

Auto-Test Self-Diagnostics

General Description

The Auto-Test Self-Diagnostics continuously monitors normal unit operation and automatically performs discharge tests at programmed intervals to exercise battery and check emergency operation. The microcontroller self-diagnostic logic circuits detect the malfunction in battery, charger, transfer circuit or emergency lamps by means of a separate multi-colour LED indicator. An additional LED indicates charger mode and a single test switch allows for a variety of manual test at anytime.

Operation

Setup & Standard Operation

1. To Reset/Initiate, disconnect batteries and turn off AC power supply for 10 seconds. Re-connect batteries and turn on AC power. The system will automatically test unit operation. It also will reset and start all counters for automated operations.
2. To manually test lamp output, follow instructions in Variable Duration System & Load Tests. The CHARGE and DIAGNOSTIC indicators will go out and the DC lamps will come on. If any part of the unit fails during the testing duration then the DIAGNOSTIC indicator will show the appropriate colour as outlined below.
3. When AC fails, the DC lamps will be turned on by a delay of 3 seconds.
4. After AC resumes, the DC lamps will be turned off. (With optional AC time delay, the DC lamps will remain for 10 minutes or specified time (automatic re-transfer delay), then extinguish.) The CHARGE LED will come on.
5. A steady green CHARGE indicator indicates a high charge rate. After the battery has reached full charge, the indicator light will go out. Under normal operation, the charge indicator will turn off and on intermittently while the unit is in standby mode (normal AC present) since the charge rate will vary in order to maintain an optimal battery charge.
6. A flashing green DIAGNOSTIC LED indicates that there has been a power failure/loss of AC in the past 48 hours. The 90 minutes Manual Test will not be allowed during this period, and the 90 minutes Auto-test will be started after 48 hours has passed and indicator turns back to steady green.

Load Calibration

1. The Auto-Test Self-Diagnostics is designed to monitor and indicate any changes (i.e. burnt out lamps) in the lamp load that has been connected to the output circuit(s) of the unit. In order to accurately test the connected load, the load detection circuitry must first be calibrated to the exact load. The DC lamp loads **MUST** be turned off for more than 2 minutes before calibration starts. Otherwise, system will not indicate a successful calibration and Load Diagnostics feature will not be enabled.
To calibrate: Press Test Switch four times, within three seconds. Once the system has completed the load calibration, the DIAGNOSTIC indicator will briefly flash red (one time). Charger with optional audible alarm feature will also buzz one time.
2. If any remote fixtures/lamps are added or removed from the connected load circuits, or if any lamps are changed replaced with ones of a different wattage, the load calibration needs to be repeated. If the load has changed and the system has not been recalibrated, the Load Diagnostics might indicate a lamp problem even though one may not exist.

TROUBLESHOOTING - RESET CHARGER BOARD

1. To clear any unit failures OR problems from indicating on the DIAGNOSTIC LED, disconnect batteries and turn off AC power supply for 10 seconds to RESET the charger board. Reconnect battery and resume AC, then re-calibrate load.

Variable Duration System & Load Tests

1. The unit and connected load can be auto-tested for various preset durations by pressing the Test Switch. During 5 or 90 minutes test, the DIAGNOSTIC LED will indicate flashing yellow. If battery fails before any manual test duration has completed, a steady red will be displayed. These tests will not trigger the optional AC time delay, therefore allowing the unit to turn off the lamps once the test is completed. The multiple durations can be selected as follows:

Instant Test: Press and hold Test Switch for more than 3 seconds, holding another 3 seconds will complete the LAMP DIAGNOSTICS check.

5 Minutes Test: Press Test Switch 2 times, within 3 seconds.

90 Minutes Test: Press Test Switch 3 times, within 3 seconds.

Momentary Test: Useful during installation, connect battery only (without AC connected), press and hold Test Switch.

To CANCEL any manual test: Press and hold Test Switch for 5 seconds.

Battery or Charger Diagnostics

Charger:

During normal operation, the on-board microcontroller constantly monitors charger performance. Should charger output vary from design parameter values, the DIAGNOSTIC LED will show flashing Red.

Transfer:

A failure of the unit to transfer to battery power during an power outage will cause the DIAGNOSTIC LED to flash Red.

Battery:

Disconnection of the batteries from the charger will cause the DIAGNOSTIC LED to flash Red. If the battery voltage drops too low or the unit fails to provide battery power for the required duration during a manual/automated test, the DIAGNOSTIC LED will display steady Red. Charger with optional audible alarm feature will also buzz continuously until system is reset.

To prevent battery damage: Do not connect battery to charger for more than 7 days when AC is not present.

Lamp / Remote Load Diagnostics

Lamps:

Once the load has been calibrated, should the lamp load become disconnected or some lamps burn out, the DIAGNOSTIC LED will display a steady yellow colour. Every time the lamp load is turned on, the system checks and compares the connected load to the value stored in memory during the last load calibration (lamps must be off for more than 2 minutes for load diagnostics to be activated). If the values do not match (i.e. a burn out lamp) then the DIAGNOSTIC LED will display a steady yellow colour. Charger with optional audible alarm feature will also buzz continuously until system is reset. Please note that in order to reduce false lamp load warnings, the system will only report load discrepancies greater than 9W for 6V, 12W for 12V, and 24W for 24V charger.

Short Circuit Protection:

If a short is detected in the DC lamp load, the DIAGNOSTIC LED will become steady yellow and system is shut down. To clear alarm, charger needs to be reset and short must be removed.

Testing / Diagnostics

Automated Testing:







The auto-test counter of charger will start when both AC and battery are first applied. When automatic testing is underway the DIAGNOSTIC LED will be flashing yellow. A steady Green DIAGNOSTIC LED indicates normal operation.

Automated Diagnostic Routine

The Auto-Test automatically initiates a five minute discharge/diagnostic test every month and two 90-minute discharge/diagnostic tests every 6 months. Twenty-four hours following the first 6 month test, the unit retests again to ensure that the charger has completely recharged the battery. The lamps and connected remote load will come on during these tests. The tests exercise the battery to optimize its capacity and analyse the unit's emergency operation performance. Any malfunction of the transfer circuit, batteries or emergency lamps will cause the multi-colour DIAGNOSTIC LED on the unit to indicate the problem. The DIAGNOSTIC indications will remain latched (stay on) in the system until corrected or reset.

Diagnostics Display

The Auto-Test Self-Diagnostics provides visual indication of unit status via a multi-coloured LED. The LED may indicate just one or any combination of the various conditions as follows:

-  Steady Green : Normal Operation
-  Flashing Green : AC Interruption in Last 48 Hours
-  Steady Yellow : Lamp Circuit Malfunction
-  Flashing Yellow : Auto-test or Manual Test in Progress
-  Steady Red : Battery Failed Testing
-  Flashing Red : Battery Disconnected or Charger Malfunction

Battery Unit LEDs
and Test Switch
Configuration

