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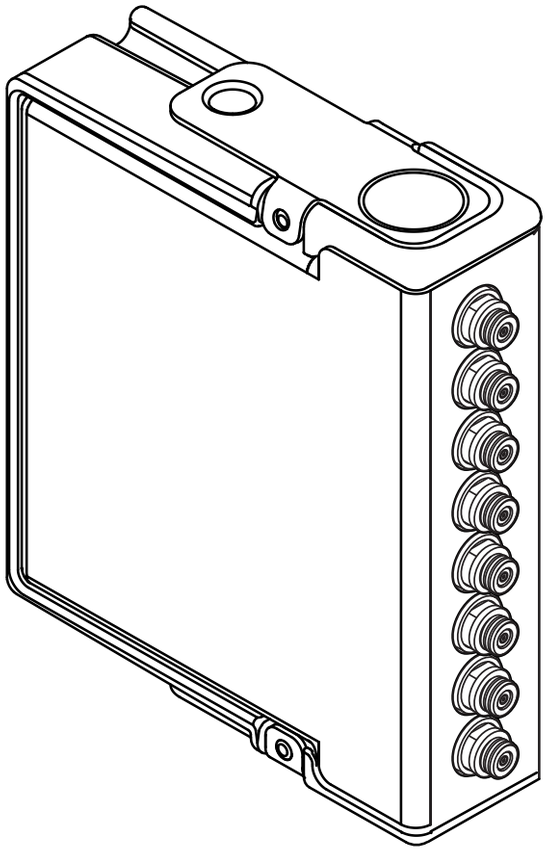
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Find the *National Instruments NI 9231* at our website: ***Click HERE***

GETTING STARTED GUIDE

NI 9231

8 AI, ±5 V, 24 Bit, 51.2 kS/s/ch Simultaneous, AC/DC Coupling, IEPE AC Coupling



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This document explains how to connect to the NI 9231.



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 9231. 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 9231 only as described in this document.



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



Caution Do not operate the NI 9231 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection

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built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

NI 9231 with 10-32 Coaxial Jack Safety Voltages

Connect only voltages that are within the following limits:

Channel-to-earth ground	±30 V maximum, Measurement Category I
Isolation	
Channel-to-channel	None
Channel-to-earth ground	None

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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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.

Caution Do not connect the NI 9231 to signals or use for measurements within Measurement Categories II, III, or IV.

Safety Guidelines for Hazardous Locations

The NI 9231 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 9231 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.

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI 9231 has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 12 ATEX 1202658X and is IECEx UL 14.0089X certified. Each NI 9231 is marked Ⓔx II 3G and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of -40 °C ≤ Ta ≤ 70 °C. If you are using the NI 9231 in Gas Group IIC hazardous locations, you must use the device in an NI chassis that has been evaluated as Ex nC IIC T4, Ex IIC T4, Ex nA IIC T4, or Ex nL IIC T4 equipment.

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Caution Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value of 85 V at the supply terminals to the equipment.

Caution The system shall only be used in an area of not more than Pollution Degree 2, as defined in IEC/EN 60664-1.

Caution The system shall be mounted in an ATEX/IECEx-certified enclosure with a minimum ingress protection rating of at least IP54 as defined in IEC/EN 60079-15.

Caution The enclosure must have a door or cover accessible only by the use of a tool.

EMC 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

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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 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.



Notice To ensure the specified EMC performance, operate this product only with shielded cables and accessories.



Notice To ensure the specified EMC performance, the length of all I/O cables must be no longer than 3 m (10 ft).

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Notice Conducted RF interference on the NI 9231 can adversely affect its I/O ports' measurement accuracy.

Preparing the Environment

Ensure that the environment in which you are using the NI 9231 meets the following specifications.

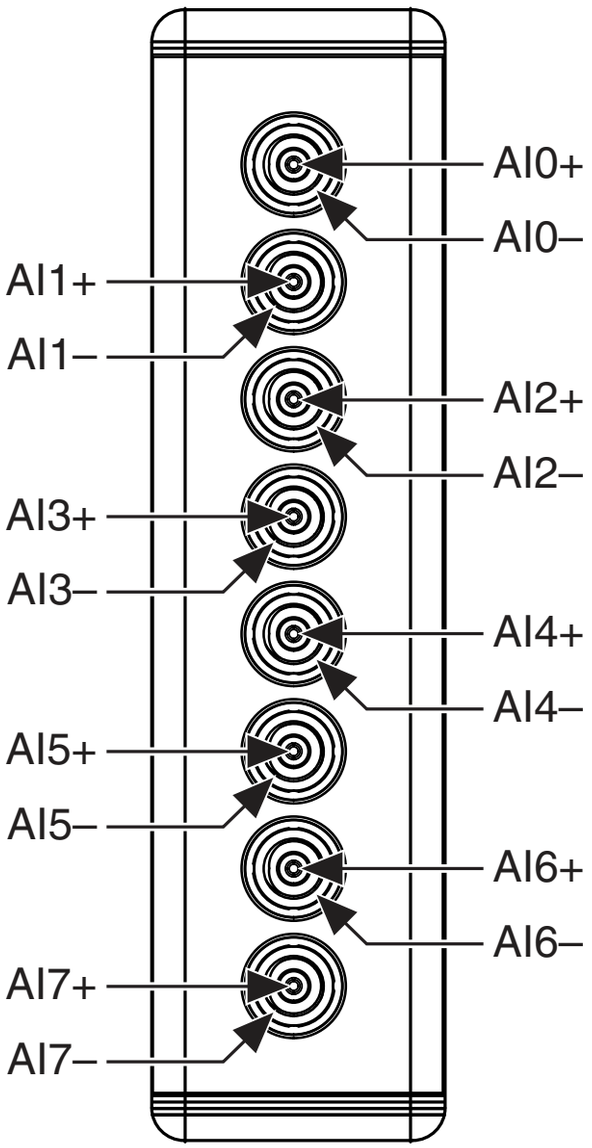
Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Operating humidity (IEC 60068-2-30)	10% RH to 90% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m

Indoor use only.

Note Refer to the device datasheet on *ni.com/manuals* for complete specifications.

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NI 9231 Pinout

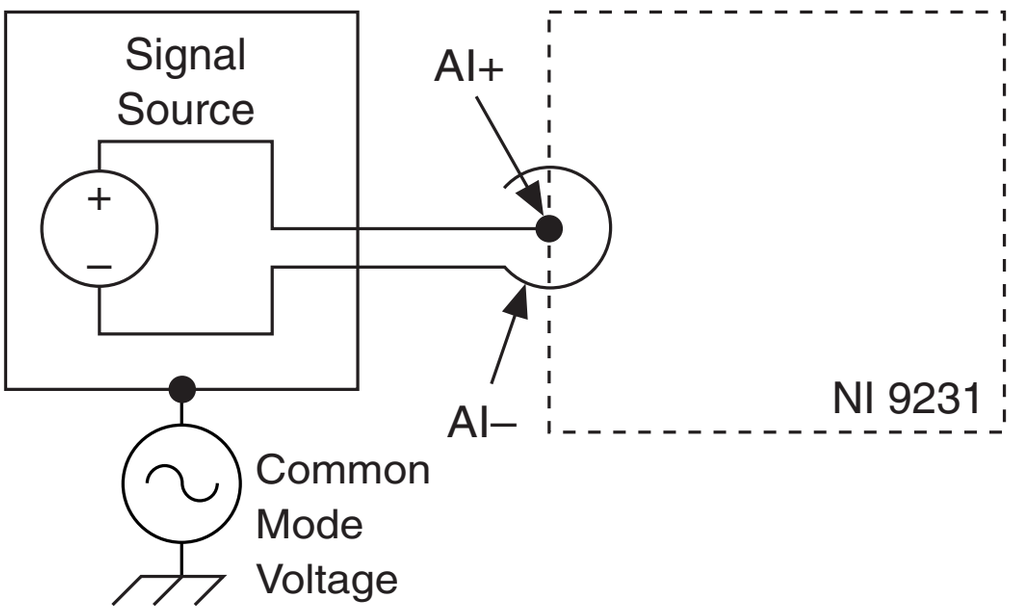


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Table 1. Signal Descriptions

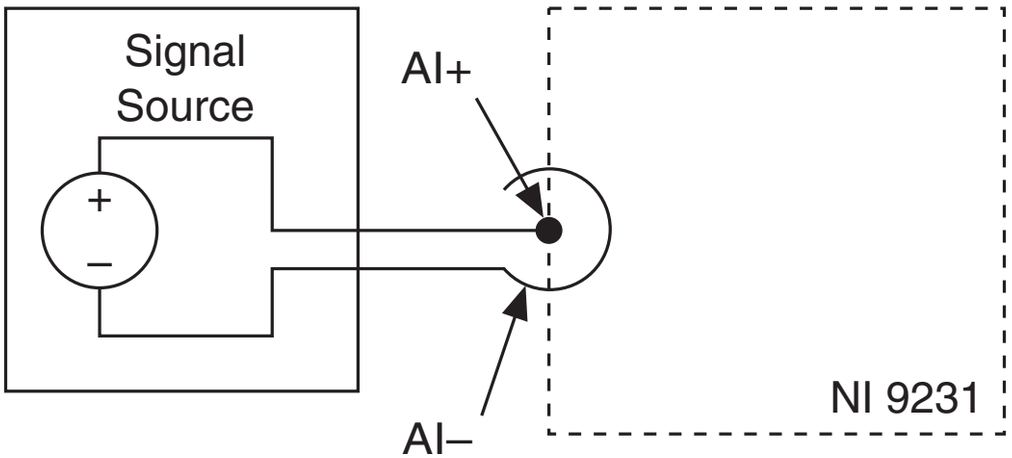
Signal	Description
AI+	Positive analog input signal connection
AI-	Negative analog input signal connection

Grounded Connections



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Floating Connections



NI 9231 Connection Guidelines

- Make sure that devices you connect to the NI 9231 are compatible with the module specifications.

Integrated Electronic Piezoelectric (IEPE) Sensors

The NI 9231 provides an IEPE excitation current for each channel to measure the IEPE sensors. Typical IEPE sensors have a case that is electrically isolated from the IEPE electronics. As a

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result, connecting the sensor to the NI 9231 results in a floating connection even though the case of the sensor is grounded.

Overvoltage Protection

The NI 9231 provides overvoltage protection for each channel.

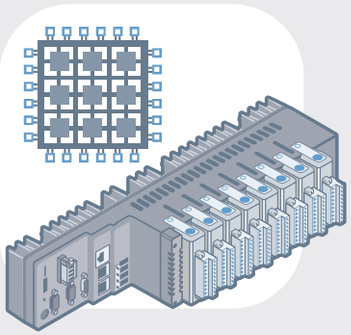


Note Refer to the device datasheet on *ni.com/manuals* for more information about overvoltage protection.

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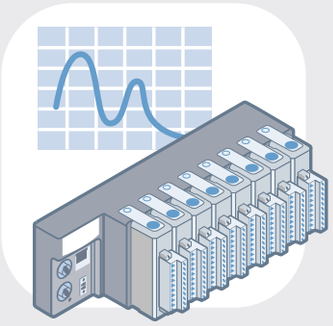
Where to Go Next

CompactRIO



- *NI 9231 Datasheet*
- *NI-RIO Help*
- *LabVIEW FPGA Help*

CompactDAQ



- *NI 9231 Datasheet*
- *NI-DAQmx Help*
- *LabVIEW Help*

RELATED INFORMATION

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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.

Visit *ni.com/services* for information about the services NI offers.

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*.

NI corporate headquarters is located at
11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI

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also has offices located around the world. For support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For support outside the United States, visit the *Worldwide Offices* section of *ni.com/niglobal* to access the branch office websites, which provide up-to-date contact information.

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378041A-01 April 3, 2018

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