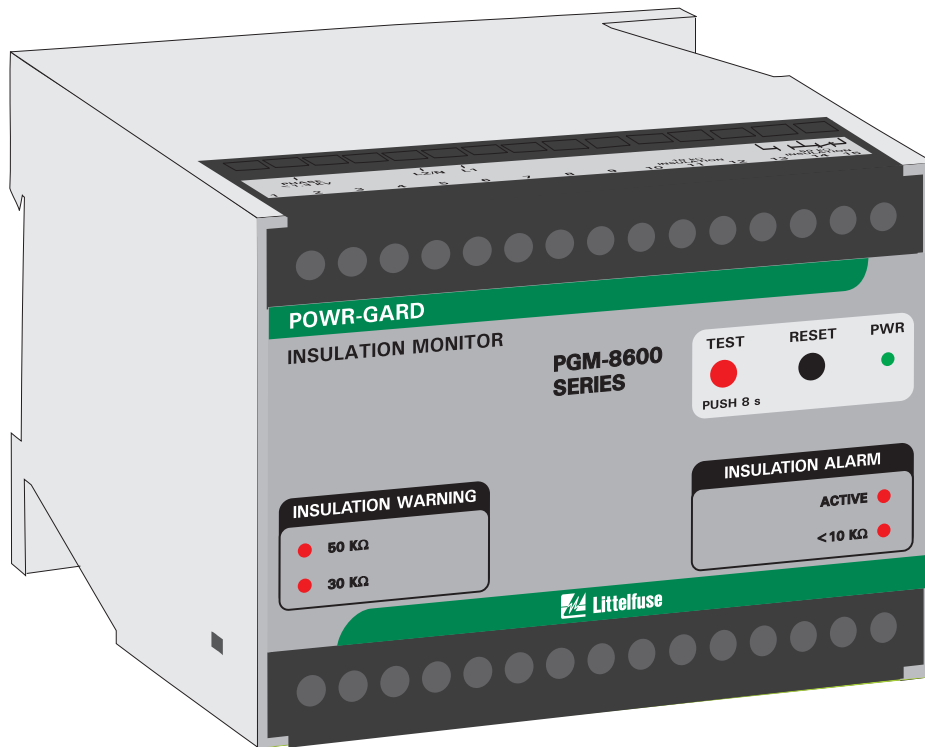


**PGM-8600 MANUAL**  
**INSULATION MONITOR**

September 1, 2010

REVISION 2



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## 1. GENERAL

The PGM-8600 Series are insulation monitors that measure phase-to-ground resistance to detect electrical-insulation failure in a power utilization system. It provides three levels of detection with a 50-kohm warning with an LED and output contact indication, a 30-kohm warning with LED indication, and a 10-kohm alarm with LED and output contact indication. An analog output is provided for predictive maintenance trending.

The PGM-8600 can be used to detect faults in solidly grounded, resistance-grounded, and ungrounded systems up to 6 kV. It can be directly connected to a system up to 1.3 kV, single or three phase, 50 or 60 Hz. A PGH-series high-tension coupler is required for 5- and 6-kV systems.

## 2. OPERATION

The PGM-8600 actively monitors insulation resistance when it is connected to the supply voltage and terminals 27 and 28 are connected. All conductors connected to the monitored circuit are included in the insulation measurement.

When used on an ungrounded distribution system, the PGM-8600 can be connected to be active at all times, or it can be connected to be active only when a feeder is isolated from the supply, thereby monitoring only the single feeder. See Figs. 2, 3 and 4.

When used on a grounded distribution system, the PGM-8600 must be connected to be active only when the monitored feeder is de-energized. This is to prevent a false alarm because of the supply neutral-to-ground connection. See Fig. 4.

### 2.1 Relay Operating Mode

The PGM-8600 output relays operate in the non-fail-safe mode; they energize when an insulation warning or alarm occurs.

### 2.2 Front-Panel Controls

#### 2.2.1 Reset

The front-panel RESET switch is used to reset latching trips. Cycling the supply voltage will also reset the PGM-8600. See Section 2.5.

#### 2.2.2 Test

All LED's will light and output relays will energize when the TEST button is pressed for at least 8 s.

### 2.3 Front-Panel Indication

#### 2.3.1 Power

The green LED labeled PWR indicates presence of supply voltage.

#### 2.3.2 Insulation Warning

The red LED's labeled 50 K $\Omega$  and 30 K $\Omega$  will light when those respective insulation-resistance values, or lower, are measured.

#### 2.3.3 Active

The red LED labeled ACTIVE indicates that insulation monitoring is enabled; terminals 27 and 28 are connected.

#### 2.3.4 Insulation Alarm

When insulation resistance measures 10 k $\Omega$  or less, the red LED labeled <10 K $\Omega$  will light.

### 2.4 Analog Output

A non-isolated, 0- to 1-mA output (terminals 25 and 26) indicates insulation resistance. The metering output relates to an insulation-resistance range of 0 to infinity using optional meter PGA-0510. See Figs. 2, 3, 4, and 7.

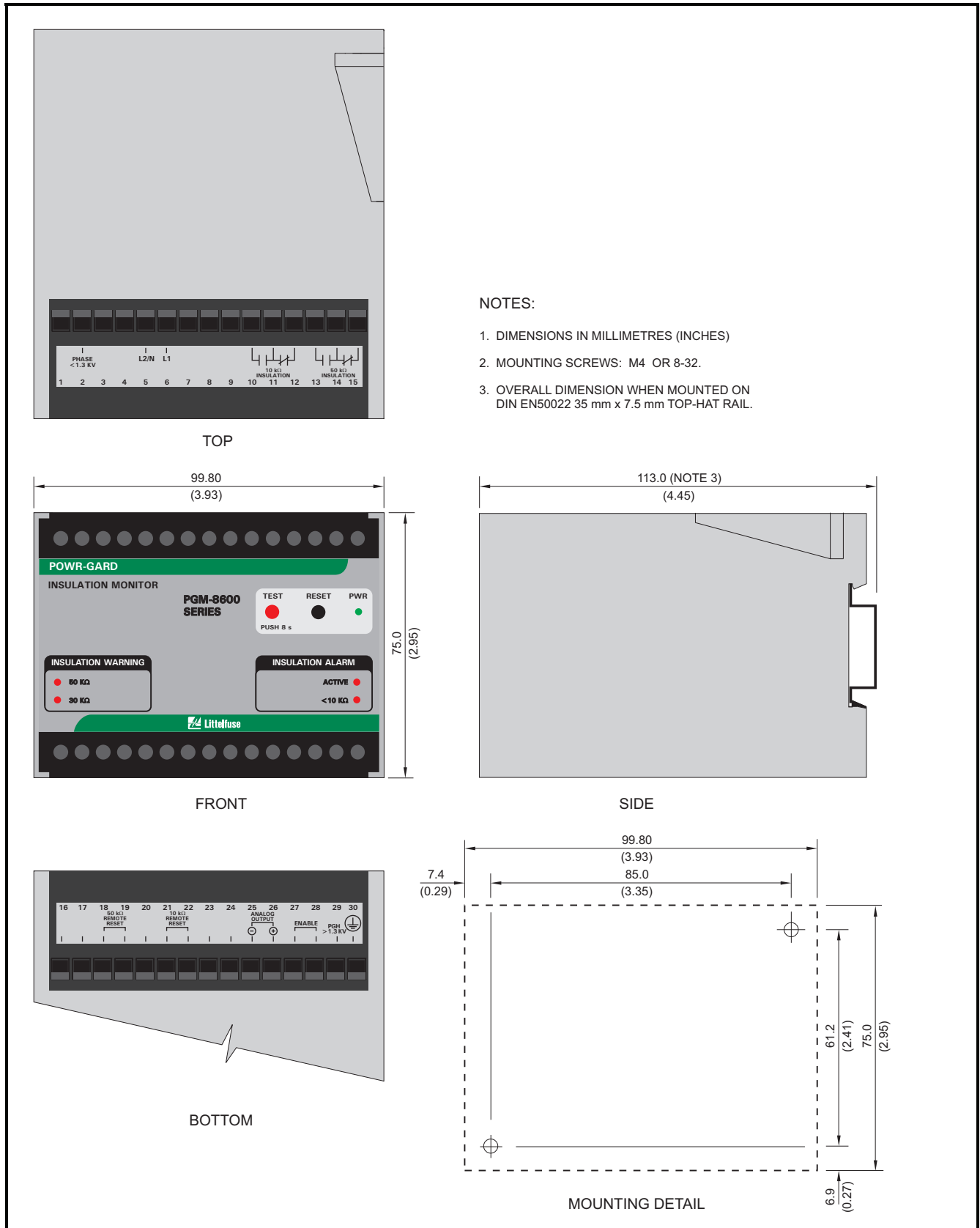
### 2.5 Remote Reset

When remote-reset terminals 18 and 19 (alarm) or 21 and 22 (warning) are connected, a warning or alarm remains latched until the RESET switch is pressed or the remote-reset terminals are momentarily opened.

If the remote-reset terminals are not connected, the PGM-8600 operates in the non-latching mode; a warning or alarm will reset when the fault is removed.

### 2.6 Remote Test

When terminal 29 is connected to ground the monitor will alarm. See Figs 2, 3, and 4. Response to a test input can take several seconds.



NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES)
2. MOUNTING SCREWS: M4 OR 8-32.
3. OVERALL DIMENSION WHEN MOUNTED ON DIN EN50022 35 mm x 7.5 mm TOP-HAT RAIL.

FIGURE 1. PGM-8600 Outline and Mounting Details.

### 3. INSTALLATION

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

The PGM-8600 can be surface or DIN-rail mounted. See Fig. 1.

Use terminal 6 (L1) as the line terminal and terminal 5 (L2/N) as the neutral terminal. Connect terminal 30 to ground.

For systems up to 1.3 kV, connect terminal 2 to one phase on the load side of the starter.

Connect terminals for latching operation, remote reset, and remote test as required. See Sections 2.5 and 2.6 and Figs. 2, 3, and 4.

Connect an optional PGA-0510 Megaohmmeter to terminals 25 and 26.

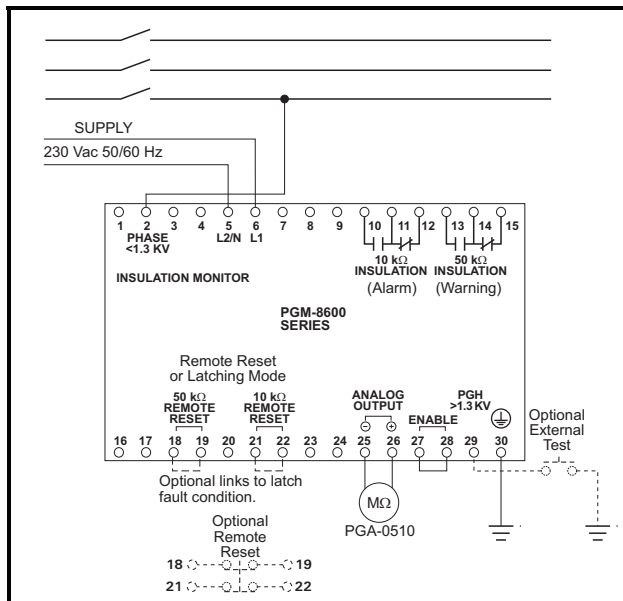


FIGURE 2. Connection Diagram for Ungrounded Systems Under 1.3 kV.

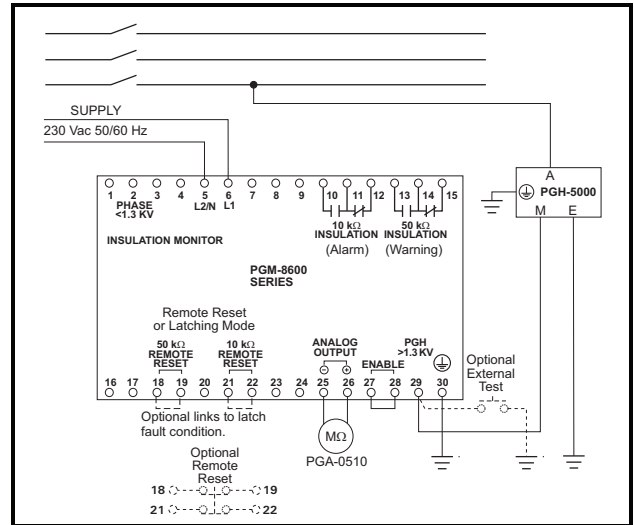


FIGURE 3. Connection Diagram for Ungrounded 5-kV Systems.

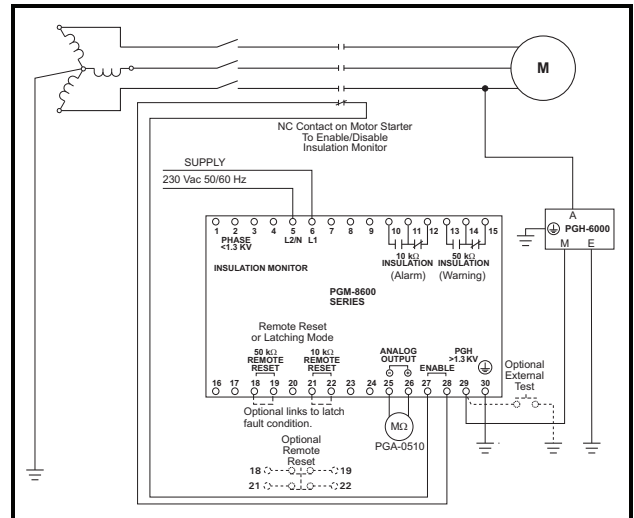


FIGURE 4. Connection Diagram for a Grounded 6-kV Motor Application.

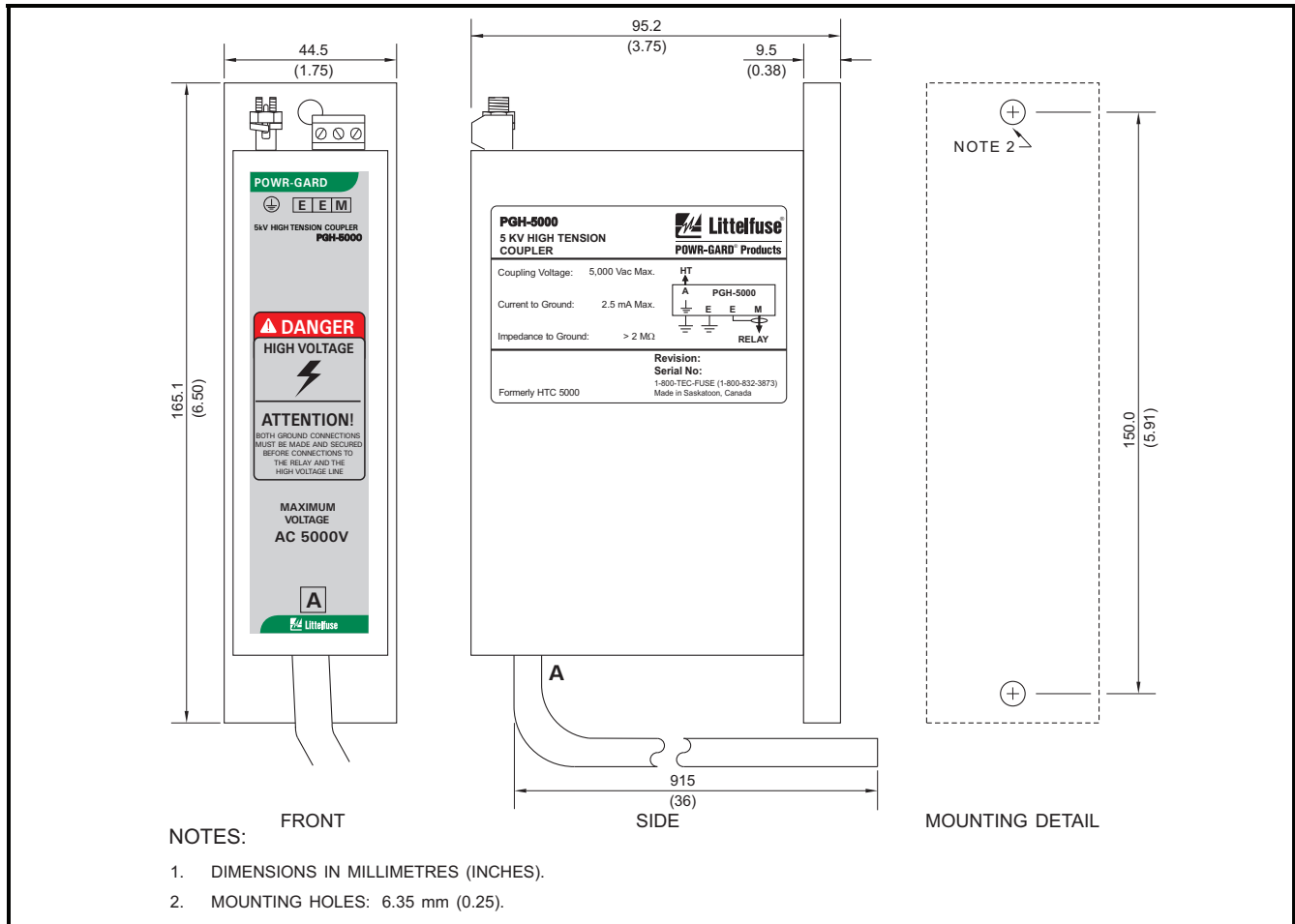


FIGURE 5. PGH-5000 Outline and Mounting Details.

### 3.1 PGH-5000 and PGH-6000

For 5-kV and 6-kV systems, connect the PGM-8600 to the monitored circuit with a PGH-5000 and PGH-6000 respectively. See Fig. 5 for PGH-5000 outline and mounting details. See Fig. 6 for PGH-6000 outline and mounting details.

Connect protective-ground terminal (⊕) to ground. Connect terminal E to ground or to PGM-8600 terminal 30, which must be grounded. Connect terminal M to PGM-8600 terminal 29. (PGM-8600 terminal 2 is not used.) For PGM-8600 to PGH-5000/PGH-6000 distances greater than 10 m (30'), use shielded cable, and connect the cable shield to the second PGH-5000/PGH-6000 terminal E. Connect terminal A to one phase on the load side of the motor starter. See Figs. 3 and 4. The PGH-5000/PHG-6000 includes 915 mm (3') of high-voltage conductor.



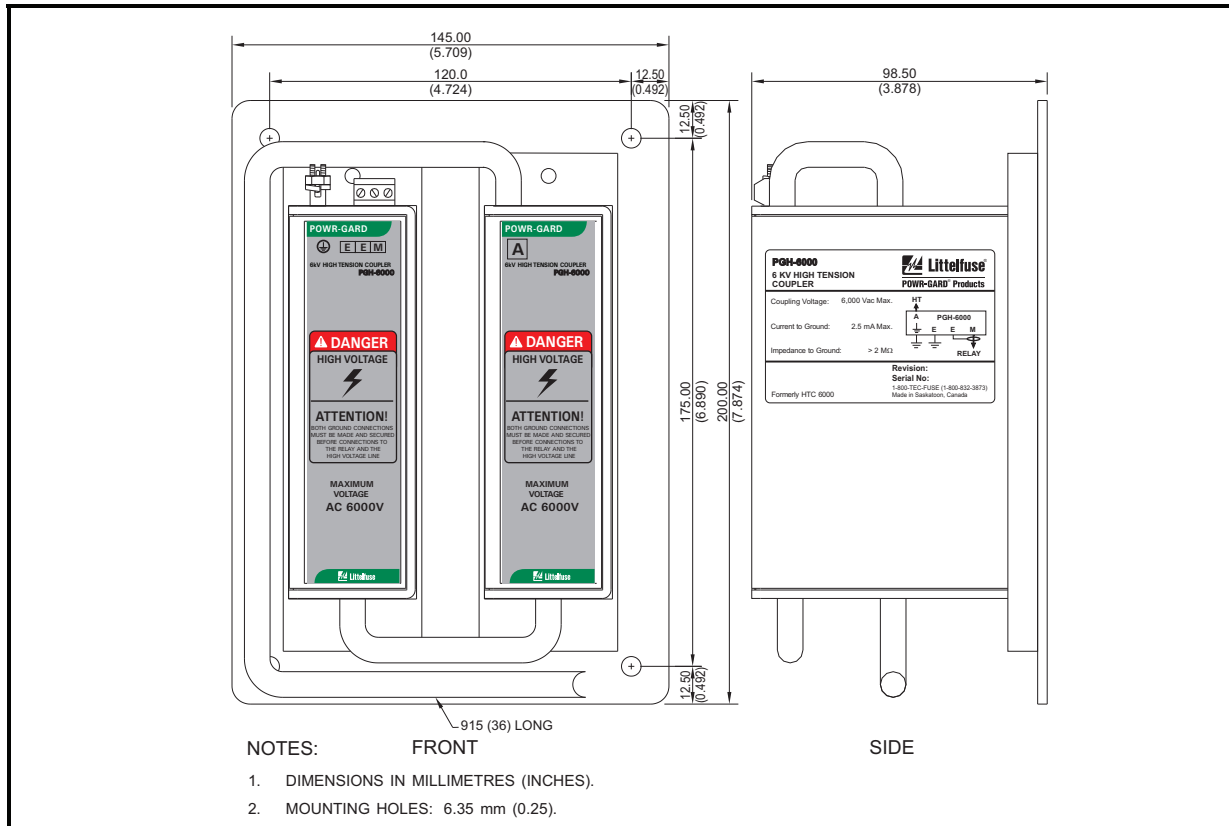


FIGURE 6. PGM-6000 Outline and Mounting Details.

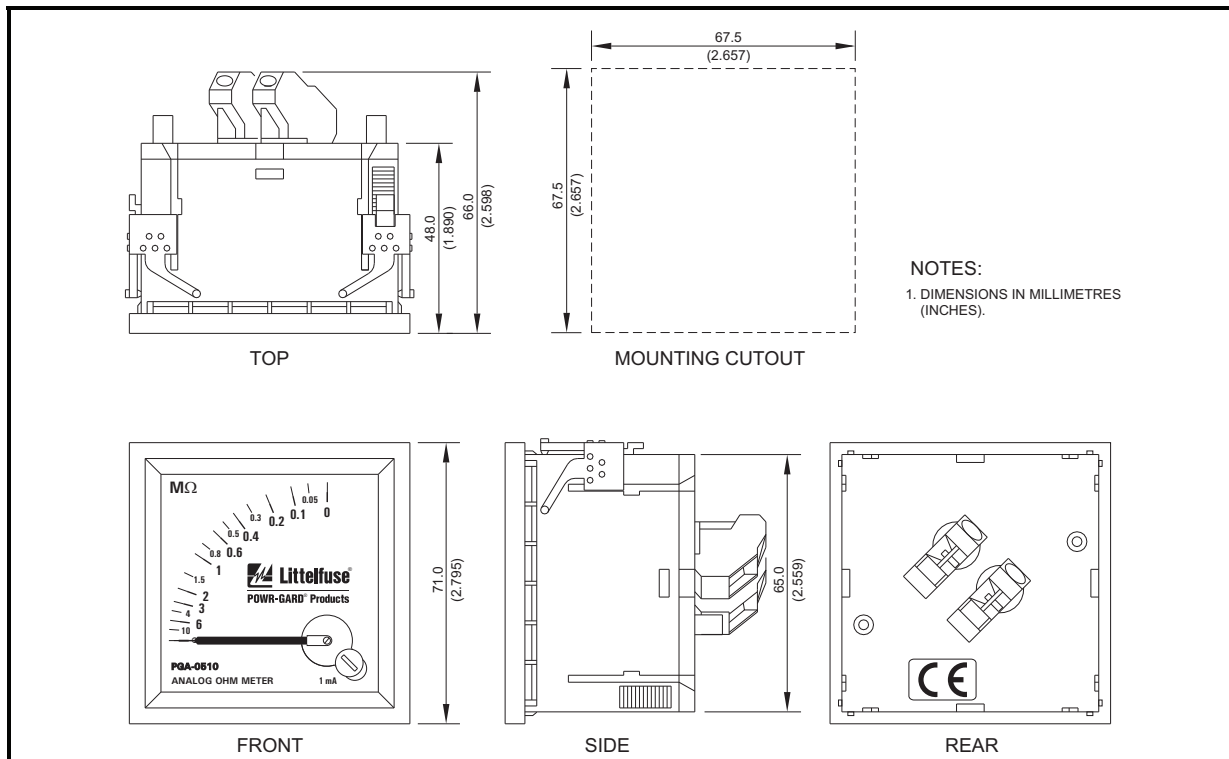


FIGURE 7. PGA-0510 Analog Ohm Meter.

#### 4. TECHNICAL SPECIFICATIONS

##### 4.1 PGM-8600

Supply .....	5 VA, 240 Vac, (+10, -15%) 50/60 Hz
Insulation Test Voltage .....	12 Vdc Maximum (Terminal 2 or 29 relative to Terminal 30)
Insulation-Test Noise Rejection.....	20 kHz
Response Time:	
Warning, 10 kΩ relay output:	
Insulation Resistance < 5 kΩ .....	4 s
Insulation Resistance = 10 kΩ .....	5 s
Alarm, 50 kΩ relay output:	
Insulation Resistance < 25 kΩ .....	2.5 s
Insulation Resistance = 50 kΩ .....	4.5 s
Analog Output:	
Mode .....	Self Powered
Impedance.....	6 kΩ Maximum
Range .....	0 to 1 mA
Parameter .....	0 to ∞ Ω Insulation Resistance
Reset .....	Front-Panel Switch and Remote N.C. Contacts
Test.....	Front-Panel Switch and Remote N.O. Contact
Output Relays; Warning and Alarm:	
Contact Configuration .....	N.O. and N.C. (Form C)
Supplemental Contact Ratings:	
Carry Continuous .....	5 A
Break:	
dc (Resistive) .....	0.3 A, 110 Vdc, L/R = 0
ac.....	3 A, 240 Vac P.F. = 0.4
Operating Mode .....	Non-Fail-Safe
Warning and Alarm Operating Mode .....	Latching or Autoreset


Terminals ..... Wire Clamping,  
22 to 12 AWG  
(0.2 to 2.5 mm<sup>2</sup>)  
Conductors

Dimensions:  
Height ..... 75 mm (3.0")  
Width ..... 55 mm (2.2")  
Depth..... 115 mm (4.5")

Shipping Weight..... 0.45 kg (1 lb)

Environment:  
Operating Temperature ...-10°C to 60°C  
Storage Temperature .....-40°C to 80°C  
Humidity .....85% Non-Condensing

##### 4.2 PGH High-Tension Couplers

Maximum Line Voltage:	
PGH-5000 .....	5,000 Vac
PGH-6000 .....	6,000 Vac
Current to Ground .....	2.5 mA maximum
Terminal M Maximum Voltage .....	50 Vac
Terminals:	
E, E, and M.....	Wire Clamping, 22 to 12 AWG (0.2 to 2.5 mm <sup>2</sup> ) Conductors
 .....	Wire Clamping, 10 AWG Maximum
High Tension Lead A .....	8 AWG, 40 kVdc, 915 mm (3')

#### 5. ORDERING INFORMATION

PGM-8600.....	240 Vac Insulation Monitor
PGA-0510 .....	Analog Ohm Meter
PGH-5000 .....	5 kV High Tension Coupler
PGH-6000 .....	6 kV High Tension Coupler