
NI-9208

Specifications

2024-08-07



Contents

NI-9208 Specifications 3

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Connector Types

The NI-9208 has more than one connector type: NI-9208 with spring terminal and NI-9208 with DSUB. Unless the connector type is specified, NI-9208 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.

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](#)

Input Characteristics

| | | |
|--|---|--|
| Number of channels | 16 analog input channels | |
| ADC resolution | 24 bits | |
| Type of ADC | Delta-Sigma | |
| Sampling mode | Scanned | |
| Input range | | |
| Minimum | ± 21.5 mA | |
| Typical | ± 22 mA | |
| Conversion time (per channel) | | |
| High-resolution mode | 52 ms | |
| High-speed mode | 2 ms | |
| Overvoltage protection, channel-to-COM | ± 30 V maximum on one channel at a time | |
| Vsup pins | | |
| Current | 2 A maximum | |
| Voltage | 30 V maximum | |

| | |
|-----------------|-------------|
| Input impedance | 85 Ω |
|-----------------|-------------|

Table 1. Accuracy

| Calibrated Measurement Conditions | Percent of Reading (Gain Error) | Percent of Range ^[1] (Offset Error) |
|-----------------------------------|---------------------------------|--|
| Maximum (-40 °C to 70 °C) | $\pm 0.76\%$ | $\pm 0.04\%$ |

| Input noise | |
|----------------------------------|------------|
| High-resolution mode | 50 nA RMS |
| High-speed mode | 200 nA RMS |
| Stability | |
| Gain drift | 20 ppm/°C |
| Offset drift | 62 nA/°C |
| NMRR (High-resolution mode only) | |
| 50 Hz | 66 dB |
| 60 Hz | 68 dB |

NI-9208 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits:

| Isolation | |
|--------------------------|--|
| Channel-to-channel | None |
| Channel-to-earth ground | |
| Continuous | 250 V RMS, Measurement Category II |
| Withstand, up to 4,000 m | 3,000 V RMS, verified by a 5 s dielectric withstand test |

NI-9208 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 |

Measurement Category

Measurement Category I



Caution Do not connect the NI-9208 with DSUB to signals or use for measurements within Measurement Categories II, III, or IV.



Attention Ne pas connecter le NI-9208 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-9208 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-9208 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-9208 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-9208 with spring terminal to signals or use for measurements within Measurement Categories III or IV.



Attention Ne pas connecter le NI-9208 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-9208 with spring terminal | 4,000 m | |
| NI-9208 with DSUB | 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 | 282 mW maximum |

| | |
|---------------------------------------|--------------------|
| Sleep mode | 25 μ W maximum |
| Thermal dissipation (at 70 °C) | |
| Active mode | 1.29 W maximum |
| Sleep mode | 0.72 W maximum |

Physical Characteristics

| | |
|------------------------------|--|
| Weight | |
| NI-9208 with spring terminal | 161 g (5.7 oz) |
| NI-9208 with DSUB | 144 g (5.1 oz) |
| Dimensions | Visit ni.com/dimensions and search by module number. |

NI-9208 with Spring Terminal

| | |
|-------------------------------|--|
| 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-9208 at ni.com/calibration.

| | |
|----------------------|---------|
| Calibration interval | 2 years |
|----------------------|---------|