

Specifications for the NI PCMCIA-4050

This document lists the specifications of the NI PCMCIA-4050. These specifications are guaranteed between 15 °C and 35 °C unless otherwise specified.

DC Voltage

Accuracy (% of reading \pm μ V)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25° C \pm 10 °C)	Tempco (% of Reading/ $^{\circ}$ C \pm μ V/ $^{\circ}$ C)
250 V	0.0032% \pm 4.9 mV	0.021% \pm 49 mV	0.024% \pm 49 mV	0.0017% \pm 4800 μ V
25 V	0.0032% \pm 4.9 mV	0.021% \pm 49 mV	0.024% \pm 49 mV	0.0017% \pm 4800 μ V
2 V	0.0029% \pm 37 μ V	0.014% \pm 260 μ V	0.017% \pm 260 μ V	0.0009% \pm 25 μ V
200 mV	0.0029% \pm 27 μ V	0.014% \pm 250 μ V	0.017% \pm 250 μ V	0.0009% \pm 25 μ V
20 mV	0.0029% \pm 27 μ V	0.014% \pm 250 μ V	0.017% \pm 250 μ V	0.0009% \pm 25 μ V

Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise.

Noise Rejection

NMRR (10 Hz reading rate,
50/60 Hz powerline frequency \pm 1%) 80 dB

DC ECMRR 140 dB (with a 1 k Ω imbalance
in LO lead)

AC ECMR (RDC to 60 Hz) 150 dB (with a 1 k Ω imbalance
in LO lead)

Input Characteristics

Input bias current 1 nA max

Input resistance >1 G Ω (2 V, 200 mV,
20 mV ranges);
1 M Ω (250 V, 25 V)

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June 2003
323448B-01

DC Current

DC current measurements require the use of the CSM current shunt modules.

Accuracy (% of reading \pm μ A)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25 °C \pm 10 °C)	Tempco (% of Reading/ $^{\circ}$ C \pm μ A/ $^{\circ}$ C)
200 mA*	0.1% \pm 27 μ A	0.14% \pm 250 μ A	0.15% \pm 250 μ A	0.0035% \pm 25 μ A
20 mA*	0.1% \pm 27 μ A	0.14% \pm 250 μ A	0.15% \pm 250 μ A	0.0035% \pm 25 μ A
10 A**	0.02% \pm 4 mA	0.035% \pm 26 mA	0.035% \pm 26 mA	0.007% \pm 2.5 mA

Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise.

* Requires 200 mA shunt, CSM-200mA.

** Requires 10 A shunt, CSM-10A.

Input Characteristics

200 mA shunt

Input protection.....Fuse F1 500 mA/250 V fast fusing

Shunt resistor1 Ω

Burden voltage.....<400 mV at 200 mA

10 A shunt

Input protectionFuse F1 12.5 A/250 V fast fusing

Shunt resistor10 m Ω

Burden voltage.....<300 mV at 10 A

AC Voltage

Accuracy (% of reading \pm mV)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25 °C \pm 10 °C)	Tempco (% of Reading/ $^{\circ}$ C \pm mV/ $^{\circ}$ C)
250 V	0.6% \pm 500 mV	0.62% \pm 680 mV	0.62% \pm 680 mV	0.007% \pm 20 mV
25 V	0.3% \pm 30 mV	0.32% \pm 210 mV	0.32% \pm 210 mV	0.007% \pm 20 mV
2 V	0.4% \pm 3 mV	0.42% \pm 21 mV	0.42% \pm 21 mV	0.019% \pm 2 mV
200 mV	0.3% \pm 0.22 mV	0.32% \pm 1.20 mV	0.32% \pm 1.20 mV	0.007% \pm 0.110 mV
20 mV	0.4% \pm 100 μ V	0.42% \pm 170 μ V	0.42% \pm 170 μ V	0.019% \pm 12 μ V

Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise, applies for sine waves \geq 10% of input range. Accuracy may be affected by source impedance, cable capacitances dielectric absorption, or slew rate.

Noise Rejection

AC CMRR (DC to 60 Hz)..... >80 dB (with a 1 k Ω imbalance in LO lead)

Input Characteristics

Input resistance 1 M Ω all ranges

Bandwidth 20 Hz–25 kHz

Additional AC Errors

Frequency-dependent errors

Input Frequency	Additional Error (% of Reading)
20 Hz–50 Hz	2.5%
50 Hz–100 Hz	1%
100 Hz–5 kHz	0%
5 Hz–10 kHz	1%
10 kHz–25 kHz	2.5%

AC Current

AC current measurements require the use of the CSM current shunt module.

Accuracy (% of reading \pm mA)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25 °C \pm 10 °C)	Tempco (% of Reading/°C \pm mA/°C)
200 mA*	0.45% \pm 0.22 mA	0.47% \pm 1.2 mA	0.47% \pm 1.2 mA	0.007% \pm 0.110 mA
20 mA*	0.35% \pm 110 μ A	0.37% \pm 170 μ A	0.37% \pm 170 μ A	0.019% \pm 0.120 mA
10 A**	0.3% \pm 22 mA	0.32% \pm 120 mA	0.32% \pm 120 mA	0.026% \pm 11 mA

Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise.

* Requires 200 mA shunt, CSM-200mA.

** Requires 10 A shunt, CSM-10A.

Input Characteristics

200 mA shunt

Input protection.....Fuse F1 500 mA/250 V;
quick-acting
Shunt resistor1 Ω
Burden voltage.....<400 mV at 200 mA

10 A shunt

Input protectionFuse F1 12.5 A/250 V;
quick-acting
Shunt resistor10 m Ω
Burden voltage.....<300 mV at 10 A

Resistance

Accuracy (% of reading $\pm \Omega$)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25 °C \pm 10 °C)	Tempco (% of Reading/ $^{\circ}$ C \pm Ω / $^{\circ}$ C)
Extended resistance (>2 M Ω)	0.1% \pm 6 k Ω	0.1% \pm 60 k Ω	0.1% \pm 60 k Ω	0.0072% \pm 6 k Ω
2 M Ω	0.012% \pm 55 Ω	0.077% \pm 370 Ω	0.080% \pm 20 Ω	0.0072% \pm 35 Ω
200 k Ω	0.012% \pm 37 Ω	0.077% \pm 350 Ω	0.080% \pm 2 Ω	0.0072% \pm 35 Ω
20 k Ω	0.006% \pm 0.5 Ω	0.024% \pm 4 Ω	0.027% \pm 4 Ω	0.0020% \pm 0.40 Ω
2 k Ω	0.006% \pm 0.4 Ω	0.024% \pm 4 Ω	0.027% \pm 4 Ω	0.0020% \pm 0.40 Ω
200 Ω	0.006% \pm 0.4 Ω	0.024% \pm 4 Ω	0.027% \pm 4 Ω	0.0020% \pm 0.40 Ω

Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise.

Measurement mode.....2-wire resistance

Test current 100 μ A for 200 Ω , 2 k Ω ,
20 k Ω ranges;
1 μ A for 2 M Ω and 200 k Ω
ranges;
1 μ A and 1 M Ω in parallel for
extended resistance measurements

Diode Testing

Accuracy (% of reading \pm μ V)

Range	24 Hour (25 °C \pm 1 °C)	90 Day (25 °C \pm 10 °C)	1 Year (25 °C \pm 10 °C)	Tempco (% of Reading/°C \pm μ V/°C)
2 V	0.006% \pm 60 μ V	0.024% \pm 400 μ V	0.027% \pm 400 μ V	0.002% \pm 40 μ V
Accuracy numbers are for 5 1/2 digits and include the effects of full-scale and zero-scale errors, temperature variation, linearity, and noise.				

Test current 100 μ A

General Specifications

Settling time Affected by source impedance and input signal changes

Warm-up time 30 minutes for measurements accurate within specifications

Bus type..... PCMCIA, slave

Altitude..... Up to 2,000 m; at higher altitudes the installation category must be derated

Working voltage..... 250 V maximum between either input terminal and earth ground

Power requirement +5 VDC, 45 mA in operational mode

Operating temperature..... 0 °C to 55 °C

Storage temperature -20 °C to 70 °C

Relative humidity 10 to 90% noncondensing

Installation Category II

Pollution Degree 2

Physical Dimensions

NI PCMCIA-4050	8.6 by 5.4 cm (3.4 by 2.1 in.) (Type II PC card)
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Note The P4-BJ2 cable connects the NI PCMCIA-4050 to the test probes.

P4-BJ2 cable	
Length.....	0.3 m
End that connects to the NI PCMCIA-4050	3.7 by 2.3 cm (1.5 by 0.9 in.)

Safety

The NI PCMCIA-4050 meets the requirements of the following standards for safety and electrical equipment for measurement, control, and laboratory use:

- IEC 60950, EN 60950
- UL 1950, UL 60950
- CAN/CSA C22.2 No. 60950



Note For UL and other safety certifications, refer to the product label or to ni.com.

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1
EMC/EMI	CE, C-Tick, and FCC Part 15 (Class A) Compliant



Note For EMC compliance, you *must* operate this device with shielded cabling.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

Low-Voltage Directive (safety) 73/23/EEC

Electromagnetic Compatibility
Directive (EMC) 89/336/EEC



Note Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, click **Declarations of Conformity Information** at ni.com/hardref.nsf/. This Web site lists the DoCs by product family. Select the appropriate product family, followed by your product, and a link appears to the DoC in Adobe Acrobat format. Click the Acrobat icon to download or read the DoC.