



GE Energy

## Functional Testing Specification

Parts & Repair Services  
Louisville, KY

LOU-GED-IS200TRPG-B

### Test Procedure for a Gas Turbine Primary Trip Board

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	John Madden	8/10/07
B	Shift data on page 4 step 6.2.5 to flow better	J. Hardin	3/2/2009
C			

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## 1. SCOPE

1.1 This is a functional testing procedure for an IS200TRPG 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 N:\Design Folders\IS2\IS200T\TRPG

## 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		125VDC Supply or equivalent

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## 6. TESTING PROCESS

### 6.1 Setup

**6.1.1** Setup is to be performed per instructions given in each test step.



**Note: This test uses voltages in excess of 120VDC. Follow any applicable NFPA guidelines for your own personal protection while performing this test.**

### 6.2 Testing Procedure

**6.2.1 Chip ID verification:** The first thing you need to do is to take the unit over to the Chip ID pc and verify that all three ID chips are programmed correctly. If you've never done this before, consult with the Mark VI staff.

**6.2.2 Resistance Measurements:** Several circuits you will perform static checks on using your Fluke DVOM to measure resistance. From PCOM (JR1-2, JS1-2, OR JT1-2, otherwise referred to as JR,S,T1-2) you should see 1.475K Ohms to JR,S,T1-3, 4, 7-12. Next, again from PCOM, you should see 10K Ohms to JR,S,T1-33.

**6.2.3 Resistance Measurements, Flame Detection Circuits:** From PCOM, you should see 4.77K Ohms to TB2-48. Keeping your meter leads on these two points, drag the lead on TB2-48 down the next 7 pins: 46, 44, 42, 40, 38, 36, & 34, reading the same 4.77K Ohms of resistance. Next, you need to go to rectifier bridge DN1, pin 3 (the one marked with the plus sign on the chip), and measure from there to TB2-47. You should see 801K Ohms (.801M Ohms). Keeping your meter leads on these two points, drag the lead on TB2-47 down the next 7 pins: 45, 43, 41, 39, 37, 35, & 33, reading the same 801K Ohms of resistance. Repeat this last step for DN2-3 and DN3-3. Finally, from PCOM, you should see 520K Ohms to pin 1 of DN1 and DN3 (the AC pin across from the one marked with the minus sign). You should also see 520K Ohms from PCOM to pin 2 of DN2 (the other AC pin, right across from the one with the plus sign, pin 3)

**6.2.4 Power Connections, TMR circuit testing:** For the remaining tests, you'll need to connect a 10K Ohm resistor between your 5Vdc supply and the positive side of your meter, to act as a logic pull-up circuit. The logic outputs on this card are all open-collector and will not read properly without a pull-up circuit. Connect the common of your 5Vdc pull-up supply to the common of your 28Vdc supply, and then connect both to PCOM (JR,S,T1-2). As for P28, you may have been able to use just one P28 input to power other IS200 "TMR" boards, but on this one all three P28 inputs must be supplied

power because they are diode-blocked from backfeeding one another. Connect +28Vdc to JR1-1, JS1-1, & JT1-1 (JR,S,T1-1). Now set up for 125VDC using one or more supplies as necessary, but do not apply power until called for later in this test. N125 goes to TB1-9 or 10. P125 goes to TB1-1, 3, or 5.

**6.2.5 Relay & Monitor Operation:** Each of the nine relays on this card can be fired individually, or in “Simplex” mode. By grounding any of pins 28, 29, or 30 on the Jx1 connectors, a specific relay will fire in response to the input. As each relay fires, it switches 125VDC to a monitor circuit that in turn sends a 5V logic high or low output to indicate the state of that relay. This is where you’ll need your meter setup with the pull-up resistor to read these logic outputs. Use the following table to test these nine relay/monitor circuits: With your pull-up modified meter reading JR, S, or T1-25, switch 125VDC power off and then back on again. The output should be High with power off, and Low with power on.

Input, grounded to PCOM	Output, Low to 5V High w/ Relay Energized
JR1-28	JR1-22
JR1-29	JR1-23
JR1-30	JR1-24
JS1-28	JS1-22
JS1-29	JS1-23
JS1-30	JS1-24
JT1-28	JT1-22
JT1-29	JT1-23
JT1-30	JT1-24

**6.2.6 “Solenoid” Operation:** There are three solenoids on another card that interfaces with this one, the IS200TREG, and they are fired by TMR operation of three sets of the nine relays on this particular card. To test these circuits, you must connect the meter as follows: Remove the 5V pull-up resistor from the meter; you’re done with it. Connect the positive of the meter to P125. The negative meter lead will go to one of the points listed in the table below. Using the following table, fire at least two of the three relays listed in each row to fire the designated “solenoid” circuit and look for the N125 connection at the specified point. If it works, you’ll see your meter transition from <3Vdc to 125VDC as soon as you fire the second of the three required relays for each circuit:

Inputs, At least 2 of 3, grounded to PCOM	Output, N125 Connection
JR1-28, JS1-28, JT1-28 (SOL1)	TB1-2
JR1-29, JS1-29, JT1-29 (SOL2)	TB1-4
JR1-30, JS1-30, JT1-30 (SOL3)	TB1-6

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

**Note: MAKE SURE TO PUT THE LEXAN SHIELD BACK IN PLACE OVER THE FLAME DETECTION CIRCUITS IF YOU REMOVED IT!! This part needs to be on the unit as a safety device.**

**6.4 \*\*\*TEST COMPLETE\*\*\*****7. NOTES**

7.1 None at this time

**8. ATTACHMENTS**

8.1 None at this time