



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-DS2020LPPB/C

Test Procedure for Line Protection Panel Modules

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1. SCOPE

1.1 This is a functional testing procedure for a Line Protection Panel Module

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 **GEH-6361 Chapter 6 Module Startup and Troubleshooting Tests**

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		480VAC Cord

6. TESTING PROCESS

6.1 Blown Fuse Detector Circuit Tests

- 6.1.1** Perform the following resistor measurements to check the applied voltage calibration resistors for the three relay circuits. Measure per the following charts: For example with a meter between points E1 and E5 you should measure 10K with jumper in position 1-3. Check all four positions on each circuit J1, J2, & J3.

Jumper	Measurement Point
JP1	E1 to R5
JP2	E2 to R11
JP3	E3 to R17

JP1, JP2, JP3 POSITION	Resistance (ohms, $\pm 1\%$)
1 to 3	10 K
1 to 4	15 K
1 to 5	23.2 K
1 to 2	33.2 K

- 6.1.2** Perform resistance measurements per the following chart to verify that the relay contacts are open and that they are isolated from the power system.

Measurement Point	Resistance
E4 to E5	Open (>100 M)
E4 to E1	Open (>100 M)
E5 to E1	Open (>100 M)

6.2 Analog Ground Sensing Circuit Tests

- 6.2.1** Perform resistance measurements per the following chart to check the applied voltage calibration resistors.

Measurement Point	JP4 Position	Resistance (ohms, $\pm 1\%$)
E6 to E7	1 to 2	195
E6 to E7	2 to 3	390

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6.3 LPPA Module Tests (Setup)

- 6.3.1 Isolate the ground current sensing circuitry from the blown fuse detection and MOV circuitry.
- 6.3.2 Remove Berg jumper between TB1-1 and TB1-2.
- 6.3.3 Remove berg jumper between TB1-3 and TB1-4.
- 6.3.4 Remove berg jumper between TB1-5 and TB1-6.
- 6.3.5 Set the LPPA board jumpers JP1, JP2, and JP3 in the 1-2 position.
- 6.3.6 Verify that TB1-7 is jumpered to TB1-8.

6.4 Resistance measurements

- 6.4.1 Measure resistance between the three input connections to FU1 fuse block and verify that it is not less than 66K ohms and not greater than 100K ohms (measure with fuses open).
- 6.4.2 Measure resistance between any one of the fuses and ground and verify that it is an open circuit (>100 M resistance).
- 6.4.3 Measure the resistance between each of the three TB points (TB1-2, TB1-4, and TB1-6) and ground and verify that it is 22K ohms ($\pm 5\%$).
- 6.4.4 Remove the jumper between TB1-7 and TB1-8, then measure the resistance between TB1-2 and ground and verify that it is an open circuit (>100 M resistance).

6.5 LPPB/LPPC Module Tests

- 6.5.1 Perform resistance measurements on the LPPB/LPPC module per the following steps. Refer to Figure 6-1 for LPPA board component locations.
- 6.5.2 Measure the resistance between the designated points and the GND lug. Resistance should be as shown in table 6-1.
- 6.5.3 Remove all the wire jumper connection (temporarily) to E6 on the LPPA board to open the ground circuit and measure the resistance on all points shown in Table 6-1. Note: All resistances should be >10 M.
- 6.5.4 Verify that microswitch contacts 1 to 2 in the fuse holder are closed when the fuse carrier is closed.
- 6.5.5 Open fuse carrier and verify that the contacts also open.
- 6.5.6 Manually press microswitch lever that is operated by the fuse carrier and verify that contacts close.
- 6.5.7 Manually operate the fuse trip indicator levers and verify that the contacts open.
- 6.5.8 Verify that the trip indicator end of the fuse is oriented towards the microswitch end of the fuseholder.

6.6 Table 6-1 LPPB/LPPC Module Ground Resistance

Module catalog Number Suffix	FU1	FU2	FU3	TB1-2	TB1-4
LPPB/LPPC__0	>10 M	>10 M	>10 M	N/A	N/A
LPPB__1*	39K	39K	39K	N/A	N/A
LPPB/LPPC__2**	>10 M	>10 M	>10 M	39K	39K
LPPB__3*	55K	55K	55K	N/A	N/A
LPPB/LPPC__4**	>10 M	>10 M	>10 M	55K	55K
LPPC__5**	>10 M	>10 M	>10 M	39K	39K
LPPC__6**	>10 M	>10 M	>10 M	55K	55K

6.7 Attach 3-phase 480VACord to fuse holder. Apply 480VAC to verify MOVs are working properly.
Power down, end of test.

6.8 *****TEST COMPLETE*****

7. NOTES

7.1 None at this time

8. ATTACHMENTS

8.1 None at this time