g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-531X301DCC**

Test Procedure for a AC/DC 2000 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	D. Smith	01/11/99
B	Added initial column to section 5, revised procedure number, Incorporated both the DC2000 and 531X style cards	R. Duvall	6/14/02
C	Changed DAC test steps	L Groves	6/20/02
D	Converted procedure to new format	R. Duvall	6/21/02
E	Corrected header, removed comment "Replace U7 & U77 RAM Chips", added a picture of H033760 test fixture to section 7	C. Wade	8/30/06
F	Clarify steps 6.1.8, 6.2.3.1, & 6.2.35	K. Greenwell	12/2/2010
G	Notes about Turbine Control card firmware (531X301DCCAxG2) have been added to section 7. Firmware is not to be included on repair(s) unless it came in already installed on card. After testing card and firmware (if applicable); firmware should be shipped along with card in a separate ESD container for customer to install.	C. Wade	9/10/2014

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
David Smith	Kenny Greenwell	K. Greenwell	Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
1/11/99	1/11/99	12/2/2010	6/6/2007

1. SCOPE

1.1 This is a functional testing procedure for a 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.

3.1.1 GEK-85730 FOR 531X style cards

3.1.2 GEH-6005 for DS200 style cards

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		Fluke 87 DMM (or Equivalent)
1		Oscilloscope
1	H033758 or H033762	Drive Test Fixture (For DS200 style cards)
1	H033760	Drive Test Fixture (For 531X style cards)

6. TESTING PROCESS

6.1 Setup

6.1.1 Visually inspect U7 & U77, if made by Samsung, then replace.

6.1.2 Remove DCC card from drive.

6.1.3 Install latest firmware version available. (Firmware versions can be identified on the Salem MRP system).

6.1.4 Install EEPROM U9 from test board.

6.1.5 Verify jumper settings using GE TOOLBOX software.

6.1.6 Install board into drive ***DO NOT APPLY POWER***

6.1.7 On Control Panel measure from COM to all red test jacks and verify no shorts are on the power supplies. If any shorts or low ohm readings are found, correct before powering up drive.

6.1.8 NOTE: +5VDC will read between 130-220 ohms in circuit at red test jack.

6.2 Testing Procedure

6.2.1 Apply power by pulling E-Stop out.

6.2.2 Verify LCC programmer card displays “INITIALIZATION” then “MS 0% I 0%”.

6.2.3 Power supply verification.

6.2.3.1 Check power supply voltage at Control Panel and verify the following;

+5VDC +/- 0.1

+15VDC +/- 0.2

-15VDC +/- 0.5

+24VDC + 25-28

-24VDC – 25-28

6.2.4 DAC1 and 2 can be tested by charging REFP-63 (60 is max out on 531X0 settings. Meters labeled DAC1 and DAC2 will increase and decrease from 0-125% appox.

6.2.5 IMET1 & 2 can be tested by changingFDBP-69 (90 is max out). Meters labeled IMET1 & IMET2 (IMET1-4 on DS200) will increase and decrease from 0-125% approx.

6.2.6 Execute Test 12 “SCR Test”.

6.2.7 This can be done by entering the following in on the programmer; ([set], [drv], [7], [7], [Enter], [Reset], [Reset], [Test], [1], [2], [Enter].

6.2.8 LCC will display “Cell Test Passed”.

6.2.9 Press RESET on the Control Panel, this will take you out of DIAGNOSTIC MODE.

6.2.10 On Control Panel press IN 1-8, yellow lamps above IN 1-8 PB will change to red.

6.2.11 On Control Panel press CI 1-8, yellow lamps above CI 108 PB will change to red.

6.2.12 Push RUN switch up on Control Panel.

6.2.13 Verify MACPL 1-2 illuminates on control panel.

6.2.14 Increase and decrease REFP-63 (RUN REF) switch. Motor should increase and decrease in speed and LCC display MS % will match REFP-63 switch reading on control panel.

6.2.15 Set REFP-63 (RUN REF) switch to 10.

6.2.16 LCC display will read MS xx% xx%.

6.2.17 Push POL (REVERSE) switch on Control Panel up.

6.2.18 LCC display will read MS xx% xx%.

6.2.19 Push POL (REVERSE) switch on Control Panel down.

6.2.20 Push RUN switch down on Control Panel.

6.2.21 Push JOG switch up on Control Panel.

6.2.22 Increase and decrease FDBP-69 (JOG REF) switch. Motor should increase and decrease in speed and LCC display MS % will match FDBP-69 switch reading.

6.2.23 Set FDBP-69 (JOG REF) switch to 10.

6.2.24 LCC display will read MS xx% xx%.

6.2.25 Push JOG switch down on Control Panel.

6.2.26 Push RUN switch up.

6.2.27 Push XSTOP switch down; motor will brake to a stop.

6.2.28 Push XSTOP switch up.

6.2.29 Push RUN switch down.

6.2.30 On the DS200 series cards push the RESET button.

6.2.31 After initialization, push RUN switch up, motor will restart.

6.2.32 Press CTLN 42/44 (E-Stop) pushbutton switch on Control Panel, motor will stop and cause Fault 29.

6.2.33 Push RUN switch down.

6.2.34 Press RESET on DCC card, fault will clear.

6.2.35 Using the trend recorder in GE TOOLBOX software view the analog inputs on the PC screen. Verify the table below by changing switch labeled ANALOG INPUTS on Control Panel. Tolerances are +/- 5.

NOTE: If this test will not run the serial port on drive is bad!!

NOTE: The V ¾ VCO column is for the DS200 series cards and their values may vary slightly, all should be within +- 5%.

Setting	P1-46	P2-48	P3-50	P4-52	ASP0-51	DVM-49	PF1-8	PF2-10	V3/4VCO
10	71	71	71	71	71	7	71	71	62/42
20	117	117	117	117	117	12	117	117	108/89
30	156	156	156	156	156	15	156	156	147/127
40	194	194	194	194	194	19	194	194	184/163
50	236	236	236	236	236	23	236	236	226/206
60	286	286	286	286	286	28	286	286	290/269
70	351	351	351	351	351	35	351	351	341/320
80	442	442	442	442	442	44	442	442	431/412
90	511	511	511	511	511	51	511	511	574/551

6.2.36 Exit from Trend Recorder.

6.2.37 Set REFP-63 to 03

6.2.38 Verify EE110 is 264

6.2.39 This can be done by entering the following in on the programmer; ([set], [drv], [7], [7], [Enter], [1], [1], [0], [Enter].

6.2.40 Run Test 11

6.2.41 This can be done by entering the following in on the programmer; ([set], [drv], [7], [7], [Enter], [Reset], [Reset], [Test], [1], [1], [Enter].

6.2.42 Push RUN up, motor will start.

6.2.43 With POL up LCC display will count down.

6.2.44 With POL down LCC display will count up.

6.2.45 Push RUN down, motor will stop.

6.2.46 Press RESET on Control Panel.

6.2.47 Set FDBP-69 to 10 on Control Panel.

6.2.48 To verify communication first check on IOS to see which test you are using, TEST TYPE will have either DLAN or ARCNET.

6.2.49 Press and hold JOG#_ pushbutton on IOS that matches drive you are using to test Drive should start and IOS will display in SPEED#_ the drives speed.

6.2.50 You have just tested only one of the communication tests. You must test both DLAN and ARCNET.

6.2.51 If IOS TEST TYPE is DLAN you need to load IOS with ARCNET.

6.2.52 If IOS TEST TYPE is ARCNET you need to load IOS with DLAN.

6.2.53 Refer to LOADING INSTRUCTION to test software in IOS.

6.2.54 Press and hold JOG#_ pushbutton on IOS that matches drive you are using to test Drive should start and IOS will display in SPEED#_ the drives speed.

6.2.55 Check the multimeter on Control Panel that EIV1 is between +14.25 and 15 VDC.

6.2.56 Check the multimeter on Control Panel that MSRF is between +25 and 27 VDC.

6.2.57 Verify that the 1FAPL light on the panel is illuminated.

6.3 Test Complete.

7. NOTES

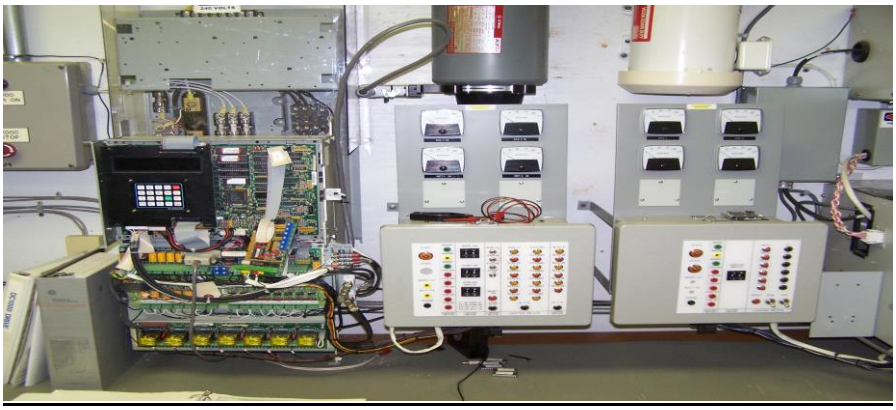
7.1 Turbine Control cards 531X301DCCAx**G2** models coming in for repair

7.1.1 Shall have their firmware chips tested (if applicable) for proper checksums and returned with board. It is recommended that they be returned separately (ESD firmware box is best choice) with card. Let customer install firmware. Otherwise card will be returned without firmware (U11, U12, U22, U23, U36, & U37).

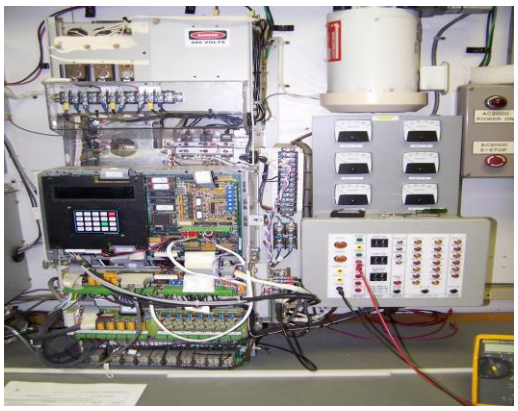
7.2 Turbine Control cards 531X301DCCAx**G2** coming in for Exchange or Reman (Atlanta Request).

7.2.1 Cards shall be tested and all firmware (U11, U12, U22, U23, U36, & U37) shall be removed prior to shipping to warehouse. It will be up to the customer to buy and install firmware.

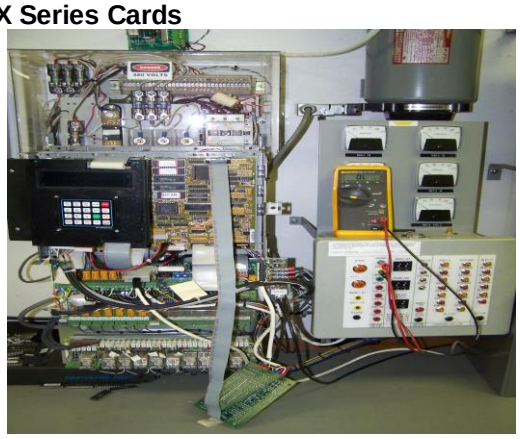
8. ATTACHMENTS



H033760 for testing 531X Series Cards



H033762 for testing DS200 Series Card



H033758 for testing DS200 Series Cards