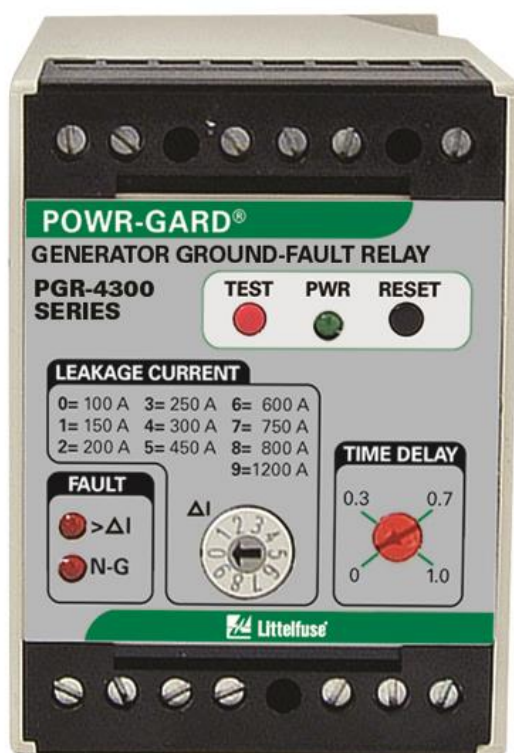


PGR-4300 MANUAL

GENERATOR GROUND-FAULT RELAY

REVISION 3-B-041318



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DISCLAIMER

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1. GENERAL

The PGR-4300 Generator Ground-Fault Relay provides a simple method for detecting a ground-fault condition on a generator-supplied system, without the need for a current transformer. It continuously monitors for ground-fault current and neutral-to-ground continuity. It can be applied on a three phase system with a three-pole or four-pole transfer switch and can be used in a dedicated generator application.

In a three-pole transfer-switch application, the generator neutral and system neutral are connected to ground at the service entrance. The connection between the generator neutral and service-entrance ground is assumed to have a resistance of 2 m Ω and voltage across this conductor is measured to calculate ground-fault current. See Fig. 2. The selection of a neutral-bonding conductor can be made using NEC 250.102(D) and 250.122, and calculating the conductor length needed for a 2 m Ω resistance.

In a four-pole transfer-switch application the ground connection to earth is at the generator. See Fig. 3. The resistance of the bonding cable between the generator neutral and ground is assumed to have a resistance of 0.2 m Ω . The voltage across this conductor is measured to calculate ground-fault current. A 0.9 m (3') length of AWG 3/0 copper cable is recommended per NEC 250.102(C).

In a dedicated generator application, to ensure proper operation of the PGR-4300 there can be only one ground connection to earth. If the earth connection is at the generator, configure the PGR-4300 as a four-pole system. If the earth connection is at the load or service entrance, configure as a three-pole system.

The PGR-4300 has one output relay with normally open / normally closed contacts for use in a control circuit. Additional features include LED trip and power indication, front-panel and remote reset, 0- to 1-mA analog output, a level-selector switch, and a trip-time setting.

An epoxy-filled enclosure provides the PGR-4300 protection against vibration.

The trip level of the ground-fault circuit is switch selectable from 100 to 1,200 A. Trip time is selectable from 0 to 1.0 s.

2. OPERATION

2.1 SYSTEM SELECTION

For a four-pole system, connect terminals 11 and 12. For a three-pole system, leave terminals 11 and 12 open.

2.2 FRONT-PANEL CONTROLS

2.2.1 GROUND-FAULT TRIP LEVEL

The ΔI selector switch is used to set the ground-fault trip level from 100 to 1,200 A. Unbalanced single-phase currents returning through the bonding conductor will appear as ground-fault current. To avoid nuisance tripping, set the trip-level setting above these currents.

2.2.2 GROUND-FAULT TRIP TIME

The PGR-4300 has a definite-time trip characteristic. In tripping systems, the TIME DELAY selector is used to set the ground-fault trip time for coordination with downstream ground-fault devices. Trip time is selectable from 0 to 1.0 s. Coordination requires the same trip level for all ground-fault devices in a system and the trip time to progressively increase upstream. The amount of equipment removed from the system will be a minimum if the first ground-fault device to operate is the one immediately upstream from the fault.

2.2.3 RESET

The front-panel RESET button is used to reset latching trips. When remote-reset terminals 4 and 5 are connected, a trip remains latched until the RESET button is pressed or the remote-reset terminals are opened. Cycling the supply voltage will also reset the PGR-4300. If the remote-reset terminals are not connected, the PGR-4300 operates in the non-latching mode and a trip will reset when the fault is removed.

2.2.4 TEST

The TEST button is used to test the ground-fault circuit, the indication, and the output relay. When the TEST button is pressed, the circuit will trip, the $>\Delta I$ LED will light, the output relay will energize, and the analog output will indicate full scale (1 mA).

2.3 FRONT-PANEL INDICATION

2.3.1 POWER

The green LED labelled PWR indicates the presence of supply voltage.

2.3.2 $>\Delta I$

The red LED labelled $>\Delta I$ indicates a ground-fault trip. It also lights when the neutral connection is open.

2.3.3 N-G

The red LED labelled N-G indicates a neutral-to-ground trip. When continuity between the generator neutral and ground is broken, the N-G and $>\Delta I$ LED's will be on and the output relay will be energized.

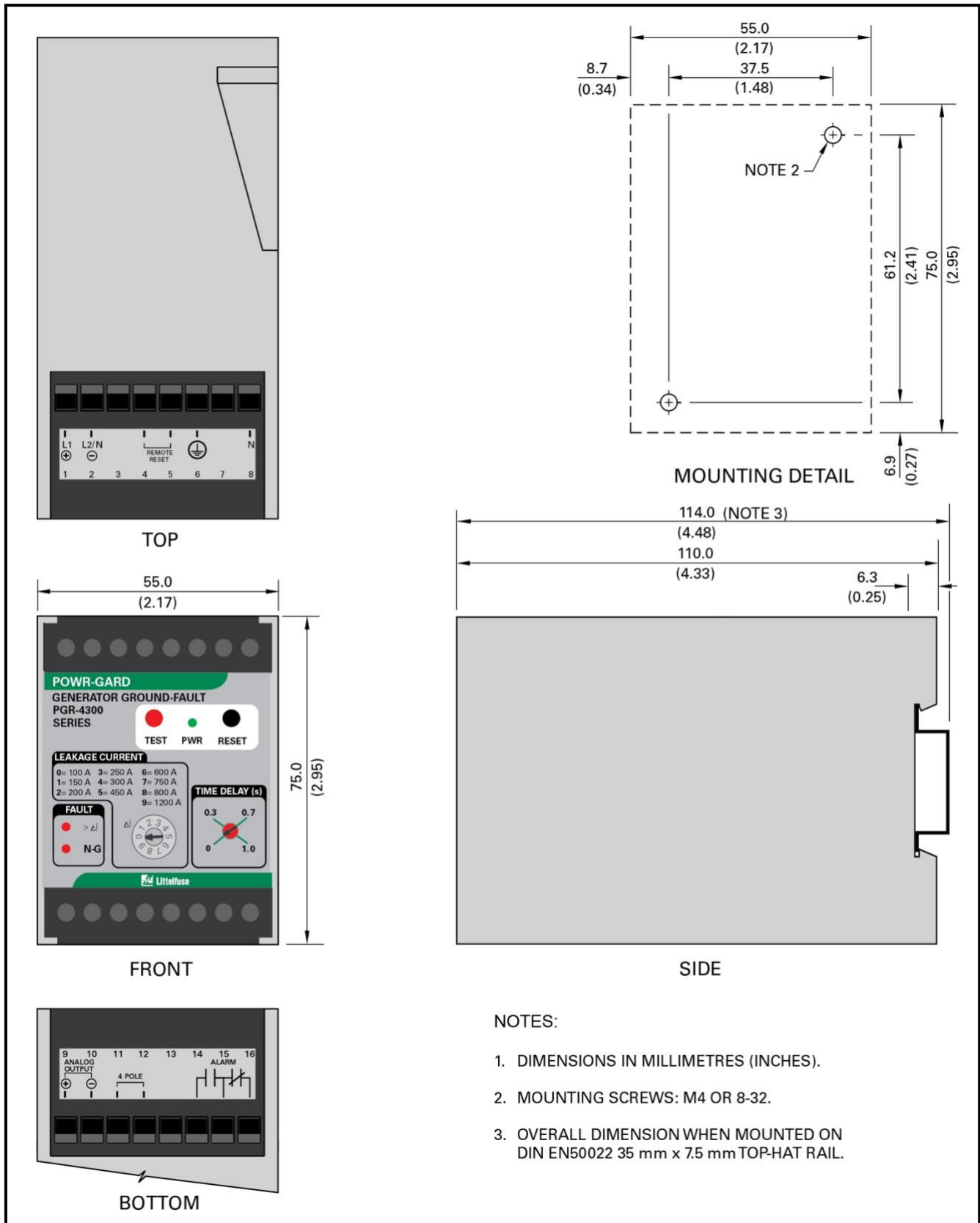


FIGURE 1. PGR-4300 Outline and Mounting Details.

2.4 ANALOG OUTPUT

A non-isolated, 0- to 1-mA output (terminals 9 and 10) indicates ground-fault current. Full-scale corresponds to the ground-fault level setting. For example, if the ground-fault level setting is 300 A, then 1 mA output will be indicated when the measured current is 300 A. The output is linear between zero and full scale. See Figs. 2, 3 and 4 for PGA-0500 meter details.

2.5 REMOTE RESET

Terminals 4 and 5 are used for remote reset. A normally closed contact switch is required to configure the PGR-4300 for latching operation. See Section 2.2.3 and Figs. 2 and 3.

2.6 RELAY OPERATING MODE

The output relay operates in the non-fail-safe mode only; it energizes when a trip occurs.

3. INSTALLATION

NOTE: Mounting, terminal block connections and wiring must conform to applicable local electrical codes. Check all applicable codes prior to installation.

This ground-fault monitoring system consists of a PGR-4300 Generator Ground-Fault Relay connected as shown in Figs. 2 and 3.

A PGR-4300 can be surface, DIN-rail, or panel mounted. Panel mounting requires a PMA-55 or PMA-60 Panel-Mount Adapter. See Figs. 1, 5, and 6.

Use terminal 1 (L1) as the line terminal on ac systems or the positive terminal on dc systems. Use terminal 2 (L2/N) as the neutral terminal on ac systems or the negative terminal on dc systems.

For a three-pole system, connect terminal 8 to the generator neutral, and terminal 6 to the local ground. See Fig. 2.

For a four-pole system, connect terminals 11 and 12, connect terminal 8 to the generator neutral, and terminal 6 to the ground side of the bonding conductor. See Fig. 3.

Use AWG 14 wire to make connections from the PGR-4300 to the bonding conductor, neutral and ground.

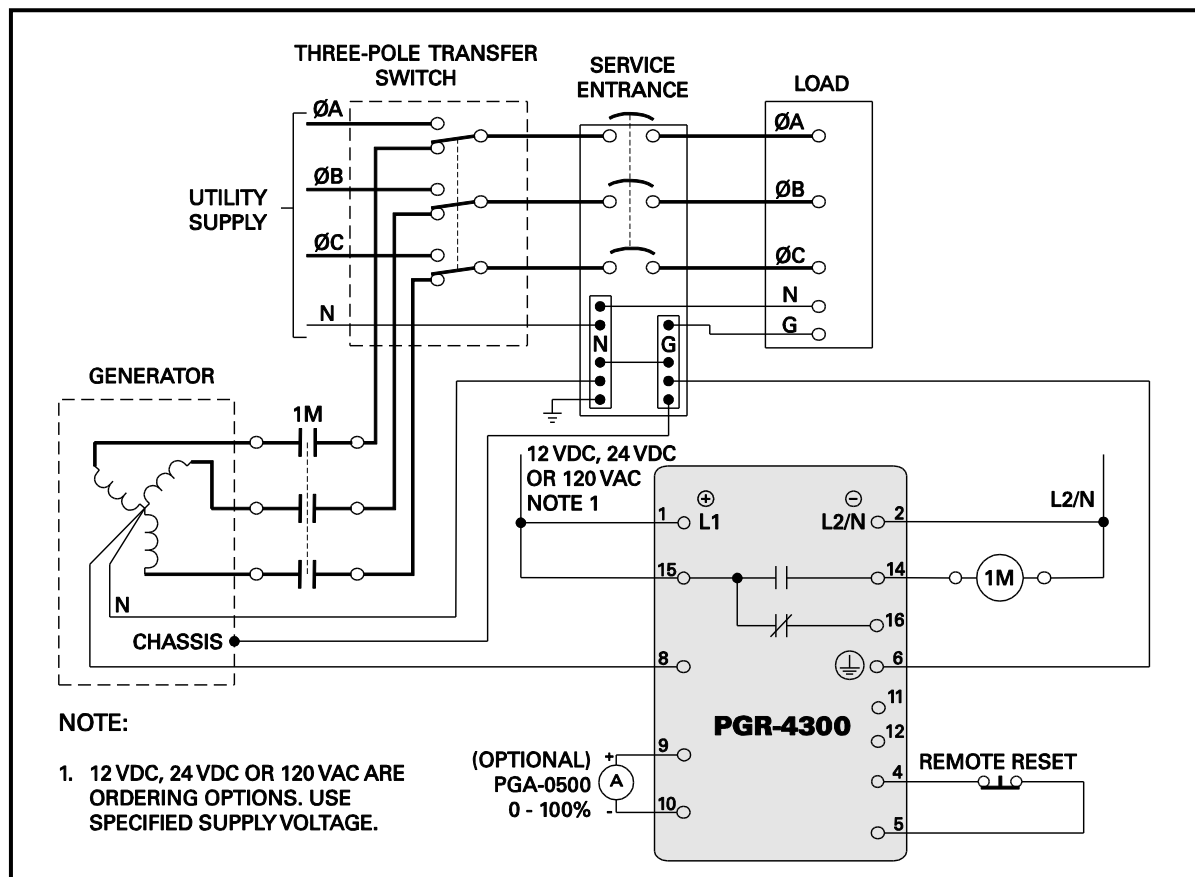


FIGURE 2. Three-Pole Transfer Switch Typical Connection Diagram.

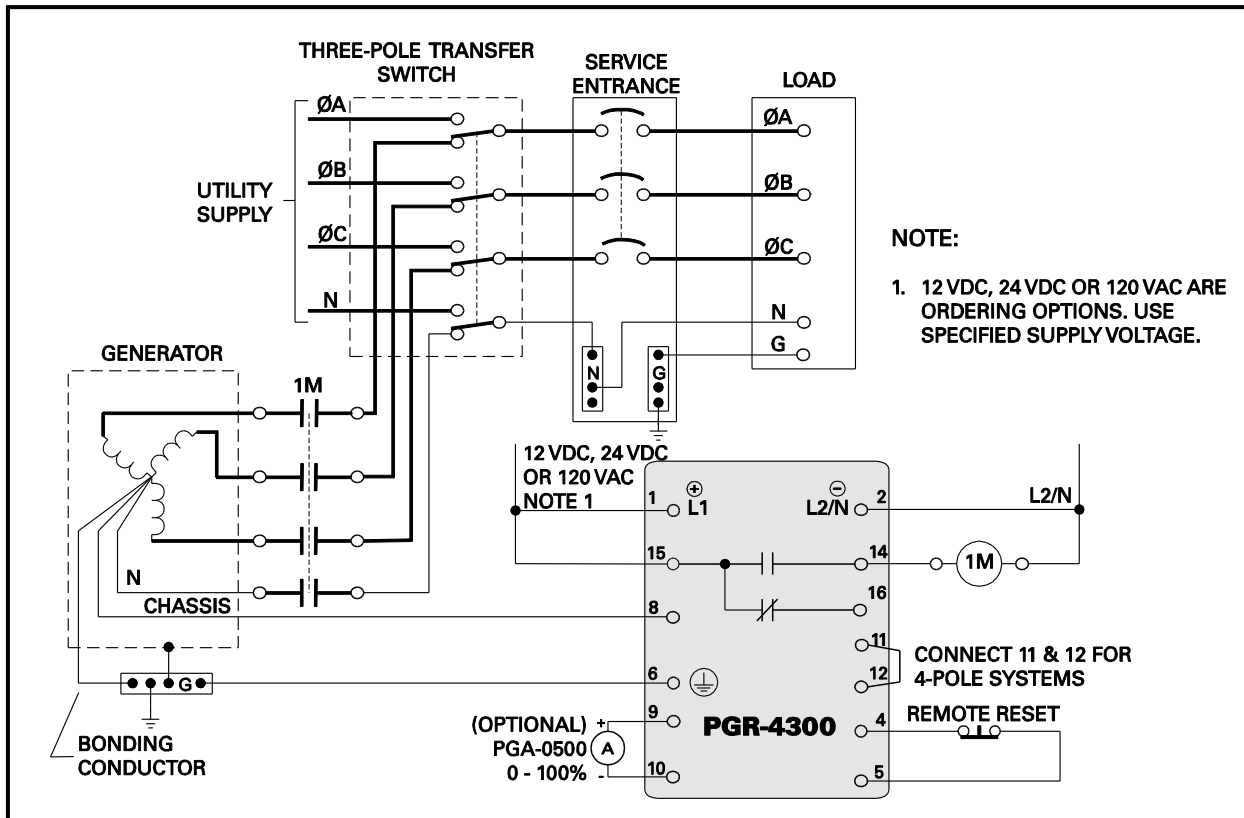


FIGURE 3. Four-Pole Transfer Switch Typical Connection Diagram.

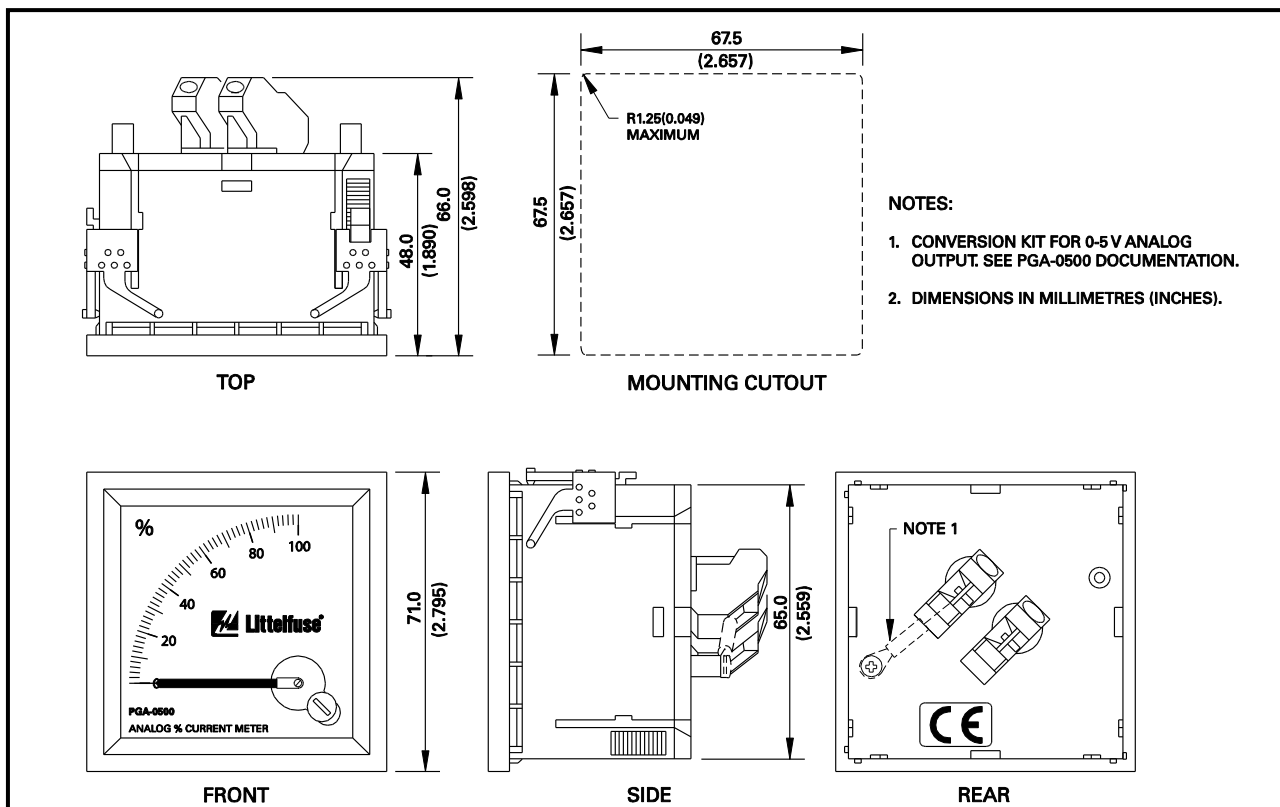
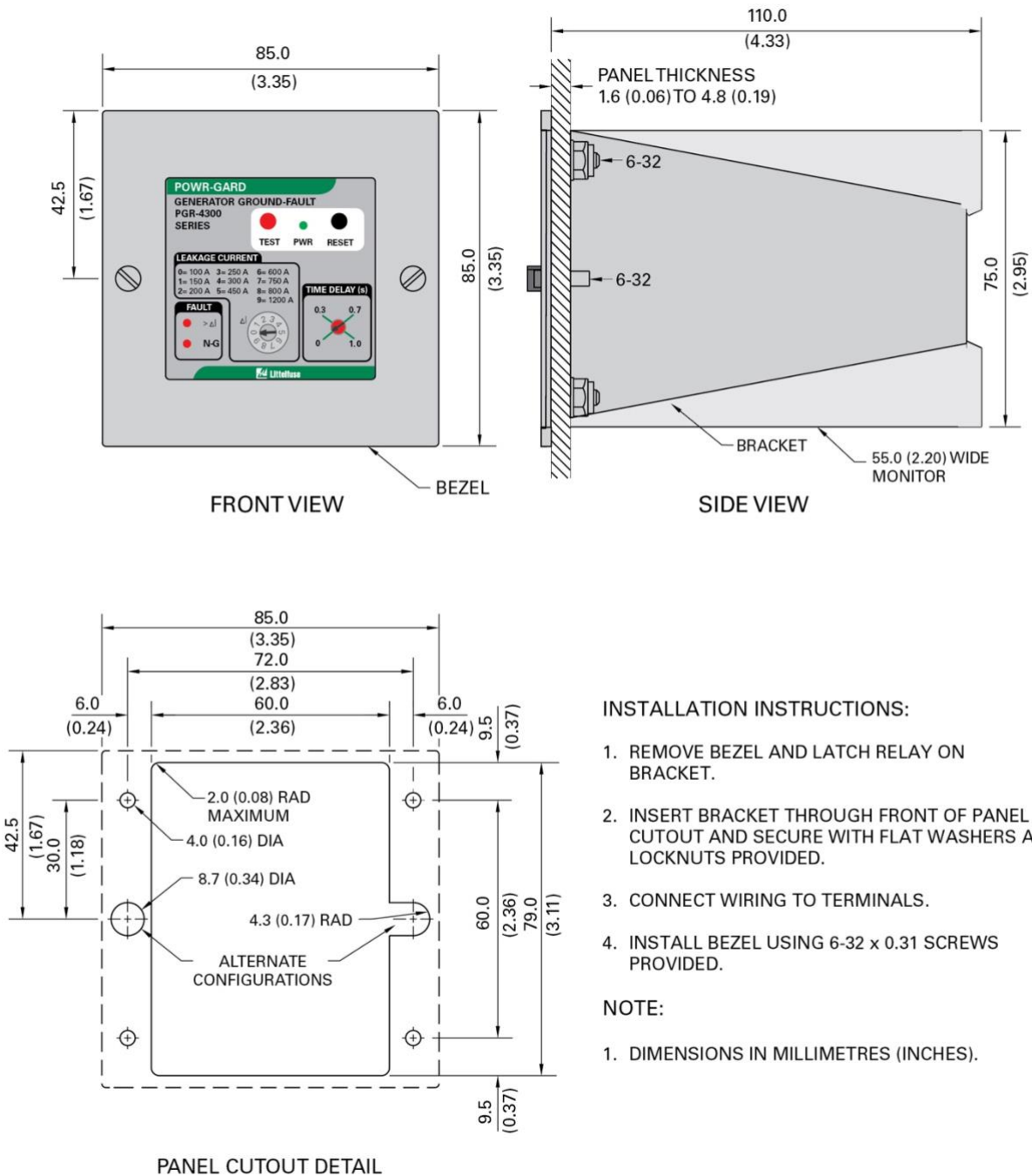


FIGURE 4. PGA-0500 Analog Percent Current Meter.



INSTALLATION INSTRUCTIONS:

1. REMOVE BEZEL AND LATCH RELAY ON BRACKET.
2. INSERT BRACKET THROUGH FRONT OF PANEL CUTOUT AND SECURE WITH FLAT WASHERS AND LOCKNUTS PROVIDED.
3. CONNECT WIRING TO TERMINALS.
4. INSTALL BEZEL USING 6-32 x 0.31 SCREWS PROVIDED.

NOTE:

1. DIMENSIONS IN MILLIMETRES (INCHES).

FIGURE 5. PMA-55 Panel-Mount Adapter.

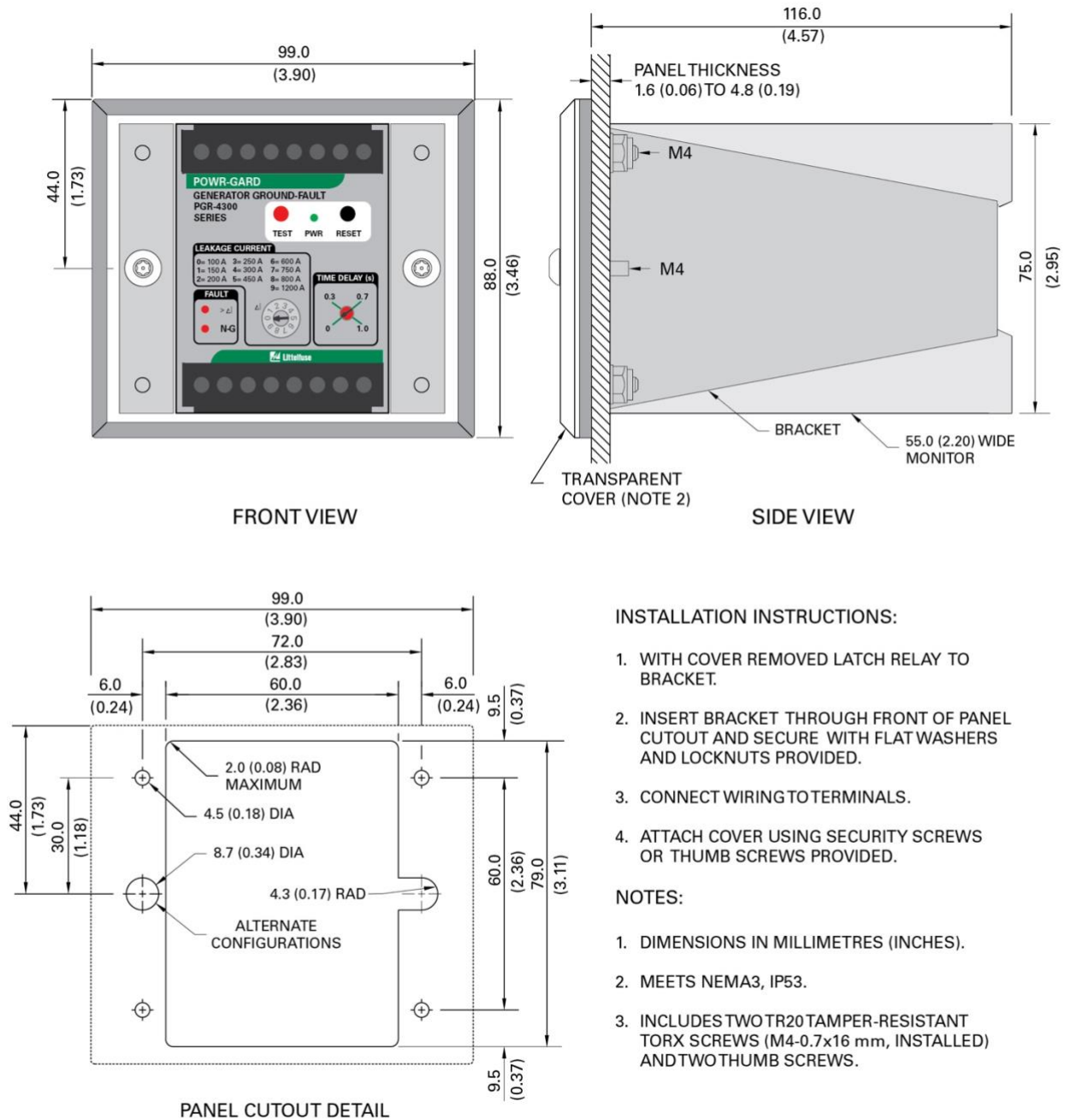


FIGURE 6. PMA-60 Panel-Mount Adapter.

4. TECHNICAL SPECIFICATIONS

Supply:

12 Option	3 W, 12 Vdc, (+16, -25%)
24 Option	3 W, 24 Vdc, (+37, -25%)
120 Option	4 VA, 120 Vac, (+10, -15%) 50/60 Hz

Trip-Level Settings.....100, 150, 200, 250, 300,
450, 600, 750, 800, and
1,200 A

Trip-Time Settings0 to 1.0 s

Accuracies:

Trip Level ⁽¹⁾	±10%
Trip Time ⁽²⁾	10% of Setting, 40 ms minimum

Analog Output:

Mode.....	% of Trip Level
Range.....	0 to 1 mA dc

ResetFront-Panel Button,
Remote Momentary
Open Contact

Test.....Front-Panel Button

Output Relay:

Contact Configuration	Form C
Operating Mode	Non-Fail-Safe
UL rating	5 A, 125 Vac Resistive
Supplemental Contact Ratings:	
Carry Continuous.....	5 A

Trip ModeLatching or Autoreset

Terminals.....Wire Clamping,
22 to 12 AWG
(0.3 to 3.3 mm²)
Conductors

Tightening Torque.....0.40 N·m (3.54 lbf-in)

Conductor Type.....Copper, Solid or
Stranded with
Ferrules

Conductor Rating60/75°C

Vibration Protection.....Fibreglass-reinforced
Epoxy

Dimensions:

Height.....75 mm (3.0")

Width55 mm (2.2")
Depth.....115 mm (4.5")

Shipping Weight0.45 kg (1 lb)

Environment:

Operating Temperature-10 to 60°C (14 to 140°F)
Storage Temperature-40 to 80°C (-40 to 176°F)
Humidity.....85% Non-Condensing
Enclosure Rating.....IP20
Altitude2,000 m (6,562 ft)
maximum
Overvoltage CategoryII
Pollution Degree2

Certification.....UL Listed



NOTES:

- ⁽¹⁾ Based on generator-neutral to service-entrance conductor resistance of 2 mΩ (three-pole transfer-switch application) or 0.2 mΩ (four-pole transfer-switch application).
⁽²⁾ At 3x trip-level setting.

5. ORDERING INFORMATION

PGR-4300- ☐

12 – 12-Vdc Supply
24 – 24-Vdc Supply
120 – 120-Vac Supply

PGA-0500 Analog Percent Current Meter
PMA-55 Panel-Mount Adapter, NEMA 1
PMA-60 Panel-Mount Adapter, NEMA 3, IP53
PMA-03 Adapter Plate, GEC/MCGG
Consult factory for custom mounting adapters.

6. PERFORMANCE TEST

Some jurisdictions require periodic ground-fault performance tests. A test record form is provided for recording the date and the result of the performance tests. The following ground-fault system tests are to be conducted by qualified personnel.

- Evaluate the interconnected system in accordance with the overall equipment manufacturer's detailed instructions.
- Press the TEST and RESET buttons to ensure the monitor is functioning properly.
- Verify proper reaction of the device in response to a simulated ground-fault current. To simulate ground-fault current, set up a voltage-divider circuit as shown in Fig. 7.

Select 9 k Ω for R_{TEST} resistance and do not connect terminals 11 and 12 for 3-pole systems.

Select 99 k Ω for R_{TEST} resistance and connect terminals 11 and 12 for 4-pole systems.

For each leakage current setting (0, 6, 9), verify that the unit trips at each V_{TEST} voltage shown within the selected trip time.

Voltage V_N represents the voltage at terminal 8 if the actual leakage current was flowing through the bonding cable between the generator neutral and ground; See Section 1.

- d) Record the date and the results of the test on the attached test-record form.

TABLE 1. Ground-Fault-Test Record

Retain this record for the authority having jurisdiction.

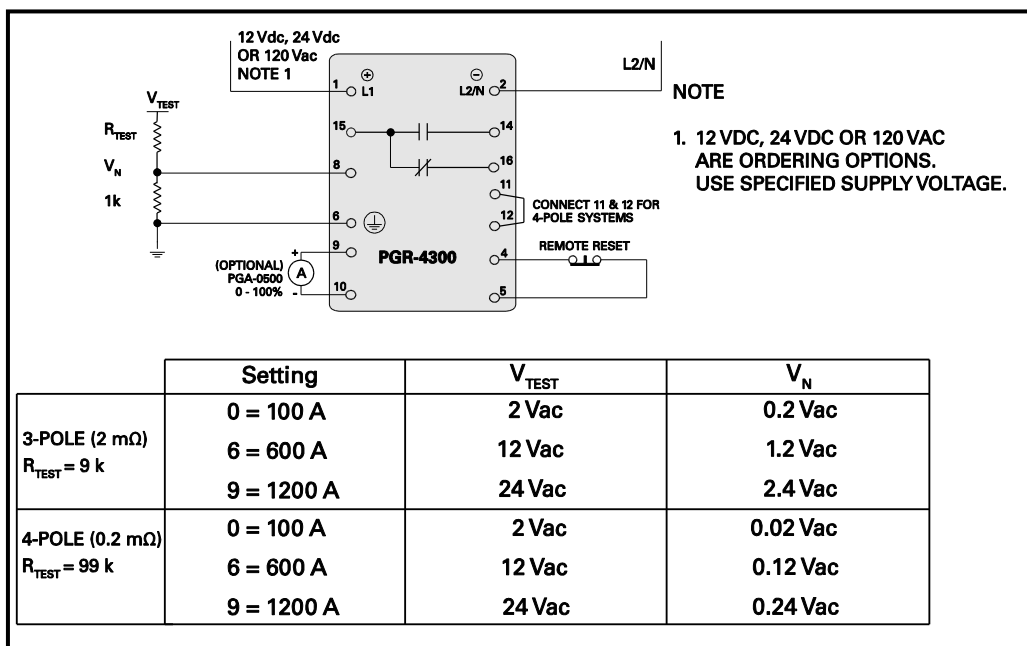


FIGURE 7. PGR-4300 Performance Test Circuit.

APPENDIX A PGR-4300 REVISION HISTORY

MANUAL RELEASE DATE	MANUAL REVISION	PRODUCT REVISION (REVISION NUMBER ON PRODUCT LABEL)
April 13, 2018	3-B-041318	00
July 31, 2015	3-A-073115	

MANUAL REVISION HISTORY

REVISION 3-B-041318

SECTION 4

Specifications updated.

REVISION 3-A-073115

SECTION 2

Fig. 1 updated.

SECTION 3

Fig. 6 updated.

SECTION 7

Fig. 7 updated.

APPENDIX A

Revision history added.

PRODUCT REVISION HISTORY

PRODUCT REVISION 00

UL Certification.

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