



# Research and Development Sensors and Instrumentation

Shock & Vibration, Acoustics, Pressure and Force

PCB Piezotronics Inc. manufactures the largest selection of sensors and sensor accessory products worldwide. Product lines include sensors for the measurement of acceleration, acoustics, force, load, pressure, shock, strain, torque, and vibration. All sensors are backed by our Total Customer Satisfaction guarantee.

Engineers and scientists at leading businesses, research institutions, and independent laboratories around the world choose PCB® as their sensor manufacturer. In a global marketplace driven by innovation and development, PCB® has a sensor for every stage of product development including R&D, production variation control, and process monitoring and protection.



## Industries

- Acoustic Architectural Design
- Appliance
- Business Machine
- Consumer Electronics
- Chemical
- Environmental Testing
- Food & Beverage
- Industrial Hygiene
- Injection Molding
- Machine Tool
- Medical Metal, Glass, Plastic & Material Forming
- Pharmaceutical
- Package Design & Testing
- Power Tool
- Production/Process Equipment
- Quality Assurance
- Semiconductor





## Piezoelectric Accelerometers

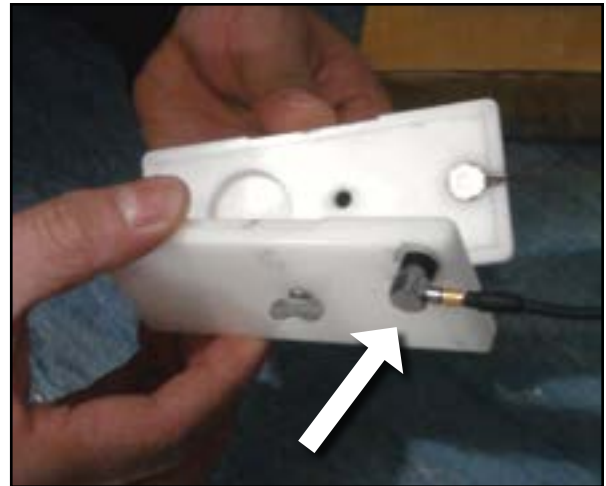
PCB® piezoelectric accelerometers offer tremendous versatility for shock and vibration measurements. Sensors are available with measurement capabilities down to 1µg, (for making low level, low frequency vibration measurements) and up to 100,000g's, (for measuring short duration transient shock events).

### Product Highlights

- Durable - No Moving Parts
- Rigidity Imparts High Frequency Range
- Single Axis and Triaxial Configurations
- Most Sensors Hermetically Sealed in a Titanium Housing
- Screw, Stud, or Adhesive Housing

### Applications

- Product Qualification Studies
- Vibration Control
- Quality Assurance (End of Line Testing)
- Package Drop Testing
- Structural Vibration Testing
- Environmental Testing
- Floor Vibration Monitoring
- Simulated Pyroshock Testing



Photos Courtesy of BaKo Co., Ltd.

Testing of linear motors used in cell phones



#### 352A21

- +/- 500 g range
- Low 0.6 gram mass
- Low 0.14" height



#### 352C33

- +/- 50 g range
- Low 0.1 mg resolution
- 0.5 to 10,000 Hz. frequency range



#### 356A01

- +/- 1000 g range
- Triaxial configuration
- Low 1.0 gram mass



#### 350D02

- +/- 50,000 g range
- Built-in filtering
- Electrically case isolated



#### 393B05

- +/- 0.5 g range
- High 10 V/g sensitivity
- Low 4 µg resolution

## Dynamic Force Sensors

Quartz, piezoelectric force sensors are durable measurement devices with exceptional characteristics for the measuring of dynamic force events. Typical measurements include dynamic and quasistatic forces as encountered during actuation, compression, impact, impulse, reaction, and tension.

### Product Highlights

- Rugged and durable
- High Stiffness
- Very Repeatable
- Wide Dynamic Range
- Fast Rise Time
- High Useable Frequency Range

### Applications

- Modal Analysis
- Biomechanics
- Drop Testing
- Component Fatigue Testing
- Impact & Repetitive Applications
- Material Studies



Assembly force monitoring using 208C Series force sensor



#### 208C Series

- Ranges 10 to 5k lbs
- Tension / compression
- 5/8" H x 5/8" D
- General purpose



#### 201B Series

- Ranges 10 to 5k lbs
- Low profile design
- High resonant freq.
- 0.31" H x 0.65" D



#### 260 Series

- 3-Axis, Fx, Fy, Fz
- ICP®
- Mtg. hardware incl.
- Ranges 1k to 10k lbs



#### 200B Series

- Ranges 10 to 5k lbs
- Compression only
- Impact applications
- 0.36" H x 0.65" D



#### 200C20

- 20k lb FS capacity
- Impact cap incl.
- ¼-28 (F) mtg. thd.
- S.S. construction



## Precision Microphones

A broad portfolio of acoustic products is provided to measure sound pressure and noise. These range from the industry's first 1/2" low noise (to 6.5 dBA) prepolarized microphone and other high accuracy 377 and 378 series of IEC compliant microphones and preamplifiers to the value oriented 130F series of "array" electret microphones and preamplifiers.

### Product Highlights

- Modern Prepolarized (0V)
- Traditional Externally Polarized (200V)
- Free-field, Random Incidence and Pressure Response Fields
- Wide Dynamic Range 6.5 dBA to 178 dB
- Wide Temperature Range -40° to 800°C
- IEC 61094 & Class 1 Compliant Models
- 378 and 377 series are A2LA and ILAC Accredited and CE marked
- Calibrations are traceable through one or more of the following: National Labs, NIST, PTB or DFM

### Applications

- Sound Power Testing
- Engine Noise Analysis
- Sound Quality
- Wind Turbine Measurements
- Material Absorption Testing
- Beamforming & Holography
- Computer Disk Drive Noise
- Noise, Vibration, Harshness (NVH) Testing
- Noise Source Identification



Noise source identification for noise reduction



Get results of independent side-by-side testing. PCB® vs. other leading microphone brands



- 378B02**
- 1/2" prepolarized
  - Free-field
  - For open areas and anechoic chamber tests
  - **HT378B02** High temperature applications model available (**125 °C**)



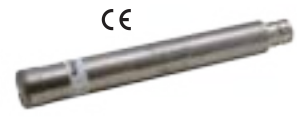
- 377A21**
- 1/2" prepolarized
  - Random incidence
  - For measuring sound and its reflections
  - 4 Hz to 25 kHz



- 378A14**
- 1/4" prepolarized
  - Pressure field
  - High amplitudes and high frequency
  - Side vented



- 130F20**
- Cost effective
  - Free-field
  - For large channel count systems



- 378A04**
- Industry's 1st 1/2" prepolarized low noise (6.5 dBA)
  - Free-field
  - High sensitivity, 450 mV/pa
  - Wide frequency range (10 Hz – 16 kHz)

## Dynamic Pressure Sensors

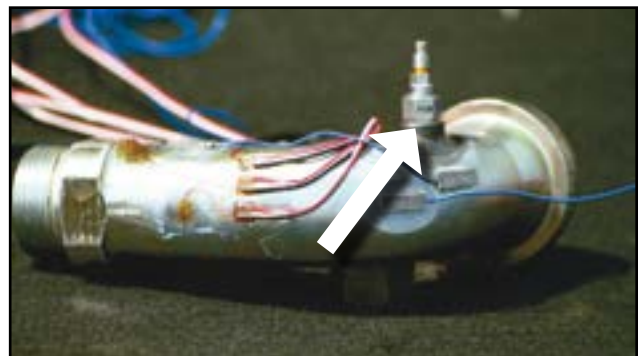
A wide variety of pressure sensors are provided to satisfy a multitude of dynamic measurement requirements. Whether it's a pharmaceutical injection design application, a component test, or a pulsation study of a hydraulic pump, PCB® has off-the-shelf sensors and can custom design sensors for specific applications

### Product Highlights

- Fast, Micro-second Response Time
- Resonant Frequency to 500 kHz
- Measurement of Small Pressure Changes Under Large Static Pressures
- Operating Temperature Range From -320 to +750 °F (-196 to +399 °C)
- Rugged Solid State Construction

### Applications

- Fluid Borne Noise
- Pulsations, Surges, Cavitations
- Combustion Studies
- Explosive Component Testing
- Hydraulic & Pneumatics Systems
- High Intensity Sound



Automotive air bag propellant testing using 102 Series ICP® pressure sensor



- 102 Series**
- Ranges 50 to 10 kpsi
  - Ground isolated
  - Easy installation
  - Rise time of  $\leq 1 \mu\text{sec}$



- 112 Series**
- Acceleration compensation
  - $\geq 250 \text{ kHz}$  res. freq.
  - ICP®
  - High sensitivity



- 113 Series**
- $\geq 500 \text{ kHz}$  res. freq
  - Rise time of  $\leq 1 \mu\text{sec}$
  - Frequency tailored
  - Acceleration compensation



- 106 Series**
- Hermetic acoustic
  - Ranges 1 to 8.3 psi
  - Acceleration compensation
  - ICP®



- 116 Series**
- 100 psi FS range
  - -400 °F to +650 °F
  - 6 pC/psi
  - Hermetically sealed



## Electronics

PCB® offers a wide variety of signal conditioners for use with our sensor products. These range from single to multi-channel units that are battery or line powered.

### Highlights

- Single and Multi-channel
- Battery or Line Powered
- Gain and Filter Options
- ICP®, Charge, MEMS Sensor Inputs
- AC/DC Coupling



#### 482C24

- ICP® / Voltage inputs
- 4 channels
- Line powered
- AC/DC coupling
- Incremental gain



#### 480C02

- ICP® input
- 1 channel
- Battery powered



#### 483C41

- ICP® / Charge inputs
- 8 channels
- Incremental gain
- Selectable filtering



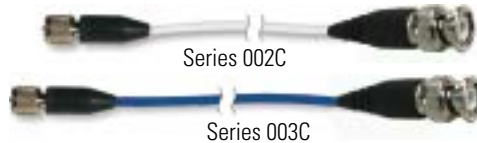
ICP® signal conditioners for 64-channel product modal test

## Cables

A wide variety of cable assemblies are manufactured that mate with different sensor types, signal conditioners and data acquisition systems.

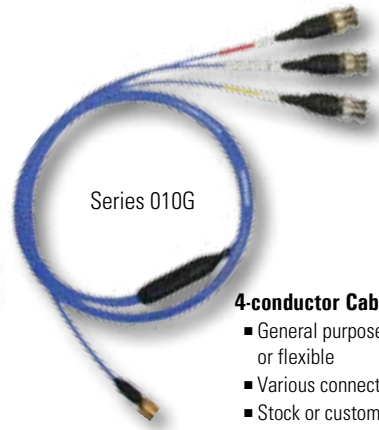
### Highlights

- Shielded Single and 4-conductor Cable Assemblies
- General Purpose and Low Noise Cables
- Flexible and Ruggedized Options



#### Coaxial Cables

- General purpose, low noise, or flexible
- Various connector terminations
- Stock or custom lengths



Series 010G

#### 4-conductor Cables

- General purpose, low noise, or flexible
- Various connector terminations
- Stock or custom lengths



SAME DAY SHIPPING • LIFETIME WARRANTY

At PCB®, we don't just know the sensor business; we pioneered ICP® technology. For almost 50 years, every sensor design and assembly is subjected to tight in-house inspection and quality control. That's why we have impeccable product performance and longevity. And that's what our customers expect from every PCB® sensor.

Platinum Stock Sensors® program is one of the ways we live up to our Total Customer Satisfaction guarantee. Driven by customer demand, these sensors and cables are the best fit for typical R&D, product testing, and industrial monitoring applications. Platinum Stock Sensors ship the same day and are backed by a lifetime warranty — if you are not 100% satisfied, simply send them back. We'll repair or replace them, guaranteed. No questions asked!

\*For U.S. customers, orders up to 10 units placed before 4 p.m. EST ship the same day. IF NOT, YOUR SHIPPING IS FREE. For orders outside the U.S., please contact your local representative. Volume discounts are valid in the USA only.



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AS9100 CERTIFIED ■ ISO 9001 CERTIFIED ■ A2LA ACCREDITED to ISO 17025

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PCB® Piezotronics is a global supplier of microphones, vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology. This instrumentation is used for test, measurement, monitoring, and control requirements in automotive, aerospace, industrial, R&D, military, educational, commercial, OEM applications, and more. Our Platinum Stock Sensors program ensures fast delivery of over 10,000 sensors that are covered by a Lifetime Warranty. With a customer support team of more than 30 Customer Service Representatives and Application Engineers, PCB® proudly stands behind their products with the services you value most, including 24-hour technical support, a global distribution network, and the industry's only commitment to **Total Customer Satisfaction**. Visit us at [www.pcb.com](http://www.pcb.com).

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