Uninterruptible Power Supply

Minipower Plus Rack

User Manual

Uninterruptible Power Supplies Ltd

Uninterruptible Power Supplies Ltd has taken every precaution to produce an accurate, complete and easy to understand manual and will therefore assume no responsibility nor liability for direct, indirect or accidental personal or material damage due to any misinterpretation of or accidental mistakes in this manual.

Document Control

ISSUE	DATE	REVISION SUMMARY
1.0	01-08-06	General manual consolidation re-issue

Table of Contents

1 Safety

BEFORE ATTEMPTING TO INSTALL OR START UP THIS UPS THE USER MUST ENSURE THAT THE SAFETY INSTRUCTIONS IN THIS MANUAL ARE CAREFULLY READ AND OBSERVED BY TECHNICALLY COMPETENT PERSONNEL. KEEP THIS MANUAL WITH THE UPS FOR FUTURE REFERENCE.

THIS UPS MUST NOT BE STARTED UP OR PUT INTO USE WITHOUT HAVING BEEN COMMISSIONED BY A FULLY TRAINED AND AUTHORISED PERSON.

ALL SERVICING MUST BE PERFORMED BY QUALIFIED PERSONNEL. DO NOT ATTEMPT TO SERVICE THE UPS YOURSELF.

BY OPENING OR REMOVING THE UPS-COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

UNINTERRUPTIBLE POWER SUPPLIES LTD WILL ASSUME NO RESPONSIBILITY NOR LIABILITY DUE TO INCORRECT OPERATION OR MANIPULATION OF THE UPS.

HIGH LEAKAGE CURRENT!
MAKE SURE THAT THE EARTHING IS CARRIED OUT CORRECTLY BEFORE YOU CONNECT THE MAINS POWER SUPPLY!

The MINIpower PLUS Rack model 1.25 - 5kVA IS CLASS A - UPS-PRODUCT (ACCORDING TO EN 50091-2).

IN A DOMESTIC ENVIRONMENT IT MAY CAUSE RADIO INTERFERENCE. IN SUCH AN ENVIRONMENT THE USER MAY BE REQUIRED TO UNDERTAKE ADDITIONAL MEASURES.

ALL THE INFORMATION CONTAINED IN THIS MANUAL IS PROVIDED AS A GUIDE AND IS SUBJECT TO CHANGE WITHOUT NOTICE FOR PRODUCT UPGRADING.

2 Description

2.1 Introduction

Congratulations on your purchase of the MINIpower PLUS. Your new UPS incorporates the latest technological developments in power engineering. High reliability, upgrade ability, low operating cost and excellent electrical performance are only some of the highlights of this innovative UPS solution.

Uninterruptible Power Supplies Ltd. specialises in the design, building, installation and maintenance of Uninterruptible Power Systems. This compact and powerful UPS is just one example of our wide range of state of the art power protection devices and will provide your critical equipment with a steady and reliable power supply for many years.

The criteria and methods which are used in the design, manufacture, and maintenance of Uninterruptible Power Supply systems are certified to International Standard ISO 9001/EN 29001. A full UPS Specification is given in Chapter 8 of this manual.

The MINIpower PLUS UPS is supplied with a limited warranty that the UPS and its component parts are free from defects in materials and workmanship for a period of one year from the date of original commissioning or fifteen months from the date of original delivery, whichever is the sooner. This warranty is the only warranty given and no other warranty, express or implied, is provided.

This warranty is invalidated if the UPS is put into use without having been commissioned by a fully trained and authorised person. This warranty does not apply to any losses or damages caused by misuse, abuse, negligence, neglect, unauthorised repair or modification, incorrect installation, inappropriate environment, accident, act of God or inappropriate application.

If the UPS fails to conform to the above within the warranty period then Uninterruptible Power Supplies Ltd. will, at its sole option, repair or replace the UPS. All repaired or replaced parts will remain the property of Uninterruptible Power Supplies Ltd.

2.2 Warranty

The UPS may contain batteries which must be re-charged for a minimum of 24 hours every six months to prevent deep-discharging. Batteries that have been, for whatever reason, deep-discharged are not covered by the warranty.

2.3 Extended Warranty

The standard warranty may be enhanced by protecting the UPS with an Extended Warranty Agreement (maintenance contract).

An Extended Warranty Agreement enhances the standard warranty by providing the following:-

- Regular preventative maintenance inspections
- Guaranteed speed of response to operational problems
- 24 hour telephone support
- Fully comprehensive (excluding batteries) cover

Contact the Service Support Hotline on 0800 731 3269 for further details.

2.4 Additional Service/Maintenance Support

In addition to providing support for the MINIpower PLUS UPS, Uninterruptible Power Supplies Ltd. are able to provide maintenance and support on a wide range of different UPS products.

If you are interested in an extended warranty for your MINIpower PLUS UPS, or any other UPS you may have, please complete the enquiry form overleaf and return or FAX to:

Uninterruptible Power Supplies Ltd.
Bacchus House
Calleva Park
Aldermaston
Berkshire
RG7 8EN

Tel:	0118 981 5151 0800 773 3269
Fax:	0118 981 5152
Email:	service@upspower.co.uk

Fax to: 0118 981 5152

www.upspower.co.uk

Uninterruptible Power Supplies Ltd.
Bacchus House
Calleva Park
Aldermaston
Berkshire
RG7 8EN

Tel: 0118 981 5151

Name: .....

Job Title: .....

Company: .....

Address: .....

.....

.....

.....

Post Code .....

Tel. .....

Fax. .....

E-mail .....

Please contact me to discuss:

☐ Extended Warranty options for my MINIpower PLUS UPS

☐ Extended warranty options for my UPS System as below:

Manufacturer:.....

Model Nº:.....

Rating kVA:.....

☐ Replacement Batteries.....

☐ Other .....(please specify)

Thank you for your enquiry, which will receive our prompt attention.
If you need to contact us immediately call free on,

Freefone 0800 731 3269

or E-mail us on service@upspower.co.uk

www.upspower.co.uk

3 Installation

3.1 Introduction

This chapter contains all the necessary information for the correct unpacking, positioning, cabling and installation of the MINIpower PLUS UPS.

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED PERSONNEL. UNINTERRUPTIBLE POWER SUPPLIES LTD. WILL TAKE NO RESPONSIBILITY FOR ANY LOSS, PERSONAL OR MATERIAL DAMAGE CAUSED BY INCORRECT CABLING, OPERATIONS OR ACTIVITIES WHICH ARE NOT CARRIED OUT AS PER THE INSTRUCTIONS CONTAINED IN THIS MANUAL.

3.1.1 Receipt of the UPS

The packing container of the UPS protects it from mechanical and environmental damage. To increase its protection the MINIpower PLUS UPS is wrapped with a plastic sheet.

Upon receiving the UPS, carefully examine the packaging and the UPS for any sign of physical damage.

Ensure that the received UPS corresponds to the description indicated in the delivery note.

3.1.2 Nameplate

The technical specifications of the MINIpower PLUS UPS are provided on the attached nameplate.

3.2 Unpacking

When unpacking the UPS observe the “FRAGILE” and “ARROW” indications on the packaging.

Perform the following steps to unpack the UPS:

- Cut the wrappers and remove the packaging by pulling it upwards.
- Remove the plastic cover from the UPS.
- Remove the UPS from the pallet.
- Retain the packaging materials for future shipment of the UPS.
- Examine the UPS for any sign of damage. Notify your supplier immediately if damage is apparent.

3.3 Batteries

The standard batteries for the UPS are sealed, maintenance free, internally mounted and will typically be connected when the UPS is commissioned.

The battery life depends very much on the ambient temperature. A temperature range between +18° and +23°C will achieve the optimum battery life.

If the UPS is delivered without batteries, Uninterruptible Power Supplies Ltd. is not responsible for any damage or malfunctioning caused to the UPS by the incorrect installation or connection of batteries by third parties.

3.4 Storage

3.4.1 UPS

If you plan to store the UPS prior to use, store it unpacked in a clean dry environment with a temperature between -20°C to +50°C and humidity of less than 90%.

If the packing container is removed, protect the UPS from dust.

3.4.2 Battery

The UPS is equipped with sealed, maintenance-free batteries, whose storage capability depends on ambient temperature. It is therefore important not to store the UPS longer than 6 months at 20°C, 3 months at 30°C and 2 months at 35°C storage temperature without a battery recharge.

For longer term storage make sure that the battery is fully recharged every 6 months.

SEALED BATTERIES MUST NEVER BE STORED IN A DISCHARGED OR PARTIALLY DISCHARGED STATE.

EXTREME TEMPERATURE, UNDER- AND OVERCHARGE AND OVERDISCHARGE WILL DESTROY BATTERIES!

Before and after storing, charge the battery.

Always store the batteries in a dry, clean, cool environment in their original packaging.

If the packaging is removed protect the batteries from dust and humidity.

3.5 Positioning

The MINIpower PLUS is a compact and light UPS and can easily be moved to its final position.

The UPS should be located where:

- Humidity and temperature are within prescribed limits.
- Fire protection standards are respected.
- Cabling can be performed easily.
- Access is available for service or periodic maintenance.
- Required cooling air flow is possible.
- The site air conditioning system has sufficient capacity.
- Dust or corrosive/explosive gases are absent.
- The site is vibration free.
- Minimum 200 mm space is required above the UPS for proper cooling.

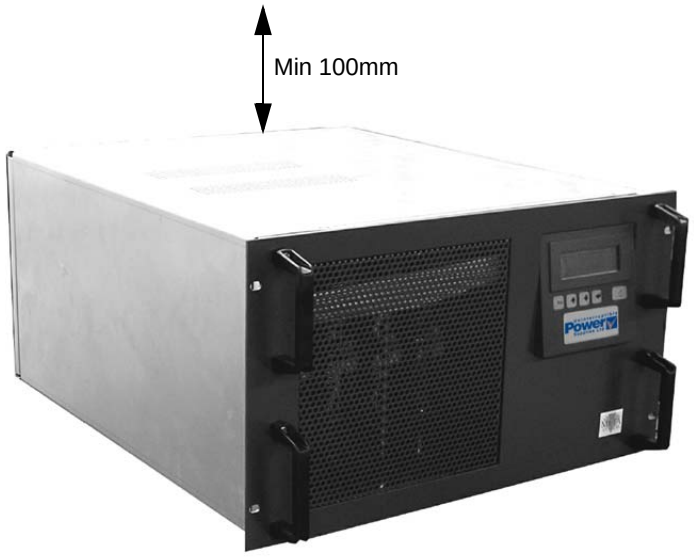
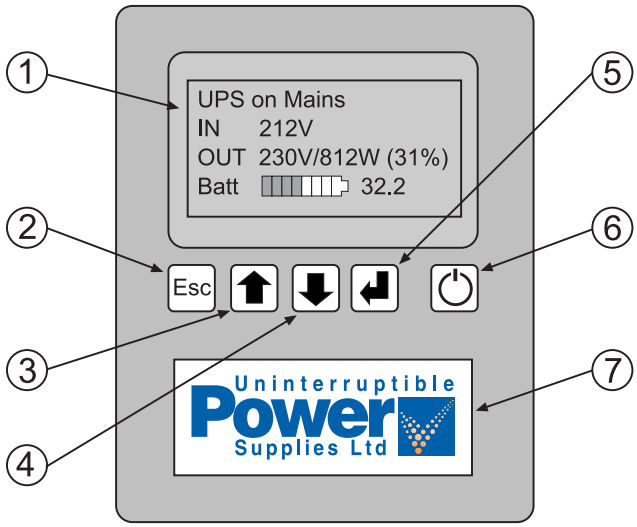


Figure 3.1: Ventilation Clearances

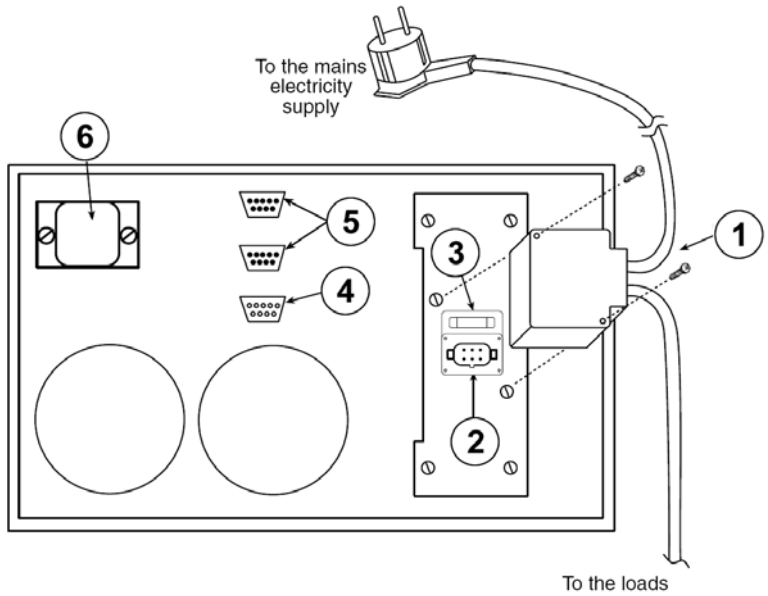
3.6 Front Panel



1. Alphanumeric Display
2. Exit function or silence acoustic signal
3. Scroll backwards or increase value
4. Scroll forwards or decrease value
5. Confirm function or access menu
6. ON/OFF switch
7. Multicolour operating status indicator (green/yellow/red)

Figure 3.2: Front Panel

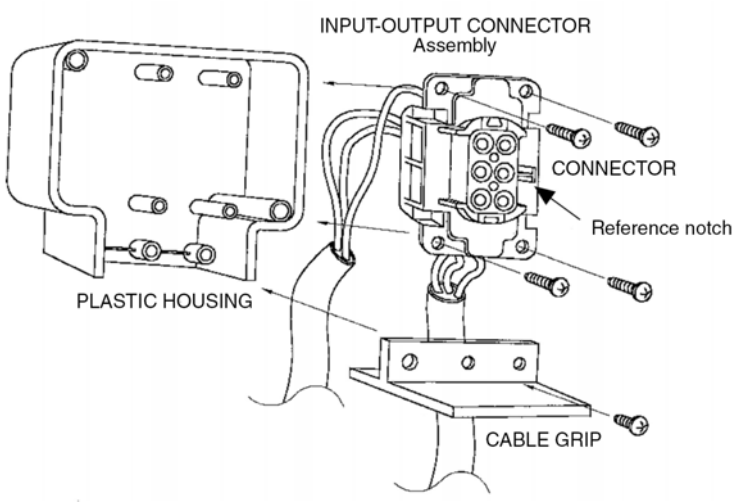
3.7 Single Cabinet UPS Installation



1. Input/Output cables
2. Input/Output plug
3. Input fuse
4. RS232 serial interface (9-pin female)
5. Logic signals outlet (9-pin male)
6. Autonomy expansion connectors

Figure 3.3: Electrical Connections

1. Wire up the Input-Output connector using insulated cable (min. 2.5mm^2).
2. Insert the connector into the plastic housing and secure using the screws supplied. Secure the wires to the housing using the cable grip.
3. Remove plug cover by removing its screws.
4. Put the Input-Output connector into the plug [9] on the rear of the UPS, and secure to its case using the screws supplied (Figure 3.3).



5. Check all UPS loads are OFF and connect them to the output socket.
6. Insert the power supply plug into a power outlet adequate for the voltage and current required.

Figure 3.4: Cabling

The UPS is fitted with protection against incorrect connections. This is indicated by its red warning light, lit without flashing, and the continuous sounding of its internal buzzer. Should you note this signal immediately after switching the UPS on, switch it off and remove the power supply plug immediately.

For 1250/2500/3750/5000 Versions
Since current dispersion towards earth of all the loads merges in the UPS protection wire (earth wire), for safety reasons, it is essential to check that the sum of these currents does not exceed 2.7 mA, according to standard EN 50091-1-1.

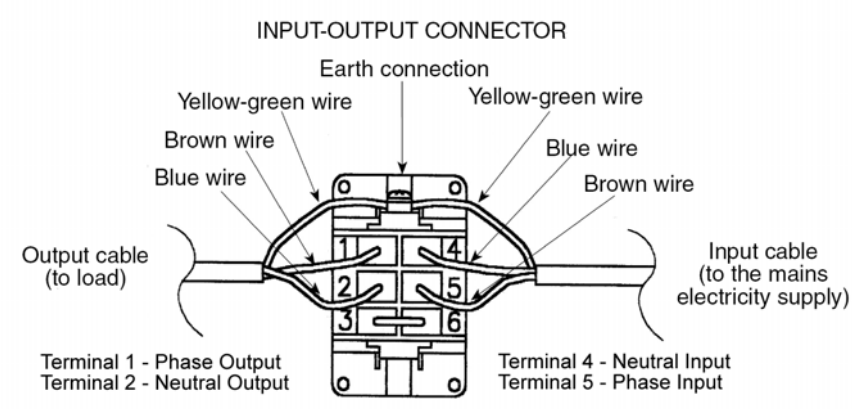


Figure 3.5: Terminals

3.8 Expansion of Autonomy

Ensure the UPS has been switched off and disconnected from the mains supply before proceeding with connections

The UPS is complete with connections for additional battery cabinets. One or more extra battery cabinets can be fitted to a single cabinet UPS as follows:

1. Loosen screws 1 and 2, but do not unscrew them completely.
2. Slide the protective casing so that the connectors located inside the box are completely accessible.
3. Tighten the screws to secure the metal protection.
4. Connect the battery cabinet to the UPS using the dedicated cables.
5. Use the plaited conductor supplied to safeguard a good contact with earth.

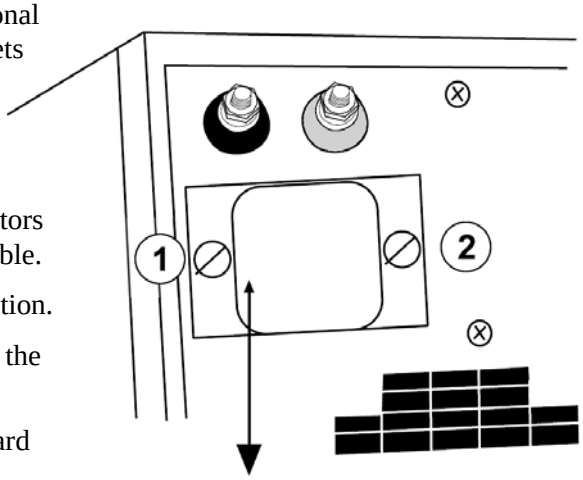


Figure 3.6: External Battery Cabinet Connectors

4 Operation

4.1 Commissioning

The MINIpower PLUS UPS is a high quality electronic machine that must be commissioned by a fully trained and authorised Uninterruptible Power Supplies Ltd. field service engineer before being put into use.

The commissioning of the UPS involves the connection of the UPS and battery, the checking of the electrical installation and operating environment of the UPS, the controlled start-up and testing of the UPS and customer training.

ANY MINIpower PLUS SYSTEM NOT COMMISSIONED BY AN UNINTERRUPTIBLE POWER SUPPLIES LTD. FIELD SERVICE ENGINEER MUST BE CONSIDERED AN ELECTRICAL HAZARD AND UNINTERRUPTIBLE POWER SUPPLIES LTD. ACCEPTS NO RESPONSIBILITY FOR ITS SAFE OPERATION OR THE SAFETY OF ANY PERSONNEL. ADDITIONALLY, THE MANUFACTURER'S WARRANTY IS IMMEDIATELY INVALIDATED IF THE UPS IS PUT INTO USE BEFORE IT HAS BEEN CORRECTLY COMMISSIONED.

4.2 Operation

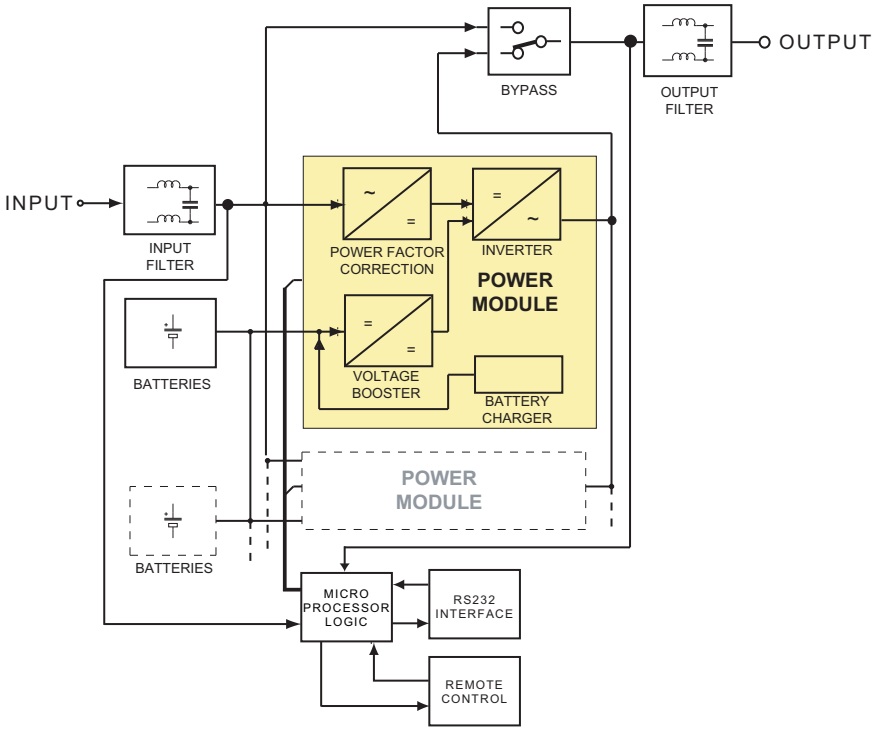


Figure 4.1: Block diagram

4.3 Operating Principles

When the mains supply is present, the input voltage is filtered and rectified by a special input stage (power factor corrector) which optimises the use of the mains supply, so that the power factor becomes practically unitary, and compensates for any voltage fluctuations. This stage supplies the inverter even in conditions of very low mains voltage.

This feature is particularly important with very low loads: with a load of around 50% nominal load, mains operation is possible as low as about 100V without reverting to battery power. This enables more “intelligent” management of the switchover to battery power, minimising use of the batteries.

The mains voltage is rectified and then supplied to a high frequency inverter to produce the ‘clean’ sinusoidal output voltage, with very low distortion. A rapid, synchronised by-pass circuit assists during overloads above the inverter’s capacity, for example when certain, high start current, peripherals are switched on.

Should the mains voltage fail or be subject to excessive sag, a booster stage is automatically activated.This employs the batteries and safeguards the supply of power to the output inverter, and thus to the load, without any break. The circuitry is a passing neutral type, i.e. the mains supply neutral is common through to the inverter output.

During normal operation, a sensor verifies the difference in potential between the neutral wire and the earth wire: should this be excessive, it will activate the input protection and switch the UPS to battery mode, signalling the anomaly. It is, however, possible to modify the parameters of the software so that only signalling is provided, if preferred.

All the UPS functions are supervised in “real time” by a microprocessor that also controls and memorises certain operating parameters, in addition to managing an RS232 UPS-computer interface.

The UPS keeps the operator informed regarding its operating status using:

- An alphanumeric display
- A status indicator
- An acoustic alarm

The combination of these signals enables rapid and intuitive understanding of its operating status and recognition of any problems in the power supply.

4.4 Operating Modes

There are three main operating modes

- Mains operation
- Battery operation
- Bypass operation

4.4.1 Mains Operation

This is the normal operating condition:

- The mains supply is converted to DC by the power factor corrector
- The inverter reconstructs a sinusoidal voltage from the DC supply
- The output filter provides smoothing of the output voltage
- The batteries are continually charged

4.4.2 Battery Operation

When there is a mains power failure, the UPS automatically switches over to battery mode.

- The voltage of the batteries is increased by the “booster” circuit
- The inverter constructs an alternating voltage from the battery DC supply
- The output filter provides smoothing of the output voltage

4.4.3 Bypass Operation

The bypass circuit excludes the UPS and connects the input directly to the output. The switchover takes place in a synchronised manner to ensure the correct output voltage is always supplied, preventing the risk of a break in power or excess voltage.

Operation of the by-pass circuit can be customised, to meet the specific demands of the application, by means of a dedicated menu (Config. UPS, By-pass) which provides many options (automatic, disabled, by-pass in load waiting mode, etc.) in order.

4.5 Basic Operation

4.5.1 Switch On

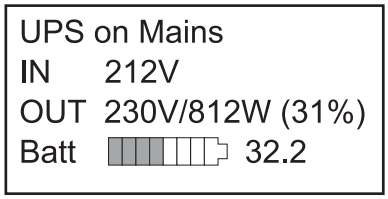
Press button	
Display shows	UPS switching on.....
The status indicator shows starting (red, yellow, green)	
The display shows the operating status	UPS on Mains IN 212V OUT 230V/812W (31%) Batt 32.2

4.5.2 Switch Off

With the UPS operating normally (example)	UPS on Mains IN 212V OUT 230V/812W (31%) Batt 32.2
Press button for a few seconds	
The acoustic warning signal sounds repeatedly and the UPS switches off after 5 seconds.	

4.6 Displays and Alarms

The main messages provided by the alphanumeric display in the three different operating modes are shown below.



UPS	On Mains	Indicates normal operating status, when mains voltage is present.
	On Battery	Indicates that there is no mains power and the UPS is using its batteries to supply power.
	On By-pass	Indicates that by-pass operation has been turned on: the output of the UPS is connected directly to the mains.
IN	xxxV	Indicates the UPS input voltage and the RMS power absorbed by the mains. This message is not displayed during battery operation.
OUT	xxxV/x,xKW (xx%)	The current power is also given as the percentage of the total power that the UPS is able to supply.
Batt.	xx,x'	Indicates the state of charge of the batteries in a chart format and the autonomy available in a numeric format

4.6.1 Warning Signals

Indication and Sound	Message	Description
Solid Green No Sound	UPS on Mains IN xxxV	Normal operation. Mains OK and load within limits.
Fast flashing Green	UPS on Mains No sync mains xx.xHz	Frequency of the output voltage not synchronised with the input voltage. Possible casues: - PLL disabled - Input frequency outside limits
Solid Yellow Short intermittent sound (every 20sec)	UPS on Batteries MAINS ABSENT	Battery operation
Fast flashing Yellow No Sound	UPS on Bypass	Load is connected directly to the mains supply via the bypass.
Fast flashing Red Short, fast intermittent sound		**Module failure** Switch off the UPS and contact your service centre **Overload** Reduce the connected load until it is within the UPS capactiy.
Solid Red Continuous sound		**UPS error or failure** ATTENTION! We recommend you switch off the ups and contact your service centre
Flashing Red (1 flash/10 s)		Above 90% of MAX load
Flashing Red Alternating short long Alternating short, long intermittent sound	RESERVE AUTONOMY!	Autonomy reserve. During battery operation - Incorrect battery connection - Incorrect Neutral
Flashing Red Short with pause	OUT OF REDUNDANCY!	Consumption by the load is above the redundancy that has been set. Power board redundancy is not guaranteed in case of failure

Press ESC to silence the acoustic signal. The signal will be silenced or enabled each time this button is pressed.

4.7 Customising the Operating Mode

4.7.1 Button Functions

The buttons on the front panel of the UPS are used to access various menus

Button	Function
Esc	• Exit a function without modifying it • Go up a menu level • Exit the main menu and return to status display • Silence the buzzer
↑	• Select previous function • Increase a value • Select a new item within the function (e.g. go from DISABLED to ENABLED)
↓	• Select next function • Reduce a value • Select a new item within the function (e.g. go from ENABLED to DISABLED)
↵	• Confirm a value • Access an item in the menu • Go down a menu level

Some menus contain more than four lines: use the ↑ and ↓ buttons to scroll through items that are not displayed.

4.7.2 Service Mode

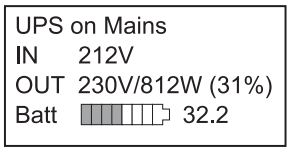
All the settings and programming described below can be done even when the UPS is switched off. Press the ↵ button to enter UPS “Service” mode in order to access the Display menu. Press the ○ button to exit this mode.

Alternatively, the UPS will automatically exit the function and switch off if it does not receive manual or serial commands.

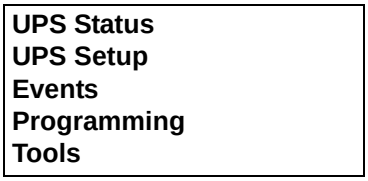
4.8 Accessing the Menus

4.8.1 Main Menu

With UPS operating normally, (example)

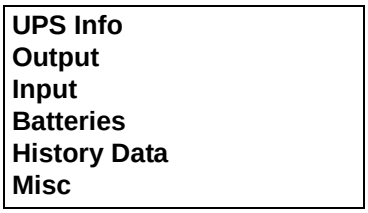


Press ↵. Display shows the Main Menu:



↓ and ↵ to select the chosen section:

4.8.2 UPS Status



↓ and ↵ to select the chosen section:

UPS Info.

Mod	xxxx	Name of UPS
POut Max	xxxx	Max. potential active power (W)
SWVer.	xxxx	Software Version
S/N	xxxxxxxxxx	Serial Number
Installed Modules	x	Number of Power Modules fitted
Faulty Modules	x	Number of Faulty Power Modules

Output

Power	xxxxx	Active Power (W)
Appar.Pow.	xxxx	Apparent Power (VA)
V RMS	xxxx	Voltage (V rms)
I RMS	xxxx	Current (A rms)
Peak Current	xx	Current (A)
Frequency	xx	Frequency (Hz)
I Crest factor	x	Peak current/rms current
Power fact.	x	Power Factor

Input

Power	xxxxx	Active Power (W)
Appar.Pow.	xxxx	Apparent Power (VA)
V RMS	xxxx	Voltage (V rms)
I RMS	xxxx	Current (A rms)
Peak Current	xx	Current (A)
Frequency	xx	Frequency (Hz)
I Crest factor	x	Peak current/rms current
Power fact.	x	Power Factor

Batteries

Voltage	xxxxx	Battery terminal Voltage (V)
Residual Cap.	xxxx	Percentage battery charge
Discharge Count	xxxx	Number of discharge cycles
Usage	xxxx	Hours on battery power
Cal.	dd/mm/yyhh:mm	Day/Month/Year/Time of battery calibration
Ext. KB units	xx	Number of external battery KBs
Ext Chargers	xx	Number of external battery chargers

History Data

UPS Ontime	xxxxx	Hours of UPS operation
BoosterOnTime	xxxx	Hours in Booster mode
DrainedOut N.	xxxx	Number of complete battery discharges
Booster Int.	xxxx	Number of Booster mode operations
Bypass Interv.	xxxx	Number of Bypass interventions
OverheatCount	xxxx	Number of Thermal protection triggers

Misc.

Int. Temp.	xx	Internal temperature (C)
Ext Temp.	xx	External temperature (C)
Fan Speed.	xx	Percentage cooling fan speed

4.8.3 UPS Setup

Output
Input
Bypass
Neutral Sensor
Batteries
Clock Setup
Operator Panel

↓ and ↵ to select the chosen section:

Output

Voltage	Set UPS Output Voltage (V)
Frequency	Set UPS Output Frequency<Hz)
	Nominal Value
	Set to either 50 or 60 Hz
	Auto Selection
	UPS reads Input Frequency and synchronises Output to it. If disabled UPS uses Nominal Value
N+x Redundancy	Set number of redundant Power Modules

NOTE: Redundancy Settings
Function is used to manage the redundancy of power modules. For example: A load requires N power modules; X power modules must be added to achieve N+X redundancy. If the load then exceeds the power available from N modules, the UPS will signal a lack of redundancy alarm.

NOTE: Practical Examples

Load (W)	Power Modules	Total Power (W)	Redundant Modules	Alarm Level (W)	Overload Level (W)
3700	3	3750	0	no	3750
3700	4	5000	1	3750	5000
1500	4	5000	2	2500	5000
1000	4	5000	3	1250	5000

Input

PLL Enable	If **enabled**, UPS sychronises Output frequency with Input frequency. If **disabled**, the Output frequecy is not synchronised with the Input and the Status indictor flashes Green
Extended PLL Range	If **enabled**, the Output frequency is synchronised with the Input up to 50 or 60Hz ± 14%. If disabled, the Output frequency is synchronised with the Input up to 50 or 60Hz ± 2%.

If the PLL function is disabled, the automatic bypass facility is NOT AVAILABLE. In the event of a UPS fault or overload condition, the load is NOT FULLY PROTECTED.

Bypass

Bypass Enable	If **enabled**, the UPS manages bypass operation automatically. If **disabled**, the UPS will never switch to bypass and will switch off in the event of sustained overload or fault.
Forced Mode	If **enabled**, the UPS is set to premanent bypass condition.
DIP Speed	When **Forced Mode is disabled**, this alters the speed of bypass intervention. **SLOW**: for loads which aremay cause high peak demands and are insensitive to input voltage disturbance. **STANDARD**: normal condition. **FAST**: For loads which are extremely sensitive to input voltage disturbance.
Off-Line Mode	If **enabled**: • UPS is in permanent bypass mode while mains supply is available • UPS reverts to battery power if the mains supply fails
Load Wait Mode	If **enabled**, the bypass operates normally for loads below the “Minimum Load Threshold” but is not available for higher loads. During a mains failure the UPS switches OFF and is only restarted when mains is restored.

Programming Priority

Function	Enable Bypass	Forced Mode	Off-line Mode	Load Waiting
Forced	Enabled	Enabled	X	X
Off-Line	Enabled	Disabled	Enabled	Enabled
Off-Line	Enabled	Disabled	Enabled	Disabled
Load Waiting	Enabled	Disabled	Disabled	Enabled
Automatic	Enabled	Disabled	Disabled	Disabled
Bypass Disabled	Disabled	X	X	X

Neutral Sensor

Enable	If **enabled**, the UPS uses the neutral sensor to verify the voltage between neutral and earth is within safe limits. Otherwise the UPS will switch to battery mode. If **disabled**, the sensor is ignored
Ignore While Run	If **enabled**, the UPS only checks the neutral sensor during startup.

Batteries

Capacity Manag.	**ADVANCED MODE**: The end of autonomy warning is based on the power being drawn by the load and is displayed as remaining autonomy time. **SIMPLE MODE**: The end of autonomy warning is calculated from the battery terminal voltage.

↓ and ↵ to select the chosen section:

ADVANCED MODE

Set capacity **Reserve Time**	**Advanced Mode** Sets the end of battery autonomy warning signal using the remaining run time (mins)

SIMPLE MODE

Set capacity **Battery Thresholds**	**Simple Mode** Sets the end of battery autonomy warning signal using the battery voltage. There are two possible settings in the Mode menu: **Mode - Automatic Thresholds** UPS automatically calculates the voltage threshold based on the load. UPS will signal AUTONOMY RESERVE and END OF AUTONOMY **Mode - Fixed Thresholds** ***Reserve Thresholds:*** Sets the battery voltage threshold, UPS signals AUTONOMY RESRVE below this level. ***Exhaust Threshold:*** Sets the battery voltage threshold, UPS signals END OF AUTONOMY below this level.

Max Time On Batt.	Sets the max. time (in seconds) for continuous operation in battery mode. Set to “0” to disable.
Max. time reserve	Sets max. time (in seconds) for operation in battery mode after the reserve limit is reached. Set to “0” to disable.
TurnOn Test Enable	If **enabled**, batteries are tested each time the UPS is started.
Restart Enable	If **enabled**, the UPS restarts automatically when mains supply is restored after the UPS has switched off due to the end of autonomy.
External Options	**Battery Chargers No.** Sets the number of external battery chargers. **KB Kits** Sets the number of sets of three cells fitted internally.

Clock Setup

26/07/06 - 10:01:05	Use ⇧, ⇩ and ↵ to select and modify the chosen setting.

Operator Panel

Language	Sets the display language
Keyboard Beep	Enables/disables keyboard beep
Display Backlight	**Fixed**: Always ON **Timed**: Switches OFF after period of inactivity **Disabled**: Always OFF
Display Contrast	Sets display contrast
Password Change	Sets password to enable access to UPS settings

4.8.4 Events

Log View
Log Reset

⇩ and ↵ to select the chosen section:

Log View	Displays events stored in UPS memory, for example END OF AUTONOMY, OVERHEATING ALARMS etc with TIME and DATE
Log Reset	Deletes events stored in UPS memory

4.8.5 Programming

Schedule Planning
Restart
Shutdown Planning

⇩ and ↵ to select the chosen section:

Schedule Planning

Enable	Enables/Disables set programmes
View/Edit	View, Set or Modify programmes: **Batteries Test** - Verifies battery status **Batt. Calibration** - Calibrate batteries **Turn On** - Switch on UPS **Turn Off** - Switch off UPS **Absent** - Disable programming Each item can be set to operate: **Daily** “hours-minutes” **Single** “day-month-hour-minutes **Weekly** “day name-hour-minutes”
Sched. sequence	Displays up to 16 programmes in date order
Reset	Deletes all programmes

Restart

Delay	Duration (seconds) of the signal warning that the UPS is about to restart.
Min Autonomy	Percentage of battery charge below which the UPS will NOT automatically restart.

Shutdown

Delay	Duration (seconds) of the signal warning that the UPS is about to shutdown.

4.8.6 Tools

Signalling Test
LCD Display Test
Battery Test
Battery Calibration

↓ and ↵ to select the chosen section:

Signalling Test	Tests the warning lights. Press the Enter button to execute the test of the Green, Yellow and Red warning lights and the Acoustic warning signal.
LCD Display Test	Tests the alphanumeric display. Press the ENTER button and all the available digits are shown on the alphanumeric display.
Battery Test	Tests the batteries. Contact your Service Centre in case of problems.
Battery Calibration	Calibrates batteries by calculating the discharge curve. This should be carried out when the batteries have been changed so that the UPS is able to provide precise information on charge status.

4.9 Diagnostic Software

The UPS is fitted with a standard RS232 interface, which can be used, with a computer, to access data relating to the operation of the UPS and its log.

A suitable interface programme for Windows® computers is available, free of charge, from our website www.upspower.co.uk.

An RS232 cable is required to connect a serial port on your PC to the interface outlet on the rear of the UPS.

5 Maintenance

5.1 Introduction

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

TO ENSURE OPTIMUM OPERATION OF THE MINIpower PLUS SERIES UPS AND CONTINUOUS AND EFFICIENT PROTECTION OF THE CONNECTED LOAD IT IS RECOMMENDED THAT THE OPERATIONAL PARAMETERS AND CALIBRATIONS OF THE UPS AND THE BATTERIES ARE CHECKED EVERY 6 MONTHS.

5.2 User Responsibilities

There are no user serviceable parts contained within the UPS so the maintenance responsibilities of the user are minimal. To maximise the useful working life and reliability of the UPS and its batteries, the environment in which the UPS operates should be kept cool, dry, dust and vibration free.

5.3 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 maximised. When the UPS is commissioned, the commissioning field service engineer will attach a service record book to the front of the UPS and this will be used to record the full service history of the UPS.

Preventative maintenance inspections involve working inside the UPS which contains hazardous AC and DC voltages. Only Uninterruptible Power Supplies Ltd. trained and authorised field service engineers are fully aware of all of the hazardous areas within the UPS.

During a preventative maintenance inspection the field service engineer will carry out the following checks:

- Site/environment conditions.
- Integrity of electrical installation.
- Cooling airflow.
- Rectifier operation and calibration.
- Inverter operation and calibration.

- Static switch operation.
- Battery status.
- Load characteristics.
- Integrity of alarm and monitoring systems.
- Operation of all installed options.

Preventative maintenance inspections form an integral part of all Extended Warranty Agreements (maintenance contracts) offered by Uninterruptible Power Supplies Ltd.

For further details on Extended Warranty Agreements please refer to section 2.3.

6 Troubleshooting

6.1 Potential Problems and Solutions

Problem	Possible Solution
When the UPS is switched on, the buzzer sounds and the red warning light makes alternating short-long flashes, then the UPS switches off after 15 seconds	The connection of the neutral conductor is incorrect: swap the connections of the neutral and phase input leads, or exclude the neutral sensor.
The UPS works but a short beep is heard every 12 seconds and the yellow warning light is lit without flashing.	Check power is present at the mains outlet. Check that the UPS power supply cable is correctly inserted in both the mains outlet and in the connector on the UPS itself. Check the fuse located at the side of the input/output connector under the plastic housing (refer to fig.1 or 4)
The UPS works but it beeps intermittently and the red warning light and the yellow warning light are flashing.	There is an overload on the UPS output. Reduce the load so that it does not exceed the maximum power that the UPS can supply. Alternatively, if the UPS is not in its maximum configuration, you can ask your Service Centre to increase the power of your UPS by fitting extra power boards and batteries inside the UPS cabinet.
The UPS beeps continuously and the yellow warning light flashes for about 15 seconds, after which the UPS switches off	The UPS has completely flattened its batteries; it can only start up again when the mains input line is present. Check the magneto-thermal or differential switches that precede the UPS and the input fuse
The UPS works but the green warning light is flashing quickly	The mains supply is out of the limits permitted for the voltage and/or frequency, but it can still be used by the UPS. However, the by-pass function is not operational
The UPS beeps intermittently and the red warning light is flashing quickly.	The thermal protection has been tripped. Switch the UPS off and wait for a few minutes so that the internal temperature of the UPS can get back to normal. Check that the fans operate correctly and that the airflow is not obstructed (e.g. if the UPS is too close to a wall). There is a fault on one of the internal circuits. Contact your service centre.

6.2 Contacting Service

Uninterruptible Power Supplies Limited has a service department dedicated to providing routine maintenance and emergency service cover for your UPS.

If you have any queries regarding your UPS please contact us.

Uninterruptible Power Supplies Ltd..
Bacchus House
Calleva Park
Aldermaston
Berkshire
RG7 8EN

Tel: 0118 981 5151
0800 7313269

Fax: 0118 981 5152

Email: service@upspower.co.uk

We recommend that your UPS is protected by an Extended Warranty Agreement (see section 2.3 for details). These agreements assist us in caring for your UPS correctly, ensuring that it is well maintained and attended to promptly should any problems occur.

7 Options

Non available.

8 Specifications

Construction				
Model	1250	2500	3750	5000
Weight (Kg.)	23.5	34	43	53
Size (mm) (WxHxD)	19” Rack 6U 483.5 x 266 x 600			
Technology	PWM high frequency both for input stage and output stage. Microprocessor control logic			
Expandability	Optional upgrading to configurations with higher power by fitting one or more extra power modules inside the same cabinet, up to a maximum of 4. Optional upgrading of autonomy by fitting extra batteries inside, up to a maximum of 4 sets of 3, 12V, 9Ah batteries.			
Expandability	For greater autonomies, optional battery cabinets can be connected, each with a capacity of max 10 sets of 3, 12V, 9Ah batteries.			
Computer Interface	With logic levels, to interface with optional kits. Output with 9-pin male, SELV insulated connector. Standard serial RS232 for interfacing with personal computer using diagnostics software. Output with 9pin, female, SELV insulated, connector.			
Remote control	Output with 9-pin male, SELV insulated connector for connection to optional remote control. Optional scheduling of UPS switch on/off and display of main UPS signals.			
Protection	Electronic protection against overloads, short circuits and excessive battery discharge. Operation blocked at end of autonomy. Inrush limitation when switching on. Sensor for correct neutral connection. Back-feed protection (electrical insulation for the safety of the input plug when running in battery mode). EPO contact (emergency power off)			
Synchronised By-pass	Automatic static and manual (optional). Intervenes in case of overload and operating anomaly.			

Environmental				
Model	1250	2500	3750	5000
Storage Altitude	10.000 metres			
Storage Temperature	-20° C to +50° C			
Operating Temperature	0° C to +40° C			
Relative Humidity	20-80% non-condensing			
Protection	IP 21 (IEC529)			
Audible Noise	< 40dBA at 1 metre			

Electrical Input				
Model	1250	2500	3750	5000
Voltage	184V to 264V with nominal load 100V to 264V with 50% nominal load			
Frequency	50 or 60Hz ± 2% autosensing and/or selected by operator			
Current (Nom.)	4.6A	8.9A	13.2A	17.7A
Current (Max.)	5.75A	11.2A	16.6A	22.2A
Current Distortion	<3% THD			
Power Factor	> 0.99 at 20% nominal load			
Inrush Current	100% of nominal current			
Phases	Single			
Line Fuse	25AF			
Battery Charger	0.8A rms (direct from mains)			

Output Waveform				
Model	1250	2500	3750	5000
Mains Operation	Sine wave			
Battery Operation	Sine wave			
Topology	No break, on line UPS with passing neutral and double conversion			

Output When Running on Mains Power				
Model	1250	2500	3750	5000
Nominal Output Voltage	230 V ± 1%			
Nominal Output frequency	50 Hz / 60Hz synchronised (autosensing and/or as selected by operator)			
Output Current with linear load and 0.7 pf (A rms)	5.37	10.75	16.25	21.6
Crest Factor	3.5			
Output VA	1250	2500	3750	5000
Output W with 0.7 pf linear/non-linear load	875	1750	2625	3500
THD	< 0.5% with nominal load and < 1% with 0.7 pf nominal non-linear load			
Overload Capacity	300% for 1s, 200% for 5s and 150% for 30s without By-pass intervention			
Phases	Single			
AC-AC conversion efficiency with Linear load pf=1 and charged batteries	80% with 50% load 85% with 75% load 92% with 100% load			

Output When Running on Battery Power				
Model	1250	2500	3750	5000
Nominal Output Voltage	230 V ± 1%			
Nominal Output frequency	50 Hz / 60Hz synchronised (autosensing and/or as selected by operator)			
Output VA	1250	2500	3750	5000
Output W with 0.7 pf linear/non-linear load	875	1750	2625	3500
THD	< 1%			
Overload Capacity	160% for 15s			
Allowable load pf	0.7-1.0			
DC-AC conversion efficiency	80% with 50% linear load pf = 1 and charged batteries: 80% with 75% load 80% with 100% load			

There is a danger of explosion should the batteries be replaced with the wrong type.
Dispose of used batteries as per the instructions and precautions for their disposal on the battery label.

Battery Operation												
Model	1250			2500			3750			5000		
	Approximate autonomy in minutes with charged batteries											
Percentage of applied load	50	80	100	50	80	100	50	80	100	50	80	100
Standard UPS	20	11	8	20	11	8	20	11	8	20	11	8
Recharge time to 90% charge	5 - 6 hours according to level of discharge											
Specifications and quantity of batteries	3 pcs 12V 9Ah, sealed, lead-acid, maintenance free batteries connected in series for each power module											
Reserve signals	32.2 V to 36V, programmable											
Minimum voltage for battery operation during discharge	27V to 31.5V with automatic selection depending on applied load, or as programmed by operator.											
Average battery life	3-6 years according to use and working temperature **The UPS batteries are subject to a reduction in capacity depending on their age (a feature declared by their manufacturer in the technical manual). For example, the reduction of capacity of a 4-year-old battery can be as much as 40%, resulting in a proportional reduction of UPS autonomy time when running on battery power.**											

Bypass				
Model	1250	2500	3750	5000
Type	Static and electromechanical			
Switchover time	Zero			

Reference Standards				
Model	1250	2500	3750	5000
Safety	Conforms to standard EN 62040-1-1			
Electromagnetic compatibility	Immunity: Conforms to standard EN 50091-2 (class A) Emmisions: Conforms to standard EN 50091-2 (class B)			
Typical Performance	Conforms to standard EN 62040-3			