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Low-Cost 6½-Digit Multimeters

NI PXI-4065, NI PCI-4065, NI PCIe-4065, NI USB-4065 *NEW!*

- Basic 6½-digit digital multimeters (DMMs) for PXI, PCI, PCI Express, and USB
- 7 built-in measurement modes – AC/DC voltage, AC/DC current, 2- or 4-wire resistance, and diode test
- ±300 VDC/V_{rms} isolation
- 10 readings/s maximum at 6½ digits
- Ideally suited for OEMs, educational labs, and production test

For increased accuracy, resolution, measurement speed, and functionality, consider NI 407x FlexDMM devices.

[1]PXI-4065 only

Operating Systems
- Windows Vista/XP/2000

Recommended Software
- LabVIEW
- LabVIEW Real-Time Module[1]
- LabWindows™/CVI
- Measurement Studio
- LabVIEW SignalExpress

Other Compatible Software
- Microsoft Visual Basic
- C/C++

Driver Software (included)
- NI-DMM
- NI-DMM Soft Front Panel
- DMM/Switch Express VI



Overview

National Instruments 4065 devices are low-cost 6½-digit PXI, PCI, PCI Express, and USB DMMs for the measurement of voltage, current, and resistance, or for diode test. They are ideally suited for OEMs, educational laboratories, or other cost-conscious test and measurement facilities. With ±300 VDC/V_{rms} of isolation, current measurements up to 3 A, and 2- or 4-wire resistance measurements, NI 4065 DMMs provide a complete multimeter solution for basic 6½-digit measurement needs.

For higher-performance requirements, consider using NI 407x PCI and PXI FlexDMM devices. They combine industry-leading accuracy and resolution at 6½ and 7½ digits with 1.8 MS/s digitizer capability for faster sampling rates in production test environments.

Flexible Software Improves Usability

You can program NI 4065 DMMs through a standard application programming interface (API) in NI LabVIEW and LabWindows/CVI or Microsoft programming languages. For simple benchtop measurements, the NI-DMM Soft Front Panel provides the common display and interface found on traditional DMMs to make simple measurements quickly and easily. When combined with switches, the DMM/Switch Express VI can rapidly develop a high-channel-count data-logging system with a single function call in LabVIEW. In LabVIEW SignalExpress, the DMM/Switch Express VI sets up a live data logger without any programming.

Efficient Mixture of Accuracy, Resolution, and Speed

NI 4065 DMMs offer 6½ digits of resolution at up to 10 readings/s and up to 3000 readings/s at lower resolutions. By trading off speed for resolution, you can maximize measurement quality and throughput. NI 4065 DMMs also offer comparable accuracy over a 24-hour cycle or one year of an external calibration to other GPIB, LAN, or USB-based 6½-digit DMMs on the market. With an NI 4065, there is no need to sacrifice basic measurement quality for a low selling price.

Digits	Resolution (bits)	Reading Rate (S/s)
6½	22	10
5½	18	1500
4½	15	3000

Table 1. NI 4065 Reading Rates versus Resolution

For higher resolution, accuracy, or speed, consider using one of the NI 407x 6½-digit FlexDMM devices. The PCI-4070 can accurately measure 100 readings/s at 6½ digits with 31 ppm of DC voltage accuracy over a two-year period. This represents a 3X improvement over the NI 4065 DMMs for accuracy and noise. The PXI-4071 is also available with measurements at 7½ digits up to 1000 V. For more information on the complete line of National Instruments DMMs, visit **ni.com/multimeters**.

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Integration with Switching

NI PXI-4065

You can easily combine the NI PXI-4065 DMM with NI PXI switches in the low-cost NI PXI-1033 integrated chassis and controller to create high-channel-count, 6½-digit data-logging systems with up to 588 channels. You can configure these systems, controllable from any PCI Express or ExpressCard slot on a PC or laptop computer, with more than 100 available PXI switch topologies. For further system expansion, you can add more than 3,000 channels with each additional 18-slot PXI chassis.

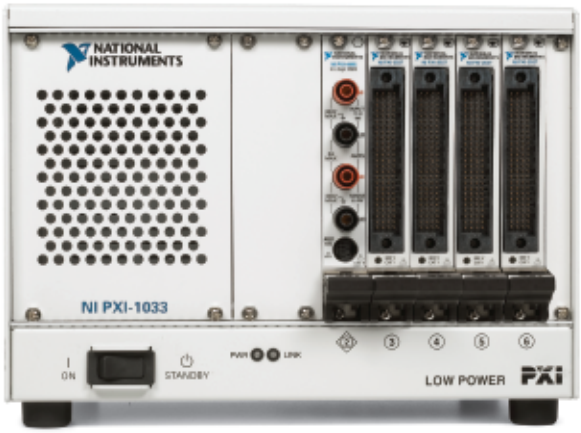


Figure 1. Expand channel count with PXI switching.

NI USB-4065, PCI-4065 and PCIe-4065

You can integrate NI 4065 DMMs with stand-alone switching using the 4- or 12-slot USB Switch Mainframes from National Instruments. You can configure these switch systems, controllable from any available USB port on a PC or laptop computer, with more than 50 available SCXI switch topologies. For existing SCXI switch systems, the NI 4065 DMMs can also provide control via the AUX connector on the front of the DMM. Switching offers a simple method of channel expansion for data-logging systems based on an NI 4065.



Figure 2. Expand channel count with USB-controlled switching.



Figure 3. Use the USB-4065 with USB-controlled switching for a complete DMM/switch solution.

Ordering Information

NI PXI-4065 780011-01
NI PCI-4065 779770-01
NI PCIe-4065 779771-01
NI USB-4065 780152-01
Includes the standard P-1 probe set and NI-DMM software.

Accessories for PXI

NI PXI-1033 (chassis and integrated MXI Express controller, 1 PXI Express port, 3 m cable) 779756-01
NI PXI-2527 (300 V, 64-channel multiplexer) 778572-27

Accessories for USB, PCI, and PCI Express

NI USB Switch Mainframe (4-slot) 778570-01
NI SCXI-1127 (300 V, 64-channel multiplexer) 776572-27

General Accessories

P-1 Probe Set (standard) 761000-01
P-2 Probe Set (additional connectors) 184698-01
P-3 Probe Set (banana plug to bare wire) 185692-01
CSM-10 A (10 A current shunt) 777488-02

BUY NOW!

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

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Specifications

DC Specifications

Resolution (Digits)	Reading Rate[1] (S/s)	Aperture Time (NPLC)	RMS Noise[2] (ppm of range)
6½	0.6 (0.5)	100	0.06
	6 (5)	10	0.2
	10 (8.33)	6	0.25
5½	30 (25)	2	0.4
	60 (50)	1	0.55
	900	0.06	1.7
	1,500	0.04	2.5
4½	3,000	0.02	11.5

[1] Specified for 60 Hz and (50 Hz) operation
[2] Measured on the 10 V range

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

Range	Resolution	Input Resistance[4]	24-Hour[2], T_{cal} ±1 °C	90-Day, T_{cal} ±5 °C	1-Year, T_{cal} ±5 °C	Tempco (0 to 55 °C)
100 mV[3]	100 nV	>10 GΩ, 10 MΩ	30 + 30	65 + 35	90 + 35	5 + 2
1 V	1 µV	>10 GΩ, 10 MΩ	20 + 6	65 + 7	90 + 7	5 + 0.2
10 V	10 µV	>10 GΩ, 10 MΩ	15 + 5	65 + 6	90 + 6	5 + 0.2
100 V	100 µV	10 MΩ	20 + 6	75 + 7	110 + 7	6 + 0.2
300 V	1 mV	10 MΩ	20 + 20	75 + 20	110 + 20	6 + 0.5

[1]ppm (part per million) = 0.0001%
[2]Relative to external calibration source
[3]With offset nulling
[4]Default input resistance is 10 MΩ
T_{cal} = temperature at which last external calibration was performed NI factory calibration is 23 °C ± 1 °C
Tempco = temperature coefficient

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

Range	Resolution	Burden Voltage (typical)	24-Hour[2], T_{cal} ±1 °C	90-Day, T_{cal} ±5 °C	1-Year, T_{cal} ±5 °C	Tempco (0 to 55 °C)
10 mA	10 nA	<60 mV	50 + 100	300 + 200	500 + 200	30 + 20
100 mA	100 nA	<0.6 V	100 + 40	300 + 50	500 + 50	30 + 5
1 A	1 µA	<0.35 V	500 + 60	800 + 100	1000 + 100	65 + 10
3 A	3 µA	<1 V	1000[1] + 200	1200[1] + 200	1200[1] + 200	65 + 20

[1]Add 650 ppm/A of reading for currents above 1.5 A
[2]Relative to external calibration source

Resistance (4- and 2-Wire) ± (ppm of reading + ppm of range)

Range	Resolution	Test Current	24-Hour[1], T_{cal} ±1 °C	90-Day, T_{cal} ±5 °C	1-Year, T_{cal} ±5 °C	Tempco (0 to 55 °C)
100 Ω	100 µΩ	1 mA	30 + 30	95 + 40	110 + 40	8 + 3
1 kΩ	1 mΩ	1 mA	20 + 6	95 + 10	110 + 10	8 + 1
10 kΩ	10 mΩ	100 µA	20 + 6	95 + 10	110 + 10	8 + 1
100 kΩ	100 mΩ	10 µA	20 + 6	95 + 10	110 + 10	8 + 1
1 MΩ	1 Ω	5 µA	20 + 10	110 + 12	125 + 12	10 + 1
10 MΩ	10 Ω	500 nA	150 + 10	400 + 12	500 + 12	30 + 2
100 MΩ	100 Ω	500 nA ll 10 MΩ	2000 + 20	6000 + 40	8000 + 40	400 + 4

[1]Relative to external calibration source
Specifications are for 4-wire measurements. For 2-wire measurements, perform offset nulling or add 200 mΩ to reading.

Diode Test[1]

Range	Resolution	Test Current	Accuracy
10 V	10 µV	100 µA, 1 mA	Add 50 ppm of reading and 50 ppm of range to 10 VDC voltage specifications.

[1]Can be used to test p-n junctions, LEDs, or zener diodes up to 10 V⎓

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DC Functions General Specifications

Effective common-mode rejection ratio (CMRR)
(1 kΩ resistance in LO lead)..... >150 dB (DC, 50 and 60 Hz ± 1%) with second-order DC noise rejection, 10 PLC aperture
Maximum 4-wire lead resistance..... Use the lesser of 10% of range or 1 kΩ
Overrange..... 105% of range except 300 V and 3 A range
DC voltage input bias current..... <40 pA at 23 °C (typical)

AC Specifications

Digits	Desired Bandwidth	Recommended Reading Rate
6½	10 Hz to 100 kHz	1 S/s
5½	100 Hz to 100 kHz	10 S/s
4½	500 Hz to 100 kHz	100 S/s

AC Voltage ± (% of reading + % of range)

Range (Peak Voltage)	Frequency	24-Hour, T_{cal} ±1 °C	90-Day, T_{cal} ±5 °C	1-Year, T_{cal} ±5 °C	Tempco (0 to 55 °C)
200 mV (±320 mV)	10 to 40 Hz	1.5 + 0.04	2 + 0.05	2 + 0.05	0.01 + 0.003
2 V (±3.2 V)	>40 Hz to 20 kHz	0.2 + 0.04	0.2 + 0.05	0.2 + 0.05	0.005 + 0.003
20 V (±32 V)	>20 to 50 kHz	0.3 + 0.04	0.3 + 0.05	0.3 + 0.05	0.01 + 0.003
300 V (±425 V)	>50 to 100 kHz	1.5 + 0.08	1.5 + 0.08	1.5 + 0.08	0.02 + 0.005

Tempco = temperature coefficient

AC Current ± (% of reading + % of range)

Range (Peak Current)	Frequency	24-Hour, T_{cal} ±1 °C	90-Day, T_{cal} ±5 °C	1-Year, T_{cal} ±5 °C	Tempco (0 to 55 °C)
10 mA (±15 mA)	10 to 40 Hz	1.6 + 0.05	2.1 + 0.05	2.1 + 0.05	0.015 + 0.03
100 mA (±150 mA) 500 mA (±750 mA) 3 A (±4.2 A)	>40 Hz to 5 kHz	0.3 + 0.05	0.3 + 0.06	0.3 + 0.06	0.015 + 0.03

Tempco = temperature coefficient

High Crest Factor Additional Error[1]

Crest Factor	Additional Error (% of reading)
1 to 3	0.05%
3 to 4	0.1%
4 to 5	1%[2]

[1]Applicable for non-sine wave signals up to the rated peak voltage/current or bandwidth
[2]For frequencies above 2 kHz

AC Functions General Specifications

Input impedance ..... 10 MΩ in parallel with 200 pF
Input coupling ..... AC coupling
Maximum volt-hertz product ..... >3 x 10^7 V-Hz
Maximum DC voltage component ..... 250 V
CMRR (1 kΩ resistance in LO lead) ..... >70 dB (DC to 60 Hz)
Overrange..... 105% of range except 300 V, 3 A range

General Specifications

External calibration interval ..... 1 year recommended
Input protection
  Resistance, diode ..... Up to 300 VDC
  DC V, AC V ..... Up to 300 VDC, 300 V_{rms}, 450 V_p
  DC I and AC I ..... F 3.15 A 250 V fast-acting fuse, user-replaceable

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Maximum common-mode voltage	300 VDC or V_{rms}
Input terminals	Gold-plated low-thermal emf solid copper
Dimensions	PXI: 3U, 1 slot, PXI/CompactPCI module; 21.6 by 2.0 by 13.0 cm (8.5 by 0.8 by 5.1 in.) PCI/PCI Express: 1 slot, PCI or PCI Express board; 18.3 by 12 cm (7.2 by 4.72 in.) USB: 17.8 by 10.4 by 3.3 cm (7.0 by 4.1 by 1.3 in.)
Operating temperature	PXI: 0 to 55 °C; PCI/PCI Express: 0 to 40 °C; USB: 0 to 45°C
Storage temperature	-40 to 70 °C
Relative humidity	Up to 95% at 40 °C
Measurement category	CAT II
Pollution degree	2
Approved at altitudes	Up to 2000 m

Safety

An NI 4065 meets the requirements of the following standards of safety and 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**.

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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

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