

# Protection Relays & Controls

## NGR SERIES – CANADA

### Neutral Grounding Resistor System



### Description

High-resistance grounding prevents many of the problems that are associated with ungrounded and solidly grounded electrical distribution and utilization systems. High-resistance grounding can limit point-of-fault damage, eliminate transient overvoltages, reduce the arc-flash hazards, limit voltage exposure to personnel, and provide adequate tripping levels for selective current-based ground-fault detection and coordination.

The Littelfuse Neutral Grounding Resistor System is a neutral grounding resistor (NGR), current transformer, and sensing resistor installed in a NEMA 3R enclosure used to high-resistance ground transformers and generators. The NGR system is designed for use with Littelfuse Neutral Grounding Resistor Monitors for complete system grounding and grounding protection.

The NGR series – Canada systems are specifically designed for use in Canadian applications. For applications in the US and other parts of the world, please use the NGR series – US.

### Applications

High-resistance grounding is applied on transformers and generators where safety and continuity of service are important. A faulted feeder may remain in operation until it is safe to repair the fault, where allowed by the local electrical code.

### Features



#### Enclosure

The NGR Series - Canada comes pre-installed in a ventilated NEMA 3R galvanized steel enclosure and components are pre-wired to terminals for ease of installation. Back view shown on left.

#### ER Series Sensing Resistor

Used with the SE-330 to continuously monitor the continuity of a neutral-grounding resistor and eliminate hazardous voltage levels at the relay.



- ER-600VC is designed for use on systems up to 600 V for indoor applications. Available in optional moisture-proof enclosure (shown on left) for outdoor applications.



- ER-5KV for use on systems up to 4160 V for indoor applications.



- ER-5WP is designed for use on systems up to 4160 V and comes with weather-protected terminals for outdoor installations.

#### Earth-Fault Current Transformer

Used with the SE-330 to measure ac current flowing through the NGR for use with the continuity monitoring circuit and to detect ground faults.



- ELCT5-31 used with SE-330 for 2 A and 5 A NGRs.



- SE-CS10-2.5 used with SE-330 for 10 A and 15 A NGRs.

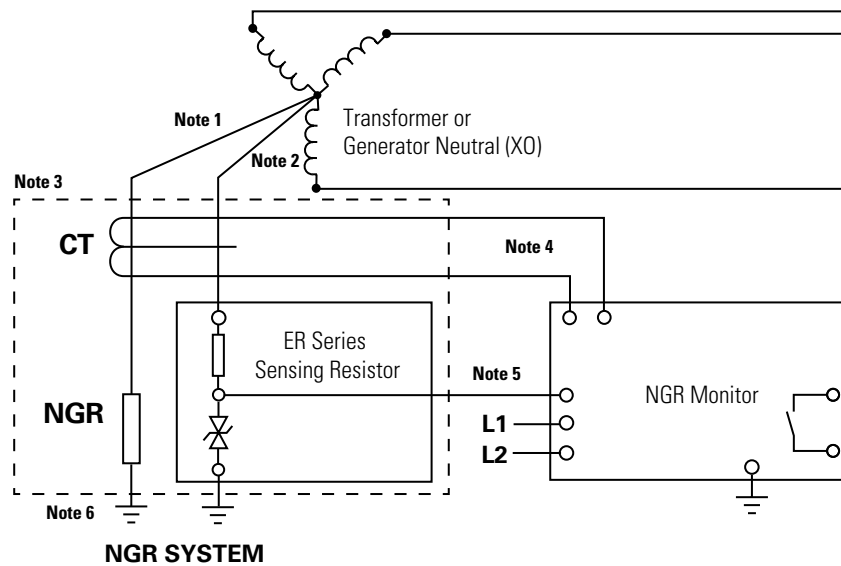


- ELCT30-31 used with SE-330 for 25 A NGRs.

### Benefits

- Eliminate phase-to-ground arc-flash incidents
- Eliminate transient overvoltages
- Reduce point-of-fault damage
- Can provide continuity of service during a ground fault
- Includes current transformer and ER series sensing resistor for use with Littelfuse monitoring relay and for ease of installation.

### Simplified Circuit Diagram with Littelfuse Neutral-Grounding-Resistor Monitor



**Note 1:** Use minimum #8 AWG white or grey conductor insulated to system voltage to connect NGR to neutral.

**Note 2:** Use conductor insulated to system voltage (#14 AWG is typically used) and a separate lug at the X0 point to connect ER Series Sensing Resistor to neutral.

**Note 3:** Locate NGR system near transformer or generator.

**Note 4:** Two-conductor twisted cable required, shielded recommended.

**Note 5:** Voltage between ER Series Sensing Resistor terminals R and G is limited to 100 V by internal clamp.

**Note 6:** Use minimum #8 AWG green or bare conductor to connect NGR to ground.

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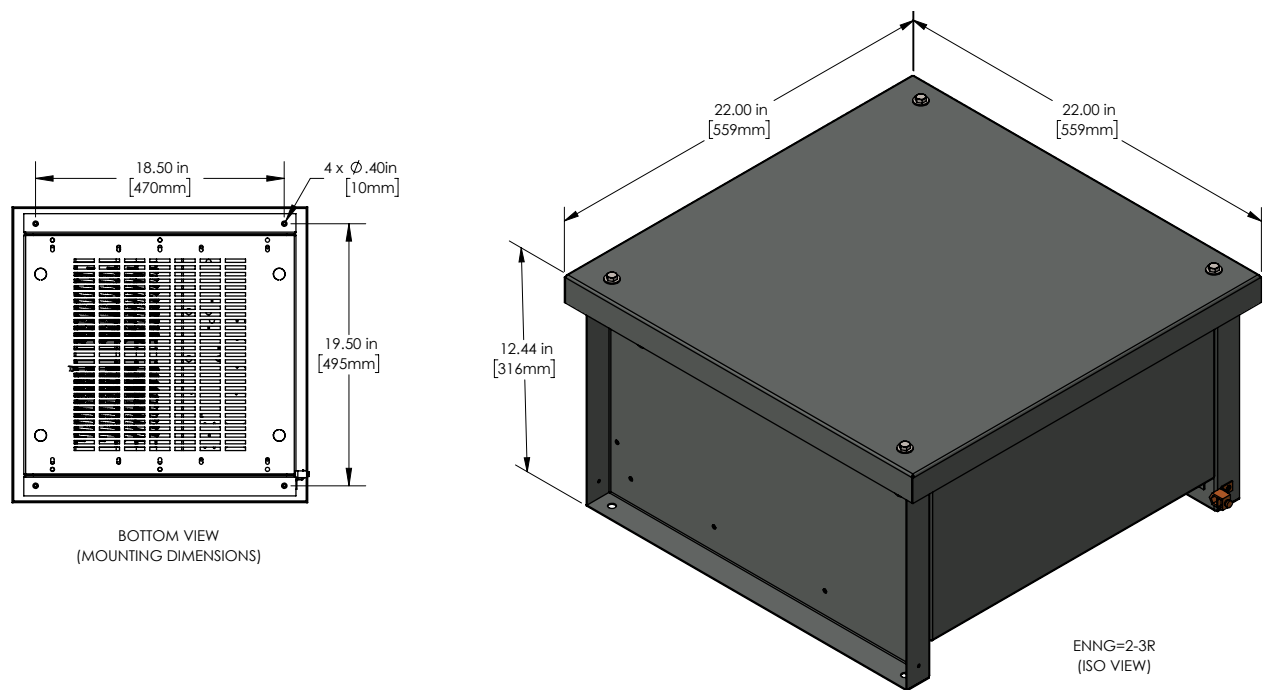
### Ordering Information

PART NUMBER	LINE-LINE VOLTAGE (V)	LET-THROUGH CURRENT (A)	IMPEDANCE (OHMS)	TIME RATING	CURRENT TRANSFORMER	CT PRIMARY RATING (A)	CT SECONDARY RATING (A)	SENSING RESISTOR	ENCLOSURE
NGR1050	480	2	138.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGR1041	480	2	138.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGR1036	480	5	55.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGR1051	480	5	55.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGR1052	600	2	173.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGR1053	600	2	173.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGR1038	600	5	69.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGR1045	600	5	69.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGR1066	4160	5	480.9	10 s	ELCT5-31	5*	0.05	ER-5KV	NEMA 3R
NGR1067	4160	5	480.9	10 s	ELCT5-31	5*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1068	4160	5	480.9	Continuous	ELCT5-31	5*	0.05	ER-5KV	NEMA 3R
NGR1069	4160	5	480.9	Continuous	ELCT5-31	5*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1070	4160	10	240.5	10 s	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGR1071	4160	10	240.5	10 s	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1072	4160	10	240.5	Continuous	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGR1073	4160	10	240.5	Continuous	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1074	4160	15	160.3	10 s	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGR1075	4160	15	160.3	10 s	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1076	4160	15	160.3	Continuous	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGR1077	4160	15	160.3	Continuous	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1078	4160	25	96.2	10 s	ELCT30-31	30*	0.05	ER-5KV	NEMA 3R
NGR1079	4160	25	96.2	10 s	ELCT30-31	30*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGR1080	4160	25	96.2	Continuous	ELCT30-31	30*	0.05	ER-5KV	NEMA 3R
NGR1081	4160	25	96.2	Continuous	ELCT30-31	30*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor

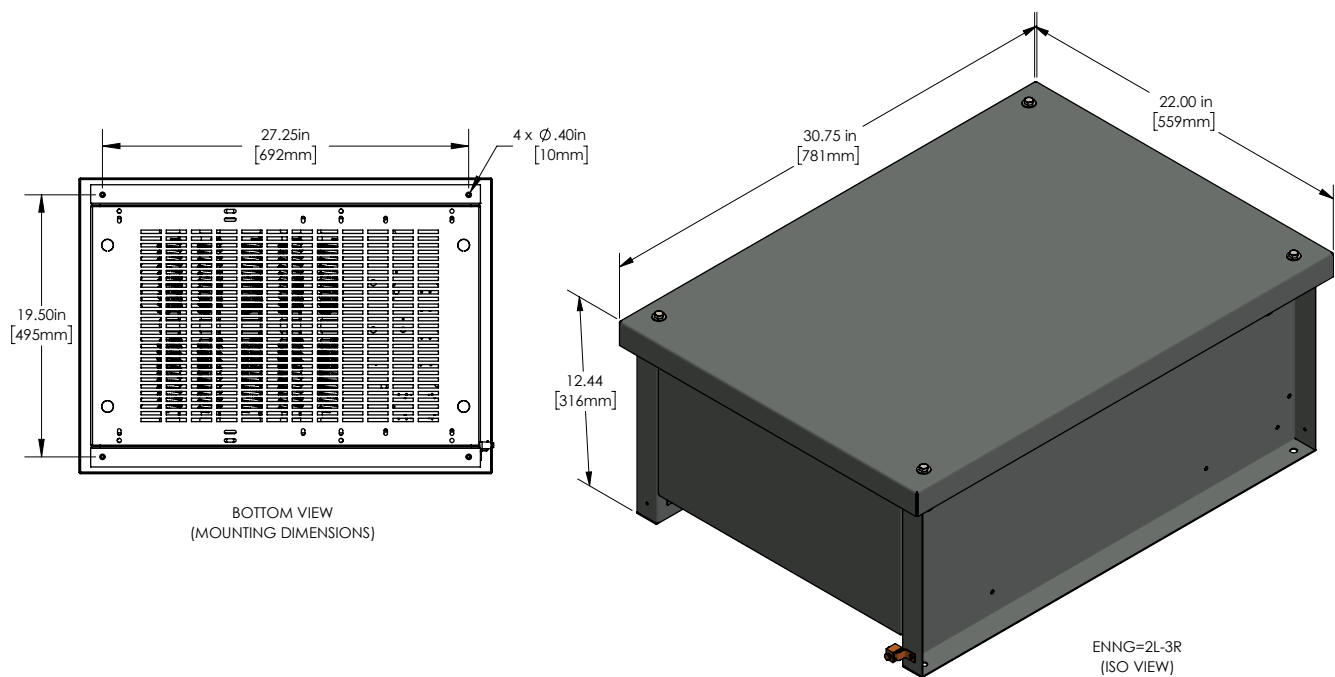
\* Connect to SE-330 terminals 8 and 11

Dimensions and Mounting Diagrams

For 480 V NGR Systems:



For 600 V NGR Systems:



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### Specifications: 480 V NGR Systems

<b>Voltage</b>	480 V line-to-line, 277 V line-to-neutral
<b>Let-Through Current</b>	2 A or 5 A
<b>Resistance</b>	138.5 $\Omega$ (2 A) or 55.4 $\Omega$ (5 A)
<b>Tolerance</b>	+/- 10 % resistance
<b>Duty Cycle</b>	Continuous rated
<b>Current Transformer</b>	<b>ELCT5-31:</b> For use with SE-330 NGR Monitor Turns Ratio: 100:1 Current Rating: 5:0.05 A Primary Rating with SE-330: 5 A when connected to terminals 8 and 11 GF Trip Range: 100 mA to 5 A Window Diameter: 31 mm (1.22")
<b>Sensing Resistor</b>	ER-600VC; Optional installation in NEMA 4 enclosure for outdoor applications
<b>Insulation Level</b>	11 KV BIL
<b>Temperature Rise</b>	385 °C (725 °F)
<b>Resistor Type</b>	Stainless steel wire wound
<b>Dimensions</b>	<b>H</b> 316 mm (12.44"); <b>W</b> 559 mm (22.00"); <b>D</b> 559 mm (22.00")
<b>Weight</b>	23 kg (50 lbs)
<b>Altitude</b>	0–2000 masl
<b>Enclosure Style</b>	NEMA 3R, galvanized steel
<b>Finish</b>	Powder coated
<b>Color</b>	ANSI 61 grey
<b>Mounting</b>	Floor mount
<b>Siesmic Bracing</b>	Included
<b>Approvals</b>	cULus
<b>Warranty</b>	12 months in service or 18 months from the date of shipment whichever occurs first

### Specifications: 600 V NGR Systems

<b>Voltage</b>	600 V line-to-line, 347 V line-to-neutral
<b>Let-Through Current</b>	2 A or 5 A
<b>Resistance</b>	173.5 $\Omega$ (2 A) or 69.4 $\Omega$ (5 A)
<b>Tolerance</b>	+/- 10 % resistance
<b>Duty Cycle</b>	Continuous rated
<b>Frequency</b>	50–60 Hz
<b>Current Transformer</b>	<b>ELCT5-31:</b> For use with SE-330 NGR Monitor Turns Ratio: 100:1 Current Rating: 5:0.05 A Primary Rating with SE-330: 5 A when connected to terminals 8 and 11 GF Trip Range: 100 mA to 5 A Window Diameter: 31 mm (1.22")
<b>Sensing Resistor</b>	ER-600VC; Optional installation in NEMA 4 enclosure for outdoor applications
<b>Insulation Level</b>	11 KV BIL
<b>Temperature Rise</b>	385 °C (725 °F)
<b>Resistor Type</b>	Stainless steel wire wound
<b>Dimensions</b>	<b>H</b> 316 mm (12.44"); <b>W</b> 559 mm (22.00"); <b>D</b> 781 mm (30.75")
<b>Weight</b>	32 kg (70 lbs)
<b>Altitude</b>	0–2000 masl
<b>Enclosure Style</b>	NEMA 3R, galvanized steel
<b>Finish</b>	Powder coated
<b>Color</b>	ANSI 61 grey
<b>Mounting</b>	Floor mount
<b>Siesmic Bracing</b>	Included
<b>Approvals</b>	cULus
<b>Warranty</b>	12 months in service or 18 months from the date of shipment whichever occurs first

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### Specifications: 4160 V NGR Systems

<b>Voltage</b>	4160 V line-to-line, 2400 V line-to-neutral
<b>Let-Through Current</b>	5 A, 10 A, 15 A, or 25 A
<b>Resistance</b>	480 Ω (5 A), 240 Ω (10 A), 160 Ω (15 A), or 96 Ω (25 A)
<b>Tolerance</b>	+/- 10 % resistance
<b>Duty Cycle</b>	Continuous-duty or 10-second-duty rating
<b>Frequency</b>	50-60 Hz
<b>Current Transformer</b>	<b>ELCT5-31:</b> For use with SE-330 NGR Monitor Turns Ratio: 100:1 Current Rating: 5:0.05 A Primary Rating with SE-330: 5 A when connected to terminals 8 and 11 GF Trip Range: 100 mA to 5 A Window Diameter: 31 mm (1.22") <b>SE-CS10-2.5:</b> For use with SE-330 NGR Monitor Turns Ratio: 200:1 Current Rating: 12.5:0.0625 A Primary Rating with SE-330: 10 A when connected to terminals 8 and 11 GF Trip Range: 200 mA to 10 A Window Diameter: 63.5 mm (2.5") <b>ELCT30-31:</b> For use with SE-330 NGR Monitor Turns Ratio: 600:1 Current Rating: 30:0.05 A Primary Rating with SE-330: 30 A when connected to terminals 8 and 11 GF Trip Range: 600 mA to 30 A Window Diameter: 31 mm (1.22")
<b>Sensing Resistor</b>	ER-5KV Optional ER-5WP for outdoor applications
<b>Insulation Level</b>	75 KV BIL
<b>Temperature Rise</b>	Continuous-duty rated: 385 °C (725 °F) 10-second-duty rated: 760 °C (1400 °F)
<b>Resistor Type</b>	Stainless Steel Wire Wound
<b>Weights and Dimensions</b>	
<b>5 A, continuous-duty rated:</b>	<b>H</b> 1226 mm (48.28"); <b>W</b> 1143 mm (45.00"); <b>D</b> 940 mm (37.00"); 192 kg (424 lbs)
<b>10 A, continuous-duty rated:</b>	<b>H</b> 1214 mm (47.78"); <b>W</b> 1270 mm (50.00"); <b>D</b> 1143 mm (45.00"); 235 kg (519 lbs)
<b>15 A, continuous-duty rated:</b>	<b>H</b> 1214 mm (47.78"); <b>W</b> 1270 mm (50.00"); <b>D</b> 1143 mm (45.00"); 258 kg (568 lbs)
<b>25 A, continuous-duty rated:</b>	<b>H</b> 1283 mm (50.50"); <b>W</b> 1575 mm (62.00"); <b>D</b> 1143 mm (45.00"); 320 kg (705 lbs)

<b>5 A, 10-second-duty rated:</b>	<b>H</b> 749 mm (29.50"); <b>W</b> 1143 mm (45.00"); <b>D</b> 940 mm (37.00"); 136 kg (300 lbs)
<b>10 A, 10-second-duty rated:</b>	<b>H</b> 749 mm (29.50"); <b>W</b> 1143 mm (45.00"); <b>D</b> 940 mm (37.00"); 136 kg (300 lbs)
<b>15 A, 10-second-duty rated:</b>	<b>H</b> 749 mm (29.50"); <b>W</b> 1143 mm (45.00"); <b>D</b> 940 mm (37.00"); 136 kg (300 lbs)
<b>25 A, 10-second-duty rated:</b>	<b>H</b> 749 mm (29.50"); <b>W</b> 1143 mm (45.00"); <b>D</b> 940 mm (37.00"); 136 kg (300 lbs)
<b>Altitude</b>	0-1000 masl
<b>Enclosure Style</b>	NEMA 3R, galvanized steel
<b>Finish</b>	Powder coated
<b>Color</b>	ANSI 61 grey
<b>Mounting</b>	Floor mount
<b>Siesmic Bracing</b>	Included
<b>Approvals</b>	cULus
<b>Warranty</b>	12 months in service or 18 months from the date of shipment, whichever occurs first

### Accessories



#### SE-330 Neutral Grounding Resistor Monitor

Advanced ground-fault and neutral-grounding resistor monitoring relay that measures neutral current, neutral-to-ground voltage, and neutral-to-ground resistance.



#### NGRM-ENC Enclosed Neutral Grounding Resistor (NGR) Monitor

Type 4X enclosure housing a Littelfuse Startco 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.

### Custom NGR Systems

Additional custom NGR systems are also available from Littelfuse. For NGR systems not listed on this sheet please contact Littelfuse by emailing [NGRquotes@Littelfuse.com](mailto:NGRquotes@Littelfuse.com)

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