NI-9217 Specifications

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Contents

NI-9217 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.

Related information:

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

Conditions

Specifications are valid for the range -40 °C to 70 °C unless otherwise noted.

All specifications given in °C are specific to 100 Ω platinum RTDs.

NI-9217 Pinout

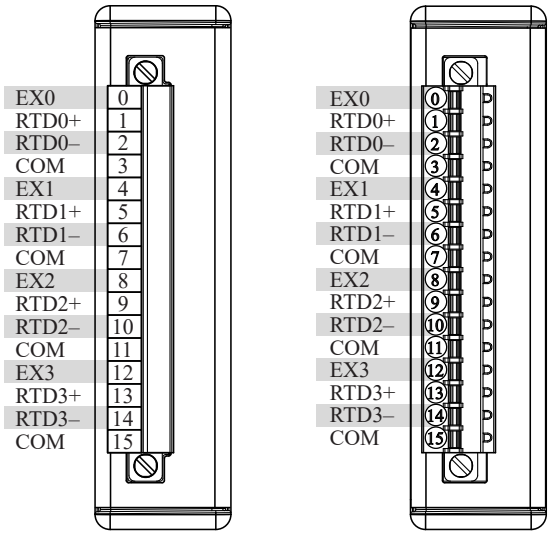


Table 1. Signal Descriptions

Signal	Description
COM	Common reference connection to isolated ground
EX	Excitation source connection
RTD+	Positive resistance temperature detector connection
RTD-	Negative resistance temperature detector connection

Input Characteristics

Number of channels	4 analog input channels
ADC resolution	24 bits
Type of ADC	Delta-sigma
Sampling mode	Scanned

Measurement range	
Temperature	-200 °C to 850 °C
Resistance	0 Ω to 400 Ω
Common-mode range	
COM-to-earth ground	±250 Vrms
Channel-to-COM	50 mV
Conversion time	
High-resolution mode	200 ms per channel, 800 ms total for all channels
High-speed mode	2.5 ms per channel, 10 ms total for all channels

Temperature accuracy (including noise)[1], 4-wire mode

Measured Value	Typical (25 °C)	Maximum (-40 to 70 °C)
-200 °C to 150 °C	0.15 °C	0.35 °C
150 °C to 850 °C	0.20 °C	1.0 °C

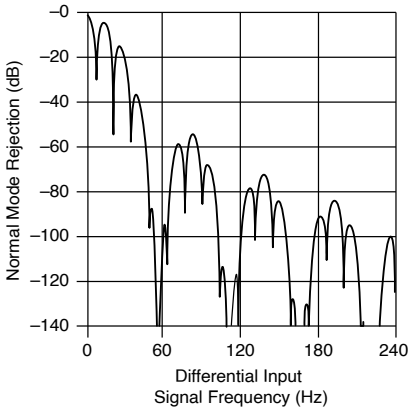
Temperature accuracy (including noise)[1], 3-wire mode

Measured Value	Typical (25 °C)	Maximum (-40 to 70 °C)
-200 °C to 150 °C	0.20 °C	0.50 °C
150 °C to 850 °C	0.30 °C	1.0 °C

1. For high-speed mode, add a 0.1 °C error.

Noise	
High-resolution mode	0.003 °C
High-speed mode	0.02 °C
Excitation current	1 mA per channel
Noise rejection	
Normal mode (50/60 Hz)	
High-resolution mode	85 dB minimum
High-speed mode	None
Common-mode rejection, channel to earth ground (50/60 Hz)	
High-resolution mode	170 dB minimum
High-speed mode	155 dB
Input bandwidth (high-resolution mode)	3.3 Hz

Figure 1. High-Resolution Filter Response



Note This image is provided courtesy of Linear Technology Corp. High-speed filter response has the same characteristics as the high-resolution filter response except that the first notch is at 14 kHz.

Overvoltage protection	
EX+ to COM	-20 V to 30 V
COM to COM	None
Any other pin-to-pin	±30 V

MTBF	891,597 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method

Safety Voltages

Connect only voltages that are within the following limits.

Isolation Voltages

Channel-to-channel	None

Channel-to-earth ground	
Continuous	
up to 2,000 m	250 V RMS, Measurement Category II
up to 5,000 m	60 V DC, Measurement Category I
Withstand	
up to 2,000 m	2,300 V RMS,verified by a 5 s dielectric withstand test
up to 5,000 m	1,000 V RMS, verified by a 5 s dielectric withstand test

Measurement Category I

Warning Do not connect the product 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 produit 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 product to signals or use for measurements within Measurement Categories III or IV.

Attention Ne pas connecter le produit 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	350 mW maximum
Sleep mode	1 mW maximum
Thermal dissipation (at 70 °C)	
Active mode	350 mW maximum
Sleep mode	1 mW maximum

Physical Characteristics

Weight	142 g (5.0 oz)
Dimensions	Visit ***ni.com/dimensions*** and search by module number.
Screw-terminal wiring	
Gauge	0.05 mm^2 to 1.5 mm^2 (30 AWG to 14 AWG) copper conductor wire
Wire strip length	6 mm (0.24 in.) of insulation stripped from the end
Temperature rating	90 °C minimum

Torque for screw terminals	0.22 N · m to 0.25 N · m (1.95 lb · in. to 2.21 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 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-9217 at ni.com/calibration.

Calibration interval	1 year