

NTL

3Phase **10-520**Kva



Uninterruptible Power Systems

Indice

1. Safety	3
1.1 Safety Notes	3
1.2 Symbols used in this manual	3
2. Main Features	3
2.1 Summary	3
2.2 Functions and Characteristics	3
3. Installation	4
3.1 Packing check	4
3.2 UPS	5
3.3 Appearance of UPS	14
3.4 LCD control panel of UPS module	15
3.5 Installation Notes	15
3.6 External protection devices	16
3.7 Power cables	16
3.8 Power cables connection	17
3.9 Battery connection	20
3.10 Replacing modules with UPS On-Line	20
3.11 Parallel systems installation	21
3.11.1 Cabinet UPS installation	22
3.11.2 Paralleling cables installation	22
3.11.3 Jumper modify on parallel card	23
3.11.4 Requirement for system operating in parallel	24
4. Operation	25
4.1 Operating mode	25
4.2 Turn-On / Turn-off UPS	25
4.2.1 Re-start procedure	25
4.2.2 AutoTest procedure	26
4.2.3 Turn-On from battery (Cold Start)	26
4.2.4 Manual Bypass	27
4.2.5 UPS shutdown procedure	28
4.2.6 Turn-On procedure for systems in parallel	28
4.3 Display LCD	29
4.3.1 System with display LCD	29
4.3.2 Display LCD of the power module	37
4.3.3 Control panel on monitoring module	41
4.4 Display's messages / Problems solving	43
4.5 Option	48
Appendix 1 Technical specification	50
Appendix 2 Troubleshooting	51
Appendix 3 RS232port: definition	53
Warranty	54

Thank you for purchasing this UPS.

This UPS model is an intelligent, Three phase in/Three phase out, high frequency online UPS designed by our experienced and skilled R&D team. With excellent electrical performance, perfect intelligent monitoring and network functions, smart appearance, complying with EMC and safety standards, the UPS meets the world's class level of quality

Read this manual carefully before installation.

This manual provides technical support to the operator of the equipment.

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 related 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 with 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 connect to 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 risk of electrical 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 electrical shock



WARNING! Read this information carefully to avoid damage on equipment

2. Main Features

2.1 Summary

This is a UPS series On-line double conversion at high frequency with three-phase input and output. It use a modular architecture, with N+X redundancy. The number of power modules installed may change according to the load. This scalability features may help to optimize the Total Cost of Ownership.

The UPS may solve most of the problems of electrical network, such as blackouts, overvoltage, undervoltage, voltage dips, voltage surge, fluctuations, overcurrent, current peaks, harmonic distortion (THD), interference noise, frequency oscillations, etc.

The UPS may be installed in many different applications: data centers, IT installations, telecommunication systems, industrial systems, POS, etc.

2.2. Functions and Characteristics

- ◆ Digital Control
- ◆ Standard 19" cabinet with height 1400 - 1600 – 2000cm according to the application's spec.
- ◆ Modular design.
- ◆ High power-density design.

Each Power module is 3U high. The cabinet 1400cm high may contain up to 5 Power modules, while 2000cm cabinet may host up to 10 modules.

- ◆ N+X parallel redundancy

In fact, this series is designed for a N+X redundant architecture. The user can set the type of redundancy based on the importance and type of load. Through the settings of the LCD display it is possible to configure the number of modules necessary for the parallel operation. When the load exceeds the range of the

redundant units, the UPS will report it immediately. When the load exceeds the redundancy setting, the UPS can still work normally and simultaneously sends the corresponding alarm messages until the load no longer exceeds the total capacity of the module.

- ◆ Redundant Parallel control system
- ◆ Load sharing
- ◆ Separate Bypass.
- ◆ Common Battery.
- ◆ Configurable Battery Voltage (32-40pcs)
- ◆ charging current regulated according to the type of battery connected.
- ◆ Intelligent 3 levels charging method
- ◆ Display LCD Touch-screen (Optional)
- ◆ Display LCD on each power module.
- ◆ Remote monitoring system via SNMP.
- ◆ Optional: Isolating transformer, Distribution panel, SNMP card, Relay card, etc..
- ◆ Manual Bypass for easy maintenance
- ◆ Low MTTR (Reparation Mean time) & Shutdown time for a quicker maintenance
- ◆ Availability of Centralized monitoring module.
- ◆ EPO

3. Installation

3.1 Packing checking

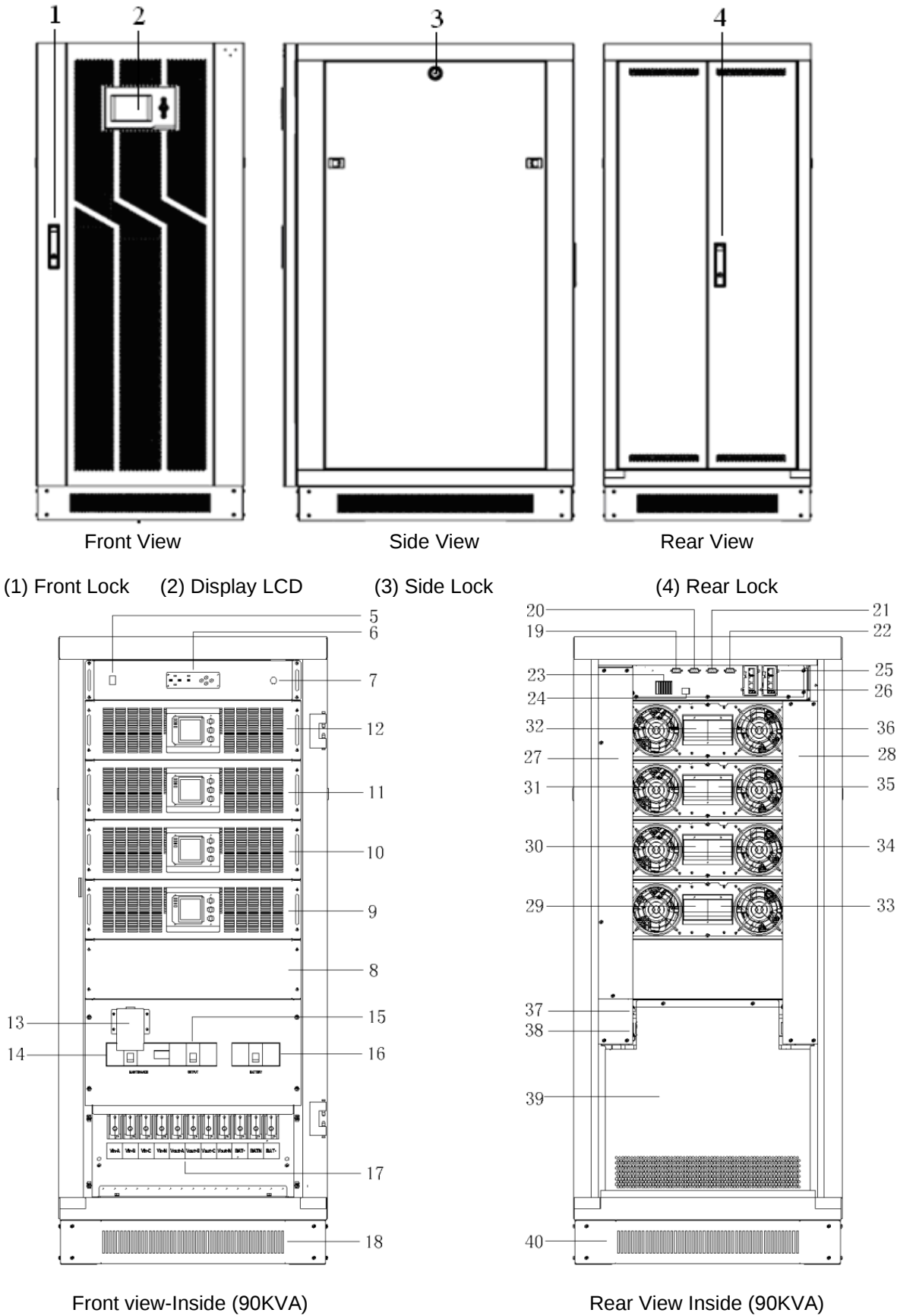
1. Don't lean the UPS when moving it out from the packaging
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the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

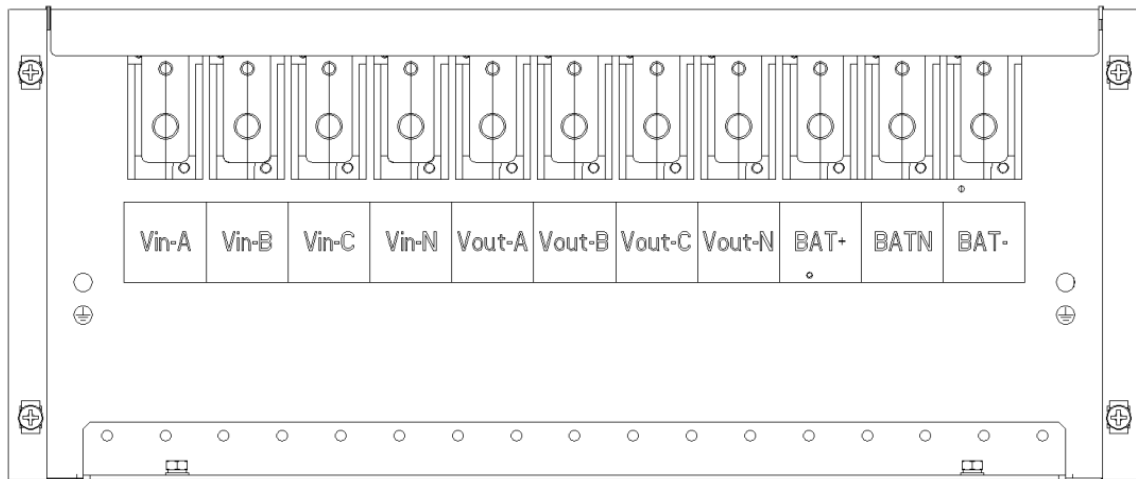
TYPE	NTL 10-520
Instruction Manual	●
Software MUSER4000 (CD)	●
USB cable	●
EPO connector	●

1. ● included ○ optional

3.2 UPS appearance

1. 1400cm cabinet - FRAME150 (10/15/20/30KVA Modules)

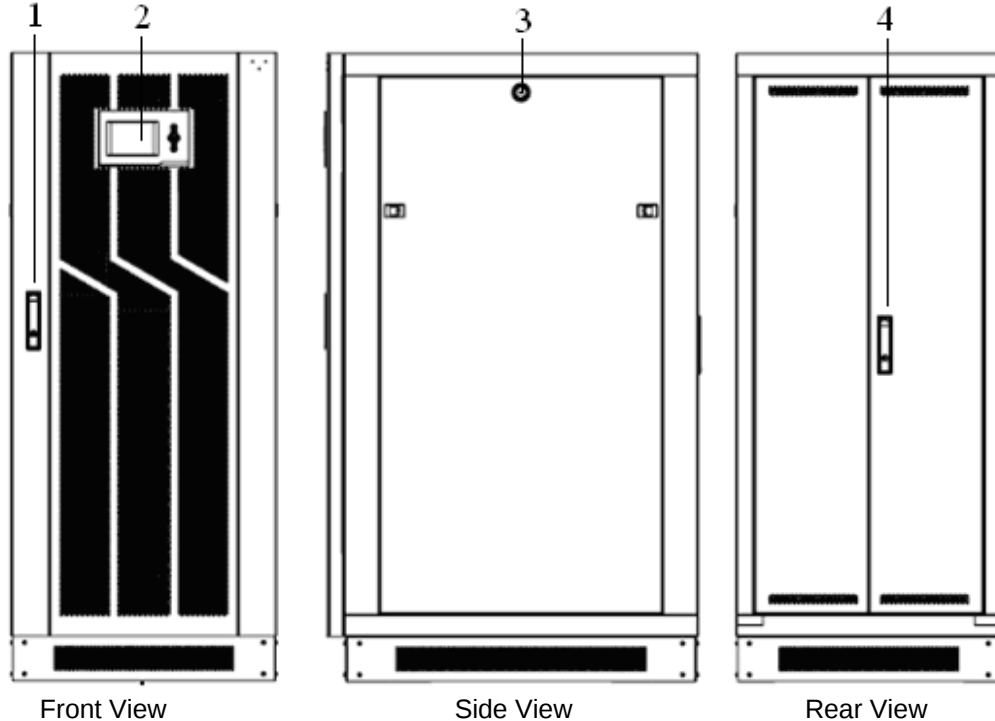




Terminal block FRAME150 (90KVA)

(5) Central monitoring unit switch - (6) Display LED Central monitoring unit- (7) Switch EPO - (8) Cover module - (9) UPS Module 1 - (10) UPS Module 2 - (11) UPS Module 3 - (12) UPS Module 4 - (13) Manual Bypass cover - (14) Manual Bypass - (15) Load switch - (16) Battery switch - (17) Terminal - (18) Baseboard for basement front part - (19) RS485 port - (20) RS485 port - (21) RS232 port - (22) Optional port - (23) Dry contacts - (24) LCD connection port - (25) SNMP port - (26) Intelligent Network port- (27) PDU input - (28) PDU output - (29) Switch UPS Module 1 - (30) Switch UPS Module 2 - (31) Switch UPS Module 3 - (32) Switch UPS Module 4 - (33) bypass switch module 1 - (34) bypass switch module 2 - (35) bypass switch module 3 - (36) bypass switch module 4 - (37) Parallel port- (38) Update SCI port- (39) Terminal cover - (40) Baseboard for rear part.

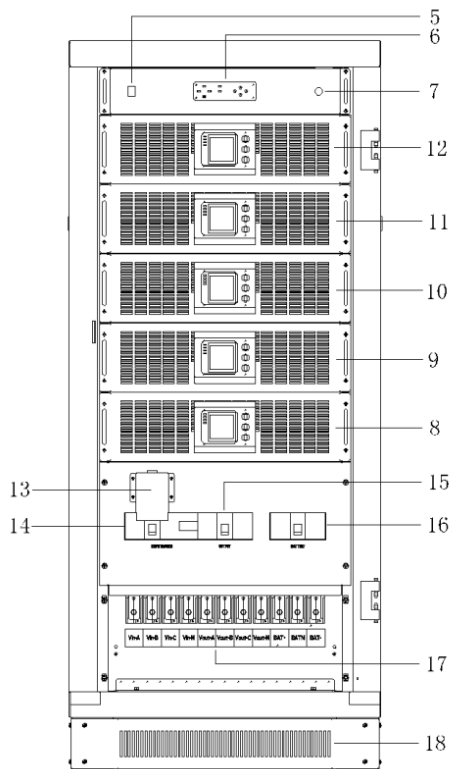
2. 1400cm Cabinet - FRAME150 (10/15/20/30KVA Modules)



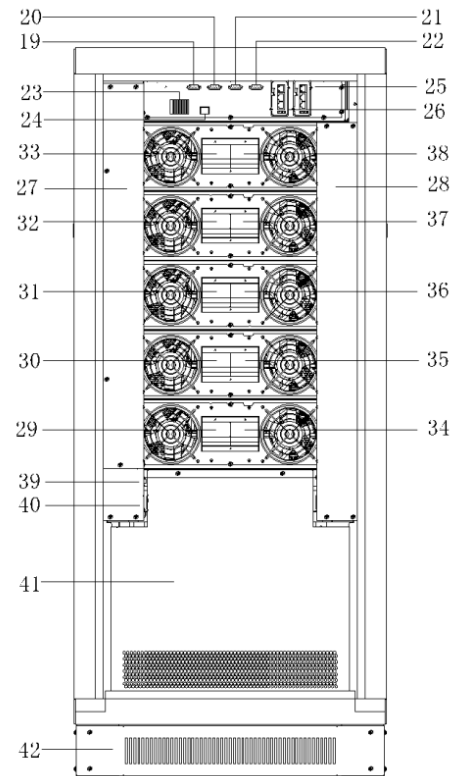
(1) Front Lock (2) Display LCD

(3) Side Lock

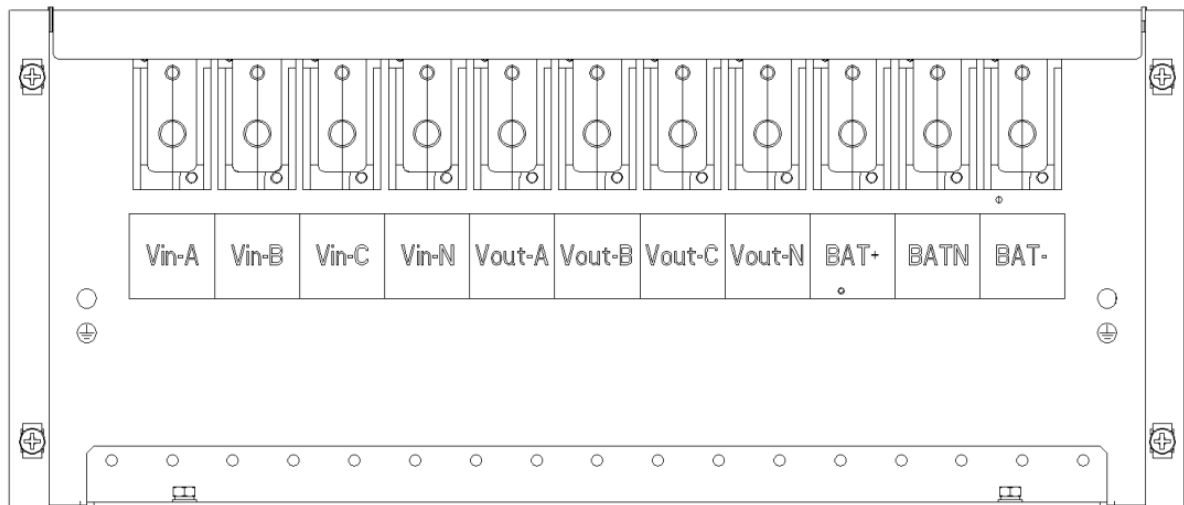
(4) Rear Lock



Front View Inside (150KVA)



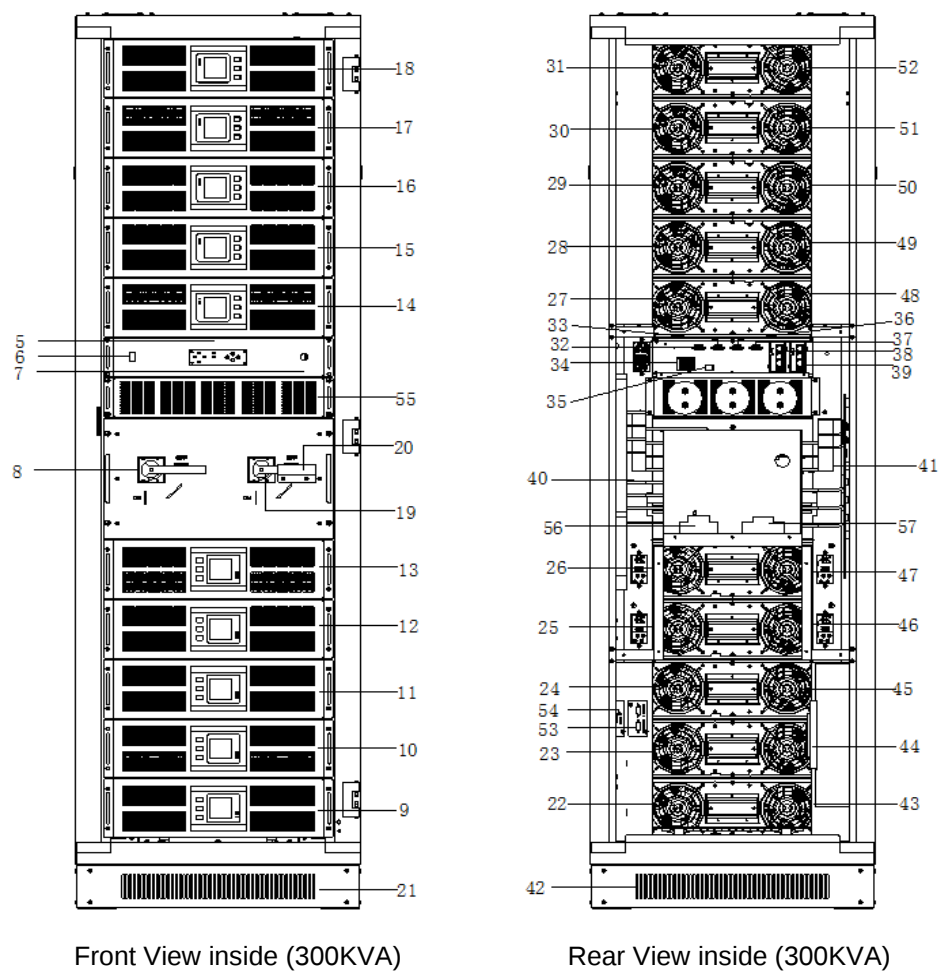
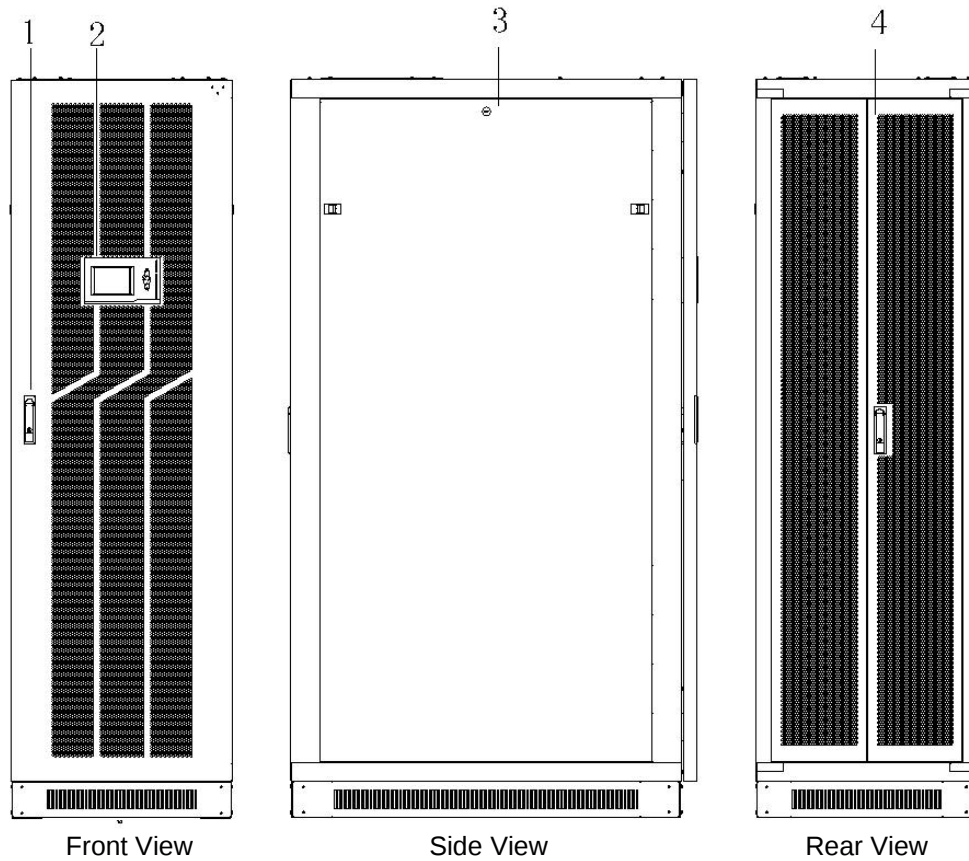
Rear View Inside (150KVA)



Terminal Block FRAME150 (150KVA)

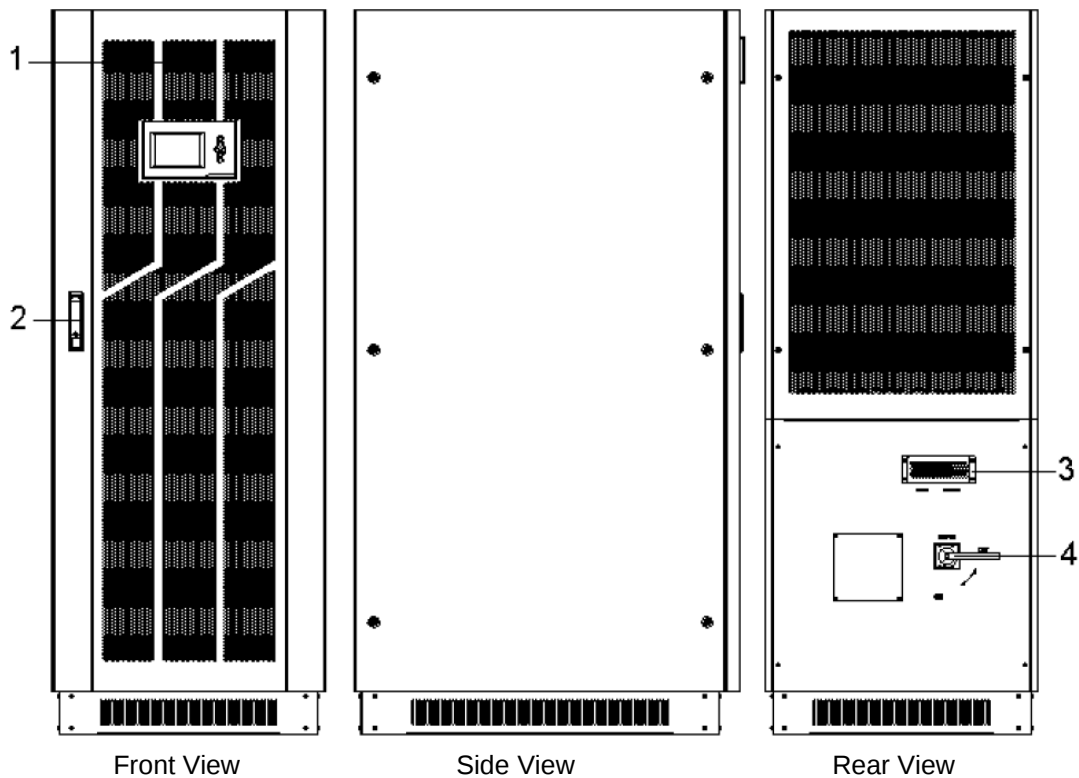
(5) Central monitor unit switch - (6) Display LED Central monitor unit switch - (7) EPO switch - (8) UPS Module 1 - (9) UPS Module 2 - (10) UPS Module 3 - (11) UPS Module 4 - (12) UPS Module 5 (13) Manual Bypass cover - (14) Manual Bypass - (15) Output Switch - (16) Battery Switch - (17) Terminal - (18) Baseboard for basement front part - (19) RS485 port - (20) RS485 port- (21) RS232 port - (22) Optional - (23) Dry contacts - (24) LCD connection port- (25) SNMP port - (26) Intelligent Network port- (27) Input PDU - (28) Output PDU - (29) UPS Module 1 switch- (30) UPS Module 2 switch - (31) UPS Module 3 switch- (32) IUPS Module 4 switch- (33) UPS Module 5 switch - (34) bypass switch module 1 - (35) Interruttore di bypass modulo 2 - (36) Interruttore di bypass modulo 3 - (37) Interruttore di bypass modulo 4 - (38) bypass switch module 5 - (39) Parallelo port- (40) Update SCI port- (41) Terminal cover - (42) Baseboard for rear part.

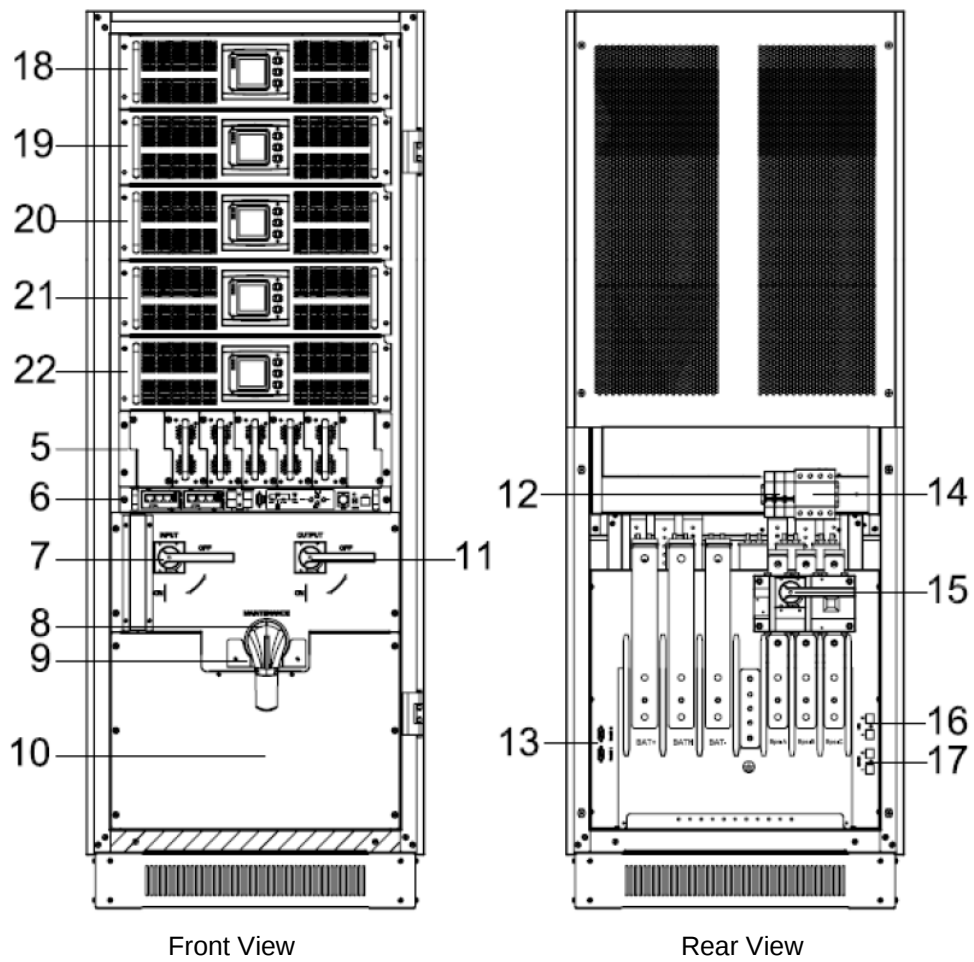
3. 2000cm Cabinet – FRAME300 (Modules 25/30KVA)



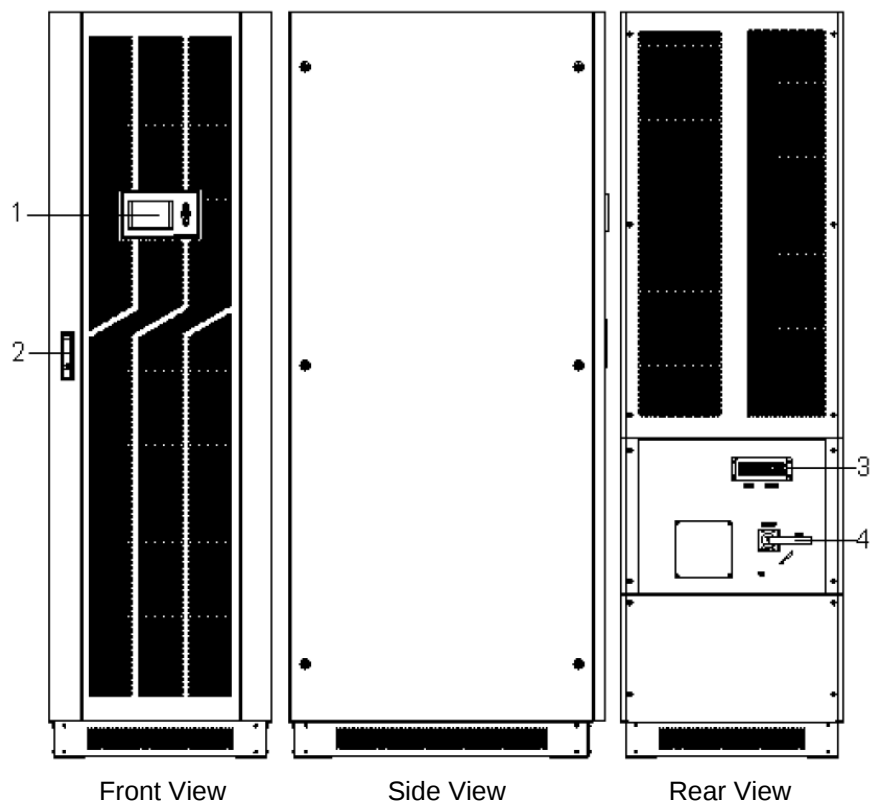
(1) – Front Lock - (2) LCD Display - (3) Side Lock - (4) Rear Lock - (5) Display LED Central monitoring Unit - (6) Central monitoring Unit switch - (7) EPO switch- (8) Output switch - (9) UPS Module 1 - (10) UPS Module 2 - (11) UPS Module 3 - (12) UPS Module 4 - (13) UPS Module 5 - (14) UPS Module 6 - (15) UPS Module 7 - (16) UPS Module 8 - (17) UPS Module 9 - (18) UPS Module 10 - (19) Manual Bypass - (20) Cover Manual Bypass - (21) Baseboard for basement front part - (22) UPS Module 1 switch - (23) UPS Modulo 2 switch - (24) UPS Module 3 switch - (25) UPS Module 4 switch - (26) UPS Module 5 switch - (27) UPS Module 6 switch - (28) UPS Module 7 switch - (29) UPS Module 8 switch - (30) UPS Module 9 switch - (31) UPS Module 10 switch - (32) RS485 port- (33) RS485 port- (34) Dry contacts - (35) LCD connection port - (36) RS232 port- (37) Optional port - (38) Intelligent Network port - (39) SNMP port- (40) Bypass & Ooutput terminal blocks - (41) Input, Batteries & GND terminal blocks - (42) Baseboard for rear part. - (43) bypass switch module 1 - (44) bypass switch module 2 - (45) bypass switch module 3 - (46) bypass switch module 4 - (47) bypass switch module 5 - (48) bypass switch module 6 - (49) bypass switch module 7 - (50) bypass switch module 8 - (51) bypass switch module 9 - (52) bypass switch module 10 - (53) Parallel port - (54) Update SCI port - (55) Bypass Module choke - (56) EMI filter switch - (57) Overvoltage protection device.

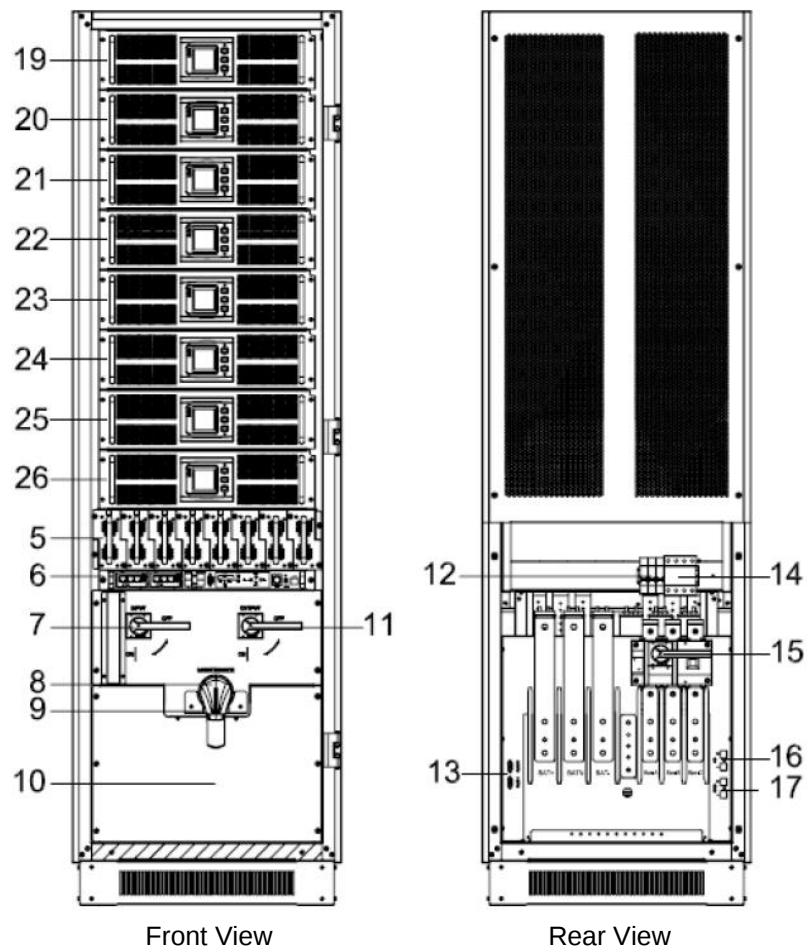
4. 2000cm cabinet – FRAME200 (Modules 40KVA)



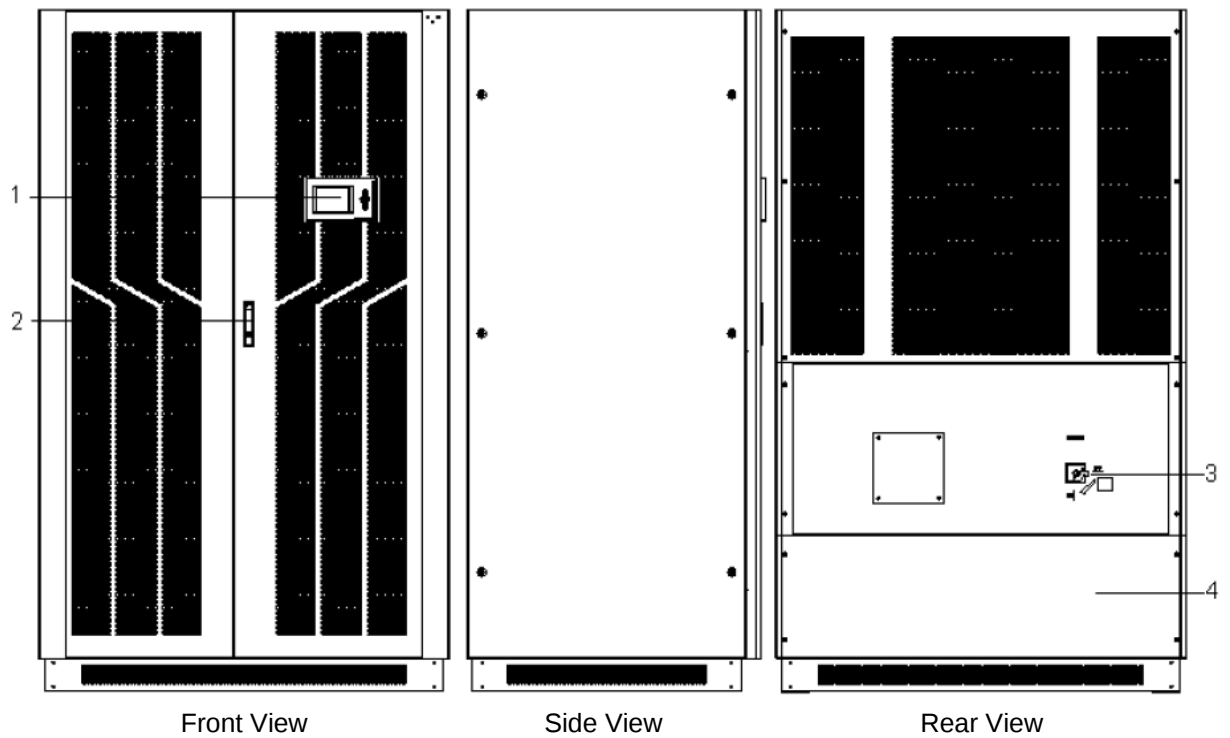


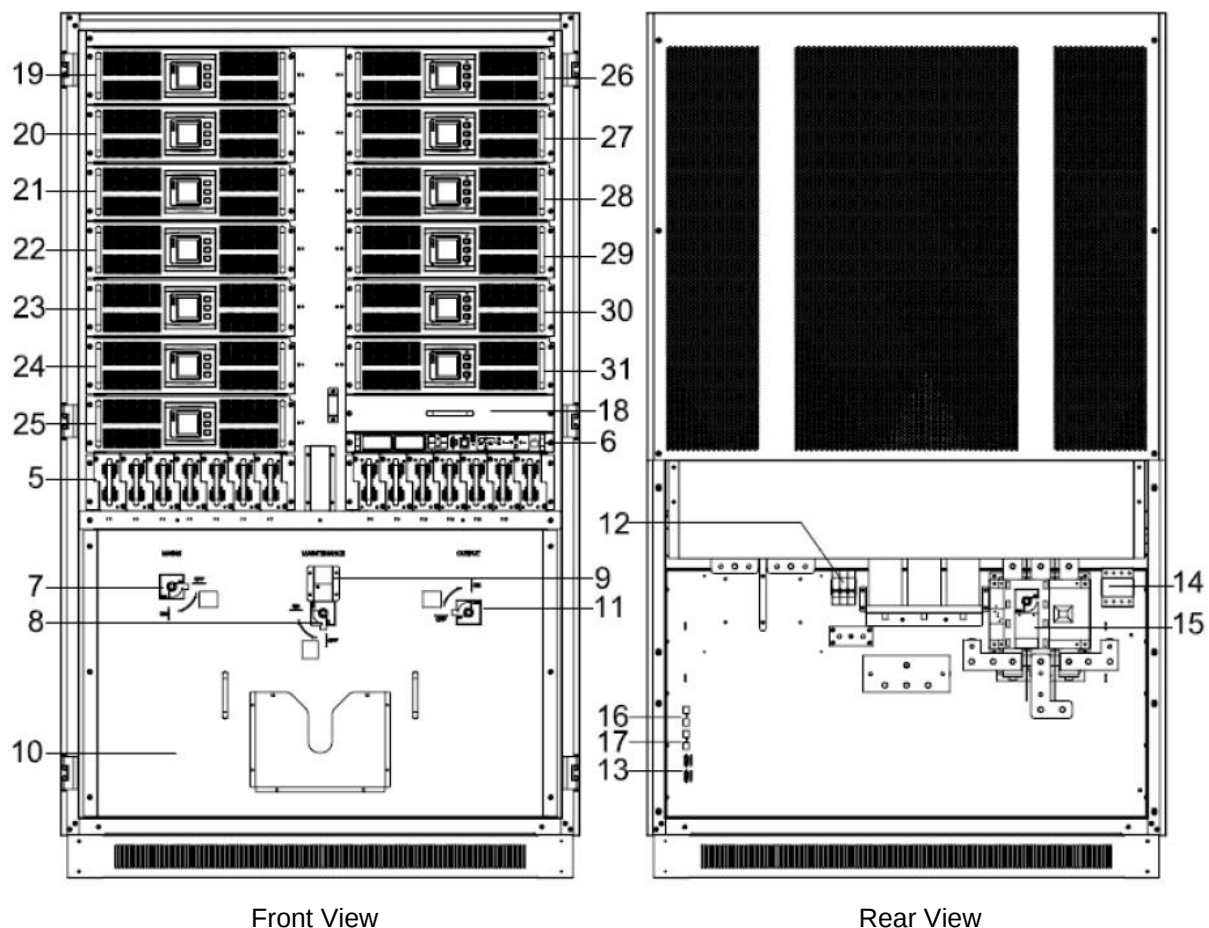
5. 2000cm Cabinet – FRAME320 (Modules 40KVA)





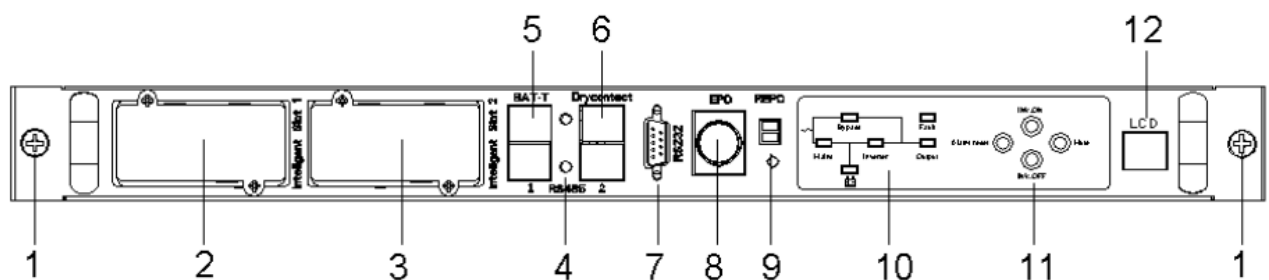
6. 2000cm Cabinet – FRAME520 (Modules 40KVA)





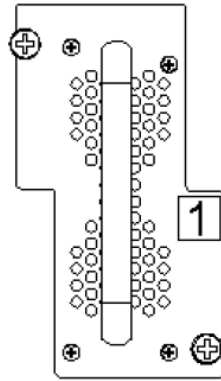
(1) LCD panel - (2) Front Lock - (3) Surge suppressor cover: remove the cover to replace the suppressor - (4) Bypass and Batteries terminal blocks - (5) Input and Battery Fuse holder 1 for module 1 etc. - (6) Communication Module - (7) Input switch - (8) Manual Bypass switch - (9) Manual Bypass switch cover - (10) Input/Output terminal cover - (11) Output switch - (12) Filter capacitors disconnecter - (13) parallel ports 1 e 2 - (14) Surge suppressor - (15) Bypass switch - (16) RS485 port - (17) LBS port- (18) Tools box (parallel cables – manual) - (19) Power module 1 (tighten the screw on the top left of the modules as you plug them otherwise they do 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 Module (FRAME 200-320-520KVA for power modules 40KVA)



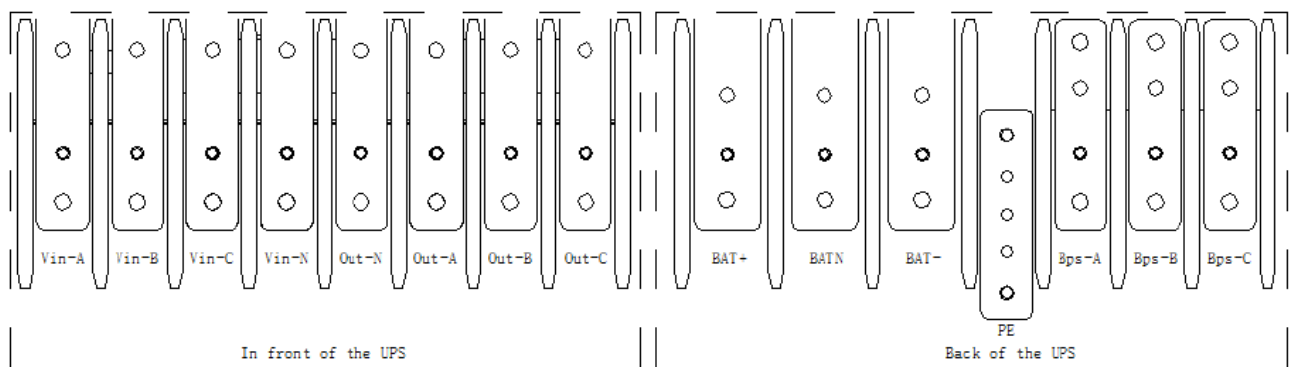
(1) – Fixing screws of the module - (2) Communication Slot 1 (for SNMP or Dry Contacts cards) - (3) Communication Slot 2 (for SNMP or Dry Contacts cards) - (4) RS485 1 e 2 – (5) BAT_T 1-2 port (to connect battery temperature sensor) - (6) Dry Contacts (Pin1-12Vdc, Pin2- DRY_GENER, Pin3- BP_O, Pin4- BP_S) - (7) Port RS232 - (8) EPO button- (9) REPO port - (10) LED indicators - (11) Function buttons - (12) LCD port.

Fuse holder (FRAME200-320-520KVA for power modules 40KVA)

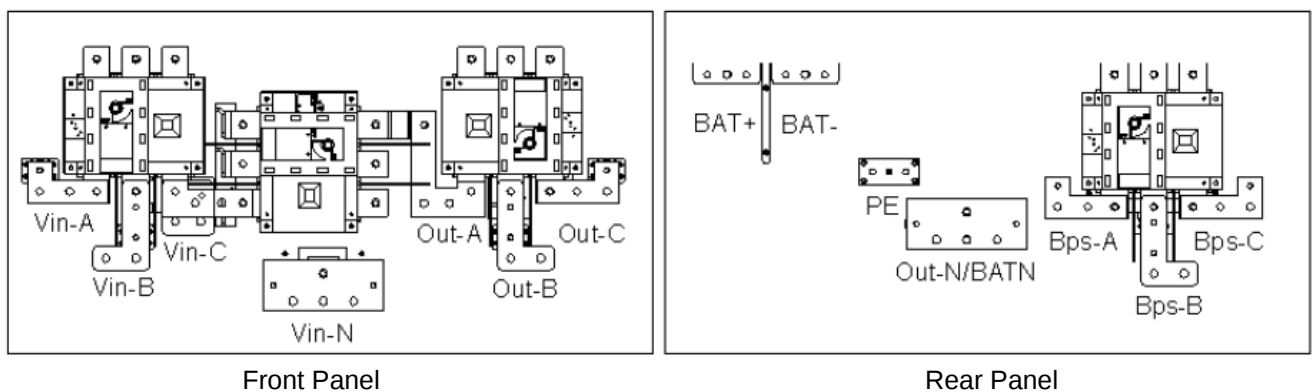


- (1) Fuse Box 1 : input fuse and battery fuse inbuilt, connect to module 1
- (2) Fuse Box 2 : input fuse and battery fuse inbuilt, connect to module 2
- (3)
- (13) Fuse Box 13 : input fuse and battery fuse inbuilt, connect to module 13

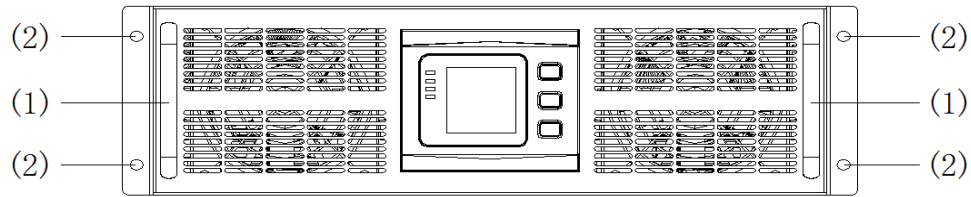
Terminal (FRAME200-320KVA)



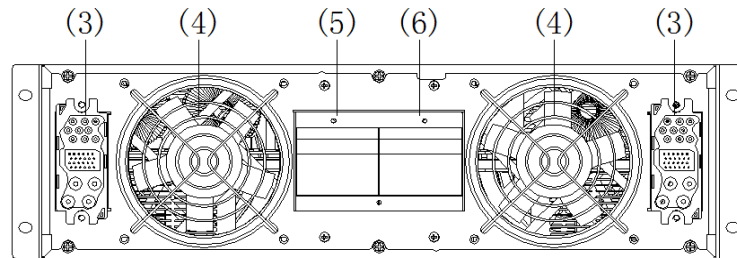
Terminal (FRAME400-520KVA)



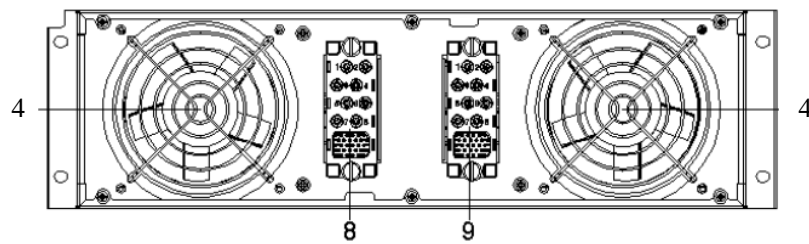
3.3 UPS module appearance



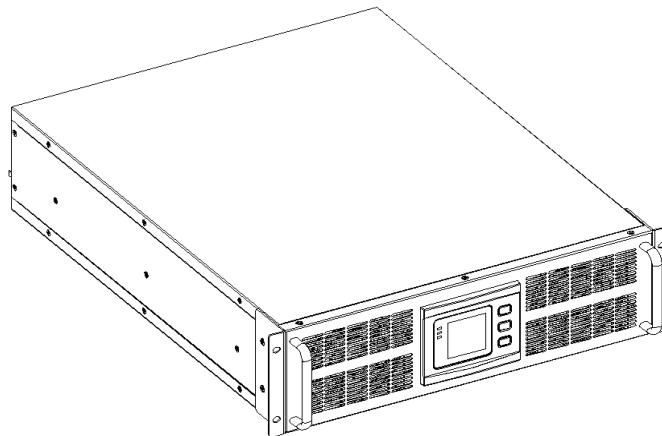
Front View



Rear View Module 10/15/20/25/30 KVA



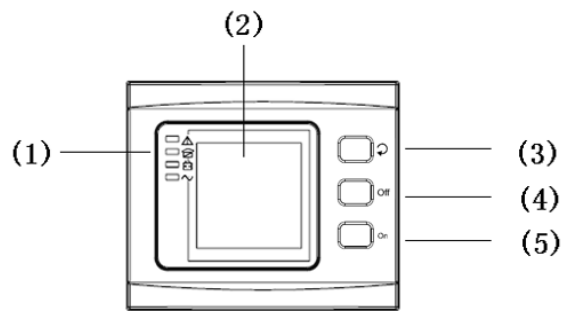
Rear View Module 40 KVA



Side View

(1) Handles - (2) Fixing holes - (3) Module connector slot - (4) Fan - (5) Input switch UPS - (6) Bypass switch UPS module - (8) Output connector slot - (9) Input connector slot.

3.4 LCD Control panel of UPS module



- 1) LED (from top to bottom: “alarm”, “bypass”, “battery”, “inverter”)
- 2) LCD Display
- 3) Scroll button
- 4) Turn-off button
- 5) Turn-on button (“Cold start” if turned on from battery)

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 environment, far away from vibration, dust, humidity, flammable gas and liquid, corrosive. To avoid from high room temperature, a system of air extractor fans is recommended to be installed in the room. 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 allowable is 50℃.
- ◆ If the UPS is unpacked 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 a risk of electrical 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℃ and 25℃. 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.



WARNING!

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 (Mt)	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 obstacles.

3.6 External Protective Devices

For safety reasons, it is necessary to install external circuit breaker at the AC input 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.

◆ Overcurrent

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.



WARNING!

On AC input/output, please select a thermo magnetic circuit-breaker with an IEC 60947-2 trip curve C (normal) for 125% of the current.

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!

BEFORE START-UP THE SYSTEM, 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 WRONG OPERATION.

- ◆ For full scalability purpose, it is economical to install power cables according to the full rating capacity since the beginning. The diameter of cable is shown below:

FRAME150-300 (MODULES 10/15/20/25/30KVA)

UPS	Cable dimensions (mm ²)			
	Input AC	Output AC	Input DC	Grounding
90KVA	4 x 50	4 x 50	3 x 75	50
150KVA	4 x 70	4 x 70	3 x 120	70
300KVA	4 x 150	4 x 150	3 x 120*2	120

FRAME200-520 (MODULES 40KVA)

UPS	Cable dimensions (mm ²)			
	Input AC	Output AC	Input DC	Grounding
200KVA	4 x 100	4 x 100	3 x 150	100
320KVA	4 x 150	4 x 150	3 x 120*2	120
520KVA	4 x 150*2	4 x 150*2	3 x 185*2	185



WARNING!

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

WARNING!

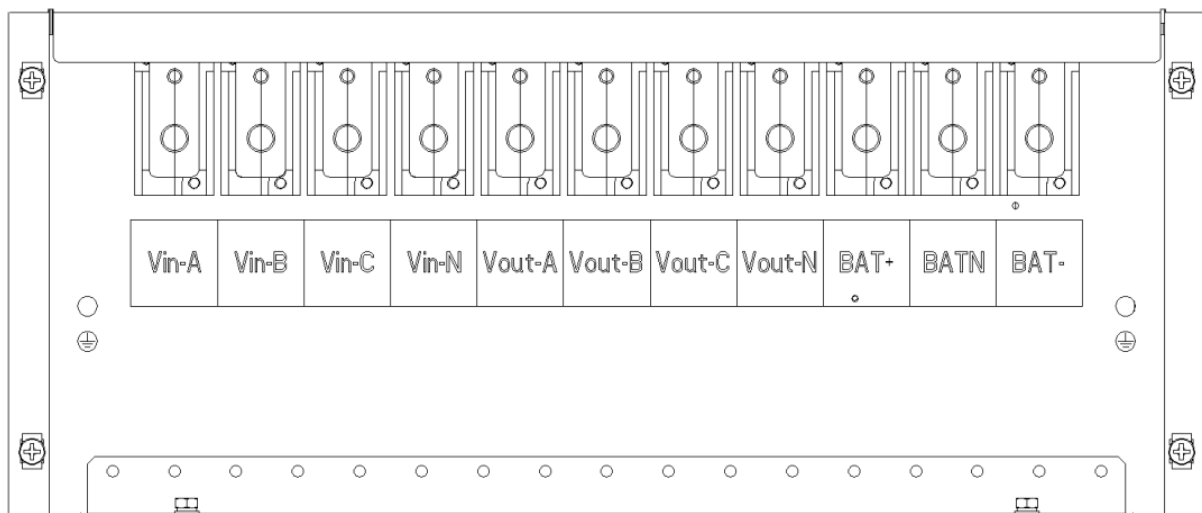
Failure to follow adequate earthing procedures may result in electromagnetic interference or in hazards involving electric shock and fire.

3.8 Power cables connection

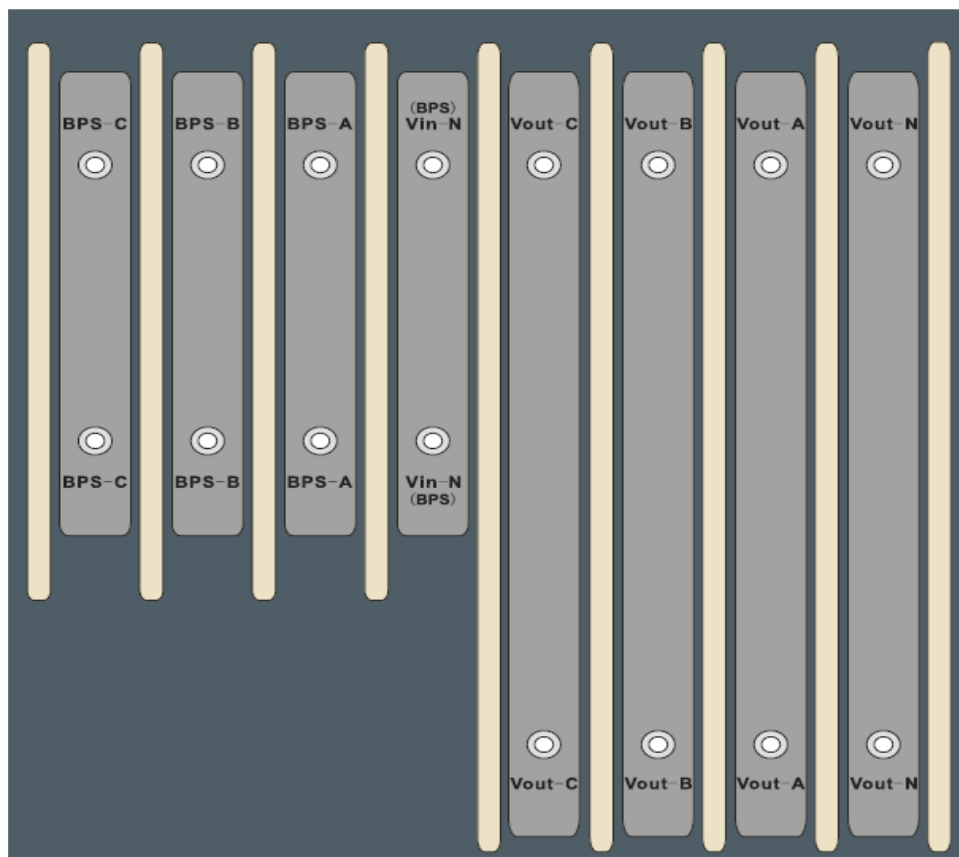
Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

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

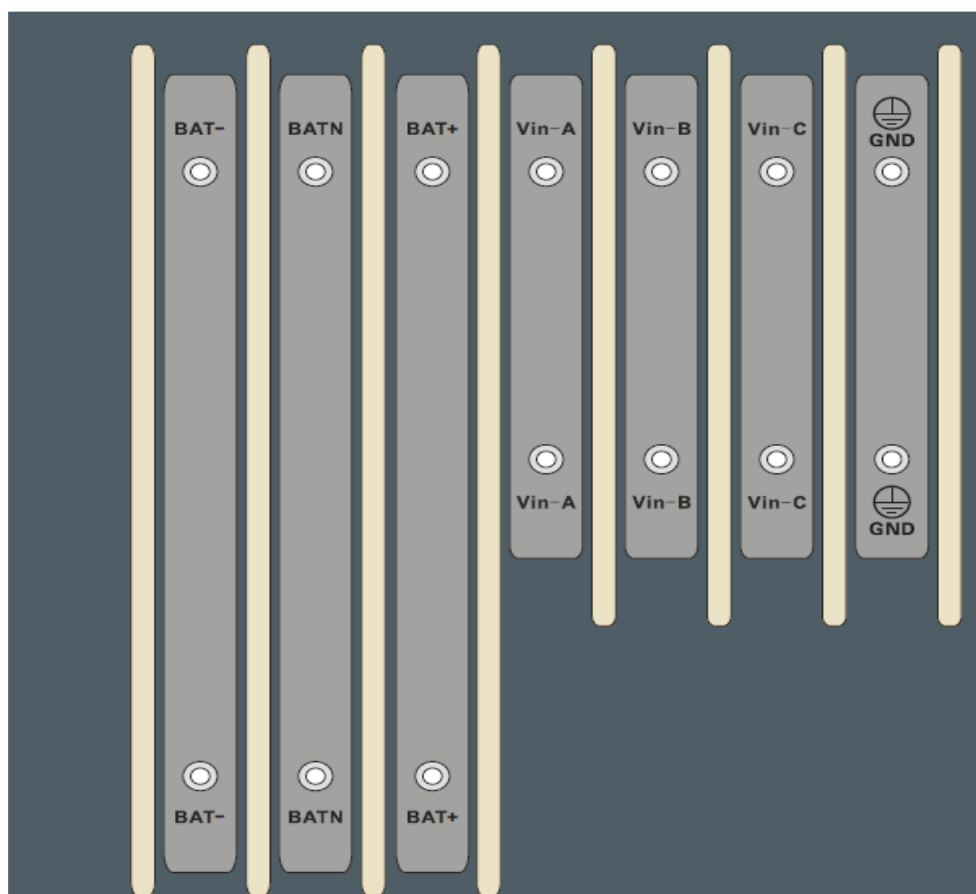
Open the UPS rear panel, remove the cover of terminals for wiring easily.



FRAME150KVA



Input Bypass – Output connections, with copper bars for FRAME300KVA



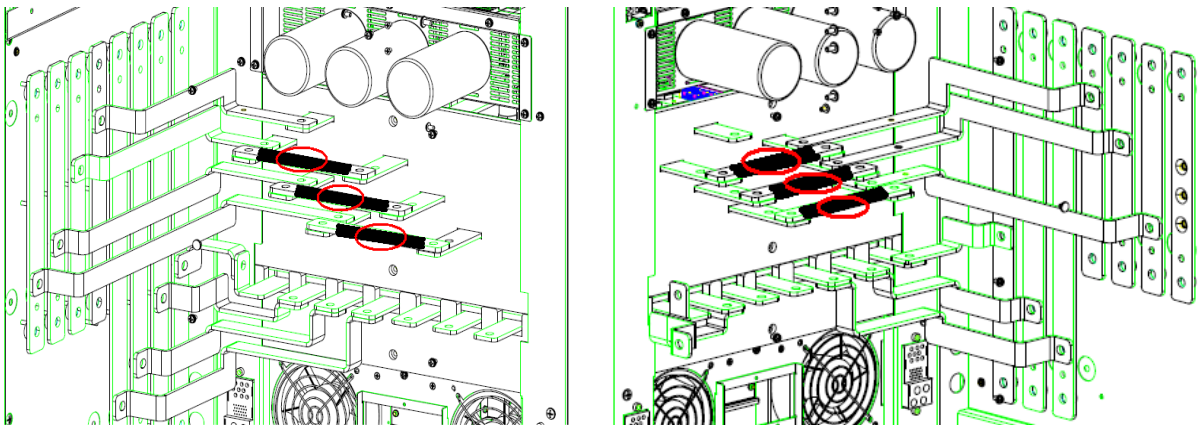
Input Batteries - Input AC connections, with copper bars for FRAME300KVA

FRAME300KVA Common Input connection.

This model is set by the factory with a standard configuration for common input connection. Connect AC input of this configuration to BPS-C/BPS-B/BPS-A/Vin-N(BPS) or Vin-C/Vin-B/Vin-A/ Vin-N(BPS), tighten the connections, the connection will be defined as a common Input connection for the Bypass.

FRAME300KVA separate Bypass connection.

If separate Bypass connection is used, then remove the copper bar between input Bypass and AC input. Copper bar position is shown on figure here below. Connect AC input from Mains to copper bar (Vin-C/Vin-B/Vin-A/ Vin-N(BPS)) and Bypass input to copper bar (BPS-C/BPS-B/BPS-A/Vin-N(BPS)). Tighten the connections.



WARNING!

On separate Bypass connection, the copper bar between separate Bypass and AC input must be removed.
AC input and Bypass input must be connected to the same Neutral pole.

Select the most appropriate cables. (please refer to the above table) and pay attention to the diameter of the connection terminal of the cable that should be bigger or equal to that of the connecting poles;



WARNING!

If the load at UPS output is not ready to be powered during the commissioning by the technician, then make sure that the output cables are insulated at their ends and secured. Connect the grounding safely, any grounding cable should be connected to the copper ground screws located on the bottom of the equipment under the electrical connections. All UPS cabinets must be properly grounded.

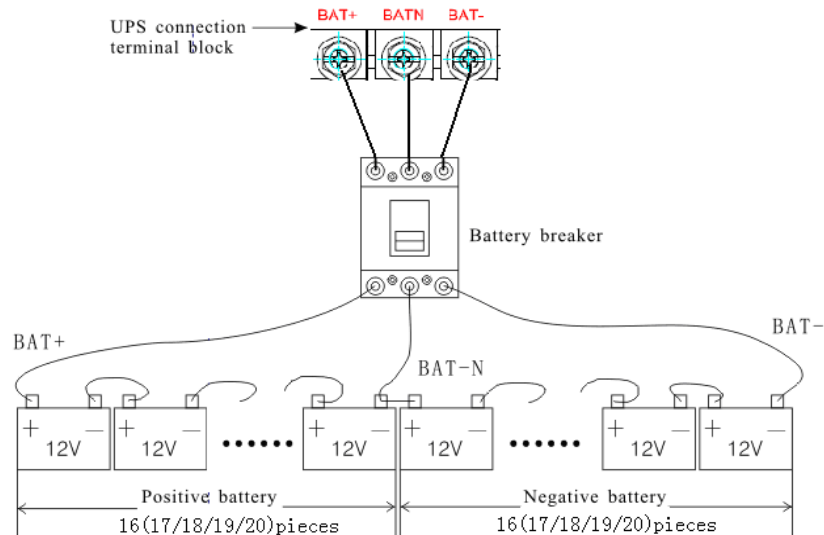


WARNING!

Grounding and connection of the neutral must comply with local and national regulations.

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 needs. The connection scheme is shown below



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 is battery quantity---32pcs, battery capacity---12V40AH. When connecting 32/34/38/40 batteries, please re-set desired battery quantity and its capacity after UPS starts in AC mode. Charging current will be adjusted automatically according to battery capacity selected. All related settings can be done through LCD panel or monitoring software.



WARNING!

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.

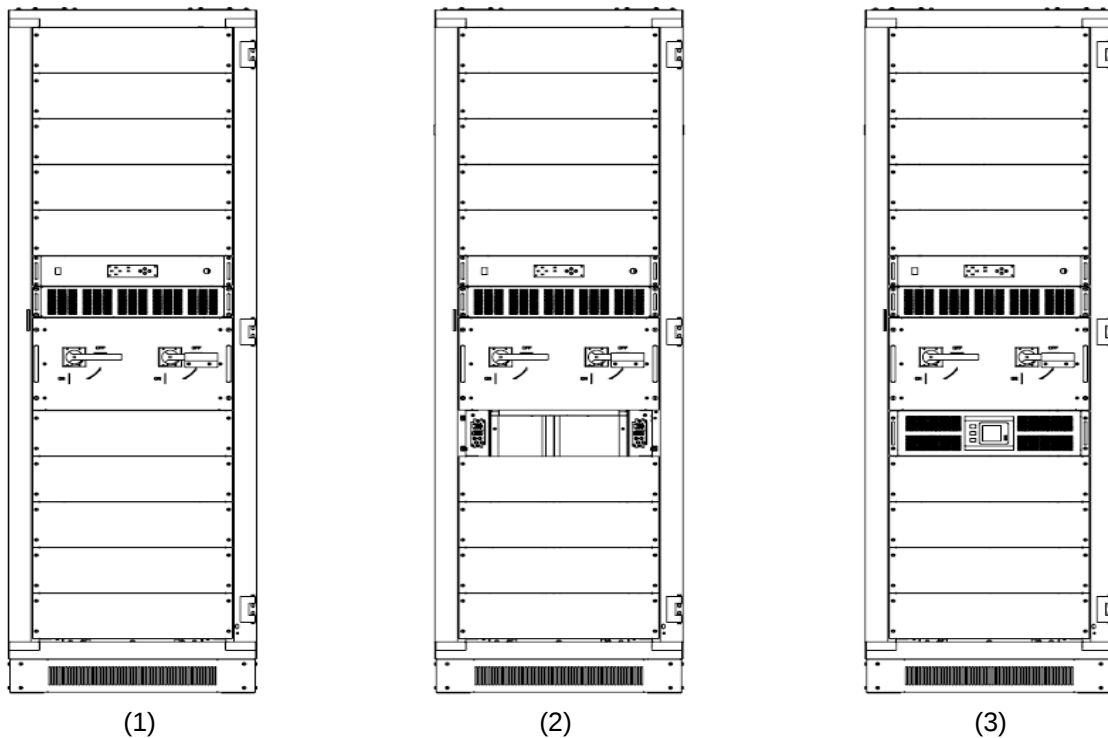
3.10 Replace the Power Modules with UPS online

To make a UPS system complete, each individual UPS modules must be inserted.

The replacement of any UPS power module is very simple and can be done with UPS Online. The UPS control system automatically detects the module(s) plugged in (i) or removed (i). The user can easily carry out these operations by following what is described below:

◆ **NOTE:** The UPS module is quite heavy, do not move it by yourself.

◆ Plug-in of the power module



(1) to find the location where to insert the power module.

(2) Remove the protective cover by unscrewing the screws.

(3) Insert the module into the slot until it is in the correct position and secure it with the same screws.

WARNING: the fixing screw in the upper left corner of the module controls the operation of the module. Only after having tightened this screw the module can be started, so when inserting a new module, be sure to tighten this screw.

WARNING: when inserting a module in battery mode, press the ON button on the LCD panel of the module until the module is started.

(4) Operate the Input switch on the rear of the module (Ref. (5) Section 3.3) and the output switches accordingly.

(5) After switching on the module, the system automatically detects the modules plugged in and connect in parallel the entire system.

◆ Remove the Power module

Remove the fixing screw at the top left of the module to turn it off and remove it only after the fan has stopped completely.

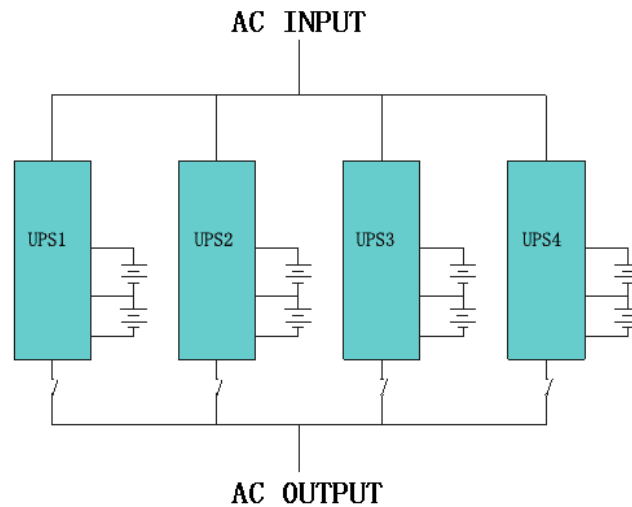
WARNING! Make sure the LCD screen is completely turned off before removing the module, otherwise electric shocks may occur between the module connections and the UPS system cabinet connections.

3.11 Multiple UPS 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 Cabinets installation

All the UPSs to be installed in the parallel system must be connected as shown in the figure below.



Make sure that each UPS switch is in the "OFF" position and there is no UPS output connected. The battery cabinets can be connected separately or in parallel, this means that the system itself provides both a battery assembly for each single UPS and a central battery assembly for all the UPS.

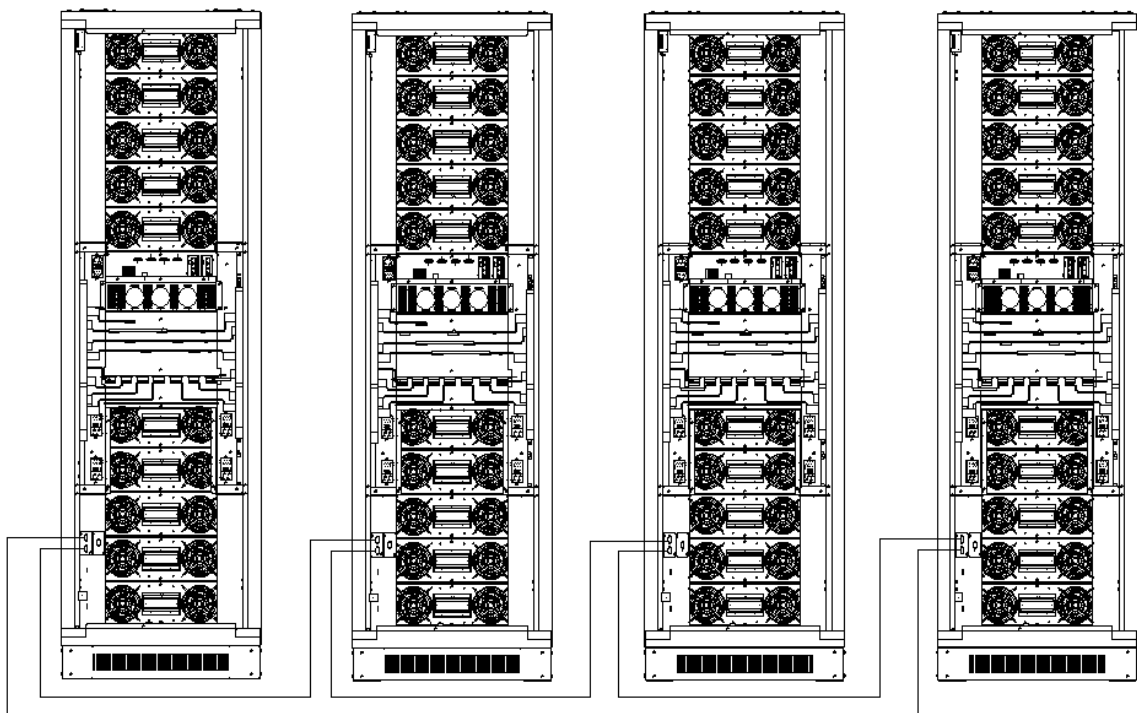


WARNING!

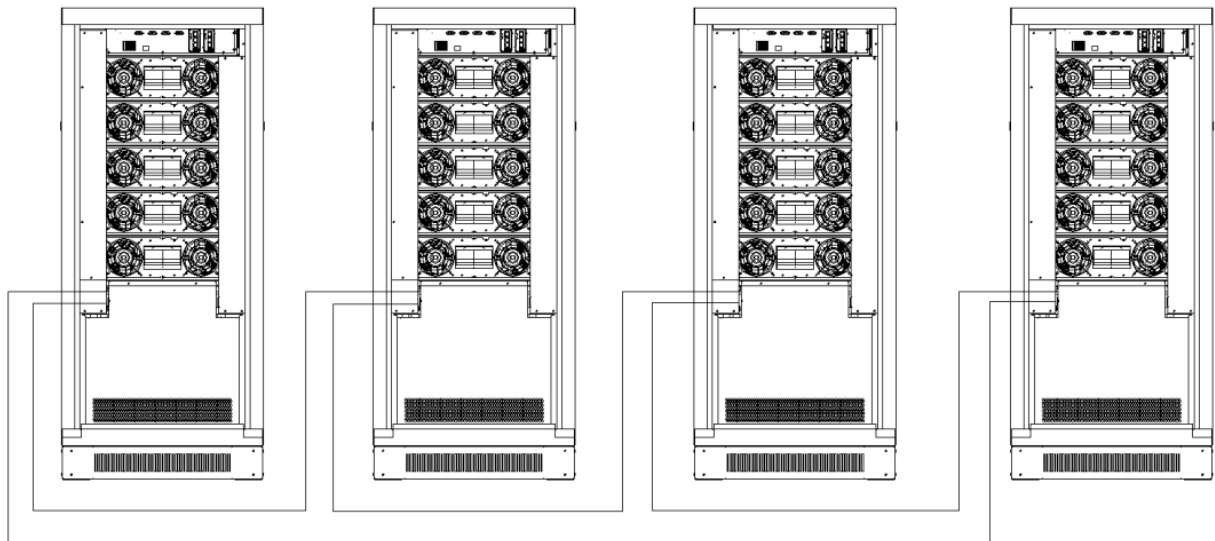
Make sure that lines N, A (L1), B (L2), C (L3) are correct and grounding is well connected.

3.11.2 Parallel cable installation

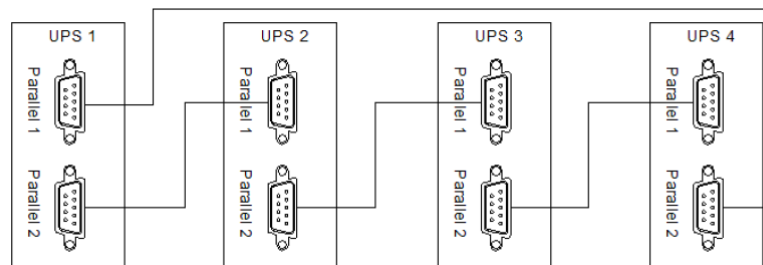
The parallel control cables supplied with the UPS are shielded and double insulated and must be interconnected in a ring configuration between the UPSs as shown in the figure below. The parallel board is installed in every single UPS. The ring configuration ensures control with high reliability.



Position of the parallel cards in the 2000cm cabinet (FRAME300KVA)



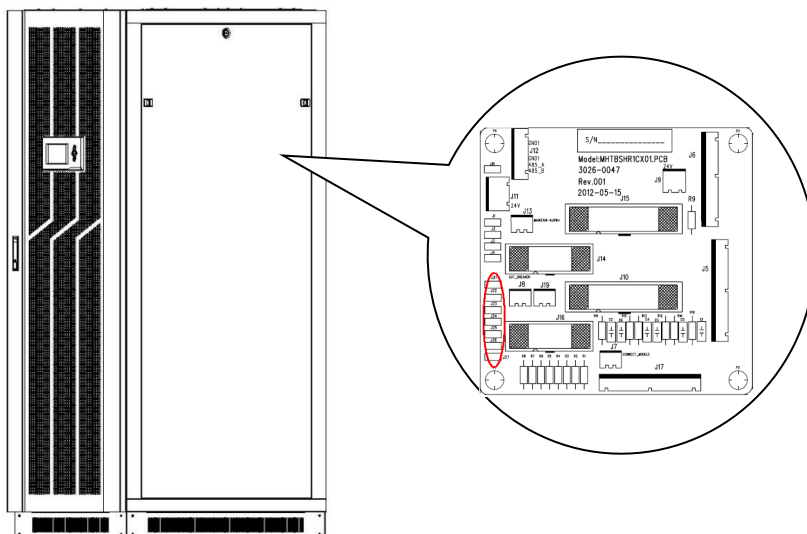
Position of the parallel cards in the 1400cm cabinet (FRAME150KVA)



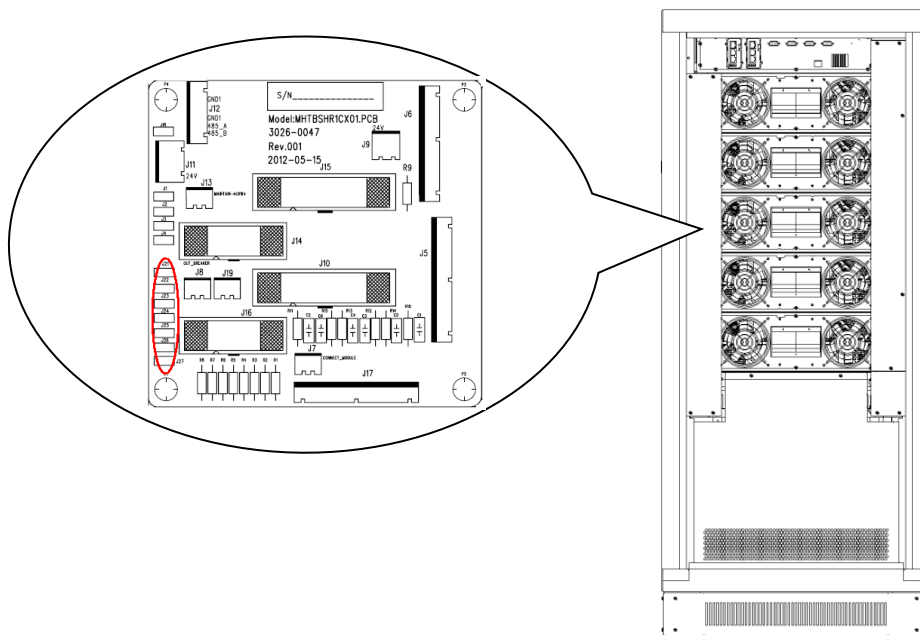
Parallel cables connection (FRAME200-320-520KVA)

3.11.3 To modify the Jumper position on Parallel cards (FRAME150-300KVA)

After connecting the parallel cables, remove the PDU deflector or the right panel of the cabinet to access the parallel board (MHTBSHR1CX01) to change the jumper configuration. Refer to the following figures according to the type and number of cabinets that make up the system:



Position of Parallel card on 2000cm cabinet



Position of Parallel card on 1400cm cabinet

WARNING!



When two 2000cm cabinets are connected in parallel, remove jumper J25 and J26 from all parallel boards (MHTBSHR1CX01); if, on the other hand, three or four cabinets are connected in parallel, remove the jumper J25, J26 and J27 from all parallel boards (MHTBSHR1CX01).

When two 1.4-meter cabinets are connected in parallel, remove the jumper J21, J22, J23 and J24 from all parallel boards (MHTBSHR1CX01); if, on the other hand, three or four 1.4-meter cabinets are connected in parallel, remove the jumper J21, J22, J23, J24, J25 and J26 from all parallel boards (MHTBSHR1CX01).

3.11.4 Requirement for Parallel system

A group of UPS in parallel has the functionality of a single large UPS but with the advantage of being more reliable. In order to ensure that all UPSs are used in the same way and comply with the wiring rules, the requirements listed below must be respected:

- 1) All UPS must have the same power and be connected to the same power line.
- 2) Bypass input and AC input of the network must be connected to the same Neutral.
- 3) The outputs of all the UPS must be connected in parallel to the same point of the distribution board.
- 4) Electrical cables such as bypass input cables and UPS output cables should have the same length and specifications. This facilitates the distribution of the load when operating in bypass mode..

4. Commissioning

4.1 Commissioning modes

The UPS is an online double conversion type that can operate in the various modes listed below:

- ◆ **Normal Operation**

The rectifier / battery charger receives alternate AC voltage from the mains and supplies the inverter with DC voltage and simultaneously charges the batteries through the booster. The inverter converts DC voltage into alternating voltage AC and supplies the load.

- ◆ **Battery operation (Accumulated Energy mode)**

When the AC voltage of the network fails or fall below the limits, the inverter receives voltage from the batteries and then feeds the critical load with an AC voltage. There is no interruption of power to the critical load. The UPS automatically returns to normal mode when the mains voltage returns.

- ◆ **Bypass mode**

If the inverter does not work or if there are overloads, the static switch will be activated to transfer the load from the inverter to the bypass without interruption of power to the critical load. If the inverter output is not synchronized with the bypass current, the static switch will transfer the load from the inverter to the bypass with a power cut to the critical load. This is to avoid the parallelization of unsynchronized AC sources. This interruption can be programmed but is generally set to be less than one cycle, e.g. less than 15ms (50Hz) or less than 13.33ms (60Hz).

- ◆ **Maintenance mode (manual Bypass)**

A manual bypass switch is available to power the critical load when the UPS is not working, under repair or maintenance. This manual Bypass switch is designed for all UPS modules and supports a load equal to the UPS rated load.

- ◆ **Parallel redundant mode**

Depending on the different needs, the UPS can be configured in N + X redundancy mode to increase the reliability of the connected load.

4.2 Turn on/off UPS

4.2.1 Restart procedure



WARNING!

MAKE SURE GROUNDING IS PROPERLY DONE!

- ◆ Close the battery switch in the "ON" position according to the user manual.

- ◆ Open the front and rear doors of the UPS cabinet to access the main power switches. During this procedure the output terminals are live.



WARNING!

Verify that the load is correctly connected to the UPS output. If the load is not suitable to be powered, make sure it is not connected to the UPS output!

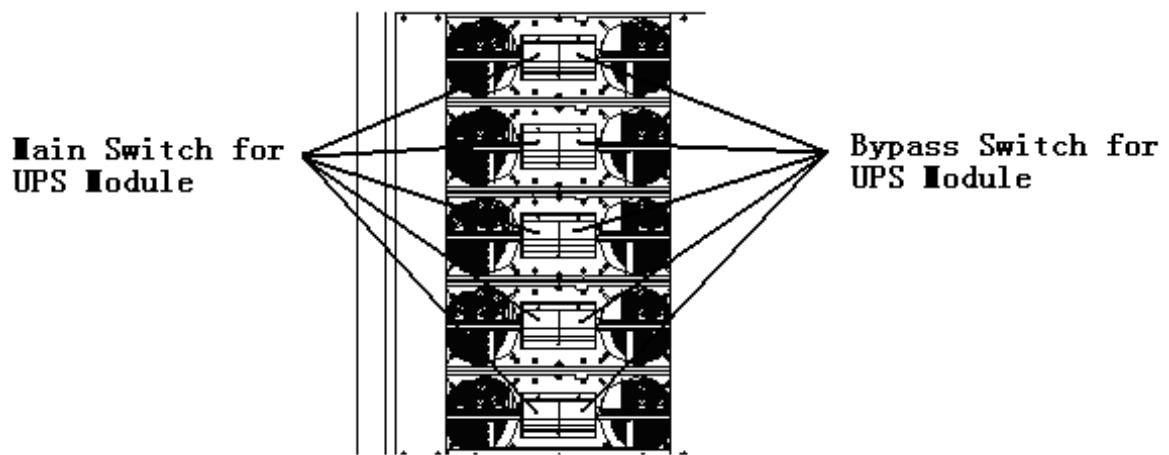
- ◆ Check the status of the central unit monitoring switch. By default it is set to "ON".

Monitoring module power supply switch



Close the power switch of the Monitoring Module so that the UPS can communicate normally with the control unit. Should it be necessary to replace the module (hot-swap) this switch must be open (OFF).

- ◆ Close the output switch.
- ◆ Close the input and Bypass switch of all the modules on the back of the modules.



When the AC mains input voltage is within the acceptance range, the rectifier will start within 30 seconds, at which point the inverter will also start. When the output switch is activated, the green LED on the inverter will light up.

4.2.2 AutoTest procedure



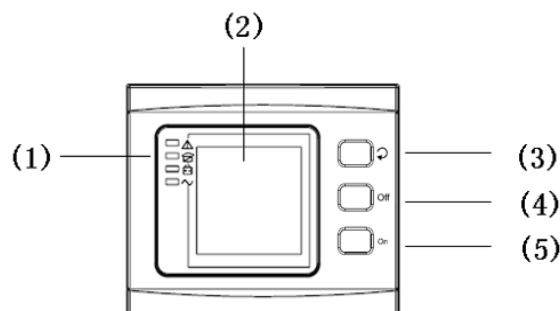
WARNING!

UPS operates normally.

It may take about 60 seconds to completely perform the self test.

- ◆ Open the input disconnecter to simulate a mains failure, the rectifier will switch off and the batteries will power the inverter without interrupting the UPS output voltage. In this condition the battery LED will light up.
- ◆ Close the input switch to simulate the return of the network, the rectifier will start automatically after about 20 seconds and the inverter will continue to power the load. It is suggested to use a dummy load for the execution of the test. The UPS can be loaded up to its maximum capacity during the execution of the test.

4.2.3 Start-up without mains (Cold start).



WARNING!

Follow these procedures when the input AC Utility fails, but battery is in normal condition.

- ◆ Close the battery switch. The batteries supply the "Auxiliary power board" board.
- ◆ Close the UPS output disconnecter.

Activate the modules using the power-on button (cold start) (no. 5 above).

When the battery voltage is good, the rectifier starts up and 30 seconds later the inverter turns on and starts running and the battery LED lights up

**WARNING!**

Wait approximately 30 seconds after closing the battery isolator before activating the cold start button.

4.2.4 Manual Bypass

To power the load directly with the network, the manual bypass switch located inside the UPS can be closed.

**WARNING!**

When supplied by manual Bypass the load is not protected.

Manual bypass activation.

**WARNING!**

If the UPS is working properly, perform all the steps as follows.

- ◆ Open the manual bypass cover, the UPS will automatically switch the load on the bypass line (Bypass).
- ◆ Close the switch of manual bypass;
- ◆ Open the battery switch;
- ◆ Switch Off the input mains breaker;
- ◆ Switch Off the UPS output breaker.

At this point the bypass line will supply the load through the maintenance switch.

Deactivation of manual bypass.

**WARNING!**

Do not attempt to switch the UPS into normal mode from manual bypass without first checking that there are no faults in the UPS.

- ◆ Open the front and back door of the UPS for easy access to the mains isolator Chiudere il sezionatore d'uscita UPS.

- ◆ Close the input switches of all modules.

The UPS will power the load with the bypass line rather than with the manual bypass, at this point the bypass LED will light up.

- ◆ Open the manual bypass disconnect, the output is supplied by the module bypass.
- ◆ Restore Bypass cover.

The rectifier will be on after 30 seconds. If the inverter will run regularly it will synchronize with the bypass line and the UPS will switch the load from the backup line to the inverter.

4.2.5 UPS Turn Off procedure

**WARNING!**

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 control panel for about two seconds.
- ◆ the inverter LED will switch off and at the same time the acoustic signals will be activated.
- ◆ Open the BATTERY breaker;
- ◆ Open the UPS door to easily access to the main power switch;
- ◆ Switch OFF the input breaker.
- ◆ Open the OUTPUT power switch. The UPS shuts down;
- ◆ To completely isolate the UPS from AC Mains, all input switches of Utility shall be completely off, which includes the ones for rectifier and bypass.
- ◆ The primary input distribution panel, which is often located far away from the UPS area, so a label should be posted to advise service personnel that the UPS circuit is under maintenance.



WARNING!

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

4.2.6 Start up procedure for systems in parallel

- ◆ Connect the parallel cable, the input / output cable and the battery cable, correctly change the jumpers on the parallel board.
- ◆ Measure the negative and positive voltage of the batteries. The battery switch is temporarily open.
- ◆ Check that the monitoring module power switch is closed. By default it is closed.
- ◆ Close the output switch of the distribution unit from the front door.
- ◆ Set the operating mode for each UPS following the start-up procedure for each unit. The operating mode is changed from single to parallel. Set the parallel number for each UPS. Up to 4 units can be put in parallel. Set the parallel ID for each UPS, the ID must be different for each UPS.
- ◆ Close the switches of all the modules. Close the external input switch and start from the mains.
- ◆ After booting from the network, check the LCD interface of each UPS to see if the ID and the VA match those set.
- ◆ Close the external battery switch of each UPS. Verify that the charging current shown on the LCD is normal.

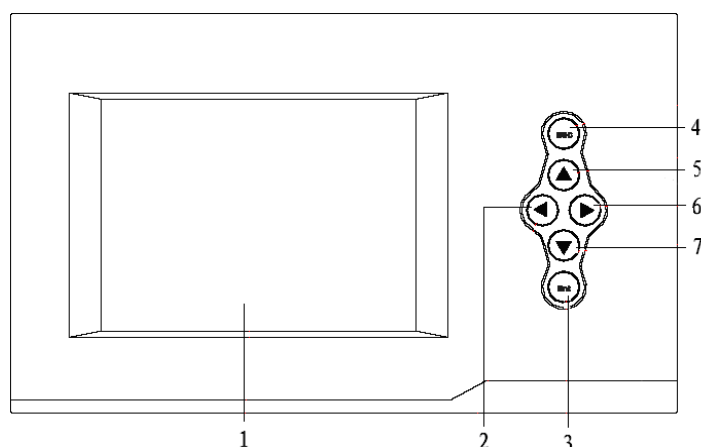


Note!

The UPSs cannot be connected in parallel until each unit is working properly.

4.3 LCD Display

4.3.1 LCD display system



UPS display view

- 1) LCD Touch screen: monitoring of all parameters and measurements, UPS status and Batteries, events history and alarms
- 2) LEFT BUTTON: goes left or scrolls upward
- 3) ENTER KEY: insert items, confirm selection.
- 4) ESC KEY: exit or cancel
- 5) UP BUTTON: scrolls upwards
- 6) RIGHT KEY: goes to the right or scrolls down
- 7) DOWN KEY: scrolls downwards

Introduction



WARNING!

The display provides many more features than those described in this manual.

100KVA On-Line 23-05-2012						
ID:01 08:00						
◀	Output	Module	Input	Batt	State	▶
				A	B	C
Phase Voltage(v)				220	221	221
Phase Current(A)				16	10	18
Frequency(Hz)				50		
Active Power(kw)				5.0	5.2	5.6
Apparent Power(KVA)				3.7	3.9	4.1
Load percent(%)				50	52	53
Load Peak Rate				1.3	1.5	1.8

Output

100KVA On-Line 23-05-2012						
ID:01 08:00						
◀	Output	Module	Input	Batt	State	▶
		Module01	Online			
		Module02	Online			
		Module03	Online			
		Module04	Online			
		Module05	Online			
		Module06	Offline			
		Module07	Offline			
		Module08	Offline			
		Module09	Offline			
		Module09	Offline			
		Module10	Offline			

Power modules status

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Output	Module	Input	Batt	State ▶
Module01					
Invert Voltage(V)				220	220 220
Invert Current(A)				0	0 0
Frequency(HZ)				50	
Positive Bus Voltage(V)				390	
Negative Bus Voltage(V)				390	
Code		8000-8000		D800-8000	
		0000-0000		0000-0000	
Back					

Single Power module: detailed info

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Output	Module	Input	Batt	State ▶
Mains					
				A	B C
Phase Voltage(V)				220	220 220
Phase Current(A)				2	2 2
Frequency(HZ)				50	
Bypass					
Phase Voltage(V)				220	220 220
Frequency(HZ)				50	

Input

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Output	Module	Input	Batt	State ▶
Positive Battery Voltage (V)					
				239.9	
Negative Battery Voltage (V)					
				241.0	
Positive Battery Current (A)					
				15.1	
Negative Battery Current (A)					
				14.8	
Battery State				Charge	
Battery Temperature (°C)				0.0	
Lasting(min)					
				0	

Battery Values

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Output	Module	Input	Batt	State ▶
Input Switch					
				ON	
Output Switch					
				ON	
Bypass Switch					
				OFF	
Manu-Bypass Switch					
				OFF	
Inside Temperature (°C)					
				30	

UPS status

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
Battery Test					
Buzzer Set				ON	
Default Set					

C
Commands

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Language/English					
Change Password					
Date Setting				2012-05-23 08:00	
Back-Light Delay				10 min	
Contrast				20	
Self-Test Date				disable	
Timing of ON/OFF				disable	Back
					Next

Setting values 1

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Work Mode		Paralle			
System Voltage Level		220V			
System Frequency Level		50HZ			
Auto Turn-on		Enable			
Bypass Frequency Range		10%			
Bypass Volt. Upper Limit		15%		Back	
Bypass Volt. Lower Limit		-45%			
O/P Volt Regulation		0%		Next	

S

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
Parallel ID		01			
UPS Output		Enable			
Float Volt Revise		0.001			
Parallel Amount		04			
Internal Module amount		05		Back	
				Next	

Setting values 2

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
Single Battery Volt.		12V			
Battery Number		20			
Battery Group		1			
Single Battery Capa.		100AH			
Boost Upper Limit Volt.		2.31			
Float Base Volt.		2.25			
Battery Protect Volt.		1.70			
Boost Charge		Enable		Back	
Boost Last Time		231 Min			
Max Charge Current		25A		Next	

Setting values 4

Setting values 3

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
0004	05-23	07:16:05	On Line		
0002	05-23	07:16:01	Back Nomal		
0003	05-23	07:06:00	Int.Input Switc..		
0004	05-23	07:00:00	Int.Bypass Swit..		
..				Back	
				Next	

S

values recording

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
SYS Version: V02×10 LCD Version: 701×02F					

V

Version

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
ID:00 Record:0001 ▲ 2008-12-21 15:00:25 Status:On Line ▼ Event: On Line Alarm: CODE:CC00-0000 DF00-0000 0000 0000-0000 0000-0000 Quit					

module values recording

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
Battery	Battery Test ▼ 10Min ▲ Ensure Cancel				
Buzzer					
Default					

Batteries test setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Battery	Buzzer Set On Mute Ensure Cancel				
Buzzer					
Default					

Buzzer setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀		Setting	Record	Version	▶
Battery	Default Set Ensure Cancel				
Buzzer					
Default					

R

Factory reset

100KVA		On-Line		23-05-2012																	
ID:01				08:00																	
◀		Setting	Record	Version	▶																
Enter New Password 000000 <table border="1" style="width: 100%; text-align: center;"> <tr> <td>7</td> <td>8</td> <td>9</td> <td>Cancel</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>←</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>→</td> </tr> <tr> <td>.</td> <td>0</td> <td colspan="2">Ensure</td> </tr> </table>						7	8	9	Cancel	4	5	6	←	1	2	3	→	.	0	Ensure	
7	8	9	Cancel																		
4	5	6	←																		
1	2	3	→																		
.	0	Ensure																			

Password setting

100KVA		On-Line		23-05-2012																	
ID:01				08:00																	
◀	Command	Setting	Record	Version	▶																
Date Setting 2012-01-01 08:00 <table border="1" style="width: 100%; text-align: center;"> <tr> <td>7</td> <td>8</td> <td>9</td> <td>Cancel</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>←</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>→</td> </tr> <tr> <td>.</td> <td>0</td> <td colspan="2">Ensure.</td> </tr> </table>						7	8	9	Cancel	4	5	6	←	1	2	3	→	.	0	Ensure.	
7	8	9	Cancel																		
4	5	6	←																		
1	2	3	→																		
.	0	Ensure.																			

Data setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Language/English	Back-Light Delay ▼ 10 ▲ Ensure Cancel				
Change Pa					
Date Settin					
Back-light					
Contrast					
Self-Test f					
Timing of C					
Back					
Next					

Back-Light setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Language/English Change Date Set Back-lig Contrast Self-Test Timing Contrast ▼ 17 ▲ Ensure Cancel 8:00:00 Back Next					

C

I Contrast setting
settings

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Work Mode System System Auto Tu Bypass Bypass Back Single Work Mode ▼ Single ▲ Ensure Cancel 0V Hz ble % 10% 10%					

Operating mode

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Work M System System Auto Tu Bypass Bypass Back System Volt. Level ▼ 220V ▲ Ensure Cancel 10% 10%					

Voltage setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Work M System System Auto Tu Bypass Bypass Back System Freq. Level ▼ 60HZ ▲ Ensure Cancel 10% 10%					

Frequency setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Work System System Auto Bypa Bypa Bypa Auto Turn-on ▼ Enable ▲ Ensure Cancel 0V 0 % % %					

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Comman	Setting	Record	Version	▶
Work M Method System System Auto T Bypass Bypass Bypass Freq. Range ▼ 2% ▲ Ensure Cancel 10% 10%					

S

Self Turn On setting

Bypass frequency range setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Work Mode Single System Voltage 220V System Voltage Level 220V Auto Transfer 100% Bypass Voltage 100% Bypass Voltage 100% Bypass Voltage 100% O/P Voltage Regulation 0% BPV. Upper Limit ▼ 10% ▲ Ensure Cancel Back Next					

Bypass voltage upper limit setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Work Mode Single Method BPV. Lower Limit ▼ -30% ▲ Ensure Cancel Back Next					
Bypass Volt. Lower Limit		-30		10%	
O/P Voltage Regulation		0%		Next	

Bypass voltage under limit setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Work Mode Single System Voltage Level 220V O/P Voltage Regulation ▼ 0% ▲ Ensure Cancel Back Next					

Output voltage regulation setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Parallel ID 01 UPS Output Parallel ID ▼ 01 ▲ Ensure Cancel Back Next					

Parallel ID setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Parallel ID 04 UPS Output Float Volt Revise ▼ 0.000 ▲ Ensure Cancel Back Next					

Float Voltage setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Parallel ID 01 UPS Output Parallel Amount ▼ 01 ▲ Ensure Cancel Back Next					

Number of modules in parallel setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀		Setting	Record	Version	▶
Parallel ID 01 UPS On Internal Module amount ▼ 00 ▲ Ensure Cancel Float V Parallel Internal Back Next					

Internal modules number setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Battery N Battery G Single Battery Volt. ▼ 6V ▲ Ensure Cancel Boost Up Float Bas Battery P Boost Charge Boost Last Time Max Charge Current Enable 231 Min 25A Back Next					

Single battery voltage setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Battery Battery Single Boost U Float B Battery Boost C Battery Number ▼ 20 ▲ Ensure Cancel Boost Last Time Max Charge Current 231 Min 25A Back Next					

Battery quantity setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Battery Battery Single B Boost U Float Ba Battery Boost C Battery Group ▼ 1 ▲ Ensure Cancel Boost Last Time Max Charge Current 231 Min 25A Back Next					

Battery group setting

100KVA		On-Line		23-05-2012	
ID:01		08:00			

◀		Setting	Record	Version	▶																								
<table border="1"> <tr> <td colspan="4">Single Battery Capa.</td> </tr> <tr> <td colspan="4">0100</td> </tr> <tr> <td>7</td> <td>8</td> <td>9</td> <td>Cancel</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>←</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>→</td> </tr> <tr> <td>.</td> <td colspan="2">0</td> <td>Ensure</td> </tr> </table>						Single Battery Capa.				0100				7	8	9	Cancel	4	5	6	←	1	2	3	→	.	0		Ensure
Single Battery Capa.																													
0100																													
7	8	9	Cancel																										
4	5	6	←																										
1	2	3	→																										
.	0		Ensure																										

Single battery capacity setting

100KVA		On-Line		23-05-2012																					
ID:01				08:00																					
◀		Setting	Record	Version	▶																				
<table> <tr> <td>Single Battery Volt.</td> <td>12V</td> </tr> <tr> <td>Battery</td> <td></td> </tr> <tr> <td>Battery</td> <td></td> </tr> <tr> <td>Single</td> <td></td> </tr> <tr> <td>Boost</td> <td></td> </tr> <tr> <td>Float B</td> <td></td> </tr> <tr> <td>Battery</td> <td></td> </tr> <tr> <td>Boost Charge</td> <td>Enable</td> </tr> <tr> <td>Boost Last Time</td> <td>231 Min</td> </tr> <tr> <td>Max Charge Current</td> <td>25A</td> </tr> </table>						Single Battery Volt.	12V	Battery		Battery		Single		Boost		Float B		Battery		Boost Charge	Enable	Boost Last Time	231 Min	Max Charge Current	25A
Single Battery Volt.	12V																								
Battery																									
Battery																									
Single																									
Boost																									
Float B																									
Battery																									
Boost Charge	Enable																								
Boost Last Time	231 Min																								
Max Charge Current	25A																								
Max Charge Current ▼ 25 ▲ Ensure Cancel																									
Back Next																									

Max charging current setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Float Base Volt. ▼ 2.28 ▲ Ensure Cancel Back					
Boost Last Time		231 Min			
Max Charge Current		25A		Next	

Recharging voltage setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Bat. Protect Volt. ▼ 1.28 ▲ Ensure Cancel Back					
Boost Last Time		231 Min			
Max Charge Current		25A		Next	

Battery voltage protection setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Boost Charge ▼ Enable ▲ Ensure Cancel Back					
Boost Last Time		231 Min			
Max Charge Current		25A		Next	

Boost charge setting

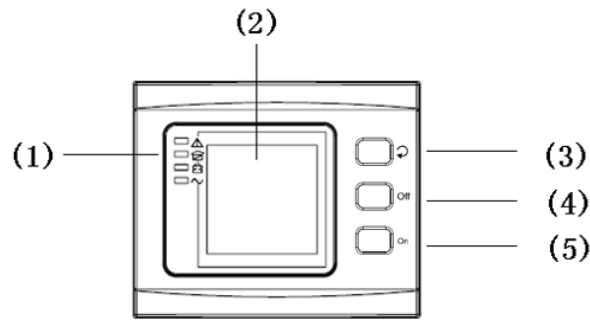
100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Boost Last Time ▼ 231 ▲ Ensure Cancel Back					
Boost Last Time		231 Min			
Max Charge Current		25A		Next	

Boost Last time setting

100KVA		On-Line		23-05-2012	
ID:01				08:00	
◀	Command	Setting	Record	Version	▶
Single Battery Volt. 12V Battery Number 20 Boost Upper Limit Volt. ▼ 2.32 ▲ Ensure Cancel Back					
Max Charge Current		25A		Next	

Boost voltage upper limit setting

4.3.2 LCD display of Power module



- 1) LED (from top to bottom: “alarm”, “bypass”, “battery”, “inverter”)
- 2) Display LCD
- 3) Scroll button
- 4) Switch Off button
- 5) Switch On button (“Cold start” if switched on from battery)

Introduction



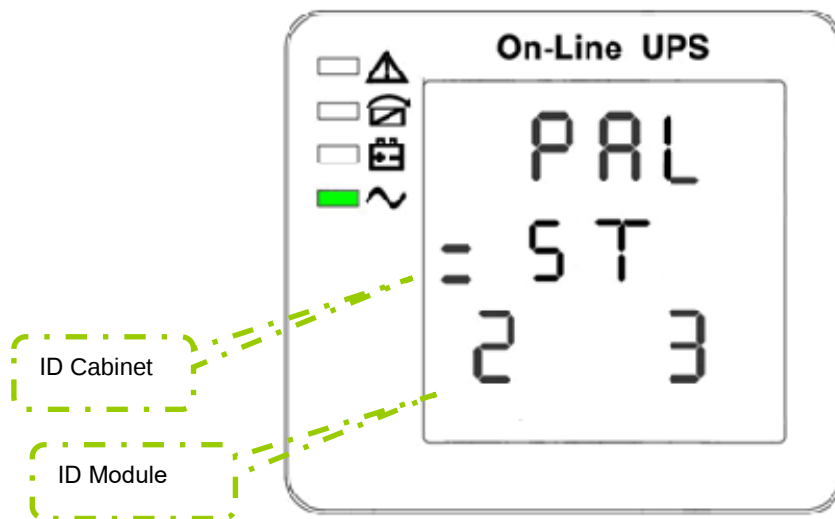
WARNING!

The display provides many more features than those described in this manual.

The interfaces available on the LCD display are 16 and are as follows:

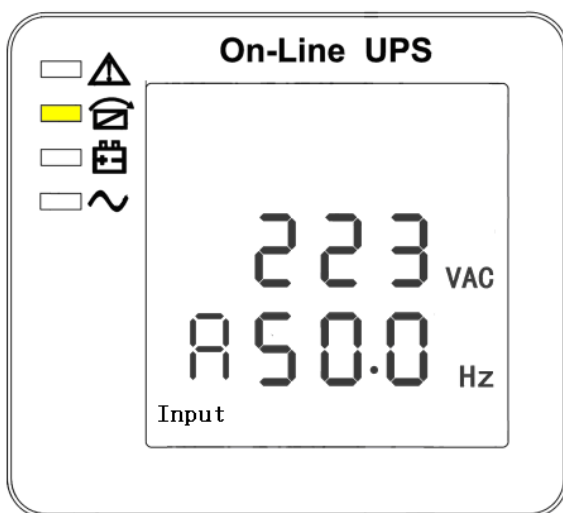
N°	DESCRIPTION	VISIBLE CONTENT
01	CODE	Operating status and mode
02	Input A (Input L1)	Voltage and Frequency
03	Input B (Input L2)	Voltage and Frequency
04	Input C (Input L3)	Voltage and Frequency
05	Battery +	Voltage and Current
06	Battery -	Voltage and Current
07	Output A (Output L1)	Voltage and Frequency
08	Output B (Output L2)	Voltage and Frequency
09	Output C (Output L3)	Voltage and Frequency
10	Load A	Load
11	Load B	Load
12	Load C	Load
13	Total Load	Load
14	Temperature	Internal Temp and Ambient Temp
15	Software version & Model	SW version rectifier, SW version inverter, model
16	CODE	Alarm code or error

- When the UPS is operating with mains or battery (Cold start) it will show the following information:

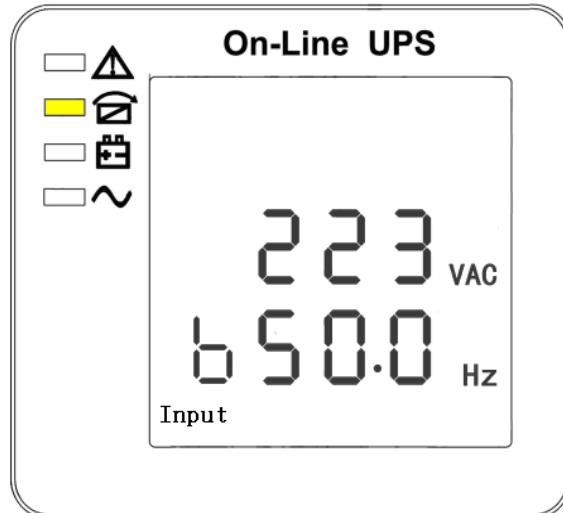


1. ID module and status code

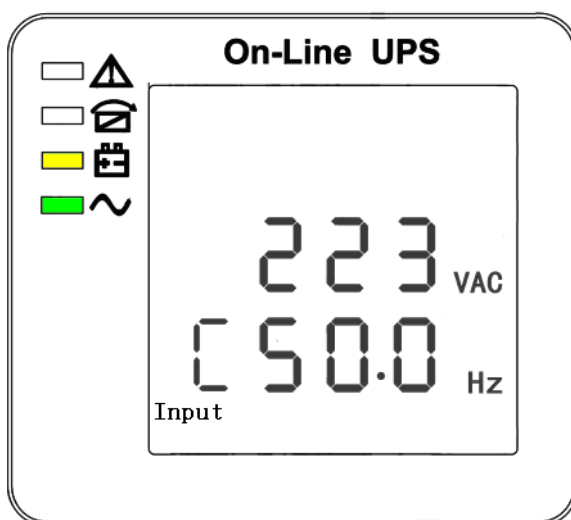
- Press the scroll button, the UPS shows the next information as shown below:



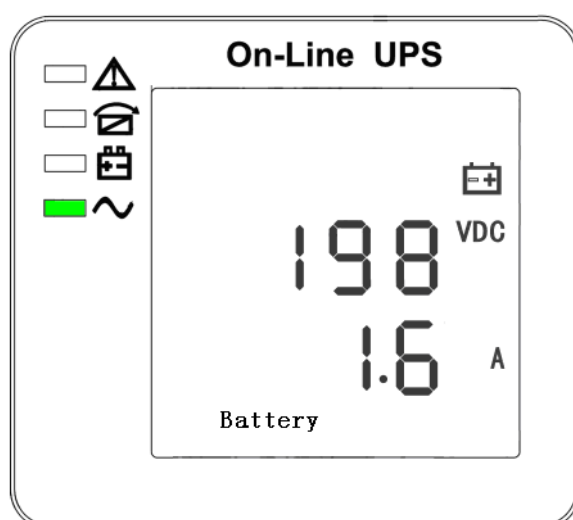
2. Phase A(L1) Input Voltage/Frequency



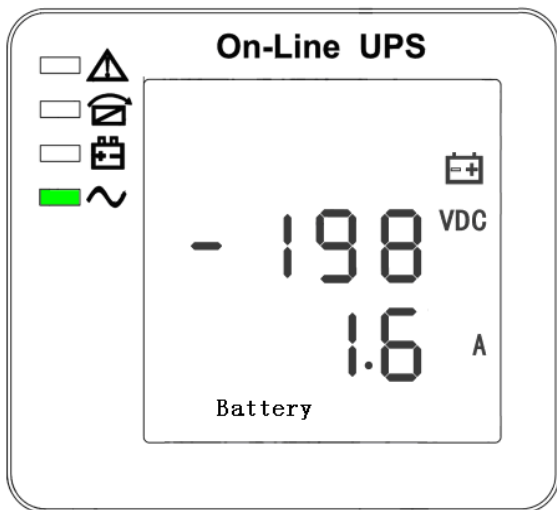
3. Phase B(L2) Input Voltage/Frequency



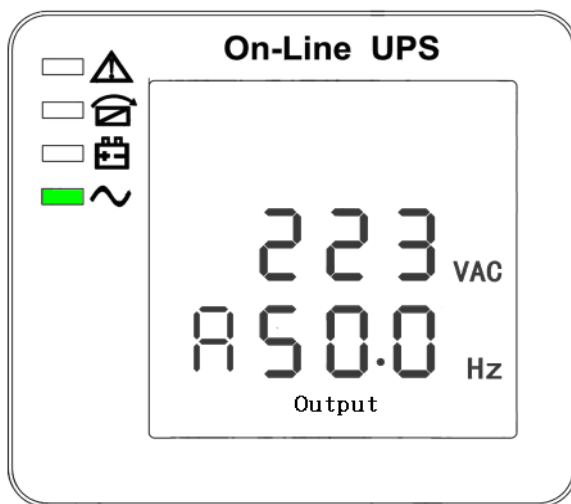
4. Phase C(L3) Input Voltage/Frequency



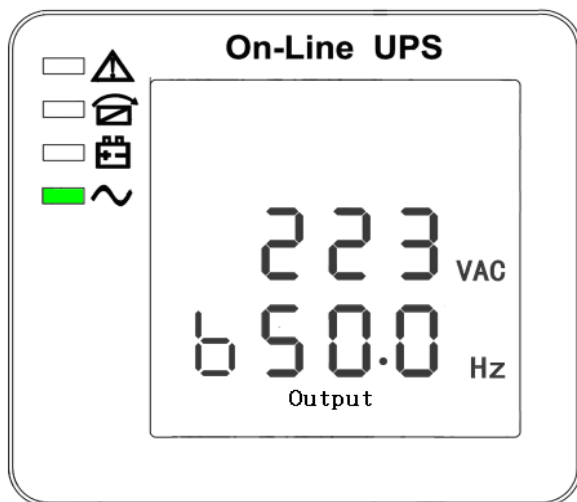
5. Battery + (Positive)



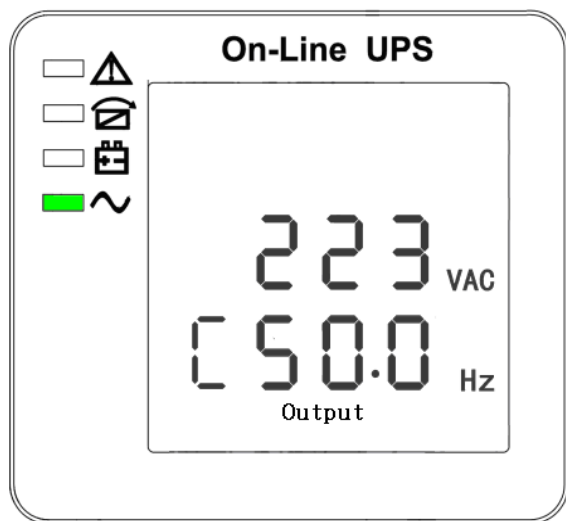
6. Battery – (Negative)



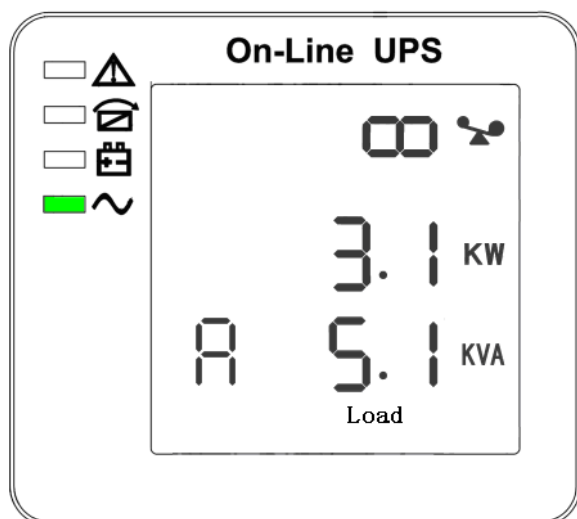
7. Phase A(L1) Output Voltage/Frequency



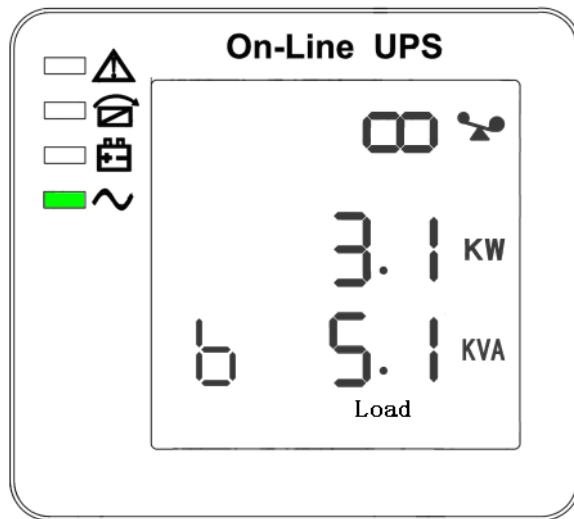
8. Phase B(L2) Output Voltage/Frequency



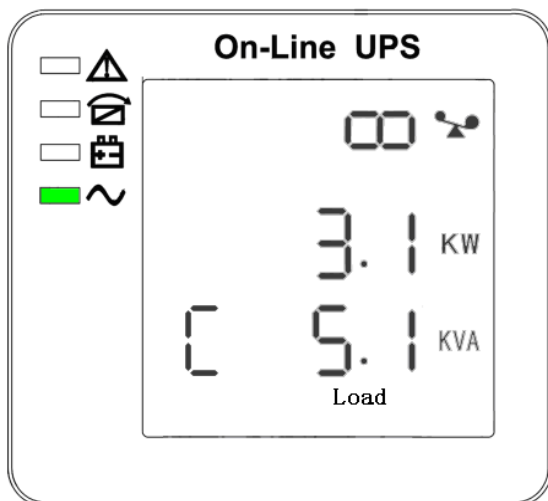
9. Phase C(L3) Output Voltage/Frequency



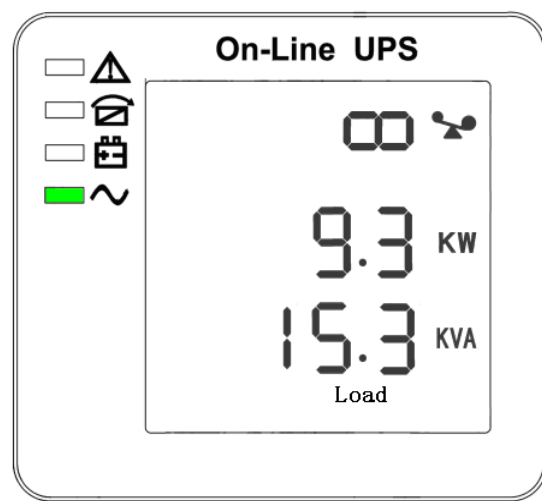
10. Phase A(L1) Load



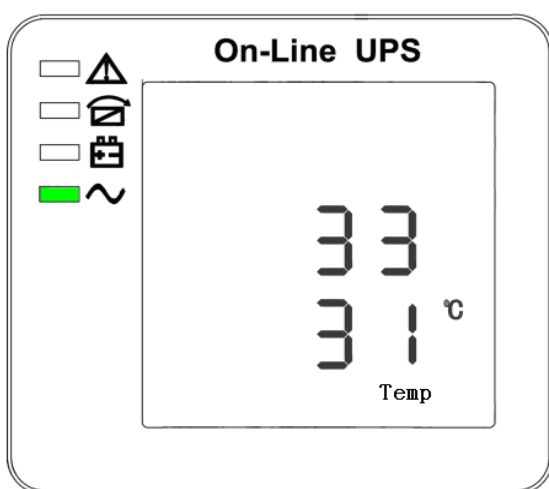
11. Phase B(L2) Load



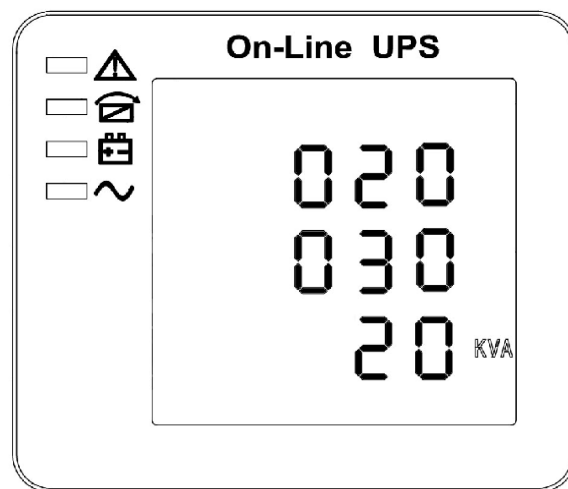
12. Phase C(L3) Load



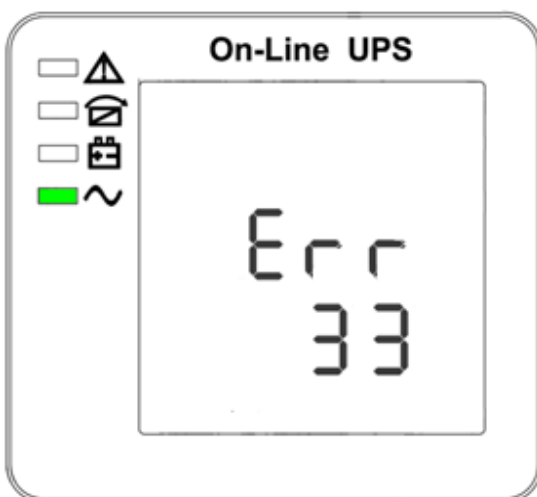
13. Total Load



14. Inside temperature and Ambient Temperature

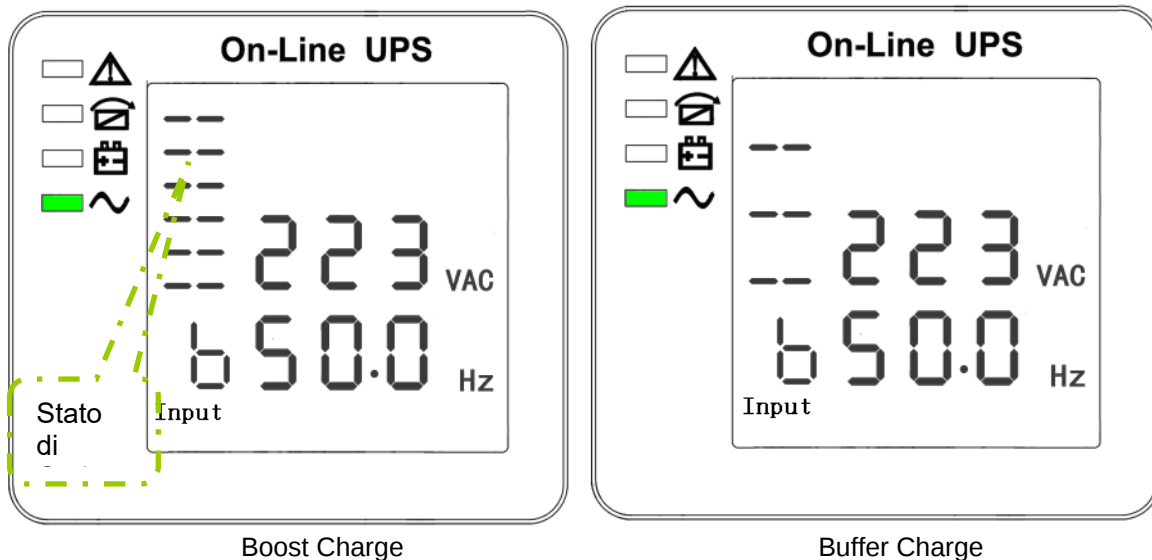


15. Software version & model



16. Error Code

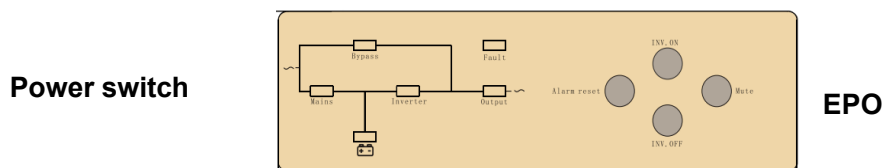
- Battery charging information is shown in the figures below:



- 1) 1) By pressing the "scroll" key, you could go through all the messages from the first to the last and then go back to the first one and vice versa.
- 2) Alarm codes appear when abnormal behavior (s) occurs.

4.3.3 Control panel of the Monitoring module.

The Monitoring Module Control Panel is normally located at the top of the UPS. Through the buttons and the LEDs, the operator is able to monitor all the measured values, the UPS status, the batteries and the alarms.



- 1) Power Switch: after turning it off you can replace the module without stopping the UPS (hot swap mode).
- 2) EPO button: disconnects the power supply from the load. Disable the rectifier, the inverter, the static Bypass and the battery operations.
- 3) MAINS LED: shows the status of the AC input voltage.
- 4) LED INVERTER: shows the status of the inverter.
- 5) OUTPUT LED: shows the status of the output voltage.
- 6) BYPASS LED: indicates the status of the Bypass input.
- 7) BAT LED: shows the status of the batteries.
- 8) FAULT LED: indicates that the UPS has a fault.
- 9) ALARMS RESET: to reset an alarm when present.
- 10) MUTE: to silence the acoustic signal, the buzzer will automatically restart when a fault occurs.
- 11) INVERTER OFF PUSH BUTTON: disables the inverter operation.
- 12) INVERTER ON SWITCH: enables inverter operation..



WARNING!

The LEDs positioned on the flowchart represent the path of the electricity and the current status of the UPS.

Indicator LED MAINS (3)

GREEN	The rectifier operates normally
FLASHING GREEN	Input Voltage or Frequency out of tolerance
OFF	AC input is not available

Indicator LED BAT (7)

GREEN	Battery OK, but discharging as it supply the load.
FLASHING GREEN	Battery low pre-alarm, Abnormal battery (High or low voltage, absent or with reverse polarity), abnormal charging.
OFF	Battery and Battery charger works normally, Battery in charge.

Indicator LED BYPASS (6)

GREEN	Load on bypass
FLASHING GREEN	Bypass not available, out of tolerance, Bypass static switch in shortcircuit or failed, reverse polarity on Bypass switch, Bypass in overload status.
OFF	Bypass normal status, load not on Bypass

Indicator LED INVERTER (4)

GREEN	Inverter normal, it supply the load.
FLASHING GREEN	Inverter failed, IGBT diode bridge on Inverter shorted, Inverter thyristor shorted or faulty, Overload.
OFF	Inverter not working.

Indicator LED OUTPUT (5)

GREEN	UPS output available and within tolerances.
FLASHING GREEN	Ups output in overload or Output switch open.
OFF	UPS output not available

Indicator LED FAULT (8)

RED	UPS faulty
OFF	Normal operation

4.4 Display Messages/Troubleshooting

This section lists the events and alarm messages that the UPS might show. The messages are listed in alphabetical order. This section lists the alarm messages to help you solve any problems.

Messages to Module display – Operating status and mode

CODE (ST)	STATUS	LED			
		FAULT	BYPASS	BATTERY	INVERTER
1	ON	OFF	OFF	OFF	OFF
2	Standby Mode	OFF	OFF	X	OFF
3	No output	OFF	OFF	X	OFF
4	Bypass mode	OFF	ON	X	OFF
5	Mains mode	OFF	OFF	X	ON
6	Battery mode	OFF	OFF	ON	OFF
7	Battery self-test	OFF	OFF	ON	OFF
8	Inverter in start-up	OFF	X	X	OFF
9	ECO Mode	OFF	X	X	X
10	EPO Mode	ON	OFF	X	OFF
11	Manual Bypass mode	OFF	OFF	OFF	OFF
12	Failure mode	ON	X	X	X

NOTE: “X” means that it is determined by other conditions

Alarm information on Module

FAULT CODE (Err)	UPS FAULT TYPE	BUZZER	LED
1	Rectifier failure	Beep continuos	Fault LED On
2	inverter failure (it includes the Inverter bridge shorted)	Beep continuos	Fault LED On
3	inverter thyristor shorted	Beep continuos	Fault LED On
4	inverter thyristor open	Beep continuos	Fault LED On
5	bypass thyristor shorted	Beep continuos	Fault LED On
6	bypass thyristor open	Beep continuos	Fault LED On
7	Fuse fault	Beep continuos	Fault LED On
8	Parallel relay failure	Beep continuos	Fault LED On
9	Fan failure	Beep continuos	Fault LED On
10	Spare	Beep continuos	Fault LED On
11	Auxiliary current failure	Beep continuos	Fault LED On
12	Initialization failure	Beep continuos	Fault LED On
13	Battery charger failure P-Battery side	Beep continuos	Fault LED On
14	Battery charger failure N-Battery side	Beep continuos	Fault LED On
15	DC voltage overvoltage	Beep continuos	Fault LED On
16	DC voltage undervoltage	Beep continuos	Fault LED On
17	DC voltage unbalanced	Beep continuos	Fault LED On
18	Soft-start start up failed	Beep continuos	Fault LED On
19	Rectifier overtemperature	Twice per second	Fault LED On
20	Inverter overtemperature	Twice per second	Fault LED On
21	Spare	Twice per	Fault LED On

		second	
22	Reverse battery	Twice per second	Fault LED On
23	Cable connection error	Twice per second	Fault LED On
24	CAN bus communication fault	Twice per second	Fault LED On
25	Load sharing failure	Twice per second	Fault LED On
26	Battery overvoltage	Once per second	Fault LED blinking
27	Mains connection error	Once per second	Fault LED blinking
28	Bypass connection error	Once per second	Fault LED blinking
29	Output short-circuit	Once per second	Fault LED blinking
30	Rectifier overload	Once per second	Fault LED blinking
31	Bypass overload	Once per second	Bypass LED blinking
32	Overload	Once per second	Bypass Led or Inverter blinking
33	No battery	Once per second	Battery LED blinking
34	Battery undervoltage	Once per second	Battery LED blinking
35	Low battery pre-alarm	Once per second	Battery LED blinking
36	Internal communication error	Once per 2 seconds	Fault LED blinking
37	DC current component above the limit	Once per 2 seconds	INV LED blinking
38	Parallel overload	Once per 2 seconds	INVLED blinking
39	Mains voltage abnormal	Once per 2 seconds	Battery LED On
40	Mains frequency abnormal	Once per 2 seconds	Battery LED On
41	Bypass not available		Bypass LED blinking
42	Bypass unable to trace		Bypass LED blinking
43	Inverter not available		
44	Screw on the Power module open		
45	Inverter OFF		
46	Output switch open	Once per 3 seconds	

UPS – messages Display

Events:

N°	DISPLAY MESSAGE	DESCRIPTION
1	Initializing	The DSP and MCU are in Initializing.
2	Standby	
3	Non Output	UPS doesn't supply the load
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 warning 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

UPS – Alarms information:

Events:

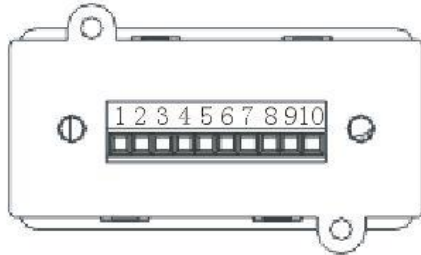
N°	DISPLAY MESSAGE	DESCRIPTION
1	Rectifier Fault	Rectifier detected faulty. Rectifier and inverter and charger shut down.
2	Rectifier Over Temperature	The temperature of heatsink is too high to keep the rectifier running. Charger and inverter shut down.
3	Inverter Over temperature	The temperature of the inverter heatsink 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.

RELAY CARD

- ◆ Loosen the 2 screws on both sides of the board.
- ◆ Carefully insert the card into the appropriate SLOT. Reverse the procedure for unplugging.

The RELAY board provides the dry contacts for external UPS monitoring reporting the status of the UPS. The RELAY board has 10 clean contacts available to the user: 7 outputs provide the status of the UPS, 1 for the ground and 2 for the remote shutdown of the UPS (5-12Vdc).



CONTACT		FUNCTION
1	Output	Mains failure
2		/
3		Battery low
4		Bypass output
5		UPS failure
6		Inverter output
7		UPS alarm
8	Input	COM
9		OFF +
10		OFF -



WARNING!
Contacts are NO type (normally open).

FRAME (Cabinet Model UPS)			150	200	250	300	200	320	520
Capacity	UPS (KVA)		10~150	10~200	25~250	25~300	40~200	40~320	40~520
	Module (KVA)		10/15/20/30	10/15/20	25	25/30	40		
	Module (KW)		9/13,5/18/27		22,5	22,5/27	36		
	Max N° of modules		5	10	10	10	5	8	13
Input	Phase		3 Phase + Neutral + GND						
	Nominal Voltage		380/400/415Vac						
	Voltage range		208~478Vac						
	Frequency range		40Hz-70Hz						
	Power Factor		≥0.99						
	Current THDi		≤3% (100% non linear load)						
	Voltage range Bypass		380V: +25% (optional +10%, +15%, +20%) 400V: +20%(optional +10%, +15%) 415V: +15%(optional +10%) Min. Voltage: -45% (optional -20%, -30%) Frequency protection range: ±10%						
	Genset input		Supported						
Uscita	Phase		3 Phase + Neutral + GND						
	Nominal Voltage		380/400/415Vac						
	Power Factor		0.9						
	Voltage regulation		±1%						
	Frequency	With Mains	±1%, ±2%, ±4%, ±5%, ±10% of nominal frequency (optional)						
		Battery Mode	(50/60±0.2%) Hz						
	Crest Factor		3:1						
	THD		≤2% with linear load						
			≤5% with non linear load						
Efficiency (normal mode)			95.5%						
Battery	Voltage		±192V\±204V\±216V\±228V\±240V DC; battery quantity (optional)						
	Charge current	Cabinet UPS	30A Max	100A Max					130A Max
		Module UPS	10/15/20KVA=6A Max 30/40KVA=10A Max.						
		The charging current can be set according to the number of batteries installed							
Switch time			From Mains to battery: 0ms from Mains to bypass: 0ms						
Protection	Overload	Normal mode	Load≤110%:Duration 60min, ≤125%:duration10min, ≤150%:duration 1min, ≥150% switch immediately to bypass						
		Battery mode	Load≤110%:duration 10min, ≤125%:duration 1min, ≤150%:duration 10s, ≥150% switch off immediately the UPS						
		Bypass mode					400A	500A	800A
	Fuse	Input	-	-	-	-	120A		
		Output					200A		
	Shortcircuit		Fully involve the UPS						
	Overheating		Normal mode:switch to Bypass, Battery mode :switch off immediately the UPS						
	Battery discharged		Alarm and switch off the UPS						
	Self-test		At UPS start-up and through Software command						
	EPO (optional)		Switch off immediately the UPS						
	Battery		Advanced battery management						

	Noise suppression		Compliant with EN62040-2				
Communication Interface			RS232, RS485, Dry contacts, Intelligent slot, SNMP card (optional), Relay card (optional)				
Environment	Operating temperature		0°C~40°C				
	Storage temperature		-25°C~55°C				
	Humidity		0%~95% non condensing				
	Altitude		< 1500m				
Others	Dimensions FRAME (DxWxH) mm		840x600 x1400	1100x600x2000	860x600 x1600	860x600 x2000	860x1200 x2000
	Dimensions MODULE (DxWxH) mm		580x443x131				
	Weight (Kg)	Frame UPS	150	312	205	310	450
		Modulo UPS	30KVA=33Kg				
Compliance to safety std.			CE,EN/IEC 62040-2,EN/IEC 62040-1-1				

APPENDIX 2 – Troubleshooting

In case the UPS does not work properly, it may be a problem of incorrect installation, incorrect connections or incorrect settings. Please check these aspects before contacting the service department. If the problem remains, contact the after-sales service and provide the following information:

- 1) UPS model, power capability, serial number.
- 2) Try to describe the problem in details, such as messages on the LCD display, LED status, type and percentage of load and all that is considered important.

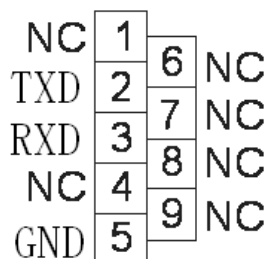
Reading the operation manual carefully can help you to use this UPS correctly. Here is some information for troubleshooting.

NO.	PROBLEM	POSSIBLE REASON	SOLUTION
1	The LCD display shows nothing	The power cable or cable (telephone type) of the front door is not well connected.	Check the connections
2	Mains is available but UPS doesn't start-up.	Power cable not connected. Input voltage low; input switch of the module is OFF.	Verify that the input voltage and frequency are within tolerances. Verify that the module input switch is in the ON position.
3	The mains is present and in its tolerances but the LED of the mains is off and the UPS works in battery mode.	Input switches on the modules are OFF; Power cables at the input are not well connected..	Close the input disconnecter; Make sure the cables are well connected.
4	The UPS does not report any failure, but the load is not powered	Output cables are not connected	Make sure that output cables are well connected.
5	"24 CAN" alarm on UPS module communication error	When the number of modules is set at 2 or more but only one works properly.	If only one module works, reset the qty of the modules to one.
6	"45 Inverter off" alarm on UPS mode	Inverter disconnection within 2 min in normal mode, UPS in Bypass mode more than 2 min.	Switch from Bypass mode to normal mode.

7	Module doesn't switch to Bypass or Inverter	The module has not been plugged well. The module fixing screw is not tightened well The output switch is not closed	Remove and plug again the module. Tighten the fixing screw. Close the output switch.
8	The fault LED on the module remains lit.	The module is damaged	Replace the module
9	Mains LED is blinking	Input voltage of UPS is out of tolerance	If the UPS is battery mode, pay attention to the remaining time of the autonomy to allow shut down the system
10	The battery LED is blinkong, there is no voltage or charging current.	The battery disconnecter is open, the batteries are faulty, the batteries are connected with wrong polarity. The number of batteries and the capacity are wrong.	Close the battery disconnecter. If the batteries are faulty, replace the entire battery pack. Connect the batteries correctly. Go to the LCD to set the number and capacity of the batteries correctly.
11	The buzzer sounds every 0.5 seconds and "overload" appears on the LCD display	Overload on the output	Partly remove the load
12	The buzzer sounds constantly and "output short circuit" appears on the LCD display	Short circuit on UPS output	Make sure the load is not shorted, then restart the UPS.
13	The module's Red LED is on.	The module is not well plugged	Remove the module and plug-in again it correctly.
14	UPS works only in bypass mode (on bypass line)	UPS is ECO mode or in Bypass mode.	Set up the UPS to operate the module in single mode. Switch from Bypass mode to normal mode.
15	Doesn't start up in Cold start	The battery disconnecter is not properly closed; Battery fuses are open or battery voltage is low.	Close the battery disconnecter; Replace the battery fuses; Recharge the batteries.
16	The buzzer sounds continuously and "Fault rectifier" or "Fault on output" appears on the LCD display	The UPS is faulty and out of service.	Contact the assistance service.

APPENDIX 3 –RS232 communication: definitions

Port definition:



Connection between RS232 PC port and RS232 UPS port

RS232 PC	RS232 UPS	DESCRIPTION
PIN # 2	PIN # 2	UPS send PC receive
PIN # 3	PIN # 3	PC send UPS receive
PIN # 5	PIN # 5	Ground connection

Available functions on RS232 port

- ◆ UPS voltage and current monitoring.
- ◆ Monitoring and information of UPS alarms.
- ◆ Monitoring of UPS operating parameters.
- ◆ Automatic switch-off / switch-on of the UPS

RS232 communication parameters:

Transmission speed	2400bps
Byte length	8bit
Stop bit	1bit
Parity check	nessuna

END OF DOCUMENT