



Whad 3, 4, 5, 6 kVA

EN

ENGLISH

3

IT

ITALIANO

19



Index

1	Introduction	4
1.1	Important information	4
2	Operation	5
2.1	Operating procedure	5
2.2	Mains operation	5
2.3	Battery operation	5
2.4	By-pass operation	5
2.5	Visual and acoustic warning signals	5
3	Installation	7
3.1	Prior to installation	7
3.2	Where to install your UPS	7
3.3	Front panel	8
3.4	Installation procedure	8
3.5	Guide to using the diagnostics software	11
3.6	Switching on	11
4	Specifications	12
4.1	Construction specifications	12
4.2	Environmental specifications	12
4.3	Electrical input specifications	13
4.4	Output waveform	13
4.5	Electrical output specifications when running on mains power	14
4.6	Electrical output specifications when running on battery power	14
4.7	Battery operation	15
4.8	By-pass Specifications	15
4.9	Reference Standards	15
4.10	Routine maintenance	16
5	Troubleshooting	17

1. Introduction

Thank you for choosing to purchase a LEGRAND® product. Our company's main objective is to supply innovative products that are the outcome of our ongoing research and application of cutting-edge technology.

Our products are covered by several international patents, emblematic of LEGRAND®'s quest for exclusivity and ongoing improvement.

LEGRAND® uninterruptible power supplies are designed to protect electronic equipment from problems that may be encountered with your mains electricity supply, such as power cuts, surges and interference.

In particular, the product you have purchased is enhanced with our exclusive "State of Charge Algorithm" which makes it possible for your UPS to achieve the best possible performance in terms of autonomy.

Our products comply with international standards: an additional guarantee of the quality of our products.

We recommend you read this manual carefully and keep it for future reference.

1.1 Important information

- Do not connect loads in excess of the limit stipulated on the product's label and in the relative documents provided.
- Do not dismantle the UPS. Only authorised technical personnel are allowed access to the internal parts of the UPS.
- Never disconnect the UPS from the mains power supply when it is running: this would cut off the earth protection of both the UPS and of the loads connected to it.
- Do not insert screwdrivers or other items inside the ventilation holes or into the fan.
- The UPS must be installed according to the instructions in this manual and in compliance with the set limits.
- Take care that no liquids come into contact with your UPS.
- This product should only be employed for the designated uses described in this manual.
- The manufacturer is not liable for any damage or injury caused by failure to comply with the instructions in this manual.

All the information contained in this manual is provided as a guide and is subject to change without notice for product upgrading.

2. Operation

2.1 Operating procedure

The UPS keeps the operator informed regarding its operating status using visual and acoustic signals:

- status indicator 2 (see fig. 2)
- acoustic signal (located inside the UPS).

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

There are three main operating modes

- Mains operation
- Battery operation
- By-pass operation.

2.2 Mains operation

This is considered the normal operating condition:

- mains voltage is converted by the power factor corrector (PFC) into continuous current
- the inverter reconstructs the sinusoidal voltage from the continuous current
- the output filter provides extra "cleaning" of the output voltage
- the batteries are recharged.

2.3 Battery operation

Il gruppo di continuità in assenza della tensione di rete, commuta automaticamente nel modo di funzionamento a batteria.

- la tensione delle batterie viene elevata dal circuito "survoltore"
- l'inverter ricostruisce la tensione sinusoidale dalla tensione continua
- il filtro di uscita garantisce la pulizia della tensione verso il carico.




2.4 By-pass operation

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

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

2. Operation

2.5 Visual and acoustic warning signals

STATUS INDICATOR	ACOUSTIC SIGNAL	DESCRIPTION
Green	-	Normal operation with mains present and loads within the set limits
Green Fast flashing	-	The UPS is indicating that the frequency of the output voltage is not synchronised with the input voltage. The cause of this may be: - PLL disabled - Frequency of the input voltage is outside the set limits for the UPS
Yellow	Short intermittent sound (every 12 sec.)	Battery operation
Yellow Fast flashing	-	By-pass operation
Red Fast flashing	Short and fast intermittent sound	Module failure  ATTENTION! We recommend you switch off the UPS and contact your service centre Overload  ATTENTION! We recommend removing some of the appliances connected to the ups so that consumption by the load returns below set limits
Red	Continuous sound	UPS error or failure  ATTENTION! We recommend you switch off the ups and contact your service centre
Red Alternating short long flashing	Alternating short, long intermittent sound	Autonomy reserve. During battery operation. Incorrect battery connection

3. Installation

3.1 Prior to installation

Check the packaging has not been opened or damaged and that the product has not been damaged during transport. Please contact your shipping agent in case of doubt.

Check the contents of the box:

- Nr.1 UPS
- Nr.1 connector for the input/output cable (single cabinet version includes multiple output socket and input cable)
- Instructions manual.

We recommend you keep the equipment's packaging materials as they can be useful should the need arise to send the product back for repairs.

3.2 Where to install your UPS

Make sure the place where you intend installing your UPS is level and sturdy.

Please comply with the following requisites for installation (see fig. 1):

- The UPS must be located in an enclosed environment: it was not designed to operate out of doors.
- It is essential that you comply with the environmental conditions illustrated in this manual.
- Avoid placing it in very dusty or damp areas or in direct sunlight.
- Avoid places where there are inflammable liquids and/or corrosive substances.
- Ventilation must be guaranteed by placing the UPS at least 20 cm away from any walls
- Do not cover the ventilation outlets on the front, rear or sides of the UPS.

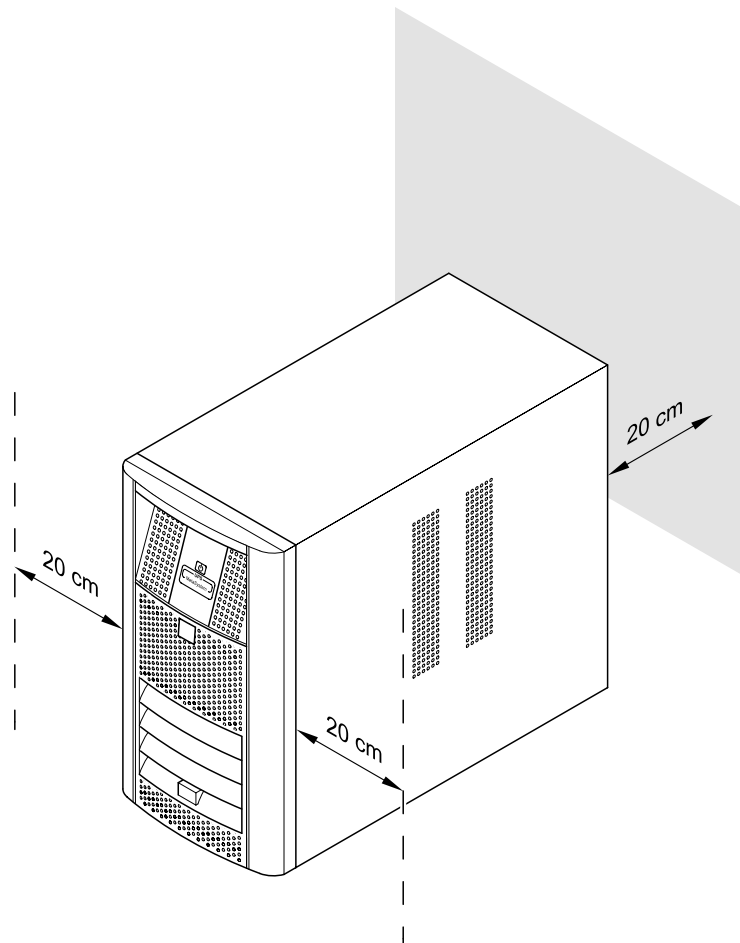


Fig. 1.
Where to install the
UPS.

3. Installation

3.3 Front panel

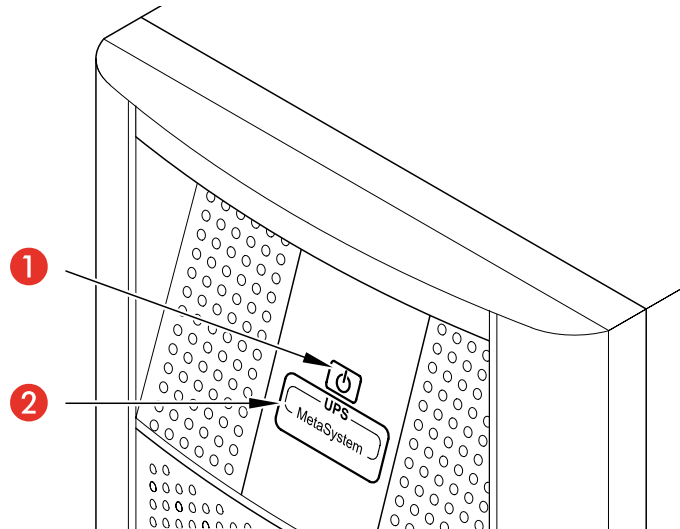


Fig. 2.
Front Panel.

1. Button to switch on / switch off
2. Multicolour operating status indicator light (green / yellow / red)

3.4 Installation procedure

3.4.1 Electrical connections

3. Input/Output connector
4. Input/Output plug
5. Input fuse
6. RS232 serial interface outlet (9-pin female)
7. Logic signals outlet (9-pin male)
8. SNMP Interface

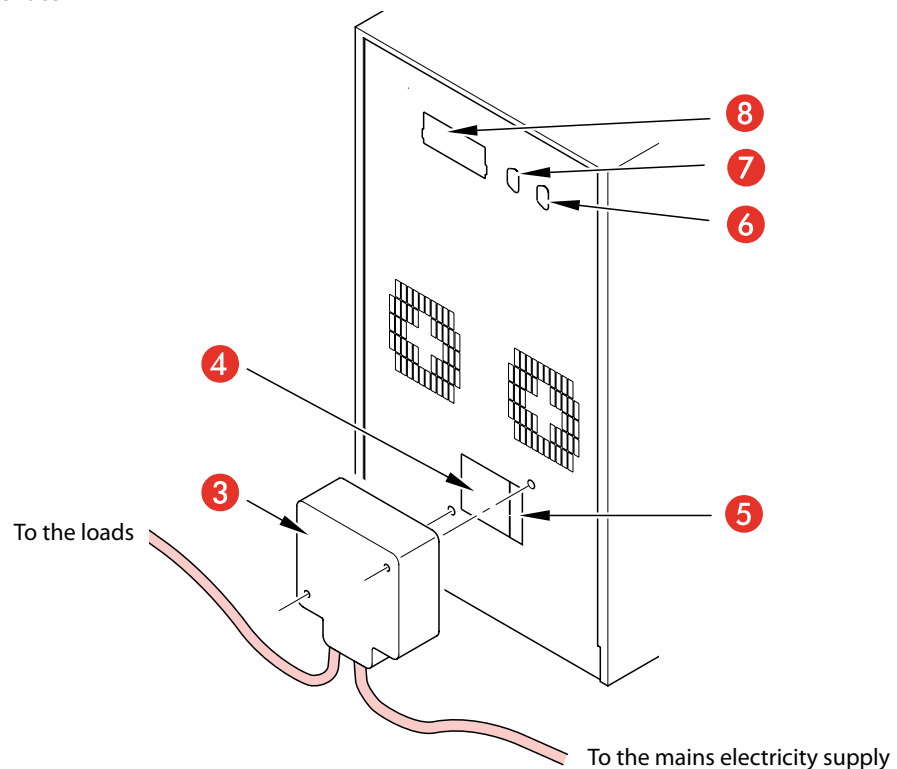


Fig. 3.
Electrical
Connections.

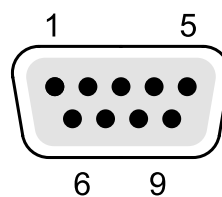
3.4.2 Logic level interface

Logic level interface is available on the male DB9 connector; it is used to connect the UPS to a remote system for monitoring its operating status.

The following indications are available with it:

- Mains/battery run;
- UPS failure;
- Overload;
- Autonomy reserve.

The functions of the interface pins are:



- Pin 1: Input ON/OFF (Maximum voltage +15V, equivalent to the 'ON/OFF' key on the panel);
- Pin 5: GND (common);
- Pin 6: UPS failure output (Open Collector – active low);
- Pin 7: UPS on autonomy reserve output (Open Collector - active low);
- Pin 8: GND (common);
- Pin 9: UPS on battery output (Open Collector - active low).

3.4.3 UPS Whad 3000 - 4000

1. Wire up the Input-Output connector supplied as shown in figure 4, using insulated cable with wires whose section is at least 2.5 mm².
2. Insert the connector into the plastic housing and secure it using the screws supplied. Secure the wires to the housing using the cable grip (see fig. 4).
3. Take the cover off the plug [4] by removing its screws.
4. Put the Input-Output connector into the plug [4] located on the rear of the UPS, and secure to its case using the screws supplied (see fig. 3).
5. Check that the on/off switches of all the appliances to be connected to the UPS are OFF and connect them to the output socket.
6. Insert the power supply plug into a power outlet that is adequate for the voltage and current required.

Input-Output connector - Assembly

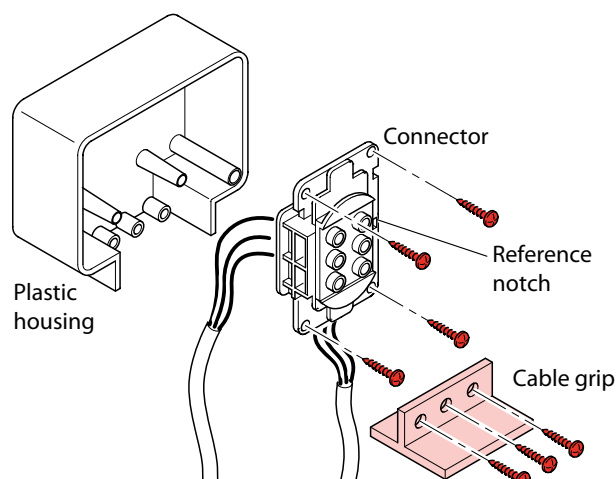


Fig. 4.
Connection
terminals
housing.



WARNING

Your UPS is NOT fitted with a circuit to protect it against the risk of incorrect connections.

3. Installation

Precautions for installation

Electrical connections should only be done by trained personnel

- Do not modify the electric cables supplied
- Make sure that the mains outlet is connected securely to an earth circuit
- The mains outlet, or the circuit breaker, must be installed near the appliance and must be easily accessible.

ATTENTION (for versions 3000/4000)

Since current dispersion towards earth of all the loads merges in the UPS protection wire (earth wire), it is essential to check that the sum of these currents does not exceed 2.7 mA, according to standard EN 62040-1, for safety reasons.

Input-Output connector - Side with insertion of wires

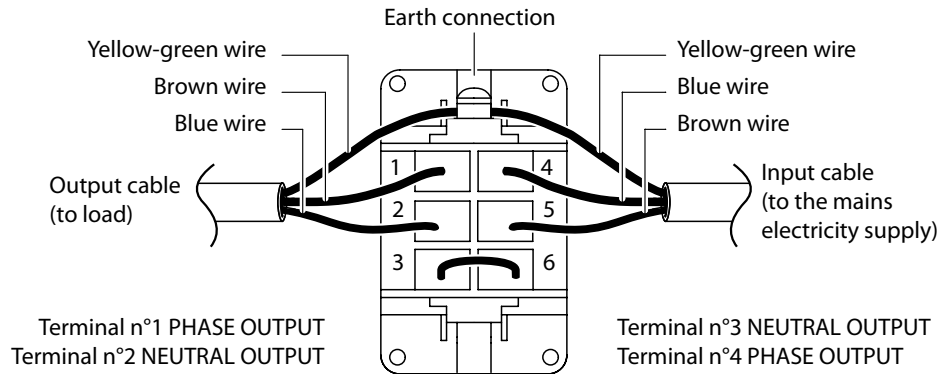


Fig. 5.
Terminals.

3.4.4 Single cabinet UPS What 5000 - 6000

1. Wire up the Input-Output connector supplied as shown in figure 6-7, using insulated cable with wires whose section is at least **4 mm²**. Check that the on/off switches of all the appliances to be connected to the UPS are OFF.
2. Insert the connector into the plastic housing and secure it using the screws supplied. Secure the wires to the housing using the cable grip (see fig. 6).
3. Take the cover off the plug [4] by removing its screws.
4. Put the Input-Output connector [3] into the plug [4] located on the rear of the UPS, and secure to the plug using the orange flanges for secure.
5. Secure the plastic housing to the rear of the UPS the screws supplied (see fig. 3).

Input-Output connector - Assembly

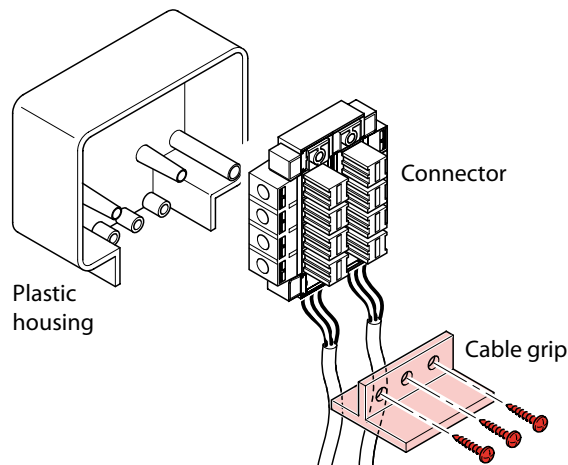


Fig. 6.
Connection
terminals
housing.

WARNING
 UPS What 5000 - 6000 don't have internal automatic back feed protection.

1. The WHAD series of UPS must be permanently connected. An appropriate and accessible disconnect device shall be incorporated in the fixed wiring. It's forbidden to connect the UPS to mains power using a traditional plug.
2. A warning label shall be fit on all primary power isolators installed remote from the UPS area in order to warn electrical maintenance personnel that the circuit feeds an UPS. The warning label shall carry the following wording or equivalent:

Isolate uninterruptible power supply (UPS) before working on this circuit.

WARNING
 Your UPS is NOT fitted with a circuit to protect it against the risk of incorrect connections.

Precautions for installation

- Electrical connections should only be done by trained personnel
- Make sure that mains is connected securely to an earth circuit
- The circuit breaker must be installed near the appliance and must be easily accessible.

Input-Output connector - Side with insertion of wires

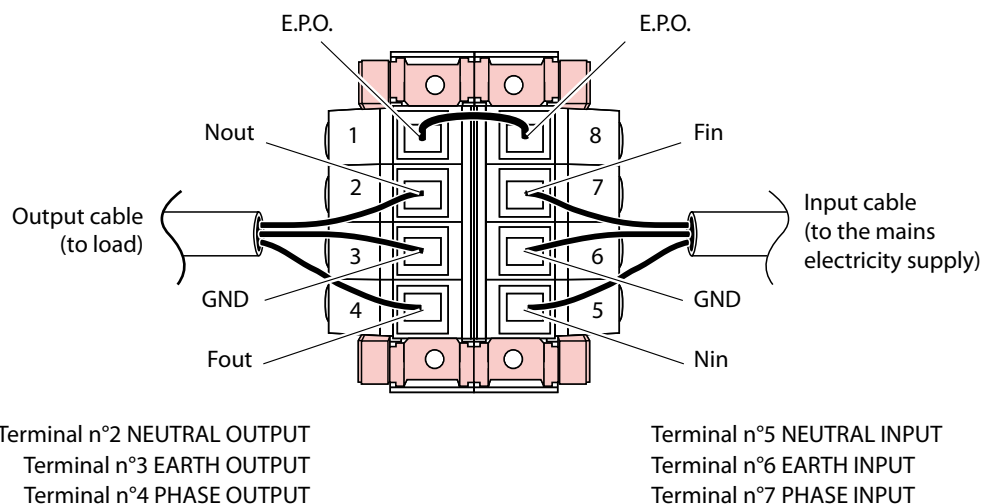


Fig. 7.
 Terminals.

3.5 Guide to using the diagnostics software

3.5.1 Connection

Your UPS is fitted with a standard RS232 interface, which can be used in conjunction with a computer in order to access data relating to the operation of the UPS and its log. This function must be used together with the interface programme for WINDOWS environments available from our website www.ups.legrand.com without charge. A RS232 cable is required to connect a serial port on your PC to the interface outlet [6] located on the rear of the UPS.

3.6 Switching on

1. Switch the UPS on with the appropriate button (1).
 The UPS initially supplies the output directly with mains power using its inverter and enters its normal operation mode (the green Status Indicator [2] is on). If the UPS emits an alarm, switch it off and then keep the ON/OFF button pushed until the UPS is completely switched on.
2. Switch the connected loads on and, after any bypass intervention, check that normal operation is resumed: at this point the green Status Indicator [2] is on. Should the connected loads be too large, the bypass will remain active and the red Status Indicator [2] will flash fastly.

4. Specifications

4.1 Construction specifications

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Weight (Kg.)	55	55	65	65
Size (LxHxP)	270 x 475 x 570 mm			
Technology	PWM high frequency both for input stage and output stage. Microprocessor control logic.			
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 9-pin, female, SELV insulated, connector.			
Protection	Electronic protection against overloads, short circuits and excessive battery discharge. Operation blocked at end of autonomy. Inrush limitation when switching on. Back-feed protection (electrical insulation for the safety of the input plug when running in battery mode) for UPS Whad 3000/4000. EPO contact (emergency power off).			
Synchronised By-pass	Automatic static and manual (optional). Intervenes in case of overload and operating anomaly.			

4.2 Environmental specifications

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Maximum altitude for storage	10.000 metres			
Storage temperature range	from -20° C to +50° C			
Operating temperature range	from 0° C to +40° C			
Range of relative humidity for operating	20-80% non condensing			
Grade of protection (IEC529)	IP 21			
Noise level at 1 metre	(<) 40dB A			

4.3 Electrical input specifications

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Nominal input voltage	230 V			
Input voltage range	from 184V to 264V with nom. load – from 100V to 264V with 50% of nom. load			
Nominal input frequency	50 Hz or 60 Hz +/-2% (autosensing and/or as selected by operator)			
Maximum input current	13A rms	18A rms	22A rms	27A rms
Distortion of input current	THD < 3%			
Input power factor	> 0,99 dal 20% of nominal load			
Number of input phases	100% of nominal current			
In-rush current	Single phase			
Input automatic breaker	16A (2P) curve C	20A (2P) curve C	25A (2P) curve C	32A (2P) curve C
Mains fuse	(10x38) FF 25A	(10x38) FF 25A	(10x38) GG 32A	(10x38) GG 32A

4.4 Output waveform

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
With mains operation	Sine wave			
With battery operation	Sine wave			
Type of operation	No break, on line UPS with passing neutral and double conversion			

4. Specifications

4.5 Electrical output specifications when running on mains power

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
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 power factor 0,7	13A rms	18A rms	22A rms	27A rms
Crest factor on output current	3,5			
Nominal output power VA	3000VA	4000VA	5000VA	6000VA
Active output power with linear or nonlinear load P.F. 0,7	2100W	2800W	3500W	4200W
Overload capacity	150% for 30 seconds without By-pass intervention			
Number of output phases	Single phase			

4.6 Electrical output specifications when running on battery power


	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Nominal output voltage	230 V ± 1%			
Output frequency	50 Hz / 60Hz ± 1% (autosensing and/or as selected by operator)			
Max output current with linear load P.F. 0,7	13A rms	18A rms	22A rms	27A rms
Nominal output power VA	3000VA	4000VA	5000VA	6000VA
Active output power with linear or nonlinear load P.F. 0,7	2100W	2800W	3500W	4200W
Number of output phase	Single phase			



ATTENTION:

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!

4.7 Battery operation

	3 100 98 3 kVA		3 100 99 4 kVA		3 101 00 5 kVA		3 101 01 6 kVA	
Approximate autonomy in minutes with charged batteries								
Percentage of applied load	80%	100%	80%	100%	80%	100%	80%	100%
Standard UPS	15	10	11	8	15	10	11	8
Recharge time up to 90% of total charge	8 hours according to level of discharge							
Specifications and quantity of batteries	n. 12 pcs 12V 7,2Ah, sealed, lead-acid, maintenance free batteries connected in series				n. 16 pcs 12V 7,2Ah, sealed, lead-acid, maintenance free batteries connected in series			
Average battery life	3-6 years according to use and working temperature  WARNING!! The batteries in the UPS are subject to a reduction in capacity depending on their age (a feature of lead batteries 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.							

4.8 By-pass Specifications

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Type of by-pass	Static and electromechanical			
Switchover time	zero			

4.9 Reference Standards

	3 100 98 3 kVA	3 100 99 4 kVA	3 101 00 5 kVA	3 101 01 6 kVA
Safety: Designed to satisfy standard	Conforms to standard EN 62040-1			
Electromagnetic compatibility: • immunity • emission	Conforms to standard EN 62040-2			
Typical performance	Conforms to standard EN 62040-3			

LEGRAND® reserves the right to vary data and specifications without notice.

4. Specifications

4.10 Routine maintenance

4.10.1 Cleaning

Before cleaning, it is essential to verify the following:

- all appliances connected to the UPS have been switched off
- all the appliances have been disconnected from the UPS
- the UPS has been disconnected from the mains power supply.

4.10.2 Cleaning the cabinet

- Clean with a soft dry cloth.

4.10.3 Cleaning the air vents

- Clean the air vents regularly by vacuuming them or using a soft brush.

5. Troubleshooting

Problems	Solutions
The UPS works but a short beep is heard every 12 seconds.	<ul style="list-style-type: none"> - 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 quantity of appliances connected so that the load 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 relative 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 will beep and the red visual indicator flashes quickly.	Thermal protection. Turn off the UPS and wait for a few minutes so that the temperature inside the UPS decreases to a rated value. Check proper operation of fans and that the airflow is not obstructed (eg. UPS too close to a wall). There has been a failure in any internal circuit. Contact the service center.