

For Additional Technical Assistance Call +1.509.332.1890

Express Installation Guide

SEL-751A Feeder Protection Relay



Package Contents



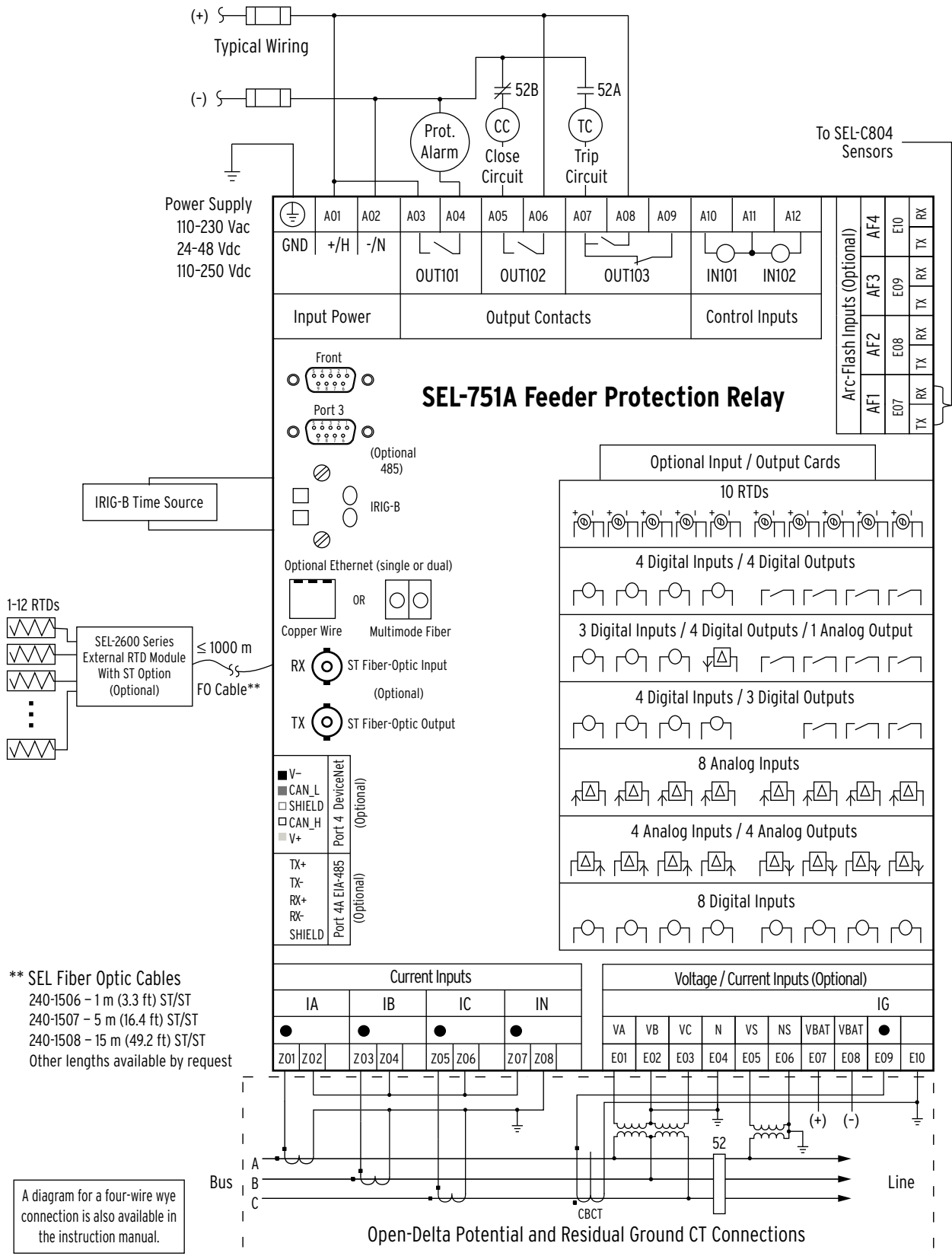
Panel Cutout Template

Manual CD

No. 8-32 Mounting Screws,
Gasket, & Serial Port Cover

Configurable Label Kit
(if equipped)

Typical Connections

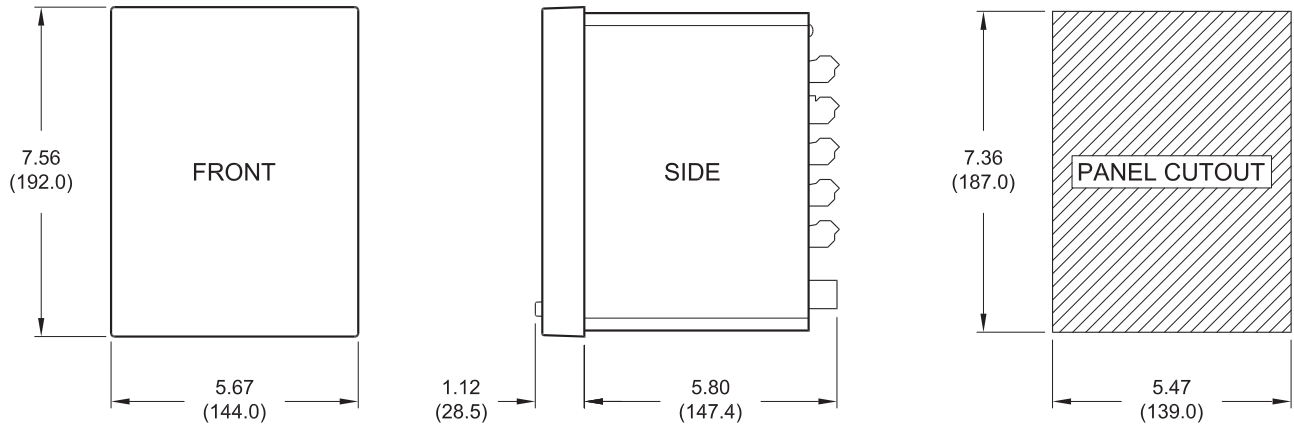


** SEL Fiber Optic Cables
 240-1506 – 1 m (3.3 ft) ST/ST
 240-1507 – 5 m (16.4 ft) ST/ST
 240-1508 – 15 m (49.2 ft) ST/ST
 Other lengths available by request

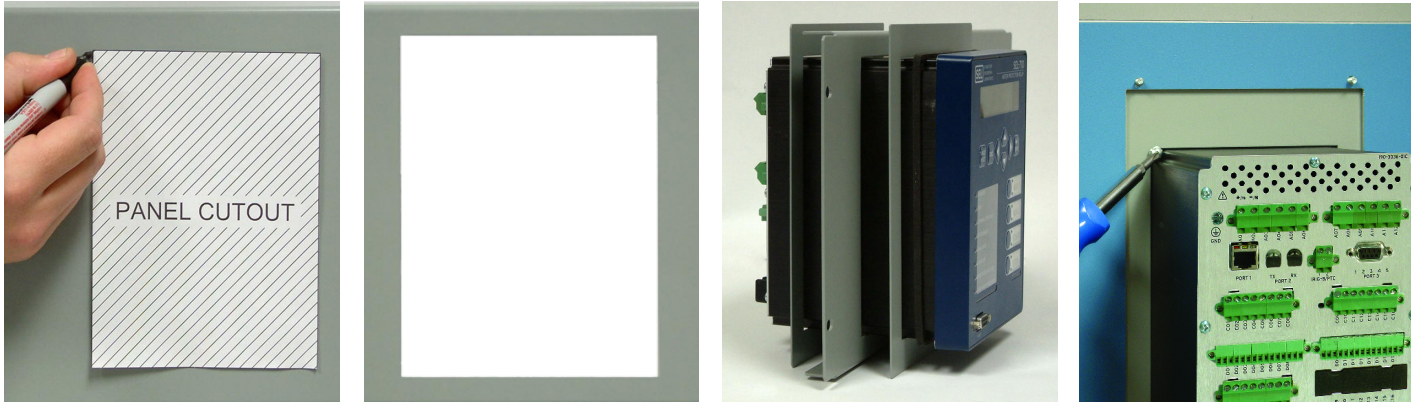
A diagram for a four-wire wye connection is also available in the instruction manual.

Rack Mounting

Mount the SEL-751A in a sheltered indoor environment (a building or an enclosed cabinet) that does not exceed the temperature rating of -40°C to $+85^{\circ}\text{C}$. For mounting consideration, the relay dimensions are shown below.

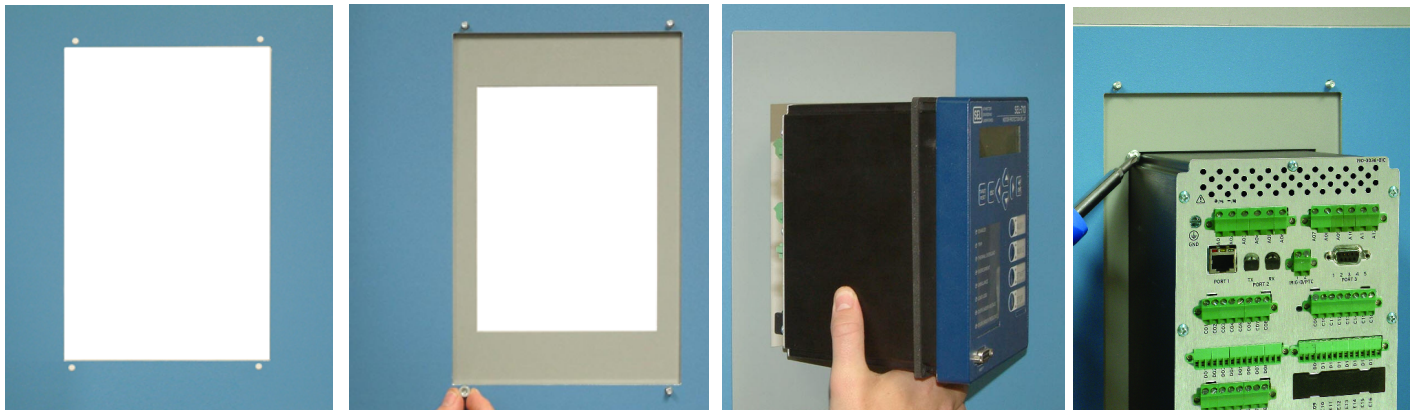


New Control Center



1. Place the enclosed Panel Cutout over desired mounting location and trace.
2. Make smooth cut around cutout.
3. Place mounting gasket around relay and insert unit into hole. (The photo displays optional appearance bezel.)
4. Fasten relay to mounting plate with included screws.

Retrofitting



1. Remove old relay.
2. Insert retrofitting plate and fasten (see www2.selinc.com/mounting_selector/ for retrofits).
3. Place mounting gasket around relay and insert unit into retrofitting plate.
4. Fasten relay to mounting plate with included screws.

Connections

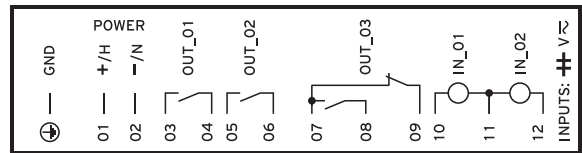
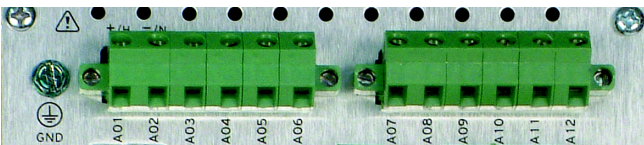
The following section shows connections for the SEL-751A with Ethernet, Fiber Optic, IRIG-B, EIA-232, 4 DO/3 DI/1 AO Option, 8 DI Option, and Voltage Option. Refer to the SEL-751A manual for additional details and other options.

Wire sizes for connections are dictated by the terminal blocks and expected load currents. You can use the following table as a guide in selecting wire sizes:

Connection Type	Minimum Wire Size	Maximum Wire Size
Grounding (Earthing) Connection	18 AWG (0.8 mm ²)	14 AWG (2.1 mm ²)
Current Connection	16 AWG (1.3 mm ²)	12 AWG (3.3 mm ²)
Potential (Voltage) Connection	18 AWG (0.8 mm ²)	14 AWG (2.1 mm ²)
Contact I/O	18 AWG (0.8 mm ²)	14 AWG (2.1 mm ²)
Other Connection	18 AWG (0.8 mm ²)	14 AWG (2.1 mm ²)

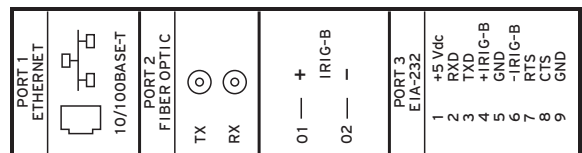
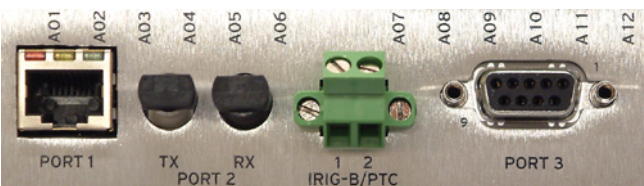
Card Slot A: Power Supply Card With 2 DI/3 DO

- Step 1. Connect ground terminal **GND** to a rack frame or switchgear ground for proper safety and performance.
- Step 2. Connect appropriate power supply to terminal 01 (+/H) and terminal 02 (-/N). Note that power terminals are isolated from chassis ground.
- Step 3. Connect up to two digital inputs, per application requirements, to optoisolated inputs IN101 (terminals 10 and 11) and IN102 (terminals 11 and 12).
- Step 4. Connect the three output contacts, per application requirements, to OUT101 (terminals 03 and 04), OUT102 (terminals 05 and 06), and OUT103 (terminals 07, 08, and 09).



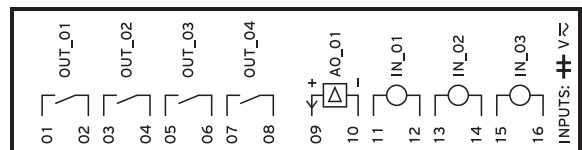
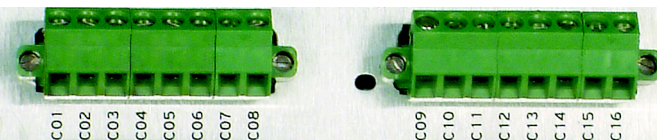
Card Slot B: Main Board With Ethernet, Fiber Optic, IRIG-B, and EIA-232

- Step 1. Connect communications devices as required to front DB-9 serial Port F (EIA-232), rear Port 3 (EIA-232), 10/100BASE-T Ethernet (RJ-45 connector) Port 1 and fiber-optic (ST[®] connector) serial Port 2.
- Step 2. Connect IRIG-B time-code input to terminals 01 (+) and 02 (-).



Card Slot C: 3 Digital Inputs, 4 Digital Outputs, 1 Analog Output Card (3 DI/4 DO/1 AO)

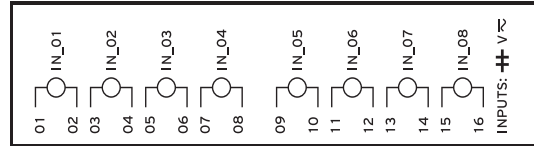
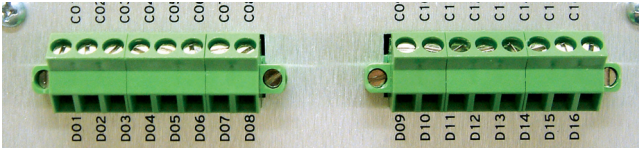
- Step 1. Connect additional digital inputs (IN_01, IN_02, IN_03) and outputs (OUT_01, OUT_02, OUT_03, OUT_04), if required by application, using the connection diagram.
- Step 2. Connect the analog (transducer) output AO_01 using terminals 09 and 10.



Connections

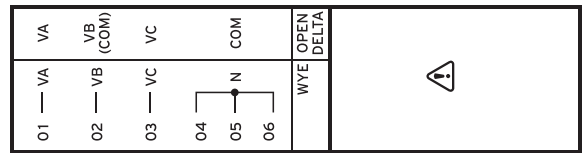
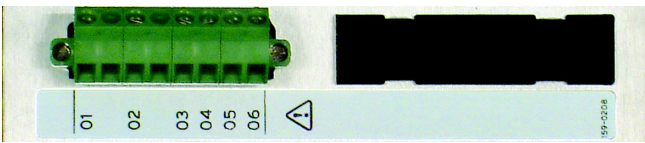
Card Slot D: Eight Digital Inputs Card (8 DI)

Connect up to eight digital inputs per application requirements to inputs IN_01 (terminals 01 and 02), IN_02 (terminals 03 and 04), . . . , IN_08 (terminals 15 and 16).



Card Slot E: Voltage Inputs Card

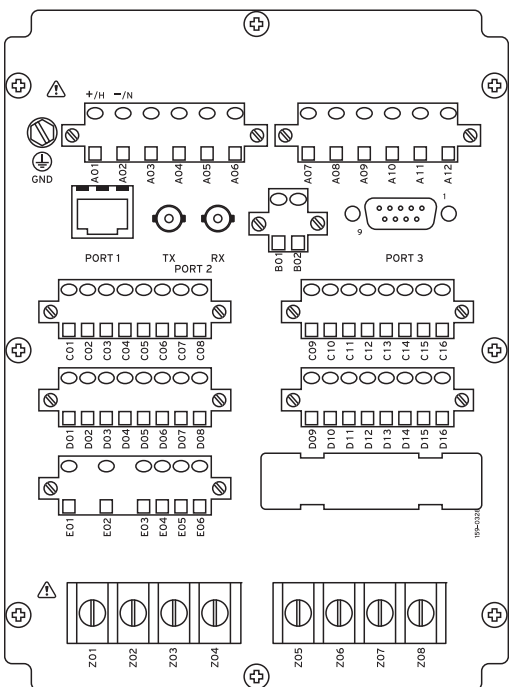
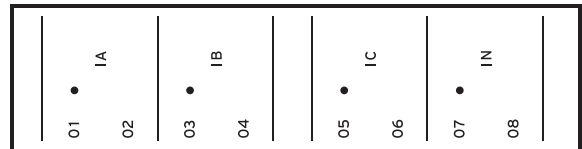
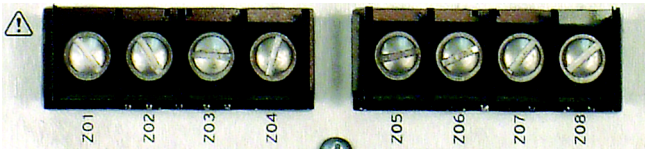
Connect four-wire wye-connected PTs or open-delta connected PTs as shown in the typical connections diagram. For other PT connection options refer to Section 2 of the SEL-751A manual.



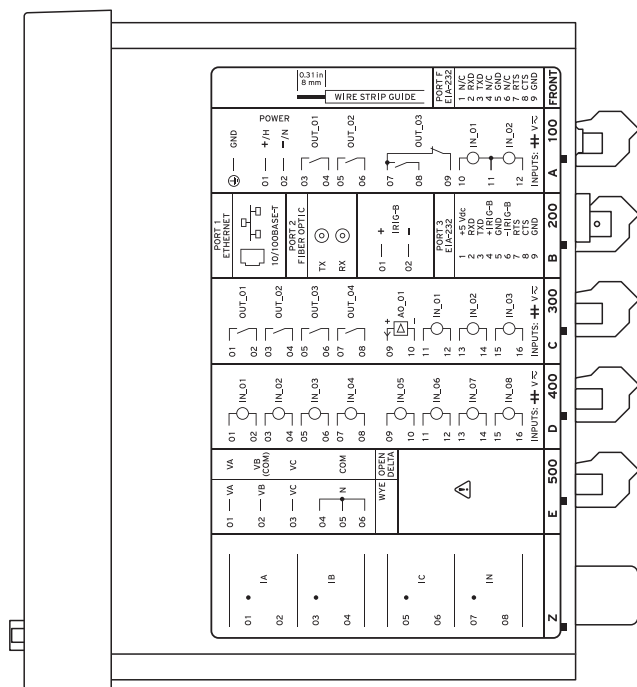
Card Slot Z: Current Inputs Card

Connect phase current and neutral current inputs as shown in the typical connections diagram.

- Step 1. Connect Phase A, Phase B, and Phase C current inputs to terminals 01 and 02; terminals 03 and 04; and terminals 05 and 06, respectively, following the convention shown in the typical connections diagram.
- Step 2. Connect neutral current IN inputs to terminals 07 and 08.



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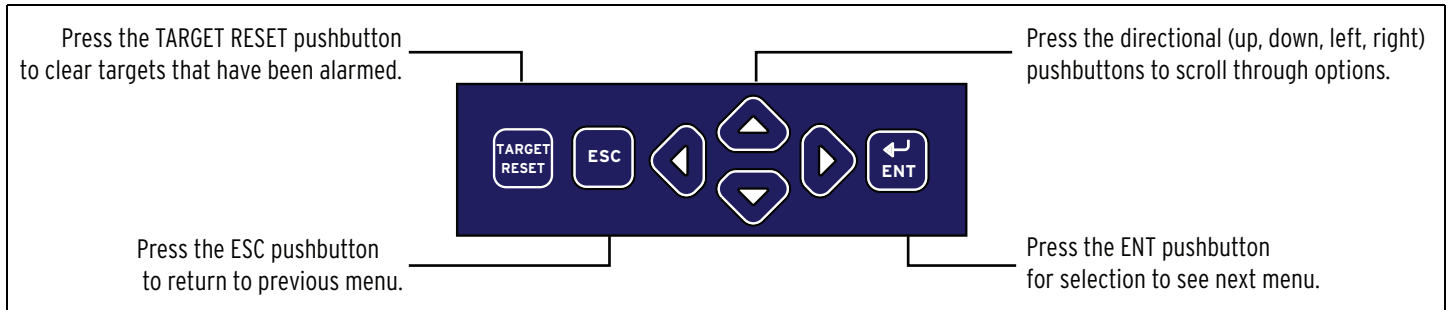
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‡ SEE DOCUMENTATION FOR INPUT VOLTAGE RATING

Communication With Relay

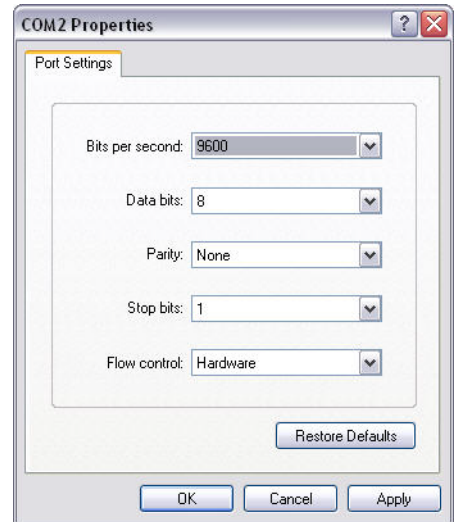
There are three ways of communicating with the SEL-751A. You can communicate with the relay using the human machine interface (HMI) on the front panel, remote communications, or a direct computer connection. For direct serial communications, the computer must have a serial port (or USB port if using SEL-C662 USB cable) and the operating system should be Windows® 2000 or newer. A standard EIA-232 crossover cable or an SEL-234A cable will also be required.

HMI Pushbuttons



Computer Connection Steps

- Step 1. Use a serial communications cable to connect the PC and the relay.
- Step 2. Apply power to both the PC and the relay.
- Step 3. Open a terminal emulation program.



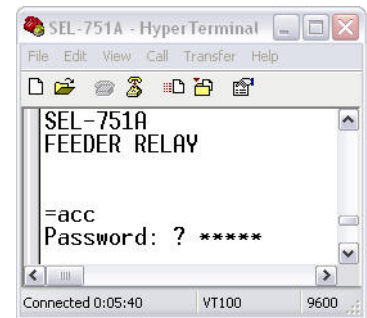
Option 1: ACSELERATOR QuickSet SEL-5030 Software

Open ACSELERATOR QuickSet and proceed to *Step 4*. If you do not have ACSELERATOR QuickSet, you can download the program from www.selinc.com/sel-5030/. Refer to Section 3 of the SEL-751A manual for more information about ACSELERATOR QuickSet.

Option 2: HyperTerminal

To open HyperTerminal go to **Start > Programs > Accessories > Communications > HyperTerminal**. Once there, you will be prompted to enter a name of your choice for the connection. Then you will choose which port to connect through. Make sure you select the same port to which you connected the cable, then click **OK**.

- Step 4. Set the PC terminal emulation program to the same communications port settings as shown in the figure to the right, and click **OK**.
- Step 5. Press the **<Enter>** key on the PC keyboard to check the communications link. You should see the = prompt. If you do not see the = prompt, check the cable connections, confirm that the settings in the terminal emulation program are the default values, and that the emulation mode is set to VT100.
- Step 6. Once you have established a connection, you can set all other relay settings and obtain values as necessary. Refer to Section 6 in the SEL-751A manual for more information.



SEL-751A Relays are shipped with default passwords. To prevent unauthorized access, change default passwords to private passwords at installation. SEL shall not be responsible for damage resulting from unauthorized access.

Relay Settings


This section of the Express Installation Guide provides step-by-step instructions for a typical application of the SEL-751A Feeder Protection Relay. For more information on the setting procedures, please refer to the SEL-751A manual or contact your local SEL representative. For more information on relay setting using ACSELERATOR QuickSet SEL-5030 Software as shown in this example, refer to Section 3 in the SEL-751A manual.

Feeder protection applications of the SEL-751A require setting the relay, including the current and voltage transformer (if used) ratios and configurations, to match the feeder installation. The relay is equipped with a wide selection of protection and logic elements. Section 4 in the SEL-751A manual describes all the protection and logic functions of the relay, together with the necessary settings.

Design the specific protection, logic, and communications system for your feeder protection application. Use the Settings Sheets provided in Section 6 of the manual to record the relay settings, or connect the relay to a personal computer (PC) and use ACSELERATOR QuickSet software to enter the settings. Complete the following steps to set the relay.

NOTE: Make sure you evaluate and confirm all relay settings before implementing this application on an actual feeder protection application.

Step 1. Use ACSELERATOR QuickSet SEL-5030 Software to connect to the SEL-751A.

- a. Use an SEL-C234A serial or SEL-C662 USB cable to connect the relay to a PC.
- b. Apply power to the relay.
- c. Start the ACSELERATOR QuickSet software program and establish communication with the relay.
- d. Click on the **Read Settings From Device** icon  to download the current settings from the relay.
- e. Save the downloaded setting file into your ACSELERATOR QuickSet database.

Step 2. Gather the SEL-751A relay application data.

Record the information gathered in this step for use in the following steps.

- Highest expected load current
- Current transformer primary and secondary ratings and connections
- System phase rotation and nominal frequency
- Voltage transformer ratios and connections, if used
- Type and location of arc-flash detectors, if arc-flash protection is used
- Type and location of resistance temperature devices (RTDs), if used
- Expected fault current magnitudes for ground and three-phase faults

Step 3. Edit the ACSELERATOR QuickSet relay settings file.

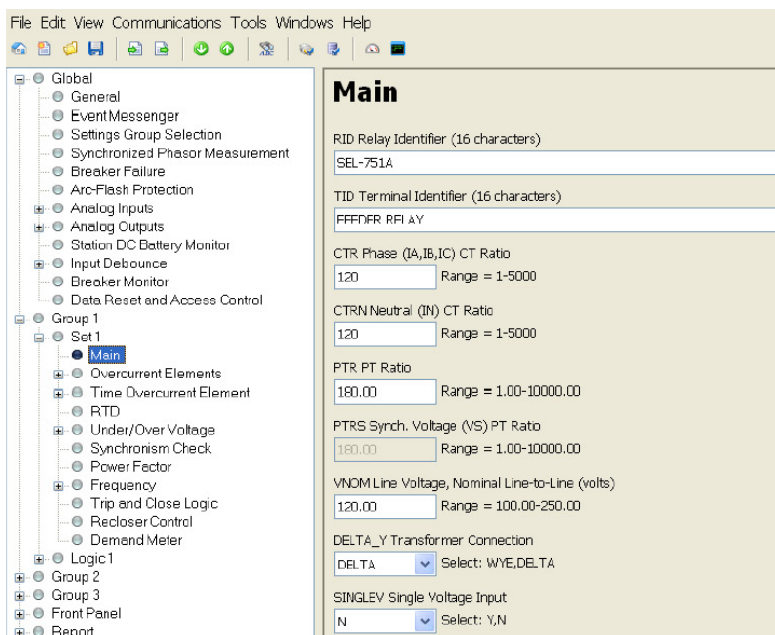
Group 1 Settings

- a. Open and edit the Group 1 Main settings (as shown in accompanying graphic).

Typically, the feeder application configuration information will be the same for all protection settings groups used in the SEL-751A.

- b. Set the CT ratio settings (CTR and CTRN), using the application data collected from *Step 2*.

If the relay is using ac voltage inputs, including synchronizing voltage input, set the PTR (PT ratio) and PTRS settings, together with the delta-wye transformer connection and nominal voltage VNOM settings.



Relay Settings

- c. Enable and set the phase overcurrent, neutral overcurrent, residual overcurrent, and negative-sequence overcurrent elements (as many as four elements of each type) as required by the application.
- d. Enable and set the phase time-overcurrent (TOC), maximum phase TOC, negative-sequence TOC, neutral-ground TOC, and the residual-ground TOC elements as required by the application.
- e. Enable and enter RTD settings if RTDs are supported by the relay and used for the application.
- f. If ac voltage inputs are supported by the relay, enable and set the undervoltage and overvoltage elements as required by the application.
- g. If synchronism-check elements are supported in the relay, enable and enter the settings per the guidance provided in Section 4 of the SEL-751A manual.
- h. Enable and set the frequency and rate-of-change-of-frequency elements (if supported and used for the application).
- i. Enable and set the power factor elements (if supported and used for the application).
- j. Set the trip/close logic settings using the Relay Word bits of the enabled protection and logic elements to drive the breaker trip logic.
- k. Enable and set the recloser control elements if the relay supports the recloser control option.
- l. Enable and set demand and peak demand metering.

Group 1 Logic Settings

Enable and enter SELOGIC control equation settings as needed by the application.

Repeat *Step 3* for Group 2 and 3 settings if required by the application.

Global Settings

Review, enable, and enter the Global settings required by the application. Global settings include event messenger, synchrophasors, breaker failure, arc-flash protection, etc.

Front-Panel Settings


- a. Configure relay display points. Use the front-panel display to indicate fault conditions, alarms, and operational parameters.
- b. Configure relay front-panel target indications.

Report Settings

- a. Configure relay event reporting (ER) to capture relay trip conditions.
- b. Configure and set the SER (sequence-of-events report) settings.
- c. Configure and set the LDP (load profile report settings) report, if required.

Communications Ports and Protocol Settings

Enable and enter the communications ports and protocol settings as required by the application.

- Step 4. Save the revised setting file into the database, click the **Send Active Settings** icon  with the settings still open, and then click **OK** when prompted to upload the revised settings into relay.
- Step 5. Perform relay verification and commissioning tests per your requirements. Refer to Section 10 in the SEL-751A manual for details on relay testing.