NI-9425 Specifications

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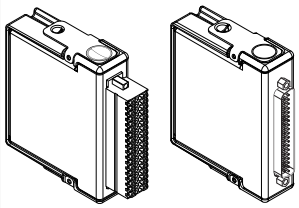


- Compatible with 24 V logic levels
- DSUB or spring terminal connectivity
- 250 V RMS, CAT II, channel-to-earth isolation (spring terminal); 60 V DC, CAT I, channel-to-earth isolation (DSUB)

Note In this document, the NI-9425 with spring terminal and the NI-9425 with DSUB are referred to inclusively as the NI-9425.

The NI-9425 works with industrial logic levels and signals to connect directly to a wide array of industrial switches, transducers, and devices. Each digital input line is compatible with 24 V logic levels. The NI-9425 offers isolation between the input and output banks from channel to earth ground. You cannot use the NI-9425 in a CompactDAQ chassis to perform counter operations.

Kit Contents	• NI 9425 •NI 9425 Getting Started Guide
Required Accessories	• NI 9940 Backshell Kit (Spring) • NI 9923 Front-mount DSUB to Screw-Terminal (DSUB) OR • DIN-Rail 37-Pin, Spring-Terminal Connector Block with Shielded Female to Male Cable, 1m (DSUB)

C SERIES DIGITAL INPUT MODULE COMPARISON							
Product Name	Module Type	Signal Levels	Direction	Channels	Update Rate	Connectivity	Isolation
NI 9411	Digital Input	±5, 24 V	Sinking/Sourcing Diff/ SE Input	6	500 ns	15-Pin DSUB	60 V DC Ch-Earth
NI 9421	Digital Input	12, 24 V	Sinking Input	8	100 µs	Screw Terminal, Spring Terminal, 25-Pin DSUB	250 V RMS Ch-Earth (Screw/Spring) 60 V DC Ch-Earth (DSUB)
NI 9422	Digital Input	24, 48, 60 V	Sinking/ Sourcing Input	8	250 µs	Screw Terminal	250 V RMS Ch-Ch and Ch-Earth
NI 9423	Digital Input	12, 24 V	Sinking Input	8	1 µs	Screw Terminal, Spring Terminal	60 V DC Ch-Earth
NI 9425	Digital Input	12, 24 V	Sinking Input	32	7 µs	Spring Terminal, 37-Pin DSUB	250 V RMS Ch-Earth (Spring) 60 V DC Ch-Earth (DSUB)
NI 9426	Digital Input	24 V	Sourcing Input	32	7 µs	37-Pin DSUB	60 V DC Ch-Earth
NI 9435	Digital Input	250 V DC/ V AC	Sinking/ Sourcing Input	4	3 ms	Screw Terminal	250 V RMS Ch-Earth
NI 9436	Digital Input	250 V DC/ V AC	Sinking/ Sourcing Input	8	20 ms	Screw Terminal	250 V RMS Ch-Ch and Ch-Earth
NI 9437	Digital Input	24 V to 250 V	Sinking Input	8	1 µs	Screw Terminal, Spring Terminal	300 V RMS Ch-Earth

NI C Series Overview

NI provides more than 100 C Series modules for measurement, control, and communication applications. C Series modules can connect to any sensor or bus and allow for high-accuracy measurements that meet the demands of advanced data acquisition and control applications.

- Measurement-specific signal conditioning that connects to an array of sensors and signals
- Isolation options such as bank-to-bank, channel-to-channel, and channel-to-earth ground

- -40 °C to 70 °C temperature range to meet a variety of application and environmental needs
- Hot-swappable

The majority of C Series modules are supported in both CompactRIO and CompactDAQ platforms and you can move modules from one platform to the other with no modification.

CompactRIO

CompactRIO combines an open-embedded architecture with small size, extreme ruggedness, and C Series modules in a platform powered by the NI LabVIEW reconfigurable I/O (RIO) architecture. Each system contains an FPGA for custom timing, triggering, and processing with a wide array of available modular I/O to meet any embedded application requirement.

CompactDAQ

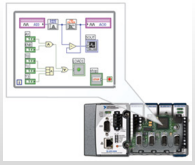
CompactDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using CompactDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your measurement data.

Software

LabVIEW Professional Development System for Windows

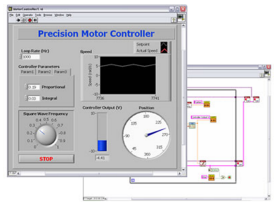
- Use advanced software tools for large project development
- Generate code automatically using DAQ Assistant and Instrument I/O Assistant
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

NI LabVIEW FPGA Module



- Design FPGA applications for NI RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx IP generator functions
- Purchase as part of the LabVIEW Embedded Control and Monitoring Suite

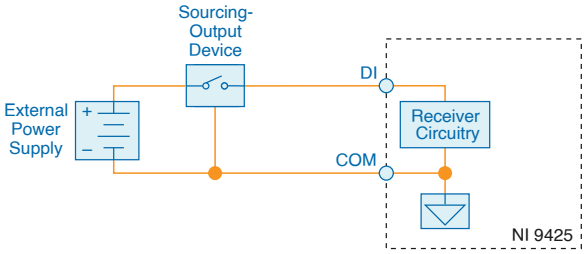
NI LabVIEW Real-Time Module



- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging support, and board support

NI LabVIEW Real-Time Module	
	▪ Purchase individually or as part of a LabVIEW suite

NI-9425 Circuitry



▪ The NI-9425 has sinking inputs. Sinking inputs provide a path to COM when the sourcing device connected to the NI-9425 drives current or applies voltage to DI.

Tip For more information about sinking inputs, visit ni.com/info and enter the Info Code sinksource.

NI 9425 Specifications

The following specifications are typical for the range -40 °C to 70 °C unless otherwise noted.

> **Caution** Do not operate the NI-9425 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.

Input Characteristics

Number of channels	32 digital input channels
Input type	Sinking

Digital logic levels

OFF state

Input voltage	≤5 V
Input current	≤150 µA

ON state

Input voltage	≥10 V
Input current	≥330 µA

Hysteresis

Input voltage	2 V minimum

Input current	60 µA minimum
Input impedance	30 kΩ ± 5%

I/O protection

Input voltage

8 channels	60 V DC maximum
32 channels	30 V DC maximum

Reverse-biased voltage

8 channels	-60 V DC maximum
32 channels	-30 V DC maximum

Hold time[1]	0 µs minimum
Setup time[2]	1 µs minimum

Update/transfer time[3]

cRIO-9151 R Series Expansion chassis	8 µs maximum
All other chassis	7 µs maximum

MTBF	1,256,699 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method

Power Requirements

Power consumption from chassis	
Active mode	410 mW maximum
Sleep mode	0.5 mW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.45 W maximum
Sleep mode	1 W maximum

Physical Characteristics

Spring terminal wiring	
Gauge	0.14 mm^2 to 1.5 mm^2 (26 AWG to 16 AWG) copper conductor wire
Wire strip length	10 mm (0.394 in.) of insulation stripped from the end
Temperature rating	90 °C, minimum
Wires per spring terminal	One wire per spring terminal; two wires per spring terminal using a 2-wire ferrule
Connector securement	
Securement type	Screw flanges provided
Torque for screw flanges	0.2 N · m (1.80 lb · in.)

NI-9425 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-channel	
Up to 8 channels simultaneously	±60 V maximum
All channels simultaneously	±30 V maximum

Isolation		
Channel-to-channel		None
Channel-to-earth ground		
Continuous	250 V RMS, Measurement Category II	
Withstand up to 5,000 m	3,000 V RMS, verified by a 5 s dielectric withstand test	

Caution Do not connect the NI 9425 with spring terminal to signals or use for measurements within Measurement Categories III or IV.

NI-9425 with DSUB Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-channel	
Up to 8 channels simultaneously	±60 V maximum
All channels simultaneously	±30 V maximum

Isolation

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

Caution Do not connect the NI 9425 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 for other circuits not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Hazardous Locations

U.S. (UL)	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4 Gc
Canada (C-UL)	Class I, Division 2, Groups A, B, C, D, T4; Ex nA IIC T4 Gc
Europe (ATEX) and International (IECEx)	Ex nA IIC T4 Gc

Safety 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 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 6, UL 60079-15; Ed 4
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-15

Note For UL and other safety certifications, refer to the product label or the Online Product Certification section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Industrial immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For EMC declarations and certifications, and additional information, refer to the Online Product Certification section.

CE Compliance CE

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)

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.

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration	
Random (IEC 60068-2-64)	5 g_{rms}, 10 Hz to 500 Hz
Sinusoidal (IEC 60068-2-6)	5 g, 10 Hz to 500 Hz
Operating shock (IEC 60068-2-27)	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

Environmental

Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 85 °C
Ingress protection	IP40
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing

Storage humidity (IEC 60068-2-78)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m

Indoor use only.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）

- **中国 RoHS**— NI 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

[1] **Hold time** is the amount of time input signals must be stable after initiating a read from the module.

[2] **Setup time** is the amount of time input signals must be stable before reading from the module.

[3] The update/transfer time is valid when the module is used in a CompactRIO system. When used in other systems, driver software and system latencies impact this time.

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