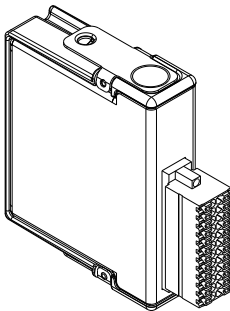


## GETTING STARTED GUIDE

# NI 9235

10 kS/s/channel, 120  $\Omega$  Quarter-Bridge Strain Gage, 8-Channel C Series Strain/Bridge Input Module



This document explains how to connect to the NI 9235.



**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 9235. 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

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Operate the NI 9235 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 9235 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.

## Safety Voltages

Connect only voltages that are within the following limits:

Between any two terminals	$\pm 30$ V maximum
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### Isolation

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



**Caution** Do not connect the NI 9235 to signals or use for measurements within Measurement Categories II, III, or IV.

## Safety Guidelines for Hazardous Locations

The NI 9235 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 9235 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 9235 has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 07 ATEX 0626664X and is IECEx UL 14.0089X certified. Each NI 9235 is marked  II 3G 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 9235 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

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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.



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

## 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](https://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.

## Preparing the Environment

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Ensure that the environment in which you are using the NI 9235 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 60068-2-78)	10% RH to 90% RH, noncondensing
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Pollution Degree	2
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Maximum altitude	5,000 m
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Indoor use only.

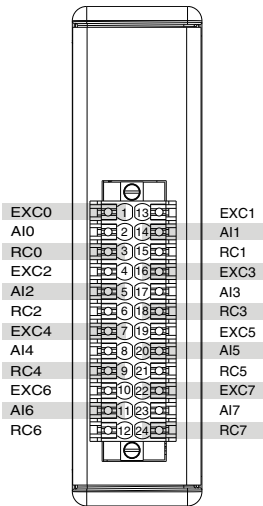


**Note** Refer to the device datasheet on [ni.com/manuals](https://ni.com/manuals) for complete specifications.



# NI 9235 Pinout

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**Table 1.** Signal Descriptions

<b>Signal</b>	<b>Description</b>
AI	Analog input signal connection
EXC	Excitation source connection
RC	Quarter-bridge completion connection

## NI 9235 Connection Guidelines

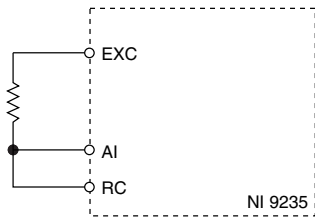
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- Make sure that devices you connect to the NI 9235 are compatible with the module specifications.
- You must use 2-wire ferrules to create a secure connection when connecting more than one wire to a single terminal on the NI 9235.
- Push the wire 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.

## Connecting a Quarter-Bridge Sensor

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You can connect quarter-bridge sensors to the NI 9235.



You must connect each EXC terminal to only one strain gage to maintain the channel-to-channel crosstalk performance of the module.

For the best system accuracy, observe the following conditions when connecting to the NI 9235.

- Set up the connections to EXC and RC with equal lengths of an identical wire type and gauge.
- Connect the AI terminal directly at the sensor instead of shorting AI to RC directly at the terminals.

## High-Vibration Application Connections

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If your application is subject to high vibration, NI recommends that you use a backshell kit to protect connections to the NI 9235.

## Overvoltage Protection

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The NI 9235 provides overvoltage protection between any two terminals.

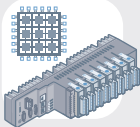


**Note** Refer to the device datasheet on [ni.com/manuals](https://ni.com/manuals) for more information about overvoltage protection.

# Where to Go Next

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## CompactRIO



*NI 9235 Datasheet*



*NI-RIO Help*



*LabVIEW FPGA Help*

## CompactDAQ



*NI 9235 Datasheet*



*NI-DAQmx Help*



*LabVIEW Help*

## RELATED INFORMATION



**C Series Documentation  
& Resources**

[ni.com/info/cseriesdoc](http://ni.com/info/cseriesdoc)



**Services**

[ni.com/services](http://ni.com/services)



Located at [ni.com/manuals](http://ni.com/manuals)



Installs with the software

## Worldwide Support and Services

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The NI website is your complete resource for technical support. At [ni.com/support](https://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](https://ni.com/services) for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit [ni.com/register](https://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](https://ni.com/certification). If your product supports calibration, you can obtain the calibration certificate for your product at [ni.com/calibration](https://ni.com/calibration).

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