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# NI-9320

# Specifications

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# NI-9320 Specifications

## NI-9320 Specifications

These specifications apply to the NI-9320.

### Revision History

Version	Date changed	Description
379260A-01	November 2025	Initial release.

### Looking For Something Else?

For information not found in the specifications for your product, such as operating instructions, browse ***Related Information***.

#### Related information:

- [Software Support for CompactRIO, CompactDAQ, Single-Board RIO, R Series, and EtherCAT](#)
- [Calibration Services](#)
- [Software and Driver Downloads](#)
- [Dimensional Drawings](#)
- [Product Certifications](#)
- [Letter of Volatility](#)
- [Discussion Forums](#)
- [NI Learning Center](#)

### Definitions

***Warranted*** specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

***Characteristics*** describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- **Typical** specifications describe the performance met by a majority of models.
- **Nominal** specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are **Typical** unless otherwise noted.

## Conditions

Specifications are valid for the range -40 °C to 70 °C unless otherwise noted. All voltages are relative to the AI- signal on each channel unless otherwise noted.

## NI-9320 Push-In Spring Terminal Pinout

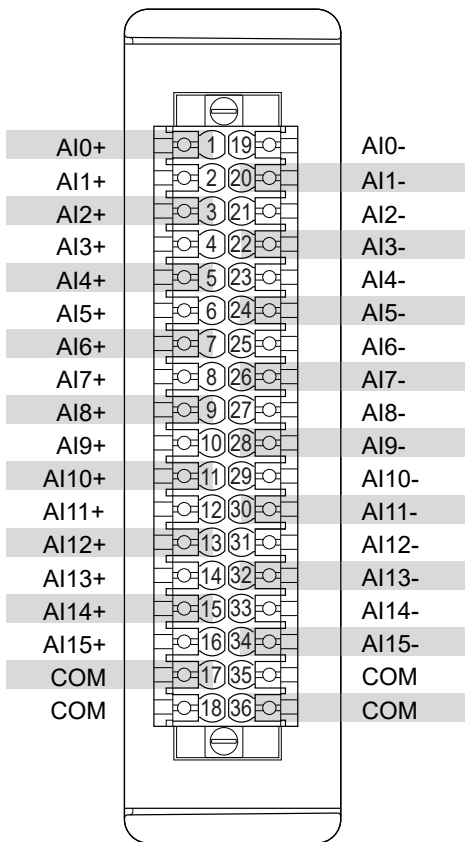


Table 1. Signal Descriptions

Signal	Description
AI+	Positive analog input signal connection

Signal	Description
AI-	Negative analog input signal connection
COM	Common reference connection to isolated ground

## NI-9320 with DSUB Pinout

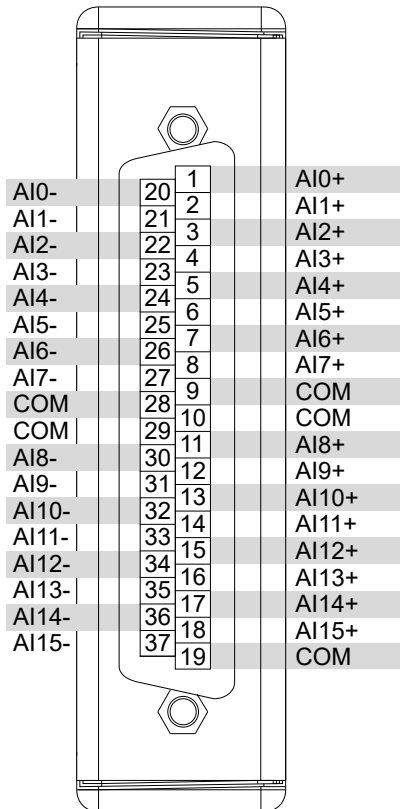


Table 2. Signal Descriptions

Signal	Description
AI+	Positive analog input signal connection
AI-	Negative analog input signal connection
COM	Common reference connection to isolated ground

# Input Characteristics

Number of channels	16 analog input channels
ADC resolution	16 bits
Type of ADC	Successive approximation register (SAR)
No missing codes	16 bits guaranteed

Table 3. Input Voltage Ranges

Measurement voltage (AI+ to AI-)	$\pm 10.5$ V (max)
Maximum common mode voltage	$\pm 10.5$ V (max)

Overvoltage protection	$\pm 30$ V
Conversion time	5 $\mu$ s
Sample rate	200 kS/s

Table 4. Accuracy

Measurement Conditions	Within 2 Years of Calibration		Within 10 Years of Calibration	
	Percent of Reading (Gain Error)	Percent of Range <sup>1</sup> (Offset Error)	Percent of Reading (Gain Error)	Percent of Range <sup>[1]</sup> (Offset Error)
Maximum (-40 °C to 70 °C)	$\pm 0.093\%$	$\pm 0.022\%$	$\pm 0.144\%$	$\pm 0.030\%$
Typical (23 °C $\pm 5$ °C)	$\pm 0.015\%$	$\pm 0.003\%$	$\pm 0.026\%$	$\pm 0.004\%$



**Note** NI recommends a calibration interval of 2 years and only provides calibration services referencing the 2-year specification limits. If you choose to calibrate less often, the 10-year column provides predicted performance over this extended interval. Choose an appropriate interval based on your

1. Range equals  $\pm 10.5$  V. For example, maximum offset error within 2 years of calibration equals  $10.5$  V \*  $\pm 0.022\% = \pm 2.3$  mV.

application requirements. Longer calibration intervals are more likely to result in As-Found calibration failures when the device is sent back for calibration and compared against the 2-year specification limits.

Table 5. Stability Drift

Gain drift	2.5 ppm/°C (Typical)
Offset drift	6.5 $\mu$ V/°C (Typical)

Common-mode rejection ratio (CMRR) ( $f_{in} = 60$ Hz)	70 dB
-3 dB bandwidth <sup>2</sup>	> 200 kHz
Input impedance	> 1 G $\Omega$
Input noise	0.5 LSB <sub>rms</sub>
Crosstalk	-105 dB

Table 6. Settling Time (to 2 LSBs)

10 V step	12 $\mu$ s
20 V step	15 $\mu$ s

## NI-9320 with Push-In Spring Terminal (Black/Orange Connector) Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-channel	$\pm$ 10.5 V maximum
Channel-to-COM	$\pm$ 10.5 V maximum
<b>Isolation</b>	

2. Up to 3.5 V<sub>rms</sub> sine wave.

Channel-to-channel	None
Channel-to-COM	None
<b>Channel-to-earth ground</b>	
Continuous	250 V RMS, Measurement Category II
Withstand up to 4000 m	4250 V DC, verified by a 5 s dielectric withstand test

## NI-9320 with DSUB Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-channel	$\pm 10.5$ V maximum
Channel-to-COM	$\pm 10.5$ V maximum
<b>Isolation</b>	
Channel-to-channel	None
Channel-to-COM	None
<b>Channel-to-earth ground</b>	
Continuous	60 V DC, Measurement Category I



Withstand up to 3000 m	1000 V RMS, verified by a 5 s dielectric withstand test
Withstand up to 5000 m	860 V RMS, verified by a 5 s dielectric withstand test

## Measurement Category

### Measurement Category I



**Caution** Do not connect the NI-9320 with DSUB to signals or use for measurements within Measurement Categories II, III, or IV.



**Attention** Ne pas connecter le NI-9320 with DSUB à des signaux dans les catégories de mesure II, III ou IV et ne pas l'utiliser pour effectuer des mesures dans ces catégories.



**Warning** Do not connect the NI-9320 with DSUB to signals or use for measurements within Measurement Categories II, III, or IV, or for measurements on MAINS circuits or on circuits derived from Overvoltage Category II, III, or IV which may have transient overvoltages above what the product can withstand. The product must not be connected to circuits that have a maximum voltage above the continuous working voltage, relative to earth or to other channels, or this could damage and defeat the insulation. The product can only withstand transients up to the transient overvoltage rating without breakdown or damage to the insulation. An analysis of the working voltages, loop impedances, temporary overvoltages, and transient overvoltages in the system must be conducted prior to making measurements.



**Mise en garde** Ne pas connecter le NI-9320 with DSUB à des signaux dans les catégories de mesure II, III ou IV et ne pas l'utiliser pour des mesures dans ces catégories, ou des mesures sur secteur ou sur des circuits dérivés de surtensions de catégorie II, III ou IV pouvant présenter des surtensions



transitoires supérieures à ce que le produit peut supporter. Le produit ne doit pas être raccordé à des circuits ayant une tension maximale supérieure à la tension de fonctionnement continu, par rapport à la terre ou à d'autres voies, sous peine d'endommager et de compromettre l'isolation. Le produit peut tomber en panne et son isolation risque d'être endommagée si les tensions transitoires dépassent la surtension transitoire nominale. Une analyse des tensions de fonctionnement, des impédances de boucle, des surtensions temporaires et des surtensions transitoires dans le système doit être effectuée avant de procéder à des mesures.

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.



**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.

## Measurement Category II



**Caution** Do not connect the NI-9320 with spring terminal to signals or use for measurements within Measurement Categories III or IV.



**Attention** Ne pas connecter le NI-9320 with spring terminal à des signaux dans les catégories de mesure III ou IV et ne pas l'utiliser pour effectuer des mesures dans ces catégories.

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.

# Environmental Characteristics

Temperature	
Operating	-40 °C to 70 °C
Storage	-40 °C to 85 °C
Humidity	
Operating	10% RH to 90% RH, noncondensing
Storage	5% RH to 95% RH, noncondensing
Ingress protection	IP40
Pollution Degree	2
Maximum altitude	
NI-9320 with push-in spring terminal (black/orange connector)	4,000 m
NI-9320 with DSUB	5,000 m
Shock and Vibration	
Operating vibration	
Random	5 g RMS, 10 Hz to 500 Hz
Sinusoidal	5 g, 10 Hz to 500 Hz

Operating shock	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations
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To meet these shock and vibration specifications, you must panel mount the system.

## Power Requirements

Power consumption from chassis (full-scale input, 200 kS/s)	
Active mode	1 W maximum
Sleep mode	1 mW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.4 W maximum
Sleep mode	600 mW maximum

## Physical Characteristics

### Weight

NI-9320 with push-in spring terminal (black/orange connector)	165 g (5.8 oz)
NI-9320 with DSUB	150 g (5.3 oz)

## NI-9320 with Push-In Spring Terminal (Black/Orange Connector)

Spring terminal wiring
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Gauge	0.14 mm <sup>2</sup> to 1.5 mm <sup>2</sup> (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	
<b>Ferrules</b>		
Single ferrule, uninsulated	0.14 mm <sup>2</sup> to 1.5 mm <sup>2</sup> (26 AWG to 16 AWG) 10 mm barrel length	
Single ferrule, insulated	0.14 mm <sup>2</sup> to 1.0 mm <sup>2</sup> (26 AWG to 18 AWG) 12 mm barrel length	
Two-wire ferrule, insulated	2 x 0.34 mm <sup>2</sup> (2 x 22 AWG) 12 mm barrel length	
<b>Connector securement</b>		
Securement type	Screw flanges provided	
Torque for screw flanges	0.2 N · m (1.80 lb · in.)	

## Calibration

You can obtain the calibration certificate and information about calibration services for the NI-9320 at [ni.com/calibration](http://ni.com/calibration).

Recommended calibration interval	2 years
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