

SECTION 26 3323
EMERGENCY LIGHTING EQUIPMENT

PART 1 – GENERAL

- 1.1 Furnish and install an uninterruptible emergency lighting Inverter System and Emergency Power Control Relays to provide a reliable source of emergency power, designed to operate during periods of utility line deficiencies without any interruption in power supplied to the connected load. The system shall provide and be capable of powering any combination of electronic, power factor corrected, fluorescent, LED, incandescent or HID lighting. Other connected loads shall include but not be limited to building management systems, motors, security systems and other critical voltage or frequency-sensitive electronic loads. The system shall operate from 0-100% loading and be rated to deliver full KVA rated output at unity power factor for a minimum of 90 minutes. Upon return to normal AC utility line power, the system shall recharge the batteries without any interruption of power supplied to the load.
- 1.2 The Inverter System shall be listed to or comply with these standards:
 - 1.2.1 UL 924 Standard for Emergency Lighting and Power Equipment
- 1.3 The Emergency Power Control Relay shall comply with UL 924
- 1.4 Submit Manufacturers' data sheets for all components including:
 - 1.4.1 Warranty
 - 1.4.2 Wiring diagrams
 - 1.4.3 Bill of materials.
 - 1.4.4 Product catalog sheets or equipment brochures.
 - 1.4.5 Product guide specifications.
 - 1.4.6 Installation information, including weights and dimensions.
 - 1.4.7 Drawings for requested optional accessories.
- 1.5 **Common submittal mistakes which will result in the submittals being rejected:**
 - 1.5.1 Not including all items listed in the above itemized description.
 - 1.5.2 Including catalog cut sheets which have several items on a page, and not clearly identifying by highlighting, underlining, or clouding the items to be reviewed, or crossing out the items which are not applicable.
 - 1.5.3 Not including actual manufacturer's catalog information of proposed products.
 - 1.5.4 Do not include multiple manufacturers for similar products and do not indicate "or approved equal" statements, or "to be determined later" statements. The products being submitted must be the products installed.

PART 2 - PRODUCTS

Single Phase systems 250W

- 2.1 The Central Inverter System specified herein shall be:
 - 2.1.1 Myers Power Products LVM Ceiling Grid Mount series
 - 2.1.2 LVS Control CEPS Ceiling Grid Mount series
 - 2.1.3 Alternate manufacturers shall comply with these specifications and shall not exceed the physical dimensions and weights indicated on the drawing schedule.
 - 2.1.4 All substitutions or alternates to those indicated shall be submitted for approval (7) days prior to the project bid date. Approvals when accepted will be issued in the form of an addendum. No consideration for substitutions will be provided after the award of the contract.
 - 2.1.5 The substitution request must include a statement indicating the difference in price of both the specified and alternate product, both contractor and list price. The substitution request must include a comparison of the features and capabilities between the specified and proposed systems, software and all components and warranty comparison.
 - 2.1.6 Equipment as manufactured by Digital Signal Power Manufacturer (DSPM) has been reviewed and is not an approved alternate for this project.
- 2.2 System operation shall be fully automatic. The charging system will maintain the batteries at full capacity at all times. On-board microprocessors will continuously monitor charger settings and the system's overall readiness. Diagnostic circuitry shall include a software-controlled charger, continuous monitoring of operating parameters, and programmable system testing capabilities. Individual alarms and system logs shall be provided. All alarms and logs shall be automatically recorded and readily displayed via the User Interface Display (UID). The system shall also include one RS232 serial port for remote communications.
- 2.3 Automatic overload and short circuit protection in normal and emergency mode shall consist of 150% momentary surge capability, 120% overload for 5 minutes, and 110% overload for 10 minutes. Protection shall also include a low battery voltage disconnect, AC input circuit breaker, a DC input breaker or Fuse, and an AC output fuse. A digitally generated sinusoidal output waveform (PWM) with less than 5% total harmonic distortion at rated linear load shall be provided to the connected load.
- 2.4 Available input voltage shall be as indicated on the drawings, with a frequency of 60Hz. The AIC rating shall be a minimum of 42,000 RMS symmetrical amperes.
- 2.5 Available output voltage shall be as indicated on the drawings, with a frequency of 60Hz + 0.05Hz.
- 2.6 The user interface display (UID) shall include an array of LED's, a 2-line, 40-character LCD display, and a keypad for system input. The UID shall be menu-driven and display individual system parameters using a numbered code (Hot Key). The LED array shall indicate, by color code, the following status modes:
 - 2.6.1 AC output presence (green)

- 2.6.2 System ready (green)
- 2.6.3 Battery charging (red)
- 2.6.4 Inverter “ON” (amber)
- 2.6.5 Alarm functions (red)
- 2.7 To ensure only authorized personnel have system access, a multi-level password shall be required to change all functions and operating parameters. A continuous scrolling display of the following metered functions shall be provided:
 - 2.7.1 AC input voltage, AC output voltage, AC output amps
 - 2.7.2 Battery voltage, Battery charging amps, Battery discharge amps
 - 2.7.3 Output volt-amps (VA), Output power (watts)
 - 2.7.4 Ambient temperature
 - 2.7.5 Last inverter run time, Total inverter run time, System run time, Date Time
- 2.8 Audible and visual alarms shall be provided, with automatic logging of the twenty-five most recent events. An alarm acknowledgment feature shall be provided, which will allow the user to silence only the current audible alarm without silencing other alarms or clearing the alarm condition until the fault has been addressed. An alarm shall be sounded if any of the following operating conditions occur:
 - 2.8.1 Low battery voltage, Near low battery voltage, High battery voltage
 - 2.8.2 High AC input voltage, High AC output voltage, Low AC output voltage Output, overload (VA), Low remaining run time
 - 2.8.3 High ambient temperature
 - 2.8.4 Tripped circuit breaker
- 2.9 Manual and automatic test modes shall be provided.
 - 2.9.1 Manual user-initiated system test at any time.
 - 2.9.2 Automatic monthly and annual self-diagnostic tests.
 - 2.9.3 Automatic recording of the last twenty events in a Test Results log.
- 2.10 A three-step float charger shall be software controlled and temperatures compensated, and charge the batteries continuously while in normal “standby” condition (non emergency mode). Following a power failure, the constant current charger mode shall be initiated until battery voltage reaches the equalize stage. Equalize stage shall be maintained until the charging current drops to .5 amps, or 0.3% of the battery amp/hour rating. Battery voltage shall then enter the float stage.

- 2.11 Batteries shall be designed to provide a minimum 1.5 hours rated output voltage to the connected load in emergency mode without dropping below 87.5% of nominal battery voltage.
 - 2.11.1 The batteries shall be encased in an enclosure that permits easy maintenance without requiring removal.
 - 2.11.2 Sealed Lead Calcium: Maintenance Free Construction requires no addition of water over its useful. Life expectancy is 10-years at 77F (25C) ambient temperature.
- 2.12 The following optional factory-installed equipment shall be provided:
 - 2.12.1 Normally-On Output Circuit Breaker Options:
 - 2.12.1.1 A maximum of fourteen monitored positions are available. Single pole 120V and 277V breakers occupy one position each, while double pole 240V breakers occupy two positions. Reference drawings for required number of output breakers required.
 - 2.12.2 Provide Universal cabinet locks for all electronic and battery cabinets.
 - 2.12.3 Provide, using the system's RS232 port, a fax operating status reports is transmitted over a customer-supplied dedicated analog phone line to up to six locations. Phone numbers can be programmed locally using the unit keypad or computer terminal, or remotely via a modem. Each designated fax location automatically receives a unit status report following monthly and annual tests, or when an alarm condition is detected. Status reports include readings on key operating parameters, as well as complete alarm and inverter log printouts, in uncoded, user-friendly descriptions. This option also provides for two-way communications thru terminal emulation software, such as HyperTerminal (not supplied with the inverter system).
 - 2.12.4 Provide a factory-installed, internally-mounted two-position "make before break" switch. Compatible with all input/output combinations and any combination or quantity of output circuit breakers. Allows connecting the utility power supply to the load without placing the inverter in emergency mode.
- 2.13 Maintenance, Service and Enhanced Warranty Plans. The following shall be provided to assure initial and long-term viability of the system through additional maintenance and service plans and/or through enhancements to the standard two-year electronics limited warranty.
 - 2.13.1 Factory Start-Up shall be supplied as a service to the installing contractor. The Factory Start-Up process shall verify correct installation and operation of the inverter system. Trained, factory authorized technicians shall administer an on-site, point-by-point check of the system to include:
 - 2.13.1.1 Internal electrical connections
 - 2.13.1.2 AC input and Battery connections
 - 2.13.1.3 System operating voltages
 - 2.13.1.4 System operating parameters

- 2.13.1.5 Initial system “power-up
 - 2.13.1.6 Battery discharge test
 - 2.13.1.7 Correction of existing deficiencies
 - 2.13.1.8 Final testing, calibration and recording
 - 2.13.1.9 Training of available operating personnel
- 2.13.2 A Monitoring Program shall provide for the continuous monitoring of the inverter system by the Factory Technical Support Group. All monthly and annual system tests shall be reviewed and analyzed for early warning signs of system malfunction. Any failures shall be automatically relayed to the service department where corrective action can be recommended to the owner/operator. For activation, a user supplied dedicated analog phone line must be available.
- 2.13.3 Preventive Maintenance Plan (PMP) - The Preventive Maintenance Plan shall provide system coverage beyond the standard two-year factory warranty. PMP warranty service excludes the batteries, which are covered under a separate warranty plan. Installation of a Fax Modem option shall be provided for Preventive Maintenance Plan.
- 2.13.3.1 Additional 2-year warranty and 2-year service coverage, weekdays, Monday-Friday, 8AM to 5PM EST. If the standard factory warranty has expired before selection and purchase of a PMP plan, an on-site evaluation shall be scheduled to determine if the system requires parts and/or labor to return to factory specifications. Parts and labor required shall be charged at additional costs.
- 2.14 The system shall be contained in a code gauge, steel NEMA 1 enclosure, finished in a scratch resistant, powder coat finish, with a key lock, conduit knockouts at the top and sides, and front opening doors. Enclosures shall be designed to allow stacking to minimize the overall system’s footprint. All components shall be front accessible and incorporate a modular design and a quick disconnect means to facilitate servicing.
- Emergency Power Control Relays** - (Noted on the drawings as LVS EPC Control relay)
- 2.15 Insert Series power control modules are designed to allow locally switched lighting fixtures to be wired for emergency operation from either generator, inverter system, or secondary sources.
- 2.16 As Manufactured by:
- 2.16.1 “Highlights” HEPC Series Emergency Power Control modules (203) 575-2044 www.highliteslighting.com or approved equal.
 - 2.16.2 LVS Controls (800) 982-4587 www.lvscontrols.com.
- 2.17 During normal operation, LEDs on the module’s faceplate indicate the presence of both utility (Green) and emergency (red) power and the local switch will be capable of turning all circuit lighting fixtures on or off as required. During utility power failures, emergency lighting fixtures controlled by the module will illuminate regardless of local switch position. If, during normal operation, emergency backup power is lost, the module will automatically produce an audible alarm as an alert to this potentially hazardous condition.

- 2.18 Recent energy mandates require improved vigilance in the conservation of resources. By eliminating the need for night light circuits, power controls conserve energy by allowing all area ambient lighting to be turned off while still assuring the availability of emergency illumination in the event of a utility power failure.
- 2.19 The power control automatically initiates a test of the emergency lighting fixtures whenever the local switch is turned off. Upon turning off of the local switch, the designated emergency lighting fixtures will remain illuminated for an additional 5 seconds to assure system readiness. The power controls may also be checked manually at any time through the integral test switch provided on the module's faceplate. With the local lighting turned off and both utility and emergency power present, pressing the test switch will cause the controlled emergency fixtures to illuminate for 5 seconds.
- 2.20 Adapts locally switched lighting fixtures for emergency operation, bypasses local switch during power failures. Compatible with motion detector and photocells.
- 2.21 Full 20 amp load capability available for 120 or 277VAC operation. Approved for in-wall or in-ceiling applications.
- 2.22 Provided with Surge and short circuit protection.
- 2.23 Audible emergency power circuit failure alarm, Built-in manual emergency circuit test feature, Momentary test switch.
- 2.24 Provide a single module at each emergency lighting fixture where the lighting fixture is locally controlled by a room switch and or motion sensor. These modules are to be furnished and installed by the contractor installing the lighting fixtures.
- 2.25 Provide a single module located at the panelboard or low voltage control panel to control emergency lights controlled from a low voltage control system. These modules are to be furnished and installed by the contractor installing the lighting fixtures.
- 2.26 Where dimmable light fixtures are on emergency circuit, provide emergency relay control, which is dimming compatible, and will bring lights to full brightness in emergency mode.
- 2.27 The Module has a full 5-year replacement warranty.

PART 3 - EXECUTION

- 3.1 Input and output conductors shall be enclosed in separate conduits. All load side wiring shall be sized as required for voltage drop conditions to assure proper operation of connected loads.
- 3.2 All free-standing electrical equipment or enclosures shall be anchored to the floor and braced at the top of the equipment to the structure. Where details have not been provided on the drawings, anchorage shall comply with CBC Section 1632A and Table 16-A0. The Contractor shall submit drawings signed by the Contractors registered structural Engineer indicating method of compliance prior installation.
- 3.3 The system shall allow connection of both "normally on" and "normally off" (optional) loads. Connected loads shall receive utility power during normal operation, and 'no break" system inverter power during utility interruptions.
- 3.4 In emergency mode, the inverter system shall supply true digitally-generated AC sinusoidal output. Refer to plans for type and location of loads served by the system.

- 3.5 A factory trained service representative shall be dispatched to perform the initial system start-up.
- 3.6 Documents supplied with each system shall include:
 - 3.7 Shop drawings showing physical dimensions, mounting information and wiring diagrams.
 - 3.7.1 Installation/Users manual(s) for locating, mounting, interconnecting, and wiring the system, with operating and preventive maintenance procedures.
 - 3.7.2 The system shall be installed in accordance with all appropriate manufacturers' instructions and in compliance with all appropriate codes.
- 3.8 The system shall be guaranteed, under normal and proper use, against defects in workmanship and materials for a period of two years from the date of shipment. Batteries supplied as part of the systems shall be covered under a separate pro-rata warranty as described below:
 - 3.8.1 Sealed Lead Calcium, 10-year life expectancy – One-year full replacement warranty plus an additional nine years pro-rata.
 - 3.8.1.1 Note: Within 90days from date of shipment, batteries shall be connected to an energized charging system to maintain the Warranty. Battery life and capacity is rated at an optimum operating temperature range of 68F to 85F. Operating temperatures outside this range will affect battery life and capacity. Batteries are rated at 100% capacity at 77F.
- 3.9 Maintenance and service programs shall be made available by the supplier to assure long-term reliability of the system.

END OF SECTION