
NI-9215 Getting Started

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Overview

This document explains how to connect to the NI-9215. In this document, the NI-9215 with screw terminal, NI-9215 with spring terminal, and NI-9215 with BNC are referred to inclusively as the NI-9215.



Note Before you begin, read the **NI-9215 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-9215. 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-9215 with Screw Terminal and NI-9215 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-COM	±30 V maximum
Isolation	
Channel-to-channel	None
Channel-to-earth ground	
Continuous	250 V RMS, Measurement Category II
Withstand	2,300 V RMS, verified by a 5 s dielectric withstand test

NI-9215 with BNC Safety Voltages

Connect only voltages that are within the following limits.

AI+-to-AI-	±30 V maximum
Isolation	
Channel-to-channel	None
Channel-to-earth ground	
Continuous	60 V DC, Measurement Category I
Withstand	1,500 V RMS, verified by a 5 s dielectric withstand test

Safety Guidelines for Hazardous Voltages

You can connect hazardous voltages only to the NI 9215 with screw terminal and the NI 9215 with spring terminal. Do not connect hazardous voltages to the NI 9215 with BNC.



Caution Ensure that hazardous voltage wiring is performed only by qualified personnel adhering to local electrical standards.



Caution Do not mix hazardous voltage circuits and human-accessible circuits on the same module.



Caution Ensure that devices and circuits connected to the module are properly insulated from human contact.



Caution When module terminals are hazardous voltage LIVE ($>42.4 V_{pk}/60 V$ DC), you must ensure that devices and circuits connected to the module are properly insulated from human contact. You must use the NI 9927 connector backshell kit with the NI 9215 with screw terminal and the NI 9981 connector backshell kit with the NI 9215 with spring terminal to ensure that the terminals are not accessible.

Safety Guidelines for Hazardous Locations

The NI-9215 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-9215 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 μ F maximum
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Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI 9215 has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 03ATEX 0324020X and is IECEx UL 14.0089X certified. Each NI 9215 is marked ⚡ II 3G and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of $-40^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$. If you are using the NI 9215 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.

Safety Compliance and Hazardous Locations Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1
- EN 60079-0, EN 60079-7
- IEC 60079-0, IEC 60079-7
- UL 60079-0, UL 60079-7
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-7



Note For safety certifications, refer to the product label or the [Product Certifications and Declarations](#) section.

CE Compliance

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

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.

Physical Characteristics

If you need to clean the module, wipe it with a dry towel.



Tip For two-dimensional drawings and three-dimensional models of the C Series module and connectors, visit ni.com/dimensions and search by module number.

Screw-terminal wiring

Gauge	0.2 mm ² to 2.5 mm ² (26 AWG to 14 AWG) copper conductor wire
Wire strip length	13 mm (0.51 in.)
Temperature rating	90 °C, minimum
Torque for screw terminals	0.5 N · m to 0.6 N · m (4.4 lb · in. to 5.3 lb · in.)
Wires per screw terminal	One wire per screw terminal; two wires per screw terminal using a 2-wire ferrule
Ferrules	0.25 mm ² to 2.5 mm ² (26 AWG to 14 AWG)

Spring-terminal wiring

Gauge 0.2 mm² to 2.5 mm² (26 AWG to 14 AWG) copper conductor wire

Wire strip length	10 mm (0.39 in.)
Temperature rating	90 °C, minimum
Wires per spring terminal	One wire per spring terminal; two wires per spring terminal using a 2-wire ferrule
Ferrules	0.25 mm ² to 2.5 mm ² (26 AWG to 14 AWG)

Connector securement

Securement type	Screw flanges provided
Torque for screw flanges	0.2 N · m (1.80 lb · in.)

Weight

NI-9215 with screw terminal	150 g (5.3 oz)
NI-9215 with spring terminal	138 g (4.9 oz)
NI-9215 with BNC	173 g (6.1 oz)

Preparing the Environment

Ensure that the environment in which you are using the NI 9215 meets the following specifications.

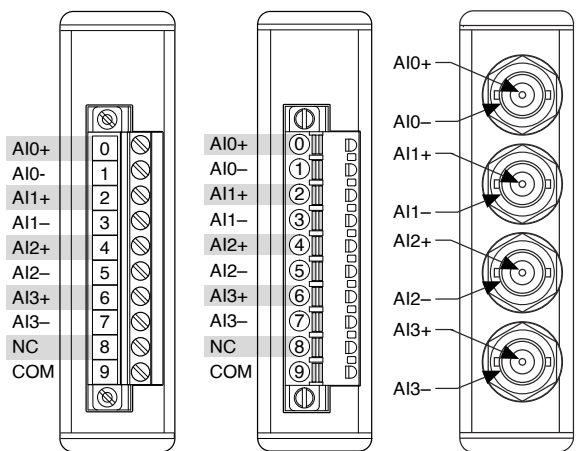
Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.



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

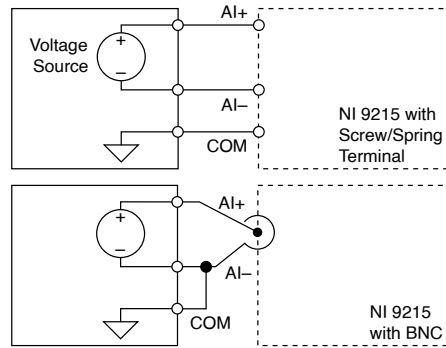
NI 9215 Pinout



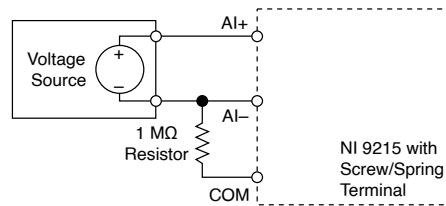
Signal	Description
AI+	Positive analog input signal connection
AI-	Negative analog input signal connection
COM	Common reference connection to isolated ground
NC	No connection

Table 1. Signal Descriptions

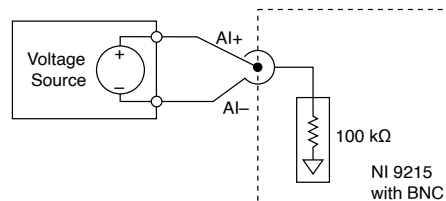
Grounded Differential Connections



Floating Differential Connections

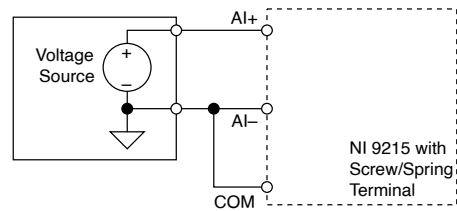


- Connect the negative lead to COM through a 1 MΩ resistor to keep the signal source within the common-mode voltage range.
- The NI 9215 with screw terminal and the NI 9215 with spring terminal does not read data accurately if the signal source is outside of the common-mode voltage range.

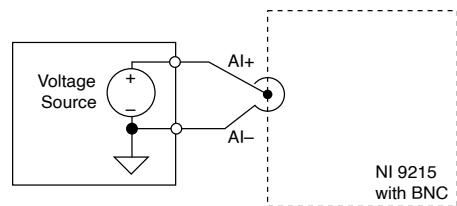


The NI 9215 with BNC has internal circuitry that maintains the common mode voltage range.

Single-Ended Connections



Connect the ground signal to COM to keep the signal source within the common-mode voltage range.



The NI 9215 with BNC has internal circuitry that maintains the common mode voltage range.

Connection Guidelines

- Make sure that devices you connect to the NI-9215 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-9215 with screw terminal or NI-9215 with spring terminal.

High-Vibration Application Connections

If your application is subject to high vibration, NI recommends that you follow these guidelines to protect connections to the NI-9215 with screw terminal or the NI-9215 with spring terminal:

- Use ferrules to terminate wires to the detachable connector.
- Use the NI 9927 backshell kit with the NI-9215 with screw terminal or the NI 9981 backshell kit with the NI-9215 with spring terminal.

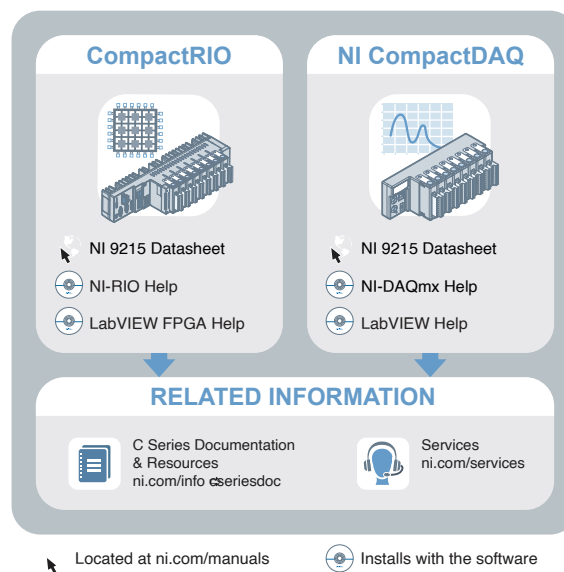
Overvoltage Protection

The NI-9215 provides overvoltage protection for each channel.



Note Refer to the **NI-9215 Specifications** on ni.com/manuals for more information about overvoltage protection.

Where to Go Next



Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

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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