

User's Manual



(DSP)

UNINTERRUPTIBLE POWER SUPPLY

Caution

Please strictly comply with the manual operation instruction, and keep the manual well. Make sure to read the manual carefully before use !

Non-professional technicians are prohibited to open the unit casing in case of electric shock, as the input and output of the unit have high voltage, it may endanger your safety.

Make sure the unit connects with ground well when installing .

Close up all switches for 5 minutes before opening the unit casing for maintenance.

Do not touch the electrolyte flooded from the damaged battery, as the electrolyte is corrosive.

The unit battery should keep same brand and same type. Forbid mixed-using different battery from different manufacturers.

The unit is class “A” product, it may cause radio interference on environment.

Do not try to change the unit configuration, it may affect the unit performance.

Operate the unit within the specified voltage range. Prevent unit from insolation, drenching or shaking.

Do not install the unit in the environment of flammability, explosibility or corrosiveness and electric dust.

Only professionals can install and maintain the unit.

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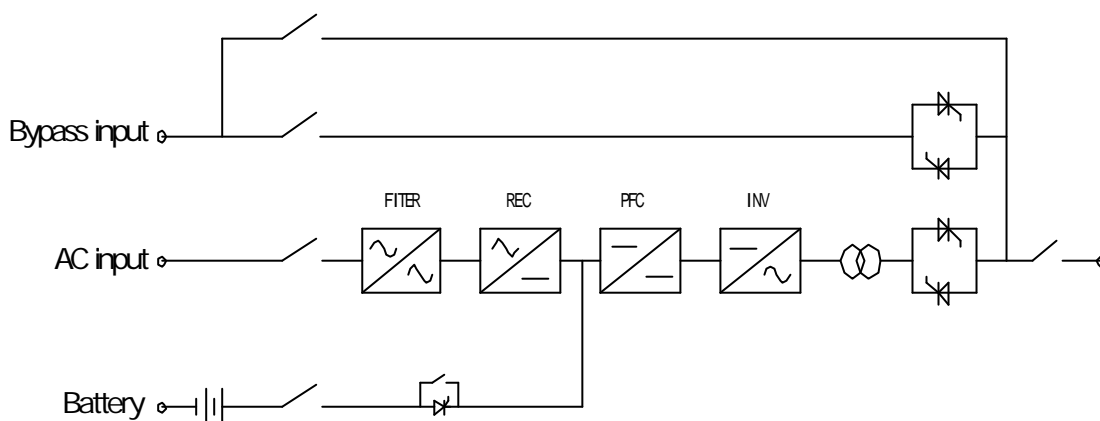
1 SYSTEMS

1.1 BRIEF INTRODUCTION

DSP series UPS are mainly applied to computers, data center, administration center of networks, precision instruments ect. providing high reliable AC uninterruptible power supply.

The UPS, equipped with dual-conversion design with output isolation transformer and advanced complete digital control technology, keep on providing the load with clean uninterruptible power with stable voltage and frequency when the mains off.

1.2 SYSTEMS CONFIGURATION



DSP series UPS is composed of input & output switches, input & output EMI filter, rectifier, inverter, output transformer, static switches, battery, maintenance bypass switch ect.

The main circuit of input power through air breaker input, and get into rectifier unit by input EMI filter. The rectifier transfer AC power to DC power then get into PFC circuit to improve UPS input power factor. The partial circuits adopt time delay soft-start and PFC control technology improving system's impact resistance and input power factor and greatly decreasing the harmonic pollution when UPS come back to energy grids and making UPS use power much better.

Battery connection gets through the switch and contactor, and boost upto DC Bus

voltage by PFC. The contactor pull in only when the DC Bus voltage reach upto a certain value. The battery supply DC power to inverter via the PFC circuit.

Bypass input power through air breaker input, and control output by static bypass switch.

The whole systems adopts complete digital DSP control. All of UPS inverter control, phase synchronization, input rectifier control and logic control ect adopt DSP digital signal manager, which has high precision, fast speed, easy circuit and high reliability.

The systems has the following working modes.

1.3 Working Mode

- Normal working mode

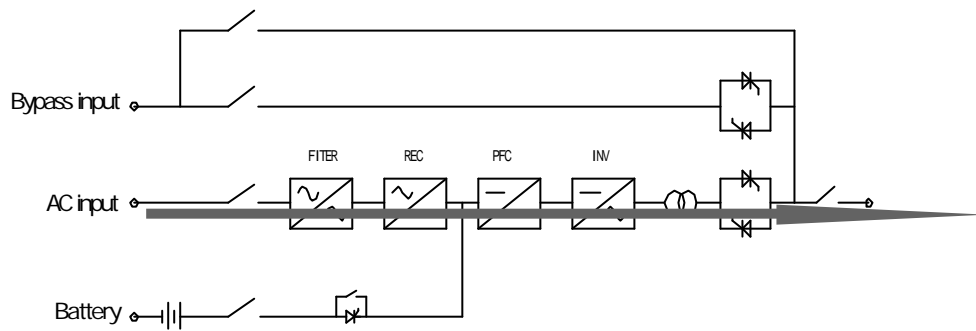


Figure1.1 Normal working mode

Figure 1.1 , when the AC is normal, the AC will pass the UPS through rectifier and inverter and the UPS will output pure and stable AC power to the load. At the same time, the UPS charges the battery.

- Battery working mode

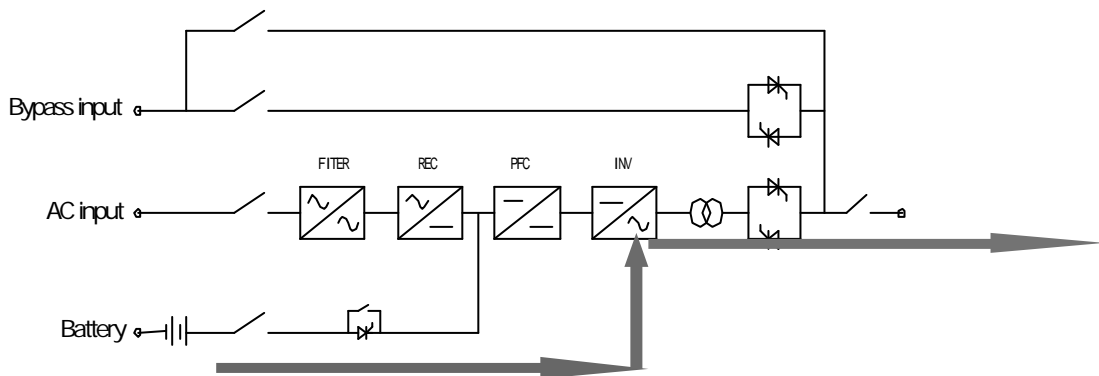


Figure1.2 Battery working mode

Figure 1.2 , When AC is abnormal or inverter failure, the UPS input rectifier is off and the DC power from battery is supplied to inverter through static switch and then output pure and stable AC to load. At the same time, UPS stops charging the battery.

- Bypass working mode

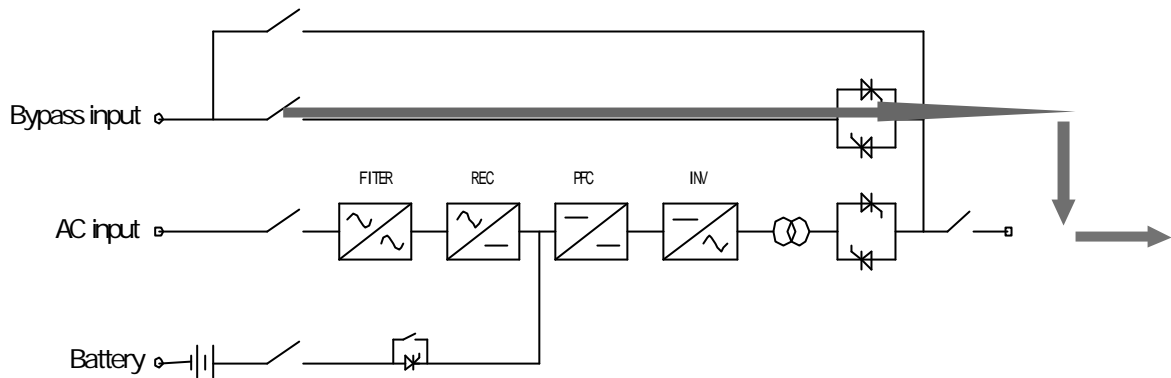


Figure1.3 Bypass working mode

Figure 1.3 , when the inverter is abnormal,for example, overload,over temperature, short-circuit or failure, UPS will turn off the inverter automactially and turn on the bypass static switch and then the bypass will supply the power to load. At the same time, UPS is uable to provide uninterruptible power to the load and the power is just supplied by AC from the bypass.

- Maintenance working mode

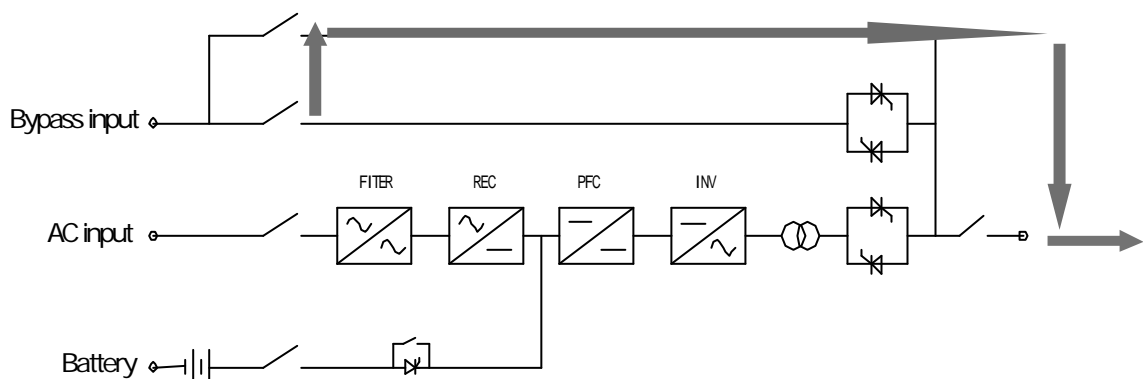


Figure1.4 Maintenance working mode

Figure 1.4 , when the UPS is needed to be repaired, in order to make sure continous power supply to the load;the UPS has to transfer to the bypass working mode and please turn on the maintenance bypass switch and turn off the UPS input

switch, output switch and battery switch and then the UPS is transferred to maintenance working mode, see the arrow in the figure; it is safe to repair the UPS as there is no power inside the UPS at this time.

1.4 Function and Features

1. Advanced DSP digital control technology

the inverter control, phase synchronization, input rectifier control, logic control etc... all adopts DSP digital signal technology with high precision, high speed, high reliability.

2. High input power factor, green energy-saving power

Input power factor reaches up to 0.99; input current total harmonic distortion THDI < 5%;

3. Wide input voltage and frequency range

4. Excellent network monitor function

With RS232, RS485, SNMP, USB, dry contact interface port available, support TCP/IP protocol

5. Big LCD display

6. Perfect protection

UPS has input low / over voltage protection, output low / over voltage protection, overload protection, short-circuit protection, overheat protection; ECO protection, surge protection etc.

7. Cold start and AC start function

When there is no AC, UPS can start by the battery set; or when there is no battery, UPS can start by AC; when AC returns, UPS starts automatically

8. Easy for maintenance

with manual bypass maintenance design; when the UPS is in repair, the UPS can still supply power to the load.

1.5 Technical Specification

Model		8806	8810	38810	38815	38820	38830
Rated capacity		6KVA	10KVA	10KVA	15KVA	20KVA	30KVA
Working mode and principle		Online, static bypass switch(uninterruptible transfer), double conversion					
Configuration		Single phase input , single phase output		Three phase input and single phase output			
Rectifier input	Input power factor	>0.99		>0.95			
	Rated voltage	220VAC		380/400/415VAC			

	Input voltage range	120V-160V at half load;160V-280V at full load		210V-280V at half load; 280V-485V at full load			
	Rated frequency	50Hz/60Hz					
	Input frequency range	40—70Hz					
	Current harmonic distortion	< 5%		—			
	Soft start	0 ~ 100% 15—20sec					
Bypass input	Input voltage range	187 ~ 253V					
	Frequency trace range	± 5%					
charge	Floating voltage	220VDC					
	Charge current	8A					
	protection	Input/output over voltage protection, short-circuit protection, over temperature protection ect.					
battery	type	Maintenance-free sealed lead-acid battery					
	quantity	16pcs of 12V battery connected in serial					
	Rated battery voltage	192VDC					
AC ouput	Power factor	0.8					
	phase	L+N+G					
	Rated voltage	200/208/220/230/240VAC					
	Rated frequency	50Hz/60Hz, settable					
	Frequency precision	< ± 0.1Hz (in battery mode)					
	Voltage precision	< ± 2% (stable)					
	Output current crest	3 : 1					
	Wave distortion	Linear load < 3%					
	Overload capacity	105% ~ 125% load for 10min ; 125% ~ 150% load for 1min ; >150% load for 1s					
	Transfer time	AC—battery : zero transfer ; bypass—inverter : zero transfer					
Alatm	AC abnormal	Interval for 4S , beep for 1S ; after 1min, beep stops automatically					
	Battery low voltage	Interval for 1S , beep for 1S ; beep continously					
	Overload alarm	Interval for 4S , beep for 2S ; beep continously					
	Failure alarm	Continuous beeps					
System	display	LED+LCD					
	Protection function	Ouptut short -circuit, overload, ouput over voltage or low voltage, battery low voltage, over temperature					
	Communication port	RS232,USB(Standard),RS485,SNMP(Optional)					
	Operation temperature	0 ~ 40					
	Relative humidity	0 ~ 90% (non-condense)					
	Cooling	Intelligent fan speed adjustable					
	Noise dB	<55 -1M-		<60- 1M			
	Input/output	Terminal					
others	Surge protection	IEC60664-1 grade protection					
	Electromagnetism compatibility	Comply with GB7260.2-2003					
Weight and packing	configuration	Tower type, IP30					
	Weight(Kg)	65	120	150	160	280	300
	Dimension(W × H × D)mm	260 × 700 × 545	330 × 940 × 670	350 × 1030 × 810	400 × 1150 × 860		520 × 1160 × 910

The specifications may be changed without prior notice!

2 INSTALLATION

2.1 Environment Selection

Working Temperature : 0-40

Storage Temperature : -40-70 (without battery)

-20-55 (with battery)

Relative humidity : 5% ~ 95% , Non condensing

Altitude : 1500m , appeal to GB3859.2-93

The tolerance of uprightness : No vibration, bumps and the vertical gradient should be no more than 5 degrees.

UPS installed environment should be adequate ventilation, cool, low humidity and no dust. Recommended working temperature is 20~25 , humidity is about 50%.

UPS should work in the place with the altitude below 1000m; When the altitude is above 1000m, we recommend to operate UPS according to below descending table.

Altitude(m)	1500	2000	2500	3000	3500	4000	4500	5000
Descending coefficient	100%	95%	91%	86%	82%	78%	74%	70%

2.2 Placement

The provided AC power capacity must meet the requirement of UPS normal working. Please use unique air switch for input and output connection

Install UPS as close as possible to the utility power outlet.

The floor board of UPS installed place should be good enough to support the weight of UPS. Any dangerous installation is forbidden.

No storage of flammable, explosive and other dangerous goods in the place and there must have fire equipment

Keep good ventilation around UPS, don't obstruct the cooling channels.

Keep each side of the UPS at least 1 meter away from the wall so that there have a enough space for future maintainance and operation.

Recommend professional to manage the UPS house and stop the entry of non-related people.

2.3 Unpacking

Before unpacking, inspect if the packaging is damaged during the transport and if it is the correct model you ordered. After unpacking, check if all the accessories are

included and if the real product is right.

2.3.1 Accessories

User manual, 1pc;

CD for monitoring software, 1pc;

Cables for RS232 and USB interface, each 1pc;

2.3.2 The items of UPS specification should be checked

UPS Capacity ;the voltage of input and output、 frequency ;the phase of input and output ; battery voltage.

2.4 Dimension of structure and instruction

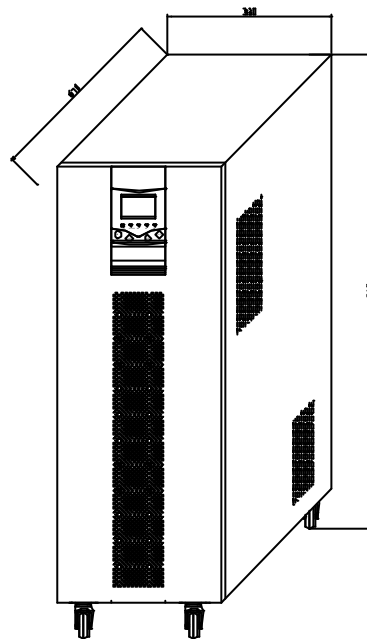


Figure2.1 Drawing of structure

As the UPS has the ventilation holes in the front side, back side, right side and left side as long as the bottom, please make sure there is enough space so that the air can flow.

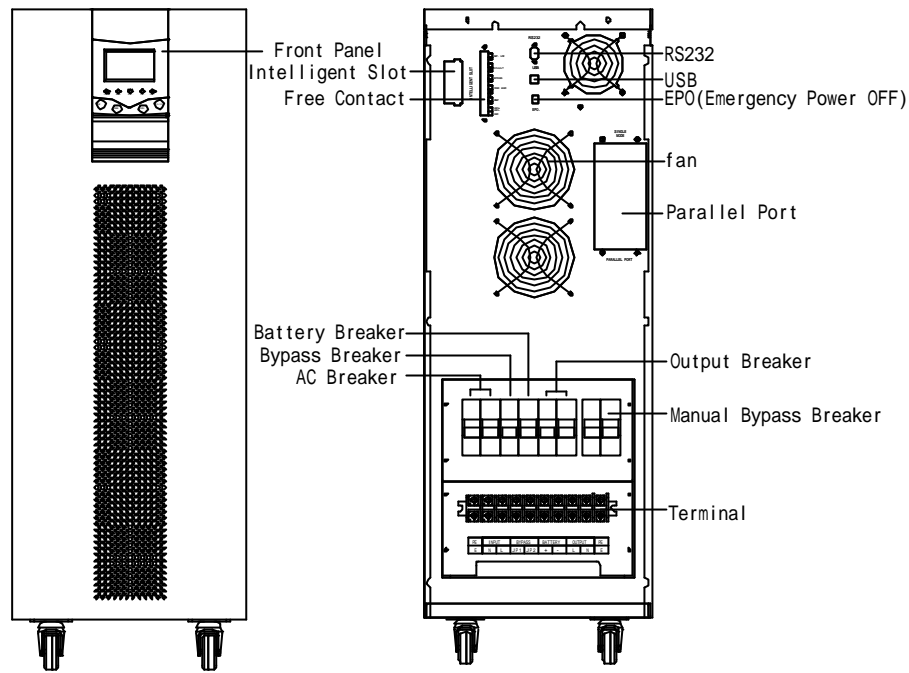


Figure 2.2 Layout of full unit

2.5 The selection of Air switch and connecting wires

The wires for different capacity of UPS should be with different grade, unsuitable wires or air switch will easily bring dangers. The principle of selection are: 3-5A/mm² for middle and small size UPS, 2.5-3A/mm² for big power UPS. Meantime, we should consider to control the max voltage drop no more than 3V.

There have input neutral wire for bypass and output neutral wire for UPS power in the UPS midline system. For three phases in and single phase out UPS, the cross-sectional area of input null line should be 1.5-1.7 times of phase line.

There have groundings for safe protection and lightning protection in the UPS system, their cross-sectional area should be 0.5-1.0 time of phase line and no smaller than 6mm²

2.5.1 The selection of air switch

POWER KVA	Input voltage VAC	Output voltage VAC	Input Max.current(A)	Output Max.current(A)	Input air switch (A)	Output air switch (A)
4	220	220	32	18	50	32
6	220	220	44	27	63	40
8	220	220	55	36	80	50
10	220/380	220	66	45	100	63

15	380	220	94	68	125	100
20	380	220	122	90	150	125
30	380	220	177	136	200	160

Note: Forbid to use creepage protection type switch

2.5.2 The selection of connecting wires

Model	4KVA	6KVA	8KVA	10KV A	10KVA(3: 1)	15KVA(3: 1)	20KVA(3: 1)	30KVA(3: 1)
	Wire mm ²	Wire mm ²	Wire mm ²	Wire mm ²	Wire mm ²	Wire mm ²	Wire mm ²	Wire Mm ²
Input	6	8	10	16	6	6	8	16
By-pas	6	6	8	10	10	16	25	35
Output	6	6	8	10	10	16	25	35
Battery	6	8	10	10	10	16	25	35
Neutral	6	8	10	16	10	16	25	35
Earthin	6	6	6	6	6	6	6	8

Note : The real wires should be no smaller than the figures in above table.

2.6 Instruction of input and output terminal

The terminal is on the rear panel, see below figure for details on terminal plate:

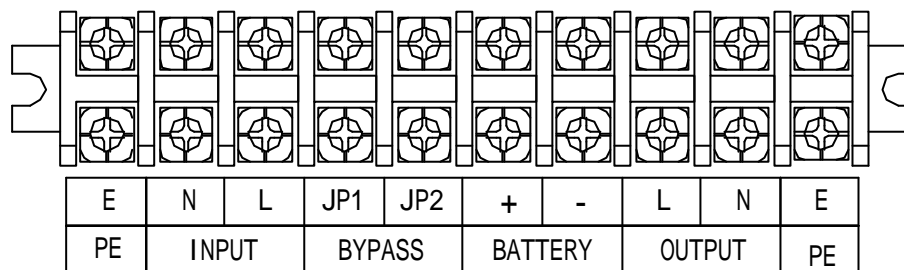


Figure2.3 Single phase 4 ~ 10K terminal drawing

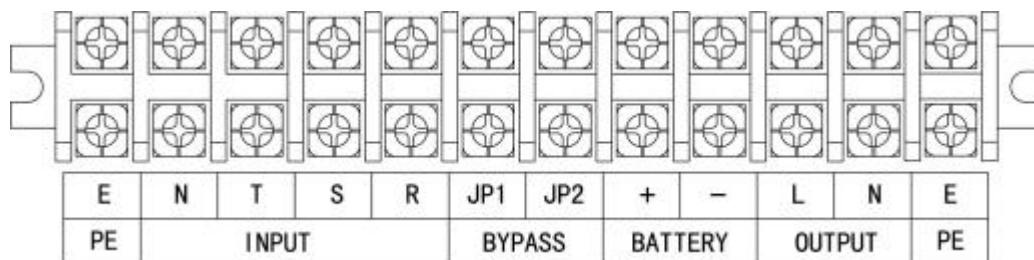


Figure2.4 three phase in one phase 10K/15K/20K out terminal drawing

2.7 Installation instruction of single unit

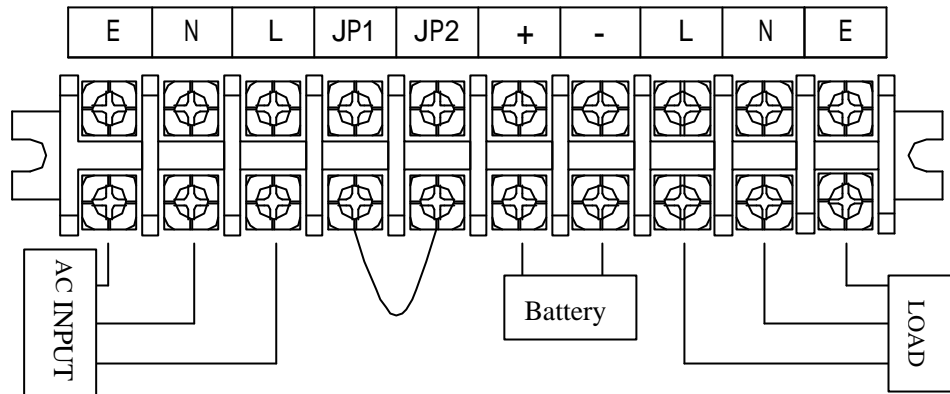


Figure2.5 Single phase 4~10K terminal connection drawing

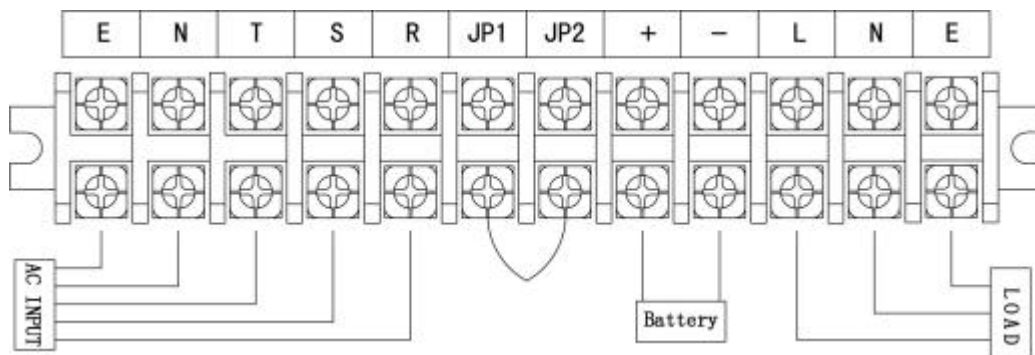


Figure2.6 three phase in one phase out 10K/15K/20K terminal connection drawing

- 1) JP1,JP2 must be short connected with 10mm² wire when operate a single UPS.
- 2) Anode, cathode of battery and live wire, neutral wire cannot be connected in reverse.

2.8 Installation introduction of hot standby in series connection.

2.8.1 Make the slave UPS connected to the master UPS's input bypass, then become a hot standby system. See sketch map2.7

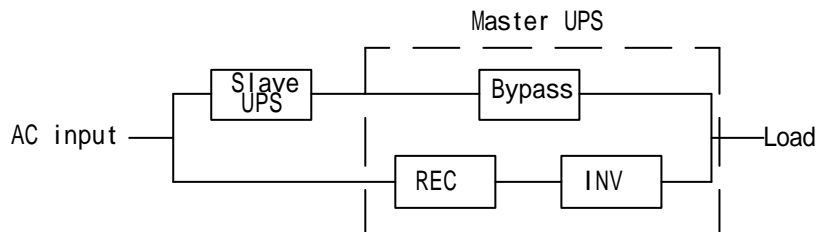


Figure2.7

2.8.2 Cable connection of hot standby

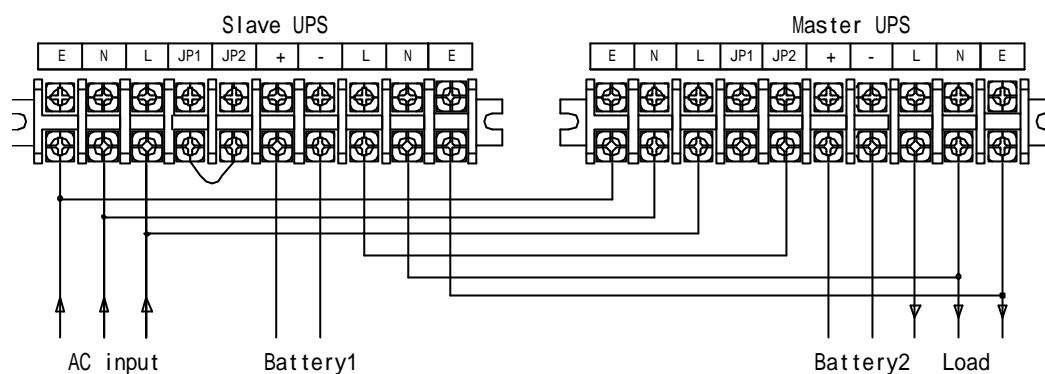


Figure2.8 Single phase hot standby connection diagram

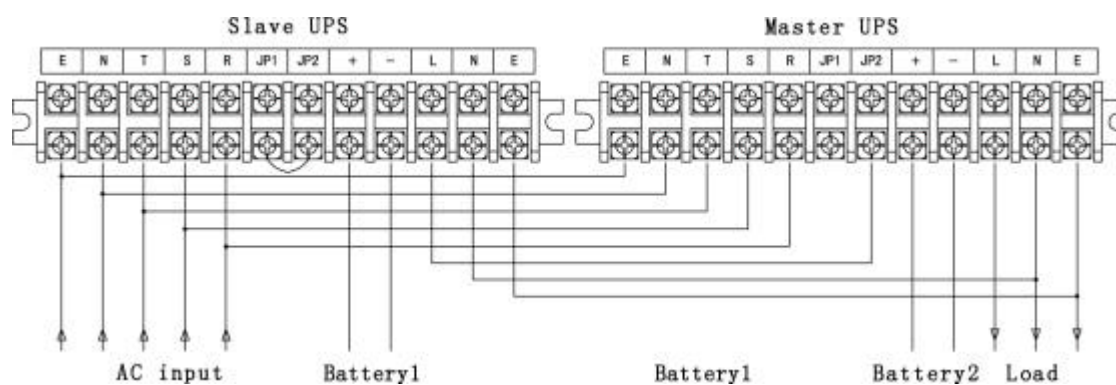


Figure2.9 Three phase hot standby connection diagram

Connect the neutral,line,earth of the mater and slave in parallel , and make the output line of slave connected to input of the master(JP2) (JP2), and ouput neutral and earth in prallel , and loads will be at the ouput of the master

2.8.3 work pinciple of hot standby

Normal work mode:

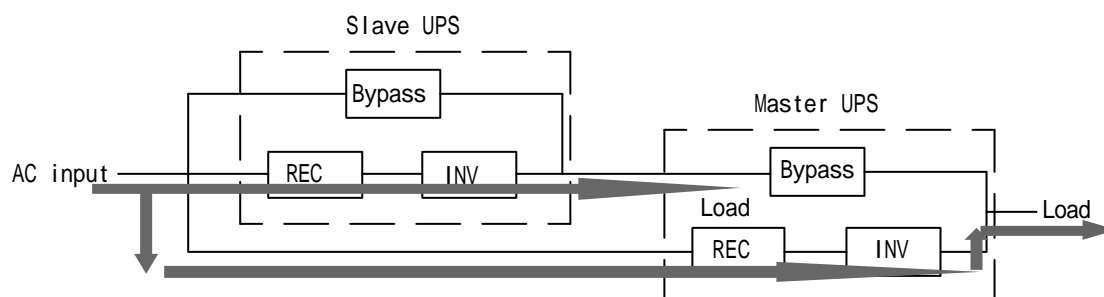


Figure2.10 Nomal work flow

Figure 2.10 stands for system normal ,power is supplied by the master UPS ,and

the slave UPS works at “0” bad status. Once the master UPS is failed, the master will transfer to bypass and then the slave UPS provides the power.

See Figure 2.11

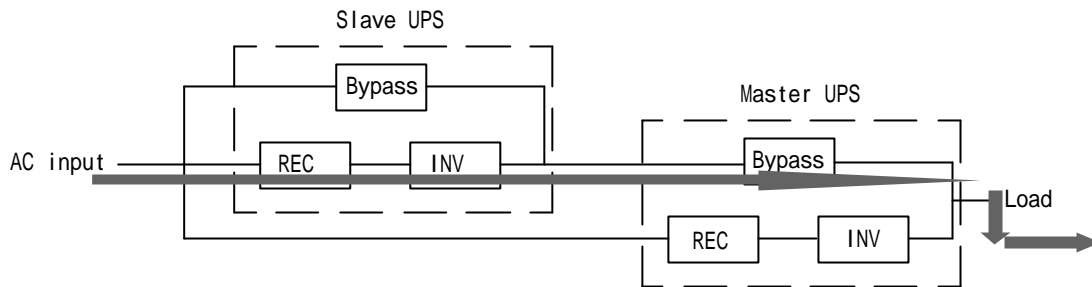


Figure 2.11 Master UPS abnormal work flow

2.9 Inspection of installation

2.9.1 Inspection of UPS

After UPS installation, please do the necessary inspections below:

Whether the UPS truck brake fixed or steady or skew.

Whether the UPS scraped or hit damage.

Whether there is sundries around the UPS body or around it.

2.9.2 Electric inspection

After UPS switching finished, please inspect following items:

The input and output switching is ok and the in and out terminals are canonical

Make sure the input and output connected cable steady, phase series correct and mark complete.

Make sure battery cable connection fastened, polarity normal and battery settled steady.

Make sure the cable laying of system canonical, neat and easy for future inspection and extendable.

3 ON/OFF OPERATION

3.1 Preparation before switching on the UPS

Reconfirm the all connection and power supply are right.

Inspect the input voltage and frequency are within the range.

All UPS switches are at off mode.

3.2 Starting steps of single UPS.

Turn the input AC switch. The power supply board starts to work and the LCD will display “LINE” and “BAT” lights on, reminding to select the language and going into standby status.

Turn on battery switch and UPS recharges the batteries with small current.

1) UPS Starting .Long press ON/OFF button above 1second , LCD display “starting in process , plz wait...” , about 10seconds later on , UPS transfer to inverter output and “INV” light on , “BAT” off.

2) Turn on bypass switch.

3) Turn on output switch

3.3 Steps of switching off single UPS

1) Shut off output switch.

2) Shut off the UPS. Long press ON/OFF button above 1second.

3) Shut off battery switch.

4) Shut off bypass.

5) Shut off AC input switch

3.4 Hot standby system starting steps

First start the slave UPS (the Standby UPS. Start steps are the same as turn on single UPS

Then turn the master UPS. Start steps are the same as turn on single UPS.

3.5 Shutting off steps of hot standby system.

Turn off the master first. Turn off steps as the as single UPS.

Then turn off the slave UPS. Turn off steps as the as single UPS.

3.6 Emergency turn off steps of UPS.

When meet emergency affairs, must shut off all power supply at once and shut all the switches at the same time.

3.7 Maintenance operation steps

This steps must be done by pfoessional people, otherwise it's accounto your responsibility for any cost.

Turn off the inverter. Long press the ON/OFF above 1 second , and UPS will transfer to bypass and bypass light on.

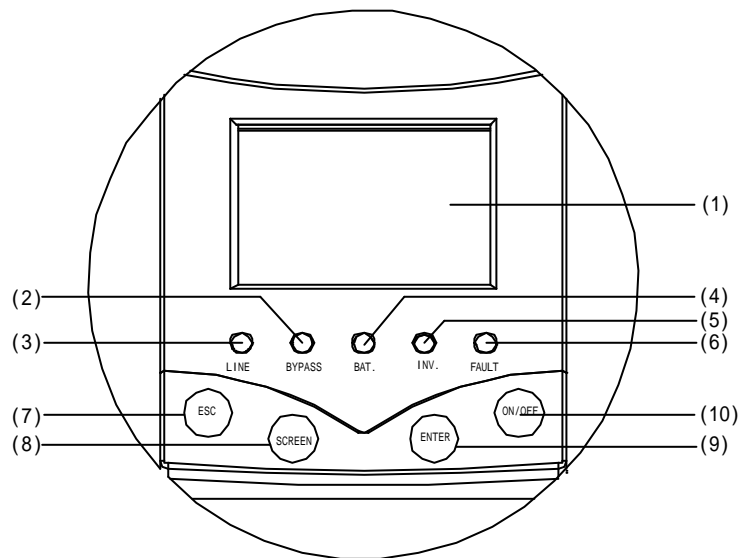
- 1) Open the rear cover board of the breaker,turn on the manual bypass breaker.
- 2) Shut off UPS input, battery switch,byapss switch and ourput switch.
- 3) Operate relative maintenance of UPS
- 4) Turn on the output switch.
- 5) Turn on the bypass switch,input switch,battery switch and bypass light will be on.

6) Shut off manual maintenance switch.

7) Switch on the inverter.Long press ON/OFF button above 1s, and 10s later, UPS goes into normal working status.

4 Operation of front panel

4.1 The structure & function of front panel



(1) LCD display screen.Display the working parameter and status of the UPS.

(2) Bypass output indicator (green).It will light when UPS output is in bypass model.

(3)Main power input indicator (green).It will light when main power is normal.

(4) Battery is working (yellow).It will light when UPS is powered by batteries.

(5) Inverter output indicator (green).It will light when the Inverter is working and outputting.

(6) Error alarm indicator (red).It will light with alarm when UPS is failure.

(7) “Back”Press this button to back to last step or exit,or cancel the setting of parameter.

(8) —“Screen”.To view and choose the functions or items.

(9)—“Enter”.This button is to confirm where the cursor points or the setting of parameter.

(10) —“ON/OFF”.Press it over 1 second,the UPS will start or turn off.

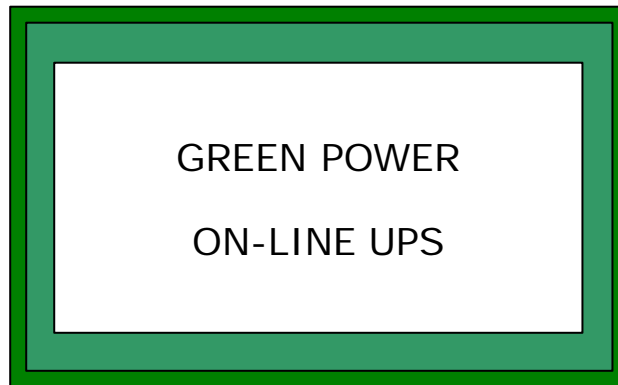
4.2 The instruction os setting

Choose the language :

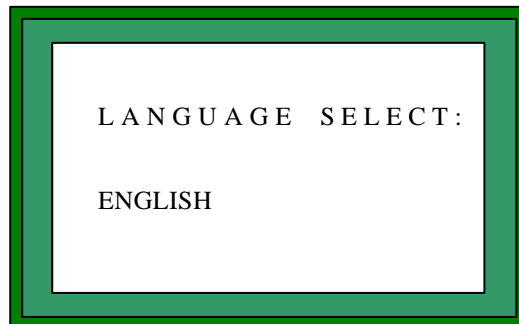
When UPS is in “Sleep”model,press “ENTER”to enter the main page,press “Screen”and choose “System setting”,then press “Enter” to choose “Language setting”,after chose the Language that you need,press ENTER to confirm.

4.3 Display content

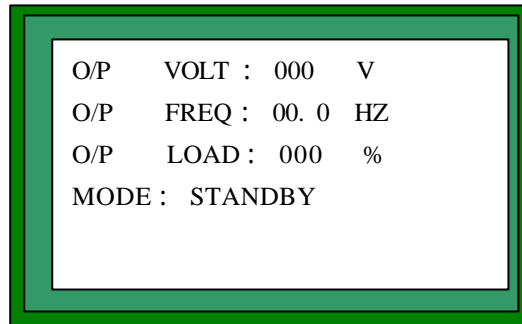
1) Turn on the A/C input switch,LCD will display as below.



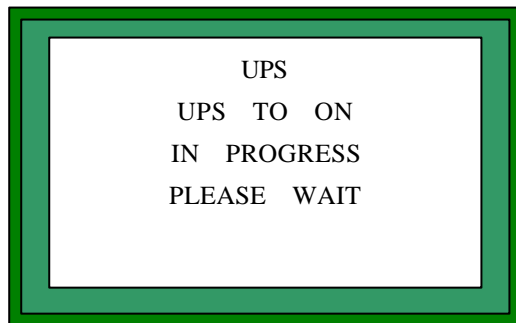
3 seconds later,the system will enter the“language setting”page



If you don't select the language the language, the system will set the language as Chinese automatically, and enter "Sleep" model.

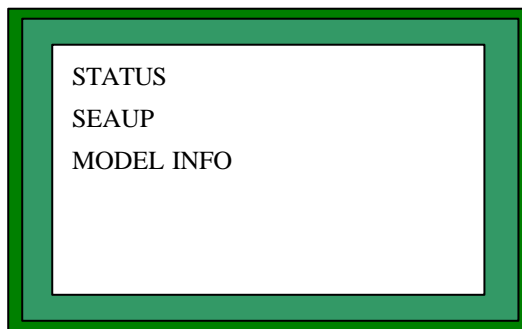


2) Press the ON/OFF button for over 1 second, UPS will enter start model.

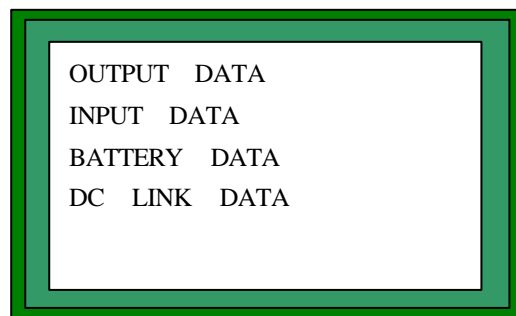


3)10 seconds later, UPS will transfer to Inverter output, the "sleep" model becomes "main power model"

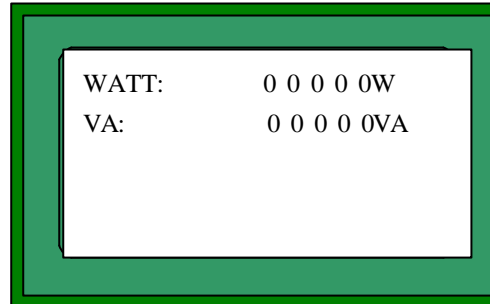
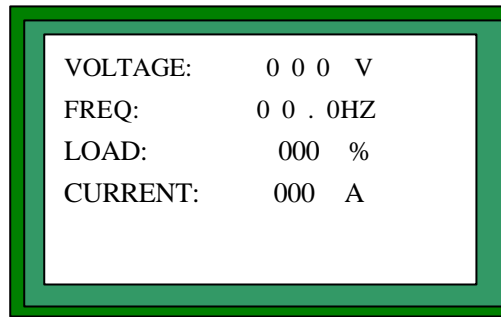
4)Press "Enter"to enter "Function Menu"



5)Select "parameter setting" and press "Enter" to check parameters

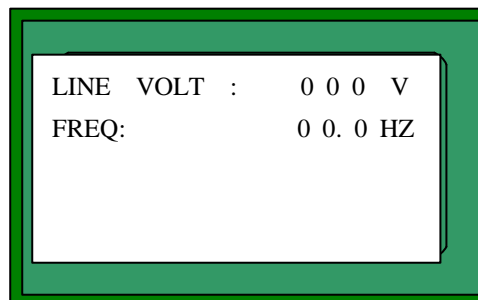


6)Select “output parameter” and press “enter” to check the parameter of output.

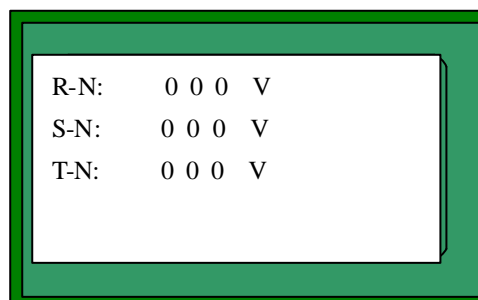


7)Press “ESC”, the window will be back to last page, select “model info” and press “Enter”

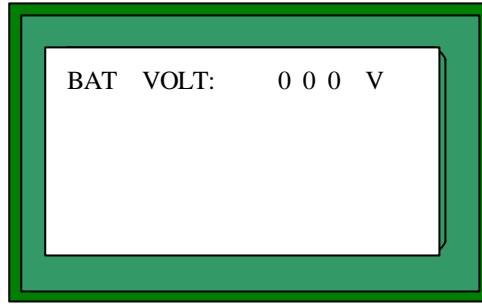
4-10KVA single phase UPS



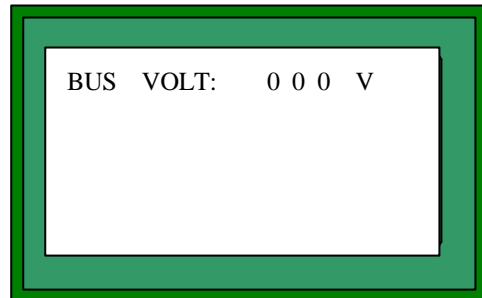
(2) 10-30KVVA three phase input and single phase output



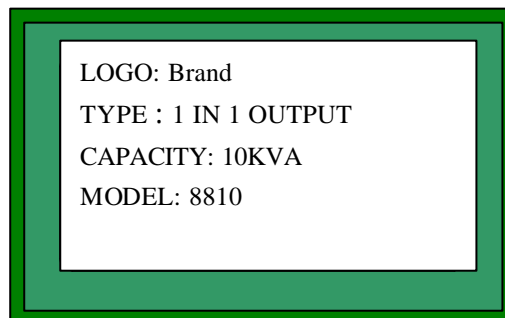
8)Or you may select “battery parameter” and press “Enter” to check the battery status.



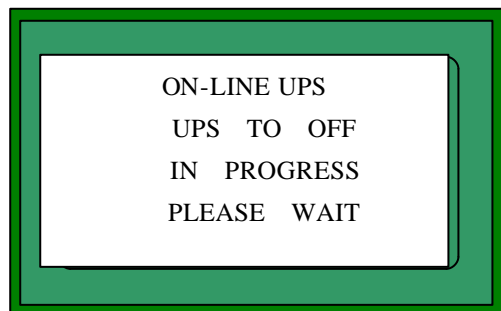
9)Or you may check the voltage of the DC wire inside UPS



10)Press “ESC” to return to the last step,press “Input the parameter”and “Enter”to check the UPS information.



11)Press the “ON/OFF”for more than 1 second,the UPS will be turned off,LCD will display as below:



5 Communication Interface

UPS supplies many communication interface methods including RS232 and

RS485.It communicates one by one thru RS232. It has remote communication thru RS485.There is built-in SNMP card (optional) to complete remote alarming and network monitoring. Interface soft mainly completes working status real time,e-mail,UPS control,alarming history and timing on or off etc. Such as:

5.1 RS232 instructions

RS232 completes communication close distance.It doesn't often exceed 10 meters.The pin instruction are as follows:

DB9 pin	1	2	3	4	5	6	7	8	9
instructions	NO	RX	TX	NO	GND	NO	NO	NO	NO

5.2 RS485 Instructions

RS 485 interface adopts intercommunication to complete remote monitoring.Output data cable adopts twisted-pair cable. There are three cables A (485+) B (485-) and GND respectively.

5.3 USB instructions:

UPS also supplies USB interface.It adopts stochastic USB communication. It completes real time monitoring and management without RS232.

5.4 Dry Contact instructions

Inactive voltage and current is 120VAC/1A or 24VDC/1A , such as

Signal definition	BAT.LOW	AC FAULT	BYPASS	OVER LOAD	FAULT
Terminal	On+close	On+close	On+close	On+close	On+close
Instructions	Low battery voltage	Line is abnormal	Bypass	Overload	UPS is failed

5.5 SNMP instructions

SNMP card supports SNMP、HTTP、TCP/IP protocol,etc.It complete UPS monitoring thru monitoring software, NMS and Web browser(IE and NetScape etc)

5.6 EPO interface

EPO completes remote turn off urgently. When UPS does working, EPO are under short circuit. When EPO is open, UPS closes output.

6 Daily Maintenance

6.1 Battery use and maintenance

- 1) The working temperature is within 20 ~ 25 for god's snake. So it expand its life span.
- 2) Please check if battery terminal and cable are fixed for a certain period.
- 3) Please clean dirty and white mash on battery to avoid short circuit for a certain period.
- 4) When user clean battery, please use wet clothes and stop to use solvent.
- 5) Please check if battery voltage is normal. If not, please change
- 6) Please check if battery are over-charging and leakage of electrolyte. If so, please do in time.
- 7) When user changes battery, please note that use same brand and capacity to avoid confused.
- 8) No stopping power for a long time, user should discharge artificially for 4 to 6 months. User stops discharging within 50% capacity.
- 9) Its current is small inadvisably to protect deep discharge and damage battery.

6.2 UPS maintenance

- 1) Please check if input and output connection is ok or not for a certain period.
- 2) Please check if UPS working status is normal or not for a certain period.
- 3) Please check if heatsink fan is ok to prevent sundries stopping window.
- 4) Please check if there is dirty inside the UPS to prevent much dirty to happen UPS failure.

6.3 Safe Step Maintenance

Right maintenance operation not only makes UPS exert best working status to expand its life span, but also keep safe. Technician man's maintenance is a must. When maintenance, please note following notice.

- 1) Please acquaint user manual to know its performance before maintenance.

2) Please warn high voltage inside the UPS the time of day. And keep no power inside the UPS before maintenance.

3) Stop to take metal, jewelry, watch etc before maintenance.

4) Please use special tool and testing equipment

5) Please keep label and history when maintenance.

6.4 Troubleshoot

Abnormal phenomenon	Fault diagnosis	Solutions
Alarming when battery connects	Connection method is reverse	Checking and connect rightly
Fan stop running	Fan failed or board of fan damaged	Contact technician man repair
Don't work when turn on UPS	Switch failed	Check power supply switch
	Power supply board failed	Contact technician man repair
Line is failed and No output	Battery switch don't turn on or failed	Check power supply switch
	Low battery to supply	Contact technician man testing
UPS don't have communication	Communicate software wrongly set and data cable has failure	Reset and change data cable.
UPS don't start up in line and UPS works normally in battery	Charging board has failure	Checking if input fuse of charging board are failed
Small charging current	Long backup charging board are failed	Checking if input fuse of charging board are failed
Buzzer alarms for a long time, fault light is bright	Heatsink is over temperature in inverter	Check if heatsink do work or not
	UPS failed	Contact technician man repair

6.5 package, shipment and storage.

6.5.1 package

There are two packages. Firstly we use carton to pack them. Then we will use wooden carton to pack. There are some information as model, rating, date etc

6.5.2 shipment

When UPS is in convey, you should follow caution sign. When ups are intransit, you should put according to notice and caution sign. Don't put UPS to drench, solarization. Don't also put UPS with flammability, Explosion and causticity goods together when UPS is in transit. When UPS download, you use special equipment to avoid bump, concussion and damage.

6.5.3 storage

UPS should put in dry environment to prevent drenching and solarization. The temperature of storage is within 0~ +40 . And the humidity of storage is within 20% ~ 90%. When battery inside the UPS are storage for more three months. They should be charged once to prevent discharging automatically and damage.