Portable USB-Based DAQ with Signal Conditioning

NI USB-9211, NI USB-9215

- Small, portable packaging
- 4 channels of:
  - 24-bit thermocouple inputs or
  - 16-bit simultaneously sampled analog inputs
- 250 V_{rms} isolation channel-to-earth
- Built-in, removable connectors for easier and more cost-effective connectivity
- Plug-and-play connectivity via USB
- Bus powered

Operating Systems

- Windows 2000/XP

Recommended Software

- LabVIEW
- LabWindows/CVI

Included Software

- NI-DAQmx Base driver software
- Ready-to-run data logger

Product	Platform	Analog Inputs[1]	Input Resolution (bits)	Sampling Rate (S/s)	Input Range
USB-9215	USB	4 SSH	16	20 k	±10 V
USB-9211	USB	4 TC	24	12	±80 mV

[1]SSH – Simultaneous sample and hold; TC – thermocouple

Hardware Description

The National Instruments USB-9211 and USB-9215 data acquisition devices with integrated signal conditioning provide plug-and-play connectivity via USB for faster setup and measurements. The NI USB-9211 is designed especially for thermocouple measurements with 24-bit resolution for superior accuracy. The USB-9215 provides four channels of simultaneously sampled voltage inputs with 16-bit accuracy to provide minimal phase delay when scanning multiple channels.

Software Description

USB-9211 and USB-9215 devices each come with a ready-to-run data logger application that acquires and logs up to four channels of analog data. For more functionality, the NI-DAQmx Base driver software is a multiplatform driver with a limited NI-DAQmx programming interface. Use it to develop customized DAQ applications with NI LabVIEW or C-based development environments.

Recommended Accessories

The USB-9211 and USB-9215 both have built-in connectivity, so no additional accessories are required.

Common Applications

USB-9211 and USB-9215 devices are ideal for a number of applications where small size and portability are essential, such as:

- Portable data logging – log temperature or voltage data quickly and easily
- Academic lab use – academic discounts available for quantities of five or more. Visit ***ni.com/academic*** for details.
- Environmental monitoring – monitor environmental conditions such as temperature, humidity, or light.
- Embedded OEM applications
- In-vehicle data acquisition

Information for OEM Customers

For information on special configurations and pricing, please visit ***ni.com/oem***.

Ordering Information

NI USB-9211.....778976-01
NI USB-9215.....778977-01
Includes NI-DAQmx Base and ready-to-run data logging software

NATIONAL INSTRUMENTS™

Portable USB-Based DAQ with Signal Conditioning

Specifications – USB-9211

The following specifications are typical at 25 °C, unless otherwise noted.

Input Characteristics

Number of channels	4 thermocouple channels 1 internal autozero channel 1 internal cold-junction compensation channel
Type of ADC	Delta-sigma
Resolution	24 bits
Maximum sampling rate	12 S/s
Input signal range	±80 mV
Temperature measurement ranges	Ranges defined by NIST (J, K, R, S, T, N, E, and B thermocouple types)
Overvoltage protection	±30 V between any input and common
Isolation	
Channel-to-channel	No isolation between channels
Channel-to-earth ground	
Continuous	$250V_{rms}$, Installation Category II

Installation Category II is for measurements performed on circuits directly connected to the electrical distributions system. The category refers to a local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 V for U.S. or 230 V for Europe.)

Withstand	$2,300V_{rms}$, 1 minute max

Amplifier Characteristics

Differential input impedance	20 MΩ
Input current	50 nA
CMRR (DC to 60 Hz)	
Channel-to-common	95 dB
Common-to-earth ground	>170 dB

Dynamic Characteristics

Input bandwidth (–3 dB)	15 Hz
Input noise	$1\ \mu V_{rms}$

Calibration

Calibration interval	1 year

Physical

Dimensions	12.1 by 8.6 by 2.5 cm (4.75 by 3.37 by 0.99 in.)
Weight	249 g (8.8 oz)
I/O connectors	Screw terminals
Bus Interface	USB 2.0, full speed

Power Requirement

Current consumption from USB	300 mA, max
Suspend mode	500 µA, max

Environmental

Operating temperature	
(IEC 60068-2-1 and IEC 60068-2-2)	0 to 60 °C
Storage temperature	
(IEC 60068-2-1 and IEC 60068-2-2)	-40 to 85 °C
Operating relative humidity	
(IEC 60068-2-56)	10 to 90% RH, noncondensing
Storage humidity	
(IEC 60068-2-56)	5 to 95% RH, noncondensing
Maximum altitude	2,000 m (at 25 °C ambient temperature)
Pollution Degree (IEC 60664)	2

Safety

The USB-9211 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 610610-1
- CAN/CSA C22.2 No. 61010-1

Electromagnetic Compatibility

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

Certifications and Compliances CE

CE Mark Compliance

View additional specifications at ***ni.com/manuals***.

Portable USB-Based DAQ with Signal Conditioning

Specifications – USB-9215

The following specifications are typical at 25 °C, unless otherwise noted.

Error	Percent of Reading	Percent of Range[1]
Calibrated, max (0 to 60 °C)	0.2	0.067
Calibrated, typ (25 ±5 °C)	0.02	0.0067
Uncalibrated, max (0 to 60 °C)	1.05	0.82
Uncalibrated, typ (25 ±5 °C)	0.6	0.38

[1]Range equals 10.4 V

Accuracy Specifications

Input Characteristics

Number of channels ..... 4 simultaneous sample and hold channels
Type of ADC ..... Successive approximation register (SAR)
Resolution ..... 16 bits
Maximum sampling rate ..... 20 kS/s
Operating voltage range (AI+-to-AI–)
  Typical ..... ±10.4 V
  Minimum ..... ±10.2 V
  Maximum ..... ±10.6 V
Overvoltage protection ..... ±30 V
Isolation
  Channel-to-channel ..... No isolation between channels
  Channel-to-earth ground
    Continuous ..... 250V_{rms}, Installation Category II

Installation Category II is for measurements performed on circuits directly connected to the electrical distributions system. The category refers to a local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 V for U.S. or 230 V for Europe.)

Withstand ..... 2,300V_{rms}, 1 minute max

Transfer characteristics

No missing codes ..... 15 bits guaranteed
DNL ..... –1.9 to 2 LSB max
INL ..... ±6 LSB max

Amplifier Characteristics

Input impedance
  Resistance ..... 1 GΩ
  Capacitance ..... 25 pF
Input bias current ..... 10 nA
CMRR (at 60 Hz) ..... –73 dB min

Dynamic Characteristics

Settling time (to 2 LSBs)
  10 V step ..... 10 µs
  20 V step ..... 15 µs
Input noise
  rms ..... 1.2 LSB_{rms}
  Peak-to-peak ..... 7 LSB

Calibration

Calibration interval ..... 1 year

Physical

Dimensions ..... 12.1 by 8.6 by 2.5 cm (4.75 by 3.37 by 0.99 in.)
Weight ..... 249 g (8.8 oz)
I/O connectors ..... Screw terminals
Bus Interface ..... USB 2.0, full speed

Power Requirement

Current consumption from USB ..... 300 mA
Suspend mode ..... <500 µA

Environmental

Operating temperature
(IEC 60068-2-1 and IEC 60068-2-2) ..... 0 to 60 °C
Storage temperature
(IEC 60068-2-1 and IEC 60068-2-2) ..... -40 to 85 °C
Operating relative humidity
(IEC 60068-2-56) ..... 10 to 90% RH, noncondensing
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- CAN/CSA C22.2 No. 61010-1

Electromagnetic Compatibility

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

Certifications and Compliances CE

CE Mark Compliance

View additional specifications at ***ni.com/manuals***.

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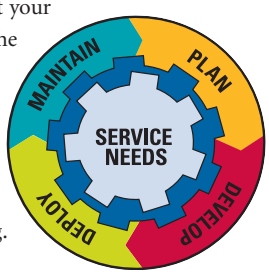

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Hardware Services

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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