

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.

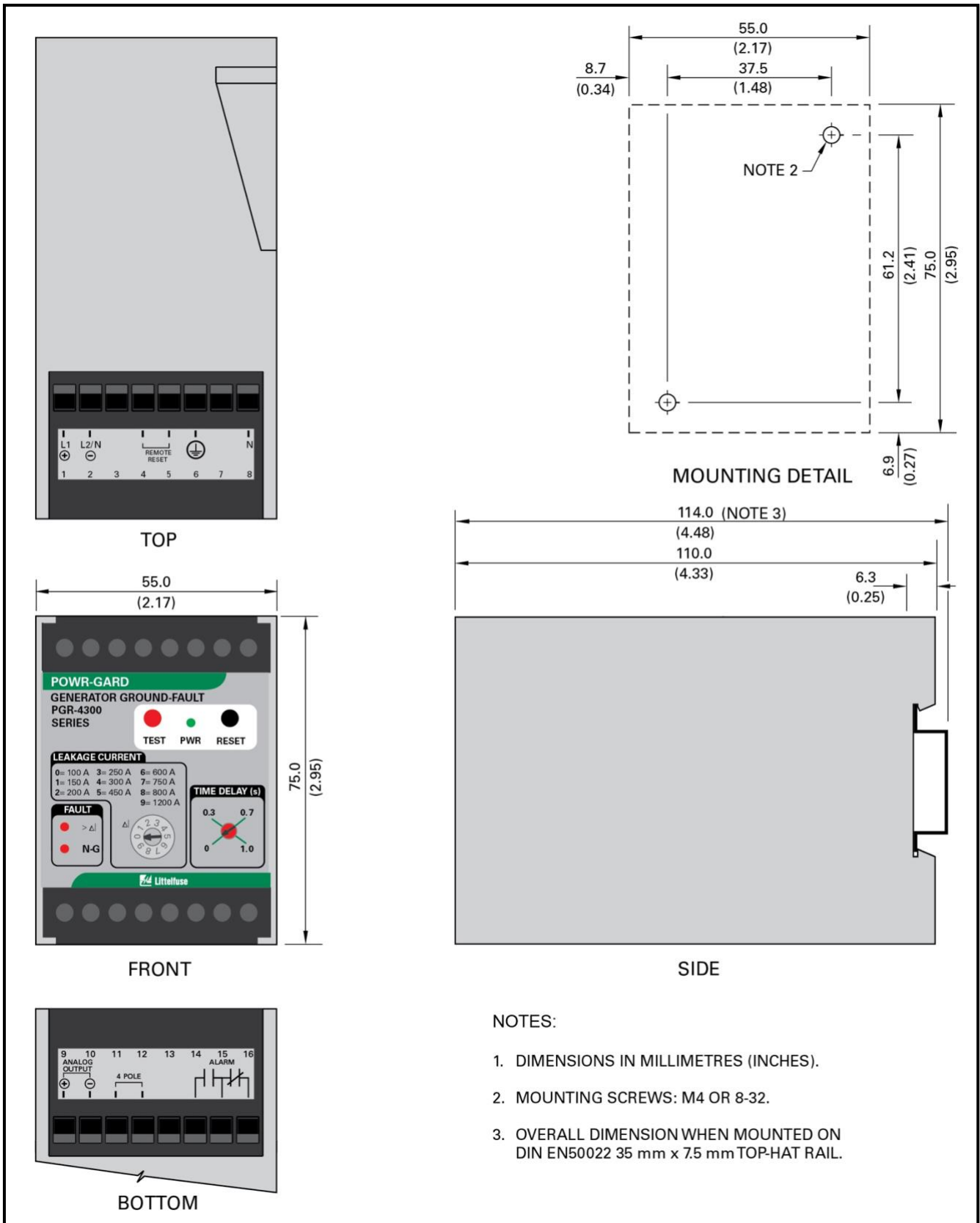


FIGURE 1. PGR-4300 Outline and Mounting Details.

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.

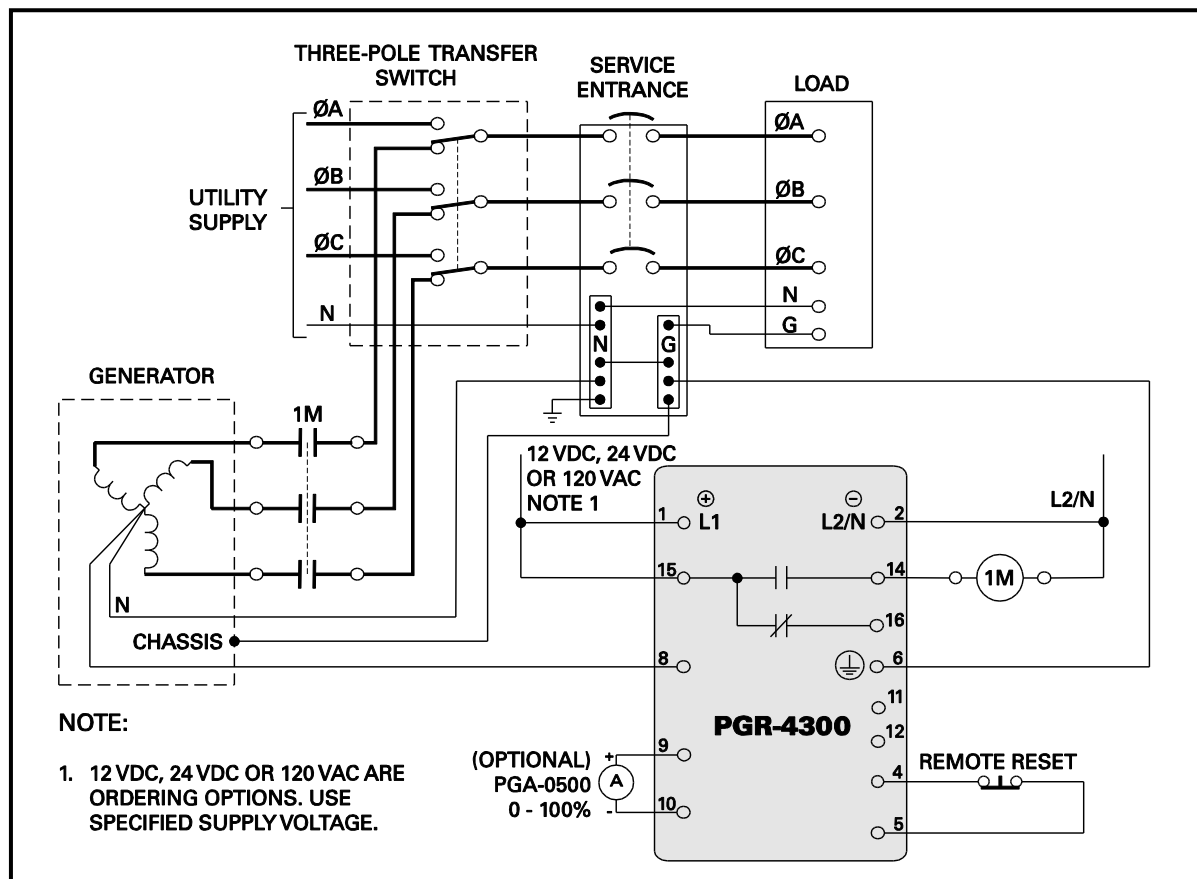


FIGURE 2. Three-Pole Transfer Switch Typical Connection Diagram.

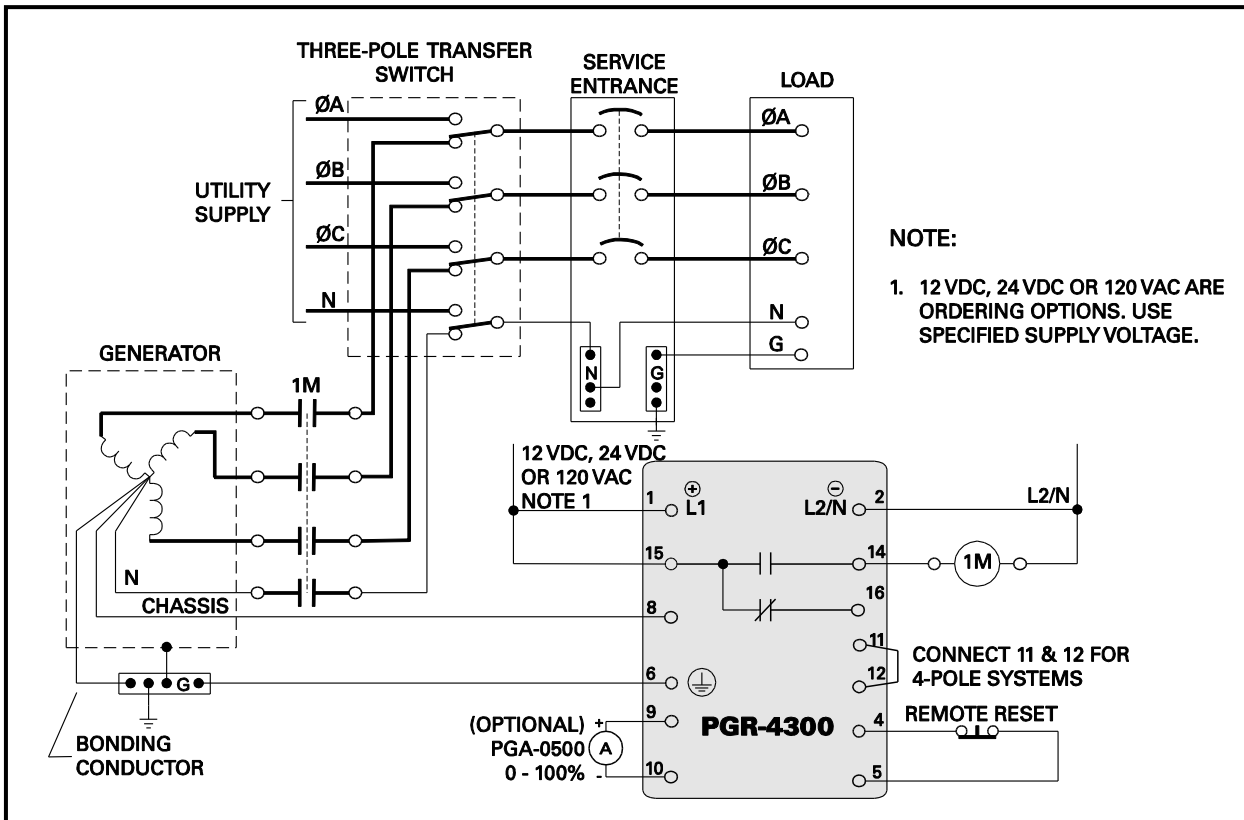


FIGURE 3. Four-Pole Transfer Switch Typical Connection Diagram.

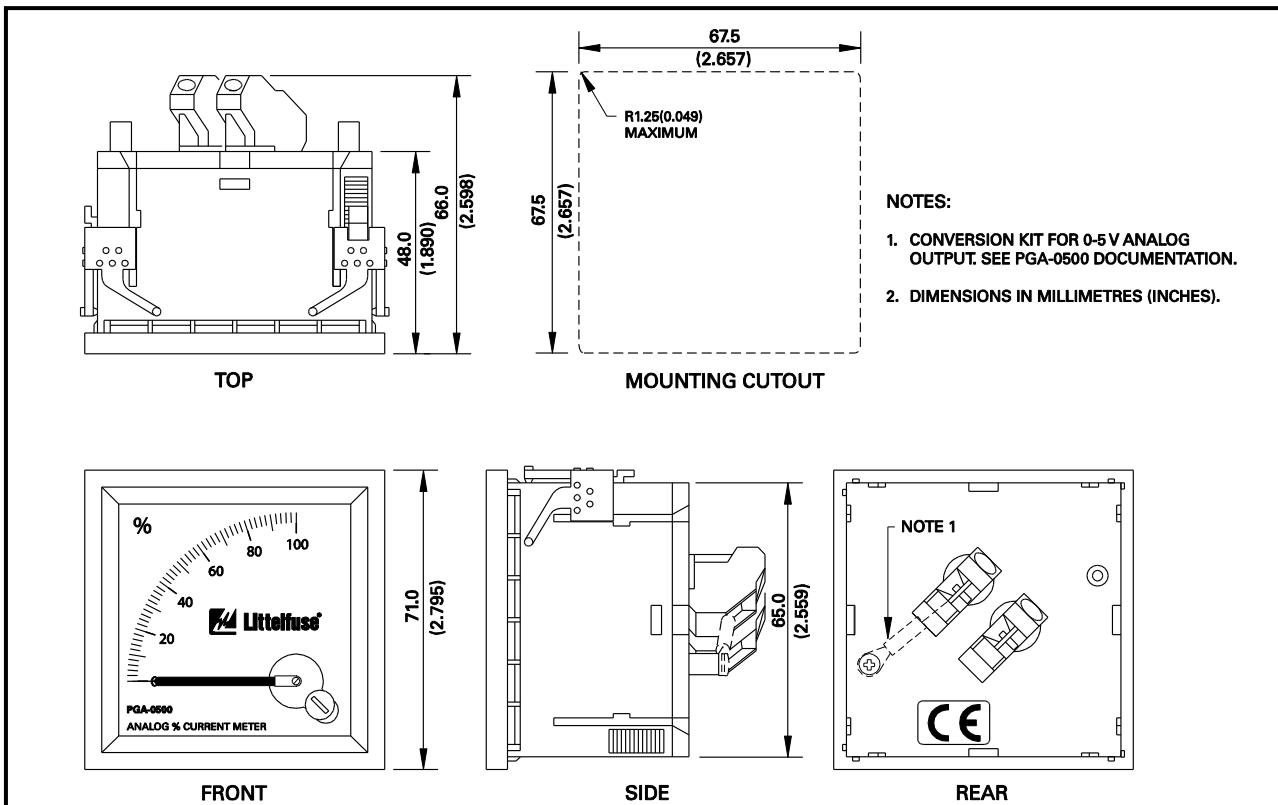


FIGURE 4. PGA-0500 Analog Percent Current Meter.

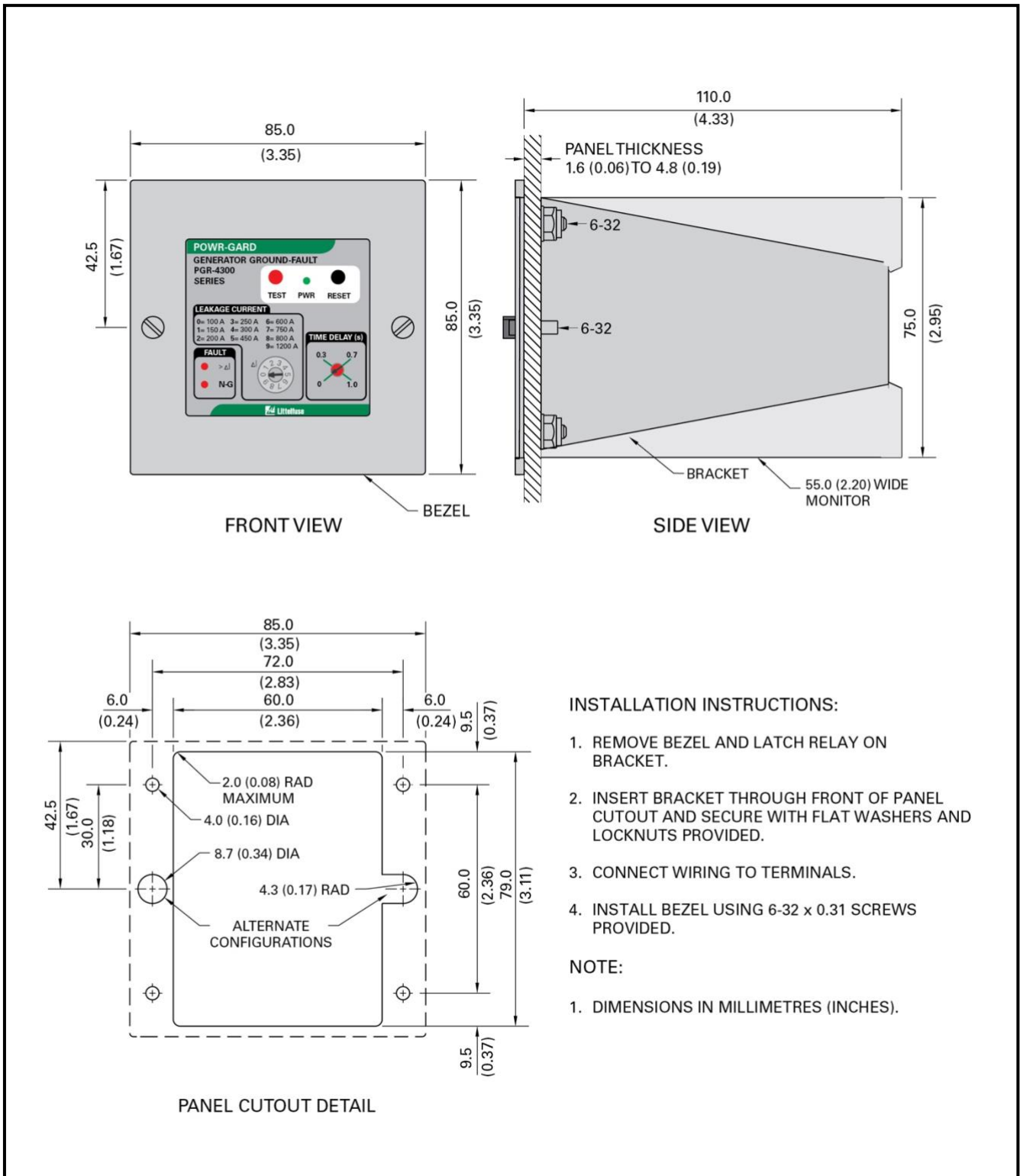


FIGURE 5. PMA-55 Panel-Mount Adapter.

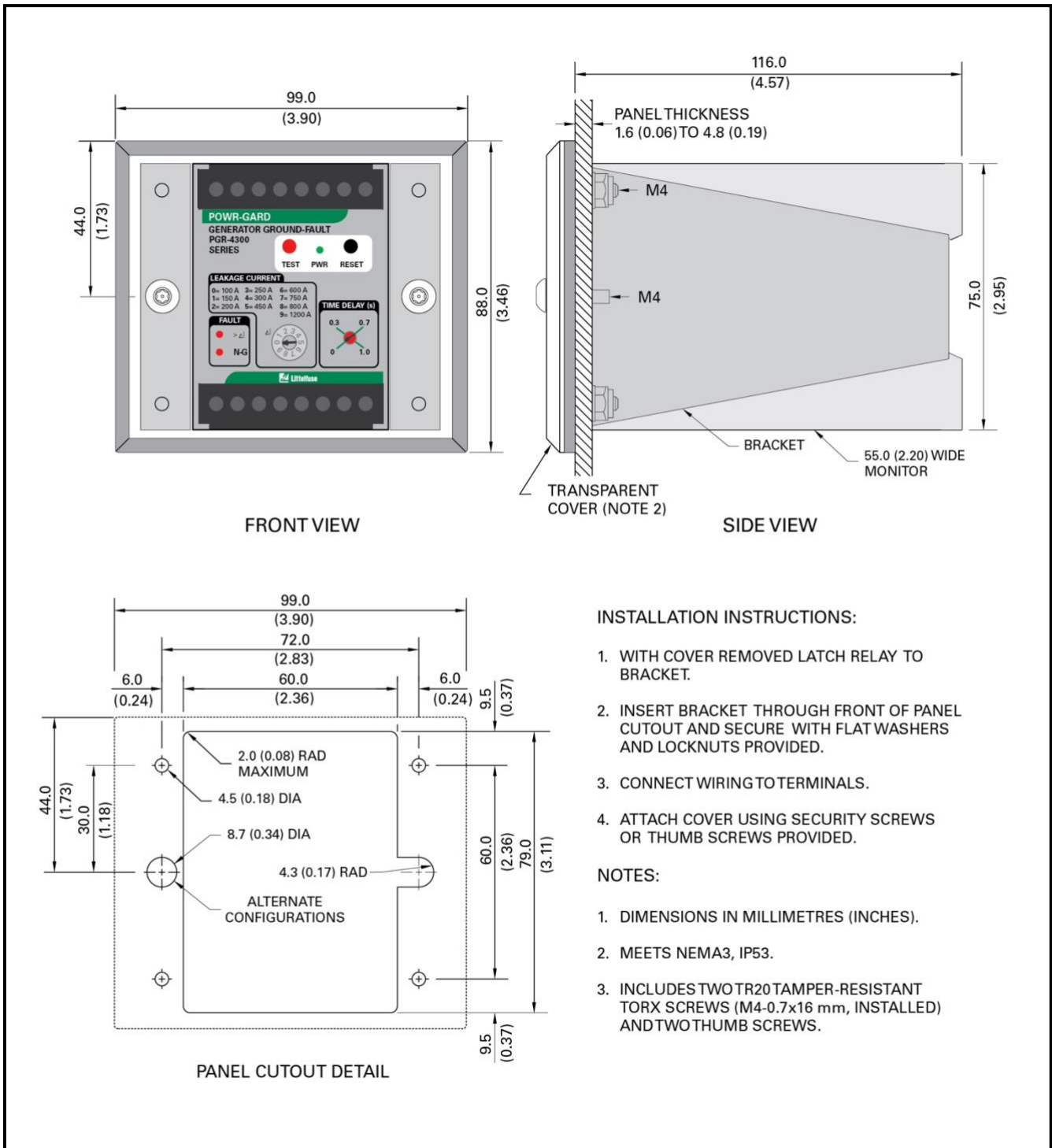


FIGURE 6. PMA-60 Panel-Mount Adapter.

4. TECHNICAL SPECIFICATIONS

Supply:

12 Option3 W, 12 Vdc,
(+16, -25%)

24 Option3 W, 24 Vdc,
(+37, -25%)

120 Option4 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 ConfigurationForm C

Operating ModeNon-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 TypeCopper, Solid or
Stranded with
Ferrules

Conductor Rating60/75°C

Vibration Protection.....Fibreglass-reinforced
Epoxy

Dimensions:

Height75 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

Oversvoltage CategoryII

Pollution Degree2

CertificationUL 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 kΩ for R_{TEST} resistance and do not connect terminals 11 and 12 for 3-pole systems.

Select 99 kΩ 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.

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

TABLE 1. Ground-Fault-Test Record

DATE	TEST RESULTS

Retain this record for the authority having jurisdiction.

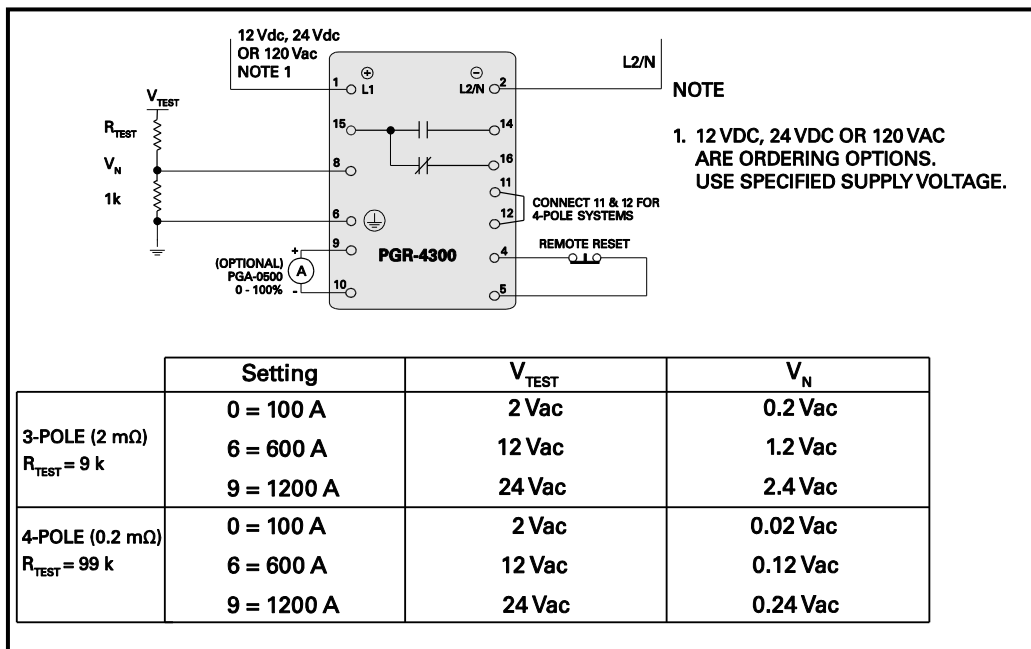


FIGURE 7. PGR-4300 Performance Test Circuit.

**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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