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# NI-9361

# Specifications

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# NI-9361 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.

### Related information:

- [Software Support for CompactRIO, CompactDAQ, Single-Board RIO, R Series, and EtherCAT](#)

## Input Characteristics

Number of inputs	8
Input type, programmable per line	Differential, single-ended with pull-up or single-ended without pull-up

I/O signal rate	1 MHz maximum
Digital line filtering settings, programmable per line	0 ns (disabled) to 5.24 ms in 80 ns steps
<b>Digital logic levels</b>	
<b>Differential(DI+ - DI-)</b>	
Input voltage range (DI+ and DI-)	0 V to 5 V
Input high range	200 mV to 5 V
Input low range	-200 mV to -5 V
Hysteresis	None
<b>Single-ended (DI+)</b>	
Input voltage range (DI+)	0 V to 24 V
Programmable input threshold range	1 V to 4 V
Input threshold error	12% maximum
Input threshold resolution	20 mV
Hysteresis	500 mV

Internal pull-up settings, programmable per line	Enabled or disabled
Internal pull-up voltage	5 V
<b>Maximum input current</b>	
With 5 V input (DI+ or DI-)	50 $\mu$ A maximum per input terminal
With 24 V input (DI+)	1.5 mA maximum per input terminal
<b>I/O protection</b>	
Input voltage (channel-to-COM), on 8 DI+ terminals simultaneously	+30 V
Input voltage (channel-to-COM), on two pairs of DI+ and DI- terminals at a time	$\pm$ 30 V
Input current on DI+	$\pm$ 2.3 mA maximum at $\pm$ 30 V overvoltage
Input current on DI-	$\pm$ 3 mA maximum at $\pm$ 30 V overvoltage
Input propagation delay	310 ns maximum
Input channel-to-channel skew	220 ns maximum
Input pulse width distortion	160 ns maximum

## Counter Features

Number of counters	8 counters
Resolution	32 bits
Sample rate	102.4 kHz maximum
Counter measurements	Edge counting, pulse <sup>1[1]</sup> , pulse width, period, frequency, duty-cycle and two-edge separation <sup>[1]</sup>
Encoder measurements	Velocity and position
Encoder support	Incremental encoders with two-pulse or quadrature encoding (and optional Z index reloading)
Internal timebase	100 MHz
Timebase accuracy	±50 ppm maximum
Input routing	Any DI can drive any counter input

## Power Requirements

Maximum power consumption from chassis

1. The NI-9361 supports this measurement only for CompactRIO systems.

Active mode	0.92 W maximum
Sleep mode	53 $\mu$ W maximum
<b>Maximum thermal dissipation (at 70 °C)</b>	
Active mode	1.20 W maximum
Sleep mode	0.46 W maximum
<b>External Power Supply (VSUP)</b>	
Input voltage	30 V DC maximum
Current	1 A maximum



**Note** The NI-9361 does not provide overvoltage protection for external power supply connection.

## Physical Characteristics

Weight	146 g (5.15 oz)
Dimensions	Visit <a href="https://ni.com/dimensions">ni.com/dimensions</a> and search by module number

## Safety Voltages

Connect only voltages that are within the following limits:

Isolation	
Channel-to-channel	None
<b>Channel-to-earth ground (up to 3,000 m)</b>	
Continuous	60 V DC, Measurement Category I
Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test
<b>Vsup inputs-to-earth ground (up to 3,000 m)</b>	
Continuous	60 V DC, Measurement Category I
Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test
<b>Channel-to-earth ground (up to 5,000 m)</b>	
Continuous	60 V DC, Measurement Category I
Withstand	860 V RMS, verified by a 5 s dielectric withstand test
<b>Vsup inputs-to-earth ground (up to 5,000 m)</b>	
Continuous	60 V DC, Measurement Category I
Withstand	860 V RMS, verified by a 5 s dielectric withstand test



**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.

## 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.