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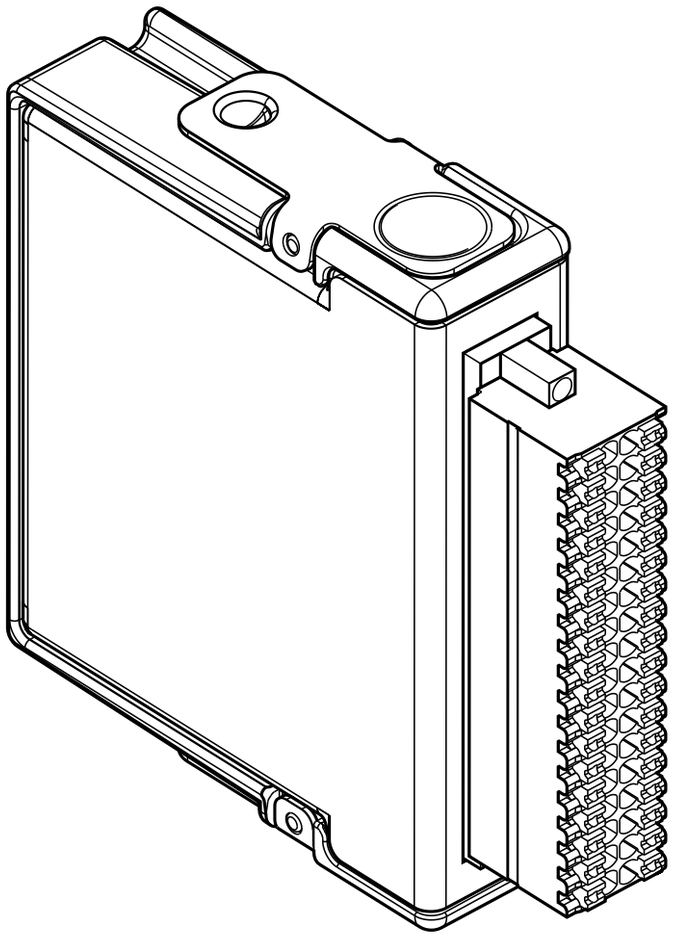
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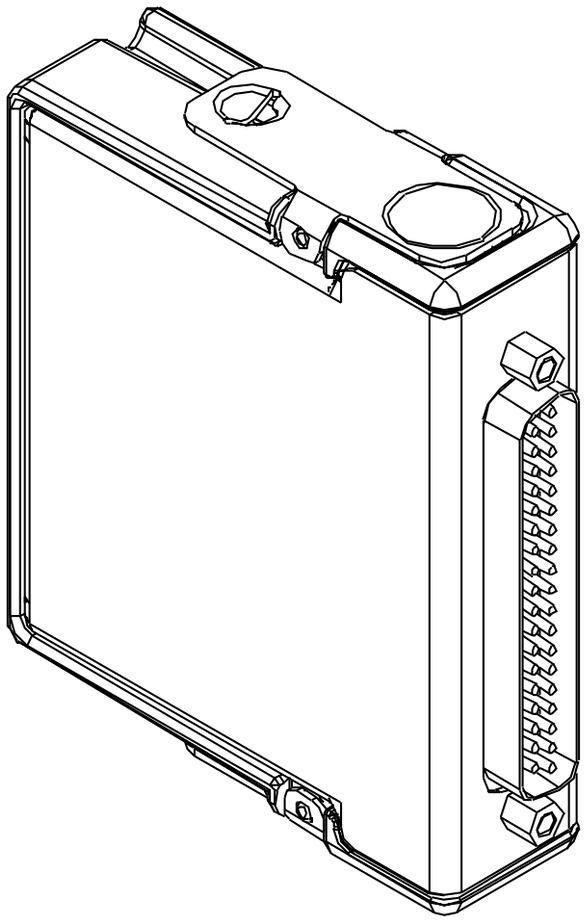
Find the *National Instruments NI 9209* at our website: ***Click HERE***

GETTING STARTED GUIDE

NI 9202

16 AI, ±10 V, 24 bit, 10 kS/s/ch Simultaneous





NATIONAL INSTRUMENTS™

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This document explains how to connect to the NI 9202. In this document, the NI 9202 with spring terminal and the NI 9202 with DSUB are referred to inclusively as the NI 9202.



Note Before you begin, complete the software and hardware installation procedures in your chassis documentation.



Note The guidelines in this document are specific to the NI 9202. The other components in the system might not meet the same safety ratings. Refer to the documentation for each component in the system to determine the safety and EMC ratings for the entire system.

Safety Guidelines

Operate the NI 9202 only as described in this document.



Caution This icon denotes a caution, which advises you to consult documentation where this symbol is marked.

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Caution Do not operate the NI 9202 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.



Hazardous Voltage This icon denotes a warning advising you to take precautions to avoid electrical shock with the NI 9202 with spring terminal.

Safety Voltages

Connect only voltages that are within the following limits:

Maximum voltage[1]	
Channel-to-COM	±30 V DC maximum, up to 6 channels at a time

[1] The maximum voltage that can be applied or output between AI and COM without creating a safety hazard.

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NI 9202 with Spring Terminal Isolation Voltages

Channel-to-channel	None
Channel-to-earth ground	
Continuous	250 V RMS, Measurement Category II
Withstand	
up to 5,000 m	3,000 V RMS, verified by a 5 s dielectric withstand test

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example, 115 V for U.S. or 230 V for Europe.



Caution Do not connect the NI 9202 with spring terminal to signals or use for measurements within Measurement Categories III or IV.

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NI 9202 with DSUB Isolation Voltages

Channel-to-channel	None
Channel-to-earth ground	
Continuous	60 V DC, Measurement Category I
Withstand	
up to 2,000 m	1,000 V RMS, verified by a 5 s dielectric withstand test
up to 5,000 m	500 V RMS

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

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Caution Do not connect the NI 9202 with DSUB to signals or use for measurements within Measurement Categories II, III, or IV.

Note Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are for other circuits not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Safety Guidelines for Hazardous Voltages

You can connect hazardous voltages only to the NI 9202 with spring terminal. Do not connect hazardous voltages to the NI 9202 with DSUB.

If hazardous voltages are connected to the device, take the following precautions. A hazardous voltage is a voltage greater than 42.4 V_{pk} voltage or 60 V DC to earth ground.

Caution Ensure that hazardous voltage wiring is performed only by qualified personnel adhering to local electrical standards.

Caution Do not mix hazardous voltage circuits and human-accessible circuits on the same module.

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Caution Ensure that devices and circuits connected to the module are properly insulated from human contact.



Note When module terminals are hazardous voltage LIVE (>42.4 V_{pk}/60 V DC), you must ensure that devices and circuits connected to the module are properly insulated from human contact. You must use the NI 9940 connector backshell kit with the NI 9202 with spring terminal to ensure that the terminals are not accessible.

Safety Guidelines for Hazardous Locations

The NI 9202 is suitable for use in Class I, Division 2, Groups A, B, C, D, T4 hazardous locations; Class I, Zone 2, AEx nA IIC T4 Gc and Ex nA IIC T4 Gc hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the NI 9202 in a potentially explosive environment. Not following these guidelines may result in serious injury or death.



Caution Do not disconnect I/O-side wires or connectors unless power has been switched off or the area is known to be nonhazardous.

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Caution Do not remove modules unless power has been switched off or the area is known to be nonhazardous.

Caution Substitution of components may impair suitability for Class I, Division 2, or Zone 2.

Caution The system must be installed in an enclosure certified for the intended hazardous (classified) location, having a tool secured cover/door, where a minimum protection of at least IP54 is provided.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the

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product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.



Caution To ensure the specified EMC performance of the NI 9202 with DSUB, the length of all I/O cables must be no longer than 30 m (100 ft).



Caution To ensure the specified EMC performance, operate the NI 9202 with DSUB only with shielded cables and accessories. Do not use unshielded cables or accessories unless they are installed in a shielded enclosure with properly designed and shielded input/output ports and connected to the product using a shielded cable. If unshielded cables or accessories are not properly installed and shielded, the EMC specifications for the product are no longer guaranteed.

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Special Conditions for Marine Applications

Some products are Lloyd's Register (LR) Type Approved for marine (shipboard) applications. To verify Lloyd's Register certification for a product, visit *ni.com/certification* and search for the LR certificate, or look for the Lloyd's Register mark on the product.

Caution In order to meet the EMC requirements for marine applications, install the product in a shielded enclosure with shielded and/or filtered power and input/output ports. In addition, take precautions when designing, selecting, and installing measurement probes and cables to ensure that the desired EMC performance is attained.

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Environmental

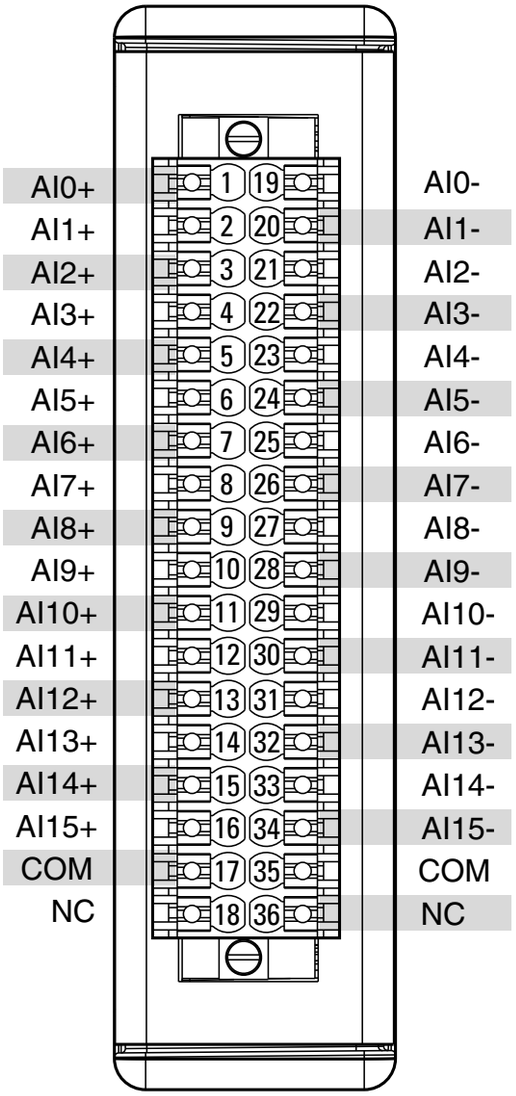
Refer to the manual for the chassis you are using for more information about meeting these specifications.

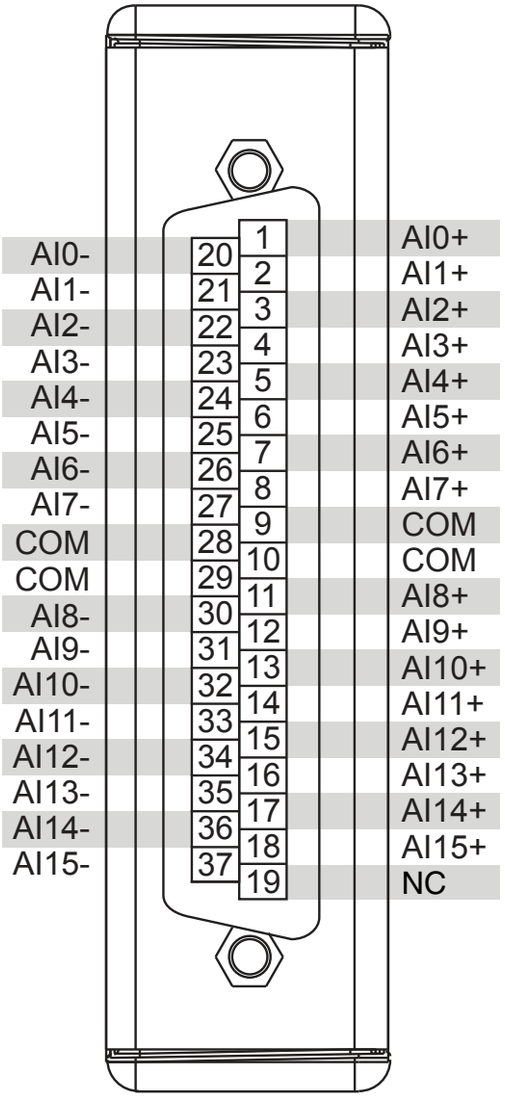
Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 85 °C
Ingress protection	IP40
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-78)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m

Indoor use only.

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NI 9202 Pinout



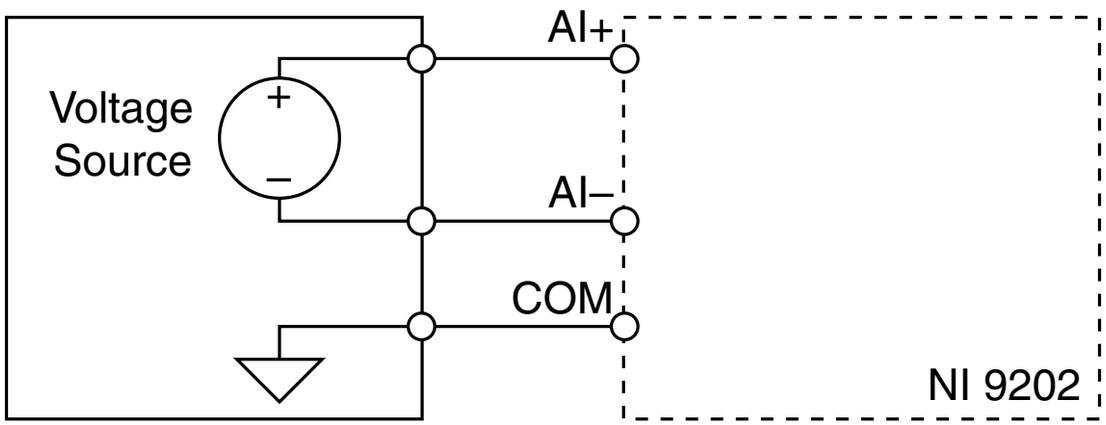


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Table 1. Signal Descriptions

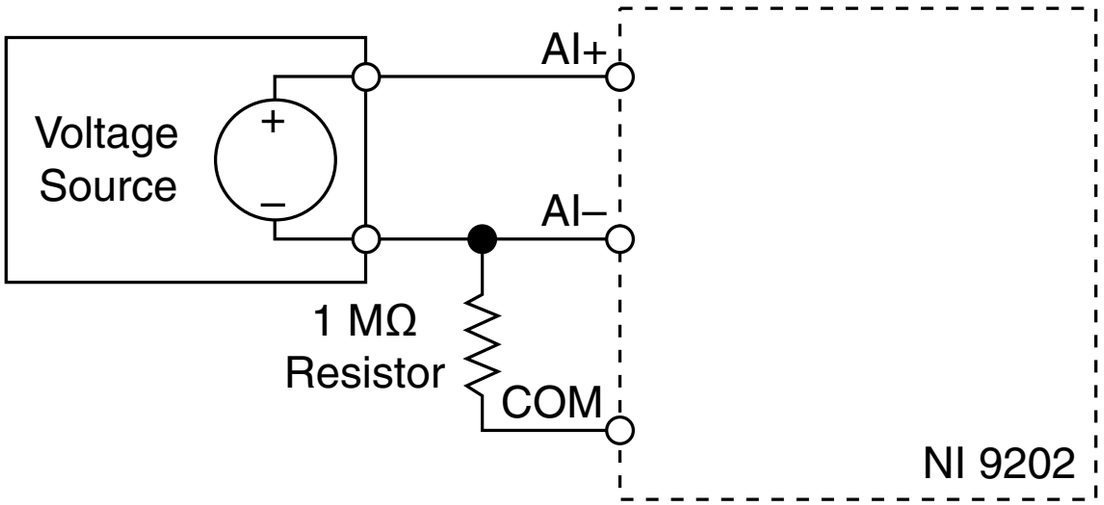
Signal	Description
AI+	Positive analog input signal connection
AI-	Negative analog input signal connection
COM	Common reference connection to isolated ground
NC	No connection

Grounded Differential Connections



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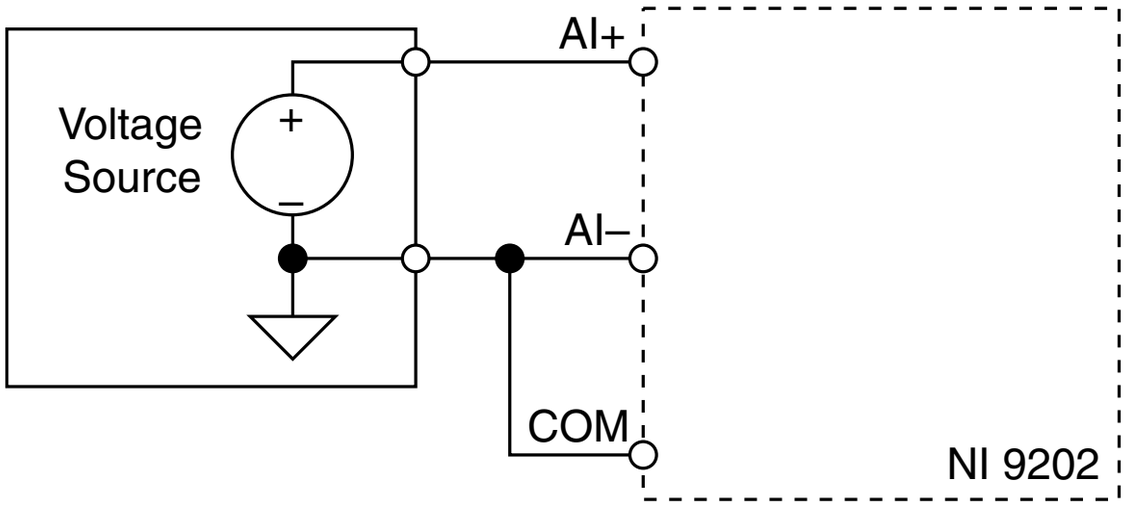
Floating Differential Connections



Connect the negative lead to COM through a 1 MΩ resistor to keep the signal source within the common-mode voltage range. The NI 9202 does not read data accurately if the signal source is outside of the common-mode voltage range.

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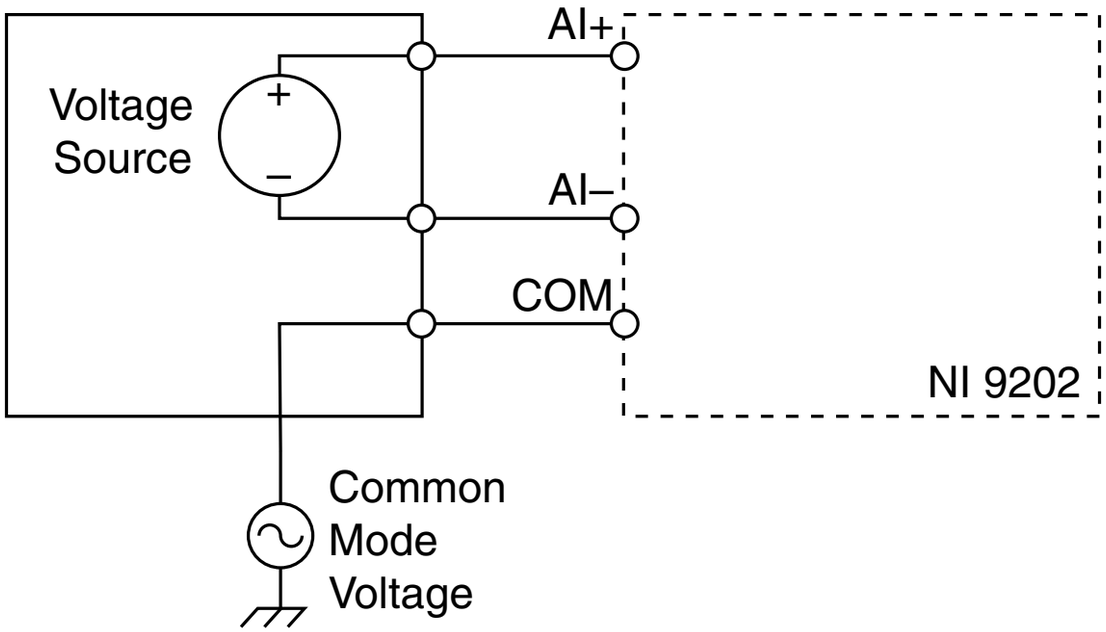
Single-Ended Connections



Connect the ground signal to COM to keep the signal source within the common-mode voltage range.

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Differential Connections with Common Mode Voltage



NI 9202 Connection Guidelines

- Make sure that devices you connect to the NI 9202 are compatible with the module specifications.
- You must use 2-wire ferrules to create a secure connection when connecting more than one wire to a single terminal on the NI 9202 with spring terminal.

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- For the NI 9202 with spring terminal, push the wire into the terminal when using a solid wire or a stranded wire with a ferrule.
- For the NI 9202 with spring terminal, open the terminal by pressing the push button when using stranded wire without a ferrule.

High-Vibration Application Connections

If your application is subject to high vibration, NI recommends that you use the NI 9940 backshell kit to protect connections to the NI 9202 with spring terminal.

Overvoltage Protection

The NI 9202 provides overvoltage protection for each channel.

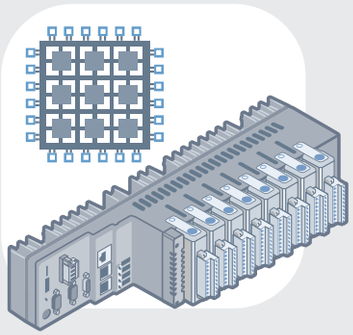


Note Refer to the device datasheet on *ni.com/manuals* for more information about overvoltage protection.

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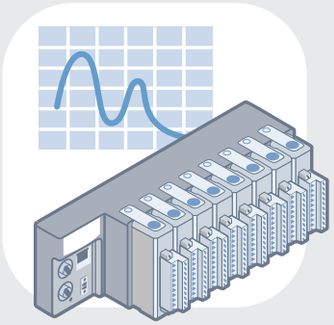
Where to Go Next

CompactRIO



- NI 9202 Datasheet
- NI-RIO Help
- LabVIEW FPGA Help

CompactDAQ



- NI 9202 Datasheet
- NI-DAQmx Help
- LabVIEW Help

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Worldwide Support and Services

The NI website is your complete resource for technical support. At *ni.com/support*, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

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Visit *ni.com/register* to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting *ni.com/certification*. If your product supports calibration, you can obtain the calibration certificate for your product at *ni.com/calibration*.

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