

## NGRM-ENC MANUAL

### ENCLOSED NEUTRAL-GROUNDING-RESISTOR MONITOR

Revision 0-B-030515



Copyright © 2015 by Littelfuse Startco

All rights reserved.

This page intentionally left blank.

## TABLE OF CONTENTS

SECTION	PAGE
<b>1 General</b> .....	1
1.1 SE-325 Models .....	1
1.2 SE-330 Models .....	1
<b>2 Operation</b> .....	1
2.1 Indication, Metering, and Reset .....	1
2.2 Configuration and Settings .....	1
<b>3 Installation</b> .....	2
3.1 Type 4X Enclosure .....	2
3.2 Connections to the Neutral-Grounding-Resistor and Current Transformer .....	2
3.2.1 SE-325 Models .....	2
3.2.2 SE-330 Models .....	2
3.3 Supply Voltage Connection .....	2
3.3.1 Supply by Field Connection .....	2
3.3.2 Control Power Transformer (CPT) Models .....	2
3.4 Phase-Voltage Indication .....	2
3.5 Relay-Output Connections .....	2
3.6 Network-Communications Connections .....	2
3.7 Dielectric-Strength Testing .....	2
<b>4 Technical Specifications</b> .....	15
<b>5 Ordering Information</b> .....	16
<b>6 Warranty</b> .....	16
<b>Appendix A NGRM-ENC Revision History</b> .....	17

## DISCLAIMER

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

## LIST OF FIGURES

FIGURE	PAGE
1 NGRM-ENC Outline and Mounting Details .....	3
2 SE-325 Typical Wiring Diagram .....	4
3 SE-330 Typical Wiring Diagram .....	5
4 SE-325 Model (NGRM-ENC-100-01) Interior/Exterior Details .....	6
5 SE-325 Model (NGRM-ENC-100-01) Interior Details .....	7
6 SE-325 Model (NGRM-ENC-XX0-XX) Wiring Label .....	8
7 SE-330 Surface-Mount Model (NGRM-ENC-XX0-21) Interior/Exterior Details ....	9
8 SE-330 Surface-Mount Model (NGRM-ENC-XX0-X1) Interior Details .....	10
9 SE-330 Surface-Mount Model (NGRM-ENC-XX0-XX) Wiring Label .....	11
10 SE-330 Panel-Mount Model (NGRM-ENC-XX1-21) Interior/Exterior Details ..	12
11 SE-330 Panel-Mount Model (NGRM-ENC-XX1-X1) Interior Details .....	13
12 SE-330 Panel-Mount Model (NGRM-ENC-XX1-XX) Wiring Label .....	14

This page intentionally left blank.

## 1. GENERAL

The NGRM-ENC Enclosed Neutral-Grounding-Resistor (NGR) Monitor series is a Type 4X enclosure housing a Littelfuse Startco SE-325 or SE-330 Neutral-Grounding-Resistor Monitor and optional accessories that include a 480/600-V control power transformer (CPT), faulted-phase indication (FPI; implemented with an EL3100 Ground-Fault & Phase-Voltage Indicator), earth-leakage panel meter, pulse-enable control, and mounting options. Appropriate fusing is included and field wiring is to terminal blocks.

This manual supplements the relevant NGR-monitor and EL3100 manuals.

### 1.1 SE-325 MODELS

NGRM-ENC models with an SE-325 NGR Monitor include a surface-mounted NGR monitor, panel-mounted indication and reset and have a Type 4X rating. Options include a CPT and FPI. See Figs. 4 and 5.

### 1.2 SE-330 MODELS

NGRM-ENC models with an SE-330 NGR Monitor include a panel- or surface-mounted NGR monitor which can be optionally equipped with a network-communications interface. Panel-mounted models include an SE-IP65CVR-G Hinged Transparent Cover and have an IP65 rating. Surface-mounted models include panel-mounted indication and reset, USB connector, and have a Type 4X rating. Both mounting styles can optionally be equipped with a CPT, FPI, earth-leakage panel meter, and pulse-enable switch. See Figs. 7 and 10.

## 2. OPERATION

Refer to the SE-325, SE-330, and EL3100 manuals included with the NGRM-ENC or at [www.littelfuse.com/relayscontrols](http://www.littelfuse.com/relayscontrols), as required.

**NOTE:** For models equipped with an SE-330 NGR Monitor and an optional pulse-enable switch, select Pulse Enable to cause the SE-330 K1 contact to cycle at a rate determined by the SE-330 front-panel Pulse Period switch. Ensure that SE-330 configuration switch S1 is set to K1=Pulse.

**CAUTION:** For models equipped with a CPT and/or FPI, the maximum supply voltage is 600 Vac.

### 2.1 INDICATION, METERING, AND RESET

Surface-mount models include red panel-mounted Ground Fault and Resistor Fault LED's that indicate the NGR-monitor trip state, and a green Control Power LED. Reset latched trips by pressing the Reset button when the trip condition is no longer present. NGR-monitor front-panel indication and reset is accessible when the door panel is open.

Panel-mounted SE-330 face-plate indication is visible through the hinged transparent cover. Open the hinged transparent cover to access the SE-330 Reset button.

Models equipped with earth-leakage metering continuously display earth-leakage current as a percentage of the ground-fault-CT-primary rating when the SE-330 is energized.

All SE-330 models have a USB interface through which NGR-resistance-change, neutral-voltage and current metering is accessible with a PC running SE-MON330 software that is available at [Littelfuse.com](http://Littelfuse.com). This data is also accessible through the optional network-communications interface.

### 2.2 CONFIGURATION AND SETTINGS

Factory configuration is per the SE-325 or SE-330 manual, except that SE-330 models equipped with a pulse-enable switch have configuration switch S1 set to K1=Pulse. Adjust settings as required – refer to the appropriate manuals.

### 3. INSTALLATION

#### 3.1 TYPE 4X ENCLOSURE

The 455 x 340 x 175 mm polyester enclosure has a hinged front panel with dual lockable latches. For wall mounting, attach the included mounting brackets to the back of the enclosure with the enclosed fasteners, and prepare the mounting surface using the dimensions as shown in Fig. 1.

All models ship with no predrilled cable entry. An appropriate hole or holes must be made in the enclosure for the installation of all conductors. Space is allowed at the bottom for cable entry. See Figs. 4, 7, and 10. Use appropriate cable-entry fittings.

#### 3.2 CONNECTIONS TO THE NEUTRAL-GROUNDING-RESISTOR AND CURRENT TRANSFORMER

For all models, connect NGRM-ENC terminal R to an ER-series sensing resistor<sup>(1)</sup> terminal R. Follow SE-325 or SE-330 manual guidelines for wire size selection. See Figs. 2 and 3. All models connect to a current transformer<sup>(1)</sup>, which measures NGR current. The sensing resistor and CT are typically located in the NGR enclosure.

##### 3.2.1 SE-325 MODELS

Connect the CT200 current transformer<sup>(1)</sup> secondary to NGRM-ENC terminals CT1 and CT2. Connections are not polarity sensitive. Follow SE-325 manual guidelines for wire size selection. See Fig. 2.

##### 3.2.2 SE-330 MODELS

For sensitive EFCT- or SE-CS30-series current sensors<sup>(1)</sup>, connect to NGRM-ENC terminals S and C. For 5-A-secondary CT's connect to terminals 5 and C. A field-wiring change is required for 1-A-secondary CT connections. See Fig. 3. CT connections are not polarity sensitive. Follow SE-330 manual guidelines for wire size selection.

#### 3.3 SUPPLY VOLTAGE CONNECTION

Appropriate supply-voltage fusing is provided for all models. Connect terminal GND to system ground.

##### 3.3.1 SUPPLY BY FIELD CONNECTION

For models requiring field-supply-voltage connections, connect line and neutral to NGRM-ENC terminals L and N. See Figs. 2 and 3. SE-325 and SE-330 models require a 120-Vac supply. Consult the appropriate product manual for power requirements.

#### 3.3.2 CONTROL POWER TRANSFORMER (CPT) MODELS

Models equipped with a CPT are compatible with 480- and 600-V systems, and are factory-connected for a 600-V system. Field adjustment for a 480-V system is required by moving the T1H3 connection on T1 to the H2 terminal of T1. Connect NGRM-ENC terminals ØA and ØB to the 480- or 600-V bus using 14 to 6 AWG (2.08 to 13.3 mm<sup>2</sup>) wire. See Figs. 2 and 3.

#### 3.4 PHASE-VOLTAGE INDICATION

For models equipped with phase-voltage and faulted-phase indication, connect NGRM-ENC terminals ØA, ØB, and ØC to the 480- or 600-V bus using 14 to 6 AWG (2.08 to 13.3 mm<sup>2</sup>). See Figs. 2 and 3. These terminals are shared by the CPT connections for models so equipped.

#### 3.5 RELAY-OUTPUT CONNECTIONS

For external alarm or trip indication and protection, connect to SE-325 A-B relay output or SE-330 K1 relay output by connecting to NGRM-ENC terminals 301 and 302. A field-wiring change is required if a supply-voltage connection is required to the relay output(s) within the NGRM-ENC. Field wiring is required if connection to SE-330 relay outputs K2, K3, and K4 is required. See Figs. 2 and 3 and the appropriate product manual.

**NOTE:** The SE-330 surface-mount options use relays K2 and K3 for panel-mounted ground-fault and resistor-fault indication respectively.

#### 3.6 NETWORK-COMMUNICATIONS CONNECTIONS

For SE-330 models equipped with a communications option, connect directly to the SE-330 network interface, referring to the appropriate product manual.

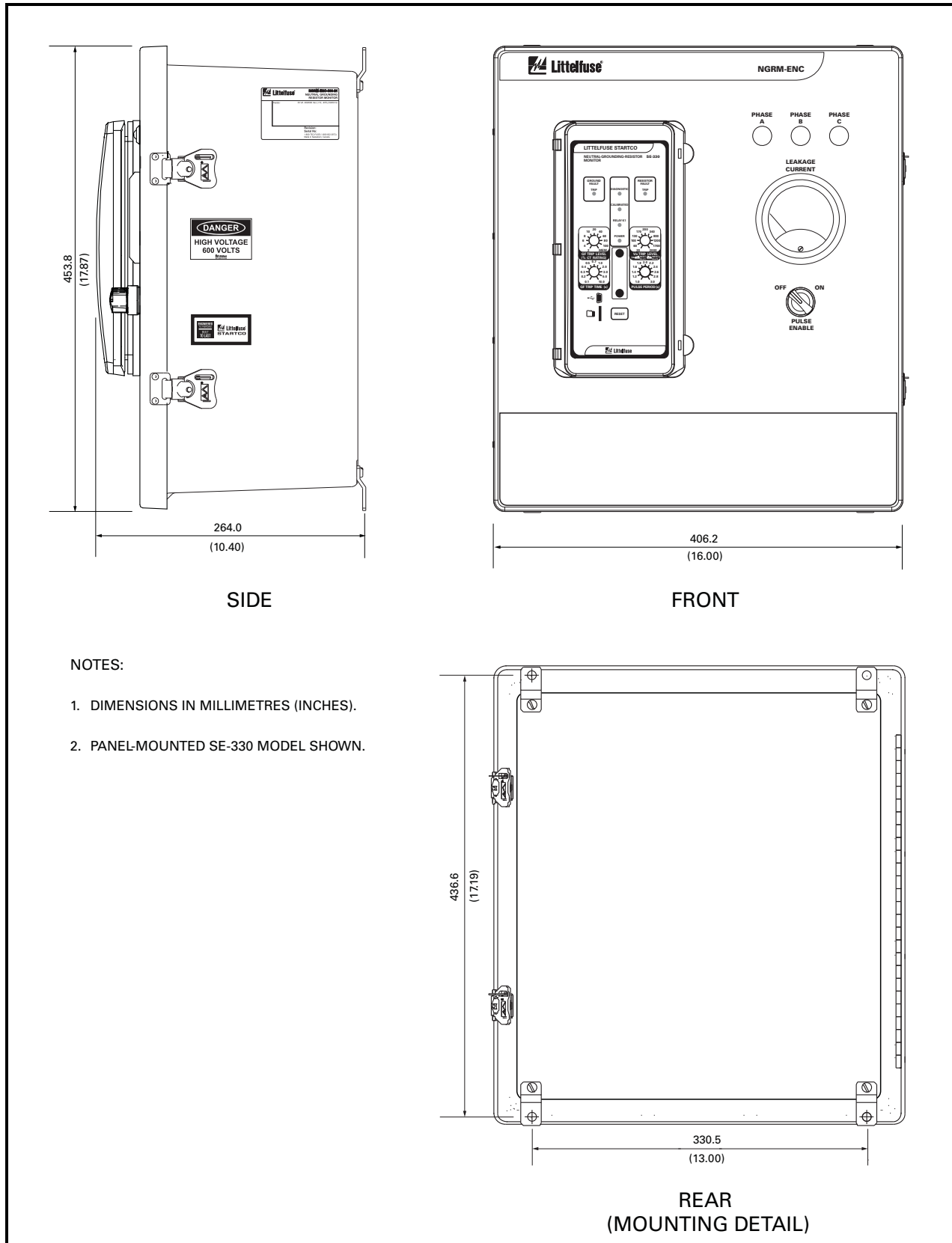
#### 3.7 DIELECTRIC-STRENGTH TESTING

Remove the connections at the SE-325 and SE-330 L1 and L2 terminals, and remove the connection to the EL3100 terminal 19 (if installed), before performing dielectric-strength testing.

Ensure that all connections are reconnected and securely fastened after any tests. See Figs. 2 and 3.

#### NOTES:

<sup>(1)</sup> Not included with the NGRM-ENC.



NOTES:

1. DIMENSIONS IN MILLIMETRES (INCHES).
2. PANEL-MOUNTED SE-330 MODEL SHOWN.

FIGURE 1. NGRM-ENC Outline and Mounting Details.

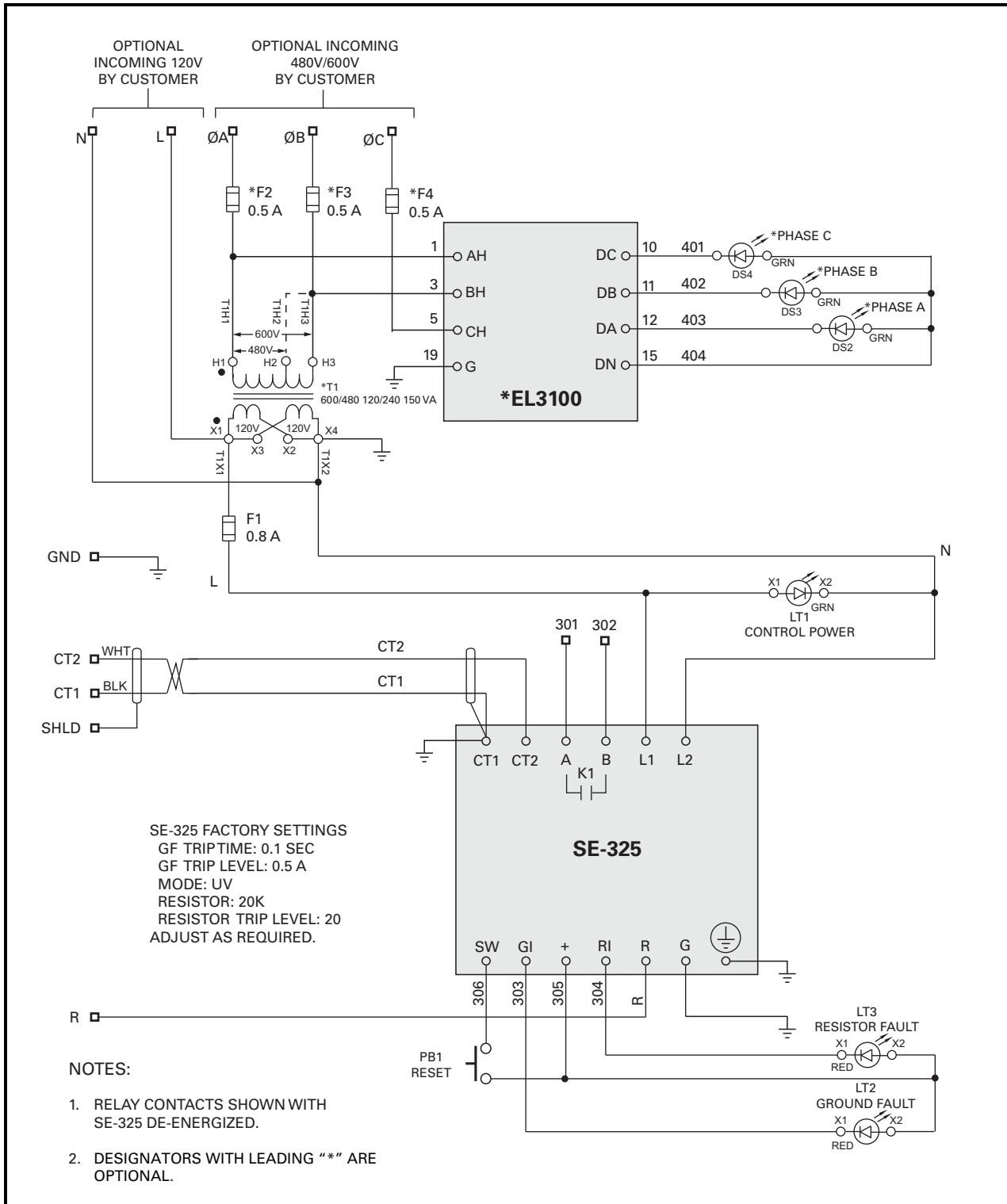


FIGURE 2. SE-325 Typical Wiring Diagram.



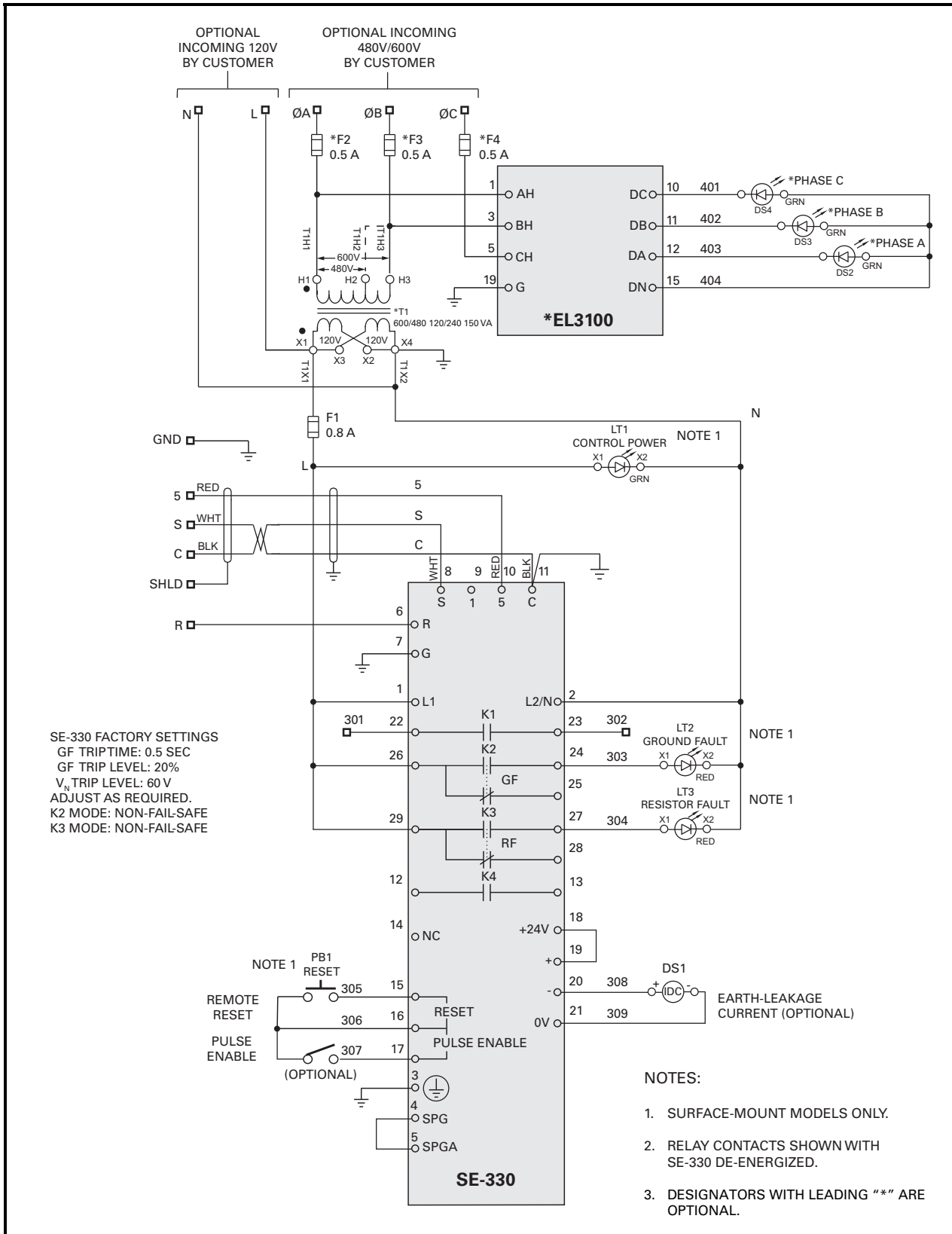
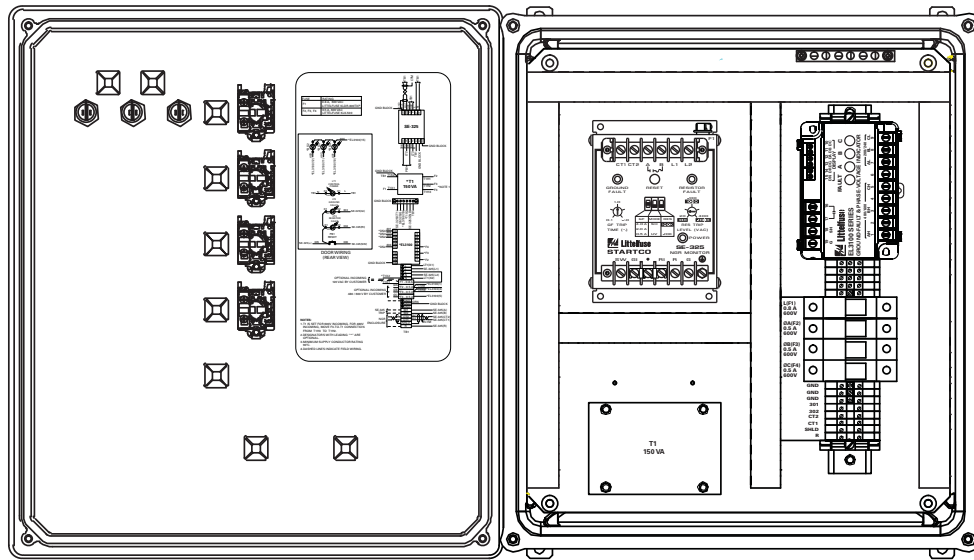
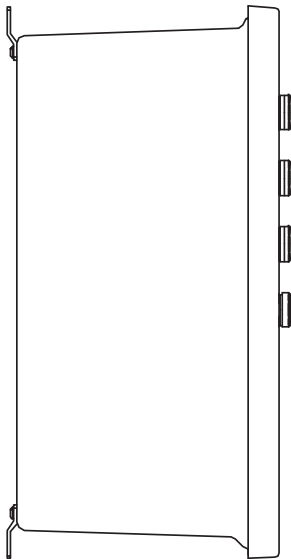


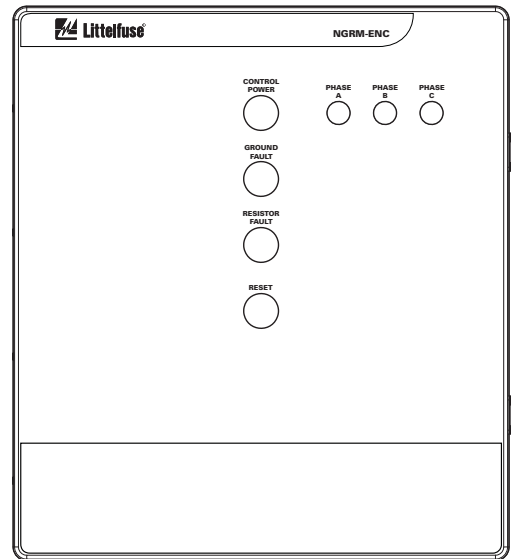
FIGURE 3. SE-330 Typical Wiring Diagram.



INTERIOR



SIDE



FRONT

NOTE:

1. SHOWN WITH ALL OPTIONS AVAILABLE.

FIGURE 4. SE-325 Model (NGRM-ENC-100-01) Interior/Exterior Details.

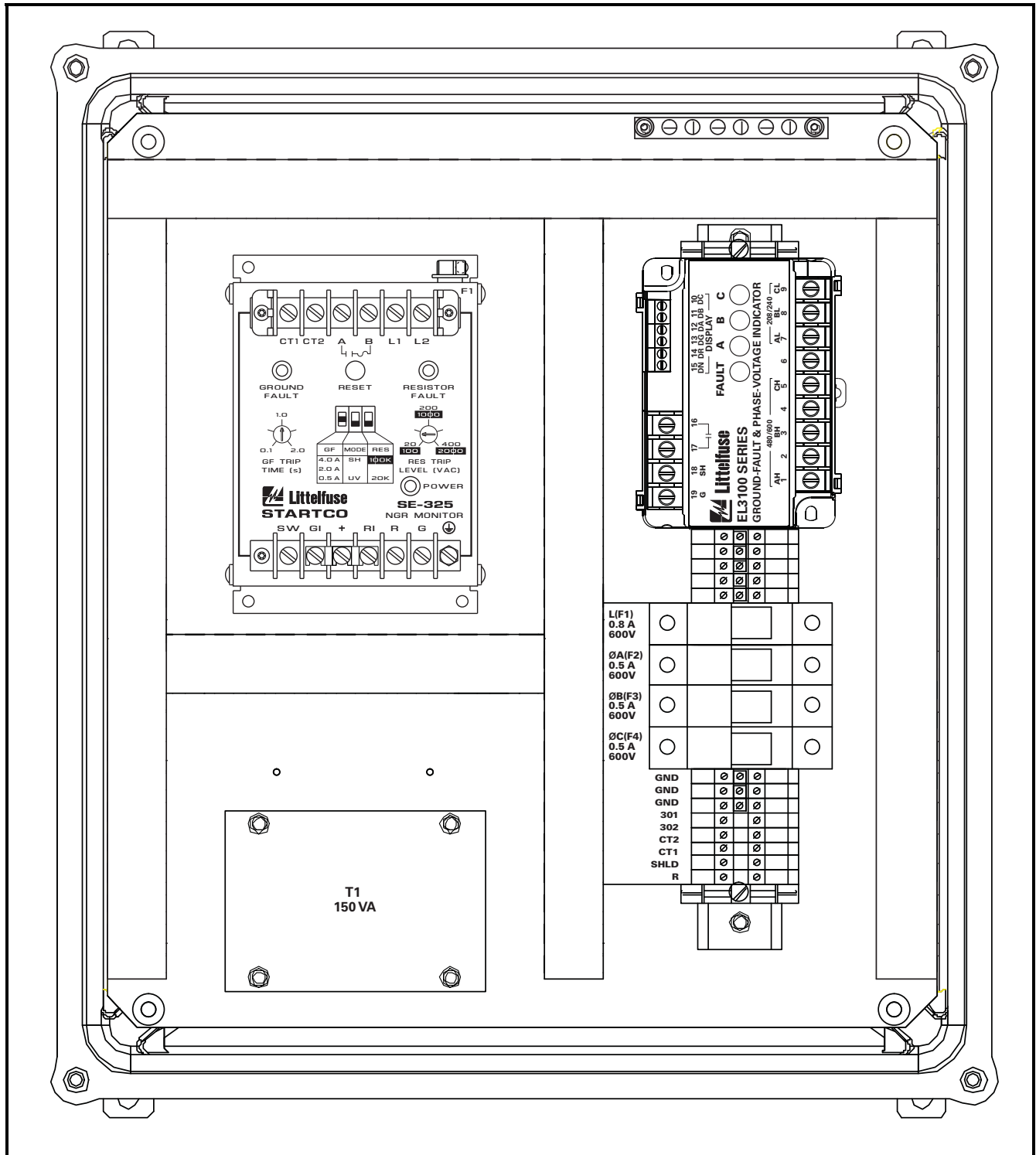


FIGURE 5. SE-325 Model (NGRM-ENC-100-01) Interior Details.

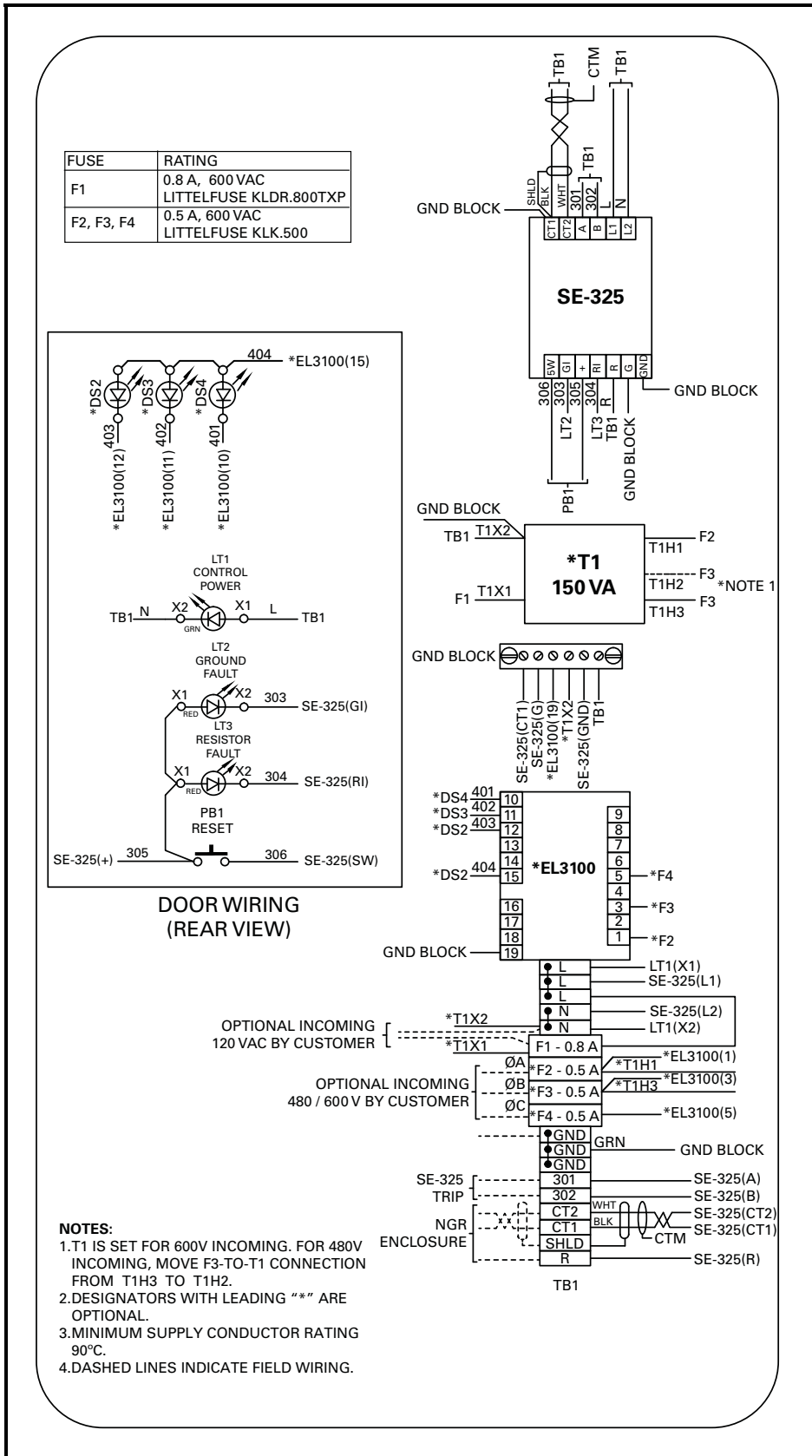
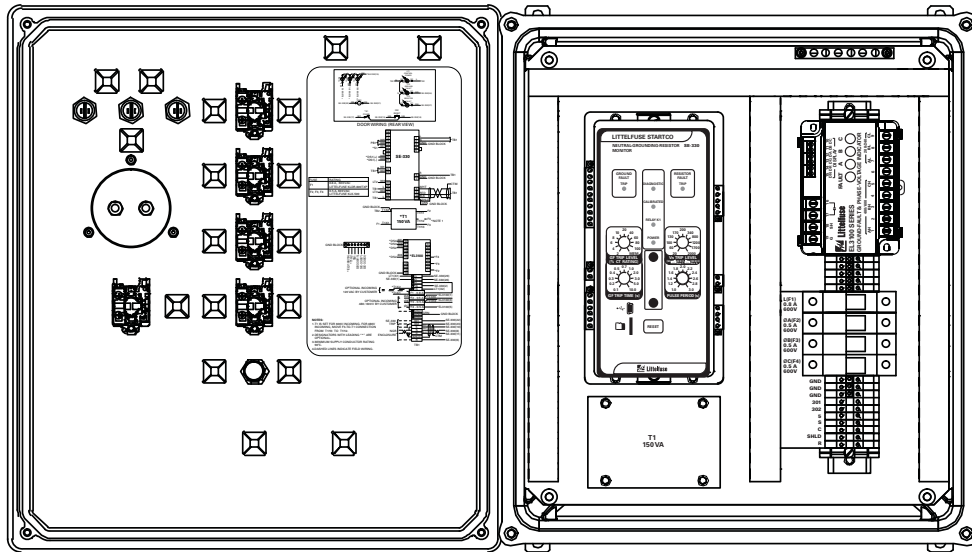
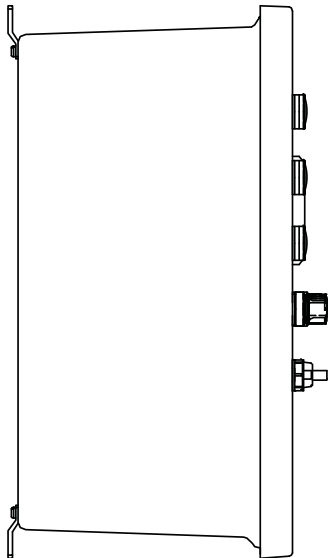


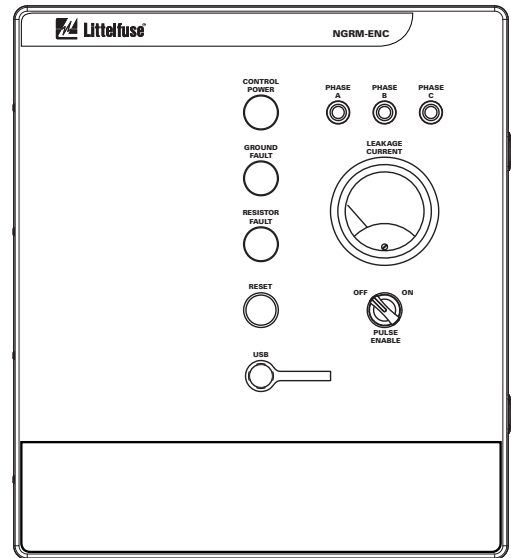
FIGURE 6. SE-325 Model (NGRM-ENC-XX0-XX) Wiring Label.



INTERIOR



SIDE



FRONT

NOTE:

1. SHOWN WITH ALL OPTIONS AVAILABLE.

FIGURE 7. SE-330 Surface-Mount Model (NGRM-ENC-XX0-21) Interior/Exterior Details.

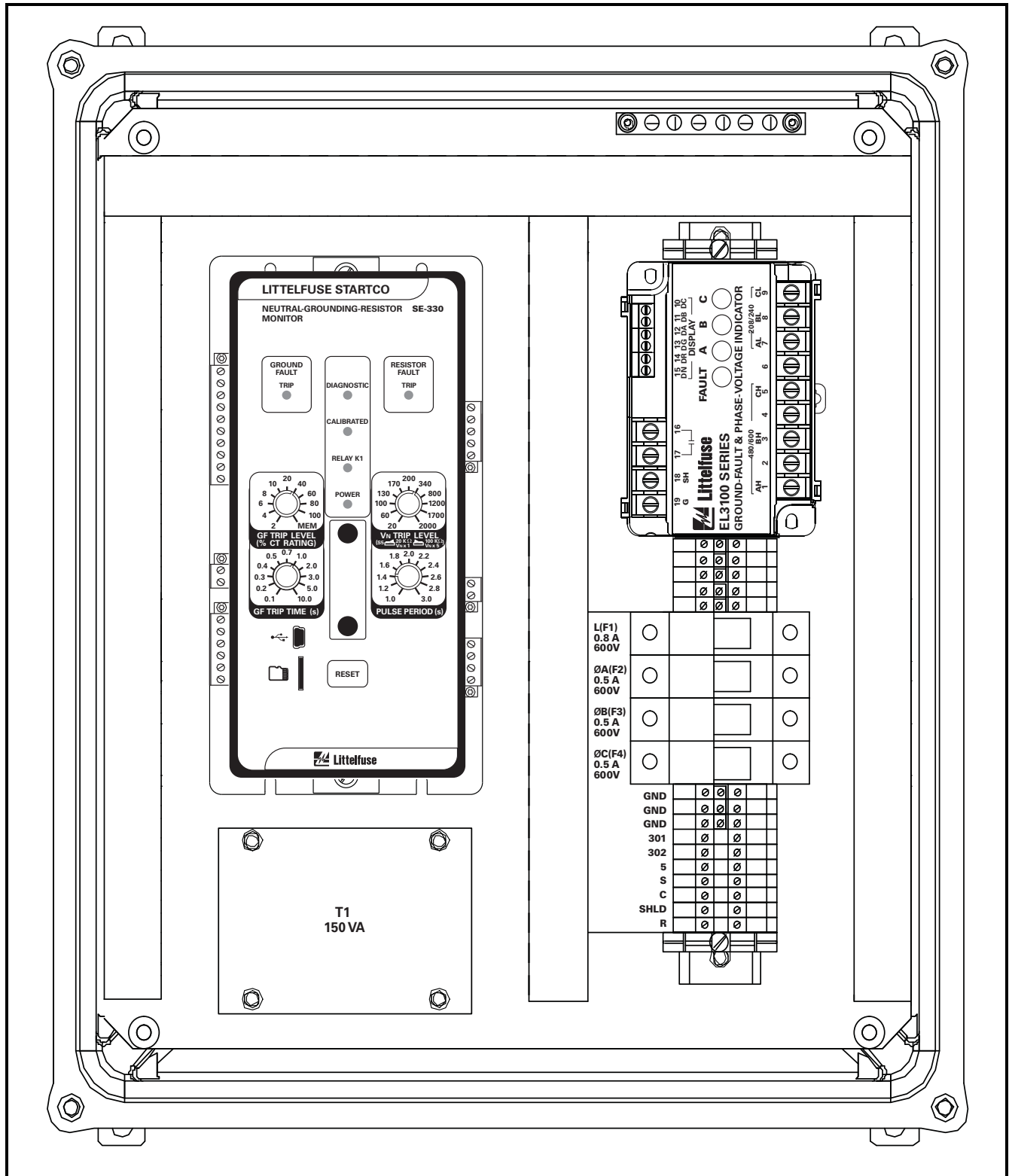


FIGURE 8. SE-330 Surface-Mount Model (NGRM-ENC-XX0-X1) Interior Details.

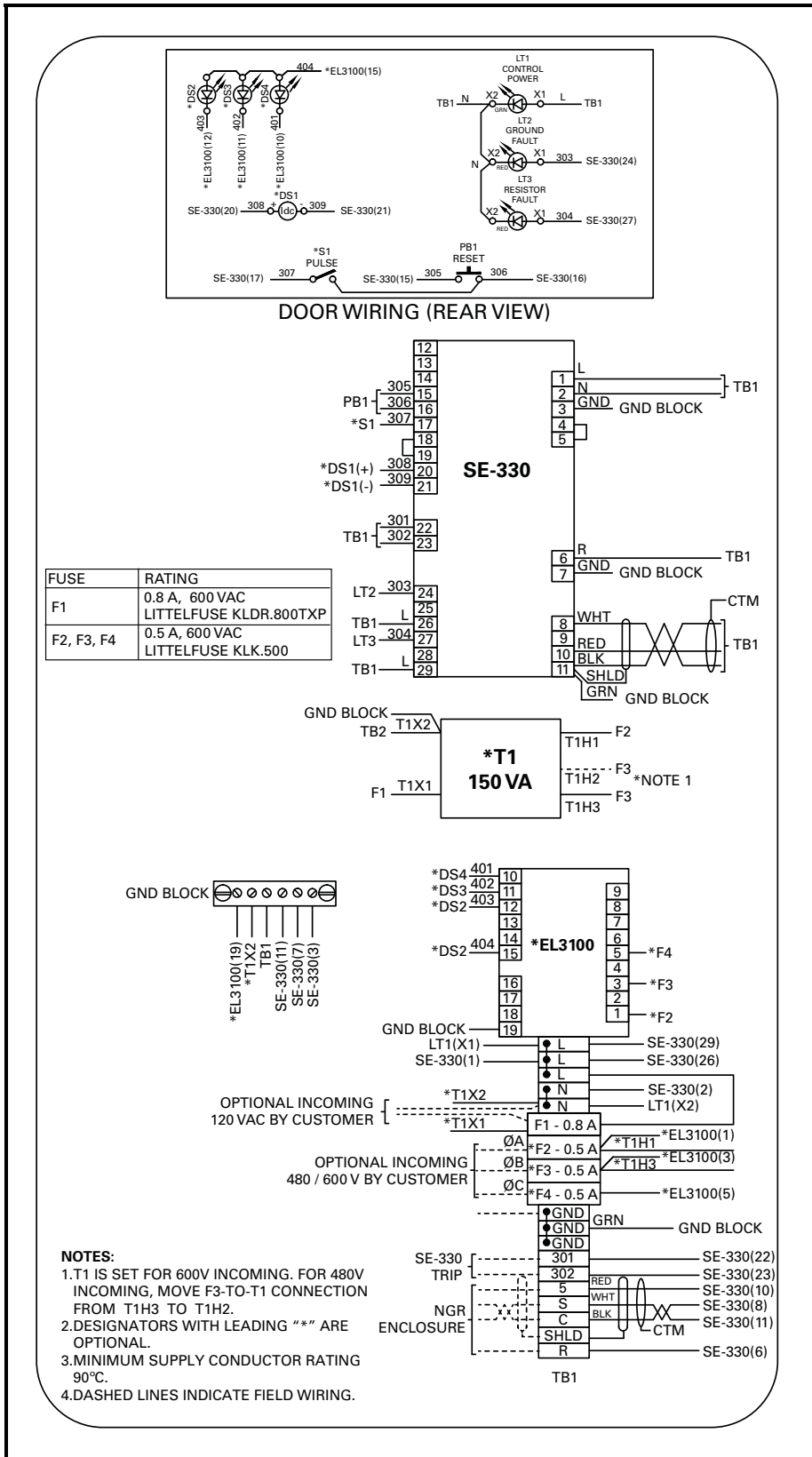
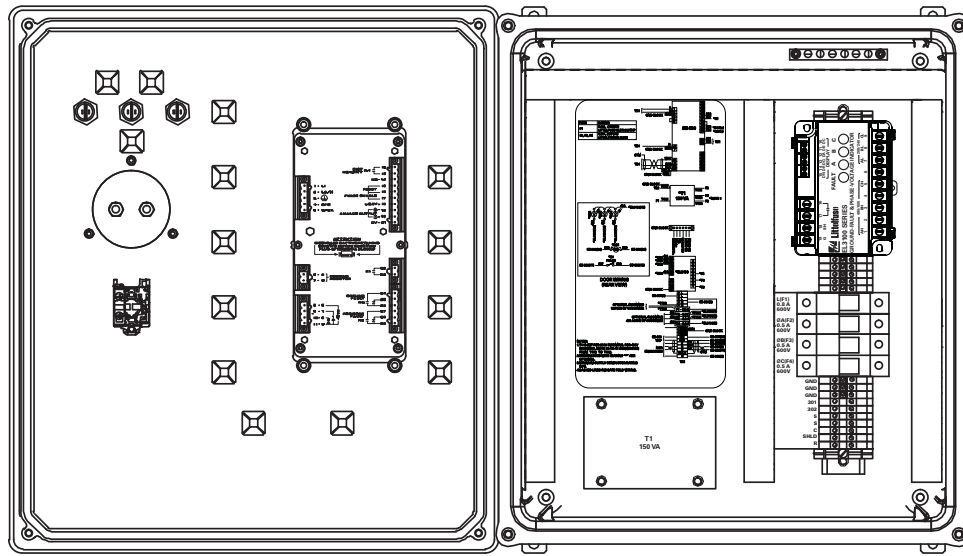
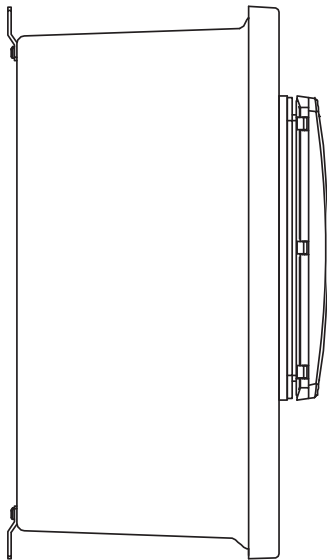


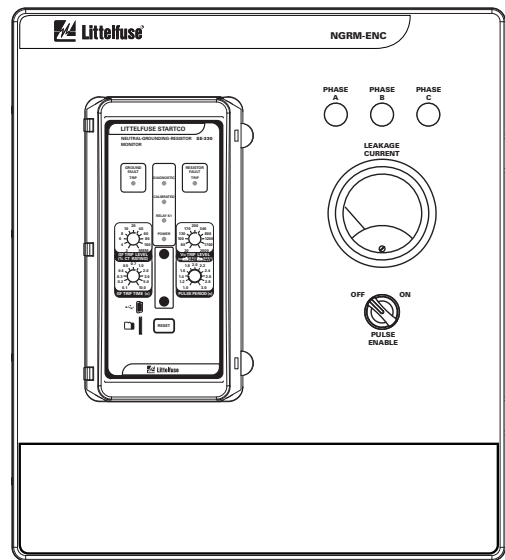
FIGURE 9. SE-330 Surface-Mount Model (NGRM-ENC-XX0-XX) Wiring Label.



**INTERIOR**



**SIDE**



**FRONT**

**NOTE:**

1. SHOWN WITH ALL OPTIONS AVAILABLE.

FIGURE 10. SE-330 Panel-Mount Model (NGRM-ENC-XX1-21) Interior/Exterior Details.



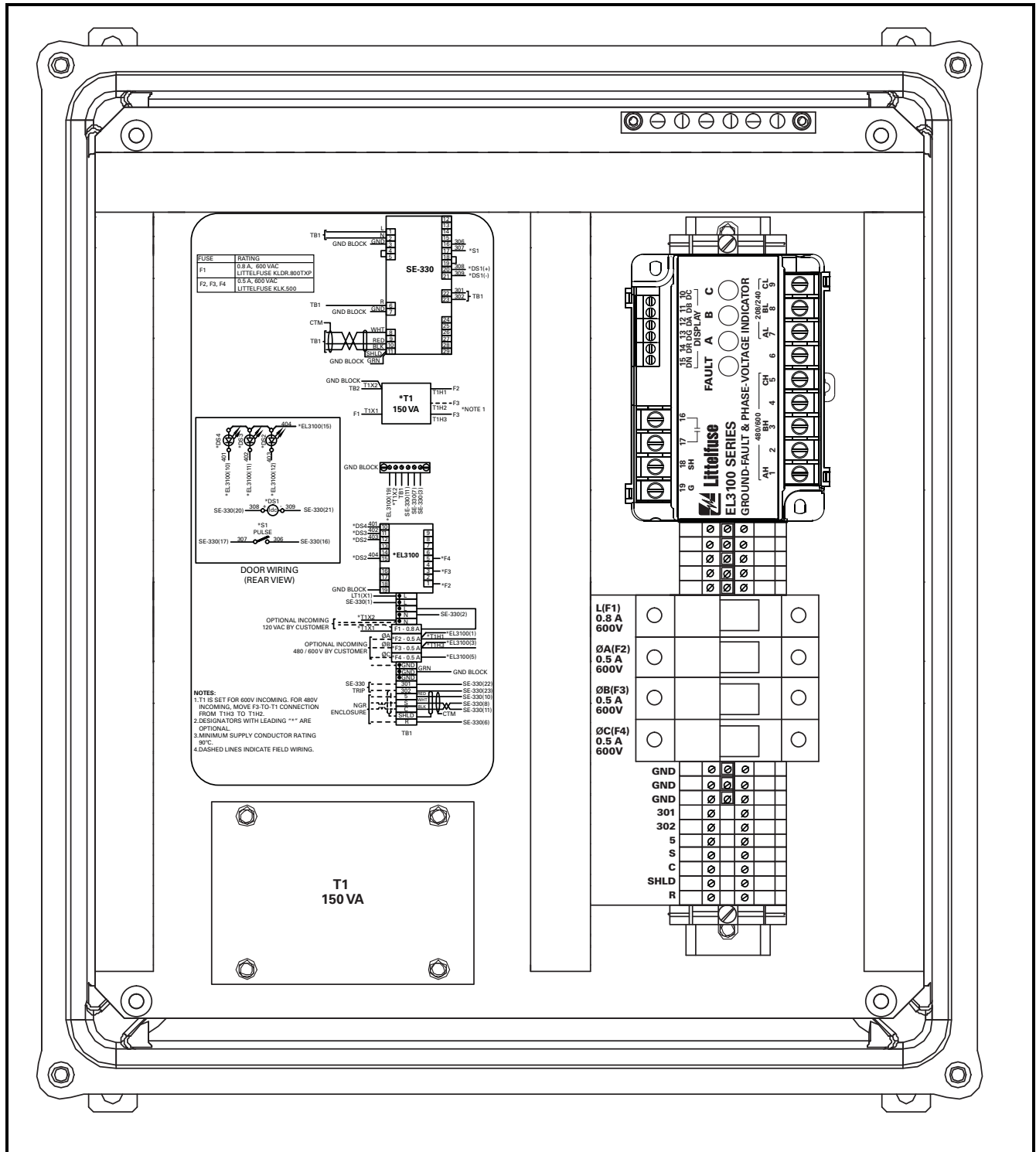


FIGURE 11. SE-330 Panel-Mount Model (NGRM-ENC-XX1-X1) Interior Details.

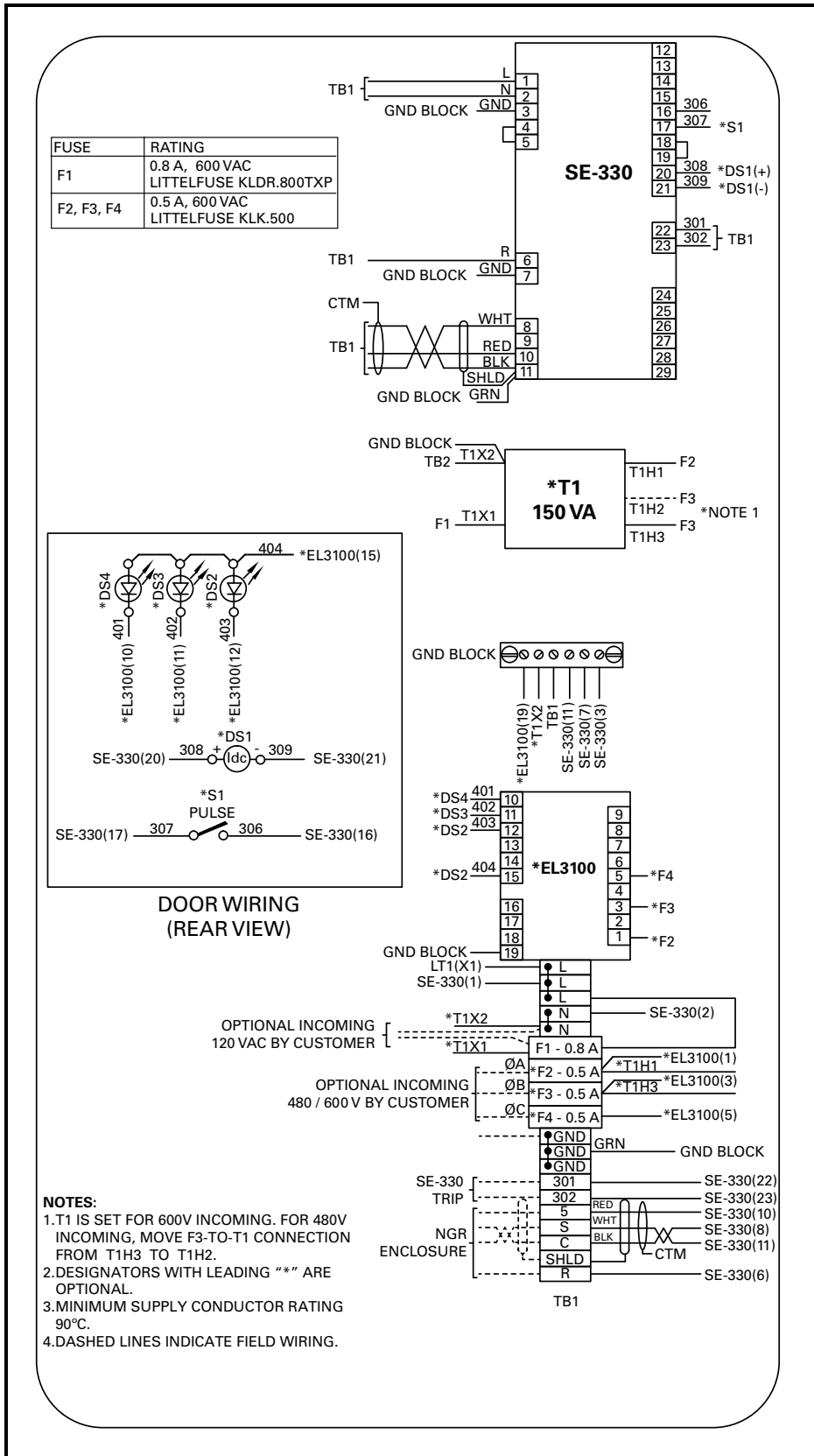


FIGURE 12. SE-300 Panel-Mount Model (NGRM-ENC-XX1-XX) Wiring Label.

**4. TECHNICAL SPECIFICATIONS**

Supply:

NGRM-ENC-000-00	.....12 VA, 120 Vac (+10, -45%), 60 Hz
NGRM-ENC-100-00	
EL3100	.....2 mA, 480/600 Vac, 60 Hz, 3-phase, 3-wire (no neutral)
Monitor	.....12 VA, 120 Vac (+10, -45%), 60 Hz
NGRM-ENC-000-01, NGRM-ENC-100-01	.....14 VA, 480/600 Vac, 60 Hz, 3-phase, 3-wire (no neutral)
NGRM-ENC-2XX-X0, NGRM-ENC-4XX-X0, NGRM-ENC-6XX-X0, NGRM-ENC-8XX-X0	.....32 VA, 120 Vac (+10, -45%), 60 Hz
NGRM-ENC-3XX-X0, NGRM-ENC-5XX-X0, NGRM-ENC-7XX-X0, NGRM-ENC-9XX-X0	
EL3100	.....2 mA, 480/600 Vac, 60 Hz, 3-phase, 3-wire (no neutral)
Monitor	.....32 VA, 120 Vac (+10, -45%), 60 Hz
NGRM-ENC-2XX-X1, NGRM-ENC-3XX-X1, NGRM-ENC-4XX-X1, NGRM-ENC-5XX-X1, NGRM-ENC-6XX-X1, NGRM-ENC-7XX-X1, NGRM-ENC-8XX-X1, NGRM-ENC-9XX-X1	.....34 VA, 480/600 Vac, 60 Hz 3-phase, 3-wire (no neutral)

Wiring Requirements:

Terminals Blocks:	
Conductor Size	.....20 to 10 AWG (0.52 to 5.26 mm <sup>2</sup> )
Fuseholders:	
Conductor Size	.....14 to 6 AWG (2.08 to 13.29 mm <sup>2</sup> )

Fuse Requirements:

F1:	
Fuse Rating	.....0.8 A, 600 Vac, Class CC
Fuse Part Number	.....Littelfuse KLDR.800T or KLDR.800TXP (RoHS)
F2 to F4 (see order options):	
Fuse Rating	.....0.5 A, 600 Vac,
Fuse Part Number	.....Littelfuse KLK.500

Dimensions:

Height	.....454 mm (17.9")
Width	.....406 mm (16.0")
Maximum Depth (with SE-IP65CVR-G installed)	..264 mm (10.4")
Clearance required to open SE-IP65CVR-G	.....112 mm (4.4")

Shipping Dimensions:

NGRM-ENC-XXX-XX:	
Height	.....516 mm (20.3")
Width	.....465 mm (18.3")
Depth	.....309 mm (12.2")

Shipping Weight:

NGRM-ENC-XXX-XX	.....13.6 kg (30 lb) maximum
-----------------	------------------------------

Enclosure ..... Polyester, Lockable

Ratings:	
SE-325 Order Options	.....Type 4X
SE-330 Surface-Mount	
Order Options	.....Type 4X
SE-330 Panel-Mount	
Order Options	.....IP65

Environment:

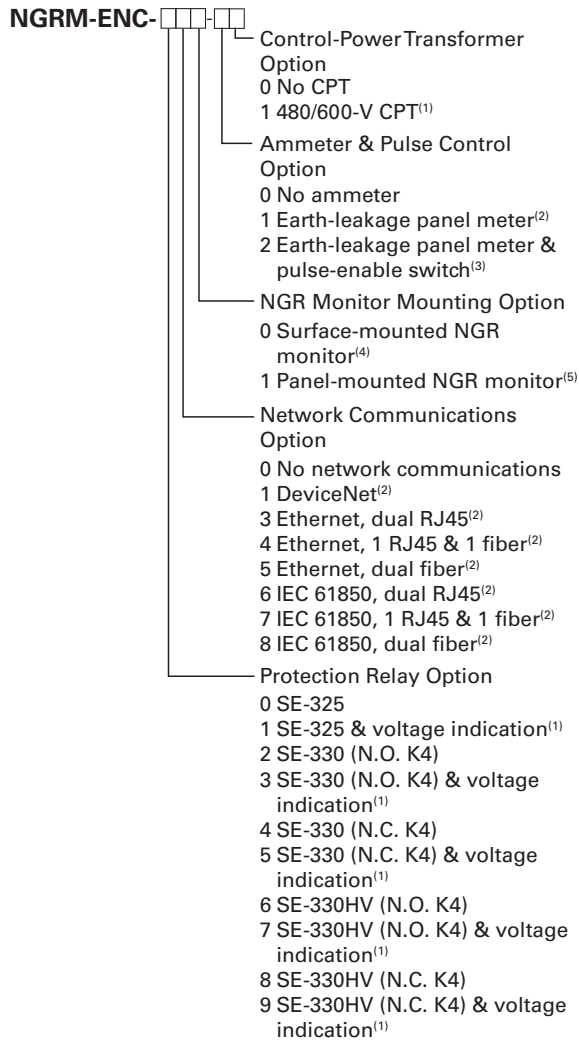
Operating Temperature	.....-40 to 60°C (-40 to 140°F)
Storage Temperature	.....-55 to 80°C (-67 to 176°F)
Humidity	.....85% Non-Condensing

Certification ..... CSA, Canada and USA



To: CSA C22.2 No. 144 Ground Fault Circuit  
Interrupters  
CSA C22.2 No. 94 Special Purpose Enclosures  
UL 1053 Ground Fault Sensing and Relaying  
Equipment  
UL 50 Enclosures for Electrical Equipment

## 5. ORDERING INFORMATION



### NOTES:

- <sup>(1)</sup> Includes fuses.
- <sup>(2)</sup> SE-330 models only.
- <sup>(3)</sup> SE-330 models only, excluding SE-330HV models.
- <sup>(4)</sup> Includes panel-mounted indication & reset, and USB connector for SE-330 models.
- <sup>(5)</sup> SE-330 models only; includes IP65 hinged transparent cover.

## 6. WARRANTY

The NGRM-ENC Enclosed Neutral-Grounding-Resistor Monitor is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase.

Littelfuse Startco will (at Littelfuse Startco's option) repair, replace, or refund the original purchase price of an NGRM-ENC that is determined by Littelfuse Startco 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 Startco does not warrant products repaired or modified by non-Littelfuse Startco personnel.

**APPENDIX A**  
**NGRM-ENC REVISION HISTORY**

<b>MANUAL RELEASE DATE</b>	<b>MANUAL REVISION</b>	<b>PRODUCT REVISION (REVISION NUMBER ON PRODUCT LABEL)</b>
March 5, 2015	0-B-030515	00
April 25, 2014	0-A-042514	

**MANUAL REVISION HISTORY**

**REVISION 0-B-030515**

**SECTION 1**

Added enclosure ratings.

**SECTION 3**

Updated Figs. 2, 3, 7, 11, and 12.

**SECTION 4**

Added enclosure ratings and CSA certification.

**APPENDIX A**

Updated revision history.

**REVISION 0-A-042514**

Initial release.

**PRODUCT REVISION HISTORY**

**REVISION 00**

Initial release.

This page intentionally left blank.