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GE Energy

Functional Testing Specification*Parts & Repair Services
Louisville, KY***LOU-GED-114D9540****Test Procedure for a 114D9540G0001 & G0002 card****DOCUMENT REVISION STATUS:** Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release, converted from P3K-AL-0090-A01 to this work instruction. Added datasheet and a 2003 email about end resistance on the potentiometers.	G. Chandler	3/17/2012
B			
C			

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PREPARED BY G. Chandler	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL <i>Charlie Wade</i>
DATE 3/17/2012	DATE	DATE	DATE 3/17/2012

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1. SCOPE

1.1 This is a functional testing procedure for a 114D9540G0001 & G0002 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 Check board's electronic folder for more information

3.1.2 Referencing test instructions P3K-AL-0090-A01

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)

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6. Testing Process

- 6.1 Examine the circuit board to see that the electrical components and printed circuits are not physically damaged.
- 6.2 Connect a digital ohm-meter between pin-41 and pin-27.
- 6.3 Adjust lag pot R4 to the clockwise position and read 100K ohms $\pm 5\%$.
- 6.4 Adjust lag pot R4 to the counter-clockwise position and read 100K ohms $\pm 5\%$.
- 6.5 Connected ohm-meter between pin-27 and pin-26 and adjust R3 counter-clockwise, should read 0 ohms.

Special Note: Steps 6.5 & 6.9, replacement pots have an end resistance, measure and seek end customers approval for these steps.

- 6.6 Adjust R3 clockwise and read 100K ohms $\pm 5\%$.
- 6.7 Connect ohm-meter between pin-12 and pin-6 and adjust R6 clockwise and read 100K ohms $\pm 5\%$.
- 6.8 Adjust R6 to the counter-clockwise position and read 100K ohms $\pm 5\%$.
- 6.9 Connected ohm-meter between pin-11 and pin-6 and adjust R5 counter-clockwise, should read 0 ohms.

Special Note: Steps 6.5 & 6.9, replacement pots have an end resistance, measure and seek end customers approval for these steps.

- 6.10 Adjust R5 clockwise position and read 100K ohms $\pm 5\%$.
- 6.11 Adjust R3 and R5 counter-clockwise.
- 6.12 Connect the ohm-meter between pin-27 and R4 wiper.
- 6.13 Adjust dial CW to beginning of active portion of pot. Mechanically reposition the dial to read 0.0.
- 6.14 Connect the ohmmeter between pin-26 and R3 wiper
- 6.15 Repeat step 6.1.13 for R3 dial.
- 6.16 Connect the ohmmeter between pin-6 and R6 wiper
- 6.17 Repeat step 6.1.13 for R6 dial.
- 6.18 Connect the ohmmeter between pin-11 and R5 wiper
- 6.19 Repeat step 6.1.13 for R5 dial.
- 6.20 Remove the circuit board from test fixture and identify with a suitable mark to indicate that it has been tested.

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6.21 Post Testing Burn-in Required X Yes No



Note: All MARK I, II, & III Turbine related cards require a post testing burn-in of 100 hours.

6.21.1 Apply BUS or Operational power to the card for a period of 100 hours.

6.21.2 Re-test card while warm using the above procedure.

6.22 *TEST COMPLETE *****

7. Notes

7.1 None at this time.

8. Attachments

8.1 Email dated March 2003 about end resistance is attached to this work instruction.

8.2 See datasheet next page.

Job # _____

Serial # _____

Date _____

Data Sheet for 114D9540G0001

Test Procedure LOU-GED-114D9540

Burn-in Start _____

Burn-in Stop _____

Technician _____

Test Procedure Step	Nominal	Lower Limit	Pre-Burn in Results	Post Burn in Results	Upper Limit	Pot Values If applicable CW CCW		Pass/Fail
3	100K Ohm	95K Ohm			105K Ohm			
4	100K Ohm	95K Ohm			105K Ohm			
5	See Note 1 below	R3 & R4 CCW 26 - 27			0 ohm			
6	100K Ohm	95K Ohm			105K Ohm			
7	100K Ohm	95K Ohm			105K Ohm			
8	100K Ohm	95K Ohm			105K Ohm			
9	See Note 1 below	R5 & R6 CCW 6 - 11			0 ohm			
10	100K Ohm	95K Ohm			105K Ohm			

Note 1: Original potentiometers are no longer available, Replacement potentiometers have an end resistance which is a by-product of the manufacturing process. This resistance will be measured and supplied to the end customer for their approval.

Young, Arnold G (IndSys, SalemVA)

From: Wolter, Donald J (IndSys SalemVA)
Sent: Tuesday, March 04, 2003 3:08 PM
To: Young, Arnold G (IndSys, SalemVA)
Subject: FW: 114D9540G0003, Lead/Lag

Arnold:

FYI.

Don Wolter

-----Original Message-----

From: Wolter, Donald J (IndSys SalemVA)
Sent: Tuesday, March 04, 2003 1:13 PM
To: Edwards, Alfred W (IndSys, SalemVA)
Subject: FW: 114D9540G0003, Lead/Lag

Al:

Based on the information provided below by the GE Field Engineer, please accept this as a waiver to allow shipment of the subject board with the pots with end resistance.

If you have any questions, please contact me. Thanks.

Don Wolter

Technical Support Engineer
Renewal Parts - Rm 464
GE Industrial Systems
GE Drives & Controls, Inc.
1501 Roanoke Blvd.
Salem, VA 24153
Phone: (540)387-7913, Dial Comm *278-7913
Fax: (540)387-7016, Dial Comm *278-7016
E-Mail: Donald.Wolter@indsys.ge.com

-----Original Message-----

From: Rost, Arthur C (PS, PGS)
Sent: Tuesday, March 04, 2003 12:37 PM
To: 'Wolter, Donald J (IndSys SalemVA)'
Subject: RE: 114D9540G0003, Lead/Lag

DON

THE LEAD/LAG BOARDS USED IN BWR CONTROL SYSTEMS ARE NEVER AT A MINIMUM OR MAXIMUM VALUE. THEY ARE ADJUSTED AND LEFT ALONE. THERE SHOULD BE NO PROBLEM WITH THE END RESISTANCE.
RUSTY

-----Original Message-----

From: Wolter, Donald J (IndSys SalemVA)
Sent: Monday, March 03, 2003 4:08 PM
To: Rost, Arthur C (PS, PGS)
Subject: 114D9540G0003, Lead/Lag

Rusty:

I have one of the subject boards here that we are trying to ship. I was told that the pots that were originally specified for this card are no longer available. ATC substituted a "hybrid" pot, but the new pots have an end resistance of up to 500 ohms (the pots are 100K ohm total). Apparently this end resistance is a byproduct of the process used to manufacture the hybrid and cannot be eliminated.

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The original spec. for the pots, U6011ADXP0008, does not refer to end resistance, however, the test instructions for the card says to check that it is zero. The card is held up in test. Ed Andrejko (ATC) says that in use, the pots are generally set somewhere in the middle, so a little end resistance doesn't matter. Mike Molitor says "I think that this will cause a problem when calibrating the circuit external to the lead lag." I, personally, don't see how.

We can get the pot manufacturer to build the original design at a cost of \$2,500.00 and a lead time of 12 weeks. We want to ship this card to the customer in less than three months. I would like to let this one go on a waiver but I need confirmation that the end resistance will not cause problems in the field.

Please let me know what you think. Please call me if you would like to discuss. Thanks in advance for your help.

Don Wolter

Technical Support Engineer
Renewal Parts - Rm 464
GE Industrial Systems
GE Drives & Controls, Inc.
1501 Roanoke Blvd.
Salem, VA 24153
Phone: (540)387-7913, Dial Comm *278-7913
Fax: (540)387-7016, Dial Comm *278-7016
E-Mail: Donald.Wolter@indsys.ge.com