7½-Digit, 26-Bit, 1000 V Digital Multimeter and 1.8 MS/s Isolated Digitizer

NI PXI-4071

- Superior accuracy and measurement rates
- 10- to 26-bit flexible resolution
- Wide dynamic range of measurements
- ±10 nV to 1000 VDC (700 VAC) voltage
- ±1 pA to 3 A current
- 10 μΩ to 5 GΩ resistance
- ±500 VDC/V_{rms} common-mode isolation
- 1.8 MS/s isolated waveform acquisition
- Up to 1000 V and 3 A input

Calibration

- Gain and offset self-calibration
- 2-year external calibration cycle

Operating System

- Windows Vista/XP/2000
- Linux®

Recommended Software

- LabVIEW
- LabVIEW Real-Time Module
- LabWindows™/CVI
- Measurement Studio
- LabVIEW SignalExpress

Software (included)

- NI-DMM driver
- LabVIEW Express VIs
- DMM Soft Front Panel

Overview

The NI PXI-4071 7½-digit FlexDMM is a high-performance, multifunction 3U PXI module that provides the measurement capability found in two common test instruments – a high-resolution digital multimeter (DMM) and a digitizer. As a DMM, the PXI-4071 delivers fast, accurate voltage measurements from ±10 nV to 1000 V, current measurements from ±1 pA to 3 A, and resistance measurements from 10 μΩ to 5 GΩ, as well as takes frequency/period and diode measurements. In the high-voltage, isolated digitizer mode, the PXI-4071 can acquire DC-coupled waveforms at sample rates up to 1.8 MS/s in all voltage and current modes. Using the analysis functions in NI LabVIEW software, you can analyze these waveforms in both the time and frequency domains. The PXI-4071 offers superior speed, accuracy, and functionality, making it an excellent fit for use in automated tests on both the production floor and in an R&D environment.

High-Speed Digital Multimeter

The PXI-4071 surpasses conventional 7½-digit DMM speed/performance barriers by using a modern architecture that exploits the high-speed PXI bus. At 7½ digits, the PXI-4071 achieves DC reading rates of 7 S/s. For applications requiring higher throughput, it has a maximum DC reading rate of 10 kS/s at 4½ digits, as depicted in Table 1. These rates are at least five times faster than the traditional GPIB-controlled DMMs.

Digits	Bits	Maximum Sampling Rate (Digitizer)	Reading Rate (DMM)
7½	26	–	7 S/s
6½	22	100 S/s	100 S/s
5½	18	5 kS/s	3 kS/s
4½	15	20 kS/s	10 kS/s
3	10	1.8 MS/s	–

Table 1. PXI-4071 Sampling Rate

Wide Dynamic Range of Measurements

This FlexDMM can measure 1000 VDC and 700 V_{rms} at CAT I levels. In addition, the PXI-4071 uses a novel solid-state current shunt configuration, which delivers current sensitivity down to 1 pA, as shown in Table 2.

This wide measurement range makes it ideal for applications such as fuel cell testing, leakage measurements, current-voltage curve tracing analysis, off-state semiconductor device measurements, and battery testing.

NATIONAL INSTRUMENTS™

	PXI-4071	PXI-4070
Voltage Ranges (V)		
Maximum DC	1000	300
DC sensitivity	10 n	100 n
Maximum AC_{rms} (peak)	700 rms (1000)	300 rms (425)
Common mode	500	300
Current Ranges (A)		
Maximum DC	3	1
DC sensitivity	1 p	10 n
Maximum AC_{rms} (peak)	3 (4.2)	1 (2)
AC_{rms} sensitivity	100 p	10 n
Resistance Ranges (Ω)		
Maximum	5 G	100 M
Sensitivity	10 µ	100 µ

Table 2. FlexDMM Input Range Comparison

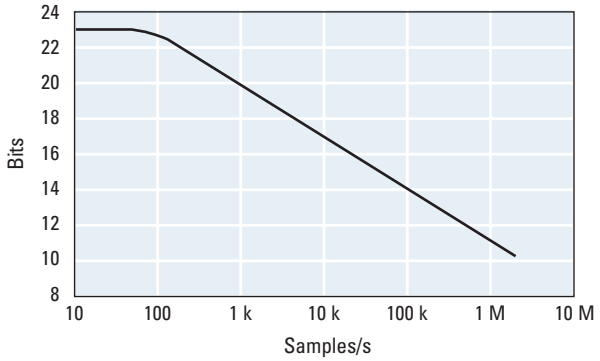


Figure 1. PXI-4071 Frequency versus Resolution Flexibility

Fast, Accurate AC Measurements

With NI FlexDMM devices, slow AC measurements are a thing of the past. FlexDMM devices achieve unprecedented AC measurement speeds by solving a traditional analog problem, rms-to-DC conversion, in the digital domain. They use a digital algorithm that requires only a few cycles of a waveform to compute rms values, which dramatically increases AC reading rates. The digital algorithm automatically rejects the DC component of the signal, making it possible to bypass the slow-settling input capacitor. To measure small AC voltages in the presence of large DC offsets, such as ripple on a DC power supply, FlexDMM devices offer the standard AC volts mode, which uses a coupling capacitor to eliminate the offset so the FlexDMM can use the most sensitive range.

The digital approach to rms computation offers accuracy benefits as well. The algorithm is completely insensitive to crest factor, and can deliver exceptionally quiet and stable readings. The PXI-4071 guarantees AC accuracy down to 1 percent of full scale, rather than the 10 percent of full scale offered by traditional DMMs; it can achieve usable readings even below 0.1 percent of full scale.

1.8 MS/s Flexible-Resolution Isolated Digitizer

The architectural design of the PXI-4071 incorporates a 1.8 MS/s isolated digitizer. In the isolated digitizer mode, the PXI-4071 can acquire DC-coupled waveforms in all voltage and current ranges, at a maximum sampling rate of 1.8 MS/s. With isolation, you can measure differential waveforms with high levels of common-mode voltage. By using LabVIEW software with the isolated digitizer capability of FlexDMM devices, you can analyze transients, fly-back signals, or other aperiodic high-voltage AC waveforms in both the time and frequency domains. No other 7½-digit DMM has this capability.

You can vary the resolution of the PXI-4071 from 10 to 23 bits by simply changing the sampling rate, as reflected in Figure 1.

This unique multi-instrument functionality minimizes overall system costs by eliminating the need to purchase a separate data acquisition device, signal conditioning, and fixturing. The FlexDMM is entirely software programmable and requires no external hardware intervention.

Built-In Self-Calibration and Two-Year Calibration Cycle

The NI FlexDMM offers self-calibration, which is traditionally found in only the highest-resolution DMMs costing thousands of dollars more. Self-calibration corrects for all DC gain and offset drifts within the DMM using a precision, high-stability internal voltage reference that has an outstanding temperature coefficient and time drift. Self-calibration also accounts for all resistance and current source drifts. In resistance, all errors are corrected to a single internal high-stability foil resistor, stable to within 0.8 ppm/°C over the full operating range.

Self-calibration makes the FlexDMM highly accurate and very stable at any operating temperature – well outside of the traditional 18 to 28 °C range. Self-calibration takes less than a minute to complete and requires no external calibrator. With the self-calibration precision circuitry, NI can offer a two-year external calibration cycle on the PXI-4071.

Tight Switch Integration

The PXI-4071 can import and export triggers, making it easy to integrate them with any multiplexer/matrix switch modules. In particular, the FlexDMM integrates seamlessly with National Instruments switch offerings, such as the NI PXI-2530 multiplexer and the NI SCXI-1129 high-density matrix. When you use a PXI-4071 with these NI switch modules and NI Switch Executive switch management software, you can measure thousands of channels, consisting of voltages, thermocouples, RTDs, and thermistors. You can also keep a firm control on the cost of your system. For more details on NI switching, visit **ni.com/switches**.

Calibration

Each PXI-4071 is calibrated to NIST-traceable standards to the levels detailed in the specifications. You can find the calibration certificate at **ni.com/calibration**. You can return the FlexDMM devices to National Instruments or to a qualified metrology lab for calibration.

Software

All National Instruments DMMs are shipped with NI-DMM driver software. NI-DMM is an IVI-compliant driver that provides numerous example programs and access to the complete functionality of the DMM through an easy-to-use application programming interface (API).

NI-DMM 2.4 or later contains the DMM Express VI, with which you can quickly develop a FlexDMM application in LabVIEW or LabVIEW SignalExpress through interactive configuration dialogs and can preview measurement results immediately.

NI-DMM also includes the DMM Soft Front Panel (SFP). The DMM SFP is an interactive executable that provides an easy way to test input signals or debug your system. NI-DMM is optimized for use with LabVIEW, LabWindows/CVI, Measurement Studio, and Microsoft Visual Studio .NET.

Ordering Information

NI PXI-4071 778271-01
Includes the P-1 probe set, NI-DMM, and DMM Soft Front Panel.

Recommended Switching and Accessories

NI PXI-2503 24x1 multiplexer switch 777697-01
NI PXI-2530 128x1 multiplexer switch 778660-01
NI SCXI-1127 250 V multiplexer switch 776572-27
P-1 probe set (standard probe) 761000-01
P-2 probe set (additional probe) 184698-01
P-3 probe set (banana plug to bare wire) 185692-01
10 A current shunt, CSM-10A 777488-02

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/dmm**.

Specifications

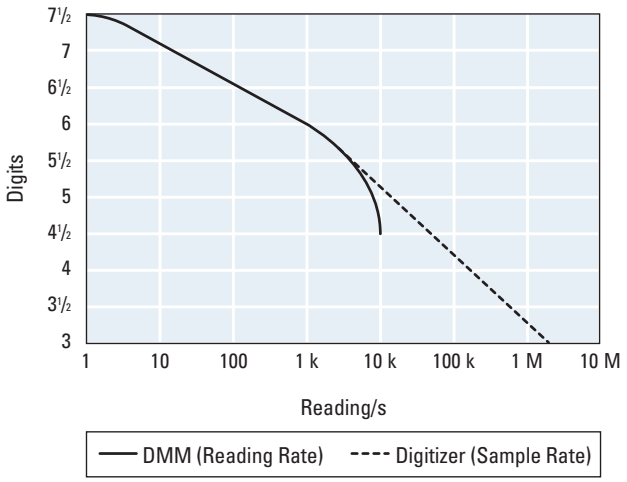
Specifications are subject to change without notice. For the most complete and current specifications, visit **ni.com/modularinstruments**.

DC Specifications

Digits	Bits	Maximum Sampling Rate (Digitizer)[1]	Reading Rate (DMM)[2]
7½	26	–	7 S/s
6½	22	100 S/s	100 S/s
5½	18	5 kS/s	3 kS/s
4½	15	20 kS/s	10 kS/s
3	10	1.8 MS/s	–

[1]Maximum sampling rates refer to waveform acquisition in digitizer mode.
[2]Auto Zero disabled, except 7½ digits; measured on a 10 V and 10 kΩ range.

DC Voltage Maximum Reading Rate



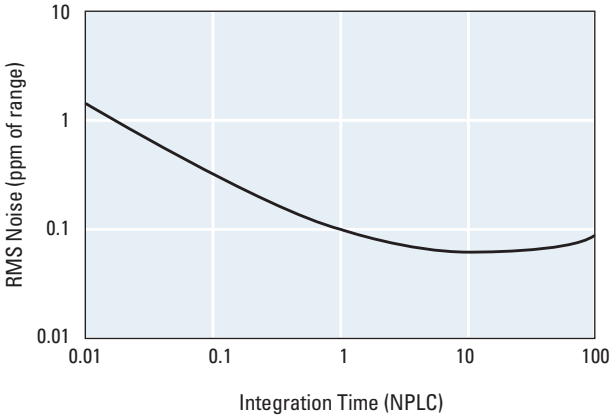
DC System Speeds

Range or function change	100/s
Autorange time, DC V and DC I	5 ms
Autorange time, resistance	50 ms
Trigger latency	2 µs
Maximum trigger rate	6 kHz

DC Accuracy Specifications

Note: All DC voltage accuracy specifications apply to 7½-digit resolution with Auto Zero and ADC calibration enabled.

Additional Noise Error



RMS Noise[1]

Range	Multiplier
100 mV	X 15
1 V	X 2
10 V	X 1
100 V	X 6
1000 V	X 1

[1]Multiply the RMS noise value from the graph above by the range-appropriate multiplier in this table. For the peak-to-peak noise error, multiply the RMS noise by 6.

Note: All DC current specifications apply to 6½-digit resolution with Auto Zero and ADC calibration enabled.

DC Voltage ± (ppm[1] of reading + ppm of range)

Range	Resolution	Input Resistance	24-Hour[2] T_{cal} ±1 °C	90-Day[3] 18 to 28 °C T_{cal} ±1 °C	2-Year[3] 18 to 28 °C T_{cal} ±1 °C	Tempco/°C 0 to 55 °C Without Self-Cal	Tempco/°C 0 to 55 °C With Self-Cal	2-Year[3] 0 to 55 °C T_{cal} ±5 °C
100 mV[4]	10 nV	>10 GΩ, 10 MΩ	5 + 4	18 + 7	20 + 8	3 + 2	0.3 + 1	30 + 10
1 V[5]	100 nV	>10 GΩ, 10 MΩ	4 + 0.8	13 + 0.8	15 + 0.8	2 + 0.2	0.3 + 0.1	22 + 0.8
10 V	1 µV	>10 GΩ, 10 MΩ	2 + 0.5	9 + 0.5	12 + 0.5	0.3 + 0.02	0.3 + 0.01	15 + 0.5
100 V	10 µV	10 MΩ	5 + 2	18 + 2	20 + 2	4 + 0.2	0.3 + 0.1	32 + 2
1000 V[6]	100 µV	10 MΩ	4 + 0.5	18 + 0.5	20 + 0.5	3 + 0.02	0.3 + 0.01	32 + 0.5

[1]1 ppm (part per million) = 0.0001%. [2]Relative to external calibration source. [3]Using internal self-calibration; specifications valid over the entire operating temperature range. [4]With offset nulling and 100 ms aperture.
[5]With offset nulling; add 1.3 ppm of range for no offset nulling. [6]For inputs above 300 V, add 25 ppm x (V_{IN}/1000 V) ^2 to the 90-Day and 2-Year columns.
T_{cal} = temperature at which last self-calibration or external calibration was performed. Tempco = temperature coefficient.

DC Current ± (ppm of reading + ppm of range)

Range	Resolution	Burden Voltage	24-Hour[1] T_{cal} ±1 °C	90-Day[3] 18 to 28 °C T_{cal} ±1 °C	2-Year 18 to 28 °C T_{cal} ±1 °C	Tempco/°C 0 to 55 °C
1 µA	1 pA	<50 mV	25 + 20	320 + 40	350 + 40	25 + 0.7
10 µA	10 pA	<500 mV	25 + 2	320 + 15	350 + 15	25 + 0.7
100 µA	100 pA	<60 mV	10 + 20	71 + 20	100 + 20	10 + 0.5
1 mA	1 nA	<60 mV	4 + 20	80 + 20	100 + 20	4 + 0.5
10 mA	10 nA	<60 mV	12 + 20	90 + 20	110 + 20	12 + 0.5
100 mA	100 nA	<100 mV	9 + 20	140 + 20	165 + 20	9 + 0.5
1 A	1 µA	<250 mV	15 + 20	240 + 20	290 + 20	11 + 0.5
3 A[2]	1 µA	<700 mV	15 + 30	390 + 30	440 + 30	11 + 0.5

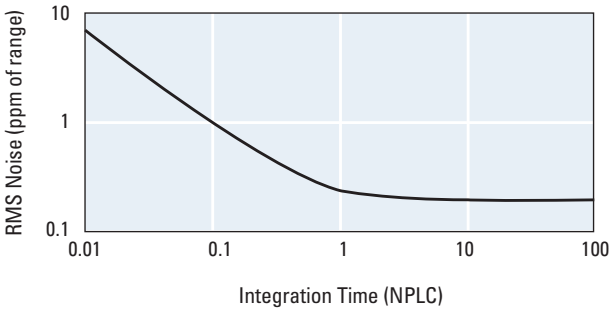
[1]Relative to external calibration source. [2]Above 2 A, add 300 ppm of reading to 90-day and 2-year specifications. [3]Using internal self-calibration; specifications valid over the entire operating temperature range. T_{cal} = temperature at which last self-calibration or external calibration was performed. Tempco = temperature coefficient.

Additional Noise Errors for Current

Resolution	Additional Noise Error
5½ digits	10 ppm of range
5 digits	30 ppm of range
4½ digits	100 ppm of range

Note: All resistance specifications apply to 7½-digit resolution with Auto Zero and ADC calibration enabled.

Additional Noise Error



Resistance (4- and 2-wire[1]) ± (ppm of reading + ppm of range)

Range	Resolution	Test Current[2]	Max Test Voltage	24-Hour[3] T_{cal} ±1 °C	90-Day[4] 18 to 28 °C T_{cal} ±1 °C	2-Year[4] 18 to 28 °C T_{cal} ±1 °C	Tempco/°C 0 to 55 °C Without Self-Cal	Tempco/°C 0 to 55 °C With Self-Cal	2-Year[4] 0 to 55 °C T_{cal} ±5 °C
100 Ω[5]	10 µΩ	1 mA	100 mV	8 + 2.5	31 + 4	56 + 4	6 + 0.12	0.8 + 0.12	60 + 5
1 kΩ[5]	100 µΩ	1 mA	1 V	5 + 0.5	26 + 0.5	48 + 0.5	5 + 0.05	0.8 + 0.05	55 + 1
10 kΩ[5]	1 mΩ	100 µA	1 V	5 + 0.5	26 + 0.5	48 + 0.5	5 + 0.05	0.8 + 0.05	55 + 1
100 kΩ[7]	10 mΩ	10 µA	1 V	5 + 0.5	28 + 0.5	50 + 0.5	5 + 0.05	0.8 + 0.05	56 + 6
1 MΩ	100 mΩ	10 µA	10 V	5 + 0.5	30 + 0.5	52 + 0.5	5 + 0.05	0.8 + 0.05	58 + 1
10 MΩ	1 Ω	1 µA	10 V	60 + 5	70 + 10	90 + 10	20 + 1	20 + 1	400 + 10
30 MΩ[6]	10 Ω	1 µA ‖ 10 M	10 V	180 + 20	240 + 30	360 + 60	60 + 20	60 + 20	–
100 MΩ[8]	10 Ω	1 µA ‖ 10 M	10 V	500 + 6	1600 + 10	2000 + 20	250 + 6	250 + 6	–
5 GΩ[8]	10 Ω	1 µA ‖ 10 M	10 V	1% + 0.2	5% + 0.2	5% + 0.2	2500 + 0.2	2500 + 0.2	–

[1]Perform offset nulling. [2]-10 to 0% tolerance. [3]Relative to external calibration source. [4]Using internal self-calibration; specifications valid over the entire operating temperature range. [5]With offset compensated ohms enabled. For ADC calibration disabled, add 4 ppm of 100 Ω range and 0.4 ppm of 1 kΩ and 10 kΩ range to the 90-Day and 2-Year columns. [6]Applies to 100 MΩ range up to 30 MΩ. 2-wire resistance measurement only. Use tempco outside 18 to 28 °C. [7]Perform offset nulling or add 1 ppm of range to the 24-Hour column and add 5 ppm of range to 90-Day and 2-Year columns. [8]2-wire resistance measurement only. Use tempco outside 18 to 28 °C. T_{cal} = temperature at which last self-calibration or external calibration was performed. Tempco = temperature coefficient.

RMS Noise[1]

Range	Multiplier
100 Ω	X 8
1 kΩ	X 1
10 kΩ	X 1
100 kΩ	X 2
1 MΩ	X 3.5
10 MΩ	X 5
100 MΩ	X 55
5 GΩ	X 2500

[1]Multiply the RMS noise value from the graph above by the range-appropriate multiplier in this table. For the peak-to-peak noise error, multiply the RMS noise by 6.

Note: All diode specifications apply to 6½-digit resolution with Auto Zero and ADC calibration enabled.

Diode Test[1]

Range	Resolution	Test Current[2]	Accuracy
10 V	10 µV	1 µA, 10 µA, 100 µA, 1 m[3]	Add 20 ppm of reading to 10 VDC voltage specification

[1]Can be used to test p-n junctions, LEDs, or zener diodes up to 10 V. [2]-10 to 0% tolerance. [3]Up to 4.0 V measurement for 1 mA test current.

DC Function General Specifications

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
Maximum 4-wire lead resistance..... Use the lesser of 10% of range or 1 kΩ
Overrange..... 105% of range except 1000 V and 3 A range
DC voltage input bias current..... <30 pA at 23 °C (typical)

Normal-Mode Rejection Ratio (NMRR)

Range	Multiplier	Conditions
10	>100 dB[1]	All noise sources >46 Hz
50 (60)	>60 dB[2]	50 (60) Hz ±0.1%

[1]With high-order DC noise rejection; 100 ms aperture. [2]With normal DC noise rejection; 20 ms (16.67 ms) aperture.

AC Specifications

Digits	Reading Rate	Bandwidth
6½	0.25 S/s	1 Hz to 300 kHz
6½	2.5 S/s	10 Hz to 300 kHz
6½	25 S/s	100 Hz to 300 kHz
6½	100 S/s	400 Hz to 300 kHz
5½	1 kS/s	20 kHz to 300 kHz

Note: All AC speed specifications apply with Auto Zero disabled.

AC System Speeds

Range or function change..... 10/s
Autorange time, AC V and AC I..... 250 ms
Trigger latency..... 2 µs
Maximum trigger rate..... 1 kHz

AC Accuracy Specifications

Note: All AC accuracy specifications apply to 6½-digit resolution with signal amplitudes greater than 1% of range and Auto Zero enabled.

AC Voltage[1] 2-Year ± (% of reading + % of range), 18 to 28 °C

Range (rms)	Peak Voltage	Resolution	1 Hz to 40 Hz[2]	40 Hz to 20 kHz	20 kHz to 50 kHz	50 kHz to 100 kHz	100 kHz to 300 kHz
50 mV[3]	±105 mV	100 nV	0.1 + 0.02	0.05 + 0.02	0.09 + 0.04	0.5 + 0.08	2 + 0.1
500 mV	±1.05 mV	1 µV	0.1 + 0.005	0.05 + 0.005	0.06 + 0.01	0.2 + 0.01	0.7 + 0.05
5 V	±10.5 V	10 µV	0.1 + 0.005	0.05 + 0.005	0.06 + 0.01	0.2 + 0.01	0.7 + 0.05
50 V	±105 V	100 µV	0.1 + 0.005	0.05 + 0.005	0.09 + 0.02	0.3 + 0.02	2 + 0.05
700 V	±1000 V	1 mV	0.1 + 0.005	0.05 + 0.005	0.09 + 0.02	0.3 + 0.02	2 + 0.05

[1]After self-calibration. Measurement aperture greater than $4/f_L$, where f_L is the lowest frequency component of the signal being measured. [2]Specification applies for DC coupling. [3]Applies to signals >1 mV_{rms}.

AC Voltage Tempco/°C (0 to 55 °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 500 mV 5 V	0.001 + 0.0002	0.001 + 0.0002	0.001+ 0.001	0.001 + 0.001	0.01 + 0.01
50 V 700 V	0.001 + 0.0002	0.003 + 0.0002	0.012 + 0.001	0.045 + 0.001	0.1 + 0.01

Tempco = temperature coefficient.

AC Current[1] 2-Year ± (% of reading + % of range), 18 to 28 °C

Range (rms)	Peak Current	Resolution	Burden Voltage (rms)	1 Hz to 20 kHz[2]	Tempco/°C 0 to 55 °C
100 µA[3]	±200 µA	100 pA	100 mV	0.03 + 0.02	0.002 + 0.0002
1 mA	±2 mA	1 nA	100 mV	0.01 + 0.02	0.001 + 0.0001
10 mA	±20 mA	10 nA	100 mV	0.011 + 0.02	0.002 + 0.0002
100 mA	±200 mA	100 nA	100 mV	0.02 + 0.02	0.001 + 0.0002
1 A	±2 A	10 µA	250 mV	0.04 + 0.02	0.002 + 0.0002
3 A	±4.2 A[4]	10 µA	700 mV	0.1 + 0.02	0.002 + 0.0001

[1]Measurement aperture greater than $4/f_L$, where f_L is the lowest frequency component of the signal being measured. [2]Only to 5 kHz for 100 µA; specification is typical for the 5 to 20 kHz frequency range. [3]Applies to signals >9 μA_{rms} and <1 kHz. Add 0.03% of reading from 1 to 5 kHz. [4]Sine wave only.
Tempco = temperature coefficient.

Note: No degradation in accuracy due to crest factor for signals up to the rated peak voltage/current or bandwidth occurs. For high crest factor signals, increase range. For example, for a 500 mV_{rms} signal with a crest factor between 2 and 20, use the 5 V range.

AC Functions General Specifications

Input impedance	10 MΩ in parallel with 90 pF
Input coupling	AC or DC coupling
Maximum Volt-Hertz product	>8 x 10^7 V-Hz
Maximum DC voltage component	400 V
CMRR	
(1 kΩ resistance in LO lead)	>70 dB (DC to 60 Hz)
Overrange	105% of range except 700 V, 3 A range

Frequency and Period[1]

Input Range	Peak Current	Resolution	Burden Voltage (rms)	2-Year Accuracy[2] 0 to 55 °C ± % of reading
50 mV to 700 V	1 Hz to 500 kHz	1 s to 2 µs	6½ digits	0.01

[1]2s gate time; input signal must be >10% of AC voltage input range. [2]0.0025% of reading typical.

Isolated Digitizer Specifications

Acquisition System

Sampling rate and record duration

Available sampling rates ..... $r = \frac{1.8\ \text{MS/s}}{y}$,

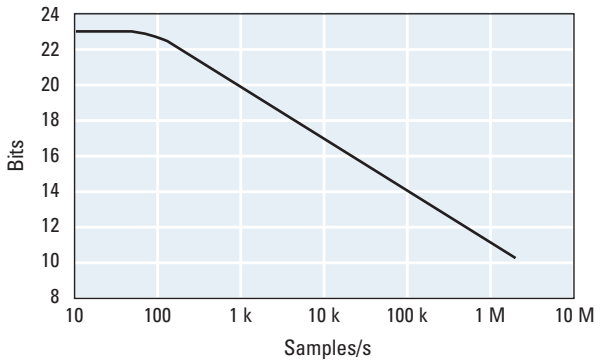
where y = 1, 2, 3,…1.8 x 10^5

Minimum record duration	8.89 µs
Maximum record duration	149 s
Record duration	n/r, where n = number of samples, r = sampling rate
Variable resolution	10 to 23 bits; refer to the Digitizer Maximum Sampling Rate graph
Available functions	Voltage and current
Voltage ranges	±100 mV to ±1000 V (DC or AC coupled)
Current ranges	100 µA to 3 A
Timebase accuracy	25 ppm
Input trigger	
Latency[1]	3.6 µs
Jitter	<600 ns

[1]Is actually negative latency. Can be reduced to near zero (within the jitter specification) or made positive in software.

Note: Refer to Triggers under General Specifications for additional input trigger specifications.

Digitizer Maximum Sampling Rate



Voltage

Range	Input Impedance[1]	Flatness Error 20 kHz	Bandwidth[2,3] (-3 dB)	THD[2] 1 kHz signal, -1 dBFS	THD[2] 20 kHz signal, -1 dBFS
100 mV	>10 GΩ, 10 MΩ	-0.014 dB	340 kHz	-108 dB	-90 dB
1 V	>10 GΩ, 10 MΩ	-0.014 dB	336 kHz	-110 dB	-86 dB
10 V	>10 GΩ, 10 MΩ	-0.014 dB	345 kHz	-90 dB	-64 dB
100 V	10 MΩ	-0.05 dB	280 kHz	-110 dB	-92 dB
1000 V	10 MΩ	-0.05 dB	245 kHz	-89 dB	-70 dB

[1]In parallel with 90 pF. [2]Typical specification. [3]The AC coupling low frequency (-3 dB) point is 0.7 Hz.

Note: For accuracy at low frequencies, refer to the DC voltage specifications in the DC Specifications section.

Current

Range	Burden Voltage (typical)	Flatness Error[1] 20 kHz	Bandwidth (-3 dB)
100 µA	<60 mV	±0.42 dB	42 kHz
1 mA	<60 mV	±0.01 dB	450 kHz
10 mA	<60 mV	±0.01 dB	450 kHz
100 mA	<100 mV	±0.01 dB	450 kHz
1 A	<250 mV	±0.01 dB	450 kHz
3 A	<700 mV	±0.01 dB	450 kHz

[1]Typical specification.

Note: For accuracy at low frequencies, refer to the DC current specifications in the DC Specifications section.

General Specifications

Self-calibration..... Calibrates the FlexDMM relative to high-precision internal voltage and resistance standards. Requires no external calibration equipment.
External calibration interval..... 2-year recommended
Input protection
  Resistance
    2-wire ..... Up to 1000 VDC
    4-wire ..... Up to 500 VDC
  Diode..... Up to 1000 VDC
  DC V, AC V ..... Up to 1000 VDC, 700 VAC_{rms}, 1000 VAC peak
  DC I and AC I ..... 3 A, 250 V fast-acting user replaceable fuse
Maximum common-mode voltage ..... 500 V
Input terminals..... Gold-plated low-thermal EMF solid copper

Triggers
  Measurement complete trigger pulse width ..... 3 µs
  Input trigger pulse width..... 1 µs, with <2 m cable

Note: Refer to the Isolated Digitizer Specifications section for additional digitizer specifications.

Trigger Voltage Levels

Trigger Voltage	High	Low
V_{IN}	2.4 V min	0.4 V max
V_{OUT}	2.0 V min	0.8 V max

Trigger Voltage Level Absolute Maximums

Trigger Voltage	High	Low
V_{IN}	5.5 V min	-0.5 V

Note: Triggers are LVTTL/TTL compatible.

Power consumption ..... <8 W from PXI backplane

Rail Voltage	Current Consumption	Power Consumption
12 V	500 mA	6.00 W
5 V	30 mA	0.15 W
3.3 V	230 mA	0.76 W
-12 V	0 mA	0.00 W

Operating environment ..... 0 to 55 °C, up to 80% relative humidity at 35 °C
Storage environment ..... -40 to 70 °C
Warm-up ..... 1 hour to rated accuracy
Dimensions..... 3U, 1 slot, PXI/CompactPCI module; 2.0 by 13.0 by 21.6 cm (0.8 by 5.1 by 8.5 in.)
Weight..... 314 g (11 oz)
Measurement category..... I (up to 1000 V), II (up to 500 V)
Pollution degree..... 2

Safety and Compliance

Safety

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

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note: For UL and other safety certifications, refer to the product label or visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

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

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: For EMC compliance, operate this device according to product documentation.

CE Compliance

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

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

NI Services and Support

NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit **ni.com/services**.

Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit **ni.com/training**.

Professional Services

Our NI Professional Services team is composed of NI applications and systems engineers and a worldwide National Instruments Alliance Partner program of more than 600 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit **ni.com/alliance**.

NATIONAL INSTRUMENTS™
Certified Alliance Partner

OEM Support

We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit **ni.com/oem**.

Local Sales and Technical Support

In offices worldwide, our staff is local to the country, giving you access to engineers who speak your language. NI delivers industry-leading technical support through online knowledge bases, our applications engineers, and access to 14,000 measurement and automation professionals within NI Developer Exchange forums. Find immediate answers to your questions at **ni.com/support**.

We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit **ni.com/calibration**.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit **ni.com/services**.

NATIONAL INSTRUMENTS™

ni.com • 800 813 3693
National Instruments • info@ni.com

351495D-01 2008-10025-101-D