GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-IS200TTURH1Cxx**

Test Procedure for a Mark VIe Primary Turbine Protection (TTUR) terminal board.

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release.	J. Francis	09/16/2015
B			
C			

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
J. Francis			L. Groves
DATE	**DATE**	**DATE**	**DATE**
09/16/2015			9/23/2015

1. SCOPE

1.1 This is a functional testing procedure for a Mark VIe Primary Turbine Protection (IS200TTURH1Cxx) terminal board.

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.

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	H190144	Mark VIe TMR Test Rack with HMI
1	*	Fluke 87 DMM (or equivalent)

6. TESTING PROCESS

6.1 Static Checks

6.1.1 Using Fluke 87 DMM (or equivalent) set for Resistance function, verify the following connections, with expected results, in the table below:

From:	To:	Expected Result:
J8-1	PR3-51	Continuity
J8-2	PS3-51	Continuity
J8-2	PT3-51	Continuity
TB3-1	TB2-25	Continuity
TB3-2	TB2-27	Continuity
TB3-3	TB2-33	Continuity
TB3-4	TB2-35	Continuity
TB3-5	TB2-41	Continuity
TB3-6	TB2-43	Continuity

6.2 Testing Procedure

✍ **Note: The following tests assume you are familiar with using ToolboxST. You will need to perform downloads at least twice for UUT to be setup fully. You should also wait for approximately 6 minutes in between downloads for rack and UUT to reboot.**

6.2.1.1 Verify that the Test Rack is in operating order before proceeding.

6.2.1.2 Turn “OFF” Rack Power located in Cabinet 1 by turning off both circuit breakers CB1 and CB2. Turn “OFF” the Buss and Gen Voltage in Cabinet 3 at bottom right in box.

6.2.1.3 Remove test card (GOLD card) from test rack and install Unit Under Test (UUT) into test rack.

6.2.1.4 Turn “ON” Rack Power located in Cabinet 1 by turning on both circuit breakers CB1 and CB2. Turn “ON” the Buss and Gen Voltage in Cabinet 3 at bottom right in box.

6.2.1.5 Open **ToolboxST** and open “**LSCTMR**” by double-clicking on it and click the “ONLINE” button in the toolbar.

6.2.1.6 Click on the “Distributed I/O” icon, then click on the “Front Side I/O” icon, this will show you all of the associated modules. The PTUR module should have a red circle with an X through it, indicating no communications.

6.2.1.7 Double click on the "X" on the PTUR Module. This will bring up a configuration box to enter the serial number of the UUT and hardware form. Click "OK" button when done.

6.2.1.8 From the menu, Download Controller Setup by going to **Device->Download->Download Wizard.** Follow instructions in dialog boxes that follow.

6.2.1.9 After all downloads completed successfully, bring unit online in ToolboxST and check that the red circle with an X through it is gone and ToolboxST will communicate with PTUR Modules.

6.2.1.10 After Test Rack has completely booted, the 6 Relays in Cabinet 3, bottom left, will illuminate.

6.2.1.11 Click "Summary" tab for PTUR in ToolboxST. This will show all readings for the PTUR/TTUR/TRPG in green.

6.2.1.12 Verify that all 4 Pulse Rates read the same and can be adjusted. Frequencies above 4 KHz and below 680 Hz will cause a "TRIP" for the Test Rack, at which time the Test Rack will need to be restarted (approx. 6 minutes). Make sure to test both conditions.

6.2.1.13 Verify that the ShCurMon and ShVoltMon readings are between 5 and 15.

6.2.1.14 Verify that the Buss Volts and Gen Volts are within 1 volt of each other.

6.2.1.15 Verify that the Circuit Breaker Closed reading is "TRUE".

6.2.1.16 Scrolling down to next page of variables, verify that the kq1, kq2, and kq3 readings are "TRUE".

6.2.1.17 Verify that all 8 Flame Indicators are reading approximately "400". Frequencies above 700 Hz cause the Flame Indicators to read "0". Verify that all Flame Indicators adjust from "0" to "700" by adjusting the Flame Detect ADJ Pot just to the left of the TTUR card. Set Flame indicators back to "400" when finished.

6.2.1.18 After verifying successful operation of Unit Under Test (UUT), start Burn-In Process.

6.2.1.19 Let unit run online for at least 48 hours.

6.2.1.20 After testing has been completed successfully, remove UUT, reinstall GOLD card, and verify successfully operation in ToolboxST.

1.1 ***TEST COMPLETE ***

7. NOTES

7.1 Live View screens will be forthcoming and tests will be amended as needed.

8. ATTACHMENTS

8.1 None at this time.