



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-IS230SPRO

Test Procedure for an IS230SPRO Mark VIe Protection Assembly

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1. SCOPE

- 1.1 This is a functional testing procedure for an **IS230SPROH1AA** MARK Vle Protection Assembly. This unit consists of a IS200SPROH1A and IS220PPROH1A modules.

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	H188922	Mark Vle Simplex Test Rack with computer
1		Fluke 87 DMM (or equivalent)
1	H188818	Toffee Test System #14
1	H188890	Toffee test fixture for IS220PPRO

6. Testing Process

6.1 Automated Testing TOFFEE

- 6.1.1 Install IS220PPRO fixture H188890 onto TOFFEE test System.
- 6.1.2 Install Unit Under Test into test fixture.
- 6.1.3 Double click on the OPERATOR INTERFACE icon on screen.
- 6.1.4 On the user name dialogue box, choose either administrator or technician. If administrator is selected use password NGTF2008*, technician password is KISS, both are case sensitive. The next window should say configuration management and you should always click on no.
- 6.1.5 Screen will flicker and box marked single pass will be highlighted. Click on it and it should put up another dialogue box that says Orange book is old. Click O.K. If Orange book needs to be updated, there is an icon for that but I would let Paul or Eric do it until user is familiar with system.
- 6.1.6 The next dialogue box should say select DUT (device under test). Detected fixture should have the model number being tested and family name should say MVle. Click the drop down box DUT and your model number should be the only option. Select it and it should appear in the DUT model number. Put your revision level of unit being tested in DUT REV and click ok.
- 6.1.7 A delay dialogue box appears, counts down and then asks for a serial number, enter 14 and check the boxes marked RUN UPLOADS and DELETED LOGS. Click O.K. If you logged on as an administrator, you will not get this dialogue box. The test will automatically run these.
- 6.1.8 A delay dialog box appears and counts down, do not stop it and then system runs test. You will get either a pass or fail message.

6.2 Static Checking SPRO

- 6.2.1 Using Fluke 87 DMM (or equivalent), set for Resistance function, check the following points for the expected results in the table below:

From:	To:	Expected Results:
TB2-1	C16 BOTTOM LEAD	<2 ohms
TB2-2	C15 BOTTOM LEAD	<2 ohms
TB2-3	C17 BOTTOM LEAD	<2 ohms
C16 TOP LEAD	TB1-19	<2 ohms
C15 TOP LEAD	TB1-21	<2 ohms

From:	To:	Expected Results:
C17 TOP LEAD	TB1-23	<2 ohms
TB1-A7	JA1-3	<2 ohms
TB1-8	JA1-24	<2 ohms
TB1-9	JA1-44	<2 ohms
TB1-10	JA1-45	<2 ohms
TB1-11	JA1-25	<2 ohms
TB1-12	JA1-46	<2 ohms
TB1-13	JA1-47	<2 ohms
TB1-14	JA1-48	<2 ohms
TB1-15	JA1-49	<2 ohms

6.3 Functional 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 3 minutes in between downloads for rack and UUT to reboot.

- 6.3.1 Remove 125 VDC if connected to test rack.
- 6.3.2 Turn off Rack Power switch.
- 6.3.3 Install unit to be tested into Mark VIe Simplex test rack.
- 6.3.4 Turn on Rack Power switch. Wait for approximately 3 minutes for rack to boot.



Note: The following portions of the test assume you are familiar with using ToolboxST. You will need to perform downloads at least twice for UUT to be setup fully. You must also wait for approximately 3 minutes in between downloads for rack and UUT to reboot.

- 6.3.5 Open **ToolboxST** and open “**UCSAH1_Simplex_VIe**” by double-clicking on it. Go online with ToolboxST.
- 6.3.6 Click on the “**HARDWARE**” tab, this will show you all of the modules setup in the rack under the “**Distributed IO**” icon. The PPRO module should have a red circle with an X through it, indicating no communications.
- 6.3.7 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.
- 6.3.8 From the menu, Download Controller Setup by going to **Device->Download->Download Wizard**. Follow instructions in dialog boxes that follow.
- 6.3.9 Apply 125 VDC to test rack.

- 6.3.10 Ensure that the “Contact Inputs 1 – 7” switch at the top of the yellow TRES panel is “CLOSED” (down). The ETR relays will not engage if the switch is not “CLOSED”.
- 6.3.11 Turn “ON” Rack Power switch. Wait for test rack to fully boot, approximately 3 minutes.
- 6.3.12 Wait for test rack to boot completely before continuing. This will be by waiting for the ETR Relays (1 through 3) to engage, which will turn the “TRIP” LED’s off and turn the “RUN” LED’s on in the yellow TRES panel just to the left of the keyboard.
- 6.3.13 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.
- 6.3.14 At this time all of the K4CL LED, located just above the controller, should not be illuminated.
- 6.3.15 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.
- 6.3.16 Highlight the “HARDWARE” tab. Then highlight the “PPRO” icon under the “DISTRIBUTED I/O” icon. This should display the “SUMMARY” screen for the SPRO and TRES cards.
- 6.3.17 Verify that the Pulse Rate 1-3 are at 60 Hz. You may need to adjust the frequency generator, located just above the yellow TRES panel, a little to get this to be accurate.
- 6.3.18 Verify that the “bus_pt” and “gen_pt” are approximately the same, 117 VAC.
 - 6.3.18.1 Turn “OFF” the yellow “BUS” switch on the front of the test rack above the monitor. Verify that the “bus_pt” point in the summary screen goes to 0 VAC, while the “gen_pt” point stays at 117 VAC. Turn “ON” the yellow “BUS” switch and verify that the “bus_pt” returns to 117 VAC.
 - 6.3.18.2 Turn “OFF” the yellow “GEN” switch on the front of the test rack above the monitor. Verify that the “gen_pt” point in the summary screen goes to 0 VAC, while the “bus_pt” point stays at 117 VAC. Turn “ON” the yellow “GEN” switch and verify that the “gen_pt” returns to 117 VAC.
- 6.3.19 Verify that all 7 of the Contact Input points are “TRUE”.
- 6.3.20 Verify that K1, K2, K3, and K25A Relay feedback points are “TRUE”.
- 6.3.21 Verify that K4CL relay feedback point is “FALSE”.
- 6.3.22 On the yellow TRES panel, “OPEN” the “Contact Inputs 1- 7” switch by moving it to the middle/up position. This will cause a “TRIP” for the unit.
 - 6.3.22.1 Verify that all 3 “TRIP” LED’s are illuminated on the yellow TRES panel.

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- 6.3.22.2** Verify that all 7 of the Contact Input points are “FALSE”.
- 6.3.22.3** Verify that K1, K2, K3, and K25A Relay feedback points are “FALSE”.
- 6.3.22.4** Verify that K4CL relay feedback point is “TRUE”.
- 6.3.22.5** Verify that the LED inside of the K4CL relay is on.
- 6.3.22.6** Verify on the PPRO PAC Module that the LED’s are not scrolling, the “RUN” LED is red, the ATTN LED is flashing RED, and all other LED’s are normal.
- 6.3.23** On the yellow TRES panel, “CLOSE” the “Contact Inputs 1 - 7” switch by moving it to the down position.
 - 6.3.23.1** Verify that all 7 of the Contact Input points return to “TRUE”.
- 6.3.24** Cycle power to the test rack.
 - 6.3.24.1** Bring ToolboxST online.
 - 6.3.24.2** Verify that all 7 of the Contact Input points are “TRUE”.
 - 6.3.24.3** Verify that K1, K2, K3, and K25A Relay feedback points are “TRUE”.
 - 6.3.24.4** Verify that K4CL relay feedback point is “FALSE”.
 - 6.3.24.5** Wait for test rack to boot completely before continuing. This will be by waiting for the ETR Relays (1 through 3) to engage, which will turn the “TRIP” LED’s off and turn the “RUN” LED’s on in the yellow TRES panel
 - 6.3.24.6** 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.
- 6.3.25** Adjust the Frequency generator, located just above the yellow TRES panel, from 60 Hz to 84 Hz.
 - 6.3.25.1** Verify the ETR 1-3 “TRIP” LED’s come on.
 - 6.3.25.2** Verify on the PPRO PAC Module that the LED’s are not scrolling, the “RUN” LED is red, the ATTN LED is flashing RED, and all other LED’s are normal.
- 6.3.26** Adjust the Frequency generator back to 60 Hz.
 - 6.3.26.1** Verify that the ETR 1-3 “RUN” LED’s come back on.
 - 6.3.26.2** 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.
 - 6.3.26.3** Verify the K4CL relay LED is “OFF”.
- 6.3.27** Adjust the Frequency generator to 600 Hz.
 - 6.3.27.1** Verify that all 3 of the ETR 1-3 “TRIP” LED’s are “ON”.
 - 6.3.27.2** Verify that the K4CL relay LED is “ON”.

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

6.3.27.4 Adjust the Frequency generator back to 60 Hz.

6.3.28 Cycle power to the test rack.

6.3.28.1 Bring ToolboxST online.

6.3.28.2 Verify that all 7 of the Contact Input points are "TRUE".

6.3.28.3 Verify that K1, K2, K3, and K25A Relay feedback points are "TRUE".

6.3.28.4 Verify that K4CL relay feedback point is "FALSE".

6.3.28.5 Wait for test rack to boot completely before continuing. This will be by waiting for the ETR Relays (1 through 3) to engage, which will turn the "TRIP" LED's off and turn the "RUN" LED's on in the yellow TRES panel

6.3.28.6 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.

6.3.29 Let unit run online for at least 48 hours.

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

6.4 *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.