

# Whad 4000

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## 1. GENERAL FEATURES

The Legrand UPS Whad 4000 model is a UPS using high frequency PWM technology, On Line Double Conversion type, solid neutral, Rated Power 4,000 kVA – 2,800 kW, equipped with valve-regulated hermetic-type batteries, contained inside the UPS in a specific compartment or in one or more external cabinets, sized to guarantee a minimum autonomy of 11 minutes at 80% of the load.

The UPS rectifier is comprised of a control and regulation circuit (PFC), which in addition to the functions of a normal rectifier it also:

- automatically correct the power factor of the load bringing it to a value >0.99 with the load already applied in output at 20% of the rated load;
- power the inverter without requiring energy from the batteries even when there is a very low network voltage (operation with power supply from the network for values of  $V_{IN} \cong 110 V_{ac}$  at 50% of the rated load);
- guarantee a total harmonic distortion of the input current  $THD_{I_n} < 10\%$  without the addition of filters or supplementary parts.

The bypass circuit is designed and built in compliance with the following:

- Electromechanical switching device
- Command and control logic managed by the microprocessor which:
  - automatically transfers the load directly to the primary network without interrupting the power supply, in conditions of overload, overheating, continuous voltage outside of the tolerances and inverter fault;
  - automatically re-transfer the load from the primary network to the inverter line, without interrupting the power supply, when the normal conditions of the load are restored;
  - if the primary network and inverter are not synchronised, the bypass must be disabled.

In order to protect the batteries from damage due to surges, the minimum battery voltage threshold allowed varies automatically based on the applied load (default setting), although it also provides the user with the possibility of selecting fixed voltage threshold management.

A diagnostic and shutdown software (UPS Communicator), if installed accordingly on a PC connected to the UPS, allows you to access all of the operating data, regulate and set special functions and control the shut down of Windows and Linux operating systems.

An optional software (UPS SuperviSor) provides hierarchical multiserver shutdown and remote UPS management for any operating system in a heterogeneous network (Windows, Novell, Linux and the most common Unix).

Whad is managed by a microprocessor and is capable of displaying alarms and operating modes on a LED control panel, as described below:

- normal operation
- output frequency non-synchronised with the input
- battery operation
- bypass operation
- faulty power module
- overload
- generic fault
- incorrect neutral connection
- back-up time reserve capacity
- end of back-up time

The Static Whad 4000 UPS has the CE marking, pursuant to Directives 73/23, 93/68, 89/336, 92/31, 93/68 and is designed and built in compliance with the following standards:

- EN 62040-1 "General and safety requirements for UPS used in operator access areas"
- EN 62040-2 "Electromagnetic compatibility (EMC) requirements"
- EN 62040-3 "Method of specifying the performance and test requirements".

## 2. TECHNICAL FEATURES

General Features	
Type of operation	On line double conversion
Neutral Connectivity	Solid neutral
Wave shape in networked operation	Sinusoidal
Wave shape in battery operation	Sinusoidal
Switching time	None

Input features	
Rated input voltage	230 V
Input voltage interval	From 184 V to 264 V with rated load
Minimum voltage in network operation	110 V at 50% of the load
Input frequency	50 Hz or 60Hz (can be selected by the user)
Total harmonic distortion of the input current ( $THD_{I_n}$ )	< 10% at 100% of the rated load
Power factor	> 0.99 from 20% of the rated load
Inrush current	At most 100% of the load current

**2. TECHNICAL FEATURES** (continued)

Output features (network operation)	
Rated output voltage	230 V $\pm$ 1 %
Rated/active output power	4,000 VA / 2,800 W
Total harmonic distortion of the output voltage on linear rated load	< 1 %
Total harmonic distortion of the output voltage on non-linear rated load, PF=0.7	< 4 %
Rated output frequency	50 Hz or 60 Hz (can be selected by the user)
Tolerance on the output frequency	Synchronised to the input frequency; $\pm$ 1 % when not synchronised
Crest factor on the output current	3.5:1
Overload capacity: • for at least 1 second • for at least 5 seconds	300% without the operation of the automatic bypass 200% without the operation of the automatic bypass

Output features (battery operation)	
Rated output voltage	230 V $\pm$ 1 %
Output frequency	50 Hz or 60 Hz $\pm$ 1 %
Rated/active output power	4,000 VA / 2,800 W
Total harmonic distortion of the output voltage on non-linear rated load, PF=0.7	< 1 %
Overload capacity: • for 15 seconds	160%

Battery features	
Type of battery	Lead-acid, sealed, maintenance-free
Unitary capacity	7 Ah (12V)
UPS battery / battery module voltage	36 V max. (series of 3*12V)
Battery module protection	2 fuses for each battery module

Environmental Specifications	
Noise level measured at 1 meter	<42 dBA
Thermal dissipation	760 (BTU/h)
Range of operating temperature	From 0°C to +40°C
Range of storage temperature	From -20°C to +50°C
Range of operating relative humidity	20-80% non-condensing
Degree of protection	IP21

Manufacturing Specifications	
Maximum weight <sup>1</sup>	55 kg
Maximum dimensions (W×L×H) <sup>2</sup>	270x475x570 mm
Type of switching	High frequency PWM
Rectifier/booster/inverter technology	MOSFET
Interfaces	1x RS232 serial port

<sup>1</sup> Maximum weight referring to a configuration with a back-up time of 11 minutes at 80% of the rated load.

<sup>2</sup> Maximum dimensions referring to a configuration with a back-up time of 11 minutes at 80% of the rated load.