NI-9269 Specifications

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Contents

NI-9269 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 voltages are relative to the AO- signal on each channel unless otherwise noted.

NI-9269 Pinout

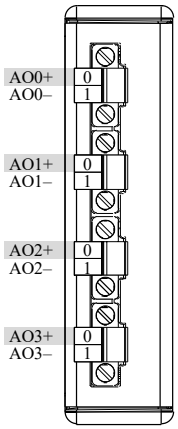

Table 1. Signal Descriptions

Signal	Description
AO+	Positive analog output signal connection
AO-	Negative analog output signal connection

Output Characteristics

Number of channels	4 analog output channels
DAC resolution	16 bits
Type of DAC	R-2R
Power-on output state	High impedance
Startup voltage[1]	0 V
Power-down output state[2]	High impedance

1. When the output stage powers on, a glitch occurs for 5 µs peaking at -900 mV.
2. When the module powers down, a glitch occurs for 20 µs peaking at -600 mV.

Output voltage range[3]	
Nominal	±10 V
Minimum	±10.38 V
Typical	±10.47 V
Maximum	±10.56 V
Current drive	±20 mA all channels maximum; ±10 mA per channel typical
Output impedance	100 mΩ

Table 2. Accuracy

Measurement Conditions		**Percent of Reading (Gain Error)**	**Percent of Range**[4] **(Offset Error)**
Calibrated	Maximum (-40 °C to 70 °C)	0.17%	0.15%
	Typical (25 °C, ±5 °C)	0.05%	0.01%
Uncalibrated[5]	Maximum (-40 °C to 70 °C)	0.44%	0.37%
	Typical (25 °C, ±5 °C)	0.14%	0.05%

Stability

3. Refer to the device Getting Started Guide on ni.com/manuals for information about the stacked nominal output voltage range and current drive.
4. Range equals 10.47 V
5. Uncalibrated accuracy refers to the accuracy achieved when acquiring in raw or unscaled modes where the calibration constants stored in the module are not applied to the data.

Gain drift	5 ppm/°C
Offset drift	80 µV/°C
Protection	
Overvoltage	±30 V
Short-circuit	Indefinitely

Table 3. Update Time

Number of Channels	Update Time for NI cRIO-9151 R Series Expansion Chassis	Update Time for All Other Chassis
1	3.5 µs minimum	3 µs minimum
2	6.5 µs minimum	5 µs minimum
3	9.3 µs minimum	7.5 µs minimum
4	12.3 µs minimum	9.7 µs minimum

Noise	300 µVrms
Slew rate	7 V/µs
Crosstalk	
Channel-to-channel	100 dB
Common-mode voltage	120 dB
Settling time	

100 pF load, to 1 LSB	
Full-scale step	20 µs
1 V step	10 µs
0.1 V step	10 µs
1 kΩ || 100 pF load, to 4 LSB	
Full-scale step	20 µs

Capacity drive	1,500 pF maximum
Monotonicity	16 bits
DNL	±1 LSB maximum
INL (best fit)	±2 LSBs maximum

Safety Voltages

Channel-to-channel	
Continuous	250 V RMS, Measurement Category II
Withstand	1,390 V RMS, verified by a 5 s dielectric withstand test
Channel-to-earth ground	

Continuous	250 V RMS, Measurement Category II
Withstand	2,300 V RMS, verified by a 5 s dielectric withstand test

Division 2/Zone 2 hazardous locations applications (Channel-to-channel and channel-to-earth ground)	60 V DC, Measurement Category I

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 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	2,000 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	1 W maximum
Sleep mode	120 µW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.4 W maximum
Sleep mode	77 mW maximum

Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

Tip For two-dimensional drawings and three-dimensional models of the C Series module and connectors, 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.)
Weight	156 g (5.5 oz)

Calibration

You can obtain the calibration certificate and information about calibration services for the NI-9269 at ni.com/calibration.

Calibration interval	1