Filnor Inc.

Neutral Grounding Resistors

Filnor, Inc. Neutral Grounding Resistors are designed, manufactured and tested for the ultimate in safety, reliability and product life.

Filnor, Inc.
P.O. Box 2328
227 N. Freedom Ave.
Alliance, OH 44601
U.S.A.
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Email: filnor@filnor.com

ISO 9001
Quality System Certified

Neutral Grounding Resistors

Filnor Inc.

Product Brochure

NEUTRAL GROUNDING RESISTORS

Protect Your Power Distribution Equipment With

Neutral Grounding Resistors

Neutral Grounding Resistors are the most effective, common, economical and preferred method of grounding.

Standards

The neutral grounding system's purpose is to protect life and property in the event of 50/60 Hz faults (short-circuit) and transient phenomena. Filnor Neutral Grounding Resistors are designed and tested in strict accordance with IEEE Standard 32-1972.

ISO9001 certified since August of 1999

13.8 kV System,
8 kV Line to Neutral,
400 Ampere,
10 Second

13.8 kV System,
8 kV Line to Neutral,
50 Ampere,
10 Second

- Designed and tested in accordance with IEEE Standard 32-1972
- All units triple insulated
- All stainless steel resistor elements and terminals

High Resistance
Grounding System

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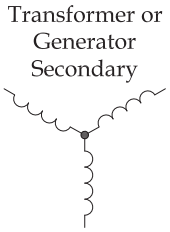
NEUTRAL GROUNDING RESISTORS

Typical Grounding Methods

- Ungrounded Systems
- Solidly Grounded Neutral Systems
- Resistance Grounded Systems

Ungrounded System



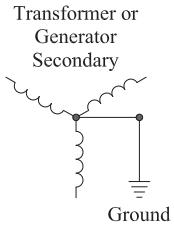
Typical Ungrounded System

Ungrounded System has no connection between the conductors and earth ground.

Under normal operating conditions this method is fine.

With fault conditions, damage to equipment can occur, and the fault may be dificult locate.

Solidly Grounded System

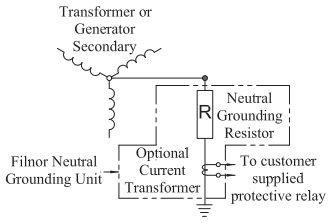


Typical Solidly Grounded System

A solidly Grounded System is one which the neutral point has been connected to earth ground with a conductor.

It lacks the current limiting ability of resistance grounding and extra protection for your equipment

Grounding Through Resistor



Resistance Grounding is the most effective and preferred method.

It solves the problem of transient over voltages, which reduces equipment damage.

Limiting the fault current prevents equipment damage.

Neutral Grounding Resistors

The most effective, common, economical and preferred method of grounding.

Standards

Filnor Neutral Grounding Resistors are designed and tested in strict accordance with IEEE Standard 32-1972.

The standard establishes maximum allowable temperature ratings for neutral grounding devices for various duty cycles as follows:

DUTY CYCLE	MAX. TEMP. RISE ABOVE AMBEINT	TYPICAL CURRENT
Continuous	385° C	1 to 25 amps
Extended Time *	610° C	10 / 25 / 50 amps
60 Seconds or less	760° C	100 to 2000 amps

* Defined as 10 minutes or greater, no more than 90 days total per year

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Function

Neutral Grounding Resistors are used to protect power transformers, power generators and other associated equipment in your power systems against 50/60 Hz faults (short circuit) and transient phenomena (lightning).

Specification

There are three parameters needed to specify the neutral grounding resistor.

1. Rated voltage line to neutral or system voltage
2. Rated fault current
3. Rated "time on" of the line to neutral voltage not exceeding the allowable temperature rise

Range

- Rated current: from 1 amp to 5000 A
- Rated voltage: from 0.38 to 34.5kV
- Rated time: 1 sec to continuous time rating

Testing & Quality

All Filnor Neutral Grounding Resistors are designed, rated, manufactured and tested in strict compliance with IEEE-32-1972. Routine tests performed on each Neutral Grounding Resistor are measurement of resistance, high voltage power frequency, insulation measurement, aspect verification, dimensional control. Filnor's internal quality system has been developed and certified under ISO 9001 quality system.

Construction

A standard unit includes the stainless steel resistor assembly plus all the required insulators, internal connections and hardware installed in a standard safety enclosure. Neutral Grounding Resistor units are completely assembled, prewired, and tested at our facility. For shipping all units are crated for added protection and ease of handling.

Enclosure Materials

- Solid overhung top slightly sloped to prevent standing water and will support heavy ice and snow.
- Forged eyebolts in all four corners for easy hoisting.
- Removable front and rear louvered covers for easy access for connection and inspection.
- Corrosion resistant nameplate provides complete ratings and manufacturers information.
- Mill galvanized for maximum protection.
- Bottom screening prevents the entry of birds and rodents while providing maximum cooling for the resistors.

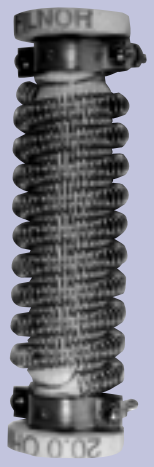
Enclosure Options

- Mill galvanized, aluminum, stainless steel and hot-dipped galvanized construction. Custom paint finish is available.
- Top or side mounted entrance bushing(s).
- Screened covers for indoor applications.
- Support stands for elevating the enclosure above ground.

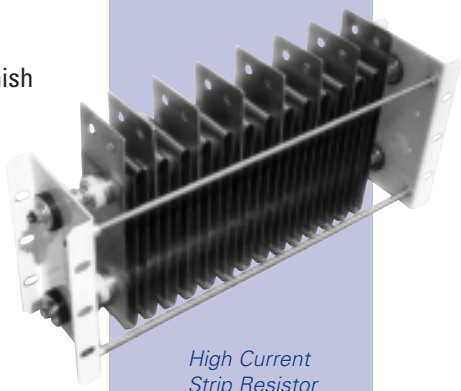
Options

- Current or potential transformers mounted and prewired at our facility
- ON or OFF Load disconnecting switches
- Space heater
- Specially designed units for hazardous or high altitude locations

Grounding Transformer Cubicle



Helicoil Wire Wound Resistor used for low current applications.



High Current Strip Resistor

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NEUTRAL GROUNDING RESISTORS

Most Common Neutral Grounding Resistors			
2400 System Voltage – 1390 Line to Neutral – 10 second Time On			
Initial Amperes	Catalog Number	Dimensions W"x D"x H"	Approx Weight
10	FNG2400-10-10	36 x 36 x 24	250
50	FNG2400-50-10	36 x 36 x 24	280
100	FNG2400-100-10	36 x 36 x 24	310
200	FNG2400-200-10	36 x 36 x 24	320
300	FNG2400-300-10	36 x 36 x 24	330
400	FNG2400-400-10	36 x 36 x 24	340
500	FNG2400-500-10	36 x 36 x 24	350
600	FNG2400-600-10	36 x 36 x 24	360
800	FNG2400-800-10	36 x 36 x 24	380
1000	FNG2400-1000-10	36 x 36 x 24	400
4160 System Voltage – 2400 Line to Neutral – 10 second Time On			
10	FNG4160-10-10	36 x 36 x 24	350
50	FNG4160-50-10	36 x 36 x 24	400
100	FNG4160-100-10	36 x 36 x 24	450
200	FNG4160-200-10	36 x 36 x 32	460
300	FNG4160-300-10	36 x 36 x 32	470
400	FNG4160-400-10	36 x 36 x 32	480
500	FNG4160-500-10	36 x 36 x 32	500
600	FNG4160-600-10	36 x 36 x 32	510
800	FNG4160-800-10	36 x 36 x 32	520
1000	FNG4160-1000-10	36 x 36 x 32	530
7200 System Voltage – 4160 Line to Neutral – 10 second Time On			
10	FNG7200-10-10	36 x 36 x 32	450
50	FNG7200-50-10	36 x 36 x 32	550
100	FNG7200-100-10	46 x 46 x 42	610
200	FNG7200-200-10	46 x 46 x 42	620
300	FNG7200-300-10	46 x 46 x 42	630
400	FNG7200-400-10	46 x 46 x 42	640
500	FNG7200-500-10	46 x 46 x 42	650
600	FNG7200-600-10	46 x 46 x 42	660
800	FNG7200-800-10	46 x 46 x 42	670
1000	FNG7200-1000-10	46 x 46 x 42	680
13800 System Voltage – 8000 Line to Neutral – 10 second Time On			
10	FNG13800-10-10	42 x 46 x 42	600
50	FNG13800-50-10	42 x 46 x 42	750
100	FNG13800-100-10	42 x 46 x 58	810
200	FNG13800-200-10	42 x 46 x 58	820
300	FNG13800-300-10	42 x 46 x 58	830
400	FNG13800-400-10	42 x 46 x 58	840
500	FNG13800-500-10	42 x 46 x 58	850
600	FNG13800-600-10	42 x 46 x 58	860
800	FNG13800-800-10	42 x 46 x 58	870
1000	FNG13800-1000-10	42 x 46 x 58	880
480 System Voltage – 277 Line to Neutral – Continuous Rated			
5	FNG480-5-C	27 x 15 x 8	50
10	FNG480-10-C	27 x 15 x 8	60
25	FNG480-25-C	27 x 15 x 8	110
2400 System Voltage – 1390 Line to Neutral – Continuous Rated			
10	FNG2400-10-C	42 x 46 x 42	410
25	FNG2400-25-C	42 x 46 x 58	550
50	FNG2400-50-C	42 x 46 x 58	610

Standard Units

- Designed and Tested to IEEE-32-1972 Standard
- Space for Current Transformer
- Enclosure: Nema 3R Outdoor – Mill Galvanized
- Internal Terminal Connections

Filnor, Inc. designs and builds Neutral Grounding Resistors up to 72kV and 5000 amps.

Options: (Please, contact us for more details)
- Aluminum, Stainless Steel, or Special Paint Finishes.
- Space Heater
- Current Transformer
- Elevating Stands
- Potential Transformers
- Entrance Bushings
- Units design for hazardous or high altitude locations
- Seismic Qualified Units
- Disconnect Switches
- Special ratings not listed

Drawings available upon request,
and on the www.Filnor.com website.

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Neutral Grounding Resistor Enclosure Configurations

FNG13800-50-10
13800 V System, 8000 V Line to Neutral, 50 Ampere, 10 Second, 50:1 CT Option

FNG6800-500-10
6800 V System, 3926 V Line to Neutral, 500 Ampere, 10 Second

FNG12470-400-10
12470 V System, 7200 V Line to Neutral, 400 Ampere, 10 Second, 600:5 CT Option with Side Neutral Bushing

FNG4160-25-C
4160 V System, 2400 V Line to Neutral, 25 Ampere, Continuous, 200:5 CT Option with Support Stand

FNG13800-5-C
13800 V System, 8000 V Line to Neutral, 5 Ampere, Continuous, with Zig Zag Transformer

FNG13800-400-10
13800 V System, 8000 V Line to Neutral, 400 Ampere, 10 Second, with Top Neutral Bushing

FNG13800-400-10
13800 V System, 8000 V Line to Neutral, 400 Ampere, 10 Second, with Zig Zag Transformer, Severe Weather Enclosure

High Resistance Neutral Grounding Detection System
480 V AC, 5 Ampere Maximum

FNG20000-200-10
20000 V System, 11600 V Line to Neutral, 200 Ampere, 10 Second, 200:5 CT Option with Dust Filters and Side Neutral Bushing

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