Protection Setup Using Service Center Configuration Kit

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NOTICE

A hardware change was made to TripSaver II Cutout-Mounted Reclosers manufactured after October 2022 that are factory-loaded with firmware version 2.0. A new model of the USB transceiver firmware version 2.0 (part number FDA-1868R2) is also available with an enhanced antenna. USB transceiver firmware version 2.0 is required to connect to TripSaver II reclosers with firmware version 2.0. USB transceiver version 2.0 is backward compatible with all TripSaver II recloser firmware versions.

A USB transceiver with firmware version 1.6 can be used with the latest version of the service center configuration software and TripSaver II reclosers with firmware version 1.9 and earlier. To connect to TripSaver II reclosers with firmware version 2.0, USB transceivers must be upgraded to firmware version 2.0. This can be done using the latest version of the service center configuration software. See the “USB Transceiver Firmware Update” section on page 43.

Because of a hardware change, TripSaver II reclosers with firmware version 1.0 can only be upgraded to version 1.3 using the latest version of the service center configuration software. With the October 2022 hardware change, TripSaver II reclosers with firmware versions 1.5 through 1.8 can be upgraded to firmware version 1.9 using the latest version of the service center configuration software, but they cannot be upgraded to firmware version 2.0.

Qualified Persons

⚠ WARNING

Only qualified persons 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 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 your <Product Name Here>. Become familiar with the Safety Information page 4 and Safety Precautions on page 5. The latest version of this publication is available online in PDF format at **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.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels attached to the TripSaver II Cutout-Mounted Recloser or in the TripSaver II Service Center Configuration Software. Become familiar with these types of messages and the importance of these 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 installing or operating 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.

⚠ DANGER

The TripSaver II Cutout-Mounted 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 II Cutout-Mounted Reclosers must be restricted only to qualified persons. See the "Qualified Persons" section on page 3.
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.** 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

Failure to properly configure a TripSaver II recloser in accordance with applicable codes and standards can result in misoperation or miscoordination, equipment damage, personnel injury, or death.

Settings should be determined and approved by qualified personnel who are familiar with the principles of selective coordination and system protection. S&C Electric Company is not responsible for the misoperation or miscoordination of a TripSaver II recloser resulting from improper configuration.

Make sure the TripSaver II recloser settings files are maintained in a secure manner by properly trained personnel.

⚠ 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 setup 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 can cause arcing, burns, electric shock, and death.**

Packing

A complete TripSaver II recloser configuration kit, which weighs about 4 lbs. (1.8 kg) and works with both 15-kV and 25-kV TripSaver II reclosers, consists of the following items stored in a carrying case:

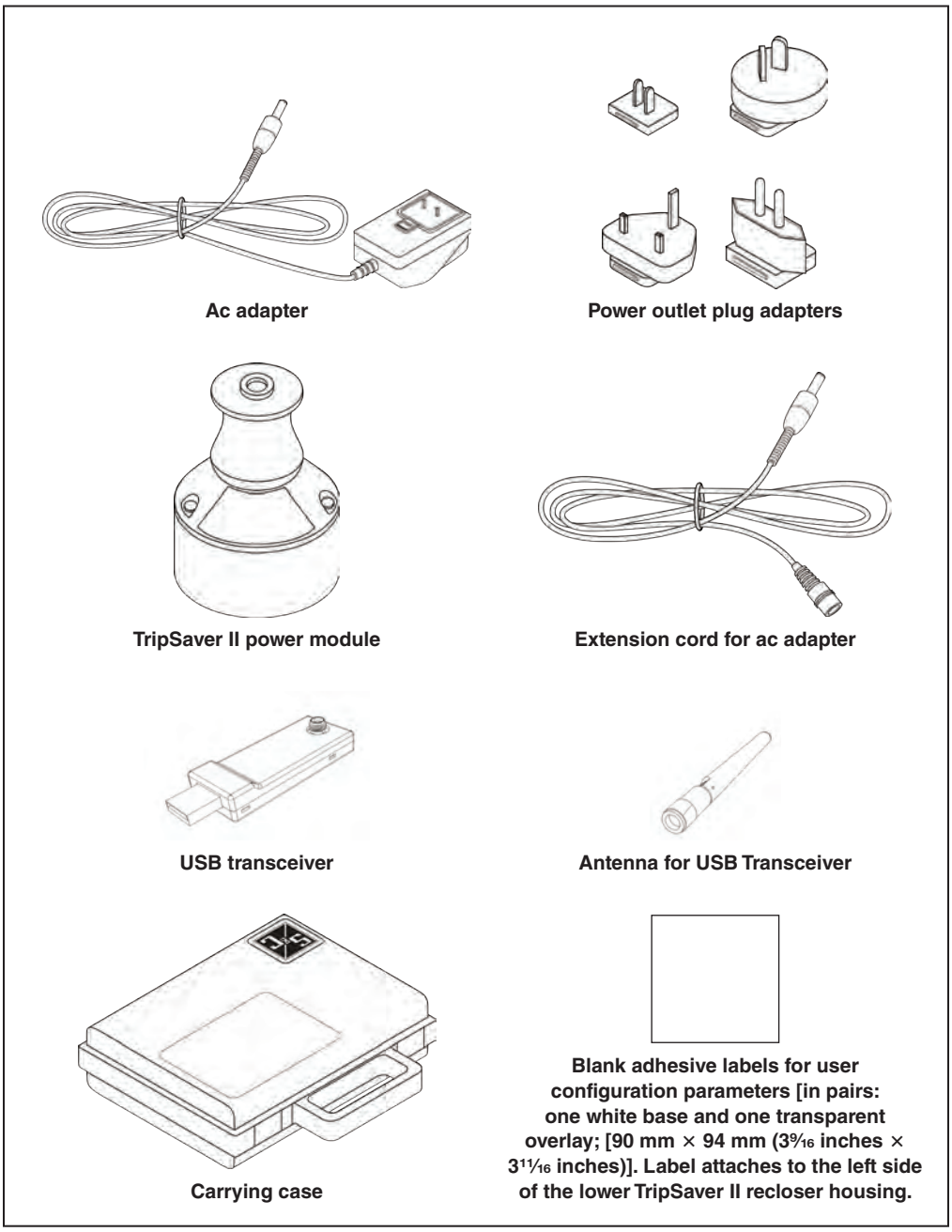


Figure 1. Components of the S&C TripSaver II recloser configuration kit.

Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before the carrier departs. Check the bill of lading to make sure the listed shipping packages are present.

If there is visible loss and/or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier 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

NOTICE

Handle the configuration kit with care. **DO NOT** drop the components or subject any of their parts to undue stress during use. Only remove components from the carrying case when they are ready to be used. After a TripSaver II recloser has been configured, always return components to the carrying case for protection.

In addition, **DO NOT** drop a TripSaver II recloser or subject any of its parts to undue stress during configuration or installation. Only remove a TripSaver II recloser from the carton when it is ready for configuration or installation. After a TripSaver II recloser has been configured, always return it to its carton until ready for installation.

Computer Requirements

Installing TripSaver II Service Center Configuration (SCC) Software requires:

- A computer with Microsoft Windows 7 with Service Pack (SP) 1 with .NET framework version 4.7 or later or Microsoft Windows 10 and 11 with .NET framework version 4.7 or later.

Note: If the .NET framework is missing, the software installer will automatically install .NET framework. Microsoft has discontinued Windows 7 support.

- Administrative privileges for software installation.

Downloading Software

TripSaver II Service Center Configuration Software is available for download only to customers who have purchased the configuration kit. The latest release is posted on the S&C Automation Customer Support Portal at **sandc.com/en/support/SC-customer-portal/**. A username and password is required to log in to the portal. New S&C customers must complete the form in the lower section of the Web page, and a new username and password will be sent to them.

Customers who already have a password can click on the **Log In to Secure Site** button. This opens the log-in page. See Figure 2.

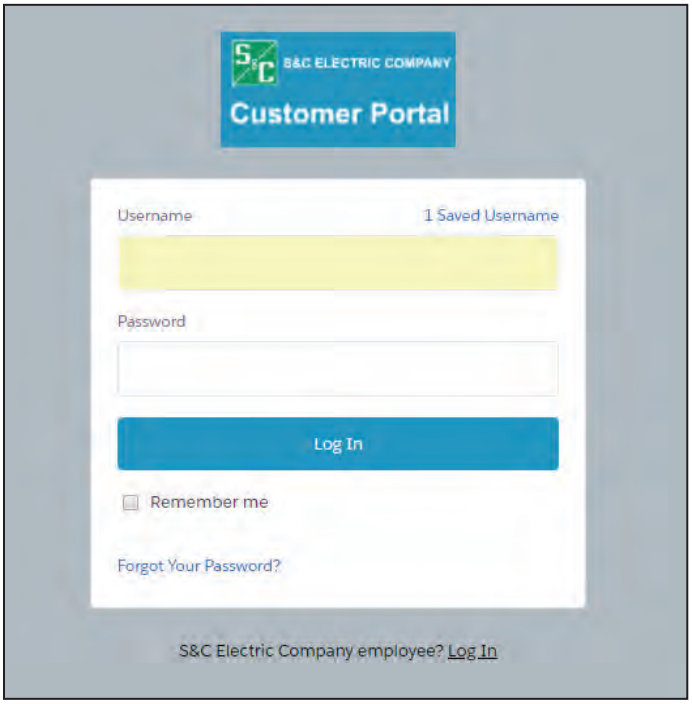


Figure 2. The customer portal log-in page.

Enter the username and password and click on the **Log In** button to log in to the portal.

Go to the "TripSaver II Workspace" section and download the latest installer SCC<version number>_Installer.exe file from the portal.

Software Installation

Use the following steps to install the software:

STEP 1. Double-click on the downloaded installation file to self-extract and start the process. The name of the software and its version number will appear. Click on the **Install** button to proceed, or click on the **Close** button to quit the installation process. See Figure 3.

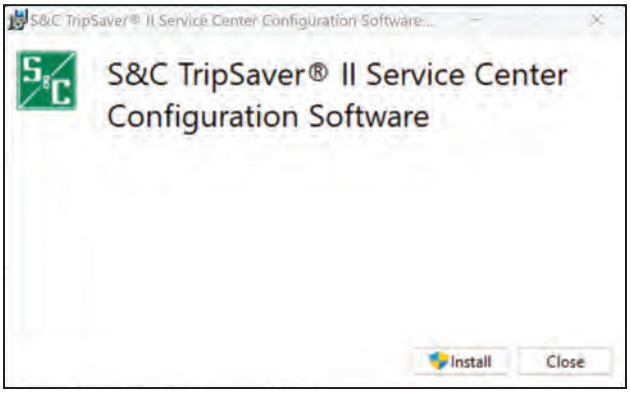


Figure 3. Launching the software installer.

STEP 2. After clicking on the **Install** button, wait for the installation to finish. The installer will automatically install the correct .NET framework onto the computer if .NET is missing. When .NET is successfully installed, the setup wizard for the S&C TripSaver II Service Center Configuration Software will open. See Figure 4.

NOTICE

If a previous version of the TripSaver II Service Center Configuration Software version was installed on the computer, the installation process will remove it and install the latest version.

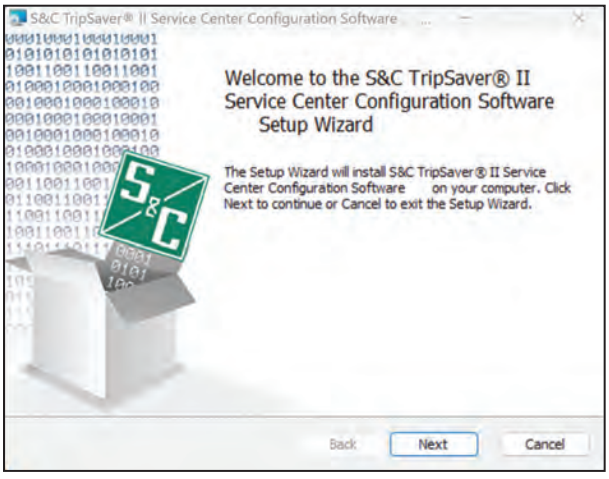


Figure 4. The SCC installation setup wizard.

STEP 3. Click on the **Next** button to continue, or click on the **Cancel** button to quit the installation process.

STEP 4. The next dialog box to open allows the installer to select the installation folder. Click on the **Change** button to select a specific destination folder, or use the default folder shown. Click on the **Next** button to continue, or click on the **Cancel** button to quit the installation process. Click on the **Back** button to go back to the previous step. See Figure 5.

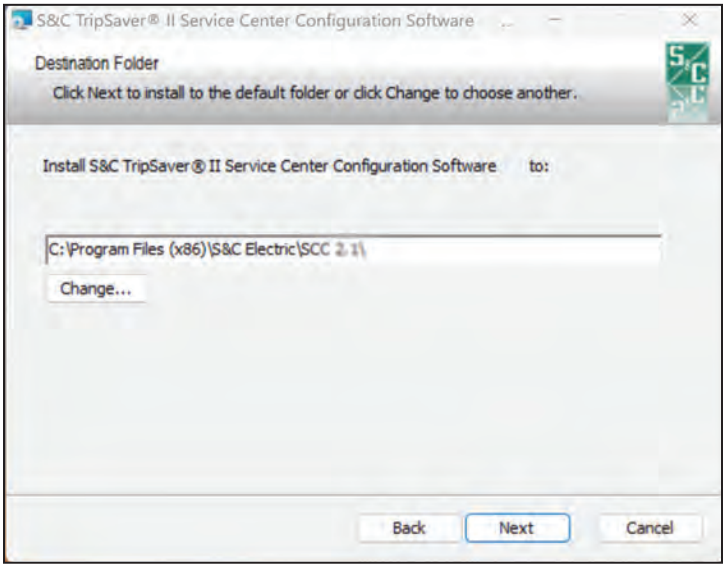


Figure 5. The dialog box for selecting the destination folder.

STEP 5. When the installation folder has been selected, the Ready to Install dialog box opens. See Figure 6. Click on the **Install** button to begin the installation. Click on the **Back** button to review or change the settings, or click on the **Cancel** button to quit the installation process.

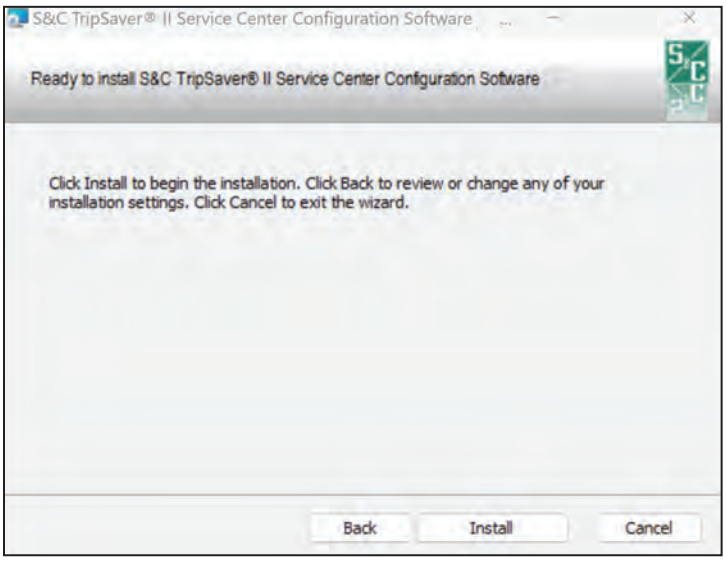


Figure 6. The Ready to Install dialog box.

During the installation process, a status bar is shown. When the installation is complete, the screen shown in Figure 7 will be displayed. Click on the **Finish** button to exit the setup wizard.

Figure 7. This dialog box indicates installation is complete.

STEP 6. When TripSaver II Service Center Configuration Software has been installed successfully, the Installation Successfully Completed dialog box opens. See Figure 8. Click on the **Close** button to exit the installer.

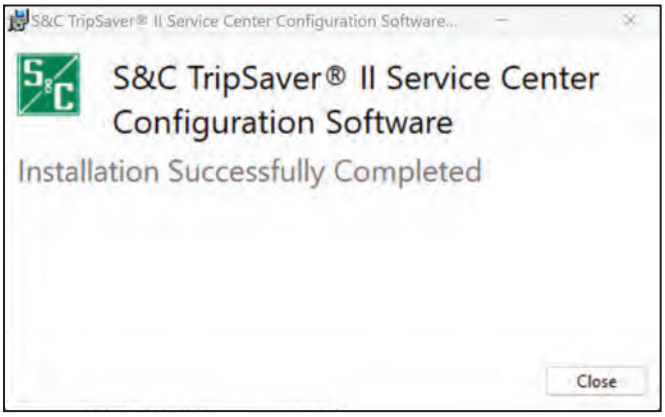


Figure 8. The SCC Installation Successfully Completed dialog box.

The installation will create the following icon on the desktop and in the Windows **Start** menu. See Figure 9.

Figure 9. The SCC software desktop icon.

To uninstall the TripSaver II Service Center Configuration Software from the computer, go to the **Apps** menu in the Windows Settings panel.

Assembling and Installing the USB Transceiver

A USB transceiver must be installed on the computer to communicate with a TripSaver II recloser. **Note:** Installing the configuration software and running the software in an offline mode does not require the presence of a USB transceiver.

STEP 1. Screw the threaded bottom of the antenna onto the threaded connector on the USB transceiver. See Figure 10.

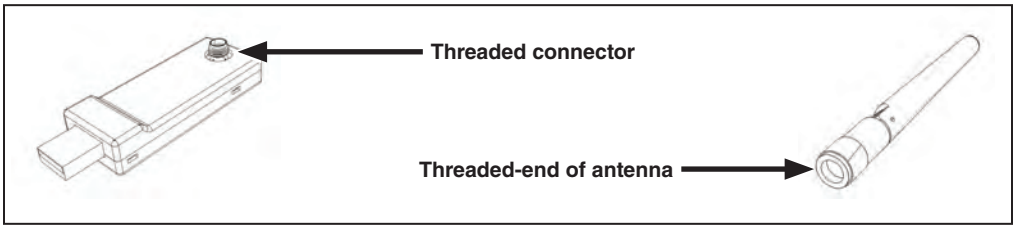


Figure 10. Connecting the antenna to the USB transceiver.

STEP 2. Insert the USB transceiver into any USB port on the computer. See Figure 11. The installation process is automatic.

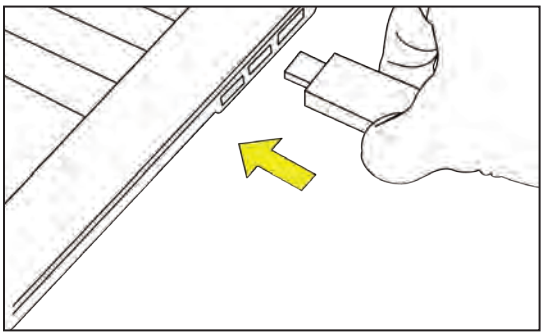


Figure 11. Inserting the USB transceiver into the computer.

Assembling the Power Supply and Powering the TripSaver II Recloser

A TripSaver II recloser can be powered by the power module to enable its communication capability. Complete the following steps before attempting to communicate with a TripSaver II recloser.

Note: TripSaver II Service Center Configuration Software has an offline setting mode that allows TripSaver II recloser settings to be configured and saved without communicating with a recloser.

STEP 1. Plug the connector of the ac adapter into the opening of the power module. See Figure 12.

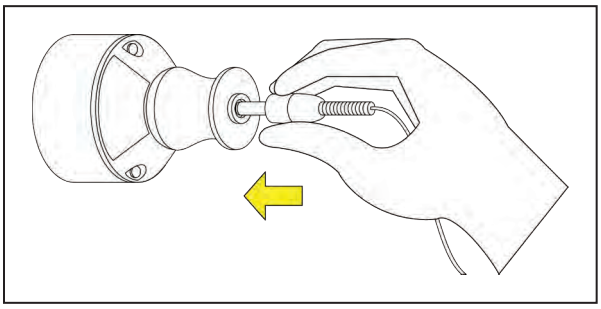


Figure 12. Inserting the power connector into the power module.

STEP 2. Position the power module near the base of the TripSaver II recloser; the module will be held in place magnetically. See Figure 13.

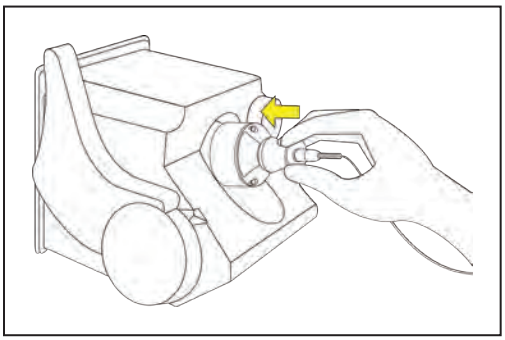


Figure 13. Attaching the power module to the TripSaver II recloser.

STEP 3. Install the proper power outlet plug adapter onto the ac adapter. See Figure 14.

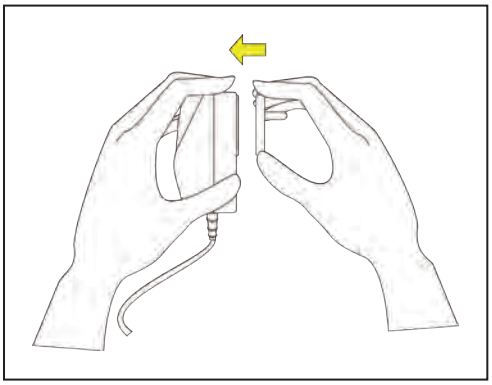


Figure 14. Installing the outlet plug adapter.

STEP 4. Plug the ac adapter into a wall outlet. See Figure 15.

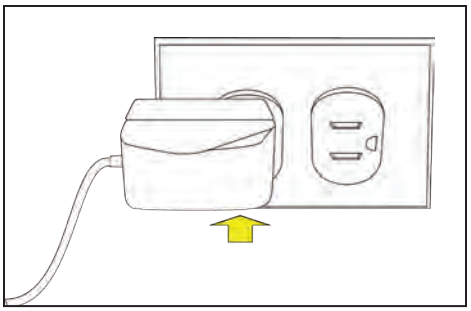


Figure 15. Plugging the ac adapter into a live outlet.

To verify the TripSaver II recloser is powered up, rotate the MODE-SELECTOR lever and observe the LCD screen. If the LCD screen begins to scroll, it indicates the recloser has been successfully powered.

Obtaining the Transceiver ID

A Transceiver ID unique to each TripSaver II recloser is needed to establish communications between the computer and the recloser. The ID consists of a 32-digit character string in the format of:

"**0019C900.00020000._ _ _ _ _ _ _ _ . _ _ _ _ _ _ _ _**"

The Transceiver ID for the TripSaver II recloser can be obtained through the following methods:

- **Method 1:** The Transceiver ID is embedded in the QR code laser-etched onto the lower housing of each TripSaver II recloser. See Figure 16. Download a free QR scanner app to a smart phone and scan the QR code to obtain the Transceiver ID.

Figure 16. The Transceiver ID QR code.

- **Method 2:** Rotate the MODE-SELECTOR lever to initiate the *Display* screens after the TripSaver II recloser is powered up. The LCD screen will begin to scroll. The first screen displayed contains the Transceiver ID. See Figure 17.

Note: This screen does not appear when communication is disabled or when no screens are added to the *Display* screen sequence.

Figure 17. The Transceiver ID shown on the first LCD scrolling screen.

- **Method 3:** The Transceiver ID is also printed on the back of the yellow "DO NOT DROP—HANDLE WITH CARE" tag attached to each TripSaver II recloser when it leaves S&C Electric Company. See Figure 18.

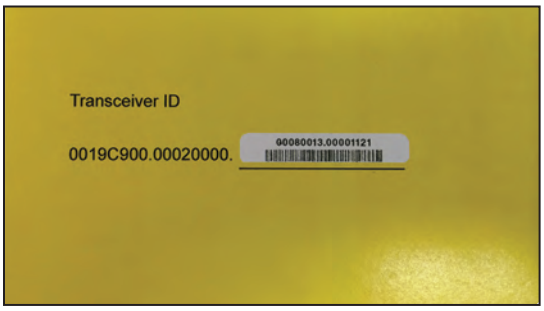


Figure 18. The Transceiver ID label.

Launching the Software

Click on the **SCC** icon on the desktop or in the **Start** menu to launch the TripSaver II Service Center Configuration Software. See Figure 9 on page 12.

Reading and Understanding the Warning Message

The warning message shown in Figure 19 is displayed after the software is launched:

The configuration process starts after clicking on the green **I have read and understand the above Warning** button.

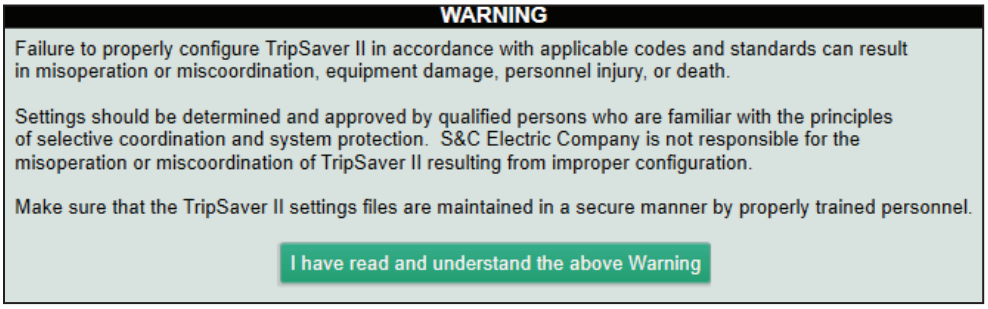


Figure 19. The SCC software Warning message.

Terminology

Apply. Overwrite old settings in a TripSaver II recloser with new settings.

Buffer. An area of memory in the software holding temporary settings information.

Revert. Reset the edit buffer to its original state. The definition of the "original state" is explained in the "Revert" section of this instruction sheet on page 35.

Setpoints. Setpoints are user-changeable settings entered into the control to configure a TripSaver II recloser. Setpoints are displayed as check boxes, light-blue text, or selection menus. Setpoints can be saved locally to a setpoint file with the extension .xspt.

Snapshot. A snapshot file captures all data from a TripSaver II recloser at a specific instant. The setpoints part of the snapshot can be saved locally to a setpoint file. Snapshot files have the extension .xdss.

Validate. Check settings against validation rules that define a valid configuration.

Note: For SCC software v1.8, v1.9, v2.0, and v2.1, the validation feature will NOT prevent the user from applying settings that are out of range for the ratings of the TripSaver II recloser. Instead, a warning will be displayed informing the user that settings are out of range. The user will have the opportunity to either accept an out of range setting, or adjust it before applying. Accepting an out of range setting will then be entered into the factory service log.

Overview

TripSaver II Service Center Configuration Software is used to communicate with and configure TripSaver II Cutout-Mounted Reclosers. The user interface is organized in the following way:

Menu Bar and Quick Access Toolbar

At the top of the user interface is a menu bar that has a number of commands. Below the menu bar is a quick access toolbar with the most frequently used commands found in the menu bar. See Figure 20.

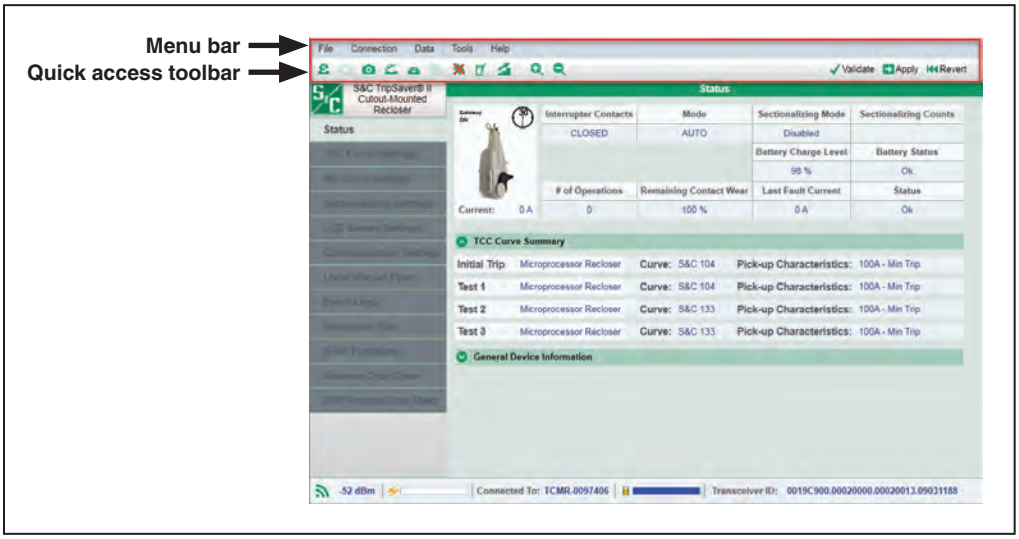


Figure 20. The menu bar and quick access toolbar found on all screens.

Menu Tree

On the left side of the user interface is a menu tree that contains the names of available screens. Click on the menu tree items to navigate through screens. Active screens are highlighted, and the rest remain gray. See Figure 21.

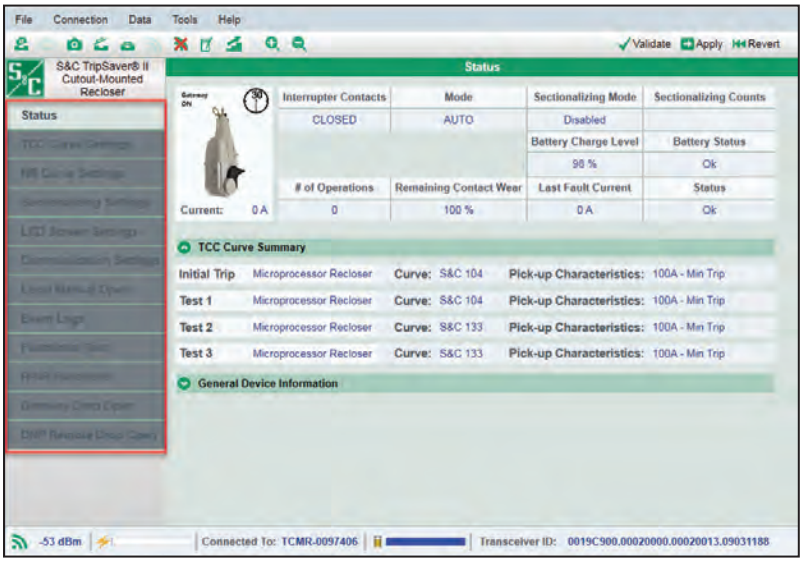


Figure 21. The menu tree on the left side of every screen.

Main Body

To the right of the menu tree is the main body of the user interface, where configuration and other tasks are performed. See Figure 22.

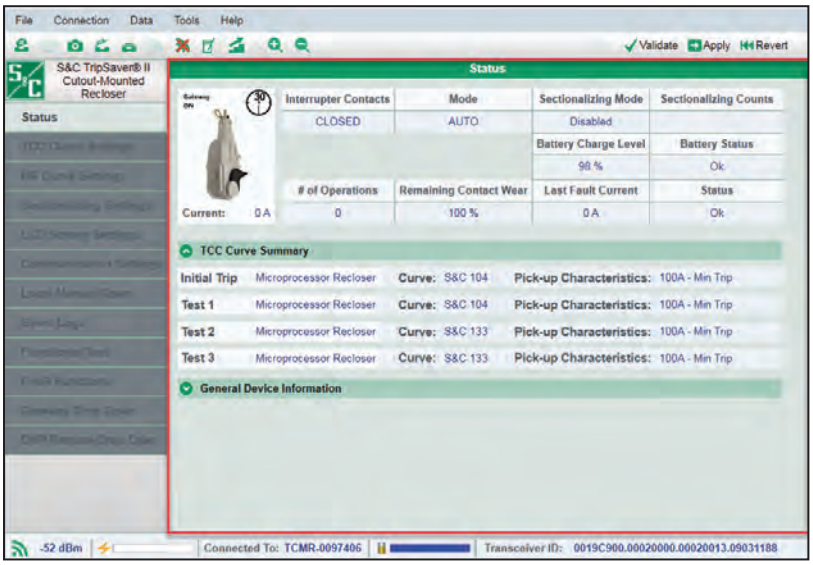


Figure 22. The main body of the screen is to the right of the menu tree.

Additional Information Bar

At the bottom of the screen is an information bar that contains additional recloser-related information. See Figure 23.

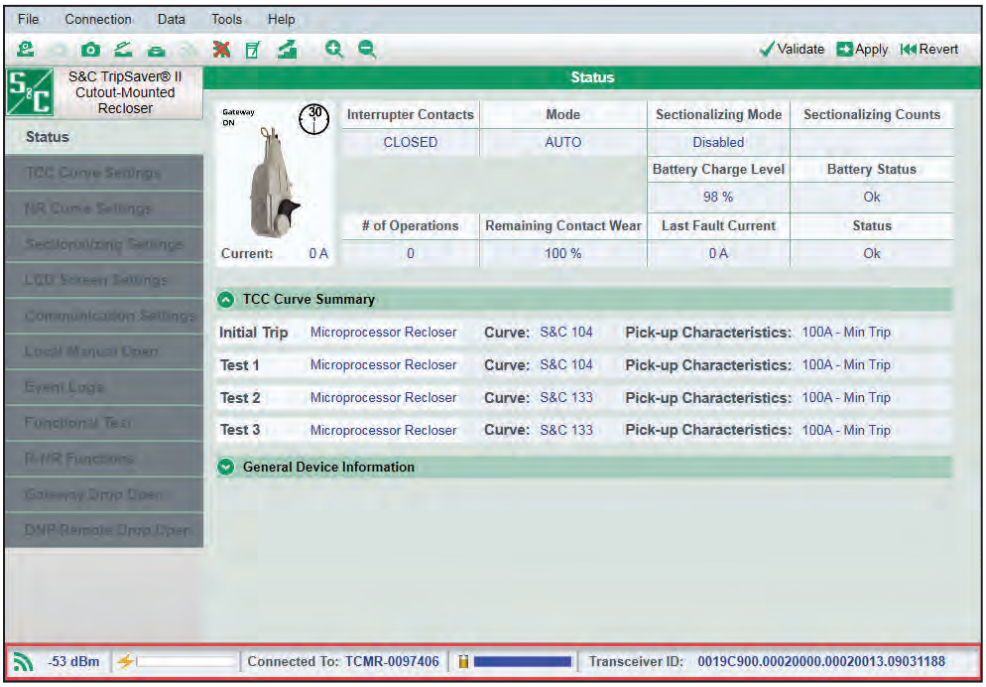


Figure 23. The information bar at the bottom of the screen.

Standalone Mode

TripSaver II Service Center Configuration Software has two operating modes: **Standalone** (offline) and **Connected** (online). The software automatically enters the **Standalone** mode after the software is launched. It starts with S&C default configuration settings.

Users can define their own default settings that the software uses in **Standalone** mode by selecting the **Tools>Options>Standalone** option. In **Standalone** mode, the settings can be configured without being connected to a recloser, saved to a setpoint file for later use, and loaded into a previously saved snapshot file for analysis. Six settings screens are available under this mode. They are: 1) *TCC Curve Settings*, 2) *NR Curve Settings*, 3) *Sectionalizing Settings*, 4) *LCD Screen Settings*, 5) *Communications Settings*, and 6) *Local Manual Open*. See Figure 24.

Note: Validation in **Standalone** mode will validate for a TripSaver II recloser rated 100 amperes continuous. Validation in **Connected** mode will validate settings based on the actual continuous current setting of the recloser: 40 A, 100 A, or 200 A.

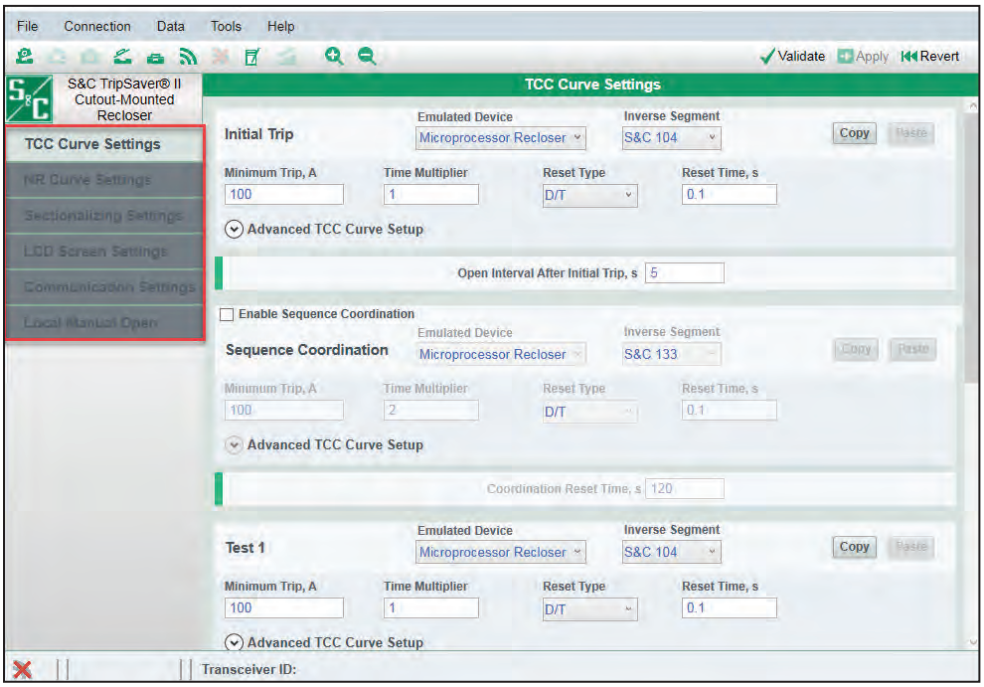


Figure 24. The Standalone mode menu tree items.

Connected Mode

The software enters the **Connected** (online) mode when a communications connection is established with a TripSaver II recloser. When connected, the setpoints from the recloser will be placed into the edit buffer, overwriting all previous settings in the buffer. When the present settings in the buffer have not been saved, a prompt to save the settings will open before connecting to the recloser.

NOTICE

If serial number information, catalog number information, or programmed settings are missing or the screen shows incorrect continuous current rating. Please refer to the "Restoring Profile If Lost During a Firmware Update" section on page 122.

Under **Connected** mode, users can view existing settings, status information, and event logs of the TripSaver II recloser, apply new settings to the control, download a snapshot file, or perform functional tests. Three additional screens are available under this mode. They are: 1) *Status*, 2) *Event Logs*, and 3) *Functional Test*. See Figure 25. And as follows, the 4) *R-NR Functions* screen, 5) *Gateway Drop Open* screen, and 6) *DNP Remote Drop Open* screen, will open if the TripSaver II recloser has the **Extended Open Interval** option ("-O"). These screens are also available when a snapshot file is open.

The software also allows viewing the data captured in a previously saved snapshot file.

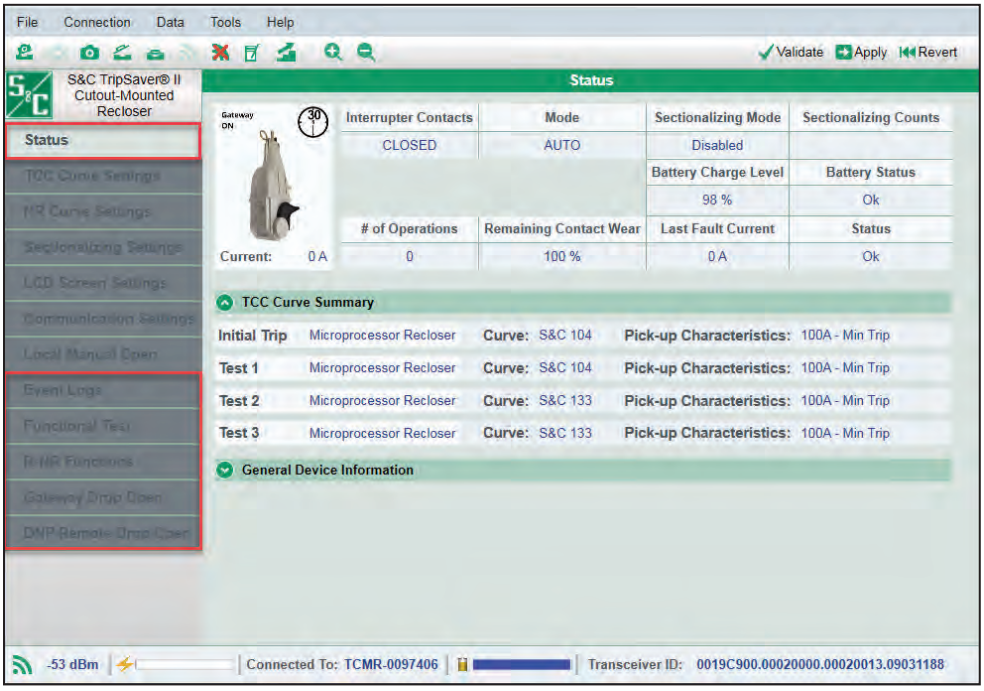


Figure 25. The Connected mode menu tree items.

Menu Bar Functions

At the top of the user interface is a menu bar that contains a number of commands that are described in this section. Below the menu bar is a quick access toolbar that contains the most frequently used commands found in the menu bar. See Figure 26.

Figure 26. The quick access toolbar.

Each **Menu Bar** function is described in the following sections: “File Menu,” “Connection Menu,” “Data Menu,” “Tools Menu,” and “Help Menu.”

Open Snapshot

When a snapshot is saved, the configuration software can open it later and the data can be viewed offline. A snapshot file can be opened under the **Standalone** (offline) or **Connected** (online) mode or when another snapshot is already open. Users can also edit the settings part of a snapshot file and then save the modified settings to a setpoints file. A previously saved snapshot can be opened by selecting the **File>Open Snapshot** option from the **Main** menu or by clicking the **Open Snapshot** icon in the quick access toolbar.

If the present setpoint changes were not saved in the edit buffer, an Operation: Open Snapshot dialog box will open asking that it be saved. Click on the **Discard** button to open the snapshot without saving settings, click on the **Save** button to save setpoints first, or click on the **Cancel** button to quit the **Open Snapshot** process. See Figure 27.

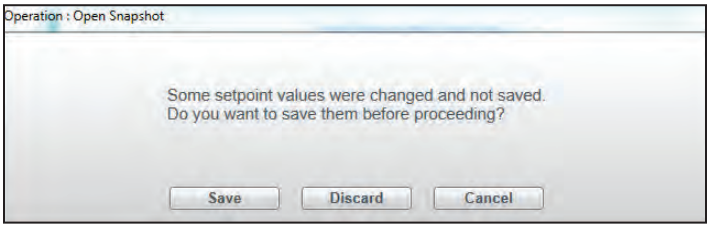


Figure 27. The Operation: Open Snapshot dialog box for saving changes before the Open Snapshot process.

When attempting to open a snapshot before finishing any TCC curve-selection process, the dialog box shown in Figure 28 will open. Click on the **Cancel** button to complete TCC curve selection and then try again. Click on the **Discard** button to open a snapshot without saving the modified settings on the screen.

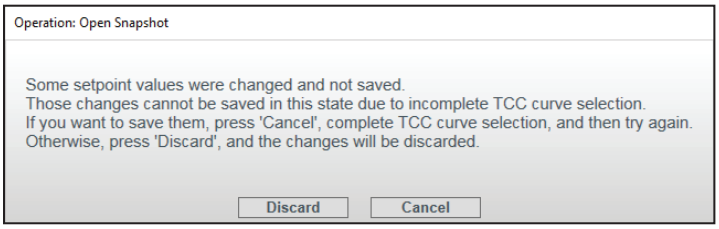


Figure 28. The Operation: Open Snapshot dialog box for completing TCC curve selection before the Open Snapshot process.

The File-open dialog box opens to allow browsing for and selecting a snapshot file to be opened. When the snapshot is opened successfully, the message shown in Figure 29 will open.

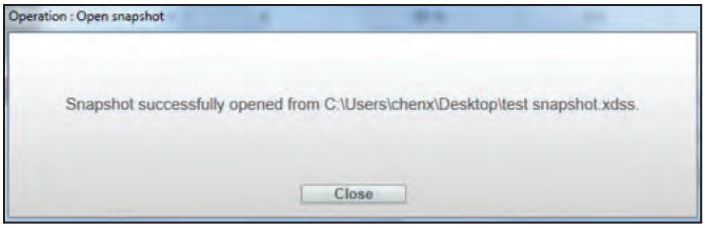


Figure 29. The snapshot successfully opened.

When a snapshot is opened, data captured from the TripSaver II recloser can be viewed or modified, and the setpoints in the snapshot file can be saved in a new setpoints file.

When opening a snapshot file under the **Connected** (online) mode, the recloser will be disconnected automatically, and no data will be applied to the connected TripSaver II recloser. If no setpoint changes have been saved in the edit buffer, a prompt will open asking the user to do so. The TripSaver II recloser can be reconnected after a snapshot file is opened. See the "Connect to Device" section on page 29.

The snapshot saved always has the same version number as the firmware version of the TripSaver II recloser from which the snapshot file was generated. Snapshots with any earlier version numbers can all be opened and viewed using the latest version of the service center configuration software.

Close Snapshot

A snapshot can be closed by selecting the **File>Close Snapshot** option from the **Main** menu or by clicking on the **Close Snapshot** icon in the quick access toolbar, or simply by exiting the software. If attempting to close a snapshot without first saving any modified settings in the edit buffer, the dialog box shown in Figure 30 will open.

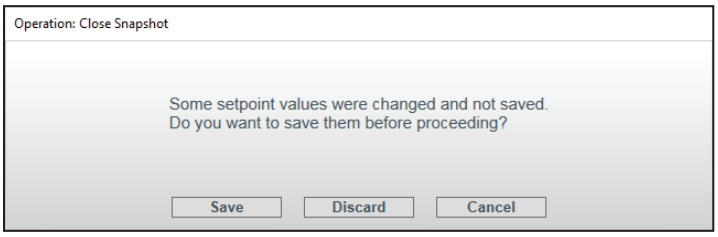


Figure 30. The Operation: Close Snapshot dialog box for saving changes before a Close Snapshot command.

Click on the **Discard** button to close a snapshot without saving settings. Click on the **Save** button to save setpoints first, or click on the **Cancel** button.

The **Close Snapshot** button is only available when a snapshot file is open. When a snapshot is closed, the software goes to the **Standalone** mode.

If an attempt is made to close a snapshot before finishing a TCC curve-selection process, the dialog box shown in Figure 31 will open. Click on the **Cancel** button to continue making TCC curve selection changes. Click on the **Discard** button to close snapshot without saving the modified settings. The **Save** button is unavailable in this case.

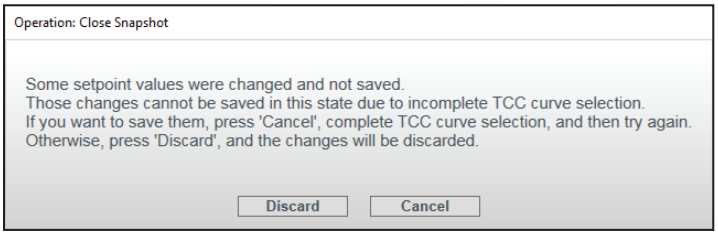


Figure 31. The Operation: Close Snapshot dialog box for completing TCC curve selection before a Close Snapshot operation.

Save Snapshot

This feature is only available when connected to and communicating with a TripSaver II recloser. To save a snapshot, select the **File>Save Snapshot** option from the **Main** menu or click on the **Save Snapshot** icon in the quick access toolbar. A File Selection dialog box will open, allowing selection of a name and location where the file is to be saved.

This process can take several minutes. During the saving process, the progress bar shown in Figure 32 will be displayed.

Figure 32. The Save snapshot progress bar.

Click on the **Cancel** button to cancel the **Save Snapshot** operation. If the snapshot is saved successfully, the message shown in Figure 33 appears.

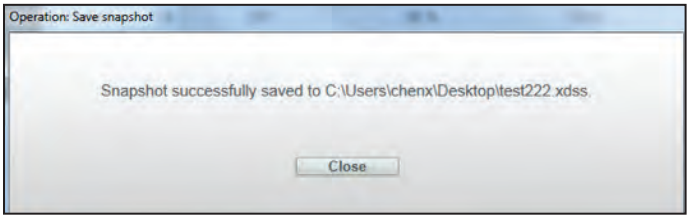


Figure 33. The dialog box noting Snapshot successfully saved.

Snapshot files have the .xdss extension.

NOTICE

DO NOT unplug the USB transceiver or power down the recloser until the **Save Snapshot** process is completed.

The snapshot saved always has the same version number as the firmware version of the TripSaver II recloser where the snapshot file is generated.

Load Setpoints

Previously saved setpoints, either from a setpoints file (.xspt) or from a saved snapshot file (.xdss), can be loaded into the edit buffer file by selecting the **File>Load Setpoints** option from the **Main** menu or by clicking the **Load Setpoints** icon in the quick access toolbar. When the setpoint changes have not been saved or applied in the edit buffer, an Operation: Load Setpoints dialog box will open. See Figure 34.

Note: When loading a setpoints file made in service center configuration software version 1.8 (or earlier) to a TripSaver II recloser using a later firmware version, the older setpoints file will configure the TripSaver II recloser with the version 1.8 (or earlier) settings by default. If any of the new functions available in the most recent version of the software are required, they must be manually set after the older setpoints file is loaded.

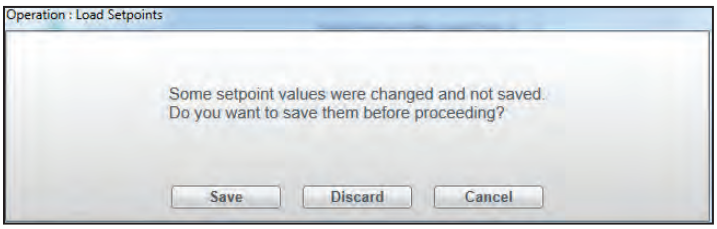


Figure 34. The Operation: Load Setpoints dialog box for saving changes before a Load Setpoints operation.

Click on the **Discard** button to load setpoints without saving settings. Click on the **Save** button to save setpoints in the edit buffer first. Or click on the **Cancel** button to quit the **Load Setpoints** process.

The Load Setpoints dialog box opens to allow browsing and selecting a setpoint file or a snapshot file to load. When the setpoints are loaded successfully, the message shown in Figure 35 will open.

Note: Loaded setpoint values will not take effect in the recloser until they have been applied.

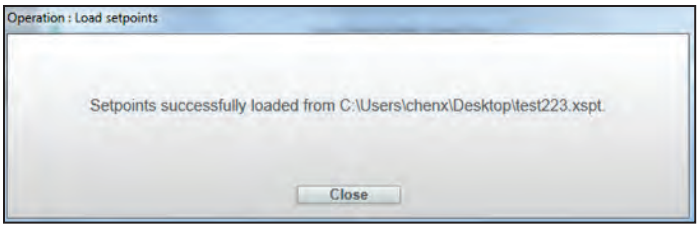


Figure 35. The dialog box noting setpoints were loaded successfully.

Save Setpoints

Setpoints can be saved while in **Standalone** (offline) mode, **Connected** (online) mode, or when a snapshot file is opened by selecting the **File>Save Setpoints** option from the **Main** menu or by clicking the **Save Setpoints** icon in the quick access toolbar. A file-selection dialog box will open to allow selecting a name and location where the file will be saved. When the setpoints are saved successfully, the message shown in Figure 36 will open.

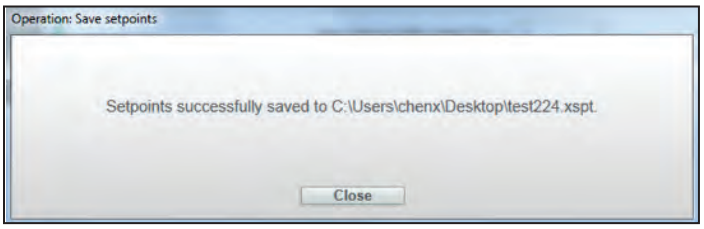


Figure 36. The dialog box noting setpoints successfully saved.

A complete or partially completed set of setpoints can be saved. However, if having started but not finished the process of selecting a TCC curve, setpoints cannot be saved, and the **Save Setpoints** button is grayed out until the curve-selection process is complete. The **Save Setpoints** button is grayed out when it is not available.

Setpoint files have the .xspt extension. When connected to a TripSaver II recloser or when a Snapshot file is open, the setpoint files saved only contain setting fields available to the firmware version of the TripSaver II recloser or snapshot file from which the setpoint files have been generated.

Exit

To exit the TripSaver II Service Center Configuration Software, select the **File>Exit** option or click on the "**×**" icon in the upper right corner of the main screen. If the setpoint changes have not been saved or applied in the edit buffer, a prompt to do so will open. Click on the **Discard** button to exit the software without saving settings. Click on the **Save** button to save setpoints first, or click on the **Cancel** button to quit the exit process. See Figure 37.

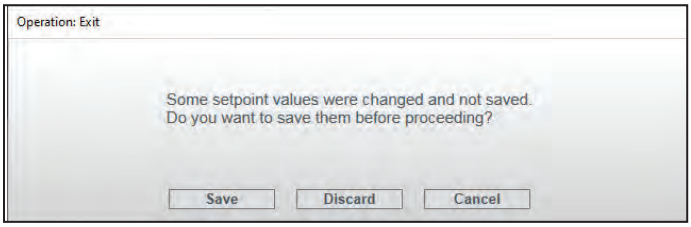


Figure 37. The Operation Exit dialog box for saving changes before exiting.

Connect to Device

To connect to a TripSaver II recloser, select the **Connection>Connect to Device** option from the **Main** menu or click on the **Connect to Device** icon in the quick access toolbar. Make sure the USB transceiver is already plugged in to the computer.

If attempting to connect without saving the modified settings first, the dialog box in Figure 37 on page 28 will open. Click on the **Discard** button to connect without saving settings, click on the **Save** button to save setpoints first, or click on the **Cancel** button to quit the process.

If attempting to connect before finishing any TCC curve selection process, the dialog box shown in Figure 38 will open. Click on the **Cancel** button to complete TCC curve selection and then try again. Click on the **Discard** button to connect without saving the settings. The **Save** button is unavailable in this case.

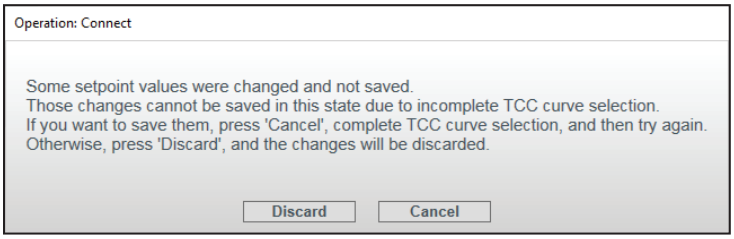


Figure 38. The Connect dialog box for completing TCC curve selection before connecting.

Next, a Transceiver ID Request dialog box will open. Enter the Transceiver ID of the TripSaver II recloser to be connected, and click on the **OK** button to connect. If the TripSaver II recloser is furnished with firmware version 1.8 or later, the **Auto Detect** button can be used to auto-detect the Transceiver ID. If the **Auto Detect** button is used with a recloser with firmware version 1.7 or previous, the Auto-Detect feature will display a pop up stating that the Auto-Detect feature will not work for previous versions of the firmware. The transceiver ID is unique to each TripSaver II recloser, and it consists of a 32-digit character string in the format of "0019C900.00020000. _ _ _ _ _ _ _ _ . _ _ _ _ _ _ _ _." The first 16 digits of the ID are pre-typed. Only the last 16 digits must be entered. See Figure 39. Up to 16 previously typed valid IDs are saved under the drop-down menu. When the drop-down menu is full, the oldest ID will be replaced by a new ID.

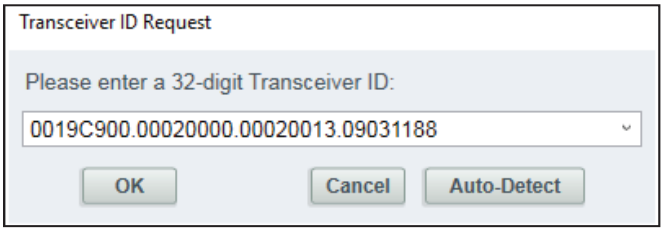


Figure 39. The Transceiver ID Request dialog box.

NOTICE

USB transceivers with firmware version 1.6 can connect to TripSaver II reclosers with firmware version 1.9 or lower using service center configuration software v2.1. To connect to TripSaver II reclosers with firmware version 2.0, USB transceivers with firmware version 1.6 must be upgraded to firmware version 2.0.

USB transceivers with firmware version 2.0 can connect to all TripSaver II firmware versions using the latest version of the service center configuration software. See the "USB Transceiver Firmware Update" section on page 43.

During the connection process, a progress bar is displayed. See Figure 40. Wait about 10 seconds for the connection process to finish, or click on the **Cancel** button to cancel the connection process.

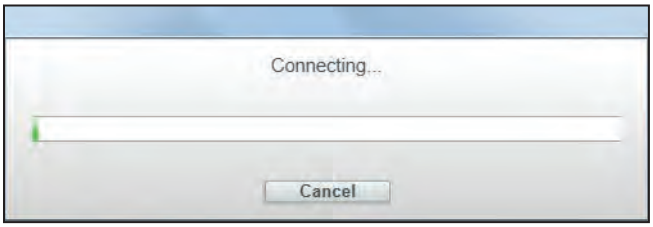


Figure 40. The progress bar during the Connection process.

The message shown in Figure 41 will open if the format of the transceiver ID entered is invalid, e.g. fewer than the required 32 digits. Click on the **OK** button and then click on the **Connect to Device** button to restart the process.

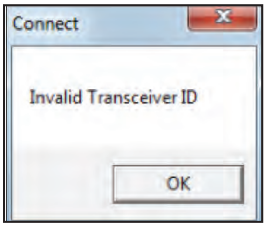


Figure 41. The Invalid Transceiver ID message.

The following screen will open if a USB Transceiver is not present, the contacts between the USB port on the computer and the transceiver are not reliable, or the transceiver serial port is being used by another program. Correct the problem and click on the **Retry** button. Click on the **Cancel** button to quit the connection process. See Figure 42.

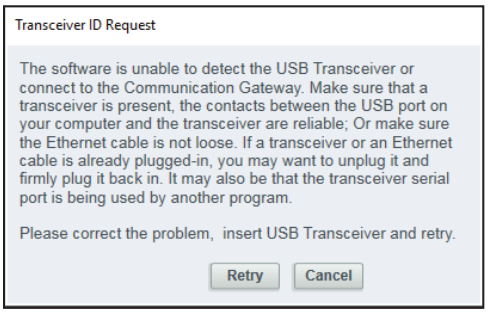


Figure 42. The "Unable to detect USB transceiver" prompt message.

To connect to TripSaver II reclosers with firmware version 1.9 or earlier, the USB transceiver MUST have firmware version 1.6 or 2.0 for a successful connection. Otherwise, the message shown in Figure 42 will appear. The combination of USB transceiver version 1.6 or 2.0 and the latest version of the service center configuration software will be backward-compatible with all TripSaver II recloser firmware versions.

To connect successfully with TripSaver II reclosers with firmware version 2.0, a USB transceiver with firmware version 2.0 is required. Either update a USB transceiver with firmware version 1.6 to 2.0 using the procedure detailed in the "USB Transceiver Firmware Update" section on page 43, or use the new USB transceiver part number FDA-1868R2.

The connection may not succeed if the TripSaver II recloser is not powered up or the 32-bit transceiver ID is incorrect. If the connection is not successful, the message shown in Figure 43 will open. Click on the **Retry** button to restart the connection process, or click on the **Cancel** button to quit the process.

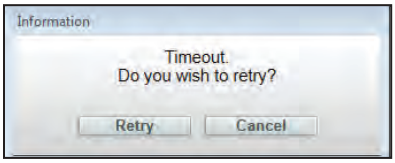


Figure 43. The Connection Timeout dialog box.

When the recloser is connected, the signal strength indication is displayed at the lower left corner. See Figure 44. The *Status* screen is then opened and populated with data from the connected recloser. Navigation is now possible to other screens.

Figure 44. The signal strength indicator.

Disconnect

Terminate the connection with a TripSaver II recloser by selecting the **Connection> Disconnect** menu item or by clicking on the **Disconnect** button on the quick access toolbar. The TripSaver II Service Center Configuration Software will terminate the session and switch to the **Standalone** mode. The recloser also can be disconnected by just exiting the software. If any setpoint changes have not been saved or applied in the edit buffer, a dialog box will open asking the user to do so.

Settings are temporarily stored in the edit buffer on the computer and are not active until they have been applied to the TripSaver II recloser. The following commands manage settings between the edit buffer and the active-settings area of the control.

Validate

The **Validate** command checks settings against validation rules that define a valid configuration. This function is available for the **Standalone** (offline) mode, the **Connected** (online) mode, and when a snapshot file is open. To validate settings in the edit buffer without applying them, select the **Data>Validate** option from the **Main** menu or click the **Validate** icon ✓ in the quick access toolbar.

If the validation procedure detects an error, a red error message explaining the error will be displayed in the Validation Results panel at the bottom of the main screen area. See Figure 45.

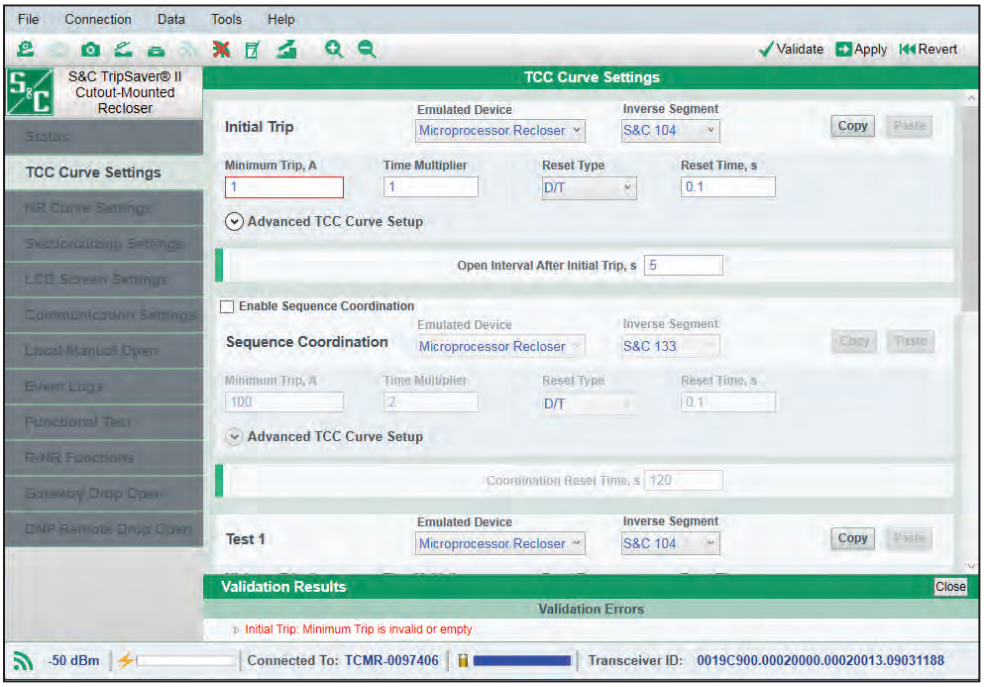


Figure 45. The Validation Results message.

To view a setpoint field that failed the validation rules, expand the description by double-clicking on the red error message and then single-clicking on the name of the field in black color in the Validation Results panel, as indicated in Figure 46. The border of the erroneous field will be highlighted in red.

Note: When validating settings in **Standalone** mode, the service center configuration software will provide accurate validation for settings for a 100-A continuous TripSaver II recloser. When validating settings in **Connected** mode, the service center configuration software will detect the actual continuous current rating of the TripSaver II recloser (40 A, 100 A, or 200 A) and validate settings accordingly. If a setpoint value entered is out of range, the border of that edit field will be highlighted in red automatically. Any invalid value will be erased from the edit field when navigating to another settings screen.

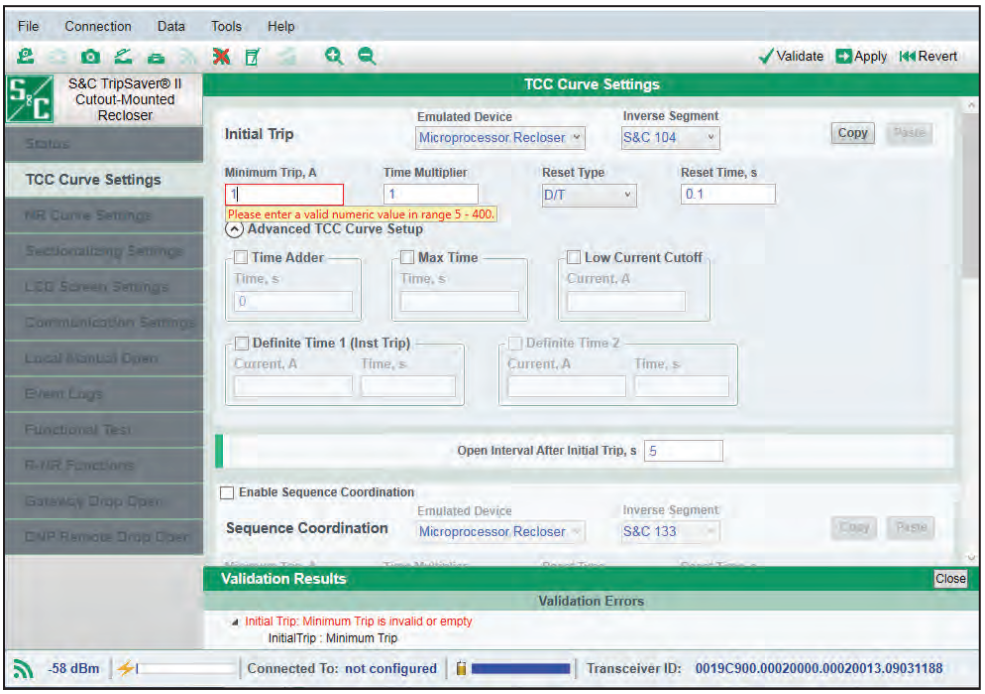


Figure 46. The border of the erroneous field, highlighted in red.

For validation under the **Connected** (online) mode, various error messages are also generated if mandatory setpoint fields are not filled in. For validation in the **Standalone** mode, the software only validates settings that have already been entered.

When the validation is successful, the Validation Results panel will display a message in green at the bottom of the main screen area after the **Validate** button is clicked. See Figure 47.

Figure 47. The message showing successful validation.

For settings that can be applied but need special attention, the Validation Results panel will display a warning message in black. See Figure 48.

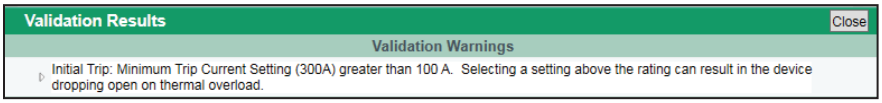


Figure 48. The Validation Warnings message.

Clicking on the **Close** button closes the Validation Results panel. Click on the **Validate** button again to bring back the Validation Results panel. Click on the **Validate** button at any time to re-validate and display remaining errors, if any.

Apply

The **Apply** function is only available when connected to and communicating with a TripSaver II recloser. To apply newly configured settings to the TripSaver II recloser, select the **Data>Apply** option from the **Main** menu or click on the **Apply** button in the quick access toolbar. The software will validate all of the settings first before applying them to the recloser. Previous settings in the TripSaver II recloser will be overwritten and cannot be restored. The warning shown in Figure 49 will be displayed before the process starts. Save previous settings to a setpoint file or to a snapshot file before proceeding.

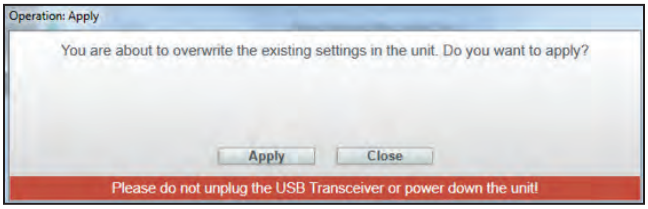


Figure 49. The overwrite warning before an Apply operation.

NOTICE

DO NOT unplug the USB transceiver or power down the recloser until the **Apply** process is completed.

The procedure for applying settings has multiple automatic steps and can take a few minutes. The process cannot be canceled when the process passes the second of those steps. Do not unplug the USB transceiver or power down the recloser until the process is completed. The message shown in Figure 50 will be displayed after settings are successfully applied.

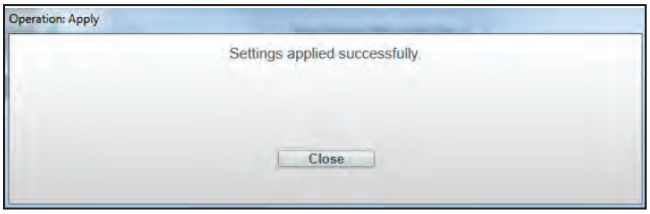


Figure 50. The Apply dialog box showing the settings applied successfully.

Revert

To reset the edit buffer to its original state, select the **Data>Revert** option from the **Main** menu or click on the **Revert** button ⏮ in the toolbar. The "original state" is defined as:

- For **Standalone** (offline) mode—Default settings the **Standalone** mode always starts with each time the software is launched
- For **Connected** (online) mode—Active settings presently residing in the connected TripSaver II recloser
- When a snapshot file is open—Settings saved in the snapshot file

Note 1: Loading a setpoint file does not create a new original state.

Note 2: The **Revert** button does not undo a configuration step. It is not an "undo" button. It also will not undo an **Apply** command.

Options

Under the **Options** feature, preferences can be changed for PC-to-TripSaver II communication-related logging, several communication parameters can be set, and the default settings the software uses under the Standalone (offline) mode can be changed.

The two logging-related features are mainly intended for engineering-debugging use in case the communications encounter any unexpected errors. S&C recommends customers use default settings unless instructed to do otherwise by S&C technical support.

Note: Customer privacy is important to us. No logging information is sent back to S&C or any third-party company over the Internet. All logging information is stored locally on the computer.

Logging

Enable Log. Select the check box to enable communication-related logging. Deselect the check box to disable communication-related logging. When deselected, all fields under the **Logging** tab will be grayed out. Default is "Enabled."

The interaction between the PC and the USB transceiver is also included in the log.

Log File Directory. This directory displays where the communication-related logging files will be saved. Type a full directory path into the field, or use the **Browse** button on the right to select a desired directory. This field is grayed out when the Default check box (for the Log File Directory) is selected.

Note: Do not select a directory on a network drive.

Default check box. Select the check box to use the default log file directory. Uncheck the box to use the directory selected previously. The default log file directory is C:\Users\(yourcomputername)\Documents\S&C Electric\SCC. When the default check box is selected, the **Log File Directory** field will be grayed out and display the default log file directory. The default for the Default check box is the **Enabled** setting.

Level. Three levels of logging details are available for selection:

- **Basic.** This level logs sufficient error/warning information for initial analysis. It is the default logging level.
- **Medium.** This level logs all traffic (e.g. packets exchanged), and is to be used by trained S&C support personnel. Medium is the default logging level at software installation.
- **Detailed.** This level traces the code execution in addition to those being logged at the Medium level and is to be used only by S&C Software Developers to look for difficult bugs.

Maximum File Size (kB). Specify the maximum size, in kilobytes, allowed for each log file. (Unlimited: 0; default: 10000)

Number of Old Log Files. Specify the maximum number of old log files to keep in the selected directory. (Unlimited: 0; default: 500)

Restore Defaults. Click on this button to change settings under the present tab to their default values. This button is grayed out when all settings under the present tab are the same as their default values.

Apply. Click on this button to apply settings and exit the option box. New settings will take effect after clicking on the **Apply** button. This button is grayed out when there are no changes made under all three **Options** tabs or when an incorrect value has been entered.

Cancel. Click on this button to discard changes and exit the option box.

Communication

Timeout, ms. Specify the duration (in milliseconds) the software waits for a response from a connected TripSaver II recloser before it retries. The default is 500.

Retries. Specify the number of additional times the software sends a communication request to a connected TripSaver II recloser. The default is 20.

Intersend Delay, ms. Specify the duration (in milliseconds) the software waits before it sends the next communication request to a TripSaver II recloser. The default is 20.

Note: These settings are optimally set and should only be changed when directed by an S&C technician.

Standalone

Use the Customer Settings check box. Select this check box to use a customer setpoints file or the setpoints part of a saved snapshot file as the default settings the software uses under the **Standalone** (offline) mode. Deselect the check box to use S&C factory default. When deselected, the **File Name path** field under the check box will be grayed out.

File Name path. This field displays the path of the file used for the customer default settings under the **Standalone** (offline) mode. Type a full directory path into the field, or use the **Browse** button on the right to select a desired file. This field is grayed out when the S&C factory default is used (Use Customer Settings check box deselected).

Create Report

A report of the configuration settings and the Event log displayed in the TripSaver II Service Center Configuration Software can be printed by selecting the **Tools>Create Report** option or by clicking on the **Create Report** button  in the quick access toolbar. This feature is available in both the **Standalone** (offline) mode, **Connected** (online) mode, or when a snapshot file is open.

Note: Customer privacy is important to us. No logging information is sent back to S&C Electric Company or any third-party company over the Internet during this process. The report generated will reside locally on the computer.

Report format. Select the preferred format for the report created, either in html or csv.

What to report. Use the check box to select the contents to be reported, either Settings, or Event Log, or both. The Event Log check box is grayed out in the **Standalone** (offline) mode.

Save to file. This displays the file to which the report created will be saved. Type a full file path including the folder and desired name of the file into the field, or use the **Browse** button on the right to select a desired directory, and then name the file. The report will be created on the desktop if a path is not specified.

Note: Do not select a directory on a network drive.

Open after save. Select the check box to open the file automatically after it is saved.

Report. Click on this button to generate a report. This button is grayed out when none of the check boxes in the **What to report** field are selected or when the **Save to file** path is left empty.

Cancel. Click on this button to exit the **Create Report** process.

When a report file is created, an information message similar to that shown in Figure 51 will be displayed.

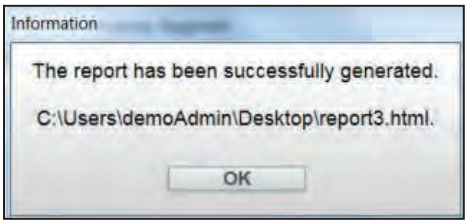


Figure 51. The dialog box showing a report successfully generated and its file location.

Firmware Update

NOTICE

The TripSaver II recloser must be removed from the utility pole and placed near the USB Transceiver before performing a firmware update.

NOTICE

DO NOT perform a firmware update using the cordless power module. Use the corded power module attached to an appropriate ac power source.

TripSaver II Service Center Configuration Software 2.1 (this release) is backward-compatible with all TripSaver II recloser firmware versions: 2.0, 1.9, 1.8, 1.7, 1.6, 1.5, 1.3, and 1.0. It can update TripSaver II recloser firmware versions 1.5, 1.6, 1.7, and 1.8 to 1.9, and firmware version 1.0 to 1.3.

Because of changes in TripSaver II recloser hardware, service center configuration software version 2.1 is unable to update TripSaver II reclosers loaded with firmware versions 1.3 to the latest firmware version 2.0. A TripSaver II recloser with firmware version 1.3 can no longer be updated. Also, because of hardware changes, TripSaver II reclosers loaded with firmware versions 1.8, 1.7, 1.6, and 1.5 can only be upgraded to firmware version 1.9. A TripSaver II recloser with firmware version 1.9 cannot be updated to 2.0.

To update the firmware in the TripSaver II recloser, complete the following steps:

STEP 1. Connect to the TripSaver II recloser with a computer loaded with service center configuration software v2.1, plug a USB transceiver into the USB port of the computer and attach the ac power module to the TripSaver II recloser.

STEP 2. Make a note of the serial number, starting with "TCMR," of the TripSaver II recloser to be updated. See Figure 52. This number is also etched on the body of the TripSaver II recloser.

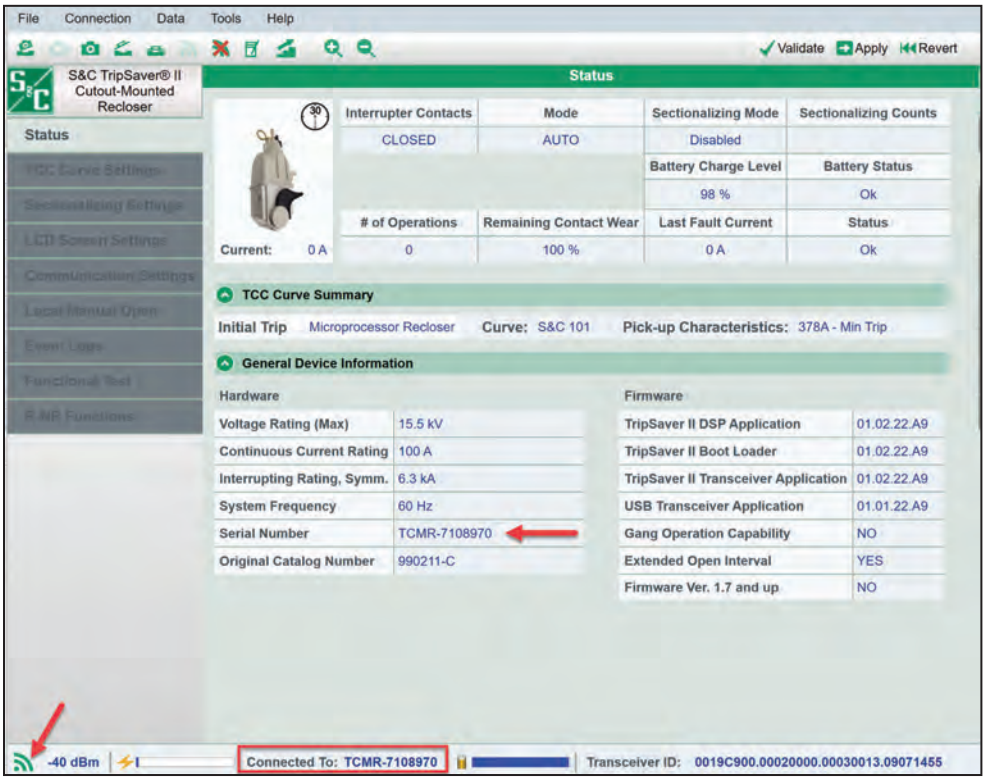


Figure 52. The TripSaver II recloser serial number and Signal Strength indicator locations.

STEP 3. Check that the **Signal Strength** indicator on the left side of the Additional Information Bar is green. See Figure 52 on page 39. See the "Additional Information Bar" section on page 20 for more information on the **Signal Strength** indicator. Then, optimize the signal strength between the TripSaver II recloser and USB transceiver, as described in the "Optimizing Signal Strength" section on page 113. If in an area with strong signal interference, or if the **Signal Strength** indicator is yellow or red, do not try to update the TripSaver II recloser's firmware.

NOTICE

DO NOT unplug the USB transceiver or power down the recloser until the **Firmware Update** process is completed.

When the service center configuration software is communicating with a TripSaver II recloser via the communications gateway, the firmware update function will be disabled. Firmware updates can only be done using the USB transceiver from the service center configuration kit.

STEP 4. Select the **Tools>Firmware Update** option from the **Main** menu, or click on the **Firmware Update** icon in the quick access toolbar. If the firmware is out of date, a dialog box will appear. See Figure 53.

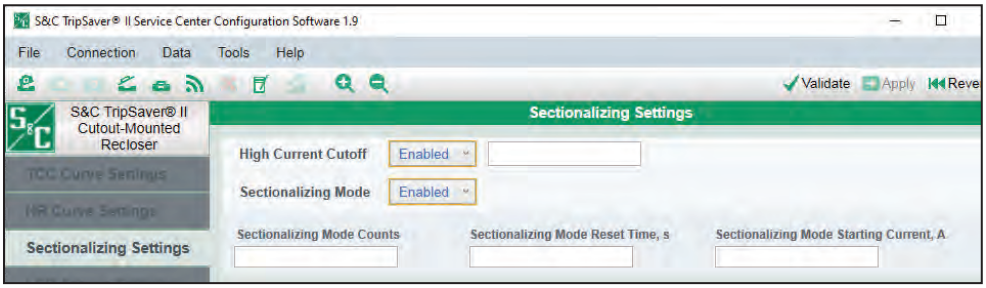


Figure 53. The firmware update Warning dialog box.

STEP 5. Select the **Perform firmware update** option, and then click on the **OK** button.

STEP 6. A second dialog box will open. See Figure 54. Agree with the terms and conditions by selecting the appropriate option. Then, click on the **OK** button. If instead wanting to abort the firmware update, select the **Disconnect from the TripSaver II and work offline without performing firmware update** option and click on the **OK** button.

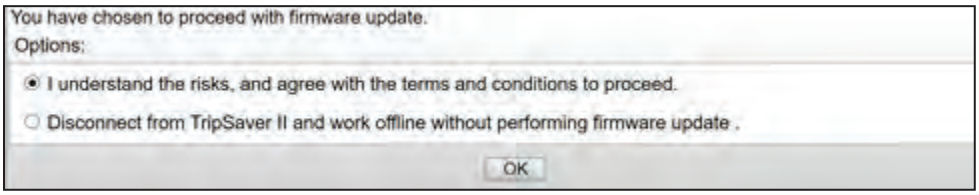


Figure 54. The firmware update Terms and Conditions dialog box.

The update process can take several minutes and automatically completes the following:

- Saves a snapshot file before updating the firmware (See Figure 55.)
- Updates the firmware (See Figure 56.)
- Applies the settings and historical logs from the saved snapshot file back to the TripSaver II recloser (If new features are available after the update, default settings for those features will be loaded to the TripSaver II recloser.)
- Opens the software screens that support the newly loaded firmware

Figure 55. The firmware update saving a snapshot file before updating the firmware.

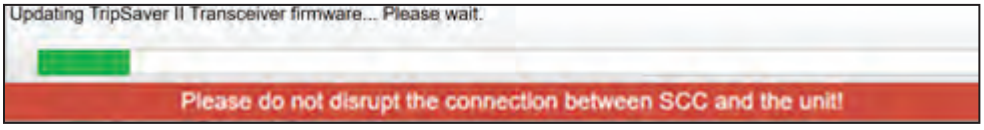


Figure 56. The firmware update progress bar.

STEP 7. A "Success" message will appear upon successful completion of the firmware update. After the update, check the *Status* screen to make sure the latest firmware has been applied correctly. See Figure 57.

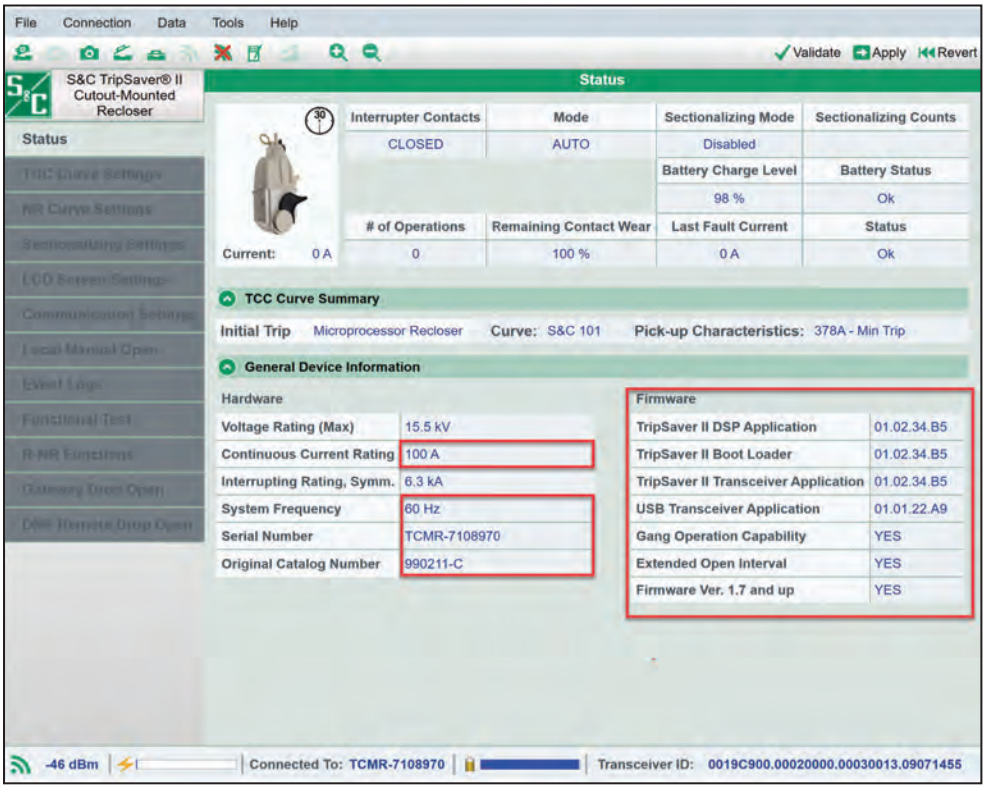


Figure 57. Status screen to check the latest firmware version.

Restore Profile

Information on the **Restore Profile** menu item can be found in "Restoring Profile If Lost During a Firmware Update" section on page 122.

USB Transceiver Firmware Update

USB transceivers with firmware version 1.6 can connect TripSaver II reclosers with firmware version 1.9 or lower using service center configuration software v2.1. For TripSaver II reclosers with firmware version 2.0, USB transceivers with firmware version 1.6 must be upgraded to firmware version 2.0.

USB transceivers with firmware version 2.0 can connect to all TripSaver II firmware versions using service center configuration software v2.1.

To upgrade the USB transceiver firmware, complete the following steps:

STEP 1. Plug a USB transceiver with firmware version 1.6 into the USB port of the computer. Do not connect to a TripSaver II recloser. Keep the service center configuration software in **Standalone** mode.

NOTICE

DO NOT unplug the USB transceiver until the USB Transceiver **Firmware Update** process is completed.

STEP 2. Select the **Tools>USB Transceiver Firmware Update** option from the **Main** menu. See Figure 58.

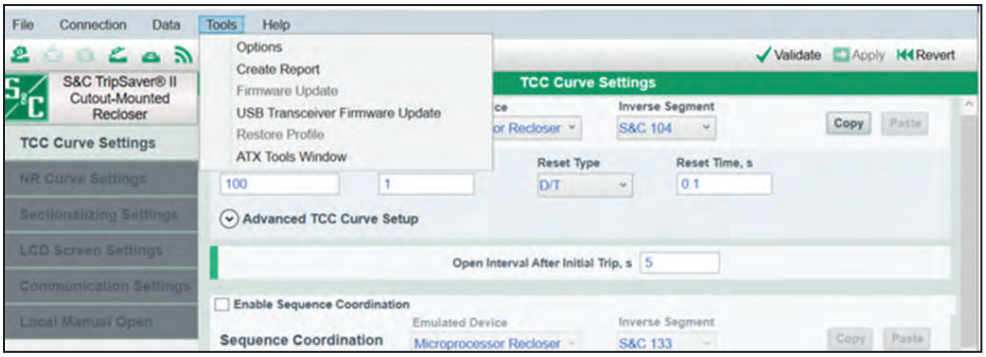


Figure 58. USB Transceiver Firmware Update menu item under the Tools menu.

STEP 3. If the firmware can be updated, the following selection menu will appear. See Figure 59. (If the firmware is up to date, a dialog box will appear. See Figure 62.)

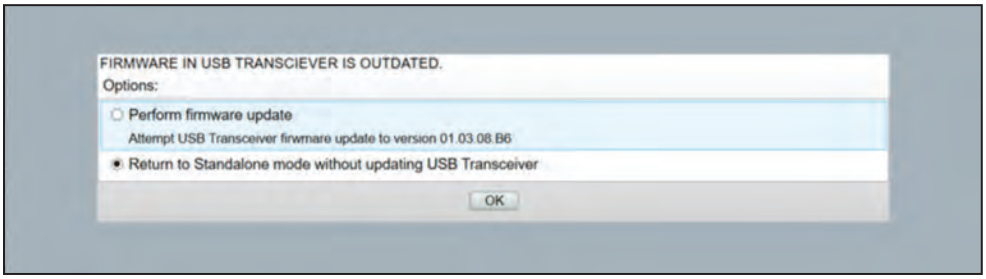


Figure 59. The Firmware in USB Transceiver is Outdated selection menu.

Click on the **Perform Firmware Update** radio button. A progress bar will appear showing the USB transceiver firmware update progress. See Figure 60.

Figure 60. The USB transceiver firmware update progress bar.

STEP 4. When the update is complete, a dialog box will appear displaying a success message. Click on the **OK** button. See Figure 61.

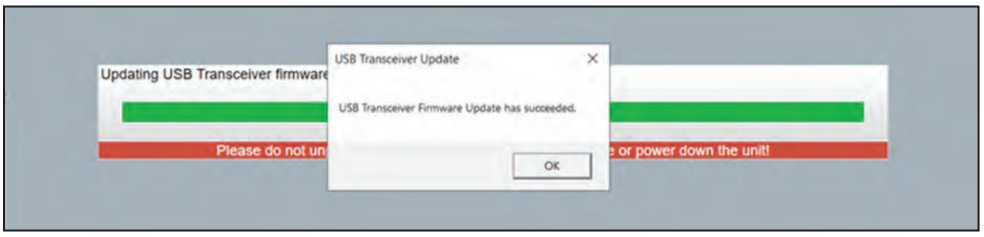


Figure 61. The USB transceiver firmware update success message.

Note: If the USB transceiver is up to date, the dialog box in Figure 62 will appear.

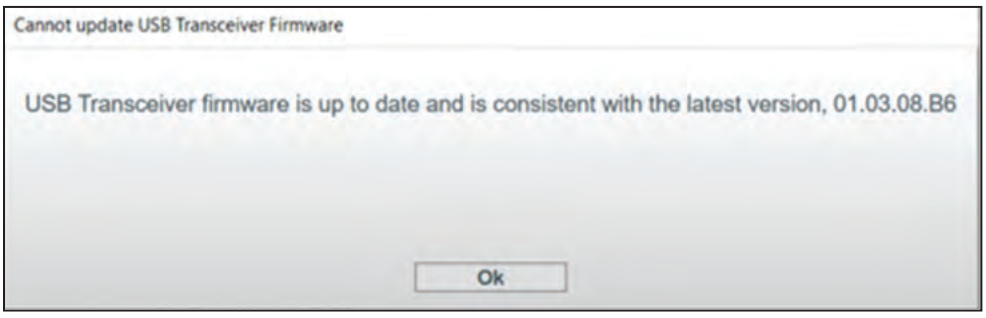


Figure 62. The Cannot update USB Transceiver Firmware dialog box.

Note: If the service center configuration software is in **Connected** mode (communicating with a TripSaver II recloser) the dialog box shown in Figure 63 will appear. The **USB Transceiver Firmware Update** procedure can only be completed in **Standalone** (offline) mode.

Figure 63. The Cannot update USB Transceiver Firmware dialog box when service center configuration software is in Connected mode.

Note: If the service center configuration software is unable to detect the USB transceiver, unplug it and plug it back in. If it's still not working, try a different USB port on the computer. See Figure 64.

Figure 64. The USB Transceiver cannot be detected dialog box.

Clear "Service Now"

The **Clear "Service Now"** menu item will only appear when a **Clear Service Now** procedure is being performed. Information on the **Clear "Service Now" menu** item can be found in "Clearing the Service Now LCD Screen" section on page 115.

Help on S&C TripSaver II Service Center Configuration Software

Selecting the **Help>Help S&C TripSaver II Service Center Configuration Software** option provides a copy of this instruction sheet.

Note: The latest version of Instruction Sheet 461-504 will always be available from **sandc.com**.

About S&C TripSaver II Service Center Configuration Software

Selecting the **Help>About S&C TripSaver II Service Center Configuration Software** option displays the copyright information and revision information of the TripSaver II Service Center Configuration Software, its database, and firmware included.

Zoom In/Out

To magnify the main body of the screen, click on the **Zoom In** button. See Figure 65. To zoom out, click on the **Zoom Out** button. See Figure 66.

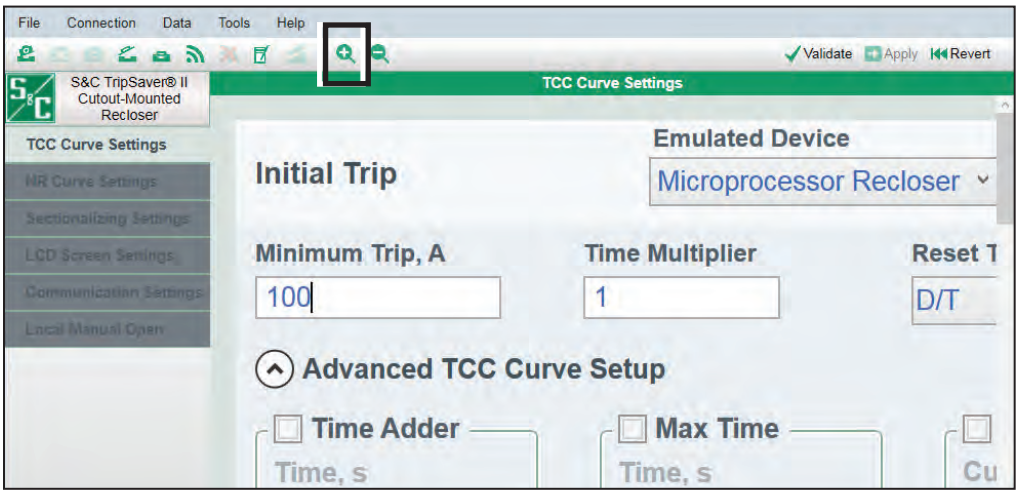


Figure 65. Magnifying the screen size.

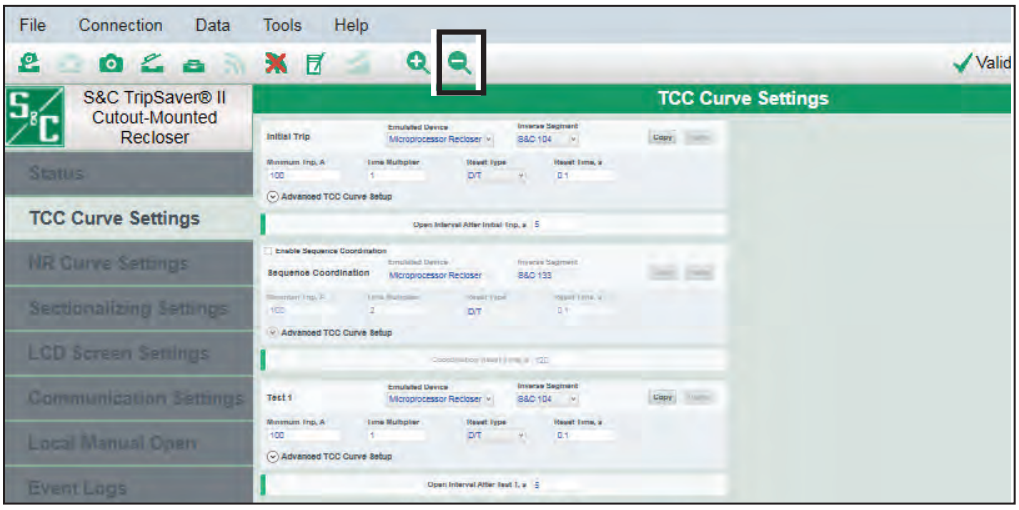


Figure 66. Reducing the screen size.

At the bottom of the user interface is an information bar containing four pieces of additional recloser-related information. See Figure 67.

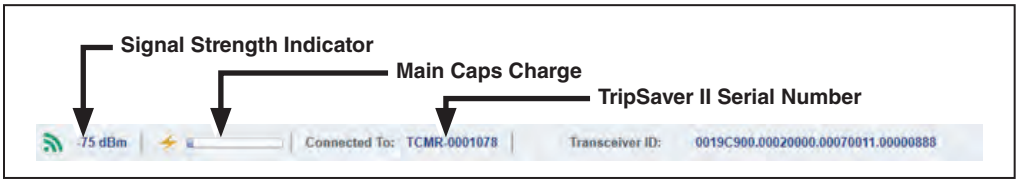


Figure 67. The Additional Information bar at the bottom of the screen.

Signal Strength. The **Signal Strength** indicator provides information on the quality of the communication. It uses four different icons to indicate different signal strength levels:

- When there is no active communication: 
- When the signal quality is poor (red): 
- When the signal quality is acceptable (yellow): 
- When the signal quality is good (green): 

A numerical representation of the signal strength is also provided in units of dBm. The greater the value (e.g. -69 is greater than -87), the better the signal strength.

Main Caps Charge. This indicates the state of charge of the main power supply capacitors inside the TripSaver II recloser.

The bar stays mostly unfilled during the configuration process, indicating only a small amount of charge is needed by the control for configuration use. The blue color indicator will start to fill the empty space as the main capacitors' charge increases, e.g. during functional testing.

The **Main Caps Charge** indicator is available for the **Connected** (online) mode or when a snapshot file is open.

Connected To (or Snapshot From). "Connected To" is displayed for the **Connected** (online) mode. It indicates the serial number of the TripSaver II recloser presently connected.

"Snapshot From" is displayed when a snapshot file is open. It indicates the serial number of the TripSaver II recloser from which the snapshot being viewed was saved. See Figure 68.

Figure 68. The "Snapshot From" serial number.

Transceiver ID. This indicates the transceiver ID of the TripSaver II recloser presently connected. It is only available for the **Connected** (online) mode.

Battery State of Charge. This indicates the state of charge of the rechargeable battery inside a TripSaver II recloser furnished with the **Extended Open Interval** feature ("-O" option). See Figure 69.

Figure 69. The internal battery state of charge indicator.

The bar will be filled completely blue if the state of charge is full, and the length will recede as the state of charge drops.

Working with Setpoints and Setpoint Files

Setpoints

Setpoints are user-changeable settings entered into the control to configure a TripSaver II recloser. Setpoints are displayed as check boxes, data-entry fields, and selection menus. The font color of all setpoints is light blue. Complete a setpoint configuration by clicking anywhere outside its editable field. If a setpoint field is grayed out, it is presently unavailable.

Check box: When the mouse cursor is located over a check box, the background color of the check box will change to light blue. Select a check box to enable the feature; deselect a check box to disable the feature. **Note:** Deselecting a check box will erase all settings under that feature in the edit buffer.

Data-entry field: When the mouse cursor is located over a data-entry field, the border of the field will change to light blue. Click into the data-entry field to enter the setting.

Selection menu: When the mouse cursor is located over a selection menu, the background color of the selection menu will change to light blue. Click on the menu to expand the list of available items. Click on an item in the list to finish the selection. The background color of the selection menu will change to dark blue, and the font color will change to white. Click anywhere outside the menu to complete the configuration.

Setpoints can be saved locally to a setpoint file with the extension .xspt. A previously saved setpoint file can be loaded into the edit buffer to make changes or to apply the settings to a recloser later. **Save Setpoints** and **Load Setpoints** functions are available in both the **Standalone** (offline) and **Connected** (online) modes, and also when a snapshot file is open.

Typing on the <Tab> and <Shift>+<Tab> keys on the computer keyboard can be used to navigate back and forth through setpoints.

Flyover Text

When the mouse cursor is located over a setpoint, flyover text will appear for seven seconds to describe the setpoint, including the range for numerical setpoints. When the mouse is located over a command button, flyover text will also appear to describe the function of that button. Flyover text is provided to facilitate the data-entry process. An example of flyover text is shown in Figure 70.

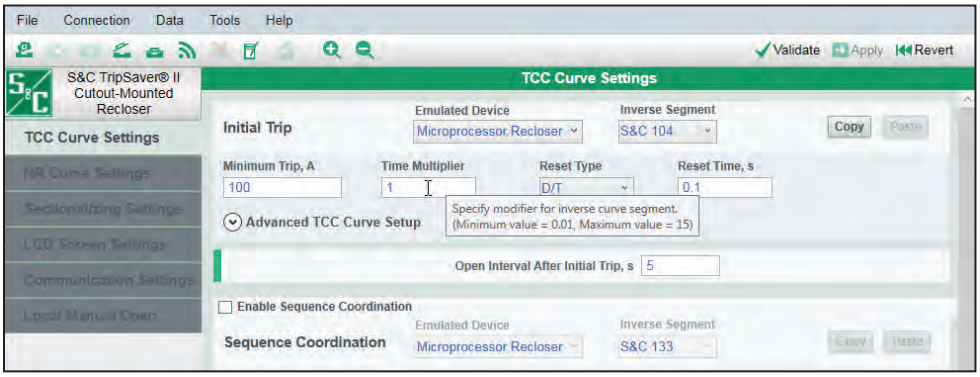


Figure 70. Sample flyover text.

Color Change of Setpoints Border

The color of the border of a setpoint field changes according to the following rules:

At any time if a setpoint field holds a value within the valid range but is different from the "original" state of the field, the border will change to yellowish orange. See Figure 71.

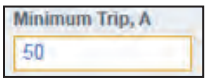


Figure 71. The border in yellowish orange when the value differs from the "original" state.

The "original" state of a setpoint field, again, is defined as:

- **Standalone** (offline) mode—This is the default setpoint the **Standalone** mode always starts with each time the software is launched.
- **Connected** (online) mode—This is the active setpoint currently residing in the TripSaver II recloser.
- When a snapshot file is open—This is the setpoint saved in the snapshot file.

Setpoint changes will not take effect in the connected recloser until they have been validated and applied. When applied, the changes become the new "original" state for the **Connected** (online) mode, and the yellowish-orange color will disappear.

When a setpoint field contains a value out of its valid range, the border will change to red. See Figure 72. That indicates an error that needs to be fixed.

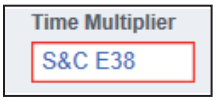


Figure 72. The border is red when the value is out of its valid range.

When the mouse cursor is located over a setpoint, the border will change to light blue. See Figure 73.

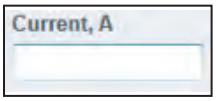


Figure 73. The border is light blue when the cursor is over it.

There is one exception. If a data-entry field has a yellow-orange or red border, the border will not change to light blue.

Out-of-Range Warning

When a value outside of the valid range is typed into a data-entry field, a warning message opens next to the field indicating the correct range and the degree of precision needed. See Figure 74.

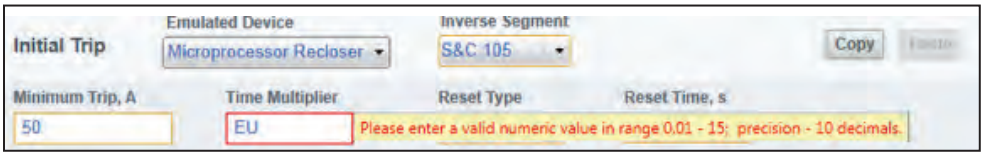


Figure 74. The out-of-range warning.

The warning message disappears on the next mouse click. **Note**: The invalid value will be erased when navigating to another settings screen.

Save Setpoints

A complete or partially completed set of setpoints can be saved, with one exception:

- If the process of selecting a TCC curve has been started, setpoints cannot be saved, and the **Save Setpoints** button will be grayed out until the curve-selection process is complete.

Working with a Snapshot File

TripSaver II Service Center Configuration Software allows saving a snapshot of all data from the control at a specific instant and viewing it later offline. The snapshot file has file extension .xdss.

Saving a snapshot is available only in the **Connected** (online) mode. The snapshot saved always has the same version number as the firmware version of the TripSaver II recloser where the snapshot file was generated.

A snapshot file can be opened in the **Standalone** (offline), the **Connected** (online) mode, or when another snapshot is already open. All snapshot firmware versions can be opened and viewed using the latest version of the service center configuration software.

Note: When opening a snapshot file under the **Connected** (online) mode, the recloser will be disconnected automatically, and no data will be applied to the connected TripSaver II recloser. Users can re-connect to the TripSaver II recloser after a snapshot file is open. See the “Connect to Device” section on page 29.

The setpoints in a snapshot file can be edited and, when the editing is completed, it can be saved into a setpoint file.

TCC Settings Screen

The time-current characteristic (TCC) curves for the initial **Trip** operation, optional sequence coordination, and up to three **Test** operations are selected using the *TCC Curve Settings* screen, which is also the first screen to open when the software is launched. The five **Trip** operations are named: **Initial Trip**, **Sequence Coordination**, **Test 1**, **Test 2**, and **Test 3** respectively. Setting fields for each **Trip** operation are grouped in separate areas identifiable by trip names shown on the left side of each area. See Figure 75.

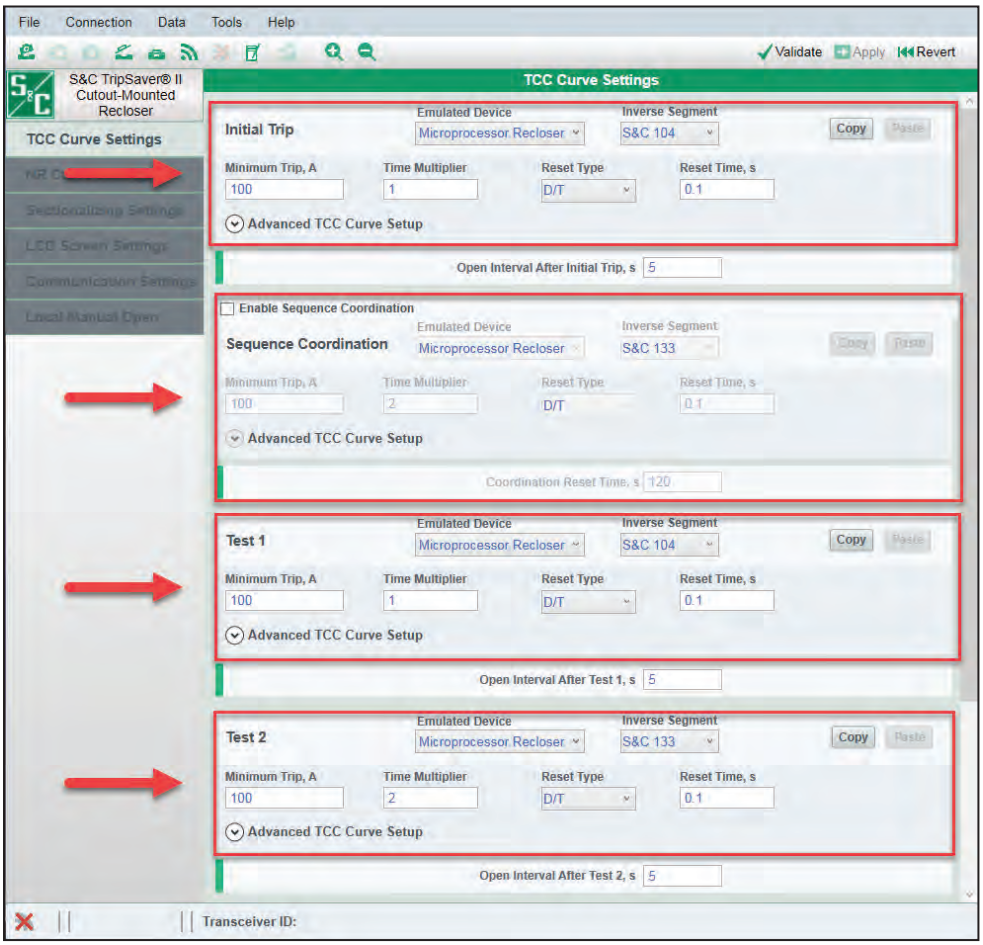


Figure 75. Setting fields for each Trip operation are grouped in separate areas.

The **Initial Trip** operation is required; if that is the only trip operation selected, the TripSaver II recloser will operate one time and then drop open (i.e., single shot to lockout). One of the available TCC curves listed in Appendix A on page 127 must be selected for the initial trip and for each of the additional tests to be added.

Sequence Coordination

The optional **Sequence Coordination** feature maintains proper coordination between an upstream TripSaver II Cutout-Mounted Recloser and the downstream recloser when each is set with fast and slow TCC curves. If the downstream recloser operates, the upstream TripSaver II recloser will shift (without operating) from its **Initial Trip** curve setting to a user-configured (usually slower) Sequence Coordination time-current characteristic curve. The TripSaver II recloser will maintain its **Sequence Coordination** setting until the **Coordination Reset** timer expires.

When the Sequence Coordination TCC is active and the **Coordination Reset** timer expires, it will afterwards revert to the **Initial Trip** TCC settings. More information about the **Sequence Coordination** feature with examples can be found in S&C Information Bulletin 461-50 "TripSaver® II Cutout-Mounted Recloser: *Sequence Coordination Application Guide*."

Sequence coordination is enabled by checking the Enable Sequence Coordination check box. Sequence coordination uses the same TCC curves as are available for the **Initial Trip** and **Test 1**, **2**, and **3** operations. A **Coordination Reset Time** setting must be entered (Default: 120 seconds). The **Coordination Reset Time** setting defines how long the recloser will stay in the Sequence Coordination TCC curve before reverting to the Initial Trip TCC curve. The range for the **Coordination Reset Time** setting is between 0.5 and 1000 seconds. See Figure 76. The Sequence Coordination TCC curve will use the same **Open Interval After Trip** setting as the Initial Trip TCC curve.

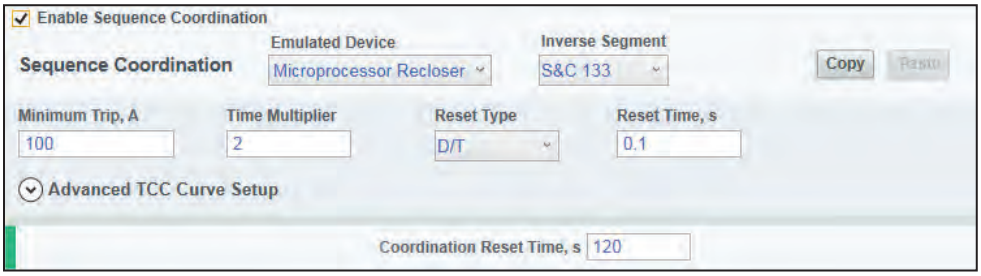


Figure 76. The Sequence Coordination settings.

Add/Remove a Test Operation

Remove a Test Operation. Click on the green **Remove Last Test** button at the bottom of the screen to remove the last **Test** operation from the test sequence. See Figure 77.

Figure 77. The Remove Last Test button.

Test operations can only be removed sequentially from the bottom up. For example, Test 2 cannot be removed without first removing Test 3. The Test 3 settings can be saved to the clipboard first by clicking on the **Copy** button located in the setting area for Test 3. Otherwise, settings will be lost when the curve is removed. The function of the **Copy** button is explained in the "Copy and Paste Feature" section on page 54.

Add a Test Operation. Click on the green **Add a Test** button at the bottom of screen to add a new **Test** operation to the end of the test sequence. See Figure 78. **Test** operations can only be added sequentially from the top down.

Figure 78. The Add a Test button.

Copy and Paste Feature

The **Copy and Paste** feature can be used to copy TCC curve settings from one trip operation to another trip operation. This eliminates the need to re-enter TCC curve settings multiple times. Each trip operation has its own **Copy** and **Paste** buttons. See Figure 79. **Note**: The open interval between two adjacent operations is not copied.

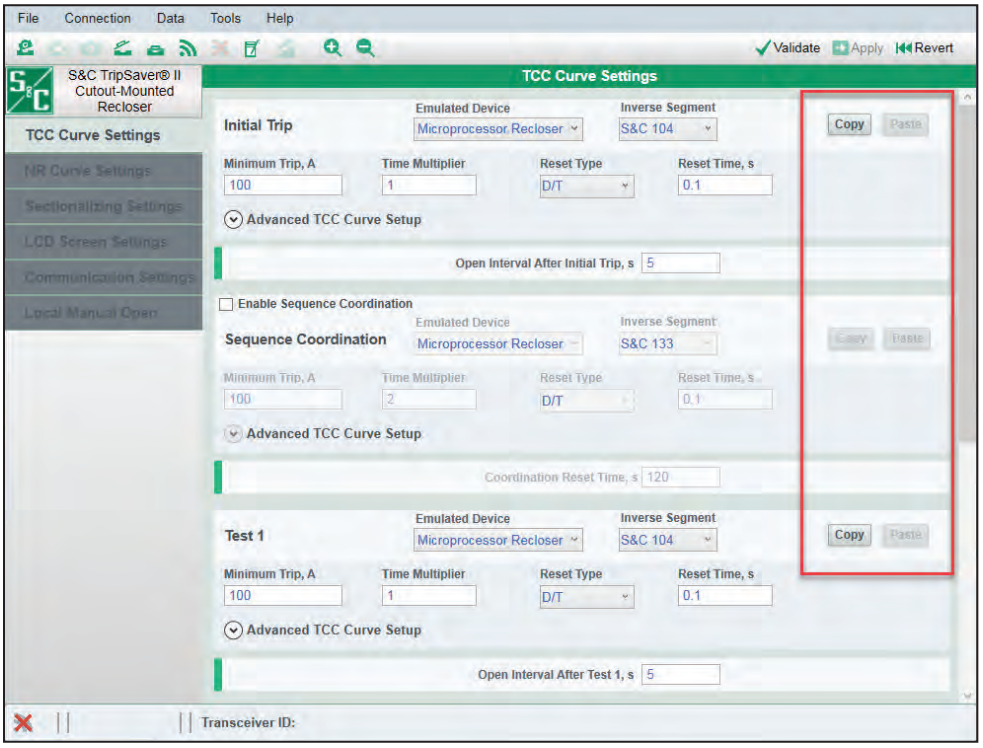


Figure 79. The Copy and Paste buttons.

Copy. To copy TCC curve settings to the clipboard, click on the **Copy** button for the operation being duplicated (e.g., Initial Trip or Test 1, etc.). The **Copy** button will not be active until a curve has been completely defined.

Paste. To paste TCC curve settings from the clipboard, click on the applicable **Paste** button. The **Paste** button will not be active until a **Copy** button is clicked.

Open Interval and O/C Sequence Time

If the reclosing sequence consists of just the **Initial Trip** operation (i.e., single shot to lockout), the reset time does not need to be entered. If there are two or more **Trip** operations, the open interval must be entered between adjacent **Trip** operations in addition to the reset time. On the screen, the field for the **Open Interval** setting is located between two adjacent **Trip** operations; the field for the **O/C Sequence Time** setting is always located at the end of all **Trip** operations. See Figure 80.

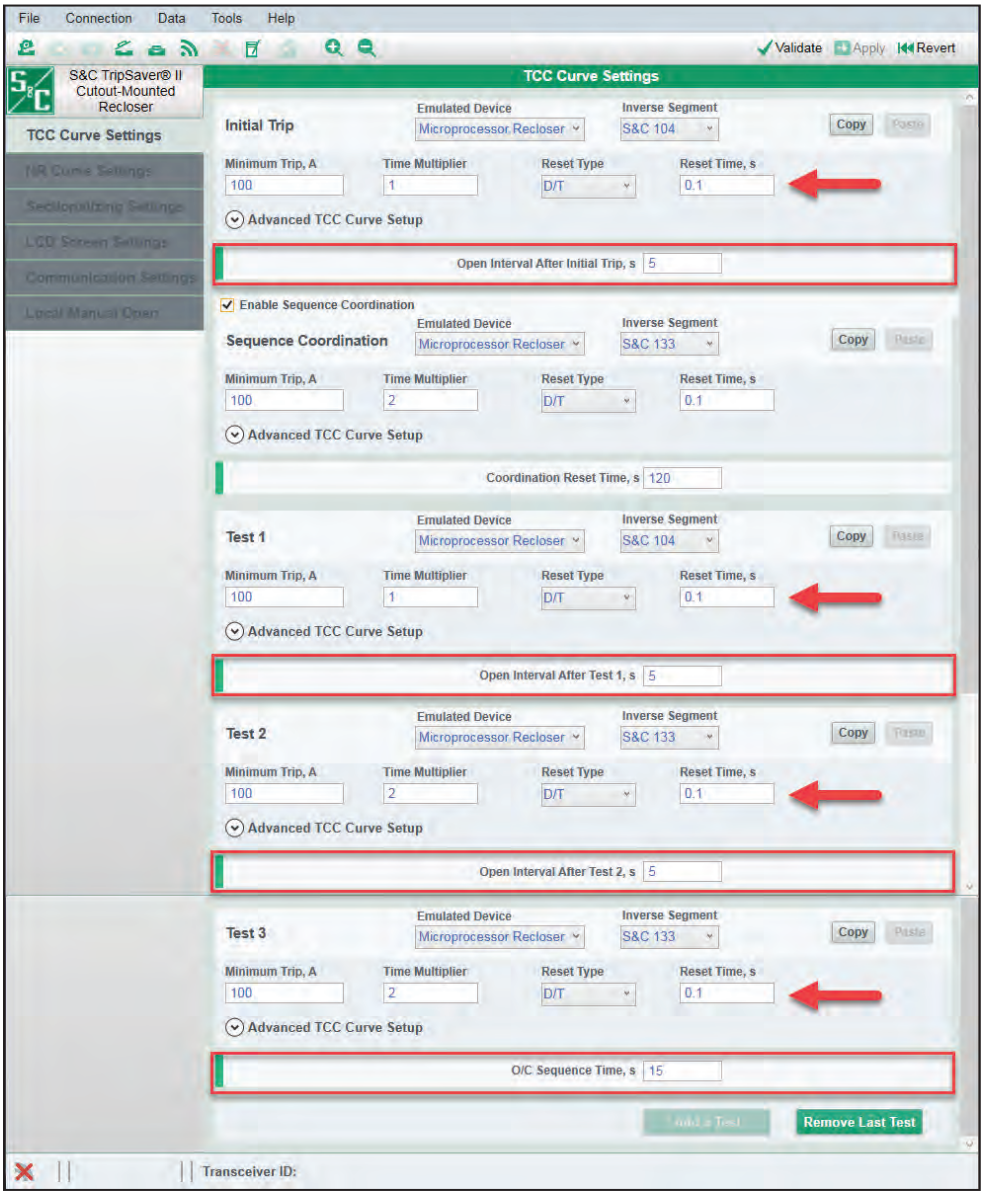


Figure 80. The Open Interval and O/C Sequence Time setting field locations.

Open Interval following Initial Trip, Test 1, or Test 2. Specify interrupter open time (in seconds) before it recloses after the initial **Trip** operation, after Test 1, or after Test 2, as applicable (Minimum value: 0.5; maximum value: 5 [or 30 for extended open interval-capable reclosers]).

O/C Sequence Time. Specify the reset time for the test sequence, in seconds (Minimum value: 0.5; maximum value: 1000). If a TripSaver II recloser remains closed upon completion of an action in the test sequence—and the overcurrent element has not picked up and started timing again within this setting—the test sequence counter will reset and the TCC curve will reset to its setting defined in the **Trip** operation.

Note: An active **O/C Sequence Time** timer will not expire after a TripSaver II recloser loses power. It will continue counting down until the defined duration has been reached.

Default TCC Curve Settings

The software launches with a set of default TCC curve settings that match those programmed into every standard TripSaver II recloser before it leaves the factory. This is the starting point of the configuration process. The S&C default TCC curve settings are shown below:

Initial Trip: Microprocessor Recloser S&C 104 curve; Minimum Trip Current: 100 A; Time Multiplier: x1; Reset Type: D/T (Definite Time); Reset Time: 0.1s; Advanced TCC Curve Setup: Off.

Open Interval After Initial Trip: 5s.

Sequence Coordination (Disabled): Microprocessor Recloser S&C 133 curve; Minimum Trip Current: 100 A; Time Multiplier: x2; Reset Type: D/T (Definite Time); Reset Time: 0.1s; Advanced TCC Curve Setup: Off.

Coordination Reset Time: 120s.

Test 1: Microprocessor Recloser S&C 104 curve; Minimum Trip Current: 100 A; Time Multiplier: x1; Reset Type: D/T (Definite Time); Reset Time: 0.1s; Advanced TCC Curve Setup: Off.

Open Interval After Test 1: 5s.

Test 2: Microprocessor Recloser S&C 133 curve; Minimum Trip Current: 100 A; Time Multiplier: x2; Reset Type: D/T (Definite Time); Reset Time: 0.1s; Advanced TCC Curve Setup: Off.

Open Interval After Test 2: 5s.

Test 3: Microprocessor Recloser S&C 133 curve; Minimum Trip Current: 100 A; Time Multiplier: x2; Reset Type: D/T (Definite Time); Reset Time: 0.1s; Advanced TCC Curve Setup: Off.

O/C Sequence Time: 15s.

These default settings for the setup software used while in the **Standalone** (offline) mode can be changed in the **Standalone** tab under the **Options** feature. See the **Options** feature under the **Tools** menu.

Clearing Settings

To clear settings, either remove the **Trip** operation and then reinstate it using the **Remove Last Test** and **Add a Test** buttons, or select the **Blank** option under the **Emulated Device** selection menu for that **Trip** operation, as shown in Figure 81.

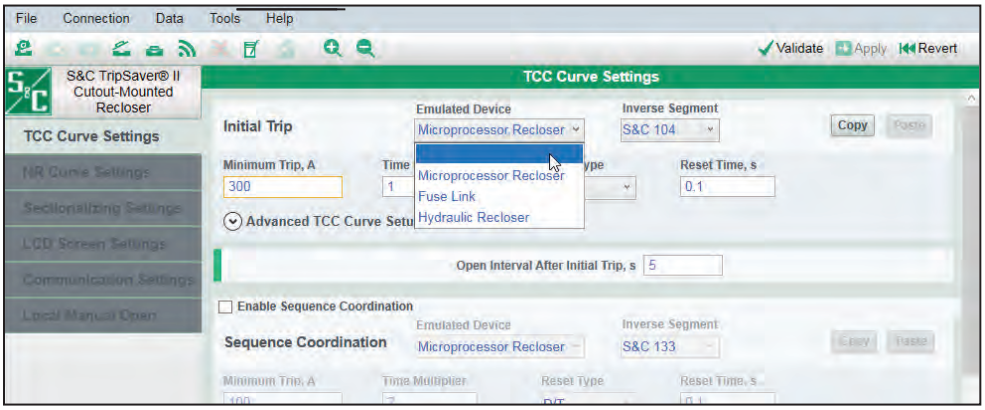


Figure 81. The blank option for clearing the TCC setting.

All existing settings will be erased. See Figure 82. **Note:** Any unwanted curve must be removed before applying new settings to a TripSaver II recloser. Leaving a curve added with completely blank settings will not allow the settings to be applied.

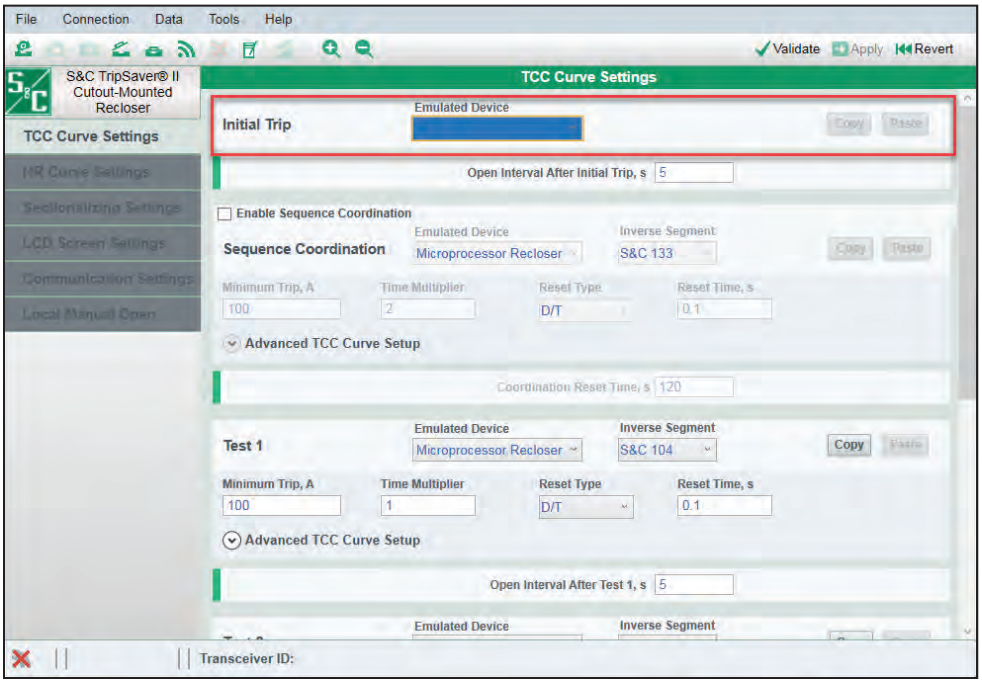


Figure 82. The TCC setting erased.

Configuring a Trip Operation

When a test is added, a new configuration area for that **Test** operation will be displayed, but with only two user-configurable fields available at the beginning—the **Emulated Device** drop-down menu and the **Open Interval** setting between the newly added **Trip** operation and the previous **Trip** operation. See Figure 83. For the **Emulated Device** drop-down menu, select one of the following four options (additional user-configurable fields will be displayed depending on what is selected):

- Microprocessor Recloser
- Fuse Link
- Hydraulic Recloser
- Blank (explained in the "Clearing Settings" section on page 57.)

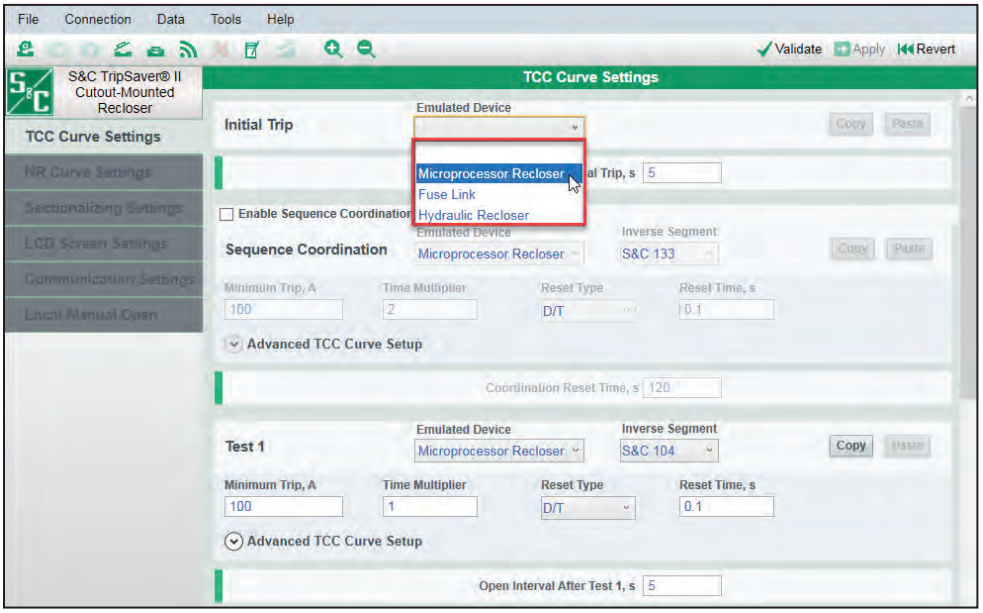


Figure 83. The selections for an emulated device.

Note: When changing the selection for **Emulated Device** options at any time when configuring a **Trip** operation, all settings entered for that **Trip** operation will be erased. However, the **Open Interval** field can be edited independently.

Selecting a Microprocessor Recloser Curve

Emulated Device. Select the **Microprocessor Recloser** option. See Figure 84.

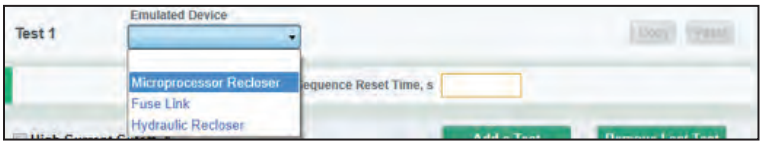


Figure 84. The Microprocessor Recloser option selected.

Inverse Segment. A new **Inverse Segment** field will open after the **Microprocessor Recloser** option is selected under the **Emulated Device** pull-down menu. See Figure 85.

Figure 85. The Inverse Segment field.

Select various inverse curve segments from the list or select the **DefiniteTime** option. The term "S&C," if present, means the inverse curve segment is an S&C-developed data-points-based emulation of the TCC curve published by the recloser manufacturer. If the **DefiniteTime** option is selected, only the Definite Time-related setting fields will be displayed.

Note: When an **Inverse Segment** setting is selected, the curve-selection process is completed and the **Test** operation can be copied to the clipboard or saved to a setpoint file.

Inverse Segment

If an inverse curve segment is selected (e.g., S&C 105), additional fields will open, as shown in Figure 86.

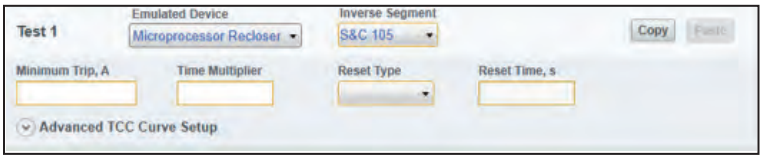


Figure 86. The additional fields under Inverse Segment option.

Minimum Trip, A. Specify the current (in primary amperes) at which the inverse curve segment begins timing (Minimum value: 5; maximum value: 400). **Note:** Though the maximum value available is 400 A, the software will prompt with an overload warning of 40 A for TripSaver II reclosers rated 40 A continuous, 100 A for TripSaver II reclosers rated 100 A continuous, and 200 A for TripSaver II reclosers rated 200 A continuous.

Some curves may have different ranges for the **Minimum Trip** setting, as indicated in the flyover text. This field is mandatory. The Minimum Trip current for 40-A and 100-A continuous TripSaver II reclosers is 5 A. The Minimum Trip current for 200-A continuous TripSaver II reclosers is 10 A.

Time Multiplier. Specify the modifier for the inverse curve segment (Minimum value: 0.01; maximum value: 15). **Note**: Some curves may have different ranges for the **Time Multiplier** setting, as indicated in the flyover text. This field is mandatory.

Reset Type. Select the reset method for the inverse curve segment from the drop-down list: "D/T" (Definite Time) or "E/M" (Electromechanical). (This is not to be confused with **O/C Sequence Time** setting. "Reset" here means how fast that curve will reset if it has picked up but the fault disappears before the TripSaver II recloser could trip.) This field is mandatory.

Reset Time, s. Specify the time delay (in seconds) before the inverse curve segment resets under D/T reset type (Minimum value: 0; maximum value: 1,000). This field is mandatory.

Reset Time, s (TM1, I0A). When the **Reset Type** setting is E/M, the title of the reset time will be changed to "Reset Time, s (TM1, I0A)." The value specified here is the time delay (in seconds) before the inverse curve segment resets when the **Time Multiplier** setting is set at 1 and load current flowing is at 0 A (Minimum value: 0; maximum value: 1,000). The actual reset time used by the **Electromechanical Reset** feature will be calculated using the following quadratic algorithm:

$$\frac{Reset\ Time * Time\ Multiplier}{\left(\frac{Load\ Current}{Min\ Trip}\right)^2 - 1}$$

Note: This formula will provide a "negative" value, but the absolute value should be considered.

This field is mandatory. See Figure 87.

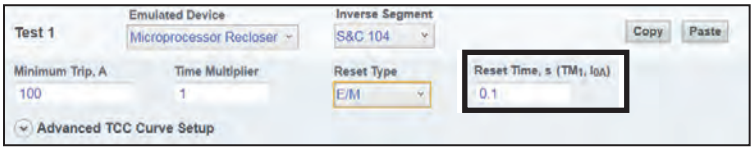


Figure 87. The Reset Time setting field for E/M Reset Type.

Advanced TCC Curve Setup (optional). (Click on the **Advanced TCC Curve Setup** button to expand/collapse area.) See Figure 88.

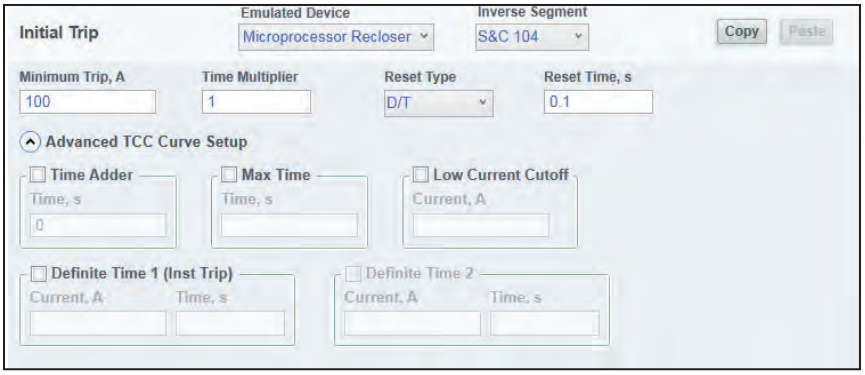


Figure 88. The Advanced TCC Curve Setup fields for a microprocessor recloser.

Time Adder (check box)**.** Select this check box to enable the **Time Adder** setting.

Time Adder, Time s. Specify a time modifier (in seconds) to add a constant time delay to the inverse curve segment. (Default: 0; minimum value: 0; maximum value: 0.25)

Max Time (check box). Select this check box to enable the **Max Time** setting. See Figure 88 on page 60. The **Max Time** setting enables the setting of a maximum time duration of the current before a trip will occur. This is helpful when TCC curves are designed where the load or fault must be sustained for long durations (seconds or minutes) when the current magnitude is near the **Minimum Trip** setting, before a protection **Trip** operation occurs according to the set TCC curve.

Max Time, Time s. Specify a maximum time (in seconds) to trip prior to inverse curve segment expiration. (Default: Disabled; minimum value: 0.2; maximum value: 180)

Low Current Cutoff (check box). Select this check box to enable low-current cutoff.

Low Current Cutoff, Current, A. Specify the current (in primary amperes) below which the inverse curve segment is truncated. The **Low Cutoff Current** setting will be the actual minimum trip current (Minimum value: 5; maximum value: 600). **Note**: This value must be greater than the minimum trip current of the inverse curve segment and smaller than the **High Current Cutoff** setting.

Definite Time 1 (Inst Trip) (check box). Select this check box to enable the **Definite Time 1** element. For **Instantaneous Trip** mode, the settings depend on the emulated device, and the Minimum Trip, Coil Rating, or Ampere rating depending on the emulated device (microprocessor recloser, hydraulic recloser, or fuse respectively) and the setting is listed in the flyover text. **Note**: The **Definite Time 1** element must be enabled before the **Definite Time 2** element can be enabled. If the **Definite Time 1** element is deselected, the **Definite Time 2** element is deselected automatically.

Definite Time 1 Current, A. Specify the current (in primary amperes) at which the **Definite Time 1** element picks up (Minimum value: 5; maximum value: 6300). **Note:** This value must be greater than the Minimum Trip current, greater than the Low-Current Cutoff current, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 1, Time s. Specify the time delay (in seconds) after which the **Definite Time 1** element trips (Minimum value: 0; maximum value: 1000). **Note**: This value must be less than or equal to time on inverse curve segment at Definite Time 1 current.

Definite Time 2 (check box). Select this check box to enable the **Definite Time 2** element. **Note:** This check box is not active unless the **Definite Time 1** element is enabled.

Definite Time 2 Current, A. Specify the current (in primary amperes) at which the **Definite Time 2** element picks up (Minimum value: 5; maximum value: 6,300). **Note**: This value must be greater than the Definite Time 1 current, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 2 Time, s. Specify the time delay (in seconds) after which the **Definite Time 2** element trips (Minimum value: 0; maximum value: 1,000). **Note**: This value must be less than **Definite Time 1** setting.

For Definite Time

If the **DefiniteTime** setting is selected from the same **Inverse Segment** selection menu, additional fields will open, described below. See Figure 89. **Note:** When the **DefiniteTime** setting is selected, the test operation can be copied to the clipboard or saved to a setpoint file.

Figure 89. The additional fields when DefiniteTime is selected under Inverse Segment.

Current, A. Specify the current (in primary amperes) at which the **DefiniteTime** setting begins timing (Minimum value: 5; maximum value: 400). This field is mandatory.

Time, s. Specify the time delay (in seconds) after which the **DefiniteTime** setting trips (Minimum value: 0; maximum value: 1,000). This field is mandatory.

Reset Type. Select the reset method for the **DefiniteTime** setting from the drop-down list: "D/T" (Definite Time) or "E/M" (Electromechanical). (This not to be confused with the **O/C Sequence Time** setting. "Reset" here means how fast that curve will reset if it has picked up but fault disappears before the TripSaver II recloser could trip.) This field is mandatory.

Reset Time, s. Specify the time delay (in seconds) before **DefiniteTime** setting resets under "D/T reset type" (Minimum value: 0; maximum value: 1,000). This field is mandatory.

Reset Time, s (I0A). When the **Reset Type** setting is "E/M", the title of the **Reset Time** field will be changed to "Reset Time, s (I0A)." The value specified here is the time delay (in seconds) before the **DefiniteTime** element resets when load current flowing is at 0 A (Minimum value: 0; maximum value: 1,000). The actual reset time used by the electromechanical reset will be calculated using the following quadratic algorithm: the value in this field/(the load current / the current entered)^2 - 1). This field is mandatory. See Figure 90.

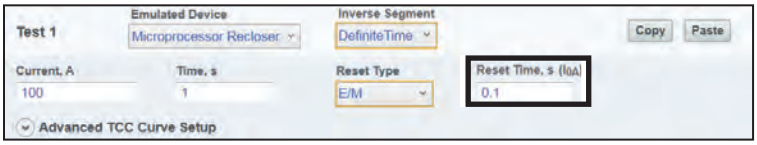


Figure 90. The DefiniteTime Reset Time setting field for E/M Reset Type.

Advanced TCC Curve Setup (optional). Click on the words to expand/collapse area. See Figure 91.

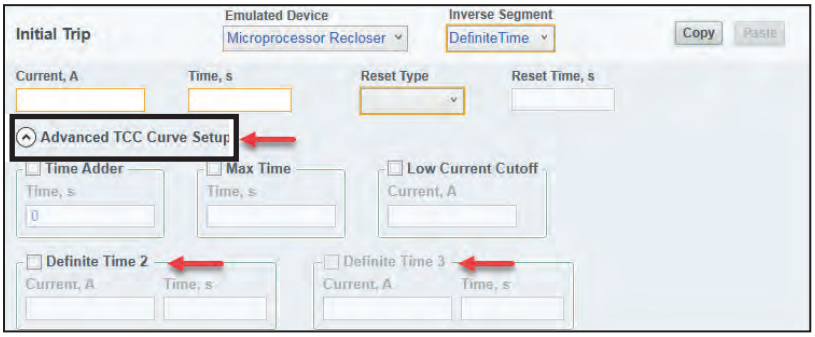


Figure 91. The Advanced TCC Curve Setup fields when "DefiniteTime" is selected under Inverse Segment.

Time Adder (check box). Select this check box to enable time adder.

Time Adder, Time s. Specify a time modifier (in seconds) to add a constant time delay to the inverse curve segment. (Default: 0; minimum value: 0; maximum value: 0.25)

Max Time (check box). Select this check box to enable the **Max Time** setting. The **Max Time** setting enables the setting of a maximum time duration of the current before a trip will occur. This is helpful when TCC curves are designed where the load or fault must be sustained for long durations (seconds or minutes) when the current magnitude is near the minimum trip threshold, before a **Protection Trip** operation occurs according to the set TCC curve. When the **Max Time** setting is applied and a fault event occurs, either the **Max Time** setting or the TCC curve will cause the recloser to trip, whichever is fastest.

Max Time, Time s. Specify a maximum time (in seconds) to trip prior to inverse curve segment expiration. (Default: Disabled; minimum value: 0.2; maximum value: 180)

Low Current Cutoff (check box). Select this check box to enable low-current cutoff.

Low Current Cutoff, Current, A. Specify the current (in primary amperes) below which the inverse curve segment is truncated. The **Low Cutoff Current** setting will then be the actual minimum trip current (Minimum value: 5; maximum value: 600). **Note:** This value must be greater than the minimum trip current of the inverse curve segment and smaller than the **High Current Cutoff** setting.

Definite Time 1 (Inst Trip) (check box). Select this check box to enable the **Definite Time 1** element. With additional definite times, it is possible to reduce the uncertainty of the protection at high fault currents and improve coordination between multiple devices.

The following examples show the same 100ST fuse curve with no additional definite time, with one additional definite time, and with two additional definite times:

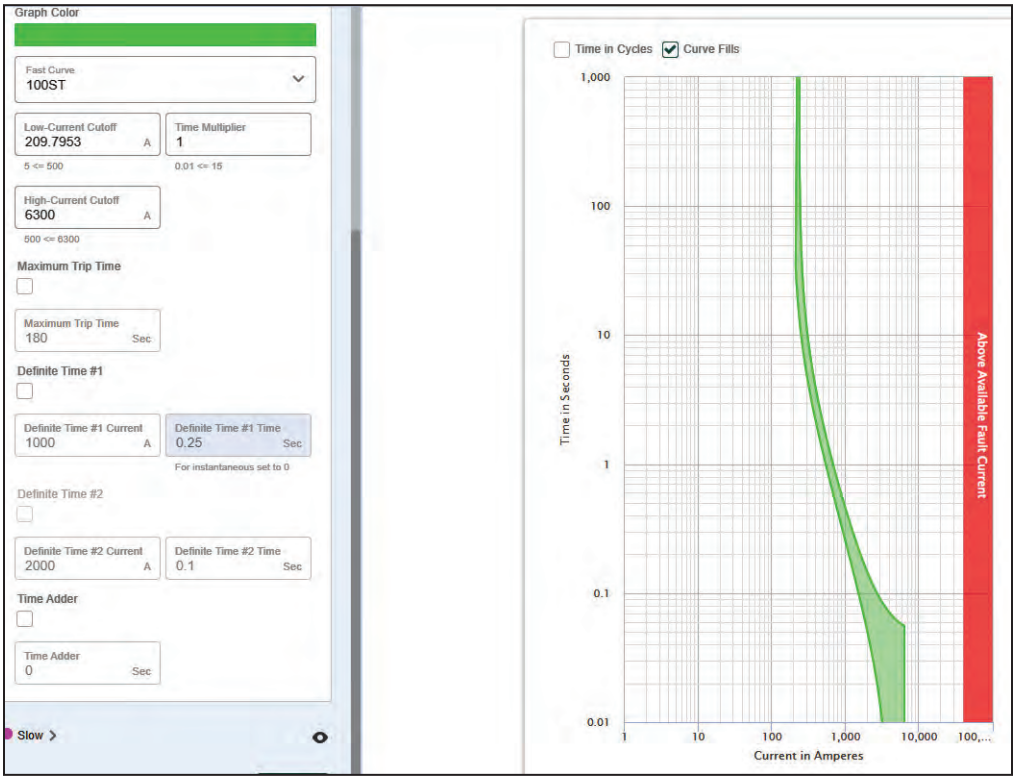


Figure 92. Example of a 100ST Fuse curve without definite times.

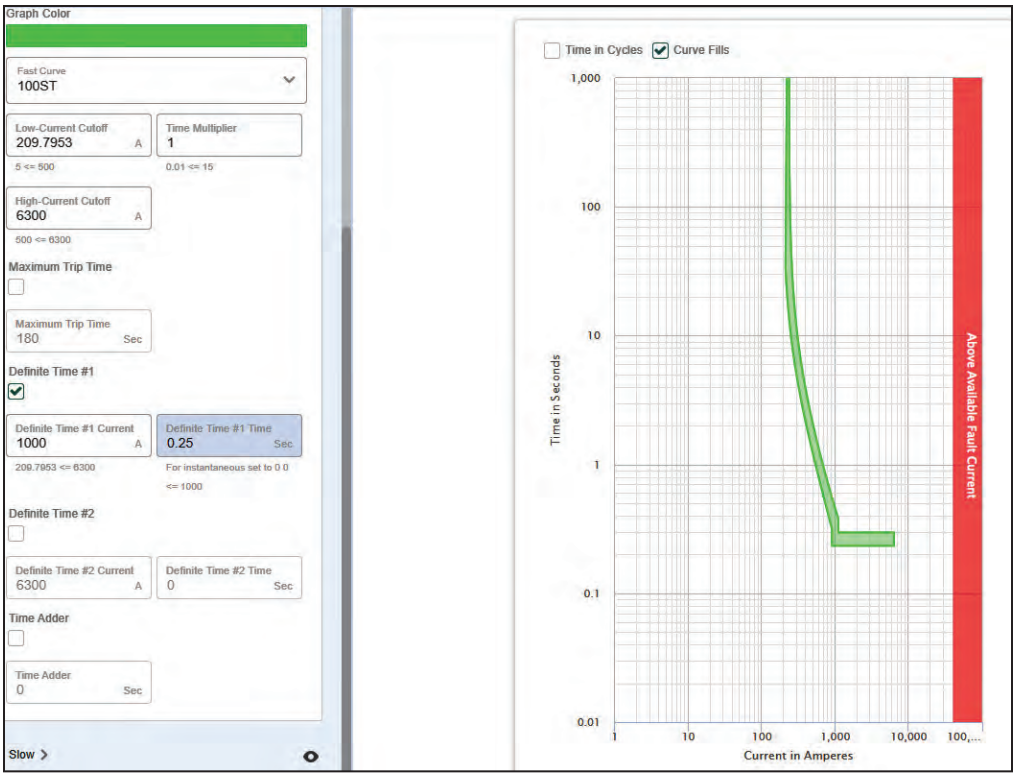


Figure 93. Example of a 100ST fuse curve with one definite time

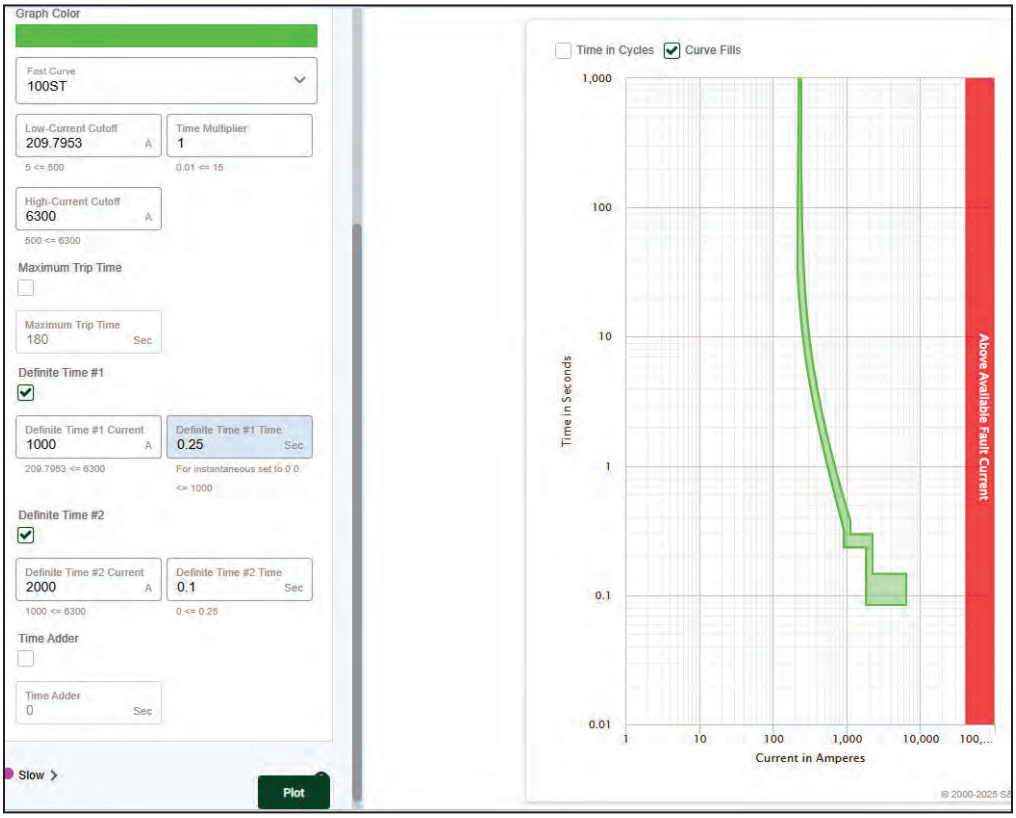


Figure 94. Example of a 100ST fuse TCC curve with two definite times.

Note: The **Definite Time 1** element must be enabled before the **Definite Time 2** element can be enabled. If the **Definite Time 1** element is deselected, the **Definite Time 2** element is deselected automatically.

Definite Time 1 Current, A. Specify the current (in primary amperes) at which the **Definite Time 1** element picks up (Minimum value: 5; maximum value: 6300). **Note:** This value must be greater than the Minimum Trip current, greater than the Low-Current Cutoff current, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 1, Time s. Specify the time delay (in seconds) after which the **Definite Time 1** element trips (Minimum value: 0; maximum value: 1000). **Note**: This value must be less than or equal to time on inverse curve segment at Definite Time 1 current.

Definite Time 2 (check box). Select this check box to enable the **Definite Time 2** element. **Note**: The **Definite Time 2** element must be enabled before the **Definite Time 3** element can be enabled. If the **Definite Time 2** element is deselected, the **Definite Time 3** element is deselected automatically.

Definite Time 2 Current, A. Specify the current (in primary amperes) at which the **Definite Time 2** element picks up (Minimum value: 5; maximum value: 6,300). See Figure 91 on page 63. **Note:** This value must be greater than the **DefiniteTime Current** setting, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 2 Time, s. Specify the time delay (in seconds) after which the **Definite Time 2** element trips. (Minimum value: 0; maximum value: 1,000; precision to 10 decimal places) See Figure 91 on page 63. **Note:** This value must be less than the **DefiniteTime** setting.

Definite Time 3 (check box). Select this check box to enable the **Definite Time 3** element. **Note:** This field is not active unless the **Definite Time 2** element is enabled.

Definite Time 3 Current, A. Specify current (in primary amperes) at which the **Definite Time 3** element picks up (Minimum value: 5; maximum value: 6,300). **Note**: This value must be greater than the **Definite Time 2 Current** setting, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 3 Time, s. Specify the time delay (in seconds) after which the **Definite Time 3** element trips (Minimum value: 0; maximum value: 1,000; precision to 10 decimal places). **Note:** This value must be less than **Definite Time 2** setting time.

Note: When changing the selection for **Inverse Segment** setting at any time, all settings entered for that trip operation except the **Emulated Device** setting will be erased.

Selecting a Fuse Link Curve

The following describes how to select the fuse link curve:

Emulated Device. Select the **Fuse Link** option from the **Emulated Device** pull-down menu. See Figure 95.

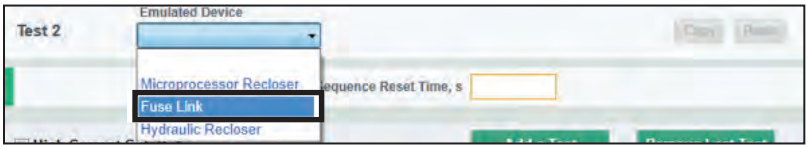


Figure 95. The Fuse Link option.

A new **Speed** field and an **Ampere Rating** field will open. See Figure 96.

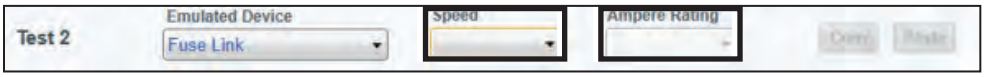


Figure 96. The Speed and Ampere Rating fields.

Speed. Select the fuse link speed from the list in the **Speed** pull-down menu. See Figure 97.

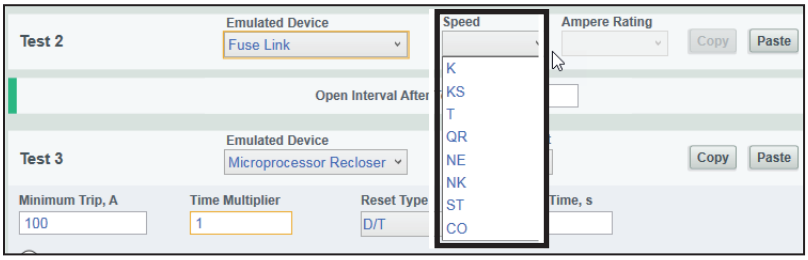


Figure 97. The Speed pull-down menu.

Ampere Rating. Select a fuse link ampere rating from the list. For fuse links, the minimum trip current is about twice the ampere rating. See Figure 98. **Note:** This field is not active unless a Speed type for fuse link has been selected. When changing the **Speed** setting at any time, all data entered in the **Ampere Rating** pull-down menu and the optional **Advanced TCC Curve Setup** setting will be erased.

Figure 98. The Ampere Rating drop-down menu.

Note: When the ampere rating has been selected, the curve selection process is completed, and the test operation can be copied to the clipboard or saved to a setpoint file. An optional **Advanced TCC Curve Setup** field will also open.

Advanced TCC Curve Setup (optional). (Click on the words to expand/collapse area.) See Figure 99.

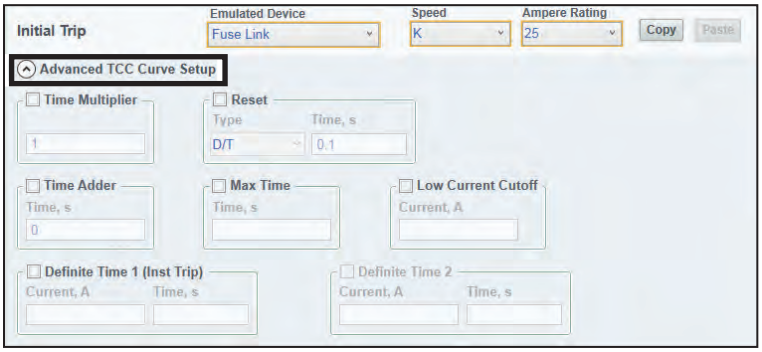


Figure 99. The Advanced TCC Curve Setup when Fuse Link is selected under Emulated Device.

Time Multiplier (Check box). Select this check box to enable the **Time Multiplier** setting.

Time Multiplier. Specify modifier for inverse curve segment. (Minimum value: 0.01; maximum value: 15)

Reset (Check box). Select this check box to enable the **Reset** setting.

Reset Type. Select the reset method for inverse curve segment. (Default: D/T Definite Time, (D/T) Definite Time, or (E/M) Electromechanical)

Reset Time, s. Specify the time delay before inverse curve segment resets (in seconds). (Default: 0.1; minimum value: 0; maximum value: 1000)

Time Adder (check box). Select this check box to enable the **Time Adder** setting.

Time Adder, Time, s. Specify a time modifier (in seconds) to add a constant time delay to the inverse curve segment. (Default: 0; minimum value: 0; maximum value: 0.25)

Max Time (check box). Select this check box to enable the **Max Time** setting. The **Max Time** setting enables the setting of a maximum time duration of the current before a trip will occur. This is helpful when TCC curves are designed where the load or fault must be sustained for long durations (seconds or minutes) when the current magnitude is near the minimum trip threshold, before a protection **Trip** operation occurs according to the set TCC curve. When the **Max Time** setting is applied and a fault event occurs, either the **Max Time** setting or the TCC curve will cause the recloser to trip, whichever is fastest.

Max Time, Time, s. Specify a maximum time (in seconds) to trip prior to inverse curve segment expiration. (Default: Disabled; minimum value: 0.2; maximum value: 180)

Low Current Cutoff (check box). Select this check box to enable low-current cutoff.

Low Current Cutoff, Current, A. Specify the current (in primary amperes) below which the inverse curve segment is truncated. The **Low Cutoff Current** setting will then be the actual minimum trip current. (Minimum value: 5; maximum value: 600) **Note:** This value must be greater than the minimum trip current of the inverse curve segment and smaller than the **High Current Cutoff** setting.

Definite Time 1 (Inst Trip) (check box). Select this check box to enable the **Definite Time 1** element. For Instantaneous Trip, the settings depend on the emulated device, and the Minimum Trip, Coil Rating, or Ampere rating, depending on the emulated device (microprocessor recloser, hydraulic recloser, or fuse respectively) and the setting is listed in the flyover text. **Note**: The **Definite Time 1** element must be enabled before the **Definite Time 2** element can be enabled. If the **Definite Time 1** element is deselected, the **Definite Time 2** element is deselected automatically.

Definite Time 1 Current, A. Specify the current (in primary amperes) at which the **Definite Time 1** element picks up (Minimum value: 5; maximum value: 6300). **Note:** This value must be greater than the Minimum Trip current, greater than the Low Current Cutoff current, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 1, Time, s. Specify the time delay (in seconds) after which **Definite Time 1** element trips (Minimum value: 0; maximum value: 1000). **Note:** This value must be less than or equal to time on inverse curve segment at the **Definite Time 1 Current** setting.

Definite Time 2 (check box). Select this check box to enable the **Definite Time 2** element. **Note:** This check box is not active unless the **Definite Time 1** element is enabled.

Definite Time 2 Current, A. Specify the current (in primary amperes) at which the Definite Time 2 element picks up (Minimum value: 5; maximum value: 6,300). **Note:** This value must be greater than the **Definite Time 1 Current** setting, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 2 Time, s. Specify the time delay (in seconds) after which the Definite Time 2 element trips (Minimum value: 0; maximum value: 1,000). Note: This value must be less than **Definite Time 1** setting.

Selecting a Hydraulic Recloser Curve

The following describes how to configure the Hydraulic Recloser curve:

Emulated Device. Select the **Hydraulic Recloser** option from the **Emulated Device** pull-down menu. See Figure 100.

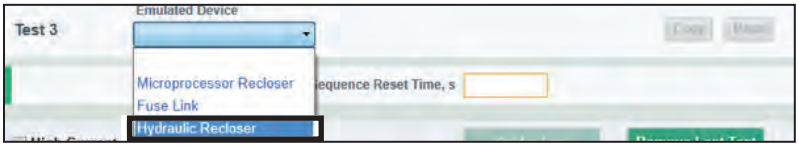


Figure 100. The Hydraulic Recloser option.

New **Inverse Segment and Coil Rating** fields will open after the **Hydraulic Recloser** option is selected from the **Emulated Device** pull-down menu. See Figure 101.

Figure 101. The Inverse Segment and Coil Rating fields.

Inverse Segment. Select inverse curve segment from the list. It's identified as follows: "x-y", where "x" indicates the recloser type (e.g., H, L, E, etc.) and the "y" indicates the specific TCC curve (e.g., A, B, C, or D). See Appendix A on page 127 for curve definitions. For example, in Figure 102, for an H recloser, an A curve has been selected.

Figure 102. The Inverse Segment drop-down list.

Coil Rating. Select a coil rating from the drop-down list. For hydraulic reclosers, the minimum trip current of the inverse segment is twice the coil rating. See Figure 103.

Note: This field is not active unless a hydraulic recloser **Inverse Segment** option has been selected. When changing the selection for the **Inverse Segment** setting at any time, the coil rating selected will be removed. When the coil rating is selected, the curve selection process is complete and the test operation can be copied to the clipboard or saved to a setpoint file.

Figure 103. The Coil Rating drop-down list.

Advanced TCC Curve Setup (optional). Click on the words to expand/collapse area. See Figure 104.

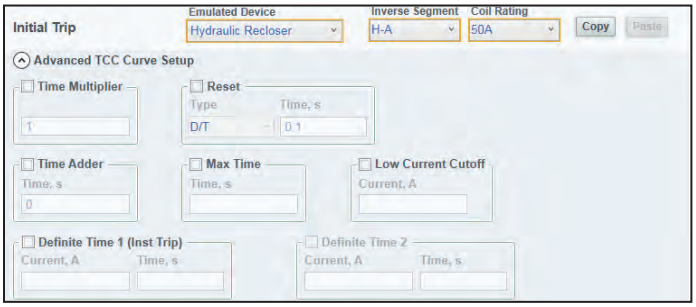


Figure 104. The Advanced TCC Curve Setup when Hydraulic Recloser is selected under Emulated Device.

Time Multiplier (Check box). Select this check box to enable the **Time Multiplier** setting.

Time Multiplier. Specify modifier for inverse curve segment (Minimum value: 0.01; maximum value: 15).

Reset (Check box). Select this check box to enable the **Reset** setting.

Reset Type. Select the reset method for inverse curve segment. (Default: D/T Definite Time, (D/T) Definite Time, or (E/M) Electromechanical)

Reset Time, s. Specify the time delay before inverse curve segment resets (in seconds). (Default: 0.1; minimum value: 0; maximum value: 1000)

Time Adder (check box). Select this check box to enable time adder.

Time Adder, Time, s. Specify a time modifier (in seconds) to add a constant time delay to the inverse curve segment. (Default: 0; minimum value: 0; maximum value: 0.25)

Max Time (check box). Select this check box to enable the **Max Time** setting. The **Max Time** setting enables the setting of a maximum time duration of the current before a trip will occur. This is helpful when TCC curves are designed where the load or fault must be sustained for long durations (seconds or minutes) when the current magnitude is near the minimum trip threshold, before a protection **Trip** operation occurs according to the set TCC curve. When the **Max Time** setting is applied and a fault event occurs, either the **Max Time** setting or the TCC curve will cause the recloser to trip, whichever is fastest.

Max Time, Time, s. Specify a maximum time (in seconds) to trip prior to inverse curve segment expiration. (Default: Disabled; minimum value: 0.2; maximum value: 180)

Low Current Cutoff (check box). Select this check box to enable low-current cutoff.

Low Current Cutoff, Current, A. Specify the current (in primary amperes) below which the inverse curve segment is truncated. (Minimum value: 5; maximum value: 600) **Note:** This value must be greater than the minimum trip current of the inverse curve segment and smaller than the **High Current Cutoff** setting.

Definite Time 1 (Inst Trip) (check box). Select this check box to enable the **Definite Time 1** element. For Instantaneous Trip, the settings depend on the emulated device, and the Minimum Trip, Coil Rating, or Ampere rating depending on the emulated device (microprocessor recloser, hydraulic recloser, or fuse respectively) and the setting is listed in the flyover text. **Note:** The **Definite Time 1** element must be enabled before the **Definite Time 2** element can be enabled. If the **Definite Time 1** element is deselected, the **Definite Time 2** element is deselected automatically.

Definite Time 1 Current, A. Specify the current (in primary amperes) at which the **Definite Time 1** element picks up. (Minimum value: 5; maximum value: 6300) **Note:** This value must be greater than the Minimum Trip current, greater than the Low Current Cutoff current, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 1, Time, s. Specify the time delay (in seconds) after which **Definite Time 1** element trips. (Minimum value: 0; maximum value: 1000) **Note:** This value must be less than or equal to time on inverse curve segment at the **Definite Time 1 Current** setting.

Definite Time 2 (check box). Select this check box to enable the **Definite Time 2** element. **Note:** This check box is not active unless the **Definite Time 1** element is enabled.

Definite Time 2 Current, A. Specify the current (in primary amperes) at which the **Definite Time 2** element picks up (Minimum value: 5; maximum value: 6,300). **Note:** This value must be greater than the **Definite Time 1 Current** setting, less than or equal to the interrupting rating of the recloser, and smaller than the **High Current Cutoff** setting.

Definite Time 2 Time, s. Specify the time delay (in seconds) after which the **Definite Time 2** element trips. (Minimum value: 0; maximum value: 1,000) **Note:** This value must be less than the **Definite Time 1 Time** setting.

NR Curve Settings Screen

NOTICE

In service center configuration software versions 1.6 and earlier, the MODE-SELECTOR lever in the **Down** position or in **R-NR** mode would not go through the reclosing sequence but would operate instantaneously in response to a Trip event using the current setting set under the **Initial Trip** trip-operation field on the *TCC Curve Setting* screen. (See the "TCC Settings Screen" section on page 52.) The new *NR Curve Settings* screen allows the user to program different TCC curves specifically for the MODE-SELECTOR lever when in **NR** or **R-NR** mode.

The *NR Curve Settings* screen is where the curves used by the TripSaver II recloser when the MODE-SELECTOR lever is in the **Down** position or the recloser is in **R-NR** mode are set. See Figure 105. All curves in the *NR Curve Settings* screen are set the same and have the same setting ranges as the curves in the *TCC Curve Settings* screen.

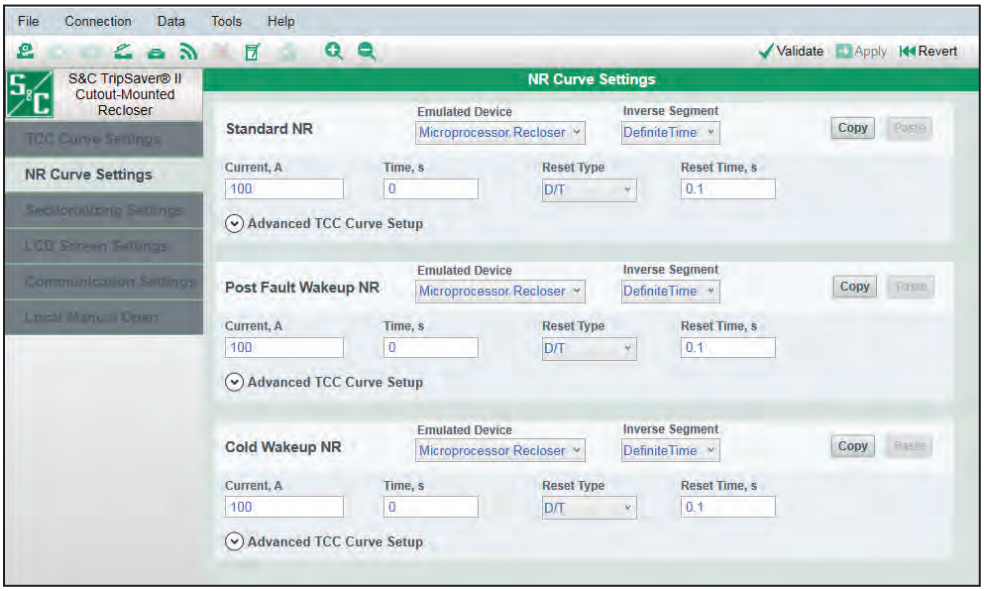


Figure 105. The *NR Curve Settings* screen.

Standard NR

The **Standard NR** setting allows the user to select *any* curve in the library when **NR** or **R-NR** mode are active. See Figure 106 on page 73. In TripSaver II recloser firmware version 1.6 and earlier, the NR curve was factory-set as the instantaneous curve and was not configurable. This TripSaver II recloser will use this setting when the MODE-SELECTOR lever is in the **Down** position or when the recloser is in the **R-NR** mode.

The recloser will not go through a reclosing sequence but will respond to the TCC set in the **Standard NR** setting field. The default setting is illustrated in Figure 105 on page 72.

Note: To make the **Standard NR** setting behave as an instantaneous curve, select the **Definite Time** setting for the **Inverse Segment** mode, and make sure the minimum trip value of the **Standard NR** setting is the same as the minimum trip value of the initial trip curve, as shown in Figure 80 on page 55.

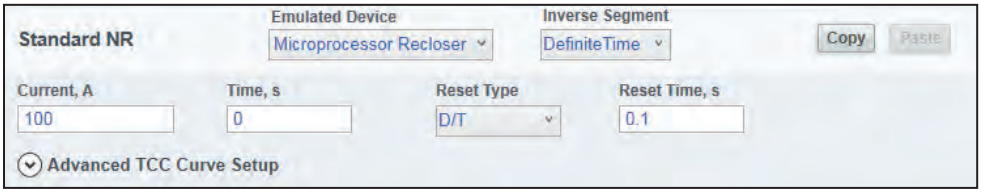


Figure 106. The Standard NR setting field.

Post Fault Wakeup NR

The **Post Fault Wakeup NR** setting is configured when a separate curve is desired when the TripSaver II recloser is energized or is closed into its mounting after a drop-open event occurs. See Figure 107. This setting will be used by the TripSaver II recloser when the MODE-SELECTOR lever is in the **Down** position or when the recloser is in the **R-NR** mode. After 10 cycles, if a current above the **Current, A** setting is not detected, the Post Fault Wakeup TCC curve will revert to the **Standard NR** curve settings.

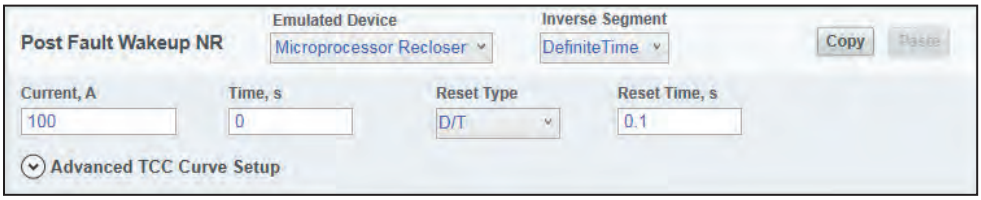


Figure 107. The Post Fault Wakeup NR setting field.

The **Post Fault Wakeup NR** setting will be used after the recloser has dropped open in response to fault current, or another event that results in the recloser dropping open (i.e. LMO or Gang Operation). In situations where the recloser is waking up or is closed into the mounting after being de-energized when it did not experience a drop open event, the **Cold Wakeup NR** setting will be used. See Figure 108 on page 74.

If a **Post Fault Wakeup NR** setting is not required, set the TCC curve to the same settings as the **Standard NR TCC** setting.

Cold Wakeup NR

The **Cold Wakeup NR** setting is configured when a separate curve is desired in response to a cold wakeup of the TripSaver II recloser. See Figure 108. In most cases, this is a slower curve. This setting will be used by the TripSaver II recloser when the MODE-SELECTOR lever is in the **Down** position or when the recloser is in the **R-NR** mode. After 10 cycles, if a current above the **Current, A** setting is not detected, the Cold Wakeup NR curve will revert to the Standard NR curve.

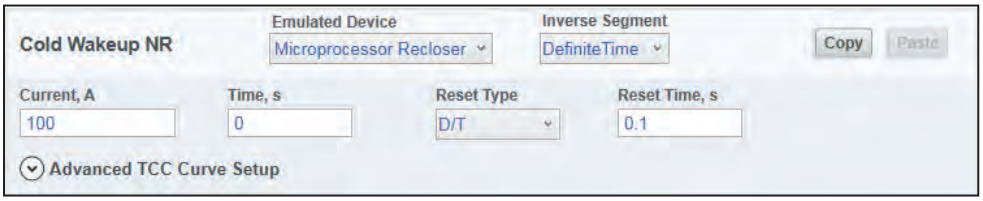


Figure 108. The Cold Wakeup NR setting field.

The Cold Wakeup TCC curve will not be used in a "post-fault" situation, where the load is being picked up after the TripSaver II recloser has previously dropped open. In those cases, the Post Fault Wakeup NR curve will be used. See Figure 107 on page 73.

If a **Cold Wakeup NR** setting is not required, set the TCC curve to the same settings as the **Standard NR** setting.

Sectionalizing Settings Screen

The TripSaver II recloser features a **Sectionalizing** function in both the 4-kA and 6.3-kA rated models. When enabled, a TripSaver II recloser will start its secondary protection function—the **Sectionalizing** function—over a user-specified range of fault currents when the source-side circuit breaker or recloser for whatever reason trips faster than the TripSaver II recloser's TCC overcurrent protection. It will count the number of operations of the source-side circuit breaker or recloser and will drop open after a user-specified number of counts. The *Sectionalizing Settings* screen is shown in Figure 109.

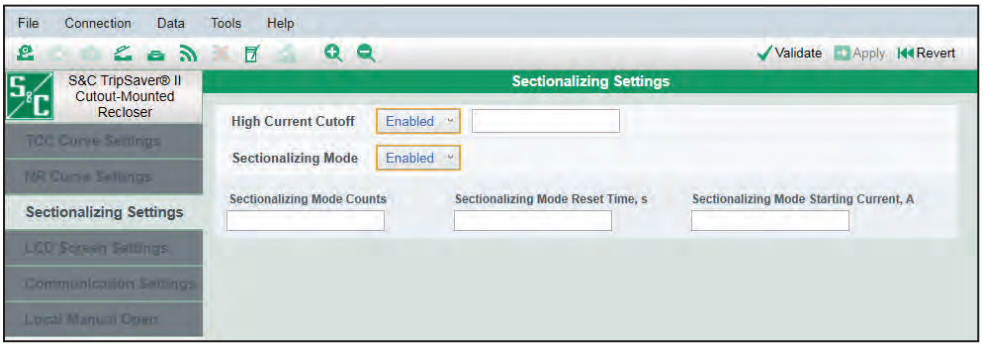


Figure 109. The *Sectionalizing Settings* screen.

Note: The **Sectionalizing** feature serves as backup protection that works in parallel with the TCC curve overcurrent protection. Enabling this feature does not automatically switch the TCC curve overcurrent protection off and make the TripSaver II recloser a pure sectionalizer. Instead, the TripSaver II recloser will begin to operate as a pure sectionalizer for load or fault current that exceeds the **High Current Cutoff** setting.

An example of how the TripSaver II recloser will behave is shown in Figure 110. In this example, the **Sectionalizing** mode starting current is set to its lowest setting of 10 A, and the **High Current Cutoff** setting is set at its lowest value of 400 A. The initial trip (TCC0) curve will still provide protection at currents less than 10 A.

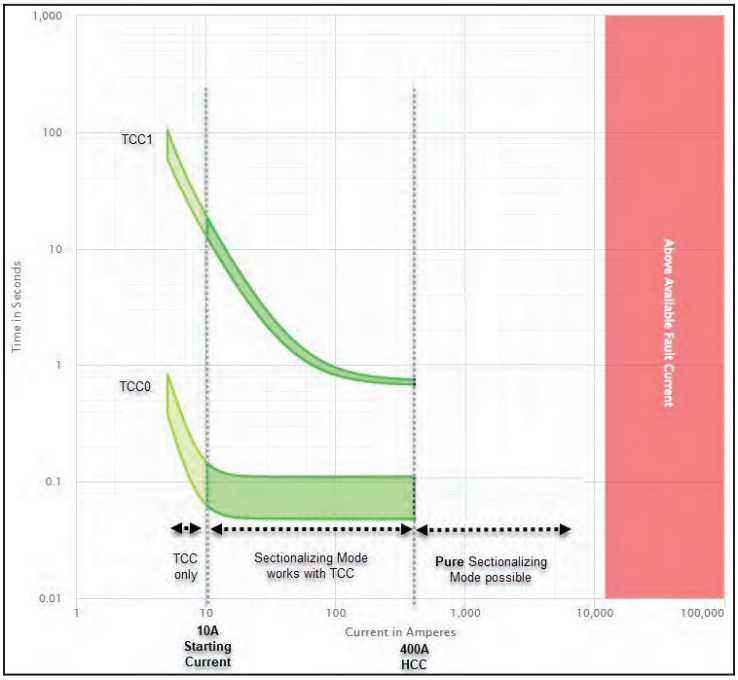


Figure 110. An example of the Sectionalizer mode behavior.

Both the **High Current Cutoff** setting and **Sectionalizing** mode starting currents are global and apply to each trip in the protection sequence.

In the zone between 10 A and 400 A, if the upline protective device is faster than the TripSaver II recloser's initial trip (TCC0), the upline device will interrupt the fault and the downline TripSaver II recloser will increment its sectionalizer count by one. But if the downline TripSaver II recloser is faster than the upline protective device, the downline TripSaver II recloser will interrupt the fault and will increment its protection sequence counter by one.

In the example shown in Figure 110, when a load or fault current of 400 A or more is incurred, the TripSaver II recloser will act as a pure sectionalizer and will not interrupt. Instead, it will increment its **Sectionalizing** mode counts for each fault interrupted by the upline recloser. The deadline threshold for all TripSaver II recloser models is 3 A, meaning a fault current followed by a current at or below 3 A is considered a fault interrupted by the upline recloser.

Pure **Sectionalizing** mode occurs where the **High Current Cutoff** setting and **Sectionalizing Mode** feature overlap. It starts where the **High Current Cutoff** setting is equal to or greater than the **Sectionalizing Mode Starting Current** setting. The lowest value the **High Current Cutoff** setting can be set equal to the **Sectionalizing** mode starting current is 400 A. To create a zone where the TripSaver II recloser performs like a pure sectionalizer, set the **High Current Cutoff** setting to the same value as the **Sectionalizing Mode Starting Current** setting. The lowest the **High Current Cutoff** setting can be set equal to the **Sectionalizing** mode starting current is 400 A.

High Current Cutoff

The **High Current Cutoff** setting is a global setting that applies to all TCC curves selected. When enabled, the overcurrent elements for all TCC curves including NR curves will not time and trip on fault current above the value entered. Protection will be provided by the upstream device. See Figure 109 on page 74.

High Current Cutoff (Enabled or Disabled). Select the **Enabled** value to enable the **High Current Cutoff** setting for all TCC curves.

High Current Cutoff, Current A. Specify current (in amperes) above which the **Overcurrent** element of all enabled TCC curves will not time and trip (Minimum value: 400; maximum value: 6,300). This value must be less than or equal to the interrupting rating of the recloser. It also must be equal or greater than the **Sectionalizing Mode Start Current** setting to avoid a gap in protection.

Sectionalizing Mode

Sectionalizing Mode. Select the **Enabled** or **Disabled** option from the **Sectionalizing Mode** pull-down menu list. See Figure 109 on page 74. **Note**: When toggling this selection at any time when configuring the sectionalizing settings, all data entered for sectionalizing settings will be erased.

Sectionalizing Mode Counts. Specify the number of source-side circuit breaker or recloser trip operations the TripSaver II recloser will count up to before dropping open. (Minimum value: 1; maximum value: 9, integer).

Sectionalizing Mode Reset Time, s. Specify the length of time the **Sectionalizing** logic waits for an additional sectionalizing event to occur before it resets, in seconds. (Minimum value: 0.5; maximum value: 1,000)

Sectionalizing Mode Starting Current, A. Specify the current, in primary amperes, at which the **Sectionalizing** mode starts. (Minimum value: 10; maximum value: 6,500) **Note**: This value must be less or equal to the **High Current Cutoff** setting to avoid a gap in protection.

LCD Screen Settings Screen

The TripSaver II recloser uses a non-volatile liquid-crystal-display (LCD) to show various status and operational information. The screen has two operating modes: *Normal* screen and *Display* screen. The LCD shows the *Normal* screen most of the time. The *Display* screen parameters may be viewed by toggling the MODE SELECTOR. TripSaver II reclosers will scroll through the user-configurable *Display* screen items the specified number of times before the screen returns to the *Normal* screen.

Use the *LCD Screen Settings* screen to select the desired screens from a list of available LCD Display screen items. See Figure 111.

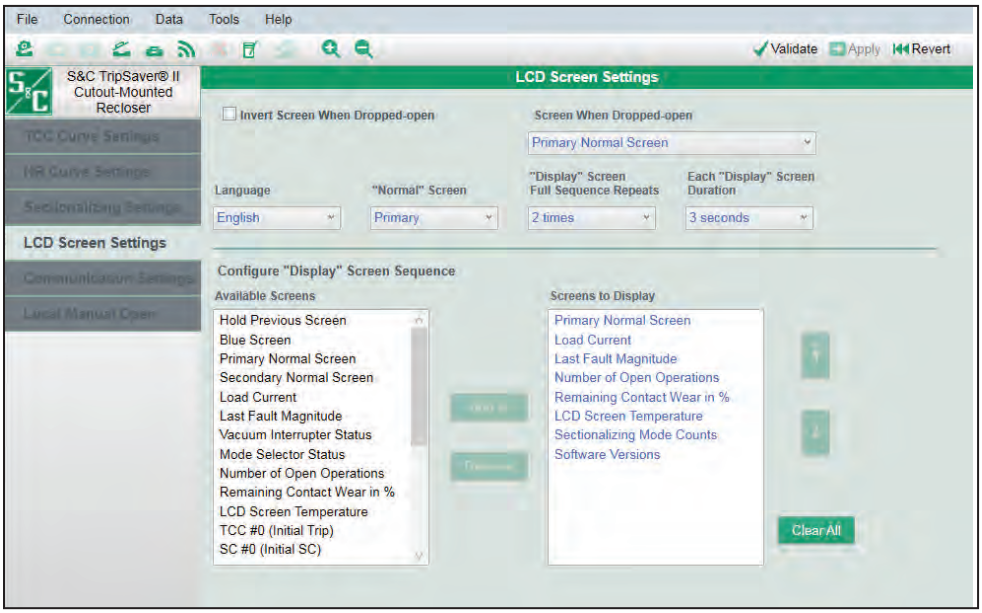


Figure 111. The *LCD Screen Settings* screen.

Invert Screen When Dropped-open (check box)**.** Select this check box to invert the LCD screen when the connected TripSaver II recloser is in the **Dropped Open** (horizontal) position. The inverted display is easier to read from the ground when a TripSaver II recloser is in the **Dropped Open** position.

Screen When Dropped Open. Select from the list the desired screen to display after a Drop Open event.

See Appendix B on page 130 for the available options.

Language. Select from the list the display language for the LCD screen. (**Note:** This is not the language for the configuration software.) The following languages are supported: English, Spanish, Portuguese, French, Chinese, and Arabic.

***Normal* Screen.** Select from the list. Two *Normal* screen options are available. The *Normal* screen is the screen that displays most of the time. See Figure 111 on page 77 and Table 1.

Table 1. Normal Operation Screens (Default setting)

Screen	Name	Description
	*Primary Normal* screen	For standard TripSaver II reclosers, four operating parameters are displayed: Vacuum interrupter status (**Open** or **Closed**), Mode selector status (**Auto** or **NR**)
	Load current	The load current in primary amperes is displayed.
	Last fault magnitude	The fundamental-frequency magnitude of the last fault current in primary amperes, as measured just before the vacuum interrupter opens, is displayed. The fault current unit is amperes for faults smaller than 1000 A and kiloamps with two decimals for faults greater than or equal to 1000 A. This was done because of the limited horizontal space on the LCD screen.
	Number of **Open** operations	The total number of vacuum interrupter **Open** operations is displayed.
	Remaining contact wear in %	The remaining vacuum interrupter contact wear, in percent, is displayed.
	The LCD *Temperature* screen.	The temperature is shown, in degrees Celsius.
	**Sectionalizing** mode counts:	This screen displays the preset number of source-side circuit breaker or recloser operations the TripSaver II recloser will count up to before dropping open. This screen is automatically skipped if **Sectionalizing** mode is disabled.

	Software versions	Three pieces of information about software version are displayed: Application, Bootloader, and Radio Frequency Microcontroller Unit.
 **Cycles back to Closed | Auto screen**	Transceiver ID	This is the communication ID.

TripSaver II Cutout Mounted Reclosers built before 8-30-2024 may include Alternate Normal screens.

Table 2. *Alternate Normal* screens

Screen	Name	Description
	*Alternate Normal* screen (*Secondary Normal* screen) Vacuum interrupter state—**Open**	The vacuum interrupter is in an **Open** state.
	*Alternate Normal* screen (*Secondary Normal* screen) Vacuum interrupter state—**Close**	The vacuum interrupter is in a **Closed** state.
	*Alternate Normal* screen (*Secondary Normal* screen) Vacuum interrupter state—**Unknown**	This is an unknown vacuum interrupter state.

"Display" Screen Full Sequence Repeats. Select the number of times the entire sequence of *Display* screen items is repeated. See Figure 111 on page 77. The *Display* screen is initiated by any operation of the MODE SELECTOR lever.

Each "Display" Screen Duration. Select the length of time, in seconds, each *Display* screen item is displayed before the screen scrolls to the next item.

Selecting "Display" Screen items

The lower half of this setting screen is where the *Display* screen items are selected. See Figure 111 on page 77.

Available Screens. This list displays the selection of screens that can be added to the **Display Screen** sequence. See Appendix B on page 130 for the available options. An item can be selected and added to the **Display Screen** sequence by clicking on it. The clicked item will be highlighted in blue color. See Figure 112. Multiple items can be selected simultaneously.

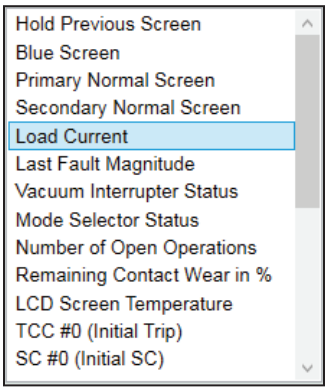


Figure 112. The list of available items for the Display Screen mode.

Screens to Display. This is the list of items that will be displayed on the LCD screen under the **Display Screen** mode. See Figure 113. Multiple items can be selected simultaneously. Up to 32 items can be added to this list.

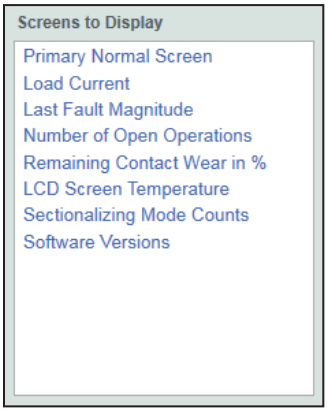


Figure 113. The list of screens that will be displayed.

Add. The **Add** button is used to add a highlighted item or a group of items from the Available Screens list to the Screens to Display list on the right. See Figure 114.

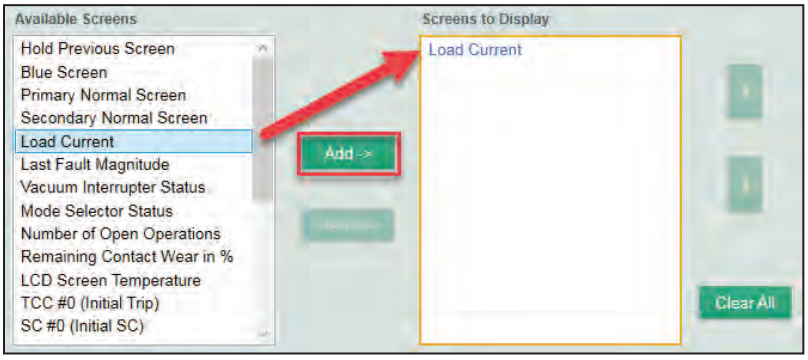


Figure 114. The Add button.

The **Add** button is grayed out when no item in the Available Screens list has been highlighted.

Note: If an existing item or items in the Screens to Display list is highlighted before adding a new item over from the Available Screens list, the new item will be inserted below the highlighted item in the Screens to Display list. See Figure 115.

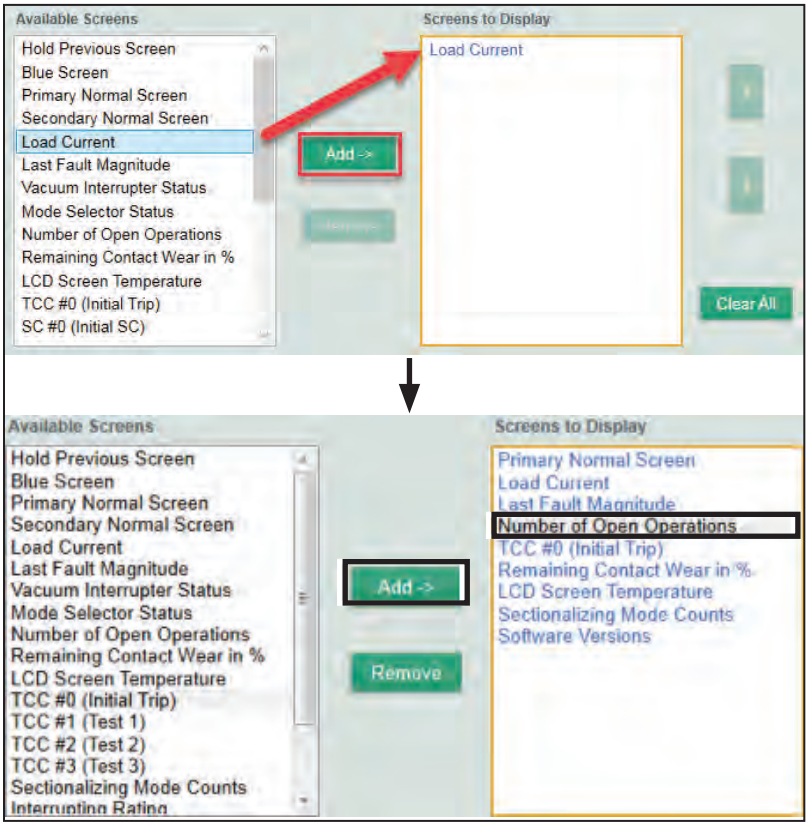


Figure 115. A new item is always added under the highlighted existing item.

Remove. Click on the **Remove** button to remove a highlighted item or items from the Screens to Display list. See Figure 116.

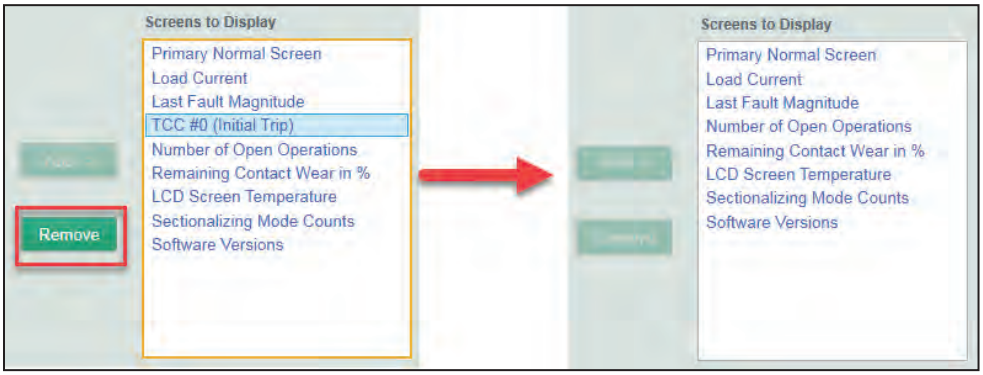


Figure 116. The Remove button.

The **Remove** button is grayed out when no item in the Screens to Display list has been selected.

Up and Down Arrows. These are used to move highlighted items up or down in the Screens to Display list. See Figure 117.

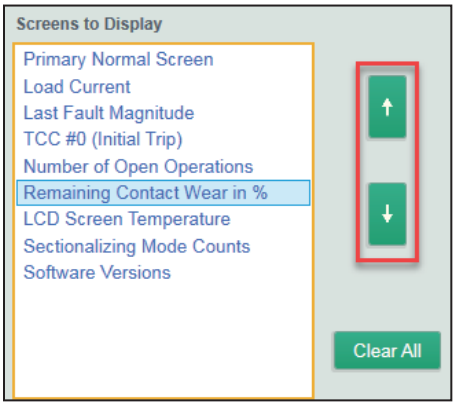


Figure 117. The Up and Down arrows.

Note: The Up arrow is grayed out when the selected item is already on the top of the list, and the Down arrow is grayed out when the selected item is already on the bottom of the list.

The arrows are also grayed out when no item in the Screens to Display list has been selected. See Figure 118.

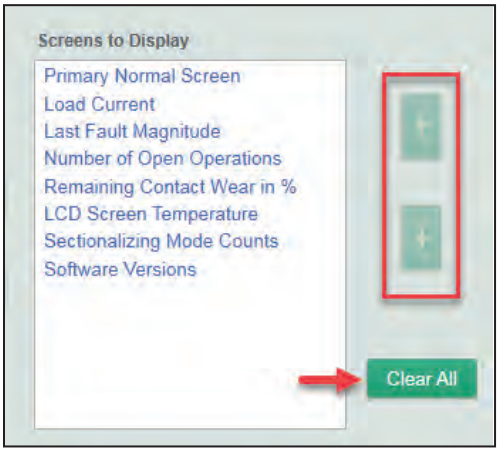


Figure 118. The arrows are grayed out when no items are selected.

Clear All. Click on this button to remove all items from the Screens to Display list. See Figure 118.

The **Display Screen** mode will be disabled if no screens are added to the Screens to Display list.

LCD Screen Settings Screen—Default Settings

TripSaver II Service Center Configuration Software launches with a set of default LCD screen settings that match those programmed into the standard TripSaver II recloser before it leaves the factory. This is the starting point of the LCD configuration process. The default LCD screen settings are shown below.

Invert Screen When Dropped-Open: Off

Screen When Dropped-Open: *Primary Normal* screen

Language: English

"Normal" Screen: *Primary Normal* screen

"Display" Screen Full Sequence Repeats: 2 times

Each "Display" Screen Duration: 3 seconds

Screens to Display: *Primary Normal*, *Load Current*, *Last Fault Magnitude*, *Number of Open Operations*, *Remaining Contact Wear in %*, *LCD Screen Temperature*, *Sectionalizing Mode Counts*, *Software Versions*.

Status Screen

The *Status* screen is available under the **Connected** (online) mode or when a snapshot file is open. When a TripSaver II recloser is connected, the *Status* screen will be the first screen to open, and it will populate with data from the TripSaver II recloser. The *Status* screen presents status information, a summary of TCC curve settings, and general recloser information. This screen is view-only; there are no data-entry fields. See Figure 119.

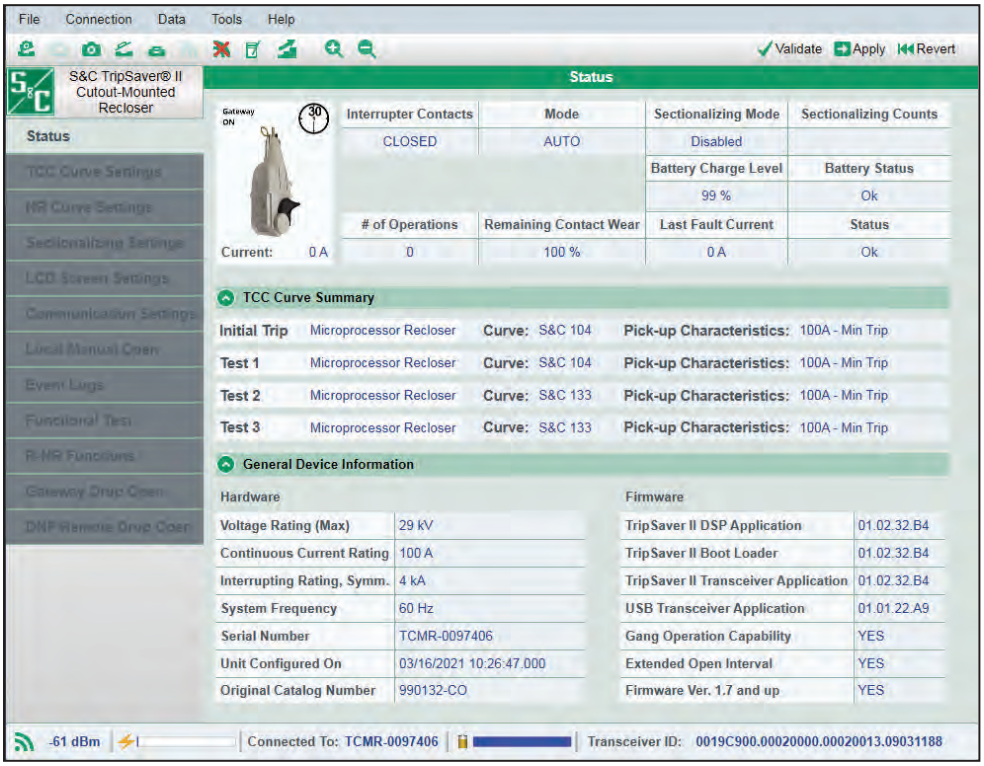


Figure 119. The *Status* screen.

Status Information

The status information is shown at the top section of this screen. See Figure 120.

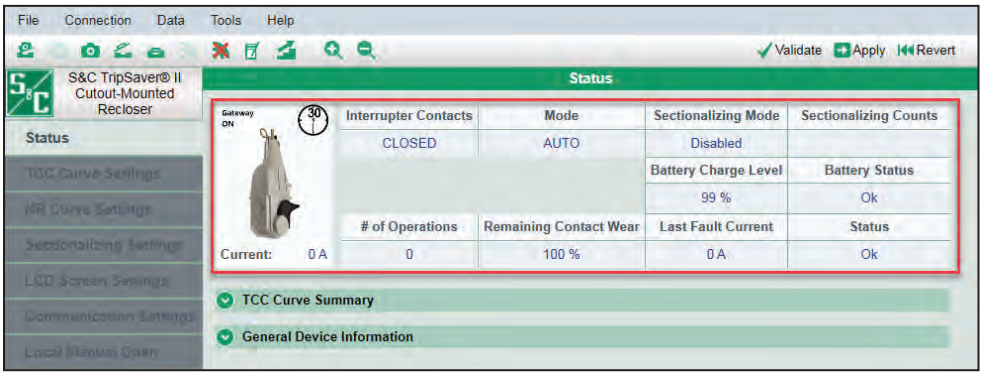


Figure 120. The Status information area.

Photo. Depending on the TripSaver II recloser, a photo of either a 15-kV (15.5-kV max) or 25-kV (29-kV max) recloser will be displayed. If a TripSaver II recloser is furnished with the **Extended Open Interval** option ("-O"), a black and white clock face icon indicating "30s" will be displayed on the top right side in the photo frame. See Figure 119 on page 84 and Figure 121.

Figure 121. Photos of 15-kV and 25-kV TripSaver II reclosers.

Current, A. This is the instantaneous magnitude of the current flowing through the control, in primary amperes. It's located below the photo. Current displayed will typically be 0 A~1 A when the TripSaver II recloser is being powered by the power module during configuration. See Figure 119 on page 84.

Interrupter Contacts. This indicates whether the vacuum interrupter contacts of the connected TripSaver II recloser are presently open or closed. **Note:** During a functional test, it is normal for the vacuum interrupter contacts to show "Transit," which means the interrupter contacts are opening or closing.

Mode. This indicates the operational mode of the TripSaver II recloser: AUTO (lever up), NR (lever down), or R-NR (lever up). In **Auto** mode, a TripSaver II recloser will perform open or reclose operations according to the pre-selected TCC curves. In **NR** (Non-Reclose) and **R-NR** (Remote-Non-Reclose) mode, a TripSaver II recloser will not reclose; it will trip once on the applicable user-specified NR curve or the default instantaneous curve if the NR curve settings have not been configured (the minimum trip current comes from the initial trip curve) and then drop open. The TripSaver II recloser automatically resets approximately 2 seconds after it drops open.

Sectionalizing Mode. This indicates whether the **Sectionalizing** feature is presently enabled or disabled in the connected TripSaver II recloser.

Sectionalizing Counts. This indicates the number of source-side circuit breaker or recloser tripping operations the enabled **Sectionalizing** feature counts up to before commanding a TripSaver II recloser to drop open. The field is grayed out if the **Sectionalizing** feature is disabled.

Battery Charge Level. This field is only displayed if a recloser is furnished with the **Extended Open Interval** option ("-O"). It indicates the battery state of charge, in percent. The battery state of charge is also represented by a blue "Battery Charge Level" bar at the bottom of the screen, similar to the "Main Cap Charge" bar.

Battery Status. This field is only displayed if a recloser is furnished with the **Extended Open Interval** option ("-O"). It indicates the status of the battery that is used to support the extended open interval.

OK: The battery is functioning normally.

Error: This indicates a battery problem.

# of Operations. This indicates the number of vacuum interrupter open operations registered in total. See Figure 119 on page 84.

Remaining Contact Wear in %. This indicates the remaining vacuum interrupter contact wear, in percent.

Last Fault Current, A. This indicates the fundamental-frequency magnitude of the last fault, in primary amperes, measured just prior to the opening of the vacuum interrupter contacts.

Status. This displays the status of the control. The following status messages can be displayed.

- **OK:** The TripSaver II recloser is functioning normally and is in the **Idle** state.
- **Waiting to Open VI:** This indicates the vacuum interrupter contacts are waiting to open.
- **Waiting to Close VI:** This indicates the vacuum interrupter contacts are waiting to close.
- **Open Interval:** This indicates the TripSaver II recloser is in the **Open Interval** state.
- **Waiting to Drop Open:** This indicates when TripSaver II recloser is waiting to drop open.
- **Waiting to Reset Drop-Open:** This indicates when TripSaver II recloser is waiting to reset the drop-open mechanism. This is a relatively short transient state.
- **Dropped Open:** This indicates the TripSaver II recloser has dropped open. This is a relatively short transient state, after which the status will go back to being **OK.**
- **Error:** This indicates an error has just occurred. This is a transient state and only temporarily displays immediately after an error event.
- **Service Now:** This appears when a TripSaver II recloser cannot release the drop-open mechanism after consecutive re-tries, when the vacuum interrupter contacts cannot open after consecutive re-tries, or when a TripSaver II recloser is no longer capable of interrupting a fault when remaining contact wear is at 0%. When a TripSaver II recloser enters the **Service Now** state, the LCD will be locked with a special *Service Now* screen: the right side of the screen will display the vacuum interrupter status ("O" for Open; "I" for Closed; "X" for an error situation when the recloser cannot sense the vacuum interrupter status) and the left side of the screen will display an "!" symbol, indicating immediate attention is needed. Rotating the MODE SELECTOR lever, applying a 9-Volt Lithium L522 battery, or applying the Service Center Configurability power module will not unlock the screen. When this occurs, follow the steps in the "Clearing the Service Now LCD Screen" section on page 115.

Note: The **Status** field displays "OK" most of the time during configuration. Changes in status will be seen during a functional test. However, some of the fast transient events may not be captured on the screen. To optimize the performance of communications system, the software is designed to pull status information from the connected TripSaver II recloser only once per second. Therefore, some fast transient events may have already expired by the time TripSaver II recloser starts to transmit its latest status information to the software.

TCC Curve Summary

The "TCC Curve Summary" section is expanded by default. Users can collapse the section by clicking on the green title row. This screen summarizes the basic information of the configured TCC curves residing in the connected TripSaver II recloser. See Figure 122.

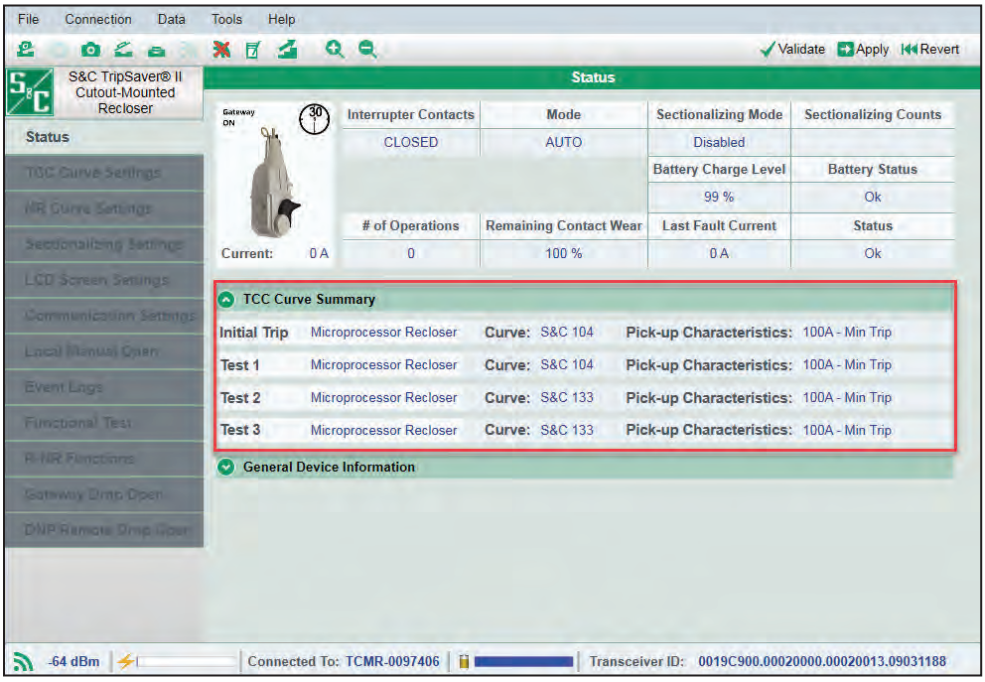


Figure 122. The TCC Curve Summary area.

The following curve information is extracted from the connected recloser.

- **Emulated Device.** The type of device the curve is emulating. It displays either Microprocessor Recloser, Fuse Link, or Hydraulic Recloser. See Figure 123.

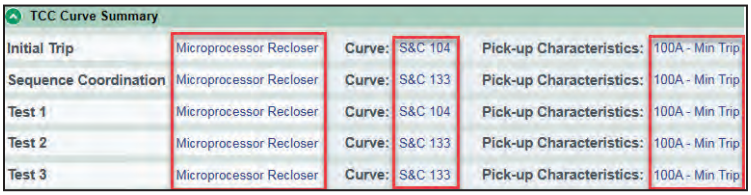


Figure 123. The columns for emulated devices, curves, and pick-up characteristics

- **Curve.** The specific curve used for each trip operation. It displays either the inverse segment selected for a microprocessor recloser emulation, the speed selected for a fuse link emulation, or the inverse segment selected for a hydraulic recloser emulation.
- **Pickup Characteristics.** The pickup characteristics for each trip operation. It displays either the minimum trip current for a microprocessor recloser emulation, ampere rating for a fuse link emulation, or coil rating for a hydraulic recloser emulation. The **Low Cutoff** setting is also displayed, if enabled.

General Device Information

The "General Device Information" section is collapsed by default. The section can be expanded by clicking on the green title located at the bottom part of the *Status* screen. See Figure 124.

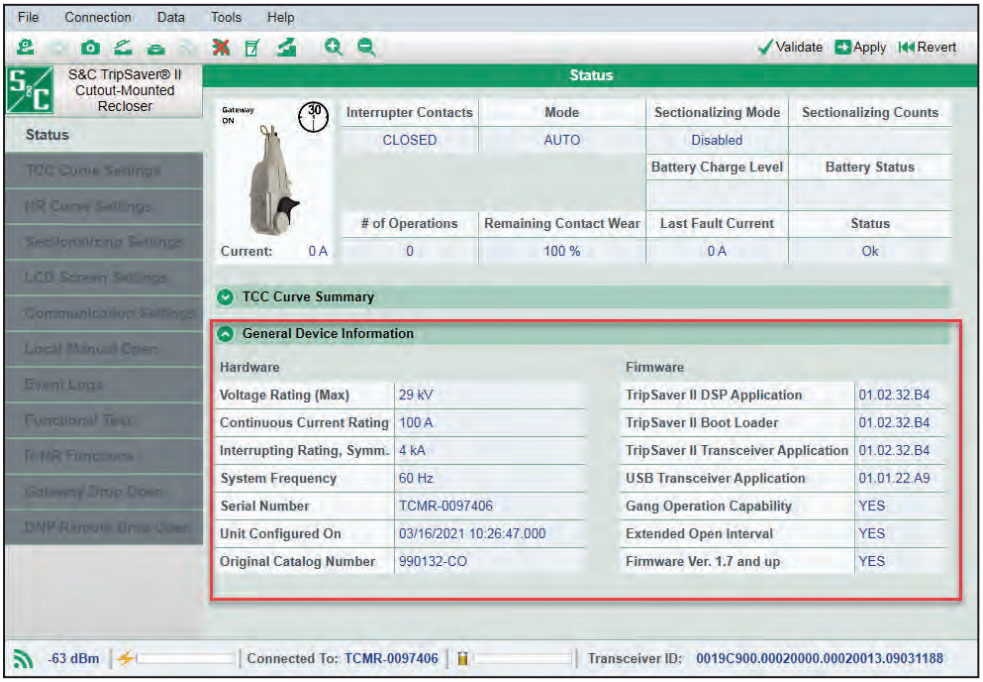


Figure 124. The General Device Information area.

When expanded, the following hardware and firmware related information of the connected TripSaver II recloser are displayed:

Hardware

Voltage Rating (Max), kV. This indicates the rated maximum voltage of the connected TripSaver II recloser. Either 15.5 kV or 29 kV is displayed.

Continuous Current Rating, A. This indicates the continuous current rating of the connected TripSaver II recloser. This value will be either 100 A or 200 A.

Interrupting Rating, Symm., kA. This indicates the interrupting rating in symmetrical kiloamps of the connected TripSaver II recloser. Either 4 kA or 6.3 kA is displayed.

System Frequency, Hz. This indicates the frequency of the electrical system the connected TripSaver II recloser was configured to operate on by the factory. Either 50 Hz or 60 Hz is displayed.

Serial Number. This indicates the serial number of the connected TripSaver II recloser.

Unit Configured On. This indicates the time stamp the connected TripSaver II recloser was last configured on, in the format of MM/DD/YYYY HH:MM:SS.milliseconds.

Note: When using the service center configuration software to view a TripSaver II recloser for the first time, the **Unit Configured On** field will not be visible. To display the **Unit Configured On** field, complete the following steps:

STEP 1. Go to **Tools>Options** menu and select the **Communication** tab.

STEP 2. Uncheck the Split Profile Apply Messages check box. Then, click the **Apply** button.

STEP 3. Go to the **Connection** menu and select the **Disconnect** option.

STEP 4. Reconnect to the TripSaver II recloser following the instructions in the "Connect to Device" section on page 29.

STEP 5. Make a change to the device configuration. Any change will prompt the device to initialize the configuration date in the register. Validate the change according to the directions in the "Validate" section on page 32 and then click on the **Apply** button. The **Unit Configured On** field should now show the correct information. See Figure 125.

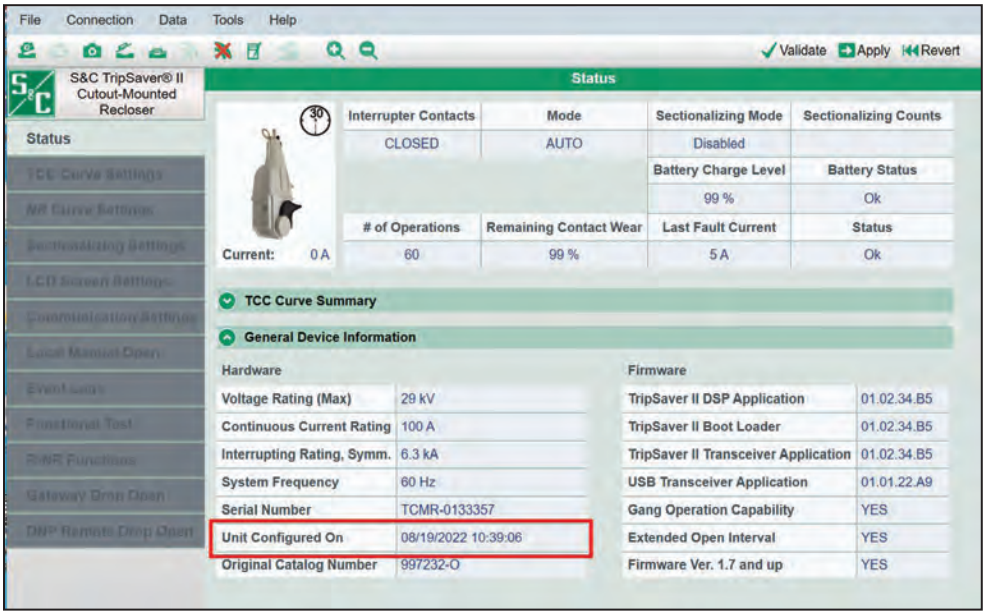


Figure 125. The Unit Configured On field.

Original Catalog Number. This indicates the catalog number of the connected TripSaver II recloser when it left the factory.

Firmware

TripSaver II DSP Application. This indicates the version of the DSP firmware the connected TripSaver II recloser is using. See Figure 124 on page 88.

TripSaver II Boot Loader. This indicates the version of the boot loader the connected TripSaver II recloser is using.

TripSaver II Transceiver Application. This indicates the version of the 802.15.4 transceiver application code the connected TripSaver II recloser is using.

USB Transceiver Application. This indicates the version of the 802.15.4 transceiver application code the USB transceiver is using.

Event Logs Screen

The *Event Logs* screen provides eight different historical counts, including the number of interrupter operations and recloser drop-opens, of the connected TripSaver II recloser, and the duration and current level of the last 25 trip events. See Figure 126.

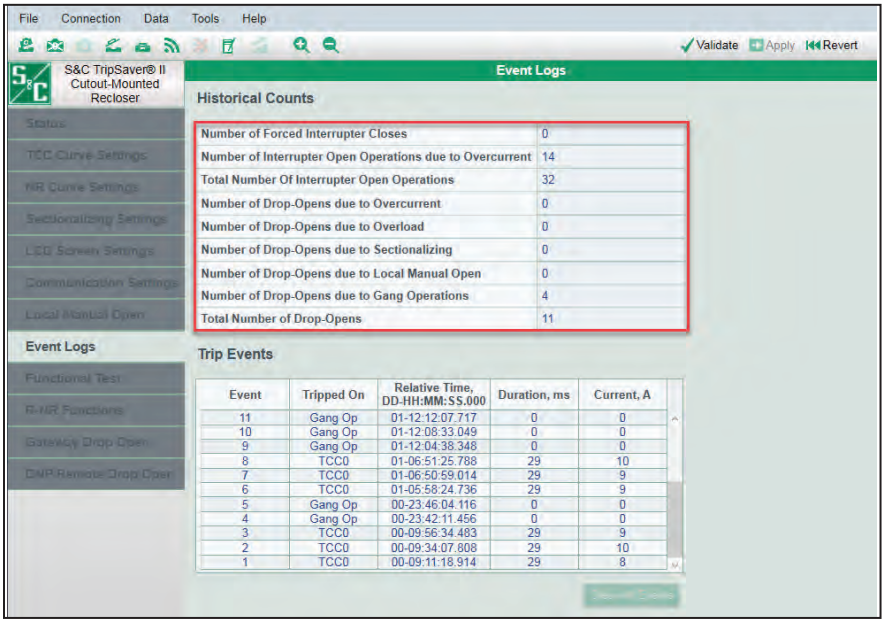


Figure 126. The *Event Logs* screen.

Historical Counts

Number of Forced Interrupter Closes. This is the number of times the vacuum interrupter has been manually reset using the service center configuration kit power module, cordless power module, or a 9-Volt Lithium L522 battery.

Number of Interrupter Open Operations due to Overcurrent. This is the number of times the vacuum interrupter contacts have opened because of an **Overcurrent** condition.

Total Number of Interrupter Open Operations. This is the total number of times the vacuum interrupter contacts have opened.

Number of Drop-Opens due to Overcurrent. This is the number of times the TripSaver II recloser has dropped open because of an **Overcurrent** condition. See Figure 126 on page 90.

Number of Drop-Opens Due to Overload. This is the number of times the TripSaver II recloser has dropped open because of an **Overload** condition.

Number of Drop-Opens Due to Sectionalizing. This is the number of times the active **Sectionalizing** feature has counted up to the specified number and commanded the TripSaver II recloser to drop open.

Number of Drop-Opens Due to Local Manual Open. This is the number of times the TripSaver II recloser has dropped open, triggered by the **Local Manual Open** feature.

Total Number of Drop-Opens. This is the total number of times the TripSaver II recloser has dropped open, including the number of drop-opens during a functional test and triggered by the **Local Manual Open** feature.

Trip Events

The TripSaver II Service Center Configuration Software allows viewing the relative time stamp, duration, and current level of the last 25 interrupter trip events in the Trip Events table. When the table is full (loaded with 25 events), each new event will overwrite the oldest event in the table. For example, the 26th event will overwrite the first event shown in the table.

Note: While the Trip Events table only displays the last 25 interrupter trip events for user review, the firmware uses a separate memory to store full event logs for future engineering analysis use. The full log can be obtained by saving a snapshot file.

The Trip Events table is located in the lower section of the *Event Logs* screen. Five columns of data are presented. See Figure 127.

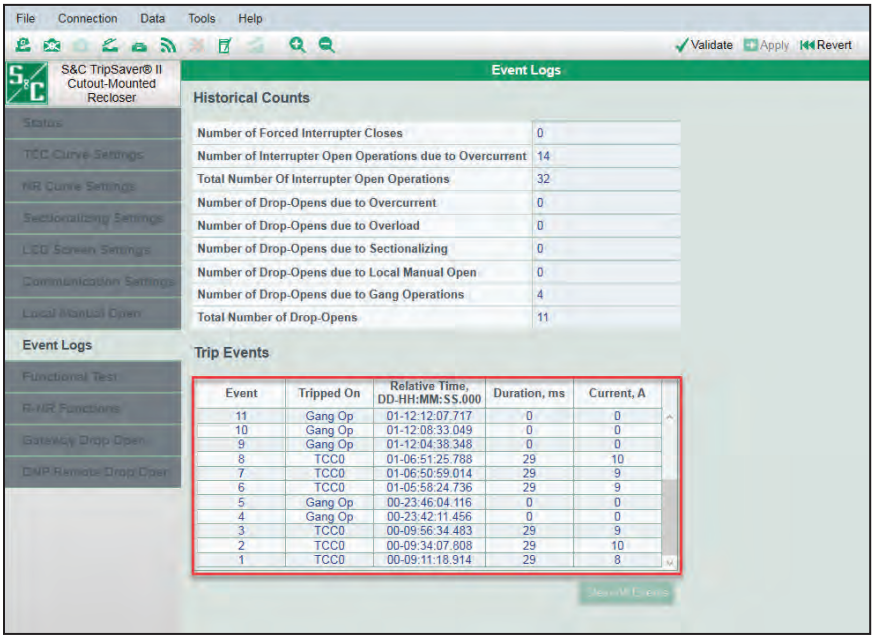


Figure 127. The Trip Events table.

Event. Each new event is assigned an event ID number in ascending order. The newest event is displayed in the top row of the table, and the oldest event is displayed in the bottom row. See Figure 128.

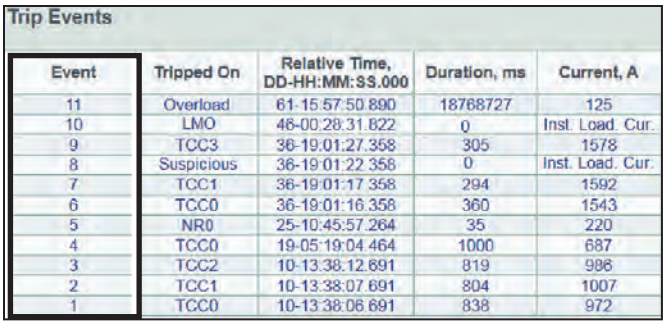


Figure 128. The Event ID column.

Tripped On. This indicates the event that caused the vacuum interrupter to trip. See Figure 129.

Trip Events

Event	Tripped On	Relative Time, DD-HH:MM:SS.000	Duration, ms	Current, A
11	Overload	61-15:57:50.890	18768727	125
10	LMO	46-00:28:31.822	0	Inst. Load. Cur.
9	TCC3	36-19:01:27.358	305	1578
8	Suspicious	36-19:01:22.358	0	Inst. Load. Cur.
7	TCC1	36-19:01:17.358	294	1592
6	TCC0	36-19:01:16.358	360	1543
5	NR0	25-10:45:57.264	35	220
4	TCC0	19-05:19:04.464	1000	687
3	TCC2	10-13:38:12.691	819	986
2	TCC1	10-13:38:07.691	804	1007
1	TCC0	10-13:38:06.691	838	972

Figure 129. The column indicating the type of event the vacuum interrupter was tripped on.

The following events can be displayed.

- **Overload.** This indicates the vacuum interrupter tripped because of an **Overload** condition and the TripSaver II recloser dropped open.
- **Sectionalizer.** This indicates the vacuum interrupter tripped when the enabled **Sectionalizing** feature commanded the TripSaver II recloser to drop open after the preset count was reached.
- **NR#0, NR#1, NR#2.** This indicates the vacuum interrupter tripped because of an **Overcurrent** condition while the recloser was in **NR or R-NR** mode and the recloser dropped open.
- **TCC0** or **TCC1** or **TCC2** or **TCC3.** This indicates which trip or test operation the TripSaver II recloser was on when the vacuum interrupter tripping event happened because of an **Overcurrent** condition under **AUTO** mode. TCC0: Initial Trip; TCC1: Test 1; TCC2: Test 2; TCC3: Test 3.
- **Sequence Coordination trip operation**. When the feature is configured and enabled, and when the TripSaver II recloser detects a fault that exceeds the TCC0 minimum trip setting but the fault duration is not sufficient to cause TCC0 to trip, the TripSaver II recloser will assume the downline device has operated. The recloser will switch protection from TCC0 to its **Sequence Coordination** settings.

If the fault isn't cleared by the downstream device, the Sequence Coordination curve will start timing and trip. A **Sequence Coordination** trip operation will then show as "SC0" in the event log. See Figure 130. If the fault persists beyond SC0, the TripSaver II recloser will use the remaining settings in the protection sequence, including TCC1, TCC2, and TCC3, as programmed. For more information on the **Sequence Coordination** feature, see the description on page 53 and in S&C Information Bulletin 461-50, "TripSaver® II Cutout-Mounted Recloser: *Sequence Coordination Application Guide*."

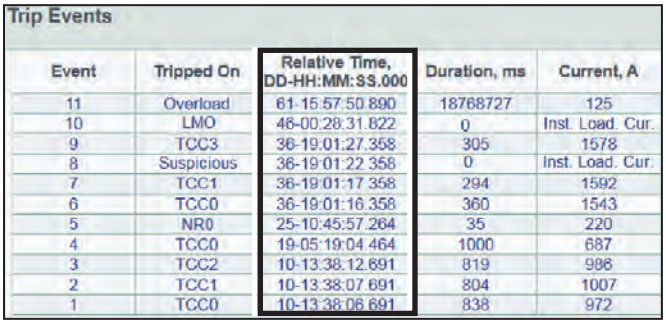
Trip Events

Event	Tripped On	Relative Time, DD-HH:MM:SS.000	Duration, ms	Current, A
24	TCC2	06-10:10:15.302	372	10
23	TCC1	06-10:10:07.633	284	11
22	SC0	06-10:10:00.523	56	10

Figure 130. An example of a sequence coordination trip in the Trip Events log.

- **LMO.** This indicates the vacuum interrupter tripped because of a **Local Manual Open** command, and the TripSaver II recloser dropped open.
- **Suspicious.** This indicates the S&C-determined flag for suspicious malicious local manual open attempts has been detected. The S&C-determined flag is defined as: 10 consecutive MODE SELECTOR lever operations (moving the lever down and then back up is counted as two operations) within a 60-second period, when the **Local Manual Open** feature is disabled. The logic only monitors the condition when the recloser is vertical.

Relative Time, DD-HH:MM:SS.000. This indicates the relative time stamp of vacuum interrupter trip events in the format of days, hours, minutes, seconds and milliseconds. A TripSaver II recloser has an internal timer that starts when each recloser leaves the S&C factory. The timer saves a relative time stamp into memory immediately before the timer stops five hours after the recloser loses power. The internal timer will start from this saved time stamp when the TripSaver II recloser is powered up again. See Figure 131.

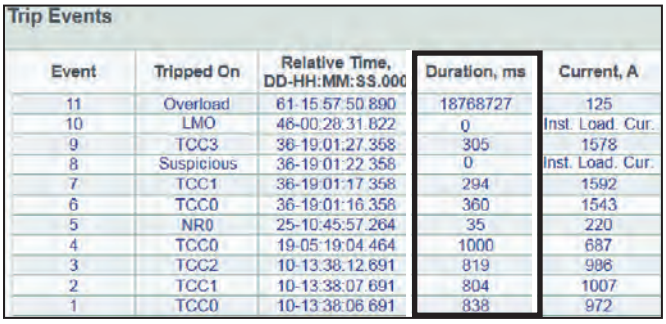


Trip Events

Event	Tripped On	Relative Time, DD-HH:MM:SS.000	Duration, ms	Current, A
11	Overload	61-15:57:50.890	18768727	125
10	LMO	46-00:28:31.822	0	Inst. Load. Cur.
9	TCC3	36-19:01:27.358	305	1578
8	Suspicious	36-19:01:22.358	0	Inst. Load. Cur.
7	TCC1	36-19:01:17.358	294	1592
6	TCC0	36-19:01:16.358	360	1543
5	NR0	25-10:45:57.264	35	220
4	TCC0	19-05:19:04.464	1000	687
3	TCC2	10-13:38:12.691	819	986
2	TCC1	10-13:38:07.691	804	1007
1	TCC0	10-13:38:06.691	838	972

Figure 131. The column displaying Relative Time timestamp.

Duration, ms. This indicates the duration (defined here) of each event shown in the Tripped On column, in milliseconds. See Figure 132.



Trip Events

Event	Tripped On	Relative Time, DD-HH:MM:SS.000	Duration, ms	Current, A
11	Overload	61-15:57:50.890	18768727	125
10	LMO	46-00:28:31.822	0	Inst. Load. Cur.
9	TCC3	36-19:01:27.358	305	1578
8	Suspicious	36-19:01:22.358	0	Inst. Load. Cur.
7	TCC1	36-19:01:17.358	294	1592
6	TCC0	36-19:01:16.358	360	1543
5	NR0	25-10:45:57.264	35	220
4	TCC0	19-05:19:04.464	1000	687
3	TCC2	10-13:38:12.691	819	986
2	TCC1	10-13:38:07.691	804	1007
1	TCC0	10-13:38:06.691	838	972

Figure 132. The column displaying duration for each event.

- **For Overcurrent (TCC0, TCC1, TCC2, TCC3, SC0, and the NR curves):** This indicates the duration of the fault.
- **For Overload:** This indicates the duration of the overload drop-open event during which the current measured was above 100 A.
- **For Sectionalizer:** This indicates the duration during which the current measured during the last sectionalizing event, before the enabled **Sectionalizing** feature commanded the TripSaver II recloser to drop open, was above the **Sectionalizing Mode Starting Current** setpoint.
- **For LMO:** This value will be 0.
- **For Suspicious:** This value will be 0.

Current, A. This indicates the current level (defined here) of each event shown in the "Tripped On" column, in primary amperes. See Figure 133.

Trip Events

Event	Tripped On	Relative Time, DD-HH:MM:SS.000	Duration, ms	Current, A
11	Overload	61-15:57:50.890	18768727	125
10	LMO	46-00:28:31.822	0	Inst. Load. Cur
9	TCC3	36-19:01:27.358	305	1578
8	Suspicious	36-19:01:22.358	0	Inst. Load. Cur
7	TCC1	36-19:01:17.358	294	1592
6	TCC0	36-19:01:16.358	360	1543
5	NR0	25-10:45:57.264	35	220
4	TCC0	19-05:19:04.464	1000	687
3	TCC2	10-13:38:12.691	819	986
2	TCC1	10-13:38:07.691	804	1007
1	TCC0	10-13:38:06.691	838	972

Figure 133. The column displaying current level for each event.

- **For Overcurrent (TCC0, TCC1, TCC2, TCC3, SC0, and the NR curves):** This indicates the value of the current measured just before the vacuum interrupter contacts opened.
- **For Overload:** This indicates the value of the current measured just before the vacuum interrupter contacts opened.
- **For Sectionalizer:** This indicates the maximum value of the current measured during the last sectionalizing event before the enabled **Sectionalizing** feature commanded the TripSaver II recloser to drop open.
- **For LMO:** This indicates the value of the load current measured just before the vacuum interrupter contacts opened by the **Local Manual Open** command.
- **For Suspicious:** This indicates the value of the load current measured when a suspicious local manual open attempt was detected.

Clear All Events. Clicking on this button will clear the log for "Trip Events" in the connected TripSaver II recloser. This can be useful prior to deploying a TripSaver II recloser to a different location. This button is grayed out when viewing a snapshot file. See Figure 126 on page 90.

Note 1: The command executes immediately after clicking on the button. Save a snapshot before clearing the log.

Note 2: Clicking on this button does not reset the relative timer.

Note 3: Clicking on this button does not erase anything from the memory used to store full event logs for use by S&C Technical Support.

Functional Test Screen

Simulation-based functional tests can be performed on this screen to verify the vacuum interrupter and the drop-open mechanism respond correctly to the applied TCC curve settings. The *Functional Test* screen is shown in Figure 134.

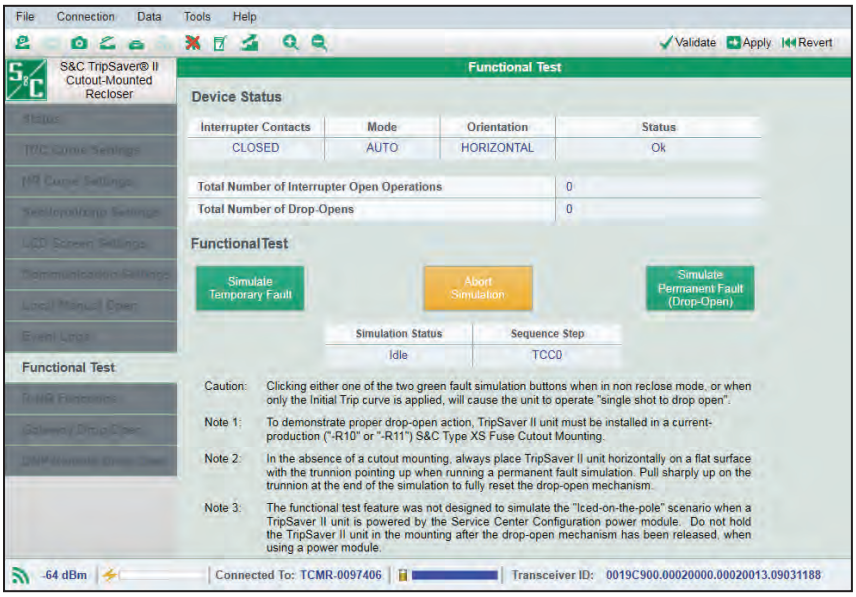


Figure 134. The *Functional Test* screen.

Specifically the test verifies the following:

- Main power supply capacitor inside the TripSaver II recloser will charge.
- Vacuum interrupter contacts will open.
- Vacuum interrupter contacts will close.
- Drop-open mechanism will respond correctly at the end of a permanent fault simulation.
- The test operations correctly sequence after the vacuum interrupter contacts are closed.
- The test operations reset at the end of a permanent fault simulation.
- The number of **Trip** operations matches the setting.
- The open interval matches the setting.
- The sequence-reset time matches the setting.

Note: This is not a primary injection test and does not involve any actual current.

Device Status

The upper section of the *Functional Test* screen monitors device status relevant to the functional test. See Figure 135.

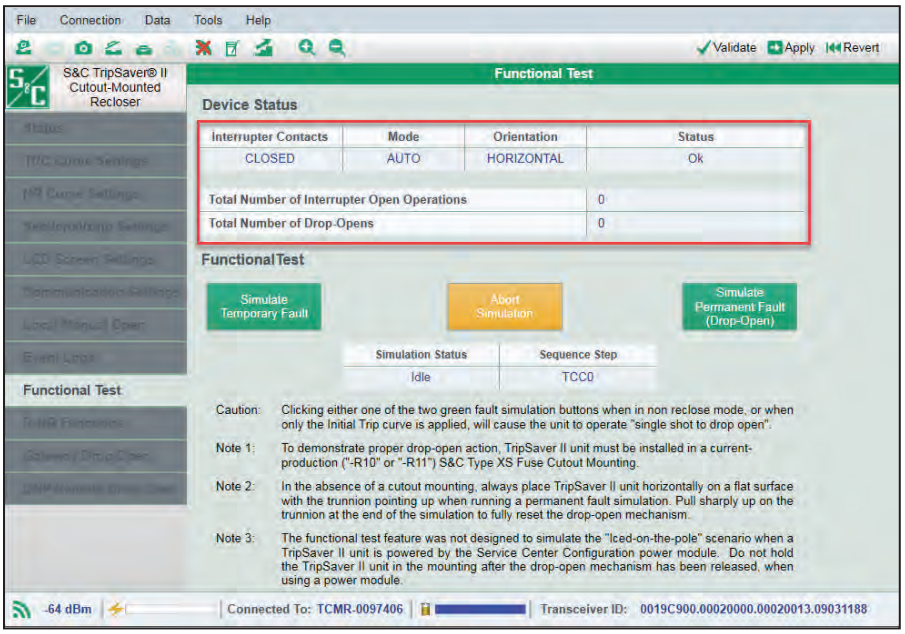


Figure 135. The Device Status area.

Interrupter Contacts. This indicates whether the vacuum interrupter contacts of the connected TripSaver II recloser are presently open or closed. **Note**: During a functional test, it's normal for the vacuum interrupter contacts to show “Transit,” which means the interrupter contacts are opening or closing.

Mode. This indicates the position of the MODE SELECTOR lever: **AUTO** (up), **Remote-NR** (up), or **NR** (down). In **AUTO** mode, the TripSaver II recloser will perform an open and reclose operation during the functional test according to the applied TCC curves. In **Remote-NR** or **NR** (non-reclose) mode, the TripSaver II recloser will not reclose during the functional test; it will open the vacuum interrupter contacts instantaneously and release the drop-open mechanism after a simulation button is clicked. The TripSaver II recloser will drop open and reset itself afterward.

Orientation. This indicates whether the TripSaver II recloser is closed into a fuse cutout mounting (in the **Vertical** position) or is in the **Dropped-Open** position (in the horizontal position).

Status. This field displays the same status items as the *Status* screen. The following can be displayed:

- **Ok:** The TripSaver II recloser is functioning normally and is in the **Idle** state.
- **Waiting to Open VI:** This indicates the vacuum interrupter contacts are waiting to open.

- **Waiting to Close VI:** This indicates the vacuum interrupter contacts are waiting to close.
- **Open Interval:** This indicates the state when the TripSaver II recloser is in the open interval.
- **Waiting to Drop Open:** This indicates when the TripSaver II recloser is waiting to drop open.
- **Waiting to Reset Drop-Open:** This indicates when TripSaver II recloser is waiting to reset the drop-open mechanism. This is a relatively short transient state.
- **Dropped Open:** This indicates the TripSaver II recloser has dropped open. This is a relatively short transient state, after which the status will go back to being "OK."
- **Service Now:** This appears when the TripSaver II recloser cannot release the drop-open mechanism after consecutive re-tries, when the vacuum interrupter contacts cannot open after consecutive re-tries, or when the TripSaver II recloser is no longer capable of interrupting a fault when remaining contact wear is at 0%. When the TripSaver II recloser enters the **Service Now** state, the LCD screen will display a special *Service Now* screen: the right side of the screen will display the vacuum interrupter status ("O" for open; "I" for closed), and the left side of the screen will display an "!" symbol, indicating immediate attention is needed. Rotating the MODE SELECTOR lever, applying a 9-Volt lithium L522 battery, or the service center configuration kit power module will not be able to unlock the screen. When this occurs, see the "Clearing the Service Now LCD Screen" section on page 115.
- **Error:** This indicates an error has just occurred. This is a transient state and only temporarily displays immediately after an error event.

Note: During the functional test, some of the fast transient events may not be captured on the screen. To optimize the performance of communications subsystems, the software is designed to pull status information from the connected TripSaver II recloser only once per second. Therefore, some fast transient events may have already expired by the time TripSaver II recloser starts to transmit its latest status information to the software.

Total Number of Interrupter Open Operations. This is the total number of times the vacuum interrupter contacts have opened. The value will increment by 1 for each interrupter open operation performed during the functional test.

Total Number of Drop-Opens. This is the total number of times the TripSaver II recloser has dropped open. The value will increment by 1 for each **Drop Open** operation performed during the functional test.

Functional Test

The lower section of the *Functional Test* screen is where the functional tests are performed. This section also monitors two additional pieces of information useful to the functional test. See Figure 136.

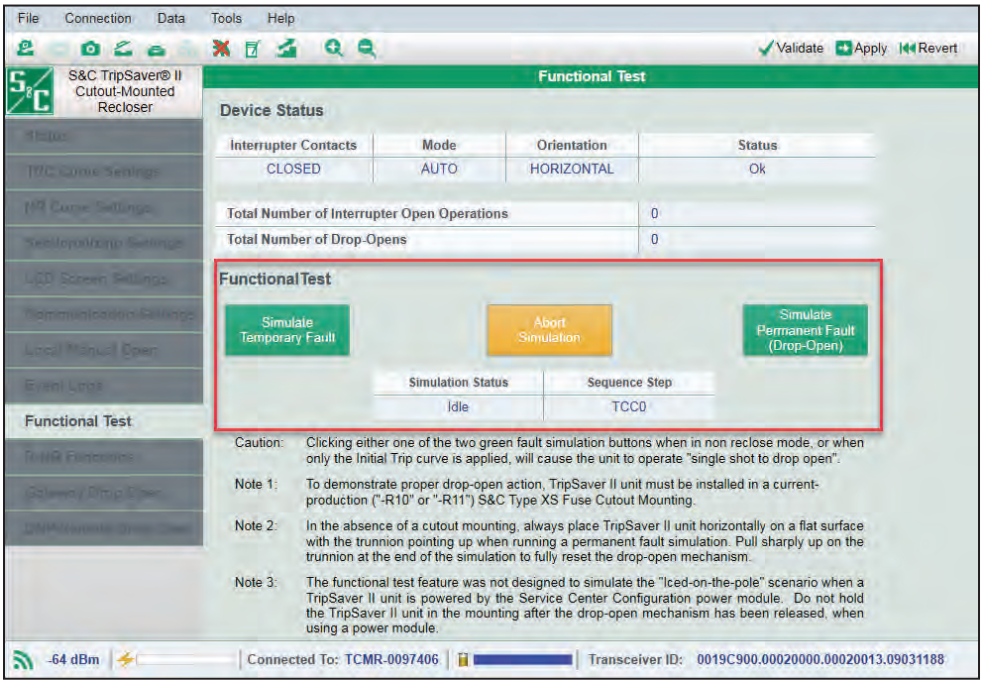


Figure 136. The Functional Test command area.

Simulation Status. This field displays control status relevant to the functional test.

The following can be displayed:

- **Idle:** The TripSaver II recloser is functioning normally and is in the **Idle** state.
- **Charging Caps:** This indicates the main power supply capacitors inside the TripSaver II recloser are charging. When this message is present, the blue “Main Caps Charge” bar at the bottom of the screen can be observed lengthening.
- **Waiting to Reclose:** This indicates the vacuum interrupter contacts are waiting to close.
- **Waiting to Drop-open:** This indicates the TripSaver II recloser is waiting to drop open.

Sequence Step. This field indicates which trip or test operation the connected TripSaver II recloser will use for the next fault simulation. TCC0: Initial Trip; TCC1: Test 1; TCC2: Test 2; TCC3: Test 3. This number will reset to TCC0 when 1) no additional temporary **Fault Simulation** commands are given before the **Sequence Reset** timer expires or 2) at the end of a permanent fault simulation.

Simulate Temporary Fault. Click on the green **Simulate Temporary Fault** button to simulate a temporary fault.

The main power supply capacitors will start to charge, and the **Simulation Status** field will display "Charging Caps." The blue **Main Caps Charge** indicator at the bottom of the screen will start to fill up the empty space. The vacuum interrupter contacts will open after the main capacitors are fully charged. When the interrupter contacts are open, the full blue "Main Caps Charge" bar recedes immediately. See Figure 137 for an example of what is displayed on the *Functional Test* screen during the open interval.

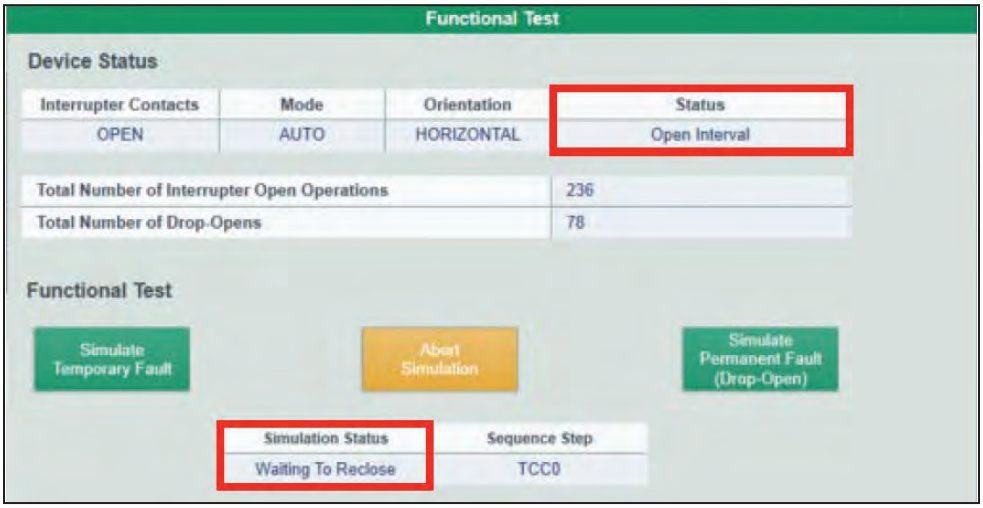


Figure 137. The status during functional test open interval.

The vacuum interrupter contacts will reclose after the configured open-interval time has elapsed, and the operating sequence will step to the next **Trip** operation; the TripSaver II recloser is now ready for another fault simulation. Perform another temporary fault simulation by clicking on the button again before the sequence-reset time expires. Otherwise, the sequence step will reset back to the initial-trip curve.

When the sequence step reaches the last configured **Trip** operation, an additional temporary fault simulation within the sequence reset time will release the drop-open mechanism and the TripSaver II recloser will drop open.

Simulate Permanent Fault. Click on the green **Simulate Permanent Fault** button to simulate a permanent fault.

NOTICE

For TripSaver II reclosers with firmware version 1.7 or previous, make sure the trunnion of the recloser is pointing up when performing testing. Performing testing with the trunnion facing down or pointing to the side may cause the TripSaver II recloser to enter the **Service Now** state and display the *Service Now* screen. See the "End of Interrupting Capability and Service Now Screen" topic in the "Troubleshooting" section of S&C Instruction Sheet 461-502 and the "Clearing the Service Now LCD Screen" section on page 115.

Similar to the temporary fault simulation, the main power supply capacitors will start to charge first, and the **Simulation Status** field will display "Charging Caps." After the main capacitors are fully charged each time, the TripSaver II recloser will open and reclose based on the configured operating sequence and eventually release the drop-open mechanism. The TripSaver II recloser will then drop open and reset.

Clicking on the **Simulate Permanent Fault** button before the sequence-reset time expires after a temporary fault simulation is performed will immediately start a permanent fault simulation from the beginning of -TCC0.

NOTICE

Clicking either of the two green fault-simulation buttons when in **NR or R-NR** mode or when only the Initial Trip curve is applied will cause the recloser to operate a single shot to drop open.

Note: To properly simulate a **Drop Open** operation, the TripSaver II recloser must be installed in a present-production ("-R10" or "-R11") S&C cutout mounting. In the absence of a cutout mounting, always place the TripSaver II recloser horizontally on a flat surface with the trunnion pointing up when simulating a permanent fault. The recloser will still go through the entire sequence and release the drop-open mechanism at the end. However, the drop-open mechanism must be reset manually by either pulling up on the trunnion or by installing the TripSaver II recloser into a cutout mounting. The drop-open mechanism is fully reset when the trunnion is no longer loosely movable. The **Functional Test** feature was not designed to simulate the "Iced-on-the-pole" scenario when a TripSaver II recloser is powered by the service center configuration power module. Do not hold the TripSaver II recloser in the mounting after the drop-open mechanism has been released when using a power module.

Abort Simulation. Click on the yellow **Abort Simulation** button to stop the ongoing simulation. The blue "Main Caps Charge" bar recedes after this button is clicked. See Figure 137 on page 100.

Local Manual Open Settings Screen

How the Local Manual Open Works

TripSaver II reclosers loaded with firmware version 1.6 and later have a **Local Manual Open** (LMO) feature for loadbreaking without the use of the Loadbuster®—The S&C Loadbreak Tool. When enabled, this feature provides a manual operation sequence that commands the TripSaver II recloser to open the vacuum interrupter contacts and drop open. A TripSaver II recloser must be powered and installed vertically in a cutout mounting for the **LMO** feature to work.

The MODE-SELECTOR lever controls the **LMO** feature. The **Open** command state is triggered by operating the MODE-SELECTOR lever X number of times within a Y-second window when the TripSaver II recloser is in the vertical position.

When the triggering condition has been met, the TripSaver II recloser starts the open time-delay sequence. For the next 10 seconds, an "LMO Cancel?" prompt will appear on the LCD screen for cancellation. The **LMO** command can be canceled by any operation of the MODE-SELECTOR lever. If the MODE-SELECTOR lever is operated during this time, an "LMO Canceled" message will briefly appear on the LCD screen to indicate the user has canceled the operation.

If the command is not canceled within 10 seconds, a "WALK AWAY" message will display on the LCD screen, indicating the start of the 20-second operation timer intended to allow the operator to comply with any operating-distance requirements specified by the utility work practices.

During the walk-away period, the operator can no longer cancel the **Open** operation. At the end of the walk-away period, the TripSaver II recloser will open the vacuum-interrupter contacts to interrupt the load current, then drop open and reclose the contacts after the tilt sensor indicates a completed drop-open function. See Figure 138 for a flowchart of the **LMO** feature sequence.

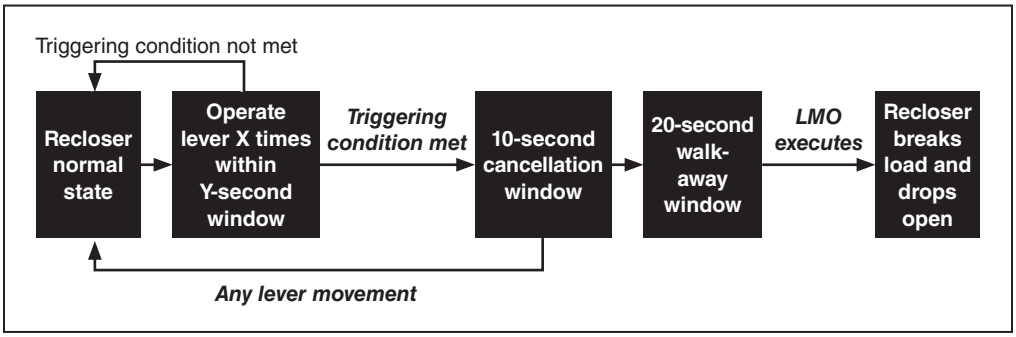


Figure 138. The LMO feature sequence.

It is important to keep in mind the following:

- When the **LMO** feature is enabled, a new LCD screen titled "LMO" will be automatically displayed under the LCD scrolling screen sequence as its first scrolling screen, with the X value shown on the left and the Y value shown on the right. This screen is not displayed when the **LMO** feature is disabled.

- The mode-selector **Operation** counter registers a single movement starting either in the **Up** or **Down** position of the lever as an operation. Moving the lever down and then back up would be counted as two operations.
- If the operation time window (Y) expires before (X) lever operations are completed, the command sequence will be terminated. The **Operation** counter will reset to zero; any additional lever operations will begin the count toward a new command sequence.
- If the TripSaver II recloser detects a fault while a user is performing the **LMO** command, the command sequence will reset before the recloser trips, and the protection sequence of the TripSaver II recloser will operate normally. The **Reclose/ Non-Reclose** function will be selected based on the operating lever position at the time the TripSaver II recloser trips. Figure 139, Figure 140, Figure 141, Figure 142 on page 104 and Figure 143 on page 104 show how the LCD screens appear.
- LMO events will be recorded in the Event log.

When the **LMO** feature is disabled, the TripSaver II recloser will not drop open, no matter how many times the MODE-SELECTOR lever is operated. However, if 10 MODE-SELECTOR lever operations are detected within a 60-second time frame when the mode is disabled and the recloser is in the vertical position, the recloser will display a screen showing "LMO XXXXX" to remind the line crew the **LMO** feature is disabled (see Figure 143 on page 104).

At the same time, to maximize system security, the recloser will consider that as a suspicious malicious attempt, and if the TripSaver II recloser is connected to remote communications, the recloser will send an unsolicited alert. This activity will also be recorded in the event log.

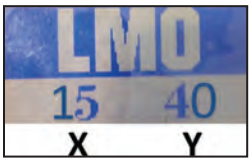


Figure 139. The LMO is enabled with the operations count and time window.

Figure 140. The prompt screen for LMO feature cancellation.

Figure 141. The confirmation screen that LMO feature is canceled.

Figure 142. The *Walk Away* screen.

Figure 143. The *Suspicious Attempt* screen.

User-Configurable Inputs

User configuration inputs for the **Local Manual Open** feature are shown in Figure 144.

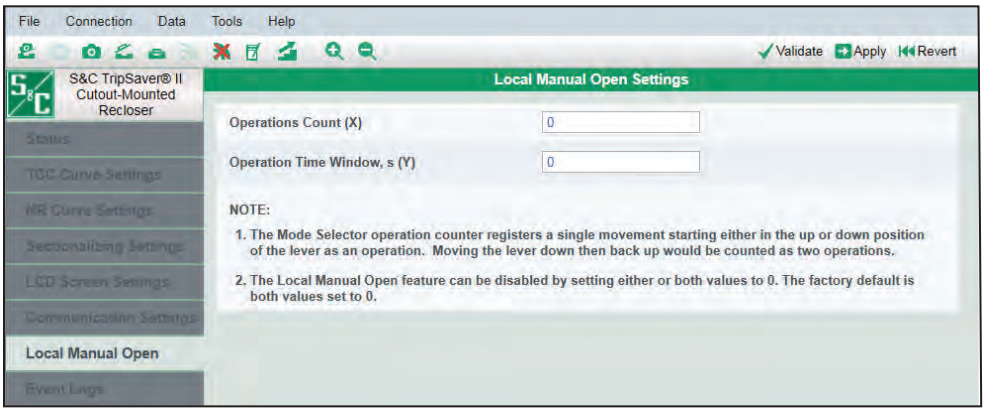


Figure 144. The *Local Manual Open Settings* screen.

Operation Count (X). Enter an integer to specify the **LMO** trigger condition. (Minimum value: 6; maximum value: 16)

Operation Time Window, s (Y). Enter an integer to specify the time window within which the **LMO** command sequence must be completed or it will expire. (Minimum value: 30 seconds; maximum value: 180 seconds; increment: 10 seconds)

Disabling LMO. "0" is accepted as a valid entry for both of these two user-configurable fields. The **LMO** function can be disabled by setting either or both values to "0." The factory default setting for the **Standalone** (offline) mode is the **Disabled** state, with both fields set to "0." All TripSaver II reclosers will leave S&C factory with the **LMO** feature disabled unless specified otherwise via S&C optional factory programming.

Communication Settings Screen

The *Communication Settings* screen is where the TripSaver II recloser's **Communication** mode and where the **Side-Magnet Radio Enabling** function are configured. See Figure 145.

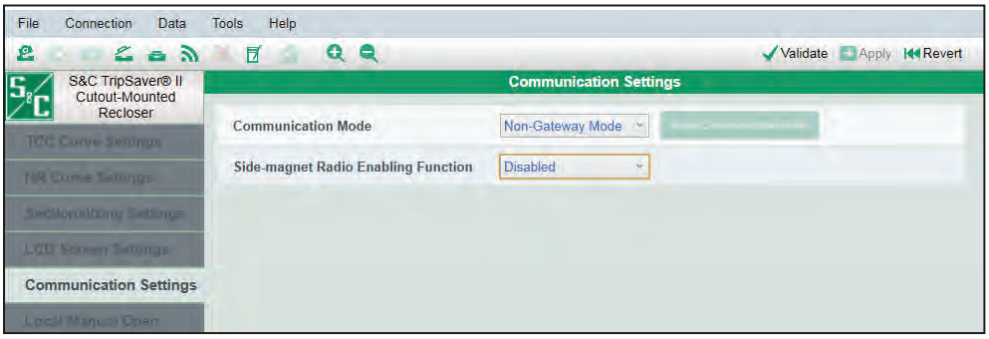


Figure 145. The *Communication Settings* screen.

Communication Mode

The **Communication** mode is used to enable or disable a TripSaver II recloser with the **Extended Open Interval** option's (option "-O") ability to communicate with a TripSaver® II Communications Gateway. When connected to a TripSaver II recloser, select the desired **Communication** mode–either the **Gateway Mode** or **Non-Gateway Mode** setting—from the drop-down menu and click the **Apply** button on the menu bar or the **Apply Communication Mode** button. See Figure 146.

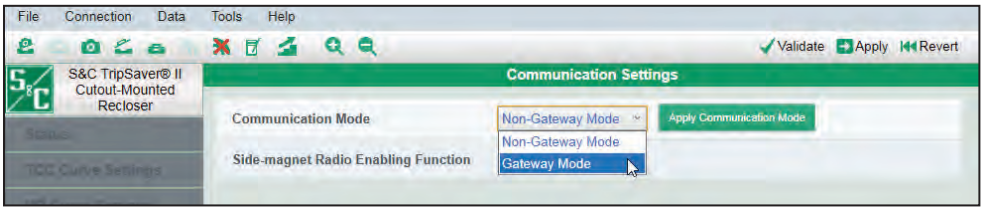


Figure 146. The Communication Mode option menu.

NOTICE

How to use the **Apply Communication Mode** button:

The **Apply Communication Mode** button has been newly added to assist in the following two situations: when changing an installed TripSaver II recloser from the **Non-Gateway Mode** to the **Gateway Mode** setting in the field, or when encountering gateway commissioning difficulties and toggling from the **Gateway Mode** to the **Non-Gateway Mode setting** and back to the **Gateway Mode** setting is required.

This button is meant to be a quick way of changing both the **Communication Mode** and the **Side-magnet Radio Enabling Function** settings. To change the communication mode and apply other settings at the same time (TCC, NR, Sectionalizing, etc.), click on the **Apply** button on the menu bar.

When the **Gateway Mode** setting is enabled, the **Side-magnet Radio Enabling Function** setting will be automatically disabled, and its menu field will become blank and grayed out.

The **Communication** mode is automatically set to the **Non-Gateway Mode** setting for the standard 5s open interval recloser, and the field is hidden because the standard 5s model is unable to communicate with a TripSaver II Communications Gateway. The **Side-magnet Radio Enabling Function** setting is still available.

When placed in the **Gateway Mode** setting, a TripSaver II recloser with the extended open interval will no longer be able to communicate directly to a PC when a side magnet is attached, and the **Side-magnet Radio Enabling Function** setting will be disabled, and the **Side-magnet Radio Enabling Function** menu will be blank and grayed out. The recloser will, however, still be able to communicate directly to a PC when the service center configuration power module or cordless power module is attached.

When the service center configuration software is in **Standalone** mode, the default **Communication Mode** setting is **Non-Gateway Mode**. When creating a setpoint file, the **Gateway Mode** setting can be saved to the setpoint file by selecting it and clicking on the **Save Setpoints** button on the menu bar. When a snapshot file from a TripSaver II recloser model with the extended open interval capability is open, the state of the associated TripSaver II recloser's communications mode will be shown.

All TripSaver II reclosers are factory-set to the **Non-Gateway Mode** setting unless specified otherwise via optional factory programming. Always select the **Non-Gateway Mode** setting on the TripSaver II recloser configuration worksheet (Form 888) and in the user-provided setpoints file when requesting factory programming for standard 5s TripSaver II reclosers.

NOTICE

When the service center configuration software is communicating with a TripSaver II recloser via the communications gateway, the **Firmware Update** function will be disabled. Firmware updates can only be done using the USB transceiver from the service center configuration kit.

Side-Magnet Radio Enabling Function

Use the drop-down list to enable or disable the **Side-magnet Radio Enabling Function** setting and click on the **Apply** button on the menu bar. See Figure 147. The **Side-magnet Radio Enabling Function** setting, which works only under the **Non-Gateway Mode** setting, is described in more detail in S&C Instruction Sheet 461-507, "*Enabling Pole-Top Communication via the TripSaver II Magnet Tool.*"

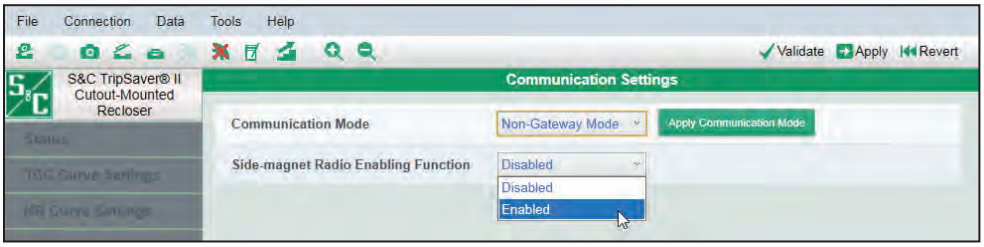


Figure 147. The Side-Magnet Radio Enabling Function option.

The default setting for the **Standalone** mode is "Enabled." All TripSaver II reclosers will leave the S&C factory with the function enabled unless optional factory programming specifies otherwise. When disabled, placing a side-magnet on the recloser will not establish communication directly between a TripSaver II recloser and a PC, even when the TripSaver II recloser is powered. The TripSaver II recloser will, however, still be able to communicate directly to a PC when removed from the pole and using the service center configuration power module or on the pole using the cordless power module.

This setting field is not available for selection and will be grayed out when the **Gateway Mode** setting under **Communication** mode is selected. When placed in the **Gateway Mode** setting, a TripSaver II recloser with the **Extended Open Interval** option is only able to communicate directly to a communications gateway and is unable to communicate directly to a PC when a side-magnet is attached. The recloser will, however, still be able to communicate directly to a PC when the service center configuration power module is attached.

R–NR Functions Screen

R-NR Reset

TripSaver II reclosers with the **Extended Open Interval** option ("-O") can communicate with the TripSaver II Communication Gateway, and the user can remotely set the recloser to **Remote Non-Reclose (R-NR)** operational mode and back to **Auto** mode when the MODE SELECTOR lever is in the **Up** position. To avoid a situation where the TripSaver II recloser is permanently stuck in the **R-NR** mode when remote communications are not available, the user can set the operational mode back to the **Auto** setting locally by using the **R-NR Reset** feature when a TripSaver II recloser is connected to the S&C TripSaver II Service Center Configuration Software. See Figure 148.

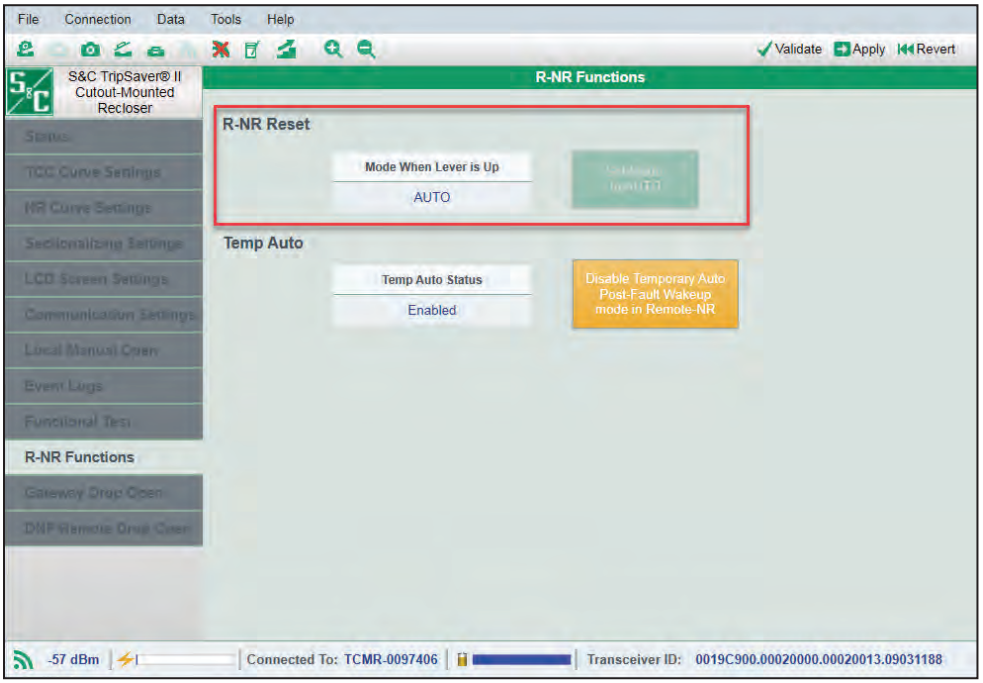


Figure 148. The *R-NR Functions* screen.

The feature will be hidden for standard 5s TripSaver II reclosers that do not have the **Extended Open Interval** option capability. The operational mode will always be in the **Auto** setting when the lever is in the **Up** position.

Mode when lever is up. This indicates the state of the operational mode when the lever is in the **Up** position. The **Reset** function is only available when this field displays "R-NR."

Set Mode to AUTO. Click on this button to set the operational mode when the lever is in the **Up** position back to the **Auto** setting from **R-NR** mode. When the mode is set to the **Auto** setting, the button will be grayed out and no longer available for clicking. **Note:** This feature does not allow users to set the recloser to **R-NR** mode from **Auto** mode locally. Also, changing the connection to **Non-Gateway** mode does not automatically reset the recloser to **Auto** mode from **R-NR** mode.

Temp Auto

A SCADA communication can place a TripSaver II recloser with the **Extended Open Interval** option ("-O") into the **Remote-Non-Reclose (R-NR)** mode when remote communications are enabled via the TripSaver II Communications Gateway. After the recloser drops open under **R-NR** mode, the recloser will operate in **Auto** mode if it is closed into its mounting with the MODE-SELECTOR lever in the **Up** position for a period of five minutes after re-energization. This is called **Temporary Auto** mode.

This **Temporary Auto** mode can be disabled by clicking on the **Disable Temporary Auto Post-Fault Wakeup mode in Remote-NR** button. With **Temporary Auto** mode disabled and the recloser in **R-NR** mode, the recloser will use the **NR Curve** settings instead. See Figure 149.

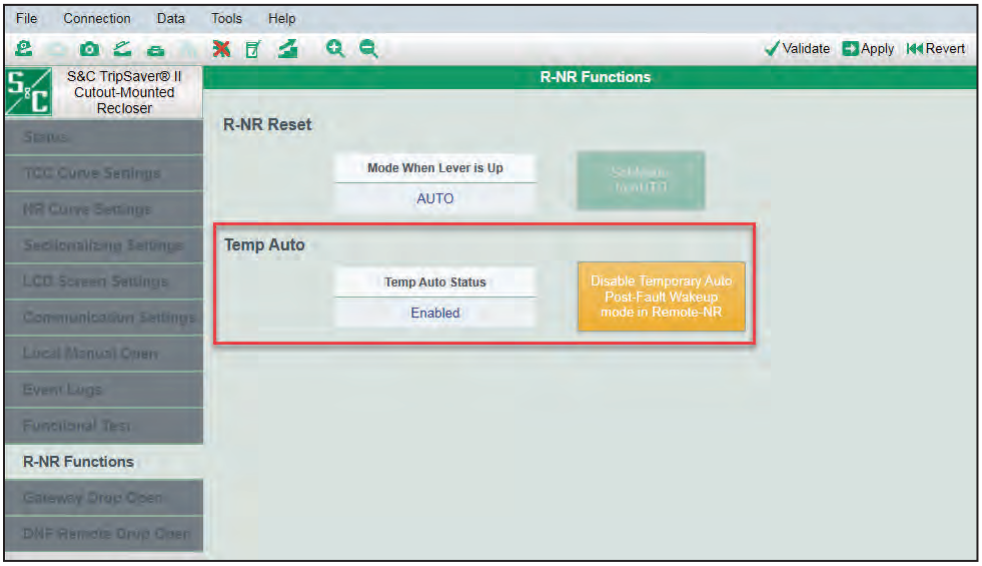


Figure 149. Enable or disable Temporary Auto mode when the recloser is in R-NR mode.

For more information, see Appendix D, "Understanding the Active TCC Curve When the TripSaver II Recloser is in R-NR Mode" on page 136.

Gateway Drop Open Screen

The *Gateway Drop Open* screen is used with the S&C TripSaver II Communications Gateway to allow the TripSaver II recloser to drop open by means of a local signal from the TripSaver II Communications Gateway. It can only be used if the TripSaver II recloser has been configured using the **Gateway Mode** setting under the *Communication Settings* screen and is communicating with a TripSaver II Communications Gateway, and if the appropriate settings for **Gateway Drop Open** mode are configured in the communications gateway. See S&C Instruction Sheet 461-509, "TripSaver® II Communications Via Gateway: *Installation*, *Operation*, *and Configuration*," for more details on configuring the TripSaver II recloser to work in **Gateway Drop Open** mode.

When the service center configuration software is connected to the TripSaver II recloser via the USB transceiver and power module, the status of the TripSaver II recloser's Gateway Drop Open configuration will appear in the *Gateway Drop Open Settings* screen when the software is in the **Connected** mode. See Figure 150.

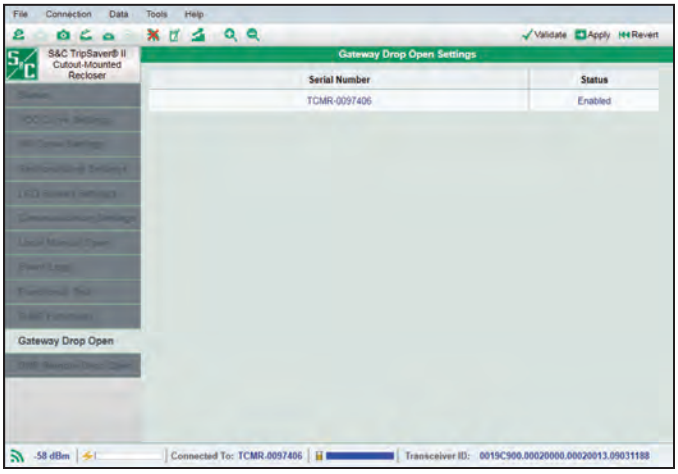


Figure 150. The *Gateway Drop Open Settings* screen, when connected via USB transceiver.

When connected to the service center configuration software via the communications gateway instead of the USB transceiver and power module, **Disable** and **Enable** buttons will be visible. The **Gateway Drop Open** feature can be enabled or disabled using these buttons. See Figure 151.

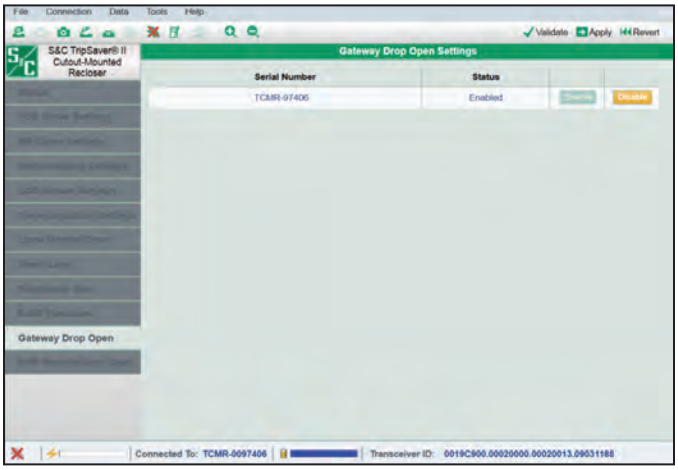


Figure 151. The *Gateway Drop Open Settings* screen, when connected via communications gateway.

Note: Disabling or enabling the **Gateway Drop Open** feature in the service center configuration software's *Gateway Drop Open Settings* screen will disable or enable the recloser's **Gateway Drop Open** mode in the communications gateway. See S&C Instruction Sheet 461-509, "TripSaver® II Communications Via Gateway: *Installation*, *Operation*, *and Configuration*," for more information.

DNP Remote Drop Open Screen

The **Remote Drop Open** feature is only available for TripSaver II reclosers supplied with the **Extended Open Interval** option ("-O") and firmware versions 1.8 and later and for reclosers that have also been ordered with the **Remote Drop Open** option ("-D") factory-enabled.

The TripSaver II recloser must be properly paired with a TripSaver II Communications Gateway, and it must be properly configured to accept a **Drop Open** command in response to a DNP3 command received via the connected SCADA transceiver. **Note**: The *DNP Remote Drop Open* screen is also used when the communications gateway has been set to use the IEC104 protocol. For detailed instructions for proper configuration of the **Remote Drop Open** feature in the TripSaver II recloser and the communication gateway, see S&C Instruction Sheet 461-509, "TripSaver® II Communications via Gateway: *Installation*, *Operation*, *and Configuration*."

When Connected to the Service Center Configuration Software via the USB Transceiver

When the TripSaver II Service Center Configuration Software is connected to the TripSaver II recloser via the USB transceiver and power module, the status of the TripSaver II recloser's Remote Drop Open configuration will appear in the *DNP Remote Drop Open* screen when the software is in **Connected** mode. See Figure 152.

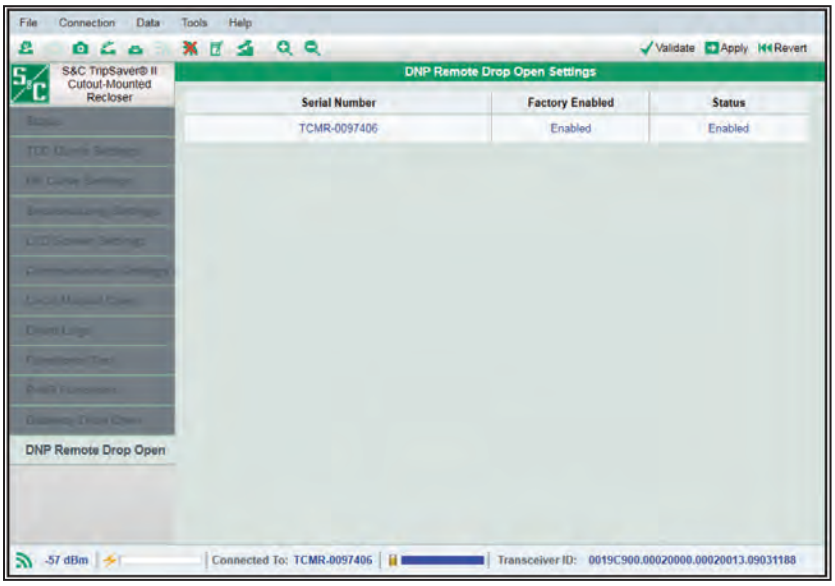


Figure 152. The *DNP Remote Drop Open* screen, when connected via the USB transceiver.

When Connected to the Service Center Configuration Software via the Communication Gateway

When connected to the TripSaver II Service Center Configuration Software via the TripSaver II Communications Gateway instead of the USB transceiver, the **Disable** and **Enable** buttons will be visible. The **DNP Remote Drop Open** feature can be enabled or disabled using these buttons. See Figure 153.

Note: Disabling or enabling the **DNP Remote Drop Open** feature from the service center configuration software's *DNP Remote Drop Open* screen will disable or enable **DNP Remote Drop Open** mode in the communication gateway. See S&C Instruction Sheet 461-509, "TripSaver® II Communications via Gateway: *Installation, Operation, and Configuration*," for more information about configuring this feature.

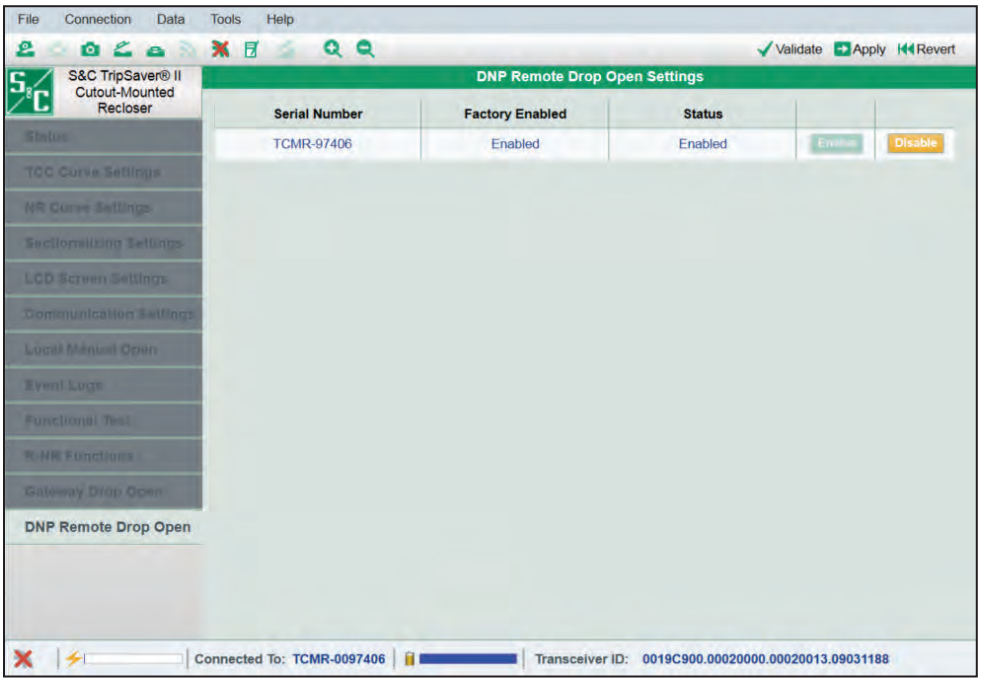


Figure 153. The *DNP Remote Drop Open* screen, when connected via the communication gateway.

Optimizing Signal Strength

Having a low signal strength between the TripSaver II recloser and the USB transceiver can cause delays in updating settings and extended firmware update times. If experiencing low signal quality when connected to a TripSaver II recloser using the USB transceiver and the service center configuration software, move the powered TripSaver II recloser between one to 4 inches (25 to 102 mm) away from the USB transceiver, with the recloser facing down and the trunnion pointing up and with the LCD screen toward the USB transceiver at an approximate 45° angle. See Figure 154.

Figure 154. Placement of the TripSaver II recloser in relation to the USB transceiver.

Service center configuration software version 2.1x in combination with the USB transceiver with enhanced antenna (part number FDA-1868R2) significantly improves signal strength

Note: For more information on signal quality and the signal strength indicator, see the "Additional Information Bar" section on page 20.

Understanding the LED Indicators on the USB Transceiver

Table 3 details the USB transceiver's LED indicators and their meaning. See Figure 155.

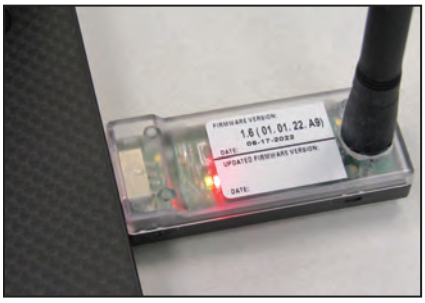


Figure 155. LED indicators on the USB Transceiver.

Table 3. USB Transceiver LED Indicators

LED Indicators	Condition
Green (constant)	Power is On.
Red (fast-blinking)	The USB transceiver is transmitting data. Fast-blinking during the connecting stage indicates the connection is successful and about to complete.
Red (slow-blinking)	The USB transceiver is attempting to connect to a TripSaver II recloser.
Red (Constant)	USB transceiver is in the **Error** state. If the red LED is on constantly, the USB transceiver should be reset. (See the "If Connection Process Displays a Timeout Message" section on page 114 for directions on how to reset the USB transceiver.)

If Connection Process Displays a Timeout Message

When attempting to connect a TripSaver II recloser using the service center configuration software, the connection process will timeout if it is unable to create or maintain a wireless connection. See Figure 156. This is generally caused by low signal strength, which can be a result of distance, orientation of the product, interference from other signal sources, or a combination of these. A USB transceiver is available with an enhanced external antenna to improve signal strength.

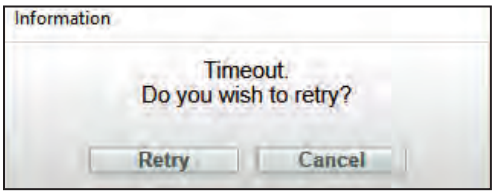


Figure 156. Timeout message.

STEP 1. Remove sources of interference. Wi-Fi and Bluetooth operate in the same 2.4-GHz frequency band as the USB transceiver. Before clicking on the **Retry** button, disable the computer's Wi-Fi and Bluetooth adapters. If possible, disable nearby Wi-Fi and Bluetooth devices. If Wi-Fi is required for the laptop, if possible, disable the 2.4-GHz band and use a 5-GHz connection.

Keep any powered TripSaver II reclosers not being configured at least 30 feet (914 cm) away from the TripSaver II recloser being configured, or power off any TripSaver II reclosers not being configured. Also power off any TripSaver II Communications Gateways near the TripSaver II recloser.

STEP 2. Optimize the TripSaver II recloser's placement. Make sure the TripSaver II recloser is positioned as described in the "Optimizing Signal Strength" section on page 113.

STEP 3. Reattempt connecting to the TripSaver II recloser. If the Timeout message (see Figure 156) persists or an Object Error message (see Figure 157) appears, (this may be noticeable more often when connection to consecutive TripSaver II reclosers using the same computer), reset the USB transceiver.

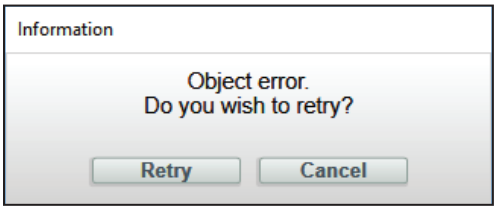


Figure 157. Object error message.

STEP 4. Reset the USB transceiver.

(a) Click on the **Cancel** button when the error message displays.

(b) Unplug the USB transceiver. Disconnect the power module from the TripSaver II recloser being configured and wait 15 seconds for it to completely power down.

(c) Close the service center configuration software.

(d) Plug back in the USB transceiver.

(e) Restart the service center configuration software.

(f) Re-connect the power module to the TripSaver II recloser to be configured.

(g) Re-establish communications with the TripSaver II recloser using the configuration software.

If still having connection problems, contact the S&C Global Support and Monitoring Center at 1-888-762-1100.

Clearing the Service Now LCD Screen

The SERVICE NOW LCD screen can appear because of these circumstances:

- When a TripSaver II recloser is blocked from swinging to the **Drop Open** position for five consecutive attempts, when commanded to drop open either by a **Fault** operation, a **Gang** operation, a **Local-Manual Open** (LMO) operation, or a **Remote** operation (This condition might occur when the recloser is iced into the cutout mounting or otherwise held in the cutout mounting when attempting to drop open.)
- When a functional test of the TripSaver II recloser is performed with the trunnion facing down or to the side for five consecutive drop-open attempts (**Note**: The only acceptable position for the recloser to be in during a functional test is with the trunnion pointing up. These orientation issues will not affect TripSaver II reclosers with firmware version 1.8 or later.)
- When test current is applied to the recloser terminals simulating a permanent fault for five consecutive drop-open attempts (**Note:** The only proper bench-testing orientation for the TripSaver II recloser is with the trunnion pointing up. These orientation issues will not affect TripSaver II reclosers with firmware version 1.8 or later.)
- When the vacuum interrupter contact wear is at 0%

When a TripSaver II recloser enters the **Service Now** state, the LCD screen will be locked with a special *Service Now* screen. The right side of the screen will display the vacuum interrupter status (“O” for open, “I” for closed, and “X” for an error situation when the recloser cannot sense the vacuum interrupter status). The left side of the screen will display an “!” symbol, indicating immediate attention is needed. Rotating the MODE SELECTOR lever, applying a 9-Volt lithium L522 battery, or applying the power module will not unlock the state.

To clear the *SERVICE NOW* LCD screen because of five consecutive improper orientation drop open attempts, follow these steps:

STEP 1. Connect to the TripSaver II recloser using the service center configuration software. Instructions for connecting to the software are explained in the "Connect to Device" section on page 29.

STEP 2. Confirm the TripSaver II recloser is in the **Service Now** state by checking the *Status* screen. Then, check the **Remaining Contact Wear** field. If the remaining contact wear is 0%, the TripSaver II Cutout-Mounted Recloser should be taken out of service. If it is greater than 0%, continue with Step 3. See Figure 158.

STEP 3. Create a snapshot file by clicking on the **Save Snapshot** icon. See Figure 158. Contact S&C through the Global Support and Monitoring Center at 1-888-762-1100. The support technician will request the snapshot file via email.

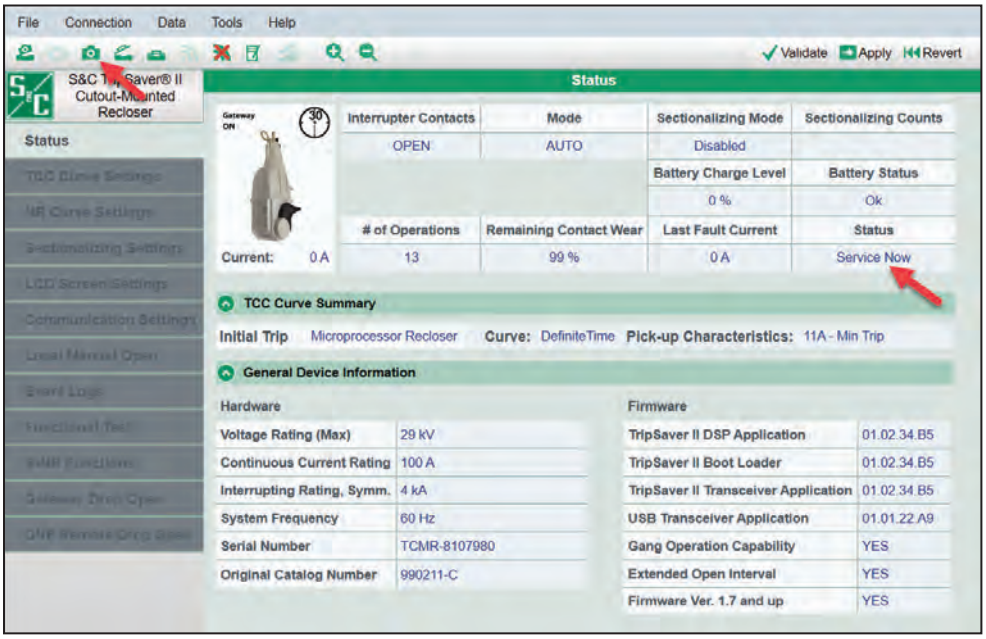


Figure 158. The *Status* screen showing the Service Now status and the location of the Save Snapshot icon.

STEP 4. S&C will return the repair ATXReset.xml file. Place the repair file in the default Log File Directory. To find the default Log File Directory, select "Tools>Options" on the **Main** menu. See Figure 159 and Figure 160.

Note: If clearing the **Service Now** status on multiple TripSaver II reclosers, it is important not to mix up repair files. Each repair file is only good for the snapshot file it was made from. S&C recommends clearing the **Service Now** status from affected reclosers one at a time, deleting the repair file after each successful attempt. The repair file "ATXReset.xml" is good for 24 hours. S&C recommends completing the **Clear "Service Now"** process as soon as the repair file is received. If the file expires, contact the Global Support and Monitoring Center for a new one.

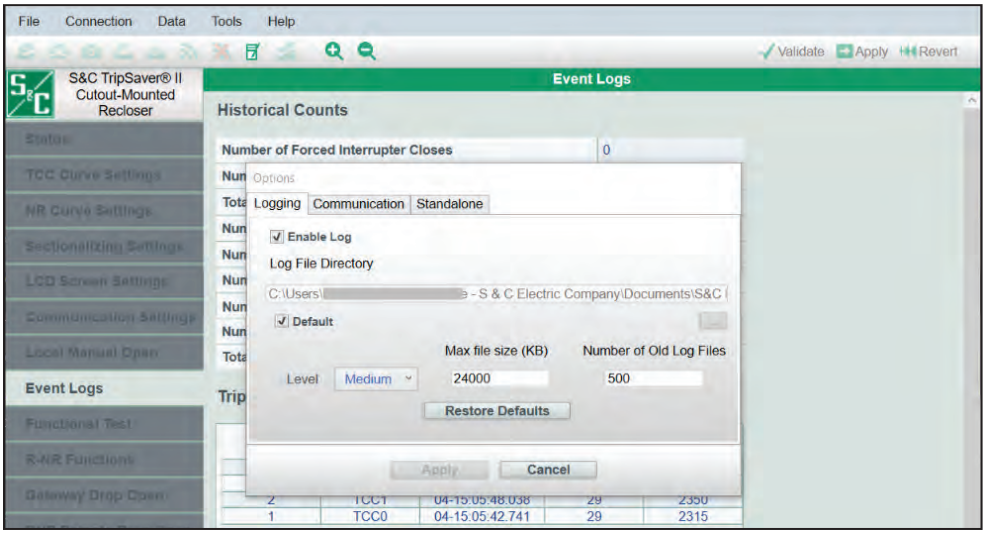


Figure 159. The default Log File Directory.

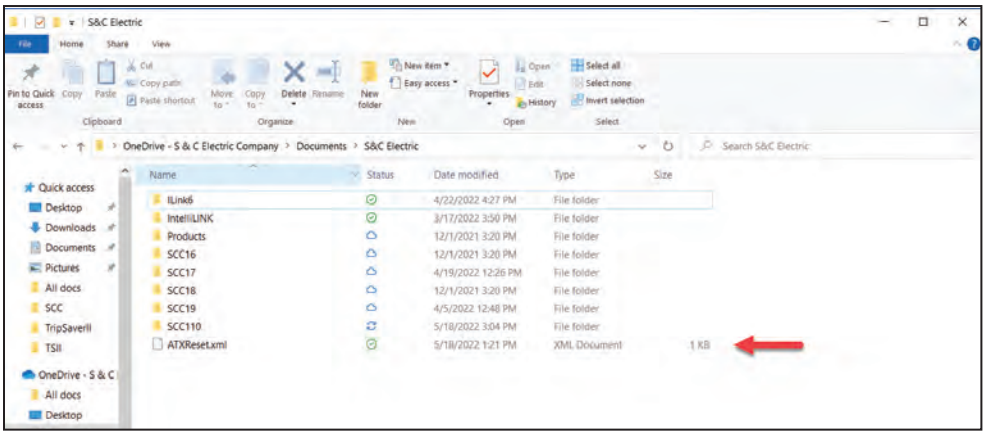


Figure 160. The location of the repair file will be the default Log File Directory.

STEP 5. From the **Tools** menu, click on the **Clear 'Service Now'** menu item. See Figure 161.

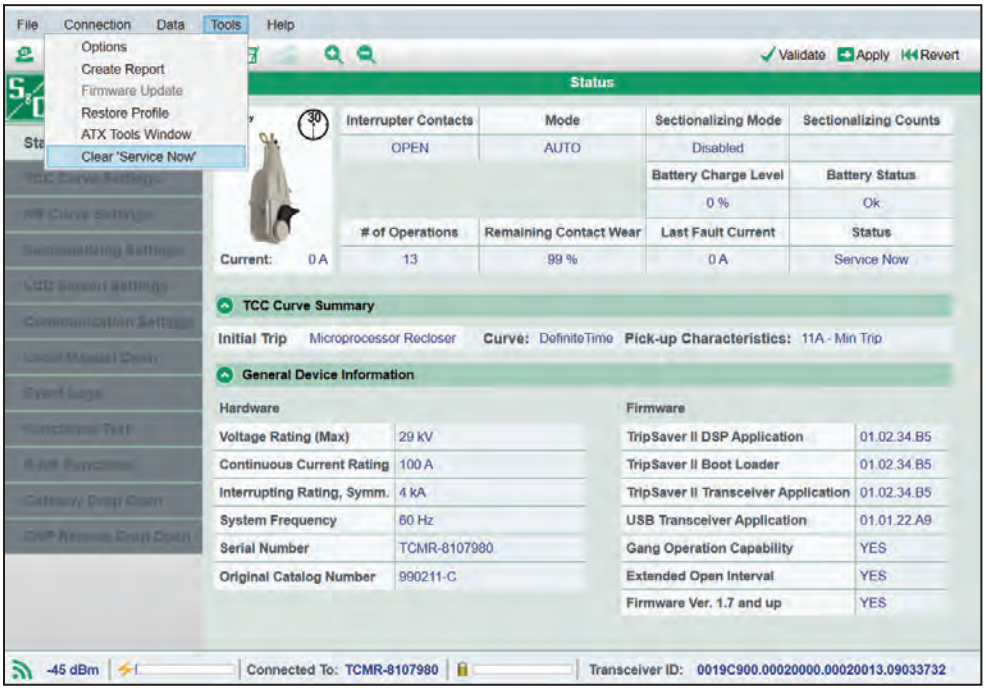


Figure 161. The Clear Service Now menu item on the Tools menu.

STEP 6. The Clear Service Now dialog box will appear with the following message:

"Before proceeding with the **Service Now Reset** procedure, the TripSaver II Cutout-Mounted Recloser must be placed on a workbench in the horizontal position with the trunnion pointing up." See Figure 162.

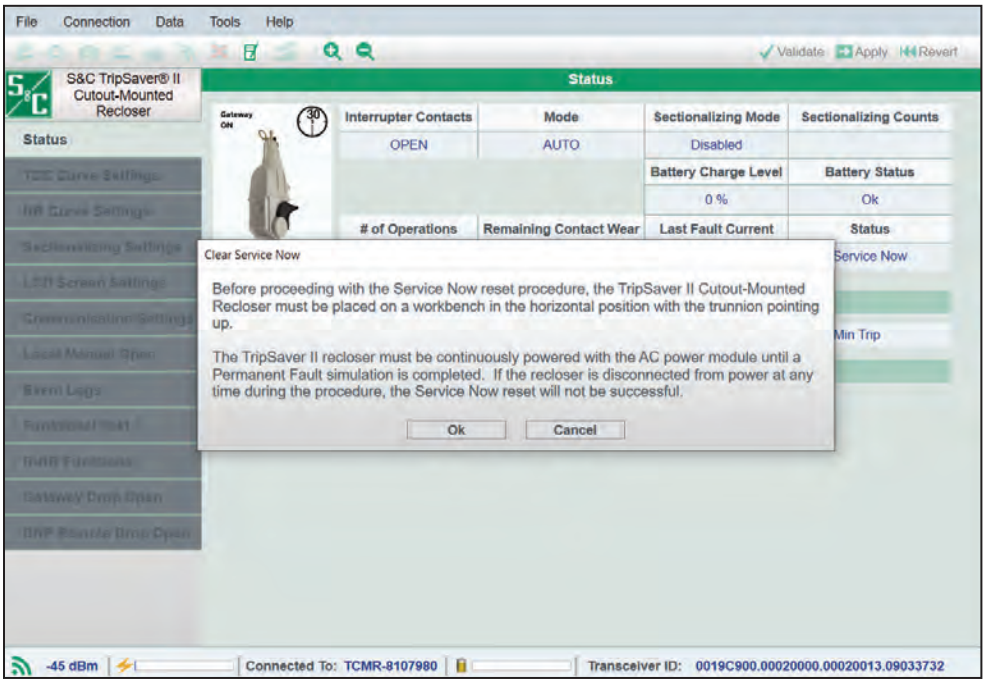


Figure 162. The Clear Service Now dialog box.

"The TripSaver II recloser must be continuously powered with the ac power module until a Permanent Fault simulation is completed. If the recloser is disconnected from power at any time during the procedure, the **Service Now Reset** procedure will not be successful."

After confirming the TripSaver II recloser is in the horizontal position with the trunnion pointing up, and it is powered with the ac adapter, click on the **Ok** button.

STEP 7. The Clear Service Now–Final Step dialog box will appear. See Figure 163. Click on the **Ok** button.

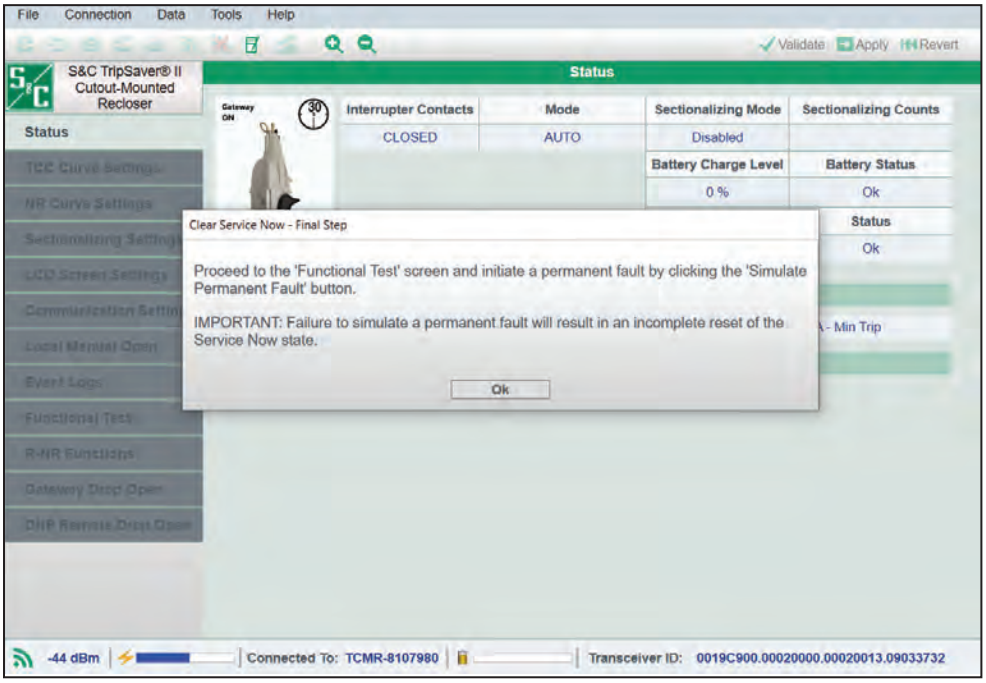


Figure 163. The Clear Service Now—Final Step dialog box.

If the TripSaver II recloser is at 0% contact wear: A dialog box will appear explaining the **Service Now** state cannot be cleared.

"This Recloser cannot be repaired and must not be reused. This ends the **Clear Service Now** process for this recloser."

If the TripSaver II recloser is not at 0% contact wear: A dialog box will appear advising the user to proceed to the *Functional Test* screen. Go to the *Functional Test* screen and click on the **Simulate Permanent Fault** button.

The TripSaver II recloser will go through the permanent fault simulation, and a loud click will sound when it has completed. Pull up on the trunnion after the test has completed to reset the drop-open mechanism.

Go to the **Connection** menu and click on the **Disconnect** menu item. Disconnect power to the TripSaver II recloser by removing the power module. Then, reconnect power to the TripSaver II recloser by replacing the power module and reconnect to it using the method described in "Connect to Device" section on page 29.

STEP 8. Navigate to the *Status* screen and check the status of the TripSaver II recloser. If the Status is **OK**, the **Service Now** status has been cleared. See Figure 164. Then, delete the ATXReset.xml file from the default log file directory. See Figure 160 on page 117. If the **Service Now** status is still present, contact the S&C Global Support and Monitoring Center at 1-888-762-1100.

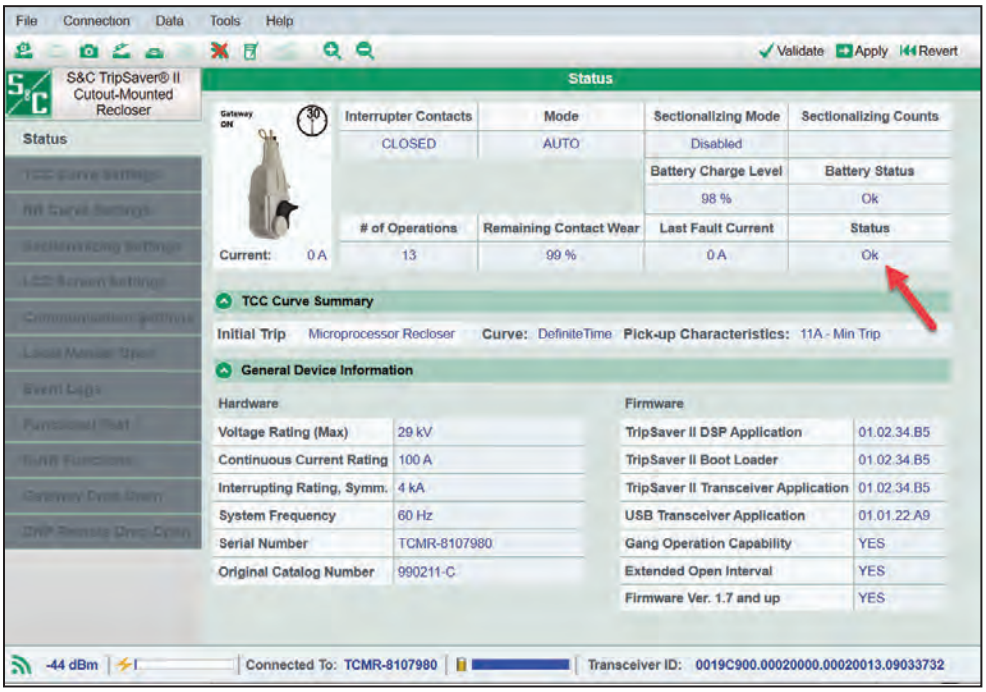


Figure 164. The *Status* screen after a successful Clear Service Now reset procedure.

Restoring Profile If Lost During a Firmware Update

TripSaver II reclosers that have experienced connection issues during a firmware update may lose their profile data. This can include serial number information, catalog number information, all programmed settings, and an incorrect continuous current rating. This condition can occur when:

- Signal interference is encountered during a firmware update
- Power to the TripSaver II Cutout-Mounted Recloser is lost during the firmware update

S&C strongly recommends only doing a firmware update with the TripSaver II recloser removed from the pole, on a workbench, and with the corded power module providing power to the TripSaver II recloser. Never use the cordless power module during a firmware update. S&C also recommends performing firmware updates in an area free from signal interference. See the "Optimizing Signal Strength" section on page 113 for more information.

An example *Status* screen of a profile before and after data loss is shown in Figure 165 and Figure 166 on page 123.

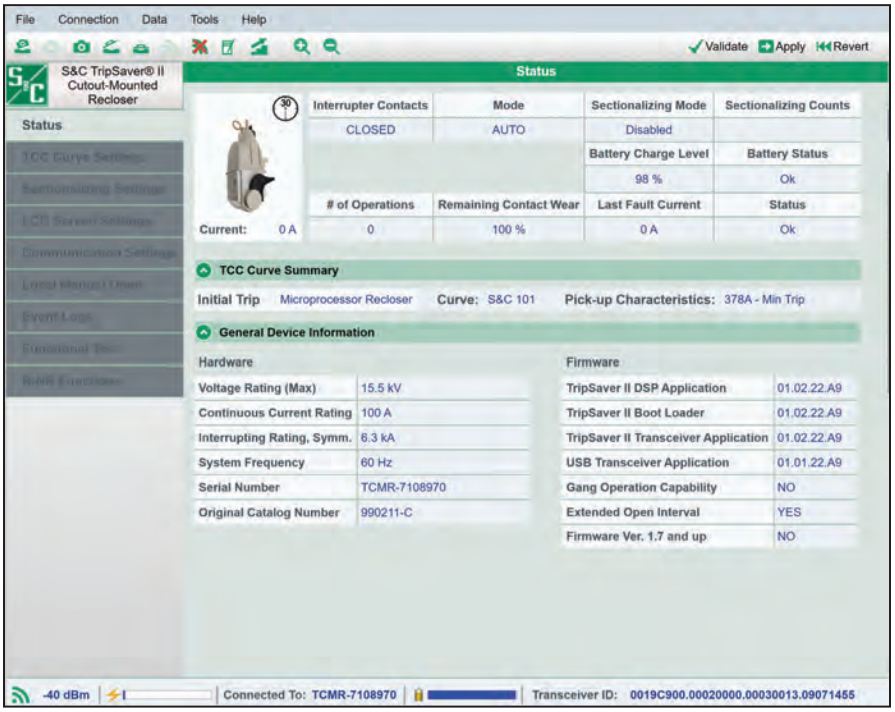


Figure 165. A TripSaver II recloser profile before a firmware update.

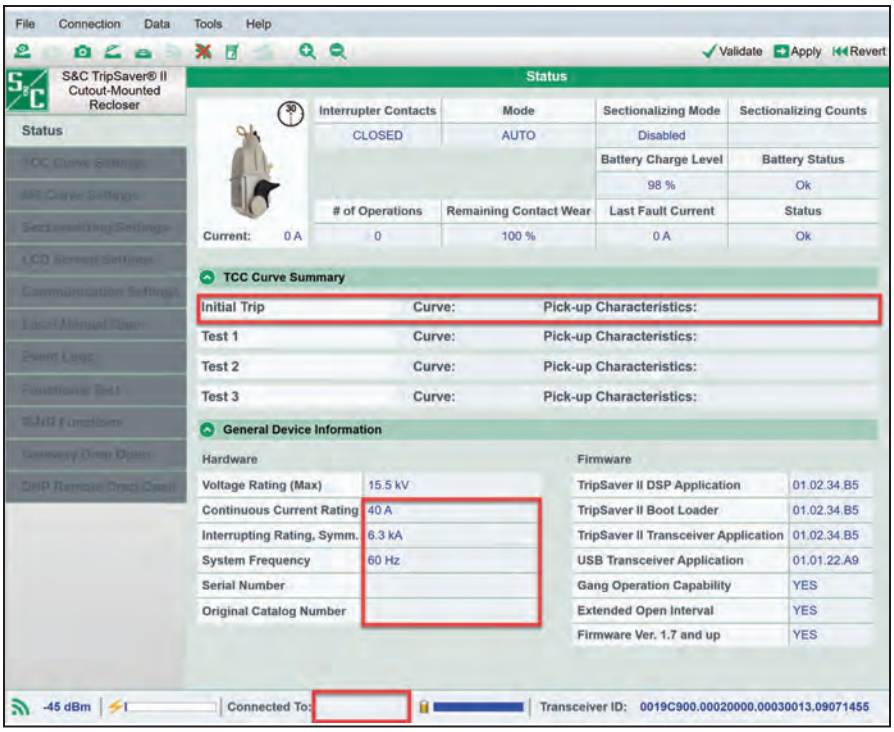


Figure 166. A TripSaver II recloser profile after profile data has been lost. Lost settings are noted within the red boxes.

If profile data are lost during a firmware update, the information can be recovered from the snapshot file the service center configuration software creates before the firmware update. To restore profile data, follow these steps:

STEP 1. Download and install SCC 2.1 software on the laptop.

STEP 2. Launch SCC 2.1 software and connect to the TripSaver II recloser.

STEP 3. Navigate to **Tools>Restore** menu item. See Figure 167.

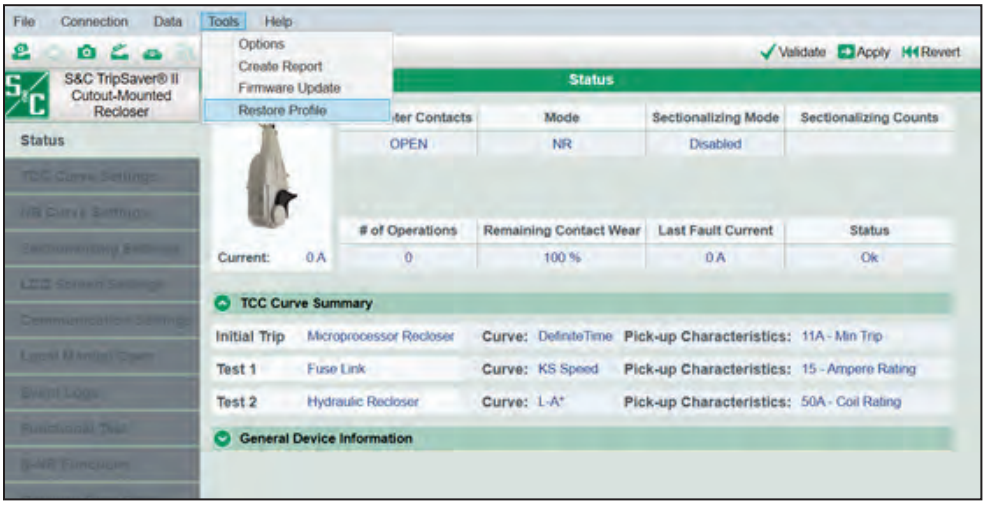


Figure 167. The Restore Profile menu item in the Tools menu.

STEP 4. When prompted, navigate to the snapshot (.xdss) file in the Documents>S&C Electric>Products>TripSaver II folder and choose the most recent snapshot file having the TCMR number matching the TripSaver II recloser being restored. See Figure 168.

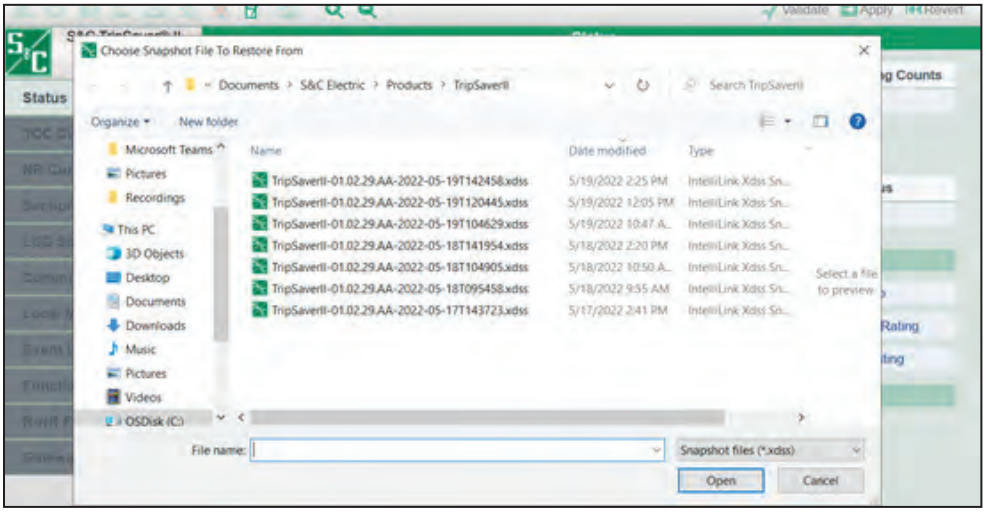


Figure 168. Snapshot files in the *Documents>S&C Electric>Products>TripSaver II* folder.

Note: If the firmware update was done with service center configuration software version 1.9 or earlier, S&C recommends opening the snapshot (.xdss) file in Microsoft Notepad to determine whether the TCMR number in the snapshot file matches the TCMR etched on the TripSaver II recloser being restored. (The serial number for the TripSaver II recloser (TCMR-) is etched on the recloser housing.) It is important not to alter the snapshot file when opened because doing so may have an adverse impact on the restoration process. See Figure 169.

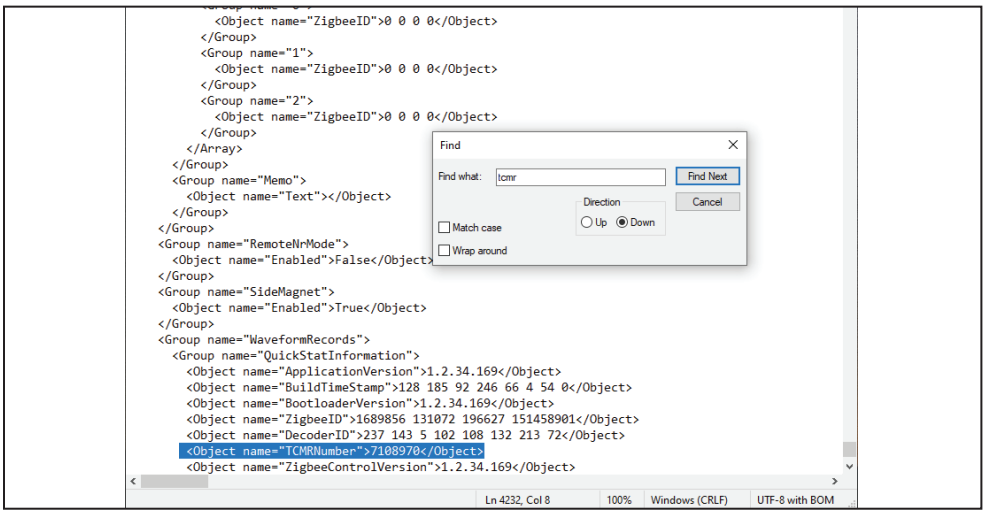


Figure 169. The Snapshot file opened with Notepad.

If your company uses OneDrive, the location will follow the format:

C:\Users\<USER>\OneDrive – (users company name)\Documents\S&C Electric\Products\TripSaverII file path.

To check the snapshot file using Notepad: Navigate to the *Documents>S&C Electric>Products>TripSaver II* folder. If several TripSaver II reclosers have been updated, more than one snapshot file could be in this folder. Open the snapshot file using Microsoft Notepad. From the **Edit** menu, select the **Find** menu item and search for "TCMR." Match this to the TripSaver II recloser to which the profile data is to be restored. See Figure 169 on page 124. Close the snapshot file without saving any changes.

STEP 5. After selecting the snapshot file, the Restoring Profile dialog box will open. Click on the **OK** button. A "Success" message will appear when the profile restoration is complete. See Figure 170.

Note: If the correct snapshot file cannot be found, have whoever tried to perform the firmware upgrade log in to the laptop with their credentials. The snapshot file may not be showing up in the file directory under the user's profile credentials. It instead could the person who was logged in to the computer.

Figure 170. The Restoring Profile dialog box.

STEP 6. Check the *Status* screen to make sure the profile information has been successfully restored. See Figure 171.

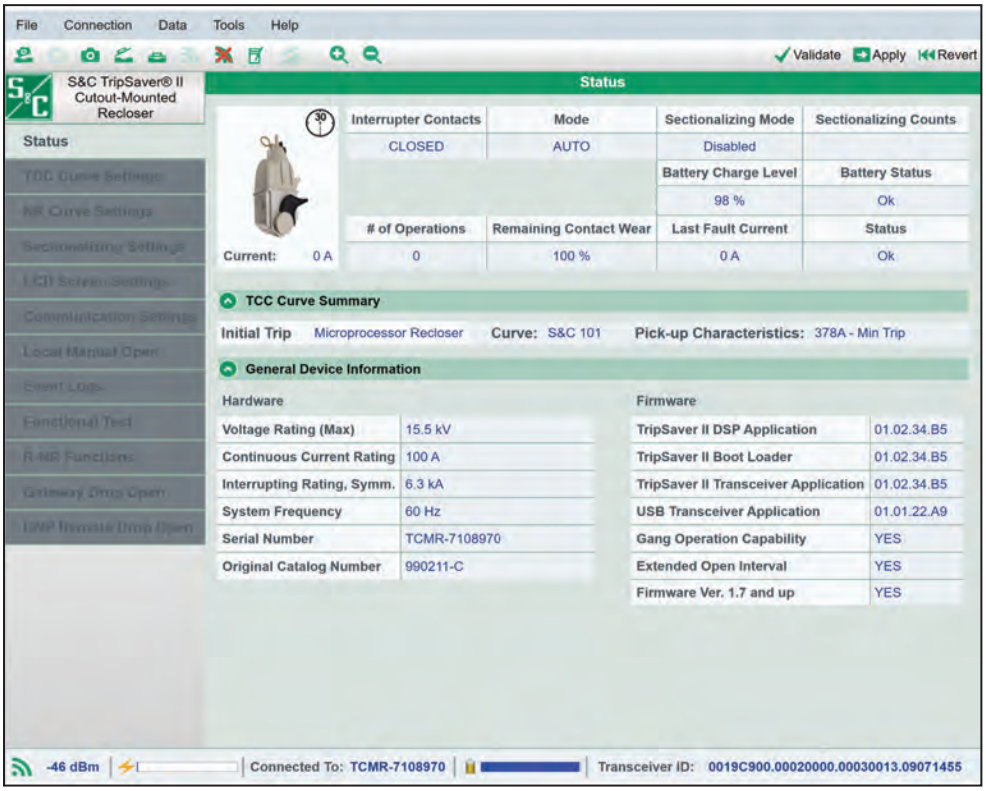


Figure 171. The *Status* screen after a successful profile restoration.

List of Available Curves

Table 4. Cooper

Cooper Microprocessor Form 4,5,6, FX	
Inverse Segment	**Definition**
S&C 101	Cooper 101
S&C 102	Cooper 102
S&C 103	Cooper 103
S&C 104	Cooper 104
S&C 105	Cooper 105
S&C 106	Cooper 106
S&C 107	Cooper 107
S&C 111	Cooper 111
S&C 112	Cooper 112
S&C 113	Cooper 113
S&C 115	Cooper 115
S&C 116	Cooper 116
S&C 117	Cooper 117
S&C 118	Cooper 118
S&C 119	Cooper 119
S&C 120	Cooper 120
S&C 132	Cooper 132
S&C 133	Cooper 133
S&C 134	Cooper 134
S&C 135	Cooper 135
S&C 137	Cooper 137
S&C 138	Cooper 138
S&C 142	Cooper 142
S&C 151	Cooper 151
S&C 161	Cooper 161
S&C 162	Cooper 162
S&C 163	Cooper 163
S&C 165	Cooper 165
S&C 201	Cooper 201
S&C 202	Cooper 202

Table 5. SEL

SEL 351R/651R Recloser Control	
Inverse Segment	**Definition**
SEL U1	SEL U1 Moderately Inverse
SEL U2	SEL U2 Inverse
SEL U3	SEL U3 Very Inverse
SEL U4	SEL U4 Extremely Inverse
SEL U5	SEL U5 Short-Time Inverse
SEL C1	SEL C1 Standard Inverse
SEL C2	SEL C2 Very Inverse
SEL C3	SEL C3 Extremely Inverse
SEL C4	SEL C4 Long-Time Inverse
SEL C5	SEL C5 Short-Time Inverse

Table 6. ABB

ABB DPU 2000R Recloser Control	
Inverse Segment	**Definition**
ABB INV	ABB Inverse
ABB VI	ABB Very Inverse
ABB EI	ABB Extremely Inverse
ABB STI	ABB Short-Time Inverse
ABB STEI	ABB Short-Time Extremely Inverse

Table 7. IEC

IEC Standard Curve	
Inverse Segment	**Definition**
IEC SI	IEC Standard Inverse
IEC VI	IEC Very Inverse
IEC EI	IEC Extremely Inverse

Table 8. IEEE

IEEE Standard Curve	
Inverse Segment	**Definition**
IEEE EI	IEEE Extremely Inverse
IEEE MI	IEEE Moderately Inverse
IEEE VI	IEEE Very Inverse

LIST OF CURVES CONTINUED ►

Table 9. Fuse Link

Ampere Rating							
K-Speed	T-Speed	QA/QR	KS	NE (N-Speed McGraw- Edison)	NK (N-Speed Kearney)	ST①	CO②
6K	6T	3QR	10KS	5NE	5NK	5ST	**101CO**
8K	8T	5QR	15KS	8NE	7NK	7ST	**102CO**
10K	10T	7QR	20KS	10NE	10NK	10ST	**103CO**
12K	12T	8QR	25KS	15NE	15NK	15ST	
15K	15T	10QR	30KS	20NE	20NK	20ST	
20K	20T	15QR	40KS	25NE	25NK	25ST	
25K	25T	20QR	50KS	30NE	30NK	30ST	
30K	30T	25QR	65KS	40NE	40NK	40ST	
40K	40T	30QR	80KS	50NE	50NK	50ST	
50K	50T	40QR	100KS	60NE	65NK	65ST	
65K	65T	50QR	125KS	75NE	80NK	80ST	
80K	80T	60QR	150KS	85NE	100NK	100ST	
100K	100T	75QR	200KS	100NE	125NK	125ST	
140K	140T	100QR		125NE	150NK	150ST	
200K	200T	125QR		150NE	175NK	200ST	
		150QR		200NE	200NK		
		175QR					
		200QR					

① ST curves are S&C Standard Fuse emulation curves.

② CO curves are S&C Coordinating Fuse emulation curves.

LIST OF CURVES CONTINUED ►

Table 10. Hydraulic Recloser

Type	Inverse Segment	Definition	Coil Rating
Type 4H, V4H	(V)4H-A●	Type 4H or Type V4H, A curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
	(V)4H-B	Type 4H or Type V4H, B curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
	(V)4H-C	Type 4H or Type V4H, C curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
Type H	H-A●	Type H, A curve	5A, 10A, 15A, 25A, 35A, 50A
	H-B	Type H, B curve	5A, 10A, 15A, 25A, 35A, 50A
	H-C	Type H, C curve	5A, 10A, 15A, 25A, 35A, 50A
Type L	L-A●	Type L, A curve	25A, 35A, 50A, 70A, 100A, 140A, 200A
	L-B	Type L, B curve	25A, 35A, 50A, 70A, 100A, 140A, 200A
	L-C	Type L, C curve	25A, 35A, 50A, 70A, 100A, 140A, 200A
	L-D	Type L, D curve	25A, 35A, 50A, 70A, 100A, 140A, 200A
Type V4L, V4E	V4L(E)-A●	Type V4L or Type V4E, A curve	15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
	V4L(E)-B	Type V4L or Type V4E, B curve	15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
	V4L(E)-C	Type V4L or Type V4E, C curve	15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
	V4L(E)-D	Type V4L or Type V4E, D curve	15A, 25A, 35A, 50A, 70A, 100A, 140A, 200A
Type E	E-A●	Type E, A curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A
	E-B	Type E, B curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A
	E-C	Type E, C curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A
	E-D	Type E, D curve	5A, 10A, 15A, 25A, 35A, 50A, 70A, 100A
Type 4E	4E-A●	Type 4E, A curve	50A, 70A, 100A, 140A, 200A
	4E-B	Type 4E, B curve	50A, 70A, 100A, 140A, 200A
	4E-C	Type 4E, C curve	50A, 70A, 100A, 140A, 200A
	4E-D	Type 4E, D curve	50A, 70A, 100A, 140A, 200A
Type DV	DV-A●	Type DV, A curve	100 A, 140 A
	DV-B	Type DV, B curve	100 A, 140 A
	DV-C	Type DV, C curve	100 A, 140 A
	DV-D	Type DV, D curve	100 A, 140 A
	DV-E	Type DV, E curve	100 A, 140 A

● Curves are available that emulate both the Maximum Clearing Time and the Average Clearing Time.

Normal Operation LCD States

The LCD states listed in Table 11 are the normal operation of a TripSaver II recloser. TripSaver II reclosers can be programmed to display user-configured LCD states in sequence by toggling the LMO lever or by powering up.

Table 11. Normal Operation Screens

Screen	Name	Description
 ●	*Primary Normal* screen	For standard TripSaver II reclosers, four operating parameters are displayed: Vacuum interrupter status (**Open** or **Closed**), Mode selector status (**Auto** or **NR**).
—	*Hold Previous* screen	The previous screen selected in the sequence is displayed for an additional period of time as defined by each **Display Screen Duration** setpoint.
 ●	*Blue* screen	A blue screen is displayed.
 ●	*Alternate Normal* screen (*Secondary Normal* screen) vacuum interrupter in an **Open** state	The vacuum interrupter is in an **Open** state.
 ●	*Alternate Normal* screen (*Secondary Normal* screen) vacuum interrupter in a **Closed** state	The vacuum interrupter is in a **Closed** state.
 ●	*Alternate Normal* screen (*Secondary Normal* screen) vacuum interrupter is in an unknown state	This is an unknown vacuum interrupter state.
 ●	**Mode Selector Lever** status	The mode of operation–either **Auto**, **NR**, or **R-NR**–is displayed.
 ●	Remaining contact wear, in %	The remaining vacuum interrupter contact wear, in percent, is displayed.

● LCD states that can be programmed to display when a TripSaver II recloser is in its **Dropped-Open** state. Only one state can be selected in the service center configurator software.

TABLE CONTINUED ▶

Table 11. Normal Operation Screens—Continued

Screen	Name	Description
 ●	Load current	The load current, in primary amperes, is displayed.
 ●	Number of **Open** operations	The total number of vacuum interrupter **Open** operations is displayed.
 ●	Last fault magnitude	The fundamental-frequency magnitude of the last fault current, in primary amperes as measured just before the vacuum interrupter opens, is displayed. The fault-current unit is amperes for faults smaller than 1000 A and kiloamps with two decimals for faults greater than or equal to 1000 A. This was done because of the limited horizontal space on the LCD screen.
 ●	**Vacuum Interrupter** status	The **Open** or **Closed** status of the vacuum interrupter is displayed.
 ●	The *LCD Temperature* screen.	The TripSaver II recloser temperature is shown, in degrees Celsius.
 ●	Interrupting rating	The interrupter rating of the recloser, in kA, is displayed.
 ●	Max-rated voltage	The rated maximum voltage of the recloser; either 15.5 kV or 29 kV is displayed.
 ●	System frequency	The frequency of the electrical system the TripSaver II recloser is configured for, in Hz, is displayed.

● LCD states that can be programmed to display when a TripSaver II recloser is in its **Dropped-Open** state. Only one state can be selected in the service center configurator software.

TABLE CONTINUED ▶

Table 11. Normal Operation Screens—Continued

Screen	Name	Description
 ●	Software versions	Three pieces of information about software version are displayed: Application, Bootloader, and Radio Frequency Microcontroller Unit.
 ■	Transceiver ID	This is the communication ID. Displayed when the mode selector is rotated.
 ●	TCC #0 (initial trip)	The short name for the initial trip curve is displayed.
 ●	TCC #1 (Test 1)	The short name for the Test 1 curve (2nd TCC curve) is displayed. This screen is automatically skipped if the **Test 1** operation is disabled.
 ●	TCC #2 (Test 2)	The short name for the Test 2 curve (3rd TCC curve) is displayed. This screen is automatically skipped if the **Test 2** operation is disabled.
 ●	TCC #3 (Test 3)	The short name for the Test 3 curve (4th TCC curve) is displayed. This screen is automatically skipped if the **Test 3** operation is disabled.
 ●	**Sectionalizing** mode counts:	This screen displays the preset number of source-side circuit breaker or recloser operations the TripSaver II recloser will count up to before dropping open. This screen is automatically skipped if **Sectionalizing** mode is disabled.
 ●	NR #0 (NR/Remote NR TCC curve)	This is the standard NR TCC curve.

● LCD states that can be programmed to display when a TripSaver II recloser is in its **Dropped-Open** state. Only one state can be selected in the service center configurator software.

■ Rotating the MODE SELECTOR lever initiates the display screens after the TripSaver II recloser is powered up. When powered up, the display will show the transceiver ID.

TABLE CONTINUED ▶

Table 11. Normal Operation Screens—Continued

Screen	Name	Description
 ●	NR #1 (Post-Fault TCC curve)	This is the Post-Fault Wakeup NR TCC curve
 ●	NR #2 (Cold Wake-up TCC curve)	This is the Cold Wakeup NR TCC curve.
 ●	SC#0 (sequence coordination)	The Sequence Coordination TCC curve or “Disabled” is displayed

● LCD states that can be programmed to display when a TripSaver II recloser is in its **Dropped-Open** state. Only one state can be selected in the service center configurator software.

Alternate LCD States: Fault Interruption, Local Manual Open and error conditions.

Table 12. Fault Interruptions

Screen	Name	Description
	Temporary fault (count)	This is the number of fault interruptions from a transition from a **Closed** position to an **Open** position.
	*Dropped Out* screen	This is the **Inverted** option selected shown during a permanent fault

Table 13. Local Manual Open (LMO)—Operation

Screen	Name	Description
	LMO—local manual open	The **LMO** feature is enabled with the operations count and time window.
	LMO—Cancel?	The *Prompt* screen for cancellation of the **LMO** feature.
	LMO—Canceled	The *Confirmation* screen that the **LMO** feature is canceled.
	LMO—Aborted	The *Confirmation* screen that the **LMO** feature is aborted
	LMO—XXXXX	The *Suspicious Attempt* screen.
	Walk Away	The *Walk Away* screen.

Table 14. Error Conditions

Screen	Name	Description
	Overload	The OVERLOAD indicator at the bottom left corner (symbol “X”).
	Service soon	The SERVICE SOON indicator at the bottom right corner (symbol “•”).
SERVICE NOW • If the LCD screen shows the exclamation mark, the unit is in **Service Now** mode and will not perform any protection actions. • The unit must be removed from operation. Even if the unit is in the cutout mounting (not dropped out) in the **Service Now** condition, it will not perform any protection actions. The vacuum interrupter may be in an **Open**, **Closed**, or unknown state. • In a “normal” vacuum interrupter end-of-life situation, the unit will drop out and stay with the vacuum interrupter open and the trunnion disengaged (the unit will not stay in the cutout mounting in the vertical position).		
	Service Now	The vacuum interrupter state is unknown.
	Service Now	The position of the vacuum interrupter is in an **Open** state.
	Service Now	The position of the vacuum interrupter is in a **Closed** state.

Understanding the Active TCC Curve When the TripSaver II Recloser is in R-NR Mode

A SCADA communication can place a TripSaver II recloser with the **Extended Open Interval** option (option "-O") into **Remote Non-Reclose (R-NR)** mode if remote communications are enabled via the TripSaver II Communications Gateway. With the addition of the new NR-Standard, Cold Wakeup, and Post Fault Wakeup curves, and with the ability to turn off the **Temporary Auto** mode, the TripSaver II recloser may behave differently from what is expected.

Table 15 explains which curve is active depending on the **MODE-SELECTOR lever** position, the **R-NR** mode, the conditions the recloser is "waking up" from when being closed into its mounting, and whether the **Temporary Auto** mode has been disabled under the **R-NR Functions** menu.

Table 15. Active TCC Curve When TripSaver II Recloser Is in R-NR Mode

Settings and Conditions				Active TCC Curve			
Mode-Selector Lever Position	R-NR Mode①	Condition During Wakeup	Temporary Auto Feature Setting in R-NR Feature Menu	Temporary Auto	Standard NR	Cold Wakeup NR	Post Fault Wakeup NR
Up	Off	Warm	–	X			
		Cold	–	X			
		Post Fault	–	X			
	On	Warm	–		X		
		Cold	–			X	
		Post Fault	Off●				X
			On●	X			
Down	Off	Warm	–		X		
		Cold	–			X	
		Post Fault	–				X
	On	Warm	–		X		
		Cold	–			X	
		Post Fault	–				X

① When the TripSaver II recloser is set to the **Remote Non-Reclose (R-NR)** state via SCADA.

● The **Temporary Auto** mode can be enabled or disabled using the **Disable Temporary Auto Post-Fault Wakeup mode in Remote-NR** button found in the **R-NR Functions** menu. This ONLY disables **Temporary Auto** mode when the switch is in **R-NR** mode with the lever in the **Up** position.

Regulatory and Compliance Statements

This document contains statements required for compliance with the rules and policies of various national and international regulatory agencies. The information is current as of the date of this publication but may be subject to change without notice. For the most recent version of this instruction sheet with the most up-to-date regulatory information, contact S&C Electric Company.

United States of America—FCC (Federal Communication Commission)

This device complies with part 15 of the FCC rules and regulations regarding unlicensed transmissions. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference.

IMPORTANT! Changes or modifications not expressly approved by S&C Electric Company could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada—ISED (Innovation, Science & Economic Development Canada)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes Industry Canada exemptes de licence RSS standard(s). Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable.

The changes or modifications not expressly approved by the S&C Electric Company could void the user's authority to operate the equipment.

CAN ICES-3 (A)/NMB-3(A)

Brazil (ANATEL)

Atendimento à Regulamentação Anatel

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

Este produto está homologado pela ANATEL, de acordo com os procedimentos regulamentados pela Resolução 242/2000, e atende aos requisitos técnicos aplicados.

Para maiores informações, consulte o site da ANATEL. **www.anatel.gov.br**

Thailand

This radiocommunication equipment is exempted to possess license, user license, or radiocommunication station license as per NBTC notification regarding radiocommunication equipment and radiocommunication station has been exempted for license according to radio communication act B.E.2498