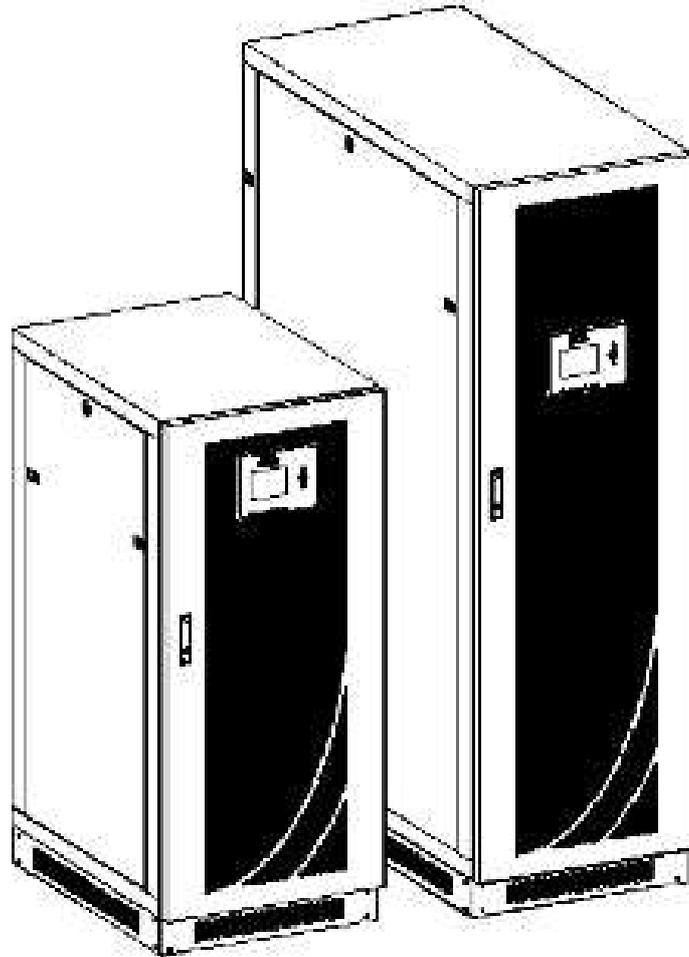




## 25-300kVA UPS

# INSTALLATION AND USER MANUAL SAFEPOWER MODULAR SPM



KEEP FOR FUTURE REFERENCE  
for the entire life of the appliance



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The information in this document is subject to change without notice.

## Publish statement

Thank you for purchasing this series UPS.

This series UPS is an intelligent, three phase in Three phase out, high frequency online UPS designed by our R&D team who is with years of designing experiences on UPS.

With excellent electrical performance, perfect intelligent monitoring and network functions, smart appearance, complying with EMC and safety standards, The UPS meets the world's advanced level.

Read this manual carefully before installation

This manual provides technical support to the operator of the equipment.



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# 1. Safety

Important safety instructions – Save these instructions

There exists dangerous voltage and high temperature inside the UPS. During the installation, operation and maintenance, please abide the local safety instructions and relative laws, otherwise it will result in personnel injury or equipment damage. Safety instructions in this manual act as a supplementary for the local safety instructions. Our company will not assume the liability that caused by disobeying safety instructions.

## 1.1 Safety notes

1. Even no connection with utility power, 220/230/240Vac voltage may still exist at UPS outlet!
2. For the sake of human being safety, please well earth the UPS before starting it.
3. Don't open or damage battery, for the liquid spilled from the battery is strongly poisonous and do harmful to body!
4. Please avoid short circuit between anode and cathode of battery, otherwise, it will cause spark or fire!
5. Don't disassemble the UPS cover, or there may be an electric shock!
6. Check if there exists high voltage before touching the battery
7. Working environment and storage way will affect the lifetime and reliability of the UPS.  
Avoid the UPS from working under following environment for long time

- ◆ Area where the humidity and temperature is out of the specified range(temperature 0 to 40°C, relative humidity 5%-95%)
- ◆ Direct sunlight or location nearby heat
- ◆ Vibration Area with possibility to get the UPS crashed.
- ◆ Area with erosive gas, flammable gas, excessive dust, etc

8. Keep ventilations in good conditions otherwise the components inside the UPS will be over-heated which may affect the life of the UPS.

## 1.2 Symbols used in this guide



**WARNING!**

Risk of electric shock



## CAUTION!

Read this information to avoid equipment damage

## 2. Main Features

### 2.1 Summarization

Our UPS is a kind of three-in- three -out high frequency online UPS, it provides three specifications: The 90kVA, 150kVA and 300kVA. The products are modularized and adopt the N+X redundancy. It can flexibly increase the number of the UPS modules according to the load capacity which is convenient for flexible allocation and gradually investment.

The UPS can solve most of the power supply problems, such as blackout, over-voltage, under-voltage, voltage sudden drop, oscillating of decreasing extent, high voltage pulse, voltage fluctuation, surge, inrush current, harmonic distortion (THD), noise interference, frequency fluctuation, etc..

This UPS can be applied to different applications from computer device, automatic equipment, communication system to industry equipment.

### 2.2 Functions and Features

◆ Digital control

◆ 19-inch standard cabinet

1.4-meter and 2-meter high cabinets are provided according to the user's requirement.

◆ Modularized design

◆ High power-density design

The height of the single module is 3U, a standard 1.4m cabinet can hold 5 pieces modules and a standard 2M cabinet for 10 modules can reach maximum as below:

90kVA cabinet: (3+1) x 25k/30kVA modules (3pcs for power upgrade + 1pcs for redundancy)

150kVA cabinet: 5 x 25k/30kVA modules

300kVA cabinet: 10 x 25k/30kVA modules

◆ N+X parallel redundancy

This series UPS adopts N+X parallel redundancy design, user can set different redundancy according to the importance of the load. While the redundancy modules are set more than two, the availability of UPS system will achieve 99.999%, which may satisfy the required reliability of the critical load connected. Through LCD display setting, you may configure the required quantity of the redundancy unit. When the load connected is over the number of the redundancy, the UPS will alert right away. The design of the MTBF (Meantime before Failure) is up to 100,000 hours.

This series can set the number of redundancy modules. When the load exceeds the redundancy setting, the UPS can still work normally and simultaneously send out corresponding warning as long as the load doesn't exceed the total capacity of modules.

◆ Parallel redundant control system



- ◆ Optimizing distributed convergence for the cabinet
- ◆ Separated Bypass
- ◆ Common Battery
- ◆ Configurable Battery Voltage (32-40pcs)
- ◆ Automatic charge current adjustment according to battery capacity connected.
- ◆ 3-Stage Intelligent charging
- ◆ Touch-screen Super-large LCD display(Optional)
- ◆ Each module with individual LCD display
- ◆ Remote Monitoring via SNMP
- ◆ Optional Accessories available such as Isolation transformer, Distribution Panel, SNMP Card,  
Relay Contact Board, etc..
- ◆ Equip with Maintenance Bypass Switch for easy maintenance purpose.
- ◆ Superior MTTR(Meantime to repair) & Short shutdown time in maintenance
- ◆ Centralized monitoring module is also available
- ◆ EPO function

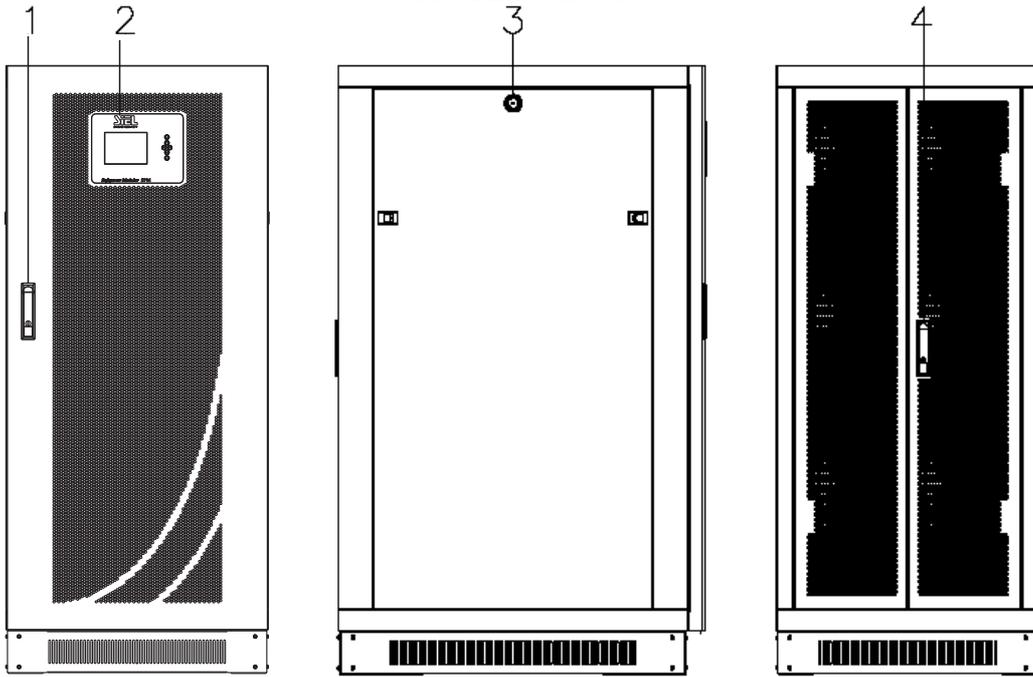
## **3. Installation**

### **3.1 Unpack checking**

1. Don't lean the UPS when moving it out from the packaging
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the dealer in case of missing parts.

### **3.2 Cabinet Outlook**

1. 1.4M 19" Rack Cabinet (90kVA)



**Front View**

**Side View**

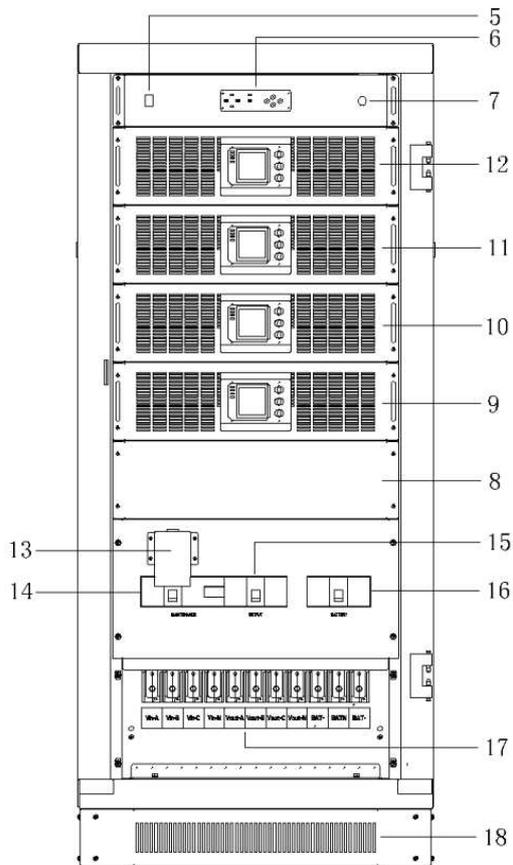
**Rear View**

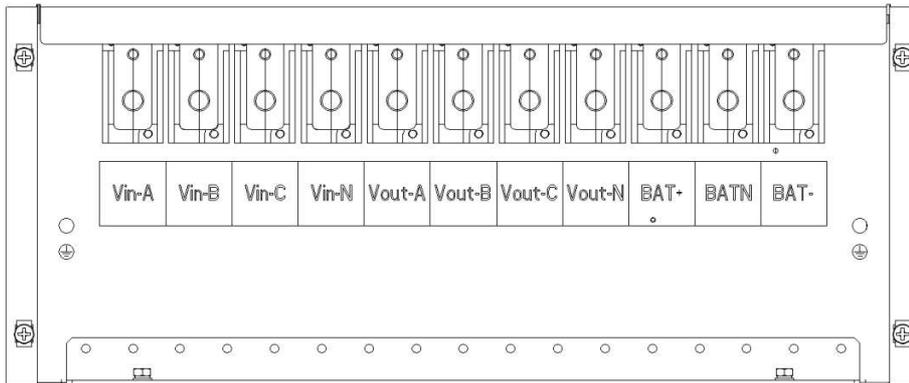
(1) front lock

(2) LCD Display

(3) Side Lock

(4) Rear Lock

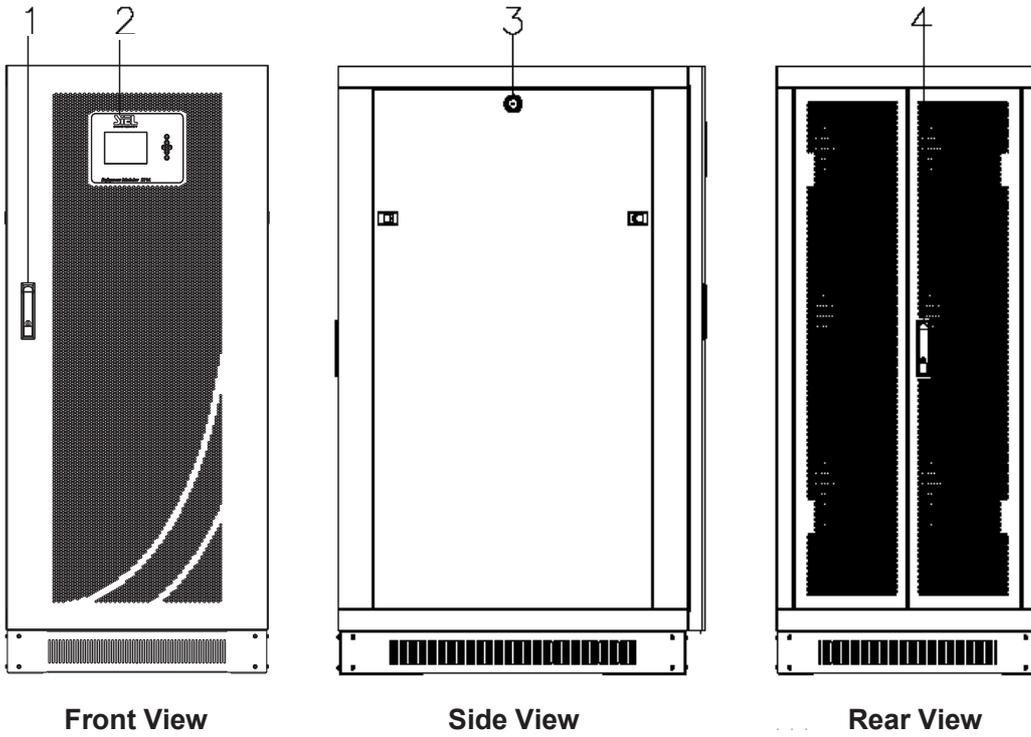




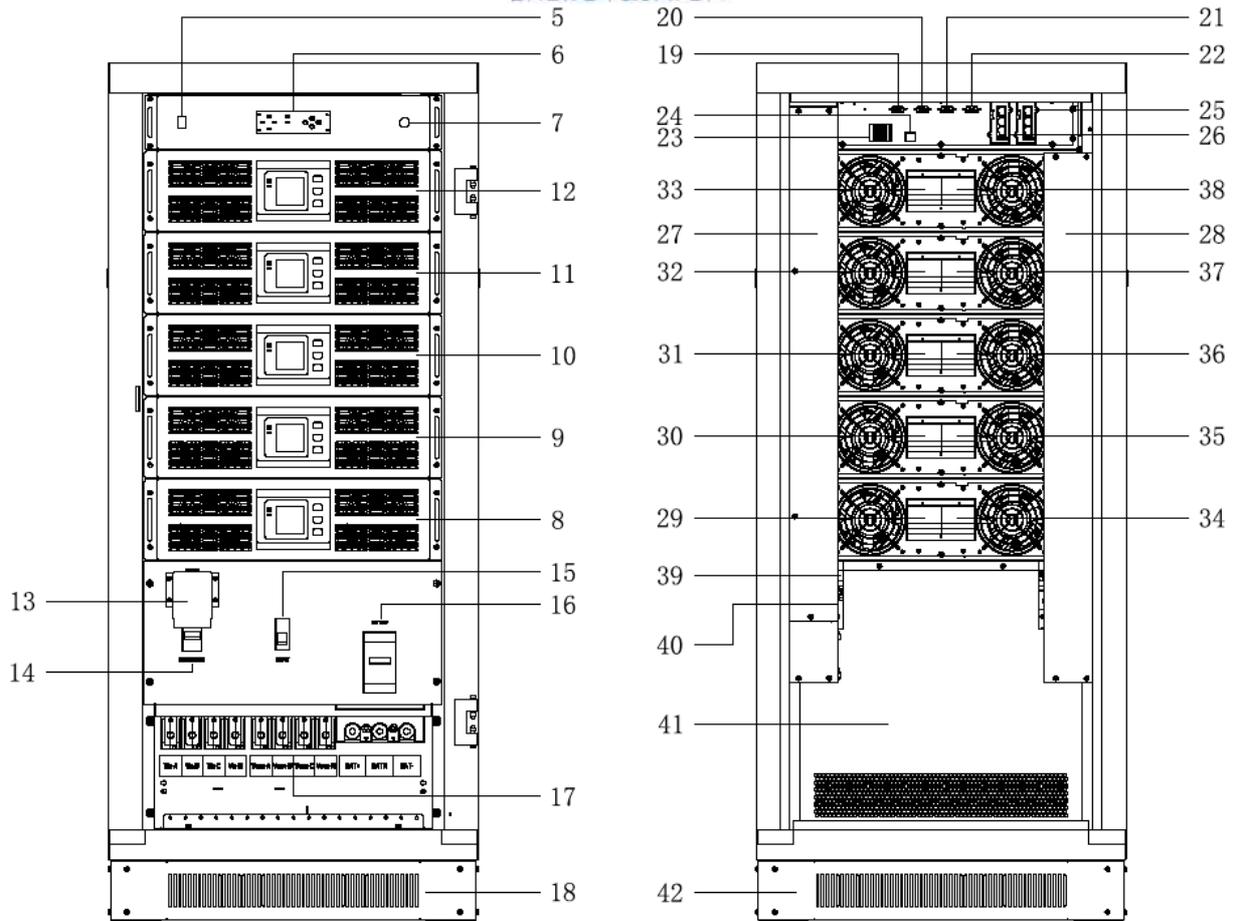
**90kVA Terminal Block of the cabinet (terminal block without cover)**

(5) Main Switch of Central Monitor Unit (6) LED display of Central Monitor Unit (7) EPO switch (8) module cover (9) UPS Module 1 (10) UPS Module 2 (11) UPS Module 3 (12) UPS Module 4 (13) Maintenance switch cover (14) Maintenance switch (15) O/P Switch (16) Battery switch (17) Terminal block for Input, output & battery (18) bottom cover for front door (19) RS485 port (20) RS485 port (21) RS232 port (22) OPTION port (23) Dry Contact Port (24) LCD connecting port (25) SNMP port (26) Intelligent Network Port (27) PDU input (28) PDU Output (29) Main Switch for UPS Module 1 (30) Main Switch for UPS Module 2 (31) Main Switch for UPS Module 3 (32) Main Switch for UPS Module 4 (33) bypass switch for power module 1 (34) bypass switch for power module 2 (35) bypass switch for power module 3 (36) bypass switch for power module 4 (37) Parallel port (38) SCI Update port (39) Cover for terminal block (40) bottom cover for rear door

2. 1.4M 19" Rack Cabinet (150kVA)

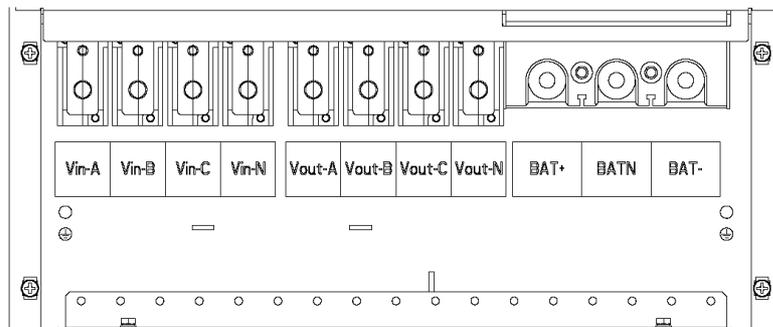


- (1) front lock
- (2) LCD Display
- (3) Side Lock
- (4) Rear Lock



**150kVA Front View(internal)**

**150kVA Rear View (terminal block without cover)**

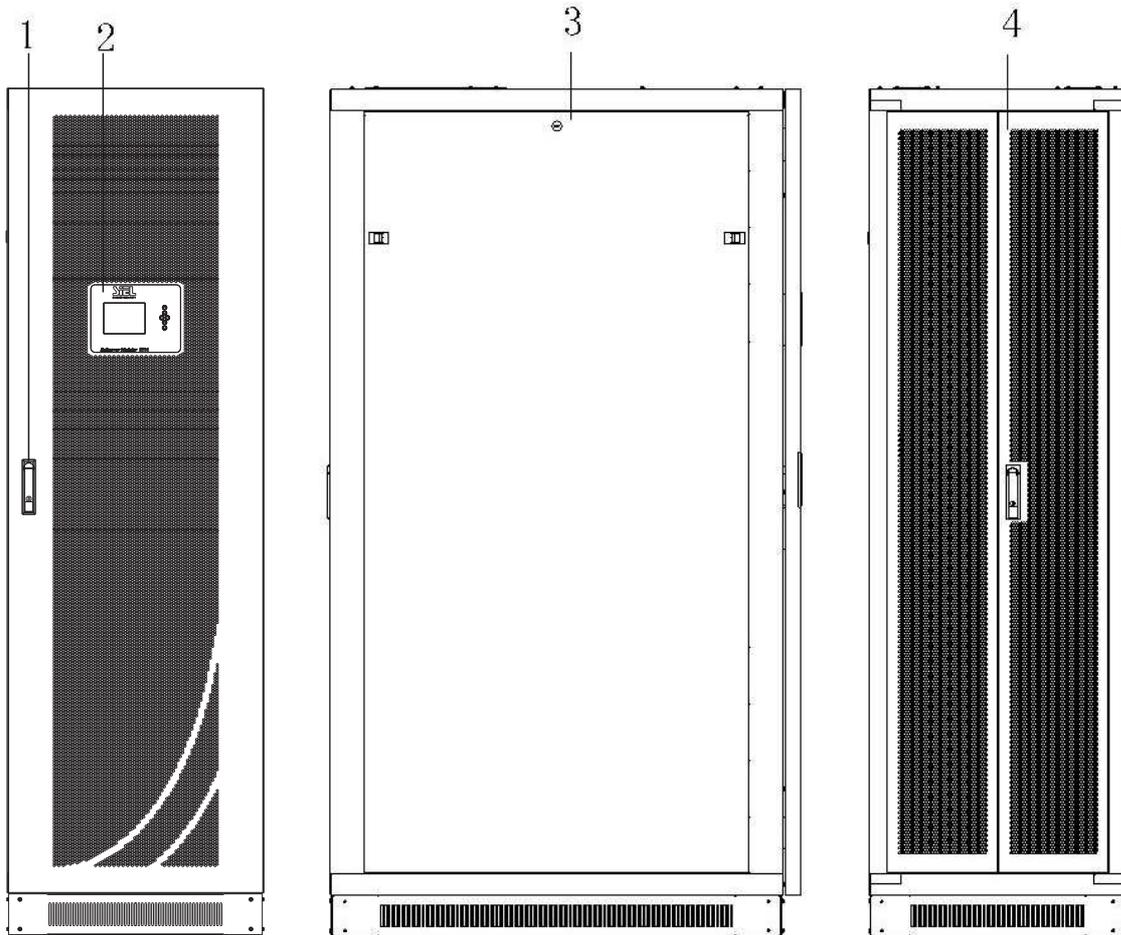


**150kVA Terminal Block of the cabinet (terminal block without cover)**

(5) Main Switch of Central Monitor Unit (6) LED display of Central Monitor Unit (7) EPO switch (8) UPS Module 1 (9) UPS Module 2 (10) UPS Module 3 (11) UPS Module 4 (12) UPS Module 5 (13) Maintenance switch cover (14) Maintenance switch (15) O/P Switch (16) Battery switch (17) Terminal block for Input, output & battery (18) bottom cover for front door (19) RS485 port (20) RS485 port (21) RS232 port (22) OPTION port (23) Dry Contact Port (24) LCD connecting port (25) SNMP port (26) Intelligent Network Port (27) PDU input (28) PDU Output (29) Main Switch for UPS Module 1 (30) Main Switch for UPS Module 2 (31) Main Switch for UPS Module 3 (32) Main Switch for UPS Module 4 (33) Main Switch for UPS Module 5 (34) bypass switch for

power module 1 (35) bypass switch for power module 2 (36) bypass switch for power module 3 (37) bypass switch for power module 4 (38) bypass switch for power module 5 (39) Parallel port (40) SCI Update port (41) Cover for terminal block (42) bottom cover for rear door

3. 2M 19" Rack Cabinet (300kVA)

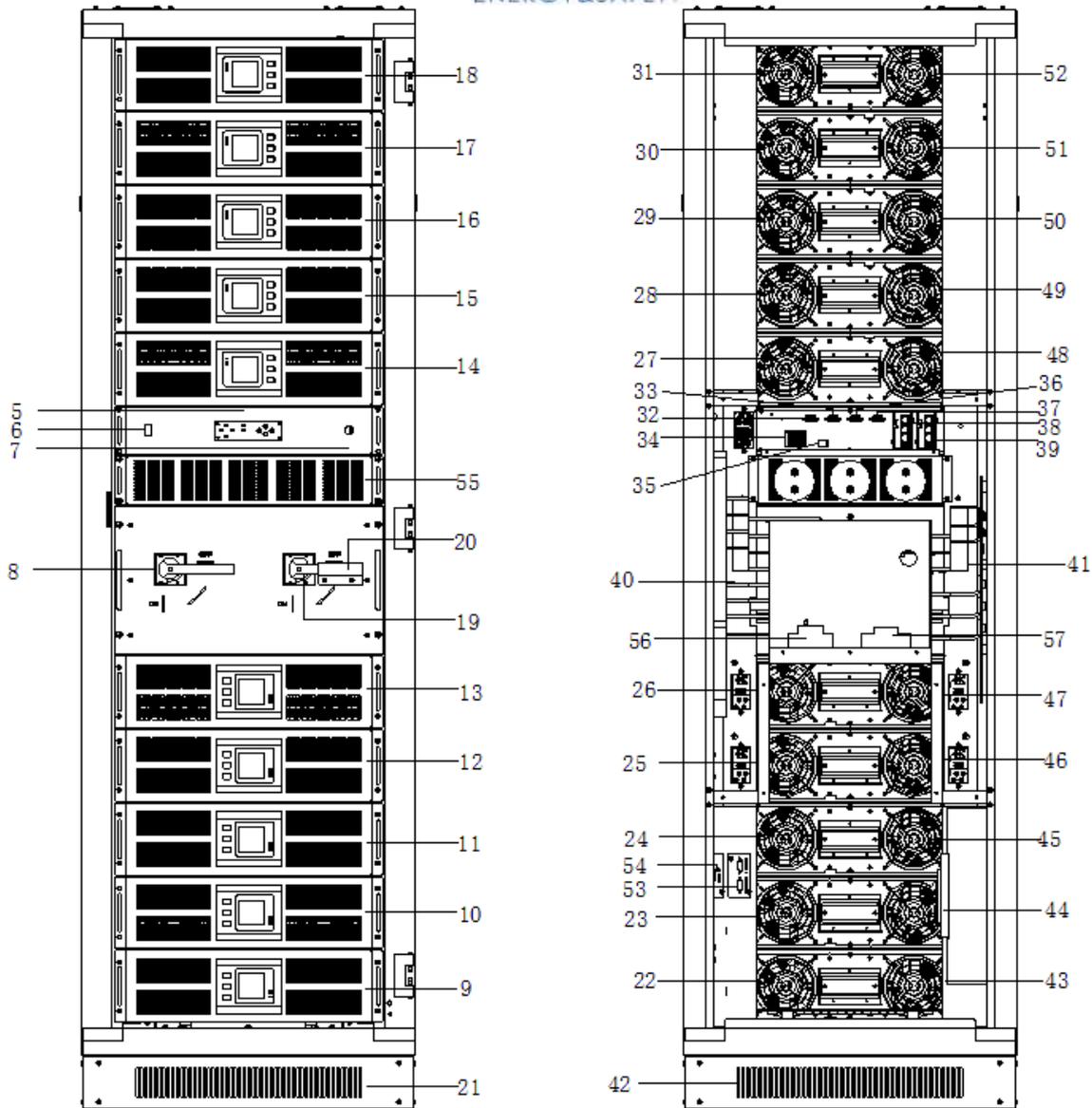


**Front View**

**Side View**

**Rear View**

- (1) front lock
- (2) LCD Display
- (3) Side Lock
- (4) Rear Lock



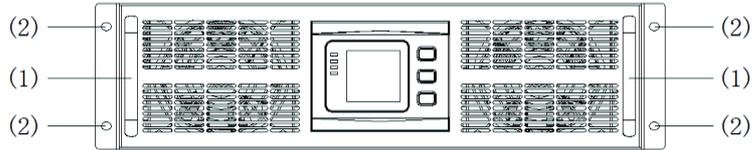
**300kVA Front View(internal)**

**300kVA Rear View (terminal block without cover)**

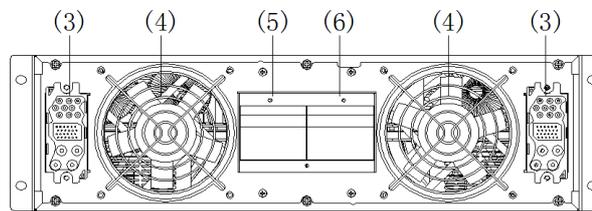
(5) LED display of Central Monitor Unit (6) Main Switch of Central Monitor Unit (7) EPO switch (8) O/P Switch (9) UPS Module 1 (10) UPS Module 2 (11) UPS Module 3 (12) UPS Module 4 (13) UPS Module 5 (14) UPS Module 6 (15) UPS Module 7 (16) UPS Module 8 (17) UPS Module 9 (18) UPS Module 10 (19) Maintenance Switch (20) maintenance switch & its cover (21) bottom cover for front door (22) Main Switch for UPS Module 1 (23) Main Switch for UPS Module 2 (24) Main Switch for UPS Module 3 (25) Main Switch for UPS Module 4 (26) Main Switch for UPS Module 5 (27) Main Switch for UPS Module 6 (28) Main Switch for UPS Module 7 (29) Main Switch for UPS Module 8 (30) Main Switch for UPS Module 9 (31) Main Switch for UPS Module 10 (32) RS485 port (33) RS485 port (34) Dry Contact Port (35) LCD connecting port (36) RS232 port (37) OPTION port (38) Intelligent Network Port (39) SNMP port (40) terminal block for bypass & output (41) terminal block for Input, battery & GND (42) back blind cover (43) bypass switch for power module 1 (44) bypass switch for power module 2 (45) bypass switch for power module 3 (46) bypass switch for power module 4 (47)

bypass switch for power module 5 (48) bypass switch for Module 6 (49) bypass switch for Power module 7 (50) bypass switch for power module 8 (51) bypass switch for power module 9 (52) bypass switch for power module 10 (53) Parallel port (54) SCI Update port (55) bypass choke module (56) Switch for input EMI capacitance (57) Surge protection device

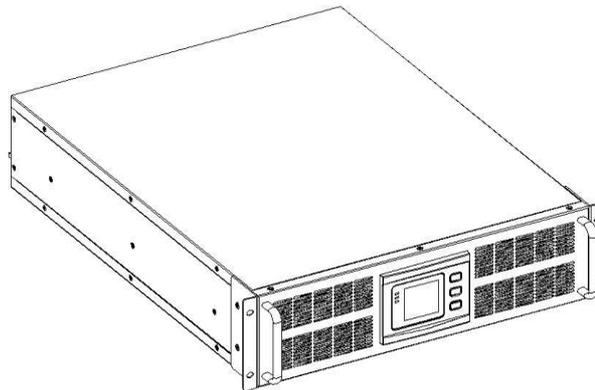
### 3.3 UPS module appearance



**Front View**



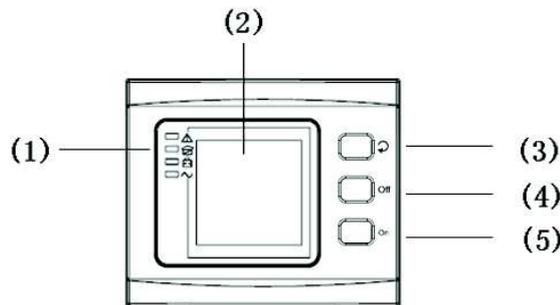
**Rear View**



**Side View**

- (1) handle (2) screw holes (3) module connector slot (4) fan (5) UPS Module input switch (6) UPS Module bypass switch

### 3.4 UPS Module LCD control panel



#### LCD control panel introduction

- (1) LED (from top to bottom: “alarm”, “bypass output”, “battery output”, “mains output”)  
 (2) LCD display (3) scroll button (4) Off button (5) On button(battery cold start switch)

### 3.5 Installation notes

Note: Consider for the convenience of operation and maintenance, the space in front and back of the cabinet should be left at least 100cm and 80cm respectively when installing the cabinet.

◆ Please place the UPS in a clean, stable environment, avoid the vibration, dust, humidity, flammable gas and liquid, corrosive. To avoid from high room temperature, a system of room extractor fans is recommended to be installed. Optional air filters are available if the UPS operates in a dusty environment.

◆ The environment temperature around UPS should keep in a range of 0°C ~ 40°C. If the environment temperature exceeds 40°C, the rated load capacity should be reduced by 12% per 5°C. The max temperature can't be higher than 50°C.

◆ If the UPS is dismantled under low temperature, it might be in a condensing condition. The UPS can't be installed unless the internal and external of the equipment is fully dry. Otherwise, there will be in danger of electric shock.

◆ Batteries should be mounted in an environment where the temperature is within the required specs. Temperature is a major factor in determining battery life and capacity. In a normal installation, the battery temperature is maintained between 15°C and 25°C. Keep batteries away from heat sources or main air ventilation area, etc.



#### WARNING!

Typical battery performance data are quoted for an operating temperature between 20°C and 25°C. Operating it above this range will reduce the battery life while operation below this range will reduce the battery capacity.

◆ Should the equipment not be installed immediately it must be stored in a room so as to protect it against excessive humidity and or heat sources.



**CAUTION!**

An unused battery must be recharged every 6 months temporarily connecting the UPS to a suitable AC supply mains and activating it for the time required for recharging the batteries.

◆ The highest altitude that UPS may work normally with full load is 1500 meters. The load capacity should be reduced when this UPS is installed in place whose altitude is higher than 1500 meters, shown as the following table:

(Load coefficient equals max load in high altitude place divided by nominal power of the UPS)

Altitude (m)	1500	2000	2500	3000	3500	4000	4500	5000
Load coefficient	100%	95%	90%	85%	80%	75%	70%	65%

◆ The UPS cooling is depending on fan, so it should be kept in good air ventilation area. There are many ventilation holes on the front and rear, so they should not be blocked by any exotic obstacles.

### 3.6 External Protective Devices

For safety reasons, it is necessary to install, external circuit breaker at the input A.C. supply and the battery. This chapter provides guidelines for qualified installers that must have the knowledge of local wiring practices for the equipment to be installed.

◆ **External Battery**

The UPS and its associated batteries are protected against the effect of over-current through a DC compatible thermo-magnetic circuit-breaker (or a set of fuses) located close to the battery.

◆ **UPS Output**

Any external distribution board used for load distribution shall be fitted with protective devices that may avoid the risk of UPS overloaded.

◆ **Over-current**

Protection device shall be installed at the distribution panel of the incoming main supply. It may identify the power cables current capacity as well as the overload capacity of the system.

### 3.7 Power Cables

◆ The cable design shall comply with the voltages and currents provided in this section, Kindly follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media) .

**WARNING!**



UPON STARTING, PLEASE ENSURE THAT YOU ARE AWARE OF THE LOCATION AND OPERATION OF THE EXTERNAL ISOLATORS WHICH ARE CONNECTED TO THE UPS INPUT/BYPASS SUPPLY OF THE MAINS DISTRIBUTION PANEL. CHECK TO SEE IF THESE SUPPLIES ARE ELECTRICALLY ISOLATED, AND POST ANY NECESSARY WARNING SIGNS TO PREVENT ANY INADVERTENT OPERATION

- ◆ For future expansion purpose, it is economical to install power cable according to the full rating capacity initially. The diameter of cable is shown below:

UPS cabinet	Cable Dimension			
	AC Input (mm <sup>2</sup> )	AC Output (mm <sup>2</sup> )	DC Input (mm <sup>2</sup> )	Grounding (mm <sup>2</sup> )
90kVA	75	75	120	75
150kVA	150	150	185	150
300kVA	2 x 150	2 x 150	2 x 185	2 x 150



**CAUTION!**

Protective earth cable: Connect each cabinet to the main ground system. For Grounding connection, follow the shortest route possible.



**WARNING!**

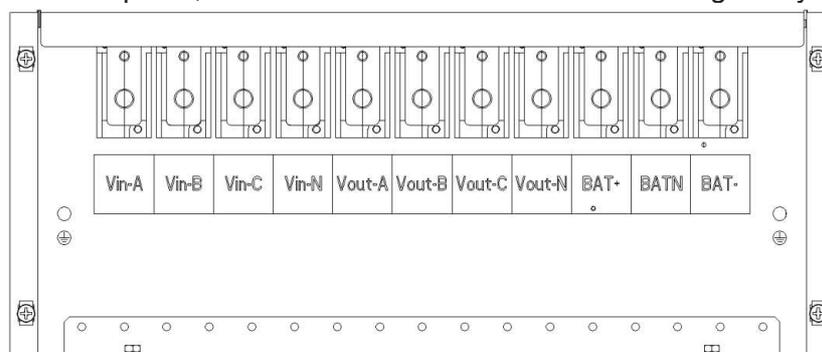
FAILURE TO FOLLOW ADEQUATE EARTHING PROCEDURES MAY RESULT IN ELECTROMAGNETIC INTERFERENCE OR IN HAZARDS INVOLVING ELECTRIC SHOCK AND FIRE

### 3.8 Power cable connect

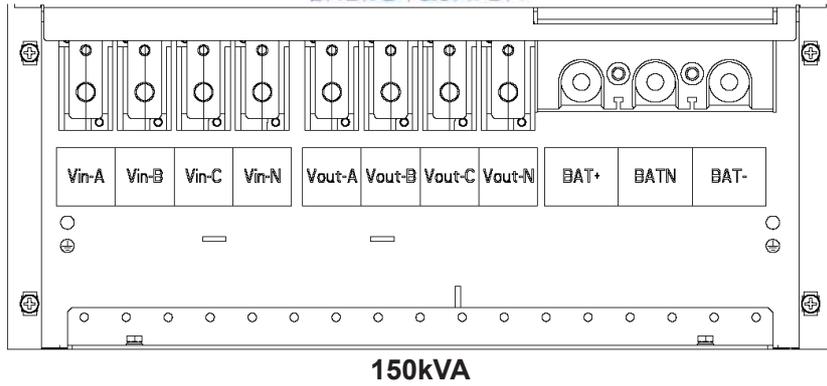
Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

Verify the UPS is totally isolated from its external power source and also all power isolators of the UPS are open. Check to see if they are electrically isolated, and post any necessary warning signs to prevent their inadvertent operation.

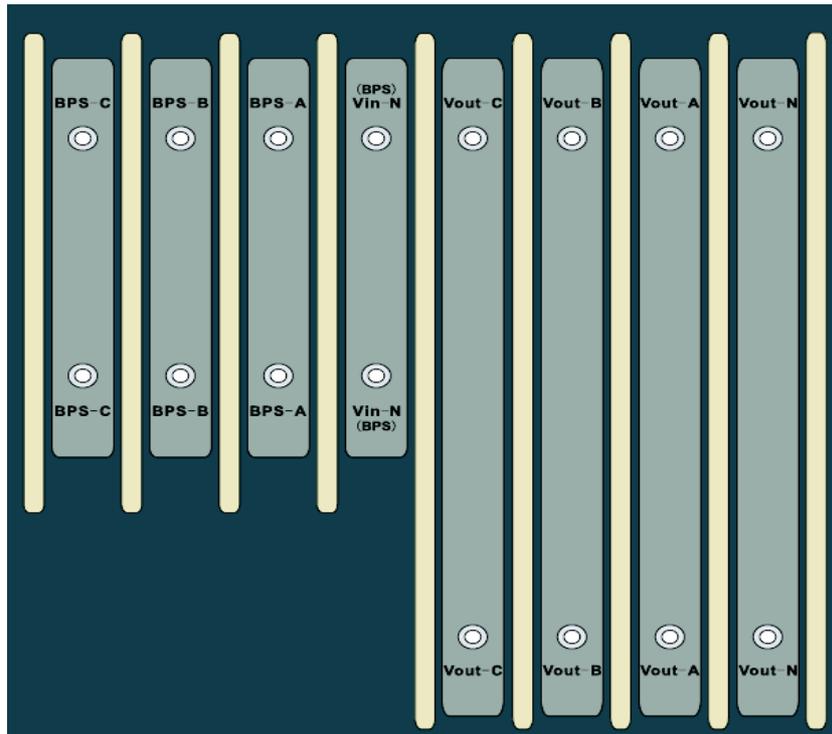
Open the UPS rear panel; remove the cover of terminals for wiring easily.



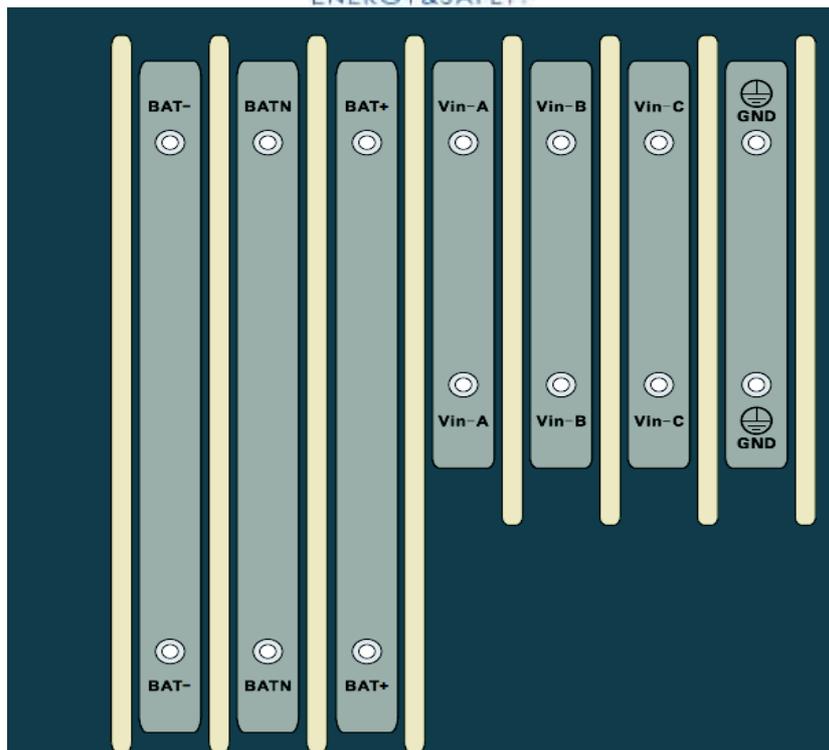
**90kVA**



**150kVA**



**Copper bar for 300kVA bypass input, output connection**



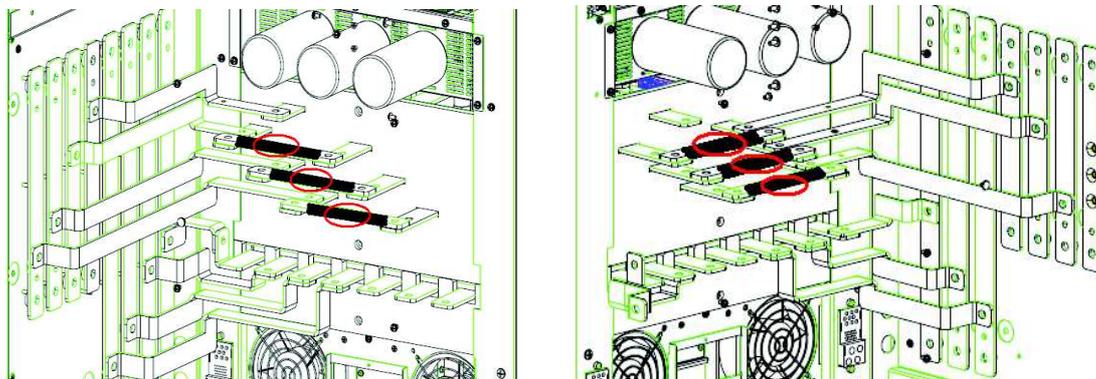
**Copper bar for 300kVA battery input, AC input connection**

### 300kVA common input connection

The common input connection configuration is provided when out of factory for this model. If this type of configuration is chosen and connect AC input to the BPS-C/BPS-B/BPS-A/Vin-N (BPS) or Vin-C/Vin-B/Vin-A/ Vin-N (BPS) tighten the connection point, the connection will be defined as a common input connection for bypass and main road.

### 300kVA separate bypass connection

If separate bypass configuration is used, first remove the power distribution copper strip between bypass input copper bar and mains input copper bar. The position of the copper strip is shown as below. Then connect the AC input of main road to the copper bar (Vin-C/Vin-B/Vin-A/ Vin-N(BPS)) and the bypass input to the copper bar (BPS-C/BPS-B/BPS-A/Vin-N(BPS)) . At last, tighten the connection point.



### Warning!



In separate bypass connection, the power distribution copper strip between bypass input and AC input must be removed.

The AC input and bypass input must be connected to the same neutral.

Choose appropriate power cable. (Refer to the table above) and pay attention to the diameter of the connection terminal of the cable that should be greater than or equal to that of the connection poles;

**WARNING!**



If the load equipment is not ready to accept power on the arrival of the commissioning engineer then ensure that the system output cables are safely isolated at their ends

Connect the safety earth and any necessary bonding earth cables to the copper earth screw located on the floor of the equipment below the power connections. All cabinets in the UPS must be grounded properly.

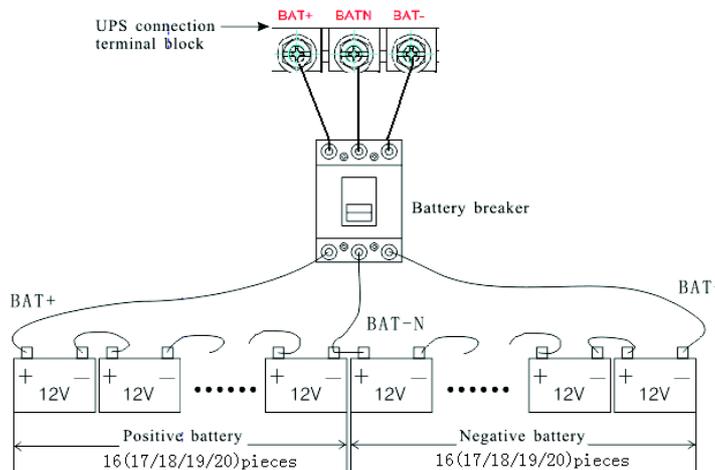


**CAUTION!**

The earthing and neutral bonding arrangement must be in accordance with local and national codes of practice.

**3.9 Battery connection**

The UPS adopts positive and negative double battery framework, total 32(optional 34/36/38/40) in series. A neutral cable is retrieved from the joint between the cathode of the 16<sup>th</sup> (17<sup>th</sup>/18<sup>th</sup>/19<sup>th</sup>/20<sup>th</sup>) and the anode of the 17<sup>th</sup> (18<sup>th</sup>/19<sup>th</sup>/20<sup>th</sup>/21<sup>th</sup>) of the batteries. Then the neutral cable, the battery Positive and the battery negative are connected with the UPS respectively. The battery sets between the Battery anode and the neutral are called positive batteries and that between neutral and cathode are called negative ones. The user can choose the capacity and the numbers of the batteries according to their desire. The connection is shown as following:



**Note:**

The BAT+ of the UPS connect poles is connected to the anode of the positive battery, the BAT- is connected to the cathode of the positive battery and the anode of the negative battery, the BAT- is connected to the cathode of the negative battery.

Factory default setting for battery quantity is 32pcs and for battery capacity is 40AH (charger current 6A). Connecting 34/36/38pcs or 40pcs batteries, please re-set desired battery quantity and its capacity after UPS starts at AC mode. Charger current could be adjusted automatically according to battery capacity selected. (Also charger current is selectable). Please refer to "LCD display"



**CAUTION!**

Ensure correct polarity battery string series connection. i.e. inter-tier and inter block connections are from (+) to (-) terminals.

Don't mix batteries with different capacity or different brands, or even mix up new and old batteries, either.



**WARNING!**

Ensure correct polarity of string end connections to the Battery Circuit Breaker and from the Battery Circuit Breaker to the UPS terminals i.e. (+) to (+) / (-) to (-) but disconnect one or more battery cell links in each tier. Do not reconnect these links and do not close the battery circuit breaker unless authorized by the commissioning engineer.

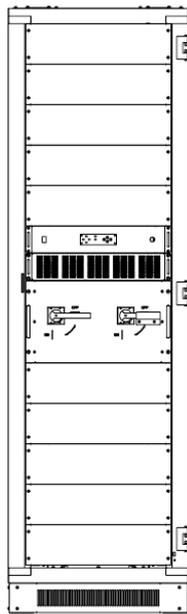
### 3.10 Online UPS Modules Replacement

For the UPS, modules must be inserted to make a complete UPS system.

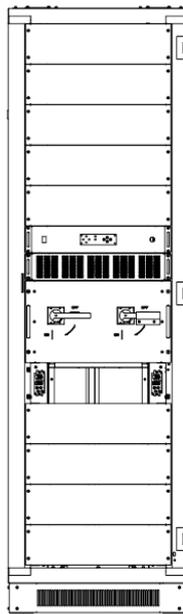
The replacement of UPS module is very simple and can be operated online. The control system of the UPS can detect the inserted or removed module(s) automatically. The user may operate easily by following the steps mentioned below.

◆ **NOTE: The UPS module is rather heavy, please move it by two people!**

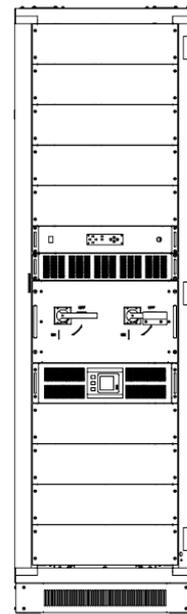
◆ **Insert module**



**Remove  
decorating panel**



**Insert  
UPS module**



**Fix with  
screw**

- (1) Remove decorated panel;
- (2) Put the UPS module in the cabinet module slot. Push the module along the slot into the cabinet until the module is inserted properly.
- (3) Fix the module with screws (M5) at the positioning screw holes;
- (4) Open input switch at modules' rear panel, and bypass switches accordingly.  
(From bottom to top, the order is 1-5 or 10)

(5) After the modules start up, the system will detect the modules inserted automatically, and parallel up the modules into whole system.

### ◆ Remove UPS module

Remove the coronal screws on the left side of the module to stop the module running completely and remove the module after fan stop spinning.

#### WARNING!

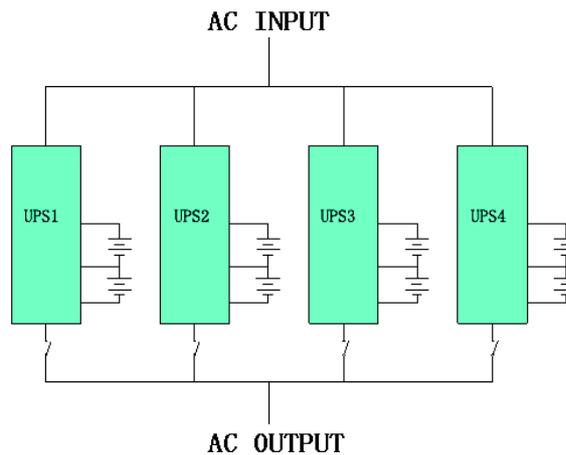
- (1) The coronal screw at left side of the module controls the operation of the module. Only after the screw is tightened, the module can start running. When insert new module, make sure the screw is tightened properly.
- (2) When insert the module under battery mode, please press “ON” button at modules LCD panel until the module starts.

## 3.11 Parallel system installation

The basic installation procedure of a parallel system comprising two or more UPS is the same as that of single. The following sections introduce the installation procedures specified to the parallel system.

### 3.11.1 Cabinet installation

Connect all the UPS needed to be put into parallel system as below picture.



(Make sure each UPS input breaker is in “off” position and there is no any output from each UPS connected. Battery groups can be connected separately or in parallel, which means the system itself provides both separate battery and common battery. )



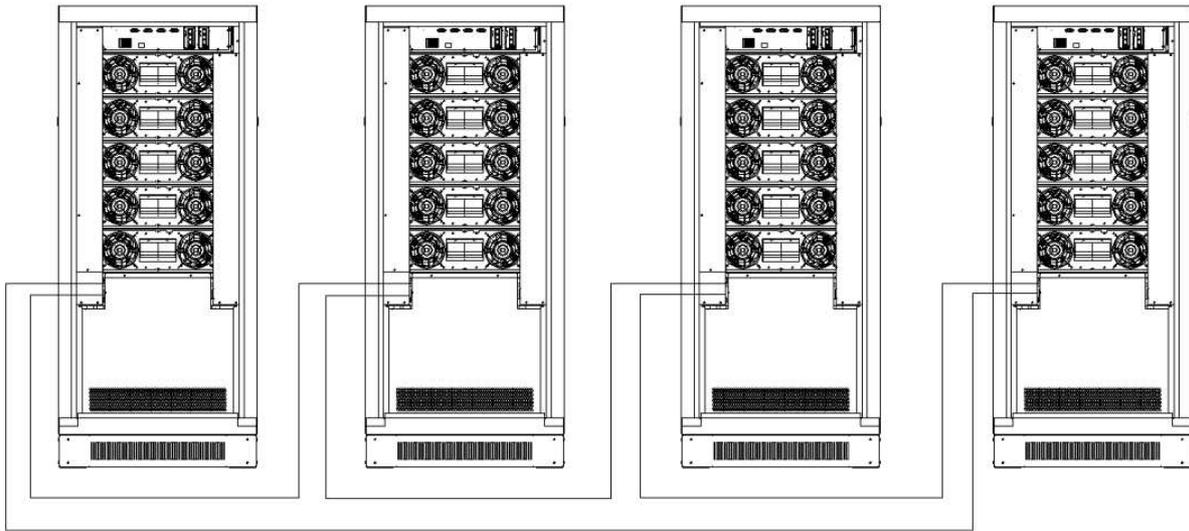
#### WARNING!

**Make sure the N,A (L1) ,B (L2) ,C (L3) lines are correct, and grounding is well connected.**

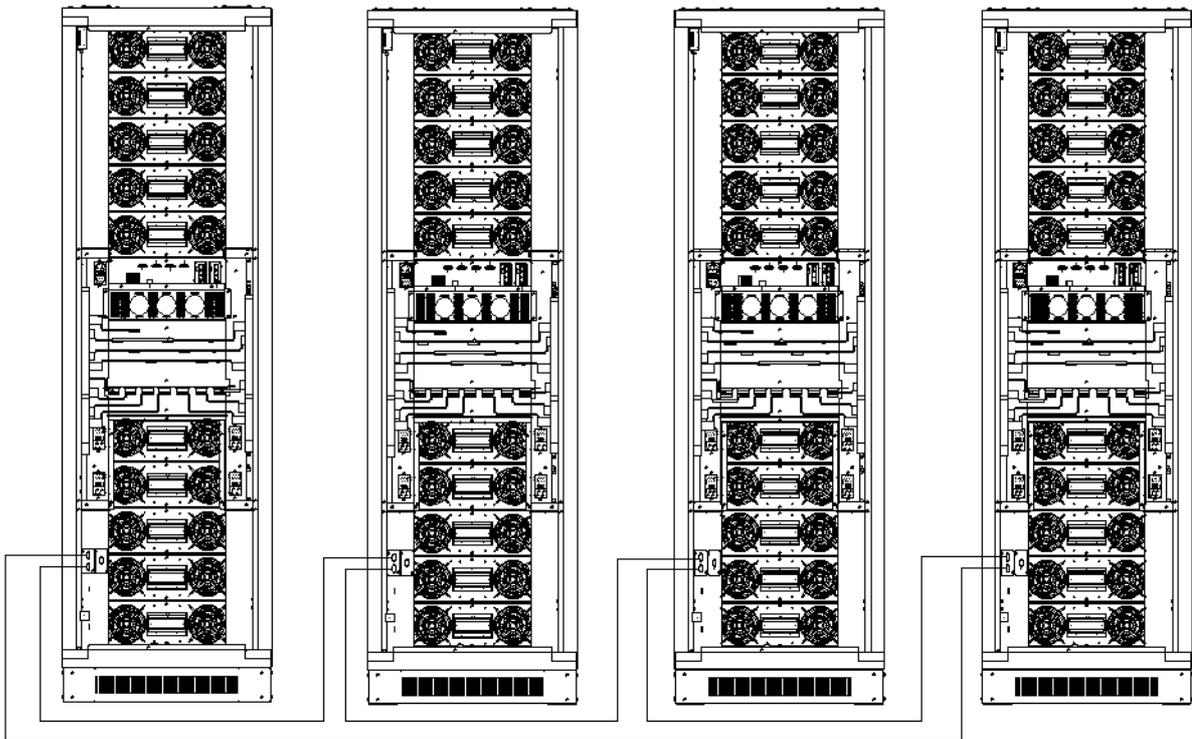
### 3.11.2 Parallel cable installation

Remove connectors on the parallel port, and connect parallel cables as shown below.

Shielded and double insulated control cables available must be interconnected in a ring configuration among UPS modules as shown below. The parallel control board is mounted on each UPS. The ring configuration ensures high reliability of the control.



**PDU parallel board position for 1.4m cabinet**



**Parallel board position for 2m cabinet**

### 3.11.3 Requirement for the parallel system

A parallel system behaves as a large UPS but with the advantage of presenting higher reliability. In order to assure that all UPS are equally utilized and comply with relevant wiring rules, please follow the requirements below:

- 1) All UPS must be of the same rating and be connected to the same source.
- 2) Bypass input and AC input of main road must be connected to the same Neutral
- 3) The outputs of all the single UPS must be connected to a common output bus.

- 4) The length and specification of power cables including the bypass input cables and the UPS output cables should be the same. This facilitates load sharing when operating in bypass mode.

## 4. Operation

### 4.1 Operation Modes

The UPS is a double-conversion on-line UPS that may operate in the following alternative modes:

#### ◆ Normal mode

The rectifier/charger derives power from the AC Mains and supplies DC power to the inverter while floating and boosting charge the battery simultaneously. Then, the inverter converts the DC power to AC and supplies to the load.

#### ◆ Battery mode (Stored Energy Mode)

If the AC mains input power fails, the inverter, which obtains power from the battery, supplies the critical AC load. There is no power interruption to the critical load. The UPS will automatically return to Normal Mode when AC recovers.

#### ◆ Bypass mode

If the inverter is out of order, or if overload occurs, the static transfer switch will be activated to transfer the load from the inverter supply to bypass supply without interruption to the critical load. In the event that the inverter output is not synchronized with the bypass AC source, the static switch will perform a transfer of the load from the inverter to the bypass with power interruption to the critical AC load. This is to avoid paralleling of unsynchronized AC sources. This interruption is programmable but typically set to be less than an electrical cycle e.g. less than 15ms (50Hz) or less than 13.33ms (60Hz).

#### ◆ Maintenance mode (Manual Bypass)

A manual bypass switch is available to ensure continuity of supply to the critical load when the UPS is out of order or in repair. This manual bypass switch is fitted for all UPS modules and bears for equivalent rated load.

#### ◆ Redundancy mode

Based on different demands, The UPS can be set as N+X redundancy mode to increase the reliability to the load connected.

### 4.2 Turn on/off UPS

#### 4.2.1 Restart procedure



#### CAUTION!

MAKE SURE GROUNDING IS PROPERLY DONE!

- ◆ Set the Battery Breaker to the “ON” position according to the user’s manual.
- ◆ Open the front and rear doors of the UPS to access to the main power switches.

During this procedure the output terminals will become alive.

**CAUTION!**



Check to see if the load is safely connected with the output of the UPS. If the load is not ready to receive power from the UPS, make sure that it is safely isolated from the UPS output terminals

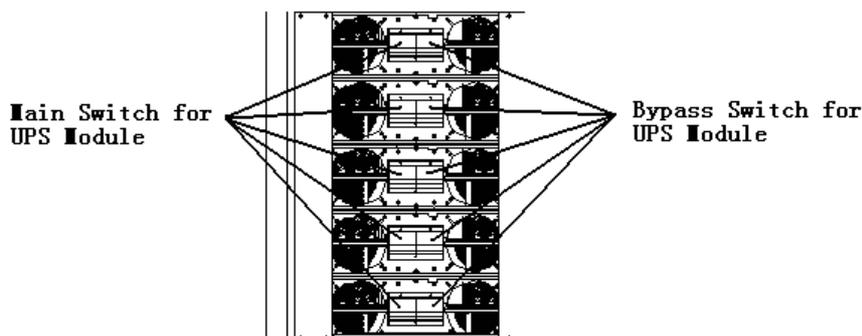
- ◆ Check the status of the power switch of the monitoring module. Default is set at “ON”.

Monitoring module power supply switch



Turn ON the power switch of the monitoring module, so that the UPS system can communicate normally through the monitoring unit. When hot-swap this monitoring unit, the power switch must be OFF.

- ◆ Turn ON output breaker.
- ◆ Turn ON the input and bypass switches of all UPS modules, which locate at the modules’ rear panels.



When AC MAINS input voltage within the range, And the rectifiers of the UPS will be started up in 30 seconds, then the inverter is started completely. When the output breaker is “ON”, the inverter LED lights up.

**4.2.2 Test procedure**

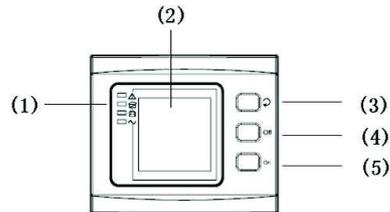
**CAUTION!**



The UPS is operating normally. It may take 60 seconds to boost up the system and perform self-test completely.

- ◆ Switch off the MAINS to simulate utility failure, the rectifier will turn off and the battery should feed the inverter without interruption. At this time, the LEDs of battery should be turned on.
- ◆ Switch on the MAINS to simulate utility recovery, the rectifier will restart automatically after 20 seconds and the inverter will supply to the load. It is suggested to use Dummy loads for testing. The UPS can be loaded up to its maximum capacity during load test.

### 4.2.3 Black (Cold) start procedure



#### CAUTION!

Follow these procedures when the input AC Utility Failure, but battery is normal

- ◆ Turn on the battery switch.  
The battery will feed the Auxiliary power board.
- ◆ Turn on the Output switch
- ◆ Trigger the cold start buttons of the modules respectively as the position 5 of the above

Drawing:

When battery normal, rectifier starts operation, 30s later, inverter starts and operates and battery LED on



#### CAUTION!

Wait for approximately 30 seconds before you press the black start key

### 4.2.4 Maintenance bypass

To supply the load via Mains, you may simply active the internal mechanical bypass switch.



#### CAUTION!

The load is not protected by the UPS when the internal mechanical bypass system is active and the power is not conditioned.

#### Switch to mechanical bypass



#### CAUTION!

If the UPS is running normally and can be controlled through the display, carry out steps 1 to 6; otherwise, jump to Step 5.

- ◆ Open the cover of maintenance switch, the UPS turns to bypass mode automatically.
- ◆ Turn on MAINTANCE breaker;
- ◆ Switch OFF BATTERY breaker;
- ◆ Switch OFF the MAINS breakers of all modules;
- ◆ Switch OFF the BYPASS breakers of all modules;

- ◆ Switch OFF the OUTPUT breaker;

At this time the bypass source will supply to the load through the Maintenance breaker.

### Switch to normal operation (from mechanical bypass)



#### CAUTION!

Never attempt to switch the UPS back to normal operation until you have verified that there are no internal UPS faults

- ◆ Open the front and rear doors of the UPS to be easily access to the main power switches
- ◆ Turn ON the OUTPUT breaker;
- ◆ Turn ON the BYPASS breakers of all modules;
- ◆ Turn ON the MAINS breakers of all modules;

The UPS powers from the static bypass instead of the maintenance bypass, then the bypass LED will light up;

- ◆ Switch OFF the maintenance bypass breaker, then the output is supplied by the bypass of the modules;
- ◆ Put on the maintenance switch cover;

The rectifier will operate normally after 30 seconds. If the inverter works normally, the system will be transferred from bypass mode to normal mode.

### 4.2.5 Shut down procedure



#### CAUTION!

This procedure should be followed to completely shut down the UPS and the LOAD. After all power switches, isolators and circuit breakers are opened, there will be no output.

- ◆ Press the INVERTER OFF button on the right side of the operator control panel for about two seconds;
- ◆ The Inverter LED will be extinguished and audible alarm comes simultaneously;
- ◆ Switch OFF the BATTERY breaker;
- ◆ Open the UPS door to easily access to the main power switch;
- ◆ Switch OFF the MAINS breakers of all modules.
- ◆ Switch OFF the BYPASS breakers of all modules.
- ◆ Switch OFF the OUTPUT power switch. The UPS shuts down;

- ◆ To completely isolate the UPS from AC Mains, all input switches of Utility shall be completely off, which includes the ones for rectifier and bypass;
- ◆ The primary input distribution panel, which is often located far away from the UPS area, so a label should be posted to advise service personnel that the UPS circuit is under maintenance.



**WARNING!**

Wait for about 5 minutes for the internal D.C. bus bar capacitors to be completely discharged.

#### 4.2.6 Startup procedure for parallel system

- ◆ Connect parallel cable, input/output cable, battery cable.
- ◆ Measure the positive and negative battery pack voltage. Battery breaker is opened temporarily.
- ◆ Check if the power switch of monitoring module is closed. The default is closed.
- ◆ Close the output switch of power distribution unit at the front door.
- ◆ According to the startup procedure for single unit, set the operation mode of each UPS: single mode is changed to parallel mode; set the parallel number for each UPS; up to 4 units can be parallel; set the ID of each cabinet, the ID of each unit must be different.
- ◆ Close the breakers of all the power module. Close the external input switch and start from mains.
- ◆ After start from mains, check the LCD interface of each UPS to see if the ID, VA is the same with the actual values.
- ◆ Close the external battery breaker of each UPS. Check if the charging current displayed in LCD is normal.

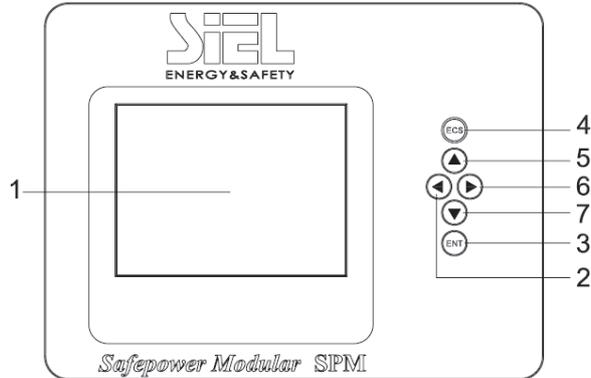


**Note!**

**The UPS cannot be parallel until each single unit is normal.**

## 4.3 The Display

### 4.3.1 System LCD display



**Overview of the operating panel of the UPS**

- 1) Touch LCD screen :monitoring of all measured parameters, UPS and Battery status and event and alarm logs
- 2) LEFT KEY: turn left or scroll up
- 3) ENT KEY: enter the items or ensure the select
- 4) ESC KEY: exit the items or cancel
- 5) UP KEY: scroll up
- 6) RIGHT KEY: turn right or scroll down
- 7) DOWN KEY: scroll down

### Introduction



#### **CAUTION!**

The display provides more functions than those described in this manual.

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
				A	B	C
	Phase Voltage(v)			220	221	221
	Phase Current(A)			16	10	18
	Frequency(Hz)			50		
	Active Power(kw)			5.0	5.2	5.6
	Apparent Power(KVA)			3.7	3.9	4.1
	Load percent(%)			50	52	53
	Load Peak Rate			1.3	1.5	1.8

**Output data**

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
	Module01	Online				
	Module02	Online				
	Module03	Online				
	Module04	Online				
	Module05	Online				
	Module06	Offline				
	Module07	Offline				
	Module08	Offline				
	Module09	Offline				
	Module09	Offline				
	Module10	Offline				

**Modules data**

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
Module01						
Invert Voltage(V)				220	220	220
Invert Current(A)				0	0	0
Frequency(HZ)				50		
Positive Bus Voltage(V)				370		
Negative Bus Voltage(V)				370		
Code		8000-8000		D800-8000		
		0000-0000		0000-0000		
Back						

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
Mains						
				A	B	C
Phase Voltage(V)				220	220	220
Phase Current(A)				2	2	2
Frequency(HZ)				50		
Bypass						
Phase Voltage(V)				220	220	220
Frequency(HZ)				50		

#### Detailed module data

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
Positive Battery Voltage (V)				239.9		
Negative Battery Voltage (V)				241.0		
Positive Battery Current (A)				15.1		
Negative Battery Current (A)				14.8		
Battery State				Charge		
Battery Temperature (°C)				0.0		
Lasting(min)				0		

#### Input data

150KVA		On-Line		23-01-2014		
ID:01				08:00		
◀	Output	Module	Input	Batt	State	▶
Input Switch				ON		
Output Switch				ON		
Bypass Switch				OFF		
Manu-Bypass Switch				OFF		
Inside Temperature (°C)				30		

#### Battery data

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Battery Test					
Buzzer Set				ON	
Default Set					

#### Status data

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Language/English					
Change Password					
Date Setting				2012-05-23 08:00	
Back-Light Delay				10 min	
Contrast				20	
Self-Test Date				disable	
Timing of ON/OFF				disable	
Back					
Next					

#### Command data

#### etting data1

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	Work Mode		Parallel		
	System Voltage Level		220V		
	System Frequency Level		50HZ		
	Auto Turn-on		Enable		
	Bypass Frequency Range		10%		
	Bypass Volt. Upper Limit		15%		Back
	Bypass Volt. Lower Limit		-45%		
	O/P Volt Regulation		0%		Next

Setting data2

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	Parallel ID		01		
	UPS Output		Enable		
	Float Volt Revise		0.001		
	Parallel Amount		04		
	Internal Module amount		05		Back
					Next

Setting data3

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	Single Battery Volt.		12V		
	Battery Number		20		
	Battery Group		1		
	Single Battery Capa.		100AH		
	Boost Upper Limit Volt.		2.31		
	Float Base Volt.		2.25		
	Battery Protect Volt.		1.70		
	Boost Charge		Enable		Back
	Boost Last Time		231 Min		
	Max Charge Current		25A		Next

Setting data4

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	0004	05-23	07:16:05		On Line
	0002	05-23	07:16:01		Back Nomal
	0003	05-23	07:06:00		Int.Input Switc..
	0004	05-23	07:00:00		Int.Bypass Swit..
	..				
					Back
					Next

Record data

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	SYS Version: V02×10				
	LCD Version: 701×02F				

Version data

150KVA		On-Line		23-01-2014	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
	ID:00	Record:0001			▲
	2008-12-21 15:00:25				
	Status:On Line				▼
	Event: On Line				
	Alarm:				
	CODE:CC00-0000	DF00-0000	0000		
	0000-0000	0000-0000	Quit		

Module detailed record data

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Battery	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Battery Test</b>            ▼ 10Min ▲            Ensure Cancel         </div>			
Buzzer				
Default				

**Setting of battery test**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Battery	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Buzzer Set</b>            On Mute            Ensure Cancel         </div>			
Buzzer				
Default				

**Setting of Buzzer**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Battery	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Default Set</b>            Ensure Cancel         </div>			
Buzzer				
Default				

**Restore default setting**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00																								
◀	Command	Setting	Record	Version ▶																								
<table border="1" style="margin: auto;"> <tr><th colspan="4">Enter New Password</th></tr> <tr><td colspan="4">000000</td></tr> <tr><td>7</td><td>8</td><td>9</td><td>Cancel</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>←</td></tr> <tr><td>1</td><td>2</td><td>3</td><td>→</td></tr> <tr><td>.</td><td colspan="2">0</td><td>Ensure</td></tr> </table>					Enter New Password				000000				7	8	9	Cancel	4	5	6	←	1	2	3	→	.	0		Ensure
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7	8	9	Cancel																									
4	5	6	←																									
1	2	3	→																									
.	0		Ensure																									

**Password setting**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00																								
◀	Command	Setting	Record	Version ▶																								
<table border="1" style="margin: auto;"> <tr><th colspan="4">Date Setting</th></tr> <tr><td colspan="4">2012-01-01 08:00</td></tr> <tr><td>7</td><td>8</td><td>9</td><td>Cancel</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>←</td></tr> <tr><td>1</td><td>2</td><td>3</td><td>→</td></tr> <tr><td>.</td><td colspan="2">0</td><td>Ensure.</td></tr> </table>					Date Setting				2012-01-01 08:00				7	8	9	Cancel	4	5	6	←	1	2	3	→	.	0		Ensure.
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**Date setting**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Language/English	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Back-Light Delay</b>            ▼ 10 ▲            Ensure Cancel         </div>			:00
Change Password				
Date Setting				
Back-light				Back
Contrast				Next
Self-Test				
Timing of C				

**Back-Light Delay setting**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Language/English Change Password Date Sett Back-light Contrast Self-Test Timing of	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>Contrast</b></p> <p style="text-align: center;">▼ 17 ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		00:00	Back	Next

**Contrast setting**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Work Mode System Voltage Level System F Auto Tur Bypass F Bypass Back Bypass V O/P Volt Regulation	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>Work Mode</b></p> <p style="text-align: center;">▼ Single ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		Single 220V Z e 10% 0% Next	Back	Next

**Setting of work mode**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Work Mode System System Auto Tu Bypass Bypass Back Bypass Volt. Lower Limit O/P Volt Regulation	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>System Volt. Level</b></p> <p style="text-align: center;">▼ 220V ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		Single 10% -30% 0% Next	Back	Next

**Setting of system volt. Level**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Work Mode System System Auto Tu Bypass Bypass Back Bypass Volt. Lower Limit O/P Volt Regulation	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>System Freq. Level</b></p> <p style="text-align: center;">▼ 60HZ ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		Single 10% 0% Next	Back	Next

**Setting of system freq. level**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Work Mode System System Auto Bypa Bypa O/P V	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>Auto Turn-on</b></p> <p style="text-align: center;">▼ Enable ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		Single 0V 0% 10% 10% 0%	Back	Next

**Setting of auto turn-on**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00			
◀	Comman	Setting	Record	Version	▶
Work Mode Method System System Auto Tu Bypass Bypass Back Bypass Volt. Lower Limit O/P Volt Regulation	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;"><b>Bypass Freq. Range</b></p> <p style="text-align: center;">▼ 2% ▲</p> <p style="text-align: center;">Ensure    Cancel</p> </div>		Single 10% -30% 0% Next	Back	Next

**Setting of bypass freq.rang**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Work Mode	Single			
System Voltage Level	220V			
System Voltage Level	BPV. Upper Limit			
Auto Transfer	▼ 10% ▲			
Bypass	Ensure	Cancel		Back
Bypass				Next
O/P Voltage				

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Work Mode	Single			
Method	BPV. Lower Limit			
System Voltage Level	▼ -30% ▲			
Auto Transfer	Ensure	Cancel		Back
Bypass				10%
Bypass				
O/P Voltage				
Bypass Volt. Lower Limit			-30	
O/P Volt Regulation			0%	Next

**Setting of bypass volt. Upper limit**

**Setting of bypass volt. Lower limit**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Work Mode	Single			
System Voltage Level	220V			
System Voltage Level	O/P Volt Regulation			
Auto Transfer	▼ 0% ▲			
Bypass	Ensure	Cancel		10%
Bypass				
O/P Voltage			0%	Next

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Parallel ID	01			
UPS Output	Parallel ID			
Float Voltage	▼ 01 ▲			
Parallel Amount	Ensure	Cancel		Back
Internal Mode				Next

**Setting of output volt. Regulation**

**Whole system ID (parallel ID) setting**

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Parallel ID	01			
UPS Output	Float Volt Revise			
Float Voltage	▼ 0.000 ▲			
Parallel Amount	Ensure	Cancel		Back
Internal Mode				Next

150KVA ID:01	<b>On-Line</b>			23-01-2014 08:00
◀	Command	Setting	Record	Version ▶
Parallel ID	01			
UPS Output	Parallel Amount			
Float Voltage	▼ 01 ▲			
Parallel Amount	Ensure	Cancel		Back
Internal Mode				Next

**Setting of float charge volt. Compensation factor**

**Setting of parallel modules amount**

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00
◀	Command	Setting
Record	Version	▶
Parallel ID	01	
UPS O	Internal Module amount	
Float V	▼ 00 ▲	
Paralle	Ensure	Cancel
Intern	Back	
Next		

Setting of internal module amount

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00
◀	Command	Setting
Record	Version	▶
Single Battery Volt.	12V	
Battery	Battery Number	
Battery	▼ 20 ▲	
Single	Ensure	Cancel
Boost U	Back	
Float B	Boost Last Time	231 Min
Battery	Max Charge Current	25A
Boost C	Next	

Setting of battery number

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00	
◀	Command	Setting	
Record	Version	▶	
Single Battery Capa.			
0100			
7	8	9	Cancel
4	5	6	←
1	2	3	→
.	0		Ensure

Setting of single battery capacity

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00
◀	Command	Setting
Record	Version	▶
Single Battery Volt.	12V	
Battery N	Single Battery Volt.	
Battery G	▼ 6V ▲	
Single Ba	Ensure	Cancel
Boost Up	Back	
Float Bas	Boost Last Time	231 Min
Battery P	Max Charge Current	25A
Boost Ch	Next	

Setting of single battery voltage

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00
◀	Command	Setting
Record	Version	▶
Single Battery Volt.	12V	
Battery	Battery Group	
Battery	▼ 1 ▲	
Single E	Ensure	Cancel
Boost U	Back	
Float Ba	Boost Last Time	231 Min
Battery	Max Charge Current	25A
Boost C	Next	

Setting of battery group

150KVA ID:01	<b>On-Line</b>	23-01-2014 08:00
◀	Setting	Record
Version	▶	
Single Battery Volt.	12V	
Battery	Max Charge Current	
Battery	▼ 25 ▲	
Single	Ensure	Cancel
Boost	Back	
Float B	Boost Last Time	231 Min
Battery	Max Charge Current	25A
Boost C	Next	

Setting of max. Charge current

150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery					
Battery					
Single B					
Boost U					
Float B					
Battery					
Boost C					
Boost Last Time	231 Min				
Max Charge Current	25A				

150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery N					
Battery C					
Single B					
Boost Up					
Float Ba					
Battery P					
Boost C					
Boost Last Time	231 Min				
Max Charge Current	25A				

### Setting of float base charge voltage

150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery Number	20				
Battery Gr					
Single Bat					
Boost Up					
Float Base					
Battery Pr					
Boost Cha					
Boost Last time	231 Min				
Max Charge Current	25A				

### Setting of Battery Protect Voltage

150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery Number	20				
Battery Gro					
Single Batt					
Boost Up					
Float Base					
Battery Pro					
Boost Char					
Boost Last time	231 Min				
Max Charge Current	25A				

### Setting of boost charge

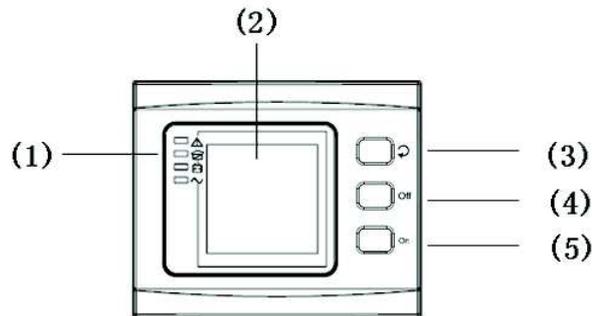
150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery Number	20				
Battery					
Single					
Boost U					
Float B					
Battery					
Boost C					
Boost L					
Max Charge Current	25A				

### Setting of boost charge lasting time

150KVA ID:01	On-Line	23-01-2014 08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt.	12V				
Battery Number	20				
Battery Gro					
Single Batt					
Boost Up					
Float Base					
Battery Pro					
Boost Char					
Boost Last time	231 Min				
Max Charge Current	25A				

### Setting of boost Upper Limit Volt

### 4.3.2 UPS Module LCD display



#### Overview of the operating panel of the UPS

- 1) LED indicator
- 2) LCD Display
- 3) scroll button: enter to next item
- 4) OFF button
- 5) ON button (battery cold start switch)

#### Introduction



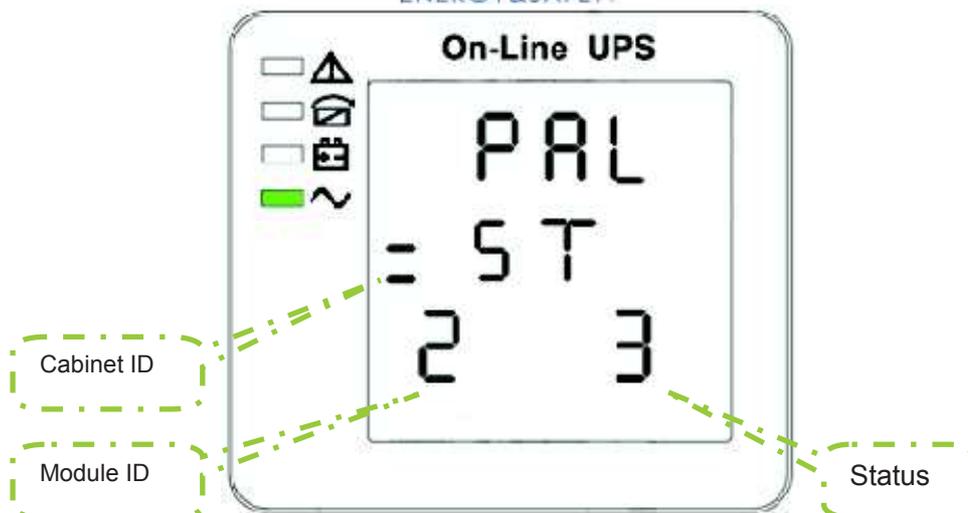
#### CAUTION!

The display provides more functions than those described in this manual.

There are 16 interfaces available in the LCD display:

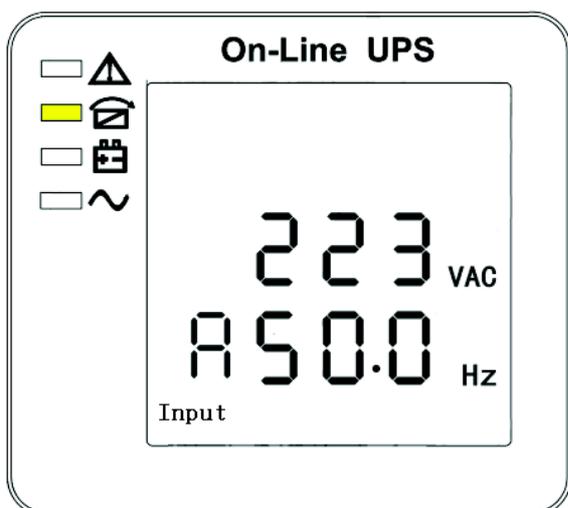
Item	Interface Description	Content Displayed
01	CODE	Operational status and mode
02	Input A(Input L1)	Voltage & Frequency
03	Input B(Input L2)	Voltage & Frequency
04	Input C(Input L3)	Voltage & Frequency
05	Bat. +	Voltage & Current
06	Bat. -	Voltage & Current
07	Output A(Output L1)	Voltage & Frequency
08	Output B(Output L2)	Voltage & Frequency
09	Output C(Output L3)	Voltage & Frequency
10	Load A	Load
11	Load B	Load
12	Load C	Load
13	Total Load	Load
14	Temperature	Internal temperature and ambient temperature
15	Software version & model	Version of rectifier software, version of inverter software, model
16	CODE	Alarm Code(Warning Message)

- 1) When the UPS is connecting with the Utility or Battery at cold start mode, it shows as drawing below:

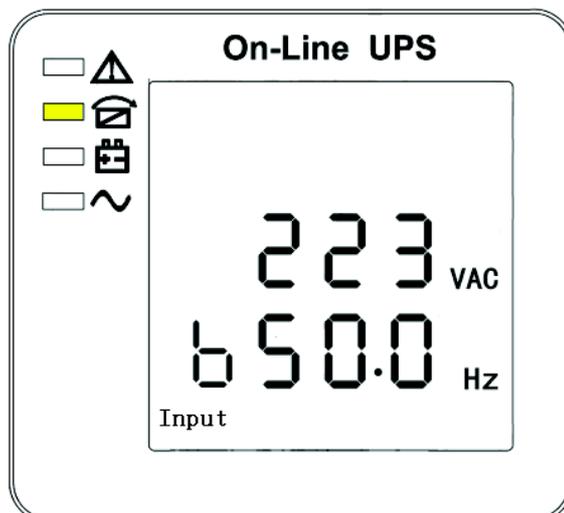


1. Module ID and status code

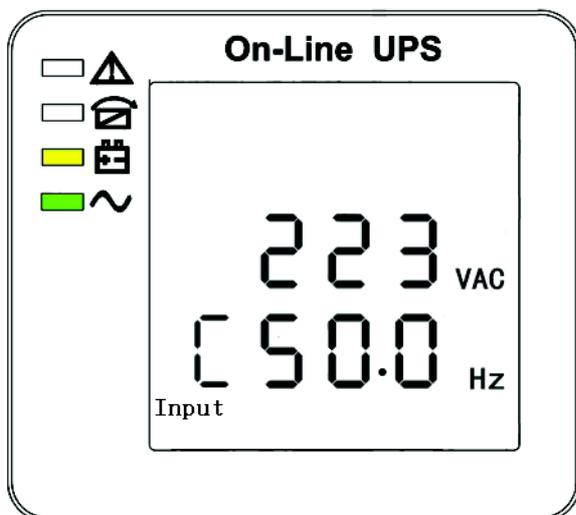
2) Press “scroll” button, the UPS goes to next page as shown below.



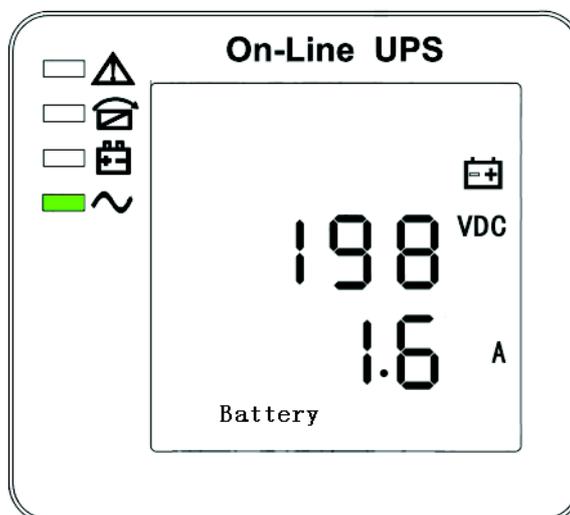
2. Phase A (L1) Input/Frequency



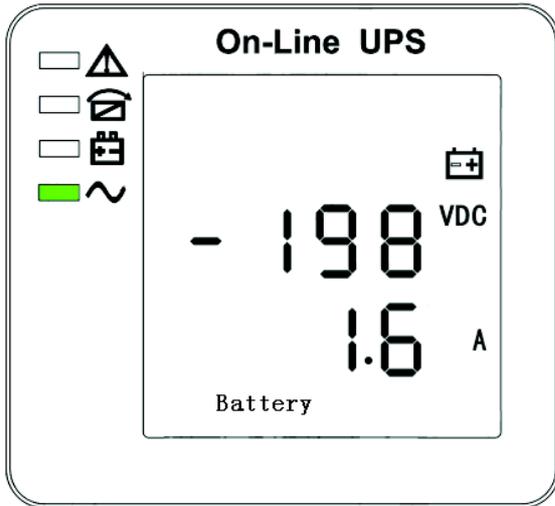
3. Phase B (L2) Input/Frequency



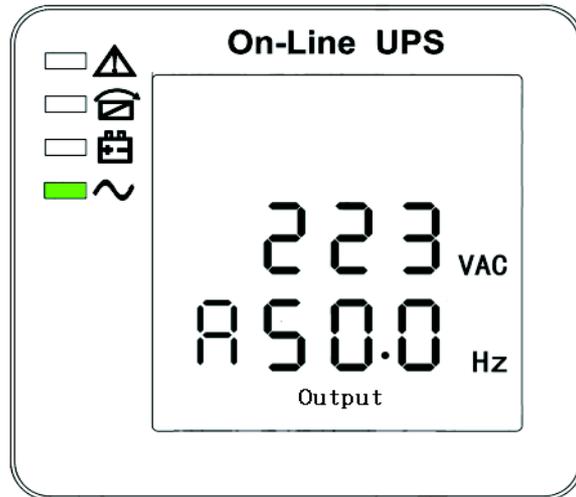
4. Phase C (L3) Input/Frequency



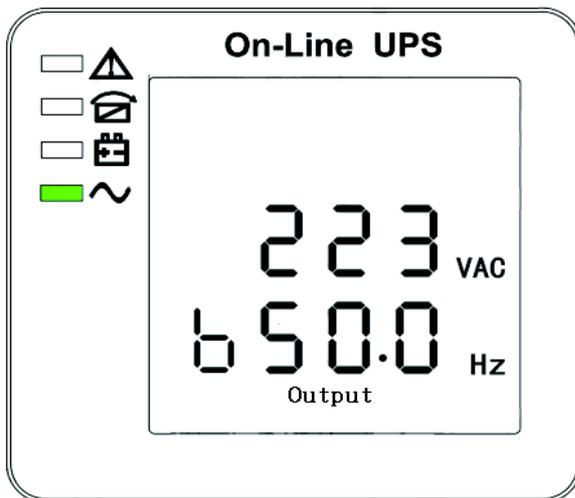
5. Bat + (Positive)



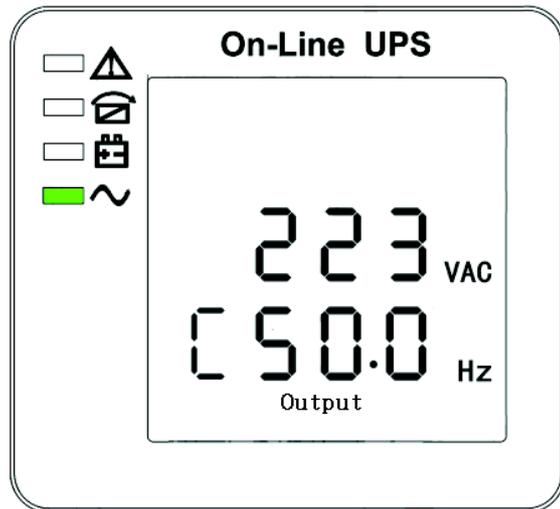
6. Bat – (Negative)



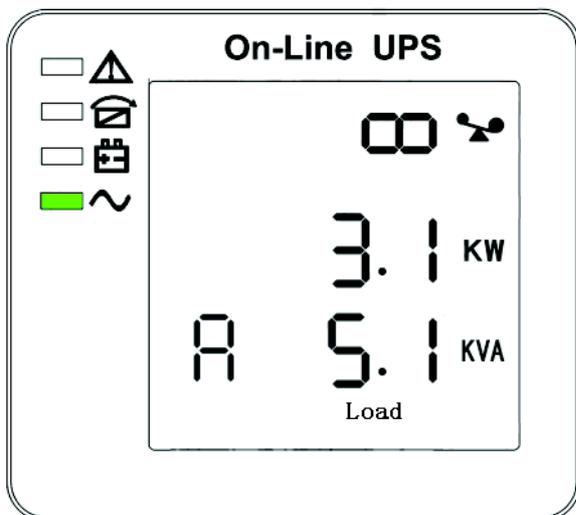
7. Phase A (L1) Output Voltage/Frequency



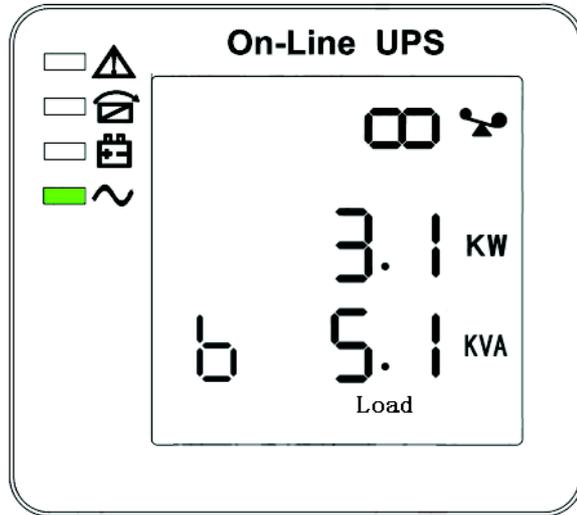
8. Phase B (L2) Output Voltage/Frequency



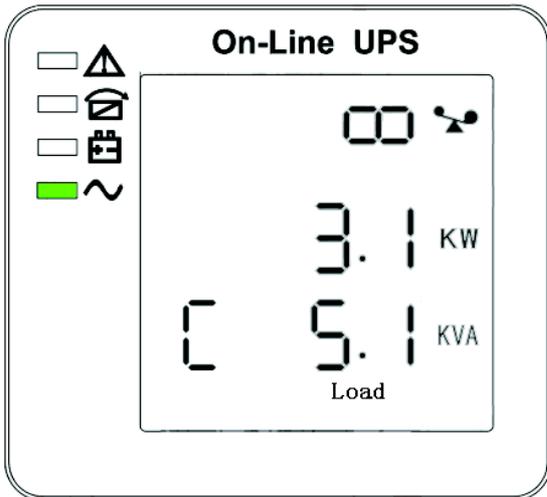
9. Phase C (L3) Output Voltage/Frequency



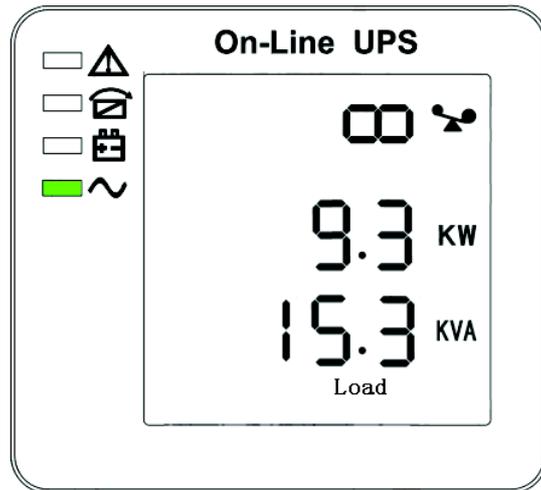
10. Phase A (L1) Load Capacity



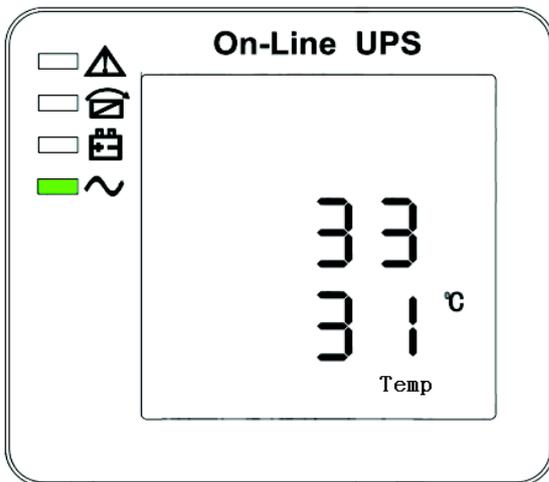
11. Phase B (L2) Load Capacity



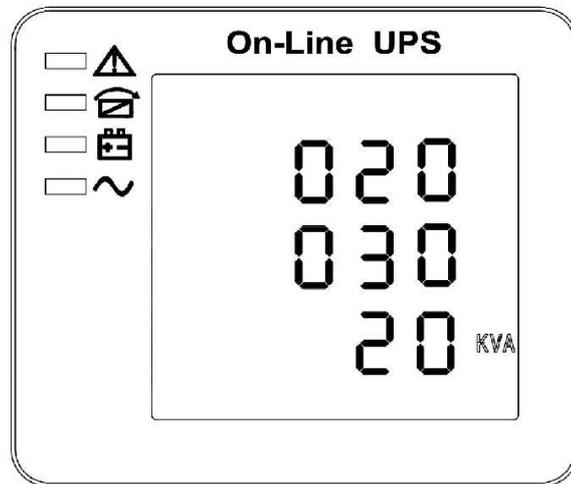
12. Phase C (L3) Load Capacity



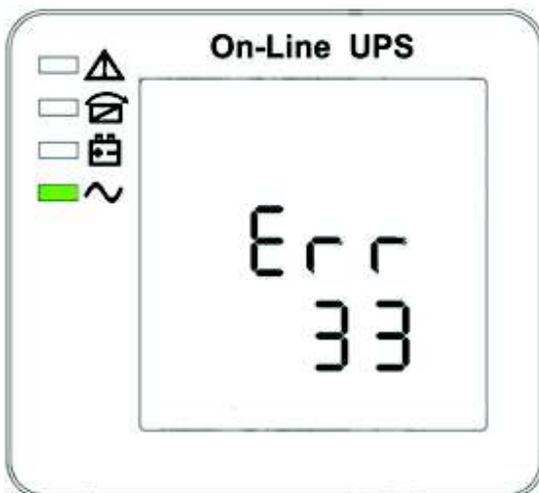
13. Total Load Capacity



14. Internal temperature and ambient temperature

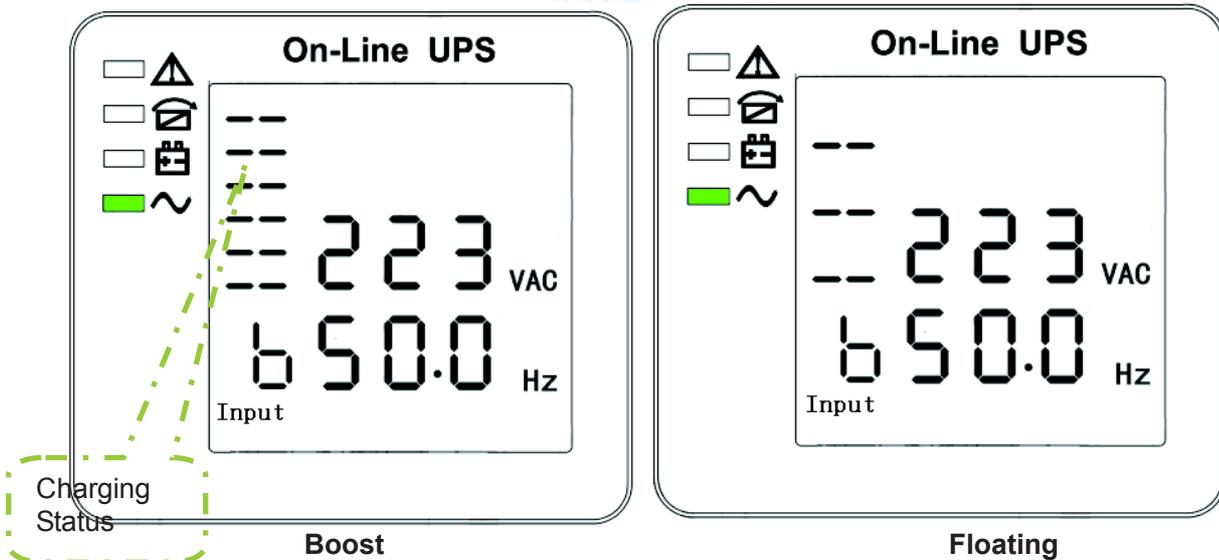


15. Software version & model



16. Alarm Code

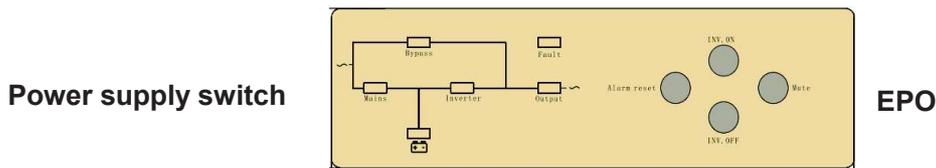
If some of above interfaces have battery charging, it will display the charging information at the same time as shown below.



- 3) Pressing “scroll” button, you may circulate all messages from the first one to the last one then returns back to the first one and vice versa.
- 4) All alarm codes are present when abnormal behavior(s) occur(s).

#### 4.3.3 Monitoring module control panel

Monitoring module control panel is at UPS top. Through this control panel and LED, the operator may monitor all measured dates, UPS & battery status, and alarm events.



- 1) Power supply switch: the power supply switch of the monitoring module. After switch it off, the monitoring module can be hot swapped.
- 2) EPO KEY: Disconnects Power to the Load. Disables rectifier, inverter, static bypass and battery operation
- 3) MAINS INDICATOR (LED): the status of the AC Input
- 4) INVERT INDICATOR (LED): the status of the inverter
- 5) OUTPUT INDICATOR (LED): the status of the output
- 6) BYPASS INDICATOR (LED): the status of the bypass Input
- 7) BAT INDICATOR (LED): the status of the battery
- 8) FAULT INDICATOR (LED): UPS is faulty
- 9) ALARM RESET: to reset alarm.
- 10) MUTE: MUTE function of monitoring module, to mute buzzer, The buzzer will be re-started automatically when fault occurs.
- 11) INVERTER OFF KEY: Disable Inverter Operation
- 12) INVERTER ON KEY: Enable Inverter Operation



### CAUTION!

The LEDs mounted on the mimic flow chart represent the various power paths and current UPS operational status.

#### Mains indicator

<b>Green</b>	Rectifier in Normal Operation
<b>Flashing Green</b>	Input mains voltage or frequency out of normal range
<b>Off</b>	Input AC Not Available

#### Battery indicator

<b>Yellow</b>	Battery Normal, but discharging and powering the load
<b>Flashing Green</b>	Battery End of Discharge pre-warning, Battery abnormal (high or low voltage, Absent or Polarity Reversed), charger abnormal
<b>Off</b>	Battery and Converter Normal, Battery charging.

#### Bypass indicator

<b>Green</b>	Load on Bypass power
<b>Flashing Green</b>	Bypass not available, out of normal range, Static bypass switch short or broken fault, bypass switch wiring fault, bypass over current
<b>Off</b>	Bypass Normal, load not on bypass

#### Inverter indicator

<b>Green</b>	Inverter Normal and powering the load
<b>Flashing Green</b>	Inverter failed, Inverter IGBT bridge direct conduct protection, Inverter Thyristor short or broken fault, over load or Parallel Overload, Feedback protection
<b>Off</b>	Inverter not operating

#### Output indicator

<b>Green</b>	UPS output ON and Normal
<b>Flashing Green</b>	UPS output overload or UPS output switch not switch ON
<b>Off</b>	UPS output OFF.

#### Fault indicator

<b>Off</b>	Normal Operation
<b>Red</b>	UPS fault e.g.

## 4.4 Display Messages/Troubleshooting

This section lists the event and alarm messages that the UPS might display. The messages are listed in alphabetical order. This section is listed with each alarm message to help you troubleshoot problems.

### Module Display messages

#### Operational Status and Mode(s)

item	Content Displayed	LED			
		alarm	Bps output	Bat. output	Mains output
1	Initialized	Extinguish	Extinguish	Extinguish	Extinguish
2	Standby Mode	Extinguish	Extinguish	X	Extinguish
3	No Output	Extinguish	Extinguish	X	Extinguish
4	Bypass Mode	Extinguish	Light	X	Extinguish
5	Utility Mode	Extinguish	Extinguish	X	Light
6	Battery Mode	Extinguish	Extinguish	Light	Extinguish
7	Battery Self-diagnostics	Extinguish	Extinguish	Light	Extinguish
8	Inverter is starting up	Extinguish	X	X	Extinguish
9	ECO Mode	Extinguish	X	X	X
10	EPO Mode	Light	Extinguish	X	Extinguish
11	Maintenance Bypass Mode	Extinguish	Extinguish	Extinguish	Extinguish
12	Fault Mode	Light	X	X	X

**Note: “X” shows that it will determined by other conditions.**

#### Module Alarm Information

Event log	UPS Alarm Warning	Buzzer	LED
1	Rectifier Fault	Beep continuously	Fault LED lit
2	Inverter fault(Including Inverter bridge is shorted)	Beep continuously	Fault LED lit
3	Inverter Thyristor short	Beep continuously	Fault LED lit
4	Inverter Thyristor broken	Beep continuously	Fault LED lit
5	Bypass Thyristor short	Beep continuously	Fault LED lit
6	Bypass Thyristor broken	Beep continuously	Fault LED lit
7	Fuse broken	Beep continuously	Fault LED lit
8	Parallel relay fault	Beep continuously	Fault LED lit
9	Fan fault	Beep continuously	Fault LED lit
10	reserve	Beep continuously	Fault LED lit
11	Auxiliary power fault	Beep continuously	Fault LED lit
12	Initializtion fault	Beep continuously	Fault LED lit
13	P-Battery Charger fault	Beep continuously	Fault LED lit
14	N-Battery Charger fault	Beep continuously	Fault LED lit
15	DC Bus over voltage	Beep continuously	Fault LED lit
16	DC Bus below voltage	Beep continuously	Fault LED lit
17	DC bus unbalance	Beep continuously	Fault LED lit
18	Soft start failed	Beep continuously	Fault LED lit
19	Rectifier Over Temperature	Twice per second	Fault LED lit
20	Inverter Over temperature	Twice per second	Fault LED lit
21	reserve	Twice per second	Fault LED lit
22	Battery reverse	Twice per second	Fault LED lit
23	Cable connection error	Twice per second	Fault LED lit

24	CAN comm. Fault	Twice per second	Fault LED lit
25	Parallel load sharing fault	Twice per second	Fault LED lit
26	Battery over voltage	Once per second	Fault LED blinking
27	Mains Site Wiring Fault	Once per second	Fault LED blinking
28	Bypass Site Wiring Fault	Once per second	Fault LED blinking
29	Output Short-circuit	Once per second	Fault LED blinking
30	Rectifier over current	Once per second	Fault LED blinking
31	Bypass over current	Once per second	BPS LED blinking
32	Overload	Once per second	INV or BPS LED blinking
33	No battery	Once per second	Battery LED blinking
34	Battery under voltage	Once per second	Battery LED blinking
35	Battery low pre-warning	Once per second	Battery LED blinking
36	Internal Communication Error	Once per 2 seconds	Fault LED blinking
37	DC component over limit.	Once per 2 seconds	INV LED blinking
38	Parallel Overload	Once per 2 seconds	INV LED blinking
39	Mains volt. Abnormal	Once per 2 seconds	Battery LED lit
40	Mains freq. abnormal	Once per 2 seconds	Battery LED lit
41	Bypass Not Available		BPS LED blinking
42	Bypass unable to trace		BPS LED blinking
43	Inverter on invalid		
44	Module screws unlocked		
45	Inverter not on		
46	Output switch not ON	Once per 3 seconds	

### Cabinet Display messages

#### Events:

No.	Display message	Meaning
1	Initializing	The DSP and MCU are in Initializing.
2	Standby	
3	Non-Output	The UPS does not provide power to the load equipment.
4	On Bypass	Inverter output is turned off and the load connected at the inverter output receives power from utility line via STS.
5	On Line	Inverter output power is the primary energy source to load
6	EPO Activated	Emergency Power Off Switch has been activated.
7	Automatic Self Test	The UPS has started pre-programmed battery test.
8	Inverter in soft starting	The inverter is in soft-starting
9	System Fault Detected	The system has detected an internal error
10	MBS status	status of maintenance bypass

11	EPO status	status of EPO(emergency power off)
12	Int. Input Switch closed	The internal input breaker is closed manually.
13	Int. Input Switch opened	The internal input breaker is opened manually.
14	Rectifier Deactivated	The rectifier has been deactivated.
15	Rectifier Activated	The rectifier has been activated.
16	Rectifier Current Limit	When the input voltage is at 208V~305V, the output of the UPS will not be interrupted, but it will be at current limit, for example, to reduce charge current. When the load connected exceeds its limit, the warning shall occur.
17	Battery charge deactivated	The charger has been deactivated.
18	Positive Battery Boost Charging	The Positive battery is in boost charge, which is Constant voltage boost charge mode or constant current boost charge mode.
19	Positive Battery Float Charging	The Positive battery is in float charge.
20	Negative Battery Boost Charging	The Negative battery is in boost charge.
21	Negative Battery Float Charging	The Negative battery is in float charge.
22	Int. bypass Switch Opened	The internal bypass breaker is opened manually
23	Int. bypass Switch Closed	The internal bypass breaker is closed manually
24	Int. output Switch Opened	The internal output breaker is opened manually
25	Int. output Switch Closed	The internal output breaker is closed manually
26	Ext. bypass Switch Opened	The external bypass breaker(parallel system) is opened
27	Ext. bypass Switch Closed	The external bypass breaker(parallel system) is closed
28	Ext. output Switch Opened	The external output breaker(parallel system) is opened
29	Ext. output Switch Closed	The external output breaker(parallel system) is closed
30	Coming to Interval transfer	Allows transfer to bypass or inverter with 3/4 cycle break. Use of this command will drop load.
31	Coming to over load due to inverter off	When the inverter is turned off manually, the load will exceed the power capacity.
32	Coming to Interval transfer due to inverter off	When the inverter is turned off manually, the load will exceed the power capacity.
33	Inverter invalid due to over load	The load exceeds the capability of the single or parallel modules.
34	Inverter Master	It indicates the Master Inverter.
35	Transfer Times-out	Latched load transfer to bypass as a result of too many successive transfers within the current hour. Automatic reset attempt within the next hour.
36	UPS In shutdown Due To Overload.	The load exceeded the power capacity. The UPS has been shutdown
37	UPS In Bypass Due To Overload.	The load exceeded the power capacity. The UPS has switched to Bypass Mode.
38	Parallel in Bypass	The parallel system has switched to bypass mode
39	LBS Activated	LBS has been activated.
40	Lightning Protection	Lightning protector has been activated.
41	Battery low to UPS OFF	battery voltage lower than protection point
42	UPS timing on	UPS on at certain time
43	UPS timing OFF	UPS off at certain time

44	timing self-test start	start to self-test at certain time
45	Stop self-test	self-test stops
46	manual OFF	turn off UPS manually
47	remote OFF	turn off UPS remotely
48	module connected	module is connected
49	module removed	module is removed

### Cabinet Alarm Information

No.	Display message	Meaning
1	Rectifier Fault	Rectifier detected faulty. Rectifier and inverter and charger shut down.
2	Rectifier Over Temperature	The temperature of heat sink is too high to keep the rectifier running. Charger and inverter shut down.
3	Inverter Over temperature	The temperature of the inverter heat sink is too high to keep inverter running.
4	Rectifier over-current	Rectifier failure due to over-current
5	Input thyristor failure	Failure of input thyristor
6	Battery discharge thyristor failure	Failure of battery discharge thyristor
7	Battery charge thyristor failure	Failure of battery charge thyristor
8	Fan fault	At least one of the cooling fans fails. Rectifier and inverter and charger shut down.
9	DC Bus over-voltage	Rectifier, inverter and battery converter are shutdown due to high DC bus voltage.
10	DC Bus under-voltage	Rectifier, inverter and battery converter are shutdown due to low DC bus voltage.
11	DC bus unbalance	If the difference between positive DC bus and negative DC bus exceeds 30V, this warning shall occur.
12	Soft start fault	Rectifier could not be started due to low DC bus voltage
13	Input Neutral line missing	If Input Neutral line is missing or disconnected while the UPS is in operation, the UPS will generate Neutral line failure alarm and go into Battery mode.
14	Battery Reverse	The polarity of the battery is reversed.
15	No Battery	Battery is disconnected
16	Positive Battery Charger fault	The positive battery Charger is fault. The charger will be shut down.
17	Negative battery charger fault	The negative battery charger is fault. The charger will be shut down.
18	Battery under-voltage	The battery voltage is too low and the charger has been deactivated.
19	Battery over-voltage	The battery voltage is too high and the charger has been deactivated.
20	Battery under-voltage pre-warning	The UPS is in battery operation and the battery voltage is low. Note: Runtime is limited in duration.
21	Mains freq. abnormal	Mains frequency is out of limit range and results in rectifier shutdown.
22	Mains volt. Abnormal	Mains Voltage exceeds the upper or lower limit and results in rectifier shutdown.

23	Inverter fault	When inverter has been turned on for a certain time, but the output voltage of the inverter is still out of the range of Rating voltage +12.5% and -25%, inverter fault will occur, and the inverter will be shut down and the UPS will transfer to bypass. This fault cannot be cleared until this unit is completely powered off.
24	Inverter IGBT bridge direct conduct protection	If the two IGBTs in the same bridge of inverter are on simultaneously, inverter should be shut down
25	Inverter Thyristor short fault	SCR at the inverter side is short-circuited
26	Inverter Thyristor broken fault	SCR at the inverter side is open-circuited
27	Bypass Thyristor short fault	SCR at the bypass side is short-circuited
28	Bypass Thyristor broken fault	SCR at the bypass side is open-circuited
29	CAN comm. Fault	The CAN bus communication fails
30	Parallel system load sharing fault	If any unit in a parallel system has an unbalance load share that exceeds 30%, this warning will occur.
31	Bypass Site Wiring Fault	Wrong phase rotation on the bypass side.
32	System Not Synchronized To Bypass.	System cannot synchronize to bypass. Bypass Mode may not be available.
33	Bypass unable to trace	Bypass is unable to trace
34	Bypass Not Available	The frequency or voltage is out of acceptable range for bypass. This message occurs when the UPS is online, and indicates that the bypass mode may not be available if required.
35	IGBT over current	IGBT current is over limit.
36	Parallel cable connection error	If a unit is set as parallel mode, but parallel cable is not connected correctly, this warning will occur
37	Parallel relay fault	Relay of parallel circuit must be turned on when the system are in parallel and the inverter is on. If the relay of parallel circuit cannot be turned on correctly, this unit should be shut down (include inverter and bypass). This fault cannot be cleared until this unit is completely powered off.
38	LBS Not SYNC.	Two parallel systems are not in synchronization.
39	initialization fault	When the procedure of initialization is wrong, this warning will occur.
40	Inverter is invalid	The inverter on button has been activated.
41	Overload	The load exceeds the system power capacity.
42	Parallel Overload	The UPS parallel system is confirmed to be overloaded according to the set number.
43	DC component over limitation	If the DC component of the UPS output rating power is larger than the limitation, this warning should occur
44	Bypass over current	When the bypass current exceeds the limitation, this alarm will occur.

45	Feedback protection	This UPS is fitted with a voltage free contact closure signal for use with an external automatic disconnect device (by others) to protect against back-feeding voltage into the incoming bypass supply
46	Ext. Fire Alarm	External fire detector has been activated.
47	Ext. Smoke Alarm	External smoke detector has been activated.
48	battery damaged	Battery has been damaged, this warning shall occur.
49	battery over-temperature	Battery over-temperature, this warning shall occur.
50	model set wrong	Model setting of the UPS is incorrect.

## 4.5 Options

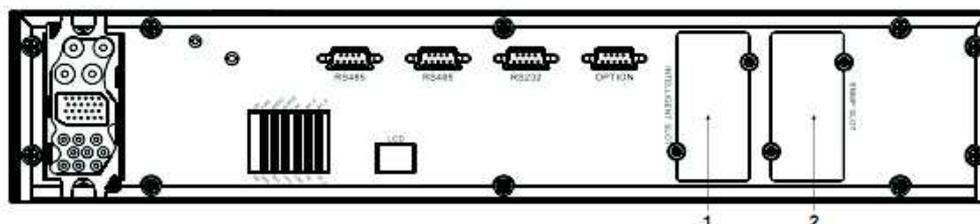
### Network Management Card with Environmental Monitoring



#### CAUTION!

For network management configuration and use, refer to the separate user manual - Network Management Card with Environmental Monitor - shipped with the CARD.

#### Network Management Card replacement



1: Intelligent Network Port 2: SNMP port

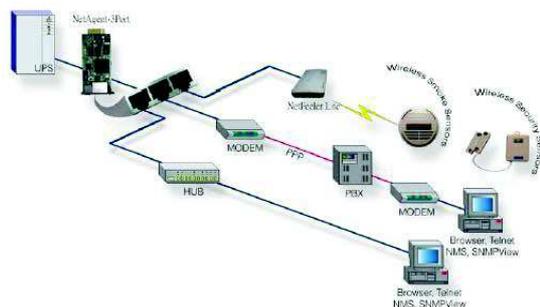
SNMP card: internal SNMP / external SNMP optional

- ◆ Loosen the 2 torque screws (on each side of the card).
- ◆ Carefully pull out the card. Reverse the procedure for re-installation

The slot called SNMP supports the MEGAtec protocol. We advise that NetAgent II-3 port is also a tool to remotely monitor and manage any UPS system

NetAgent II-3Ports supports the Modem Dial-in (PPP) function to enable the remote control via the internet when the network is unavailable.

In addition to the features of a standard NetAgent Mini, NetAgent II has the option to add NetFeeler Lite to detect temperature, humidity, smoke and security sensors. Thus, making NetAgent II a versatile management tool. NetAgent II also supports multiple languages and is setup for web-based auto language detection.



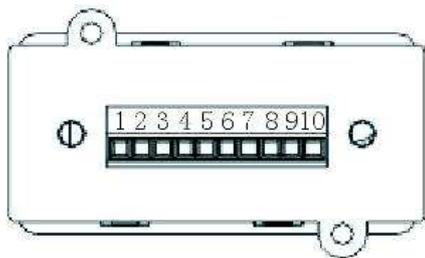
Typical topology of the UPS Network Management

## Relay card

A 10-pin terminal is supported to offer the signals of Bypass, Utility Failure, Inverter On, Battery Low, UPS fault, UPS Alarm, and UPS Shutdown.

The relay communication card contains six dry contact outputs and one dry input. The inputs and outputs are factory programmed according to functions listed in the table

Table: Relay Contacts (communication card)



Port		Function
1	Output	Utility Failure
2		/
3		Battery Low
4		On Bypass
5		UPS Fault
6		Inverter On
7		UPS Alarm
8		COM
9	Input	ON
10		OFF



### CAUTION!

The output contacts numbers for a second relay board installed will be 1 to 7. Contacts are NO (normally open) type.



Available at no charge in any of Overview of the relay card



## Appendix 1 Specifications

Model		90KVA	150KVA	300KVA	
<b>Capacity</b>	<b>UPS Cabinet</b>	25~90kVA 22.5~81kW	25~150kVA 22.5~135kW	25~300kVA 22.5~270kW	
	<b>UPS Module</b>	25kVA/22.5kW; 30kVA/27kW			
<b>Input</b>	Phase	3 Phase 4 Wires and Ground			
	Rated Voltage	380/400/415Vac			
	Voltage Range	208~478Vac			
	Frequency Range	40Hz-70Hz			
	Power Factor	≥0.99			
	Current THDi	≤3%(100% nonlinear load)			
	Bypass Voltage Range	380V: +25%(optional +10%、+15%、+20% ) 400V: +20%(optional +10%、+15% ) 415V: +15 % ( optional +10%) Min. voltage: -45% (optional -20%、-30%) Frequency protection range: ±10%			
	Generator Input	Support			
<b>Output</b>	Phase	3 Phase 4 Wires and Ground			
	Rated Voltage	380/400/415Vac			
	Power Factor	0.9			
	Voltage Regulation	±1%			
	Frequency	Utility Mode	±1%,±2%,±4%,±5%,±10% of the rated frequency(optional)		
		Battery Mode	(50/60±0.2%)Hz		
	Crest Factor		3:1		
	THD		≤2% with linear load ≤5% with non linear load		
<b>Efficiency</b>		95.5% at normal mode			
<b>Battery</b>	Voltage		±192V±204V±216V±228V±240V DC; battery quantity(optional)		
	Charging Current	UPS Cabinet	30A Max.	50A Max.	
		UPS Module	25kVA:6A Max. ; 30kVA:10A Max.		
		charge current can be set according to battery capacity installed			
<b>Transfer Time</b>		Utility to Battery : 0ms; Utility to bypass: 0ms			
<b>Protection</b>	Overload	AC Mode	Load ≤110%: last 60min, ≤125%: last 10min, ≤150%: last 1min, ≥150% turn to bypass mode immediately.		
		Bat. Mode	Load ≤110%: last 10min ≤125%: last 1min, ≤150%: Last 1S, ≥150% shut down UPS immediately.		
<b>Communication Interface</b>		RS232, RS485, Intelligent slot x 2, Dry Contact			
<b>Environment</b>	Operating Temperature		0℃~40℃		



nt	Storage Temperature		-25℃~55℃		
	Humidity		0~95% non condensing		
	Altitude		< 1500m		
Other	Unit Dimensions(D*W*H)	UPS Cabinet	840x600x1400mm		1100x600x2000mm
		UPS Module	580x443x131mm		
	Weight (Kg)	UPS Cabinet	158	170	307
		UPS Module	25kVA:32;30kVA:33.5		
STANDARD S	Safety		IEC/EN62040-1,IEC/EN60950-1		
	EMC		IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8		

## Appendix 2 UPS message table

1. The Inner Code is applied to this Series. The following format block is Inner Code display on LCD:

AAAA-AAAA BBBB-BBBB EEFF

CCCC-CCCC DDDD-DDDD

2. The part of Inner Code means

AAAA-AAAA (Rectifier State) :

Axxx-xxxx

						8	9	A	B	C	D	E	F	Int. Input Switch closed	
			4	5	6	7					C	D	E	F	Rectifier Activated
	2	3			6	7			A	B			E	F	Emergency Power off
1		3		5		7		9		B		D		F	Rectifier current Limit

xAxx-xxxx

						8	9	A	B	C	D	E	F	Input Power work on	
			4	5	6	7					C	D	E	F	Power by Input
	2	3			6	7			A	B			E	F	Battery Test
1		3		5		7		9		B		D		F	Battery Charge

xxAx-xxxx

						8	9	A	B	C	D	E	F	P-Battery Boost Charge	
			4	5	6	7					C	D	E	F	N-Battery Boost Charge
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

xxxA-xxxx

						8	9	A	B	C	D	E	F		
			4	5	6	7					C	D	E	F	
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

xxxx-Axxx

						8	9	A	B	C	D	E	F	communication connected
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5		7		9		B		D		F

xxxx-xAxx

						8	9	A	B	C	D	E	F	
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5		7		9		B		D		F

xxxx-xxAx

						8	9	A	B	C	D	E	F	
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5		7		9		B		D		F

xxxx-xxxA

						8	9	A	B	C	D	E	F	
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5		7		9		B		D		F

BBBB-BBBB (Inverter State) :

Bxxx-xxxx

						8	9	A	B	C	D	E	F	Int. bypass Switch Closed
			4	5	6	7				C	D	E	F	Int. output Switch Closed
	2	3			6	7		A	B			E	F	Manu-Bypass Switch Closed
1		3		5		7		9		B		D	F	Ext. bypass Switch Closed

xBxx-xxxx

						8	9	A	B	C	D	E	F	Ext. output Switch Closed
			4	5	6	7				C	D	E	F	00Shut Down,
	2	3			6	7		A	B	C		E	F	01: Inv starting,
														10:Inv work on ,but No
														Output
														11: Normal Output
1		3		5		7		9		B		D	F	Output by Inv

xxBx-xxxx

						8	9	A	B	C	D	E	F	Output by Bypass
			4	5	6	7				C	D	E	F	Cue: Interval Transfer
	2	3			6	7		A	B			E	F	Cue: trun-off, System will be broken
									C					
1		3		5		7		9		B		D	F	Cue:trun-off,Parallel will be overloaded

xxxB-xxxx

						8	9	A	B	C	D	E	F	Emergency Power off
			4	5	6	7				C	D	E	F	INV.invalid due to Overload
	2	3			6	7		A	B			E	F	Change Master
1		3		5		7		9		B		D	F	Transfer Times-out

xxxx-Bxxx

						8	9	A	B	C	D	E	F	Shutdown Due To Overload	
			4	5	6	7				C	D	E	F	On Bypass Due To Overload	
	2	3			6	7			A	B			E	F	Parallel in Bypass
1		3		5		7		9		B		D		F	LBS Activated

xxxx-xBxx

							8	9	A	B	C	D	E	F	INV standby
			4	5	6	7					C	D	E	F	
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

xxxx-xxBx

							8	9	A	B	C	D	E	F	Shutdown Due To Overload
			4	5	6	7					C	D	E	F	On Bypass Due To Overload
	2	3			6	7			A	B			E	F	Parallel in Bypass
1		3		5		7		9		B		D		F	LBS Activated

xxxx-xxxB

							8	9	A	B	C	D	E	F	INV standby
			4	5	6	7					C	D	E	F	
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

CCCC-CCCC (Rectifier Alarm) :

Cxxx-xxxx

							8	9	A	B	C	D	E	F	Rectifier fault
			4	5	6	7					C	D	E	F	Rectifier over temperature
	2	3			6	7			A	B	C		E	F	Inverter over temperature
1		3		5		7		9		B		D		F	Rectifier over current

xCxx-xxxx

							8	9	A	B	C	D	E	F	Auxiliary power 1 fault
			4	5	6	7					C	D	E	F	Auxiliary power 2 fault
	2	3			6	7			A	B			E	F	Input Thyristor failed
1		3		5		7		9		B		D		F	Discharge Thyristor failed

xxCx-xxxx

							8	9	A	B	C	D	E	F	Charge Thyristor failed
			4	5	6	7					C	D	E	F	Fan fault
	2	3			6	7			A	B			E	F	Fan Power fault
1		3		5		7		9		B		D		F	DC Bus over voltage

xxxC-xxxx

							8	9	A	B	C	D	E	F	DC Bus below voltage
			4	5	6	7					C	D	E	F	DC bus unbalance
	2	3			6	7			A	B			E	F	Mains Site Wiring Fault
1		3		5		7		9		B		D		F	Soft start failed

xxxx-Cxxx

							8	9	A	B	C	D	E	F	Input Neutral line missing
--	--	--	--	--	--	--	---	---	---	---	---	---	---	---	----------------------------



			4	5	6	7					C	D	E	F	Battery reverse	
	2	3			6	7				A	B			E	F	No battery
1		3		5		7		9		B		D		F		P-Battery Charger fault

xxxx-xCxx

							8	9	A	B	C	D	E	F	N-Battery Charger fault	
			4	5	6	7					C	D	E	F	Battery under voltage	
	2	3			6	7			A	B			E	F	Battery over voltage	
1		3		5		7		9		B		D		F		Battery low pre-warning

xxxx-xxCx

							8	9	A	B	C	D	E	F	Mains freq. abnormal
			4	5	6	7					C	D	E	F	Mains volt. Abnormal
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

xxxx-xxxC

							8	9	A	B	C	D	E	F	
			4	5	6	7					C	D	E	F	
	2	3			6	7			A	B			E	F	
1		3		5		7		9		B		D		F	

DDDD-DDDD (Inverter Alarm) :

Dxxx-xxxx

							8	9	A	B	C	D	E	F	Inverter fault
			4	5	6	7					C	D	E	F	Inv. IGBT bridge shorted
	2	3			6	7			A	B			E	F	Inverter Thyristor short
1		3		5		7		9		B		D		F	Inverter Thyristor broken

xDxx-xxxx

							8	9	A	B	C	D	E	F	Bypass Thyristor short
			4	5	6	7					C	D	E	F	Bypass Thyristor broken
	2	3			6	7			A	B			E	F	CAN comm. Fault
1		3		5		7		9		B		D		F	Parallel load sharing fault

xxDx-xxxx

							8	9	A	B	C	D	E	F	Bypass Site Wiring Fault
			4	5	6	7					C	D	E	F	System not Sync. to Bypass
	2	3			6	7			A	B			E	F	Bypass unable to trace
1		3		5		7		9		B		D		F	Bypass Not Available

xxxD-xxxx

							8	9	A	B	C	D	E	F	IGBT over current
			4	5	6	7					C	D	E	F	Fuse broken
	2	3			6	7			A	B			E	F	Cable connection error
1		3		5		7		9		B		D		F	Parallel relay fault

xxxx-Dxxx

							8	9	A	B	C	D	E	F	LBS Not SYNC.
			4	5	6	7					C	D	E	F	Initialization fault
	2	3			6	7			A	B			E	F	Inverter on invalid
1		3		5		7		9		B		D		F	Overload

xxxx-xDxx

							8	9	A	B	C	D	E	F	Parallel Overload
			4	5	6	7					C	D	E	F	DC component over limit.



	2	3		6	7			A	B			E	F	Bypass over current
1		3		5	7		9		B		D		F	Feedback protection

xxxx-xxDx

						8	9	A	B	C	D	E	F	BUS voltage abnormal
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5	7		9		B		D		F	

xxxx-xxxD

						8	9	A	B	C	D	E	F	
			4	5	6	7				C	D	E	F	
	2	3			6	7		A	B			E	F	
1		3		5	7		9		B		D		F	

EE (Inside Monitor) :

Ex

						8	9	A	B	C	D	E	F	generator Connect
			4	5	6	7				C	D	E	F	ShutDown Due To Batt. Low
	2	3			6	7		A	B			E	F	Time to turn on
1		3		5	7		9		B		D		F	Time to turn off

xE

						8	9	A	B	C	D	E	F	timing self test start
			4	5	6	7				C	D	E	F	Surge protection active signal, from monitoring board IO
	2	3			6	7		A	B			E	F	battery monitoring system
1		3		5	7		9		B		D		F	system unregistered

FF (Monitoring)

Fx

						8	9	A	B	C	D	E	F	Battery Falut (from battery monitoring)
			4	5	6	7				C	D	E	F	Battery over temperature (from battery monitoring)
	2	3			6	7		A	B	C		E	F	Battery over voltage (from battery monitoring)
1		3		5	7		9		B		D		F	Battery under voltage (from battery monitoring)

xF

						8	9	A	B	C	D	E	F	External Fire Alarm (from monitoring board IO)
			4	5	6	7				C	D	E	F	External Smoke Alarm (from monitoring board IO)
	2	3			6	7		A	B			E	F	UPS model wrong
1		3		5	7		9		B		D		F	time up for suggested maintenance

## Appendix 3 Trouble Shooting

In case the UPS can not work normally, it might be wrong in installation, wiring or operation. Please check these aspects first. If all these aspects are checked without any problem, please consult with local agent right away and provide below information.

- (1) Product model name and serial number, which can be found in LCD display.
- (2) Try to describe the fault with more details, such as LCD display info, LED lights status, etc.

Read the user manual carefully, it can help a lot for using this UPS in the right way. Some FAQ (frequently asked questions) may help you to troubleshoot your problem easily.

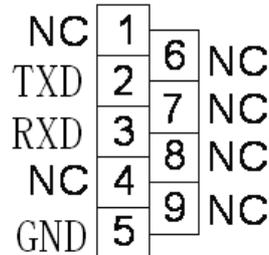
No.	Problem	Possible reason	Solution
1	LCD not display	The network cable is not fixed properly or the telephone line of the front door is not fixed properly.	Connect the network cable and telephone cable properly.
2	LCD Blue screen	LCD is Interference	Take out the cable and insert back properly
3	Utility is connected but the UPS can not be powered ON.	Input power supply is not connected; Input voltage low; The input switch of the module is not switched on.	Measure if the UPS input voltage/frequency is within the window. Check if all modules input are switched on
4	Utility normal but Utility LED does not light on, and the UPS operates at battery mode	The input breakers of the Modules are not switched on; input cable is not well connected	Switch on the input breaker; Make sure the input cable is well connected.
5	The UPS does not indicate any failure, but output do not have voltage	Output cable does not well connected	Make sure the output cable is well connected.
6	UPS modules alarm 24 'CAN communication fault'	when setting the qty of modules more than 2 units, but only work one module	If only operate one module, reset the qty of modules to '1'
7	UPS modules alarm 45 'Inverter off'	Inverter disconnection within 2 minutes in normal mode, UPS in maintenance mode more than 2 minutes	change the maintenance mode to normal mode
8	The UPS module can not transfer to bypass or inverter	Module does not well inserted; The left coronal screw is not tight. Output breaker do not switch on	Pull out the module and insert again; Tighten the screw; Switch on the output breaker.
9	The UPS module fault LED remains ON	The module is already damaged	Take out this module, replace with a new module.
10	Utility LED is flashing	Utility voltage exceeds UPS input range.	If the UPS operates at battery mode, please pay attention to the remaining backup time needed for your system.

11	Battery LED is flashing but no charge voltage and current	Battery breaker does not switch on, or batteries are damaged, or battery is reversely connected. battery number and capacity are not set correctly.	Switch on the battery breaker. If batteries are damaged, need to replace whole group batteries, Connect the battery cables correctly; Go to LCD setting of the battery number and capacity, set the correct data.
12	Buzzer beeps every 0.5 seconds and LCD display "output overload"	Overload	remove some load
13	Buzzer long beeps, LCD display "output short circuit"	The UPS output is in short circuit	Make sure the load is not in short circuit, then restart the UPS.
14	The LED of the Module with RED light	The module is not inserted properly.	Pull out the module and insert properly.
15	The UPS only works on bypass mode	The UPS is set to ECO mode, or the UPS is under maintenance mode.	Set the UPS working mode to Single Module mode, change the maintenance mode to normal mode.
16	Can not Black start	Battery switch is not properly closed; Battery fuse is not open; Or Battery low	Close the battery switch; Change the fuse; Recharge the battery
17	Buzzer beeps continuously and LCD indicates Rectifier fault or output fault	UPS is out of order	Consult with your local agent for repair



## Appendix 4 RS232 communication port definition

Definition of Male port:



Connection between PC RS232 port and UPS RS232 port

PC RS232 port	UPS RS232 port	
Pin 2	Pin 2	UPS send,PC receive
Pin 3	Pin 3	PC send,UPS receive
Pin 5	Pin 5	ground

Available function of RS232

- ◆ Monitor UPS power status.
- ◆ Monitor UPS alarm info.
- ◆ Monitor UPS running parameters.
- ◆ Timing off/on setting.

RS-232 communication data format

Baud rate ----- 2400bps

Byte length ----- 8bit

End bit ----- 1bit

Parity check -----NO