

PowerValue 11 T 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
ON	ON: The principal power switch is in the "ON" position
OFF	OFF: The principal power switch is in the "OFF" position
	Overload indication
	Alarm silence
	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 deviation from the instructions could be dangerous to the user or cause accidental load loss.

 WARNING!	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 AS THERE IS DANGER OF ELECTRICAL SHOCK.
 WARNING!	BEFORE CONNECTING THE MAINS YOU MUST ENSURE THAT THERE IS A PROPER EARTH CONNECTION!

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 and 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 90% (non-condensing).

1.3 Declaration of Safety conformity

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.

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.
- **2011/65/EU** Restriction of the use of certain hazardous substances (RoHS) DIRECTIVE

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
RoHS	IEC/EN50581:2012	IEC/EN50581:2012

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

Refer to instruction before operating the UPS.

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 of the UPS or the building wiring socket during operation as this would remove the ground to the UPS and of all connected loads.

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

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

The socket-outlet should be installed near the equipment and should be easily accessible.

ISOLATE THE UNINTERRUPTIBLE POWER SUPPLY (UPS) BEFORE WORKING ON ITS CIRCUIT.

For cabling, remove the protective panel only after disconnecting the terminal connections and use the appropriate wires as indicated in Table 1.

UPS	Input Wire	Output Wire
3 kVA (with inbuilt batteries)	NA	AWG 8, 90°C copper wire and 12 lb-in Torque force when connecting to the terminal blocks
3 kVA (no in-built batteries)	AWG 12, 90°C copper wire and 4.4 lb-in Torque force when connecting to terminal block	AWG 12, 90°C copper wire and 12 lb-in Torque force when connecting to the terminal blocks

Table 1: Input and Output Wiring

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.

Do not dispose the batteries on fire as they may explode.

Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes.

2 MAINTENANCE

2.1 Operation

PowerValue 11 T system contains no user-serviceable parts. If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In this case, please contact your dealer.

2.2 Storage

If the batteries are stored in temperate climatic zones, they should be charged every three months for 1~2 hours. It is recommended to shorten the charging intervals to two months at locations subject to high temperatures.

2.3 Routine Maintenance

The UPS is designed to receive regular preventative maintenance inspections. These preventative maintenance inspections are essential to ensure that both the useful working life and the reliability of the UPS are maximized.

Preventative maintenance inspections involve working inside the UPS, which contains hazardous AC and DC voltages. Only trained or agreed service personnel and authorized field service engineers are fully aware of all of the hazardous areas within the UPS.

2.4 Battery Maintenance

2.4.1 Battery Test

If the battery service life has been exceeded, the batteries must be replaced. Battery replacement should be performed only by qualified personnel.

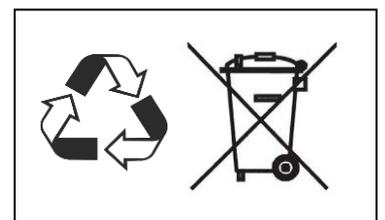
It is recommended to shut down the UPS completely before the replacement and, if present, the battery breaker should be switched off. Disconnect the battery cable carefully and make sure no exposed wires can be touched. Reconnect the new batteries to the UPS by following *Section 3.5*. Then turn on the battery breaker and start the UPS.

If it needs to replace the batteries while the UPS is running, make sure the UPS would not shut down during the replacement. If there is a battery breaker then turn it off first. Disconnect the battery cable carefully and make sure no any exposed wires can be touched. Reconnect the new batteries to the UPS by following *Section 3.5*. Then turn on the battery breaker and press the ON switch to execute the battery test, check whether the battery information is normal.

2.4.2 Maintenance, disposal and recycling

The battery maintenance shall be done by an authorized Service Partner.

Batteries contain dangerous substances that will harm the environment if thrown away. If you change the batteries yourself, call qualified organizations for battery disposal and recycling.



3 Installation

3.1 Delivery, Transportation 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, remove the foam and the plastic cover. Ensure that the received UPS corresponds to the material indicated in the delivery note.

3.1.3 Storage of UPS

If you plan to store the UPS prior to use, keep it 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 is 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. Please observe the following instructions:

- Install the UPS in the indoor area.
- Leave **25 cm** of space on each side of the cabinet to enable cooling airflow and to ensure that the circulation of air to the ventilation slits is not obstructed.
- Avoid excessively high temperature and excessive moisture.

3.3 General Characteristics

3.3.1 Front View

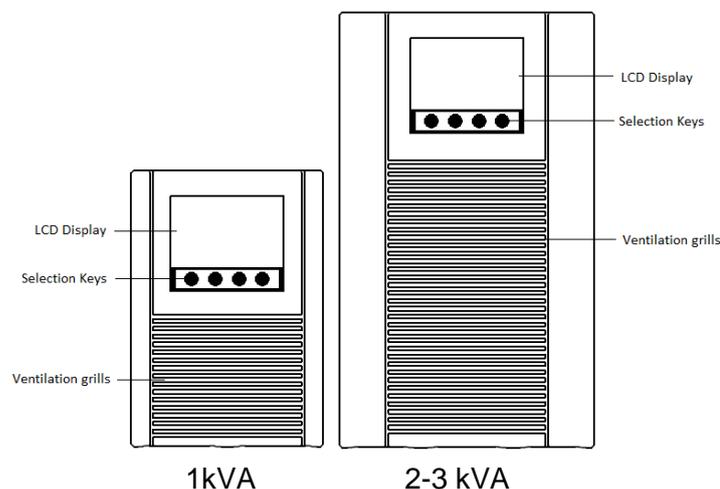
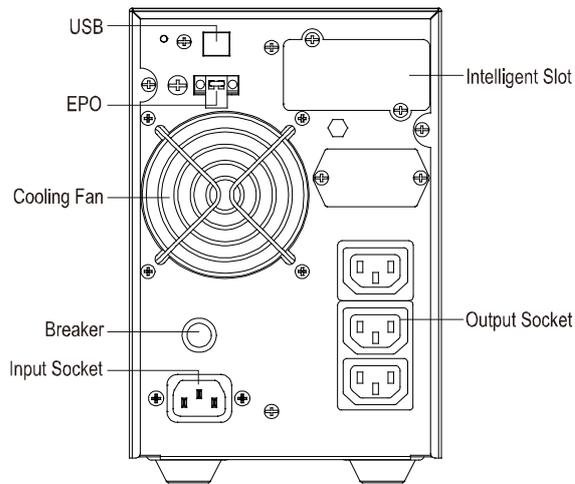
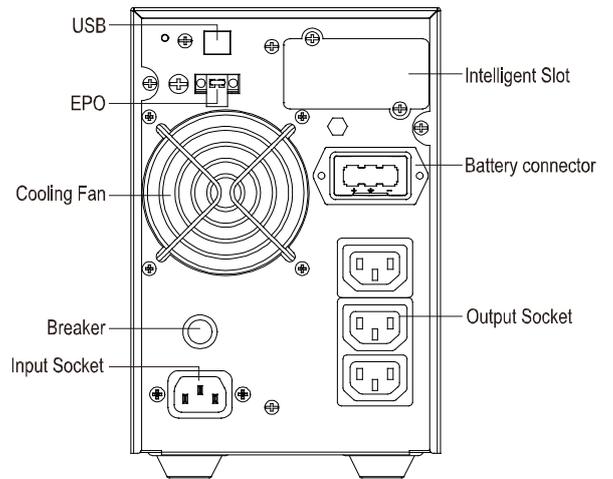


Figure 1: Front View 1-3kVA

3.3.2 Back View

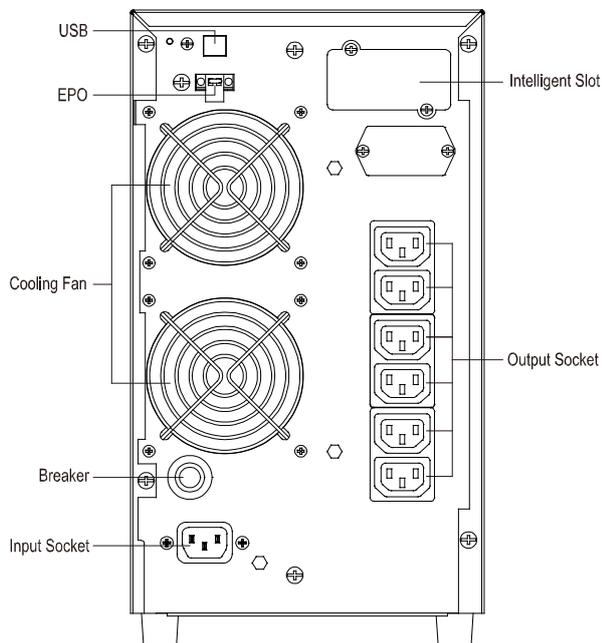


UPS with internal batteries

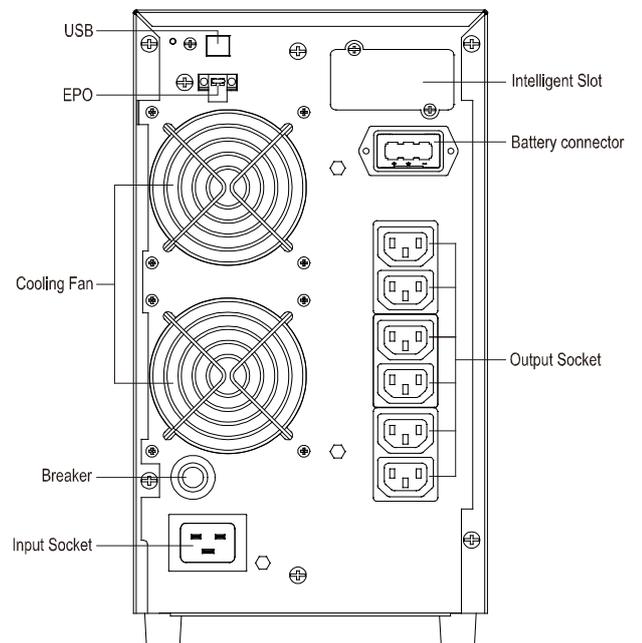


UPS without internal batteries

Figure 2: Back View of 1kVA



UPS with internal batteries



UPS without internal batteries

Figure 4: Back View of 2kVA

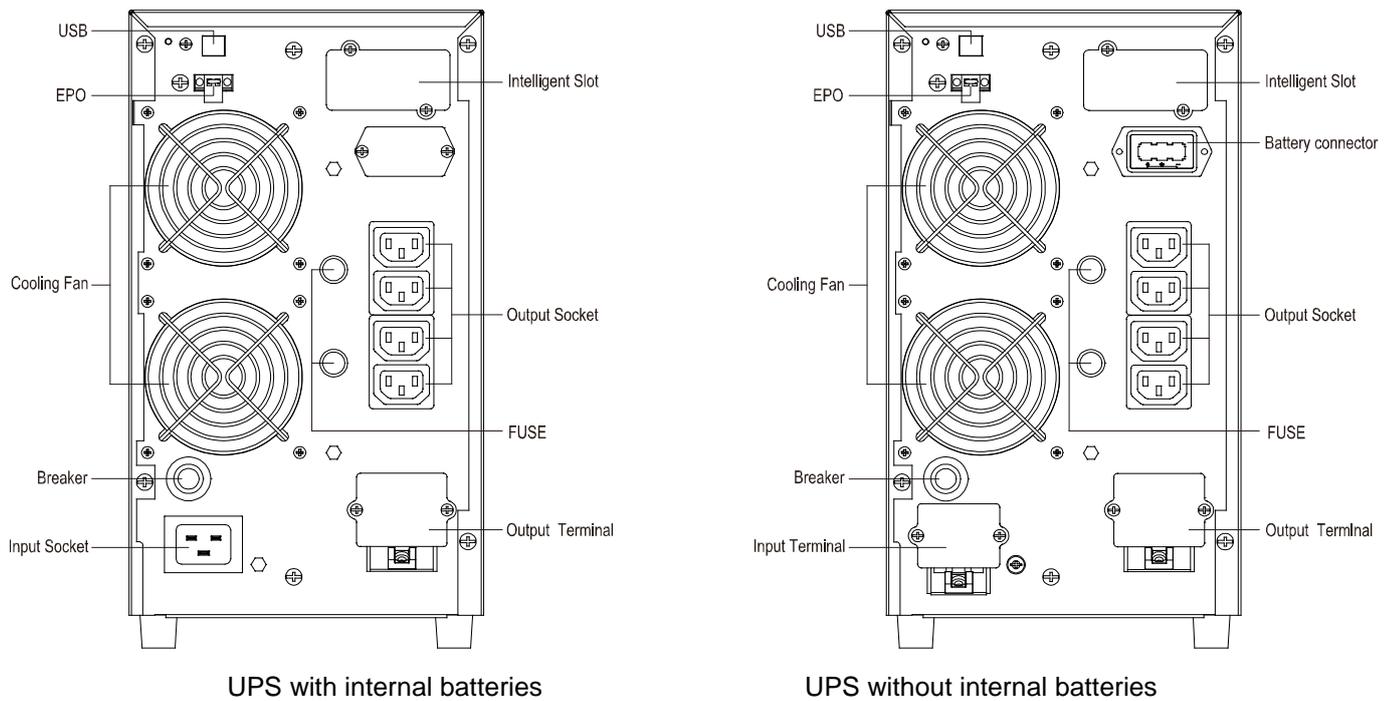


Figure 6: Back View of 3kVA

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.

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

3.4.2 UPS Input Cabling

Connection of the Earth is performed in accordance with the prescribed IEC Standards or with local regulations.

Provide input fuses and cables according to the information below or in accordance with the prescribed IEC Standards or with the local regulations. The circuit breakers will be connected between the mains supply and the UPS and will provide additional protection to the UPS in the event of overloads and short circuits. Choose the breaker according to the voltage and current indicated in Table 2.

Model	UPS Input Breaker	
	Voltage	Current
1kVA	300Vac	10A
2kVA	300Vac	20A
3kVA	300Vac	32A

Table 2: UPS Input NFB

If the UPS is connected through a power cord, use a socket with protection against electric current with the following capacities: over 9A for 1kVA, over 17A for 2kVA, over 26A for 3kVA. If the UPS is connected through wires, connect first the ground (GND) terminal using a green or a yellow wire and then connect the input phase wire. Use wires of at least 2.5mm².

3.4.3 UPS Output Cabling

The output socket of the UPS is IEC-type. Plug the load power cord to the output sockets to complete the connection. Use one cord for every 10A load.

Model	Output Socket (qty)
1KVA	3 x IEC-type
2KVA	6 x IEC-type
3KVA	4 x IEC-type +Terminal block

Table 3: Output socket configuration

When using the output terminal blocks for wiring the UPS, use 2.5mm² wires.

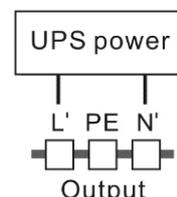
- Remove the cover of the terminal block and connect the UPS to the load.
- Check if the wires are safely fixed and put the cover back to the rear panel.



WARNING! DO NOT CONNECT EQUIPMENT THAT WOULD OVERLOAD THE UPS (EG. LASER PRINTERS)

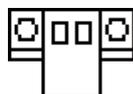
3.4.4 Emergency Power Off (EPO)

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).

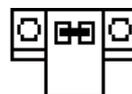


Normally closed

The EPO connector is normally closed 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.



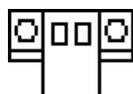
Enable the EPO status



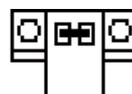
Disable the EPO status

Normally opened EPO

The EPO connector is normally opened when the connector is not wired. If the connector is closed with a wire / jumper, the UPS output will not supply energy to the load until the EPO status is again modified.



Disable the EPO status



Enable the EPO status

3.5 Battery charging

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

3.6 Connecting external batteries (Models without in-built batteries)



WARNING!

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

The UPS system may be used immediately after its installation without charging the batteries. However, the stored energy may be smaller than the nominal specified implying in lower initial autonomy. To fully charge the batteries, connect the UPS system to the mains for 1-2 hours.

Use the battery pack with voltage: 36VDC for 1kVA (3x12V batteries), 96VDC for 2kVA/ 3kVA (8x12V batteries). Connection of batteries with voltages higher or lower than required can cause abnormality or permanent damage.

Follow the steps below to connect the external batteries to the UPS.

- 1) Switch the battery breaker OFF.
- 2) Make sure the mains input is not present
- 3) Remove the cover of terminal block on the rear of the UPS and prepare the battery cable which should be able to carry the current of >30A for 1kVA, >22A for 2kVA, >33A for 3kVA. The cross section area should be great than 4 mm² for all models.

The following battery wire coloring is recommended:

+	GND	-
Red wire	Green/Yellow wire	Black wire

- 4) Connect the red wire to the "+" terminal of the battery and the black wire to the "-" terminal of the battery. (Note: the green/yellow wire is grounded for protection purpose.)
- 5) Make sure the wires are fasten and install the terminal block cover on the rear panel of the UPS.
- 6) Connect the UPS to the load. Then turn on the mains switch or connect the power cord of the UPS to the power supply. The battery charging process will then be started.



WARNING!

A DC BREAKER MUST BE CONNECTED BETWEEN THE UPS AND EXTERNAL BATTERY.

THE OUTPUT SOCKETS OF THE UPS SYSTEM MAY STILL BE ELECTRICALLY LIVE EVEN IF THE POWER SUPPLY SYSTEM HAS BEEN DISCONNECTED OR THE BYPASS SWITCH IS ON "OFF" POSITION.

For the dimensioning of the DC breaker, consider the voltages and currents indicated in Table 4.

Model No.	DC breaker	
	Voltage	Current
1KVA	48Vdc	50A
2KVA	125Vdc	40A
3KVA	125Vdc	60A

Table 4: DC breaker

3.7 Installation Checklist

- All packing materials and restraints have been removed from the UPS cabinet.
- The UPS system is placed in the installed location.
- All conduits and cables are properly routed to the UPS.
- All power cables are properly sized and terminated.
- A ground conductor is properly installed.
- If not using all wiring terminals, the provided protective covers are installed on the cabinet.
- 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. (It is recommended that the UPS be installed on a level floor suitable for computer or electronic equipment.)
- Adequate workspace exists around the UPS.
- Adequate lighting is provided around all UPS equipment.
- Any optional accessories are mounted in their installed location and properly wired.
- Start-up and operational checks have been performed by authorized service personnel.

3.8 Turning on the UPS

With utility power:

Press ON button continuously for more than 1 second to turn on the UPS. The UPS will function in inverter mode and the LCD screen will indicate the UPS status.

Without utility power (Cold start)

If the utility power is not present, press ON button twice. The first time the button ON is pressed, the UPS is powered. The second time the button ON is pressed for more than 1 second, the UPS is set to inverter mode.

Note: By default the UPS automatic bypass is disabled. If your mains supply is usually stable, enable the bypass in the settings menu of the UPS (See section **Error! Reference source not found.**).

3.9 Battery test

Press the switch ON for more than 1 second to test if the battery is connected or if the battery is low. This test can be done automatically and periodically according to the user configuration.

3.10 Turning off the UPS

From Inverter Mode

Press the OFF button continuously for more than 1 second to turn off the UPS. If the bypass mode is disabled, the power is absent in the output. In case the bypass is enabled, the UPS will go into bypass mode. Disconnect the utility power to remove the power from the output.

From Battery Mode

Press OFF button continuously for more than 1 second to turn off the UPS. Power will be then absent in the output of the UPS.

3.11 Silencing the audible alarm

In battery mode, the alarm sounds continuously. To silence it, press the ON button continuously for more than 1 second.

Whenever the batteries are low, the alarm sounds to indicate that the load will be disconnected.

In bypass mode, press OFF button continuously for more than 1 second to silence the alarms. This action does not affect the warning and alarms.

4 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

4.1 Control Panel

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

- Selection Keys
- Power Management LCD Display (PMD)

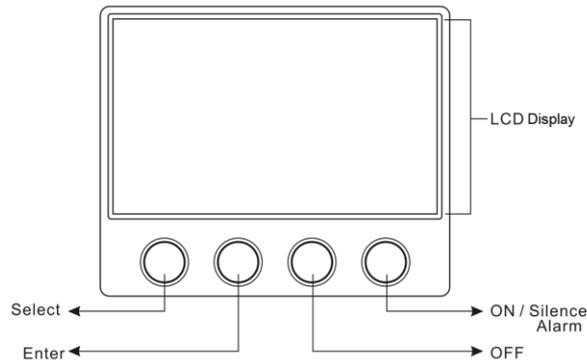


Figure 3: Control Panel

4.1.1 Selection Keys

Select	If UPS is on Bypass or OFF, the UPS voltage and frequency can be selected through this key. The bypass can be also enabled or disabled through the Select Key.
Enter	Confirms the parameters selected through the Select Key
OFF	Turns off the inverter of the UPS when pressed for more than 1 sec. - If mains is present, the UPS switches to bypass mode - If mains is not present, the UPS is turned off. Note that if the bypass mode is disabled, the UPS will shut down when the OFF key is selected.
ON / Silence Alarm	Turns on the UPS System, deactivates acoustic alarms in battery mode and performs the battery test (in online mode, ECO mode or converter mode).

4.1.2 LCD Display

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

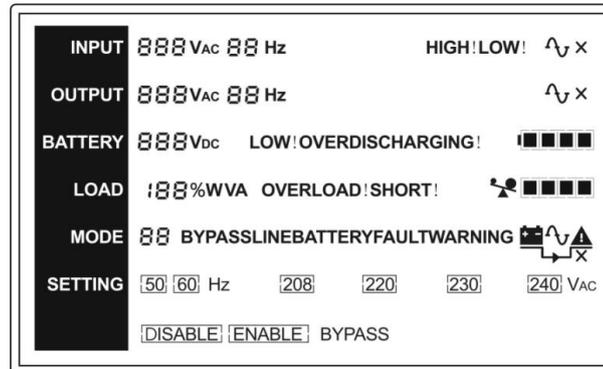


Figure 4: The LCD Display

Input	
888 V _{AC}	Indicates the input line voltage value.
88 Hz	Indicates the frequency value of input line voltage.
HIGH!	Indicates that the input line voltage is higher than the specified range: UPS in Battery mode.
LOW!	Indicates that the input line voltage is lower than the specified range: UPS in Battery mode.
⚡	Indicates the presence of the mains.
X	Indicates that the mains is not present

Output	
888 V _{AC} (*)	Indicates the UPS output voltage value.
88 Hz	Indicates the frequency of the UPS output voltage
⚡	Indicates the presence of power in the output
X	Indicates that there is no power in the output of the UPS.

(*) In the User Settings, this field is used to configure the operation mode.

“UPS” means the setting of normal inverter mode (Line mode).

“ECO” means the setting of economy mode.

“CVF” means the setting of converter mode.

The detail illustration of the three modes and the operation of the setting are presented in the following section.

Load	
188%WVA	Indicates the load percentage in Watt or Volt-Ampere
SHORT!	Indicates that the output is short circuited and that the UPS could shutdown
OVERLOAD!	Indicates that the load is over the specified range.
	Indicates the load percentage. Each grid represents 25% load.
	Indicates the load is over the specified range.

Battery	
888VDC	Indicates the battery DC voltage value.
	Indicates the battery capacitance percent, and every grid represent 25% capacitance.
DISCHARGING!	Indicates that the UPS is in the battery mode and that the battery is discharging.
OVER CHARGING!	Indicates that the battery is over charged. In this case, the UPS switches to Battery mode.
LOW!	Indicates low battery autonomy.

Mode/Fault/Warning	
88	Indicates the operating mode of the UPS: Mode code, Fault code or Warning code. For more information on the codes, see Chapter Troubleshooting.
BYPASS 	Indicates that the UPS is working in bypass mode.
	Indicates absence of power in the output of the UPS.
LINE 	Indicates that the UPS is working in online mode.
BATTERY 	Indicates that the UPS is working in battery mode.
FAULT	Indicates that the UPS is in fault mode.
WARNING	Indicates that the UPS is running under warnings.
	Indicates a failure which that can be identified by the fault codes in Section 6.

Parameters Selection	
The parameters below can be set while the UPS is running or bypass or is turned off.	
208 220 230 240 VAC	The user can select one of four output voltages (208, 220, 230 or 240Vac). Note that there is a 10% de-rating when this voltage is set to 208Vac.
50 60 Hz	The user can select one of two frequency values for the output (50 or 60z).
[DISABLE] [ENABLE] BYPASS	The user can enable or disable the bypass of the UPS.

4.2 Operation

The different codes could be displayed on the LCD screen corresponding to their own operating modes, and they are illustrated as the following table. At any time, only one normal operating mode or fault mode is presented. But the warning, even several warnings could appear in a certain normal operating mode at one time. And the normal operating mode code and the warning code would be shown circularly. Once one fault is come forth, then all previous warnings would not be shown again but only the fault code is presented.

Operating mode	Code
Output off or EPO	0
Bypass mode	1
Online mode	2
Battery mode	3
Battery test mode	4
ECO mode	5
Converter mode	6

Table 5: Code of the normal operating mode

4.2.1 Output off or EPO mode – Code 0

Output Off

The LCD display of a UPS in “Output off” mode is shown in Figure 5. The information on the mains, battery, UPS output and load will be displayed and the code “0” will indicate that the UPS is not supplying energy to the load even if the batteries may be charging.

EPO (Emergency Power Off)

The mode code “0” and the word “EPO” are shown in the LCD display when the Emergency Power Off is activated. In this mode, the UPS is under alarming situation and can only be shut down after changing the status of the EPO switch in the rear of the UPS.

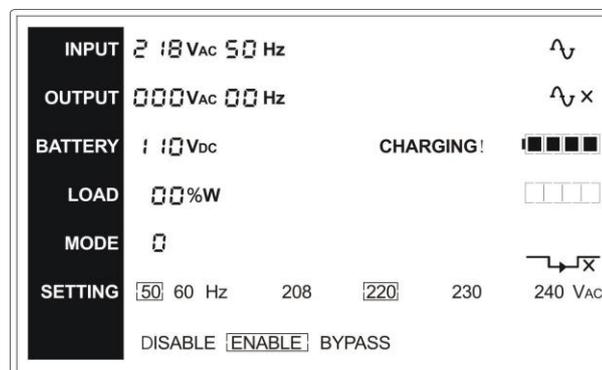


Figure 5: LCD display for UPS with output off

4.2.2 Bypass mode – Code 1

When the UPS is operating in "Bypass mode", the efficiency of the system is higher. In the event of mains failure the load will automatically be transferred from mains to inverter within 4 ms. The battery charger remains active in the "Bypass-Mode". The "Bypass-Mode" is recommended only if the loads can tolerate interruptions of 4ms (transfer time from Bypass Mode to Online Mode).

The LCD display of a UPS in bypass mode is shown in Figure 6. The information on the mains, battery, UPS output and load will be displayed and the word "BYPASS" and the code "1" will indicate the working mode of the UPS.

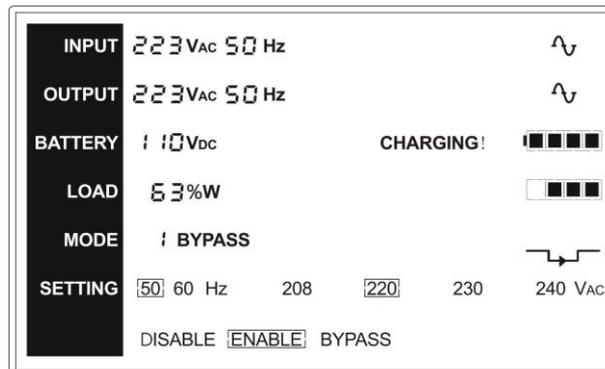


Figure 6: LCD display for UPS in bypass mode

In bypass mode, the UPS acoustic alarm sounds once every 2 minutes in bypass mode. **Note that in Bypass mode the UPS does not have the backup function. For this reason, if the mains fail, the UPS will be shut down.**

4.2.3 Online mode – Code 2

The Online mode provides the highest degree of protection, especially in the event of a mains disturbance or failure. This operating mode is always recommended if the critical loads (computer systems) will not tolerate any interruption of the supply (not even the shortest). In the unlikely event of an inverter fault or overload condition the UPS will transfer the load automatically and without interruption to the static bypass-mains supply (transfer time = 0 msec).

The LCD display of a UPS in online mode is shown in Figure 7. The information on the mains, battery, UPS output and load will be displayed and the word "LINE" and the code "2" will indicate the working mode of the UPS.

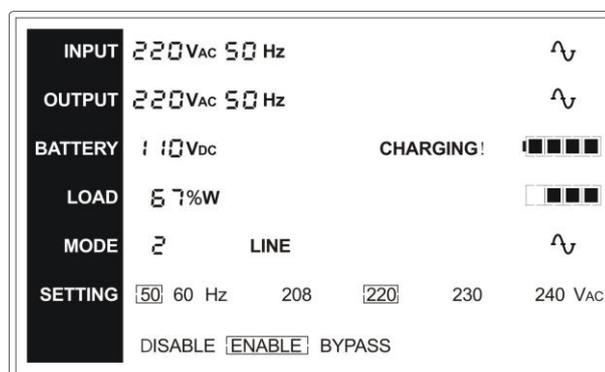


Figure 7: LCD display for UPS in online mode

In case of output overload, the acoustic alarm will sound twice every second and the percentage of the load will be displayed. Non critical loads should be shutdown in order to decrease the load percentage until it reached 90% of its nominal value.

Connecting a Generator

- Activate the generator and wait until the operation is stable before supplying power of the generator to the UPS (be sure that the UPS is in idle mode). Then turn on the UPS according to the start-up procedure. After the UPS is turned on, then the loads can be connected to the UPS one by one.
- The power capacity of the AC generator should be at least twice of the UPS capacity.

4.2.4 Battery mode – Code 3

The LCD display of a UPS in battery mode is shown in Figure 8. The information on the mains, battery, UPS output and load will be displayed and the word “BATTERY” and the code “3” will indicate the working mode of the UPS.

When the UPS is working in battery mode:

- If the input line voltage is higher than the specified range, the alarm symbol “High!” will appear in the LCD display.
- If the input line voltage is lower than the specified range, the alarm symbol “Low!” will be shown.
- If the input line voltage is not present, the input voltage and frequency are shown as zero.

In battery mode, the acoustic alarm sounds once every 4 seconds.

- To silence the buzzer, press the “ON” button on the front panel for more than 1 second.
- To resume the alarm function, press the “ON” button once again for more than 1 second.

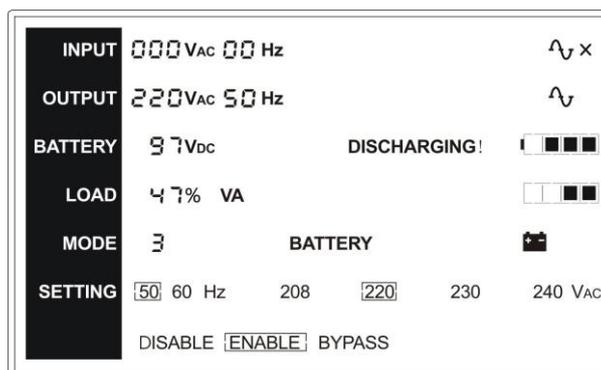


Figure 8: LCD display for UPS in battery mode

4.2.5 Battery Test – Code 4

The display of the UPS in battery test mode is similar to the one of the battery mode. The battery test mode code is “4”.

4.2.6 ECO mode (Economy mode) – Code 5

Economy mode is also known as the higher efficiency mode. When operating in ECO-mode, the load is supplied from the mains via internal filters guaranteeing higher performance of the UPS. This mode is configurable and activated through the settings of the LCD display or through the remote monitoring software.

In the event of a mains failure the load will automatically be transferred from Eco-mode to “Battery Mode” within 10 ms. For this, it is recommended to use the Eco-Mode only if the load can tolerate interruptions of 10 ms.

4.2.7 Frequency Converter mode – Code 6

In frequency converter mode (Code 6), a fixed frequency output of 50 or 60 Hz is defined by the user. It is configurable and activated through the display settings or the remote monitoring software.

When working in converter mode, if there is a failure in the mains, the UPS will transfer to battery mode (Code 3). Note that on this operating mode, the power rate of the equipment is de-rated to 60% of its nominal power.

4.3 User Settings

The user can set the UPS parameters only when the UPS is on bypass or when the output is off. When holding the “Select” key on the LCD display for more than one second, the user setting becomes active.

A flickering black dot is shown next to the “208V” symbol and every time the select button is pressed again, the dot (cursor) will point to the next parameter.

The selectable parameters are:

Output voltage:	208V, 220V, 230V, 240V
Output frequency:	50Hz, 60Hz
Bypass:	Disable, Enable
Operating mode:	UPS (default setting – Online mode), ECO (Economy mode), CVF (Converter mode)

To validate the selection, press the “Enter” key for more than 1 second. After the selection is confirmed, the “ON” key must be pressed in order to activate the unit with the new parameters.

Note that if a confirmation is not given after 30 seconds, the selection mode is de-activated and the dot cursor disappears.

5 COMMUNICATION

5.1 Interface

A USB port and an intelligent slot are provided for the monitoring software.

5.1.1 USB

The USB port is compliance with USB 1.1 protocol.

5.1.2 AS400 Interface (Option)

PowerValue 11 UPS has AS400 card (an optional accessory) for AS400 communication protocol. Please contact your local distributor for details. The following is the pin assignment and description of DB-9 connector in AS400 card.

Pin #	Description	I/O
1	UPS Fail	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 6: AS400 Interface I/O

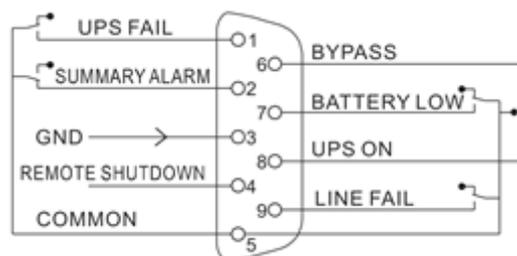


Figure 9: DB-9 Interface of AS400 communication protocol

5.2 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.

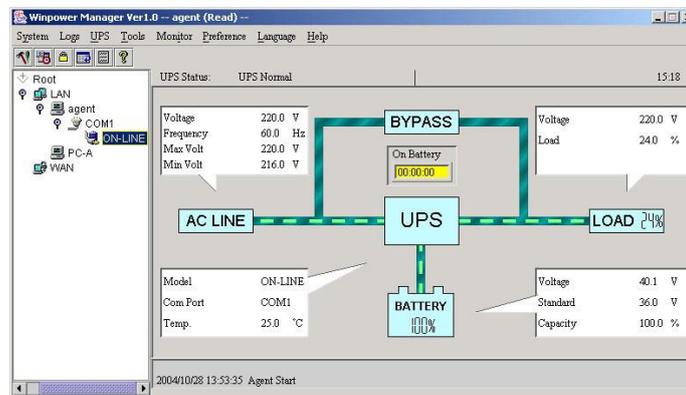


Figure 10: Monitoring Software WinPower

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.

6 TROUBLESHOOTING

6.1 Fault identification and rectification

If the UPS system does not operate as expected, check the operating status on the LCD display.

Normal operating mode	Code
Output off or EPO	0
Bypass mode	1
Online mode	2
Battery mode	3
Battery test mode	4
ECO mode	5
Converter mode	6

Table 7: Code of the Normal operating mode

Warning	Code
Site fail	09
Fan fail	10
Battery over voltage (over charged)	11
Battery low	12
Charge fail	13
DC-DC temperature high	21
Inverter temperature high	24
Ambient temperature high	25
Line voltage high (OVCD action)	26
Battery open	27
Overload	29
EPO Active	30

Table 8: Code of the different Warning

Fault	Code
Bus fault	05
Inverter fault	06
Overload fault	07
Over temperature fault	08
Inverter short	14
Bus short	28

Table 9: Code of the different Fault

If the UPS system does not operate correctly, please attempt to solve the problem using Table 10.

Problem	Possible cause	Suggested solution
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.
Display Mode code "1" in LCD, even though the power supply is available	Inverter not switched on	Press On-Switch "I".
Display Mode code "3" in LCD, and audible alarm sounding every 1 beep in every 4 seconds	Mains power supply has failed, or Input power and/or frequency are out of tolerance	Switching to battery mode automatically. Check input power source and inform dealer if necessary.
Emergency supply period shorter than nominal value	Batteries not fully charged / batteries defect	Charge the batteries for at least 5 - 8 hours and then check capacity. If the problem still persists, consult your dealer.
Fan fail	Fan abnormal	Check if the fan is running
Battery over voltage	Battery is over charged	Switching to battery mode automatically, and after the battery voltage is normal and the mains is normal, the UPS would Switching to online mode automatically again.
Battery low	Battery voltage is low	When audible alarm sounding every second, battery is almost empty.
Charge fail	The charge is broken	Notify dealer.
DC-DC temperature high	Inside temperature of the UPS is too high	Check the ventilation of the UPS, check the ambient temperature.
Inverter temperature high	Inside temperature of the UPS is too high	Check the ventilation of the UPS, check the ambient temperature.
Ambient temperature high	The ambient temperature is too high	Check the environment ventilation.
Line voltage high (OVCD action)	Input power voltage is too high	Switching to battery mode automatically, and after the mains is normal, the UPS would Switching to online mode automatically again.
Battery open	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 turn on.
Overload	Overload	Check the loads and remove some non-critical loads. Check whether some loads are failed.
Site fail	Phase and neutral conductor at input of UPS system are reversed	Rotate mains power socket by 180° or connect UPS system.
EPO active	EPO function is enabled	Plug into the EPO switch.
Bus fault	UPS internal fault	Notify dealer
Inverter fault	UPS internal fault	Notify dealer
Over temperature fault	Over temperature	Check the ventilation of the UPS, check the ambient temperature and ventilation.
Inverter short	Output short circuit	Remove all the loads. Turn off the UPS. Check whether the output of UPS and loads is short circuit. Make sure the short circuit is removed, and the UPS has no internal faults before turning on again.
Bus short	UPS internal fault	Notify dealer

Table 10: Troubleshooting table

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 display status, Buzzer alarm status
4. Utility power condition, load type and capacity, environment temperature, ventilation condition
5. The information (battery capacity, quantity) of external battery pack if the UPS (if existent)
6. Other information for complete description of the problem

7 TECHNICAL SPECIFICATIONS

GENERAL DATA	1 kVA	1 kVA B	2 kVA	2 kVA B	3 kVA	3 kVA B
Output rated power [W]	900 W	900 W	1800 W	1800 W	2700 W	2700 W
Output power factor	0.9					
Topology	True online double conversion					
Inbuilt batteries	Depending on the model					
INPUT						
Nominal input voltage	200 / 208 / 220 / 230 / 240 V _{AC}					
Input voltage tolerance	110-300 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	200 / 208 / 220 / 230 / 240 V _{AC}					
Voltage tolerance (referred to 230V)	±2%					
Voltage distortion	≤3% linear load, ≤5% non-linear load					
Overload capability (on inverter)	60s.: 105%-110% load / 30s.: 110%-125% load / 10s.: 125-150% load / 1s.: >150% load					
Overload capability (on bypass)	10m.: 125-150% load / 60s.: >150% load					
Nominal frequency	50 or 60 Hz ± 0.2 Hz					
Crest Factor	3:1					
TRANSFER TIME						
Battery ↔ inverter	0 ms					
Bypass ↔ inverter	< 4 ms					
Inverter to Eco-mode	< 4 ms					
Eco-mode to inverter	<10 ms					
EFFICIENCY						
AC-AC	≥ 88%					
In eco-mode	≥ 93%			≥ 94%		
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					
BATTERIES						
Type	VRLA, vented lead-acid					
Battery configuration	-	3 x 7.2Ah		8 x 7.2Ah		8 x 7.2Ah
Backup time	-	> 5 minutes		> 9 minutes		> 5 minutes
Charging current	8A	1 A	8A	1 A	8A	1 A
Recharge time	-	3h to 90%		3h to 90%		3h to 90%
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	7 kg	13 kg	13 kg	31 kg	13 kg	31 kg
Dimensions WxHxD	145 x 220 x 400mm		192 x 347 x 460 mm		192 x 347 x 460 mm	

*Technical specifications are subject to change without notice.

- De-rating to 90% when the output voltage is adjusted to 208VAC
- De-rating to 80% when the output voltage is adjusted to 200VAC
- De-rating to 60% when the UPS is in converter mode
- Over 1000 m the power de-rating is 1% every 100 m