
NI-9326

Specifications

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NI-9326 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.

Input Characteristics

Number of inputs	6
Input type	Differential or single-ended
Input range	150 V RMS maximum; ± 50 mV minimum

I/O protection	
Input voltage (CH+-to-CH-)	150 V RMS
Input bandwidth (-3 dB)	241 kHz
Input frequency range	0.025 Hz — 128 kHz
Input pulse width detection ¹ <u>[1]</u>	2.0 μ s minimum
Configurable input active edge per channel	Rising/Falling edge detection
Configurable input threshold range per channel	-9.5 V to 9.5 V
Configurable input hysteresis range per channel	0 V to 5 V
Input threshold error	0.6% maximum
Input threshold resolution	7.8 mV
Digital Glitch Filter line filtering settings, programmable per line	0 ns (disabled) to 5.24 ms in 80 ns steps
Input propagation delay ¹ <u>[1]</u>	1.67 μ s maximum
Input channel-to-channel skew ¹ <u>[1]</u>	85 ns maximum
Input pulse width distortion ¹ <u>[1]</u>	1.53 μ s maximum
Butterworth filter	
Filter order	2nd order

¹ Threshold setting between 10% to 90% of signal amplitude and for unsaturated square wave (<25 Vpp) only.

Table 1. Butterworth Filter Cut-off Frequencies and Filter Delays

Filter Frequency	Cut-off Frequency	Filter Delay	Filter Settling ²
Filter Frequency - 1	6167 Hz	0.037 ms	0.120 ms
Filter Frequency - 2	2941 Hz	0.070 ms	0.250 ms
Filter Frequency - 3	1439 Hz	0.137 ms	0.513 ms
Filter Frequency - 4	712 Hz	0.270 ms	1.032 ms
Filter Frequency - 5	354 Hz	0.537 ms	2.075 ms
Filter Frequency - 6	177 Hz	1.069 ms	4.163 ms
Filter Frequency - 7	88 Hz	2.135 ms	8.332 ms
Filter Frequency - 8	44 Hz	4.266 ms	16.673 ms
Filter Frequency - 9	22 Hz	8.529 ms	33.360 ms
Filter Frequency - 10	11 Hz	17.054 ms	66.727 ms
Filter Frequency - 11	6 Hz	34.103 ms	133.463 ms
Filter Frequency - 12	3 Hz	68.202 ms	266.940 ms
Filter Frequency - 13	1 Hz	136.401 ms	533.886 ms

Counter Features

Number of counters	6 counters
Resolution	32 bits
Sample rate	102.4 kHz maximum
Counter measurements	Frequency, Period, Edge counting
Internal timebase	100 MHz
Timebase accuracy	±64 ppm maximum
Input routing	Any channel can drive any counter input

² Settled to 99% of final value.

Power Up Default Input and Counter Configuration

Threshold level	0 V
Hysteresis level	31.25 mV
Input Active Edge Detection	Rising
Digital Glitch Filter pulse width	0.48 μ s
Butterworth Filter	Enabled
Butterworth Low Pass Filter cut-off	Filter Frequency-1

Frequency Measurement Accuracy

Table 2. Frequency Accuracy (for 128 kHz input)

Filter Mode	Maximum Accuracy (%)	Typical Noise (Hz Peak)
Filter Disabled (Divisor =1)	0.2568	1660
Filter Frequency — 1	0.0424	825
Filter Frequency — 2	0.0245	410
Filter Frequency — 3	0.0174	164
Filter Frequency — 4	0.0124	66
Filter Frequency — 5	0.0111	25
Filter Frequency — 6	0.0088	12
Filter Frequency — 7	0.0084	6
Filter Frequency — 8	0.0084	6
Filter Frequency — 9	0.0084	6
Filter Frequency — 10	0.0084	6
Filter Frequency — 11	0.0084	6
Filter Frequency — 12	0.0084	6

Filter Mode	Maximum Accuracy (%)	Typical Noise (Hz Peak)
Filter Frequency — 13	0.0084	6

Figure 1. Maximum Frequency Accuracy across Frequencies

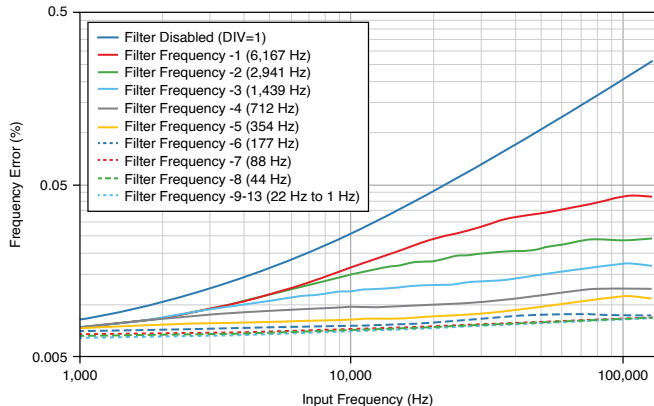
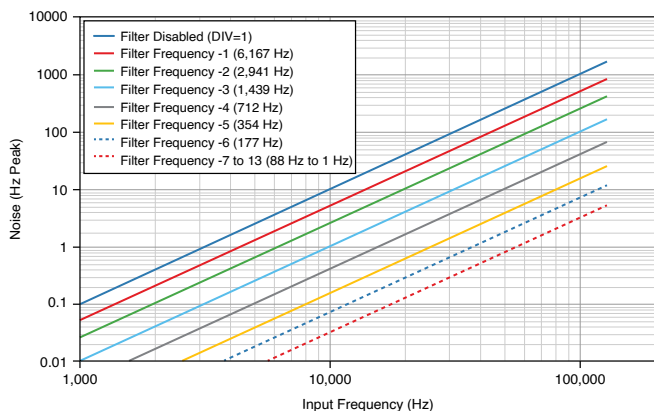


Figure 2. Frequency Noise



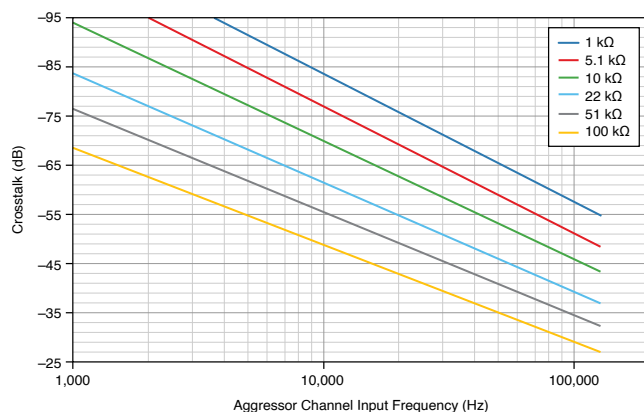
Crosstalk



Note Crosstalk is improved by >13 dB if measurement channel skips one channel from aggressor channel.

1. Sine wave (VR sensor crosstalk with source impedance at victim channels)

Figure 3. VR Sensor Crosstalk



- Square wave (Hall-effect sensor and encoder crosstalk with source impedance at victim channels)
 $[6.22 \times LN(\text{Sensor Impedance}) - 94.7] \text{ dB}$

Power Requirements

Power consumption from chassis	
Active mode	0.89 W maximum
Sleep mode	53 μW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.44 W maximum
Sleep mode	0.66 W maximum

Physical Characteristics

Screw-terminal Wiring	
Gauge	0.2 mm ² to 2.5 mm ² (26 AWG to 14 AWG) copper conductor wire

Wire strip length	13 mm (0.51 in.) of insulation stripped from the end
Temperature rating	90 °C, minimum
Torque for screw terminals	0.5 N · m to 0.6 N · m (4.4 lb · in. to 5.3 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 2.5 mm ²
Connector securement	
Securement type	Screw flanges provided
Torque for screw flanges	0.2 N · m (1.80 lb · in.)
Weight	170 g (6.0 oz)
Dimensions	Visit ni.com/dimensions and search by module number.

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

NI-9326 Safety Voltages

Connect only voltages that are within the following limits:

Channel-to-channel isolation	
Continuous	150 V RMS, Measurement Category I
Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test
Channel-to-earth ground isolation	
Continuous	150 V RMS, Measurement Category I

Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test
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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.