g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-1027**

Test Procedure for SSB Convertec L1027 Battery Charger

DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	E. Rouse	8/6/09
B	Added calibrated current and voltage meters to verify panel meters. Also added part number labeling instructions to section 7	C. Wade	8/28/2009
C			

At next revision, change header to LOU-SSB-L1027, better describes unit. C. Wade

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
Eric Rouse			Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
8/6/2009			8/28/2009

1. SCOPE

1.1 This is a functional testing procedure for a SSB Convertec L1027 battery charger module.

2. STANDARDS OF QUALITY

2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. APPLICABLE DOCUMENTS

3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

3.1.1 Original SSB operating instructions for test equipment battery charger BAT174 and L1027(A) document Art. No. 88-80-61*000010 Rev.0.0, for reference only.

3.1.2 L1014A/L1027A user manual. PDF

4. ENGINEERING REQUIREMENTS

4.1 Equipment Cleaning

4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to the local documented procedures for cleaning guidelines.

4.2 Equipment Inspection

4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

4.2.1.1 Wires - broken, cracked, or loosely connected

4.2.1.2 Terminal strips / connectors - broken or cracked

4.2.1.3 Components - visually damaged

4.2.1.4 Capacitors - bloated or leaking

4.2.1.5 Solder joints - damaged or cold

4.2.1.6 Circuit board - burned or de-laminated

4.2.1.7 Printed wire runs / Traces - burned or damaged

5. EQUIPMENT REQUIRED

5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference#	Description
1	H188816	SSB Test Fixture for L1027(A) and BATT174 battery chargers. 0541 626 5 /501
1	H188829	Light bulb load with two regular light bulb sockets. Install a 75w bulb in one socket and a 100w bulb in the other socket.
2		Digital multi-meter (Fluke 85 or equivalent)

Special Note 1: COMPONENT IMPROVEMENTS TO MAKE THE L1027 CHARGER MORE ROBUST

Each unit in for repair will have all electrolytic capacitors replaced with new ones that are completely sealed and have an improved operating temperature range of –40 to 105 degrees C.

Special Note 2: Some indicator lamps on top of the fixture are labeled with two names. The names in parenthesis correspond to testing the L1027.

6. TESTING PROCESS

6.1 Theory Of Operation – Charger and Test Fixture Cabinet

The difference between the L1027 and L1027A chargers is that the L1027A has a temp sensor input and 3 LED indicators that are not found on the L1027.

The L1027 is basically a fixed 166VDC power supply with a 1.1 amp current limited output. It has one adjustment pot on the back to set the output voltage. When more than 1.1 amps is attempted to be drawn from the supply it will roll back it's output voltage even to the point of tripping the UV/OV OK relay contacts open.

The charger performs a battery check every 7.5 seconds to determine if the connected battery is working properly. To do the test, it shuts off supply current to the battery and then pulse loads the battery with 1.6 amps and measures to see if the pole voltage is above a fixed low voltage threshold of 130 volts, which cannot be adjusted. If two battery tests fail in a row the BATT/MAINS OK relay contact will open and stay open until at least one battery test passes. This is why it takes about 15 seconds for the BATT/MAINS OK lamp on the fixture to go off when you disconnect the battery.

The BATT/MAINS OK relay in the charger remains on as long as the charger detects a battery is connected and the main AC power to the unit is present. This causes a relay contact to close and turn ON the green (MAIN/BATTERY OK) lamp on the fixture and open a contact to turn OFF the red (MAIN/BATERY FAULT) lamp.

When the battery is disconnected or with the absence of main AC power, the BATT/MAINS relay in the charger will de-activate and open a contact to turn OFF the green (MAIN/BATTERY OK) lamp on the fixture and close a contact to turn ON the red (MAIN/BATERY FAULT) lamp.

As long as the battery charging voltage is within the proper range of 111 to 181 Vdc, the UV/OV relay in the charger will activate and close a contact to turn ON the green (OVER-/UNDER-VOLTAGE OK) lamp on the fixture and open a contact to turn OFF the red (OVER-/UNDER-VOLTAGE FAULT) lamp. If the charging voltage level is out of the range the UV/OV relay will de-activate and open the contact to turn OFF the green (OVER-/UNDER-VOLTAGE OK) lamp on the fixture and close the contact to turn ON the red (OVER-/UNDER-VOLTAGE FAULT) lamp.

The MAIN switch on the test fixture is used to apply power to the entire test fixture cabinet.

The white SYSTEM ON lamp is used to indicate power to the entire test fixture cabinet.

The red CHARGER OUT POS, BATT PACK POS and LAMP LOAD POS banana jacks allow the output of the charger to be connected to either the battery pack inside the fixture or to the external lamp load. You can also connect the lamp load directly to the battery pack in order to discharge it some. Sometimes it's nice to have a partially discharged battery pack in order to test and troubleshoot certain features of the supply.

The BATTERY / LAMP switch applies the output of the charger to the battery pack inside the fixture or to the external lamp load depending on which of the two has been patched-in via the banana jacks on top of the fixture

The TEST ON button commands an AC interlock circuit in the fixture to apply 120VAC to the AC input terminals of the charger. The charger then turns on and begins to charge the batteries inside the fixture or power the lamp load. The TEST ON button also lights up green for the occasion.

The purpose of the AC interlock circuit is to prevent power from being re-applied without first cycling the MAIN switch off and back on again.

The TEST OFF button trips the interlock circuit to kill AC power to the charger.

The ESTOP button is a NC switch in series with the TEST OFF button. When activated, it will also kill AC power to the charger and trip the interlock circuit. The main difference is that the ESTOP button has to be manually pulled back up and the MAIN power recycled again to get things rolling.

The Charging Voltage meter is simply used to display the output voltage level of the charger.

The Charging Current meter is simply used to display the amount of current being drawn from the charger by the battery pack or the lamp load.

6.2 Test Setup

6.2.1 Turn the MAIN switch on the SSB test fixture OFF.

6.2.2 Pull the ESTOP button on the fixture OUT.

6.2.3 Turn the BATTERY/LAMP switch OFF.

6.2.4 Plug the power cord of the fixture into an AC outlet.

6.2.5 Lift the Lexan shield on the fixture and slide the UUT into the metal holding bracket.

6.2.6 Connect the 3-pin cable to the front of the unit the 10-pin cable to the back. Leave the other 3-pin cable in the back disconnected because the L1027 does not require an external temp sensor.

6.2.7 Lower the Lexan shield.

6.2.8 Connect the CHARGER OUT POS jack to the BATT PACK POS jack on top of the test fixture. Connect current meter in series to monitor panel meter.

6.2.9 Connect the 75w bulb of the light bulb load across the red and black banana jacks on the right-hand side of the fixture.

Special Note 2: Some indicator lamps on top of the fixture are labeled with two names. The names in parenthesis correspond to testing the L1027.

6.3 Test Procedure

6.3.1 Turn the MAIN switch ON.

6.3.2 Verify the white SYSTEM ON lamp is ON.

6.3.3 Verify the red (OVER-/UNDER-VOLTAGE FAULT) lamp is ON.

6.3.4 Verify the red (MAIN/BATTERY FAULT) lamp is ON.

6.3.5 Push the TEST ON button.

6.3.6 Verify the green TEST ON lamp is ON.

6.3.7 Wait up to 20 sec for the green (OVER-/UNDER-VOLTAGE OK) lamp to come ON.

Special Note 3: It's normal for the Charging Voltage and Charging Current meters to pulsate momentarily during each battery test every 7.5 seconds.

6.3.8 Verify 166VDC (+-5%) on the Charging Voltage meter.

6.3.9 Connect the Fluke 85 (or equiv) multi-meter to the DMM jacks just above the Charging Voltage meter to get a very accurate reading of the output voltage.

6.3.10 Adjust the pot on the back of the charger for exactly 166VDC on the Fluke meter.

6.3.11 Turn the BATTERY/LAMP switch ON to connect the battery pack.

6.3.12 Wait up to 20 sec for the green (MAIN/BATTERY OK) lamp to come ON.

6.3.13 Verify 150 – 166VDC volts on the Charging Voltage meter, depending on how well the batteries are charged.

6.3.14 Verify 0 - 1.1 amps on the Charging Current meter, also depending on how well the batteries are charged.

6.3.15 Turn the BATTERY/LAMP switch OFF to disconnect the battery pack.

6.3.16 Wait up to 20 sec for the red (MAIN/BATTERY FAULT) lamp to come ON.

6.3.17 Verify approx 166VDC (+-5%) on the Charging Voltage meter.

6.3.18 Verify 0 amps on the Charging Current meter.

6.3.19 Flip the BATTERY/LAMP switch back to the ON position.

6.3.20 Wait up to 10 sec for the red (MAIN/BATTERY FAULT) lamp to go OFF.

6.3.21 Push the TEST OFF button.

6.3.22 Wait up to 20 sec for the red (OVER-/UNDER-VOLTAGE FAULT) and (MAIN/BATTERY FAULT) lamps come ON.

6.3.23 Turn OFF the MAIN switch

6.3.24 Disconnect the BATT PACK POS jack and move it over to the LAMP LOAD POS jack to allow the charger to power the lamp load.

6.3.25 Turn the MAIN switch back ON.

6.3.26 Press the TEST ON button.

6.3.27 Verify the 75w bulb lights up bright and draws .75 to 1 amp on the Charging Current meter and the Charging Voltage meter remains steady at 166VDC (+-5%) for at least 10 minutes.

Special Note 4: It's normal for the light bulb to flicker during each battery test every 7.5 seconds. In addition the (MAIN/BATTERY FAULT) lamp will be ON during this test because the light bulb will naturally fail to be a voltage source during a battery test.

6.3.28 Now add in parallel the 100w light bulb across the 75w bulb to draw enough current to lower the output voltage enough to trip the red (OVER-/UNDER-VOLTAGE FAULT) lamp.

6.3.29 Disconnect the 100w bulb to verify the (OVER-/UNDER-VOLTAGE FAULT) lamp goes back off.

6.3.30 Turn the MAIN switch back OFF

6.3.31 Disconnect the LAMP LOAD POS jack and move it back over to the BATT PACK POS jack to connect the charger back to the battery pack.

6.3.32 Flip the BATTERY switch back to the OFF position.

6.4 ******TEST COMPLETE ******

7. NOTES

7.1 Unit is to be labeled with the following two part numbers, ????????? & C6-03-02*05, before being place on the QA shelf.

8. ATTACHMENTS

8.1 Note at this time