APPLICATION NOTE NUMBER 18
IQ CHARGER ALARM TESTING

Introduction

This Application Note describes how to test IQ charger alarms to ensure they are working properly. Two methods exist to test IQ charger alarms. One option is to use the "Relay & Display Test" provided via the charger front panel (available with version 3.00 or later firmware). The second option is to force actual alarm conditions. Both options are described in more detail below.

Default Alarm Relay States

When no AC or DC power is applied to the charger, the alarm relays will default to the following states:

Charger Fail = OK
AC Fail = FAIL
High DC = OK
Ground Fault = OK
Battery Check = OK
Low DC = FAIL
Battery End-of-Discharge = FAIL

Relay & Display Test

The Relay & Display Test is a simple way to test that all alarm relays, LEDs, and the charger LCD display are working properly (available with version 3.00 or later firmware). Initiate the test using the charger front panel display under the "Other" menu option and by choosing "Relay & Display Test." Press the UP arrow to set alarm relays to FAIL, LCD fully black, multi-color LEDs red, and single-color LEDs on. Press the DOWN arrow to set alarm relays to OK, LCD blank, multi-color LEDs green, and single-color LEDs off. A single button press will engage the test for two seconds. Holding the button will test continuously and for ten seconds after button release.

Note: The charger User Interface Mode must be set to Normal or Expert to access this test. Adjust the User Interface Mode using the charger front panel display under the "Other" menu option. The Unlock/Lock jumper on the charger control board must be in the unlock position before adjusting the User Interface Mode

Forced Alarm Conditions

The following procedures force alarm conditions to trigger actual alarms. Testing alarms in this way will not cause any damage to the charger.

CAUTION:
ONLY TRAINED AND QUALIFIED PERSONNEL
MAY PERFORM ALARM TESTING AS IT EXPOSES
TESTER TO LIVE AND HAZARDOUS
HIGH VOLTAGE POTENTIALS.

Note: A programmable time delay applies to all relays except AC Fail. Adjust the time delay (from 5-50 seconds, in one second increments) using the charger front panel display under the "Alarm settings" menu option. When testing alarms, it is useful to reduce the alarm relay delay to expedite testing time.

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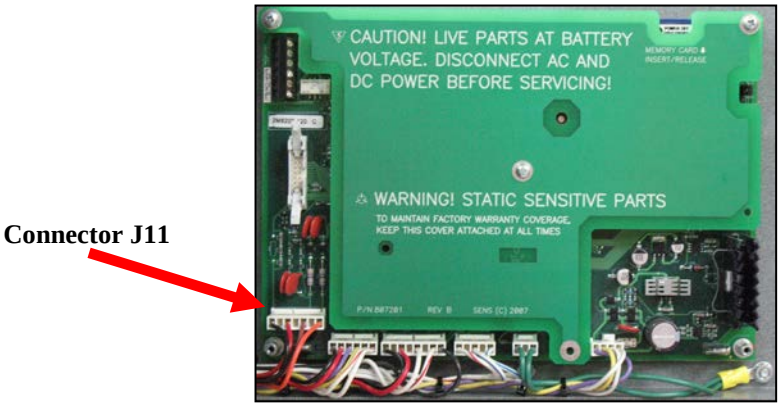
Charger Fail Alarm

The Charger Fail alarm is triggered after the user-adjustable (5 to 50 seconds) delay.

Test Procedure:
Without AC or DC power applied to the charger, unplug connector J11 from the Control printed circuit board located on the charger front door (see Figure 1). Apply AC power to the charger to trigger the alarm.

Figure 1



AC Fail Alarm

The AC Fail alarm is triggered immediately, no delay.

Test Procedure:
Apply AC power to the charger. With batteries or a DC source connected to the output of the closed DC breaker, open the AC breaker or shut off AC power to trigger the alarm.

High DC Alarm

The High DC alarm is triggered after the user-adjustable (5 to 50 seconds) delay. Testing the High DC alarm requires a DC source, such as a DC power supply, to externally induce the alarm.

Test Procedure:
Disconnect batteries and load from charger. Apply AC power to the charger. With a DC source connected to the output of the closed DC breaker, provide a DC voltage above the adjustable volts per cell setpoint (user-programmable) to trigger the alarm. View the "High DC volt alarm" setpoint voltage from the charger front panel display under the "Alarm settings" menu option.

Ground Fault Alarm

The Ground Fault alarm is triggered after the user-adjustable (5 to 50 seconds) delay.

Test Procedure:
Apply AC power to the charger. With nothing connected to the closed DC breaker, use a jumper wire to temporarily connect the DC breaker output terminal to the chassis to trigger the alarm. It is acceptable to connect either the positive or negative breaker output terminal to the chassis, resulting in either a positive or negative ground fault.

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Battery Check Alarm

The Battery Check alarm is triggered after the user-adjustable (5 to 50 seconds) delay. The Battery Check Alarm is only available on the Extended Relay Alarm printed circuit board.

Test Procedure:
Apply AC power to the charger. Under the "Battery Check" menu option from the charger front panel display, adjust the "Minutes batt. check duration" to one minute. With nothing connected to the closed DC breaker, press the "BATT CHCK" button on the charger front panel twice to start a battery check test. The test will finish after one minute, triggering the alarm.

The audible alarm will sound for 25 seconds, however pressing the front panel "ENTER/BACK" button before the 25 second timeout will shut off the audible alarm. To fully clear a failed battery check, run a successful battery check test. If this is not an option, press the front panel ENTER/BACK button twice to remove/turn off the red BATT CHCK LED. This LED will remain blank until another Battery Check test is engaged. The tripped Battery Check relay cannot be reset until a new Battery Check test successfully passes or until Battery Check is disabled. To disable, return to the "Battery Check" menu option from the charger front panel display and set the "Battery Check front panel button" to OFF. Once finished, reset the battery check feature as desired.

Low DC Alarm

The Low Battery alarm is triggered after the user-adjustable (5 to 50 seconds) delay. Testing the Low DC alarm requires a DC source, such as a DC power supply, to externally induce the alarm.

Test Procedure:
Disconnect AC power, batteries and load from charger. With a DC source connected to the output of the closed DC breaker, provide a DC voltage below the adjustable volts per cell setpoint (user-programmable) to trigger the alarm. View the "Low DC volt alarm" setpoint voltage from the charger front panel display under the "Alarm settings" menu option.

Battery End-of-Discharge Alarm

The Battery End-of-Discharge alarm is triggered after the user-adjustable (5 to 50 seconds) delay. The Battery End-of-Discharge Alarm is only available on the Extended Relay Alarm printed circuit board. Testing the Battery End-of-Discharge alarm requires a DC source, such as a DC power supply, to externally induce the alarm.

Test Procedure:
Disconnect AC power, batteries and load from charger. With a DC source connected to the output of the closed DC breaker, provide a DC voltage below the adjustable volts per cell setpoint (user-programmable) to trigger the alarm. View the "Bat end disch alarm" setpoint voltage from the charger front panel display under the "Alarm settings" menu option.

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