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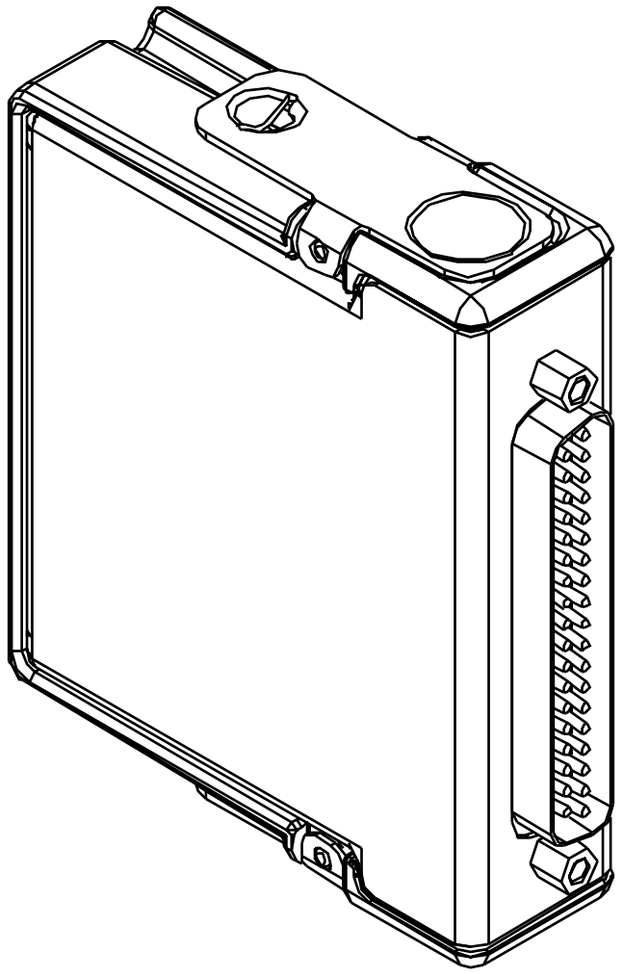
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Find the *National Instruments NI 9403* at our website: ***Click HERE***

GETTING STARTED GUIDE

NI 9403

32 DIO, 5 V/TTL, Bidirectional, 7 µs



NATIONAL INSTRUMENTS™

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This document explains how to connect to the NI 9403.



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 9403. 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 9403 only as described in this document.



Caution Do not operate the NI 9403 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.

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Safety Voltages

Connect only voltages that are within the following limits:

Channel-to-COM	±30 V maximum on up to 8 channels at a time, Measurement Category I
Isolation	
Channel-to-channel	None
Channel-to-earth ground	
Continuous	60 VDC, Measurement Category I
Withstand	
up to 3,000 m altitude	1,000 Vrms, verified by a 5 s dielectric withstand test
up to 5,000 m altitude	860 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

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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 9403 to signals or use for measurements within Measurement Categories II, III, or IV.

Safety Guidelines for Hazardous Locations

The NI 9403 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 9403 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.

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

Capacitance	0.02 µF max

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI 9403 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 9403 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 9403 in Gas Group IIC hazardous locations, you must use the device in

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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 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 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

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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 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.

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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

Ensure that the environment in which you are using the NI 9403 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.

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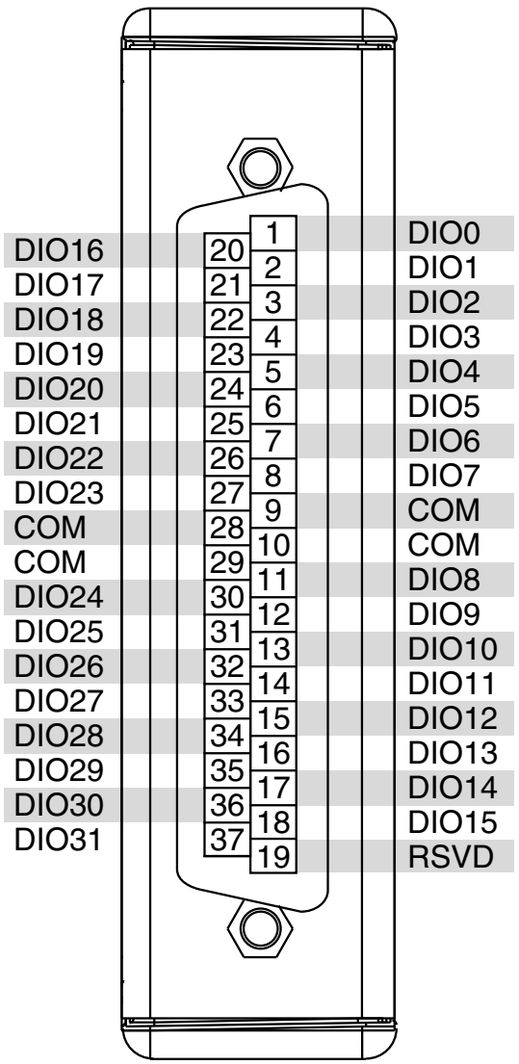
Note Refer to the device datasheet on *ni.com/manuals* for complete specifications.

Connecting the NI 9403

The NI 9403 provides connections for 32 digital input/output channels.

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Figure 1. NI 9403 Pinout



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Table 1. NI 9403 Signal Descriptions

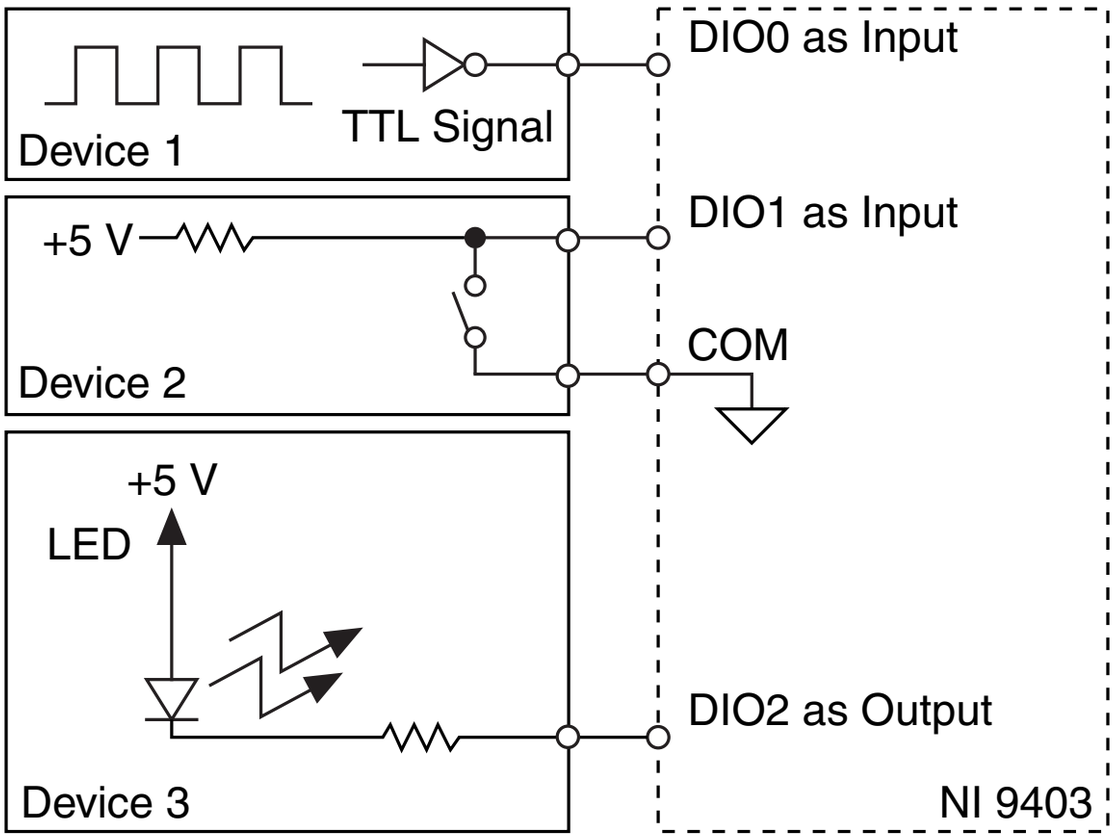
Signal Name	Description
DIO	Each channel includes a DIO pin to which you can connect a digital input or output device.
COM	DIO channels are internally referenced to COM, so you can use any of the four COM lines as a reference for the external signal.
RSVD	This channel is reserved and is not a user-facing signal.

Connecting Digital Devices to the NI 9403

You can connect digital devices to the NI 9403.

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Figure 2. Connecting Digital Devices to the NI 9403



You can independently configure each DIO channel in software for input or output.

Overcurrent/Short-Circuit Protection

The overcurrent protection allows only a specified amount of current through the output channels to protect the NI 9403 from short circuits. If the NI 9403 goes into an overcurrent state, the

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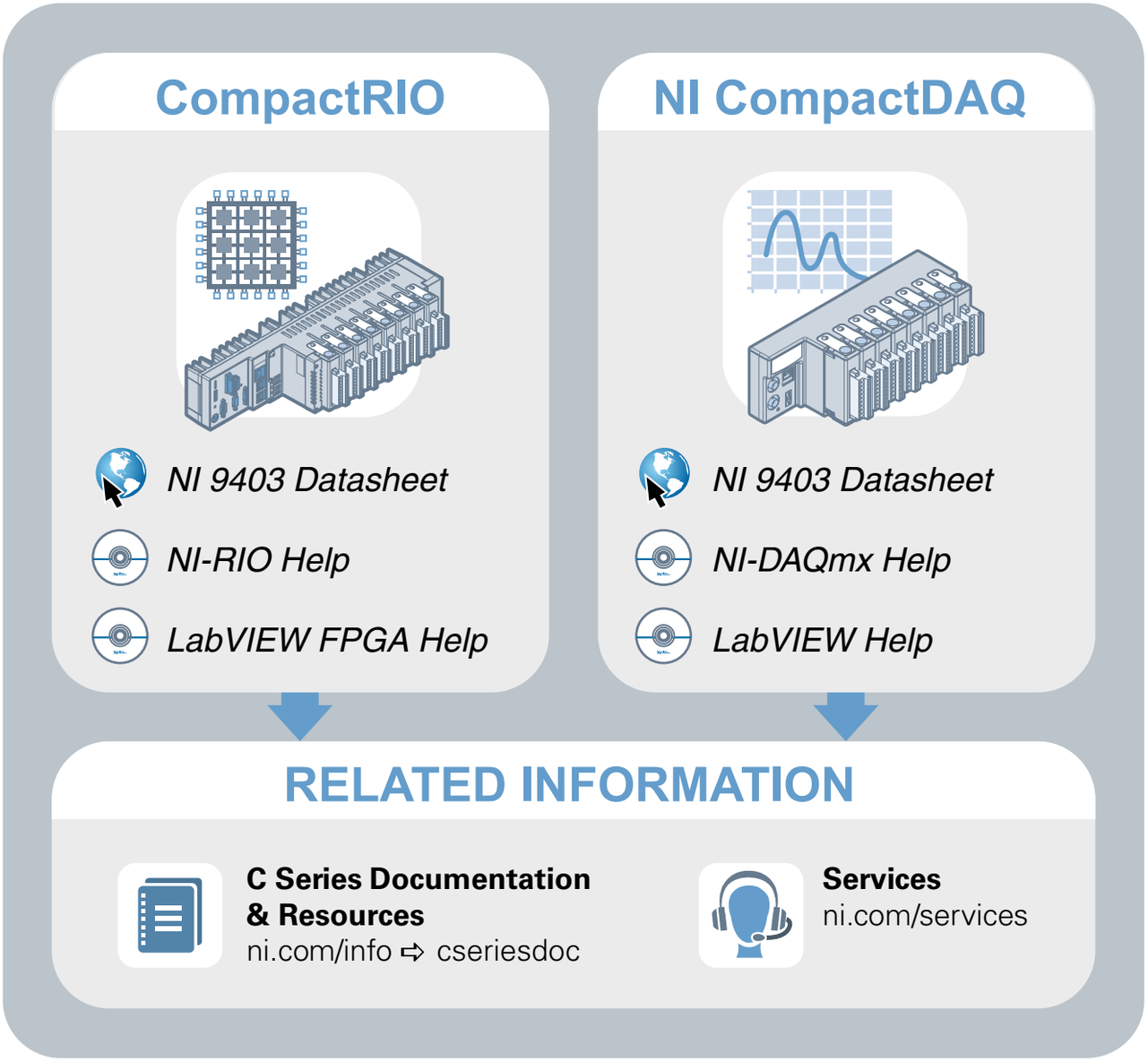
module sets all the DIO channels to high impedance for approximately 280 ms.

When the channels are in an overcurrent state, the NI 9403 can accept new line direction configuration and output state data but cannot pass valid input data to the software.

After the overcurrent protection period, the NI 9403 automatically recovers to the latest direction configuration and output state. If the overcurrent condition still exists, the module again sets the channels to high impedance. This cycle continues until the overcurrent condition is removed.

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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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11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For telephone support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the *Worldwide Offices* section of *ni.com/niglobal* to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

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