NI-9234 Getting Started

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Contents

Before You Begin

Read the **NI-9234 Safety, Environmental, and Regulatory Information** and complete the software and hardware installation procedures in your chassis documentation.

Safety Guidelines

Caution Observe all instructions and cautions in the user documentation. Using the product in a manner not specified can damage the product and compromise the built-in safety protection.

Attention Suivez toutes les instructions et respectez toutes les mises en garde de la documentation d'utilisation. L'utilisation du produit de toute autre façon que celle spécifiée risque de l'endommager et de compromettre la protection de sécurité intégrée.

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

Safety Guidelines for Hazardous Locations

The NI-9234 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-9234 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.

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.

Caution For Division 2 and Zone 2 applications, connected signals must be within the following limits.

Capacitance	0.2 µF maximum

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI-9234 has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 07ATEX 0626664X and is IECEx UL 14.0089X certified. Each NI-9234 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-9234 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.

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.

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 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.

Special Conditions for Marine Applications

Some products are approved for marine (shipboard) applications. To verify marine approval certification for a product, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Notice 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.

Preparing the Environment

Ensure that the environment in which you are using the NI-9234 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

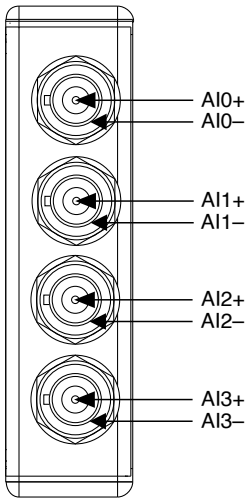
Indoor use only.

Note Refer to the **NI-9234 Specifications** on ni.com/manuals for complete specifications.

Connecting the NI 9234

The NI 9234 provides connections to four simultaneously sampled analog input channels.

Figure 1. NI 9234 Pinout



Tip To minimize ground noise, prevent the metal shells of the BNC connectors from coming in contact with each other, the modules, or the chassis.

Signal Descriptions

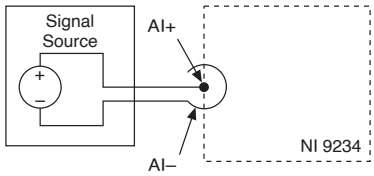
Signal	Signal Description
AI+	Provides DC excitation (when enabled) and positive input signal connection
AI-	Provides excitation return path and signal ground reference

Table 1. Signal Descriptions

Connecting Floating Differential Signals

You can connect floating differential signals to the NI-9234.

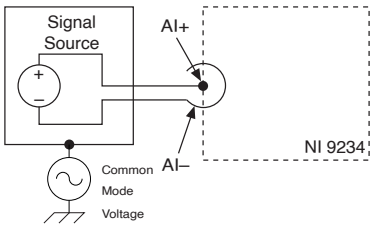
Figure 2. Connecting Floating Differential Signals to the NI-9234



Connecting Grounded Differential Signals

You can connect grounded differential signals to the NI-9234.

Figure 3. Connecting Grounded Differential Signals to the NI-9234



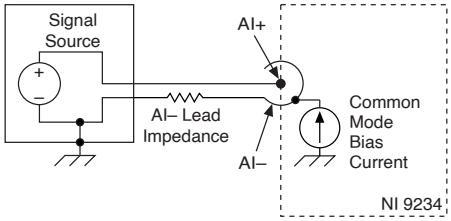
Related concepts

- Overvoltage Protection

Common-Mode Bias Current

The NI 9234 uses common-mode bias current to bias the current-limiting diodes when IEPE current is turned off. When the NI 9234 is using grounded signal sources, this current causes an error that is dependent on the AI- lead impedance. This error is approximately 50 ppm of range and 15 ppm of reading per ohm of AI- impedance. The common-mode bias current causes an error only with grounded sources and is not an issue with floating signal sources. For best accuracy, use low-impedance leads when connecting grounded signal sources.

Figure 4. Measurement Error Introduced by Common-Mode Bias Current



IEPE Excitation Current

The NI 9234 can also provide an IEPE excitation current for each channel to measure ground-referenced or floating IEPE sensors. Typical IEPE sensors have a case that is electrically isolated from the IEPE electronics, so connecting the sensor to the NI 9234 results in a floating connection even though the case of the sensor is grounded.

You can enable excitation current on a per-channel basis. Refer to your software help for more information about excitation current.

Overvoltage Protection

The NI-9234 provides overvoltage protection for each channel.

Note Refer to the **NI-9234 Specifications** on ni.com/manuals for more information about overvoltage protection.

Where to Go Next

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

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

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