

PowerValue 11 6-10 kVA User Manual



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FOREWORD

The UPS System operates with mains, battery or bypass power. It contains components that carry high currents and voltages. The properly installed UPS System is grounded to earth and IP 20 rated against electrical shock and foreign objects.

OPERATIONS INSIDE THE UPS MUST BE PERFORMED BY A SERVICE ENGINEER FROM THE SUPPLIER OR FROM AN AGENT AUTHORIZED BY THE SUPPLIER.

This user manual contains guidelines to check delivery, installing and commissioning of the UPS and is intended for people who plan the installation, install, commission and use or service the UPS. The reader is expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

THE INSTRUCTIONS IN THIS MANUAL SHOULD BE FOLLOWED DURING INSTALLATION, OPERATION AND MAINTENANCE OF THE UPS AND BATTERIES.

Read carefully all instructions and save this manual for future reference.

SYMBOLS

The following symbols are used in this manual, the list below describes each symbol.

	WARNING: DANGER OF ELECTRICAL IMPACT
	NOTE: READ THE INFORMATION, IN ORDER TO AVOID EQUIPMENT DAMAGES
	PROTECTIVE GROUNDING TERMINAL: A terminal which must be connected to earth ground prior to making any other connection to the equipment
	A terminal to which or from which an alternating current or voltage (AC) may be applied or supplied
	A terminal to which or from which a direct current or voltage (DC) may be applied or supplied
	Battery
	Idle or shutdown the UPS
	Overload indication
	Alarm silence
	Recycle
	Do not dispose with ordinary trash

CONTENTS

1	SAFETY INSTRUCTIONS	6
1.1	Operator precautions	6
1.2	Environmental Considerations	6
1.3	Declaration of Safety conformity and CE marking	6
1.4	Inquiries	7
1.5	Operation	7
1.6	Maintenance, servicing and faults	7
2	INSTALLATION	8
2.1	Delivery, Transportation, Positioning and Storage	8
2.1.1	Receipt of the UPS and visual inspection	8
2.1.2	Unpacking	8
2.1.3	Storage of UPS	8
2.2	Site Planning and Positioning	9
2.2.1	Planning before the installation	9
2.2.2	Positioning	9
2.3	General Characteristics	9
2.3.1	Rear View	9
2.4	Electrical Installation	10
2.4.1	Commissioning	10
2.4.2	Recommended Cable Sections and Fuse Ratings	10
2.5	Battery Connections (Model without internal batteries)	12
2.6	Emergency Power Off (EPO)	13
2.7	Installation Checklist	13
3	OPERATION	14
3.1	Control Panel	14
3.1.1	Selection Keys	14
3.1.2	LCD Display	15
3.2	Turning On the UPS	16
3.2.1	Turning on the UPS with mains	16
3.2.2	Turning on the UPS without mains (Cold start)	16
3.3	Turning Off the UPS	17
3.3.1	Turning off UPS with mains	17
3.3.2	Turning off UPS without mains	17
3.4	Operating Mode	17
3.4.1	ECO Mode / High Efficiency Mode	18
3.4.2	Converter Mode	18
3.5	LCD Operation	19
3.5.1	Navigation	19
3.6	Paralleling the units	24
3.6.1	Installation and operation	24
3.6.2	Adding an UPS to an existing parallel system	26
3.6.3	Removing a Single UPS from a parallel system	26
4	COMMUNICATION	27
4.1	Interface	27
4.1.1	USB	27
4.1.2	Dry contact	27
4.1.3	Intelligent Slot	27
4.2	Monitoring Software	27
5	MAINTENANCE	29
6	TROUBLESHOOTING	30

6.1	Fault identification and rectification	30
7	TECHNICAL SPECIFICATION	32

1 SAFETY INSTRUCTIONS

1.1 Operator precautions

The user must follow the precautions and only perform the described operations. Also in these measures the operator of the UPS System must adhere to the instructions in this manual. Any deviations from the instructions could be dangerous to the user or cause accidental load loss.

The only user operations permitted are:

- Use of the LCD control panel (LCD Display) and Maintenance Bypass (if present)
- Start up and shut down of the UPS (excluding the commissioning start up)
- Operation of additional connectivity devices

THE SUPPLIER DOES NOT TAKE ANY RESPONSIBILITY FOR DAMAGES CAUSED THROUGH WRONG MANIPULATIONS OF THE UPS SYSTEM.



WARNING!

IT IS PROHIBITED TO REMOVE ANY SCREWS FROM THE UPS SYSTEM OR FROM THE BATTERY CABINET: DANGER OF ELECTRICAL SHOCK.



WARNING!

HIGH FAULT CURRENTS (LEAKAGE CURRENTS):
BEFORE CONNECTING THE MAINS YOU MUST ENSURE THAT THERE IS A PROPER EARTH CONNECTION!



WARNING!

THE USER MUST DISPLAY A WARNING SHIELD ON ALL PRIMARY UPS CIRCUIT BREAKERS. THE SERVICE PERSONNEL HAS TO BE INFORMED ABOUT DANGEROUS VOLTAGES. THE WARNING PANELS MUST CONTAIN THE FOLLOWING TEXT: " BEFORE STARTING WITH THE MAINTENANCE WORK ON THE CIRCUIT BREAKERS , MAKE SURE THE UPS IS ISOLATED."

1.2 Environmental Considerations

To operate the UPS at the best efficiency point, your installation site should meet the environmental parameters outlined in this manual. Excessive amount of dust in the operating environment may cause damage or lead to malfunction. The UPS should be always protected from the outside weather and sunshine. The operating environment must meet the weight, airflow, size and clearance requirements specified in the technical datasheet.

Under no circumstances the UPS should be installed in an airtight room, in the presence of flammable gases, or in an environment exceeding environmental requirements here below.

An ambient temperature of +20°C to +25°C is recommended to achieve a long life of the UPS and batteries. The cooling air entering the UPS must not exceed +45 °C and the humidity should be below 95% (non-condensing).

1.3 Declaration of Safety conformity and CE marking

PowerValue 11 is designed, manufactured and commercialized in accordance with the standard **EN ISO 9001** of Quality Management Systems. The marking shows the conformity to the EEC Directive by means of the application of the following standards in accordance with the specifications of the harmonized standards:

- **2006/95/EC** Low voltage directive.
- **2004/108/EC** Electromagnetic Compatibility directive (EMC).



Standards as reference:

- **EN- 62040-1.** Uninterruptible power supply (UPS). Part 1-1: General and safety requirements for UPS's used in accessible areas by end users.
- **EN- 60950-1.** IT equipment. Safety. Part 1: General requirements.
- **EN- 62040-2.** Uninterruptible power supply (UPS). Part 2: EMC requirements.

The suppliers responsibility is excluded in the event of any modification or intervention in the product by the customer's side.

	Product Standards	Standards
Safety	EN 62040-1	EN 60950-1
Electromagnetic Compatibility (EMC)	EN 62040-2	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8 EN 61000-4-11 EN 61000-2-2

Table 1: Standards

1.4 Inquiries

Address inquiries about the UPS to the local office or agent authorized by the supplier. Please note the type code and the serial number of the equipment and contact your nearest agent authorized by the supplier. The Code and the serial no. are shown on the nameplate of the product. For further information on troubleshooting, go to Section 6.

1.5 Operation

Do not remove the enclosure of the UPS. This system is to be serviced by qualified service personnel only.

Do not disconnect the mains cable from the UPS or the building wiring socket during operation as this would remove the ground to the UPS and of all connected loads.

An integral single emergency switching device which prevents further supply to the load by the UPS in any mode of operation 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.

In order to fully disconnect the UPS, press the OFF button. Only after the UPS is shutdown, disconnect the mains load.

Indiscriminate operation of switches may cause output loss or damage to equipment. Refer to instruction before conducting any control.

While the UPSs work as a parallel system, the external parallel cable should be reinforced insulation.

1.6 Maintenance, servicing and faults

Repairs may be carried out only by qualified maintenance personnel as the UPS operates with hazardous voltages.



WARNING!

EVEN AFTER THE UNIT IS DISCONNECTED FROM THE MAINS POWER SUPPLY, COMPONENTS INSIDE THE UPS ARE STILL CONNECTED TO THE BATTERY 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.



WARNING!

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.

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

Replace the fuse only by a fuse of the same type and of the same amperage in order to avoid fire hazards.

2 Installation

2.1 Delivery, Transportation, Positioning and Storage

2.1.1 Receipt of the UPS and visual inspection

Upon receiving the UPS, carefully examine the packing container and the UPS for any sign of physical damage. In case of damage, notify immediately the carrier.

The packing container of the UPS protects it from mechanical and environmental damage. To increase its protection, the UPS is wrapped with a plastic sheet. Preserve the packaging for later re-use.

2.1.2 Unpacking

After examining the package, unpack the equipment by removing the packing and shipping materials. Cut the plastic poly-straps around the shipping container and remove the corrugated carton and the UPS foam on the top of the UPS. With one or two people on each side of the UPS, lift the UPS out of the pallet. Keep the UPS always in upright position and do not drop the equipment.



WARNING!

THE PLASTIC POLY-STRAPS AROUND THE SHIPPING CONTAINER ARE UNDER TENSION. WHILE CUTTING, DO NOT FACE THEM AS THEY MAY SPRING BACK AND CAUSE INJURIES.

Examine the UPS for any sign of damage and ensure that the received UPS corresponds to the material indicated in the delivery note. Notify your carrier or supplier immediately if damage is apparent.

2.1.3 Storage of UPS

If you plan to store the UPS prior to use, keep the UPS in a dry, clean and cool storage room with an ambient temperature between (-15 °C to +60°C) and humidity of less than 95% non-condensing. If

the packing container has been removed protect the UPS from dust. Keep the UPS always in upright position and do not drop the equipment.

2.2 Site Planning and Positioning

2.2.1 Planning before the installation

The appropriate place of installation for the unit is to be selected in such a way that the danger of damage to the UPS is minimized and a long service life of the device is thus ensured. Please observe the following instructions:

- Install the UPS in the indoor area.
- Leave 50cm of space on each side of the cabinet to enable cooling airflow and ensure that the circulation of air to the ventilation slits is not obstructed.
- Avoid excessively high temperature and excessive moisture.
- Make sure that the floor surface is solid and suitable for the wheeling and weight.

2.2.2 Positioning

PowerValue 11 (6-10 kVA) have wheels that make the positioning of the UPS simple after it has been unpacked. However, if the unpacking area is distant from the installation site, it is recommended to transport the UPS with a forklift before unpacking the UPS.

It is recommended to install external battery cabinet(s) next to the UPS unit. Check before the installation that the battery voltage values in the type plate of the UPS and external battery cabinets are the same.

Water condensing may occur if the UPS is unpacked in a very low temperature environment. In this case it is necessary to wait until the UPS is fully dried inside out before proceeding installation and use to avoid hazards and electric shock.

2.3 General Characteristics

2.3.1 Rear View

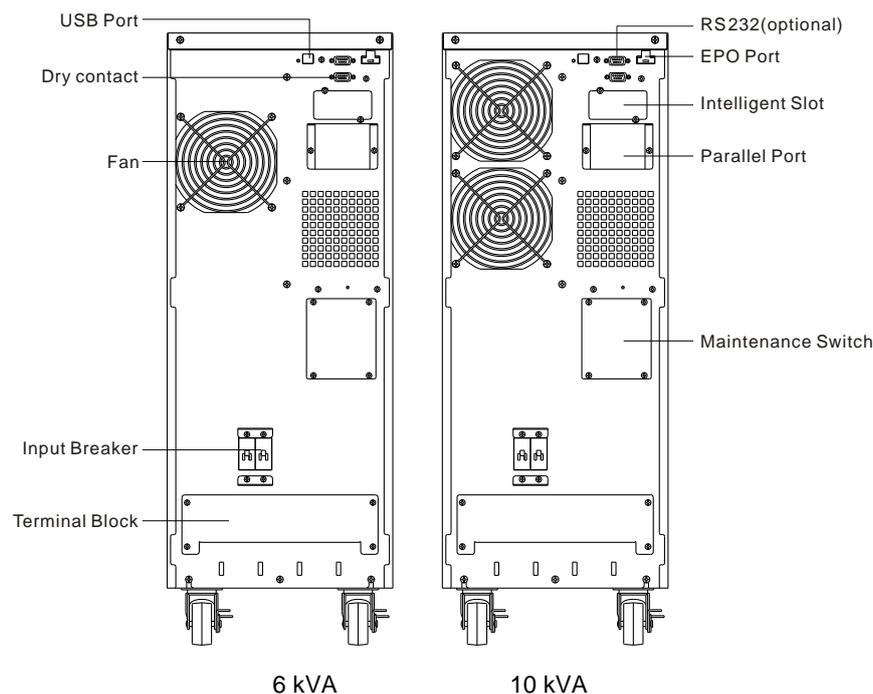


Figure 1: UPS rear view

2.4 Electrical Installation

2.4.1 Commissioning

The UPS must be commissioned by a fully trained and authorized field service engineer before being put into use. The commissioning of the UPS involves the connection of the UPS and batteries, the verification of the electrical installation and operating environment of the UPS, the controlled start-up and testing of the UPS and customer training.



WARNING!

OPERATIONS INSIDE THE UPS MUST BE PERFORMED BY A SERVICE ENGINEER FROM THE SUPPLIER OR FROM AN AGENT AUTHORIZED BY THE SUPPLIER.

DO NOT OPERATE IN CASE OF PRESENCE OF WATER OR MOISTURE.

BY OPENING OR REMOVING THE UPS-COVERS YOU ARE EXPOSED TO DANGEROUS VOLTAGES.

PHYSICAL INJURY OR DEATH MAY FOLLOW, OR DAMAGE MAY OCCUR TO THE UPS, OR THE LOAD EQUIPMENT IF THESE INSTRUCTIONS ARE IGNORED

To ensure correct operation of the UPS and its ancillary equipment it is necessary to provide the mains cables with appropriate fuse protection.

2.4.2 Recommended Cable Sections and Fuse Ratings

Follow the recommendations in Table 2 or respect the local standards.

Model	6kVA	10kVA
Protective earth conductor Minimum cross section	UL1015 6mm ² (8AWG)	UL1015 10 mm ² (6AWG)
Input L, N, G Minimum conductor cross section	UL1015 3x6mm ² (8AWG)	UL1015 3x10 mm ² (6AWG)
Input breaker	40A/250VAC	63A/250VAC
Output L,N, G Minimum conductor cross section	UL1015 3x 6mm ² (8AWG)	UL1015 3x 10 mm ² (6AWG)
External Battery Cabinet Positive Pole(+), Negative pole(-), Neutral Pole Minimum conductor cross section	UL1015 2x 6mm ² (8AWG)	UL1015 2x 10 mm ² (6AWG)
External Battery Cabinet Fuse in Positive Pole(+), Negative pole(-), Neutral Pole	30A/240VDC	60A/240VDC
External Battery Cabinet Breaker in Positive Pole(+), Negative pole(-), Neutral Pole	32A/240VDC	50A/240VDC
Torque for fixing above terminals	3.95~4.97Nm (35~44 1b in)	

Table 2: Recommended Cables and Fuses

It is suggested to install an external isolating device against current back feed between Mains input and UPS as indicated in Figure 2.

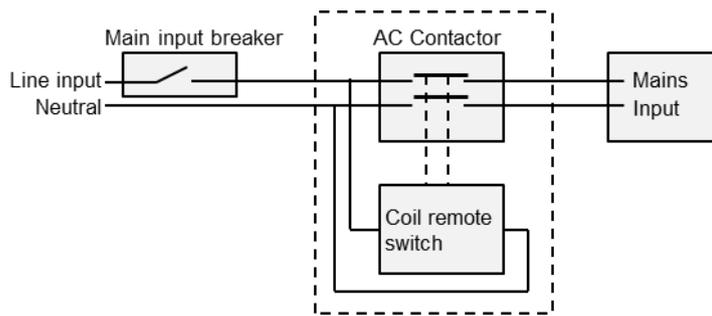


Figure 2: External Backfeed Isolation



WARNING!

AFTER THE DEVICE IS INSTALLED, ADD A LABEL WITH THE FOLLOWING WARNING ON THE EXTERNAL AC CONTACTOR: **“RISK OF BACKFEED VOLTAGE. ISOLATE THE UPS BEFORE OPERATING ON THIS CIRCUIT AND CHECK FOR HAZARDOUS VOLTAGE”**

The UPS unit has the following power connections:

- Rectifier (In): 1 phase (input L), 1 Neutral (input N) and protective earth (input G) connection for the rectifier input
- Load (Out): 1 phase (output L), 1 Neutral (output N) and protective earth (output G) connection for the load output
- External battery: Plus (+), Minus (-) and protective earth (G) connection for the external batteries
- Paralleling: Parallel Jumper 1 and 2

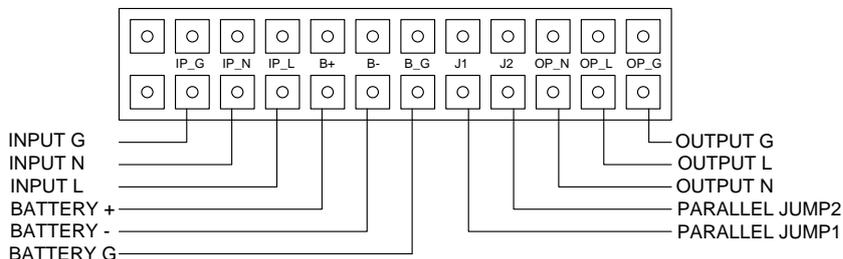


Figure 3: Terminal block wiring diagram

- 1 - The output of the UPS may be energized even if the UPS is turned off. To ensure that the UPS has no power in the output, power off the UPS, and cut off the mains power supply. Wait the UPS shut down completely.
- 2 - Open the terminal block cover located on the rear panel of UPS (refer to diagram on Section 2.3.1).
- 3 - Do not use the wall jack because its rated current is higher than the UPS maximum input current.
- 4 - Install the protective earth (ground) wire (refer to Figure 3). It is recommended to use green or green/yellow wires.
- 5 - Connect the input and output wires to the corresponding terminals

Use appropriate tools and terminal splices to guarantee a reliable contact between the wires and the terminal blocks.

Note:

- If the UPS is single in a system, JP1 and JP2 must be connected.
- If the UPS is used in parallel, the jumper between JP1 and JP2 must be removed.

- The battery connectors are only used for the UPS using external batteries

6 - Install an output breaker between the output terminal of the UPS and the load. It is recommended to use a breaker with leakage current protection.

7 - Turn off all the loads. Then connect the load to the UPS and finally turn on the loads one by one.

8 - After completing the steps above, check that all wires are connected correctly and tightly.

9 - Turn On the mains power switch and turn the input breaker to the On position. The UPS will charge the batteries automatically. The UPS can be immediately used in inverter mode but it is recommended to charge the batteries completely to guarantee the maximum back up time.

Note: The power consumption in the start-up of inductive loads (such as monitors and laser printers) is very high. If such loads are connected to the UPS, the start-up power consumed by these devices should be considered when calculating the capacity of the UPS. If this is not taken into consideration, the UPS goes often in overload and may turn off easily depending on its dimensioning.

2.5 Battery Connections (Model without internal batteries)



WARNING!

ANY INCOMPLIANCE MAY RESULT IN THE RISK OF ELECTRIC SHOCK.
FOLLOW THE INSTRUCTIONS

THE UPS CONTAINS HIGH DC VOLTAGES. A QUALIFIED PERSON MUST
DO THE CONNECTIONS BETWEEN THE UPS AND THE EXTERNAL
BATTERIES.

The nominal DC voltage of external battery pack is 240VDC. Each battery pack consists of 20 pieces of 12V maintenance free batteries in series. To achieve longer backup time, it is possible to connect several battery packs, but the principle of “same voltage, same type” should be strictly followed.

The external battery pack must be independent for each UPS. Two or more UPS cannot use the same external battery pack.

Follow the steps below to connect the battery packs.

1 - Ensure the UPS is not powered on and the mains input breaker is set in the “OFF” position.

2 - A DC breaker must be installed between the external battery pack and the UPS. The capacity of breaker must be higher than specified in the general specification.

3 - With the external battery pack breaker in “OFF” position, connect the 20 batteries in series.

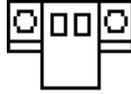
4 - Connect the external battery pack to the battery terminals. Check the polarity if the connection is correct.

5 - Turn the breaker of the battery pack to the “ON” position. The UPS will power on and start to charge the battery pack.

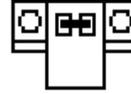
2.6 Emergency Power Off (EPO)

The EPO connector gives the user the possibility to block the output of the UPS in case of an emergency. This connector can be configured as Normally Closed (NC) or Normally Opened (NO) through the USD or RS232 port.

As a default the EPO is Normally Closed (NO) by a jumper in the rear panel. If the jumper is removed, the UPS output will not supply energy to the load until the EPO status is again modified.



Enable the EPO status



Disable the EPO status

To recover to normal status, the EPO connector should first be closed. Then, enter the LCD menu (refer to Section 0) to clear the EPO status. The UPS alarm will stop and the bypass mode will be recovered. To have the UPS in inverter mode, the selection has to be made by manual operation.

The polarity of connector could be inversed by setting in LCD menu as from section 0. Contact your local supplier for further information before modifying the settings.

2.7 Installation Checklist

- All packing materials and restraints have been removed from each cabinet.
- Each cabinet in the UPS system is placed in the installed location.
- All conduits and cables are properly routed to the UPS and auxiliary cabinets.
- All power cables are properly sized and terminated.
- A ground conductor is properly installed.
- Battery cabinet installation instructions have been completed.
- Air conditioning equipment is installed and operating properly.
- The area around the installed UPS system is clean and dust-free.
- Adequate workspace exists around the UPS and other cabinets.
- Adequate lighting is provided around all UPS equipment.
- Any optional accessories are mounted in their installed location and properly wired.
- Summary alarms and/or building alarms are wired appropriately. (OPTIONAL)
- Start-up and operational checks performed by authorized service personnel.
- All network connections are completed.

3 OPERATION

This chapter describes how to operate the UPS through the LCD display.

	<p>WARNING!</p> <p>ONLY PERSONS WHICH HAVE BEEN TRAINED BY SERVICE TECHNICIANS OF THE SUPPLIER OR HIS AUTHORIZED SERVICE PARTNERS ARE ALLOWED TO OPERATE THE CONTROL PANEL OF THE UPS.</p> <p>ALL OTHER INTERVENTIONS ON THE UPS SYSTEM HAVE TO BE DONE ONLY BY SERVICE TECHNICIANS OF THE SUPPLIER.</p>
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The only user permitted operations are:

- Operate the LCD display
- Start up and shut down of the UPS of the user field (excluding the commissioning start up)
- Operation of additional SNMP adapters and their software

3.1 Control Panel

The user-friendly control panel is composed of two parts:

- Selection Keys
- Power Management LCD Display (PMD)



Figure 4: Control Panel

3.1.1 Selection Keys

The Button	Function	Illustration
	Power on	If the unit is not powered and has the batteries connected, press this button for more than 100ms and less than 1s to power on the UPS
	Turn on	If the unit is powered on and is on Bypass mode, press this button for more than 1s to turn on the UPS
	Power off	If the unit is ON, press this button for more than 3s to turn off the UPS
	Enter main menu	If displaying the default UPS status screen, press this button for more than 1s to enter the main menu tree
	Exit main menu	Press this button for more than 1s to exit the present menu. Directs the user to default system status menu without executing any command or changing settings
	Scroll up	Press this button for >100ms&<1s to scroll up the menu option
	Scroll down	Press this button for more than 100ms and less than 1s to scroll down the menu option

	Enter next menu tree	Press this button for more than 100ms and less than 1s to select the present menu option or enter next menu. No settings are modified.
	Select one menu option	Press this button for more than 100ms and less than 1s to select the present menu option or enter next menu. No settings are modified.
	Confirm the present setting	Press this button for more than 1s to confirm the edited options and change the settings

3.1.2 LCD Display

The LCD display gives the user a complete overview on the status of the UPS. It shows information on the input, output, battery, load parameters, working mode and also the settings on voltage, frequency and bypass presence.

UPS state	Normal LED (Green)	Battery LED (Yellow)	Bypass LED (Yellow)	Fault LED (Red)
Bypass mode with no output	-	-	C	D
Bypass mode with output	-	-	A	D
Turning on	B	B	B	B
Line mode	A	-	-	D
Battery mode	A	A	-	D
HE mode	A	-	A	D
Battery test mode	B	B	B	B
Fault mode	-	-	D	A
Warning mode	D	D	D	C

Figure 5: LED representation

- A: Lightened constantly
- B: LEDs 1 to 4 Lightened circularly
- C: Flashing
- D: Depends on the fault/warning status or other status

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

Figure 6: Definition of Alarms

When powering on, the LCD displays a welcome message for a few seconds and then enters the default page that shows the UPS status.

From any screen, if the user does not press any button for more than 15 minutes, the default screen is displayed.

The status screen provides the following information:

- Status summary, including operating mode and load information
- Alarm status, if any are present (including fault and warning information)
- Battery and charger status (including battery voltage, charge level and charger status)
- Running information including parallel UPS and running time

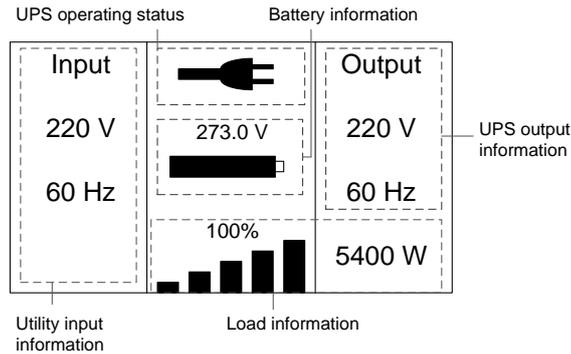


Figure 7: The default LCD display

For detailed information on how to operate the LCD, see Section 3.5.

3.2 Turning On the UPS



WARNING!

SWITCH OFF THE CONNECTED LOADS BEFORE TURNING ON THE UPS. SWITCH ON THE LOADS ONE BY ONE AFTER THE UPS IS TURNED ON.

3.2.1 Turning on the UPS with mains

- 1 - Check that all cables are connected correctly and well-fixed mechanically. Check that the position of the breaker on the external battery pack is “ON”.
- 2 - Set input breaker to “ON” position. The fans are activated and the LCD shows a welcome screen. The UPS then performs a self-test and finally displays the UPS status screen.
- 3 - Press the power-on button  continuously for more than 1 second. The alarm buzzer will sound for 1s and the UPS start-up will take place.
- 4 - After a few seconds, the UPS goes to Online mode. If the mains power is abnormal, the UPS will transfer to Battery mode without interruption of the output the UPS.

3.2.2 Turning on the UPS without mains (Cold start)

- 1 - Check that all cables are connected correctly and well-fixed mechanically. Check that the position of the breaker on the external battery pack
- 2 - Pressing the power-on button  continuously for more than 100ms, the UPS is powered on. The fan are activated and the LCD shows a welcome screen. The UPS then performs a self-test and finally displays the UPS status screen.
- 3 - Pressing the power-on button  continuously for more than 1s, the alarm buzzer sounds for 1s and the UPS start-up takes place.
- 4 - After a few seconds, the UPS goes to Battery mode. When the UPS is fed with power from the mains, the UPS transfers to Online mode without interruption in the output of the UPS.

3.3 Turning Off the UPS



WARNING!

SWITCH OFF ALL OF THE CONNECTED LOADS BEFORE TURNING OFF THE UPS

3.3.1 Turning off UPS with mains

- 1 - To turn off the inverter of UPS, press the button  continuously for more than 3s. The alarm buzzer will sound for 3s and the UPS will go to Bypass mode. Note: the output is still energized.
- 2 - In order to remove the UPS output power, disconnect the mains power supply. A few seconds later, the display will shut down and no output voltage will be available in the UPS output terminal.

3.3.2 Turning off UPS without mains

- 1 - To power off the UPS, press the power on/off button  continuously for more than 3s. The alarm buzzer will sound for 3s. The output power will be immediately cut-off.
- 2 - After a few seconds, the display will shut down and no voltage will be present in the UPS output.

3.4 Operating Mode

Different symbols indicate the status and the operating mode of the UPS. Such symbols appear always in the position indicated in Figure 8.

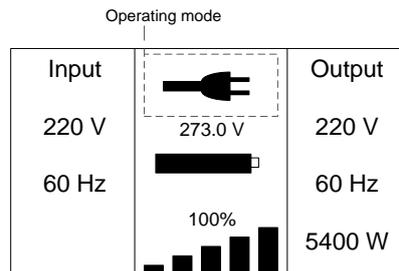


Figure 8: Operating mode

Status	Symbol	Description
Online Mode		UPS is running through the inverter (Online)
Battery Mode		UPS running on battery. (The alarm buzzer sounds every 4 seconds.)
Bypass with output		The power used by the load is supplied from the mains power via internal filter. The UPS does not have the backup function when it is in bypass mode. (The alarm buzzer will sound every 2 minutes.)
Bypass without output		UPS is running through bypass but there is no power in the output
ECO Mode		After the UPS is turned on, the power used by the load is supplied from the mains power via internal filter if the mains power is in an acceptable range. This guarantees higher efficiency of the UPS. In case of mains failure, the UPS transfers to Online mode or Battery mode and the load is supplied continuously. See Section 3.4.1 for details. Note: ECO mode can be enabled through the LCD settings or the monitoring software. Warning: The transfer time of UPS output from ECO mode to battery mode is 10ms and not recommended for sensitive

		loads.
Converter Mode		In converter mode, the UPS runs with fixed output frequency (50Hz or 60Hz). In case of mains power failure, the UPS transfers to battery mode and the load is supplied continuously. See Section 3.4.2 for details. Note: - Converter mode function can be enabled through the LCD settings or the monitoring software. - The load is de-rated to 60% in converter mode.
Warning		Warnings indicate abnormal situations that does not stop the UPS from working. In this case the UPS continues running but the user should do corrective actions. See Section 6 for details.
Fault		In fault situations, the UPS's output is disconnected or the UPS is transferred to bypass with a constant alarm. The backlight of the UPS becomes red to indicate to the user the alarming status of the UPS. See Section 6 for details.
Overload		When the UPS is in overload, an alarm sounds twice every second. Some unnecessary loads should be disconnected one by one to decrease the load. The load should be lower than 90% of its nominal power capacity in order to stop alarming.
Battery test		While doing the battery test, LEDs are lightened circularly and the battery test symbol is displayed.
Battery disconnected		If the battery is disconnected, the symbol of battery failure is shown and the UPS alarm sounds.

3.4.1 ECO Mode / High Efficiency Mode

If ECO mode (High Efficiency - HE Function) is enabled, after the UPS is turned on, the power used by the load is directly supplied from the mains power via internal filter. This guarantees a higher efficiency of the UPS. In case of mains failure, the UPS transfers to Online mode or Battery mode and the load is supplied continuously. This function can be enabled through the LCD settings in Bypass mode. Enter the power strategy Settings menu as indicated in Section 3.5.1.6.

The overall efficiency in Eco mode is higher than 96% of UPS, saving energy and reducing the running costs.

Note:

- The level of load protection is lower than in Online mode since the load is directly supplied from the mains.
- The transfer time of the UPS output from Eco mode to Battery mode is about 10ms. This function is not suitable for sensitive loads and in regions where mains power is very unstable.

3.4.2 Converter Mode

In converter mode, the UPS runs with fixed output frequency (50Hz or 60Hz). This mode is commonly used with loads that are very sensible to frequency variations. In case of mains failure, the UPS transfers to Battery mode and the load is supplied continuously. This function can be enabled through the LCD settings in Bypass mode. Enter the power strategy Settings menu as indicated in Section 3.5.1.6.

Note:

The load capacity of the UPS is de-rated to 60% in converter mode.

3.5 LCD Operation

Information regarding the status of the UPS, measurements, events and general information on the UPS are available through the LCD display. This chapter describes how to navigate through the display and how to adjust the user's settings.

3.5.1 Navigation

From the UPS status screen, press  or  for less than 1s for information on alarm, parallel system and battery.

From the UPS status screen, press  for more than 1s to enter the main menu. The main menu includes the following submenus: UPS status, event log, measurements, control, identification, settings.

See Figure 9 for details on how to navigate through the menus and submenus.

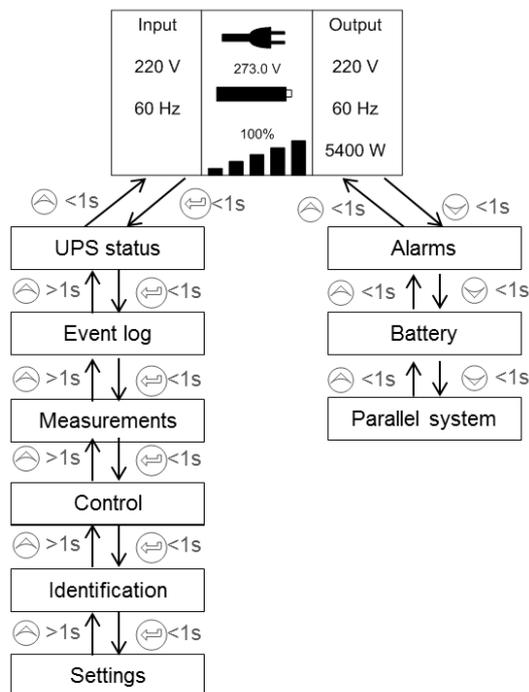


Figure 9: Main menu tree

3.5.1.1 UPS Status

Contains general information on the status of the UPS.

3.5.1.2 Event log

Displays the last 50 events, alarms and faults occurred in the UPS. The alarms are indicated by the corresponding illustration, event code and operating time of UPS when the event occurred. To navigate through the events and alarms, press  or  for less than 1s.

3.5.1.3 Measurements

Several measurements are displayed in the menu such as output voltage, frequency, current, load capacity, input voltage and frequency. To navigate through the measurements, press  or  for less than 1s.

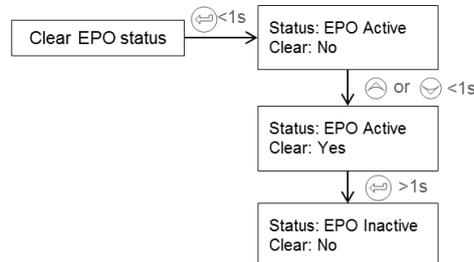
3.5.1.4 Control

From this menu, the user can give commands to the UPS. It is possible to change the UPS mode, perform battery tests, reset some status and restore settings.

Pressing  on the control submenu, the display would enter another menu tree with the following information:

- Single UPS turn off: This command is used to turn off one UPS in a parallel system. The other UPS continue to run to supply the load in the parallel system.
- Single UPS battery test: This command is used to control one UPS in a parallel system to do the battery test singularly. The other UPS do not perform the battery test.
- Parallel UPS battery test: This command is used to perform the battery test in all UPS in a parallel system simultaneously.
- Clear EPO status: Once the EPO status is enabled, the UPS output is cut-off. To recover the normal status, EPO connector must first be closed. Enter this menu to clear the status of EPO. The UPS will stop alarming and will recover in Bypass mode. Note that the UPS needs be turned on by manual operation.

Example: Clearing the EPO status



Note: First make sure the EPO signal is inactive or the LCD will show that the EPO active status couldn't be cleared.

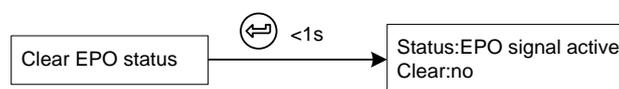


Figure 10: Clear EPO status

- Reset fault status: When a failure occurs, the UPS goes to Fault mode and the buzzer alarm sounds. After checking the reason of the failure and taking the appropriate corrective actions, enter this menu to reset the error status and recover the normal status. The UPS alarm will stop and will go to Bypass mode.

- Restore factory settings: All the factory settings are recovered. Note that this operation can only be executed when the UPS is in Bypass mode.

Figure 11 gives an overview on how to navigate on the control menu.

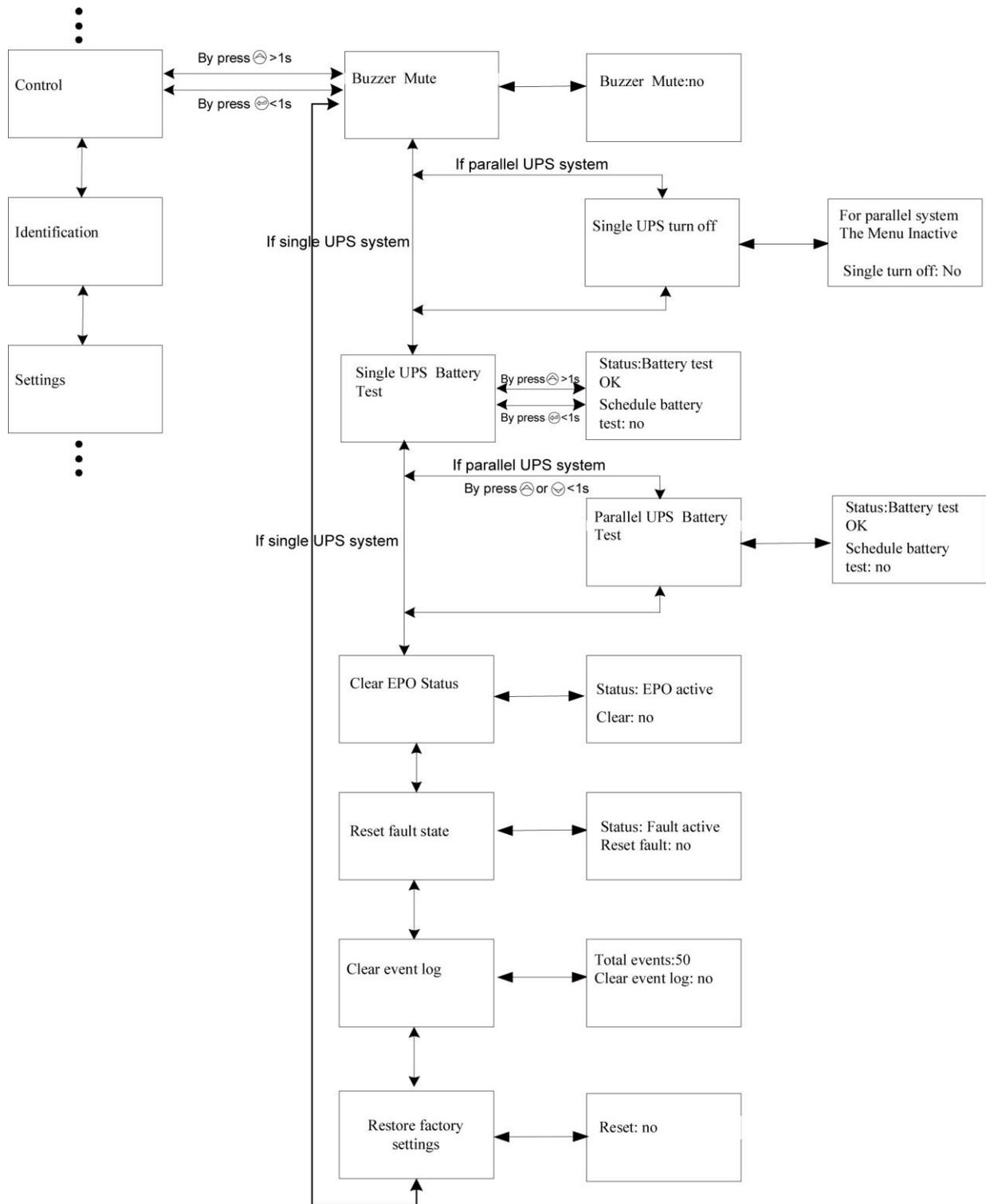


Figure 11: Control menu tree

3.5.1.5 Identification

Press on the Identification menu to navigate through its data. The identification information includes UPS serial number, firmware serial number and model type.

Press >1s to return to the last main menu.

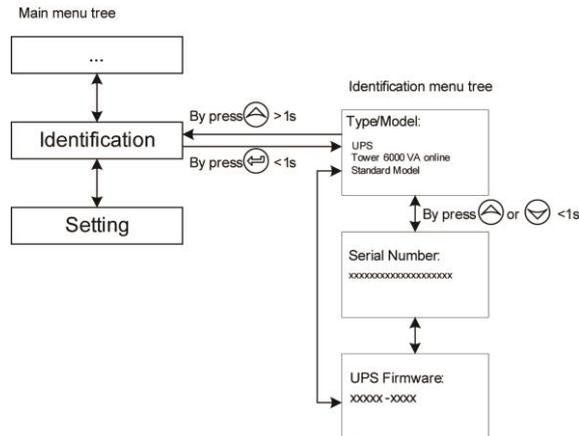


Figure 12: Identification menu tree

3.5.1.6 User's Settings

Contact your local distributor for further information before using the settings. Some settings can impact on the performance of the UPS and others can enable and disable functions within the UPS. Failures and reduced protection can occur if the equipment is not set in an adequate way.

Note that most settings should be done only with the UPS in Bypass mode.

Press \leftarrow in the Identification menu to enter the Setting menu. If the User password is enabled, the user must enter the password by pressing the buttons \uparrow , \downarrow , and \leftarrow . The setting menu is as indicated in Table 3

Submenu item	Optional Values	Default value
User password	enabled/disabled	disabled
Audio alarm	enabled/disabled	enabled
Rated output voltage	208/220/230/240V	230V
Output frequency	autosensing/50/60Hz	autosensing
Power strategy**	normal/high efficiency/ converter	normal
DC start	enabled/disabled	enabled
Site wiring fault alarm	enabled/disabled	enabled
Ambient temperature warning	enabled/disabled	enabled
Automatic battery tests period	0-31days	7days
Auto Restart	enabled/disabled	enabled
Automatic overload restart	enabled/disabled	enabled
Auto Bypass	enabled/disabled	enabled
Short circuit clearance	enabled/disabled	disabled
Bypass voltage low limit	110~215V	176V
Bypass voltage high limit	245~276V	264V
Bypass frequency low limit	1%~10%	10%
Bypass frequency high limit	1%~10%	10%
Language	Simple Chinese	English
HE voltage low limit	1%~10%	5%
HE voltage high limit	1%~10%	5%

Submenu item	Optional Values	Default value
HE frequency low limit	1%~10%	5%
HE frequency high limit	1%~10%	5%
Battery quantity***	19/20/21	20
Set running time	Day:hour:minute:second 0000:0000:00~9999:23:59:59	Running time
LCD contrast	-5~+5	0

Table 3

*Password is USER when enabled.

**Read Section 3.4, before using high efficiency or converter function.

***Ensure the real battery quantity is same as the settings not to damage the batteries.

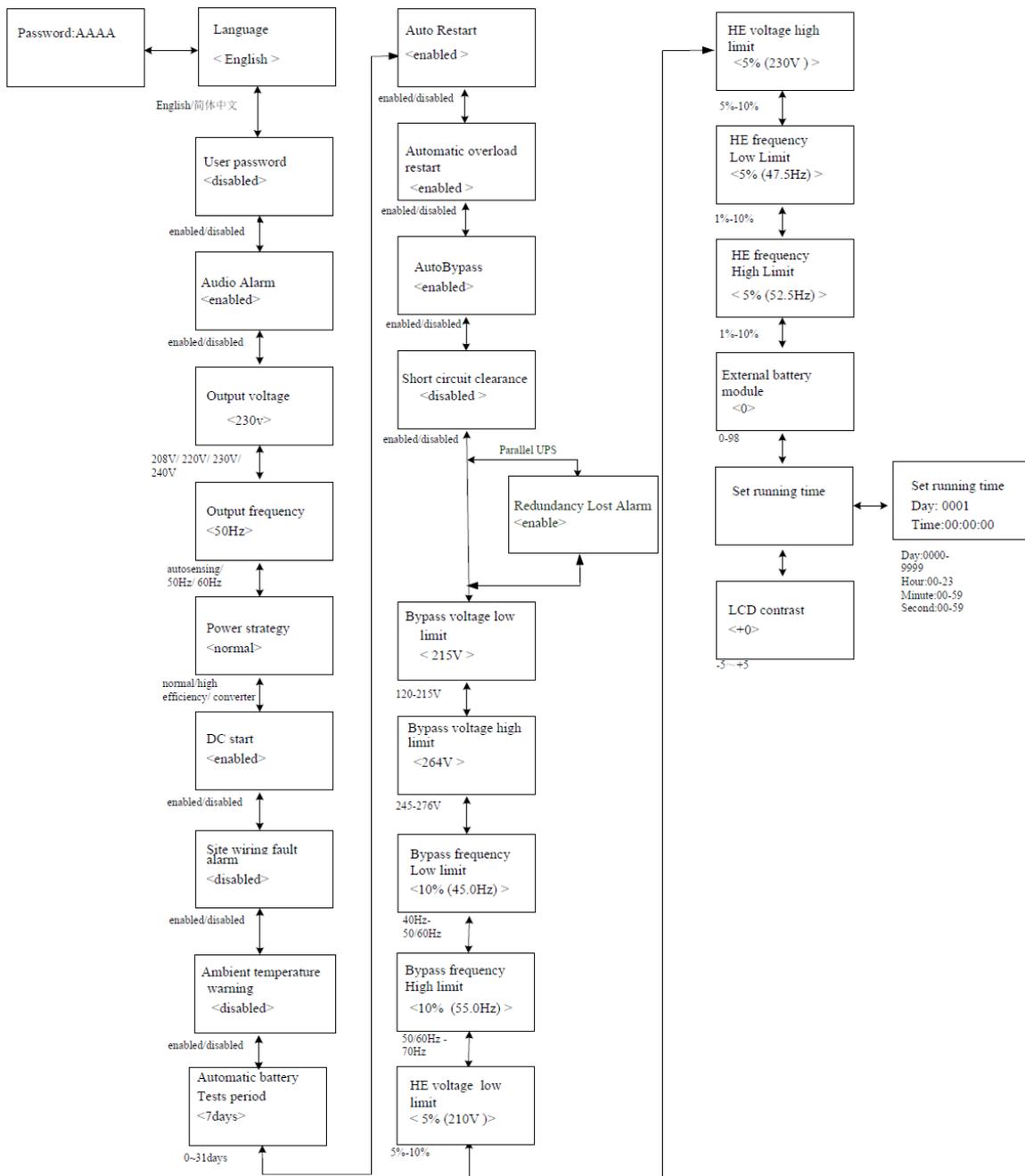


Figure 13: Setting menu tree

Example: Setting the rated output voltage value

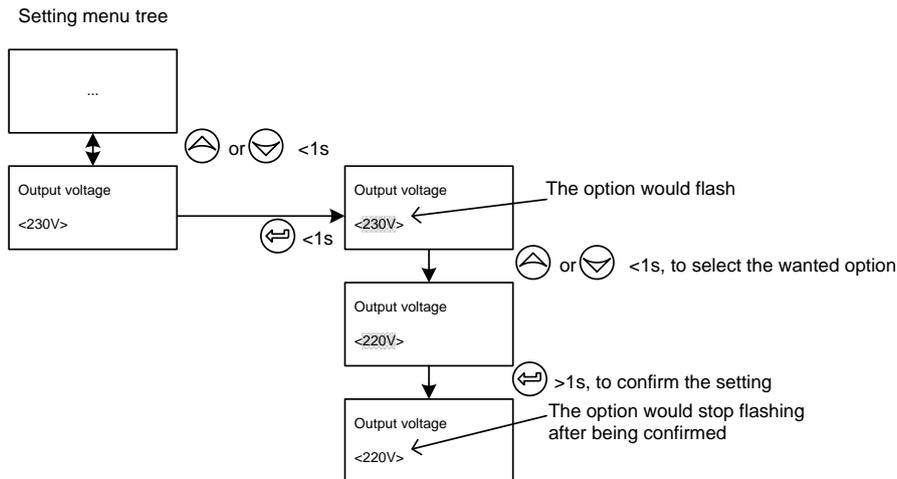


Figure 14: Setting rated output voltage value

3.6 Paralleling the units

N+X is the most reliable power structure. N represents the minimum UPS number that the total load needs and X represents the number of redundant UPS. The larger is X, higher is the reliability of the system. With PowerValue 11, up to 4 UPS can be connected in parallel to obtain output power sharing and power redundancy.

3.6.1 Installation and operation

- 1) Prepare the input and output wires, the output breaker and the parallel cable.
- 2) Use a standard 25-pin communication cable (25 colors) ideally shorter than 3m.
- 3) Remove the cover plate of the parallel port in the UPS
- 4) Connect the UPS, one by one, with the parallel cable and re-screw the parallel port cover supplied with the UPS accessories.
- 5) Strictly follow the Chapter 2 and the wiring requirements of single UPS to perform the wiring of each UPS. Connect the output wires of each UPS to an output breaker panel.
- 6) Disconnect the Jumpers JP1 and JP2 of the terminal block, then connect each output breaker to a main output breaker and then to the loads.

Each UPS needs an independent battery pack. Please refer to the wiring diagram in the following diagram. The distance between the UPS in parallel and the breaker panel is should be lower than 20 meters. The difference between the wires of the input and the output of the UPS is required to be less than 20%.

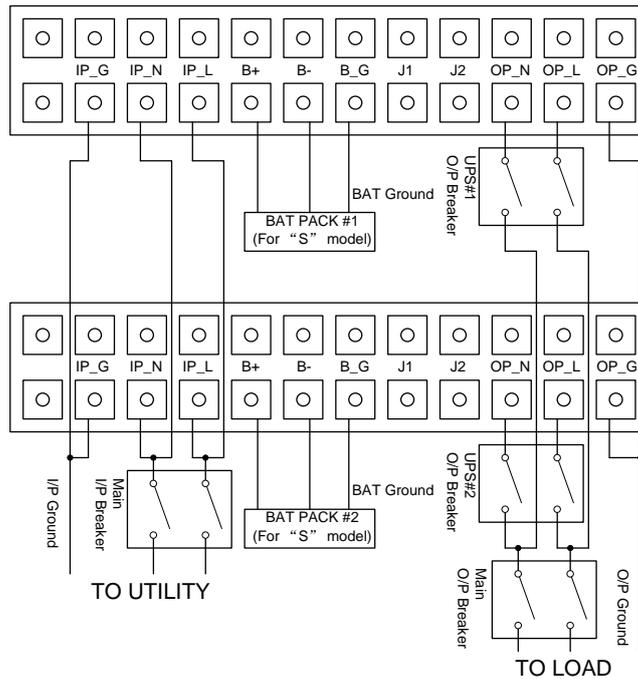


Figure 15: Input and output Terminal Block wiring diagram

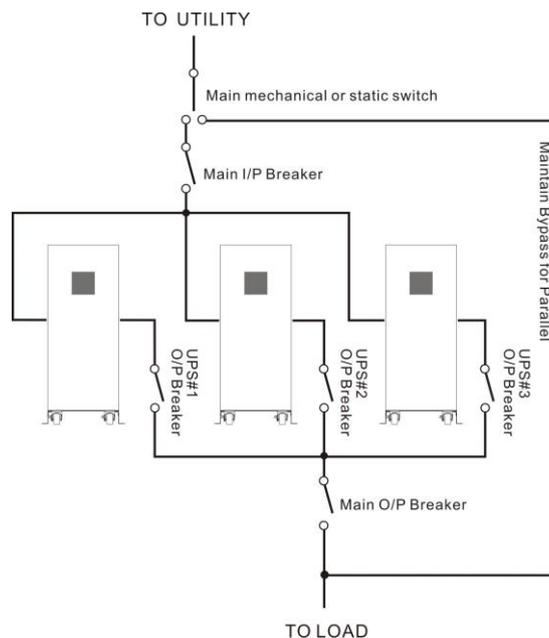


Figure 16: Parallel System Installation Diagram

- 7) Confirm that the output breaker of each UPS is switched OFF.
- 8) Switch on the input breaker of the each UPS. The UPS will start running in bypass mode. Observe the UPS displays to check if there are warnings or fault information. Measure the output voltage of each UPS separately to check if the voltage difference between them is lower than 1V. If this difference is higher than 1V, check the wiring.
- 9) Press the  button of one UPS and each UPS will start to turn on. All UPS will transfer to inverter mode simultaneously. Measure the output voltage of each UPS separately to check if the voltage difference between them is lower than 0.5V. If this difference exceeds 0.5V, the UPS have to be regulated.
- 10) Press the  button of one UPS and observe that each UPS will turn off and transfer to Bypass mode. Switch on the output breaker of each UPS to parallel the output of all UPS.

11) Press the  button of one UPS and observe that each UPS will turn on. The UPS will then work in parallel Online Mode.

3.6.2 Adding an UPS to an existing parallel system

A main maintenance mechanical switch or static switch must be installed in a parallel system.

- 1) Regulate the output voltage of the new UPS separately. Check if the output voltage difference between the new UPS and the parallel system is lower than 0.5V.
- 2) Ensure that the bypass of the parallel system is normal and that the bypass setting is “enabled”. Remove the cover plate of the maintenance switch on the rear panel of each UPS. The UPS system will transfer to bypass automatically.
- 3) Set the main maintenance switch or static switch from “UPS” to “BPS”. Switch off the main output breaker and the main input breaker, the UPS will shut down.
- 4) Ensure the UPS are completely shut down. Add the new UPS and reinstall the new UPS parallel system by following steps 1) to 6) on Section 3.6.1.
- 5) Switch on the main input breaker and the main output breaker. Set the main maintenance switch or static switch from “BPS” to “UPS”, then set the UPS maintenance switch from “BPS” to “UPS” and screw the maintenance cover plate back again. Press the  button on one UPS. Each UPS will turn on and then they will all work in parallel in Online mode.

3.6.3 Removing a Single UPS from a parallel system

A main maintenance mechanical switch or static switch must be installed in a parallel system.

- 1) Ensure the bypass of the parallel system is normal and that the bypass setting is “enabled”. Remove the cover plate of maintenance switch on the rear panel of each UPS. The UPS system will transfer to bypass automatically.
- 2) Set the maintenance switch of each UPS from “UPS” to “BPS”.
- 3) Set the main maintenance switch or static switch from “UPS” to “BPS”
- 4) Switch off the main output breaker and the main input breaker. The UPS will shut down.
- 5) Ensure the UPS are completely shut down and remove the chosen UPS from the system. Reinstall the new UPS parallel system by following steps 1) to 6) on Section 3.6.1.
- 6) If the removed UPS or the remained UPS will be used in a standalone mode, then JP1 and JP2 on the terminal block should be connected with a short connection wire.
- 7) Switch on the main input breaker and the main output breaker.
- 8) Set the main maintenance switch or static switch from “BPS” to “UPS”, then set the UPS maintenance switch from “BPS” to “UPS”.
- 9) Screw the maintenance cover plate back again. Press the  button on one UPS. Each UPS will turn on and then they will all work in parallel in Online mode.

4 COMMUNICATION

4.1 Interface

4.1.1 USB

The USB port present in the back of the UPS is compliance with USB 1.1 protocol.

4.1.2 Dry contact

PowerValue 11 UPS has independent dry contact interfaces. Please contact your local supplier for details. Figure 17 and Table 4 describe the DB-9 connector.

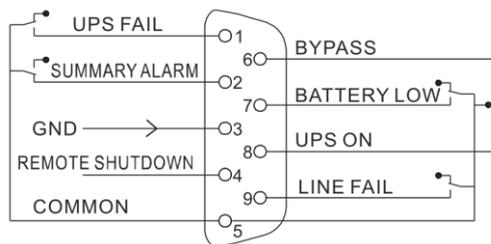


Figure 17: DB 9 Pin Layout

Pin #	Description	I/O
1	UPS Failure	Output
2	Summary Alarm	Output
3	GND	Input
4	Remote Shutdown	Input
5	Common	Input
6	Bypass	Output
7	Battery Low	Output
8	UPS ON	Output
9	Line Loss	Output

Table 4: Dry contact Pin-out

4.1.3 Intelligent Slot

PowerValue 11 is equipped with an intelligent slot for other optional cards for remote management of the UPS through internet / intranet. Please contact your local supplier for further information.

4.2 Monitoring Software

WinPower is a UPS monitoring software that allows the user to monitor the UPS. This software provides a remote and safe shutdown for multi-client systems in case of absence of power in the output of the UPS.

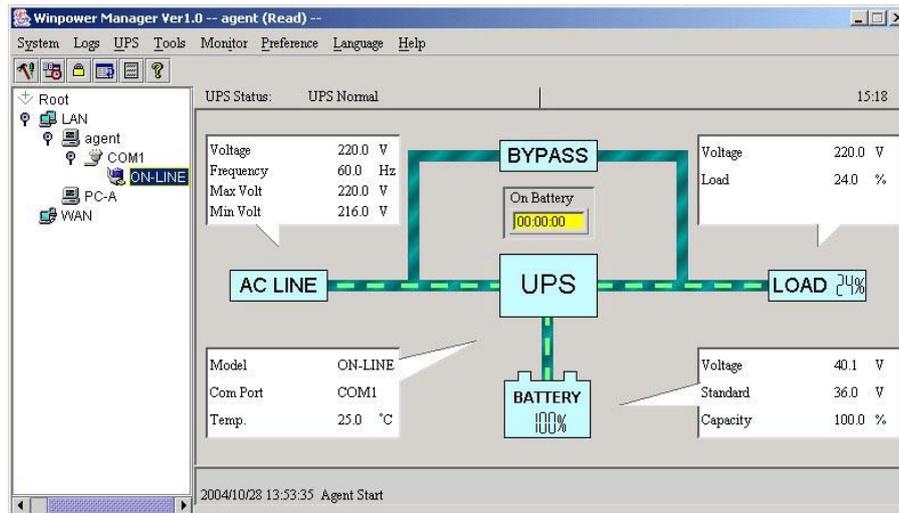


Figure 18: Monitoring Software WinPower

Installation procedure:

- Go to the website <http://www.ups-software-download.com/>
- Choose your operating system and follow the instructions described in the website to download the software.
- When downloading the files from the internet, enter the serial No: 511C1-01220-0100-478DF2A.

5 MAINTENANCE

PowerValue 11 (6-10 kVA) UPS only requires minimal maintenance. The only requirement is to charge the UPS regularly in order to maximize the expected life of the battery. When being connected to the mains power, whether the UPS is turned on or not, the UPS keeps charging the batteries and also offers the protective function of overcharging and over-discharging.



WARNING!

BATTERY REPLACEMENT SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL

- If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In this case please contact your dealer.
- The UPS should be charged once every 4 to 6 months if it has not been used for a long time.
- In high temperature regions, the battery should be charged and discharged every 2 months. The standard charging time should be of at least 12 hours.
- Under normal conditions, the battery life lasts 3 to 5 years. In case the battery is not in good conditions, earlier replacement should be made.
- Replace batteries with the same number and same type of batteries.
- Do not replace the batteries individually. All the batteries should be replaced at the same time following the instructions of the battery supplier.

6 TROUBLESHOOTING

6.1 Fault identification and rectification

If the UPS system does not operate correctly, please attempt to solve the problem using the table below. If the problem still persists, consult your supplier.

Problem Displayed	Possible cause	Remedy
Read EEPROM Error	UPS internal fault	Consult your supplier.
EPO Active	EPO connector is open	Check the EPO connector status
On Maintain Bypass	Maintain bypass switch is open	Check the maintain bypass switch status
IP soft start failed	UPS internal fault	Consult your supplier.
Site Wiring Fault	Phase and neutral conductor at input of UPS system are reversed	Reverse mains power wiring.
Battery Disconnect	Battery pack is not connected correctly	Do the battery test to confirm. Check the battery bank is connected to the UPS. Check the battery breaker is turned on.
Battery low	Battery voltage is low	If audible alarm sounds every second, the battery is almost empty.
Output Overload	Overload	Check the loads and remove some non-critical loads. Check if some loads have failures.
Fan Failure	Fan abnormal	Check if the fan is running normally.
Charger Fail	The charge fails	Consult your supplier.
Battery Over Voltage	Battery voltage is higher than normal value	Check if the battery quantity is correct.
Over Charge	Battery is over charged	The UPS will turn off the charger until the battery voltage is normal
Model Pin Error	UPS internal fault	Consult your supplier.
Ambient Over Temperature	The ambient temperature is too high	Check the environment ventilation.
Heat sink Over Temperature	Inside temperature of UPS is too high	Check the ventilation of UPS and the ambient temperature.
Ambient NTC abnormal	UPS internal fault	Consult your supplier.
Para Cable Male Loss	The parallel cable is disconnected	Check the parallel cable.
Para Cable Female Loss	The parallel cable is disconnected	Check the parallel cable.
Para Bat Differ	The battery packs of some UPSs are disconnected	Check if all the battery packs are connected.
Para Line Differ	The mains input of some UPSs is disconnected	Check the building wiring and input cable. Check if the input breaker is closed. Ensure the UPS are connected to the same input source.
Para Work Mode Differ	UPS are configured with different power settings (Ex. one in Online mode and one in Converter mode).	Modify the settings of the UPS. All UPS should be running in the same mode
Para Rate Power Differ	There are different UPS in a parallel system	UPS with different capacity (Ex. one 6kVA and one 10kVA) cannot be paralleled.
ECO In Para	ECO mode is enabled in a parallel system	Eco mode cannot be used in a parallel system.
IP Fuse Open	Input fuse break is opened	Check the input fuse status

Problem Displayed	Possible cause	Remedy
Inv Overload Fault	Overload	Check the loads and remove non-critical loads. Check if there are failures in the load.
Byp Overload Fault	Overload	Check the loads and remove non-critical loads. Check if there are failures in the load.
Output Short Circuit	Output short circuit	Remove all loads. Turn off the UPS. Check if the UPS output and loads are short circuited. Ensure short circuit is removed before turning on the UPS again.
Heat sink Over Temperature Fault	Inside temperature of UPS is too high	Check the ventilation of UPS and the ambient temperature.
Bus Over Voltage	UPS internal fault	Consult your supplier.
Bus Under Voltage	UPS internal fault	Consult your supplier.
Bus Unbalance	UPS internal fault	Consult your supplier.
Bus short	UPS internal fault	Consult your supplier.
Bus Soft start Fail	UPS internal fault	Consult your supplier.
Inv Over Voltage	UPS internal fault	Consult your supplier.
Inv Under Voltage	UPS internal fault	Consult your supplier.
Inv Soft start Fail	UPS internal fault	Consult your supplier.
Negative Power Fault	The load is purely inductive or capacitive	Remove non-critical loads. Bypass supplies the load. Ensure there is no overload, then turn on UPS.
Cable male and female Loss fault	The parallel cable is disconnected	Check the parallel cable.
Fan lock fault	Fan blocked or disconnected over time	Check the fan status.
Back Feed	Output voltage is returned to input	Consult your supplier.
No indication, no warning tone even though system is connected to mains power supply	No input voltage	Check the building wiring and input cables. Check if the input breaker is closed.
BYPASS LED light up even though the power supply is available	Inverter not switched on	Press On-Switch to turn on the UPS.
BATTERY LED lights up, and audible alarm sounding every 1 beep in every 4 seconds	Input voltage and/or frequency are out of tolerance	Check input power source. Check the building wiring and input cable. Check if the input breaker is closed.
Emergency supply period shorter than nominal value	Batteries are not fully charged / batteries defect	Charge the batteries for at least 12 hours and then check capacity.

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

1. Model number, serial number
2. Date on which the problem occurred
3. LCD/LED display information, Buzzer alarm status
4. Mains power condition, load type and capacity, environment temperature, ventilation condition
5. Information on external battery pack (battery capacity, quantity)

7 TECHNICAL SPECIFICATION

GENERAL DATA	6 kVA	6 kVA B	10 kVA	10 kVA B
Output rated power [W]	5400 W	5400 W	9000 W	9000 W
Output power factor	0.9			
Topology	True online double conversion			
Inbuilt batteries	No	Yes	No	Yes
INPUT				
Nominal input voltage	200 / 208 / 220 / 230 / 240 V _{AC}			
Input voltage tolerance	110-276 V _{AC} (depends on load level)			
Input current THD	<5% with full resistive load			
Rated current (ref. 230V)	25.8 A		43 A	
Frequency range	45-55 Hz / 54-66 Hz			
Power factor	≥0.99			
OUTPUT				
Rated output voltage	208* / 220 / 230 / 240 V _{AC}			
Waveform	Sinusoidal			
Voltage tolerance (referred to 230V)	±1%			
Voltage distortion	≤2% full linear load, ≤5% full non-linear load			
Overload capability** (inverter mode)	2 min.: 105-125% load / 30s.: 125-150% load / 1s.: >150%			
Overload capability** (bypass mode)	1 min.: 120-150% load / 10s.: >150% load / 1s.: >170%			
Nominal frequency	50 or 60 Hz x (1± 0.5 Hz on battery mode)			
Crest Factor	3:1			
TRANSFER TIME				
Battery ↔ inverter	0 ms			
Bypass ↔ inverter	0 ms			
Inverter to Eco-mode	0 ms			
Eco-mode to inverter	<10 ms			
EFFICIENCY				
AC-AC	≥ 92%			
In eco-mode	≥ 96%			
ENVIRONMENT				
Protection rating	IP 20			
UPS storage temperature	-15 – +60°C			
Batteries storage temperature	0~35°C			
Operating temperature	0 – 45°C			
Relative humidity	0-95% (Non-condensing)			
Altitude (above sea level)	<1000m for nominal power*			
BATTERY				
Type	VRLA, vented lead-acid			
Battery configuration	-	20 x 7.2Ah	-	20 x 9Ah
Backup time (100% load)	-	6 minutes	-	4 minutes
Charging current	4A	1.2 A	4A	1.2 A
Recharge time	-	3h to 90%	-	3h to 90%
EXBAT max current	32A	32A	50A	50A
COMMUNICATIONS				
User interface	LCD display			
Communication cards	SNMP (option), AS400 relay card (option)			
STANDARDS				
Safety	IEC/EN 62040-1			
Performance	IEC/EN 62040-3			
RoHS	IEC/EN50581:2012			
Manufacturing	ISO 9001:2008, ISO 14001:2004			
WEIGHT, DIMENSIONS				
Weight	25.4 kg	80 kg	28.3 kg	84 kg
Dimensions WxHxD	260 x 708 x 558 mm	260 x 708 x 558 mm	260 x 708 x 558	260 x 708 x 558

*Technical specifications are subject to change without notice.

*The load capacity is de-rated to 90% when the output voltage is adjusted to 208VAC.

*The overload capacity is de-rated in Online mode if the ambient temperature is higher than 35 °C.

* The load capacity is de-rated by 1% for every 100m above 1000m.