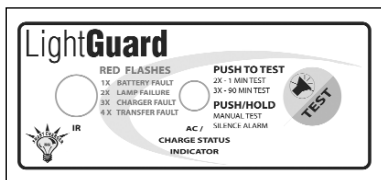


Type No. \_\_\_\_\_  
 Job Name \_\_\_\_\_  
 Catalog No. \_\_\_\_\_



## Standard Features

### General

The Smart Charger electronics system is designed around an 8-bit microprocessor to provide unmatched reliability and performance. Microprocessor controlled standard features include:

- 8-bit microprocessor ( $\mu$ p)
- AC lockout mode
- Transformer-isolated input
- AC power indicator
- Charge status indicator
- Audible user interface controls
- Optional hand-held IR remote (SCIR)
- On-board IR Receiver
- Visual LED fault indicator
- Tactile push-to-test switch
- Brownout protection
- Low-voltage battery disconnect
- Precision temperature compensation

### Charger

The on-board thermal detection feature of the Smart Charger microprocessor allows for a precision temperature compensation algorithm equal to 3 milli-volts per degree C. Standard charger features include:

- 120/277 VAC, 60 Hz standard input
- $\mu$ p controlled, linear, temperature compensation
- Reverse battery polarity detection and protection
- Reverse utility power detection and protection

### Transfer

- $\mu$ p controlled, solid state
- Low-voltage battery disconnect (LVD)
- Brownout detection circuit
- Optional time delay (15-minute)\*
- AC line latch

\*For compliance to Article 700.16 of the NEC.

### Diagnostics

The Smart Charger diagnostics monitoring circuit is continuous and in real time. The benefits of real time monitoring allows the microprocessor to self-heal all fault conditions when remedied, excluding lamp failure (lamp failure is considered most critical and requires a transfer test to clear the fault after re-lamping). In doing so, there is no need to reset the system after maintenance.

- Audible and non-audible versions available
- Silence alarm button on audible versions
- Visual LED fault display
- Battery failure
- Battery disconnect
- Charger failure
- Lamp/LED failure
- Transfer failure

# Smart Charger for Unit Equipment

- Self-Diagnostic Electronics
- Self-Testing Diagnostic Electronics
- Audible and Non-Audible Versions

### Optional Self-Testing\* (standard on select models)

The Smart Charger diagnostic/charging platform with optional self-testing mode automatically runs a one-minute self-test every 30 days and a 30-minute test on the sixth and twelfth month. A one-minute or 90-minute test may be initiated via the push to test switch on the unit or by activating the appropriate test command on the optional IR test device.

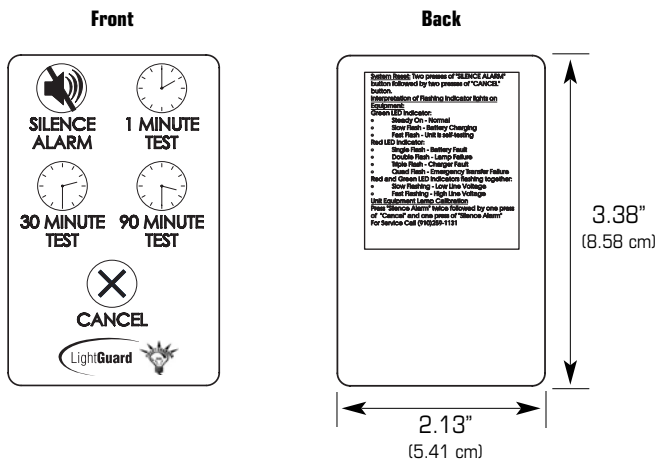
\* **Note:** NFPA 101 does not allow a self-testing diagnostics board to run the required annual 90-minute test. Refer to the 2006 version of NFPA 101, section 7.9.3.1.2 (1) through (7).

### Available Accessory Item

Hand-Held IR Interface

Indoor range: 30-40 ft.

Outdoor range: varies depending on exposure to sun



Dimensions are approximate and subject to change.

### Accessory Ordering Information

<b>SCIR</b>
<b>SERIES</b>
<b>SCIR</b> = Smart Charger Infra-Red Remote

**Note:** In outdoor applications, the IR test device may be limited to short distances due to exposure of the sun.

# Smart Charger for Unit Equipment

## System Operation

The Smart Charger microprocessor has command of all critical circuit functions and operations including battery charging, emergency transfer, brownout detection, AC lockout/line latch, internal and remote load detection, temperature compensated charging as well as providing the outputs to signal trouble/faults.

Fault detection is always provided in a visual format with the option to have audible alarms as well. When audible diagnostics are used, the visual fault indicator (LED) and audible tone will be synchronized for clear fault identification. All faults except lamp failure are self healing. That is, when the  $\mu$ p detects a corrected fault situation, the visual and audible fault modes are cleared and the fixture returns to the normal operating mode, excluding lamp failure (lamp failure is considered most critical and requires a transfer test to clear the fault after re-lamping). A silence alarm feature is also provided to provide adequate time to clear the fault without having the audible alarm active while performing maintenance. In this case, the visual indicator remains active. Should the fault not be restored after a period of one week, the audible tone returns to bring attention to repair personnel.

During prolonged periods without power (either during a power loss or shut-down due to vacancy), any alarm conditions and lamp load data are stored in the non-volatile memory. Upon restoration of power a quick self-test, as part of the system initialization, will occur and the results will be compared to the stored data. Results of the self-test are compared to the stored data for proper indicating conditions.

## Charger

The charger is a two-stage, constant-current charging system continuously monitored and under control from  $\mu$ p. The charging state is visually apparent by viewing the charge status indicator. A flashing green indicator indicates a high-charge mode while a steady green indicator indicates the battery is at full charge. Temperature compensation is always enabled by the thermal detection system on board the  $\mu$ p and has an effective range from  $-40^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ . The temperature compensation algorithm is equal to  $3\text{mv}/^{\circ}\text{C}$ , providing ideal charging conditions.

## Charger Monitor Circuit

The charger monitoring circuit constantly samples and compares the voltage and current being sent to the battery, during normal AC operation, against preset limits programmed in the  $\mu$ p. Should the compared voltage or current remain out of limits for a period of five clock cycles, the  $\mu$ p will command a charger fault alarm condition.

## Battery Monitoring Circuit

The battery voltage is continuously monitored during normal AC operation and compared to preset limits programmed in the  $\mu$ p. During a manually invoked or automatic self-test routine, the battery voltage is monitored for proper capacity-to-load ratios and indicates a battery fault if it is determined the unit will not meet the 90-minute required run time. This circuit also monitors the system for a "Reverse Polarity" condition on the battery connection. A reverse polarity condition will result in a  $\mu$ p command to shut down normal operations and indicate a battery failure, thus preventing any damage to the circuitry.

## Lamp Load Monitoring

The lamp load voltage and current are continuously monitored and compared to preset limits stored in the  $\mu$ p. The resolution of the monitoring circuit exceeds the UL required 10% detection rate for emergency/lighting fixtures. Should the compared voltage or current remain out of limits for a period of five clock cycles, the  $\mu$ p will command a lamp failure alarm condition. If lamp loads are changed any time after installation and application of power, a user-invoked load calibration may be performed.

## Transfer Circuit Monitoring

The transfer circuit is monitored any time the unit is cycled into a manual or automatic test. Any noted deficiency in the transfer of the equipment to the emergency mode will display a transfer fault condition.

## Over/Under Voltage Monitoring

During system initialization, the  $\mu$ p will sample and verify the utility voltage against preset limits stored in the memory. If after five clock cycles the voltage does not fall within the pre-determined parameters, the unit will not complete initialization and will toggle the red (fault) and green (AC on, charge status indicator) in the following manner:

- Both RED and GREEN LED's fast toggle with audible tone - AC line over-voltage
- Both RED and GREEN LED's slow toggle - AC line under-voltage

## Optional Self-Testing\*

### (standard on select models)

The self-testing routine, if enabled, is a function of the internal  $\mu$ p clock and the code generated sequence timer. Every thirty days, the program commands the  $\mu$ p to perform a self-test by transferring the unit to the emergency mode for a period of one minute with the exception of the sixth and twelfth month. On the sixth and twelfth month, the self-test duration is extended to 30 minutes to exercise the battery.

*\* Note: NFPA 101 does not allow a self-testing diagnostics board to run the required annual 90-minute test. Refer to the 2006 version of NFPA 101, section 7.9.3.1.2 (1) through (7).*

The Smart Charger circuitry is also equipped with a manual test inhibitor. While the equipment is in a high charge state due to prolonged power outage or extended on-site testing equivalent to 10 minutes discharge time, the 90-minute manual test mode shall be inhibited to allow the unit to recover properly for life safety purposes. During this time, the user may initiate a one-minute test to verify proper operation of the equipment.

## Audible/Non-Audible Diagnostics

Smart Charger is equipped with an audible user interface confirmation standard. However, the audible diagnostics feature is a selectable option. Standard diagnostics equipment offers visual verification of the equipment readiness through the flashing sequence of the RED LED in the following manner:

Fault condition status, number of RED flashes:

- 1 X - Battery Fault
- 2 X - Lamp Failure
- 3 X - Charger Fault
- 4 X - Transfer Fault

- Both RED and GREEN LED's fast toggle with audible tone - AC line over-voltage
- Both RED and GREEN LED's slow toggle - AC line under-voltage

