## VariSTAR Type AZG2 Surge Arresters

**Installation and Maintenance Instructions**

<table>
<thead>
<tr>
<th>VariSTAR® SURGE ARRESTER</th>
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<tr>
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Olean, N.Y.
USA

VariSTAR Type AZG2 Surge Arresters

Installation and Maintenance Instructions

VariSTAR® SURGE ARRESTER

Cat. No. AZG2

Ser. No. 

Rating 

MCOV/COV 

Pres. Relief 40 kA sym

Class 2/10KA

Cert. IEC 99-4

Frequency 50-60 Hz

Alt. 0-12000 Ft. 0-3600 M

Olean, N.Y.
USA
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Contents

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY ........................................... 1
SAFETY INFORMATION ........................................................................................................ III
   Safety instructions ........................................................................................................ iii
PRODUCT INFORMATION ...................................................................................................... 1
   Introduction ................................................................................................................ 1
GENERAL APPLICATION RECOMMENDATIONS ................................................................. 1
IDENTIFICATION .................................................................................................................. 1
ASSEMBLY ............................................................................................................................ 1
   Base or Foundation Mounting .......................................................................................... 2
   Bracket or Structure Mounting ....................................................................................... 2
   Suspension Mounting ...................................................................................................... 2
ELECTRICAL CONNECTIONS ............................................................................................. 2
MAINTENANCE .................................................................................................................... 3
Safety for life

Eaton's Cooper Power series products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high-voltage lines and equipment and support our “Safety For Life” mission.

Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians, who are familiar with this equipment should install, operate and service it.

A competent technician has these qualifications:

• Is thoroughly familiar with these instructions.
• Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.
• Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
• Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

⚠️ DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠️ CAUTION
Indicates a hazardous situation which, if not avoided, could result in equipment damage only.

Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

⚠️ DANGER
Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.

⚠️ WARNING
Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

⚠️ WARNING
This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply may result in death, severe personal injury and equipment damage.

⚠️ WARNING
Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.
CAUTION:
Eaton’s Cooper Power series VariSTAR Type AZG2 surge arrester is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace proper safety and operating procedures. Read all the instructions before installing the arrester.

Surge arresters should be installed and serviced only by personnel familiar with good safety practice and the handling of high-voltage electrical equipment.

Product information

Introduction
Eaton’s Cooper Power series VariSTAR™ AZG2 Class 2, 10 kA surge arresters incorporate the latest in metal oxide varistor (MOV) technology. These arresters are totally gapless and are constructed of a single series column of 49 mm diameter MOV disks. The arrester is designed and tested exclusively to the requirements of the international standard IEC 99-4 and is available in ratings for the overvoltage protection of high-voltage systems through 260 kV.

Read this manual first
Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Additional information
These instructions cannot cover all details or variations in the equipment, procedures, or process described nor provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user’s purpose, please contact your Eaton representative.

Initial inspection
The factory takes special precautions to ship the arresters in well-designed containers that reduce the possibility of damage, which may occur during transit. Carefully inspect each arrester for physical damage. In case of improper handling or shipping damage, immediately file a claim with the carrier and promptly notify Eaton representative.

Handling and storage
If the arrester is to be stored for an appreciable time before installation, provide a clean, dry storage area. Locate the arrester so as to minimize the possibility of physical damage.

Quality standards
ISO 9001 Certified Quality Management System

General application recommendations
Eaton’s Cooper Power series product application engineers are available to make specific application recommendations.

Identification
A nameplate attached to the base casting of each VariSTAR arrester indicates its catalog number, voltage rating (Ur), continuous operating voltage (Uc), rated frequency, pressure-relief rated current, class, reference to the type test standard, altitude range, serial number, and year of manufacture.

For multiple unit arresters, a nameplate attached to the top casting of each unit indicates the catalog number and serial number of the complete arrester of which the unit forms a part. The unit nameplate also indicates the total number of units comprising the complete arrester and references the position of this unit in the complete assembly.

Initial inspection
The factory takes special precautions to ship the arresters in well-designed containers that reduce the possibility of damage, which may occur during transit. Carefully inspect each arrester for physical damage. In case of improper handling or shipping damage, immediately file a claim with the carrier and promptly notify Eaton representative.

CAUTION:
Always handle surge arresters carefully. Dropping arrester may cause serious damage to the porcelain and/or internal parts and may cause catastrophic failure upon energization.

Assembly
Assemble multi-unit VariSTAR Type AZG2 arresters in a series stack as indicated on the nameplate attached to the top casting of each unit. A grading ring is supplied for standard arresters rated 132 to 240 kV and some arresters of lower voltage rating having extra creepage housings. Grading ring assembly instructions are shown in Figure 7.
Choose a permanent location so that the arresters will be installed as close as possible (electrically) to the equipment being protected. Minimum clearance distances between any line potential surface to an arrester and to any ground plane are listed in Table 1. Figures 1 and 2 show alternate mounting arrangements. See Table 1 and Figure 5 for arrester dimensions and creepage distance information.

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**CAUTION:**

The values shown in Table 1 are the minimum clearances recommended by Eaton. These minimum clearances may be increased to meet local or system requirements for spacing of energized equipment. Safe operating practices must always be followed.

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**CAUTION:**

Make electrical connections so that no excessive mechanical stress is applied to the arrester.

---

**Base or foundation mounting**

Pier footings should extend below the frost line. Elevate the foundation sufficiently above the ground line for personnel safety and to prevent contamination from ground splash, drifting snow, flood water, or other contaminating conditions. If the foundation is not level, use shims and level. Mounting dimensions for the arrester are shown in Figure 6.

The base section (unit #1) shall be bolted to the foundation. Units #2, #3, and #4 (as applicable) shall be bolted in place, one unit at a time, until all arrester units and grading ring (if supplied) are assembled.

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**CAUTION:**

The vent port in the base must be directed away from adjacent equipment to prevent ionized gases from damaging other equipment in the unlikely event of arrester failure.

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**Bracket or structure mounting**

When bolting arresters directly to structures, or mounting brackets, make the assembly rigid enough to prevent mechanical failure.

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**Suspension mounting**

Arresters rated through 120 kV can be suspension mounted. Either the top or bottom of suspension mounted arresters can be connected to line potential as long as the porcelain sheds are not inverted. For additional information regarding suspension mounting, contact your Eaton factory representative.

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**Electrical connections**

Install the arrester as close as possible (electrically) to the apparatus being protected. Line and earth connections must be short and direct. Make the earth connection to a solid, effective and permanent low resistance earth.

**Note:** Equipment protection will be improved by always interconnecting the arrester earth connections with the transformer tank and system neutral whenever possible.

The standard line terminal (Figure 3) and earth terminal (Figure 4) include connector clamps that accommodate 14-335 mm² stranded copper or aluminum conductor.

The line and ground terminals allow the connector clamp to be positioned for vertical or horizontal conductor takeoff; in addition, they accommodate industry standard two or four-hole connectors.
VariSTAR Type AZG2 Surge Arresters Installation and Maintenance Instructions

Figure 4. Line terminal cap.

Note: Line and earth terminals (suitable for copper or aluminum conductors up to 335 mm² (up to a maximum diameter of 20 mm)).

Maintenance

WARNING
Before working on arresters, disconnect all line leads. Consider any part of an arrester dangerous when connected to the line including a base not solidly earthed.

Figure 5. Earth terminal.

Note: Line and earth terminals (suitable for copper or aluminum conductors up to 335 mm² (up to a maximum diameter of 20 mm)).

Figure 6. Dimensions of VariSTAR Type AZG2 Surge Arrester.

Note: Refer to Table 1, page 4, for Dimension A. VariSTAR Type AZG2 arresters require no maintenance under normal conditions. If the arrester is installed in an area of severe contamination, keep the arrester housing clean by washing periodically. Keep line and ground connections tight.

WARNING
Arresters can be washed while energized provided standard live washing procedures are followed.

Figure 7. Base mounting details.

* To develop rated cantilever strength use 254 mm bolt circle mounting diameter and 12 mm hardened bolts and flat washers.
Figure 8. Grading ring assembly.

Note: Arresters with extra creepage housing may require grading rings in different voltage ratings.
VariSTAR Type AZG2 Surge Arresters Installation and Maintenance Instructions

Table 1. Catalog Numbers and Dimensional Information for Standard Arresters (Contact Eaton Representative for Catalog Numbers of Non-standard Arresters)

<table>
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<th>Uc COV. (kV, rms)</th>
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<th>Figure 5 View Number</th>
<th>Dimension B Phase-to-Earth Clearance* (mm)</th>
<th>Dimension C Minimum Phase-to-Phase Clearance* (mm)</th>
<th>Housing Creepage Distance (mm)</th>
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Note:
1. Position #5 designates special nameplate options:
   0-English
   1-Spanish – American
   2-Portuguese – Brazil
   3-Portuguese – Portugal
   4-Spanish – Spain (Castilian)
2. All arresters are available in grey (standard) or brown porcelain glaze. For brown glaze, substitute “B” for “G” in the eighth position of the catalog number.
3. Digit 6 & 7 housing designation may be modified for arresters requiring creepage distance other than the standard arresters shown.
4. Cantilever strength for all ratings is 10,200 NM. Maximum working load should not exceed 40% of this value.
5. Refer to Figure 2 for illustration of Dimensions C and D and Figure 5 for Dimension A.
* Phase-to-Phase clearances are expressed as minimum arrester center-to-center distances. Phase-to-Earth clearances are expressed as minimum arrester centerline-to-ground distances.