C500R 6-10kVA (B)

Rack/Tower 6-10kVA

Installation/Manual

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Contents

1. Introduction

The PowerControl C500R Series is an uninterruptible power supply incorporating double-conversion technology. It provides protection specifically tailored towards computer equipment, communication systems and computerized instruments. It protects your sensitive electronic equipment from power problems such as power failures, power sags, power surges, brownout, and line noise.

Power outages can occur when you least expect them and power quality can be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware — causing hours of lost productivity and expensive repairs.

With the C500R UPS, you can safely eliminate the effects of power disturbances and ensure the protection of your equipment. This UPS is the best choice for protect your LANs, servers, workstations, and other electrical equipment.

Online R/T UPS as Rack installation:

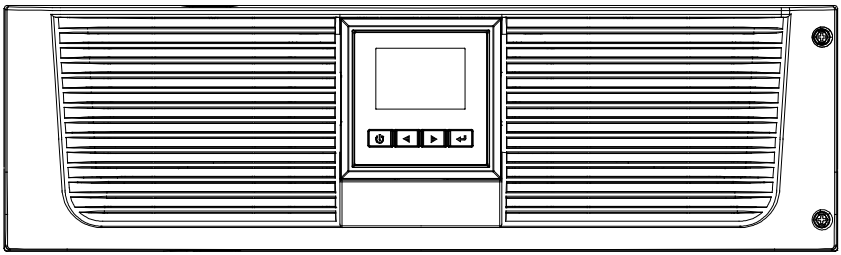


Figure.1-1. Online C500R-060-B UPS

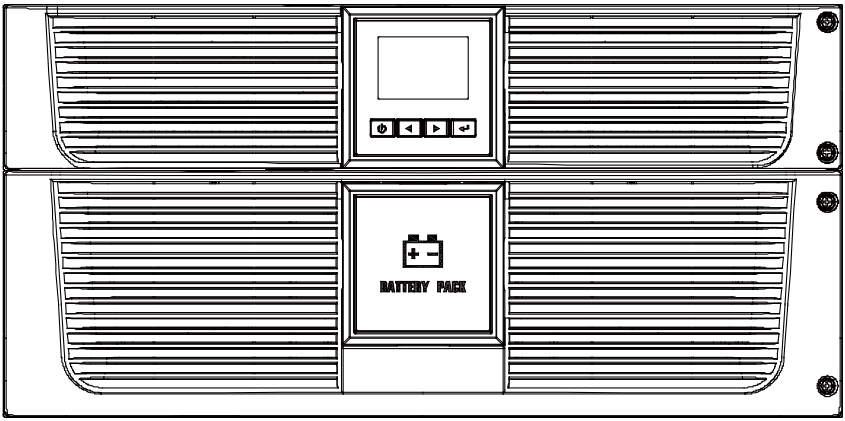


Figure.1-2.Online C500R-100-B UPS

Online R/T UPS as Tower installation.

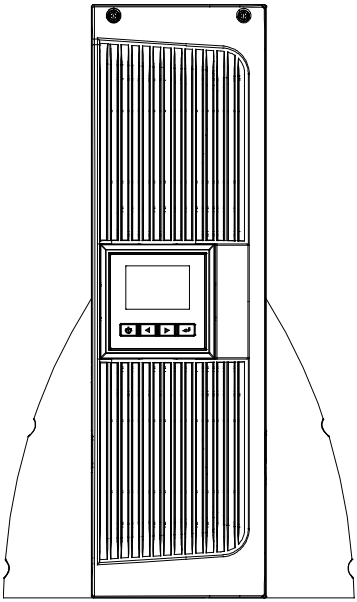


Figure.1-3.Online C500R-060-B UPS

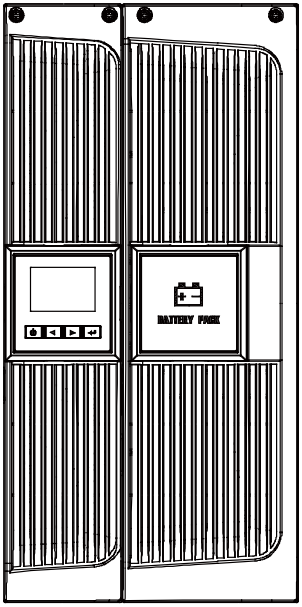


Figure.1-4.Online C500R-100-B UPS

Providing outstanding performance and reliability, the C500R benefits

include:

- Online UPS design with pure sine wave output.
- True online double-conversion technology with high power density, utility frequency independence, and generator compatibility.
- Intelligent Battery Management technology that uses advanced battery management to increase battery service life and optimize recharge time.
- Selectable High Efficiency C500R mode of operation.
- Start-on-battery capability for powering up the UPS even if utility power is not available.
- Standard communication options: one RS-232 communication port, one USB communication port.
- Optional connectivity cards with enhanced communication capabilities.
- Extended runtime with up to four Extended Battery Modules (EBMs) per UPS.
- Optional installation method — Rack & Tower.
- Remote shutdown control through the Remote Emergency Power-off (REPO) port.
- Maintenances are simplified by allowing the safe replacement of batteries without powering down the UPS.
- Parallelable with an additional C500R in order to offer increased flexibility
- Optional Rack Slider.

2. Safety Warnings

CAUTION:
Before performing the procedures in this document, read and follow the safety instructions and important regulatory information in your Safety, Environmental, and Regulatory Information document.

IMPORTANT SAFETY INSTRUCTIONS
PLEASE RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

2.1 Installation

- Condensation may occur if the UPS is moved directly from a cold to a warm environment. The UPS must be absolutely dry before being installed. An 'acclimatization time' of at least two hours must be implemented.
- Do not install the UPS near water or in damp environment.
- Do not install the UPS where it would be exposed to direct sunlight or near heat.
- Do not block ventilation openings in the UPS's housing.
- Place cables in such a way that no one can step on or trip over them.
- An integral single emergency switching device which prevents further supply to the load by the UPS in any operation mode should be provided in the building wiring installation.
- An appropriate disconnect device as short-circuit backup protection should be provided in the building wiring installation.
- This is permanently connected equipment, it should be installed by qualified maintenance personnel.
- Earth connection is essential before connecting to the building wiring terminal.

- For model C500R-100-B, use minimum 10mm^2 for Equipment input and grounding Wire, 75°C copper wire and 22.1 lb-in torque force when connecting to input terminal block.
- For model C500R-060-B, Use minimum 6mm^2 for Equipment input and grounding Wire, 75°C copper wire and 18 lb-in torque force when connecting to input terminal block.
- **For permanently connected equipment:** make sure that a readily accessible disconnect device is incorporated in the building installation wiring.

  To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection with an ampere rating in accordance with the IEC/EN 60934 standard or your local electrical code and have a contact air gap of at least 3 mm.

Uninterruptible power supply output power	240V
C500R-060-B	40 amp 2-pole circuit breaker
C500R-100-B	63 amp 2-pole circuit breaker

- You can connect four extended battery modules to the uninterruptible power supply.

Before working on this circuit
- Isolate Uninterruptable Power System(UPS)
- Then check for Hazardous Voltage between all terminals including the protective earth Risk of Voltage Backfeed.

2.2 Operation

- Do not disconnect the earth conductor cable from the UPS or the building wiring terminals at any time since this will affect the protective earthing of the UPS system and of all connected loads.
- The UPS output terminal block may be electrically active even if the UPS system is not connected to the building wiring terminal.
- In order to fully disconnect the UPS, firstly press the OFF button, and then disconnect the mains lead.
- Ensure that no liquid or other foreign objects enter the UPS.

2.3 Maintenance, servicing and faults

- The UPS operates with hazardous voltages. Maintenance should be carried out only by qualified maintenance personnel.
- Caution - risk of electric shock. Even after the unit is disconnected from the mains power supply (building wiring terminal), components inside the UPS are still connected to the battery which have potentially dangerous voltages.
- Before carrying out any kind of service and/or maintenance, please disconnect the batteries. Verify that no current is present and no hazardous voltage exists in the capacitor or BUS capacitor terminals.
- Batteries must be replaced only by qualified personnel.
- Caution –risk of electric shock. The battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground. Verify that no voltage is present before servicing!
- Batteries have a high short-circuit current and pose a risk of shock. Take all precautionary measures specified as below and any other measures necessary when working with batteries:

1) Remove all jewellery, wristwatches, rings and other metal objects

2) Use only tools with insulated grips and handles.

3) When changing batteries, replace with the same quantity and the same type of batteries.

4) Do not attempt to dispose of batteries by burning them. It can cause explosion.

5) Do not open or destroy batteries. Effluent electrolyte can cause injury to the skin and eyes. It may be toxic.

- Please replace the fuse only with the same type and of the same amperage in order to avoid fire hazards.
- The UPS should only be dismantled or worked on by qualified maintenance personnel.

2.4 Transport

- Please transport the UPS only in the original packaging (to protect against shock and impact).

2.5 Storage

- The UPS must be sited in a dry and well ventilated location.

2.6 Standards

*** Safety**	
IEC/EN 62040-1	
*** EMI**	
Conducted Emission.....:IEC/EN 62040-2	Category C2
Radiated Emission.....:IEC/EN 62040-2	Category C2
***EMS**	
ESD.....:IEC/EN 61000-4-2	Level 4
RS.....:IEC/EN61000-4-3	Level 3
EFT..... :IEC/EN 61000-4-4	Level 4
SURGE..... :IEC/EN 61000-4-5	Level 4
CS..... :IEC/EN 61000-4-6	Level 3
Power-frequency Magnetic field.... :IEC/EN 61000-4-8	Level 3
Low Frequency Signals.....:IEC/EN 61000-2-2	
Warning: This is a product for commercial applications. If used in an industrial environment extra precautions may be required.	

3. Installation

This chapter explains:

- Equipment inspection
- Unpacking the cabinet
- Checking the Accessories
- UPS setup and installation
- Connecting the internal battery
- Connecting the EBM(Extended Battery Modules)
- Installation requirements

3.1 Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

Note: Check the battery recharge date on the shipping carton label. If the date has passed and the batteries were never recharged, do not use the UPS. Contact your service representative.

3.2 Unpacking the Carton

CAUTION: If the carton unpacked in a low-temperature environment it may cause condensation in or on the cabinet of UPS. Do not install the UPS until the inside and outside of the cabinet are absolutely dry to prevent hazard of electric shock.

CAUTION: The cabinet is heavy. Refer to following instructions to unpack and move the cabinet from packing carton:

The shipping materials are recyclable. After unpacking, save them for later use or dispose of them appropriately.

Step 1:

Open the outer carton and remove the accessories package in the cabinet (see Figure 3.1&3.2).

C500R-060-B UPS:

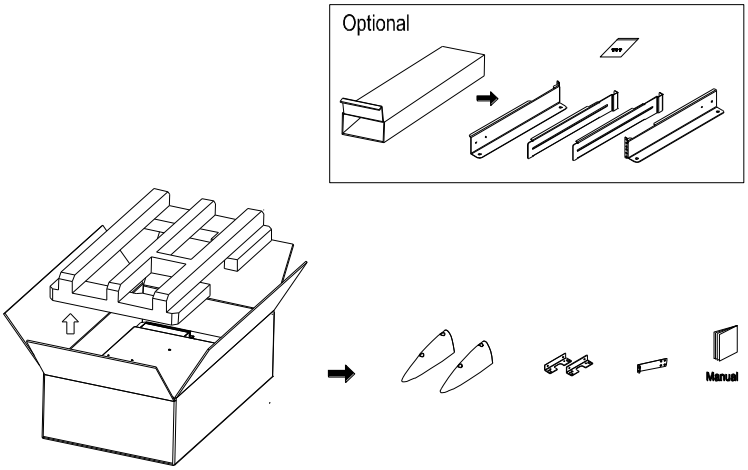


Figure 3.1: Unpacking the Carton of C500R-060-B UPS

C500R-100-B UPS

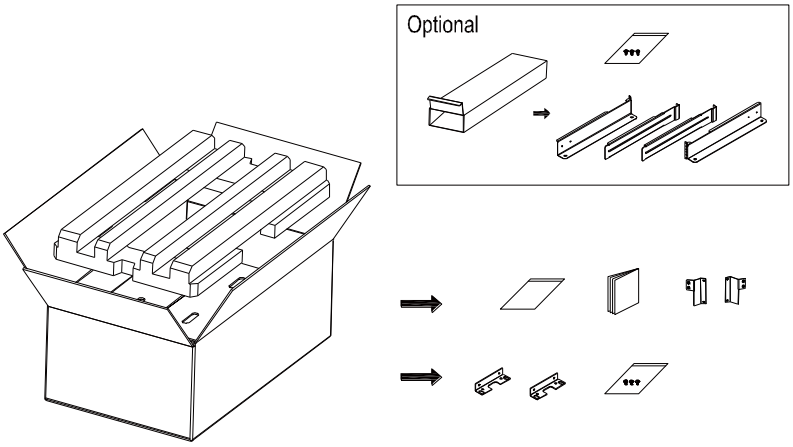


Figure 3.2: Unpacking the Carton of C500R-100-B UPS

CAUTION:

The cabinet is heavy. Lifting the cabinets out of the carton requires two persons at least.

Step 2:

With one person on each side, carefully lift the cabinet out of the outer carton using the handles on the cardboard and set it on a flat, stable surface (see Figure 3.3&3.4).

Place the cabinet in a protected area that has adequate airflow and is free of humidity, flammable gas, and corrosion.

Lifting the Cabinet:

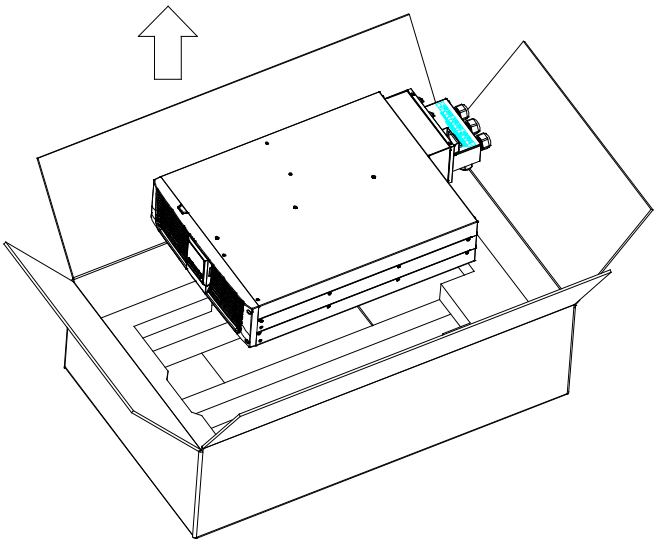


Figure 3.3: Lifting the Cabinet out of C500R-060-B carton

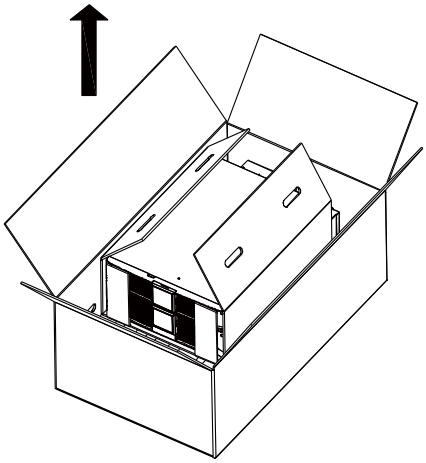


Figure 3.4: Lifting the Cabinet out of C500R-100-B carton

Step 3:

Discard or recycle the packaging in a responsible manner, or store it for future use.

3.3 UPS Rear Panel

This section shows the rear panel of the C500R models.

C500R-060-B model:

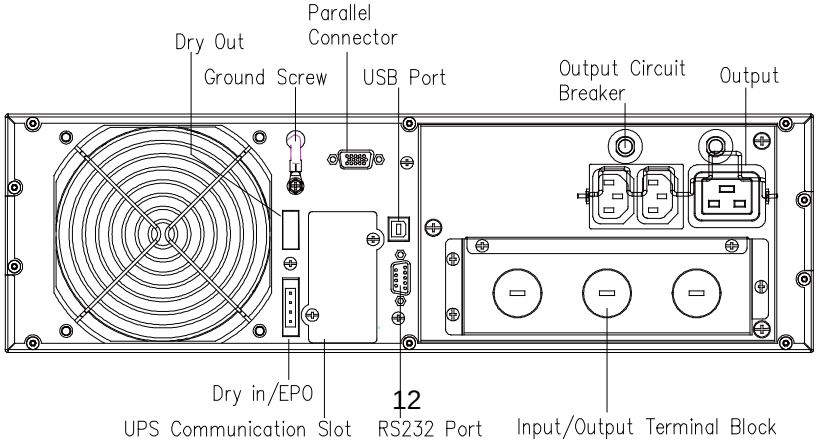


Figure 3.5: Online C500R-060-B Rear Panel

C500R-100-B model:

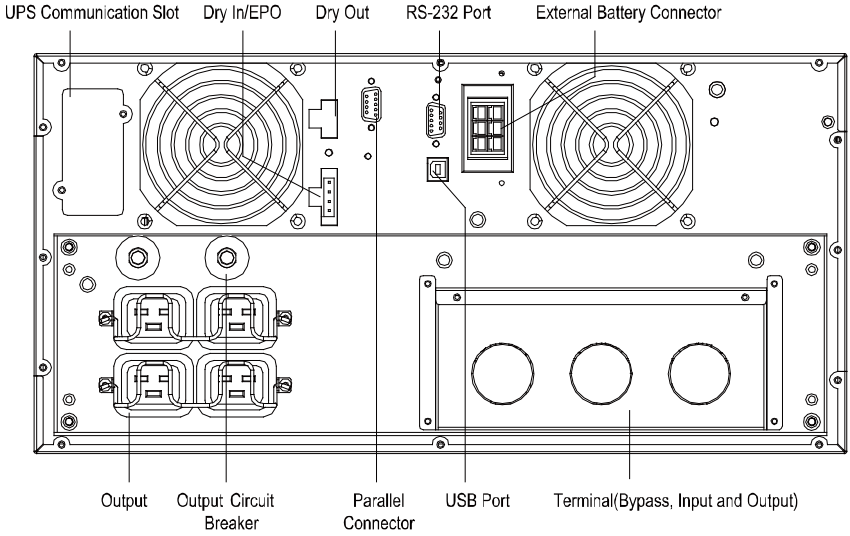


Figure 3.6: Online C500R-100-B Rear Panel

3.4 UPS Front Panel

This section shows the front panel of the Online R/T UPS. The Online series have the same LCD panel and the same control button.

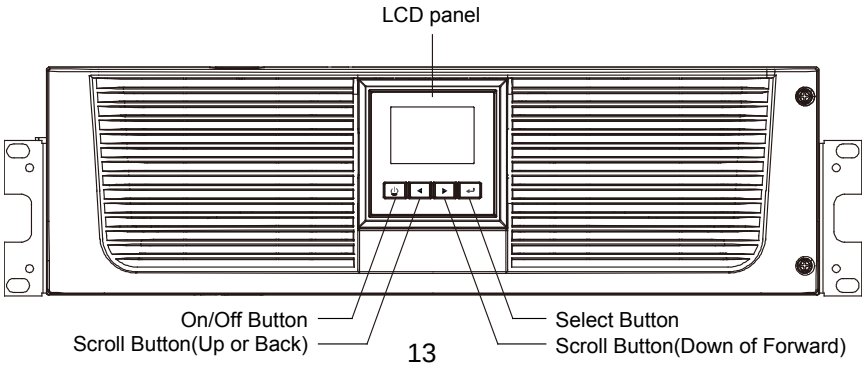


Figure 3.7: The Online R/T UPS Front Panel

3.5 Rack Mount Setup

CAUTION:

The cabinet is heavy, so:

1) Remove the battery packs from the UPS before lifting.

2) Lifting the cabinets into the rack requires a minimum of two people.

CAUTION: removal or replacement of the batteries should be performed or supervised by authorised personnel with knowledge of batteries .

CAUTION: If installing an EBM, install the EBM directly below the UPS.

3.5.1 Install the UPS and EBM (Extended Battery Modules) in a rack

1. Open the front panel and set aside.

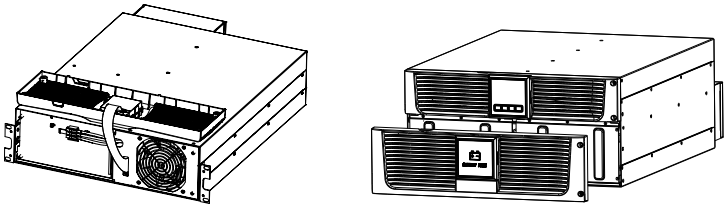


Figure 3.8. Open the front panel

(left: C500R-060-B Model, right: C500R-100-B Model)

2. Remove the battery protection plate (see Figure 3.9):

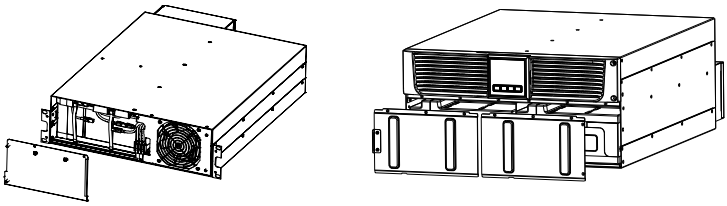


Figure 3.9. Removing the Battery Protection Plate

3. Pull the battery tray out using the plastic tabs and then remove the battery tray.(see Figure 3.10)

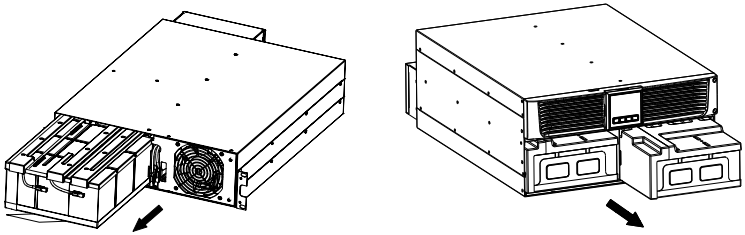


Figure 3.10: Removing the Battery Packs

4. Install the UPS and terminal box's ears to the UPS

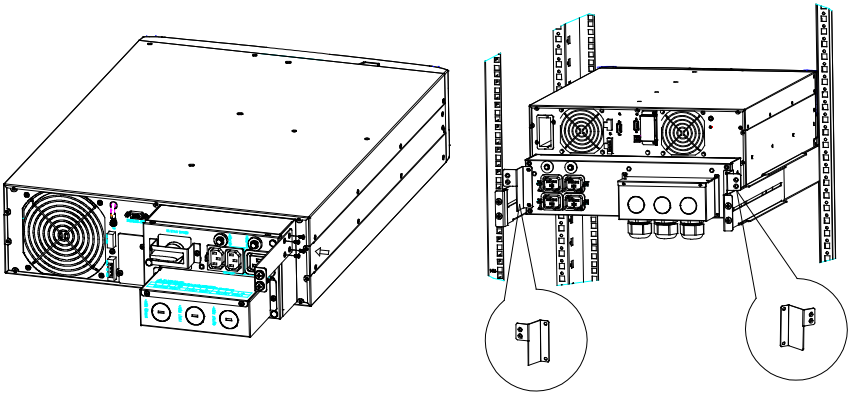


Figure 3.11: Install the UPS and terminal box's ears to the UPS

5. Select the proper holes in the rail for positioning the cabinet in the desired location in the rack. Locate the rails at the bottom of the 3U space allocated for the each UPS and EBM.
6. Install the sliding rails in the rack, then install the UPS in the sliding rail.

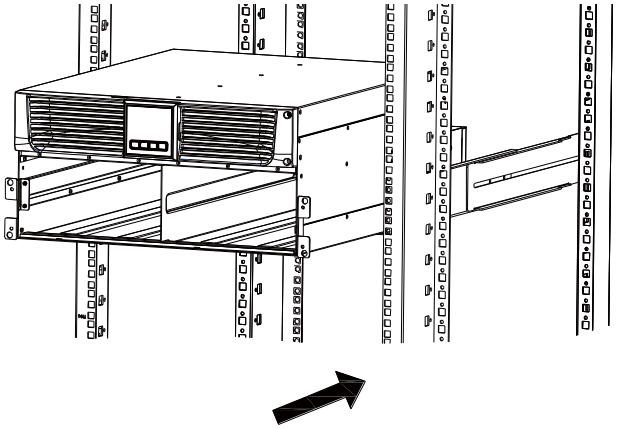


Figure 3.12: Install the sliding rails

7. For 10K---Install the battery pack and battery protection plate, then replace the front panel.

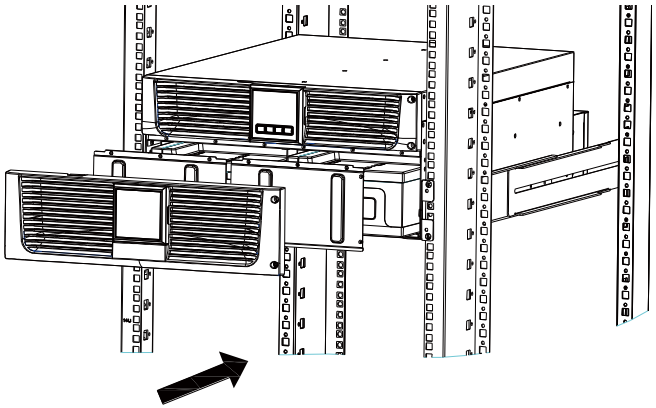


Figure 3.13: Install the UPS to the rail, then replace the front panel

8. For 6K---Replace the battery tray, and connect the internal battery connector, then replace the protection plate and the front panel.
9. If installing additional UPS, repeat from Step 1 to Step 8 for each cabinet.

3.5.2 Installing the EBMs

To install EBMs:

C500R-060-B Model:

1. Plug the EBM cable into the UPS battery connector

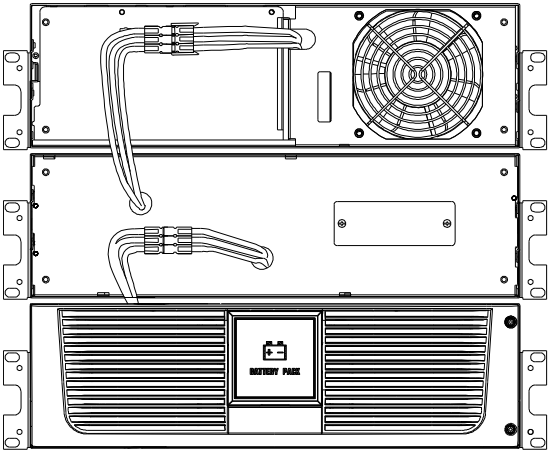


Figure 3.14. Plug the EBM cable into the UPS battery connector

2. Replace UPS's front panel and EBM's front panel.

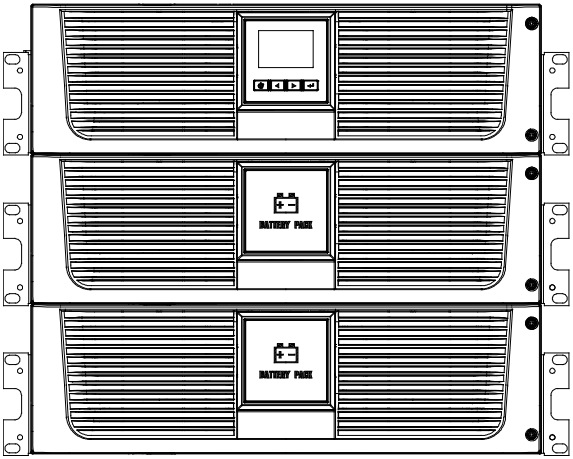


Figure 3.15. Replace UPS's front panel and EBM's front panel.

CAUTION:

Please connect the EBM to protective ground with 10mm^2 wire for B500-R100-B model firstly.

C500R-100-B Model:

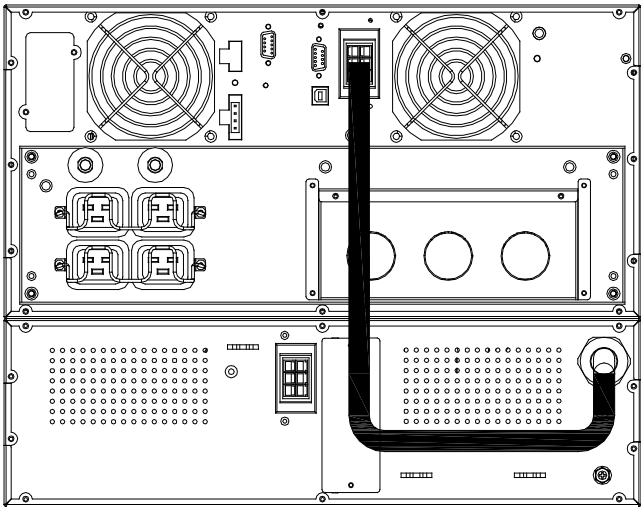


Figure 3.16. Plug the EBM cable into the UPS battery connector

3.6 Tower Setup

Tower setup as below:

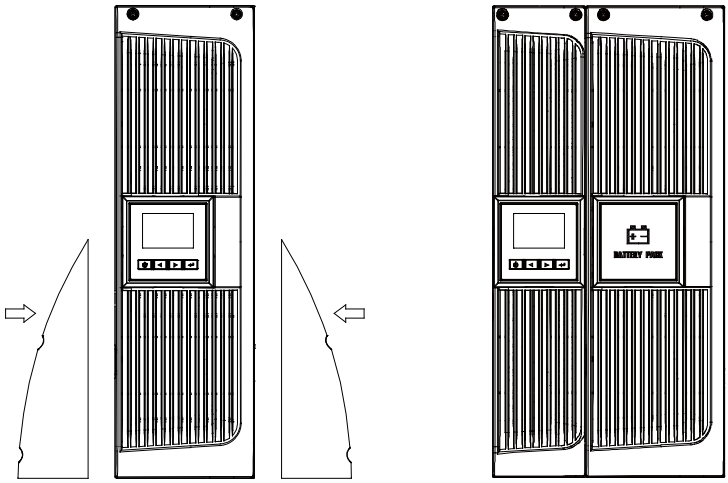
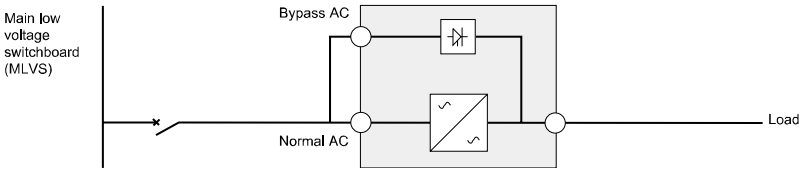


Figure 3.17. Tower setup

3.7 Installation of UPS with AC inputs

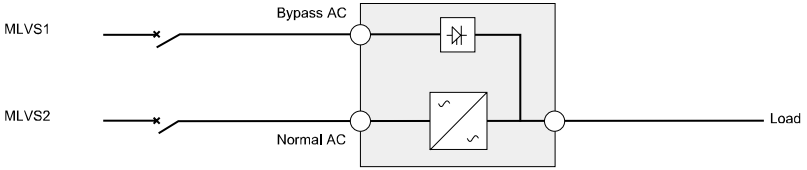
CAUTION: Online C500R-060-B/ C500R-100-B series support that the UPS can have separate AC inputs. So before connecting wires of seperate AC inputs, you should confirm that their earthing systems are identical. Otherwise, a transformer is necessary.

UPS with common Normal and Bypass AC inputs



UPS with separate Normal and Bypass AC inputs

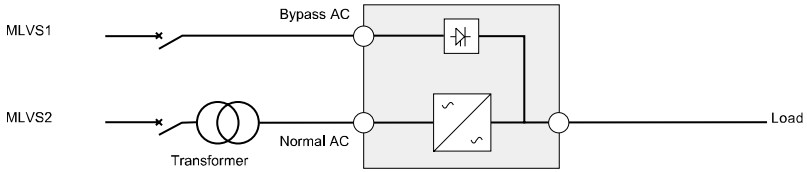
- Earthing systems are identical:



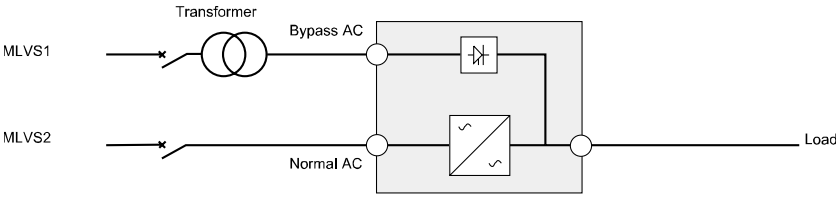
- Earthing systems are separate:

Three different installations can be choosen:

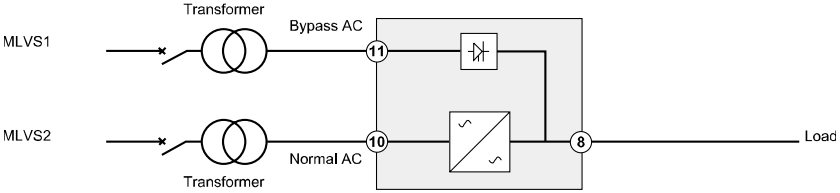
1) Transformer in the Normal AC input.



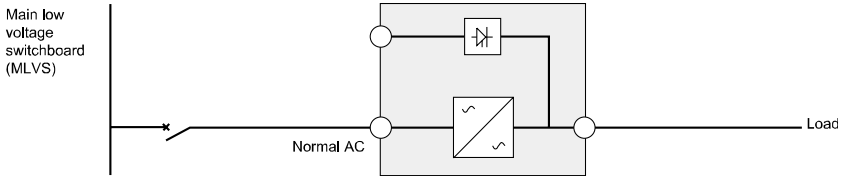
2) Transformer in the Bypass AC input.



3) Both of them have transformer



Frequency converter (without Bypass AC input)



4. Power cables connection & Startup

This section explains:

- Access to the terminal block
- Common input sources connection
- Separate input sources connection
- Frequency converter connection
- UPS initial startup

4.1 Access to terminal block

Access to terminal block: remove the 2 screws of the terminal block cover

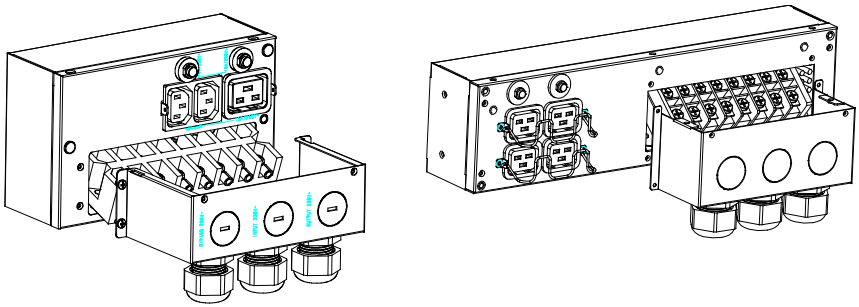


Figure 4.1. Terminal box of C500R-060-B/ C500R-100-B

4.2 Common input sources connection

CAUTION:

This type of connection must be carried out by qualified electrical personnel.

CAUTION:

Always connect the earth wire first.

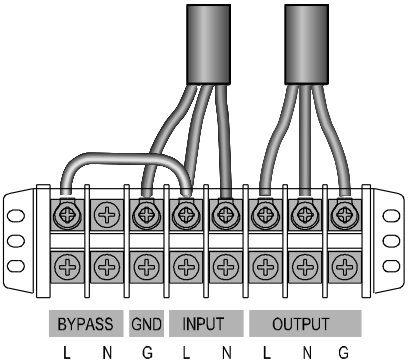


Figure 4.2. Common input sources connection

4.3 Separate input sources connection

CAUTION:

This type of connection must be carried out by qualified electrical personnel.

CAUTION:

Always connect the earth wire first.

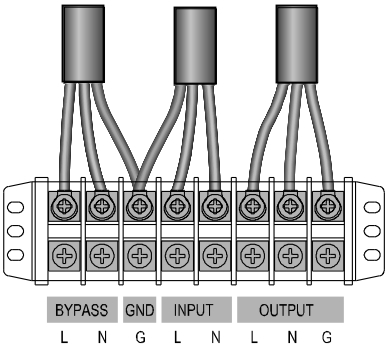


Figure 4.3. Separate input sources connection

4.4 Frequency converter connection

CAUTION:

This type of connection must be carried out by qualified electrical personnel.

CAUTION:

Always connect the earth wire first.

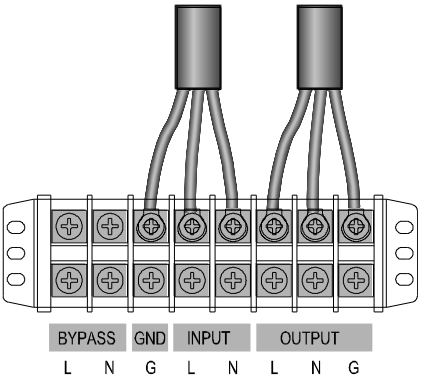
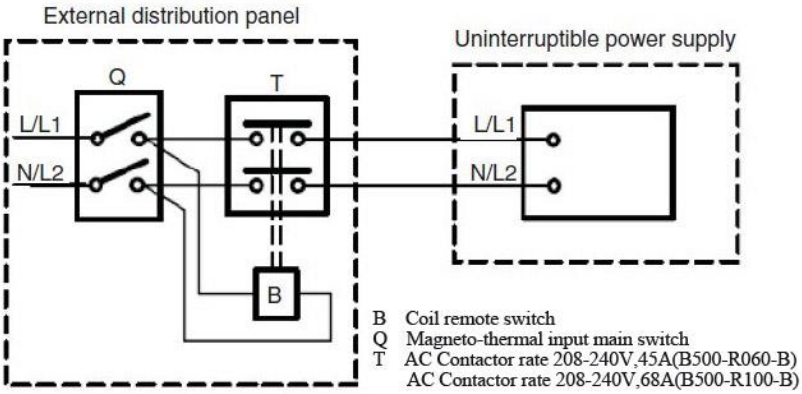


Figure 4.4. Frequency converter connection

Use cable cross section and protective device specification

Model	C500R-060-B	C500R-100-B
Protective earth conductor Min cross section	4mm² (10AWG)	6mm2(8AWG)
Input L, N, G Min conductor cross section	4mm² (10AWG)	6mm²(8AWG)
Input fuse	60A	80A
Output L,N, Min conductor cross section	4mm² (10AWG)	6mm²(8AWG)
External Battery Cabinet Positive Pole(+), Negative pole(-), Neutral Pole Min conductor cross section	4mm² (10AWG)	2.5mm²*2 (12AWG*2)
External Battery Cabinet Fuse in Positive Pole(+), Negative pole(-), Neutral Pole	60A	80A

The UPS does not have an automatic protection device against current backfeed. Installation of an external isolation device is recommended, as shown in the following illustration. Check for hazardous voltage between all terminals before operating this circuit.



4.5 UPS Initial Startup

To start up the UPS:

Verify that the total equipment ratings do not exceed the UPS capacity to prevent an overload alarm.

1. Verify that the internal batterties are connected.
2. If optional EBMs are installed, verify that the EBMs are connected to the UPS.
3. Set the upstream circuit breaker (not included) to the “I” position (ON).

   The LCD will display the logo for several seconds and then go to the default page
4. Verify that the UPS transfers to Bypass mode.

5. Press the button on the UPS front panel for at least 1 second.
6. Check the UPS display for active alarms or notices. Resolve any active alarms before continuing. See “troubleshooting”.
7. Verify that the UPS is operating normally and any loads are powered.
8. If optional EBMs are installed, see “Configuring the UPS for EBMs” to set the number of installed EBMs.
9. If an optional REPO was installed, test the REPO function:

   Activate the external REPO switch. Verify the status change on the UPS display.

   Deactivate the external REPO switch and restart the UPS.

4.6 Parallel operation

4.6.1 Brief introduction of the redundancy

The parallel structure is 1+1.As long as the UPS is equipped with parallel cables, up to 2 UPSs can be connected in parallel to configure a sharing and redundant output power.

4.6.2 Installation and operation

How to install a new parallel UPS system:

1) Before installing a new parallel UPS system, prepare the input and output wires, the input and output breakers, and the parallel cable.

2) An appropriate 15-pin communication cable should be used for this system, this should have 15 cores, corresponding stitches and shield, as the UPS parallel cable. The length of the parallel cable should be less than 3 m.
3) Follow instructions in chapter 4 for the wiring requirement of single UPS for each UPS.
4) Independent battery packs for each UPS.
5) Connect the input and output wires, fix all the wiring according to

Figure 4-5 and ensure all breakers are open.

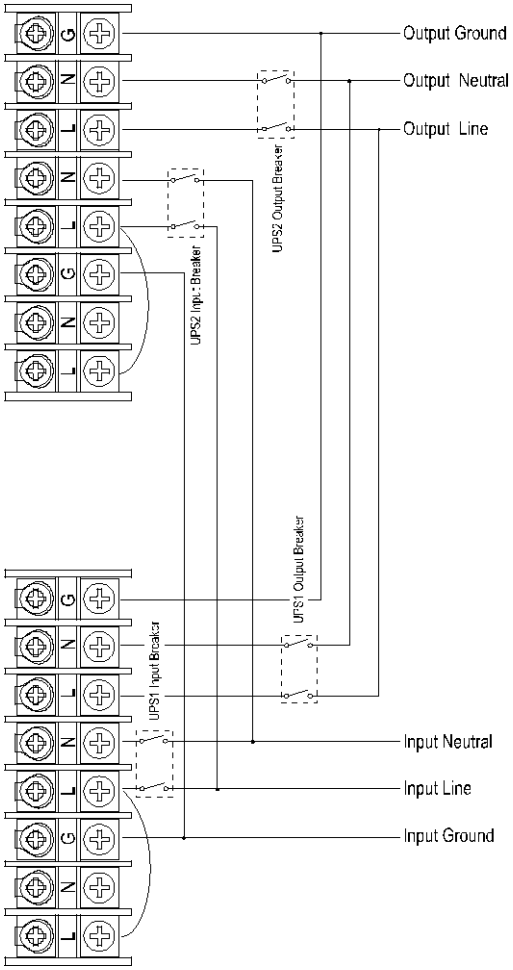


Figure 4-5.a: Parallel systerm wiring diagram of 6K/10K

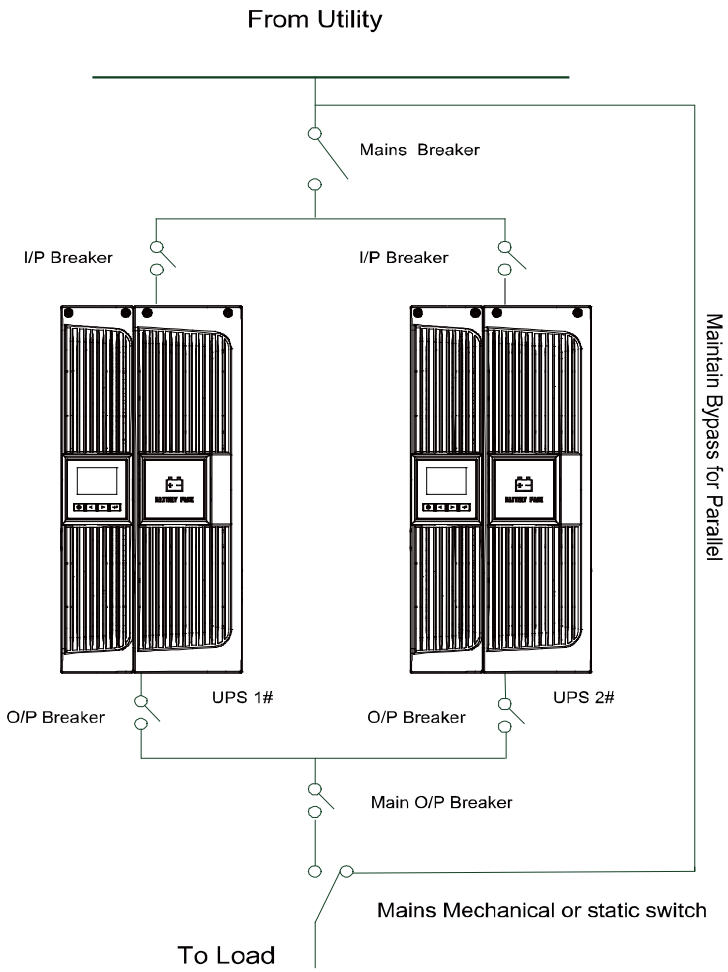


Figure 4-5.b: Parallel System Installation Diagram

6) Turn on the mains Breakers and the input breakers for the two parallel UPS.

7) Press the ⏻ button continuously for more than 1 second on one UPS in the system, then the system will start to turn on and enter line mode.
8) Regulate the output voltage of the each UPS separately, and check if the output voltage difference between the two UPS is less than 0.5V. If the difference is more than 0.5V, the UPS need to be regulated.
9) If the difference output voltage is less than 0.5V, switch on the output breakers for the two UPS separately and switch on the main O/P breakers.
10) Transfer the mains mechanical or static switch to the UPS, and then the system will work normally in parallel.

How to join a new UPS to a parallel system:

1) Firstly a main maintenance mechanical switch or static switch should be installed for the parallel system.
2) Regulate the output voltage of the new UPS: check if the output voltage difference between the new UPS and the parallel system is less than 0.5V.
3) Ensure the bypass of the parallel system is normal and the bypass setting is “enable”, then press the ⏻ button to turn off the UPS, the UPS will now work in bypass mode.
4) Set the main maintenance switch or static switch from “UPS” to “BPS”, then switch off the main output breaker, the input breaker and mains breaker. The UPS will then shut down.
5) Connect the cable and wire of the added UPS according to Figure.4-5.a and Figure.4-5.b
6) Switch on the input breakers and mains breaker, and ensure that each UPS works in bypass mode.
7) Switch on the O/P breakers and main O/P breaker. Transfer the main maintenance switch or static switch from “BPS” to “UPS”.
8) Press the ⏻ button of one UPS, each UPS will start to turn on, once initialised. The two UPS will work in parallel Line mode.

How to remove a single UPS from a parallel system:

1) Firstly a main maintenance mechanical switch or static switch should be installed for the parallel system.
2) Ensure the bypass is normal and the bypass setting is “enable”, press the ⏻ button to turn off the UPS system, and the UPS system will work in bypass mode.
3) Transfer the main maintenance switch or static switch from “UPS” to “BPS”, then switch off the output breakers, the input breakers and mains breaker for the two UPS, and the UPS will shut down.
4) Switch off the main O/P breaker and O/P breaker for the UPS system.
5) Remove the UPS and cables and wires.
6) Switch on the mains breaker and input breaker of the reserved UPS. ensure the UPS works in bypass mode.
7) Switch on the O/P breaker and main O/P breaker.
8) Transfer the main maintenance switch or static switch from “BPS” to “UPS”, and press the ⏻ button to turn on the UPS. The UPS will start to turn on. The UPS will work in Line mode.

5. Operation

5.1 Display Panel

The UPS has a four-button graphical LCD with dual colour backlight. Standard back-light is used to light up the display with white text and a blue background. When the UPS has a critical alarm, the backlight changes the text to dark amber and the background to red. See Figure below

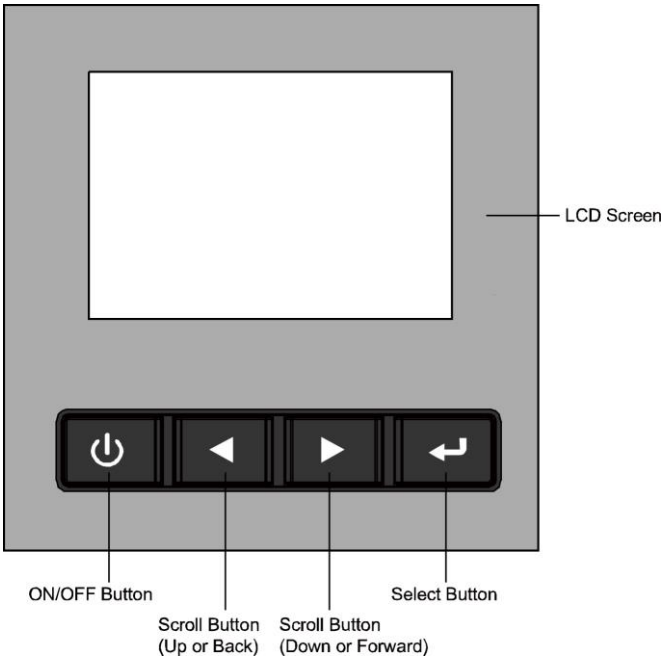


Figure. 5-1. C500R-060-B/ C500R-100-B On-line UPS Control Panel

Table 5-1 Control Button Functions

The Button	Function	Illustration
	Power on	When the unit has no power and is connected with battery, press this button for >100ms&<1s to power on
	Turn on	When the unit is powered on and in Bypass mode, press this button for >1s to turn on
	Turn off	When the unit has been turned on, press this button for >3s to turn off
	Enter main menu	When displaying default UPS status summary screen, press this button for >1s to enter the main menu tree
	Exit main menu	Press this button for >1s to exit the present menu to default system status display menu without executing a command or changing a setting
	Scroll up	Press this button for >100ms&<1s to scroll up the menu option
	Scroll down	Press this button for >100ms&<1s to scroll down the menu option
	Enter next menu tree	Press this button for >100ms&<1s to select the present menu option, or enter next menu, but do not change any setting
	Select one menu option	Press this button for >100ms&<1s to select the present menu option, or enter next menu, but do not change any setting
	Confirm the present setting	Press this button for >1s to confirm the edited options and change the setting

Table 5-2 Buzzer definition

UPS condition	Buzzer status
Fault active	Continuous
Warning active	Beep every second
Battery output	Beep every 4 seconds, if battery low, buzzer beeps every second
Bypass output	Beep every 2 minutes

The UPS provides useful information about itself:

Load status, events, measurements, identification, and settings through the front panel display.

After powering on, the LCD will display the logo for several seconds and then go to the default page which shows the UPS status summary. The display automatically returns to the default UPS status summary screen when no button has been pressed within 15 minutes.

The UPS status summary screen provides the following information:

- Status summary, including mode and load
- Alarm status, if any are present
  Notes: alarm including fault and warning information
- Battery and charger status, including battery voltage, charge level and charger status
- Running information and running time

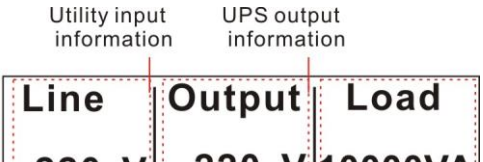


Figure.5-2. The default LCD display

More operation details for LCD are illustrated in chapter 5.4

5.2 Operating mode

Different graphic symbols could be displayed according to current operating mode or status.

5.2.1 Line mode

An example of the LCD display in Line mode is shown in the following diagram:

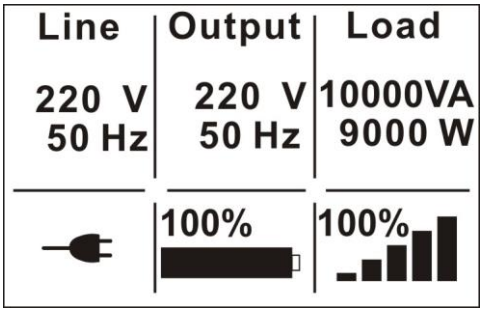


Figure.5-3. Line mode

5.2.2 Battery mode

An example of the LCD display in battery mode is shown in the following diagram:

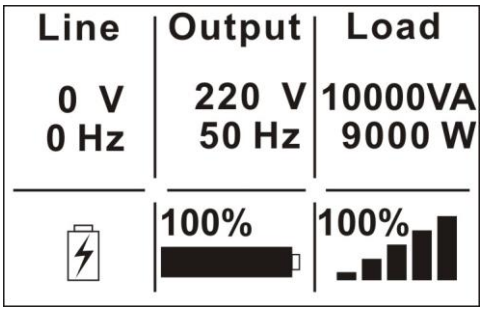


Figure.5-4. Battery mode

When the UPS is running in battery mode, the buzzer beeps once every 4 seconds.

5.2.3 Bypass with output

The LCD display in bypass mode with output is shown in the following diagram. The UPS does not have the backup function when it is in bypass mode. The power used by the load is supplied from the utility power via the internal filter. The UPS will beep once every 2 minutes in bypass mode.

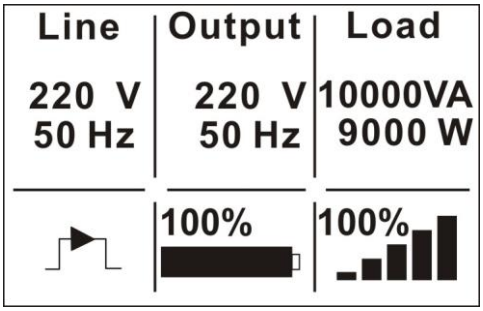


Figure. 5-5 Bypass mode with output

5.2.4 Bypass without output

The LCD display in bypass mode without output is shown in the following diagram:

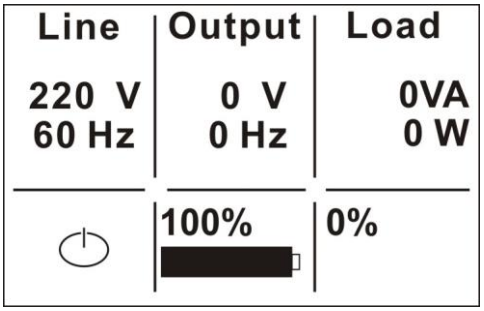


Figure. 5-6 Bypass mode without output

5.2.5 HE mode (High Efficiency mode)

When the UPS is turned on, the power is supplied from the utility power via the internal filter while the utility power is in normal range, so the high efficiency can be gained in the HE mode. Once the mains is lost or abnormal, the UPS will transfer to Line mode or Battery mode and the load is supplied continuously.

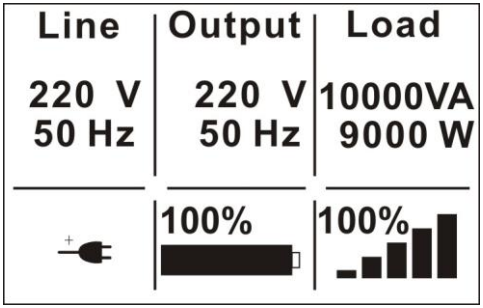


Figure. 5-7 HE mode

1) The function could be enabled through the LCD setting or the software (Winpower, etc.).

2) It should be noted that the transfer time of UPS output from HE mode to battery mode is about 10ms. But this is still too long for some sensitive loads.

5.2.6 Converter mode

In converter mode, the UPS will free run with fixed output frequency (50Hz or 60Hz). Once the mains is lost or abnormal, the UPS will transfer to battery mode and the load is supplied continuously.

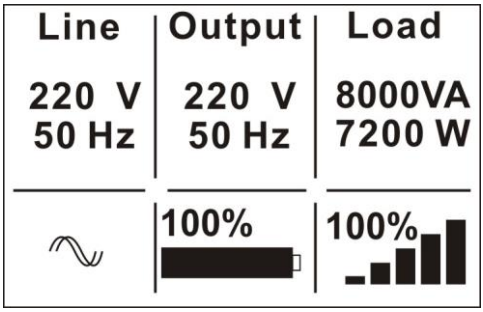


Figure. 5-8 Converter mode

1) The function could be enabled through the LCD setting or the software (Winpower, etc.).
2) The load should be derating to 80% in converter mode.

5.2.7 Warning

When a warning occurs, it indicates some abnormal problems during the operation of the UPS. Normally the problems are not serious and the UPS continues working, but they should be addressed, or the UPS may fail.

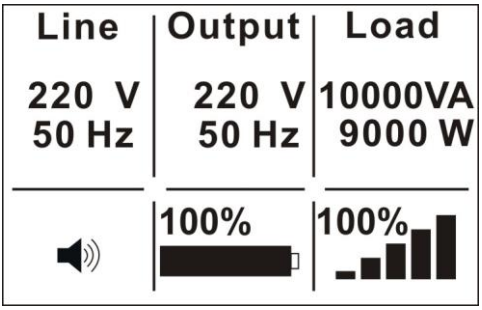


Figure. 5-9 Warning

5.2.8 Fault

When a fault occurs, the UPS will directly cut off the output or transfer to bypass, and keep alarming. The backlight of LCD will also turn to red.

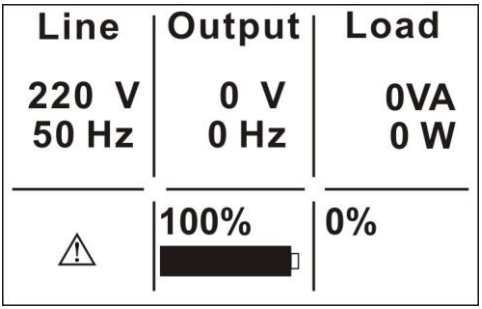


Figure. 5-10 Fault

5.2.9 Other status

When the UPS is overloaded, the alarm will beep twice every second. Some unnecessary loads should be removed one by one to decrease the loads connected to the UPS.

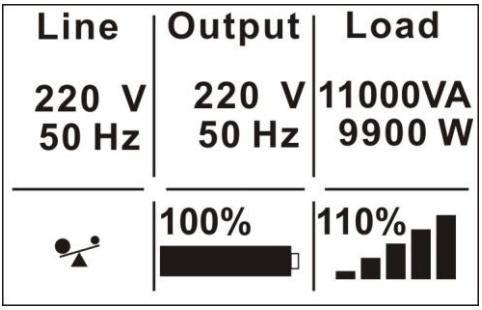


Figure. 5-11 Overload

While doing the battery test, LEDs will be illuminated and the battery test will be shown on the display.

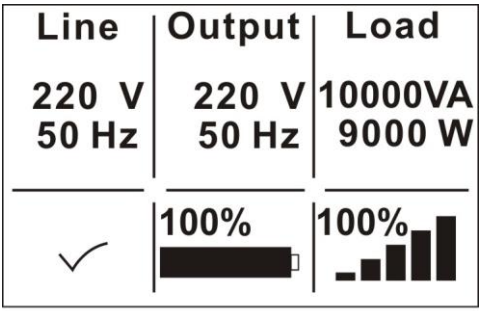


Figure. 5-12 Battery test

If the battery status detected is “bad battery detected” or “battery disconnected”, the battery failure symbol will be shown and the UPS will

alarm.

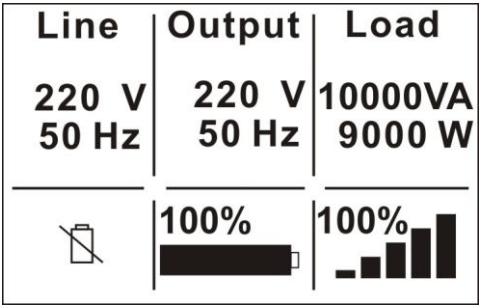


Figure. 5-13 Battery Fails

5.3 Turning on and Turning off UPS

Attention: The UPS can only be turning on when connected with the utility, for the first time.

Attention: Connected loads should be switched off before turning on the UPS. Loads should then be switched on one by one after the UPS is turned on wherever possible. Switch off all connected loads before turning off the UPS.

5.3.1 Turning on UPS with utility

1) Check all the connections are correct.
2) Power on the UPS. The fan begins to rotate and the LCD will show the logo. Then LCD will show the default UPS status summary screen.
3) Pressing ⏻ button continuously for more than 1 second. The buzzer will beep for 1 second and the UPS will start to turn on.
4) A few seconds later, the UPS goes to Line mode. If the utility power is abnormal, the UPS will transfer to Battery mode without interruption of the output of the UPS.

5.3.2 Turning on the UPS without utility

1) Check all the connections are correct.
2) Press ⏻ button continuously for more than 100ms and the UPS will power on. The fan begins to rotate and the LCD will show the logo. Then LCD will show the default UPS status summary screen after the UPS finishes the self-test.
3) Press ⏻ button continuously for more than 1 second, and the buzzer will beep for 1 second. The UPS will start to turn on.
4) A few seconds later, the UPS goes to Battery mode. If the utility power comes back, the UPS will transfer to Line mode without interruption of the UPS output.

5.3.3 Turning off the UPS with utility

1) To turn off the inverter of UPS press ⏻ button continuously for more than 3 seconds and the buzzer will beep for 3 seconds. The UPS will go into Bypass mode at once.
2) When completing the above action, UPS output voltage is still present. In order to cut off the UPS output, simply cut off the utility power supply. A few seconds later, the LCD display shuts down and no output voltage is available from the UPS output terminal.

5.3.4 Turning off the UPS without utility

1) To power off the UPS press ⏻ button continuously for more than 3 second, and the buzzer will beep for 3 seconds. The UPS will cut the output immediately.
2) A few seconds later, the LCD shuts down and no voltage is available from the UPS output.

5.4 LCD operation

The user can get more useful information about UPS: current status, detailed various measurements, previous event records which ever occurred, UPS own identification, and could change the settings to fit the user own requirements, optimize the function of UPS.

5.4.1 The main menu

In the default UPS status summary screen, when pressing ◀ or ▶ <1 second, the detailed information about the alarm, the parallel system, and the battery will be shown.

In the default UPS status summary screen, when pressing ◀ >1s, the display will enter the main menu tree.

The main menu tree includes six branches: the UPS status menu, event log menu, measurement menu, control menu, identification menu and setting menu.

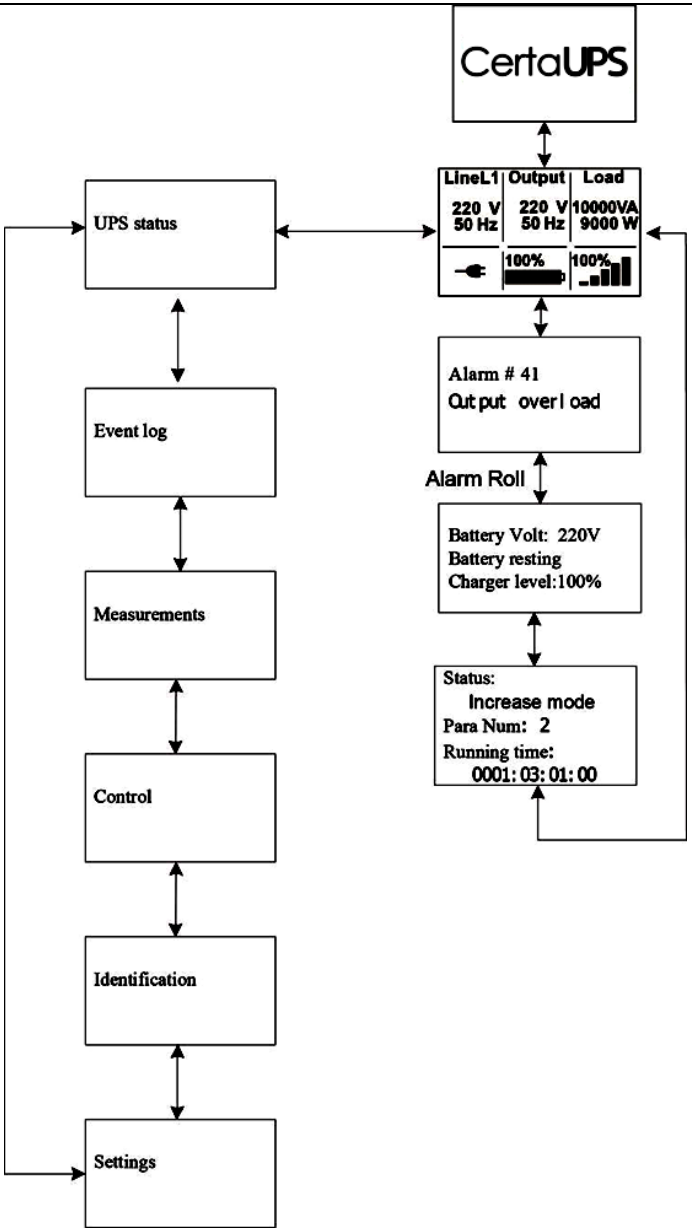


Figure. 5-14 Main menu tree

5.4.2 The UPS status menu

By pressing ↵ on the menu of “UPS status”, the display will enter the next UPS status menu tree.

The content of UPS status menu tree is the same as the default UPS status summary menu.

By pressing ◀ >1 second, the display will return the last main menu tree.

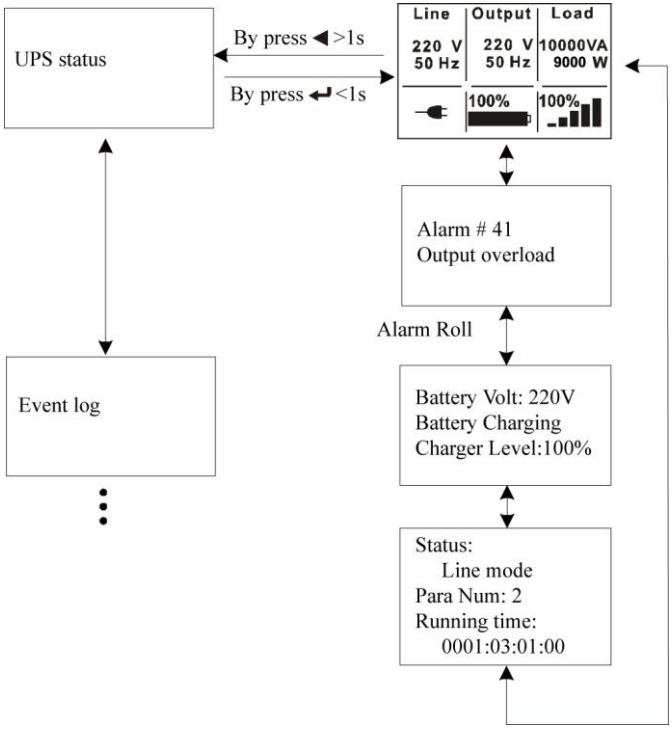


Figure. 5-15 UPS status menu tree

5.4.3 The event log menu

By pressing ↵ on the menu of “Event log”, the display will enter the next event menu tree.

All previous events, alarms and faults have been recorded here. This information includes the illustration, the event code, and the precise time when the event happened. By pressing ◀ or ▶ <1 second, all the events can be displayed one by one.

The max number of records is 50. When the number is larger than 50, the latest will replace the previous records.

By pressing ◀ >1 second, the display will return to the last main menu tree.

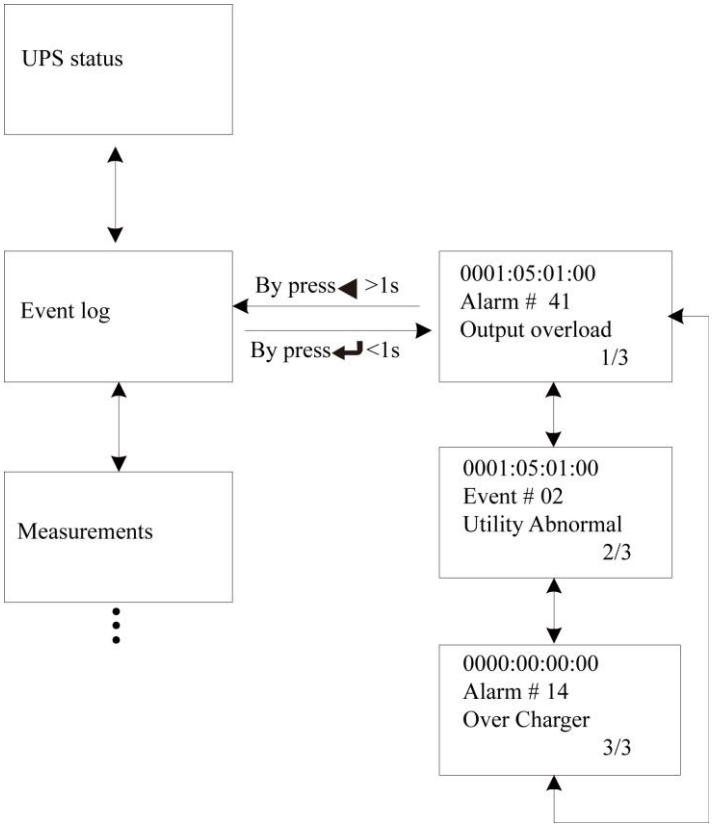


Figure. 5-16 Event menu tree

5.4.4 The measurement menu

By pressing ↵ on the menu of “Measurement”, the display will enter the next measurement menu tree.

A lot of detailed useful information can be checked here, for example. the output voltage and frequency, the output current, the load capacity, the input voltage and frequency, etc.

By pressing ◀ >1 second, the display will return the last main menu tree.

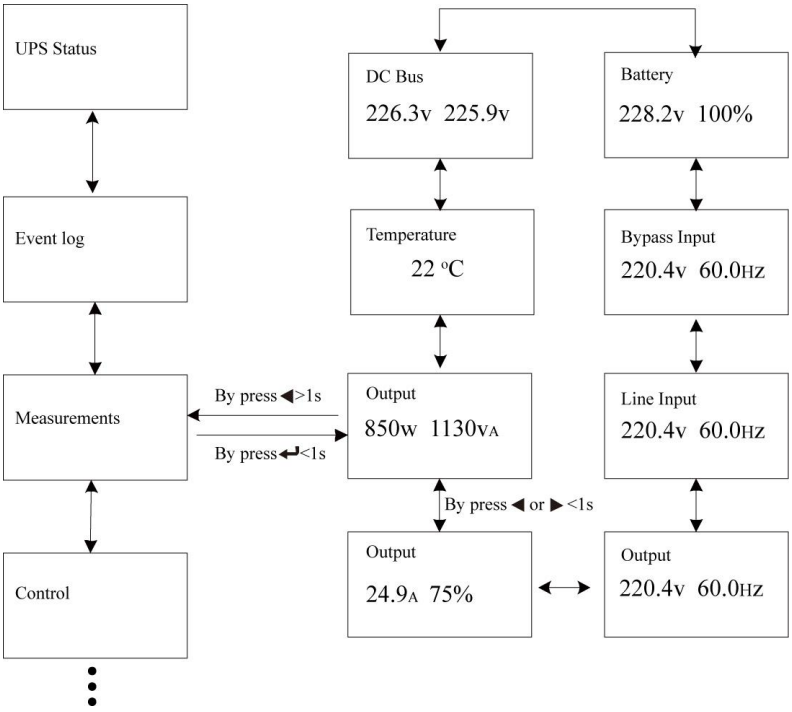


Figure. 5-17 Measurement menu tree

5.4.5 The control menu

By pressing ↵ on the menu “Control”, the display will enter the next control menu tree.

1) Start Battery Test: this instructs the UPS to do the battery test.
2) Clear EPO status: once the EPO status is enabled, the UPS output will be cut off. To recover to normal status, first the EPO connector should be closed, and enter this menu to clear EPO status, then the UPS will stop the alarm and recover to Bypass mode. The UPS should be turned on by manual operation.
3) Reset Fault status: when a fault occurs, the UPS remains in Fault mode and alarms. To recover to normal status, enter this menu to reset error status, then the UPS will stop the alarm and recover to Bypass mode. The cause of the fault should be checked and dealt with before the UPS is turned on again by manual operation.
4) Restore factory settings: all the settings can be recovered to default factory settings. This can only be done in Bypass mode.

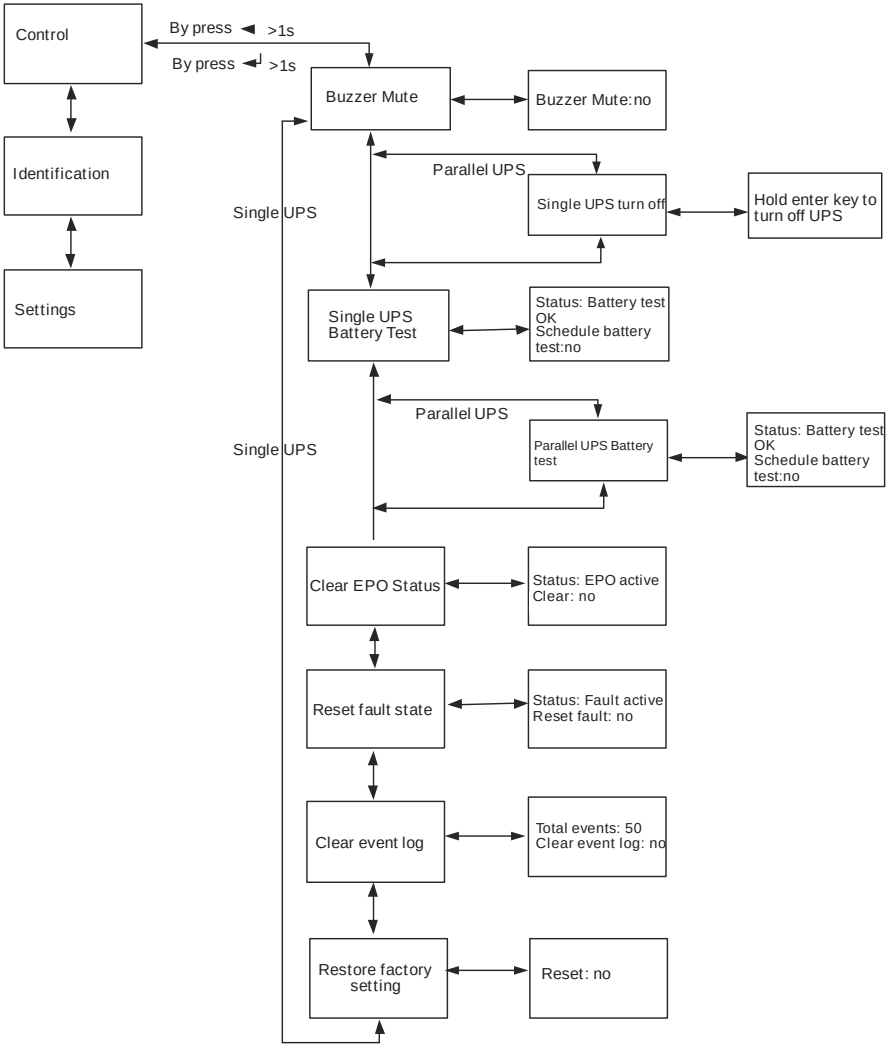

Control
By press >1s
By press >1s
Identification
Settings
Buzzer Mute
Buzzer Mute:no
Parallel UPS
Single UPS
Single UPS turn off
Hold enter key to turn off UPS
Single UPS Battery Test
Status: Battery test OK Schedule battery test:no
Parallel UPS
Single UPS
Parallel UPS Battery test
Status: Battery test OK Schedule battery test:no
Clear EPO Status
Status: EPO active Clear: no
Reset fault state
Status: Fault active Reset fault: no
Clear event log
Total events: 50 Clear event log: no
Restore factory setting
Reset: no

Figure. 5-18 Control menu tree

5.4.6 The identification menu

By pressing ↵ on the menu of “Identification”, the display will enter the next identification menu tree.

The identification information includes the UPS serial number, firmware serial number, model type, will be shown here.

By pressing ◀ >1 second, the display will return the last main menu tree.

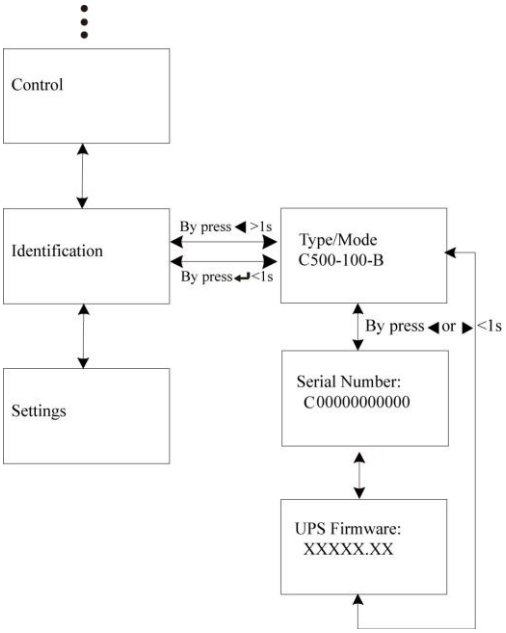


Figure. 5-19 Identification menu tree

5.4.7 The setting menu

Please contact your local distributor for further information before using the settings. An inappropriate option setting by user may result in potential failure or protecting function loss, even directly damage the

load, battery or UPS. Most of settings could only be changed while UPS is in Bypass mode.

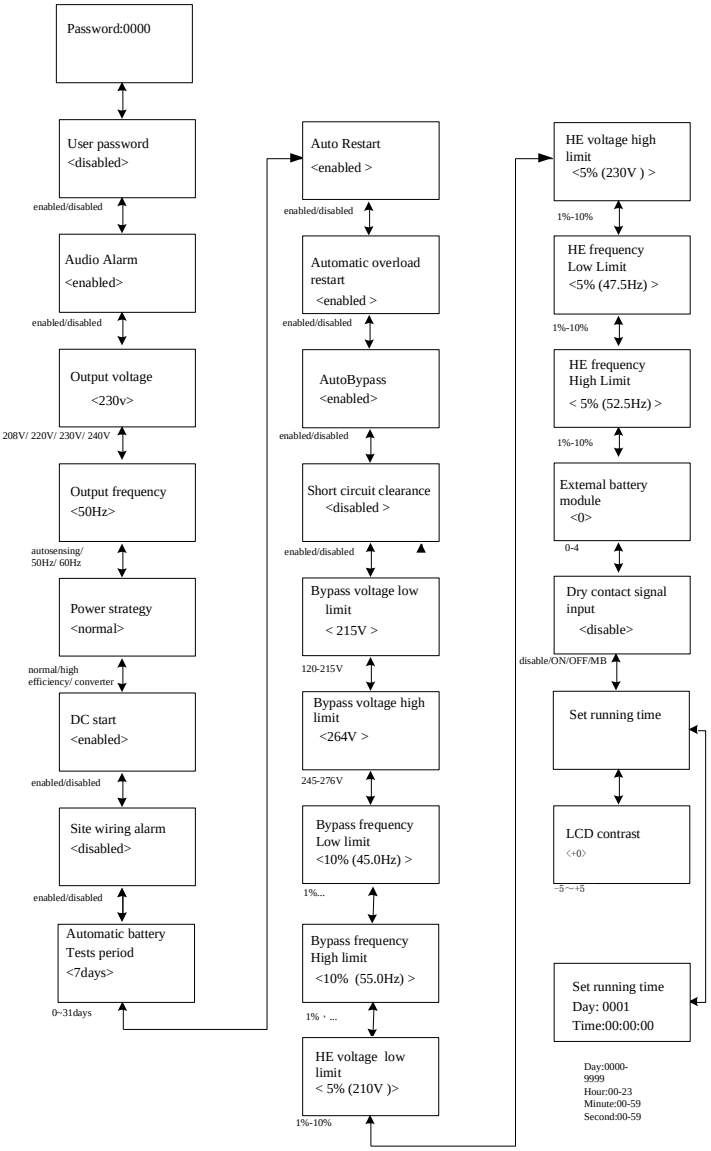


Figure 5-19:Setting menu tree

Example: set rated output voltage value

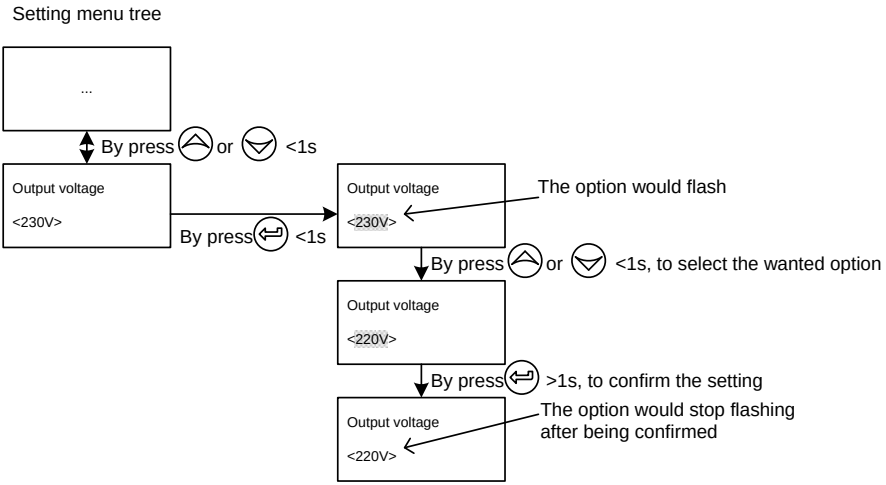


Figure 5-20:Set rated output voltage value

6. UPS Maintenance

This chapter explains how to:

- Care for the UPS and batteries
- Transport the UPS
- Store the UPS and batteries
- Test the batteries
- Recycle the used Battery or UPS

6.1 UPS and Battery Care

For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner. For full battery life, keep the UPS at an ambient temperature of 25°C (77°F)

Note: The batteries in the UPS are rated for a 3-5 year service life. The length of service life depends on the frequency of usage and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 5 years to keep units running at peak efficiency.

6.2 Transporting the UPS

NOTE: The internal UPS batteries MUST be disconnected before transport.

CAUTION: The following procedure should be performed or supervised by personnel knowledgeable about batteries and the required precautions.

If the UPS requires any type of transportation, the batteries must be disconnected (but not removed) before the unit is transported:

1. Verify that the UPS is off and disconnected from utility power.
2. Place the UPS on a flat, stable surface with the front of the cabinet facing you.
3. Remove the UPS front cover
4. Disconnect the internal battery connectors
5. Replace the UPS front cover

6.3 Storing the UPS and Batteries

If you store the UPS for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The batteries charge to 90% capacity in approximately 4 hours. However, it is recommended that the batteries charge for 48 hours after long-term storage.

Check the battery recharge date on the shipping carton label. If the date has passed and the batteries were never recharged, do not use the UPS. Contact your service representative.

When to Replace Batteries

When the status summary screen displays the UPS fault icon with the “Service

Battery" alarm and the audible alarm sounds continuously, the batteries may need replacing. Contact your service representative to order new batteries.

6.4 Testing Batteries

For a battery test, please check:

- The batteries must be fully charged.
- The UPS must be in Normal mode with no active alarms.
- The load must be higher than 10%.

To test batteries:

1. Connect the UPS to utility power for at least 48 hours to charge the batteries.
2. Press the ◀ button for one second to go to the main menu selection and scroll down to the Control menu using the ▶ button.
3. Press the ↵ button to enter the Control menu.
4. Use the ▶ button to scroll to the Battery Test option.
5. Press the ↵ button to start the battery test.

During the battery test, the UPS transfers to Battery mode and discharges the batteries for 25% of the original expected runtime. The status screen displays "Battery test running" and the percentage of the test completed. The results display on the UPS status screen on completion.

6.5 Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

7. Specifications

This chapter provides the following specifications:

- Model list
- General Specification
- Electrical Performance
- Environmental and Safety

7.1 Electrical specification

Model	C500R-060-B model	C500R-100-B model
Output		
Power Capacity	6KVA/5.4KW	10KVA/9KW
Voltage Range	208VAC/220VAC/ 230VAC/ 240VAC	208VAC/220VAC/ 230VAC/ 240VAC
Frequency	50/60Hz	50/60Hz
Voltage Distortion	<5%@Nonlinear load <2%@Linear load	<5%@Nonlinear load <2%@Linear load
Over Load	Line Mode: 2mins 102% ~ 130% 30s 130% ~ 150% 100ms >150% Battery Mode: 10s 102% ~ 130% 100ms >130%	
Efficiency		
Line mode	>92%	>93%
ECO mode	>96%	>97%
Battery mode	>89%	>90%
Input		
Input wire	1 Ph (L1,L2/N)+ PE	
Input Type	Support dual input	
Phase	single	

Voltage Range	176-276Vac	
Frequency Range	(45~55)/(54~66)Hz	
Current	26.4A@230Vac	44.0A@230Vac
Power Factor	≥ 0,99 @100% Nominal Load ≥ 0,98 @50% Nominal Load ≥ 0,95 @25% Nominal Load	
THDI	< 5 %@Full load and battery full charged	
Battery & Charger		
Battery	180VDC/5Ah	240VDC/9Ah
Current	39A	48A
Charger current	>1A	>1.7A

7.2 Dimension and Weight

Dimension (W*D*H) mm	438*748*129	438*744*215.5
Net Weight (KG)	46	82.5
Gross Weight (KG)	50	87.5

7.3 Operating Environment

Item	Specification/Function	Standards/Comments
Cooling	Force Air Cooling	
Operating Temperature Range	0°C ~ 40 °C	Nominal power & continuous operating mode
Storage Temperature	-15°C~60°C	UPS
	0~35°C	Battery
Relative Humidity	0-95%	No condensing
Altitude	<1000m for Nominal power	Over 1000 m the power derating is 1 % every 100 m
Acoustic Noise	<55dB	

8. Troubleshooting

The online series UPS is designed for durable, automatic operation and issues alarms to alert you whenever potential operating problems occur. Usually the alarms shown by the control panel do not mean that the output power is affected. Instead, they are preventive alarms intended to alert the user. Active alarms are accompanied by an audible buzzer.

The control panel provides troubleshooting information from two main menus:

- UPS status menu: Access to all active alarms
- Event Log menu: Access to the most recent 50 events, which may include active and closed alarms

8.1 Typical Alarms and Conditions

Alarm or Condition	Possible cause	Action
ON Maintenance Bypass Alarm Code: 72	UPS was manually commanded to switch to bypass and will remain in bypass until commanded out of bypass	Check the maintain bypass switch status
In Battery Mode Alarm Code: 62	A utility failure has occurred and the UPS is in Battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
In Eco Mode Alarm Code: 63	The UPS is on bypass while operating on the High Efficiency setting.	The equipment transferred to bypass utility power as a normal function of High Efficiency operation. Battery mode is available and your equipment is protected.
Epo Active Alarm Code: 71	The external contacts in the rear of the UPS are configured for REPO operation and they have been activated.	Check the EPO connector status

Site Wiring Fault Alarm Code: 04	Site Fault detection is supported on all models anytime there is a Grounding Neutral connection. Alarm triggers when the difference between ground and neutral voltage is > 15v.	Site Fault detection should be enabled by default. It can still be enabled / disabled from the LCD settings menu. Reconnect all input wires
Utility Abnormal Alarm Code: 02	Utility is out of the tolerance of input	Check input mains condition
Back feed Alarm Code:93	UPS has a unexpected bypass current on battery mode	Transfer to maintenance bypass and call service.
Battery Disconnect Alarm Code:11	Battery voltage is lower than the batteries disconnected level defined for this UPS. This may be due to a blown fuse, intermittent battery connection or battery cable being disconnected.	Verify that all batteries are properly connected. If the condition persists, contact your service representative.
Battery low Alarm Code:12	The UPS is in Battery mode and the battery is running low	This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS load and number of Extended Battery Modules(EBMs), the “Battery Low” warning may occur before the batteries reach 25% capacity
Service Battery Alarm Code:13	A faulted battery string has been detected and as a result the battery charger has been disabled until it is replaced	Contact your service representative
Output Overload	Output is overload.	Remove some of the

Alarm Code:41		equipment from the UPS. The UPS continues to operate, but may switch to Bypass mode or shutdown if the load increases. The alarm resets when the condition becomes inactive.
Inv Overload Fault Alarm Code:42	UPS has transferred to bypass or fault mode because of overload in inverter mode	The UPS transfers to Battery mode if supporting the load. Remove some of the equipment from the UPS
Byp Overload Fault Alarm Code:43	UPS has cut off the output and transferred to fault mode because of overload in bypass mode or HE mode.	Remove some of the equipment from the UPS
Output Short Circuit Alarm Code:31	Indicates that the UPS has detected abnormally low impedance placed on its output and considers it a short circuit	Remove all the loads. Turn off the UPS. Check if UPS output and loads is short circuit. Ensure short circuit is removed before turning on again.
Fan Failure Alarm Code:84	Indicates that the fan could not work normally.	Check fans of UPS
Heatsink Over Temperature Alarm Code: 81	Indicates that the temperature of heatsink is too high, UPS will get over temperature fault soon.	If the UPS transferred to Bypass mode, If the condition persists, shut down the UPS. Clear vents and remove any heat sources. Allow the UPS to cool. Ensure the airflow around the UPS is not restricted. Restart the UPS.
Ambient Over Temperature Alarm Code:82	Indicates that the ambient temperature is higher than the operation temperature on specification	
BUS Over Voltage Alarm Code:21	Indicates that the UPS get BUS over voltage fault because of BUS.	The UPS transfers to Bypass mode if supporting the load

BUS Under Voltage Alarm Code:22	Indicates that the UPS get BUS under voltage fault	The UPS transfers to Bypass mode if supporting the load
BUS Unbalance Alarm Code:23	Indicates that the positive BUS voltage and negative BUS voltage are too lopsided to fault	The UPS transfers to Bypass mode if supporting the load
BUS Short Alarm Code:24	Indicates that the BUS voltage decrease very fast	Contact your service representative
BUS Softstart Fail Alarm Code:25	Indicates that the BUS could not soft start successfully	Contact your service representative
Inv Over Voltage Alarm Code:32	Indicates that the UPS get invert over voltage fault	The UPS transfers to Bypass mode if supporting the load
Inv Under Volatge Alarm Code:33	Indicates that the UPS get inverter under voltage fault	The UPS transfers to Bypass mode if supporting the load
Inv Softstart Fail Alarm Code:34	Indicates that the inverter could not soft start successfully	Contact your service representative
Charger Fail Alarm Code:15	Indicates that the UPS has confirmed the charger has failed	The UPS turns off the charger until the next power recycle. Contact your service representative
Battery Over Voltage Alarm Code:16	Indicates that the battery voltage is too high	The UPS will turn off the charger until the battery voltage is normal
Fatal eeprom Fault Alarm Code:A3	Indicates that the UPS could not read eeprom successfully	Contact your service representative
Negative power Fault Alarm Code: E1	In parallel system，power of UPS is negative	Redundancy mode，the fault UPS turn to fault mode without output Increase mode，UPS1& UPS2 turn to fault mode

Parallel cable loss Alarm Code: E2	In parallel system，parallel cable disconnect	Disconnect parallel cable one turn to fault mode
Parallel system battery status Alarm Code: E6	UPS1 connect battery，UPS2 without battery	Check battery connect status
Line input different Alarm Code: E7	Parallel system，UPS1 line ok，UPS2 line loss	Check the line input
Bypass input different Alarm Code: E8	Parallel system，UPS1 bypass ok，UPS2 Bypass loss	Bypass different，not allow turn on UPS. Check bypass input
Power strategy different Alarm Code: E9	Parallel system，UPS OP mode（normal，converter，HE） different	Check UPS OP mode, Keep OP mode be the same
Rate power different Alarm Code: EA	Parallel system rate power different	Rate power different，not allow turn on UPS. Keep rate power be the same
HE in parallel Alarm Code: EB	Parallel system，OP mode set as HE	HE not allow in parallel system，change OP mode

9. Communication

9.1 USB Interface

The USB port is compliant with USB 1.1 protocol for its communication software.

9.2 RS-232 Interface

The RS-232 port is available for UPS monitoring, control, and firmware updates.
The cable pins for the RS-232 communication port are identified in the following illustration.

RS-232 communication port pin assignments

Pin	Signal name	Function	Direction from the UPS
1		Unused	Not applicable
2	Tx	Transmit to external device	Out
3	Rx	Receive from external device	In
4		Unused	Not applicable
5	GND	Signal common	Not applicable
6		Unused	Not applicable
7		Unused	Not applicable
8		Unused	Not applicable
9		Unused	Not applicable

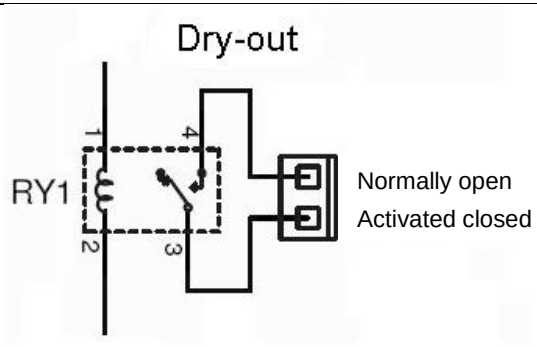
9.3 Dry contact Interface

The UPS incorporates build-in single programmable relay output with potential free contact for remote alarm indication: Dry out port; And incorporates single signal input: Dry in port. See figure in the UPS rear panel for the locations of the ports.

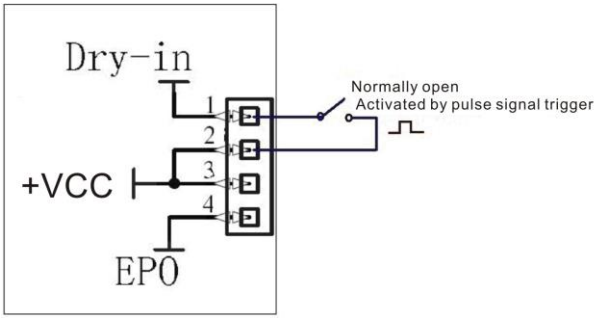
The relay output can be configured by protocol command setting, the default output contact is “Summary Alarm”; The signal input to control UPS On/Off status does not need to be configured, its function is the same as one button to control UPS On/Off status.

Note: The relay output contact must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The relay output contact has a maximum rating of 30Vac/1A and 60Vdc/2A normal values.

The following figures show schematic of the dry out/in contacts.



Dry out contact schematic



Dry in contact schematic

The following table shows the options for the dry out/in contacts

Dry out signal	**Description**
Summary Alarm	Activated when any warning happens
On Battery	Activated when the UPS operates on battery
Battery Low	Activated with the battery low alarm
UPS ok	Activated when the UPS has no alarms and no fault.
On Bypass	Activated when the UPS has bypass output.
Dry in signal	**Description**
UPS Off/On	Activated by >100ms pulse, the UPS turns off when UPS is on inverter; the UPS turns on when UPS is not on inverter. It is the same as a remote button to control UPS On/Off status.

Maintain bypass	Activated by >100ms pulse, the UPS will turn to bypass mode and warning when it is activated, just like maintain switch action. The warning would disappear if the trigger pulse disappeared for one second.

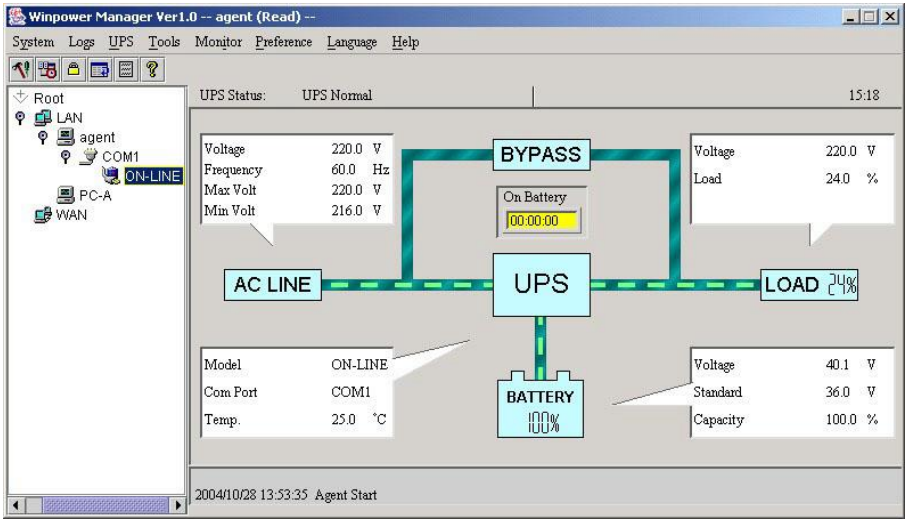
9.4 Intelligent slot

This series is equipped with an intelligent slot for other optional card to achieve remote management of the UPS through internet / intranet. Please contact your local distributor for further information.

10. Software

Free Software Download – WinPower

WinPower is a new software for UPS monitoring, which provides user-friendly interface to monitor and control your UPS. This unique software provides safely auto shutdown for multi-computer systems while power failure. With this software, users can monitor and control any UPS on the same LAN no matter how far from the UPSs.



Installation procedure:

1. Go to the website:

   http://www.certaups.com/software

2. Choose the operation system you need and follow the instructions described on the website to download the software.
3. When downloading all required files from the internet, enter the product key: **511C1-01220-0100-478DF2A** to install the software.

Restart your computer after finished installation, the WinPower software will appear as a green plug icon located in the system tray, near the clock.