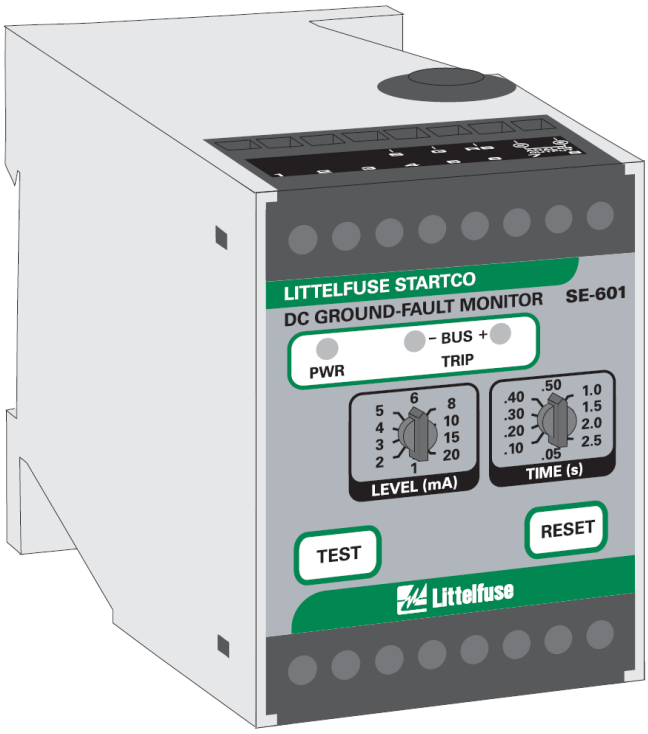
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SE-601 MANUAL

DC GROUND-FAULT MONITOR

REVISION 2-C-073123



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Document Number: PM-1000-EN

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DISCLAIMER

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

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1. GENERAL

The SE-601 is a microprocessor-based ground-fault monitor for ungrounded dc systems. Its output relay can operate in the fail-safe or non-fail-safe mode for undervoltage or shunt-trip applications. The SE-601 has one output relay with isolated normally open and normally closed contacts for use in independent control circuits. Additional features include LED power and faulted-bus indication, autoreset or latching trips with front-panel and remote reset, trip memory, test button, self diagnostics, 0- to 5-V analog output, and digital selector switches. The SE-601 can be DIN-rail, surface, or panel mounted.

Ground-fault current is sensed using an SE-GRM-series Ground-Reference Module—a resistor network that limits ground-fault current to 25 mA. The trip level of the ground-fault circuit is selectable from 1 to 20 mA. Trip time is selectable from 0.05 to 2.5 s.

2. OPERATION

2.1 CONFIGURATION-SWITCH SETTINGS

See Fig. 1.

2.1.1 RELAY OPERATING MODE

Switch 1 is used to set the operating mode of the output relay. In the fail-safe mode, the output relay energizes when the SE-601 is energized and the ground-fault circuit is not tripped. If tripped, and the supply voltage is cycled, the SE-601 will remain tripped, with the trip relay de-energized and a TRIP LED on, until reset.

In the non-fail-safe mode, the output energizes when a ground-fault trip occurs. In the non-fail-safe mode, trip status is not retained in non-volatile memory.

2.1.2 RESET MODE

Switch 2 is used to select autoreset or latching trips. See Section 2.2.3.

2.2 FRONT-PANEL CONTROLS

2.2.1 GROUND-FAULT TRIP LEVEL

The LEVEL (mA) selector switch is used to set the ground-fault trip level.

Ground-fault current is a function of fault resistance, system voltage, and the SE-GRM-series Ground-Reference Module. Table 1 lists the SE-601 trip levels and fault-resistance values for 24-, 48-, 125-, 250-, 500-, 780-, 1000-, and 1500-Vdc systems.

2.2.2 GROUND-FAULT TRIP TIME

The SE-601 has a definite-time trip characteristic. The TIME (s) selector switch is used to set the ground-fault trip time.

2.2.3 RESET

If the Reset Mode switch is in the LATCHING position, a trip remains latched until the RESET button is pressed or the remote-reset terminals (6 and 7) are momentarily connected. In the non-fail-safe mode, cycling the supply voltage will also reset the SE-601.

If the Reset Mode switch is in the AUTORESET position, a trip will reset when the fault is removed.

The reset circuit responds only to a momentary closure so that a jammed or shorted button will not prevent a trip. The front-panel RESET button is inoperative when remote-reset terminals are connected.

2.2.4 TEST

The TEST button is used to test the ground-fault circuit, trip indication, and the output relay. When the TEST button is pressed for one second, a test signal is applied to the ground-fault-detection circuit, the circuit will trip, both "-BUS" and "+BUS" TRIP LED's will light, and the output relay will operate.

TABLE 1. SE-601 TRIP LEVELS AND FAULT-RESISTANCE VALUES

	FAULT RESISTANCE (kΩ)							
TRIP LEVEL (mA)	24-Vdc SYSTEM SE-GRM024	48-Vdc SYSTEM SE-GRM048	125-Vdc SYSTEM SE-GRM125	250-Vdc SYSTEM SE-GRM250	500-Vdc SYSTEM SE-GRM500	780-Vdc SYSTEM SE-GRM780	1000-Vdc SYSTEM SE-GRM1000	1500-Vdc SYSTEM SE-GRM1500
1	11.5	22.3	60.0	120.0	240.0	374.2	480.0	715.0
2	5.5	11.0	28.7	57.5	115.0	179.2	230.0	340.0
3	3.5	7.0	18.3	36.6	73.3	114.2	146.7	215.0
4	2.5	5.0	13.1	26.2	52.5	81.7	105.0	152.5
5	1.9	3.8	10.0	20.0	40.0	62.2	80.0	115.0
6	1.5	3.0	7.9	15.8	31.7	49.2	63.3	90.0
8	1.0	2.0	5.3	10.6	21.3	32.9	42.5	58.8
10	0.7	1.4	3.7	7.5	15.0	23.2	30.0	40.0
15	0.3	0.6	1.6	3.3	6.7	10.2	13.3	15.0
20	0.1	0.2	0.6	1.2	2.5	3.7	5.0	2.5

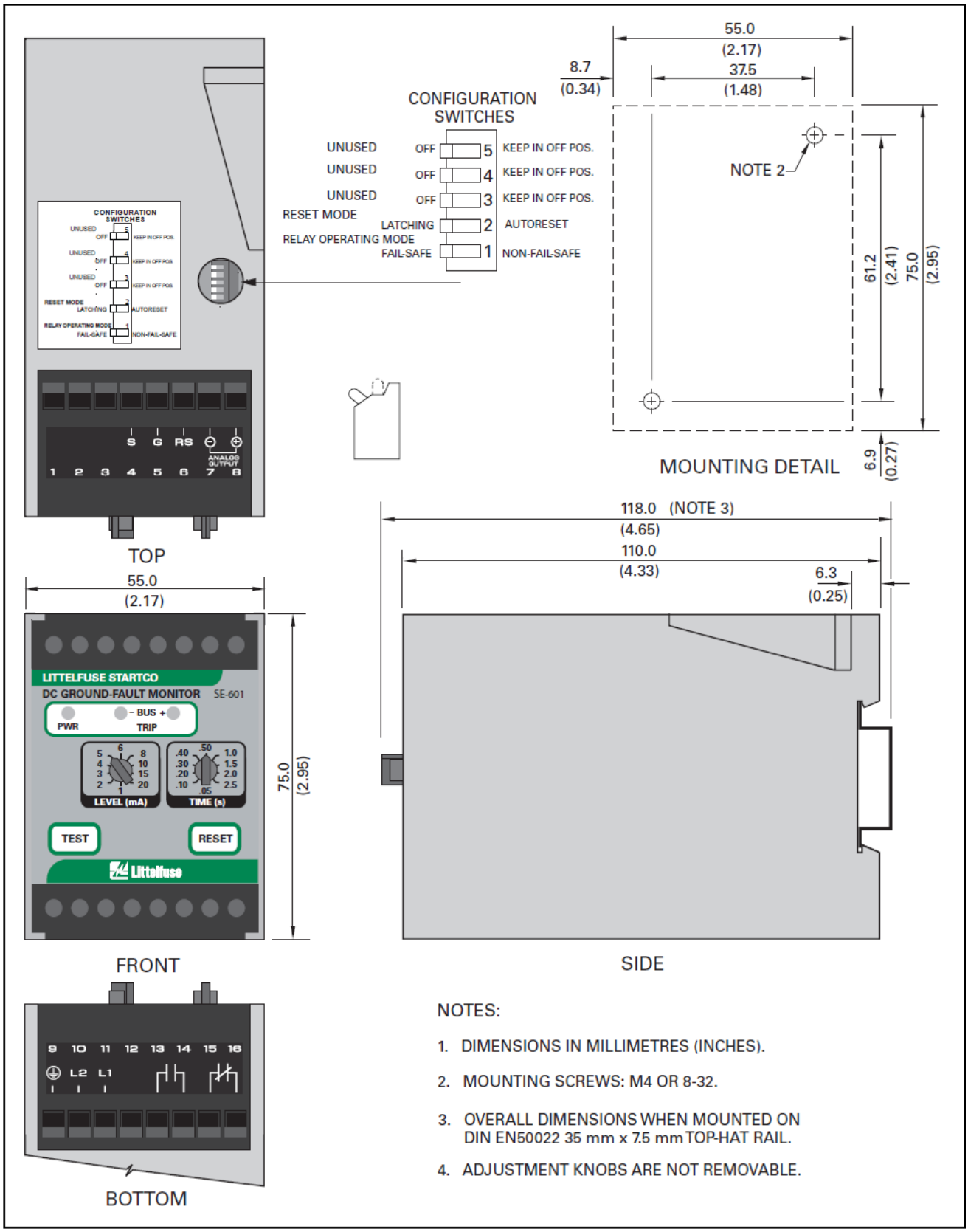


FIGURE 1. SE-601 Outline and Mounting Details.

2.3 Front-Panel Indication

2.3.1 Power

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

2.3.2 Trip

The red TRIP LED's indicate a ground-fault trip. The "-BUS" TRIP LED indicates a ground fault on the negative dc bus. The "+BUS" TRIP LED indicates a ground fault on the positive dc bus. Two fast flashes indicate a diagnostic trip. See Section 2.5

2.4 Analog Output

The non-isolated, 0- to 5-V analog output indicates ground-fault current. The output is 5 V when ground-fault current is 20 mA. Use a PGA-0500 Analog Percent Current Meter with the PGA-05CV Voltage Converter to indicate ground-fault current. See Figs. 2 and 8.

2.5 Self Diagnostics

A diagnostic trip is indicated by two fast flashes of the TRIP LED's. It can be caused by a diagnostic problem detected by an incorrect reading from non-volatile memory. Press RESET or cycle supply voltage. If problems persist, contact Littelfuse.

3. Installation

3.1 SE-601

An SE-601 can be surface or DIN-rail mounted. See Fig. 1. Panel mounting requires a PMA-55 or PMA-60 Panel-Mount Adapter. See Figs. 6 and 7.

Connect the SE-601 DC Ground-Fault Monitor and SE-GRM-series Ground-Reference Module as shown in Fig. 2.

Remove the connection to terminals 5 and 9 for dielectric-strength testing—all inputs and outputs have ANSI/IEEE C37.90 surge-protection circuits that conduct above 300 Vac.

3.2 Ground-Reference Modules

Outline and mounting dimensions for the SE-GRM-series Ground-Reference Modules are provided in Figs. 3, 4, and 5.

Ground-Reference Modules dissipate heat during normal operating conditions and when a ground fault is present. An additional heat sink may be required. See Section 5.2 for details. When using an additional heat sink, apply thermal compound (silicone grease) to the Ground-Reference Module's mounting surface, then securely fasten it to the heat sink surface.

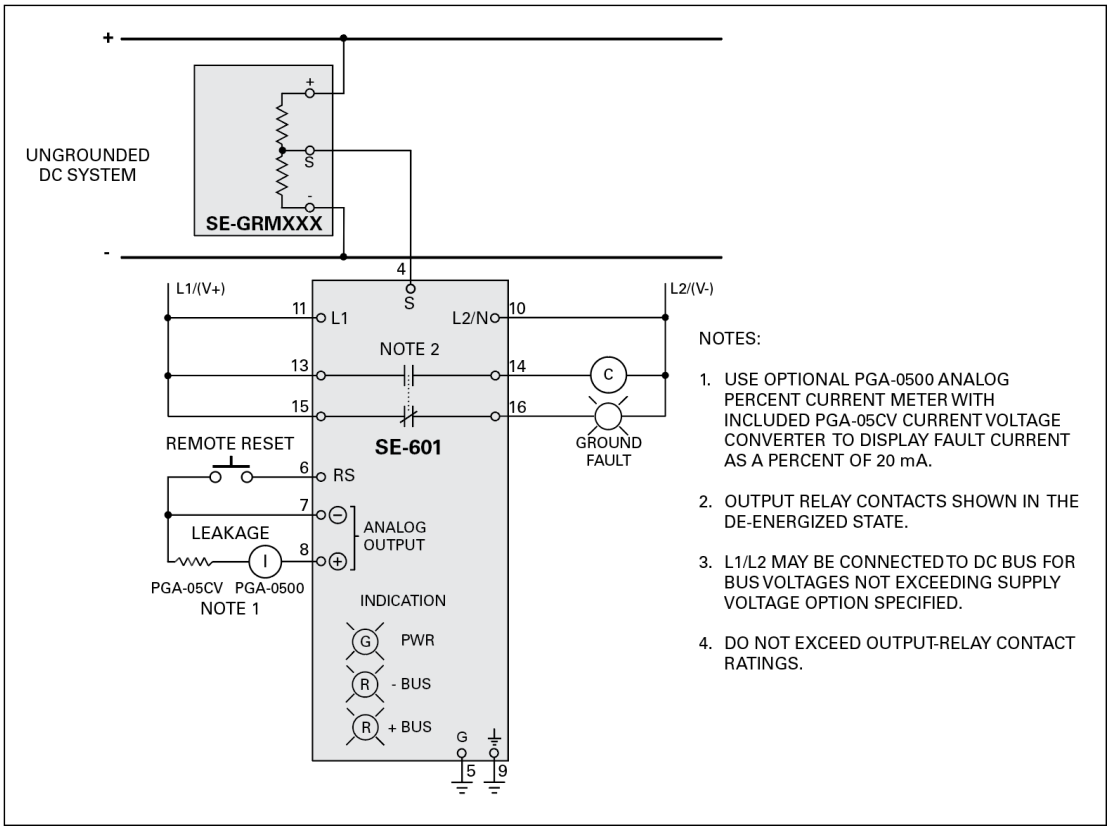
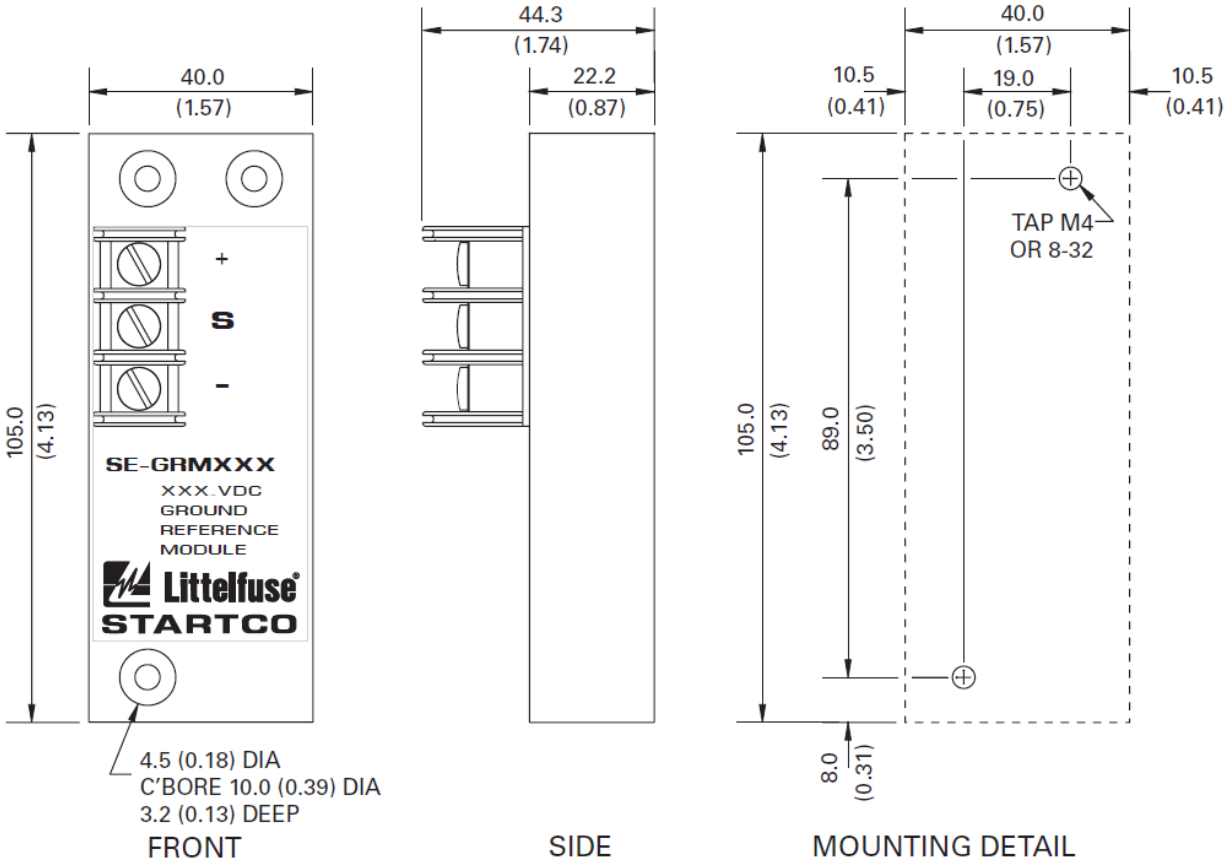


FIGURE 2. Typical Connection Diagram.

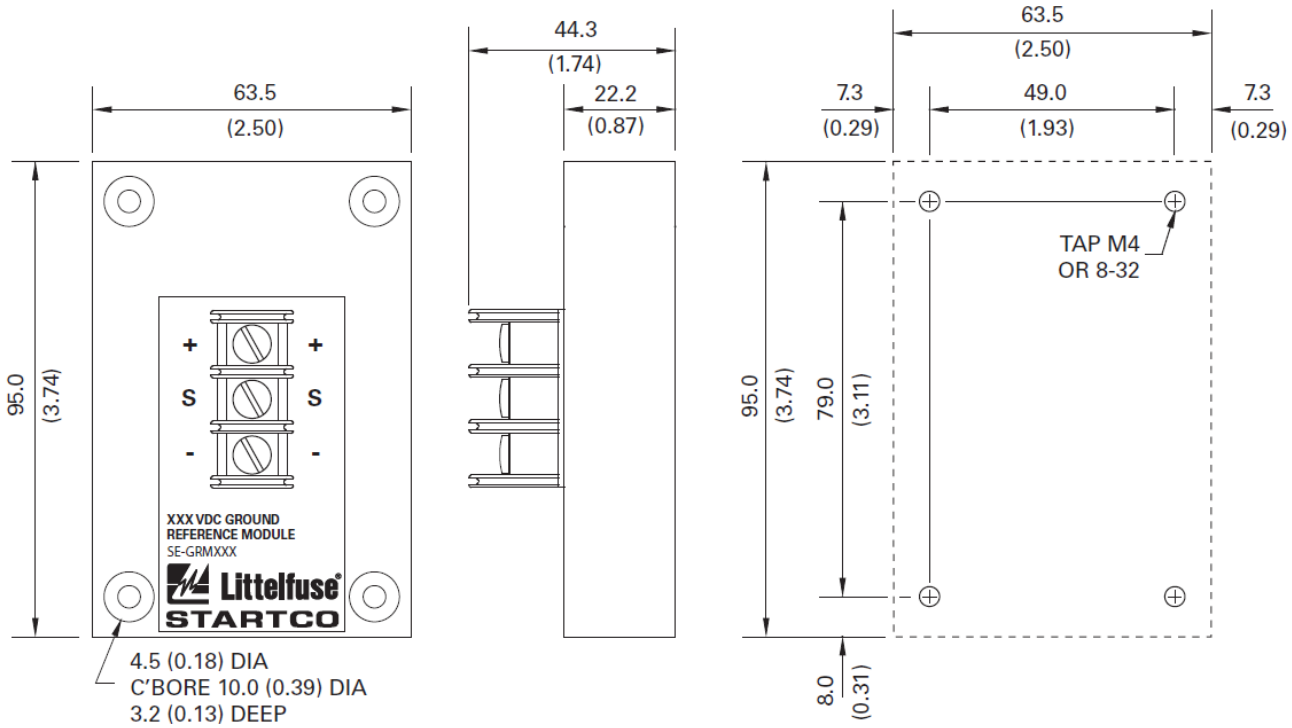


MODULE	VOLTAGE (MAX)	UNFAULTED	GROUND FAULT	FAULT CURRENT	DUTY CYCLE
SE-GRM024	24 VDC	0.3 W	0.6 W MAX	24 mA	CONTINUOUS
SE-GRM048	48 VDC	0.6 W	1.2 W MAX	24 mA	CONTINUOUS
SE-GRM125	125 VDC	1.6 W	3.2 W MAX	24 mA	CONTINUOUS
CONTACT FACTORY FOR OTHER VOLTAGES					

NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. MOUNTING SCREWS: M4 OR 8-32.

FIGURE 3. SE-GRM-Series Ground-Reference Modules – 24 to 125 V.

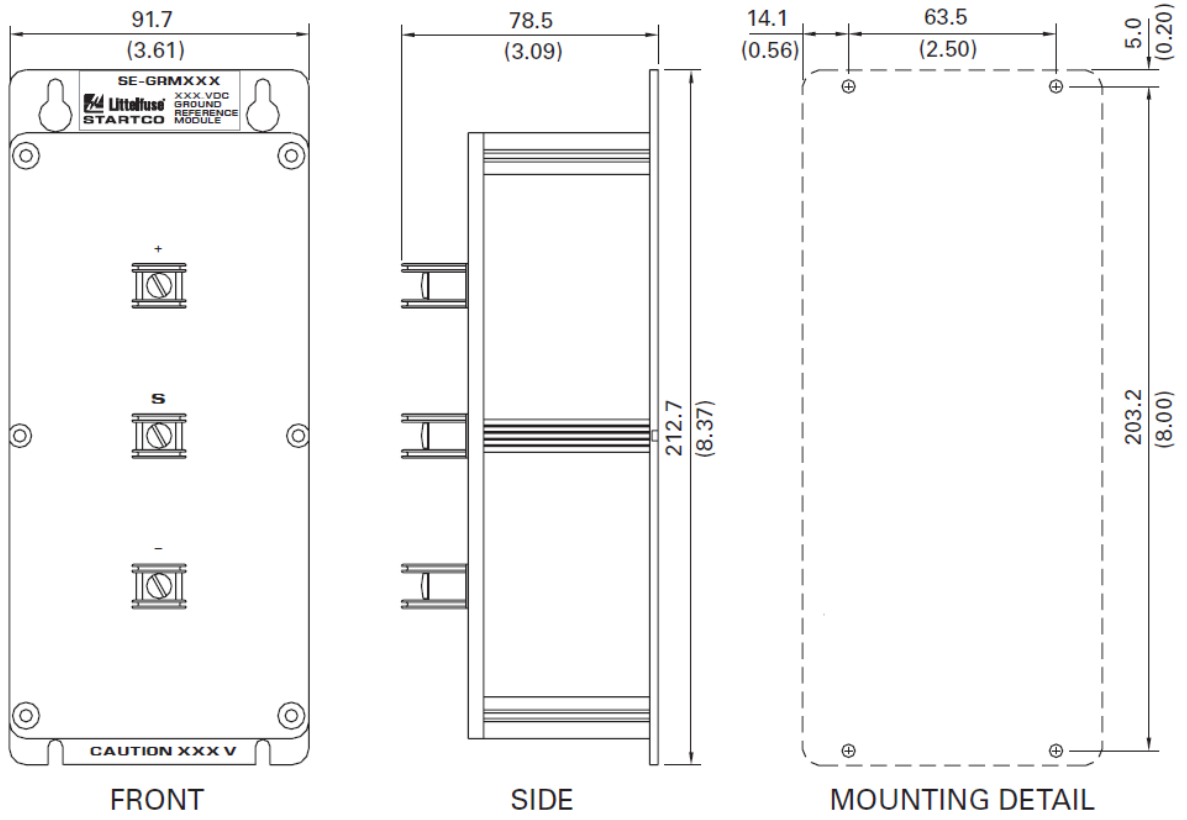


MODULE	VOLTAGE (MAX)	UNFAULTED	GROUND FAULT	FAULT CURRENT	DUTY CYCLE
SE-GRM250	250 VDC	3.1 W	6.3 W MAX	25 mA	NOTE 3
SE-GRM300	300 VDC	3.6 W	7.2 W MAX	24 mA	
SE-GRM400	400 VDC	4.4 W	8.9 W MAX	22 mA	
SE-GRM500	500 VDC	6.3 W	12.5 W MAX	25 mA	
SE-GRM600	600 VDC	7.2 W	14.4 W MAX	24 mA	
CONTACT FACTORY FOR OTHER VOLTAGES					

NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. MOUNTING SCREWS: M4 x 25 OR 8-32 x 1.00.
3. 1 MIN ON, 15 MIN OFF. CONTINUOUS WITH ADDITIONAL HEAT SINK (SEE SECTION 5.2.3).

FIGURE 4. SE-GRM-Series Ground-Reference Modules – 250 to 600 V.



MODULE	VOLTAGE (MAX)	UNFAULTED	GROUND FAULT	FAULT CURRENT	DUTY CYCLE
SE-GRM780	780 VDC	9.6 W	19.2 W MAX	24.6 mA	NOTE 3
SE-GRM1000	1000 VDC	12.5 W	25 W MAX	25 mA	
SE-GRM1500	1500 VDC	16.1 W	32.1 W MAX	22 mA	

NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. MOUNTING SCREWS: M4 OR 8-32.
3. 1 MIN ON, 15 MIN OFF. CONTINUOUS WITH ADDITIONAL HEAT SINK (SEE SECTION 5.2.4).

FIGURE 5. SE-GRM-Series Ground-Reference Modules – 780 to 1,500 V.

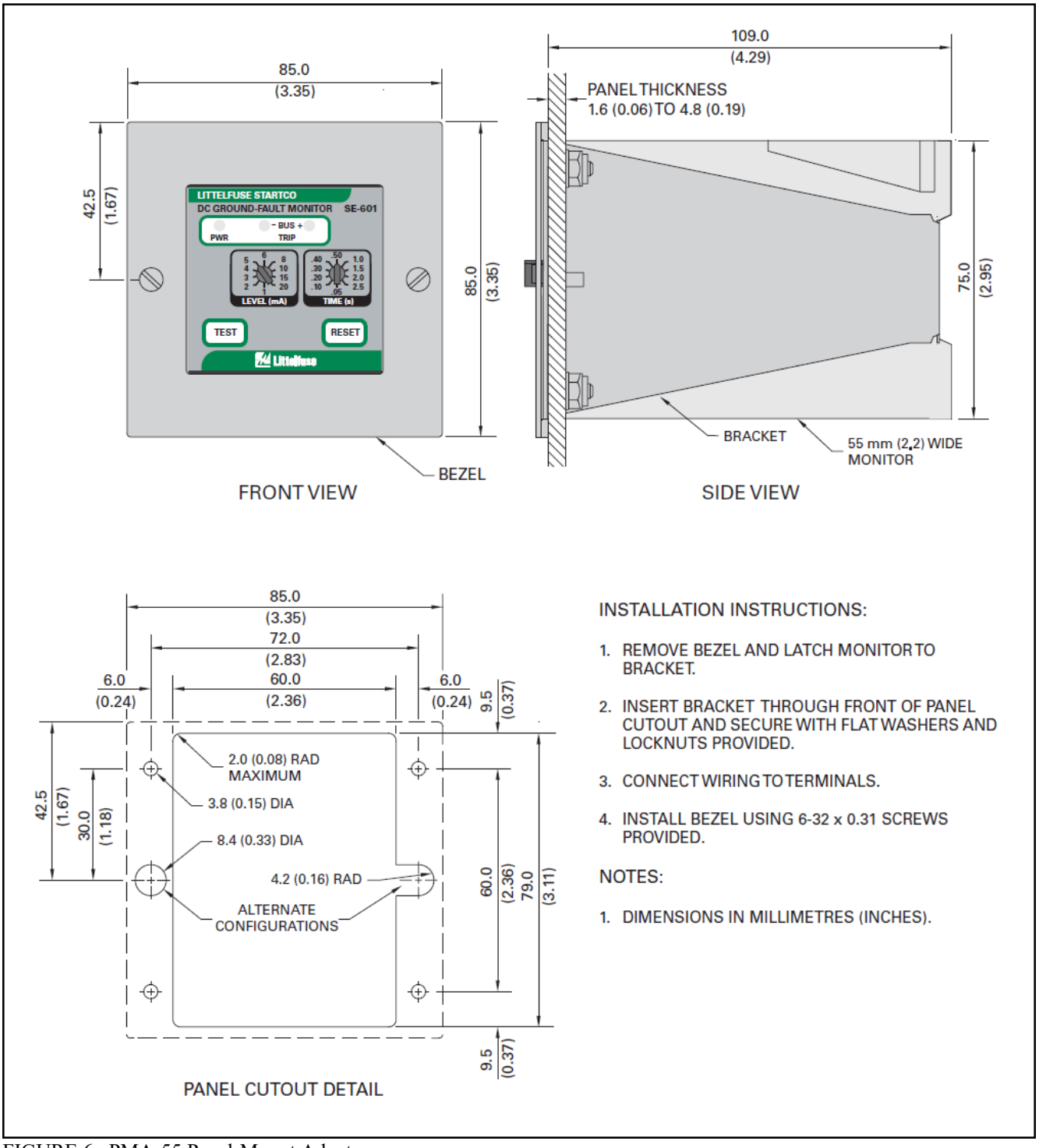


FIGURE 6. PMA-55 Panel-Mount Adapter.

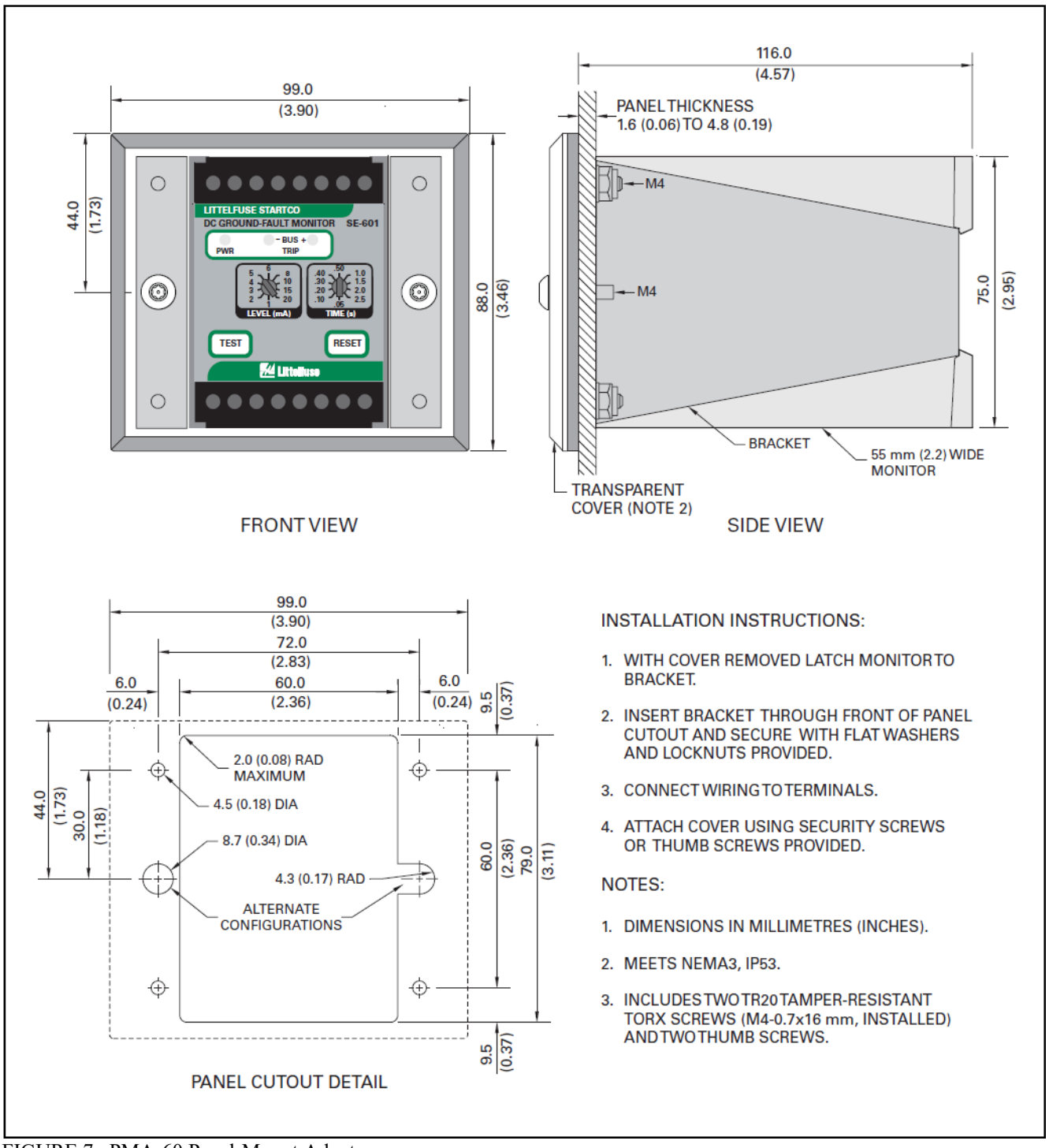


FIGURE 7. PMA-60 Panel-Mount Adapter.

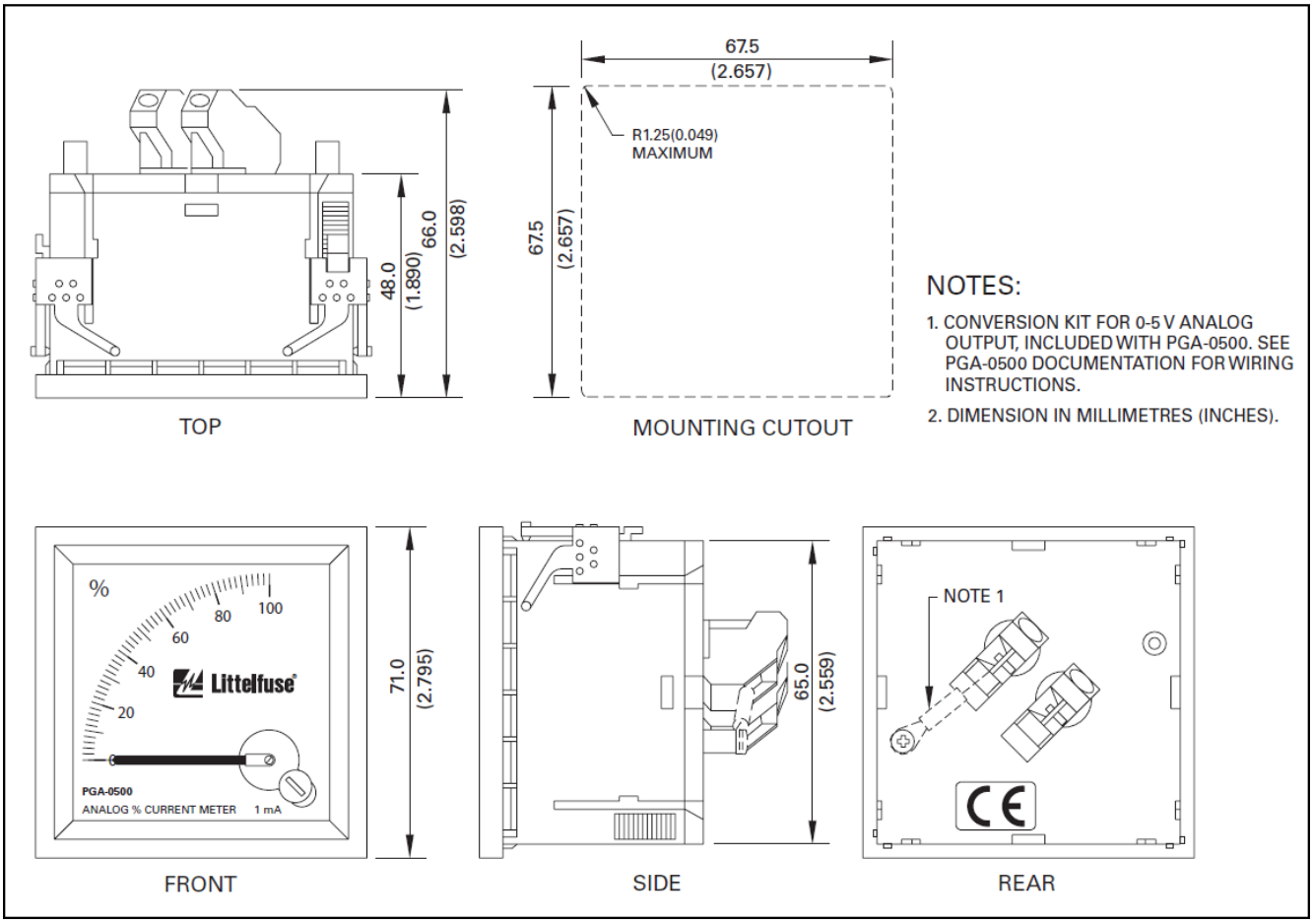


FIGURE 8. PGA-0500 Analog Percent Current Meter.

4. SE-601 COMPATIBILITY

The SE-601 has been enhanced with the addition of non-volatile trip memory for the fail-safe relay operating mode. Prior to hardware revision 01, a mechanical flag was used instead of non-volatile memory. The current revision of the SE-601 can directly replace previous revision-00 units. The hardware-revision number is listed on the SE-601 model/serial-number label affixed to the SE-601 enclosure. Both generations are compared in Table 2.

TABLE 2. TRIP-FEATURES COMPARISON

		HARDWARE REVISION	
		00	≥ 01
LED trip indication		Yes	Yes
Mechanical flag trip indication		Yes	No
Non-volatile trip memory		No	Yes
Device state after supply voltage cycled when tripped (ground-fault removed)	Fail-safe	Trip LED: Off Trip relay: Energized Trip flag: Red	Trip LED: On Trip relay: De-energized
	Non-fail-safe	Trip LED: Off Trip relay: De-energized Trip flag: Red	Trip LED: Off Trip relay: De-energized

5. TECHNICAL SPECIFICATIONS

5.1 SE-601

Supply:
- 0U Option ..... 5 VA, 120 to 240 Vac (+20, -55%), 50/60 Hz, 2 W, 100 to 240 Vdc (+20, -25%)
- 0D Option ..... 2 W, 12 to 30 Vdc (+20, -25%)
- 0T Option..... 2 W, 40 to 55 Vdc (+20, -25%)

Trip-Level Settings ..... 1, 2, 3, 4, 5, 6, 8, 10, 15, and 20 mA

Trip-Time Settings ..... 0.05, 0.10, 0.20, 0.30, 0.40, 0.50, 1.0, 1.5, 2.0, and 2.5 s

Accuracies: (1)
- Trip Level..... 5% of setting, 0.15 mA minimum
- Trip Time (2) ..... 5% of setting, 15 ms minimum

Trip Mode ..... Latching or Autoreset

Analog Output:
- Range ..... 0 to 5 V, 0.25 V per mA
- Output Impedance..... 220 Ω

Reset..... Front-Panel Button and Remote, N.O. Momentary Contact

Functional Test ..... Front-Panel Button

Relay Contacts:
- Configuration ..... Isolated N.O. and N.C.
- Operating Mode ..... Fail-Safe or Non-Fail-Safe
- CSA/UL Rating ..... 8 A resistive, 250 Vac
  8 A resistive, 30 Vdc
  0.25 HP, 120/240 Vac
- Supplemental Contact Ratings:
  - Carry Current ..... 8 A, maximum
  - Break:
    - 30 Vdc ..... 240 W Resistive, 170 W Inductive (L/R = 7 ms)
    - 120 Vdc ..... 24 W Resistive, 17 W Inductive (L/R = 7 ms)
    - ac ..... 2,000 VA Resistive, 875 VA Inductive (PF = 0.4)

  (Subject to maximums of 8 A and 250 Vac/ 30 Vdc or 200 mA at 120 Vdc)

Terminals ..... Wire-clamping 24 to 12 AWG (0.2 to 3.3 mm^2) conductors

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

Dimensions:
- Height..... 75 mm (3.0”)
- Width..... 55 mm (2.2”)
- Depth..... 113 mm (4.5”)

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

Environment:
- Operating Temperature:
  - Altitude:
    - ≤ 1,000 m (3,281’) ..... -40 to 60°C (-40 to 140°F)
    - 3,000 m (9,843’) ..... -40 to 55°C (-40 to 131°F)
    - 5,000 m (16,404’) ..... -40 to 50°C (-40 to 122°F)
- Storage Temperature..... -55 to 80°C (-67 to 160°F)
- Humidity ..... 85% Non-Condensing
- Altitude ..... 5,000 m (16,404’) maximum

PWB Conformal Coating ..... MIL-1-46058 qualified
UL QMJU2 recognized

Vibration ..... EN60255-21-1 (Vibration, Shock, and Seismic)
EN60255-21-2 (Shock and Bump)

EMC Tests:
Verification tested in accordance with EN 60255-26:2013.

- Radiated and Conducted Emissions ..... CISPR 11:2019, CISPR 32:2019
- Current Harmonics and Voltage Fluctuation..... IEC 61000-3-2 and IEC 61000-3-3 Class A
- Electrostatic Discharge..... IEC 61000-4-2 ± 6 kV contact discharge (direct and indirect) ± 8 kV air discharge
- Radiated RF Immunity ..... IEC 61000-4-3

10 V/m, 80-1000 MHz,
80% AM (1 kHz)
10 V/m, 900 MHz,
200 Hz pulse modulated

Fast Transient ..... IEC 61000-4-4
±4 kV on AC mains and
I/O lines

Surge Immunity ..... IEC 61000-4-5
Zone B
± 1 kV differential mode
± 2 kV common mode

Surge Withstand ..... IEEE C37.90.1:2012

Conducted RF Immunity .... IEC 61000-4-6
10 V, 0.15-80 MHz,
80% AM (1 kHz)

Magnetic Field Immunity ... IEC 61000-4-8
50 Hz and 60 Hz , 30 A/m
and 300 A/m

Voltage Interruption..... IEC 61000-4-11,
IEC 61000-4-29,
0% for 5, 10, 20, 50,
100 & 200 ms 3x each

Power Frequency ..... IEC 61000-4-16
Zone A: differential
mode 150 Vrms
Zone A: common mode
300 Vrms

1 MHz Burst ..... IEC 61000-4-18
± 1 kV differential mode
(line-to-line)
± 2.5 kV common mode

RFI Compliance ..... FCC Part 15, Subpart B,
Class A – Unintentional
Radiators

Certification ..... CSA, Canada and USA



UL Listed



Australia



FCC



CE, European Union



CSA C22.2 No.14 Industrial Control Equipment
UL508 Industrial Control Equipment
UL1053 Ground Fault Sensing and Relaying Equipment
Australia, Regulatory Compliance Mark (RCM)
CE Low Voltage Directive
EN 61010-1:2010/AMD1:2016/COR1:2019
FCC CFR47, Part 15, Subpart B,
Class A – Unintentional Radiators

NOTES:

(1) Over operating temperature range of -40 to 60°C (-40 to 140°F).

(2) Trip time at 3 × trip-level setting.

5.2 GROUND-REFERENCE MODULES

5.2.1 General

Nominal Current ..... 12.5 mA

Maximum Fault Current at
Nominal Voltage ..... 25 mA

Maximum Voltage ..... 110% of nominal voltage

Terminals ..... 22 to 12 AWG (0.33 to 3.3 mm^2) conductors
Screw Details ..... #6-32, Stainless Steel
Tightening Torque ..... 1.01 N·m (9.0 lbf·in)

Environment:
Operating Temperature ..... –40 to 60°C (-40 to 140°F). Review specific Ground Reference Modules for additional deratings if necessary.
Storage Temperature ..... –55 to 80°C (-67 to 160°F)
Humidity ..... 85% Non-Condensing

Certification .....UL Recognized, E328654

Littelfuse Inc.

Australia

FCC

CE, European Union

UL508 Industrial Control Equipment
UL1053 Ground Fault Sensing and Relaying Equipment
Australia, Regulatory Compliance Mark (RCM)
CE Low Voltage Directive
EN 61010-1:2010 (3rd Edition) + AMD1:2016 + Corrigendum1:2019
FCC CFR47, Part 15, Subpart B,
Class A – Unintentional Radiators

5.2.2 Small-Format Ground-Reference Modules

Duty Cycle and Derating:
- Continuous Duty Cycle:
  - Maximum Temp ..... 60°C (140°F)
  - No derating required

SE-GRM024:
- Power Dissipation
  - At 24 Vdc..... Unfaulted 0.3 W, Ground Fault 0.6 W maximum
- Shipping Weight ..... 300 g (0.7 lb)

SE-GRM048:
- Power Dissipation
  - At 48 Vdc..... Unfaulted 0.6 W, Ground Fault 1.2 W maximum
- Shipping Weight ..... 300 g (0.7 lb)

SE-GRM125:
- Power Dissipation
  - At 125 Vdc..... Unfaulted 1.6 W, Ground Fault 3.2 W maximum
- Shipping Weight ..... 300 g (0.7 lb)

5.2.3 Medium-Format Ground-Reference Modules

Duty Cycle and Derating:
- Continuous Duty Cycle:
  - Maximum Temp..... 50°C (122°F)
  - Minimum Backplate..... 127 x 191 x 1.58 mm (5 x 7.5 x 0.062 in.) Aluminum
- Limited Duty Cycle:
  - Duty Cycle ..... 1 minute on, 15 minutes off
  - Maximum Temp..... 60°C (140°F)
  - Minimum Backplate..... 76 x 105 x 1.58 mm (3 x 4.1 x 0.062 in.) Aluminum

SE-GRM250:
- Power Dissipation
  - At 250 Vdc..... Unfaulted 3.1 W, Ground Fault 6.3 W maximum
- Shipping Weight ..... 500 g (1.6 lb)

SE-GRM300:
- Power Dissipation
  - At 300 Vdc..... Unfaulted 3.6 W, Ground Fault 7.2 W maximum
- Shipping Weight ..... 500 g (1.6 lb)

SE-GRM400:
- Power Dissipation
  - At 400 Vdc..... Unfaulted 4.4 W, Ground Fault 8.9 W maximum
- Shipping Weight ..... 500 g (1.6 lb)

SE-GRM500:
- Power Dissipation
  - At 500 Vdc..... Unfaulted 6.3 W, Ground Fault 12.5 W maximum
- Shipping Weight ..... 500 g (1.6 lb)

SE-GRM600:
- Power Dissipation
  - At 600 Vdc..... Unfaulted 7.2 W, Ground Fault 14.4 W maximum
- Shipping Weight ..... 500 g (1.6 lb)

5.2.4 Large-Format Ground-Reference Modules

Duty Cycle and Derating:
- Continuous Duty Cycle:
  - Maximum Temp ..... 50°C (122°F)
  - Minimum Backplate..... 305 x 483 x 3.18 mm (12 x 19 x 0.125 in.) Aluminum
- Limited Duty Cycle:
  - Duty Cycle ..... 1 minute on, 15 minutes off
  - Maximum Temp ..... 60°C (140°F)
  - Minimum Backplate..... 110 x 235 x 3.18 mm (4.3 x 9.3 x 0.125 in.) Aluminum

SE-GRM780:
- Power Dissipation
  - At 780 Vdc..... Unfaulted 9.6 W, Ground Fault 19.2 W maximum
- Shipping Weight ..... 2.1 kg (4.5 lb)

SE-GRM1000:
- Power Dissipation
  - At 1000 Vdc..... Unfaulted 12.5 W, Ground Fault 25.0 W maximum
- Shipping Weight ..... 2.1 kg (4.5 lb)

SE-GRM1500:
- Power Dissipation
  - At 1500 Vdc..... Unfaulted 16.1 W, Ground Fault 32.1 W maximum
- Shipping Weight ..... 2.1 kg (4.5 lb)

6. ORDERING INFORMATION

SE-601-0□-□□

Conformal Coating:
Blank – Partial Conformal Coating
CC – Full Conformal Coating

Supply:
U – Universal 120/240-Vac/Vdc Supply
D – 12/24-Vdc Supply
T – 48-Vdc Supply

SE-GRM024 ..... Ground-Reference Module for 24-Vdc system
SE-GRM048 ..... Ground-Reference Module for 48-Vdc system
SE-GRM125 ..... Ground-Reference Module for 125-Vdc system
SE-GRM250 ..... Ground-Reference Module for 250-Vdc system
SE-GRM300 ..... Ground-Reference Module for 300-Vdc system
SE-GRM400 ..... Ground-Reference Module for 400-Vdc system
SE-GRM500 ..... Ground-Reference Module for 500-Vdc system
SE-GRM600 ..... Ground-Reference Module for 600-Vdc system
SE-GRM780(1) .... Ground-Reference Module for 780-Vdc system
SE-GRM1000(1) .. Ground-Reference Module for 1000-Vdc system
SE-GRM1500(1) .. Ground-Reference Module for 1500-Vdc system

Consult factory for other ground-reference modules.

PGA-0500 ..... Analog Percent Current Meter, 0 to 100% range (PGA-05CV included)
PMA-55 ..... Panel-Mount Adapter NEMA 1
PMA-60 ..... Panel-Mount Adapter, NEMA 3, IP53. Includes two TR20 tamper-resistant Torx screws and two thumb screws.

NOTES:
(1) Add suffix -01 for CE certification only (will not include UL certification).

7. WARRANTY

The SE-601 DC Ground-Fault Monitor and associated SE-GRM Ground-Reference Module is warranted to be free from defects in material and workmanship for a period of five years from the date of purchase.

Littelfuse will (at Littelfuse's option) repair, replace, or refund the original purchase price of an SE-601 that is determined by Littelfuse to be defective if it is returned to the factory, freight prepaid, within the warranty period. This warranty does not apply to repairs required as a result of misuse, negligence, an accident, improper installation, tampering, or insufficient care. Littelfuse does not warrant products repaired or modified by non-Littelfuse personnel.

8. GROUND-FAULT PERFORMANCE TEST

A test record form is provided for recording the date and the final results of the performance tests. The following ground-fault system test is to be conducted by qualified personnel.

a) Evaluate the interconnected system in accordance with the overall equipment manufacturer's detailed instructions.

b) Verify proper reaction of the device in response to a simulated or complete system test.

c) To simulate a ground fault, power down the entire system and remove the connection to terminal 4 (S). Ensure that terminal 5 is connected to ground. Using a 24 Vdc source, 50 kΩ variable resistor, fixed 1 kΩ resistor, and an ammeter, connect the circuit as shown in Fig. 9. Select a trip current on the SE-601, and slowly vary the resistance until the monitor trips. Never exceed 30 mA through the monitor.

d) For a system ground-fault test, install a fixed or variable resistance and switch that is suitably rated for the system. Install a fuse rated to protect the test circuit. The fixed test resistance can be sized to cause a ground-fault current just above the trip level setting. See Fig. 10. For a reference of fault-resistance values, see Table 1.

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

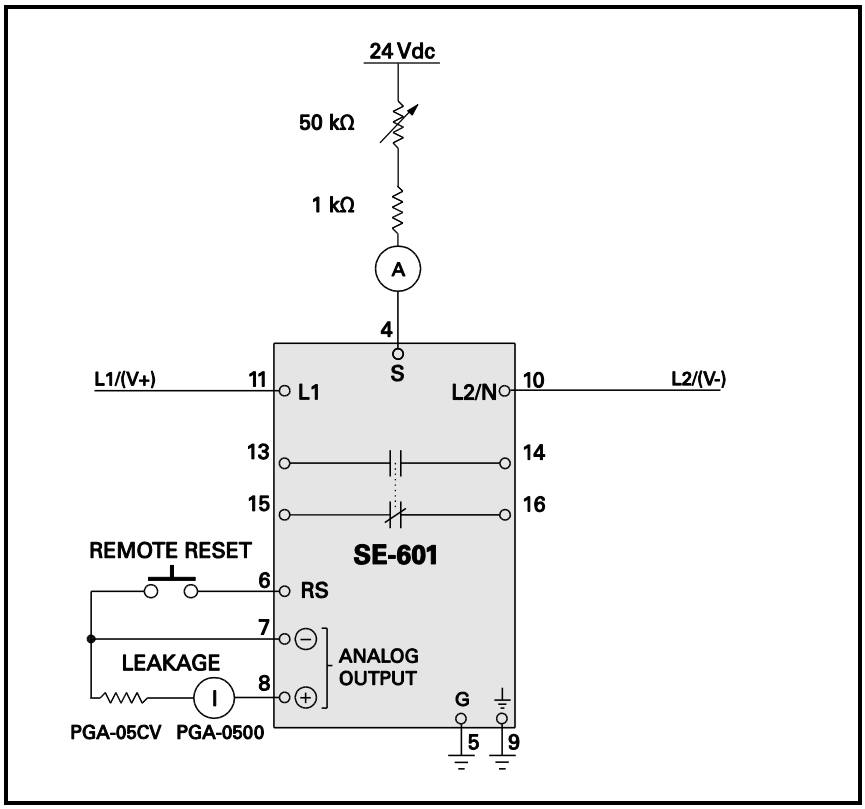


FIGURE 9. Ground-Fault Test Circuit.

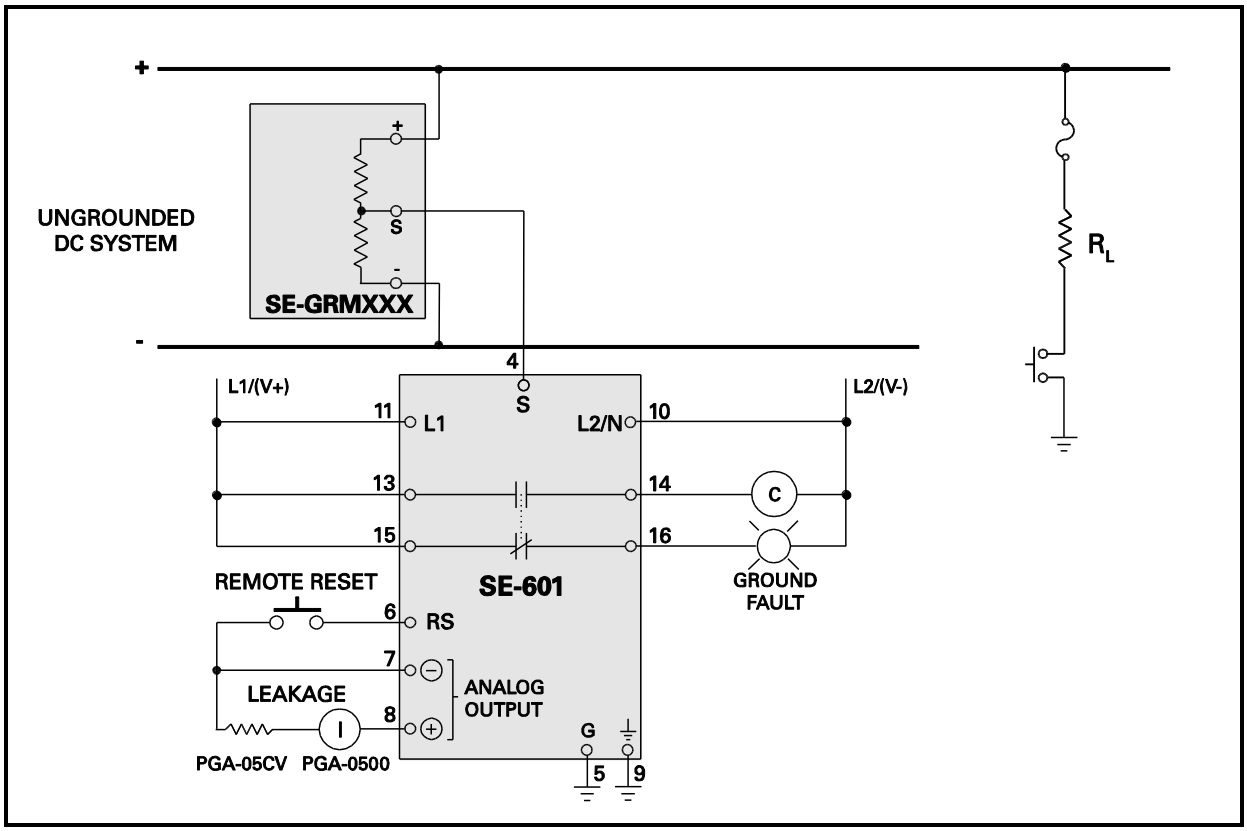


FIGURE 10. System Ground-Fault Test.

TABLE 3. GROUND-FAULT-TEST RECORD

DATE	TEST RESULTS

Retain this record for the authority having jurisdiction.

APPENDIX A
SE-601 REVISION HISTORY

MANUAL RELEASE DATE	MANUAL REVISION	PRODUCT REVISION (REVISION NUMBER ON PRODUCT LABEL)
July 31, 2023	2-C-073123	03
July 30, 2014	2-B-073014	
April 19, 2013	2-A-041913	

MANUAL REVISION HISTORY

REVISION 2-C-073123

SECTION 5

Added GRM1500 Ground Reference Module.
Added UL certification for Ground Reference Modules.

REVISION 2-B-073014

SECTION 5

Updated to include altitude and vibration specifications.

SECTION 8

Ground-fault performance test added.

APPENDIX A

Revision history updated.

REVISION 2-A-041913

SECTION 3

Fig. 2 updated to include PGA-05CV.

SECTION 5

Environment section updated to include Fahrenheit temperature range. SE-601 dimensions added.

APPENDIX A

Revision history added.

PRODUCT REVISION HISTORY

REVISION 03

Firmware: Improved operation of front-panel test button.