

Functional Inspection

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Introduction

Qualified Persons

WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

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

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating the TripSaver II Cutout-Mounted Recloser. Become familiar with the Safety Information and Safety Precautions on pages 3 through 5. The latest version of this publication is available online in PDF format at <https://www.sandc.com/en/contact-us/product-literature/>.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the TripSaver II Cutout-Mounted Recloser. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the TripSaver II Cutout-Mounted Recloser are listed in the ratings table in Specification Bulletin 461-33. The ratings are also on the nameplate affixed to the product.

Warranty

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale—Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale—Immediate Purchasers Outside the United States"), plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the 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 (or Price Sheet 153), 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 (OR PRICE SHEET 153) 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 (OR PRICE SHEET 153).

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the TripSaver II Cutout-Mounted Recloser. Become familiar with these types of messages and the importance of these various signal words:

⚠ 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
“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 any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE	
Read this instruction sheet thoroughly and carefully before testing the TripSaver II Cutout-Mounted Recloser.	

Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the 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 the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

Safety Precautions

⚠ DANGER



The TripSaver II Cutout-Mounted Recloser operates at high voltage. Failure to observe these precautions 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 II Cutout-Mounted Reclosers must be restricted only to qualified persons. See the "Qualified Persons" section 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.
4. **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 II Cutout-Mounted Recloser, use a conventional insulated hotstick or S&C Universal Pole and Pole Extension fitted with a Talon™ Handling Tool or distribution prong. An extendo stick also can be used after proper training and practice. The TripSaver II Cutout-Mounted Recloser can be opened using Loadbuster®—The S&C Loadbreak Tool attached to a conventional insulated hotstick or S&C Universal Pole.
7. **MAINTAINING PROPER CLEARANCE.** Always maintain the proper clearance from energized components.

⚠ WARNING

DO NOT disassemble a TripSaver II recloser. The control module inside the TripSaver II recloser housing is only intended for use inside the TripSaver II recloser and has not been approved for any other use. There are no customer-serviceable parts inside the recloser, and disassembling the recloser voids the warranty. If you do disassemble a TripSaver II recloser, NEVER power it with the power module included with the Service Center Configuration Kit when the inside of the recloser is exposed. Unsafe high voltage can be present on the connectors on the outside of the internal control box assembly, resulting in serious injury or death.

⚠ WARNING

The TripSaver II Cutout-Mounted Recloser MUST be de-energized and removed from the utility pole before attaching the "corded" power module (power module with ac adapter and extension cord) to the base of the TripSaver II recloser. The corded power module is ONLY intended to be used for set-up and data collection when the TripSaver II recloser is de-energized and removed from the utility pole. (To provide power to a TripSaver II recloser while it is mounted to the pole, use the cordless power module, S&C catalog number 5954.) Failure to remove the TripSaver II recloser from the utility pole before connecting the corded power module may cause arcing, burns, electric shock, and death.

Though S&C does not require testing of TripSaver II Cutout-Mounted Reclosers before commissioning, some utility practices require pre-commissioning testing to verify the integrity of the TripSaver II recloser before installation on the utility pole. This document provides instructions on how to perform a functional test of the recloser, verify the condition of the battery (if supplied), as well as perform an electrical resistance measurement. Become familiar with the parts of the TripSaver II Cutout-Mounted Recloser before starting and read and understand Instruction Sheet 461-502 and Instruction Sheet 461-504. See Figure 1.

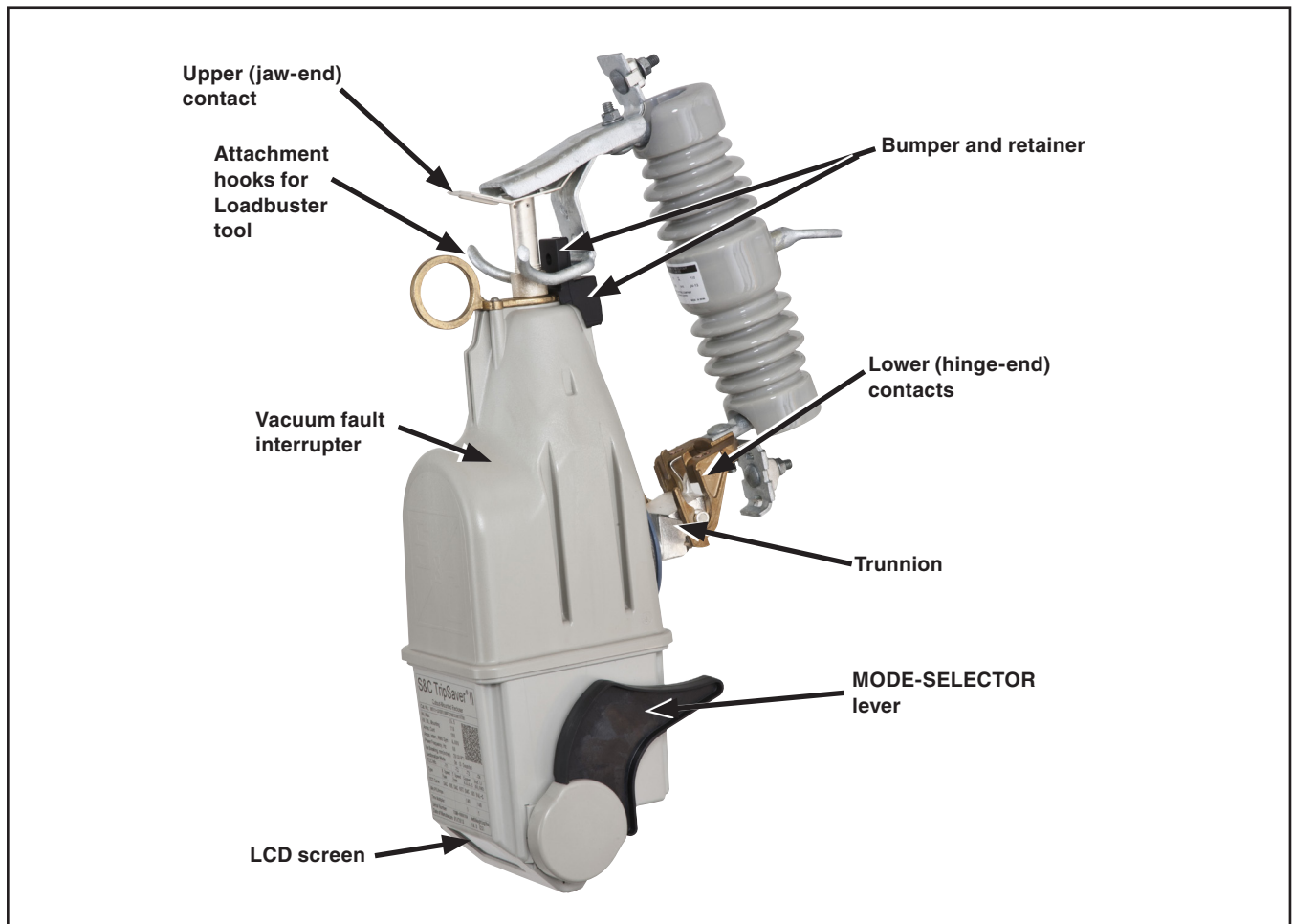


Figure 1. The TripSaver II Cutout-Mounted Recloser.

Before Starting

Functional inspection testing and resistance measurements require the use of non-S&C supplied test equipment. The user-supplied equipment required includes:

- A present-production (“-R10” or “-R11”) S&C-manufactured cutout-mounting of the appropriate rating mounted to a secure structure. This structure or workbench must be able to support the force and weight of the recloser when the recloser drops-out at the end of the test sequence—equivalent to being mounted on a utility pole
- Megger MS-2A Circuit Breaker and Overcurrent Relay Test Set or equivalent
- Megger DLRO10X Digital Low Resistance Ohmmeter with DP1-C Duplex Probe (1006-450)
- Windows PC running the current version of TripSaver® II Service Center Configuration Software (see instructions for installing the software in S&C Instruction Sheet 461-504), loaded with the appropriate setpoint file for the type of TripSaver II recloser being tested (available on the S&C Customer Portal):
 - **Pre_Commissioning Test File Standard Units.xspt** for standard reclosers.
 - **Pre_Commissioning Test File 30s -O Units.xspt** for reclosers with the extended open interval “-O” option.

WARNING

To prevent risk of fire, injury, or electric shock:

- Use good test area practices. Keep the workbench and work area clear of flammable or conductive material.
- When connecting the TripSaver II recloser to the current source, make the lead connections between the current source and the recloser before connecting the current source to ac power.
- Keep hands away from the energized parts of the recloser during testing.
- Keep personnel and equipment at least four feet away from the front of the recloser during testing. The recloser will drop-out at the end of its programmed test sequence.
- Completely disconnect power to the current source before removing the test leads from the recloser or interrupter.
- DO NOT leave the test area unattended when ac power is connected to the current source.

Pre-Operational Test Setup

- STEP 1.** Connect the power module to the base of the TripSaver II recloser as described in the “Assembling the Power Supply and Powering the TripSaver II Recloser” section in S&C Instruction Sheet 461-504. See Figure 2. Plug the power module into 120 Vac power.
- STEP 2.** Plug a USB transceiver loaded with firmware version 2.0 into a USB A port on the PC computer. Then, click on the **SCC** icon on the desktop or in the **Start** menu to launch the TripSaver II Service Center Configuration Software. Read and agree to the Warning message. For more information on launching the TripSaver II Service Center Configuration Software, refer to S&C Instruction Sheet 461-504.



Figure 2. The power module connected to the base of the TripSaver II recloser.



Figure 3. Proper placement of TripSaver II recloser and USB transceiver for connection.

STEP 5. Select the **File>Load Setpoints** menu item. See Figure 6. Navigate to **Pre_Commissioning Test File Standard Units.xspt** for reclosers with a maximum 5s open interval or **Pre_Commissioning Test File 30s -O Units.xspt** for reclosers with the extended open interval “-O” option and load the setpoints file. Then click on the **Apply** button. Setpoints will not be loaded into the TripSaver II recloser without clicking on the **Apply** button. The software will go through several automatic steps that can take a few minutes. At the end a dialog box will appear confirming the settings have been applied successfully.

Note: The file settings include Initial Trip, Test 1, Test 2, and Test 3. All tests are set for Definite Time instantaneous trip. For standard 5s open interval reclosers, the open intervals are all set to 1s. For reclosers with the extended open interval “-O” option, the open intervals are 1s after the Initial Trip, 1s after Test 1, and 30s after Test 2. The 30s interval after Test 2 will confirm that the battery is functioning properly. If equipped with the extended open interval “-O” option, check the battery charge level. If the battery charge level is below 80%, S&C recommends allowing the recloser to charge until the charge level shows 90% or more.

STEP 6. If necessary, update the firmware to the latest version using the instructions in S&C Instruction Sheet 461-504.

STEP 7. Disconnect the power module from the base of the TripSaver II recloser.

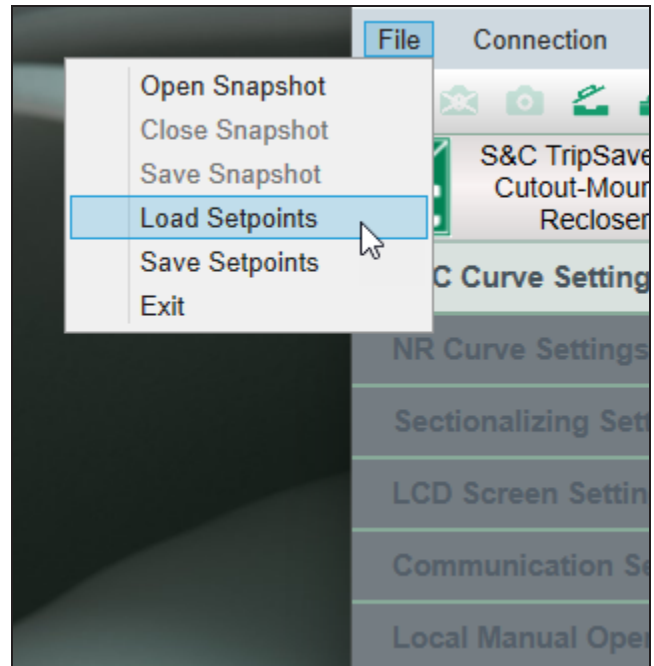


Figure 6. The Load Setpoints menu item.

⚠ CAUTION
<p>Remove the power module before applying simulated overcurrent voltage to the TripSaver II recloser.</p> <p>The TripSaver II recloser will open quickly and with some force causing the power module to eject from the bottom of the unit during operation.</p> <p>Failure to remove the power module may result in damage to the power module and minor injury.</p>

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STEP 8. Mount the TripSaver II Cutout-Mounted Recloser in the cutout mounting per the instructions in S&C Instruction Sheet 461-502. A four-foot clearance must be left in front of the recloser. Put the MODE-SELECTOR lever in the **Up** position. See Figure 7.

STEP 9. Connect the red current lead to the jaw-end contact and the black current lead to the hinge-end contact of the TripSaver II recloser as shown in Figure 8. Make sure the leads are secure.



Figure 7. A TripSaver II recloser in the test cutout mounting.

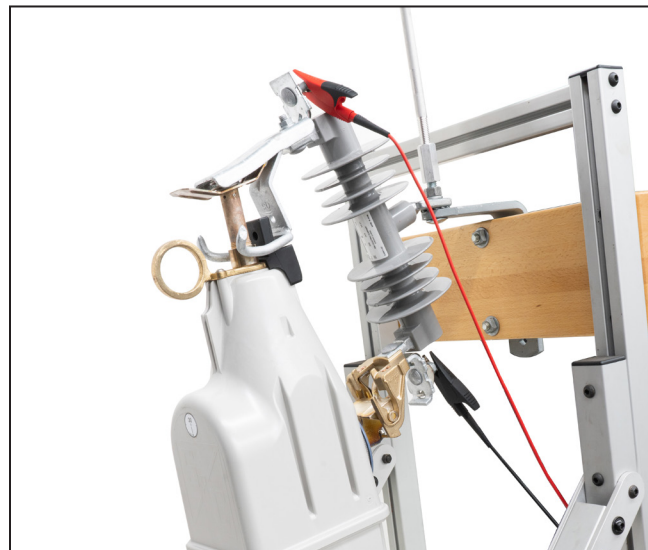


Figure 8. Proper placement of test leads.

Operational Test

To perform an operational test of the TripSaver II recloser, follow these steps:

STEP 1. Configure the Megger MS-2A test set. Consult the test set user manual for more information.

- (a) Ground the test set at the grounding point to an earth ground using a grounding cable.
- (b) Connect the red current lead to the 5-A/120-V post.
- (c) Connect the black current lead to the COMMON post.
- (d) Verify the MAIN POWER switch is in the **Off** position.
- (e) Plug the Megger MS-2A into 120 Vac power.

- (f) Set the AMMETER selector dial to the **20 A** position.
- (g) Set the DISPLAY MODE toggle switch to the **Normal** position. (The test set's memory will hold the set value on the display screen.)
- (h) Adjust the OUTPUT CONTROL dial to the **Zero** position.
- (i) Set the STOP MODE toggle switch to the **Current** position.
- (j) Set the TIMER toggle switches to **.01** and the **Sec.** setting.
- (k) Verify the CURRENT OUTPUT toggle switch is in the **Off** position.

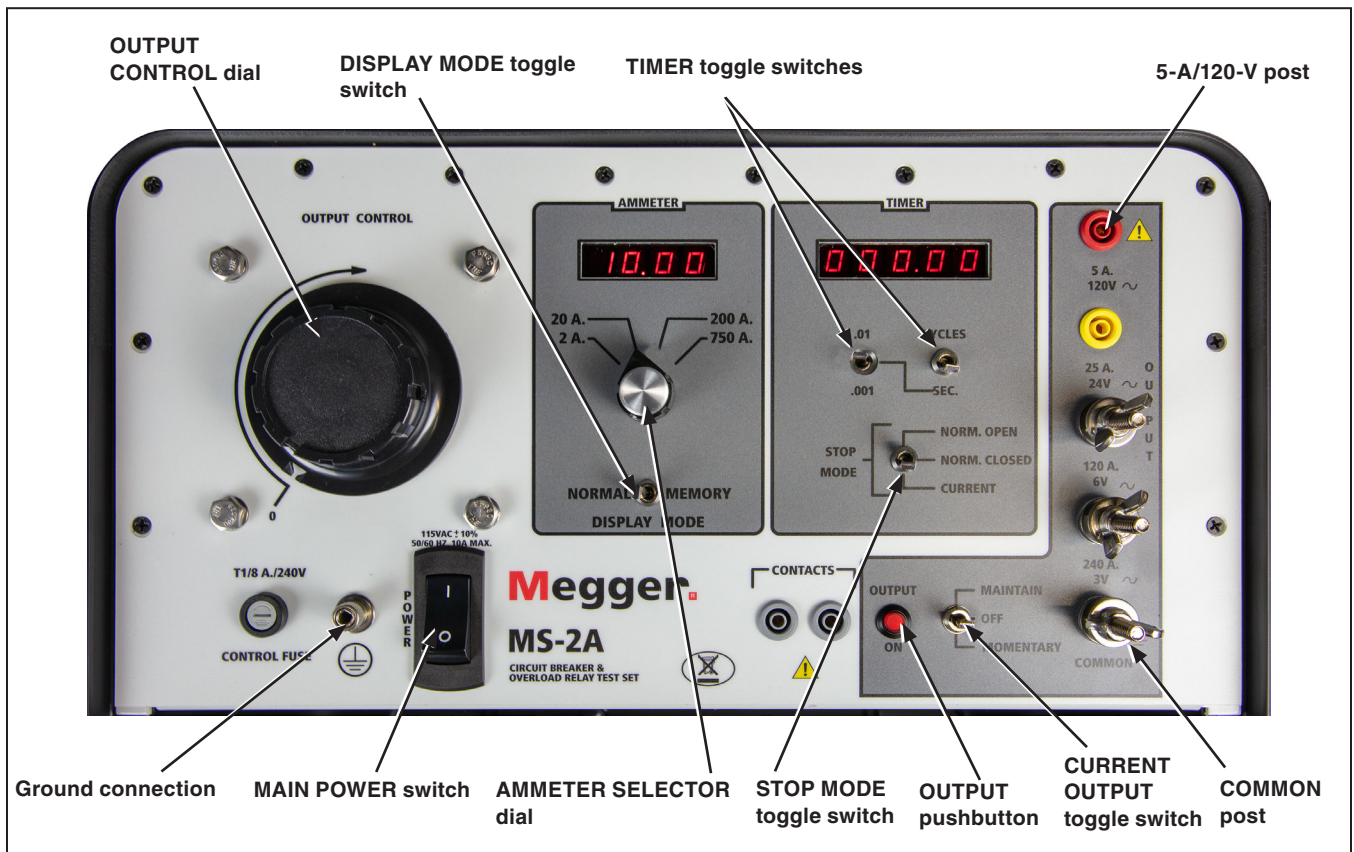


Figure 9. The Megger MS-2A test set faceplate.●

● Photo courtesy of Megger.

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⚠ WARNING

Keep personnel and equipment at least four feet away from the front of the recloser during testing. The recloser will drop-out at the end of its programmed test sequence.

Failure to keep clear of the front of the recloser during testing may result in personal injury or electric shock.

- STEP 2.** Power and calibrate the MS-2A test set by holding down the **MOMENTARY** switch and adjusting the **OUTPUT** dial to 10 A, which is 2 times the minimum trip current of the TripSaver II recloser.
- STEP 3.** Move the **CURRENT OUTPUT** toggle switch to the **Momentary** setting. Hold down the **OUTPUT** pushbutton on the MS-2A test set until the TripSaver II recloser trips. An audible click will be heard. This is the Initial Trip. Release the switch as soon as you hear the TripSaver II recloser close. Another audible click will be heard. Repeat three times for Test 1, Test 2, and Test 3, until the TripSaver II recloser opens and drops out. See Figure 9 on page 11 and Figure 10.

Note: If equipped with the extended open interval “-O” option, Test 2 will have an open interval of 30s. If it recloses faster than 30s, check the battery charge and allow the recloser to charge to above 90%. Then repeat the test. If the open interval after Test 2 is still less than 30s, contact S&C Electric Company.

- STEP 4.** Disconnect power to the MS-2A test set. Then, close the TripSaver II recloser into the cutout mounting and toggle the **MODE-SELECTOR** lever to its **Non-Reclose** (down) position. See Figure 11. Connect power to the MS-2A test set. Hold down the **OUTPUT** pushbutton on the MS-2A test set until the TripSaver II recloser trips internally. An audible click will be heard. Release the switch as soon as you hear the TripSaver II recloser close internally. Hold down the **OUTPUT** pushbutton on the test set again. The recloser should then trip open and drop out.
- STEP 5.** Disconnect power to the MS-2A test set and remove the leads from the TripSaver II recloser.
- STEP 6.** After functional testing is complete, remove the TripSaver II recloser from the cutout mounting and load the setpoints necessary for field installation using the instructions in S&C Instruction Sheet 461-504.



Figure 10. A TripSaver II recloser after dropping out.



Figure 11. The MODE SELECTOR lever in the Down position.

Resistance Measurement

To perform a resistance measurement, follow these steps:

- STEP 1.** Disconnect the TripSaver II recloser from the current source if present, and if it is installed in the cutout mounting, remove it from the cutout mounting. If present, disconnect the power module. Then, lay the TripSaver II recloser on the workbench, with the trunnion up.
- STEP 2.** Adjust the settings on the Megger DLRO10X Digital Low Resistance Ohmmeter to run in **AUTO** mode at the **10 A** setting. Settings adjustments are made using the yellow control pad. Consult the Megger DLRO10X Digital Low Resistance Ohmmeter user manual for more information.
- STEP 3.** Connect the DPI-C Duplex Probe test leads to the ohmmeter. For the most accurate results, face the prongs of the test leads with the “P” on each prong facing the tester. Apply the test leads firmly to the TripSaver II recloser, one on the upper contact and the other at the base of the trunnion. See Figure 12. When enough pressure is applied to the leads, an automatic test will initiate. The results will be displayed on the ohmmeter when the test is complete. See Figure 13.

The TripSaver II recloser’s resistance should be no greater than 1.4 mΩ (milliohms). A typical reading is between 1.0 and 1.3 mΩ. If a resistance value higher than expected is encountered, repeat the Operational Test described on pages 11 and 12 three times to help clean the vacuum interrupter contacts, then repeat the resistance measurement. If the reading is still high, contact your local S&C Sales Office.

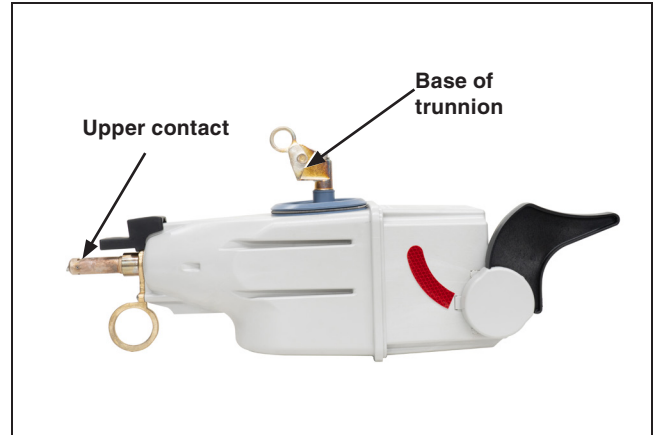


Figure 12. TripSaver II recloser resistance measurement points.



Figure 13. The Megger DLRO10X Digital Low Resistance Ohmmeter faceplate.●

● Photo courtesy of Megger.