g GE Energy	**Functional Testing Specification**
Parts & Repair Operations ***Louisville, KY***	**LOU-GED-193X529xx**

Test Procedure for a Valutrol Main Control Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	J. Barton	6/25/02
B	Attached Picture & Changed Header	C. Wade	12/04/2006
C	Clarified instructions	G. Chandler	10/23/2008
D	Clarified instructions	C. Wade	4/10/2009

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PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
J. Barton	G. Chandler		Robert Durell
DATE	**DATE**	**DATE**	**DATE**
06/25/02	10/23/2008		06/25/02

Functional test procedure for a Valutrol Main Control card

1. SCOPE

1.1 This is a functional testing procedure for a 193X529xx Main control card.

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 GEK-45115

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		Fluke 85 DMM or equivalent
1		Oscilloscope
1	H188638	Valutrol test Fixture

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6. TESTING PROCESS

6.1 Setup

6.1.1 Install and connect Main Control Card to test fixture

6.1.2 Verify all connections are correct

6.1.3 Set all pots to initial start-up settings

Note: All measurements are in respect to COM on MCC (Main Control Card)

6.2 Testing Procedure

6.2.1 ZERO ADJUST – sets up motor to zero speed with zero speed input

6.2.1.1 Jumper SR (Speed Reference) to COM

6.2.1.2 Connect meter to DR (Diagnostic Reference) to COM

6.2.1.3 Adjust Zero Adjust to (0) zero volt dc, remove jumper.

6.2.2 FWD / REV – checks armature pulses in FWD / Rev directions (If this test fails no other test will pass, suggest replacing all OP Amps and re-testing)

6.2.2.1 Diag. switch in neutral position

6.2.2.2 Start motor by operator station

6.2.2.3 Monitor VFB w/ O-Scope

6.2.2.4 Check for linearity in both FWD and REV direction

6.2.2.5 Return to STOP position

6.2.3 LINEAR TIME - adjusts ramp up time for motor to reach selected speed

6.2.3.1 Turn LIN TIME pot fully CCW

6.2.3.2 Switch Diag. Switch to Static position

6.2.3.3 Connect meter to TR test point

6.2.3.4 Adjust Local Ref Pot CCW to –10vdc

6.2.3.5 Return Diag. Switch to Neutral

6.2.3.6 Switch Diag. Back to Static and verify ramp up time to –10vdc is instantaneous

6.2.3.7 Return Diag. Switch to neutral

6.2.3.8 Rotate LIN TIME CW

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6.2.3.9 Switch Diag. Switch to Static and verify ramp up time to –10vdc is approx. 10 seconds

6.2.3.10 Return LIN TIME back to fully CCW

6.2.3.11 Adjust Local Ref pot to 0V at TR

6.2.4 COMP Test –

6.2.4.1 Set Diag. Switch to Static

6.2.4.2 Connect Meter to CFB to COM

6.2.4.3 Adjust CURRENT REF on Diagnostic card to +5vdc

6.2.4.4 Connect meter to CEMF to COM

6.2.4.5 Adjust COMP pot to –1vdc (May need to adjust MAX SPEED pot if run led goes out, Over Current Relay trips)

6.2.4.6 Return meter to CFB and adjust Current Ref pot to 0V

6.2.4.7 Reset Unit by depressing Reset button

6.2.5 MAX SPEED – adjusts maximum speed of motor to run

6.2.5.1 Connect meter to TR test point

6.2.5.2 Switch Diag. Switch to RUN position

6.2.5.3 Adjust TR test point for +4vdc with Local REF pot on Diag. Card

6.2.5.4 Connect meter to TFB test point

6.2.5.5 Adjust MAX SPEED pot for +4vdc

6.2.5.6 Connect meter back to TR

6.2.5.7 Return TR back to 0vdc with Local REF pot and return Max Speed pot to fully CW

6.2.5.8 Return Diag Switch to neutral position

6.2.5.9 REF SCALE Test

6.2.5.10 On Operators Station (on door of test fixture)

6.2.5.11 Verify Speed Pot at (zero) 0

6.2.5.12 Jog Pot at (zero) 0

6.2.5.13 Place RUN / JOG Switch to RUN position

6.2.5.14 FWD / REV switch in FWD position

6.2.5.15 Connect meter to SR (Speed Reference)

6.2.5.16 Start unit

6.2.5.17 Adjust Speed pot to -10vdc

6.2.5.18 Stop unit

6.2.5.19 Place FWD / REV in REV position

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6.2.5.20 Verify +10vdc at SR

6.2.5.21 Return to FWD position

6.2.5.22 Connect DMM to TR & Start Unit

6.2.5.23 Adjust REF. Scale Pot CCW and observe approx. -9 to –11Vdc

6.2.5.24 Adjust REF. Scale Pot CW and observe approx. -15 to –17Vdc

6.2.5.25 Stop unit

6.2.6 Min. Speed Test

6.2.6.1 Connect DMM to SMIN

6.2.6.2 Adjust MIN Speed Pot and verify a resistance from 0 ohm's to 1K ohm's.

6.2.7 Current Limit Test

6.2.7.1 Switch to DIAG Static

6.2.7.2 Connect DMM to LR test point

6.2.7.3 Adjust Local REF. Pot to 0Vdc

6.2.7.4 Connect DMM to CFB

6.2.7.5 Adjust CUR REF pot for +4Vdc

6.2.7.6 Adjust CUR LIM pot CW

6.2.7.7 Connect DMM to DR and adjust Current limit CCW until meter moves from 0Vdc

6.2.7.8 Return Diagnostic switch to neutral position

6.2.8 CEMF Limit Test

6.2.8.1 Connect O-Scope to VFB

6.2.8.2 Start unit from Operators Station and in the Rev position

6.2.8.3 Rotate speed pot (operator speed) to fully CW position

6.2.8.4 Rotate CEMF Limit pot fully CCW

6.2.8.5 Rotate CEMF pot CW and notice output increase, (CCW peak is pointed, CW point is rounded)

6.2.9 Response Test

6.2.9.1 On operators station place switch in START mode

6.2.9.2 Monitor VFB with oscilloscope

6.2.9.3 Set RESPONCE pot completely CCW

6.2.9.4 Turn SPEED REF. pot to 4V per O-scope at VFB

6.2.9.5 Adjust Gain pot fully CW (output becomes unstable)

6.2.9.6 Adjust GAIN Pot CCW until stability returns on waveform

6.2.9.7 Stop

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6.2.10 Damp Test

6.2.10.1 Put Diag. Switch on static

6.2.10.2 Adjust CUR REF pot completely neg. at CEMF

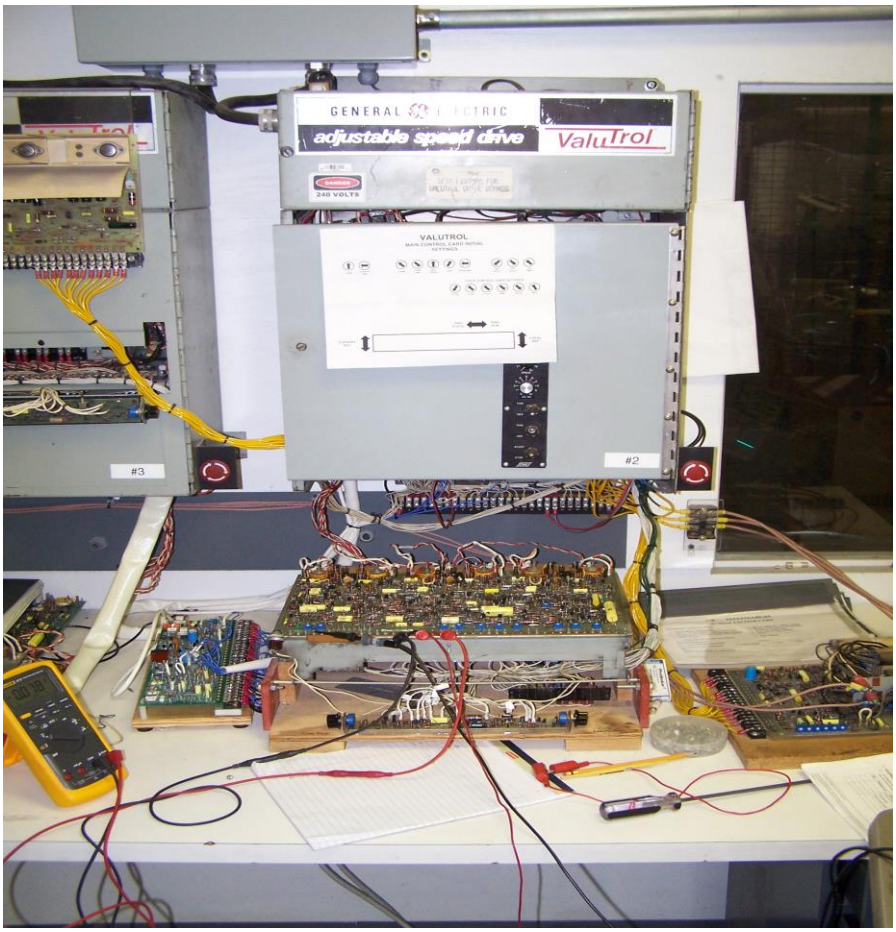
6.2.10.3 Rotate DAMP pot fully CCW

6.2.10.4 Monitor CEMF

6.2.10.5 Rotate DAMP pot fully CW and note approx. .05 V change

6.3 ***TEST COMPLETE ***

7. NOTES



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