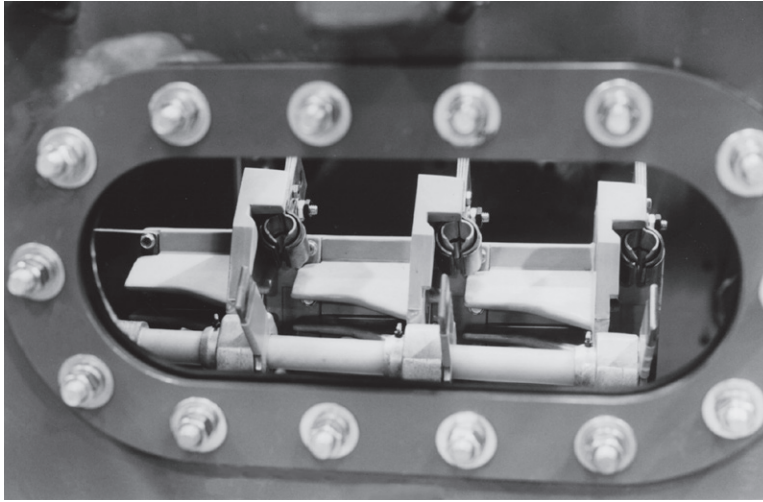


Visible-Break switch accessory operation instructions



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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, 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 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.

CAUTION

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.

G103.3

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.

G101.0

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.

G102.1

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.

G122.3

Product information

Introduction

Service Information Bulletin MN285011EN provides operation information for the Visible-Break switch accessory optionally employed on Eaton's Cooper Power series type VFI and RVAC padmounted switchgear products.

The information contained in this manual is organized into the following major categories; Safety Information, Product Information, Ratings, Product Description and Operation. Refer to the table of contents for page numbers.

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing, operating or maintaining this equipment. Further supplementary information can be found in any of the following service information bulletins provided with your particular padmounted switchgear unit:

- MN285006EN, Type VFI, Oil-Insulated, Vacuum Fault Interrupter; Installation, Operation and Maintenance Instructions.
- MN285013EN, Type Shrubline VFI, Vacuum Fault Interrupter; Installation, Operation and Maintenance Instructions.
- MN285005EN, Type RVAC, Oil-Insulated, Vacuum Switchgear; Installation, Operation and Maintenance Instructions.

Additional information

These instructions do not claim to cover all details or variations in the equipment, procedures, or process described, nor to 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, contact your Eaton representative.

ANSI standards

Type VFI Padmount Switchgear products are designed and tested in accordance with ANSI standards C37.60, C37.72, C37.85, C.57.12.28 and ANSI Standard 386.

Quality standards

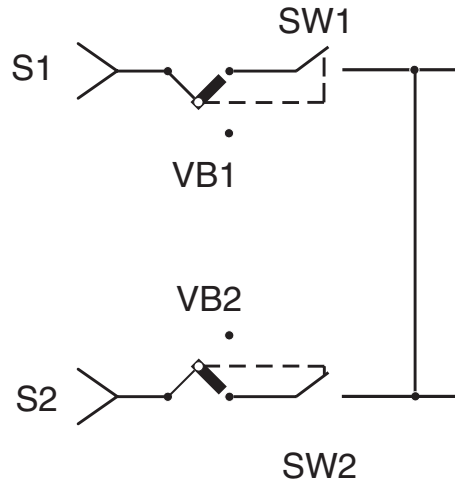
ISO 9001 Certified Quality Management System

Ratings

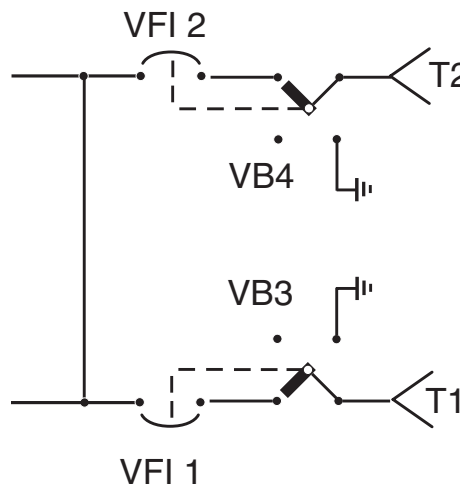
The Visible-Break accessory switch is capable of withstanding the same momentary, and close and latch values as the vacuum interrupter mechanisms employed within the switchgear. Refer to the Service Bulletin provided with your unit for ratings specific to the switchgear.

Product description

Eaton's Cooper Power series Visible-Break switch accessory for padmounted switchgear provides positive, visual verification of source-side and/or tap-side contact status (Figure 3). It is available in two- and three-position configurations (Figure 2). The two-position configuration provides Open and Close functionality. The three-position accessory provides Open, Closed, and Ground functionality.



Two-Position
Visible-Break Accessory
Shown on Source Side of Switchgear



Three-Position
Visible-Break Accessory
Shown on Tap Side of Switchgear

Figure 1. Two- and three-position Visible-Break switch configurations

The Visible-Break switch accessory consists of a 4 x 11 inch viewing window for observation of the switch contacts, a 35kV rated switch with rotary handle, index plate, and mechanical interlock mechanism. The rotary handle and index plate are located under a protective pocket door on the side of the padmounted switchgear; viewing windows are located on the front plate adjacent to the switch (Figure 3). The oil switch and interlock mechanisms are located within the central tank.

Viewing window

The viewing window (Figures 1 and 3) enables visual confirmation of the status of the padmounted switchgear contact status. With the aid of a flashlight the Visible-Break switch contact blades can be observed either in the OPEN, CLOSED or GROUND positions (Figures 4, 5, and 6).

Rotary switch handle

The rotary switch handle (Figure 3) enables placement of the Visible-Break switch contacts into the OPEN, CLOSED, and GROUND positions (Figures 4, 5, and 6). The side-mounted rotary switch is operated by a shotgun stick or by a hand operable T-handle. During switching operations the handle must be rotated approximately 45 degrees beyond the targeted switch position to overcome the spring latching mechanism. An index plate (Figure 7) on three-position Visible-Break safety switches limits free travel of the rotary switch handle and prevents the Visible-Break switch and rotary switch handle from being rotated from the CLOSED position, through the OPEN position, to the GROUND position in one continuous movement.

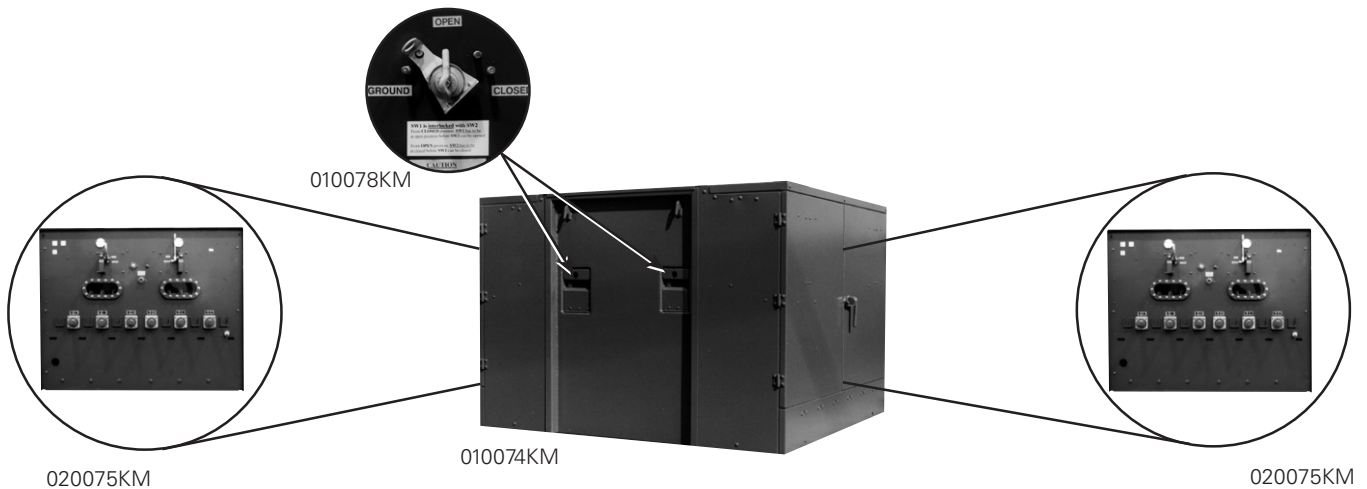
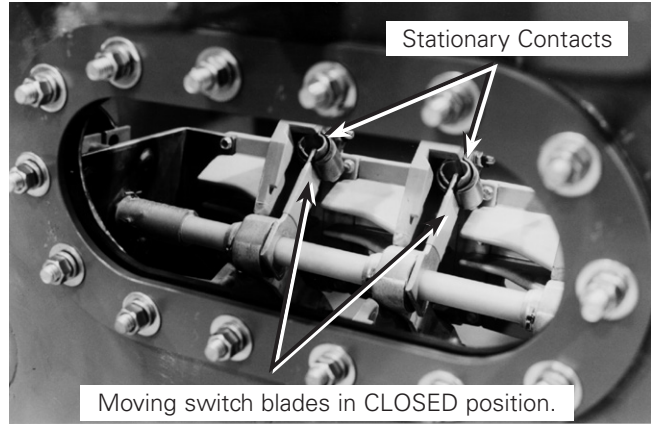
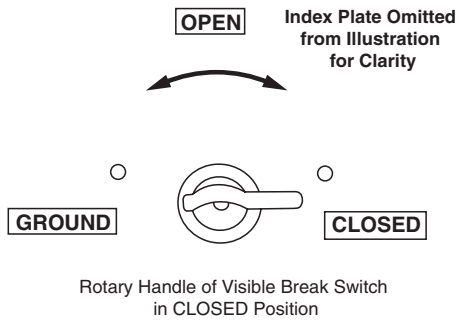


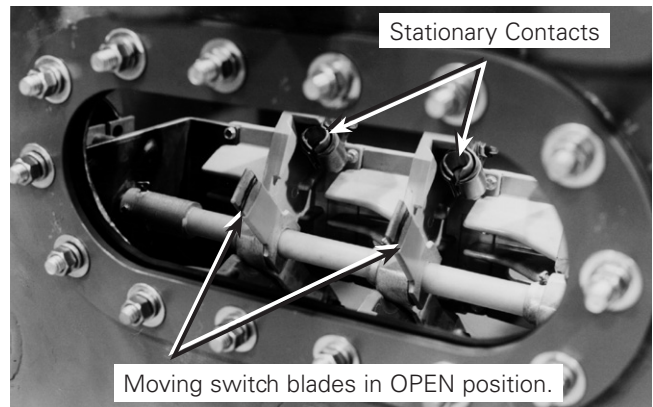
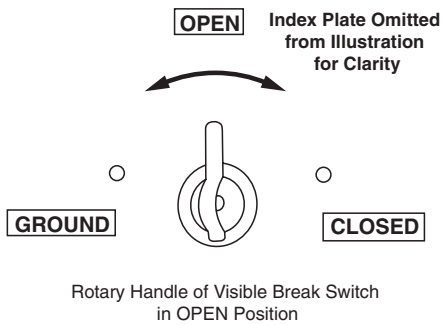
Figure 2. Location of Visible-Break viewing windows on internal frontplate panels, and rotary switch handles on exterior wall of central tank

Visible-Break accessory switch positions



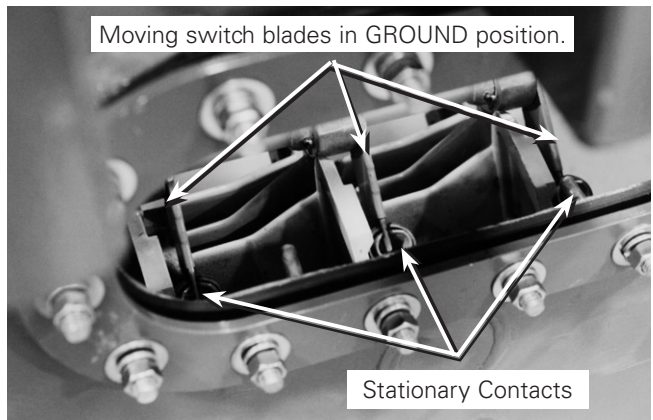
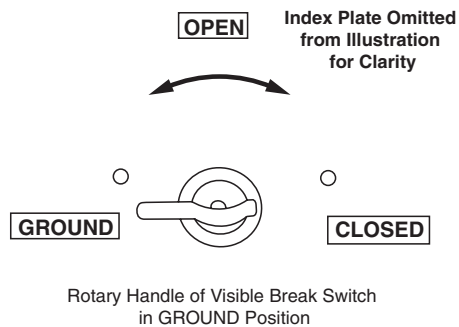
010075KM

Figure 3. Visible-Break switch in CLOSED position as observed through viewing window



010076KM

Figure 4. Visible-Break switch in OPEN position as observed through viewing window



010077KM

Figure 5. Visible-Break switch in GROUND position as observed through viewing window

Index plate

Three-position Visible-Break switches feature an index plate (Figure 7) which prevents rotation of the rotary switch handle and switch contacts from the CLOSED position, through the OPEN position, to the GROUND position in one continuous movement.

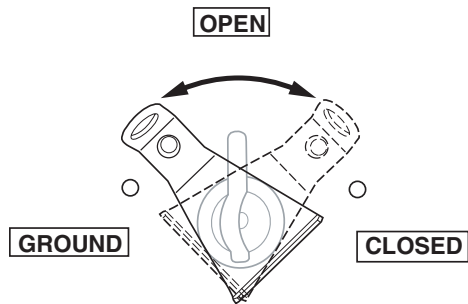


Figure 6. Index plate

The index plate physically interferes with the free travel of the rotary switch between its extremes of travel; the index plate must be shifted to its alternate position prior to completing a CLOSED to GROUND, or GROUND to CLOSED switch sequence.

Repositioning of the index plate is accomplished by lifting the index plate off of either the left or right travel stop, rotating the sequence plate toward the opposite travel stop, and parking the sequence plate over the targeted travel stop.

For three-position Visible-Break switches, one of two sequences will be followed when completing a CLOSED to GROUND, or GROUND to CLOSED switch sequence. When moving from CLOSE to GROUND, the rotary switch handle must be moved from the CLOSE position to the OPEN position, followed by the counter-clockwise rotation of the index plate prior to final placement of the rotary switch handle into the GROUND position. When returning the Visible-Break switch to CLOSE state operation from the GROUND position, the rotary switch handle must be moved from the GROUND position to the OPEN position, followed by the clockwise rotation of the index plate before placing the rotary handle into the CLOSE position.

Note: The rotary switch handle of two-position (OPEN/ CLOSE) Visible-Break units may be rotated from OPEN to CLOSE, and vice-versa, without any adjustment or repositioning of the index plate required.

Mechanical interlock mechanism

The mechanical interlock mechanism of the Visible-Break switch accessory coordinates safe switching operations. It ensures all high current closing and opening operations are performed by the high-current rated vacuum bottle interrupter assemblies employed within the source switches and VFI Vacuum Fault Interrupters of Eaton's Cooper Power series padmounted switchgear.

During opening operations the interlock mechanism prevents the contacts of the Visible-Break switch from being rotated to the open position until the vacuum source switches/vacuum fault interrupters are opened via the operating lever (Figure 8).

Similarly, during closing operations, the interlock mechanism prevents the contacts of the vacuum source switches/vacuum fault interrupters from being closed until the Visible-Break switch is closed via the rotary operating handle.

Padlock provision

A padlock provision on the access door of the Visible-Break switch provides positive lockout, and protection from unauthorized access to the Visible-Break mechanism.

Operation

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.

G102.1

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.

G103.3

WARNING

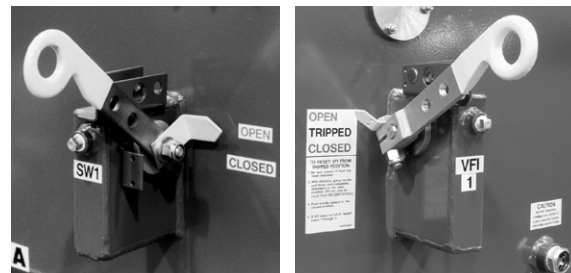
Hazardous Voltage. Always use a shotgun stick when working with this equipment. Failure to do so could result in contact with high voltage which will cause death or severe personal injury.

G108A.0

Opening

To open the contacts of the Visible-Break switch the following sequence must be followed:

1. Observe the Visible-Break switch blades through the inspection window and verify the switch is in the CLOSED position (Figure 4).
2. Move the yellow operating handle of the interlocked source switch or vacuum fault interrupter associated with the Visible-Break accessory to the OPEN position. See Figure 8.



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Figure 7. Source switch (left) and vacuum fault interrupter (right) operating handles in open position

Visible-Break switch accessory operation instructions

3. Unlock and swing open the side-mounted access door protecting the Visible-Break rotary switch handle.
4. Rotate the rotary switch handle to the OPEN position.
5. Observe the Visible-Break switch blades through the viewing window and verify the contacts are open. See Figure 5.
6. Close and padlock the Visible-Break access door prior to performing any inspection or maintenance to the padmounted switchgear.

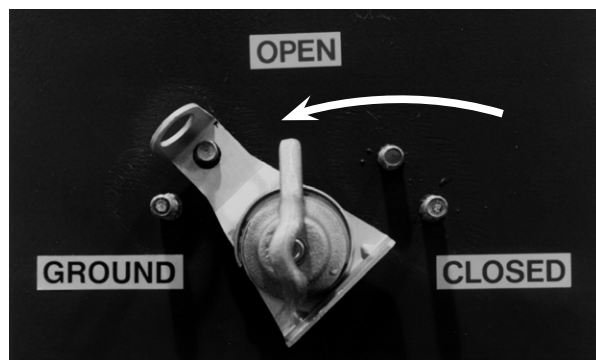
Grounding—three-position Visible-Break units only.

1. Observe the Visible-Break switch blades through the viewing window and verify the the switch is in the closed position (Figure 4).
2. Unlock and swing open the side-mounted access door protecting the rotary switch handle.
3. Rotate the rotary switch handle to the OPEN position.
4. Rotate the index plate counter-clockwise, over and on to the left travel stop (See Figure 9).

IMPORTANT

De-energize the bushings associated with the Visible-Break switch accessory before placing the Visible-Break accessory switch into the ground position. Failure to comply can result in passage of ground fault current through the switchgear, which can cause equipment damage. Refer to the one-line phase diagram located on the inside panels of the source- and tap-side cabinet doors for positive identification of Visible-Break switch accessories and associated bushings.

5. Further rotate the rotary switch handle to the GROUND position.
6. Observe the Visible-Break switch blades through the window and verify the Visible-Break switch is in the GROUND position. See Figure 6.
7. Close and padlock the Visible-Break access door prior to performing any inspection or maintenance to the padmounted switchgear or downstream devices.



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Figure 8. Index plate placed in leftmost position prior to rotating handle to ground position

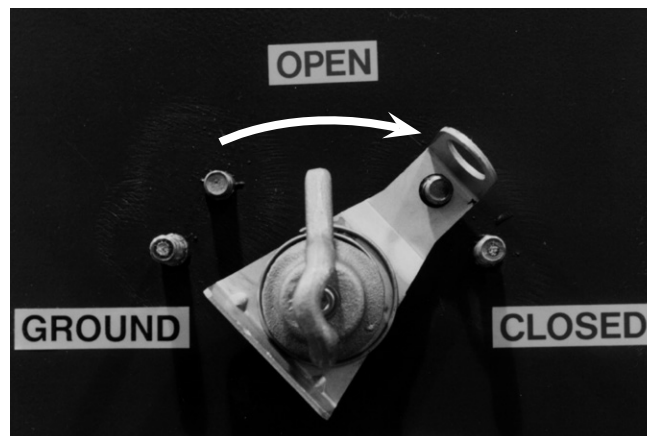
Closing

1. Observe the Visible-Break switch blades through the viewing window and verify the status of the switch contacts. Three-position configured switches may be either in the ground position (Figure 6) or in the open position (Figure 5). If starting in the open position, omit step 3. Two-position configured switches should be in the open position (Figure 5).
2. Unlock and swing open the side-mounted access door protecting the rotary handle.
3. Rotate the Visible-Break rotary switch handle to the OPEN position from the GROUND Position (three-position Visible-Break switches only).
4. Rotate the index plate clockwise, over and on to the right travel stop (three-position-Visible-Break switches only). See Figure 10.

IMPORTANT

During restoration of padmounted switchgear to CLOSED mode of operation from GROUND mode of operation, place Visible-Break switch into the CLOSED position before re-energizing source bushings. Failure to comply can result in equipment damage.

5. Rotate the rotary switch handle to the CLOSED position.
6. Observe the Visible-Break switch blades through the window and verify the contacts are in the closed position. See Figure 4.
7. Move the yellow operating handle of the interlocked source switch or vacuum fault interrupter associated with the Visible-Break accessory to the CLOSE position.
8. Close and padlock the Visible-Break access door before returning the switchgear to service.



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Figure 9. Index plate placed in rightmost position prior to rotating handle to close position

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