



# *Synchron AC Power System Suggested Specifications*

## **1. General**

### **1.1 Scope**

A Dual-Lite Synchron Series Inverter System shall be furnished to provide a reliable source of power, and shall operate during a utility line disturbance without any interruptions of power supplied to the load. The transfer from utility power to battery power shall utilize a no break (uninterruptible) system, pulse width modulated sine wave output. The system shall be capable of powering any combination of electronic, power factor corrected, fluorescent, incandescent or HID lighting; building management system, security system and any other critical voltage or frequency-sensitive electronic loads. The system shall operate from 0-100% loading, and be rated to deliver its full KVA/KW rating, at unity power factor, for a minimum of 90 minutes. Upon return of the normal AC utility line power, the system shall return to standby mode automatically and without any interruption of power supplied to the load. The charging system shall recharge the batteries within UL requirements.

### **1.2 Code & Standards**

The Dual-Lite Synchron Series Inverter System shall be listed to meet these standards. Applicable codes and standards include:

- UL 924 Standard for emergency Lighting and Power Equipment
- Complies with NEC, OSHA and Life Safety Code

## **2. Product**

### **2.1 Manufacturer**

The Central Emergency Inverter System specified herein shall be the Synchron Series Inverter System manufactured by Dual-Lite (Greenville, South Carolina).

### **2.2 Category and Type**

Furnish and install a Dual-Lite Synchron Inverter System that will supply a minimum of \_\_\_\_KVA @ unity power factor, for a period of 90 minutes (1.5 hours) upon interruption, brownout, or failure of the monitored AC utility line.

### **2.3 Operation**

The system's operation shall be fully automatic and utilize a linear transformer. The inverter shall be of the Pulse Width Modulated (PWM) design, and shall provide continuous power to the load at all times.

During normal operation, the charger maintains the batteries at full capacity. The on-board microprocessors continuously monitor charger settings and system's overall readiness. The system's circuitry shall also include an automatic, multi-rate, software controlled charger able to recharge batteries per UL924 guidelines.

The inverter section shall be off-line during standby operation to increase overall efficiency up to 98%. Continuously running double conversion systems shall not be permitted.

The automatic overload circuit protection shall shut down the system at 115% of its rated capacity, regardless of whether it is in normal or emergency operations. The system protection shall also include AC lockout, low battery voltage disconnect, AC input circuit breaker, DC input fuse and circuit breaker, and an AC output fuse. (optional output circuit breakers are available on all models). The system shall supply a digitally generated sinusoidal output waveform with less than 5% total harmonic distortion at rated linear load.

### **2.4 Input Voltage**

The available input voltage to the systems shall be 120 or 277, +10% to -15%, single phase, with a frequency of 60Hz.

### **2.4 Output Voltage**

The available output voltage of the system shall be the same as the input voltage, 120 or 277 volts, +/- 5% single phase sine wave, with a frequency of 60Hz + 0.05Hz on inverter. The output voltage and frequency, when on utility power, shall be as supplied by the utility.



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## 2.5 System Diagnostics

System shall be supplied with intelligent multipurpose LED indicators to notify the user as to system changes or possible problems. The LED illumination pattern can be interpreted as to the system's condition; these include:

Normal standby operation	Inverter on (AC input interruption)	AC input interruption
Battery charger malfunction	Overload shutdown	Circuit breaker tripped
No load connected	Temperature probe malfunction	High temperature shutdown

## 2.6 Alarms

An audible alarm shall be provided for all alarm and shutdown conditions.

## 2.7 Manual Testing

The system shall incorporate a push to test switch to initiate an inverter test at anytime. During this test, a power failure will be simulated and the batteries shall power the connected load through the inverter.

## 2.8 Battery Charger

The charger shall be software controlled, temperature compensated, three-step float type charger. The charger shall maintain the batteries fully charged during normal standby condition. Following a power failure the charger will start in constant current mode until battery voltage reaches Equalize. Equalize voltage will then be maintained until charging current drops to .5 amps or .3% of the battery amp/hour rating; battery voltage will then be allowed to drop down to float.

## 2.9 Batteries

The batteries will provide sufficient power to maintain the output voltage of the inverter for a period of 1.5 hours, without dropping below 87.5% of nominal battery voltage. The batteries shall be Sealed Lead Calcium VRLA type, enclosed in a cabinet that permits easy maintenance without requiring removal. Batteries shall require no addition of water over the life of the battery. The case and cover shall be constructed of polypropylene, contain low-pressure UL recognized safety release vents, and be non-gassing in normal use. Batteries shall have a 10-year design life expectancy at 77°F (25°C).

## 2.10 System Options

The following factory installed optional equipment shall be available with Synchron systems(see catalog for additional details)

\_\_\_ **Normally-On Output Circuit Breaker Options:** A maximum of 6 positions (10 positions without alarms) are available. Single pole 120V and 277V breakers use one position each:

\_\_\_ Monitored (recommended)      \_\_\_ Voltage      \_\_\_ Amp Rating (20 amp is standard)

\_\_\_ Unmonitored      \_\_\_ Voltage      \_\_\_ Amp Rating (20 amp is standard)

\_\_\_ **Normally-Off Output Breaker Options:** Normally-off output circuit breakers are used when the lighting fixtures are to be energized only during a power outage. The Normally Off circuit breakers are programmed for a 15 minute retransfer delay to allow HID fixtures to come up to full brightness. A maximum of 4 positions are available. Single pole 120V and 277V breakers use one position each.

\_\_\_ Monitored (recommended)      \_\_\_ Voltage      \_\_\_ Amp Rating (20 amp maximum)

\_\_\_ Unmonitored      \_\_\_ Voltage      \_\_\_ Amp Rating (20 amp maximum)



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### **2.11 Mechanical**

The system shall be contained in a NEMA 1 steel cabinet with conduit knockouts at the top with front access. Cabinets will be floor mounted. Manufacturer will supply all necessary brackets. All components must be front accessible. All inverter components shall have a modular design to facilitate field service.

### **3. Execution**

#### **3.1 Wiring**

All wiring shall be installed within NEC guidelines in conduit and shall be sized as required for voltage drop purposes to assure proper operation of connected loads. Input and output wiring shall enter the cabinet in separate conduits.

#### **3.2 System Operation**

The system shall allow connection of both “normally on” and “normally off”(optional) loads. Connected loads shall be carried via the transfer circuit by the utility during normal operation or by the system inverter during utility failures without interruption.

#### **3.3 Connected Loads**

The system shall be designed to maintain the normal operation and performance integrity of all connected loads, including voltage and frequency sensitive equipment, by providing a no break digitally generated sinusoidal output. Refer to plans for type and location of loads served by the system.

#### **3.4 Drawings and Manuals**

Drawings and manuals supplied with each system shall include:

\_\_\_ Installation/Users manual(s) with complete instructions for locating, mounting, interconnection, and wiring of the system with operating and preventive maintenance procedures. (Can be located on [www.dual-lite.com](http://www.dual-lite.com))

#### **3.5 Installation**

The system shall be installed in accordance with all appropriate manufacturers’ installation instructions and in compliance with all appropriate codes.

#### **3.6 Warranty**

The system shall be guaranteed, under normal and proper use, against defects in workmanship and materials for a period of one year (two years with optional Factory Start-Up) from the date of shipment. Batteries supplied as part of the systems shall be covered under a separate pro-rata warranty as described below.

**-Sealed Lead Calcium VRLA, 10-year life expectancy** – one-year full replacement warranty plus an additional nine years pro-rata.

**Note:** Batteries must be installed on the system’s energized charging circuit within 90 days from date of shipment to maintain the validity of the Warranty. Battery life and capacity is rated at an optimum operating temperature range of 68°F to 85°F. Operating temperatures outside this range will affect battery life and capacity. Batteries are rated at 100% capacity at 77°F.

#### **3.7 Maintenance and Service**

Maintenance and service programs will be made available by the supplier to assure long-term reliability of the system.



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### 3.8 Maintenance and Service Programs

The following shall be offered to assure initial and long term viability of the system through additional maintenance and service plans and/or through enhancements to the standard one-year electronics limited warranty.

#### FSS **Factory Start-Up (FSS)**

Factory Start-Up shall be offered as a service option that will increase the unit warranty to two years. 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:

- Internal electrical connections
- System operating voltages
- Initial system “power-up
- Correction of existing deficiencies
- Training of available operating personnel
- AC input and Battery connections
- System operating parameters
- Battery discharge test
- Final testing, calibration and recording
- Required to purchase Preventive Maintenance Plan

\*NOTE: Any inverter start-up service not performed by a Dual-Lite authorized technician will be at the customer's own risk.

#### Preventive Maintenance Plan: (PMP-\_\_\_\_\_)

The Preventive Maintenance Plan is available for systems purchased with optional Factory Start-Up. The PMP shall provide optional warranty system coverage beyond the two-year warranty provided with Factory Start-Up. PMP warranty service excludes the batteries, which are covered under a separate warranty plan.

<b>PMP-A1:</b> Additional 1-year warranty and 1-year service coverage, weekdays, Monday-Friday, 8AM to 5PM EST.	<b>PMP-A2:</b> Additional 2-year warranty and 2-year service coverage, weekdays, Monday-Friday, 8AM to 5PM EST.	<b>PMP-A3:</b> Additional 3-year warranty and 3-year service coverage, weekdays, Monday-Friday, 8AM to 5PM EST.
<b>PMP-B1:</b> Additional 1-year warranty and 1-year service coverage, 24 hours/day, 7 days/week, no holidays.	<b>PMP-B2:</b> Additional 2-year warranty and 2-year service coverage, 24 hours/day, 7 days/week, no holidays.	<b>PMP-B3:</b> Additional 3-year warranty and 3-year service coverage, 24 hours/day, 7 days/week, no holidays.
<b>PMP-C1:</b> Additional 1-year warranty and 1-year service coverage, 24 hours/day, 7 days/week, including holidays.	<b>PMP-C2:</b> Additional 2-year warranty and 2-year service coverage, 24 hours/day, 7 days/week, including holidays.	<b>PMP-C3:</b> Additional 3-year warranty and 3-year service coverage, 24 hours/day, 7 days/week, including holidays.

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.

Specifications subject to change without notice.