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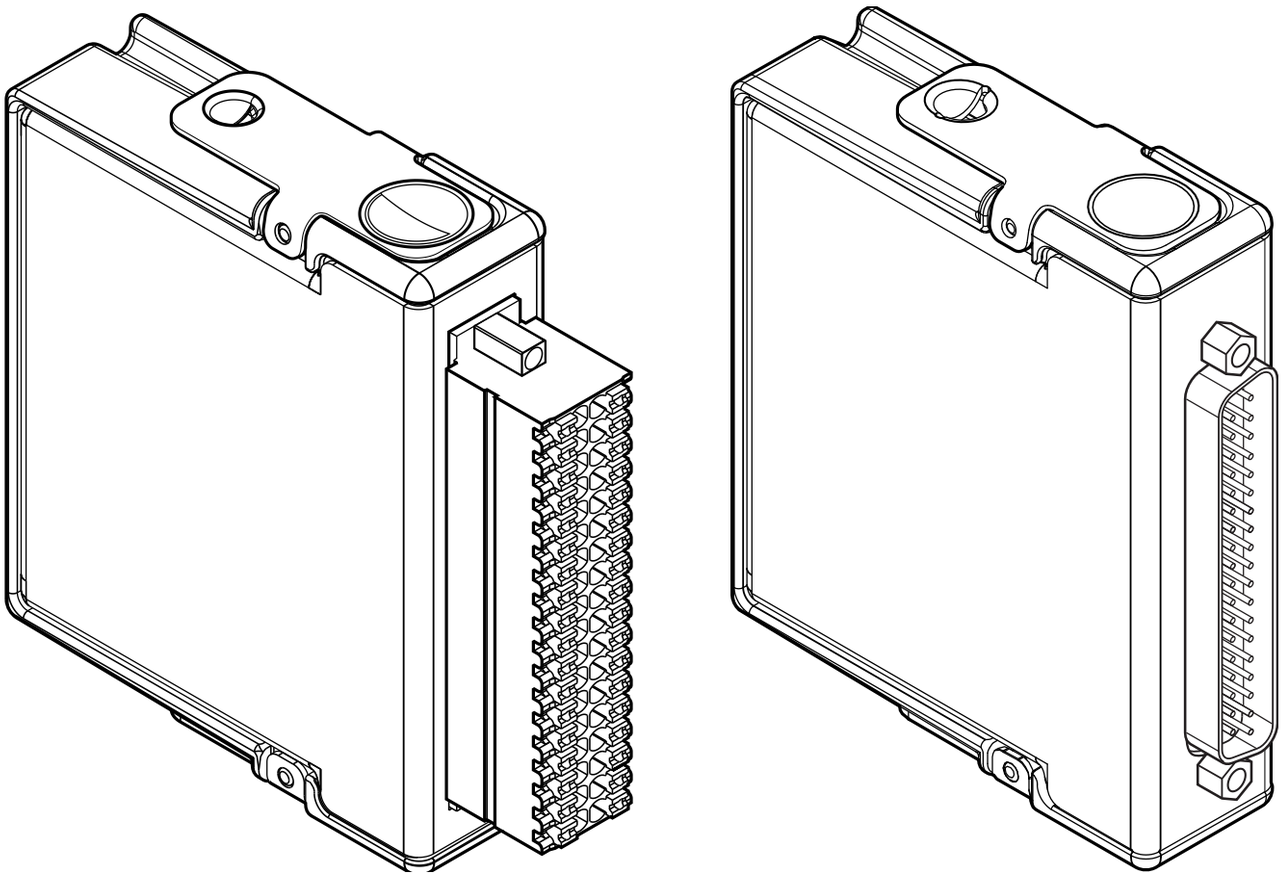
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Find the *National Instruments NI 9940* at our website: ***Click HERE***

GETTING STARTED GUIDE

NI 9207

16 AI, ±20 mA/±10 V, 24 Bit, 500 S/s Aggregate



NATIONAL INSTRUMENTS™

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This document explains how to connect to the NI 9207. In this document, the NI 9207 with spring terminal and the NI 9207 with DSUB are referred to inclusively as the NI 9207.



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 9207. 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 9207 only as described in this document.



Caution Do not operate the NI 9207 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

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way. If the product is damaged, return it to NI for repair.

NI 9207 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits:

Isolation		
	Channel-to-channel	None
	Channel-to-earth ground	
	Continuous	250 Vrms, Measurement Category II
	Withstand up to 5,000 m	3,000 Vrms, 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 9207 to signals or use for measurements within Measurement Categories III or IV.

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NI 9207 with DSUB Safety Voltages

Connect only voltages that are within the following limits:

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

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 9207 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 not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Safety Guidelines for Hazardous Locations

The NI 9207 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 and Ex nA IIC T4 hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the NI 9207 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.

Caution For Division 2 and Zone 2 applications, install the system in an enclosure rated to at least IP54 as defined by IEC/EN 60079-15.

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI 9207 with spring terminal has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 12 ATEX 1202658X and is IECEx UL 14.0089X certified. The NI 9207 with DSUB has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO Certificate No. 07 ATEX 0626664X and is IECEx UL 14.0089X certified. Each NI 9207 is marked ⟨Ex⟩ 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 9207 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 You must make sure that transient disturbances do not exceed 140% of the rated voltage.



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.

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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 the NI 9207 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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Preparing the Environment

Ensure that the environment in which you are using the NI 9207 meets the following specifications.

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

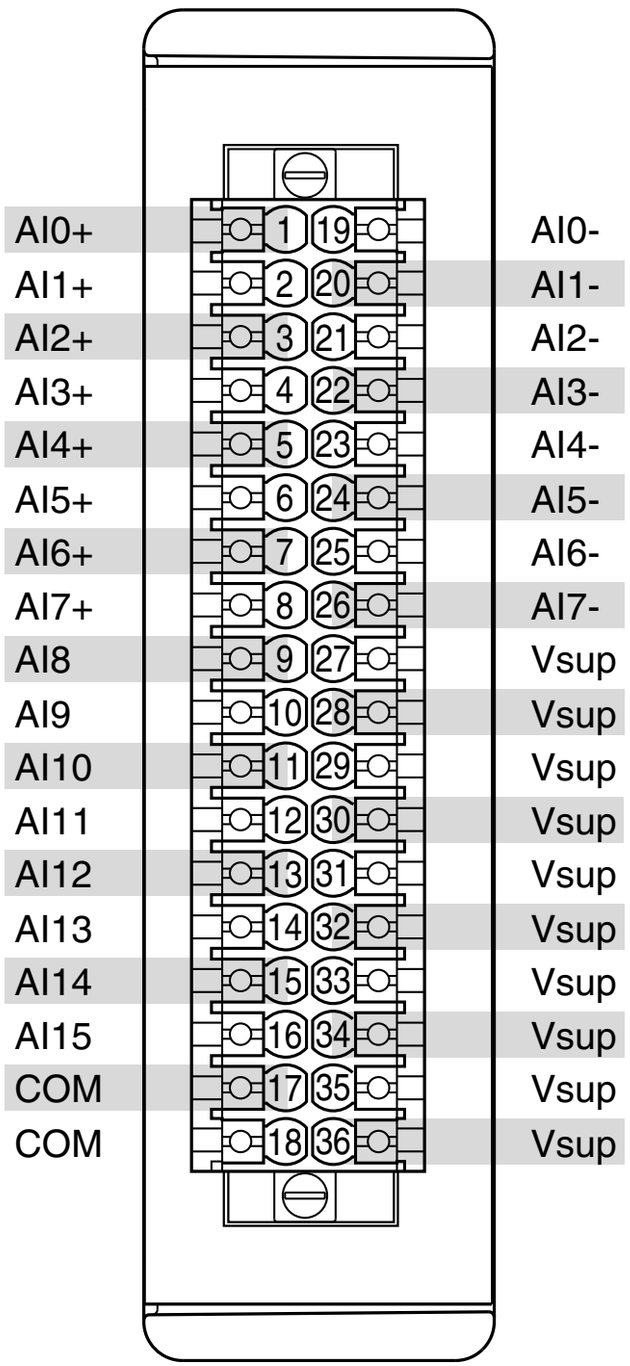
Indoor use only.

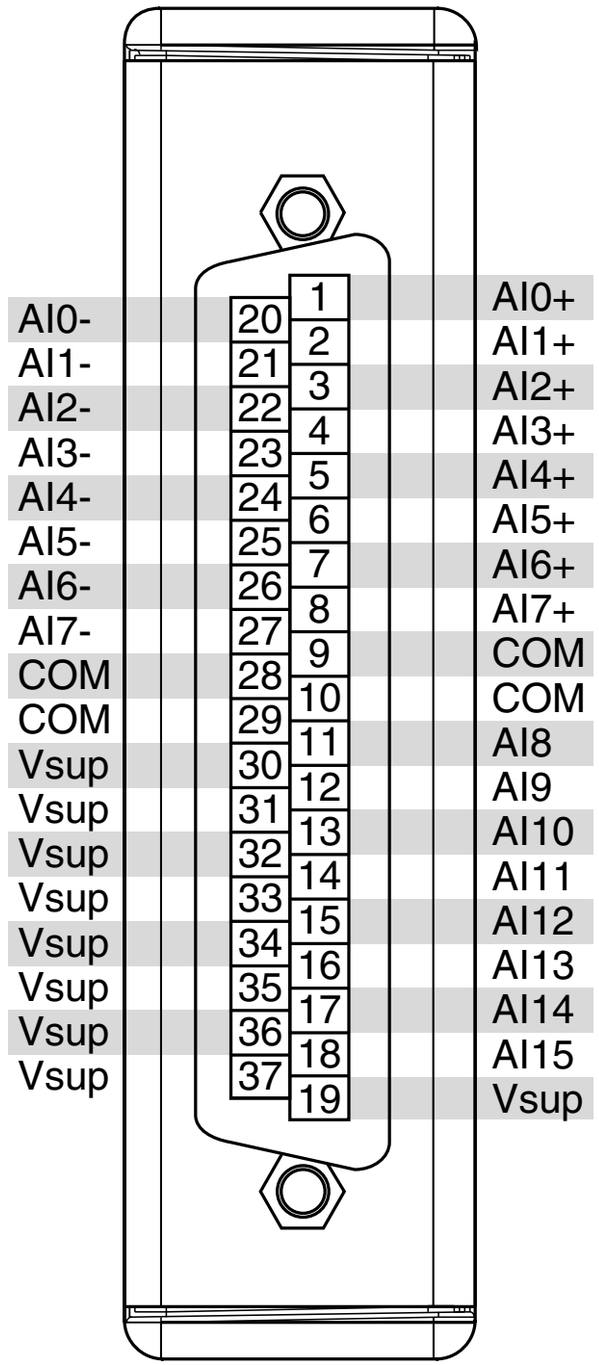


Note Refer to the device datasheet on *ni.com/manuals* for complete specifications.

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NI 9207





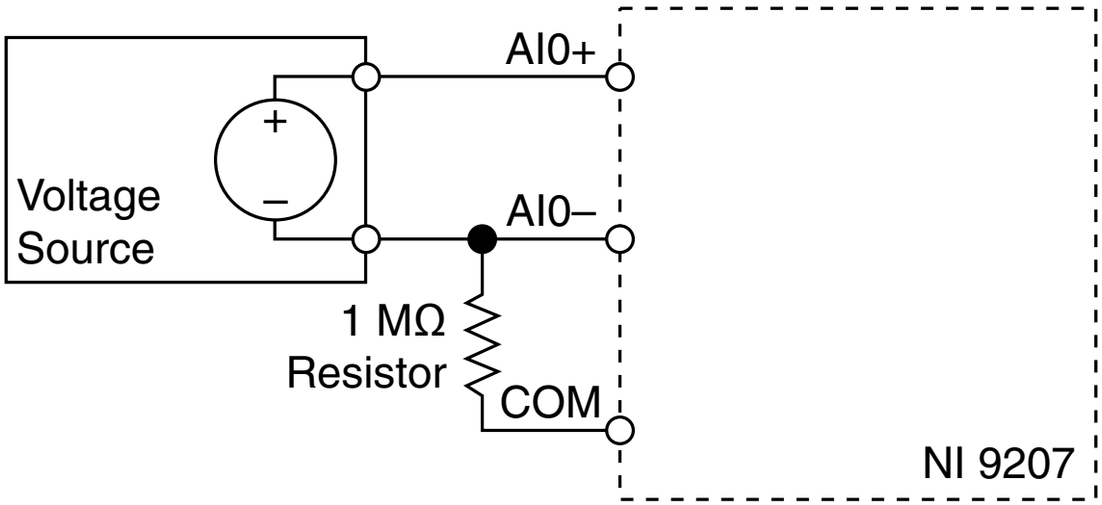
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Table 1. Signal Descriptions

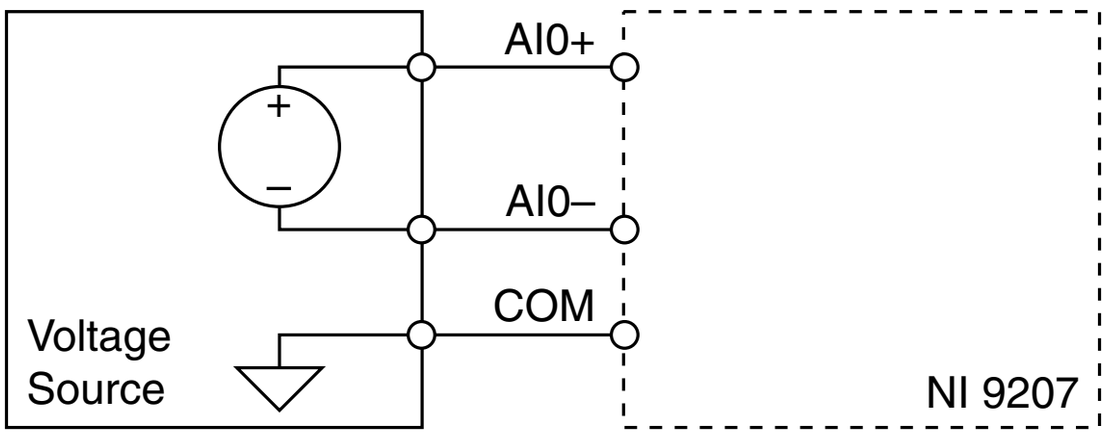
Signal	Description
AI+	Positive analog input voltage connection
AI-	Negative analog input signal connection
AI	Analog input current connection
Vsup	Voltage supply connection
COM	Common reference connection to isolated ground

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Floating Differential Connections

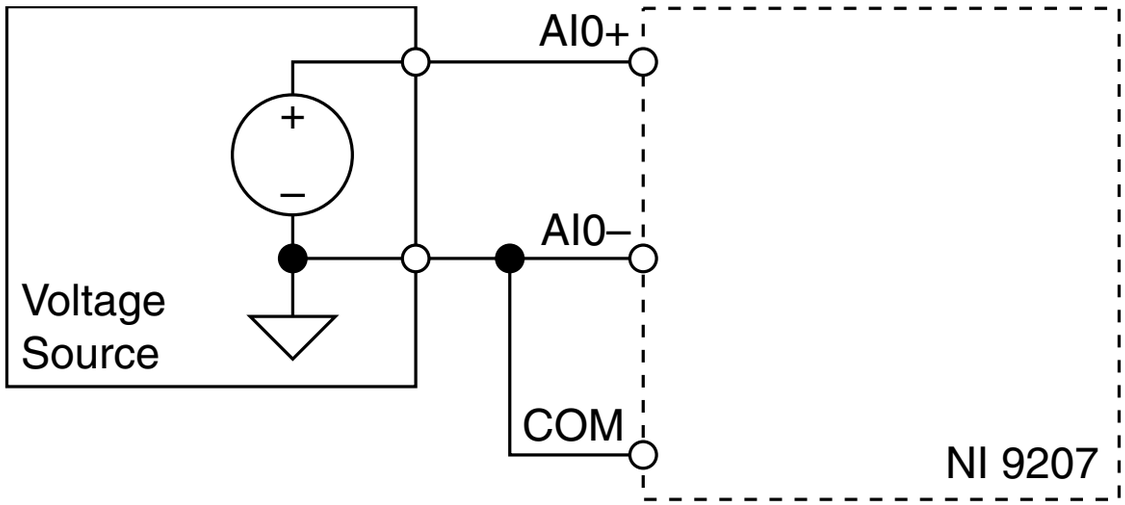


Grounded Connections



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Single-Ended Connections



Connecting an External Power Supply

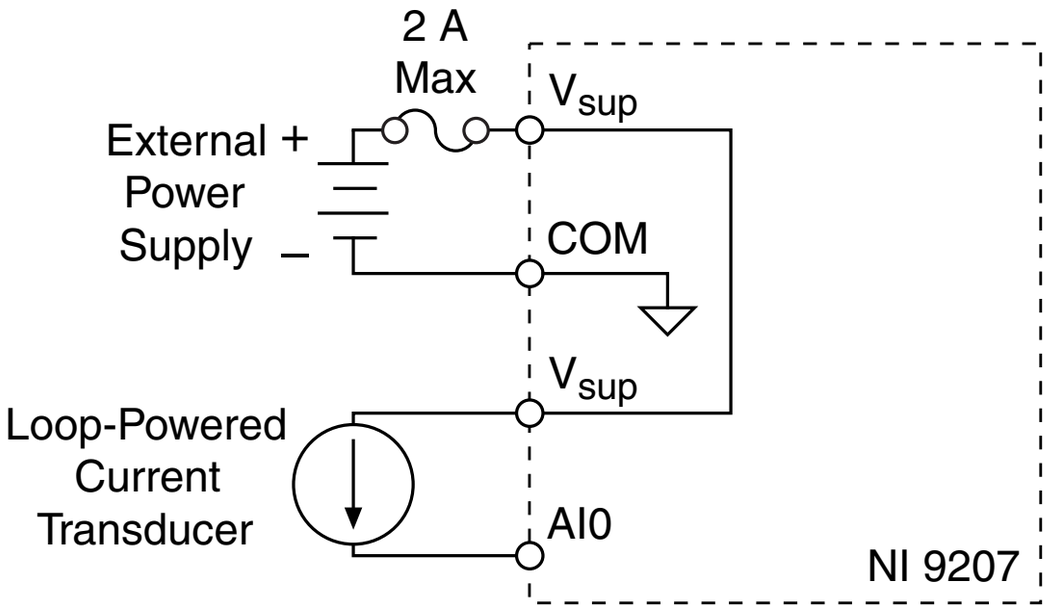
You must connect an external power supply with a 0 to 30 V voltage range to the NI 9207. This power supply provides the current for the devices you connect to the module. You can connect only one external voltage supply to the NI 9207.

1. Connect the positive lead of the power supply to Vsup.
2. Connect the negative lead of the power supply to COM.

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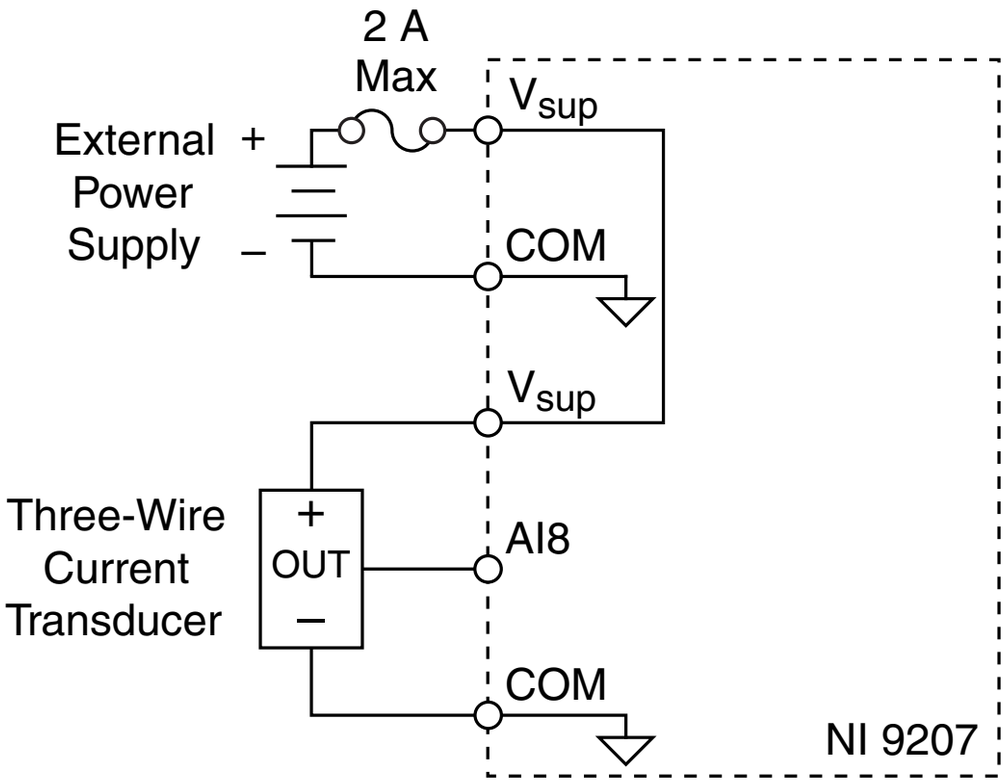
Caution Do not remove or insert modules if the external power supply connected to the Vsup and COM pins is powered on.

Connecting a Loop-Powered Current Transducer



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Connecting a Three-Wire Current Transducer



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NI 9207 Connection Guidelines

- Make sure that devices you connect to the NI 9207 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 9207 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 9207 with spring terminal.

Overvoltage Protection

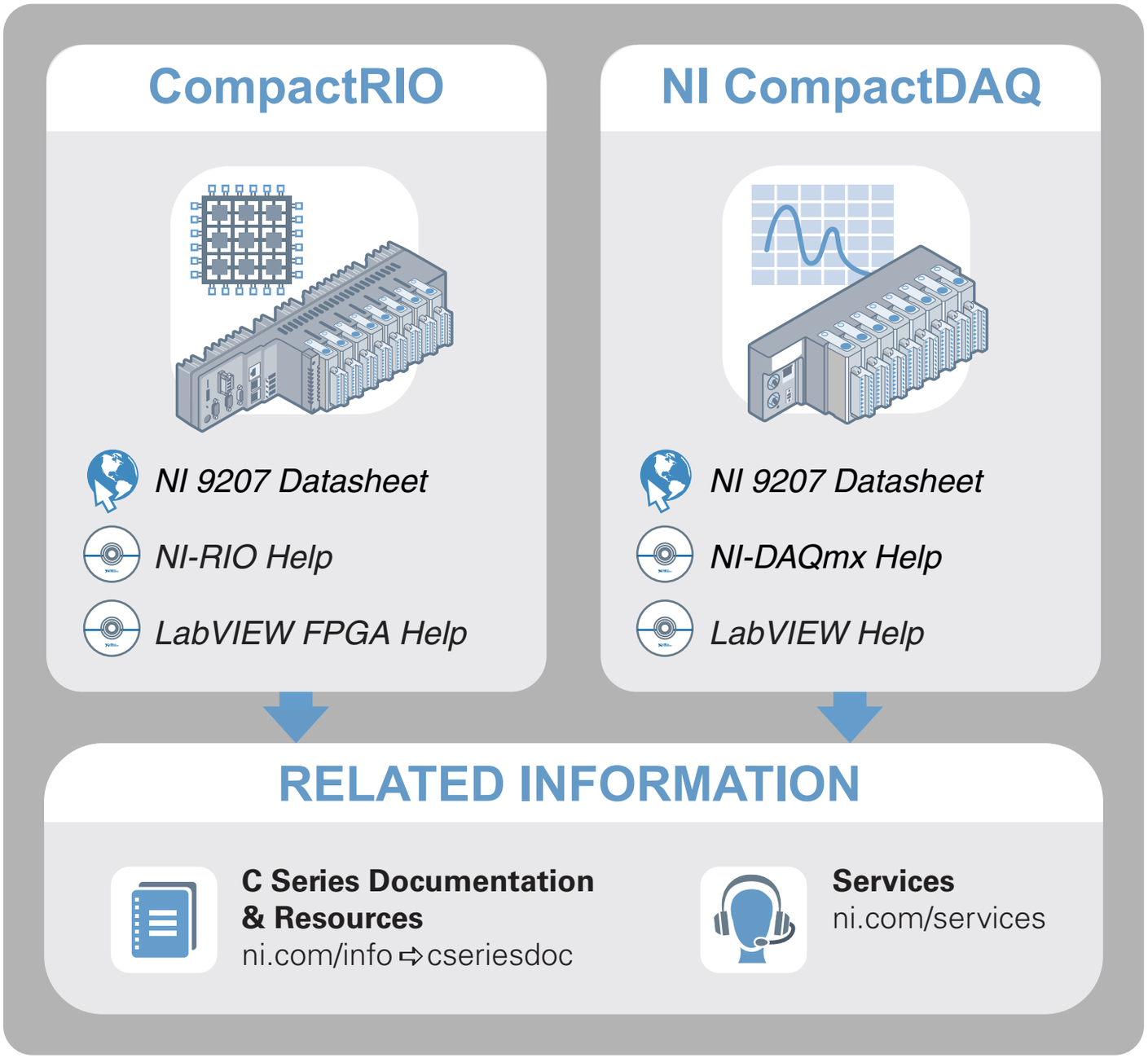
The NI 9207 provides overvoltage protection for each channel.



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

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Where to Go Next



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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 NI Factory Installation Services, repairs, extended warranty, and other services.

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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