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ELEKTRİK & ELEKTRONİK

USER MANUAL
PM Series

Cabinet: PM3340-520KVA, PM3340-400KVA
PM3340-320KVA, PM3340-200KVA
Model: PM3340-RM

UDD-SD-125

Aytemiz MAKELSAN
Uninterruptible Power Supplies

USER MANUAL
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Cabinet: PM3340-520KVA, PM3340-400KVA
PM3340-320KVA, PM3340-200KVA
Model: PM3340-RM

Publish statement
Thank you for purchasing this series UPS.
This series UPS is an intelligent, three phase in Three phase out, high frequency online UPS designed by our R&D team who is with years of designing experiences on UPS. With excellent electrical performance, perfect intelligent monitoring and network functions, smart appearance, complying with EMC and safety standards, The UPS meets the world's advanced level.
Read this manual carefully before installation
This manual provides technical support to the operator of the equipment.

About The Manual

This manual is prepared for the users of "Cabinet: PM3340-520KVA, PM3340-400KVA, PM3340-320KVA, PM3340-200KVA - Model: PM3340-RM"

Companion Manuals

For further information about this device and its options, please visit www.elektroiz.com.tr

Updates

Please visit www.elektroiz.com.tr for updates. Always use the latest manuals.

CONTENTS

1 SAFETY

Important safety instructions - Save these instructions

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

1.1 Safety Notes

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

1.2 Symbols Used in This Guide

WARNING!

Risk of electric shock

CAUTION!

Read this information to avoid equipment damage

2 MAIN FEATURES

2.1 Summarization

Our UPS is a kind of three-in- three -out high frequency online UPS, it provides three specifications: The 200kVA/320kVA and 520kVA. The products are modularized and adopt the N+X redundancy. It can flexibly increase the number of the UPS modules according to the load capacity which is convenient for flexible allocation and gradually investment.

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

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

2.2 Functions and Features

- Digital control
- 19-inch standard cabinet

  1.6-meter and 2-meter high cabinets are provided according to the user's requirement.
- Modularized design
- High power-density design

  The height of the single module is 3U
- 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
- Separated Bypass
- Common Battery
- Automatic charge current adjustment according to battery capacity connected.
- 3-Stage intelligent charging
- Touch-screen Super-large LCD display (Optional)
- Each module with individual LCD display
- Remote monitoring via SNMP
- Optional Accessories available such as Isolation transformer, Distribution Panel, SNMP Card, Relay Contact Board, etc...
- Equip with Maintenance Bypass Switch for easy maintenance purpose.
- Superior MTTR (Meantime to repair) & Short shutdown time in maintenance
- Centralized monitoring module is also available
- EPO and REPO function

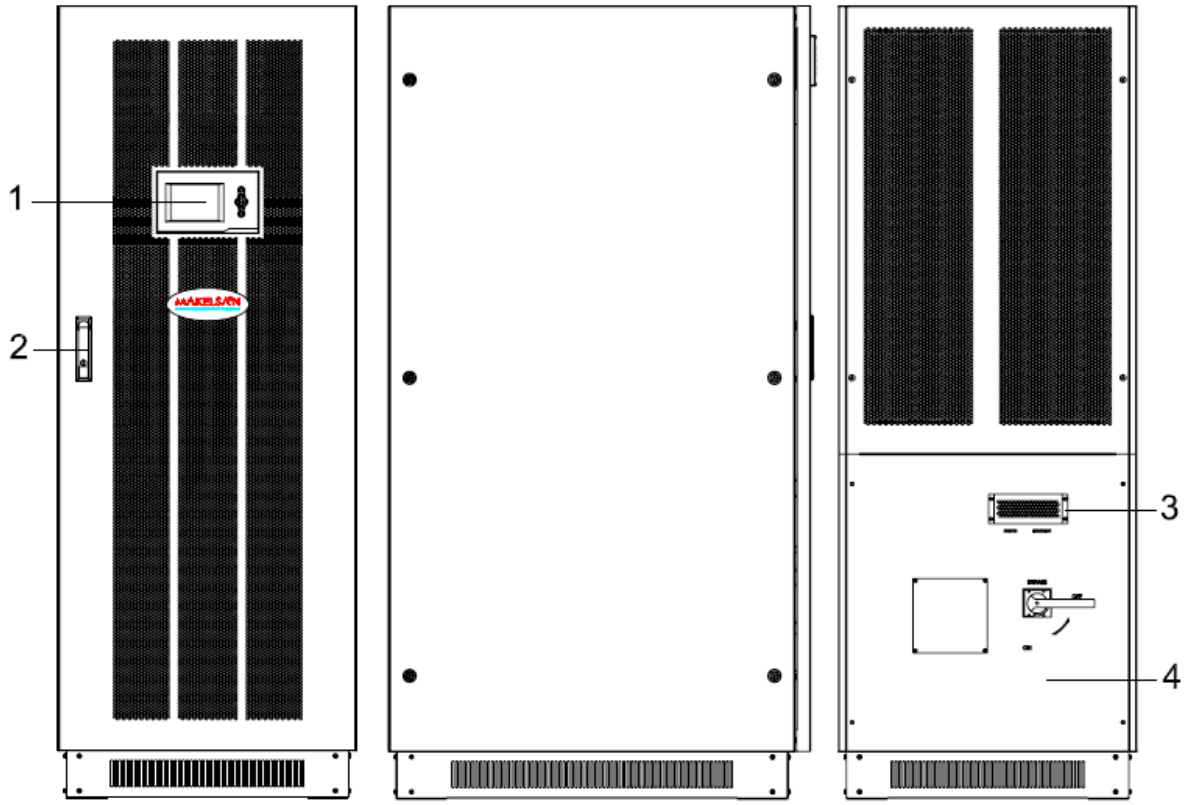
3 INSTALLATION

3.1 Unpack Checking

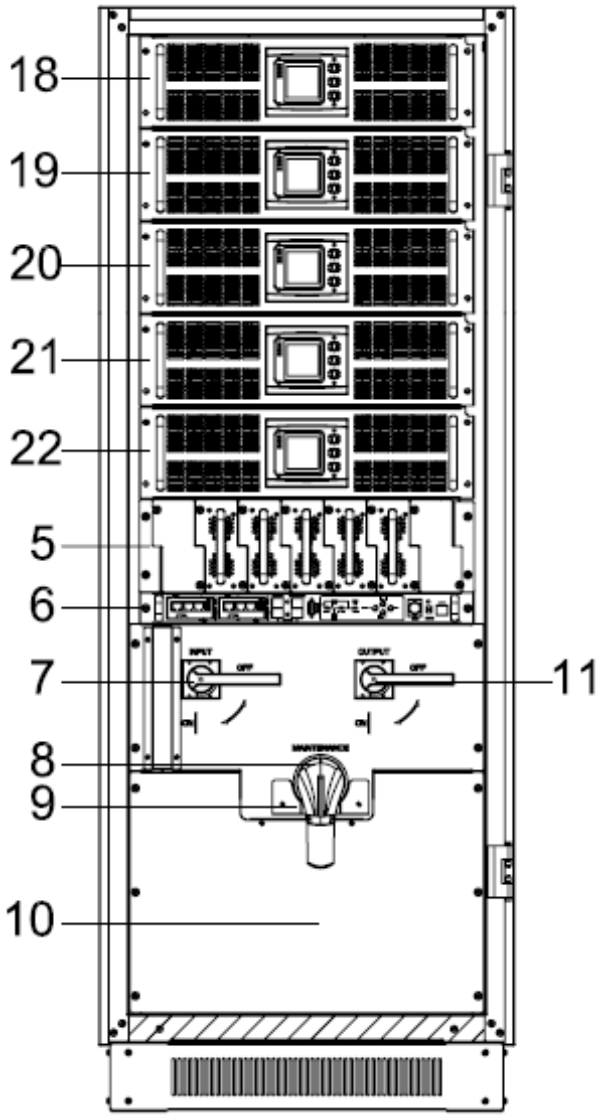
1. Don’t lean the UPS when moving it out from the packaging
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the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

3.2 The Appearance of the Product

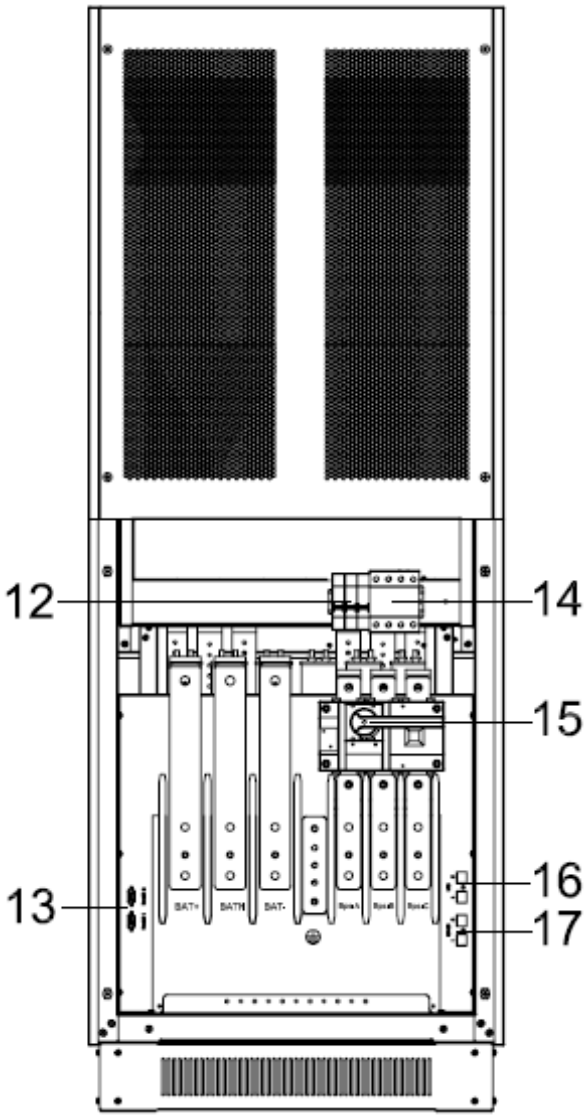
200kVA cabinet:



Front View Side View Rear View

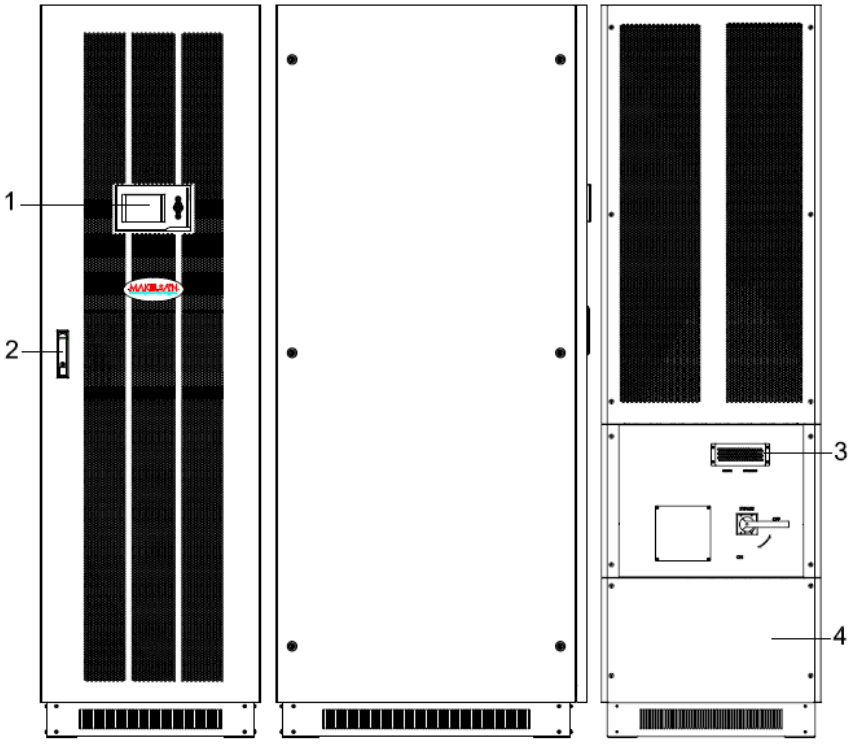


Front View (internal)

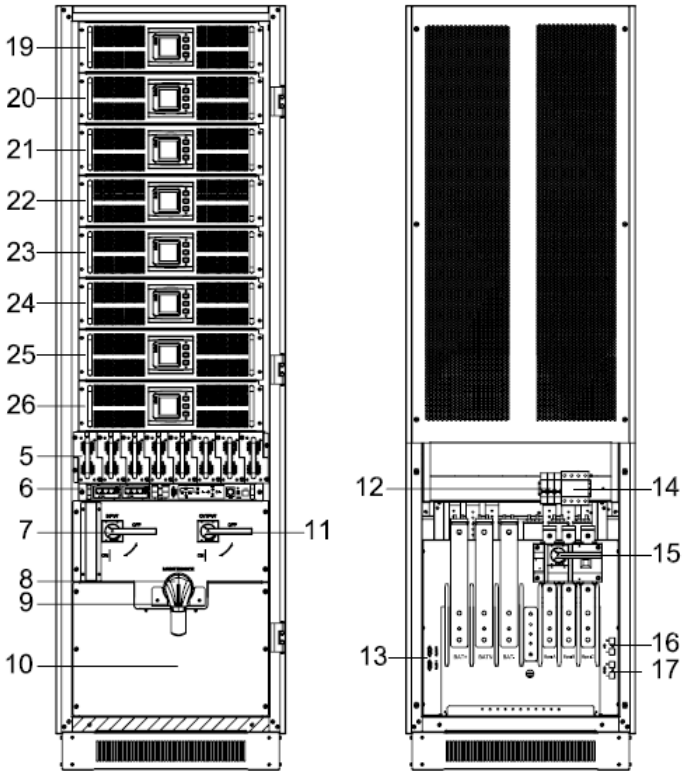


Rear View (internal)

320kVA cabinet:

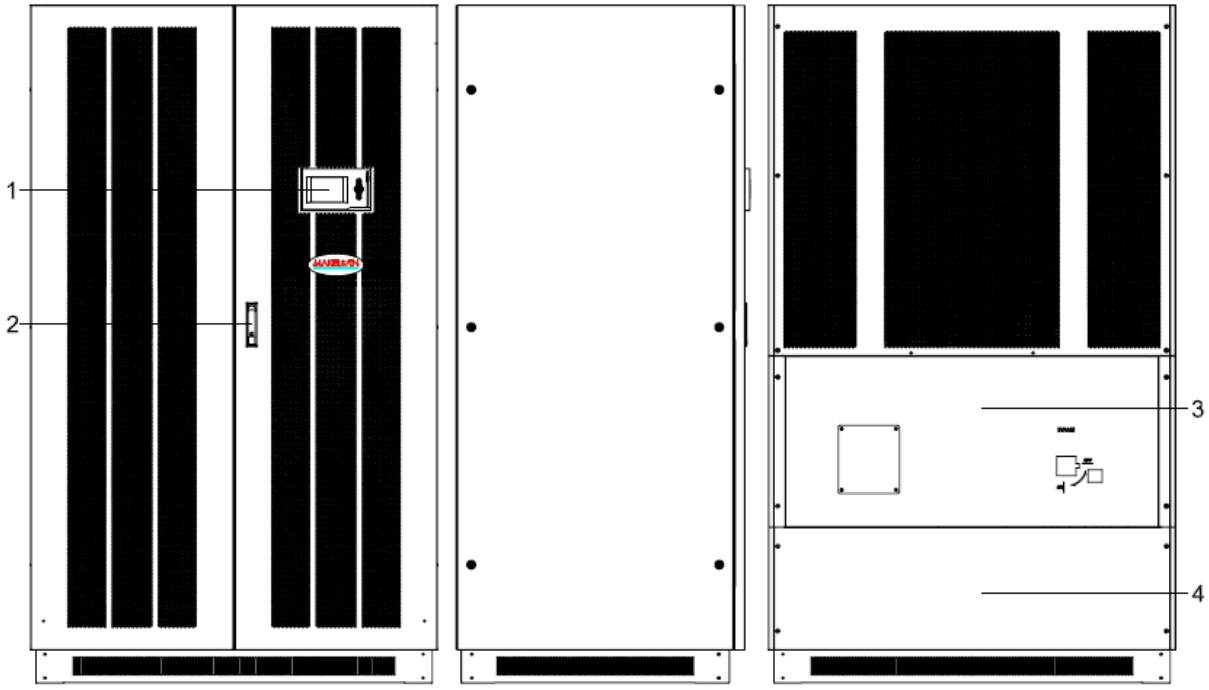


Front View Side View Rear View

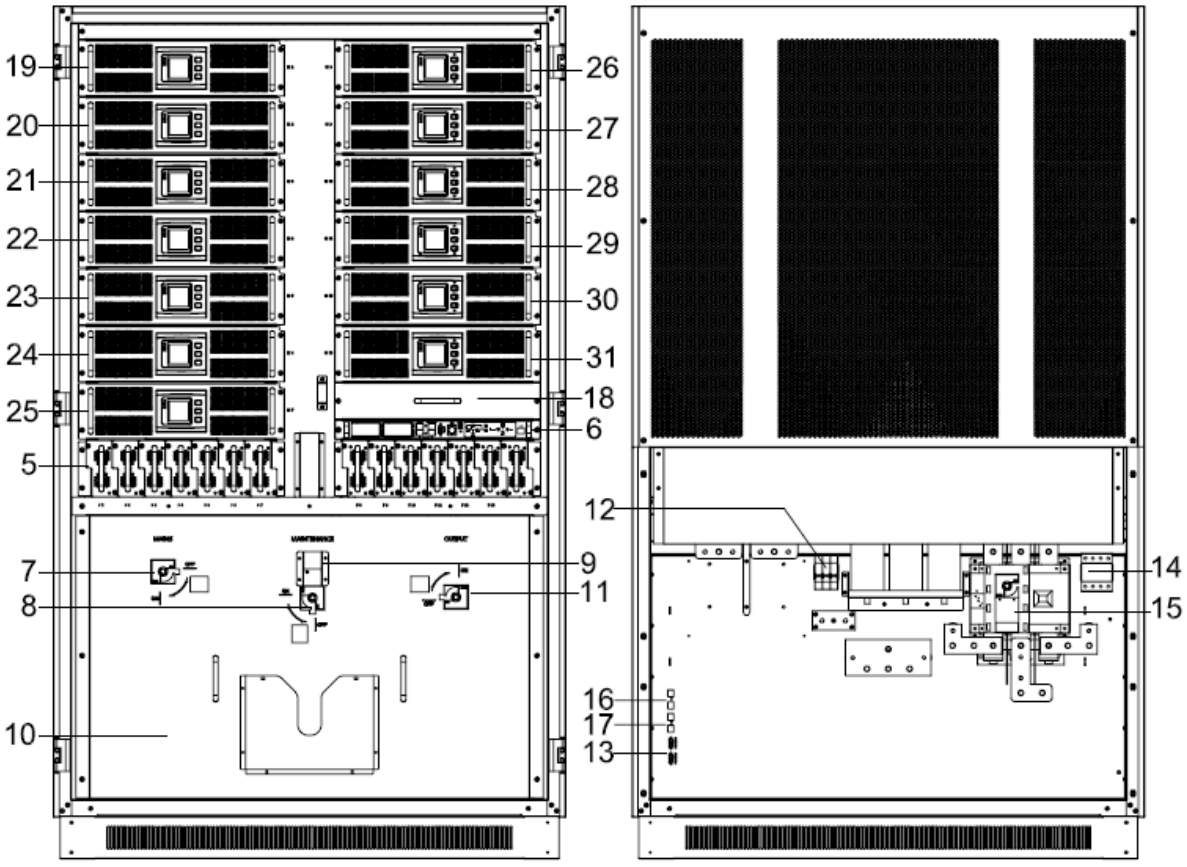


Front View (internal) Rear View (internal)

520kVA cabinet:



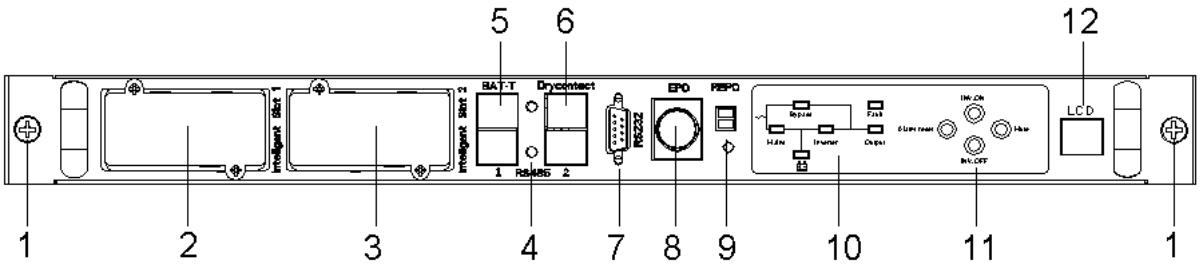
Front View Side View Rear View



Front View (internal) Rear View (internal)

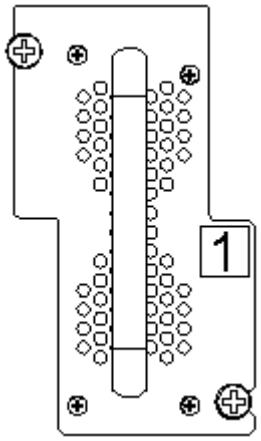
(1) LCD panel
(2) Front lock
(3) Lightning arrester cover plate : Remove cover plate to replace lightning arrester
(4) Bypass and battery terminal cover : Remove cover to operate wire
(5) Fuse box: Input fuse board and Battery fuse board inside, fuse box 1 connect to module 1
(6) Communication module
(7) I/P Switch
(8) Maintenance switch
(9) Maintenance switch cover : Remove cover UPS transfers to Maintenance
(10) Input/output Terminal cover : Remove cover to operate wire
(11) O/P Switch
(12) The input filter capacitor switch : connect capacitor or not
(13) Parallel port 1/2
(14) Lightning arrester
(15) Bypass Switch
(16) Update RS485 port : use to update UPS software
(17) LBS port
(18) Tools box : parallel cable, user manual, switch handle
(19) Power Module 1 : screw top left corner bolt of the module after insert the module, otherwise the module does not work.
(20) Power Module 2
(21) Power Module 3
(22) Power Module 4
(23) Power Module 5
(24) Power Module 6
(25) Power Module 7
(26) Power Module 8
(27) Power Module 9
(28) Power Module 10
(29) Power Module 11
(30) Power Module 12
(31) Power Module 13

Communication Panel



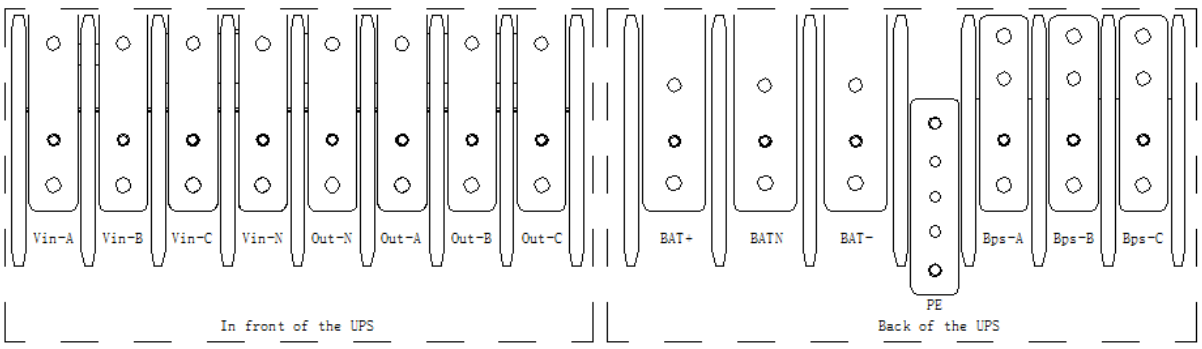
(1) Communication panel fixed screw
(2) Intelligent slot 1 : insert SNMP card or Dry contact card
(3) Intelligent slot 2 : insert SNMP card or Dry contact card
(4) RS485 port 1/2
(5) BAT_T port 1/2 : connect battery temperature sensor box
(6) Dry contact : Pin1-12Vdc, Pin2- DRY_GENER , Pin7- BP_O, Pin8- BP_S
(7) RS232 port
(8) EPO button
(9) REPO port : Remote EPO connect port
(10) LED indication
(11) Function key
(12) LCD port : connected to LCD panel

Fuse box

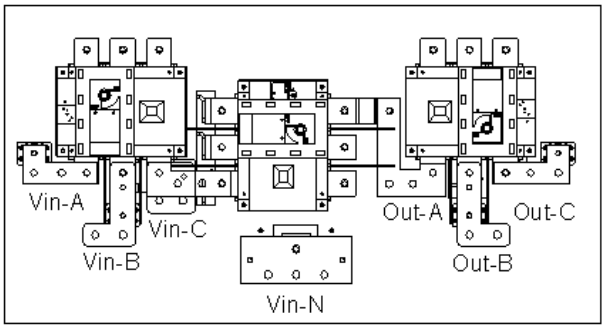


(1) Fuse Box 1 : input fuse and battery fuse inbuilt, connect to module 1
(2) Fuse Box 2 : input fuse and battery fuse inbuilt, connect to module 2
(3) Fuse Box 3 : input fuse and battery fuse inbuilt, connect to module 3
(4) Fuse Box 4 : input fuse and battery fuse inbuilt, connect to module 4
(5) Fuse Box 5 : input fuse and battery fuse inbuilt, connect to module 5
(6) Fuse Box 6 : input fuse and battery fuse inbuilt, connect to module 6
(7) Fuse Box 7 : input fuse and battery fuse inbuilt, connect to module 7
(8) Fuse Box 8 : input fuse and battery fuse inbuilt, connect to module 8
(9) Fuse Box 9 : input fuse and battery fuse inbuilt, connect to module 9
(10) Fuse Box 10 : input fuse and battery fuse inbuilt, connect to module 10
(11) Fuse Box 11 : input fuse and battery fuse inbuilt, connect to module 11
(12) Fuse Box 12 : input fuse and battery fuse inbuilt, connect to module 12
(13) Fuse Box 13 : input fuse and battery fuse inbuilt, connect to module 13

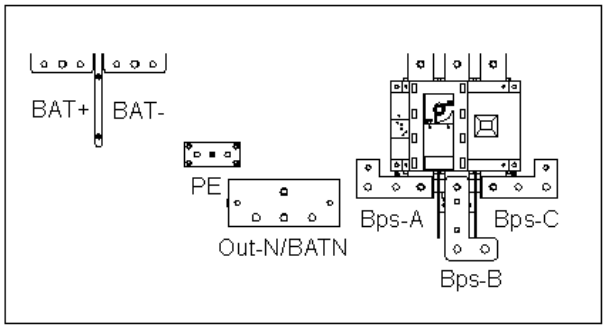
200/320kVA Terminal Block:



400/520kVA Terminal Block:

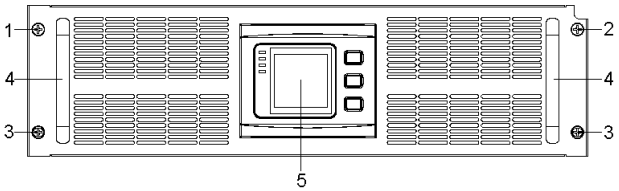


In front of the UPS

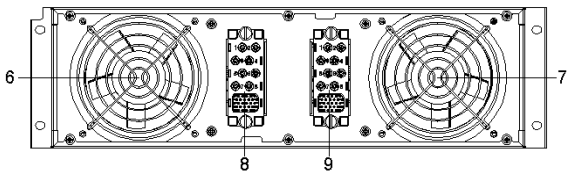


Back of the UPS

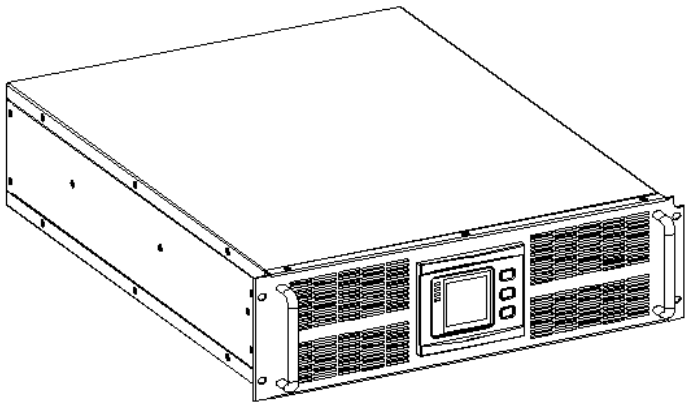
3.3 UPS Module Appearance



Front View



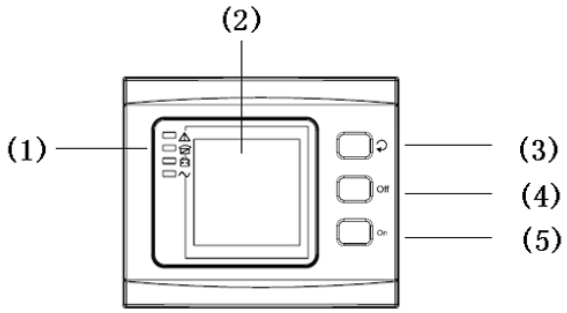
Rear View



Side View

1. Module left switch screw 2.Module right switch screw 3.Module fixed screw 4.Handle	5. LCD display 6. INV fan 7. PFC fan 8. Module output connector slot 9. Module input connector slot

3.4 UPS Module LCD Control Panel



LCD control panel introduction

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

3.5 Installation Notes

NOTE:

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

- Please place the UPS in a clean, stable environment; avoid the vibration, dust, humidity, flammable gas and liquid, corrosive. To avoid from high room temperature, a system of room extractor fans is recommended to be installed. Optional air filters are available if the UPS operates in a dusty environment.
- The environment temperature around UPS should keep in a range of 0℃～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℃ and 25℃. Keep batteries away from heat sources or main air ventilation area, etc.

WARNING!

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

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

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

- The highest altitude that UPS may work normally with full load is 1500 meters. The load capacity should be reduced when this UPS is installed in place whose altitude is higher than 1500 meters, shown as the following table:
  (Load coefficient equals max load in high altitude place divided by nominal power of the UPS)

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

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

3.6 External Protective Devices

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

- **External Battery**
  The UPS and its associated batteries are protected against the effect of over-current through a DC compatible thermo-magnetic circuit-breaker (or a set of fuses) located close to the battery.
- **UPS Output**
  Any external distribution board used for load distribution shall be fitted with protective devices that may avoid the risk of UPS overloaded.
- **Over-current**
  Protection device shall be installed at the distribution panel of the incoming main supply. It may identify the power cables current capacity as well as the overload capacity of the system.

3.7 Power Cables

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

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

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

UPS cabinet	Cable Dimension			
	AC Input (mm^2)	AC Output (mm^2)	DC Input (mm^2)	Grounding (mm^2)
200	185	185	120*2	185
320	150*2	150*2	185*2	150*2
520	240*2	240*2	240*3	240*2

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

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

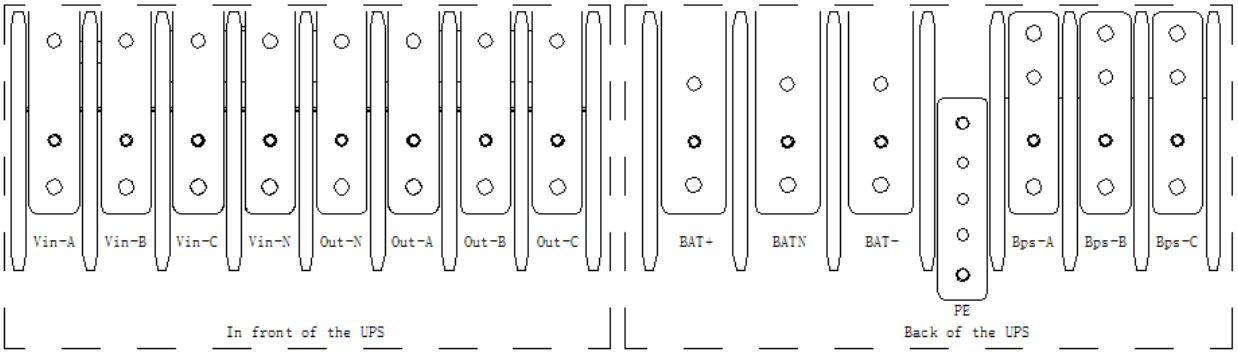
3.8 Power Cable Connect

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

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

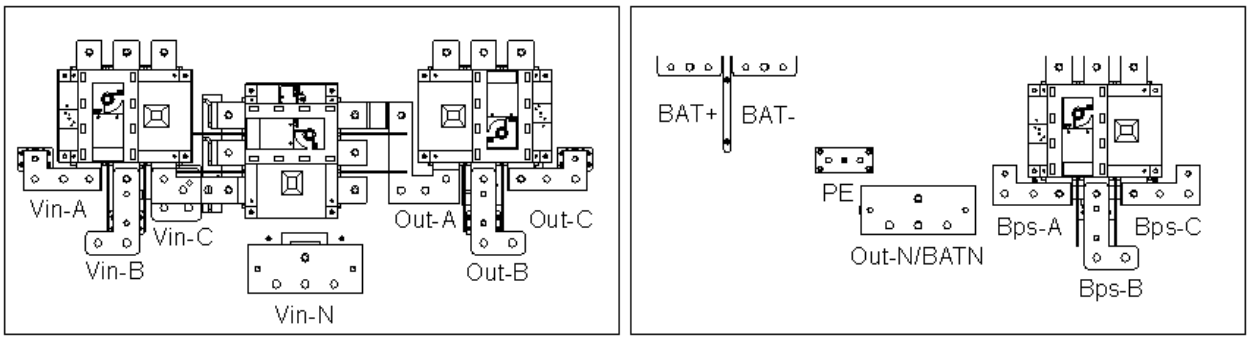
Open the UPS terminal panel; remove the cover of terminals for wiring easily.

200/320kVA Terminal Block:



Terminal sequence from left to right: input phase A(L1),input phase B(L2),input phase C(L3),input Neutral line, output Neutral line, output phase A(L1), output phase B(L2), output phase C(L3);battery positive, battery Neutral, battery negative, ground, bypass input phase A(L1),bypass input phase B(L2),bypass input phase C(L3).

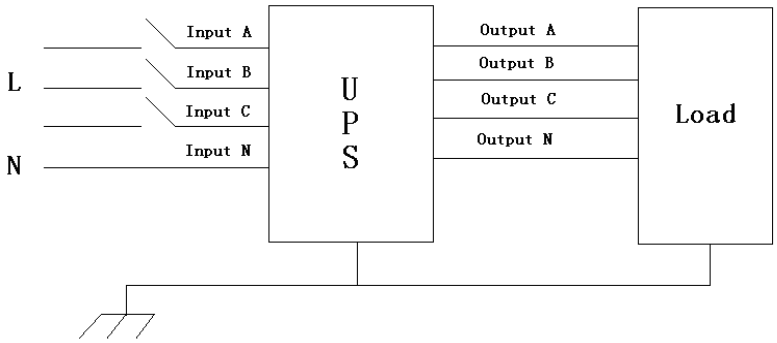
520kVA Terminal Block:



In front of the UPS Back of the UPS

Terminal sequence from left to right: input phase A(L1),input phase B(L2),input phase C(L3),input Neutral line, output phase A(L1), output phase B(L2), output phase C(L3);battery positive, battery negative, output and battery Neutral, ground, bypass input phase A(L1), bypass input phase B(L2),bypass input phase C(L3).

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



WARNING!

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

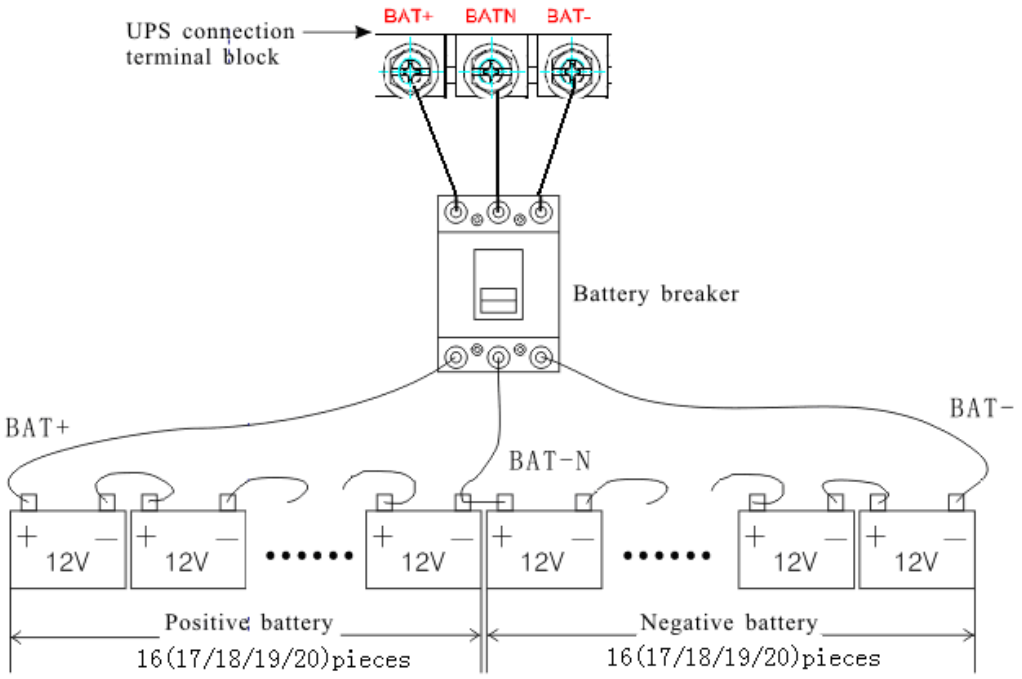
Connect the safety earth and any necessary bonding earth cables to the copper earth screw located on the floor of the equipment below the power connections. All cabinets in the UPS must be grounded properly.

CAUTION!

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

3.9 Battery Connection

The UPS adopts positive and negative double battery framework, total 32(optional 34/36/38/40) in series. A neutral cable is retrieved from the joint between the cathode of the 16th (17th/18 th/19th/20 th) and the anode of the 17th (18th/19 th/20th/21 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---32pcs, battery capacity---12V65AH. When connecting 32/34/38/40 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.

3.10 Online UPS Modules Replacement

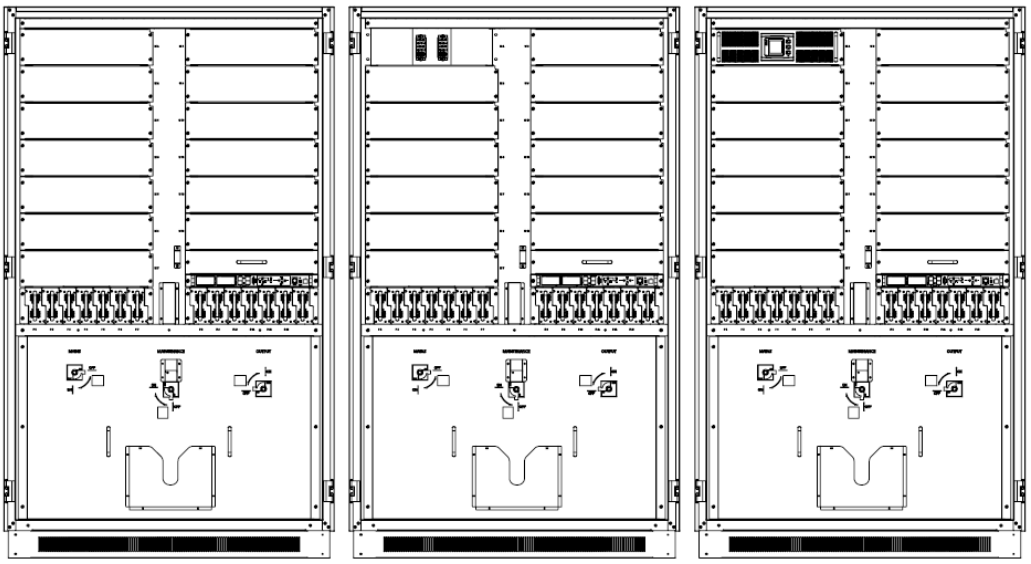
For the UPS, modules must be inserted to make a complete UPS system.

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

NOTE:

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

- **Insert module**



1. Remove decorated panel;
2. Put the UPS module in the cabinet module slot. Push the module along the slot into the cabinet until the module is inserted properly.
3. Fix the module with screws (M5) at the positioning screw holes;
4. Open input switch at modules' rear panel, and output switches accordingly. (From top to bottom, the order is 1-5 or 8)
5. After the modules start up, the system will detect the modules inserted automatically and parallel up the modules into whole system.

- **Remove UPS module**

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

WARNING!

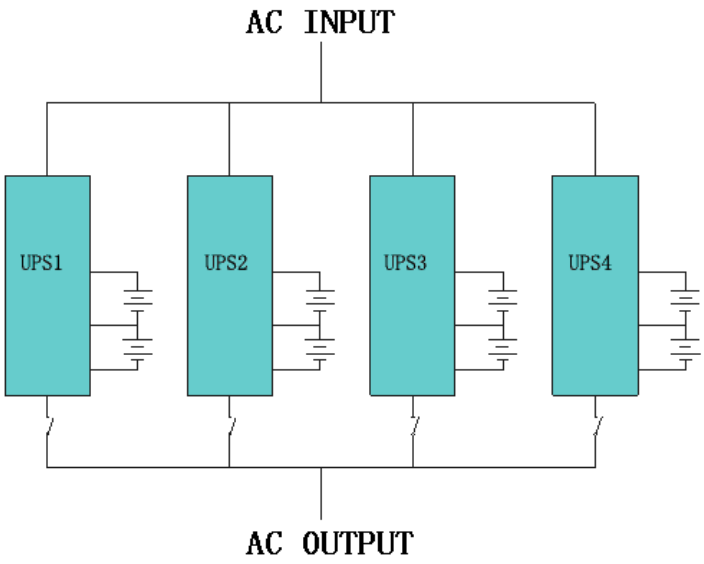
1. Make sure the LCD screen is totally off before removing the module; otherwise, electric sparks will occur at the connection of module and system cabinet.
2. The coronal screw at left side of the module controls the operation of the module. Only after the screw is tightened, the module can start running. When insert new module, make sure the screw is tightened properly.
3. When insert the module under battery mode, please press "ON" button at module's LCD panel until the module 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.



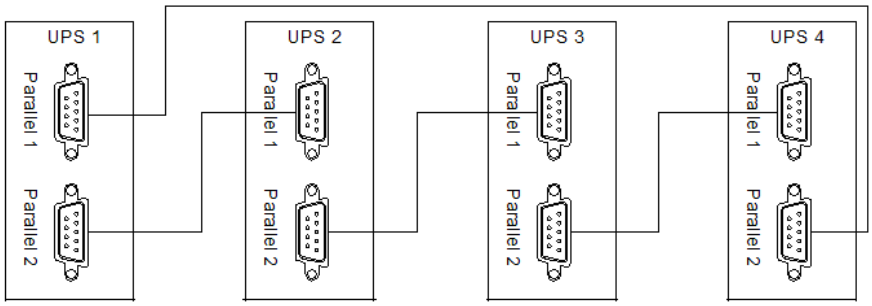
Make sure each UPS input breaker is in "off" position and there is no any output from each UPS connected. Battery groups can be connected separately or in parallel, which means the system itself provides both separate battery and common battery.

WARNING!

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

3.11.2 Parallel Cable Installation

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.



3.12 LBS Installation

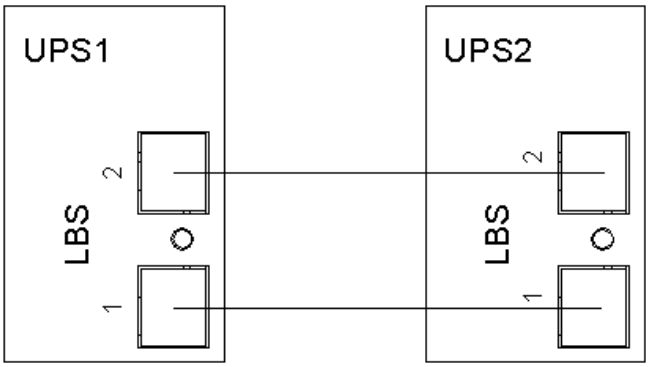
LBS system contains LCD set, cable connect and STS device.

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.

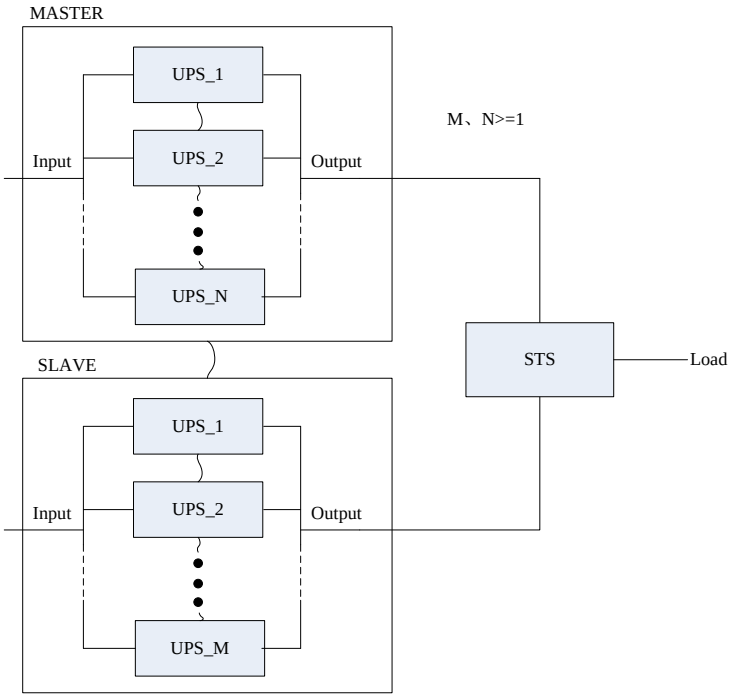
3.12.2 LBS Cable Installation

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

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).
- **Maintenance mode (Manual Bypass)**
  A manual bypass switch is available to ensure continuity of supply to the critical load when the UPS is out of order or in repair. This manual bypass switch is fitted for all UPS modules and bears for equivalent rated load.
- **Redundancy mode**
  Based on different demands, The UPS can be set as N+X redundancy mode to increase the reliability to the load connected.

- **LBS (Load Bus Synchronization)**

  The function of LBS is to keep the output of two independent UPS systems (single unit or multiple units) in synchronization even when the two systems are operating on different modes (bypass/inverter) or on batteries. It is usually used with an STS (Static Transfer Switch) connected to the critical load to achieve Dual Bus configuration.

4.2 Turn on/off UPS

4.2.1 Restart Procedure

CAUTION!

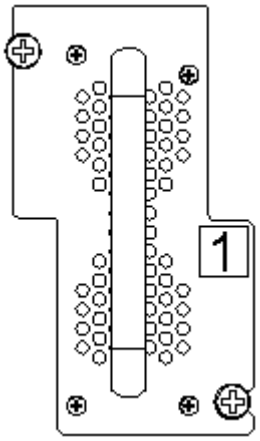
MAKE SURE GROUNDING IS PROPERLY DONE!

- Set the Battery Breaker to the "ON" position according to the user's manual.
- Open the front and rear doors of the UPS to access to the main power switches. During this procedure the output terminals will become alive.

CAUTION!

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

- Turn ON the bypass and input switches of the UPS, make sure that "fuse box" insert the cabinet, and fix with screws



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

- Switch ON output breaker

If the rectifier of the module does not start-up, the bypass LED will light up. When the inverter is on, the UPS will transfer from bypass mode to inverter mode, then the bypass LED is off and the inverter LED is on.

No matter the UPS is operated normally or not, the LCD display will indicate current status.

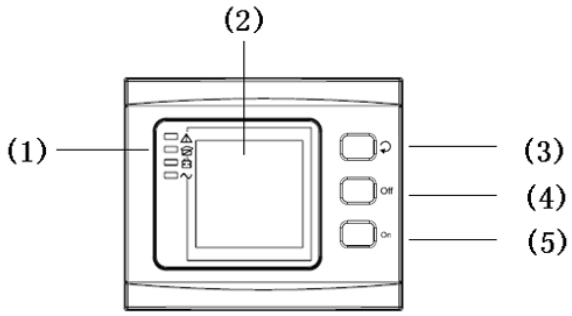
4.2.2 Test Procedure

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

4.2.3 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 buttons of the modules respectively as the position 5 of the above drawing.

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

CAUTION!

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

4.2.4 Maintenance Bypass

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

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

Switch to mechanical bypass

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

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

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

Switch to normal operation (from mechanical bypass)

CAUTION!

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

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

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

4.2.5 Shut Down Procedure

CAUTION!

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

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

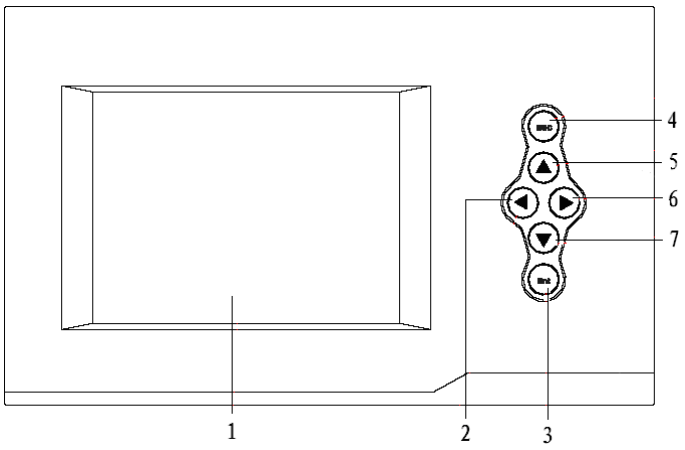
- Connect parallel cable, input/output cable, and battery cable well; modify the parallel board jumpers correctly.
- Measure the positive and negative battery pack voltage. Battery breaker is opened temporarily.
- Switch ON the output switch at the front door.
- According to the startup procedure for 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 4 units can be parallel; set the ID of each cabinet, the ID of each unit must be different.
- Switch ON the input breaker. 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 breaker of each UPS. Check if the charging current displayed in LCD is normal.

NOTE

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

4.3 The Display

4.3.1 System LCD Display



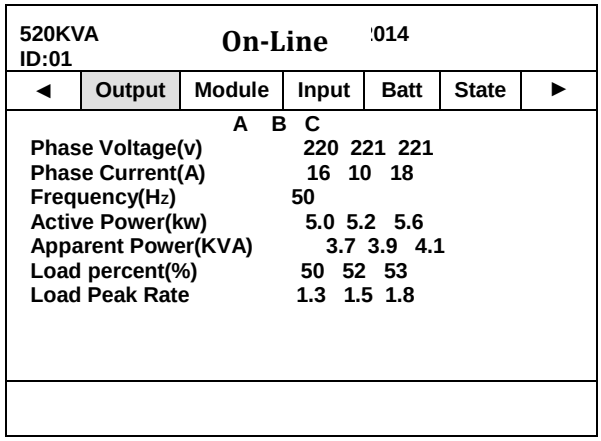
Overview of the operating panel of the UPS

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

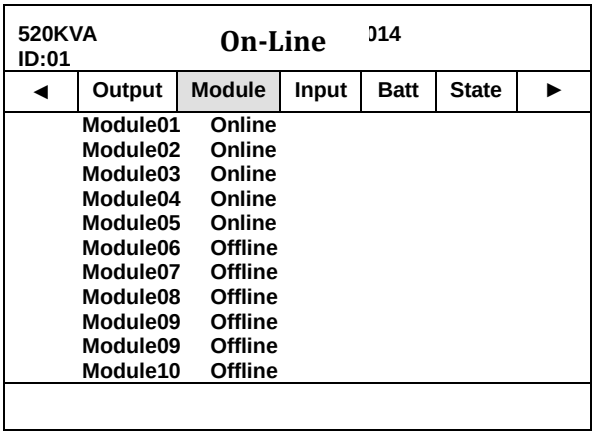
Introduction

CAUTION!

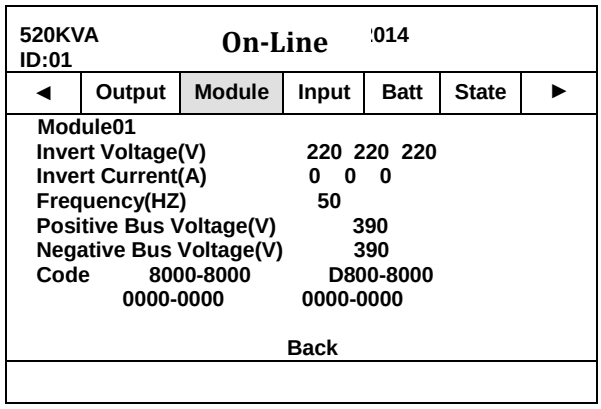
The display provides more functions than those described in this manual.



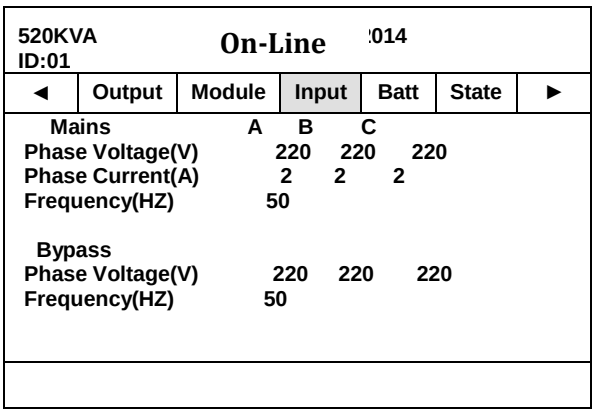
Output data



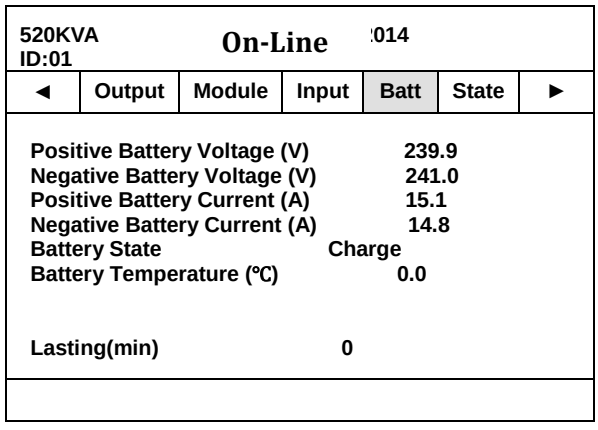
Modules data



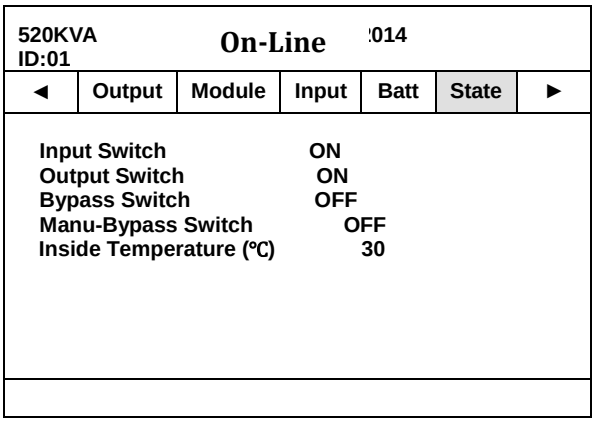
Detailed module data



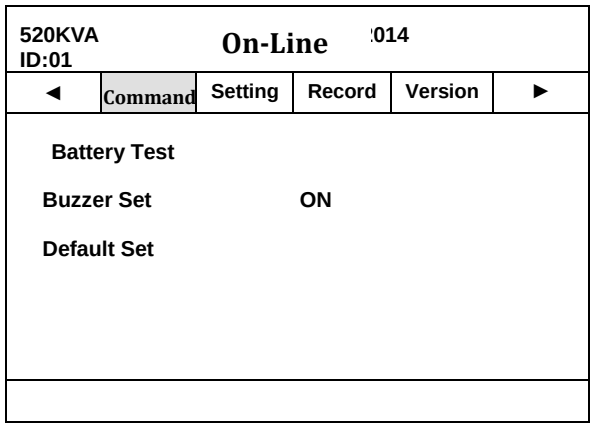
Input data



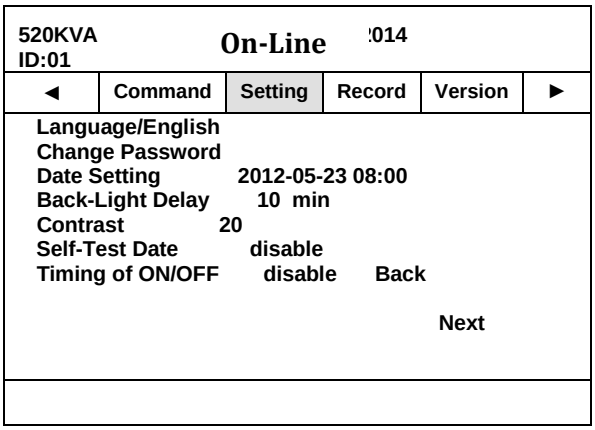
Battery data



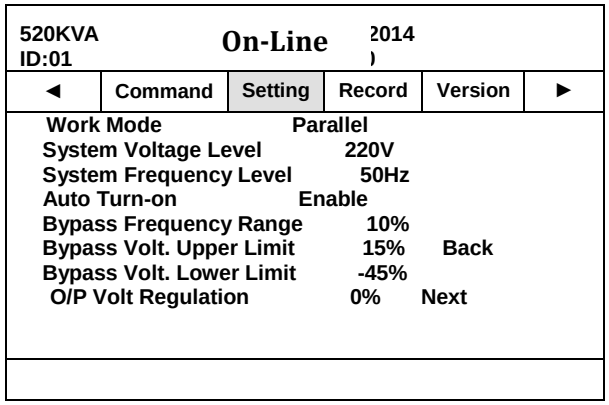
Status data



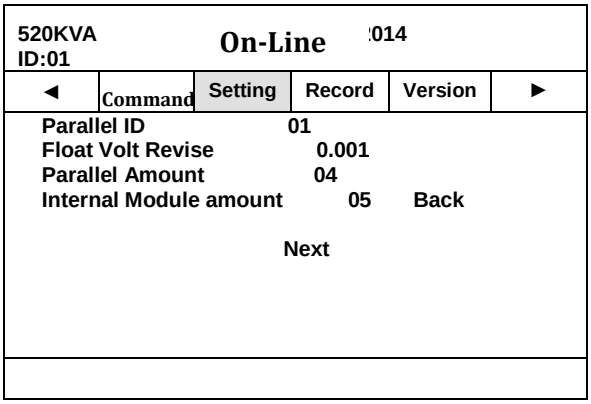
Command data



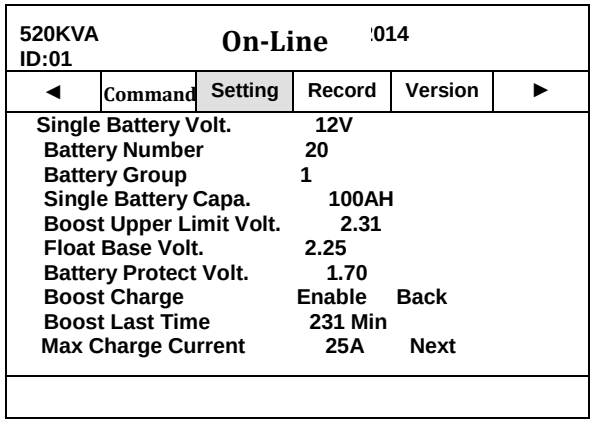
Setting data1



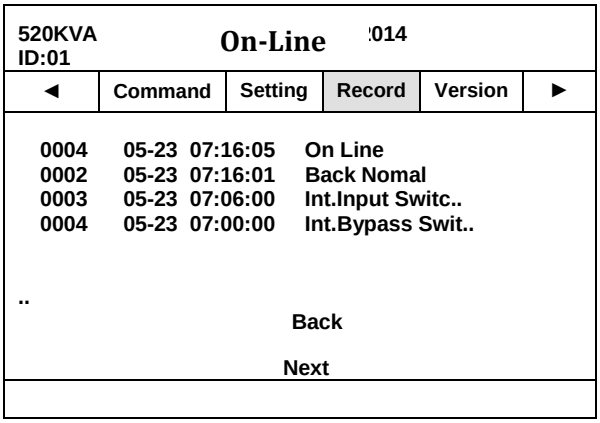
Setting data2



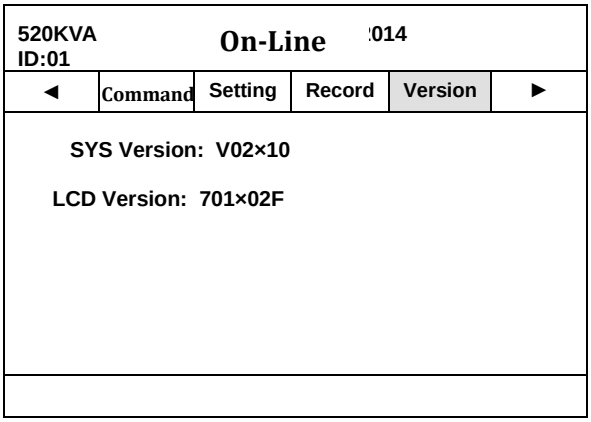
Setting data3



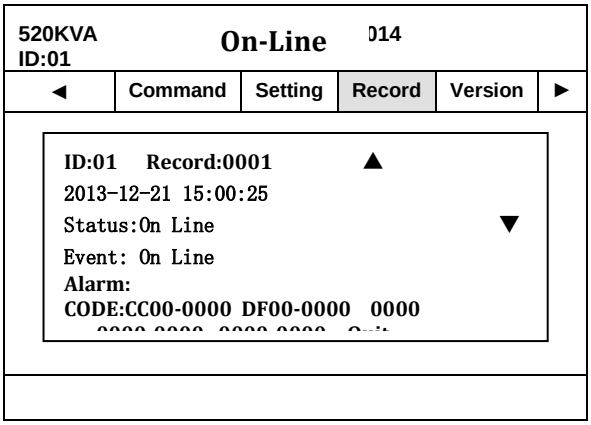
Setting data4



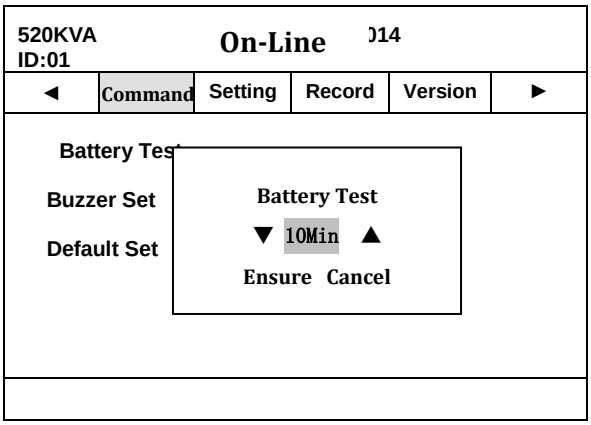
Record data



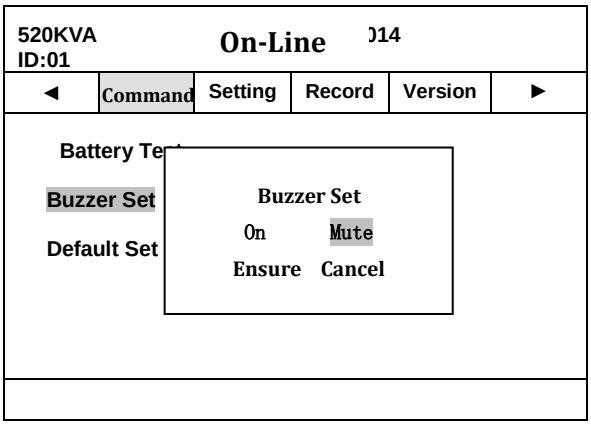
Version data



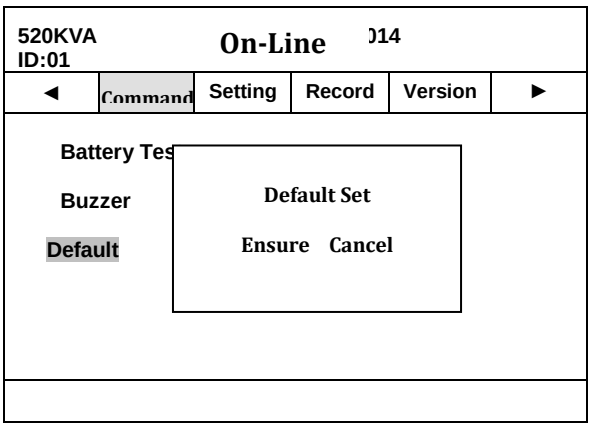
Module detailed record data



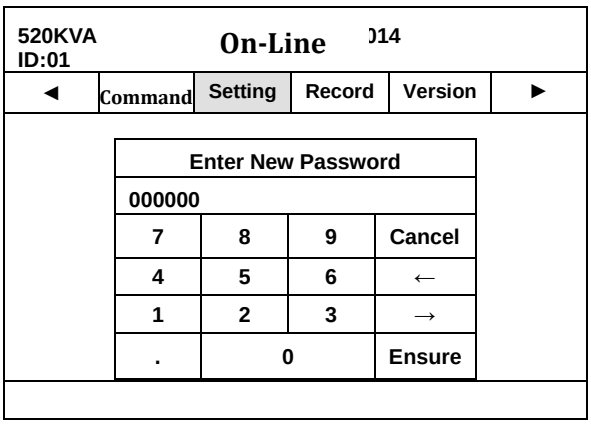
Setting of battery test



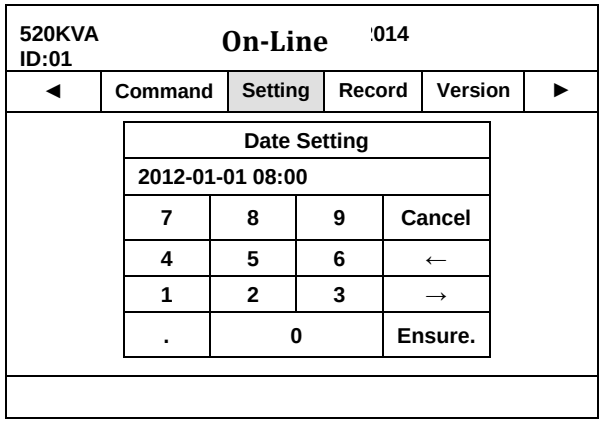
Setting of Buzzer



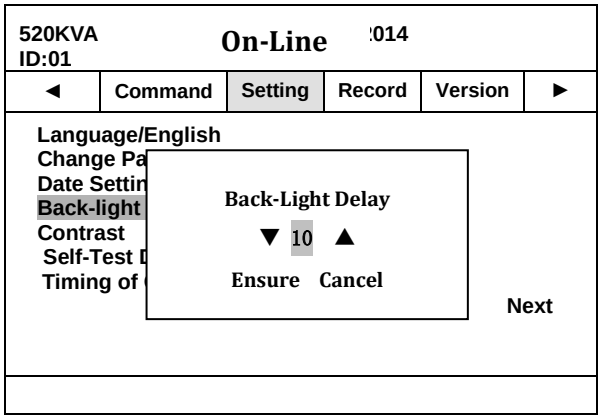
Restore default setting



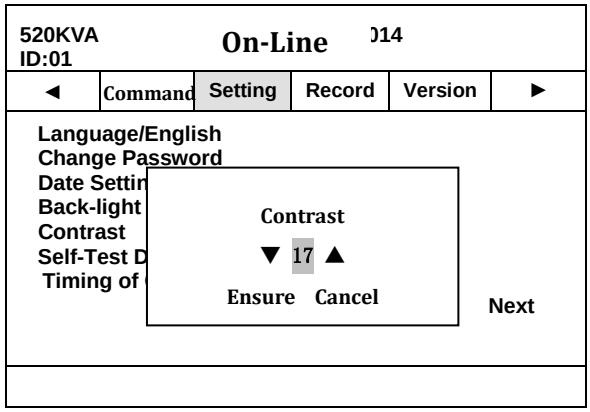
Password setting



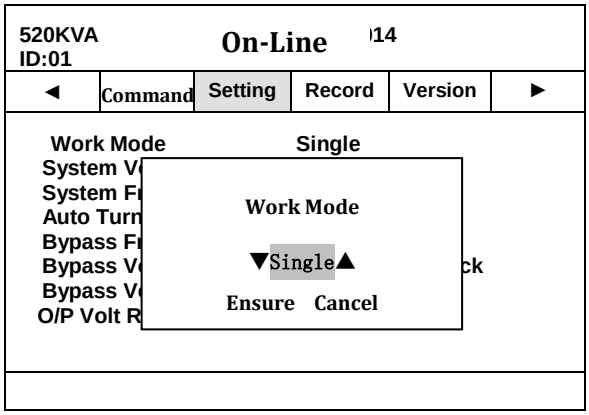
Date setting



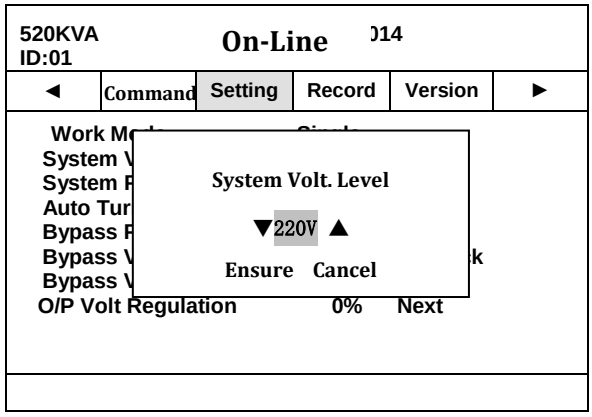
Back-Light Delay setting



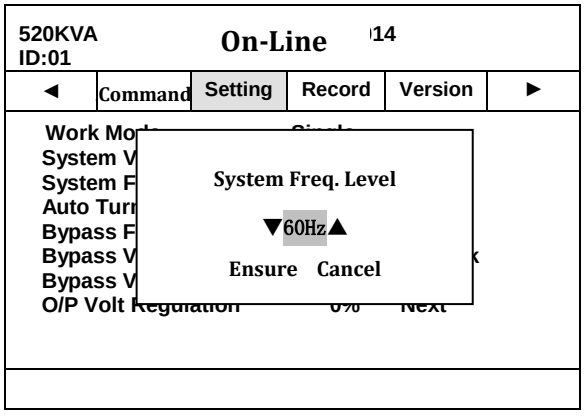
Contrast setting



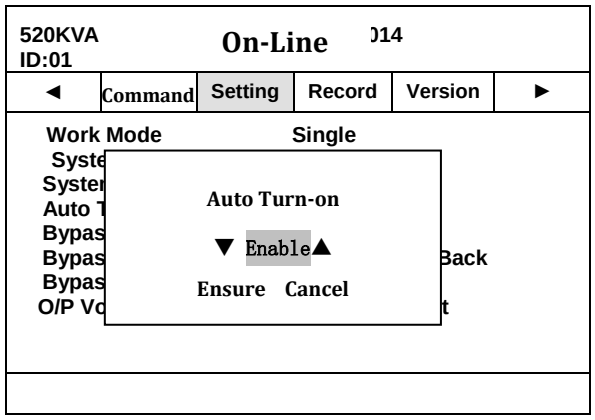
Setting of work mode



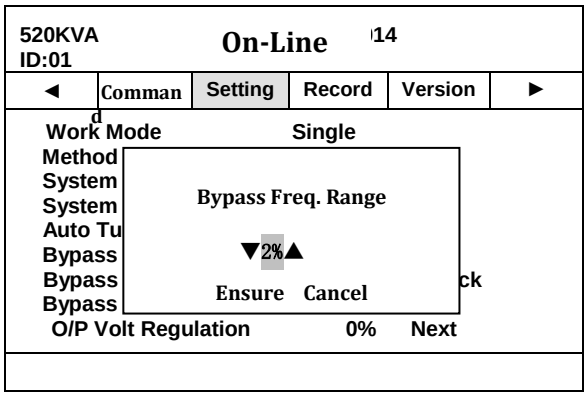
Setting of system volt. Level



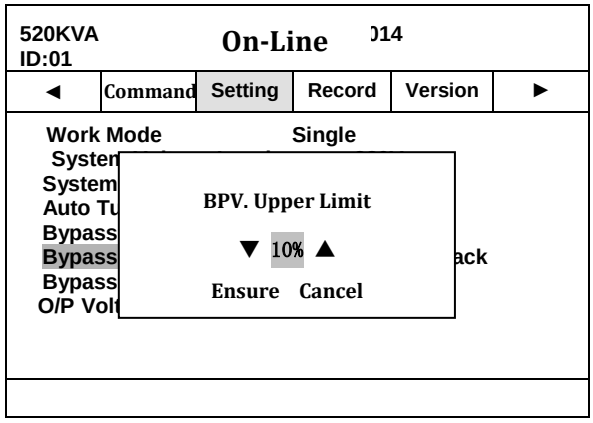
Setting of system freq. level



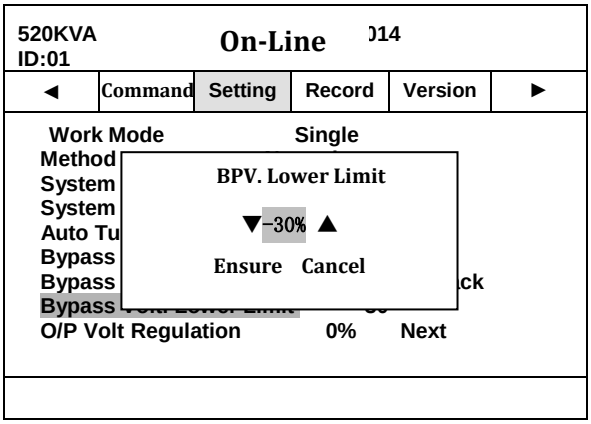
Setting of auto turn-on



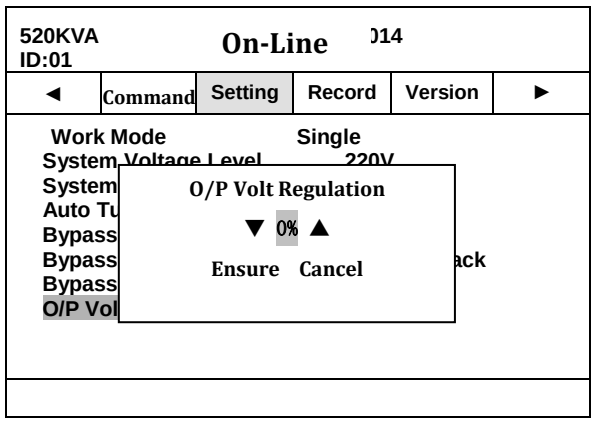
Setting of bypass freq.rang



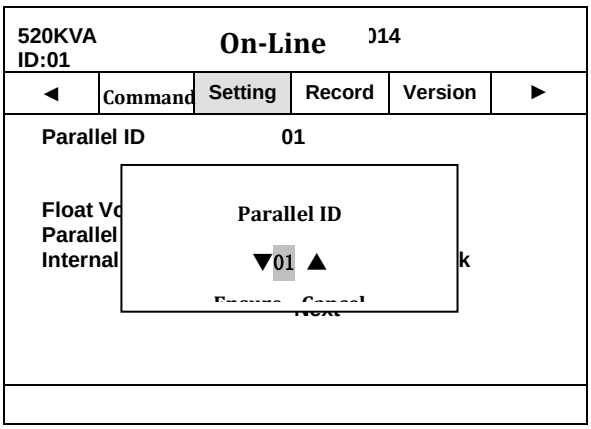
Setting of bypass volt. Upper limit



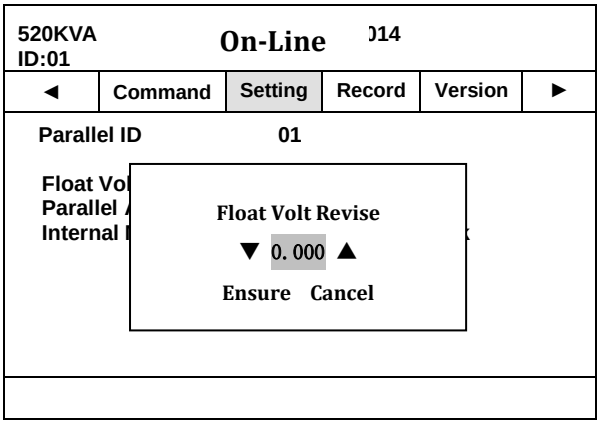
Setting of bypass volt. Lower limit

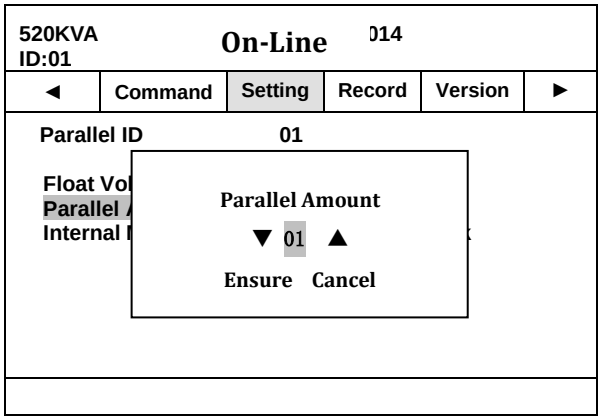


Setting of output volt. Regulation

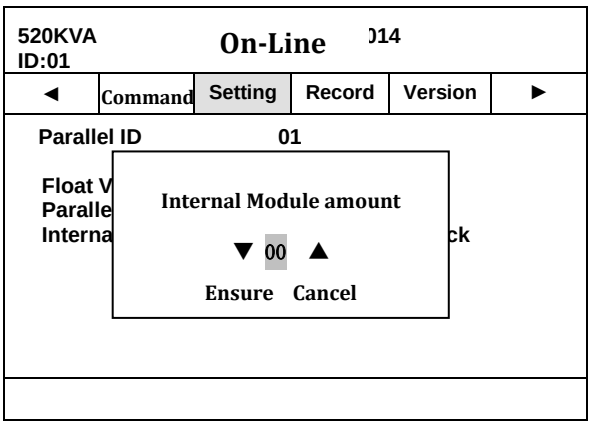


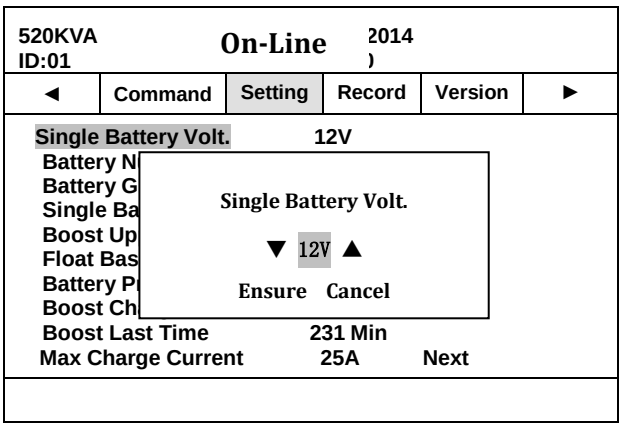
Whole system ID (parallel ID) setting



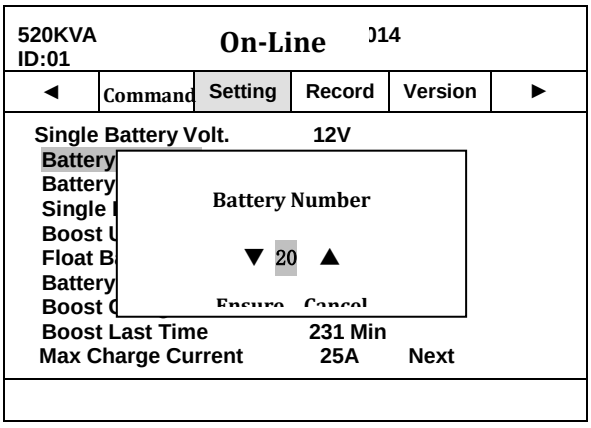


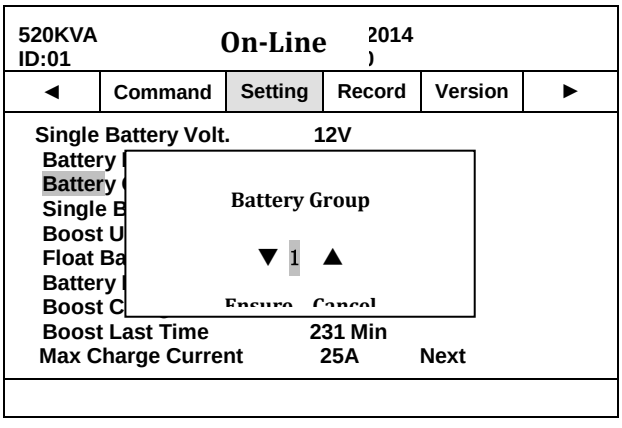
Setting of float charge volt. Compensation factor **Setting of parallel modules amount**



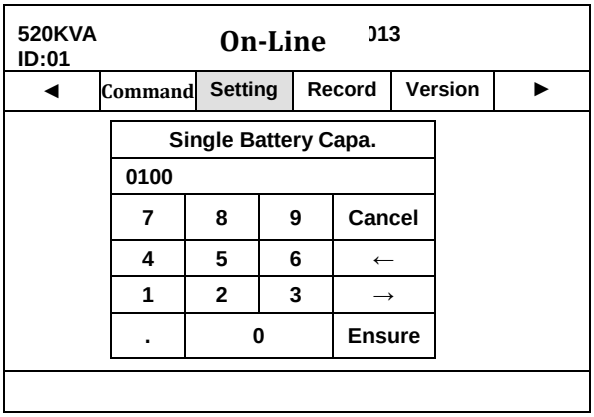


Setting of internal module amount **Setting of single battery voltage**

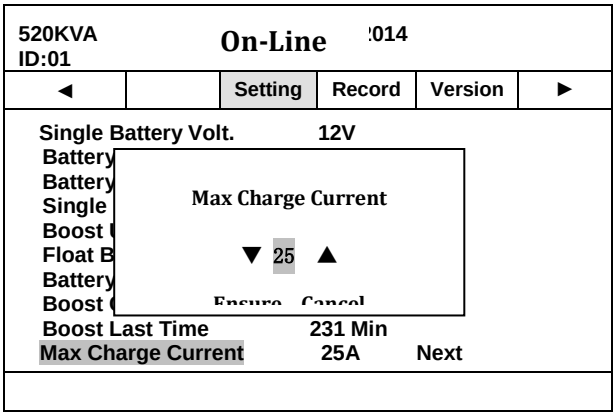




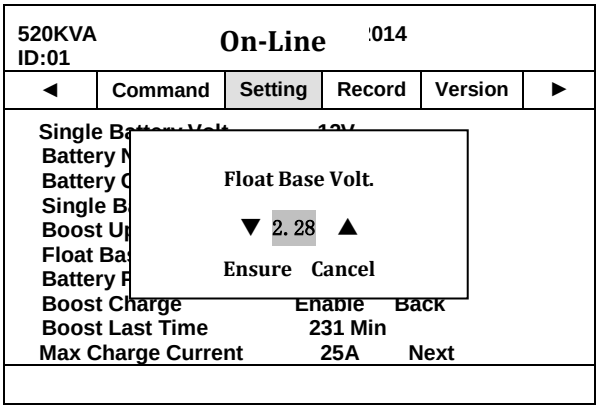
Setting of battery number **Setting of battery group**



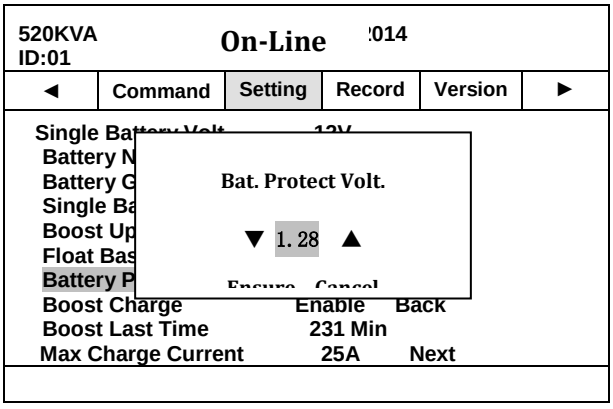
Setting of single battery capacity



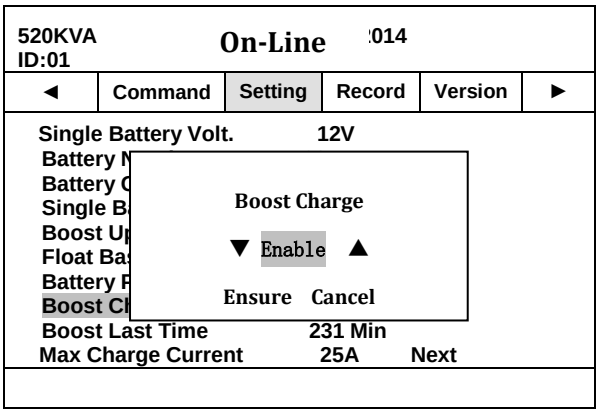
Setting of max. Charge current



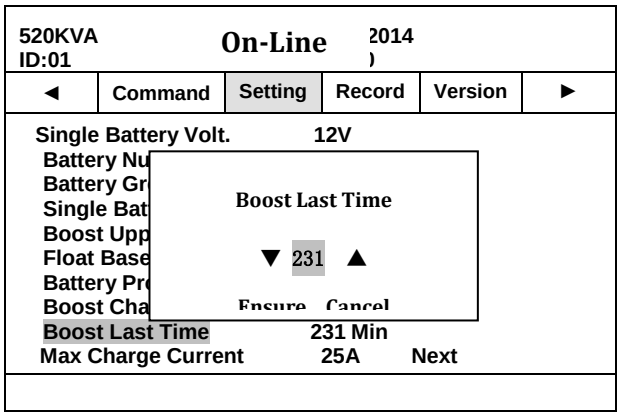
Setting of float base charge voltage



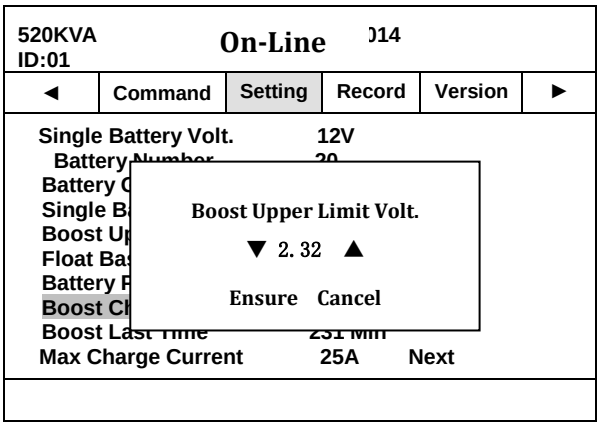
Setting of Battery Protect Voltage



Setting of boost charge

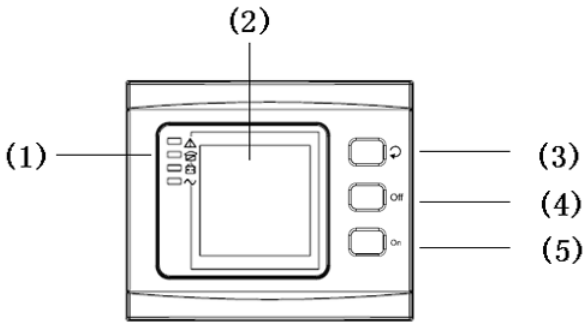


Setting of boost charge lasting time



Setting of boost Upper Limit Volt

4.3.2 UPS Module LCD Display



Overview of the operating panel of the UPS

1. LED indicator
2. LCD Display
3. scroll button: enter to next item
4. OFF button：
5. ON button:

Introduction

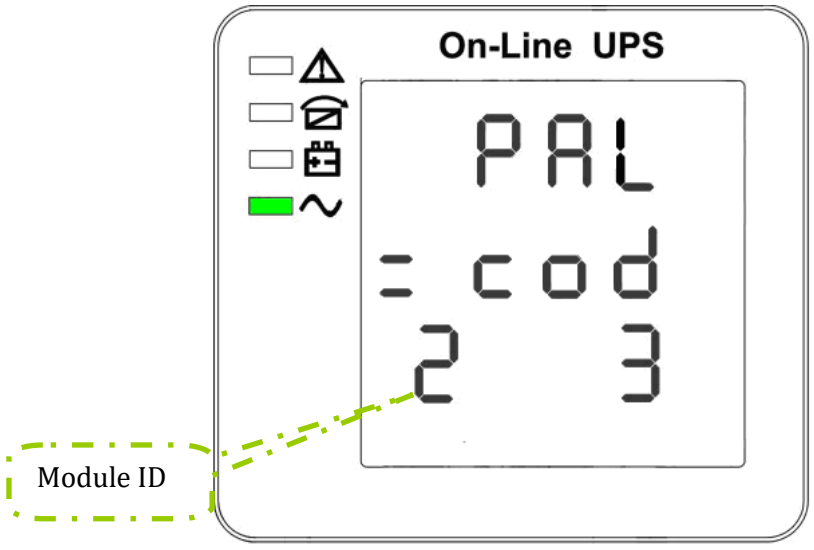
CAUTION!

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

There are 16 interfaces available in the LCD display:

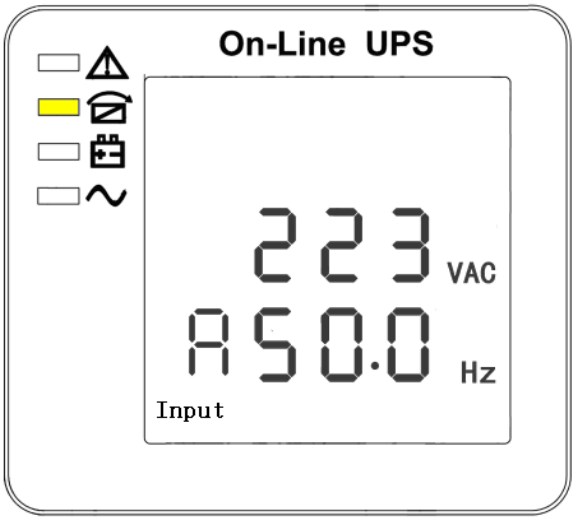
Item	Interface Description	Content Displayed
01	CODE	Operational status and mode
02	Input A(Input L1)	Voltage & Frequency
03	Input B(Input L2)	Voltage & Frequency
04	Input C(Input L3)	Voltage & Frequency
05	Bat. +	Voltage & Current
06	Bat. -	Voltage & Current
07	Output A(Output L1)	Voltage & Frequency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

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

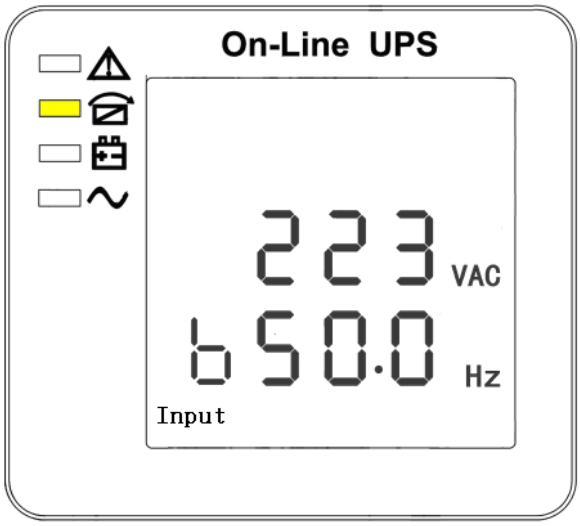


1. Module ID and status code

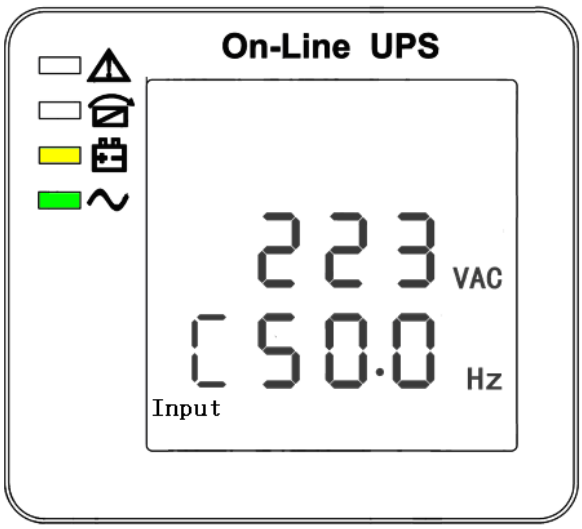
2) Press "scroll" button, the UPS goes to next page as shown below.



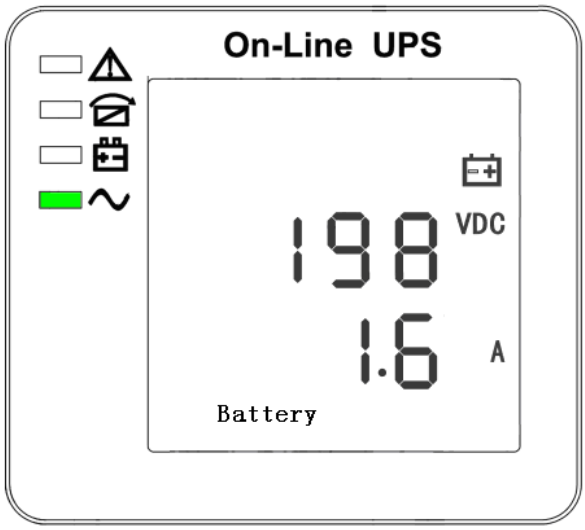
2. Phase A (L1) Input/Frequency



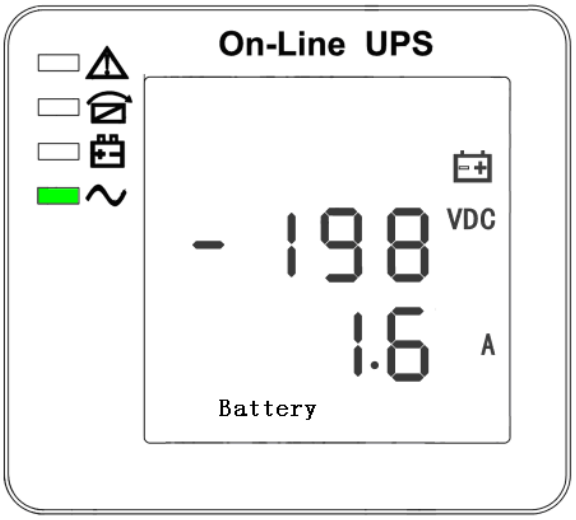
3. Phase B (L2) Input/Frequency



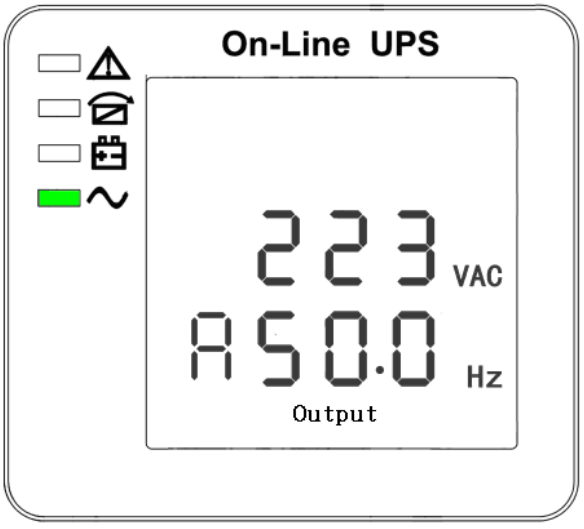
4. Phase C (L3) Input/Frequenc



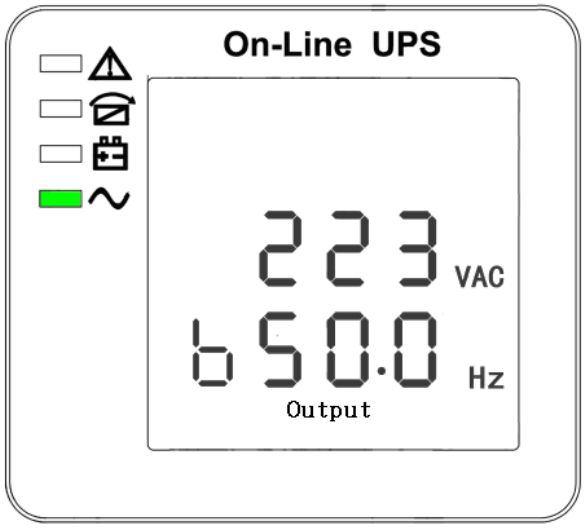
5. Bat + (Positive)



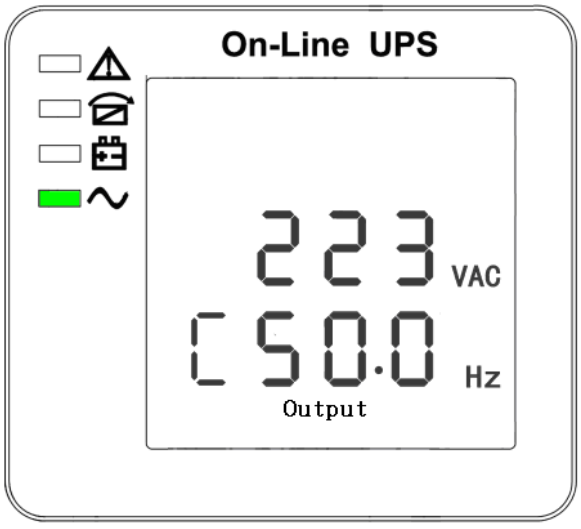
6. Bat - (Negative)



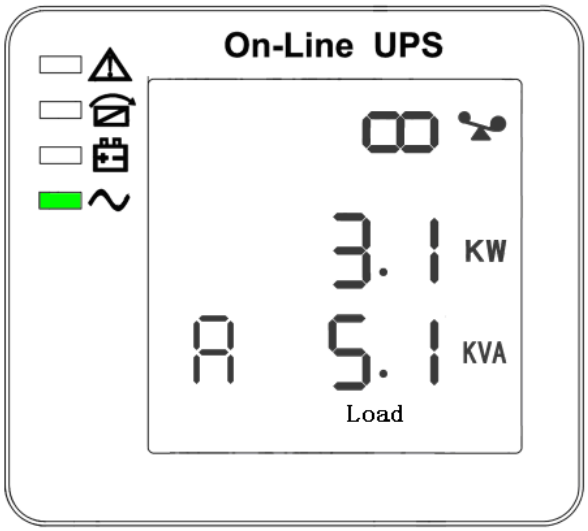
7. Phase A (L1) Output Voltage/Frequency



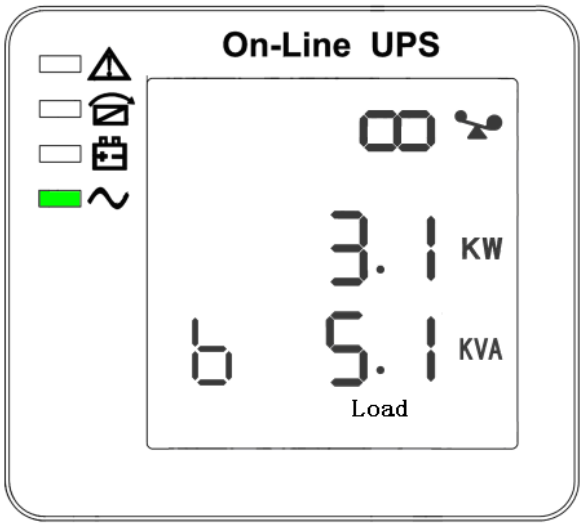
8. Phase B (L2) Output Voltage/Frequency



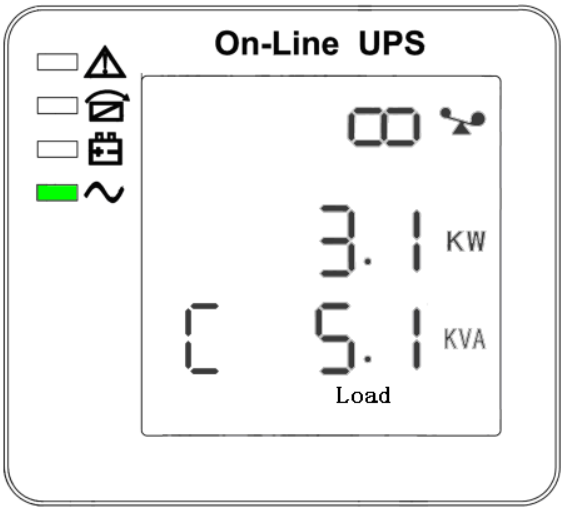
9.Phase C (L3) Output Voltage/Frequency



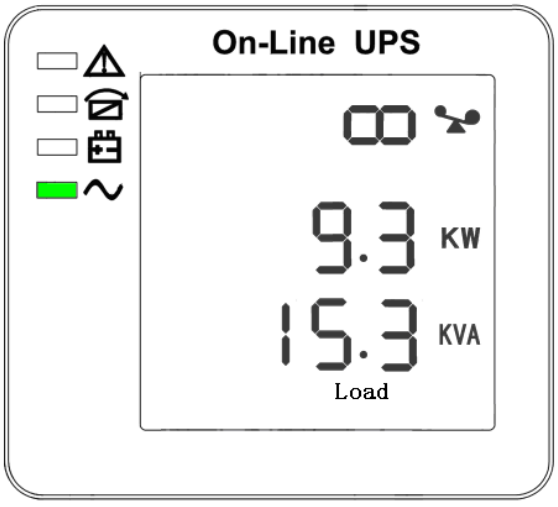
10. Phase A (L1) Load Capacity



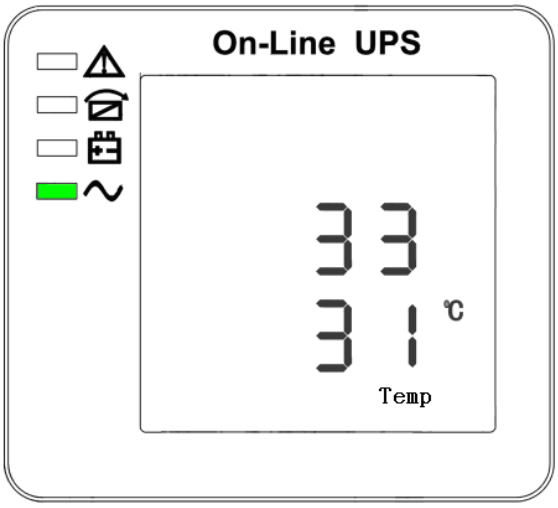
11. Phase B (L2) Load Capacity



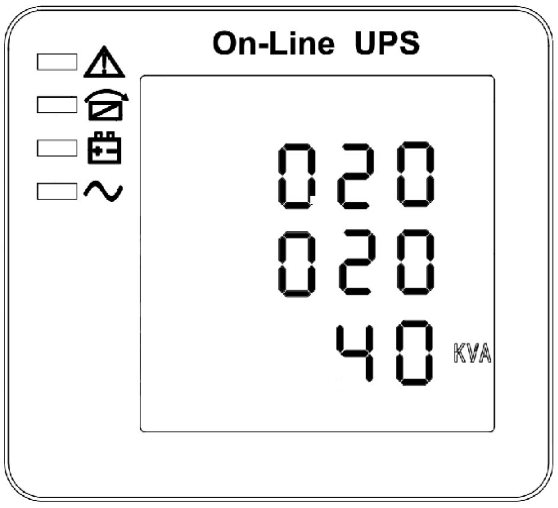
12. Phase C (L3) Load Capacity



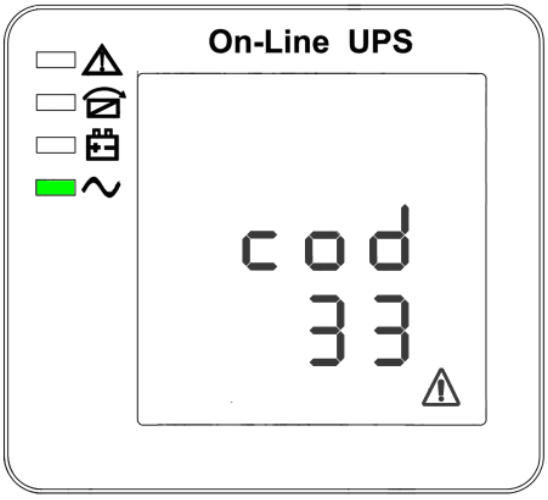
13.Total Load Capacity



14. Internal temperature and ambient temperature

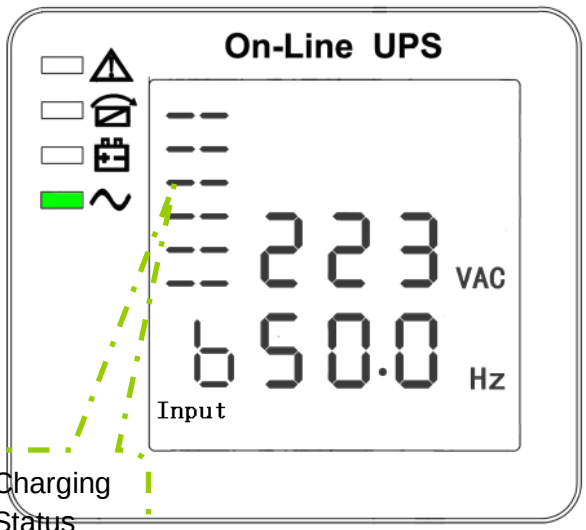


15. Software version & model

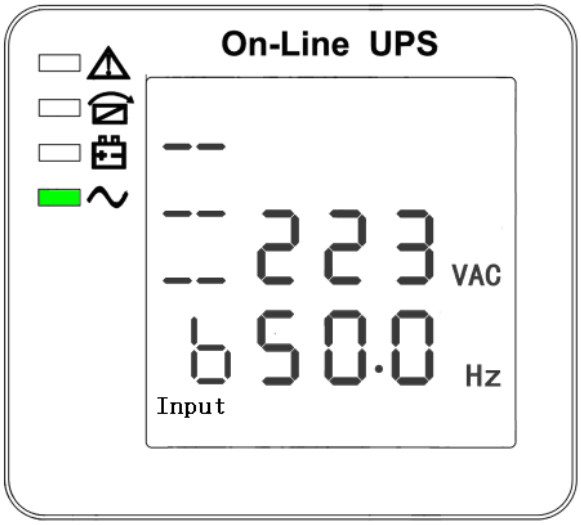


16. Alarm Code

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



Boost



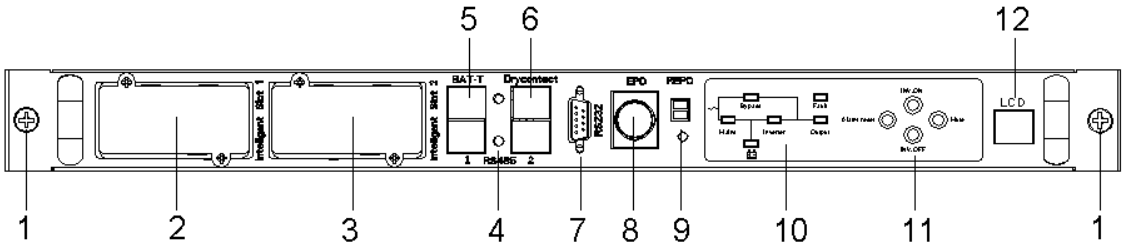
Floating

3) **Pressing "scroll" button, you may circulate all messages from the first one to the last one then returns back to the first one and vice versa.**

4) **All alarm codes are present when abnormal behavior(s) occur(s).**

4.3.3 Monitoring Module Control Panel

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



(1)	Communication panel fixed screw
(2)	Intelligent slot 1 : insert SNMP card or Dry contact card
(3)	Intelligent slot 2 : insert SNMP card or Dry contact card
(4)	RS485 port 1/2
(5)	BAT_T port 1/2 : connect battery temperature sensor box
(6)	Dry contact : Pin1-12Vdc, Pin2- DRY_GENER , Pin7- BP_O, Pin8- BP_S
(7)	RS232 port
(8)	EPO button
(9)	REPO port : Remote EPO connect port
(10)	LED indication
(11)	Function key
(12)	LCD port : connected to LCD panel

CAUTION!

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

Mains indicator

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

Battery indicator

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

Bypass indicator

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

Inverter indicator

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

Output indicator

Green	UPS output ON and Normal
Off	UPS output OFF.

Fault indicator

Off	Normal Operation
Red	UPS fault e.g.

4.4 Display Messages/Troubleshooting

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

Module Display messages

Operational Status and Mode(s)

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

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

Module Alarm Information

Event log	UPS Alarm Warning	Buzzer	LED
1	Rectifier Fault	Beep continuously	Fault LED lit
2	Inverter fault(Including Inverter bridge is shorted)	Beep continuously	Fault LED lit
3	Inverter Thyristor short	Beep continuously	Fault LED lit
4	Inverter Thyristor broken	Beep continuously	Fault LED lit
5	Bypass Thyristor short	Beep continuously	Fault LED lit
6	Bypass Thyristor broken	Beep continuously	Fault LED lit
7	Fuse broken	Beep continuously	Fault LED lit
8	Parallel relay fault	Beep continuously	Fault LED lit
9	Fan fault	Beep continuously	Fault LED lit
10	reserve	Beep continuously	Fault LED lit
11	Auxiliary power fault	Beep continuously	Fault LED lit
12	Initializtion fault	Beep continuously	Fault LED lit
13	P-Battery Charger fault	Beep continuously	Fault LED lit
14	N-Battery Charger fault	Beep continuously	Fault LED lit
15	DC Bus over voltage	Beep continuously	Fault LED lit
16	DC Bus below voltage	Beep continuously	Fault LED lit
17	DC bus unbalance	Beep continuously	Fault LED lit
18	Soft start failed	Beep continuously	Fault LED lit
19	Rectifier Over Temperature	Twice per second	Fault LED lit
20	Inverter Over temperature	Twice per second	Fault LED lit
21	reserve	Twice per second	Fault LED lit
22	Battery reverse	Twice per second	Fault LED lit
23	Cable connection error	Twice per second	Fault LED lit
24	CAN comm. Fault	Twice per second	Fault LED lit
25	Parallel load sharing fault	Twice per second	Fault LED lit
26	Battery over voltage	Once per second	Fault LED blinking
27	Mains Site Wiring Fault	Once per second	Fault LED blinking
28	Bypass Site Wiring Fault	Once per second	Fault LED blinking
29	Output Short-circuit	Once per second	Fault LED blinking
30	Rectifier over current	Once per second	Fault LED blinking
31	Bypass over current	Once per second	BPS LED blinking
32	Overload	Once per second	INV or BPS LED blinking
33	No battery	Once per second	Battery LED blinking
34	Battery under voltage	Once per second	Battery LED blinking
35	Battery low pre-warning	Once per second	Battery LED blinking
36	Internal Communication Error	Once per 2 seconds	Fault LED blinking
37	DC component over limit.	Once per 2 seconds	INV LED blinking
38	Parallel Overload	Once per 2 seconds	INV LED blinking
39	Mains volt. Abnormal	Once per 2 seconds	Battery LED lit
40	Mains freq. abnormal	Once per 2 seconds	Battery LED lit
41	Bypass Not Available		BPS LED blinking
42	Bypass unable to trace		BPS LED blinking
43	Inverter on invalid		

44	Module screws unlocked		

Cabinet Display messages

Events:

No.	Display message	Meaning
1	Initializing	The DSP and MCU are in Initializing.
2	Standby	
3	Non-Output	The UPS does not provide power to the load equipment.
4	On Bypass	Inverter output is turned off and the load connected at the inverter output receives power from utility line via STS.
5	On Line	Inverter output power is the primary energy source to load
6	EPO Activated	Emergency Power Off Switch has been activated.
7	Automatic Self Test	The UPS has started pre-programmed battery test.
8	Inverter in soft starting	The inverter is in soft-starting
9	System Fault Detected	The system has detected an internal error
10	MBS status	status of maintenance bypass
11	EPO status	status of EPO(emergency power off)
12	Int. Input Switch closed	The internal input breaker is closed manually.
13	Int. Input Switch opened	The internal input breaker is opened manually.
14	Rectifier Deactivated	The rectifier has been deactivated.
15	Rectifier Activated	The rectifier has been activated.
16	Rectifier Current Limit	When the input voltage is at 208V~305V, the output of the UPS will not be interrupted, but it will be at current limit, for example, to reduce charge current. When the load connected exceeds its limit, the warming shall occur.
17	Battery charge deactivated	The charger has been deactivated.
18	Positive Battery Boost Charging	The Positive battery is in boost charge, which is Constant voltage boost charge mode or constant current boost charge mode.
19	Positive Battery Float Charging	The Positive battery is in float charge.
20	Negative Battery Boost Charging	The Negative battery is in boost charge.
21	Negative Battery Float Charging	The Negative battery is in float charge.
22	Int. bypass Switch Opened	The internal bypass breaker is opened manually
23	Int. bypass Switch Closed	The internal bypass breaker is closed manually
24	Int. output Switch Opened	The internal output breaker is opened manually

25	Int. output Switch Closed	The internal output breaker is closed manually
26	Ext. bypass Switch Opened	The external bypass breaker(parallel system) is opened
27	Ext. bypass Switch Closed	The external bypass breaker(parallel system) is closed
28	Ext. output Switch Opened	The external output breaker(parallel system) is opened
29	Ext. output Switch Closed	The external output breaker(parallel system) is closed
30	Coming to Interval transfer	Allows transfer to bypass or inverter with 3/4 cycle break. Use of this command will drop load.
31	Coming to over load due to inverter off	When the inverter is turned off manually, the load will exceed the power capacity.
32	Coming to Interval transfer due to inverter off	When the inverter is turned off manually, the load will exceed the power capacity.
33	Inverter invalid due to over load	The load exceeds the capability of the single or parallel modules.
34	Inverter Master	It indicates the Master Inverter.
35	Transfer Times-out	Latched load transfer to bypass as a result of too many successive transfers within the current hour. Automatic reset attempt within the next hour.
36	UPS In shutdown Due To Overload.	The load exceeded the power capacity. The UPS has been shutdown
37	UPS In Bypass Due To Overload.	The load exceeded the power capacity. The UPS has switched to Bypass Mode.
38	Parallel in Bypass	The parallel system has switched to bypass mode
39	LBS Activated	LBS has been activated.
40	Lightning Protection	Lightning protector has been activated.
41	Battery low to UPS OFF	battery voltage lower than protection point
42	UPS timing on	UPS on at certain time
43	UPS timing OFF	UPS off at certain time
44	timing self-test start	start to self-test at certain time
45	Stop self-test	self-test stops
46	manual OFF	turn off UPS manually
47	remote OFF	turn off UPS remotely
48	module connected	module is connected
49	module removed	module is removed

Cabinet Alarm Information

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

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

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

4.5 Options

SNMP Card

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 (internal SNMP)

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

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

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

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

Relay card

The card is used for providing the interface for UPS peripheral monitoring. The contact signals can reflect UPS running status. The card is connected to peripheral monitoring devices via DB9 female to facilitate the effective monitoring of the real-time status of UPS and timely feedback the status to monitor when abnormal situation occurs (such as UJPS failure, mains interruption, UPS bypass and ect.). It is installed in the intelligent slot of the UPS.

The relay card includes 6 output ports and one input port. Please refer to the following table for detail.

The definition of the pins is defined as below:

Pin-out	Function description	Input/Output
1	UPS Failure	Output
2	Summary Alarm	Output
3	GND	
4	Remote Shutdown	Input
5	Common	
6	Bypass	Output
7	Battery Low	Output
8	UPS ON	Output
9	Utility Failure	Output

Appendix 1 Specifications

Model			**200k**	**320k**	**520k**
Cabinet capacity			**200kVA 180kW**	**320kVA 288kW**	**520kVA 468kW**
Module capacity			**40kVA/36kW**		
Max. module number			**5**	**8**	**13**
Input	Phase		3 Phase 4 Wires and Ground		
	Rated Voltage		380/400/415Vac		
	Voltage Range		208~478Vac		
	Frequency Range		40Hz-70Hz		
	Power Factor		≥0.99		
	Current THDi		≤3%(100% nonlinear load)		
	Bypass Voltage Range		220V:+25 %(optional +10%, +15%, +20%); 230V:+20 %(optional +10%, +15%); 240V:+15 %(optional +10%); Min. voltage:-45 %(optional -20%,-30%) Frequency protection range: ±10%		
Output	Phase		3 Phase 4 Wires and Ground		
	Rated Voltage		380/400/415Vac		
	Power Factor		0.9		
	Voltage Regulation		±1%		
	Frequency	Utility Mode	±1%/±2%/±4%/±5%/±10%of the rated frequency(optional)		
		Battery Mode	(50/60±0.1)Hz		
	Crest Factor		3:1		
	THD		≤2% with linear load ≤5% with non linear load		
Battery	Voltage		±192V/±204V/±216V/±228V/±240VDC (32 /34/36/38/40PCS)		
	Module charge current (A) max.		10A		
Transfer Time			Utility to Battery : 0ms; Utility to bypass: 0ms		
Protection	Overload	AC Mode	Load≤110%: last 60min, ≤125%: last 10min, ≤150%: last 1min, ≥150% change to bypass.		
		Bat. Mode	Load≤110%: last 60min, ≤125%: last 10min, ≤150%: last 1min, ≥150% shut down UPS.		
		Bypass Mode	400A	500A	800A
	Fuse Box	Input	160A		
		Battery	200A		

	Short Circuit (module)	180A peak		
Protection	Overheat	Line Mode: Switch to Bypass; Backup Mode: Shut down UPS immediately		
	Battery Low	Alarm and Switch off		
	Self-diagnostics	Upon Power On and Software Control		
	EPO	Shut down UPS immediately		
	Battery	Advanced Battery Management		
	Noise Suppression	Complies with EN62040-2		
Communication Interface		RS232, RS485, Parallel, SNMP card(optional), Relay card(optional)		
Environment	Operating Temperature	0℃～40℃		
	Storage Temperature	-25℃～55℃		
	Humidity	0～95% non condensing		
	Altitude	< 1500m		
Display	Audible & Visual	Line Failure, Battery Low, Overload, System Fault		
	Status LED & LCD	Line Mode, Bypass Mode, Battery Low, Battery Bad, Overload & UPS Fault		
	Reading On the LCD	Input Voltage, Input Frequency, Output Voltage, Output Frequency, Load Percentage, Battery Voltage, parameter set, history record…		
Other	Unit Dimensions(W*D*H)	600*860*1600	600*860*2000	1200*860*2000
	Weight (Kg)	249	312	514
Safety Conformance		CE,EN/IEC 62040-2,EN/IEC 62040-1-1		

Appendix 2 UPS message table

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

AAAA-AAAA BBBB-BBBB EEFF CCCC-CCCC DDDD-DDDD

2. The part of Inner Code means

AAAA-AAAA(Rectifier State)：

Axxx-xxxx

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

xAxx-xxxx

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

xxAx-xxxx

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

xxxA-xxxx

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

xxxx-Axxx

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

xxxx-xAxx

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

xxxx-xxAx

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

xxxx-xxxA

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

1		3		5		7		9		B		D		F	

BBBB-BBBB(Inverter State)：

Bxxx-xxxx

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

xBxx-xxxx

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

xxBx-xxxx

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

xxxB-xxxx

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

xxxx-Bxxx

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

xxxx-xBxx

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

xxxx-xxBx

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

xxxx-xxxB

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

CCCC-CCCC(Rectifier Alarm)：

Cxxx-xxxx

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

xCxx-xxxx

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

xxCx-xxxx

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

xxxC-xxxx

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

xxxx-Cxxx

							8	9	A	B	C	D	E	F	Input Neutral line missing
			4	5	6	7					C	D	E	F	Battery reverse
	2	3			6	7			A	B	C		E	F	No battery
1		3		5		7		9		B	C	D		F	P-Battery Charger fault

xxxx-xCxx

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

xxxx-xxCx

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

xxxx-xxxC

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

DDDD-DDDD(Inverter Alarm)：

Dxxx-xxxx

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

1		3		5		7		9		B		D		F	Inverter Thyristor broken

xDxx-xxxx

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

xxDx-xxxx

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

xxxD-xxxx

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

xxxx-Dxxx

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

xxxx-xDxx

							8	9	A	B	C	D	E	F	Parallel Overload
			4	5	6	7					C	D	E	F	DC component over limit.
	2	3			6	7			A	B			E	F	Bypass over current
1		3		5		7		9		B		D		F	Feedback protection

xxxx-xxDx

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

xxxx-xxxD

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

EE(Inside Monitor)：

Ex

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

xE

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

1		3		5		7		9		B		D		F	system unregistered

FF(Monitoring)

Fx

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

xF

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

Appendix 3 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.

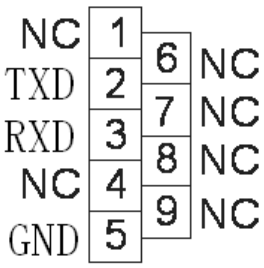
Read the user manual carefully, it can help a lot for using this UPS in the right way. Some FAQ (frequently asked questions) may help you to troubleshoot your problem easily.

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 breakers of the Modules are not switched on; input cable is not well connected	Switch on the input breaker; Make sure the input cable is well connected.
5	The UPS does not indicate any failure, but output do not have voltage	Output cable does not well connected	Make sure the output cable is well connected.
6	The UPS module cannot transfer to bypass or inverter	Module does not well inserted; The left coronal screw is not tight. Output breaker do not switch on	Pull out the module and insert again; Tighten the screw; Switch on the output breaker.
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 breaker does not switch on, or batteries are damaged, or battery is reversely connected. Battery number and capacity are not set correctly.	Switch on the battery breaker. If batteries are damaged, need to replace whole group batteries, Connect the battery cables correctly; Go to LCD setting of the battery number and capacity, set the correct data.
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 4 RS232 communication port definition

Definition of Male port：



Connection between PC RS232 port and UPS RS232 port

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

Available function of RS232

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

RS-232 communication data format

Baud rate ---------- 2400bps

Byte length ---------- 8bit

End bit ---------- 1bit

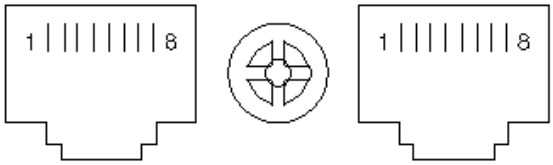
Parity check ---------none

CAUTION!

RS232 & RS485 ports cannot be used at the same time.

Appendix 5 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 ---------- 2400bps

Byte length ---------- 8bit

End bit ---------- 1bit

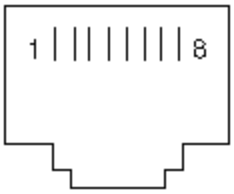
Parity check ---------none

CAUTION!

RS232 & RS485 ports cannot be used at the same time.

Appendix 6 BAT_T communication port definition

Definition of port：



Connection between the BAT_T box port and UPS2's BAT_T port. (RC77002)

Temperature sensor(RJ45)	UPS2 BAT_T(RJ45)	Description
Pin 1/5	Pin 1/5	TX
Pin 2/4	Pin 2/4	RX
Pin 7	Pin 7	12V
Pin 8	Pin 8	GND

Connection between the BAT_T box port and UPS2's BAT_T port. (UHTWSC3)

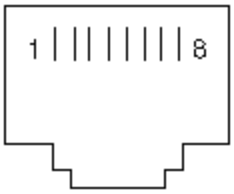
Temperature sensor	UPS2 BAT_T(RJ45)	Description
Pin 2	Pin 1/5	BAT_T signal
Pin 1	Pin 7	12V
Pin 3/4	Pin 8	GND

Available function of BAT_T

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

Appendix 7 Drycontact port definition

Definition of port：

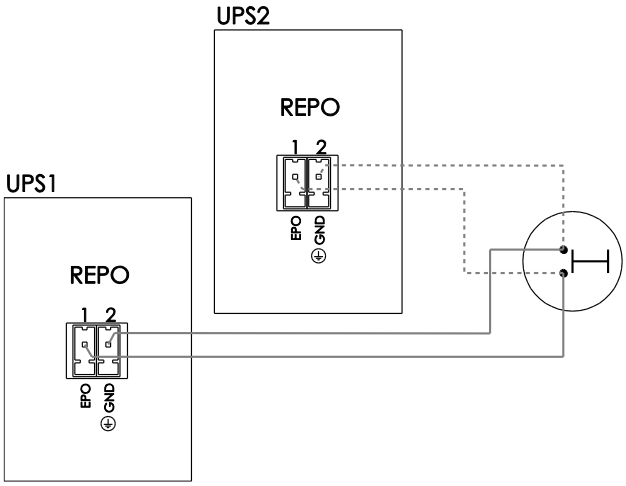


Drycontact(RJ45)	Description
Pin 1/5	12V
Pin 2/4	DRY_GENER
Pin 7	DRY_BP_O
Pin 8	DRY_BP_S

Appendix 8 REPO instruction

Definition of port：

Connection diagram：



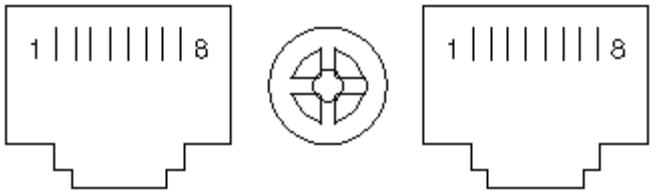
Connection between the button and UPS REPO port.

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

- In addition to the local EPO push button on the front panel of the UPS (that stops operation of that module when pressed for more than 3 second), the UPS also supports a remote emergency stop (REPO).
- A remote emergency stop switch (Dry contact signal and “normally open” - not provided) can be installed in a remote location and connection through simple wires to the REPO connector.
- The remote switch can be connected to several UPS’s in a parallel architecture allowing the user to stops all units at once.
- Additionally, a second system (not provided) can be connected to the remote switch to disconnect the main input and the secondary (bypass) input sources

Appendix 9 LBS communication port definition

Definition of port：



Connection between the UPS1’s LBS1 port and UPS2’s LBS2 port.

UPS1 LBS1(RJ45)	UPS2 LBS2(RJ45)	Description
Pin 1/5	Pin 1/5	LBS_BPSIDE_BC
Pin 2/4	Pin 2/4	LBS_TRACE_BC
Pin 8	Pin 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.

6 CONTACT INFORMATION

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