



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-145D2848

Test Procedure for a CV Position Controller Card

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Functional test procedure for a 145D2848 Card

1. SCOPE

1.1 This is a functional testing procedure for a CV Position 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 **LOU-GED-118D1364Gxxx**

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
2		Fluke 85 DMM (or Equivalent)
3		30vdc 1amp Power supplies
1		Standard 118D connector box
1		Rainbow interface box
15		Banana to clip leads
10		Banana to banana leads

6. TESTING PROCESS

6.1 Setup

6.1.1



6.1.2 Note: This procedure was written based on guidelines from procedure 115D2277.

6.1.3 This procedure supercedes procedure P3K-AL-0495-A01 rev A due to incorrect step E2A (which grounds the output of an op amp via pin 7).

6.2 Testing Procedure

6.2.1 POWER INPUTS

6.2.1.1 Connect a +22.00vdc power supply to pin 37 with the negative side Connected to ground (pin 39).

6.2.1.2 Connect a -22.00vdc power supply to pin 41 with the positive side connected to ground (pin 39).

6.2.2 POWER SUPPLIES

6.2.2.1 Check for 15.70vdc (+/- 1v) at TP1 (white).

6.2.2.2 Check for -15.70vdc (+/- 1v) at TP2 (red).

6.2.2.3 Insert a current meter in-line with the +22vdc input (pin 37) to verify a current draw from 50 to 110 milliamps.

6.2.2.4 Insert a current meter in-line with the -22vdc input (pin 41) to verify a current draw from 50 to 110 milliamps.

6.2.3 Testing IC1


6.2.3.1 Turn VR8 fully CW and check for 1.45 to 1.90vdc at TP50 (violet)

6.2.3.2 Turn VR8 fully CCW and check for -7.50 to -6.20vdc at TP50.

6.2.3.3 Adjust VR8 for 0vdc at TP50.

6.2.3.4 Apply 5vdc to pin 36.

6.2.3.5 Check for -2.55 to -2.48vdc at TP7 (blue).

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6.2.3.6 Apply –5vdc to pin 36.

6.2.3.7 Check for 2.48 to 2.55vdc at TP7.

6.2.3.8 Remove voltage from pin 36.

6.2.3.9 Ground pin 36.

6.2.3.10 Turn VR8 fully CW and check for -1.56 to -2.04vdc at TP7.

6.2.3.11 Turn VR8 fully CCW and check for 6.00 to 7.25vdc at TP7.

6.2.3.12 Adjust VR8 for 0vdc at TP7.

6.2.4 METER AMPLIFIER (IC3)

6.2.4.1 Turn VR10 fully CW and check for –22.00vdc (5% tol) at TP53 (black).

6.2.4.2 Turn VR10 fully CCW and check for –5.80 to –6.85vdc at TP53.

6.2.4.3 Connect a current meter from pin 24 to ground.

6.2.4.4 Ground pin 6.

6.2.4.5 Adjust VR50 for 0vdc at TP4 (brown) after making sure you can adjust it on either side of 0vdc.

6.2.4.6 Remove ground from pin 6.

6.2.4.7 Apply 10vdc to pin 6.

6.2.4.8 Adjust VR5 fully CW and check for 1.5 to 1.6ma at pin 24.

6.2.4.9 Adjust VR5 fully CCW and check for .82 to .92ma at pin 24.

6.2.4.10 Remove current meter from pin 24 output.

6.2.5 SUMMING AMPLIFIER (IC2)

6.2.5.1 Turn VR4 fully CCW and check for 0vdc at TP60 (violet).

6.2.5.2 Turn VR4 fully CW and check for –5.00 to –6.00vdc at TP60.

6.2.5.3 Turn VR53 fully CCW.

6.2.5.4 Turn VR7 fully CCW and check for 0vdc at TP55 (green).

6.2.5.5 Turn VR7 fully CW and check for –12.00 to –14.10vdc at TP55.

6.2.5.6 Turn VR2 fully CW.

6.2.5.7 Turn VR1 fully CCW and check for 5.42 to 5.58vdc at TP51 (white).

6.2.5.8 Turn VR1 fully CW and check for 17.00 to 17.40vdc at TP51.

6.2.5.9 TP61 should read one diode drop less than TP51 (aprox .6v less).

6.2.5.10 Turn VR54 fully CCW.

6.2.5.11 Turn VR3 fully CCW and check for 0vdc (+/- .05v) at TP64 (brown).


6.2.5.12 Turn VR3 fully CW and check for –14.17 to –15.17vdc at TP64.

6.2.6 Amplifier Gains

Special Note:

This test procedure is based on test procedure LOU-GED-118D1364 for testing the 118D1364 card. The 118D1364 card is physically the same card but with several different input resistor values which causes the gain structure of many of the circuits to be different. Red print indicates the differences found between the two boards.

- 6.2.6.1 Remove voltage from pin 6.
- 6.2.6.2 Turn VR7 fully CCW.
- 6.2.6.3 Ground TP63 (black), TP66 (orange), TP62 (red) and TP67 (blue).
- 6.2.6.4 Jumper TP57 (blue) to TP52 (red).
- 6.2.6.5 Jumper TP58 (yellow) to TP59 (gray).
- 6.2.6.6 Ground TP51 and input+2vdc into TP61.
- 6.2.6.7 Turn VR2 fully CW and check for -9.9 to -10.2vdc at TP3.
- 6.2.6.8 Turn VR2 fully CCW and check for -3.2v to -3.4vdc at TP3.
- 6.2.6.9 Remove all grounds from TP63 (black), TP66 (orange), TP62 (red) and TP67 (blue).
- 6.2.6.10 Remove jumper from TP57 (blue) to TP52 (red).
- 6.2.6.11 Ground TP7 (blue), TP54 (brown), TP61 (white), TP5 (green), TP66 (orange) and TP65 (green).
- 6.2.6.12 Apply 1.00vdc to TP56 (orange).
- 6.2.6.13 Turn VR6 and VR55 fully CCW and check for -.90 to -1.10vdc at TP3 (white).
- 6.2.6.14 Reduce the voltage on TP56 to .2v
- 6.2.6.15 Turn VR6 and VR55 fully CW and check for -3.9 to -5.3vdc at TP3.
- 6.2.6.16 Inject a more and more negative voltage into TP56 until the voltage at TP3 stops changing. The final TP3 voltage should be between 5.70 and 6.10vdc. The input voltage at TP56 should be around -6vdc (10% tol).
- 6.2.6.17 Remove the jumper from TP58 (yellow) to TP59 (gray).
- 6.2.6.18 The voltage at TP3 should be about 0.33vdc (5%).
- 6.2.6.19 Jumper TP58 (yellow) and TP59 (gray) back together.
- 6.2.6.20 Remove ground from all test points TP7 (blue), TP54 (brown), TP61 (white), TP5 (green), TP66 (orange) and TP65 (green).
- 6.2.6.21 Remove ground from pin 36.

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- 6.2.6.22** Jumper TP57 (blue) to TP52 (red).
- 6.2.6.23** Ground test points TP61 (white), TP63 (black) and TP66 (orange).
- 6.2.6.24** Adjust the voltage on TP56 (orange) to 5.00vdc.
- 6.2.6.25** Adjust VR7 for -5.00vdc at TP54 (brown).
- 6.2.6.26** Check for less than .20v at TP3 (clear)
- 6.2.6.27** Turn VR53 fully CW and check for –2.10 to –2.50vdc at TP3.
- 6.2.6.28** Check for 0vdc (+/- .1v) at TP7 (blue).
- 6.2.6.29** Turn VR7 fully CCW.
- 6.2.6.30** Adjust VR8 for 5.00vdc at TP7.
- 6.2.6.31** Remove voltage from pin TP56 (orange).
- 6.2.6.32** Turn VR51 fully CCW and check for –11.00 to –12.50vdc at TP3.
- 6.2.6.33** Turn VR51 fully CW and check for –1.90 to –2.30vdc at TP3.
- 6.2.6.34** Check for 0vdc (+/- .05v) at TP54 (brown).
- 6.2.6.35** Remove ground from test points TP63 (black) and TP66 (orange).
- 6.2.6.36** Ground test points TP62 (red) and TP67 (blue).
- 6.2.6.37** Re-apply 5.00vdc to TP56 (orange).
- 6.2.6.38** Adjust VR3 for -5.00vdc at TP65 (green).
- 6.2.6.39** Check for 0vdc (+/- .1v) at TP63 (black).
- 6.2.6.40** Turn VR54 fully CW and check for –.50 to +.50vdc at TP3.
- 6.2.6.41** Turn VR54 fully CCW and check for –4.35 to –4.75vdc at TP3.
- 6.2.6.42** Turn VR3 fully CCW
- 6.2.6.43** Turn VR52 fully CW
- 6.2.6.44** Move the 5.00vdc on TP56 (orange) over to Pin 6.
- 6.2.6.45** Check for 0vdc (+/- .5v) at TP65 (green).
- 6.2.6.46** Check for –11.00 to –12.50vdc at TP3.
- 6.2.6.47** Turn VR52 fully CCW and check for –3.55 to –3.95vdc at TP3.

6.3 *TEST COMPLETE *****