

Protection Relays & Controls

NGR SERIES – US

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 – US systems are designed for use in US applications and all other parts of the world, not including Canada. For applications in Canada, please use the NGR series – Canada.

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 – US 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

Use with the SE-325 or 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-325 or 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 5 A and 10 A NGRs.



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



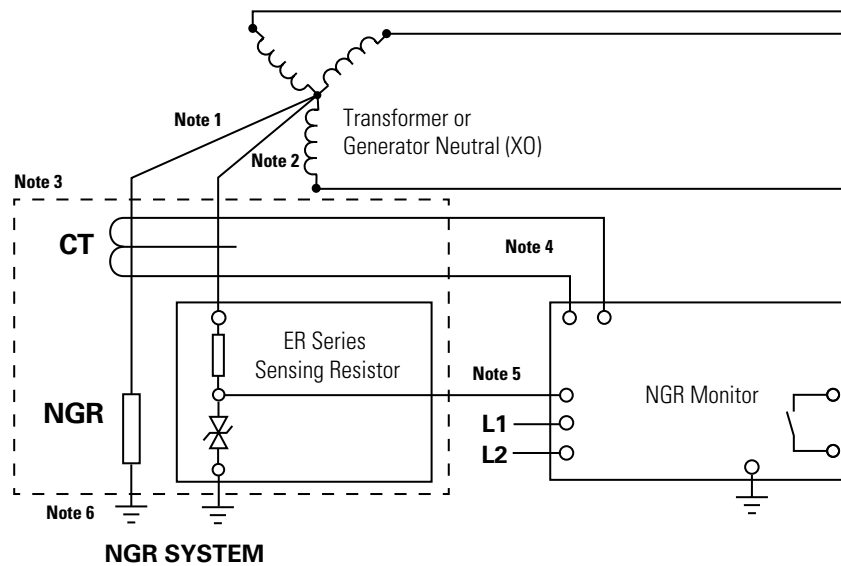
- CT200 used with the SE-325 for all applications.

- 5SHT-101-E (not shown) 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
NGRUS138	480	2	138	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R
NGRUS278	480	2	138	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS314	480	2	138	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGRUS315	480	2	138	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS003	480	5	55.4	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R
NGRUS194	480	5	55.4	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS316	480	5	55.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGRUS317	480	5	55.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS318	600	2	173.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGRUS319	600	2	173.5	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS354	600	2	173.5	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R
NGRUS355	600	2	173.5	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS169	600	5	69.4	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R
NGRUS170	600	5	69.4	Continuous	CT200	200***	5.0	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS320	600	5	69.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R
NGRUS321	600	5	69.4	Continuous	ELCT5-31	5*	0.05	ER-600VC	NEMA 3R; Weather Protected Sensing Resistor
NGRUS114	4160	5	480.9	Continuous	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS115	4160	5	480.9	Continuous	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS322	4160	5	480.9	10 s	ELCT5-31	5*	0.05	ER-5KV	NEMA 3R
NGRUS323	4160	5	480.9	10 s	ELCT5-31	5*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS324	4160	5	480.9	Continuous	ELCT5-31	5*	0.05	ER-5KV	NEMA 3R
NGRUS325	4160	5	480.9	Continuous	ELCT5-31	5*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS356	4160	5	480.9	10s	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS357	4160	5	480.9	10s	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS326	4160	10	240.5	10 s	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGRUS327	4160	10	240.5	10 s	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor

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NGRUS328	4160	10	240.5	Continuous	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGRUS329	4160	10	240.5	Continuous	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS358	4160	10	240.5	10s	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS359	4160	10	240.5	10s	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS360	4160	10	240.5	Continuous	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS361	4160	10	240.5	Continuous	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS330	4160	15	160.3	10 s	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGRUS331	4160	15	160.3	10 s	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS332	4160	15	160.3	Continuous	SE-CS10-2.5	10*	0.05	ER-5KV	NEMA 3R
NGRUS333	4160	15	160.3	Continuous	SE-CS10-2.5	10*	0.05	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS362	4160	15	160.3	10s	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS363	4160	15	160.3	10s	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS364	4160	15	160.3	Continuous	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS365	4160	15	160.3	Continuous	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS244	4160	25	96.2	10s	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS334	4160	25	96.2	10 s	5SHT-101-E	20**	1	ER-5KV	NEMA 3R
NGRUS335	4160	25	96.2	10 s	5SHT-101-E	20**	1	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS336	4160	25	96.2	Continuous	5SHT-101-E	20**	1	ER-5KV	NEMA 3R
NGRUS337	4160	25	96.2	Continuous	5SHT-101-E	20**	1	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS366	4160	25	96.2	10s	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor
NGRUS367	4160	25	96.2	Continuous	CT200	200***	5.0	ER-5KV	NEMA 3R
NGRUS368	4160	25	96.2	Continuous	CT200	200***	5.0	ER-5WP	NEMA 3R; Weather Protected Sensing Resistor

* Connect to SE-330 terminals 8 and 11

** Connect to SE-330 terminals 9 and 11

*** Connect to SE-325 terminals CT1 and CT2

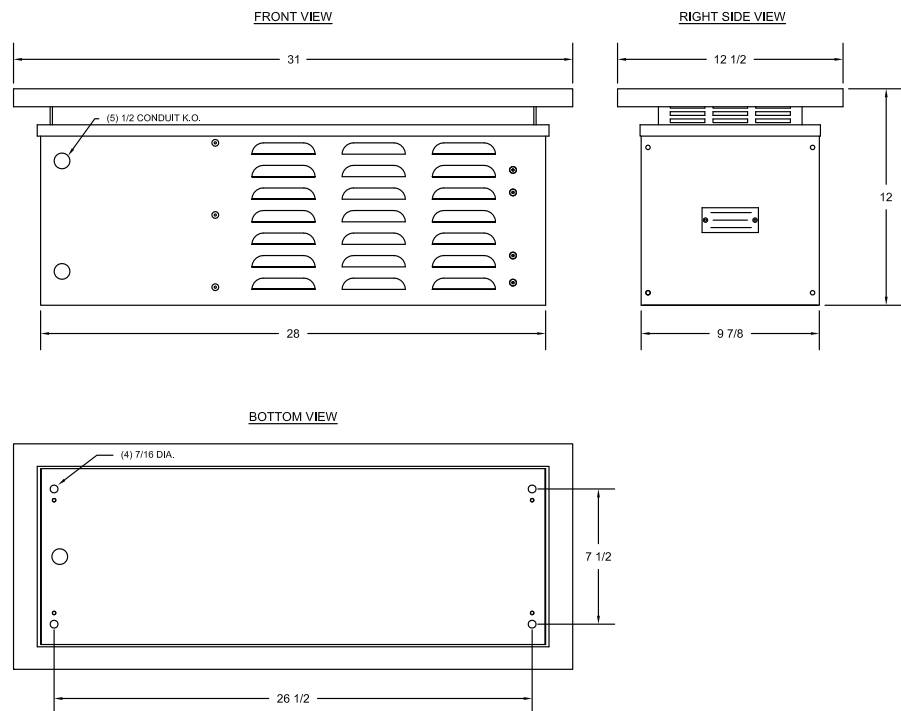
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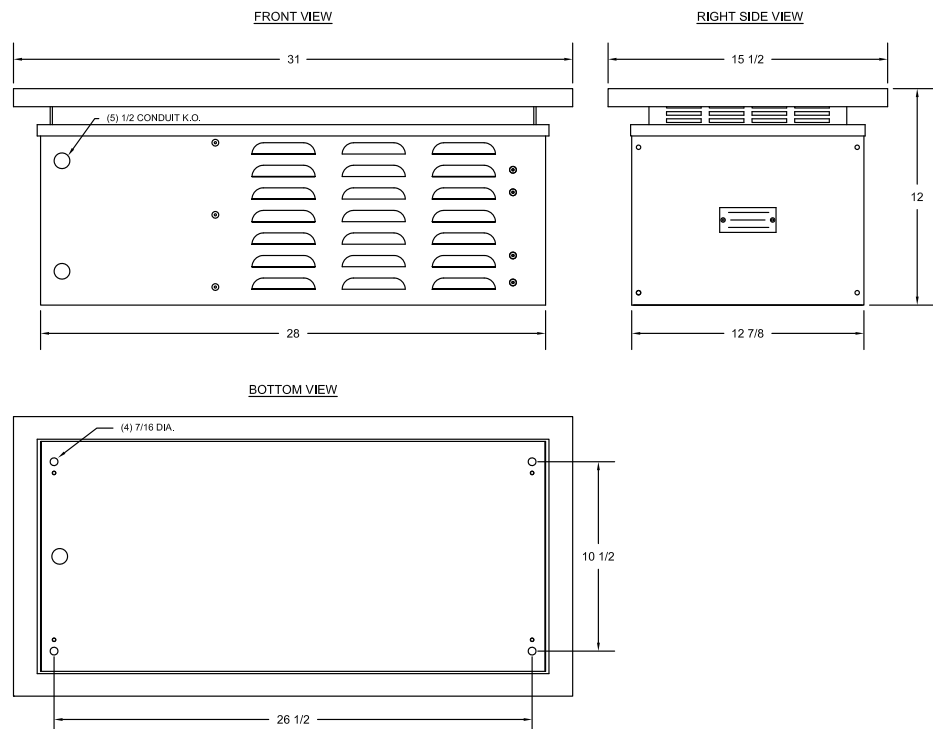
Dimensions (in inches) and Mounting Diagrams

480 V & 600 V NGR Systems:

- NGRUS314
- NGRUS316
- NGRUS318
- NGRUS320



- NGRUS315
- NGRUS317
- NGRUS319
- NGRUS321



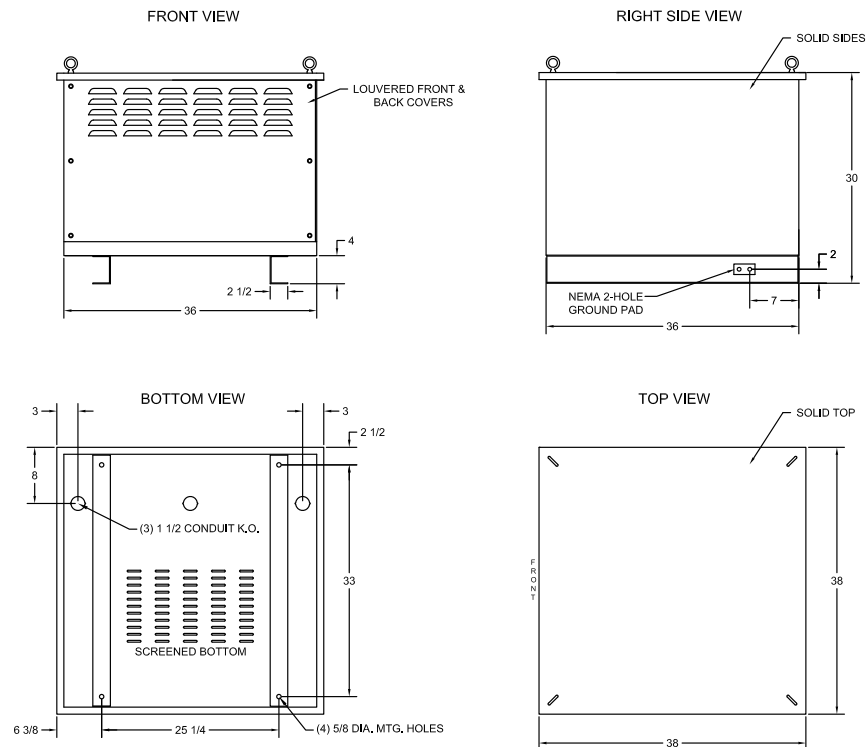
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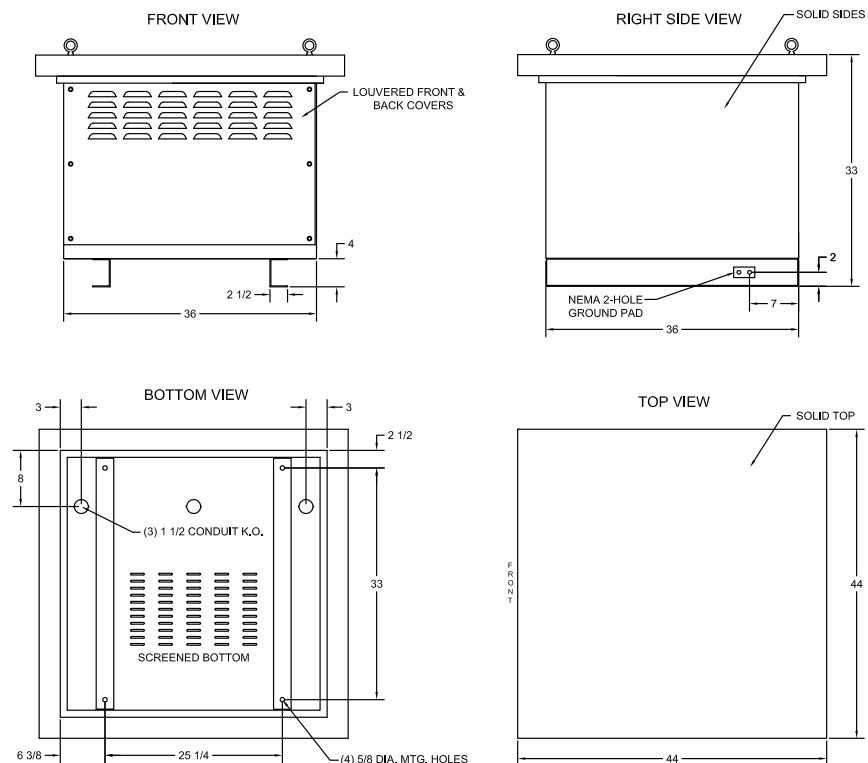
Dimensions (in inches) and Mounting Diagrams

4160 V NGR Systems:

- NGRUS322
- NGRUS323
- NGRUS326
- NGRUS327
- NGRUS330
- NGRUS331
- NGRUS344
- NGRUS345



- NGRUS324
- NGRUS325



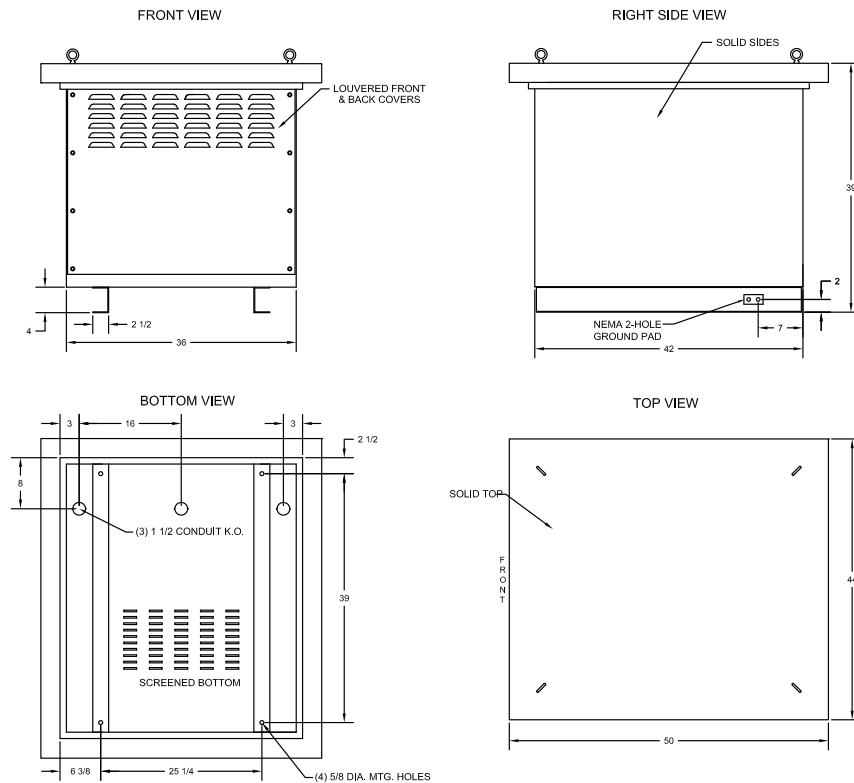
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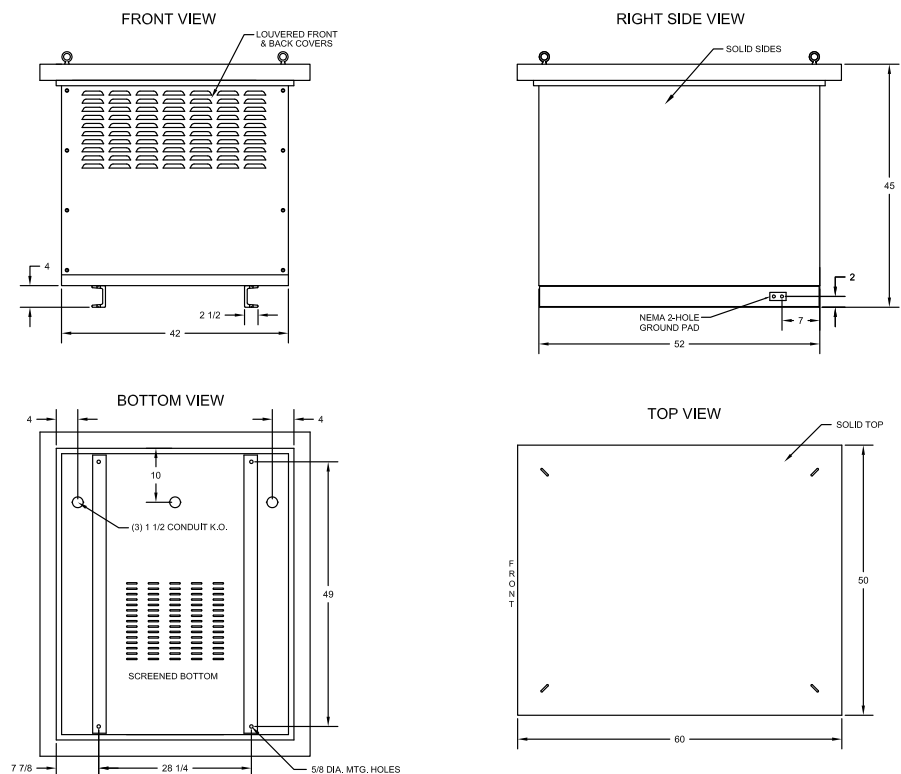
Dimensions (in inches) and Mounting Diagrams

4160 V NGR Systems:

- NGRUS328
- NGRUS329
- NGRUS332
- NGRUS333



- NGRUS336
- NGRUS337



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Specifications: 480 V NGR Systems

Voltage	480 V line-to-line, 277 V line-to-neutral
Let-Through Current	2 A or 5 A
Resistance	138.5 Ω (2 A) or 55.4 Ω (5 A)
Tolerance	+/- 10 % resistance
Duty Cycle	Continuous rated
Current Transformer	ELCT5-31: 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") CT200: For use with SE-325 NGR Monitor Turns Ratio: 200:5 Current Rating: 200:5 A GF Trip Range: 0.5, 2.0, 4.0 A Window Diameter: 56 mm (2.2")
Sensing Resistor	ER-600VC; Optional installation in NEMA 4 enclosure for outdoor applications
Insulation Level	11 KV BIL
Temperature Rise	385 °C (725 °F)
Resistor Type	Stainless steel wire wound
Dimensions	Refer to dimensions drawings
Weight	23 kg (50 lbs)
Altitude	0–2000 masl
Enclosure Style	NEMA 3R, galvanized steel
Finish	Powder coated
Color	ANSI 61 grey
Mounting	Floor mount
Siesmic Bracing	Included
Approvals	cULus or CSA at customer request
Warranty	12 months in service or 18 months from the date of shipment whichever occurs first

Specifications: 600 V NGR Systems

Voltage	600 V line-to-line, 347 V line-to-neutral
Let-Through Current	2 A or 5 A
Resistance	174 Ω (2 A) or 69 Ω (5 A)
Tolerance	+/- 10 % resistance
Duty Cycle	Continuous rated
Frequency	50–60 Hz
Current Transformer	ELCT5-31: 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") CT200: For use with SE-325 NGR Monitor Turns Ratio: 200:5 Current Rating: 200:5 A GF Trip Range: 0.5, 2.0, 4.0 A Window Diameter: 56 mm (2.2")
Sensing Resistor	ER-600VC; Optional installation in NEMA 4 enclosure for outdoor applications
Insulation Level	11 KV BIL
Temperature Rise	385 °C (725 °F)
Resistor Type	Stainless steel wire wound
Dimensions	Refer to dimensions drawings
Weight	23 kg (50 lbs)
Altitude	0–2000 masl
Enclosure Style	NEMA 3R, galvanized steel
Finish	Powder coated
Color	ANSI 61 grey
Mounting	Floor mount
Siesmic Bracing	Included
Approvals	cULus or CSA at customer request
Warranty	12 months in service or 18 months from the date of shipment whichever occurs first

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NGR SERIES – US

Specifications: 4160 V NGR Systems

Voltage	4160 V line-to-line, 2400 V line-to-neutral
Let-Through Current	5 A, 10 A, 15 A, or 25 A
Resistance	480 Ω (5 A), 240 Ω (10 A), 160 Ω (15 A), or 96 Ω (25 A)
Tolerance	+/- 10 % resistance
Duty Cycle	Continuous-duty or 10-second-duty rating
Frequency	50-60 Hz
Current Transformer	ELCT5-31: 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") SE-CS10-2.5: 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") Turns Ratio: 100:5 Current Rating: 100:5 A Primary Rating with SE-330: 20 A when connected to terminals 9 and 11 GF Trip Range: 400 mA to 20 A Window Diameter: 40 mm (1.56") CT200: For use with SE-325 NGR Monitor Turns Ratio: 200:5 Current Rating: 200:5 A GF Trip Range: 0.5, 2.0, 4.0 A Window Diameter: 56 mm (2.2") Sensing Resistor ER-5KV Optional ER-5WP for outdoor applications Insulation Level 75 KV BIL Temperature Rise Continuous-duty rated: 385 °C (725 °F) 10-second-duty rated: 760 °C (1400 °F) Resistor Type Stainless Steel Wire Wound Dimensions Refer to dimensions drawings

Weights	
5 A, continuous-duty rated:	192 kg (424 lbs)
10 A, continuous-duty rated:	235 kg (519 lbs)
15 A, continuous-duty rated:	258 kg (568 lbs)
25 A, continuous-duty rated:	320 kg (705 lbs)

5 A, 10-second-duty rated:	136 kg (300 lbs)
10 A, 10-second-duty rated:	136 kg (300 lbs)
15 A, 10-second-duty rated:	136 kg (300 lbs)
25 A, 10-second-duty rated:	136 kg (300 lbs)
Altitude	0-1000 masl
Enclosure Style	NEMA 3R, galvanized steel
Finish	Powder coated
Color	ANSI 61 grey
Mounting	Floor mount
Siesmic Bracing	Included
Approvals	cULus or CSA at customer request
Warranty	12 months in service or 18 months from the date of shipment, whichever occurs first

Accessories



SE-325 Neutral Grounding Resistor Monitor

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



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-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.

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

Disclaimer Notice – Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/product-disclaimer.