## Installation and Operation

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Instruction Sheet 461-500

## Introduction

Qualified Persons	A WARNING	
	The equipment covered by this publication must be installed, operated, and maintained by qualified persons who are knowledgeable in the installation, operation, and main- tenance of overhead electric power distribution equipment along with the associated hazards. A qualified person is one who is trained and competent in:	
	<ul> <li>The skills and techniques necessary to distinguish exposed live parts from non-live parts of electrical equipment</li> </ul>	
	<ul> <li>The skills and techniques necessary to determine the proper approach distances cor- responding to the voltages to which the qualified person will be exposed</li> </ul>	
	<ul> <li>The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment</li> </ul>	
	These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.	
Read this Instruction Sheet	Thoroughly and carefully read this instruction sheet before installing or operating your S&C TripSaver Dropout Recloser. The latest version is available online in PDF format at www. sandc.com. Select: Support/Product Literature Library. Familiarize yourself with "SAFETY INFORMATION" on pages 4–6.	
Retain this Instruction Sheet	This instruction sheet should be available for reference wherever the TripSaver Dropout Recloser is used. Retain this instruction sheet in a location where you can easily retrieve and refer to it.	
Proper Application		
	TripSaver Dropout Recloser must only be used for specific fusing applications that are within the ratings of the model selected. TripSaver Dropout Recloser ratings are listed on a ratings label attached to the unit.	

## NOTICE

When retrofitting TripSaver Dropout Recloser in an existing cutout mounting: To ensure proper performance, TripSaver Dropout Recloser must only be installed in a current-production ("-R10" catalog number supplement) S&C Type XS Cutout mounting. See Figure 1. The warranty set forth in S&C Price Sheet 150 does not apply if TripSaver Dropout Recloser is installed in an earlier-production S&C mounting, as shown in Figure 2, or another manufacturer's cutout mounting.



Figure 1. Current-production ("-R10" catalog number supplement) S&C Type XS Fuse Cutout mounting.



Figure 2. Earlier-production ("-R9" catalog number supplement) S&C Type XS Fuse Cutout mounting. "-R8" and earlier versions have similar upper contact.

#### Warranty

The warranty and/or obligations described in S&C's standard conditions of sale, as set forth in Price Sheet 150, plus any special warranty provisions, as set forth in the applicable productline specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute immediate purchaser's or end user's exclusive remedy and a fulfillment of all seller's liability. In no event shall seller's liability to immediate purchaser's or end user's claim. All other warranties whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150, and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150.

#### Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet as well as on labels attached to the crate, packing, and equipment. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.

## **DANGER**

"DANGER" identifies the most serious and immediate hazards that *will likely* result in serious personal injury or death if instructions, including recommended precautions, are not followed.

## **WARNING**

"WARNING" identifies hazards or unsafe practices that *can* result in serious personal injury or death if instructions, including recommended precautions, are not followed.

## 

"CAUTION" identifies hazards or unsafe practices that *can* result in minor personal injury if instructions, including recommended precautions, are not followed.

#### NOTICE

*"NOTICE"* identifies important procedures or requirements that *can* result in product or property damage if instructions are not followed.

### Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com** Or call S&C Headquarters at (773) 338-1000; in Canada, call S&C Electric Canada Ltd. at (416) 249-9171.

## NOTICE

Thoroughly and carefully read this instruction sheet before operating your S&C TripSaver Dropout Recloser.



#### Replacement Instructions and Labels

If you need additional copies of this instruction sheet, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

## **Location of Safety Labels**



**Reorder Information for Safety Information** 

Safety Alert Message	Description	Part Number
A DANGER	TripSaver may be energized from either side and in any position. Always consider all parts live until de-energized, tested, and grounded	G-9248

## A DANGER



TripSaver Dropout Reclosers operate at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

- 1. **QUALIFIED PERSONS.** Access to TripSaver Dropout Reclosers must be restricted only to qualified persons. See "Qualified Persons" on page 2.
- 2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
- 3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing in accordance with safe operating procedures and rules.
- SAFETY LABELS AND TAGS. Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.

- 5. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
- 6. OPERATING TOOLS. To close a TripSaver Dropout Recloser, use a conventional insulated hookstick or S&C Universal Pole and Pole Extension fitted with an S&C Talon™ Handling Tool or a distribution prong. To open the TripSaver Dropout Recloser, use a Loadbuster®—The S&C Loadbreak Tool, attached to a conventional insulated hookstick or S&C Universal Pole.
- 7. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

#### Packing

A complete S&C TripSaver Dropout Recloser includes the following:

- 1. A single-pole TripSaver Dropout Recloser.
- 2. Miscellaneous mounting hardware (less through-bolts) for securing the TripSaver Dropout Recloser to the pole.

#### Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure that shipping skids, crates, and containers listed thereon are present:

If there is visible loss and/or damage:

- 1. Notify the delivering carrier immediately.
- $2. \hspace{0.1 cm} Ask \hspace{0.1 cm} for \hspace{0.1 cm} a \hspace{0.1 cm} carrier \hspace{0.1 cm} inspection.$
- 3. Note condition of shipment on all copies of the delivery receipt.
- 4. File a claim with the carrier.

If concealed damage is discovered:

- 1. Notify the delivering carrier within 15 days of receipt of shipment.
- 2. Ask for a carrier inspection.
- 3. File a claim with the carrier.

Also notify S&C Electric Company in all instances of loss and/or damage.

#### Handling

## **A** CAUTION

**DO NOT** drop TripSaver Dropout Recloser or subject any parts to undue stress during installation.

**STEP 1.** For Overhead Pole-Top Style TripSaver Dropout Reclosers: Attach the mounting to its mounting bracket as illustrated in Figure 3. A mounting bracket—suitable for crossarm, pole, or wall mounting—is furnished only if specified through the addition of suffix "-B" or "-C" to the TripSaver Dropout Recloser catalog number. Note the placement of the external-tooth lockwasher between the mounting bracket and the center insert of the mounting. Pivot the mounting to a position that will provide maximum ease of operation, then securely tighten the carriage bolt nut.

> For Branch Feeder Style TripSaver Dropout Reclosers: Attach the mounting base support to the crossarm(s) or structure. A backup member with carriage bolts, flat washers, lockwashers, and nuts is furnished only if specified through the addition of suffix "-D1," "-D2," "-D3," or "-D4" to the TripSaver Dropout Recloser catalog number.



Figure 3. Attaching Overhead Pole-Top Style TripSaver Dropout Recloser mounting to mounting bracket.

- **STEP 2.** Make electrical connections to the mounting. If aluminum conductors are used, be sure to wirebrush them, then apply a coating of oxidation inhibitor before inserting them into the connectors.
- STEP 3. a) Insert 15-kVTripSaver Dropout Recloser into the mounting by hand as shown in Figures 4a and 4b. Alternately, while in a bucket and using a short hot stick, insert the curled prong of an S&C Talon Handling Tool or a distribution prong into the lifting eye on the trunnion, and raise TripSaver Dropout Recloser into the mounting. See Figure 4c. If a Talon tool is used, rotate the universal pole counterclockwise 180° to disengage it.



Figure 4a. Inserting 15-kV TripSaver Dropout Recloser into mounting.



Figure 4b. Inserting 15-kV TripSaver Dropout Recloser into mounting.



Figure 4c. Inserting 15-kV TripSaver Dropout Recloser into mounting.

b) Insert 15/27-kV TripSaver Dropout Recloser into the mounting by hand as shown in Figures 5a and 5b. Ensure that the end of the trunnion slides under the connector bracket, as shown in Figure 5d. This allows the trunnion to be lowered into the hinge. Alternately, insert the curled prong of an S&C Talon Handling Tool or a distribution prong into the lifting eye on the trunnion, and raise TripSaver Dropout Recloser into the mounting. See Figures 5c and 5d. If a Talon tool is used, rotate the universal pole counterclockwise 180° to disengage it.



Figure 5a. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.



Figure 5b. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.



Figure 5c. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.



Figure 5d. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.

c) Insert 25-kV TripSaver Dropout Recloser into the mounting by hand as shown in Figures 6a and 6b. Alternately, insert the curled prong of an S&C Talon Handling Tool or a distribution prong into the lifting eye on the trunnion, and raise the TripSaver Dropout Recloser into the mounting. See Figure 6c. If a Talon tool is used, rotate the universal pole counterclockwise 180° to disengage it.



Figure 6a. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.



Figure 6b. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.



Figure 6c. Inserting 15/27-kV TripSaver Dropout Recloser into mounting.

**STEP 4.** Verify that the mode selector handle is in the AUTO position. See Figure 7.

If the mode selector handle is in the NR position, place the handle in AUTO position by hand. Alternately, tap the mode selector using the straight prong of an S&C Talon Handling Tool or a distribution prong, and verify that it reverts to the AUTO position.

## NOTICE

The mode selector handle must be placed in the AUTO position before closing TripSaver Dropout Recloser into the mounting. Closing TripSaver Dropout Recloser with the mode selector handle in the NR position may result in the unit tripping open due to inrush current.

## **DANGER**

**DO NOT** attempt to move the mode selector from the AUTO position to the NR position while TripSaver Dropout Recloser is in the dropout position, as shown in Figure 8. This may result in TripSaver Dropout Recloser making contact with the upper contact of the mounting, causing arcing, serious injury, or death.



Figure 7. Verifying mode selector handle is in AUTO position.



Figure 8. DO NOT move the mode selector from AUTO to NR position with TripSaver Dropout Recloser in dropout position.

**STEP 5.** Insert the straight prong of an S&C Talon Handling Tool or a distribution prong into the pull-ring. Swing TripSaver Dropout Recloser to within approximately 45° of the fully closed position as shown in Figure 9. Then drive TripSaver Dropout Recloser to the closed position using a vigorous thrust while firmly gripping the hookstick. Carefully disengage the prong from the pull-ring, taking care to avoid pulling open TripSaver Dropout Recloser.

## **WARNING**

**DO NOT** use the curled prong on an S&C Talon tool to close TripSaver Dropout Recloser. Using the curled prong of a Talon tool to close TripSaver Dropout Recloser can prevent full closure, resulting in arcing, equipment damage, serious injury, or death.

> With the mode selector handle in the AUTO position, TripSaver Dropout Recloser will operate normally according to its operating sequence: Open-5 seconds-Close-Open-Dropout-5 seconds- Close.



Figure 9. Swinging TripSaver Dropout Recloser to within  $45^\circ$  of the fully closed position before final closing.

#### If TripSaver Dropout Recloser Has Dropped Out

- **STEP 1.** Determine and resolve the cause of the fault.
- **STEP 2.** Verify that the mode selector handle is in the AUTO position. See Figure 10.

Insert the straight prong of an S&C Talon Handling Tool or a distribution prong into the mode selector handle and place the handle in the AUTO position.

## NOTICE

The mode selector handle must be placed in the AUTO position before closing TripSaver Dropout Recloser into the mounting. Closing TripSaver Dropout Recloser with the mode selector handle in the NR position may result in the unit tripping open due to inrush current.

## A DANGER

**DO NOT** attempt to move the mode selector from the AUTO position to the NR position while TripSaver Dropout Recloser is in the dropout position as shown in Figure 11. This may result in TripSaver Dropout Recloser making contact with the upper contact of the mounting, causing arcing, serious injury, or death.



Figure 10. Verifying mode selector handle is in AUTO position.



Figure 11. DO NOT move the mode selector from AUTO to NR position with TripSaver Dropout Recloser in the dropout position.

**STEP 3.** Insert the straight prong of an S&C Talon Handling Tool or a distribution prong into the pull-ring. Swing TripSaver Dropout Recloser to within approximately 45° of the fully closed position as shown in Figure 12. Then drive the TripSaver Dropout Recloser to the closed position using a vigorous thrust while firmly gripping the hookstick. Carefully disengage the prong from the pull-ring, taking care to avoid pulling open the TripSaver Dropout Recloser.

## **WARNING**

**DO NOT** use the curled prong on an S&C Talon tool to close TripSaver Dropout Recloser. Using the curled prong of a Talon tool to close TripSaver Dropout Recloser can prevent full closure, resulting in arcing, equipment damage, serious injury, or death.

> If the TripSaver Dropout Recloser will not remain closed in the mounting, the vacuum interrupter has reached the end of its useful life. Refer to "Service" on page 17.



Figure 12. Swinging TripSaver Dropout Recloser to within  $45^\circ$  of the fully closed position before final closing.

## If Line Work Is to Be Performed Downstream of TripSaver Dropout Recloser

**STEP 1.** Insert the straight prong of an S&C Talon Handling Tool or a distribution prong into the mode selector handle and place the handle in the NR position, and ensure that the mode selector handle is securely engaged in the metal clip. See Figure 13.

### NOTICE

With the mode selector handle in the NR position, Trip-Saver Dropout Recloser will operate using the first "fast" curve, then drop open. It will not reclose.

**STEP 2.** After line work has been completed, return the mode selector handle to the AUTO position by tapping the mode selector. Verify that it reverts to the AUTO position. See Figure 14.



Figure 13. Placing mode selector handle in the NR position.



Figure 14. Placing mode selector handle in the AUTO position.

### **Operation Counter**

An operation counter is located adjacent to the mode selector handle as shown in Figure 15.

#### Service

When the vacuum interrupter reaches the end of its useful life, TripSaver Dropout Recloser will go into "Service Now" mode. It will drop into the open position and will not reset, blocking the vacuum interrupter in the open position and the operating mechanism in the dropout position. TripSaver Dropout Recloser cannot be closed into the mounting and will need to be removed and returned to the factory for service. Contact your nearest S&C Sales Office. Reverse the procedure outlined in Step 3 on pages 9 through 11 to the remove TripSaver Dropout Recloser from the cutout mounting.

## **Under Ice Conditions**

Ice hood, suffix "-H1," can be added to increase ice-breaking capability from  $\frac{1}{2}$  to  $\frac{1}{4}$ -inch. See Figure 16.

If, during a fault condition, TripSaver Dropout Recloser cannot drop out of the mounting because of excessive ice buildup, the operating sequence will be:

#### • In the AUTO mode:

Open (fast)–5 sec.– Close–Open (TCC)–5 sec.– [Close–Open (fast)–5 sec.]–No Reclose. Sequence in brackets repeats four times.

• In the NR mode:

Open (fast)-5 sec.-No Reclose.

At the end of either operating sequence above, the Trip-Saver Dropout Recloser will not have been reset and will be locked out with the contacts in the open position. The unit must be returned to S&C to be reset.



Figure 15. Operation counter.



Figure 16. Ice hood.

#### Service Soon Indicator

Option suffix "-L1" can be furnished. It indicates that the vacuum interrupter is approaching the end of its useful life. If the LED light located on the bottom side of the unit (see Figure 17) is lit continuously the vacuum interrupter has 20% or more of life remaining. If the LED is flashing then the vacuum interrupter has less than 20% of life remaining. The "Service Soon" LED light will remain lit (continuously or flashing) for a period of 5 minutes. The LED can be checked at any time by moving the mode selector handle from the AUTO to the NR position and back.

The Service Soon indicator light requires load, equal to 30% of the TripSaver Dropout Recloser rating, to be activated (e.g., 30 amperes for the 100K (65T) TripSaver Dropout Reclosers.

#### **Overload Ratings**

The TripSaver Dropout Recloser overload ratings are as follows:

Models with 100K and 65T control modules: 110 amperes Models with 50K and 30T control modules: 55 amperes

Models with 30K and 20T control modules: 35 amperes

#### **Contact Position Indicator**

Option suffix "-L2," can be added to provide visual indication of the vacuum interrupter contact position. If the contact position indicator is RED as shown in Figure 18, then the vacuum interrupter contacts are closed.

If the contact position indicator is GREEN, as shown in Figure 19, then the vacuum interrupter contacts are opened.



Figure 17. "Service Soon" indicator.



Figure 18. Red contact position indicator.



Figure 19. Green contact position indicator.

# Operation with Loadbuster®— The S&C Loadbreak Tool

Loadbuster— The S&C Loadbreak Tool provides low-cost, positive, and convenient live-switching capability for overhead distribution switching and protection devices such as TripSaver Dropout Recloser. Following an opening operation using the Loadbuster Tool, the TripSaver Dropout Recloser can be lifted out of the mounting using a universal pole equipped with a suitable fuse-handling fitting, such as an S&C Talon Fuse Handling Tool or a distribution prong.

## A WARNING

DO NOT attempt to open TripSaver Dropout Recloser without using a loadbreak tool such as S&C's Loadbuster Tool. An arc started by opening TripSaver Dropout Recloser under load without a loadbreak tool can cause arcing, equipment damage, serious injury, or death.

- **STEP 1.** Check for proper resetting of the Loadbuster Tool by extending the tool about three inches (77 mm) by hand. Throughout this travel, an increasing spring resistance should be felt.
- **STEP 2.** Fasten the Loadbuster Tool to a universal pole not less than six feet long (eight feet for Catalog Number 5400R3) with the frame of the tool in line with the pole.

As shown in Figure 20a or 20b (power fuse shown for illustration), the Loadbuster Tool must be attached so that it *reaches across in front of* the TripSaver Dropout Recloser. That is, the Loadbuster tool anchor must be hooked to the attachment hook *on the far side* of the device. The Loadbuster Tool should never be attached with its anchor hooked on the closest side of the fuse cutout or other device as shown in Figure 20c or 20d. Attaching the tool in this manner will not only obscure the operator's line of vision, but also result in bending stress on the tool, causing improper disengagement.

When the Loadbuster Tool is properly attached as shown in Figure 20a or 20b, a downward pull of the pole to open the TripSaver Dropout Recloser extends the Loadbuster Tool and charges an internal spring. At a predetermined point in the opening stroke, a trigger inside the tool trips, releasing the charged spring—thus separating the internal contacts and interrupting the circuit. Successful operation is independent of the speed with which the TripSaver Dropout Recloser is opened.

Proper attachment of Loadbuster Tool to a TripSaver Dropout Recloser is shown in Figure 21 on page 22.

When operating from a bucket truck, stay at least five feet below the device.

Although many words and illustrations are used here to describe operation of the Loadbuster Tool, correct techniques can be mastered quite easily. It is advisable, however, to spend a reasonable amount of time practicing with the Loadbuster Tool on a de-energized TripSaver Dropout Recloser.

## NOTICE

**DO NOT** attempt to use the Loadbuster Tool while climbing a pole. Engagement of the Loadbuster Tool in this position is difficult and may result in an improper opening operation.



Figure 20a. Correct approach.



Figure 20c. Incorrect approach.



Figure 20b. Correct approach.



Figure 20d. Incorrect approach.

- **STEP 3.** Swing the Loadbuster Tool toward the TripSaver Dropout Recloser and pass the Loadbuster Tool's pull-ring hook through the pull-ring on the TripSaver Dropout Recloser. The pull-ring latch will deflect and upon complete entry of the pullring, will spring back, locking the Loadbuster Tool to the pull-ring. The Loadbuster Tool is now connected across the upper contacts of the TripSaver Dropout Recloser.
- **STEP 4.** To open the circuit, operate the Loadbuster Tool with a firm, steady pull until it is extended to its maximum length. See Figure 22. Avoid jerking and hesitation. The resetting latch will keep it open. Generally, there will be no indication of circuit interruption. The only sound will be that of the Loadbuster Tool tripping.
- **STEP 5.** To detach the Loadbuster Tool after circuit interruption, first raise it slightly and disengage the anchor from the attachment hook.

## 

Careless manipulation of the Loadbuster Tool can decrease the open gap to the point where flashover will occur. This can result in arcing, electrical shock, serious injury, or death.



Figure 21. The Loadbuster Tool attached to a TripSaver Dropout Recloser.



Figure 22. Loadbuster Tool in tripped position.

Next, bring the TripSaver Dropout Recloser toward its fully open position as shown in Figure 23. Then remove the Loadbuster Tool from the pull-ring by rotating the pole. This will deflect the pull-ring latch to release the pull-ring. Because the TripSaver Dropout Recloser will drop fully open by gravity, it may be preferable to remove the Loadbuster Tool by "rolling" it off both the attachment hook and pull-ring at the same time, by twisting the pole after the Loadbuster Tool has been tripped and fully extended. To perform this operation easily and smoothly, always roll the Loadbuster Tool so that it rotates in an upward direction.

**STEP 6.** To reset the Loadbuster Tool for the next operation, hold it as shown in Figure 24. Extend the tool slightly and lift the resetting latch with your thumb. With the latch up, telescope the tool completely so the trigger can reset itself. Depress the telescoping tube until the orange paint on the inner tube assembly is no longer visible. Check for proper resetting by extending the tool about three inches (77 mm). Throughout this travel an increasing spring resistance should be felt.



Figure 23. Detaching Loadbuster Tool from TripSaver Dropout Recloser.



Figure 24. Resetting the Loadbuster Tool.