



# LOW COST ICP® ACCELEROMETERS

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 **PCB PIEZOTRONICS**  
AN AMPHENOL COMPANY

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# LOW COST ICP® ACCELEROMETERS

IMI Sensors offers a wide range of ICP® accelerometers with an AC voltage output. These accelerometers are ideal for route-based and permanently-mounted predictive maintenance applications. The AC voltage output can interface with third-party data collectors or other online monitoring systems for analysis.

ICP® accelerometers operate on a simple, two-wire system consists of an 18-30 VDC power source, current-regulating diode, voltmeter and decoupling capacitor.

- **18-30 VDC Power Source:** Supply voltage can be provided by line or battery power. Most line-powered signal conditioners supply 24 VDC power as they are connected to an external 24VDC power source. The power provided by a battery-powered signal conditioner can vary depending on the number and voltage of the batteries.
- **Current-Regulating Diode:** ICP® accelerometers require a fixed constant current between 2 and 20 mA so the power must pass through a current-regulating diode. There is an approximate 1V drop across the diode.
- **Voltmeter:** The power is transmitted to the ICP® accelerometer via two-conductor cable with one conductor acting as the ground and the other conductor transmitting both the power to the sensor and the output signal from the sensor. The portion of the voltage used to power the accelerometer’s amplifier is called the bias voltage and is usually in the range of 8-12 VDC. The voltmeter monitors this bias voltage and is useful for checking sensor operation. The output signal is an AC dynamic signal that rides on top of the bias voltage.
- **Decoupling Capacitor:** When the output signal is received at the signal conditioner, the DC bias voltage must be decoupled from the AC signal voltage in order to record accurate data. The 10-30 µF capacitor shifts the signal level to essentially eliminate the sensor bias voltage, providing a drift-free AC mode operation.

## LOW-COST VS. PRECISION

IMI Sensors’ ICP® accelerometer product offering can be divided into two categories- low cost and precision. The table below highlights the difference between the two product categories.

Characteristics	Low Cost	Precision
Construction	Embeddable pellet	Shear-mode element
Calibration	Single point	Frequency sweep
Sensitivity Tolerance	Less tight	Tighter
Price	Lower	Higher



### OPTIONAL SENSITIVITIES AND FEATURES

Most models listed in this brochure are available with alternate sensitivities and optional features. Alternate sensitivities are 10 mV/g, 50 mV/g and 500 mV/g. Optional features are indicated by a prefixed model number; to select any of the below-listed features, add the appropriate prefix to the core model number. All prefixes can be combined except EXHT and HTTO. When selecting a prefixed model, refer to model-specific outline drawings as some prefixed models' dimensions differ slightly from their unprefix model equivalents.

Optional Feature	Prefix	Description
Hazardous Area Approval	EX	Accelerometer is certified for use in potentially explosive environments via ATEX, CSA and IECEx. Available on 602, 603, 606, 607 and 608 Series.
High Temperature Range	HT	Accelerometer's operating temperature range is increased from +250 °F (+121°C) to +325 °F (+163 °C). Available on 602 Series.
Metric Mount	M	Accelerometer includes an M6x1 mounting stud or bolt instead of a ¼-28 mounting stud or bolt. Available on all series.
Temperature Output	TO	Accelerometer includes a built-in temperature sensor and provides a DC voltage temperature output in addition to the AC voltage vibration output. To transmit the second signal, accelerometer has one additional pin (connector version) or one/two cable conductors (integral cable version). Available on all series.



# LOW NOISE ICP® ACCELEROMETER

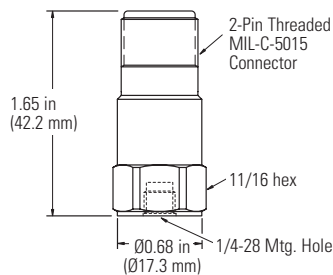
## 601 Series



### ACCELEROMETER WITH MIL CONNECTOR

MODEL 601A01

- Excellent signal-to-noise ratio
- Low noise floor



SPECIFICATIONS	
Performance	
Sensitivity	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	±50 g ±490 m/s <sup>2</sup>
Frequency Range (±3 dB)	0.27 to 10000 Hz
Resonant Frequency	16 kHz
Broadband Resolution (1 to 10000 Hz)	50 µg 491 µm/s <sup>2</sup>
Non-Linearity	±1 %
Transverse Sensitivity	≤7 %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68
Electrical	
Settling Time (within 1% of bias)	≤4.0 sec
Discharge Time Constant	≥0.6 sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	<150 Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	3.2 µg/√Hz
Spectral Noise (100 Hz)	1.0 µg/√Hz
Spectral Noise (1 kHz)	0.7 µg/√Hz
Electrical Isolation (Case)	>10 <sup>8</sup> Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Female
Mounting Torque	2 to 5 ft-lb 2.7 to 6.8 Nm
Electrical Connector	2-Pin MIL-C-5015
Electrical Connection Position	Top
Weight	2.8 oz 80 gm
Accessories	
Model 081A40: Mounting stud, 1/4-28 x 0.438"	

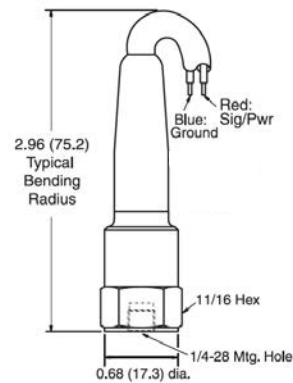
## ADDITIONAL BASE MODEL CONFIGURATIONS



### ACCELEROMETER WITH INTEGRAL POLYURETHANE CABLE

MODEL 601A11

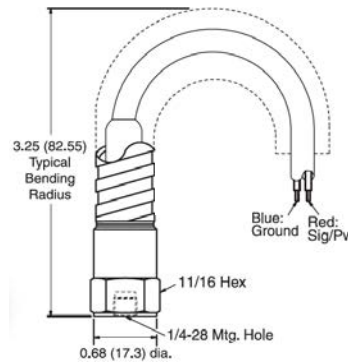
- Configurable cable length and terminating connector



### ACCELEROMETER WITH INTEGRAL ARMORED POLYURETHANE CABLE

MODEL 601A61

- Configurable cable length,  
armor length and terminating connector



# SIDE EXIT ICP® ACCELEROMETER

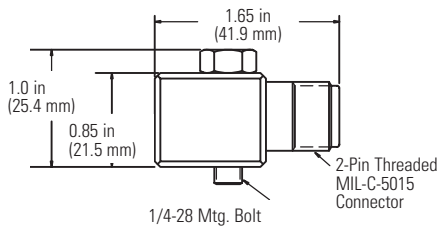
## 602 Series



### ACCELEROMETER WITH MIL CONNECTOR

MODEL 602D01

- Low profile housing
- Side exit, through-bolt design



SPECIFICATIONS	
Performance	
Sensitivity ( $\pm 10\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 8000 Hz
Resonant Frequency	25 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68
Electrical	
Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/√Hz
Spectral Noise (100 Hz)	5 $\mu$ g/√Hz
Spectral Noise (1 kHz)	4 $\mu$ g/√Hz
Electrical Isolation (Case)	$> 10^8$ Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Male
Mounting Torque	2 to 5 ft-lb 2.7 to 6.8 Nm
Electrical Connector	2-Pin MIL-C-5015
Electrical Connection Position	Side
Weight	2.61 oz 74.0 g
Accessories	
Model 081B97: Mounting bolt, 1/4-28 x 1.0"	





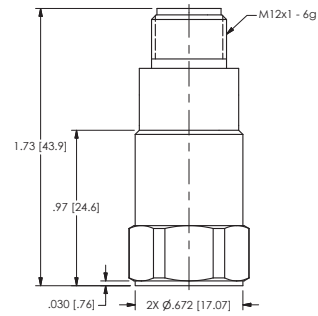


## ADDITIONAL BASE MODEL CONFIGURATIONS



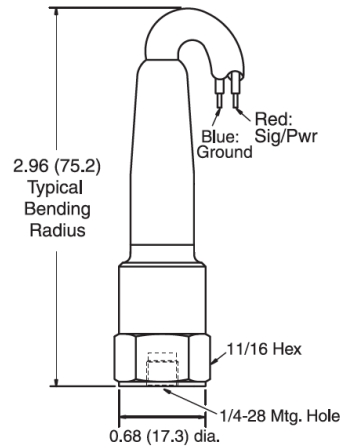
### ACCELEROMETER WITH M12 CONNECTOR

MODEL 603C91



### ACCELEROMETER WITH INTEGRAL POLYURETHANE CABLE

MODEL 603C11

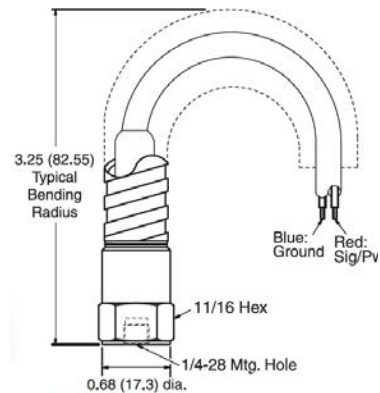


- Configurable cable length and terminating connector



### ACCELEROMETER WITH INTEGRAL ARMORED POLYURETHANE CABLE

MODEL 603C61



- Configurable cable length, armor length and terminating connector

# RING STYLE ICP® ACCELEROMETER

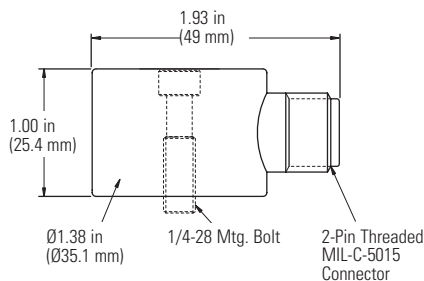
## 606 Series



### ACCELEROMETER WITH MIL CONNECTOR

MODEL 606B01

- Side exit connector
- Through bolt aids in cable orientation

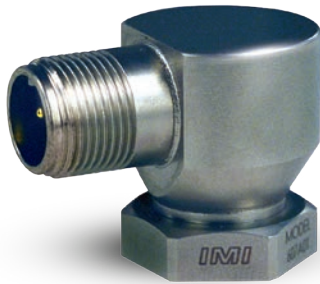


SPECIFICATIONS	
Performance	
Sensitivity ( $\pm 10\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 10000 Hz
Resonant Frequency	25 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68
Electrical	
Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/√Hz
Spectral Noise (100 Hz)	5 $\mu$ g/√Hz
Spectral Noise (1 kHz)	4 $\mu$ g/√Hz
Electrical Isolation (Case)	$> 10^8$ Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Male
Mounting Torque	2 to 5 ft-lb 2.7 to 6.8 Nm
Electrical Connector	2-Pin MIL-C-5015
Electrical Connection Position	Side
Weight	4.4 oz 124 g
Accessories	
Model 081A68: Mounting bolt, 1/4-28 x 0.87"	



# SWIVEL BASE ICP® ACCELEROMETER

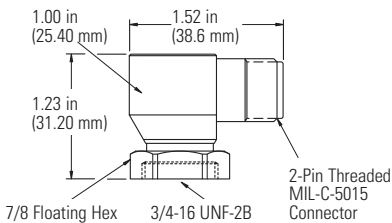
## 607 Series



### ACCELEROMETER WITH MIL CONNECTOR

MODEL 607A01

- Patented 360° swivel mount design
- Simple installation with cable able to be positioned in any direction



SPECIFICATIONS	
Performance	
Sensitivity ( $\pm 10\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 10000 Hz
Resonant Frequency	18 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68
Electrical	
Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/√Hz
Spectral Noise (100 Hz)	5 $\mu$ g/√Hz
Spectral Noise (1 kHz)	4 $\mu$ g/√Hz
Electrical Isolation (Case)	$> 10^8$ Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Male
Mounting Torque (Stud)	3 to 4 ft-lb 4.1 to 5.4 Nm
Mounting Torque (Hex Nut)	2 to 3 ft-lb 2.7 to 4.1 Nm
Electrical Connector	2-Pin MIL-C-5015
Electrical Connection Position	Side
Weight	3.7 oz 105 g
Accessories	
Model 080A162: Mounting stud, 3/4-16 to 1/4-28	

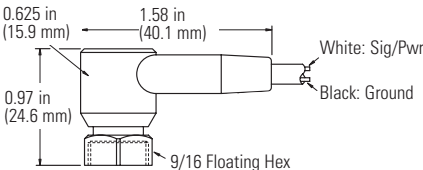
# SWIVELER® ICP® ACCELEROMETER

## 607 Series



### ACCELEROMETER WITH INTEGRAL POLYURETHANE CABLE MODEL 607A11

- World's smallest industrial accelerometer to easily fits in tight spaces
- Patented 360° swivel mount design provides hassle-free cable orientation



SPECIFICATIONS	
Performance	
Sensitivity ( $\pm 15\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 10000 Hz
Resonant Frequency	25 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68
Electrical	
Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/ $\sqrt{\text{Hz}}$
Spectral Noise (100 Hz)	5 $\mu$ g/ $\sqrt{\text{Hz}}$
Spectral Noise (1 kHz)	4 $\mu$ g/ $\sqrt{\text{Hz}}$
Electrical Isolation (Case)	$> 10^9$ Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Male
Mounting Torque (Stud)	3 to 4 ft-lb 4.1 to 5.4 Nm
Mounting Torque (Hex Nut)	2 to 3 ft-lb 2.7 to 4.1 Nm
Electrical Connector	Molded Integral Cable
Electrical Connection Position	Side
Weight	1.1 oz 31 g
Accessories	
Model 080A156: Mounting stud, 1/2-20 to 1/4-28	



# SPINDLER® ICP® ACCELEROMETER

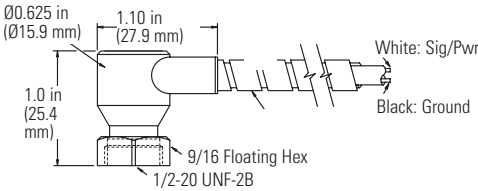
## 607 Series



### ACCELEROMETER WITH INTEGRAL ARMORED POLYURETHANE CABLE

MODEL 607A61

- World's smallest industrial accelerometer to easily fits in tight spaces
- Patented 360° swivel mount design provides hassle-free cable orientation



SPECIFICATIONS	
Performance	
Sensitivity ( $\pm 15\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 10000 Hz
Resonant Frequency	25 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %
Environmental	
Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP67
Electrical	
Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/√Hz
Spectral Noise (100 Hz)	5 $\mu$ g/√Hz
Spectral Noise (1 kHz)	4 $\mu$ g/√Hz
Electrical Isolation (Case)	$> 10^8$ Ohm
Physical	
Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Welded Hermetic
Mounting Thread	1/4-28 Male
Mounting Torque (Stud)	3 to 4 ft-lb 4.1 to 5.4 Nm
Mounting Torque (Hex Nut)	2 to 3 ft-lb 2.7 to 4.1 Nm
Electrical Connector	Integral Armored Cable
Electrical Connection Position	Side
Weight	1.1 oz 31 g
Accessories	
Model 080A156: Mounting stud, 1/2-20 to 1/4-28	

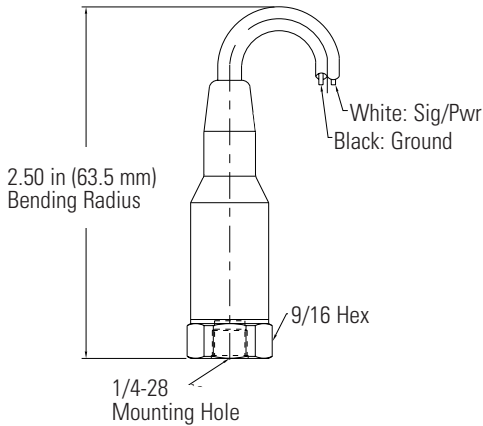
# SMALL FOOTPRINT ICP® ACCELEROMETER

## 608 Series

### ACCELEROMETER WITH INTEGRAL CABLE

MODEL 608A11

- Smallest footprint of any industrial accelerometer



#### SPECIFICATIONS

##### Performance

Sensitivity ( $\pm 10\%$ )	100 mV/g 10.2 mV/(m/s <sup>2</sup> )
Measurement Range	$\pm 50$ g $\pm 490$ m/s <sup>2</sup>
Frequency Range ( $\pm 3$ dB)	0.5 to 10000 Hz
Resonant Frequency	22 kHz
Broadband Resolution (1 to 10000 Hz)	350 $\mu$ g 3434 $\mu$ m/s <sup>2</sup>
Non-Linearity	$\pm 1$ %
Transverse Sensitivity	$\leq 7$ %

##### Environmental

Overload Limit (Shock)	5000 g pk 49050 m/s <sup>2</sup> pk
Temperature Range	-65 to +250 °F -54 to +121 °C
Enclosure Rating	IP68

##### Electrical

Settling Time (within 1% of bias)	$\leq 2.0$ sec
Discharge Time Constant	$\geq 0.3$ sec
Excitation Voltage	18 to 28 VDC
Constant Current Excitation	2 to 20 mA
Output Impedance	$< 150$ Ohm
Output Bias Voltage	8 to 12 VDC
Spectral Noise (10 Hz)	8 $\mu$ g/ $\sqrt{\text{Hz}}$
Spectral Noise (100 Hz)	5 $\mu$ g/ $\sqrt{\text{Hz}}$
Spectral Noise (1 kHz)	4 $\mu$ g/ $\sqrt{\text{Hz}}$
Electrical Isolation (Case)	$> 10^8$ Ohm

##### Physical

Sensing Element	Ceramic
Sensing Geometry	Shear
Housing Material	Stainless Steel
Sealing	Molded
Mounting Thread	1/4-28 Female
Mounting Torque	2 to 5 ft-lb 2.7 to 6.8 Nm
Electrical Connector	Integral Cable
Electrical Connection Position	Top
Cable Type	Polyurethane
Weight	3.5 oz 99.3 g

##### Accessories

Model 081A40: Mounting stud, 1/4-28 x 0.438



# **PCB PIEZOTRONICS** AN AMPHENOL COMPANY

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IMI Sensors, a division of PCB Piezotronics, Inc. manufactures industrial vibration monitoring instrumentation, such as accelerometers, vibration transmitters and switches that feature rugged stainless steel housings and survive in harsh environments like paper and steel mills, mines, gas turbines, water treatment facilities and power plants. Integrating with portable analyzers and PLC's, IMI instrumentation helps maintenance departments reduce downtime and protect critical machinery. Visit IMI Sensors at [www.pcb.com](http://www.pcb.com).

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