

DirectConnect

35 kV class DirectConnect elbow arrester installation instructions



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Safety for life



Eaton meets or exceeds all applicable industry standards relating to product safety in its Cooper Power™ series products. 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 arc flash clothing, safety glasses, face shields, hard hats, rubber gloves, clampsticks, hotsticks, 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 AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

⚠ WARNING
INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ CAUTION
INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY.

NOTICE
INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY 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 HAZARDOUS 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 CAN 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.

Product information

Introduction

Eaton's Cooper Power™ series DirectConnect™ elbow arresters provide overvoltage protection to underground systems. They protect both the equipment and the cable from surge damage.

⚠ CAUTION

THE DIRECTCONNECT ARRESTER IS DESIGNED TO BE OPERATED IN ACCORDANCE WITH NORMAL SAFE OPERATING PROCEDURES. THESE INSTRUCTIONS ARE NOT INTENDED TO SUPERSEDE OR REPLACE EXISTING SAFETY AND OPERATING PROCEDURES. THE DIRECTCONNECT ARRESTER SHOULD BE INSTALLED AND SERVICED ONLY BY PERSONNEL FAMILIAR WITH GOOD SAFETY PRACTICES AND THE HANDLING OF HIGH-VOLTAGE ELECTRICAL EQUIPMENT. IT MAY BE INSTALLED OR REMOVED FROM A SYSTEM ACCORDING TO APPROVED UTILITY PRACTICES FOR REMOVAL OF DEADBREAK TERMINATORS.

⚠ WARNING

HAZARDOUS VOLTAGE. ALL ASSOCIATED APPARATUS MUST BE DE-ENERGIZED DURING HANDS-ON INSTALLATION OR MAINTENANCE. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

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.

Acceptance and initial inspection

Each DirectConnect elbow arrester is completely assembled, inspected, and tested at the factory. It is in good condition when accepted by the carrier for shipment. Upon receipt of a DirectConnect elbow arrester, inspect it thoroughly for damage and loss of parts incurred during shipment. If damage or loss is discovered, file a claim with the carrier immediately.

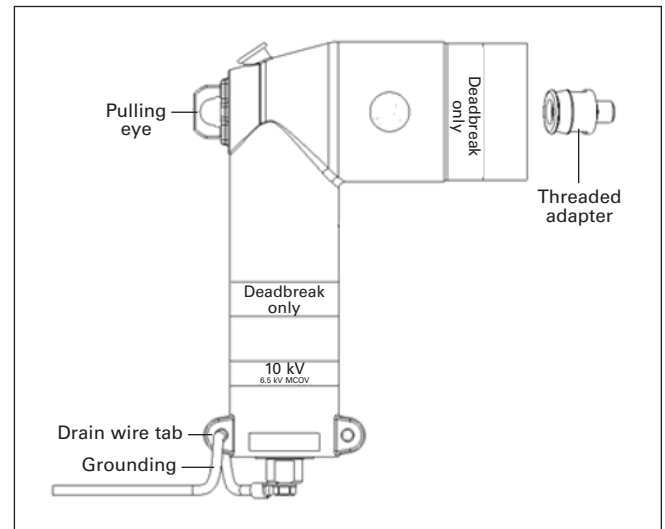
Handling and storage

If the DirectConnect elbow arrester is to be stored for an appreciable time before installation, provide a clean, dry storage area.

Standards

ISO 9001 Certified Quality Management System.

Figure 1. DirectConnect deadfront elbow arrester



Installation information

The DirectConnect elbow arrester should be installed only on systems where the power frequency voltage at the arrester does not exceed the maximum continuous operating voltage (MCOV). MCOV values are shown in **Table 1** on **page 3**.

All DirectConnect elbow arresters must be installed or removed from a de-energized bushing with a hotstick.

Note: Because the DirectConnect elbow arrester has a completely grounded case, it may be installed anywhere within the apparatus primary compartment. Determine the space requirements of the DirectConnect elbow arrester and ground lead before installation so that they do not restrict the installation, operation, or removal of other devices.

WARNING

HAZARDOUS VOLTAGE. ALL ASSOCIATED APPARATUS MUST BE DE-ENERGIZED DURING HANDS-ON INSTALLATION OR MAINTENANCE. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION

HAZARDOUS VOLTAGE. DO NOT INSTALL AN ARRESTER IF THE VOLTAGE OR MCOV DATA LISTED ON THE ARRESTER LABEL ARE NOT EXACTLY THE SAME AS THAT LISTED ON THE CARTON LABEL. DO NOT INSTALL THE ARRESTER IF THE SYSTEM LINE-TO-GROUND VOLTAGE EXCEEDS THE MCOV RATING ON THE ARRESTER. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

Installation on a de-energized system

Note: Verify the DirectConnect elbow arrester has the proper interface and voltage rating for the application.

Note: The DirectConnect elbow arrester is a deadbreak device and is to be installed only when the system is de-energized. It is recommended that the elbow arrester be installed with the ground end of the elbow arrester downward or at the adjacent ground plane.

Note: Excessive force on the ground lead may cause the metal plug to pull out of the arrester housing. Never handle the elbow arrester by the attached ground lead.

Note: The bolt attaching the ground lead to the threaded metal plug is factory installed to the proper torque value. Do not remove or retighten. Over torquing of the ground lead bolt may damage the elbow arrester.

Installation procedures

WARNING

HAZARDOUS VOLTAGE. ALL ASSOCIATED APPARATUS MUST BE DE-ENERGIZED DURING HANDS-ON INSTALLATION OR MAINTENANCE. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

Complete elbow arrester kit includes:

- Elbow arrester body
- Adapter
- Silicone lubricant
- Instruction sheet

Tools/accessories needed:

- 1-1/8 inch open-end wrench or adjustable wrench
- Hotstick
- Personal protective equipment

Detailed assembly instructions

Step 1. Verify de-energized state. Attach ground lead of the arrester (connected to the base of the arrester) to the system ground with 4 to 8 ft-lb torque.

Step 2. Verify that the grounded drain wire is routed through the rear elbow arrester drain wire tab. This ensures that the arrester is grounded if the plug is separated during a pressure relief event.

Step 3. Lubricate the arrester interface with the lubricant supplied.

Step 4. Remove the insulated protective cap from the apparatus bushing.

Step 5. Verify ground lead attachment.

⚠ WARNING

HAZARDOUS VOLTAGE. ALWAYS ASSEMBLE THE ADAPTER ONTO THE 600 A DEADBREAK BUSHING BEFORE ATTACHING THE ELBOW ARRESTER. FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

Step 6. Install the adapter into the mating threads of the apparatus. Thread the adapter into the 600 A bushing by hand until the adapter bottoms out on the bushing rod. Then using a 1-1/8 inch open end wrench or an adjustable wrench, engage the flats across the adapter and apply enough clockwise force to the adapter until the outer circumference of the adapter rotates an additional 1/16 to 1/8 inch.

Step 7. Lubricate the bushing with the lubricant supplied.

Step 8. Grasp the pulling eye of the arrester firmly using a hotstick. Position the tip of the arrester probe just into the nose of the adapter. Position the arrester so that its grounded end points downward or at an adjacent ground plane.

Step 9. Thrust the arrester firmly onto the bushing.

Step 10. To check that the elbow arrester is properly latched, apply a gentle pull force to the hotstick. When latched properly, the elbow arrester will not slide back off of the bushing.

Step 11. As a last operation, push on the hotstick to seat the elbow arrester all the way onto the bushing again.

This ensures that the elbow is latched and was not dislodged during the latching check in the previous step.

Figure 2. Use wrench to install adapter into mating threads of apparatus bushing

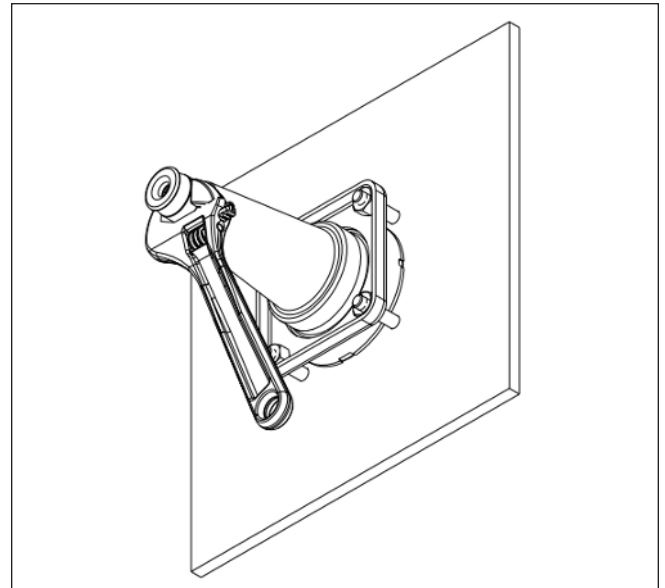


Table 1. Recommended M.O.V.E. arrester applications

System voltage (kV rms)		Commonly applied arrester duty-cycle (MCOV) voltage rating (kV rms) on distribution systems		
Nominal voltage (kV)	Maximum voltage range B (kV)	Four-wire multi-grounded neutral wye	Three-wire low impedance grounded ①	Delta and three-wire high impedance grounded
24.94 Y / 14.40	26.40 Y / 15.24	18.00 (15.3)	27.00 (22.0)	—
27.60 Y / 15.93	29.25 Y / 16.89	21.00 (17.0)	30.00 (24.4)	—
34.50 Y / 19.92	36.51 Y / 21.10	27.00 (22.0)	36.00 (29.0)	—
46.00 Y / 26.60	48.30 Y / 28.00	36.00 (29.0)	—	—

① Line-to-ground fault duration not to exceed 30 minutes. For longer durations, contact the factory for proper rating.



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