g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-IS200TPROHxC**

Test Procedure for a Mark Vie IS200TPROHxC Emergency Protection terminal card.

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release. Includes versions H1C and H2C.	J. Francis	08/19/2015
B			
C			

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DATE	**DATE**	**DATE**	**DATE**
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1. SCOPE

1.1 This is a functional testing procedure for an **IS200TPROHxC** MARK VIe Emergency Protection terminal 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 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 computer

6. TESTING PROCESS

6.1 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 7 minutes in between downloads for rack and UUT to reboot.

6.1.1.1 Verify that Mark Vie TMR Test Rack is up and running with no errors.

6.1.1.2 Turn "OFF" "MAIN" PT Voltage Source in box under the TPRO side of Cabinet 3 (location 3R4).

6.1.1.3 Turn "OFF" Rack Power by turning off both circuit breakers located in Cabinet 1 bottom of test rack.

6.1.1.4 Remove test card (GOLD card) from test rack and install Unit Under Test (UUT) into test rack (location 3R1).

6.1.1.5 Turn "ON" "MAIN" PT Voltage Source in box under the TPRO side of Cabinet 3 (location 3R4).

6.1.1.6 Turn "ON" Rack Power by turning on both circuit breakers located in Cabinet 1 bottom of test rack.

6.1.1.7 Wait for test rack to fully boot, approximately 7 minutes.

6.1.1.8 Wait for test rack to boot completely before continuing. This will be when the 6 Relays light up in location 3L4, next to PT Voltage source box.

6.1.1.9 Open **ToolboxST** and open "**LVLTMR01**" by double-clicking on it and click the "ONLINE" button in the toolbar.

6.1.1.10 Click on the "HARDWARE" tab, this will show you all of the modules setup in the rack. Expand as needed by clicking the "+" sign next to the icon with the "X" in it. The PPRO module should have a red circle with an X through it, indicating no communications.

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

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

6.1.1.13 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 PPRO Modules.

6.1.1.14 From the menu, Download Controller Setup by going to **Device->Download->Download Wizard.** Follow instructions in dialog boxes that follow. All of the devices should show "EQUAL", so no downloading should be required.

6.1.1.15 At this time all of the 6 Relays at location 3L4 should be illuminated. Also, verify the "STOPLIGHT" is illuminated in Cabinet 1.

6.1.1.16 Verify that all 3 PPRO PAC Module's LED's are scrolling with no red indicators, both of the LINK LED's and the Power LED's are GREEN, and that the TX/RX LED's are flashing AMBER.

6.1.1.17 Highlight the "HARDWARE" tab. Then highlight the "PPRO" icon. This should display the "SUMMARY" screen for the TPRO and TREG cards.

6.1.1.18 Verify that the Pulse Rate 1-3 are at approximately 3600 Hz. You may need to adjust the frequency generator, located just above the TTUR card at location 3L1 a little to get this to be accurate.

6.1.1.19 Verify that the "bus_pt_volts" and "gen_pt_volts" are approximately the same, 121 VAC.

6.1.1.19.1 Turn "OFF" the PPRO "BUS" switch on the PT Voltage source.

6.1.1.19.1.1 Verify that the PPRO buss volts point in the summary screen goes to 0 VAC, while the PPRO gen volts point stays at 121 VAC.

6.1.1.19.1.2 Verify on the PPRO PAC Module that the LED's are not scrolling, the "RUN" and "SYNC" LED's are red, the ATTN LED is flashing RED, and all other LED's are normal.

6.1.1.19.1.3 Turn "ON" the PPRO "BUS" switch on the PT Voltage source and verify that the PPRO buss volts returns to 121 VAC.

6.1.1.19.1.4 Verify that all 3 PPRO PAC Module's LED's are scrolling with no red indicators, both of the LINK LED's and the Power LED's are GREEN, and that the TX/RX LED's are flashing AMBER.

6.1.1.19.2 Turn "OFF" the PPRO "GEN" switch on the PT Voltage source.

6.1.1.19.2.1 Verify that the PPRO gen volts point in the summary screen goes to 0 VAC, while the PPRO buss volts point stays at 121 VAC.

6.1.1.19.2.2 Verify on the PPRO PAC Module that the LED's are not scrolling, the "RUN" and "SYNC" LED's are red, the ATTN LED is flashing RED, and all other LED's are normal.

6.1.1.19.2.3 Turn "ON" the PPRO "GEN" switch on the PT Voltage source and verify that the PPRO gen volts returns to 121 VAC.

6.1.1.19.2.4 Verify that all 3 PPRO PAC Module's LED's are scrolling with no red indicators, both of the LINK LED's and the Power LED's are GREEN, and that the TX/RX LED's are flashing AMBER.

6.1.1.20 Verify that all 7 of the Contact Input points are toggling between "TRUE" and "FALSE" every 30 seconds.

6.1.1.21 Verify that K1, K2, K3, KE1, KE2, KE3, E-Stop, and K25A Relay feedback points are "TRUE".

6.1.1.22 In Cabinet 3, just above the TPRO card, press the "ESTOP" button and release it. Also, turn "OFF" the "MAIN" switch in the PT Voltage source box. This will cause a "TRIP" for the unit.

6.1.1.22.1 Verify that K1, K2, K3, KE1, KE2, KE3, E-Stop, and K25A Relay feedback points are "FALSE".

6.1.1.22.2 Verify on the PPRO PAC Module that the LED's are not scrolling, the "RUN", "ESTP", OSPD", and "SYNC" LED's are red, the ATTN LED is flashing RED, and all other LED's are normal.

6.1.1.23 Turn "ON" the "MAIN" switch in the PT Voltage source box.

6.1.1.24 Cycle power to the test rack.

6.1.1.25 Bring ToolboxST online.

6.1.1.26 Wait for test rack to boot completely before continuing. This will be when the 6 Relays light up in location 3L4, next to PT Voltage source box.

6.1.1.26.1 Verify that the PPRO PAC Module's LED's are scrolling with no red indicators, both of the LINK LED's and the Power LED are GREEN, and that the TX/RX LED's are flashing AMBER.

6.1.1.27 Open PTUR_PPRO LiveView by hit Ctrl+L. Select PTUR_PPRO by clicking on it.

6.1.1.28 Once PTUR_PPRO LiveView is open, maximize window.

6.1.1.29 At bottom left of screen there is a “CrossTrip” switch. Turn it on by hitting “ON” inside same switch on screen.

6.1.1.29.1 Verify that the Trip Solenoid Relay, 2 thru 4 of the 6 Relays next to PT Voltage source have gone out.

6.1.1.30 Turn the “CrossTrip” switch it off by hitting “OFF” inside same switch on screen.

6.1.1.30.1 Verify that the Trip Solenoid Relay, 2 thru 4 of the 6 Relays next to PT Voltage source have come back on.

6.1.1.31 Let unit run online for at least 48 hours.

6.1.1.32 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.