

NRG-MED

SINGLE PHASE 0,4kW-4,05kW

**SINGLE PHASE MEDICAL USE
UNINTERRUPTIBLE POWER SUPPLIES**
PURE SINE WAVE
On line double conversion
TECHNICAL SPECIFICATION



MEDICAL UPS with ON-LINE technology NRG-MED safety and protection of medical devices



Today's healthcare provides fast, flawless diagnoses and precise patient treatments thanks to professional equipment of sophisticated technology.

Highly developed devices such as clinical analyzers, image systems, patient monitoring devices, cardiac devices, surgical lasers and other delicate electronic systems, are extremely susceptible to damage and interference due to poor power quality problems.

When this happens, it is impossible to have precise and accurate diagnoses and treatments.

The NRG-MED series is a professional UPS line totally dedicated to powering critical medical devices, where network interruptions can generate inconveniences during specific treatments.

Thanks to an accurate and precise design, the NRG-MED are defined as medical UPS of excellent quality with the following key characteristics:

- **Double toroidal isolation transformer designed to ensure real safety to the connected load, with 6000V of isolation from the network and 4000V from the output of the unit.**
- **Electrostatic shield designed to reduce electrostatic charges deriving from the network**
- **Low-voltage electronics to ensure high safety for operators**
- **Medical filters**
- **By-pass with galvanic isolation to avoid direct connection of the load with the network**

And, also

- Dedicated chargers designed to maintain battery efficiency at the highest levels allow an increase in autonomy according to customer needs.
- The choice of batteries is focused on high-performance batteries with 10 years of expected life.
- Efficiency is controlled via an automatic and manual battery test.
- An easy-to-use front panel with blue LCD and LED display allows simple control of the main functions of the unit.



Surgery



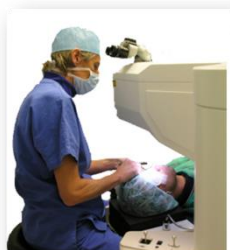
incubators



electrophoresis devices



robotic devices



laser machines

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MAIN FEATURES

ON LINE TECHNOLOGY

The choice to work with an ON-LINE technology allows to have continuity to the load without switching times in case of black-out.

NETWORK ISOLATION

This technology always provides current filtered by network disturbances.

A double toroidal isolation transformer provides total load protection.

6000V of galvanic isolation input and 4000V output allow high protection even to the electronic section.

ELECTROSTATIC PROTECTION

Maximum protection against electrostatic discharge from the network.

Key feature to safeguard the safety of operators during the operation of the unit thanks to non-hazardous voltages in the electronic section.

MEDICAL FILTERS

RFI medical filters designed at the request of specific UPSs able to reduce incoming and outgoing disturbances.

ISOLATED BY-PASS OPERATION

In By-pass mode, 6000V of galvanic isolation is maintained to avoid direct connection of the load with the network.

QUICK CHARGER

Special battery chargers on board the UPS, are designed to maintain the efficiency of the batteries at the highest levels and to be able to have the possibility to increase the autonomy according to customer requests.

BATTERY EFFICIENCY CONTROL

The status of the batteries can be easily checked at any time through a black button located on the front panel of the unit.

Periodically, however, the unit automatically performs a battery test.

BATTERIES 10 YEARS EXPECTED LIFE

Hermetic lead batteries with 99% gas recombination with 10 years of expected life.

UNIT MONITORING

LEDs positioned on the front panel for easy monitoring of unit functions

BLUE LCD DISPLAY V+I output →

Remote free contacts for remote control

ISOLATION CONTROLLER (OPTIONAL)

Each unit can be supplied with an on-board isolation controller, so you can monitor system isolation when an IT regime is required.

SPECIAL MECHANICAL TREATMENTS

TROPICALIZATION

Treatment dedicated to protecting electronic boards in case of high humidity and high temperatures.

ANTI-VIBRATION Mechanical treatment performed with a special paste/glue against vibrations.



NRG-MED rack version 19"

from 400W to 3000W of power.
Industrial version for integration into rack cabinets

NRG-MED wall version

from 400W to 3000W of power.

Wall version designed to gain space. Possibility to be integrated in portable trolleys.

(weight of this version may differ from rack 19" version, please ask for the weight of the specific item you require in case weight is an issue)



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TECHNICAL SHEETS

MODEL	NRG-MED02		NRG-MED04	NRG-MED06	NRG-MED09
Output current on linear load	1.9 A		3.9 A	5.8 A	9.1 A
POWER	400W		900W	1350W	2100W
Peak power for 5"	800W		1400W	2200W	3200W
INPUT DATA					
Tension	230Vac single-phase ±10%				
Frequency	50Hz ±5% (max speed 0.5Hz/sec)				
Network isolation	6000V galvanic isolation through toroidal transformer with electrostatic shield between primary and secondary				
Protections	Auto. input 6 A	Automatic input 10 A			Autom.ingress 16 A
Connections	Integrated Schuko cable				
Limit-in	Aboard				
OUTPUT DATA					
Tension	230Vac single-phase				
Frequency	50Hz ±0.01% (faulty network)				
Load isolation	4000V galvanic isolation through toroidal transformer				
Sine wave	Generated by microprocessor				
Soft start	Aboard				
Connections	1 multistandard socket				
Electrical protection	Life-saving differential 30mA (isolation controller + automatic output on request)				
Electronic protection	Overload – short circuit				
Linear load distortion	< 5%				
Nonlinear load distortion	< 8%				
Static voltage variation	< 1%				
Dynamic voltage variation	±3%				
By-pass	Static by-pass connected to the input toroidal transformer with galvanic isolation				
BATTERIES					
Tension	24V	48V			
Typology	Hermetic lead				
Capacity	2 x 12V 9Ah	4 x 12V 9Ah			8 x 12V 9Ah
Expected life	10 years				
Battery fuses	32AT				80AT
Max charging current	0.6 A	1.2 A			1.8 A
Autonomy with 70% of the load	20'			12'	15'
TECHNOLOGY	On line double conversion with PWM microprocessor				
Inverter	Low voltage				
Intervention time	ZERO				
Inverter efficiency	>82%				
ENVIRONMENTAL CONDITIONS					
Storage temperature	-10°C : +60°C				
Working temperature	0°C : +40°C				
Noise level at 1m.	27dB	32dB			
REPORTS					
Optics and acoustics	Network on – battery mode – low batteries – critical temperature – overtemperature – overcharge – by-pass mode – lack of insulation – battery test				
Remote Contacts	Remote on/off – lack of network – low batteries – GENERAL ALARM (critical temperature, stop temperature, overload, short circuit, lack of insulation (if any)), battery test				
CARPENTRY					
Floor version mm	243x585x482h				
Weight (kg)	30	53	56	70	

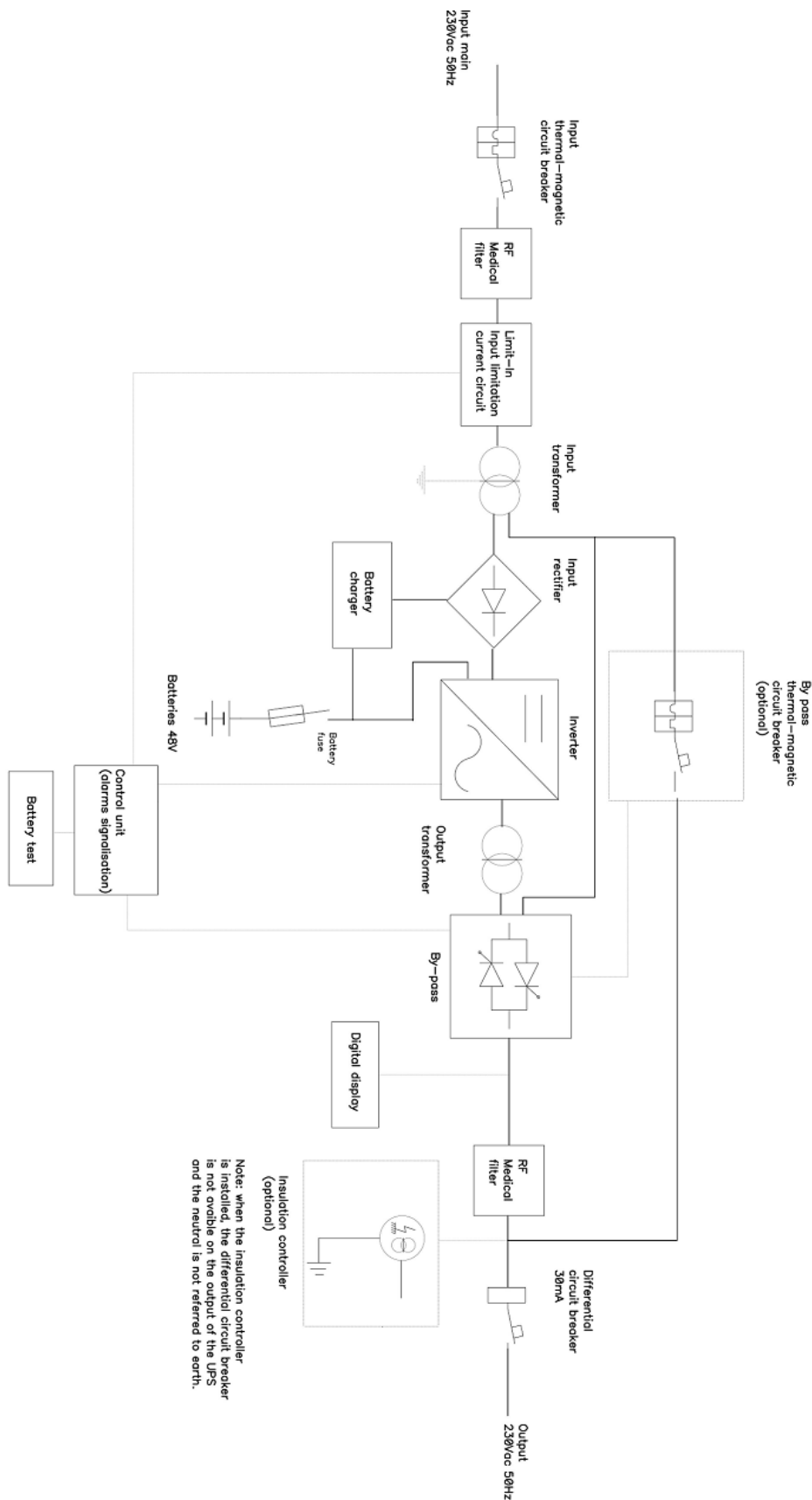
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TECHNICAL SHEETS

MODEL	NRG-MED12	NRG-MED15	NRG-MED18
Output current on linear load	13 A	14.6 A	17.6 A
POWER	3000W	3375W	4050W
Peak power for 5"	4000W	5500W	6000W
INPUT DATA			
Tension	230Vac single-phase ±10%		
Frequency	50Hz ±5% (max speed 0.5Hz/sec)		
Network isolation	6000V galvanic isolation through toroidal transformer with electrostatic shield between primary and secondary		
Protections	Automatic input 16 A	Automatic input 20 A	Automatic input 25 A
Connections	Integrated Schuko cable	Terminal block	
Limit-in	Aboard		
OUTPUT DATA			
Tension	230Vac single-phase		
Frequency	50Hz ±0.01% (faulty network)		
Load isolation	4000V galvanic isolation through toroidal transformer		
Sine wave	Generated by microprocessor		
Soft start	Aboard		
Connections	1 multistandard socket	Terminal block	
Electrical protection	Life-saving differential 30mA (isolation controller + automatic output on request)		
Electronic protection	Overload – short circuit		
Linear load distortion	< 5%		
Nonlinear load distortion	< 8%		
Static voltage variation	< 1%		
Dynamic voltage variation	±3%		
By-pass	Static by-pass connected to the input toroidal transformer with galvanic isolation		
BATTERIES			
Tension	48V		
Typology	Hermetic lead		
Capacity	8 x 12V 9Ah	4 x 12V 24Ah	4 x 12V 33Ah
Expected life	10 years		
Battery fuses	22x58 80AT	22x58 100AT	
Max charging current	1.8 A	5.5 A	5.5 A
Autonomy with 70% of the load	8'	12'	12'
TECHNOLOGY	On line double conversion with PWM microprocessor		
Inverter	Low voltage		
Intervention time	ZERO		
Inverter efficiency	>82%		
ENVIRONMENTAL CONDITIONS			
Storage temperature	-10°C : +60°C		
Working temperature	0°C : +40°C		
Noise level at 1m.	32dB	37dB	
REPORTS			
Optics and acoustics	Network on – battery mode – low batteries – critical temperature – overtemperature – overcharge – by-pass mode – lack of insulation – battery test		
Remote Contacts	Remote on/off – lack of network – low batteries – GENERAL ALARM (critical temperature, stop temperature, overload, short circuit, lack of insulation (if any)), battery test		
CARPENTRY			
Floor version mm	243x585x482h	355x782+53x765h	
Weight (kg)	80	70+60	77+70

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BLOCK DIAGRAM



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SECTIONS	DESCRIPTION
RFI INPUT FILTER	Two-stage filter used to reduce the harmonics of the inverter. Compliant with medical requirements with ground current leakage of less than 500 μ A
AUTOMATIC INPUT	Automatic bipolar magnetothermic used to protect the inlet line from power surges due to anomalies. When the rated current exceeds the normal values, the automatic triggers by removing the power supply of the unit. Curve type C.
LIMIT-INPUT CARD	This circuit provides low magnetization to the transformer core. It is controlled by the pilot board to allow battery testing. In this case a power relay will block the power supply and the unit will work in battery mode until the pilot board is controlled at the end of the battery test.
TOROIDAL TRANSFORMER ENTRANCE	Toroidal transformer with 6000V galvanic isolation and electrostatic shield between primary and secondary. It has the task of providing low voltage to the rectifier and protecting against any electrical discharge. The secondary is completely dedicated to the by-pass section.
RECTIFIER	Used to generate the dc voltage to power the inverter and the battery charger.
BATTERIES	Hermetic batteries with 99% gas recombination. They are selected with high quality standards and high performance to be able to withstand high current discharges. They are connected in series of 4 batteries with a total voltage of 48V, with parallel connections allowed. The capacity depends on the required autonomy. They are connected to a power diode which works with no network thus allowing the operation of the inverter.
BATTERY CHARGER	Battery charger switching with MOS pwm pulse power. The charging voltage is regulated through a trimmer. During the test processes, the set value is 13.7V for each battery, for a total of 55V with a battery pack of 48V. The charging current is regulated by adding or removing power resistors. The battery charger is powered directly by the rectifier and is always working with the presence of the network even if the inverter is turned off (pilot off board). It allows the batteries to recharge quickly in all conditions. One tenth of the battery capacity in the optimal charging current.
POWER SHEET	Converts the direct voltage, coming from the rectifier or batteries, into low alternating current. This board is characterized by high reliability.
PILOTING BOARD	This board is designed to have total control of the unit. Through a 20-pole flat cable, the pilot board communicates with the power board with which together they control the power supply, the operation of the MOSFETs, and the output currents. The pilot also controls the by-pass and remote contacts. It has two microprocessors: one dedicated to creating the phased sinusoidal network and controlling the signal alarms and one dedicated to checking the automatic and manual battery test.
OUTPUT TOROIDAL TRANSFORMER	Toroidal transformer with 4000V galvanic isolation. It elevates the low alternating voltage of the inverter, galvanically isolating it from the load.
STATIC BY-PASS	The by-pass board is managed by a microprocessor that communicates with the pilot board and the power card. Its main function is to switch the load on the input power line by taking it from the input transformer (secondary connected to the by-pass card). The by-pass-pass card intervenes in the following situations: overload, overtemperature, manual by-pass use, inverter or power board failures.
RFI OUTPUT FILTER	Single-stage filter used to reduce the harmonics of the inverter.
LIFE-SAVING DIFFERENTIAL	Life-saving differential for outgoing protection. It clicks when a dispersion occurs on the ground.
REMOTE CONTACTS ON TERMINALS	The remote contact card is designed to provide remote signals and to turn the unit on/off. It is controlled directly from the pilot board. All contacts are placed on a terminal block.
INSULATION CONTROLLER (optional)	Device used for the permanent control of the isolation of single-phase or three-phase networks, isolated on the ground, with or without neutral. On the front panel of the controller there are the operating or fault signals, the test button and the adjustment of the setting level. When an insulation failure occurs, a red LED will light up on the front panel along with continuous sound and remote control. The insulation controller is mounted, where required, in place of the life-saving differential, before the automatic output. It is positioned on a DIN rail and is powered directly from the output of the unit.
MANUAL BY-PASS (optional)	The manual by-pass is an automatic switch placed on the rear panel of the unit and used to "by-pass" the system in case of problems on the unit. It is connected directly to the 230Vac input of the secondary of the isolation transformer to avoid lack of insulation during the operation of the manual by-pass. With this solution the load is always connected to the grid through the transformer with 6000V of insulation.

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