

Vibration Sensor Guide

NI Vibration Sensor Suite **NEW!**

- IEPE excitation
- Calibrated
- Multiple form factors
- Various sensitivities
- Tested to work with NI dynamic signal acquisition (DSA) products



Overview

The NI Vibration Sensor Suite is a group of sensors NI offers individually that have been tested for compliance with the NI DSA product line. These sensors include two shear accelerometers that address two different sensitivity needs: an industrial IMI accelerometer for harsher environments and a triaxial accelerometer for applications where cabling to the object under test needs to be minimized. NI also offers an impact hammer for use in stimulus measurements.

Hardware

Single-Axis Accelerometers

NI provides three single-axis, IEPE-compliant accelerometers. When selecting your accelerometer, consider the measurement range as well as the form factor the accelerometer takes. The shear accelerometers are smaller sensors ideal for vibration testing during development or when space is at a premium. Industrial IMI accelerometers are designed for a more permanent fixture in harsher environments and are used in many high-channel-count applications due to their lower cost per sensor. The specifications for each single-axis accelerometer follow.

General-Purpose, Ceramic Shear IEPE Accelerometer

- Sensitivity ($\pm 10\%$): 10 mV/g (1.02 mV/(m/s²))
- Measurement range: ± 500 g pk (± 4900 m/s² pk)
- Broadband resolution (1 to 10,000 Hz): 0.0005 g rms (0.005 m/s² rms)
- Frequency range ($\pm 5\%$): 0.5 to 10,000 Hz
- Weight: 0.20 oz (5.8 g)
- Electrical connector: 10 to 32 side connector

High-Sensitivity, Ceramic Shear IEPE Accelerometer

- Sensitivity ($\pm 10\%$): 100 mV/g (10.2 mV/(m/s²))
- Measurement range: ± 50 g pk (± 490 m/s² pk)
- Broadband resolution (1 to 10,000 Hz): 0.00015 g rms (0.0015 m/s² rms)
- Frequency range ($\pm 5\%$): 0.5 to 10,000 Hz
- Weight: 0.20 oz (5.8 g)
- Electrical connector: 10 to 32 side connector

General-Purpose, Industrial, 2-Pin Accelerometer

- Sensitivity ($\pm 10\%$): 100 mV/g (10.2 mV/(m/s²))
- Frequency range (± 3 dB): 30 to 600,000 cpm (0.5 to 10,000 Hz)
- Measurement range: ± 50 g (± 490 m/s²)
- Electrical connector: 2-pin MIL-C-5015

Triaxial Accelerometer

NI offers a triaxial accelerometer that features very high sensitivity and measurement range. This premium integrated sensor and cable minimizes the necessary cabling at the unit under test. You can use BNC extenders to increase the cable length. As the highest-range sensor NI offers, this accelerometer is often used in development test for detailed vibration characterization.

Triaxial, Lightweight (1.0 g), Miniature, Ceramic Shear IEPE Accelerometer

- Sensitivity ($\pm 20\%$): 5 mV/g (0.51 mV/(m/s²))
- Measurement range: ± 1000 g pk (± 9810 m/s² pk)
- Broadband resolution (1 to 10,000 Hz): 0.003 g rms (0.03 m/s² rms)
- Frequency range ($\pm 5\%$): (y or z axis) 2 to 8000 Hz
- Electrical connector: integral cable
- Weight (without cable): 0.04 oz (1.0 g)

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Impact Hammer

NI provides a general-purpose modal analysis impact hammer that can measure up to 500 lb of force and features a wide range of tips providing 8 kHz of frequency range. The 0.6 in. diameter hammer is commonly used for stimulus measurements in stimulus-response vibration tests. It is designed to be connected to a DSA device by any standard 50 Ω BNC cable.

General-Purpose Modal Analysis Impact Hammer

- Sensitivity (±15%): 10 mV/lbf (2.25 mV/N)
- Measurement range: ±500 lbf pk (±2200 N pk)
- Hammer mass: 0.34 lb (0.16 kg)

Recommended Hardware

The NI Sound and Vibration Measurement Suite includes more than 50 examples that work with both DSA and multifunction data acquisition devices. For vibration data acquisition, NI recommends DSA devices. With simultaneously sampled 24-bit analog-to-digital converters (ADCs) and integrated antialiasing filters, DSA devices are ideal for vibration measurements.

When selecting data acquisition hardware for measuring or generating vibration signals, you have several system requirements to consider. NI offers products with up to 118 dB of dynamic range and multichannel synchronization (up to 13,000 channels). The company also has tools for applications ranging from simple test systems for labs to larger systems for manufacturing lines. You can easily expand NI tools to create systems for large structural vibration analysis projects.

Ordering Information

General-purpose modal impact hammer	780164-01
Triaxial accelerometer, 5 mV/g	780165-01
General-purpose industrial accelerometer, 10 mV/g.....	779680-01
BNC cable for industrial accelerometer.....	780984-01
High-sensitivity shear accelerometer, 100 mV/g.....	780989-01
General-purpose shear accelerometer, 10 mV/g.....	780988-01
BNC cable for shear accelerometer.....	780986-01
SMB cable for shear accelerometer.....	780987-01

BUY NOW

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

Product	Bus	Input Resolution (bits)	Dynamic Range (dB)	Sampling Rate per Channel	Analog Inputs	Input Range	Gain Settings	Coupling	TEDS Support	Analog Outputs
High Performance										
NI 4461	PXI, PCI	24	118	204.8 kS/s	2	±42 V to 316 mV	-20 to 30 dB in 10 dB increments	AC/DC	✓	2
NI 4462	PXI, PCI	24	118	204.8 kS/s	4	±42 V to 316 mV	-20 to 30 dB in 10 dB increments	AC/DC	✓	-
High Density										
NI 4495	PXI	24	114	204.8 kS/s	16	±10 to 1 V	0 and 20 dB	DC	-	-
NI 4496	PXI, PXI Express	24	114	204.8 kS/s	16	±10 to 1 V	0 and 20 dB	AC	✓	-
NI 4498	PXI, PXI Express	24	114	204.8 kS/s	16	±10 V to 316 mV	0 to 30 dB in 10 dB increments	AC	✓	-
Low Cost										
NI 4472	PXI, PCI	24	110	102.4 kS/s	8	±10 V	N/A	AC/DC	-	-
NI 4474	PCI	24	110	102.4 kS/s	4	±10 V	N/A	AC/DC	-	-
Portable/ Compact										
NI 4431	USB	24	100	102.4 kS/s	4	±10 V	N/A	AC/DC	✓	1
NI 4432	USB	24	101	102.4 kS/s	5	±40 V	N/A	AC/DC	✓	-
NI 9234	USB, NI CompactDAQ, Wi-Fi, ENET	24	102	51.2 kS/s	4	±5 V	N/A	AC/DC	✓	-

NI Dynamic Signal Acquisition Hardware

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.

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Hardware Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

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.

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