

Installation

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Introduction

Qualified Persons

WARNING

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

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

These instructions are intended **ONLY** for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Read this instruction sheet thoroughly and carefully before installing or operating your IntelliNode Interface Module. Familiarize yourself with the Safety Information on page 4 and Safety Precautions on page 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 IntelliNode Interface Module. Designate a location where you can easily retrieve and refer to this publication.

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. Refer to Specification Bulletin 1043-31 for equipment specifications.

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 IntelliNode Interface Module, 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 IntelliNode Interface Module 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 IntelliNode Interface Module 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.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels attached to the IntelliNode Interface Module. 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 (888) 762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing or operating your IntelliNode Interface Module.



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



The S&C IntelliNode Interface Module line voltage input range is 93 to 276 Vac or 10.2 to 288 Vdc. 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.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. QUALIFIED PERSONS. Access to the IntelliNode Interface Module 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. Always maintain proper clearance from energized components. 3. PERSONAL PROTECTIVE EQUIPMENT. Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, arc-flash clothing, and fall protection, in accordance with safe operating procedures and rules. | <ol style="list-style-type: none"> 4. SAFETY LABELS AND TAGS. Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so. 5. MAINTAINING PROPER CLEARANCE. Always maintain proper clearance from energized components. |
|---|--|

These instructions describe steps to complete in the service center prior to field installation of the Intelligent Electronic Device (IED) control package and field installation steps that are specific to the IntelliNode Interface Module.

Installation or setup of any equipment used for team communication or remote SCADA communication is not discussed here; see the manufacturer's documentation, S&C Instruction Sheet 1043-531, "IntelliNode Interface Module: *Setup*," or contact S&C Electric Company.

WARNING

Serious risk of personal injury or death may result from contact with electric distribution equipment when electrical isolation and grounding procedures are not followed. The equipment described in this document must be operated and maintained by qualified persons who are thoroughly trained and understand any hazards that may be involved. This document is written only for such qualified persons and is not a substitute for adequate training and experience in safety procedures for accessing high-voltage equipment.

WARNING

The IntelliNode Interface Module instructions are in addition to the installation instructions for the protective relay or recloser control. The steps in this chapter must be carried out in the correct order relative to the installation steps described in the host IED Manual to insure a safe and successful IntelliTeam SG Automatic Restoration System installation.

⚠ WARNING

These instructions do NOT replace the need for utility operation standards. Any conflict between the information in this document and utility practices should be reviewed by appropriate utility personnel and a decision made as to the correct procedures to follow.

The S&C IntelliNode Interface Module is connected to switchgear operating at primary voltage levels. High voltage may be present in the wiring to the switch control or the switch control itself during certain failures of the switchgear wiring or grounding system, or because of a failure of the switch itself. For this reason, access to the switch control should be treated with the same safety precautions that would be applied when accessing other high-voltage lines and equipment. Follow all locally approved safety procedures when working on or around this switch control.

Before attempting to access an existing switch installation, check carefully for visible or audible signs of electrical or physical malfunction (do this before touching or operating the switch control or any other part of the installation). These warning signs include such things as smoke, fire, open fuses, crackling noises, loud buzzing, etc. If a malfunction is suspected, treat all components of the installation, including the switch control and associated mounting hardware, as if they were elevated to primary (high) voltage.

Whenever you are manually reconfiguring the circuit (for example, during repairs), follow your company's operating procedures to disable automatic operation of the IntelliTeam SG Automatic Restoration System. This prevents any unexpected operation of a team member.

You can disable the IntelliTeam SG Automatic Restoration System by selecting the **Prohibit Restoration** state in any team member of the team you want to disable.

Installation

Applicable Software

These instructions were prepared for use with software **ITNInstaller-3.6.x**.

The software revision number can be found on the on the *Setup>General>Revisions* screen. For questions regarding the applicability of information in this chapter to future product releases, contact S&C Electric Company.

Interface Module Installation Overview

The panel-mounted IntelliNode Interface Module is two chassis, connected by a 1-meter (39-inch) cable, with 3M MDR-26 connectors. See Figure 1. The processor can be mounted out of sight and the compact faceplate installed near the control panel of the host device. The control power input is a two-position polarized AMP connector with a 1-meter unterminated cable. The host device must be able to provide adequate 12-Vdc power for the IntelliNode Interface Module and all communication equipment.

The rack-mounted configuration is a single chassis with connectors on the rear panel. Control power is connected by screw terminal to a multi-position Phoenix plug that accepts 20-8 AWG wire. A wide range of ac or dc control power voltage is accommodated. A two-position Phoenix plug provides 12-Vdc power output for the IntelliTeam SG communication equipment. See Figure 2 on page 9.

The SCADA radio or fiber-optic transceiver can be connected to either an Ethernet or serial port. IntelliNode modules can also communicate with an IP-based SCADA network over the LAN with an Ethernet connection. Another serial port is used for IntelliTeam SG system communication using a SpeedNet™ Radio or fiber-optic transceiver. The third serial port is connected to the host device.

Installation of all components is the customer's responsibility. The customer will also supply the interconnect cables, power supplies, communication equipment, and antennas. A correctly grounded PolyPhaser surge suppressor (manufactured by Smiths Microwave) is required if the antenna is not mounted directly on the host device enclosure.

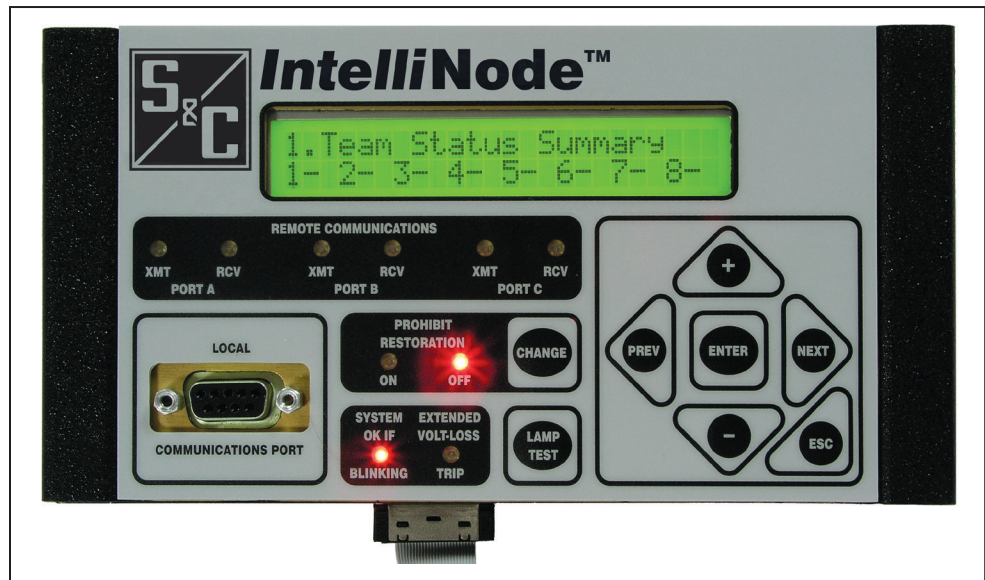


Figure 1. Panel-mounted IntelliNode Interface Module.

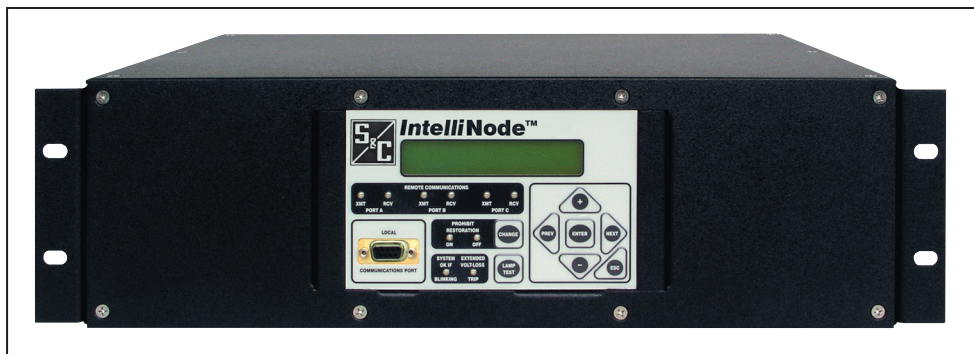


Figure 2. Rack-mounted IntelliNode Interface Module.

Pre-Installation Checklist

Before installing the IntelliNode Interface Module and IED control package in the field, carry out the following steps. This is best done in the service center before leaving for the installation site.

STEP 1. Inspect the interface module/IED cabinet for visible damage.

On receipt of the control electronics, make sure there is no obvious damage to the enclosure or any of the internal components. Also check any switch interface connectors that are included with the control. If a battery is included with the IED and it will not be used immediately, store it in a cool dry place and recharge it every six months or less.

STEP 2. Put a copy of the source, team, and line segment information/drawing in the IED cabinet.

For more details, see the “Planning Your IntelliTeam SG System” section in S&C Instruction Sheet 1043-531, “IntelliNode Interface Module: *Setup*.”

STEP 3. Locate the items that you need in order to install and set up the IntelliTeam SG software.

The following items will be needed to install the software, set up the control, set up the communications equipment (radio, modem, etc.), and enable team operation. These items can also be used to diagnose certain types of hardware problems that can occur during installation.

- **Portable Personal Computer (PC)**—The computer must be transportable to the switch control installation site and must include Microsoft® Windows 10 and a serial communications port.
- **Access to the S&C Automation Customer Support Portal**—For access to the latest software revisions, go to sandc.com/en/contact-us/sc-customer-portal/.
- **RS232 Serial Cable**—This cable must have a DB9 pin connector at one end (to plug into the local access port on the switch control faceplate) and a connector at the other end which fits the serial port on the computer. The cable should be long enough to reach comfortably from the switch control to the PC after the control is installed at the site. It must be a “straight-through” cable, not a null-modem cable.
- **All Required Setup Discs for the Communication Equipment**—For example, if using UtiliNet radios, the RadioShop setup software disc and manual are needed.

- STEP 4.** Make sure all required communication equipment (radios, antennas, etc.) for the IntelliNode Interface Module and the IED are available.

Each team member must be able to communicate with other team members—either by radio, fiber-optics, or a direct connection. Depending on the locations of the other team members, one or more repeater radios may be needed to enable communication between this control and the other team members. For more information, refer to the manufacturer's documentation for your communication system.

- STEP 5.** Install the IntelliNode Interface Module.

The panel-mounted interface module can be mounted with Velcro inside the IED enclosure. The rack-mounted version installs in a standard 3U rackmount space.

- STEP 6.** (Optional). If the panel-mounted IntelliNode module has GPS, mount the GPS plate in the enclosure. Connect to the interface module using the provided power and data cables.

- STEP 7.** Connect Communication Port A on the interface module to the Communications Port on the host IED.

Use a D-sub 9 position straight through serial cable to connect the RS232 DB9 connector on the interface module to the host IED, with proper gender connectors on each end. See Figures 4 and 5 on page 12.

- STEP 8.** Connect power to the interface module terminal strip or connector.

The panel-mounted interface module requires 12 Vdc, and the polarity label is on the faceplate.

The rack-mounted version can be powered by: 12 Vdc, 24 Vdc, 48 Vdc, 125 Vdc, 250 Vdc, and 120 to 240 Vac 50-60 Hz. See Figure 3 on page 11. Wire the corresponding terminals of the supplied power plug as follows:

120 to 240 Vac—Line to 120-240 Vac 50-60 Hz, Neutral to Neutral/dc-

125 or 250 Vdc—Positive to 125-250 Vdc+, Negative to Neutral/ dc-

12 or 24 Vdc—Positive to 12-24 Vdc+, Negative to DC-

48 Vdc—Positive to 48 Vdc+, Negative to DC-

Ground—Ground to Chassis ground

Note: An adequately sized circuit breaker should be provided for the input power of the IntelliNode module. Locating it as close as possible to the unit being powered is highly recommended.

- STEP 9.** Connect the SpeedNet Radio or fiber-optic transceiver.

Connect a SpeedNet Radio to the ETHERNET ADD-ON port with an Ethernet cable. If the communication device uses a serial connection, connect it to Communication Port B. The communication device will typically need to be supplied 12 Vdc. Use a D-sub 9 position null-modem serial cable to connect the RS232 DB9 connector on the interface module to the communication device. The cable should have male connectors at each end. See Figures 4 and 5 on page 12.

STEP 10. If two IntelliNode Interface Modules are connected to one radio:

- (a) Use an Ethernet cable from the radio to the ETHERNET ADD-ON port of the first IntelliNode or use a null-modem serial cable from the radio to Communication Port B.
- (b) Use a null-modem serial cable from Communication Port C of the first IntelliNode module to Communication Port B of the second IntelliNode Interface Module.

STEP 11. Do one of the following:

- (a) Install the IED enclosure at the site (as described in the IED Manual), then configure the equipment, see Instruction Sheet 1043-531, "IntelliNode Interface Module: *Setup.*"
- (b) Complete the configuration steps summarized on page 13 while in the service center. Then, install the IED enclosure at the site.

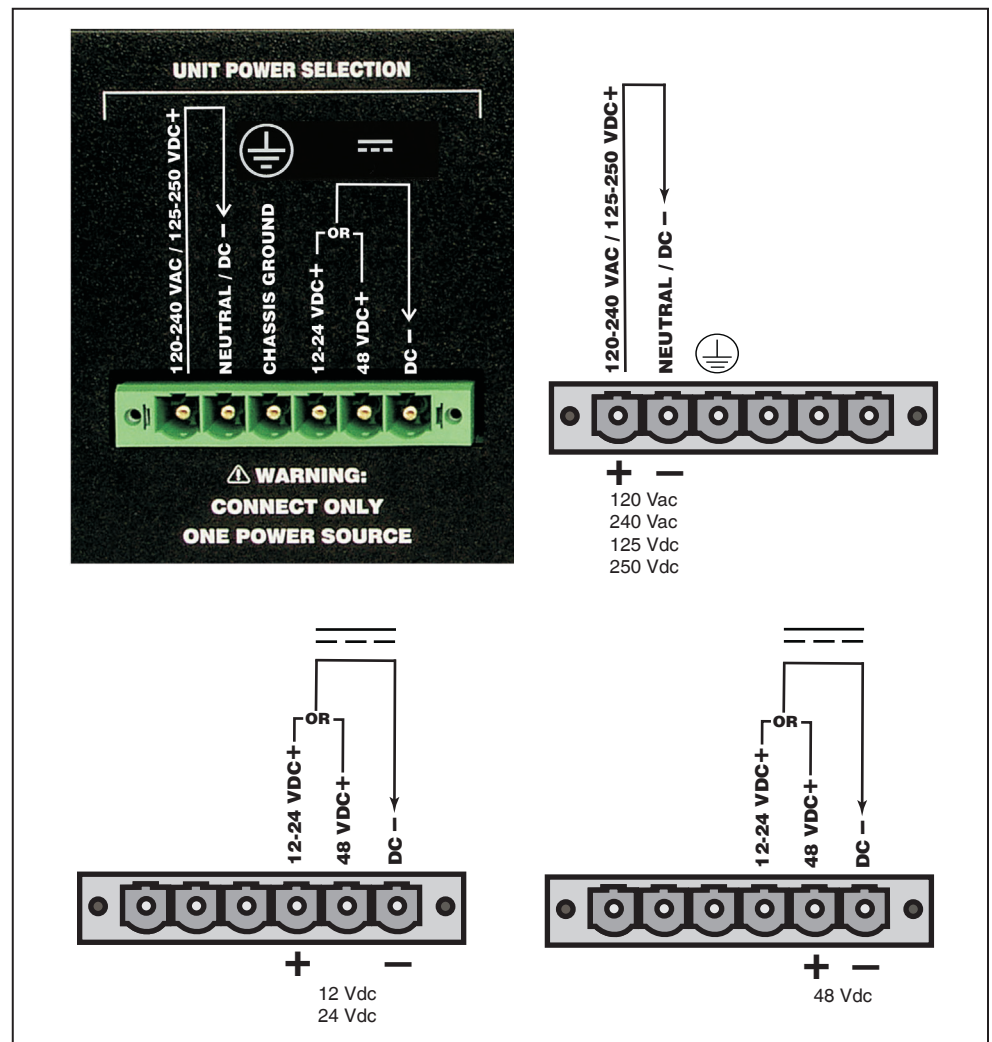


Figure 3. Rack-mounted IntelliNode Interface Module Power Terminals.

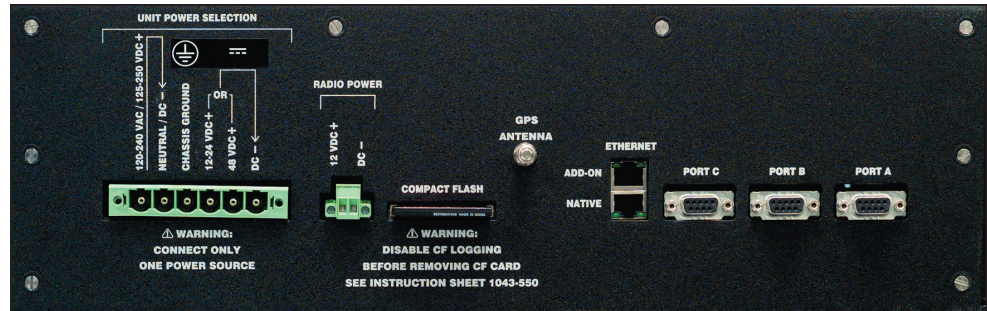


Figure 4. Rack-mounted IntelliNode Interface Module rear panel.

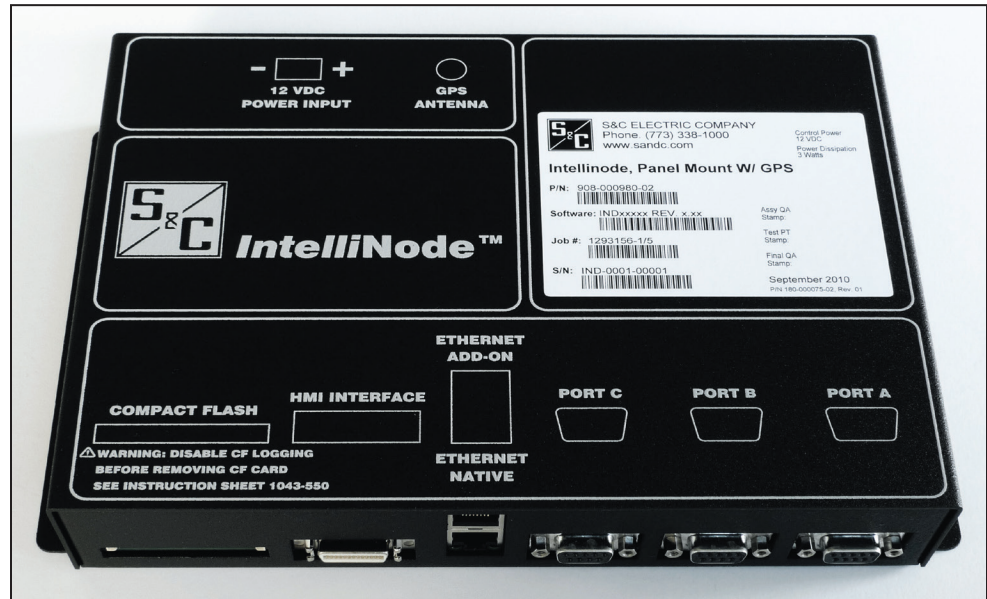


Figure 5. Panel-mounted IntelliNode Interface Module processor chassis. Connector labels are printed on the top. The right connector is Comm Port A.

Optional In-Shop Setup

The following steps can be completed while still in the shop or later at the installation site. The steps are summarized here and described in Instruction Sheet 1043-531, “IntelliNode Interface Module: *Setup*,” and the IED Manual, as noted.

STEP 1. Install S&C IntelliLink software on the computer.

For details, see the “To Install the IntelliLink Software” section in Instruction Sheet 1043-531, “IntelliNode Interface Module: *Setup*.”

STEP 2. If this IntelliNode Interface Module uses a radio, configure the radio.

For radio configuration instructions, see the manufacturer’s documentation or contact S&C.

STEP 3. If a repeater radio is needed to link the IntelliNode Interface Module to other team members, configure the repeater radio.

For radio configuration instructions, see the manufacturer’s documentation or contact S&C.

STEP 4. Set up the IntelliNode Interface Module software.

Most of the software setup can be completed while still in the shop. For an explanation of how to set up the software, see the “Setting Up the IntelliNode Interface Module and the Team” section in Instruction Sheet 1043-531, “IntelliNode Interface Module: *Setup*.”

NOTICE

With software later than version 7.3.100, the default passwords for all user accounts, including the Admin account, must be changed before the IntelliLink software can connect to and configure a control. See Instruction Sheet 1043-531, “S&C IntelliNode™ Interface Module: *Setup*,” for more information.

Installation with Host IED and Wiring

IntelliNode Interface Module/IED installation consists of several operations. Certain steps are specific to the interface module and must be performed in the correct order relative to the usual steps required for IED installation. These instructions apply for each IntelliNode Interface Module installation site.

STEP 1. Read and clearly understand the following warnings before starting to install or operate this equipment.

WARNING

These instructions do not replace the need for utility operation standards. Any conflict between the information in this document and utility practices should be reviewed by appropriate utility personnel and a decision made as to the correct procedures to follow.

For additional precautions to be observed while working around this equipment, see the host IED Manual.

You must follow the sequence of installation steps outlined in this chapter to ensure a safe and successful installation.

WARNING

During installation and setup of the IntelliNode Interface Module it is important to prevent the breaker/recloser/switch from operating unexpectedly.

This may require taking the IED out of remote operation, disabling automatic operation on both the IED and the IntelliNode Interface Module, and possibly leaving the IED disconnected from the breaker or switch mechanism.

STEP 2. Temporarily disable IED operation.

The IED must be disabled so that it cannot open or close the line while testing the IntelliNode Interface Module. For the correct way to disable the IED, see the IED Manual.

Leave the IED disabled until instructed to enable it after testing of the IntelliNode Interface Module is completed.

STEP 3. Install the IntelliNode Interface Module in the IED enclosure.

The small footprint and Velcro mount of the panel-mounted interface module facilitate installation on a flat surface. When planning your installation space, remember to leave room for attaching cables to the sockets on the bottom of the interface module, and access to the front panel buttons and LED indicators. The rack-mounted interface module installs in a standard 3U 19-inch equipment rack space.

- STEP 4.** Press the IntelliNode Interface Module faceplate PROHIBIT RESTORATION ON/OFF button to select the **On** mode.

Placing the interface module in **Prohibit Restoration On** mode does not prevent the interface module from carrying out remote switching commands. A SCADA command, received by the interface module, will cause the interface module to send a command to the IED. **Prohibit Restoration On** mode only prevents switching based on **IntelliTeam SG** logic. Because there is no **Local/Remote** feature on the interface module, the only way to prevent any remote switching commands is to use whatever **Local** or **Remote Disabled** feature existing on the IED.

- STEP 5.** Complete all normal IED installation steps.

For details, see the IED Manual.

- STEP 6.** Check the communication equipment and make sure that the communications equipment has power.

- STEP 7.** Put the IED into **Local/Non-Automatic** mode. This makes the host IED available for local operation from the faceplate.

WARNING

To avoid unexpected operation of the line switch during installation or setup operations, be sure to leave the IntelliNode Interface Module in the **Prohibit Restoration On** mode until the software in the IntelliNode Interface Module is configured.

This completes hardware installation and testing. Go to Instruction Sheet 1043-531, “IntelliNode Interface Module: *Setup*.”