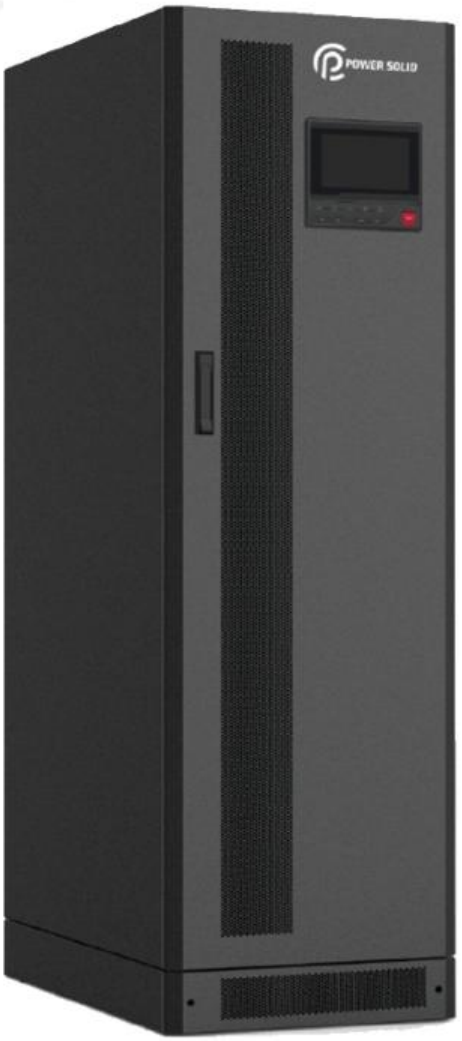
POWER SOLID

10-160 KVA
THREE-PHASE UPS

PS-POU40KT3#30BC0K



USER MANUAL

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Foreword

Summaries

Thank you for choosing the Three-Phase (10kVA-160kVA) series UPS!

This document gives a description of the Three-Phase (10kVA-160kVA) 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.

NOTE

The figures in this manual are just for reference, for details please see the actual product.

Symbol Conventions

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

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

NOTE	Provides additional information to emphasize or supplement important points in the main text.

Product standard: Q/ZZKJ 001

Change History

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

Issue 001 (2018-12-07)

First issue.

Contents

1 Safety Instructions

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 less than 5V.

WARNING

Please do not put finger or tool 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

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 actions to avoid the interference.

CAUTION

Warning label should be affixed away from UPS location!

When UPS is power off, there still exists dangerous voltage. It should affix warning labels away from UPS location and the warning labels should include: 1. It supplies power for UPS. 2. Please disconnect UPS before wiring.

1.1.2 Use Announcements for Battery

CAUTION

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

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

WARNING

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

- 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 switch on 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 endanger human life. It is necessary to set the UPS aside for enough time (≥10 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 terminal and grounding terminal. 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

Three-Phase (10kVA-160kVA) series UPS product is the high performance sine-wave online UPS which is special for the network computer room and small smart device (such as measure device, industrial automation device, etc.), precise instrument, etc. of financial, communication, insurance, railway, medical treatment, enterprise, etc. it is special for the wicked grid environment.

2.1.1 Features

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 products not only realize intellectual monitoring between UPS and PC by SNMP, but also equip with independent remote monitor to manage the power source conveniently. The monitor can be one-to-one monitor or one-to-multi monitor.

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 Figure2-1.

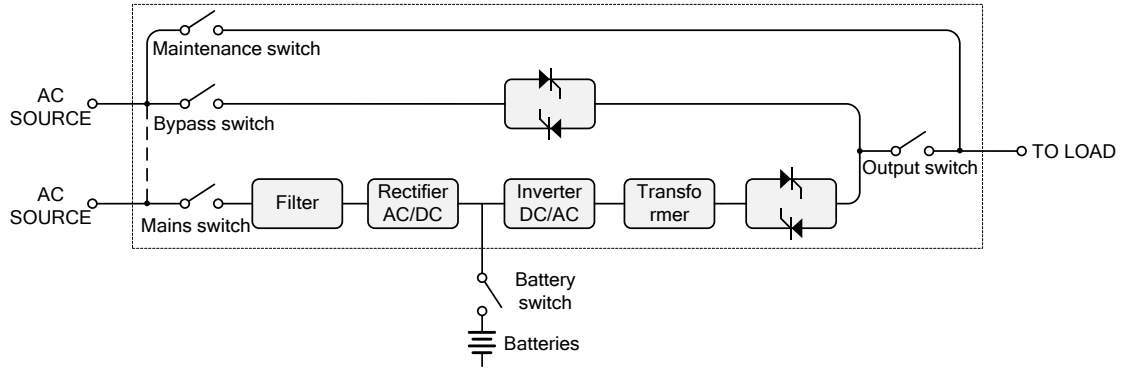


Figure2-1 Operating principle of single-unit

2.2.2 Series Hot-standby

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.

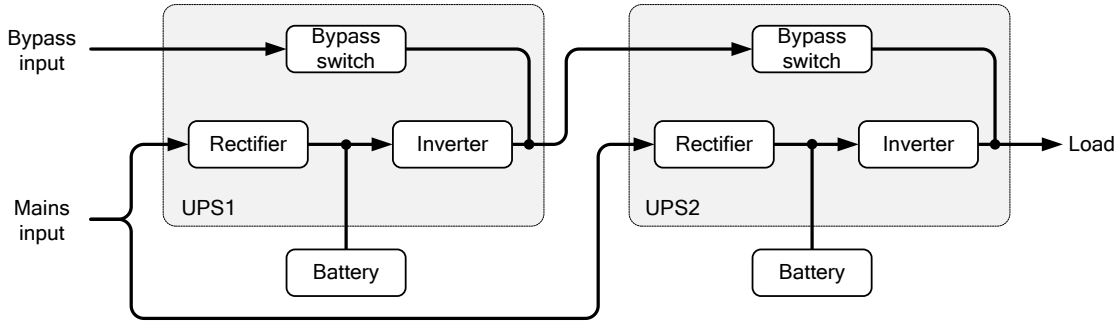


Figure2-2 Operating principle of series hot-standby system

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.

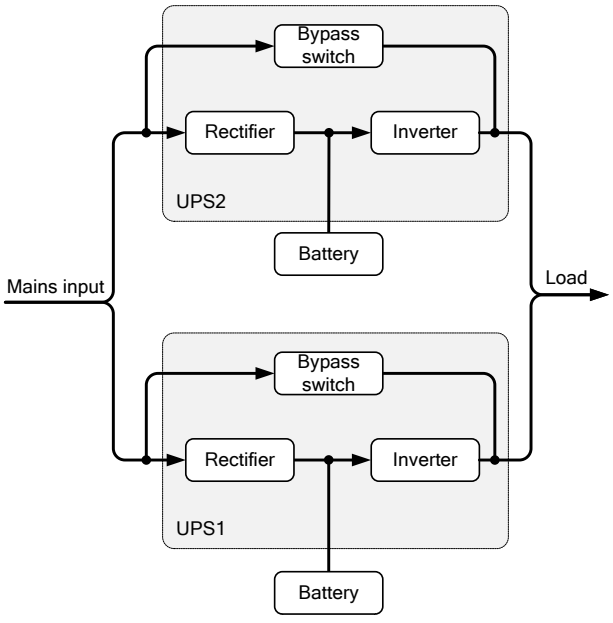


Figure2-3 Operating principle of parallel system

2.3 Work Mode

The UPS has 4 working modes: mains mode, battery mode, bypass 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 mains abnormal or rectifier stops working, the batteries connected with DC.BUS will supply power for inverter and the AC output will not interrupt.

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.

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 switch on 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 Configuration

Model	Nominal rated power	Rated DC voltage
10KVA	10kVA/9kW	348VDC
15KVA	15kVA/13.5kW	348VDC
20KVA	20kVA/18kW	348VDC
0KVA	30kVA/27kW	348VDC
40KVA	40kVA/36kW	348VDC
50KVA	50kVA/45kW	348VDC
60KVA	60kVA/54kW	348VDC

Model	Nominal rated power	Rated DC voltage
80KVA	80kVA/72kW	348VDC
100KVA	100kVA/90kW	348VDC
120KVA	120kVA/108kW	348VDC
160KVA	160kVA/144kW	348 VDC

2.5 Appearance and Structure

The appearance of Three-Phase (10kVA -160kVA) series UPS as shown in Figure2-4, Figure2-5, Figure2-6.

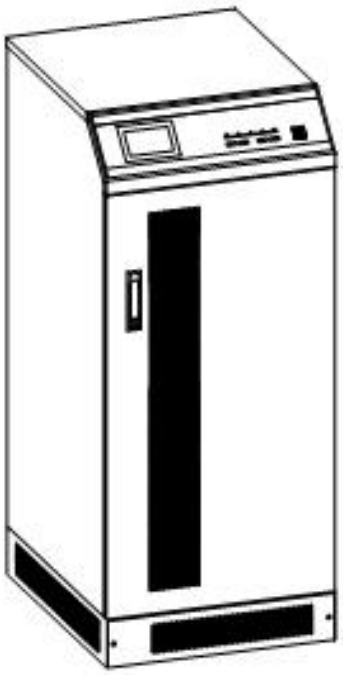


Figure2-4 Appearance of Three-Phase (10kVA-30kVA) series UPS

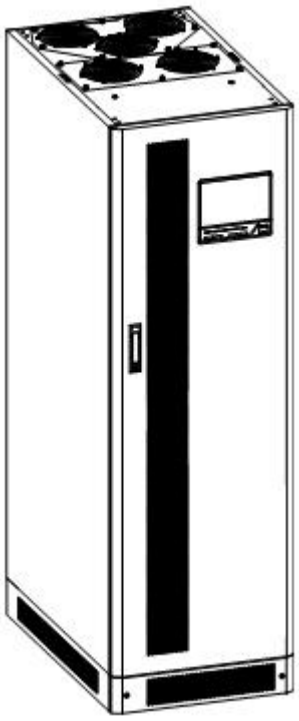


Figure2-5 Appearance of Three-Phase (40kVA-80kVA) series UPS

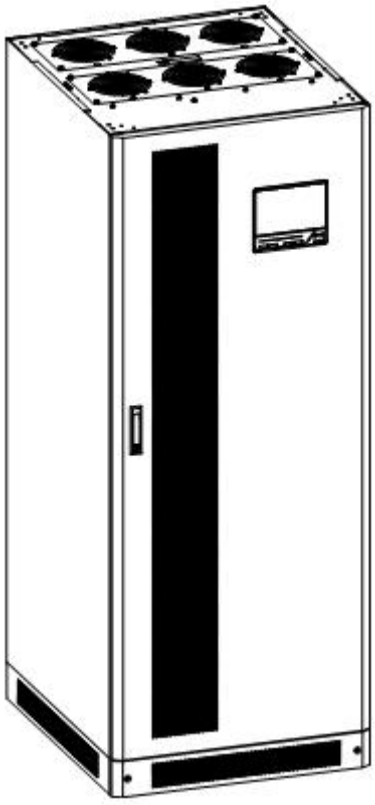


Figure2-6 Appearance of Three-Phase (100kVA-160kVA) series UPS

2.5.1 Operation Panel

The operation panel of Three-Phase (10kVA -30kVA) series UPS as shown in Figure2-7.

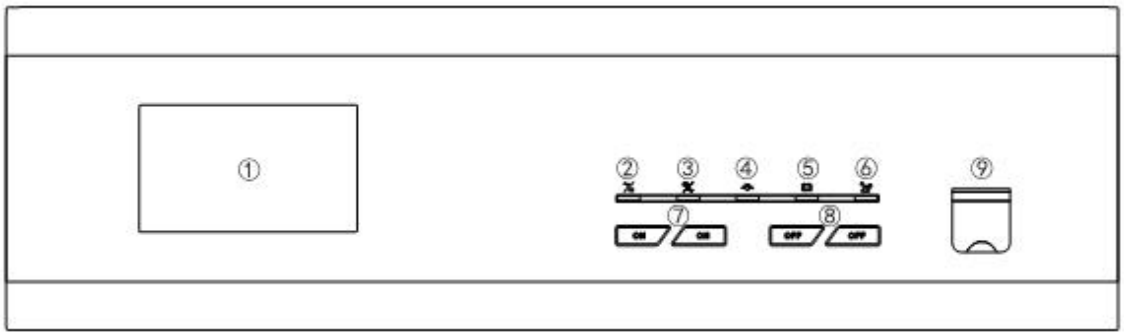


Figure2-7 Operation panel of Three-Phase (10kVA -30kVA) series UPS

The operation panel of Three-Phase (40kVA -160kVA) series UPS as shown in Figure2-8.

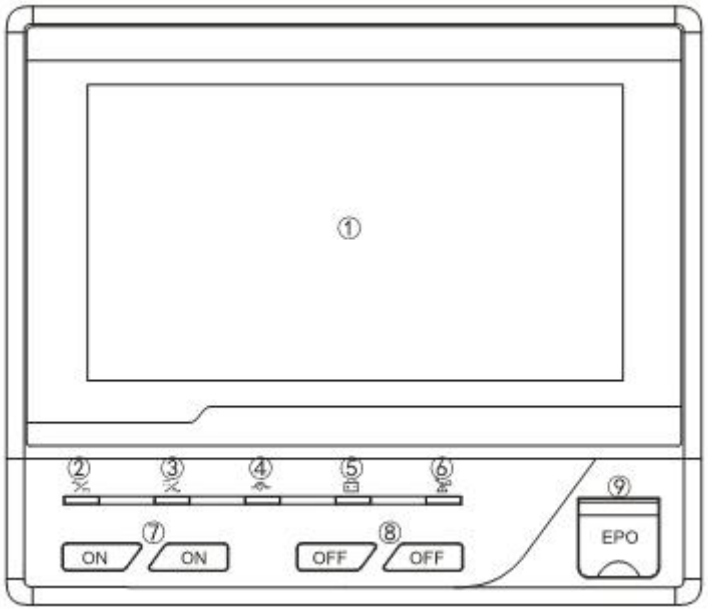


Figure2-8 Operation panel of Three-Phase (40kVA -160kVA) series UPS

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.)

No.	Name	Description
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 has no output
⑤	Battery indicator	Red indicator on: Battery loop abnormal (such as battery disconnected, low-voltage alarm) Green indicator off: Battery loop normal
⑥	Load alarm indicator	Red indicator on: Overload Off: Load is normal
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. It is prohibited to press the EPO button by the untrained personnel.

2.5.2 Layout (Open Door)

Three-Phase UPS (10kVA -30kVA)

The layout of Three-Phase (10kVA -30kVA) series UPS after opening door is as shown in Figure2-9 and Figure2-10.

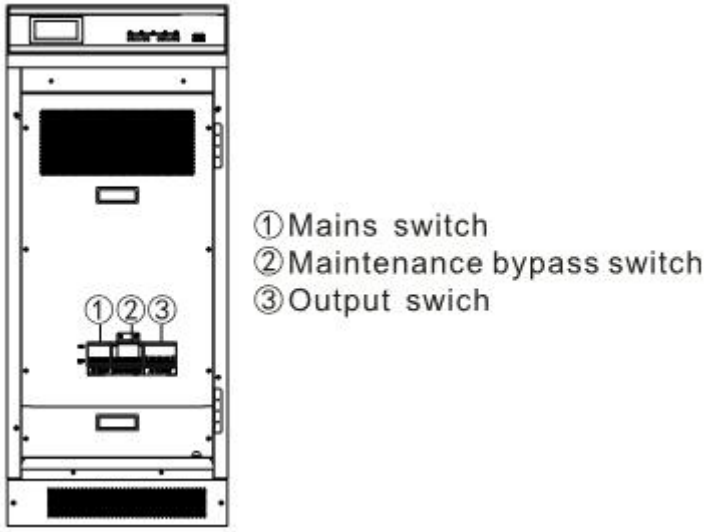


Figure2-9 Layout of Three-Phase (10kVA -30kVA) series UPS with single input(open door)

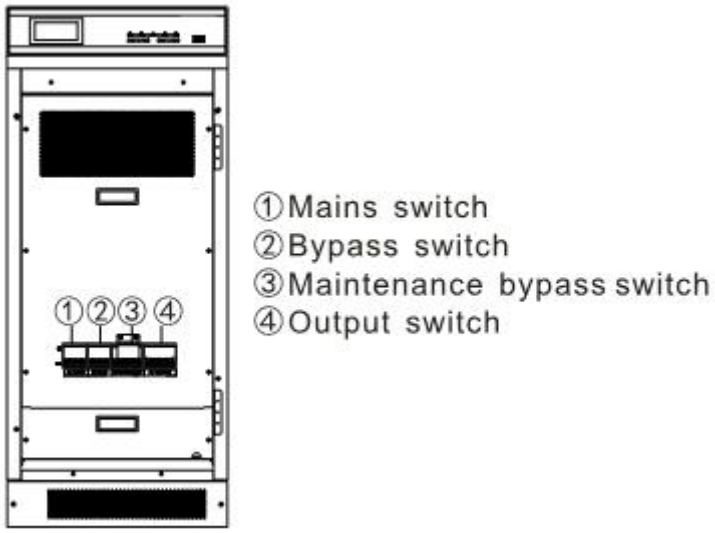


Figure2-10 Layout of Three-Phase (10kVA -30kVA) series UPS with two inputs(open door)

Three-Phase UPS (40kVA -80kVA)

The layout of Three-Phase (40kVA -80kVA) series UPS after opening door is as shown in Figure2-11 and Figure2-12

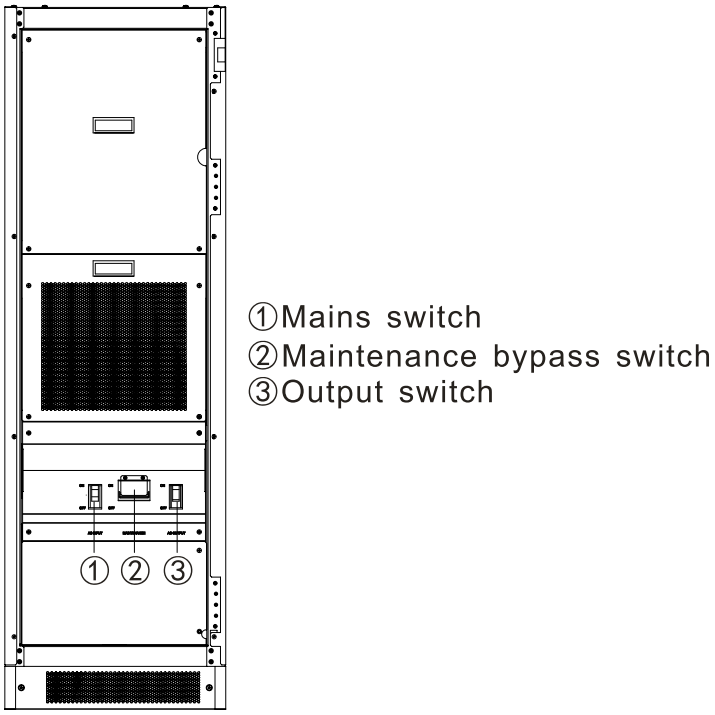


Figure2-11 Layout of Three-Phase (40kVA -80kVA) series UPS with single input(open door)

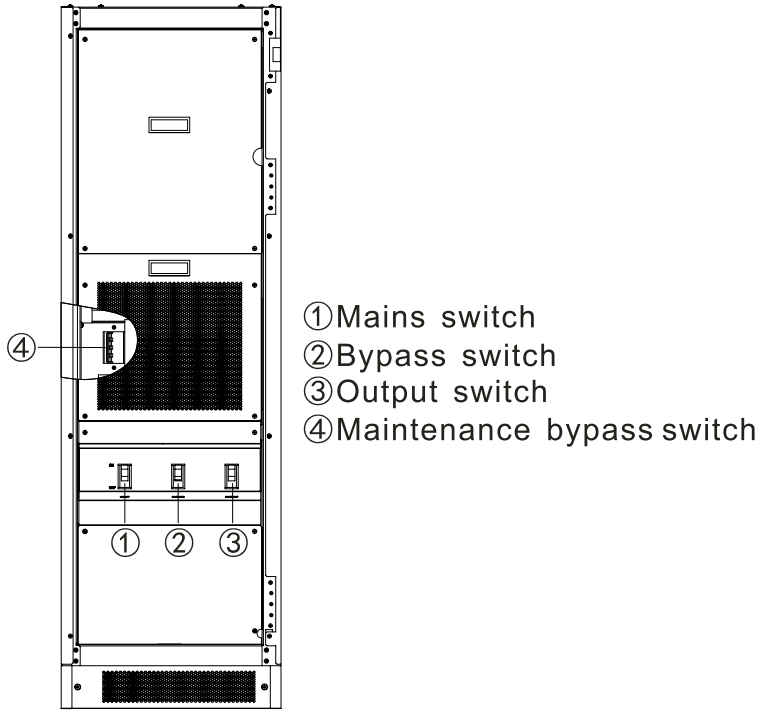


Figure2-12 Layout of Three-Phase (40kVA -80kVA) series UPS with two inputs(open door)

Three-Phase UPS (100kVA -160kVA)

The layout of Three-Phase (100kVA -160kVA) series UPS after opening door is as shown in Figure2-13 and Figure2-14.

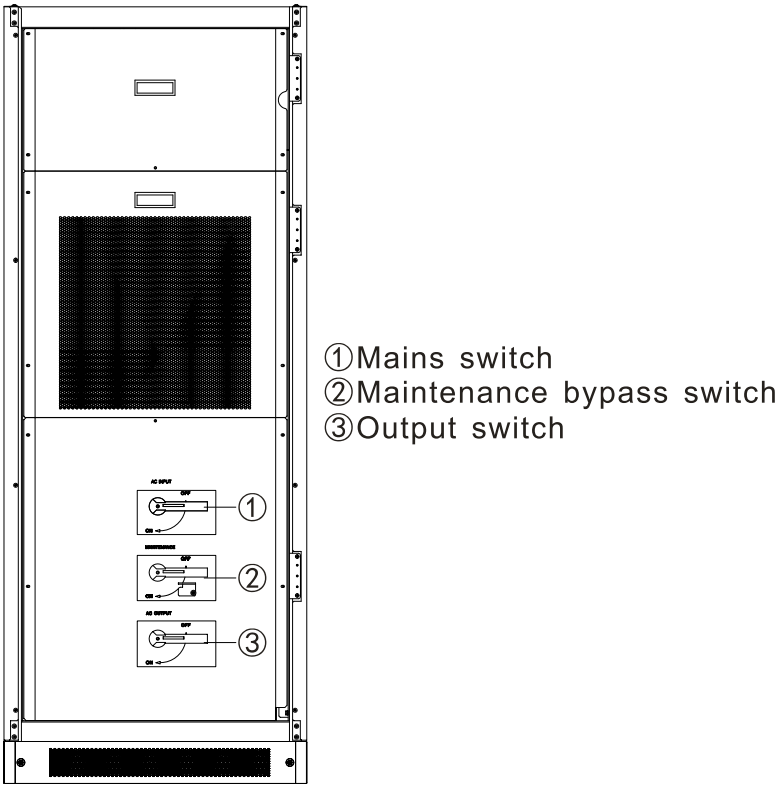
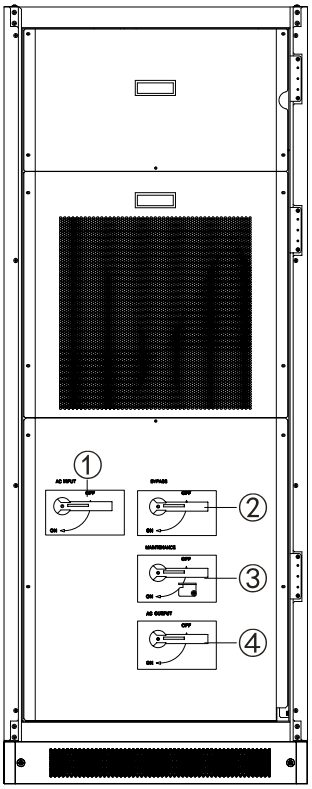


Figure2-13 Layout of Three-Phase (100kVA -160kVA) series UPS with single input(open door)



①Mains switch
②Bypass switch
③Maintenance bypass switch
④Output switch

Figure2-14 Layout of Three-Phase (100kVA -160kVA) series UPS with two inputs(open door)

2.6 Communication Way

The position of communication port of Three-Phase (10kVA -160kVA) series UPS with single input or two inputs are similar. This part we take two inputs as an example to illustrate.

2.6.1 RS485 Communicaiton

The UPS is equipped with a RS485 port, which supports short distance communication (generally, not exceed 200m). RS485 port position is as shown in Figure2-15, Figure2-16 and Figure2-17.

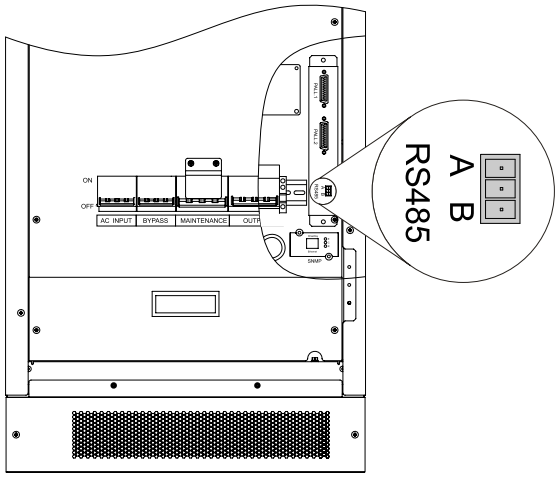


Figure2-15 RS485 port position of Three-Phase (10kVA -30kVA) series UPS with two inputs

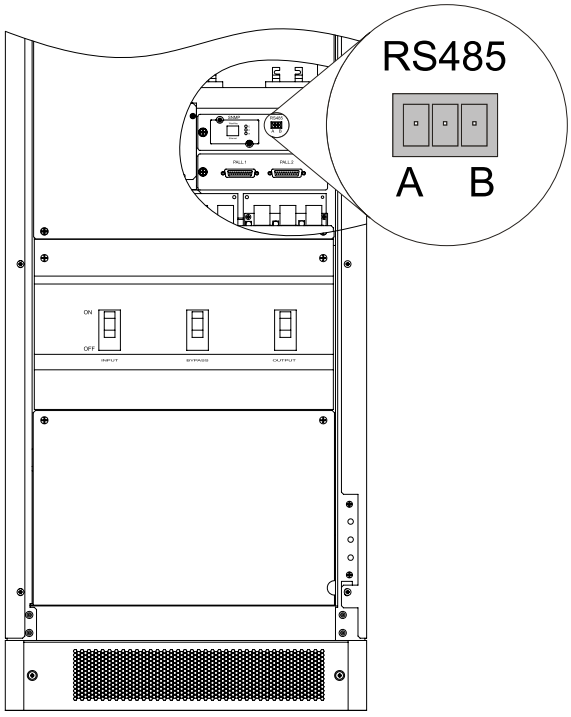


Figure2-16 RS485 port position of Three-Phase (40kVA -80kVA) series UPS with two inputs

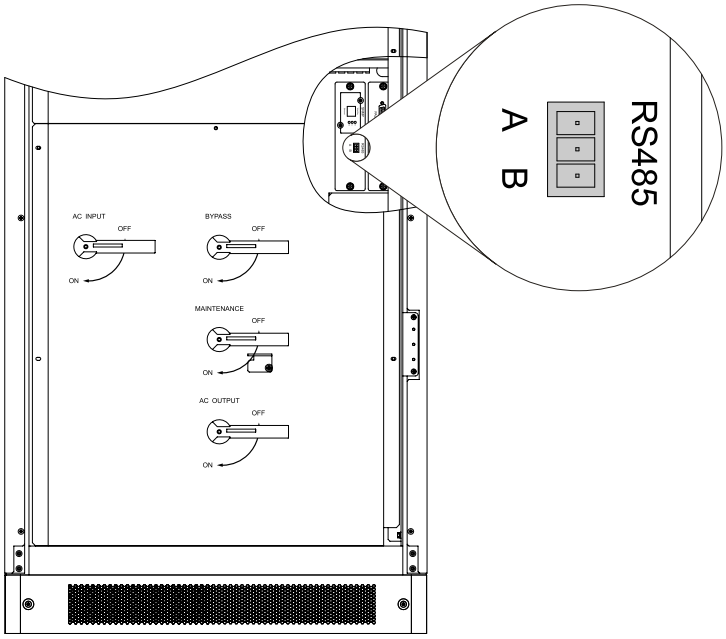


Figure2-17 RS485 port position of Three-Phase (100kVA -160kVA) series UPS with two inputs

2.6.2 Dry Contact Communicaiton(Optional for Single Input Model)

The UPS is equipped with dry contact port, which can realize the control for the dry contact signal and the transmission. Dry contact port position is as shown Figure2-18,Figure2-19 and Figure2-20.

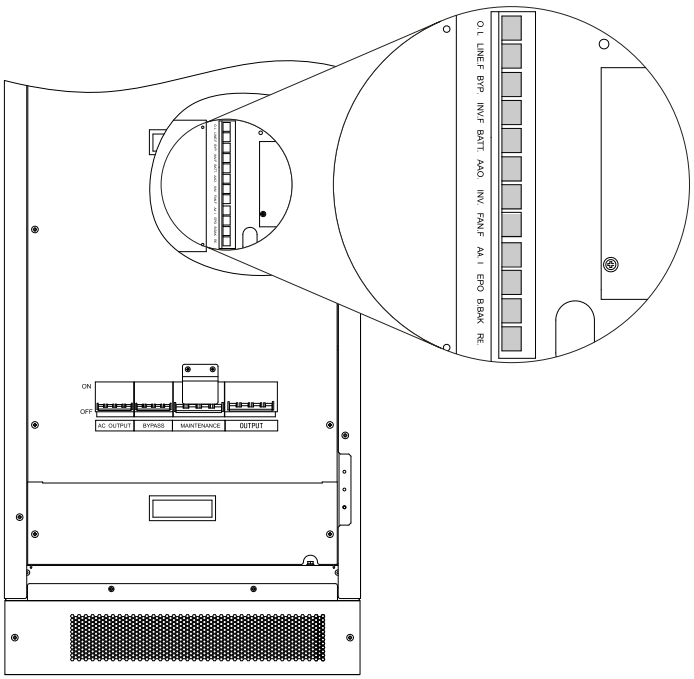


Figure2-18 Dry contact port position of Three-Phase (10kVA -30kVA) series UPS with two inputs

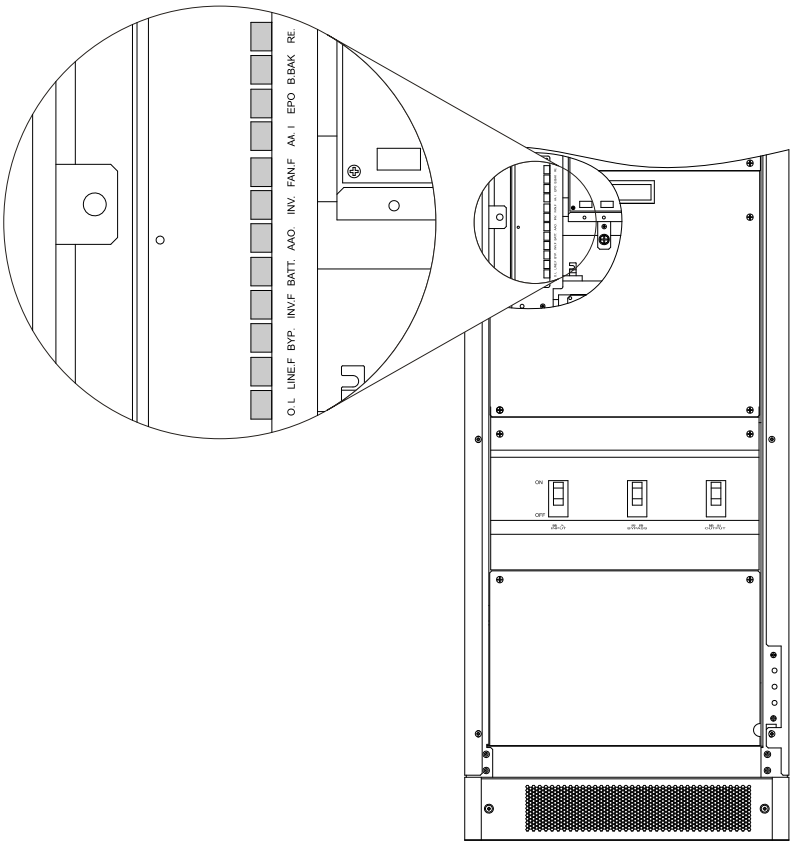


Figure2-19 Dry contact port position of Three-Phase (40kVA -80kVA) series UPS with two inputs

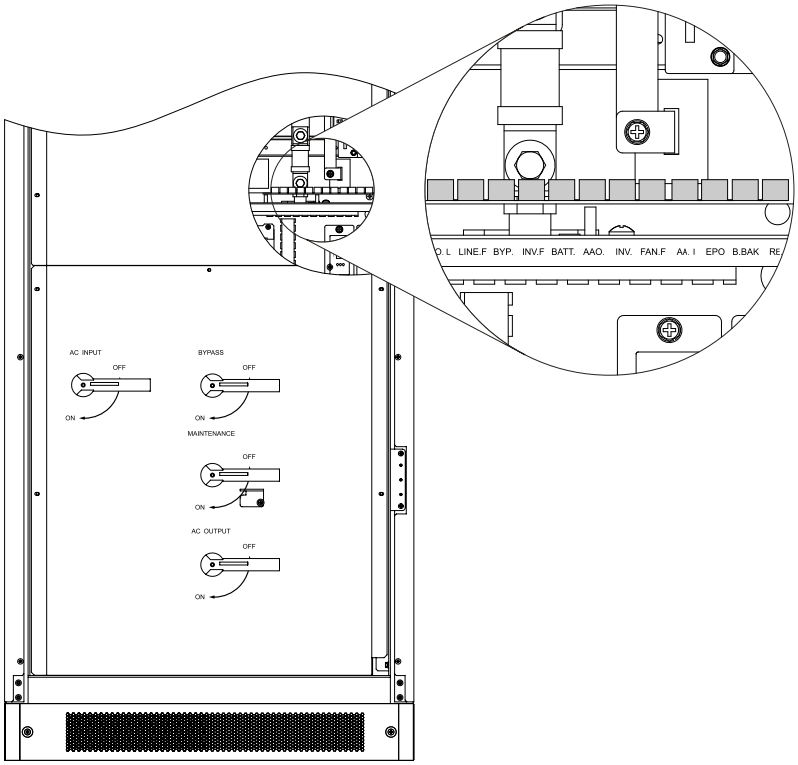


Figure2-20 Dry contact port position of Three-Phase (100kVA -160kVA) series UPS with two inputs

CAUTION

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

Table2-2 Dry contact signal illustration

Mark	Signal	Illustration	Remarks
INV.F	Inverter status signal	LED4 on: inverter fault. LED4 off: inverter works normally	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
BATT.	Battery input status signal	LED5 on: battery circuit abnormal LED5 off: battery circuit normal	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
AA.O	Maintenance bypass signal	LED6 on: maintenance bypass on LED6 off: maintenance bypass off	Output port, programmable. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
INV.	Inverter signal	LED7 on: inverter works LED7 off: inverter stop working	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
O.L	Load status signal	LED1 on: output overload LED1 off: output normal	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
LINE.F	Mains status signal	LED2 on: mains abnormal LED2 off: mains normal	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.

Mark	Signal	Illustration	Remarks
BYP.	Bypass status signal	LED3 on: bypass output LED3 off: not bypass output	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
FAN.F	Fan fault signal	LED8 on: fan fault LED8 off: fan works normally	Output port. Pin1 and pin3 is normally opened, pin2 and pin3 is normal closed.
EPO	External EPO control signal	The signal wire is connected to pin1 and pin2, default is normally opened. When it needs to set to normally closed, please short circuit CN7.	Input port
AA.I	External maintenance bypass control signal	The signal wire is connected to pin1 and pin2, default is normally opened. When it needs to set to normally closed, please short circuit CN3.	Input port
BATT. BAK	Battery cabinet breaker detection signal	The signal wire is connected to pin1 and pin2, default is normally opened. When it needs to set to normally closed, please short circuit CN11.	Input port
Re.	Reserved	Undefined. The signal wire is connected to pin1 and pin2, default is normally opened. When it needs to set to normally closed, please short circuit CN15.	Input port

2.6.3 SNMP Card (Optional)

The UPS can equip the SNMP card, which can achieve the remote monitor for the input voltage and frequency, output voltage and frequency, load, etc. of the UPS and remote ON/OFF operation. SNMP card position is as shown in Figure2-21, Figure2-22 and Figure2-23.

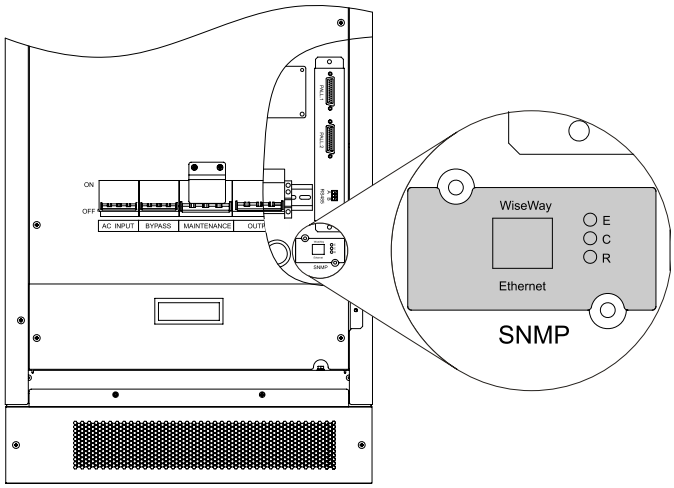


Figure2-21 SNMP card position of Three-Phase (10kVA -30kVA) series UPS with two inputs

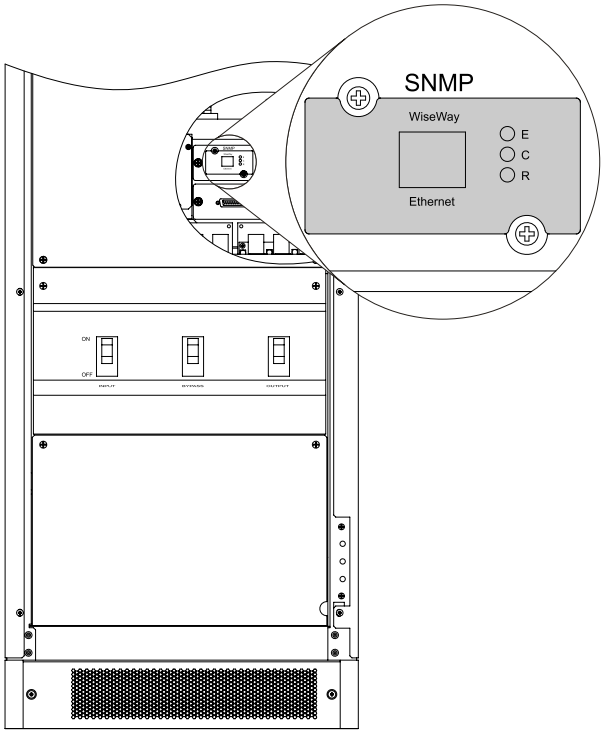


Figure2-22 SNMP card position of Three-Phase (40kVA -80kVA) series UPS with two inputs

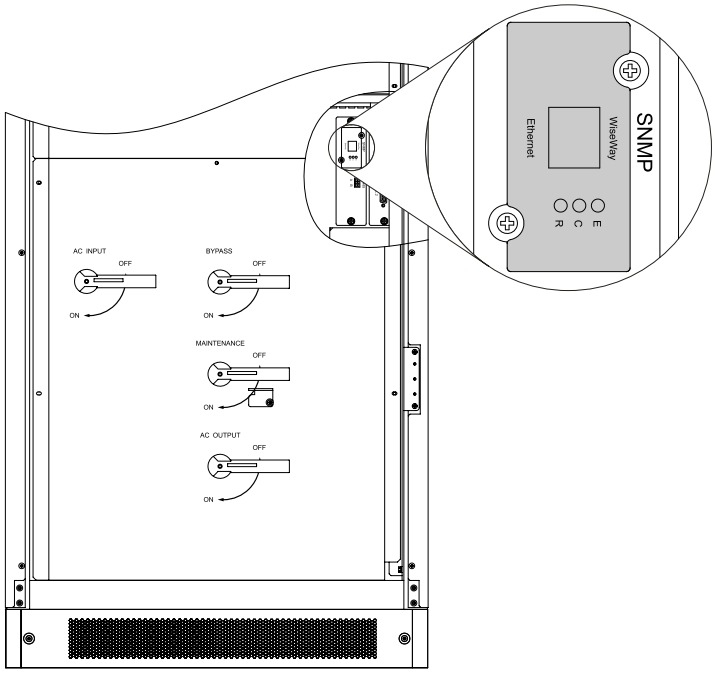


Figure2-23 SNMP card position of Three-Phase (100kVA -160kVA) series UPS with two inputs

2.6.4 RS232 Communicaiton (Optional)

The UPS is without RS232 port. If user needs to use RS232 communication, please change the reserved SNMP wires to RS232 wires.

The signal definition of reserved wire is as follows: pin1 is 0V signal, pin2 is 5V signal, pin3 is sending signal, pin4 is receiving signal.

The user's sending signal and receiving signal needs to connect to the UPS' sending signal and receiving signal crosswise (the 0V signal needs to be connected, 5V signal needn't to be connected but need to insulate for protection).

2.7 Other Optional Accessories

This series UPS can select different optional accessories to meet the requirements of different user.

2.7.1 Feedback Protection Device

If the battery mode and mains are not available, some voltage or energy inside the UPS may feedback to any input terminal directly or through a leakage path, which is called "feedback". To minimize the electric shocks hazard cased by feedback, it is suggested to install a feedback protection device. For specific selection, please consult our company.

The installation diagram is as shown in Figure2-24.

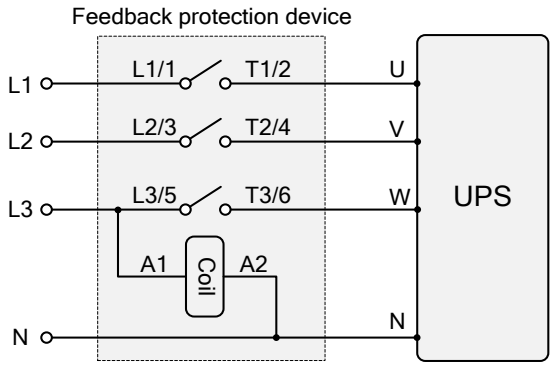


Figure2-24 Installation diagram

CAUTION

If the feedback protection device is not equipped, please add warning labels on all main power isolation devices which far away from the UPS to warn the maintenance personnel. Warning labels should contain the following text or equivalent words: This circuit supplies power for the UPS, please disconnect the UPS before constructing the circuit.

2.7.2 Wiring Cabinet

This series UPS is wiring from downside, if user needs to connect wires from upside, you can choose a wiring cabinet. The wiring cabinet can be installed at the right or left of the UPS. For specific selection, please consult our company.

NOTE

Only Three-Phase (40kVA-160kVA) series UPS can be equipped with wiring cabinet optionally.

2.7.3 Energy Feedback Absorbing Cabinet

The energy feedback absorbing cabinet is used to absorb the backward energy of electrical machinery. It is a single cabinet, and can be installed at the right or left of the UPS. One energy backwards absorbing cabinet can equip 2 independent absorber. For specific selection, please consult our company.

NOTE

Only Three-Phase (40kVA-160kVA) series UPS can be equipped with energy feedback absorbing cabinet optionally.

2.7.4 Battery Cabinet/ Rack

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

2.7.5 Battery Switch Box

The battery switches in the battery switch box can configure DC breaker that can be wall-mounted in the front or rear of battery rack. For specific selection, please consult our company. The switch specification of corresponding model is as shown in Table2-3.

Table2-3 Configuration of the battery switch box

Power (kVA)	Switch capacity(A)
10	32
15	50
20	63
30	100
40	200
50	200
60	200
80	315
100	400
120	400
160	500

2.7.6 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. As the height after equipped with the top waterproof cover is about 2300mm, the vertical height should be more than 3000mm.

NOTE

Only Three-Phase (40kVA -160kVA) series UPS can be equipped with top waterproof cover optionally.

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.

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 **4.4.2 Battery Manage**) 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.

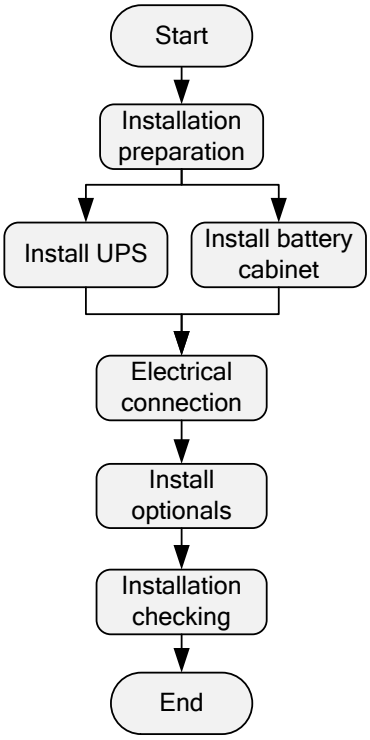
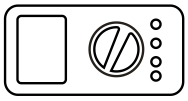
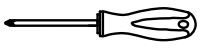
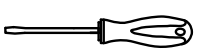
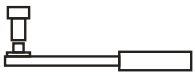
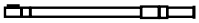
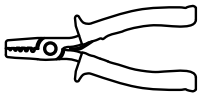
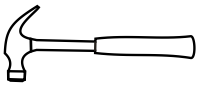
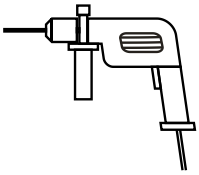
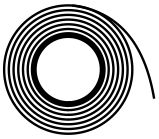
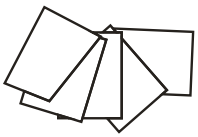
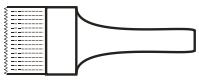
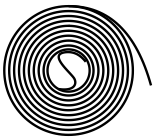
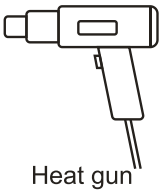
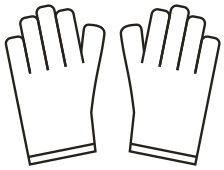
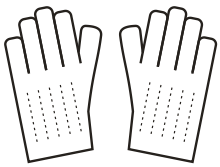
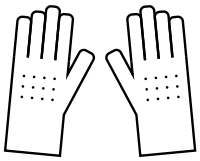
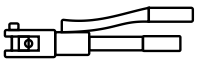


Figure3-1 UPS installation process

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

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 ℃ 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 of battery is 20℃~30℃. The temperature beyond 30℃ will shorten the battery's lifespan and lower than 20℃ 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 place must have enough space to place the UPS.
- Keep at least 700mm from the front panel and 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.

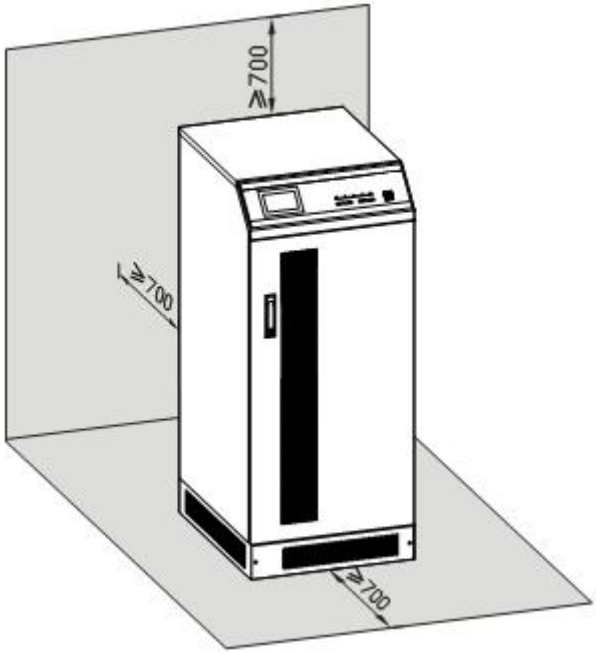


Figure3-2 Installation clearance

NOTE

The installation clearance for this series UPS is the same, here we take Three-Phase (10kVA-30kVA) series UPS 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, which will shorten UPS lifetime.

3.3.4 Selection of Input and Output Cables

For the selection of AC input and output cables of the UPS, please refer to Table3-1, Table3-2 for corresponding recommended values, and choose upwards

Input

Table3-1 Input current and cable specification of Three-Phase (10kVA-160kVA) series UPS

Power (kVA)	Input cur. (A)	Live wire cross-sectional area (mm^2)/ terminal	Neutral wire cross-sectional area (mm^2)/ terminal	Grounding wire cross-sectional area (mm^2)/ terminal	Batt. cur.(A)	Battery wire(mm^2)/ terminal
10	31	6(RVS5.5-6)	6(RVS5.5-6)	6(RVS5.5-6)	26	6(RVS5.5-6)
15	41	10(RNBS8-6)	10(RNBS8-6)	10(RNBS8-6)	39	10(RNBS8-6)
20	52	10(RNBS8-6)	10(RNBS8-6)	10(RNBS8-6)	52	10(RNBS8-6)
30	74	16(RNBS14-6)	16(RNBS14-6)	16(RNBS14-6)	78	16(RNBS14-6)
40	99	25(DT-25)	25(DT-25)	16(DT-16)	103	35(DT-35)
50	120	35(DT-35)	35(DT-35)	25(DT-25)	129	50(DT-50)
60	142	50(DT-50)	50(DT-50)	25(DT-25)	155	50(DT-50)
80	185	70(DT-70)	70(DT-70)	35(DT-35)	220	95(DT-95)
100	229	95(DT-95)	95(DT-95)	50(DT-50)	275	150(DT-150)
120	271	150(DT-150)	150(DT-150)	95(DT-95)	330	185(DT-185)
160	356	240(DT-240)	240(DT-240)	120(DT-120)	440	300(DT-300)

Output

Table3-2 Output current and cable specification of Three-Phase (10kVA-160kVA) series UPS

Power (kVA)	Current (A)	Live wire cross-sectional area (mm^2)/ terminal	Neutral wire cross-sectional area (mm^2)/ terminal	Grounding wire cross-sectional area (mm^2) / terminal
10	15	2.5(RV2-6)	2.5(RV2-6)	2.5(RV2-6)

Power (kVA)	Current (A)	Live wire cross-sectional area (mm^2)/ terminal	Neutral wire cross-sectional area (mm^2)/ terminal	Grounding wire cross-sectional area (mm^2) / terminal
15	23	6(RV5.5-6)	6(RV5.5-6)	6(RV5.5-6)
20	30	6(RV5.5-6)	6(RV5.5-6)	6(RV5.5-6)
30	46	10(RNBS8-6)	10(RNBS8-6)	10(RNBS8-6)
40	61	10(RNBS8-6)	10(RNBS8-6)	10(RNBS8-6)
50	76	16(DT-16)	16(DT-16)	16(DT-16)
60	91	25(DT-25)	25(DT-25)	16(DT-16)
80	121	35(DT-35)	35(DT-35)	25(DT-25)
100	152	50(DT-50)	50(DT-50)	25(DT-25)
120	182	70(DT-70)	70(DT-70)	35(DT-35)
160	242	120(DT-120)	120(DT-120)	70(DT-70)

NOTE
The cross-sectional areas above are recommended for about 5m long cables. Longer cables require larger cross-sectional areas.

Recommended input and output switch

Table3-3 Recommended input and output switch

Power (kVA)	Input current(A)	Input switch(A)	Output current(A)	Output switch(A)	Battery current(A)	Battery switch(A)
10	31	32	15	16	26	32
15	41	50	23	32	39	50
20	52	63	30	32	52	63
30	74	100	46	63	78	100
40	99	150	61	100	103	150

Power (kVA)	Input current(A)	Input switch(A)	Output current(A)	Output switch(A)	Battery current(A)	Battery switch(A)
50	120	150	76	100	129	150
60	142	150	91	100	155	200
80	185	200	121	150	220	250
100	229	250	152	200	275	320
120	271	320	182	200	330	400
160	356	400	242	250	440	630

NOTE
The recommended switch above is just for reference.

Recommended battery fuse

Table3-4 Recommended battery fuse

Power(kVA)	Battery fuse(A)
10	32
15	50
20	63
30	100
40	200
50	200
60	200
80	315
100	400
120	400
160	500

3.3.5 Surge Protection Device

If the UPS is installed in a lightning-prone area, install multiple surge protection devices in the inlet of mains to ensure UPS works safely.

3.4 Transportation and Unpacking

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.

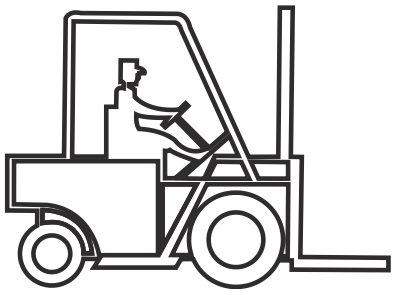


Figure3-3 Motor forklift

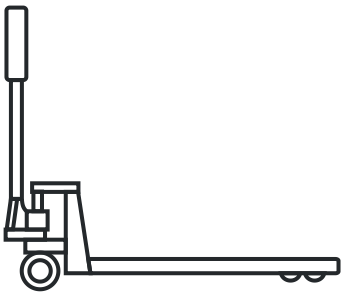


Figure3-4 manual forklift

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.

NOTE

For convenient transportation and package in the future, please put the package material into the box and save them properly.

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 Company or local agency of our company.

Step 5 After checking, unscrew the bolts that connected with device and wooden bracket by socket wrench, the bolt position is as shown in Figure3-5, Figure3-6 and Figure3-7.

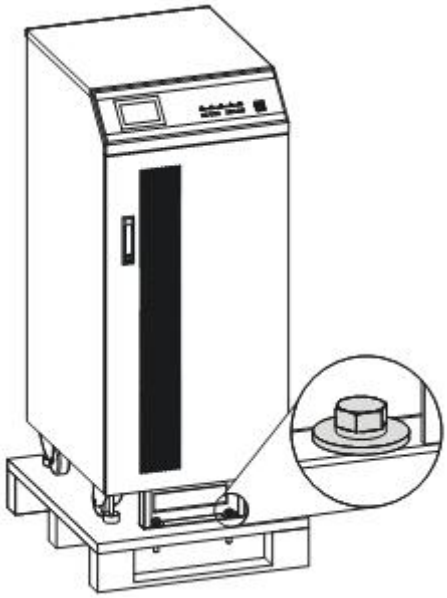


Figure3-5 Bolt position of Three-Phase (10kVA-30kVA) series UPS

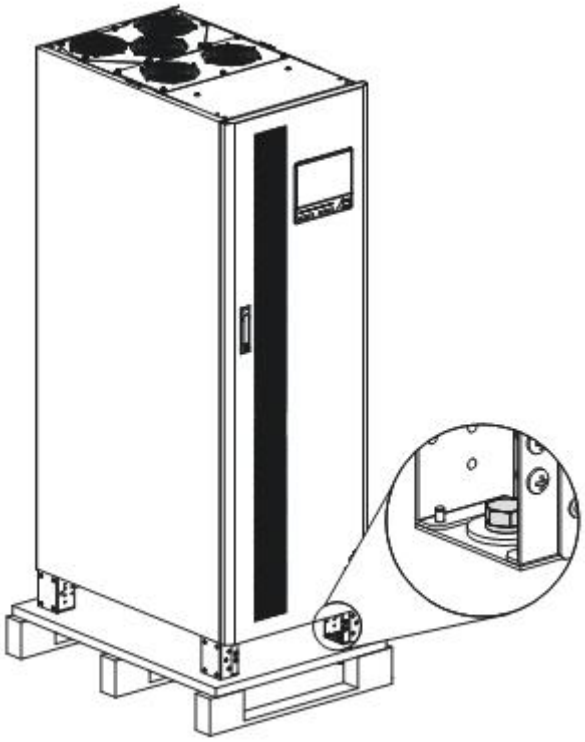


Figure3-6 Bolt position of Three-Phase (40kVA-80kVA) series UPS

Figure3-7 Bolt position of Three-Phase (100kVA-160kVA) series UPS

----End

3.5 Install UPS

3.5.1 Single-unit

NOTE

In this section, we take the ground installation as an example. For other installation way, please adjust the installation procedure on the basis of actual condition.

For easy installation and maintenance, when the UPS is installed on the ground, it needs to reserve the wire groove, as shown in Figure3-8.

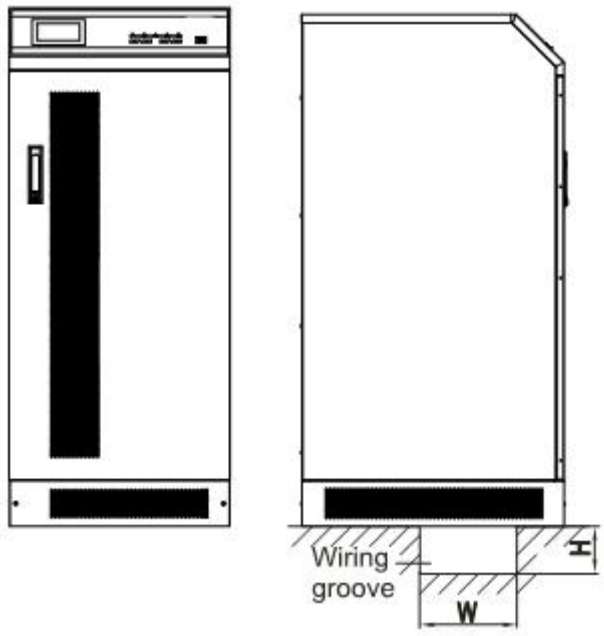


Figure3-8 Wiring groove diagram

NOTE

The wiring groove of Three-Phase (10kVA -160kVA) series UPS is the same. The recommended width is 180mm and height is 200mm.

Step 1 Determine and plan the installation position according to the UPS size (as shown in Figure3-9, Figure3-10 and Figure3-11) and installation clearance requirement (see **3.3.3 Installation Clearance**).

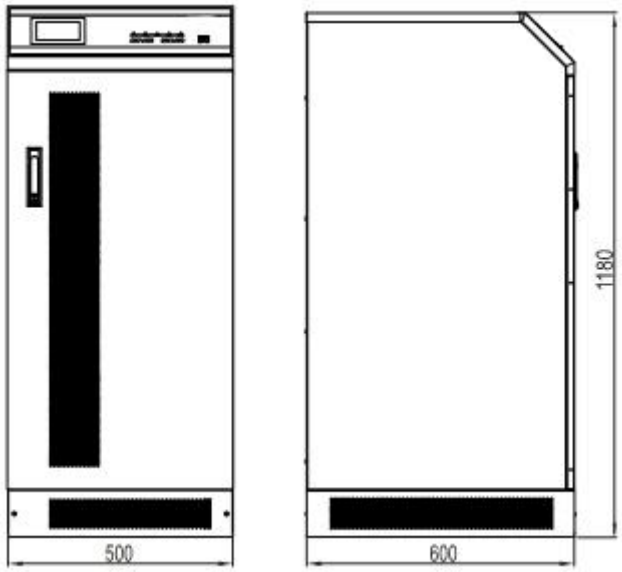


Figure3-9 Size of Three-Phase (10kVA-30kVA) series UPS

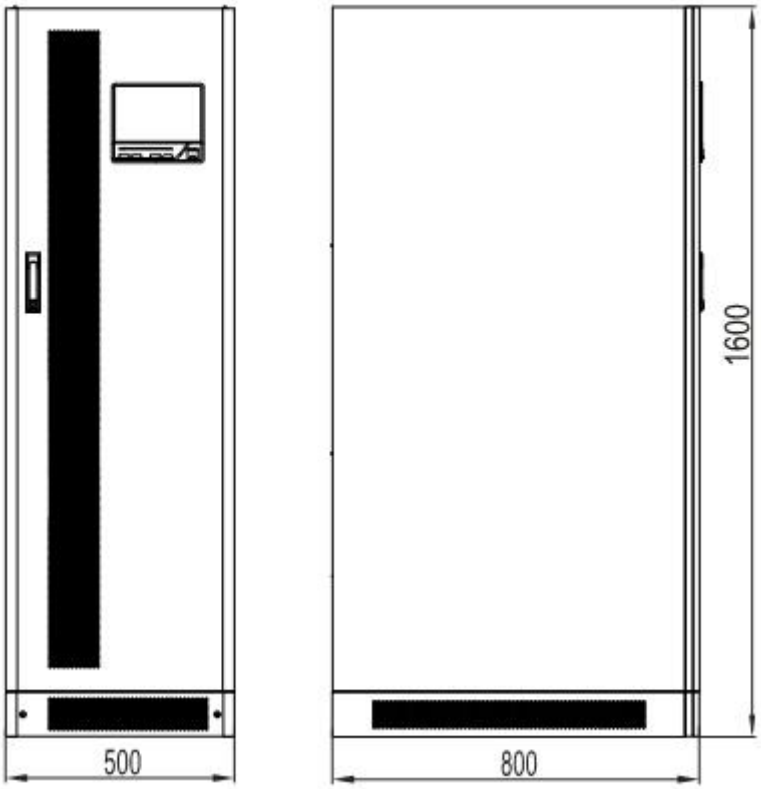


Figure3-10 Size of Three-Phase (40kVA-80kVA) series UPS

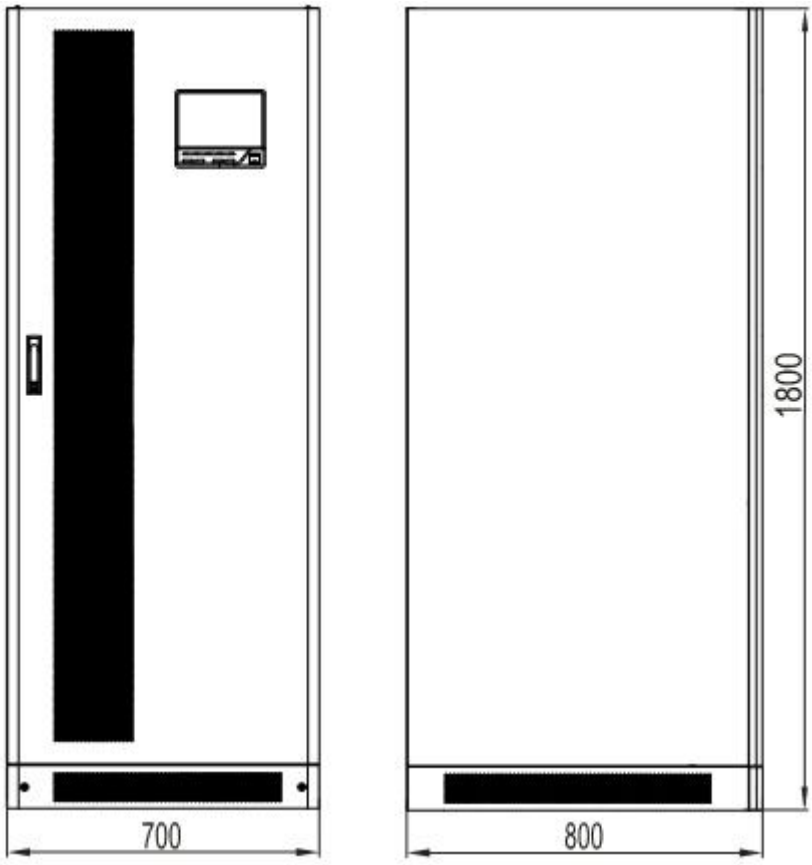


Figure3-11 Size of Three-Phase (100kVA-160kVA) series UPS

Step 2 Drillφ 16.5 holes on the ground by impact drill according to the installation hole size of pedestal. The pedestal installation hole size of each model is as shown in Figure3-12, Figure3-13 and Figure3-14.

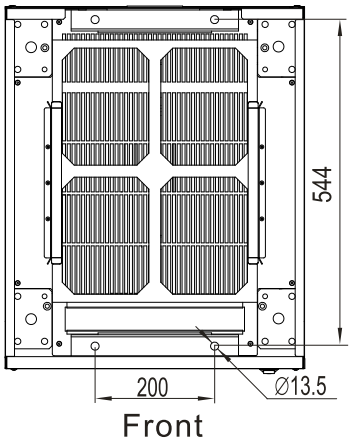


Figure3-12 Pedestal installation size of Three-Phase (10kVA-30kVA) series UPS (top view)

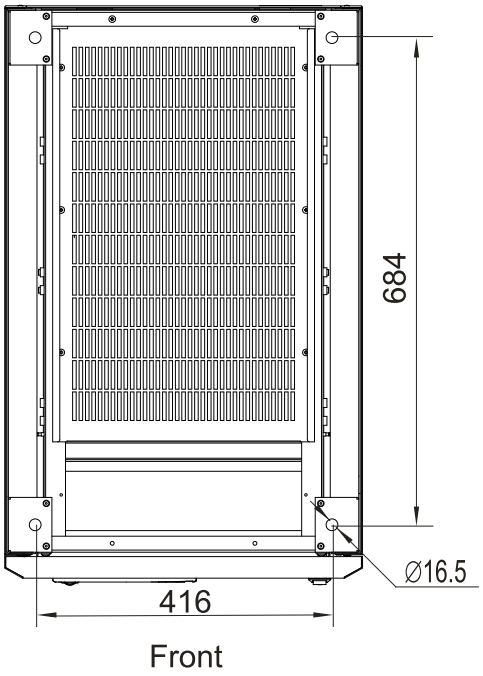


Figure3-13 Pedestal installation size of Three-Phase (40kVA-80kVA) series UPS (top view)

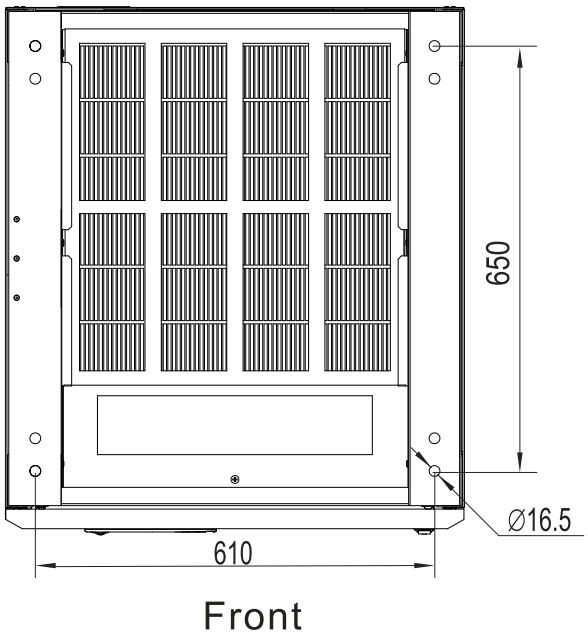
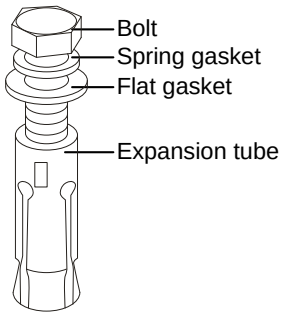


Figure3-14 Pedestal installation size of Three-Phase (100kVA-160kVA) series UPS (top view)

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.

Step 4 Fasten UPS.

- Three-Phase (10kVA-30kVA) series UPS

1. Rotate four supporting foots of universal wheel clockwise by wrench to separate anchor frame from wooden frame. Dismantle anchor frame and install it in the mounted expansion bolts.

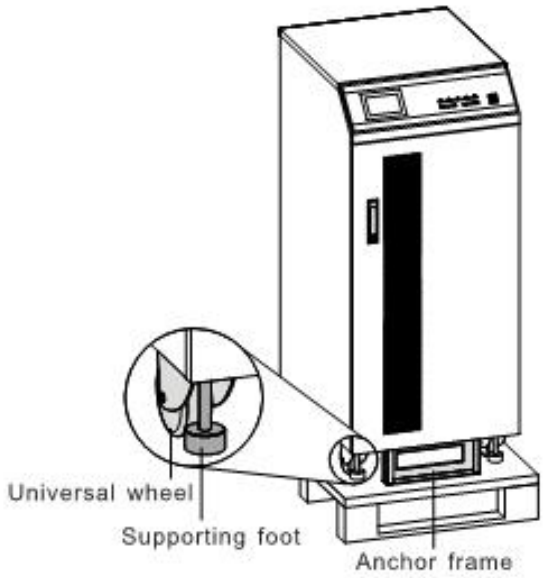


Figure3-16 Rotate four supporting foot

NOTE

Rotate four supporting foots of universal wheel clockwise to lower height.

Rotate four supporting foots of universal wheel anticlockwise to higher height.

2. Rotate four supporting foots of universal wheel anticlockwise by wrench to separate supporting foot from wooden frame and get four universal wheels to wooden frame.

NOTE

When adjusting supporting foot, it should adjust four supporting foots simultaneously to avoid tilting.

3. Put equipped board at the front of UPS and push UPS to ground through board and move it to the installed anchor frame and fasten it by bolts.

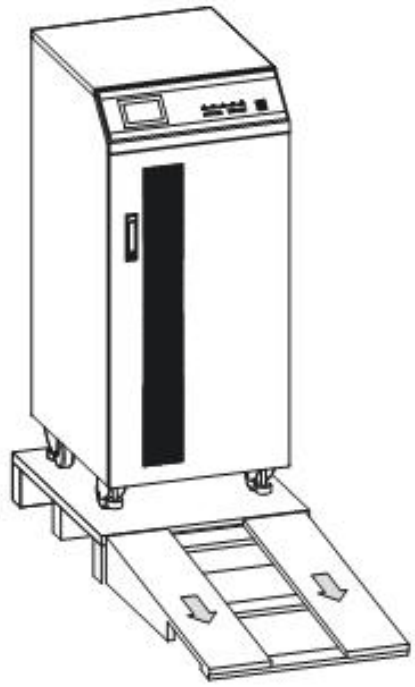


Figure3-17 Push UPS to ground through board

NOTE

It needs two person to push UPS to ground to avoid tilting or human injury(It's recommended that one person on the left and the other person on the right to move UPS.).

- Three-Phase (40kVA-80kVA) series UPS and Three-Phase (100kVA-160kVA) series UPS

Move UPS from wooden frame to ground and fasten it in the installed expansion bolts.

Step 5 After finishing installing UPS, install bottom cover plates.

----End

3.5.2 Rack Installation

Step 1 Custom made the installation rack according to the pedestal installation size and transport them to the installation site.

NOTE
The manufacturer does not provide brackets, user can order them according to the dimensions (as shown in Figure3-12, Figure3-13, Figure3-14.

Step 2 Take the UPS out of the package (as shown in **3.4.2 Unpacking**) and move it to instillation location.

Step 3 Put UPS to the bracket according to **3.5.1 Step 4** and fasten it by bolts.

----End

3.6 Electrical Connection

3.6.1 Single-unit

CAUTION

- When wiring, make sure that wires are connected with terminals tightly. Do not make any poor connection or connect wires reversely.
- The input neutral wire and output neutral wire share one neutral wire terminal.
- The connection of battery anode and cathode must be right and firm. The grounding wire must be connected firmly

Step 1 Open the front door, and dismantle the bottom wiring cover plate.

Step 2 Lead the protective grounding wire go through the bottom wiring holes (as shown in Figure3-18, Figure3-19, Figure3-20) and connect them to the grounding terminal (as shown in Figure3-21, Figure3-22, Figure3-23, Figure3-24, Figure3-25, Figure3-26) of the UPS.

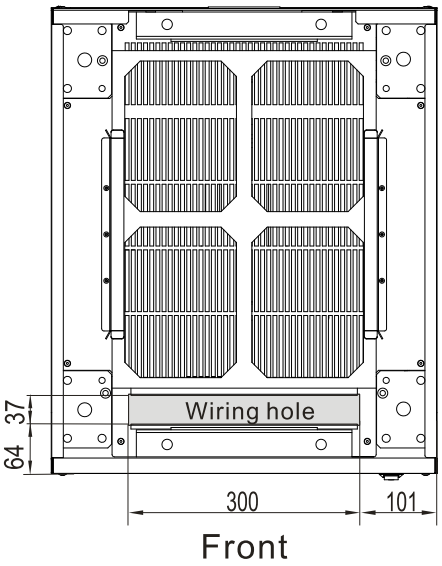


Figure3-18 Bottom wiring hole diagram of Three-Phase (10kVA-30kVA) series UPS

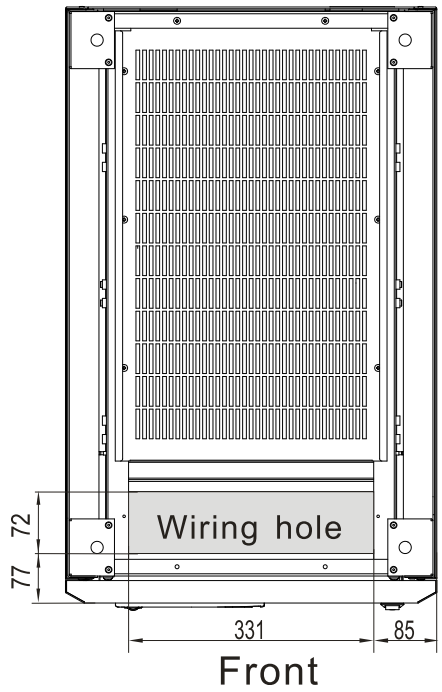


Figure3-19 Bottom wiring hole diagram of Three-Phase (40kVA-80kVA) series UPS

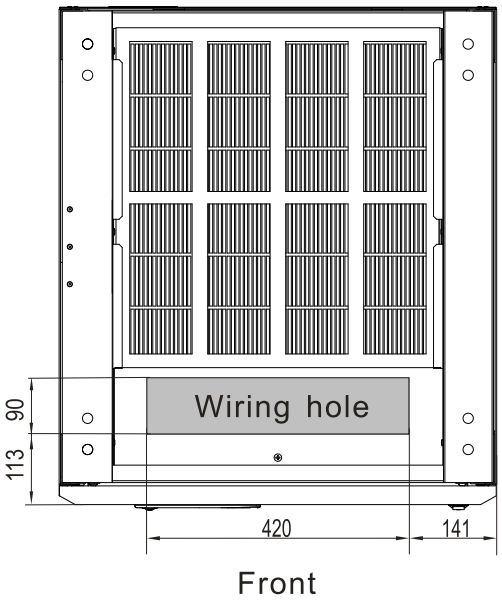


Figure3-20 Bottom wiring hole diagram of Three-Phase (100kVA-160kVA) series UPS

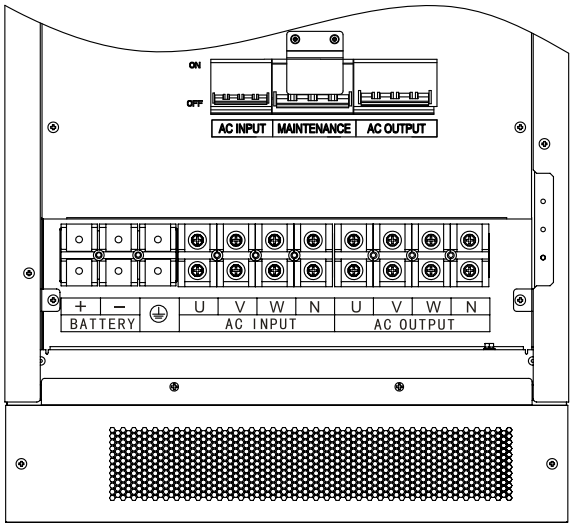


Figure3-21 Wiring terminal diagram of Three-Phase (10kVA-30kVA) series UPS with single input (front view)

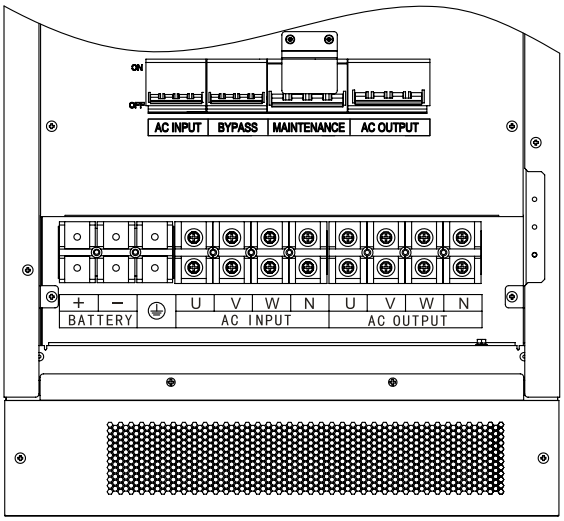


Figure3-22 Wiring terminal diagram of Three-Phase (10kVA-30kVA) series UPS with two inputs(front view)

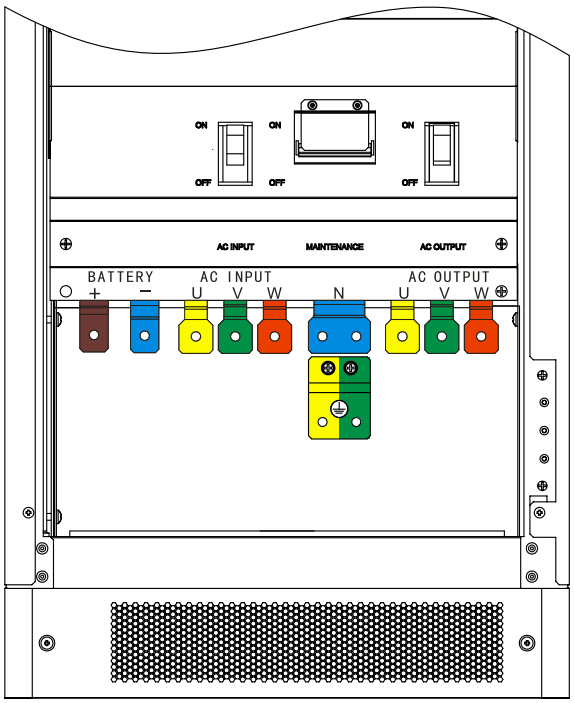


Figure3-23 Wiring terminal diagram of Three-Phase (40kVA-80kVA) series UPS with single input (front view)

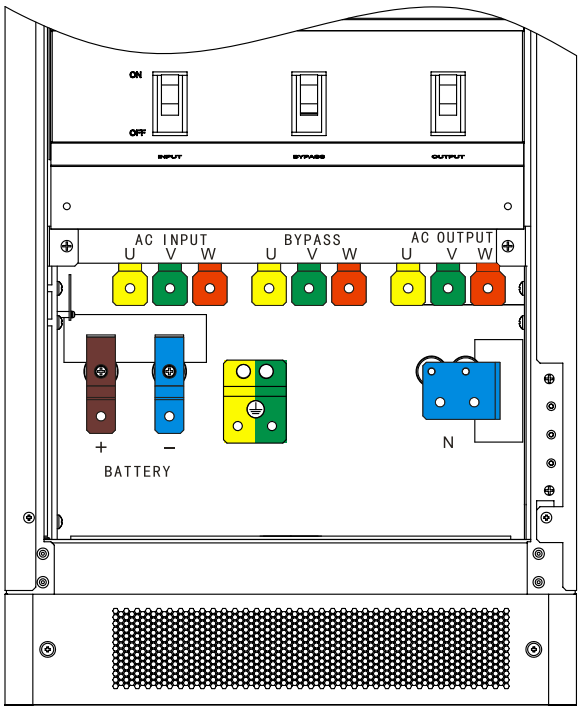


Figure3-24 Wiring terminal diagram of Three-Phase (40kVA-80kVA) series UPS with two inputs (front view)

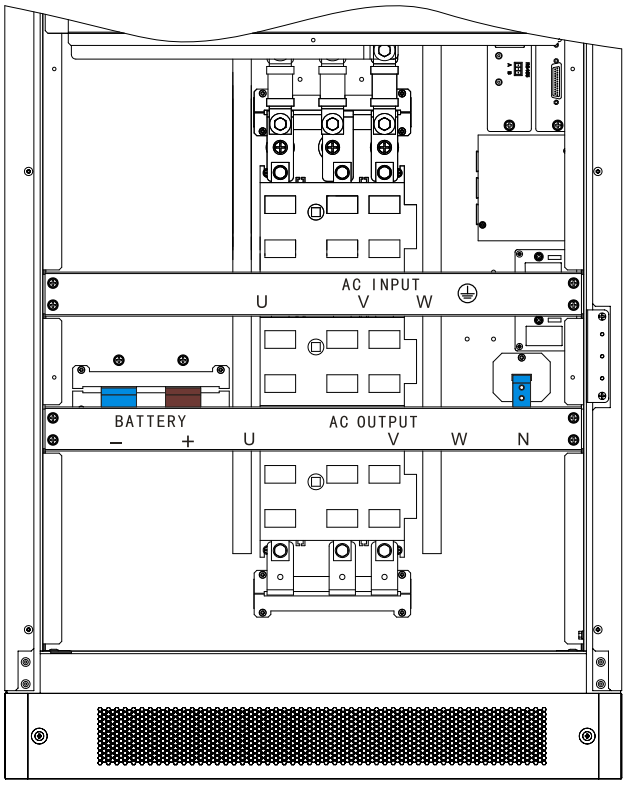


Figure3-25 Wiring terminal diagram of Three-Phase (100kVA-160kVA) series UPS with single input (front view)

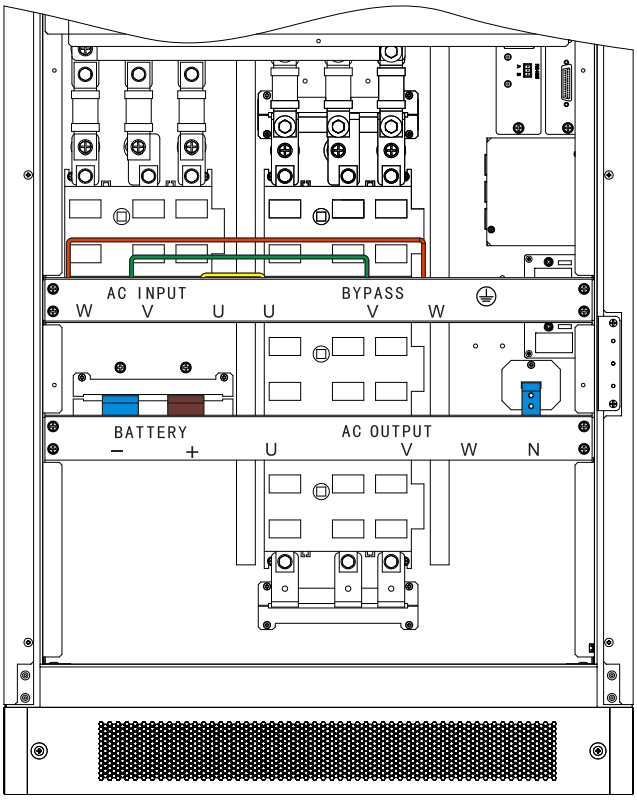


Figure3-26 Wiring terminal diagram of Three-Phase (100kVA-160kVA) series UPS with two inputs (front view)

Step 3 Lead the input, output and battery cables go through the bottom wiring hole and connect them with corresponding wiring terminal of the UPS. The input, output and battery terminals of each model are as shown in Figure3-21, Figure3-22, Figure3-23, Figure3-24, Figure3-25 and Figure3-26.

NOTE

When performing wiring for Three-Phase (40kVA-160kVA) series UPS with two inputs, if there is only one route of input, connect U, V, W of mains with U, V, W of bypass respectively by equipped wires and connect total input wire with mains terminals. When performing wiring for parallel system, if it also only has one route of input, perform wiring according to the above method. When performing wiring, pay attention to phase sequence.

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 4 Connect the communication wires.

Lead the wires of RS485, dry contact signal, SNMP go through the bottom wiring hole, and then insert them to the corresponding ports on the communication board. The RS485, dry contact signal, SNMP port of the UPS refers to 2.6 Communication Way.

Step 5 Install the wiring cover plates again.

----End

3.6.2 Series System

Step 1 Dismantle the bottom wiring cover plates of each UPS according to 3.6.1 Step 1.

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 the short-circuit cooper terminal of mains input and bypass input have been canceled.

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

Step 3 Connect the mains input of UPS2 to the minas input of UPS1.

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

The series wiring diagram of Three-Phase (40kVA-80kVA) series UPS with two inputs and Three-Phase (100kVA-160kVA) series UPS with two inputs are as shown in Figure3-27 and Figure3-28.

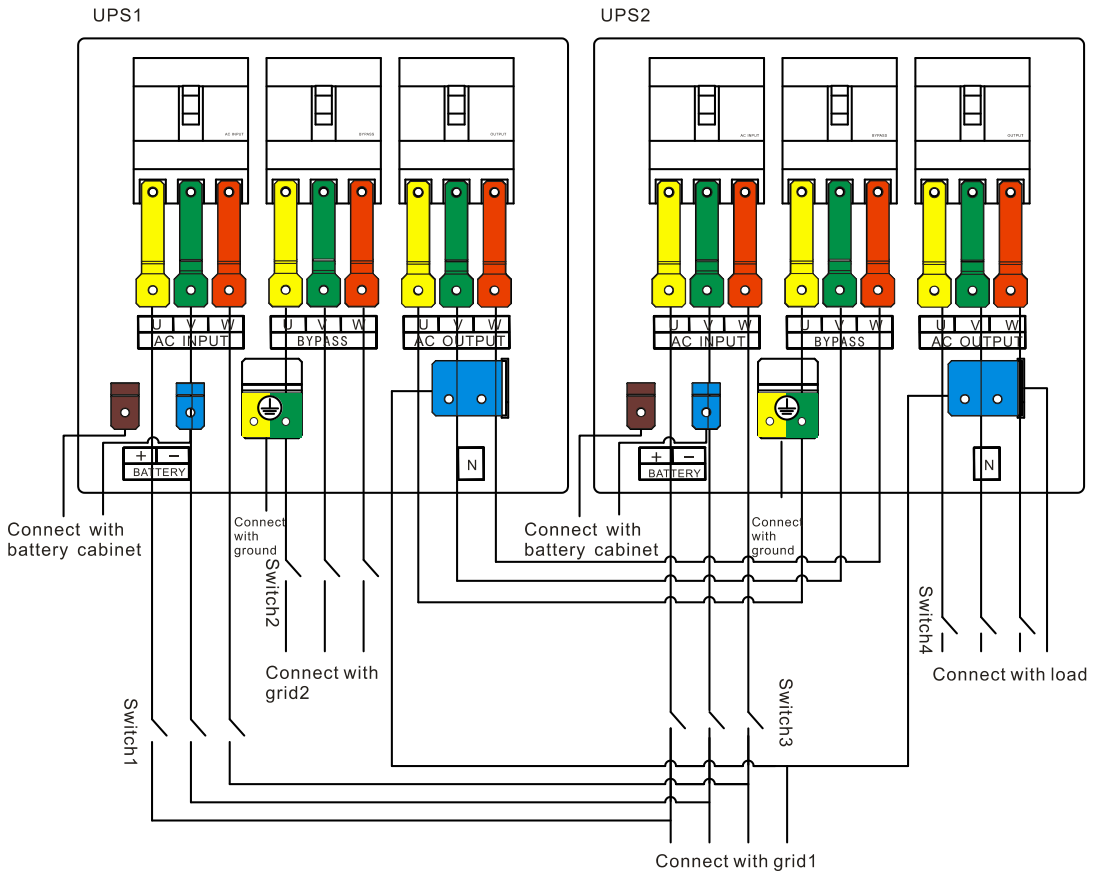


Figure3-27 Series wiring diagram of Three-Phase (40kVA-80kVA) series UPS with two inputs

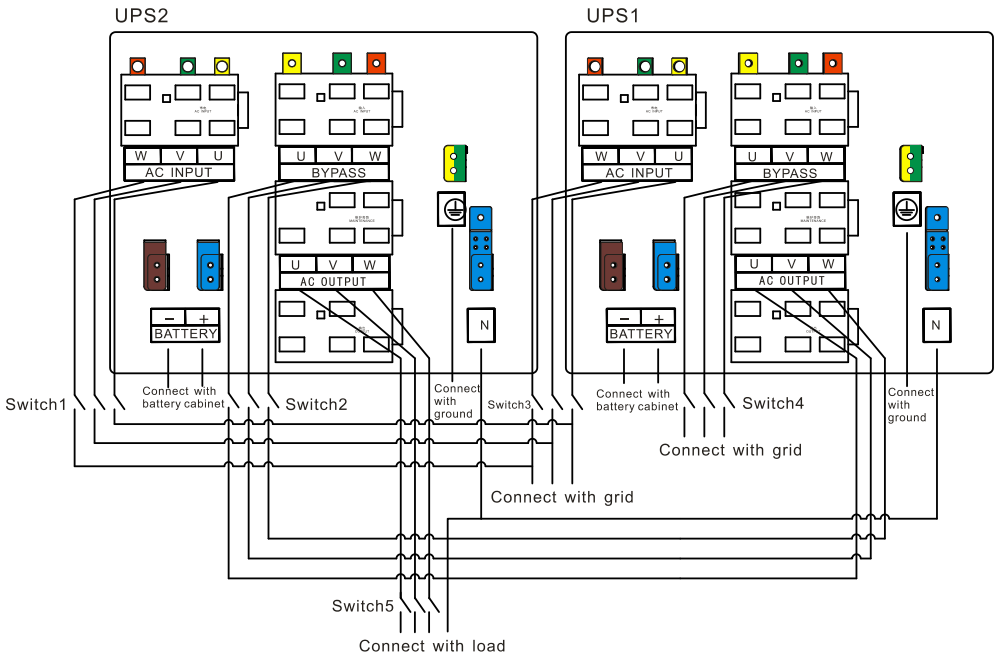


Figure3-28 Series wiring diagram of Three-Phase (100kVA-160kVA) series UPS with two inputs

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.

----End

3.6.3 Parallel System

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

CAUTION

The phase sequence of mains 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 of each UPS according to 3.6.1 Step 1.

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

Step 3 Connect the AC output of each UPS to load or distribution cabinet.

Step 4 Connect the battery input of each UPS to relevant battery cabinet/rack.

Step 5 Connect the parallel communication port of each UPS (as shown in Figure3-29, Figure3-30, Figure3-31) by parallel wires (shielding communication wire), and fasten the screws of corresponding ports.

NOTE

The parallel port position of Three-Phase (10kVA-160kVA) series UPS with single input and two inputs are similar. The following takes two inputs model as an example.

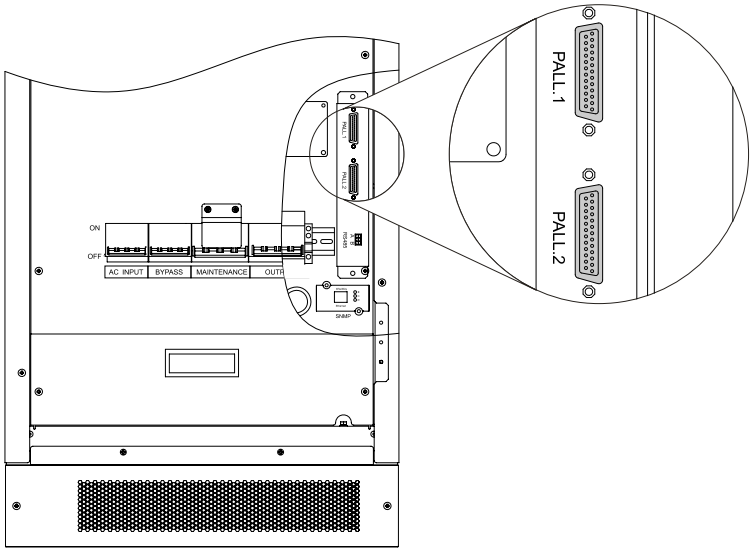


Figure3-29 Parallel port position of Three-Phase (10kVA-30kVA) series UPS with two inputs

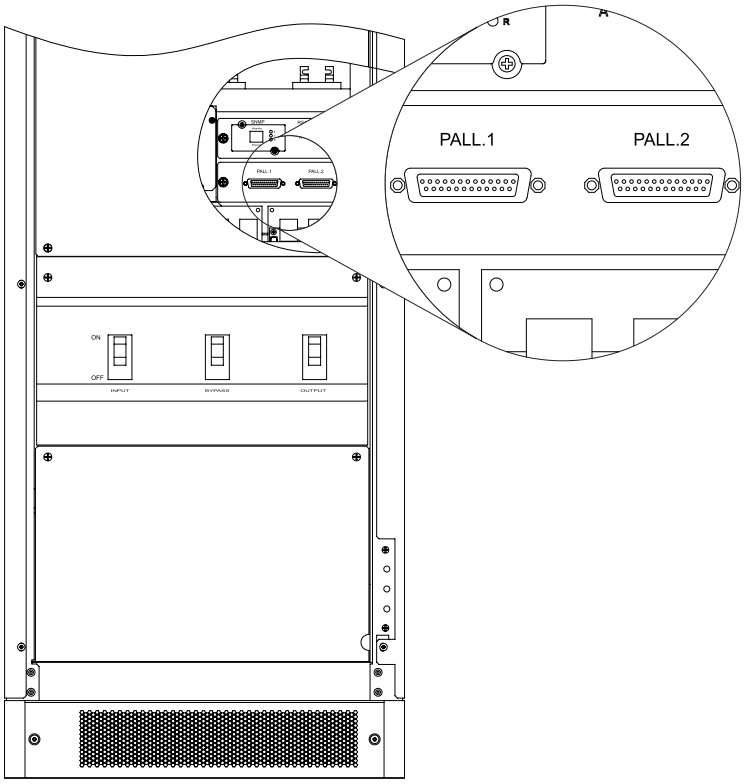


Figure3-30 Parallel port position of Three-Phase (40kVA-80kVA) series UPS with two inputs

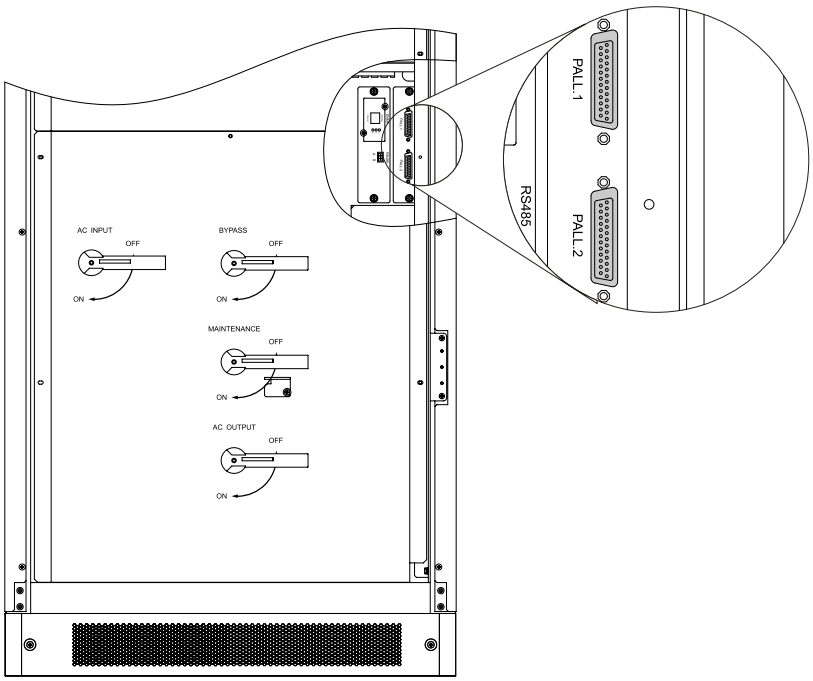


Figure3-31 Parallel port position of Three-Phase (100kVA-160kVA) series UPS with two inputs

The parallel system's output neutral wire and wires of phase-U, phase-V, phase-W are connected from the copper terminals, and short circuit at the load end or distribution cabinet.

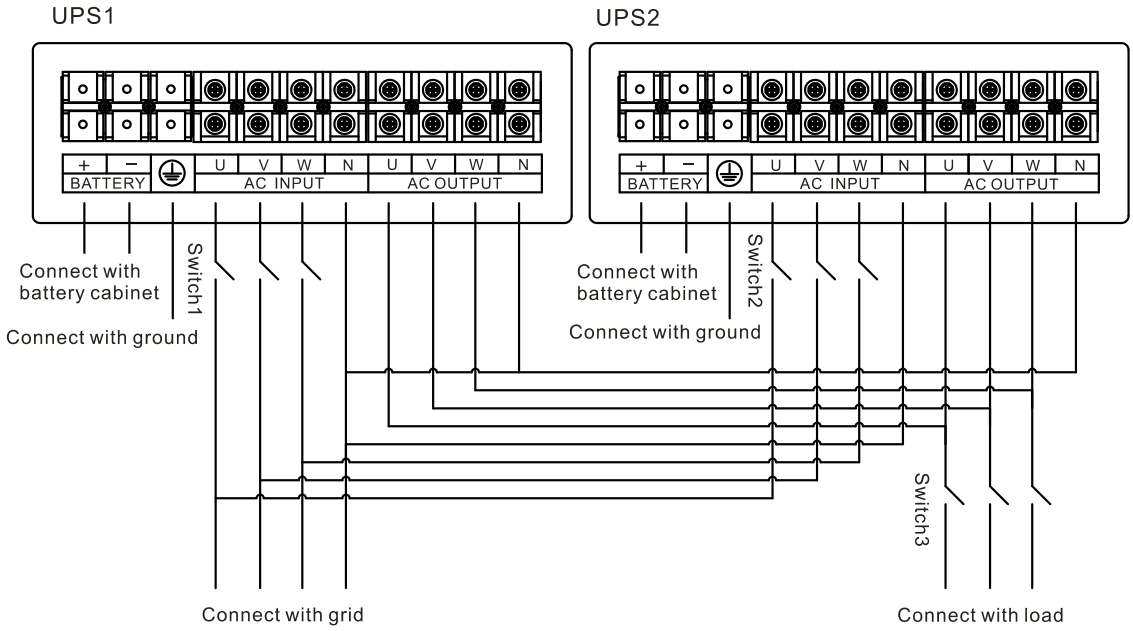


Figure3-32 Parallel system wiring diagram of Three-Phase (10kVA-30kVA) series UPS

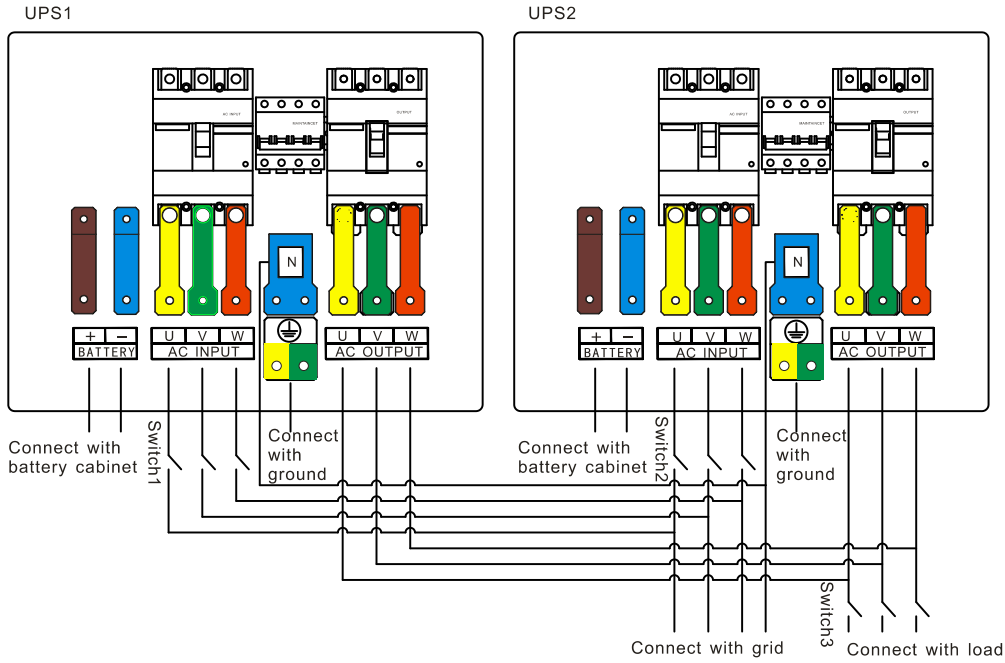


Figure3-33 Parallel system wiring diagram of Three-Phase (40kVA-80kVA) series UPS with single input

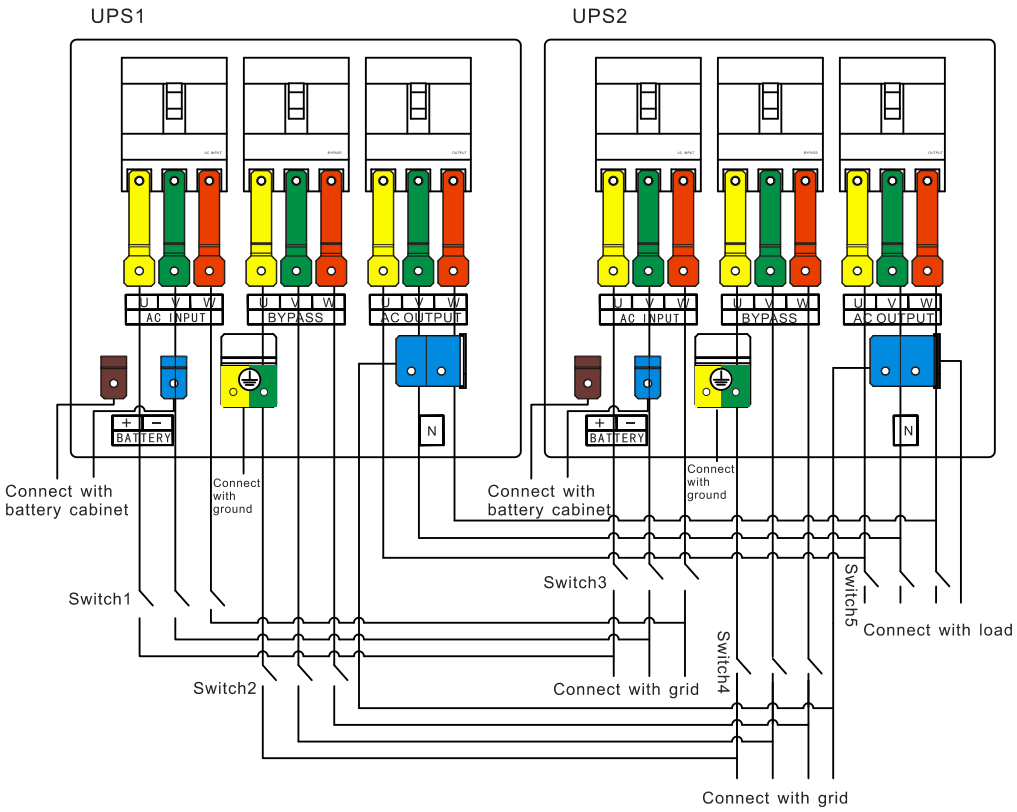


Figure3-34 Parallel system wiring diagram of Three-Phase (100kVA-160kVA) series UPS with two inputs

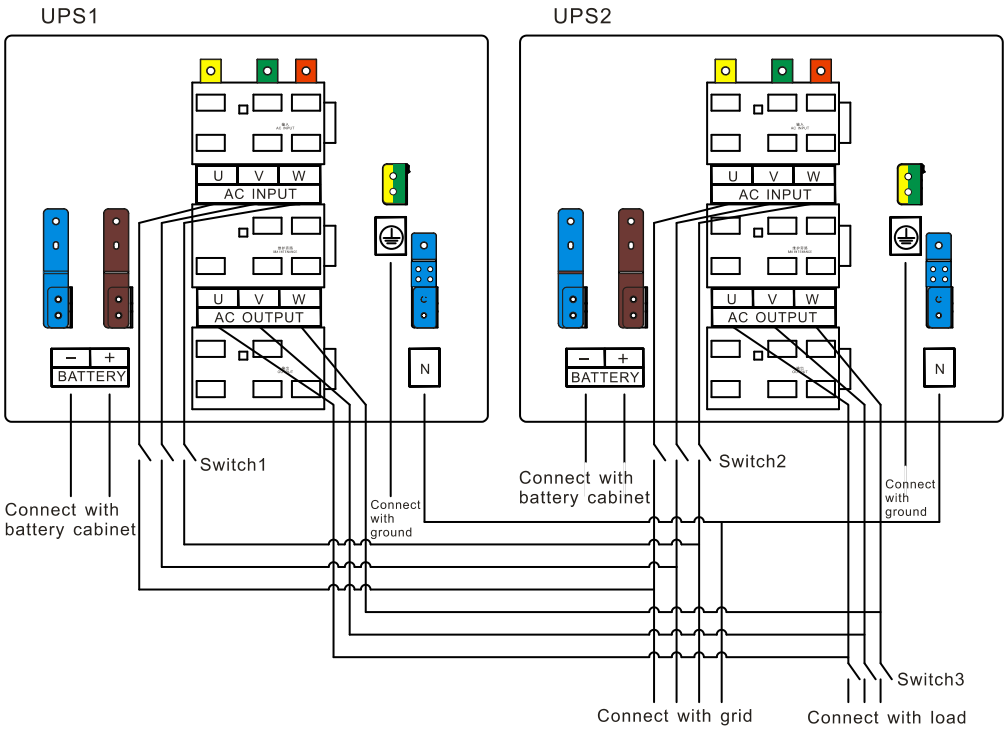


Figure3-35 Parallel system wiring diagram of Three-Phase (100kVA-160kVA) series UPS with single input

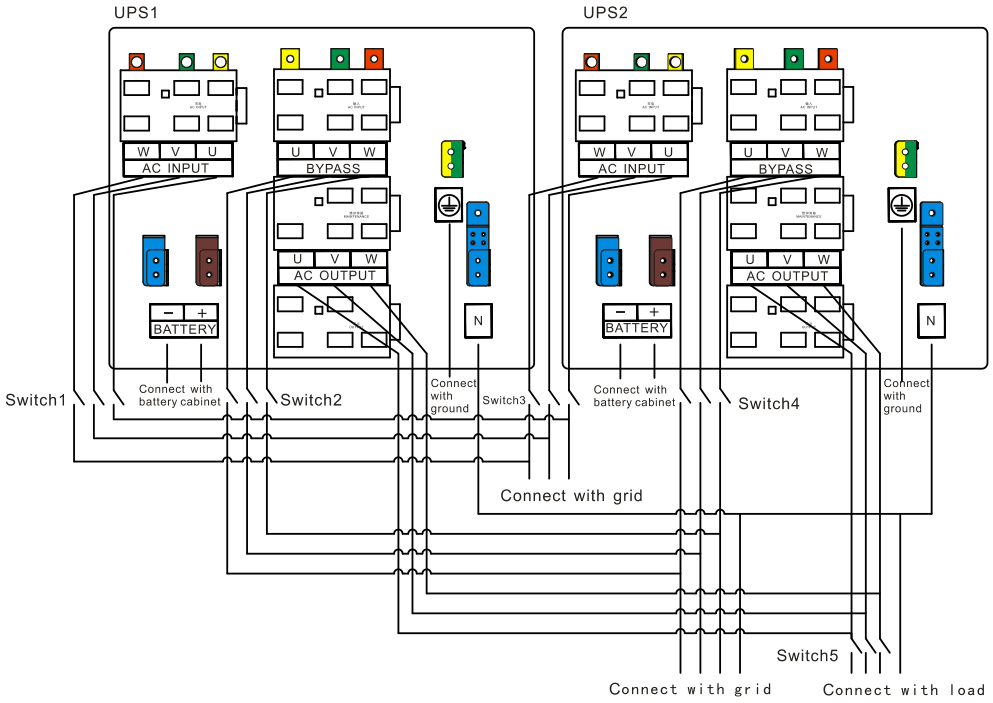


Figure3-36 Parallel system wiring diagram of Three-Phase (100kVA-160kVA) series UPS with two inputs

When there are several UPS in the parallel system, the wiring diagram of parallel wires is as shown in Figure3-37.

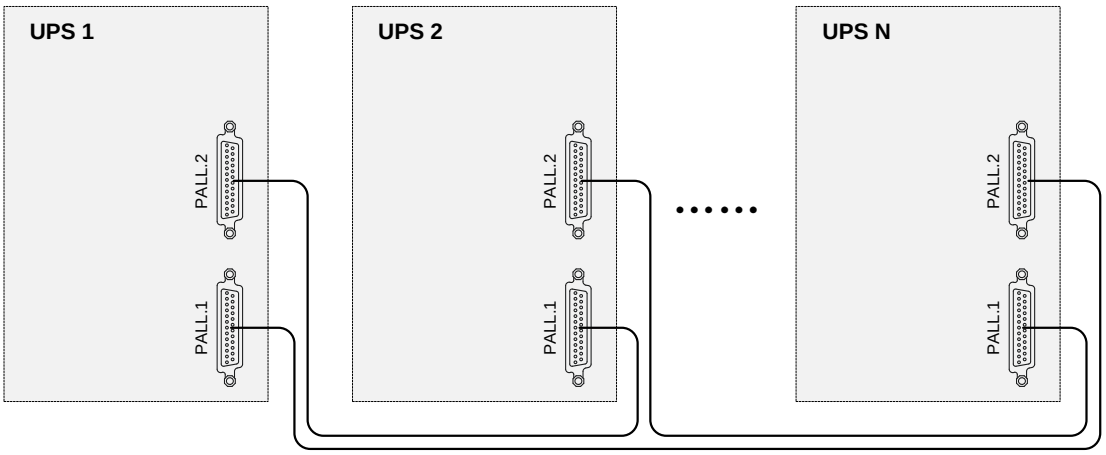


Figure3-37 Parallel wiring diagram

----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.

4.1 Menu Hierarchy

The menu hierarchy of the touch screen is as shown in Figure4-1.

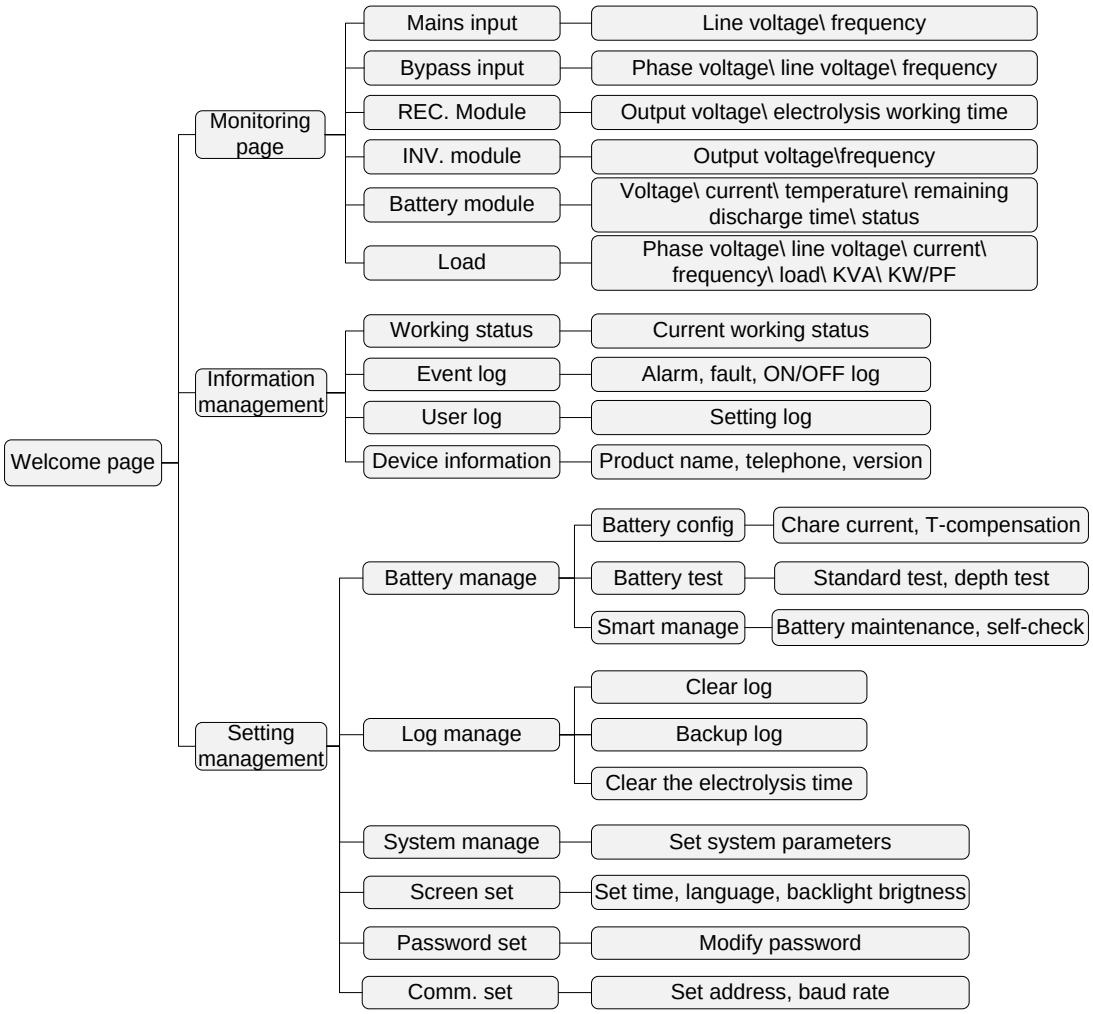


Figure4-1 Menu hierarchy of the touch screen

4.2 System Monitor Page

If setting power-on password, it will enter the power-on password page when power on, as shown in Figure4-2. If entering the right password, it will enter the monitoring page, otherwise, it can't power on.

Figure4-2 Power-on password page

After establishing the communication, it will enter the monitoring page, as shown in Figure4-3.

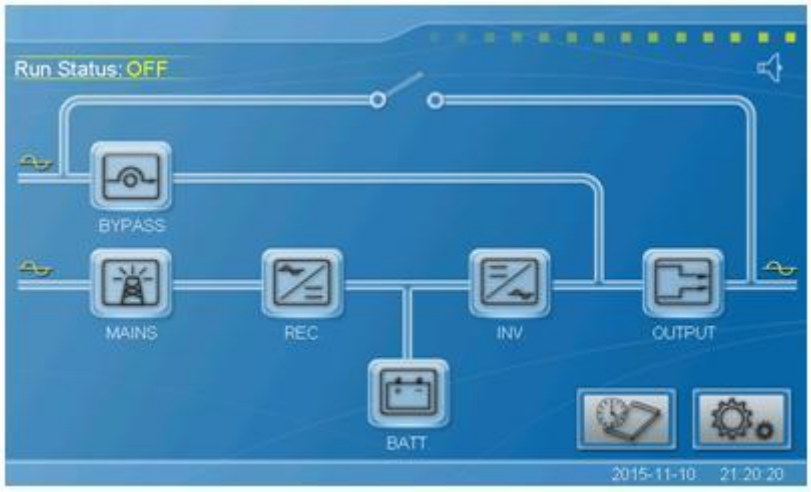


Figure4-3 Monitoring page

4.2.1 Icon Meaning

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

 : Bypass input information. When bypass input voltage or frequency abnormal, the icon will be on and show  .

 : Mains input information. When mains input voltage or frequency abnormal, the icon will be on and show  .

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

 /  : Rectifier/inverter information. When rectifier/inverter abnormal, the icon will be on and show  /  .

 : Output information. When output is overload or under-voltage, the icon will be on and show  .

 : Information management.

 : Setting management.

4.2.2 Working Status

There are five main working statuses: without energy transmission status, mains inverting status, battery inverting status, bypass output status and maintenance bypass output status. The corresponding water lights in the monitoring page are shown in Figure4-4, Figure4-5, Figure4-6, Figure4-7, Figure4-8. Other statuses has corresponding water light, such as when bypass outputs, rectifier charges battery.

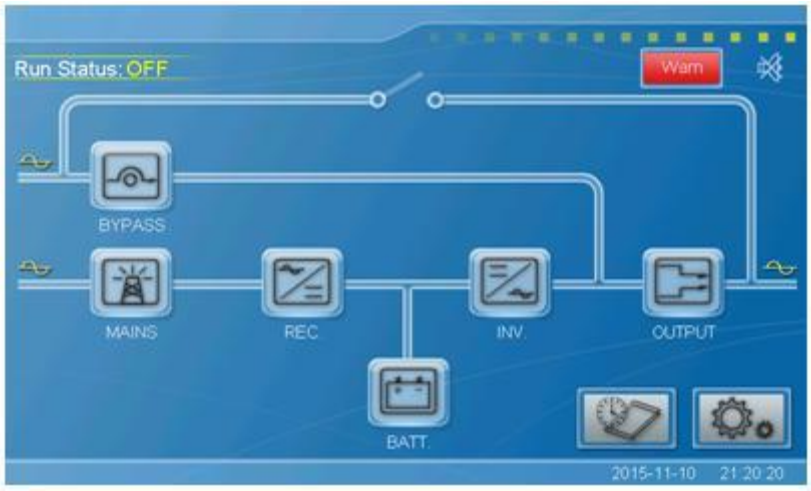


Figure4-4 Without energy transmission status

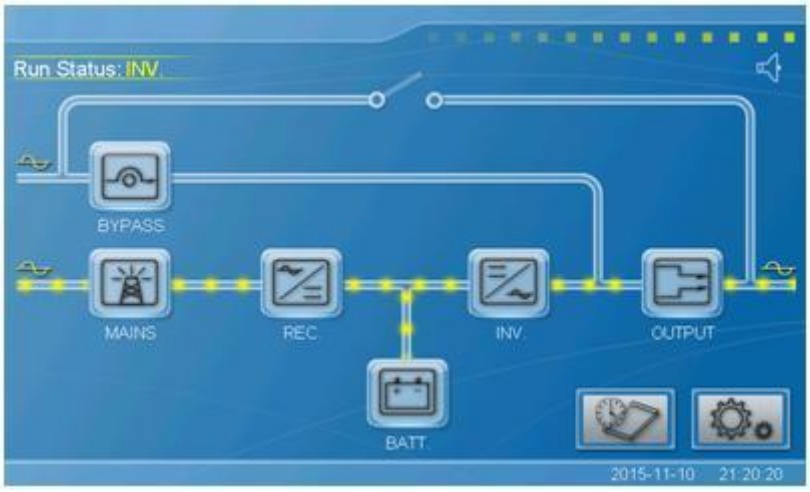


Figure4-5 Mains inverting status

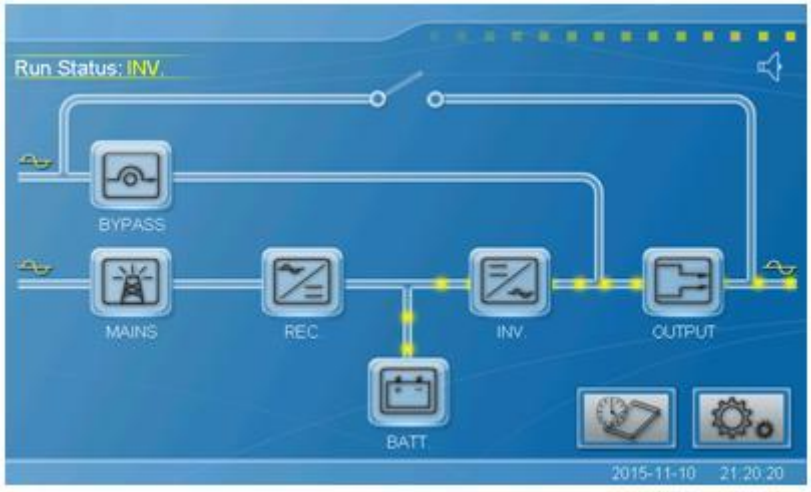


Figure4-6 Battery inverting status

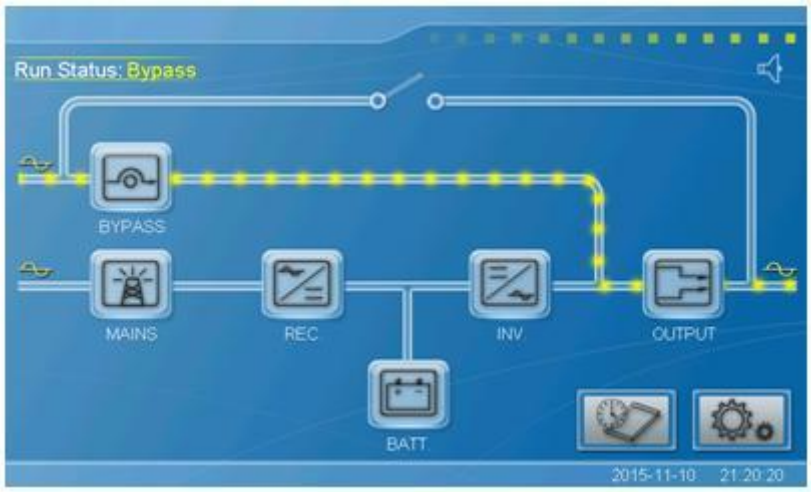


Figure4-7 Bypass output status

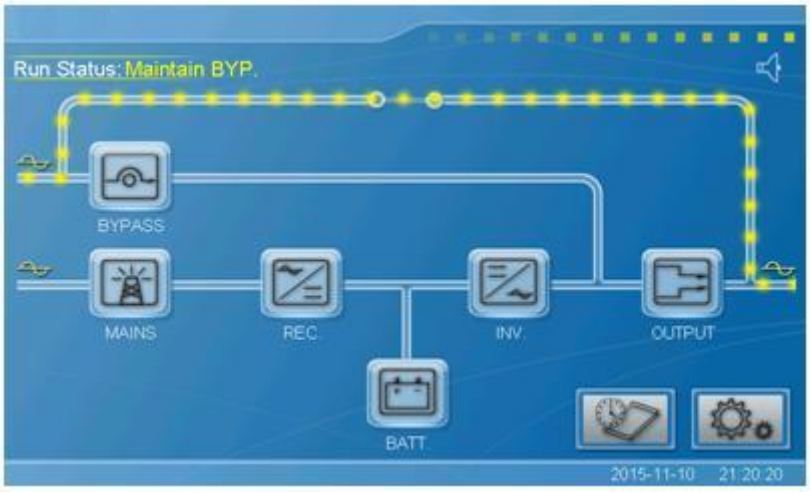


Figure4-8 Maintenance bypass output status

4.2.3 Bypass Information

In the monitoring page, click  icon and it will enter bypass information page. It shows phase voltage, line voltage, frequency. If setting the delayed start bypass, it will shown "Delayed start bypass in progress, as shown in Figure4-9.

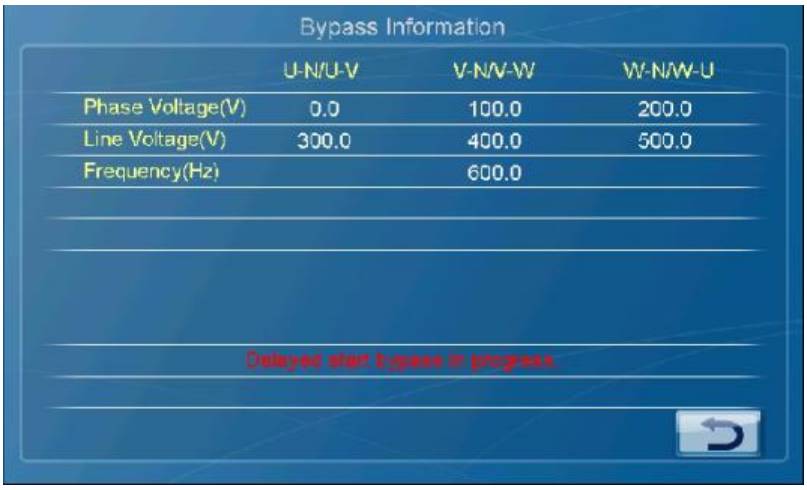


Figure4-9 Bypass information page

4.2.4 Mains Information Page

In the monitoring page, click  icon and it will enter mains information page. It shows line voltage and frequency, as shown inFigure4-10.

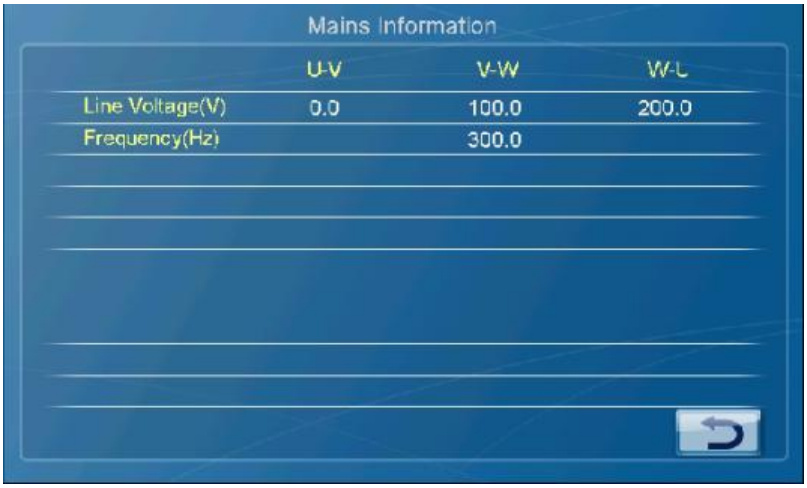


Figure4-10 Mains information

4.2.5 Battery Information

In the monitoring page, click  icon and it will enter battery information page. When battery is discharging, it shows discharge current. When battery is equalizing charging or float charging, it will shows charge current. Besides, the page also shows battery temperature, battery remaining time and battery status, as shown in Figure4-11. If it exists battery under-voltage alarm and the battery remaining time is less than 10 minutes, the battery remaining time shows battery is going to run out and turn off.

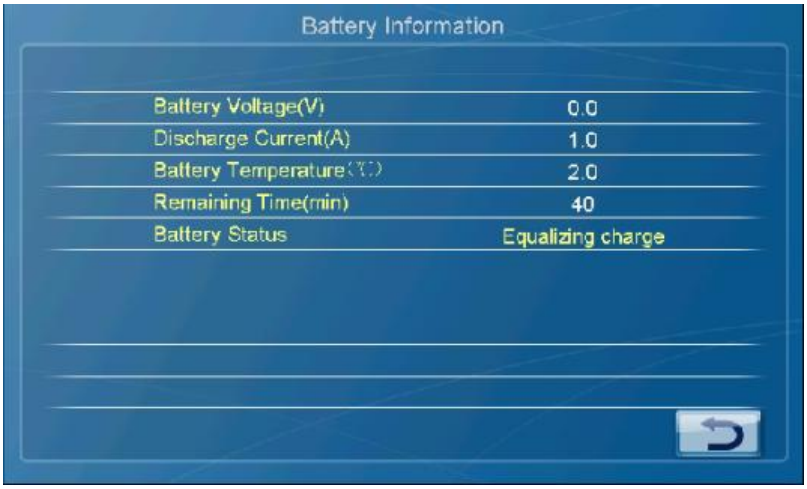


Figure4-11 Battery information page

Battery status shows current battery status. It includes discharging, equalizing charge, flow charge, standard test, depth test and battery loop abnormal.

4.2.6 Output information

In the monitoring page, click  icon and it will enter output information page. It shows phase voltage and load capacity, etc., as shown in Figure4-12.

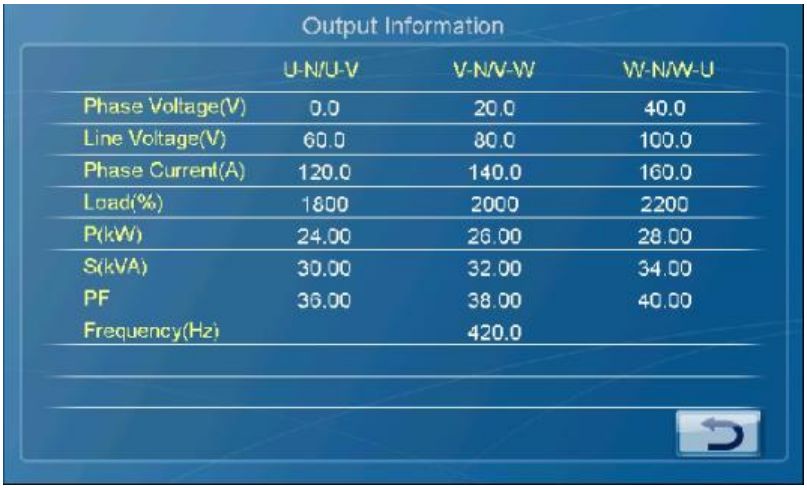


Figure4-12 Output information

4.2.7 Warning Information

When UPS is working, if UPS failure, it will popup the abnormal information window. After closing the window, if you want to view the abnormal information again, click 

icon on the top right corner of monitoring page.

There is buzzer icon on the top right corner of monitoring page. Press it will change the buzzer status, silence or open, as shown in .

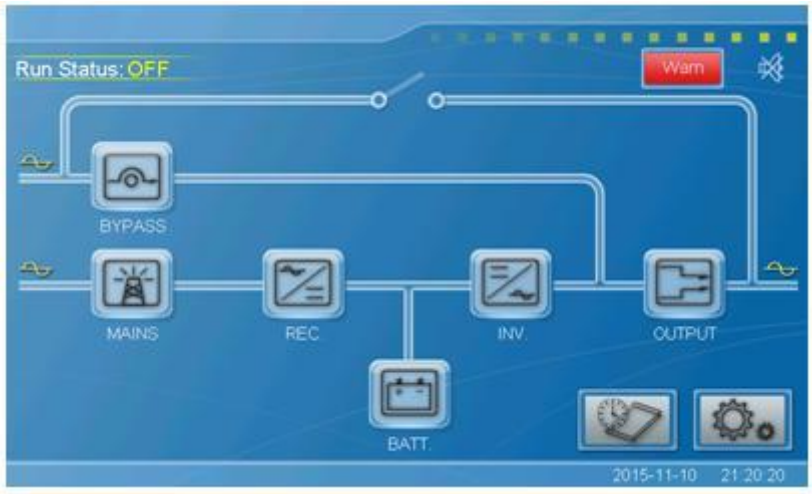


Figure4-13 Buzzer status

4.3 Information Management

In the monitoring page, click  icon and it will enter information management page, as shown in Figure4-14. It shows working status, event log, user log and device information.

Figure4-14 Information management page

4.3.1 Working Status

In the information management page, click **Working Status** icon and it will enter the working status page, as shown in Figure4-15. It shows mains status, bypass status, battery status, load status, fan status, AC/DC status, DC/A status, etc.

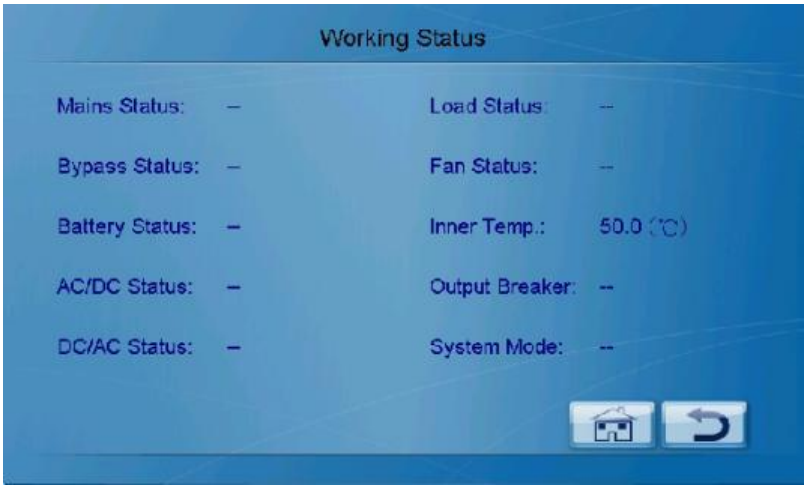


Figure4-15 Working status page

4.3.2 Event Log

In the information management page, click **Event Log** icon and it will enter the event log page, as shown in Figure4-16. It shows history alarm, fault, bypass open, startup, etc. It can use scrollbar to query, as shown in Figure4-16.

Figure4-16 Event log page

4.3.3 User Log

In the information management page, click **User Log** icon and it will enter the user log page. It shows user setting information(setting log with the user authority), as shown in Figure4-17.

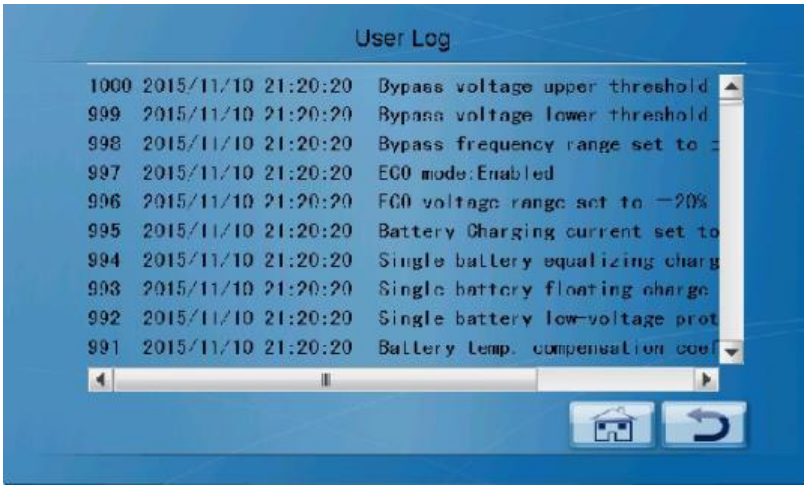


Figure4-17 User log page

4.3.4 Device Information

In the information management page, click **Device Information** icon and it will enter the device information page. It shows product information, manufacture information, version information and

device status. If probation is open, the device status is locked, as shown in Figure4-19. If the probation has not reached and it wants to close the probation, click the unlock icon and it will enter the probation unlock login page. Enter the unlock code, if it is right, it will enter the unlock page, or it will prompt the unlock code is wrong, the login page is as shown in Figure4-20.

Figure4-18 Device information page1

Figure4-19 Device information page2

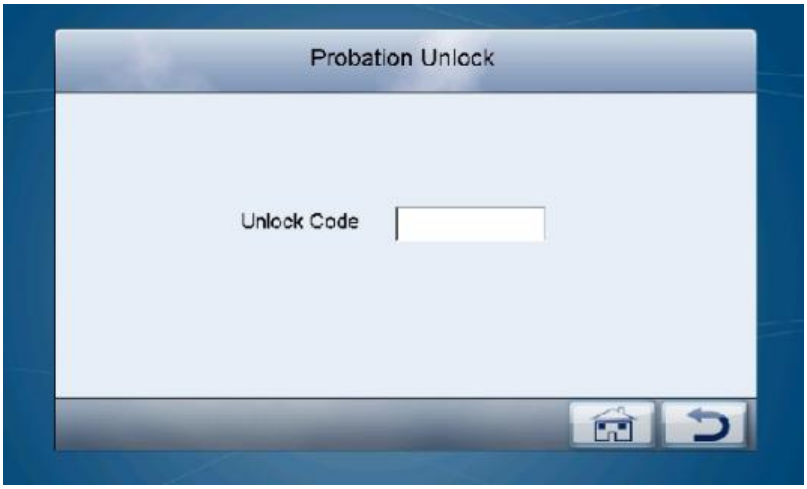


Figure4-20 Probation unlock page

4.4 Setting Management

In the monitoring page, click  icon and it will enter user login page, as shown in Figure4-21. There are two kinds of passwords, read-only authority and settable authority. It can limit the read and write operation by the different authority. In the setting management page, it shows system manage, battery manage, log manage, screen set, password set and communication set, etc. as shown in Figure4-22.

Figure4-21 User login page

Figure4-22 Device management page

4.4.1 System Manage

In the device management page, click **System Manage** icon and it will enter system manage page. In the page, it can set system parameters, such as bypass voltage, bypass frequency range, ECO mode, ECO voltage range, etc., as shown in Figure4-23.

Figure4-23 System manage page

When set a parameter and click save, if set fail, the corresponding item is as shown in Figure4-24. If set success, the corresponding item is as shown in Figure4-25. Other parameter setting result are all like this way.

Figure4-24 Set fail prompting page

Figure4-25 Set success prompting page

4.4.2 Battery Manage

In the device management page, click **Battery Manage** icon and it will enter battery manage page. In the page, it can set battery configuration, battery test, smart mange, as shown in Figure4-26.

Figure4-26 Battery manage page

In the battery configuration page, it can set charge current and temperature compensation, as shown in Figure4-27.

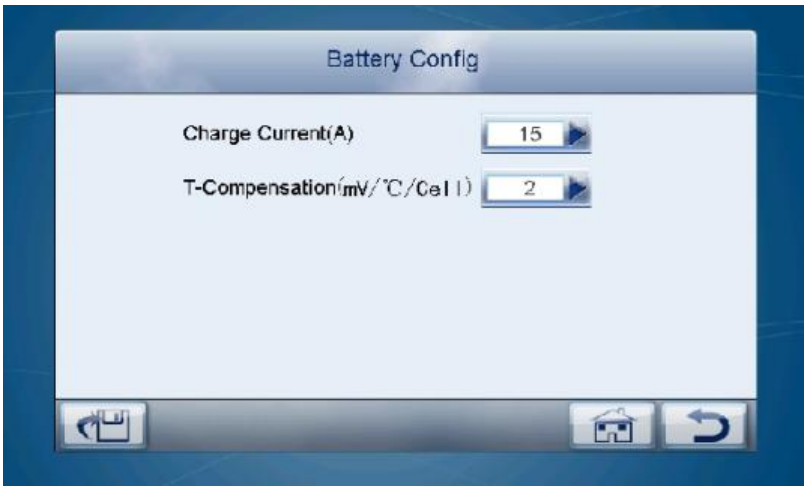


Figure4-27 Battery configuration page

In the battery test page, it can do standard test, depth test or cancel test, as shown in Figure4-28.

Figure4-28 Battery test page

In the smart manage page, it can do battery maintenance, battery loop check and set equalizing charge time, as shown in Figure4-29.

Figure4-29 Smart manage page

4.4.3 Log Manage

In the device management page, click **Log Manage** icon and it will enter log manage page. In the page, it can clear or backup log. When click **clear log** icon, it will popup a window to confirm whether to clear log or not. If yes, it will clear user log, event log and the electrolytic capacitor working time. When click **backup log** icon, the system will self-check whether there has the storage medium. If no, it will popup to prompt that please insert the storage medium and try again. If there has the storage medium, it will prompt it has connected with U-disk in the left bottom corner of window. Click backup icon, it will start backup, as shown in Figure4-30.

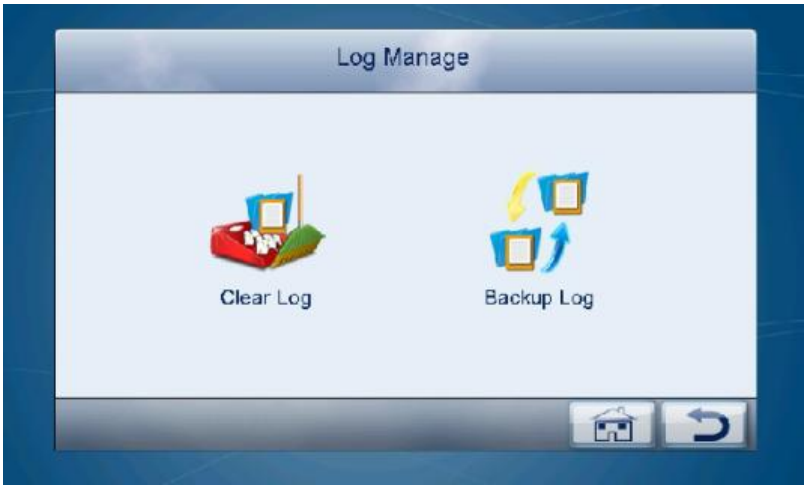


Figure4-30 Log manage page

4.4.4 Screen Set

In the device management page, click **Screen Set** icon and it will enter screen set page. In the page, it can set date, time, language, backlight brightness, etc., as shown in Figure4-31.

Figure4-31 Screen set page

NOTE

Date&time gets from build-in clock.

4.4.5 Password Set

In the device management page, click **Password Set** icon and it will enter password set page. The password set is to protect product. The set password is for the current user. For example, if the username is user, who only can read, the setting is to change the user password, as shown in Figure4-32.

Figure4-32 Password set page

4.4.6 Communication Set

In the device management page, click **Communication Set** icon and it will enter communication set page. In the page, it can set the communication parameters of upper computer, such as local address, baud rate, as shown in Figure4-33.

Figure4-33 Communication set

5 Operation Guide

This chapter mainly introduces operation guide, including checking before startup, UPS operation, manual maintenance operation, parallel system operation, series system operation, etc.

5.1 Checking Before Startup

5.1.1 Check Electrical Connection

No.	Checking item
1	Check if mains switch, bypass switch, output switch, maintenance bypass switch and external battery cabinet switch are all switched off.
2	Check if the total load capacity is in accordance with UPS capacity and load is off.
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, as well as in output.
4	Check if the AC voltage in the input terminal of mains is within the range of rated voltage by multimeter.
5	Check if the DC voltage in the input terminal of battery cabinet switch meets requirement and battery wiring is correct.
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.
10	Check if the cable mark is correct.
11	Check if the wiring is neat and the cable connection is in accordance with specification.

No.	Checking item
12	Check if the installation and wiring are good for system reformation, expansion and maintenance in future.

5.1.2 UPS Test

UPS test: When switching off mains switch, it can simulate the situation that the mains is power off. When the mains is power off, the AC/DC red indicator will turn on and the buzzer will beep slowly.

5.2 UPS Announcements

- Before starting UPS, check whether load is proper. The load capacity shouldn't exceed rated output capacity of UPS to avoid overload protection.
- Don't regard ON/OFF button on the UPS panel as the power switch of load. Don't start UPS frequently.
- When UPS works steadily, it can turn on load. Some devices generate large current when startup, and may lead to overload protection. It is better to start them first. Start the high-power devices first and then the small-power devices. If you want to close UPS, turn off the load first.
- Before starting UPS for the first time, perform checking before power on. If it is ok, power on UPS. If UPS hasn’t been used for a long time, it need to perform checking before power on.

5.2.1 Start UPS

Step 1 Switch on bypass switch.

Power board starts working and touch screen begins initializing. About 10s later, the initialization is finished, the panel and LED works normally.

Step 2 Switch on mains switch.

If mains input is normal, rectifier indicator will be on. About 15s later, the DC voltage has been completely established

Step 3 Switch on external battery cabinet switch.

CAUTION

Before switching on external battery cabinet switch, the bus voltage should be higher than the rated DC input voltage.

After finishing starting rectifier, ensure the float charging/ equalized charging voltage setting match with practical battery parameters.

Step 4 Start inverter system.

When power on, press and hold ON combination button, the green indicator is on. 30s later, finish starting inverter. Check whether the output voltage is the required voltage value.

Step 5 Switch on output switch.

----End

5.2.2 Start Load

Step 1 Observe indicators on the panel to judge working status of UPS. If indicator shows UPS works in the mains inverting status or battery inverting status(refers to **4.2.2 Working Status**), it can supply power for load.

Step 2 If UPS has worked without load for about 10 minutes, start load with the sequence that is "high power device → small power device".

CAUTION

Some devices(e.g. motor type load) generate large current when startup, and may lead to overload protection (or on bypass). It is better to start them first.

----End

5.2.3 Close UPS

Before closing UPS, close load first and keep UPS working without load for 10 minutes to exhaust heat.

Step 1 Turn off inverter.

Press "OFF" combination button to turn off inverter and the  green indicator is off. The bypass power instead of the inverter supplies power for load by static switch automatically.

Step 2 Switch off external battery cabinet switch

If all power of UPS should be closed, please switch off external battery cabinet switch.

Step 3 Switch off mains switch.

After switching off mains switch, the rectifier will not supply DC power for DC BUS from AC mains. The DC BUS will discharge slowly. 10 minutes later, it will discharge completely.

Step 4 Switch off bypass switch.

Before switching off bypass switch, it must ensure the output load aren't work. Otherwise the output will have no electricity, which will lead to the user device power down.

Step 5 When the touch screen and LED are off, switch off output switch (output), UPS will power down completely.

----End

5.3 Manual Maintenance Opeartion

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

NOTE

The maintenance bypass switch of Three-Phase (40kVA-80kVA) series UPS with two inputs is in the switch cover. When maintenance, it should dismantle the switch cover.

CAUTION

The following operations should be performed by professionals. Manufacturer will not take charge of damage which is caused by unauthorized or untrained people.

5.3.1 Transfer From UPS Status to Maintenance Bypass Status

CAUTION

Don't switch on output switch when UPS is on the maintenance bypass status.

Step 1 Transfer from UPS status to maintenance bypass status.

Press the "OFF" combination button, the green indicator is off and the green indicator is on. The UPS works on the bypass status.

Step 2 Before switching on maintenance bypass switch, check whether inverter is turned off. If OK, switch on the maintenance bypass switch. UPS will long buzz and touch screen will show "maintenance bypass open".

Step 3 Switch off mains switch, bypass switch, output switch and external battery cabinet switch. When the panel powers down about 10 minutes, it can do the maintenance.

----End

5.3.2 Transfer From Maintenance Bypass Status to UPS Status

Step 1 Switch on bypass switch and output switch.

Step 2 Switch on mains switch, the green indicator will be on. About 10s later, the rectifier works normally.

Step 3 Switch on external battery cabinet switch.

Before switching on external battery cabinet switch, the bus voltage should be higher than the rated DC input voltage.

Step 4 When green indicator is on, switch off maintenance bypass switch. The " maintenance bypass is open " prompting on the panel will disappear and the UPS will stop long buzzing.

Step 5 Press "ON" combination button, the green light is on and the inverter starts. About 30s later, finish starting inverter and UPS works normally.

----End

5.4 Parallel System Operation

5.4.1 Start Parallel System

CAUTION

Don't turn on load until parallel system powers on completely. Ensure all load switches of load of parallel system are switched off and the wiring for the input and output power is correct.

Step 1 Switch on UPS1 bypass switch, the power board starts working and touch screen begins initializing. About 10s later, the initialization is finished and touch screen and LED show normally.

Step 2 Switch on UPS mains switch.

If the mains input is normal, rectifier will activate automatically and the rectifier indicator will be on. About 15s later, the DC BUS voltage will be established completely.

Step 3 Start UPS1 inverter system.

When startup, press ON combination button. About 30s later, the green indicator is off. Switch on output switch, the indicator is on and UPS1 works normally.

Step 4 Check whether the output voltage and frequency of UPS1 are normal by multimeter.

- Normal=>Step 5
- Abnormal=>Step 12

Step 5 Start UPS2 following the Step 1 to Step 3.

Step 6 Start UPS2 inverter system.

When startup, press ON combination button. About 30s later, the green indicator is off and UPS2 works normally.

Step 7 Check whether the output voltage of UPS2 is normal by multimeter.

- Normal=>Step 8
- Abnormal=>Step 12

Step 8 Check whether the voltage difference of output three-phase of UPS1 and UPS2 is normal by multimeter.

If the voltage difference of output three-phase of UPS1 and UPS2 is less than 10V, the phase-locking is normal in mains, or it is abnormal.

- Normal=>Step 9
- Abnormal=>Step 12

Step 9 Switch off the mains switches of UPS1 and UPS2 and check whether the voltage difference of output live wire of UPS1 and UPS2 is normal.

If the voltage difference of UPS1 and UPS2 is less than 10V, the phase-locking is normal on battery status, or it is abnormal.

- Normal=>Step 10
- Abnormal=>Step 12

Step 10 Switch on the output switch of UPS2 and check whether the three-phase output voltage in parallel is normal by multimeter and clamp meter respectively.

If the voltage is less than 10V, UPS2 output is normal, or it is abnormal.

- Normal=>Step 11
- Abnormal=>Step 12

Step 11 Switch on the output switch of UPS1 and UPS2. Check whether the loop current in parallel is normal by clamp meter.

If the loop current is less than 10A, the output voltage is normal in parallel system, or it is abnormal.

- Normal=>Step 13
- Abnormal=>Step 12

Step 12 Remove fault when power down and redo the Step 1.

Step 13 If all tests are normal, switch on the load switches in the client and finish parallel system startup.

At the moment, parallel system can supply power for load. The power on sequence for load refers to the requirements of single-unit.

----End

5.4.2 Close Parallel System

Step 1 Close all loads and keep UPS running without load for 10 minutes to exhaust heat.

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

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

----End

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

----End

5.4.3 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.

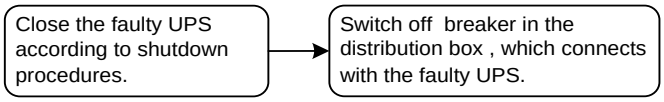


Figure5-1 Remove faulty UPS from parallel system

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.

5.4.4 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.

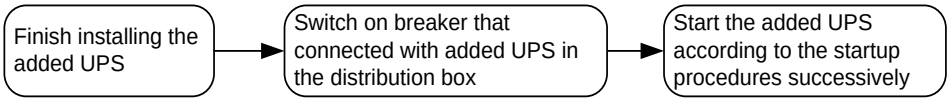


Figure5-2 Add new UPS into parallel system

5.5 Series System Operation

5.5.1 Start Series System

Start UPS1 first and then start UPS2. The startup operation of single-unit refers to 5.2.1 Start UPS.

5.5.2 Close Series System

Close UPS2 first and then close UPS1. The shutdown operation of single-unit refers to 5.5.2 Close Series System.

This chapter mainly describes maintenance guide, daily battery maintenance, replacing battery announcements and troubleshooting.

6 Routine Maintenance

This chapter mainly 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 mains 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, maintenance or replace it in time.

7 Troubleshooting

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

7.1 Identify UPS Status

After turning on UPS, if UPS works abnormally, please refer to Table7-1 to find possible reason. Meanwhile, check whether the fault is caused by external environment, such as temperature, humidity are 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 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 mains switch is switched on and fuse is OK.	—
		Check if the range of mains voltage is normal.	Check the input voltage by multimeter.
		Check if the phase of AC input is wrong.	Change the phase sequence of mains input wire of rectifier.
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 normal.	Reduce load.

No.	Abnormal phenomena	Fault diagnosis and checking items	Solution
3	When mains powers down, UPS halts and has no output.	Check if battery input switch is switched on and battery circuit is abnormal.	Switch on battery switch.
4	Touch screen and LED are off.	Check whether bypass/ mains switch is switched on and power board failure.	Maintain by professionals.
		Whether the power switches are on ON status.	Switch on the power switches.
5	 red indicator is on, and buzzer beeps continuously.	Check if load is short-circuit.	Find the short-circuit point, turn off inverter, and then restart inverter.
		Check if the input mains is power down and battery has under-voltage protection.	When mains is normal, self-start UPS.
6	 indicator is on.	Output is overload.	Reduce load.
7	When UPS powers on normally, it can't output normally.	Check if the SCR drive board of bypass/inverter failure.	Maintain by professionals.
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.	Maintain by professionals.

7.2 Deal with Emergency Fault

When UPS failure, press "OFF" combination button to shut down UPS, connect maintenance bypass and switch off the input/output switch of UPS, which is to supply power for load and avoid UPS damage again. If necessary, close load. Besides, contact with the local professionals to maintain it in time.

8 Package, Transportation, Storage

This chapter mainly describes package, transportation, storage.

8.1 Package

The package of product is carton. When packing, pay attention to the placing direction requirements. On the sides of carton, it should print warning icons, including keep dry, handle with care, this end up, stacking layer limit, etc. and the device model. Print the logo of company, direction mark, ISO authentication on the front and rear of the carton.

8.2 Transportation

Pay attention to warnings on the carton .Don't impact severely when transportation. In case of UPS damage, it should follow the placement that shows on the carton. Don't carry UPS with the objects that inflammable, explosive, or corrosive. Don't put UPS on the open-air storage when midway transshipment. Leaching and mechanical damage by rain, snow or liquid objects is prohibited.

8.3 Storage

When storing UPS, it should follow the placement that shows on the carton. The gap is 20cm between the carton and ground and the clearance is at least 50cm from carton to wall ,heat source, cold source, windows or air inlet.

The storage environment temperature is -20～50℃. The relative humidity is 0%～95%. In warehouse, It's prohibited that there has poisonous gas, objects that inflammable and explosive, corrosive chemical objects. Besides, it shouldn't have too strong mechanical shaking, impact and strong magnetic field. Under the storage conditions above, the storage period is six months Beyond six months, it has to recheck. When long term storage ,it should charge battery every three months

A Technical Specifications

Index \ Model			Three-Phase (10kVA-160kVA) UPS									
Input features	Rectifier	Rated input voltage(V AC)	380/400/415(L-L)									
		Input voltage range(V AC)	±25%									
		Phase	Three phase four line + PE									
		Input frequency(Hz)	40~70									
	Bypass	Rated input voltage(V AC)	380/400/415(L-L)									
		Bypass synchronization tracking range(Hz)	50/60 ±10%(Optional ±5%)									
		Phase	Three phase four line + PE									
Output feature	Rated power(kVA/kW)		10/ 9	15/ 13.5	20/ 18	30/ 27	40/ 36	50/ 45	60/ 54	80/ 72	100/ 90	120/ 108	160/ 144
	Voltage(V AC)		380/400/415 ±1%									
	Frequency(Hz)		Synchronization status, track the bypass input (Normal mode) 50/60 ±0.1%(Battery mode)									

Index \ Model			Three-Phase (10kVA-160kVA) UPS
	Wave form		Sine wave, THD<2% (Linear load)
	Transfer time(ms)		＜1ms(Transfer from inverting mode to bypass mode) 0ms(Transfer from mains mode to battery mode)
	Overload capacity	Inverting status	125% rated load: 10min later, turn to bypass.
			150% rated load: 1min later, turn to bypass.
			170% above rated load: turn to bypass immediately.
		Bypass status	130% below rated load: Long time working
			130%-170% rated load: 10min later, turn off bypass.
			170%-200% rated load: 1min later, turn off bypass.
			200% above rated load: turn off bypass immediately.
	Output method		Copper bar
Environment	Operating temperature		-5℃~40℃
	Storage temperature		-20℃~+55℃ (As the temperature of transportation and storage is -20℃, it is necessary to set UPS alone for increasing temperature to 0℃ and keep it for more than 4 hours before starting UPS.)
	Relative humidity		0%~95%(with no condensation)
	Operating altitude		The operating altitude should be lower than 1000m. If exceeding 1000m, it need to decrease the rated power according to GB/T 7260.3.
	Noisy(dB)		＜65dB(A)
Standard	EMC		IEC 62040-2 CLASS C3
	Safety standard		IEC 60905-1、IEC 62040-1-1、UL1778
	Design and test		IEC 62040-3

Index \ Model		Three-Phase (10kVA-160kVA) UPS										
Mechanical feature	Dimensions (mm) (Width*Depth*Height)	500*600*1180				500*800*1600				700*800*1800		
	Weight(kg)	230	250	260	300	400	430	450	520	600	650	825
Other features	Alarm function	Mains abnormal, UPS failure, battery under-voltage, output overload, etc.										
	Protection function	Battery under-voltage protection, overload protection, short-circuit protection, over-temperature protection, input over-voltage or under-voltage protection, etc.										
	Communication function	Support RS485, SNMP, dry contact communication.										

- Specifications are subject to change without prior notice.

B Acronyms and Abbreviations

A

AC	Alternating Current

D

DC	Direct Current
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

POWER SOLID

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