



# **User Manual**

**GTP Series (10-40kVA)**

Thank you for selecting this uninterruptible power supply (UPS). It provides you with protection for connected equipment. **Please read this manual** before installing the **GTP (10-40)kVA** model as it provides important information that should be followed during installation and maintenance of the UPS and batteries, allowing you to correctly set up your system for the maximum safety and performance. Included is information on customer support and service, if it is required. If you experience a problem with the UPS, please refer to the Troubleshooting section in this manual to correct the problem. If the problem is not corrected, please collect information so that the Technical Support personnel can more effectively assist you.

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## Important Safety Instructions: (Save These Instructions)

SAVE THESE INSTRUCTIONS - This manual contains important instructions for Model GTP (10-40) kVA that should be followed during installation and maintenance of the UPS and batteries.

**CAUTION! (UPS having Internal Batteries):** Risk of electrical shock – Hazardous live parts inside this unit are energized from the battery supply even when the input AC power is disconnected.

**CAUTION! (No User serviceable Parts):** Risk of electrical shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

**CAUTION! (Non-isolated Battery supply):** Risk of electric shock, battery circuit is not isolated from AC input, hazardous voltage may exist between battery terminals and ground. Test before touching.

**WARNING! (Fuses):** To reduce the risk of fire, replace only with the same type and size of fuse.

**WARNING!** Unit intended for installation in a controlled environment.

**CAUTION!** Do not dispose of batteries in a fire, the battery may explode.

**CAUTION!** Do not open or mutilate the battery, released electrolyte is harmful to the skin and eyes.

**CAUTION!** A battery can present a risk of electric shock and high short circuit current. The following precaution should be observed when working on batteries:

- Remove watches, rings or other metal objects.
- Use tools with insulated handles.

To reduce the risk of electric shock, disconnect the UPS from the main supply before installing a computer inter- face signal cable. Reconnect the power cord only after signaling interconnections have been made.

Servicing of batteries should be performed or supervised by personnel with knowledge of batteries and the required precautions. Keep unauthorized personnel away from batteries.

For Replacement of batteries located in an SERVICE ACCESS AREA -

- 1) Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- 2) Risk of explosion if battery is replaced by an incorrect type. When replacing batteries, replace with the same type and number of batteries or battery packs.
- 3) CAUTION: Do not dispose of batteries in a fire. The batteries may explode. Dispose of used batteries according to the instructions.
- 4) CAUTION – Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- 5) CAUTION – A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:
  - a. Remove watches, rings, or other metal objects.
  - b. Use tools with insulated handles.
  - c. Wear rubber gloves and boots.
  - d. Do not lay tools or metal parts on top of batteries.
  - e. Disconnect charging source prior to connecting or disconnecting battery terminals.
  - f. Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance.

These UPS units are extremely heavy. Caution should be taken in moving and positioning equipment. The instructions contained within this safety manual are deemed important and should be closely followed at all times during installation and follow-up maintenance of the UPS and batteries.



## CAUTION

The unit has a dangerous amount of voltage. If the UPS indicator is on, the unit's outlets may have a dangerous amount of voltage even when not plugged into the wall outlet because the battery may continue to supply power.

Care should be taken to undertake installation indoors, free from electrically-conductive particles which are under temperature and humidity control, in order to reduce the risk of electric shock.

It is best to disconnect the device using the power supply cord. Ensure that the equipment is placed in a position near the outlet where easily accessible.

Except for replacing the batteries, all servicing on this equipment must be carried out by qualified service personnel.

Before conducting any maintenance, repair, or shipment, first ensure that everything is turned off completely and disconnected.

For additional safety instructions, please use the Safety Manual as a reference.

## Special Symbols

The following symbols used on the UPS warn you of precautions:



RISK OF ELECTRIC SHOCK - Please observe the warning that a risk of electric shock is present



CAUTION: REFER TO OPERATOR'S MANUAL - Refer to the operator's manual for additional information, such as important operating and maintenance instructions.



SAFE GROUNDING TERMINAL - Indicates primary safe ground



Please do not discard of the UPS or the UPS batteries as the UPS may have valve-regulated lead-acid bat- teries. Please recycle batteries appropriately.

# 1. Main Features

## 1.1 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.

## 1.2 Functions and Features

### ◆ Integrated solution for data center

UPS can be integrated with battery cabinet, PDU external maintenance bypass, offering excellent choice for data center.

### ◆ 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.

### ◆ 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>d</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.

### 1.3 System Configuration

The UPS device and the external batteries make up the system. Depending on the site and load requirements of the installation, certain additional options are available for the solution.

Planning a UPS system, the following should be taken into consideration:

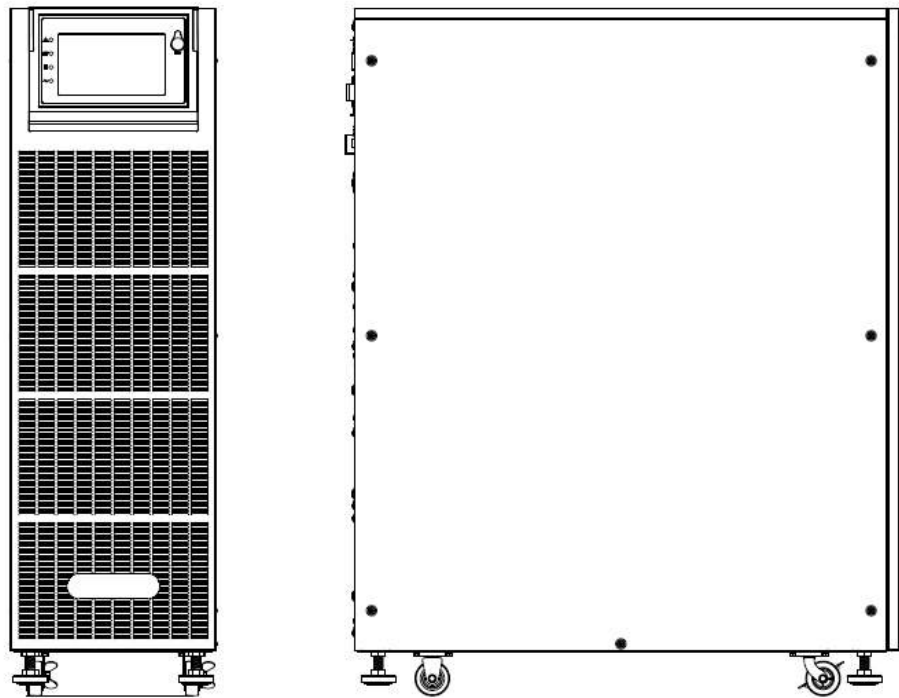
- The total demand of the protected system shall dictate the output power rating (VA). Allow a margin for future expansion or calculation inaccuracies from measured power requirements.
- Backup time required will indicate the battery size needed. If the load is less than the UPS nominal power rating, then actual backup time is longer.
- The following options are available:
  - o Connectivity Options –SNMP/WEB/Relay card
  - o Extended Battery Packs –Matching battery pack configuration and maximum quantity:
    - 10kVA Maximum battery packs of 20pcs +/- 120Vdc;
    - 20kVA Maximum battery packs of 20pcs +/- 120Vdc;
    - 30kVA Maximum battery packs of 20pcs +/- 120Vdc;
    - 40kVA Maximum battery pack of 32/34/36/38/40pcs +/- 192~240Vdc;

See the Specification section of this manual for additional model information.

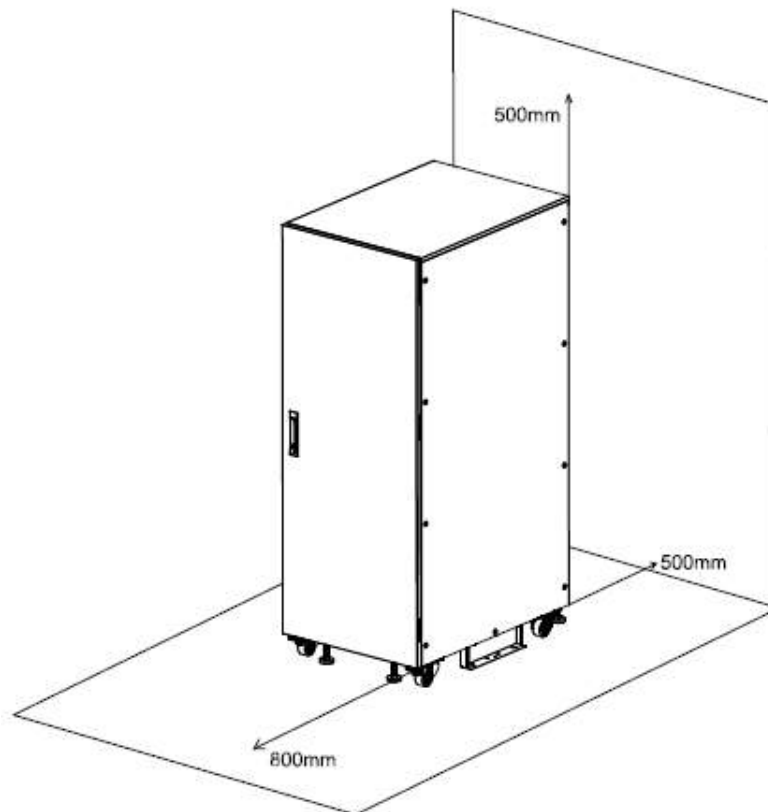


## 2. Installation

### 2.1 Installation



Leave some space around the cabinet for operation and ventilation



## 2.2 Unpacking and checking



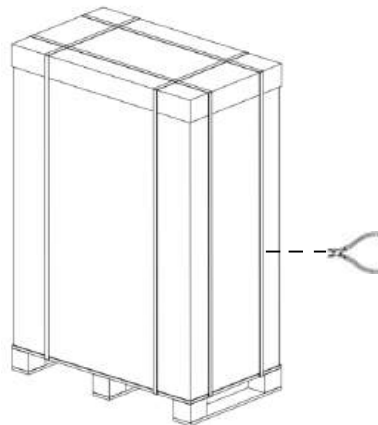
**Don't lean the UPS when moving it out from the packaging**

### Procedure

**Step 1** Use a pallet truck to transport the UPS to the installation position.

**Step 2** Check the UPS packing.

**Step 3** Hold the sliding plate steady. Cut and remove the binding tapes.

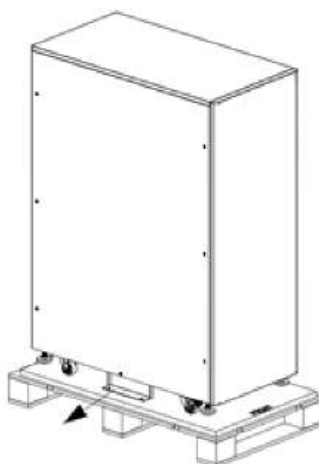


**Step 5** Remove the cabinet's inner packaging

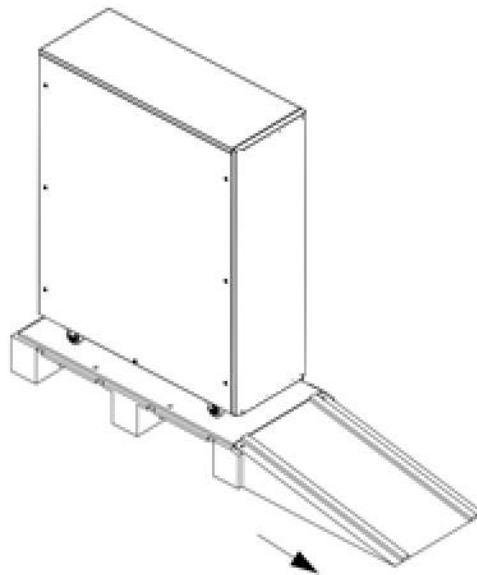
**Step 6** Check that the UPS is intact.

1. Visually inspect the UPS appearance for shipping damage. If it is damaged, notify the carrier immediately.
2. Check the accessories according to the packing list and contact the dealer in case of missing parts.

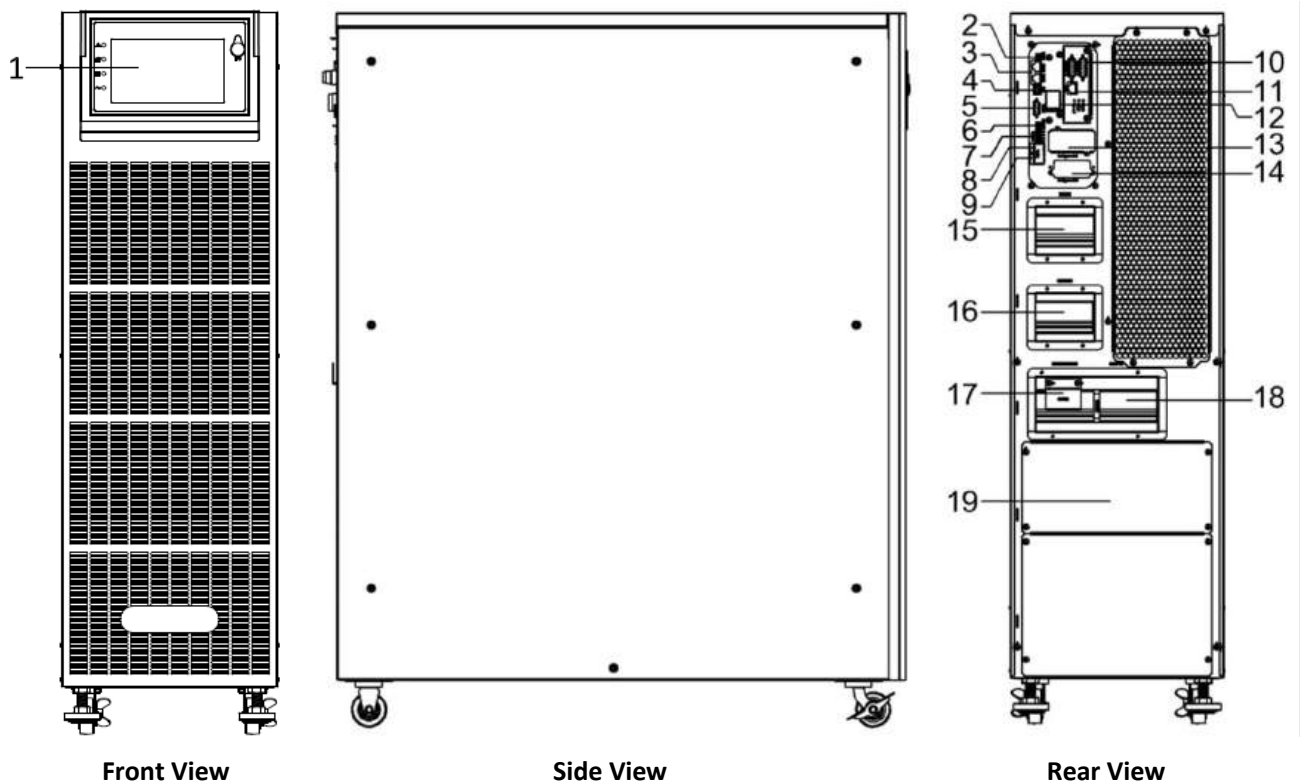
**Step 7** Unfasten the screws and remove the wooden bar or sheet metal affixed to the cabinet.

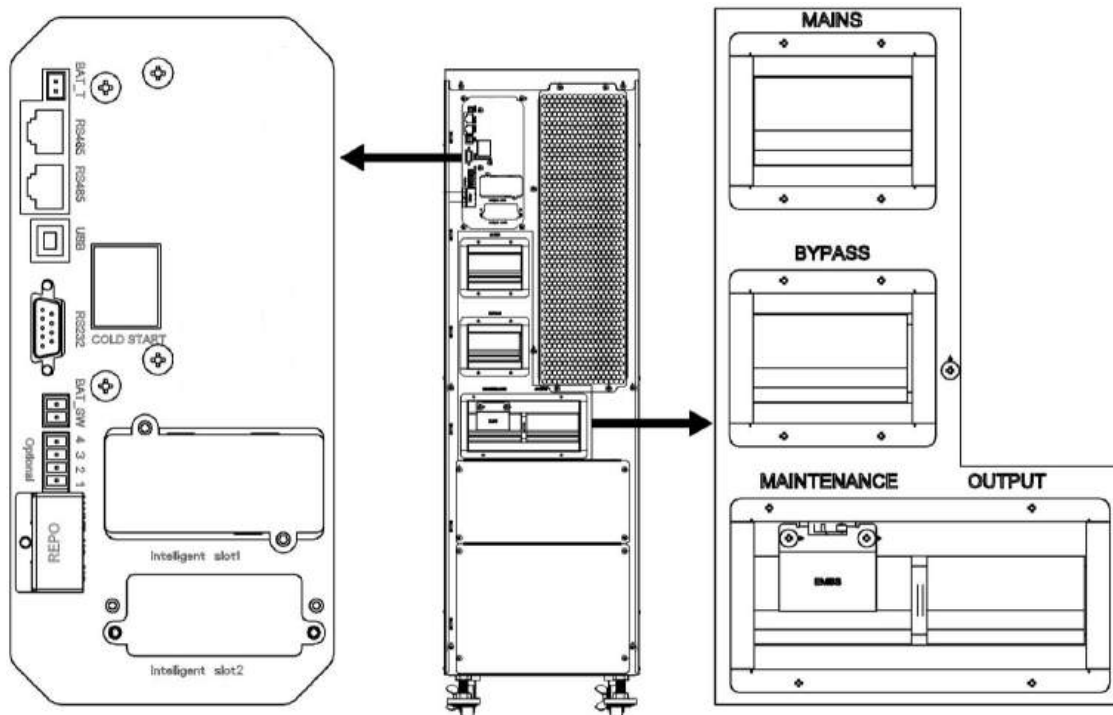


**Step 8** Slowly slide the unit from the pallet



## 2.3 Cabinet Outlook

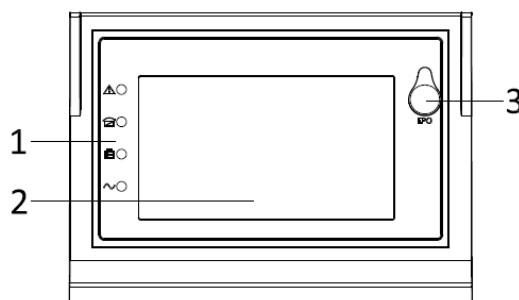




10kVA to 40kVA rear view

(1) LCD panel	(2) Battery temperature sensor(NTC)
(3) RS485 port (for RS485 temperature sensor)	(4) USB port
(5) RS232 port RS485 port (for RS485 temperature sensor)	(6) BAT_SW : detect battery switch status
(7) Optional port (Port for backfeed protection, or for battery breaker driver to prevent battery over-drain after UPS shuts down)	(8) MAINTAIN-AUXSWS port
(9) REPO port	(10) Parallel port
(11) LBS port	(12) Cold-start button
(13) Intelligent Slot 1 (SNMP card/ Relay card)	(14) Intelligent Slot 2 (SNMP card)
(15) Mains breaker	(16) Bypass breaker
(17) Maintenance breaker	(18) Output breaker
(19) Terminal block	

## 2.4 LCD control panel



LCD control panel introduction

(1) LED (from top to bottom: "Fault", "bypass", "battery", "inverter") (2) LCD display (3) EPO key

## 2.5 Installation notes

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

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

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

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

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



### WARNING!

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

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



### CAUTION!

**An unused battery must be recharged every 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.

## 2.6 External Protective Devices

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

### ◆ External Battery

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

### ◆ UPS Output

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

### ◆ Over-current

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



#### CAUTION!

**Select a thermo magnetic circuit-breaker with an IEC 60947-2 trip curve C (normal) for 125% of the current as listed below.**

## 2.7 Power Cables

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



#### WARNING!

**Upon starting. Please ensure that you are aware of the location and operation of the external isolators which are connected to the UPS input/bypass supply of the mains distribution panel. Check to see if these supplies are electrically isolated. And post and necessary warning signs to prevent any inadvertent operation.**

### 2.7.1 Recommended cross-sectional areas for power cables

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> )
	L	N	L	N	+/-	N	
10kVA	25	50	25	50	50	50	16
20kVA	35	50	35	50	70	70	25
30/40kVA	70	120	50	95	120	95	35

- ◆ When selecting, connecting, and routing power cables, follow local safety regulations and rules.
- ◆ If external conditions such as cable layout or ambient temperatures change, perform verification in accordance with the IEC-60364-5-52 or local regulations.
- ◆ If primary loads are non-linear loads, increase the cross-sectional areas of neutral wires 1.5–1.7 times.
- ◆ The maximum battery discharge current refers to the current when forty 12 V batteries in standard configuration, that is, two hundred and forty 2 V battery cells (1.67 V/cell), stop discharging.
- ◆ The battery cable specifications are selected based on 20 batteries by default and compatible with application scenarios with 16–20 batteries.

- ◆ When the mains input and bypass input share a power source, configure both types of input power cables as mains input power cables. The cables listed in Table are used only when the following requirements are met:
  - Routing mode: Routing the cables over the cable ladder or bracket in a single layer (IEC60364-5-52 middle E).
  - The ambient temperature is 30°C.
  - The AC voltage loss is less than 3%, and the DC voltage loss is less than 1%.
  - 90°C copper flexible cable.
  - The length of the AC power cables of a UPS is no longer than 30 m and DC power cables no longer than 50 m.

### 2.7.2 Power cable connector requirements

Model	Connector	Connection Mode	Bolt Type	Bolt Hole Diameter	Torque
10-30kVA	Mains input connector	Crimped OT terminals	M8	9mm	20N•m
	Bypass input connector	Crimped OT terminals	M8	9mm	20N•m
	Battery input connector	Crimped OT terminals	M10	11mm	26N•m
	Output connector	Crimped OT terminals	M8	9mm	20N•m
	Neutral connector	Crimped OT terminals	M8	9mm	20N•m
	Grounding connector	Crimped OT terminals	M8	9mm	20N•m
40kVA	Mains input connector	Crimped OT terminals	M10	11mm	26N•m
	Bypass input connector	Crimped OT terminals	M10	11mm	26N•m
	Battery input connector	Crimped OT terminals	M10	11mm	26N•m
	Output connector	Crimped OT terminals	M10	11mm	26N•m
	Neutral connector	Crimped OT terminals	M10	11mm	26N•m
	Grounding connector	Crimped OT terminals	M10	11mm	26N•m

### 2.7.3 Recommended input front-end and output back-end circuit breakers

UPS capacity	Component	Specifications
10-20kVA	Mains input circuit breaker	100A 3P
	Bypass input circuit breaker	100A 3P
	Output circuit breaker	100A 3P
	Battery circuit breaker	160A 3P
30-40kVA	Mains input circuit breaker	125A 3P
	Bypass input circuit breaker	125A 3P
	Output circuit breaker	125A 3P
	Battery circuit breaker	200A 3P



#### 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**



## 2.8 Power cable connect

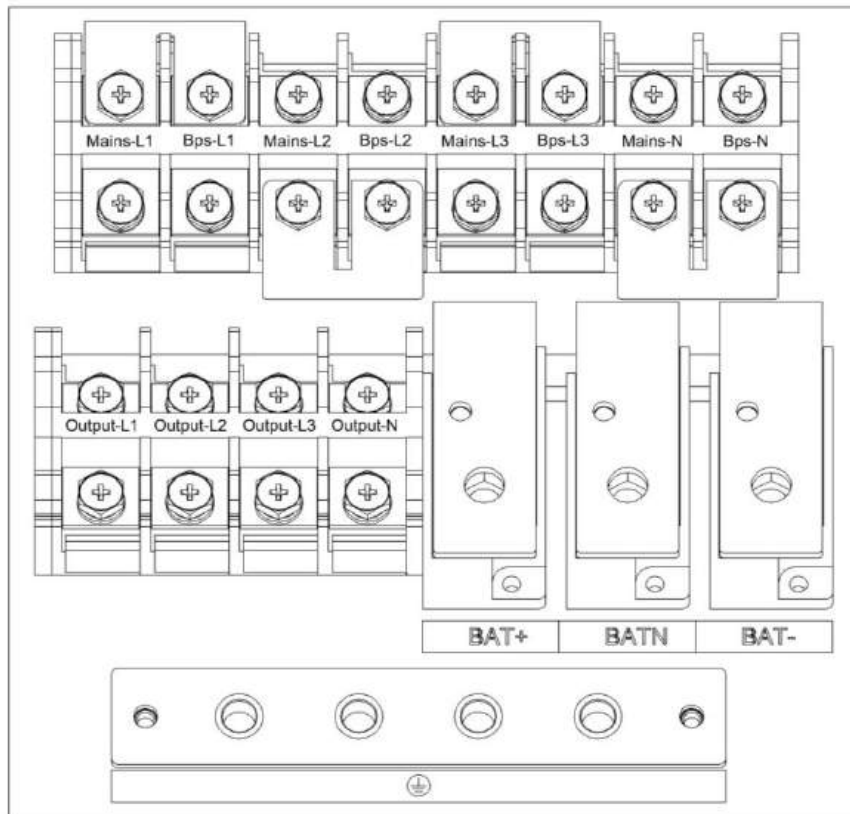
Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

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

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

### 2.8.1 Common input connection

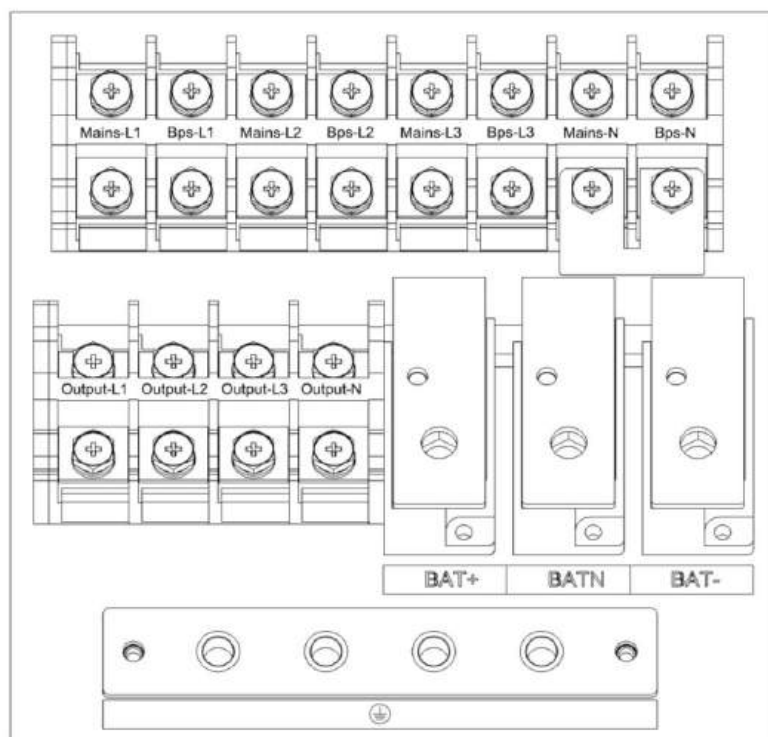
**10 - 40kVA**



INPUT Primary input Line	OUTPUT
	<b>Vout-L1:</b> Output Phase L1
<b>Vin-L1:</b> Primary input Phase L1	<b>Vout -L2:</b> Output Phase L2
<b>Vin-L2:</b> Primary input Phase L2	<b>Vout -L3:</b> Output Phase L3
<b>Vin-L3:</b> Primary input Phase L3	<b>Vout -N:</b> Output Neutral
<b>Vin-N:</b> Input Neutral for primary and secondary input	<b>PE:</b> Grounding
	<b>BAT+:</b> Positive terminal of the batteries string
	<b>BATN:</b> Neutral terminal of the batteries string
	<b>BAT-:</b> Negative terminal of the batteries string

## 2.8.2 Dual input connection

10 - 40kVA



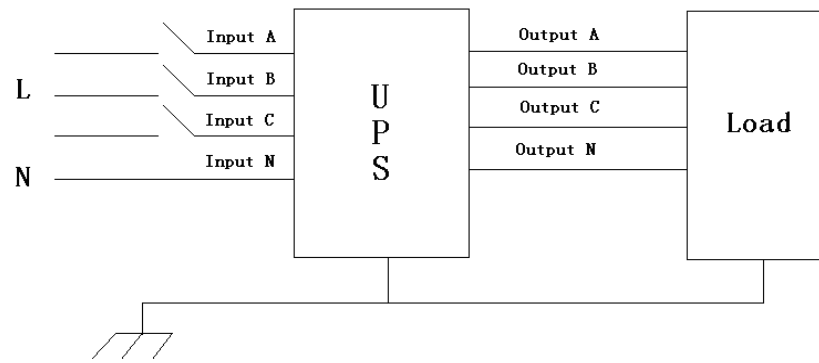
Mains Primary input Line	Output
Bypass Secondary/Bypass input line (optional)	<b>Vout-L1:</b> Output Phase L1
<b>Vin-L1:</b> Primary input Phase L1	<b>Vout-L2:</b> Output Phase L2
<b>Vin-L2:</b> Primary input Phase L2	<b>Vout-L3:</b> Output Phase L3
<b>Vin-L3:</b> Primary input Phase L3	<b>Vout-N:</b> Output Neutral
<b>Vin-N:</b> Input Neutral for primary and secondary input	<b>PE:</b> Grounding
<b>BPS-L1:</b> Secondary input Phase L1	<b>BAT+:</b> Positive terminal of the batteries string
<b>BPS-L2:</b> Secondary input Phase L2	<b>BATN:</b> Neutral terminal of the batteries string
<b>BPS-L3:</b> Secondary input Phase L3	<b>BAT-:</b> Negative terminal of the batteries string

### 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.



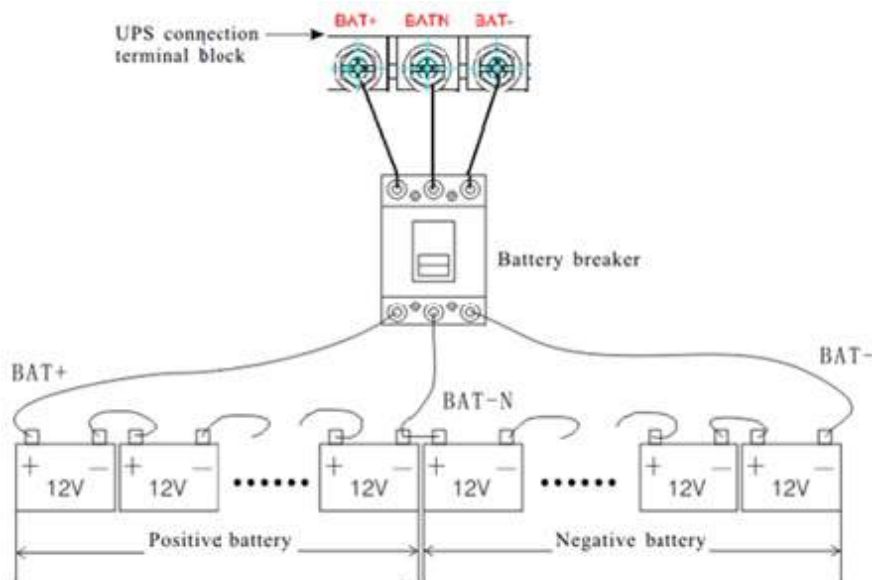
### CAUTION!

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

## 2.9 Battery configuration

### 2.9.1 External battery connection

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.

**2.9.2 Battery setting:** Homepage Setting>>Advanced Setting>>password “191210”>>BATT

**Setup Battery Group:** Must modify the number to actual configuration, The value can be 1~8, default value is 1.

**Battery number:** Default value is 20.

**Single Battery Capability:** Must modify the value to actual configuration, The value can be 7~2000.

**Boost/Float Conversion(month):** Set up boost charge and float charge conversion time. The value can be 0~24, default value is 0.

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Battery Group:	 1 		
Battery Number:	 20 		
Single Battery Capability(AH) :	2000		
Boost/Float Conversion (Month) :	0		
<div>Save Config</div>			

**Chg.Cur.Limiting Coef.:** The charging current limit is a multiple of the battery capacity. The value can be 0.05–0.15, and is 0.1 by default.

**Cell float volt:** The float voltage value can be 2.20-2.29 V/cell, and is 2.25V/cell by default.

**Cell boost volt:** The battery equalized voltage value can be 2.30–2.40 V/cell, and is 2.30 V/cell by default.

**Aver charging Duration:** boost charge time limit, the value can be 1–999min , and is 240 by default.
















Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Chg. Cur. Limiting Coef.(C) :	 0.15 		
Cell Float Volt (V/Cell) :	 2.25 		
Cell Boost Volt (V/Cell) :	 2.40 		
Aver Charging Duration (min) :	 999 		
<div>Save Config</div>			

**EOD Battery Volt(V/Cell):** End of discharge voltage. The value can be 1.60~1.90, and is 1.80 by default.

**Float Temp Compens Coeff(V/Cell/°C):** modify the voltage of compensation after enable the switch. the value can be 0.001~0.007/cell, and is 0.003 by default.

**Boost Charge Setting:** Boost charge disable or enable, and is enable by default.

**No Battery Warning:** can be no warning when no batter after set disable, and is enable by default.

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
EOD Battery Volt (V/Cell) :	 1.80 		
Float Temp Compens Coeff (V/Cell/°C) :	 0.003 		
Boost Charge Setting :	 Enable 		
No Battery Warning :	 Enable 		
			



#### 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.

## 2.10 UPS parallel Installation

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

### 2.10.1 Cabinet installation



#### WARNING!

Installation and wiring must be performed in accordance with the local codes/regulations and installed using the following instructions by a qualified electrical service technician only.

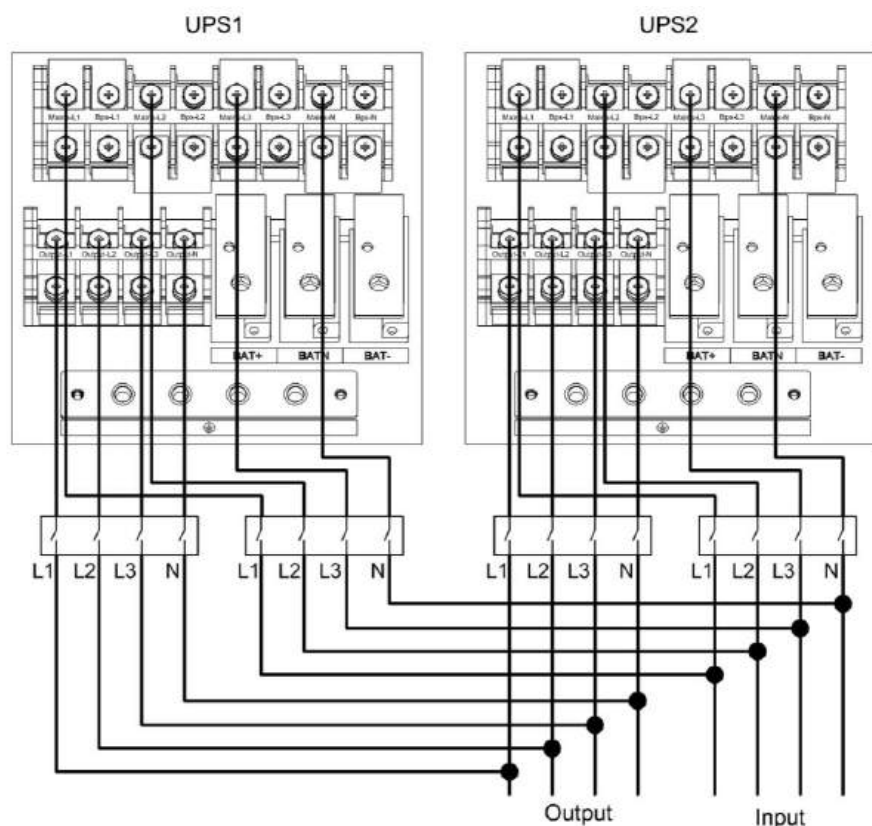
If the UPS is only used for single operation, you may skip this section and proceed to **section 3.10**.

- 1) Parallel configuration supports up to three UPS systems. Do not attempt to link more than three UPS systems via parallel configuration.
- 2) Install and wire the UPS system according to section 3.8 guidelines.
- 3) When installing the parallel system, the length of input wires (L1, L2, L3, N) in one UPS must be equal to the input wires of the other UPS. Likewise, the length of output wires (L1, L2, L3, N) must also be in equal length. If not, it will cause unbalance current on the output load.
- 4) Connect the input wiring of each UPS to an input breaker.
- 5) Connect all input breaker wiring to a main input breaker.
- 6) Connect the output wiring of each UPS to an output breaker.
- 7) Connect all output breakers to a main output breaker. This main output breaker will directly connect to the loads.
- 8) If an external battery pack is used, each UPS must be connected to an independent battery pack or a common battery pack.

**Note:** The parallel system cannot use a common external battery pack. Doing so will cause permanent damage to the entire system.

- 9) Refer to the following wiring diagram for parallel installation:

## 10 - 40kVA



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.

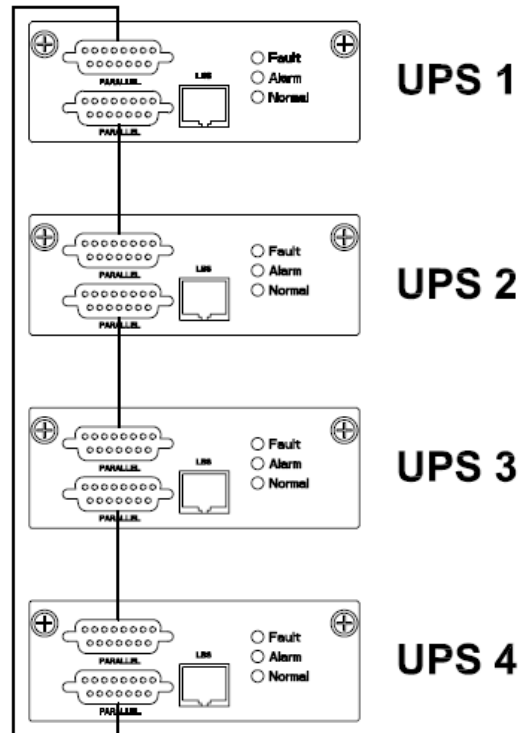


### WARNING!

Make sure the N, L1 (R), L2 (S), L3 (T) lines are correct, and grounding is well connected.

## 2.10.2 Parallel cable installation (Optional feature)

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.



## 2.10.3 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.

## 2.10.4 Parallel setting: Turn off inverter, then set on the LCD of UPS.

Homepage Setting>>Advanced Setting>>password "191210">>System Setup.

**Working Mode:** Select the work mode of UPS, work mode: Single mode, Parallel mode, ECO mode, Eco+Paral Machine Mode



Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Working Mode :	 Single Mode 		
Auto Turn-on :	 Enable 		
Aging Load Rate (%) :	60		
<input type="button" value="Save Config"/>		 	

Homepage Setting>>Advanced Setting>>password “191210”>>Parallel Setup.

**Parallel ID:** Parallel ID, must modify the ID after set work mode to parallel mode. The value can be 1~6, default value is 1.

**Cabinet Paral Basic Units:** Parallel cabinet number, must modify the total parallel cabinet number after set work mode to parallel mode. The value can be 2~6, default value is 2.

**Cabinet Paral Redund Units:** Parallel redundancy cabinet number, can modify the redundancy cabinet number after set work mode to parallel mode. The value can be 0~5, default value is 0.

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Parallel ID	 1 		
Cabinet Paral Basic Units :	 2 		
Cabinet Paral Redund Units :	 0 		
<input type="button" value="Save Config"/>			

## 2.11 LBS installation

LBS system contains LCD set, commucation cable and STS device.

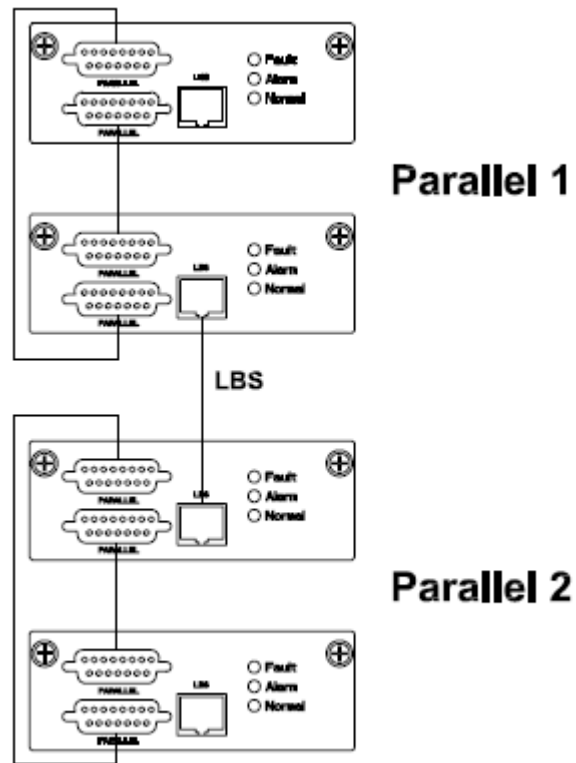
### 2.11.1 LCD setting

Set every UPS of the systems to be LBS Master or LBS Slave. For instance if the UPS belongs to LBS master system, its LBS setting must be set to Master.



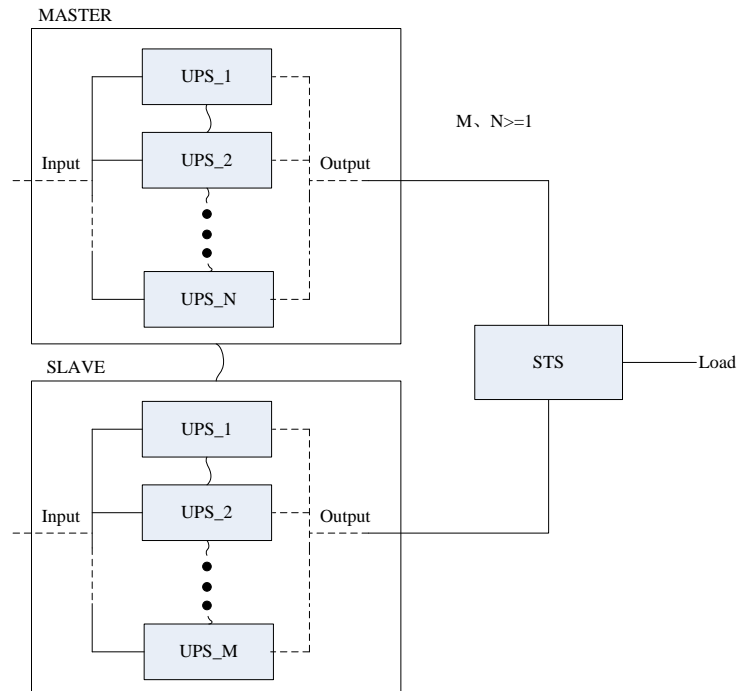
### 2.11.2 LBS cable installation (Optional feature)

The two ports of one mesh wire should be plug into RJ45 interface of any one UPS of both master and slave system.



### 2.11.3 UPS installation

The whole systems is showed below.



#### 2.11.4 LBS setting: Turn off inverter, then set on the LCD of UPS.

Homepage Setting>>Advanced Setting>>password “191210”>>BATT Setup

**LBS mode:** setting value: LBS disable, LBS master, LBS slave. Default is LBS disable.

- Sigle UPS LBS system: one UPS set LBS mode to LBS master, one UPS set LBS mode ot LBS slave.
- Parallel UPS sysetem: one paralale UPSs set LBS mode to LBS master, one parallel UPSs set LBS mode ot LBS slave.

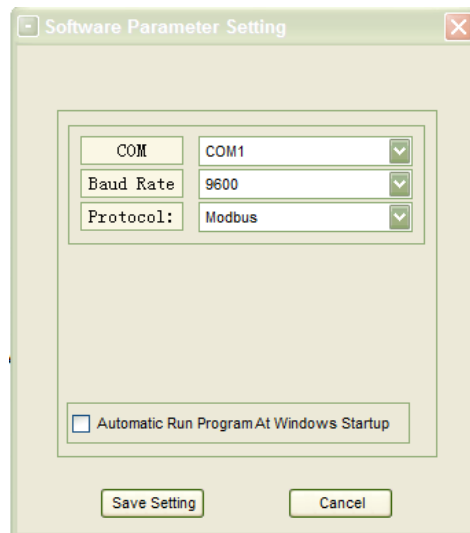


## 2.12 Computer access

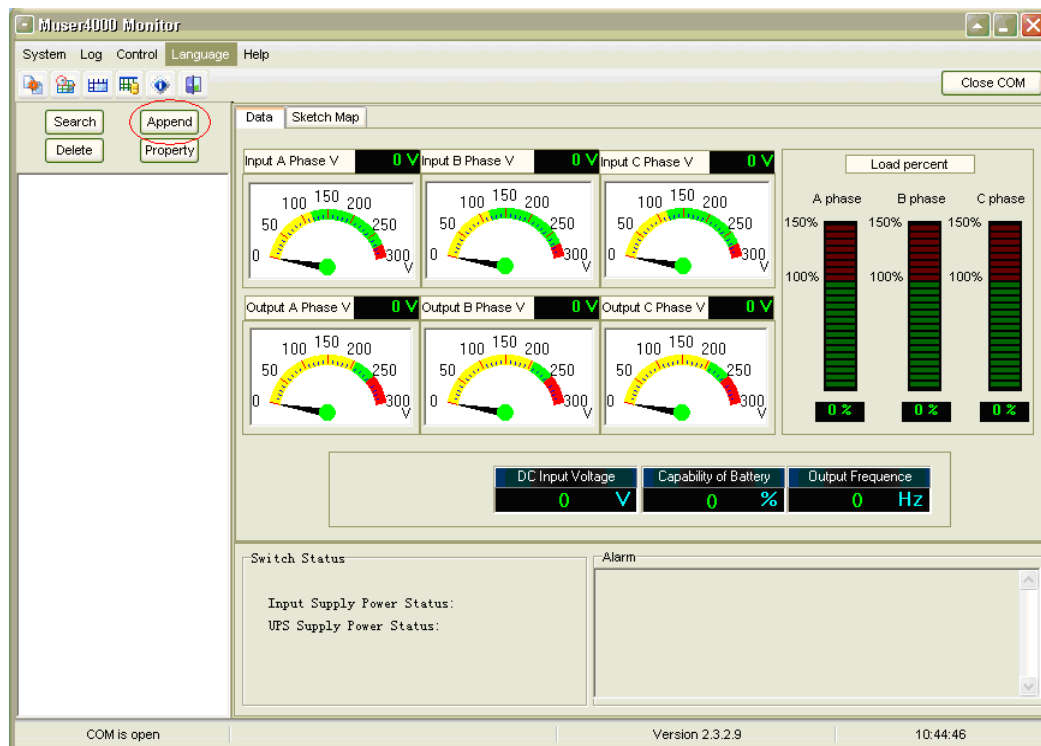
- ◆ One end of a USB cable connect to the computer, the other end connect to the USB port on the UPS.
- ◆ Open the software Muser5000, click “system” button.



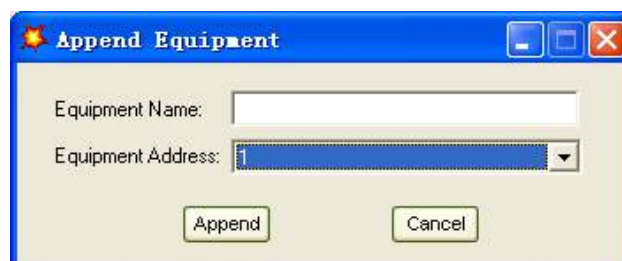
- ◆ A window of “Software Parameter Setting” comes out as below, COM choose according to the UPS , baud rate choose 9600, protocol choose “modbus”, then save this setting.



◆ On the main page of Muser5000, 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**

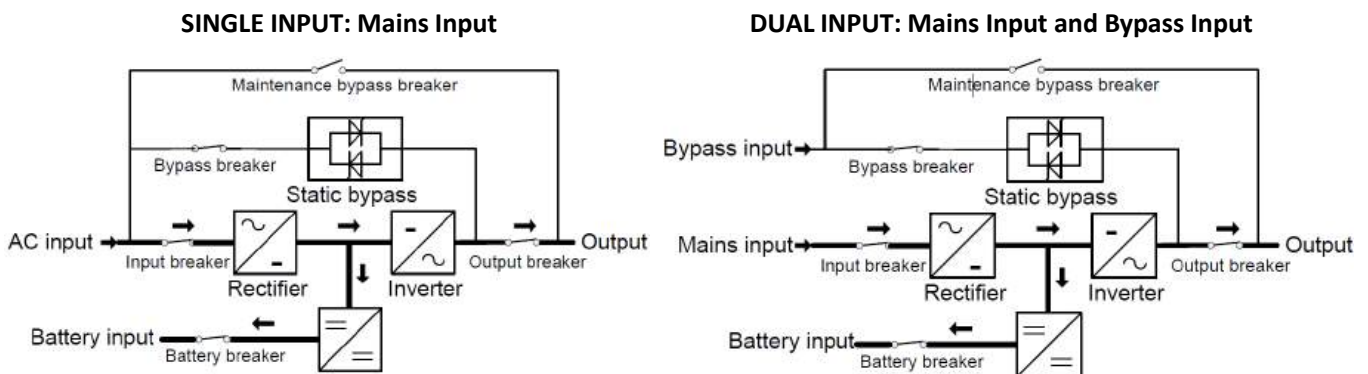
## 3. Operation

### 3.1 Operation Modes

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

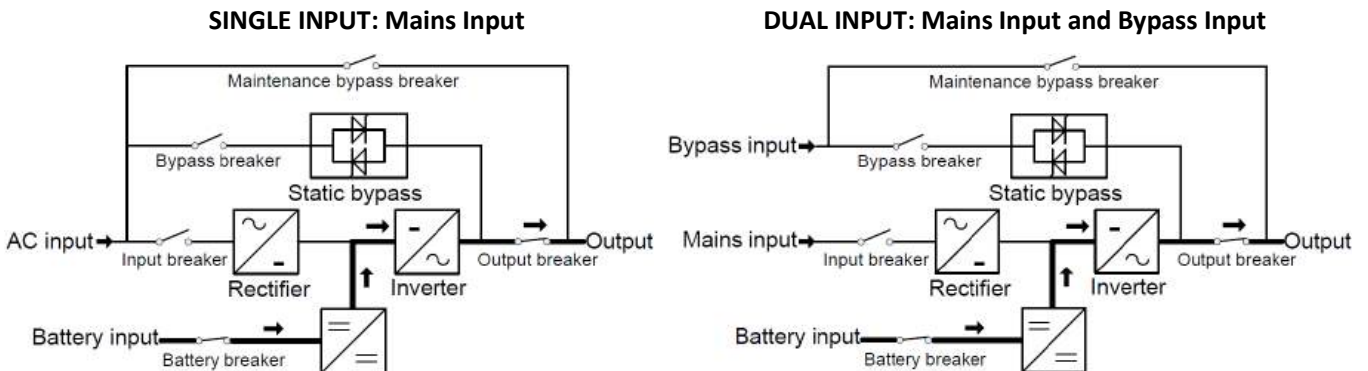
#### ◆ Normal mode

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)

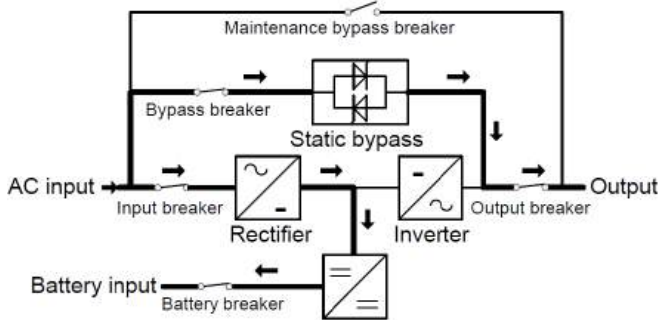
If the AC mains input power fails, the inverter, which obtains power from the battery, supplies the critical AC load. There is no power interruption to the critical load. The UPS will automatically return to Normal Mode when AC recovers.



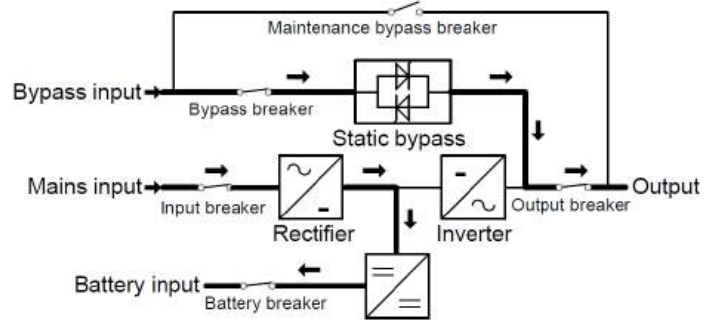
#### ◆ Bypass mode

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).

**SINGLE INPUT: Mains Input**



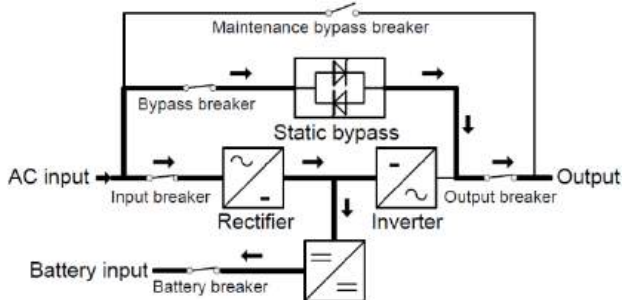
**DUAL INPUT: Mains Input and Bypass Input**



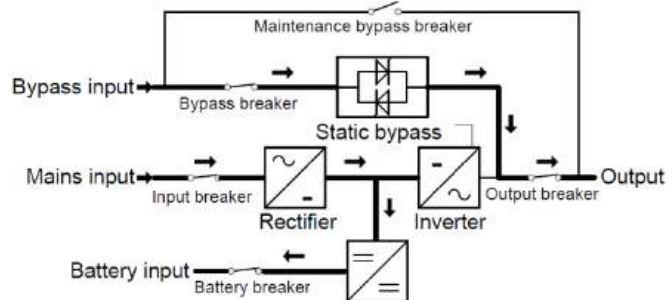
#### ◆ ECO Mode

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.

**SINGLE INPUT: Mains Input**



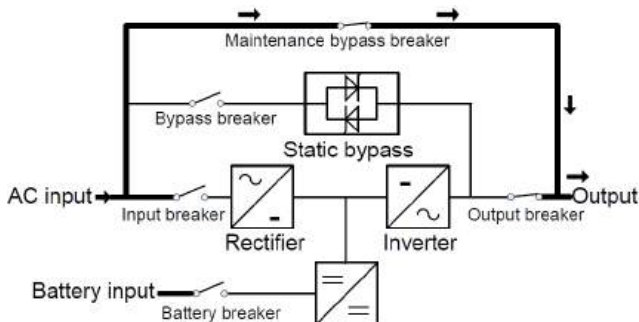
**DUAL INPUT: Mains Input and Bypass Input**



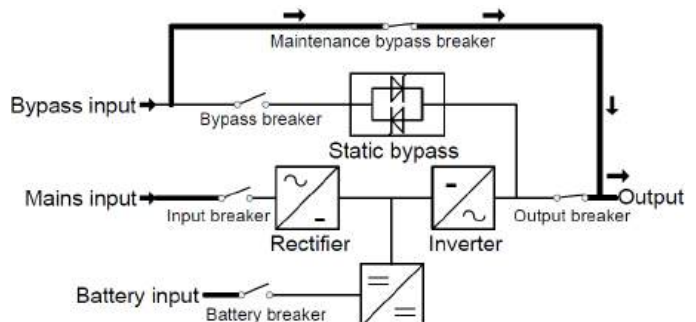
#### ◆ Maintenance mode (Manual Bypass)

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.

**SINGLE INPUT: Mains Input**



**DUAL INPUT: Mains Input and Bypass Input**



## 3.2 Turn on/off UPS

### 3.2.1 Restart procedure



#### CAUTION!

MAKE SURE GROUNDING IS PROPERLY DONE!

- ◆ Set the Battery Breaker to the "ON" position according to the user's manual.

### 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

- ◆ Turn ON OUTPUT breaker. (Below the UPS power units at the front door)
- ◆ Turn ON BYPASS breaker and MAINS breaker. (Below the UPS power units at the front door)

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

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, 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.

### 3.2.2 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 °

### 3.2.3 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 6; otherwise, jump to Step 5.

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

- ◆ Turn ON OUTPUT breaker.
- ◆ Turn ON BYPASS breaker.
- ◆ Turn ON MAINS 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.

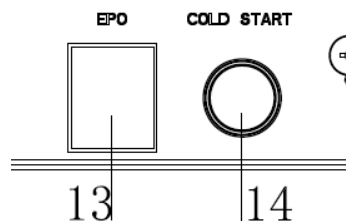
### 3.2.4 Cold start procedure



#### CAUTION!

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

- ◆ Turn on the BATTERY breaker.  
The battery will feed the Auxiliary power board.
- ◆ Turn on the OUTPUT breaker.
- ◆ Trigger the cold start(Cold start) button as the position 14 of the below drawing.



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



#### CAUTION!

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

### 3.2.5 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.

- ◆ Switch OFF the BATTERY breaker;
- ◆ Open the UPS door to easily access to the main power switch;
- ◆ Switch OFF the MAINS breaker.
- ◆ Switch OFF the BYPASS 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, which includes the ones for rectifier and bypass.

- ◆ The primary input distribution panel, which is often located far away from the UPS area, so a label should be posted to advise service personnel that the UPS circuit is under maintenance.

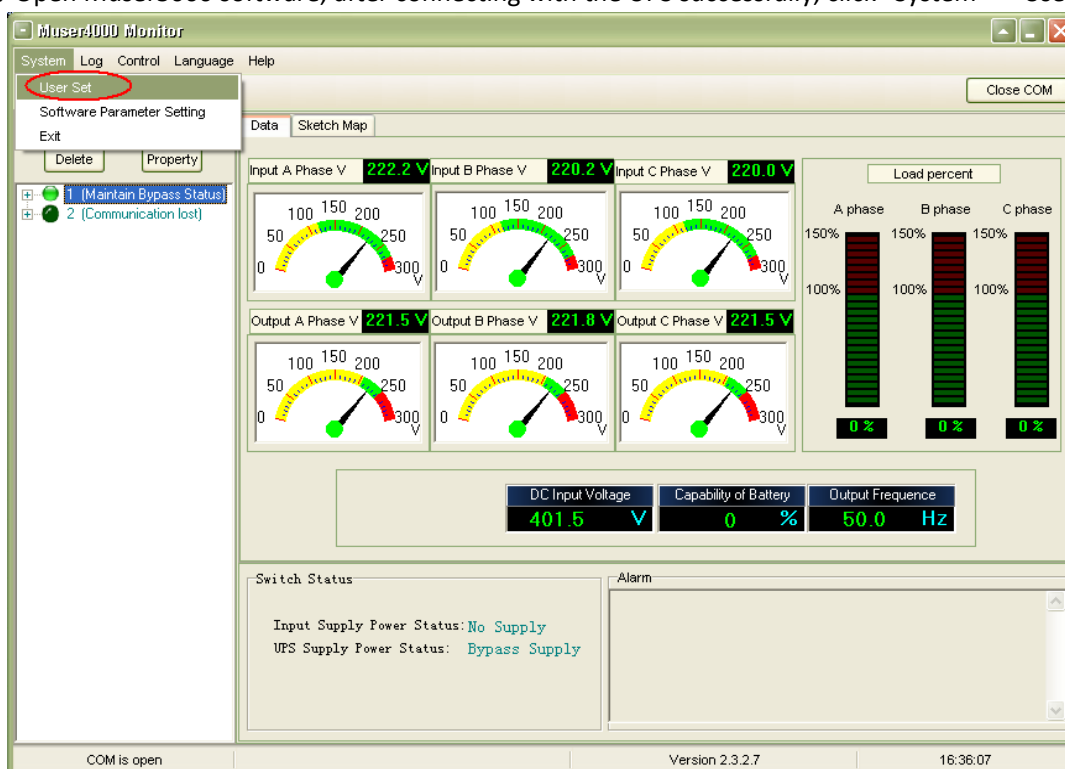


### WARNING!

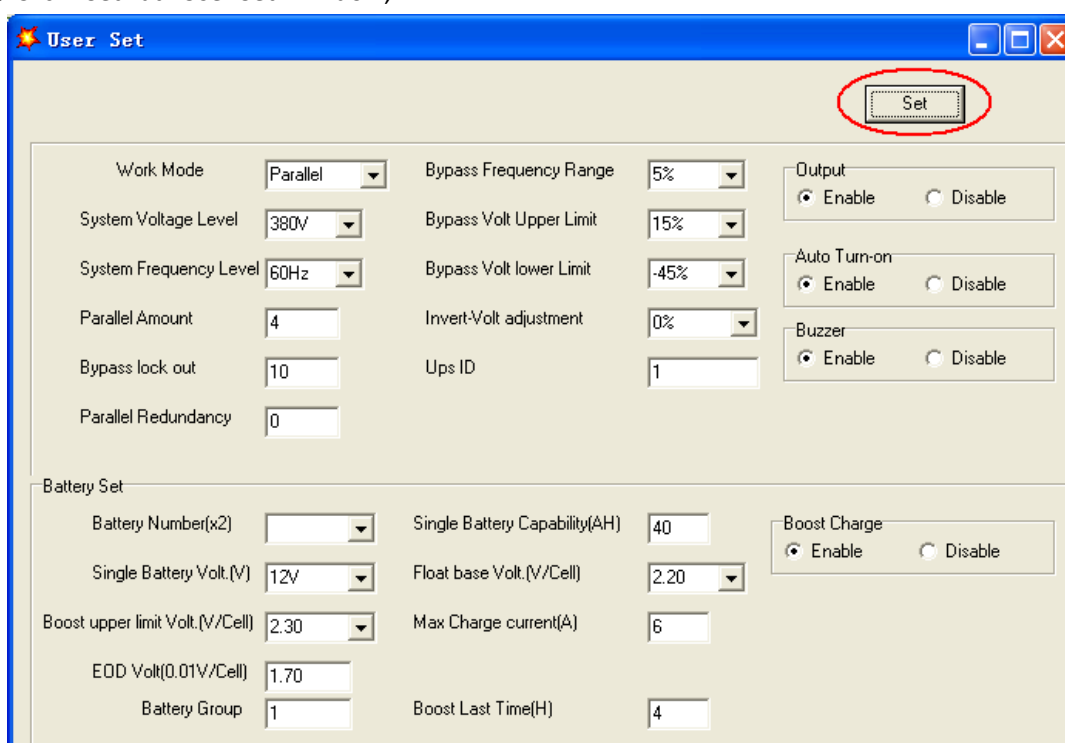
Wait for about 5 minutes for the internal D.C. bus bar capacitors to be completely discharged.

## 3.2.6 Parallel setting

- ◆ Connect the UPS with computer. Power on the UPS.
- ◆ Open Muser5000 software, after connecting with the UPS successfully, click “System”->“User Set”



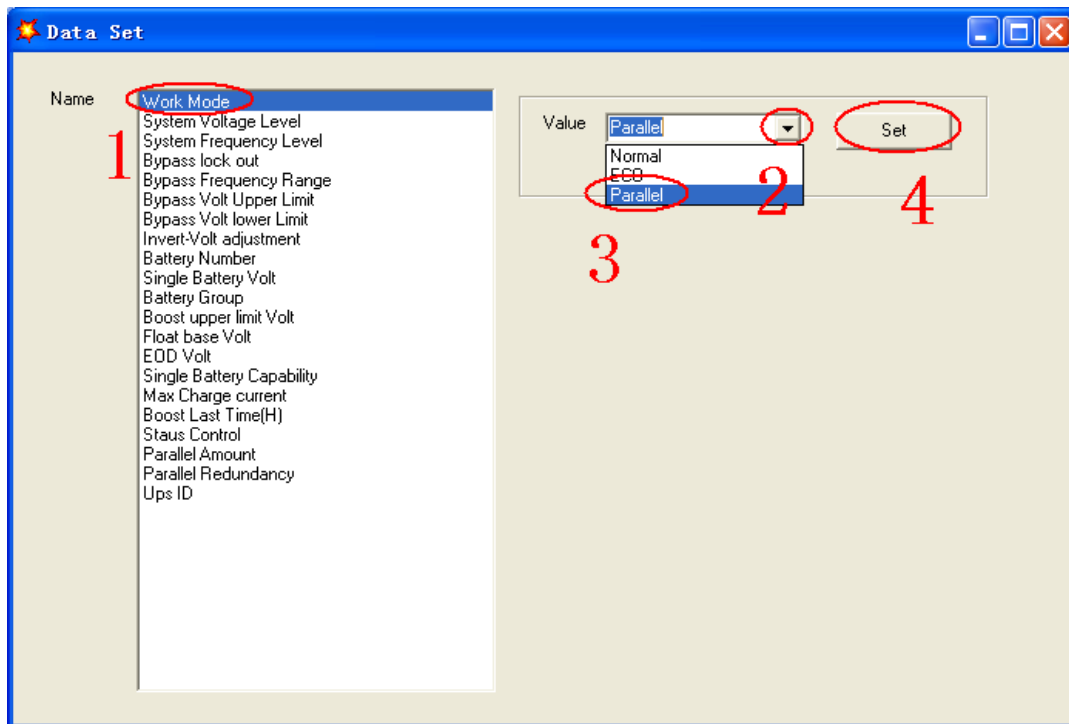
- ◆ Click “Set” at “User Set” window;



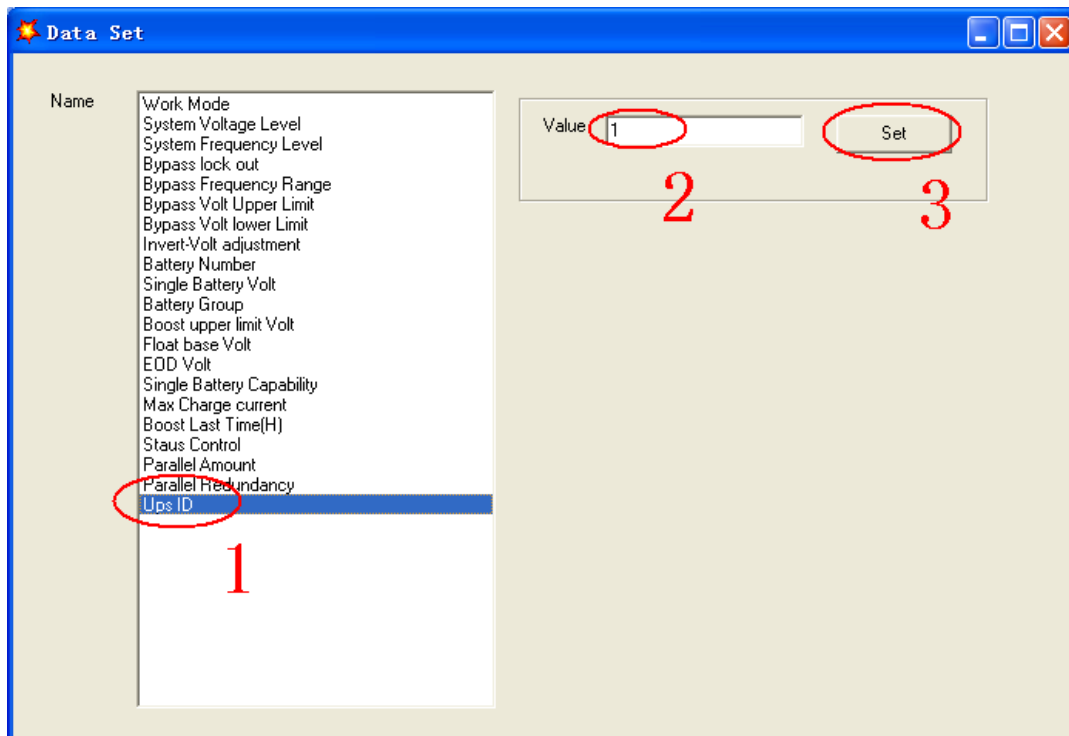
The screenshot shows the 'User Set' configuration window. The 'Set' button is highlighted in the top-right corner. The window contains various configuration options. The 'Work Mode' is set to 'Parallel'. The 'System Voltage Level' is 380V, 'System Frequency Level' is 60Hz, 'Parallel Amount' is 4, 'Bypass lock out' is 10, and 'Parallel Redundancy' is 0. The 'Bypass Frequency Range' is 5%, 'Bypass Volt Upper Limit' is 15%, 'Bypass Volt lower Limit' is -45%, 'Invert-Volt adjustment' is 0%, 'Ups ID' is 1, 'Output' is 'Enable', 'Auto Turn-on' is 'Enable', 'Buzzer' is 'Enable', 'Battery Set' is 'Enable', 'Single Battery Capability(AH)' is 40, 'Single Battery Volt.(V)' is 12V, 'Boost upper limit Volt.(V/Cell)' is 2.30, 'EOD Volt(0.01V/Cell)' is 1.70, 'Battery Group' is 1, 'Float base Volt.(V/Cell)' is 2.20, 'Max Charge current(A)' is 6, 'Boost Last Time(H)' is 4, and 'Boost Charge' is 'Enable'.



◆ 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 Muser5000 and equipment might be interrupted. If it occurs, please re-connect in accordance with the instruction described before.

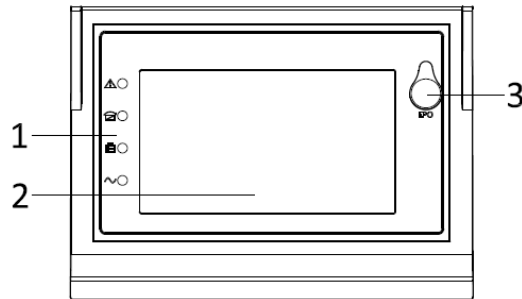


## CAUTION!

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.

## 3.3 The LCD Display



LCD control panel introduction

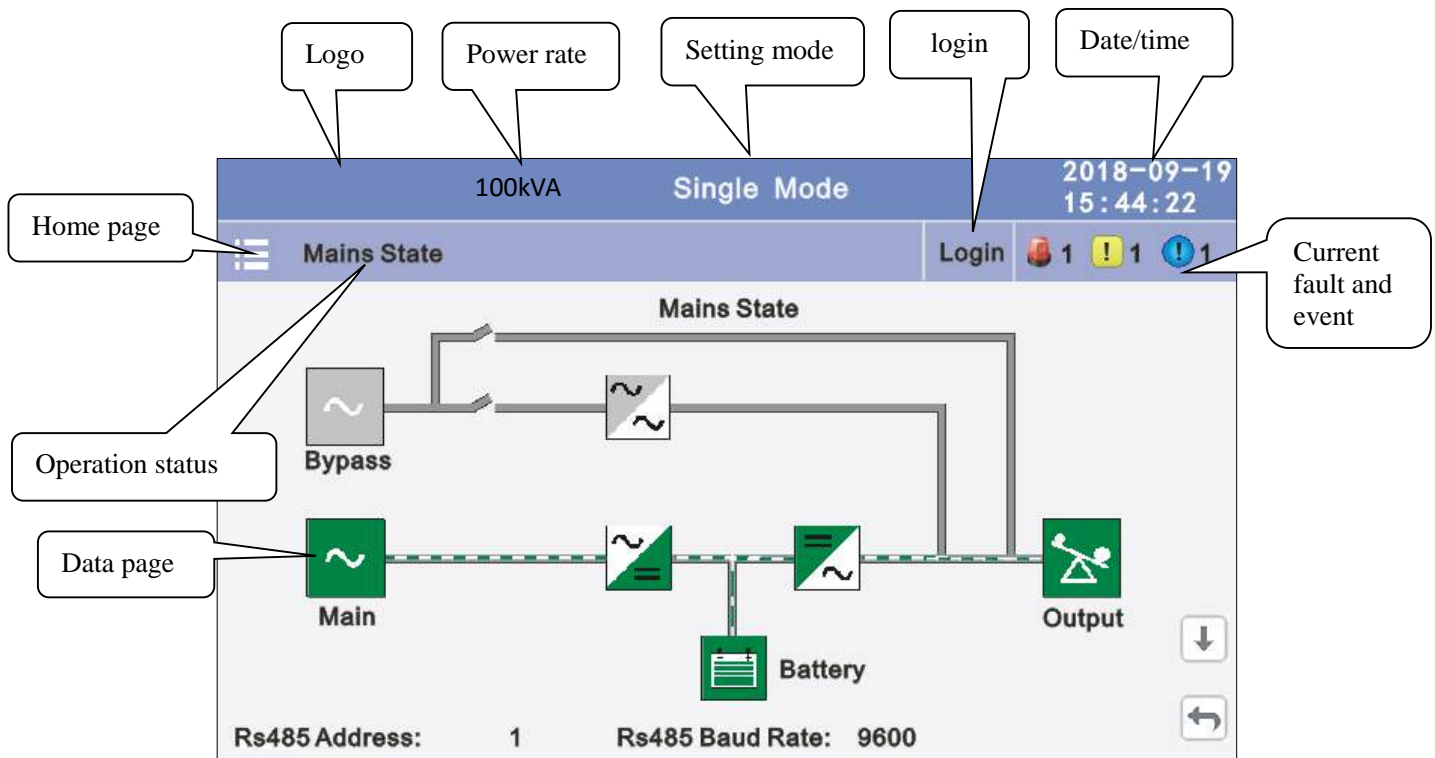
- (1) LED (from top to bottom: “Fault”, “bypass”, “battery”, “inverter”)
- (2) LCD display
- (3) EPO key

### Introduction

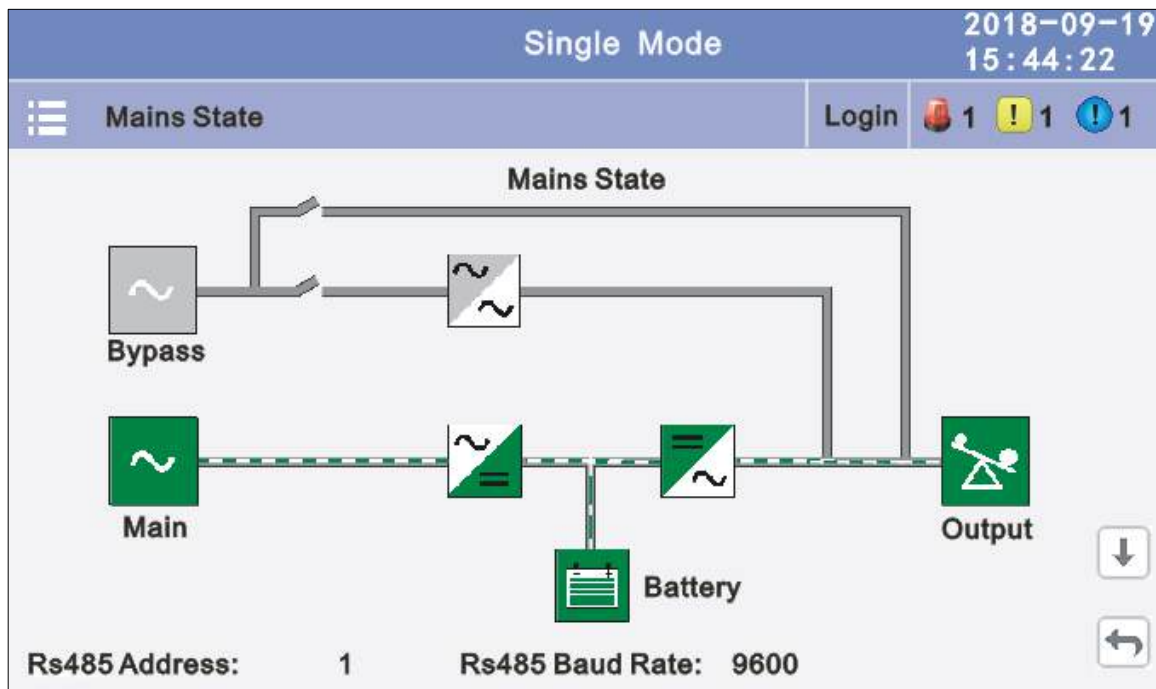


## CAUTION!

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






**3.3.1 Sys.Status.:** Displays the flow state of UPS work, and quickly enters real-time data by clicking on the block.



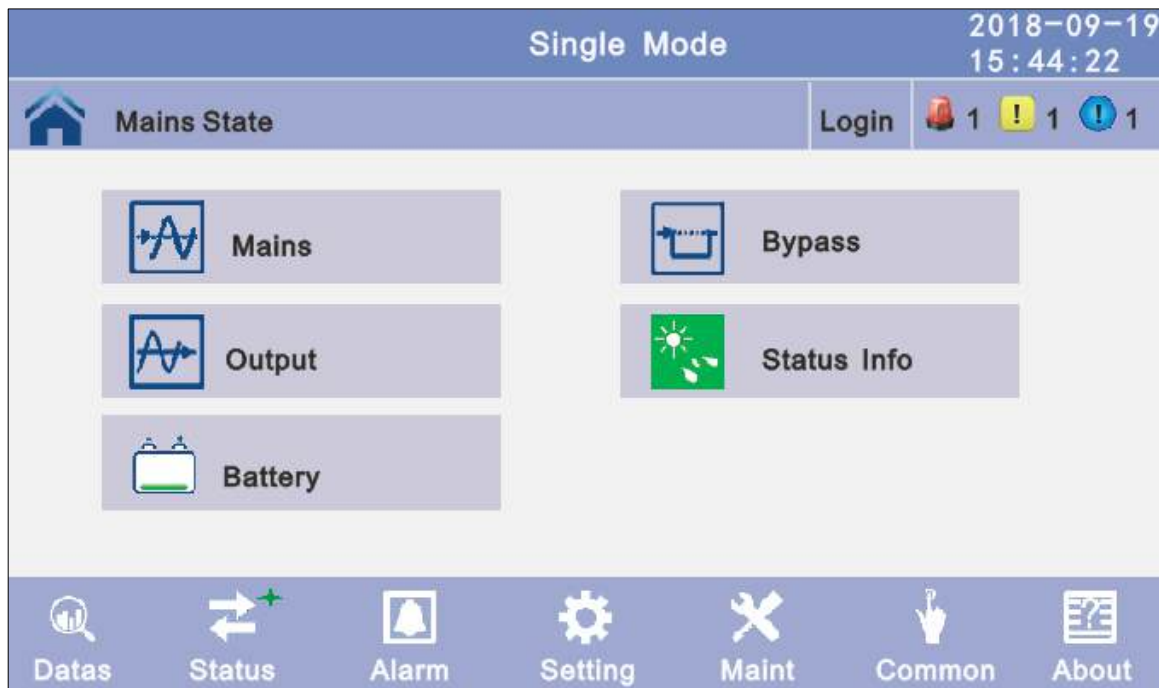
2020-03-06  
15:44:22

100kVA      Single Mode


AC Line Mode Login  1  1  1

<b>Input Voltage(V)</b>  A    120.0V B    120.0V C    120.0V	<b>Online</b>  <b>Battery</b> 100%    999M  Float charging	<b>Output Freq(Hz)</b>  50.0Hz
<b>Input current(A)</b>  A    10.0A B    10.0A C    10.0A	<b>Apparent Power(kVA):</b> 10.0    10.0    10.0  <b>Actv Power(kW):</b> 10.0    10.0    10.0  <b>Load Rate(%):</b> 50%    50%    50%	<b>Output Voltage(V)</b> A    120.0V B    120.0V C    120.0V
		<b>Output current(A)</b> A    10.0A B    10.0A C    10.0A







**3.3.2 Status:** View the voltage and current of the main, bypass, output, battery (can also be entered through by real-time data block), View the status of the switches, dry contacts, through clicking on the block, enter the corresponding data window.



**3.3.2.1 Main:** Click the main block to enter the main data display window, click return to return to the previous window, click home page to return to the main page.

Single Mode				2018-09-19 15:44:22
Mains State		Login	1 1 1	
 Mains	A	B	C	
	Phase Volt (V) :	120.0	120.0	120.0
	Line Volt (V) :	208.0	208.0	208.0
	Phase Freq (Hz) :	50.0	50.0	50.0
	Phase Current (A) :	5.5	5.0	6.0
	Input Factor:	0.932	0.931	0.921


**3.3.2.2 Bypass:** Click the bypass block to enter the bypass data display window, click return to return to the previous window, click home page to return to the main page.

Single Mode				2018-09-19 15:44:22
 Mains State	Login	 1	 1	 1
 Bypass	A	B	C	
	Phase Volt (V) :	120.0	120.0	120.0
	Line Volt (V) :	208.0	208.0	208.0
	Phase Freq (Hz) :	50.0	50.0	50.0
				




**3.3.2.3 Output:** Click the output block to enter the output data display window, click return to return to the previous window, click home page to return to the main page.


Single Mode

2018-09-19 15:44:22


Mains State

Login

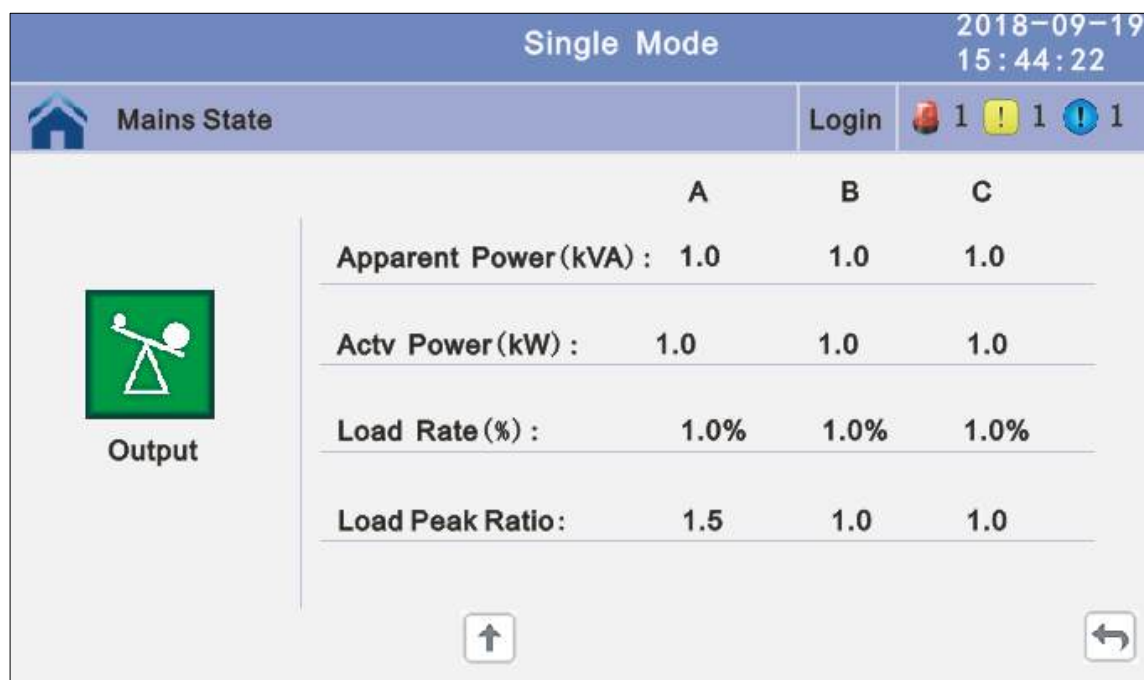
 1
 1
 1


Output

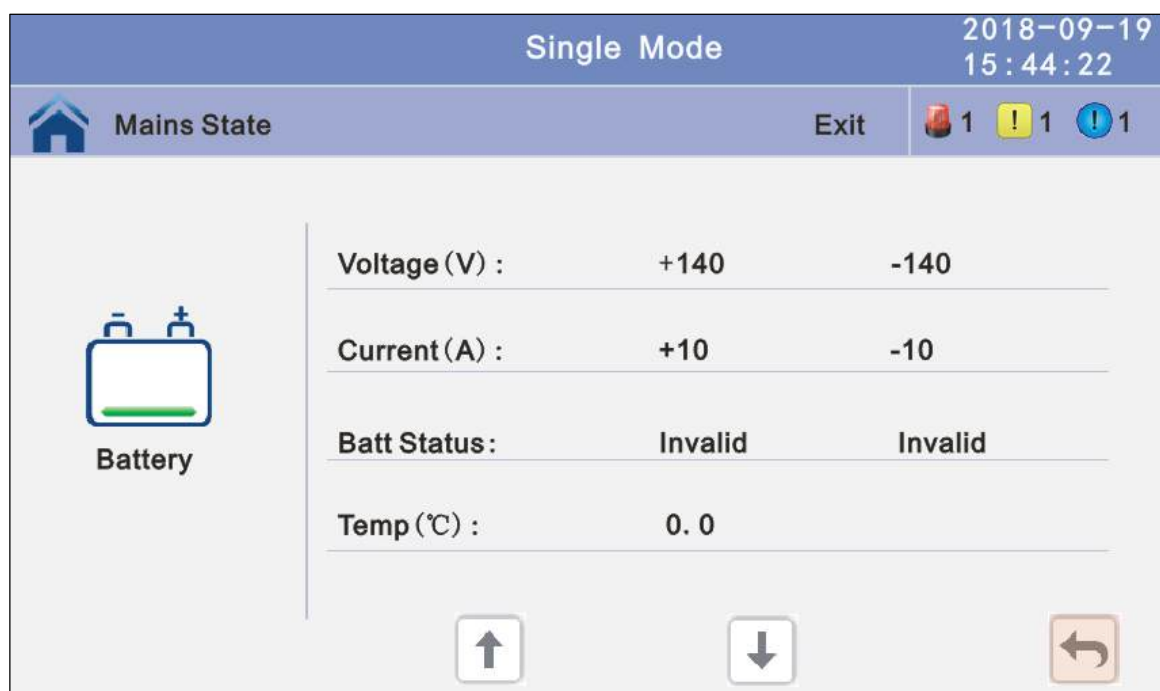
	A	B	C
Phase Volt(V) :	120.0	120.0	120.0
Line Volt(V) :	208.0	208.0	208.0
Phase Freq (Hz) :	50.0	50.0	50.0
Phase Current(A) :	5.5	5.0	6.0

↓

↶



**3.3.2.4 Battery:** Click the battery block to enter the battery data display window, click return to return to the previous window, click home page to return to the main page.





**3.3.3 Alarm:** View the alarm and history of the UPS, and open or close the buzzer.





**3.3.3.1 Curr Alarm:** Click the curr alarm to enter the current alarm display window, click return to return to the previous window, click home page to return to the main page.

Single Mode

2018-09-19 15:44:22

Mains State

Exit

1
 1
 1

Alarm

No.	Level	Info	Loc
001		14C-01 ECU Abnormal	
002		09C-01 Dry Node Comm. Fault	

↑

↓

↶

**3.3.3.2 History:** Click the history to enter the history recode display window, click return to return to the previous window, click home page to return to the main page.

Single Mode

2018-09-19 15:44:22

Mains State

Login

1
 1
 1

History

No.	Level	Info	Loc	Time
0001		On Line	System	2018-06-15 18:12:00
0002		Rectifier Activated	System	2018-06-15 18:12:00

↑

↓

↶



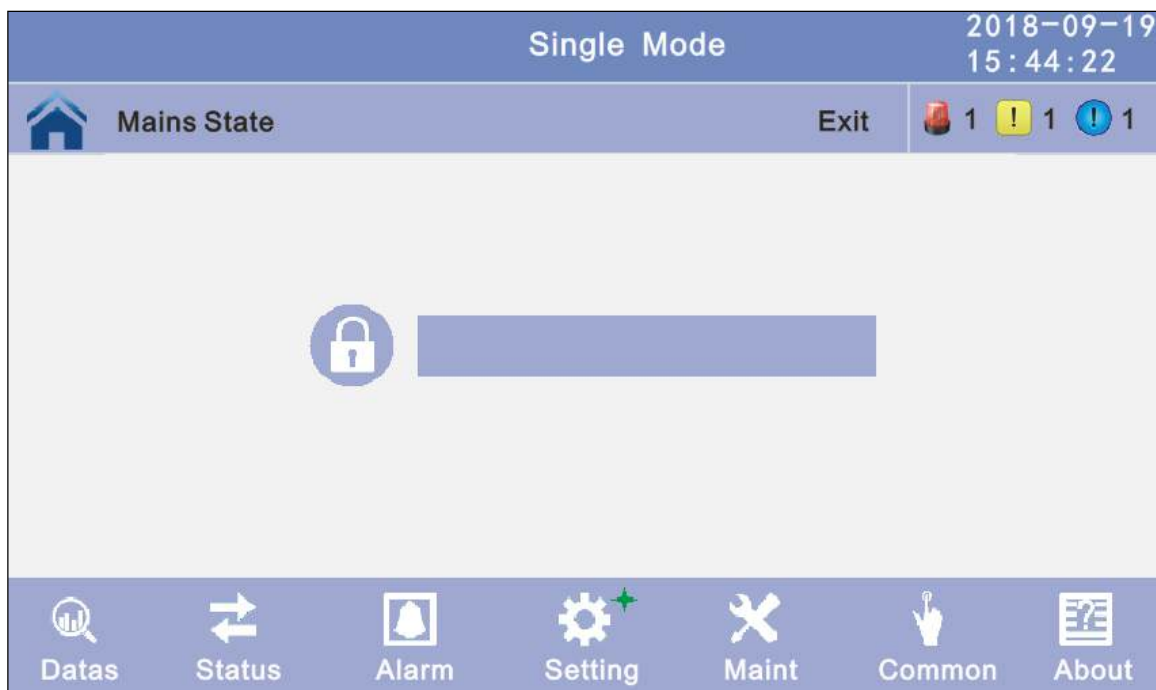
**3.3.3.1 Buzzer:** Click the buzzer mute then the buzzer will mute and the red block will change to green, if the buzzer is on, then click the block buzzer will on and the block will change to red. click return to return to the previous window, click home page to return to the main page.

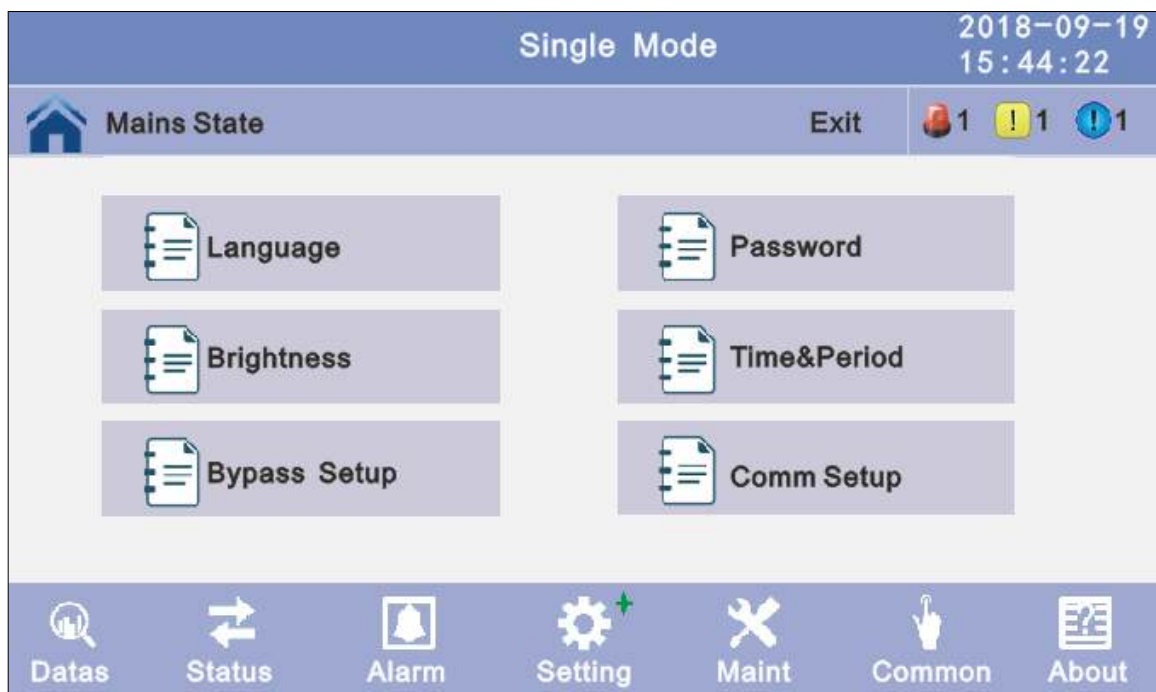
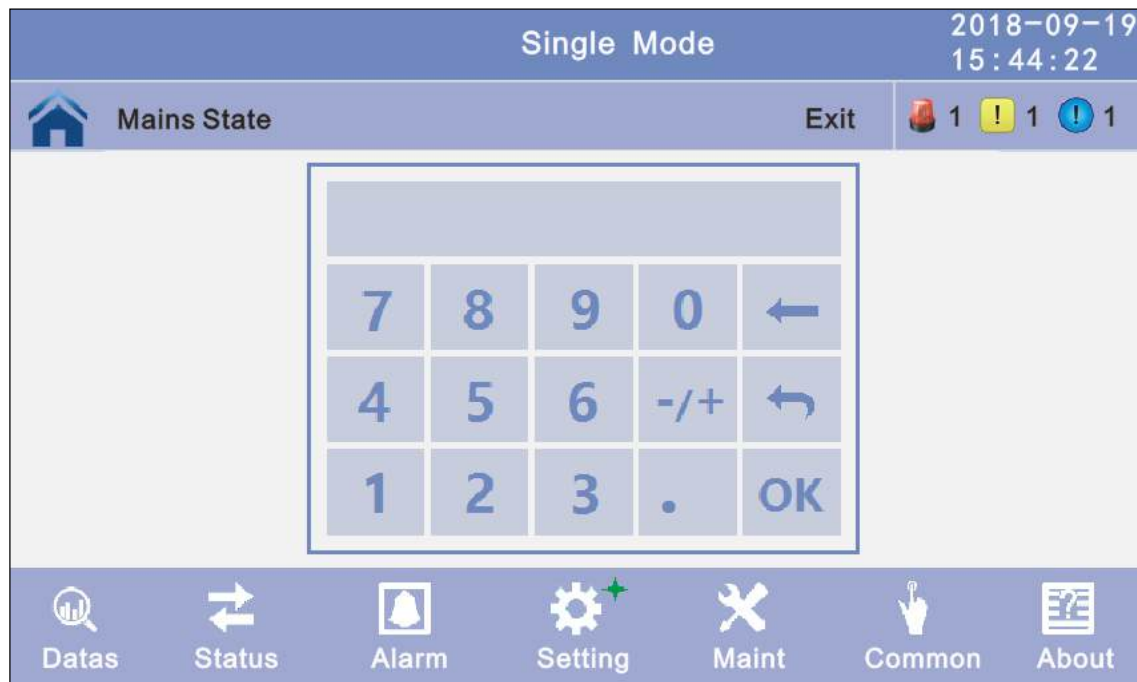


**3.3.4 Setting:** There are two levels, the basic setting for user settings, advanced setting for technical personnel, please contact the relevant technical personnel to enter advanced settings.



**3.3.4.1 Basic Setting:** Click basic setting, enter by input the correct password. The user password is "111111".





**3.3.4.1.1 Language:** Click the language block witch you want and click the save config block to save.  
click return to return to the previous window, click home page to return to the main page.



**3.3.4.1.2 Password:** Click password block enter user password setting page, input old password and new password, then click save confirm to save the change. Password format is six numbers. click return to return to the previous window, click home page to return to the main page.


**Password lock time:** When LCD is not touched, it needs to re login when the setting value is set, click left or right block to change the value.



**3.3.4.1.3 Brightness and Backlight time:** Click the block to change value. click return to return to the previous window, click home page to return to the main page.

**Brightness:** Click the text to input new value and click the save config block to save. Value range is 1~63, default value is 63. Click return to return to the previous window, click home page to return to the main page.

**Backlight time:** LCD backlight delay time, click the text to input new value and click save config block to save. Value range is 1~255, default value is 60. Click return to return to the previous window, click home page to return to the main page.

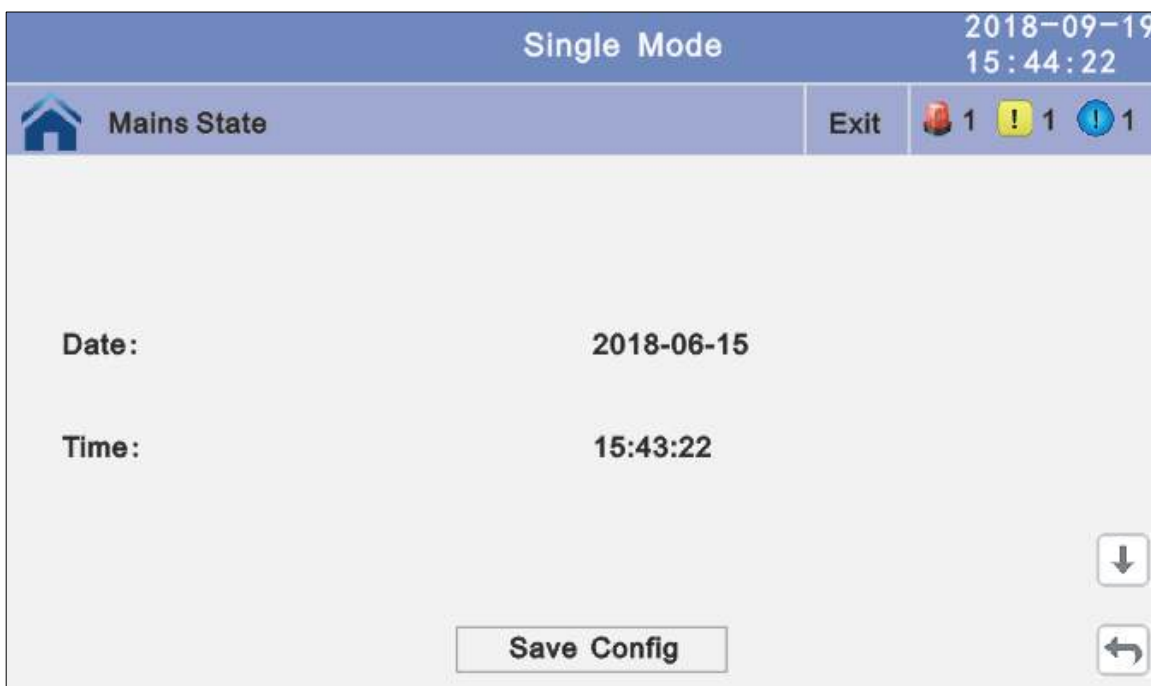


The screenshot shows a configuration interface titled 'Single Mode' with a date and time display of '2018-09-19 15:44:22'. Below the title bar, there is a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red light icon with '1', a yellow warning icon with '1', and a blue exclamation mark icon with '1'. The main content area displays two settings: 'BrighNess' with a value of '63' and 'Backlight Time (S) : ' with a value of '60'. At the bottom, there is a 'Save Config' button and a return arrow icon.

**3.3.4.1.4 Date and time setting:** Click the text to select other value or input new value and click save config block to save. Click return to return to the previous window, click home page to return to the main page.

**Date:** current date

**Time:** current time



The screenshot shows a configuration interface titled 'Single Mode' with a date and time display of '2018-09-19 15:44:22'. Below the title bar, there is a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red light icon with '1', a yellow warning icon with '1', and a blue exclamation mark icon with '1'. The main content area displays two settings: 'Date:' with a value of '2018-06-15' and 'Time:' with a value of '15:43:22'. At the bottom, there is a 'Save Config' button and a return arrow icon.

**3.3.4.1.5 Communication setting:** Click the text to select other value or input new value and click save config block to save. Click return to return to the previous window, click home page to return to the main page.

**Rs485 address:** UPS communication ID, address range is 1~15, default is 1

**Rs485 Baud Rate:** baud rate: 2400, 4800, 9600, 14400, 19200, default is 9600



### 3.3.4.1.5 Bypass settings

**Bypass Volt Prot Lower Limit:** When the difference between the bypass voltage and the rated voltage exceeds the lower threshold for the bypass voltage, the system determines that the bypass voltage is abnormal and that the bypass is unavailable. The value can be -10%, -15%, -20%, -30%, -40%,. The default value is -40%.

**Bypass Volt Prot Limit:** When the difference between the bypass voltage and the rated voltage exceeds the upper threshold for the bypass voltage, the system determines that the bypass voltage is not normal and that the bypass is unavailable.

NOTE:

When the voltage level is 120V, the value range is 10%, 15%, 20%, and 25% (default).

When the voltage level is 127 V, the value range is 10%, 15%, and 20% (default).

**Bypass Freq Tracking Range:** When the difference between the bypass input frequency and the rated frequency is greater than this value, the system determines that the bypass frequency is not normal, and that the bypass is unavailable. The value range is 1%, 2%, 4%, 5%, 10%(default).

**Bypass rate tracking rate:** Inverter frequency tracking to bypass frequency rate. The value range is 0.5~2, and is 1 by default.

**Power Supply Upon BYP SCR Overtemp:** Specifies whether to start bypass mode when over temperature occurs. The default value is Enable.

**Bypass Switches Limit:** Cross currents occur during the transfer between bypass mode and normal mode, which impacts the system. This parameter specifies the number of transfers between bypass mode and normal mode within 1 hour, which ensures system security. The value can be 3 to 10, and is 10 by default.

**EPO Transfers To BYP:** Specifies whether transfers to bypass mode when press EPO button. The default value is Disable

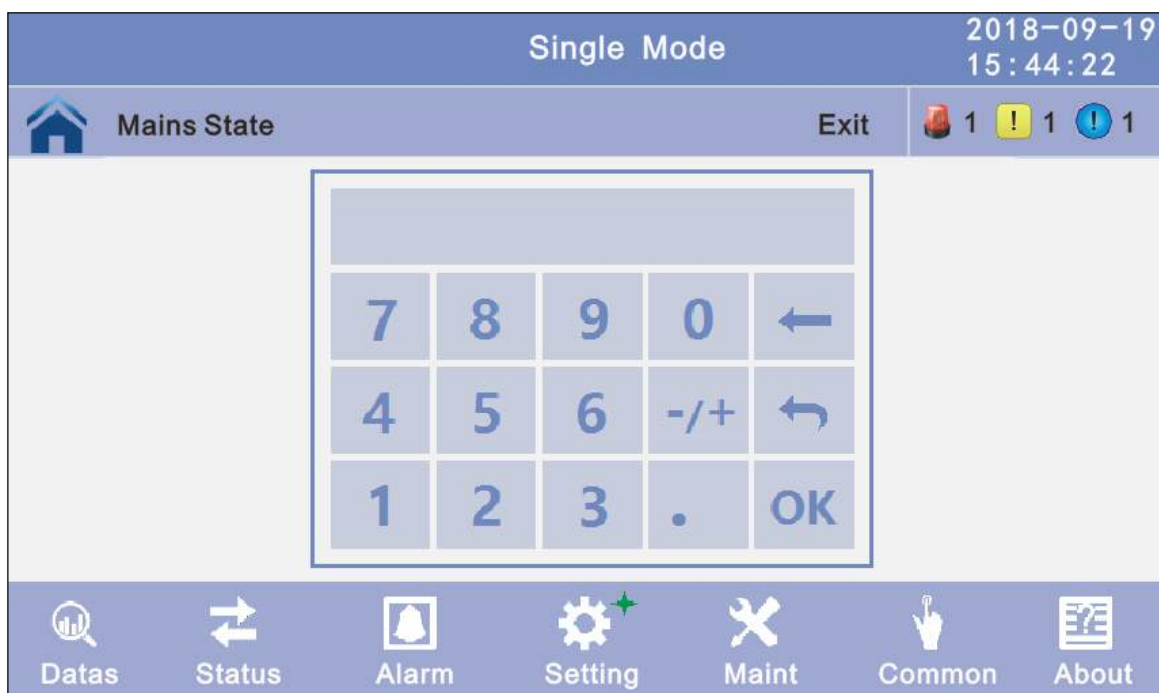
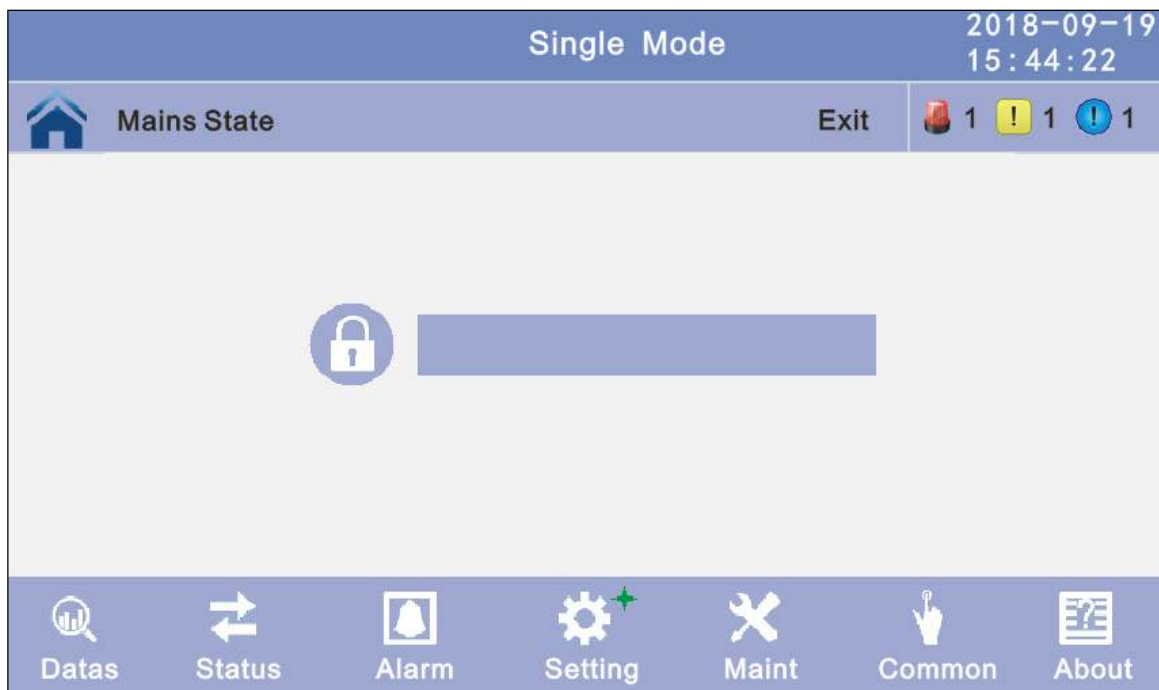
Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Bypass Volt Prot Lower Limit (%) :	 -45 	 	
Bypass Volt Prot Limit (%) :	 25 		
Bypass Freq Tracking Range (%) :	 10 		
Bypass Tracking Rate (Hz/s) :	 1.0 		
Save Config			

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Power supply upon bypass SCR over temp.	 Power supply allow 	 	
Bypass Switches Limit:	 10 		
EPO Transfers To BYP:	 Disable 		
Save Config			

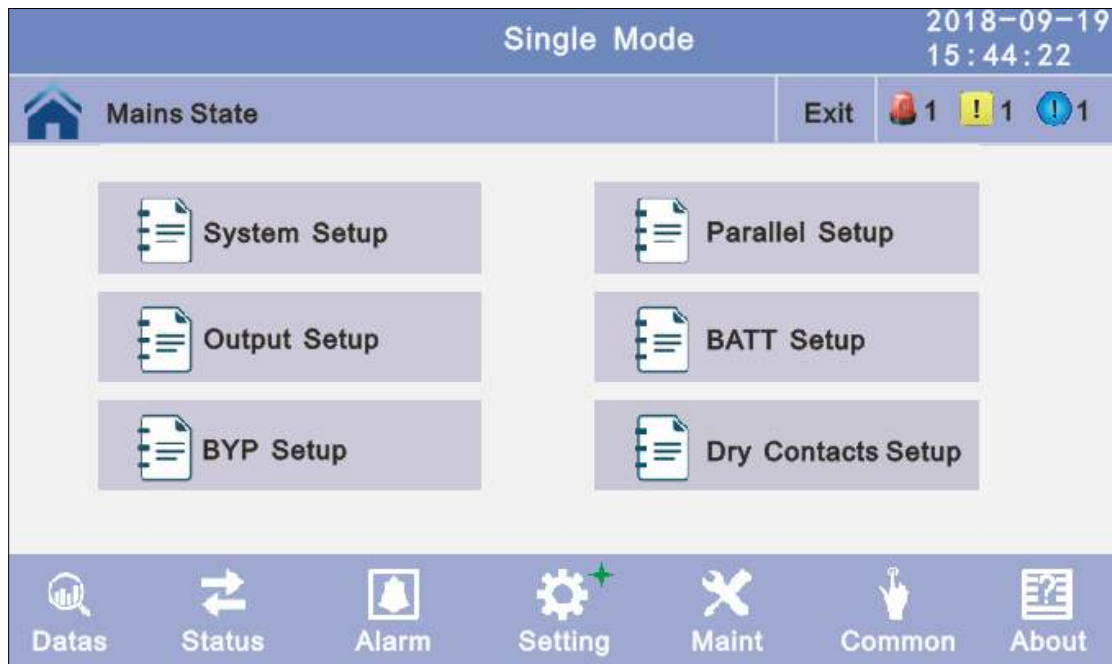


**3.3.4.2 Advanced Setting:** Click advanced setting, enter by input the correct password. The user password is “191210”.

**Note:** This operation is recommended to be operated by professionals, or under the guidance of professionals.







**3.3.4.2.1 System setting:** Click the text to select other value or input new value and click save config block to save. Click return to return to the previous window, click home page to return to the main page.

**Working Mode:** Select the work mode of UPS, work mode: Single mode, Parallel mode, ECO mode, Eco+Paral Machine Mode

**Auto Turn-on:** Select the UPS start logic, Enable: UPS start inverter output automatic, Disable: No output.

**Aging Load Rate(%):**The value can be 18~100%, default value:60



**Freq Conv Mode:** Frequency conversion mode, enable: output frequency set 50Hz or 60Hz, input frequency is 60Hz or 50Hz, UPS no alarm not battery and bypass abnormal. Default is Disable.

**LBS mode:** setting value: LBS disable, LBS master, LBS slave. Default is LBS disable.

**Float Temp. Compen:** temperature sensor compensation switch, when need to connect battery temperature sensor, please change the value to enable

**Temp Sensor Select:** temperature sensor type select. Has two types: NTC and RS485. NTC for single and short distance. Rs485 for multiple and far distance.



The screenshot shows the 'Single Mode' configuration interface. At the top, the date and time are 2018-09-19 15:44:22. Below the title bar, there is a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red fire icon with '1', a yellow warning icon with '1', and a blue alarm icon with '1'. The main configuration area contains four settings, each with a left arrow, a text value, and a right arrow:

- Freq Conv Mode: Disable
- LBS Mode: Disable
- Float Temp. Compen: Enable
- Temp Sensor Select: Rs485

At the bottom, there is a 'Save Config' button and a back arrow icon.

**Inter Power Walk in(s):** When UPS are in parallel mode. this is enable the UPS to control the interval that each UPS transfers from battery mode to normal mode, which reduces the impact on the generator or power grid. The value can be 1~200, default value is 10.



The screenshot shows the 'Single Mode' configuration interface. At the top, the date and time are 2018-09-19 15:44:22. Below the title bar, there is a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red fire icon with '1', a yellow warning icon with '1', and a blue alarm icon with '1'. The main configuration area contains two settings:

- Inter Power Walk in(s): 10
- Inter sleep mode: Disable

At the bottom, there is a 'Save Config' button and a back arrow icon.

### 3.3.4.2.2 Parallel setting

**Parallel ID:** Parallel ID, must modify the ID after set work mode to parallel mode. The value can be 1~6, default value is 1.

**Cabinet Paral Basic Units:** Parallel cabinet number, must modify the total parallel cabinet number after set work mode to parallel mode. The value can be 2~6, default value is 2.

**Cabinet Paral Redund Units:** Parallel redundancy cabinet number, can modify the redundancy cabinet number after set work mode to parallel mode. The value can be 0~5, default value is 0.



The screenshot shows the 'Single Mode' configuration interface. At the top, it displays the date '2018-09-19' and time '15:44:22'. Below the title bar, there's a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red fire alarm icon with '1', a yellow warning icon with '1', and a blue exclamation mark icon with '1'. The main configuration area has three rows, each with a label, a left arrow button, a numerical value, and a right arrow button. The first row is 'Parallel ID' with a value of '1'. The second row is 'Cabinet Paral Basic Units' with a value of '2'. The third row is 'Cabinet Paral Redund Units' with a value of '0'. To the right of the third row is an upward arrow button. At the bottom center is a 'Save Config' button, and at the bottom right is a back arrow button.

#### 3.3.4.2.3 Output setting

**Output Freq:** Output frequency, The value can be 50Hz or 60Hz.

**Output Volt Level:** Output voltage level, The value can be 120 and 127.

**Output Volt Adjust(%):** Inverter voltage regulated, The value can be -5%~0~+5%, step is 0.5%, default value: 0.



The screenshot shows the 'Single Mode' configuration interface for output settings. It has the same top bar with date '2018-09-19' and time '15:44:22'. Below the title bar, there's a 'Mains State' section with a home icon and an 'Exit' button. To the right of 'Exit' are three status indicators: a red fire alarm icon with '1', a yellow warning icon with '1', and a blue exclamation mark icon with '1'. The main configuration area has three rows, each with a label, a left arrow button, a numerical value, and a right arrow button. The first row is 'Output Freq (Hz) :' with a value of '50.0'. The second row is 'Output Volt Level (V) :' with a value of '120.0'. The third row is 'Output Volt Adjust (%) :' with a value of '0.0'. At the bottom center is a 'Save Config' button, and at the bottom right is a back arrow button.

#### 3.3.4.2.4 Battery setting

**Battery Group:** Must modify the number to actual configuration, The value can be 1~8, default value is 1.

**Battery number:** Must modify the number to actual configuration, The value is 20.

**Single Battery Capability:** Must modify the value to actual configuration, The value can be 7~2000.

**Boost/Float Conversion(month):** Set up boost charge and float charge conversion time. The value can be 0~24, default value is 0.

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Battery Group:	 1 		
Battery Number:	 20 		
Single Battery Capability(AH) :	2000		
Boost/Float Conversion (Month) :	0		
<input type="button" value="Save Config"/>		 	

**Chg.Cur.Limiting Coef.:** The charging current limit is a multiple of the battery capacity. The value can be 0.05–0.15, and is 0.1 by default.

**Cell float volt:** The float voltage value can be 2.20-2.29 V/cell, and is 2.25 V/cell by default.

**Cell boost volt:** The battery equalized voltage value can be 2.30–2.40 V/cell, and is 2.30 V/cell by default.

**Aver charging Duration:** boost charge time limit, the value can be 1–999min , and is 240 by default.

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1	 1
Chg. Cur. Limiting Coef.(C) :	 0.15 		
Cell Float Volt (V/Cell) :	 2.25 		
Cell Boost Volt (V/Cell) :	 2.40 		
Aver Charging Duration (min) :	 999 		
<input type="button" value="Save Config"/>			

**EOD Battery Volt(V/Cell):** End of discharge voltage. The value can be 1.60~1.90, and is 1.80 by default.

**Float Temp Compens Coeff(V/Cell/°C):** modify the voltage of compensation after enable the switch. the value can be 0.001~0.007/cell, and is 0.003 by default.

**Boost Charge Setting:** Boost charge disable or enable, and is enable by default.

**No Battery Warning:** can be no warning when no batter after set disable, and is enable by default.

Single Mode				2018-09-19 15:44:22	
 Mains State			Exit	 1  1  1	
EOD Battery Volt (V/Cell) :	←	1.80	→		
Float Temp Compens Coeff (V/Cell/°C) :	←	0.003	→		
Boost Charge Setting:	←	Enable	→	↑	
No Battery Warning:	←	Enable	→	↓	
<input type="button" value="Save Config"/>				↩	





### 3.3.4.2.5 Dry contact setting

**Battery abnormal BCB trip(DRV):** Enable or disable BCB trip single output. The default value is Disable.

**Bypass Feedback Trip:** Enable or disable bypass feedback output. The default value is Disable.

**External Maint. Breaker(MT):** Enable or disable external maintenance breaker connection detection. The default value is Disable.

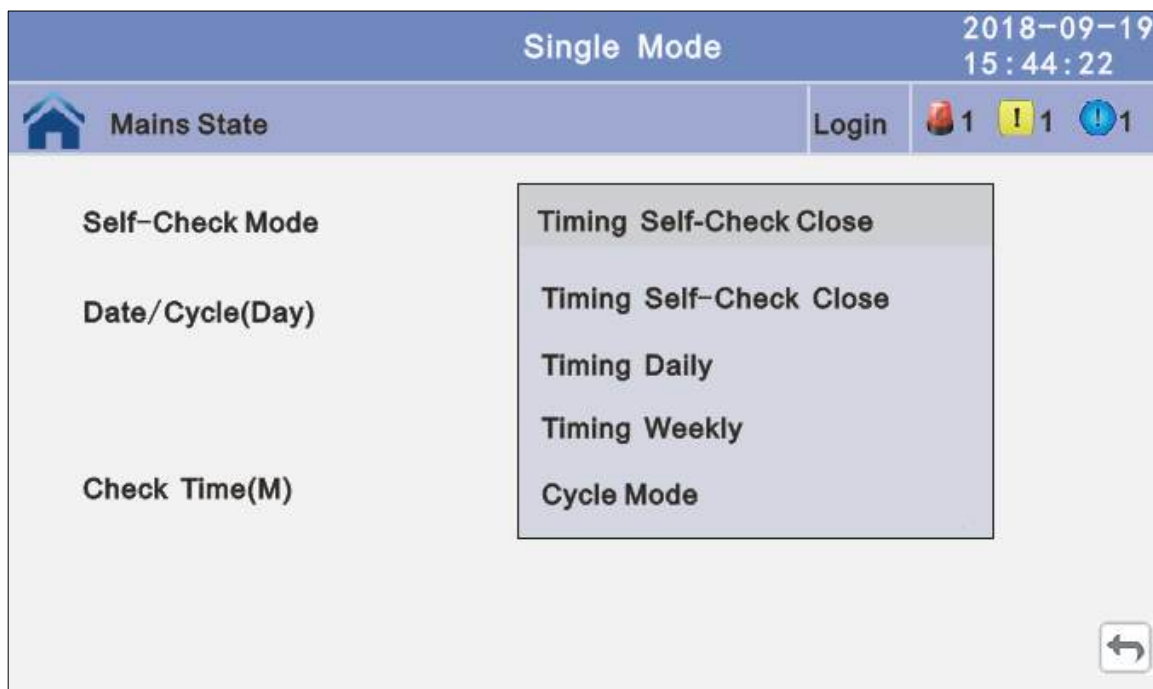
**Battery Switch(BAT):** Enable or disable battery breaker connection detection. The default value is Disable

Single Mode				2018-09-19 15:44:22	
 Mains State			Exit	 1  1  1	
Battery Abnormal BCB trip(DRV):	←	Enable	→		
Bypass Feedback Trip	←	Enable	→		
External Maint. Breaker (MT) :	←	Enable	→	↑	
Battery Switch (BAT) :	←	Enable	→	↓	
<input type="button" value="Save Config"/>				↩	

### 3.3.5 Maint: Touch correction and battery self-test.



**3.3.5.1 Battery Self-Check:** can select check by Timing Daily, Timing Weekly. Cycle Mode. The default value is Timing Self-Check Close.









**3.3.5.1.1 Timing Daily:** modify the check date, time and check time (10S(default), 10min, EOD).

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1  1  1	
Self-Check Mode	Timing Daily		
Date/Cycle(Day)	20 Day	20 Hour	20 Min
Check Time(M)		10s	
Save Config			

**3.3.5.1.2 Timing Weekly:** modify the check date, time and check time(10S(default),10min, EOD).

Single Mode		2018-09-19 15:44:22	
 Mains State	Exit	 1  1  1	
Self-Check Mode	Timing Weekly		
Date/Cycle(Day)		Monday	
	20 Hour	20 Min	
Check Time(M)		10s	
			10s
Save Config			

### 3.3.6 Common: INV ON/OFF, Battery test and Fault clear.



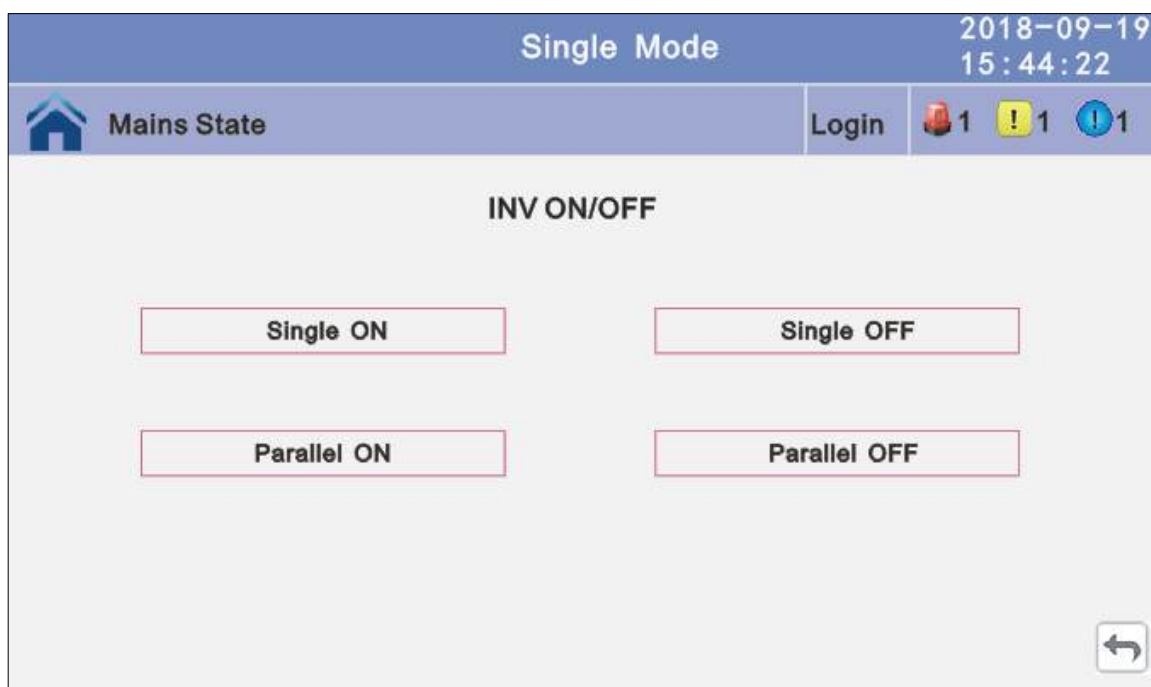
#### 3.3.6.1 INV ON/OFF

**Single OFF:** Inverter OFF location UPS

**Single ON:** Inverter ON location UPS

**Parallel OFF:** Inverter OFF all parallel UPSs

**Parallel ON:** Inverter ON all parallel UPSs





### 3.3.6.2 Battery Test

**10S:** battery test for 10s

**10min:** battery test for 10min

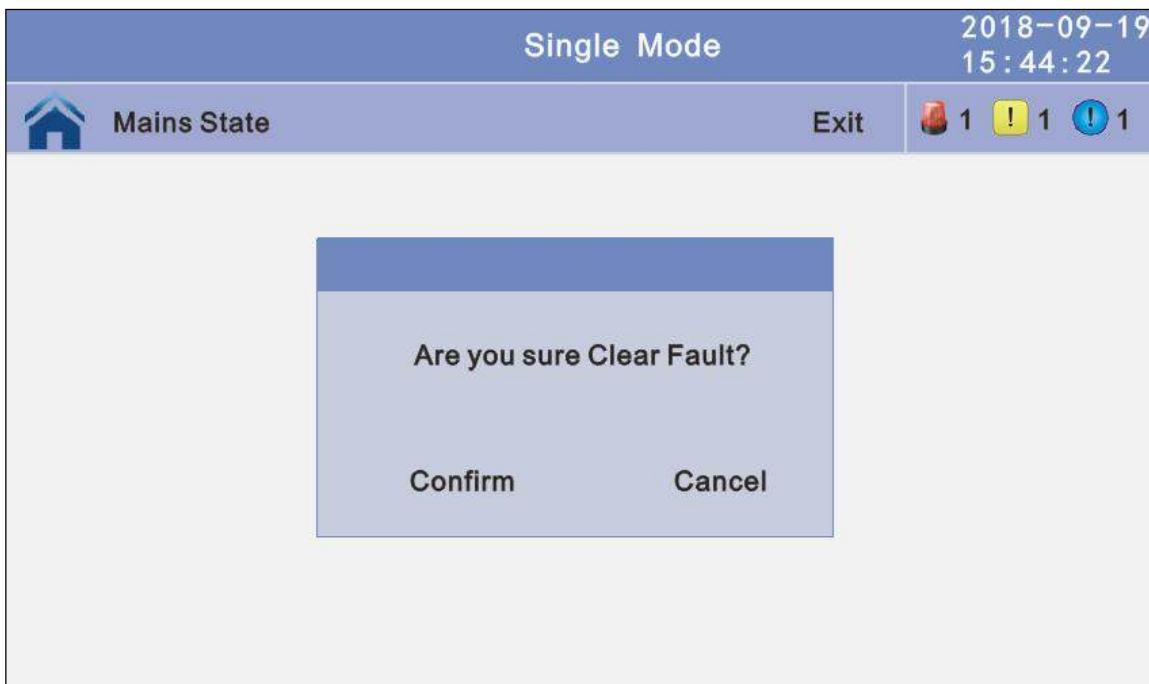
**EOD:** battery test to EOD

**-10%:** battery test down 10% capability.



The screenshot shows the 'Single Mode' interface with the date '2018-09-19' and time '15:44:22'. The 'Mains State' is indicated by a house icon. A 'Login' button is present. On the right, there are three status indicators: a red fire alarm icon with '1', a yellow warning icon with '1', and a blue information icon with '1'. The main area is titled 'Battery Test' and contains five buttons: 'OFF', 'EOD', '10S', '-10%', and '10min'. A back arrow button is located in the bottom right corner.

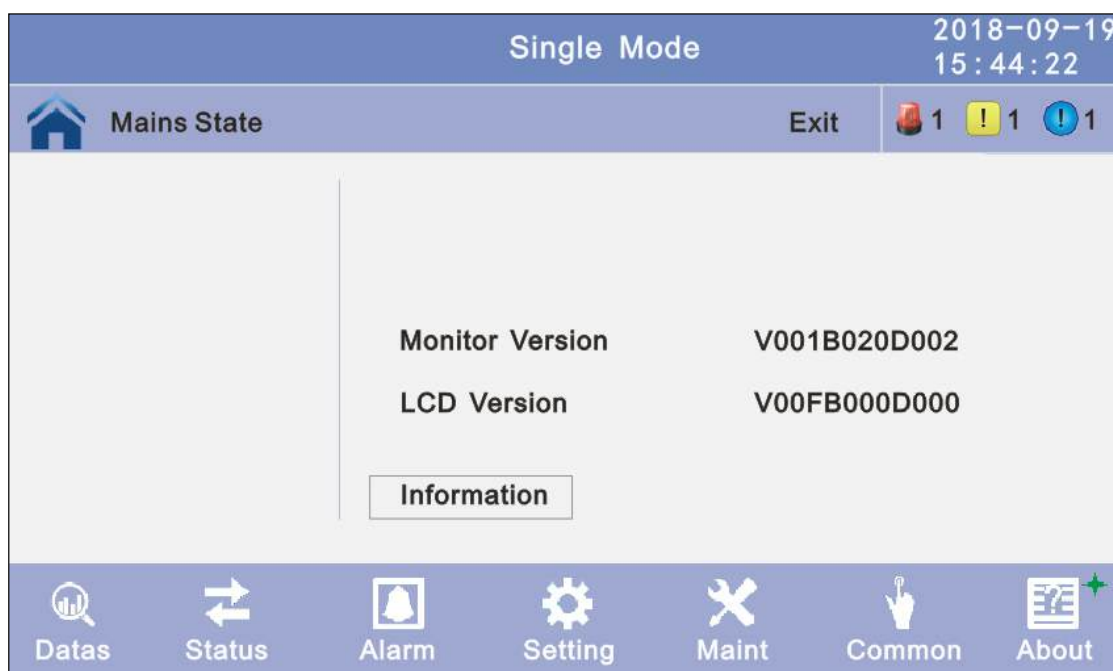
### 3.3.6.3 Fault clear: Clear the current fault (not for all faults).



The screenshot shows the 'Single Mode' interface with the date '2018-09-19' and time '15:44:22'. The 'Mains State' is indicated by a house icon. An 'Exit' button is present. On the right, there are three status indicators: a red fire alarm icon with '1', a yellow warning icon with '1', and a blue information icon with '1'. A modal dialog box is displayed in the center with the text 'Are you sure Clear Fault?'. Below the text are two buttons: 'Confirm' and 'Cancel'.

### 3.3.7 About: check the software version

#### 3.3.7.1 Monitor and LCD software version



### 3.4 Display Messages/Troubleshooting

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

#### Display messages

##### Operational Status and Mode(s)

	AUDIBLE ALARMS		DISPLAY LEDS			
UPS Modes	Alarm Status	Mutable On/Off	Online/Alarm	Bypass	Battery	Inverter
UPS Initialization	Beeps, Only ring once	No	Blink/0.5s	Blink/0.5s	Blink/0.5s	Blink/0.5s
UPS Online Mode (Normal)	NO Beeps	NO Beeps	Off	Off	Off	On
UPS Battery Mode	Beeps/2s	Yes	Off	Off	On	Off
UPS Battery test Mode	NO Beeps	NO Beeps	Off	Off	On	Off
UPS ECO Mode	NO Beeps	NO Beeps	Off	On	Off	Off
UPS Standby Mode	NO Beeps	NO Beeps	Off	Off	Off	Off
UPS Static Bypass Mode	NO Beeps	NO Beeps	Off	On	Off	Off
UPS Maintenance Bypass Mode	NO Beeps	NO Beeps	Off	On	Off	Off
UPS Frequency Coverter Mode	NO Beeps	NO Beeps	Off	Off	Off	On
UPS Load Overload	Beeps/1s	Yes	Off	Off	Off	Blink/2s
UPS Warnings	Beeps/2s or Beeps/1s	Yes	Blink/2s	Blink/2s	Off	On
UPS Faults	Beeps/2s or Beeps/1s	Yes	On	On	Off	Off

## Fault Information

No	Fault Cord	UPS Alarm Warning	Buzzer	LED
1	002	REC Over Temperature	Twice per second	Fault LED lit
2	003	REC par. cable Fault	Twice per second	Fault LED lit
3	004	REC Over Current	Beep continuously	Fault LED lit
4	005	REC Power Fault	Beep continuously	Fault LED lit
5	007	Input SCR Fault	Beep continuously	Fault LED lit
6	00A	Battery SCR Fault	Beep continuously	Fault LED lit
7	00C	Charge SCR Fault	Beep continuously	Fault LED lit
8	00E	Fan Fault	Beep continuously	Fault LED lit
9	011	Fan Power fault	Beep continuously	Fault LED lit
10	012	Charger Over Temp.	Beep continuously	Fault LED lit
11	013	Soft Start Failed	Beep continuously	Fault LED lit
12	014	BAT Charger Fault	Beep continuously	Fault LED lit
13	016	REC Comm. Fault	Once per 2 seconds	Fault LED blinking
14	019	REC Initializes Fault	Beep continuously	Fault LED lit
15	01D	Unit insert fault	Once per 2 seconds	Fault LED lit
16	063		Once per 2 seconds	Fault LED lit
17	01E	Rectifier Fault	Beep continuously	Fault LED lit
18	041	Inverter Fault	Beep continuously	Fault LED lit
19	044	INV IGBT SHORT	Beep continuously	Fault LED lit
20	047	Inverter relay Short	Beep continuously	Fault LED lit
21	04A	Inverter relay Broken	Beep continuously	Fault LED lit
22	04D	INV par. cable Fault	Twice per second	Fault LED lit
23	051	Output Short Circuit	Once per second	Fault LED blinking
24	054	INV Comm. Fault	Once per 2 seconds	Fault LED blinking
25	057	INV Initializes Fault	Beep continuously	Fault LED lit
26	05A	INV self-test Fault	Beep continuously	Fault LED lit
27	05E	DC Component Fault	Once per 2 seconds	Fault LED lit
28	061	DC bus abnormal	Beep continuously	Fault LED lit
29	064	INV DSP Power Fault	Beep continuously	Fault LED lit
30	067	INV Over Temperature	Twice per second	Fault LED lit
31	068	Load Sharing Fault	Twice per second	Fault LED lit
32	06A	Cabinet mode Fault	Beep continuously	Fault LED lit
33	06B	Fuse Broken	Beep continuously	Fault LED lit
34	081	Par. cable Fault	Twice per second	Fault LED lit

No	Fault Cord	UPS Alarm Warning	Buzzer	LED
35	086	ECU Insert Fault	Once per 2 seconds	Fault LED lit
36	088	ECU Power Fault	Beep continuously	Fault LED lit
37	08B	ECU Comm. Fault	Beep continuously	Fault LED lit
38	08D	ECU Initializes Fault	Once per 2 seconds	Fault LED blinking
39	091	Bypass SCR Broken	Beep continuously	Fault LED lit
40	0C2		Beep continuously	Fault LED lit
41	094	Bypass SCR short	Beep continuously	Fault LED lit
42	0C5		Beep continuously	Fault LED lit
43	097	BPS Over Temperature	Beep continuously	Fault LED lit
44	0CF		Beep continuously	Fault LED lit
45	09A	Output CT Reverse	Beep continuously	Fault LED lit
46	09D	Bypass Feedback Fault	Beep continuously	Fault LED lit

### Alarm Information

No	Alarm Cord	UPS Alarm Warning	Buzzer	LED
1	103	Battery Over Voltage	Once per second	BATTERY LED blinking
2	104	BAT Low Pre-warning	Once per second	BATTERY LED blinking
3	105	Battery Reverse	Twice per second	BATTERY LED blinking
4	106	Battery EOD	Once per second	BATTERY LED blinking
5	107	Battery Voltage low	Once per second	BATTERY LED blinking
6	108	No Battery	Once per second	BATTERY LED blinking
7	109	Input Phase Reverse	Once per second	INVERTER LED blinking
8	10A	Input N-Line lost	Twice per second	INVERTER LED blinking
9	10B	Mains Freq. Abnormal	Once per 2 seconds	INVERTER LED blinking
10	10C	Mains Volt. Abnormal	Once per 2 seconds	INVERTER LED blinking
11	10D	REC Comm. Error	Once per 2 seconds	INVERTER LED blinking
12	10E	Mains input lost	Once per 2 seconds	
13	10F	Set Data Err.	Once per 2 seconds	FAULT LED blinking
14	121	INV Par. cable abnormal	Once per 2 seconds	FAULT LED blinking
15	125	INV Overload	Once per 2 seconds	INVERTER LED blinking
16	126	INV not synchronized	Beep continuously	INVERTER LED blinking
17	12A	INV Set Data Err	Once per 2 seconds	FAULT LED blinking
18	129	INV Comm. Error	Once per 2 seconds	FAULT LED blinking
19	141	Bypass Switch to Num	Once per 2 seconds	BYPASS LED blinking
20	142	Unit quantity mismatch	Once per 2 seconds	FAULT LED blinking

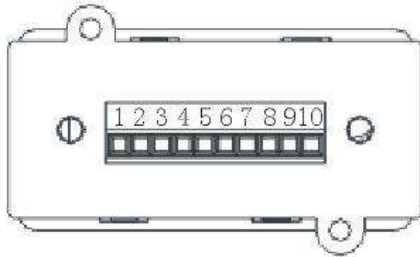


## Relay card

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

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

Table: Relay Contacts (communication card)



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



### CAUTION!

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



## Appendix 1 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.

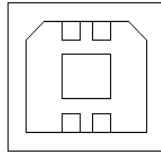
(2) Try to describe the fault with more details, such as LCD display info, LED lights status, etc.

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; Input voltage low; The input switch of the UPS is not switched on.	Measure if the UPS input voltage/frequency is within the window. Check if UPS input is switched on
2	Utility normal but Utility LED does not light on, and the UPS operates at battery mode	The input breakers of the UPS are not switched on; input cable is not well connected	Switch on the input breaker; Make sure the input cable is well 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	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
8	Cannot Black start	Battery switch is not properly closed: Battery fuse is not open: Or Battery low: Battery quantity set wrong; Power breaker in the rear panel not switch ON.	Close the battery switch: Change the fuse: Recharge the battery: Power ON the UPS with AC to set the battery quantity & quantity; Switch on the power breaker.

## Appendix 2 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



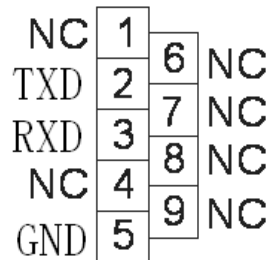
### CAUTION!

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



## Appendix 3 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

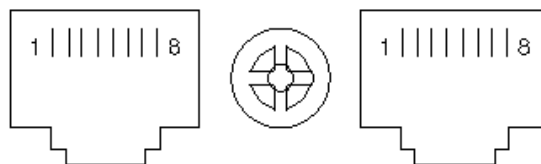


### CAUTION!

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

## Appendix 4 RS485 communication port definition

Definition of port:



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

device(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

Communication data format

Baud rate ----- 9600bps

Byte length ----- 8bit

End bit ----- 1bit

Parity check -----none

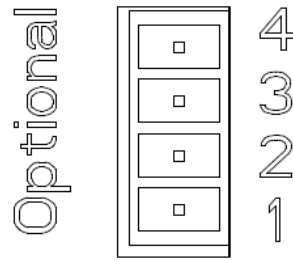


**CAUTION!**

**RS485 port pin7 is 12Vdc!**

## Appendix 5 Optional port definition

Definition of Male port:



Instruction:

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

Function 1 description (Optional):

- ◆ Close the bypass breaker when feedback alarm.

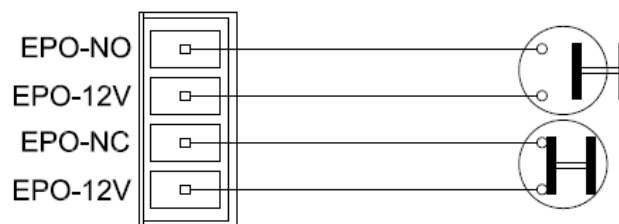
Function 2 description (Optional):

- ◆ Close the battery breaker when battery voltage low.

## Appendix 6 REPO instruction

Definition of port:

Connection diagram:



Connection between the button and UPS REPO port.

Button	UPS REPO	Description
Pin 1	Pin 1	EPO-NO
Pin 2	Pin 2	EPO-12V
Pin 1	Pin 3	EPO-NC
Pin 2	Pin 4	EPO-12V

- ◆ A remote emergency stop switch can be installed in a remote location and connection through simple wires to the REPO connector.