g GE Energy	**Functional Testing Specification**
Parts & Repair Operations ***Louisville, KY***	**LOU-GED-DS200GDPA**

Test Procedure for a DS200GDPA Power Supply Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Eric Rouse	08-22-03
B	Corrected typos, added grid coordinates for test points, deleted repeated steps, tightened tolerance of GDPL 50Vac/27KHz outputs per Salem engineering specs	J. Madden	07-27-06
C	Adjusted specs to more accurately reflect the internal control voltage readings likely to be seen, added a test instrument, condensed text and shifted steps around to improve the "flow" of the test and make it easier on the eyes	J. Madden	10-17-06
D	Corrected another typo, added notes	J. Madden	5-17-07
E	Modified step 6.2.11for better accuracy	J. Madden	10-9-07
F	Completed Tester	R. Johnson	12/10/2010
G	Adjusted voltage in steps 6.2.1, 6.2.3 & 6.2.8 due to factory upgrade.	D. Bush	8/2/2018

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
John Madden	R. Johnson	D. Bush	L. Groves
DATE	**DATE**	**DATE**	**DATE**
October 9, 2007	12/10/2010	8/2/2018	8/2/2018

Functional test procedure for a DS200GDPA Power Supply Card

1. SCOPE

1.1 This is a functional testing procedure for a GDPA Power Supply 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 K:\DS\DS200\DS200G\GDPA\ECNs**
- **3.1.2 K:\DS\DS200\DS200G\GDPA\Schematics & BOM**
- **3.1.3 K:\DS\DS200\DS200G\GDPA\GEI-100287.pdf**

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 87 SERIES DMM ONLY
1		120vdc bench power supply
1		120vac power cord
1	H188970	Test Box
1	H188852	Chopper supply tester

6. TESTING PROCESS

6.1 Continuity Checks

6.1.1 With all power removed, Check for 934Kohms (5%) from GND1 To 1GDPL-1, check for continuity from the STAB2 [Location 1B] terminal to pin 2 of connector's 1GDPL through 4GDPL (all four connectors are parallel); check from STAB1 to GND2 then to C9, check CPTPL-2 to DSPL-3; then from GND3 (corner hole) to GXPL-3 and also to GIPL-3. Check from ACPL-1 to 1FAPL-1 to 2FAPL-1, check from ACPL-3 to 1FAPL-2 to 2FAPL-2 all three connectors are in parallel with other.

6.1.2 Install Board on the tester ensure SW1, SW2 and SW3 are off. Turn the pot1 fully clock-wise. Connect all connectors. Connect a DC supply, set for 120Vdc connect it to DCPL-1 **BLACK jack on the back on fixture** (-) to DCPL-3 **ORANGE jack on the back of fixture** (+). Clip the RED test leads on each side of resistor R68 (2W resistor next to L2 coil). Connect the ORANGE test lead to R72 (top side) the end closest to U4. Connect the GREEN test lead to R79 (top side) just to the left of U4 pin 7. Connect the PURPLE test lead to R95 (bottom side) the side closest to U4. Connect the BLACK test lead to TP2 (ACOM). Connect the GRAY test lead to the top of R15 side closest to the transformer. Connect the AC plug to the back of the tester (120Vac) this will apply the 120Vac across ACPL-1 and ACPL-3.

6.2 Testing Procedure

6.2.1 **VOLTAGE CHECKS, part 1:** Ensure SW1, SW2 and SW3 are off. Turn the pot1 fully clock-wise. Verify the RED test leads on each side of resistor R68 (2W resistor next to L2 coil). Verify the ORANGE test lead to R72 (top side) the end closest to U4. Verify the GREEN test lead to R79 (top side) just to the left of U4 pin 7. Verify the PURPLE test lead to R95 (bottom side) the side closest to U4. Switch SW1 to AC on, verify LED's CR1, CR37, CR2 and CR39 are all ON. Check the main power output for 54Vac (+/-.5Vac) @27KHz +/- 2% from 1GDPL-1(**GRAY** Jack) to 1GDPL-3(**WHITE** jack). **Note:** If either the voltage or the frequency is out of spec, pots R1 (FREQ) and R2 (VOLTS) are for bringing them back into line. Outdated electrolytic caps may also throw these readings off. Be sure to change them out.

6.2.2 Connect a DMM to TP17 and R90 (top side) the side closest to Q6. Verify meter reads 19Vdc to 25Vdc, if not in range adjust R3 for 19Vdc to 25Vdc.This measurement will be set from the P80 Volt bus 80Vdc @5%.

6.2.3 **VOLTAGE CHECKS, part 2:** After changing out any outdated caps and adjusting the output for 54Vac and 27KHz +/- 2%, perform the following DC voltage tests: Connect the negative side of the multi-meter to TP2 (ACOM) [Location 4H]. Using the following table, check for the following voltages at the indicated points:

Between TP2 (ACOM) &:	**Voltage(s) to be read:**	**Grid Location of Test Point**
TP16 (NBUS)	0Vdc (+/-.1v)	[Location 3J]
TP1 (P160)	+160Vdc (5%)	[Location 2K]
TP15 (P160F)	+160Vdc (5%)	[Location 4H]
TP6 (P5)	+5Vdc (5%)	[Location 4H]
TP3	+13 to +15Vdc	[Location 4H]
TP18	+13 to +15.5Vdc	[Location 7G]
TP19	+13 to +15.5Vdc	[Location 7G]
TP17 (P80)	+80Vdc (5%)	[Location 7F]

6.2.4 **VOLTAGE CHECKS, part 3:** Connect a multi-meter across the inputs of the CPTPL-1(**BLUE jack**) (+) to CPTPL-3(**GREEN jack**) (-), Verify 160Vdc to 220Vdc and from DSPL-1(**BROWN jack**) (+) to CPTPL-3(**GREEN jack**) (-)Verify 160Vdc to 220Vdc. Switch on SW3, Repeat above steps and Verify 125Vdc (5%). Switch off SW3 when 125Vdc is verified.

6.2.5 **VOLTAGE CHECKS, part 4:** Check for 120Vac (5%) from 1FAPL-1 to 1FAPL-2, from 2FAPL-1 to 2FAPL-2 both connectors are in parallel with ACPL-1 and ACPL-3, then verify CPTPL-4 (**ORANGE jack**) to CPTPL-5 (**BLACK jack**).

6.2.6 **VOLTAGE CHECKS, part 5:** Check for 23Vac (+/-2Vac) @ 27KHz (2%) from GIPL-4 (**BLUE jack**) to GIPL-5 (**GREEN jack**).

6.2.7 **VOLTAGE CHECKS, part 6:** Check for 23Vac (+/- 2Vac) @ 27KHz (2%) from GIPL-5 (**Green jack**) to GIPL-6 (**BROWN jack**), & from GXPL-1 (**YELLOW jack**) to GXPL-4 (**PURPLE jack**), Verify 43Vac +/- 4Vac @ 27KHz (2%).

6.2.8 TO CHECK THE P80 OVER-VOLTS LOCKOUT CIRCUIT: Check for 50Vac (+/-.2Vac) from 1GDPL-1 (**WHITE jack**) to 1GDPL-3 (**GRAY jack**) (leave the meter plugged onto these points for the next several steps). Verify the RED test leads are clipped on each side of resistor R68 (2W resistor next to L2 coil). Turn POT1 fully clock-wise then turn on SW2 start turning POT1 counter clock-wise this will vary the voltage R68 with the test leads you attached. Make sure the output voltage on the meter drops to below 12Vac then turn off SW2 and verify that the over-volt lockout stays latched that way even when you remove the over voltage condition from R68. **Note:** Sometimes the output will drop and latch to near 0 volts ac and the supply may make chirping sounds. This is okay. Turn off power and adjust POT1 fully clock-wise ensure SW2 is off. Turn the power back on and verify 54Vac again on the meter. **ALSO:** One problem that stumped us for a while was this: if the unit wants to run wide open, causing the P80 Over-volts circuit to keep the unit locked down, try lifting one leg of R68. If this then allows unit to run, but unit has 160Vdc on the P80 bus, look at CR12 & CR13. These can fail in such a way that the unit goes "full throttle", and R2 will not be able to correct it.

6.2.9 TO CHECK THE P15 UNDER-VOLTS LOCKOUT CIRCUIT: Connect the ORANGE test lead to R72 (top side) the end closest to U4, press the P15 under-volts button and verify it kills the output voltage as it did above in step 6.3.7, and keeps it down after short has been removed. Cycle power to the board again to restore the output voltage.

6.2.10 TO CHECK THE INVERTER OVER-CURRENT LOCKOUT CIRCUIT: Connect the GREEN test lead to R79 (top side) just to the left of U4 pin 7 press the inverter over-current button and verify it kills the output voltage. It may not work as "crisply" as in step 6.3.7, or pull the power output down as far. Just look to see that it pulls it down and holds it down in a similar fashion as the previous steps. Cycle power to the board again once short has been removed to restore the output voltage.

6.2.11 TO CHECK THE BUCK OVER-CURRENT LOCKOUT CIRCUIT: Connect the PURPLE test lead to R95 (bottom side) the side closest to U4 press the buck over-current lockout Hold down for 5 seconds for best results and verify it kills the output. Once again, it may not work as "crisply" as in step 6.3.7, or pull the power output down as far. Just look to see that it pulls it down. This particular

circuit isn't intended to "latch" like the previous ones, so don't expect the unit to stay in the "soft reset" state, but rather it should come back up and run again after your stimulus has been removed. Sometimes, depending on how you touched the pin, a little noise could have been introduced into the same latching circuit used in the previous steps, and causes the unit to stay locked down. While this may happen on occasion, don't expect it to happen all the time.

6.2.12 TO CHECK THE "RUNNING" CIRCUIT: Move the multi-meter to check for 6.2Vdc (5%) from GIPL-1(**ORANGE jack**) (+) to GIPL-2(**BLACK jack**) (-).

6.2.13 TO CHECK THE F3 FUSE INDICATOR (N2): With power OFF, carefully pull out fuse F3. Power up the board to see N2 neon light up (indicating an blown or missing F3 fuse). Remove power and re-insert fuse F3.

6.2.14 TO CHECK THE BOARD FOR DC OPERATION: Switch main power switch over to DC on power. Use a shop DC supply, apply 120Vdc from DCPL-1 **BLACK jack on the back on fixture** (-) to DCPL-3 **ORANGE jack on the back of fixture** (+). Verify that the board comes up and runs by checking for 50Vac again from 1GDPL-1 (**WHITE jack**) to 1GDPL-3(**GRAY jack**). Remove DC power and disconnect the AC power cord.

6.2.15 TO CHECK HIGH VOLTAGE SHORT INDICATOR (N1): Connect the GRAY test lead to the top of R15 side closest to the transformer**.** Connect the 120VDC supply to the **ORANGE** jack (positive voltage) and **BLACK** jack (ground) on the right side of test fixture press the N1 test button while the button is pressed the N1 indicator should light. **NOTE the ACPL connector must be plugged into the test board for test to pass.**

6.2.16 RE-SEAL ALL POTENTIOMETERS.

6.2.17 Place test board in chopper supply tester (ref to DS200GGDA.DOC for setup info) and burn-in for 1 hour.

6.3 ***TEST COMPLETE ***

7. NOTES

7.1 None at this time.

8. Oscilloscope Verification Examples:

8.1 None at this time.