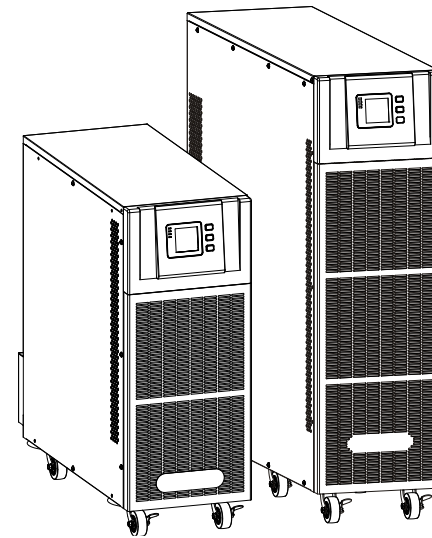




# Uninterruptible Power Systems

10~40kVA



## Operation Manual

4256-9386 A

All rights reserved.

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.

Contact the nearest hazardous waste disposal station when the products or components are discarded

# Contents

|   |    |
|---|----|
| <b>1. Safety</b> .....                                      | 2  |
| <b>1.1 Safety notes</b> .....                               | 2  |
| <b>1.2 Symbols used in this guide</b> .....                 | 2  |
| <b>2. Main Features</b> .....                               | 2  |
| <b>2.1 Summarization</b> .....                              | 3  |
| <b>2.2 Functions and Features</b> .....                     | 3  |
| <b>3. Installation</b> .....                                | 3  |
| <b>3.1 Unpack checking</b> .....                            | 4  |
| <b>3.2 Cabinet Outlook</b> .....                            | 4  |
| <b>3.3 LCD control panel</b> .....                          | 8  |
| <b>3.4 Installation notes</b> .....                         | 8  |
| <b>3.5 External Protective Devices</b> .....                | 9  |
| <b>3.6 Power Cables</b> .....                               | 9  |
| <b>3.7 Power cable connect</b> .....                        | 10 |
| <b>3.8 Battery connection</b> .....                         | 13 |
| <b>3.9 UPS parallel Installation</b> .....                  | 14 |
| <b>3.10 Computer access</b> .....                           | 15 |
| <b>4. Operation</b> .....                                   | 17 |
| <b>4.1 Operation Modes</b> .....                            | 17 |
| <b>4.2 Turn on/off UPS</b> .....                            | 19 |
| <b>4.3 The LCD Display</b> .....                            | 25 |
| <b>4.4 Parameters setting</b> .....                         | 30 |
| <b>4.5 Parallel system commissioning</b> .....              | 37 |
| <b>4.6 Display Messages/Troubleshooting</b> .....           | 37 |
| <b>4.7 Options</b> .....                                    | 39 |
| <b>Appendix 1 Specifications</b> .....                      | 40 |
| <b>Appendix 2 Problems and Solution</b> .....               | 42 |
| <b>Appendix 3 USB communication port definition</b> .....   | 43 |
| <b>Appendix 4 RS232 communication port definition</b> ..... | 44 |
| <b>Appendix 5 RS485 communication port definition</b> ..... | 45 |
| <b>Appendix 6 BAT_T communication port definition</b> ..... | 46 |
| <b>Appendix 7 Optional port definition</b> .....            | 47 |
| <b>Appendix 8 REPO instruction</b> .....                    | 48 |

# 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 terminal!
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

This series UPS is a kind of three-in-three-out high frequency online UPS.

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

### ◆3Phase In/3Phase Out UPS

It is 3Phase In/3Phase Out high-density UPS system, of which input current is kept in balance. No unbalance problem might occur.

### ◆Digital Control

This series UPS is controlled by Digital Signal Processor (DSP); enhance, it increases reliability, performance, self-protection, and self-diagnostics and so on.

### ◆Battery Configurable

10-30kVA: from 16 blocks to 20 blocks, the battery voltage of this series UPS can be configured at 16 blocks, 18 blocks or 20 blocks according to your convenience.

10-30kVA (Optional): from 30 blocks to 50 blocks, the battery voltage of this series UPS can be configured at 30 blocks, 32 blocks, 34 blocks, 36 blocks, 38 blocks, 40 blocks, 42 blocks, 44 blocks, 46 blocks, 48 blocks or 50 blocks according to your convenience.

40kVA: from 30 blocks to 50 blocks, the battery voltage of this series UPS can be configured at 30 blocks, 32 blocks, 34 blocks, 36 blocks, 38 blocks, 40 blocks, 42 blocks, 44 blocks, 46 blocks, 48 blocks or 50 blocks according to your convenience.

### ◆Charging Current is configurable

Via setting tool, the user may set the capacity of the batteries as well as reasonable charging current as well as maximum charging current. Constant voltage mode, constant current mode or floating mode can be switched automatically and smoothly.

### ◆Intelligent Charging Method

The series UPS adopts advanced three-stage charging method—

1<sup>st</sup> stage: high current constant current charging  
to guarantee to charge back to 90%;

2<sup>nd</sup>-stage: Constant Voltage

In order to vitalize battery and make sure batteries are fully charged

3<sup>rd</sup> stage: floating mode.

With this 3-stage charging method, it extends the life of the batteries and guarantees fast charging.

### ◆LCD Display

With LCD plus LED displays, the user may easily get UPS status and its operational parameters, such as input/output voltage, frequency & load%, battery % and ambient temperature, etc...

### ◆Intelligent Monitoring Function

Via optional SNMP Card, you may remotely control and monitor the UPS.

### ◆EPO Function

The series UPS may be completely shut off when the EPO is pressed. REPO function (Remote EPO) is also available in this series UPS.

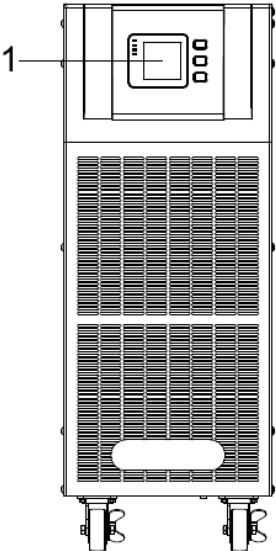
## 3. Installation

### 3.1 Unpack checking

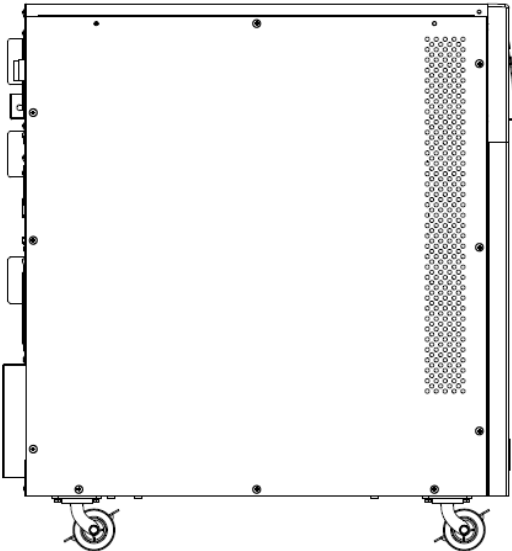
1. Don't lean the UPS when moving it out from the packaging
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the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

### 3.2 Cabinet Outlook

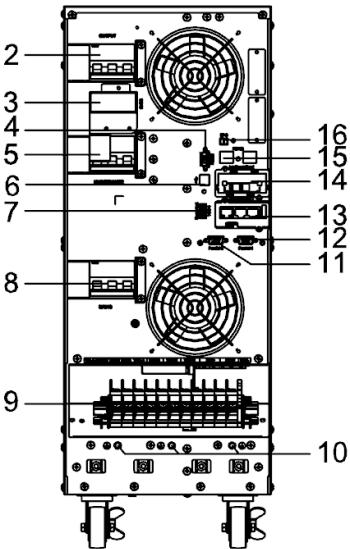
#### 3.2.1 10-40kVA (H)



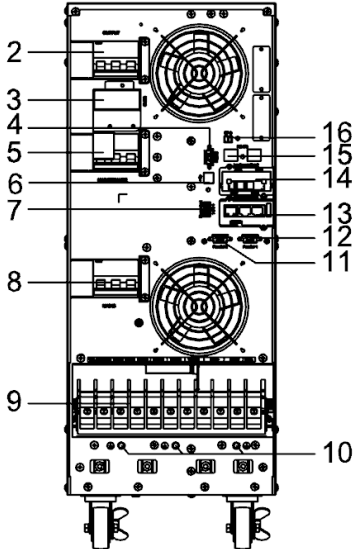
Front View



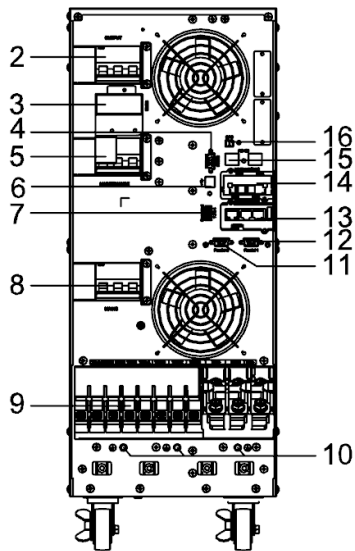
Side View



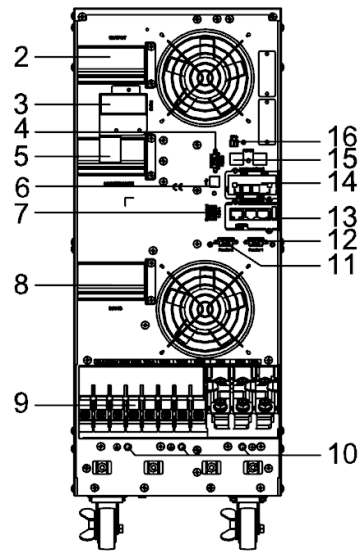
10kVA (H) Rear View  
(Terminal block without cover)



15-20kVA (H) Rear View  
(Terminal block without cover)



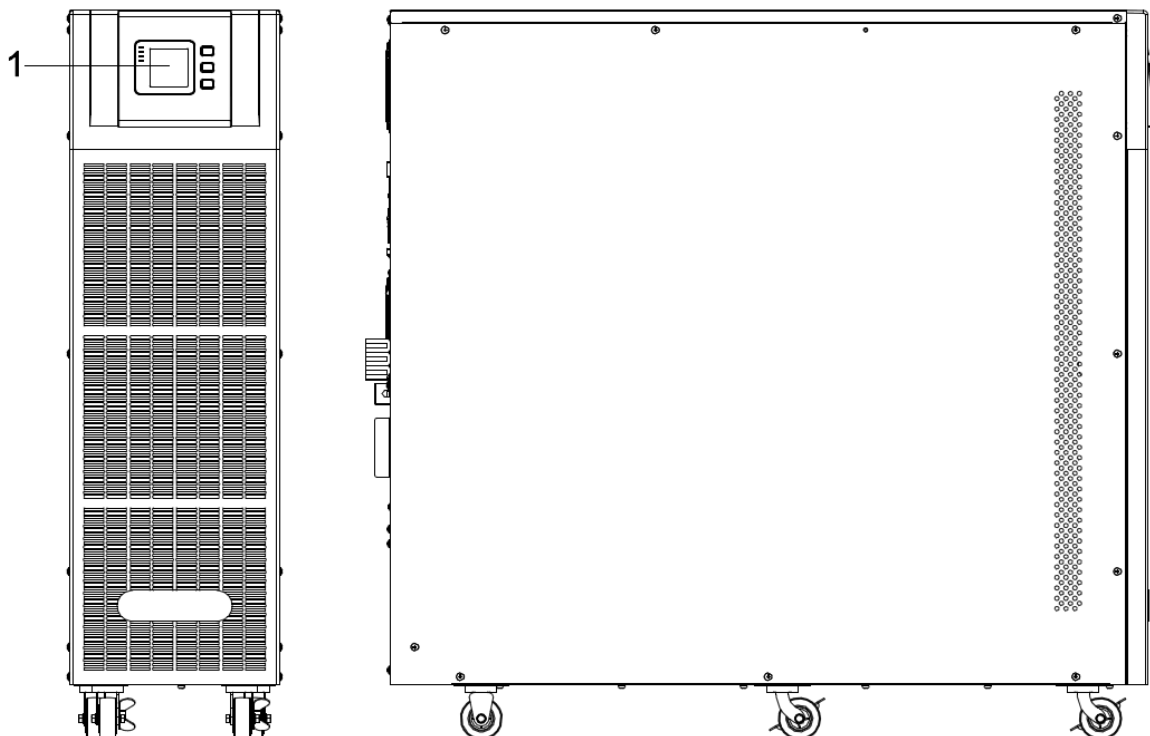
**30kVA (H) Rear View  
(Terminal block without cover)**



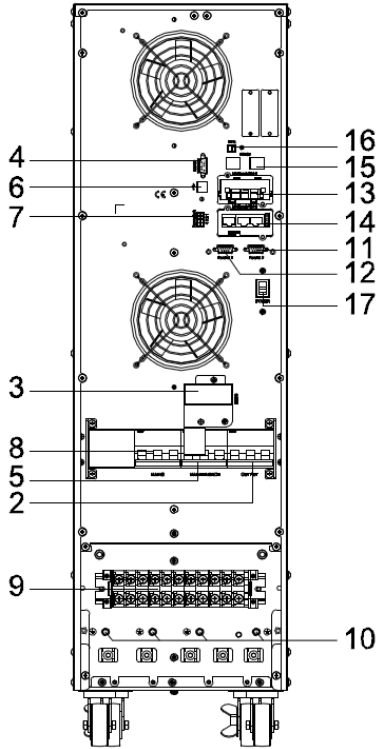
**40kVA (H) Rear View  
(Terminal block without cover)**

|   |                                     |
|---|-------------------------------------|
| (1) LCD panel   | (2) Output Switch                   |
| (3) External maintenance switch signal / Maintenance switch cover plate | (4) RS232 port                      |
| (5) Maintenance switch  | (6) USB port                        |
| (7) Dry contact port  | (8) Input Switch                    |
| (9) Terminal block for Input, output, battery & Ground (Dual input)     | (10) Ground                         |
| (11) Parallel port 1  | (12) Parallel port 2                |
| (13) Intelligent Slot 2 (SNMP card/ Relay card)                         | (14) Intelligent Slot 1 (SNMP card) |
| (15) RS485 port   | (16) REPO port                      |

### 3.2.2 10-40kVA (S)

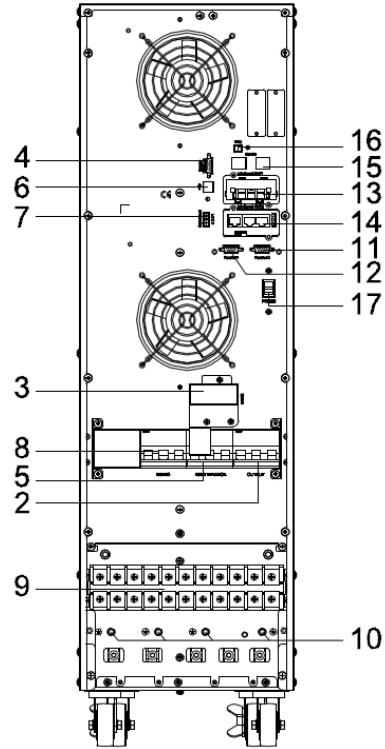


**Front View**

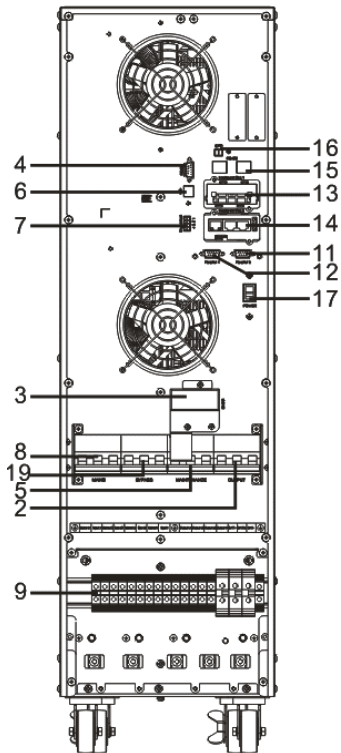


**10kVA Rear View  
(Terminal block without cover)**

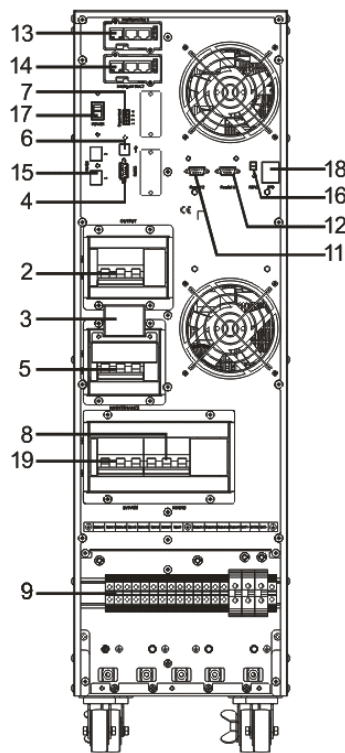
**Side View**



**15-20kVA Rear View  
(Terminal block without cover)**



**10-20kVA Rear View  
(Dual input, terminal block without cover)**

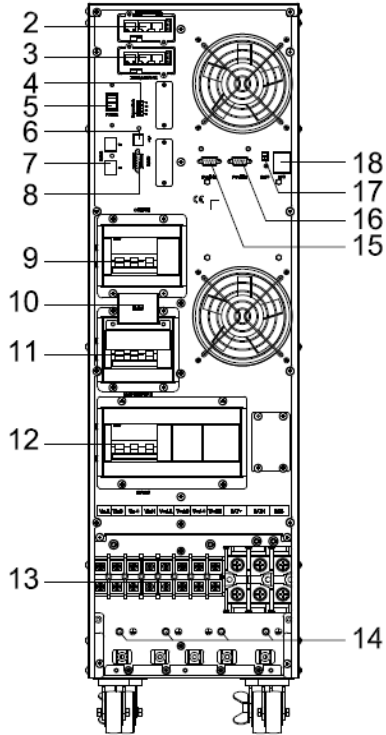


**10-20kVA(60pcs optional) Rear View  
(Dual input, terminal block without cover)**

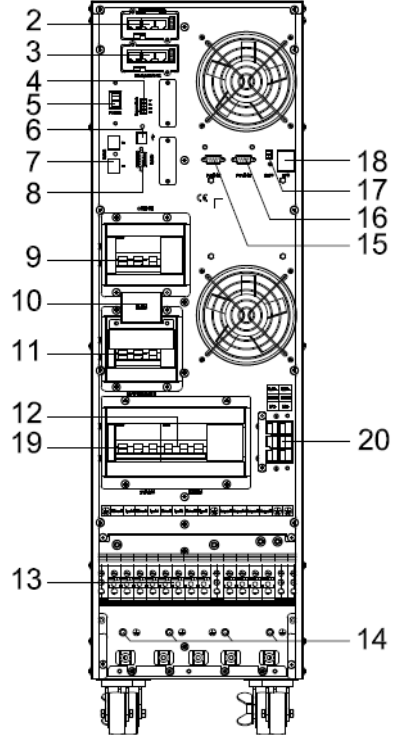
|   |                   |
|---|-------------------|
| (1) LCD panel   | (2) Output Switch |
| (3) External maintenance switch signal / Maintenance switch cover plate | (4) RS232 port    |
| (5) Maintenance switch  | (6) USB port      |
| (7) Dry contact port  | (8) Input Switch  |



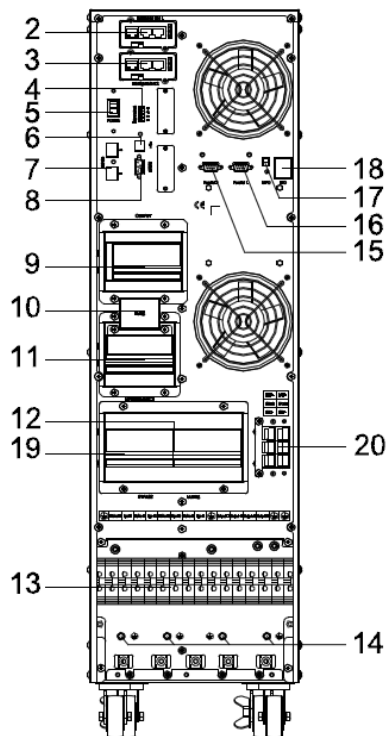
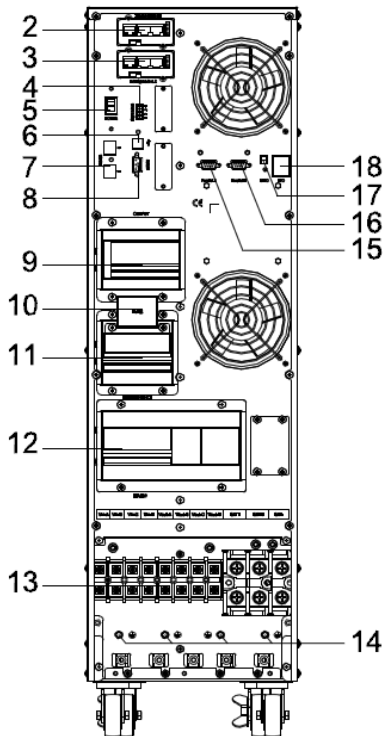
|   |   |
|---|---|
| (9) Terminal block for Input, output, battery | (10) Ground                                     |
| (11) Parallel port 2                          | (12) Parallel port 1                            |
| (13) Intelligent Slot 1 (SNMP card)           | (14) Intelligent Slot 2 (SNMP card/ Relay card) |
| (15) RS485 port                               | (16) REPO port                                  |
| (17) Power Switch                             | (18) EPO switch                                 |
| (19) Bypass Switch (Dual input)               |   |



**30kVA Rear View  
(Terminal block without cover)**

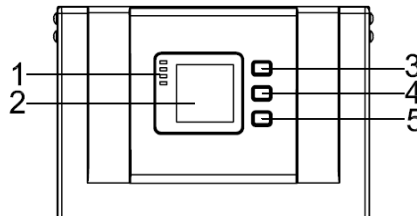


**30kVA Rear View  
(Dual input, terminal block without cover)**



| 40kVA Rear View<br>(Terminal block without cover)                | 40kVA Rear View<br>(Dual input, terminal block without cover)               |
|--|---|
| (1) LCD panel  | (2) Intelligent Slot 1 (SNMP card/ Relay card)                              |
| (3) Intelligent Slot 2 (SNMP card/ Relay card)                   | (4) Dry contact port  |
| (5) Power Switch   | (6) USB port  |
| (7) RS485 port   | (8) RS232 port  |
| (9) Output Switch  | (10) External maintenance switch signal /<br>Maintenance switch cover plate |
| (11) Maintenance switch  | (12) Input Switch   |
| (13) Terminal block for Input, output, battery<br>(Single input) | (14) Ground   |
| (15) Parallel port 2   | (16) Parallel port 1  |
| (17) REPO port   | (18) EPO switch   |
| (19) Bypass Switch (Dual input)                                  | (20) battery (Dual input)   |

### 3.3 LCD control panel



#### LCD control panel introduction

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

### 3.4 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 6months 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.

### 3.5 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.

### 3.6 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 and 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 bellow:

| 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> ) |
| 10KVA       | 4                           | 4                            | 10                          | 4                            |
| 15KVA       | 6                           | 6                            | 16                          | 6                            |
| 20KVA       | 8                           | 8                            | 20                          | 8                            |
| 30kVA       | 12                          | 12                           | 35                          | 8                            |
| 40kVA       | 16                          | 16                           | 35                          | 10                           |



**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**

### 3.7 Power cable connect

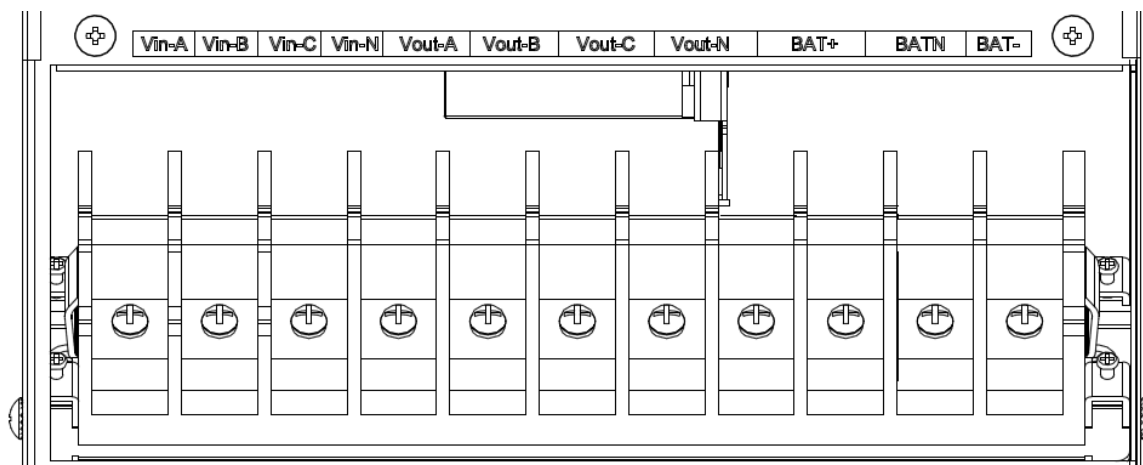
Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

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.

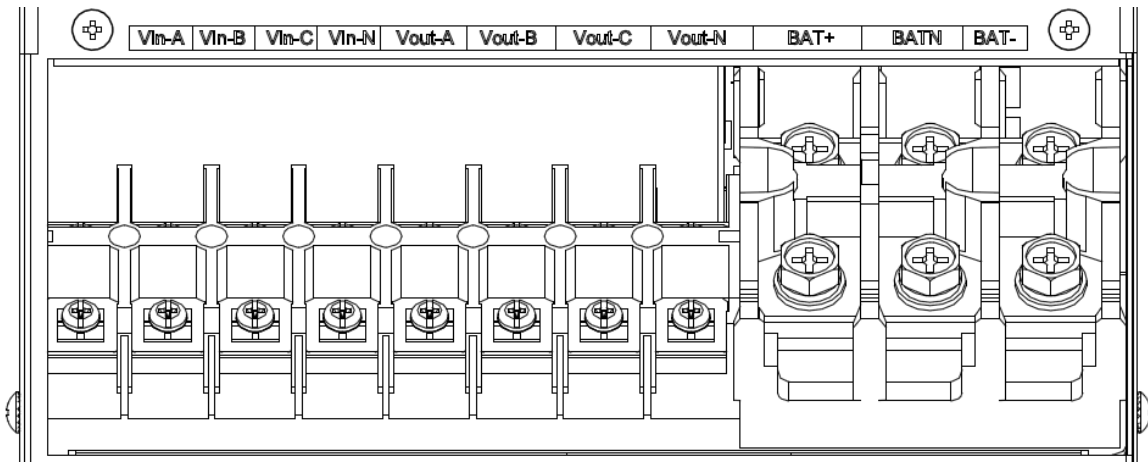
Remove the cover of terminals for wiring easily.

**Single input version:**

**10-20kVA**



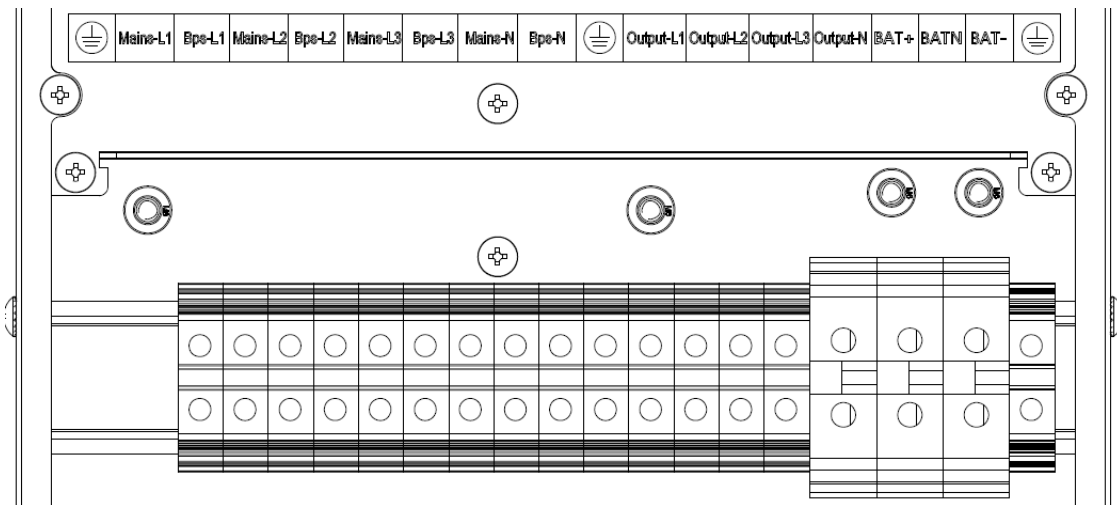
### 30-40kVA



Terminal sequence from left to right: Input phase A(L1), input phase B(L2), input phase C(L3), input Neutral line, output phase A(L1), output phase B(L2), output phase C(L3), output Neutral line, battery positive, battery Neutral line, battery negative. There are 3 connectors of GROUND under the terminal block.

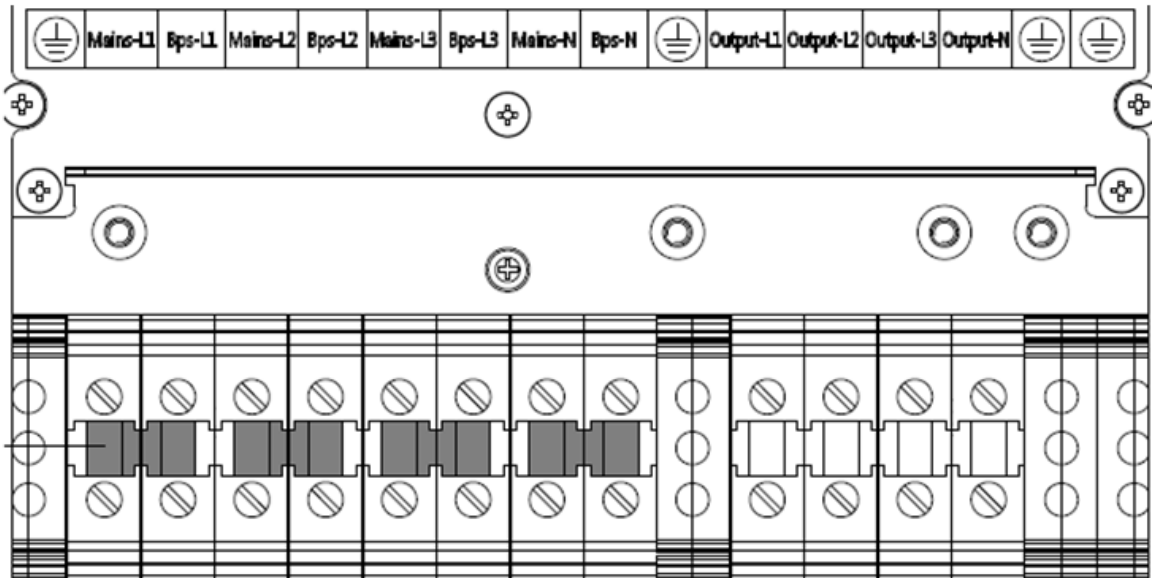
### Dual input version:

#### 10-20kVA



Terminal sequence from left to right: GROUND, Input phase A(L1), Bypass phase A(L1), Input phase B(L2), Bypass phase B(L2), Input phase C(L3), Bypass phase C(L3), Input Neutral line, Bypass Neutral line, GROUND, Output phase L1, Output phase L2, Output phase L3, Output Neutral line, battery positive, battery Neutral line, battery negative, GROUND.

**30-40kVA**



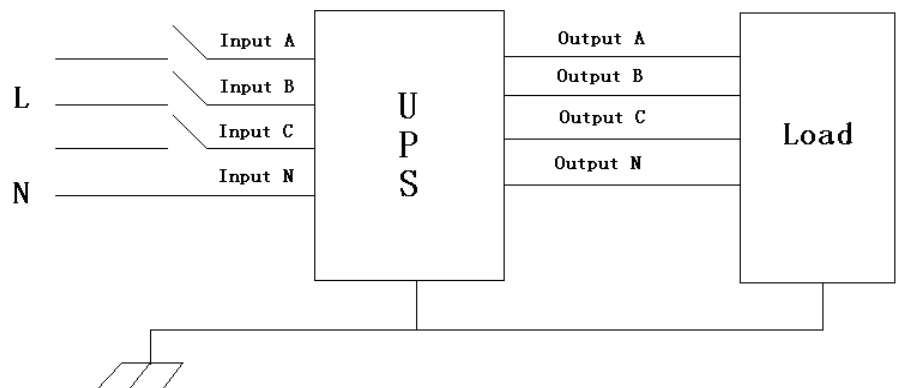
Terminal sequence from left to right: GROUND, Input phase A(L1), Bypass phase A(L1), Input phase B(L2), Bypass phase B(L2), Input phase C(L3), Bypass phase C(L3), Input Neutral line, Bypass Neutral line, GROUND, Output phase L1, Output phase L2, Output phase L3, Output Neutral line, GROUND, GROUND.

**Warning!**



In the case of “Dual input” operation, make sure the copper wire between each input lines have been removed. The AC input and the AC bypass supplies must be referenced to the same neutral point.

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!**

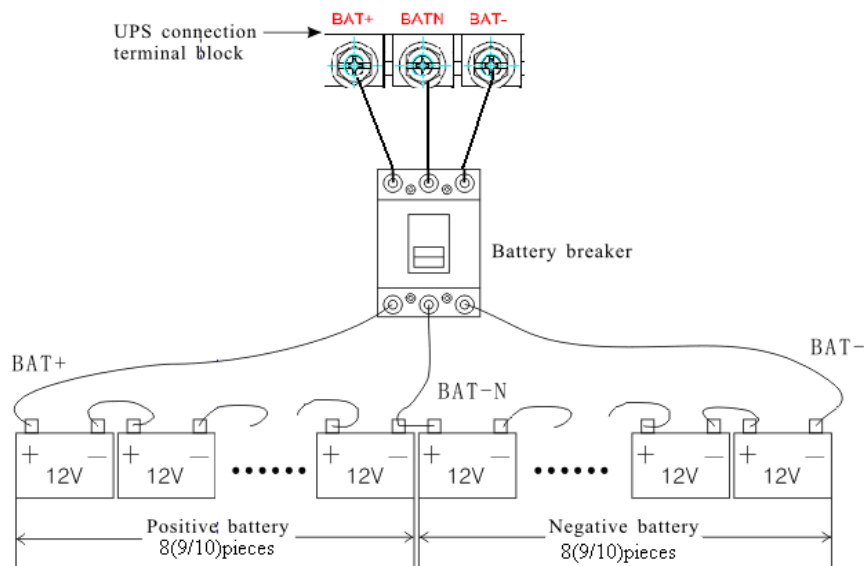
The earthing and neutral bonding arrangement must be in accordance with local and national codes of practice.

**3.8 Battery connection**

**10-30kVA:**

The UPS adopts positive and negative double battery framework, totally 16pcs (optional 18/20) in series. A neutral cable is retrieved from the joint between the cathode of the 8<sup>th</sup> (9<sup>th</sup>/10<sup>th</sup>) and the anode of the 9<sup>th</sup> (10<sup>th</sup>/11<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.

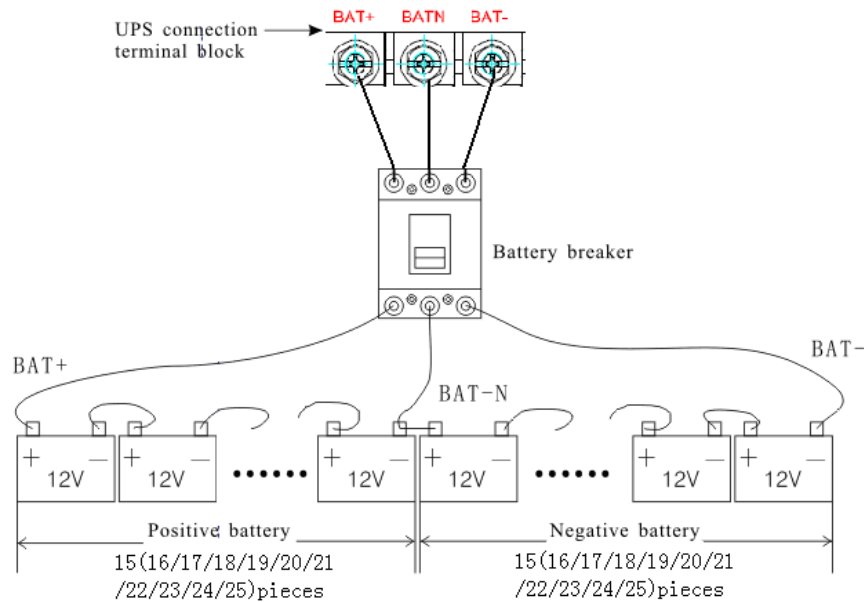
External battery connections for long-run units.



**40kVA / 10-30kVA (Optional):**

The UPS adopts positive and negative double battery framework, totally 30pcs (optional 32/34/36/38/40/42/44/46/48/50) in series. A neutral cable is retrieved from the joint between the cathode of the 15<sup>th</sup> (16<sup>th</sup>/17<sup>th</sup>/18<sup>th</sup>/19<sup>th</sup>/20<sup>th</sup>/21<sup>th</sup>/22<sup>th</sup>/23<sup>th</sup>/24<sup>th</sup>/25<sup>th</sup>) and the anode of the 16<sup>th</sup> (17<sup>th</sup>/18<sup>th</sup>/19<sup>th</sup>/20<sup>th</sup>/21<sup>th</sup>/22<sup>th</sup>/23<sup>th</sup>/24<sup>th</sup>/25<sup>th</sup>/26<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.

External battery connections for long-run units.



**Note:**

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

**10-30kVA** factory setting of the long-run unit is battery quantity---16pcs, battery capacity--12V40AH (charger current 6A). When connecting 18/20 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. All related settings can be done through LCD panel or monitoring software

**40kVA** factory setting of the long-run unit is battery quantity---30pcs, battery capacity---12V40AH (charger current 6A). When connecting 32/34/36/38/40/42/44/46/48/50 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. All related settings can be done through LCD panel or monitoring software



**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.**

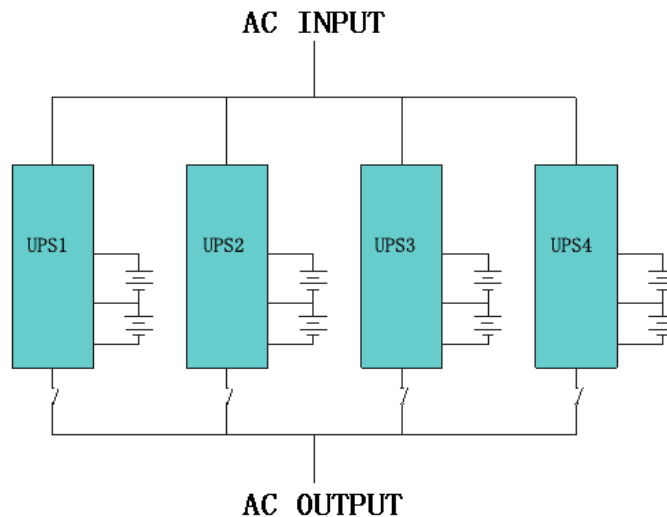
### 3.9 UPS parallel Installation

The following sections introduce the installation procedures specified to the parallel system.

#### 3.9.1 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.

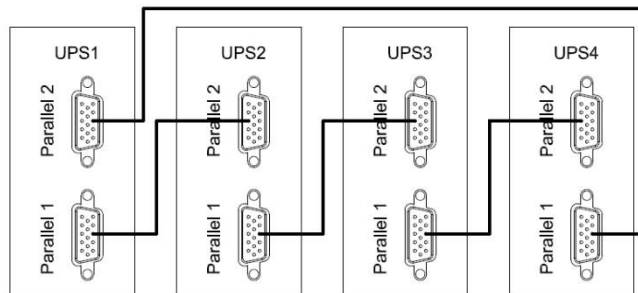


**WARNING!**

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

**3.9.2 Parallel cable installation**

Shielded and double insulated control cables available must be interconnected in a ring configuration between UPS units as shown below. The ring configuration ensures high reliability of the control.



**3.9.3 Requirement for the parallel system**

A group of paralleled UPS behaves as one large UPS system 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:

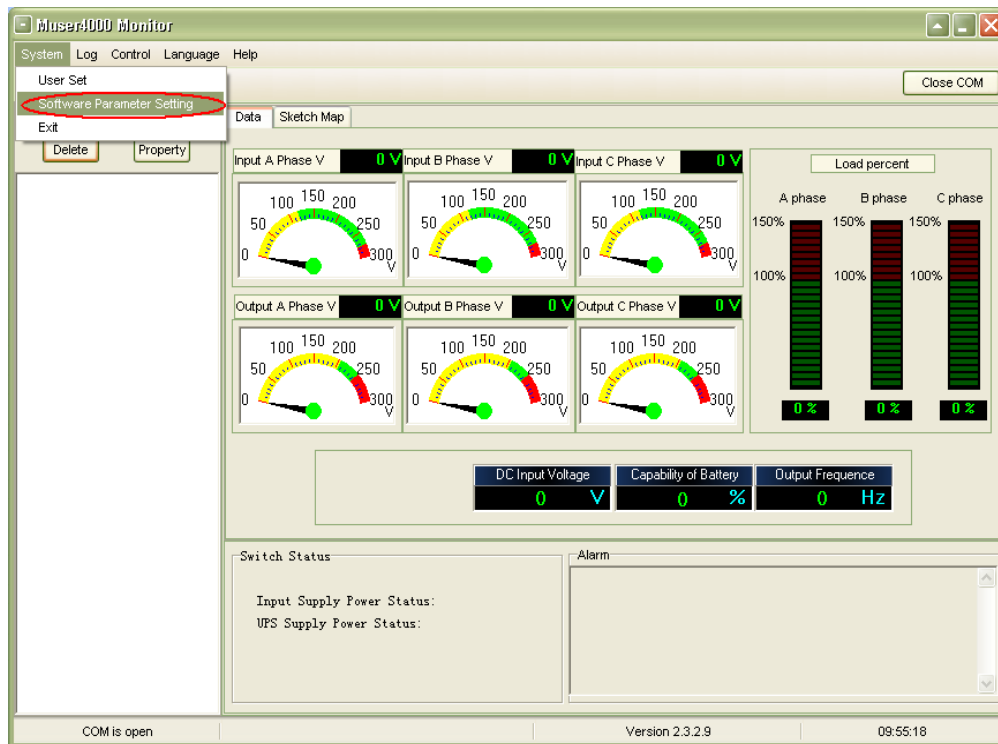
- 1) All UPS must be of the same rating and be connected to the same bypass source.
- 2) The outputs of all the UPS must be connected to a common output bus.
- 3) The length and specification of power cables including the bypass input cables and the UPS output cables should be the same. This facilitates load sharing when operating in bypass mode.

**3.10 Computer access**

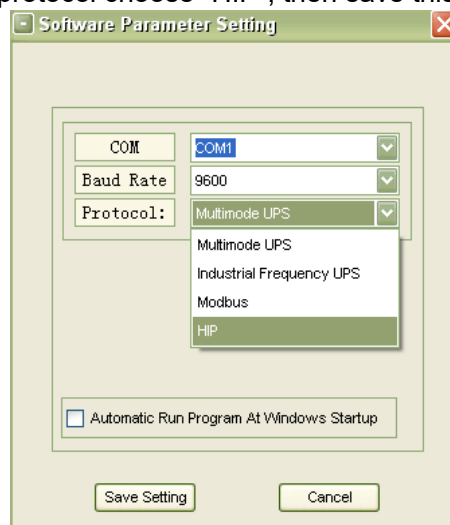
- ◆ One end of a USB cable connect to the computer, the other end connect to the USB port on

the UPS.

- ◆ Open the software Muser4000, click “system” button.



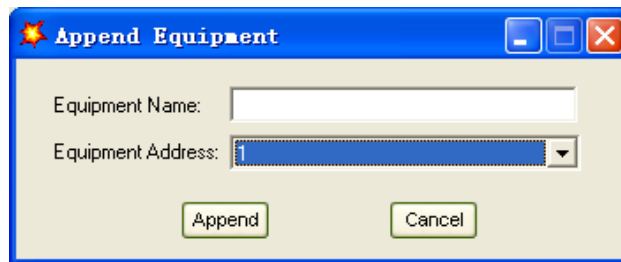
- ◆ A window of “Software Parameter Setting” comes out as below, COM choose according to the UPS , baud rate choose 9600, protocol choose “HIP”, then save this setting.



- ◆ On the main page of Muser4000, click the button of “Append”, then goes to a window of “Append equipment”.



- ◆ Put the UPS name into “Equipment Name”, and UPS’ ID address into “Equipment address”.



- ◆ Click the button “Append”, then the connection between UPS & computer is accomplished.



### CAUTION!

**When the UPS worked on inverter. If you want to use PC to set the output voltage and frequency. Must shut down the inverter first**

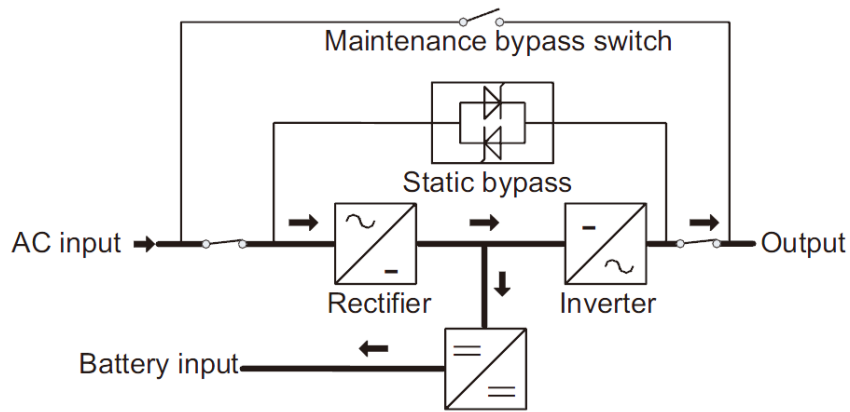
## 4. Operation

### 4.1 Operation Modes

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

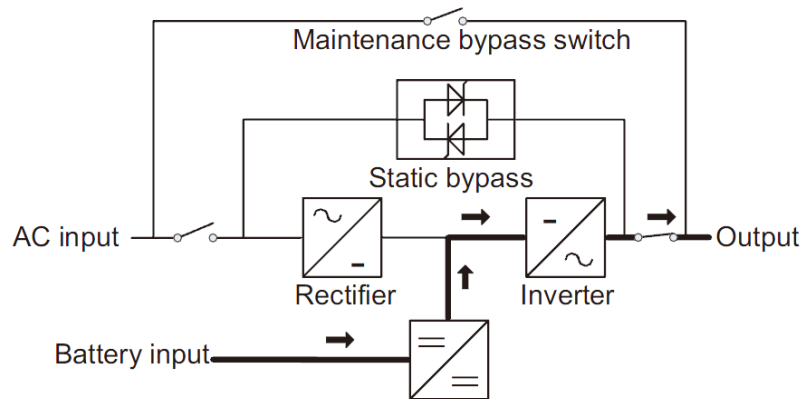
- ◆ **Normal mode**

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.



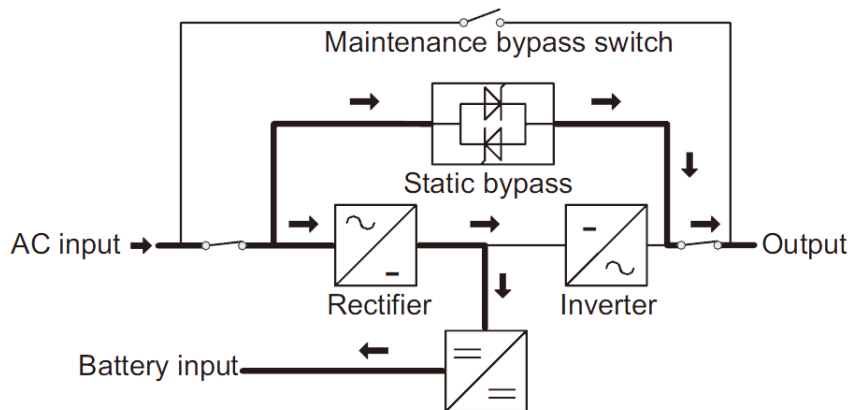
#### ◆ Battery mode (Stored Energy Mode)

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

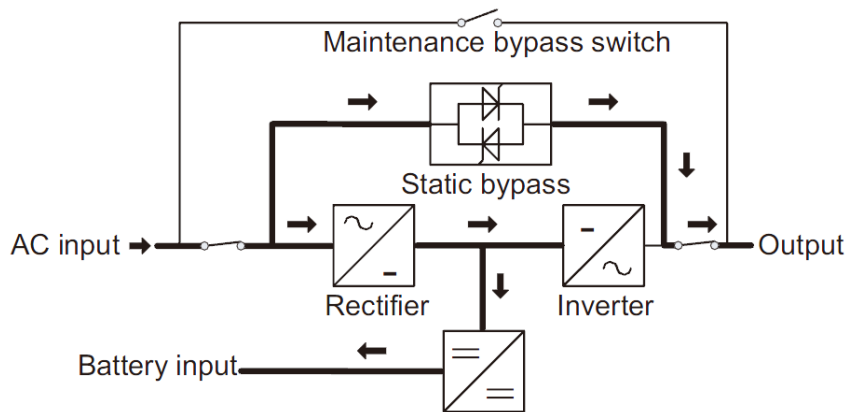
If the inverter is out of order, or if overload occurs, the static transfer switch will be activated to transfer the load from the inverter supply to bypass supply without interruption to the critical load. In the event that the inverter output is not synchronized with the bypass AC source, the static 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).



#### ◆ ECO Mode

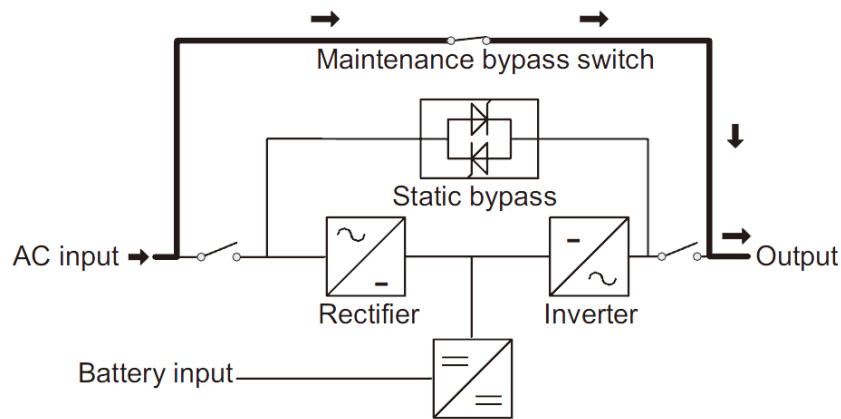
When the UPS is at AC Mode and the requirement to the load is not critical, the UPS can be set

at ECO mode in order to increase the efficiency of the power supplied. At ECO mode, the UPS works at Line-interactive mode, so the UPS will transfer to bypass supply. When the AC is out of set window, the UPS will transfer from bypass to Inverter and supplies power from the battery, and then the LCD shows all related information on the screen.



◆ **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 and this manual bypass switch bears for equivalent rated load.



**4.2 Turn on/off UPS**

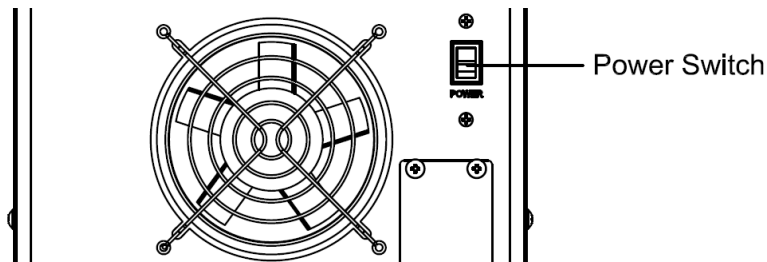
**4.2.1 Restart procedure**



**CAUTION!**

**Make sure grounding is properly done!**

- ◆ Set the Battery Breaker to the “ON” for long run UPS.
- ◆ Switch ON the power switch for standard UPS.

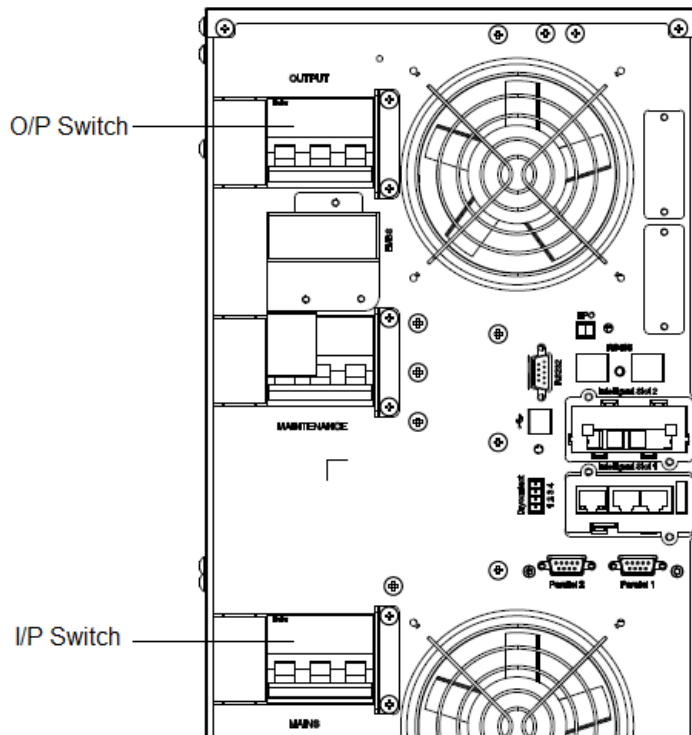


**CAUTION!**

**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

- ◆ Switch ON UPS input switch



If the Rectifier input is within voltage range, the rectifier will start up in 30 seconds then the inverter will start up after then.

- ◆ Switch ON UPS output switch

If the rectifier fails at startup, the bypass LED will light up. When the inverter starts up, the UPS will transfer from bypass mode to inverter mode, and then the bypass LED extinguishes and the inverter LED lights up.

No matter whether the UPS can work normally or not, all the status will be shown on the LCD display.

#### 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 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 5; otherwise, jump to Step 4.**

◆ Open the cover of maintenance switch, the UPS turns to bypass mode automatically.

- ◆ Turn on MAINTANCE breaker;
- ◆ Open BATTERY breaker;
- ◆ Switch OFF the MAINS breaker,
- ◆ Switch OFF 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**

- ◆ Switch ON the output breaker.
- ◆ Switch ON the input breaker.

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 static bypass of the UPS.
- ◆ 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.

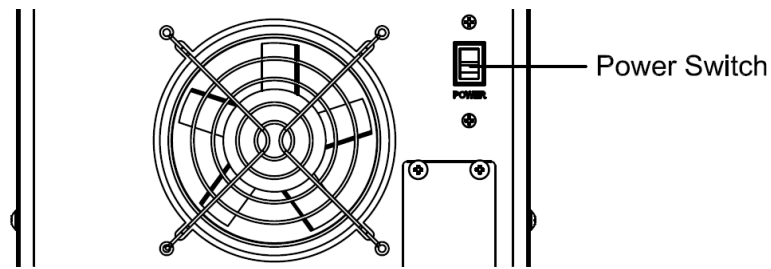
## 4.2.4 Cold start procedure



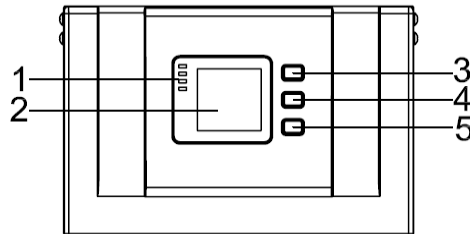
### CAUTION!

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

- ◆ Set the Battery Breaker to the "ON" for long run UPS.
- ◆ Switch ON the power switch for standard UPS.
- ◆ Turn on the Output switch.
- ◆ Switch ON the power switch (power will feed to auxiliary power board).



◆ Trigger the cold start button as the position 5 of the below drawing.



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



**CAUTION!**

**Please press the close start button after 30 seconds until closing the battery switch.**

**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.**

On-line mode:

- ◆ Press OFF to shut down the UPS, waiting about 30s.
- ◆ Open the BATTERY breaker for long run UPS. Open the battery power switch for standard UPS.
- ◆ Switch OFF the input breaker.
- ◆ Open the OUTPUT breaker. The UPS shuts down;
- ◆ To completely isolate the UPS from AC Mains, all input switches of Utility shall be completely off.
- ◆ 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.

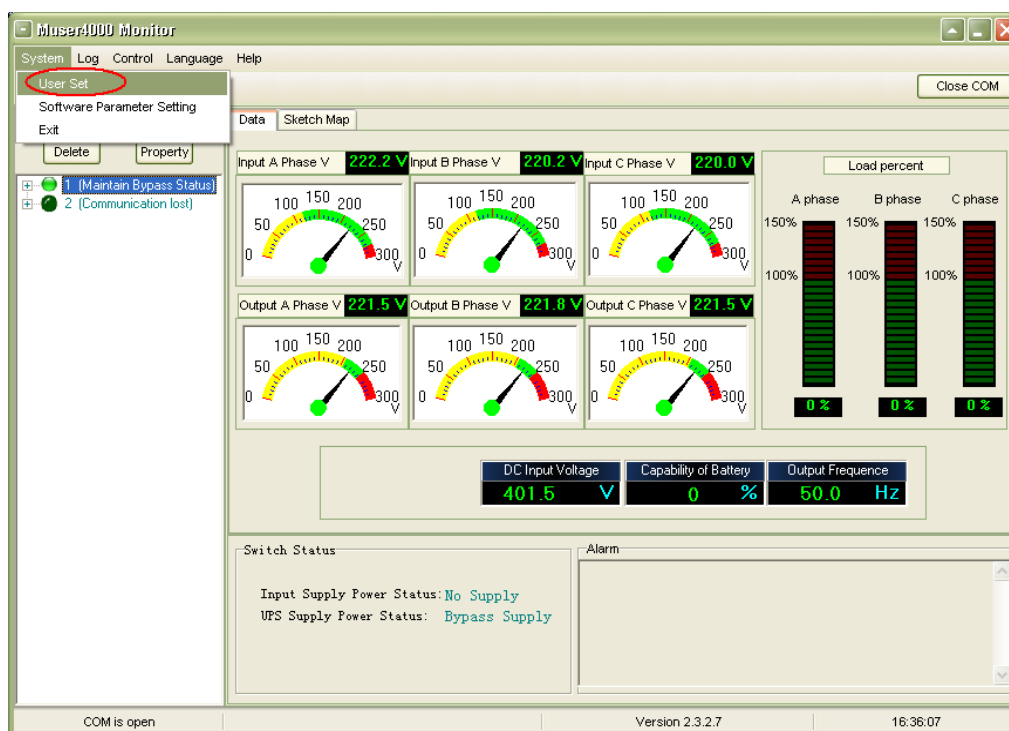
Battery mode:

- ◆ Press OFF to shut down the UPS, waiting about 30s.
- ◆ Open the BATTERY breaker for long run UPS. Open the battery power switch for standard UPS.
- ◆ Open the OUTPUT breaker. The UPS shuts down.

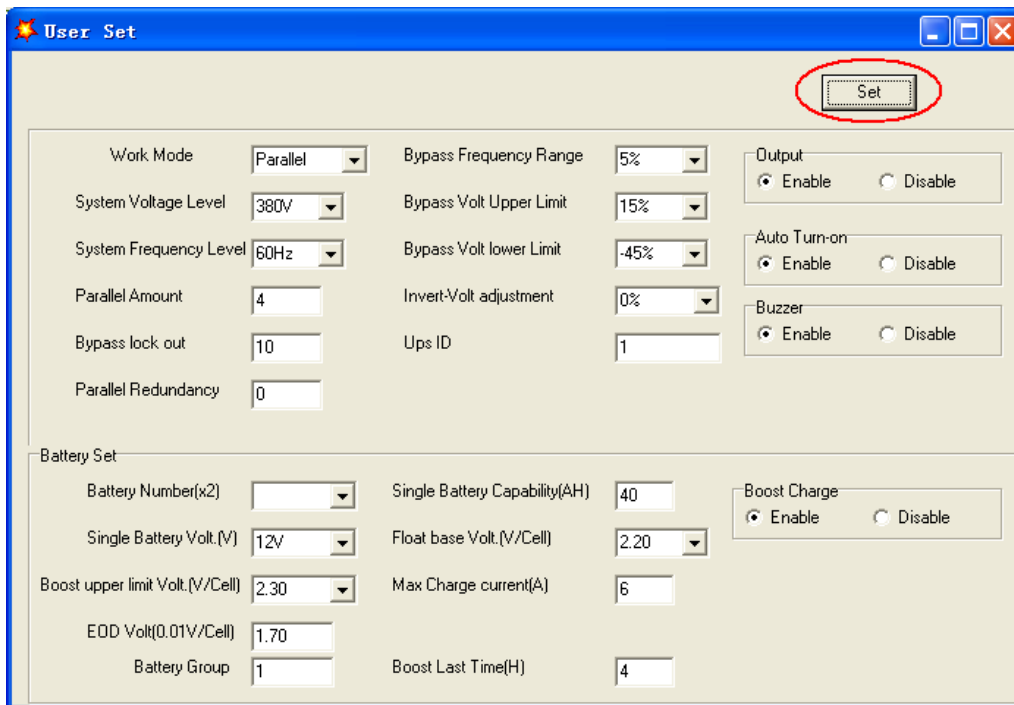


## 4.2.6 Parallel setting

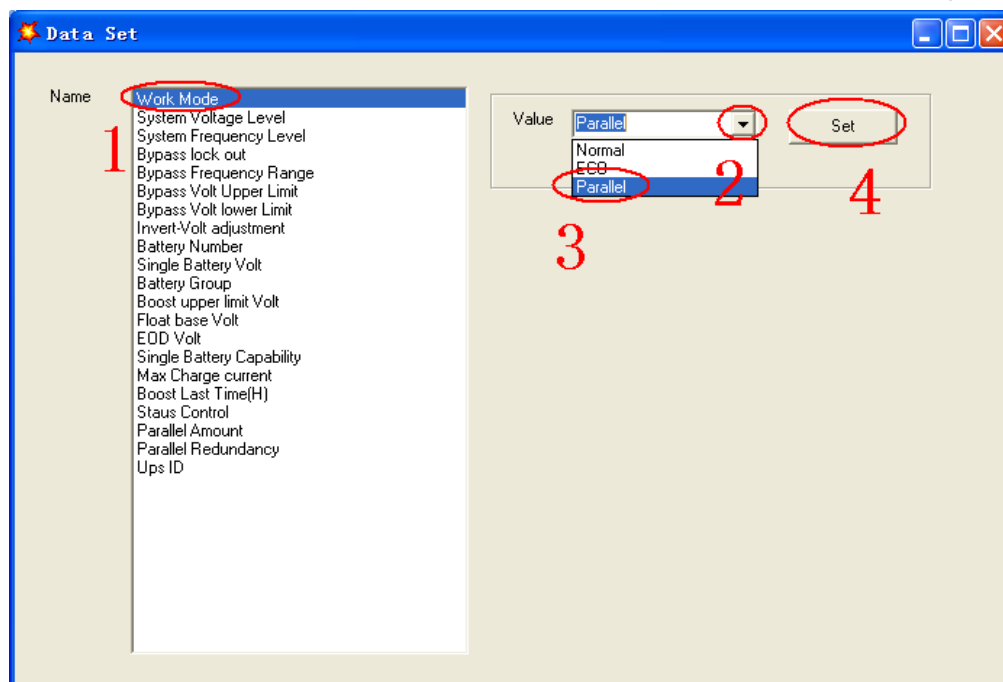
- ◆ Connect the UPS with computer. Power on the UPS.
- ◆ Open Muser4000 software, after connecting with the UPS successfully, click “System”->“User Set”



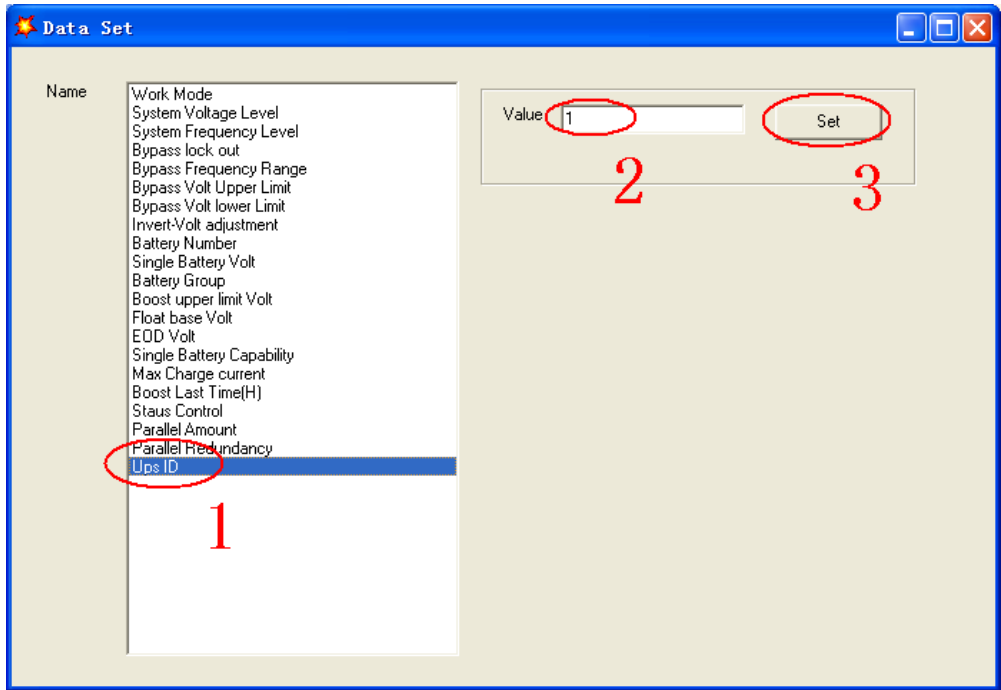
- ◆ Click “Set” at “User Set” window;



◆ At the window of “Data Set”, click “Work Mode”, choose “Parallel” for the value, then click “Set” as shown in below picture. If the UPS sounds a “beep”, that means the setting is correct.



◆ At the window of “Data Set”, click “Ups ID”, write a value for the parallel UPS ID at the right side, such as “1”, then click “Set” as shown in below picture. If the UPS sounds a “beep”, that means the setting is correct.



**CAUTION!**

After changing the parallel system ID, the connection between Muser4000 and equipment might be interrupted. If it occurs, please re-connect in accordance with the instruction described before.

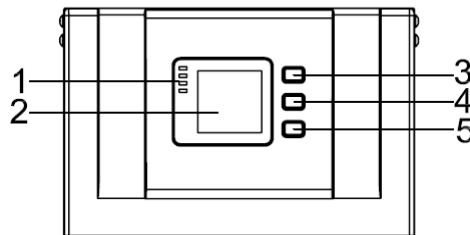


**CAUTION!**

Parallel cable cannot be connected when setting the parallel parameters.

- ◆ After setting the UPS needed to be paralleled, power off all the UPS. Connect all the UPS according to “parallel cable installation”, and then power on the UPS.

**4.3 The 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

**Introduction**



**CAUTION!**

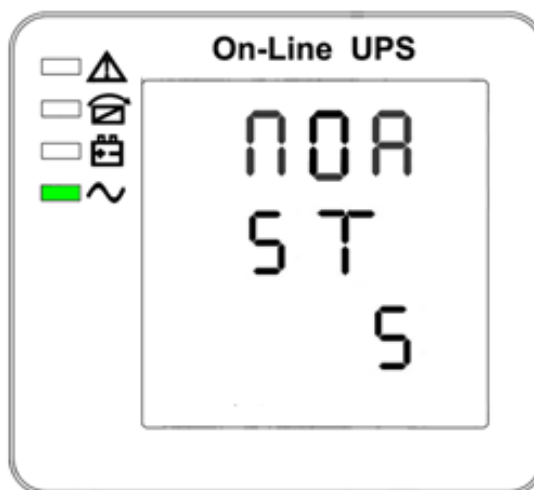
The display provides more functions than those described in this manual.

There are 17 interfaces available in the LCD display:

| Item | Interface Description | Content Displayed           |
|------|-----------------------|-----------------------------|
| 01   | CODE                  | Operational status and mode |

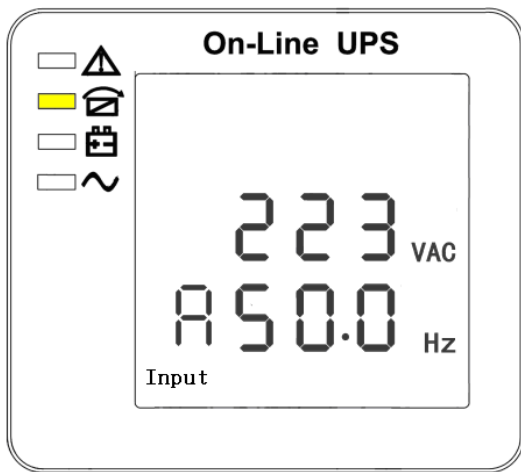
|    |                          |  |
|----|--------------------------|--|
| 02 | Input A(Input L1)        | Voltage & Frequency  |
| 03 | Input B(Input L2)        | Voltage & Frequency  |
| 04 | Input C(Input L3)        | Voltage & Frequency  |
| 05 | Bat. +                   | Voltage & Current  |
| 06 | Bat. -                   | Voltage & Current  |
| 07 | Backup time              | Capacity & Time  |
| 08 | Output A(Output L1)      | Voltage & Frequency  |
| 09 | Output B(Output L2)      | Voltage & Frequency  |
| 10 | Output C(Output L3)      | Voltage & Frequency  |
| 11 | Load A                   | Load   |
| 12 | Load B                   | Load   |
| 13 | Load C                   | Load   |
| 14 | Total Load               | Load   |
| 15 | Temperature              | battery temperature(need to connect batter sensor, Internal temperature and ambient temperature) |
| 16 | Software version & model | Version of rectifier software, version of inverter software, model                               |
| 17 | CODE                     | Alarm Code(Warming Message)  |

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

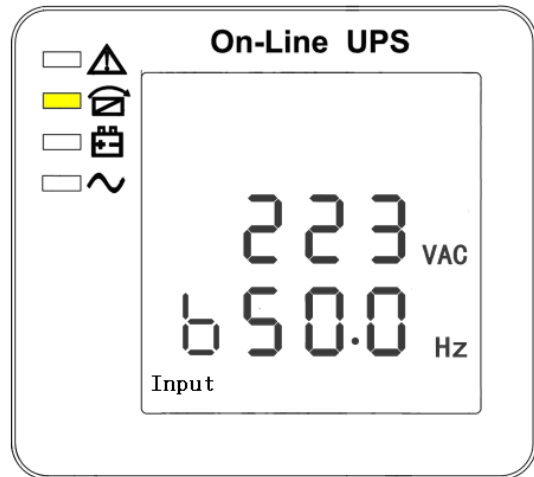


Operational Status and mode (When the UPS at single mode, it shows “NOR” or “ECO”, but If the UPS at parallel mode, it shows “PAL” instead.)

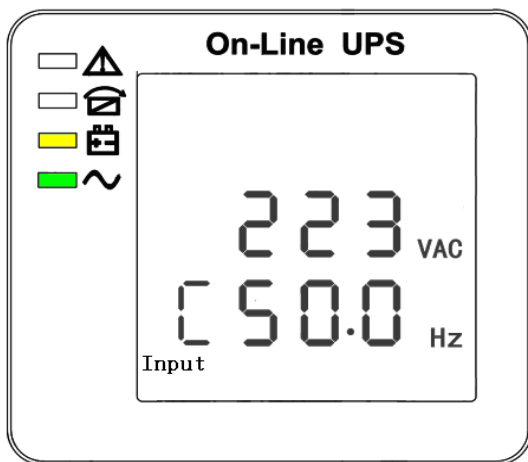
- 2) Press “scroll” button, the UPS goes to next page as shown below.



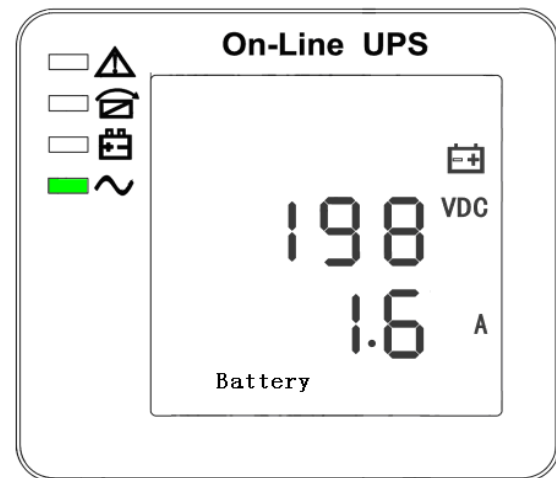
2. Phase A (L1) Input/Frequency



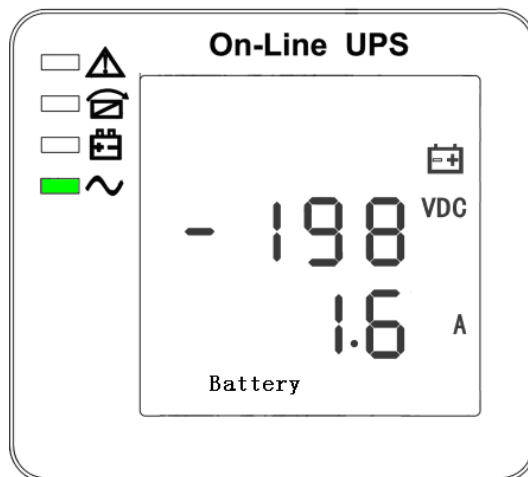
3. Phase B (L2) Input/Frequency



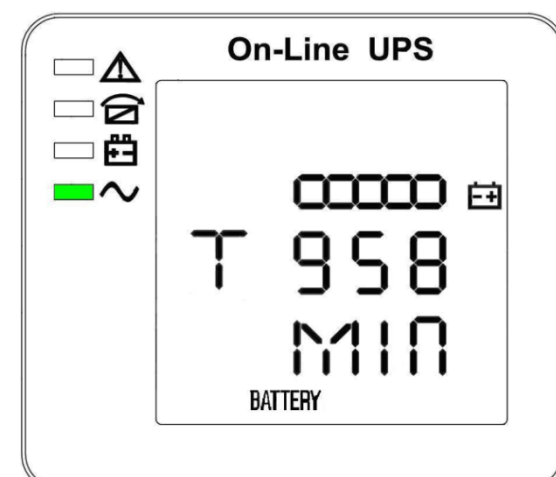
4. Phase C (L3) Input/Frequency



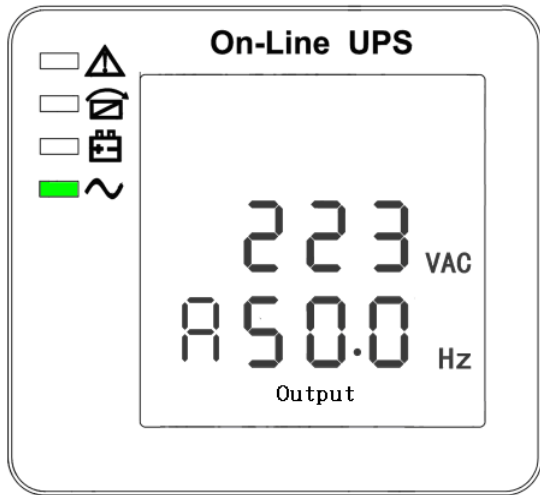
5. Bat + (Positive)



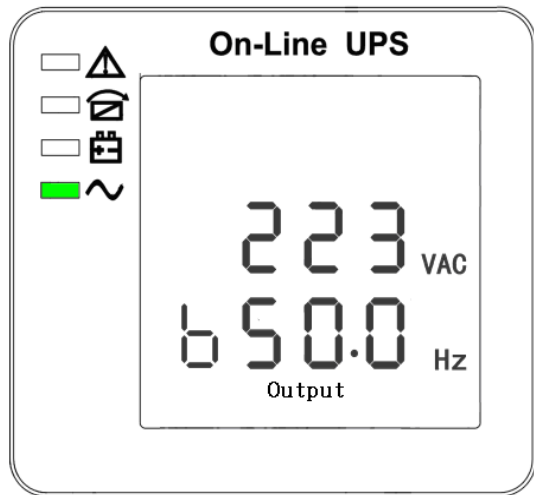
6. Bat - (Negative)



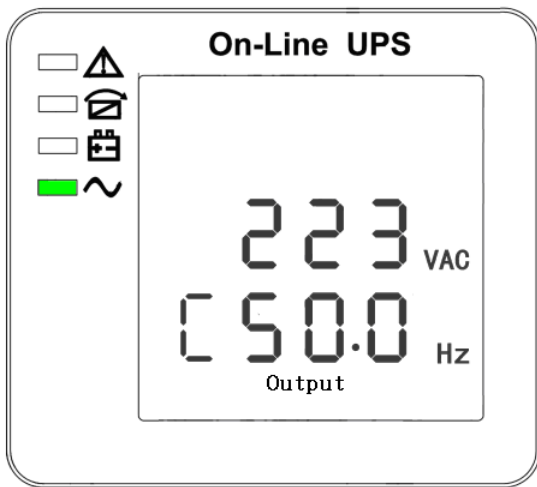
7. Backup time



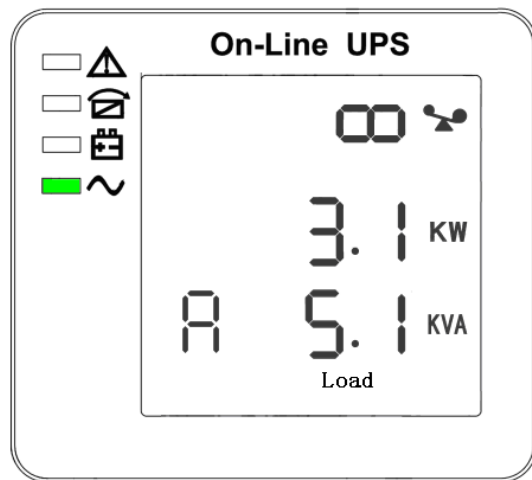
8. Phase A (L1) Output Voltage/Frequency



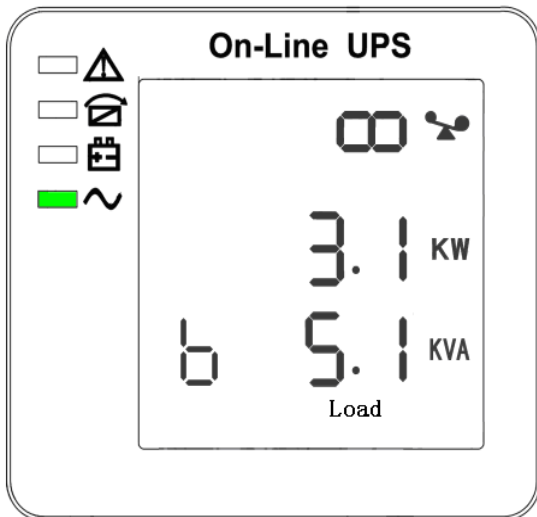
9. Phase B (L2) Output Voltage/Frequency



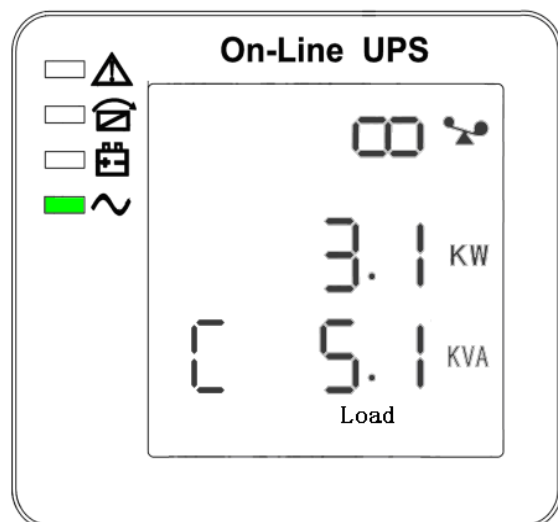
10. Phase C (L3) Output Voltage/Frequency



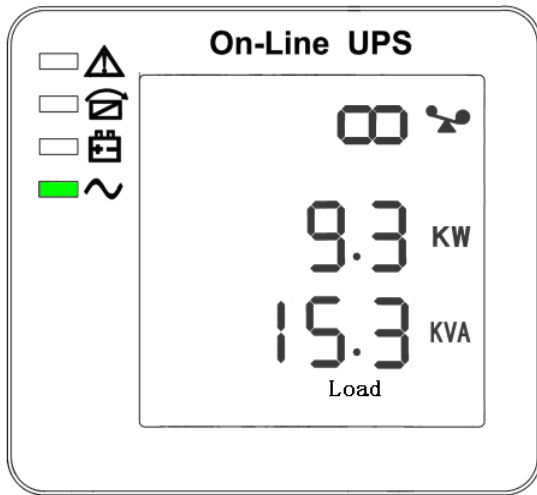
11. Phase A (L1) Load Capacity



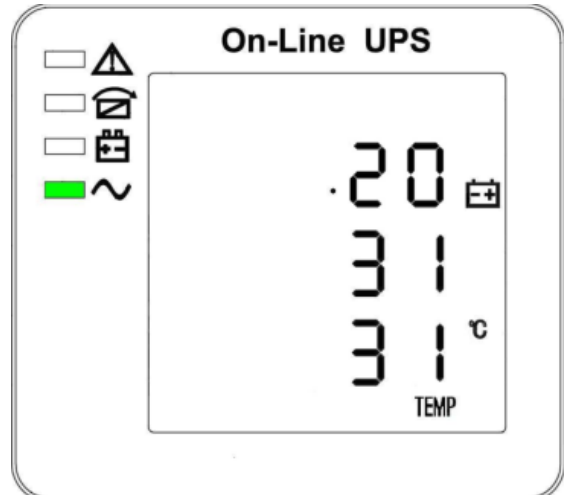
12. Phase B (L2) Load Capacity



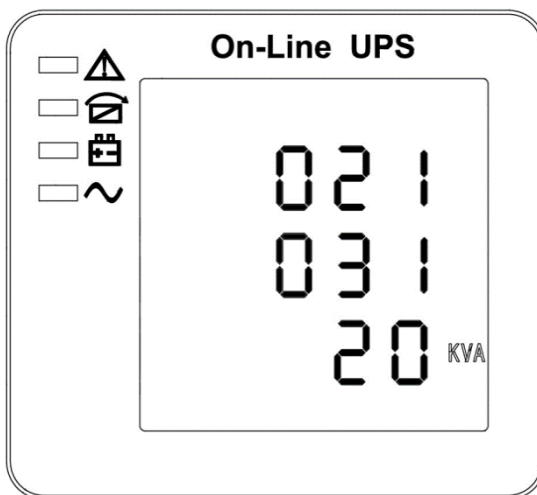
13. Phase C (L3) Load Capacity



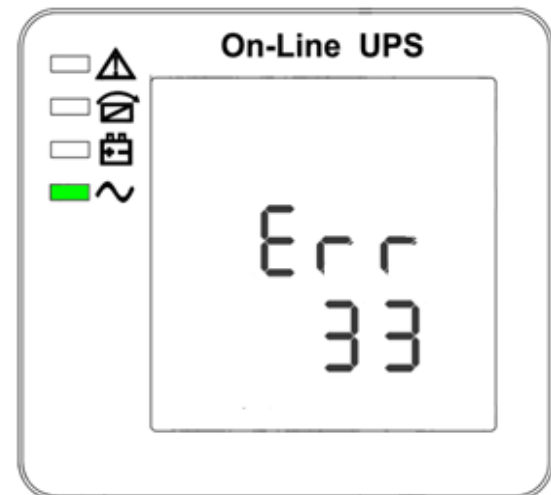
14. Total Load Capacity



15. Temperature (battery/Internal and ambient temperature)

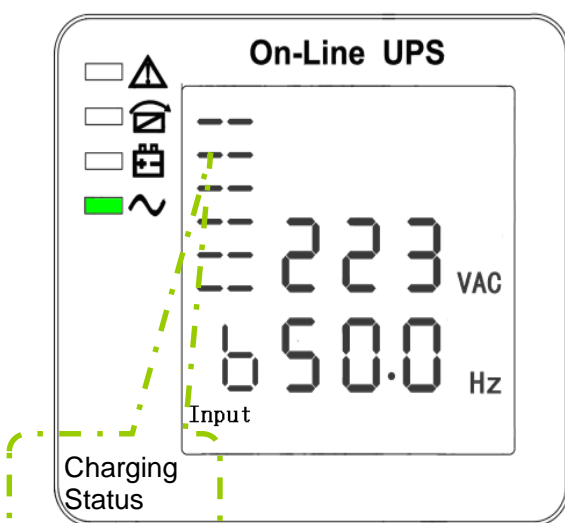


16. Software version & model

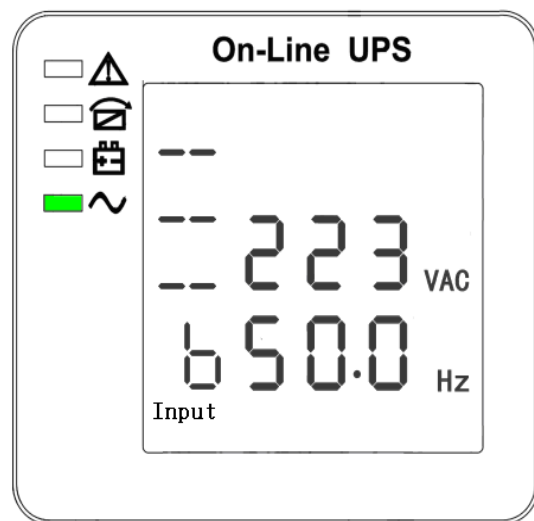


17. Alarm Code

If has battery charging, above 2-13 interface windows will also display the charging status at the same time as below:



Boost



Floating

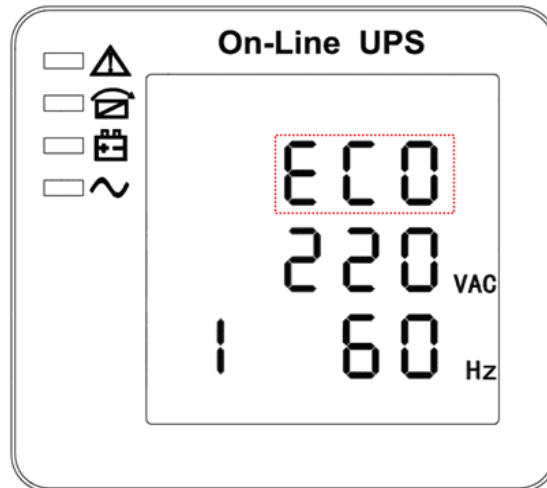
- 3) Pressing "scroll" button, you may circulate all messages from the first one to the last one then returns back to the first one and vice versa.
- 4) All alarm codes are present when abnormal behavior(s) occur(s).

## 4.4 Parameters setting

The setting function is controlled by 3 buttons (⏏, OFF, ON) : ⏏---goes into the setting page and value adjustment; OFF---for exit setting; ⏏---for choosing different pages.

After the UPS turn ON, press buttons “⏏” & “OFF” for 2 seconds and then goes into the setting interface page.

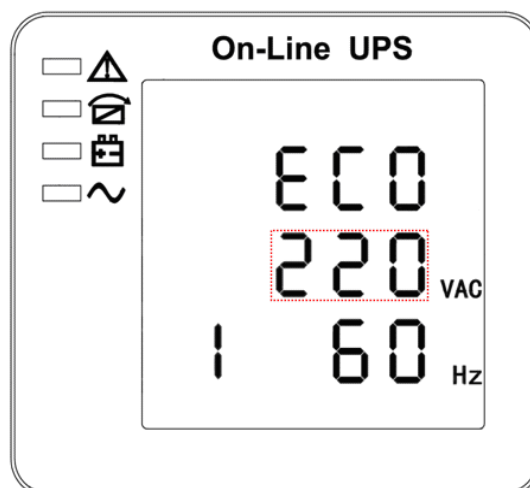
### 4.4.1 Mode setting



Mode setting (Note: Inside the broken-line is the flashing part.)

After entering the setting menu, its mode setting defaulted, and the mode setting line flashing as in above picture. ①Use button “⏏” to choose different mode. There are 3 different modes for setting: ECO, PAL, NOR. ②Press “ON” to exit the mode setting and save the mode setting value, and goes to output voltage setting. ③Press “OFF” to exit the mode setting, and goes to parallel redundancy quantity setting.

### 4.4.2 Output voltage setting



Output voltage setting (Note: Inside the broken-line is the flashing part.)

In the mode setting press “ON” or in frequency setting press “Off”, it goes to the output voltage setting. The output voltage line flashes as in above picture. ①Use button “⏏” to choose the different output voltage. There are 3 different voltages---220, 230, 240. ②Press “ON” to exit the output voltage setting and save the output voltage setting value, and goes to frequency setting. ③Press “OFF” to



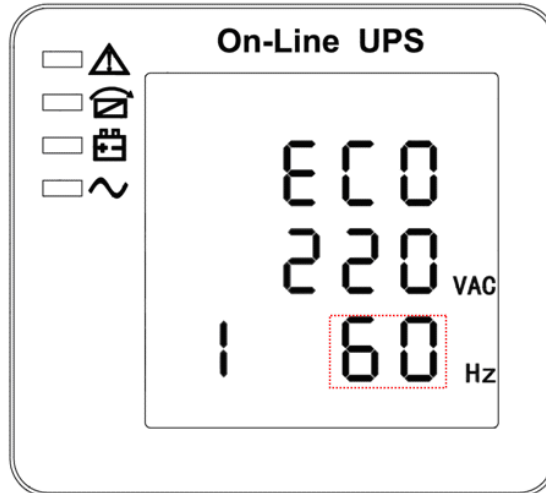
exit the output voltage setting, and goes to mode setting.



**CAUTION!**

**When powered by inverter, it is necessary to turn off the inverter before setting voltage and frequency level.**

**4.4.3 Frequency setting**



Frequency setting (Note: Inside the broken-line is the flashing part.)

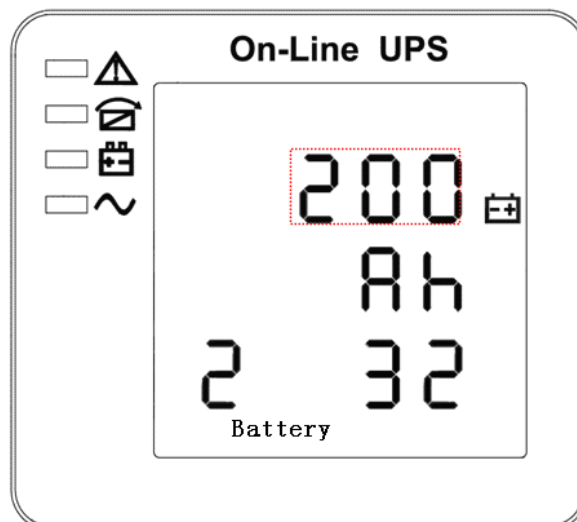
In the output voltage setting press “ON” or in battery capacity setting press “OFF”, it goes to the frequency setting. The frequency line flashes as in above picture. ①Use button “⏪” to choose the different frequency. There are 2 different frequency---50,60Hz. ②Press “ON” to exit the frequency setting and save the frequency setting value and goes to battery capacity setting. ③Press “OFF” to exit the frequency setting, and goes to output voltage setting.



**CAUTION!**

**When powered by inverter, it is necessary to turn off the inverter before setting voltage and frequency level.**

**4.4.4 Battery capacity setting**

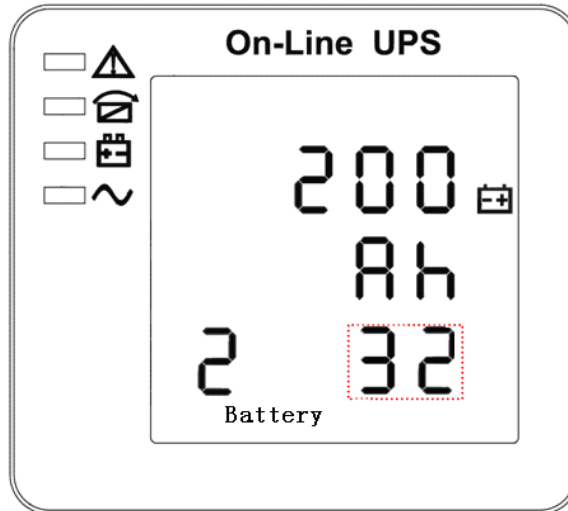


Battery capacity setting (Note: Inside the broken-line is the flashing part.)

In the frequency setting press “ON” or in battery quantity setting press “OFF”, it goes to the battery capacity setting. The battery capacity line flashes as in above picture. ①Use button “⏪” to

choose the different battery capacity. Battery capacity range is 1-999Ah. (Note: long-press of “⏏” can adjustment battery capacity quickly.) ②Press “ON” to exit the battery capacity setting and save the capacity setting value and goes to battery quantity setting. ③Press “OFF” to exit the battery capacity setting and goes to frequency setting.

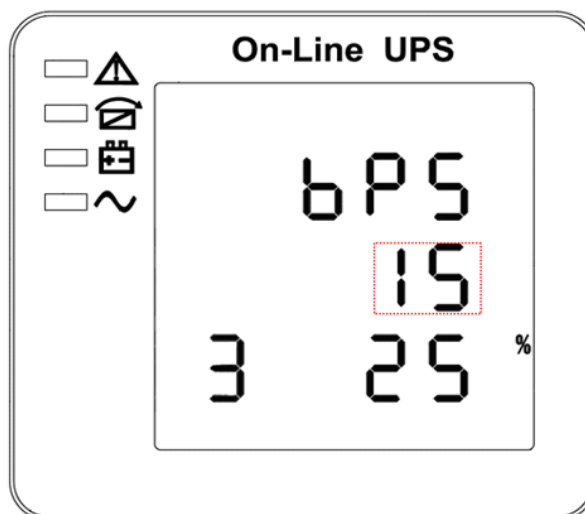
#### 4.4.5 Battery quantity setting



Battery quantity setting (Note: Inside the broken-line is the flashing part.)

In the battery capacity setting press “ON” or in bypass voltage upper limit setting press “OFF”, it goes to the battery quantity setting. The battery quantity line flashes as in above picture. ①Use button “⏏” to choose the different battery quantity. ②Press “ON” to exit the battery quantity setting and save the battery quantity setting value and goes to bypass voltage upper limit setting. ③Press “OFF” to exit the battery quantity setting and goes to battery capacity setting.

#### 4.4.6 Bypass voltage upper limit setting

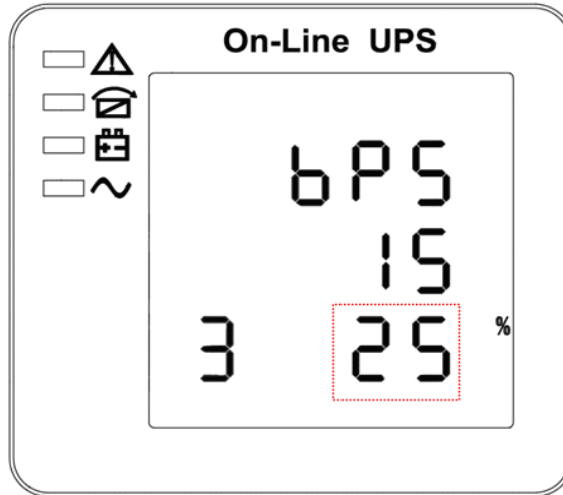


Bypass voltage upper limit setting (Note: Inside the broken-line is the flashing part.)

In the battery quantity setting press “ON” or in bypass voltage lower setting press “OFF”, it goes to the bypass upper limit setting. The bypass upper limit line flashes as in above picture. ①Use button

“**U**” to set the different bypass voltage upper limit. The bypass voltage upper limit range is 10%, 15%, 20%, 25 % ( 25% only for 220V output). ②Press “**ON**” to exit the bypass voltage upper limit setting and save the bypass voltage upper limit setting value and goes to bypass voltage lower limit setting. ③Press “**OFF**” to exit the bypass voltage upper limit setting and goes to battery quantity setting.

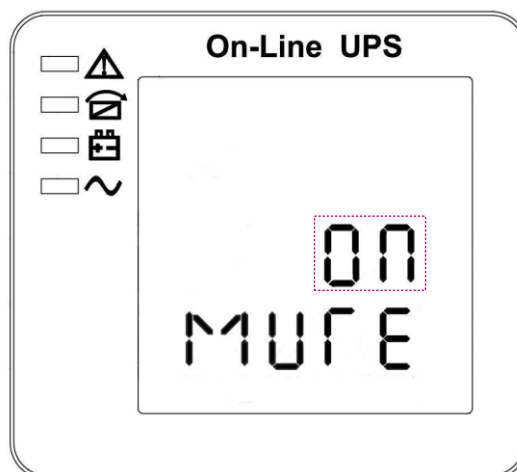
#### 4.4.7 Bypass voltage lower limit setting



Bypass voltage lower limit setting (Note: Inside the broken-line is the flashing part.)

In the bypass voltage upper limit setting press “**ON**” or in parallel ID setting press “**OFF**”, it goes to the bypass lower limit setting. The bypass lower limit line flashes as in above picture. (“-” for negative, positive does not have any symbol.) ①Use button “**U**” to set the different bypass voltage lower limit. The bypass voltage lower limit range is 10%, 20%, 30%, 45%. ②Press “**ON**” to exit the bypass voltage lower limit setting and save the bypass voltage lower limit setting value and goes to buzzer mute setting. ③Press “**OFF**” to exit the bypass voltage lower limit setting and goes to bypass upper limit setting.

#### 4.4.8 Buzzer Mute Setting

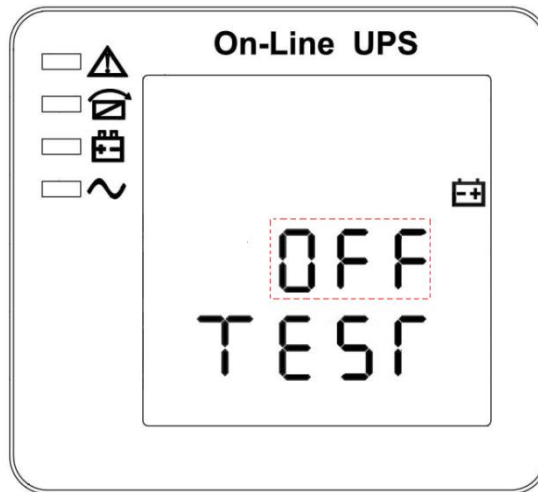


Buzzer Settings (note: red dashed box is the scintillation part)

In the bypass voltage low limit setting press “**ON**” or in battery self-test setting press “**OFF**”, it goes to buzzer setting. The scintillation of setting state shows as the figure (Note: ON shows MUTE, OFF shows NO MUTE).①Press button “**U**” for Mute Cycle Settings, mute choice has On and Off. ②Press button “**ON**” exits mute setting and save mute setting state and change to battery self-test

settings. ③ Press button “OFF” exits mute setting and change to bypass voltage lower limit setting.

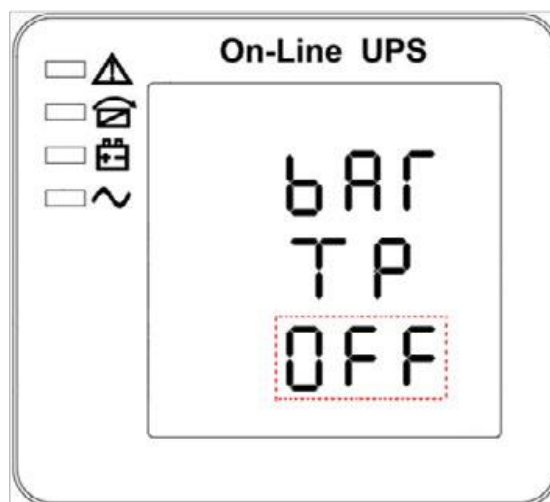
#### 4.4.9 Periodical battery self-test Setting



Periodical battery self-test setting (note: the part in dashed box flashes)

In the buzzer setting press “ON” or in parallel ID setting press “OFF”, it goes to the battery self-test setting. In the meantime the setting state flashes as above picture shows (Note: ON 1- the battery self-test function is enabled, UPS will do self-test 10 seconds every 30 days; ON 2- the battery self-test function is enabled, UPS will do self-test 10 minutes every 30 days; ON 3- the battery self-test function is enabled, UPS will do self-test till battery voltage reaches EOD point every 30 days; OFF- battery self-test function is disabled.). ① Press “ $\cup$ ” to set periodically self-test setting. The options are OFF, ON 1, ON 2 and ON 3. ② Press “ON” to exit Periodically Self-test setting and save the setting value, and goes to battery temperature compensation sensor switch setting. ③ Press “OFF” to exit Periodically Self-test setting and goes to buzzer setting.

#### 4.4.10 Battery temperature compensation sensor switch setting

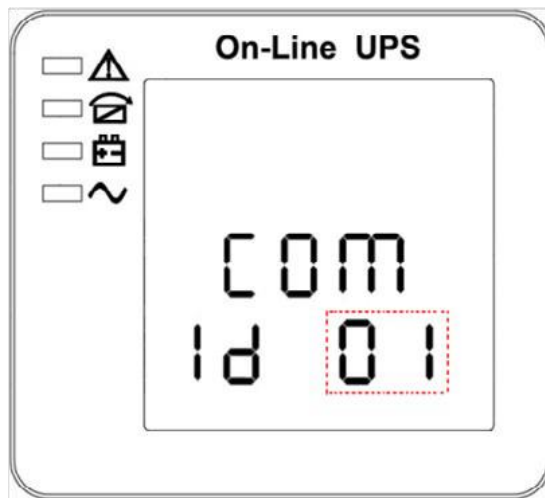


Battery temperature compensation sensor switch setting  
(Note: the information in the red box will be flashing)

Press “ON” under the periodical battery self-test setting or press “OFF” under device address setting, goes to the battery temperature compensation switch setting. The setting state flashes as above picture shows (Note: OFF means turn off the sensor switch, ON means turn on the sensor switch, send query command to sensor with address 11,12 every second. ① Press “ $\cup$ ” is to set the battery

sensor, with options OFF & ON. ②Press “ON” to exit the battery sensor setting and save the battery sensor setting value and transfer to device address setting. ③Press “OFF” to exit the battery sensor setting and transfer to battery periodical battery self-test setting.

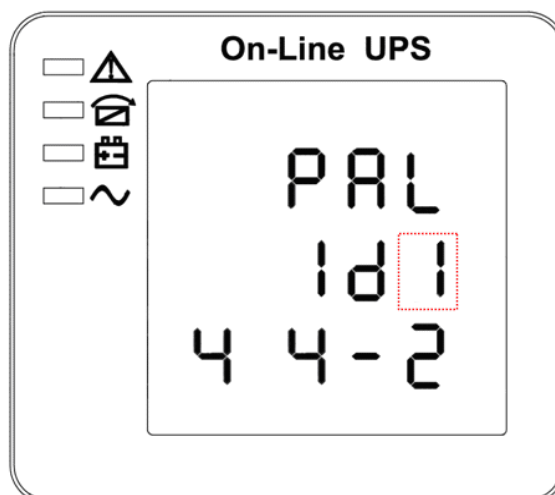
#### 4.4.11 Device address setting



Device address setting (Note: the information in the red box will be flashing)

Press “ON” under the battery temperature compensation sensor switch setting or press “OFF” under parallel ID setting, goes to the device address setting. The setting state flashes as above picture shows (Note: device address is 1~15, it is the MODBUS device address at RS232 & RS485 communication ports. ① Press “↶” to set the address, with options 1~15. When battery temperature sensor is open, can choose 1~10 & 13~15; If it’s parallel mode and device address <= parallel quantity, device address= parallel ID. ② Press “ON” to exit the device address setting and save the device address setting value and parallel ID setting. (Note: Under single UPS mode, until this device address setting save and exit, single UPS setting is done.) ③ Press “OFF” to exit the device address setting and transfer to battery temperature compensation sensor setting.

#### 4.4.12 Parallel ID setting



Parallel ID setting (Note: Inside the broken-line is the flashing part.)

When in device address setting press “ON” or when under parallel quantity setting press “OFF”, it goes to the parallel ID setting. The parallel ID flashes as in above picture. ① Use button “↶” to set the different parallel ID. The parallel ID range is 1~4. ② press “ON” to exit the parallel ID setting and save the parallel ID setting value and goes to parallel quantity setting. ③ press “OFF” to exit the

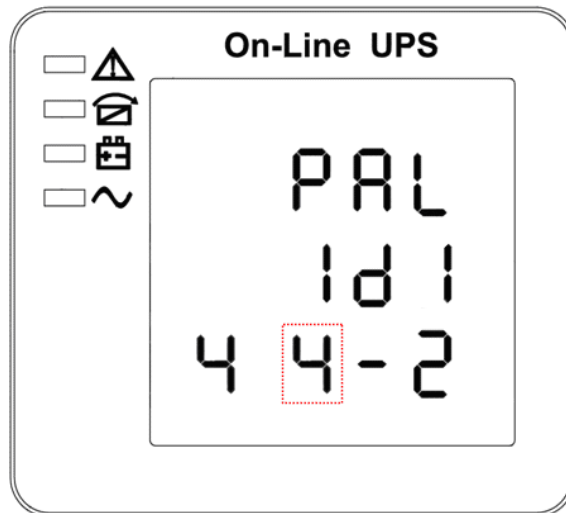
parallel ID setting and goes to device address setting.



### CAUTION!

**Parallel cable cannot be connected when setting the parallel parameters.**

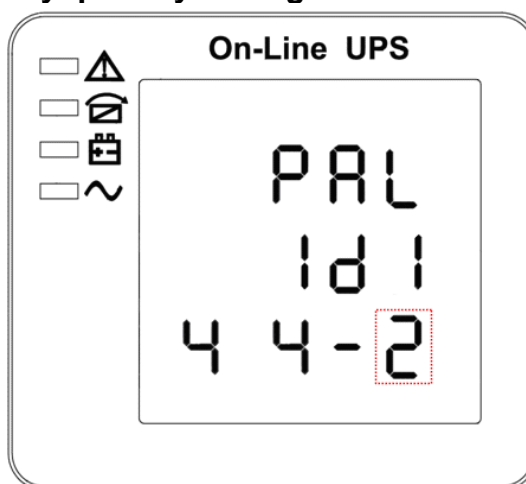
#### 4.4.13 Parallel quantity setting



Parallel quantity setting (Note: Inside the broken-line is the flashing part.)

When under the parallel ID setting press “ON” or when under parallel redundancy quantity setting press “OFF”, it goes to the parallel quantity setting. The parallel quantity flashes as in above picture. ①Use button “ $\cup$ ” to set the parallel quantity. The parallel quantity range is 2~4. ②Press “ON” to exit the parallel quantity setting and save the parallel quantity setting value and goes to parallel redundancy quantity setting. ③Press “OFF” to exit the parallel quantity setting and goes to parallel ID setting.

#### 4.4.14 Parallel redundancy quantity setting



Parallel redundancy quantity setting (Note: Inside the broken-line is the flashing part.)

When under the parallel quantity setting press “ON”, it goes to the parallel redundancy quantity setting. The parallel redundancy quantity flashes as in above picture. ①Use button “ $\cup$ ” to set the parallel redundancy quantity. The parallel redundancy quantity range is 0~3. ②press “ON” to exit the mode setting and save the mode setting value and then UPS LCD panel setting is accomplished. ③

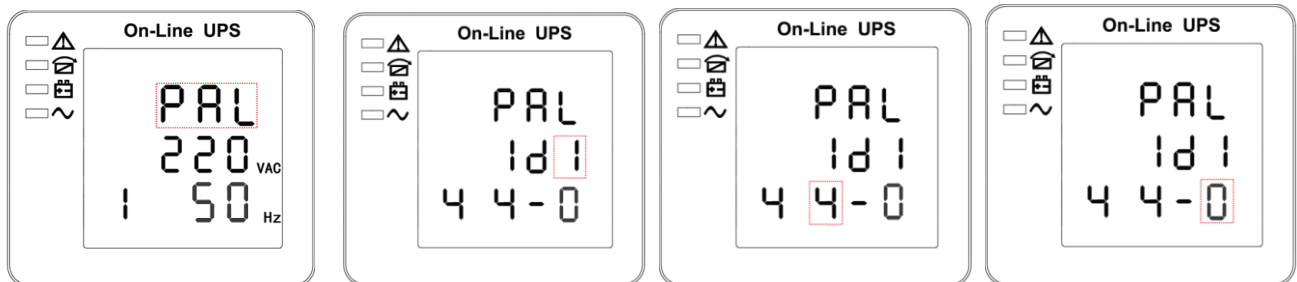
Press "OFF" to go to parallel quantity setting.

## 4.5 Parallel system commissioning

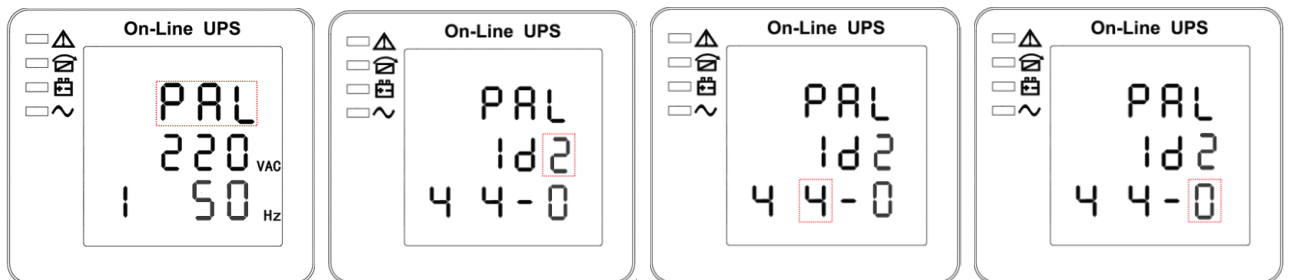
Parallel system should be commissioning when the stand-alone are all intact.

Take 4 units in parallel for example.

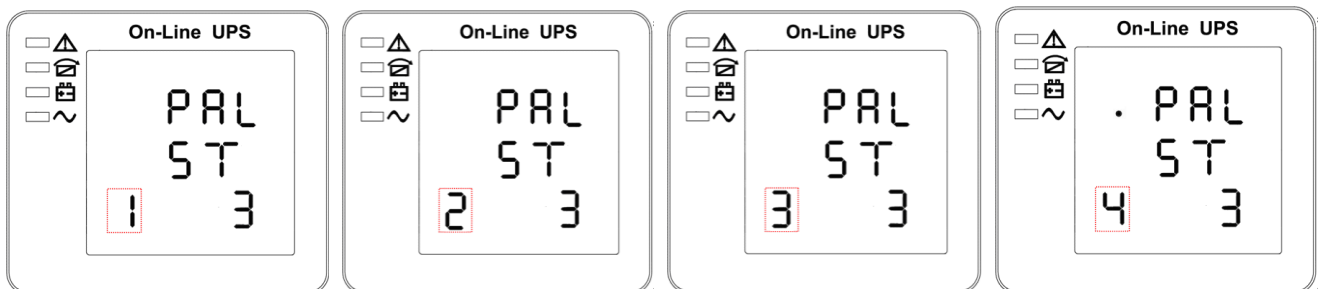
- 1) Confirm the input/output wires connection and input phase sequence are correct; switch off the battery breaker, and measure the +/- bat voltage of all battery group are normal.
- 2) Connect the parallel cable, it should be formed loop connection.
- 3) Switch on the input breaker of unit 1, and access LCD setting interface to setting the working mode、ID、parallel number、redundant number. The setting interface is showed as below, require setting the in series number、capacity of battery. The output voltage level and Bypass protection range are default setting.



- 4) Turn off the input breaker of Unit 1, and make sure the UPS is off. Turn on the input breaker of Unit 2, access the LCD setting interface, setting the parallel working mode, ID (NO.2), parallel 4 units, redundant number. The other setting are the same as UPS 1 operation.



- 5) For Unit 3 and Unit 4 UPS, the operation setting are all the same as Unit 1 and 2.
- 6) Turn on Bypass/input/output breaker of all the paralleled UPS, then confirm all the setting are correct. Each UPS has their owed different ID.
- 7) There are only one master in parallel system. The one has a dot behind parallel mode is the master. You can turn on all the UPS after confirm all the setting are correct.



- 8) Turn on all the battery breaker and confirm the parameter (V/I) are normal.
- 9) Connected the Load, and check whether the output current are balance.

Switch on and off the utility breaker to test all the UPS converters system from Utility to battery and restored function are working find

## 4.6 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.

## Display messages

### Operational Status and Mode(s)

| Code (ST) | Information stand for    | LED        |            |            |            |
|-----------|--------------------------|------------|------------|------------|------------|
|           |                          | Fault      | Bypass     | Battery    | Inverter   |
| 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          |

**CAUTION:** "X" means it is determined by other conditions

### Alarm Information

| Fault code (Err) | 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               | Initialization 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               | Input neutral loss                                   | 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 | Reserve                      |                    |                         |
| 45 | inverter not on              |                    |                         |

## 4.7 Options

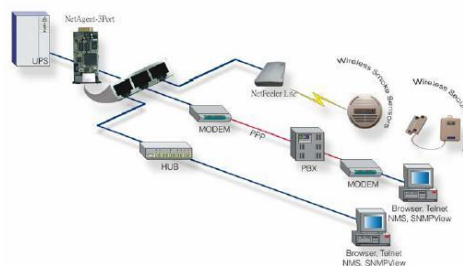
**SNMP card:** internal SNMP / external SNMP optional

- ◆ 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.



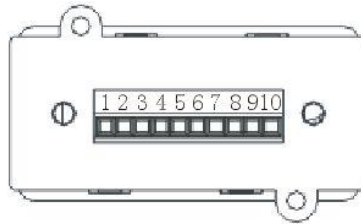
Typical topology of the UPS Network Management

**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)



| Pin | Function Description | Input or Output |
|-----|----------------------|-----------------|
| 1   | Utility Failure      | Output          |
| 2   | Battery Low          |                 |
| 3   |                      |                 |
| 4   | Bypass On            |                 |
| 5   | UPS Fault            |                 |
| 6   | Inverter On          |                 |
| 7   | Summary Alarm        |                 |
| 8   | common               |                 |
| 9   | Remote Shutdown +    | Input (5~12V)   |



### Appendix 1 Specifications

| Model                      |                        | 10KVA(S/H)                 | 15KVA(S/H)   | 20KVA(S/H)               | 30KVA(S/H)               | 40KVA(S/H)               |
|----------------------------|------------------------|----------------------------|--|--------------------------|--------------------------|--------------------------|
| <b>Capacity (VA/Watts)</b> |                        | 10kVA/9kW<br>10kVA/10kW    | 15kVA/13.5kW<br>15kVA/15kW   | 20kVA/18kW<br>20kVA/20kW | 30kVA/27kW<br>30kVA/30kW | 40kVA/36kW<br>40kVA/40kW |
| <b>INPUT</b>               |                        |                            |  |                          |                          |                          |
| <b>Input</b>               | <b>Rectifier input</b> | Rated AC Input Voltage     | 380/400/415Vac, (3Ph+N+PE)   |                          |                          |                          |
|                            |                        | Input Voltage Range        | 305~478Vac (Full load); 208~478Vac (50% Load)  |                          |                          |                          |
|                            |                        | Frequency                  | 40-70Hz  |                          |                          |                          |
|                            |                        | Power Factor               | 0.99   |                          |                          |                          |
|                            |                        | Harmonic distortion (THDi) | ≤3% (100% nonlinear load)  |                          |                          |                          |
|                            | <b>Bypass input</b>    | Rated AC Voltage           | 380/400/415Vac, (3Ph+N+PE)   |                          |                          |                          |
|                            |                        | Bypass voltage Range       | 220Vac Max.voltage: +25%(optional +10%,+15%,+20% )<br>230Vac Max.voltage: +20%(optional +10%,+15% )<br>240Vac Max.voltage: +15%(optional +10% )<br>Min. voltage: -45% (optional -20%,-30%) |                          |                          |                          |

|                        |                                     |  |   |  |                            |                          |
|------------------------|-------------------------------------|--|---|--|----------------------------|--------------------------|
|                        | Bypass frequency Range              | ±10%   |   |  |                            |                          |
|                        | Synchronization - Window            | ±1%/±2%/±4%/±5%/±10% optional (default:±10%)   |   |  |                            |                          |
|                        | Max current (A)                     | Breaker 20A  | Breaker 32A   | Breaker 40A  | Breaker 63A<br>Breaker 80A |                          |
|                        | Upstream protection, bypass line    | Thermomagnetic circuit-breaker, rated up to 125% of nominal output current. IEC 60947-2 curve C.   |   |  |                            |                          |
|                        | Current rating of neutral cable (A) | 1.7×In   |   |  |                            |                          |
|                        | Generator Input                     | Support  |   |  |                            |                          |
| <b>OUTPUT</b>          |                                     |  |   |  |                            |                          |
| <b>Inverter Output</b> | Power factor                        | 0.9/1.0  |   |  |                            |                          |
|                        | Rated AC Voltage 1                  | 380/400/415Vac, (3Ph+N+PE)   |   |  |                            |                          |
|                        | Voltage Regulation                  | ±1%  |   |  |                            |                          |
|                        | Transient Voltage Response          | ±5% (linear load)  |   |  |                            |                          |
|                        | Phase Balance                       | 120° ±1° (100% unbalanced load)  |   |  |                            |                          |
|                        | Frequency                           | 1.Line Mode: synchronize with input; when input frequency > ±10% (±1%/±2%/±4%/±5% optional), output (50/60±0.1%)Hz.<br>2.Battery Mode:(50/60±0.1%)Hz |   |  |                            |                          |
|                        | Crest factor                        | 3:1  |   |  |                            |                          |
|                        | Harmonic distortion (THD)           | < 2% (linear load), <5% (non linear load)  |   |  |                            |                          |
|                        | Overload Capacity                   | AC Mode  | Load≤110%: last 60min change to bypass, ≤125%: last 10min, change to bypass, ≤150%: last 1min change to bypass, >150% change to bypass immediately  |  |                            |                          |
| Bat. Mode              |                                     | Load≤110%: last 10min , ≤125%: last 1min , ≤150%: last 5S , > 150% shut down UPS immediately   |   |  |                            |                          |
| <b>Efficiency</b>      | Normal mode                         | Up to 93.5%  | Up to 94.5%   |  |                            |                          |
| <b>BATTERY</b>         |                                     |  |   |  |                            |                          |
| <b>Battery</b>         | Battery voltage                     | Standard unit  | ±120Vdc (20pcs 12V9AH) ; (2x20pcs 12V9AH;3x20 pcs 12V9AH optional)  | ±120Vdc (2x20pcs 12V9AH) ; (3x20pcs 12V9AH optional) | ±120Vdc (3x20pcs 12V9AH)   | ±180Vdc (2x30pcs 12V9AH) |
|                        |                                     | Long run unit  | 10-30kVA: ±96/108/120Vdc; battery quantity (16~20 pcs, 16 pcs define, Standard unit and 20 pcs no power derating; 18 pcs output power factor 0.8/0.9; 16 pcs output power factor 0.7/0.8;)<br>40kVA / 10-30kVA (Optional): ±180/192/204/216/228/240/252/264/276/288/300Vdc (30/32/34/36/38/40/42/44/46/48/50pcs optional) |  |                            |                          |
|                        | Float Voltage                       | 2.25V/cell (selectable from 2.20-2.29V/cell) Constant current and constant voltage charge mode   |   |  |                            |                          |
|                        | Boost Charge Voltage                | 2.30V/cell (selectable from 2.30-2.40V/cell) Constant current and constant voltage charge mode   |   |  |                            |                          |
|                        | End of Discharge                    | 1.75 V/cell (selectable from 1.60 or 1.90V/cell)   |   |  |                            |                          |

|                                |  |  |  |  |  |   |
|--------------------------------|--|--|--|--|--|---|
|                                | Charge Current(A)<br>(charge current can be set according to battery capacity installed) | Standard unit:<br>1.35A (2.7A ;<br>4.05A optional);<br>Long run unit:<br>Max. current<br>14A (limited by<br>input current)                       | Standard unit:<br>2.7A (4.05A<br>optional);<br>Long run unit:<br>Max. current<br>16A (limited by<br>input current) | Standard unit:<br>2.7A(4.05A<br>optional);<br>Long run unit:<br>Max. current<br>18A (limited<br>by input<br>current) | Standard unit:<br>4.05A;<br>Long run unit:<br>Max. current<br>20A (limited<br>by input<br>current) | Standard<br>unit: 2.7A;<br>Long run unit:<br>Max. current<br>20A (limited<br>by input<br>current) |
| <b>SYSTEM FEATURES</b>         |  |  |  |  |  |   |
| <b>Transfer Time</b>           | Synchronous transfer   | Utility to Battery : 0ms; Utility to bypass: 0ms   |  |  |  |   |
|                                | Asynchronous transfer  | Asynchronous transfer: 15ms (50 Hz), 13.3ms (60 Hz)  |  |  |  |   |
| <b>Alarms</b>                  |  | overload, utility abnormal, UPS fault, battery low, etc.   |  |  |  |   |
| <b>Protection</b>              |  | short circuit, overload, over temperature, battery low, fan fault alarm.   |  |  |  |   |
| <b>Communication Interface</b> |  | USB, RS232,RS485, Parallel port, Dry contact, Intelligent slot, SNMP card (optional), Relay card (optional),Battery temperature sensor(optional) |  |  |  |   |
| <b>ENVIRONMENTAL</b>           |  |  |  |  |  |   |
| <b>Environment</b>             | Operating Temperature  | 0°C~40°C   |  |  |  |   |
|                                | Storage Temperature  | -25°C~55°C (no battery)  |  |  |  |   |
|                                | Humidity   | 0~95% non condensing   |  |  |  |   |
|                                | Acoustical Noise (from 1M distance)  | <55dB  | <58dB  | <61dB  | <64dB  |   |
|                                | Altitude   | < 1500m.When>1500m,lower the rated power for use   |  |  |  |   |
| <b>PHYSICAL</b>                |  |  |  |  |  |   |
| <b>Dimension WxDxH (mm)</b>    |  | Standard unit: 250x900x868<br>Long run unit: 250x580x655   |  |  |  |   |
| <b>Net weight (Kg)</b>         |  | 129/35   | 186/39   | 187/40   | 236/43   | 239/46  |
| <b>STANDARDS</b>               |  |  |  |  |  |   |
| <b>Safety certifications</b>   |  | IEC/EN62040-1,IEC/EN60950-1  |  |  |  |   |
| <b>EMC</b>                     |  | IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4,IEC61000-4-5,IEC61000-4-6,IEC61000-4-8  |  |  |  |   |

## Appendix 2 Problems and Solution

In case the UPS cannot 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.
- ( 2 ) Try to describe the fault with more details, such as LCD display info, LED lights status, etc.

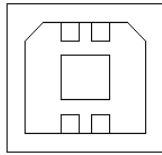
Read the user manual carefully, it can help a lot for using this UPS in the right way. Some FAQ (frequently asked questions) may help you to troubleshoot your problem easily.

| No. | Problem  | Possible reason   | Solution  |
|-----|--|---|---|
| 1   | Utility is connected but the UPS cannot be powered ON. | Input power supply is not connected;<br>Input voltage low;<br>The input switch of the UPS is not switched on. | Measure if the UPS input voltage/frequency is within the window.<br>Check if UPS input is switched on |
| 2   | Utility normal but Utility LED does not light on,      | The input breakers of the UPS are not   | Switch on the input breaker;<br>Make sure the input cable is well                                     |

|    |   |   |   |
|----|---|---|---|
|    | and the UPS operates at battery mode                                    | switched on; input cable is not well connected  | connected.  |
| 3  | The UPS does not indicate any failure, but output do not have voltage   | Output cable does not well connected; Output breaker do not switch on   | Make sure the output cable is well connected; Switch on the output breaker.   |
| 4  | 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.  |
| 5  | 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. |
| 6  | Buzzer beeps every 0.5 seconds and LCD display "output overload"        | Overload  | Remove some load  |
| 7  | Buzzer long beeps, LCD display "29"fault code                           | The UPS output is in short circuit  | Make sure the load is not in short circuit, and then restart the UPS.   |
| 8  | The UPS only works on bypass mode                                       | The UPS is set to ECO mode, or the transfer times to bypass mode are limited.   | Set the UPS working mode to UPS type(non-parallel) or to reset the times of transferring to bypass or re-start the UPS  |
| 9  | Cannot Black start  | Battery switch is not properly closed:<br>Battery fuse is not open:<br>Or Battery low:<br>Battery quantity set wrong;<br>Power breaker in the rear panel not switch ON. | Close the battery switch:<br>Change the fuse:<br>Recharge the battery:<br>Power ON the UPS with AC to set the battery quantity & quantity;<br>Switch on the power breaker.  |
| 10 | Buzzer beeps continuously and LCD indicates 1,3,5,9,15, etc fault codes | UPS is out of order   | Consult with your local agent for repair  |

### Appendix 3 USB communication port definition

Definition of port:



Connection between PC USB port and UPS USB port.

| PC USB port | UPS USB port | Description        |
|-------------|--------------|--------------------|
| Pin 1       | Pin 1        | PC : +5V           |
| Pin 2       | Pin 2        | PC : DPLUS signal  |
| Pin 3       | Pin 3        | PC : DMINUS signal |
| Pin 4       | Pin 4        | Signal ground      |

Available function of USB

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

Communication data format

Baud rate ----- 9600bps

Byte length ----- 8bit

End bit ----- 1bit

Parity check -----none

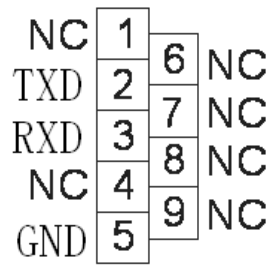


**CAUTION!**

**USB, RS232 and RS485 interface cannot be used at the same time, you can only use one of them at one time.**

**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 ----- 9600bps

Byte length ----- 8bit

End bit ----- 1bit

Parity check -----none

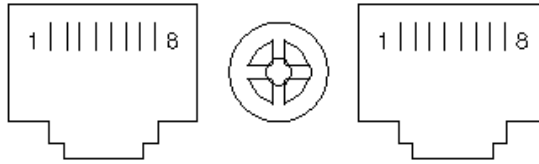


**CAUTION!**

**USB, RS232 and RS485 interface cannot be used at the same time, you can only use one of them at one time.**

**Appendix 5 RS485 communication port definition**

Definition of port:



Connection between the Device's RS485 port and UPS RS485 port.

| RJ45    | UPS(RJ45) | Description |
|---------|-----------|-------------|
| Pin 1/5 | Pin 1/5   | 485+ "A"    |
| Pin 2/4 | Pin 2/4   | 485 - "B"   |
| Pin7    | Pin7      | +12Vdc      |
| Pin8    | Pin8      | GND         |

Available function of RS485

- ◆ Monitor UPS power status.
- ◆ Monitor UPS alarm info.
- ◆ Monitor UPS running parameters.
- ◆ Timing off/on setting.
- ◆ Battery environment temperature monitoring.
- ◆ Charging voltage modulation depending on batteries temperature



### CAUTION!

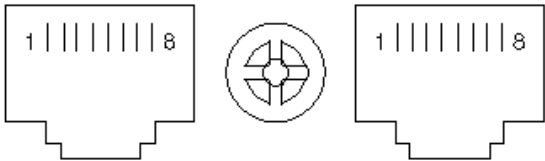
**USB, RS232 and RS485 interface cannot be used at the same time, you can only use one of them at one time.**

**RS485 port pin7 is 12Vdc!**

## Appendix 6 BAT\_T communication port definition



Definition of port:



Connection between the Temperature senator RJ45 port and UPS RJ45 port.

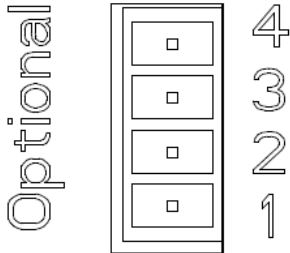
| RJ45    | UPS(RJ45) | Description |
|---------|-----------|-------------|
| Pin 1/5 | Pin 1/5   | 485+ "A"    |
| Pin 2/4 | Pin 2/4   | 485 - "B"   |
| Pin7    | Pin7      | +12Vdc      |
| Pin8    | Pin8      | GND         |

Available function of BAT\_T

- ◆ Battery environment temperature monitoring.
- ◆ Charging voltage modulation depending on batteries' temperature.

**Appendix 7 Optional port definition**

Definition of Male port:



Instruction:

Relay Dry Contact Port 5A/277Vac

| UPS  | Instruction |
|------|-------------|
| Pin1 | Normally NC |
| Pin2 | Normally NO |
| Pin3 | /           |
| Pin4 | Common      |

Function 1 description (default, internal J6 jumper):

- ◆ Drive the bypass breaker when backfeed alarm.

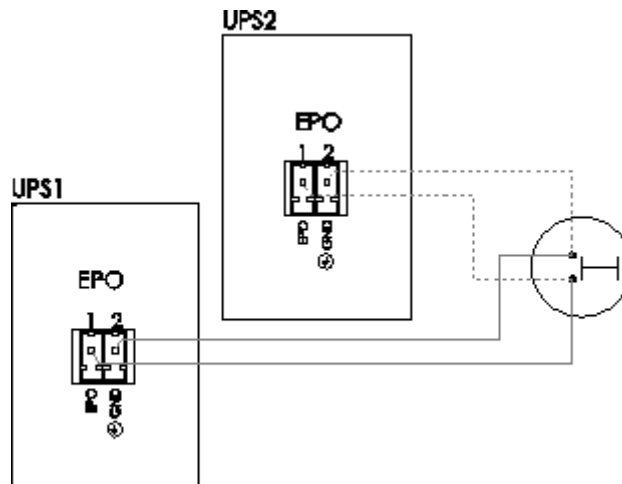
Function 2 description (Optional, internal J5 jumper):

- ◆ Drive the battery breaker when battery voltage low.

**Appendix 8 REPO instruction**

## Definition of port:

Connection diagram:



Connection between the button and UPS REPO port.

| Button | UPS REPO | Description |
|--------|----------|-------------|
| Pin 1  | Pin 1    | EPO         |
| Pin 2  | Pin 2    | GND         |

- ◆ A remote emergency stop switch can be installed in a remote location and connection through simple wires to the REPO connector.
- ◆ The remote switch can be connected to several UPS in a parallel architecture allowing the user to stop all units at once.