

# DAQ for High-Voltage Measurements

## 16-Bit, 200 kS/s, 8 Analog Inputs

New

### NI PXI-4204

- 8 analog inputs at 200 kS/s, 16-bit resolution
- $\pm 100$  V input range
- Programmable gain (0.5, 1, 10, 100) per channel
- Programmable 2-pole Butterworth filter (6 Hz or 10 kHz) per channel
- Differential simultaneous sampling inputs
- CombiCon screw terminal direct connectivity
- NI-DAQ driver simplifies configuration and measurements

#### Operating Systems

- Windows 2000/NT/XP

#### Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio for Visual Studio.NET

#### Other Compatible Software

- Visual Basic, C/C++, and C#

#### Driver Software (Included)

- NI-DAQ 7



Device	Bus	Analog Inputs	Resolution	Sampling Rate	Input Range	Triggers	Filter Settings
NI PXI-4204	PXI	8 DI	16 bits	200 kS/s	$\pm 0.5$ to $\pm 100$ V	Digital (2)	2-pole Butterworth (6 Hz or 10 kHz)

Table 1. NI PXI-4204 Channel, Speed, and Resolution Specifications

## Overview and Applications

The National Instruments PXI-4204 module delivers accurate data acquisition for input ranges up to 100 V. With this module you can handle a broad variety of applications including:

- 42 V automotive applications
- High-voltage, multichannel data logging applications
- Fuel cell and battery test applications

## Features

The NI PXI-4204 is a full-featured data acquisition module with a  $\pm 100$  V input range, 16-bit accuracy, and software-selectable filter and gain settings per channel. Programmable filter and gain settings ensure that the PXI-4204 achieves maximum accuracy over the entire  $\pm 100$  V input range. In addition, the PXI-4204 is designed to work with LabVIEW 7 Express and NI-DAQmx. The DAQ Assistant in LabVIEW 7 can configure the PXI-4204 and acquire data through a menu-based window, eliminating the need to manually program the device.

**For high-channel-count, high-voltage applications, explore NI signal conditioning hardware. Visit [ni.com/sigcon](http://ni.com/sigcon)**

## Driver Software

NI-DAQ 7 is the robust driver software included with all National Instruments data acquisition and signal conditioning products. This easy-to-use software tightly integrates the full functionality of your DAQ hardware to LabVIEW, LabWindows/CVI, and Measurement Studio for Visual Studio.NET. High-performance features include multidevice synchronization, networked measurements, and DMA data management. Bundled with NI-DAQ 7, the Measurement & Automation Explorer (MAX) utility simplifies the configuration of your measurement hardware with device test panels, interactive measurements, and scaled I/O channels. NI-DAQ also provides numerous example programs for LabVIEW and other application development environments to get you started with your application quickly.

## Ordering Information

NI PXI-4204 .....778745-4204

Includes NI-DAQ driver software.

For more information on extended warranty and value-added services, visit [ni.com/services](http://ni.com/services)



# DAQ for High-Voltage Measurements

## 16-Bit, 200 kS/s, 8 Analog Inputs

### Specifications – PXI-4204

#### Complete Accuracy Tables

#### Input Characteristics

SSH Disabled		Absolute Accuracy						Absolute Accuracy	Percent Error
Nominal Range (V)		% of Reading		Offset	Noise + Quantization (mV)		Temp	at Full Scale	at Full Scale
Positive FS	Negative FS	24 Hrs	1 Year	(mV)	Single Pt.	Averaged	Drift (%/°C)	(mV)	(%)
100	-100	0.063	0.070	± 16.8	± 9.34	± 0.92	0.0027	88	0.088
50	-50	0.031	0.038	± 10.4	± 4.68	± 0.57	0.0025	30	0.060
5	-5	0.061	0.068	± 4.7	± 0.69	± 0.40	0.0027	8.5	0.17
0.5	-0.5	0.061	0.068	± 4.1	± 0.49	± 0.40	0.0027	4.8	0.97

SSH Enabled		Absolute Accuracy						Absolute Accuracy	Percent Error
Nominal Range (V)		% of Reading		Offset	Noise + Quantization (mV)		Temp	at Full Scale	at Full Scale
Positive FS	Negative FS	24 Hrs	1 Year	(mV)	Single Pt.	Averaged	Drift (%/°C)	(mV)	(%)
100	-100	0.085	0.090	± 19.0	± 9.35	± 1.02	0.0027	110	0.110
50	-50	0.035	0.042	± 12.6	± 4.70	± 0.73	0.0025	34	0.069
5	-5	0.063	0.070	± 6.8	± 0.82	± 0.60	0.0027	11	0.22
0.5	-0.5	0.063	0.070	± 6.3	± 0.66	± 0.60	0.0027	7.2	1.4

**Note:** Accuracies are valid for measurements following an internal calibration. Averaged numbers assume dithering and averaging of 100 single-channel readings. Measurement accuracies are listed for operational temperatures within ±1°C of internal calibration temperature and ±10°C of external or factory calibration temperature.

Number of Channels

PXI-4204	8 differential
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Input signal ranges..... see accuracy tables

Resolution..... 16 bits, 1 in 65,536

#### Sampling Rate

Maximum Sampling Rate..... 200 kS/s aggregate multi-channel

Module	Single Channel	Max per channel (scanning all channels)	
		Scan Rate w/SSH*	Scan Rate w/o SSH*
PXI-4204	333 kS/s	20 kS/s/ch	25 kS/s/ch

\*SSH = Simultaneous Sample and Hold

Connector	Powered On	Powered Off
Screw Terminals	± 100 VDC	± 100 VDC
SMB Connector	± 15 V	± 15 V

Overvoltage protection

Inputs with overvoltage protection..... CH<0..7>

Input coupling..... DC

Data transfers..... DMA, interrupts, programmed I/O

#### Transfer Characteristics

Nonlinearity

Range	Percent of Full Scale (Typical)
± 100 V	0.02%
Other Ranges	0.01%
± 100 V, SSH Enabled	0.06%
Other Ranges, SSH Enabled	0.02%

DNL

Module	Typical	Maximum
PXI-4204	± 0.5 LSB	± 1 LSB

Gain Error..... See Accuracy Table

Offset Error..... See Accuracy Table\*\*

#### Amplifier Characteristics

Input Impedance

Module	Input Configuration	Normal Powered On	Powered Off
PXI-4204	Differential Input	2 MΩ	2MΩ
	Single-Ended	1 MΩ	1MΩ

NMR (60 Hz)

PXI-4204	40 dB @ 6 Hz filter setting
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CMRR

Module	Input Frequency Ranges	CMRR
PXI-4204	DC to 60 Hz	>60 dB
PXI-4204	100 Hz to 10 kHz	>40 dB

#### Filter Characteristics

Filter Type..... 6 Hz or 10 kHz, 2-pole, Butterworth  
Stability

Module	Input Range	Gain Temperature Coefficient	Offset Temperature Coefficient
PXI-4204	± 100 V	± 25 ppm/°C	± 385 uV/°C

#### Triggers

Digital Triggers

Number of triggers..... 2  
Purpose..... Start & stop trigger, gate, clock  
Source..... PFI0/TRIG1 (front SMB connector),  
PXI\_TRIG\_0...PXI\_TRIG\_6  
(PXI trigger bus)

Slope..... Positive or negative; software selectable

Compatibility..... 5V/TTL  
Response..... Rising or falling edge  
Pulse width..... 10 ns minimum  
Impedance..... 10 kOhm  
Coupling..... DC

PXI Trigger Bus

Trigger lines..... 6  
Star trigger..... 1

#### Bus Interface

PXI..... Master, slave

#### Power Requirements

Module	5 VDC (±5%)
PXI-4204	1 A

#### Calibration

Recommended warm-up time..... 15 minutes  
External calibration interval..... 1 year  
Onboard calibration reference  
Level..... 5.000V +/- 1mV  
Temperature coefficient..... + 0.6 ppm/°C  
Long-term stability..... 6 ppm/Sqrt(1000h)

#### Physical

Dimensions (not including connectors)..... 16.0 by 10.0 cm by 2.0 cm  
(6.3 x 3.9 x 0.79 in)  
Analog input signal connector..... 16 x 1 minicombicon, 3.81 mm pitch  
Analog input signal mating connector..... 16 x 1 minicombicon, 3.81 mm pitch,  
28-16 AWG signal wire

\*\*Gain Error = Actual Input Voltage \* % of Reading

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### Specifications

#### I/O Connectors

Module	Front
PXI-4204	16 screw terminals, 1 SMB

#### Environment:

Operating temperature .....	0 to 55 °C
Storage temperature .....	-20 to 70 °C
Relative humidity .....	10 to 90%, non-condensing
Maximum altitude .....	2,000m
Pollution degree (indoor use only) .....	2

### Certification and Compliance

#### European Compliance **CE**

Emissions .....	EN 55011 Class A 10 meters
Immunity .....	EN 61326:1997 + A2:2001, Table 1
EMC .....	CE, C-Tick and FCC Part 15 (Class A) Compliant
Safety .....	IEC 61010-1, EN 61010-1

#### North American Compliance **CE**

Emissions .....	FCC Part 15A above 1 GHz
Immunity .....	EN 61326:1997 + A2:2001, Table 1
EMC .....	CE, C-Tick and FCC Part 15 (Class A) Compliant
Safety .....	IEC 61010-1, UL 3111-1, UL 61010B-1, CAN/SA C22.2 No. 1010.1

# Global Services and Support

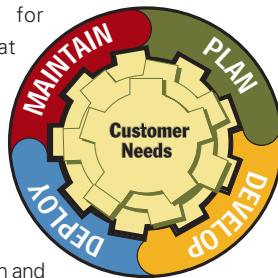
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