g GE Energy ***Parts & Repair Services*** ***Louisville, KY***	**Functional Testing Specification** **LOU-GED-4006L6700AA**

Test Procedure for a SCR Cell Stack

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	G. Chandler	4/2/2013
B	Added asset number for light bulb load	C. Wade	4/16/2013
C	Changed step 6.2.8.8.3 from 499 ohms to 499K ohms	G. Chandler	11/26/2013
D	Added steps 6.2.7.3 and 5 to remove connection, and added step 6.2.8.8.3 to remove stab-on connections	G. Chandler	12/12/2013

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PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
G. Chandler			Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
4/2/2013			4/2/2013

1. SCOPE

1.1 This is a functional testing procedure for a SCR Cell Stack 4006L6700AA.

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 board's electronic folder for more information
- **3.1.2** 0621L0428G001 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 site specific SRA's 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	H188547	Light bulb load
1		34 pin breakout connector
1		120VAC Variac
2		+/- 15VDC Power Supplies
1		50VDC Power Supply
1		Scope

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6. Testing Process

6.1 Setup

6.1.1 Before applying power to the unit verify the snubber resistors (R73-R76) and snubber capacitors (C27-C30). Resistors are 30 ohms +/- 5% and capacitors are 0.1uf +/- 10%.

6.1.2 Connect the following to the unit.

6.1.2.1 +15VDC to JF1 and JF17.

6.1.2.2 -15VDC to JF33, commons to JF25.

6.1.2.3 115VAC between pins TB1-2 and TB1-3

6.2 Testing Procedure

6.2.1 This unit has four firing circuits. Firing circuits will be tested individually. Use the chart below and connect the negative non-isolated output of a firing box to the appropriate pin. Connect common of the firing box to power supply common (JF25).

6.2.2 Connect the light bulb load fixture to the appropriate point,

6.2.3 Verify while varying the firing from 0-100% the light has a smooth transition from full off to full on, and also the corresponding LED should light. NOTE: The light bulb will only glow half brightness at full on because this is half wave rectified AC and L1 is connected to the current transformer.

Light Bulb Load	Firing Box	LED
L1 to DC+	JF2	LED1
L1 to DC-	JF4	LED2
L2to DC+	JF6	LED3
L2 to DC-	JF8	LED4

6.2.4 Verify by measuring the voltage across capacitors C39 and C40 is +0.54VDC and -0.54VDC +/- 2%, respectively.

6.2.5 Connect +44VDC to the following connectors and verify the outputs

Inputs	Output			
+44VDC	JF18	JF20	JF22	JF24
None	+5VDC	+5VDC	+5VDC	+5VDC
CP33	-0.6VDC	-0.6VDC	+5VDC	+5VDC
CP36	-0.6VDC	+5VDC	-0.6VDC	+5VDC
CP39	+5VDC	-0.6VDC	+5VDC	-0.6VDC
CP42	+5VDC	+5VDC	-0.6VDC	-0.6VDC

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6.2.6 Zero Crossing Feedback

6.2.6.1 Install jumper on CP45 and CP46 then apply isolated 115VAC between CP38 and CP41. Connect scope A to CP38 and scope B to TP5. Verify waveform below (Figure 3). Adjust R1 so the waveform crosses at zero. Move scope B to JF26 and verify the same signal as per TP5.

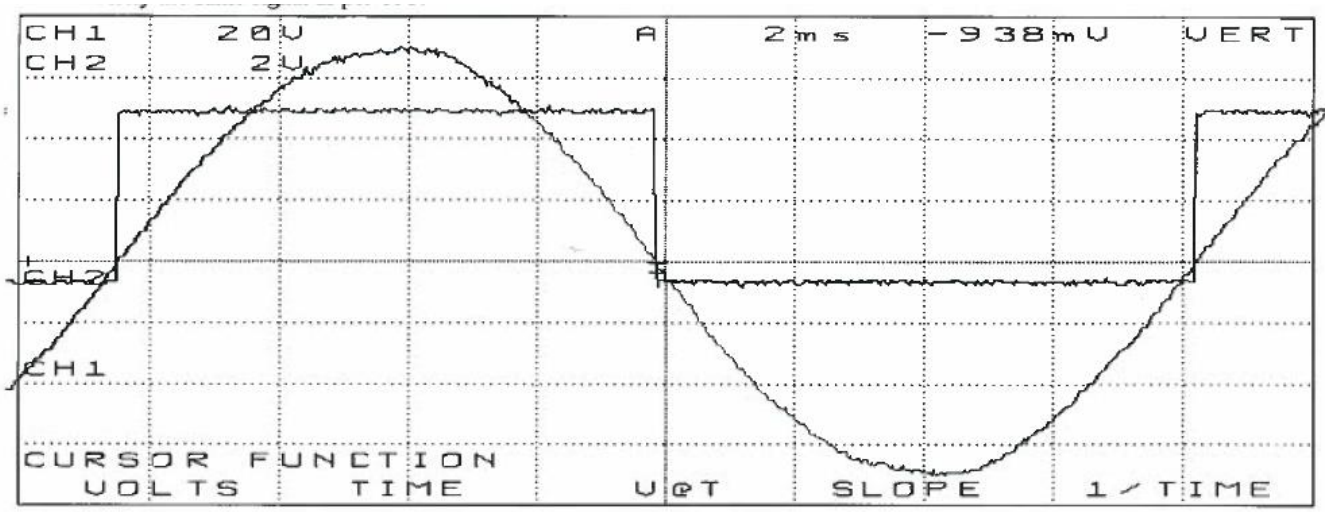

Figure 3

6.2.7 Voltage Feedback Circuit

6.2.7.1 Install a 47.5K ohm resistor to R2 (sc1 & SC2)

6.2.7.2 Apply +14.6V to CP35 and observe +2.64 +/-0.1V on CP56.

6.2.7.3 Remove connection from CP35.

6.2.7.4 Apply +14.6V to CP44 and observe -2.64 +/-0.1V on CP56.

6.2.7.5 Remove connection from CP44

6.2.8 Current Feedback Circuit

6.2.8.1 Install 392 ohm into R3 (SC3 & SC4)

6.2.8.2 Disconnect CP47 – CP51.

6.2.8.3 Apply +1V to CP47 and observe -3.9 +/-0.1V and TP8 and CP55

6.2.8.4 Observe TP7 is +3.9 +/-0.1V

6.2.8.5 Connect JF31 to Acom and observe TP8 and CP55 are now +3.9V.

6.2.8.6 Connect JF32 to Acom and observe TP8 and CP55 are now -3.9V. (Connect JF31 to Acom too).

6.2.8.7 Observe TP7 is still +3.9V due to absolute value circuit.

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6.2.8.8 Resistance Check

6.2.8.8.1 Power down everything and check for 0 ohms +/- 0.5. See table below

From	To		From	To
TP1	JF18		GRD	JF25
TP2	JF20		GRD	JF27
TP3	JF22		JF1	JF3
TP4	JF24		JF1	JF5
TP5	JF26		JF1	JF7
SC6	CP53		JF1	JF9
SC7	CP57		JF1	JF11
SC8	CP58		JF1	JF13
GRD	CP59		JF1	JF15
GRD	JF21		JF17	JF19
GRD	JF23		JF33	JF34

6.2.8.8.2 Check for 100 ohms +/- 5% between the following points.

From	To
CP56	JF28
CP55	JF30
TP7	JF29

6.2.8.8.3 Remove all stab-on connections CP33 to CP44.

6.2.8.8.4 Check for 499K ohms +/- 5% between the following points.

From	To
CP33	CP35
CP36	CP38
CP39	CP41
CP42	CP44

6.3 ***TEST COMPLETE ***

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7. Notes

7.1 Upgrades

Rev 0 to Rev 1

A) Do not populate parts not called for.
B) Remove Screen for 0621L0429 G001.

Rev1 to Rev2

A) Remove screen for MOV3 and MOV4
B) Widen wire wrap holes to 0.25Dia.
C) Add more holes at the following locations

X	Y
1.2	0.25
0.2	7.525
0.2	7.875

Rev2 to Rev3

A) Add four stabs 0177A1127 P037 use 0621L0429 G001 silk screen as a guide.
B) CP5, CP6, CP11 and CP12
C) Add appropriate screens as per 0621L0429 G001.
D) Cut trace from JF29 to C77 and replace with a wire jumper. Trace may cause short with screws.
E) Cut trace from U16-pin7 to D32.
F) Cut trace from U16-pin8 to R172 and R174.
G) Jumper U16-pin8 to D32
H) Jumper U16-pin7 to TP8

Rev3 to Rev4

A) Replace OD1-OD8 and OE1-OE8 with 0239A2680 P001 flat side ~~down~~ up.
B) Pin1 and Pin2 to OE.
C) Pin3 and Pin4 to OD.
D) Replace R77 – R84 From 0177A1001 P045 to 0177A1001 P049 1kΩ.

Rev4 to Rev5

A) Remark silk screen to REV 5

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