NI-9207 Specifications

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Contents

NI-9207 Specifications

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 COM unless otherwise noted.

Related information:

- Software Support for CompactRIO, CompactDAQ, Single-Board RIO, R Series, and EtherCAT

Connector Types

The NI-9207 has more than one connector type: NI-9207 with spring terminal and NI-9207 with DSUB. Unless the connector type is specified, NI-9207 refers to all connector types.

NI-9207 Pinout

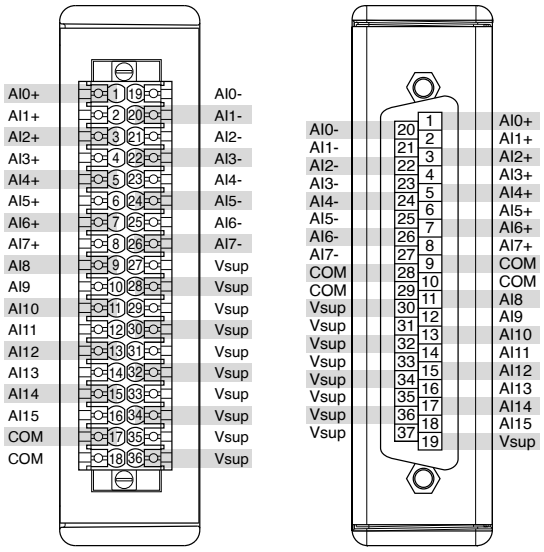

Table 1. Signal Descriptions

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

Input Characteristics

Number of channels	16 analog input channels: 8 voltage and 8 current
ADC resolution	24 bits
Type of ADC	Delta-Sigma
Sampling mode	Scanned

Input range	
Voltage channels	
Minimum	±10.2 V
Typical	±10.4 V
Current channels	
Minimum	±21.5 mA
Typical	±22.0 mA
Maximum working voltage for analog inputs (signal voltage + common mode voltage), voltage channels only	Each channel must remain within ±10.2 V of common
Conversion time (per channel)	
High-Resolution Mode	52 ms
High-Speed Mode	2 ms
Overvoltage protection, channel-to-COM, all channels	±30 V maximum on one channel at a time
Vsup pins, current channels only	
Current	2 A maximum
Voltage	0 to 30 V maximum

Input impedance	
Voltage channels	>1 GΩ
Current channels	85 Ω

Table 2. Accuracy

Calibrated Measurement Conditions	**Channels**	**Percent of Reading (Gain Error)**	**Percent of Range[1](Offset Error)**
Maximum (-40 °C to 70 °C)	Voltage channels	±0.52%	±0.04%
	Current channels	±0.87%	±0.05%

Input noise	
Voltage channels	
High-Resolution Mode	16 µV RMS
High-Speed Mode	80 µV RMS
Current channels	
High-Resolution Mode	50 nA RMS
High-Speed Mode	200 nA RMS
Stability	
Voltage channels	

1. Range equals 10.4 V for voltage channels and 22.0 mA for current channels.

Gain drift	±21 ppm/°C
Offset drift	±14 µV/°C
Current channels	
Gain drift	±43 ppm/°C
Offset drift	±30 nA/°C
CMRR (f_{in}= 0 Hz to 60 Hz), voltage channels only	86 dB
CMRR, channel-to-earth ground (50/60 Hz)[2]	
High-Resolution Mode	160 dB
High-Speed Mode	120 dB
NMRR (High-Resolution Mode only)	
50 Hz	66 dB
60 Hz	68 dB

NI-9207 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits:

Isolation

2. Voltage channel of NI-9207 with spring terminal only.

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

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 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

Measurement Category

Measurement Category I

Caution Do not connect the NI-9207 with DSUB to signals or use for measurements within Measurement Categories II, III, or IV.

Attention Ne pas connecter le NI-9207 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-9207 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-9207 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 NI-9207 with DSUB 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-9207 with spring terminal to signals or use for measurements within Measurement Categories III or IV.

Attention Ne pas connecter le NI-9207 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	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

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

Power Requirements

Power consumption from chassis	
Active mode	295 mW maximum
Sleep mode	25 µW maximum
Thermal dissipation (at -40 °C)	

Active mode	0.75 W maximum
Sleep mode	0.59 W maximum

Physical Characteristics

Weight		
NI-9207 with spring terminal		161 g (5.7 oz)
NI-9207 with DSUB		144 g (5.1 oz)
Dimensions	Visit ni.com/dimensions and search by module number.	
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	
Ferrules	0.14 mm^2 to 1.5 mm^2	
Connector securement		

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-9207 at ni.com/calibration.

Calibration interval	2 years