



GE Energy

Functional Testing Specification

*Parts & Repair Services
Louisville, KY*

**LOU-MG-3300A03B00xx-NE-A
Voltage Regulator**

Test Procedure for a Voltage Regulator for GE Nuclear

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| DATE 11/3/2008 | DATE | DATE | DATE 11/4/2008 |

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1. SCOPE

1.1 This is a functional testing procedure for a Voltage Regulator for GE Nuclear.

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 Check unit for GEK 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, 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 | | Oscilloscope |
| 1 | | 120VAC Variac |
| 1 | | Load (Light Bulb) |

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6. TESTING PROCESS

6.1 Visual Test & Rework Process

- 6.1.1 Disassemble unit and check all soldering work. Resolder any bad joints and fill in holes. Use spare solder runs for filler if needed.
- 6.1.2 If electrolytic capacitors are over a year old, replace them with new.
- 6.1.3 Once completed have someone else look unit over after you have finished.
- 6.1.4 When done reapply conformal coating to the solder side of the board.
- 6.1.5 Label unit with a NE at the end of the part number; probably have to make a new label. This NE stands for Nuclear Energy. Also affix a bar coded serial number to the unit, for better tracking.
- 6.1.6 On the bottom of the unit label clearly the month and year unit was built, or rebuilt if you need to change out capacitors.
- 6.1.7 All holes on top of assembly should be labeled clearly or covered over. This can be done by a simple plastic or metal plug. I have also used the silver labels from the old Silco serial number labels to cover silkscreen information and the hole, but I had to cut to size. These labels look similar to the color of the MG plate. These labels are in the plastic bin boxes in the hardware section of the warehouse.
- 6.1.8 Fill out a PQC sheet (which comes from GE NE) on each regulator and return sheet back to GE NE (ship with part). Do not forget to add the flashing requirements on the PQC, see past examples. See binder GE NUCLEAR MG REQUESTS for example PQC forms, locate by the QA Rep.

6.2 Setup

- 6.2.1 Connect a power cord via 120VAC Variac to terminal 5 (neutral) and terminal 7 (line voltage). There should be a jumper between terminals 6 & 7.
- 6.2.2 If not done already, hook up a 500-ohm test pot across terminals 2, 3, & 4, see diagram for further clarity. There should be a rheostat with the load.
- 6.2.3 The light bulb should be connected across terminals 10 & 11 to simulate load.
- 6.2.4 Connect scope across D1, this will allow you to monitor the SCR's firing angle as the voltage regulator is adjusted. You may have to use a ground isolation plug on the scope to keep scope from interfering with regulator.

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6.3 Testing Procedure

- 6.3.1** Slowly increase the variac's voltage to get the SCR to conduct between NO LOAD to FULL LOAD, if variac appears to be binding as voltage is increased, check connections and look for any shorts. The light will be off for NO LOAD and on for FULL LOAD.
- 6.3.2** Vary the pots until you get desired waveform. Once the full load waveform is selected and it has stabilized, turn off the unit then on again, and the regulator should go to full conduction and slowly come back to original cal setting.
- 6.3.3** Power down and change connection from terminals (6 & 7) to (6 & 8) and check settings. If OK, then power down again and change connection from (6 & 8) to (6 & 9) and check settings again. This checks the diodes and capacitors that the original connection missed.
- 6.3.4** Let unit burn in for at least 30 minutes.

6.4 *TEST COMPLETE *****

7. NOTES

- 7.1** None at this time

8. ATTACHMENTS

- 8.1** None