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GE Energy

Functional Testing Specification*Parts & Repair Services
Louisville, KY***LOU-GED-IS210AEPS**
Alternate Energy Power Supply

Test Procedure for a IS200AEPS Power Supply Board

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial Procedure	GED Salem	11/16/2005
B	Modified for new revision IS210AEP SG1AFC	GED Salem	5/16/2007
C	Transcribed to this format, removed spelling errors, and added a picture of the test fixture.	C. Wade	10/1/2008
D	Added GE Wind part numbers to page 6	C. Wade	9/9/2009

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DATE 10/1/2008	DATE 9/9/2009	DATE	DATE 10/3/2008

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1. SCOPE

- 1.1 This is a functional test procedure for testing IS210AEPS (Alternate Energy Power Supply) board.

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 electronic folder 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 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		Custom IS210APES Test Fixture

6. TESTING PROCESS

6.1 Safety Warning to Operator: Be aware that the fixture to power the board under test uses a Link Voltage of approximately 1000vdc. This voltage could be DEADLY. The large analog voltmeter on the top of the fixture is used to indicate when Link Voltage is present. When you open the Lexan cover, the safety switch on the left side of the cover will turn off and discharge the Link Voltage within 1 second. If this does not happen immediately turn off the fixture and unplug it. Notify test development that the fixture needs repair.

When removing the board under test from the fixture **ALWAYS** turn the fixture power switch OFF so that you are not relying only on the safety switch for protection. In addition, **ALWAYS, ALWAYS**, check for 0vdc on the link voltage meter before removing or touching the board under test.

CAREFUL TROUBLE SHOOTING: There is an air-operated footswitch that can be connected to the front left corner of the fixture to allow an override of the safety switch on the Lexan cover. You must hold the switch down with your foot to keep the fixture running. Be **EXTREMELY** careful while making any measurements necessary for troubleshooting purposes, due to high voltage present on the board.

6.2 Setup


- 6.2.1** Make sure the power switch is OFF and the Link Voltage Meter reads 0vdc.
- 6.2.2** Mount the board under test on the test fixture using the 4 threaded stand-offs to hold the board down in the corners.
- 6.2.3** Connect all labeled cables from the test fixture to the board under test with pin 1 of a cable always being the white wire. Be very careful to ensure that the Red link voltage wire goes to the LINKP terminal and the Black link voltage wire goes to the LINKN terminal.
- 6.2.4** Close the Lexan cover.

6.3 Testing Procedure

- 6.3.1** Turn the power switch on. **DANGER**, high voltage should now be present on the board.
- 6.3.2** Check for approximately 1000vdc as shown on the Link Voltage meter.
- 6.3.3** Verify the following 6 green LEDs are lit.

N24COK	P24COK	I24OK	MCOK	I5BOK	I5AOK
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- 6.3.4** Set the Fluke multi-meter for measuring DC voltage and check for +17 to 19vdc from TP1-A (pos) to TP1-B (neg).


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- 6.3.5 Check for +17 to 19vdc from TP2-A (pos) to TP2-B (neg).
- 6.3.6 Check for +24vdc (5% tol) from P24A (pos) to PCOMA (neg).
- 6.3.7 Check for +5vdc (5% tol) from IP5A (pos) to I5COMA (neg).
- 6.3.8 Check for +24vdc (5% tol) from IP24 (pos) to I24COM (neg).
- 6.3.9 Check for +5vdc (5% tol) from IP5B (pos) to I5COMB (neg).
- 6.3.10 Check for +24vdc (5% tol) from P24C (pos) to PCOMC (neg).
- 6.3.11 Check for -24vdc (5% tol) from N24C (pos) to PCOMC (neg).
- 6.3.12 Check for +24vdc (5% tol) from P24B (pos) to PCOM (neg).
- 6.3.13 Turn power switch OFF and verify 0vdc on Link Voltage meter.
- 6.3.14 Lift the Lexan cover and move the cable marked P18A1 over to the P18A2 connector and move the cable marked P4A1 over to P4A2.
- 6.3.15 Close the Lexan cover and re-apply power.
- 6.3.16 Check for +24vdc (5% tol) from P24C (pos) to PCOMC (neg).
- 6.3.17 Check for -24vdc (5% tol) from N24C (pos) to PCOMC (neg).
- 6.3.18 Check for +24vdc (5% tol) from P24B (pos) to PCOM (neg).
- 6.3.19 Let the board under test burn-in under load for at least 30 minutes. When finished with burn-in, go back and retest card per steps 6.3.3 through 6.3.18. If board checks out fine, continue on to next step.
- 6.3.20 Turn power switch OFF and verify 0vdc on Link Voltage meter.

DANGER: Be safe and double check for 1000vdc voltage.

- 6.3.21 Unplug the power cord from the back of the test fixture.
- 6.3.22 Remove the board under test from the test fixture.

6.4 ***TEST COMPLETE***

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7. NOTES

7.1 **Mandatory Requirements:**

- 7.1.1 Always use the CCR machine to remove any conformal coating from ALL fuse receptacles.
- 7.1.2 Replace all small fuses due to the “conformal coating on fuses” issue. On G1AFC fuses FU10, FU12, FU2, FU3 are SLO-BLO.
- 7.1.3 Just use the CCR to blast any conformal coating off the larger FU1 and FU2 fuses. They are at least large enough to hold onto with your hand inside the CCR machine.
- 7.1.4 You will often need to remove conformal coating from the bottom of the board before removing a component.
- 7.1.5 Always re-conformal coat the bottom of the board, if needed.
- 7.1.6 Retain any failed components (except fuses, caps and L1). Place failed parts into plastic bag and mark with model, serial, and job number and store in location designated by MSO.

7.2 **Revision Upgrade Information:** The latest board revision as of 05-16-07 is G1AFC

- 7.2.1 G1AAA revision boards Repair “As Is”. Cannot be upgraded any higher because of an artwork change with the very next revision, which was G1ABC.
- 7.2.2 Upgrade G1ABC revisions and above to the latest revision (G1AFC) by doing the following:
 - 7.2.2.1 Replace any of the ten 3-legged electrolytic caps with the blue 100ufd 100vdc 2-legged capacitors.
 - 7.2.2.2 Replace L1 transformer “with new style white one”.
 - 7.2.2.3 Re-label the card IS210AEPSG1AEF.

7.3 **Common Failures**

- 7.3.1 Conformal coating on fuse receptacles causing missing output voltages.
- 7.3.2 There are ten 3 legged caps on older revision boards which often short out which is why we always replace them with the blue 100ufd 100vdc 2 legged caps.
- 7.3.3 Transformer T2 is often physically broken.
- 7.3.4 Inductor L1 is often physically broken.

8. **ATTACHMENTS**

8.1 GE Wind Part Numbers for complete AEPS Units. The IS210 units have been conformally coated.

Model Number	Description	GE Wind Part # (new)	Supplier Part Number	GE Louisville Repair Number
IS210AEPG1Axx (AFC)	Alternate Energy Power Supply	104W4657P001	IS210AEPG1Axx (AFC)	104W4657R001
IS210AEPG1Bxx (BCA)	Alternate Energy Power Supply	104W8038P001	IS210AEPG1Bxx (BCA)	104W8038R001
IS210AEPG2Bxx (BBA)	Alternate Energy Power Supply	104W8287P001	IS210AEPG2Bxx (BBA)	104W8287R001

8.2 Picture of AEPS Test Fixture.

