

ALPHA OUTBACK ENERGY

Tri Power X33 MOD CE5S BP24 10-75kVA

USER MANUAL

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Information on the manual

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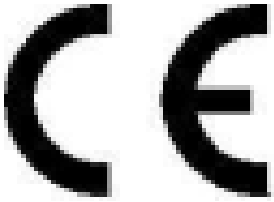
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Preface

We thank you for the trust in selecting our UPS.

Our equipment complies with the European Community directives for professional equipment



The purpose of this manual is to introduce the operating principles of the UPS and to provide instructions for its safe operation. The manual also provides troubleshooting assistance should an abnormal message or behaviour occur.

Should an abnormal message not covered in this manual appear, please contact your local authorized service agent for troubleshooting and repair.

All of the installation, operation, and maintenance of this device must be performed by authorized and qualified technicians who are familiar with this manual.

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.

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

1.1 Symbols used in this guide



WARNING!

Risk of electric shock



CAUTION!

Read this information to avoid equipment damage

1.2 Safety notes

1. Even no connection with utility power, 220/230/240VAC voltage may still exist at UPS outlet!
2. For the sake of human being safety, please well earth the UPS before starting it.
3. Don't open or damage battery, for the liquid spilled from the battery is strongly poisonous and do harmful to body!
4. Please avoid short circuit between anode and cathode of battery, otherwise, it will cause spark or fire!
5. Don't disassemble the UPS cover, or there may be an electric shock!
6. Check if there exists high voltage before touching the battery
7. Working environment and storage way will affect the lifetime and reliability of the UPS. Avoid the UPS from working under following environment for long time
   - Area where the humidity and temperature is out of the specified range (temperature 0 to 40℃, 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.



BEFORE WORKING ON THIS CIRCUIT

-ISOLATE UNINTERRUPTIBLE POWER SYSTEM (UPS)

-THEN CHECK FOR HAZARDOUS VOLTAGE BETWEEN ALL TERMINALS INCLUDING THE PROTECTIVE EARTH

RISK OF VOLTAGE BACKFEED

9. Affix a label bearing the following words on all external switches of the UPS Unit power supply:
10. There is no output switch in the Standard Version cabinet. During installation, an external output switch is required, and the auxiliary contact signal of the output switch is connected to the dry contact of the output switch of UPS, and the output dry contact signal of the switch is enabled on the display screen of ups.

11. **Do not connect the UPS output to regenerative load systems including photovoltaic system and speed drives. Failure to follow instruction can result in equipment damage!**

2. Main Features

2.1 Summarization

The Centauri Series UPS systems are modular online double-conversion systems with a modular design and internal redundancy. Virtually any level of redundancy (n+x) can be configured via software, and the modular design allows the UPS to scale to meet increasing load requirements.

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

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

2.2 Functions and Features

- Digital control
- 19-inch standard cabinet
- 2-meter high cabinets are provided according to the user's requirement.
- Modularized design
- High power-density design
- The height of the single module is 2U.
- N+X parallel redundancy

This series UPS adopts N+X parallel redundancy design, user can set different redundancy according to the importance of the load. While the redundancy modules are set more than two, the availability of UPS system will achieve 99.999%, which may satisfy the required reliability of the critical load connected. Through LCD display setting, you may configure the required quantity of the redundancy unit. When the load connected is over the number of the redundancy, the UPS will alert right away. The design of the MTBF (Meantime before Failure) is up to 250,000 hours.

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

- Parallel redundant control system.
- Optimizing distributed convergence for the cabinet.
- Centralized bypass.
- Common Battery.
- Automatic charge current adjustment according to battery capacity connected.
- 3-Stage intelligent charging.
- Super-large LCD touch display.
- Remote monitoring via SNMP.
- Optional Accessories available such as Isolation transformer, distribution Panel, SNMP Card, Relay Contact Board, etc...
- Equip with Maintenance Bypass Switch for easy maintenance purpose. Superior MTTR (Meantime to repair) & Short shutdown time in maintenance.
- Centralized monitoring module is also available.
- EPO and REPO function.

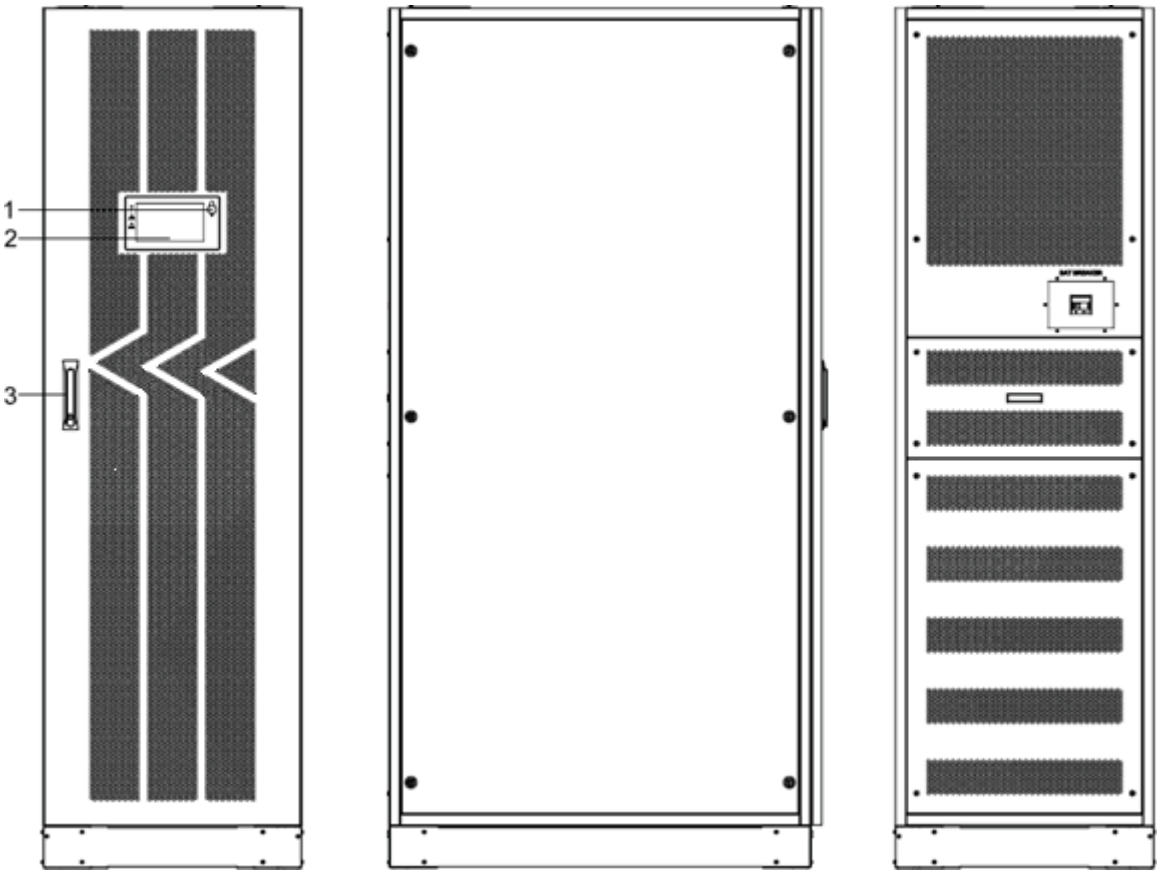
3. Installation

3.1 Unpack checking

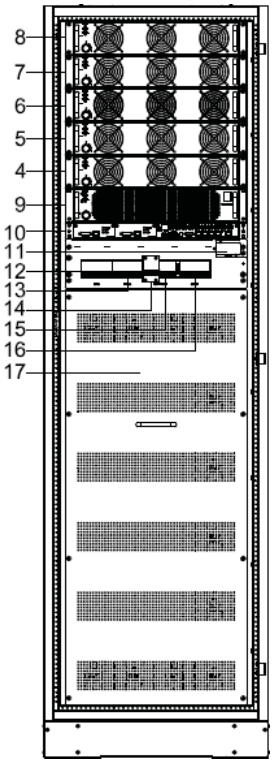
- Don’t lean the UPS when moving it out from the packaging
- Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
- Check the accessories according to the packing list and contact the dealer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

3.2 The appearance of the product

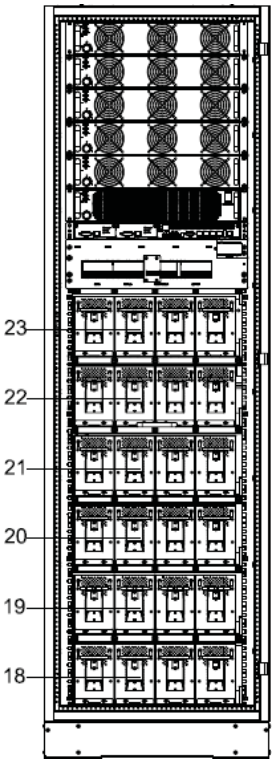
MOD CE-BP24



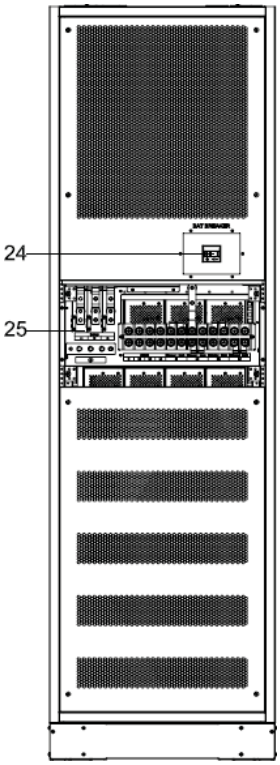
Front View (with battery cover)



Front View (without cover)



Rear View (without cover)



UPS components

Table 1: UPS components

1	EPO key	for location energy power stop
2	LCD panel	Display UPS data and status
3	Front door lock	
4	Power module 1	15/20/25/30kVA power module for 45/60/75kVA cabinet
5	Power module 2	15/20/25/30kVA power module for 45/60/75kVA cabinet
6	Power module 3	15/20/25/30kVA power module for 60/75kVA cabinet, 30kVA power module for redundancy module for 60kVA cabinet
7	Power module 4	15kVA power module for 75kVA cabinet, 20/25/30kVA power module is redundancy module for 60 and 75kVA cabinet
8	Power module 5	15kVA power module for 75kVA cabinet, 20/25/30kVA power module is redundancy module for 60 and 75kVA cabinet
9	Bypass module	
10	Control unit	
11	Intelligent Slot	SNMP card/ Relay card
12	Mains breaker	
13	Bypass breaker	
14	Maintenance breaker cover	
15	Maintenance breaker	
16	Output breaker	
17	Battery bank cover	
18	Battery group 1	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
19	Battery group 2	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
20	Battery group 3	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
21	Battery group 4	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
22	Battery group 5	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
23	Battery group 6	Included 4 pcs battery kits and even battery kit included 10 pcs 7Ah or 9Ah batteries
24	Battery breaker	
25	Distribution	

Power module configuration

Pmax = 75kVA

Power module rate	Power module number	Redundancy number
10kVA	5	
15kVA	5	
20kVA	3	1 or 2
25kVA	3	1 or 2
30kVA	2	1 or 2 or 3

Note: Do not exceed the cabinet's maximum power rating.

Control unit

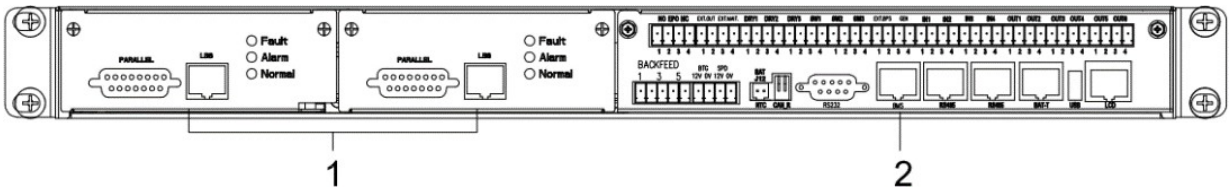


Table 2: Control unit

1	ECU 1/2 Centralized control unit	2	Monitor unit

ECU unit

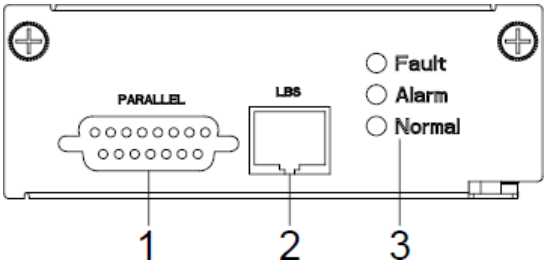


Table 3: ECU Unit

1	Parallel port	2	LBS port
3	LED		

Monitor unit

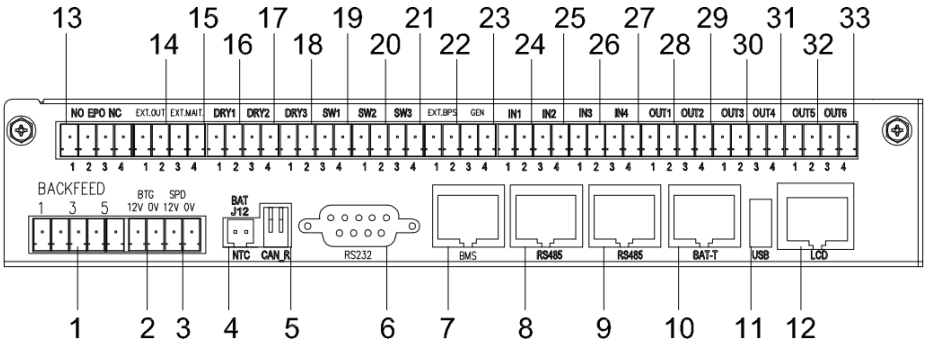


Table 4: Monitor unit

	Component	Description
1	BACKFEED	Bypass backfeed signal input port, PIN 1 common, PIN3 NO, PIN5 NC
2	BTG	Battery grounding detect signal input port, 12V power supply, 0V GND
3	SPD	SPD detect signal input port, 12V power supply, 0V GND
4	BAT_T	NTC temperature sensor port
5	R-CAN	CAN communication resistor adjust
6	RS 232	RS 232 communication port
7	BMS	Communicate to Lithium Battery BMS, include CAN RS485 signal
8	RS-485	RS 485 communication port, parallel to 19
9	RS-485	RS 485 communication port, parallel to 18
10	BAT_T	Battery temperature sensor port (RS 485)
11	USB	USB port for software update and history download
12	LCD	For LCD power supply and data communication
13	EPO	NO-12V; Normally open port, NC-12V; normally close port
14	EXT.OUT	External output breaker auxiliary contact signal port, PIN1: 12Vdc, PIN2: GND
15	EXT.MAINT	External maintenance breaker auxiliary contact signal port, PIN1: 12Vdc, PIN2: GND
16	DRY1	Battery group 1 breaker driver signal output port PIN1: 24Vdc, PIN2: GND
17	DRY2	Battery group 2 breaker driver signal output port PIN3: 24Vdc, PIN4: GND
18	DRY3	Battery group 3 breaker driver signal output port PIN1: 24Vdc, PIN2: GND
19	SW1	Battery group 1 breaker auxiliary contact signal port, port, PIN3 12Vdc, PIN4 GND
20	SW2	Battery group 2 breaker auxiliary contact signal port, port, PIN1 12Vdc, PIN2 GND
21	SW3	Battery group 3 breaker auxiliary contact signal port, port, PIN3 12Vdc, PIN4 GND
22	EXT.BPS	External bypass breaker auxiliary contact signal port, PIN1 12Vdc, PIN2 GND
23	GEN	Generator detect signal input port, PIN1: 12Vdc, PIN2: GND
24	IN1	Optional input dry contact 1, PIN1: 12Vdc, PIN2 GND
25	IN2	Optional input dry contact 2, PIN3: 12Vdc, PIN4 GND
26	IN3	Optional input dry contact 3, PIN1: 12Vdc, PIN2 GND
27	IN4	Optional input dry contact 4, PIN3: 12Vdc, PIN4 GND
28	OUT1	Optional output dry contact 1, PIN1: common, PIN2 NO
29	OUT2	Optional output dry contact 2, PIN3: common, PIN4 NO
30	OUT3	Optional output dry contact 3, PIN1: common, PIN2 NO
31	OUT4	Optional output dry contact 4, PIN3: common, PIN4 NO
32	OUT5	Optional output dry contact 5, PIN1: common, PIN2 NO
33	OUT6	Optional output dry contact 2, PIN3: common, PIN4 NO

3.3 UPS module appearance

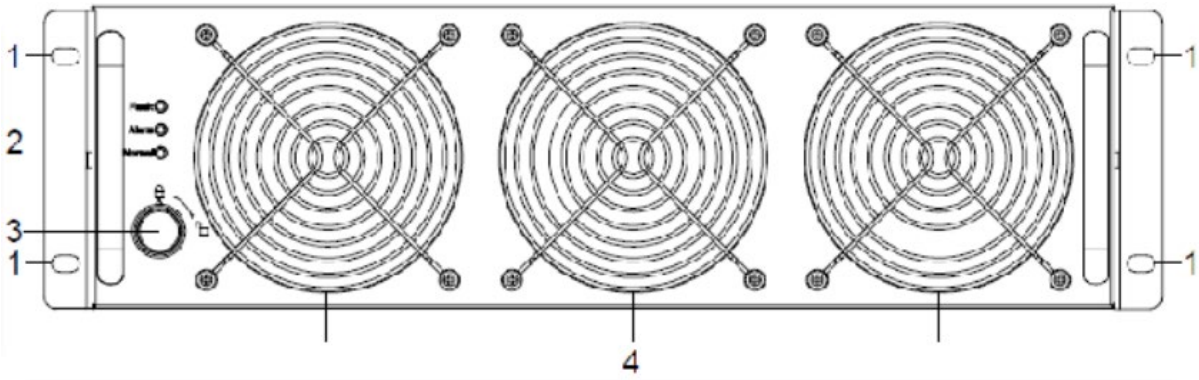
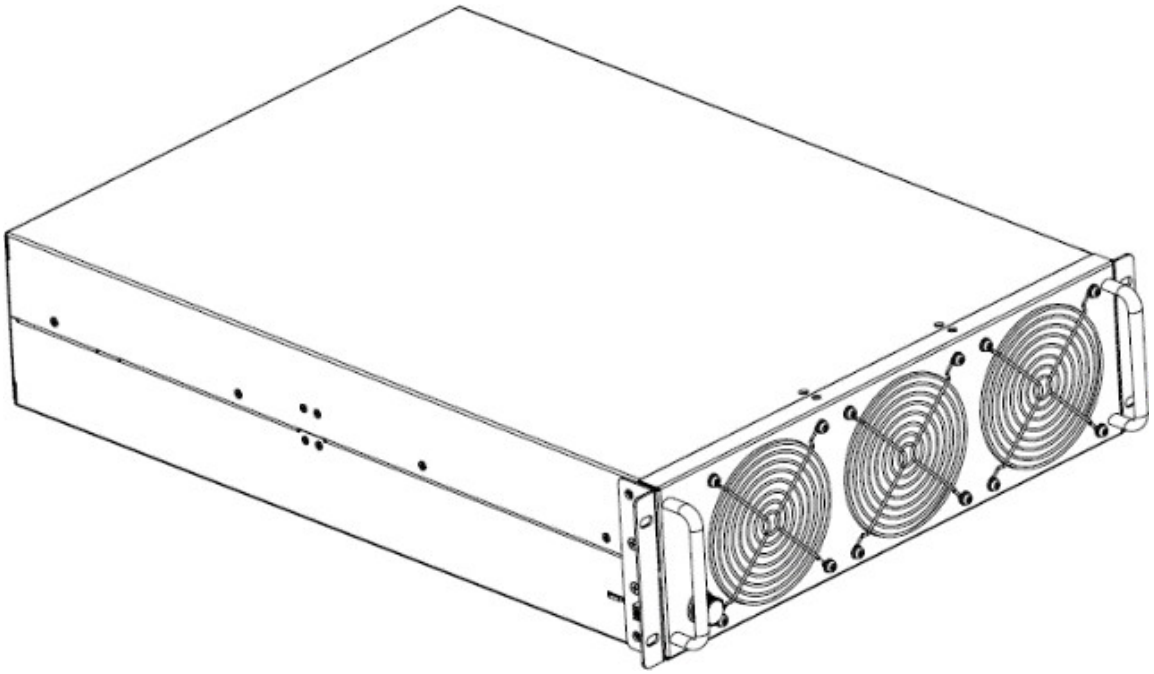


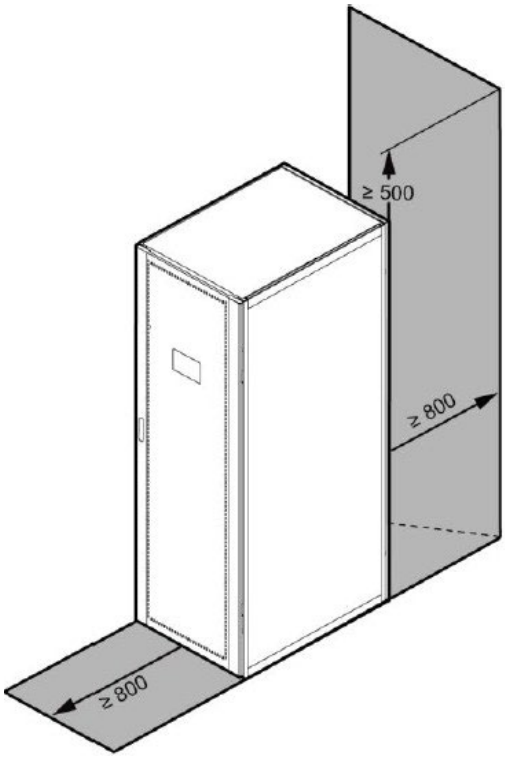
Table 5: Power module

1	Module fixed screw	2	Status-LED
3	Module switch	4	Fan



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 800mm and 800mm 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℃～40℃. If the environment temperature exceeds 40℃, the rated load capacity should be reduced by 12％ per 5℃. The max temperature can't be higher than 50℃.
- If the UPS is dismantled under low temperature, it might be in a condensing condition. The UPS can't be installed unless the internal and external of the equipment is fully dry. Otherwise, there will be in danger of electric shock.
- Batteries should be mounted in an environment where the temperature is within the required specs. Temperature is a major factor in determining battery life and capacity. In a normal installation, the battery temperature is maintained between 15°C and 25°C. Keep batteries away from heat sources or main air ventilation area, etc

WARNING!



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

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

CAUTION!



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

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

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

Table 6: Load coefficient

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 Internal battery bank installation

The specification of three input three output series battery kit is W107*H160*D694mm. It includes battery connection cables and terminal, with max. Capacity of 10pcs 12V/7AH or 12V/9AH batteries inside. 4pcs kits makes up a battery group, the voltage is ±240Vdc and can build in 6 groups batteries in one cabinet

3.5.1 Battery kits installation

- Remove the crews of battery cover and remove it, as shown in Fig.1.

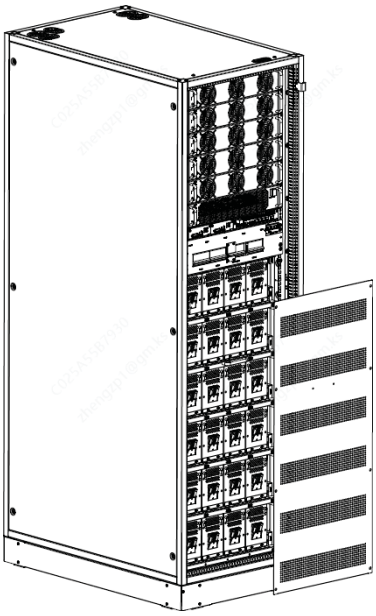


Fig. 1 Battery cover

- Remove the screws of battery kits, as shown in Fig.2.

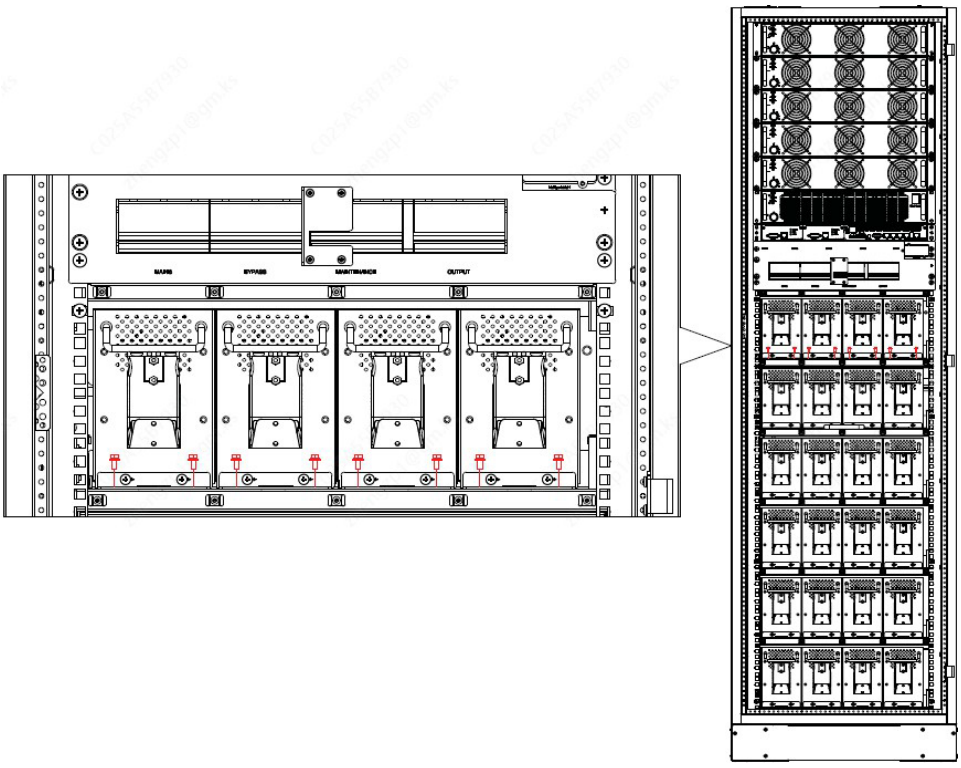


Fig. 2: battery kit screws

- Remove the connectors and cables of battery kits, as shown in Fig.3.

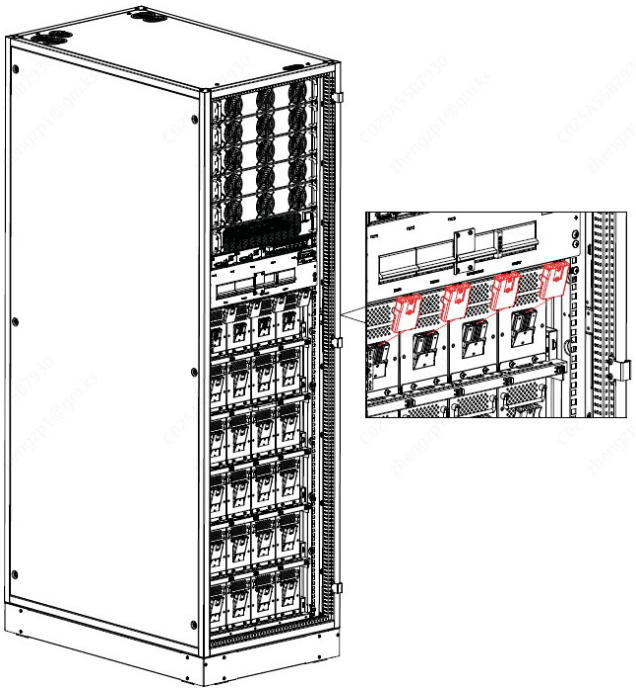


Fig. 3: battery kit connector

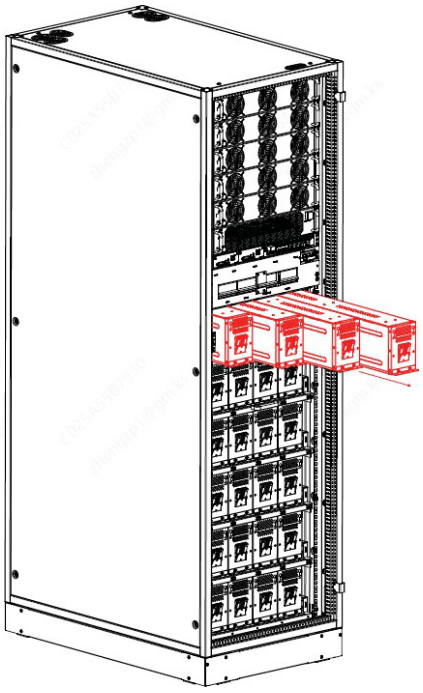


Fig. 4: battery trays

- Remove the battery kits, as shown in Fig.4

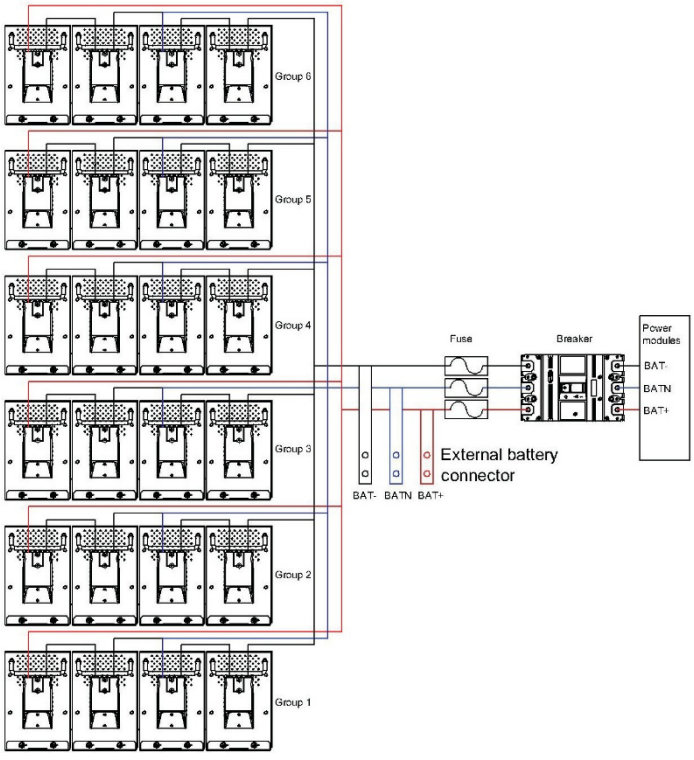
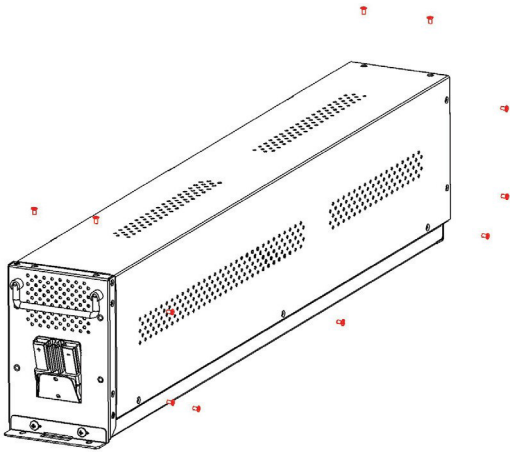


Fig. 5: Battery connection of cabinet

3.5.2 Battery installation

- Remove the screws of top cover of the battery kit and remove the cover (push to direction 1 first), as shown in Fig.6.



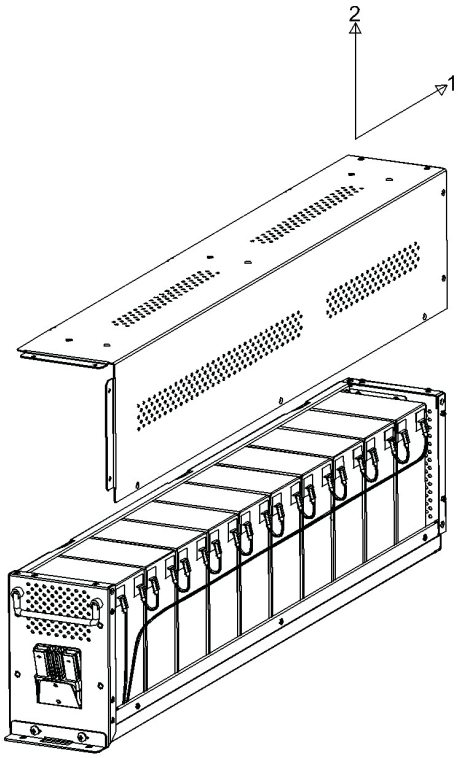
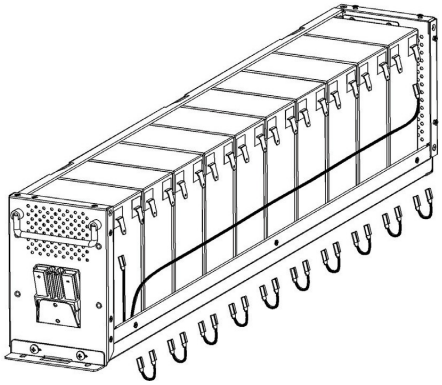


Fig. 6: remove screws and top cover

- Remove the connect cables of the batteries and remove the batteries, as shown in Fig.7



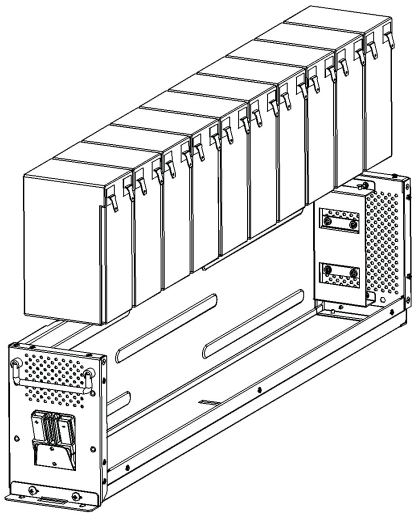


Fig. 7: remove cables and batteries

- Battery connection of kit, as shown in Fig.10

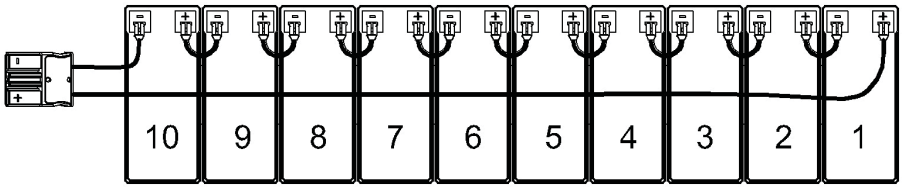
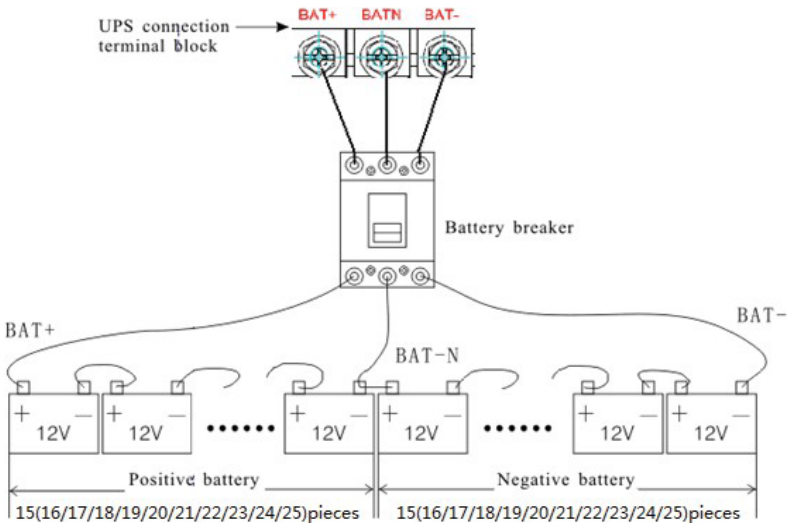


Fig. 8: Battery connection of kit

3.6 External battery connection

The UPS adopts positive and negative double battery framework, total 30(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 15th (16th/17th/18 th/19th/20 th/21 th/22 th/23 th/24 th/25 th) and the anode of the 16th (17th/18th/19 th/20th/21 th/22 th/23th/24 th/25 th/26 th) 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.



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. Factory setting of the long-run unit is battery quantity---30pcs, battery capacity---12V 9AH. 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.



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.



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.

3.7 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.

3.8 Power cables

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

WARNING!



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

3.8.1 Recommended cross section areas for power cables

- For future expansion purpose, it is economical to install power cable according to the full rating capacity initially. The diameter of cable is shown in Table 7

Table 7: Cross section areas

UPS cabinet [kVA]	Cable Dimension [mm²]				
	AC Input	BSP input	AC Output	DC input	Grounding
75	50	50	50	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 the rated voltage is 400V, multiply the currents by 0.95. If the rated voltage is 415V, multiply the currents by 0.92.
- If primary loads are non-linear loads, increase the cross-sectional areas of neutral wires1.5 –1.7 times.
- The nominal battery discharge current refers to the current of forty (40) 12V batteries at 480V in standard configuration.
- The maximum battery discharge current refers to the current when forty 12V batteries in standard configuration, that is, two hundred and forty 2V battery cells (1.67V/cell), stop discharging.
- The battery cable specifications are selected based on 40 batteries by default and compatible with application scenarios with 30–50 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.

3.8.2 Power cable connector requirements

Table 8: Power cable connector requirements

UPS cabinet [kVA]	Connectors	Connection mode	Bolt type	Bolt hole diameter [mm]	Torque [Nm]
30-75	Mains input, Bypass input, Battery input, Output, Grounding	Crimped OT Terminals	M8	M8	20

3.8.3 Recommended input front-end and output- back end circuit breaker

Table 9: Recommended circuit breaker

Components	[A]
Mains input circuit breaker	125
Bypass input circuit breaker	125
Output circuit breaker	125
Battery circuit breaker	250



CAUTION!

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



WARNING!

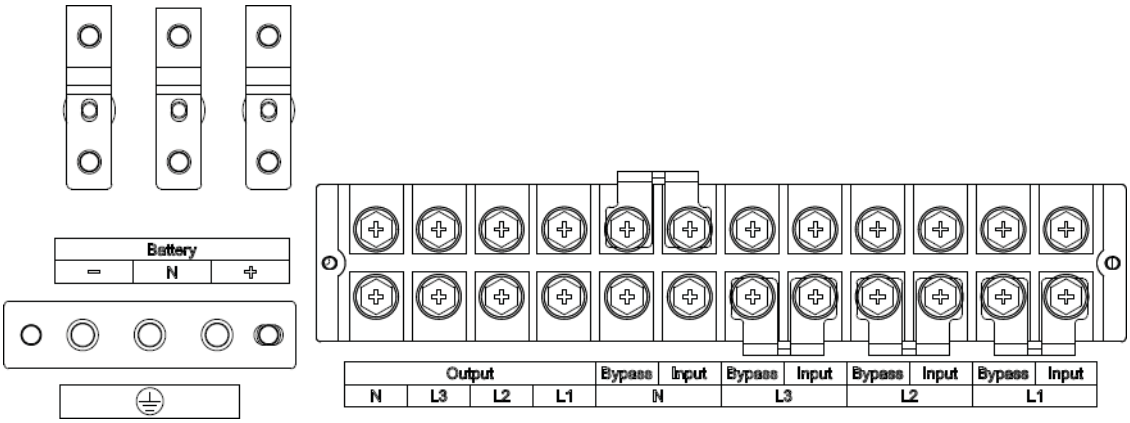
FAILURE TO FOLLOW ADEQUATE EARTHING PROCEDURES MAY RESULT IN ELECTROMAGNETIC INTERFERENCE OR IN HAZARDS INVOLVING ELECTRIC SHOCK AND FIRE

3.9 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.

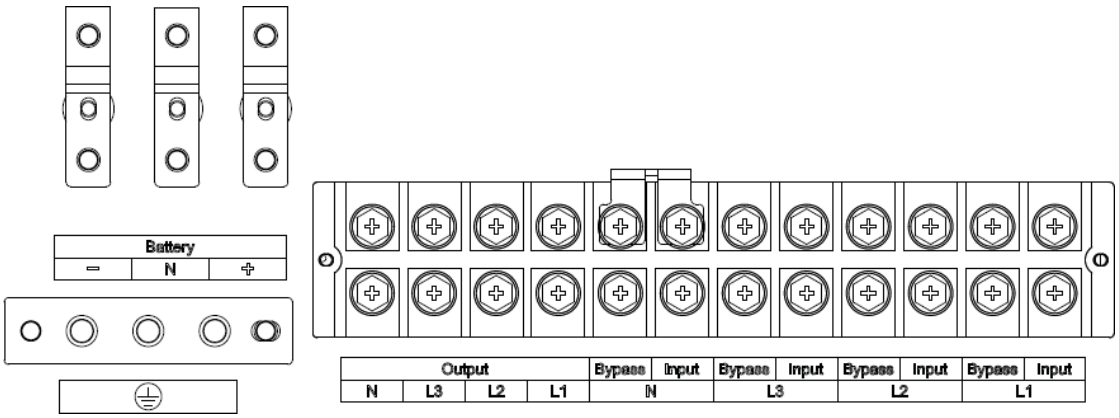
Open the UPS rear panel; Remove the cover of terminals for wiring easily.

3.9.1 Common input connection



INPUT	Primary input line	**OUTPUT**	
Bypass	Secondary/Bypass input line (optional)		
Vin-L1	Primary input Phase L1	**Vout L1**	Output Phase L1
Vin-L2	Primary input Phase L2	**Vout L2**	Output Phase L2
Vin-L3	Primary input Phase L3	**Vout L3**	Output Phase L3
Vin-N	Input Neutral for primary and secondary input	**Vout N**	Output Neutral
BPS-L1	Secondary input phase L1	**PE**	Grounding
BPS-L2	Secondary input phase L2	**BAT+**	Positive terminal batteries string
BPS-L3	Secondary input phase L3	**BATN**	Neutral terminal batteries string
		BAT-	Negative terminal batteries string

3.9.2 Dual input connection

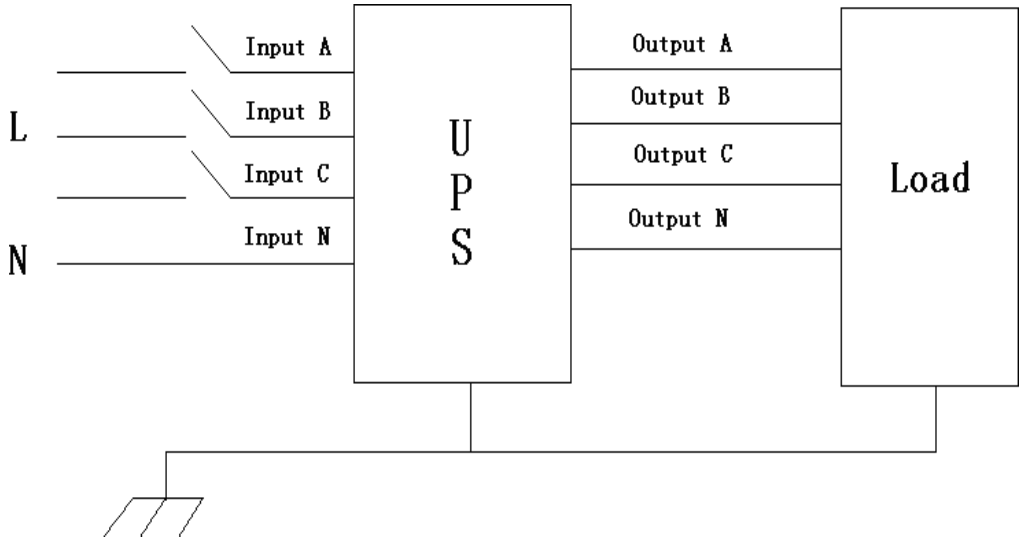


For dual input remove the bridges between Bypass and Input for L1, L2, L3 . Don't remove the bridge between Bypass input N.

INPUT	Primary input line	**OUTPUT**	
Vin-L1	Primary input Phase L1	**Vout L1**	Output Phase L1
Vin-L2	Primary input Phase L2	**Vout L2**	Output Phase L2
Vin-L3	Primary input Phase L3	**Vout L3**	Output Phase L3
Vin-N	Input Neutral for primary and secondary input	**Vout N**	Output Neutral
		PE	Grounding
		BAT+	Positive terminal batteries string
		BATN	Neutral terminal batteries string
		BAT-	Negative terminal batteries string

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;

Wiring



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.

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!

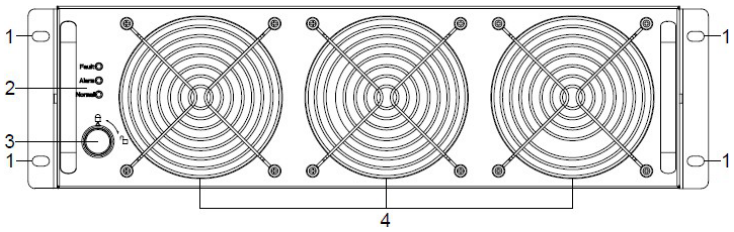


The earthing and neutral bonding arrangement must be in accordance with local and national codes of practice.

3.10 Online UPS power modules replacement

For the UPS, power modules must be inserted to make a complete UPS system.
The replacement of UPS module is very simple and can be operated online.
The control system of the UPS can detect the inserted or removed module(s) automatically.
The user may operate easily by following the steps mentioned below.

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



3.10.1 Insert module

Remove decorated panel;

1. Put the UPS module in the cabinet module slot. Push the module along the slot into the cabinet until the module is inserted properly, then the indicator will flash.
2. Fix the module with screws (1) at the positioning screw holes;
3. Switch on the module_ON switch (3) at the left of the module panel, then the red indecator
4. (2) will off.
5. After the modules start up, the system will detect the modules inserted automatically and parallel up the modules into whole system.

3.10.2 Remove UPS module

Switch off the module_ON switch (3) at the left of the module panel, then the red indicator (2) will light and green indicator flash. Remove the screws (1) of the module and remove the module from the cabinet.

WARNING!



1. Before start the module, the module_ON switch must on the "ON" status and the red indicator must flash or off.
2. Before remove the module, the module_ON switch must on the "OFF" status and the red indicator must light.
3. When insert the module under battery mode, please press “Cold start” button at bypass module panel until the modules starts.

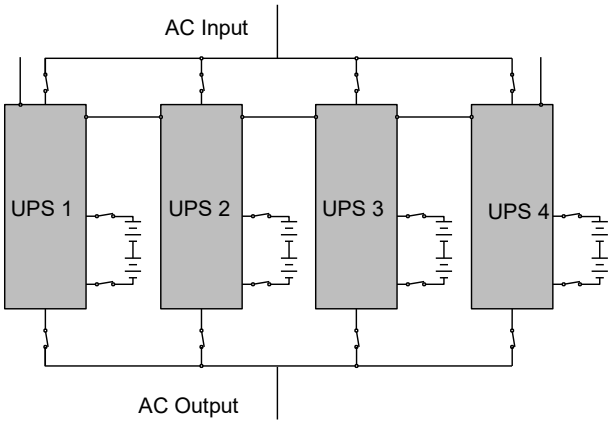
3.11 UPS Multi-module installation

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

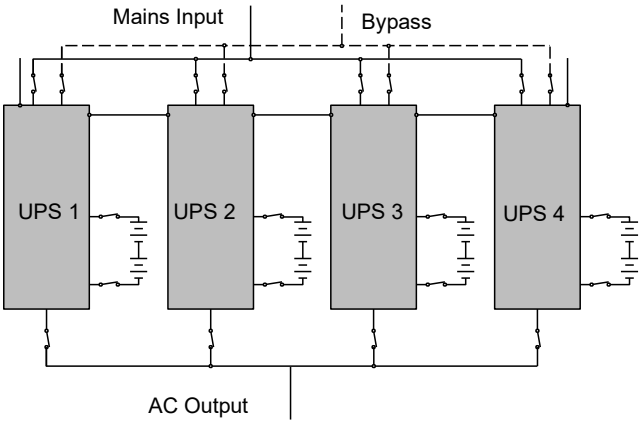
3.11.1 Cabinet installation

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

Common input



Dual input



Make sure each UPS input switch 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.

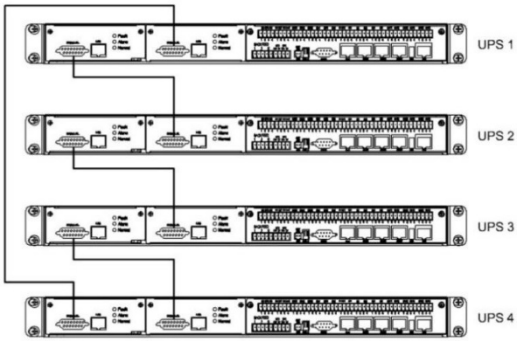


CAUTION!

A group of parallel systems is equivalent to a large capacity UPS, but it has higher reliability. In order to ensure that all UPS machines are current sharing, and comply with the relevant wiring rules, the following requirements should be met:

- All UPS must be the same rated and connected to the same way bypass power supply.
- Bypass and the mains input power must be received with the same neutral.
- The output of all UPS machines must be connected to a common output bus.
- All bypass input cables and UPS output cables should be of the same length and specification, which is to make the machine operate in the bypass mode and compare the current sharing.
- The ground of each UPS must be connected in series and reliably connected to the ground.

3.11.2 Parallel cable installation



Shielded and double insulated control cables, available 10 meters long as a standard, must be interconnected in a ring configuration between UPS modules as shown below.

The parallel control board is mounted on each UPS module. The ring configuration ensures high reliability of the control.

3.12 LBS installation (optional)

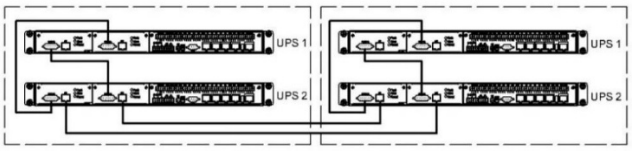
LBS system contains LCD set, cable connect and STS device

3.12.1 LCD setting

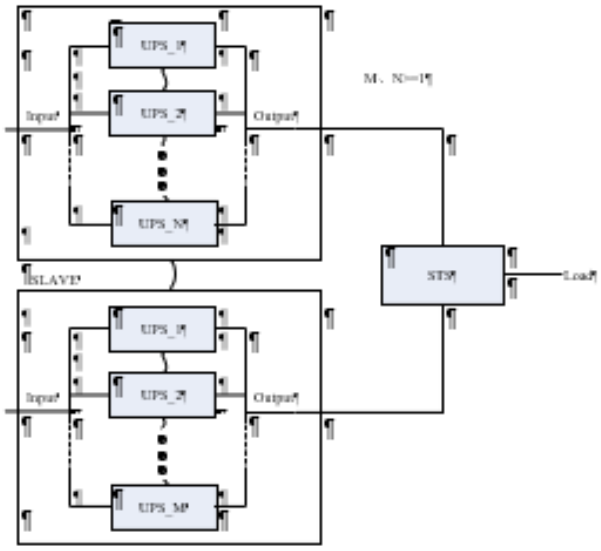
Set every UPS of the systems to be LBS Master or LBS Slave. For instance if the UPS belongs to LBS master system, its LBS setting must be set to Master.

3.12.2 LBS cable installation

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



3.12.3 UPS installation

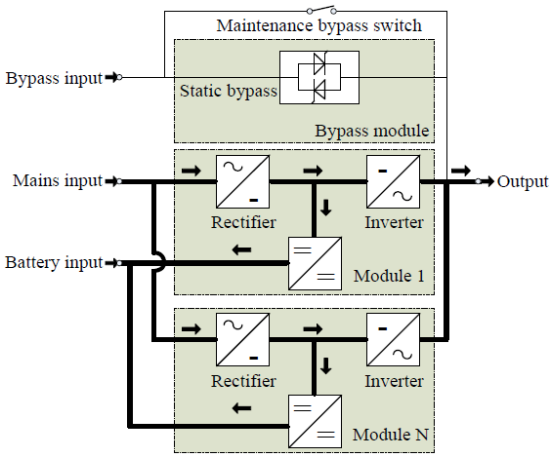


4 Operation

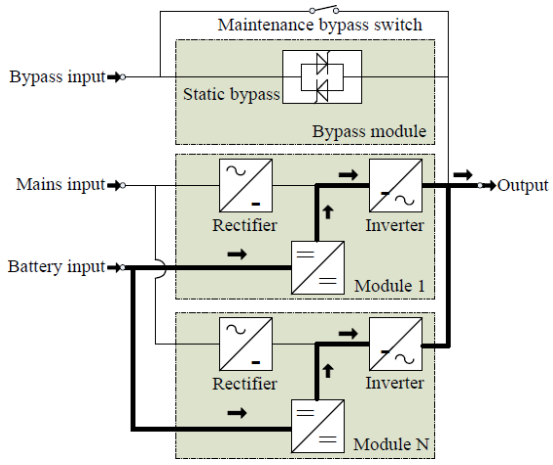
4.1 Operation modes

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

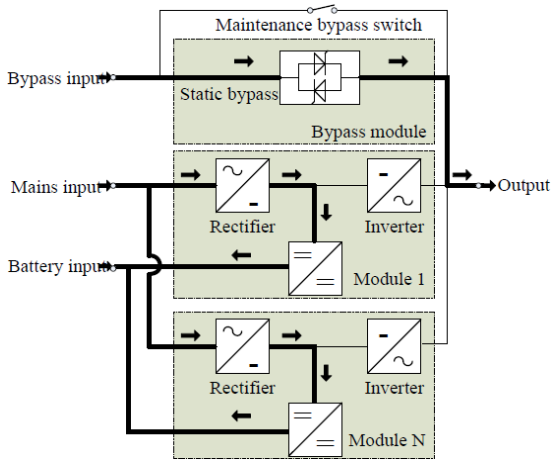
- **Normal mode**
  The rectifier/charger derives power from the AC Mains and supplies DC power to the inverter while floating and boosting charge the battery simultaneously. Then, the inverter converts the DC power to AC and supplies to the load.



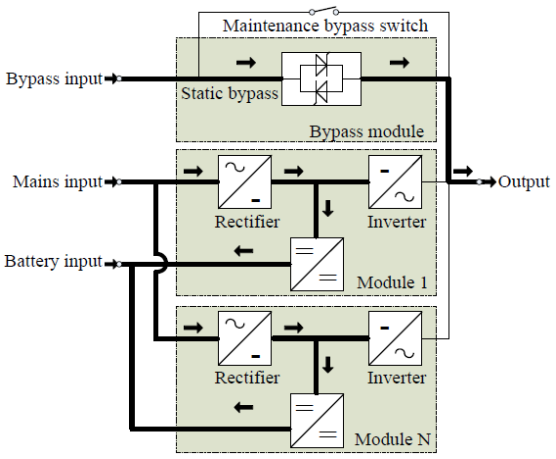
- **Battery mode (Stored Energy Mode)**
  If the AC mains input power fails, the inverter, which obtains power from the battery, supplies the critical AC load. There is no power interruption to the critical load. The UPS will automatically return to Normal Mode when AC recovers.



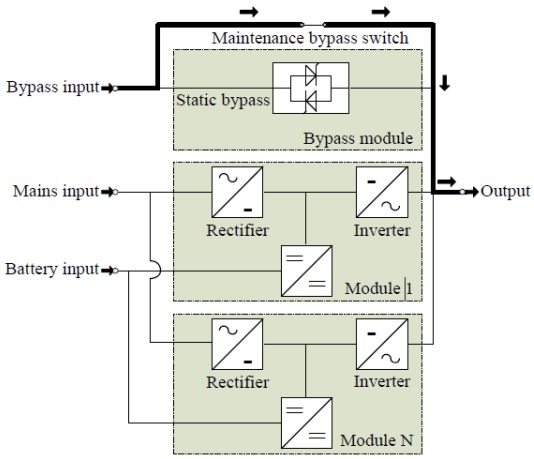
- **Bypass mode**
  If the inverter is out of order, or if overload occurs, the static transfer switch will be activated to transfer
  the load from the inverter supply to bypass supply without interruption to the critical load. In the event that the inverter output is not synchronized with the bypass 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. This manual bypass switch is fitted for all UPS modules and bears for equivalent rated load.



4.2 Turn on/odd UPS

4.2.1 Restart procedure



CAUTION!

MAKE SURE GROUNDING IS PROPERLY DONE!

- Set the Battery breaker to the “ON” position according to the user’s manual.
- Open door of the UPS to access to the main power breakers. During this procedure the output terminals will become alive.



CAUTION!

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

- Turn ON the bypass and input breakers of the UPS, make sure that “Bypass module” insert the cabinet and fix with screws and the module_in switch at the on status
- When AC MAINS input voltage within the range, and the rectifiers of the UPS will be started up in 30 seconds, then the inverter is started completely. When the output switch is “ON”, the inverter LED lights up.
- Turn ON output breaker
- If the rectifier of the module does not start-up, the green LED will flash, bypass module green LED will light on, the power module green LED will flash. when UPS turn to inverter mode power module and display panel green LED will light on.
- No matter the UPS is operated normally or not, the LCD display will indicate current status.

4.2.2 Test procedure



CAUTION!

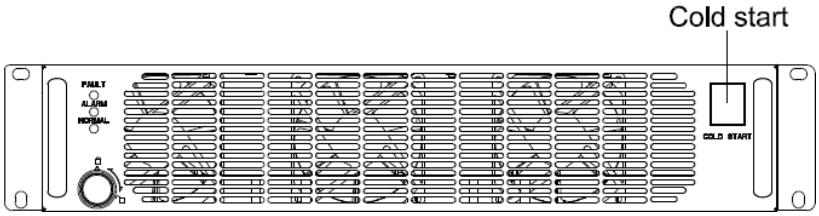
- The UPS is operating normally.
- It may take 60 seconds to boost up the system and perform self-test completely.
- Turn off the MAINS to simulate utility failure, the rectifier will turn off and the battery should feed the inverter without interruption.
- Turn on the MAINS to simulate utility recovery, 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 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 button of the bypass module.
- When battery normal, rectifier starts operation, 30s later, inverter starts and operates and the green LED will light on.



CAUTION!

Wait for approximately 30 seconds before you press the “COLD START” key

4.2.4 Maintenance bypass

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



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.

- Turn off the inverter on the LCD, remove the maintenance cover, then the UPS turns to bypass mode automatically.
- Turn on the maintenance breaker;
- Turn OFF the battery breaker;
- Turn OFF the mains breaker;
- Turn OFF the output breaker;

At this time the bypass source will supply to the load through the maintenance switch.

Switch to normal operations (from mechanical bypass)



CAUTION!

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

- Open the front and rear doors of the UPS to be easily access to the main power switches;
- Turn ON the output breaker;
- Turn ON the bypass and mains breaker;
- Turn ON the battery breaker;
- The UPS powers from the static bypass instead of the maintenance bypass.
- Turn OFF the maintenance bypass breaker, then the output is supplied by the Bypass module.
- Put on the maintenance breaker cover.

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

4.2.5 Shut down procedure



CAUTION!

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

- Press the INVERTER OFF key on the LCD display;
- Turn OFF the BATTERY breaker;
- Open the UPS door to easily access to the main power breaker;
- Turn OFF the input breaker.
- Turn OFF the OUTPUT breaker. The UPS shuts down;



WARNING!

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

4.2.6 Startup procedure for parallel system

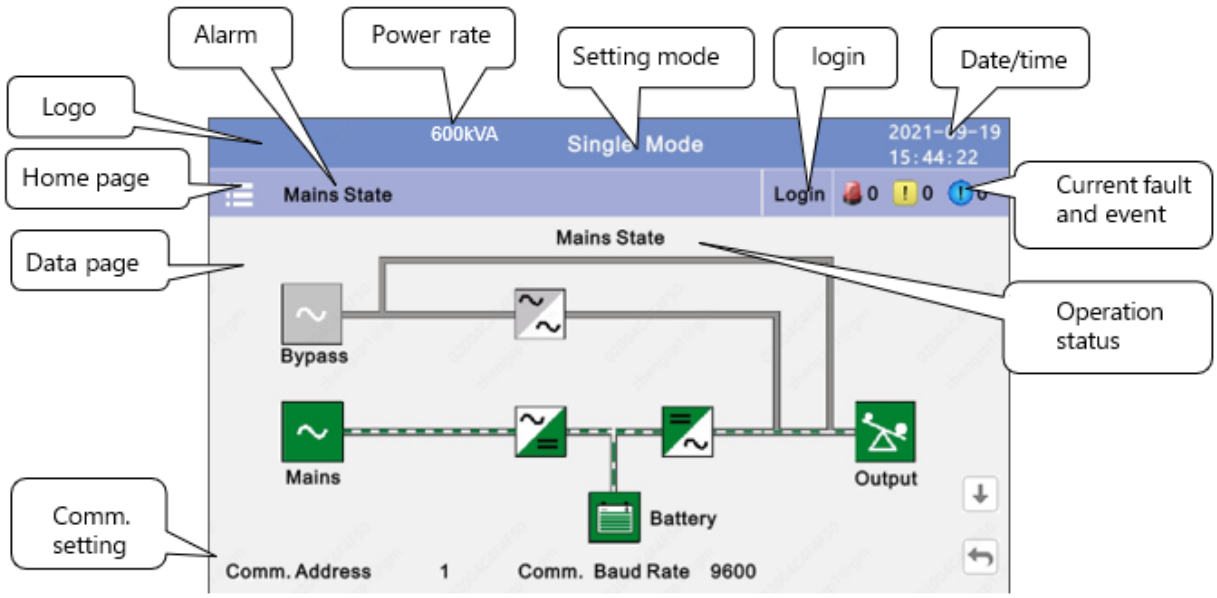
- Connect parallel cable, input/output cable, and battery cable well; modify the parallel board jumpers correctly.
- Measure the positive and negative battery pack voltage. Battery breaker is opened temporarily.
- Turn ON the output breaker at the front door.
- According to the startup procedure for single unit, set the operation mode of each UPS: single mode is changed to parallel mode; set the parallel number for each UPS; up to 6 units can be parallel; set the ID of each cabinet, the ID of each unit must be different.
- Turn ON the input breaker. Close the external input breaker and start from mains. After start from mains, check the LCD interface of each UPS to see if the ID, VA is the same with the actual values.
- Turn ON the external battery breaker of each UPS. Check if the charging current displayed in LCD is normal.



Note!

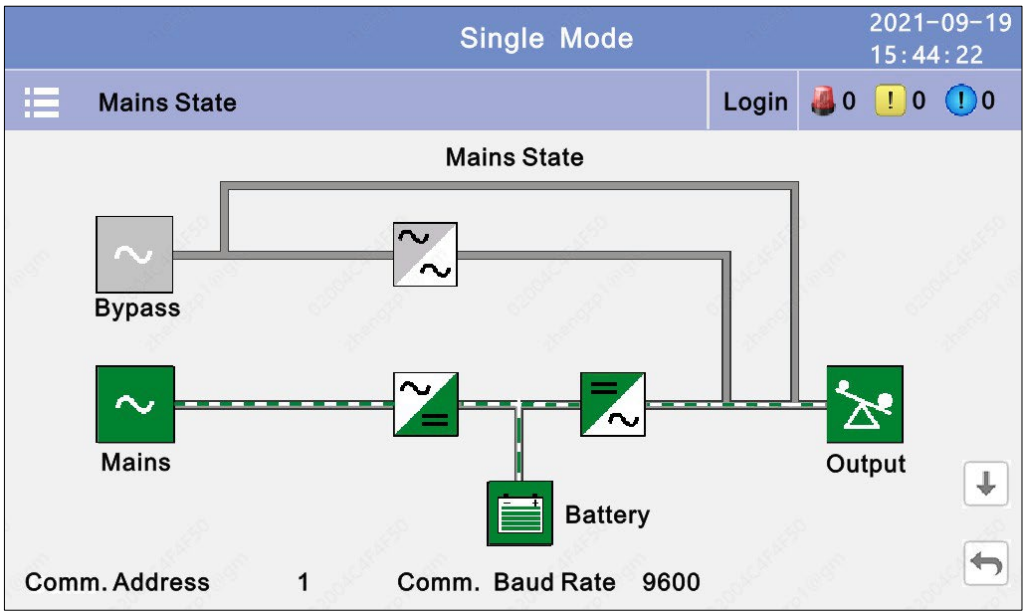
The UPS cannot be parallel until each single unit is normal.

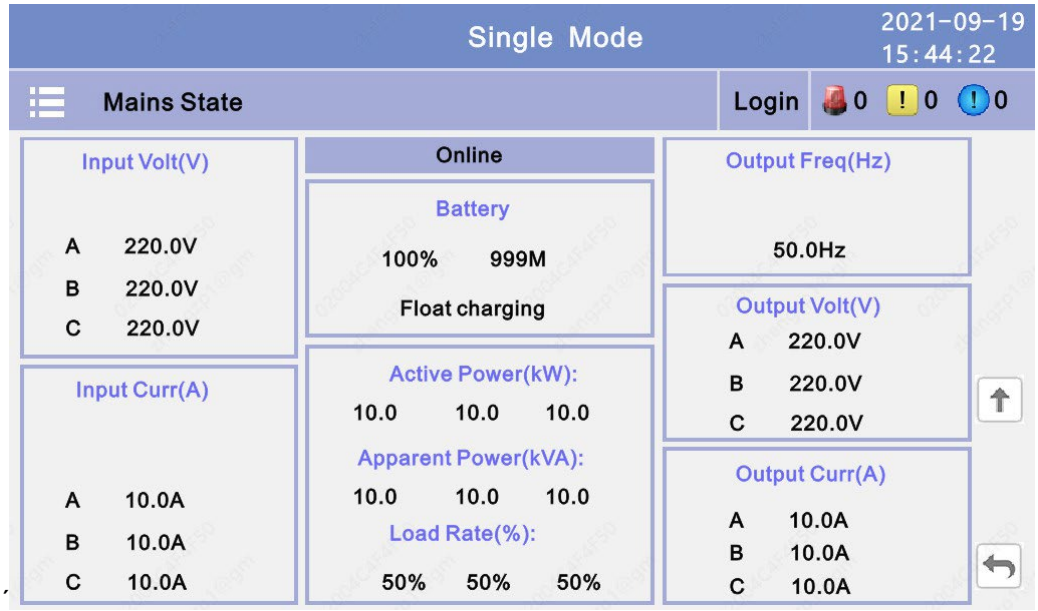
4.3 The Display



4.3.1 Datas

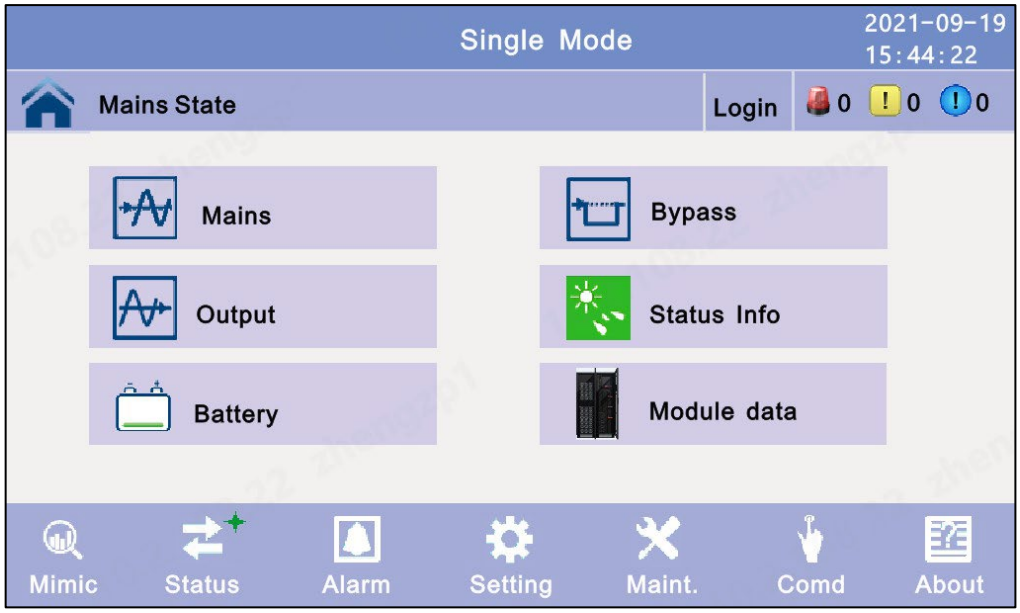
Displays the flow state of UPS work, and quickly enters real-time data by clicking on the block.





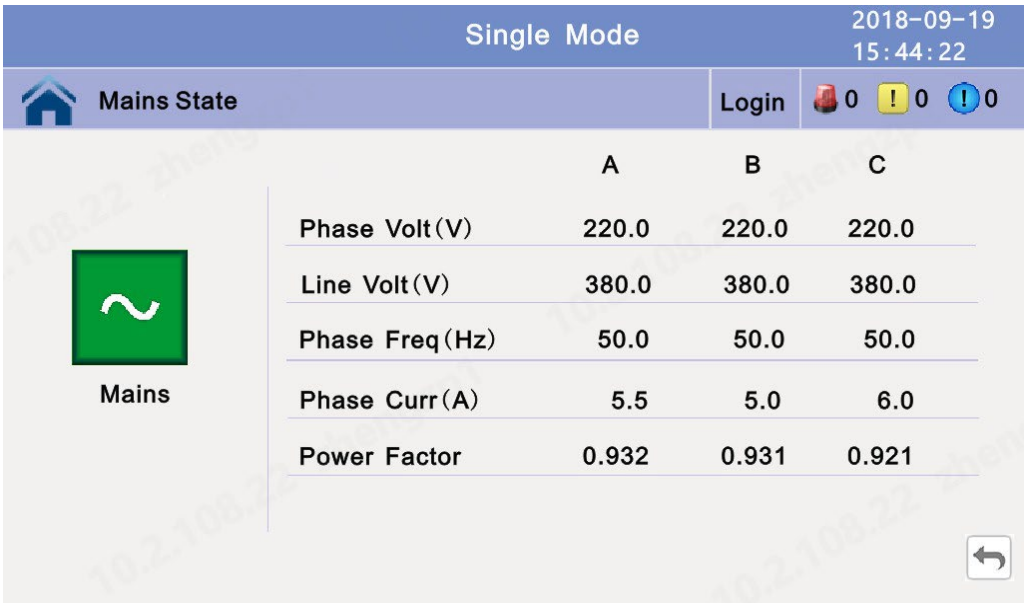
4.3.2 Status

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



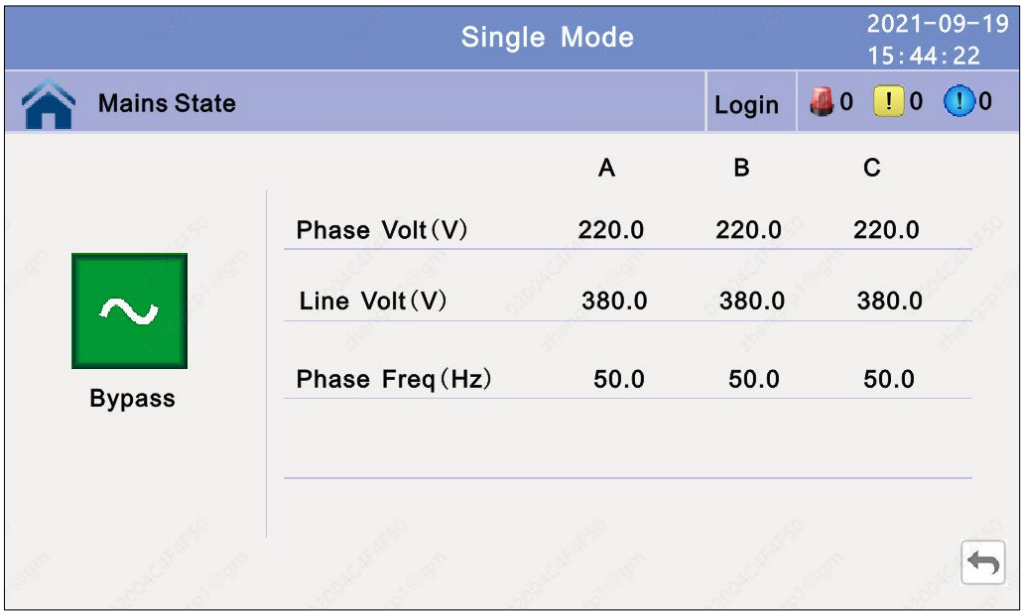
4.3.3 Main

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.



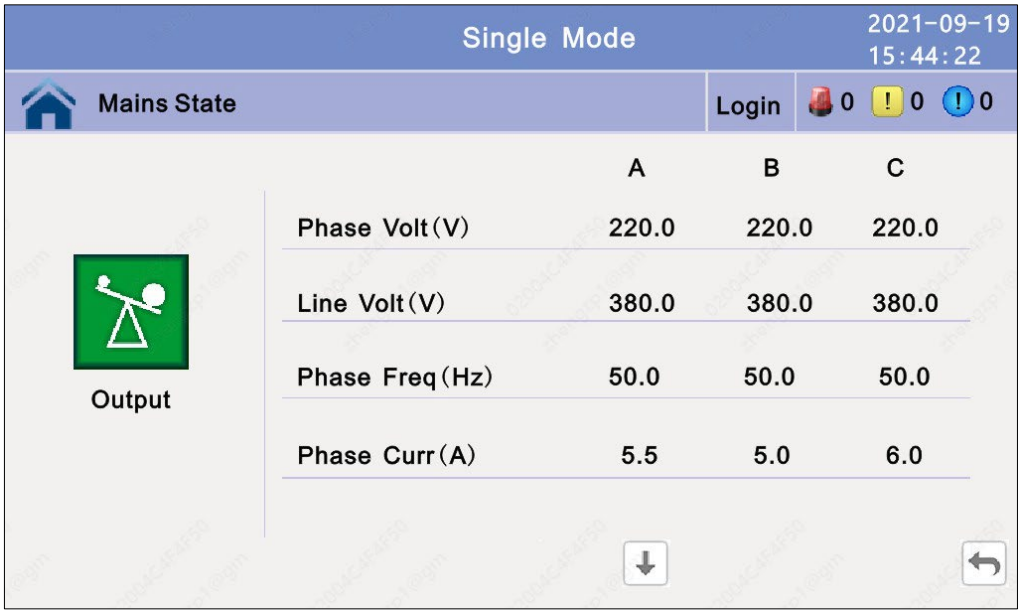
4.3.4 Bypass

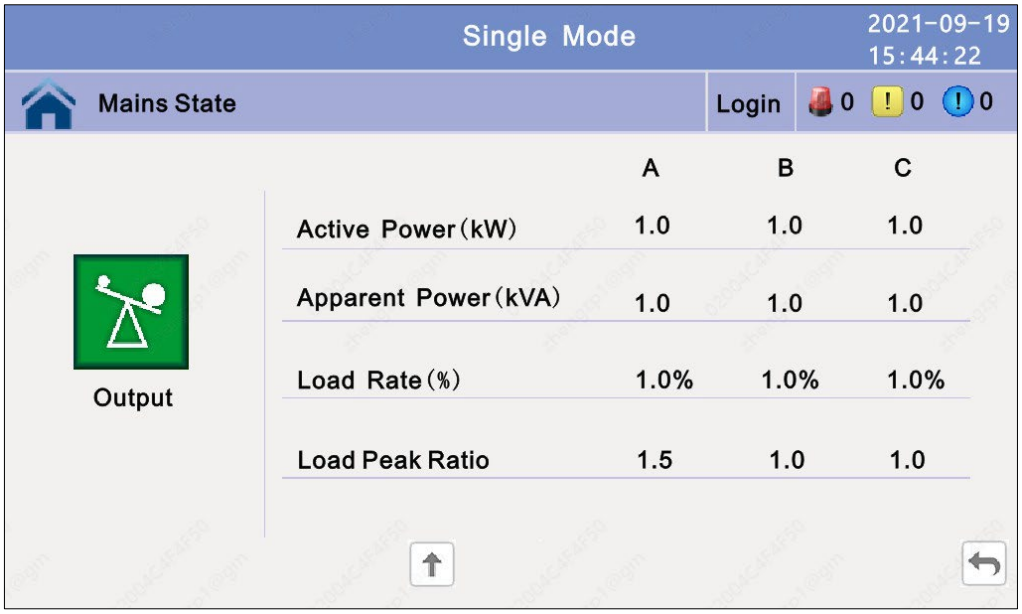
Click the bypass block to enter the bypass data display window, click return to return to the previous window, click home page to return to the main page.



4.3.5 Output

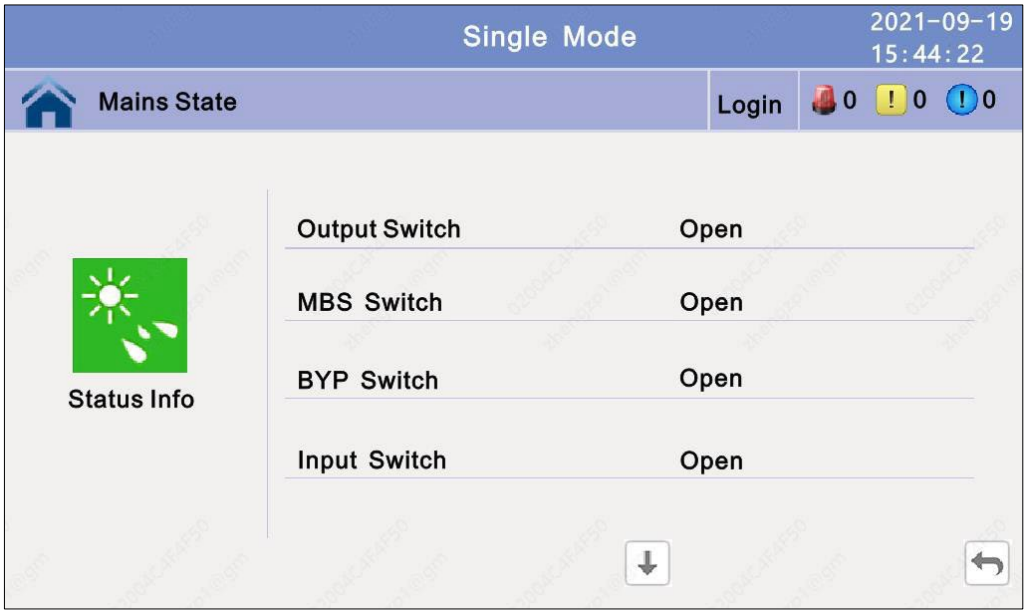
Click the output block to enter the output data display window, click return to return to the previous window, click home page to return to the main page.

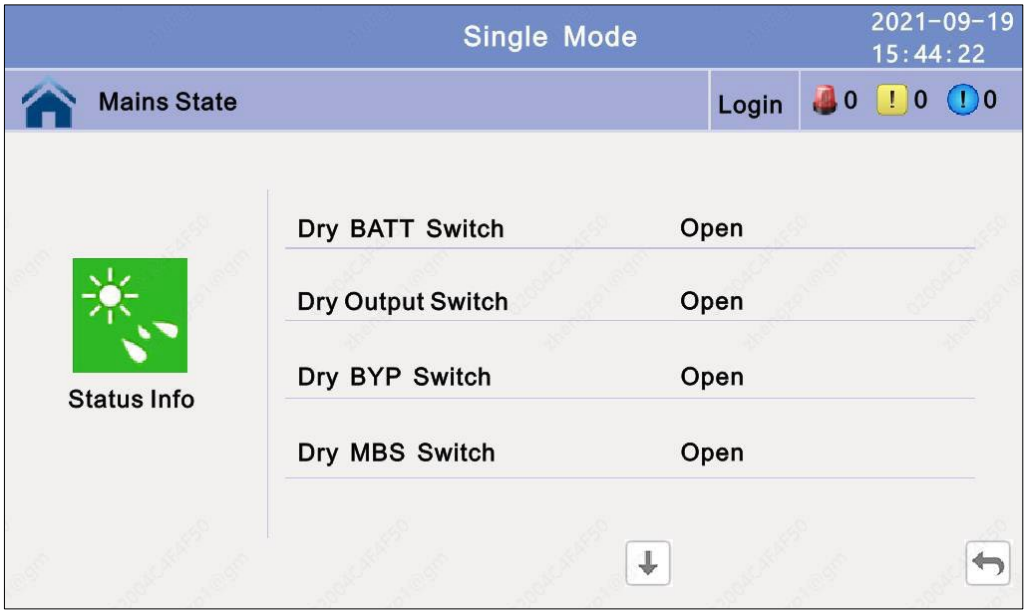




4.3.6 Status info

Click the status info block to enter the status data display window, click return to return to the previous window, click home page to return to the main page.



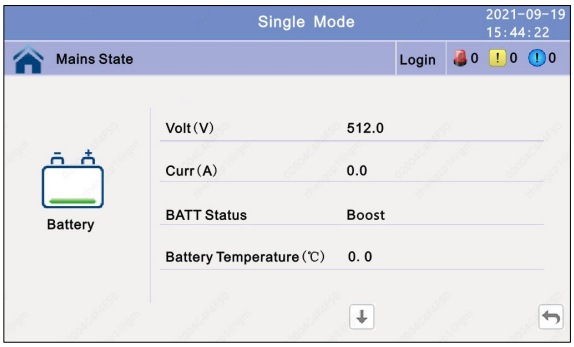


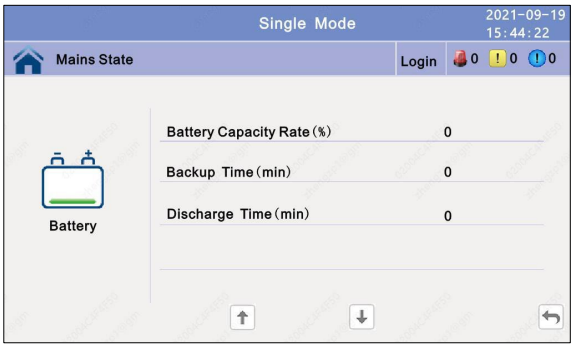


4.3.7 Battery

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.

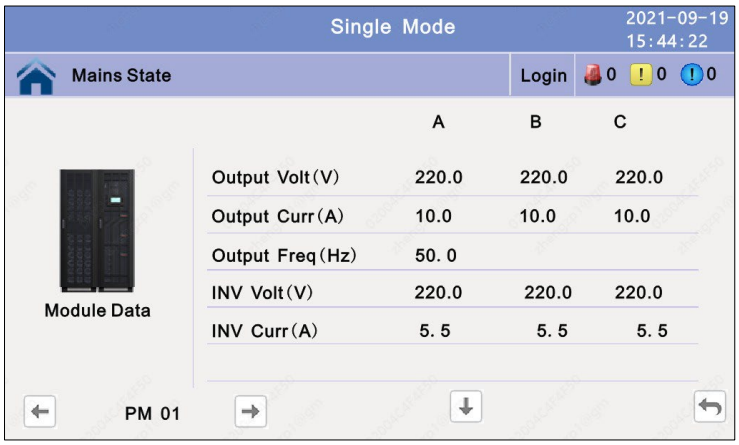
VRLA battery window:





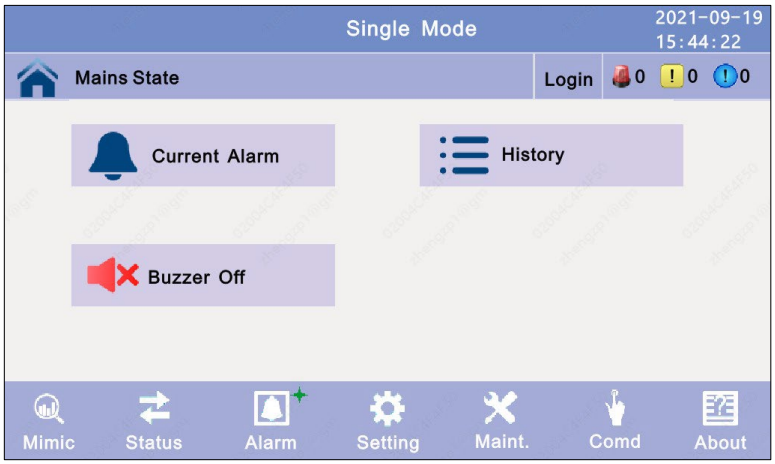
4.3.8 Module

Click the module block to enter the module data display window, click return to return to the previous window, click home page to return to the main page.



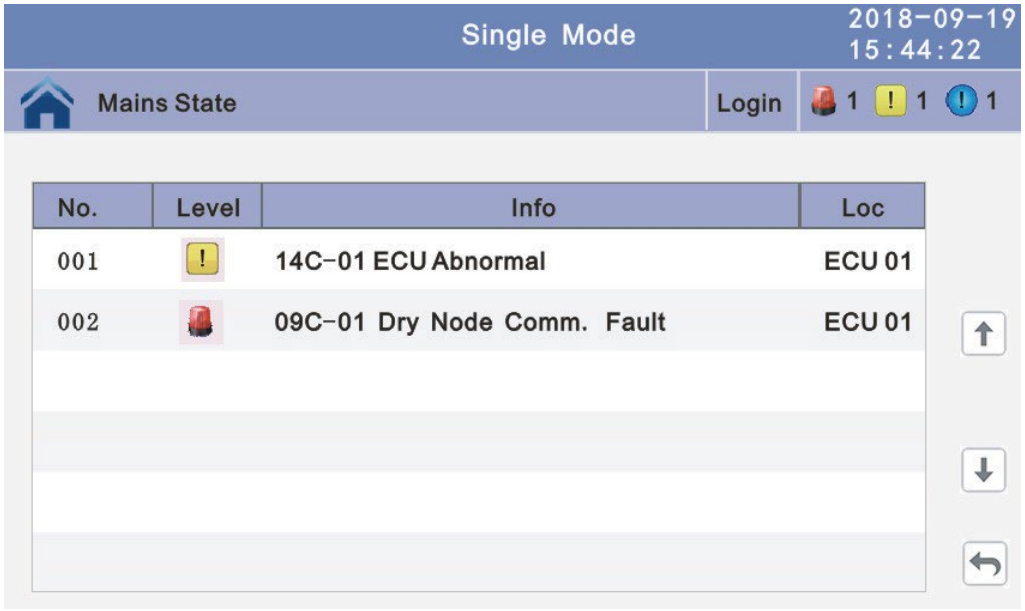
4.4 Alarm

View the alarm and history of the UPS, and open or close the buzzer.



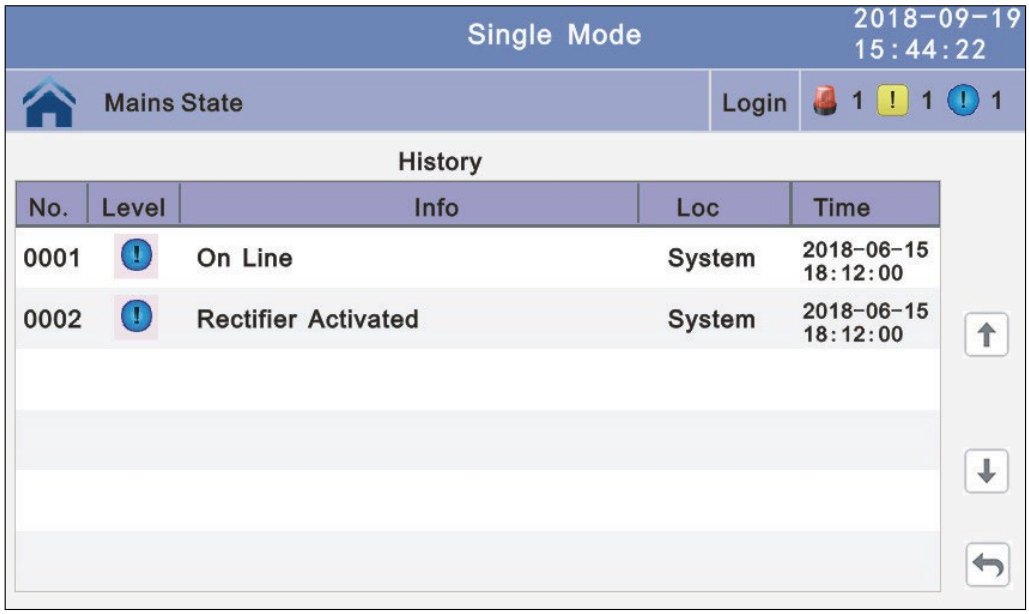
4.4.1 Curr Alarm

Click the current 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.



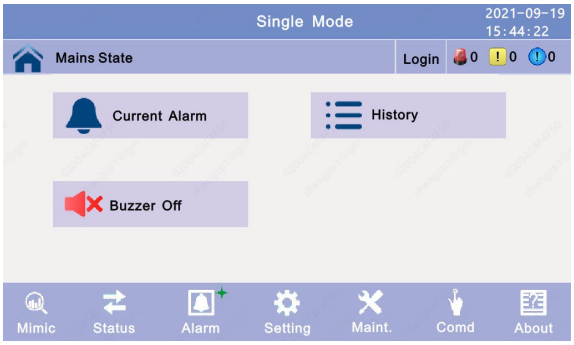
4.4.2 History

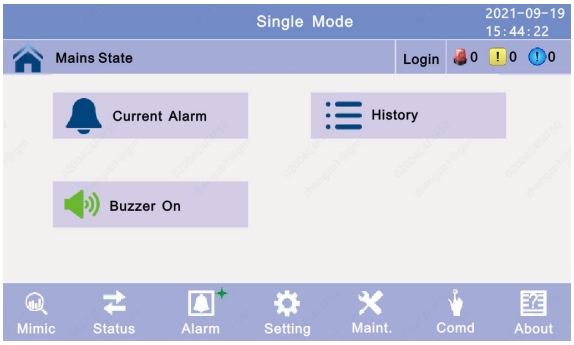
Click the history to enter the history recode display window, click return to return to the previous window, click home page to return to the main page.



4.4.4 Buzzer

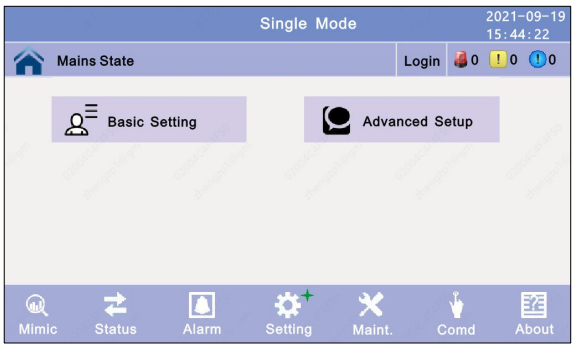
Click the buzzer mute then the buzzer will mute and the red block will change to green, if the buzzer is on, then click the block buzzer will on and the block will change to red. click return to return to the previous window, click home page to return to the main page.





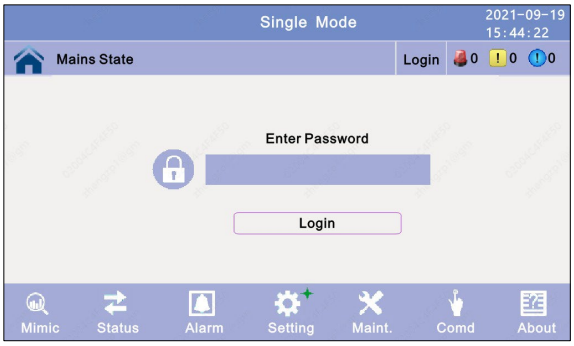
4.5 Setting

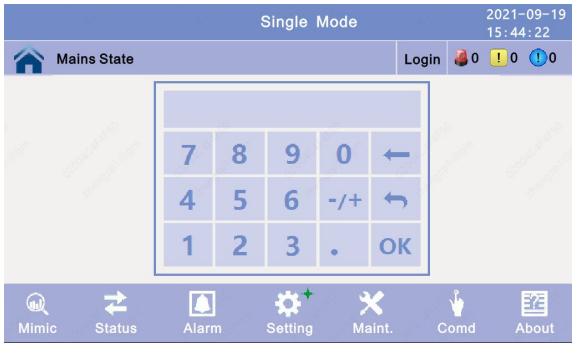
There are two levels, the basic setting for user settings, advanced setting for technical personnel, please contact the relevant technical personnel to enter advanced settings.

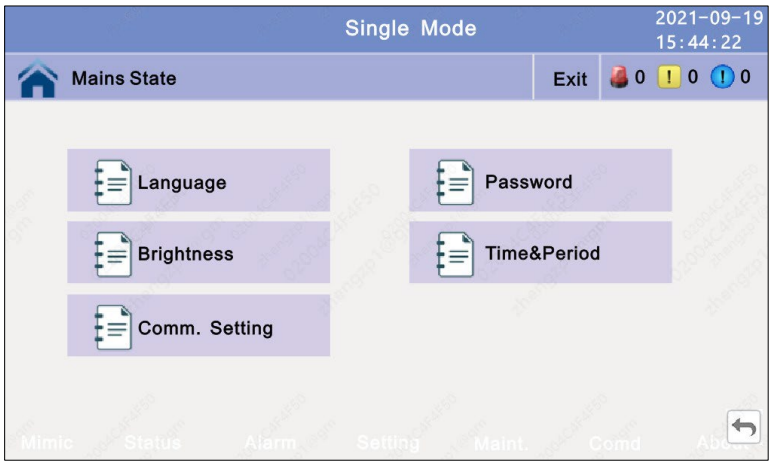


4.5.1 Basic Setting

Click basic setting, enter by input the correct password. The user password is “111111”.

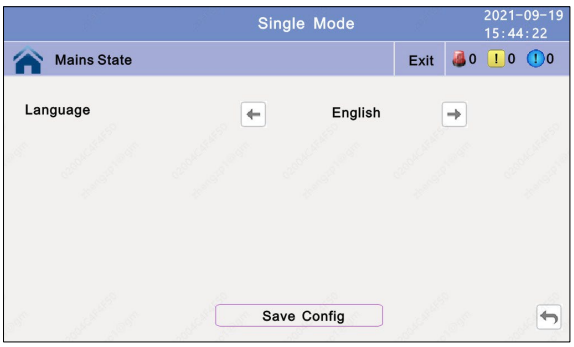






4.5.2 Language

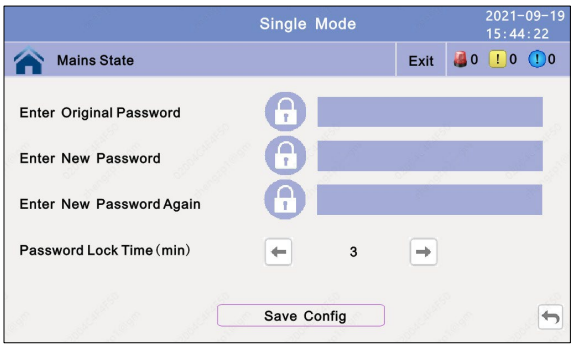
Click the language block witch you want and click the save config block to save. click return to return to the previous window, click home page to return to the main page.



4.5.3 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 (min): 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.



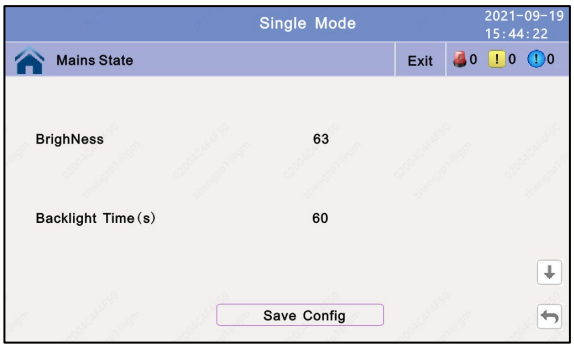
4.5.4 Brightness and Backlight time

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 (s): 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.

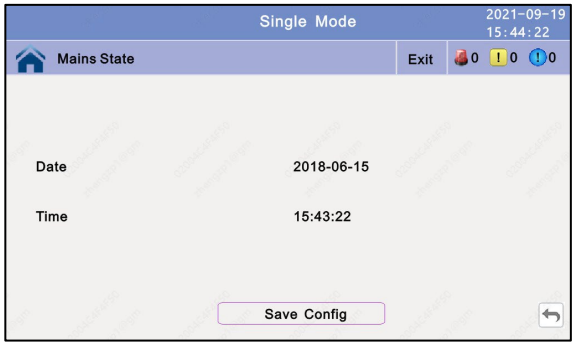
4.5.5 Date and time setting

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



4.5.6 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.

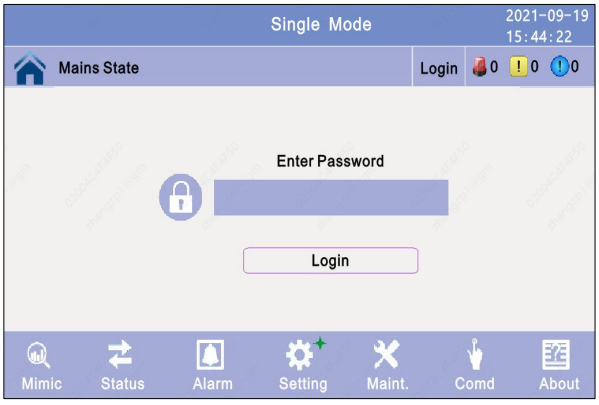
Rs485 address: UPS communication ID, address range is 1~15, default is 1.

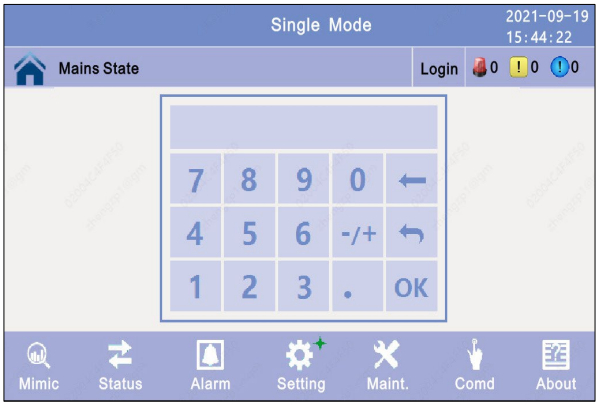
Rs485 Baud Rate: baud rate: 2400, 4800, 9600, 14400, 19200, default is 9600

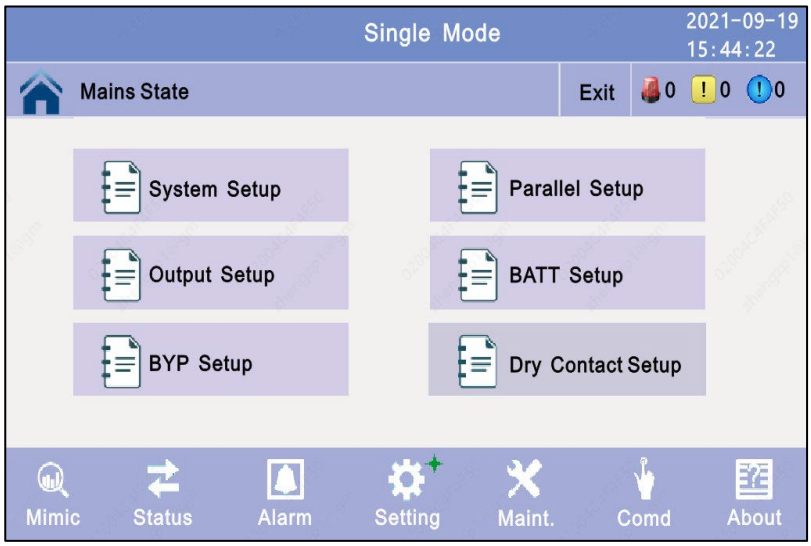


4.5.7 Advanced Setting

Click advanced setting, enter by input the correct password. Advanced setting password to be required to the UPS vendor or to its representative.





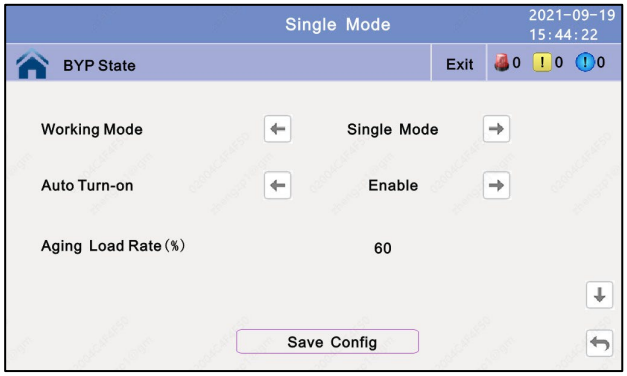


4.5.8 System setting

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.

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

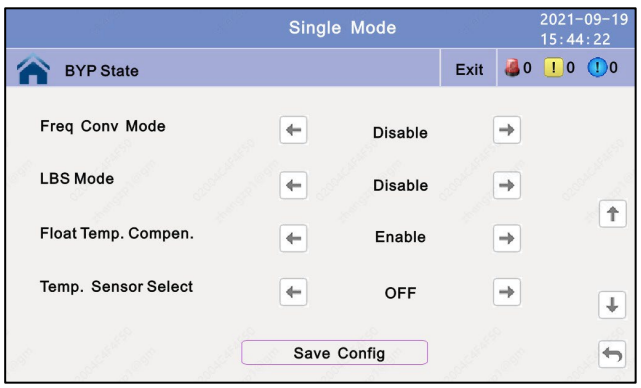


Aging Load Rate (%): The value can be 18~100%, default value: 60%.

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.

Temp Sensor Switch: temperature sensor compensation switch, when need to connect battery temperature sensor, please charge the value to enable.



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

Power Walk in (s): this is enable the UPS to control the interval that each module transfers from battery mode to normal mode, which reduces the impact on the generator or power grid. The value can be 1~20, default value is 1

Inter Power Walk in (s): this is enable the UPS to control the interval that each rack transfers from battery mode to normal mode, which reduces the impact on the generator or power grid. The value can be 0~200, default value is 10.

Inter sleep mode: when load less than the software setting value, same parallel rack will turn to standby mode and if the load more than the setting value some rack will turn to inverter mode after setting the sleep mode enable. Default value is disable



Basic Unit Numb: power module number for actual configuration, if setting number no the same to actual number, UPS will alarm.

Cabinet Power (kVA): cabinet power range, the same power range of bypass.

Sleep Mode: when load less than the software setting value, same power module will turn to standby mode and if the load more than the setting value some power module will turn to inverter mode after setting the sleep mode enable. Default value is disable.



Parallel ID: Parallel operation 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 Redunt 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.



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

Output Volt Level (V): Output voltage level, The value can be 220V, 230V, 240V.

Inverter Volt Adjust (%): Inverter voltage adjust, The value can be -5%~0~+5%, step is0.5%, default value: 0.

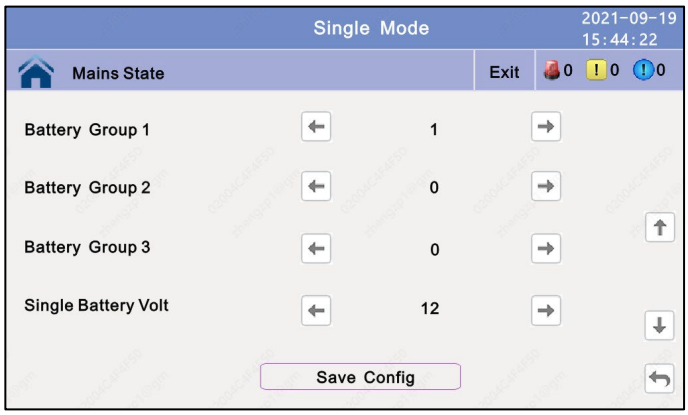


Battery Group 1: Must modify the group number to actual configuration, The value can be 1~8, default value is 1.

Battery Group 2: This option needs to be set when multiple sets of batteries are required and connected to the battery breaker auxiliary contact and trips. Must modify the group number to actual configuration, The value can be 1~8, default value is 1.

Battery Group 3: This option needs to be set when multiple sets of batteries are required and connected to the battery breaker auxiliary contact and trips. Must modify the group number to actual configuration, The value can be 1~8, default value is 1.

Single Battery Volt: Must modify the voltage to actual configuration, The value can be 2 or 12, default value is 12, for VRLA Battery.



Battery type: Must modify the battery type to actual configuration, The value can be 1~8, default value is 1.

Battery number: Must modify the battery number to actual configuration, The value can be 30~50, default value is 30, for VRLA Battery.

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

Boost/Float conversion (Month): Boost charge and float charge alternate time, the value can be 0~20, for VRLA Battery.

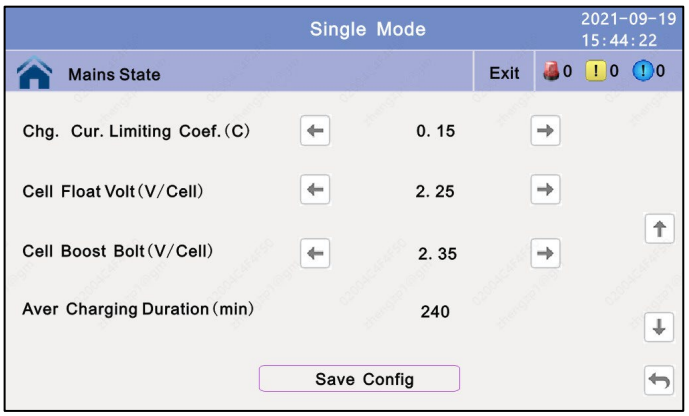


Chg.cur.limiting coef. (C): The charging current limit is a multiple of the battery capacity. The value can be 0.05–0.15, and is 0.1 by default, for VRLA Battery.

Cell float voltage (V/Cell): The float voltage value can be 2.20-2.29 V/cell, and is 2.25 V/cell by default, for VRLA Battery.

Cell boost voltage (V/Cell): The battery equalized voltage value can be 2.30–2.40 V/cell, and is 2.35 V/cell by default, for VRLA Battery.

Aver charging Duration (min): boost charge time limit, the value can be 1–1440min, and is 240 by default, for VRLA Battery.



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

Float Temp Compen Coeff (V/Cell/℃): Modify the voltage of compensation after enable the switch. the value can be 0.001~0.007/cell, and is0.003 by default, for VRLA Battery.

Boost Charge Setting: Boost charge disable or enable, and is enable by default, for VRLA Battery.

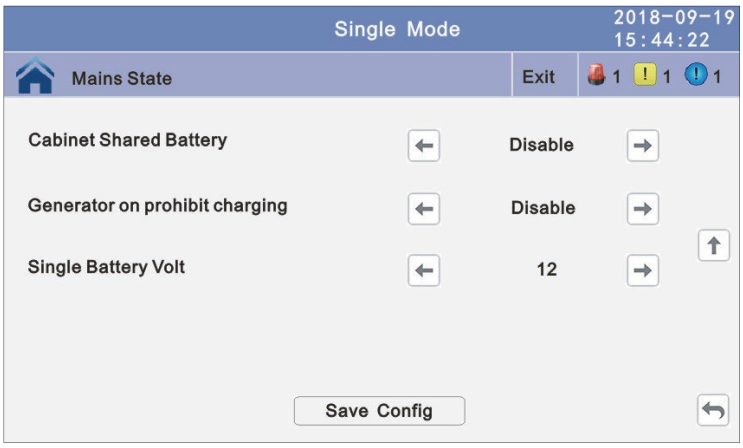
No Battery Warning: can be no warning when no batter after set disable, and is enable by default.



Cabinet shared battery: Tow parallel ups use common batter bank. The value can be set Disable and enable, disable by default.

Generator on prohibit charging: UPS disable charge the battery if set the value to enable when the generator signal is enable.

Single Battery Volt: Set the battery type, 2V/12V, 12 by default.



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%, -45%,. The default value is -45%.

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:

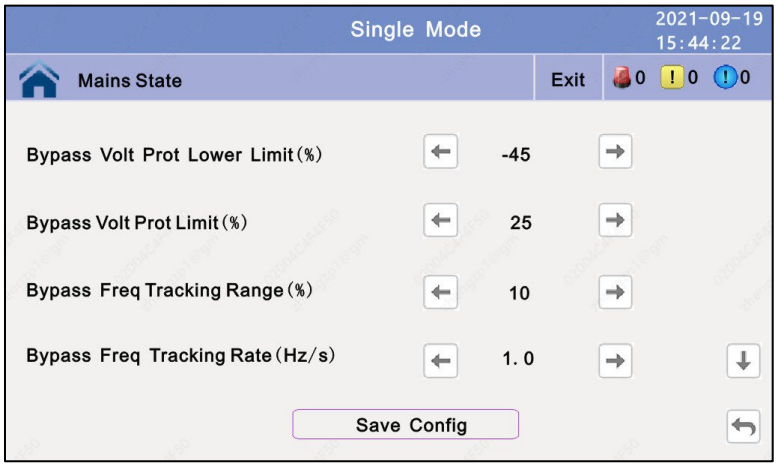
When the voltage level is 380 V, the value range is 10%, 15%, 20%, and 25% (default).

When the voltage level is 400 V, the value range is 10%, 15%, and 20% (default).

When the voltage level is 415 V, the value range is 10% and 15%(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).

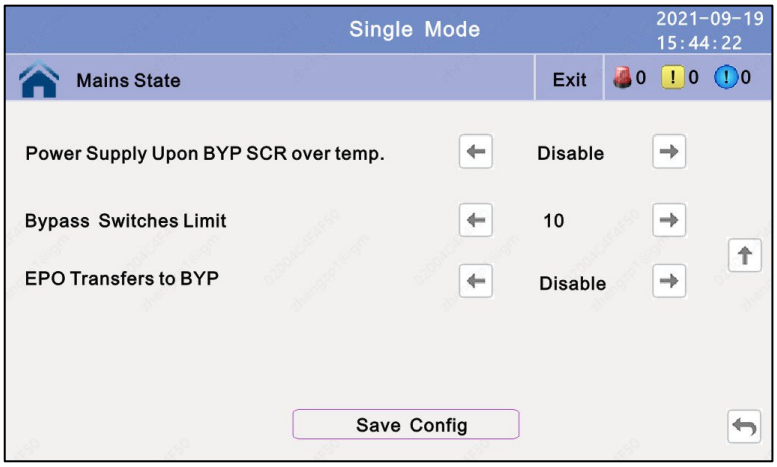
Bypass rate tracking rate (Hz/s): Inverter frequency tracking to bypass frequency rate. The value range is 0.5~2, and is 1 by default.



Power Supply upon BYP SCR Overtemp.: Specifies whether to start bypass mode when overtemperature 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 bypass: Specifies whether to start bypass mode when EPO occurs. The default value is Enable.

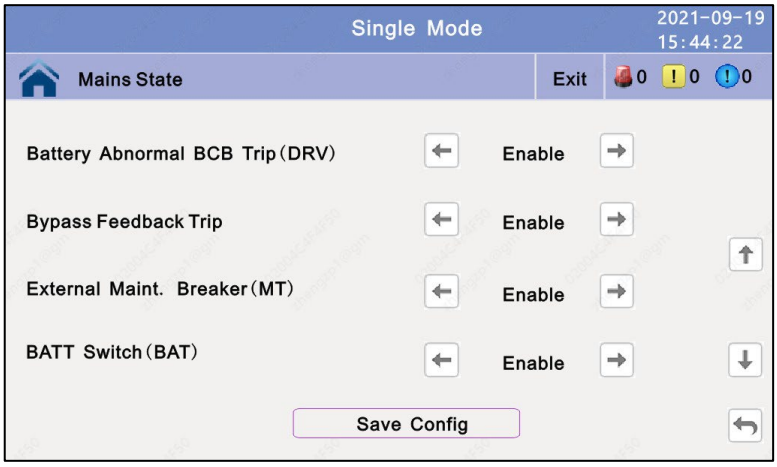


Battery Abnormal BCB trip(DRV): Enable or disable BCB trip single output. The default value is Disable.

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.

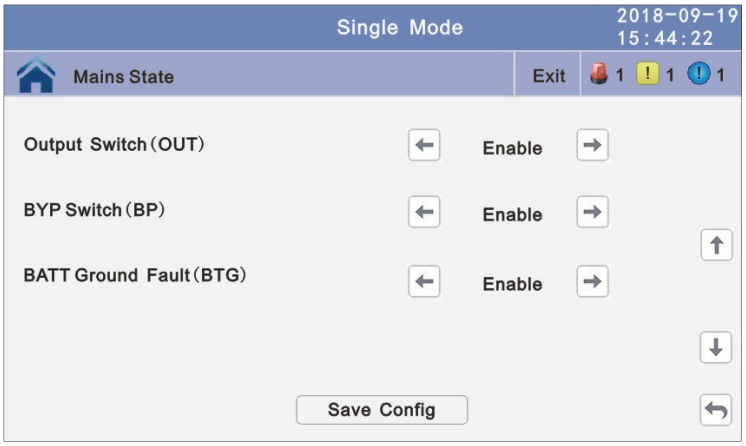
BATT Switch(BAT): Enable or disable battery breaker connection detection. The default value is Disable.



Output Breaker: Enable or disable output breaker value is Disable

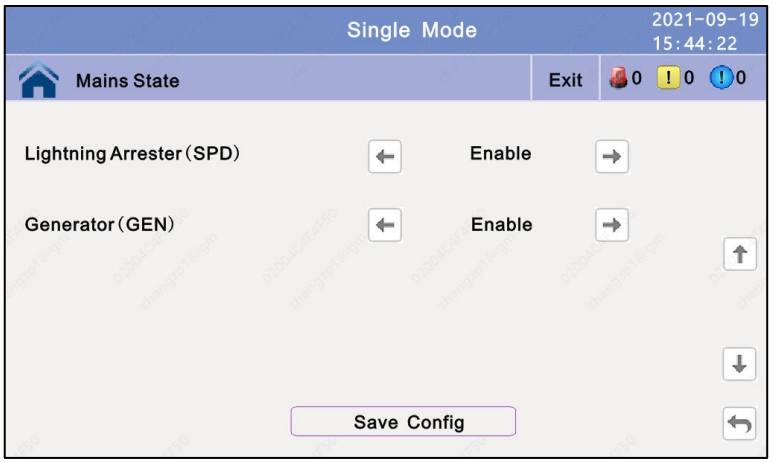
BYP Breaker: Enable or disable bypass breaker connection detection. The default value is Disable

BATT Ground Fault: Enable or disable battery grounding failure detection. The default value is Disable



Lightning arrester(SPD): Enable or disable SPD detection. The default value is Disable.

Generator (GEN): Enable or disable GEN detection. The default value is Disable.

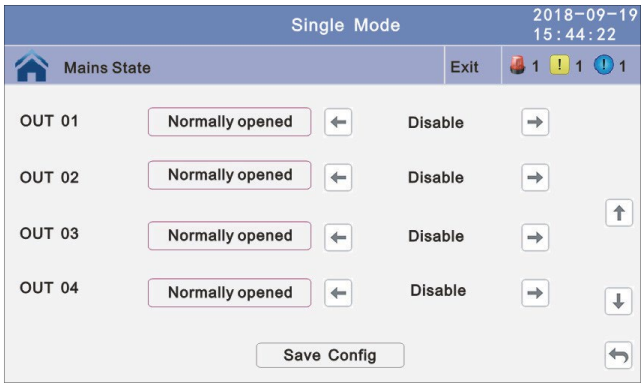


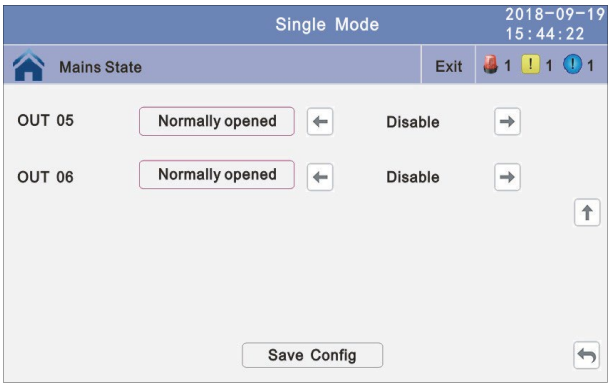
OUT 01-OUT06

Output dry contact port, modify on the LCD, the default value is DISABLE.
The Output port can set to normally clo0sed or normally opened by jumpers on dry contact board, the default value is normally opened

Setting value:

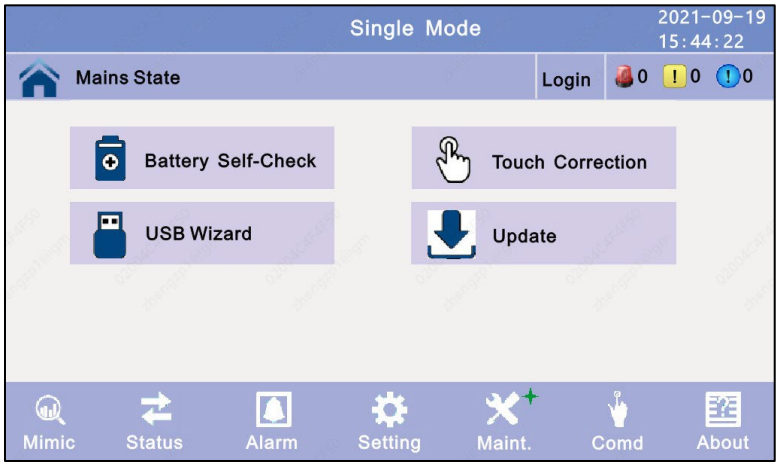
No	Item	No	Item
1	URGENT ALARM	6	MAIN SUPPLY
2	MINOR_ALARM	7	BYPASS SUPPLY
3	MAIN ANORMAL	8	BATTERY SUPPLY
4	BATTERY LOW VOLT	9	NO SUPPLY
5	BATTERY SELFCECK	10	ECO MODE





4.5.9 Maintenance

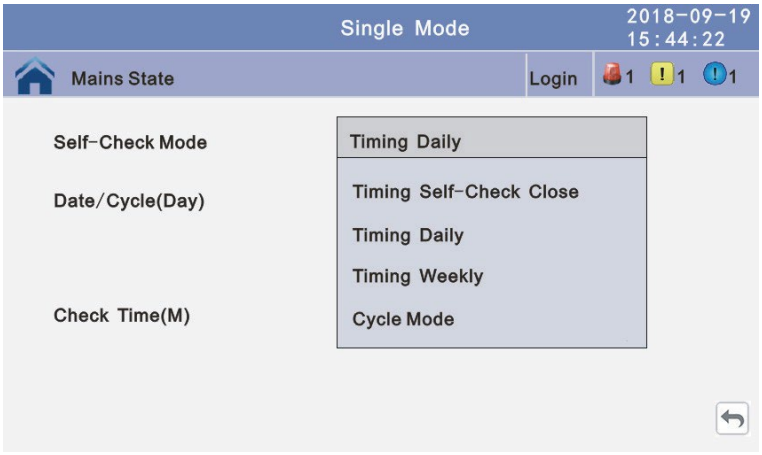
Battery self-test, touch correction, history and setting record download and software update.



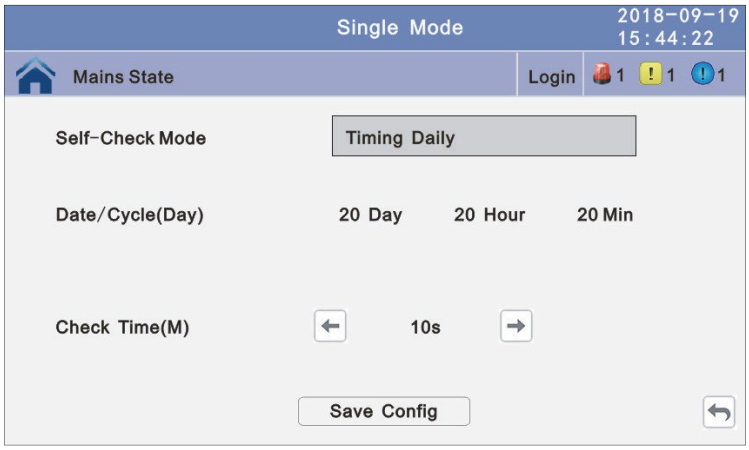
4.5.10 Battery Self-Check

Can select check by Timing Daily, Timing Weekly, Cycle mode.

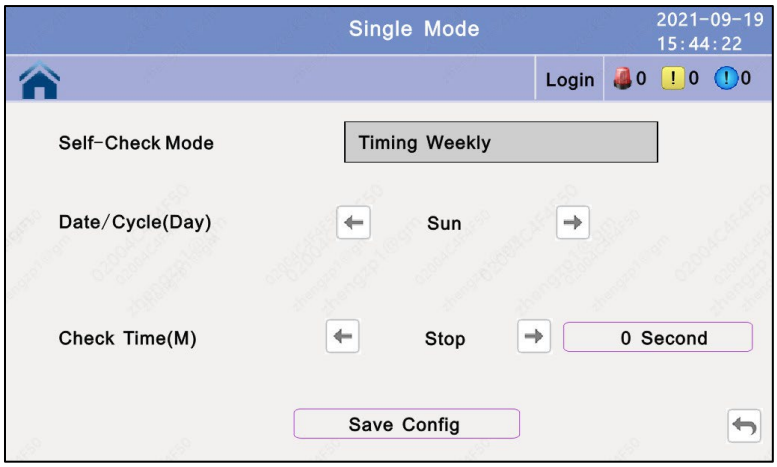
The default value is **Timing Self-Check Close.**



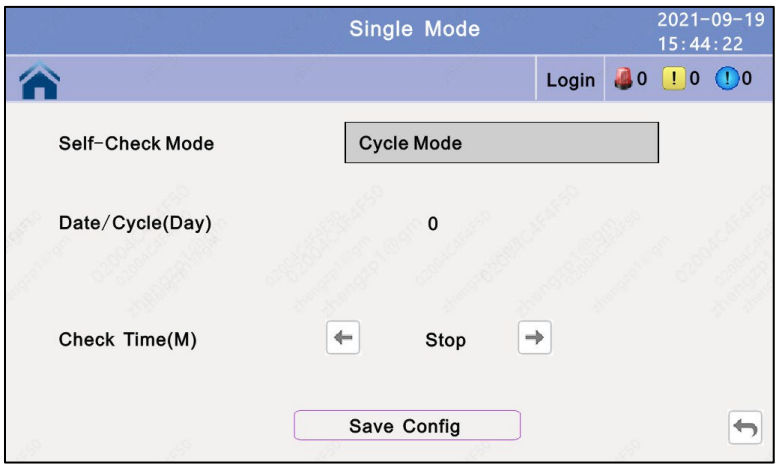
Timing Daily: modify the check date and check time



Timing Weekly: modify the check date and check time

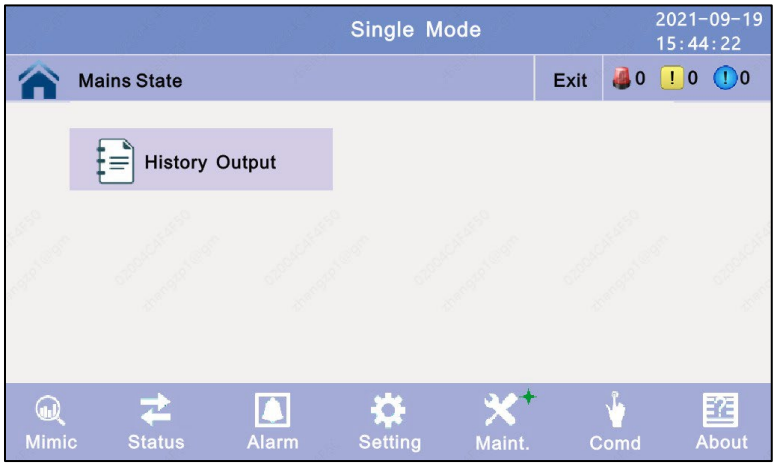


Timing Cycle mode: modify the cycle date and check time



4.5.11 USB Wizard

Download history and setting record by USB



Alarm Log output

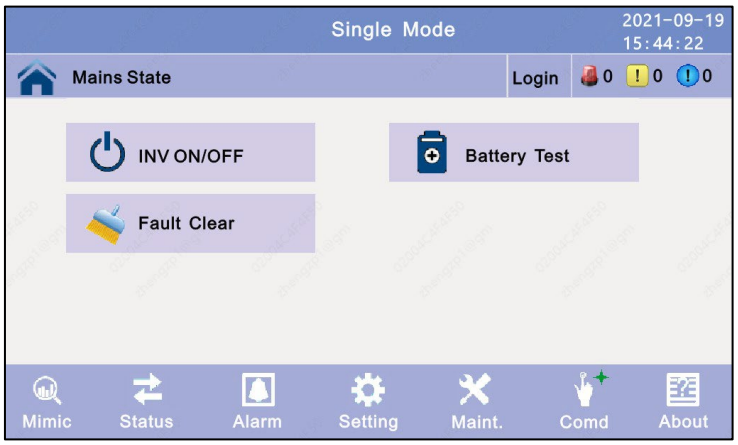


Setting Log output



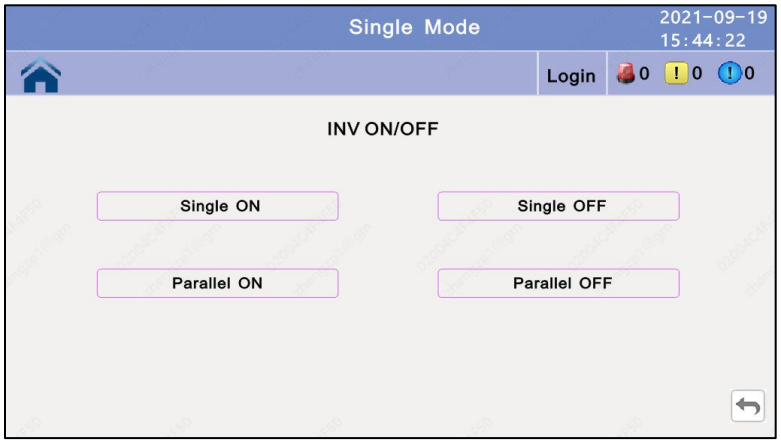
4.5.12 Common

INV ON/OFF, Battery test and Fault clear.



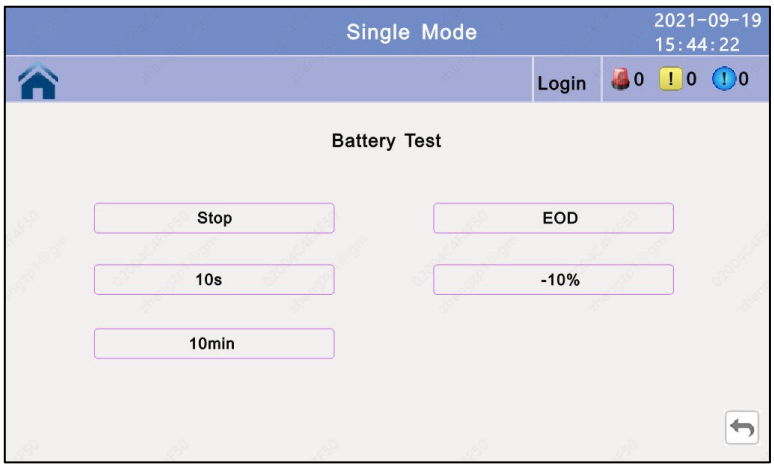
INV ON/OFF

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



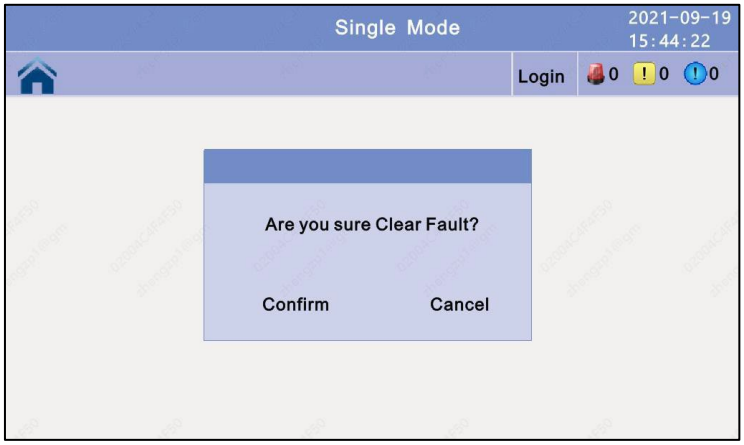
Battery Test

10S: battery test for 10s
10min: battery test for 10min
EOD: battery test to EOD
-10%: battery test down 10% capability



Fault clear

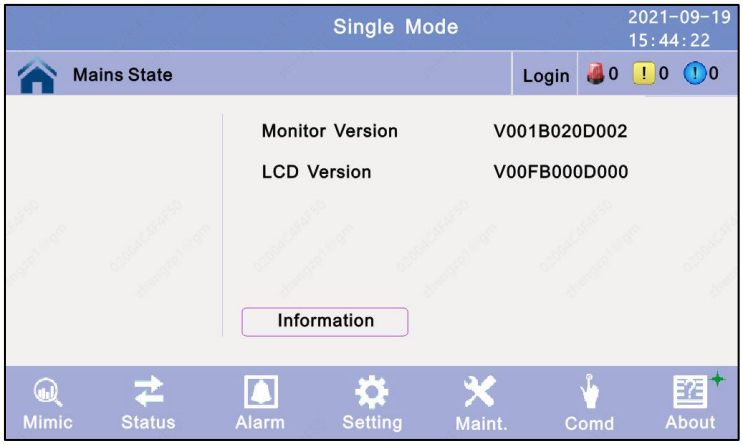
Clear the current fault (not for all faults)



4.6 About

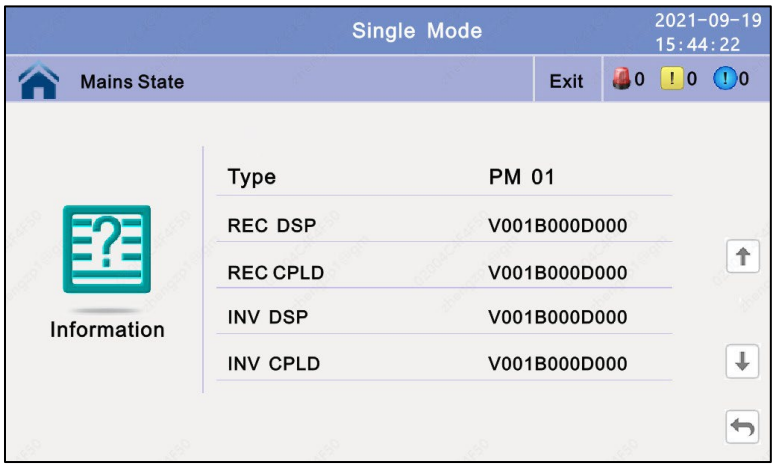
Check the software version

4.6.1 Monitor and LCD



4.6.2 Internal software version

Power module software version: PFC DSP, PFC CPLD, INV DSP and INV CPLD.
Center control unit (ECU) software version: DSP and CPLD
Bypass module software version: DSP and CPLD



5 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.

Fault and alarm information

No	Code	Fault	Buzzer	Fault LED	Alarm LED
1	002	REC Over temperature	Twice per second	Light	
2	003	REC Par. Cable fault	Twice per second	Light	
3	004	Rec Over current	Once per second	Light	
4	005	REC Power fault	Beep continously	Light	
5	007	Input SCR fault	Beep continously	Light	
6	00A	Battery SCR fault	Beep continously	Light	
7	00C	Charge SCR fault	Beep continously	Light	
8	00E	Fan fault	Beep continously	Light	
9	011	Fan Power fault	Beep continously	Light	
10	012	Charger over temp	Beep continously	Light	
11	013	Soft start failed	Beep continously	Light	
12	014	BAT charger fault	Beep continously	Light	
13	016	REC Comm. Fault	Once per 2 second	Light	
14	019	REC initializes fault	Twice per second	Light	
15	01D	Unit insert fault	Once per 2 second	Light	
16	063	Unit insert fault	Once per 2 second	Light	
17	01E	Rectifier fault	Beep continously	Light	
18	041	Inverter fault	Beep continously	Light	
19	044	INV IGBT SHORT	Beep continously	Light	
20	047	Inverter relay short	Beep continously	Light	
21	04A	Inverter relay broken	Beep continously	Light	
22	04D	INV Par. Cable fault	Twice per second	Light blinking	
23	051	Output Short Circuit	Once per second	Light blinking	
24	054	INV Comm. Fault	Once per 2 second	Light blinking	
25	057	INV initializes fault	Beep continously	Light	
26	05A	INV self test fault	Beep continously	Light	
27	05E	DC component fault	Once per 2 second	Light	
28	061	DC Bus abnormal	Beep continously	Light	
29	064	INV DSP Power fault	Beep continously	Light	
30	067	INV over temp.	Twice per second	Light	
31	068	Load sharing fault	Twice per second	Light	
32	06A	Cabinet mode fault	Beep continously	Light	
33	06B	Fuse broken	Beep continously	Light	
34	081	Par. Cable fault	Twice per second	Light	
35	086	ECU insert fault	Once per 2 second	Light	
36	088	ECU Power fault	Beep continously	Light	
37	08B	ECU Comm. Fault	Beep continously	Light	

No	Cord	Fault	Buzzer	Fault LED	Alarm LED
38	08D	ECU initializes fault	Once per 2 second	Light blinking	
39	091	Bypass SCR broken	Beep continously	Light	
40	0C2	Bypass SCR broken	Beep continously	Light	
41	094	Bypass SCR Short	Beep continously	Light	
42	0C5	Bypass SCR Short	Beep continously	Light	
43	097	Bypass over temp.	Beep continously	Light	
44	0CF	Bypass over temp.	Beep continously	Light	
45	09A	Output CT reversed	Beep continously	Light	
46	09B	Dry contact power fault	Beep continously	Light	
47	09C	Dry contact comm. fault	Beep continously	Light	
48	09D	Bypass Backfeed fault	Beep continously	Light	
49	0C1	Bypass par. Cable fault	Beep continously	Light	
50	0C8	Bypass Comm.Fault	Beep continously	Light	
51	0CA	Bypass initializes fault	Beep continously	Light	
52	0CD	Bypass connected fault	Beep continously	Light	
53	0D2	Bypass fan fault	Beep continously	Light	
54	103	BATT over volt	Once per second		Light
55	104	BATT low pre-warning	Once per second		Light
56	105	BATT reversed	Twice per second		Light
57	106	BATT EOD	Once per second		Light
58	107	BATT low volt	Once per second		Light
59	108	No BATT	Once per second		Light
60	109	Input phase reversed	Once per second		Light
61	10A	Input N-line lost	Twice per second		Light
62	10B	Mains frequency abnormal	Once per 2 second		Light
63	10C	Mains voltage abnormal	Once per 2 second		Light
64	10D	REC comm. Error	Once per 2 second		Light
65	10E	No Mains	Once per 2 second		Light
66	10F	REC Set data error	Once per 2 second		Light
67	121	Inv par. Cable abnormal	Once per 2 second		Light
68	125	Inverter overload	Once per second		Light
69	126	INV not syncronized	Beep continously		Light
70	129	INV comm. Error	Once per 2 second		Light
71	12A	INV set data error	Once per 2 second		Light
72	141	Bypass breaker change to num	Once per 2 second		Light
73	142	PM: Unit quantity mismatch	Once per 2 second		Light
74	143	Parallel overload	Once per 2 second		Light
75	144	Bypass overload	Once per 2 second		Light
76	145	Maint. Switch Misuse	Once per 2 second		Light
77	146	ECU comm. Error	Once per 2 second		Light
78	147	Rack par. Cable abnormal	Once per 2 second		Light
79	14B	ECU par. Cable abnomal	Once per 2 second		Light
80	14C	ECU abnormal	Once per 2 second		Light

No	Cord	Fault	Buzzer	Fault LED	Alarm LED
81	14E	Bypass phase reverse	Once per second		Light
82	14F	Bypass unable to trace	Once per 2 second		Light
83	150	Bypass not available	Once per 2 second		Light
84	151	ECU set data error	Once per 2 second		Light
85	152	LBS signal error	Once per 2 second		Light
86	153	Parallel link error	Once per 2 second		Light
87	161	BYP par. cable abnormal	Once per 2 second		Light
88	162	Bypass phase reverse	Once per 2 second		Light
89	163	Bypass unable to trace	Once per 2 second		Light
90	164	Bypass not available	Once per 2 second		Light
91	165	Bypass comm error	Once per 2 second		Light
92	166	Bypass module take over	Once per 2 second		Light

6 Options

SNMP card

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



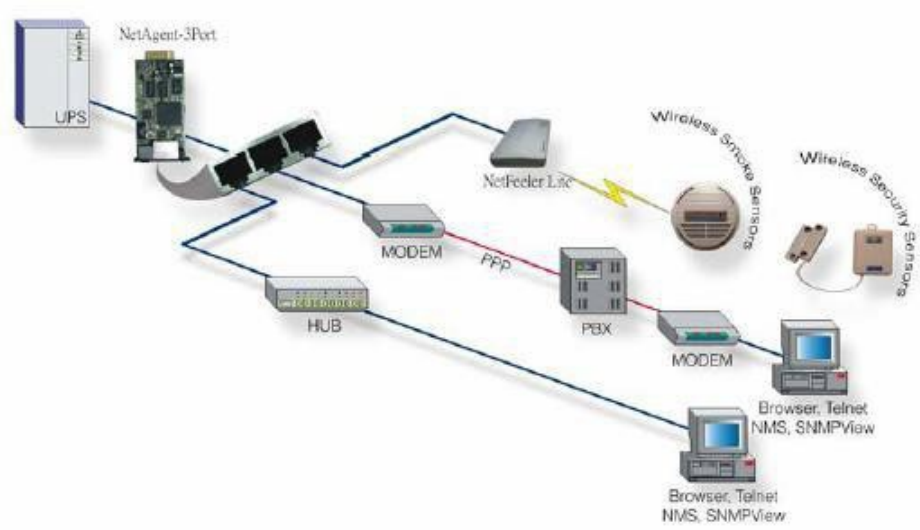
Functions

- Support multiple operating systems (Windows、Mac、Linux) UPS can be monitored remotely through the network;
- Can realize web-based user interface; Support e-mail alarm;
- Multi-user permission management; Support DHCP;
- Support remote self-testing, shutdown and restart UPS functions (UPS support required); Support telnet, SSH, Web page configuration;
- Support scheduled tasks (timed self-test, power on/off); Historical events and historical data storage functions;
- Remote UPS monitoring and management can be performed through HTTP, SNMP, SSH, Telnet;
- Complete equipment event handling (including event recording and notification);
- Can be extended to connect 2 channels of temperature and humidity monitoring modules;

Features

- Networking methods: IP-based LAN, WAN, Internet, wireless Ethernet, etc.;
- User permission management, safe, confidential and reliable;
- Support multiple configuration management methods such as Telnet, SSH, Web;
- Support scheduled task function, allow setting scheduled UPS on/off, scheduled battery discharge, etc.
- Support storage of 50, 000 historical data and 5, 000 historical event records;
- Built-in ultra-long-life system clock, support automatic timing to achieve time synchronization;
- Support SNMP V1/V2/V3, HTTP, DHCP, SSH, SSL and other network protocols;
- Support IPV6;
- Support the expansion of 2-channel ambient temperature and humidity monitoring modules;
- Support e-mail alarm function;

Typical topology of the UPS Network Management



7 Technical specifications

Model	X33 MOD CE5S-BP24
Max. power cabinet [kW]	75
Power modules Nominal power [kW]	5x10 5x15 3x20* 3x25* 2x30*
*All slots can always be occupied; however, the UPS may only be operated up to the cabinet's maximum power limit. The UPS's maximum power is set in the software and can be increased up to the power limit by upgrading with additional modules. All modules must be of the same type; mixed configurations are not possible.	

Physical	
Dimensions WxDxH [mm]	600x850x2000
Weigth cabinet [kg]	170 (w/o Batteries)
Weigth module	10kW:19kg, 15,20,25,30kW:21kg

Input	
Nominal voltage	380/400/415 (3Ph+N+PE)
Input voltage range	138-305 40% Last, 305-485 100% Load
Power factor	≥0.99
THI	≤ 3% (100% linear load)
Bypass voltage range	Max. Voltage: 220: +25% (Optional +10%, +15%, +20%) 230: +20% (Optional +10%, +15%) 240: +15% (Optional +10%) Min. Voltage: -45% (Optional -10%, -15%, -20%, -30%)
Bypass frequency range	50/60Hz ± 10%
Nominal voltage	380/400/415 (3Ph+N+PE)
Input voltage range	138-305 40% Last, 305-485 100% Load
Power factor	≥0.99
Output	
Voltage	380/400/415 (3Ph+N+PE)
Voltage regulation	± 1%
Output frequency	Line mode: synchron with Input, in case of deviation >10 % 50/60Hz 0,1%, Battery mode 50/60Hz ± 0,1%
Crest Factor	3 : 1
Harmonic distortion (THDv)	≤ 1% (100% linear load), ≤ 3% (100% non-linear load)
Overload	
Inverter Bypass	≤ 110% 60min, ≤125% 10min, ≤ 150% 1min, > 150% 1,2s until inverter shuts down 30°C: 135% permanent, 40°C: 125% permanent, > 1000% 100ms
Efficiency	
AC Mode	Up to 96,8%
ECO Mode	Up to 99%
HECO Mode	Up to 99%

Batteries	
Battery type	VRLA
Battery voltage	240 x 12V/9Ah
max. charging current	18A/Powermodule
System Features	
Alarm messages	Mains voltage, bypass mode, low battery, battery error, overload, and UPS system error.
Communication interfaces	RS232, RS485, parallel port, LBS, BMS, dry contacts, relay card (optional), SNMP card (optional), battery temperature sensor (optional)
Overtemperature	Inverter mode: Switch to bypass. Battery mode: Shut down immediately
Self-Diagnosis	At system startup and at any time via the software
Generator -Input	support
EPO	Immediately shut down of UPS
Environment	
Operation temperature	0-40°C
Storage temperature	-25 - 55°C
Humitidy	0-95% (non-condencing)
Altitude [m]	1000m, Derating required>1000m
Noise level [dB]	<58
Standards	
Safety	IEC/EC 62040-1, IEC/EC 62477-1
EMC	IEC/EN 62040-2 (IEC 61000-2-2, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11)

8 Problems and solutions

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.

- Product model name and serial number, which can be found on LCD display rear cover and power module side.
- Try to describe the fault with more details, such as LCD display info, LED lights status, etc.

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

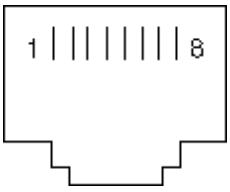
No.	Problem	Possible reason	Solution
1	LCD not displayed	The Network cable is not fixed properly or the telephone line of the front door is not fixed properly	Connect the network cable and telephone cable properly
2	LCD blue screen	LCD is interference	Take out the cable and insert back properly
3	Utility is connected but the UPS cannot be powered ON	Input power supply is not connected. Input voltage low. The input switch of the module is not switched on	Measure if the UPS input voltage/frequency is in the specified range. Check if all Power modules are switched on
4	Utility normal but Utility LED does not light on, and the UPS operates at battery mode	The input switch of the modules are not switched on. The input cable is not connected	Switch on the input switch of the modules. Make sure that the input cable is well connected
5	The UPS does not indicate any failure, but output do not have voltage	Output cable does not well connected	Make sure that the output cable is well connected
6	The UPS module cannot transfer to bypass or inverter mode	Module does not well inserted. The left coronal screw in not tight. Output switch do not switch on	Pull out the module and insert again. Tighten the screw Switch on the output switch
7	The UPS module fault LED remains ON	The module is already damaged	Take out this module and replace it with a new module
8	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.
9	Battery LED is flashing but no charge voltage and current	Battery switch 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 switch. If batteries are damaged, need to replace whole group batteries. Connect the battery cables correctly. Got to LCD setting of the battery number and capacity and set the correct data
10	Buzzer beeps ervery 0,5 seconds and LCD display “output overload”	Overload	Remove some load

11	Buzzer long beeps, LCD display “output short circuit”	The UPS output is in short circuit	Make sure the load is not in short circuit, and the restart the UPS
12	The LED of the Module with red light	The module is not inserted properly	Pull out the module and insert it properly
13	The UPS only works on bypass	The UPS is set to ECO mode or the transfer times to bypass are limited	Set the UPS working mode to Single Module type (non parralel) or to reset the times of transferring to bypass or restart the UPS
14	Cannot black start	Battery switch is not properly closed. Battery fuse is not open Battery is low	Close the battery switch Change the fuse Recharge the battery
15	Buzzer beeps continuously and LCD indicates rectifier fault or output fault	UPS is out of order	Consult with your local agent for repair.

9 Port definitions

9.1 BMS communication port definition

Definition of port



Connection between the BMS's CAN or RS485 port and UPS BMS's CAN or RS485 port

BMS	UPS	Description
PIN1	PIN1	CAN_H
PIN2	PIN2	CAN_L
PIN4	PIN4	RS485 –"B"
PIN5	PIN5	RS485 –"A"
PIN7/8	PIN7/8	GND

Available function of BMS:

- Communicate to LI battery BMS

9.2 RS485 Communication port definition

Definition of port



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

Device (RJ45)	UPS (RJ45)	Description
PIN1/5	PIN1/5	RS485 –"B"
PIN2/4	PIN2/4	RS485 –"A"

Available functions of RS485:

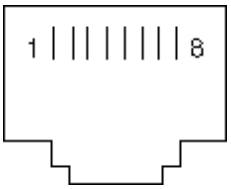
- Monitor UPS power status
- Monitor UPS alarm info
- Monitor UPS running parameters
- Timing off/on setting

RS485 communication data format

Baud rate	9600
Byte length	8bit
End bit	1bit
parity check	none

9.3 BAT_T communication port definition

Definition of port



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

Device (RJ45)	UPS (RJ45)	Description
PIN1/5	PIN1/5	RS485 –"A"
PIN2/4	PIN2/4	RS485 –"B"
PIN7	PIN7	12Vdc
PIN8	PIN8	GND

Available function of RS 485:

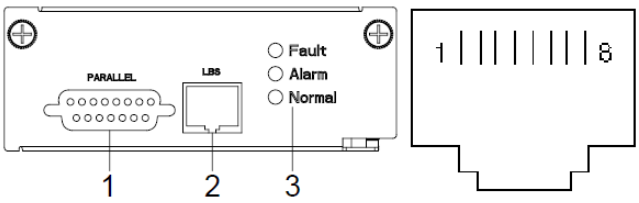
- Communicate to Battery temperature sensor

RS485 communication data format

- Baud rate 9600
- Byte length 8bit
- End bit 1bit
- parity check none

9.4 LBS port definition

Definition of port



Connection between the UPS LBS port

UPS (RJ45)	UPS (RJ45)	Description
PIN1/2/3	PIN1/2/3	LBS
PIN5/7/8	PIN5/7/8	GND

Available function of LBS:

- The output power of two or more UPS in non-parallel system should be synchronized with each other
- The output phase of two or more UPS in non-parallel system should be synchronized with each other

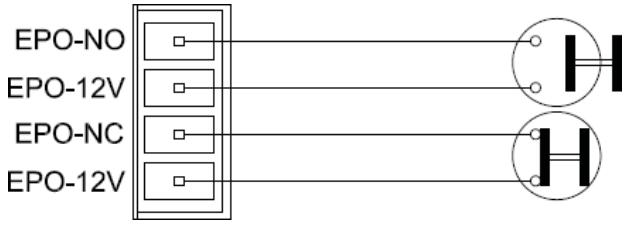
CAUTION!

Two or more LBS cables must be used to form a ring when two or more LBS in non-parallel system. And the cables must use horizontal line.

9.5 REPO Instruction

Definition of port:

Connection diagram



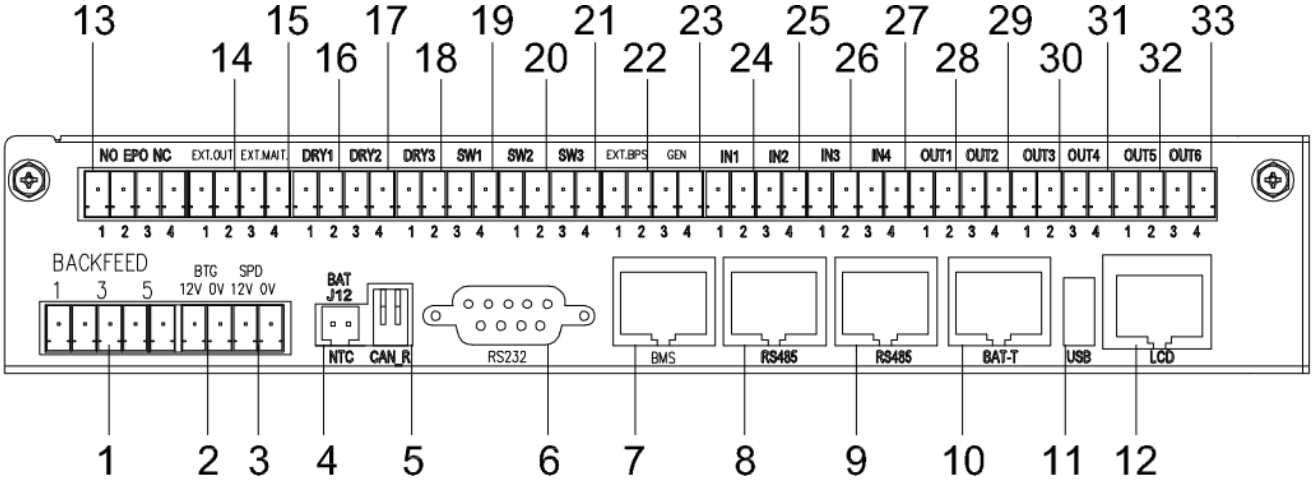
Connection between the EPO button and UPS REPO

EPO Button	UPS REPO	Description
PIN1	PIN1	EPO NO
PIN2	PIN2	EPO 12V
PIN1	PIN3	EPO NC
PIN2	PIN4	EPO 12V

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

9.6 Dry contact ports

Definition of input and output ports



Functions of input dry contact ports

No.	Dry contact port	PIN	Function
13	EPO	NO 12V	EPO normally opened port. EPO activation when NO port is shorted to 12V port. When EPO status active the UPS will turn to EPO mode.
		NC 12V	EPO normally closed port. EPO activation when NC port is disconnected from 12V port. When EPO status active the UPS will turn to EPO mode.
14	Switch Status	Ext.OUT	External output breaker status dry contact port. Normally opened port. Status activation when Ext. OUT port pin1 is shorted to pin2.
15		Ext. MAINT	External maintenance breaker status dry contact port. Normally opened port. Status activation when Ext. MAINT port pin3is shorted to pin4. When Ext. MAINT status active the UPS will turn to maintenance bypass if the function is enable.
22		Ext. Bypass	External bypass breaker status dry contact port. Normally opened port. Status activation when Ext. BPS port pin1 is shorted to pin2.
19		SW1	External battery breaker status dry contact port. Normally opened port. Status activation when SW1 port pin 3 is shorted to pin4, if the function is enable.
20		SW2	External battery breaker status dry contact port. Normally opened port. Status activation when SW2 port pin 1 is shorted to pin2, if the function is enable.
21		SW3	External battery breaker status dry contact port. Normally opened port. Status activation when SW3 port pin 3 is shorted to pin4, if the function is enable.
2	Battery grounding tester	12V 0V	Battery grounding tester status dry contact port. Normally opened. Status activation when BTG port 12V is shorted to 0V port.
	Surge protection devive	12V 0V	Surge protective device status dry contact port. Normally opened. Status activation when SPD port 12V is shorte3d to 0V port.
23	Generator set	12V 0V	Generator Set status dry contact port. Normally opened. Status activation when GEN port 12V is shorted to 0V port. When gen status active the UPS will disable the DC charge if the function is enable.

Functions of the output dry contact ports

No.	Dry contact port	PIN	Function
16	Battery breaker driver	DRY1	Battery group 1 breaker driver port. Normally opened port. DRV activation when battery discharge and voltage to EOD. Then DRV port will sent +24V voltage to battery breaker coil to trip the breaker off, if the function is enable.
17		DRY2	Battery group 2 breaker driver port. Normally opened port. DRV activation when battery discharge and voltage to EOD. Then DRV port will sent +24V voltage to battery breaker coil to trip the breaker off, if the function is enable.
18		DRY3	Battery group 3 breaker driver port. Normally opened port. DRV activation when battery discharge and voltage to EOD. Then DRV port will sent +24V voltage to battery breaker coil to trip the breaker off, if the function is enable.
1	BP-BACKFEED	1 3 4	1 is connected to relay common pin, 3 is connected to relay NO pin, 5 is connected to relay NC pin. BP- BACKFEED activation when the UPS work on battery mode and then bypass SCR short. It will alarm that bypass input is high voltage. Relay: 270Vac/5A, 125Vac/10A, 30Vdc/3A
28-33	OUT 1-6	OUT Common	It can chose normally opened or normally closed on the LCD. NO will short to com or disconnect from com when the port is enable. The function of the port as per the table in LCD description section. Relays: 125Vac/0.5A, 30Vdc/2A

10 Backfeed protection

Backfeed Protection

The presence of a backfeed protection is required by IEC 62040-1 UPS standard.

An additional external isolation device must be installed upstream the UPS system. A magnetic contactor or a circuit breaker with UVR (Under Voltage Release) functionality can be used for this purpose.

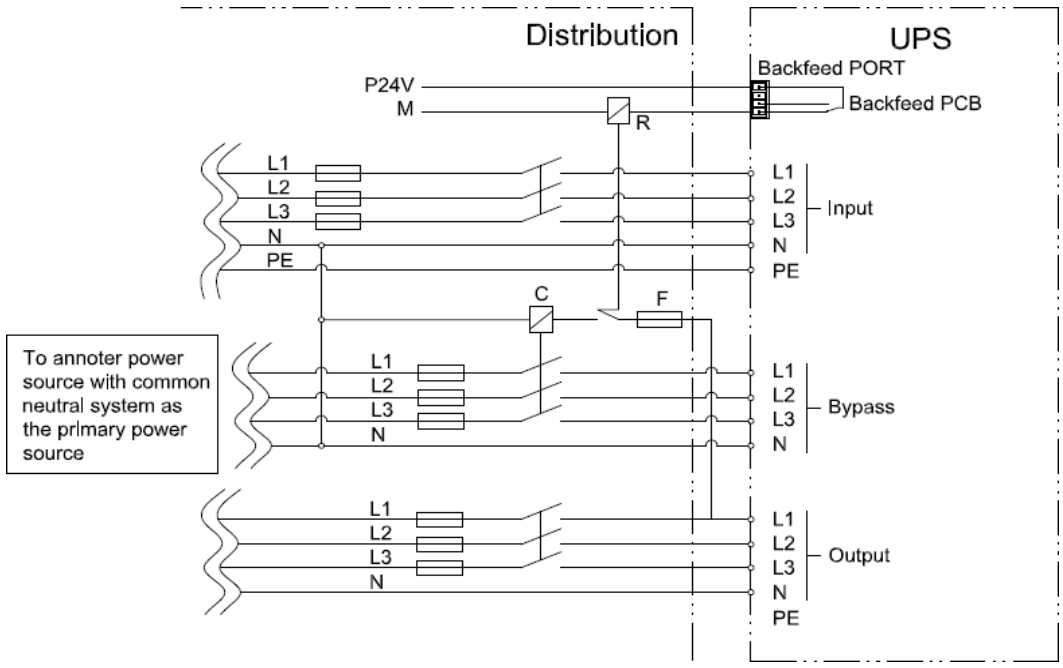
The isolation device must be able to carry the UPS input current (common input in case of single source, bypass input in case of dual source).

E.g. an isolation device can be a magnetic contactor. The coil of the contactor should be supplied by (eg. fused L1-N voltage) the input source in single mains configurations or by the bypass source in dual mains configurations, via the output port as per Appendix 6.

If the contactor coil exceeds the voltage/current limits of the UPS output port a 24 Vcc source should be generated from the same source the contactor coil is supplied from, in order to supply an additional external auxiliary relay coil. The relay contact, properly rated, should allow to supply the contactor coil.

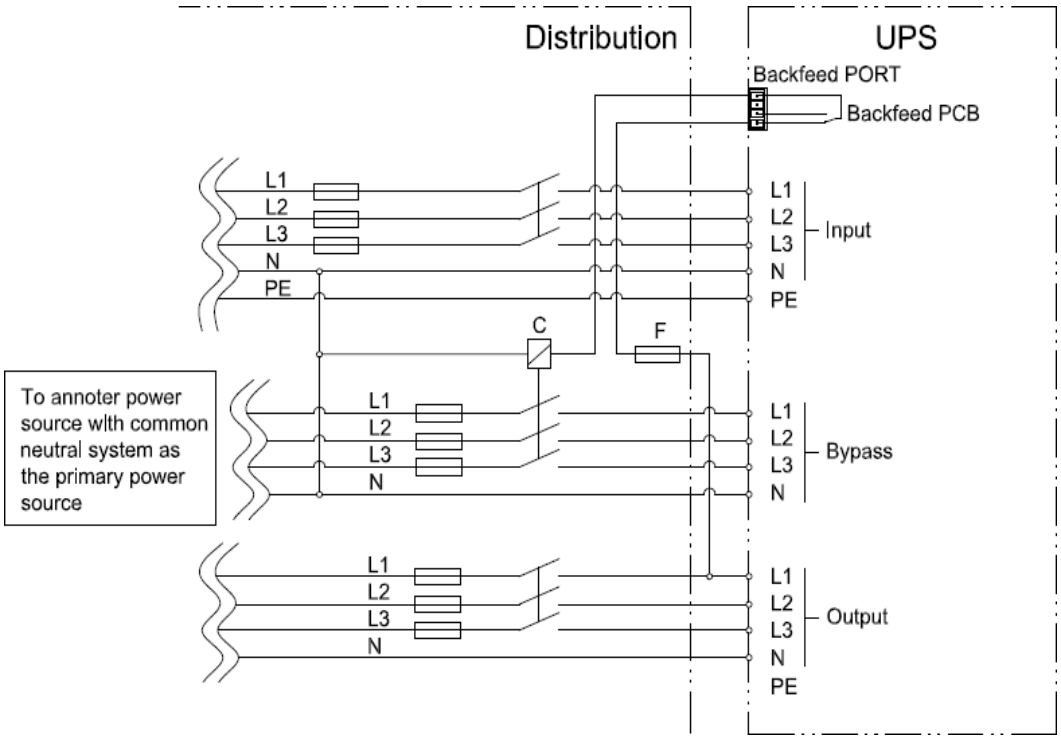
Backfeed installation with relay:

- Connect the UPS backfeed dry contact port to an external +24 VDC supply pole “+”. Route the cable with the other signal cables.
- Connect the UPS backfeed dry contact to a terminal of the relay R coil. Route the cable with the other signal cables.
- Connect the terminal of the relay R coil to a +24 VDC supply pole “-” (M).
- Connect the fuse F, the auxiliary contact of relay R, and the coil of C as shown in the illustration below.
- Connect C (L1, L2 , L3) with UPS bypass input (L1, L2, L3) as shown in the illustration below.
- Connect bypass input (N) with mains feeding (N) in the distribution switchgear.

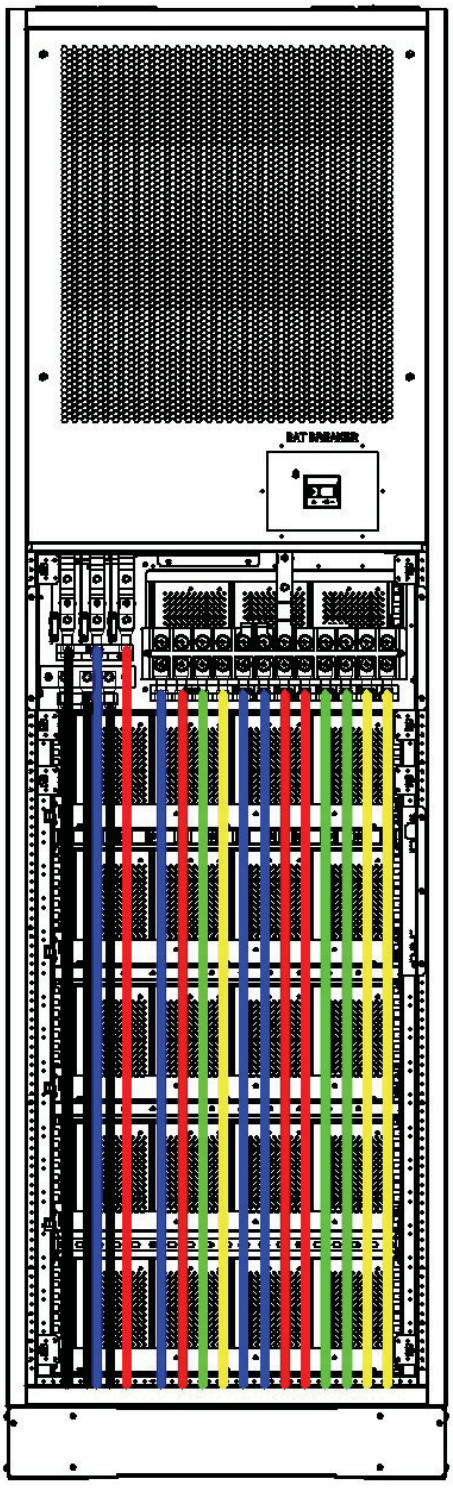


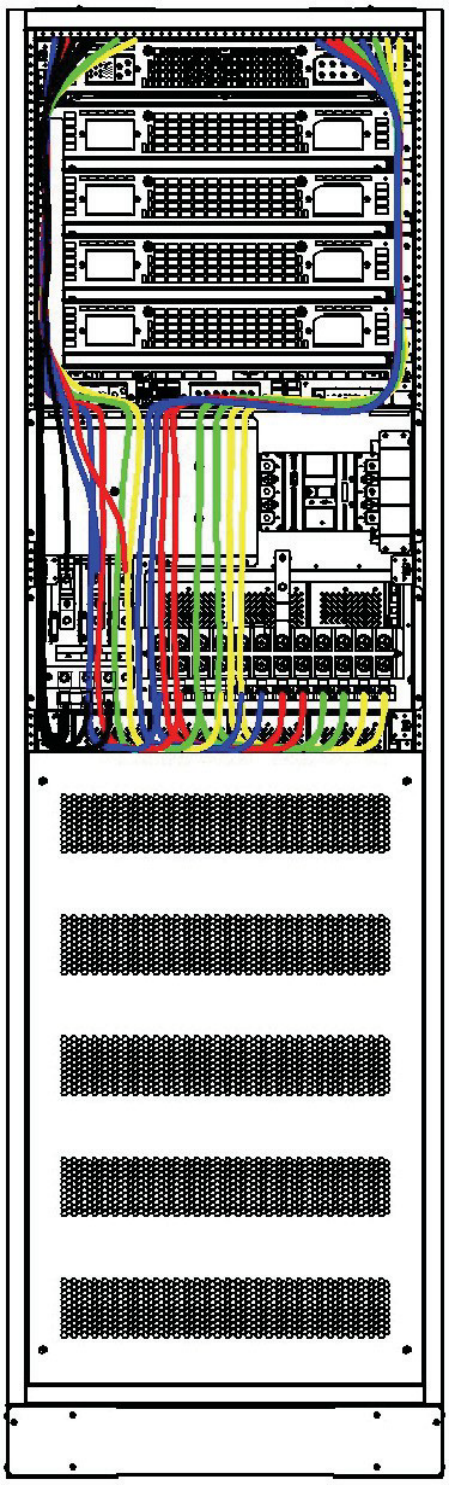
Backfeed installation without relay:

- Connect the UPS backfeed dry contact port 1 to F. Route the cable with the other signal cables.
- Connect the UPS backfeed dry contact port 4 to the contactor C coil. Route the cable with the other signal cables.
- Connect the fuse F and the coil of C as shown in the illustration below.
- Connect C (L1, L2 , L3) with with UPS bypass input (L1, L2, L3) as shown in the illustration below.
- Connect bypass input (N) with mains feeding (N) in the distribution switchgear.

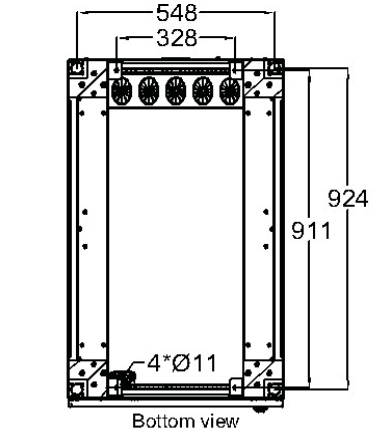


11 Cabling and distribution

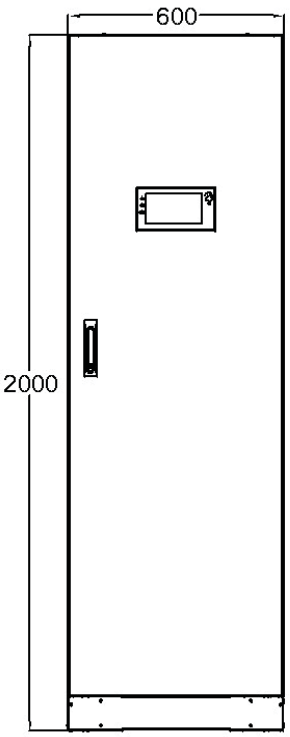




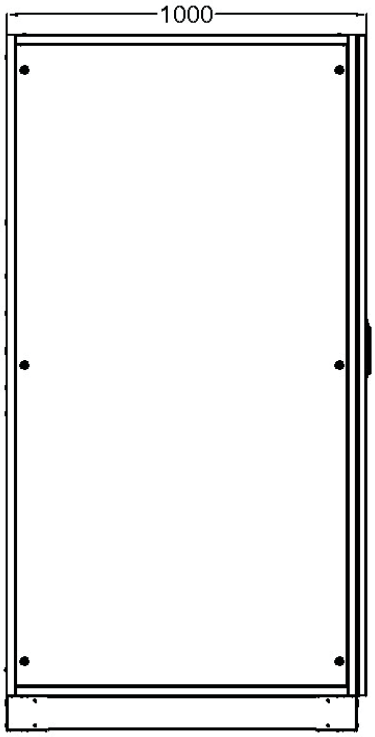
12 Dimensions



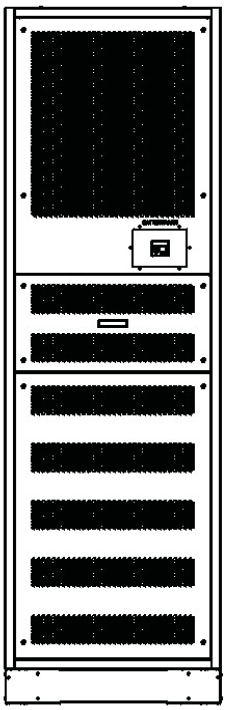
Bottom view

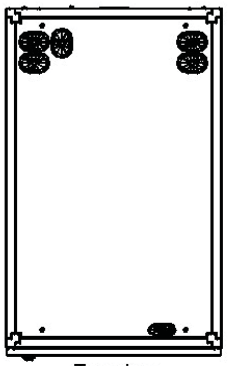


Front view



Front view


Rear view


Top view

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