

L series 3/3 online UPS (10KVA~400KVA)



User's Manual

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1. Importance indication

This manual contains the guidance of UPS and accumulator when installation and application, also includes the guidance of problem setting and maintenance.

- Ø Please read this user manual carefully before using or installing the machine.
- Ø This manual must be read to and conserved by a professional person.
- Ø This manual does not introduce the specified technologies.
- Ø This manual only applies to the L series 3/3 online UPS.

This manual provides the reference when using and guidance when alarming and working.

1.1. Applied condition

This UPS provides AC power supply, which is the basic power of your equipment. Please carefully check whether the input and output pressure and frequency can meet the using requirements.

UPS input AC capacitor must be as requested. Otherwise the UPS will work improperly or even occur security accident (when the UPS input is generator, generator capacity should be 3 multiple more than UPS).

1.2. Working environment

The working environment and maintain methods also influent the using age and failure rate of the UPS. Therefore, please avoid the following working environment in long term.

- Places over demand of specifications (temperature 0°C~40°C, relative humidity 30%~95%).
- Places with bare sunshine.
- Places near by the heat sources. Over heat will speed up the external battery self-discharge.
- Places liable to shaking and shoving.
- Places have powder, corrosive substances and combustible gas.

1.3. Safety notice

Forbiddance

1.3.1. Because it is with high-voltage power in the UPS, only our company's or our non-authorized technical staff can open the UPS cover. Otherwise there will be the danger of electric shock and loss the warranty qualification.

1.3.2. Discussion with distributor is a must before applying to the following load equipments. The application, setting, management and maintenance and so on must be considerate and design specially.

Life supporting systems

Medical devise directly linked to with the patient's life

Equipment which might endanger person's safety such as elevator

Similar equipments

1.3.3. The battery is prohibited to be close to fire, so as to avoid the explosion.

Safety notice

1.3.4. Generally the UPS is in connection with batteries. So that there might still be voltage in the output end even without AC input.

1.3.5. When UPS need to be moved or re-wiring, you must ensure that all UPS stop working, electricity input and batteries input is off. Otherwise, there may still be risk of electric shock in the output end.

1.3.6. To ensure the person's safety, this series UPS must be of good grounding protection and of reliable grounding before the using.

1.3.7. Please keep the air intake and exhaust open. Poor ventilation will increase the internal temperature of the UPS and therefore short the lifetime of UPS spare parts.

1.3.8. Liquid and other objects should not be leaked into the inside UPS inside box.

1.3.9. In case of fire broken out around, please use dry powder fire extinguisher. Liquid fire extinguisher will be danger of electric shock.

1.3.10. The life time of product will decrease by the increasing of temperature. Regular replacement could guarantee UPS work normally and maintain sufficient time. Replacement the battery must be operated by authorized technologists.

1.3.11. If no use it long time, UPS must be stored in dry environment, the host (without batteries) the storage temperature range: -40 °C~+70 °C.

1.3.12. In term of no use the UPS for long time, it is advised to charge it by AV for more than 12 hours every 3 months. To avoid any battery damage for long time no using.

1.3.13. Please do not open the battery cabinet in case that the electrolyte injury the skin and eye. If incaution the body contact the electrolyte, please wash it with plenty of water and then go to the hospital.

1.3.14. Please do not open the cabinet by yourself because there are many high voltage accumulator spare parts. Otherwise any accident arisen should at your peril.

1.3.15. Please do not disassembly any connection cable by yourself without permission.

1.3.16. Because this UPS is very big and heavy, please do not move and shake it violently. Also good ventilation is necessary.

1.3.17. Do not exhaust the dust when it is electrophorus. Do not use wet washrag to clean the dirt.

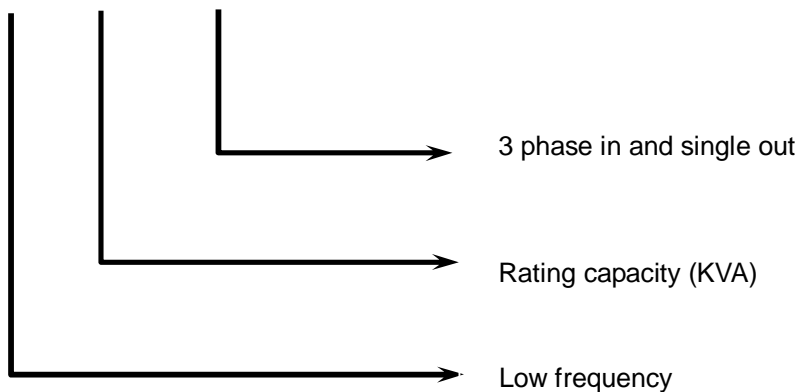
1.3.18. The battery must be replaced by professional technologist. Replaced battery should be send to special Recycling agencies. Battery belongs to toxic waste.

2. Products information

L series 3/3 UPSs are with a power range from 10KVA up to 400KVA. This series UPSs use high-speed MCU and CPLD and programmed and controlled by software. L series 3/3 UPSs bring in the sixth generation low-exhaust and big-power IGBT and static switch as power components. L series 3/3 UPSs product combine world's newest control spare parts and the most advanced software, and apply broadly to industrials such as building lighting, road traffic lighting, electricity, industry and other industrial and mining enterprises fields.

2.1. How to name the UPS

L XXX — 3/3



UNINTERRUPTIBLE POWER SUPPLY

Name: UPS

Type: L**K3/3

Input voltage: 380VAC±20%, 50Hz

Output voltage: 380VAC±2%, 50Hz

Battery voltage: 384VDC

Production date:

Production number: BKUPSTT400K060508001



PC1215400K9H060508

Name——UPS;

Type——it means the UPS's rating capacity; please refer to the product naming regulation.

Input pressure——rating input pressure and frequency

Output pressure——rating output pressure and frequency

Battery pressure——rating battery pressure

Production date——leave factory date

Production number——production serial number

Code number——CODE-39 standard

2.2. Main features

I Online working pattern and prompt static switch

I Intelligent digital control technology

It adopts 3 high-speed microprocessor controlling systems and operation parameters which make its operation & management more perfect and its self-diagnosis and self-detect function stronger. You can also fully trust the sine wave which was converted by figure voltage to operate perfectly and meet your demand.

I Efficient IGBT inverter AB technology

I High-speed switch feature of IGBT; High voltage and large current; adopt voltage drives, only needs little control power. With lower saturation voltage of the fifth IGBT, the inverter AB works more efficiency and reliable.

I Superior load

It is completely capable to load from 0-100% while no need to change to bypass, which make sure the output reliable.

I Intuitive view of the LED working state and work flow

I Humanized big touch screen LCD in both Chinese and English

It provides intuitive view of intelligent icon status of the flow chat, tabular data, events records and menu operation in both Chinese and English.

I Perfect protection

It has output over/low load protection, input surge protection, phase sequence protection; battery over charge/discharge protection; short circuit protection; over-temperature protection and so on, as well as alarming function.

I High dynamic performance

Adopting kinds of feedback control such as instantaneous control method and valid date, it achieves high dynamic adjustment and reduces the output THD.

I Adopt 6 pulse rectifier (option 12 pulse and input harmonic filter)

Effectively restrain the input THD; raise UPS input power factor, reduce the input THD current.

I Intelligent battery management

L series 3/3 online UPSs can automatically adjust battery charge parameters according the user's battery configuration, and can achieve battery float and boost conversion, temperature compensation and battery charge& discharge management according to the power supply environment. It prolongs the battery's lifetime and reduces the operator's burden.

I Optional battery detecting module

It is able to test the single parameter, and display on the LCD. If battery failure it will alarm to runner.

I Intelligent detection function

The system microprocessor will continuously detect on line all power's supply working status, breaker status, and all circuits working status. Any failure occurs, the detecting system will immediately alarm to the runner.

I Intelligent communication

RS232 and RS485 interface realizes multi-communication and long distance monitor.

The choice SNMP card 100% carries out long distance supervision and network management; the optional dry contact connection, adopting no have no the source, efficiently carries out the supervision and control of the UPS status.

I Characteristic setting

As per different power supply, the UPS can adjust the input parameters.

2.3. Technology parameters

(1) Rectifier parameters

Type	L10 K3/ 3	L15 K3/ 3	L20 K3/ 3	L30 K3/ 3	L40 K3/ 3	L50 K3/ 3	L60 K3/ 3	L80 K3/ 3	L10 0K 3/3	L12 0K 3/3	L16 0K 3/3	L20 0K 3/3	L25 0K 3/3	L30 0K 3/3	L35 0K 3/3	L40 0K 3/3
(KVA)	10	15	20	30	40	50	60	80	100	120	160	200	250	300	350	400
Input capacity(A)	20	30	40	60	80	101	121	161	202	242	323	404	505	606	707	808
Working	6 pulse(2 pulse option)rectifier															
Phase	Three phase +N+G															
Voltage	380VAC±25%															
Frequency	50Hz±5%, 60Hz±5%															
THDi	< 5%															
Soft start	0~100% 5s															
Output	432VDC															
Set the DC voltage by soft	432VDC(set them by our engineer)															

(2) Battery and charge parameters

Type	L10 K3/ 3	L15 K3/ 3	L20 K3/ 3	L30 K3/ 3	L40 K3/ 3	L50 K3/ 3	L60 K3/ 3	L80 K3/ 3	L10 0K 3/3	L12 0K 3/3	L16 0K 3/3	L20 0K 3/3	L25 0K 3/3	L30 0K 3/3	L35 0K 3/3	L40 0K 3/3
Max current discharge(A)	27.6	42.5	55	82	108	135	162	216	270	324	428	535	668	803	935	1069
Battery type	Maintenance-free lead acid battery															
Battery numbers	32pcs															
DC voltage	384VDC															
Float voltage	432VDC(once of three months charge, charge voltage 464VDC)															
Charge power	Rated powerX20%(automatically change follow the batteries)															

(3) Inverter parameters

Type	L10 K3/ 3	L15 K3/ 3	L20 K3/ 3	L30 K3/ 3	L40 K3/ 3	L50 K3/ 3	L60 K3/ 3	L80 K3/ 3	L10 0K 3/3	L12 0K 3/3	L16 0K 3/3	L20 0K 3/3	L25 0K 3/3	L30 0K 3/3	L35 0K 3/3	L40 0K 3/3
Rated power Cosφ=0.8	Capacity×0.8(KW)															

Phase	Three phase+ N+G
Voltage	220/380VAC±1%(state load, 220/380VAC±5%(fluctuate load))
Frequency	50Hz±0.5%, 60Hz±0.5%(with battery)
Output frequency stability	<±0.5%(no in phase)
Input frequency	50Hz±5%
Crest factor	3:1
Wave	Pure sine wave
Output waveform distortion	Pure sine wave, linear load<3%; non-linear load<5%
Dynamic characteristics	<±5%(0←→100%load)
Recover time	<10ms
Overload	125% 1 minute, 150% 1s
Inverter efficiency	≥95%(with100% load)

(4) Bypass parameters

Type	L10 K3/ 3	L15 K3/ 3	L20 K3/ 3	L30 K3/ 3	L40 K3/ 3	L50 K3/ 3	L60 K3/ 3	L80 K3/ 3	L10 0K 3/3	L12 0K 3/3	L16 0K 3/3	L20 0K 3/3	L25 0K 3/3	L30 0K 3/3	L35 0K 3/3	L40 0K 3/3
Phase	Single phase + N															
Voltage	220/380VAC±25%															
Frequency	50Hz±5%, 60Hz±5%															
Transfer time	<1ms(inverter←→bypass)															

(5) System parameters

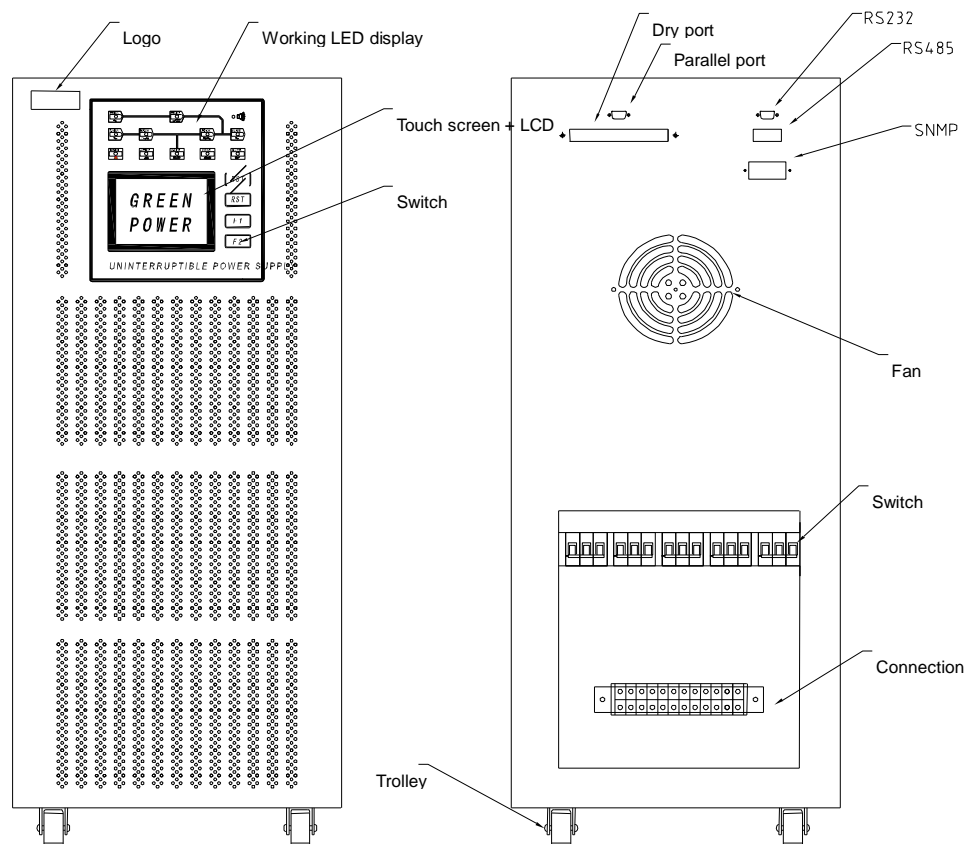
Type	L1 0K 3/3	L1 5K 3/3	L2 0K 3/3	L3 0K 3/3	L4 0K 3/3	L5 0K 3/3	L6 0K 3/3	L8 0K 3/3	L1 00 3	L1 20 3	L1 60 3	L2 00 3	L2 50 3	L3 00 3	L3 50 3	L4 00 3
Efficiency	>80%(load 100%)															
Communication	RS232/RS485, (SNMP card option)															
Temperature	0~40℃															
Relative humidity(no coagulation)	30%~90%															

Height(Max)	< 1000M(a 1% decrease against 100 meters' rise; altitude 4000M Max)															
Cooling-down method	Compulsive ventilation(with temperature control)															
Noise dB	40~50				45~55			55~60			60~65			65~70		
Cabinet colors	Grey(option other colors)															
Input place	Under/back															
Easy to maintain	Top/left or right side open															
Cabinet size W×D×H(mm ³)	430×750×1050				430×765×1050			980×800×180			1380×950×180			1600×1150×180		
Weight(Kg)	200	300	350	400	480	530	580	850	920	1200	1300	1520	1720	1830	1930	1980
Input mode	With the line connection															
Output mode	With the line connection															

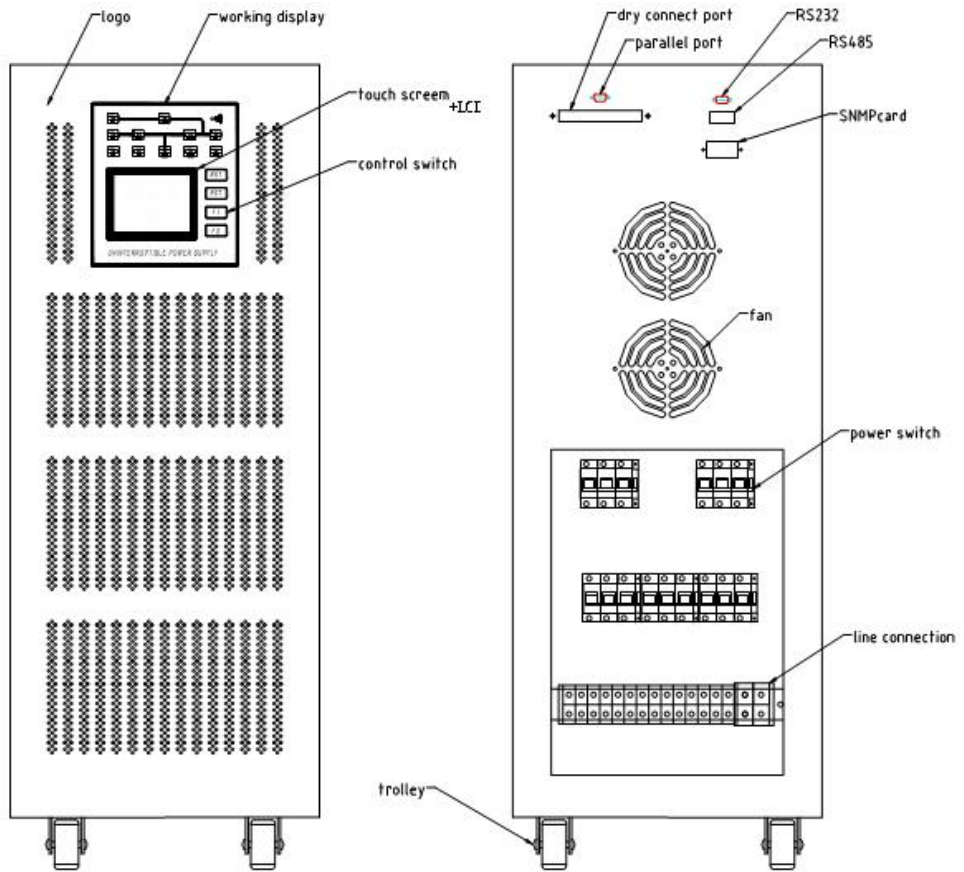
All the above parameters are reference only, any difference please refer to the actual UPS.

3. UPS appearance introduction

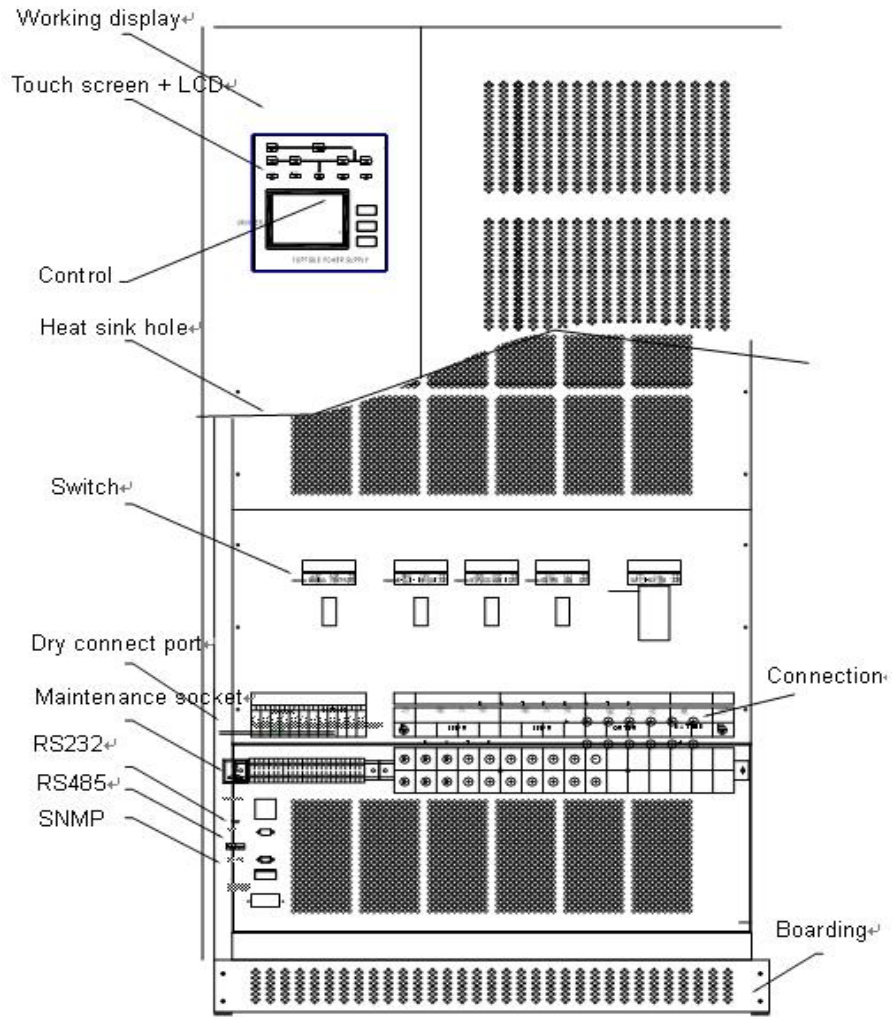
3.1. L10~30K3/3



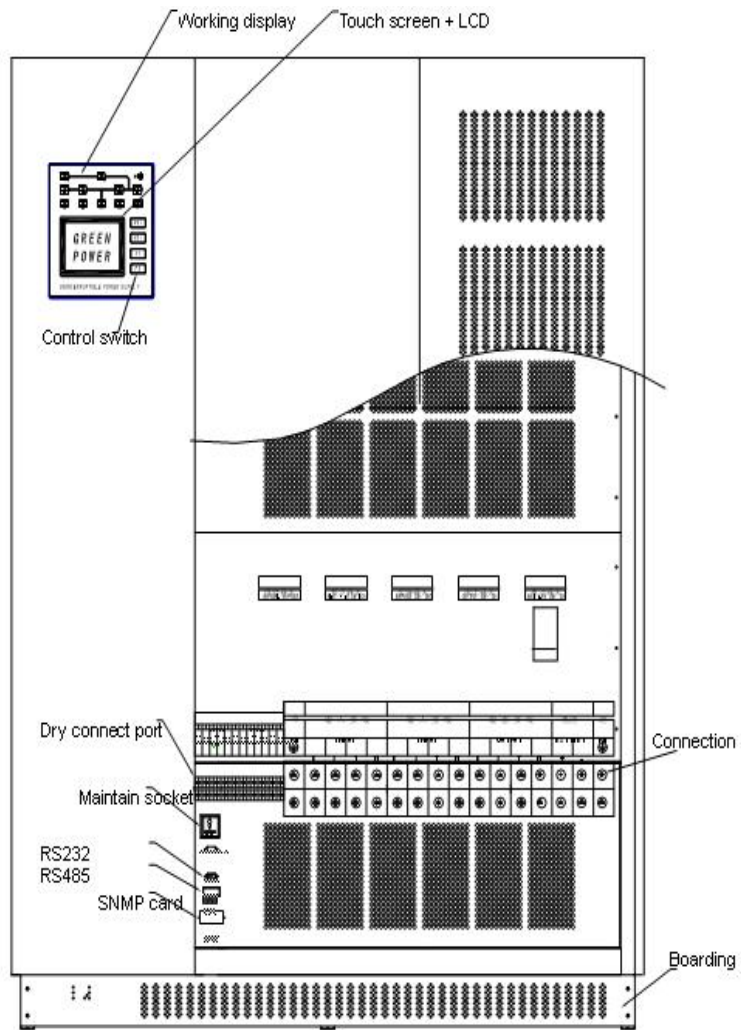
3.2. L40~60K3/3



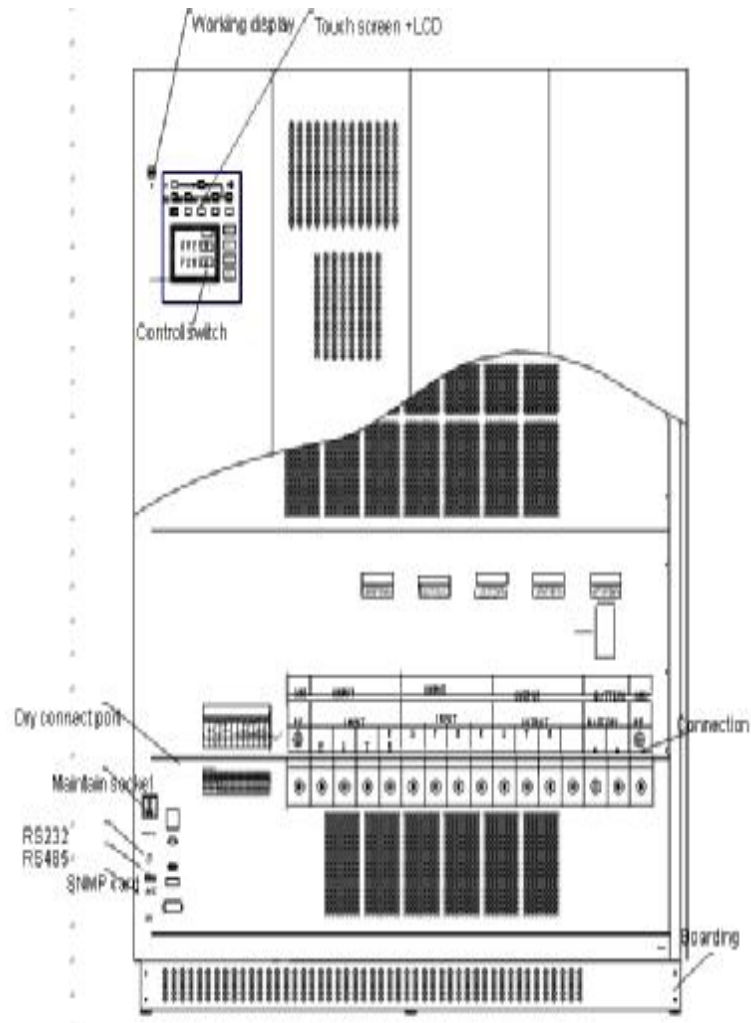
3.3. L80~120K3/3



3.4. L160~250K 3/3



3.5. L300~400 3/3



A. Working status lamp ---- indicate each part of the circuit working status when it works.

- Ø Bypass input---- lightens when bypass input power's voltage and frequency are within normal range.
- Ø Bypass operation----lightens when static switch is bypass working status.
- Ø Main power input---- lightens when main input power's voltage and frequency are within normal range.
- Ø Rectifier normal -- lightens when rectifier works normally.
- Ø Inverter normal -- lightens when inverter works normally.
- Ø Input indication -- lightens when UPS inputs.
- Ø Wrong phase order -- lighten when input AC's phase order has error.
- Ø Working status -- lightens when controlling circuit of the whole machine works normally.
- Ø Battery normal -- lightens when battery's voltage works normally.
- Ø Low voltage -- lightens when the voltage of the battery is low.
- Ø Overloaded input -- lightens when the input is overloaded.

B. Touch screen plus LCD

- Ø Touch screen -- you can touch directly on the screen board and enter into the corresponding menu.
- Ø LCD -- show the status and figures.

C. Details please refer to the part of display and communication.

- Ø Rectifier switch -- the breaker controls the rectifier's input. Meanwhile it protects the rectifier: the breaker cuts when the rectifier is over current.
- Ø Bypass switch -- the breaker controls the bypass's input and protect the bypass meanwhile. The breaker cuts when bypass circuit is over current.
- Ø Battery's switch -- the breaker controls the battery's input and protects the battery group meanwhile. The breaker cuts when battery group is over current.
- Ø Input switch -- the breaker controls the UPS's AC output and protects the output meanwhile. The breaker cuts when input over current or short circuit.
- Ø Maintain switch -- it is used for maintain ups with uninterruptible power, It will turn off when working normally. Please refer to correct flow when using this swift, otherwise it will cause the failure of UPS or output cut.

—Flow of turning on the manual bypass: Manually turn off the inverter (please press the F1 and F2 synchronously on the panel) and start the UPS bypass status. Turn off the manual bypass and then cut off the output swift. Then cut off the other swift according to the detail.

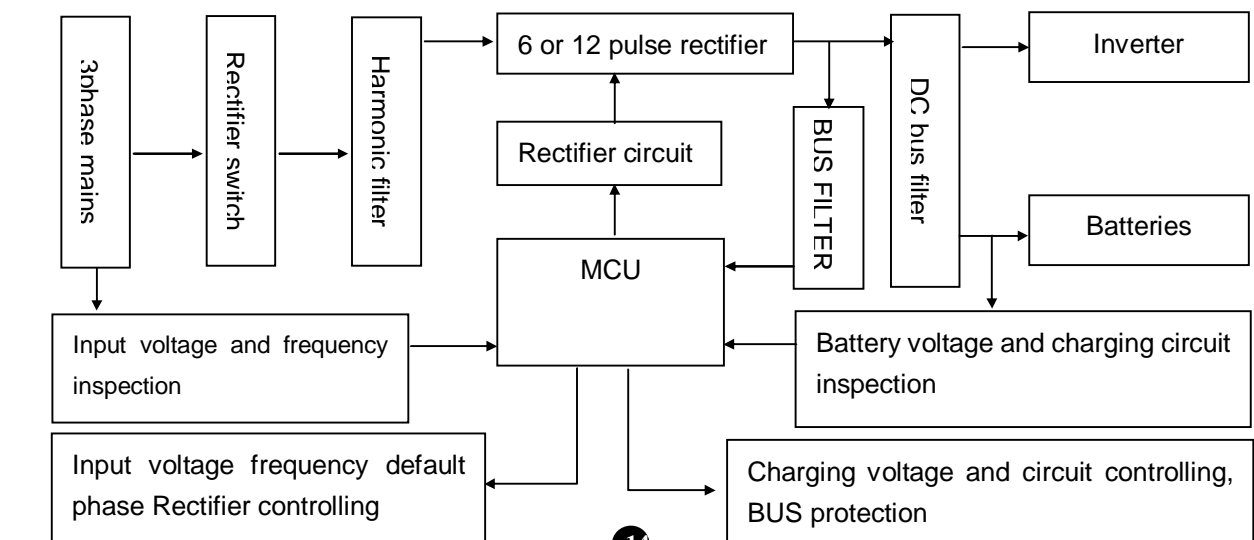
—Flow of turning off the manual bypass: turn on the bypass swift and manually turn off the inverter. Then turn off the output swift and the manual bypass. Then close the rectifier swift and battery swift.

- D. Connection end -- cables connect the input, output and battery.
- E. Dry connection point connections
- F. RSS232 communication meet end -- connect the RS232 meet end in the computer. It will monitor the UPS in background through monitor software.
- G. RS485 communication meet end -- connect the RS485 meet end in the computer. It will monitor the UPS in background through monitor software.
- H. SNMP card -- connect the inter website and operate the web long-distance monitor.
- I. Boarding -- open it and screw and connect lines
- J. Idler wheel -- To move the UPS when installing. Should be fixed after installation.

4. Parts of UPS

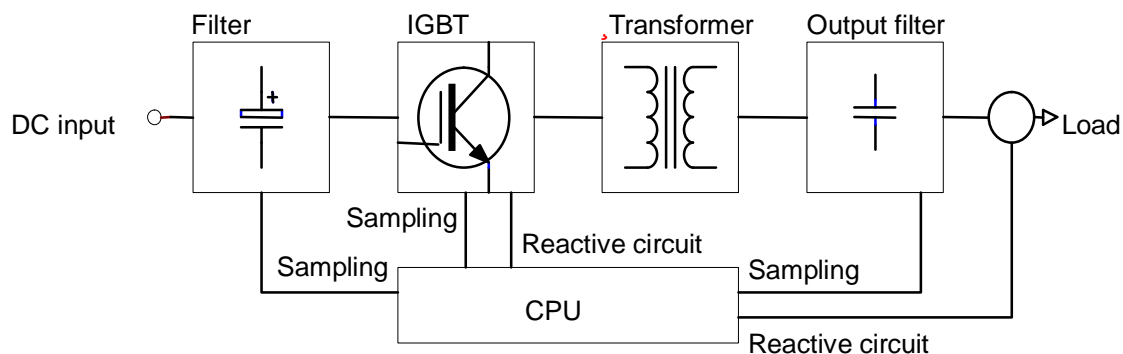
4.1. Rectifier

Convert the 3 phase input AC electricity into stable DC through the rectifier and charge the battery meanwhile. Its consisted parts are as following:



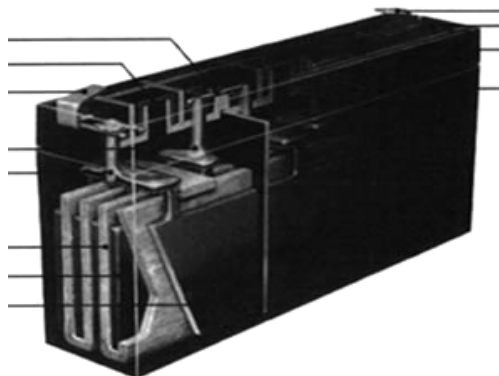
As the above chart, controlled by input through rectifier switch, the main power was rectified to DC firstly by harmonic filter and secondly the 6 or 12 pulse rectifier. At last it was rectified to stable DC bus by harmonic again. Though measuring the input voltage and frequency and DC bus and controlling the rectifier, the commutating control circuit input stable DC to inverter and battery group. Meanwhile it starts protection when I/P wrong phase, be lack phase and over limited.

4.2. Inverter



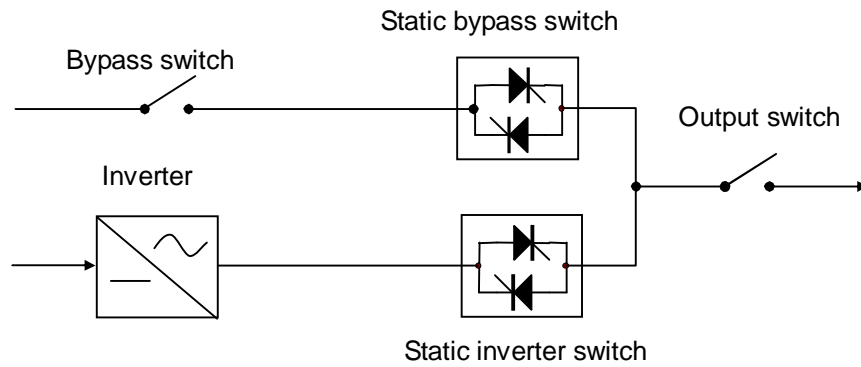
Be consist of sampling circuit, single-chip controlling circuit, IGB driving circuit, IGBT module, inverter isolating transformer, filter inductance and protecting circuit. Microprocessor firstly produce the SPWM signal through computing the sampling signals, and meanwhile drive the IGBT module bas AC and change it into high frequency SPWM waves. Secondly it output pure sine AC through inverter isolating transformer, inverter filter. At the same time it adjust the output voltage and waves' shape via the feedback of sampling signals such as voltage, current and temperature.

4.3. Battery



Battery is consisted of the power slot (plastic crust), the cathode plate, the negative electrode, separator, electrolyte, inter-unit bridge, terminations, safety valves and other components. It is a power and chemical energy conversion devices. The working principle is, when AC is normal the charger will charge and the battery will convert the power to chemical energy which will be stored in the battery; when the AC works abnormally the battery will convert the chemical energy to power to UPS.

4.4. Switch



The UPS pattern is dual-mode transformation. When the inverter does not start it is bypass mode; after turning on the inverter it will high-speedily switch from static bypass switch to static inverter output switch. As static switch is electronic switch so there is no mechanical switching time.

4.5. Displaying and touching screen operation

4.5.1. Touching screen information

Touch-screen LCD monitors is our company's latest invention of the UPS modules, using today's most popular and intuitive graphical operation interface. Comparing with the traditional button-LCD display modules, the touch-screen display module shows a more rich content which avoids frequent page turning. At the same time because the user can get corresponding information by directly press the button on the display screen. It is easy to use easy to get. Meanwhile touch-screen display module comes with real-time clock and memory and can be recorded 256 incidents and other information, which is more humanize.

4.5.2. Operation interface statement

4.5.2.1 Standby screen

Standby screen is shown in figure 1. UPS will start up in the show this standby screen. When the touch-screen interval of about four minutes not to touch, shows CPU will automatically cut off power ----- touch screen backlight can be extended so the backlight life, and return to the standby interface (if UPS is in the police state, the touch screen will be priority information shows that the police box, police information to repeal or abolish manual alarm will not be cut off before the show CPU touch screen backlight back to standby power supply interface).

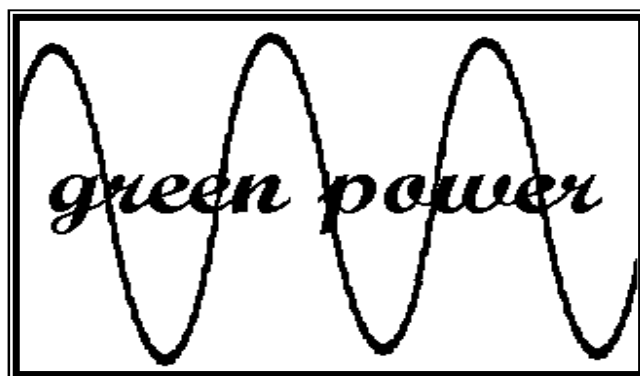














Chart 1

4.5.2.2 Flow chart

As shown in chart 2. Flow chart of the display screen is as shown in figure 2. In standby screen, click any on display screen with their hands to enter the flow chart of the display screen. In this screen can be seen in the UPS work and running the graphics display. Screen in all parts of significance as follows:

- (1) Working status: UPS is on working.
- (2) Alarming: work abnormally.
- (3) Phase lock: when the touch screen displays this mark, it means the UPS and bypass at same frequency, same phase; if in parallel system, and this UPS in accessorial I status, it shows the accessory UPS and the main UPS at same frequency, same phase.
- (4) Communicating: UPS has been in connection with long distant monitor.
- (5) Timing: there is timing assignment.
- (6) Time countdown turning on/off: when the screen appears in the "S" logo, the system is to enter the countdown shutdown turning off; when the screen appears "R" logo, the system is to enter into the countdown turning on state.
- (7) Count down clock: balance time display.
- (8) Maintaining bypass switch: display the maintaining bypass state, when it turns out mark , it means the maintaining bypass is turned on, when it turns out mark of , it means the maintaining bypass is turned off.
- (9) Bypass button: you can check the bypass input state and data display by pressing it.
- (10) When it turns out mark , it means the bypass is turned on, when it turns out mark , it means the bypass is turned off.
- (11) AC button: you can check the AC input state and data display by pressing it
- (12) Input switch: display the input switch state, when it turns out mark , it means the input switch is turned on, when it turns out mark , it means the input switch is turned off.
- (13) Rectifier button: you can check the rectifier's working status and data display.
- (14) System management module: you can control the UPS and inquiry the system record by pressing it.
- (15) AC safety: display the AC safety state, when it is , in the screen it means the AC fuse works normally, when it is , in the screen it means the AC fuse works abnormally.
- (16) Inverter button: you can check the inverter's working status and data display by pressing it.
- (17) Output switch: display the state of output switch, when it turns out mark , it means the output switch is turned on; when it turns out mark , it means the output switch is turned off.
- (18) Output button: you can check the UPS output status and data display by pressing it.
- (19) Battery switch: display the switch's statement, when it is , it means the batter's switch is turned on; when it is , it means the batter's switch is turned off.
- (20) System parameters setting module: to set the system time and language and so on.
- (21) Battery button: you can check the battery's working status and data display by pressing it.
- (22) System time: display the real time on the system.
- (23) UPS series number: show the UPS production series number.
- (24) Broken line: it means the connected modules with broken line are off working.
- (25) Real line, it means the connected modules with real line are on working.
- (26) Present working pattern: if it shows the mark **ECO**, it means the system is working under the ECO pattern; if it shows the mark **EPS**, it means the system is working under the UPS pattern; if no mark, it

means the system is working under UPS pattern.

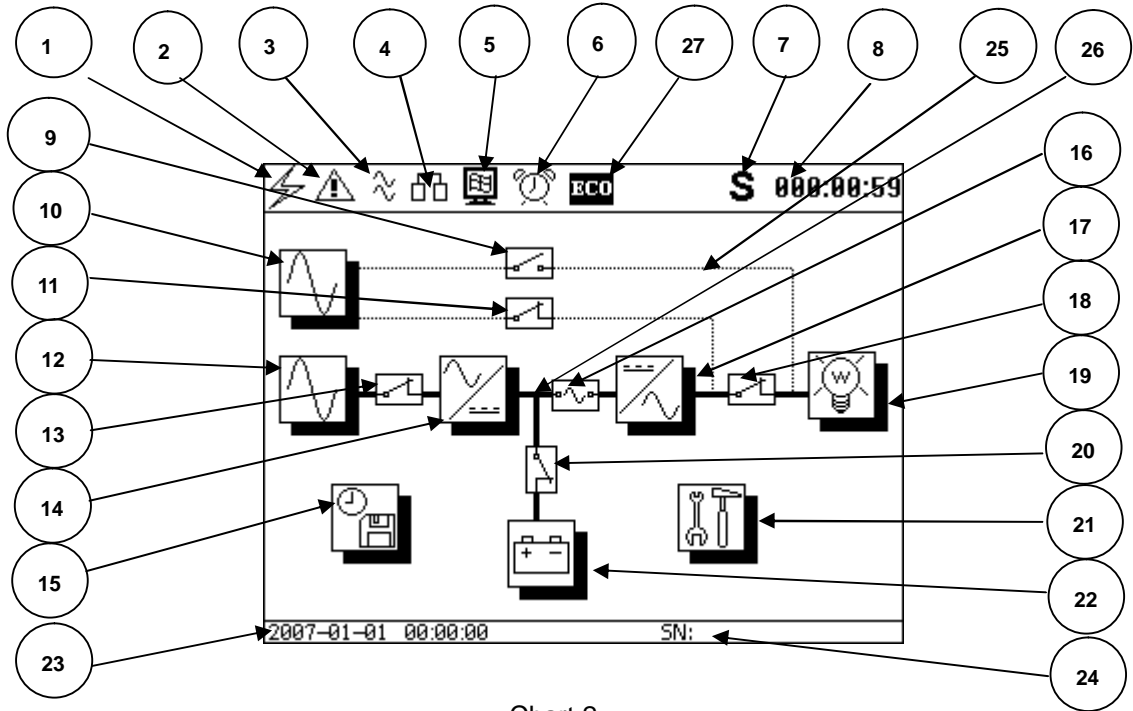


Chart 2

4.5.2.3 Data measured display interface

You can enter into the corresponding measuring data display interface by press the buttons. The detail is:

- (1) Table title
- (2) Table content: kinds of states and data display
- (3) System time: system real time
- (4) Back
- (5) Escape: back to the standby interface

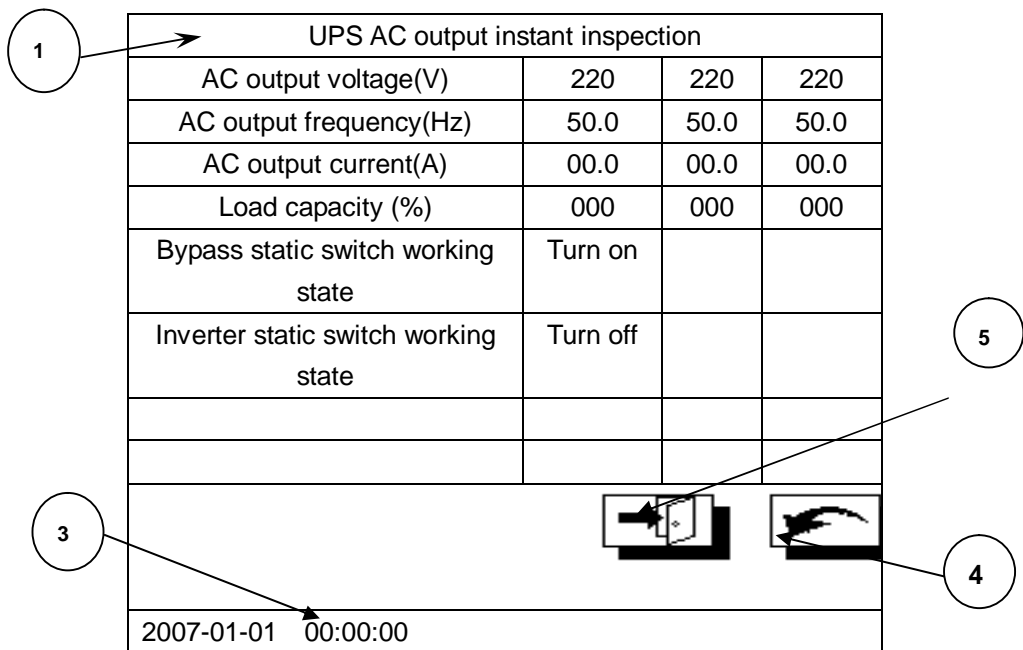


Chart 3

4.5.2.4 Management display interface

As shown in chart 4, when you are in flow chart interface you can enter into the management display interface by clicking on the management display interface button. In this interface you can press corresponding button to operate the UPS.

- (1) Turn on/off UPS operation button: the button will display “start the system” when the UPS is turned off. Press this button it will start the UPS. Correspondently, the button will display “shut down the system” when the UPS is turned on.
- (2) Battery test operation button: when the UPS is turned on, you can press this button to enter into battery test pattern (password is required in order to avoid mis-operation).
- (3) About the button: you can enquiry touching screen edition information by pressing it.
- (4) Alarming elimination: to eliminate the buzzer alarming by pressing it.
- (5) Current status button: to check the UPS current working status by pressing it.
- (6) Esc: back to standby interface.
- (7) Back
- (8) Help: you can look into help information about the touching screen by pressing it.
- (9) System information: you can look into UPS rating information by pressing it.
- (10) System record: you can look into record about the touching screen by pressing it.

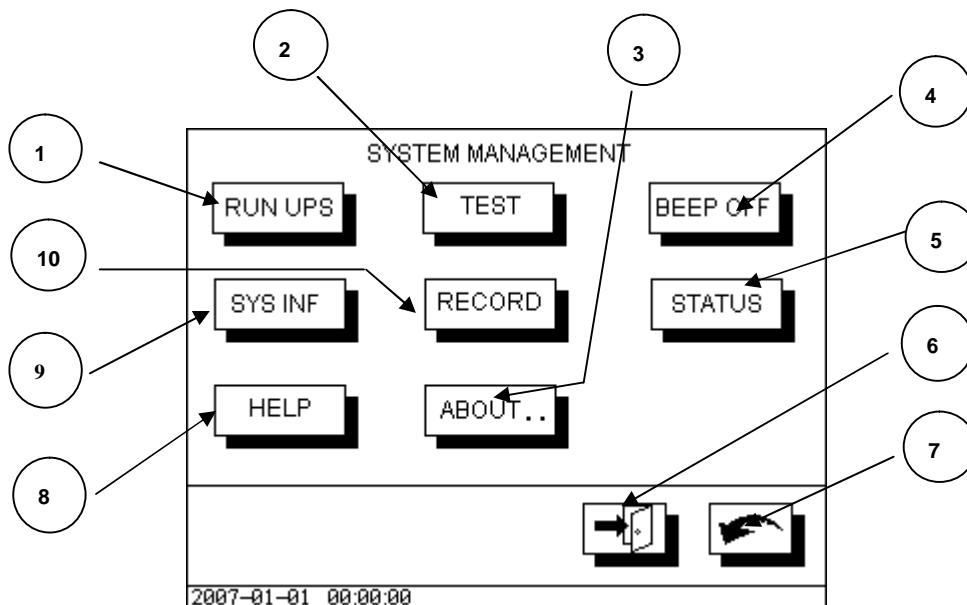


Chart 4

4.5.2.5 Password input interface

Some operation will change the UPS current state, such as turning on/off the machine and so on. So here you will be requested to input the password and otherwise the operation will be refused. Original password when the machine leaves the factory is 1234. Password input interface is shown as chart five and the detail meanings are:

- (1) Input password: to display the input password digit. In order to protect it, the password will be covered by **
- (2) Number key: to input corresponding figures.
- (3) Enter key: to press this key after you finished the password input.
- (4) Cancel: escape the password input dialog.

System will run correspondingly after input the correct password.

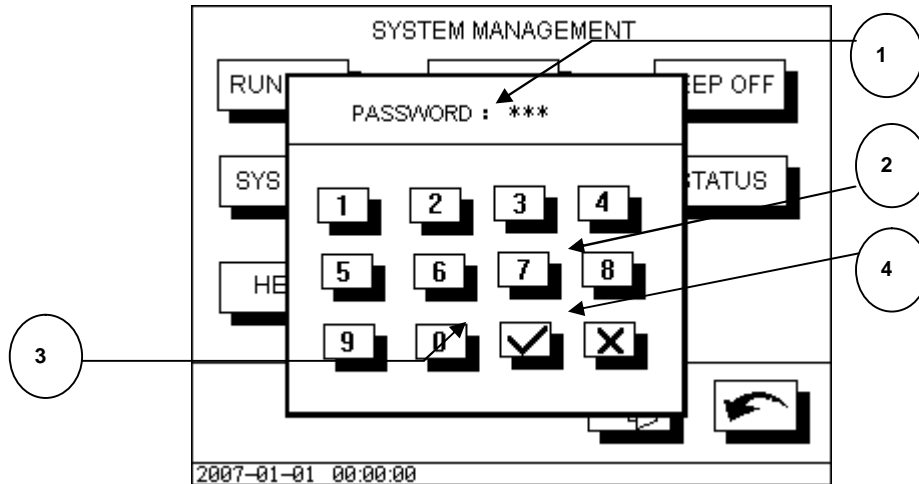


Chart 5

4.5.2.6 Incident record enquiry interface

You can enter into incident enquiry interface after pressing “system record key” in the management display interface. This interface display the all the system records and incidents, as shown in the chart six.

Each part in the chart is means:

- (1) Events in memory are of the order, the latest incident is in the first order, the smallest number.
- (2) Incident code
- (3) Incident time: incidents occur time.
- (4) Time description: describe the detail incident type.
- (5) Page up: enquiry other 9 incidents record.
- (6) Page down: enquiry other 9 incidents record.
- (7) Escape key: escape from the catalogue and back to standby interface.
- (8) Back key.

Incident record				
Number	Code	Time	Incident	
000	044	2007-01-01 00:00:03	Eliminate alarming	
001	002	2007-01-01 00:00:00	Batter low voltage	
002	062	2007-01-01 00:00:00	Rectifier shut down	
003	001	2007-01-01 00:00:00	Input abnormally	
004	000	2000-00-00 00:00:00	Blank	

2007-01-01 00: 00: 00	
-----------------------	--

Chart 6

4.5.2.7 Currently UPS working state interface

You can enter into current UPS working state interface after pressing this button in the management display interface. This interface display the system current working state, as shown in the chart seven. Each part in the chart is means:

- (1) Show UPS's currently working status.
- (2) Escape: escape all menu and back to standby interface.
- (3) Back up

UPS current working state	
UPS has been turned off; battery low voltage, input abnormally; bypass	
Output	
2007-01-01 00:00:00	

Chart 7

4.5.2.8 System setting interface

As shown in the chart eight. Press the system parameter setting module button in the flow chart interface you will enter into the system setting display interface. Press any key you can modify the UPS's system parameter. Each part of the interface means:

- (1) Time setting: to modify the system clock (password is required by the system in case of wrong operation).
- (2) Language choosing: to choose system language. Chinese and English is available from the system.
- (3) Help: enquiry touch screen information by pressing it.
- (4) Back
- (5) Escape: escape all menu and back to standby interface.
- (6) Clean system record: to clean all incident record in the system (password is required by the system in case of wrong operation).
- (7) Password modifying: to modify the system operation password. Last password is required by the system in case of wrong operation. New password will be required to input twice. If two passwords are the same the password modifying succeeds.

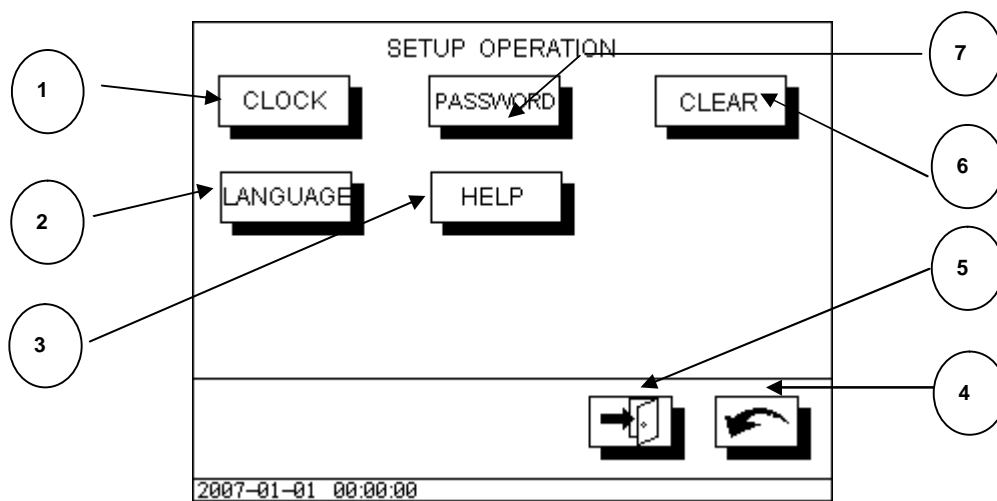


Chart 8

4.5.2.9 Password input interface

Some operation will change the UPS's current parameters, such as system time modifying. Here system will request operator to input password. Otherwise operation will be refused.

4.5.2.10 Clock setting interface

You can enter into clock setting interface by pressing the clock setting button in the setting interface and input the correct password. Each part of the interface means:

- (1) Dialog. Input "?" before input new number; when the user input new number then it will display the number.
- (2) Month: enter the new month. Input "?" before input new number; when the user input new number then it will display the number.
- (3) Day: enter the new day. Input "?" before input new number; when the user input new number then it will display the number.
- (4) Enter: finish the input by pressing it.
- (5) Cancel: escape new clock setting dialog box.

(6) Number key: input corresponding figures.

(7) Minute: enter the new minute. Input "?" before input new number; when the user input new number then it will display the number.

(8) Seconds: enter the new seconds. Input "?" before input new number; when the user input new number then it will display the number.

(9) Hour: enter the new hour. Input "?" before input new number; when the user input new number then it will display the number.

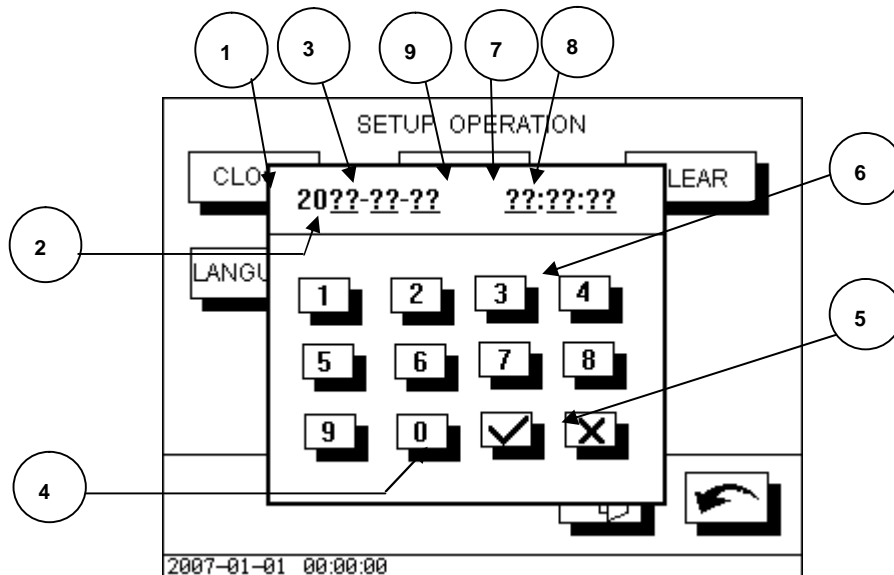


Chart 9

Notice: when setting the clock, the order is from left to right, that is set chronological order: year → month → day → hour → minute → seconds. Every figure the user input, the number of the cursor automatically move right one digit, and correspondingly, the "?" be replaced by the number user inputted.

4.5.2.11. Record clean interface

In the setting interface, press the record clean button and input the correct password can enter into record clean interface. All the incidents records will be deleted and irretrievable. As shown in the chart ten. Each part of the interface means:

- (1) Message dialog
- (2) Schedule bar: delete assignment schedule

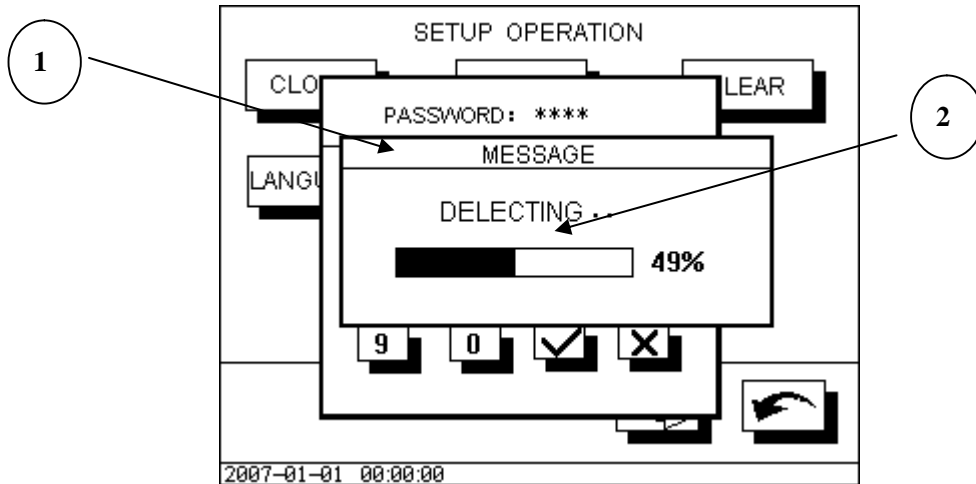


Chart 10

4.5.2.12. Language choosing interface

Press language button in the setting interface you will enter into the language choosing interface. Here you can choose the system language:

- (1) Message dialog
- (2) Chinese language choosing dialog: press this button the system will display all message with Chinese.
- (3) English language choosing dialog: press this button the system will display all message with English.

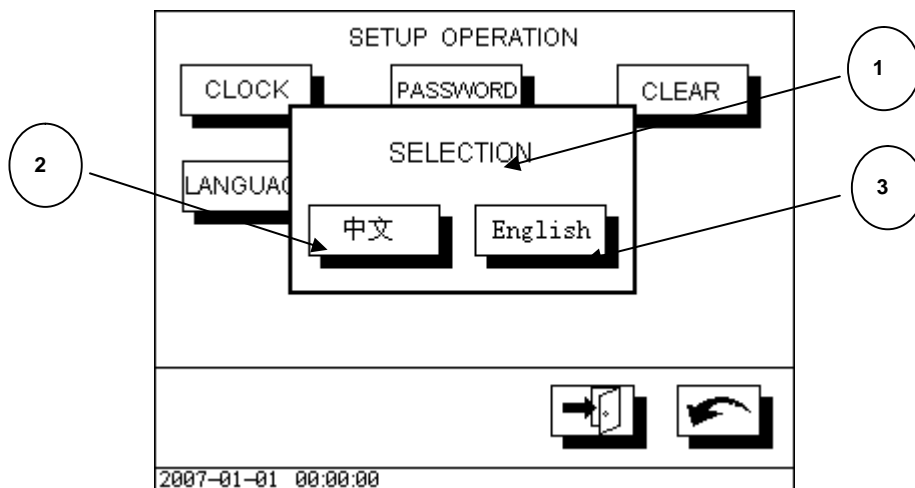


Chart 11

4.5.2.13. Alarming interface

When the UPS is on alarming status, the displaying module will prior display alarming interface. If UPS alarming interface does not canceled, displaying module will keep on displaying the alarming interface till be canceled. As shown in chart 12. Each part of the interface means:

- (1) Alarming message dialog: alarming message will display here.
- (2) Alarming message display
- (3) Enter key: press this will cancel the alarming and escape the alarming interface meanwhile.

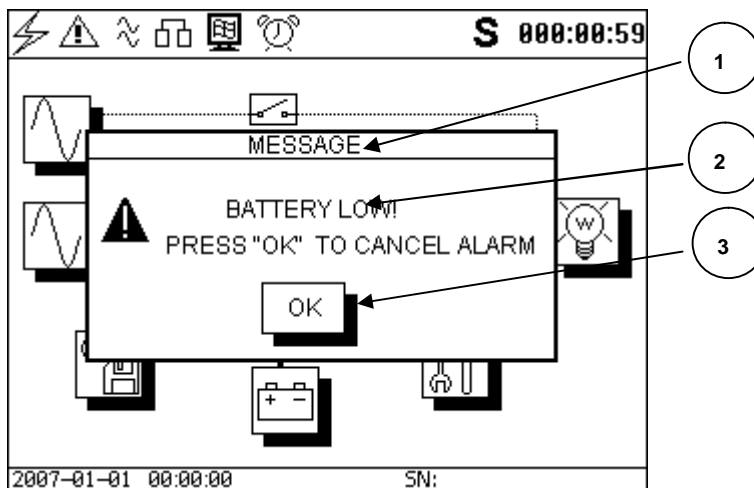


Chart 12

4.5.2.14 battery password setting interface

When UPS are in setting interface, the screen will skip automatically to this interface to require user to input the operation password, as shown in chart 13. Each part of the interface means:

- (1) Password input: display password digit. For safety purpose the inputted number will be replaced by *.
- (2) Number key: input corresponding numbers.
- (3) Enter key: press it to finish the password inputting. If the password is correct, the screen will switch to 4.5.2.15 display interface. Otherwise there will be no switch and require another password inputting.
- (4) Cancel: to cancel the inputted password and try again.

Notice: This password is not the touch screen operation password mentioned above, but is the password which is set when leaving factory. Acquiescent password: 6666.

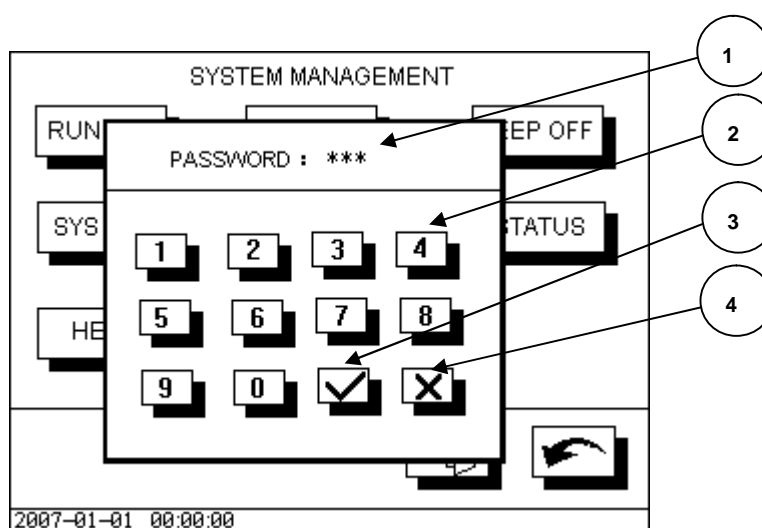


Chart 13

4.5.2.15. Battery capacity setting interface

When UPS is on setting status and you have inputted the correct password, the screen will automatically skip to this interface and you are required to input UPS corresponding battery capacity. As shown in chart 14. Each part of the chart means:

- (1) Inputted battery capacity: to display inputted numbers. Please set from left to right. That is the order of: hundred place → ten place → one place. Each number the user inputs, the cursor automatically move right one digit, correspondingly the “?” will replace with the inputted number.
- (2) Number key: input corresponding number.
- (3) Enter key: press it to finish the password inputting. If the password is correct, the screen will switch to 4.5.2.15 display interface.
- (4) Cancel: to cancel the inputted password and try again.

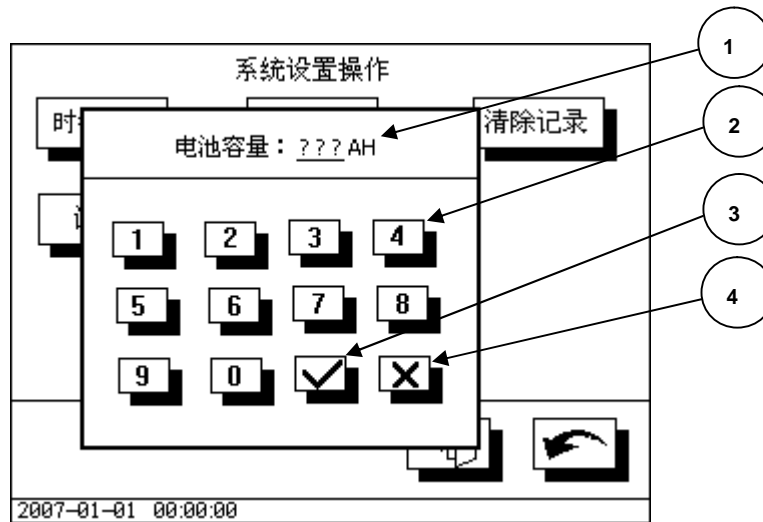


Chart 14

4.5.2.16. Working pattern setting interface

As shown in chart 15. Each part of the chart means:

- (1) Working pattern choosing dialog
- (2) UPS working pattern. Press this button to enter into the UPS working pattern.
- (3) ECO working pattern: press this button to enter into the ECO working pattern.
- (4) UPS working pattern: press this button to enter into the UPS working pattern.

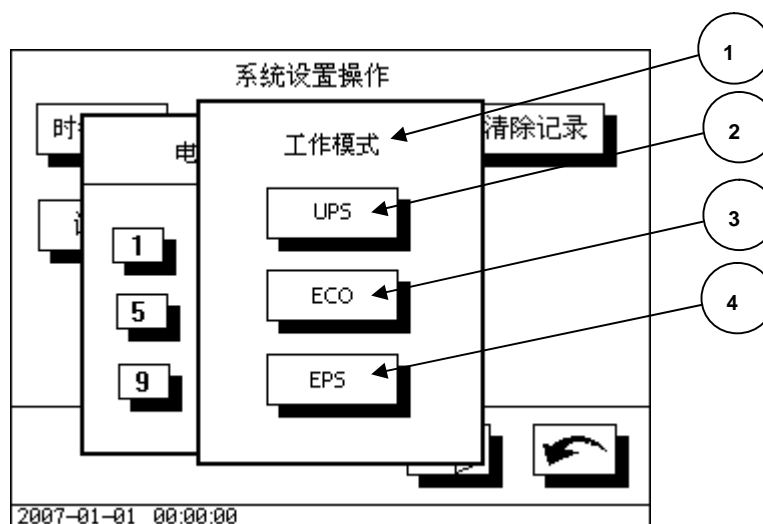


Chart 15

After setting the working pattern the setting parameters will be permanently saved in the machine. Escape the setting status and restart the machine.

4.5.2.17. Incident code

System will automatically record some important incident and the date for future enquiry and management. The maximum capacity is 256 incidents. Every kind of incident will be code differently. Users can press the system record key in the system management operation interface to enquiry the incident record. In the table, beside of displaying every record's code and time, the screen will also present brief incident description. In the below chart 13 we will give all the incident code and detail incident descriptions.

Code	Detail incident description
000	Blank, no record
001	Mains error
002	Battery voltage low
003	UPS overloaded
004	Temperature error means temp high
005	Phase order error, Phase order error: wrong input phase order
006	Inverter error
007	System error
008	Bypass output incident, means the UPS switch to bypass output.
009	Inverter output incident, means the UPS switch to inverter output.
010	Rectifier error
011	Maintaining bypass switch is turning on
012	DC fuse is off
013	Rectifier switch is cut down
014	Bypass switch is turning on
015	Output switch is turning off
016	Battery switch is cut down
020	Batter switch is turning on
021	AC returns to normal
022	Battery voltage returns to normal
023	Load returns to normal
024	UPS temperature recover normal
025	UPS phase order returns to normal
026	Maintaining bypass switch is turning off
027	AC insurance returns to normal
028	Rectifier switch turning on
029	Battery switch turning on
030	Output switch turning on
031	Transmission error
032	Transmission returns to normal
041	Turning off automatically, means the machine is automatically shut down because of low UPS voltage or other error, and switch to bypass output
042	UPS restart

043	UPS enter battery testing status
044	Cancel buzzer alarming manually
045	Turn off UPS manually
051	User sends distant count down UPS turning off command from the monitor end
052	User sends distant count down UPS turning on command from the monitor end
053	Count down time till turning off the UPS
054	Count down time till turning on the UPS
055	User sends distant count down UPS turning on canceling command from the monitor end
056	Send battery testing command from the display panel
057	Send alarming canceling command from the display panel
058	Send turning on command from the display panel
059	Send turning off command from the display panel
061	Rectifier re-works
062	Rectifier stops working
Other	Unknown error or wrong error record

4.6. RS232 intelligent communication

End definition adopts DB9 standard port

NC-----1
 RXD-----2
 TXD-----3
 NC-----4
 Signal GND-----5
 NC-----6
 NC-----7
 NC-----8
 NC-----9

2 pin: receiving end, receive computer RS-232 communication data in the UPS.

3 pin: sending end, send computer RS-232 communication data in the UPS.

5 pin: communication "GND";

Other pin: no connect.

RS-232 communication provides the following functions

Monitor UPS current power supplying status.

Monitor UPS current alarming status.

Monitor UPS current running parameters.

To control the UPS time turning on/ff and setting the system.

RS-232 communication data format

Baud rate ----- 2400bps

Byte----- 8bit
Over No ----- 1bit
Parity check ----- NO

Connection of computer RS-232 and UPS RS232

Computer -----	UPS
RXD (2 pin) -----	TX (3 pin)
TXD (3 pin) -----	RX (2 pin)
GND (5 pin) -----	GND (5 pin)

4.7. RS485 intelligent communication

Port definition (from left to right)

1 pin: RS-485 communication port A(DATA+) port;
2 pin: RS-485 communication port B(DATA-) port;
3 pin: RS-485 Communication GND
4 pin: RS-485 communication port A(DATA+) port
5 pin: RS-485 communication port B(DATA-) port
6 pin: communication GND;

RS-485 communication method provides the same function with RS-232

RS-485 communication data format provides the same function with RS-232

How to connect UPS with RS-485

How to connect -----	UPS
DATA+ port -----	A port (1 pin)
DATA- port -----	B port (2 pin)
GND port -----	Communication source (3 pin)

How to connect UPS with UPS RS-485

UPS1 -----	UPS2
A port (4 pin) -----	A port (1 pin)
B port (5 pin) -----	B port (2 pin)
Communication GND (6 pin)-----	Communication GND (3 pin)

4.8. Communication of SNMP and distant web

Port definition

T568A standard and T568B standard

- Ø T568A standard description order from left to right is: 1-white & green, 2-green, 3-white&orange, 4-blue, 5-white&blue, 6-orange, 7-white&brown, 8-brown
- Ø T568B standard description order from left to right is: 1-white and brown, 2-orange, 3-white&green,

4-blue, 5-white&blue, 6-green, 7-white&brown, 8-brown

SNMP card has the following function

- Ø Provide SNMP MIB to monitor the UPS status.
- Ø Automatically detect and transform the 10/100M fast ETHERNET SPEED
- Ø Set the functions through internet, web browser or NMS
- Ø Support TCP/IP, UDP, SNMP, TELNET, SNTP, PPP, HTTP, SMTP agreements.
- Ø Provide facility installation and updating tools which applied to MS-windows. No need the time-costing RS232 traditional way to set.
- Ø Send SNMP TRAP, EMAIL and pager to inform the operator when battery errors.
- Ø Can be set of sending daily history record via email.
- Ø Able to match shutdown software to protect computer system to save documents safely and turning off the machine.
- Ø Net Agent-3 ports generation: able to link out NETFEELER LITE environment detecting system and external modems. Also able to use the dial-up methods

4.9. Dry connect state communication

Port definition

- 1 pin: Rectifier signal is the COM port of relay
- 2 pin: Rectifier signal is the NC port of relay
- 3 pin: Bypass signal is the COM port of relay
- 4 pin: Rectifier signal is the NC port of relay
- 5 pin: Inverter signal is the COM port of relay
- 6 pin: Inverter signal is the NC port of relay
- 7 pin: DC input signal is the COM port of relay
- 8 pin: DC input signal is the NC port of relay
- 9 pin: BAT low signal is the COM port of relay
- 10 pin: BAT low signal is the NC port of relay
- 11 pin: System fault signal is the COM port of relay
- 12 pin: System fault signal is the NC port of relay
- 13 pin: Rectifier switch signal is the COM port of relay
- 14 pin: Rectifier switch signal is the NC port of relay
- 15 pin: Bypass switch signal is the COM port of relay
- 16 pin: Rectifier switch signal is the NC port of relay
- 17 pin: Inverter switch signal is the COM port of relay
- 18 pin: Inverter switch signal is the NC port of relay
- 19 pin: DC input switch signal is the COM port of relay
- 20 pin: DC input switch signal is the NC port of relay
- 21 pin: Maintain switch signal is the COM port of relay
- 22 pin: Maintain switch signal is the NC port of relay
- 23 pin: Fuse signal is the COM port of relay
- 24 pin: Fuse signal is the NC port of relay

Dry connect state communication function

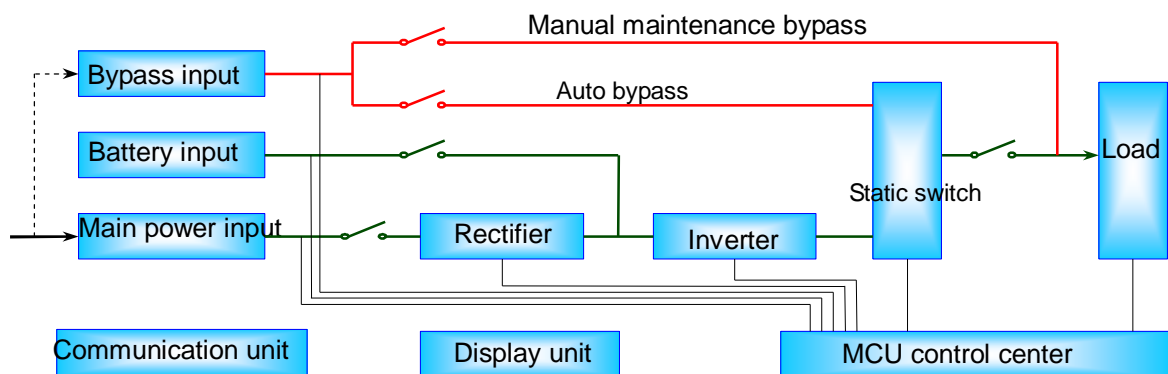
Rectifier status—signal relay turns on at the rectifier working normally

Bypass status—signal relay turns on at the bypass working normally
 Inverter status—signal relay turns on at the inverter working normally
 DC input status—signal relay turns on at the DC inverter working normally
 BAT voltage low status—signal relay turns on at the BAT voltage low
 System fault status—signal relay turns on at the system fault
 Rectifier switch status—signal relay turns on when the rectifier switch is turned on
 Bypass switch status—signal relay turns on when the bypass switch is turned on
 Output switch status—signal relay turns on when the output switch is turned on
 DC input switch status—signal relay turns on when the DC input switch is turned on
 Maintain switch status—signal relay turns on when the maintain switch is turned on
 Fuse status—signal relay turns on when the fuse is broken

5. UPS working principle

5.1. Working principle of complete machine

I Diagram of complete machine working principle



I Working principle of complete machine

UPS is multi-layer protected alternating current supply equipment. When the main power is normal, firstly, to rectify the main current and transfer it into pure direct current and filter the disturbance in main power; then charge up the accumulator and output the main power. When the main power is abnormal, to invert the direct current stocked in accumulator into alternating current and output it to ensure the high quality power supply of user load. The manual maintenance bypass ensures the maintenance, examination and repair of UPS on the condition of no power cut.

I MCU control center

MCU high-speed operates such data as input, output, battery and environment; then control the running and protection of rectifier, inverter and static switch to respond the external operation instruction.

I Rectify and charge unit

Main power input examines the circuit and send the voltage, frequency and phase of main power input to MCU for operation. When the voltage, frequency and phase of main power input are within the normal range, MCU delivers the rectified control signal; rectified voltage slowly raised to rated voltage from 0V so as to minus the strike on the input surge current.

As battery pack and DC(direct current) bus is operating in parallel, rectifier is charging the battery at the same time, therefore, when battery's voltage is lower than floating battery's voltage, rectifier will operate in constant current mode. At this time, MCU will calculate and control the feedback of charge current from battery and the information of battery capacity set by user; when battery is charged into floating voltage, then rectifier will change into constant voltage charging mode. Meanwhile, basing on the temperature of battery, MCU will charge battery in a temperature compensation style, maintain and manage battery in a regular time on the basis of its using situation (when battery hasn't been charged or discharged for a very long time, MCU will automatically transfer into an equalized charging mode in order to activate the activity of battery), thus it will extend battery's lifetime and reduce user's burden of management.

I IGBT inverter unit

When DC bus is normal, if MCU issues inverter control signal, inverter circuit will drive IGBT Inverter Bridge by SPWM driving signal, through inverter's isolation, voltage transformation and wave filtration, produce out pure sine AC (altering current). Through adjusting driving signal's pulse width, Inverter can raise output voltage from 0V to rated degree, and control stability of output through its feedback. Meanwhile, check voltage and current of output in order to protect inverter.

I Automatic and manual bypass unit

Bypass circuit can directly convert input electricity into output electricity through switch circuit. If inverter is closed or fell, MCU-controlled high-speed static switch will automatically switch into bypass electricity, without interrupt loaded power supply.

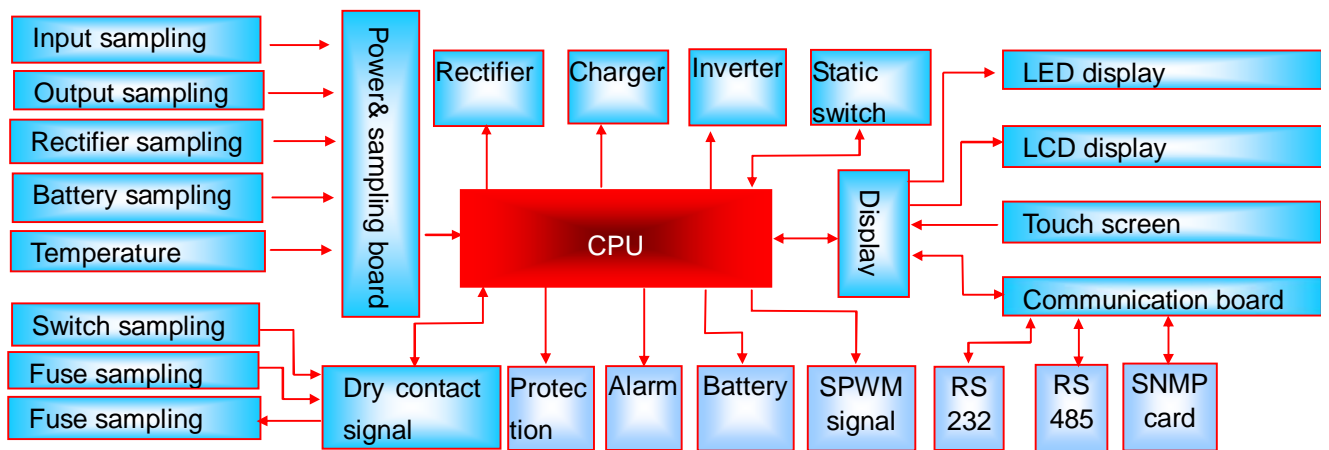
Bypass and main power can be a same group of power supply; it also can be a different AC (altering current).

I Display communication unit:

Display unit is to show operational status and data of entire machine through LCD and LED, and through RS232, RS485, dry contact signal, SNMP card, etc., realize long-distance monitor with background software.

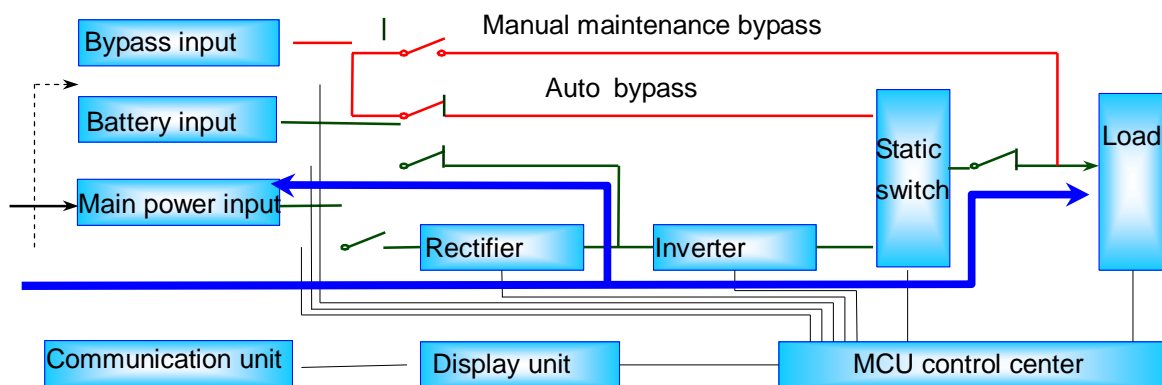
L series 3/3 adopt large-screen LCD (320×240) and touch-screen design, graphical manipulative interface, tabular data display. With 256 long record of incident, L series 3/3 can provide great help to your power supply status's analysis and management.

POCASA-styled UPS highly integrates digital technology, improves MTBF and reliability, its independent main control board controls the whole system's work. Meanwhile, it is controlled by a high-speed microprocessor, which ensures the stability of equipment and the reliability of operation.



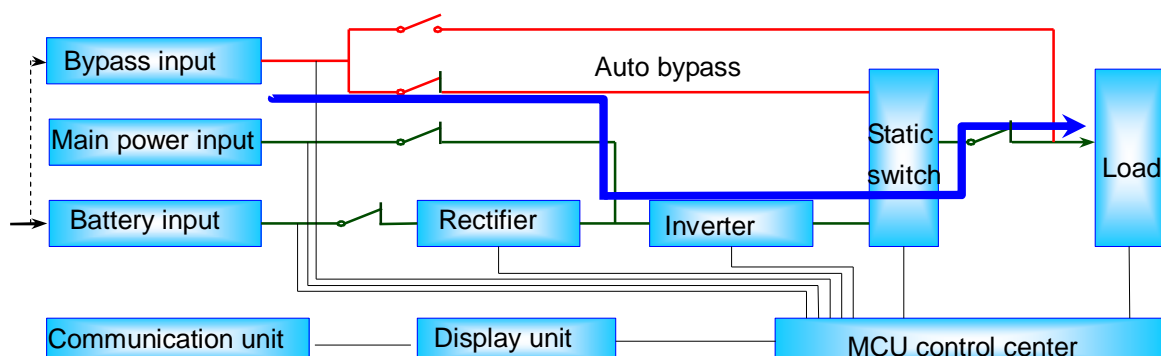
Besides the above chart, other components of UPS include: inverter transformer, input inductance, IGBT, SCR, switches, etc.

5.2. Mains operational mode



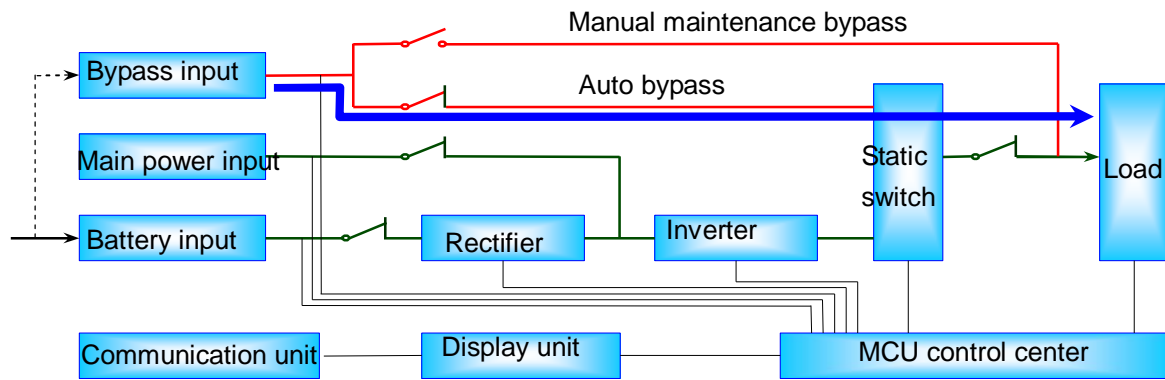
The input AC will be transformed into DC through rectification and filtering, and then through SPWM Inverter, DC outputs AC supply, through static inverter switch, AC reaches user. At the same time, DC can charge the battery pack.

5.3. Battery inverter operational mode



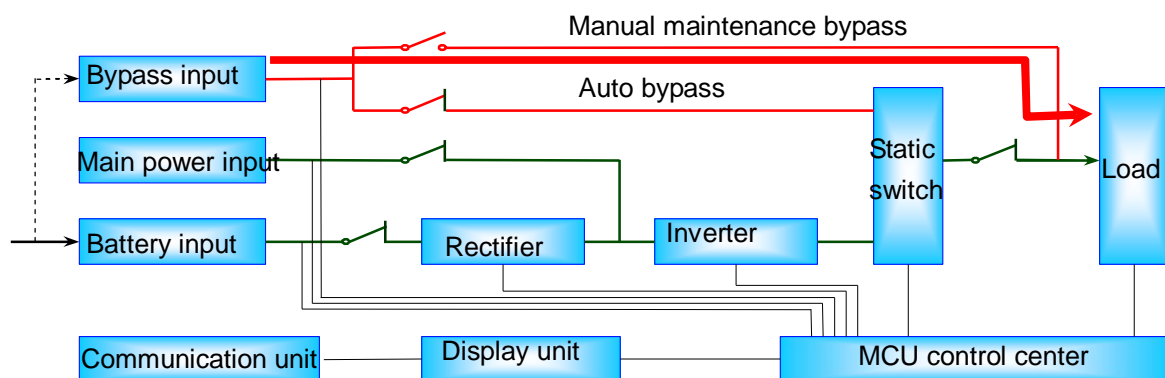
When mains become abnormal, battery will supply AC through SPWM Inverter; put it out through static inverter switch.

5.4. Bypass operational mode



When inverter is not open or abnormal, then system will convert into bypass operational mode, AC inputs through bypass circuit, and outputs through static switch.

5.5. Manual maintenance bypass mode



When asked on-wire maintenance without cutting power, the switch on maintenance bypass needs to be turned on, cut off the output switch and auto bypass switch, this will completely separate UPS's circuit from input and output, without interrupting users' output.

Note: when using maintenance bypass switch, must accord with operational procedures of maintenance switch!

6. UPS installation

6.1. Disassemble and inspect

- ∅ When open up packages, and take out UPS, check if it has any damage during transportation
- ∅ At the same time, make sure all the switches are cut off, UPS inside should include: warranty card, instruction, installation manual, RS232 CD-ROM, RS232 cable.

6.2. UPS positioning

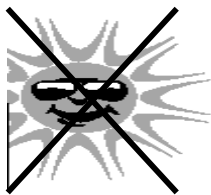
6.2.1. Environmental requirements of installation

- ∅ Temperature: 0℃~+40℃
- ∅ Relative humidity: 30%~90%
- ∅ Height: less than 1000M, if height exceeds 1,000M, reduce 10% usage per 1000M
- ∅ The size of installation environment should be larger at least 800 mm than the front and back, left and right size of equipment in order to convenient thermal dispersion and routine maintenance; floor force requirement: 1500KG/M².

Ensure installation has following indoor environment.

- ∅ No dust
- ∅ A proper indoor temperature: UPS can operate under 0~40°C indoor environment, but to open it, it needs temperature to be higher than 0°C, the ideal temperature is 25°C.
- ∅ Have a good cooling system, there are some feasible methods as followings:
 - A. Natural ventilation system: only apply to low heat and broad space.
 - B. Artificial ventilation system: when temperature of machine shell (TA) higher than exterior temperature (TE), then it is necessary to install an air condition. When these two temperatures are close, the capacity of ventilation system needs to be increased relatively.

UPS is forbidden to locate at any of following conditions



Avoid direct sunlight



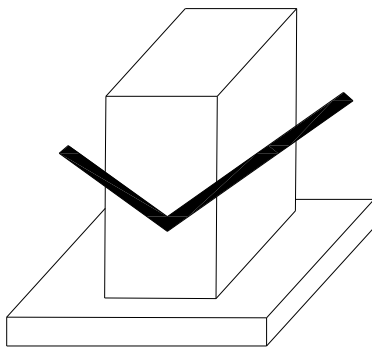
Avoid raining and humidity



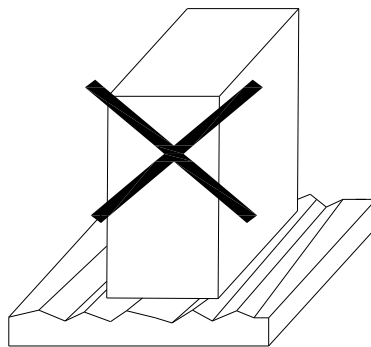
Far from fire and high temperature



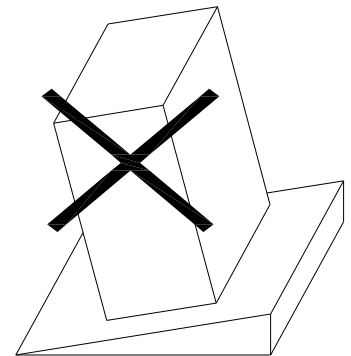
Avoid rot-gas



Level off



Do not place on unsmooth ground



Do not place on oblique ground

6.2.2. Installation location

- ∅ Distance of machine back from wall or any object should be at least 800mm
- ∅ At the top of UPS should not be placed any object
- ∅ The front, right and left sides of equipment should be prepared enough space for maintenance operation
- ∅ Equipment battery should be installed in the right-hand side of machine, and reserve sufficient space for battery overhauling

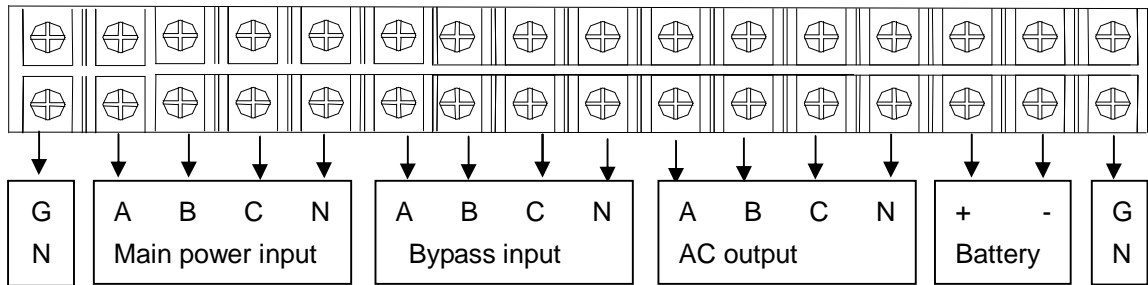
6.3. UPS wires connection

6.3.1. 3 phase in and 3 phase out UPS systems 10-400KVA recommended cable specifications: (unit: mm²)

Capacity	Input, bypass, output					Battery	
	A	B	C	N	E	+	-
L10K3/3	6	6	6	10	6	10	10

L15K3/3	8	8	8	10	6	16	16
L20K3/3	10	10	10	16	6	16	16
L30K3/3	16	16	16	25	8	25	25
L40K3/3	20	20	20	25	10	35	35
L60K3/3	25	25	25	35	16	50	50
L80K3/3	35	35	35	50	16	70	70
L100K3/3	50	50	50	70	25	90	90
L120K3/3	60	60	60	70	25	110	110
L160K3/3	80	80	80	90	35	150	150
L200K3/3	100	100	100	150	35	180	180
L250K3/3	120	120	120	150	35	230	
L300K3/3	150	150	150	180	35	275	
L350K3/3	180				35	325	
L400K3/3	200				35	370	

6.3.2. Main circuit cable connection

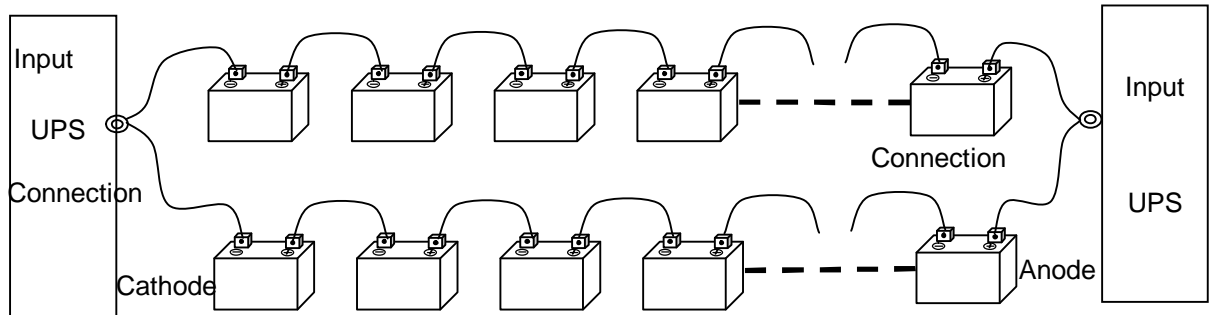


Before installing UPS, turn off all switches. According to left part of the above plan, A, B, C, N connect three-phase, separately to the fire wire and middle wire of main power input; A, B, C, N on bypass connect three-phase, separately to the fire wire and middle wire of bypass input(when one power inputs, link the main power input and bypass input together); According to right part of the above plan, A, B, C, N connect to three-phase, separately to the fire wire and middle wire of AC output.; E is connected to the safe protecting ground wire; +, - are connected to the anode and cathode of battery.

6.3.3. Battery connection

1. Before connecting battery, please check manufacturers of each battery, specifications and models, and terminal voltage to make sure whether they are in consistent (because different manufacturers' battery internal resistances are different. When battery pack run in series, because of uneven voltage, the whole battery pack can be damaged; meanwhile, the old and new batteries from same manufacturers cannot be mixed as well).
2. The input battery voltage of UPS is voltage of battery pack in series, the labeled voltage is a standard value, and it is the summation of all batteries' standard values in the battery pack running in series. For example, the standard value of a single 100AH/12VDC is 12VDC rather than measured value. The input voltage of L10K3/3 battery is 384VDC, namely, 12VDC×32=384VDC.
3. Series and parallel connection of battery:
When the capacity of a single battery pack meet required backup time, then all the batteries should be connected in series; or couples of series connected batteries should be connected in parallel, the bus voltage of battery must be the same when connecting in parallel, capacity is equivalent to

the summation of parallel battery pack.



When connecting in series, the first battery's anode is connected to the second battery's cathode, the second battery's anode is connected to the second battery's cathode, and so is the other battery's connection.

When connecting in parallel, the battery pack's anodes are connected together; the battery pack's cathodes are connected together.

- ∅ Open the chassis of battery box connect according the above methods.
- ∅ Install battery on the appropriate position; connect battery wire rightly according to the above connecting methods.
- ∅ Connect the cable of battery to UPS's battery terminal board.

6.3.4. RS232 cable connections

Connect one end of DB9 signal cable which is distributed from UPS to the serial port of computer's DB9, connect the other end to the interface of UPS's RS232. If the distance is too far to connect, then you can increase the standard length of communication wire of D89, however, it should not exceeded 30 meters, or it can not communicate normally.

6.3.5. RS485 cable connection

According to UPS's A, B and G, use communication wires to connect the interfaces of computer's RS485 and UPS's RS485. The longest linking distance should be less than 4,000M, or it can not communicate normally.

6.3.6. Connection method of SNMP card

The international standard of producing twisted-pair: EIA/TIA568A and EIA/TIA568B. Both ends of plug should follow 568 A or 568 B standard.

Network cable production:

- (1) Cut: use knife-edge scissor or press line pliers to cut network cables with appropriate length.
- (2) Peel: use knife-edge of press line pliers to shear cables orderly, then put wire heads on peeling blade, make wire heads touch baffle, then slightly clench pliers and slowly rotate it, let knife rip off the protecting rubber skin of twisted pair, peel off the skin(note: strip as long as thumb's length).

【Tip】: The length between baffle and peeling blade of press line pliers usually is just same length as plug's, which can effectively avoiding peeling too long or too short. If peel too long, the network cable will look ugly, meanwhile, it can not be stuck by plug, the connection point can easily get to loose; if peel too short, because of the existing of protecting skin, cables become too thick to plug into the bottom of plug, which results in plug can not contact perfectly with cable cores. Production can not be success as well.

(3) Sort: after removing outer protecting skin, you can see four pairs of twisted-pair's eight cores, and each pair's color is different. Each pair of two allied core wires consists by one core wire stained with a corresponding color and one core wire stained with white and little corresponding color. The colors of four panchromatic core wires are: brown, orange, green and blue. Each pair is entangled with each other. When produce network cable, these four pairs of eight thin cores should be disassembled, tidied up, straightened and sorted in sequence according to the following wire order regulation.

Put the side with plastic spring of plug down, up the side with pin, make the end with pin towards to the opposite direction of yourself, the end with square hole towards to yourself, simultaneously, the far left is the first wire, the far right is the eighth wire, followed by the remaining order.

(Standard)	1	2	3	4	5	6	7	8
T568A	White green	Green	White orange	Blue	White blue	Orange	White brown	Brown
T568B	White orange	Orange	White green	Blue	White blue	Green	White brown	Brown
Alignment	Same alignment		Same alignment with 6	Same alignment		Same alignment with 3	Same alignment	
T568A standard and T568B standard wire order table								

(4) Cut: straighten wires as right as possible (do not wrap), press to flat (do not overlap), tighten and tidy up (lean against each other in one direction), and then use press line pliers to cut flush. In this way, after inserting twisted pair into plug, each wire can well contact plug's pin, which avoids bad connection. If the former skin is peeled too long, then it can be cut shorter at this stage. Except outer insulation skin, the remained part is about 14mm, which length can rightly insert each thin wire into corresponding trucking. If this part is too long, for one hand it can increase mutual crosstalk, because allied wires ate no longer twist together, for the other hand, owing to the plug can not pin the sheathes, cables derail from plug, which can cause bad connection or even Interruption.

(5) Insert: use one hand's thumb and middle finger to nip plug, the plastic shrapnel of plug faces downside, its pin towards the opposite direction of yourself, using your forefinger to hold it. Other hand nips the rubber skin which is outside of twisted pair, slowly inserts eight wires along RJ-45's eight truckings with proper force until reaching the top of trucking.

(6) Press: when all wires are in place, and all wires' sequence is correct after thoroughly checking over through connectors, then you can use press line pliers to make RJ-45 plug. Push one head of RJ-45, from the side without teeth, into the trough of press line pliers, then clench pliers at full tilt(if your strength is not enough, you can use both hands to press), press pins which are prominent outside into plug.

Network cable connection:

One end of a well pressed network cable connects to UPS's SNMP card, the other one connects to the switch or hub of LAN (local area network).

6.4. Connection inspection

After connecting all the wires and cables, check the following items:

Whether all of battery cables are connected correctly and in a good contacting status, whether all of input, output, grounding wires have been properly connected to corresponding connection field on equipment, whether UPS's input voltage, frequency, and phase sequence are consistent with UPS's bypass voltage, frequency, and phase sequence.

7. Operation and management

7.1. Preparations before turning on the machine

- Test tool
- Millimeter
- Ammeter
- Computer for communication test
- Load (actual load)

7.2. The first time turn on the UPS

Wiring inspections

Check the input line to make sure all of them meet the requirements.

Input supply test

Use millimeter to test input voltage and frequency, to make sure whether they are in the input range.

Load test

Check the output load by millimeter to make sure if there is short circuit. And calculate the loads.

Battery polarity test

Check whether the polar is right or not by millimeter and the voltage of battery belongs to the input range of UPS.

7.3. Testing in AC mode operation

Procedures of turning on the machine

Turn off the bypass switch and output switch and check whether the machine bypass is in the normal condition.

Turn off the rectification switch; the rectification will be done automatically. After that low-voltage battery indicator light will extinguish and inverter indicator will lighten, automation will become inverter running.

Turn off the battery switch, and battery will be tested by UPS. After that battery will be rectified again, when it becomes normal, use the concurrent ammeter to test charging current.

7.4. Testing in battery mode operation

Turn off the rectifier switch to simulate the inversion of battery and check whether the supply is normal.

Close the rectifier switch to change the inverter of city electricity and charge the battery.

7.5. Daily operation management

7.5.1. The opening procedures of UPS

Although the battery switch is equipped in UPS, it still must follow the following steps to open UPS:

If the commutate switch does not be turned on with 10 seconds after UPS got the power, it will alarm for wrong phase order. Please press F1 to cancel the alarm and meanwhile operate the UPS starting program as above.

7.5.2. No AC input, the battery is in inverter mode

Turn on the battery switch and press the BAT button on the panel. The panel lamp will lights and UPS will be in inverter running mode. Turn on the output switch after normal inverter then it can be add load.

7.5.3. Urgency turning off program

This program only suggested to be started when fire, electricity attaching and electricity is arcing.

Cut down all the switches.

8. Daily maintaining

8.1. Preventing maintaining

——the preventing maintaining will protect the UPS liability and long term performance.

- I Regularly check whether any of the UPS cables insulation parts is aging or broken. If yes it should be maintained immediately to avoid any safety accident.
- I UPS; Check whether the intakes are jam. There should be enough heat sink room, otherwise the UPS lifetime will be shorten even the UPS will be damaged.
- I Use the dry dishcloth (do not use wet dishcloth or liquid cleaner) to clean the UPS external dust. Should be processed without wires nearby to avoid electrical shock.
- I Check whether all the lamps work normally. The lamps status should be accordant with LCD displaying status.
- I Check whether LCD displays normally, enquiry UPS incidents records and analysis the power supply status.
- I AC work status testing.
- I Battery inverter running testing.
- I Battery charging testing.
- I Check whether all the fasteners are fixed and whether the wires are over hot with the power cut off.

8.2. Battery maintaining

——good maintaining towards the battery could prevent any loss when electricity is cut down accidentally or battery is low.

- I Open the battery cabinet to check whether the battery liquid is leaked and whether the port





connection is loose.





- I Use the millimeter to test whether each battery voltage is accordant with each other. If any battery voltage is abnormal, it should be replaced immediately in order to avoid the damage of whole battery group.





8.3. The explanation of alarm





I Alarm 1: switch status abnormal



If buzzer alarms and the LCD displays switch are abnormal, please check the following:

1. Rectifier switch is turned off: the LCD displays  and if changed to  please check whether the rectifier's switch is off automatically. If switch off please check whether there is output overloaded or short circuit. Switch the LCD screen to output menu to examine the output circuit, if displayed data are within prescribed range please re-start rectifier switch. The alarm will be cleaned automatically. The LCD displays  and if change to , the UPS gets right.

2. Bypass switch is turned off: the LCD displays  and if changed to  please check whether the bypass is switched off automatically. If switch off please check whether there is output overloaded or short circuit. Switch the LCD screen to output menu to examine the output circuit, if displayed data are within prescribed range please re-start bypass switch. The alarm will be cleaned automatically. The LCD displays bypass status change from  to , the UPS gets right.

3. Battery switch is turned off: the LCD displays  and if changed to  please check whether the battery's switch is off automatically. If switch off please check whether there is output overloaded or short circuit. Switch the LCD screen to output menu to examine the output circuit, if displayed data are within prescribed range please re-start battery switch. The alarm will be cleaned automatically. The LCD displays  and if change to , the UPS gets right. Check the LCD battery displaying column for the battery voltage and charging circuit. They should be accord with battery capacity's setting.

4. Output switch is turned off: the LCD displays  and if changed to  please check whether the output's switch is off automatically. If switch off please check whether there is output overloaded or short circuit. Carefully check the load and after confirm it is normal please re-turn off the output switch. Switch the LCD screen to output menu to examine the output circuit, if displayed data are within prescribed range please re-start rectifier switch. The alarm will be cleaned automatically. The LCD displays  and if change to , the UPS gets right.

5. Breaker switch is turned off: the LCD displays  and if changed to  please check whether the commutate switch is normal. If it is normal please press F1. After cleaning the alarm please switch to inverter column and press the F2 on the panel to check whether inverter works normal. If it is also normal it is the problem of the breaker. Please replace the breaker.

I Alarm 2: input error

When the buzzer alarms 1 second with 3 seconds intermission, please check:

1. Input phase voltage is not within 165-275VAC range
2. Input frequency is not within 47.5-52.5Hz range
3. Commutate switch is not turned on.

4. Bypass switch is not turned on

I Alarm 3: wrong phase order

If buzzer alarms please check the following:

1. Main input power error or commutate input switch is cut down
2. Input main phase order errors
3. Bypass input phase order errors
4. Main power input some of the phase fault

I Alarm 4: low battery voltage

If buzzer alarms 1 second with 1 second's intermission please check:

1. Low battery voltage
2. The battery running time is less than set schedule time

I Alarm 5: inverter running errors

If buzzer alarms please check:

1. The loose connection of the inverter part leads to its abnormal work
2. Breaker is cut off and there is no AC input in the inverter
3. Inverter output is short circuit or output overload
4. Inverter output voltage beyond the prescribed range
5. Transmission errors

A. Connection cable between display panel and main panel leads to abnormal communication.

B. Main panel works abnormal and the display panel can not receive the data back from it. Please check whether the connection wires of the main panel is loose or the MCU of mail panel connect bad.

I Alarm 6: UPS overload

Buzzer alarms 3 seconds with 1 second's intermission, and the overload lamp on the panel is lighted. It means the load power is bigger than rating output power, that is, the percentage value is bigger than 100%. When overload peak value is too big the UPS alarms. When UPS alarms it need to lessen the load capacity. Otherwise the UPS will automatically switch to bypass power supplying, time span is calculated accord to overload value's inverse ratio.

I Alarm 7: temperature error

When buzzer alarms please check the following:

1. Cabinet airway is jam and can not
2. The installation environment's temperature is too high and beyond the machines. It protects itself.
3. Heat sink fan does not work, which leads to too hot power part.

I Alarm 8: system error

When buzzer alarms please check the following:

1. Loose main board connection cable leads to abnormal working
2. Main board setting error leads to wrong MCU receiving data.
3. Low battery voltage.
4. Power board abnormality leads to controlling circuit abnormal.

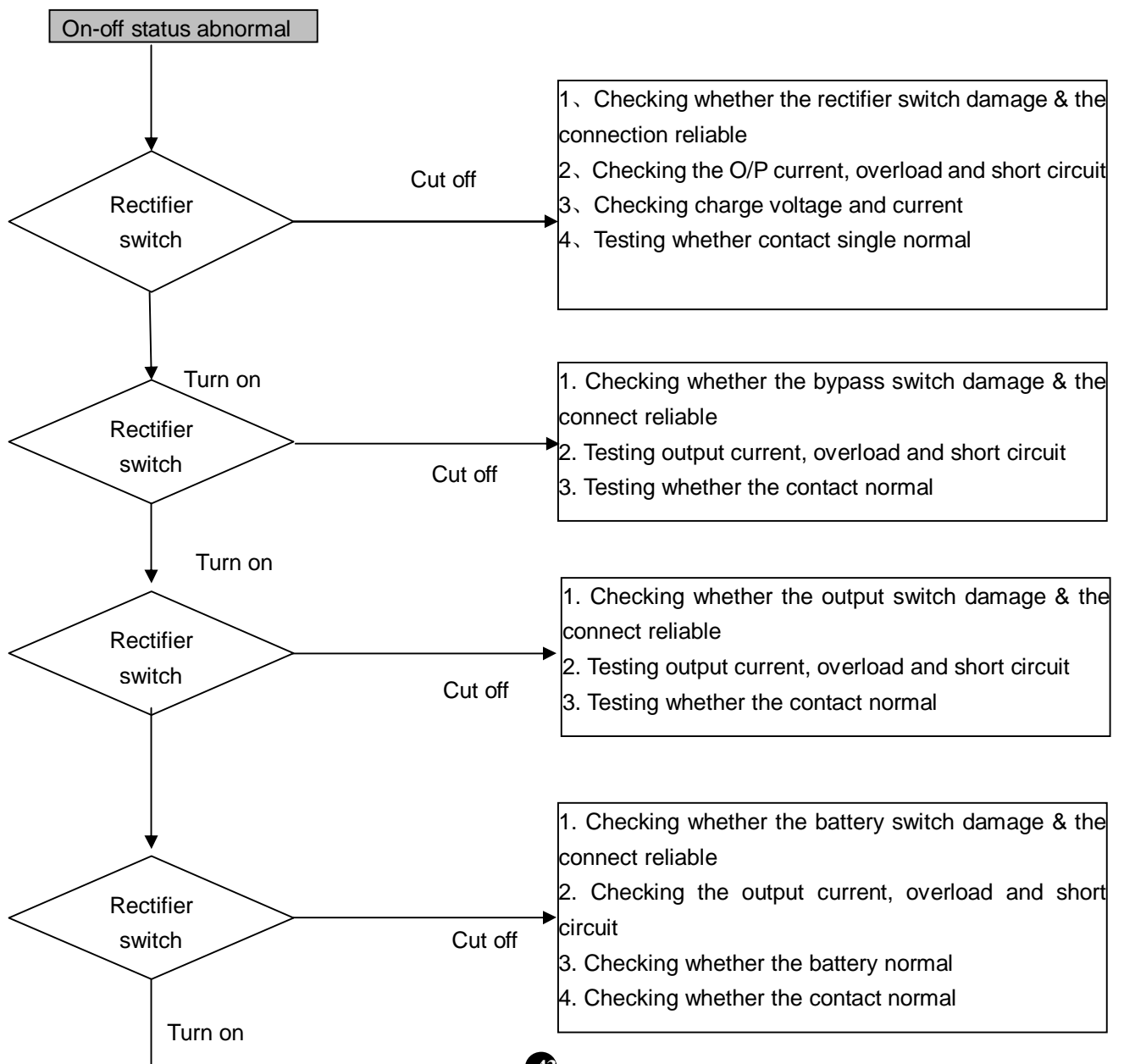
I Alarm 9: commutate error

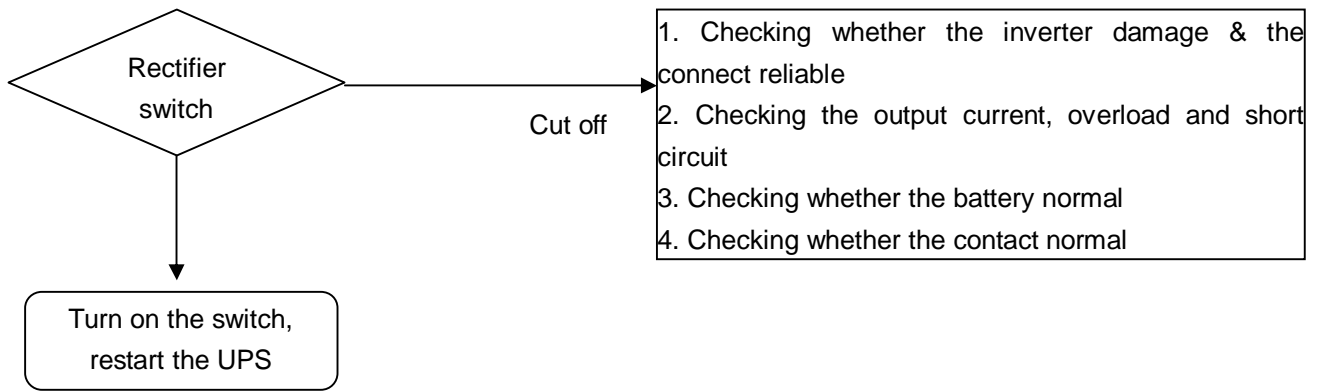
Bypass voltage error or bypass fuse SCR error, alarming when:

1. Bypass input voltage error
2. Bypass switch input switch break up
3. Bypass SCR fuse break up or be burned because of short circuit.

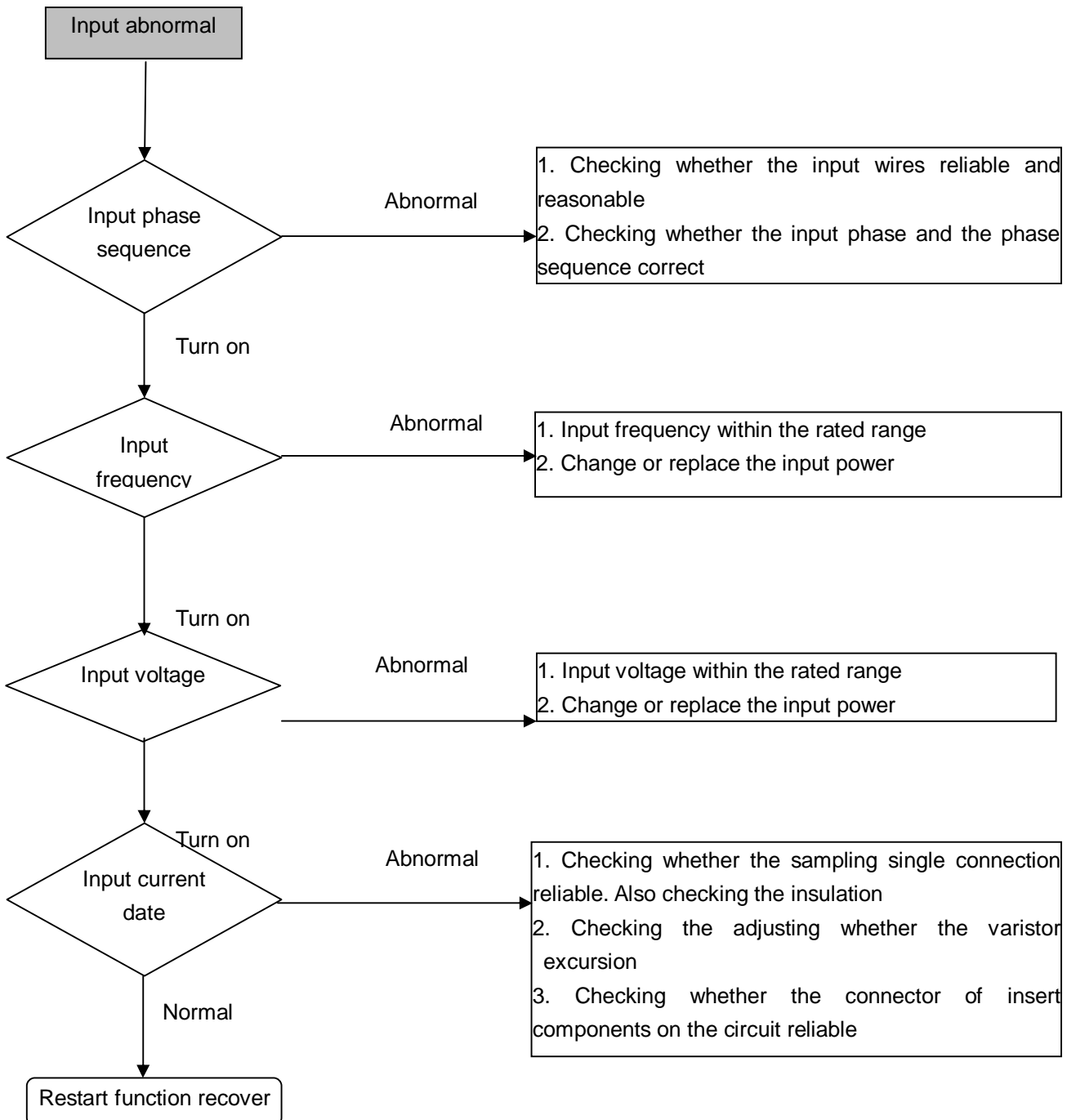
9. Dispose of abnormal

* On-off status abnormal

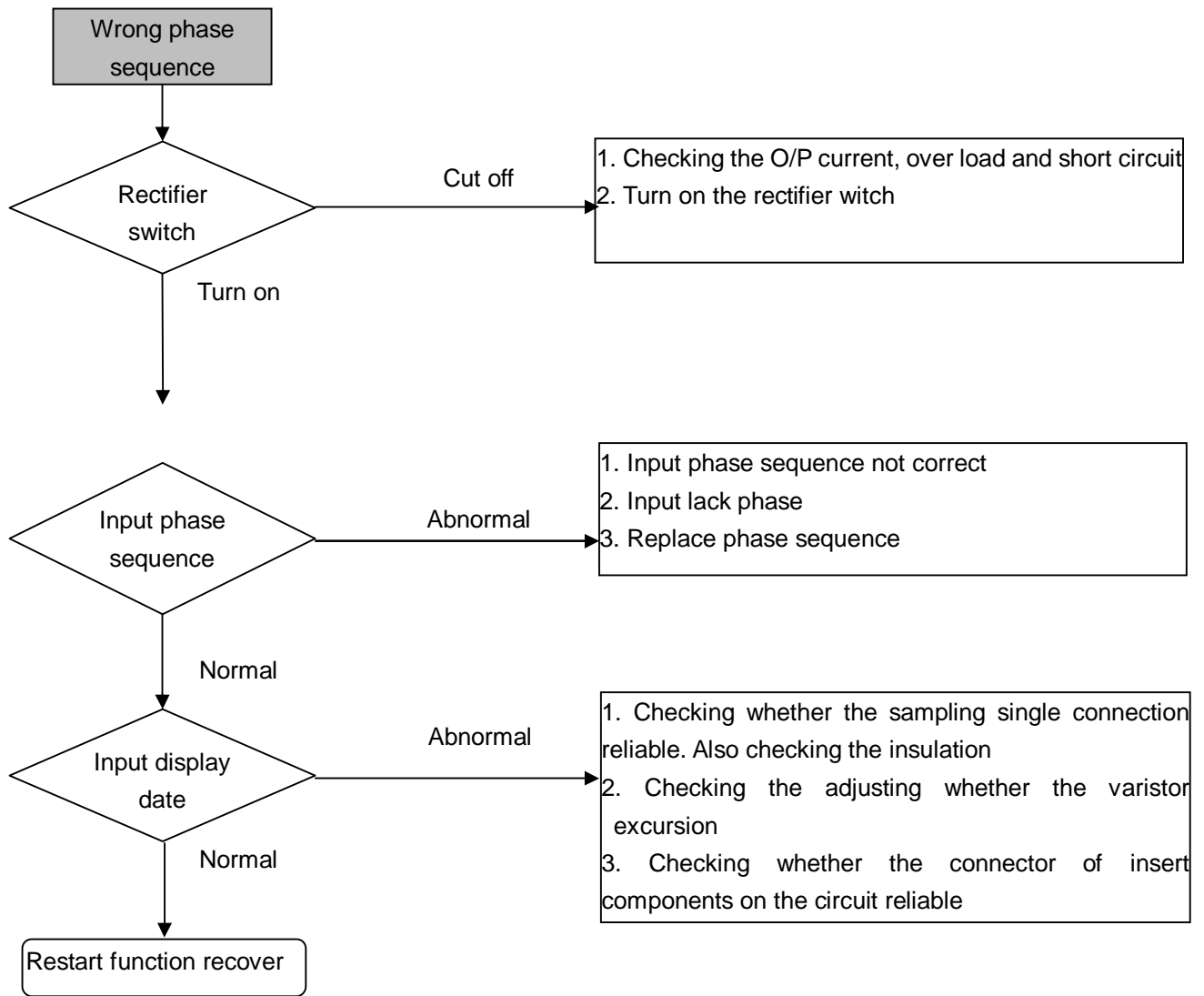




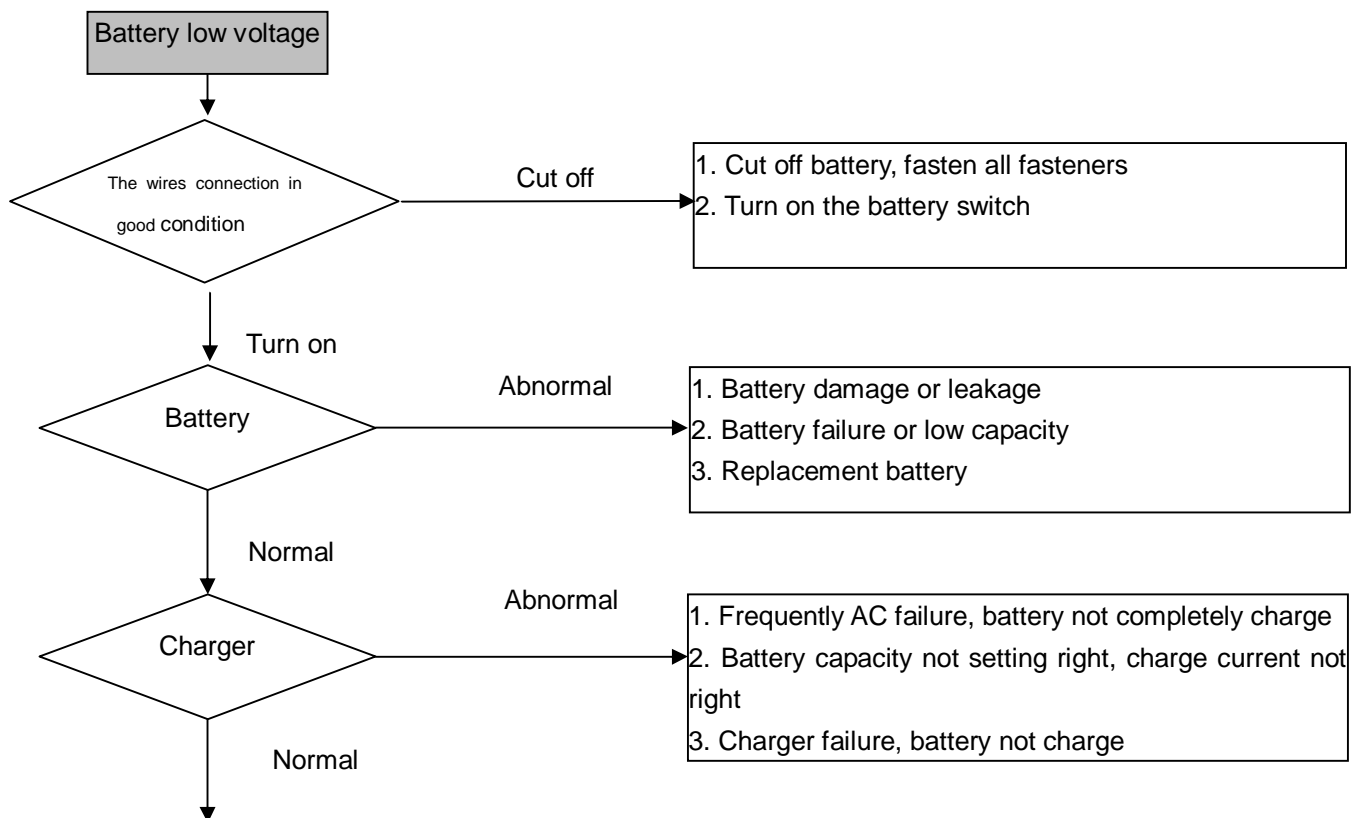
*** Input abnormal**



*** Phase sequence not correct**

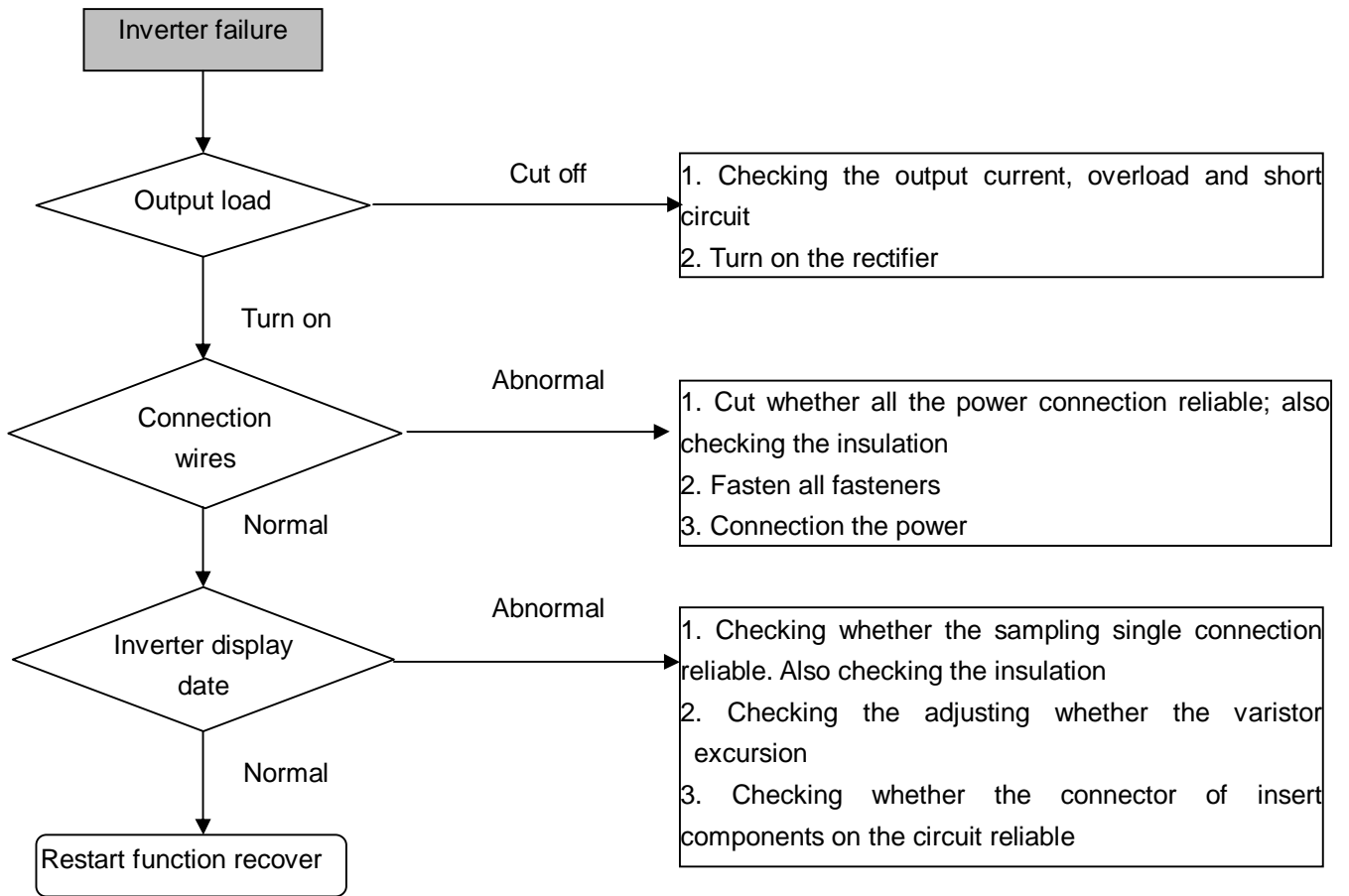


*** Battery low voltage**

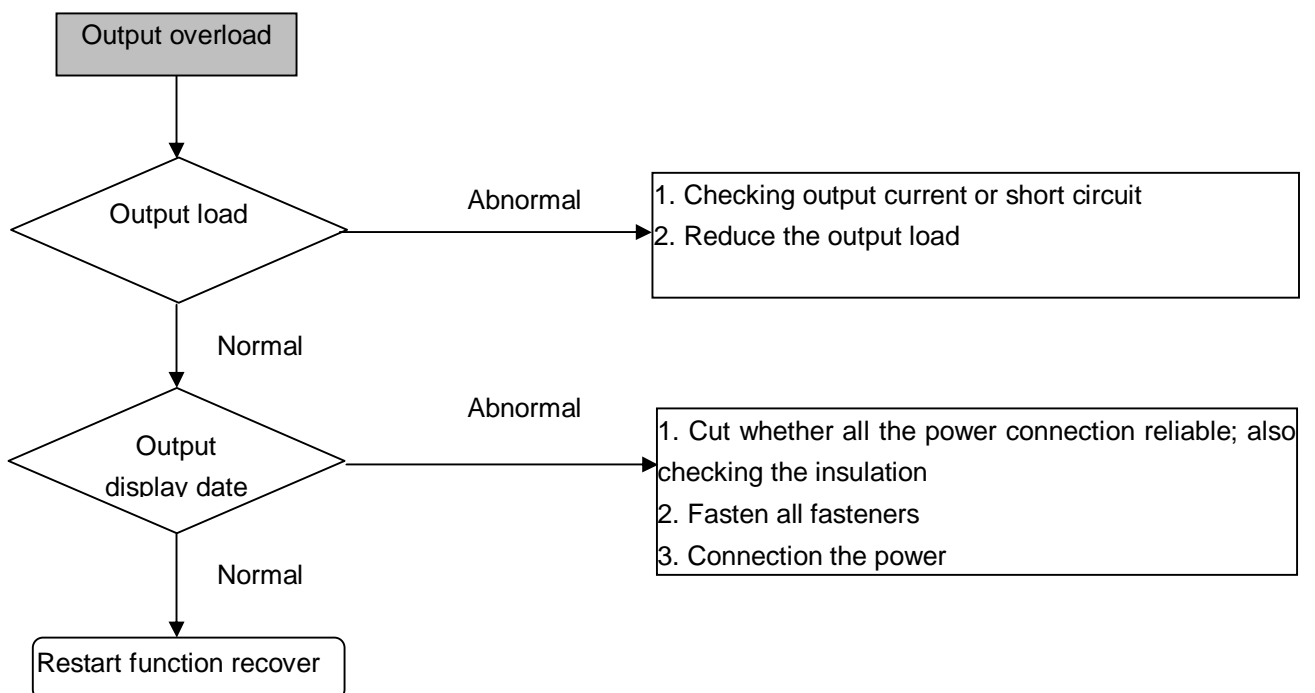


Restart function recover

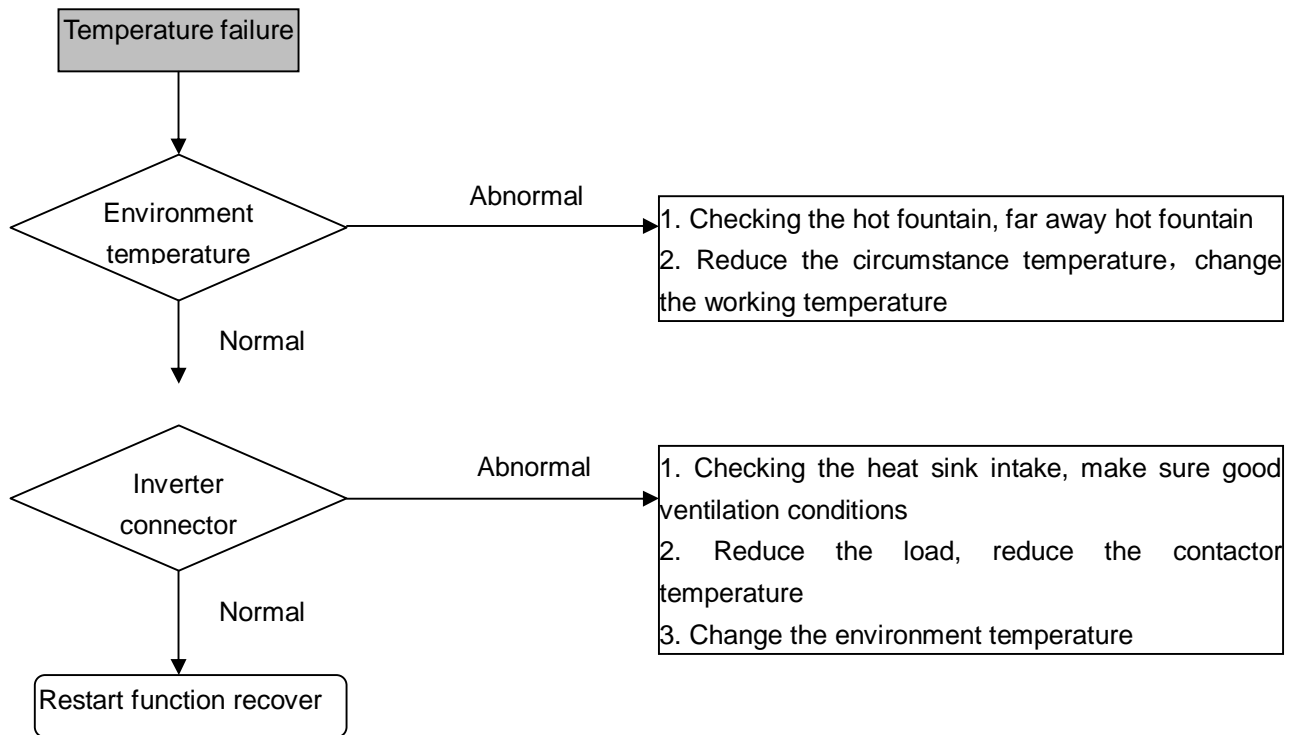
*** Inverter failure**



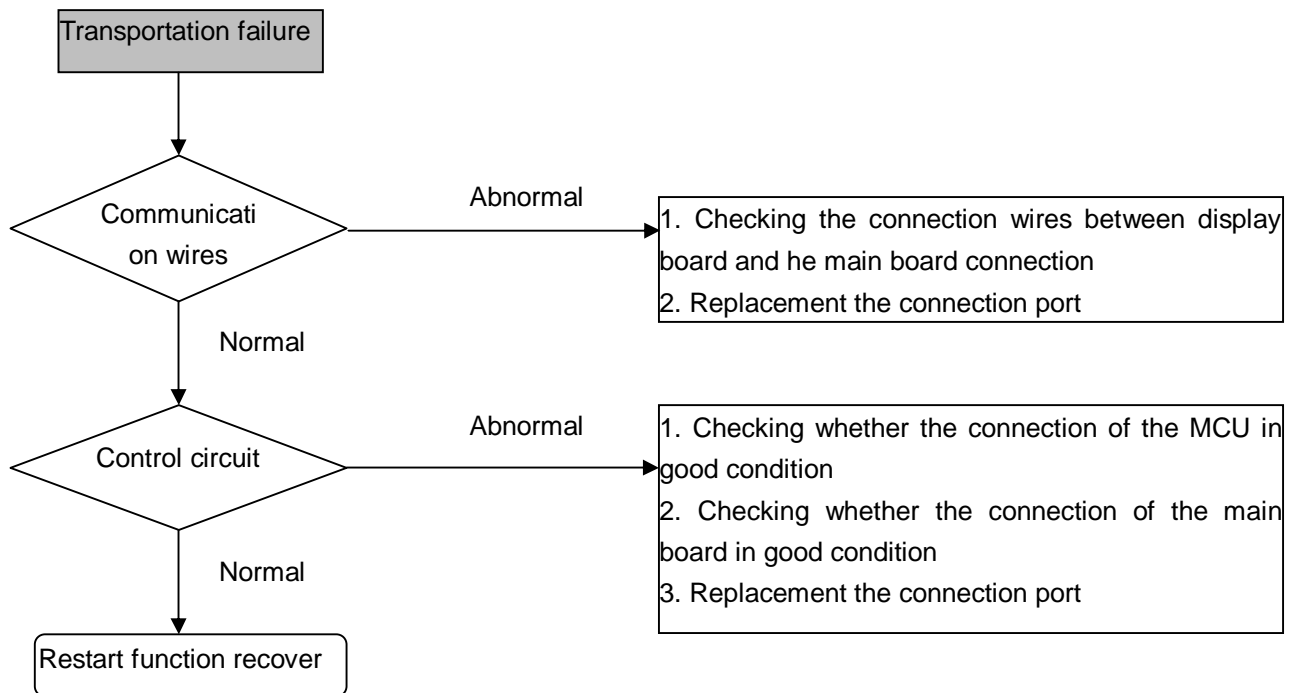
*** Output overload**



*** Temperature**

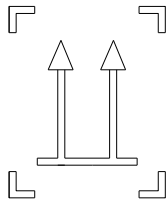


*** Transportation failure**

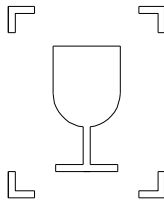


10. Transport requirements

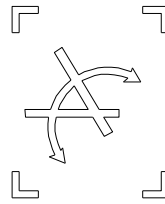
10.1. Transport marks



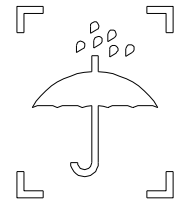
UP



Frangible



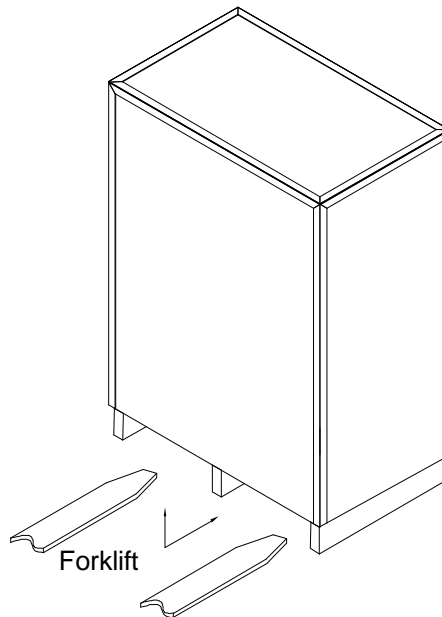
No hook



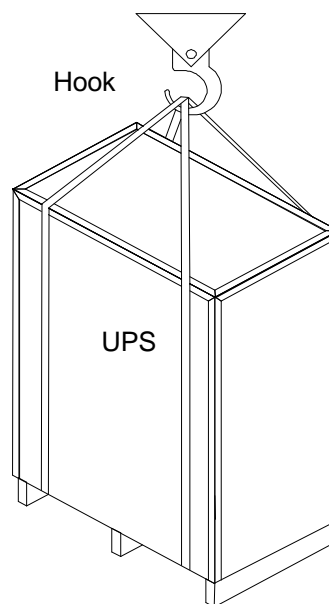
No rain

10.2. Handling and shipping

10.2.1. Forklift handling



10.2.2. Crane load and unload



10.2.3. Transport

Put the packed machine into the carriage stably and fix it with cord in case of any vibration of the vehicle. Although there is anti-vibration of the box designed, please surely make some anti-vibration and drive slowly when in the bumpy road.

11. Packing list

S/N	Name	Qty/piece	Notice
1	UPS	1 pc	
2	Manual	1 pc	
3	Qualification	1 pc	
4	Installation guider	1 pc	
5			
6			

If can not understand the manual or any more detail please contacted the distributor or our company. We will zealously provide our service.

Notice: Any changing of the manual will not be informed specially.