Wi-Fi, SCADA, and GPS Communication Setup

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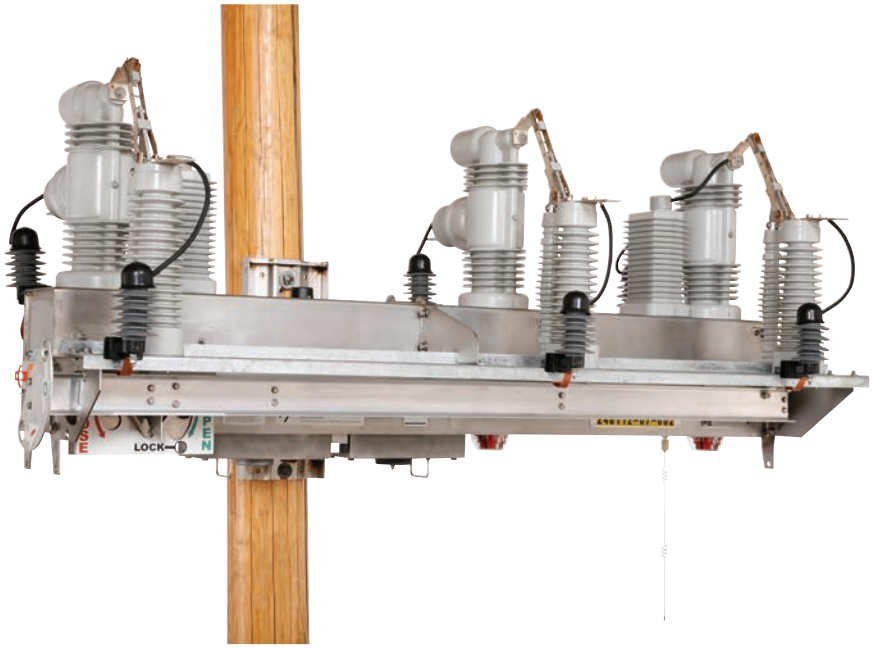

February 17, 2020

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 overhead electric power distribution equipment along with the associated hazards. A qualified person is one 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.

Read this Instruction Sheet

NOTICE

Read this instruction sheet thoroughly and carefully before installing or operating your IntelliRupter PulseCloser Fault Interrupter. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 and 5. The latest version of this publication is available online in PDF format at **sandc.com/en/support/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your IntelliRupter® fault interrupter. Designate a location where it can be easily retrieved for reference.

Proper Application

⚠ WARNING

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

Special Warranty Provisions

The standard warranty contained in S&C's standard conditions of sale, as set forth in Price Sheets 150 and 181, applies to the IntelliRupter fault interrupter, except that the first paragraph of the said warranty is replaced by the following:

(1) General: The seller warrants to the immediate purchaser or end user for a period of 10 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within 10 years after the date of shipment, the seller agrees, upon prompt notification thereof and confirmation that the equipment has been stored, installed, operated, inspected, and maintained in accordance with the recommendations of the seller and standard industry practice, to correct the nonconformity either by repairing any damaged or defective parts of the equipment or (at the seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

Replacement parts provided by the seller or repairs performed by the seller under the warranty for the original equipment will be covered by the above special warranty provision for its duration. Replacement parts purchased separately will be covered by the above special warranty provision.

For equipment/services packages, the seller warrants for a period of one year after commissioning that the IntelliRupter fault interrupter will provide automatic fault isolation and system reconfiguration per agreed-upon service levels. The remedy shall be additional system analysis and reconfiguration of the IntelliTeam® SG Automatic Restoration System until the desired result is achieved.

Warranty of the S&C IntelliRupter fault interrupter is contingent upon the installation, configuration, and use of the control or software in accordance with S&C's applicable instruction sheets.

This warranty does not apply to major components not of S&C manufacture, such as batteries and communication devices. However, S&C will assign to immediate purchaser or end user all manufacturer's warranties that apply to such major components.

Warranty of equipment/services packages is contingent upon receipt of adequate information on the user's distribution system, sufficiently detailed to prepare a technical analysis. The seller is not liable if an act of nature or parties beyond S&C's control negatively impact performance of equipment/services packages; for example, new construction that impedes radio communication, or changes to the distribution system that impact protection systems, available fault currents, or system-loading characteristics.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels attached to the IntelliRupter PulseCloser Fault Interrupter. Familiarize yourself with these types of messages and the importance of these various signal words:

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com,** or call 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 your IntelliRupter PulseCloser Fault Interrupter.

Replacement Instructions and Labels

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

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

⚠ DANGER

IntelliRupter PulseCloser Fault Interrupters 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 an IntelliRupter fault interrupter must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "*NOTICE*" labels.
5. **OPERATING MECHANISM AND BASE.** IntelliRupter fault interrupters contain fast-moving parts that can severely injure fingers. Do not remove or disassemble operating mechanisms or remove access panels on the IntelliRupter fault interrupter base unless directed to do so by S&C Electric Company.
6. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded. The integrated power module (IPM) contains components that can retain a voltage charge for many days after the IntelliRupter fault interrupter has been de-energized and can derive a static charge when in close proximity to a high-voltage source. Voltage levels can be as high as the peak line-to-ground voltage last applied to the unit. Units that have been energized or installed near energized lines should be considered live until tested and grounded.
7. **GROUNDING.** The IntelliRupter fault interrupter base must be connected to a suitable earth ground at the base of the utility pole, or to a suitable building ground for testing, before energizing an IntelliRupter fault interrupter, and at all times when energized.

   The ground wire(s) must be bonded to the system neutral, if present. If the system neutral is not resent, proper precautions must be taken to ensure the local earth ground, or building ground, cannot be severed or removed.
8. **VACUUM INTERRUPTER POSITION.** Always confirm the **Open/Close** position of each interrupter by visually observing its indicator.

   Interrupters, terminal pads, and disconnect blades on disconnect-style models may be energized from either side of the IntelliRupter fault interrupter.

   Interrupters, terminal pads, and disconnect blades on disconnect style models may be energized with the interrupters in any position.
9. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

These instructions cover the Wi-Fi, SCADA, and GPS communication setup of an IntelliRupter PulseCloser Fault Interrupter. The communication module contains a Wi-Fi transceiver, a GPS receiver, and, if specified, a radio providing wide-area network capability in SCADA applications. The communication module may also include a battery that supports operation for approximately four hours after loss of ac line voltage on both sides of the IntelliRupter fault interrupter, permitting extended deadline switching.

IntelliRupter fault interrupter software must be installed on a portable IBM/PC-compatible computer. Refer to instruction Sheet 766-530, "IntelliRupter® PulseCloser® Fault Interrupter: *Protection and Communication Setup*," for the software installation procedure.

Maintenance

The communication module can be easily removed and replaced using a hookstick for maintenance of the battery, Wi-Fi transceiver, GPS receiver, and radio.

NOTICE

To prevent contamination of the connectors, avoid routine battery replacement during inclement weather, and never place the connector on the ground without some form of protection from dirt and mud.

Removing the Communication Module

The communication module can be removed from a bucket truck with the module handling fitting, catalog number 4450, attached to a suitable hookstick.

⚠ CAUTION

The communication module is heavy. Removal and replacement from the ground using an extendostick is not recommended. Remove and replace the communication module from a bucket truck using the module handling fitting attached to a suitable hookstick.

Follow these steps to remove the communication module:

STEP 1. Insert the handling fitting into the module latch and push up on the hookstick. Rotate the fitting 90 degrees counterclockwise (as viewed from the underside of the base) to open the latch. See Figure 1.

STEP 2. Remove the communication module from the base. See Figure 2. Pull very hard to disengage the wiring connectors.

STEP 3. Remove the handling fitting from the module latch by pushing in on the hookstick while rotating it 90 degrees clockwise. Place the communication module on a clean, dry surface. See Figure 3.

Figure 1. Inserting the handling fitting into the module latch.

Figure 2. Removing the communication module from the base.

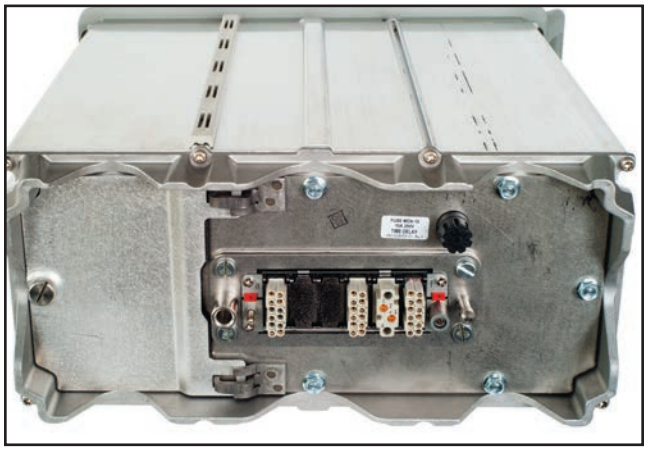

Figure 3. Communication module removed from the IntelliRupter fault interrupter base.

Replacing the Battery

Perform the following procedure to replace the battery in the communication module:

STEP 1. Loosen the battery compartment cover locking screw using a ⅜-inch nut driver. See Figure 4.

STEP 2. Open the battery compartment cover. See Figure 5.

STEP 3. Push in the clip on the battery connector and carefully disconnect the battery leads. See Figure 6.

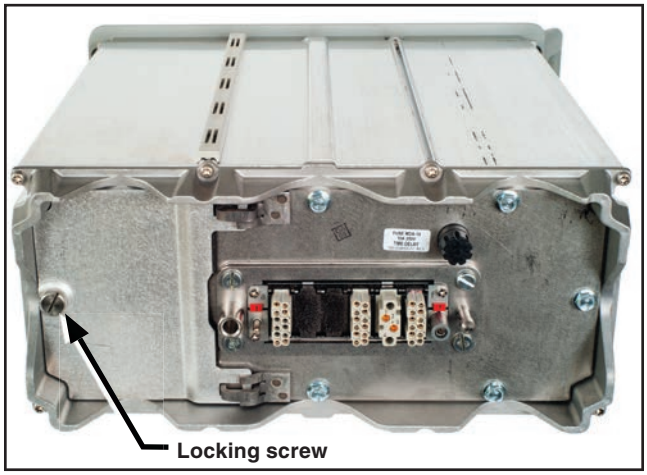

Figure 4. Loosening the battery compartment cover locking screw.

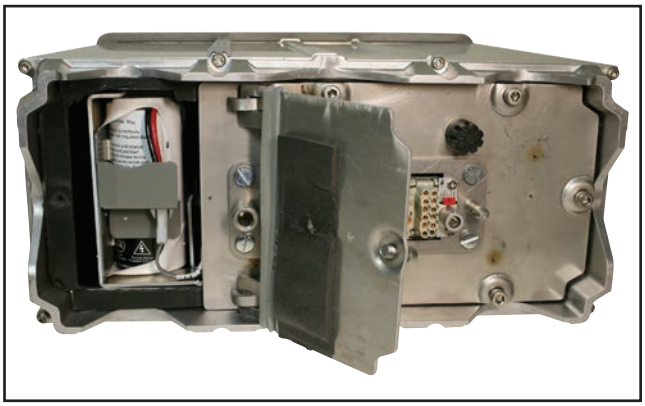

Figure 5. Opening the battery compartment cover.

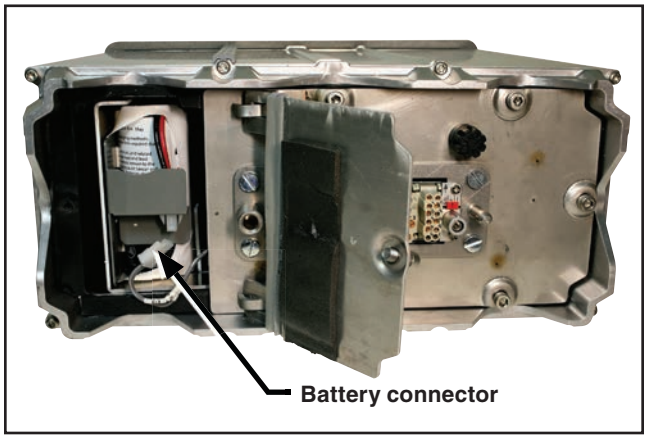

Figure 6. Disconnecting the battery leads.

STEP 4. Using the finger-pull, slide out the existing battery and slide in the replacement battery. See Figure 7. Reconnect the battery leads.

STEP 5. Close the battery compartment cover and securely tighten the battery compartment cover locking screw.

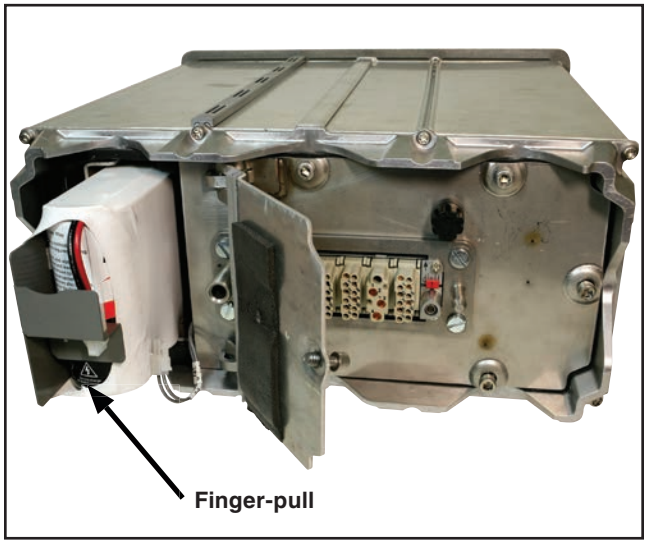

Figure 7. Replacing the battery.

Installing a Radio

A radio providing wide-area network capability for SCADA applications, if specified, is furnished factory-installed in the communication module. Alternately, a user-furnished radio can be installed in the field. Some radios must be programmed using a cable connected to a computer. In such instances, remove the radio tray assembly to connect to the radio, and power the radio with the battery or a separate power supply.

Follow these steps to install a radio in the communication module:

STEP 1. Loosen the battery compartment cover locking screw and open the battery compartment cover. See Figures 4 and 5 on page 8.

STEP 2. Remove the five ¼–20 bolts that attach the radio tray assembly using a ⅜-inch nut driver. Retain the bolts. See Figure 8.

STEP 3. Remove the radio tray assembly and place it on a clean, dry surface.

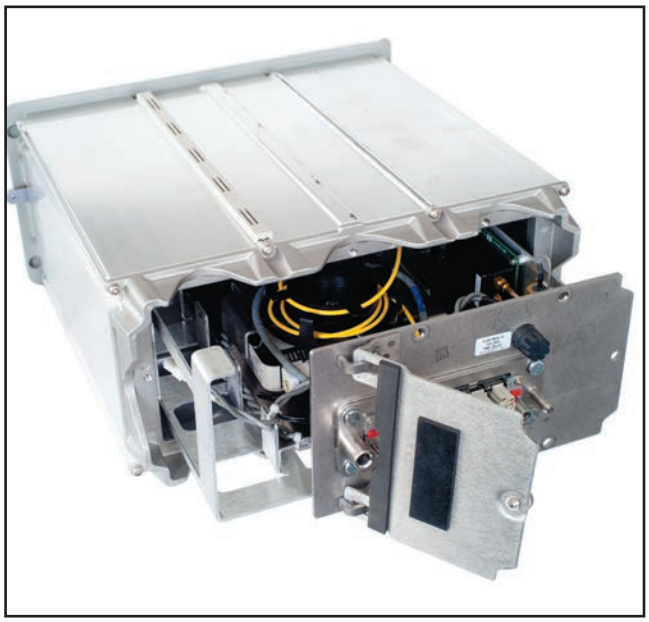

Figure 8. Removing the radio tray assembly.

The radio tray mounting plate, with connections for power, data, and antenna, will be accessible. See Figure 9.

STEP 4. Install the radio on the mounting plate using the furnished hardware. See Figure 11 on page 12. The **Radio Ready** option includes a bag of parts for the radio ordered. Most bags include only a power-adapter cable and the radio-mounting screws. See Figure 10.

STEP 5. The wiring harness on most radios includes a power plug and a serial or Ethernet data-port connector. Insert the power plug in its receptacle. If applicable, insert the control's Ethernet 1 connector in its receptacle and insert the serial-to-Wi-Fi connector in its receptacle on the radio and in the receptacle on the Wi-Fi circuit board. See Figure 12 on page 12. The connection to the Wi-Fi board is for maintenance or programming of the communication device over Wi-Fi, not for data transfer.

When the radio does not have an Ethernet port, insert the serial connector in the pink plastic bag in the transparent (main) serial connector on the radio. Then, if applicable, insert the serial-to-Wi-Fi connector in the LAN (secondary) serial connector on the radio and in the receptacle on the Wi-Fi circuit board.

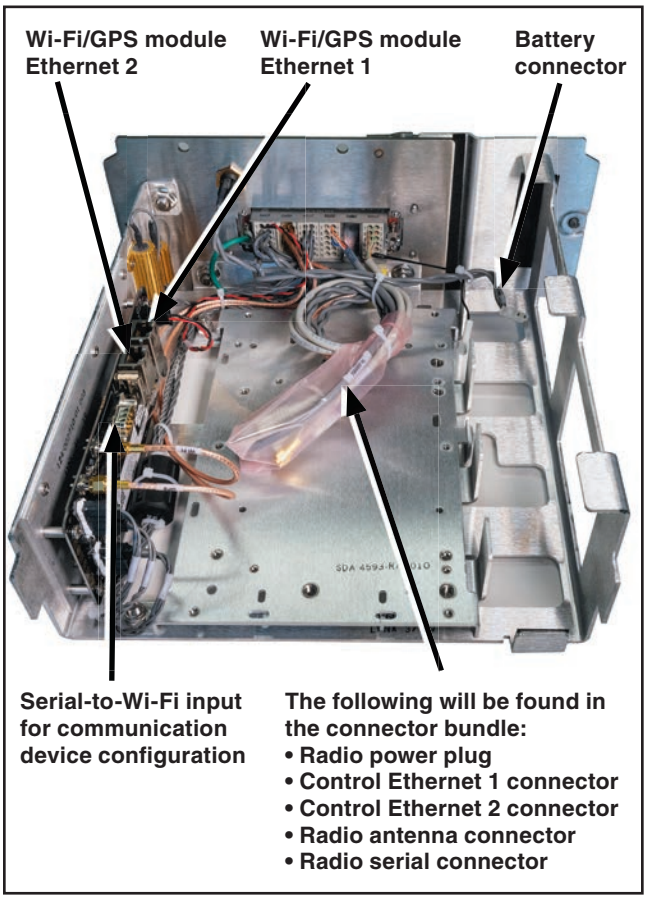

Figure 9. Radio tray mounting plate.

Figure 10. Radio hardware and cables; catalog number SDA-4747 is shown.

STEP 6. Connect the antenna connector to the radio.

STEP 7. Reinstall the radio tray assembly, and replace and securely tighten the five ¼–20 bolts. Close the battery compartment cover, and tighten the battery compartment cover screw.

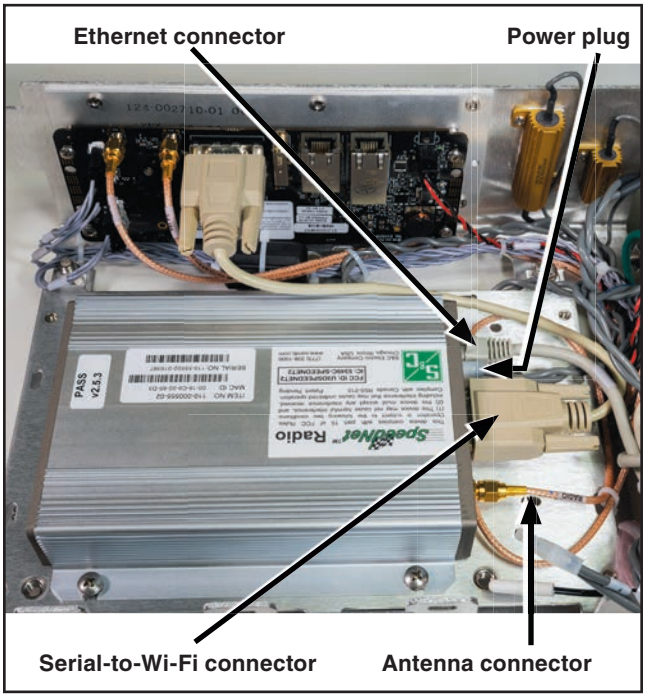

Figure 11. Radio installed in the communication module.

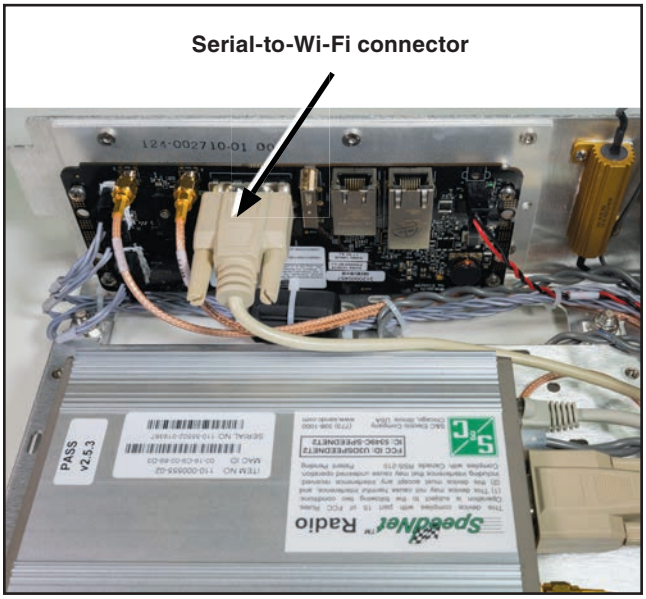

Figure 12. Serial cable connected to the Wi-Fi circuit board.

Reinstalling the Communication Module

The communication module can be installed from a bucket truck with the module handling fitting, catalog number 4450, attached to a suitable hookstick.

⚠ CAUTION

The communication module is heavy. Removal and replacement from the ground using an extendostick is not recommended. Remove and replace the communication module from a bucket truck using the module handling fitting attached to a suitable hookstick.

Follow these steps to install the communication module:

STEP 1. Inspect the wiring connectors and insertion guides of the communication module and communication module bay for damage. See Figure 4 on page 8.

STEP 2. Push the handling fitting into the module latch and simultaneously turn the fitting 90 degrees counterclockwise.

STEP 3. Position the communication module so the alignment arrows line up, and insert the module into the left bay of the base as shown in Figure 13. Push very hard to engage the connectors.

STEP 4. While pushing up on the hookstick, rotate the handling tool 90 degrees clockwise (as viewed from the underside of the base) to close the latch. Then, remove the fitting.

Figure 13. Inserting the communication module into the base.

Wi-Fi Capability

The Wi-Fi transceiver in the communication module provides secure wireless point-to-point communication to a wireless-equipped personal computer operating under the IEEE 802.11b standard. Transmission range is typically 150 feet (45.7 meters) or less. The Wi-Fi connection permits local configuration and control of the IntelliRupter fault interrupter. Further, if a wide-area network radio has been furnished—and the radio supports configuration through its serial port—it can be configured using the Wi-Fi connection. SpeedNet™ Radios may be configured in this manner.

The Wi-Fi transceiver and associated software provide extensive security features to prevent unauthorized access. These security features are described in S&C Instruction Sheet 766-524, "IntelliRupter® PulseCloser® Fault Interrupter: *Wi-Fi and Security Administration*."

The communication module must be installed and powered, and IntelliLink® Setup Software must be installed on the computer before a Wi-Fi connection can be established.

Wi-Fi Antenna

The factory-installed Wi-Fi antenna is on the underside of the base, as shown in Figure 14.

If signal strength is not adequate, make sure the laptop computer is less than 150 feet (45.7 meters) away and has an unobstructed line of sight to the Wi-Fi antenna.

Figure 14. The Wi-Fi antenna is located on the underside of the base.

SCADA Capability

The IntelliRupter fault interrupter can communicate with a SCADA system via the DNP protocol by using a WAN radio or fiber-optic transceiver installed in the communication module. Alternately, an appropriate SCADA communication device can be housed in a separate pole-mounted enclosure.

DNP Implementation

DNP implementation of the IntelliRupter fault interrupter operating system conforms to DNP V3.00 Subset Definitions, version 2.00, available from the DNP Users Group. Refer to S&C Instruction Sheet 766-560, "IntelliRupter® PulseCloser® Fault Interrupter: *DNP Points List and Implementation*."

SCADA Antenna

A standard N type antenna connector for a WAN radio is furnished on the underside of the IntelliRupter fault interrupter base. A surge suppressor for the antenna is mounted inside the base.

The antenna can be mounted directly to the connector as shown in Figure 15. If the optional bracket-mounted antenna has been furnished, the antenna is positioned 2½ feet (762 mm) horizontally from the bottom of the base.

SCADA Setup

SCADA communication setup is covered in S&C Instruction Sheet 766-530, "IntelliRupter® PulseCloser® Fault Interrupter: *Protection and Communication Setup*." Among the topics presented are mapping DNP analog input and output points, status points, counter points, and control points.

SCADA Diagnostics and Troubleshooting

SCADA communication diagnostics are covered in S&C Instruction Sheet 766-552, "IntelliRupter® PulseCloser® Fault Interrupter: *Operating and Diagnostic Instructions for IntelliTeam® SG Automatic Restoration System*." Data log messages are listed in S&C Instruction Sheet 766-561, "IntelliRupter® PulseCloser® Fault Interrupter: *Data Log Messages*."

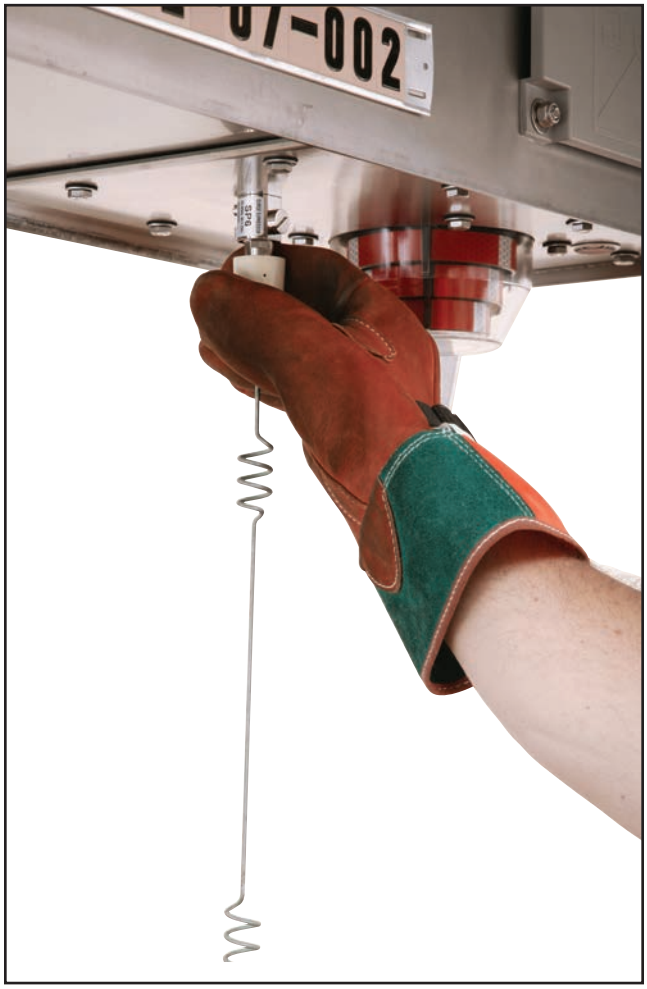

Figure 15. SCADA antenna mounted directly to the connector on the base.

GPS Capabilities

A global positioning system (GPS) receiver installed in the communication module provides precise time synchronization. The system allows rapid analysis of event records, simplifying the determination of a sequence of events.

GPS Antenna

The factory-installed GPS antenna is located on the top of the base as shown in Figure 16.

GPS Setup and Diagnostics

As discussed in S&C Instruction Sheet 766-530, "IntelliRupter® PulseCloser® Fault Interrupter: *Protection and Communication Setup*," no setup procedure is required for the GPS other than specifying how time is displayed. GPS coordinate information will be displayed on one screen. The screen for specifying how time is displayed indicates the quality of the GPS signal. The GPS receiver requires no maintenance.

Figure 16. GPS antenna installed on the top of the IntelliRupter fault interrupter base.