Uninterruptible Power Supply (10K-30K)

User Manual

Foreword

Summaries

Thank you for choosing the 10-30K series Uninterruptible Power Supply!

This document gives a description of the 10-30K series uninterruptible power supply(hereinafter referred to as UPS), including the features, performance, appearance, structure, working principles, installation, operation and maintenance.

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

NOTE
The figures in this manual are just for illustration, details please take the actual product as standard.

Suitable Model

- 10kVA
- 15kVA
- 20kVA
- 30kVA

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 meaningas follows.

Symbol	Description
DANGER	Alerts you to a high risk hazard that will, if not avoided, result in serious injury or death.
WARNING	Alerts you to a medium low risk hazard that could, if not avoided, result in moderate or minor injury.
CAUTION	Alerts you to a low risk hazard that could, if not avoided, result in minor injury.

Symbol	Description
	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.

Contents

1 Safety Description

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

1.1 Safety Announcements

Thissection 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 thissection carefully to avoid accident.

The DANGER, WARNING, CAUTION, etc. in the manual are not all the safety announcements that you must abide by, they are just the supplements forthe 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

There exists high temperature and high voltage inside the UPS. During using, please strictly comply with all warnings and operation instruments on the UPS and in the user manual.

DANGER

In case of fire, please use the fire extinguisher which is suitable for li-ion battery system.

CAUTION

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

- No liquid or other objects are allowed to enter the UPS.
- UPS must be well grounded.
- In case of fire, please use dry power fire extinguisher. If using liquid fire extinguisher, it may cause electric shock.

1.1.2 Use Announcements forBattery

CAUTION

Before using, please confirm that the charge voltage of S^{3}li-ion battery system matches that of connected UPS. If any question, please consult the manufacturer to support.

- Only authorized professional can replace battery. Do not wear conductive objects, such as watches, bracelets and rings during operating.Wear rubber shoes and gloves and use tools with insulated handle.
- Don't put tools or other conductive objects on the battery.
- It is prohibitedto short the positive pole and negativepoleof the battery or connect them reversely, which is to avoid fire or electric shock.
- The battery must be with the same type, model and manufacturer.
- Battery should be kept away from fire source or other electrical equipment that may easily cause sparkto avoid human injury.

- Don't open or destroy the battery. The electrolyte in the battery includes some dangerous objects, such as strong acid, which will be harmful to skin and eyes. If it is careless to touch the electrolyte, clean it by a lot of water immediately and then check it in the hospital.
- The waste battery should be disposed according to the local regulations.

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.

1.2 Operation and Maintenance Requirements

CAUTION

Only authorized professionals are allowed to open the UPS chassis, or it may cause electric shock and the caused UPS fault is out of the guarantee range.

- If UPS needs to be moved, rewired or maintained, disconnect all electrical connection, such as AC power, battery power, etc. to isolate power input. Do not do any work on the UPS until it is powered off completely (≥10min). Otherwise, the output may haveelectricity, which may cause electric shock.
- When dismantling fan, do not put fingers or tools in to the rotating fan to avoid device damage or human injury.

1.3 Environment Requirements

DANGER

Do not put the UPS in the environment where has inflammable, explosive gas or smog, do not do any operation in thisenvironment.

- Do not use the UPS in the place where has direct sunshine, rain or wet.
- The normal work temperature of UPS is 0℃~+40℃, relative humidity: 0%-95%RH, with no condensation (recommended work temperature is 20℃~25℃, humidity is about 50%).
- Put the UPS in the flat floor without vibration and the vertical gradient is less than 5°. Keep good ventilation around the UPS. The clearance between the rearorthe side of UPS and adjacent devices or wall should be at least 300~500mm(11.9~19.7in). Poorventilation will rise temperature inside UPS, which will reduce the service life of inner components and even affect the life spanof the UPS.
- The UPS must be used below2000m.
- Avoid installing UPS in environments with direct sunlight, dust, volatile gases, corrosive substance and high salinity.
- Do not install UPS in an open-air environment, the installation environment of S³ li-ionbattery module should meet the S³ li-ionbattery module specification.
- It is strictly forbidden to install the UPS in environment with metal conductive dust.

⚠ CAUTION

The optimal operating temperature for the battery is 20℃~30℃. Working at a temperature higher than 30℃ will shorten the battery life, and working at a temperature below 20℃ will shorten the battery's backup time.

2 Overview

Thischapter mainly introduces the UPS's features, structure, work principle, etc.

2.1 Product Introduction

10-30K series UPSis whole high frequency, pure online, double-conversion, smart product. The system is perfect power security forfile server, enterprise server, center server, micro-computer, concentrator, telecom system, data center and others that require high quality power protection.They are widely used in many key business areas, such asfinance, network, stock, Oil & Gas, industrial power, electric power, automobile, etc.

2.1.1 Features

Completely digitalized smart control

The UPS can monitor the grid frequency (50Hz/60Hz) and self-adapt the frequency.The output voltage can be set to 110V/115V/120V/127V, which makes the use more flexible.

Energy savingand high efficiency

Adopts three-level inverter technology and PFC control technology, the output voltage wave is perfect and the whole efficiency can be 94%, the input power factor is greater than 0.99, which greatly improves the use ratio of electric energy and reduces the load of power grid.

Smart fan speed control

The fan speed is adjusted automatically in accordance with the load status, which prolong fan life and reduce noise.

ECO energy saving mode

The UPS is designed with ECO energy saving mode. When the grid is good, if the UPS operating in thismode, the bypass prior to output, and the efficiency can be 98%.When the bypass voltage or

frequency out of normal range and cannot satisfy the user's power supply requirement, it will switch to inverter output, which guarantee the reliability of power supply and also, save energy.

Low mains input voltage

Adopt the independent rapid detection technology. When output load is small, even the mains voltage is 70V, which is the mainslow limit, the battery still doesn't discharge. Therefore, in the mains mode, all output power gets from the grid, which is to ensure the battery in 100% energy storage status, and at the same time, reduce the battery discharge times and prolong the service life.

2.1.2 Appearance

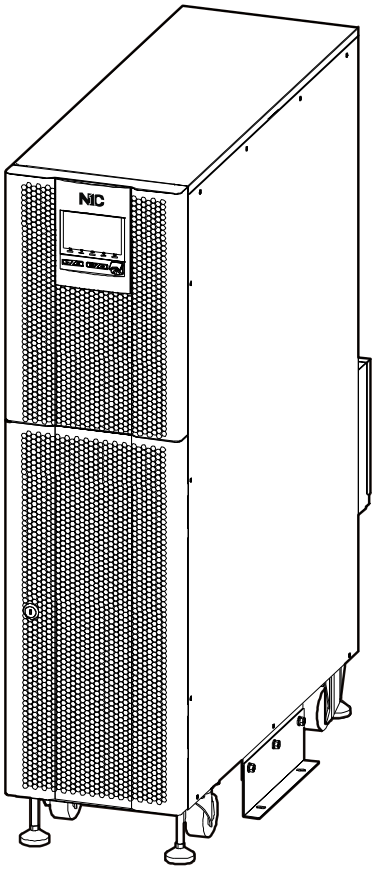


Figure2-1 Appearance

Operation panel

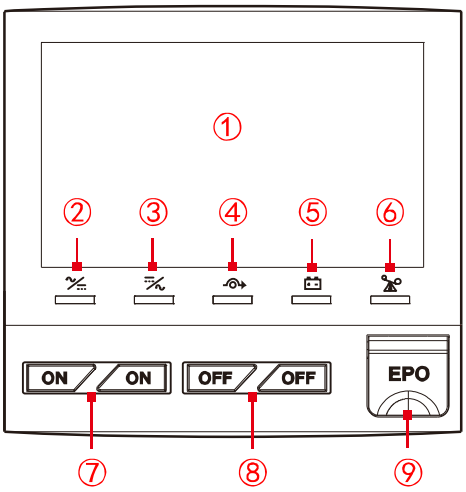


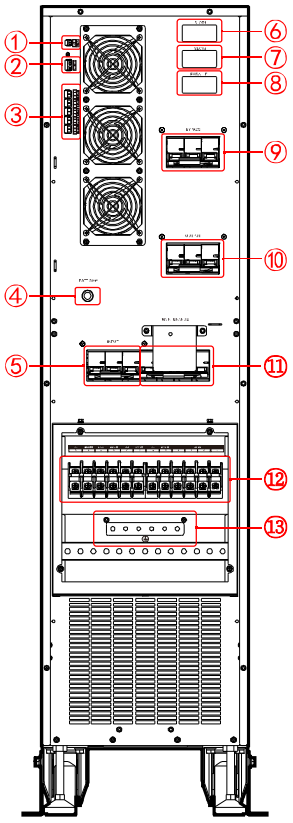
Figure2-2 Operation panel

Table2-1 Illustrationfortouch screenoperation panel

No.	Name	Illustration
Illustration foroperation panel		
①	Touch screen display	Shows the working status and system setting.
②	AC/DCindicator	On (green): rectifier works normally; On (red): rectifier abnormal.
③	DC/ACindicator	On (green): inverter works normally; On (red): inverter abnormal.
④	BYP.indicator	On (green): bypass output; On (red): bypass abnormal.
⑤	BATT. LOW indicator	On (red): battery is low-voltage.
⑥	OVERLOADindicator	On (red): output is overloador overload protection.
Buttons operation instructions		
⑦	"ON" combination button	Press a couple "ON"buttonsfor1s at the same time, the system will power on.
⑧	"OFF"combination button	Press a couple "OFF" buttonsfor1s at the same time, the system will power off.

No.	Name	Illustration
⑨	EPOemergency power offbutton	Press the button, the system will power outage immediately.

Rear panel



① RS485
② EPO+Input dry contact
③ Output dry contact
④ Battery start button
⑤ Input
⑥ Intelligent slot 1
⑦ Intelligent slot 2
⑧ Parallel port
⑨ Bypass breaker
⑩ Output breaker
⑪ Maintenance breaker
⑫ AC wiring terminals
⑬ PE

Figure2-3 Structure of rearpanel

NOTE

1. When connectingexternal battery, the UPScan be directly connected to external battery through wiring terminals.
2. The battery start operation: press "BATT. Start" button and wait forthe buzzer sounds7s, and then the system establishesauxiliary power and then start ON operation, the device will start up.

CAUTION

1. Battery start only works in thiscase: the UPS power on through battery power when there is no mains power.

2. The gate controlled switch release automaticallywhen dismantle the maintenance breakercover plate, closes automaticallywhen reinstallthe cover plate.
3. Operation method of maintenance bypass mode: firstly, dismantle the cover plate of maintenance breaker, the door control switch formaintenance bypass detection pops up automatically, the UPS turns off the inverter and switches to bypass mode. Switch on the maintenance bypass breaker and then switch off the input breaker, bypass breaker and output breaker. Meanwhile, the maintenance bypass power forload, and the UPS input and output power are all disconnect, so the UPS can dismantle wire formaintenance.
4. Operation method of restoring maintenance bypass mode to inverter mode: switch on input breaker, bypass breaker and output breaker in turn. When UPS working power is normal and touch screen has display bypass output voltage, switch off maintenance bypass breaker. Reinstall maintenance bypass breaker cover plate. Finally, press ON combination button on UPS panel to start UPS inverter power.

2.1.3 Li-ion Battery Module

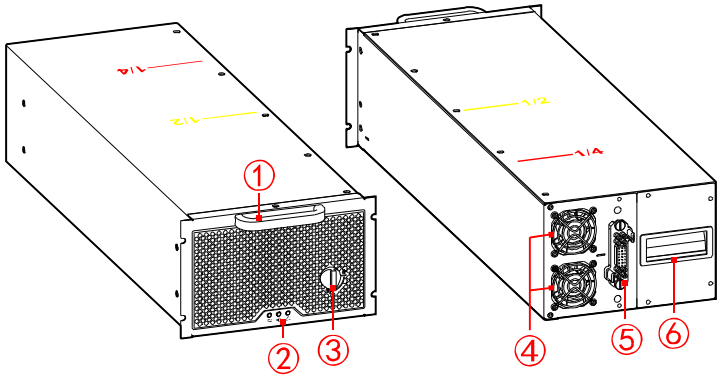


Figure2-4 Li-ion battery module appearance

Table2-2 Component illustration of li-ion battery module

No.	Name	No.	Name
①	Front handle	④	Fan
②	Indicator	⑤	Output connector
③	ON/OFF switch	⑥	Handle

NOTE

- At the top of the battery module, there is position marks. The yellow "1/2"means half of the module. The red "1/4"means quarter of the module.

- When the ON/OFF knob stay in status, the module is not locked with cabinet, and the module can be dismantled.
- When the ON/OFF knob stays in status, the module is locked with cabinet, and the module cannot be dismantled.

CAUTION

When the ON/OFF knob is stays in status, the module starts to output automatically, and the output is with DC voltage.

Table2-3 Indicator illustration

Mark	Name	Color
	Run indicator	Green
	Alarm indicator	Yellow
	Fault indicator	Red

Table2-4 Indicator status illustration

Status \ Indicator	Run	Alarm	Fault
Charge			
Discharge			
Sleep			
OFF			
Module alarm	-*		
Communication abnormal	-		-
Module protection			

Indicator / Status	Run	Alarm	Fault
Battery abnormal			

NOTE

"*"means that the indicator stay in any status.

, , means that the corresponding indicator is on.

, , means that the corresponding indicator flickers once every 1 second.

means that the alarm indicator flickers once every 3 seconds.

, , means that the corresponding indicator is off.

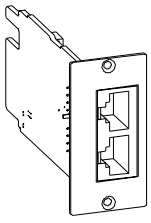
2.1.4 Communication

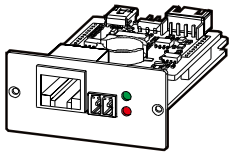
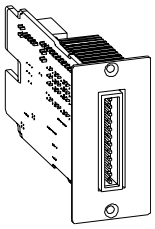
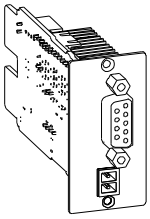
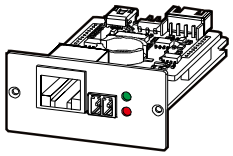
The supported communication method of thisseries UPS include RS485, Parallel Kit-T (2m) NT-PA, communication dry contact, Dry-contact Kit (Y5) NT-RS485Y5, Protocol Transfer Kit NT-MODBUS and SNMPcard.

Table2-5 Communication method correspondence with hardware port

Communication method	Communicationport
RS485	RS485
Dry contact	Dry contact 1: output dry contact (OUT.1~OUT.5); Dry contact 2: input dry contact (EPO+IN.1)

Table2-6 Communication method correspondence with hardware port

Communication method	Sketch map	Communicationport
Parallel Kit-T (2m) NT-PA (optional)		Parallel port

Communication method	Sketch map	Communicationport
SNMPcard (optional)		Slot 1
Dry-contact Kit (Y5) NT-RS485Y5 (optional)		Slot 2 (choose any one)
Protocol Transfer Kit (optional)		
SNMPcard (optional)		

RS485

The UPS adopt RS485 series port to communicate with PC. The corresponding pin relationship of RS485 port between UPS and PC is as shownTable2-7.

Table2-7 The corresponding pin relationship of RS485 port between of UPS and PC

RS485 port of UPS	RS485 port of PC
A	A (+)
B	B (-)

NOTE
The standard RS485 communication ports of rear panel cannot communicate normallywhen slot2 uses optional communication card.

Dry contact

The control of dry contactsignal or alarm information can be achieved by communication dry contact. Dry contact function can be set through the touch screen.

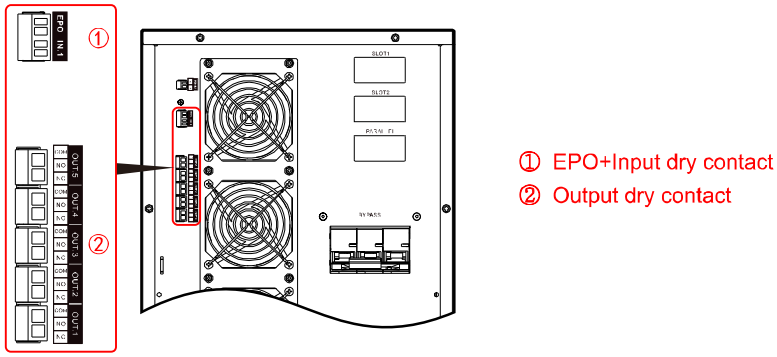


Figure2-5 Dry contactposition

CAUTION

Relay dry contact capacity is 277Vac/30Vdc/10A, relay coil voltage is 12V.

Table2-8 Dry contact functions illustration

No.	Silk-screen		Functionillustration	Remarks
Dry contact 1	OUT.1	NC	Trigger actionwhen signal is valid: NO and COM is connect, which disconnect with NC. The signal is settable and refers to the note fordetail. Default is mains abnormal.	NC: normal close; NO: normal open; COM: common port.
		NO		
		COM		
	OUT.2	NC	Trigger actionwhen signal is valid: NO and COM is connect, which disconnect with NC. The signal is settable and refers to the note fordetail. Default is bypass abnormal.	
		NO		
		COM		
	OUT.3	NC	Trigger actionwhen signal is valid: NO and COM is connect, which disconnect with NC. The signal is settable and refers to the note fordetail. Default is battery abnormal.	
		NO		
		COM		
	OUT.4	NC	Trigger actionwhen signal is valid: NO and COM is	

No.	Silk-screen		Functionillustration	Remarks
		NO	connect, which disconnect with NC. The signal is settable and refers to the note fordetail. Default is output abnormal.	
		COM		
	OUT.5	NC	Trigger actionwhen signal is valid: NO and COM is connect, which disconnect with NC. The signal is settable and refers to the note fordetail. Default is overload alarm.	
		NO		
		COM		
Dry contact 2	EPO		The signal is validwhen 2P terminal block disconnect. The signal is EPO and cannot settable.	-
	IN. 1		The trigger level of signal is settable (NC/NO) and short circuit is valid fordefault. The signal is settable and refers to the note fordetail. Default is charge disabled.	-

NOTE
The settable item and illustrations of the corresponding input and output dry contact is as shown in Table2-9 and Table2-10.

CAUTION

Input dry contact port of EPO must be short circuit, UPS can work normally.

If EPO port is disconnected, UPS shutdown all output of inverter and bypass, meanwhile the display screens report EPO fault. UPS will be release this fault after UPS shutdown totally and this port restoring short circuit.

Table2-9 The settable item and illustrations of input dry contact

NO.	Item	Illustration
1	Charge disabled	The charge disabled signal of battery: The UPS will alarm and turn off the battery charge when receiving this signal. The trigger level of signal is settable.

NO.	Item	Illustration
2	External MBBon	The breaker on signal of external maintenance bypass: The UPS will alarm and turn off the inverter output and switch over bypass output when receiving thissignal. The trigger level of signal is settable.
3	External BBstatus	The breaker disconnected signal of external battery: The UPS will alarm and prompts fault when receiving thissignal. The trigger level of signal settable.
4	UPS remote ON/OFF	The remote ON/OFF signal of UPS: The UPS will on when receiving this signal. The trigger level of signal is settable.
5	Batt. ground fault	The fault signal of battery ground: The UPS will report an alarm and prompts fault when receiving this signal. The trigger level of signal is settable.
6	Discharge disabled	The discharge disabled signal of battery: The UPS will report an alarm and prohibits the battery discharge when receiving this signal. The trigger level of signal is settable.

Table2-10 The settable item and illustrations of outputdry contact

NO.	Item	Illustration
1	Mains abnormal	When mains grid is abnormal, the signal is valid and triggers action of dry contact.
2	Bypass abnormal	When bypass is abnormal, the signal is valid and triggers action of dry contact.
3	Battery abnormal	When battery is abnormal, for example: battery low-voltage, battery over-voltage, battery over-temperature and battery disconnected, the signal is valid and triggers action of dry contact.
4	Output abnormal	When output is abnormal, the signal is valid and triggers action of dry contact.
5	Overload abnormal	When bypass or inverter of UPS is overloaded, the signal is valid triggers action of dry contact.

NO.	Item	Illustration
6	General abnormal	When the UPSis alarmingforfault, the signal is valid and triggers action of dry contact.
7	Normal operation	When the UPSis in the normal operation, the signal is valid and triggers action of dry contact.
8	Battery operation	When the UPSis in the battery operation, the signal is valid and triggers action of dry contact.
9	Bypass operation	When the UPS is in the bypass operation, the signal is valid and triggers action of dry contact.
10	UPS ON/OFF status	When the UPS is in onstatus, the signal is valid and triggers action of dry contact.
11	Battery low	When battery is low voltage, the signal is valid and triggers action of dry contact.
12	ECO mode	When the UPS output mode is ECO, the signal is valid and triggers action of dry contact.
13	Fan fault	When fanis abnormal, the signal is valid and triggers action of dry contact.

Parallel port

The Parallel Kit-T (2m) NT-PA has been built-in the parallel port, which is used in single mode bydefault, and the parallel mode was set to single mode at touch screen. If parallel operation isrequired, please set the device to the corresponding parallel mode, such as redundancy or expand. See the screen setting fordetailsrefer to **4.5.7 Device Configuration Page** of touch screen.

Intelligent slot 1

SNMP card: Built-in card and configuration protocol through webpage.Through the web configuration protocol to meet the use of different models or different communication protocols.

Click "**Management>Device management>Network adapter**>**Power**>**UPS**" to enter the UPS list page, then click "**Edit**" button to enter the "**Device management parameters**" page, the **Communication protocol** is setto WRWF-1201-04_3I3O.

Click "**Setting**>**Serialport setting**" to enter the serial port list page, the **Interface standard** is setto RS232, **Baud rate** is setto 9600, **Data bit** is setto 8, **Stopbit** is setto 1, **Verification method** is setto No check.Communication can only be performed normally after the setting is completed.

Intelligent slot 2 (optional)

1. Dry-contact Kit (Y5) NT-RS485Y5 (optional): Built-in card. Three output dry contacts: mains status, battery statusand inverter status (configurable as bypass output status). Two input dry contacts: battery temperature sampling status (temperature compensation), battery breaker status (configurable asremote ON/OFFstatus).
2. Protocol Transfer Kit NT-MODBUS (optional): Built-in card. One route forRS485 communication, reserved for li-ionbattery communication (2P green terminalblock); the other routes forRS485+RS232.Only one can be selected forcommunicate (DB9terminalblock).
3. SNMP card (optional): Built-in card and configuration protocol through webpage.Through the web configuration protocol to meet the use of different models or different communication protocols.

   Click "**Management>Device management**>**Power**>**UPS**" to enter the UPS list page, then click "**Edit**" button to enter the "**Device management parameters**" page, the **Communication protocol** is setto WRWF-1201-04_3I3O.

   Click "**Setting**>**Serialport setting**" to enter the serial port list page, the **Interface standard** is setto RS232, **Baud rate** is setto 9600, **Data bit** is setto 8, **Stopbit** is setto 1, **Verification method** is setto No check.Communication can only be performed normally after the setting is completed.

NOTE
Please see the installation guide of corresponding optionalcommunication cardformore details.

2.2 Work Principle

2.2.1 Work Principle Diagram

Work principle diagram of the UPS is as shown in Figure2-6.

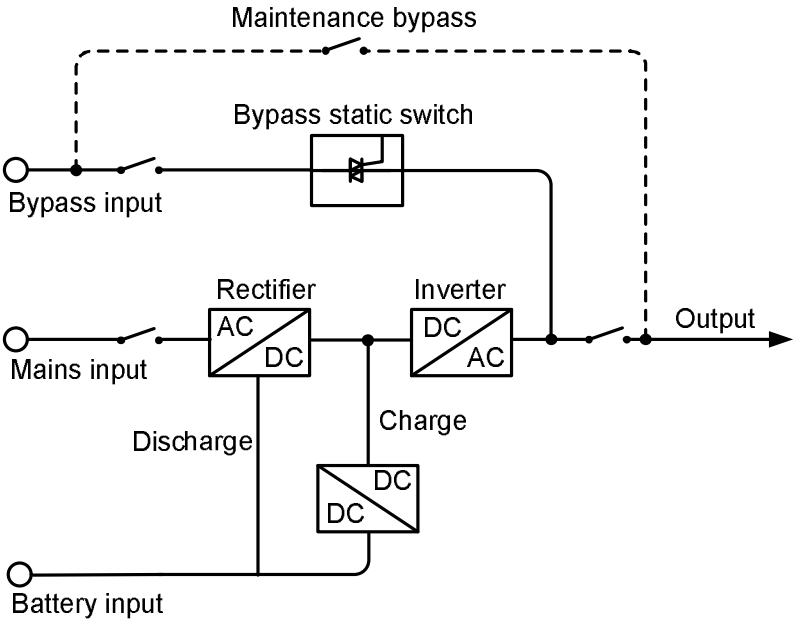


Figure2-6 Work principle diagram

The 10-30K seriesUPS includes rectifier/PFC, inverter, charger, bypass static switch etc function module, the input power includes mains input, bypass input, battery input, the output mode includes inverter output, bypass output and maintenance bypass output (if equipped).

When mains is normal, the rectifier starts and the charger charges the battery at the same time. When UPS off, if bypass is normal, the system turns to bypass output; when UPS on, the mains boosts by rectifier/PFC and output DC bus voltage, and then go through inverter and output pure sine-wave AC power, the output turns to inverter output to load from bypass output (if equipped).

When mains is abnormal, the battery voltage boosts by rectifier/PFC and output DC bus voltage, and then go through inverter and output pure sine-wave AC power to load. When mains recover normal, the UPS turns to mains mode from battery mode automatically.

2.2.2 Work Mode

There are 5 work modes of the UPS: normal mains power supply mode, battery inverter mode, bypass power supply mode, ECO power supply mode and maintenance bypass power supply mode.

Normal mains power supply mode

When mains power is normal, the UPS works in mains inverter status and charge the battery at the same time.The work mode is as shown in Figure2-7.

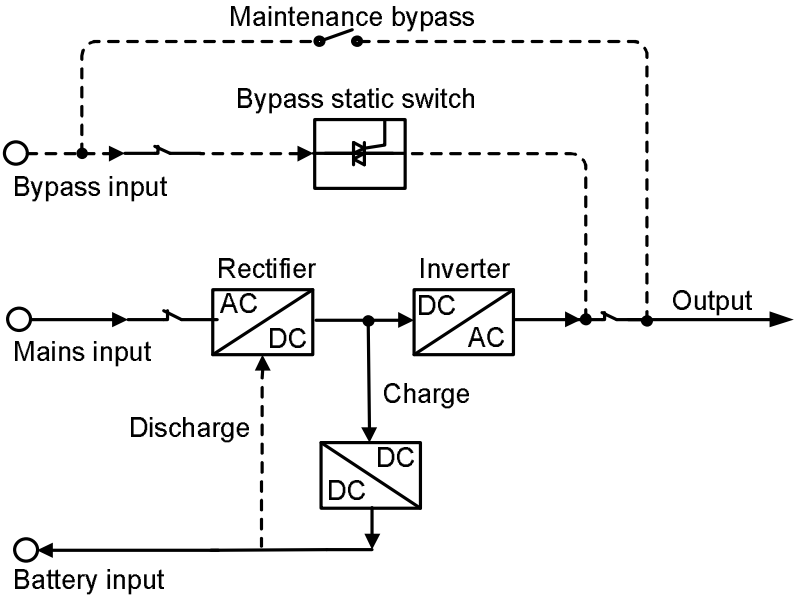


Figure2-7 Normal mains power supply mode (the thick solidline stands forthe energy flow direction)

Battery inverter mode

When mains is abnormal, the rectifier will transfer to battery input immediately, boost the battery voltage and then maintain the voltage of DC bus voltage to guarantee the inverter output continuous.As shown in Figure2-8.

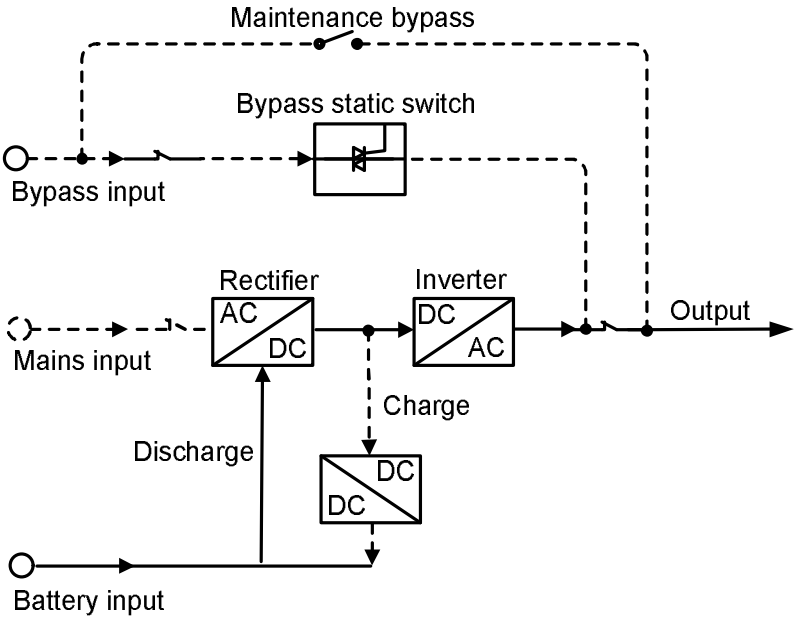


Figure2-8 Battery inverter mode (the thick solidline stands forthe energy flow direction)

Before the battery stop discharging, if the mains recover normal, the rectifier will transfer to mains input automatically and charge the battery at the same time.That is to say, the UPS recover normal

mains power supply mode. If the mains always abnormal and the battery is running up, the UPS will send sound and light alarm and stop working till battery low-voltage point. At that time, the buzzer long beeps to alarm, the power forload powers down. Under the circumstance of mains power outage completely, the UPS will shut down about 1min later automatically and close the power of the UPS to avoid the battery discharge slimly, thus to protect the service life of battery. Once the mains recover, the UPS will start automatically and turn to normal mains power supply mode.

Bypass power supply mode

Under the circumstance of bypass voltage is normal, when UPS off orfault (such as inverter output overload, over-current surge or IGBT over-temperature etc.) while UPS on, the UPS will output by bypass. When UPS on and the fault removed, it will turn to inverter output again. If the same fault occurs more than 5 times in a short time, the UPS protects and output by bypass until power off manually or power down and remove the fault, restart the UPS and then it will recover normal work.

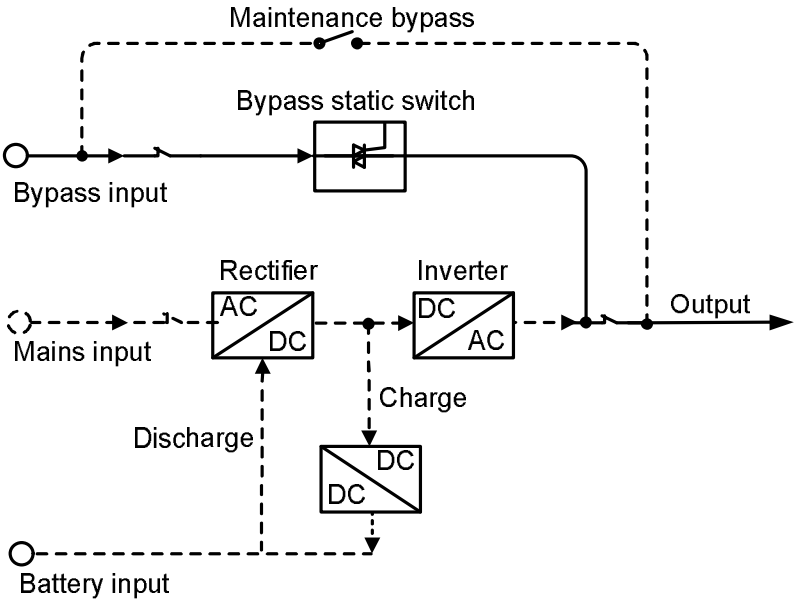


Figure2-9 Bypass power supply mode (the thick solidline stands forthe energy flow direction)

ECO power supply mode (just suitable forsingle UPS)

At the ECO mode, when bypass voltage is normal, the power forload is priorsupplied by bypass, when bypass voltage is abnormal, the power forload turns to inverter. ECO mode is an economic operation mode. Forthe load which does not require high quality, user can select ECO mode to reduce the energy consumption. At the ECO mode, the UPS efficiency canup to 98%.

Maintenance bypass power supply mode

When the UPS needs to be maintained and the power supply forload cannot be interrupted, user can shut down the inverter and make the UPS works in bypass status, the gate controlled switch release automaticallywhen openthe maintenance bypass cover plate, then switch on the maintenance bypass breaker and switch off the mains input breaker and bypass input breaker, output breaker. During the transforming of manual maintenance bypass, AC power is supplied forload by maintenance bypass breaker. At thistime, the inner UPS has no electricity, maintainer can perform the maintenance safely.

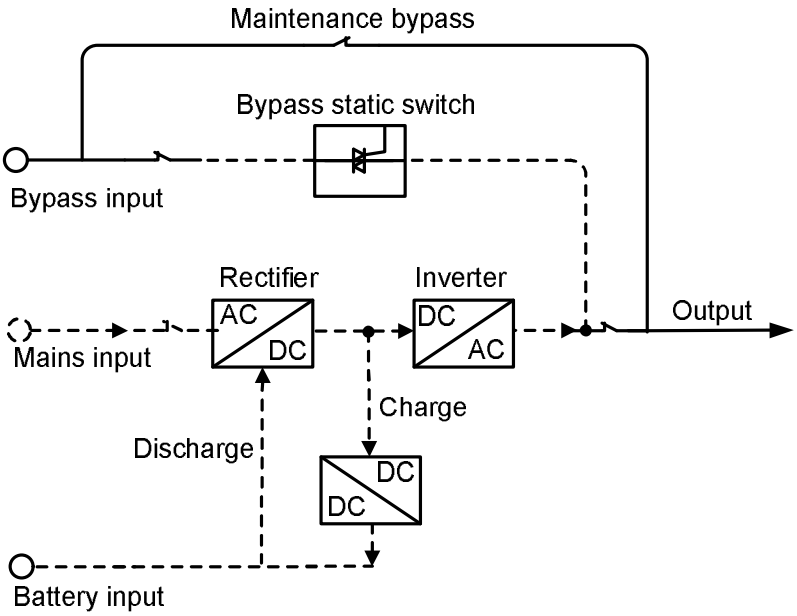


Figure2-10 Maintenance bypass power supply mode (the thick solidline stands forthe energy flow direction)

3 Installation

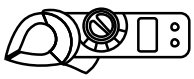
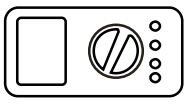
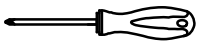
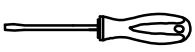
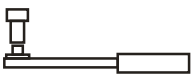
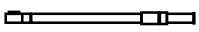
Thischapter mainly introduces the installation of the UPS, including unpacking and checking, cable selection, installation, electrical connection, etc.

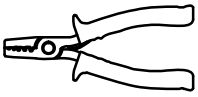
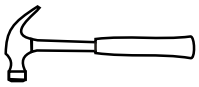
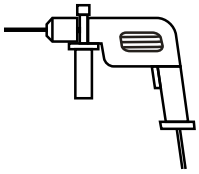
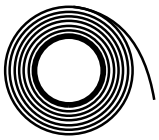
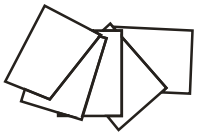
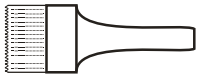
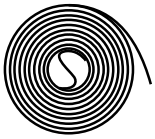
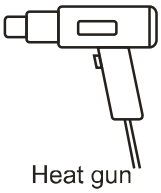
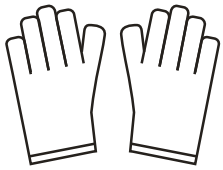
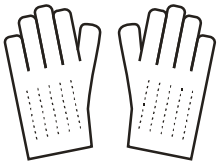
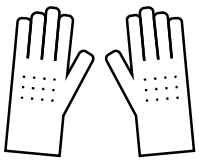
3.1 Announcements

- The installation tools should be withisolated operation, which is to avoid electric shock.
- There exist high-voltage in wiring terminal, please ensure that the wiring terminal with no electricity, and then the wire connection can be done.
- Placethe UPS flat on the ground, avoid tilt and uneven ground.
- DONOT place goods or sit on the UPS.

3.2 Installation Preparation

3.2.1 Tools

Tools			
 Clamp meter	 Multi-meter	 Label paper	 Phillips screwdriver
 Flat-headscrewdriver	 Socket wrench	 Adjustable wrench	 Torque wrench

Tools			
 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

3.2.2 InstallEnvironment

The installation environment of the UPS should be with good ventilation, and far away from water source, heat source and inflammable and explosive objects. Avoid installing the UPS in the place where has direct sunshine, dust, volatile gas, corrosive objects or high salt.

3.2.3 InstallSpace

The installation site should be with enough space to place the device. Maintain a clearance of at least 300mm(11.9in) from rear panel of the UPS to the wall or other device.

3.2.4 Select Breaker & Wires

The selecting forAC input and output wire, and corresponding breakers needs to be judged by the UPS's max. steady state phase current. Table3-1shows the max. steady state phase current of each work mode, Table3-2shows the rated current of recommended breakers, Table3-3shows the min.

recommended wire cross-sectional area. Select the wires and breakers according toTable3-1 to Table3-5.

Table3-1 UPS max. steady state phase current

Type	10kVA	15kVA	20kVA	30kVA
AC input (A)	35.5	65.7	81.7	119.5
Bypass input (A)	35.5	65.7	81.7	119.5
AC output (A)	30.3	45.5	60.6	90.9

3.2.5 Select Input Breaker

We suggest to add a breaker (we suggest to select the breaker with feedback double pole disconnection equipment) that matches the UPS power at the front of the UPS input to insulate the mains. Considering the UPS charge power and the impact current while power on, the selected breaker must be larger than max. current of UPS inputand cannot with leakage protection, which is to avoid wrong action of breaker. The breaker of DC input should be select more than the 500Vdc. The selection of breaker, please reference Table3-2.

Table3-2 Recommended input breaker list

Type	10kVA	15kVA	20kVA	30kVA
AC input (A)	63*3P	100*3P	100*3P	125*3P
Bypass input (A)	63*3P	100*3P	100*3P	125*3P
AC output (A)	63*3P	100*3P	100*3P	125*3P

⚠ CAUTION

Withstanding voltage value of recommended AC and Bypass input breaker and AC output breaker is 250Vac.

3.2.6 Select Wires

For the wire cross-sectional area of AC input and output, please see the recommended value in Table3-3. The cross-sectional area of the following cable is only for reference when the user is

connected wire for a length of about 5 meters. If the length of the lead wire exceeds 20 meters, the cross-sectional area of the conduct or wire shall be increased.

Table3-3 Recommended cross-sectional area of wire (environment temperature: 25℃)

Type	10kVA	15kVA	20kVA	30kVA
Mains input live wire (U/V/W)	10AWG	4AWG	4AWG	2AWG
Mains input neutral wire (N)	10AWG	4AWG	4AWG	2AWG
Bypass input neutral wire (N)	10AWG	4AWG	4AWG	2AWG
Bypass input live wire (U/V/W)	10AWG	4AWG	4AWG	2AWG
Mains output live wire (U/V/W)	10AWG	4AWG	4AWG	2AWG
Mains output neutral wire (N)	10AWG	4AWG	4AWG	2AWG
Grounding wire (PE)	10AWG	4AWG	4AWG	2AWG

Table3-4 Contrast list between wires and wiring terminals

Wire cross-sectional area	Wiring terminal type
10AWG	RVS5.5-5
8AWG	RNB8-10
4AWG	RNBS22-6/RNB22-10
2AWG	RNBS38-8/RNB38-10

The wiring terminals recommend type as shown in Figure3-6. If users have additional terminals required, please check dimensions to ensure proper selectionaccording to Table3-5.

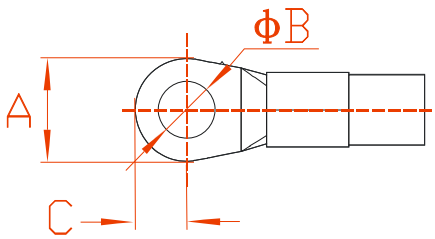


Figure3-6 Dimensions of wiring terminal

Table3-5 Dimensionslimit of wiring terminal

Dimensions	Input/Bypass/Output
A	≤19.5mm (≤0.77in)
B	≥6mm (≤0.24in)
C	≤12mm (0.47in)

NOTE
The equipped wires by our company are all passed the national standard or UL certification, the quality is perfect and meets the requirements of safety standard. Under the condition that the lengthisless than 0.5 meters, part of the wire is slightly smaller than the recommended specification, it can be used normally.

3.3 Transport and Unpacking

3.3.1 Transport

CAUTION

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

The UPS can be transported by forkliftand manual forklift.When lifting the device, the device's center of gravity should be at the centre of the forklift arm. Keep the devices moving slowly and stably.

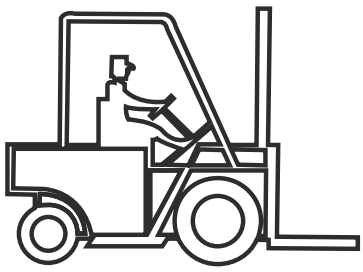


Figure3-2 Forklift transportation

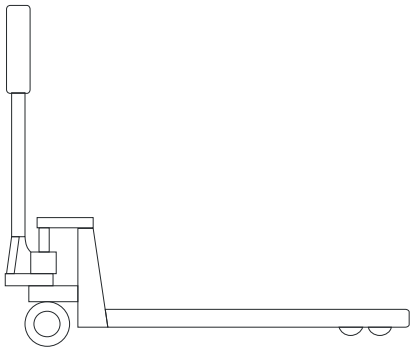


Figure3-3 Manual forklift transportation

CAUTION

1. During transporting, please take care and avoid impact or falling off.
2. During moving, keep the UPS vertical and do not put down or uplift suddenly.

3.3.2 Unpacking

NOTE
Determine the unpacking site in advance. In principle, the unpacking site should be as close as possible to the installation site.

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

Step 2 Transport the UPS to assigned site.

Step 3 Unpack the external package, and take out the fittings.

Step 4 Check the UPS.

- Inspect the appearance 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 fittings are complete and proper. If the fittings lack or model wrong, please take note and contact the local agency of our company.

Step 5 Put the front plate down to become an oblique board.

Step 6 After checking, unscrew the bolts that connected with the UPS and wooden bracket and thesupporting plate by socket wrench, the bolt position as shown in Figure3-4, dismantlethe supporting plate.

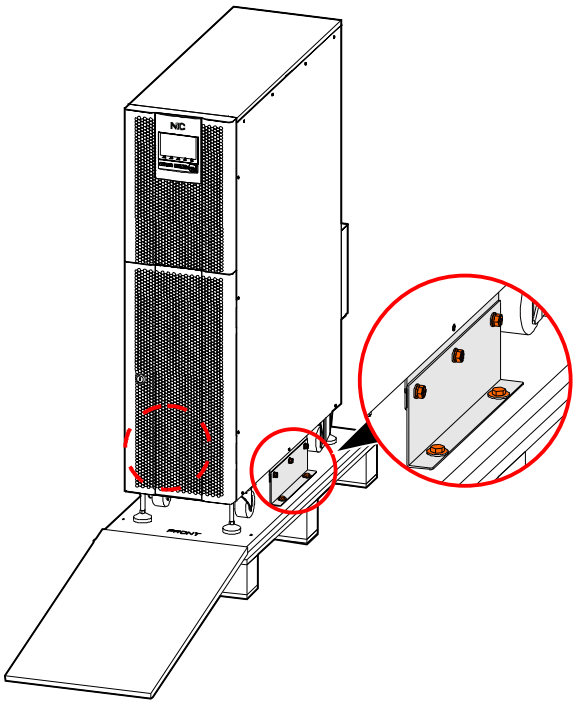


Figure3-4 Bolts position

Step 7 Thenslip the UPS along the oblique board to ground slowly.

CAUTION

During moving, it needs to operate by two people (one at left side and the another at right side) to avoid tilting or human injury.

----End

3.4 Mechanical Installation

3.4.1 UPS Installation

NOTE
In thissection, we take the ground perforation installation as an example, please adjust the installation procedure on the bas is of actual condition.

Step 1 Determine and plan the installation position according to the device size (as shown in Figure3-5) and install space requirement (see**3.2.3 InstallSpace**).

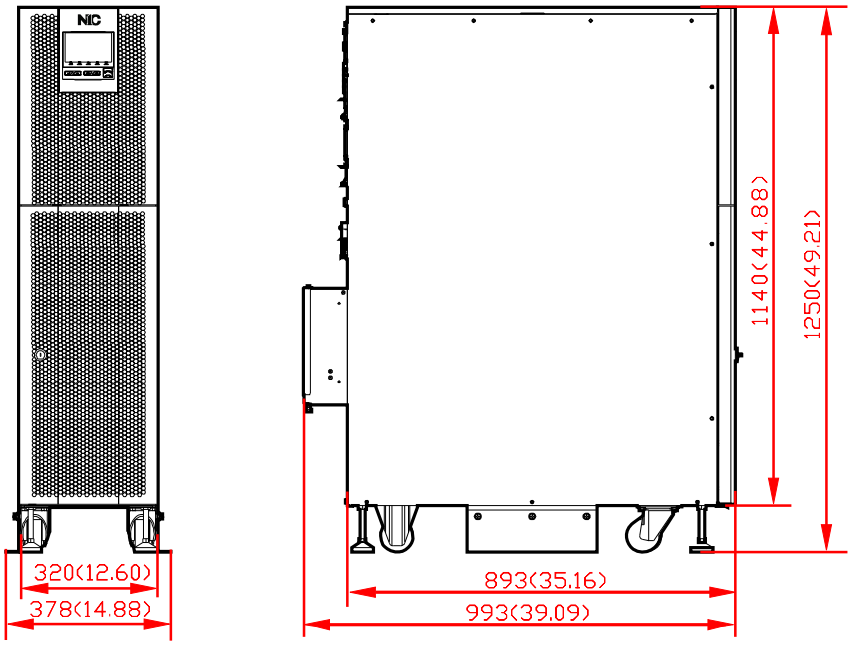


Figure3-5 Outerdimension (mm (in))

Step 2 Drill 4φ10 holes on the ground by impact drill according to the installation holes size of pedestal, as shown in Figure3-6 (drilling deviation ±2mm). Install expansion bolts M8. The structure and installation forthe expansion bolt is as shown in Figure3-7.

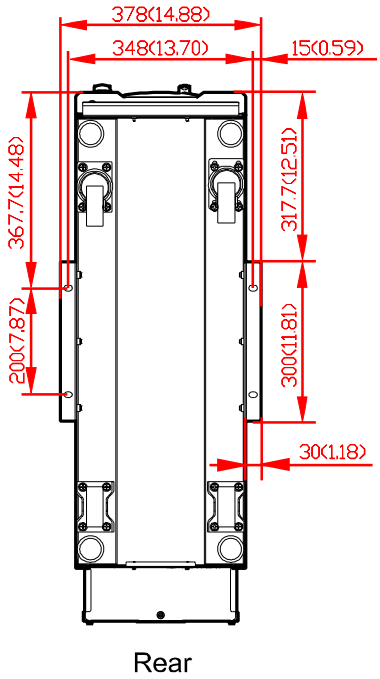
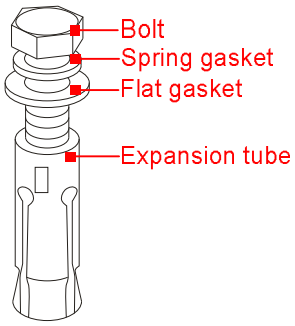


Figure3-6 Installation holes size (mm (in))



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.

Figure3-7 Expansion bolt structure and installation

NOTE
The exposed height of expansion bolt must be within 50mm(19.6in).

Step 3 Move the UPS above the holes, pre-lock the supporting plate (not fully locked, leave one-third to two-thirds of the screws). Move and align the bottom installation hole of the supporting plate with the expansion bolt.Install the flat gasket (Φ8), spring gasket (Φ8) and screw the bolts. Tighten the UPS and the six unlocked screws of supporting plate.

Step 4 Then screwdown the supporting feetanticlockwise of the UPSto parallel with ground.

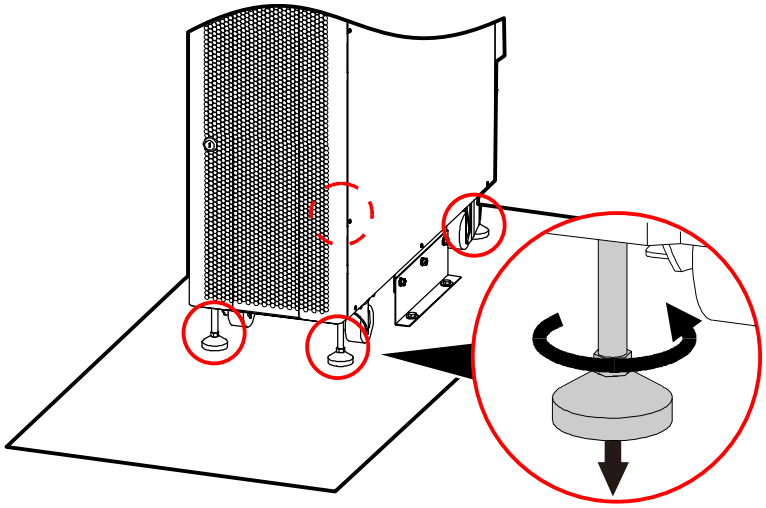


Figure3-8 Screwdown the supporting feet brackets

NOTE
1. Adjust the support feet in clockwise to height the supporting feet, and adjust in anticlockwise to lower the supporting feet.
2. During operating, do not adjust one supporting foot only,adjust the four supporting feet in phase, which is to avoid tilting even device damage.

CAUTION

During moving the UPS, please move the device stably and avoid device tilting.

----End

3.4.2 Battery Installation

Step 1 Insert the key and rotate the keyclockwise to open the front door.

Step 2 Dismantle three plug-in, as shown in Figure3-9.

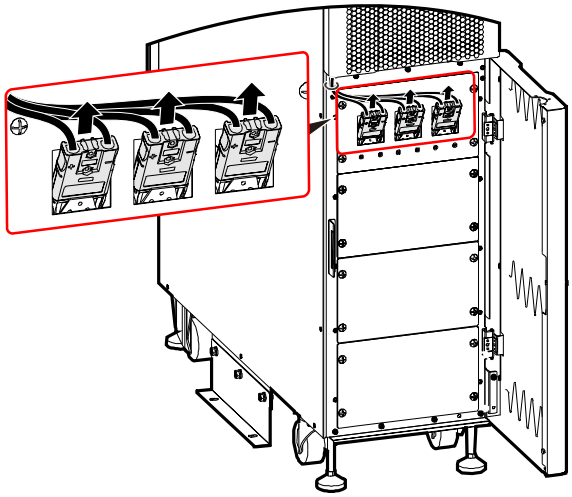


Figure3-9 Dismantle plug-in

Step 3 Remove battery cover plate by removing four screws.

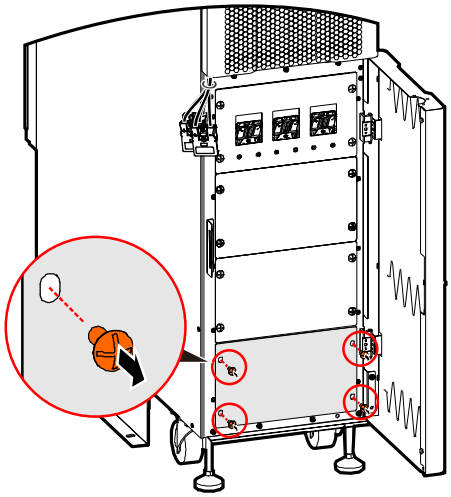


Figure3-10 Remove screws

Step 4 Insert the battery module to the UPS

CAUTION

The weight of singleli-ionbattery module is 37kg(81.6lb). When transporting, please follow the relevant regulations.

Pay attention to the corresponding relationship between the module and the plug-in, and the battery module needs to be installed from bottom to top.

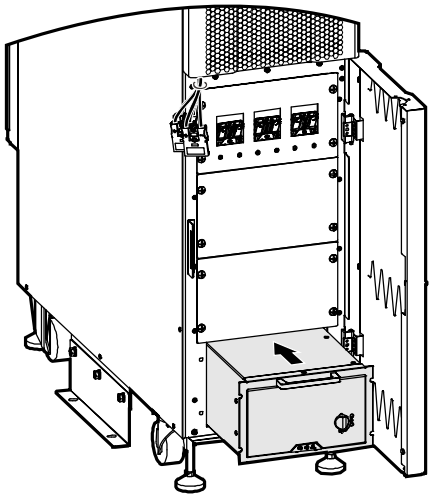


Figure3-11 Insert battery module

Step 5 Tighten the screws to fasten the battery module.

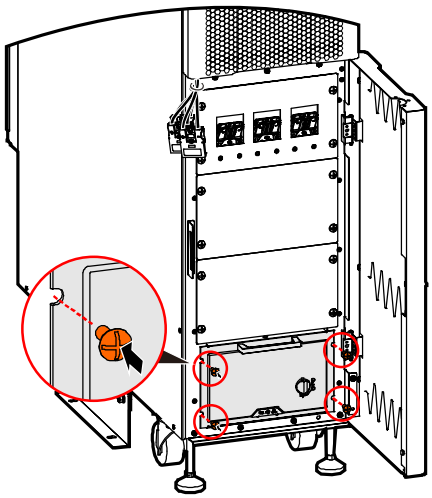


Figure3-12 Fasten the battery module

NOTE

The installation of battery module is the same, in above figure, we take the installation of 1 battery module as example to illustrate.

The quantity and installation position of battery module for 10kVA,15kVA,20kVA and 30kVA are shown inFigure3-13, Figure3-14, Figure3-15.

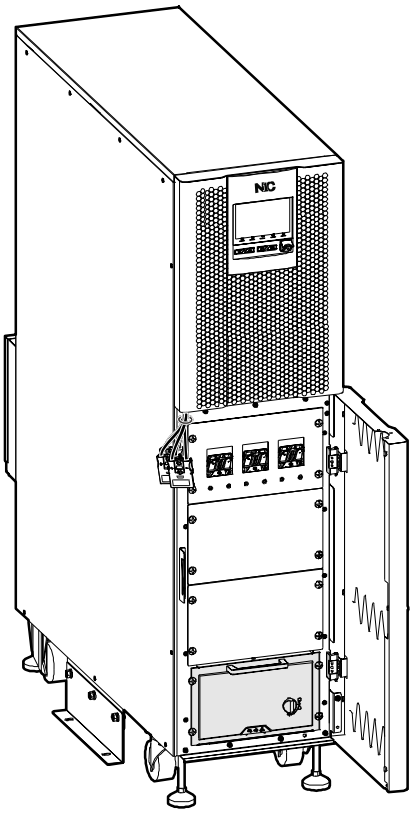


Figure3-13 10kVA

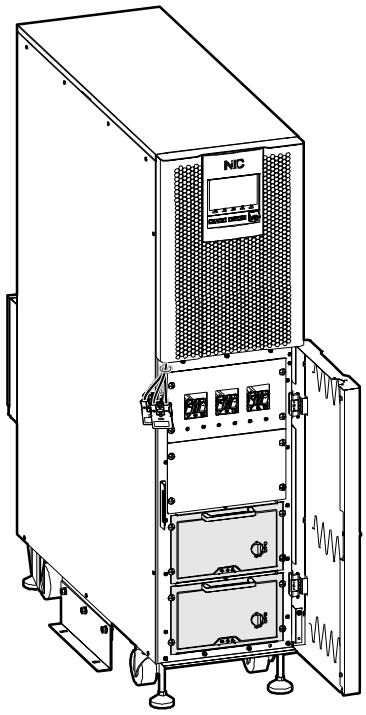


Figure3-14 15kVA/20kVA

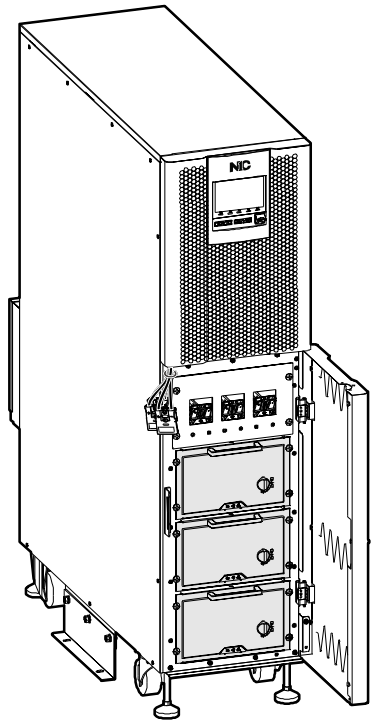


Figure3-15 30kVA

NOTE

Plug-in should be plugged back into the battery module after the wiring is completed , for detail please see3.5.1 UPS Wiring Operation.

----End

3.5 Electrical Connection

WARNING

1. Before connecting, ensure that the rear breakers of mains are all open. DO NOT connect wires with electricity.
2. While wiring, avoid making the power wire at the place where is easy to be trod or tripped.
3. DO NOT move the UPS after connect wires.

3.5.1 UPS Wiring Operation

Step 1 Loosen the screw at the bottom of the wiring box and then remove the bottom plate.

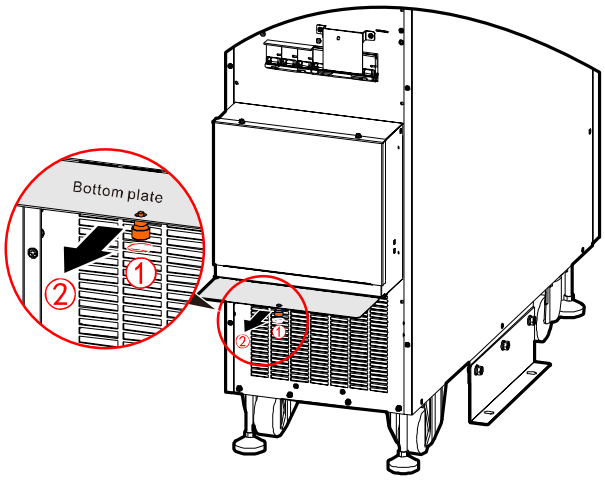


Figure3-16 Remove the bottom plate

Step 2 Drill wiring holes, the recommend drilling position as shown in Figure3-17.

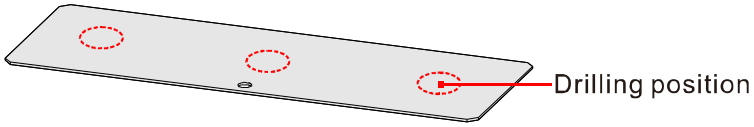


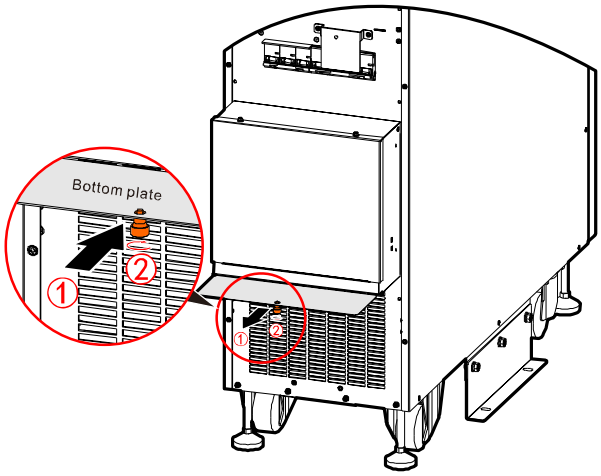
Figure3-17 Recommend drilling position

Table3-6 Recommend drilling size

Model	Drilling hole size
10kVA	Φ25mm(Φ0.99in)
15kVA/20kVA	Φ35mm(Φ1.38in)
30kVA	Φ50mm(Φ1.97in)

NOTE
Customers can drill wiring holes according to actual needs.

Step 3 Reinstall the bottom plate back to the bottom of the wiring box.



Step 4 Remove the wiring cover plate. When removing the wiring cover plate, unscrew the cover plate bolts first, and then move the wiring cover plate upwards. As shown in Figure3-18.

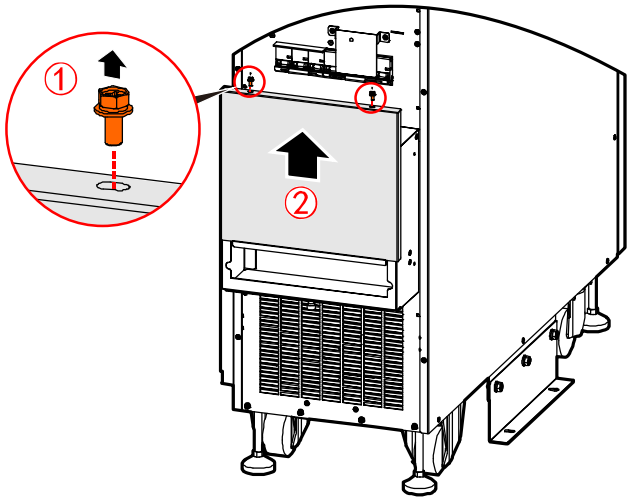


Figure3-18 Dismantle the wiring cover plate

Step 5 The silk-screenis as shown in Figure3-19. Connect the input, output and groundingwire to corresponding wiring terminal, as shown in Figure3-20.

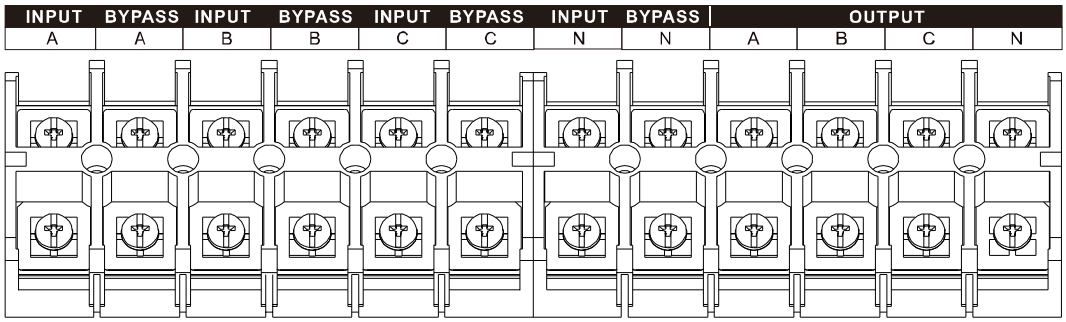


Figure3-19 Wiring terminal silk-screen

NOTE

Three-phase identify methods adoption A, B, C. Corresponding to U phase, Vphase and Wphase or Rphase, Sphase and Tphase.

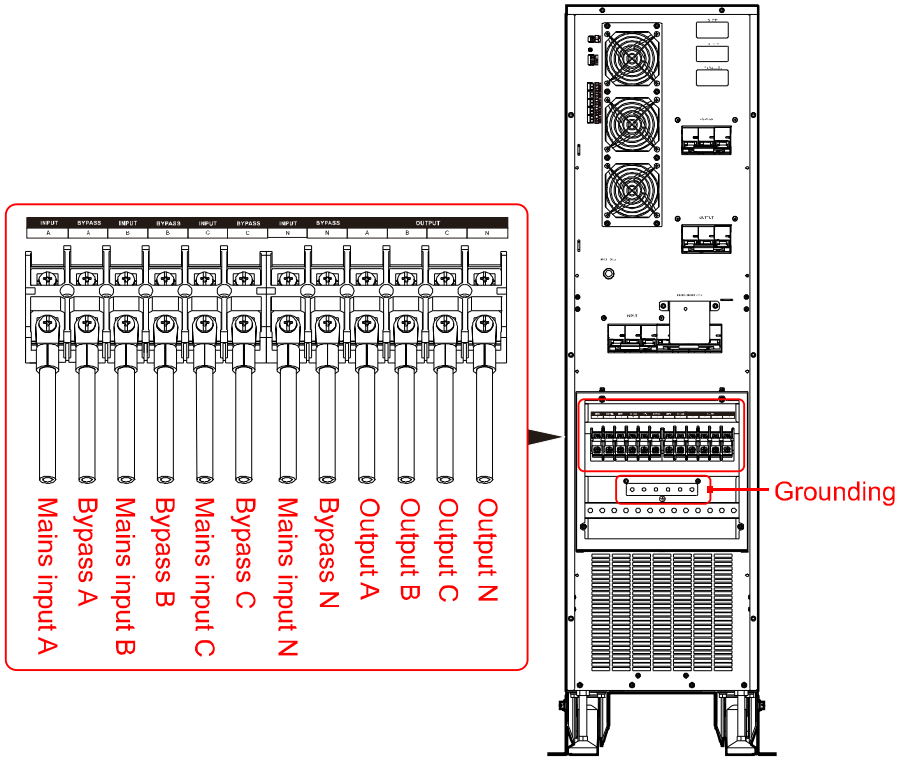


Figure3-20 Wiring diagram

CAUTION

1. UPS wiring must be strictly in accordance with Figure3-20to avoid short circuit.

2. It is necessary to confirm that all wires are connected to the terminal properly and reliably before reinstall the wiring cover plate.
3. When wiring, it is necessary to connect grounding wire first.

Step 6 Divide the wires into three bundles and fixed to the bottom of device through cable tie.

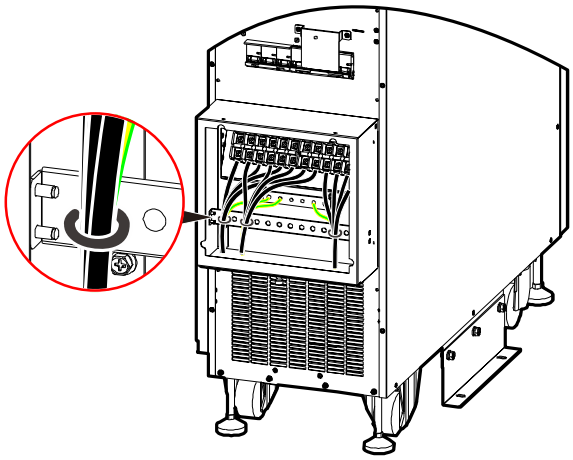


Figure3-21 Wiresfixation

NOTE
The plastic protective cover should be disassembled before the external battery wiring, and put back to the original position after completing the external battery wiring.

Step 7 After wiring is completed, reinstall the wiring cover plateto the wiring box.

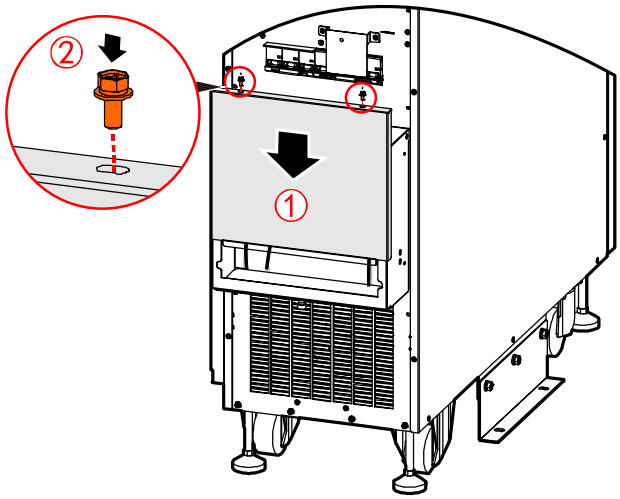


Figure3-22 Reinstall the wiring cover plate

Step 8 Insert three plug-in.

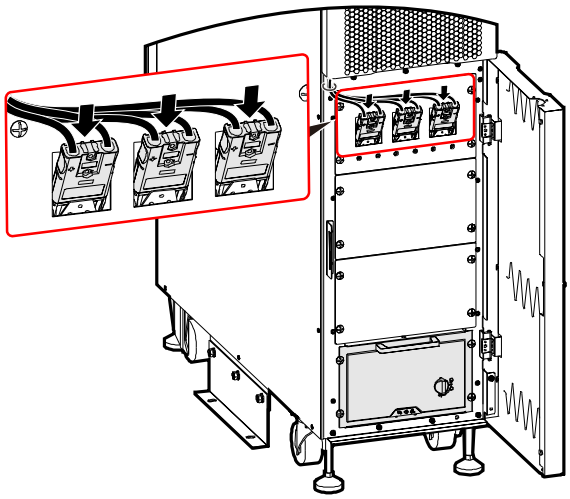


Figure3-23 Insert three plug-in

CAUTION

Insert the plug-in after all battery modules are installed.

If you need to remove the battery module, it is required to unplug the battery plug-in before removing the battery module.

Step 9 Turn the key anticlockwiseto close the front door, and pull out the key.

----End

3.5.2 Wiring of Parallel System

Step 1 Install the battery and UPS of parallel system separately according to**3.4 Mechanical Installation**.

Step 2 Connect the wires of input, bypass, outputand battery in parallel system, as shown in Figure3-24.

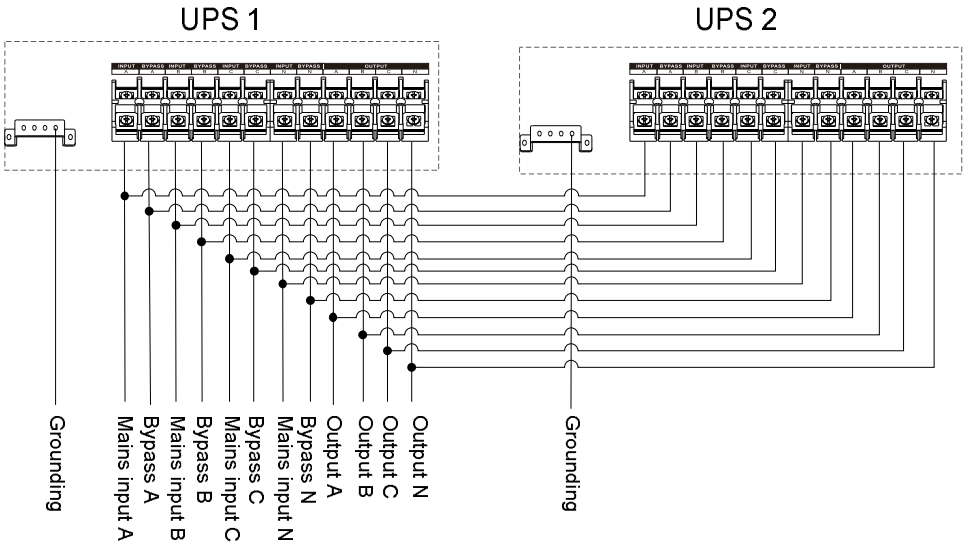


Figure3-24 Parallel systemwiring diagram

Step 3 Connect the parallel port of each UPS in parallel by parallel wires, as shown in Figure3-25 and Figure3-26.

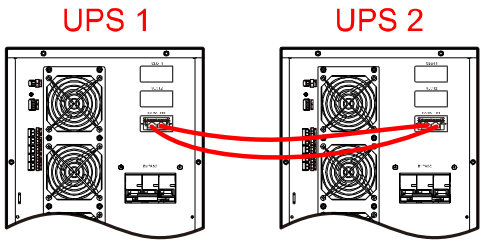


Figure3-25 Double parallelwiring diagram

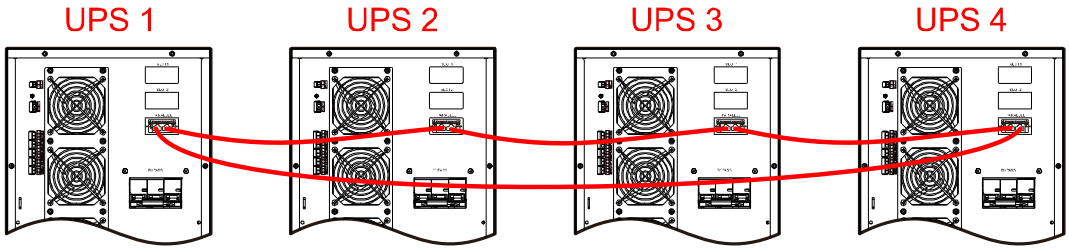


Figure3-26 Four parallel wiring diagram

NOTE

Connect the parallel ports of each device in parallel system by equipped parallel wires. The two RJ45 parallel ports are the same,they are redundancies and backup foreach other to increase the reliability of the system. The UPS will send alarm promptingonce one of them is not connected.

WARNING

1. Ensure thatthe Parallel Kit-T (2m) NT-PA of each UPS is correctly installed in the parallel system (see the installation guideofParallel Kit-T (2m) NT-PA fordetails).
2. The wiring and phase sequence of each UPS in the parallel system must be the same strictly, which is to ensure the bypass power of parallel system is the same phase.
3. The parallel system of thisseries UPS can share battery groups, but the battery number of each UPS must be the same.

Step 4 Set the device to the corresponding parallel mode accordingto **4.5.7 Device Configuration Page**.

----End

4 Touch Screen Operation

In the touch screen, usercan set and check the 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 forfault diagnosis.

NOTE
The parameters values and other details in the pictures in thischapter are forillustrationonly. Detailed information should be based on the touch screen of the product.

4.1 Menu Structure

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

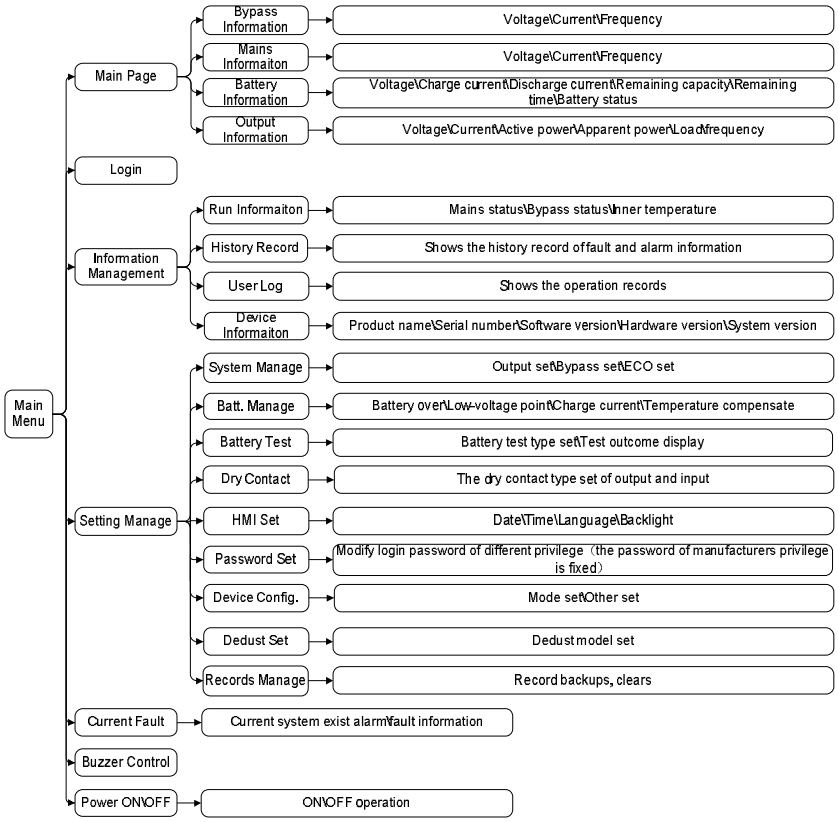


Figure4-1 Menu structure of the touch screen

WARNING

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

4.2 Main Page

After powering on, the touch screen will enter initialize.Then will enter system monitoring main page after powering on, as shown in Figure4-2.

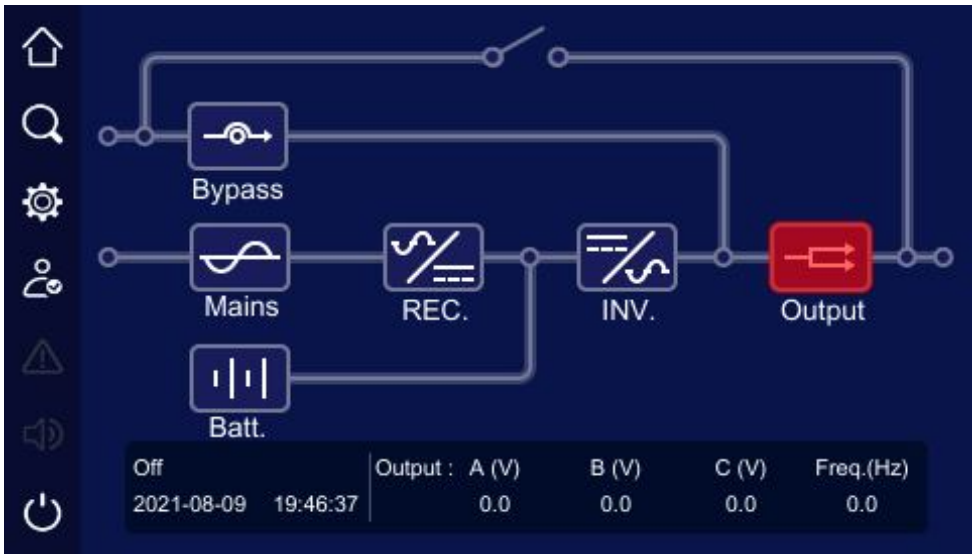


Figure4-2 Main page

4.2.1 Icon Meaning

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

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

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

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

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

: Buzzer. Click the icon to control the buzzer.

: Login.

: ON/OFF.

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

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

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

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

4.2.2 Working Status

There are six main working statuses: without energy transmission status, mains inverting status, battery inverting status, bypass output status, ECO output and maintenance bypass output status. The corresponding water lights in the monitoring page are shown in Figure4-3 to Figure4-8. Besides, other statuses also have corresponding indicator instruction.

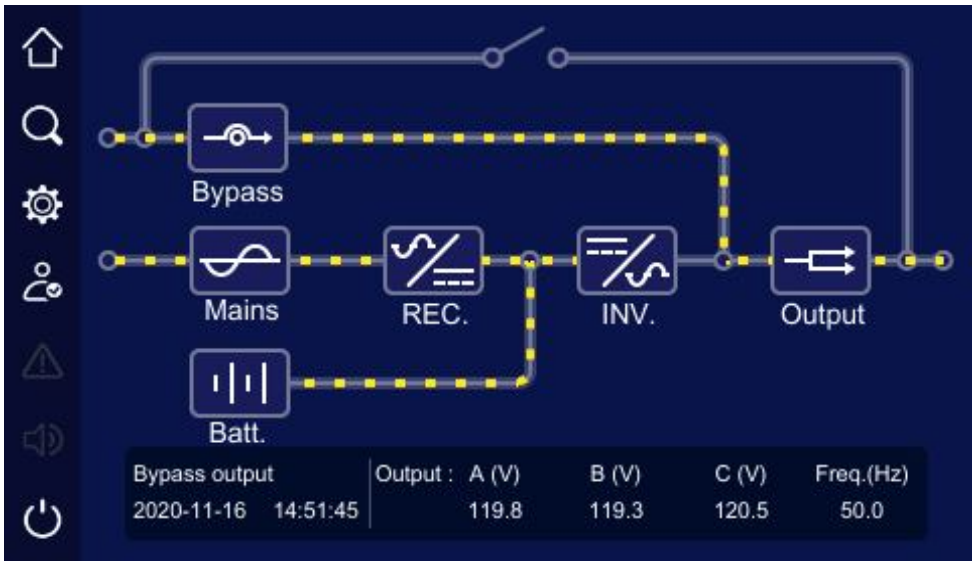


Figure4-3 Without energy transmission status

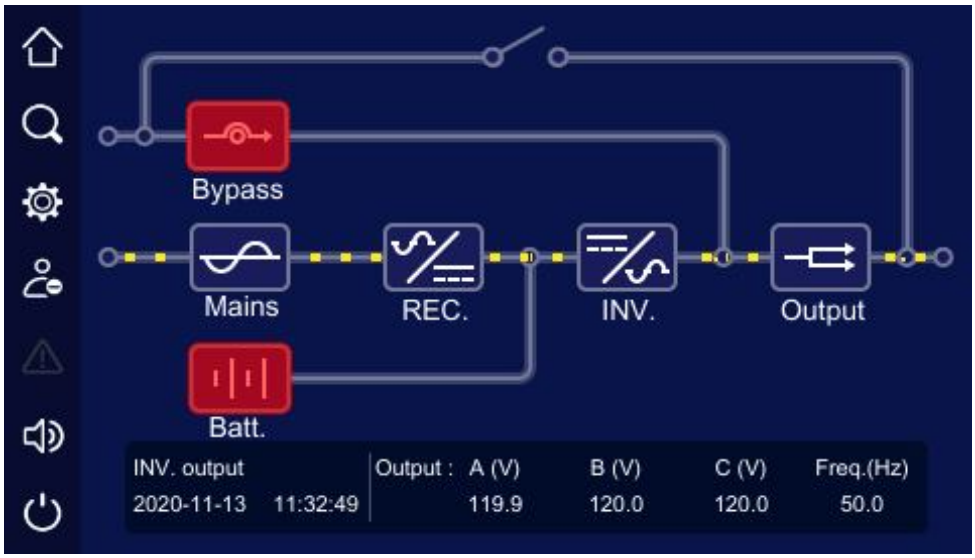


Figure4-4 Mains normal, mains inverting status

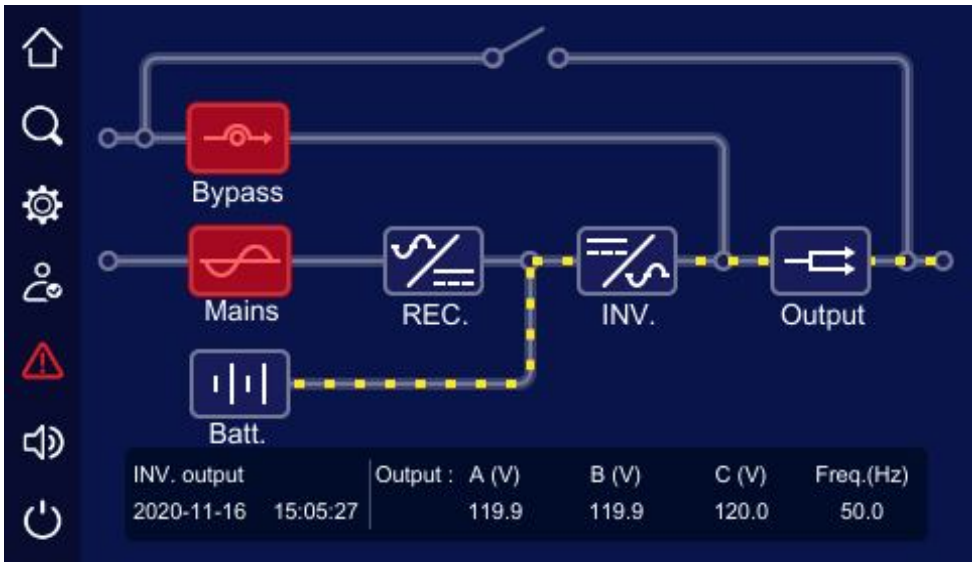


Figure4-5 Mains abnormal, battery inverting status

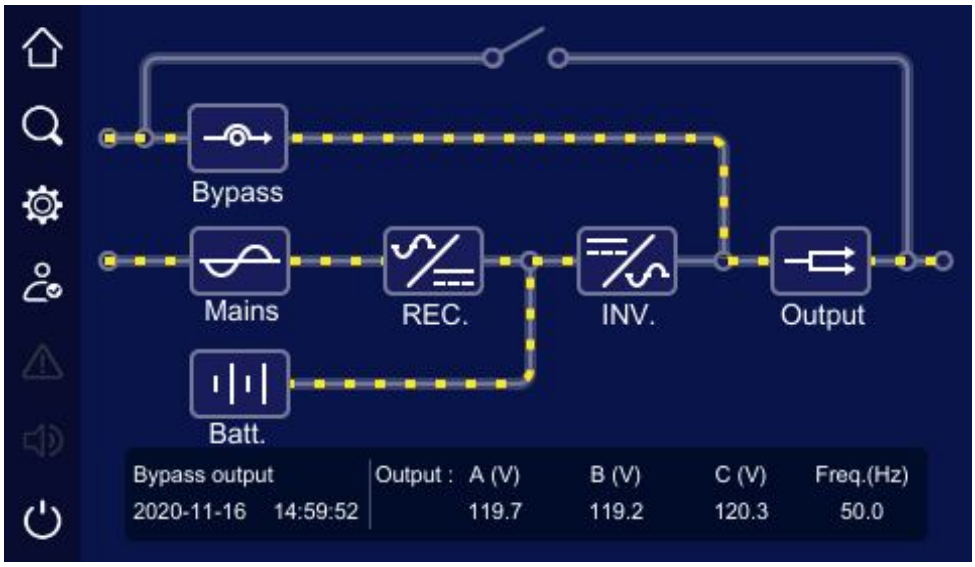


Figure4-6 Bypass output status

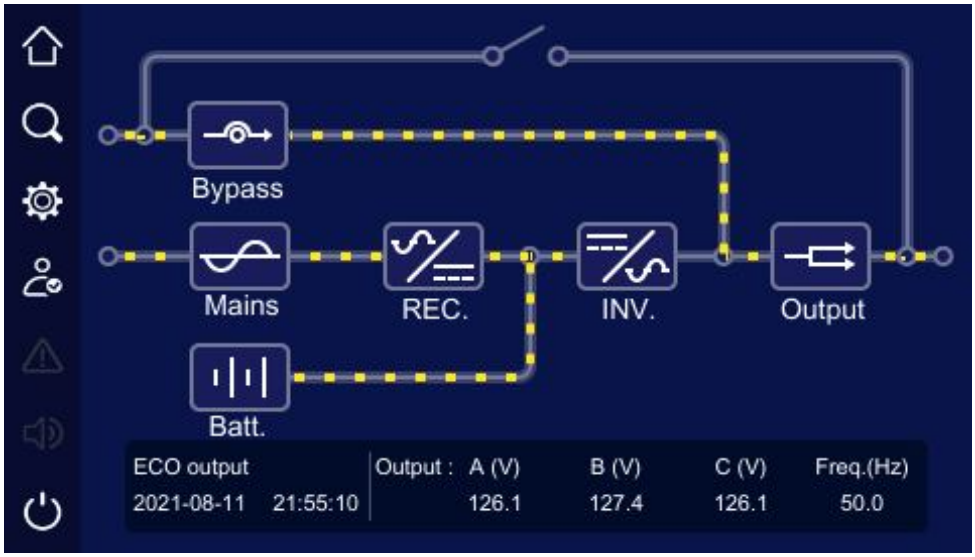


Figure4-7 ECO status

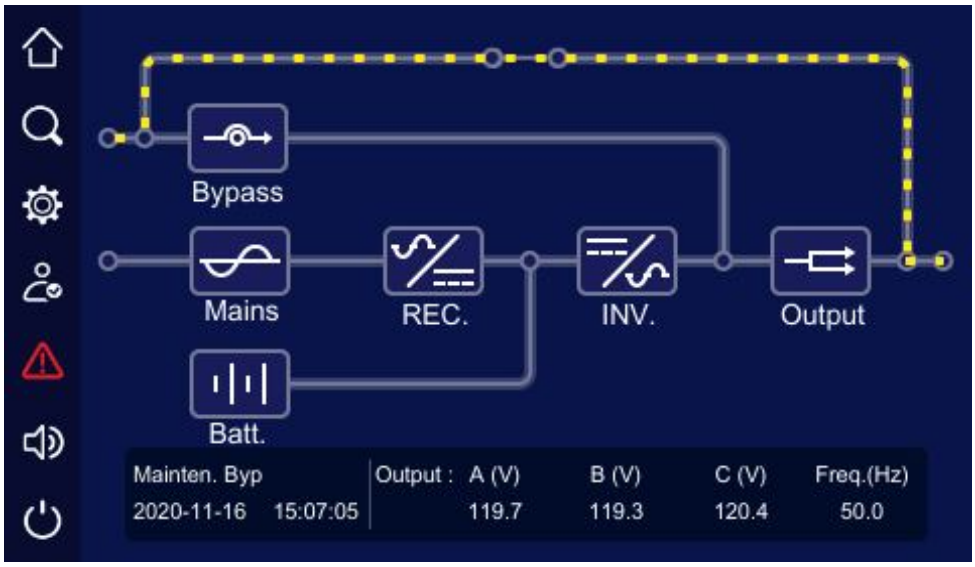


Figure4-8 Maintenance bypass output status

4.2.3 Bypass Information Page

On main page, click " " icon, it will enter the bypass information page, as shown in Figure4-9.

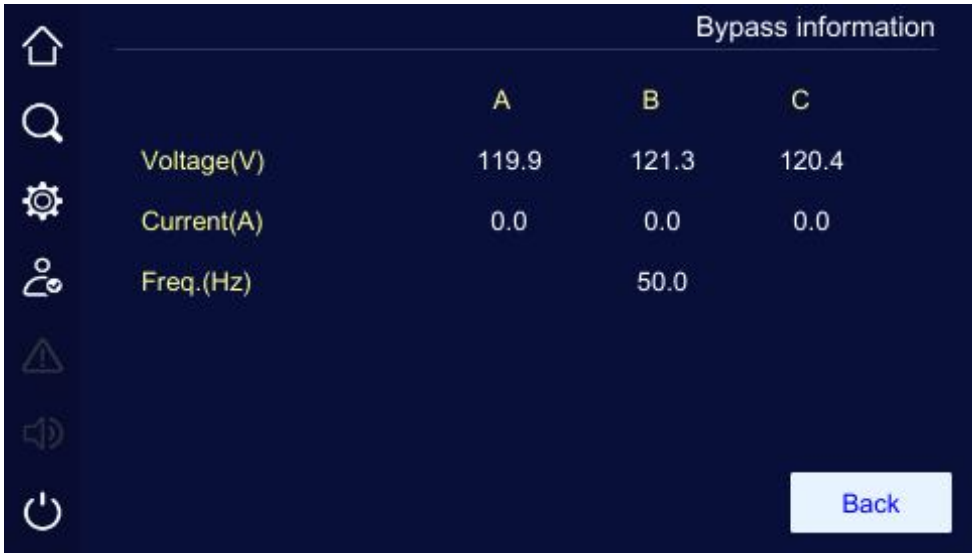


Figure4-9 Bypass information page

4.2.4 Mains Informaiton Page

In the main page, click " " icon, it will enter the mains information page, as shown in Figure4-10.

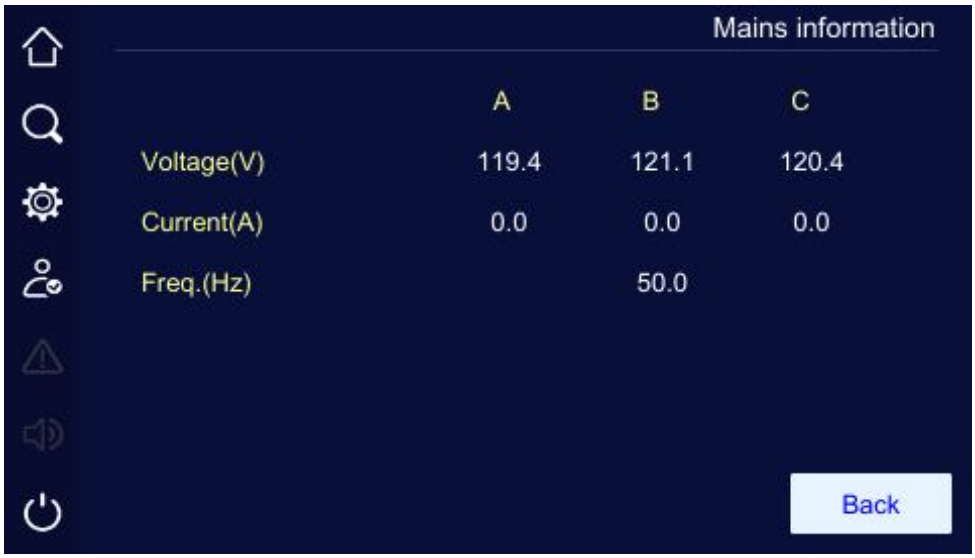


Figure4-10 Mains information page

4.2.5 Battery Information Page

In the main page, click "  " icon, it will enter the battery information page. The "Batt.cab.info."page shows information such as battery voltage, charge current, discharge current, SOC, SOH, battery status, remaining time. As shown inFigure4-11, Figure4-12.

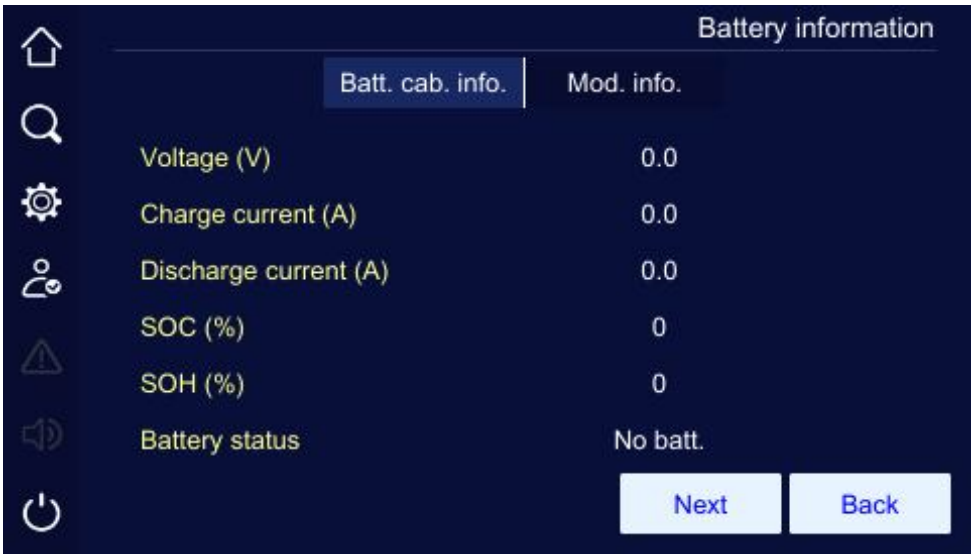


Figure4-11 Battery cabinet information page 1

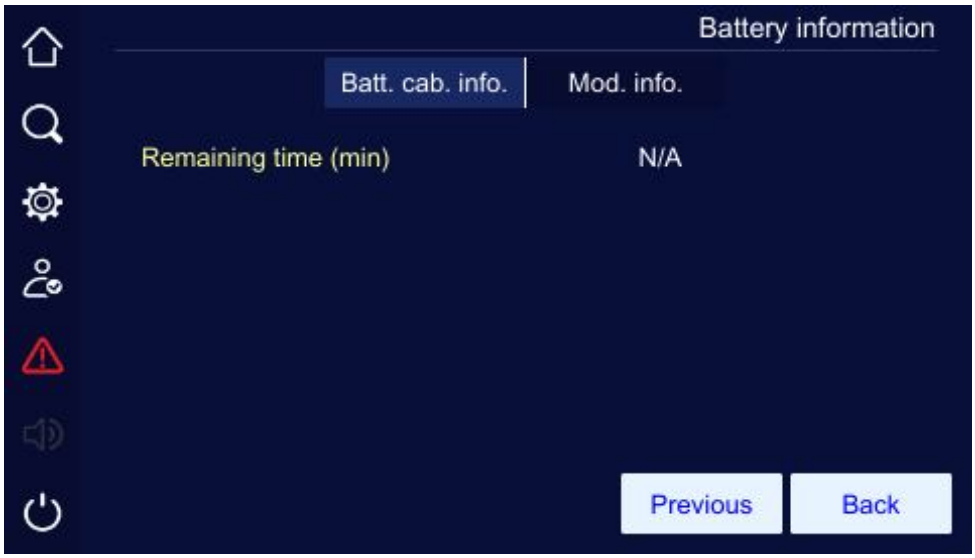


Figure4-12 Battery cabinet information page 2

"Mod.info" page shows running status and data of each module, you can click the icon in the lower left corner to select the module that needs to view the information. As shown in Figure4-13.

Figure4-13 Module selection

The "Mod.info" page shows battery module information such as PACK voltage, PACK temperature, PACK SOC, PACK SOH, total current, inner temperature, route1 output voltage, route2 output voltage, route1 output current, route2 output current, module On/Off status, charge/discharge status, module discharge status, module status, module disable test, positive insulation impedance, negative insulation impedance, system operation time, max. cell voltage, min. cell voltage, max. cell temperature, min. cell temperature. As shown in Figure4-14,Figure4-15, Figure4-16, Figure4-17.

Figure4-14 Module information page 1

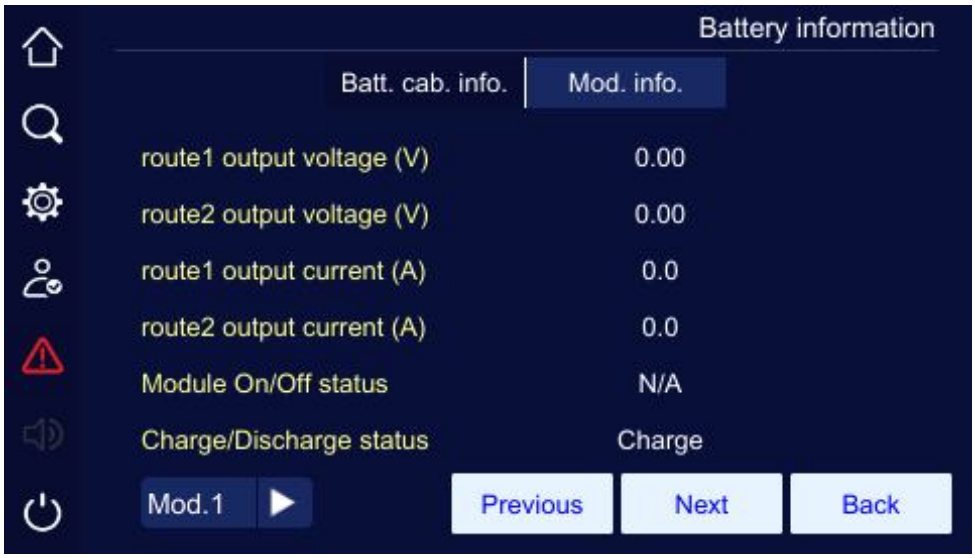


Figure4-15 Module information page 2

Figure4-16 Module information page 3

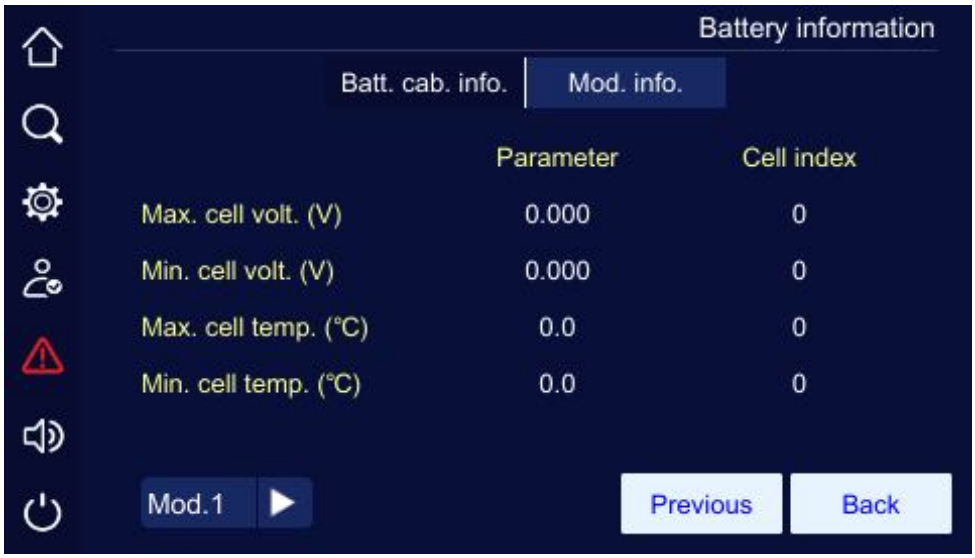


Figure4-17 Module information page 4

4.2.6 Output Information Page

In the main page, click "  " icon, it will enter the output information page. The page shows the output voltage, current, load, active power, apparent power, power factor, output frequency, etc.As shown in Figure4-18.

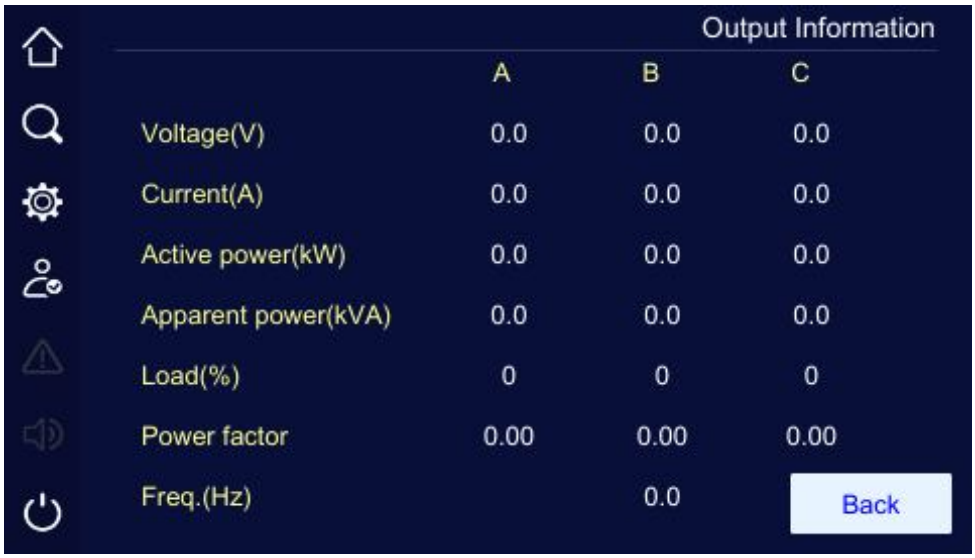


Figure4-18 Output information page

4.3 Login Page

In the main page, click " " icon, it will enter the login page, as shown in Figure4-19. Only login, the setting management can be done.

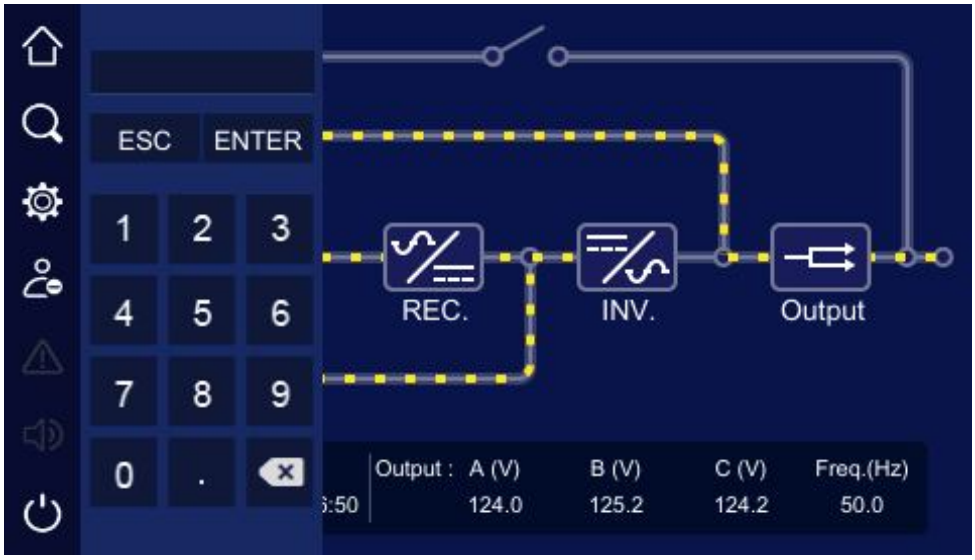


Figure4-19 Login page

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

4.4 Information Management Page

In the main page, click "" icon, it will enter the info manage page, as shown in Figure4-20. The page includes run info, history record, user log and device info.

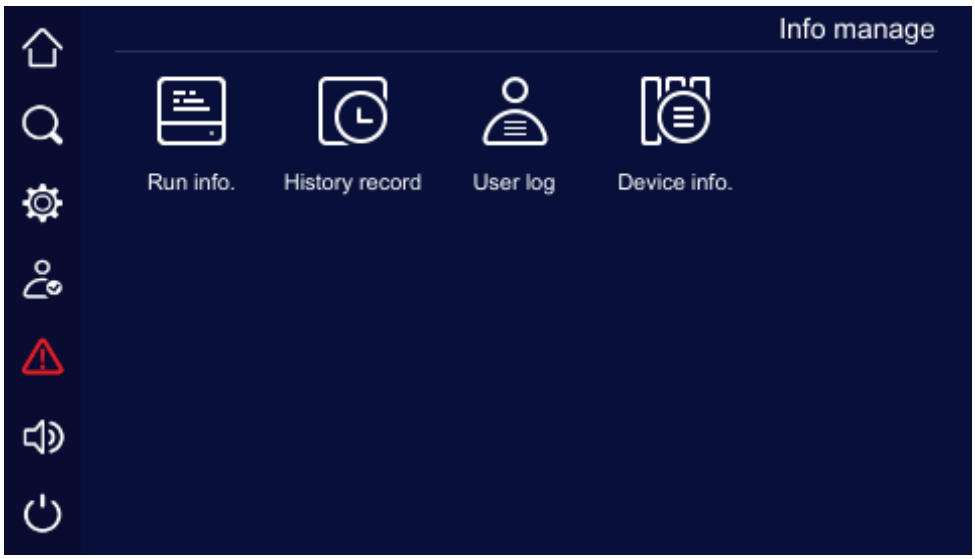


Figure4-20 Information management page

4.4.1 Run Information Page

In the info manage page, click the run info.icon, it will enter the run information page, as shown in Figure4-21 toFigure4-22. The page shows the UPS current status, including mains status, bypass status, battery status, output status, load status, rectifier status, inverter status, work mode, input loop, bypass loop, battery loop, fan status, inner temperature.

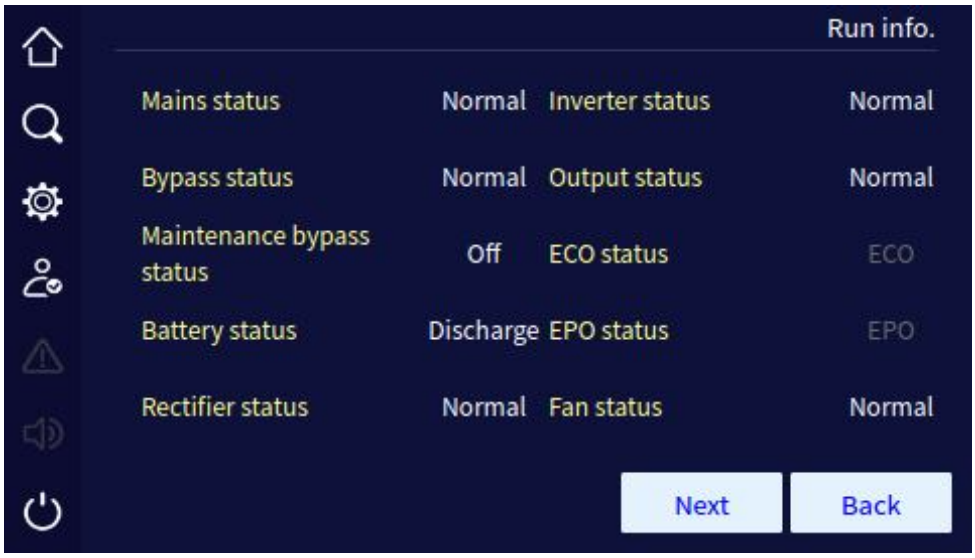


Figure4-21 Run info page 1

Figure4-22 Working status page 2

4.4.2 History Record Page

In the info manage page, click history recordicon, it will enter the history record page, as shown in Figure4-23. The page shows the fault and alarm information, and they are listed on the bas is of time. The first record is the latest fault.

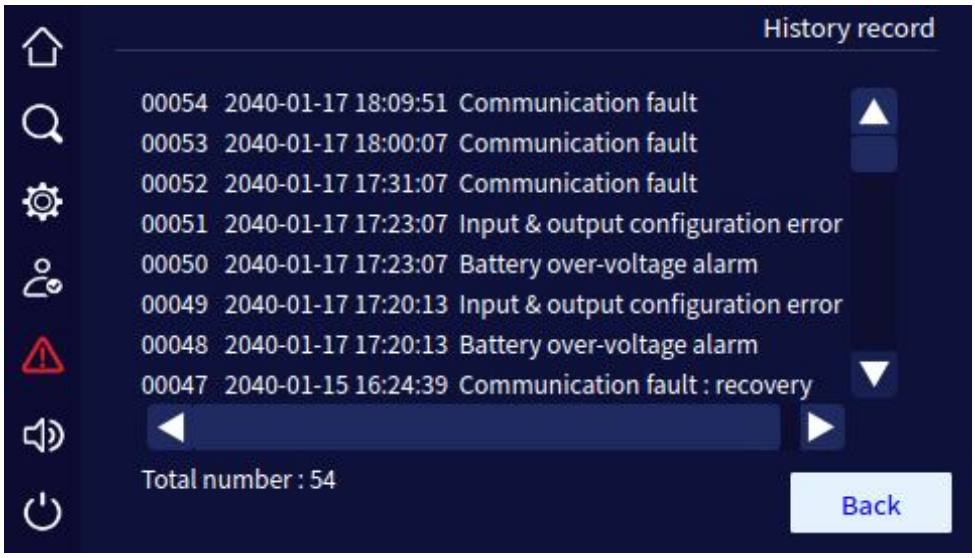


Figure4-23 Event log page

4.4.3 User Log Page

In the info manage page, click the user log icon, it will enter the user log page, as shown in Figure4-24. The page shows the operation records, such as ON\OFF operation, mains voltage range setting, bypass voltage setting, etc. The user log is listed on the bas is of time. The first record is the latest operation record.

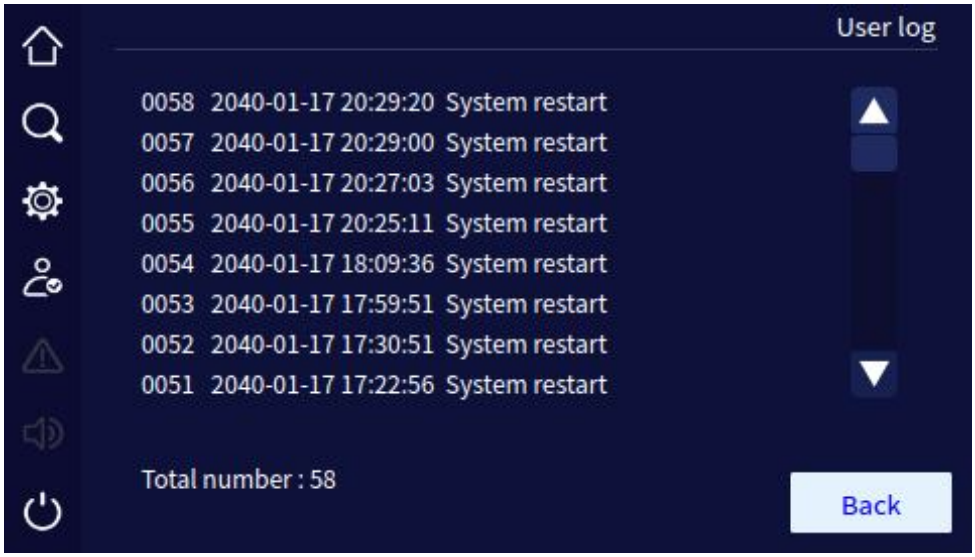


Figure4-24 User log page

4.4.4 Device Infomation Page

In the info manage page, click the device infoicon, it will enter the device information page, as shown in Figure4-25 and Figure4-26. Device information page includes product name and model, version

information includes serial number, rectifier version, inverter version, system version, protocol version and HMI software version, etc.

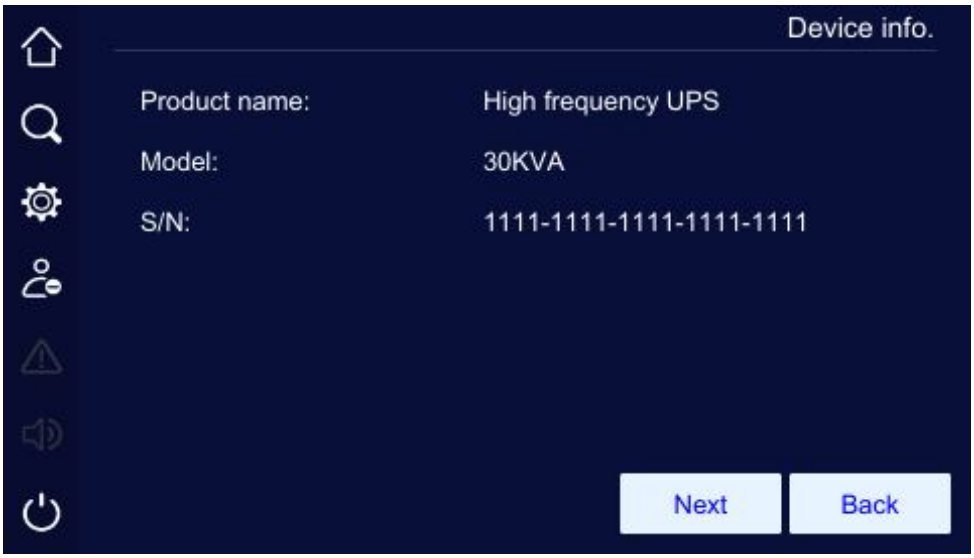


Figure4-25 Device information page 1

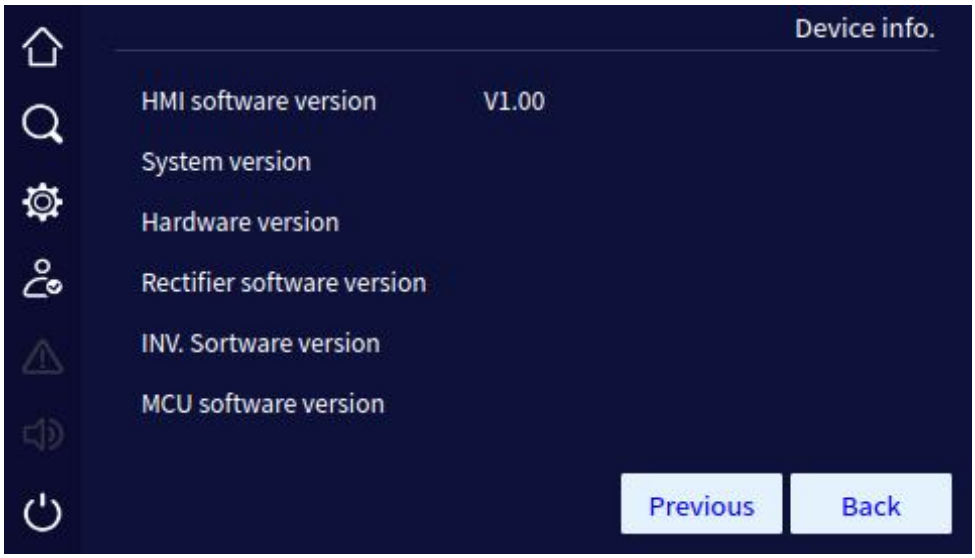


Figure4-26 Device information page 2

Figure4-27 Device information page 3

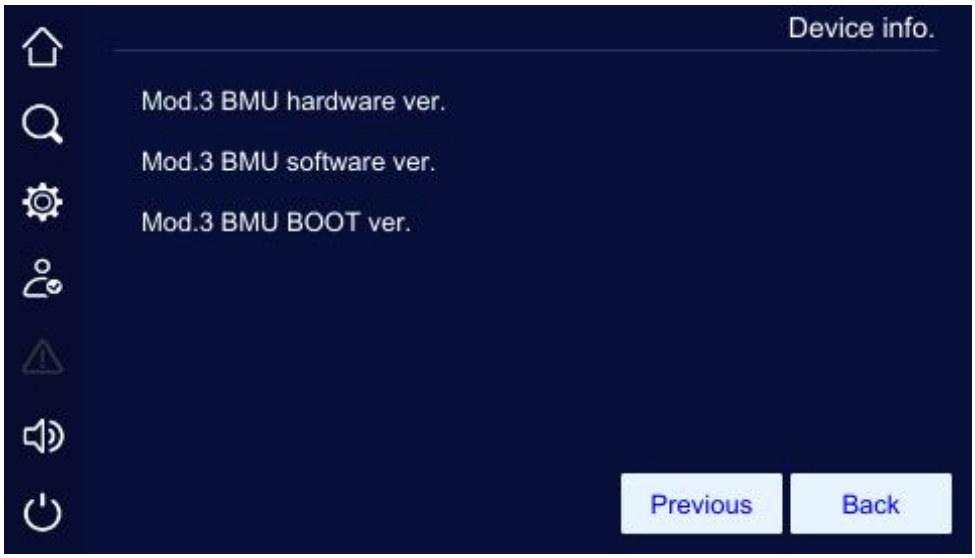


Figure4-28 Device information page 4

4.5 SettingManagement Page

In the main page, after login, click " " icon, it will enter the setting manage page, as shown in Figure4-29. The page includes: system manage, battery manage, battery test, log manage, communication setting, screen setting, dedust setting and password setting.

Figure4-29 Setting manage page

4.5.1 System Management Page

In the system manage page, user can set the mains voltage range, bypass voltage range, bypass frequency range, ECO mode and ECO voltage range, as shown in Figure4-30 to Figure4-32.

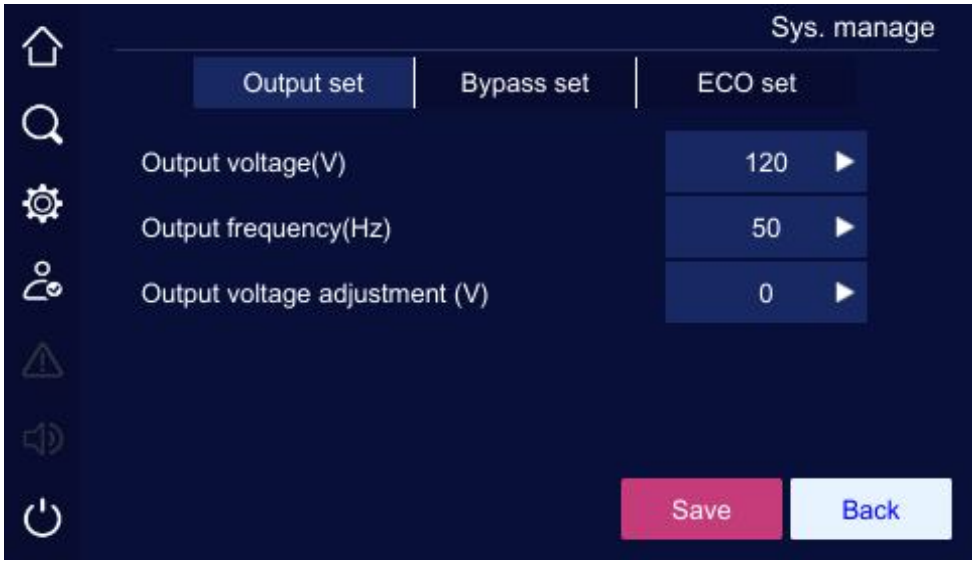


Figure4-30 System manage page 1 of output set

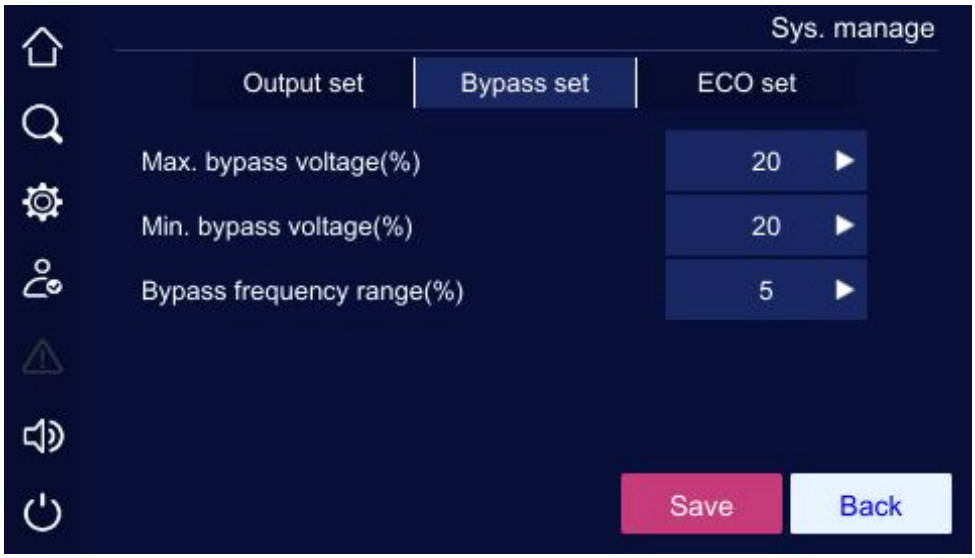


Figure4-31 System manage page 2 of bypass set

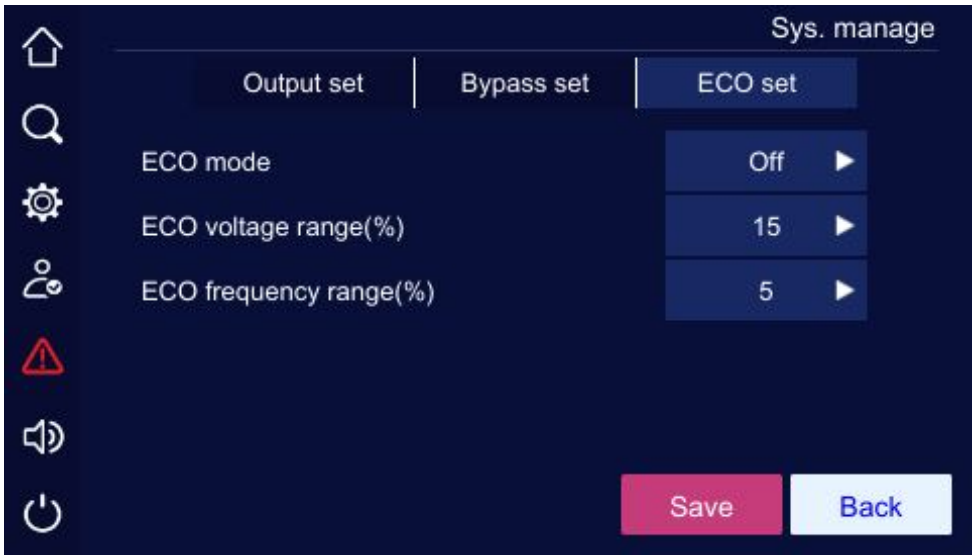


Figure4-32 System management page 3 of ECO set

Table4-1 Setting description forsystem mange

Item	Settable value
Output voltage (V)	110V, 115V, 120V, 127V
Output frequency (Hz)	50Hz, 60Hz
Output voltage adjustment (V)	-5~+5
Max. bypass voltage (%)	10%, 15%, 20%

Item	Settable value
Min. bypass voltage (%)	10%, 15%, 20%
Bypass frequency range (%)	5%, 10%
ECO mode	On, Off
ECO voltage range (%)	10%, 15%
ECO frequency range (%)	5%, 10%

After changing the parameter, it is necessary to click "Save" button to save the setting. If the setting is successful, there will be a "✓" icon at the right side of the parameter, as shown in Figure4-33, if the setting is unsuccessful, there will be a "✗" icon at the right side of the parameter, as shown in Figure4-34.

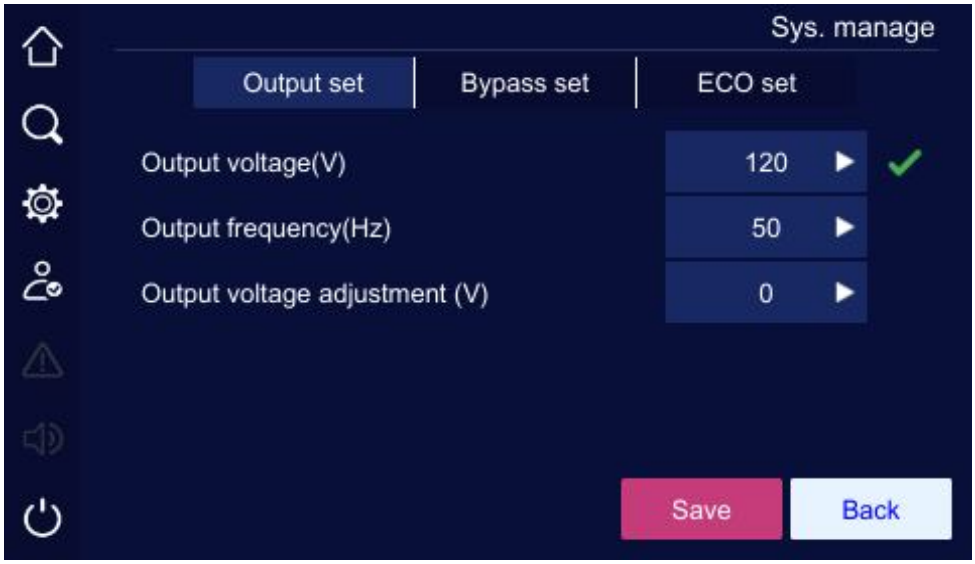


Figure4-33 Successful setting

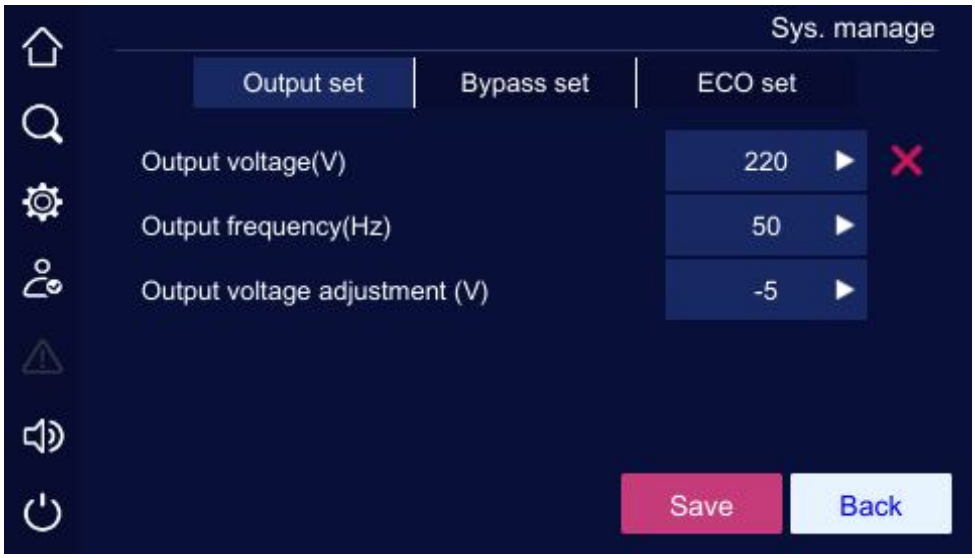


Figure4-34 Unsuccessful setting

4.5.2 Battery ManagementPage

In the"Battery Management"page, you can set the following parameters: li-batt. module quantity, module charge current, li-batt. ON, li-batt. OFF, li-batt. force charge on, li-batt. force charge off, battery backup function, li-batt. insulation detection, and li-batt. SOC balance enable.

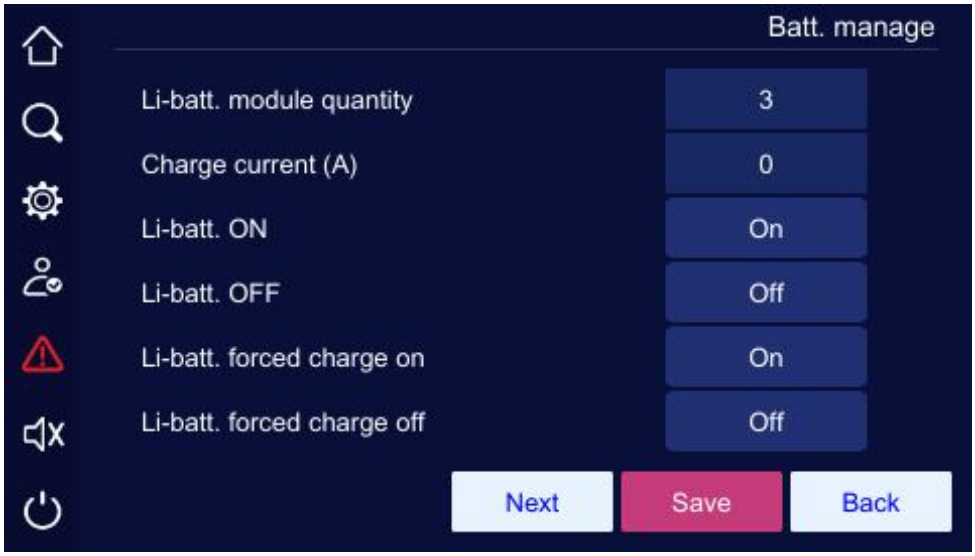


Figure4-33 Battery manage page 1

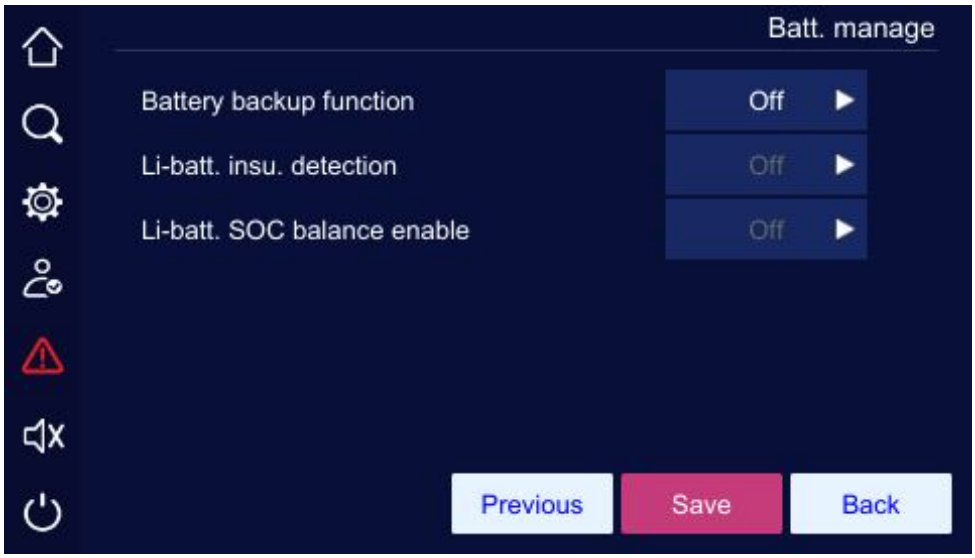


Figure4-35 Battery manage page 2

Table4-2 Setting description forbattery mange page

Item	Settable value
Li-batt. module quantity	1-3
Charge current(A)	2-40
Li-batt. ON	On
Li-batt. OFF	Off
Li-batt. forced charge on	On
Li-batt. forced charge off	Off
Battery backup function	On,Off
Li-batt. insu. detection	On,Off
Li-batt. SOC balance enable	On,Off

Click number input box, it will display the input range of setting value at the top of the input keyboard. When the setting exceeds the range, the setting will be invalid. After setting, click "Save" button to save the setting. Successful setting/unsuccessful setting mark is the same as that of system management.

4.5.3 Battery Test Page

Battery test includes standard test and depth test and the battery test also can be canceled. The page shows the test status, battery current, consumed capacity and test time. The battery test page is as shown in Figure4-36.

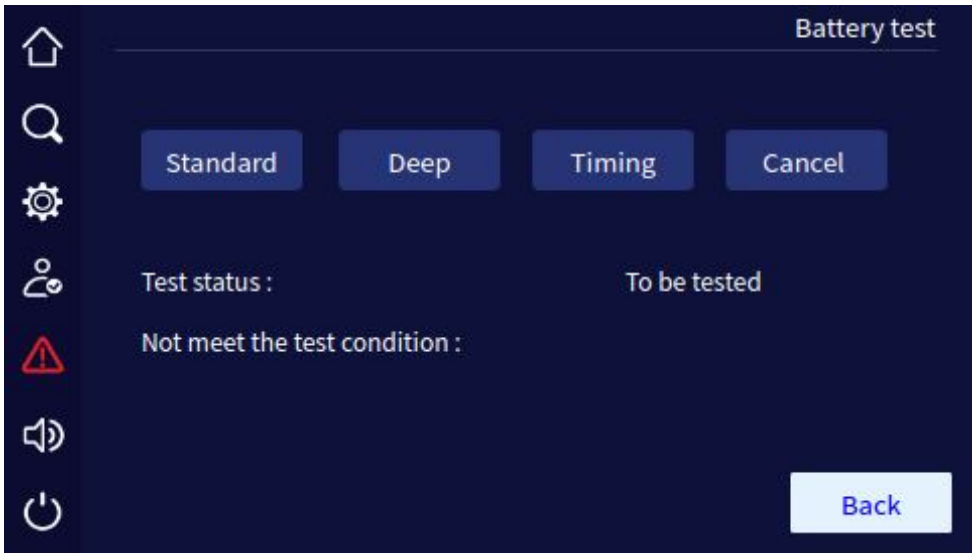


Figure4-36 Battery test page

4.5.4 Dry Contact Page

In setting manage page, click "**Dry contacticon**", it will enter dry contact setting page, as shown in Figure4-37 and Figure4-40.

NOTE
The dry contact setting is the same, below we take dry contact 1 as an example to illustrate.

Input dry contact

On Dry contact page, click "Charge forbidden" icon, it will enter corresponding dry contact setting page, as shown in Figure4-38.Click "OK" button to save the dry contact setting and returnDry contact setting page. After setting, click "Save" button on Dry contact page to save the setting. Successful setting/unsuccessful setting mark is the same as that of system management.

Figure4-37 Input dry contact setting page 1

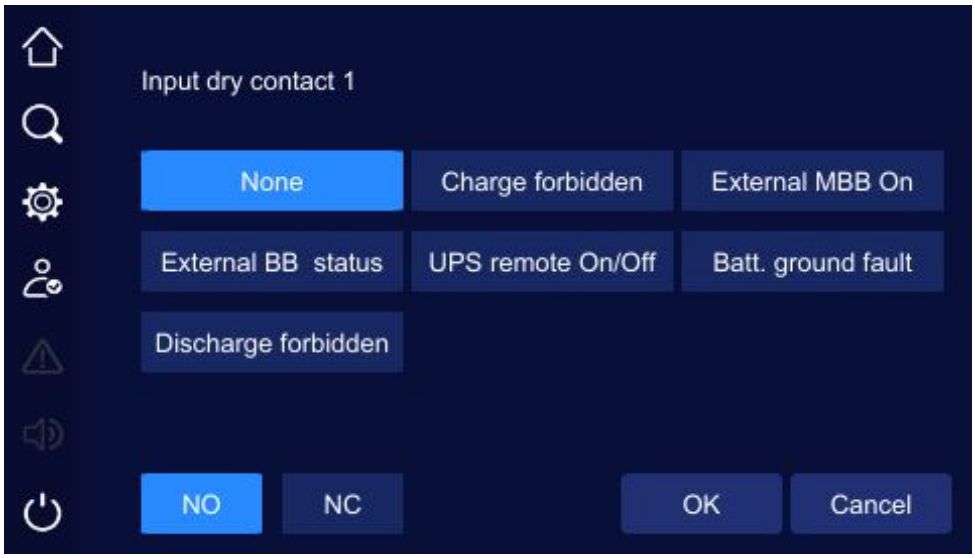


Figure4-38 Input dry contact setting page 2

Output dry contact

On Dry contact page, click "ECO output" icon, it will enter corresponding dry contact setting page, as shown in Figure4-40.Click "OK" button to save the dry contact setting and returnDry contact setting page. After setting, click "Save" button on Dry contact page to save the setting. Successful setting/unsuccessful setting mark is the same as that of system management.

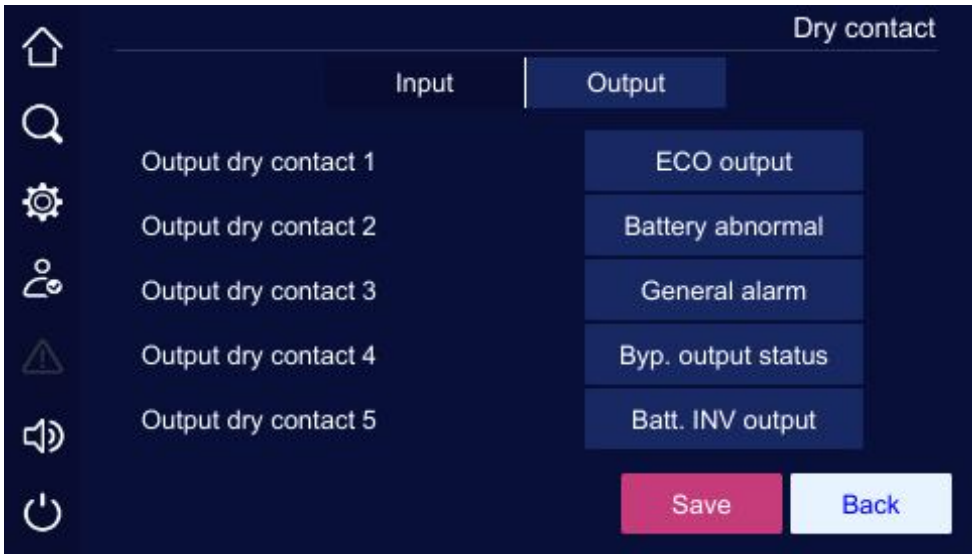


Figure4-39 Outputdry contact setting page 1

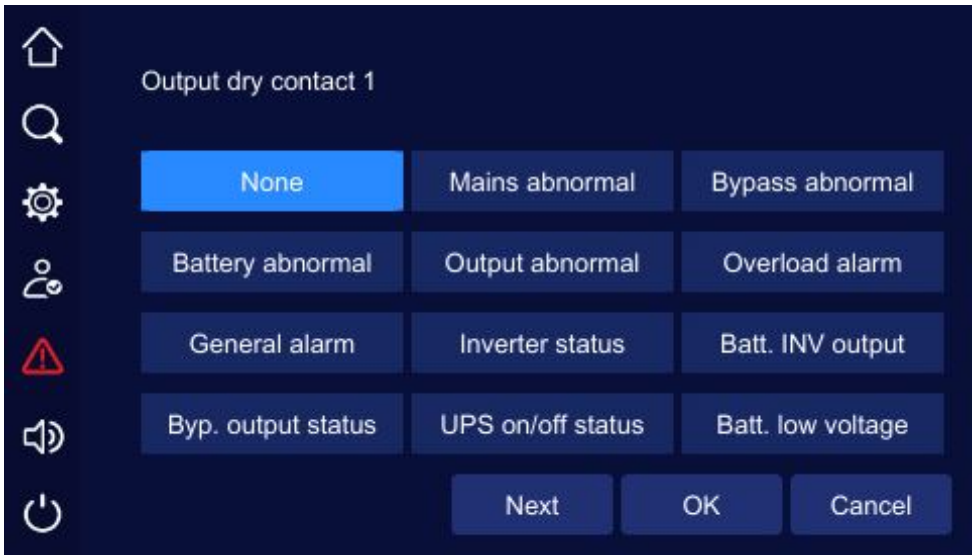


Figure4-40 Output dry contact setting page 2

4.5.5 HMI Setting Page

In HMI set page, user can set the date, time, language, backlight and screen saver, as shown in Figure4-41.

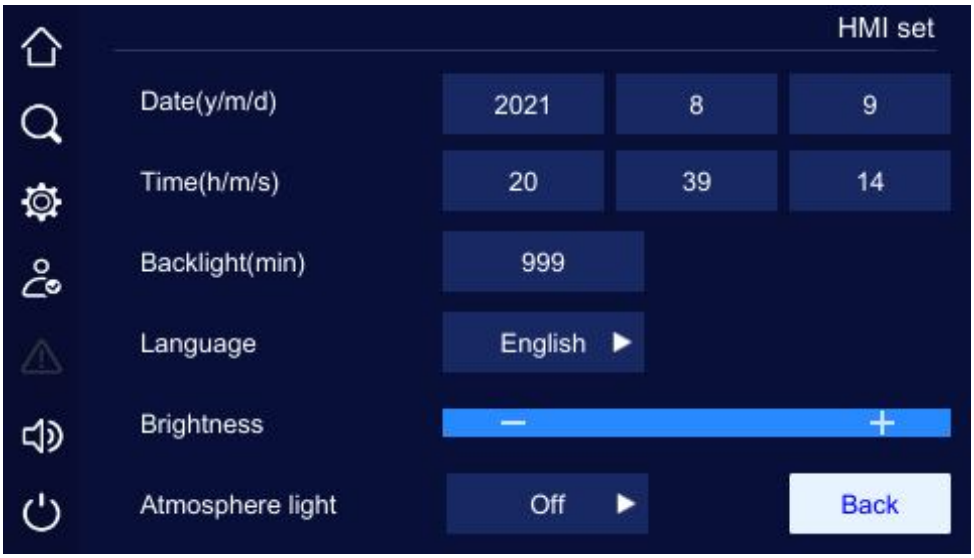


Figure4-41 Screen setting page

4.5.6 Password Setting Page

In setting manage page, click "**Password set**" icon, it will enter the password setting page, as shown in Figure4-42.

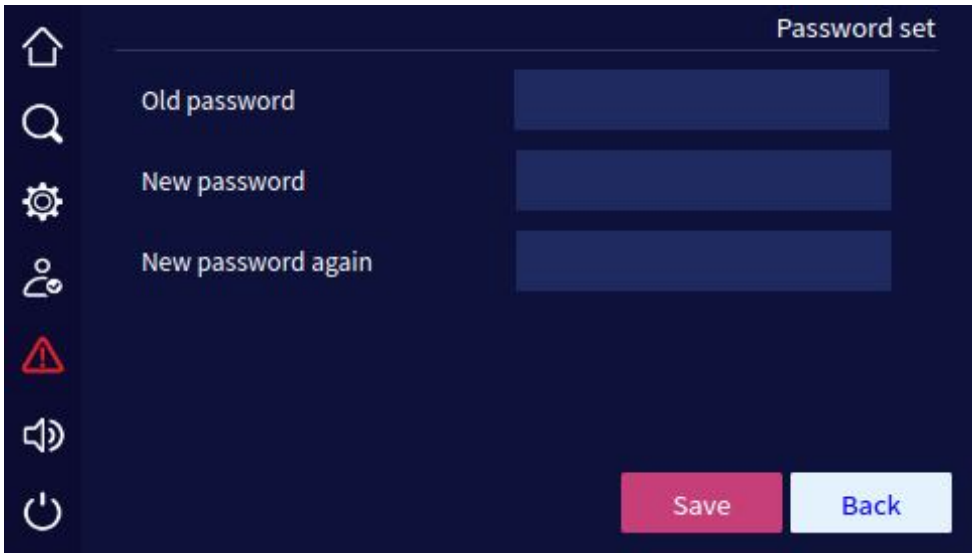


Figure4-42 Password setting page

4.5.7 Device Configuration Page

In setting manage page, click "**Device config.**"icon, it will enter Device configuration page, as shown in Figure4-43toFigure4-46.

Figure4-43 Mode setpage 1 of device configuration

Figure4-44 Mode setpage 2 of device configuration

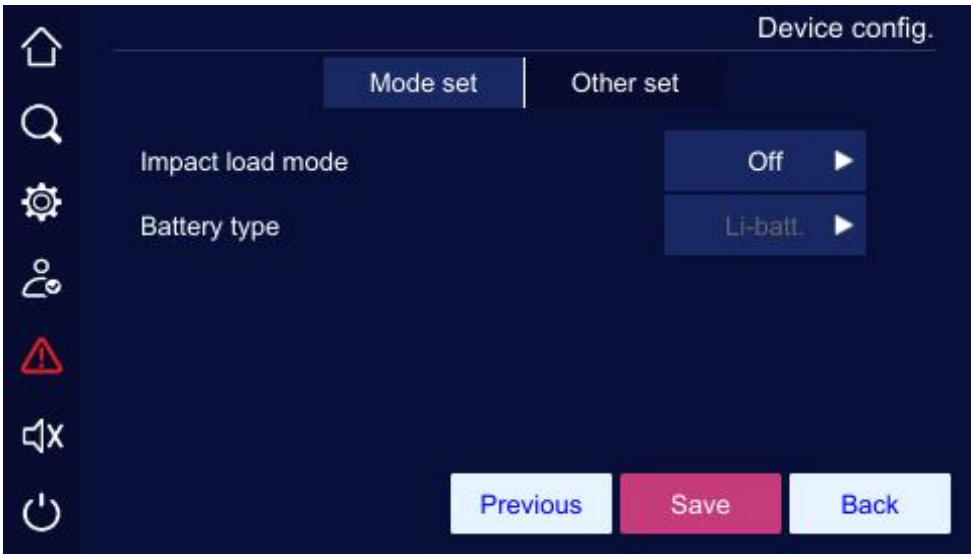


Figure4-45 Mode setpage 3 of device configuration

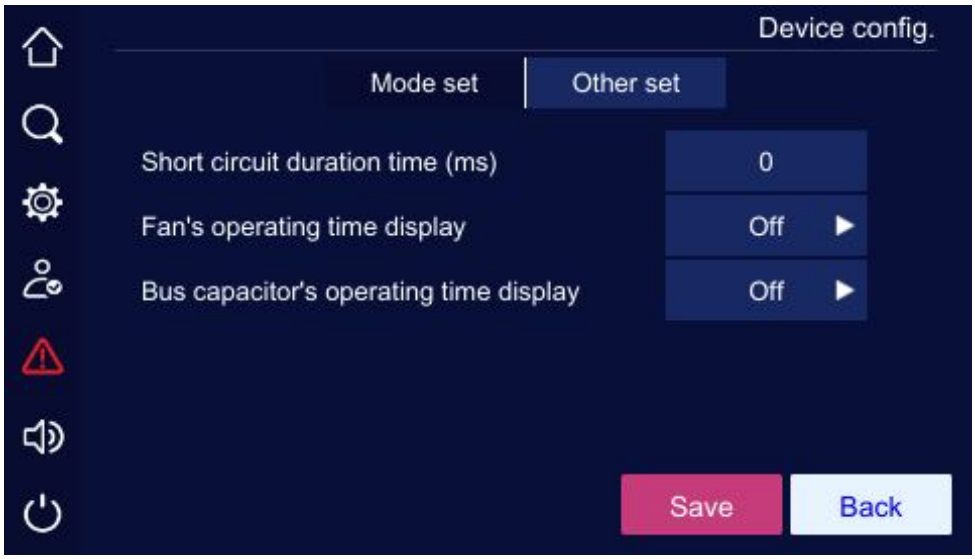


Figure4-46 Other setpage of device configuration

Table4-3 Setting description forbattery mange page

Item	Settable value
Short circuit duration time (ms)	10-200
Fan's operating time display	On, Off
Bus capacitor's operating time display	On, Off
Work configuration	33

Item	Settable value
Parallel mode	Redundant, Single, Expand, BSC
Parallel UPS ID	1-4
Frequency converter function	On, Off
Frequency converter frequency	50, 60
Self-start when power on	UPS will not turn off, On, Off
Bypass disable	On, Off
Bypass disable when short circuit	On, Off
Test load function	On, Off
Test load rate (%)	10-100
Impact load mode	On, Off
Battery type	Li-batt.

Click number input box, it will display the input range of setting value at the top of the input keyboard. When the setting exceeds the range, the setting will be invalid. After setting, click "Save" button to save the setting. Successful setting/unsuccessful setting mark is the same as that of system management.

4.5.8 Dedust Setting Page

In setting manage page, click "**Dedust set**" icon, it will enter dedust setpage, as shown in Figure4-47.

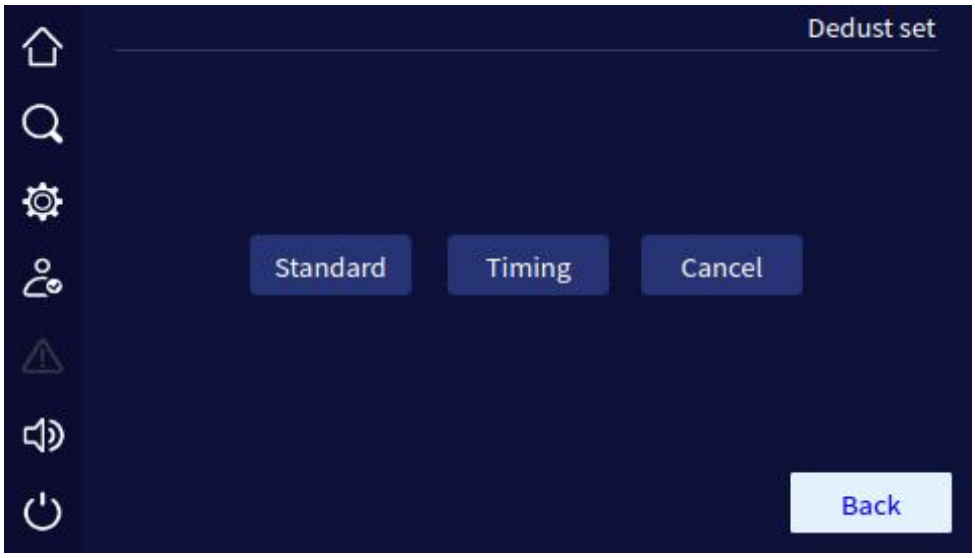


Figure4-47 Dedust set page

4.5.9 Record Management Page

Record mange page can export and clear the history log, user log, and wave capture. Click " " button, you can export the selected items by USB flash drive, click the " " button, you can clear the selected items. Before clearing, it will show the prompting window to confirm, as shown in Figure4-48.

Figure4-48 Export success of record manage page

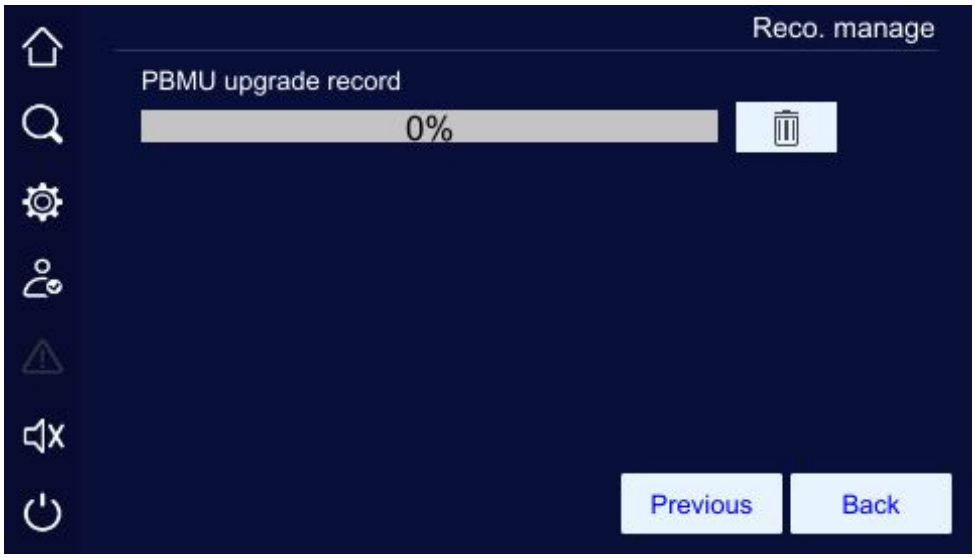


Figure4-49 PBMU upgrade record page

Insert U dish, you can backup the records, as shown in Figure4-50 andFigure4-51.

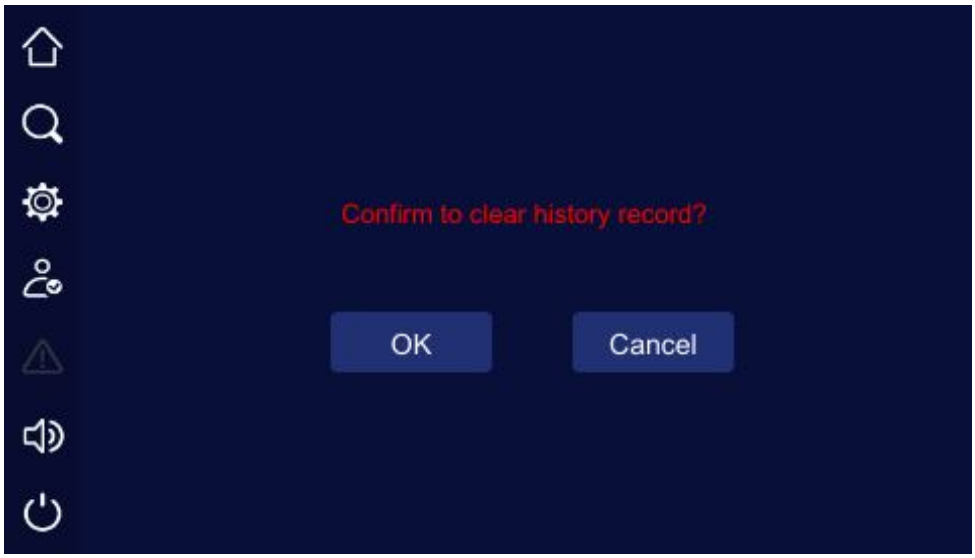


Figure4-50 Prompting forclearing log

Figure4-51 The U dish is not inserted

4.6 Current Fault Page

When the UPS isfault, the " " icon at the left will light on, as shown in Figure4-52. Click it, the page will show the current fault information, as shown in Figure4-53.

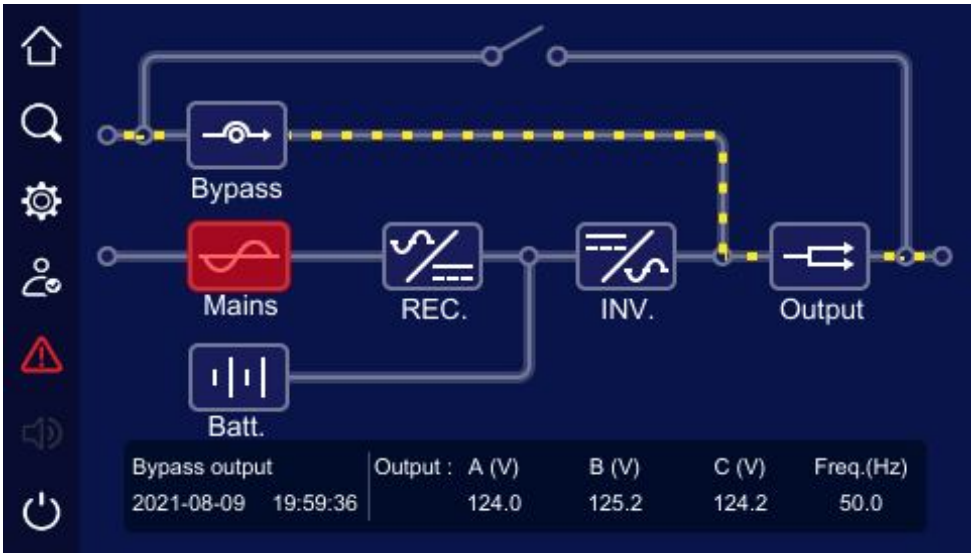


Figure4-52 Fault alarm status

Figure4-53 Current fault information

4.7 Buzzer Control

When the UPS fault, the buzzer icon will light on. Click the "  " icon, the buzzer can be muted or opened. Figure4-54 shows the buzzer mute status.

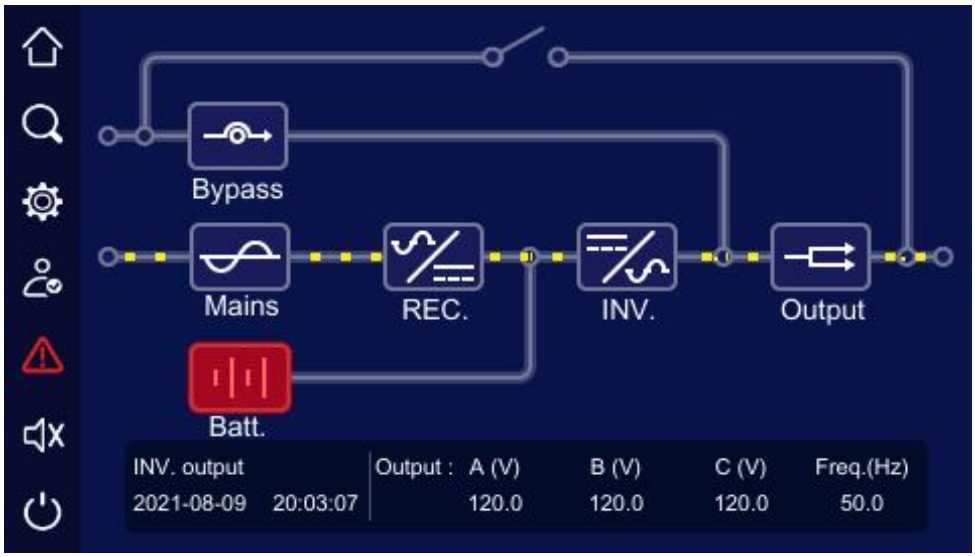


Figure4-54 Buzzer mute status

NOTE
The buzzer cannot be mutedwhen it long beep.

4.8 ON\OFF Operation

4.8.1 UPS ON/OFF Operation

In main page, click " " icon, the UPS can be started or shutdown. When the UPS is shutdown, click the icon, it will show" Confirm to power on? " , when the UPS is started, it will show " Confirm to power off? " as shown in Figure4-55 and Figure4-56.

Figure4-55 Confirm to turn on page

Figure4-56 Confirm to turn off page

4.8.2 Li-ion battery ON/OFFOperation

When the battery module is powered on, it will automatically turn on. In the Batt. manage page, set "Li-batt. OFF" to "Off", the page will prompt "Confirm to power off?" , then you can click

"**OK**"button to power off all battery module. Set "**Li-batt. ON**" to "**On**", the page will prompt "Confirm to power on ? ", then you can click "**OK**" button to power on all battery module. As shown in below.

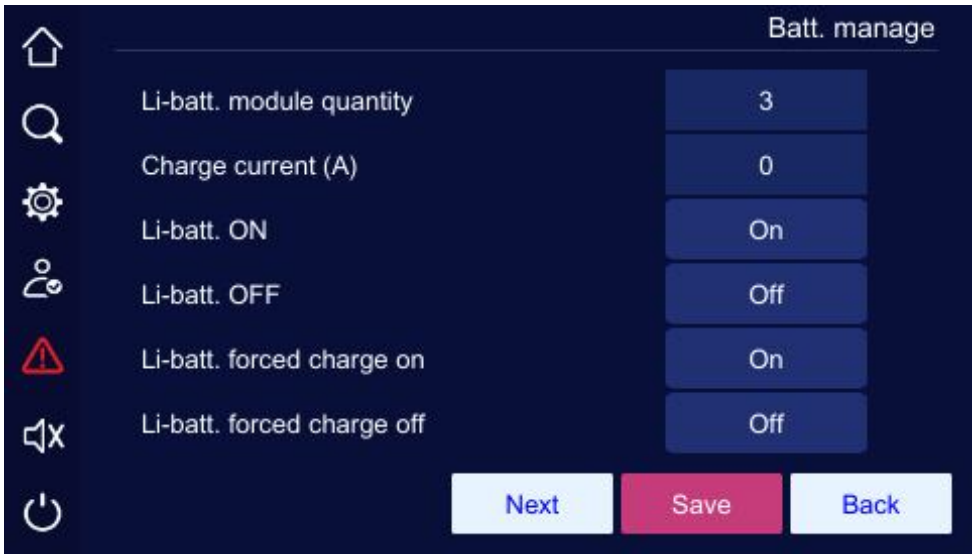


Figure4-57 Li-ion battery ON/OFF page

Figure4-58 Li-ion battery power offconfirmation

Figure4-59 Li-ion battery power on confirmation

5 Operation and Maintenance

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

5.1 Check Before Startup

- Check if the wire connection is firm and the color of AC wires is in accordance with the specification.
- Check if UPS is grounded reliably.
- Check if the voltage between the neutral wire and grounding wire is less than 5Vac.
- If the UPS equipped with remote monitoring device, check if the wiring of the RS485 port is correct.
- If it is long backup model, check if the wiring between UPS and battery box is correct and reliable.
- Check if the wiring is neat and the wire binding is in accordance with the specification.
- Check if the installation and wiring are good fortransformation, expansion and maintenance in future.
- Check that there is no short-circuit in the output of the UPS and the load capacity isn't beyond the rated capacity of the UPS.

5.2 Startup Operation

Step 1 Closethe breakerof input and bypass.

Step 2 After touch screen light on, turn the switch on all battery module to  position, until all green indicators are on.

Step 3 Press "ON" combination button (touch screen) for1sat the same timeto start the UPS.

Step 4 About 10s later, if the UPS works steadily, start loads, such as PC, etc.

CAUTION

Start load according to "high power device→small power device", which is to avoid overload protection when starting high power device.

----End

5.3 Shutdown Operation

Step 1 Close load and keep the UPS running without load forabout10min to exhaust heat.

Step 2 Press "OFF" combinationbutton (touch screen) for1sat the same time to shut down the UPS.

Step 3 Turn the switch on all battery module to position, all indicators are off.

Step 4 Open the breaker of input and bypass.

----End

5.4 Parallel SystemOperation

5.4.1 Start Parallel System

CAUTION

Ensure that each UPS in the parallelsystem is equipped with theParallel Kit-T (2m) NT-PA (optional) forparallel and has been set to the same parallel mode through the screen display.

Please refer to the **4.5.7 Device Configuration Page** of touch screenforcorresponding screen display settings.

Before completely starting the parallel system, please do not start load, and ensure that all switches of UPS are off.

The following steps forstart the parallel system:

Step 1 Ensure that each UPS of parallel system is installed properly, start each UPS of parallel system according to the 5.2 Startup Operationone by one.

Step 2 After each UPSin parallel system outputs by inverter, measure the inverter voltage of each paralleled UPS. The voltage difference between max. and min. voltage should be within 8V. Close the output breaker of paralleled UPS, measure the circulating current of parallel UPS, and the current should be less than 3A.

When the voltage different larger than 8V, measure the output voltage of the UPS and check if the output are all 120V, if the voltage different larger than 15V, please report it to our company to maintain it. In addition, once the circulating current of parallel UPStoo large, it will lead to the inverter fault. If the circulating current is larger than 3A, please report it to our company to maintain it.

Step 3 Switch on the total output breaker of UPS, each output branch breaker, and then start the load one by one.

----End

5.4.2 Shut Down Parallel System

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

Step 1 Shut down all load.

Step 2 Shut down parallel UPS one by one.

Step 3 Switch off the related breakers of each UPS (when daily use, the breakers can be not closed).

----End

5.4.3 Exit Parallel System

When one UPS in parallel system fault, it will exit from parallel system automatically with sound & light alarm. At that time, perform the operations shown in Figure5-1, the fault UPS will be exited from parallel system completelyto achieve online hot maintenance or replacement.

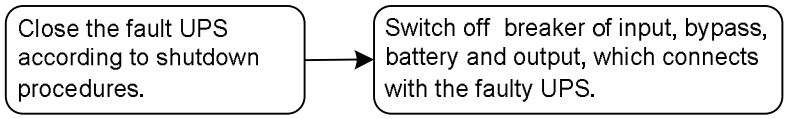


Figure5-1 Exit parallel system

CAUTION

When the parallel system works normally, it's better not to exit the output from parallel system before the UPSclosed, or the power supply will be abnormal.

5.4.4 Redundance Function of Parallel System

When system adopts N+1 redundance design, the total output cannot larger than N times of single UPS's rated power. When one paralleled UPSfault, it can put in to use or exit parallel system and do not affect the operation of system, which enhance the system reliability. When output exceed N times of single UPS's rated power, the overload UPS (exceeding N/ (N+1) times of single UPS's rated power) will send alarm. Forexample, forthe backup system with two UPS, once one UPS overload for50% rated power, it will send overload alarm.

5.5 Periodic Preventative Maintenance

To improve the efficiency and reliability of the UPS, perform the following maintenance regularly:

- Clean the UPS by dry cloth regularly. Don't use liquid or spray cleaner. Before cleaning, shut down the UPS.
- Check if the wiring of input and output is firmly and well connected.
- Check the working status of cooling fans regularly. Prevent sundries from blocking the air outlet. If damaged, please replace it in time.
- Check the battery voltage and the working status of UPS regularly to discover fault timely.

5.6 Maintenance Guide

Proper maintenance is the key to make the S^3li-ion battery system operate in the best status and with a longer service life.

5.6.1 Safety Precautions

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

- Please keep in mind that there is dangerous voltage inside the S^3 li-ion battery system even if it does not operate. Before maintenance, use a multi-meter to check the voltage and make sure that the S^3 li-ion battery system is completely shut down and stays in safe status.
- Do not wear any conductive metal objects during operating, such as ring, watch.

- Observe safety regulations strictly. If any doubt, please consult professionals who is familiar with the li-ion battery system.

5.6.2 Preventive Maintenance

To improve the reliability and efficiency of S^3 li-ion battery system, perform the following maintenance tasks regularly.

- Keep the operating environment clean to avoid dust or chemical pollution to the li-ion battery system.
- Check the wiring terminals on input, output cables every half year and see if the contact is in good status.
- Check the fans work status regularly, avoid sundries blocking the air vents. If a fan is damaged, maintain or replace it in time.
- Check the SOC and SOH of li-ion battery modules regularly, ensure that the li-ion battery modules work in good status.
- Check the work status of S^3 li-ion battery system regularly and ensure that any fault can be found in time.

5.7 Daily Maintenance of Li-ion Battery Module

- Charge requirement of li-ion battery module
  - When first use, please start the UPS and charge the battery. During charging, the S^3 li-ion battery system still can be used, but if power outage occurs at the same time, the battery discharge time may less than the standard vale this time.
  - If the S^3 li-ion battery system or module not used for a long time, please charge them regularly to supply power. The charge time of li-ion battery module is as follows.

    When SOC≤10%, please charge it immediately.

    When 10%≤SOC＜40%, please charge it every month.

    When 40%≤SOC＜80%, please charge it every 3months.

    When 80%≤SOC＜100%, please charge it every 6 months.
- Clean the shells of li-ion module by cloth. Oil and organic solvents, such as petrol and diluents are prohibited.

- Keep the li-ion battery modules far away from fire sources and devices that easily generate sparks to avoid explosion.
- If the S^3 li-ion battery system needs to stop using, screw the ON/OFF knob to  status to avoid long discharge, and even cause the li-ion battery damage.

5.8 Announcements for Module Replacement

- Do not put the battery into fire, which is to avoid explosion.
- Do not open or disassemble the battery, especially for the inner cells, which is to avoid electric shock or burn dangerous.
- The recycle for the li-ion battery module should be done according to corresponding laws and regulations.
- Dangerous voltage may exist in the output end of the li-ion battery module, before contacting, please check if there is dangerous voltage to avoid endanger human safety.
- Keep the ON/OFF knob of replaced module at  status If the replaced module needs to be transported, it is suggested to pack the module the original package material or contact the local agency or distributor.

5.9 Troubleshooting

5.9.1 Common Fault

As shown in Table5-1, it only includes some common fault diagnosis. If any doubt, contact the local office or distributor fordetails.

Table5-1 Troubleshooting

Fault phenomenon	Possible reason
The mains normal, after starting the UPS, it outputs normally, but it works in the battery mode and the buzzer beeps intermittently.	Check if the contactors and wiring terminals in the input circuit are in good condition; Check if the displayed input voltage amplitude or frequency of mains on the touch screen is beyond the allowable range of UPS; Check if the mains input breaker is disconnected, if yes, pleaseclose the breaker again.

Fault phenomenon	Possible reason
After installing UPS, connecting with power will fuse the fuse or cause tripping operation.	The wiring of UPS input or output is short circuit.
After starting, the touch screen display and output are normal. But once connecting with load, it will stop outputting immediately.	UPS is overload seriously or the output circuit is short-circuit. Please reduce load to proper capacity or find the short-circuit reason. The common reason is that the output changeover socket short-circuit or the input short-circuit after UPS damage; The load is not started according to "high power device → small power device". Restart the UPS, and after the UPS works steadily, start high power load first, and then start small power ones successively.
Buzzer long beeps, fault indicator lights on, UPS works in bypass mode and inverter failure.	The output is overload. The load is too heavy and beyond the rated power of the UPS. Please reduce load or select a UPS with larger power capacity. If it is temporary bypass caused by impact of load start and recovers automatically, it still is normal; UPS over-temperature protection. Check if the air inlet and air outlet of UPS is blocked or the working temperature of UPS is beyond the allowable range.
Usually, UPS works normally. When power failure, it doesn't transfer to battery mode or it transfers to battery mode and battery under-voltage protection soon.	Battery aging, the battery capacity loss. Please replace battery; Battery charger fault. At ordinary time, the battery cannot be charged; Battery wire doesn't connect well or the terminals contact is bad.
When the load is PC, everything works normally. When power failure, UPS works normally, but the computer system halted.	The grounding connection is not so good. The floating voltage between the neutral wire and the grounding wire is too high.
The module quantity on the touch screen is not the same as the actual module quantity.	The module quantity on the touch screen is not set according to the actual used module.

Fault phenomenon	Possible reason
Mains normal and the SOC of li-ion battery module is lower than 80%, but the charging for li-ion battery module cannot be done.	1. The charge voltage of UPS beyond the allowed range and cannot charge the li-ion battery system. 2. The wiring of battery is not well connected or the polarity of battery is reverse connected. 3. Li-ion batterypower off.
Once the S^3 li-ion battery system switches to discharge status, it starts to protect immediately.	1. The connected load capacity exceeds the rated output capacity of li-ion battery system. Please lessen the load or add the battery module quantity. 2. The S^3li-ion battery system is not charged for a long time and cause the SOC low or the battery damaged, once discharge, it will turn to protect for low SOC.
After starting, theS^3 li-ion battery system works normally, but some time later, it will shut down automatically.	On battery supply power mode, the system turns to battery low-voltage protection for discharging ending, the system shut down automatically, this phenomenon is normal. When the mains recover, the system will start and charge the battery automatically.
The red indicator on the panel of li-ion battery module light on.	1. The module protects for low SOC. 2. The operating temperature exceeds the allowed range or the heat dissipation fan is not started. 3. The module fault, please replace it in time.

Table5-2 Meaning of fault symbol and buzzer status

NO.	Fault symbol	Buzzer status	Meaning
1	EPO	Long beep	UPS has emergency protection (if equipped with EPO function), Bypass output and inverting output are all closed.
2	Mode fault	Long beep	UPS system mode system settings and the actual wiring do not match the fault, please check the main power or bypass wiring, and make the actual system is consistent with the set mode system.

NO.	Fault symbol	Buzzer status	Meaning
3	Maintain bypassfault	Long beep	UPS maintenance bypass protection, inverted output closed, please checks back board maintenance bypass detection port is shorted.
4	Output fault	Long beep	The UPS output is faulty, detect the UPS output is short or over load.
5	Mode mismatch	Long beep	The UPS of the input and output mode in the parallel does not match the actual system.
6	Voltage mismatch	Long beep	The UPS of the output voltage in the parallel does not match the actual system.
7	Frequency mismatch	Long beep	The UPS of the frequency in the parallel does not match the actual system.
8	Bypass mismatch	Long beep	The UPS of the bypass voltage or frequency in the parallel does not match the actual system.
9	Pattern mismatch	Long beep	The UPS parallel mode setting in the parallel system does not match the actual system.
10	Power mismatch	Long beep	The UPS of the output power setting in the parallel does not match the actual system.
11	Battery number mismatch	Long beep	The UPS of the battery number setting in the parallel does not match the actual system.
12	Parallel mismatch	Long beep	The UPS of parameters setting in the parallel does not match the actual system.
13	Short mismatch	Long beep	The UPS of short turn to bypass setting in the parallel does not match the actual system.
14	Two-ended fault	Long beep	Fall-off fault at both ends of the parallel wire.
15	Single-ended fault	Slow beep	Fall-off fault at one ends of the parallel wire.
16	Auxiliary powersupply	Long beep	UPS internal working power failure, if it cannot be automatically recovered, please report

NO.	Fault symbol	Buzzer status	Meaning
	failure		repairpromptly.
17	Fan failure	Urgent beep (alarmonceabout every 0.2s)	Fan fault warning prompt, please check the fan fordamage or blocking.
18	CAN fault	Slow beep (alarm once about every 2.0s)	The CAN communication of parallel system abnormal, please check if the parallel wire is damaged or there is only one UPS in parallel system works.
19	SCI fault	Long beep	UPS internal communication abnormal, if the continuous alarm cannot be restored, please report repairpromptly.
20	There is no redundancy in the parallel UPS	Slow beep (alarm once about every 2.0s)	The total output load of the UPS parallel system exceeds the full load of the single machine, check that the output load exceeds the requirements forredundant backups.
21	Main power abnormal	Long beep	The mains power input phase sequence is abnormal, please check the main power input wiring.
		3 continuous alarms at 10s intervals	The main power inputoccur lack N fault, power down failure, overvoltage protection, undervoltage protection, over-frequency fault, under-frequency fault, please check whether the main power input status is normal.
22	Bypass abnormal	Slow beep (alarmonce about every 2.0s)	At mains status, the bypass voltage abnormal, frequency abnormal, phase sequence abnormal, or mode setting mismatches the wiring. Please check if the bypass breaker is closed, if the bypass phase sequence is normal, if the wiring way of bypass matches the system mode setting.
23	Battery	Slow beep (alarm once	Battery has been pressure protection, charging fuse failure, over-pressure alarm fault, please check the

NO.	Fault symbol	Buzzer status	Meaning
	abnormal	about every 2.0s)	battery status is normal.
		Urgent beep (alarm once about every 0.2s)	Battery wiring fault, charging short, under-voltage protection, under-voltage warning problem, please check the battery wiring and the current state is normal.
		No buzzer warning	The battery charging temperature is too high.
24	Rectifier abnormal	Urgent beep (alarm once about every 0.2s)	UPS rectifier fault.
25	Inverter abnormal	Long beep	UPS inverter fault.

NOTE

The buzzer alarm in the table above describes the phenomenon of UPS boot state and no beep ban when the buzzer is not set, the shutdown state or some abnormal phenomena when setting the buzzer ban will prompt the information in the touch screen, but the buzzer alarm will not be issued.

When one battery module fault, it will be insulated with system automatically. Generally, it will not affect the normal operation of system, but it will decrease the redundancy degree of module. At this time, please shut down the fault module and pull it out of the cabinet, and then inform the engineering technicist to maintain.

6 Package, Transportation and Storage

6.1 Package

During packing, please pay attention to the place direction requirements. At the side of the package, there is afraid of wet, handle with care, upward, etc. alarm marks. And also, the device model is printed on the package. At front of the package, the device name is printed.

6.2 Transportation

During transporting, pay attention to the warning marks and avoid severe impact on the package. Place the device according to the marked direction, which is to avoid damage the component. Any inflammable, explosive, corrosive object is not allowed to shipping with the device. While midway transportation, do not put the device in the open air. The device cannot suffer any rain, snow or liquid material or mechanical damage.The capacity of transported li-ion battery module should be within the range of 20-50%.

6.3 Storage

During storing, place the UPS according to the marked direction. The package box should be far away from ground for200mm(7.9in), and keep at least 500mm(19.7in) from wall, eat source, cold source, window or air inlet.

Storage temperature: -10~45℃, relative humidity is 20%~80%.In the warehouse, any inflammable, explosive, corrosive object or harmful gas is not allowed, and also, strong mechanical shake, impact or magnetic field is forbidden. The storage period of these requirements, generally, is 6 months. If the UPS is stored more than 6 months, it is necessary to check again. If the UPS is stored fora long time, please charge the battery every 3 months.If the device is stored for a long time, please charge the S^3li-ion battery system every 3 months.

A Technical Specifications

Index \ Power		10kVA	15kVA	20kVA	30kVA
Input	Input mode	3W+N+PE			
	Voltage range (Vac)	When the input voltage in the range of 90~155, the UPS can bear load of 100% rated power; When the input voltage in the range of 70-90, the output of the UPS needs to decrease rated power linearly to use			
	Frequency range (Hz)	39.5~70.5			
	Bypass synchronism track range (Hz)	50/60±10% (50/60 self-adaption)			
	Bypass input voltage range (Vac)	10%/15%/20% (default is 20%)			
	Input power factor	≥0.99			
	Input THDI	Resistive full load: ≤3%; non-linear full load: ≤5%			
	Battery voltage (Vdc)	240Vdc			
	Charge current (A)	2~40 settable (default is 20)			
Output	Output mode	3W+N+PE			
	Capacity (kVA/kW)	10/10	15/15	20/20	30/30
	Voltage (Vac)	L-N: 110/115/120/127 (default is 120);			

Index \ Power		10kVA	15kVA	20kVA	30kVA
		L-L: 190/200/208/220 (default is 208)			
	Frequency (Hz)	When mains is normal, it tracks the bypass input frequency; When mains is abnormal, it tracks the frequency of 50±0.1 or 60±0.1			
	Wave form	Sine-wave			
	Voltage distortion	Resistive full load: ≤1%; non-linear full load: ≤4%			
	Power factor	0.9/1 settable (default is 1)			
	Transfer time of bypass and inverter (ms)	Synchronization: <1ms; asynchronization: <10ms			
	System efficiency	Up to 94%			
	Overload capacity	Inverter: <105%: continue; 105%~110%: 60min; 110%~130%: 10min; 130%~150%: 1min; 150%~200%: 200ms; >200%: protection immediately. Bypass: <130%: continue; 130%~155%: 1min; >155%: 200ms.			
Other	DC startup function	Equipped			
	Panel display	Touch screen show the running status of the UPS			
	Communication port	RS485 (standard)/RS232 (optional)/SNMP (optional)			
	Alarm function	Alarm for battery low-voltage, mains abnormal, UPS fault, output overload, etc.			

Index \ Power		10kVA	15kVA	20kVA	30kVA
	Protection function	Protection for battery under-voltage, overload, short-circuit, over-temperature, input over-voltage, communication abnormal, etc.			
	Noise (dB)	<63 (25℃)			<68 (25℃)
	Work temperature (℃)	0~40			
	Relative humidity	0~95%, non-condensation			
	IP class	IP20			
	Size (W×D×H)	378×993×1250mm(14.9*39.1*49.2in)			
	Weight	135kg(298lb)	177kg(390lb)		220kg(485lb）

- Specifications are subject to change without priornotice.

B Acronyms and Abbreviations

A

AC	Alternating Current
AWG	American Wire Gauge

D

DC	Direct Current

E

ECO	Energy Control Operation
EPO	Emergency Power Off

P

PE	Protective Earthing

R

RS232	Recommend Standard232
RS485	Recommend Standard485

S

SNMP	Simple Network Management Protocol

U

UPS	Uninterruptible Power Supply
USB	Universal Serial Bus