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SCXI™-1338 Current Input, High-Voltage Terminal Block

This guide describes how to install and use the SCXI-1338 terminal block with your SCXI-1120, SCXI-1120D, SCXI-1125, or SCXI-1126 module.

Introduction

The SCXI-1338 current input terminal block is a shielded terminal block with screw terminals that connect to the SCXI-1120, SCXI-1120D, SCXI-1125, and SCXI-1126 modules. The SCXI-1338 has eight 249 Ω precision resistors to convert current to voltage when measuring 0–20 mA and 4–20 mA process current sources.

The terminal block has 18 screw terminals for easy connection. Eight pairs of screw terminals are for signal connection to the eight module inputs. One pair of terminals connects to the SCXI chassis ground.

What You Need to Get Started

To set up and use your SCXI-1338 terminal block, you need the following items:

- ❑ SCXI-1338 current input terminal block
- ❑ *SCXI-1338 Current Input, High-Voltage Terminal Block Installation Guide*
- ❑ SCXI chassis
- ❑ One of the following modules:
  - SCXI-1120
  - SCXI-1120D
  - SCXI-1125
  - SCXI-1126

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- ❑ Number 1 and 2 Phillips-head screwdrivers
- ❑ 1/8 in. flathead screwdriver
- ❑ Long-nose pliers
- ❑ Wire cutter
- ❑ Wire insulation stripper

Conventions

The following conventions are used in this guide:



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

italic — Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

`monospace` — Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

Safety Information



Caution Do *not* operate the device in an explosive atmosphere or where there may be flammable gases or fumes.

Keep away from live circuits. Do *not* remove equipment covers or shields unless you are trained to do so. If signal wires are connected to the device, hazardous voltages can exist even when the equipment is turned off. To avoid a shock hazard, do *not* perform procedures involving cover or shield removal unless you are qualified to do so and disconnect all field power prior to removing covers or shields.

Equipment described in this document must be used in an Installation Category II[1] environment per IEC 60664-1. This category requires local level supply mains-connected installation.

[1] Category II refers to local-level power distribution, such as that provided by a standard wall outlet.

Do *not* operate damaged equipment. The safety protection features built into this device can become impaired if the device becomes damaged in any way. If the device is damaged, turn the device off and do *not* use it until service-trained personnel can check its safety. If necessary, return the device to National Instruments for service and repair to ensure that its safety is not compromised.

Do *not* operate this equipment in a manner that contradicts the information specified in this document. Misuse of this equipment could result in a shock hazard.

Do *not* substitute parts or modify equipment. Because of the danger of introducing additional hazards, do *not* install unauthorized parts or modify the device. Return the device to National Instruments for service and repair to ensure that its safety features are not compromised.

You *must* insulate all of your signal connections to the highest voltage with which the SCXI-1338 can come in contact.

When using the device with high common-mode voltages, you *must* insulate your signal wires for the highest input voltage. National Instruments is *not* liable for any damages or injuries resulting from inadequate signal wire insulation. Use only 26-14 AWG wire with a minimum voltage rating of 300 V and a temperature value of 60 °C for measuring up to 300 V.

When connecting or disconnecting signal lines to the SCXI terminal block screw terminals, make sure the lines are powered off. Potential differences between the lines and the SCXI ground can create a shock hazard while you connect the lines.

Connections, including power signals to ground and vice versa, that exceed any of the maximum signal ratings on the SCXI device can create a shock or fire hazard, or can damage any or all of the boards connected to the SCXI chassis, the host computer, and the SCXI device. National Instruments is *not* liable for any damages or injuries resulting from incorrect signal connections.

If hazardous voltages ($\geq$30 V_{rms} and 42.4 V_{peak} or 60 VDC) are present, you *must* connect a safety earth-ground wire to the terminal block safety-ground lug, shown in Figure 2. This complies with safety agency requirements and protects against electric shock when the terminal block is not connected to the chassis. To connect the safety earth-ground to the safety-ground lug, run an earth-ground wire from the signal source to the terminal block. National Instruments is *not* liable for any damages or injuries resulting from inadequate safety earth-ground connections.

Do *not* loosen or re-orient the safety-ground lug hardware when connecting the safety-ground wire; to do so reduces the safety isolation between the high voltage and safety ground.

Clean the module and accessories by brushing off light dust with a soft non-metallic brush.

Remove other contaminants with a stiff non-metallic brush. The unit *must* be completely dry and free from contaminants before returning it to service.
The terminal block *must* be used with a UL-listed SCXI chassis.

Current-Loop Resistors

Note Refer to the *Safety Information* and *Connecting the Signals* sections before removing equipment covers or connecting or disconnecting any signal wires.

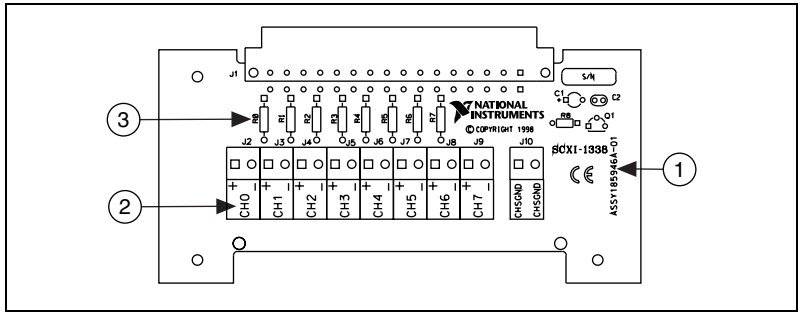
The SCXI-1338 is used with the SCXI-1120, SCXI-1120D, SCXI-1125, and SCXI-1126 modules to measure 0–20 mA and 4–20 mA sources. The SCXI-1338 contains a precision 249 Ω, 0.1%, 10 ppm, 1/4 W resistor across each channel to convert current to voltage. The SCXI module then measures the voltage and the data acquisition (DAQ) device acquires the voltage.

To convert the voltage read by the SCXI module to the actual current being measured, use the following formula:

$$current = measured\ voltage / 249$$

The voltage measured for a 4–20 mA current source is in the range of 0.996–4.98 VDC.

The SCXI-1338 can measure both current sources and voltage sources. When measuring voltage signals, you must remove the current-loop resistor for that input channel. You can identify the resistor for a particular channel by its reference designator. The reference designator matches the channel the resistor is across. For example, input channel 0 has resistor R0 across it. Input channel 7 has resistor R7 across it. Figure 1 shows the SCXI-1338 signal connections.



1	Product Name, Assembly Number, Revision Letter, and Serial Number	2	Channel Labeling
		3	Current-Loop Resistors

Figure 1. SCXI-1338 Signal Connections

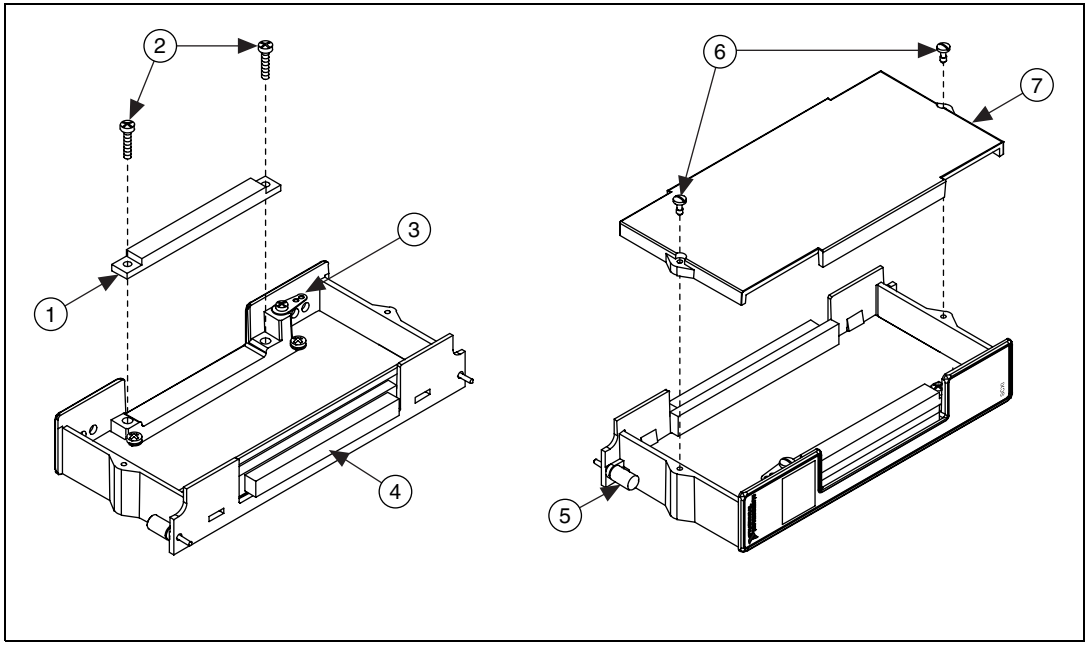
Connecting the Signals

Note Refer to the *Safety Information* section before removing equipment covers or connecting or disconnecting any signal wires.

When connecting your signals to the SCXI-1338, follow the labeling on the SCXI-1338 for the appropriate module, as indicated in Figure 1.

To connect the signal to the terminal block, perform the following steps, referring to Figures 1 and 2 as necessary:

1. Unscrew the top cover screws and remove the top cover.
2. Loosen the strain-relief screws and remove the strain-relief bar.
3. Run the signal wires through the strain-relief opening. You can add insulation or padding, if necessary.
4. Prepare your signal wire by stripping the insulation no more than 7 mm.
5. Connect the wires to the screw terminals by inserting the stripped end of the wire fully into the terminal. No bare wire should extend past the screw terminal. Exposed wire increases the risk of a short circuit and equipment failure.
6. Tighten the screws to a torque of 5–7 in.-lb.
7. Connect safety earth ground to the safety ground lug. Refer to the *Safety Information* section for connection information.
8. Reinstall the strain-relief bar and tighten the strain-relief screws.
9. Reinstall the top cover and tighten the top cover screws.



1 Strain-Relief Bar	4 Mating Connector	6 Top Cover Screws
2 Strain-Relief Screws	5 Thumbscrew	7 Top Cover
3 Safety Ground Lug		

Figure 2. SCXI-1338 Parts Locator Diagram

Installing the Terminal Block

To connect the terminal block to the SCXI module front connector, perform the following steps:

1. Connect the module front connector to its mating connector on the terminal block.
2. Tighten the top and bottom thumbscrews on the back of the terminal block to hold it securely in place.

Specifications

All specifications are typical at 25 °C unless otherwise specified.

Electrical

Compatible modules

- SCXI-1120/D ..... 8 input channels
- SCXI-1125 ..... 8 input channels
- SCXI-1126 ..... 8 input channels

Coupling ..... DC[1]

Current-receiver resistors

- Resistor provided ..... 1 per channel, socketed (8 total)
- Resistance ..... 249 Ω
- Resistance accuracy ..... ±0.1%
- Temperature coefficient ..... 10 ppm/°C
- Wattage ..... 0.25 W

Maximum working voltage (signal + common – mode)

- Channel to ground ..... Each channel must remain within 300 V_{rms} or ±300 VDC of ground
- Channel to channel ..... Each channel must remain within 300 V_{rms} or ±300 VDC of the voltage applied to any other channel

Maximum input current ..... ±20 mA

Field-wiring connectivity

- Screw terminals for signals ..... 16 (8 pairs)
- Screw terminals for functional earth ground 2
- Safety earth-ground lugs 1
- Strain relief ..... Strain-relief bar at terminal block entrance
- Maximum wire gauge ..... 16 AWG

[1] In instrumentation terminology, *DC coupling* means that both DC and AC signals are passed.

Terminal spacing .....0.5 cm (0.2 in.) center-to-center

Dimensions of front entrance .....1.2 by 7.3 cm (0.47 by 2.87 in.)

Solder pads for additional components.....none

Mechanical

Dimensions .....17.8 by 7.94 by 3.0 cm (7.0 by 3.125 by 1.2 in.)

Weight .....200 gm (7 oz.)

Environmental

Operating temperature .....0 to 50 °C

Storage temperature.....–20 to 70 °C

Relative humidity .....10 to 90% noncondensing

Pollution degree.....2

Altitude (maximum) .....2000 m

Safety

Designed in accordance with IEC 61010-1, UL 3111-1, and CAN/CSA C22.2 No. 1010.1 for electrical measuring and test equipment.

Installation Category II

Pollution degree 2

Electromagnetic Compatibility

EMC/EMI .....CE, C-Tick and FCC Part 15 (Class A) Compliant

Electrical emissions .....EN 55011 Class A at 10 m, FCC Part 15A above 1 GHz

Electrical immunity .....Evaluated to EN 61326:1998, Table 1

Note This device should only be operated with shielded cabling for full EMC and EMI compliance. See the Declaration of Conformity for this product for any additional regulatory compliance information.

Technical Support Resources

NI Web Support

National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of `ni.com`

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