
NI-9209 Getting Started

2022-07-06



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Overview

This document explains how to connect to the NI-9209. In this document, the NI-9209 with spring terminal and the NI-9209 with DSUB are referred to inclusively as the NI-9209.



Note Before you begin, read the **NI-9209 Safety, Environmental, and Regulatory Information** document on ni.com/manuals and complete the software and hardware installation procedures in your chassis documentation.



Note The guidelines in this document are specific to the NI-9209. 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



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.

NI-9209 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits:

Isolation

Channel-to-channel	None
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Channel-to-earth ground

Continuous	250 V RMS, Measurement Category II
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Withstand up to 5,000 m	3,000 V RMS, verified by a 5 s dielectric withstand test
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NI-9209 with DSUB Safety Voltages

Connect only voltages that are within the following limits:

Isolation

Channel-to-channel	None
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Channel-to-earth ground

Continuous	60 V DC, Measurement Category I
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Withstand	1,000 V RMS up to 3,000 m, verified by a 5 s dielectric withstand test; 860 V RMS up to 5,000 m
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Safety Guidelines for Hazardous Locations

The NI-9209 is suitable for use in hazardous locations; , and hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the NI-9209 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.

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI-9209 has been evaluated as equipment under DEMKO ATEX and is IECEx certified. Each NI-9209 is marked and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of $-40\text{ }^{\circ}\text{C} \leq T_a \leq 70\text{ }^{\circ}\text{C}$. If you are using the NI-9209 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-9209 meets the following specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
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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-9209 Specifications** on ni.com/manuals for complete specifications.

NI 9209 Pinout



Signal	Description
AI	Analog input signal connection
COM	Common reference connection to isolated ground
NC	No connection

Table 1. Signal Descriptions

Signals

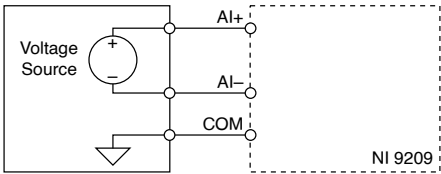
You can connect single-ended or differential signals to the NI-9209. Use a differential measurement configuration to attain more accurate measurements and less noise. The following table shows the signal pairs that are valid for differential connection configurations with the NI-9209.

Channel	AI +	AI-
0	AI0	AI8
1	AI1	AI9
2	AI2	AI10

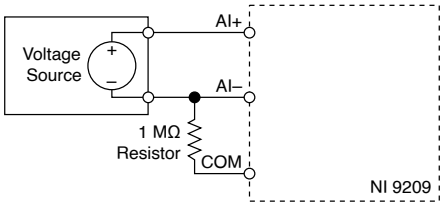
Channel	AI +	AI-
3	AI3	AI11
4	AI4	AI12
5	AI5	AI13
6	AI6	AI14
7	AI7	AI15
16	AI16	AI24
17	AI17	AI25
18	AI18	AI26
19	AI19	AI27
20	AI20	AI28
21	AI21	AI29
22	AI22	AI30
23	AI23	AI31

Table 2. Differential Pairs

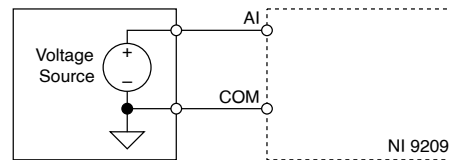
Grounded Differential Connections



Floating Differential Connections



Single-Ended Connections



NI-9209 Connection Guidelines

- Make sure that devices you connect to the NI-9209 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-9209 with spring terminal.
- Push the wire into the terminal when using a solid wire or a stranded wire with a ferrule.
- 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-9209 with spring terminal.

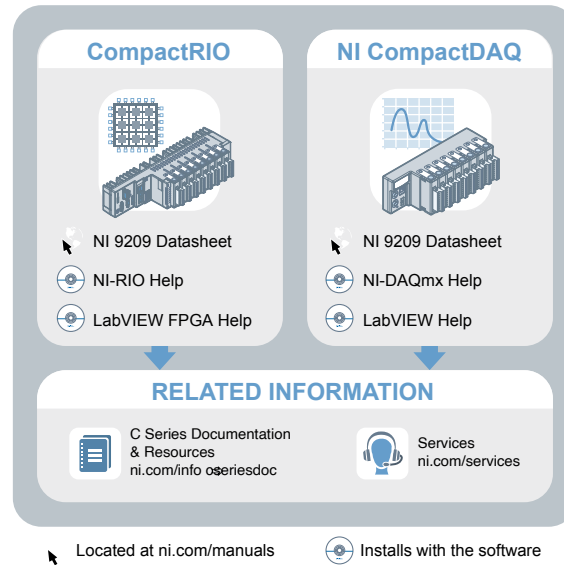
Overvoltage Protection

The NI-9209 provides overvoltage protection for each channel.



Note Refer to the **NI-9209 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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