

UltraLITE Model ELU Centralized Emergency Lighting Inverter 1.5kW- 2.2kW

General Specification

1.0 General

This specification describes the features and design of an on-line, dual conversion, uninterrupted emergency lighting inverter power system. The ELU Series emergency lighting inverter system is designed to assure maximum reliability, serviceability and performance. The system incorporates a microprocessor controlled, high frequency IGBT PWM rectifier/charger, IGBT PWM inverter, high speed automatic bypass transfer device and 90 minute battery pack to provide immunity from all line disturbances and power interruptions with no break in AC output power. The system as described herein shall include a normally on uninterrupted AC output power section and provision to include a normally off AC output power section, thus enabling compatibility with emergency lighting fixtures operating in normally on and standby operating modes. A self-diagnostic monitoring alarm system continuously advises system status and battery condition.

2.0 Inverter Ratings

<u>Model</u>	<u>Rating</u>
ELU1500	1500 Watts
ELU2200	2200 Watts

3.0 Standards

The systems shall be designed in accordance with applicable portions of the following standards:

- 3.1 American National Standards Institute (ANSI C57.110).
- 3.2 Institute of Electrical and Electronic Engineers (IEEE 519-1992) (C62.41-1991).
- 3.3 National Electrical Manufacturers Association (NEMA PE-1).
- 3.4 National Electric Code (NEC 2005, Article 700).
- 3.5 National Fire Protection Association (NFPA 101, 111).
- 3.6 Underwriters Laboratories (UL).
- 3.7 Federal Communications Commission (FCC Part 15, Sec. J, Class A).
- 3.8 Federal Aviation Administration (FAA-G 201e).
- 3.9 Listed UL Standards UL 924, UL 924 Auxiliary Lighting and Power Equipment (UL924A) , UL 1778, C-UL listing to CSA C22.2, No. 107.1-M01.

4.0 Input Specifications

- 4.1 Input Voltage: 120 VAC or 277 VAC.
- 4.2 Operating Range: +10% to -15% without battery usage.
- 4.3 The unit incorporates the use of variable range logic in conjunction with the load percentage to extend the input range to +15% to -30% without battery usage while maintaining a regulated, useable output voltage.
- 4.4 Frequency Range: 57.5 Hz. To 62.5 Hz.
- 4.5 Power Factor: Self correcting to >0.97 (approaching unity).

5.0 Output Specifications

- 5.1 Output Voltage: 120 VAC or 277 VAC or 277/120 VAC.
- 5.2 Sine Wave Voltage Output: Maximum 3% THD under linear load.
- 5.3 Output frequency: 60Hz, plus or minus 0.5 % under full range load while in the battery operation mode.
- 5.4 Harmonic Attenuation: Reflected load generated harmonics are attenuated at the input.
- 5.5 Overload Rating: 105% continuous, 125% for 10 seconds and 1000% for 3 cycles.
- 5.6 Voltage Regulation: $\pm 2\%$.

6.0 Battery Specifications

- 6.1 Battery Time: Standard battery run time is 90 minutes at full rated kilowatt output, consistent with UL924 standards.
- 6.2 Battery Type: Integral, valve regulated, sealed lead calcium, maintenance free batteries.
- 6.3 Charger: Four stage, 700 watts, 1% ripple filtered.
- 6.4 Recharge Time: UL924, NFPA 101 compliant.
- 6.5 DC Bus Voltage: 120 VDC.

7.0 Performance

- 7.1 Compatibility: UltraLITE Model ELU centralized emergency lighting inverter systems are compatible with all fixture types. Fixture types include, but not limited to fluorescent ballasts, incandescent lamps, electronic and high power factor fluorescent ballasts and HID fixtures. Normally on and optional normally off AC outputs are 100% rated and limited only by the system maximum kilowatt output rating.
- 7.2 Normal Operation: The load is supplied with regulated power derived from the normal AC power input terminals through the rectifier charger and inverter. The rectifier charger is fully rated to charge the batteries and supply sufficient DC energy for the inverter when under full load. The battery is connected in parallel with the rectifier charger output.
- 7.3 Uninterrupted Emergency Operation: Upon the failure or unacceptable deviation of commercial AC power, energy will be supplied by the battery through the inverter and continue to supply power to the load without switching loss or disturbance. When power is restored at the AC input terminals of the system, the rectifier charger continues to supply power to the load through the inverter and simultaneously recharges the batteries.
- 7.4 Standby Emergency Operation (optional): Upon the failure or unacceptable deviation of commercial AC power or upon a remote input "zone command on signal", the standby, normally off AC output bus section of the system becomes energized thus providing emergency power for standby lighting fixtures which are required to illuminate only in the event of emergency. Field adjustable timers are optional for use with on and off delay transition requirements.
- 7.5 Automatic Bypass Operation: The system includes a high speed automatic bypass for fault clearing, instantaneous overload conditions and/or to connect the load to the normal utility source in the event of a system rectifier charger or inverter failure.

8.0 Environmental Specifications

- 8.1 Operating Temperature: 0° C (32°F) to 40°C (105°F).
- 8.2 Storage Temperature: -20°C to 50°C.
- 8.3 Relative Humidity: 95% non-condensing.
- 8.4 Elevation: 5,000 feet, 1,500 meters.
- 8.5 BTU/HR Emitted, Weight, Cabinet Sizes:

<u>Rating / Voltage</u>	BTU's / Hr		<u>Weight (lb.)</u>	<u>Dimensions W x D x H</u>
	<u>Full Load</u>	<u>Standby Mode</u>		
1500 / 120 - 120	511	128	898	36" x 24" x 72"
1500 / 277 - 277	511	128	1,081	36" x 24" x 72"
1500 / 277 - 277/120	511	128	1,081	36" x 24" x 72"
2200 / 120 - 120	750	188	898	36" x 24" x 72"
2200 / 277 - 277	750	188	1,081	36" x 24" x 72"
2200 / 277 - 277/120	750	188	1,081	36" x 24" x 72"

- 8.6 Audible Noise Level: Not greater than 50 dba.
- 8.7 Enclosure: NEMA 1, Sealed prohibiting rodent entry.

9.0 Display Monitor and Diagnostics

- 9.1 Display Panel – Systems includes a local, front mounted, sealed, LED display panel to indicate system status and battery condition. Display automatically monitors inverter input voltage normal, inverter input voltage high, inverter input voltage low, inverter on bypass, % load, battery in use, battery full, battery low and check battery.
- 9.2 Audible Alarm – The display panel includes an audible alarm with alarm silence for system on battery, low battery, check battery, over temperature warning, system fault, and inverter overloaded.
- 9.3 Control Functions – The display panel includes push a button for inverter on, fail safe dual push buttons for inverter off, alarm silence push button and push button for system battery testing.
- 9.4 Communications Port (RS232) – A communications port for remote monitoring access to electrical measurements, system set point programming and the system’s log is furnished for computer interface.
- 9.5 Electrical Measurements (RS232) – Electrical measurements include: Input voltage L1-neutral, output voltage L1-neutral, output current (amps), output watts, output volt amperes, % load, battery voltage and DC charging current, and output frequency.
- 9.6 System Set Points (RS232) – Systems include provisions to program via computer interface the following: The percentage point at which the display panel indicates the low battery alarm. Sag point at which battery usage is to occur, surge point at which battery usage is to occur, and points at which automatic battery tests are to be performed (7 day intervals, 30 day intervals, or 90 day intervals).
- 9.7 System Log (RS232) – System also includes provision to log power outages with date and time and system overloads with date and time.
- 9.8 Automatic Self-Testing – Systems provide a 5 minute automatic battery test programmable for every 7, 30, or 90 days.

10.0 Communications Interface

Status / Alarm relay interface normally open contacts are provided for optional remote annunciator panel or automatic message dialer. Contacts for inverter on battery, low battery warning, on static bypass, and general alarm are available via the relay interface contacts.

11.0 Reliability

11.1 MTBF Electronic / Electrical System: 100,000 hours.

11.2 MTTR: One hour.

12.0 Standard Equipment

12.1 Terminals for hard wired input and output.

12.2 Normally on, uninterrupted A.C. output bus.

12.3 Single control module design.

12.4 Make before break secure bypass switch.

12.5 Front mounted diagnostic monitor panel.

12.6 Batteries (90 minute).

12.7 Thermal magnetic A.C. input circuit breaker.

12.8 D.C. battery fuse and Anderson connector with interconnect cable.

12.9 Output distribution circuit breaker panel.

12.10 Copper conductor construction.

12.11 Functional steel cabinet enclosure with hinged, lockable front door.

13.0 Optional Equipment

13.1 Normally off AC output bus.

13.2 Timed normally off AC output bus with field programmable timers.

13.3 Pre-installed, 20 amp. output circuit breakers for use with normally on AC output bus.

13.4 Pre-installed, 20 amp. output circuit breakers for use with normally off AC output bus and or timed normally off AC output bus.

13.5 System output circuit breaker open or tripped alarm contacts.

13.6 Automatic message dialer.

13.7 Remote annunciator panel.

13.8 Fax/Voice/Web multifunction communications modem.

13.9 Network device SNMP / Ethernet TCP/IP adapter.

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

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

13.12 Control device(s) override.

13.13 Zone sensing device(s).

14.0 Warranty

14.1 All systems are guaranteed to be free from defects in material and workmanship for a period of 2 years following shipment from the factory.

14.2 Batteries are warranted for 15 years prorated with full replacement in the first year.

14.3 Extended warranty and maintenance contracts are available.

15.0 Serviceability

Each inverter system contains one front-accessible electronics module subassembly. The electronics module includes AC terminals and a DC Anderson connector for rapid replacement. Batteries are positioned and wired to facilitate rapid replacement.