

eLITE Model ELE Centralized Emergency Lighting Inverter Systems 2.0 kW to 18 kW Systems

General Specification

1.0 General

This specification describes the features and design the eLITE Series model ELE centralized emergency lighting inverter system. The system is designed and manufactured to assure maximum reliability, serviceability and performance. The system as described herein is a line interactive, uninterruptible, seamless transfer, emergency lighting inverter power system. The system consists of a microprocessor controlled transistorized PWM inverter, high speed transfer devices, constant voltage regulating transformer, battery charging system, energy storage battery platform, a diagnostic monitoring display panel and all the related hardware components and software to facilitate a functional centralized system. The emergency power supply system provides immunity from all line disturbances and power interruptions with no break in AC output power. The system as described herein includes 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 of system status and battery condition.

2.0 Inverter Ratings

<u>Model</u>	<u>Rating</u>		
ELE 2000	2000 Watts	ELE 10K	10,000 Watts
ELE 2500	2500 Watts	ELE 12.5K	12,500 Watts
ELE 3500	3500 Watts	ELE 14.5K	14,500 Watts
ELE 5300	5300 Watts	ELE 16K	16,000 Watts
ELE 7500	7500 Watts	ELE 18K	18,000 Watts
ELE 8500	8500 Watts		

3.0 Standards

The systems are 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) and (C62.41-1991).
- 3.3 National Electrical Manufacturers Association (NEMA PE-1).
- 3.4 National Electric Code (NEC 2005) (NEC 2005, Article 700).
- 3.5 National Fire Protection Association (NFPA 70, 101, 111).
- 3.6 Underwriters Laboratories (UL 924).
- 3.7 Federal Communications Commission (FCC part 15, Sec. J, Class A).
- 3.8 Listed UL Standards UL 924 Emergency Lighting Equipment with 90 minutes, or UL 924 Auxiliary Power Supplies for other than 90 minutes battery back up time, UL 1778 UPS Equipment and C-UL listing to C22.2, No. 107.1-M01 Canadian Standards for UPS Equipment.

4.0 Input Specifications

- 4.1 Input Voltage: 120 VAC or 208 VAC or 240 VAC or 277 VAC or 347 VAC.
- 4.2 Operating Range: +10% to -15% at full load without battery usage.
- 4.3 Frequency Range: 57.5 Hz to 62.5 Hz.
- 4.4 Power Factor: Self correcting to >0.95.
- 4.5 Input Harmonics: < 5% THD.

4.6 Spike Attenuation: 3000:1.

5.0 Output Specifications

5.1 Voltage: 120 VAC or 240/120 VAC or 277/120 VAC or 347/120 VAC.

5.2 Sine Wave Voltage: Maximum 5% harmonic distortion under linear load.

5.3 Crest Factor: 3 : 1.

5.4 K Factor: 30 or better.

5.5 Power Factor: Unity rated, KW=KVA.

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

5.7 Line Regulation: $\pm 3\%$.

5.8 Load Regulation: Typically better than $\pm 3\%$.

5.9 Isolation: NEC article 250-5d, complies with this standard that specifies a separately derived power source.

6.0 Battery Specifications

6.1 Standard run times are 90 minutes at full kilowatt load, UL 924 compliant.

6.2 Battery Type: Integral, valve regulated, sealed lead calcium, maintenance free, 10 year design life.

6.3 Charger: Full wave, three stage, filtered.

6.4 Recharge Time: UL 924, NFPA 101, NFPA 111 compliant.

6.5 Bus Voltage: 48 VDC: 2 KW – 3.5 KW, 96 VDC: 5.3 KW – 8.5KW, 120 VDC: 10KW - 18KW.
Float voltage 2.27 VPC, Final Voltage 1.75 VPC.

6.6 Projected Life: 5 years service, 15 year pro-rated.

7.0 Performance Specifications

7.1 Compatibility: eLITE Series centralized emergency lighting inverter systems are 100% compatible with all HID, incandescent, halogen and quartz fixture types. Systems are compatible with PFC electronic ballasts not to exceed 50% loading of the inverter's rated output. Normally on and normally off AC outputs are 100% rated and limited only by the system maximum KW output rating.

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

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

7.4 Standby Emergency Operation: 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 section of the system becomes energized, providing emergency power for standby lighting fixtures which are required to

illuminate only in the event of emergency. When utility power is restored or upon a remote input “zone command off signal”, the system reverts to normal operation thus de-energizing the normally off AC output bus.

- 7.5 Automatic Restart: In the case of a public utility power outage that exceeds the battery time requirement, the output of the inverter will de-energize to protect the battery system, but automatically restart once commercial AC power returns. When the public utility power returns, recharging of the batteries commences immediately.
- 7.6 Manual Maintenance Bypass: The system includes an integral make-before-break service maintenance bypass switch. The service bypass is accessible via the front of the inverter enclosure through a hinged, key lockable door. The maintenance bypass service switch incorporates make before break functionality allowing make before break transitions to and from bypass mode without power interruption or disturbance.
- 7.7 Overload Capability: 125% for ten minutes.
- 7.8 Surge Capability: 150% of rated output without need of static bypass.
- 7.9 Frequency Stability: ± 0.2 Hz.
- 7.10 Inner Winding Capacitance: 0.01 pF (primary to secondary coupling).
- 7.11 Common Mode Noise Attenuation: 120 dB (10^6 : 1 ground noise attenuation).
- 7.12 Transverse Mode Noise Attenuation: 70 dB (3160 : 1 line noise attenuation).
- 7.13 Reactive Power Factor Correction: Load at .6 pf corrected to > 0.95 at input (automatically correcting).
- 7.14 PFC Ballast Loading: up to 50% of the inverter’s rated KW output.
- 7.15 Efficiency: 89% typical under full rated load.
- 7.16 Reliability: 100,000 hours MTBF.

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, 1500 meters.
- 8.5 Full Load BTU/HR Emitted, Weight, Cabinet Sizes (90m configurations):

Power Rating (Watts)	BTU/HR	Weight	Dimensions
2000	682	1114 lbs	26”w x 24”d x 84”h
2500	853	1114 lbs	26”w x 24”d x 84”h
3500	1194	1284 lbs	26”w x 24”d x 84”h
5300	1807	1628 lbs	26”w x 24”d x 84”h
7500	2558	2536 lbs	42”w x 24”d x 84”h
8500	2899	2783 lbs	42”w x 24”d x 84”h
10000	3410	3018 lbs	42”w x 24”d x 84”h
12500	4263	3545 lbs	68”w x 24”d x 84”h
14500	4945	3812 lbs	68”w x 24”d x 84”h
16000	5456	4644 lbs	68”w x 24”d x 84”h
18000	6138	4788 lbs	68”w x 24”d x 84”h

- 8.6 Audible Sound Level: Not greater than 50 dba.
- 8.7 Enclosure: NEMA 1 for indoor use, Sealed, prohibiting rodent entry.
- 8.8 Cooling: Forced air with air intake entry through vents on door, and air exit through top of enclosure.

9.0 Display Monitor and Diagnostics

- 9.1 Intellistat Monitor Panel – Systems include a local, front mounted, sealed, touch screen, LCD display monitor panel. The Intellistat displays electrical parameters, system status and alarm conditions.

- 9.1.1 The monitor displays the following electrical parameters:

- Input Voltage
- Output Voltage L₁-N
- Output Voltage L₂-N
- Output Voltage L₁-L₂
- Output Current L₁-N
- Output Current L₂-N
- Output Volt-Amperes L₁-N
- Output Volt-Amperes L₂-N
- Output Volt-Amperes Total
- Output Watts L₁-N
- Output Watts L₂-N
- Output Watts Total
- Output Power Factor L₁ – N
- Output Power Factor L₂ – N
- Output Power Factor Total
- Output Percent Load L₁-N
- Output Percent Load L₂-N
- Output Percent Load Total
- Output Frequency
- Battery Voltage
- Battery Charge Current

- 9.1.2 The monitor displays the following system status alarm conditions:

- Input Voltage High/Low
- Output Voltage L₁-N High/Low
- Output Voltage L₂-N High/Low
- Output Volt-Amperes High - Overloaded
- Output Volt-Amperes Low
- Output Frequency High/Low
- Battery Voltage High/Low
- Battery Charger Current High
- Battery Temperature High
- General Alarm
- System on Battery
- Low Battery Warning
- Low Battery Shutdown
- Inverter Over Temperature Shutdown
- DC Charger Failure / DC Open
- Output Circuit Breaker Open
- REPO Shutdown
- System in Manual Bypass

- 9.1.3 The monitor displays the following operational conditions:
- Percent Battery Time Remaining
- 9.2 The monitor incorporates into its design, user programmable set points for the following:
- Status and Alarm Conditions – User Programmable for all High/Low threshold alarm set points.
 - Off Bus Delay Time – User programmable for off bus delay timing adjustments.
 - Periodic Battery Test Duration – User programmable for periodic battery test duration.
 - Annual Battery Test Duration – User programmable for annual battery test duration.
- 9.3 The monitor maintains a log that records all system alarms, events and battery system test results. The logs are made available through the LCD display on the monitor. The system log capacity is:
- Event and Alarm Log: 25 Alarms
 - Battery System Test Log: 25 Battery Tests
- 9.4 The monitor features a manual, proprietary, password protected “Push to Test” feature.
- 9.5 The monitor features automatic battery testing that records test data to comply with NEC, NFPA requirements:
- 9.5.1 It features a monthly or quarterly 5 min discharge test and a programmable annual discharge test of either 30minutes, 60 minutes, 90 minutes, 2 hours or 4 hours
 - 9.5.2 It reports the Time, Date, and a Pass/Fail indication via the local monitor panel and/or via E-mail, SNMP, MODBUS or Ethernet TCP/IP with an optional network adapter or via Fax, Voice messaging and or web page generation via an optional multifunction communications modem.
 - 9.5.3 During the battery test, the monitor performs a lighting fixture integrity test. The lighting fixture integrity test measures the load on the output of the system and if the output is below the customer’s programmed / defined value, the inverter will sound an audible alarm indicating possible deficiencies in emergency illumination candela.
- 9.6 The monitoring system includes a 25 pin status / alarm port and a terminal strip with potential free, 1 amp, 120 volt rated contacts.
- 9.6.1 Alarms monitored from the status/alarm port:
 - On Battery
 - Low Battery
 - General Alarm
 - Manual Restart Required
 - System On Bypass
 - 9.6.2 Status / Alarm relay contact ratings: 24 VAC and/or 24 VDC, 500mA.
 - 9.6.3 The following alarms are monitored from the terminal strip:
 - On Battery
 - Low Battery
 - General Alarm
 - Manual Restart Required
 - System On Bypass
 - Battery Test Pass
 - Battery Test Fail

10.0 Reliability

- 10.1 MTBF Electronic / Electrical System: 100,000 hours.
- 10.2 MTBF Transformer: 200,000 hours.
- 10.3 MTTR: One hour.

11.0 Standard Equipment

- 11.1 Thermal Magnetic AC Input Circuit breaker.
- 11.2 Thermal Magnetic DC Circuit breaker.
- 11.3 Normally on uninterrupted A.C. output bus.
- 11.4 Batteries (90 Minute).
- 11.5 Anderson, quick connect / disconnect battery connector with interconnecting DC cable.
- 11.6 Copper conductor construction.
- 11.7 Intellistat monitor display panel.
- 11.8 Internal maintenance bypass service switch.
- 11.9 Functional cabinet enclosure with hinged, lockable front doors and lockable output distribution panel door.
- 11.10 Integral distribution panel section for use with optional output circuit breakers.

12.0 Optional Equipment

- 12.1 Normally off AC output bus.
- 12.2 Timed normally off AC output bus.
- 12.3 External maintenance bypass switch.
- 12.4 Input / Bypass isolation transformer for 480 VAC and 575 VAC building service applications.
- 12.5 Pre-installed, monitored output circuit breakers for use with normally on AC output bus.
- 12.6 Pre-installed, un-monitored output circuit breakers for use with normally on AC output bus.
- 12.7 Pre-installed, monitored output circuit breakers for use with normally off AC output bus.
- 12.8 Pre-installed, un-monitored output circuit breakers for use with normally off AC output bus.
- 12.9 Pre-installed, monitored output circuit breakers for use with timed normally off AC output bus.
- 12.10 Pre-installed, un-monitored output circuit breakers for use with timed normally off AC output bus.
- 12.11 Automatic message dialer.
- 12.12 Remote annunciator panel.

- 12.13 Fax/Voice/Web multifunction communications modem.
- 12.14 Network device SNMP / MODBUS TCP / Ethernet TCP/IP adapter.
- 12.15 Network device SNMP / MODBUS TCP & RS485 / Ethernet TCP/IP adapter.
- 12.16 Control device override(s).
- 12.17 Zone sensing device(s).
- 12.18 Output circuit breaker open / tripped alarm contacts.
- 12.19 Optional alternate battery run times of 30, 60, 120 or 240 minutes.

13.0 Warranty

- 13.1 All systems are guaranteed to be free from defects in material and workmanship for a period of 2 years following shipment from the factory.
- 13.2 Batteries are warranted for 15 years prorated with full replacement in the first year.
- 13.3 Optional extended warranty and maintenance contracts available.