

⚠ DANGER

This quick operation guide is not a replacement for adequate training and safety procedures for this product. Read S&C Instruction Sheet 676-540 thoroughly and carefully before using this quick operation guide. **Failure to have adequate training and understanding of these instructions will likely result in serious personal injury or death if the instructions, including recommended precautions, are not followed.**

⚠ WARNING

The EdgeRestore Underground Distribution Restoration System must be installed, operated, and maintained by qualified persons who are knowledgeable in underground electric power distribution equipment and the associated hazards. For more information on the requirements of a qualified person, see the "Introduction" section of S&C Instruction Sheet 676-540. **These instructions are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Failure to follow these operating and safety procedures can result in serious injury.**

NOTICE

All of the manual operations in this Instruction sheet are to be performed with a shotgun-style hotstick, a hotstick fitted with a distribution prong, or a gloved hand.

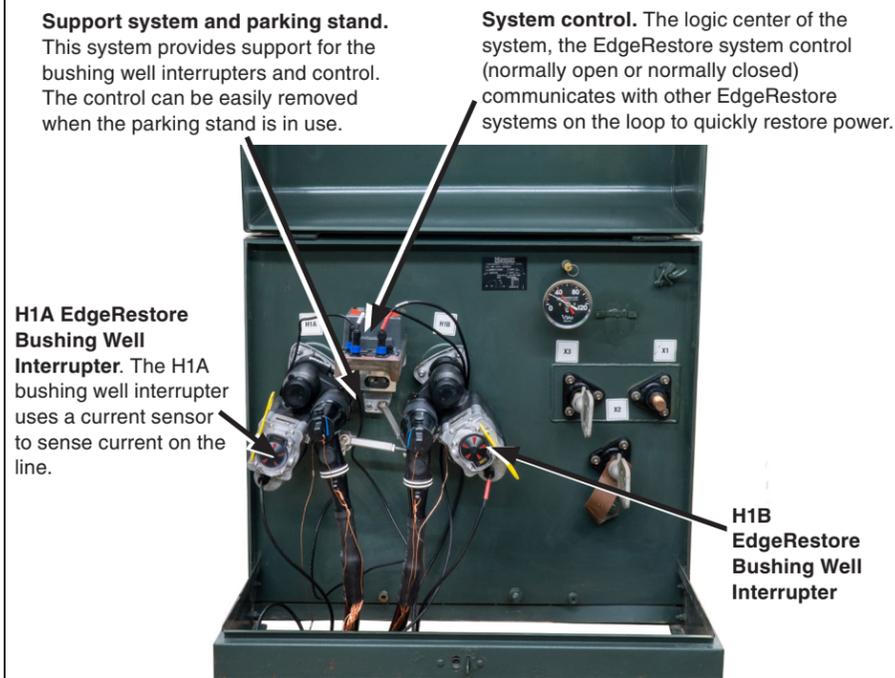


Figure 1. A complete EdgeRestore Underground Distribution Restoration System on an ANSI Type 1 transformer.

Manually Opening the EdgeRestore® Bushing Well Interrupters

To manually open the bushing well interrupters:

- STEP 1.** A closed bushing well interrupter is in the **Closed (red) and Ready** position. See Figure 2. Pull the operating lever away from the transformer. The vacuum interrupter will operate and will be in the **Open (green) and Locked** position. See Figure 3.
- STEP 2.** Release the lever without moving it. The bushing well interrupter will remain in the **Open and Locked** position and automatic restoration will be disabled.

⚠ WARNING

After an Automatic Restoration event, the bushing well interrupters around the faulted section of cable will be in the **Open and Ready** position and the ABNORMAL LED on the control will be red.

To disable the automatic restoration system and prevent automatic operation, move the operating levers on the bushing well interrupters located on either side of the circuit to be repaired to their **Open and Locked** position. To do so, pull the lever on each bushing well interrupter away from the transformer and release it in the **Open and Locked** position. Then, check that the bushing well interrupter position indicators show "Open and Locked."

Failure to operate the open bushing well interrupters to their **Open and Locked** position before performing work on the system may allow automatic operation of the system and re-energization of isolated sections of the circuit. **This may result in equipment damage, injury, or death.**

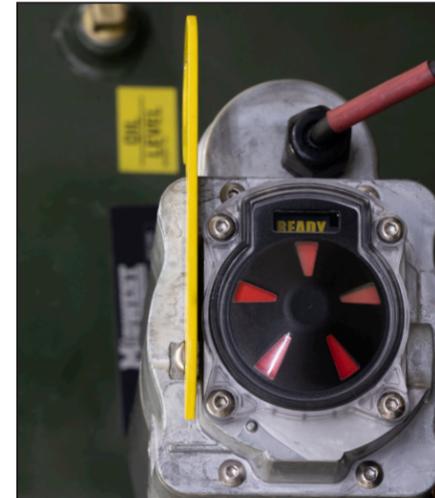


Figure 2. The bushing well interrupter in the Closed and Ready position.



Figure 3. The bushing well interrupter in the Open and Locked position.

To manually close the bushing well interrupters:

- STEP 1.** If control power is unavailable, use the cordless power module. See S&C Instruction Sheet 676-540 for details.
- STEP 2.** Engage the yellow operating lever. Starting in the **Open and Locked** position, toggle the operating lever toward the transformer to the **Open and Ready** position three times, leaving it in the **Open and Ready** position on the third toggle. Then, carefully release the lever. Each toggle must be completed within 10 seconds, and the sequence of three toggles must be completed within 30 seconds

The DELAY LED on the control will immediately begin flashing, and the bushing well interrupter will close in 10 seconds into the **Closed and Ready** position. See Figure 2. Toggling the operating lever at any time during the **Closing** sequence will cancel the **Closing** process.

Note: The **Closing** sequence will be canceled if any of the following conditions occur:

- The time between operating lever toggles exceeds 10 seconds.
- More than three toggles occur.
- The time to complete three operating level toggles exceeds 30 seconds.
- The operating lever was left in the **Locked** position.
- The operating lever is moved at any time after the DELAY LED begins flashing.
- The control does not have enough power to close the bushing well interrupter.

- STEP 3.** Confirm the bushing well interrupter indicator shows the **Closed and Ready** position. See Figure 2.

NOTICE

Manually closing a normally open bushing well interrupter, or all bushing well interrupters in a loop, will tie the loop together. Follow your standard operating practice when manually closing a loop.



Figure 4. A bushing well interrupter in the Open and Ready position.

Disabling the EdgeRestore System After Automatic Restoration

⚠ WARNING

After an Automatic Restoration event, the bushing well interrupters around the faulted section of cable will be in the **Open and Ready** position and the ABNORMAL LED on the control will be red.

To disable the automatic restoration system and prevent automatic operation, move the operating levers on the bushing well interrupters located on either side of the circuit to be repaired to their **Open and Locked** position. To do so, pull the lever on each bushing well interrupter away from the transformer and release it in the **Open and Locked** position. Then, check that the bushing well interrupter position indicators show “Open and Locked.”

Failure to operate the open bushing well interrupters to their **Open and Locked** position before performing work on the system may allow automatic operation of the system and re-energization of isolated sections of the circuit. **This may result in equipment damage, injury, or death.**

Note: This procedure should be used to disable the EdgeRestore system even if an automatic restoration event has not occurred before maintenance is performed on the loop.

Following an automatic EdgeRestore system operation, the bushing well interrupters on either side of the faulted section of cable will be in the **Open and Ready** position, isolating the fault. See Figure 4. Please read and understand the WARNING message on page 1 in the “Manually Opening the EdgeRestore Bushing Well Interrupters” section. To disable the automatic restoration system before making system repairs:

STEP 1. Open the transformer enclosure to confirm the EdgeRestore system has operated.

STEP 2. *For normally closed transformers:* The bushing well

interrupter adjacent to the faulted section will be in the **Open and Ready** position. The ABNORMAL/PLC LED indicator will be red.

STEP 3. *For normally open transformers:* If the faulted section is between the normally open point and a neighboring normally closed transformer, the position indicator in the **Open and Ready** position indicates the side of the transformer where the fault has occurred. The other bushing well interrupter will be in the **Closed and Ready** position, indicating the side where power restoration occurred. The ABNORMAL/PLC LED indicator will be red.

STEP 4. Pull the yellow operating lever of the bushing well interrupter that is in the **Open (green) and Ready** position away from the transformer once. The bushing well interrupter will still show a green position indicator but the system state will show “Locked.” See Figure 3. When a bushing well interrupter is in the **Open and Locked** position, automatic restoration is disabled.

Powering a Control Without Transformer Power

NOTICE

Control power must be present to close the bushing well interrupters.

The EdgeRestore system’s control is powered using the transformer secondaries. If the transformer is not energized, using a temporary 9-Vdc external cordless power module can power the control and allow closing of the bushing well interrupters.

The cordless power module comes in a foam-padded carrying case. See Figure 5. When not in use, the cordless power module should be stored in its carrying case. The carrying case should be stored in a protected area, such as inside a truck or indoors in a service center. Use care not to drop the cordless power module.

Contents of Cordless Power Module Kit

- Case
- Cordless power module (part number 5954 or 5955)

Note: The cordless power module for the EdgeRestore system is the same as the cordless power module for TripSaver® II Cutout-Mounted Recloser.

NOTICE

The cordless power module is not designed for extended use on an EdgeRestore Underground Distribution Restoration System.



Figure 5. The cordless power module kit.

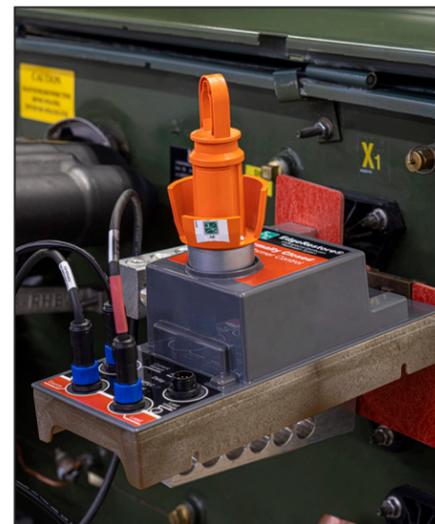


Figure 6. The power module connected to the EdgeRestore system control.

Using the Cordless Power Module

To power the control, attach the cordless power module as shown in Figure 6 for the battery to charge the control. During charging, the CONTROL POWER LED will flash, and will turn solid when there is enough power to close the bushing well interrupters. After closing the bushing well interrupters, make sure to remove the power module.

Battery Life

Battery life depends on the brand of 9-Volt battery used in the cordless power module. S&C recommends using a 9-Volt lithium (L522) battery. Do not use rechargeable or zinc-carbon batteries.

Cable Testing

Disconnect the section of cable being thumped from the EdgeRestore Bushing Well Interrupter before testing.

⚠ WARNING

When it is necessary to test the cables connected to a transformer, proper isolation of the power-frequency source from the dc test source must be maintained. Follow the recommendations of the manufacturer of the dc test equipment or fault-locating equipment. The user’s operating and safety procedures should be followed for grounding the cable, connecting the dc test source (in case of flashover), ungrounding the cable, applying the dc test source, discharging the cable, and re-grounding the cable.

Failure to follow these operating and safety procedures can result in serious personal injury, death, or equipment damage.

Automatic Return to Normal

For instructions on returning the system to its normal state after disabling it for repairs, see S&C Instruction Sheet 676-540.

Support system and parking stand. This system provides support for the bushing well interrupters and control. The control can also be mounted on the parking stand.

System control. The logic center of the system, the EdgeRestore system control (normally open or normally closed) communicates with other EdgeRestore systems on the loop to quickly restore power.

H1A EdgeRestore Bushing Well Interrupter. The H1A bushing well interrupter uses a current sensor to sense current on the line.

H1B EdgeRestore Bushing Well Interrupter



Figure 7. A complete EdgeRestore Underground Distribution Restoration System on an ANSI Type 2 transformer.

Need More Information on the Control LED Lights?

A Quick Operation Guide is available for understanding the control’s LED lights. See S&C Instruction Sheet 676-542 for more information. Complete information can also be found in S&C Instruction Sheet 676-540.

