

# Industrial Vibration Monitoring

Rugged Sensors and Instrumentation for Continuous Vibration Monitoring, Predictive Maintenance & Machinery Protection

## Typical Applications

### Machinery

- Bearings
- Compressors
- Cooling Towers
- Fans
- Gearboxes
- HVAC Equipment
- Machine Tools
- Motors
- Pumps
- Turbines

### Industries

- Aggregate & Concrete
- Assembly Plants
- Food, Dairy & Beverage
- Mining
- Navy
- Petrochemical
- Pharmaceutical
- Power Generation
- Pulp & Paper
- Steel & Aluminum
- Transportation
- Water & Waste Treatment



## Industrial Vibration Monitoring

The IMI Sensors division of PCB® offers a vast selection of industrial accelerometers, vibration sensors, vibration switches, vibration transmitters, switch boxes, cables, and accessories for industrial and shipboard machinery health monitoring, analysis, and diagnostics. Sensors are available with choice of connector, integral cable, temperature signal output, velocity signal output, and hazardous area approval. Determining machinery health through vibration monitoring has proven effective for maintenance planning, reducing downtime, and avoiding catastrophic loss. Whether it's a cooling tower fan motor or a paper machine calendar bearing, we can help, with sensors that are off-the-shelf or custom designed for a specific application.

### What is an "industrial" accelerometer?

*Industrial accelerometers are built to endure the rigors of harsh factory environments. They are typically constructed with stainless steel housings to survive exposure to corrosive chemicals. Welded construction and hermetic sealing guard against any influx of dirt, oil, and other contaminants. Heavy duty electrical connectors are used to permit interface with strong, durable cables. Sealed, integral cables may be utilized to tolerate exposure to fluids, wash-down conditions, or submersion. Armored cables offer further protection from metal chips or being pinched or crushed.*



*Additionally, filtering is normally included to guard against RF interference caused by wireless communication equipment and high frequency saturation. Electrical case isolation and faraday shielding are used to protect against electromagnetic interference, surface noise pickup, and ground loop problems. Additional circuitry is normally included to guard against damage from mis-wiring and exposure to electrostatic discharge. These attributes permit industrial accelerometers to provide uncorrupted measurements and years of trouble-free, unattended service.*

### About Accelerometer Specifications...

The following specifications are common to **all** IMI accelerometers, unless otherwise noted:

- -65 to +250 °F (-54 to +121 °C)
- 1/4-28 mounting thread (M6 for metric versions)
- 2-pin MIL-C-5015 connector (Integral cable models also available with connector options)

## Low-cost Industrial ICP® Accelerometers

- Ideal for permanent installations and use with continuous, on-line monitoring systems
- Promote safety when installed in hazardous or inaccessible locations
- Connect through switch or junction box for route-based data collection schemes
- NIST traceable, single-point calibration at 100 Hz
- Intrinsically safe versions available  



#### Model 603C01

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.4 to 10k Hz
- 26 to 600k cpm
- 11/16" hex × 1.65" (42 mm) H
- 1.8 oz (51 gm)



#### Model 601A01

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.3 to 10k Hz
- 16 to 600k cpm
- 7/8" hex × 1.94" (49.3 mm) H
- 2.8 oz (80 gm)



#### Model 602D01



- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 8000 Hz
- 30 to 480k cpm
- 1.65" L × 0.74" W × 0.85" H  
(41.9 × 18.8 × 21.6 mm)
- 2.75 oz (78 gm)



#### Model 608A11

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.4 to 10k Hz
- 26 to 600k cpm
- 9/16" hex × 2.5" (63.5 mm) H
- 1.8 oz (51 gm)

## Precision Industrial ICP® Accelerometers

- Ideal for roving use with route-based data collectors
- Utilize for effective machinery analysis and fault diagnostics
- Velocity output, temperature output, high temperature (+325 °F/+163 °C), and intrinsically safe version available  
- NIST traceable calibration through full frequency range



**Model 626B02**  
**Low Frequency**

- 500 mV/g
- 51 mV/(m/s<sup>2</sup>)
- 0.2 to 6000 Hz
- 12 to 360k cpm
- 1-3/16" hex × 2.19" (55.6 mm) H
- 7.0 oz (199 gm)



**Model 625B01**  
**Low Frequency**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.2 to 10.5k Hz
- 12 to 630k cpm
- 1.38" Dia × 1.13" H (35.1 × 28.7 mm)
- 5.1 oz (145 gm)



**Model 625B02**  
**Low Frequency**

- 500 mV/g
- 51 mV/(m/s<sup>2</sup>)
- 0.2 to 6000 Hz
- 12 to 360k cpm
- 1.38" Dia × 1.13" H (35.1 × 28.7 mm)
- 6.1 oz (173 gm)

**Model 622A01**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.2 to 10k Hz
- 12 to 600k cpm
- 7/8" hex × 2.06" (52.3 mm) H
- 3.3 oz (94 gm)



**Model 621B40**


- High Frequency, even with a magnet
- 10 mV/g
- 1.02 mV/(m/s<sup>2</sup>)
- 1.6 to 30k Hz
- 96 to 1800k cpm
- 5-40 mounting thread
- M3 for metric versions
- 0.10 oz (2.8 gm)



**Model 623C01**  
**High Frequency**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.8 to 15k Hz
- 48 to 900k cpm
- 11/16" hex × 1.97" (50 mm) H
- 1.8 oz (51 gm)

## Multi-axis Industrial ICP® Accelerometers

- Measure acceleration simultaneously in up to three axes
- Through-bolt mounting for simplified alignment
- Simultaneous radial and axial bearing vibration measurements
- Interface directly with vibration data collectors and FFT analyzers
- Intrinsically safe versions available 



**Model 629A31**  
**Triaxial**

- 100 mV/g (all axes)
- 10.2 mV/(m/s<sup>2</sup>)
- 0.8 to 8000 Hz (all axes)
- 48 to 480k cpm
- 1.5" L × 1.5" W × 0.82" H (38.1 × 38.1 × 20.8 mm)
- 4.9 oz (139 gm)



**Model 604B31**  
**Triaxial**



- 100 mV/g (all axes)
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 5000 Hz (all axes)
- 30 to 300k cpm
- 1.38" Dia × 1" H (35.1 × 25.4 mm)
- 4.4 oz (124 gm)



**Model 605B61**  
**Biaxial**

- 100 mV/g (all axes)
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 5000 Hz
- 30 to 600k cpm
- 1.38" Dia × 1" H (35.1 × 25.4 mm)
- 4.0 oz (113.3 gm)

## Swivel-mount Industrial ICP® Accelerometers

- Easy-to-install, patented, swivel mount design (*US Patent No. 6,435,902*)
- Cable rotates to any desired orientation
- Smaller and less costly than ring-style sensors
- Electrically protected from saturation problems
- Excellent for use on high-speed rotating machinery & spindles
- Available with temperature output
- Intrinsically safe versions available  



**Model 607A01 Swiveler®**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 10k Hz
- 30 to 600k cpm
- 7/8" hex × 1.23" (31.2 mm) H
- 3.7 oz (105 gm)



**Model 607A61 Spindler®**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 10k Hz
- 30 to 600k cpm
- 9/16" hex × 1.0" (25.4 mm) H
- 1.1 oz (31 gm)



**Model 607A11 Swiveler®**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.5 to 10k Hz
- 30 to 600k cpm
- 9/16" hex × 0.97" (24.6 mm) H
- 1.1 oz (31 gm)

## High Temperature Accelerometers

- Survive elevated surface or ambient temperatures
- Ideal for monitoring paper machines, steam handling systems, gas turbines, engines, & in steel mills
- Operate up to +900 °F (+482 °C)



**Model 600A03  
(+500 °F/+260 °C)  
Accelerometer Kit**

- Includes sensor, armor cable, & charge converter
- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 1 to 10k Hz
- 60 to 600k cpm
- -65 to +500 °F (-54 to +260 °C)



**Model 600A13  
(+900 °F/+482 °C)  
Accelerometer Kit**



- Includes sensor, hardline cable & differential charge converter
- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 2 to 8500 Hz
- 120 to 510k cpm
- -65 to +900 °F (-54 to +482 °C)



**Model HT622A01  
(+325 °F/+163 °C)  
ICP® Accelerometer**

- 100 mV/g
- 10.2 mV/(m/s<sup>2</sup>)
- 0.2 to 8000 Hz
- 12 to 480k cpm
- -65 to +325 °F (-54 to +163 °C)
- 7/8" hex × 2.0" (50.8 mm) H
- 3.3 oz (93 gm)

## 4-20 mA Industrial Vibration Sensors

- Adapts analog vibration signals to process monitoring instruments
- Facilitates low-cost, continuous vibration monitoring
- Connects to PLC, alarm & SCADA systems
- Two-wire, loop-powered
- Outputs proportional to peak velocity, rms velocity, or rms acceleration
- Optional analog vibration output signal for diagnostics
- Optional temperature output signal
- Optional raw vibration output signal
- Explosion-proof & intrinsically safe versions for all models  
- High temperature models available to +257 °F (+125 °C)



**Model 640B01**

- 0.0 to 1.0 in/sec peak
- 0.0 to 25.4 mm/sec peak
- 180 to 60k cpm (3 to 1000 Hz)
- -40 to +185 °F (-40 to +85 °C)



**Model 640B11**

- 0.0 to 1.0 in/sec peak
- 0.0 to 25.4 mm/sec peak
- 180 to 60k cpm (3 to 1000 Hz)
- -40 to +185 °F (-40 to +85 °C)



**Model 642A01**

- 0.0 to 1.0 in/sec peak
- 0.0 to 25.4 mm/sec peak
- 180 to 60k cpm (3 to 1000 Hz)
- -40 to +185 °F (-40 to +85 °C)



**Model 641B61**

- 0.0 to 1.0 in/sec RMS
- 0.0 to 25.4 mm/sec RMS
- 600 to 60k cpm (10 to 1000 Hz)
- -40 to +185 °F (-40 to +85 °C)



**Model EX640B71**

- ATEX/ CSA approved intrinsically safe
- 0.0 to 1.0 in/sec peak
- 0.0 to 25.4 mm/sec peak
- 180 to 60k cpm, (3 to 1000 Hz)
- -40 to +176 °F (-40 to +80 °C)

## Vibration Transmitters

- Interface vibration signals with PLC, alarm & SCADA systems



### Model 682A03

- Accepts ICP® accelerometer input
- 4-20 mA output for rms acceleration, peak velocity, or peak-to-peak displacement with filtering options
- Analog vibration output signal for fault diagnostics
- Additional 4-20 mA output for temperature is available



### Model 682A05 Bearing Fault Detector (US Patent No. 6,889,553)

- Accepts ICP® accelerometer input
- Detects impacting faults due to bearing and gear problems
- Provides dual 4-20 mA signals for peaks & overall vibration
- Provides analog vibration output signal for fault diagnostics



### Model 649A01 Reciprocating Machinery Protector (patent pending)

- Detects faults and mechanical looseness in reciprocating compressors
- Improves on existing impact monitoring technology
- Provides continuous trending, with alarm and alert levels for early warning
- Field programmable set points & alarm levels optimize performance
- Hermetically sealed, loop-powered design

## Vibration Alarms

- Accept vibration sensor input signals, detect vibration threshold exceedance, and provide relay outputs for alarm, annunciation, or emergency shutdown
- Versions for use with either ICP® or 4-20 mA vibration sensors. Digital display shows measured vibration level & provides visual alarm indication



### Series 683 1/8 DIN Panel Mount Indicator/Alarm

- Provides loop power for two-wire 4-20 mA sensors
- Optional version provides ICP® sensor excitation
- Four-digit, high visibility LED display
- Offers up to four, user-programmable set points with relay outputs
- Time delay feature eliminates false alarms due to momentary upsets
- Optional 4-20 mA retransmission



### Series 684 Indicator/Alarm Enclosures

- Available in two sizes
- Accommodates up to eight Series 683A indicators/alarms
- Optional BNC outputs for analog vibration signals

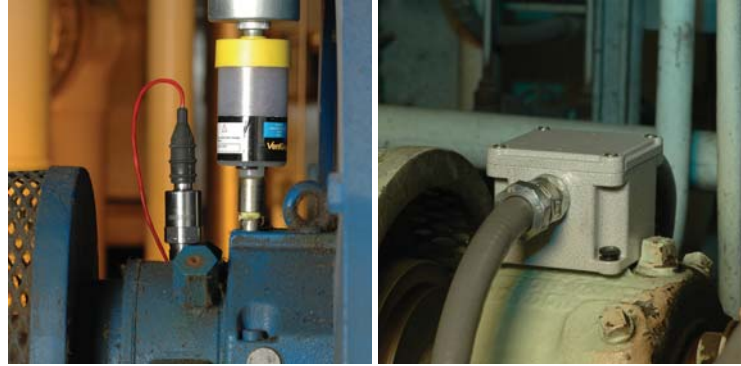


### Model 682A06 Universal Transmitter

- Provides loop power for two-wire, 4-20 mA sensors and transmitters
- Accepts mA, VDC, RTD, TC, linear resistance, and potentiometer inputs
- Delivers current and voltage output signals
- Offers two set points with Form A relay outputs (2 amp AC, 1 amp DC)
- Fully programmable via detachable pushbutton display (**Model 070A80**)

## Vibration Switches

- Provide essential protection for critical machinery
- Fully self-contained with vibration sensor & relay for alarm or shutdown
- Explosion proof versions
- Time delay included for all electronic versions
- Hermetically sealed versions available
- Remote reset options



### Series 686A Smart Vibration Switch *(patent pending)*

- Universal, AC or DC-powered
- Hermetically sealed
- Built-in accelerometer
- Microprocessor controlled
- Two-wire simplicity
- Single relay
- Small footprint
- Magnetically Adjustable Vibration Threshold (MAVT™)



### Series 685B

- Built-in or remote accelerometer
- Dual relays with time delay
- Analog output signal for diagnostics
- 4-20 mA overall vibration output
- Calibration signal insertion for accurate set-up
- AC or DC-powered (factory set)



### Series 685Ax1

- Built-in accelerometer
- Single relay with time delay
- DC-powered



### Models 685A07

- Spring-magnet actuated
- Single relay
- No power required
- NEMA 4 enclosure



### Models 685A08

- Spring-magnet actuated
- Single relay
- No power required
- CSA/UL approved explosion-proof enclosure

## Switch Boxes and Termination Boxes

- Simplify data collection by routing sensor cables to one central location
- Promote data collection safety by keeping workers out of hazardous areas
- Access more data points in less time
- Versions from 1 to 48 channels



## Model 687A01 Portable Vibration Meter Kit

- Measures rms vibration levels
- 3-1/2 digit LCD display
- Headphones offer audible monitoring
- Supplied with **Model 603C01** industrial ICP® accelerometer, coiled cable & magnet



## Cables and Installation Accessories



Magnetic Mounting Bases



Spot Face Preparation Tools



Cable Assemblies

## Calibration Shakers



### Model 699A02 Handheld Calibration Shaker

- 1 g RMS or 1 g peak output @ 159.2 Hz
- Battery operated (4 AA) or DC power supply option for continuous use
- Supplied nylon carrying pouch with belt loop



### Model 699A04 Portable Calibration Shaker

- Choice of acceleration, velocity, or displacement
- Variable frequency and amplitude
- Built in NIST traceable reference accelerometer
- Calibrates instruments up to 8 lb (3.63 kg)
- Ideal for calibrating heavy instruments & switches