MedPoweRx

Patient Vicinity Series

Model LT/M Uninterruptible Power System 700VA – 2.1kVA

General Specification

1.0 General

This specification describes the features and design of the Model LT/M, a UL 60601-1 listed Uninterruptible Power System. The system is designed and manufactured to assure maximum reliability, serviceability, and performance. The system is a line interactive UPS incorporating a microprocessor controlled PWM inverter, high speed transfer SCR devices, constant voltage regulating transformer, battery charger and energy storage battery platform to facilitate complete protection for non-life support, sensitive medical electronic systems and many other patient vicinity applications. The UPS as specified herein provides complete immunity from line disturbances and power interruptions without loss or disruption in AC output power. The system's constant voltage output transformer regenerates the output waveform during all phases of operation, thus maintaining a regulated, clean power source for the intended load. A self-diagnostic monitoring alarm system continuously advises of system status and battery condition.

2.0 UPS Ratings

Model	Rating	Model	Rating
LT/M 700	700 VA / 500 Watts	LT/M 1400	1400 VA / 1000 Watts
LT/M 850	850 VA / 600 Watts	LT/M 1600	1600 VA / 1200 Watts
LT/M 1000	1000 VA / 700 Watts	LT/M 1800	1800 VA / 1300 Watts
LT/M 1200	1200 VA / 850 Watts	LT/M 2100	2100 VA / 1500 Watts

3.0 Standards

The system is designed in accordance with applicable portions of the following codes and standards:

3.1 American National Standards Institute (ANSI C57.110).
3.2 Institute of Electrical and Electronic Engineers (IEEE 519-1992) and (C62.41-1991).
3.3 International Electrotechnical Commission (IEC 555)
3.4 National Electric Code (NEC) (NFPA 70).
3.5 National Electrical Manufacturers Association (NEMA PE-1, 2003) and (IEC 62040-3).
3.6 Underwriters Laboratories (UL 1778).
3.7 Federal Communications Commission (FCC Part 15, Sec. J, Class A).
3.8 Meets 2005 NFPA 99, sections 8.4.1.3, and 10.2.13, as applicable, via UL60601-1 listing.
3.9 Listed, UL 60601-1, UL Standard for Safety for Medical Electrical Equipment, Part 1: General Requirements for Safety.
3.10 Listed, UL 1778, Uninterruptible Power Supply Equipment, Second Edition.
3.11 Listed, C-UL, Canadian National Standard C22.2 No. 107.1-M91, and 601.1-M90.
3.12 All units provided with input plug and output receptacles, and with internal batteries are CE Marked and tested to EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN55022 (CISPR 16 & 22), EN55011, and EN50082-2

4.0 Input Specifications

4.1 Input Voltage: 120 VAC at 60Hz.

4.2 Input Voltage Operating Range: +10% to -30% at typical load and +10 to -15% at full load without battery usage.

4.3 Input Voltage Extended Range: The unit incorporates the use of fuzzy ranging in conjunction with load percentage to extend the input range up to +10% to -40% without battery usage.

4.4 Frequency Range: 57.5 Hz to 62.5 Hz.

4.5 Power Factor: Self correcting to > 0.95.

4.6 Input Current Harmonics: < 3% THD.

4.7 Transient / Spike Attenuation: 3000:1.

5.0 Output Specifications

5.1 Output Voltage: 120 VAC at 60Hz.

5.2 Output Waveform: Sinusoidal, regenerated, with maximum 3% harmonic distortion, any single harmonic.

5.3 Crest Factor: 3.0 : 1.

5.4 K Factor: 30 or better.

5.5 Harmonic Attenuation: Reflected load generated harmonics are attenuated 23dB at the input.

5.6 Line Voltage Regulation: Typically better than +/-3%.

5.7 Load Voltage Regulation: Typically better than +/-3%.

6.0 Battery Specifications

6.1 Battery Time: Based on full kilowatt rating of the UPS.

6.2 Battery Type: Sealed, maintenance free.

6.3 Battery Charger: 2 Amp, 3 stage, filtered 0.1%, temperature compensated (internal batteries only).

6.4 Recharge Time: Typically 10 times discharge time to full charge.

6.5 Bus Voltage: 24 VDC, float 2.27 VPC, final 1.75 VPC.

7.0 Performance Specifications

7.1 Normal Operation: The load is supplied with regenerated, filtered, and regulated utility power derived from the output constant voltage regulating transformer. When public utility AC power is present, the battery charger maintains a ripple free float charge on the batteries.

7.2 Uninterrupted Emergency Operation: Upon failure or unacceptable deviation of the public utility AC power, energy will be supplied by the battery, converted to AC through the PWM inverter, regenerated, filtered, and regulated through the system's constant voltage regulating output transformer which continues to supply power to the load without interruption, loss or disturbance. When utility power is restored, the system reverts to normal operation without any interruption, loss or disturbance.

7.3 Automatic Restart: In the case of a public utility power outage that exceeds the battery time available, the output of the system will de-energize to protect the batteries, but automatically restart once commercial AC power returns. When the public utility power returns, recharging of the batteries commences immediately.

7.4 Hot Start (DC): The UPS is capable of being started from battery power when no AC power is present. This feature can be enabled or disabled through the RS232 interface.

7.5 Overload Capability: 125% for ten minutes.

7.6 Surge Capability: 150% of rated output

7.7 Frequency Stability: $\pm$ 0.2 Hz.

7.8 Isolation: NEC article 250.20b, complies with this standard that specifies a separately derived power source.

7.9 Inner Winding Capacitance: 0.01 pF (primary to secondary coupling).

7.10 Common Mode Noise Attenuation: 120 dB (10^6 : 1 ground noise attenuation).

7.11 Transverse Mode Noise Attenuation: 70 dB (3160 : 1 line noise attenuation).

7.12 Reactive Power Correction: Load at .6 PF corrected to > 0.95 at input (automatically correcting).

7.13 Leakage Current to Ground: < 300µA

7.14 MTBF (Mean Time Between Failure): 100,000 hours

7.15 Efficiency, BTU/HR Emitted, Weight and Cabinet Sizes:

Model	Efficiency	BTU/HR	Weight	Dimensions W x D x H
LT/M 700	85%	256	70 lb.	8.125" x 17.5" x 17.5"
LT/M 850	85%	307	70 lb.	8.125" x 17.5" x 17.5"
LT/M 1000	85%	358	75 lb.	8.125" x 17.5" x 17.5"
LT/M 1200	85%	435	104 lb.	8.125" x 17.5" x 17.5"
LT/M 1400	85%	512	104 lb.	8.125" x 17.5" x 17.5"
LT/M 1600	85%	561	104 lb.	8.125" x 17.5" x 17.5"
LT/M 1800	87%	598	123 lb.	8.125" x 17.5" x 17.5"
LT/M 2100	87%	670	123 lb.	8.125" x 17.5" x 17.5"

Note: Weight includes minimum internal batteries.

8.0 Display Monitor and Diagnostics

8.1 Display Panel – Front mounted, sealed, numeric LED panel. Displays input voltage, output voltage, % load, and % battery as selected using a display select push button. System display panel includes automatic visual status indicators for system on, system on battery, low battery, and general alarm. Includes audible alarm for system on battery, low battery and general alarm conditions.

8.2 General Alarm Conditions (Contact Closure) – Communications port for access to general alarm conditions and electrical measurements. General alarm conditions include: loss of AC input power, low battery warning, frequency fault, check battery, shorted SCR, low battery shutdown, low output voltage, high output voltage, system overload, and system over temperature warning.

8.3 Electrical Measurements (RS232) – Communications port for access to general alarm conditions and electrical measurements. Electrical measurements include: AC input voltage, AC output voltage, output amps, % load, output watts, output VA, power factor, output frequency, number of power outages recorded from last clear function, and number of overloads recorded from last clear function. Last power off alarms include: normal, low battery shutdown, thermal shutdown, and overload shutdown.

8.4 Battery Replacement Testing – The system includes provisions for determining battery life and scheduled battery replacement.

9.0 Communications Interface

9.1 Status / Alarm open collector transistor interface is provided for use with optional remote annunciator panel, or automatic message dialer. Inverter on, utility AC power failure (system using battery power), low battery warning, and general alarm signals are included.

9.2 Status / Alarm open collector transistor ratings: 40 VDC maximum, 300mA for use with optional remote annunciator panel or automatic message dialer, or for use with customer's remote indicator.

9.3 +/- 10 VDC, 1 mA power supply and potential free contact closure REPO input included for use with customer's remote emergency power off push button.

9.4 RS232 communication port included for customer's remote computer terminal display of all monitored criteria.

10.0 Environmental

10.1 Operating Temperature: 0°C (32°F) to 40°C (105°F).

10.2 Storage Temperature: -20°C to 50°C.

10.3 Relative Humidity: 95% non-condensed.

10.4 Elevation: 5,000 feet (1500 meters) without de-rating.

10.5 Audible Noise: 45dB - 50dB (VA Size Dependent).

11.0 Reliability

11.1 Total System MTBF: 100,000 hours

11.2 Transformer MTBF: 200,000 hours.

11.3 MTTR: Less than one hour.

12.0 Standard Equipment

12.1 Medical grade input plug with 6' detachable input line cord.

12.2 Power on/off switch.

12.3 Main printed circuit control board (single PC board design).

12.4 Constant voltage regulating output transformer.

12.5 Standard internal battery.

12.6 Medical grade NEMA 5-20R2 duplex output receptacles, quantity of three (3); or for Canadian installations, medical grade NEMA 5-15R2, quantity of three (3).

12.7 Copper conductor construction throughout entire system.

12.8 Local display monitor / diagnostics panel.

12.9 Communications port (RS232).

12.10 Functional tower-style enclosure.

13.0 Optional Equipment

13.1 Internal and/or external battery options for extended back up time.

13.2 Automatic message dialer used in conjunction with system alarm conditions for system on emergency battery power, low battery warning, and general alarm.

13.3 Remote annunciator panel used in conjunction with system alarm conditions for system on emergency battery power, low battery warning, and general alarm.

13.4 Software package for automatic, unattended, graceful shutdown of computer systems in the event of an extended outage and limited battery time remaining, plus remote monitoring and notification of electrical parameters and alarm conditions.

13.5 Network device SNMP / Ethernet TCP/IP adapter.

13.6 Network device SNMP / MODBUS TCP / Ethernet TCP/IP adapter.

13.7 Network device SNMP / MODBUS TCP & RS485 / Ethernet TCP/IP adapter.

13.8 Wheeled cart for UPS mobility.

14.0 Warranty

14.1 All systems are guaranteed to be free from defects in material and workmanship for a period 1 year following shipment from the factory.

14.2 Batteries are warranted with a 1 year full replacement warranty and an additional 3 year pro-rated warranty with the applicable optional maintenance contract.

14.3 Optional extended warranty and maintenance contracts are available.