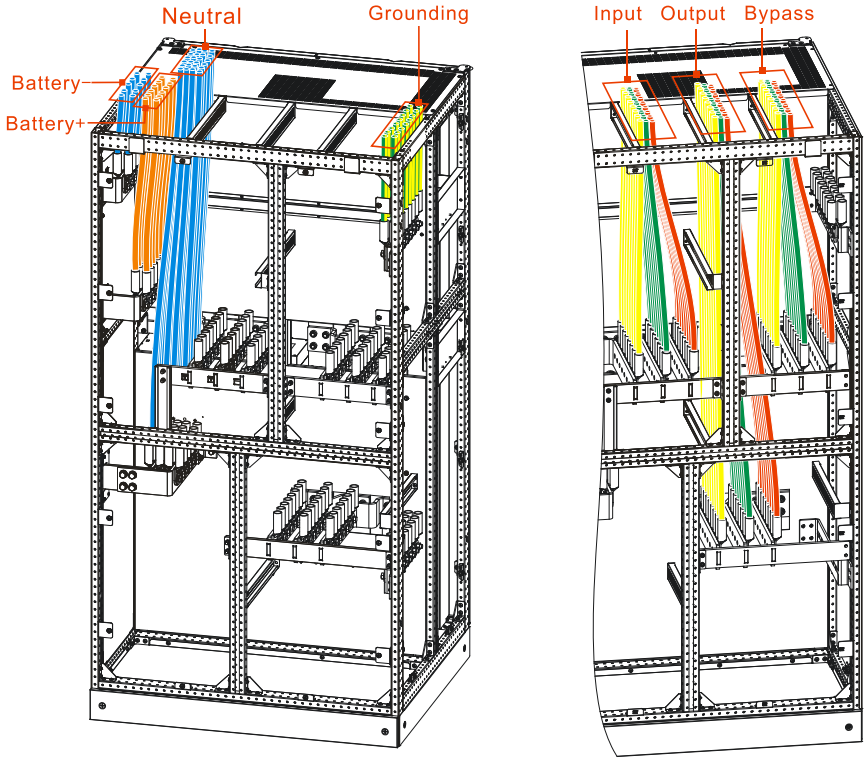


Figure3-46 KR331000, PS1200KVA wiring diagram

WARNING

PS1000KVA, PS1200KVA input, output and bypass are prohibited to use back to back. The specific wiring quantity in Figure3-46 is subject to the actual situation.

CAUTION

The UPS must be connected with user grounding.

The grounding wire of UPS cannot be the same with the lightning conductor grounding wire of installed building, the two must be separated.

CAUTION

The three-phase live wires are marked by U, V, W, they are corresponding the phase-A, phase-B, phase-C or phase-R, phase-S, phase-T respectively.

NOTE

When AC input and bypass are from the same power source, the power wires number of each phase for AC input should be even 2n, connect the n pieces of wires to one phase copper bar of AC input, connect the other n pieces of wires to the same phase cooper bar of bypass input, and then, short connect the AC input copper bar and bypass input of the same phase. This kind of wiring is very simple and the system is reliable.

Step 4 Connect the communication wires

Open the front door, lead the wires of dry contact signal, SNMP, RS232/RS485 go through the top wiring hole, and then insert them to the corresponding ports on the communication board. The communication board is as shown in

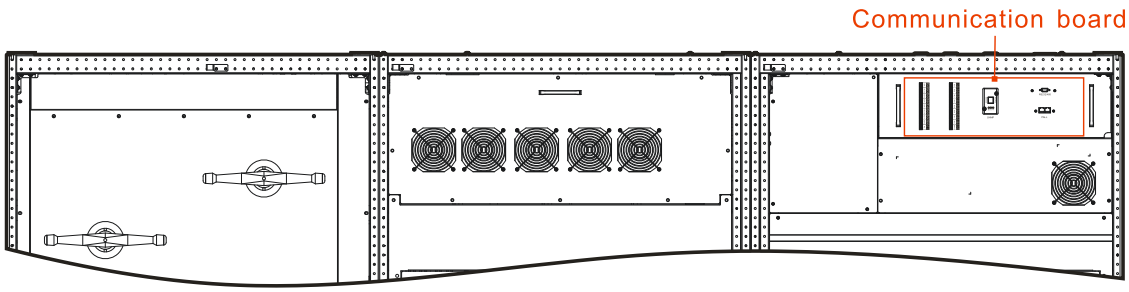


Figure3-47 Communication board of PS1000KVA, PS1200KVA

Step 5 Fill the empty part of the bottom wiring hole with fireproofing mud.

Step 6 Reinstall the front and rear wiring cover plates to their original places.

----End

3.6.3 Series System

The cable connection for the series backup system is as follows:

Step 1 Remove the top wiring cover plate and the left rear wiring cover plate of UPS respectively.

Step 2 Connect the output live wires of UPS1 to the bypass input of UPS2 on the base of phase sequence, and connect the output neutral wire of UPS1 to the input neutral wire of UPS2.

CAUTION

First, please ensure the UPS2 is two-routes input, and ensure that there is no external connection between mains and bypass wires.

The phase sequence of AC input must be right, or the UPS will not start normally.

Step 3 Connect the AC input of UPS1 and UPS2 to the same grid.

Step 4 Other wires connection is the same as that of signal-unit.

The series wiring diagram is as shown in Figure3-48.

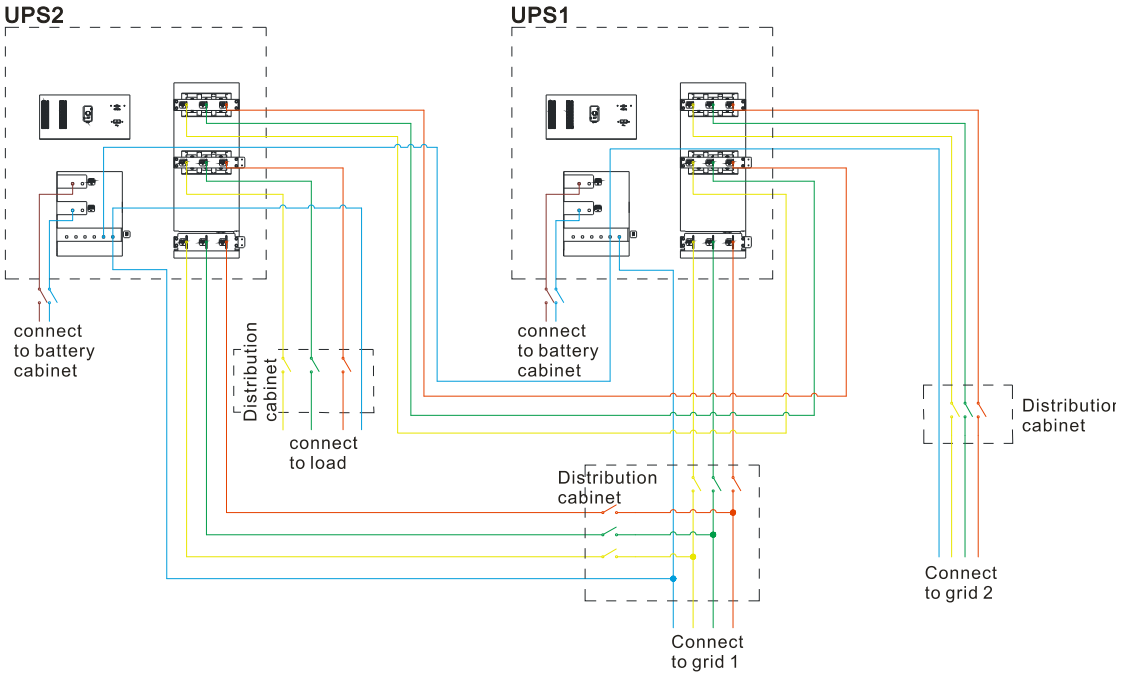


Figure3-48 Wiring diagram of series system

CAUTION

The three-phase live wires above are marked by U, V, W, they are corresponding the phase-A, phase-B, phase-C or phase-R, phase-S, phase-T respectively.

NOTE

When the mains and bypass input is from the same power source, the bypass and mains wire connection of UPS1 please refer to one-route wire connection of single-unit.

----End

3.6.4 Parallel System

Install the battery and UPS of the parallel system, and then connect wires of parallel system.

CAUTION

The phase sequence of AC input must be right, or, the UPS cannot work normally.

The connection and phase sequence of AC input of each UPS in parallel system should be in accordance with each others, and ensure the bypass power phase is the same.

Before powering, check if the input phase of each UPS is separately corresponding.

Step 1 Dismantle the bottom wiring cover plates and rat guards of each UPS according to step 1, step 2 in **3.6.2 Single-unit**.

Step 2 Connect the AC input of each UPS to mains.

Step 3 Connect the bypass input of UPS1 and UPS2 to the same grid.

Step 4 Connect the AC output of each UPS to load or distribution cabinet.

The output U, V, W, N of parallel system are connected from the terminal bars of UPS and short connected at the distribution cabinet or load.

CAUTION

The wire length of bypass and output to each device in parallel system should be the same.

Step 5 Connect the battery input of UPS in parallel system to corresponding battery groups.

Step 6 Connect the parallel port (as shown in Figure3-49) of each UPS in parallel system by parallel wires (shielded communication wire), and fasten the corresponding screws. (Here take the PS400KVA as an example.)

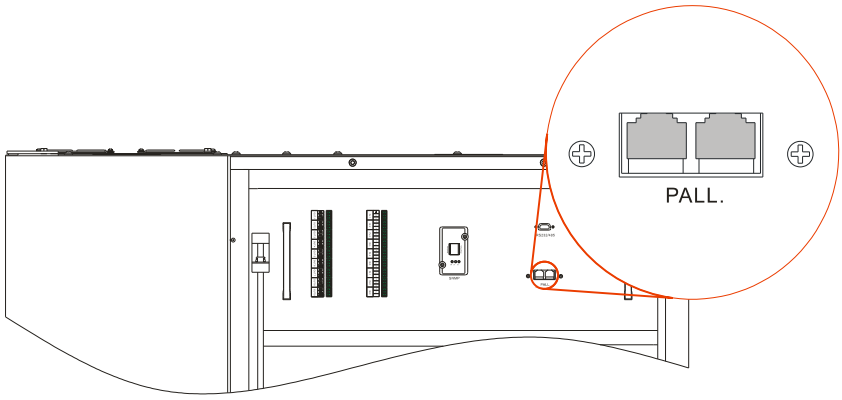


Figure3-49 Parallel port position

The connection of parallel system is as shown in Figure3-50.

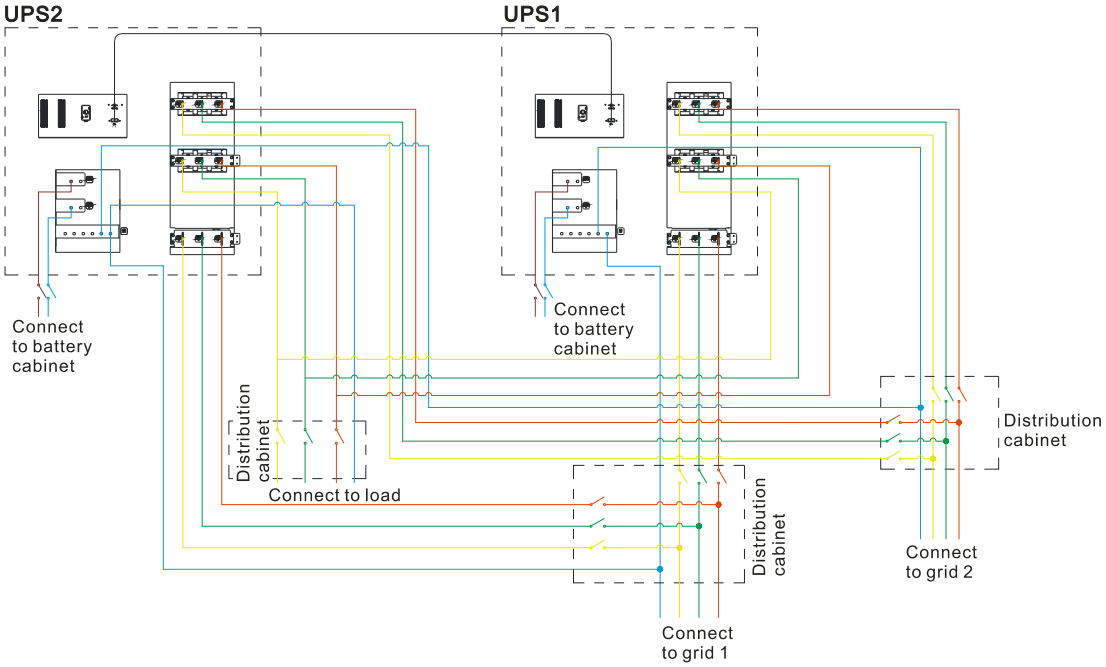


Figure3-50 Parallel system's wiring diagram

NOTE

When the mains and bypass input is from the same power source, the bypass and mains wire connection of UPS1 please refer to one-route wire connection of single-unit.

----End

4 Touch Screen Operation

In the touch screen, it can scan input parameter, output parameter, load parameter, battery parameter, get UPS status and warning information and perform relative setting. Besides, it also can query event log for fault diagnosis.

NOTE

The parameters and other details in the pictures in this chapter are used for illustration. Detailed information is in accordance with the final product.

4.1 Menu Hierarchy

The menu hierarchy of the touch screen is as shown in 0.

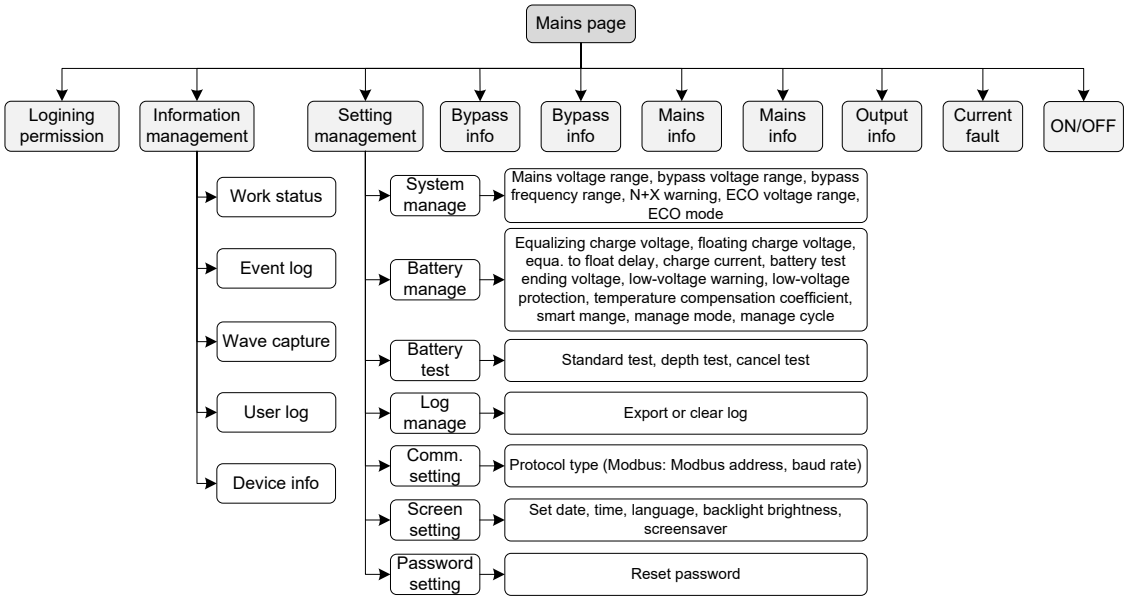


Figure4-1 Menu hierarchy of the touch screen

WARNING

The touch screen contains parameters related to the operation of the device. All settings such as modification of parameters must be done by a designated professional. For parameters with unclear meanings, please refer to this book or consult relevant staff of our company. Please do not modify without authorization.

4.2 Main Page

After powering on, the touch screen will enter the welcome page, as shown in Figure4-2, and begin to initialize.

Figure4-2 Welcome page

If the power-on password function is set, the power will be transferred to the power-on password page, as shown inFigure4-3.

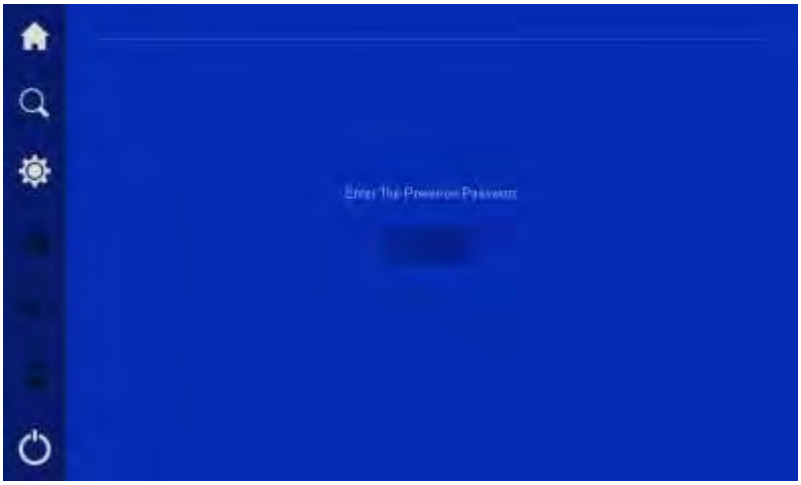


Figure4-3 The Power-on Password

After the power-on password, it will enter the main page, as shown in Figure4-4.

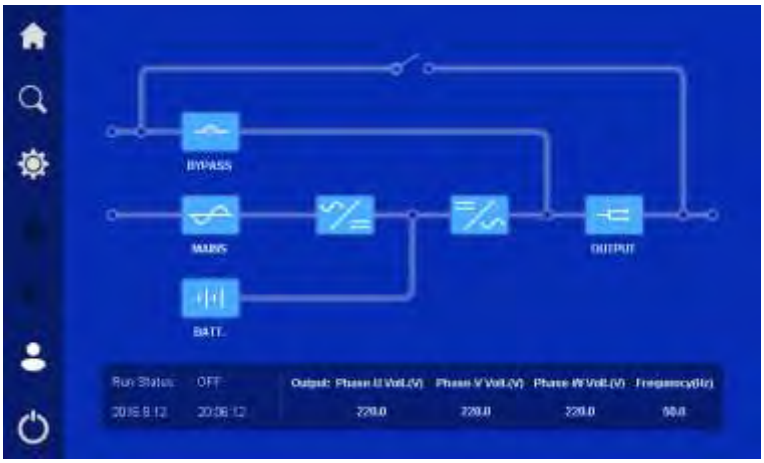


Figure4-4 Main page

4.2.1 Icon Meaning

In the main page, it shows the topological structure of UPS. The icon meaning is as follows

: Homepage. Click the icon in any page, it will return to the main page.

: Information management. Click the icon, it will enter the information management page.

: Setting management. Click the icon, it will enter the setting management page.

: Current fault information. If there is any fault, click the icon, you can check the corresponding fault information.

: Buzzer. Click the icon to control the buzzer.

: Login.

: ON/OFF

: Bypass information. When bypass abnormal, the icon will be on and show in red.

: Mains information. When mains abnormal, the icon will be on and show in red.

: Battery information. When battery abnormal, the icon will be on and show in red.

: output information. When output abnormal, the icon will be on and show in red.

4.2.2 Working Status

There are six main working statuses: without energy transmission status, mains inverting status, battery inverting status, bypass output status, smart ECO output, ECO output and maintenance

bypass output status. The corresponding water lights in the monitoring page are shown in Figure4-5 to Figure4-6. Besides, other statuses also have corresponding indicator instruction.

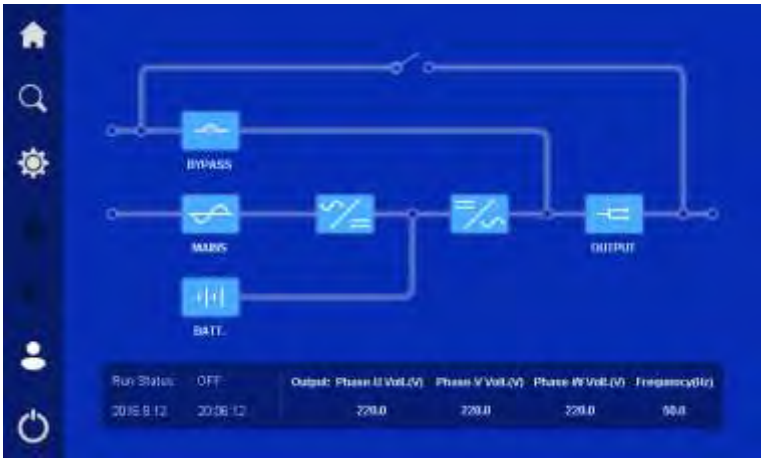


Figure4-5 Without energy transmission status

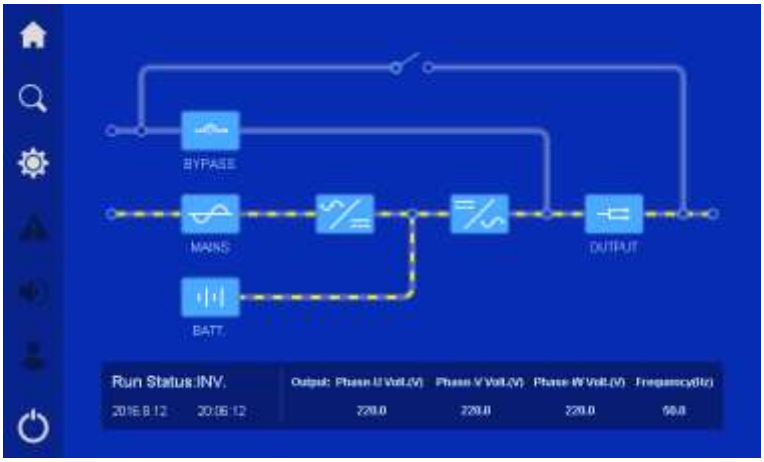


Figure4-6 Mains normal, mains inverting status

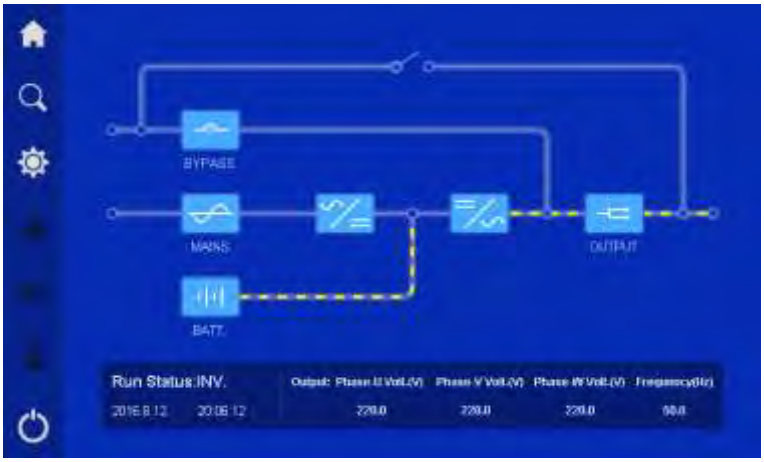


Figure4-7 Mains abnormal, battery inverting status

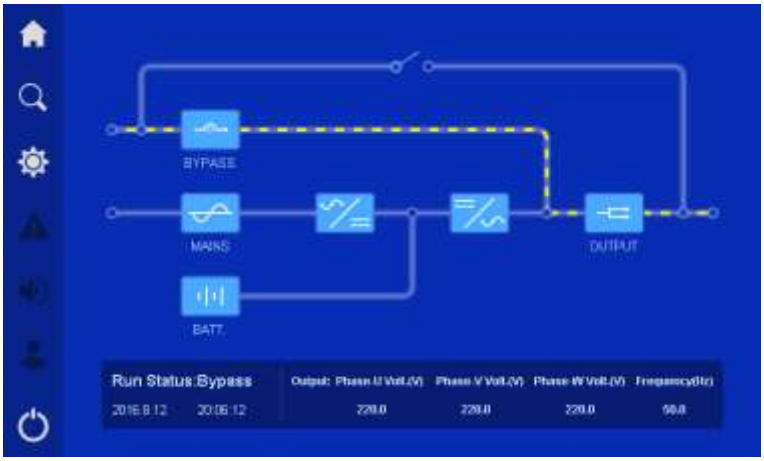


Figure4-8 Bypass output status

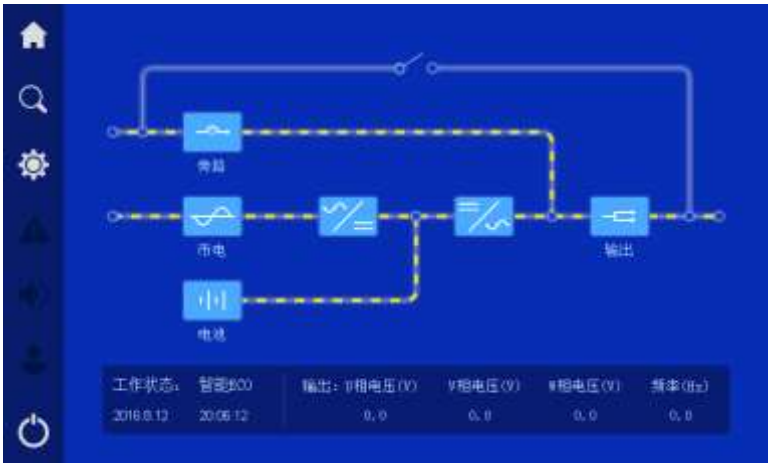


Figure4-9 Smart ECO status

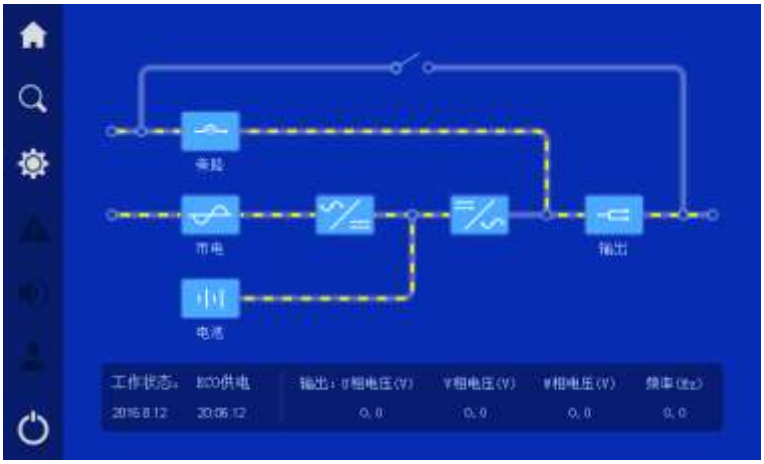


Figure4-10 ECO status

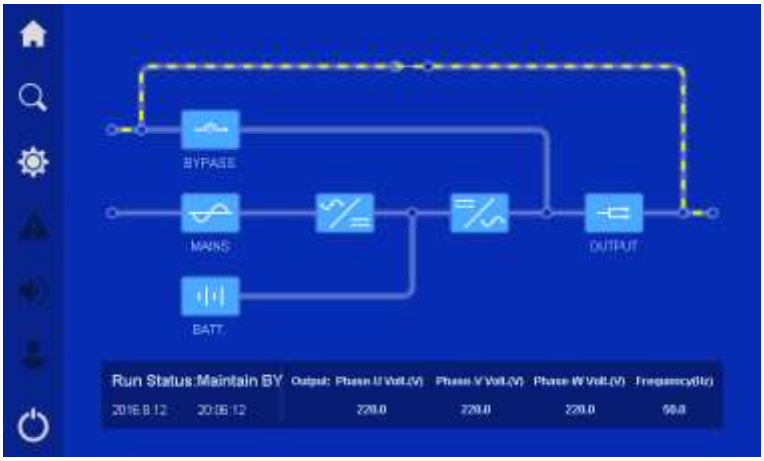


Figure4-11 Maintenance bypass output status

4.2.3 Bypass Information Page

In the main page, click icon, it will enter the bypass information page, as shown in Figure4-12.

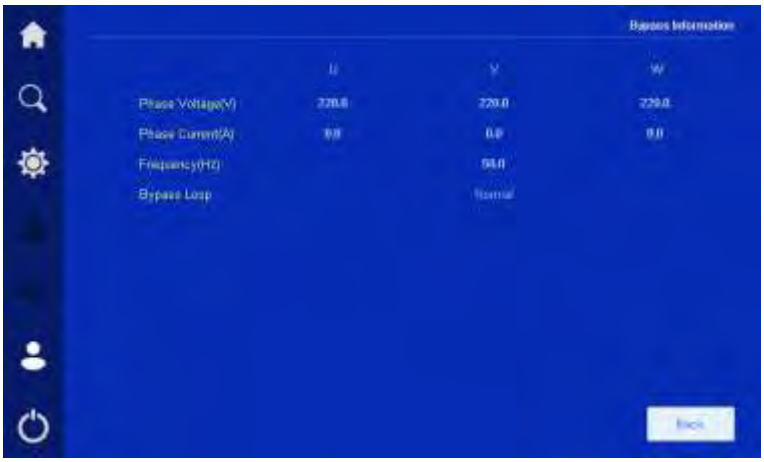


Figure4-12 Bypass information page

4.2.4 Mains Informaiton Page

In the main page, click icon, it will enter the mains information page, as shown in Figure4-13.

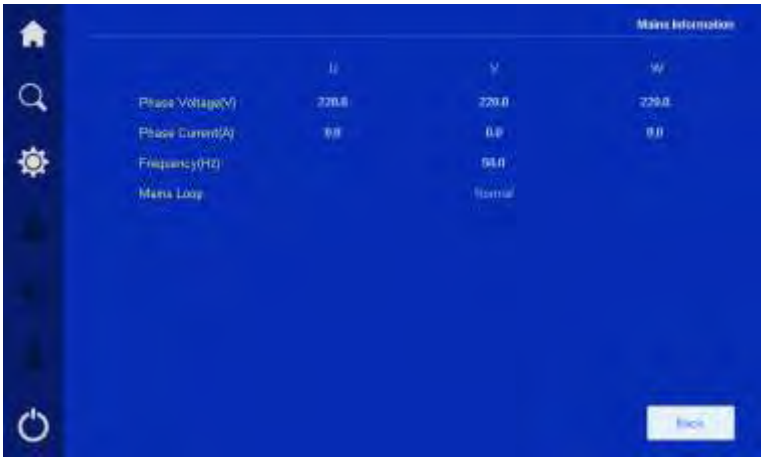


Figure4-13 Mains information page

4.2.5 Battery Information Page

In the main page, click  icon, it will enter the battery information page. When battery is discharging, it shows discharge current. When battery is equalizing charging or float charging, it will show charge current. The battery status shows the current battery status: discharge, equalized charge, floating charge. Besides, the page also includes the battery remaining time capacity and remaining time, etc. as shown in Figure4-14.

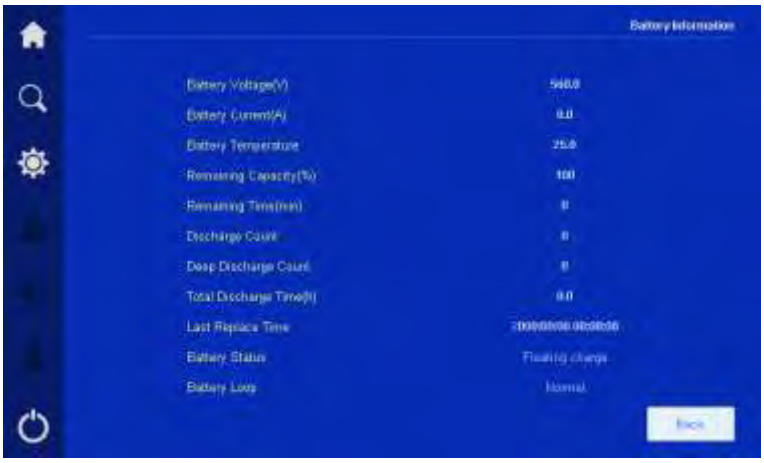


Figure4-14 Battery information page

4.2.6 Output Information Page

In the main page, click  icon, it will enter the output information page. The page shows the output voltage, current, load, active power, apparent power, power factor, output frequency, etc. as shown in Figure4-15.

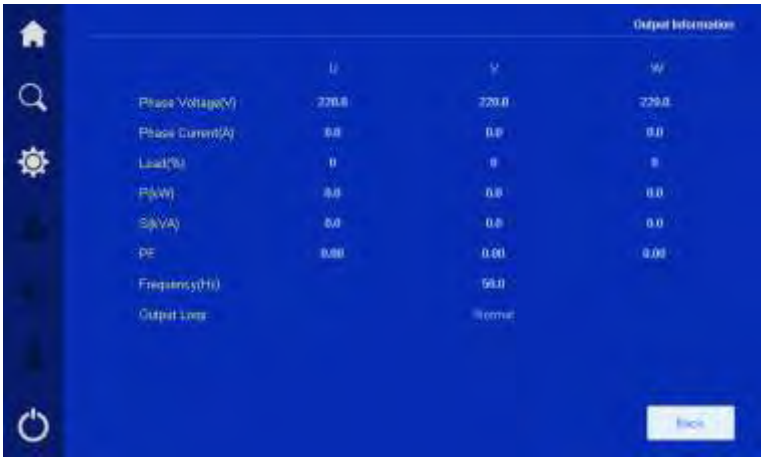


Figure4-15 Output information page

4.3 Login Page

In the main page, click icon, it will enter the login page, as shown in Figure4-16. Only login, the setting management can be done.

Figure4-16 Login page

NOTE
The password for common user is 111, the password for administrator is 222. Common user can check the parameters only, administrator can check and set the UPS parameters.

4.4 Information Management Page

In the main page, click icon, it will enter the information management page, as shown in Figure4-17. The page includes working status, event log, wave capture, user log and device information.

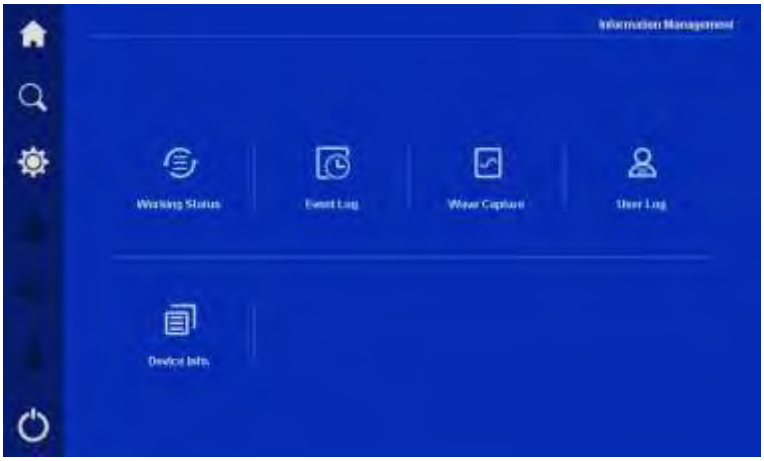


Figure4-17 Information management page

4.4.1 Working Status Page

In the information management page, click the working status icon, it will enter the working status page, as shown in Figure4-18, Figure4-19. The page shows the UPS current status, including mains status, bypass status, battery status, output status, load status, rectifier status, inverter status, work mode, input loop, bypass loop, battery loop, fan status, inner temperature.

Figure4-18 Working status page (single unit)

Figure4-19 Working status page (parallel system)

4.4.2 Event Log Page

In the information management page, click event log icon, it will enter the event log page, as shown in Figure4-20. The page shows the fault and alarm information, and they are listed on the basis of time. The first record is the latest fault.

Figure4-20 Event log page

4.4.3 Wave Capture Page

In the information management page, click the wave capture icon, it will enter the wave capture page. The page records the corresponding data wave form of fault. It is very helpful to locate the fault.

When fault occurs, click the wave capture icon, it will enter the fault wave list page. In the page, user can select the checked wave form. After clicking, it will show the corresponding fault information of selected wave form, and then click the wave form, it will show the wave form and analysis the wave form. In the page of wave form checking, user can set the channel and check the channel wave form, as shown in Figure4-21 to Figure4-24.

Figure4-21 Fault time list page

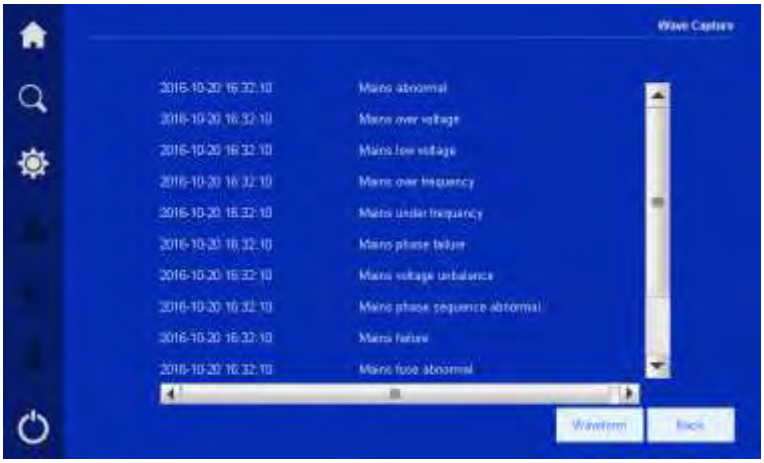


Figure4-22 Corresponding fault details of fault time

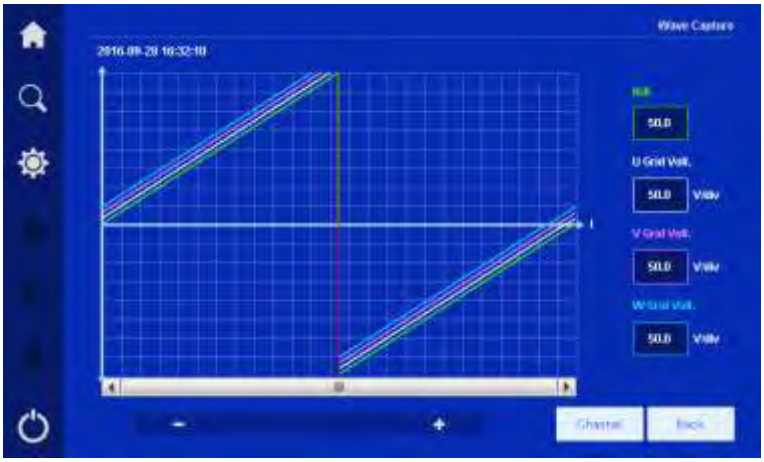


Figure4-23 Fault wave page

Figure4-24 Channel setting of fault wave page

4.4.4 User Log Page

In the information management page, click the user log icon, it will enter the user log page, as shown in Figure4-25. The page shows the operation records, such as ON/OFF operation, mains voltage range setting, bypass voltage setting, etc. The user log is listed on the basis of time. The first record is the latest operation record.

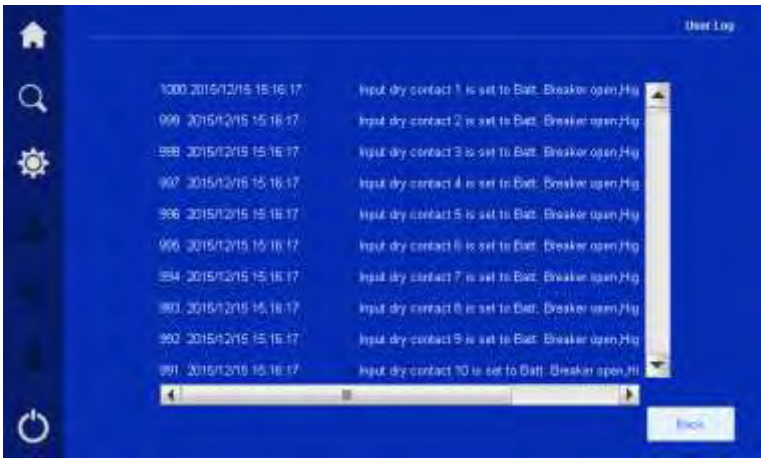


Figure4-25 User log page

4.4.5 Device Information Page

In the information management page, click the device information icon, it will enter the device information page, as shown in Figure4-26, Figure4-27. Device information page includes product name and model, version information includes serial number, rectifier version, inverter version, system version, protocol version and HMI version, etc.

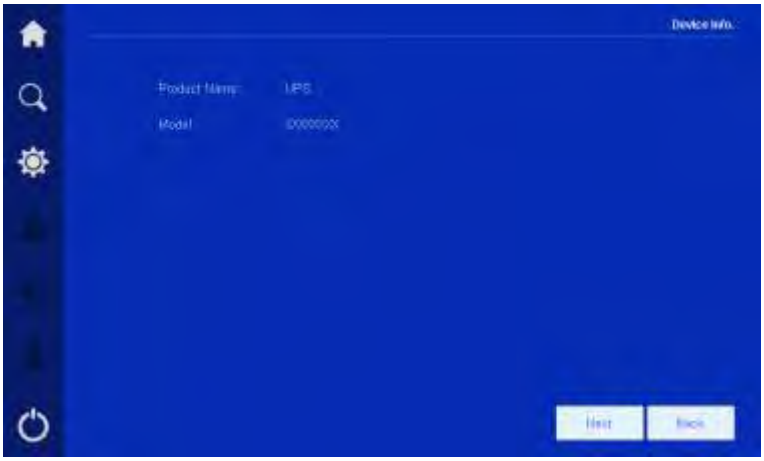


Figure4-26 Device information page 1

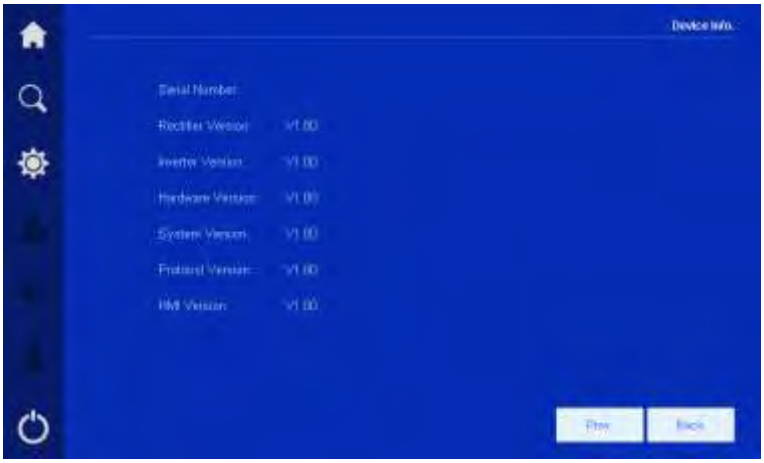


Figure4-27 Device information page 2

4.5 Setting Management Page

In the main page, after login, click  icon, it will enter the setting management page, as shown in Figure4-28. The page includes system manage, battery manage, battery test, log manage, communication setting, screen setting and password setting.

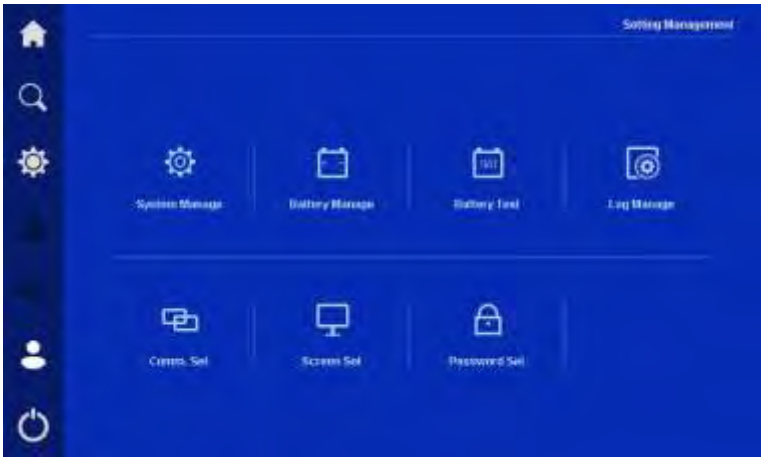


Figure4-28 Setting management page

4.5.1 System Manage Page

In the system manage page, user can set the mains voltage range, bypass voltage range, bypass frequency range, ECO mode and ECO voltage range, N+X warning (only can be set in parallel system), as shown in Figure4-29.

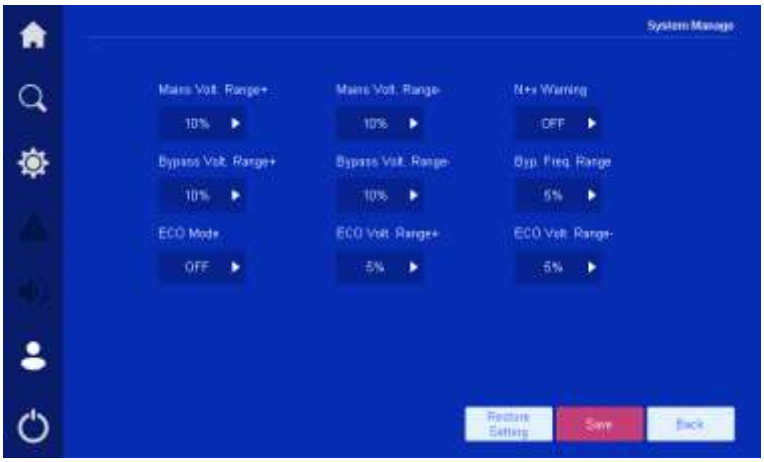


Figure4-29 System manage page

Click “restore setting” button, all the parameters in system manage and battery manage page will be restored. It has corresponding setting prompting, as shown in Figure4-30. Please do not operate it at will.

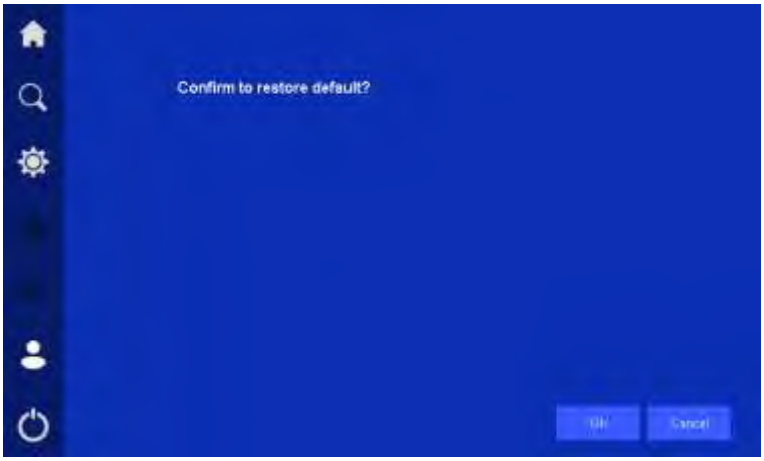


Figure4-30 Prompting for restoring default setting

4.5.2 Battery Manage Page

Battery manage page includes equalizing charge voltage, floating charge voltage, equa. To float charge delay, charge current, battery test ending voltage, low-voltage warning, low-voltage protection, temperature compensation coefficient, force equalizing charge. Also, smart manage, manage mode, manage cycle can be set according to needs. The battery manage page are as shown in Figure4-31 and Figure4-32.

Figure4-31 Battery manage page 1

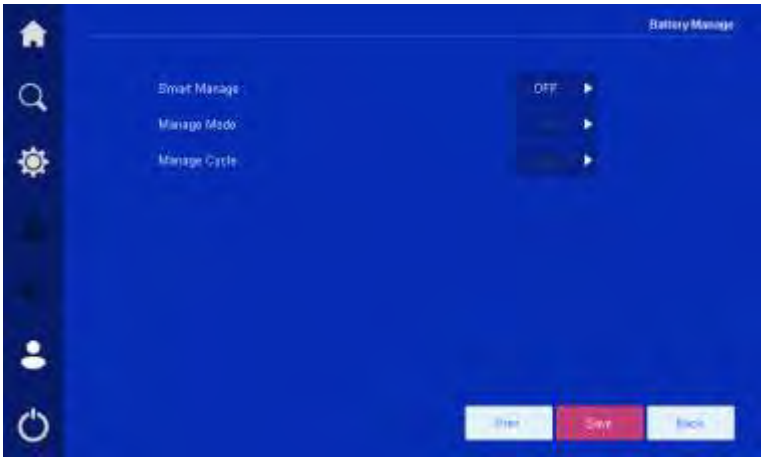


Figure4-32 Battery manage page 2

4.5.3 Battery Test Page

Battery test includes standard test and depth test and the battery test also can be canceled. The page shows the test status, battery current, consumed capacity and test time. the battery test page is as shown in Figure4-33.

Figure4-33 Battery test page

4.5.4 Log Manage Page

Log mange page can export and clear the history log, user log, and wave capture. Click button, you can export the selected items by USB flash drive, click button, you can clear the selected items. Before clearing, it will show the prompting window to confirm, as shown in Figure4-34 and Figure4-35.

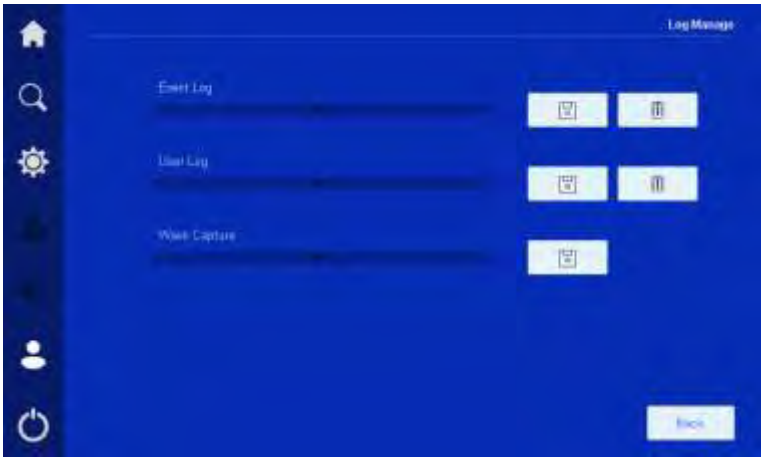


Figure4-34 Log manage page

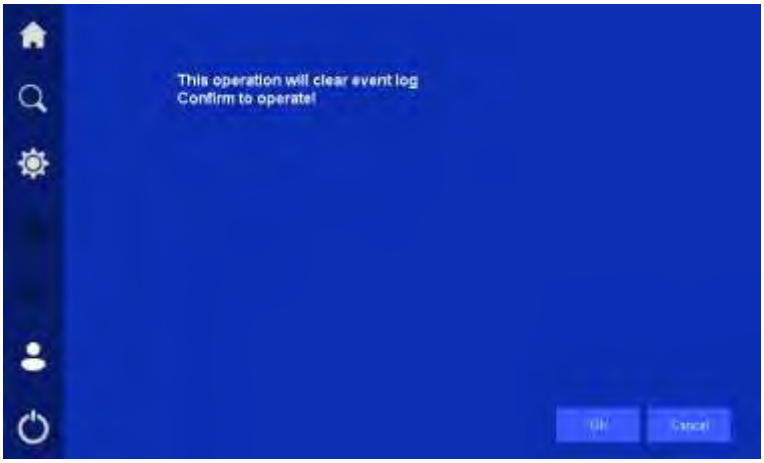


Figure4-35 Clearing prompting

4.5.5 Communicaiton Setting Page

User can select the communication way of upper-computer in communication setting page, Modbus and SNMP can be set. For Modbus communication, user can set the Modbus address and baud rate. The communication setting page is as shown in Figure4-36.

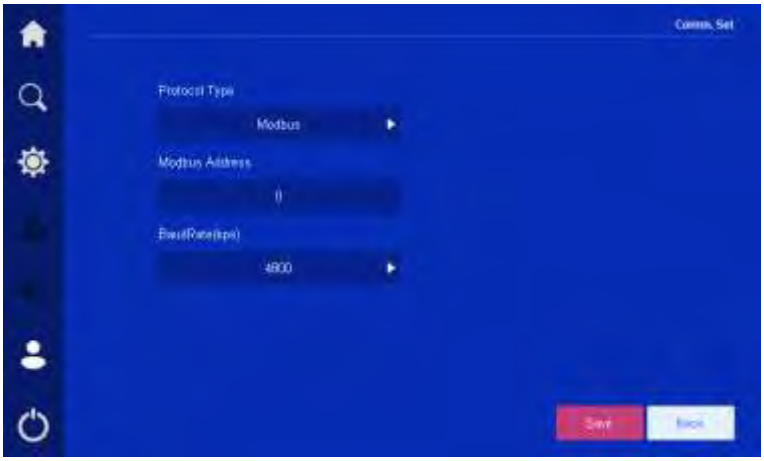


Figure4-36 Communication setting page

4.5.6 Screen Setting Page

In screen setting page, user can set the date, time, language, backlight and screen saver, as shown in Figure4-37.

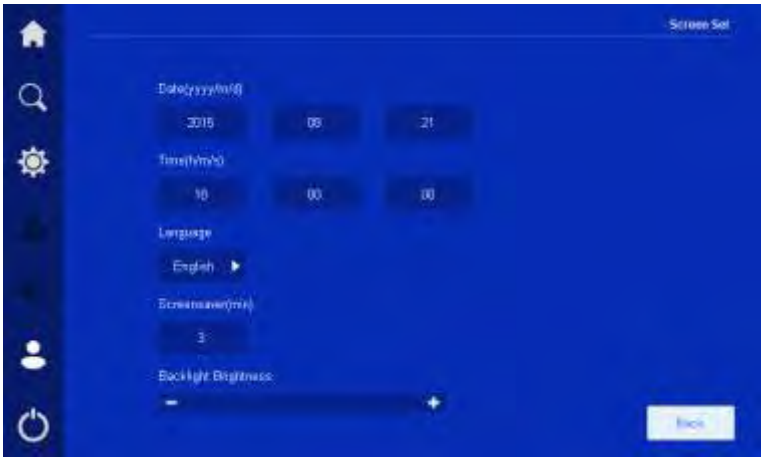


Figure4-37 Screen setting page

4.5.7 Password Setting Page

In setting management page, click password setting icon, it will enter the password setting page, as shown in Figure4-38.

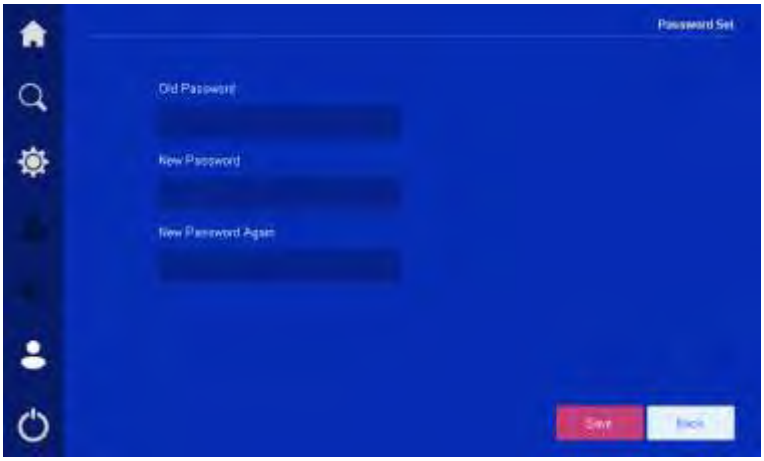


Figure4-38 Password setting page

4.6 Current Fault Page

When the UPS fault, the  icon at the left will light on, as shown in Figure4-39. Click it, the page will show the current fault information, as shown in Figure4-40.

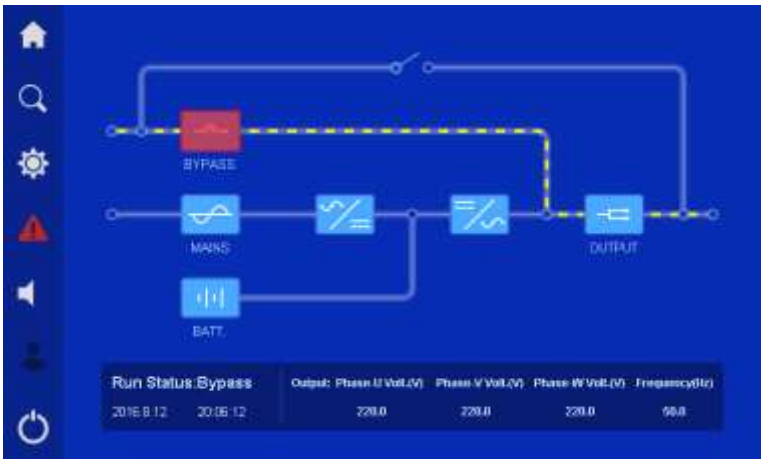


Figure4-39 Fault alarm status

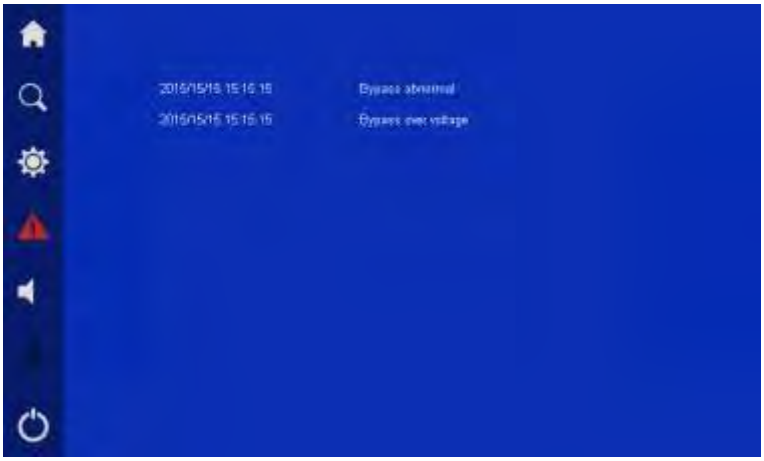


Figure4-40 Current fault information

4.7 Buzzer Control

When the UPS fault, the buzzer icon will light on. Click the  icon, the buzzer can be muted or opened. Figure4-41 shows the buzzer mute status.

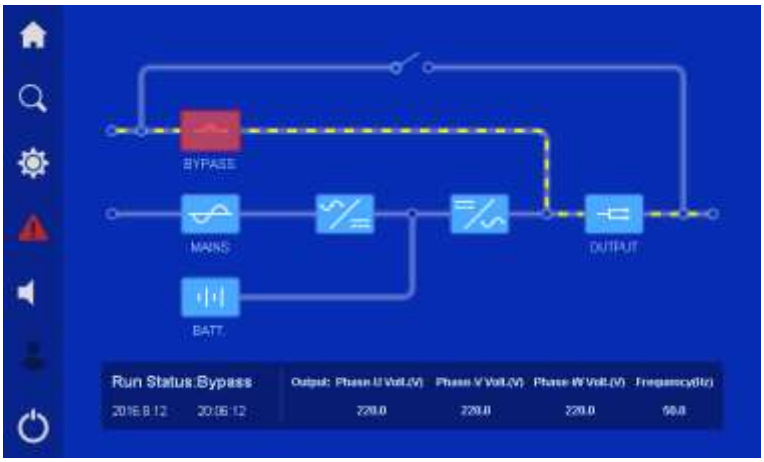


Figure4-41 Buzzer mute status

4.8 ON/OFF Operation

In main page, click  icon, the UPS can be started or shutdown. When the UPS is shutdown, click the icon, it will show “confirm to power on?”, when the UPS is started, it will show “confirm to power off?” as shown in Figure4-42 and Figure4-43.

Figure4-42 Power on prompting page

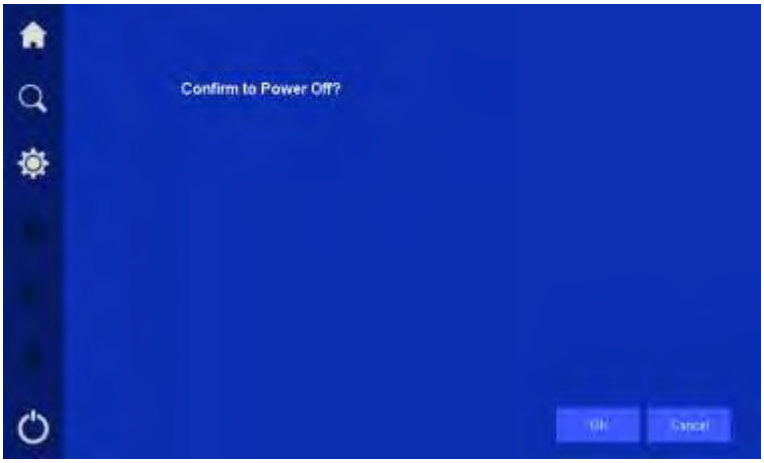


Figure4-43 Power off prompting page

5 Operation Guide

This section introduces the daily operation of the UPS, including check before startup, use announcements, daily operation, manual maintenance operation, parallel system and series system operation, etc.

5.1 Check Before Startup

5.1.1 Electrical Connection Check

Table5-1 Check list

NO.	Check items
1	Check if AC input switch, bypass switch, output switch, maintenance bypass switch and external battery cabinet switch are all off.
2	Check if the total load capacity is in accordance with UPS capacity and ensure the load is not connected.
3	Check if there is no short-circuit between live wire and live wire, live wire and neutral wire, live wire and ground wire in input. Ensure the output with no short-circuit.
4	Check the AC voltage in input terminal by multimeter. Ensure the voltage within the range of rated voltage.
5	Check the DC voltage in input terminal of battery cabinet. Ensure that the voltage meets the requirement and battery wiring is proper.
6	Check if the color of AC cables is in accordance with specification.
7	Check if the wiring is firm.
8	Check if the safe symbol of AC distribution unit is complete.
9	Check if the cable connection is firm.

NO.	Check items
10	Check if the cable mark is correct.
11	Check if the wiring is neat and the cable connection is in accordance with specification.
12	Check if the installation and wiring are good for system reformation, expansion and maintenance in future.

5.2 Use Announcements

- Before starting, check whether the load is suitable. The load should not exceed the rated output power of the UPS, which is to avoid overload protection.
- Do not use the switch on the UPS as the switches of power supply for load. Avoid power outage of load caused by improper operation.
- Start load after the UPS work steady. The start current of some device is large, and may cause overload protection, so, start those devices before others. Start the large power device first, and then, start the small ones. When shut down the UPS, please close the load first.
- When AC input power outage, if the generator supplies power for the UPS, it is necessary to start the generator firstly. After the generator work stably, the UPS can be connected, or it may cause UPS or load damage. If the generator needs to be shut down, switch off the INPUT switch of the UPS firstly.
- Before start the UPS for the first time, perform the checking items. If OK, power on the UPS. If the UPS won't be used for long time, when use it again, please do the checking items again.

CAUTION

Before first startup, please keep the UPS in the allowable environment for at least 4h to make it return to normal operation temperature range.

Before operation, ensure that the top cover plate of fan has been dismantled.

5.3 Daily Operation

5.3.1 Start UPS

Step 1 Close the BYPASS switch.

The panel starts to initialize, 15s later, the initialization finishes, the panel displays normally. The green bypass indicator light on.

Step 2 Close the INPUT switch.

If the AC input voltage is normal, the AC input icon on the touch screen shows normally, 30s later, the rectifier is automatically started. The rectifier indicator light on.

Step 3 Start the inverter system

Long press the ON combination buttons on the panel, the rectifier starts to work. 10s later, the inverter is started, the green bypass indicator light off. Close the output switch, the UPS begins to inverter output normally.

Step 4 Close the external battery cabinet switch.

Before switching on, please ensure the green rectifier indicator is on and the rectifier has been operating completely, the touch screen without “battery cannot connect”, and then, the external battery cabinet switch can be switched on.

CAUTION

After the start of rectifier has finished, ensure that the setting for floating charge voltage, equalizing charge voltage and charge current matches that of actual battery, and then close the external battery switch.

Step 5 Start the load.

The load device can be started after the inverter is normal. Start load according to the order of large power ones to small power ones.

CAUTION

The start current of some device is large (such as electrical machine), and may cause overload protection (such as bypass operation), so, it’s better to start these devices prior to others.

----End

5.3.2 Shut Down UPS

Before shutdown the UPS, please shut down the load and keep the UPS running without load for 10 minutes to exhaust inner heat.

Step 1 Shut down the inverter system.

Press the OFF combination button on the panel to shut down the inverter, the inverter indicator  light off, The bypass power instead of the inverter supplies power for load.

Step 2 Switch off the external battery cabinet switch.

Step 3 Switch off the INPUT switch.

Step 4 Switch off the OUTPUT switch, and make ensure the load is not used.

Before switching off the OUTPUT switch, please ensure that the load is not used, or, once the OUTPUT switch is disconnected, the output won't be any power, and the power supple for load will be outage.

Step 5 Switch off the BYPASS switch.

Step 6 When the touch screen and LED are all off, the UPS will power down completely.

----End

5.4 Manual Maintenance Opeartion

When the UPS needs to be maintained and at the same time, the load cannot power off, please do the following operation.

CAUTION

The following operations should be performed by professionals. Our company will not undertake the damage caused by the operation of unauthorized or untrained people.

5.4.1 Turn to Maintenance Bypass Status From UPS Status

CAUTION

DO NOT close the OUTPUT switch when the UPS on the maintenance bypass status.

Step 1 Shut down the UPS and it will turn to bypass status.

CAUTION

Ensure the bypass input is normal, the red bypass indicator on the panel is off, and then, the shutdown operation can be done.

Press the **OFF** combination button, the inverter indicator light off, the green bypass indicator light on, the UPS turn to bypass status.

Step 2 Before switching on the MAINTENANCE switch, please check whether the inverter is off. If OK, close the MAINTENANCE switch. The UPS will long buzz and the touch panel will show "maintenance bypass on".

Step 3 Switch off INPUT switch, BYPASS switch, OUTPUT switch and the external battery cabinet switch.

Step 4 After the touch screen and LED light off about 15 minutes, the maintenance can be done.

----End

5.4.2 Turn to UPS Status From Maintenance Bypass Status

Step 1 Close the BYPASS switch and INPUT switch.

Step 2 Wait 30s for the rectifier to start automatically, the green rectifier indicator light on, then close the OUTPUT switch (The OUTPUT switch cannot be closed in advance).

Step 3 After the bypass indicator light on, switch off the MAINTENANCE bypass switch, the prompting “maintenance bypass on” disappears, the UPS stops buzzing.

Step 4 Press the ON combination buttons to start the UPS, the green inverter indicator light on. 10s later, the inverter finishes starting, the green bypass indicator light off. The UPS starts to inverter output normally.

Step 5 Close the external battery cabinet switch.

Before switching on, please ensure that the touch screen without warning prompting “do not connect battery”. After the green rectifier indicator light on, and the rectifier starts to work completely, the external battery cabinet switch can be switched on.

----End

5.5 Parallel System Operation

5.5.1 Start Parallel System

CAUTION

DO NOT turn on OUTPUT switch or load until parallel system powers on completely. Ensure all load switches of parallel system are switched off and the wiring of the input and output power is proper.

Step 1 Close the bypass switch of UPS1, the panel starts to initialize. 15s later, the initialization finishes, the panel and LED show normally.

Step 2 Close the INPUT switch of UPS1.

If the input is normal, the mains icon on the touch screen shows normally. 30s later, the rectifier finishes starting, the rectifier indicator light on.

Step 3 Start the inverter system of UPS1 and connect the battery pack.

Long press the **ON** combination button on the panel to start the UPS. The inverter starts, the green inverter indicator light on. 10s later, the inverter finishes starting, the green bypass indicator light off. Close the OUTPUT switch, the UPS begins to inverter output normally. Connect the battery pack according to the signal unit operation steps.

Step 4 Measure the output voltage and frequency of UPS1 by multimeter and see if the voltage and frequency is normal. Turn off the OUTPUT switch after the test is completed.

- Normal =>Step 5
- Abnormal =>Step 10

Step 5 Start UPS2 according to Step 1 to Step 3.

Step 6 Measure the output voltage of UPS2 by multimeter and see if the voltage and frequency is normal.

- Normal =>Step 7
- Abnormal =>Step 10

Step 7 Measure the voltage difference of output three-phase between UPS1 and UPS2 by multimeter and see if the voltage difference is normal.

If the voltage difference of output three-phase between UPS1 and UPS2 is less than 5V, it means that the phase-locking in mains is normal, or abnormal.

- Normal =>Step 8
- Abnormal =>Step 10

Step 8 Switch off the INPUT switch of UPS1 and UPS2, and then measure the voltage difference of output live wire between UPS1 and UPS2 and see if the voltage difference is normal.

If the voltage difference less than 5V, it means that the phase-locking in battery status is normal, or, abnormal.

- Normal =>Step 9
- Abnormal =>Step 10

Step 9 Close the OUTPUT switch of UPS1 and UPS2, and then measure the three-phase output voltage and loop current in parallel system and see if the voltage and loop current is normal.

If measured output loop current less than 10A, it means the parallel output of UPS1 and UPS2 is normal, or, abnormal.

- Normal =>11
- Abnormal =>10

Step 10 Power down the UPS and remove the fault, and then do **Step 1**.

Step 11 After test OK, close the load switch, the start for parallel system is accomplished.

At this time, the parallel system can supply power for load, the power on order for the load please see the signal unit.

----End

5.5.2 Shut Down Parallel System

Step 1 Shut down all load, and keep the UPS running without load for 10 minutes to exhaust heat.

Step 2 Perform the shutdown operation of single inverter to turn off all inverters respectively.

Step 3 Perform the shutdown operation of single UPS to switch off the relevant switches.

NOTE
Generally, it isn't recommended to start or close parallel system frequently.

----End

5.5.3 Remove Faulty UPS from Parallel System

When one UPS failure, it will remove from parallel system automatically with sound & light alarm. Now, perform the operations shown in Figure5-1 to remove the faulty UPS from parallel system completely to achieve online hot maintenance or replacement.

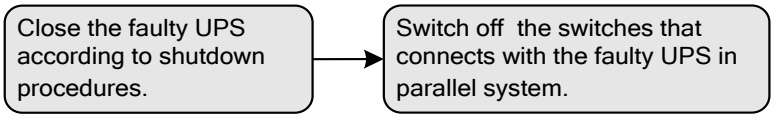


Figure5-1 Remove faulty UPS from parallel system

CAUTION

When the parallel system works normally, don't remove UPS from the parallel system until it's switched off, or the power system will work abnormally.

Before removing faulty UPS from parallel system, close faulty UPS completely.

5.5.4 Add New UPS into Parallel System

When it has to add one or more UPS into parallel system, perform the operations shown in Figure5-2. When the added UPS works steadily, it will add into parallel system automatically for share current.

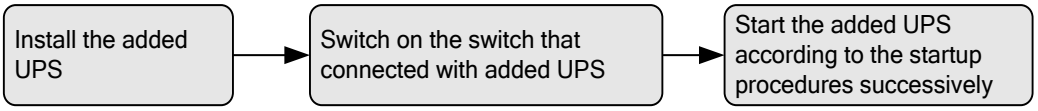


Figure5-2 Add new UPS into parallel system

5.6 Series System Operation

5.6.1 Start Series System

CAUTION

DO NOT turn on load until series system powers on completely. Ensure all load switches of series system are switched off and the wiring of the input and output power is proper.

Step 1 Close the BYPASS switch of UPS1, the power board starts to work, the panel begins to initialize. 15s later, the initialization is finished, the panel and LED shows normally.

Step 2 Close the INPUT switch of UPS1.

If the input power normal, the input icons on touch screen shows normally. 30s later, the rectifier finishes starting, the rectifier indicator light on.

Step 3 Start the rectifier and inverter system of UPS1.

Long press the **ON** combination button on the panel to start the UPS. The inverter starts, the green inverter indicator light on. 10s later, the inverter finishes starting, the green bypass indicator light off. Close the OUTPUT switch, the UPS begins to inverter output normally.

Step 4 Measure the output voltage and frequency of UPS1 by multimeter and see if the voltage and frequency is normal.

- Normal =>Step 5
- Abnormal =>Step 7

Step 5 Start UPS2 according to Step 1~Step 3.

Step 6 Measure the output voltage and frequency of UPS2 by multimeter and see if the voltage and frequency is normal.

- Normal =>Step 8
- Abnormal =>Step 7

Step 7 Power down the UPS and remove the fault, and then do **Step 1**.

Step 8 After test OK, close the load switch, the start for series system is accomplished.

At this time, the series system can supply power for load, the power on order for the load please see the signal unit.

----End

5.6.2 Shut Down Series System

Step 1 Shut down all load, and keep the UPS running without load for 10 minutes to exhaust heat.

Step 2 Perform the shutdown operation of single inverter to turn off the inverters of UPS2, UPS1 respectively.

Step 3 Perform the shutdown operation of single UPS to switch off the relevant switches of each UPS.

NOTE
Generally, it isn't recommended to start or close the series system frequently.

----End

5.6.3 Quit Series System Online

When one UPS in series system fault, it needs to exit the series system according to the actual position.

When UPS1 fault, perform the operation according to Figure5-3, the fault unit will be removed from series system completely.

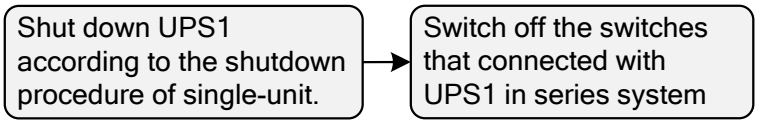


Figure5-3 Quit series system online

When UPS2 fault, perform the operation in **5.4.1 Turn to Maintenance Bypass Status From UPS Status** to remove the fault unit.

6 Routine Maintenance

This chapter introduces routine maintenance, including UPS status checking, battery maintenance, fan maintenance, etc.

6.1 UPS Status Checking

Proper maintenance is the key that the device works on the best status and with a longer service life.

6.1.1 Safety Precautions

To ensure human safety and device security, observe the following precautions.

- Remember that even though UPS doesn't work, there may still exist dangerous voltage inside UPS. Before maintenance, use a multi-meter to check the voltage and make sure that UPS is completely shut down and stay in safe status.
- Before operating, take off conductive objects, such as rings, watches.
- Observe safety regulations strictly. If any doubt, consult professionals.
- Keep operation environment free from dust and chemical pollutant.

6.1.2 Preventive Maintenance

To improve the efficiency and reliability of UPS, do the following maintenance tasks regularly(every three months).

- Check if the wiring terminals in the input and output are connected well.
- Check if fans work properly and air vents are not blocked. If some fans stop working, replace them in time.
- Check if batteries voltage is normal.
- Check if UPS works normally.

6.2 Battery Maintenance

6.2.1 Battery Maintenance Announcements

- Clean battery shells by water-dipped cloth. Oil and organic solvents, such as petrol and diluents are prohibited.
- To avoid explosion, keep battery far away from fire sources and devices that easily generate sparks.
- Don't connect battery+ with battery- to avoid burning.
- Don't open or dismantle battery. The inner electrolyte is harmful to human skin and eyes.

6.2.2 Battery Maintenance Method

To save battery life, perform the following battery maintenance tasks periodically.

- Charge and discharge battery once every four to six months, and the charging time should be no less than four hours.
- In high-temperature areas, charge and discharge battery once every two months. The charging time should be no less than four hours.
- If battery don't discharge for a long time, charge and discharge them once every three months. The charging time should be no less than four hours.
- Don't over-discharge battery. After discharging, fully charge them within 24 hours.
- After battery have been used for six months, check whether battery cables are properly connected.
- When AC input powers down, it needs to switch off battery switch to avoid battery charging for a long time.

6.2.3 Battery Replacement Announcements

When replacing battery, observe the following announcements.

- Consult professionals for replacing battery.
- A new battery should be with the same capacity, model, and manufacturer as the replaced one.
- Replaced battery should be recycled by UPS dealer.

6.3 Fan Maintenance

Check if fans work properly and air vents aren't blocked periodically. If a fan stops running, please maintenance or replace it in time.

7 Troubleshooting

This chapter introduces the troubleshooting of the UPS, including identifying the UPS status, deal with emergency fault, etc.

7.1 Identify UPS Status

After starting the UPS, if it cannot work normally, please refer to Table7-1 to find possible reason. Meanwhile, check whether the fault is caused by external environment, such as temperature, humidity is not accordance with requirements or UPS is overload.

Table7-1 only includes some simple diagnosis. If the diagnosis is not clear or not sufficient to solve the problem, please contact with local agency or dealer to deal with.

Table7-1 Common troubleshooting

No.	Abnormal phenomena	Fault diagnosis and checking items	Solution
1	red indicator is on.	Check if input switch is switched on and the fuse is OK.	--
		Check if the AC input voltage range is normal.	Check the input voltage by multimeter.
		Check if the phase of AC input is wrong.	Change the phase sequence of AC input wire.
2	The inverter can't output normally and the buzzer beeps continuously.	The rectifier doesn't start completely. The buzzer beeps continuously and battery low-voltage indicator is on. Battery input switch is not switched on.	Wait the rectifier starting and buzzer beeping will be removed.
		Output is overload. The  indicator is on.	Reduce load.

No.	Abnormal phenomena	Fault diagnosis and checking items	Solution
3	When AC input power down, UPS has no output.	Check if battery input switch is switched on and battery circuit is normal.	After the AC input recovers, the rectifier starts completely, close the battery switch.
4	Touch screen and LED are off.	Check whether the bypass/ AC input switch is switched on and power board failure.	Inform professionals to maintain.
5	 red indicator is on, and buzzer beeps continuously.	Check if load is short-circuit.	Find the short-circuit point, turn off inverter, the UPS will be power down completely, and then restart inverter.
		Check if the AC input is power down and battery has under-voltage protection.	When AC input recovers, the UPS will be started automatically.
6	The red  indicator is on.	Output is overload.	Reduce load.
7	The UPS is started normally, but it cannot output normally.	Check if the SCR drive board of bypass is fault, and the output contactor is fault	Inform professionals to maintain.
8	Communication abnormal	The connection position of communication wire is wrong.	Connect the communication wire correctly.
		The communication software isn't successful installed.	Install communication software correctly.
		The computer communication window setting is wrong.	Properly set the communication port.
		Above problems are all eliminated, but it still cannot communicate normally.	Inform professionals to maintain.

7.2 Deal with Emergency Fault

When the UPS failure, press "OFF" combination button to shut down the UPS. If necessary, please close the load. Close the MAINTENANCE bypass switch and switch off the input/output switch of UPS to ensure continuous supply power for load and avoid further damage for the UPS. Besides, contact with the local professionals to maintain it in time.

8 Package, Transportation, Storage

This chapter introduces package, transportation, storage of the UPS.

8.1 Package

The UPS is packaged by wooden box. When packing, pay attention to the placing direction requirements. On the sides of the package, warning icons (including keep dry, handle with care, this end up, stacking layer limit, etc.) and the device model are printed. At the front of the package, it prints the logo of Power Solid company, direction mark, ISO authentication.

8.2 Transportation

During transporting, pay attention to the warnings marks on the package. DO NOT make the UPS impact severely. To avoid damage, place the UPS strictly according to the placement direction. DO NOT carry the UPS with objects that is inflammable, explosive, or corrosive. DO NOT put the UPS in the open-air while midway transshipment. Leaching or mechanical damage by rain, snow or liquid objects is prohibited.

8.3 Storage

During storage, place the UPS strictly according to the direction that showed on the package. Keep at least 20cm from the bottom package to the floor and keep at least 50cm from the package to wall, heat source, cold source, windows or air inlet.

The storage environment temperature is -25～55℃. The relative humidity is 0%～95%. In warehouse, the poisonous gas, objects that inflammable or explosive or corrosive chemical objects are prohibited. Besides, strong mechanical shaking, impact or strong magnetic field are also prohibited. Under the storage conditions above, the storage period is six months. If the UPS is stored beyond six months, it should be rechecked.. While storing the UPS for long term, the battery should be charged every three months.

A Technical Specifications

Index \ Model			PS300KVA PS400KVA	PS500KVA PS600KVA	PS800KVA	PS1000KVA PS1200KVA
Input	Rectifier	Rated input voltage (V AC)	380/400/415（L-L）			
		Input voltage range (V AC)	-40%~+25%			
		Phase	Three-phase four-wire +PE			
		Input frequency (Hz)	40~70			
	Bypass	Rated input voltage (V AC)	220/230/240			
		Bypass synchronization tracking range (Hz)	50(60)±10% (±5% optional)			
		Phase	Three-phase four-wire +PE			
Output	Voltage (V AC)		220/230/240±1%			
	Frequency (Hz)		Synchronization status, it tracks the bypass input frequency (Normal mode) 50 (60)±0.5% (Battery mode)			
	Wave form		Sine wave, THDV<1% (Linear load)			
	Power factor		0.9/1.0[1]			
	Transfer time (ms)		1ms (from inverting mode to bypass mode) 0ms (from mains mode to battery mode)			
	Overload capacity	Inverting status	For 105% rated load, it will alarm and work normal.			
			For 110% rated load, it will turn to bypass mode after 1h.			

Index \ Model			PS300KVA PS400KVA	PS500KVA PS600KVA	PS800KVA	PS1000KVA PS1200KVA
			For 125% rated load, it will turn to bypass mode after 10min.			
			For 150% rated load, it will turn to bypass mode after 1min.			
			For more than 150% rated load, it will turn off the bypass after 1s.			
		Bypass status	For less than 125% rated load, it will alarm and work normally.			
			For 150% rated load, it will turn off the bypass after 10min.			
			For 170% rated load, it will turn off the bypass after 1min.			
			For more than 170% rated load, it will turn off the bypass after 10s.			
Environment	Operating temperature		-5℃~40℃			
	Operating altitude		≤1500m. If exceeding 1500m, it needs to decrease the rated power to use according to GB/T 3859.2.			
	Noise (dB)		＜75			
Standards	EMC		Meet the provision mentioned in CE(EN / IEC 62040-2), GB7260.2.			
	Safety standard		Meet the provision mentioned in CE(EN / IEC 62040-1), GB7260.1			
Mechanical features	Size (mm) (Width*Depth*Height)		1000*900*1950	1400*900*1950	1900*900*1950	3000*900*1950
	Weight (kg)		750	1100	1450	2400
Other feature	Alarm function		Alarm for AC input abnormal, UPS fault, battery under-voltage, overload, etc.			
	Protection function		Protect for battery under-voltage, overload, short-circuit, over-temperature, input over-voltage/ under-voltage, etc.			

Index \ Model		PS300KVA PS400KVA	PS500KVA PS600KVA	PS800KVA	PS1000KVA PS1200KVA
	Communication function	It supports RS232, RS485, SNMP (optional), dry contact communication.			

- Specifications are subject to change without prior notice.

NOTE

[1] 1.0: when the environment temperature lower than 35℃ and the input voltage larger than 210V, the power factor of the UPS can be 1.0.

B Acronyms and Abbreviations

A

AC	Alternating Current

C

CE	Conformite Europeenne

D

DC	Direct Current
DO	
DSP	Digital Signal Processor

E

ECO	Energy Control Operation
EPO	Emergency Power Off

I

IEC	International Electrotechnical Commission

L

LED	Light-emitting Diode

P

PE	Protective Earthing

R

RS232	Recommend Standard232
RS485	Recommend Standard485

S

SNMP	Simple Network Management Protocol

U

UPS	Uninterruptible Power System
USB	Universal Serial Bus