

PowerValue 11 RT 1-3 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
	Power On, Idle or shutdown the UPS
	Overload indication
	Recycle
	Do not dispose with ordinary trash

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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 or moisture in the operating environment may cause damage or lead to malfunction. The UPS should always be 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 could 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 +40 °C and the humidity should be below 95% (non-condensing).

1.3 Declaration of Safety conformity and CE marking

PowerValue 11 RT 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-IEC 62040-1.** Uninterruptible power supply (UPS). Part 1-1: General and safety requirements for UPS's used in accessible areas by end users.
- **EN-IEC 60950-1.** IT equipment. Safety. Part 1: General requirements.
- **EN-IEC 62040-2.** Uninterruptible power supply (UPS). Part 2: EMC requirements.

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

	Product Standards	Standards
Safety	IEC/EN 62040-1	IEC/EN 60950-1
Electromagnetic Compatibility (EMC)	IEC/EN 62040-2 (C1)	IEC/EN 61000-4-2 IEC/EN 61000-4-3 IEC/EN 61000-4-4 IEC/EN 61000-4-5 IEC/EN 61000-4-6 IEC/EN 61000-4-8 IEC/EN 61000-2-2

Figure 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 serial number is shown in 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.

In order to fully disconnect the UPS, press the OFF button. Wait until it is on bypass or on stand-by mode to disconnect it from the mains. Do not disconnect the equipment from the mains if it is in inverter/online-mode.

Indiscriminate operation of switches may cause output loss or damage to equipment. Refer to instruction before operating the UPS.

Ensure that no liquid or other foreign objects enter the UPS.

2 Maintenance

PowerValue 11 (1-3 kVA) RT UPS only requires minimal maintenance. The main 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 offers the protective function of overcharging and over-discharging.



WARNING!

BATTERY REPLACEMENT SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL

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.

- 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. The batteries charge to 90% capacity in approximately 4 hours. However, it is recommended that the batteries charge for 48 hours after long-term storage.
- 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 lifetime is 3 to 5 years. In case the battery is not in good conditions, earlier replacement should be made.
- When the discharging time is less than 50% of specified after full charged, the battery may need to be replaced. Please check the battery connection or contact your local dealer to order new battery.
- Replace batteries with the same number and same type of batteries.
- Do not replace the batteries individually. They should be replaced at the same time following the instructions of the battery supplier.

Batteries have high short-circuit currents and pose high risks of electric shock. Take all precautionary measures specified below:

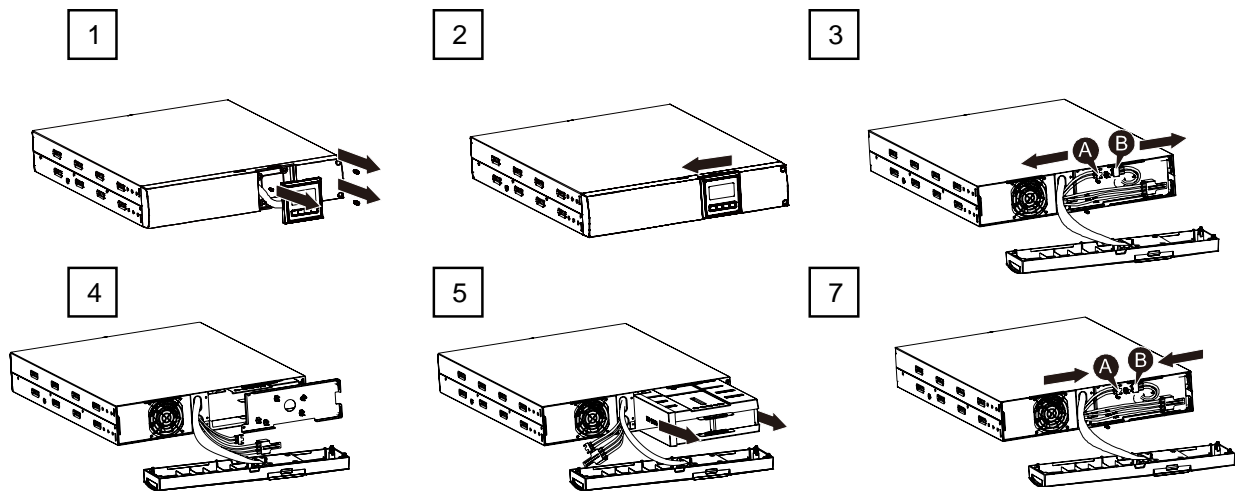
- Remove all jewelry, wristwatches, rings and other metal objects
- Use only tools with insulated grips and handles
- Do not lay tools or metal parts on top of batteries
- Wear rubber gloves and boots
- Disconnect the charging source prior to connecting or disconnecting the battery terminals.

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

2.1 Replacing Internal Batteries

To replace the internal batteries, follow the instructions below:

1. Remove the LCD box and the screws of the front panel.
2. Slide and pull the front panel to the left and remove it.
3. Disconnect the cable from the UPS and the battery pack.
4. Remove the right inner battery bracket.
5. Pull out the battery pack and place it in a flat surface.
6. Install the new battery pack.
7. Screw the battery protection and reconnect the battery cable (A and B)
8. Re-install the front panel back to UPS.



2.2 Testing New Batteries

Before performing a battery test, check the items below:

1. The batteries should be fully charged. If this is not the case, connect the UPS to the mains power for at least 48 hours.
2. Transfer the UPS to Online or Eco Mode if not yet in one of these configurations.
3. Clear out all alarms if existent
4. In the Control menu, choose "Start battery test" by pressing the select button to start the battery test either on online mode or on ECO mode (High efficiency mode).

Note that the load should be connected while doing the battery test.

2.3 Battery Recycling



WARNING!

NEVER DISPOSE BATTERIES ON FIRE AS THEY MAY EXPLODE.

DO NOT OPEN OR MUTILATE THE BATTERIES.

RELEASED ELECTROLYTE IS HARMFUL TO THE SKIN AND EYES.

Discard appropriately the UPS, battery module and batteries and follow your local laws and regulations.

3 Installation

3.1 Delivery, Transportation, Positioning and Storage

3.1.1 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.

3.1.2 Unpacking

After examining the package, open the carton box and remove the accessories.

- 1 x User manual
- 4 x UPS support (feet)
- 1 x IEC Cable
- 1 x German Cable
- 1 x USB cable
- 1 x 2 pin EPO Connector
- 1 x 4 pin EPO Connector
- 1 x Monitoring Software CD

Rack mounting kit (optional)

- 1 x 'L' metal slide
- 1 x 'R' metal slide
- 10 x M6 round screw
- 10 x M6 clip nut
- 2 x 90° metal support ("ears")
- 8 x M4 flat screws (black)
- 6 x M4 round screws
- 1 x User manual

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.

3.1.3 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.

3.2 Site Planning and Positioning

3.2.1 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. Observe the following instructions:

- Install the UPS in an indoor area.
- Leave 25 cm 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 surface is solid and flat.
- Use No. 10AWG (for all models battery wire), 90°C copper wire and Anderson PP45 connectors for user's external battery enclosure.

3.2.2 Positioning

PowerValue 11 RT can be mounted in a rack or in a standalone configuration. Follow the instructions in this section accordingly to the installation requirements.

Note that 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.

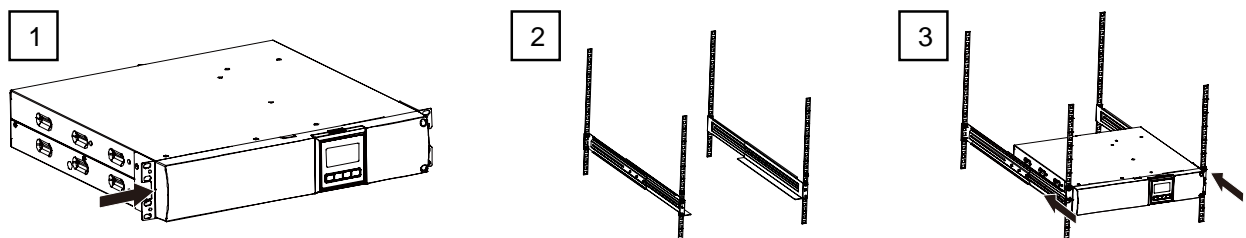
3.2.3 Rack Mount Installation

PowerValue 11 RT can be installed in 19 inches racks. Both the UPS and the external battery enclosure are 2U in height.

3.2.3.1 Installing the UPS

1. Align the rack mounting ears on the side of the UPS and tighten the screws
2. Assemble the rack rails with the rack-mounting kit.
3. Slide the UPS into the rack rail and lock it into the structure.
4. Tighten the screws and then proceed with the wiring of the UPS.

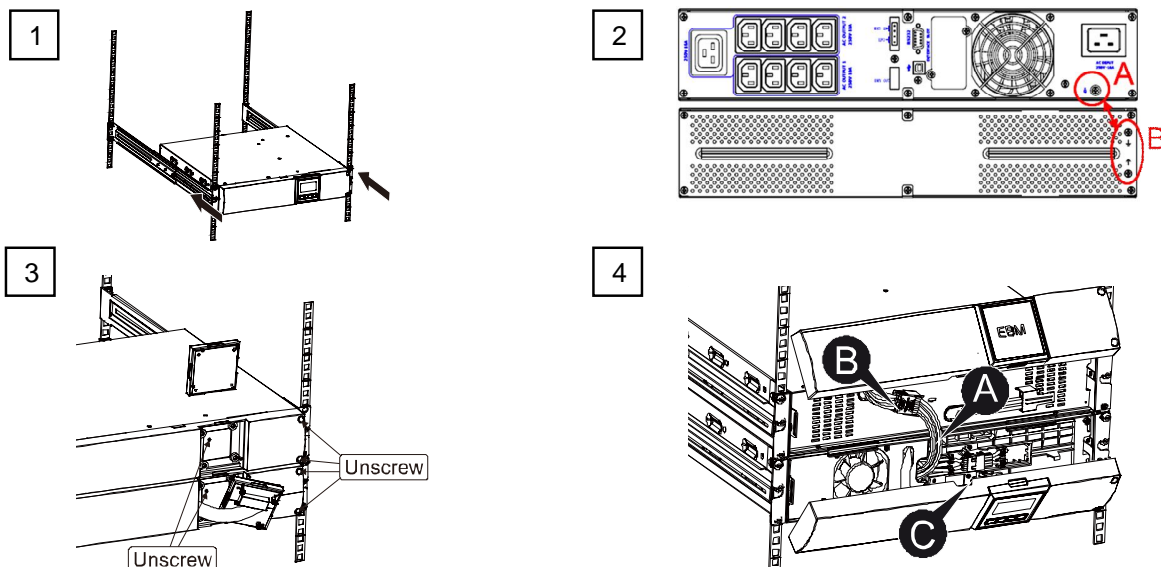
If installing additional UPS, repeat the procedures above for each cabinet.



3.2.3.2 Installing the External Battery Enclosure

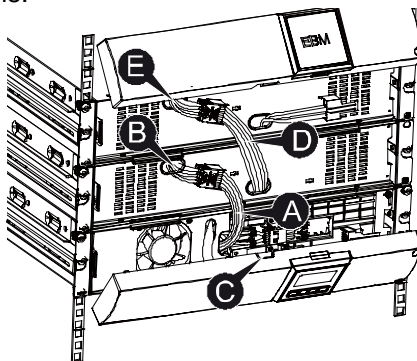
1. Using the same method as for assembling the UPS, install the external battery module into the rack on the top or on the bottom of the UPS.
2. Connect the earth line from UPS (port A) to Battery Module (port B)
3. Remove the display box and remove the screws positioned in the front panel (in the back of the LCD box and on the right side of the panel itself).
4. Remove the front panel and connect the battery terminal (A) from the UPS to the Battery Module terminal (B) as shown below. Remove the small cable entrance gate (C) on the side of the front panel to allow the outlet wire of the External Battery Enclosure to pass through the gate.

5. Reassemble the front panel
6. After installing the UPS into the rack, proceed with the connection of the load to UPS. Make sure the load equipment is turned off before plugging them into the output receptacle.



3.2.3.3 Installing Multiple External Battery Enclosures

1. Remove the front panel and connect the battery terminal (A) from the UPS to the Battery Enclosure terminal (B) shown below.
2. Connect the battery terminal (D) from the first Battery Enclosure to the battery terminal (E) from the second Battery Enclosure.
3. Remove the gates (C) on the side of the front panel to allow the outlet wire of the Battery Module to pass through the gate.
4. Reassemble the front panels.



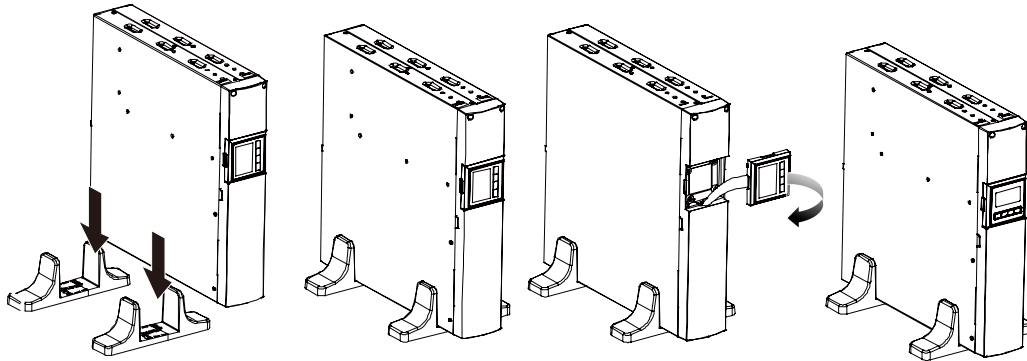
Note: After connecting the Battery Enclosures, configure the number of battery modules in the control panel (refer Section 4.4). If using a nonstandard battery modules, use Anderson PP45 connectors. Set the external battery packs 0~9 through LCD setting menu (See section 4.4.2.6). The number of battery modules should be calculated as: $n = (\text{battery capacity Ah}) / 7.2$.

3.2.4 Standalone / Tower Installation

3.2.4.1 Installing the UPS

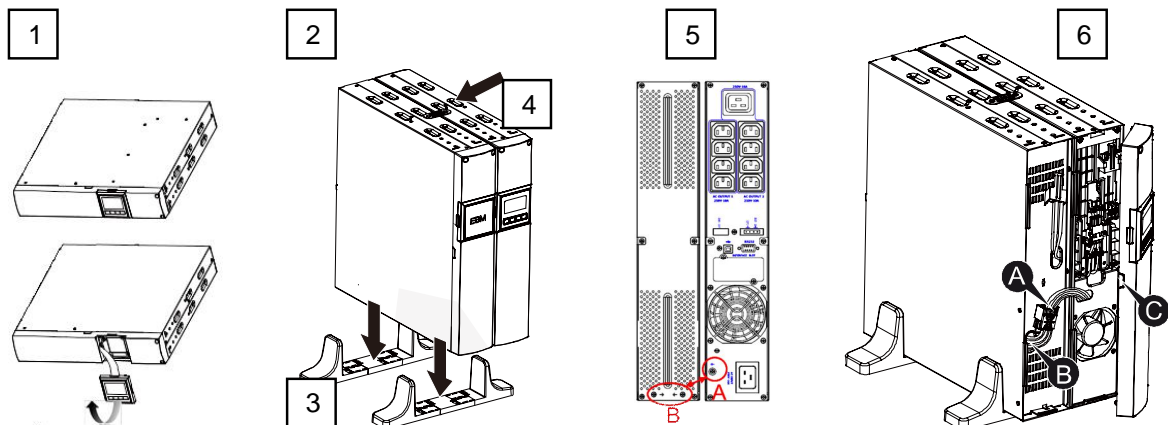
Installing the UPS in a vertical (tower) position, the UPS stands (feet)

1. Place the UPS in a vertical position (with the front panel screws to the top)
2. Place the two stands (feet) towards the end of the units (see figure below).
3. Place the UPS in the stands carefully.
4. Pull out the LCD box. Rotate it by 90° clockwise and then push it back into the front panel.



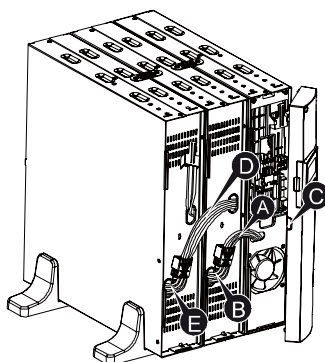
3.2.4.2 Installing the External Battery Enclosure

1. Pull out the LCD box of the UPS and of the Battery Enclosure and rotate them by 90° clockwise. Then push the LCD box back into the front panel.
2. Place the UPS and the Battery Enclosure in a vertical position (with the front panel screws to the top)
3. Place the two stands (feet) towards the end of the units (see figure below).
4. Place the UPS and the Battery Enclosure in the stands carefully and tighten the screws on the top of the units.
5. Connect the earth line from UPS (port A) to the Battery Module (port B)
6. Remove the front panel and connect the battery terminal (A) from the UPS to the Battery Module terminal (B) as shown below. Remove the small cable entrance gate (C) on the side of the front panel to allow the outlet wire of the External Battery Enclosure to pass through the gate.



3.2.4.3 Installing Multiple External Battery Enclosures

1. Connect the earth line between the UPS and the first Battery Enclosure. Then connect the earth line between the first Battery Enclosure and the second Battery Enclosure.
2. Remove the front panel and connect the battery terminal (A) from the UPS to the Battery Enclosure terminal (B).
3. Connect the battery terminal (D) from the first Battery Enclosure to the battery terminal (E) from the second Battery Enclosure. Remove the small gates (C) on the side of the front panel to allow the outlet wire of the Battery Enclosure to pass through the gates.
4. Reassemble the front panel.



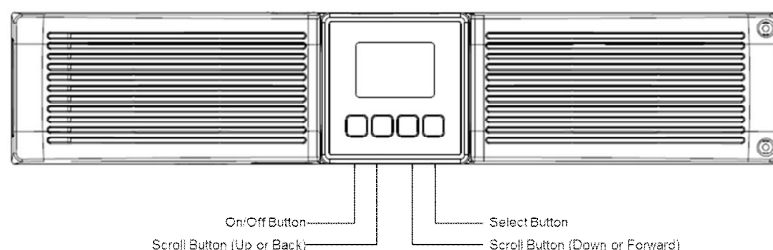
Notes:

- Up to four External Battery Enclosures can be connected to the UPS in the same way as shown above.
- After connecting the Battery enclosures, configure their quantity through the LCD display (Refer to Section 4.4)

If using a nonstandard battery modules, use Anderson PP45 connectors. Set the external battery packs 0~9 through LCD setting menu (See section 4.4.2.6). The number of battery modules should be calculated as: $n = (\text{battery capacity Ah}) / 7.2$.

3.3 General Characteristics

3.3.1 Front View



3.3.2 Rear View

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

Number	Description
1	AC output
2	EPO / Dry contact input port
3	USB port
4	AC input
5	Ground contact
6	RS-232
7	SNMP/ AS400 slot
8	Dry contact output port

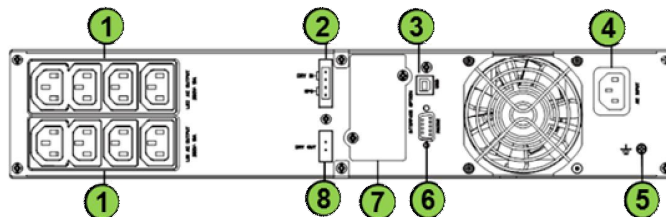


Figure 2: Rear view of PowerValue 11 RT 1 and 2 kVA

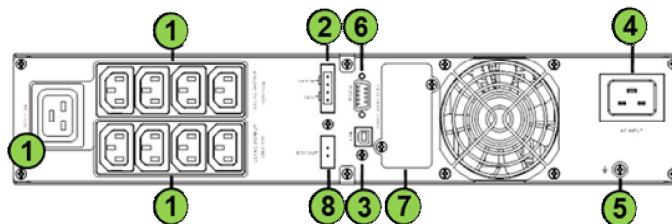


Figure 3: Rear view of PowerValue 11 RT 3 kVA

The External Battery Enclosure rear panel's description table and picture are shown below:

No.	Description
1	Earth port

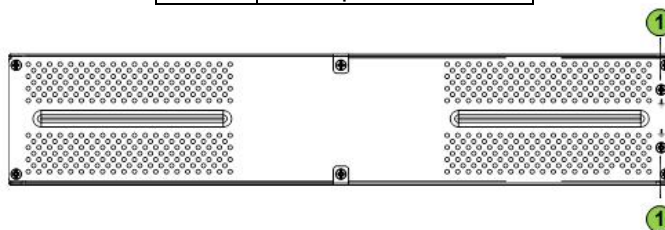


Figure 4: Rear view of 36V, 48V and 72V Battery Enclosures

3.4 Electrical Installation

3.4.1 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.

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

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

3.4.2 Connections

Before installing the electrical wiring, check the nominal amperage of your incoming feeder.



WARNING!

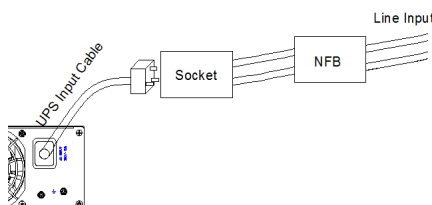
THE CABLING CONNECTIONS MUST BE CARRIED OUT BY QUALIFIED ELECTRICAL PERSONNEL.

3.4.2.1 Input

If the UPS is connected through the power cords supplied with the unit, use the appropriate input connectors with protection against electric current as indicated in Table 1.

The UPS System does not have an input breaker in the standard cabinet. When installing the UPS, connect the external breakers and protective components in the input terminals. It is recommended to select NFB (Non-Fused Breakers) instead of the traditional combination kit including breaker and fuse.

To select the breakers, refer to Table 1.



UPS Power	UPS input breaker, Power Cord and Sockets	
	Voltage	Current
1 kVA	300 Vac	10A
2 kVA	300 Vac	16A
3 kVA	300 Vac	20A

Table 1: Recommended cables and breakers

3.4.2.2 Output

The output connections of the UPS are done through the IEC sockets present in the back of the units. Simply plug the load power cord to the output sockets to complete connection.

UPS Power	Output Socket (Qty)
1 and 2 kVA	8 x IEC320 C13
3 kVA	8 x IEC320 C13 + 1 x C19

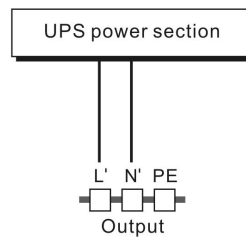


Figure 5: Connection Diagram



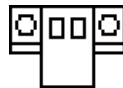
WARNING!

DO NOT CONNECT EQUIPMENT THAT COULD OVERLOAD THE UPS SYSTEM (E.G. LASER PRINTERS)

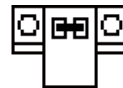
3.5 Emergency Power Off (EPO)

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 USB or RS232 port.

As a default the EPO is Normally Closed (NC) 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 4.4.2.4) 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 4.4.2.6. Contact your local supplier for further information before modifying the settings.

3.6 Installation Checklist

- ☐ All packing materials and restraints have been removed from each module.
- ☐ Each module in the UPS system is placed in the installed location.
- ☐ All conduits and cables are properly routed to the UPS and auxiliary enclosures.
- ☐ All power cables are properly sized and terminated.
- ☐ A ground conductor is properly installed.
- ☐ Battery enclosure 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.

4 OPERATION

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



WARNING!

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.

ALL OTHER INTERVENTIONS ON THE UPS SYSTEM HAVE TO BE DONE ONLY BY SERVICE TECHNICIANS OF THE SUPPLIER.

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

4.1 Control Panel

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

- Selection Keys
- Power Management LCD Display (PMD)

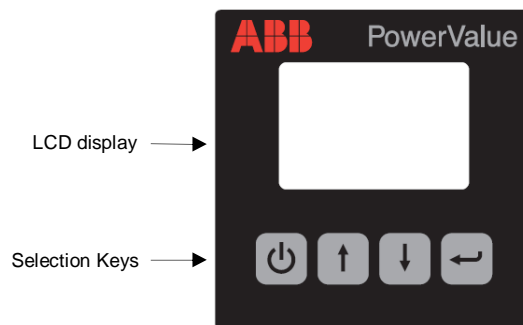






Figure 6: Control Panel

4.1.1 Selection Keys

The Button	Function	Illustration
	Power On/Off	Turn on and off the UPS or change operating mode.
	Scroll up	Enter/Exit the menus and scroll across the screens.
	Scroll down	Scroll down the menu
	Select / Edit	Select and confirm settings.

To see how to operate the UPS, go to Section 4.2.

4.1.2 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 the settings on voltage, frequency and bypass presence.

It has two main backlight colors. The standard color is a blue background with white texts. In case of a critical alarm, the backlight color changes to orange with dark text. The buzzer also indicates different UPS status. Figure 7 indicates the buzzer status meanings.

UPS condition	Buzzer status
Active fault	Continuous
Active Warning	Beep every second
Battery	UPS on battery: Beep every 4 seconds Low battery: buzzer beeps every second
Bypass	Beep every 2 minutes
Overload	Beep twice every second

Figure 7: Definition of Alarms

When powering on, the LCD display 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 present (including fault and warning information)
- Battery and charger status (including battery voltage, charge level and charger status)
- Current runtime information

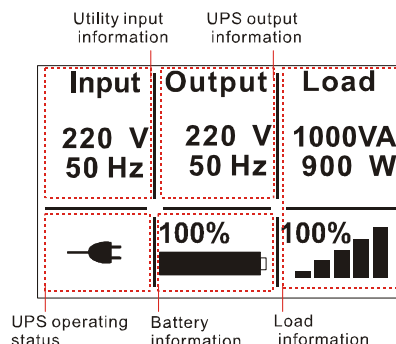


Figure 8: The default LCD display

4.2 Operating Mode

Different symbols indicate the status and the operating mode of the UPS. Such symbols appear always in the position indicated in Figure 9.

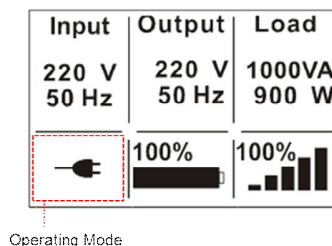













Figure 9: Operating mode

Status	Symbol	Description
Online-mode		UPS is running through the inverter (Online-mode)
Battery-mode		UPS running on battery. (The alarm buzzer sounds every 4 seconds.)
Bypass-mode		The power used by the load is supplied from the mains power via internal filter. Note that if there is a power failure and the UPS is on bypass, it will not transfer back to mains or to battery-mode. (This is not the case if the UPS is in ECO-mode). In bypass-mode the alarm buzzer will sound every 2 minutes.
Stand-by-mode		UPS is running 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 via internal filter if its 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. Note: ECO-mode can be enabled through the LCD settings or through 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. Note: - Converter-mode function can be enabled through the LCD settings or the monitoring software. - The load is de-rated to 70% 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 situations of failure, the UPS may disconnect the load or transfer to bypass depending on the cause of the failure. In all cases there will be a constant alarm and the backlight of the UPS will turn red. 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		UPS is performing a battery test.
Battery disconnected		The battery is disconnected or defective. The UPS alarm sounds.

4.3 UPS Start-up and Shutdown

Attention: The first time the UPS is started-up, the utility must be connected. This is to prevent turning on the UPS by mistake during transportation.

IMPORTANT: Switch off the connected loads before turning on the UPS. Then 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.

4.3.1 UPS start-up

With mains supply

1. Check that all cables are connected correctly and well-fixed mechanically.
2. Connect the UPS to the power supply.

3. Press the power-on button continuously for more than 1 second. The alarm buzzer will sound for 1 second 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 UPS's output power.

Cold Start (UPS start-up without mains supply)

1. Check that all cables are connected correctly and well-fixed mechanically.
2. Press the power-on button. The UPS will perform a self-test and display the status screen.
3. Press the power-on button continuously for more than 1s, the alarm buzzer sounds and the UPS start-up takes place.
4. After a few seconds, the UPS transfers to battery-mode. When the UPS is again supplied with power from the mains, the UPS transfers to online-mode without interruption in the output of the UPS.

4.3.2 UPS Shutdown

With mains supply

1. If the UPS is working on bypass-mode, go to step 3.
2. If the UPS is on online-mode, press the power-on button continuously for more than 3s. The alarm buzzer will sound and the UPS will transfer to bypass-mode. Note: the output is still energized.
3. Disconnect the mains power supply and a few seconds later the display will shut down and the output voltage will be removed from the UPS output terminal.

In case the bypass has been disabled through the Settings menu, press the power-on button for more than 3s to shutdown the UPS. The unit will change from online to stand-by-mode. Then, simply disconnect the input power cable and a few seconds later the display will shutdown.

Without mains supply

1. To power off the UPS, press the power on/off button continuously for more than 3s. The alarm buzzer will sound for 3s and the output power will be immediately cut-off.
2. After a few seconds, the display will shut down and the output voltage will be removed from the UPS output terminal.

4.4 UPS 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.

4.4.1 Changing the operating-mode

To change the operating-mode, the power-on button is used as follows:

- From online-mode to bypass-mode: Press the power-on button for 3s.
- From bypass-mode to online-mode: Press the power-on button for 3s.
- From bypass-mode to battery: Disconnect the power supply cable
- From battery-mode to online-mode: Connect the power supply to the UPS and it will transfer automatically to online-mode.

Note: If the bypass is disabled in the settings menu, when pressing the power-on button for 3s, the UPS goes from online-mode to stand-by-mode.

4.4.2 Navigation

To navigate through the UPS screens, the scroll buttons are used.

From the main screen (UPS status screen), press  or  for information on alarm and battery.


From the main 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.

Figure 10 shows details on how to navigate through the menus and submenus.

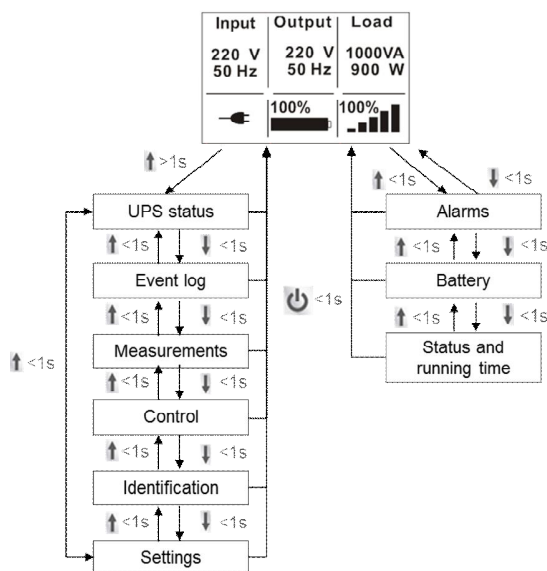





Figure 10: Main menu tree

4.4.2.1 UPS Status

Contains general information on the status of the UPS.

4.4.2.2 Event log

To enter this menu, press . In this menu the last 50 events, alarms and faults occurred in the UPS are displayed. The alarms are indicated by the corresponding, event code and operating time of UPS when the event occurred. To navigate through the events and alarms, press  or .

4.4.2.3 Measurements

To enter this menu, press . The following measurements are displayed:

Measurements
Output power [W]
Output power [VA]
Output current [A]
Load percentage [%]
Output voltage [V]
Output Freq. [Hz]
Input voltage [V]
Input Frequency [Hz]
Battery Voltage [V]
Battery Capacity [%]
DC Bus Voltage [V]
Temperature [°C]

To navigate through the measurements, press  or .

4.4.2.4 Control

From this menu, the user can control some features of the UPS. The possible operations are indicated below:

Control	Possible Values	Default Values
Buzzer mute	No/Yes	No
Start battery test	Schedule No/Yes	No
Load segments	Seg1 and seg 2: on/off	On / On
Clear EPO status	No/Yes	No
Reset fault state	No/Yes	No
Clear event log	No/Yes	No
Restore factory settings	No/Yes	No

To modify the parameters, press . Then scroll up or down to modify the parameters. To confirm the selection, press for more than 1s.

Error! Reference source not found. gives an overview on how to navigate on the control menu.

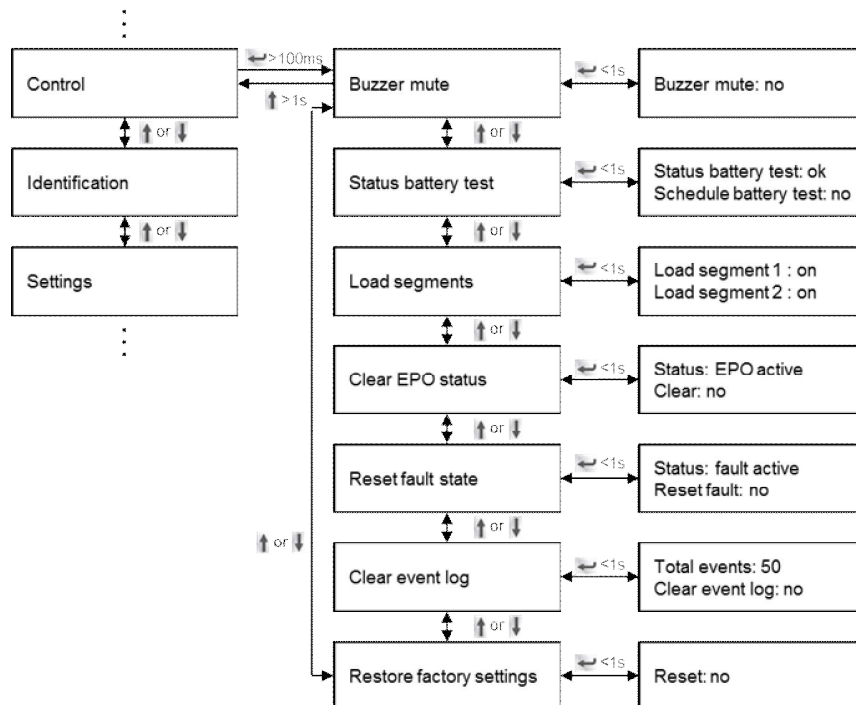


Figure 11: Control menu tree

Examples:

- 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.

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

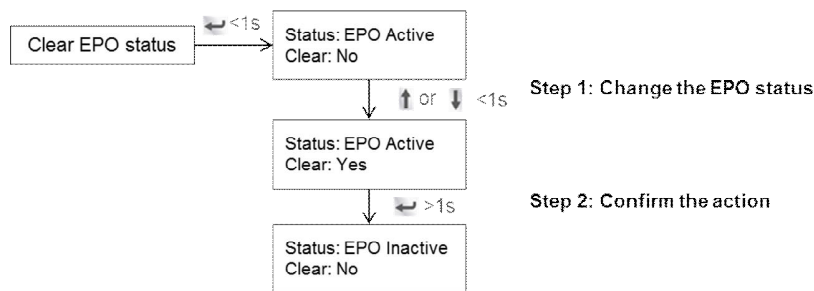


Figure 12: Clear EPO status

- 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.

4.4.2.5 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 for more than 1s to return to the last main menu.

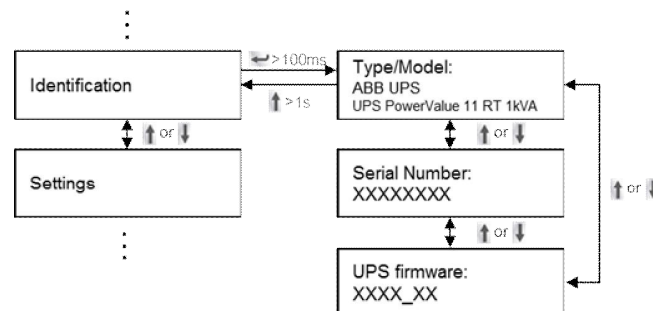


Figure 13: Identification menu tree

4.4.2.6 User's 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 in the Settings menu to enter the sub-menus.

To modify a parameter, press and scroll up or down. To confirm the selection press this same button for more than 1 second.

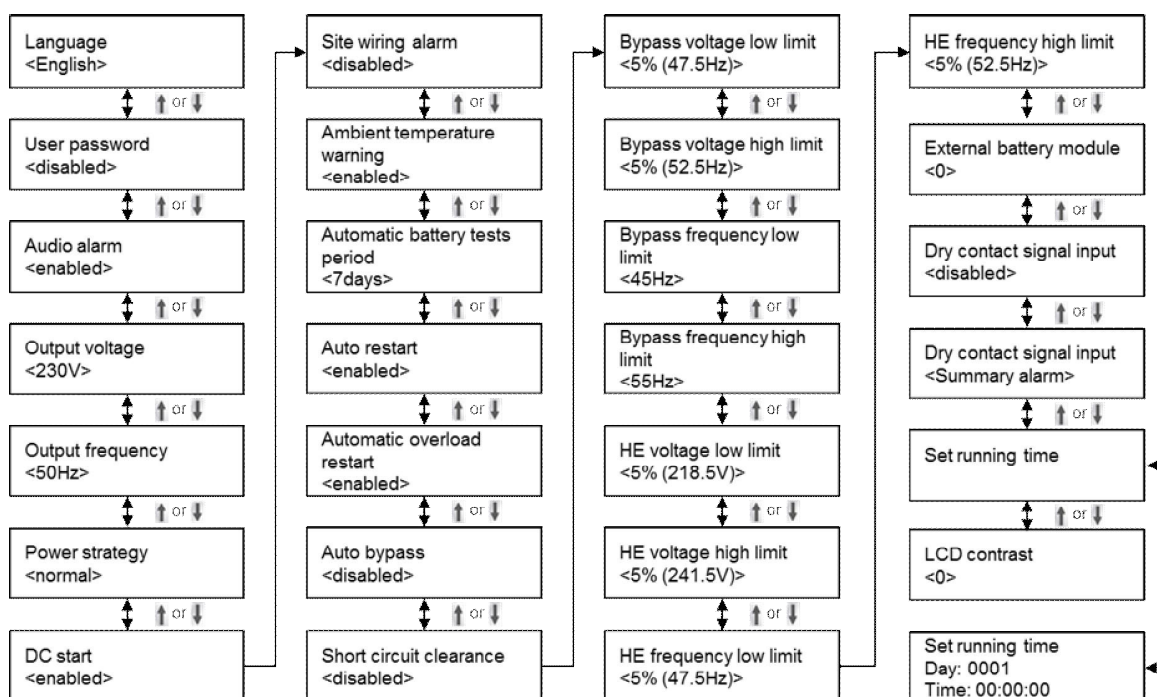


Figure 14: Setting menu tree

If the User password is enabled, the user must enter the password **4314** by pressing the buttons \uparrow , \downarrow and \rightarrow . It is used mainly to protect against modifications in the Settings menu. The possible operations are indicated in Table 2: Settings menu information

Submenu item	Optional Values	Default value
Language	English / Chinese	English
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 (ECO-mode)/ converter	normal
DC start (Cold start)	enabled/disabled	enabled
Site wiring fault alarm	enabled/disabled	disabled
Ambient temperature warning	enabled/disabled	enabled
Automatic battery tests period	0-31 days	7 days
Auto Restart	enabled/disabled	enabled
Automatic overload restart	enabled/disabled	enabled
Auto Bypass	enabled/disabled	disabled
Short circuit clearance	enabled/disabled	disabled
Bypass voltage low limit	120~215V	184V
Bypass voltage high limit	245~276V	264V
Bypass frequency low limit	40~49.5 Hz	45 Hz
Bypass frequency high limit	50.5~70 Hz	55 Hz
Eco-mode voltage low limit	5%~10%	5%

Eco-mode voltage high limit	5%~10%	5%
Submenu item	Optional Values	Default value
Eco-mode frequency low limit	5%~10%	5%
Eco-mode frequency high limit	5%~10%	5%
External Battery modules***	0 - 9	0
Set running time	Day:hour:minute:second 0000:0000:00~9999:23:59:59	Running time
LCD contrast	-5~+5	0

Table 2: Settings menu information

**Read Section 4.2, before using high efficiency (ECO-mode) or converter function.

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

Example: Setting the rated output voltage value (Figure 15) and setting running time (**Error! Reference source not found.**)

Step 1: Scroll through the settings menu

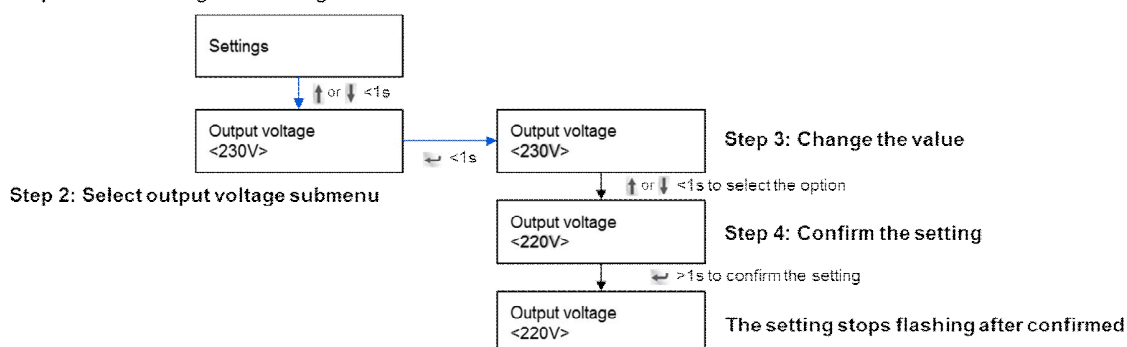


Figure 15: Setting rated output voltage value

5 COMMUNICATION

A USB and an RS-232 port are available to enable the communication between the UPS and a remote computer/station. Only one communication port can be active at a time and the priority is given to the USB port.

Once the communication cable is installed, the power management software can exchange information with the UPS. The software collects information from the UPS and indicates the status of the device, the power quality of the mains and the battery autonomy of the units.

In case of a power failure and a predicted shutdown of the UPS due to low battery autonomies, the monitoring system is capable of saving the data in the load and of initiating the shutdown of the equipment connected to the UPS.

5.1 RS-232 port

An 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 and 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 described in Figure 16 and in Table 3.

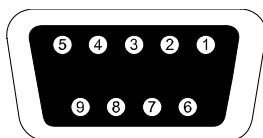


Figure 16: RS-232 Communication Port (DB-9 Connector)

Pin Number	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

Table 3: RS- 232 Port Pin Assignment

5.2 USB port

The UPS can communicate with an USB-compliant computers. 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. Connect the other end of the USB cable to the USB port on a computer.

5.3 Dry Contact ports

Remote alarm indication is possible through the potential free (dry contact) ports positioned in the rear of the UPS. The 4-pole connector correspond to the input contacts. The signal input to control UPS On/Off/Maintain bypass statuses needs to be configured through the LCD setting menu or protocol command. The default input contact is “Disabled”.

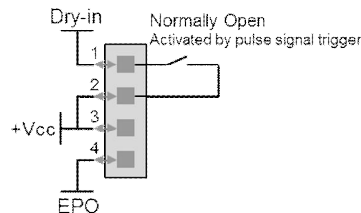


Figure 17: Input Dry contact schematic

Dry contact input signal	Description
Disable	Disable the function.
UPS On	One second pulse activate. If active, the UPS turns on if the UPS is not on inverter.
UPS Off	One second pulse activate. If active, the UPS turns off if the UPS is on inverter.
Maintain bypass	One second pulse activate. If active, the UPS will transfer to bypass-mode. To recover to normal status, inactivate the signal and turn on the UPS by manual operation.

The 2-pole connector correspond to the output contacts. The relay output can be configured through the LCD setting menu or protocol command, the default output contact corresponds to “Summary Alarm”. The possible alarms are described in the table that follows.

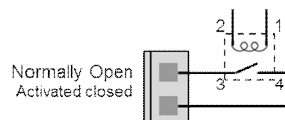


Figure 18: Output Dry Contact schematic

Dry contact output signal	Description
Summary Alarm	Activated when any warning happens
On Battery	Activated when the UPS operates on battery
Battery Low	Activated if battery autonomy is low
UPS ok	Activated when the UPS has no alarms and no fault.
On Bypass	Activated when the UPS has bypass output.

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.

5.4 Network Management Card (Optional)

PowerValue 11 is equipped with an intelligent slot for optional cards for remote management of the UPS through internet / intranet. Either of the accessories below can be installed in the intelligent slot.

SNMP Card - SNMP, HTTP and monitoring capabilities through a Web browser interface.

AS400 Card - AS400 card for AS400 communication protocol.

5.4.1 Installing a Serial Network Management Card (optional)

Each UPS has a communication slot for an optional Serial Network Management (SNMP) Card. After installing an SNMP card, an environmental monitoring probe can be connected to the UPS.

Note: The UPS does not have to be shutdown before installing a communication card.

To install the Network Management Card, go through the following steps:

1. Remove the two screws that protect the communication slot of the UPS.
2. Insert the SNMP card into the communication slot.
3. Screw the SNMP card onto the slot using the screws removed in step 1.

For more information on the SNMP Cards, see the SNMP User's Manual.

5.4.2 Monitoring Software

ABB UPS can be monitored through a software that allows the user to monitor the UPS. The software provides a remote and safe shutdown for multi-client systems in case of absence of power in the output of the UPS. Instructions on how to install the software are provided with the network management cards.

6 TROUBLESHOOTING

6.1 Fault identification and rectification

Alarm and events identify warning situations and notify errors or potential failures of the system. The output of the UPS is not necessarily affected in case of an alarm but taking the correct actions may prevent loss of power to the load. If the UPS system does not operate correctly, attempt to solve the problem using the table below.

Problem	Possible cause	Remedy
No indication, no warning tone even though system is connected to mains power supply	No input voltage	Check building wiring socket outlet and input cable.
Emergency supply period shorter than nominal value	Batteries not fully charged / batteries with defect	Charge the batteries for at least 5 - 8 hours and then check capacity. If the problem still persists, consult your supplier.
Fan fail Alarm Code: 84	Fan abnormal	Check if the fan is running
Battery over voltage Alarm Code:16	Battery is over charged	Stop charging to battery automatically, and after the battery voltage is normal and the mains is normal, charge automatically again.
Battery low Alarm Code:12	Battery voltage is low	If audible alarm sounds every second, the battery is almost empty.
Charge fail Alarm Code:15	The charge is broken	Notify dealer.
Inverter temperature high Alarm Code:86	Inside temperature of the UPS is too high	Check the ventilation of the UPS, check the ambient temperature.
Ambient temperature high Alarm Code:82	The ambient temperature is too high	Check the environment ventilation.
Battery open Alarm Code:11	Battery pack is not connected correctly	Check if the battery bank is connected to the UPS. Check if the battery breaker is turned on.
Service Battery Alarm Code:13	Battery may need to be replaced	Consult dealer
Overload Alarm Code: 41/42/43	Overload	Check the loads and remove some non-critical loads. Check whether some loads have failures.
Site fail Alarm Code:04	Phase and neutral conductor at input of UPS system are reversed	Rotate mains power socket by 180° or connect UPS system.
EPO active Alarm Code:71	EPO function is enabled	Turn off the EPO switch.
Bus fault (Low / high / Unbalance / Soft start) Alarm Code: 22/21/23/25	UPS internal fault	Consult your supplier
Inverter fault(Low/high/soft start) Alarm Code:33/32/34	UPS internal fault	Consult your supplier
Over temperature fault Alarm Code:81	Over temperature	Check the ventilation of the UPS, check the ambient temperature and ventilation.
NTC open Alarm Code:87	UPS internal fault	Consult your supplier
Inverter short Alarm Code:31	Output short circuit	Remove all the loads. Turn off the UPS. Check whether the output of UPS and loads is short circuited. Make sure the short circuit is removed, and the UPS has no internal faults before turning on again.
Bus short Alarm Code:24	UPS internal fault	Consult your supplier

Please have the following information 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		1000 VA	2000 VA	3000 VA
Output rated power [W]		900 W	1800 W	2700 W
Output power factor		0.9		
Topology	True online double conversion			
Inbuilt batteries	yes			
INPUT				
Nominal input voltage	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			
Frequency range	45-55 Hz / 54-66 Hz			
Power factor	≥0.99			
OUTPUT				
Rated output voltage	208 / 220 / 230 / 240 V _{AC}			
Voltage tolerance (referred to 230V)	±1%			
Voltage distortion	≤2% linear load, ≤5% non-linear load			
Overload capability	12s.: 102%-130% load / 1.5s.: 130%-150% load / 100ms.: >150% load (Inverter)			
Nominal frequency	50 or 60 Hz ± 0.2 Hz			
Crest Factor	3:1			
TRANSFER TIME				
Battery ↔ inverter	0 ms			
Bypass ↔ inverter	0 ms			
Inverter to Eco-mode	1 ms			
Eco-mode to inverter	<10 ms			
EFFICIENCY				
AC-AC	> 88%	> 89%	> 92%	
In eco-mode	> 95%			
ENVIRONMENT				
Protection rating	IP 20			
Storage temperature	-15 – +60°C			
Operating temperature	0 – 40°C			
Relative humidity	0-95% (Non-condensing)			
Altitude (above sea level)	1000m without de-rating			
BATTERIES				
Type	VRLA, vented lead-acid			
Number of batteries	3	4	6	
Battery capacity	7.2 Ah	9 Ah	9 Ah	
Backup time	> 5 minutes	>3 minutes	>3 minutes	
Charging current	1.5 A			
Recharge time	3 hours to 90%			
COMMUNICATIONS				
User interface	LCD display			
Communication cards	SNMP (option), AS400 relay card (option)			
STANDARDS				
Safety	IEC/EN 62040-1			
EMC	IEC/EN 62040-2			
Performance	IEC/EN 62040-3			
Manufacturing	ISO 9001:2008, ISO 14001:2004			
WEIGHT, DIMENSIONS				
Weight	16.2	19.7	28.6	
Dimensions WxHxD	438x86.5x550mm		438x86.5x608	

*Technical specifications are subject to change without notice.