B400R Online UPS

User Manual

B400R-010-B (C)

B400R-020-B (C)

B400R-030-B (C)

208/220/230/240VAC

Contents Page

1. Safety and EMC Instructions

Please read carefully through the following user manual and safety instructions before installing and using the UPS.

1.1 Installation

- Read through the installation instructions before connecting UPS system to the supply.
- 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. Please allow an acclimatisation time of at least two hours.
- Do not install the UPS near water or in a damp environment. Do not install the UPS where it would be exposed to direct sunlight or near a heat source.
- Do not connect appliances which would overload the UPS (e.g. laser printers, etc) to the UPS output.
- Install cables in such a way that no one can step on or trip over them.
- Assure UPS system and external battery source are earthed appropriately by a competent person.
- Only connect the UPS to an appropriately earthed shockproof supply.
- Connections to the UPS must be easily accessible for maintenance and servicing purposes.
- Once equipment has been installed, the sum of the leakage current of the UPS and the connected load must not exceed 3.5mA.
- Do not block ventilation openings in the UPS's housing. Ensure the air vents on the front and rear of the UPS are not blocked. Allow at least 25cm of clearance space on each side to allow correct ventilation.
- The UPS has been provided with an earthed terminal, during installation, equipotential earth bonding to the external battery cabinets should be made.
- An appropriate disconnection device as short-circuit backup protection should be provided in the buildings wiring installation. Please see the disconnection device specification in chapter 4.2.
- The equipment is powered by more than one source.

1.1.1 Inspection of Unit

Inspect the UPS upon arrival. If the UPS is apparently damaged during shipment, please keep the box and packaging material in its original form for the courier and notify the Borri immediately.

1.1.2 Unpacking the Cabinet

To unpack the system:
1. Open the outer carton and remove the accessories packaged with the cabinet.
2. Carefully lift the cabinet out of the outer carton and set it on a flat, stable surface.
3. Discard or recycle the packaging in a responsible manner, or store it for future use.

1.1.3 UPS Setup

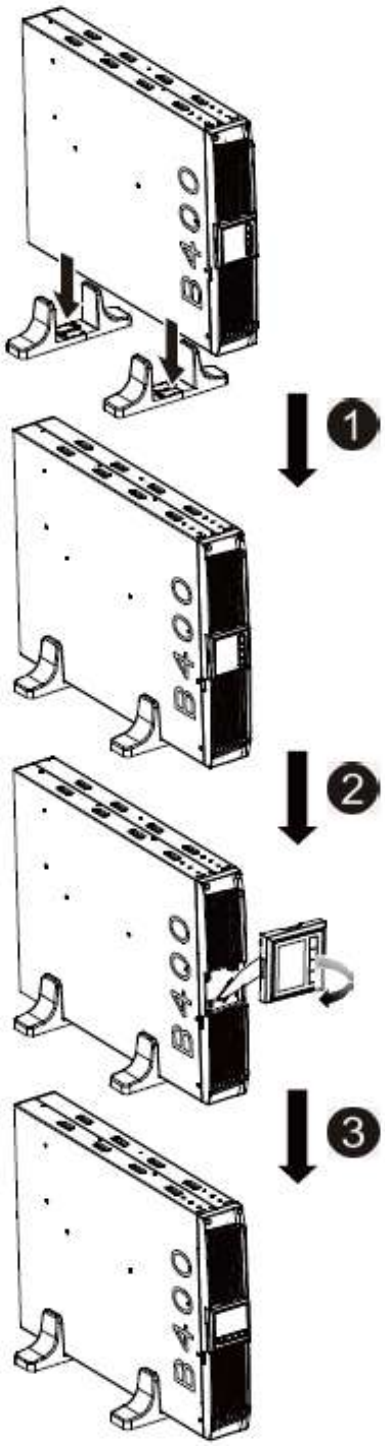
All models of the B400R series are designed for tower and rack purpose. They can be installed into a 19 inch equipment rack or installed within a provided stand as a tower. Please follow the below instruction for Tower or Rack-Mount Setup.

- **Tower setup**

The B400R Series can be installed horizontally and vertically. As a tower configuration, it is provided with optional UPS stands to stabilize the UPS. The UPS stand must be attached to the bottom of the tower. Use the following procedure to install the UPS within the stands.

1. Position the UPS stands appropriately so that 1 stand will be at either end of the UPS.
2. Lift and carefully place down the UPS within the stands.
3. Pull out the LCD box carefully and rotate it in a clockwise direction by 90 degrees and then place it back in the front panel.

Illustrations are shown on the page below.


B400
1
B400
2
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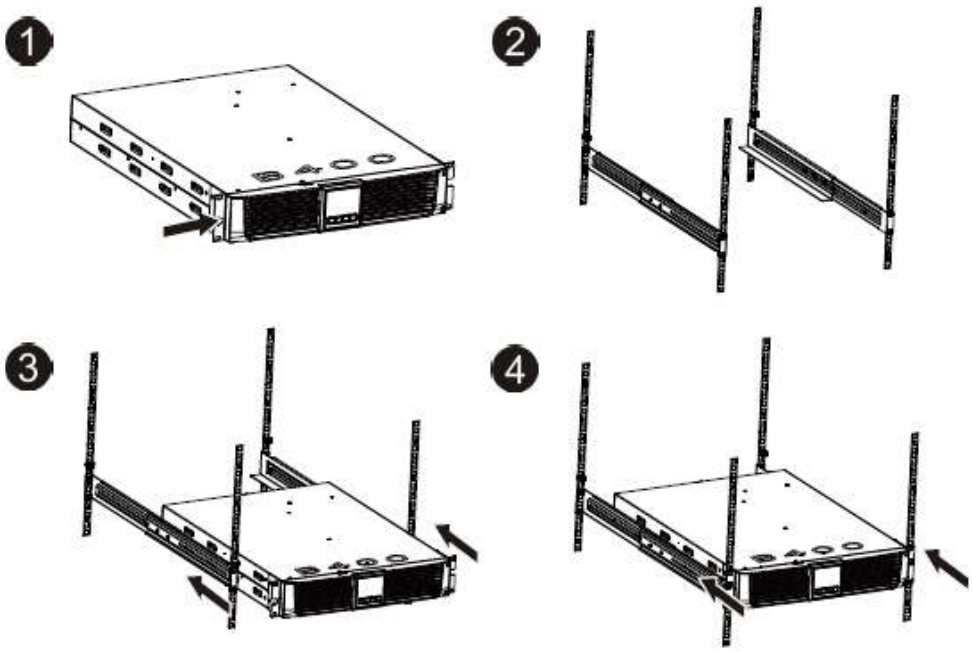
- **Rack-mount setup**

The B400R series can also be installed in a 19 inch rack. Both the UPS and external battery enclosure(S) require 2U of rack space each. Use the following procedure to install UPS in a rack:

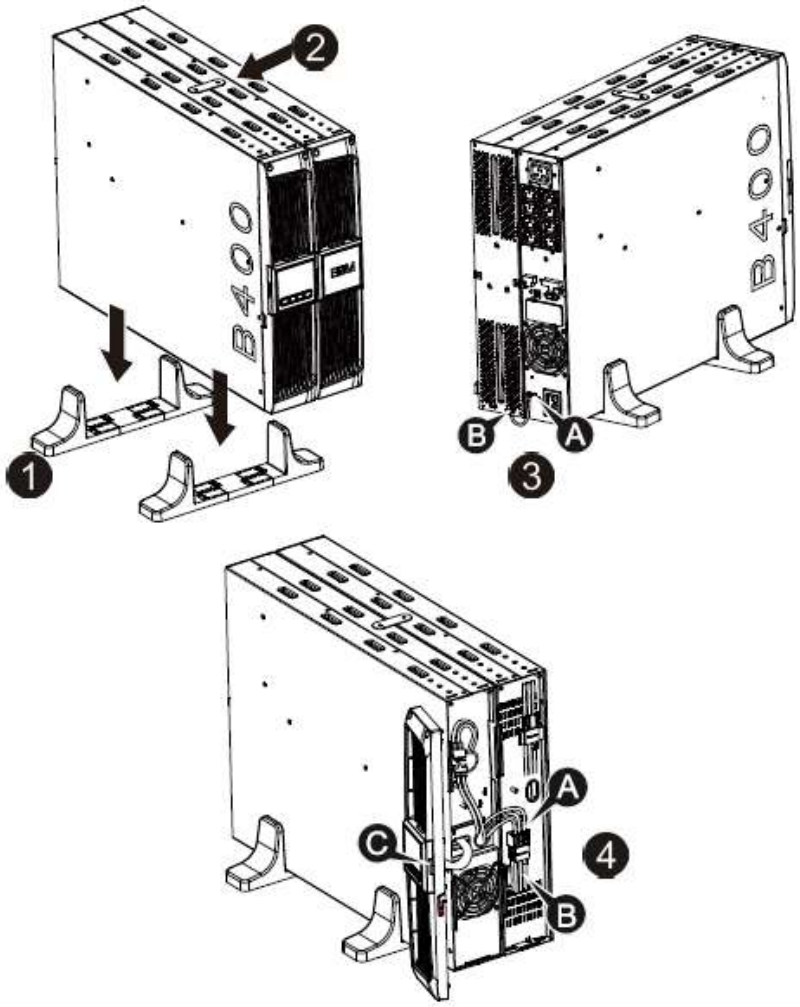
1. Align the mounting ears with the screw holes on the side of the UPS, and tighten the screws.
2. Assemble the rack rails within the rack-mounting.
3. Slide in the UPS into the rack rail and lock it into the Rack-mounting.
4. Tighten the screws, to secure the UPS into place and then the load can be connected.



1.1.4 EBM Installation (Optional)

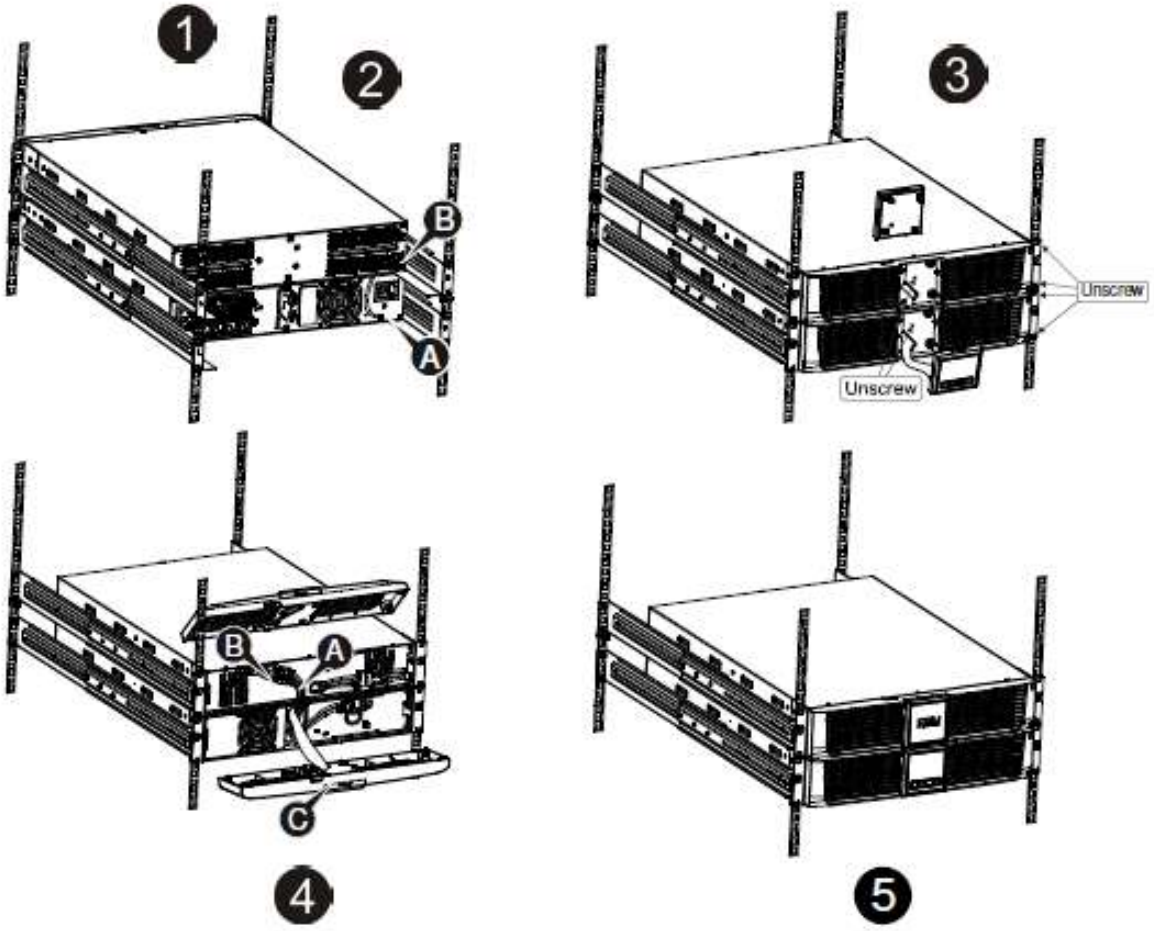
- **Connecting the EBM in Tower form:**

1. Position the extended UPS stands appropriately so that 1 stand will be at either end of the UPS and EBM.
2. Tighten the screw on the metal sheet for stabilization and secure the UPS and EBM together, then lift and place down the UPS and EBM carefully into the stands.
3. Connect the Earth line from UPS (port A) to EBM (port B)
4. Take off the front panel, and connect the battery terminal (A) from UPS to EBM terminal (B) as shown below. Users need to remove the small gate(C) on the side of the front panel to allow the outlet wire of the EBM to pass through the gate and then reassemble front panel.



- **Connecting the EBM in a rack form**

1. Using the same method as assembling the UPS in a rack form, assemble the EBM into the rack-mounting above or below the UPS.
2. Connect the earth line from UPS (port A) to EBM (port B)
3. Take out the LCD box carefully, and unscrew the internal screws.
4. Take off the front panel, and connect the battery terminal (A) from UPS to EBM terminal (B) as shown below. Users need to remove the small gate(C) on side of the front panel to allow the outlet wire of the EBM to pass through the gate and then reassemble front panel.
5. After installing the UPS into the rack, the load can then be connected to UPS. Please make sure the load equipment is turned off before connecting to the UPS output receptacles.

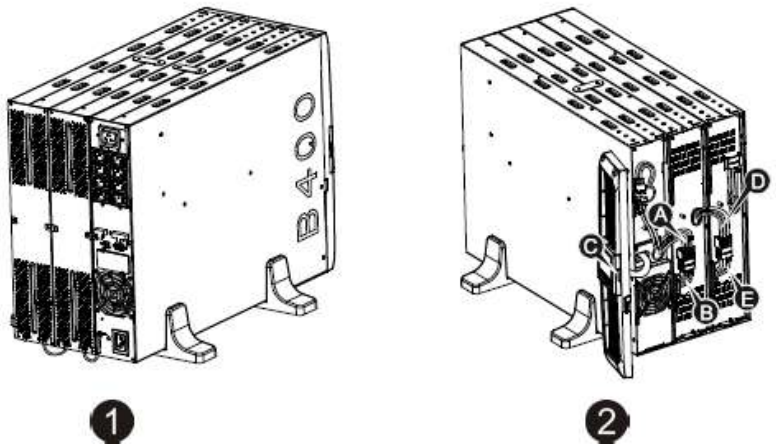


- **Connecting Multiple EBMs**

The B400R series includes external battery ports that allow users to connect multiple EBMs in order to provide additional backup time. Follow the below procedure to install multiple EBMs.

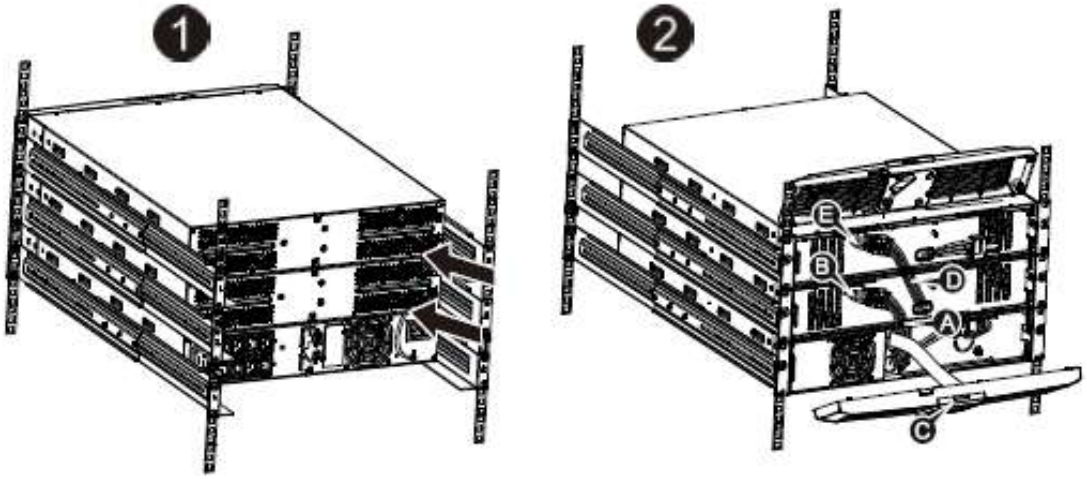
Connecting multiple EBMs in Tower form

1. Connect an Earth line between the UPS and the first EBM, and then connect an Earth Line between the first EBM and the second EBM.
2. Take off the front panel, and connect the battery terminal (A) from UPS to EBM terminal (B) shown as below. And then connect the battery terminal (D) from the first EBM to the battery terminal (E) of the second EBM. Users need to remove the small gate(C) on side of the front panel to allow the outlet wire of the EBM to pass through the gate and then reassemble front panel.



Connecting the Multiple EBMs in rack form

1. Connect an Earth line between the UPS and the first EBM, and then connect an Earth Line between the first EBM and the second EBM.
2. Take off the front panel, and connect the battery terminal (A) from the UPS to the EBM terminal (B) shown as below. Then connect the battery terminal (D) from the first EBM to the battery terminal (E) of the second EBM. Users need to remove the small gate(C) on side of the front panel to allow the outlet wire of the EBM to pass through the gate and then reassemble front panel.



Note: Three or more EBMs can be connected to the UPS in the same way as shown above.
Note: After connect the EBMs, please do not forget to set the number of EBMs on LCD, If use the nonstandard EBMs, please call local dealer or distributor for setting method.

1.2 Operation

- Do not disconnect the mains cable on the UPS or the building mains supply (grounded shockproof socket) during operation as this will remove the ground protection to the UPS and all connected equipment.
- The UPS features its own, internal current source (batteries). There is a risk of electric shock if you touch the UPS output sockets or output terminal block even if the UPS is not connected to the mains.
- In order to fully disconnect the UPS, first press the ON/OFF button to turn off the UPS, and then disconnect the mains lead.
- Ensure that no liquid or other foreign objects can enter the UPS.
- Do not remove the enclosure.
- This system is to be serviced by qualified service personnel only.
- Remove the protective panel only after disconnecting the terminal connections.

1.3 Maintenance, servicing and faults

- The UPS operates with hazardous voltages. Repairs must be carried out by qualified maintenance personnel.
- Caution - risk of electric shock. Even after the unit is disconnected from the mains power supply, components inside the UPS are still connected to the batteries which are potentially dangerous.
- Before carrying out any kind of service and/or maintenance, 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 below and any other measures necessary when working with batteries:
  - ― Remove all jewellery, wristwatches, rings and other metal objects
  - ― Use insulated tools only.
- When changing batteries, replace with the same quantity and the same type of batteries.
- Do not attempt to dispose of batteries by burning them. It could cause an explosion.
- Do not open or destroy batteries. Effluent electrolyte can cause injury to the skin and eyes and may be toxic.
- Please replace the fuse only by a fuse of the same type and of the same amperage in order to avoid fire hazards.
- Dismantling of the UPS must only be performed by qualified service personnel.

1.3.1 UPS and Battery Care

For the best preventative 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 long battery life, keep the UPS at an ambient temperature of 25°C (77°F)

1.3.2 Storing the UPS and Batteries

When the UPS is intended to be stored for a long period, recharge the batteries every 6 months by connecting the UPS to mains supply. The batteries charge to 90% capacity in approximately 4 hours. However, it is recommended that the batteries charge for 48 hours after a period of long-term storage.

1.3.3 Time to Replace Batteries

When the discharge time is less than 50% of is specified after fully charging, the battery may need to be replaced. Please check the battery connection or contact Borri or your distributor to order new batteries.

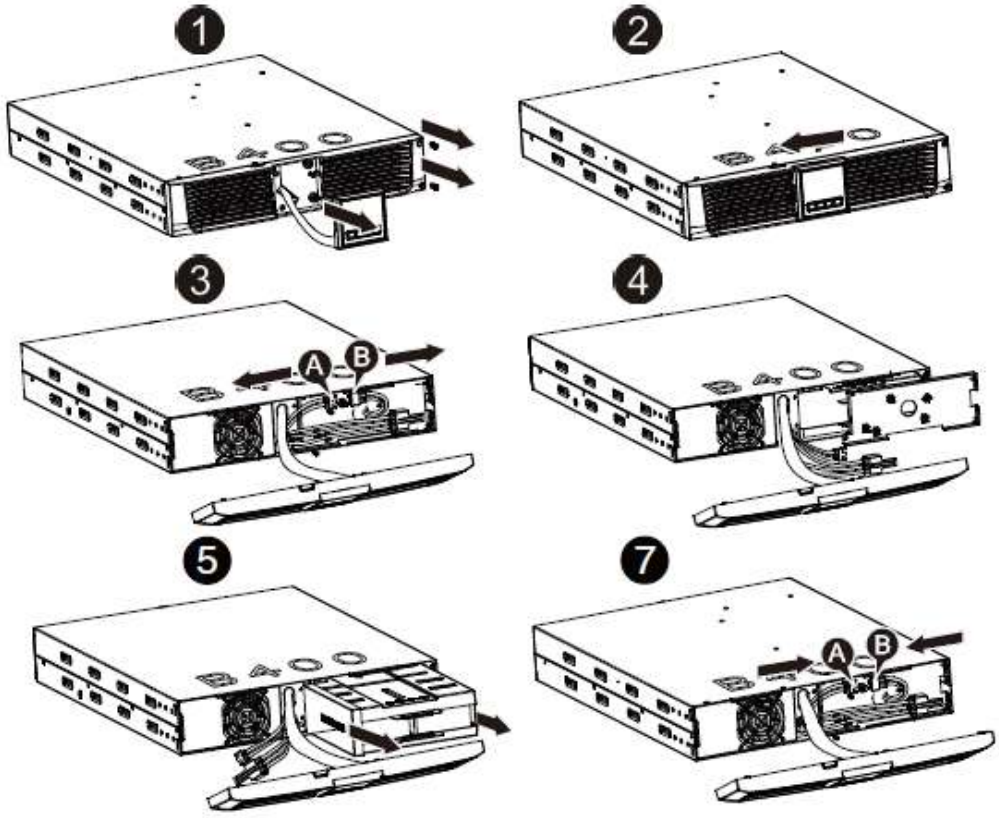
WARNING:

- Turn off the UPS and disconnect the UPS power cord from the wall outlet.
- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Batteries can present a risk of electrical shock or burn from high short circuit current. The following precautions should be observed:
  1. Remove watches, rings, or other metal objects.
  2. Use tools with insulated handles.
  3. Do not lay tools or metal parts on top of batteries.
  4. Wear rubber gloves and boots.
  5. Disconnect the charging source prior to connecting or disconnecting battery terminal.
- When replacing batteries, replace them with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Do not dispose of battery in a fire. Batteries may explode when exposed to flame.
- Proper disposal of batteries is required. Ensure these are disposed of in relation to WEEE and other local legislation.
- Do not open or mutilate the battery. Released toxic electrolyte is harmful to skin and eyes.

Note: If you are not qualified to replace the battery, do not attempt to open the battery cabinet. Please call Borri or your distributor immediately.

1.3.4 Replacing UPS Internal Batteries

Follow the below instructions and illustrations to replace batteries:
1. Carefully removed the LCD box, and remove the screws.
2. Slide and Pull the front panel leftward and then take it off.
3. Disconnect the cable from the UPS and battery pack.
4. Remove the right inner battery bracket.
5. Pull the battery pack out onto flat area.
6. Install the new battery pack into the UPS.
7. Re-attach the battery bracket and reconnect the battery cable A and B
8. Re-install the front panel back to UPS.



1.3.5 Testing New Batteries

For a battery test, please check:
- The batteries must be fully charged.
- The UPS must be in Normal mode with no active alarms.
- Don’t take on/off the load.

To test batteries:
1. Connect the UPS to mains supply for at least 48 hours to charge the batteries.
2. When the UPS is working on line mode or HE mode, go to the “Start battery test” of the “control” menu to implement the test.

1.3.6 Recycling the Used Battery:

Warning:
- Never dispose the batteries in a fire. It may explode.
- Do not open or mutilate the batteries. Released electrolyte is harmful to the skins and eyes. It may be toxic. A battery can present a risk of electrical shock and high short circuit current.

To properly recycle the used batteries, please follow WEEE Regulations, or your local regulations and procedures from the correct disposal of electrical products. Please contact Borri or your distributor for further information.

1.4 Transport

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

1.5 Storage

The UPS must be stockpiled in a room that is well ventilated and dry to protect UPS Service life.

1.6 Standards

Safety	
IEC/EN 62040-1	
EMI	
Conducted Emission…… IEC/EN62040-2	**Category C1**
Radiated Emission…… IEC/EN62040-2	**Category C1**
Harmonic Current…….. IEC/EN 61000-3-2	
Voltage Fluctuation and Flicker…. IEC/EN 61000-3-3	
EMS	
ESD…… IEC/EN 61000-4-2	**Level 3**
RS…….. IEC/EN 61000-4-3	**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**
MS…… IEC/EN 61000-4-8	**Level 3**
Voltage dips…… IEC/EN 61000-4-11	
Low frequency signals…… IEC/EN 61000-2-2	

2. Description of Commonly Used Symbols

Some or all of the following symbols may be used throughout this manual. It is advisable to familiarize yourself with them and understand their meaning:

Symbol and Explanation			
Symbol	**Explanation**	**Symbol**	**Explanation**
	Alert you to pay Special attention		Protective Ground
	Caution of high voltages present		Alarm Silenced
	Turn on the UPS		Overload Indication
	Turn off the UPS		Battery
	Idle or shut down the UPS		Recycle
	Alternating Current Source (AC)		Do not dispose with ordinary waste
	Direct Current Source (DC)		

3. Introduction

The B400R Series is an uninterruptible power supply incorporating online double-conversion technology. The UPS's flexibility to handle an array of network devices makes it the perfect choice to protect your LANs, servers, workstations, and other electrical equipment.

The double-conversion principle eliminates all mains power disturbances. A rectifier converts the alternating current from the mains to direct current. This direct current charges the batteries and powers the inverter. On the basis of this DC voltage, the inverter generates a sinusoidal AC voltage, which permanently supplies the loads.

Computers and periphery are thus powered entirely by the mains voltage. In the event of power failure, the maintenance-free batteries power the inverter.

This manual covers the UPS listed as follows. Please confirm whether it is the model you intend to purchase by performing a visual inspection of the Model No. on the rear panel of the UPS.

Model No.	Type	Model No	Type
B400R-010-B	Internal batteries Model	B400R-010-C	Internal Charger Model
B400R-020-B		B400R-020-C	
B400R-030-B		B400R-030-C	

4. Connection

4.1 Inspection

Inspect the packaging carton and its contents for damage. Please inform Borri or your supplier immediately should you find signs of damage.

Please keep the packaging in a safe place for future use.

Note: Please ensure that the incoming feeder is isolated and secured to prevent it from being switched back on again.

4.2 Connection

(1) UPS Input Connection
If the UPS is connected via the power cord, please use an appropriate socket with protection against electric current, the user can refer to below table for guidance. If the UPS is to be hardwired, it is recommended that 2.5mm^2 wires are used, the "GND" terminal should be connected first.

The UPS System has no input breaker on the standard cabinet. When installing the UPS, the user needs to connect the external breakers and protective components to the input terminals. It is recommended to select the ISOLATOR instead of the traditional combination kit including breaker and fuse.

When selecting the ISOLATOR, the user can refer to below table.

Model No.	UPS INPUT ISOLATION	
	VOLTAGE	CURRENT
B400R-010-B (C)	300VAC	10A
B400R-020-B (C)	300VAC	16A
B400R-030-B (C)	300VAC	20A

(2) UPS Output Connection
The output terminals of the UPS are an IEC socket-type, IEC320 C13 for 10A load, IEC320 C19 for 16A load. Simply plug the load power cord to the output sockets to complete connection.

Model No.	Output Socket (pcs)
B400R-010-B (C) / B400R-020-B (C)	8 * IEC320 C13
B400R-030-B (C)	8 * IEC320 C13 + 1 * C19

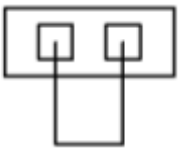
Caution:
Do not connect equipment which would overload the UPS system (e.g. laser printers)

(3) EPO Connection:
The User can select the polarity of the EPO, the EPO is normally close by default settings.

- NO

The EPO connector is normally open on the rear panel. Once the connector is closed with a wire, the UPS will stop the output until the EPO status is disabled.

Disable the EPO Status

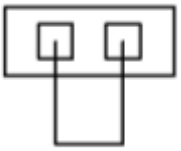


Enable the EPO Status

- NC

The EPO connector is normally closed with a wire on the rear panel. Once the connector is open, the UPS will stop the output until the EPO status is disabled.

Enable the EPO Status



Disable the EPO Status

4.3 Battery charge

Fully charge the batteries of the UPS system by leaving the UPS system connected to the mains for approximately 1-2 hours. The UPS system can be used directly without charging the batteries but the stored energy time may be shorter than the nominal value specified.

4.4 Operation procedure of external battery for long backup time model ("S" model)

(1) Use the battery pack with voltage:
36VDC for 1KS (12V x3 batteries) for B400R-010-B (C)
48VDC (12V x4 batteries) for the B400R-020-B (C)
72VDC (12V ×6 batteries) for the B400R-030-B (C)

Connection of battery quantities that exceed or do not meet the above mentioned quantities will cause abnormal operation or permanent damage to the UPS.

(2) One hard wired battery terminal on the rear panel is used for connecting the battery pack.

(3) The battery connection procedure is very important. Any incompliance may result in the risk of electric shock. Therefore, the following steps must be strictly complied with.

(4) Make sure the UPS is isolated from the supply, if there is a battery breaker then turn it off first.

(5) Remove the front panel; connect the battery via Anderson PP45 connectors. Prepare the battery cable which should be able to carry the current of >50A for all models, the cross section area should be greater than 4mm^2 for all models. Battery wire colour is recommended as following:

+	GND	-
Brown	Green/Yellow	Blue

(6) The brown wire is connected to the "+" terminal of the battery. The blue wire is connected to the "-" terminal of the battery. (Note: the green/yellow wire is grounded for protection purpose.)

(7) Make sure all wires are connected correctly, and install the terminal block cover on the rear panel of the UPS.

(8) Connect the UPS to the load. Then, turn on the mains switch or connect the power cord of the UPS to utility power supply, the battery would start to be charged.

Caution:
A DC Breaker must be connected between the UPS and external battery.

Caution:
The output terminals of the UPS system may still be electrically live even if the UPS has been disconnected from mains or if the Bypass switch is in the "OFF" Position

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 amber. See Figure below:

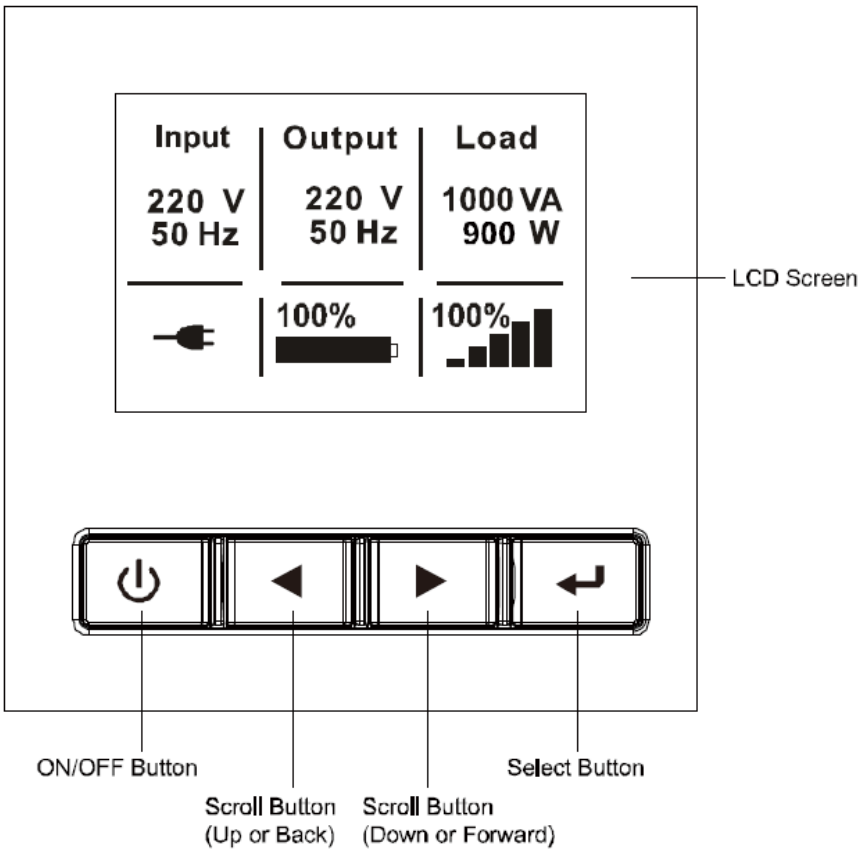


Figure 5-1: On-line UPS Control Panel

Table 5-1: Control Button Functions

The Button	Function	Description
	Power On	When the unit has no power and is connected with batteries, 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 the unit on
	Turn Off	When the unit has been turned on, press this button for >3s to turn off the unit
	Enter Main Menu	When the UPS is displaying the default status summary, press this button for > 1s to enter the main menu tree
	Exit Main Menu	Press this button > 1s to exit the present menu and return to the default status summary
	Scroll Up	Press this button for > 100ms & < 1s to scroll up through the menu options
	Scroll Down	Press this button for > 100ms & < 1s to scroll down through the menu options
	Enter Next menu tree	Press this button for > 100ms & < 1s to select the present menu option, or enter the next menu, but do not change any settings
	Select one menu option	
	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 is low, buzzer will beep 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 show the default UPS status summary screen.

The display automatically returns to the default UPS status summary screen when no button has been pressed for 15 minutes. On the UPS status summary screen the following information is given:

- 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 including UPS operating mode and running time

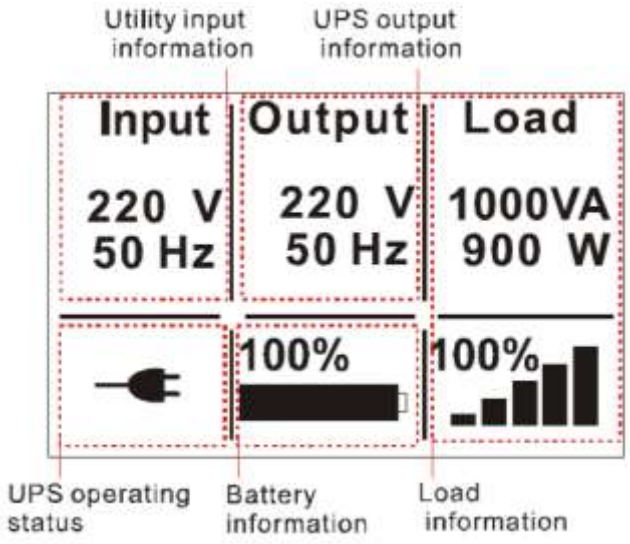


Figure 5-2: The default LCD Display

More details on the operation of the LCD is illustrated in chapter 4.4

5.2 Operating mode

Different graphic symbols could be displayed dependent on the current operating mode or status.

5.2.1 Line mode

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

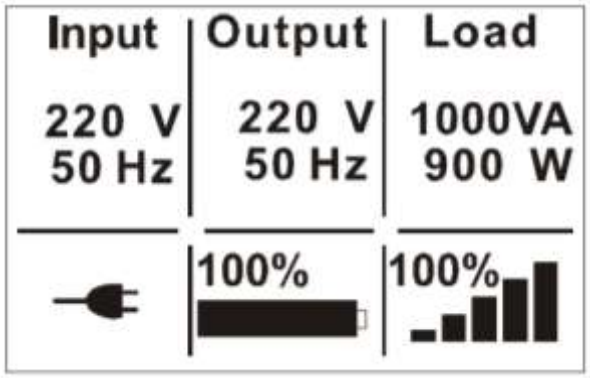


Figure 5-3: Line Mode

5.2.2 Battery mode

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

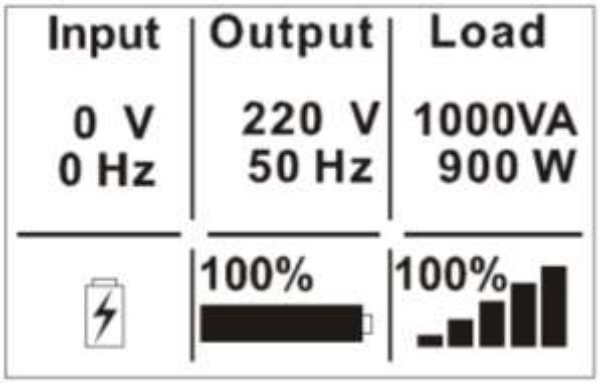


Figure 5-4: Battery Mode

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

5.2.3 Bypass mode

An example of the LCD display in bypass mode is shown in the below 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 mains via an internal filter. The UPS will beep once every 2 minutes whilst in bypass mode.

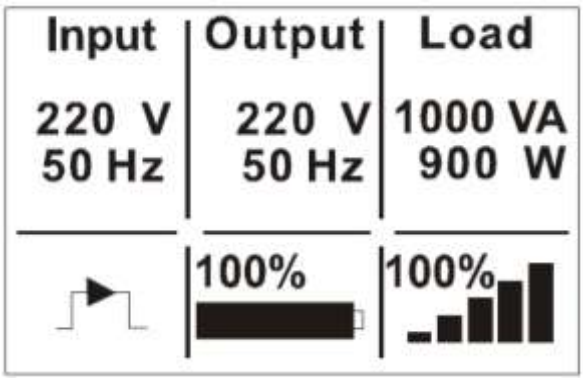


Figure 5-5: Bypass Mode

5.2.4 Standby mode

An example of the LCD display in standby mode is shown below:

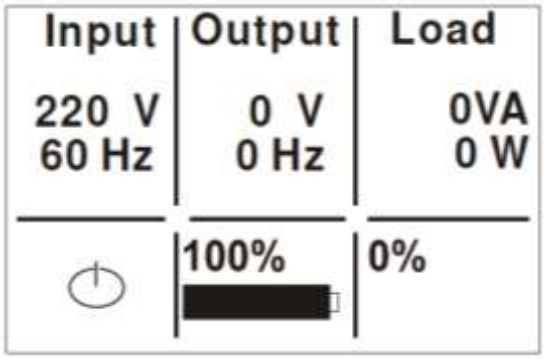


Figure 5-6: Standby Mode

5.2.5 HE mode (High Efficiency mode)

This is also referred to as economy (ECO) mode.

After the UPS is turned on, the power used by the load is supplied from the utility power via an internal filter while the utility power is in normal range, so high efficiency can be obtained in the HE mode. During mains failure or abnormality, the UPS will transfer to Line mode or Battery mode and the load is supplied continuously.

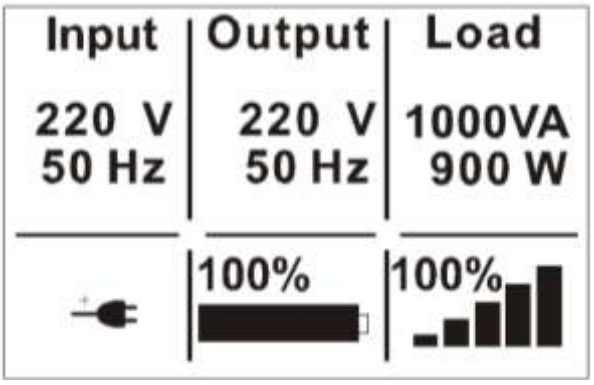


Figure 5-7: HE Mode

1) This function can be enabled through the LCD settings or the UPS Management software, Winpower.
2) It is Important that the transfer time of the UPS output from HE mode to battery mode is less than 10ms. Although this is a short transfer time it may be too excessive for some sensitive load.

5.2.6 Converter mode

When operating in converter mode, the UPS will operate with a fixed output frequency (50Hz or 60Hz). During mains failure or abnormality, the UPS will transfer to battery mode and the load is supplied continuously.

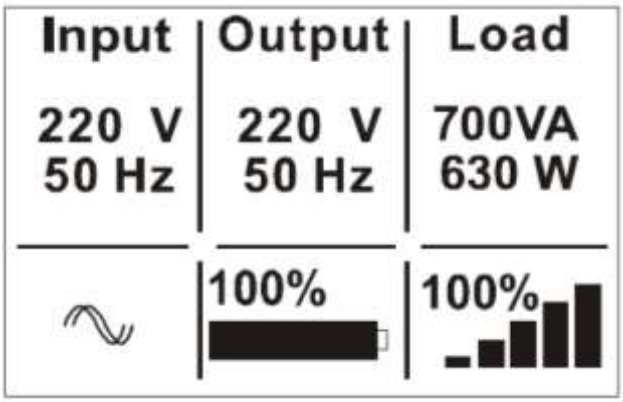


Figure 5-8: Converter Mode

1) This function can be enabled through the LCD settings or the UPS Management software, Winpower.
2) The available UPS capacity is de-rated to 70% in converter mode.

5.2.7 Warning

When the warning occurs, it illustrates that there is problems affecting the UPS standard operations. Normally these problems are not fatal and the UPS continues working, but they should be rectified quickly, or the UPS may fail. The detailed warning table is shown in chapter 7.

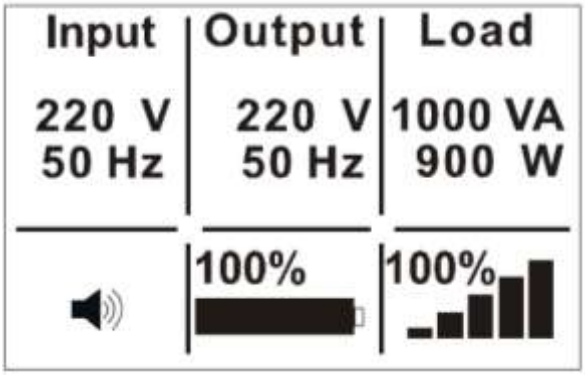


Figure 5-9: Warning

5.2.8 Fault

When a fault occurs, it illustrates that some fatal problem(s) is present; the UPS will be directly cut off the output or transfer to bypass, and keep alarming. The backlight of LCD will also change to red. The detailed fault table is shown in chapter 7.

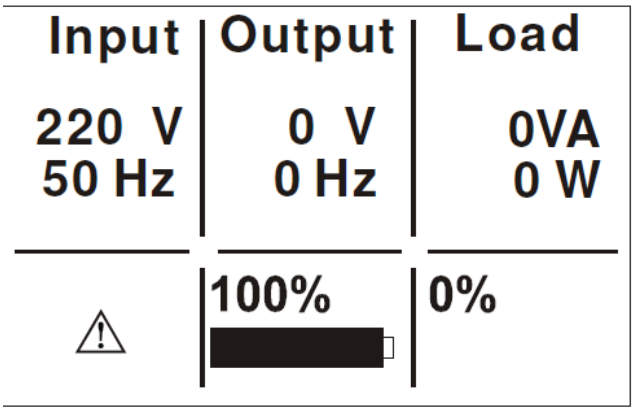


Figure 5-10: Fault

5.2.9 Other status

When the UPS is overloaded, the alarm will beep twice every second. Some unnecessary loads should be removed from the ups one by one to decrease the loads connected until it reaches a value less than 90% of its nominal power capacity.

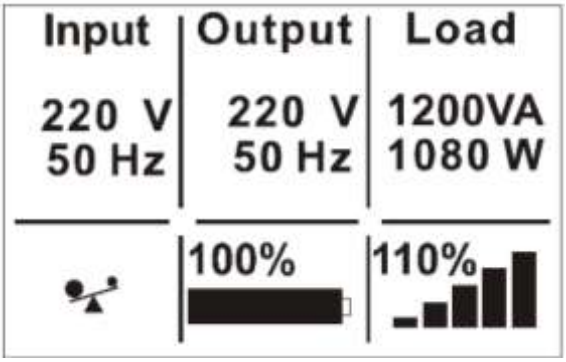


Figure 5-11: Overload

While doing a battery test, the symbol for battery test will be shown on the display.

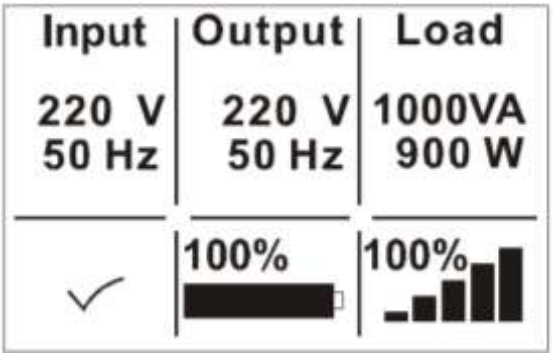


Figure 5-12: Battery Test

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

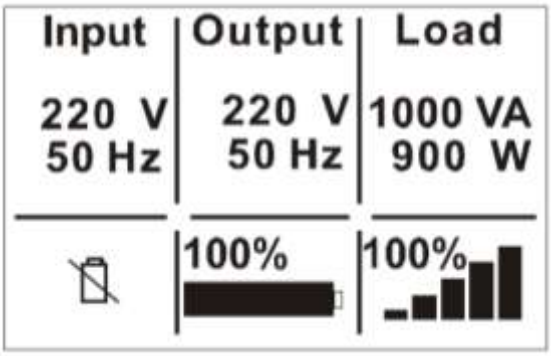


Figure 5-13: Battery Fails

5.3 Turning on and Turning off the UPS

Attention: The UPS could only be turning on while connecting with the utility at the first time.
Attention: Please switch off the connected loads first before turning on the UPS, and switch on the loads one by one after the UPS is turned on. Switch off all of the connected loads before turning off the UPS.

5.3.1 Turning on the UPS with mains

1) Check all the connections have been made correctly.
2) When the UPS is powered on, the fan begins to rotate, and LCD will display the Borri logo. The LCD will then show the default UPS status summary screen after the UPS completes its self-test.
3) By pressing the power button continuously for more than 1 second, the buzzer will beep for 1s and the UPS will turn on.
4) A few seconds later, the UPS will go into Line mode. If mains power is abnormal, the UPS will transfer to Battery mode without interruption to the UPS or the connected load.

5.3.2 Turning on the UPS without mains

1) Check all the connections have been made correctly.
2) By pressing the power button continuously for more than 100ms, the UPS will be powered on. At this time the fan begins to rotate, and the LCD will display the Borri logo. The LCD will then show the default UPS status summary screen after the UPS completes its self-test.
3) By pressing the power button continuously for more than 1 second, the buzzer will beep for 1s and the UPS will turn on.
4) A few seconds later, the UPS will enter Battery mode. If the mains power comes back, the UPS will transfer to Line mode without interruption to the UPS or the connected load.

5.3.3 Turning off the UPS with mains

1) Turn off the inverter of the UPS by pressing the power button continuously for more than 3 seconds and the buzzer will beep for 3s. The UPS will then enter Bypass mode.
2) When the above step is complete the UPS output voltage is still present. In order to cut off the UPS output, simply turn off the mains supply to the UPS. A few seconds later the LCD display will shut down and no output voltage will be available from the UPS output terminals.

5.3.4 Turning off the UPS without mains

1) Turn off the UPS by pressing the power button continuously for more than 3 seconds, and the buzzer will beep for 3s. The UPS will cut off the output at once.
2) A few seconds later the LCD display will shut down and no voltage will be available from the UPS output terminals.

5.4 LCD operation

Apart from the default UPS status summary screen, the user can get access to more information about the UPS current status, details on various measurements, old events which have occurred, the UPS' own identification, and can change the settings to fit the users own requirements, allowing optimisation of the UPS functionality.

5.4.1 The main menu

Whilst on the default UPS summary screen, pressing the ◀ or ▶ button for <1s, will bring up detailed information about alarms, battery will be shown.

Whilst on the default UPS summary screen, when pressing the ◀ button >1s, will allow the user to enter the main menu tree.

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

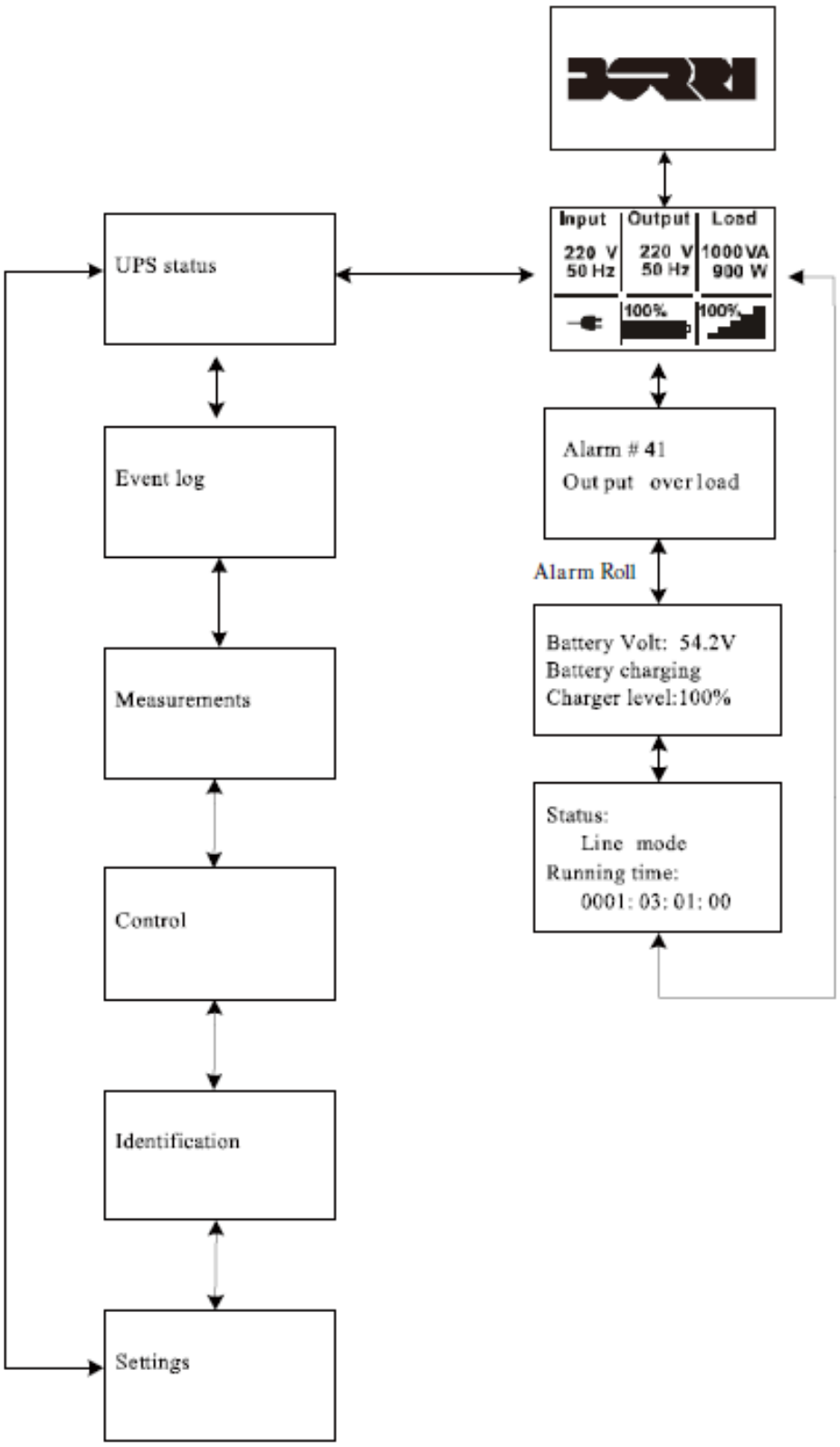


Figure 5-14: Main menu tree

5.4.2 The UPS status menu

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

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

By pressing the ◀ button for >1s, the display will return to the previous menu tree.

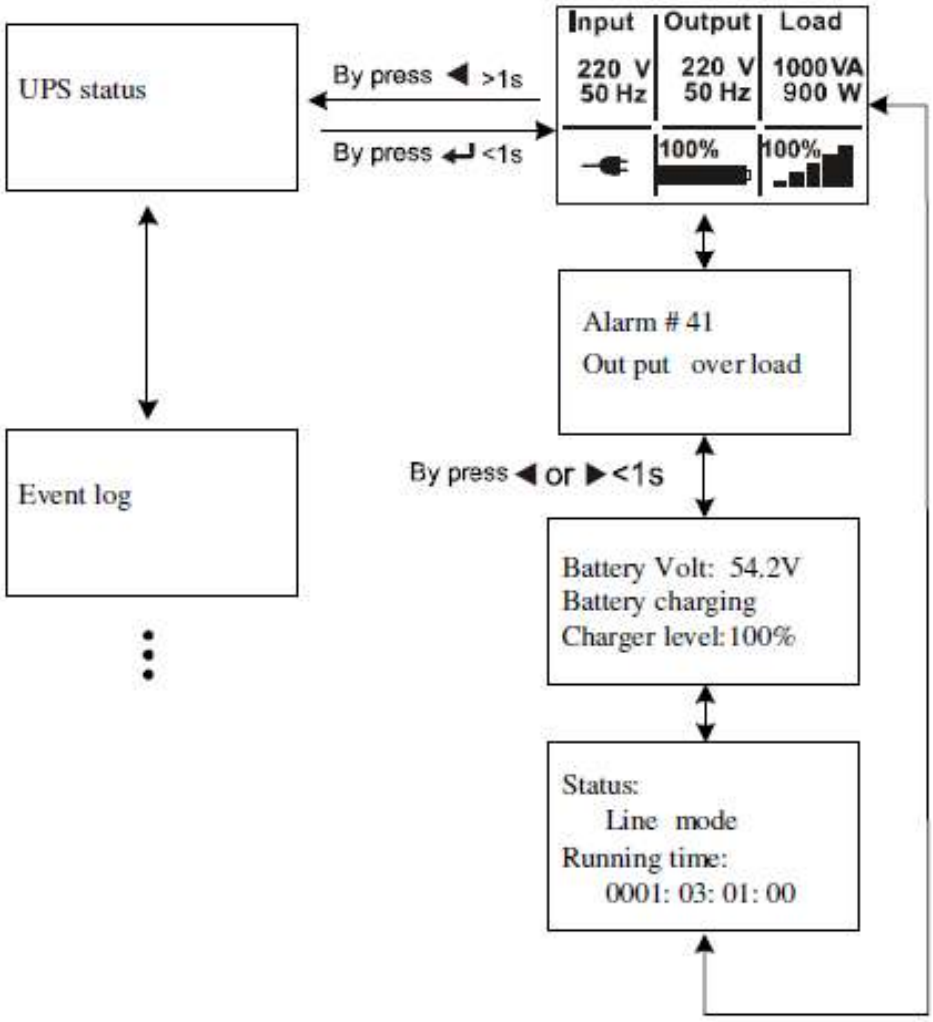


Figure 5-15: UPS Status menu tree

5.4.3 The event log menu

By pressing the ↵ button whilst on the menu item “Event log”, the display will enter the next menu tree.

All the old events, alarms and faults will have been recorded and stored in this menu. The information available includes the illustration, the event code, and the operating time of UPS when the event happened. By pressing the ◀ or ▶ button for <1s, all the events can be displayed one by one.

The max number of recorded events is 50, when the number is larger than 50, the oldest fault/event is overwritten by the newest event/fault.

By pressing the ◀ button for >1s, the display will return to the previous menu tree.

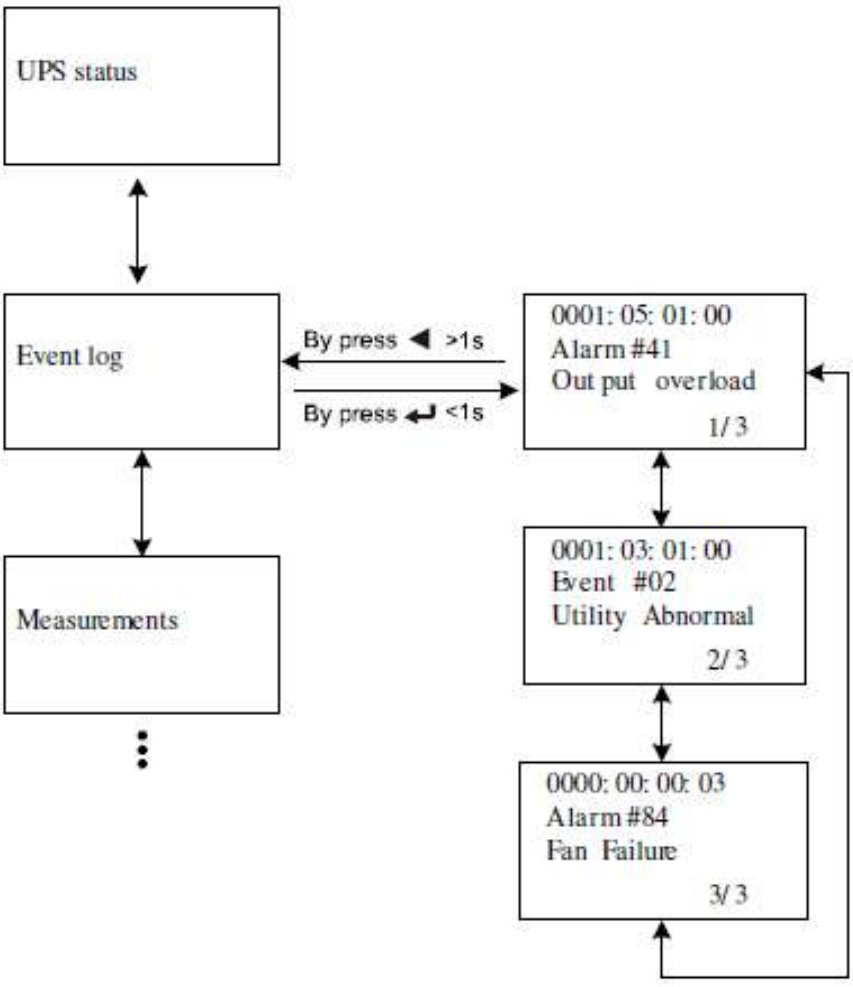


Figure 5-16: Event menu tree

5.4.4 The measurement menu

By pressing the ↵ button whilst on the menu item “Measurement”, the display will enter the next menu tree.

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

By pressing the ◀ button for >1s, the display will return to the previous menu tree.

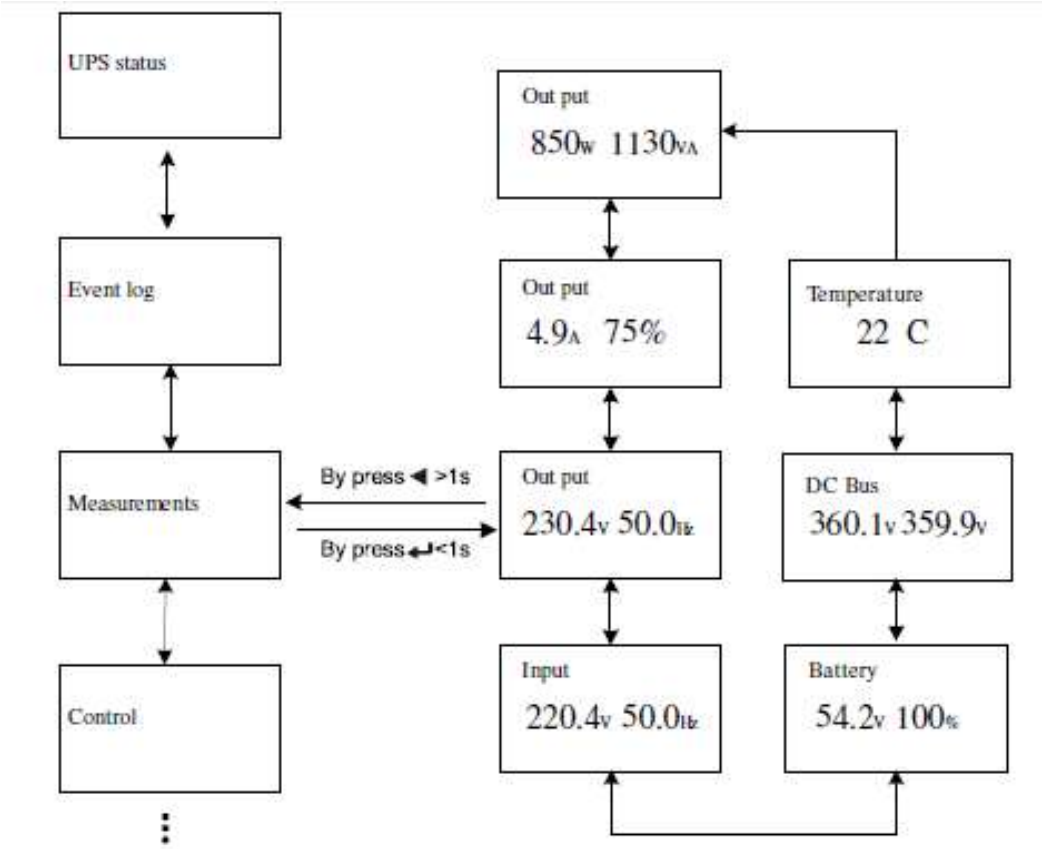


Figure 5-17: Measurement menu tree

5.4.5 The control menu

By pressing the ↵ button whilst on the menu item “Control”, the display will enter the next menu tree. The following options are available:

1) Buzzer mute: the buzzer will stop beeping (enter silence mode).
2) Start battery test: commands the UPS to do a battery test.
3) Load segments: commands to control two load segments when the UPS is in output mode.
4) 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 then enter this menu to clear EPO status, the UPS alarm will then stop and recover to bypass or standby mode. The UPS needs be turned on by manual operation.
5) Reset Fault status: when a fault occurs, the UPS will remain in Fault mode and alarm. To recover to normal status, enter this menu to reset error status, the UPS alarm will then stop and recover to bypass or standby mode. The reason for the fault should be checked and rectified before the UPS is turned on again by manual operation.
6) Clear event log: To clear the entire event, alarm and fault history that has been recorded.
7) Restore factory settings: all the settings will be reset to default factory settings. This can only be done whilst in bypass or standby mode.

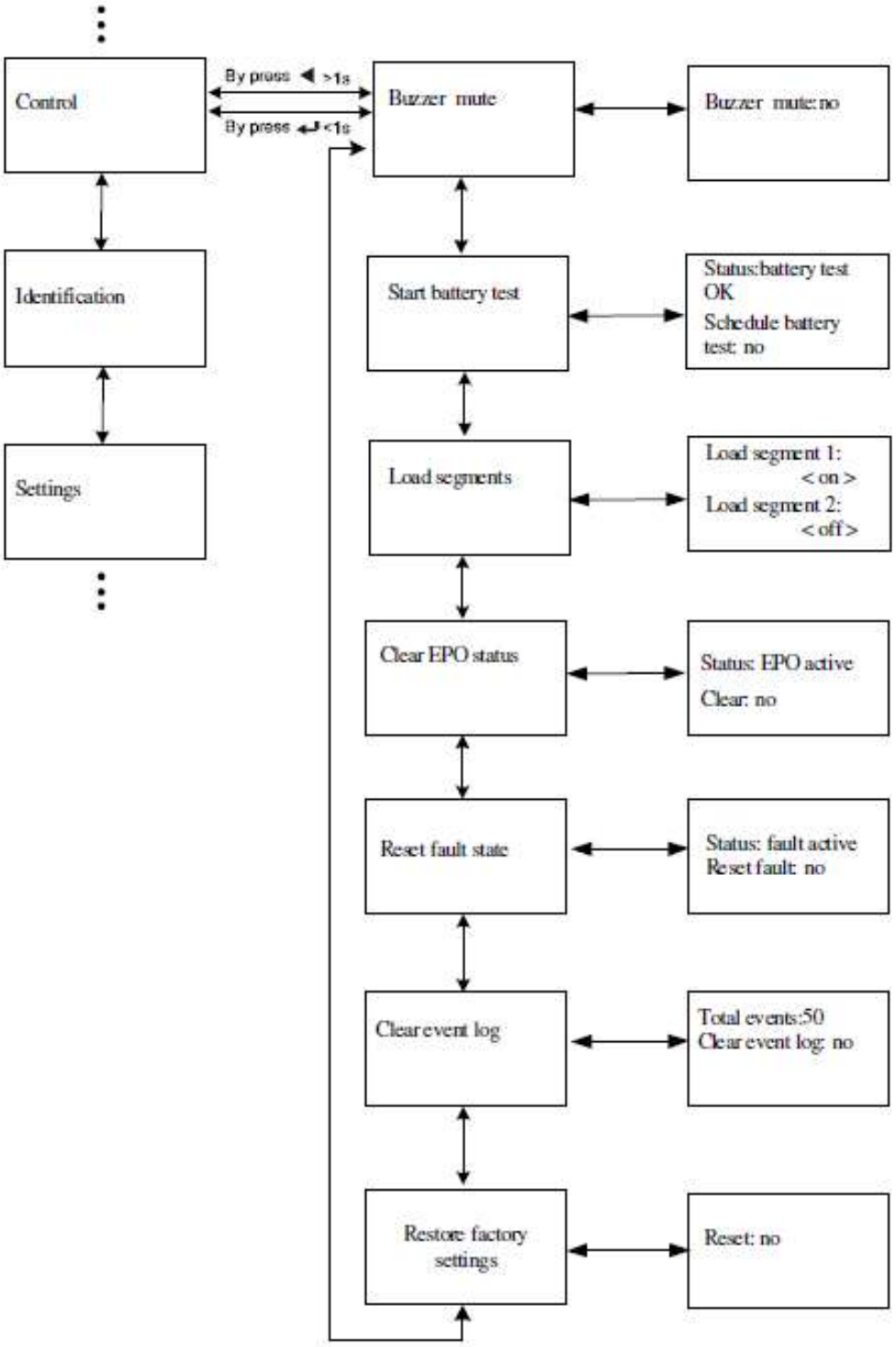


Figure 5-18: Control menu tree

5.4.6 The identification menu

By pressing the ↵ button whilst on the menu item “Identification”, the display will enter the next menu tree.

The identification information includes: the UPS serial number, firmware serial number and UPS model type.

By pressing the ◀ button for >1s, the display will return to the previous menu tree.

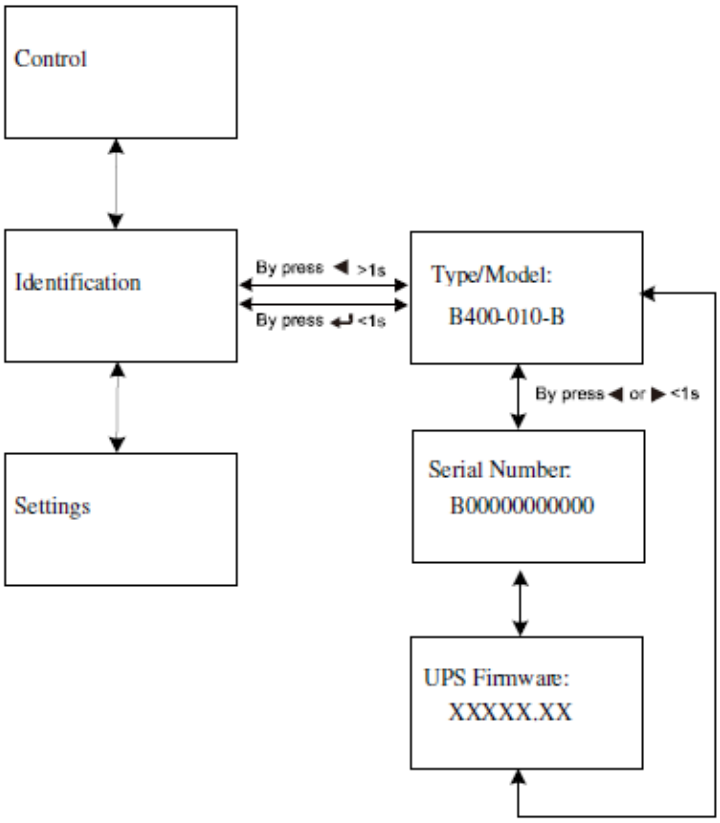


Figure 5-19: Identification menu tree

5.4.7 The setting menu

Please contact your local distributor for further information before altering the settings. Some settings will change the specification, and some settings will enable or disable UPS functions. The unsuitable alteration of settings by users may result in potential UPS failure, and even cause direct damage to the load, batteries or UPS.

6. Special function

The B400R series has some special functions, which could satisfy some applications. These functions have their own features; please contact your distributor or Borri for further information before using these functions.

6.1 HE function

6.1.1 Brief introduction to the HE function

If the HE function is set to enabled, after the UPS is turned on, the power used by the load is directly supplied from the mains via an internal filter while the mains is in normal range, so high efficiencies can be gained in HE mode. It is also called economy (ECO) mode. If the mains is lost or abnormal, the UPS will transfer to Line mode or Battery mode and the load is supplied continuously.

The great advantage to this mode is that overall efficiency is >96% of UPS, meaning less power is wasted. But the disadvantages are:
1) The load does not have the same level of protection as it does in Line mode, as the load is directly supplied from the mains;
2) The transfer time of the UPS output from HE mode to Battery mode is about 10ms. So the function is not suitable to some sensitive loads, and the region where mains power is unstable.

6.1.2 Set the function

This function can be enabled through the LCD setting whilst in Bypass mode or Standby mode.

6.2 Converter function

6.2.1 Brief introduction of Converter function

In converter mode, the UPS will operate with a fixed output frequency (50Hz or 60Hz). During mains failure or abnormality, the UPS will transfer to Battery mode and the load is supplied continuously.

The advantage to this is that the output frequency is fixed, which may be a requirement for some very sensitive loads.

But the disadvantage is the load capacity of UPS will be de-rated to 70% in converter mode.

6.2.2 Set the function

This function can be enabled through the LCD setting whilst in Bypass mode or Standby mode.

7. Trouble Shooting

If the UPS system does not operate correctly, check the operating information on the LCD display.

Please use the table below to help identify and resolve the problem. If the problem cannot be rectified please contact your distributor or Borri for assistance.

Problem	Possible Cause	Remedy
No indication or alarm even when the system is connected to mains supply	No Input voltage	Check cable condition and condition of mains socket the UPS is connected to
Emergency supply period shorter than nominal value	Batteries not fully charged / batteries defective	Charge the batteries for at least 5 – 8 hours and then check capacity. If the problem persists, please contact your distributor or Borri for assistance
Fan Failure Alarm Code: 84	Abnormality in fan operation / fan defective	Check if the fan is running, if the fan is not operating, please contact your distributor or Borri for assistance
Battery Over Voltage Alarm Code: 16	Battery is over charged	Stop charging the batteries automatically, after the battery voltage has returned to a normal level, and mains is normal, set batteries to charge automatically once more
Battery Low Alarm Code: 12	Battery Voltage is low	Should the alarm sound every second, it's recommended the protected equipment is safely shutdown.
Charge Fail Alarm Code: 15	UPS charger is faulty	Please contact your distributor or Borri for assistance.
Inverter Temperature High Alarm Code: 86	UPS internal temperature is too high	Check ventilation to UPS is not blocked, check the ambient temperature
Ambient Temperature High Alarm Code: 82	The ambient temperature is too high	Check the environment ventilation, adjust rooms ventilation settings
Battery Open Alarm Code: 11	Battery pack is not connected correctly	Power down the UPS and disconnect from the mains, check that connections between UPS and batteries are secure, check the battery breaker is on
Service Battery Alarm code: 13	Batteries may need to be replaced/ at end of recommended service life	Please contact your distributor or Borri for assistance

Overload Alarm Code: 41/42/43	Overload	Check current load, indicated on the LCD remove non-critical equipment until load is within UPS operating parameters.
Site Fail Alarm Code: 04	Phase and neutral conductor connections on the UPS are reversed	
EPO Active Alarm Code: 71	EPO function is enabled	Turn off the EPO switch
Bus fault (low / high / unbalanced / soft start) Alarm Code: 22/21/23/25	UPS Internal fault	Please contact your distributor or Borri for assistance
Inverter fault (low / high / soft start) Alarm Code: 33/32/34	UPS Internal fault	Please contact your distributor or Borri for assistance
Over temperature fault Alarm Code: 81	UPS System overheating	Check ventilation to UPS is not blocked, check the ambient temperature, and adjust room ventilation where possible.
NTC open Alarm Code: 87	UPS Internal fault	Please contact your distributor or Borri for assistance
Inverter Short Alarm Code: 31	UPS Output short circuit	Remove all protected equipment and turn off the UPS. Check whether the UPS outputs or load are short circuit. Make sure fault has cleared and that no internal faults are present before switching the UPS back on.
Bus short Alarm Code: 24	UPS Internal fault	Please contact your distributor or Borri for assistance

Please have the following information to hand before calling the After-Sales Service Department:

1) Model number, serial number
2) Date on which the problem occurred
3) LCD display information, Buzzer alarm status
4) Mains power condition, load type and capacity, environment temperature, ventilation condition
5) Information of external battery pack if the UPS is “S” model
6) Other information that may assist in the description of the problem

8. Maintenance

8.1 Operation

The UPS system contains no user-serviceable parts. If the battery service life (3-5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In the event that you require new batteries please contact your distributor or Borri for assistance.

8.2 Storage

If the batteries are stored in temperate climatic zones, they should be charged every three months for 1-2 hours. You should shorten the charging intervals to two months at locations subject to high temperatures i.e. temperatures exceeding 25°C.

8.3 Battery Replacement

If the battery service life has been exceeded, the batteries must be replaced.

Battery replacement should be performed only by qualified personnel.

It is recommended to isolate the UPS completely from the mains before the replacement. If there is a battery breaker then turn it off first. Disconnect the battery cable carefully and make sure no exposed wires can be touched. Reconnect the new batteries to the UPS by following section 5.8. Then turn on the battery breaker and start the UPS.

If batteries need to be replaced while the UPS is running, make sure the UPS will not shut down during the replacement. If there is a battery breaker then turn it off first. Disconnect the battery cable carefully and make sure no exposed wires can be touched. Reconnect the new batteries to the UPS by following section 5.8. Then turn on the battery breaker and press the ON switch to start the battery test, check that the battery information is normal.

9. Technical Data

9.1 Electrical specifications

Input Parameters			
Model No.	**B400R-010-B (C)**	**B400R-020-B (C)**	**B400R-030-B (C)**
Phase	1		
Frequency	(45-55)/(54-66) Hz		
Max Current (A)	7.5	13.5	16
Output Parameters			
Power Rating	1kVA/0.9kW	2kVA/1.8kW	3kVA/2.7kW
Voltage	208/220/230/240 (± 1%)		
Frequency	50/60 (±0.2) Hz (Battery mode)		
Wave form	Sinusoidal		
Batteries			
Model No.	**B400R-010-B**	**B400R-020-B**	**B400R-030-B**
Number and Type	3 x 12V 7Ah	4 x 12V 9AH	6 x 12V 9Ah

9.2 Operating Environment

Ambient Temperature	0°C to 40°C
Operating Humidity	< 95%
Altitude	< 1000m
Storage Temperature	0°C to 45°C

9.3 Typical backup time (Typical values at 25°C in minutes)

Model No.	**100% Load**	**50% Load**
B400R-010-B	5	15
B400R-020-B	3	10
B400R-030-B	3	10

9.4 Dimensions & Weights

Model		B400R-010-B / C	B400R-020-B / C	B400R-030-B / C
UPS Case	Net Weight (KG)	16.2 / 8.4	19.7 / 9.3	28.6 / 13.2
	Dimensions (mm) (W x D x H)	440 x 440 x 88 (2U)		440 x 605 x 88 (2U)
EBM Case	Dimensions (mm) (W x D x H)			
	Net Weight (KG)	6.8	6.8	9.3
	Type	36V	48V	72V

10. Communication Port

10.1 RS-232 and USB communication ports

To establish communication between the UPS and a computer, connect the UPS via one of the communication ports by using the appropriate communications cable (USB/RS232).

Note:

Only one of communication ports can be active at any one time. The USB Port has priority over the RS-232 port. When a communication cable is installed, the power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a mains fail occurs, the software initiates the saving of all data and the orderly shutdown of the equipment

10.2 RS-232 port

The RS-232 port is available for UPS monitoring, control, and firmware updates. To establish communication between the UPS and a computer, connect one end of the serial communication cable that comes with the UPS to the RS-232 port on the UPS. Connect the other end of the serial cable to the RS-232 port on a computer. The cable pins for the RS-232 communication port are identified in the following table:

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 (tied to chassis)	Not Applicable
6		Unused	Not Applicable
7		Unused	Not Applicable
8		Unused	Not Applicable
9		Unused	Not Applicable

10.3 USB port

The UPS can communicate with a USB-compliant computer by using HID-compatible power management software. To establish communication between the UPS and a computer, connect the USB cable that comes with the UPS to the USB port on the UPS and the USB port of a computer.

10.4 Installing a Network Management Card (optional)

Each UPS in the B400R range has one available communication bay, which supports the optional Network Management Card. After you install a Network Management Card, you can connect an environmental monitoring probe to the UPS.

Note: You do not have to shut down the UPS before you install a communication card.

To install the Network Management Card, complete the following steps:

1) Locate the UPS communication bay.
2) Remove the two screws that secure the communication bay cover to the UPS and save the screws.
3) Insert the Network Management Card into the slot on the UPS.
4) Secure the Network Management Card to the UPS with both screws.

For more information about the Serial Network Management Card, see the Serial Network Management Card User's Guide.

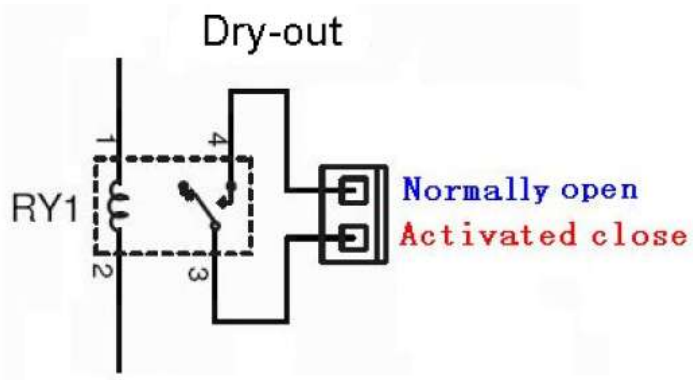
10.5 Dry Contact port

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.

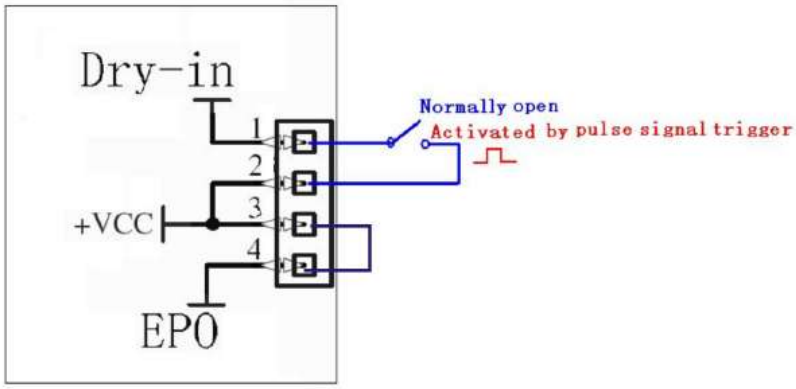
The relay output can be configured by LCD setting menu or protocol command, the default output contact is “Summary Alarm”; the signal input to control UPS On/Off/Maintain bypass status need to be configured by LCD setting menu or protocol command, the default input contact is “Disable”.

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 diagrams show schematic of the dry out/in contacts:



Dry Out contact schematic



Dry In contact schematic

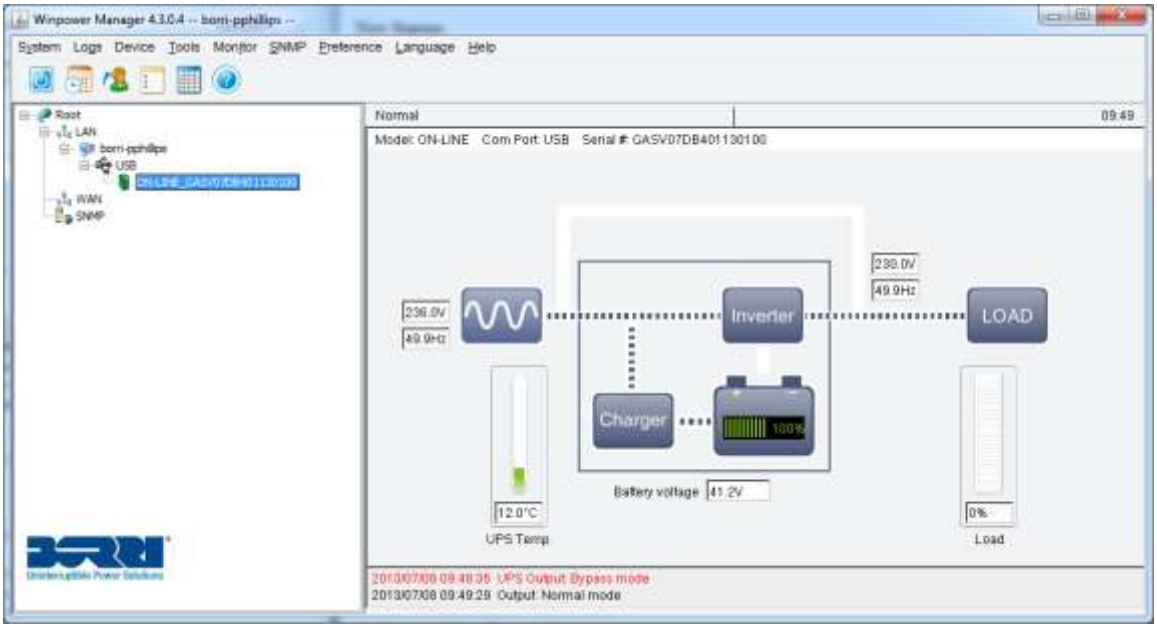
The following table shows the options for the dry out/in contacts:

Dry Out Signal	**Description**
Summary Alarm	Activated when any warning occurs
On Battery	Activated when the UPS is operating from batteries
Battery Low	Activates with the batteries low alarm (Alarm Code: 12)
UPS ok	Activated when the UPS has no active alarms or faults
On Bypass	Activated when UPS is operating on Bypass Output
Dry in Signal	**Description**
Disable	Disable the function
UPS On	One second pulse activated, the UPS turns on when the UPS is not on inverter. It is the same as a remote button to control the UPS Status.
UPS off	One second pulse activated, the UPS turns off when the UPS is on inverter. It is the same as a remote button to control the UPS Status.
Maintain Bypass	One second pulse activated, the UPS transfers to bypass mode. To recover the UPS to normal status, first deactivate the signal, and then the UPS needs to be turned on via manual operation.

11. Software

Free Software Download – WinPower

Winpower is UPS monitoring software which provides a user-friendly interface to monitor and control your UPS. This unique software provides safe auto shutdown for multiple computer systems during a power failure. With this software the user can monitor and control any UPS on the same LAN regardless of distance from the UPS.



Installation procedure:

1. Go to the website: http://www.borri.co.uk/softwaredownload

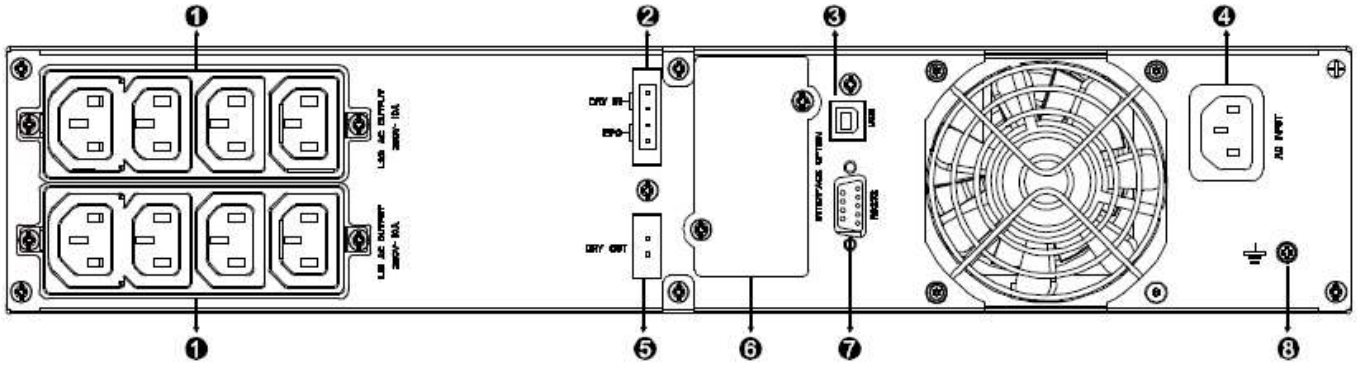
2. Choose the operating system you use and follow the instructions described on the website to download the software.

3. When downloading the required files from the internet, enter the serial No.: **S11C1-01220-0100-478DF2A** to initiate installation of the software. When the computer restarts, the Winpower software will appear as a green plug icon located in the system tray, near the clock.

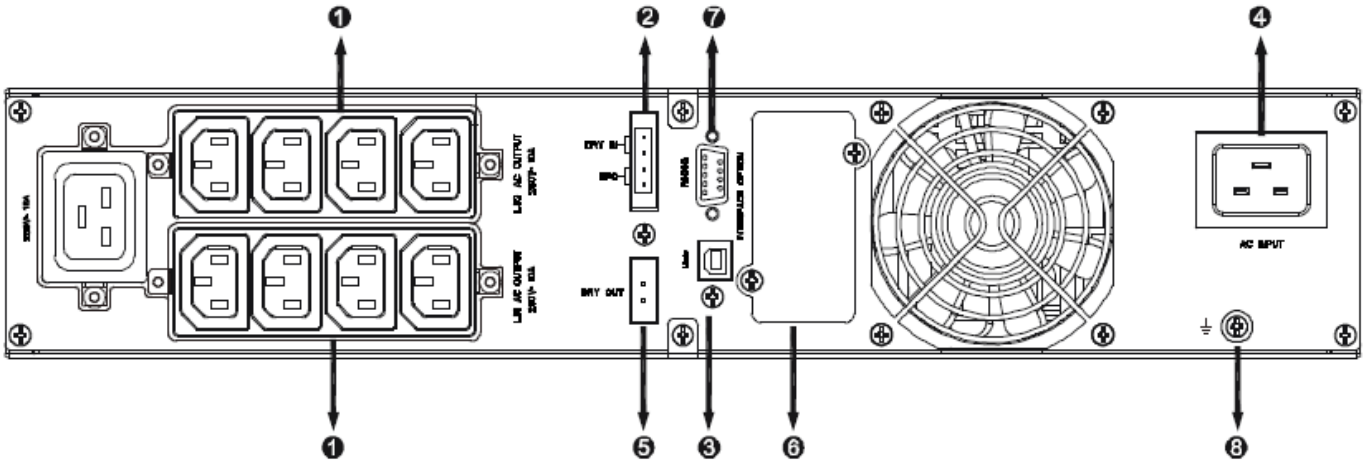
Appendix: Rear Panel

The UPS rear panel description table and pictures are shown as below:

No.	Function (B400R 1-3kVA)
1	AC Output
2	EPO / Dry in Communication Port
3	USB Port
4	AC Input
5	Dry Out
6	SNMP Slot
7	RS232
8	Earth Line Port



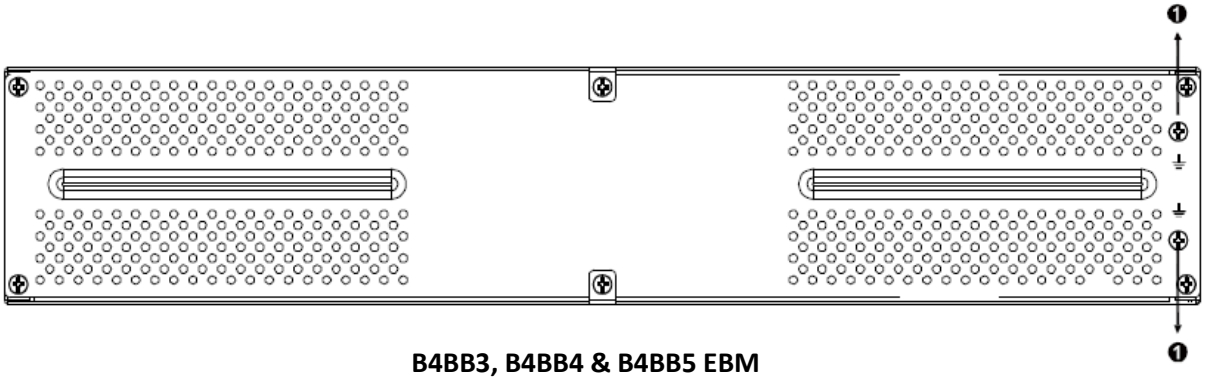
B400R-010-B (C) & B400R-020-B (C)



B400R-030-B (C)

The EBM rear panel description table and picture are shown below:

No.	Function (B4BB3, B4BB4 & B4BB5 EBM)
1	Earth Line Port



B4BB3, B4BB4 & B4BB5 EBM

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