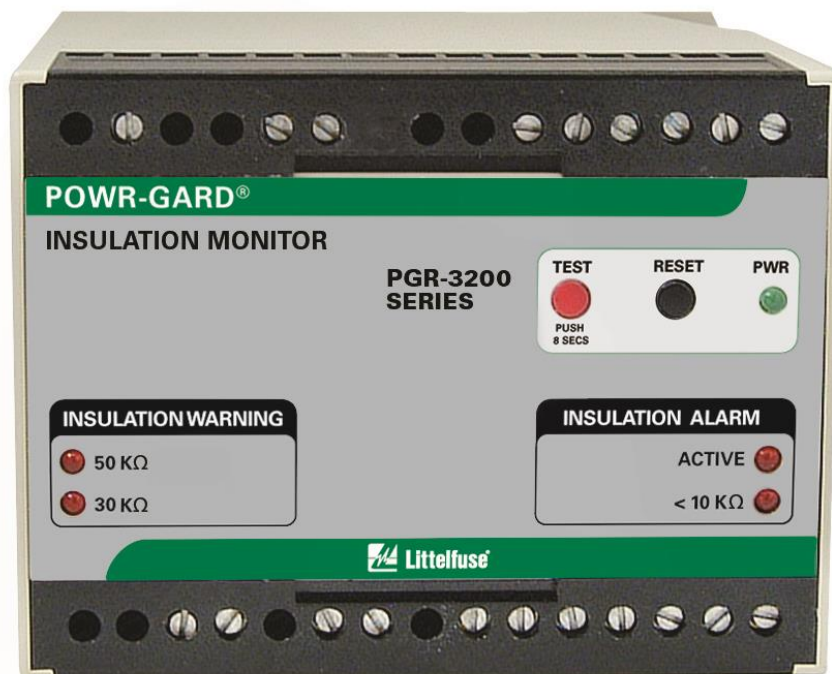


**PGR-3200 MANUAL**  
**INSULATION MONITOR**  
REVISION 3-E-040918



Copyright © 2018 by Littelfuse, Inc.

All rights reserved.

This page intentionally left blank.

## TABLE OF CONTENTS

SECTION	PAGE
<b>1 General</b> .....	1
<b>2 Operation</b> .....	1
2.1 Relay Operating Mode .....	1
2.2 Front-Panel Controls .....	1
2.2.1 Reset .....	1
2.2.2 Test .....	1
2.3 Front-Panel Indication .....	1
2.3.1 Power.....	1
2.3.2 Insulation Warning.....	1
2.3.3 Active .....	1
2.3.4 Insulation Alarm.....	1
2.4 Analog Output.....	1
2.5 Remote Reset .....	1
2.6 Remote Test.....	1
<b>3 Installation</b> .....	3
3.1 PGH-5000 and PGH-6000.....	4
<b>4 Technical Specifications</b> .....	6
4.1 PGR-3200 .....	6
4.2 PGH High-Tension Couplers .....	7
<b>5 Ordering Information</b> .....	7
<b>6 Performance Test</b> .....	7
6.1 Insulation Test.....	7
<b>Appendix A PGR-3200 Revision History</b> .....	8

## LIST OF FIGURES

FIGURE	PAGE
1 PGR-3200 Outline and Mounting Details.....	2
2 Connection Diagram for Ungrounded Systems Under 1.3 kV .....	3
3 Connection Diagram for Ungrounded 5-kV Systems .....	3
4 PGH-5000 Outline and Mounting Details .....	4
5 PGH-6000 Outline and Mounting Details .....	5
6 PGA-0510 Analog Ohm Meter.....	5

## DISCLAIMER

Specifications are subject to change without notice. Littelfuse, Inc. is not liable for contingent or consequential damages, or for expenses sustained as a result of incorrect application, incorrect adjustment, or a malfunction.

This page intentionally left blank.

## 1. GENERAL

The PGR-3200 Insulation Monitor measures phase-to-ground resistance to detect electrical-insulation failure in an ungrounded power utilization system. It provides three levels of detection with a 50-k $\Omega$  warning with an LED and output contact indication, a 30-k $\Omega$  warning with LED indication, and a 10-k $\Omega$  alarm with LED and output contact indication. An analog output is provided for predictive maintenance trending.

The PGR-3200 can be used to detect faults in 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 PGR-3200 actively monitors insulation resistance when it is connected to the supply voltage. All conductors connected to the monitored circuit are included in the insulation measurement. See Fig. 2.

### 2.1 RELAY OPERATING MODE

The PGR-3200 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 PGR-3200. 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's labelled PWR indicates presence of supply voltage.

#### 2.3.2 INSULATION WARNING

The red LED's labelled 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 labelled ACTIVE indicates the monitor is enabled.

#### 2.3.4 INSULATION ALARM

When insulation resistance measures 10 k $\Omega$  or less, the red LED labelled <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, and 6.

### 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 PGR-3200 operates in 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 and 3. Response to a test input can take several seconds.

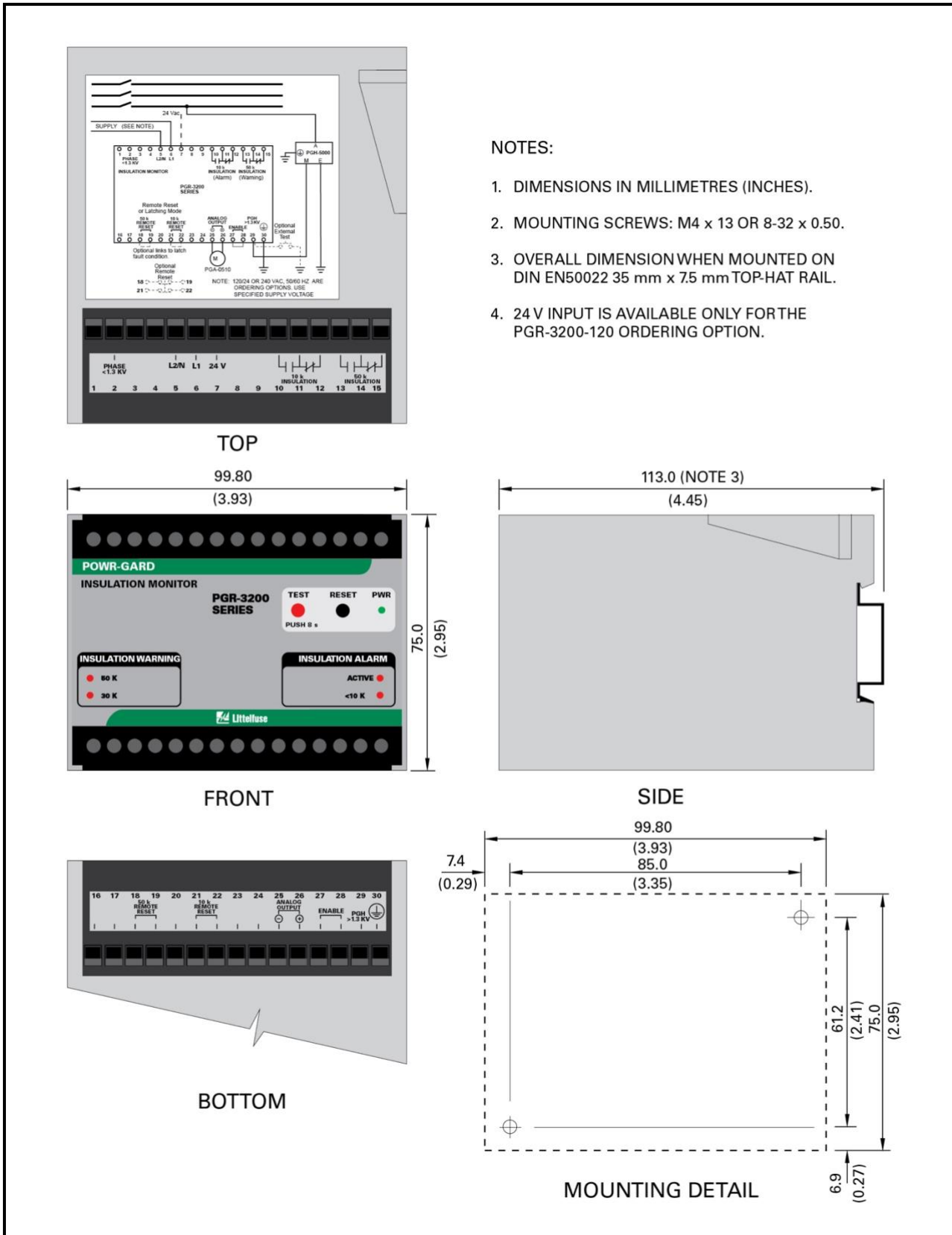


FIGURE 1. PGR-3200 Outline and Mounting Details.

### 3. INSTALLATION

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

The PGR-3200 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 and 3.

Connect an optional PGA-0510 Analog Ohm Meter to terminals 25 and 26. Meter outline, dimensions, and cutout size are shown in Fig. 6.

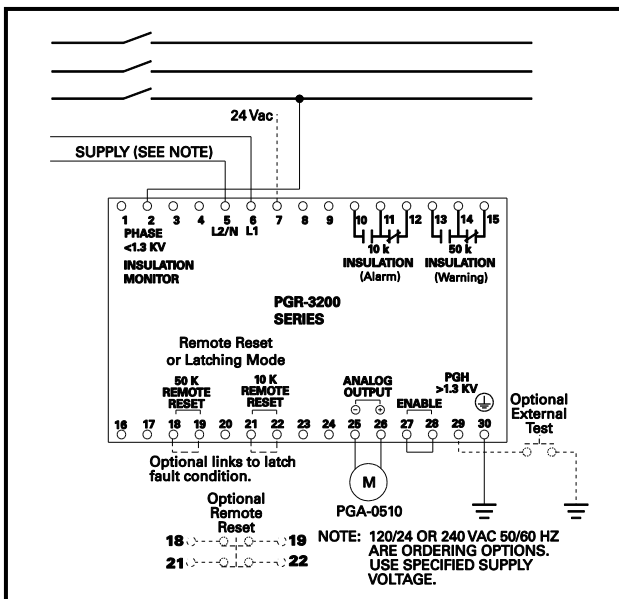


FIGURE 2. Connection Diagram for Ungrounded Systems Under 1.3 kV.

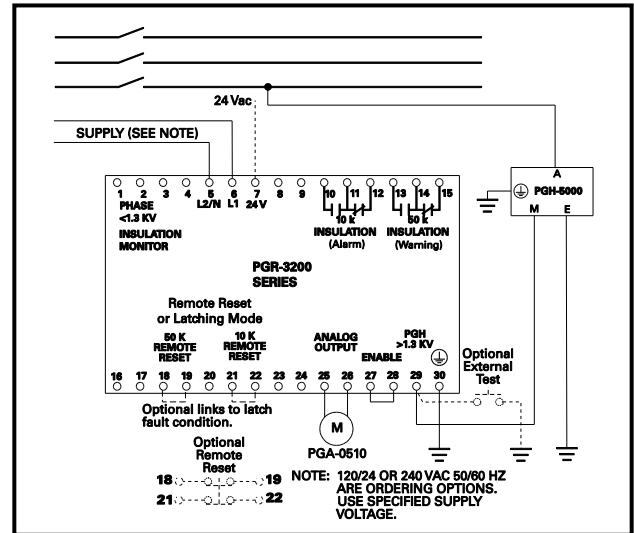


FIGURE 3. Connection Diagram for Ungrounded 5-kV Systems.

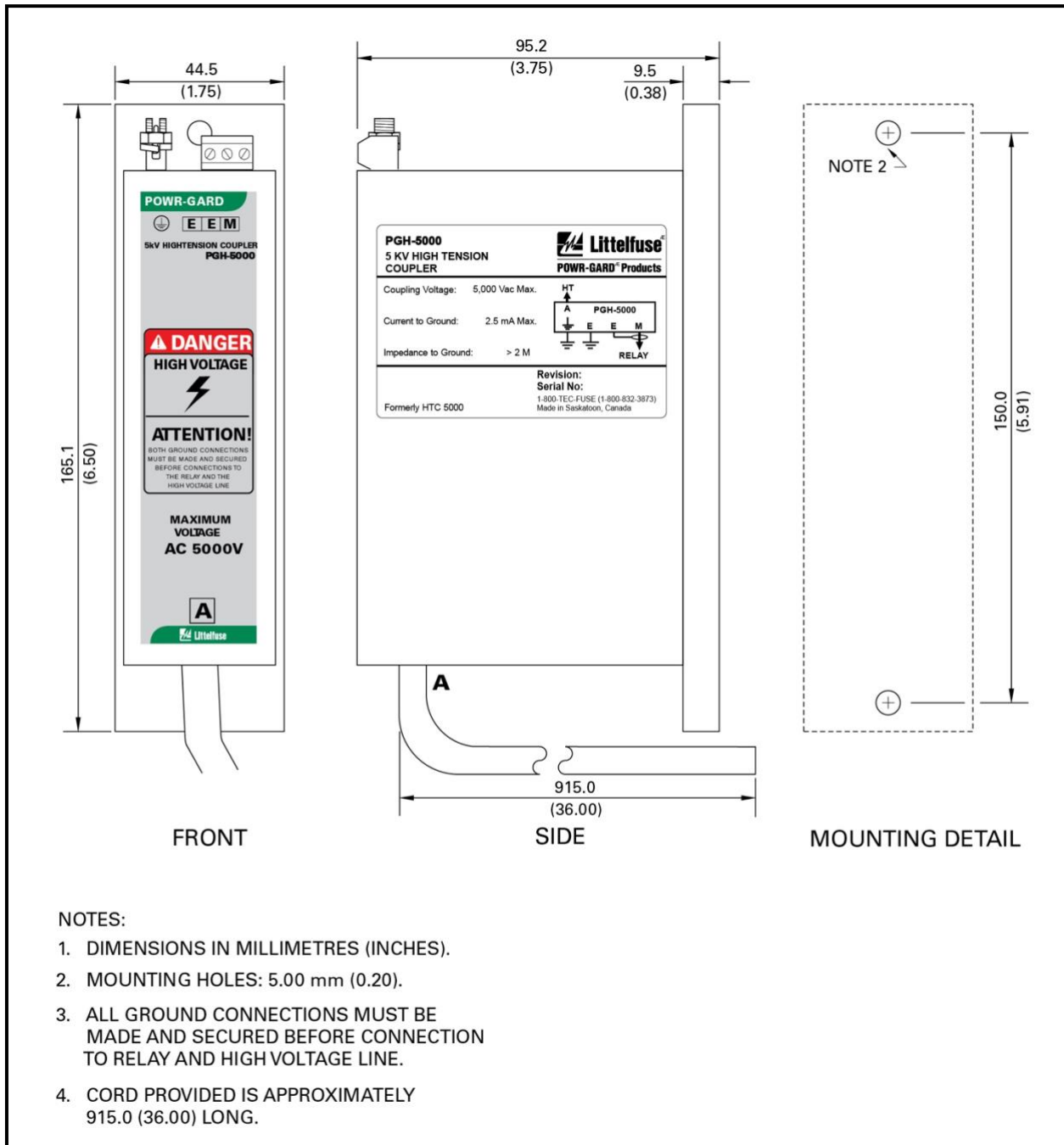


FIGURE 4. PGH-5000 Outline and Mounting Details.

### 3.1 PGH-5000 AND PGH-6000

For 5-kV and 6-kV systems, connect the PGR-3200 to the monitored circuit with a PGH-5000 and PGH-6000 respectively. See Fig. 4 for PGH-5000 outline and mounting details. See Fig. 5 for PGH-6000 outline and mounting details.

Connect protective-ground terminal (⊕) to ground. Connect terminal E to ground or to PGR-3200 terminal 30, which must be grounded. Connect terminal M to PGR-

3200 terminal 29. (PGR-3200 terminal 2 is not used.) For PGR-3200 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 Fig. 3. The PGH-5000/PHG-6000 includes 915 mm (36") of high-voltage conductor.



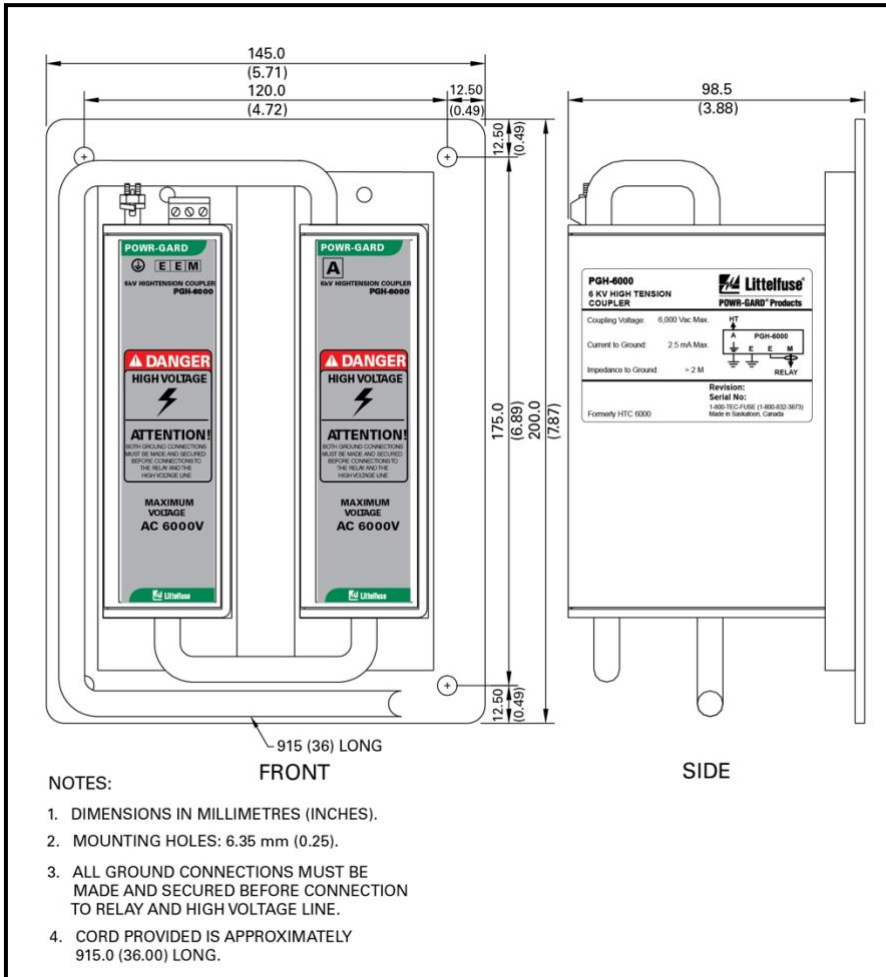


FIGURE 5. PGH-6000 Outline and Mounting Details.

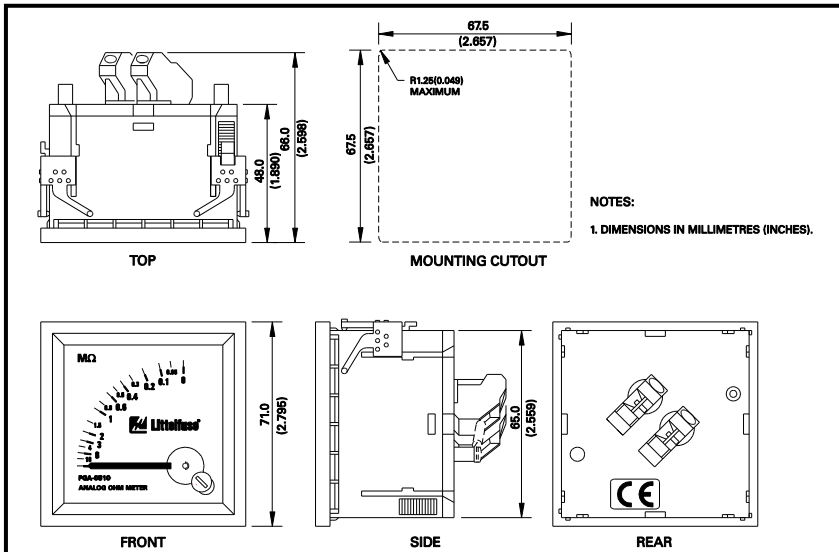


FIGURE 6. PGA-0510 Analog Ohm Meter.

## 4. TECHNICAL SPECIFICATIONS

### 4.1 PGR-3200

#### Supply

120 V option	5 VA, 120 Vac, 24 Vac (+10, -15%) 50/60 Hz
240 V option	5 VA, 240 Vac, (+10, -15%) 50/60 Hz

#### Maximum System Voltage:

##### Direct Connection:

UL Rating	600 Vac
Maximum	1,300 Vac
With PGH-5000	5,000 Vac
With PGH-6000	6,000 Vac

Measuring Voltage	12 Vdc
Measuring Current	20 $\mu$ A maximum
DC Resistance	600 k $\Omega$
AC impedance at 50-60 Hz	> 1 M $\Omega$
Frequency Range	50 – 20,000 Hz

Response-Level Settings ..... 10, 30, and 50 k $\Omega$  (fixed)

#### Response Delay:

##### Warning, 10 k $\Omega$ relay output:

Insulation Resistance	
< 5 k $\Omega$	4 s
Insulation Resistance	
= 10 k $\Omega$	5 s

##### Alarm, 50 k $\Omega$ relay output:

Insulation Resistance	
< 25 k $\Omega$	2.5 s
Insulation Resistance	
= 50 k $\Omega$	4.5 s

#### Analog Output:

Mode	Self Powered
Range	0 to 1 mA
Impedance	6 k $\Omega$ maximum
Parameter	0 to $\infty$ $\Omega$ Insulation Resistance

#### Output Relays; Warning and Alarm:

Configuration	N.O. and N.C. (Form C)
Operating Mode	Non-Fail-Safe
UL Contact Rating	5 A, 240 Vac resistive, 0.28 A, 30 Vdc resistive
Switching Capacity	1,200 VA
Supplemental Contact Ratings:	
Carry Continuous	5 A, maximum

Trip Mode ..... Latching or Autoreset

Reset ..... Front-Panel Button and Remote N.C. Contacts

Test ..... Front-Panel Button and Remote N.O. Contact

Terminals ..... Wire Clamping,  
22 to 12 AWG  
(0.3 to 3.3 mm<sup>2</sup>)  
conductors

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

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

Conductor Rating ..... 60/75°C

#### Dimensions:

Height	75 mm (3.0")
Width	100 mm (3.9")
Depth	113 mm (4.4")
Including DIN rail	115 mm (4.5")

Shipping Weight ..... 0.45 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
Altitude	2,000 m (6,562 ft) maximum
Overvoltage Category	II
Pollution Degree	2

Certification ..... UL Listed



UL508 Industrial Control Equipment



RoHS



**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,  
 26 to 12 AWG  
 (0.13 to 3.3 mm<sup>2</sup>)  
 conductors
- Tightening Torque .....0.50 N·m (4.43 lbf·in)

-  .....Wire Clamping,  
 10 AWG (5.3 mm<sup>2</sup>)  
 maximum

High Tension Lead A.....8 AWG (8.4 mm<sup>2</sup>),  
 40 kVdc, 915 mm (36")

**5. ORDERING INFORMATION**

**PGR-3200-**

Supply:  
 Blank – 240 V Supply<sup>(1)</sup>  
 120 – 120- or 24- Vac Supply

- PGA-0510 .....Analog Ohm Meter
- PGH-5000 .....5 kV High Tension  
 Coupler
- PGH-6000 .....6 kV High Tension  
 Coupler

**NOTES:**

<sup>(1)</sup> UL not available for this supply option.

**6. PERFORMANCE TEST**

**6.1 INSULATION TEST**

Perform this test with the starter open and appropriate lock-out procedures.

Connect a 20 kΩ resistor between one phase and ground at the line side of the starter or motor terminal box. Select a phase that is not connected to PGR-3200 terminal 2 (or the PGH-5000 or PGH-6000). The PGR-3200 will indicate a warning by lighting the 50 kΩ and 30 kΩ LED's and energizing the 50 kΩ insulation relay.

Replace the 20-kΩ resistor with an 8 kΩ resistor.

The PGR-3200 will indicate an alarm by lighting the < 10 kΩ LED and energizing the 10 kΩ insulation relay.

**APPENDIX A  
PGR-3200 REVISION HISTORY**

<b>MANUAL RELEASE DATE</b>	<b>MANUAL REVISION</b>	<b>PRODUCT REVISION (REVISION NUMBER ON PRODUCT LABEL)</b>
April 9, 2018	3-E-040918	01
November 19, 2015	3-D-111915	
August 4, 2015	3-C-080415	

**MANUAL REVISION HISTORY**

**REVISION 3-E-040918**

**SECTION 4**

Specifications added.

**REVISION 3-D-111915**

**SECTION 4**

Terminal torque specifications added.

**REVISION 3-D-111915**

**SECTION 4**

Terminal torque specifications added.

**SECTION 5**

Ordering information updated.

**REVISION 3-C-080415**

Model name changed to Insulation Monitor.

**SECTION 3**

Figs. 4, 5, and 6 updated.

**SECTION 4**

Output relay, dimension, and environment specifications updated.

Certifications updated.

Section 4.2 added.

**SECTION 5**

Ordering information updated.

**APPENDIX A**

Revision history added.

**PRODUCT REVISION HISTORY**

**PRODUCT REVISION 01**

UL Certification.