

NI-9269

Specifications



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NI-9269 Specifications 100 kS/s/ch Simultaneous, ±10 V, Isolated, 4-Channel C Series Voltage Output Module

Contents

1.	Connector Types	3
2.	Definitions	3
3.	Conditions	3
4.	NI-9269 Pinout	4
6.	Safety Voltages	6
6.1	Measurement Category I	7
6.2	Measurement Category II	8
7.	Environmental Characteristics	8
8.	Power Requirements	9
9.	Physical Characteristics	9
10.	Calibration	10

Connector Types

The NI-9269 has more than one connector type: NI-9269 with screw terminals and NI-9269 with snap in terminals. Unless the connector type is specified, NI-9269 refers to all connector types.

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

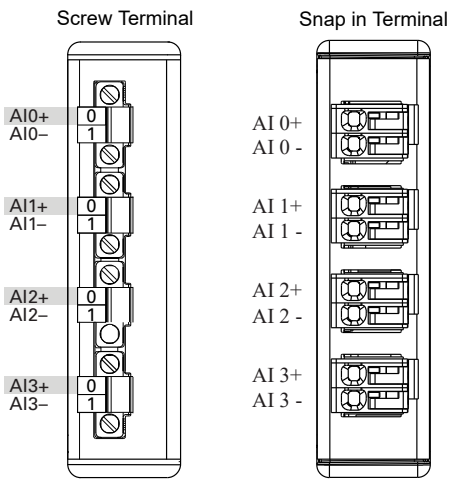


Table 1 : Signal Descriptions

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
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 [†] (Offset Error)
Calibrated	Maximum (-40 °C to 70 °C)	0.17%	0.15%
	Typical (25 °C, ±5 °C)	0.05%	0.01%
Uncalibrated [‡]	Maximum (-40 °C to 70 °C)	0.44%	0.37%
	Typical (25 °C, ±5 °C)	0.14%	0.05%

[†] Range equals 10.47 V

[‡] 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.

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.

³ Refer to the device Getting Started Guide on ni.com/manuals for information about the stacked nominal output voltage range and current drive.



Stability		
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 μ W maximum
Thermal dissipation (at 70 °C)	
Active mode	1.4 W maximum
Sleep mode	77 mW maximum

Physical Characteristics

Dimensions Visit ni.com/dimensions and search by module number.

Weight

NI-9269 with screw terminal	156 g (5.5 oz)
NI-9269 with snap in terminal	161.3 g (5.7 oz)

Screw terminal wiring

Gauge	0.05 mm ² to 1.5 mm ² (30 AWG to 16 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
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Snap in terminal wiring

Gauge	0.5 mm ² to 2.5 mm ² (20 AWG to 14 AWG) copper conductor wire
Wire strip length	9 mm $\pm$ 1 mm (0.35 in. $\pm$ 0.04 in.) of insulation stripped from the end
Temperature rating	90 °C, minimum
Wires per snap in terminal	One wire per snap in terminal; two wires per snap in terminal using a 2-wire ferrule
Ferrules	0.5 mm ² to 2.5 mm ²



Connector securement	
Securement type	Snap in securement provided

Calibration

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

Recommended calibration interval	1
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