g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-DS200SHVx**

Test Procedure for a SCR High Voltage Interface Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release. This test replaces previous tests LOU-GED-DS200SHVI-A, SHVIG1B.DOC, & SHVMG1A.DOC so that both the DS200SHVI and DS200SHVM can be tested with just one procedure.	John Madden	9-20-07
B	Added testing for DS200SHVIG1BF in step 6.2.7	Jill Hardin	6-16-09
C	Clarified several test steps and adjusted tolerances	Paul Kelley	11/24/2010
D	Changed values in steps 6.2.9 and 6.2.10 to reflect values listed on GEDS document SHVIG1BG.DOC	C. Wade	11/16/2011

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
John Madden	Jill Hardin	Paul Kelley	Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
September 20, 2007	6/16/2009	11/24/2010	10/2/2007

1. SCOPE

1.1 This is a functional testing procedure for both the DS200SHVI & SHVM cards.

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 N:\Design Folders\DS\DS200\DS200S\SHVM

3.1.2 N:\Design Folders\DS\DS200\DS200S\SHVI

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	H188649	IS200HFPA, painted blue, modified, w/transformer 323A2335P2 for powering SQPL connector
1		Oscilloscope
1		MilliVolt source, either hand-held Fluke 715 or Fluke 5500A Calibrator
1		Function generator (Fluke 5500A won't source enough current for this particular step)
1		120Vac to 480VAC +/- 25VAC step-up transformer (**for SHVI only**)

6. TESTING PROCESS

6.1 Setup: To be performed as noted in each test step.

6.2 Testing Procedure

6.2.1 PLACE ALL JUMPERS IN POSITIONS **2-3**.

6.2.2 CONTINUITY CHECKS: VERIFY CONTINUITY (=< 1 ohm) BETWEEN EACH OF THE POINTS LISTED IN THE TABLE BELOW. NOTE: Points with asterisk (*) not on the SHVM board.

FROM	TO
M1*	MPL-1*
B1*	MPL-2*
M2*	MPL-3*
B2*	MPL-4*
RMPL-1*	RMPL-3*
RMPL-2*	RMPL-4*
L1	V1
L2	V2
L3	V3
P1	P1A
P2	P2A
CT1PL-1	1CPL-1
CT1PL-2	1CPL-2
CT3PL-1	1CPL-3
CT3PL-2	1CPL-4
M1A	VM1A
M1B	VM1B
M2A	VM2A
M2B	VM2B

6.2.3 NOW PLACE ALL JUMPERS IN THE **1-2** POSITION.

6.2.4 VERIFY THE PROPER RESISTANCE BETWEEN EACH OF THE POINTS LISTED BELOW:

FROM	TO	RESISTANCE (OHMS)
L1	V1	711K-715K
L2	V2	711K-715K
L3	V3	711K-715K
P1	P1A	1422K-1428K
P2	P2A	1422K-1428K
M1A	VM1A	1422K-1428K
M1B	VM1B	1422K-1428K
M2A	VM2A	1422K-1428K
M2B	VM2B	1422K-1428K

6.2.5 DIODE TESTS: PUT THE DMM POSITIVE (+) LEAD ON THE "FROM" POINT AND THE NEGATIVE (-) LEAD ON THE "TO" POINT AS INDICATED IN THE TABLE BELOW. SET METER TO DIODE CHECK, MEASURE PER TABLE BELOW: *NOTE: This step pertains only to the SHVI. If you're working on a SHVM, skip to the next step.*

FROM (+)	TO (-)	VOLTS
CAC1	RMPL-1	.45-.7V
RMPL-1	CAC1	.OL
CAC2	RMPL-1	.45-.7V
RMPL-1	CAC2	.OL
RMPL-2	CAC1	.45-.7V
CAC1	RMPL-2	.OL
RMPL-2	CAC2	.45-.7V
CAC2	RMPL-2	.OL

6.2.6 USING A FUNCTION GENERATOR, APPLY A 30 HZ (+/- 1 HZ) 7 V RMS (+/- .1V) SINEWAVE WITH ZERO OFFSET TO THE INPUT AS INDICATED IN THE TABLE BELOW. USING A DMM SET FOR VAC, VERIFY PROPER READINGS AS INDICATED ON THE OUTPUT POINTS.

INPUT	OUTPUT	READING
1CPL-1, 1CPL-2	CT1PL-1, CT1PL-2	.7 VRMS (+/- .1V)
1CPL-3, 1CPL-4	CT3PL-1, CT3PL-2	.7 VRMS (+/- .1V)

6.2.7 DISCONNECT THE FUNCTIION GENERATOR FROM THE BOARD

6.2.8 SHUNT ISOLATOR TESTS: USE THE IS200HFPA TEST CARD (H188649) THAT HAS BEEN PAINTED ROYAL BLUE AND HAS A SMALL PROTO-BOARD ATTACHED AND CONNECT ITS SQPL CABLE TO THE SQPL CONNECTOR ON YOUR UNIT UNDER TEST. APPLY POWER TO THE HFPA, AND WITHIN 15 SECONDS YOU SHOULD SEE TWO GREEN LED's LIGHT UP, INDICATING VOLTAGES ARE UP AND RUNNING.

**Use for DS200SHVIG1BD and below revisions only:

CONNECT DVM	VOLTAGE (SHVI)
Z1 Cathode to DC1com	+14.5 to +15.5 VDC
Z2 Anode to DC1com	-14.5 to -15.5 VDC
C31 POS. lead to DC1com	+4.8 to +5.3 VDC
Z3 Cathode to DC2com	+14.5 to +15.5 VDC
Z4 Anode to DC2com	-14.5 to -15.5 VDC
C38 POS. lead to DC2com	+4.8 to +5.3 VDC
Z5 Cathode to ACNCOM	+14.5 to +15.5 VDC

**Use for all other revisions:

CONNECT DVM	VOLTAGE (SHVI)	VOLTAGE (SHVM)
CR1 CATHODE TO C10 NEG	+14.5 to +15.5 VDC	+12.1 to +12.9 VDC
CR2 ANODE TO C10 NEG	-14.5 to -15.5 VDC	-12.9 to -12.1 VDC
C10 POS. LEAD TO C10 NEG	+4.5 to +5.5 VDC	+4.8 to +5.3 VDC
CR3 CATHODE TO C11 NEG	+14.5 to +15.5 VDC	+12.9 to +12.1 VDC
CR4 ANODE TO C11 NEG	- 14.5 to -15.5 VDC	-12.9 to -12.1 VDC
C11 POS. LEAD TO C11 NEG	+4.5 to +5.5 VDC	+4.8 to +5.3 VDC
CR5 CATHODE TO CR5 ANODE	+14.5 to +15.5 VDC	+12.1 to +12.9 VDC

6.2.9 WITH BOARD STILL POWERED CONNECT POS. LEAD OF MV SOURCE TO DC1PL-1. CONNECT NEG. LEAD OF MV SOURCE TO DC1PL-2. CONNECT OSCILLOSCOPE POS. LEAD TO IA1PL-1. CONNECT NEG. LEAD TO IA1PL-2. OUTPUT VOLTAGE ON THE SCOPE SHOULD BE 40Vp-p (+/- 3V). INPUT THE SPECIFIED VOLTAGE TO THE CONNECTOR PINS AS INDICATED IN THE TABLE BELOW AND VERIFY THE FREQUENCY ON THE SCOPE.

INPUT	CONNECTORS	FREQUENCY
+0.4 VOLTS +/-10 MV	IA1PL-1 / IA1PL-2	437.5 KHZ to 462.5 KHZ
0.0 VOLTS +/-10 MV	IA1PL-1 / IA1PL-2	237.5 KHZ to 262.5 KHZ
-0.4 VOLTS +/-10 MV	IA1PL-1 / IA1PL-2	37.5 KHZ to 62.5 KHZ

6.2.10 REPEAT ABOVE TESTS APPLYING MV SOURCE POS. LEAD TO DC2PL-1. CONNECT NEG. LEAD TO DC2PL-2. CONNECT OSCILLOSCOPE POS. LEAD TO IA2PL-1. CONNECT NEG. LEAD TO IA2PL-2. OUTPUT VOLTAGE SHOULD BE 40V p-p (+/- 3V). INPUT THE SPECIFIED VOLTAGE TO THE CONNECTOR PINS AS INDICATED IN THE TABLE BELOW AND VERIFY THE FREQUENCY ON THE SCOPE.

INPUT	CONNECTORS	FREQUENCY
+0.4 VOLTS +/-10 MV	IA2PL-1 / IA2PL-2	437.5 KHZ to 462.5 KHZ
0.0 VOLTS +/-10 MV	IA2PL-1 / IA2PL-2	237.5 KHZ to 262.5 KHZ
-0.4 VOLTS +/-10 MV	IA2PL-1 / IA2PL-2	37.5 KHZ to 62.5 KHZ

6.2.11 ***SHVM TESTING COMPLETE. SHVI HAS THIS FINAL STEP REMAINING:*** LINE FILTER LIGHTS TESTING: CONNECT 480VAC FROM THE STEP-UP TRANSFORMER AS INDICATED IN THE TABLE BELOW, AND OBSERVE THE NEONS LIGHT UP (DIMLY).

480Vac INPUT	NEONS LIT (DIMLY)
FA to FC	LT1 & LT3
FB to FC	LT2 & LT3
FA to FB	LT1 & LT2

6.3 ******TEST COMPLETE ******

7. NOTES

7.1 None at this time

8. ATTACHMENTS

8.1 None at this time