

VacuFuse™ Self-Resetting Interrupter—Quick Operation Guide

Outdoor Distribution (5 kV, 15 kV, and 25 kV)

⚠ WARNING

VacuFuse Self-Resetting Interrupters must be installed, operated, and maintained by qualified persons who are knowledgeable in overhead electric power distribution equipment and the associated hazards. This guide is not a replacement for adequate training and experience in safety procedures for this product. Read S&C Instruction Sheet 465-500 thoroughly and carefully before installing or operating your VacuFuse Self-Resetting Interrupter.

⚠ DANGER

VacuFuse Self-Resetting Interrupters may be energized from either side and in any position. Always consider all parts live until de-energized, tested, and grounded.

If the VacuFuse Self-Resetting Interrupter is Found Open

⚠ WARNING

The VacuFuse Self-Resetting Interrupter is designed to protect distribution transformers from internal and external fault current. A VacuFuse interrupter found in the **Open** position should not be closed using the OPEN/CLOSE lever until the cause of the fault current has been determined and repaired. Closing without repairing the fault could result in equipment damage, injury, or death.

After responding to an overcurrent event, in either the **Auto** or the **NR** mode, the VacuFuse interrupter's vacuum interrupter will open and the position indicator will show a green target. See Figure 6. Opening the vacuum interrupter disconnects the VacuFuse interrupter's sensing and display functions from line power, and all LEDs will be inoperative after one minute. If the VacuFuse interrupter is found in the **Open** position:

- STEP 1.** Open and drop open, or remove the VacuFuse interrupter from its mounting if required by utility practice, following the steps in "Installing and Removing a VacuFuse Interrupter from the Cutout Mounting" section.
- STEP 2.** Determine and resolve the cause of the fault.
- STEP 3.** After determining the cause for the fault and making necessary repairs, install the VacuFuse interrupter into its mounting as described in the "Closing the VacuFuse Interrupter into the Cutout Mounting" section.

If Maintenance is to be Performed on the Transformer

- STEP 1.** Open the VacuFuse interrupter by pushing up on the OPEN/CLOSE lever using the straight prong of a Talon™ Handling Tool.
- STEP 2.** Open and drop open or remove the VacuFuse interrupter from its mounting, if required by utility practice, following the steps in "Installing and Removing the VacuFuse Interrupter from the Cutout Mounting" section. This creates an open gap. Depending on your utility's standard practices, additional testing or grounds may be required.
- STEP 3.** Follow the utility's standard practice for performing transformer maintenance.

After maintenance has been completed, install the VacuFuse interrupter into its mounting following the steps in "Installing and Removing a VacuFuse Interrupter from the Cutout Mounting" section.

Opening and Closing the VacuFuse Interrupter

The VacuFuse interrupter can be open or closed using the yellow OPEN/CLOSE lever. See Figure 2. The VacuFuse interrupter will not drop out of the cutout mounting when in the **Open** position. It will remain upright until removed manually. Read and understand the WARNING message in the "If the VacuFuse Self-Resetting Interrupter is Found Open" section.

To Open

Push the notched side of the yellow OPEN/CLOSE lever up firmly using the straight prong of the Talon tool or a distribution prong. The vacuum interrupter inside the VacuFuse interrupter will open, and the green position indicator will display. See Figures 2 and 6.

To Close

Pull the ring of the yellow OPEN/CLOSE lever down firmly using the straight prong of the Talon tool or a distribution prong. The vacuum interrupter inside the VacuFuse interrupter will close, and the red position indicator will display. See Figures 2 and 5. If the VacuFuse interrupter is closed into a fault, it will trip open independently of any force still applied to the OPEN/CLOSE lever.

To Reset the OPEN/CLOSE lever after Manually Closing into Fault Current

If the VacuFuse interrupter is manually closed into fault current, it will trip open, leaving the lever in the **Closed** position and the vacuum interrupter in the **Open** position. The lever can be reset by operating it into the **Open** position. Then, if desired, close the VacuFuse interrupter by pulling down on the OPEN/CLOSE lever.

Setting the MODE SELECTOR Lever

Before leaving the VacuFuse interrupter, verify the MODE SELECTOR lever is in the desired position for the installation. The MODE SELECTOR lever has two positions. When the lever is up, it is in **Auto** mode. When the lever is down, it is in **NR** (Non-Reclose) mode. To set the MODE SELECTOR lever, rotate it to the desired position with the straight prong of a Talon tool or distribution prong.

Auto Mode

In **Auto** mode, the VacuFuse interrupter will respond to fault current in accordance with its preset TCC curve. The VacuFuse interrupter will perform one **Reclosing** operation (two **Trip** operations total) to lock open. The open interval between operations is a user-specified time between 0.5 and 5 seconds. The protection sequence reset time is a user-specified interval between 30 seconds and 15 minutes. If a fault persists to the end of the protection sequence, the VacuFuse interrupter will remain in the **Open** position until manually closed. The VacuFuse interrupter will not drop out and will remain upright in the cutout mounting. The interrupter is in **Auto** mode when the curved label on the MODE SELECTOR lever side of the housing is fully covered and when the label on the base of the lever matches with the label on the bottom of the housing. See Figure 6.

NR Mode

In **NR** (Non-Reclose) mode, the VacuFuse interrupter will operate using the instantaneous curve.

The VacuFuse interrupter will open and lock open and not attempt to reclose. The VacuFuse interrupter is in **NR** mode when the red curved line on the side of the housing is visible and the amber NR LED on the base of the interrupter is blinking at a 2-second interval. See Figures 1 and 5 and the "Understanding the LED Indicators and Position Indicators" section.

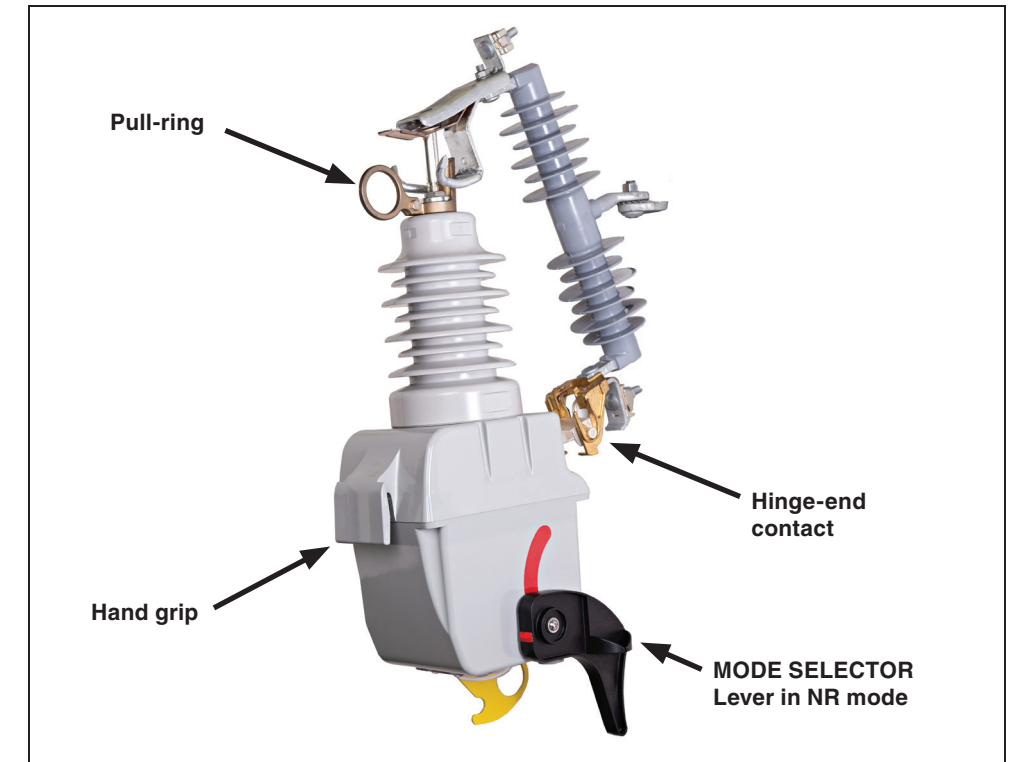


Figure 1. The VacuFuse Self-Resetting Interrupter—MODE SELECTOR lever side

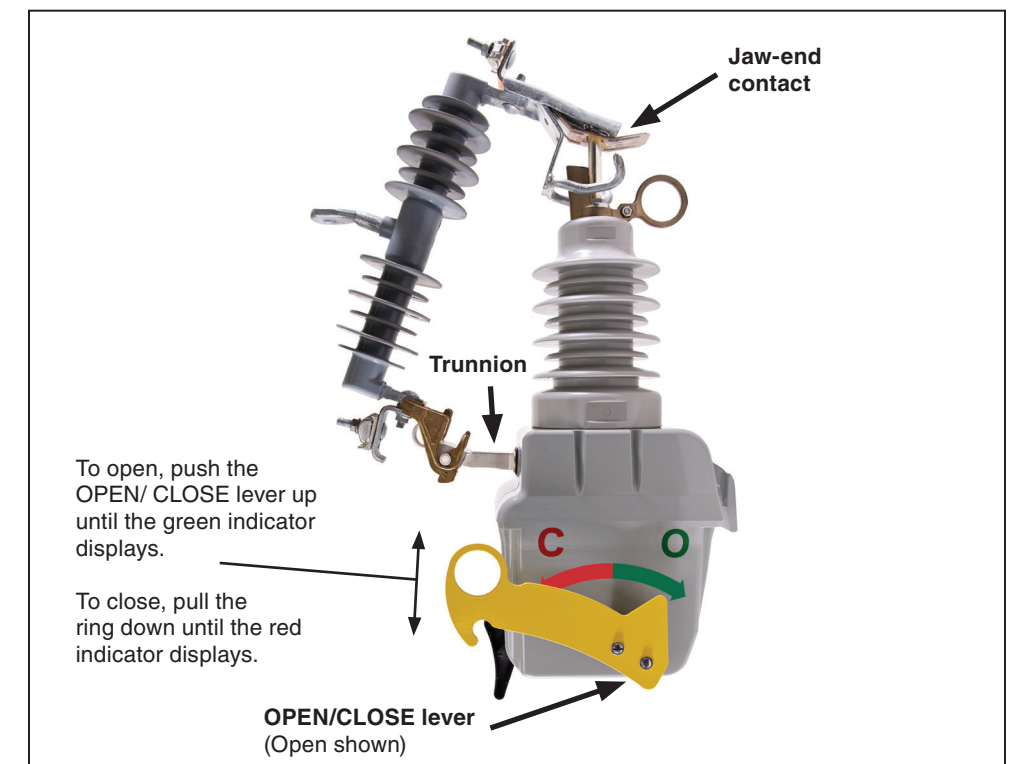


Figure 2. The VacuFuse Self-Resetting Interrupter—OPEN/CLOSE lever side.



Closing the VacuFuse Interrupter into the Cutout Mounting

⚠ WARNING

The VacuFuse interrupter is different from other cutout-mounted devices such as fuses. Before using a VacuFuse interrupter, installation training using both a hotstick and extendostick must be provided so line crews know how to correctly install the VacuFuse interrupter in the field to avoid potential serious injury or death.

Special attention should be paid to how the VacuFuse interrupter behaves when being closed into its mounting.

When the MODE SELECTOR lever is in the **Auto** (up) position, the VacuFuse interrupter will operate in **Non-Reclose (NR)** mode for the first 10 seconds. The active Time-Current Characteristic (TCC) curve will be the initial trip curve (TCC0). If a fault is not present on the line, after 10 seconds the VacuFuse interrupter will revert to **Auto** mode and the active TCC curve will be the same TCC0. If a fault is present on the line, the VacuFuse interrupter will trip open and lock open.

When closing with the MODE SELECTOR lever in the **Non-Reclose** (down) position, the VacuFuse interrupter will operate in **NR** mode until the MODE SELECTOR lever is moved to the **Auto** (up) mode position. The active TCC curve will be the instantaneous curve.

To close a VacuFuse interrupter into the cutout mounting:

- STEP 1.** Confirm that the VacuFuse interrupter is in the **Open** position by viewing its position indicator. Stand firmly in front of and in line with the cutout mounting. Do not operate standing directly underneath. If using an extendostick, stand 6 to 10 feet (183 to 305 cm) away from the utility pole.
- STEP 2.** Insert the straight prong of a Talon tool or a distribution prong into the pull-ring.
- STEP 3.** Swing the VacuFuse interrupter to within approximately 45 degrees of the **Closed** position. See Figure 3.
- STEP 4.** While firmly gripping the stick, drive the VacuFuse interrupter closed with forward force. Maintain the forward force until the VacuFuse interrupter properly closes and latches into the cutout mounting.
- STEP 5.** Disengage the prong from the pull-ring taking care to avoid pulling the VacuFuse interrupter open.
- STEP 6.** Verify the MODE SELECTOR lever is in the proper position for the application, either **Auto** or **NR** mode. Then, pull the OPEN/CLOSE lever down to close the VacuFuse interrupter and energize the transformer.

NOTICE

For a video about installing the VacuFuse Self-Resetting Interrupter visit sandc.com/vacufuse-video.

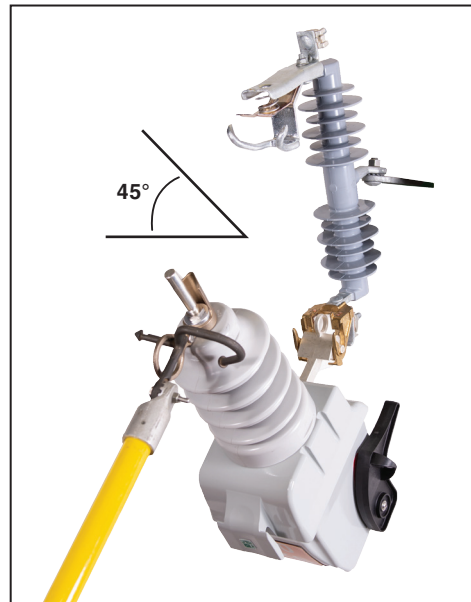


Figure 3. Angle to achieve before closing.

Installing and Removing a VacuFuse Interrupter from the Cutout Mounting

To install a VacuFuse interrupter into a cutout mounting:

- STEP 1.** Visually inspect the cutout mounting for damage or excessive wear. If damage is visible, replace the cutout mounting. Make any electrical connections to the cutout mounting. If aluminum conductors are used, wire-brush them and apply a coating of oxidation inhibitor before inserting them into the connectors.
- STEP 2.** Use appropriately rated insulated gloves. With the OPEN/CLOSE lever in the **Open** position, insert the VacuFuse interrupter into the cutout mounting with gloved hands, as shown in Figure 4. Guide the trunnion into the hinge of the cutout mounting. Close as described in the “Closing the VacuFuse Interrupter into the Cutout Mounting” section.

To open the vacuum interrupter, drop open, and remove a VacuFuse interrupter from a cutout mounting:

⚠ WARNING

Do NOT attempt to remove a VacuFuse interrupter from its cutout mounting with the interrupter in the **Closed** position. The VacuFuse interrupter is in the **Closed** position when the position indicator at the base displays a red target. Removing the VacuFuse interrupter from its cutout mounting in the **Closed** position may cause arcing, equipment damage, serious injury, or death.

- STEP 1.** Open the vacuum interrupter inside the VacuFuse interrupter by pushing up on the notch of the yellow OPEN/CLOSE lever. Confirm the position indicator at the base of the VacuFuse interrupter displays a green target. See Figure 6.
- STEP 1.** With a Talon tool or distribution prong, pull the pull-ring of the **Closed-Into-Cutout** position and drops open. A swift, firm pull will be required.
- STEP 2.** Using appropriately rated insulated gloves, remove the VacuFuse interrupter from the cutout mounting with gloved hands. See Figure 4.

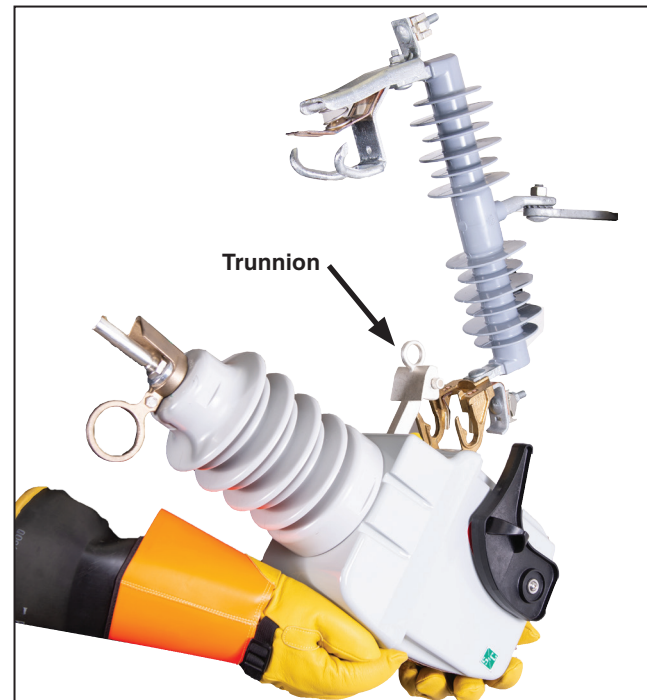


Figure 4. Carefully lift the trunnion out of, or place the trunnion into, the hinge-end contact.

Understanding the LED Indicators and Position Indicators

LED Indicators

Two LED indicators are on the base of the VacuFuse interrupter. See Figures 5 and 6.

The HEALTH INDICATOR LED is white and indicates the health state of the VacuFuse interrupter. When the interrupter is powered, the LED will flash white at a 30-second interval to indicate a healthy condition. If the VacuFuse interrupter is in an unhealthy state, the white LED will “fast-blink” at a one-second interval. An off LED indicates either the MODE SELECTOR lever is in the **NR** (down) position or the VacuFuse interrupter is no longer connected to line power. The HEALTH LED will only remain lit with the vacuum interrupter open for one minute before the unit loses power.

The NR (Non-Reclose) LED is amber and will flash at a two-second interval when the interrupter is in **NR** mode. When the VacuFuse interrupter is in **Auto** mode, the amber LED remains off.

Position Indicators

The position indicator is located at the base of the VacuFuse interrupter. It is a reflective red or green target that indicates the position of the vacuum interrupter inside the VacuFuse interrupter. The target is green when the vacuum interrupter is in the **Open** position and red when the vacuum interrupter is in the **Closed** position.

Note: Catalog number option “-F1” reverses the colors of the position indicator. This option is only available to some Canadian utilities that require reversed colors on their system.

Do not refer to the position of the OPEN/CLOSE lever to know the position of the vacuum interrupter. If the transformer is manually closed into fault current, the interrupter will trip open in response, leaving the lever in the **Closed** position and the vacuum interrupter in the **Open** position. Always observe the position indicator to know the position of the VacuFuse interrupter's vacuum interrupter.

NOTICE

Information on troubleshooting the VacuFuse Self-Resetting Interrupter can be found in S&C Instruction Sheet 465-501 available at sandc.com.

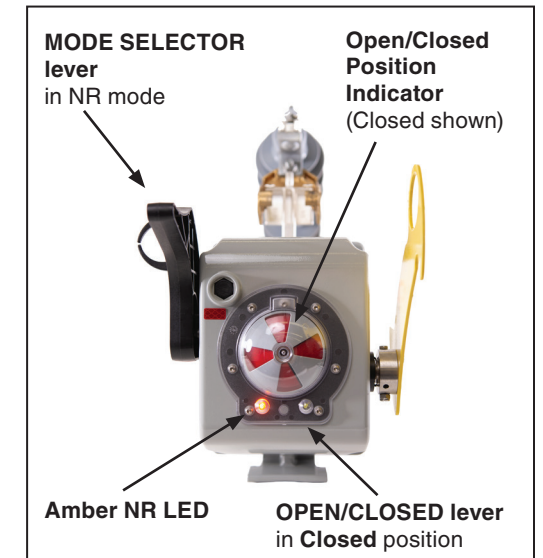


Figure 5. Base of the VacuFuse interrupter showing a red closed target and a lit amber NR LED.

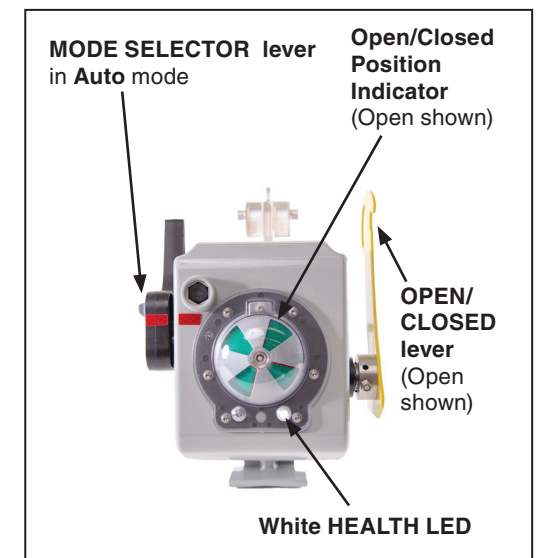


Figure 6. Base of the VacuFuse interrupter showing a green open target and a lit white HEALTH LED. The HEALTH LED will only remain lit with the vacuum interrupter open for one minute before the unit loses power.