



GE Energy

Functional Testing Specification

*Parts & Repair Services
Louisville, KY*

LOU-GE-COMPTST

Test Procedure for Component testing a Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	R. Duvall	6/19/02
B	Added section for Items sent out to external vendors	R. Duvall	11/10/03
C	Added SCRs to the list and changed header	C. Wade	8/7/2008
D	Added Chip ID test for all turbine cards	C. Wade	3/17/2009
E	Added 6.1.8, Capacitor Bank	C. Wade	5/13/2009
F	Added line 6.1.4 about powering up LEDs	S. Pharris	6/29/2009
G	Added section 6.1.7 concerning MOV testing	M. Starling	11/3/2009

© COPYRIGHT GENERAL ELECTRIC COMPANY

Hard copies are uncontrolled and are for reference only.

PROPRIETARY INFORMATION – THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF GENERAL ELECTRIC COMPANY AND MAY NOT BE USED OR DISCLOSED TO OTHERS, EXCEPT WITH THE WRITTEN PERMISSION OF GENERAL ELECTRIC COMPANY.

PREPARED BY R. Duvall	REVIEWED BY S. Pharris	REVIEWED BY	QUALITY APPROVAL R.Duvall
DATE 06/19/02	DATE 6/29/2009	DATE	DATE 06/19/02

LOU-GE-COMPTEST REV. G	g GE Energy <i>Parts & Repair Services</i> <i>Louisville, KY</i>	Page 2 of 5
---------------------------	--	-------------

Functional test procedure for component testing

1. SCOPE

1.1 This is a functional testing procedure for a.

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.

2.1.1 Check board's electronic folder (Unit Under Test) for more information

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 or cracked

4.2.1.2 Terminal strips / connectors broken or cracked

4.2.1.3 Loose wires

4.2.1.4 Components visually damaged

4.2.1.5 Capacitors leaking

4.2.1.6 Solder joints damaged or cold

4.2.1.7 Circuit board burned or de-laminated

4.2.1.8 Printed wire runs 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	N/A	Digital Multimeter
1	N/A	Power Supply
1	N/A	LCR Meter (if required)
1	N/A	Frequency counter (if required)
1	N/A	Computer (Mark VI area) for checking serial IDs if required

<p>LOU-GE-COMPTEST REV. G</p>	<p>g</p> <p>GE Energy Parts & Repair Services Louisville, KY</p>	<p>Page 3 of 5</p>
--	--	---------------------------

6. TESTING PROCESS

6.1 Testing Procedure

6.1.1 Resistors:

6.1.1.1 Verify value as best as possible using a digital multimeter.

6.1.2 Diodes:

6.1.2.1 Replace all Glass bead diodes with new

6.1.2.2 Replace any fast recovery diodes with new

6.1.2.3 Use the diode setting on the DMM to check all remaining diodes

6.1.3 SCRs:

6.1.3.1 Replaced all SCRs with new.

6.1.4 Apply power 5VDC to LED and verify it illuminates.

6.1.5 Relays:

6.1.5.1 Apply power to any relays one at a time and check the resistance of all contacts in the energized and de-energized position.

6.1.6 Inductors:

6.1.6.1 Use the LCR meter to check any inductors found on the card.

6.1.7 MOV's

6.1.7.1 Use DMM set for resistance to check across all MOV's. Replace any MOV that exhibits a low resistance or shorted condition. Note: It may be necessary to remove one leg of an MOV to acquire a proper reading.

6.1.8 Crystals and Oscillators:

6.1.8.1 Replace all crystals with new.

6.1.8.2 Oscillators should have their output verified by applying power and checking the output with a frequency counter. If for some reason this cannot be done then replace with new.

6.1.9 Integrated Circuits:

6.1.9.1 Replace all integrated circuits with new or test off of the UUT and record method in Service Actions.

6.1.10 Capacitor Banks for Innovation Equipment

6.1.10.1 Apply 100 to 150 volts to capacitors banks watching current draw as you apply power. There should be an initial draw of current, but as the capacitors charge their current should drop to a trickle. If not, check for a reversed or shorted capacitor.

<p>LOU-GE-COMPTEST REV. G</p>	<p>g</p> <p>GE Energy <i>Parts & Repair Services Louisville, KY</i></p>	<p>Page 4 of 5</p>
--	---	---------------------------

6.1.11 Mechanical Parts:

6.1.11.1 Verify operation and assembly of all mechanical parts of the device. (ie. Gears, dials, hinges, latches, etc.)

6.2 Turbine Cards Only - Chip ID Check

6.2.1 Background information - ID chips need to be read to confirm that they have all been programmed properly. Any blank or mis-programmed ID chips leaving the factory and seeing service out in the field is higher than you might think. This can cause some problems with equipment, maybe even hard failures, even when nothing else is wrong with the card depending on how the customer's software is set up.

6.2.2 Special Note for moving around in the program. Use F10 to back out of whatever screen is presently displayed. If you would like to return to the main menu, for example to test or program a different model number. Press F10 to back out one screen at a time until the main menu is displayed. Then select *ID PROM Programmer* from the menu list and select the new model number. If you happen to press the F10 button too many times, you will see the DOS prompt C:\JOBS\MENU. To get back to the main menu simply type CD\ then hit enter. You should now see C:\ prompt; Now type MENU and press the enter key.

6.2.3 Process - Simply take the card over to the CHIP ID Computer located in the MARK VI area of the shop and select the correct model from the menu and follow the instructions given to you by the PC. When selecting which model to use, you may see a 5G or 7G next to the number. This refers to the serial number and whether it has 5 or 7 digits in it. Select the proper one, as you will be expected to type this number into the system at a given point. When entering this data, be sure to use all CAPITAL LETTERS as lower case might cause it not to agree with what's programmed in the chip. If the particular revision you need to select doesn't have a 5G or 7G next to it, then get with Monte Starling to have it added before proceeding. **A trick to remember about chip ID serial numbers:** If for some reason your serial number is a 6 digit one, like the R##### numbers given out to units that arrive in our Receiving Dept. without serial number labels, you'll only need to type in some sort of gibberish to get the system to spit out an error when it compares it to what's in the chip, at which point it will tell you what serial number it found, then

<p>LOU-GE-COMPTEST REV. G</p>	<p>g</p> <p>GE Energy Parts & Repair Services Louisville, KY</p>	<p>Page 5 of 5</p>
--	--	---------------------------

it'll ask you if you want to change it to the one you typed in. Your answer will be NO, to let it fail the test and quit programming. Be sure to jot down what the number was found in the chip and print off this number in a barcode label to place on the card instead of the in-house serial number that Receiving stuck on it. Then go back and re-try the test with the correct serial number. This trick works for boards with un-readable or marred up serial number labels, too.

6.2.4 *TEST COMPLETE *****

7. NOTES

- 7.1** A printed electronic copy of a drawing can be used as an aid for a technician, where circuits may be marked off or highlighted on a drawing to denote what has or has not been checked during the test process.