

FAN-COOLED RESISTOR INSTALLATION AND MAINTENANCE INSTRUCTIONS



Post Glover
“The Resistor Specialists”

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Serving the Electrical Industry Since 1892

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FOREWORD

This manual covers the installation and maintenance for fan-cooled resistor assemblies, either for dynamic braking or use as load banks. Customer requested options and/or physical configurations may require unique termination methods. Consult the factory drawings for job-specific details.

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FAN-COOLED RESISTOR INSTALLATION AND MAINTENANCE INSTRUCTIONS

Section 1 – Compliance

1.1 Compliance with Manual Instructions

It is essential that the Purchaser/User comply with all instructions and information contained in this manual, and that all personnel associated with the apparatus supplied under this contract are thoroughly familiar with the information contained herein.

1.2 Compliance with Installation Procedures

It is the Purchaser/User's responsibility to ensure that the apparatus supplied under this contract is correctly installed in a suitable location by technically qualified and competent persons.

Apparatus supplied as loose components, devices or sub-assemblies may, when energized, constitute a safety hazard. The Purchaser/User must ensure that such apparatus is installed in a secure location, and that all necessary safety information about the installation is provided to all personnel associated with it.

1.3 Relevant Design Standards

| | |
|-------------------|-----------------------|
| Resistors: | IEEE C57.32 |
| Enclosure: | IEEE C57.32, N.E.M.A. |
| Enclosure Finish: | A.N.S.I. |

Section 2 – Shipping and Receiving

2.1 Shipping

Post Glover fan-cooled 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.

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.

2.2 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. Do not move the unit with covers uninstalled.

NOTE: Do not remove any temporary shipping braces prior to setting the unit at the permanent installation location.

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2.3 Storage

All fan-cooled resistors are suitable for prolonged storage. The unit should sit as shipped and never on the sides or top.

NOTE: Do not stack.

Whether designed for indoor or outdoor use, if it is to be stored for any length of time prior to installation, it should be covered to protect it against moisture and the accumulation of dust and dirt. The unit should be stored in a dry, enclosed area, or covered with a waterproof cover. ALWAYS BE SURE THE INTERIOR OF THE UNIT IS DRY AND CLEAN BEFORE USE.

Section 3 – Installation

WARNING: Install only in access restricted locations.

AVERTISSEMENT: Installer seulement dans des endroits auxquels l'accès est limité.

3.1 Access Clearances

At least 36 inches is required around all removable covers for access. This may be subject to local or site regulations requiring greater clearances.

3.2 Ventilation Clearances

A free-air flow environment is required around the resistor enclosure with a recommended minimum of approximately 12 inches.

3.3 Enclosure Operational Temperatures

During normal service, either due to steady state current flow (if specified), or a fault condition, both the issuing air temperature and the enclosure surface temperature may exceed 100° C.

NOTE: Equipment or combustible materials must not lie on the top cover of the enclosure or be in contact with the sides.

3.4 Mounting Surface

A flat foundation or other suitable square and plumb mounting arrangement is required.

WARNING: When mounting on or over a combustible surface, a floor plate of at least 1.43 mm galvanized steel or 1.6 mm uncoated steel extending at least 150 mm beyond the equipment on all sides shall be installed.

AVERTISSEMENT: Lorsque l'appareil est installé sur ou au-dessus d'une surface combustible, on doit prévoir une plaque d'acier galvanisé d'au moins 1.43 mm ou une plaque d'acier sans revêtement de 1.6 mm

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3.5 Assembly

The Dynamic Braking/Load Bank Resistor is supplied assembled and ready to be connected.

3.6 Tools and equipment

Ordinary hand tools are all that are needed for assembly. No special tools are required. Lifting equipment must be capable of keeping the unit in an upright position while in motion.

3.7 Installation procedure

1. Lift unit with either the lifting eyes or fork lift points, where installed.
2. Place the Dynamic Braking/Load Bank Resistor on the prepared base.
3. Remove front covers.

NOTE: Remove all packing material, if any, used to protect the insulators, resistor banks and/or transformers during shipment. Failure to remove this material may result in fire hazard.

4. With all packing material removed, carefully inspect the inside of the unit for broken insulators, bushings, resistors and other parts that may have been damaged during shipment.
5. Secure the Dynamic Braking/Load Bank Resistor onto its base.
6. Connect power to fan.
7. Connect control wires to auxiliary devices.
8. Connect the power cable to resistor bus bar.
9. In some instances a junction box with bottom gland plate contains the connection points. Consult the specific drawings for your resistor for corresponding connection locations.
10. Make sure all connections are tight.

NOTE: It is possible for the electrical connections to loosen during transit. Check all electrical connections to ensure they are firmly tightened.

NOTE: Consult local and NEC codes for proper cable sizing.

11. Reinstall the enclosure covers.
12. Be sure all enclosure hardware is correctly installed and tightened.

NOTE: The enclosure should always be securely grounded to prevent a shock hazard to personnel or wildlife. A NEMA 2 hole connection point is available to connect to on all enclosure bottom corners.

NOTE: Outdoor duty rated devices shall be installed in a location that is inaccessible in accordance with local codes, such as Canadian Electrical Code, Part 1.

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Section 4 – Commissioning

4.1 Resistance Test

Check for proper fan rotation. Air should be entering the bottom of the unit and exiting the top. Check the resistance value, using a Kelvin double bridge or a digital low-resistance ohmmeter. It must be the value stamped on the nameplate $\pm 10\%$.

4.2 Insulation Test

Check the insulation resistance between the resistor elements and the enclosure, using a 1000 Vdc megger. It should be greater than 100M Ω for new units. If this test is performed as part of routine maintenance on older units, the value should be greater than 5 M Ω .

Alternatively, perform an AC high-potential test. Maximum applied voltage = (2.25 x phase voltage) + 2000V at 60 Hz.

Section 5 – Operation Procedures

NOTE: The rules in this section must be followed to ensure the safety of personnel associated with this apparatus.

5.1 Personnel Safety

During normal use, ensure that plant operators:

- a) Are fully familiar with all controls, particularly those for emergency shutdown.
- b) Comply with all safety warning notices and keep all enclosure covers on during operation.
- c) Are trained to recognize signs of faulty operation, and know what action to take in the event of trouble.
- d) During Maintenance and Testing, ensure the following:
- e) Only technically competent and authorized persons are permitted to carry out work.
- f) Personnel comply with all statutory requirements.
- g) Personnel are thoroughly familiar with the unit and the system of which it is a part, and can recognize any potential safety hazards.
- h) Unit is isolated completely before opening enclosures and make absolutely certain it is dead before starting work. All possible precautions, e.g., lockouts, must be taken to ensure that the isolated apparatus cannot become live at any time while it is being worked on.
- i) All service personnel comply with all safety procedures for the protection of themselves and of others, including the use of temporary barriers and warning notices.
- j) Personnel are completely familiar with all pertinent information provided, particularly on safety matters.
- k) Personnel understand the hazards inherent in working on live electrical apparatus and take all necessary precautions.
- l) Personnel considers that the unit may have been modified without proper reference to the manufacturer and take extreme caution at all times before, during and after any work is carried out.
- m) Always thoroughly check and test the unit in accordance with this manual and good working practice before putting the unit back in service.
- n) Clean and tighten all connection points and insulators as required.

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- o) Do not pressure wash the resistors. The high pressure can crack the porcelain insulators.

5.2 Skills Required for Specific Tasks

To ensure that the unit is safe for use in normal plant operation it has been designed and tested in accordance with relevant U.S. and International Standards. Information is provided in this manual regarding the conditions necessary for safety against hazards reasonably foreseeable during normal use and the precautions taken to counteract them.

It is the Purchaser/User's responsibility to ensure that the unit is maintained in a safe condition by technically competent and authorized personnel only who act in compliance with all appropriate safety procedures.

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Section 6 – Maintenance/Inspection

6.1 Equipment Isolation

The equipment must be completely isolated from all power before performing any maintenance.

WARNING: *Danger: High Voltage*

AVERTISSEMENT: *Danger: Haute Tension*

6.2 Routine Maintenance

Very little maintenance is required on this equipment, but routine inspections should be carried out at regular periods to ensure that the equipment is kept in good, reliable condition. The frequency of the inspection depends upon site conditions i.e. atmospheric pollution, safe access to the equipment, etc. but initially could be done every 6 months.

NOTE: Do not pressure wash fans, step-down or zig-zag transformers.

6.3 Standard Procedure

1. Access the resistor units by removing either the front or back cover and lifting the cover away.
2. Remove all dirt from cable terminals and insulators with a dry cloth.
3. Confirm all connections are tight; see Appendix A for proper torque values when verifying previously tightened connections.
4. Test the resistance value of the unit to confirm still correct.
5. Inspect the enclosure for damage or excessive corrosion and repair as needed.
6. Test fan rotation to confirm it is still functioning properly.
7. After inspection, be sure all covers are securely fastened.

6.4 Replacement Parts

1. Should it be necessary to replace any part of this equipment, the customer should contact the manufacturer. Refer to the drawing number of the equipment (on the nameplate) and give the part number and a description of the part required.

**FOR MORE INFORMATION ABOUT POST GLOVER RESISTORS,
OR TO PLACE AN ORDER, CALL 1-800-537-6144**

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Appendix A – Torque and Cabling Requirements

A.1 Torque Recommendations for Customer Connections

The following table provides the torque required when tightening customer connection hardware unless superseded by documentation provided with the sales order. To check or verify existing connections, set the desired torque value to 80% of the appropriate value in the table.

| SAE | | | | |
|---|------------|---------------------------|---------------------------|---------------------|
| | Size-Pitch | Torque Value Inch-Lbs. | Torque Value Foot-Lbs. | Torque Value N-m |
| 304, 316, or 18/8 Stainless Steel, Lubricated | #8-32 | 14.4 | 1.2 | 1.6 |
| | #10-32 | 24 | 2.0 | 2.7 |
| | ¼"-20 | 72 | 6 | 8 |
| | 5/16"-20 | 120 | 10 | 14 |
| | 3/8"-16 | 240 | 20 | 27 |
| | ½"-13 | 540 | 45 | 61 |
| Zinc Plated #2 Grade Higher, Dry | | | | |
| | Size-Pitch | Torque Value Inch-Lbs. | Torque Value Foot-Lbs. | Torque Value N-m |
| Zinc Plated #2 Grade Higher, Dry | #8-32 | 18 | 1.5 | 1.6 |
| | #10-32 | 24 | 2.0 | 2.7 |
| | ¼"-20 | 72 | 6 | 8 |
| | 5/16"-20 | 120 | 10 | 14 |
| | 3/8"-16 | 240 | 20 | 27 |
| | ½"-13 | 540 | 45 | 61 |
| METRIC | | | | |
| | Size-Pitch | Torque Value Inch-Lbs. | Torque Value Foot-Lbs. | Torque Value N-m |
| 304, 316, or 18/8 Stainless Steel, Lubricated | M4-0.7 | 24 | 2.0 | 2.7 |
| | M5-0.8 | 48 | 4.0 | 5.4 |
| | M6-1 | 72 | 6 | 8 |
| | M8-1.25 | 120 | 10 | 14 |
| | M10-1.5 | 240 | 20 | 27 |
| | M12-1.75 | 540 | 45 | 61 |
| | M14-2 | - | 75 | 102 |
| | M16-2 | - | 120 | 163 |

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A.2 Cable Recommendations for Non-Continuously Rated Devices Based on Published Requirements

| Ampacity of Resistor Assembly | Minimum Size of Copper Conductor (AWG) |
|-------------------------------|--|
| 100 A | 8 |
| 200 A | 6 |
| 400 A | 3 |
| 600 A | 1 |
| 800 A | 0 |
| Over 800 A | 00 |

Excerpt from C22.2 No 295-25 Table 3

For continuously rated devices, use cable having a rated ampacity not less than the ampere rating of the device. The minimum wire size is 8AWG.