MQUALITY SR

10~150 kVA

THREE-PHASE ONLINE UPS

INNOVA UPS

Always connected

Content

1.Safety

Important safety instructions – Save these instructions

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

1.1 Safety notes

1. Even no connection with utility power, 220/230/240VAC voltage may still exist at UPS outlet!
2. For the sake of human being safety, please well earth the UPS before starting it
3. Don't open or damage battery, for the liquid spilled from the battery is strongly poisonous and do harmful to body!
4. Please avoid short circuit between anode and cathode of battery, otherwise, it will cause park or fire!
5. Don't disassemble the UPS cover, or there may be an electric shock!
6. Check if there exists high voltage before touching the battery
7. Working environment and storage way will affect the lifetime and reliability of the UPS. Avoid the UPS from working under following environment for long time
   - Area where the humidity and temperature is out of the specified range (temperature 0 to 40°C, relative humidity 5%-95%)
   - Direct sunlight or location nearby heat
   - Vibration Area with possibility to get the UPS crashed.
   - Area with erosive gas, flammable gas, excessive dust, etc
8. Keep ventilations in good conditions otherwise the components inside the UPS will be wover-heated which may affect the life of the UPS.

1.2 Symbols used in this guide

WARNING!
Risk of electric shock

CAUTION!
Read this information to avoid equipment damage

2.Main Features

2.1 Summarization

Our UPS is a kind of three-in-three-out high frequency online UPS, it provides three specifications: The 10~150kVA. The products are modularized and adopt the N+X redundancy. It can flexibly increase the number of the UPS modules according to the load capacity which is convenient for flexible allocation and gradually investment.

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

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

2.2 Functions and Features

- Rack modular design: Modular design, compatible with 19" standard rack cabinet, convenient to be integrated with servers.
- Integrated solution for data center.
- Digital control.
- 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 outcorresponding 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.
- Touch-screen Super-large LCD display.
- Remote monitoring via SNMP.
- Optional Accessories available such as Isolation transformer, distribution Panel, SNMP Card, Relay Contact Board, etc.
- Equip with Maintenance Bypass Switch for easy maintenance purpose.
- Superior MTTR (Meantime to repair) & Short shutdown time in maintenance.
- Centralized monitoring module is also available.
- REPO function.

3. Installation

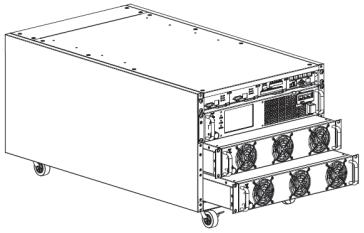
3.1 Unpack checking

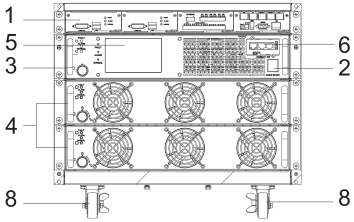
1. Don't lean the UPS when moving it out from the packaging.
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the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

3.2 The appearance of the product

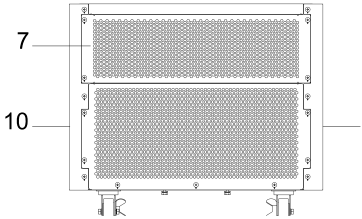
3.2.1 Standalone UPS

10kVA-60kVA (2 Module,8U,without breaker)



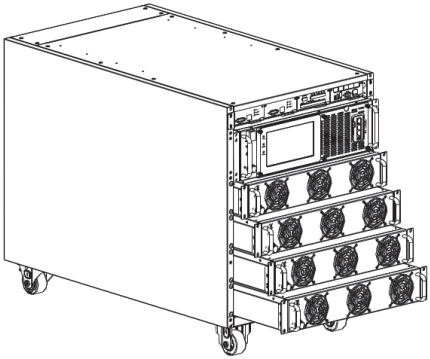


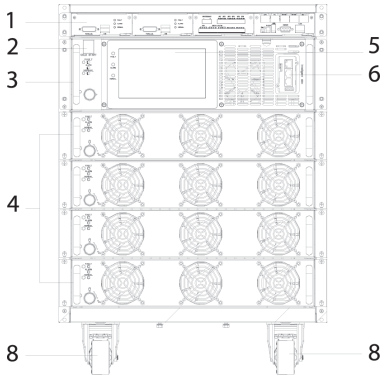
Front View



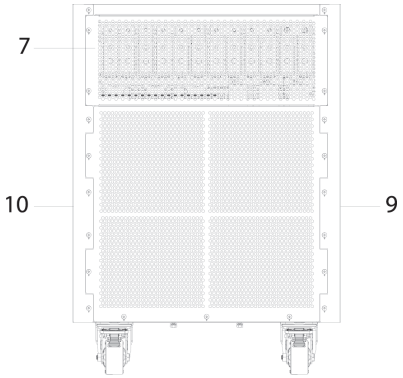
Rear View

10kVA-120kVA (4 Module,13U,without breaker)



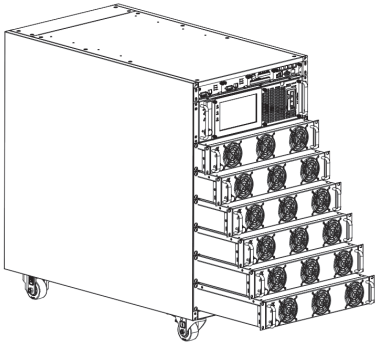


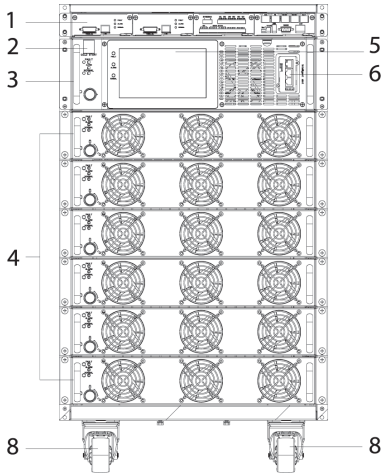
Front View



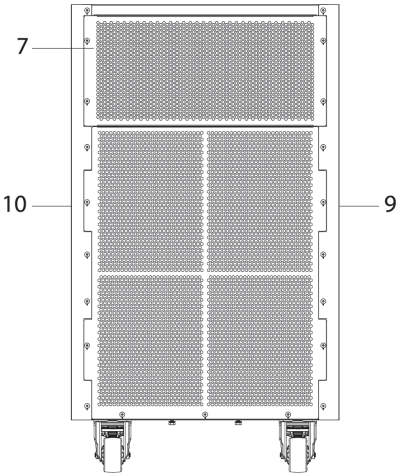
Rear View

10kVA-150kVA (6 Module,17U,without breaker)





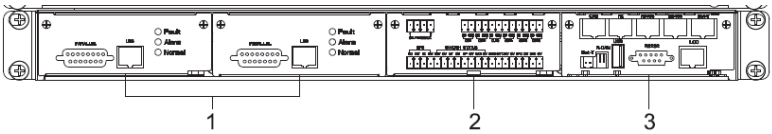
Front View



Rear View

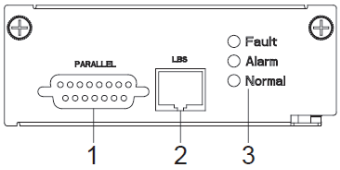
(1) Control unit
(2) Cold start button
(3) Bypass module
(4) Power module
(5) LCD panel: Display UPS data and status
(6) Intelligent Slot (SNMP card/ Relay card)
(7) Terminal block cover
(8) Wheels: for standalone UPS
(9) Left cabinet cover: for standalone UPS
(10) Right cabinet cover: for standalone UPS
(11) Distribution module (Optional)

Control unit



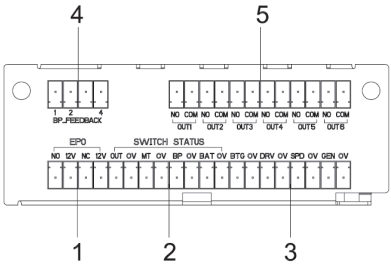
(1) ECU1/2 : Centralized control unit
(2) Dry-contact unit
(3) monitor unit

ECU unit



(1) PARALLEL port
(2) LBS port
(3) LED

Dry-contact unit



(1) EPO port: NO-12V: normaly open port; NC-12V: normaly close port;

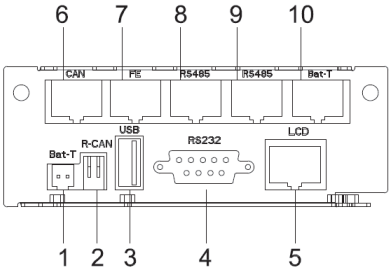
(2) SWITCH STATUS: OUT-0V: output breaker auxiliary contact singnal port; MT-0V: maintenance breaker auxiliary contact singnal port; BP-0V: bypass breaker auxiliary contact singnal port; BAT-0V: battery breaker auxiliary contact singnal port;

(3) The other port: BTG-0V: battery grounding detect singnal input port; DRV-0V: battery breaker driver singnal output port; SPD-0V: SPD detect singnal input port; GEN-0V: generator detect singnal input port;

(4) BP_FEEDBACK: PIN1_NC, PIN2_NO,PIN4_common

(5) Optional dry contacts : 6 ports, can optional by LCD.

Monitor unit



(1) BAT_T: NTC temperature sensor port

(2) R-CAN: CAN communication resistor adjust

(3) USB port: for software updata and history download

(4) RS232 port: for communication

(5) LCD port

(6) CAN port: BMS port

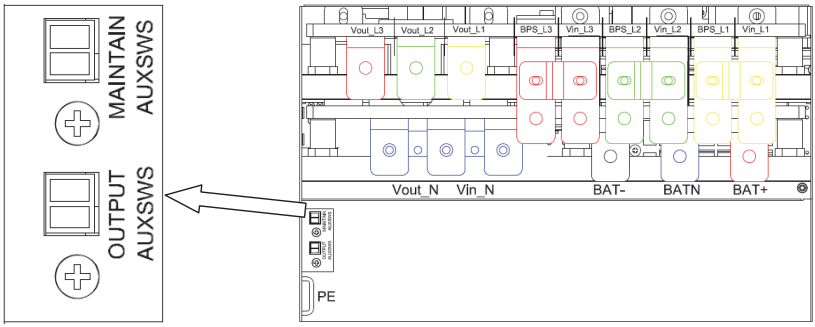
(7) FE: Net port (reserve)

(8) RS485 port: for communication

(9) RS485 port: for communication

(10) BAT_T: battery temperature sensor port (RS485)

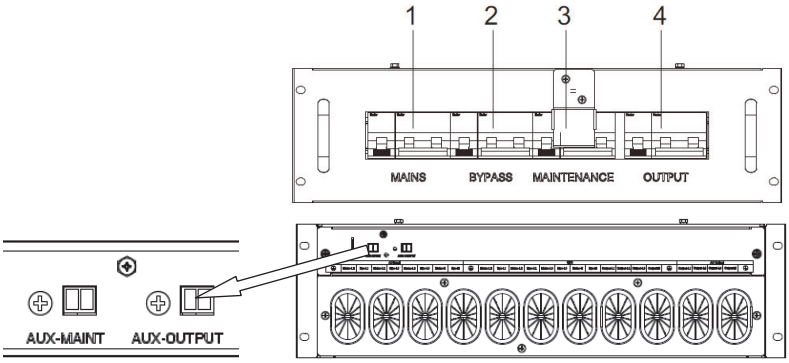
External auxiliary contact interface



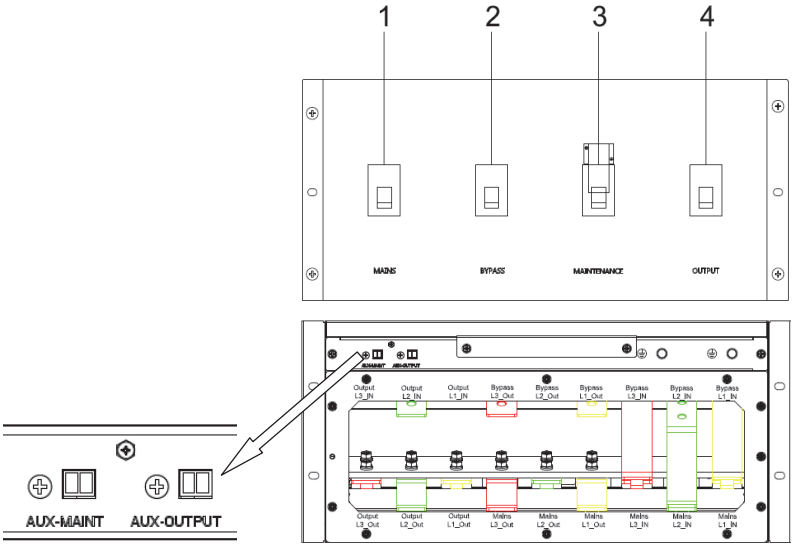
(1) MAINTAIN AUXSWS: Maintenance breaker auxiliary contacts port, connect to PDU AUX-MAINT port for detect maintenance breaker status.

(2) OUTPUT AUXSWS: Output breaker auxiliary contacts port, connect to PDU OUTPUT AUX-OUTPUT port for detect output breaker status.

Distribution module (Optional)



3U (10-60kVA)



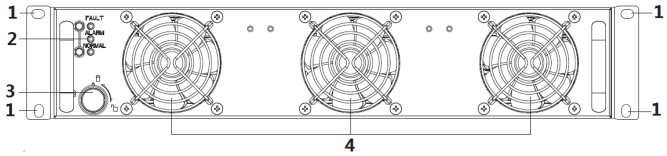
5U (80-150kVA)

(1) Mains breaker
(2) Bypass breaker
(3) Maintenance breaker and it's cover
(4) Output breaker

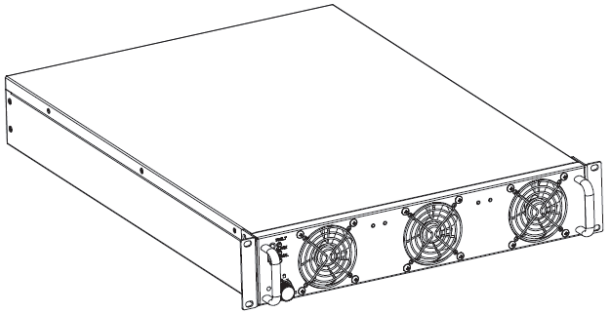
(5) AUX-MAINT: Maintenance breaker auxiliary contacts port, connect to UPS MAINTAIN AUXSWS port for detect maintenance breaker status(Normally closed)

(6) AUX-OUTPUT: Output breaker auxiliary contacts port, connect to UPS OUTPUT AUXSWS port for detect output breaker status(Normally closed).

3.3 UPS module appearance



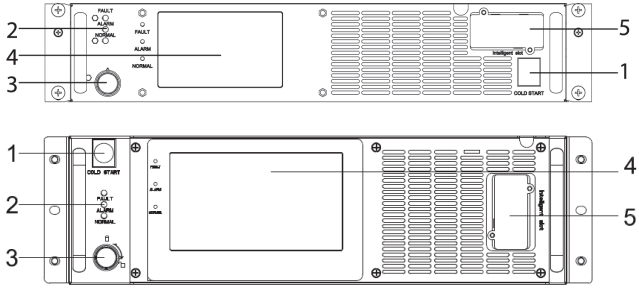
Front View



Side View

(1) Module fixed screw
(2) LED
(3) Module switch
(4) Fan

3.4 Bypass module appearance

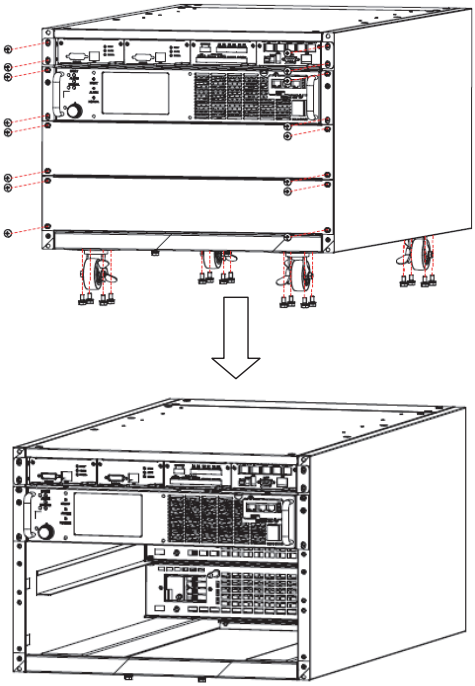


(1) Cold start button
(2) LCD panel: Display UPS data and status
(3) Module switch
(4) LCD panel: Display UPS data and status
(5) Intelligent Slot (SNMP card/ Relay card)

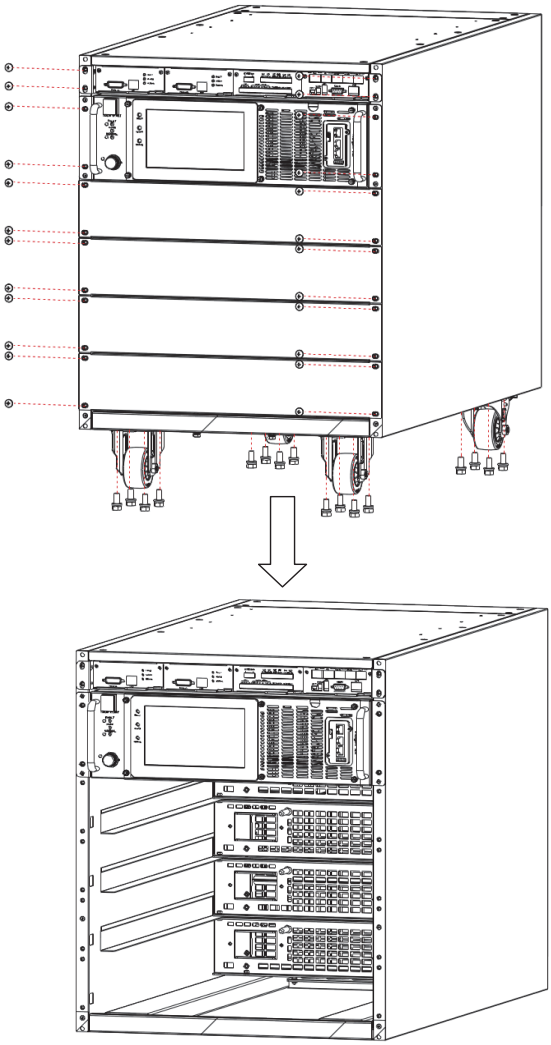
3.5 Installation

3.5.1 Standalone UPS change to sub rack UPS

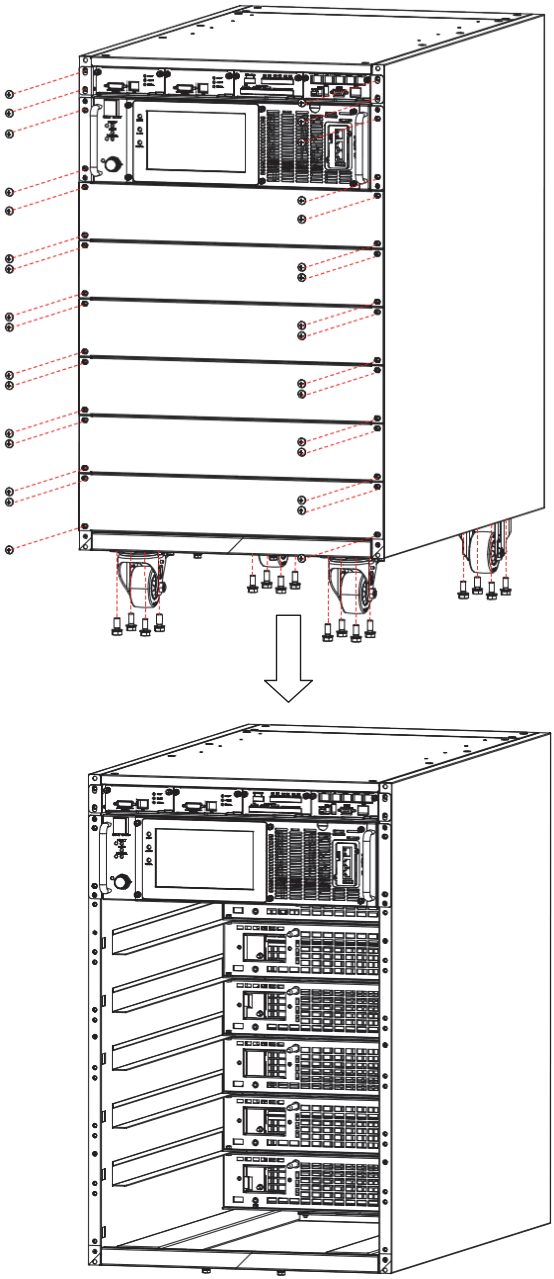
3.5.1.1 Remove the screws, to remove the modules panel and casters.



10kVA-60kVA

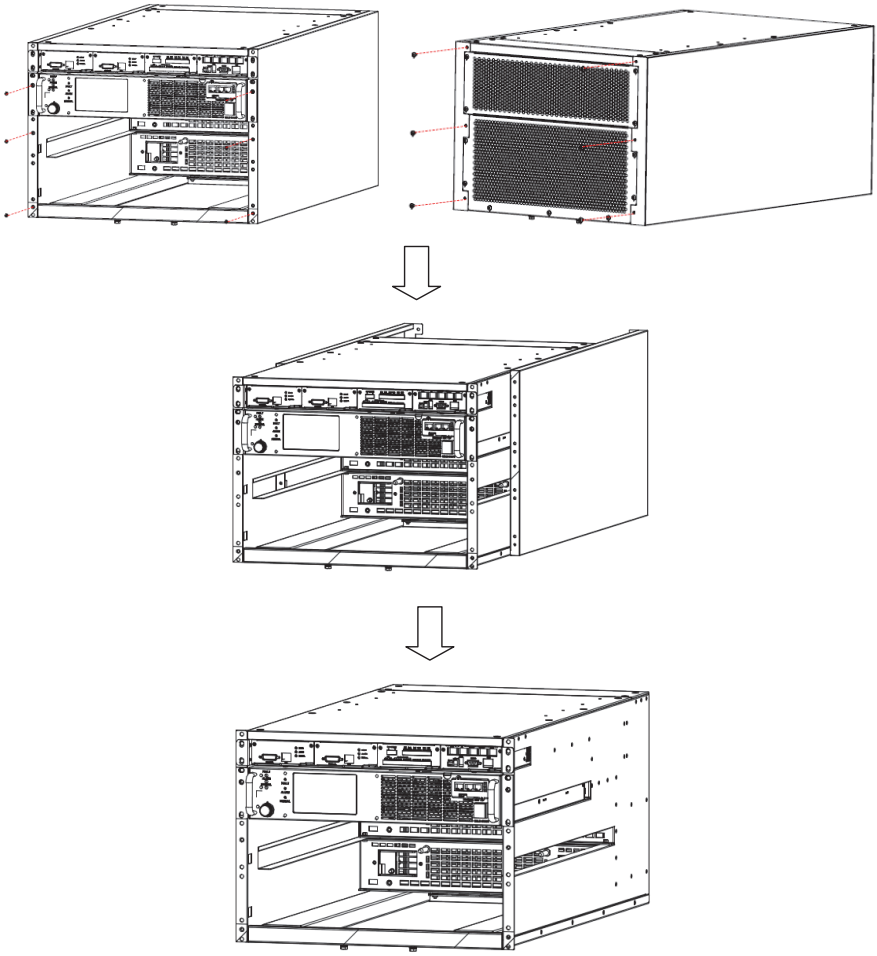


10kVA-120kVA

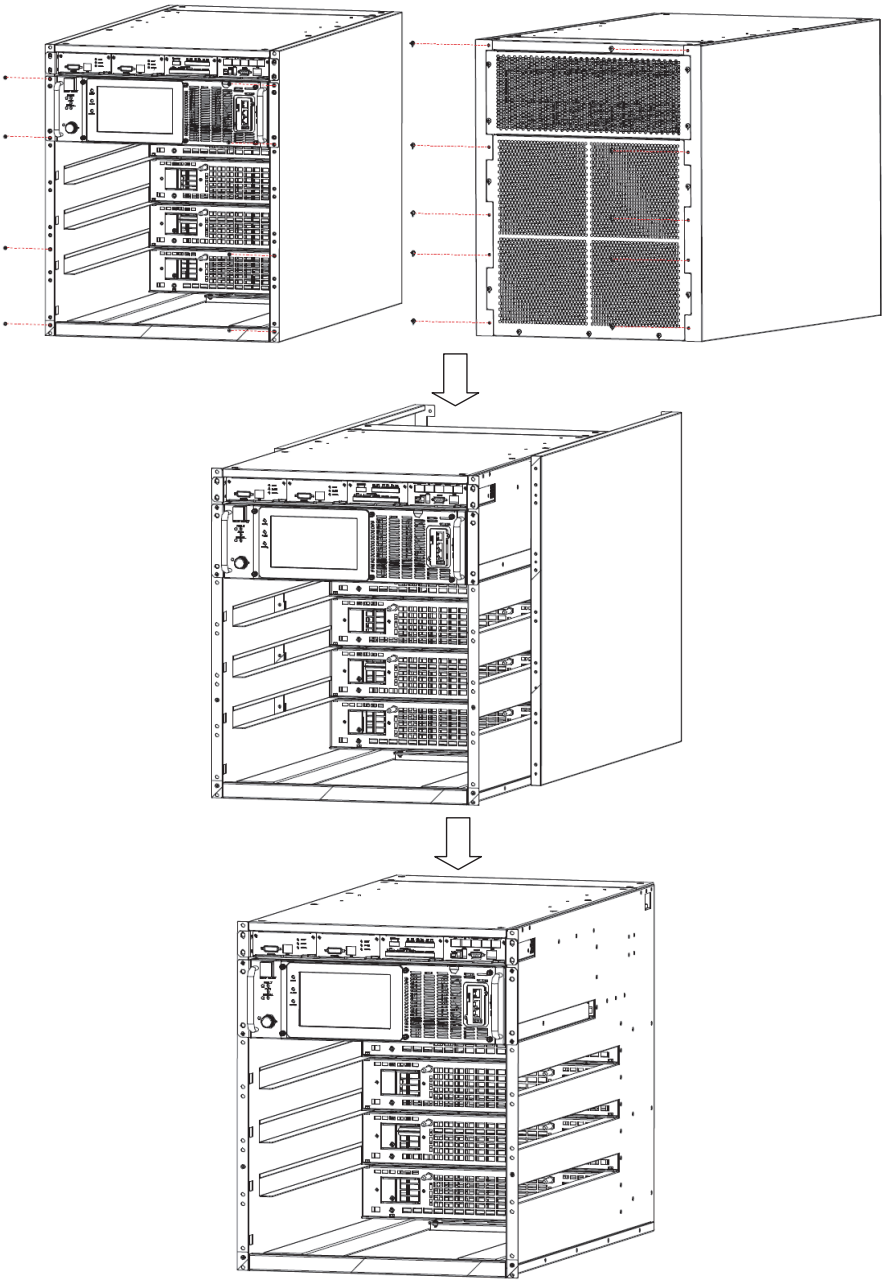


10kVA-150kVA

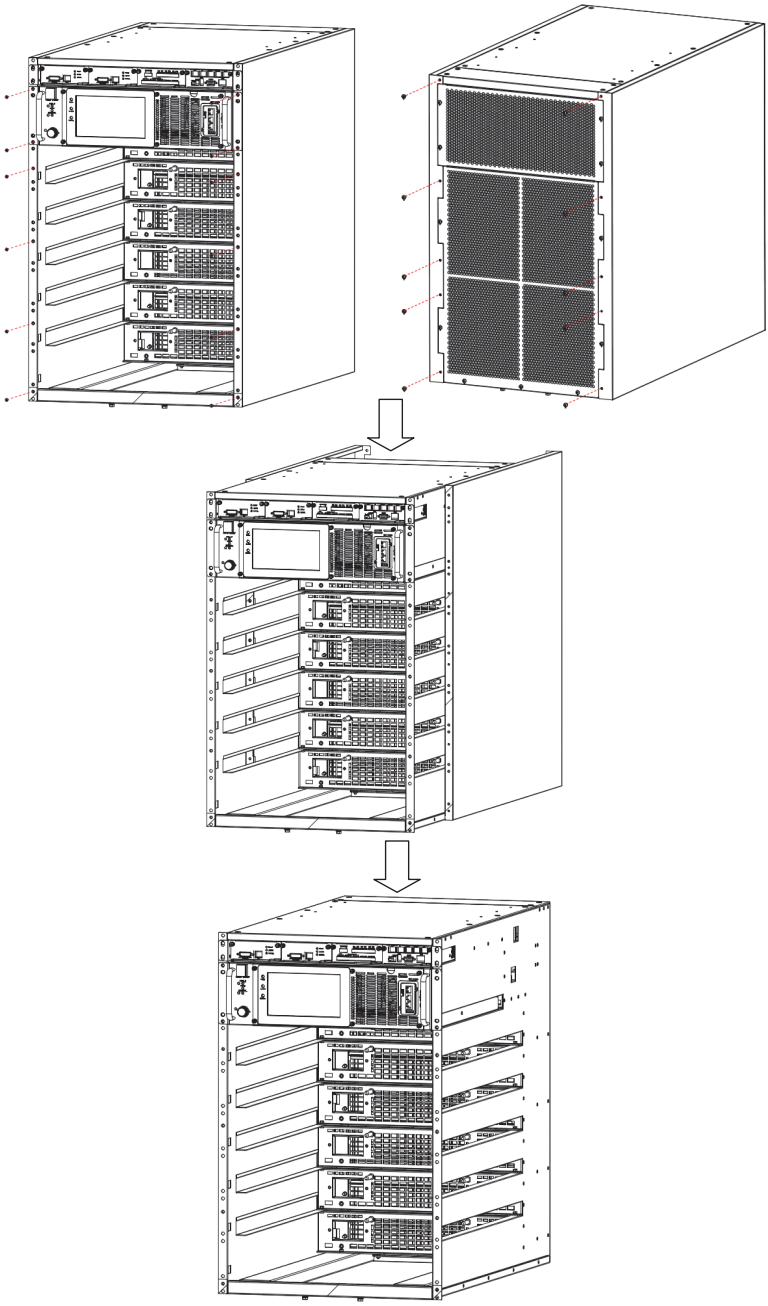
3.5.1.2 Remove the screws of the front side and rear side, to remove the right and left covers.



10kVA-60kVA



10kVA-120kVA

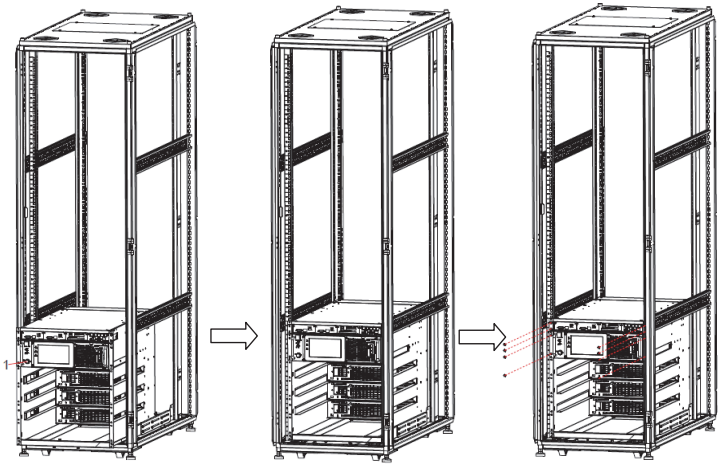


10kVA-150kVA

3.5.2 Sub rack UPS installation operation

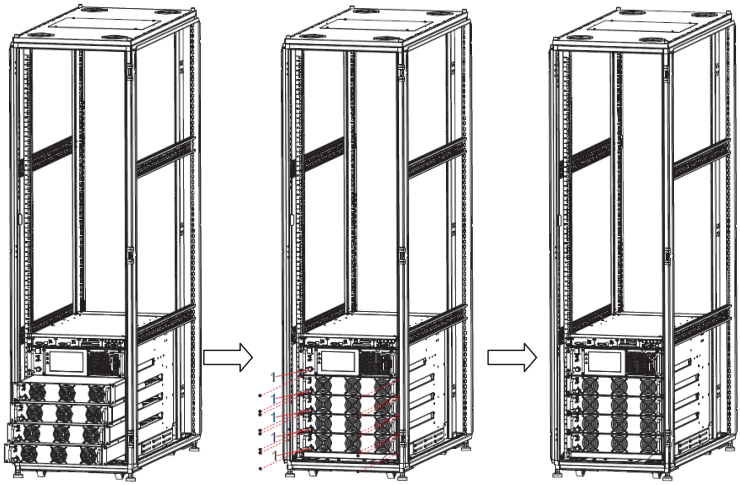
3.5.2.1 Put the sub rack UPS into standard 19" cabinet, and screw the cabinet screws (M5*12) to fix the cabinet, control module and bypass module.

CAUTION!
Bypass module "Module_IN" (1) switch must be at OFF status before put into cabinet, and then switch to ON status after put into cabinet.



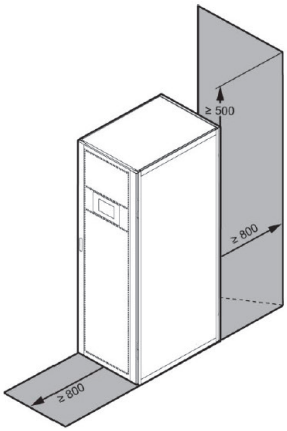
3.5.2.2 Put the modules into sub rack UPS cabinet, and screw the cabinet crews (M5*12) to fix the modules.

CAUTION!
Power module "Module_IN" (1) switch must be at OFF status before put into cabinet, and then switch to ON status after put into cabinet.



3.6 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°C~40°C. If the environment temperature exceeds 40°C, the rated load capacity should be reduced by 12% per 5°C. The max temperature can't be higher than 50°C.

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

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

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

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

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

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

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

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

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

3.7 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-sectional 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 below:

UPS Cabinet (kVA)	Cable dimension				
	AC Input (mm^2)	BPS Input (mm^2)	AC Output (mm^2)	DC Input (mm^2)	Grounding (mm^2)
20	6	6	6	10	6
30	10	10	10	25	10
40	16	16	16	35	16
50	16	16	16	50	16
60	35	35	35	50	35
80	50	50	50	95	50
90	70	70	70	120	70
100	95	95	95	120	95
120	95	95	95	150	95
150	120	120	120	185	120

• 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 400 V, multiply the currents by 0.95. If the rated voltage is 415 V, 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 12 V batteries at 480V in standard configuration.

• The maximum battery discharge current refers to the current when forty 12 V batteries in standard configuration, that is, two hundred and forty 2 V battery cells (1.67 V/cell), stop discharging.

• The battery cable specifications are selected based on 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

UPS Cabinet (kVA)	Connector	Connection mode	Bolt type	Bolt hole diameter	Torque
20-60k 8U	Mains input connector	Crimped OI terminals	/	/	4N*m
	Bypass input connector	Crimped OI terminals	/	/	4N*m
	Battery input connector	Crimped OT terminals	M10	11mm	26N*m
	Output connector	Crimped OI terminals	/	/	4N*m
	Grounding connector	Crimped OT terminals	M10	11mm	26N*m
40-120k 13U	Mains input connector	Crimped OT terminals	M10	11mm	26N*m
	Bypass input connector	Crimped OT terminals	M10	11mm	26N*m
	Battery input connetor	Crimped OT terminals	M10	11mm	26N*m
	Output connector	Crimped OT terminals	M10	11mm	26N*m
	Grounding connector	Crimped OT terminals	M10	11mm	26N*m
60-150K 17U	Mains input connector	Crimped OT terminals	M10	11mm	26N*m
	Bypass input connector	Crimped OT terminals	M10	11mm	26N*m
	Battery input connector	Crimped OT terminals	M10	11mm	26N*m
	Output connector	Crimped OT terminals	M10	11mm	26N*m
	Grounding connector	Crimped OT terminals	M10	11mm	26N*m

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

UPS CABINET (kVA)	Mains input circuit breaker	Bypass input circuit breaker	Maintenance circuit breaker	Output circuit breaker	Battery circuit breaker
20	40A 3P	40A 3P	40A 4P	40A 3P	63A 3P
30	63A 3P	63A 3P	63A 4P	63A 3P	100A 3P
40	80A 3P	80A 3P	80A 4P	80A 3P	125A 3P
50	100A 3P	100A 3P	100A 4P	100A 3P	160A 3P
60	125A 3P	125A 3P	125A 4P	125A 3P	175A 3P
80	160A 3P	160A 3P	160A 4P	160A 3P	250A 3P
90	200A 3P	200A 3P	200A 4P	200A 3P	315A 3P
100	250A 3P	250A 3P	250A 4P	250A 3P	400A 3P
120	250A 3P	250A 3P	250A 4P	250A 3P	500A 3P
150	250A 3P	250A 3P	250A 4P	250A 3P	500A 3P

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

WARNING!
FAILURE TO FOLLOW ADEQUATE EARTHING PROCEDURES MAY RESULT IN ELECTRO-MAGNETIC INTERFERENCE OR IN HAZARDS INVOLVING ELECTRIC SHOCK AND FIRE.

3.9 Power cable connect

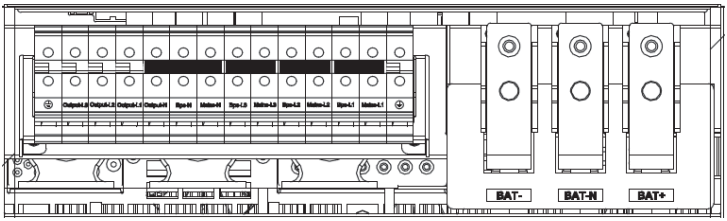
Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

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.

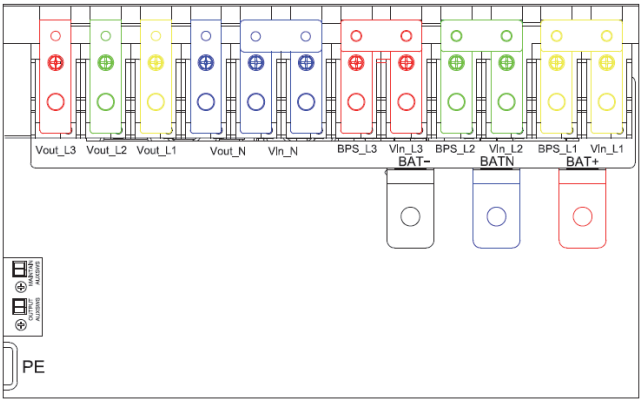
Open the UPS rear panel; Remove the cover of terminals for wiring easily.

3.9.1 Common input connection

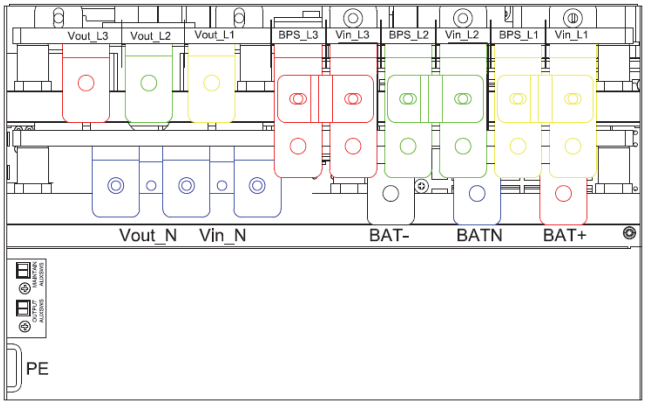
20kVA-60kVA



40kVA-120kVA



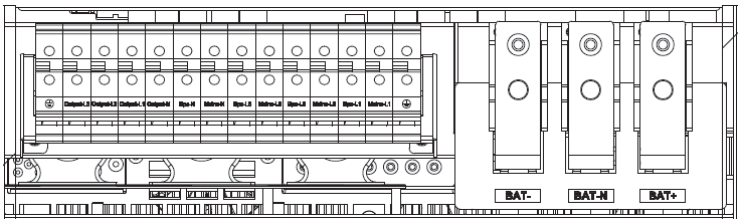
60kVA-150kVA



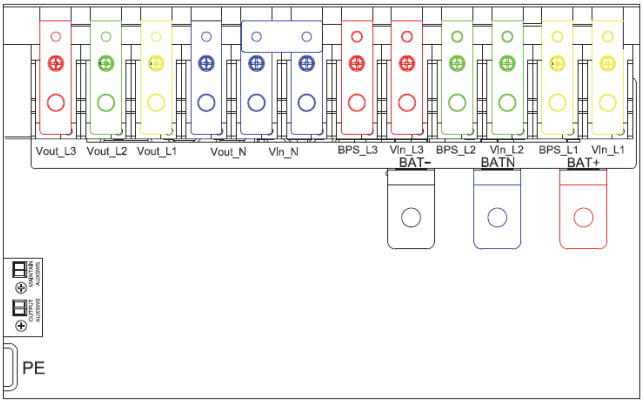
INPUT Primary input Line	**OUTPUT**
	Vout -L1: Output Phase L1
Vin -L1: Primary input Phase L1	**Vout -L2:** Output Phase L2
Vin -L2: Primary input Phase L2	**Vout -L3:** Output Phase L3
Vin -L3: Primary input Phase L3	**Vout -N:** Output Neutral
Vin -N: Input Neutral for primary and secondary input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

3.9.2 Dual input connection

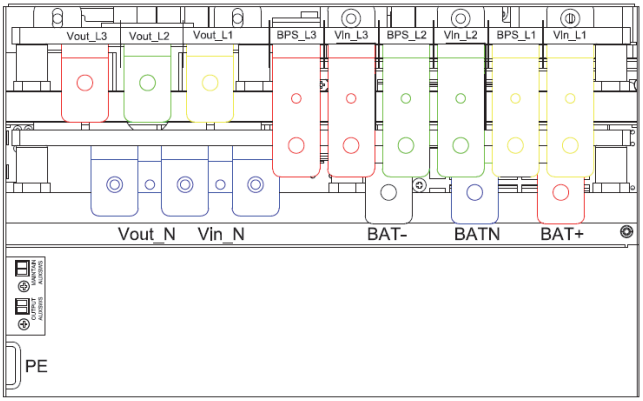
20kVA-60kVA



40kVA-120kVA



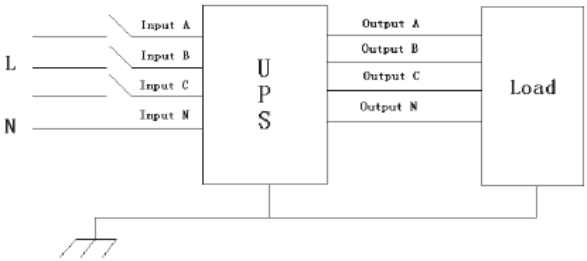
60kVA-150kVA



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



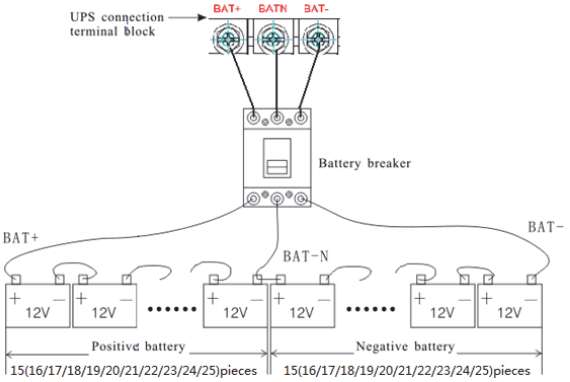
WARNING!
If the load equipment is not ready to accept power on the arrival of the commissioning engineer then ensure that the system output cables are safely isolated at their ends. Connect the safety earth and any necessary bonding earth cables to the copper earth screw located on the floor of the equipment 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 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/18th/19th/20th/21th/22th/23th/24th/25th) and the anode of the 16th (17th/18th/19th/20th/21th/22th/23th/24th/25th/26th) of the batteries. Then the neutral cable, the battery Positive and the battery negative are connected with the UPS respectively. The battery sets between the Battery anode and the neutral are called positive batteries and that between neutral and cathode are called negative ones. The user can choose the capacity and the numbers of the batteries according to their desire.

External battery connections for long-run units.



Note:

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

Factory setting of the long-run unit is battery quantity—36pcs, battery capacity—12V100AH (charger current 15A). When connecting 30/32/34/38/40/42/44/46/48/50 batteries, please re-set desired battery quantity and its capacity after UPS starts at AC mode. Charger current could be adjusted automatically according to battery capacity selected. All related settings can be done through LCD panel or monitoring software.

CAUTION!
Ensure correct polarity battery string series connection. i.e. inter-tier and inter block connections are from (+) to (-) terminals.
Don't mix batteries with different capacity or different brands, or even mix up new and old batteries, either.

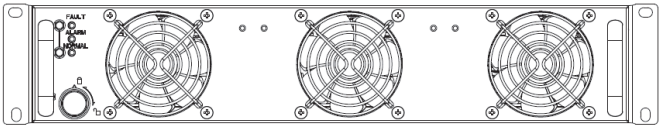
WARNING!
Ensure correct polarity of string end connections to the Battery Circuit Breaker and from the Battery Circuit Breaker to the UPS terminals i.e. (+) to (+) / (-) to (-) but disconnect one or more battery cell links in each tier. Do not reconnect these links and do not close the battery circuit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

3.11 Online UPS Modules Replacement

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

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

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



- **Insert module**

(1) Remove decorated panel;

(2) Put the UPS module in the cabinet module slot. Push the module along the slot into the cabinet until the module is inserted properly, then the indicator will flash.

(3) Fix the module with screws (1) at the positioning screw holes;

(4) Switch on the module_ON switch (3) at the left of the module panel, then the red indicator (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.

• **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.

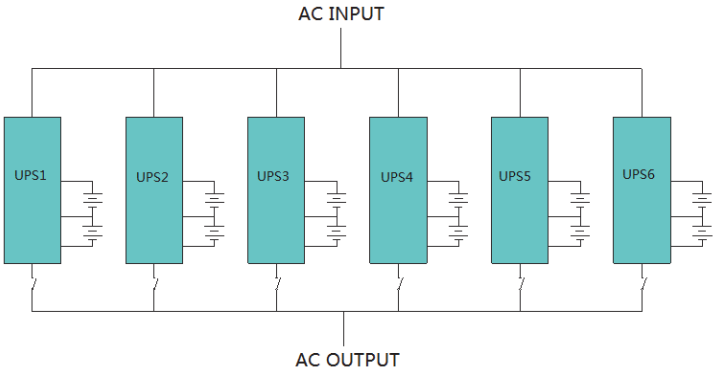
(3) When insert the module under battery mode, please press "ON" button at bypass module's panel until the module starts.

3.12 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.

3.12.1 Cabinet installation

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



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.

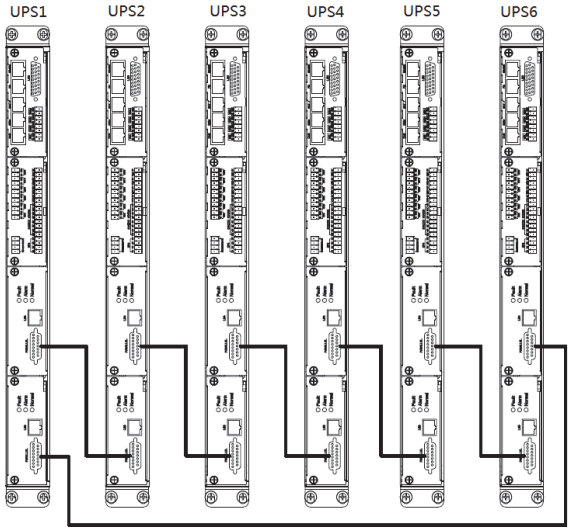
CAUTION!

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.

3.12.2 Parallel cable installation

Shielded and double insulated control cables available 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.



3.13 LBS installation (optional)

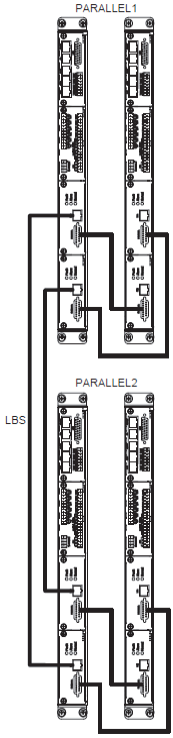
LBS system contains LCD set, cable connect and STS device.

3.13.1 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.

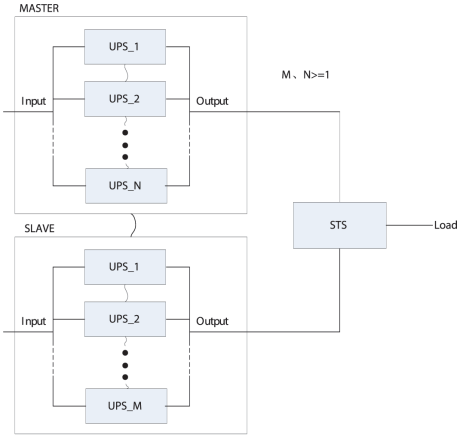
3.13.2 LBS cable installation

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



3.13.3 UPS installation

The whole systems are showed below.



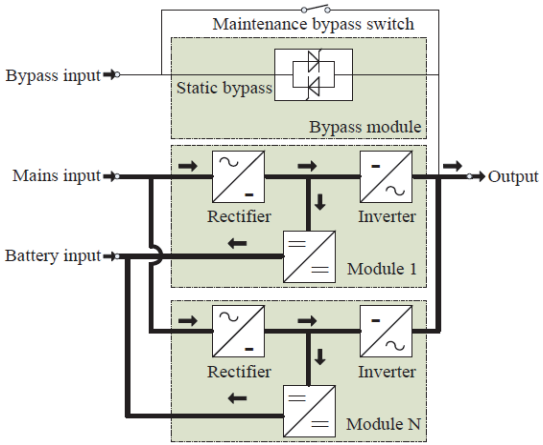
4. Operation

4.1 Operation Modes

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

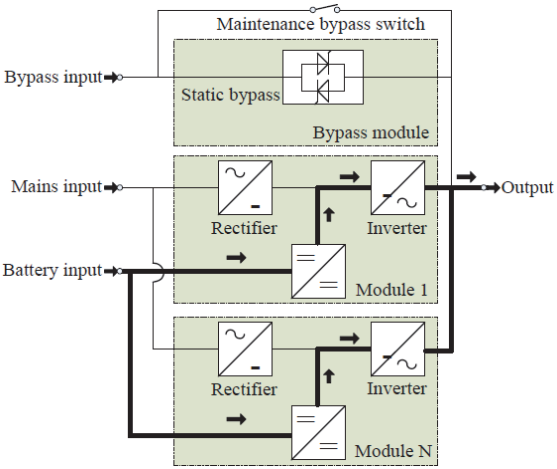
- **Normal mode**

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)**

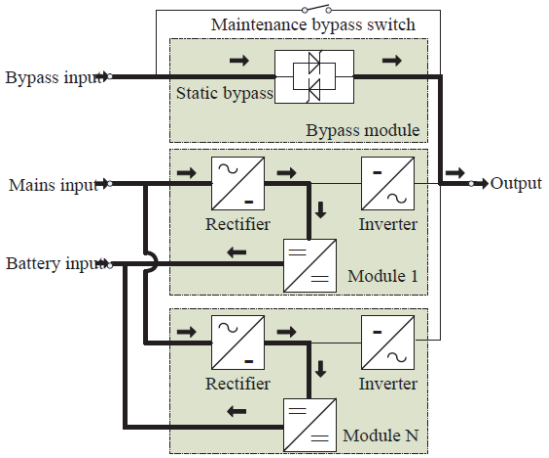
If the AC mains input power fails, the inverter, which obtains power from the battery, supplies the critical AC load. There is no power interruption to the critical load. The UPS will automatically return to Normal Mode when AC recovers.



• **Bypass mode**

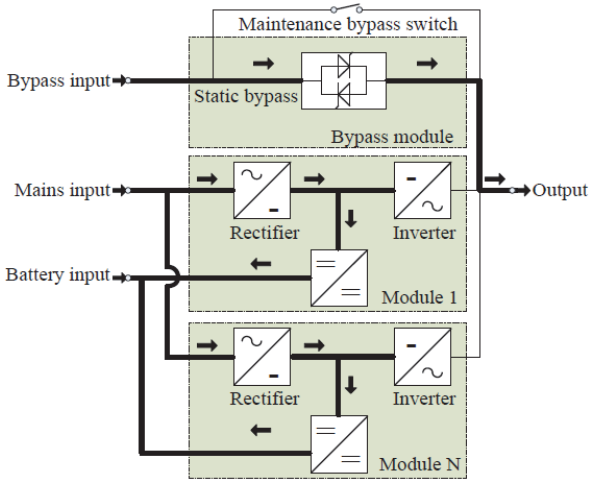
If the inverter is out of order, or if overload occurs, the static transfer switch will be activated to transfer the load from the inverter supply to bypass supply without interruption to the critical load. In the event that the inverter output is not synchronized with the bypass AC source, the static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



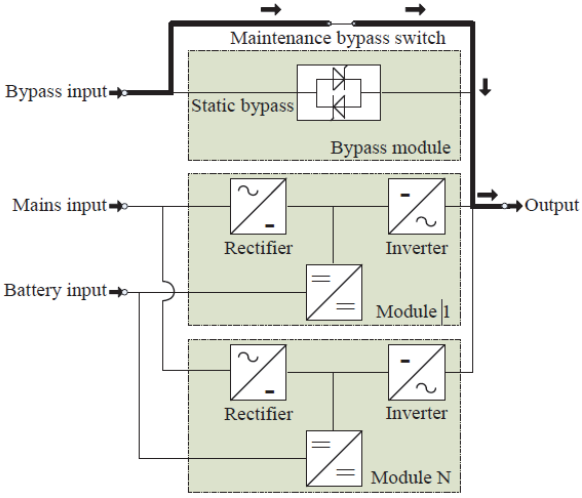
• **ECO Mode**

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

4.2.1 Restart procedure

CAUTION!
MAKE SURE GROUNDING IS PROPERLY DONE!

• Set the Battery Switch to the "ON" position according to the user's manual.

• Open the front and rear doors of the UPS to access to the main power switches. During this procedure the output terminals will become alive.

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

• Turn ON the bypass and input switches 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.

• Switch ON output switch.

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.

• Switch off the MAINS to simulate utility failure, the rectifier will turn off and the battery should feed the inverter without interruption.

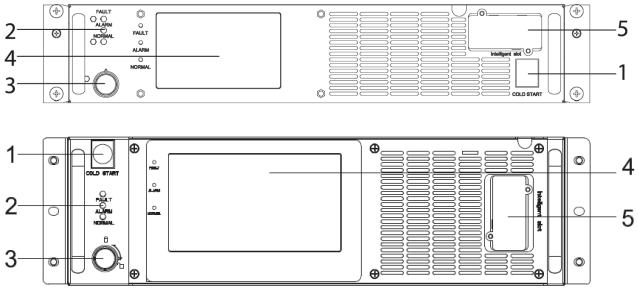
• Switch on the MAINS to simulate utility recovery, the rectifier will restart automatically after 20 seconds and the inverter will supply to the load. It is suggested to use Dummy loads for testing. The UPS can be loaded up to its maximum capacity during load test.

4.2.3 Cold start procedure

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

• Switch on the battery switch.
The battery will feed the Auxiliary power board.
• Switch on the Output switch.
• Trigger the cold start button (1) 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 black start key.

4.2.4 MAINTENANCE BYPASS

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

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

Switch to mechanical bypass

CAUTION!
If the UPS is running normally and can be controlled through the display, carry out steps 1 to 5; otherwise, jump to Step 4.

• Open the cover of maintenance switch, the UPS turns to bypass mode automatically.
• Switch on MAINTANCE switch;
• Switch OFF BATTERY switch;
• Switch OFF the MAINS switch;
• Switch OFF OUTPUT switch;

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

Switch to normal operation (from mechanical bypass)

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

• Open the front and rear doors of the UPS to be easily access to the main power switches
• Switch ON the output switch;
• Switch ON the input switch;
• Switch ON the battery switch;
The UPS powers from the static bypass instead of the maintenance bypass.
• Switch OFF the maintenance bypass switch, then the output is supplied by the bypass of the modules.
• Put on the maintenance switch cover.

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

4.2.5 Shut down procedure

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

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

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

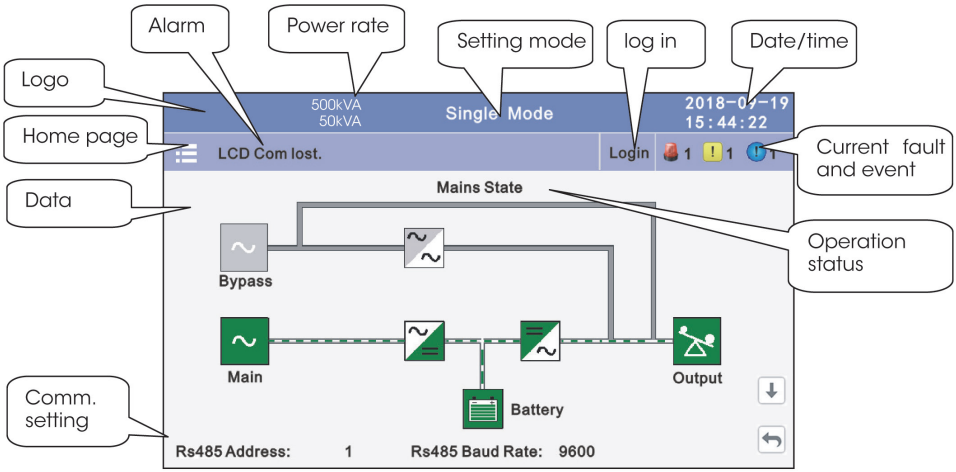
4.2.6 Startup procedure for parallel system

• 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 switch is opened temporarily.
• Switch ON the output switch 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.

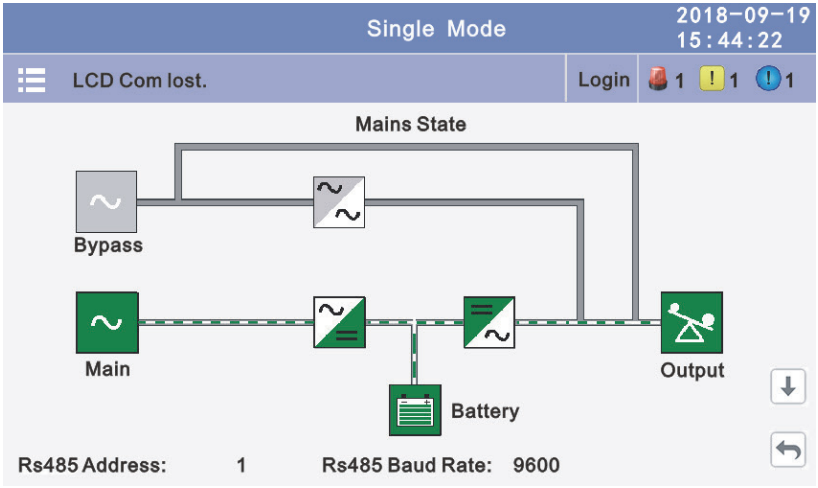
- Switch ON the input switch. Close the external input switch and start from mains.
- After start from mains, check the LCD interface of each UPS to see if the ID, VA is the same with the actual values.
- Switch ON the external battery switch of each UPS. Check if the charging current displayed in LCD is normal.

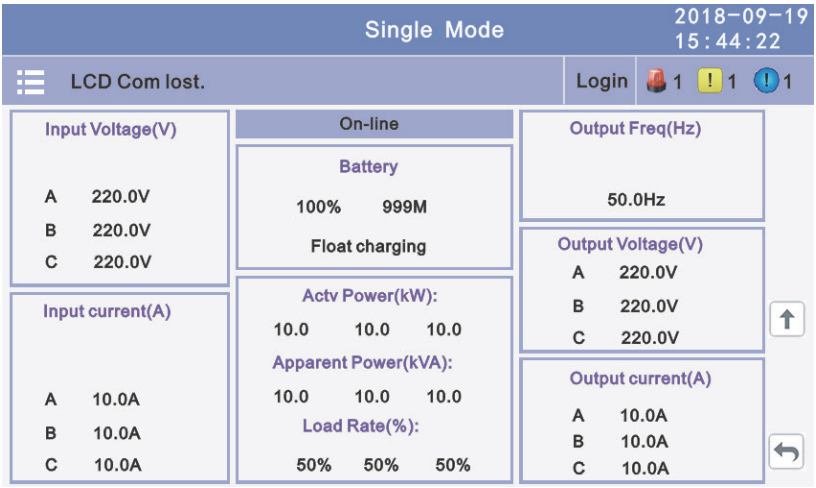
NOTE!
The UPS cannot be parallel until each single unit is normal.

4.3 The Display

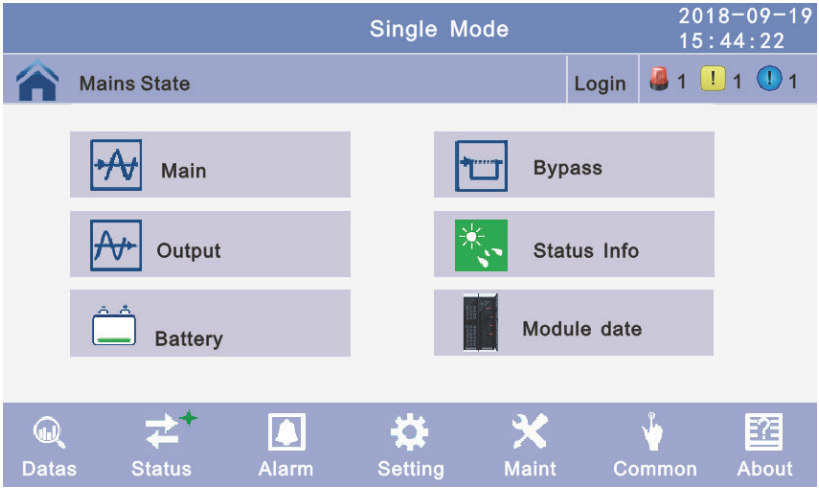


4.3.1 Datas: Displays the flow state of UPS work, and quickly enters real-time data by clicking on the block.

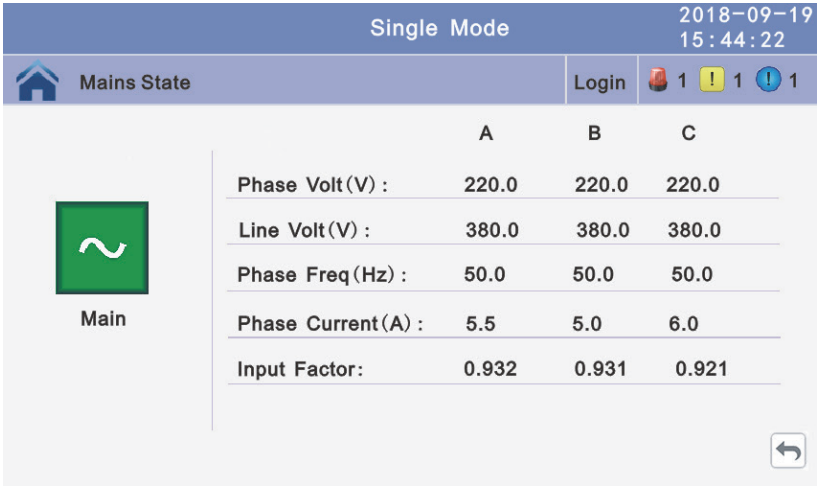




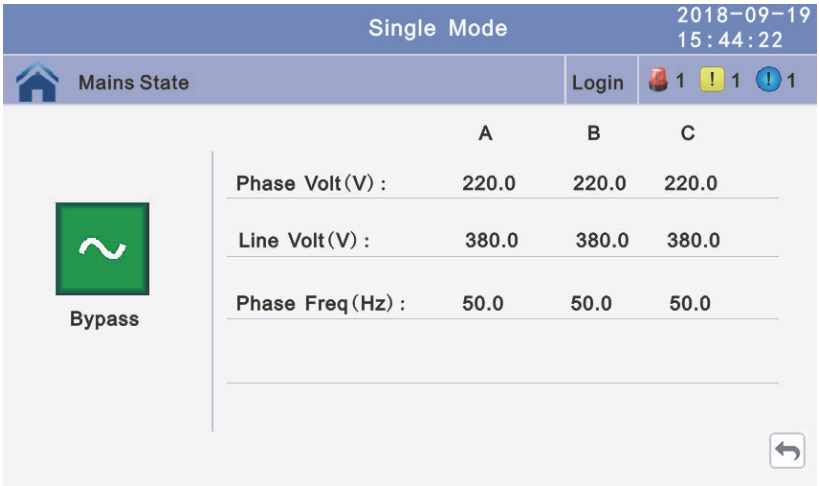
4.3.2 Status: View the voltage and current of the main, bypass, output, battery (can also be entered through by real-time data block), view the status of the switches, dry contacts and module, through clicking on the block, enter the corresponding data window.



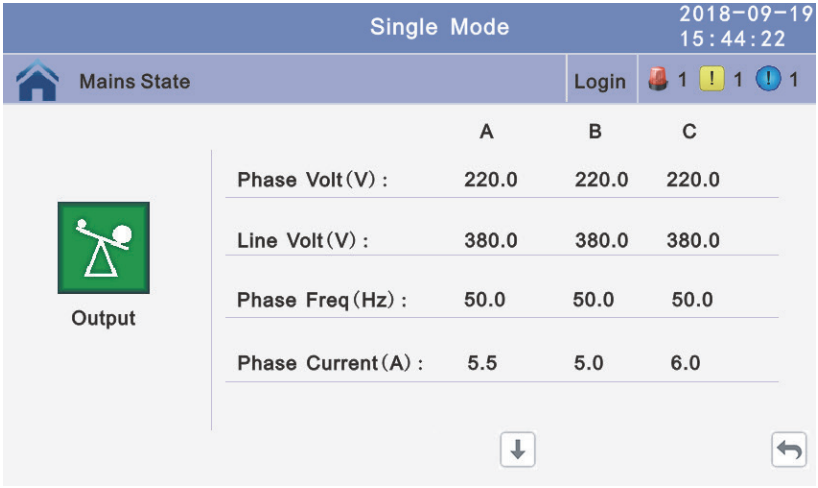
4.3.2.1 Main: Click the main block to enter the main data display window, click return to return to the previous window, click home page to return to the main page.

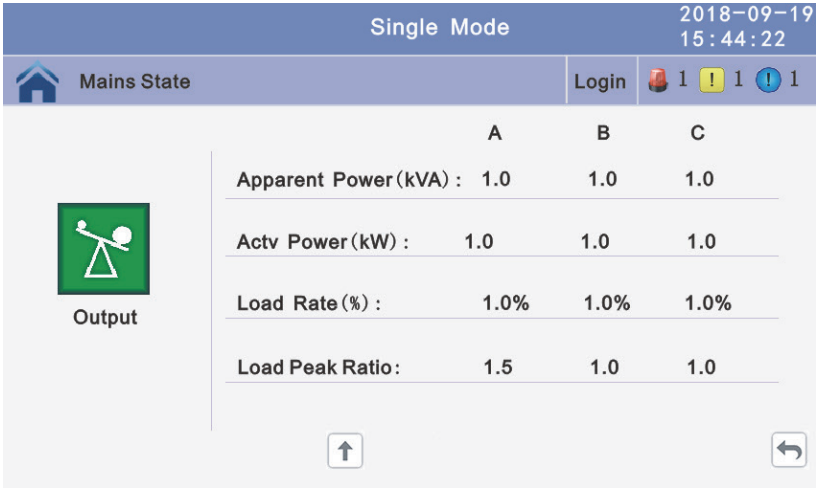


4.3.2.2 Bypass: Click the bypass block to enter the bypass data display window, click return to return to the previous window, click home page to return to the main page.

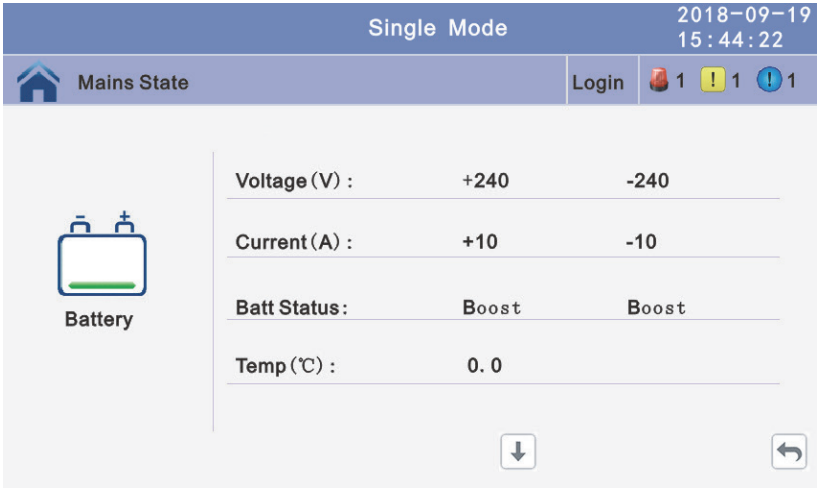


4.3.2.3 Output: Click the output block to enter the output data display window, click return to return to the previous window, click home page to return to the main page.

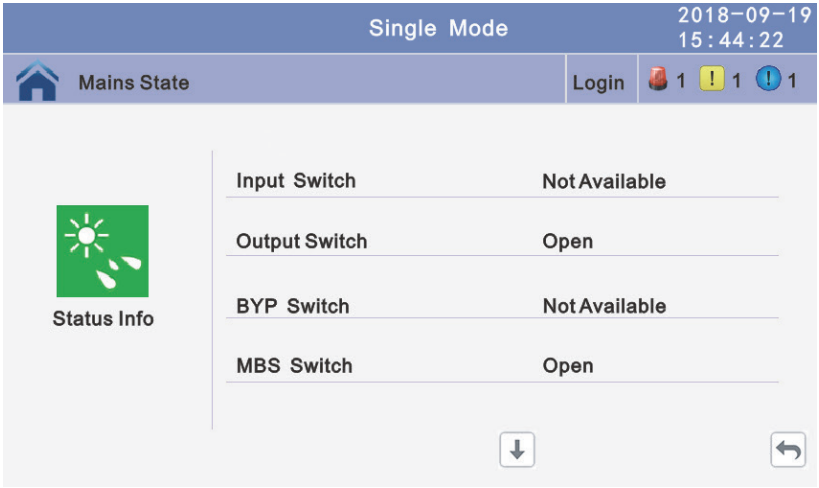


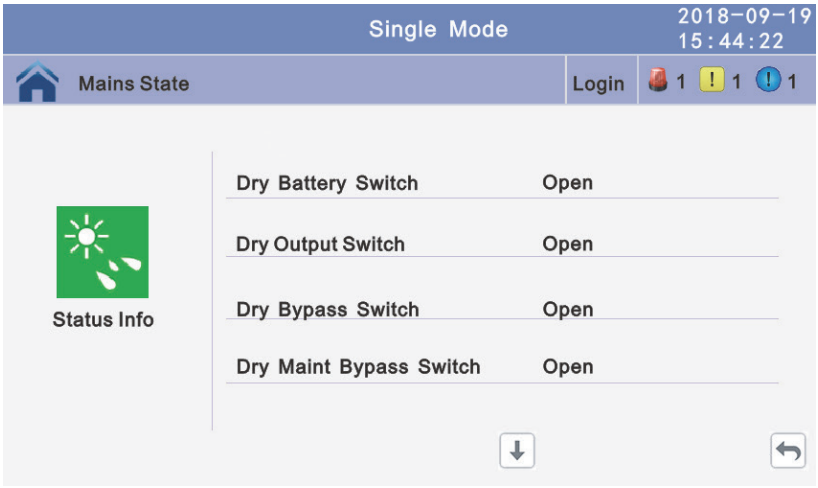


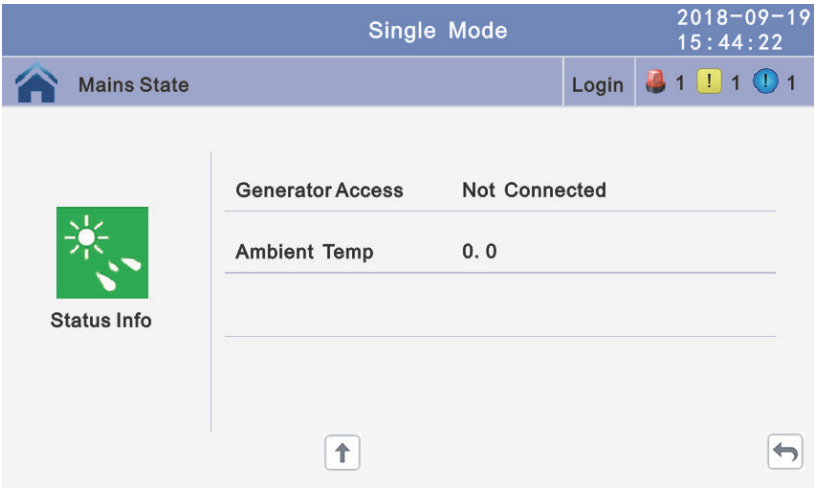
4.3.2.4 Battery: Click the battery block to enter the battery data display window, click return to return to the previous window, click home page to return to the main page.



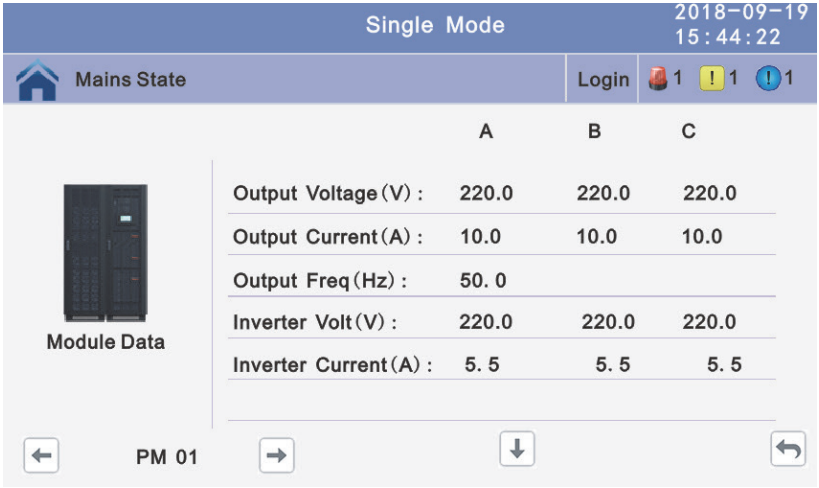
4.3.2.5 Status info: Click the status info block to enter the status data display window, click return to return to the previous window, click home page to return to the main page.



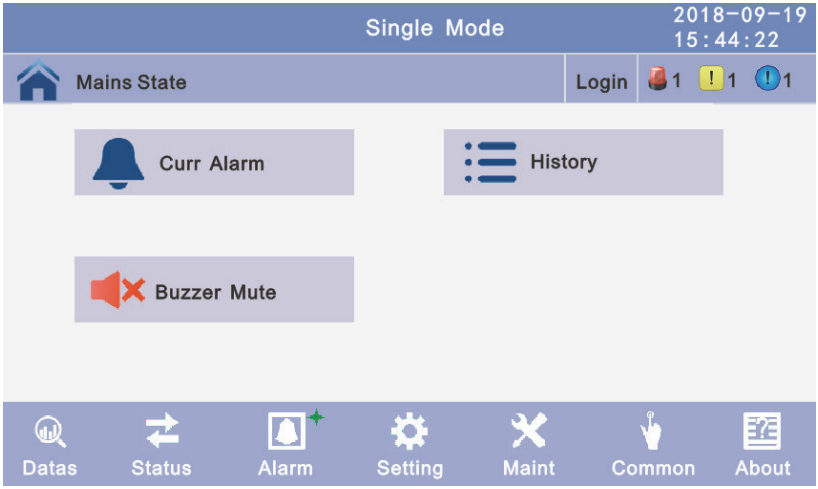




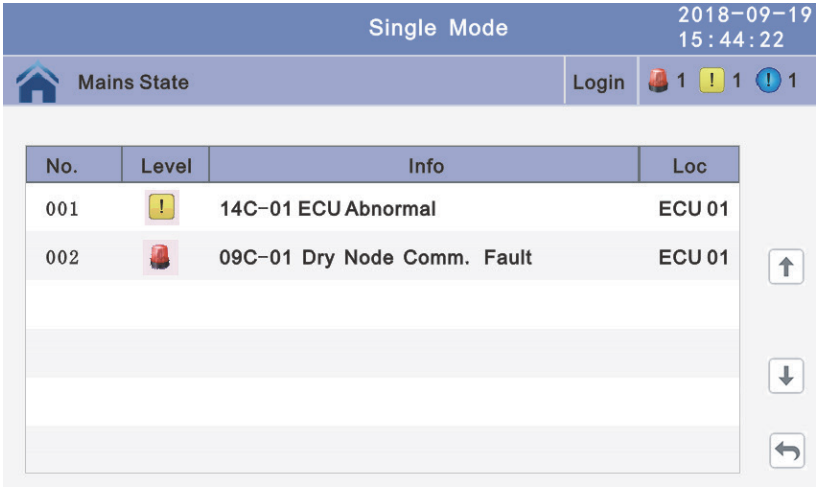
4.3.2.6 Module: Click the module block to enter the module data display window, click return to return to the previous window, click home page to return to the main page.



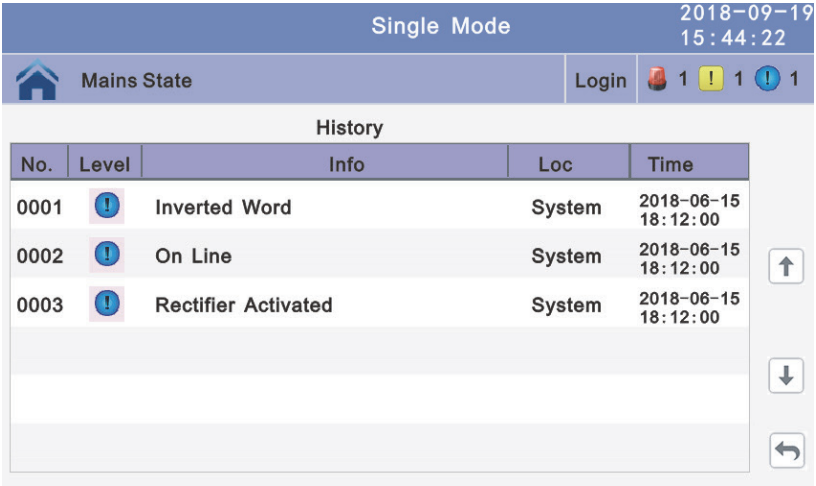
4.3.3 Alarm: View the alarm and history of the UPS, and open or close the buzzer.



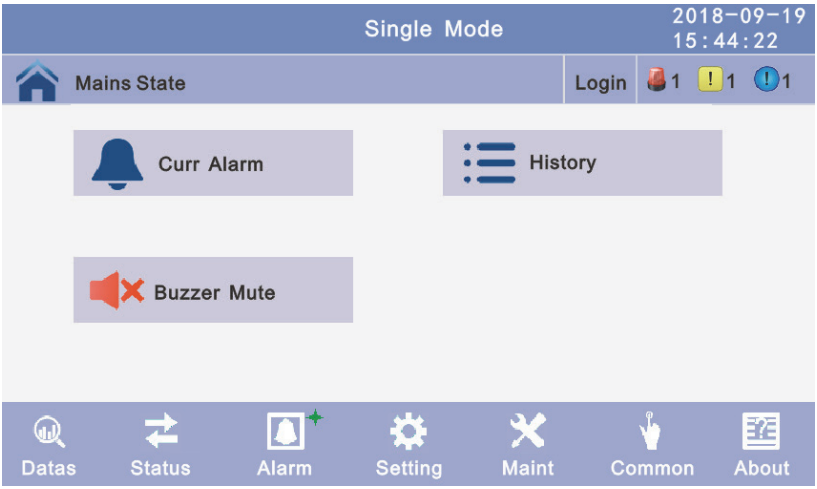
4.3.3.1 Curr Alarm: Click the curr alarm to enter the current alarm display window, click return to return to the previous window, click home page to return to the main page.

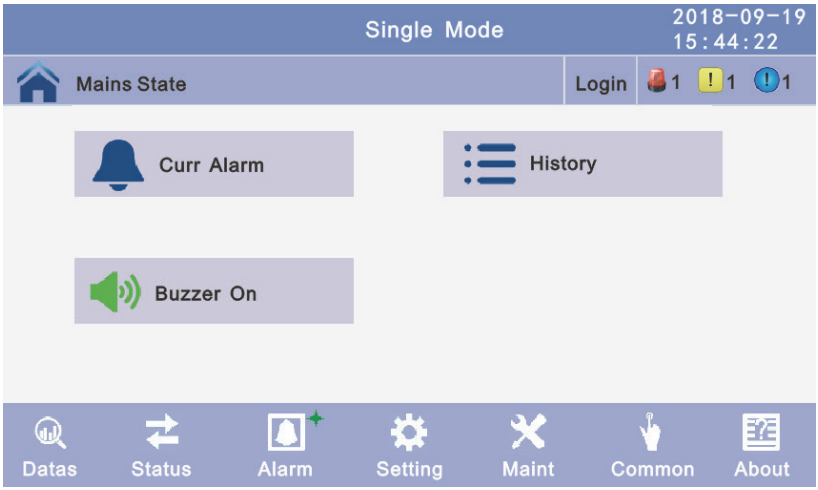


4.3.3.2 History: Click the history to enter the history recode display window, click return to return to the previous window, click home page to return to the main page.

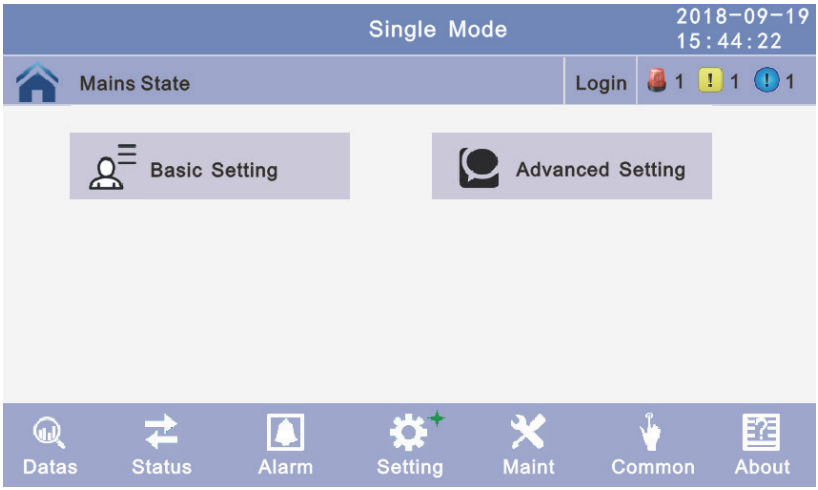


4.3.3.3 Buzzer: Click the buzzer mute then the buzzer will mute and the red block will change to green, if the buzzer is on, then click the block buzzer will on and the block will change to red. Click return to return to the previous window, click home page to return to the main page.

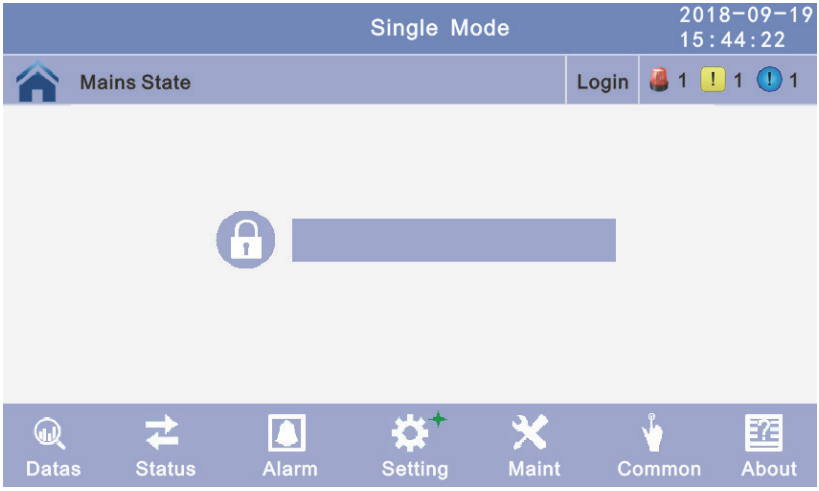


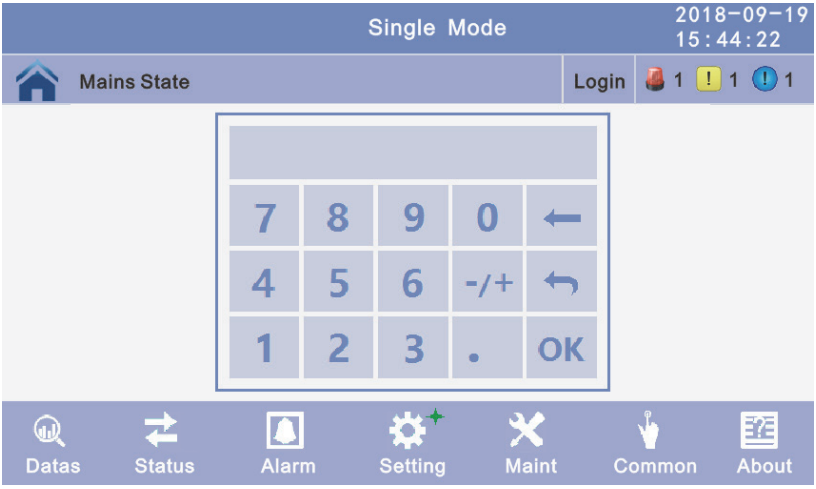


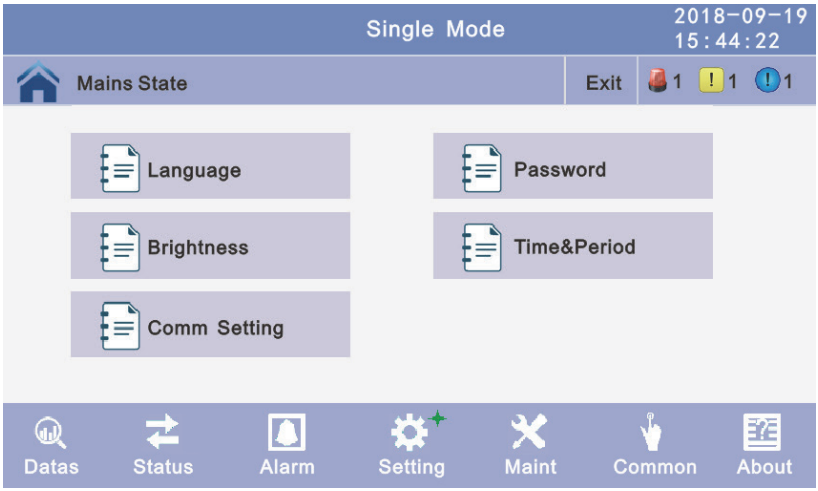
4.3.4 Setting: There are two levels, the basic setting for user settings, advanced setting for technical personnel, please contact the relevant technical personnel to enter advanced settings.



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







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

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

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

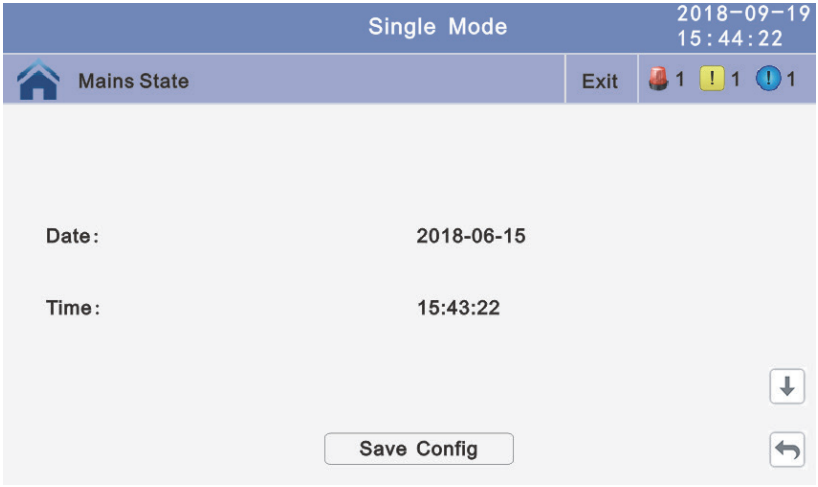
4.3.4.1.3 Brightness and Backlight time: Click the block to change value. Click return to return to the previous window, click home page to return to the main page.

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

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

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

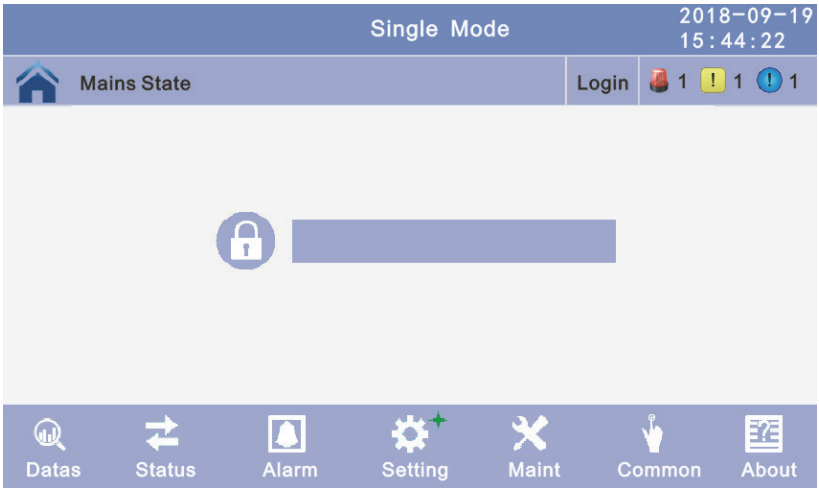
Date: current date
Time: current time

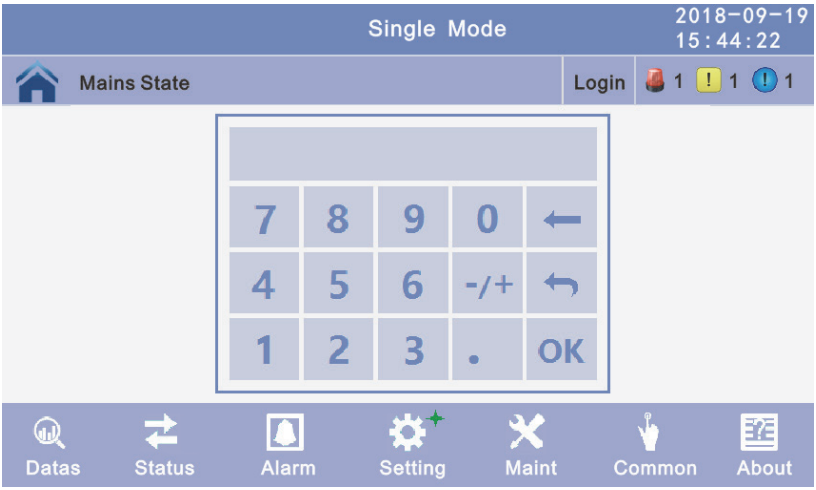


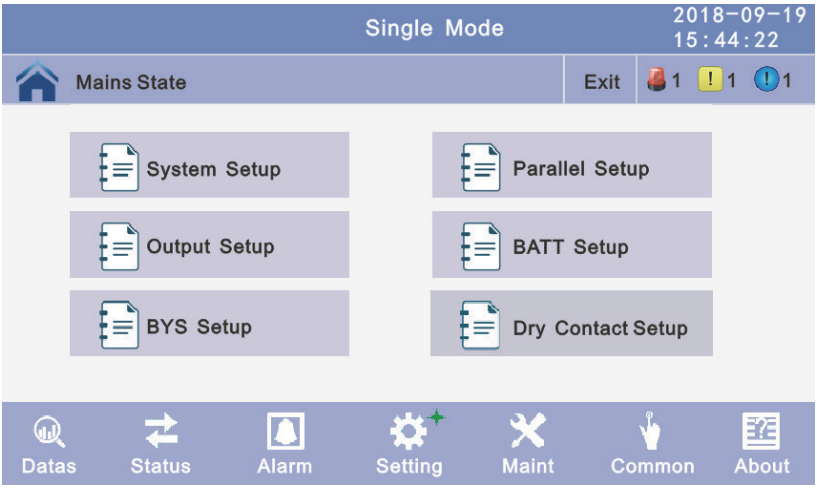
4.3.4.1.5 Communication setting: Click the text to select other value or input new value and click save config block to save. Click return to return to the previous window, click home page to return to the main page.

Rs485 address: UPS communication ID, address range is 1~15, default is 1.
Rs485 Baud Rate: baud rate: 2400, 4800, 9600, 14400, 19200, default is 9600.

4.3.4.2 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.







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

Working Mode: Select the work mode of UPS, work mode: Single mode, Parallel mode, ECO mode.

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: 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: 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: 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.

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

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

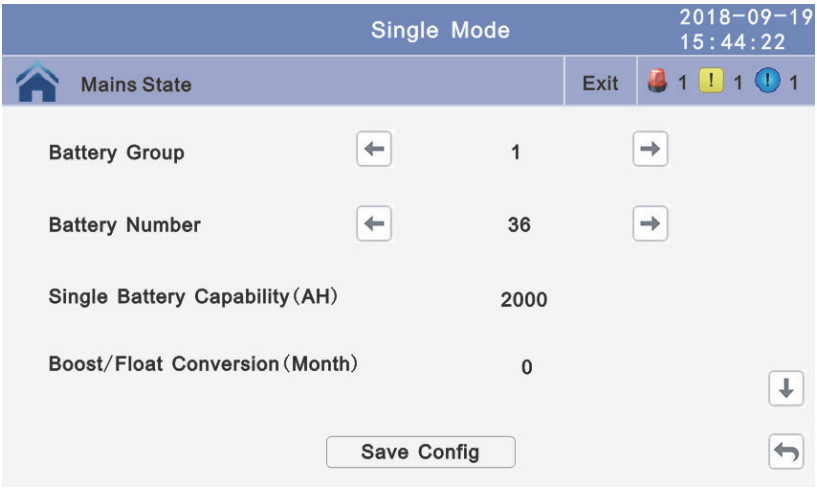
Inverter Volt Adajust: Inverter voltage adjust, The value can be -5%~0~+5%, step is 0.5%, default value: 0.

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

Battery number: Must modify the number to actual configuration, The value can be 30~50, default value is 32.

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

Boost/Float conversion: boost charge and float charge alternate time, the value can be 0~20.

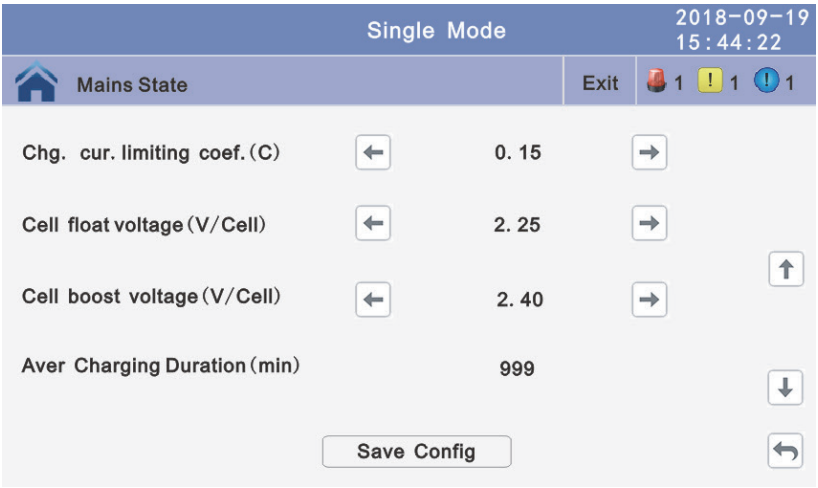


Chg.cur.limiting coef.: The charging current limit is a multiple of the battery capacity. The value can be 0.05–0.15, and is 0.1 by default.

Cell float voltage: The float voltage value can be 2.23-2.30 V/cell, and is 2.25 V/cell by default.

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

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



EOD Battery Volt: End of discharge voltage.The value can be 1.60~1.90, and is 1.80 by default.

Float Temp Compen Coeff: modify the voltage of compensation after enable the switch. the value can be 0.001~0.007/cell, and is 0.003 by default.

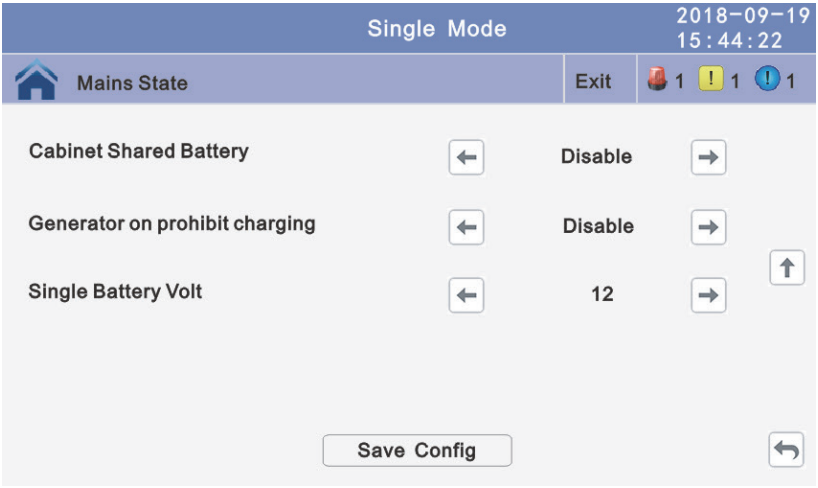
Boost Charge Setting: Boost charge disable or enable, and is enable by default.

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

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/4V/6V/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%.

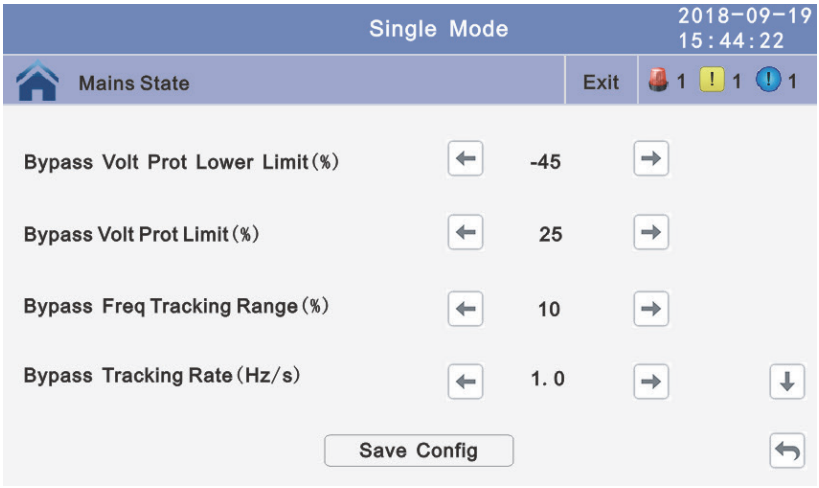
Bypass Volt Prot Limit: When the difference between the bypass voltage and the rated voltage exceeds the upper threshold for the bypass voltage, the system determines that the bypass voltage is not normal and that the bypass is unavailable.

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).

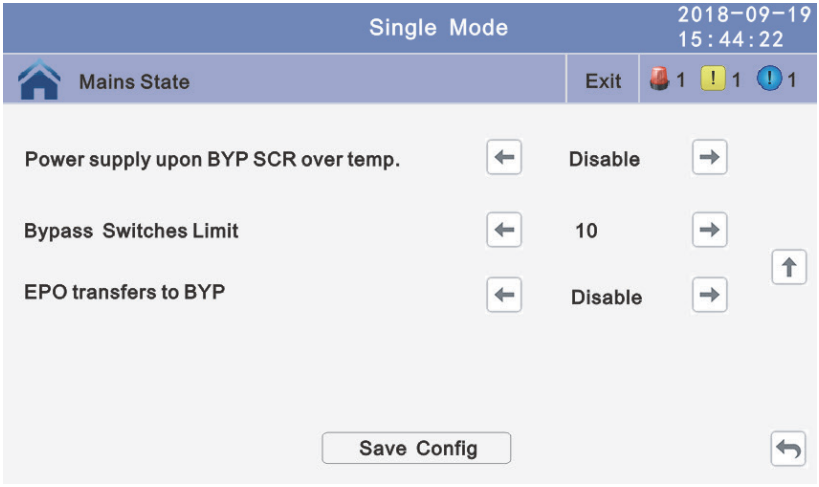
Bypass rate tracking rate: Inverter frequency tracking to bypass frequency rate. The value range is 0.5~2, and is 1 by default.



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.

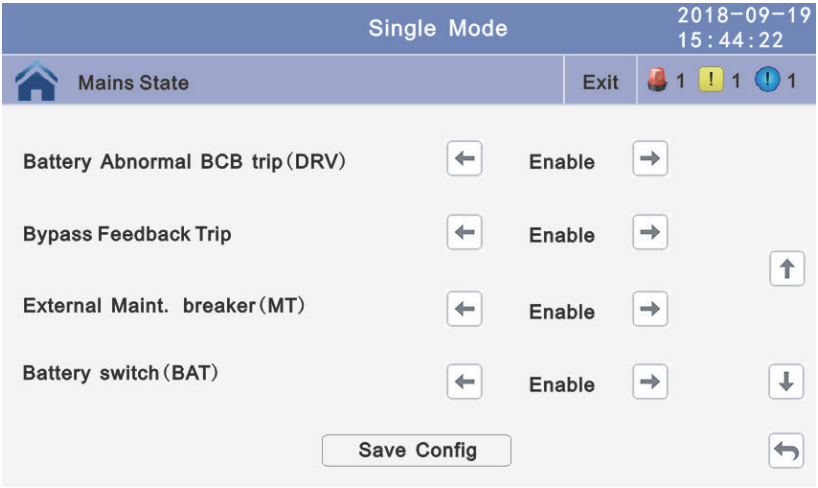


Battery Abnormal BCB trip(DRV): Enable or disable BCB trip single output. The default value is Disable.

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

External Maint. breaker: Enable or disable external maintenance breaker connection detection. The default value is Disable.

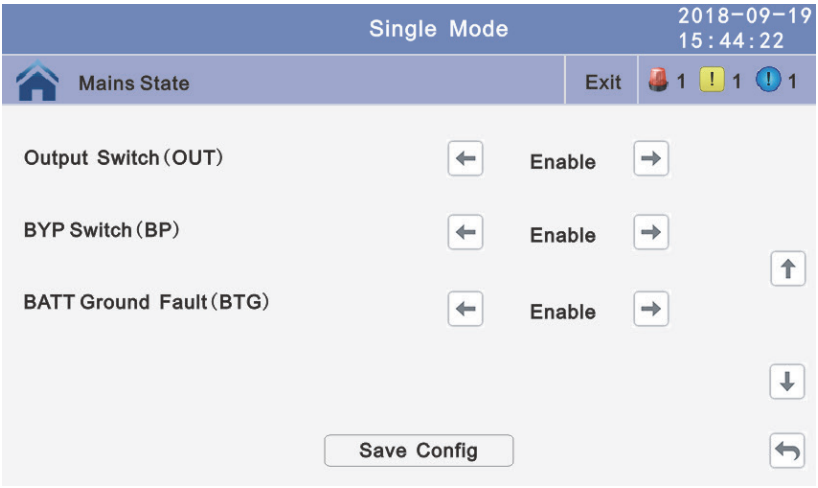
BATT Switch(BAT): Enable or disable battery breaker connection detection. The default value is Disable.



Output Switch: Enable or disable output breaker connection detection. The default value is Disable.

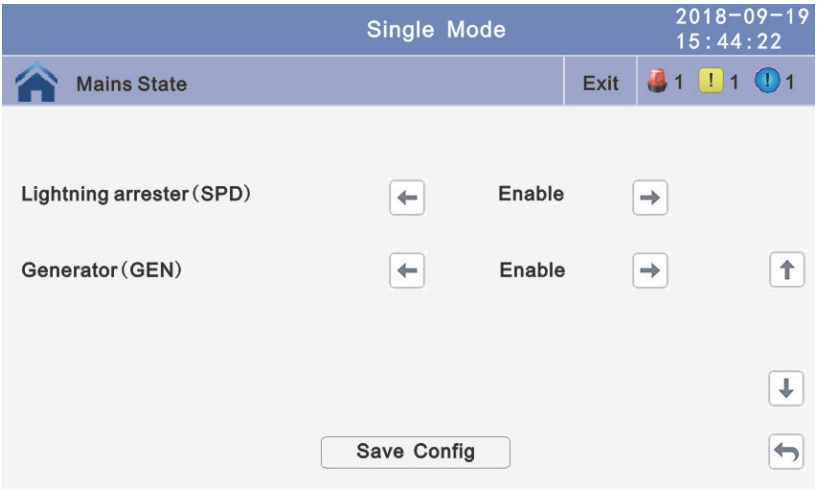
BYP Switch: Enable or disable bypass breaker connection detection. The default value is Disable.

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.

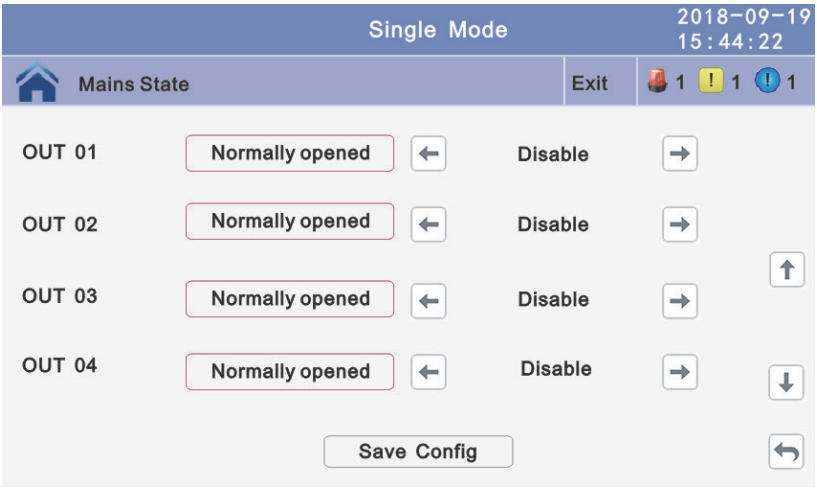
Generator (GEN): Enable or disable GEN detection.The default value is Disable.

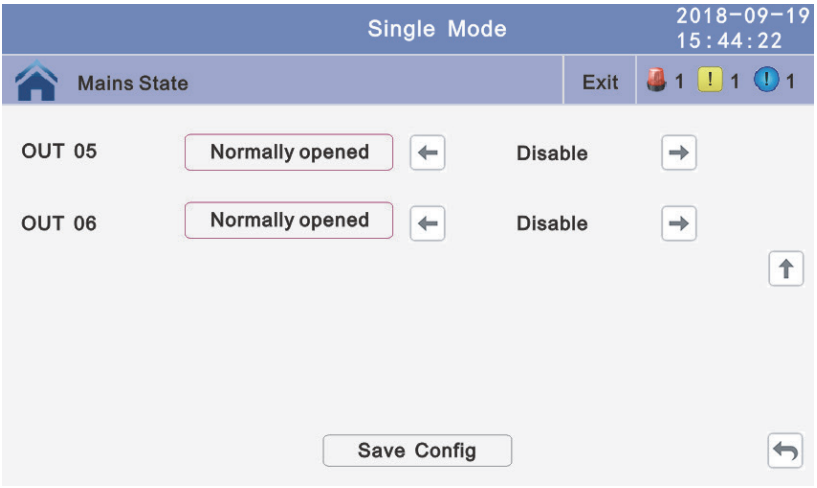


OUT01~OUT06: Output dry contact port, modify on the LCD, the default value is Disable.The output port can set to normally closed or normally opend,The default value is normally opened.

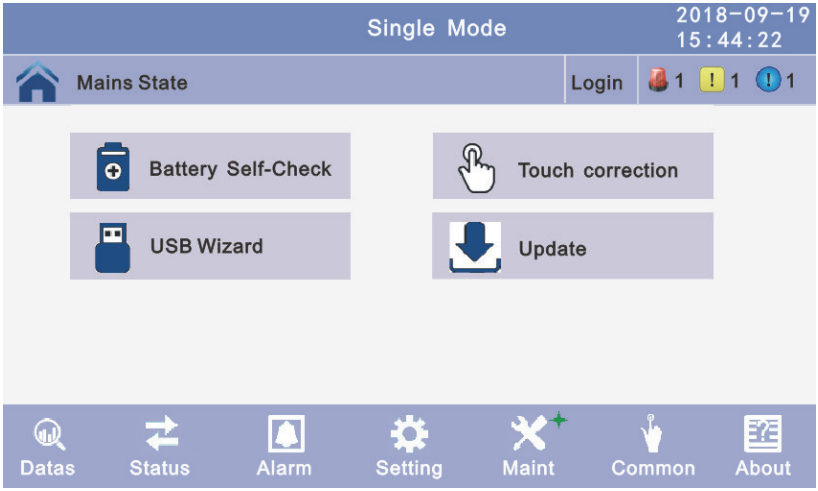
Setting value:

No.	Item	No.	Item
1	Urgent alarm	7	Bypass Supply
2	Minor alarm	8	Battery Supply
3	Main abnormal	9	No supply
4	Battery low volt	10	Eco mode
5	Battery selfcheck	11	Maint Close
6	Main supply	12	Oil machine control

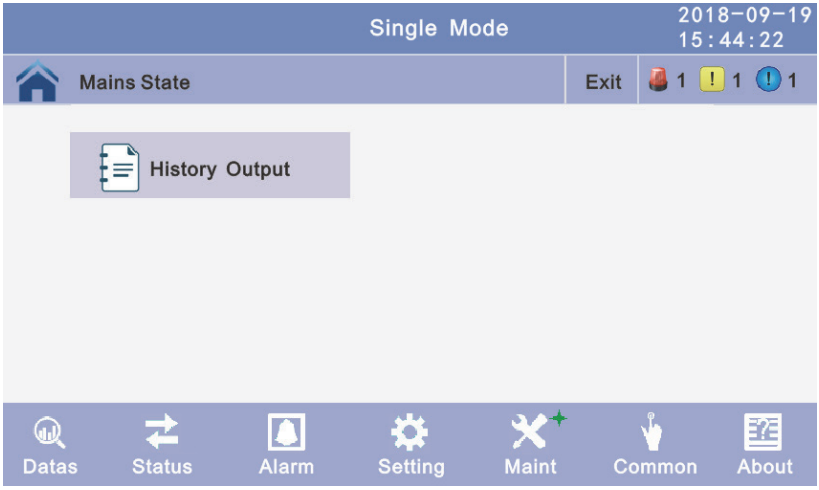

Single Mode
2018-09-19
15:44:22
Mains State
Exit
1
1
1
OUT 01
Normally opened
Disable
OUT 02
Normally opened
Disable
OUT 03
Normally opened
Disable
OUT 04
Normally opened
Disable
Save Config


Single Mode
2018-09-19
15:44:22
Mains State
Exit
1
1
1
OUT 05
Normally opened
Disable
OUT 06
Normally opened
Disable
Save Config

4.3.5 Maint: Software update, Touch correction, history download and battery self-test.



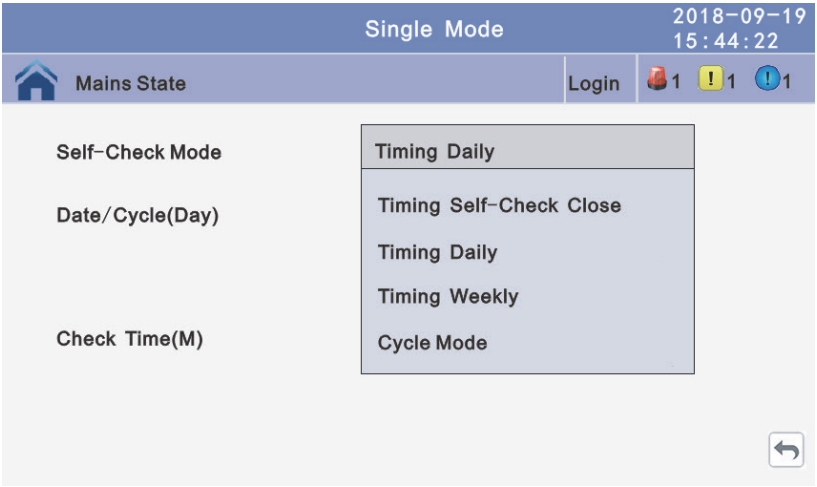
4.3.5.1 USB Wizard: History Output, download history and setting record by USB



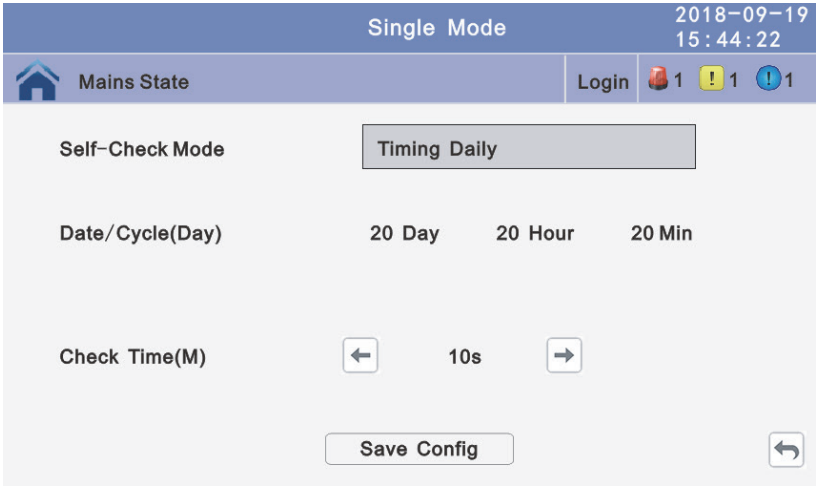
4.3.5.1.1 Alarm Log Output

4.3.5.1.2 Setting Log Output:

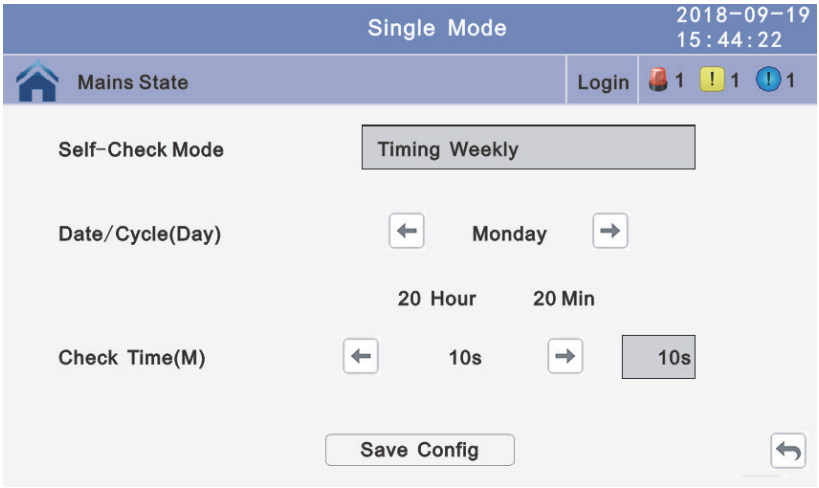
4.3.5.2 Battery Self-Check: can select check by Timing Daily, Timing Weekly, Cycle mode. The default value is Timing Self-Check Close.



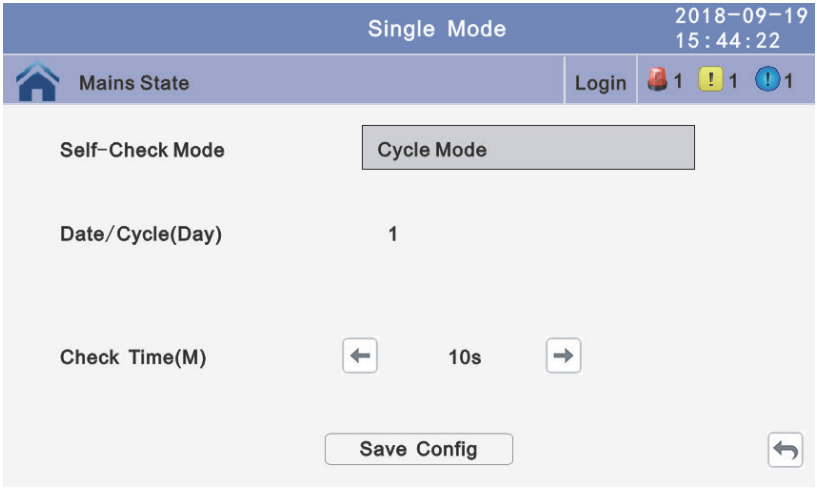
4.3.5.2.1 Timing Daily: modify the check date, time and check time (10S (default), 10min, EOD).



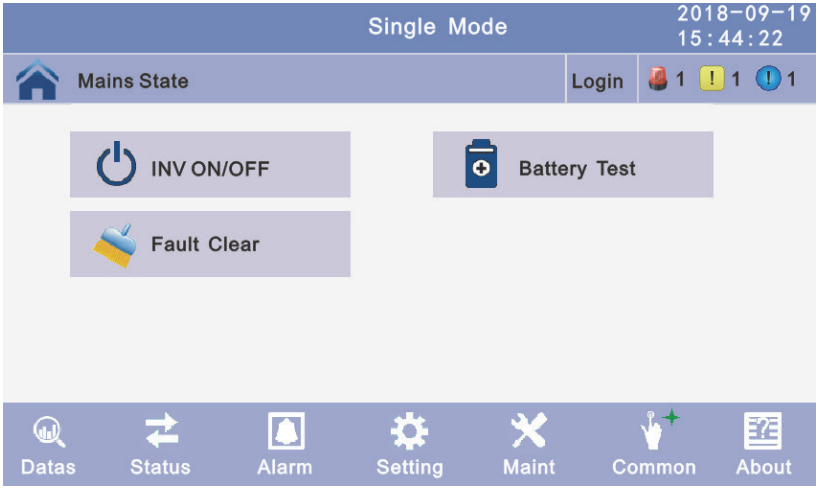
4.3.5.2.2 Timing Weekly: modify the check date, time and check time (10S (default), 10min, EOD).



4.3.5.2.3 Timing Cycle mode: modify the cycle date and check time (10S (default), 10min, EOD).

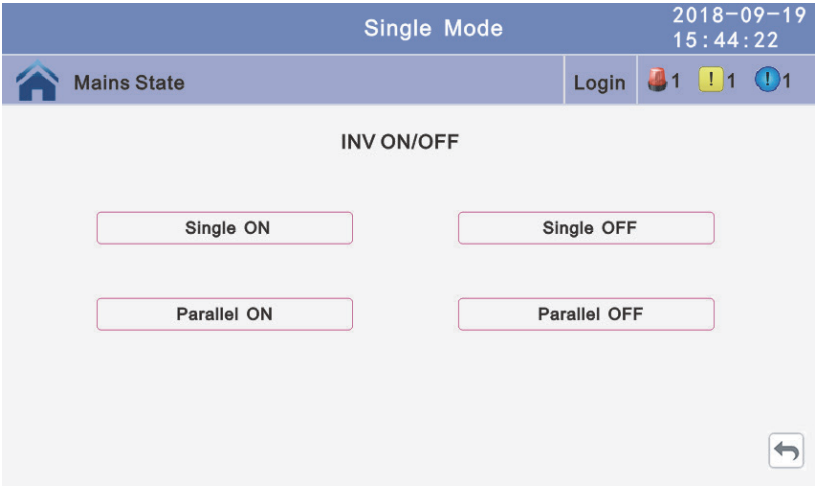


4.3.6 Common: INV ON/OFF, Battery test and Fault clear.



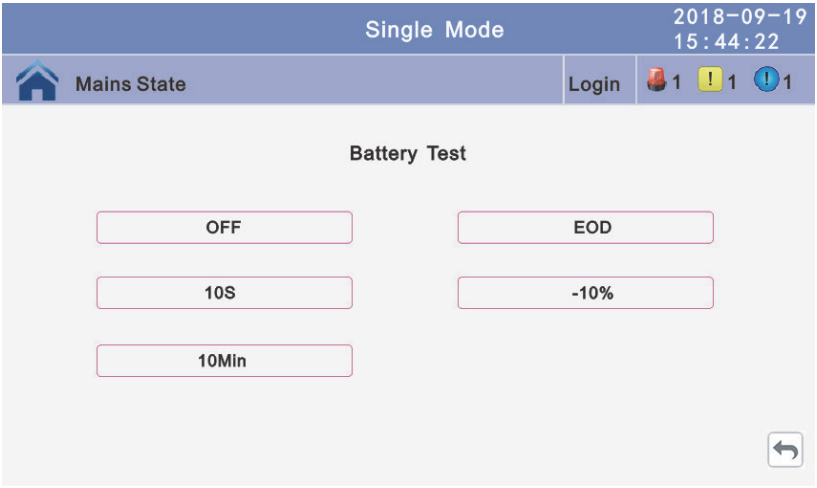
4.3.6.1 INV ON/OFF

Single OFF: Inverter OFF location UPS
Single ON: Inverter ON location UPS
Parallel OFF: Inverter OFF all parallel UPSs
Parallel ON: Inverter ON all parallel UPSs

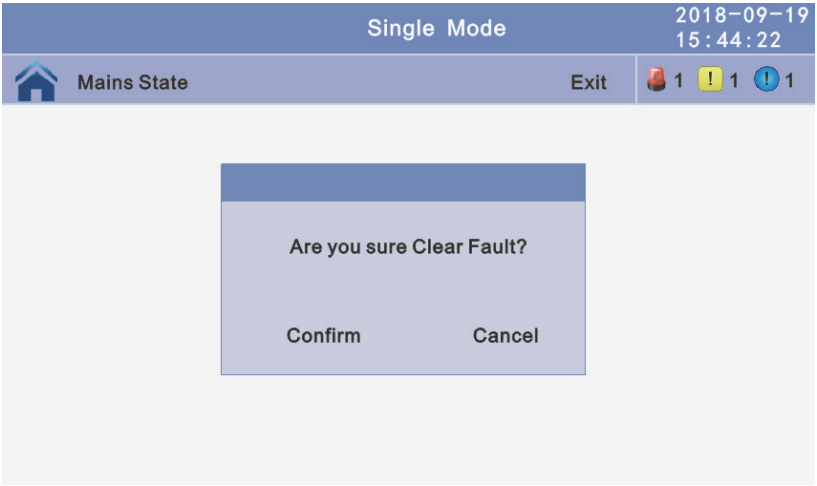


4.3.6.2 Battery Test

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

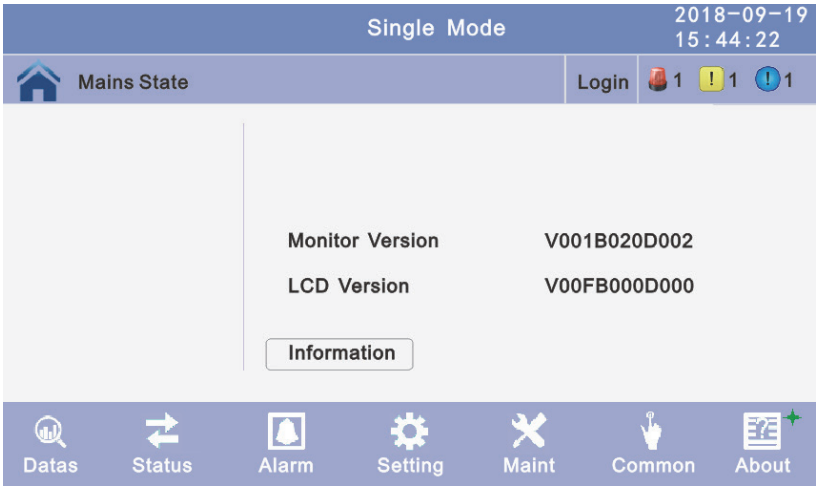


4.3.6.3 Fault clear: Clear the current fault (not for all faults).



4.3.7 About: check the software version

4.3.7.1 Monitor and LCD software version

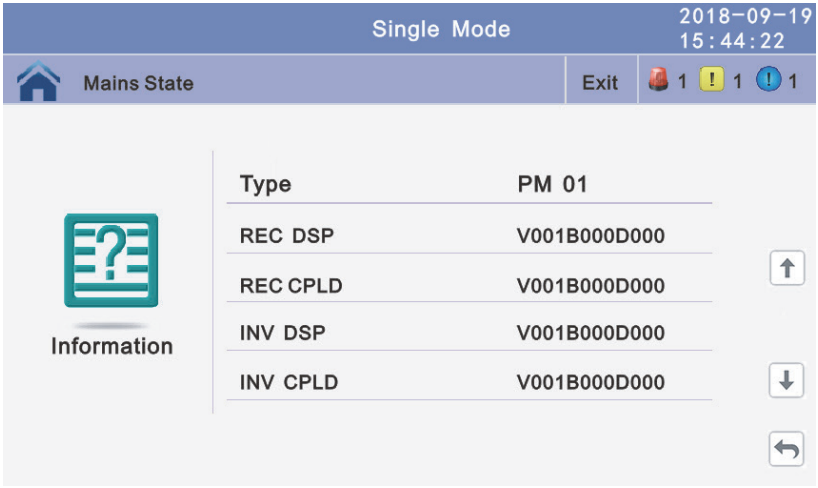


4.3.7.2 Internal software version

Power module software version: PFC DSP, PFC CPLD, INV DSP and INV CPLD.

Center control unit (ECU) software version: DSP and PFGA

Bypass module software versión: DSP and CPLD



4.4 Display Messages/Troubleshooting

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

Fault Information

	Fault Cord	UPS Alarm warning	Buzzer	LED
1	002	REC Over temperature	Twice per second	Fault LED lit
2	003	REC par. cable fault	Twice per second	Fault LED lit
3	004	REC Over Current	Beep continuously	Fault LED lit
4	005	REC Power fault	Beep continuously	Fault LED lit
5	007	Input SCR fault	Beep continuously	Fault LED lit
6	00A	Battery SCR fault	Beep continuously	Fault LED lit
7	00C	Charge SCR fault	Beep continuously	Fault LED lit
8	00E	Fan fault	Beep continuously	Fault LED lit
9	011	Fan power fault	Beep continuously	Fault LED lit
10	012	Charger over temp.	Beep continuously	Fault LED lit
11	013	Soft start failed	Beep continuously	Fault LED lit
12	014	BAT Charger fault	Beep continuously	Fault LED lit
13	016	REC Comm. fault	Once per 2 seconds	Fault LED blinking
14	019	REC Initializes fault	Beep continuously	Fault LED lit
15	01D	Unit insert fault	Once per 2 seconds	Fault LED lit
16	063		Once per 2 seconds	Fault LED lit
17	01E	Rectifier Fault	Beep continuously	Fault LED lit
18	041	Inverter Fault	Beep continuously	Fault LED lit
19	044	INV IGBT SHORT	Beep continuously	Fault LED lit
20	047	Inverter relay Short	Beep continuously	Fault LED lit
21	04A	Inverter relay Broken	Beep continuously	Fault LED lit
22	04D	INV par. cable Fault	Twice per second	Fault LED lit
23	051	Output Short Circuit	Once per second	Fault LED blinking
24	054	INV Comm. Fault	Once per 2 seconds	Fault LED blinking
25	057	INV Initializes Fault	Beep continuously	Fault LED lit
26	05A	INV self-test Fault	Beep continuously	Fault LED lit
27	05E	DC Component Fault	Once per 2 seconds	Fault LED lit
28	061	DC bus abnormal	Beep continuously	Fault LED lit
29	064	INV DSP Power Fault	Beep continuously	Fault LED lit
30	067	INV Over Temperature	Twice per second	Fault LED lit
31	068	Load Sharing Fault	Twice per second	Fault LED lit
32	06A	Cabinet mode Fault	Beep continuously	Fault LED lit
33	06B	Fuse Broken	Beep continuously	Fault LED lit
34	081	Par. cable Fault	Twice per second	Fault LED lit
35	086	ECU Insert Fault	Once per 2 seconds	Fault LED lit
36	088	ECU Power Fault	Beep continuously	Fault LED lit
37	08B	ECU Comm. Fault	Beep continuously	Fault LED lit
38	08D	ECU Initializes Fault	Once per 2 seconds	Fault LED blinking
39	091	Bypass SCR Broken	Beep continuously	Fault LED lit
40	0C2		Beep continuously	Fault LED lit
41	094	Bypass SCR short	Beep continuously	Fault LED lit
42	0C5		Beep continuously	Fault LED lit
43	097	BPS Over Temperature	Beep continuously	Fault LED lit
44	0CF		Beep continuously	Fault LED lit
45	09A	Output CT Reverse	Beep continuously	Fault LED lit
46	09B	Dry-contact Power Fault	Beep continuously	Fault LED lit
47	09C	Dry-contact Comm. Fault	Beep continuously	Fault LED lit

	Fault Cord	UPS Alarm warning	Buzzer	LED
48	09D	Bypass Feedback Fault	Beep continuously	Fault LED lit
49	0C1	BYS Par.cable Fault	Beep continuously	Fault LED lit
50	0C8	BPS Comm. Fault	Beep continuously	Fault LED lit
51	0CA	Bypass Initializes Fault	Beep continuously	Fault LED lit
52	0CD	Bypass connected fault	Beep continuously	Fault LED lit
53	0D2	Bypass Fan Fault	Beep continuously	Fault LED lit

Alarm information

No	ALARM CORD	UPS ALARM WARNING	BUZZER	LED
1	103	Battery Over Voltage	Once per second	Alarm LED lit
2	104	BAT Low Pre-warning	Once per second	Alarm LED lit
3	105	Battery Reverse	Twice per second	Alarm LED lit
4	106	Battery EOD	Once per second	Alarm LED lit
5	107	Battery Voltage low	Once per second	Alarm LED lit
6	108	No Battery	Once per second	Alarm LED lit
7	109	Input Phase Reverse	Once per second	Alarm LED lit
8	10A	Input N-Line lost	Twice per second	Alarm LED lit
9	10B	Mains Freq. Abnormal	Once per 2 seconds	Alarm LED lit
10	10C	Mains Volt. Abnormal	Once per 2 seconds	Alarm LED lit
11	10D	REC Comm. Error	Once per 2 seconds	Alarm LED lit
12	10E	Mains input lost	Once per 2 seconds	Alarm LED lit
13	10F	Set Data Err.	Once per 2 seconds	Alarm LED lit
14	121	INV Par. cable abnormal	Once per 2 seconds	Alarm LED lit
15	125	INV Overload	Once per 2 seconds	Alarm LED lit
16	126	INV not synchronized	Beep continuously	Alarm LED lit
17	12A	INV Set Data Err	Once per 2 seconds	Alarm LED lit
18	129	INV Comm. Error	Once per 2 seconds	Alarm LED lit
19	141	Bypass Switch to Num	Once per 2 seconds	Alarm LED lit
20	142	Unit quantity mismatch	Once per 2 seconds	Alarm LED lit
21	143	Parallel Overload	Once per 2 seconds	Alarm LED lit
22	144	Bypass Overload	Once per 2 seconds	Alarm LED lit
23	145	Maint. Switch Misuse	Once per 2 seconds	Alarm LED lit
24	146	ECU Comm. Error	Once per 2 seconds	Alarm LED lit
25	147	Par. cable abnormal	Once per 2 seconds	Alarm LED lit
26	14B	ECU Par. cable abnormal	Once per 2 seconds	Alarm LED lit
27	14C	ECU Abnormal	Once per 2 seconds	Alarm LED lit
28	14E	BPS Phase Reversed	Once per second	Alarm LED lit
29	162		Once per second	Alarm LED lit
30	14F	BPS Unable To Trace	Once per 2 seconds	Alarm LED lit
31	163		Once per 2 seconds	Alarm LED lit
32	150	BPS Not Available	Once per second	Alarm LED lit
33	164		Once per second	Alarm LED lit
34	151	Ecu Set Data Err	Once per 2 seconds	Alarm LED lit
35	161	BPS Par.cable abnormal	Once per 2 seconds	Alarm LED lit
36	165	Bypass Comm. Error	Once per 2 seconds	Alarm LED lit
37	166	Bypass module take over	Once per 2 seconds	Alarm LED lit

4.5 Options

Network Management Card with Environmental Monitoring.

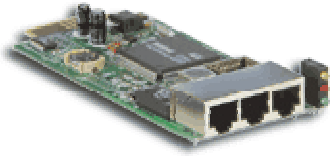
CAUTION!
For network management configuration and use, refer to the separate user manual - Network Management Card with Environmental Monitor - shipped with the CARD.

Network Management Card replacement.

SNMP card: internal SNMP / external SNMP optional.

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

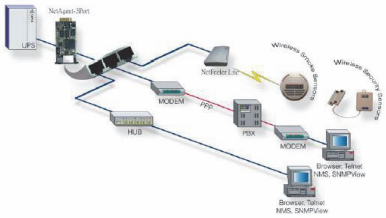
The slot called SNMP supports the MEGAtec protocol. We advise that NetAgent II-3 port is also a tool to remotely monitor and manage any UPS system.



The overview of the SNMP card

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

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



Typical topology of the UPS Network Management

Appendix 1- Specifications

Cabinet (30 kVA module)		60kVA	120kVA	150kVA
Capacity (VA/Watts)	UPS cabinet	30k~60k / 30k~60k	30k~120k / 30k~120k	30k~150k / 30k~150k
	Module	30k / 30k		
	Max. Number	2	4	5+1
Cabinet (25 kVA module)		**50kVA**	**100kVA**	**150kVA**
Capacity (VA/Watts)	**UPS cabinet**	25k~50k / 25k~50k	25k~100k / 25k~100k	25k~150k / 25k~150k
	Module	25k / 25k		
	Max. Number	2	4	6
Cabinet (20 kVA module)		**40kVA**	**80kVA**	**120kVA**
Capacity (VA/Watts)	UPS cabinet	20k~40k / 20k~40k	20k~80k / 20k~80k	10k~120k / 10k~120k
	Module	20k / 20k		
	Max. Number	2	4	6
Cabinet (15 kVA module)		**30kVA**	**60kVA**	**90kVA**
Capacity (VA/Watts)	UPS cabinet	15k~30k / 15k~30k	15k~60k / 15k~60k	10k~90k / 10k~90k
	Module	15k / 15k		
	Max. Number	2	4	6
Cabinet (10 kVA module)		**20kVA**	**40kVA**	**60kVA**
Capacity (VA/Watts)	UPS cabinet	10k~20k / 10k~20k	10k~40k / 10k~40k	10k~60k / 10k~60k
	Module	10k / 10k		
	Max. Number	2	4	6
INPUT				
Nominal voltage		380/400/415Vac, (3Ph+N+PE)		
Operating voltage range		138~305Vac for 40% Load; 305~485Vac for 100% Load;		
Operating frequency range		40Hz-70Hz		
Power factor		≥0.99		
Harmonic distortion (THDi)		3% (100% linear load)		
Bypass voltage range		Max. voltage:220V: +25%(optional +10%,+15%,+20%); 230V: +20%(optional +10%,+15%) ; 240V: +15%(optional +10%) Min. voltage: -45% (optional-10%, -20%,-30%)		
Bypass Frequency range		Frequency protection range: ±10%		
Generator input		Support		
OUTPUT				
Rated voltage		380/400/415Vac, (3Ph+N+PE)		
Power factor		1		
Voltage regulation		±1%		
Output frequency	Line Mode	±1%/±2%/±4%/±5%/±10% of the rated frequency (optional)		
	Bat. Mode	(50/60±0.1%)Hz		
Crest factor		3:1		
Harmonic distortion (THD)		≤2% with linear load ≤4% with non linear load		
Efficiency		UP to 95.8%		

BATTERY				
Battery voltage		Optional Voltage: ±180/192/204/216/228/240/252/264/276/288/300Vdc (30/32/34/36/38/40/42/44/46/48/50pcs optional) 360Vdc~600Vdc (30~50 pcs), 36 pcs define, 36 and 50 pcs no power derating; 32~34 pcs output powerfactor 0.9; 30 pcs output power factor 0.8;)		
Power module Charge Current		18A (Max.)		
UPS cabinet Max. Charge Current		36A	72A	108A
SYSTEM FEATURES				
Transfer time		Utility to Battery : 0ms; Utility to bypass: 0ms		
Overload	Line Mode	110% overload for 60 min; 125% overload for 10 min; 150% overload for 1 min		
	Bypass Mode	135% overload for long term; >1000% overload for 100 ms		
Overheat		Line Mode: Switch to Bypass; Backup Mode: Shut down UPS immediately		
Low battery voltage		Alarm and Switch off		
Self-diagnostics		Upon Power On and Software Control		
EPO(optional)		Shut down UPS immediately		
Battery		Advanced Battery Management		
Noise suppression		Complies with EN62040-3		
Audible & Visual alarms		Line Failure, Battery Low, Overload, System Fault		
Status LED & LCD display		Line Mode, Bypass Mode, Battery Low, Battery Bad, Overload & UPS Fault		
Reading on the LCD display		Input,Output, Battery,Command,Setting,Maintenace		
Communication interface		CAN, RS485,Parallel, Dry contact port, Relay card(optional), SNMP card(optional),Battery temperature sentor(optional)		
ENVIRONMENTAL				
Operating temperature		0°C~40°C		
Storage temperature		-25°C~55°C		
Humidity range		0~95% (non condensing)		
Altitude		< 1500m		
Noise level(from 1M distance)		<58dB	<60dB	<62dB
PHYSICAL				
Dimension WxHxD (mm)	UPS cabinet	485x353(8U)x850	485x575(13U)x850	485x752(17U)x850
	Power module	440x86 (2U)x620		
Net weight (kg)	UPS cabine	142	153	295
	Power module	21		
STANDARDS				
Safety		IEC/EN62040-1,IEC/EN60950-1		
EMC		IEC/EN62040-2,IEC61000-4-2,IEC61000-4-3,IEC61000-4-4, IEC61000-4-5,IEC61000-4-6,IEC61000-4-8		

Appendix 2 - Problems and Solution

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

(1) Product model name and serial number, which can be found in LCD display.

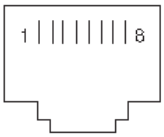
(2) Try to describe the fault with more details, such as LCD display info, LED lights status, etc. Read the user manual carefully, it can help a lot for using this UPS in the right way. Some FAQ (frequently asked questions) may help you to troubleshoot your problem easily.

No.	Problem	Possible reason	Solution
1	LCD not display.	The network cable is not fixed properly or the telephone line of the front door is not fixed properly.	Connect the network cable and telephone cable properly.
2	LCD Blue screen.	LCD is Interference.	Take out the cable and insert back properly.
3	Utility is connected but the UPS 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 within the window. Check if all modules input are switched on.
4	Utility normal but Utility LED does not light on, and the UPS operates at battery mode.	The input switch of the Modules are not switched on; input cable is not well connected.	Switch on the input switch; Make sure the input cable is well connected.
5	The UPS does not indicate any failure, but output do not have voltage.	Output cable does not well connected.	Make sure the output cable is well connected.
6	The UPS module cannot transfer to bypass or inverter.	Module does not well inserted; The left coronal screw is 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, replace 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; Go to LCD setting of the battery number.
10	Buzzer beeps every 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 then restart the UPS.
12	The LED of the Module with RED light.	The module is not inserted properly.	Pull out the module and insert properly.
13	The UPS only works on bypass mode.	The UPS is set to ECO mode, or the transfer times to bypass mode are limited.	Set the UPS working mode to Single Module type(non-parallel) or to reset the times of transferring to bypass or re-start the UPS.
14	Cannot Black start.	Battery switch is not properly closed; Battery fuse is not open; Or Battery low.	Close the battery switch; Change the fuse; Recharge the battery.
15	Buzzer beeps continuously and LCD indicates Rectifier fault or output fault.	UPS is out of order.	Consult with your local agent for repair.

Appendix 3 - CAN communication port definition

Definition of port:



Connection between the Device's CAN converter port and UPS CAN port.

BMS	UPS (RJ45)	Description
PIN 1	PIN 1	CAN_H
PIN 2	PIN 2	CAN_L
PIN 3/7	PIN 3/7	CAN_GND

Available function of CAN
- Comunicate to BMS.
- Comunicate to remote LCD.

Appendix 4 - RS485 communication port definition

Definition of port:

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

Device (RJ45)	UPS (RJ45)	Description
Pin 1/5	Pin 1/5	485+ "A"
Pin 2/4	Pin 2/4	485- "B"

Available function of RS485

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

RS485 communication data format

Baud rate ——— 9600bps

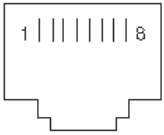
Byte length ——— 8bit

End bit ——— 1bit

Parity check ———none

Appendix 5 - BAT_T communication port definition

Definition of port:



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

Device (RJ45)	UPS (RJ45)	Description
Pin 1/5	Pin 1/5	485+ "A"
Pin 2/4	Pin 2/4	485- "B"
Pin 7	Pin 7	12 Vdc
Pin 8	Pin 8	GND

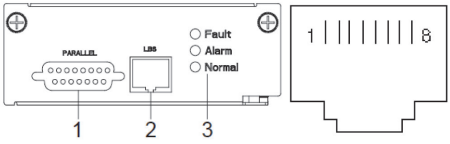
Available function of RS485

• Communicate to battery monitor

RS485 communication data format
Baud rate ——— 9600bps
Byte length ——— 8bit
End bit ——— 1bit
Parity check ———none

Appendix 6 - LBS port definition

Definition of port:



Connection between the UPS LBS port.

UPS (RJ45)	UPS(RJ45)	Description
Pin 1/2/3	Pin 1/2/3	LBS
Pin 5/7/8	Pin 5/7/8	GND

Available function of LBS

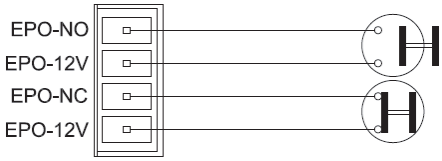
• The output power of two or more UPS in non-parallel system should be synchronized with each other.

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.

Appendix 7 REPO - instruction

Definition of port

Connection diagram:



Connection between the button and UPS REPO port.

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

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

INNOVA UPS
Always connected

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