TOTAL CUSTOMER SATISFACTION GUARANTEED

Dynamic Force Sensors

Conduct Impact and Cyclic Compression and Tension Measurements for Testing, Monitoring, and Process Control Requirements

- Piezoelectric Quartz Sensing Technology
- ICP® and Charge Output Styles
- High Stiffness - No Moving Parts
- Single Axis and Multi-Component Styles
- High Ranges
- NIST Traceable, A2LA Accredited Calibration

Dynamic Force Sensors

Measuring dynamic forces with piezoelectric quartz sensors permits accurate capture of fast, transient forces associated with manufacturing processes and product testing. Unlike strain gage sensors that are suitable for slow changing or static loads, quartz dynamic force sensors possess the endurance to survive, and the response necessary, to quickly and accurately follow fast-rising, short-duration crimping, stamping, punching, and impact events.

In addition to the wide array of sensors that accommodate a multitude of measurement tasks, a comprehensive assortment of signal conditioning equipment is offered to complete the measurement chain. When complemented with today's powerful data acquisition equipment and control software, creation of a complete, automated monitoring system is easily achievable.

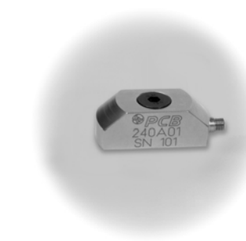
All sensors are designed and manufactured in an ISO 9001 certified facility and provided with A2LA accredited calibration with traceability to N.I.S.T.

As with all equipment from PCB®, these sensors are complemented with toll-free applications assistance, 24-hour customer service, and are backed by a no risk policy that guarantees satisfaction or your money refunded.

PCB PIEZOTRONICS INC.
FORCE / TORQUE DIVISION

Total Customer Satisfaction Guaranteed

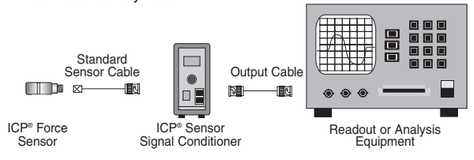
DYNAMIC FORCE SENSORS

Style	General Purpose	Ring	Link	Impact	Three Component Rings	Strain	Penetration
Typical Appearance							
Series / Models	**ICP® Series: 208** **Charge Output Series: 218**	**ICP® Series: 201 to 207** **Charge Output Series: 211 to 217**	**ICP® Series: 221 to 227** **Charge Output Series: 231 to 237**	**ICP® Series: 200** **Charge Output Series: 210**	**ICP® Series: 260A01 to A03** **Charge Output Series: 260A11 to A13**	**ICP® Series: M240**	**ICP® Series: 208**
Capacities	**10 lb to 5000 lb Compression** **45 N to 22k N Compression** **10 lb to 500 lb Tension** **45 N to 2200 N Tension**	**10 lb to 100k lb Compression** **45 N to 450k N Compression**	**10 lb to 50k lb Compression** **45 N to 220k N Compression** **10 lb to 30k lb Tension** **45 N to 130k N Tension**	**10 lb to 50k lb Compression** **45 N to 220k N Compression**	**Fz: 1000 lb (4500 N) to 10k lb (45k N)** **Fx: 500 lb (2200 N) to 4000 lb (18k N)** **Fy: 500 lb (2200 N) to 4000 lb (18k N)**	**50 με to 300 με**	**100 lb to 5000 lb Compression** **450 N to 22k N Compression** **500 lb Tension (Select Models)** **2200 N Tension (Select Models)**
Applications	• Tensile Testing • Fatigue Testing • Drop and Impact Testing • Material Testing • Mechanical Impedance • Biomechanics • Modal Analysis Force Input	• Clamping and Pinching • Roll Nip Profiles • Balancing • Tablet and Punch Presses • Material Testing • Machinery Studies • Stamping	• Push-rod Testing • Forming • Press Force Monitoring • Tensile Testing • Force Controlled Vibration • Materials Testing Machines • Machine Process Monitoring	• Impact Measurements • Crash Testing • Punch and Tablet Presses • Package Drop Testing • Stamping • Metal Forming	• Force Limited Vibration Testing • Cutting Tool Forces • Force Dynamometers • Engine Mount Analysis • Biomechanics Research • Modal Analysis • Impact Testing	• Press Force Monitoring • Indirect Force Measurement • Monitoring Safety and Reliability	• Material Strength Testing • Drop Testing • Polymer and Plastics Testing • Penetration Testing • Injection Molded Specimen Testing
Mounting	• 10-32 Tapped Holes • Supplied Mounting Studs • Supplied Impact Cap	• Supplied Mounting Stud • Through Bolt	• Tap Threaded Hole, Both Ends • 3/8-24 to 1 1/4-12	• Supplied Mounting Stud • Supplied Impact Cap	• Supplied Mounting Stud • Through Bolt	• M6 × 1 mm Mounting Screw	• Supplied Impact Cap
Features	• Stainless Steel Construction • Hermetically Sealed • Flexible Mounting • Low Deflection • Compact • ICP® and Charge Output Models • Axial or Radial Connector Models	• Stainless Steel Construction • Hermetically Sealed • Low Weight • Low Deflection • ICP® and Charge Output Models	• Stainless Steel Construction • Hermetically Sealed • Factory Preloaded • Low Deflection • ICP® and Charge Output Models	• Stainless Steel Construction • Hermetically Sealed • Long Cycle Life • High Frequency Response • High Overload • ICP® and Charge Output Models	• Stainless Steel Construction • Hermetically Sealed • Compact • Simultaneous Measurement in Fx, Fy, Fz axes • ICP® and Charge Output Models	• Compact Size • Easy Installation • Rugged, Sealed Construction • Stainless Steel Housing	• Stainless Steel Construction • Sealed
Performance	• Amplitude Linearity: 1% FS • Upper Freq. Limit: 36k Hz	• Amplitude Linearity: 1% FS • Upper Freq. Limit: 35k to 90k Hz	• Amplitude Linearity: 1% FS • Upper Freq. Limit: 4000 to 15k Hz	• Amplitude Linearity: 1% FS • Upper Freq. Limit: 30k to 75k Hz	• Amplitude Linearity: 1% FS • Cross Talk Fx to Fy: ± 3% • Cross Talk Fx or Fy to Fz: ± 5% • Upper Freq. Limit: 39k to 90k Hz	• Amplitude Linearity: 2% FS	• Amplitude Linearity: 1% FS • Upper Freq. Limit: 18k to 25k Hz

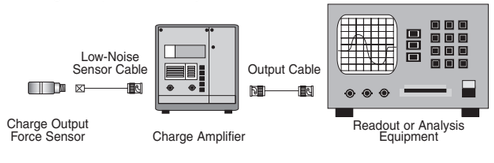
Typical Measurement Systems for Dynamic Force Sensors

Please consult factory to discuss your particular dynamic force measurement application and to request certified documents prior to designing mounting hardware.

ICP® Sensor System



Charge Output Sensor System



When weighing or measuring load, request information on our complete line of strain gage load cells for general purpose and fatigue-rated use.

Series 484 Line-Powered, DC Coupled, ICP® Sensor Signal Conditioners

Condition ICP® sensors and provide a DC coupled signal path for long duration, quasi-static measurements.

- Selectable AC or DC coupled signal path
- Versions offering gain ×1, ×10, ×100
- Versions offering clamped zero output for applications involving repetitive pulse inputs
- Convenient, line-powered, benchtop styles
- Supports calibration requirements as well as punching, crimping, and stamping operations

Series 421A10 Industrial Charge Amplifiers

Condition charge output piezoelectric sensors in demanding, harsh environments.

- Choice of 1, 2, or 3 channels
- Rugged, surface mountable, sealed aluminum enclosures
- Three-user, selectable input ranges for each channel
- Electronic reset capability
- Long discharge time constant for quasi-static and low frequency measurements

Series 440 Modular Signal Conditioners

Mix and match modules into a variety of chassis to achieve the functions and number of channels desired.

- Modules for conditioning ICP® and charge output sensors
- AC or DC coupled options
- Expands as needs grow
- Line or battery powered

Series 480 Battery Powered, ICP® Sensor Signal Conditioners

For portable measurement and testing applications.

- Unity or variable gain versions
- Powered by standard 9 VDC batteries
- Rechargeable option
- AC power adaptor option

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ISO 9001 CERTIFIED A2LA ACCREDITED to ISO 17025

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The Force/Torque Division of PCB® Piezotronics, Inc. specializes in the development, application, and support of piezoelectric and strain gage force sensors, load cells, and torque sensors for a wide range of research, test, measurement, monitoring, and control requirements. This product focus, coupled with the strengths and resources of PCB, permits the Force/Torque Division to offer exceptional customer service, 24-hour technical assistance, and a **Total Customer Satisfaction** guarantee.

Visit **www.pcb.com** *to locate your nearest sales office*