

# NEUTRAL GROUNDING RESISTORS INSTALLATION AND MAINTENANCE INSTRUCTIONS



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# NEUTRAL GROUNDING RESISTORS INSTALLATION AND MAINTENANCE INSTRUCTIONS

## Table of Contents

<b>Section 1.0</b>	Unpacking.....	4
1.1	Shipping.....	4
1.2	Receiving.....	4
<b>Section 2.0</b>	Installation.....	4
<b>Section 3.0</b>	Inspection .....	5
<b>Section 4.0</b>	Connection .....	5
4.1	Neutral Lead .....	5
4.2	Ground Lead.....	7
<b>Section 5.0</b>	Maintenance .....	8

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Revision	Date	Description of Changes
NG111-06	February 9, 2007	Initial document
NG111-12	September 27, 2012	-Update address -Update Logo -Add revision table -Change table of contents to allow hyperlinks.

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## Section 1 – Unpacking

### 1.1 Shipping

Post Glover neutral grounding resistors are placed in their normal mounting position onto a wooden skid and securely fastened to the skid with lag bolts. The units are then covered with plastic to protect the finish and to prevent dirt or moisture buildup that can occur during shipping or storage.

Wooden supports are used inside the enclosure to support the resistor banks. Finally, the units are skid-mounted.

All units are loaded by forklift into the enclosed van of a common carrier. At that point, it is the responsibility of the carrier to provide proper care in shipping and handling.

### 1.2 Receiving

Once received, the skid-mounted unit should be unloaded and moved by forklift. At this point, a preliminary inspection of the unit should be made to ensure proper handling was practiced during shipment. It is recommended that the unit remain on the skid until it reaches the job site to prevent possible damage during transfer.

All skid-mounted neutral grounding resistors are suitable for prolonged storage. If the unit is to be stored, it should sit horizontally (as shipped). Never store the unit on the sides or top as this could result in damage to the bushings or insulators. *DO NOT STACK.*

## Section 2 – Installation

When the unit arrives at the job site, remove the lag bolts which fasten the resistor unit to the skid.

**NOTE:** It is recommended that all packing material within the enclosure remain intact until the unit is installed.

Top-mounted eye-bolts are provided for easy hoisting and placement by crane.

Post Glover neutral grounding resistors can be mounted on a concrete pad or support stand near the transformer if the unit's size and weight permit. It is important that the grounding resistor be mounted horizontally (as shipped). This keeps the unit drip-proof, allows for adequate cooling, and prevents unnecessary strain on the support insulators.

The unit should be bolted to the mounting surface using the holes provided at the bottom of each enclosure leg. Expansion-type anchors are recommended for concrete pad mounting.

**NOTE:** The enclosure should always be securely grounded to prevent a shock hazard to personnel or wildlife.

# NEUTRAL GROUNDING RESISTORS INSTALLATION AND MAINTENANCE INSTRUCTIONS

## Section 3 – Inspection

After the unit has been securely mounted and grounded, remove the front panel to allow inspection and wiring. The front panel can be identified by the Post Glover nameplate.

*REMOVE ALL PACKING MATERIAL, IF ANY, USED TO PROTECT THE INSULATORS AND RESISTOR BANKS DURING SHIPMENT.*

**NOTE:** It is important that all packing material be removed from within the enclosure before energizing. *FAILURE TO REMOVE THIS MATERIAL MAY RESULT IN FIRE HAZARD.*

With all packing material removed, carefully inspect the inside of the unit for broken insulators, bushings and other parts that may have been damaged during shipment.

**NOTE:** If any damaged parts are found, contact the carrier immediately. *ENERGIZING THE UNIT WITH DEFECTIVE PARTS MAY DAMAGE THE RESISTOR AND CREATE A SHOCK HAZARD TO PERSONNEL.*

*CHECK ALL ELECTRICAL CONNECTIONS TO ENSURE THAT THEY ARE TIGHT.*

## Section 4 – Connection

### 4.1 Neutral Lead

The neutral lead from the transformer or generator may be connected one of three ways depending upon the specific design:

1. The connection is made directly to a top-mounted entrance bushing. The bushing has a NEMA two-hole pad-type connector. (See Figure 1.)
2. For grid type resistors, the connection is made directly to the resistive element inside the enclosure via rigid conduit entering from the bottom. The neutral terminal is tagged for easy identification. A compression type lug is used for terminal connection. Location and termination of the conduit is the customer's responsibility. (See Figure 2.)
3. For wirewound or edgewound type resistors, the connection is made to a terminal point separate from the resistor. This configuration prevents undue stress on the actual elements. The neutral terminal is tagged for easy identification. Location and termination of the conduit is the customer's responsibility. (See Figure 3.)
4. The connection is made directly to the primary terminal of the current transformer which is mounted inside the enclosure. This terminal will be tagged "NEUTRAL" and requires a customer-supplied lug and bolt. The other primary terminal of the current transformer has been factory wired to the resistive element. The neutral lead usually enters from the bottom through conduit. (See Figure 4.) Sometimes the current transformer is factory wired to a top-mounted entrance bushing, in which case the connection is the same as the first example above. (See Figure 1.)

# NEUTRAL GROUNDING RESISTORS INSTALLATION AND MAINTENANCE INSTRUCTIONS

In all cases, the neutral terminal is tagged for easy identification and the proper connection is shown schematically on the drawing. *CHECK TO SEE THAT ALL CONNECTIONS ARE FIRMLY TIGHTENED.*

*\*CONSULT LOCAL AND NEC CODES FOR PROPER CABLE SIZING.*

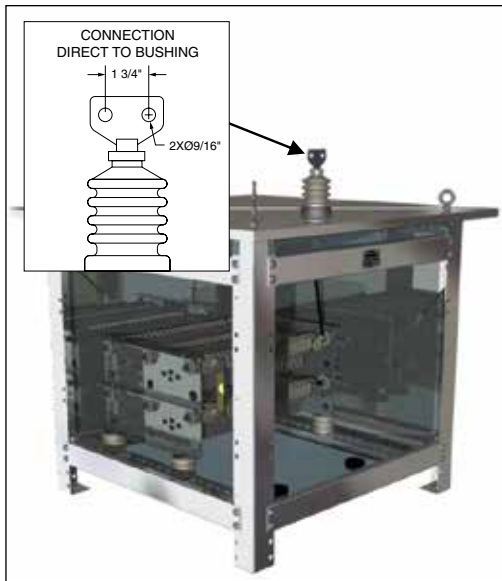


Figure 1: NEMA two-hole pad

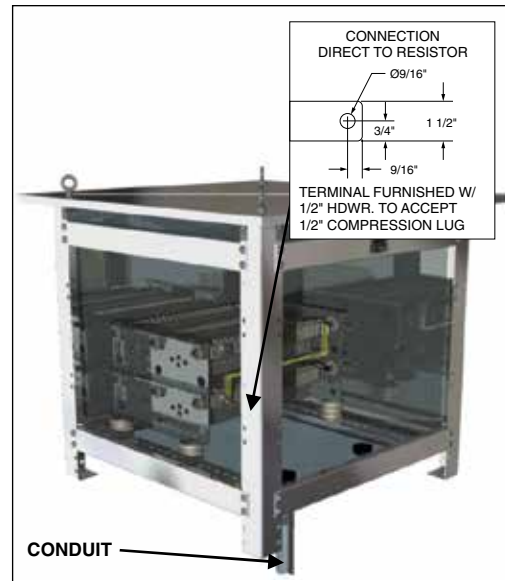


Figure 2: Grid resistors

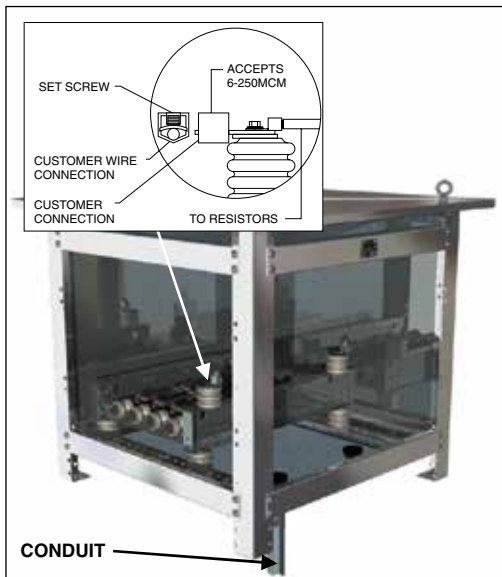


Figure 3: Wirewound or edgewound resistors

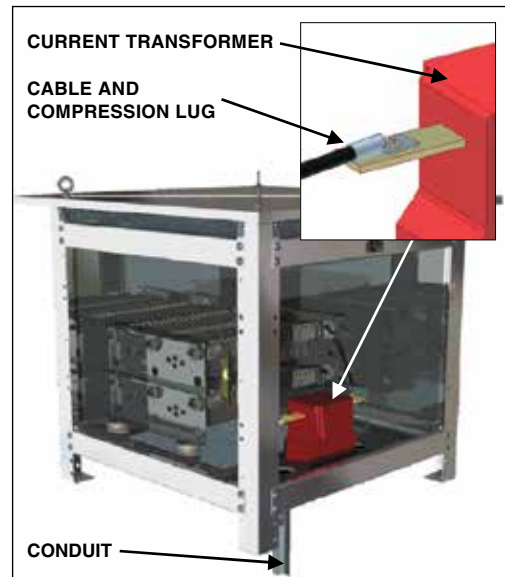


Figure 4: Primary of current transformer

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Connection (continued)

## 4.2 Ground Lead

The ground lead from the resistive element to ground may be connected one of two ways:

For grid type resistors, the connection is made directly to the resistive element inside the enclosure via rigid conduit entering from the bottom. The ground terminal is tagged for easy identification. A compression-type lug is used for the terminal connection. Location and termination of conduit is the customer's responsibility. (See Figure 5.)

For wirewound or edgewound type resistors, the connection is made to a terminal point separate from the resistor. This configuration prevents undue stress on the actual elements. The ground terminal is tagged for easy identification. Location and termination of the conduit is the customer's responsibility. (See Figure 6.)

The connection is made directly to a top-mounted exit bushing. The bushing has a NEMA two-hole pad-type connector. The bushing will be factory wired to the resistive element. (See Figure 7.)

In both cases, the ground terminal is tagged for easy identification and the proper connection is shown schematically on the drawing. **CHECK TO SEE THAT ALL CONNECTIONS ARE FIRMLY TIGHTENED.**

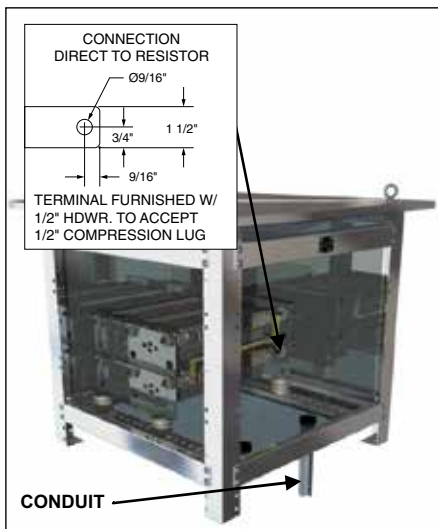


Figure 5: Grid resistors

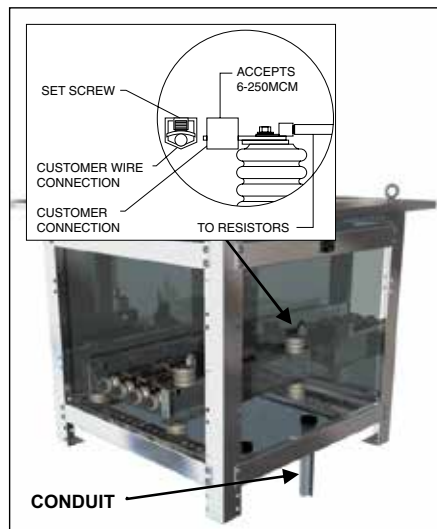


Figure 6: Wirewound or edgewound resistors

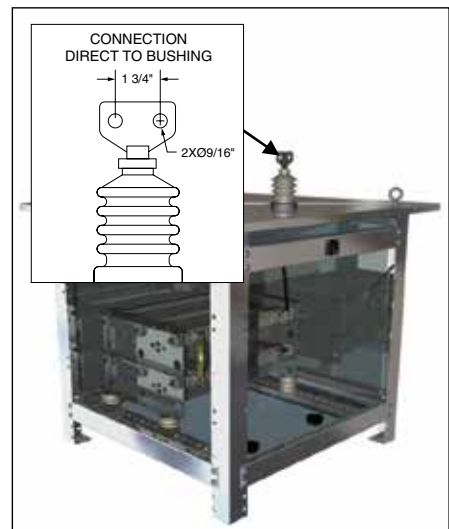


Figure 7: NEMA two-hole pad

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## Section 5 – Maintenance/Inspection

Normally, no maintenance is necessary on a neutral grounding resistor. However, periodic inspections for damage are needed to ensure that the resistor is still capable of protecting the system.

Damage may occur from lightening, storms, earthquakes, wildlife, overloads or extended service life. Basically, it is necessary to ensure that the resistive element has not burned open and that the element (including the incoming bushing) is still properly isolated from ground.

The following procedure is recommended for periodic field inspections:

1. De-energize the system being grounded and break the connection between the system, the neutral, and the grounding resistor. An isolation switch is sometimes available to break this connection. These precautions are recommended to prevent a shock hazard to maintenance personnel and to prevent the system from being operated without proper grounding.
2. Remove the front cover (which is on the same side as the nameplate) and the rear cover. This will allow for a visual inspection of all internal components.
3. Carefully check for cracked insulators or bushings. A MEGGER or HI-POT test is the most reliable method of ensuring that the porcelain insulation is still providing the necessary electrical isolation.
4. Check the resistive element for continuity. An ohmmeter reading made between the neutral and the ground side of the resistor should be within 10% of the nameplate value. If the resistance of the element is more than 15% off from the nameplate value, the resistors should be replaced. Any open resistors should be replaced. **COMPLETE NAMEPLATE DATA WILL BE NECESSARY TO OBTAIN REPLACEMENT PARTS.**
5. Check all internal connections for tightness. Check wiring for signs of damage from heat or overloads.
6. Vacuum any dirt or debris from the inside of the enclosure.
7. Check the enclosure for signs of damage from weather or rodents. Replace all side covers removed during inspection and check the mounting bolts for tightness.
8. *FOR REPLACEMENT PARTS OR ASSISTANCE, CALL 1-800-537-6144.*

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