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GE Industrial Systems

**Functional Testing Specification**

*Renewal Services  
Louisville, KY*

**LOU-GED-44C372695**

**Test Procedure for a 44C372695G01 Card**

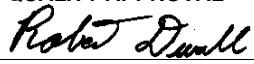
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A	Initial release	Dan Laemmle	10/24/02
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## Functional test procedure for a 44C372695G01Card

### 1. SCOPE

1.1 This is a functional testing procedure for a 44C372695G01Card.

### 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 **277A3998**

### 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
3		Fluke 85 DMM (or Equivalent)
1		Tektronix 2215 O-scope or equiv.

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## 6. TESTING PROCESS

### 6.1 Setup

- 6.1.1 Connect 100K resistor from Pin 27 to Pin 10.
- 6.1.2 Connect 28v 40 ma lamps (L25) from Pin 25 to Pin 8, and (L24) from Pin 24 to Pin 8.
- 6.1.3 Connect +15vdc to Pin 1, -15vdc to Pin 5 with coms to Pin 3.
- 6.1.4 Connect +24vdc to Pin 8, com to Pin 10.
- 6.1.5 Jumper Pin 9 to Pin 13.
- 6.1.6 Jumper Pin 11 to Pin 3.

### 6.2 Testing Procedure

- 6.2.1 Apply power to card. Measure 9.5vdc to 10.5vdc from cathode of 3Z to 10TP.
- 6.2.2 Connect DVM 3TP (+) 1TP (-). Adjust 1P (Off line) CCW 0.4v to 0.6v CW 3.0 to 3.6v. Set for 2.00vdc.
- 6.2.3 Move DVM 5TP (+) 1TP (-) Adjust 2P (On line) CCW .5 to .6vdc CW 7.2 to 9.0vdc. Set for 6.00vdc.
- 6.2.4 Move DVM 9TP(+) to 10TP(-) and change to DC HERTZ. Also connect Scope to same points, probe to TP9 and com to TP10. See 10v +/- .7v square waves. Adjust 3P (Off delay) CCW 30Hz +/- 10 hz. CW 250 Hz +/- 50Hz. Set at 100Hz +/- .5 Hz.
- 6.2.5 Move DVM and scope 7TP (+) to 10TP (-). See 10v square waves. Adjust 4P (On delay) CCW 30Hz +/- 10hz. CW 250Hz +/- 50hz. Set 66.6Hz +/- .2hz.
- 6.2.6 Move DVM and scope 8TP (+) to 10 TP (-). See 10v square waves. Adjust 5P (Trip Delay) CCW 20Hz +/- 5hz. CW 250Hz +/-50hz. Set at 50Hz +/- 0.2hz. Remove DVM.
- 6.2.7 Connect DVM on DC volts to 2TP (+) and 1TP (-). Read -10 to -15VDC. If L25 or L24 lamps or Alarm or BKR TP LEDS on card front are on at this time depress reset PB on card front to de-energize.
- 6.2.8 Remove jumper Pin 11 to Pin 3. Connect a variable dc supply (VS) (-) to pin 12 and (+) to Pin 4. With the DVM still connected from TP2 to TP1, connect another DVM (+) to Pin 12 (-) to Pin 4 to monitor VS. Slowly increase VS until TP2 to TP1 just goes positive (approx. 0.6 v). Pin 12 reads -2.5v to -3.9v. Ten to eleven seconds later the square wave at 9TP to 10TP will drop to a value less than 2 volts amplitude. L24, L25, Alarm, and BKR TP will energize.

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Apply +24 volts from Pin 8 to Pin 15 then verify that Pin 27 is greater than 15Vdc. (approx 19.8v) referred to Pin 10. Remove +24 volts from Pin 15.

- 6.2.9** Move the DVM (+) from TP2 to TP4. Read –10 to –15Vdc. Move the scope probe from 9TP to 7TP.
- 6.2.10** Further increase VS at Pin 12 until 4TP to 1TP just goes positive. Pin 12 reads –7.5v to –10v. 14.5 to 16.5 seconds later, the square wave at TP7 will drop to a value less than 2 volts amplitude. Pin 22 should read zero DC.
- 6.2.11** Return VS to zero volts at Pin 12. Remove jumper from Pin 13 to Pin 9. L24, L25, Alarm and BKR TP lights de-energize. Also Pin 27 to Pin 10 reads less than 3v with +24v applied to Pin 15. Leave +24 volts applied to Pin 15.
- 6.2.12** Apply +24v also to Pin 13. Pin 22 reads approx.+24V. Again increase negative voltage at Pin 12 until 4TP just goes positive. After approx 15 seconds L24 lamp and Alarm on card will energize. Pin 22 goes to zero volts. Approximately 35 seconds after 4TP goes to positive, L25 and BKR TP lamps energize. Return VS to zero volts at Pin 12. All lights still energized. Depress and release Reset button. All lights de-energize. Pin 22 reads 24Vdc. Remove +24v at pin 15 but leave pin 13 at 24v.
- 6.2.13** Again increase VS until 4TP just goes positive. Approximately 15 seconds later, Alarm and L24 lights energize. Pin 22 is at zero volts. Approximately 20 seconds later, L25 and BKR TP energize. Pin 22 is at Zero volts. In approximately 20 more seconds, L25 and BKR TP will start cycling off and on at approximately 20 second intervals.
- 6.2.14** Return VS to zero at Pin 12. All lights de-energized. Remove +24Vdc from Pin 13.
- 6.2.15** Reapply +24Vdc to Pins 13 and 15. Again increase VS until TP4 just goes positive. Pin 22 reads +24Vdc. Approximately 15 seconds later L24 and Alarm lamps energize. Pin 22 goes to zero. Approximately 15 seconds later L25 and BKR TP energize. Leave circuit in this state for 30 seconds or longer. No change in lights. Return VS to zero at Pin 12. Lights shall remain energized. Press and release Reset button and all lights de-energize. Remove all power.

### **6.3 \*\*\*TEST COMPLETE \*\*\***

## **7. NOTES**

### **7.1 None at this time**