

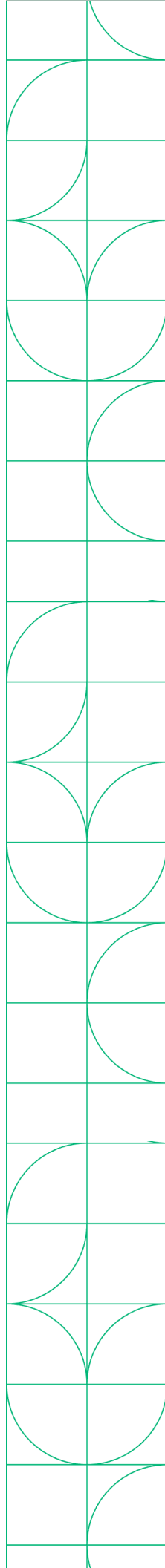


PXIe-DMM5102 Bundle

Expandable PXI bundle based on PXIe-4081
Digital Multimeter, 7 1/2-Digit, 1000V, 3A

Specifications

PXIe-1083 and PXIe-4081



PXI DMM Bundle

In the Box



PXIe-4081
(Digital Multimeter)



PXIe-1083
(5-Slot PXIe Chassis)


PXIe-DMM5102 Bundle

Accessories:

- Thunderbolt cable
- Power cable (varied by PN)
 - 867116-01 (US)
 - 867116-02 (EUR)
 - 867116-03 (Not included)
 - 867116-04 (China)

Recommended Software

Test Workflow
P/N: 788509-35



Test Workflow is a bundle of select NI software featuring engineering-specific tools that help test professionals accomplish anything from their day-to-day work to overcoming their most challenging obstacles.

Test Workflow includes:

- **LabVIEW** - a graphical programming environment engineers use to develop automated research, validation, and production test systems.
- **InstrumentStudio** - an application software that provides an integrated approach to interactive PXI measurements.
- **TestStand** - a test executive software that accelerates system development and deployment for engineers in validation and production.
- And more NI Software!

Table of Contents

This document combines the PDFs of this bundle together. The page numbers in the table of contents correspond to the page number of PDF the component’s documentation begins.

PXIe-1083 Specifications.....	3
PXIe-4081 Specifications.....	16



PXle-1083

Specifications



PXIe-1083 Specifications


This document contains specifications for the PXIe-1083 chassis.

Electrical

The following section provides information about the PXIe-1083 AC input and DC output.

AC Input

Input rating	100 VAC to 240 VAC, 50 Hz/60 Hz, 6 A to 3 A
Operating voltage range ¹	90 VAC to 264 VAC
Nominal input frequency	50 Hz/60 Hz
Operating frequency range ¹	47 Hz to 63 Hz
Efficiency	78% typical
Over-current protection	Internal fuse in line
Main power disconnect	The AC power cable provides main power disconnect. Do not position the equipment so that it is difficult to disconnect the power cord. The front-panel power switch causes the internal chassis power supply to provide DC power to the PXI Express backplane.



Caution Disconnect power cord to completely remove power.

DC Output

DC output characteristics of the PXIe-1083.

Voltage Rail	Maximum Current	Load Regulation	Maximum Ripple and Noise (20 MHz BW)
+5V_AUX	1.0 A	±5%	50 mVpp
+12 V	30.1 A	±5%	120 mVpp
+5 V	25.1 A	±5%	50 mVpp
+3.3 V	30.7 A	±5%	50 mVpp
-12 V	0.75 A	±5%	120 mVpp

Maximum total available power for the PXIe-1083 is 293 W.

The maximum combined power available on +3.3 V and +5 V is 180 W.

The maximum power available for each Thunderbolt port is 15 W (5 V/3 A).

Table 1. Backplane Slot Current Capacity

Slot	+5 V	V(I/O)	+3.3 V	+12 V	-12 V	5 V _{AUX}
Hybrid Peripheral Slot with PXI-5 Peripheral	-	-	3 A	6 A	-	1 A
Hybrid Peripheral Slot with PXI-1 Peripheral	6 A	5 A	6 A	1 A	1 A	-



Note PCI V(I/O) pins in Hybrid Peripheral Slots are connected to +5 V.



Note The maximum power dissipated in a peripheral slot should not exceed 58 W. Refer to the **Operating Environment** section for ambient temperature considerations at 58 W.

Over-current protection	All outputs are protected from short circuit and overload, they recover and return to regulation when the overload is removed and the power is cycled.
Over-voltage protection	+3.3 V clamped at 3.7 V to 4.3 V, +5 V clamped at 5.7 V to 6.5 V, +12 V clamped at 13.4 V to 15.6 V

Chassis Cooling

Module cooling	Forced air circulation (positive pressurization) through one 150 CFM fan
Module slot airflow direction	Bottom of module to top of module
Module intake	Bottom of chassis
Module exhaust	Top, right side of chassis
Slot cooling capacity	58 W; slot 6 supports 58 W cooling with high fan mode
Power supply cooling	Forced air circulation through integrated fans
Power supply intake	Front and left side chassis
Power supply exhaust	Rear of chassis
Minimum chassis cooling clearances	
Above	44.45 mm (1.75 in.)
Rear	44.45 mm (1.75 in.)
Sides	44.45 mm (1.75 in.)
Below	
Rack	44.45 mm (1.75 in.)
Desktop	25.4 mm (1.00 in.)

Environmental

Maximum altitude	2,000 m (6,560 ft.), 800 mbar (at 25 °C ambient, high fan mode)
Pollution Degree	2

Indoor use only.

Operating Environment

Ambient temperature range When all peripheral modules require ≤ 38 W cooling capacity per slot 0 °C to 50 °C (IEC 60068-2-1 and IEC 60068-2-2.) ² Meets MIL-PRF-28800F Class 3 low temperature limit and high temperature limit. When any peripheral module requires > 38 W cooling capacity per slot 0 °C to 40 °C (IEC 60068-2-1 and IEC 60068-2-2.) ² Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 4 high temperature limit.	
Relative humidity range	20% to 80%, noncondensing

Storage Environment

Ambient temperature range	–40 °C to 71 °C (IEC-60068-2-1 and IEC-60068-2-2.) ^[3] Meets MIL-PRF-28800F Class 3 limits.
Relative humidity range	10% to 95%, noncondensing

Shock and Vibration

Operational shock	30 g peak, half-sine, 11 ms pulse (IEC-60068-2-27.) ³ Meets MIL-PRF-28800F Class 2 limits.
Operational random vibration	5 to 500 Hz, 0.3 g _{rms}
Non-operating vibration	5 to 500 Hz, 2.4 g _{rms} (IEC 60068-2-64.) ³ Non-operating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.

Acoustic Emissions

Sound Pressure Level (at Operator Position)

(Tested in accordance with ISO 7779. Meets MIL-PRF-28800F requirements.)

38 W Profile

Auto fan (up to 30 °C ambient)	33.7 dBA
High fan	50.8 dBA

58 W Profile

Auto fan (up to 30 °C ambient)	54.7 dBA
High fan	55.3 dBA

Sound Power Level

38 W Profile

Auto fan (up to 30 °C ambient)	44.9 dBA
High fan	60.3 dBA

58 W Profile

Auto fan (up to 30 °C ambient)	63.4 dBA
High fan	64.2 dBA



Note The protection provided by the PXIe-1083 can be impaired if it is used in a manner not described in this document.

Safety Compliance Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1



Note For safety certifications, refer to the product label or the [Product Certifications and Declarations](#) section.

EMC Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by NI could void your authority to operate it under your local regulatory rules.

EMC Notices

Refer to the following notices for cables, accessories, and prevention measures necessary to ensure the specified EMC performance.



Notice

For EMC declarations and certifications, and additional information, refer to the [Product Certifications and Declarations](#) section.



Notice Changes or modifications to the product not expressly approved by NI could void your authority to operate the product under your local regulatory rules.



Notice Operate this product only with shielded cables and accessories.

Electromagnetic Compatibility Standards

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions

- AS/NZS CISPR 11: Group 1, Class A emissions



Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



Note In Europe, Canada, Australia, and New Zealand (per CISPR 11) Class A equipment is intended for use in nonresidential locations.

CE Compliance

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.


Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** web page at ni.com/environment. This page contains the environmental

regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

-  Waste Electrical and Electronic Equipment (WEEE)—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法 (中国 RoHS)

-  中国 RoHS— NI 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

Backplane

Size	3U-sized; 5 peripheral slots. Compliant with IEEE 1101.10 mechanical packaging. PXI Express Specification compliant. Accepts both PXI Express and CompactPCI (PICMG 2.0 R 3.0) 3U modules.
Backplane bare-board material	UL 94 V-0 Recognized
Backplane connectors	Conforms to IEC 917 and IEC 1076-4-101, UL 94 V-0 rated

System Synchronization Clocks

10 MHz System Reference Clock: PXI_CLK10

Maximum slot-to-slot skew	250 ps
Accuracy	± 25 ppm max (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS phase-jitter (10 Hz–1 MHz range)
Duty-factor	45% to 55%
Unloaded signal swing	3.3 V \pm 0.3 V



Note For other specifications, refer to the **PXI-1 Hardware Specification**.

100 MHz System Reference Clock: PXIe_CLK100 and PXIe_SYNC100

Maximum slot-to-slot skew	100 ps
Accuracy	± 25 ppm max (guaranteed over the operating temperature range)
Maximum jitter	3 ps RMS phase-jitter (10 Hz to 12 kHz range), 2 ps RMS phase-jitter (12 kHz to 20 MHz range)
Duty-factor for PXIe_CLK100	45% to 55%
Absolute differential voltage (When terminated with a 50 Ω load to 1.30 V or Thévenin equivalent)	400 mV to 1000 mV



Note For other specifications, refer to the **PXI-5 PXI Express Hardware Specification**.

Mechanical

Standard chassis dimensions	
Height	177.1 mm (6.97 in.)
Width	257.1 mm (10.12 in.)
Depth	214.2 mm (8.43 in.)
Weight	6.7 kg (14.8 lb)
Chassis materials	Extruded Aluminum (6063-T5, 6060-T6), Cold Rolled Steel/Stainless Steel, Santoprene, Urethane Foam, PC-ABS, Nylon, Polyethylene
Finish	Conductive Clear Iridite on Aluminum, Electroplated Nickel on Cold Rolled Steel, Electroplated Zinc on Cold Rolled Steel

The following figures show the PXIe-1083 chassis dimensions. The holes shown are for installing the optional rack mount kits.

Figure 1. PXIe-1083 Chassis Dimensions (Front)

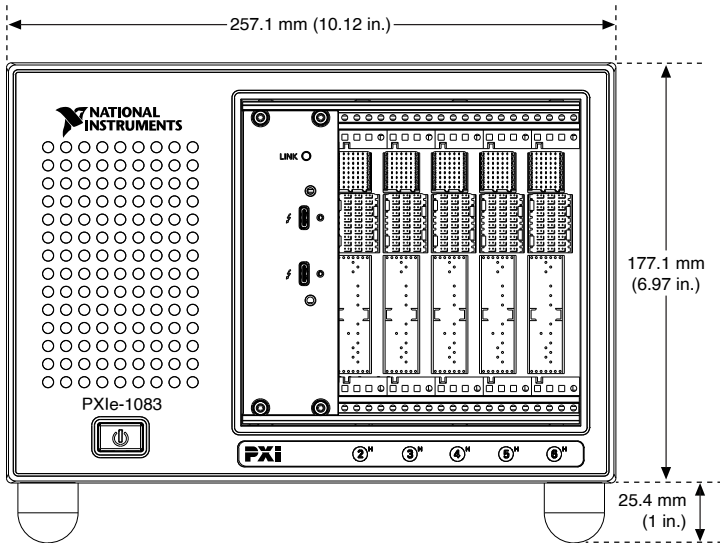


Figure 2. PXIe-1083 Chassis Dimensions (Side)

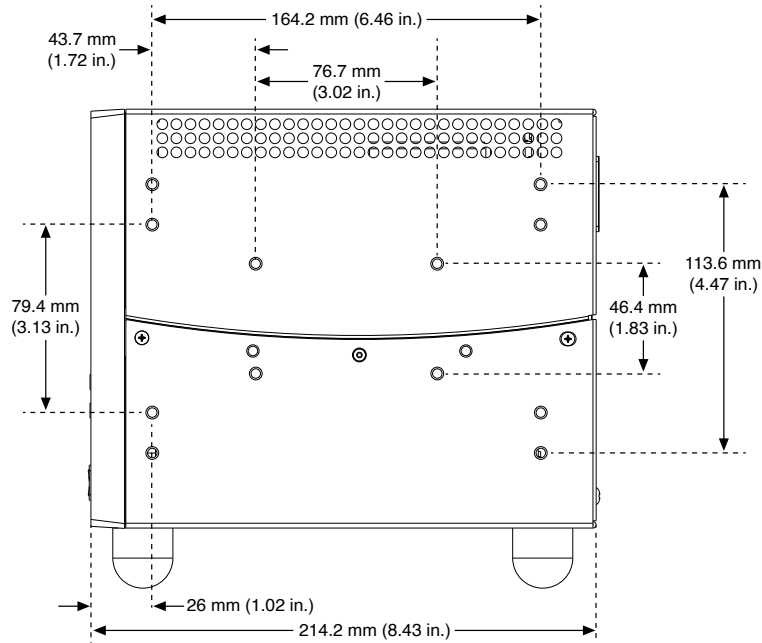
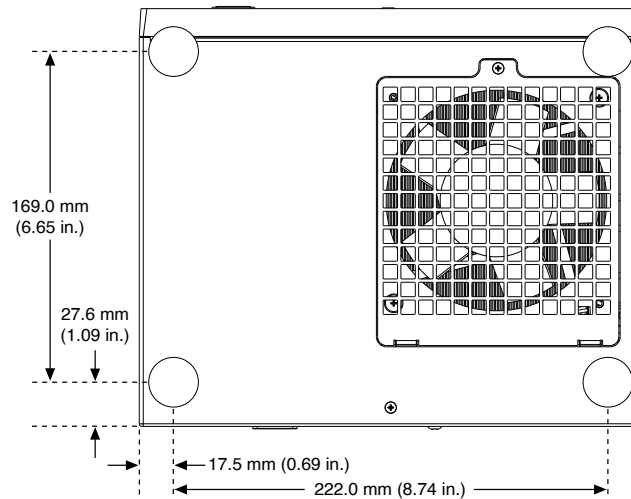


Figure 3. PXIe-1083 Chassis Dimensions (Bottom)



¹ The operating range is guaranteed by design.

² This product meets the requirements of the environmental standards for electrical equipment for measurement, control, and laboratory use.

³ This product meets the requirements of the environmental standards for electrical equipment for measurement, control, and laboratory use.

PXIe-4081

Specifications



PXIe-4081 Specifications

These specifications apply to the PXIe-4081.

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 **Warranted** unless otherwise noted.

Conditions

Specifications are valid under the following conditions unless otherwise noted. Refer to each section for additional conditions that apply.

- Self-calibration performed within the last 24 hours
- Calibration interval of 2 years
- 60 minutes warm-up time

DC Voltage Specifications

Accuracy

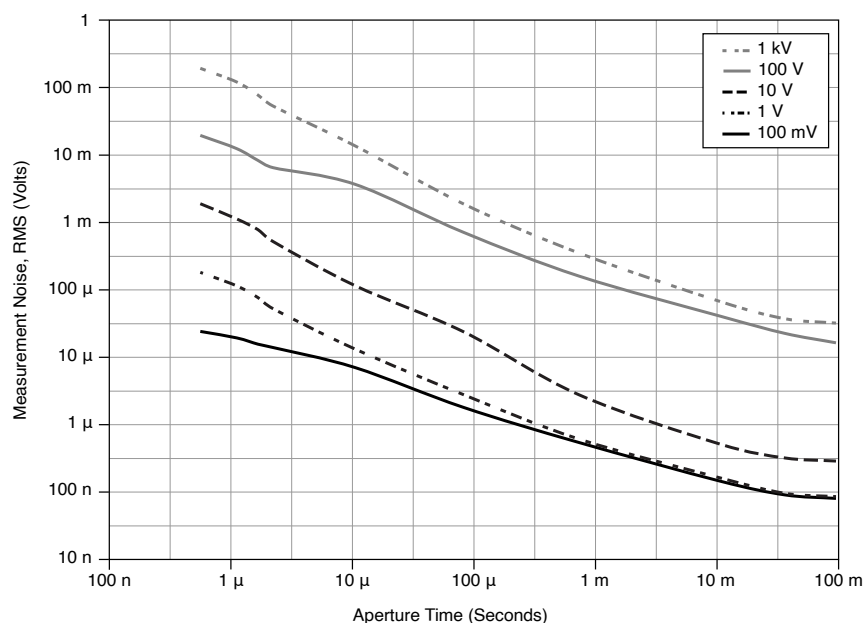
All DC voltage accuracy specifications apply to apertures of ≥ 100 ms, with Auto Zero and ADC calibration enabled. Assumes offset nulling. Otherwise, add 2 μ V to the specifications.

Range	Input Resistance ^[1]	24 Hr ^[2] $T_{\text{selfcal}} \pm 1^\circ\text{C}$	90 Day $T_{\text{selfcal}} \pm 5^\circ\text{C}$	2 Year T_{selfcal} $\pm 5^\circ\text{C}$	Tempco/ $^\circ\text{C}$ ^[3]	
					Without Self-Cal	With Self-Cal
100 mV	10 M Ω \pm 2%, >10 G Ω	6 + 5	27 + 7	28 + 8	3 + 2	0.3 + 1
1 V		4.5 + 0.8	15 + 2.5	18 + 2.5	2 + 0.2	0.3 + 0.1
10 V		2 + 0.5	10.5 + 0.5	12 + 0.5	0.3 + 0.02	0.3 + 0.01
100 V	10 M Ω \pm 2%	6 + 2	24 + 2.5	26 + 2.5	4 + 0.2	0.3 + 0.1
1000 V ^[4]		4 + 0.5	24 + 0.5	25 + 0.5	3 + 0.02	0.3 + 0.01

Table 1. DC Voltage \pm (ppm of reading + ppm of range)

Noise

Figure 1. DC Voltage Noise, Typical



Note With input shorted, Normal DC Noise Rejection, and Auto Zero ON. For apertures less than 100 ms, add five times the typical rms noise to the accuracy specification.

General

ADC Linearity	0.5 ppm of reading + 0.5 ppm of range
Effective Common-Mode Rejection Ratio (CMRR) (1 kΩ resistance in LO lead)	>140 dB (DC), 100 ms aperture; >170 dB (>46 Hz) with high-order DC noise rejection, 100 ms aperture, typical
Overrange	105% of range except 1000 V

DC voltage input bias current	<30 pA at 23 °C, typical
-------------------------------	--------------------------

Resistance Specifications

Accuracy

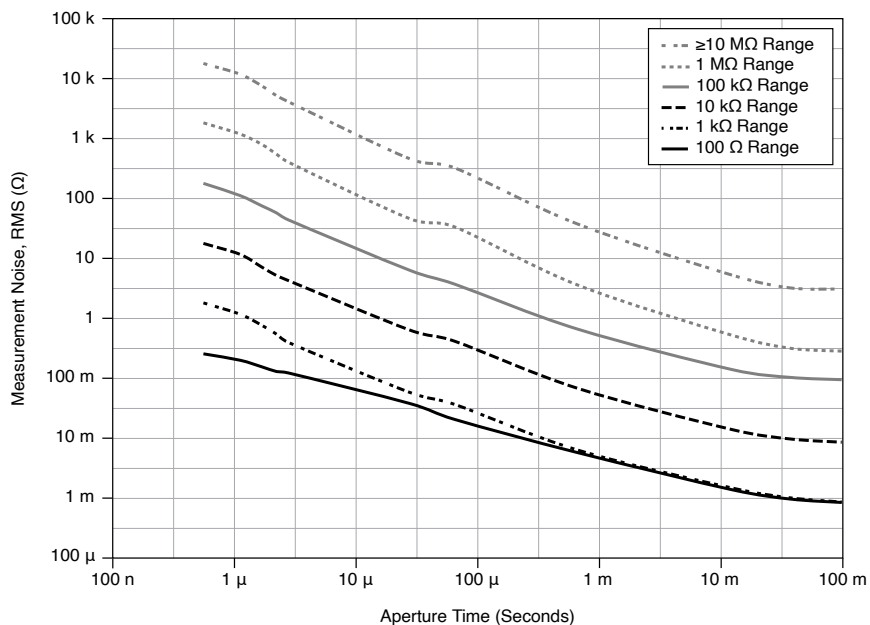
All resistance accuracy specifications apply to apertures of ≥ 100 ms, with Offset Compensated Ohms (for ranges ≤ 10 k Ω) or Auto Zero (for ranges ≥ 100 k Ω) and ADC calibration enabled.

Range	Test Current ^[6]	Max Test Voltage	24 Hr ^[7] $T_{\text{selfcal}} \pm 1^\circ\text{C}$	90 Day $T_{\text{extcal}} \pm 10^\circ\text{C}$, $T_{\text{selfcal}} \pm 5^\circ\text{C}$	2 Year $T_{\text{extcal}} \pm 10^\circ\text{C}$, $T_{\text{selfcal}} \pm 5^\circ\text{C}$	Tempco/ $^\circ\text{C}$ ^[8]		2 Year ^[9] $T_{\text{selfcal}} \pm 5^\circ\text{C}$
						Without Self-Cal	With Self-Cal	
100 Ω	1 mA	100 mV	9 + 5	40 + 12	55 + 12	5 + 0.12	0.8 + 0.12	60 + 12
1 k Ω	1 mA	1 V	7 + 0.5	30 + 1.5	45 + 1.5	5 + 0.05	0.8 + 0.05	50 + 1.5
10 k Ω	100 μA	1 V	7 + 0.5	30 + 1.5	45 + 1.5	5 + 0.05	0.8 + 0.05	50 + 1.5
100 k Ω ^[10]	10 μA	1 V	7 + 1	36 + 2.5	45 + 2.5	5 + 0.2	2 + 0.2	95 + 2.5
1 M Ω	10 μA	10 V	6 + 1	60 + 1	60 + 1	5 + 0.05	2 + 0.05	95 + 1
10 M Ω	1 μA	10 V	60 + 2	130 + 10	130 + 10	20 + 1	20 + 1	800 + 10
100 M Ω ^[11]	1 μA 10 M Ω	10 V	500 + 6	2600 + 10	3000 + 10	300 + 6	300 + 6	—
5 G Ω ^[12] (typical)	1 μA 10 M Ω	10 V	1% + 0.2%	5% + 0.2%	5% + 0.2%	0.5% + 0.2%	0.5% + 0.2%	—

Table 2. Resistance (4-Wire and 2-Wire^[5]) \pm (ppm of reading + ppm of range)

Noise

Figure 2. PXIe-4081 Resistance Noise, Typical



Note With input shorted, Normal DC Noise Rejection, and Auto Zero ON. For apertures less than 100 ms, add five times the typical rms noise to the accuracy specification.

General

Maximum 4-wire lead resistance

Use the lesser of 10% of range or 1 kΩ

DC Current Specifications

Accuracy

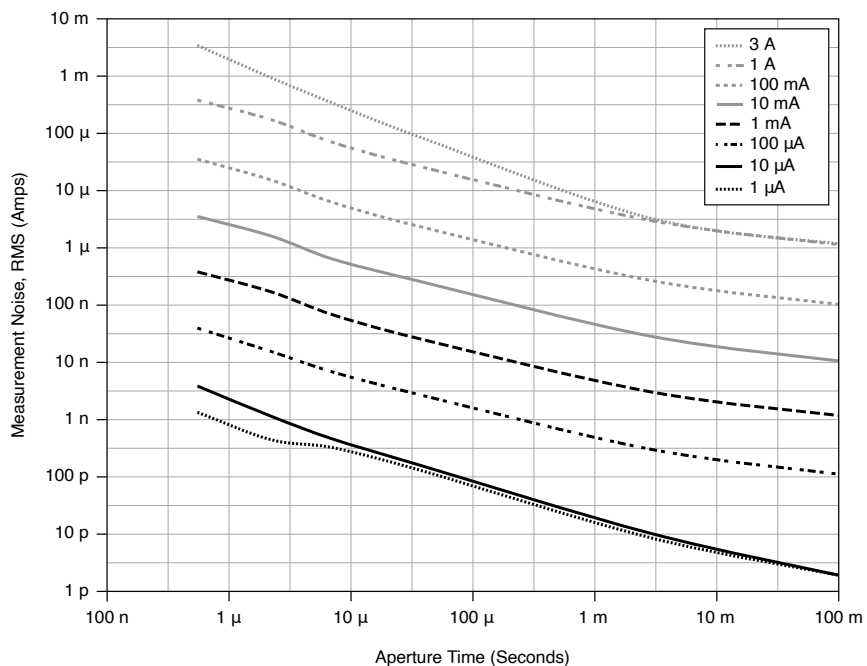
All DC current accuracy specifications apply for apertures ≥ 100 ms, with Auto Zero and ADC calibration enabled.

Range	Burden Voltage, Typical	24 Hr ^[12] $T_{\text{selfcal}} \pm 1^\circ\text{C}$	90 Day $T_{\text{extcal}} \pm 10^\circ\text{C}$, $T_{\text{selfcal}} \pm 5^\circ\text{C}$	2 Year $T_{\text{extcal}} \pm 10^\circ\text{C}$, $T_{\text{selfcal}} \pm 5^\circ\text{C}$	Tempco/ $^\circ\text{C}$	2 Year ^[13] $T_{\text{selfcal}} \pm 5^\circ\text{C}$
1 μA ^[14]	<55 mV	30 + 20	340 + 40	350 + 40	10 + 5	575 + 140
10 μA ^[14]	<550 mV	30 + 2	140 + 15	200 + 15	10 + 1	500 + 20
100 μA	<60 mV	10 + 10	105 + 20	175 + 20	5 + 0.2	220 + 20
1 mA	<60 mV	13 + 10	100 + 20	170 + 20	5 + 0.2	220 + 20
10 mA	<60 mV	15 + 10	100 + 20	170 + 20	5 + 0.2	250 + 20
100 mA	<100 mV	18 + 10	175 + 20	180 + 20	10 + 0.2	250 + 20
1 A ^[15]	<250 mV	25 + 10	275 + 20	350 + 20	16 + 0.2	800 + 20
3 A ^[15]	<700 mV	25 + 5	250 + 20	350 + 20	16 + 0.2	800 + 20

Table 3. DC Current \pm (ppm of reading + ppm of range)

Noise

Figure 3. PXIe-4081 DC Current Noise, Typical



Note With input open, Normal DC Noise Rejection, and Auto Zero ON. For apertures less than 100 ms, add five times the typical rms noise to accuracy specification.

General

Overrange	105% of range except 1 A range.
-----------	---------------------------------

AC Voltage Specifications

Accuracy

Note Measurement aperture greater than $4/f_L$ where f_L is the lowest frequency component of the signal being measured. Signal amplitudes greater than 1% of range.

Range (rms)	Peak Voltage	1 Hz to 40 Hz ^[16]	>40 Hz to 20 kHz	>20 kHz to 50 kHz	>50 kHz to 100 kHz	>100 kHz to 300 kHz
50 mV ^[17]	±105 mV	0.1 + 0.02	0.05 + 0.02	0.07 + 0.02	0.3 + 0.02	0.7 + 0.15
500 mV	±1.05 V	0.1 + 0.005	0.05 + 0.005	0.06 + 0.01	0.2 + 0.01	0.7 + 0.15
5 V	±10.5 V					
50 V	±105 V					
700 V	±1000 V	0.1 + 0.005	0.12 + 0.05	0.6 + 0.05	3 + 0.15	3 + 0.15

Table 4. AC Voltage Accuracy ± (% of reading + % of range), 2 Years, $T_{\text{extcal}} \pm 10^\circ\text{C}$

Range (rms)	1 Hz to 40 Hz	>40 Hz to 20 kHz	>20 kHz to 50 kHz	>50 kHz to 100 kHz	>100 kHz to 300 kHz
50 mV	0.001 + 0.0002	0.001 + 0.0002	0.001 + 0.001	0.002 + 0.001	0.02 + 0.01
500 mV					
5 V					
50 V	0.001 + 0.0002	0.012 + 0.001	0.045 + 0.001	0.1 + 0.01	0.1 + 0.01
700 V					

Table 5. AC Voltage Tempco/ $^\circ\text{C} \pm$ (% of reading + % of range)

General

Input impedance	10 M $\Omega \pm 2\%$ in parallel with 90 pF, typical
Input coupling	AC or DC coupled

Overrange	105% of range except 700 V
Maximum Volt-Hertz product	Verified to 2.2×10^7 V-Hz
Maximum DC voltage component	400 V
Common mode rejection ratio (CMRR), 1 k Ω resistance in LO lead	>70 dB (DC to 60 Hz), typical

AC Current Specifications

Accuracy

Note Measurement aperture greater than $4/f_L$, where f_L is the lowest frequency component of the signal being measured. Signal amplitudes greater than 1% of range.

Range (rms)	Peak Current	Burden Voltage (rms at 1 kHz), Typical	1 Hz to 1 kHz	>1 kHz to 5 kHz	5 kHz to 10 kHz ^[18]	10 kHz to 20 kHz ^[18]	Tempco/°C
100 μ A ^[19]	$\pm 200 \mu$ A	<60 mV	0.065 + 0.02	—	—	—	0.002 + 0.0002
1 mA	± 2 mA	<60 mV	0.035 + 0.02	0.06 + 0.02	0.19 + 0.02	0.44 + 0.02	0.001 + 0.0001
10 mA	± 20 mA	<60 mV	0.035 + 0.02	0.045 + 0.02	0.1 + 0.02	0.17 + 0.02	0.002 + 0.0002
100 mA	± 200 mA	<100 mV	0.04 + 0.02	0.07 + 0.02	0.1 + 0.02	0.1 + 0.02	0.001 + 0.0002
1 A	± 2 A	<250 mV	0.07 + 0.02	0.4 + 0.02	0.9 + 0.02	1.6 + 0.02	0.002 + 0.0001

Range (rms)	Peak Current	Burden Voltage (rms at 1 kHz), Typical	1 Hz to 1 kHz	>1 kHz to 5 kHz	5 kHz to 10 kHz ^[18]	10 kHz to 20 kHz ^[18]	Tempco/°C
3 A	$\pm 4.2 \text{ A}$ ^[20]	<700 mV	0.08 + 0.02	0.41 + 0.02	0.9 + 0.02	1.6 + 0.02	0.002 + 0.0001

Table 6. AC Current Specifications \pm (% of reading + % of range), 2 Years, $T_{\text{extcal}} \pm 10^\circ\text{C}$

General

Overrange	105% of range except 3 A
-----------	--------------------------

Diode Test Specifications

Range	10 V
Test current ^[21]	1 μA , 10 μA , 100 μA , 1 mA ^[22]
Accuracy	Add 20 ppm of reading to 10 VDC voltage specifications.

Frequency and Period Specifications

Note Aperture time set to 150 ms.

Frequency measurement range	15 Hz to 500 kHz
Period measurement range	2 μs to 66.67 ms

Frequency Input Voltage Range	Corresponding Digitizer Range ^[23]	Minimum Peak-to-Peak Signal Amplitude ^[24]	Maximum Peak-to-Peak Signal Amplitude	Accuracy
50 mV	100 mV	5 mV	200 mV	Refer to the PXIe_CLK100 accuracy of the chassis.
500 mV	1 V	50 mV	2 V	
5 V	10 V	500 mV	20 V	
50 V	100 V	5 V	200 V	
700 V	1000 V	50 V	1000 V	

Temperature Specifications

All temperature accuracy specifications apply to apertures ≥ 100 ms, Auto Zero, and ADC calibration enabled. Use lowest possible resistance or voltage range for each temperature. Add probe accuracy and cold junction accuracy where applicable.

Sensor Type	Temperature Range	Accuracy
RTD ^[25]	-200 to 600 °C	0.1 °C
Thermistor ^[26]	-80 to 150 °C	0.08 °C
J Thermocouple	-210 to 1200 °C	0.2 °C
K Thermocouple	-200 to 1200 °C	0.3 °C
N Thermocouple	-200 to 1300 °C	0.4 °C
T Thermocouple	-200 to 400 °C	0.3 °C
E Thermocouple	-200 to 1000 °C	0.2 °C
R Thermocouple	-50 to 1760 °C	0.8 °C
S Thermocouple	-50 to 1760 °C	0.8 °C
B Thermocouple	400 to 1820 °C	0.8 °C

Isolated Digitizer Specifications

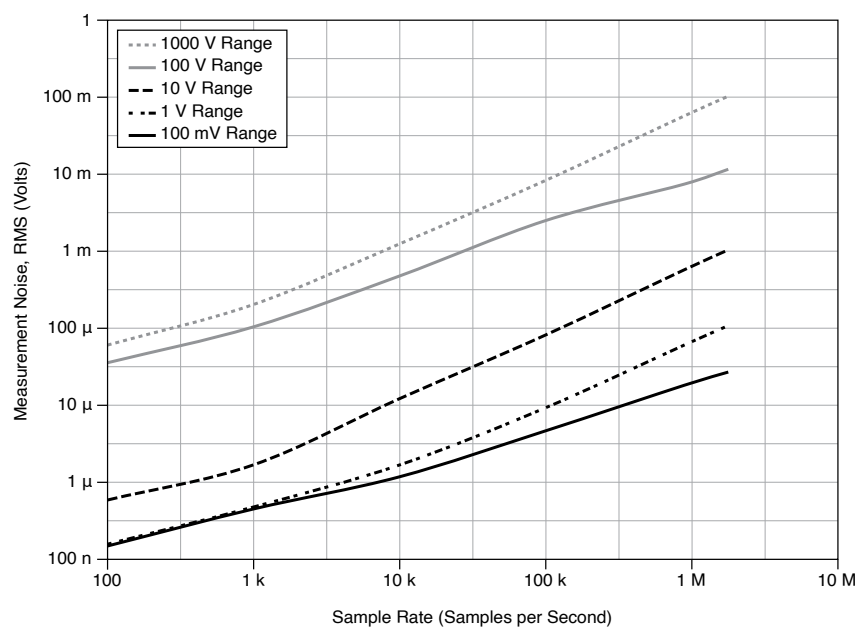
Available functions	Voltage and current
---------------------	---------------------

Voltage ranges	±100 mV to ±1000 V (DC or AC coupled)
Current ranges	100 µA to 3 A
Sample rate range	10 S/s to 1.8 MS/s
Available sample rates	$r = (1.8 \text{ MS/s}) / y$, where $y = 1, 2, 3, \dots, 1.8 \times 10^5$
Timebase accuracy	Equal to the PXIe_CLK100 accuracy of the chassis
Digitizer record length	2 samples minimum, unlimited maximum

Range	Input Resistance ^[27]	DC Accuracy (ppm/reading + ppm/range) 2 Year, $T_{\text{selfcal}} \pm 5^\circ\text{C}$	Analog Bandwidth, ^[28] Typical	
			±0.1 dB	-3 dB
100 mV	10 MΩ ± 2%, >10 GΩ	125 + 175	60 kHz	300 kHz
1 V		125 + 75	50 kHz	300 kHz
10 V		125 + 75	50 kHz	300 kHz
100 V	10 MΩ ± 2%	125 + 75	20 kHz	250 kHz
1000 V		125 + 75	30 kHz	275 kHz

Table 7. Voltage Mode

Figure 4. PXIe-4081 Voltage Waveform Noise, Typical

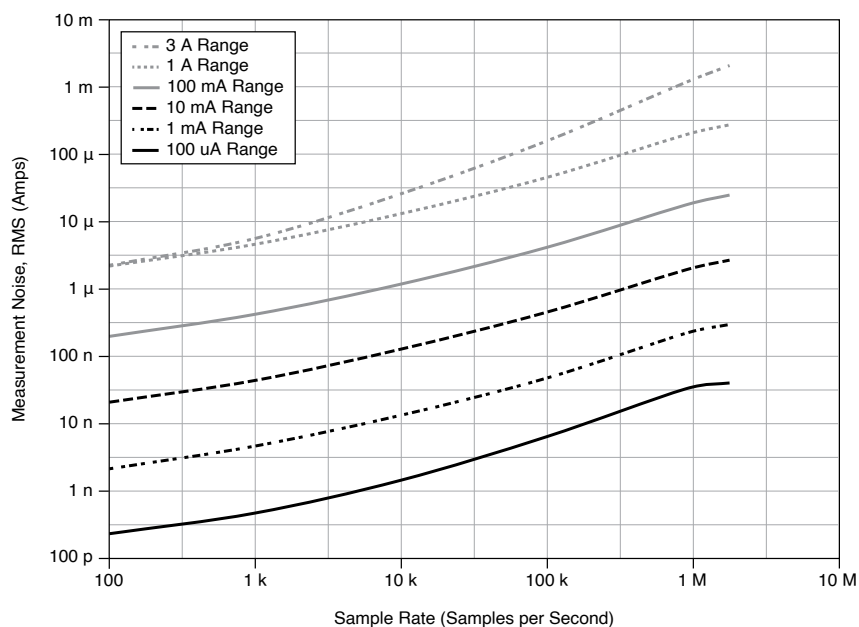


Note With input shorted.

Range	Burden Voltage, Typical	DC Accuracy (ppm/reading + ppm/range) 2 Year, $T_{selfcal} \pm 5^{\circ}\text{C}$	Analog Bandwidth, Typical	
			$\pm 0.1\text{ dB}$	-3 dB
100 μA	<60 mV	230 + 75	50 kHz	350 kHz
1 mA	<60 mV	230 + 75	60 kHz	400 kHz
10 mA	<60 mV	265 + 75	70 kHz	400 kHz
100 mA	<100 mV	265 + 75	80 kHz	400 kHz
1 A	<250 mV	800 + 75	10 kHz	450 kHz
3 A	<700 mV	800 + 75	10 kHz	450 kHz

Table 8. Current Mode

Figure 5. PXIe-4081 Current Waveform Noise, Typical



Note With input open.

General Specifications

External calibration interval	2 years
Warm-up	60 minutes to rated accuracy
Measurement Category	I ^[29] (up to 1000 VDC, 700 V _{rms} , 1000 V _{pk}) II (up to 500 VDC or V _{rms})

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.

Input protection (between terminals or terminal to ground)	1000 VDC or V_{pk}
Current mode fuse	T 3.5 A 1000 V, time-lag Minimum interrupt rating: 10 kA Siba 5019906.3,5

Fuse When this fuse symbol is marked on a device, take proper precautions.

Maximum common-mode voltage	500 VDC or V_{rms}
Maximum voltage-to-earth ground	
HI	1000 VDC or V_{pk}
LO	500 VDC or V_{rms}
HI SENSE	500 VDC or V_{rms}
LO SENSE	500 VDC or V_{rms}

Caution Take precautions to avoid electrical shock.

Attention Prenez les précautions nécessaires pour éviter tout choc électrique.

Timing

Mode	Trigger Latency		Maximum Reading Rate ^[30]
	AC Voltage	All Functions Except AC Voltage ^[31]	
Voltage, current, and resistance	15 μ s	<0 μ s	20 kS/s
Voltage and current digitizer			1.8 MS/s

Power

Power consumption	<9 W from PXI Express backplane
+12 V load	0.55 A max
+3.3 V load	0.55 A max

Physical Characteristics

Dimensions	3U, one-slot, PXI/cPCI module; 2.0 cm x 13.0 cm x 21.6 cm (0.8 in. x 5.1 in. x 8.5 in.), nominal
Weight	340 g (12 oz), nominal

Note If you need to clean the device, wipe it with a dry towel.

Environment

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
------------------	---

Pollution Degree	2
------------------	---

Indoor use only.

Operating Environment

Ambient temperature range	0 °C to 40 °C
Relative humidity range	10% to 90%, noncondensing

Storage Environment

Ambient temperature range	-40 °C to 71 °C
Relative humidity range	5% to 95%, noncondensing

Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g _{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g _{rms}

Compliance and Certifications

Caution Electromagnetic interference can adversely affect the measurement accuracy of this product. The input terminals of this device

are not protected for electromagnetic interference. As a result, this device may experience reduced measurement accuracy or other temporary performance degradation when connected cables are routed in an environment with radiated or conducted radio frequency electromagnetic interference. To limit radiated emissions and to ensure that this device functions within specifications in its operational electromagnetic environment, take precautions when designing, selecting, and installing measurement probes and cables.

Safety Compliance Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1

Note For safety certifications, refer to the product label or the [Product Certifications and Declarations](#) section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations, certifications, and additional information, refer to the [Product Certifications and Declarations](#) section.

CE Compliance

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)
- 2014/53/EU; Radio Equipment Directive (RED)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Product Certifications and Declarations


Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Environmental Management


NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

-  **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）

-  **中国 RoHS**—NI 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

¹ In parallel with 90 pF, typical.

² Relative to external calibration source.

³ Accuracy specifications allow for the indicated temperature variation. If the device temperature falls outside of that bounds, apply the Tempco 'Without Self-Cal'. Tempco 'With Self-Cal' describes the stability of the calibration mechanism, and is included for reference.

⁴ To account for self-heating effects, add 14 μV to the specification for each volt beyond $\pm 300\text{ V}$.

⁵ Perform offset nulling or add 200 $\text{m}\Omega$ to reading.

⁶ -10% to 0% tolerance, typical.

⁷ Relative to external calibration source.

⁸ Accuracy specifications allow for the indicated temperature variation. If the device temperature falls outside of that bounds, apply the Tempco 'Without Self-Cal'. Tempco 'With Self-Cal' describes the stability of the calibration mechanism, and is included for reference.

⁹ Over full operating temperature range.

¹⁰ Perform offset nulling or add 2 ppm of range to the specifications.

¹¹ 2-wire resistance measurement only.

¹² Relative to external calibration source.

¹³ Over full operating temperature range.

¹⁴ 90 day and 2 year specifications are typical.

¹⁵ To account for self-heating effects, for currents larger than 500 mA, add $I^2 \times 75\text{ ppm}$ of reading to the specification.

¹⁶ Applies to DC coupled only.

¹⁷ Applies to signals $> 1\text{ mV}_{\text{rms}}$

¹⁸ Specification typical above 5 kHz

¹⁹ Applies to signals $> 9\text{ }\mu\text{A}_{\text{rms}}$

²⁰ Sine wave only.

21 -10% to 0% tolerance, typical.

22 Up to 4.5 V measurement for 1 mA test current.

23 AC Coupled.

24 Square wave input. Minimum required peak-to-peak signal level is valid only for frequencies up to the -3 dB bandwidth. For higher frequencies, the signal amplitude must be increased. Refer to the Digitizer Voltage Mode for bandwidths.

25 Based on Pt3851 RTD in a 4-wire configuration.

26 Based on 44004, 44006, and 44007 interchangeable thermistors.

27 In parallel with 90 pF. When AC coupled, only 10 M Ω available.

28 Typical AC coupled frequency is 6 Hz (+/- 0.1 dB) and 0.8 Hz (-3 dB).

29 Measurement Categories CAT I and CAT O (Other) are equivalent. These test and measurement circuits are not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, III, or CAT IV.

30 Maximum Reading Rate assumes minimum aperture time, Auto Zero is OFF, Offset Compensated Ohms is OFF, ADC Calibration is OFF, Number of Averages is 1, and Settle Time is 0 seconds. Varying these settings will vary the reading rate.

31 Trigger latency for all functions except AC Voltage assumes Auto Zero, Offset Compensated Ohms, and ADC Calibration are OFF.