TORQUE SENSORS
We make it our business to stay on top of emerging industry demands, so that the torque sensors we provide help you meet your ever changing test requirements. Our broad selection of competitively priced torque sensors will help you meet the most demanding test and measurement requirements. Used in automotive, aerospace & defense, R&D and process control applications, our drop-in replacement torque sensors are designed to provide years of dependable performance. Whether a flange, disc or shaft, PCB® torque sensors are robust, durable, dependable and have a high degree of accuracy.

TORQUE SENSOR TECHNOLOGY
The technology behind PCB® torque sensors are resistive element strain gages configured into a Wheatstone bridge circuit. The strain gages that serve as the primary sensing elements on a rigid spring element, which convert the applied torque into an electrical signal that can be filtered, displayed and recorded for further processing. This highly accurate ratio-metric electrical signal is proportional to the applied mechanical over turning force.

GREAT MEASUREMENTS FOR 50 YEARS
With over five decades of success in the industry, we have developed a thorough understanding of industry demands and test requirements. Our vast industry knowledge has enabled us to design our torque sensors with increasing industry demands in mind — so our experienced staff of application engineers can provide appropriate product recommendations for your application, and you can be sure our products will help you meet your test requirements.
EXCEPTIONAL SERVICE

We provide world-class customer service, provided 24 hours a day by live Customer Service Representatives, so when you call any time of the day or night, you can speak with a real person. As with all PCB® instrumentation, our torque sensors are complemented with toll-free applications assistance and backed by our no risk policy that guarantees your satisfaction or your money back. You can also bring your torque sensors to us for service and calibration. Our calibration lab is A2LA accredited up to 216Klb-in.

HIGHLIGHTS

- Reaction and Rotation Models
- Variety of Drive Configurations
- Wide Capacity Range
- Broad Application Experience
- A2LA Accredited Calibration
- NIST Traceable Calibration

APPLICATIONS

- Component Durability
- Powertrain Research and Development
- Dynamometer
- End-of-line NVH Quality
- Motor Performance
- Pump & Fan Efficiency
TWO CATEGORIES OF MEASUREMENT

We offer two categories of torque measurement: reaction torque and rotational torque. Reaction torque is a non-rotational torque measurement, and rotating torque, as the name implies, is a torque sensor where the sensor elements rotates with between a prime mover and load. Reaction torque sensors are machined from a single piece of rigid material. They have no moving parts and are typically flange-mounted into a fixed position.

REACTION TORQUE SENSORS

Reaction torque sensors are typically used in torsional test machines, motor dynamometers or in any application where rotation is limited to less than 360°. These sensors do not use bearings, slip rings or other rotating components, so they are cost-effective and easy to install.

We offer a comprehensive line of reaction torque sensors to meet a wide variety testing needs. Our capacity ranges are shown in the table (right).

<table>
<thead>
<tr>
<th>Reaction Torque Sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range</td>
</tr>
<tr>
<td>Overload Limit</td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Linearity</td>
</tr>
<tr>
<td>Hysteresis</td>
</tr>
<tr>
<td>Repeatability</td>
</tr>
<tr>
<td>General Dimensions</td>
</tr>
</tbody>
</table>

ROTARY TORQUE SENSORS

Rotary torque sensors use a rotating shaft held in place with precision bearings within a fixed housing. We offer three types of rotational torque sensors: Rotary Slip Ring, Rotary Transformer Torque Transducers, and TORKDISC®.
ROTARY SLIP RING

Slip ring torque sensors are cost-effective sensors that provide the power to excite the strain gage bridge and transfer the torque signal using slip rings. These sensors are used for engine dynamometers, electric motor testing, hydraulic pump testing and fan testing, to name a few. The sensor is mounted in-line between a driving source and an absorber.

Our comprehensive line of rotary slip ring torque transducers meets a wide variety testing needs. Our style and capacity ranges are shown in the table (below).

<table>
<thead>
<tr>
<th>ROTARY SLIP RING</th>
<th>Circular Keyed Shaft</th>
<th>Flat Keyed Shaft</th>
<th>Hex Shaft</th>
<th>Square Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range (FS Capacity)</td>
<td>from 100 to 10k lbf-in</td>
<td>from 8.85 to 88.5 lbf-in</td>
<td>from 32 ozf.-in. to 2,112 ozf.-in.</td>
<td>from 50 to 216k lbf.-in.</td>
</tr>
<tr>
<td>Overload Limit</td>
<td>150% FS</td>
<td>from 200 to 500% FS</td>
<td>150%</td>
<td>150%</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>2 mV/V</td>
<td>2 mV/V</td>
<td>2 mV/V</td>
<td>2 mV/V</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤ 0.1% FS</td>
<td>≤ 0.1% FS</td>
<td>≤ 0.25% FS</td>
<td>≤ 0.25%</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>≤ 0.1% FS</td>
<td>≤ 0.1% FS</td>
<td>≤ 0.25% FS</td>
<td>≤ 0.25%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>≤ 0.05% FS</td>
<td>≤ 0.05% FS</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Speed Rating</td>
<td>7,900 RPM</td>
<td>10,000 RPM</td>
<td>up to 5,000 RPM</td>
<td>Up to 5,000 RPM</td>
</tr>
<tr>
<td>General Dimensions (shaft length x housing length x housing diameter)</td>
<td>Sizes range from 8.0 x 4.5 x 4.13 in to 11 x 5.25 x 4.5 in</td>
<td>6.5 x 3.40 x 3.5 in.</td>
<td>4.25 x 2.30 x 2.00 in.</td>
<td>Sizes range from 3.23 x 2.3 x 2.0 in. to 9.48 x 4.62 x 7.25 in.</td>
</tr>
</tbody>
</table>
ROTARY TRANSFORMER (non-contact)

Our rotary transformer torque models are precision designed and manufactured with an aerospace grade rotary transformer, shaft and housing, which makes them well suited for higher speed operation in demanding test and measurement applications. They use a transformer to power the strain gage bridge and transfer the torque measurement over an air gap between the rotating shaft and the fixed housing. They come in a number of sizes and capacities and are available in keyed-shaft and flange-mount spline drive configurations. Advantages of the rotary torque approach include less maintenance and less signal noise than slip ring designs.

We offer a full line of rotary transformer torque sensors to meet a wide variety of testing needs. Our capacity ranges are shown in the table (right).

TELEMETRY (bearing less, non-contact)

Our TORKDISC® In-line Rotary Torque Sensor System is an ideal solution for testing that requires a robust rotary torque transducer, and for applications in which axial space is at a premium. The robust construction, high stiffness and low rotating inertia of the TORKDISC® make it well suited for automotive powertrain development and in-plant quality control applications such as torque to turn, NVH and signature analysis.

The system consists of a short-coupled, flange-mounted rotating sensor and a stator assembly, and uses a 16-bit digital telemetry transmitter rather than slip rings or rotary transformers. A circumferential antenna picks up digitized measurement signals and relays them to a receiver unit where they are conditioned to dual voltage output signals. Advantages include a smaller sensor size and a noise-free, digital signal transmission.
SIGNAL CONDITIONERS AND ACCESSORIES

To complement our load cells, we offer a full line of signal conditioners to meet a wide range of test needs. They include:

- **Series 8120** provides AC bridge excitation, ± 5 Volt analog output, a selectable filter, shunt calibration and low noise.

- **Series 8159** provides 5 or 10 VDC strain gage bridge excitation which delivers ± 10 VDC and 4 to 20 mA output signals and operates from 115 or 230 VAC power.

- **Model 8162** includes an in-line, IP66 enclosure, operates from 12 to 18 VDC, provides 10 VDC sensor excitation, and delivers ± 10 V and 4 to 20 mA outputs.

- **Series 8161** provides 5 or 10 VDC bridge excitation, delivers ± 5 or ± 10 volts and 4-20 mA output signals, and operates from 12 to 28 VDC power. It also includes adjustable zero and span with built-in shunt calibration.

- **Series 920** provides a 5 VDC bridge excitation in a portable hand-held, battery operated, integral 5 digit display, external shunt calibration resistor, and RS232 computer interface.

AVAILABLE ACCESSORIES INCLUDE:

- Cable assemblies
- Load button
- Connectors
- Mounting base
- Rod end
- Thread pre-tensioners
MTS Sensors, a division of MTS Systems Corporation (NASDAQ: MTSC), vastly expanded its range of products and solutions after MTS acquired PCB Piezotronics, Inc. in July, 2016. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corp.; IMI Sensors and Larson Davis are divisions of PCB Piezotronics, Inc.; Accumetrics, Inc. and The Modal Shop, Inc. are subsidiaries of PCB Piezotronics, Inc.

PCB Piezotronics, Inc. is a designer and manufacturer of microphones, vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology used by design engineers and predictive maintenance professionals worldwide for test, measurement, monitoring, and control requirements in automotive, aerospace, industrial, R&D, military, educational, commercial, OEM applications, and more. With a worldwide customer support team, 24-hour SensorLine®, and a global distribution network, PCB® is committed to Total Customer Satisfaction. Visit www pcb.com for more information. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corporation. Additional information on MTS can be found at www.mts.com.

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