g GE Energy Services	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-IS200PICHG1**

Test Procedure for a IS200PSCDG1A Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Frank Howard	12/18/2008
B	Clarified input voltage polarity in steps 6.4.8 through 6.4.10 and changed input resistance level in step 6.6.7.	Frank Howard	07/23/2009
C			

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
Frank Howard			Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
12/18/2008			12/18/2008

1. SCOPE

1.1 This is a functional testing procedure for an IS200PICHG1A Turbine Card. The PICH is a single (13" by 16") board mounting above the laminated bus. It contains the gating and feedback circuits necessary for the 4 dual 400A IGBT modules of the PW3 H-Bridge phase assembly.

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 IS200PSCDG1A Schematics

3.1.2 PICHDR10.doc

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		Tek-2215 or Equivalent
1		HP 5304A Frequency Counter
1		DS200GDPAG1 Power Supply Card
2		Resistor Decade Boxes
1		Box marked IS200PICHH1 on test equipment shelf. It has the necessary connectors and associated equipment.

6. TESTING PROCESS

6.1 Setup

6.1.1 Verify continuity between J13-1 & J14-1, J13-2 & J14-2 & J13-3 & J14-3.

6.1.2 Using the White 3 wire connector marked #2 in box, connect 1GDPL of the IS200GDPA power supply card to J13 or J14 of the (UUT) unit under test.

6.1.3 Use power supply card in box and connect ACPL on power supply card to 120VAC outlet.

6.2 Testing

6.2.1 Apply power and P50K (Green LED DS3) on UUT should come on. All gray transmitters except DCP and DCN should be on.

6.2.2 Measure +5VDC at P5 (Next to D28 which is next to 1200uf Cap). DCOM is common.

6.2.3 Measure +15VDC at P15, -15VDC at N15, & >19VDC at P18. DCOM is common.

6.2.4 Measure +16VDC at I13P15, -16VDC at I13N15, +5VDC at I13P5. I13COM is common.

6.3 Gate Driver Circuit

6.3.1 J1 through J8 can be tested the same way. Use the 6-pin connector with exposed leads and plugged into J1. The black wire is one and the green wire is six. Connect the voltmeter's common to pins 2 & 6.

6.3.2 Connect positive of voltmeter to pin 1, meter should read 0V. Using a fiber optic cable from equipment box, plug blue end into blue receiver S1NG, connect other end of optic cable to transmitter TFBCAT J16, meter should go to +15VDC.

6.3.3 Move meter lead to PIN-3, meter should read -17VDC. Take optic lead from TFB and insert into transmitter S1NS and meter should go to 0volts.

6.3.4 Move meter lead to PIN-4 and meter should read +57VDC (+- 2VDC). Using a 10-ohm resistor from box, connect between PIN-4 and PIN-2 or 6. Meter should go to 0volts (usually around 151mV). Then remove resistor.

6.3.5 Move meter lead to PIN-5 and meter should read +15VDC (+-250mV)

6.3.6 Continue testing all gate driver circuits J1 through J8. You should get the same results across all circuits.

6.4 Shunt Circuit Test

6.4.1 Use custom receiver card #3 from test kit.

6.4.2 Connect +5VDC to test spring by PIN-14 of IC, common to test spring by PIN-7.

6.4.3 Connect frequency counter common to +5V power supply common.

6.4.4 Connect frequency counter positive to either of the remaining test springs.

6.4.5 Connect optic cable blue end to receiver closest to springs used for counter and connect other end of optic cable to IFBI.

6.4.6 Connect millivolt source positive to J15-2 and negative to J15-1.

6.4.7 Connect scope common to spring at PIN-7, probe to spring with counter. With no input counter should read 1MHz (usually 1.024MHz), scope should have +5V square wave with slight ringing.

6.4.8 +100mV in and counter should read 1.425MHz. Scope frequency increases.

6.4.9 +200mV in and counter should read 1.825MHz. Scope frequency increases.

6.4.10 +250mV in and counter should read 2.0MHz. Scope has a good clean square wave.

6.4.11 Reduce input at JP-15 to 0volts.

6.4.12 Move optic cable from IFBI to IFBS.

6.4.13 Counter reads 0Hz and scope reads +5V.

6.4.14 Increase millivolt input and at +250mV scope goes to 0volts.

6.4.15 Reduce input to 0volts. Remove connections to IFBS and J15.

6.5 UNDER/OVER VOTLAGE TEST

6.5.1 Connect optic cable to DCP.

6.5.2 Connect PS source common to DCOM and positive to DCPMAG. Scope should be at 0volts and counter at 0Hz.

6.5.3 Input in 1VDC increments, scope should show a +5V square wave increasing in freq with increased input until at +10V input scope will show +5V clean square wave and counter should read 2MHz (usually 1.998MHz) and transmitter DCOV and PSOK are OFF.

6.5.4 Move Optic Cable from DCP to DCN.

6.5.5 Move input lead from DCPMAG to DCNMAG.

6.5.6 Input in 1VDC increments, scope should show a +5V square wave increasing in freq with increased input until at +10V input scope will show +5V clean square wave and counter should read 2MHz (usually 1.998MHz) and transmitter DCOV and PSOK are OFF.

6.5.7 Reduce input to 0volts. Remove connections DCNMAG, DCOM, and DCN.

6.6 TEMPERATURE FEEDBACK CIRCUIT (Thermo Couple)

6.6.1 Connect custom 6 pin connector to J16.

6.6.2 Connect PIN-3 to PIN-6.

6.6.3 Connect optic cable to transmitter TFB.

6.6.4 Connect resistor to PIN-1 and PIN-3 or PIN-6. Before resistor box is connected, freq counter reads 11.7KHz, after box is connected, but no resistance selected, counter should read 18-20KHz.

6.6.5 Select 1K ohms, counter should read 21-23KHz.

6.6.6 Select 2K ohms, counter should read 28-30KHz.

6.6.7 Select 5K ohms, counter should read 36-38KHz.

6.6.8 Test complete, remove optic cable and connections to J16.

6.7 VCO CIRCUIT

6.7.1 Set each resistor box for 1.715K ohms

6.7.2 Connect one between R95 (Lead closest to U4) and PS common.

6.7.3 Connect the other resistor box between PS output and R81 (Lead closest to U4).

6.7.4 Connect fiber optic to VFBK. Voltmeter to VFBMAG (+) and DCOM.

6.7.5 Freq Counter reads 1.02MHz and scope has +5V square wave with slight ringing. Voltmeter reads 0V.

6.7.6 With positive input in 1V increments the frequency decreases until scope is 0V and counter reads 22KHz at +5V in. Voltmeter is inverse of input. Reduce input to 0V.

6.7.7 With negative input in 1V increments the frequency increases until scope has a clean +5V square wave and counter reads 2MHz. Voltmeter is inverse of input.

6.7.8 Remove all power and disconnect everything.

6.8 ***TEST COMPLETE ***

7. NOTES

7.1 None at this time.

8. ATTACHMENTS

8.1 None at this time.