



GE Energy

## Functional Testing Specification

Parts & Repair Services  
Louisville, KY

LOU-GED-IS200STUR

### Test Procedure for an IS200STURH1A & IS200STURH2A Cards

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<b>DATE</b> 08/11/2009	<b>DATE</b>	<b>DATE</b>	<b>DATE</b> 8/19/2009

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## 1. SCOPE

1.1 This is a functional testing procedure for a 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 electronic board 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
2		Fluke 87 DMM (or Equivalent)
1		Fluke 5500A Calibrator
1		O-Scope
1		Tenma Dual Power Supply

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## 6. TESTING PROCESS

### 6.1 Setup

- 6.1.1 Verify the programmed serial # on the serial # computer.

### 6.2 Testing Procedure

- 6.2.1 Hook up Fluke 5500A Calibrator positive to TB1-21 (GENH) and negative TB1-22 (GENL). Set voltage for 120V and frequency to 60Hz.
- 6.2.2 Hook up O-Scope probe to pin JA1-4 (GSH) and O-Scope ground to pin JA1-26 (GSL). Set Volts/Div to 100 millivolts and SEC/DIV to 5 milliseconds.
- 6.2.3 Press OPR (operate) button on Fluke 5500A Calibrator. You should see a sinewave at 60Hz with amplitude of 500 millivolts peak to peak on the O-Scope.
- 6.2.4 Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.5 Move O-Scope probe to pin JA1-5 (BSH) and move O-Scope ground to pin JA1-47 (BSL)
- 6.2.6 Move Fluke 5500A Calibrator positive to TB1-23 (BSH) and negative TB1-24 (BSL).
- 6.2.7 Press OPR (operate) button on Fluke 5500A Calibrator. You should see a sinewave at 60Hz with amplitude of 500 millivolts peak to peak on the O-Scope.
- 6.2.8 Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.9 Move O-Scope probe to pin JA1-37 (PR1H) and move O-Scope ground to pin JA1-16 (PR1L).
- 6.2.10 Move Fluke 5500A Calibrator positive to TB1-37 (TTL1) and negative to E1 or E2 (SCOM), which are the screw holes on either side of TB1. Set voltage for 10V and frequency to 60Hz.
- 6.2.11 Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.12 Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.13 Move Fluke 5500A Calibrator positive to TB1-38 (PR1\_H).
- 6.2.14 Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.15 Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.16 Move Fluke 5500A Calibrator positive to TB1-39 (PR1\_L).
- 6.2.17 Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.18 Press STBY (standby) button on Fluke 5500A Calibrator.

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- 6.2.19** Move Fluke 5500A Calibrator positive to TB1-40 (TTL2).
- 6.2.20** Move O-Scope probe to pin JA1-38 (PR2H) and move O-Scope ground to pin JA1-17 (PR2L).
- 6.2.21** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.22** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.23** Move Fluke 5500A Calibrator positive to TB1-41 (PR2\_H).
- 6.2.24** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.25** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.26** Move Fluke 5500A Calibrator positive to TB1-42 (PR2\_L).
- 6.2.27** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.28** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.29** Move Fluke 5500A Calibrator positive to TB1-43 (TTL3).
- 6.2.30** Move O-Scope probe to pin JA1-39 (PR3H) and move O-Scope ground to pin JA1-18 (PR3L).
- 6.2.31** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.32** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.33** Move Fluke 5500A Calibrator positive to TB1-44 (PR3\_H).
- 6.2.34** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.35** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.36** Move Fluke 5500A Calibrator positive to TB1-45 (PR3\_L).
- 6.2.37** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.38** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.39** Move Fluke 5500A Calibrator positive to TB1-46 (TTL4).
- 6.2.40** Move O-Scope probe to pin JA1-40 (PR4H) and move O-Scope ground to pin JA1-19 (PR4L).
- 6.2.41** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.42** Press STBY (standby) button on Fluke 5500A Calibrator.

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- 6.2.43** Move Fluke 5500A Calibrator positive to TB1-47 (PR4\_H).
- 6.2.44** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.45** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.46** Move Fluke 5500A Calibrator positive to TB1-48 (PR4\_L).
- 6.2.47** Press OPR (operate) button on Fluke 5500A Calibrator. You should see a rounded square wave at 60Hz with amplitude of 200 millivolts peak to peak on the O-Scope.
- 6.2.48** Press STBY (standby) button on Fluke 5500A Calibrator.
- 6.2.49** Adjust Tenma Dual Power Supply for 28 VDC on one output and 5 VDC on the other output. Tie the commons (PCOM) of both outputs together.
- 6.2.50** Hook up the positive 28 VDC to pin JA1-23 and negative to pin JA1-22. Turn power supply on. Check for 13 VDC Regulator output between U330 pin 2 and PCOM with Fluke 87 DMM (or Equivalent).
- 6.2.51** Hook up 1<sup>st</sup> Fluke 87 DMM (or Equivalent) positive lead to TB1-27 and negative lead to TB1-28. Set Fluke 87 DMM (or Equivalent) to measure resistance. Should read **OPEN** resistance at this time.
- 6.2.52** Hook up positive 5 VDC to pin JA1-28. Relay K25P should energize and resistance between TB1-27 and TB1-28 should read **SHORTED** on 1<sup>st</sup> Fluke 87 DMM (or Equivalent).
- 6.2.53** Remove positive 5 VDC from pin JA1-28, relay K25P should de-energize and resistance reading between TB1-27 and TB1-28 should read **OPEN** on 1<sup>st</sup> Fluke 87 DMM (or Equivalent).
- 6.2.54** Move 1<sup>st</sup> Fluke 87 DMM (or Equivalent) positive lead to TB1-29. Should read OPEN at this time.
- 6.2.55** Hook up positive 5 VDC to pin JA1-6. Relay K25 should energize and resistance between TB1-29 and TB1-28 should read **SHORTED** on 1<sup>st</sup> Fluke 87 DMM (or Equivalent).
- 6.2.56** Remove positive 5 VDC from pin JA1-6, relay K25 should de-energize and resistance reading between TB1-29 and TB1-28 should read **OPEN** on 1<sup>st</sup> Fluke 87 DMM (or Equivalent).
- 6.2.57** Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-4 and negative lead to TB1-3. Should read **SHORTED** at this time.
- 6.2.58** Hook up 5 VDC to pin JA1-35. Relay K1 should energize and the reading should change to **OPEN**.

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- 6.2.59 Remove 5 VDC from pin JA1-35. Relay K1 should de-energize and the reading should change back to **SHORTED**.
- 6.2.60 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-1. The reading should be **OPEN** at this time.
- 6.2.61 Hook up 5 VDC to pin JA1-35. Relay K1 should energize and the reading should change to **SHORTED**.
- 6.2.62 Remove 5 VDC from pin JA1-35. Relay K1 should de-energize and the reading should change back to **OPEN**.
- 6.2.63 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-5 and move the negative lead to TB1-6. The reading should be **OPEN** at this time.
- 6.2.64 Hook up 5 VDC to pin JA1-35. Relay K1 should energize and the reading should change to **SHORTED**.
- 6.2.65 Remove 5 VDC from pin JA1-35. Relay K1 should de-energize and the reading should change back to **OPEN**.
- 6.2.66 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to pin JA1-54 and move the negative lead to pin JA1-61. The reading should be **SHORTED** at this time.
- 6.2.67 Hook up 5 VDC to pin JA1-35. Relay K1 should energize and the reading should change to **OPEN**.
- 6.2.68 Remove 5 VDC from pin JA1-35. Relay K1 should de-energize and the reading should change back to **SHORTED**.
- 6.2.69 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-11 and negative lead to TB1-10. Should read **SHORTED** at this time.
- 6.2.70 Hook up 5 VDC to pin JA1-14. Relay K1 should energize and the reading should change to **OPEN**.
- 6.2.71 Remove 5 VDC from pin JA1-14. Relay K1 should de-energize and the reading should change back to **SHORTED**.
- 6.2.72 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-9. The reading should be **OPEN** at this time.
- 6.2.73 Hook up 5 VDC to pin JA1-14. Relay K1 should energize and the reading should change to **SHORTED**.
- 6.2.74 Remove 5 VDC from pin JA1-14. Relay K1 should de-energize and the reading should change back to **OPEN**.
- 6.2.75 Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to TB1-13 and move the negative lead to TB1-12. The reading should be **OPEN** at this time.

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- 6.2.76** Hook up 5 VDC to pin JA1-14. Relay K1 should energize and the reading should change to **SHORTED**.
- 6.2.77** Remove 5 VDC from pin JA1-14. Relay K1 should de-energize and the reading should change back to **OPEN**.
- 6.2.78** Move positive lead on 1<sup>st</sup> Fluke 87 DMM (or Equivalent) to pin JA1-34 and move the negative lead to pin JA1-61. The reading should be **SHORTED** at this time.
- 6.2.79** Hook up 5 VDC to pin JA1-14. Relay K1 should energize and the reading should change to **OPEN**.
- 6.2.80** Remove 5 VDC from pin JA1-14. Relay K1 should de-energize and the reading should change back to **SHORTED**.
- 6.2.81** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-32, negative lead should still be connected to PCOM. With 28 VDC applied to card the reading should be 13 VDC at this time.
- 6.2.82** Move positive lead of 5 VDC to TB1-15 and negative lead of 5 VDC to TB1-16.
- 6.2.83** Adjust 5 VDC up to 15 VDC. The reading should drop to 0 VDC on meter.
- 6.2.84** Adjust 15 VDC back to 5 VDC. The reading should return to 13 VDC.
- 6.2.85** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-11. With 28 VDC applied to card the reading should be 13 VDC at this time.
- 6.2.86** Move positive lead of 5 VDC to TB1-17 and negative lead of 5 VDC to TB1-18.
- 6.2.87** Adjust 5 VDC up to 15 VDC. The reading should drop to 0 VDC on meter.
- 6.2.88** Adjust 15 VDC back to 5 VDC. The reading should return to 13 VDC.
- 6.2.89** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-9, negative lead should still be connected to PCOM. Set Fluke 87 DMM (or Equivalent) to measure resistance. Should read **OPEN** at this time.
- 6.2.90** Move positive lead of adjustable 5 VDC supply to TB1-26 and move negative lead to TB1-32.
- 6.2.91** Adjust 5 VDC to 15 VDC. The reading will be less than 30 Ohms.
- 6.2.92** Adjust 5 VDC to 5 VDC. The reading will be **OPEN** at this time.
- 6.2.93** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-50, negative lead should still be connected to PCOM. Set Fluke 87 DMM (or Equivalent) to measure resistance. Should read **OPEN** at this time.
- 6.2.94** Move positive lead of adjustable 5 VDC supply to TB1-29.
- 6.2.95** Adjust 5 VDC to 15 VDC. The reading will be less than 30 Ohms.
- 6.2.96** Adjust 5 VDC to 5 VDC. The reading will be **OPEN** at this time.

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**6.2.97** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-29. Should read **OPEN** at this time.

**6.2.98** Move positive lead of adjustable 5 VDC supply to TB1-30.

**6.2.99** Adjust 5 VDC to 15 VDC. The reading should be less than 30 Ohms.

**6.2.100** Adjust 5 VDC to 5 VDC. The reading should be **OPEN** at this time.

**6.2.101** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-8. Should read **OPEN** at this time.

**6.2.102** Move positive lead of adjustable 5 VDC supply to TB1-27.

**6.2.103** Adjust 5 VDC to 15 VDC. The reading should be less than 30 Ohms.

**6.2.104** Adjust 5 VDC to 5 VDC. The reading should be **OPEN** at this time.

**6.2.105** Move positive lead of 2<sup>nd</sup> Fluke 87 DMM (or Equivalent) to pin JA1-30. Should read **OPEN** at this time.

**6.2.106** Move positive lead of adjustable 5 VDC supply to TB1-28 and move negative lead to TB1-32.

**6.2.107** Adjust 5 VDC to 15 VDC. The reading should be less than 30 Ohms.

**6.2.108** Adjust 5 VDC to 5 VDC. The reading should be **OPEN** at this time.

**6.2.109** Disconnect all wires and test equipment from UUT. Testing complete.

**6.3 Post Testing Burn-in**                      **Required**    \_\_\_ Yes    X No

**6.4 \*\*\*TEST COMPLETE \*\*\***

## **7. NOTES**

**7.1** None at this time

## **8. ATTACHMENTS**

**8.1** None at this time