

Controller Module and USB Transceiver User Guide

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Qualified Persons

WARNING

The equipment covered by this publication must be installed, operated, and maintained by qualified persons who are knowledgeable in the installation, operation, and maintenance of radios in electric power distribution equipment, along with the associated hazards. A qualified person is a radio technician who is qualified to install transmission-power-limited radio equipment per FCC Part 15 and who is trained and competent in:

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

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.

NOTICE

Thoroughly and carefully read this Instruction Sheet before programming, operating, or maintaining the TripSaver II controller module and USB transceiver.

WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment.

CAUTION

The controller module located inside the TripSaver II Cutout-Mounted Recloser is **ONLY** intended for use inside the TripSaver II recloser and has not been approved for any other use. **DO NOT** disassemble the TripSaver II recloser. Opening the recloser will void the manufacturer's warranty, and could cause minor injury. There are no user-serviceable parts.

NOTICE

The controller module is located inside the TripSaver II Cutout-Mounted Recloser. It has been evaluated for use only inside the TripSaver II recloser. Do not expose it to moisture. Do not use it outside the TripSaver II recloser enclosure, and do not use it for any purpose other than for which it is intended.

Retain this Instruction Sheet

This instruction sheet should be available for reference wherever a TripSaver II controller module and USB Transceiver are to be used. Retain this document in a location where it can be easily retrieved and referred to.

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. This document must be consulted in all cases where **⚠** is marked to determine the nature of the potential hazards and any actions that must be taken to avoid them. Become familiar with these types of messages and the importance of these various signal words:

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

If any portion of this instruction sheet is not understood 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 configuring, installing or operating a TripSaver II Cutout-Mounted Recloser.



Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, 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.

TripSaver II Cutout-Mounted Recloser Control Module Integration

Two electronic TripSaver II Cutout-Mounted Recloser control modules (model numbers TSII-CONTRL5 and TSII-CONTRL6) can integrate into the host self-powered cutout-mounted, electronically controlled single-phase recloser. The recloser uses a vacuum fault interrupter technology and is offered in system class voltage ratings of 15 kV and 25 kV.

The control module is an integral part of the TripSaver II recloser, and S&C will install it at the factory. End-users cannot do the installation themselves. Regardless

of the model, the control module resides in the TripSaver II Cutout-Mounted Recloser's housing, and each model's functions remain the same for all recloser configurations. The control module processes all electrical functions required for the proper operation of the TripSaver II Cutout-Mounted Recloser.

Aside from its primary functions, the control module can be wirelessly accessed by following the IEEE 802.15.4 protocol for performing maintenance. The control module includes a radio transceiver, an antenna, and software. Information regarding the 2.4-GHz radio is provided in Table 1. The communication protocol remains unaltered in all TripSaver II Cutout-Mounted Recloser configurations.

Table 1. Details of the TripSaver II Cutout-Mounted Recloser Control Module

Applicant	S&C Electric Company
Brand Name	TripSaver® II Cutout-Mounted Recloser
Product Model Name	TripSaver II Control 5 and TripSaver II Control 6
Product Model Number	TSII-CONTRL5 and TSII-CONTRL6
FCC Identifier	U3D-TSIICONTRL6
IC Identifier	5349C-TSIICONTRL6
Dimension	6.53 in. (16.6 cm) x 5.198 in. (13.2 cm) x 2.98 in. (7.6 cm)
Weight	20 oz. (567 g) for TSII-CONTRL6 and 17.6 oz. (499 g) for TSII-CONTRL5
Technologies Supported by the Equipment	Bluetooth Low Energy (Bluetooth 5), IEEE 802.15.4 (Zigbee), Thread
Transmission Speed	250 kbps
Type of Transmission	Digital Transmission System (DTS)
Rated RF Output	10 dbm (10 mW)
Frequency Range	2405 – 2480 MHz
Type of Modulation/Data Rate	GFSK / 1 Mbit/s O-QPSK / <200 kbps
Bandwidth	5 MHz
Number of Channel(s)	16 (from 11 to 26)
Antenna(s) and Gain	PCB antenna, Gain: +3.3 dBi
CT Voltage Input	CT input 230 Vac, 2 A, 50/60 Hz J10 input 11-14.5 Vdc, 1 A
Environmental	-40°C (-40°F) to +50°C (+122°F).
Manufacturer Name and Address	S&C Electric Company 6601 N Ridge Blvd. Chicago, IL 60626

This control module has been granted modular approval for TripSaver II Cutout-Mounted Recloser applications. The final host TripSaver II Cutout-Mounted Recloser and control module combination have been evaluated in a certified lab for FCC Part 15B criteria for unintentional radiators to be properly authorized for operation as a Part 15 digital device. S&C will provide a test report upon request.

Control Module Models:

The TripSaver II Cutout-Mounted Recloser control module provides controls and all logic functions for the proper functionality of TripSaver II recloser. The control module has two distinct models:

1. TripSaver II Control 5 (TSII-CONTRL5) has a main control board that provides standard 5-second open intervals during the TripSaver II recloser's reclosing sequence.
2. TripSaver II Control 6 (TSII-CONTRL6) provides extended open interval functionality, enabling a 30-second open interval during the TripSaver II recloser's reclosing sequence. The main control board has no sufficient storage energy to implement this feature. Therefore, a battery and battery charging/discharging circuitry has been added to supply necessary energy to the control module.

Both TripSaver II Cutout-Mounted Recloser control module models cause no changes to the recloser's outer enclosure. Overall integration and battery, battery board, and main control board assembly is shown in Figure 1

TripSaver II Cutout-Mounted Recloser USB Transceiver

To enhance the wireless connectivity between the TripSaver II recloser controller module and USB transceiver, S&C recommends the use of Taoglas External antenna, model# GW.11.A153 (S&C part number 904-002523-01) with USB transceiver part number FDA-1868R2.

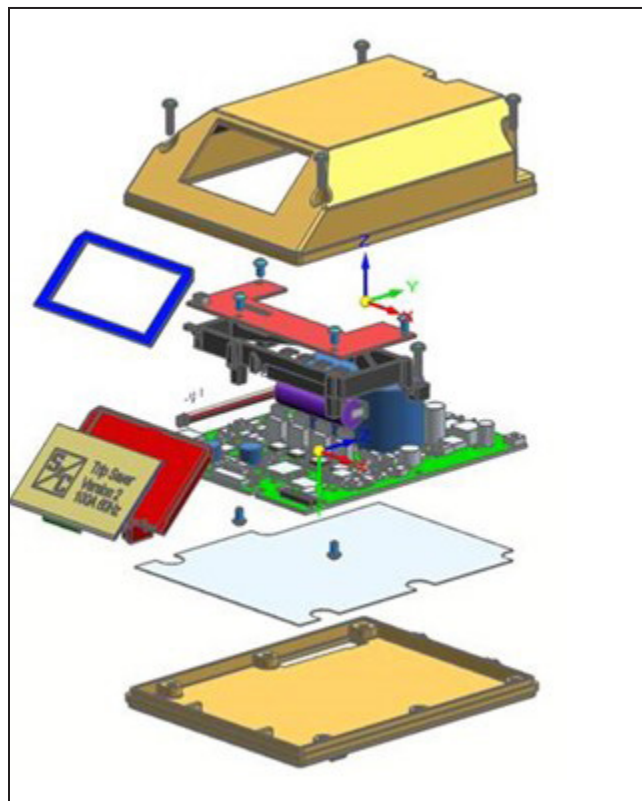


Figure 1. The control module assembly.

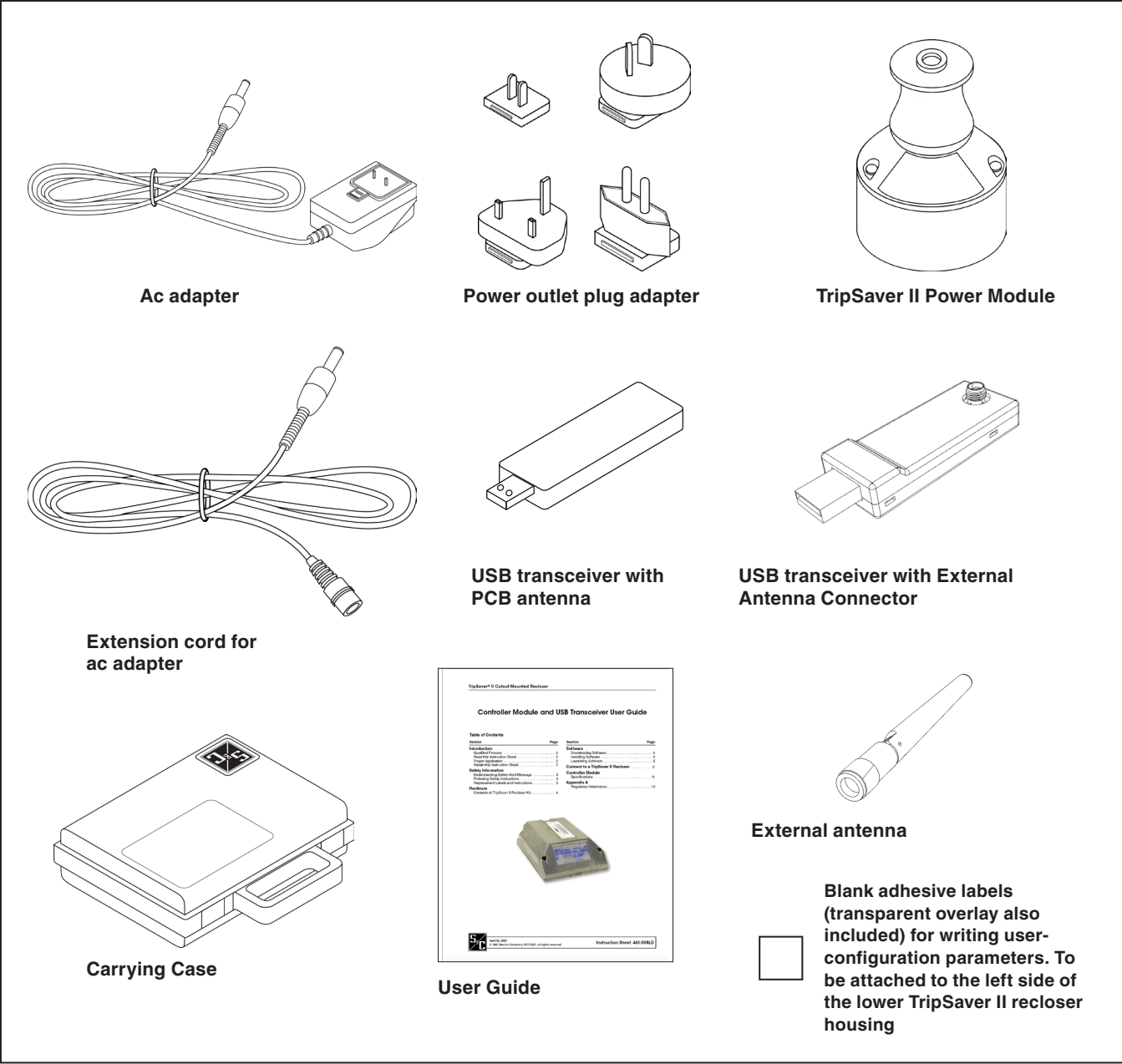


Figure 2. TripSaver II recloser kit contents.

Contents of TripSaver II Recloser Kit



Figure 3. Cordless power module in carrying case. Must be used by customers in the United Kingdom and European Union.

Inspection

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

If there is loss or visible damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note the 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 or damage.

Packing and Storage

The TripSaver II Cutout-Mounted Recloser Cordless Power Module comes in a foam-padded carrying case. See Figure 3 on page 7. A 9-V battery is included. When not in use, the cordless power module should be stored in its carrying case. The carrying case should be stored in a protected area, such as inside a truck or indoors in a service center. Use care not to drop the cordless power module during installation and removal.

Downloading Software

The TripSaver II Service Center Configuration Software is available for download only to customers who have purchased the configuration kit. For each configuration kit purchased, the user is entitled to install and use TripSaver II Service Center Configuration Software on no more than two computers at a time. The latest software release is posted on the S&C Automation Customer Support Portal. A username and password are needed to log in to the portal. A new S&C customer should complete the form in the lower section of the webpage and a new username and password will be sent. If a password is already available, click on the **Log-In To Secure Site** button. Enter the username and password to log in to the portal. Download the installer SCC1.9_Installer.exe from the portal.

Installing Software

Double-click the downloaded installer file and follow the on-screen instructions. The installer will automatically install Microsoft.NET framework onto the computer if the required .NET version is missing. Administrative privileges are needed to finish the installation.

Launching Software

To launch the software, click on the green SCC 1.9 icon on the desktop or in the **Start** menu. A warning screen will be displayed just after the software is launched. **Read the message carefully and understand the warning.** Proceed by clicking on the green **I have read and understand the above warning** button.

When the software is launched, settings can be configured and saved while in the **Standalone** (offline) mode.

Connect to a TripSaver II Recloser

⚠ DANGER

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.

Follow these steps to connect to a TripSaver II recloser to apply new settings:

STEP 1. Screw the threaded bottom of the antenna into the threaded connector on the USB transceiver. See Figure 4.

STEP 2. Install the USB transceiver.

A USB transceiver (Firmware Version 1.6) must be installed on the computer to communicate with a TripSaver II recloser. Insert the USB transceiver into any USB port on the computer. See Figure 5. The installation process is automatic.

Note: The USB transceiver does not need to be installed to install the software and to run the software in **Standalone** (offline) mode.

STEP 3. Assemble the power supply and power up the TripSaver II Recloser.

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

- (a) Plug the pin of the ac adapter into the opening on the power module. See Figure 6.

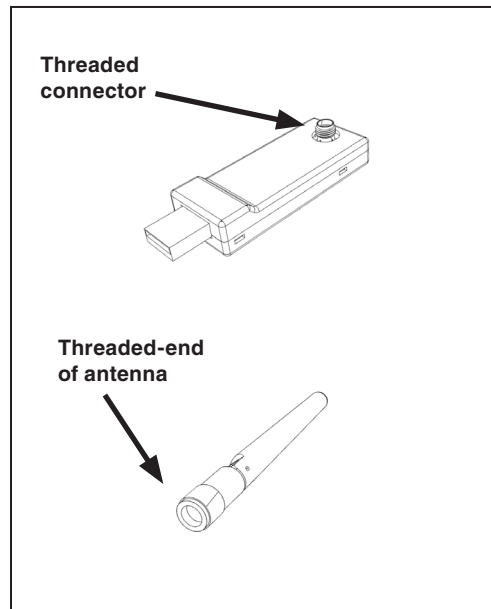


Figure 4. Connecting the antenna to the USB transceiver.

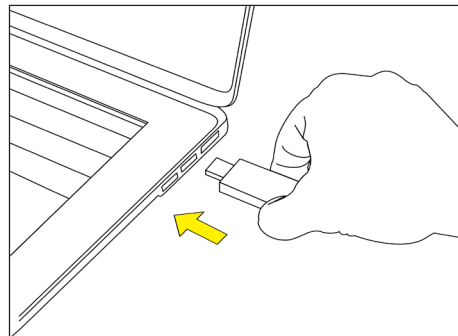


Figure 5. Plug the USB transceiver into the computer.

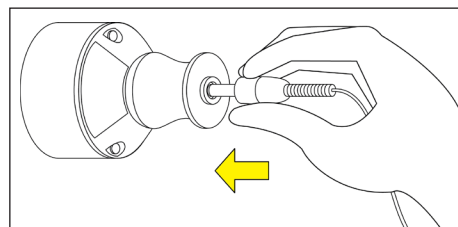


Figure 6. Plug in the ac adapter pin.

- (b) Position the power module near the base of the TripSaver II recloser, as shown in Figure 7; the module will be held in place magnetically.
- (c) Install the proper power outlet plug adapter onto the ac adapter. See Figure 8.
- (d) Plug the ac adapter into a wall outlet. See Figure 9.
- (e) To verify the TripSaver II recloser is powered, rotate the MODE SELECTOR lever and observe the LCD screen. If the LCD screen begins to scroll, it indicates the unit has been successfully powered.

The setup, at the end of Step 3, should look like the picture in Figure 10.

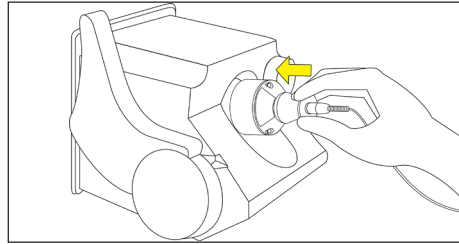


Figure 7. Position the power module.

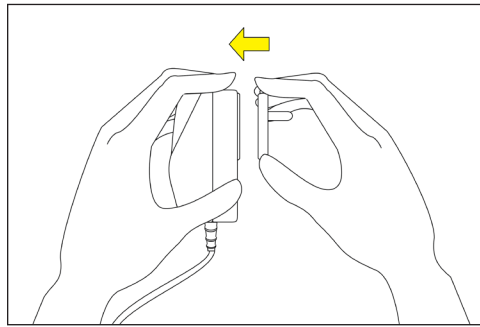


Figure 8. Install the plug adapter.

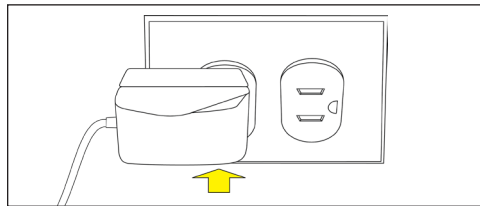


Figure 9. Connect the ac adapter to a wall outlet.



Figure 10. Completed TripSaver II recloser setup.

Connect to a TripSaver II Recloser

STEP 4. 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 TripSaver II Service Center Configuration Software v1.10 will auto-detect the Transceiver ID of TripSaver II reclosers with firmware version 1.8 or 1.9. If connection difficulties are encountered, or when connecting to a TripSaver II recloser with firmware version 1.7 or earlier, enter the Transceiver ID manually. The first 16 digits of the ID are pre-typed; only the last 16 digits must be entered.

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 11. Download a free QR scanner app to a smart phone and scan the QR code to obtain the Transceiver ID.

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 12.

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

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 13.

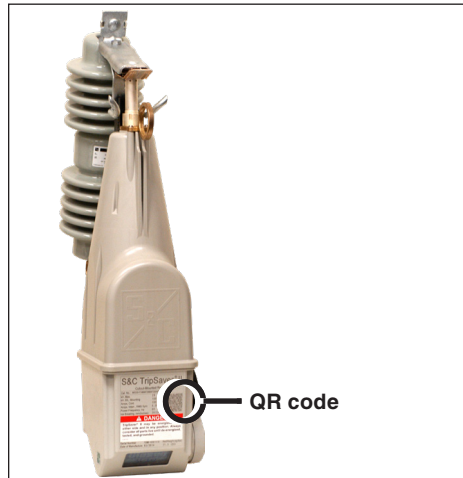


Figure 11. The location of the QR code.

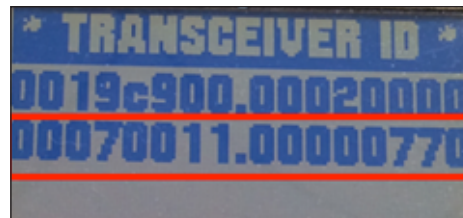


Figure 12. Transceiver ID on the TripSaver II recloser LCD screen.

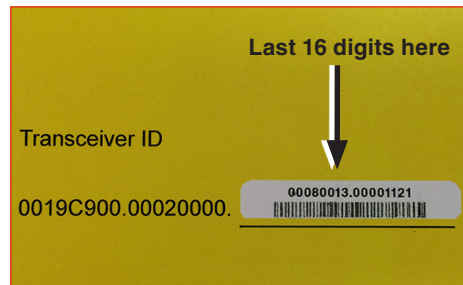


Figure 13. Transceiver ID on yellow tag.

STEP 5. Connect to the device:

- To connect to a TripSaver II recloser, select **Connection> Connect to Device** 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 into the computer.
- Next, a Transceiver ID Request dialog box will open. Enter the Transceiver ID of the TripSaver II recloser being connected to, and click on the **OK** button to connect. The first 16 digits of the ID are pre-typed, so only the last 16 digits must be typed in. See Figure 14.
- During the connection process, a status bar will be displayed. See Figure 15. Wait about 10 seconds for the connection process to finish, or click on the **Cancel** button to cancel the connection process.
- The *Status* screen will open after the TripSaver II recloser is successfully connected. See Figure 16. Existing settings, status information, and event logs of the TripSaver II recloser can now be viewed, or new settings for the device can be applied.

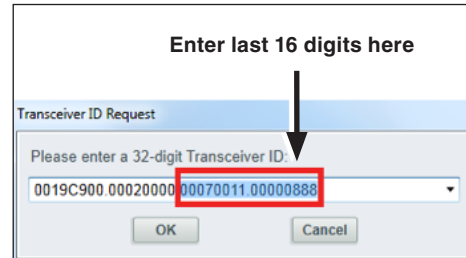


Figure 14. Enter last 16 digits into the Transceiver ID dialog box.

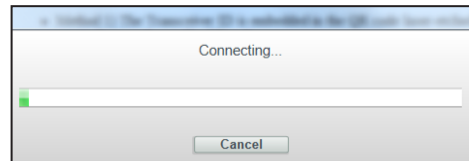


Figure 15. The Connection status bar.

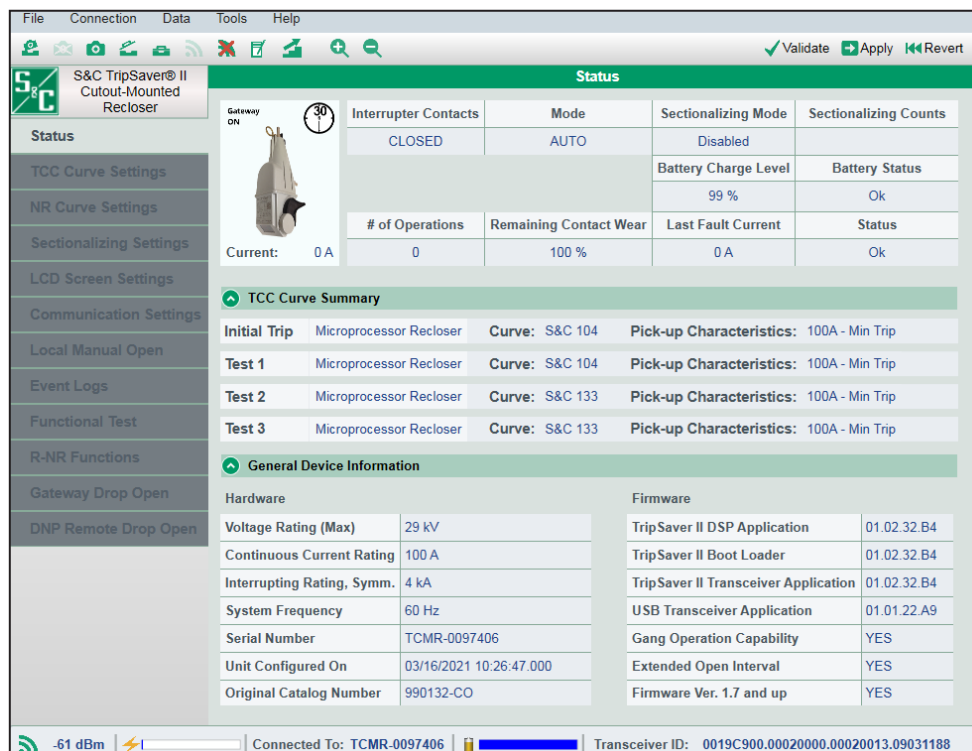


Figure 16. The recloser Status screen.

Controller Module Specifications

The TripSaver II Cutout-Mounted Recloser contains a controller module used to control the self-powered recloser. The controller module processes all electronic/ electrical functions required for the proper operation of the TripSaver II recloser. The controller can be wirelessly accessed and configured via the IEEE 802.15.4 protocol. See Figure 17 and Table 2.

Table 2. Connection Locations and Descriptions

Label	Description	Voltage
A	J10, Input Connection●	11-14.5 Vdc  , 1 A
B	J12, Rogowski Coil Connection	12 Vac  , < 10 mA
C	J9, Dropout Control Connection	225 Vdc  , 5 A
D	J8, VI Control Connection	225 Vdc  , 5 A
E	J2, CT Input Connection	230 Vac  , 2 A, 50/60 Hz

● J10 connection meets SEL V voltage levels.

Insulation rating for the external circuit connected to J10: Make sure any external circuits providing a source of power that are connected to the unit are double- or reinforced-insulated from the mains or are separated from the mains by basic insulation plus a grounded shield. They also should meet requirements for SELV voltage levels (under 33 V RMS/46.7 V peak or 70 Vdc in normal conditions, and 55 V RMS/78 V peak or 140 Vdc single-fault).

Operating Temperature Range: -40°C (-40°F) to +50°C (122°F)

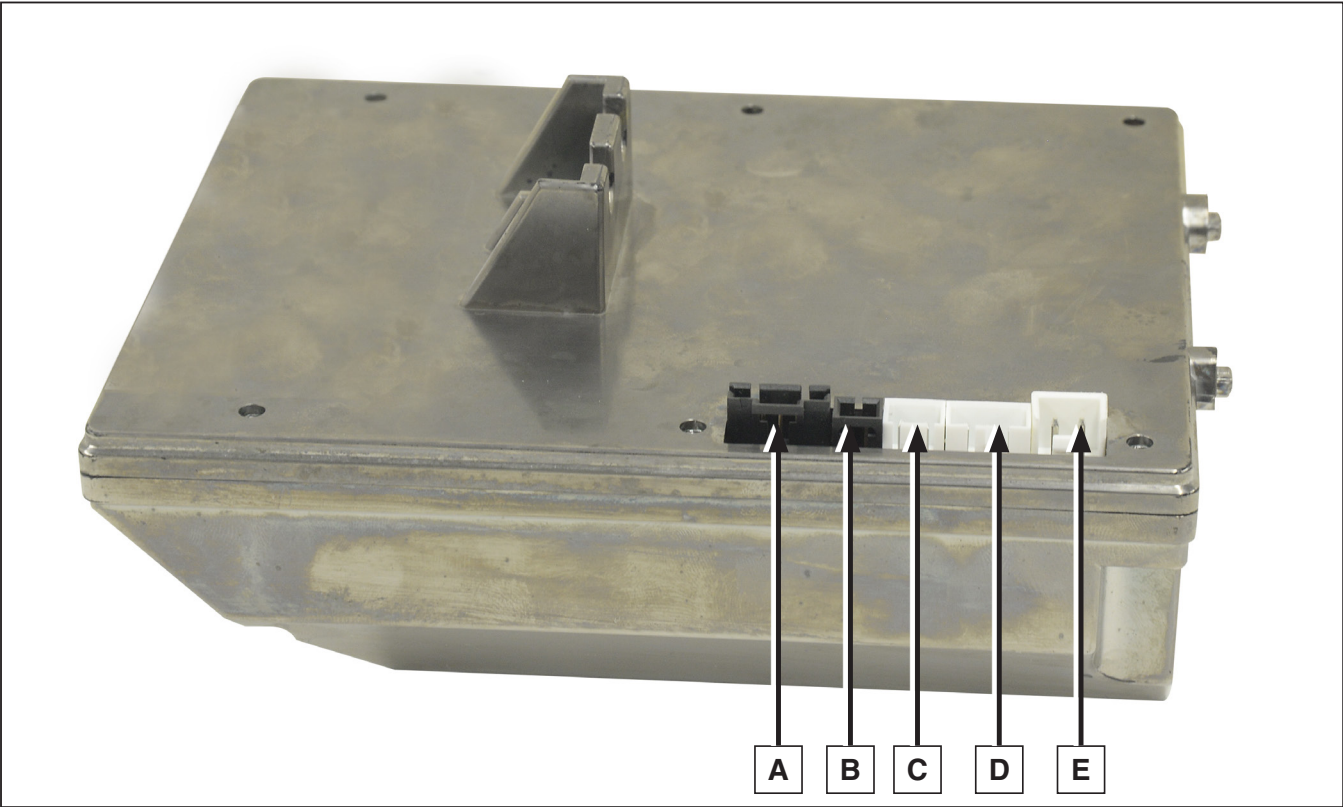
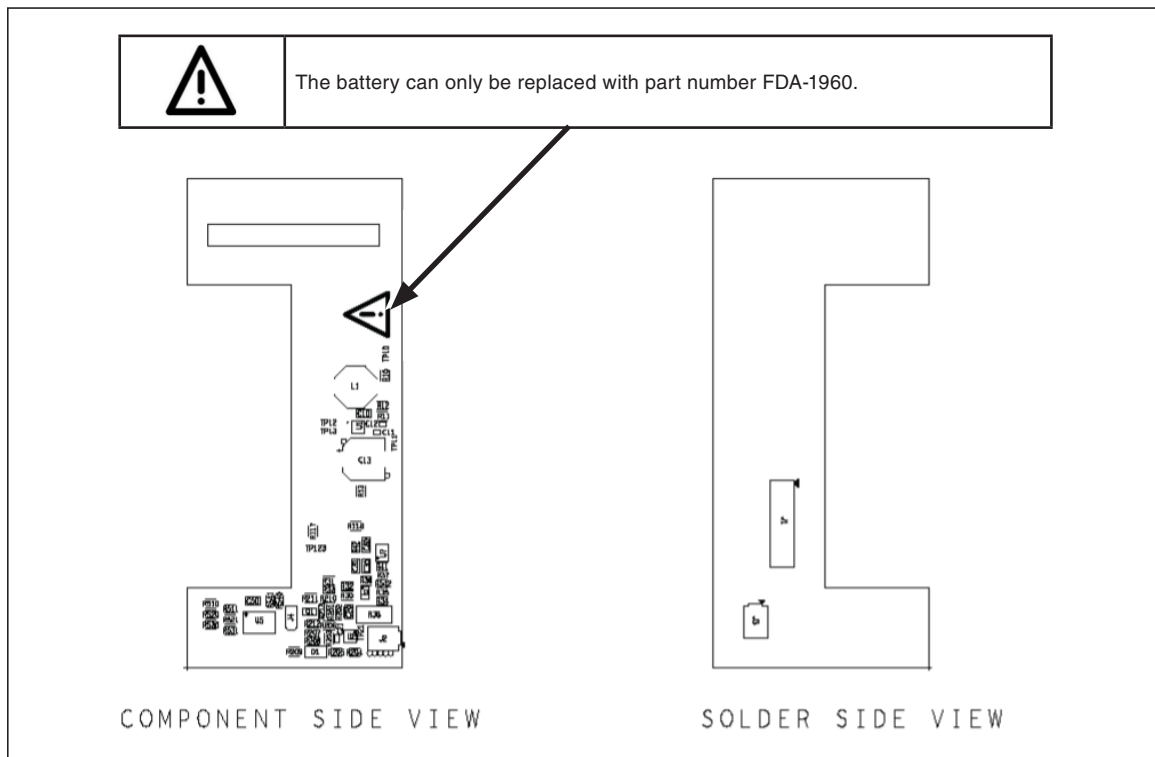


Figure 17. Controller module pinout diagram for Table 1.

Battery Information**Figure 18. Battery information label location.**

Regulatory Information

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 manual 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

