



# Industrial Monitoring Instrumentation

- Predictive Maintenance
- Energy & Power Generation
- Process Monitoring & Protection



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- Gearboxes
- Motors
- Bearings
- Machine Tools

## Predictive Maintenance

### World-Class Innovation & Construction:

- Durable, stainless-steel housing
- Welded, hermetic sealing
- Electrical case isolation
- 10 mV/g, 100 mV/g, 500 mV/g sensitivities available
- Integral, armored integral, & submersible cable options
- Hazardous area approved versions available

### Low-Cost Industrial ICP® Accelerometers

- Ideal for permanent installations & 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



**Low-Profile, Low Cost**  
**Model 602D01**  
**Model M602D01**

- Most popular side-exit accelerometer
- Low profile casing
- Ceramic shear, hermetically sealed



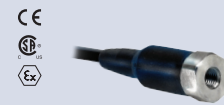
**Small Size, Low Cost**  
**Model 603C01**  
**Model M603C01**

- Our most popular accelerometer
- Compact & low cost
- 0.5 to 10,000 Hz



**Small Size, Low Cost**  
**Model 627A01**  
**Model M627A01**

- Quartz sensing element
- Temperature stable
- 0.33 to 10,000 Hz



**Small Size, Low Cost**  
**Model 608A11, Model 608A11/020BZ**  
**Model 608A11/030BZ, Model 608A11/050BZ**  
**Model M608A11, Model M608A11/030BZ**

- Excellent sensor for submersible applications
- Small size (9/16" footprint)
- Integral cable easily connects to boxes

### Precision Industrial ICP® Accelerometers

- Ideal for roving use with route-based data collectors
- Utilize for effective machinery analysis & fault diagnostics
- Velocity output, temperature output, hazardous area approved versions available
- NIST traceable calibration through full frequency range



**Ceramic, General Purpose**  
**Model 625B01**

- 5% sensitivity tolerance
- Through-hole mounting
- Intrinsically safe, velocity output versions



**Ceramic, General Purpose**  
**Model 622B01**  
**Model M622B01**

- 5% sensitivity tolerance
- Excellent high frequency energy (HFE) response
- Intrinsically safe, velocity output versions



**Quartz, General Purpose**  
**Model 624B01**

- 5% sensitivity tolerance
- Through-hole mounting
- Intrinsically safe, velocity output versions



**Quartz, General Purpose**  
**Model 628F01**  
**Model M628F01**

- 5% sensitivity tolerance
- Excellent for transient temperature applications
- Intrinsically safe, velocity output versions

### High Temp Industrial ICP® Accelerometers

- Can survive elevated surface or ambient temperatures (up to 325 °F)
- Ideal for monitoring paper machines, plastics manufacturing, engines and in steel mills



**Ceramic, General Purpose**  
**Model HT602D01**

- Through-hole mounting
- Temperatures to 325 °F (163 °C)
- Ceramic sensing element



**Ceramic, General Purpose**  
**Model HT622B01**

- Low noise
- Temperatures to 325 °F (163 °C)
- Ceramic sensing element



**Quartz, General Purpose**  
**Model HT624B01**

- Quartz sensing element
- Temperatures to 325 °F (163 °C)
- Through-hole mounting



**Quartz, General Purpose**  
**Model HT628F01**

- Quartz sensing element
- Temperatures to 325 °F (163 °C)
- Welded hermetic

**500-1200 °F accelerometers available on page 7**

**Ceramic Sensors = Lower Noise**

**Quartz Sensors = Improved Temperature Stability**





## Featured Product



# Swiveler® & Spindler® Accelerometers

Model 607A11  
Model 607A11/030BZ  
Model M607A11

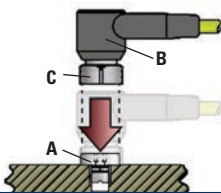
Model 607A61  
Model 607M123

a popular choice for wind turbines  
(see page 6)

This industry exclusive product is innovative in both its small size and its convenient swiveling mounting method

- 360° swivel mount allows for convenient cable orientation
- Lower cost alternative to through-bolt sensors
- Small footprint & very low profile for installation in tight spaces

## Mounting Procedures:



Mounting hole is prepared into machine surface to accept sensor's mounting stud (A). Stud is then tightened to recommended torque w/ hex Allen key. Sensor (B) floating hex nut (C) is threaded onto mounting stud.



Using the 360° capabilities of the Swiveler®, the cable is positioned into desired orientation & temporarily hand tightened. Using a wrench, the hex nut is tightened to the recommended torque while holding the cable or connector in the desired location.



## Low Frequency Industrial ICP® Accelerometers

- Ideal for permanently installed vibration measuring on slow-speed rotating machinery & structural monitoring
- Engineered to combine low-frequency response with high output sensitivity
- Common applications for these sensors include:
  - Large fans & air handling equipment
  - Paper machine rolls
  - Structural monitoring



**Ceramic, General Purpose Model 625B02**

- 500 mV/g
- Side exit, ring-style
- Available with intrinsically safe, velocity output



**Ceramic, High Sensitivity Model 626B01**

- 100 mV/g
- 0.2 Hz
- Available with temperature output



**Ceramic, High Sensitivity Model 626B02**

- 500 mV/g
- For Buildings, bridges, civil structures
- High sensitivity



**Ceramic, High Sensitivity Model 626A04**

- 10 V/g
- Excellent for seismic monitoring
- 0.04 Hz, 0.5 µg resolution

## High Frequency Industrial ICP® Accelerometers

- Ideal for permanently installed vibration measuring on high-speed rotating machinery
- A variety of casing-sizes ensures the best product for your applications
- Common applications for these sensors include:
  - Gear mesh studs & diagnostics
  - Bearing monitoring
  - Small mechanisms



**Ceramic, General Purpose Model 635A01**

- 15 kHz at 3 dB
- 100 mV/g
- 1/4-28 thru bolt, 2 pin MIL connector



**Ceramic, High Frequency Model 623C01**

- 15 kHz at 3dB
- 10 mV/g or 100 mV/g options
- Intrinsically safe models available



**Very High Frequency Model 600A12 Kit**

- 30 kHz, even with magnet
- Very high frequency
- Includes Model 621B40 accelerometer, magnet, & cable assembly



**Ceramic, General Purpose Model 631A80**

- 16 kHz at 3 dB
- 360° orientation
- 1/4-28 thru bolt, 2 pin 7/16-27 connector

## 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



**Triaxial, Low Cost Model 604B31**

- Low cost triaxial option
- 0.5 to 5000 Hz
- Side exit, 4-pin connector



**Biaxial, Low Cost Model 605B01**

- Excellent for vertical pumps
- Unique biaxial sensor
- Side exit, 3-pin connector



**Precision Triaxial Model 629A31**

- Precision triaxial sensor
- 0.8 to 8000 Hz
- 4-pin bayonet connector



**Precision Triaxial Model 639A91**

- Precision triaxial sensor
- 0.5 to 13000 Hz
- M12 connector

Our Platinum products represent some of our most popular models and can be used in a wide range of applications. As you browse this brochure, you will find Platinum products indicated with the "Platinum Shield" icon (right).

For complete information, visit [www.pcb.com/platinum](http://www.pcb.com/platinum)



- Cooling Towers
- Pumps
- Reciprocating Machinery
- Bearing Condition
- Air separators

## PROCESS Monitoring & Protection

IMI's 4-20 mA industrial vibration sensors integrate an accelerometer and vibration transmitter within a standard, robust accelerometer housing. This provides a more compact and cost-effective solution than a conventional accelerometer with separate vibration transmitter. Scaled in velocity or acceleration output signals, these 4-20 mA industrial vibration sensors provide 24/7 online protection for critical plant machinery.

All IMI sensors and vibration switches are designed to withstand the rigors of harsh industrial environments.



### Why Use 4-20 mA Monitoring Systems:

- Cost effective
- Provides 24 / 7 protection
- Operates from loop power
- Outputs acceleration, velocity, or displacement
- Works with PLC, DCS, & SCADA systems
- Intrinsically safe versions available for all models

### 4-20 mA Industrial Vibration Sensors & Transmitters



**4-20 mA Vibration Sensors**  
**Series 640B**

- Available in top or side exit casings
- Peak or RMS, acceleration or velocity
- Intrinsically safe / explosion proof versions available



**ICP® In-Line Transmitter**  
**Model 682A09**

- Converts ICP® sensors to loop powered transmitters
- Outputs 4-20 mA proportional to velocity plus analog raw vibration output
- Interfaces directly with control plant systems



**Ultra Low Frequency Displacement Sensor**  
**Model 653A01**

- Ideal for slow rotating equipment
- Measures absolute peak to peak displacement
- Accurate down to 1.5 Hz



**Hazardous Area Approvals Available on Many Other 4-20 mA Sensors**

- Hazardous Area Approved 4-20mA Vibration Sensors Series EX640B71 (pictured)**
- Explosion proof conduit elbow
  - Outputs 4-20 mA proportional to vibration
  - Interfaces directly with plant control systems

### 4-20 mA USB Programmable Smart Sensors



**Reciprocating Machinery Protector**  
**Model 649A01**

- Detects faults / mechanical looseness in reciprocating compressors
- Outperforms impact transmitters
- Continuous trending, with alarm & alert levels for early warning



**Bearing Condition Transmitter**  
**Model 649A03**

- Provides early warning of Rolling Element Bearing faults
- Works on constant & variable speed drives
- Normalizes output using compensated peak



**Programmable 4-20 mA output Sensor**  
**Model 649A04**

- Outputs acceleration, velocity, or displacement
- Selectable low & high pass filters
- Integral or armored integral options



**USB Programming Kit**  
**Model 600A35**

- Kit includes 2-Pin MIL to USB cable, terminal block adapter, and software disc
- Program various parameters in IMI sensors
- Free software updates available at [www.pcb.com/imi-sensors](http://www.pcb.com/imi-sensors)



Our Electronic Vibration Switches **MEET THE UPDATED CTI VIBRATION STANDARD!**

## Featured Product Vibration Switches

Series 686 & 685B

Vibration switches are primarily used to protect critical machinery by initiating an alarm or shutdown when excessive vibration is detected. IMI offers various vibration switch options – traditional mechanical switches, as well as higher precision electronic switches.



Series 686, IMI's revolutionary USB programmable smart switch, is an ideal replacement for traditional mechanical switches. It features the accuracy and a small footprint of a piezoelectric accelerometer along with the simplicity of a two-wire switch.

- Programmable delays eliminate false trips
- Competitive price compared to mechanical switches
- Explosion proof options available



A vibration switch with choice of built-in or remote accelerometer, Series 685B features dual output relays, time delays, 4-20 mA retransmit, and analog vibration output.

- Lower cost than competitive models
- Dual set points (relays)
- Explosion proof options available

### Mechanical Vibration Switches:

Traditional, mechanical vibration switches provide nominal vibration protection utilizing a spring-loaded, magnetically coupled switch. High vibration causes the spring force to overcome the magnet, tripping the switch.

#### Linear Adjust Mechanical Vibration Switch Models 685A09, 685A19, 685A29, 685A39



- Patented spring-loaded, magnetically coupled mechanism
- Cost effective protection for less-critical applications
- Provides better control over trip sensitivity
- Remote reset models available



#### Mechanical Vibration Switch Model 685A08

- Weatherproof & CSA/UL approved, explosions proof
- Cost effective protection for less-critical applications
- Requires no power

### 4-20 mA DIN Rail Modules



#### Vibration Transmitter Model 682C03

- Outputs 4-20 mA signal proportional to acceleration, velocity, or displacement
- ICP® accelerometer input
- Analog vibration output via front BNC



#### Bearing Fault Detector Model 682C05

- Powers ICP® accelerometers
- Dual 4-20 mA output
- Overall vibration plus high frequency bearing fault signal



#### Universal Transmitter Model 682A06

- 24 VDC loop power for 4-20 mA sensors
- Offers 2 set points with form A relay outputs
- Optional, removable programming / output module



#### Universal Transmitter Model 682A16

- ICP® power
- Offers 2 set points with form A relay outputs
- Optional, removable programming / output module

### Embeddable Accelerometers

- Mountable via adhesive or soldering and choice of either integral cable or solder pin electrical connections
- Variety of sensitivities to accommodate a wide range of applications
- Charge output piezoelectric, voltage output ICP®, & 3-wire low power options



Low Profile TO-5  
Embeddable Accelerometer



TO-5 Embeddable  
Accelerometer



TO-8 Embeddable  
Accelerometer



#### Indicator/Alarm Series 683A

- Loop power for two-wire 4-20 mA sensors or ICP® power for ICP® accelerometers
- Fully programmable
- Dual setpoint annunciators and relays



#### Indicator/Alarm Enclosure Series 684A

- Designed for use with 683A modules
- Available with up to 24 channels
- Rugged, NEMA 4X enclosure, available in fiberglass, stainless steel, or painted steel

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## ENERGY & Power Generation

- Gas Turbines
- Compressors
- Oil & Gas
- Wind Turbines

IMI Sensors specializes in the design and manufacture of innovative sensors and associated signal conditioning instrumentation to meet the demanding requirements of the energy, power generation, reciprocating equipment, oil & gas, and petrochemical industries. Whether involved with design evaluations, field testing, critical component or process monitoring, IMI provides comprehensive condition monitoring solutions for all rotating machinery applications.

### Gas Pipeline - Pumps & Motors



#### 4-20 mA Vibration Sensor Model EX64XB71

- Available in velocity or acceleration output
- ATEX / CSA approved with explosion proof conduit
- Top exit, 2-pole terminal block

### Natural Gas / Petrochemical Pressure Sensors (Hazardous Area)

- Detect / monitor dynamic pressure spikes on gas & oil well heads, supply lines, natural gas power engines, multi-stage gas compressors, & other machinery
- Control engine balancing & emissions
- Suitable for walk-around or permanent monitoring applications



#### ICP® Pressure Sensor Series 121A4X

- Mounts on well head & supply lines
- Rugged, case isolated sensor
- 1/4" NPT process fitting



#### 4-20 mA Pressure Sensor Series 1503

- Mounts on the compressor
- Withstands sour gas environments
- 1/2" NPT fitting

### Wind Turbine Monitoring & Maintenance



- Ideal for permanent installation on wind turbine bearings, gear boxes & generators
- Diagnose potential problems at an early stage to increase life of the system
- Sensors can also be used for monitoring the motor in the yaw assembly



#### Low Cost ICP® Accelerometer

Model 607A11  
Model 607A11/030BZ  
Model M607A11

- Unique 360° Swivel Design
- Allows for easy cable orientation
- Integral or Armored Integral Cable options available



#### Low Cost ICP® Accelerometer

Model 603C01  
Model M603C01

- Most popular accelerometer
- Low cost
- 0.5 Hz to 10 kHz
- Hazardous area options available

### Torque Wrenches, Model HT7000

IMI Sensors offers a wide range of electronic hand torque wrenches, from The RS Technologies Division of PCB Load & Torque, Inc., designed for wind turbine tensing applications.

- Ergonomic design for comfort
- Durable construction, yet light weight
- Excellent accuracy & compatible with data collectors



### Portable Recorders

Torque wrenches also interface with RS Technologies Model 920 and Model 960 data collectors to measure and record torque, angle, and clamp load characteristics of threaded fastener joints used in wind turbines. Model 920 and 960 are also ideal for auditing and certifying hand torque wrenches.



#### Portable Transducer Model 920

- Collects up to 300 peak data points
- Cost-effective & easy to operate
- Battery operated



## Featured Product

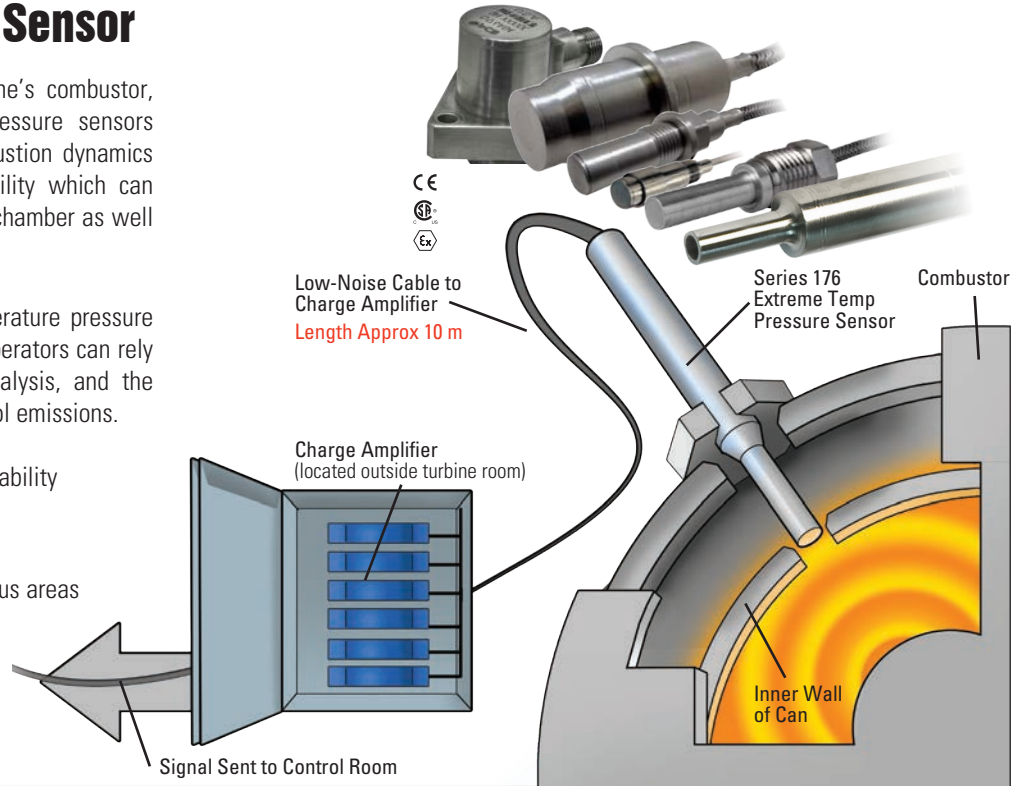
### High Temp Pressure Sensor

Series 176

When directly mounted to a gas turbine's combustor, IMI's Series 176 high-temperature pressure sensors provide 24/7, consistent, reliable combustion dynamics data monitoring to help control instability which can damage components in the combustion chamber as well as downstream equipment.

By mounting the Series 176 high temperature pressure sensors to the combustor, gas turbine operators can rely on critical diagnostics, part fatigue analysis, and the ability to continuously monitor and control emissions.

- Detect / Measure combustion instability
- Operates in extreme temperatures up to 1200 °F (649 °C)
- ATEX & CSA approved for hazardous areas



## Pressure Sensors for Gas Turbine Monitoring

IMI's high temperature pressure sensors have three basic applications for detecting and measuring dynamic pressure phenomena and combustion instability in gas turbines

- Remote Sensors
- Close Coupled Sensors
- On-Turbine Instability Sensors



**Extreme Temp (up to 1200° F)**

**Extreme Temp Pressure Sensor Models 176A02 & 176A03**

- On-turbine instability sensor
- Temperatures to 1200 °F (649 °C)
- 10 ft integral hardline cable



**Very High Temp (up to 986° F)**

**Very High Temp Pressure Sensor Models 176M03, 176M07, 176A05**

- On-turbine instability sensor
- Temperatures to 986 °F (530 °C)
- Various configurations available



**High Temp (up to 500° F)**

**High Temp Pressure Sensor Series EX171**

- Close coupled sensor
- Temperatures to 500 °F (260 °C)
- Rugged, case isolated



**ICP® (up to 250° F)**

**ICP® Pressure Sensor Series 121**

- Remote sensor
- Temperatures to 250 °F (121 °C)
- 1/4" NPT fitting

## Accelerometers for Gas Turbine Monitoring

- Avoids machinery failure through early diagnosis of gas turbine problems
- Take vibration measurements in extreme heat environments
- Integral charge amplifiers allow usage of standard data acquisition equipment

**More high temp ICP® accelerometers available on page 2**



**Extreme Temp (up to 1200° F)**

**1300 °F**

**Extreme Temp Charge Output Accelerometer Model EX611A00**

- Featuring shear mode sensing element vs. compression mode
- Temperatures to 1200 °F (649 °C)
- Hazardous area approvals



**Very High Temp (up to 900° F)**

**1200 °F**

**Very High Temp Accelerometer Model EX619A11**

- 50 pC/g sensitivity
- Temperatures up to 900 °F (482 °C)
- 7 ft integral hardline cable



**High Temp (up to 500° F)**

**900 °F**

**High Temp Accelerometer Model EX615A42**

- 100 pC/g sensitivity
- Temperatures up to 500 °F (260 °C)
- 10 ft integral hardline cable



**ICP® (up to 325° F)**

**325 °F**

**ICP® Accelerometer Series HT622B01**

- Base isolated, hermetic
- Temperatures to 325 °F (163 °C)
- Piezoelectric sensor

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## Featured Product

# Break Away Safety Cable

Keep your personnel & equipment safe with this innovative safety feature

- Rugged & reliable with EMI / RFI shielding
- Connectors available for most major data collector manufacturers
- Coiled cables available in 6 or 10ft lengths, straight cables in custom lengths

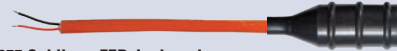


## Cables & Connectors

- General purpose polyurethane or high-temperature FEP
- Rugged military-style connectors in metal or plastic
- Wide selection of sensor &



**052 Cabling - Polyurethane Jacketed**  
Polyurethane cable, 2-conductor twisted pair w/ drain, shielded (-50 to +121 °F). Shown with BNC connector to 2-pin MIL



**055 Cabling - FEP Jacketed**  
High temp FEP cable, 2-conductor twisted pair, shielded (-85 to +392 °F). Shown with 2-pin MIL connector



**048 Cabling - Armor Jacketed**  
High temp FEP Cable, Armor Jacketed, 2-conductor twisted pair w/ drain, shielded (90 to +392 °F). Shown with Right Angle 2-Pin MIL connector

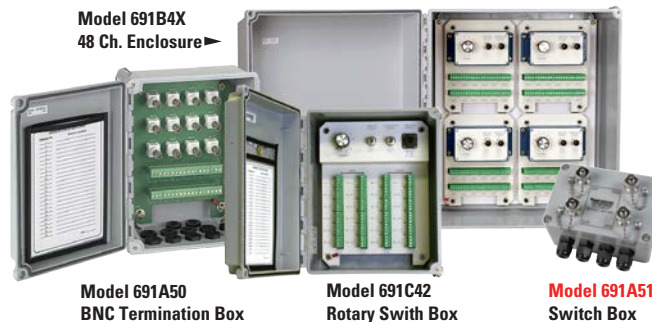


**050 Cabling - Coiled Cable**  
Coiled Polyurethane cable, 2-conductor twisted pair, shielded. Shown with BNC to 7-pin connector

- data collector cables
- Custom cable assemblies available for permanent or portable applications

## Enclosures

- Consolidate up to 48 channels of outputs into a convenient, centralized location
- Helps extend cable life by reducing number of connections needed for measurements
- Improve efficiency with temperature & vibration outputs in the same enclosure



### Model 691C41 & 691C42 Rotary Switch Boxes

- For use with data collectors that supply ICP® sensor power
- 691C41 features 6 input channels, 691C42 features 12 input channels
- BNC output connectors for switched vibration & temperature signal

### 691A51 Series Switch Box

- For use with data collectors that supply ICP® sensor power
- 1 to 4 input channels via terminal strip
- 1 to 4 output channels via BNC

## Accessories & Specialty Products

### Epoxy Kits

- Industrial grade adhesive for installing mounting pads
- Proven to withstand the demands of factory uses
- Applicator syringe helps decrease mess around measurement point

### Spot Face Tools

- Do-it-yourself installation method to help keep costs low
- Multiple end-mill diameters to suit your specific application
- Easily use with any standard drill

### Magnetic Bases

- Magnetic temporary installations during route data collection
- Mounting pads for permanent installation
- Styles for flat or curved surface mounting

### Mounting Pads

- Easily mounts to most convenient measurement point
- Improves accuracy & consistency of readings
- Allows for easy switching of permanently mounted sensors

### Motor Fin Mounts

- Easily take accurate measurements even in narrow spaces
- For use in both portable & permanent monitoring applications
- Multiple widths & lengths to fit your specific application

## “Don’t Leave Home Without it!” Portable Reference Shaker

### New Model 699B02

- Calibrates permanently mounted accelerometers at the machine
- Verifies system performance
- Confirms operation of cables, switching devices & monitoring systems
- Outputs 1g pk or rms; operates at 159.2 Hz
- Can perform up to 1,600 operating cycles without loss of battery power



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