



PCB Load and Torque Sensors

Need to meet a tight test deadline without breaking the bank? PCB Load & Torque offers a broad selection of competitively priced load and torque products that will help you meet the most demanding test and measurement requirements. Used in automotive, aerospace, R&D, and process control applications, our load and torque products provide years of dependable, high-performance service.



Taking Great Measures for More than 40 years

PCB Load & Torque is a wholly-owned subsidiary of PCB Piezotronics, Inc.—the industry leader in sensor technology for more than 40 years. Being in the business for more than four decades has given us a thorough understanding of test and measurement requirements, so our experienced application engineers can recommend the best solution for your application. In addition to load and torque products, PCB® companies are global suppliers of a wide array of measurement products including force, accelerometers, sound level meters, acoustic and MEMs sensors, to name a few.

As with all PCB instrumentation, our load and torque products are complemented with toll-free applications assistance, 24-hour customer service, and are backed by our no-risk policy that guarantees your satisfaction or your money back.



Load Cells

Our load cell offering includes competitively priced fatigue rated and general purpose load cells, which come in a variety of mechanical configurations such as low profile, canister, rod-end, and s-beam load cells—all of which provide excellent accuracy at an affordable price. We also provide a complete line of signal conditioners and accessories to complement our load cells.

General Purpose Load Cells

General purpose load cells are suitable for a wide range of general force measurement applications such as weighing, dynamometer use, and static material test machines. All offer excellent accuracy and value, and most operate in both tension and compression.

We offer several different general purpose load cell models designed to meet your complex and ever-changing testing needs. Models and capacity ranges are shown in the table on page 3 (right).

Rod End Load Cells

Rod end load cells are used in both tension and compression measurement applications such as process automation, quality assurance and production monitoring. Standard 3/4-16 and 1-14 Male/Female threads facilitate installation.

S-Type Load Cells

S-Type load cells are highly accurate strain gage based sensors used for weighing and general force measurement applications. All models come with a six-foot integral cable with pigtail leads, which are stripped and tinned for electrical interface.

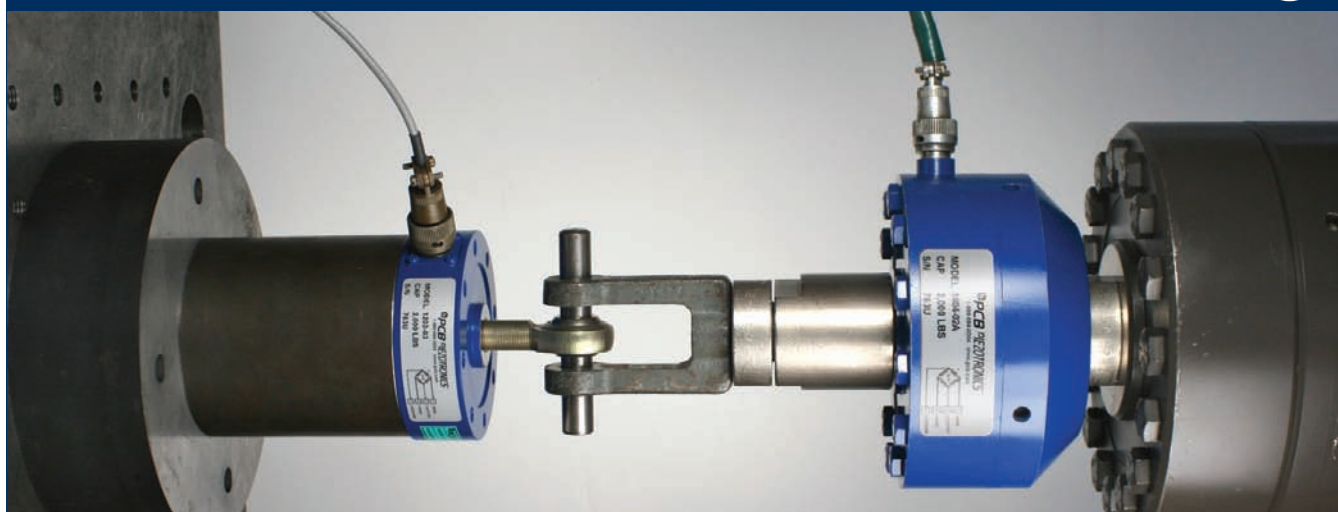
Fatigue Rated Load Cells

Fatigue rated load cells are specifically designed for component durability and fatigue test machines where highly cyclical loading is present. These rugged load cells are extremely resistant to extraneous bending and side loading forces. They are used for material testing, component life cycle testing and structural testing. All fatigue rated load cells are guaranteed against fatigue failure for 100 million fully reversed cycles.

Dual Bridge Load Cells

Our dual bridge load cells include a dual output feature that offers sensor redundancy and the ability to provide control feedback from one sensor while the other is used for data acquisition. Additional features include low deflection, high accuracy and repeatability, thermal compensation and moment compensation.





Load Cells						
	General Purpose Low Profile Load Cells	General Purpose Canister Load Cells	Rod End Load Cells	Fatigue Rated Load Cells	Dual Bridge Load Cells	S-Type Load Cells
Measurement Range	from 500 lb to 200k lb	From 25 lb to 300 lb	from 500 lb to 20 klb	from 250 lb to 200 klb	from 5K lb to 100K lb	from 50 lb to 5 klb
Overload Limit	150%	150%	150%	200% FS	300% FS	from 150%
Sensitivity	2 mV/V to 3 mV/V	2 mV/V	2 mV/V	2 mV/V	2 mV/V	2 mV/V
Linearity	0.05% FS	≤ 0.1% FS – 0.05% FS	≤ 0.25% FS	≤ 0.05% to 0.06% FS	≤ 0.04% to 0.06% FS	≤ 0.15% FS
Hysteresis	0.05% FS	≤ 0.1% FS – 0.05% FS	≤ 0.25% FS	≤ 0.05% to 0.6% FS	≤ 0.04% to 0.06% FS	≤ 0.15% FS
Repeatability	0.02% FS	≤ 0.05% – 0.02% FS	≤ 0.15% FS	≤ 0.02% to 0.03% FS	≤ 0.02% FS	≤ 0.05% FS
General Dimensions (Diameter x Height)	from 4.12 x 1.37 in to 12.0 x 4.50	2.75 x 1.5 in	Sizes range from 1.50 x 4.25 in to 1.50 x 4.5 in	Sizes range from 4.12 x 1.37 in to 12.0 x 4.50 in.	Sizes range from 4.12 x 2.75 in to 11.0 x 7.00 in.	Sizes range from 2.5 x .75 x 2.0 to 3.5 x 1.5 x 2.5 in

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 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
- Rod end
- Load button
- Connectors
- Mounting base
- Thread pre-tensioners



Series 8159



Series 8162



Series 8161



Series 920



Torque Sensors

PCB Load & Torque designs and manufactures a wide range of competitively priced torque sensors for most test and measurement applications—supporting PCB’s 40 -year tradition of helping customers take better measurements with quality, innovative instruments.

The technology behind PCB® torque sensors are resistive element strain gages configured into a Wheatstone bridge circuit that serve as a primary sensing element on a rigid spring element. The strain gages 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.

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

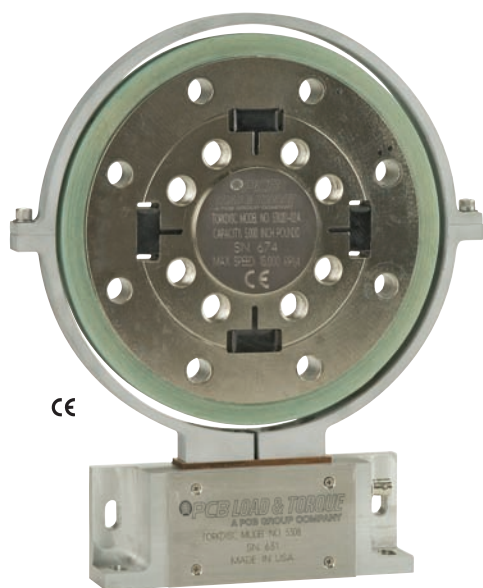
Reaction torque sensors are typically used in torsional test machines, motor dynamometers, or in any application where rotation is limited to less than 360°. These sensors do not use bearings, slip rings or other rotating components, so they are very cost-effective to use, and easy to install.

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).



Series 2303

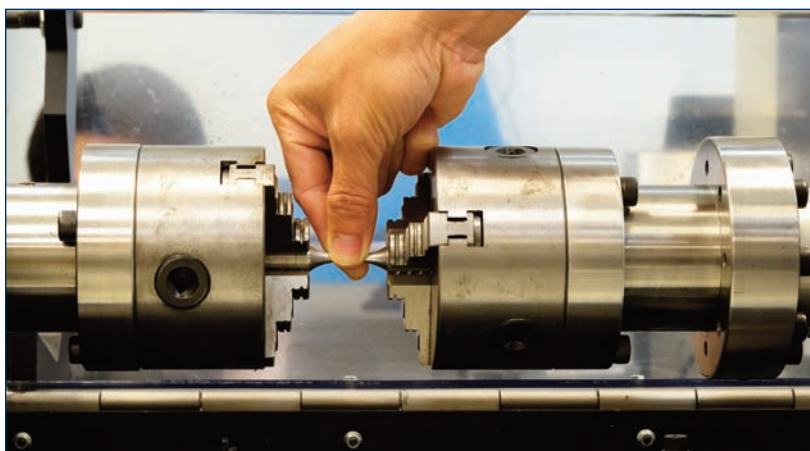
Reaction Torque Sensors	
Measurement Range	from 50 to 500K lbf-in
Overload Limit	150% FS
Sensitivity	2 mV/V
Linearity	≤ 0.1% FS
Hysteresis	≤ 0.1% FS
Repeatability	≤ 0.02% RO
General Dimensions (Diameter x Height)	Sizes range from 2 x 3 to 14 x 10.5 in



Series 5300

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 gauge bridge and transfer the torque measurement 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 show in the table (below).



Series 3122



Series 3123, 3124 & 3125



Rotary Torque Transducer

Rotary Slip Ring				
	Square Keyed Shaft	Flat Keyed Shaft	Hex Shaft	Square Shaft
Measurement Range	from 100 to 10k lbf-in	from 8.85 to 88.5 lbf-in	from 32 ozf.-in. to 2,112 ozf.-in.	from 50 to 216k lbf.-in.
Overload Limit	150% FS	rom 200 to 500% FS	150%	150%
Sensitivity	2 mV/V	2 mV/V	2 mV/V	2 mV/V
Linearity	≤ 0.1% FS	≤ 0.1% FS	≤ 0.25% FS	≤ 0.25%
Hysteresis	≤ 0.1% FS	≤ 0.1% FS	≤ 0.25% FS	≤ 0.25%
Repeatability	≤ 0.05% FS	≤ 0.05% FS	-	-
Speed Rating	7900 RPM	10,000 RPM	up to 5000 RPM	Up to 5000 RPM
General Dimensions (shaft length x housing length x housing diameter)	Sizes range from 9.0 x 4.5 x 4.13 in to 11 x 5.25 x 4.5 in	6.5 x 3.40 x 3.5 in.	4.25 x 2.30 x 2.00 in.	Sizes range from 3.23 x 2.3 x 2.0 in. to 9.48 x 4.62 x 7.25 in.

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).

Rotary Transformer	
Measurement Range	from 100 to 100K lbf-in
Overload Limit	from 150 to 200% FS
Sensitivity	1.5 mV/V to 2.5 mV/V
Linearity	≤ .05 to 0.1% FS
Hysteresis	≤ 0.05 to 0.1% FS
Repeatability	≤ 0.02% to 0.02% FS
Speed Rating	Up to 15,000 RPM
General Dimensions (Shaft length x housing length x housing diameter)	Sizes range from 10.0 x 6.0 x 4.0 in. to 19.0 x 8.75 x 6.5 in.



Series 4115A & 4115K



Series 4103-4107



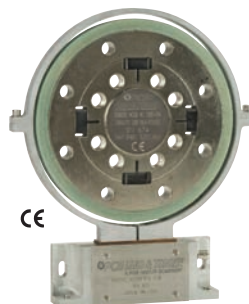
Telemetry (bearing less, non-contact)

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 applications such for automotive powertrain development and in-plant quality control.

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.

We offer a full line of TORKDISC® models to meet a wide variety testing needs. Our capacity ranges shown in the table (right).

Whether a flange, disc or shaft, PCB® torque sensors are robust, durable, dependable, and have a high degree of accuracy.



Telemetry	
Capacities	forces from 250 to 225K lbf-in FS
Overload Limit	300%
Combined Accuracy	0.1% FS
AC Coupled Output	0 ± 10 V
DC Coupled Output	0 to ± 10 V
Bandwidth	DC to 8500 Hz
Samples/sec	26k
General Dimensions (diameter x length)	Sizes range from 7.00 x 1.10 in. to 17.98 x 2.09 in

Signal Conditioners and Accessories

To complement our reaction and rotary slip ring style torque sensors, we offer a full line of signal conditioners to meet a wide range of test needs. They include:

- **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.
- **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 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.

To complement our rotary transformer style torque sensors and optional speed sensors, we offer the following signal conditioners:

- **Series 8120-400A** provides AC bridge excitation, ± 5 Volt analog output, a selectable filter, shunt calibration and low noise.
- **Series 8120-700A** provides DC excitation to Hall Effect devices, ± 5 Volt analog output, and calibration with integral crystal oscillator.

Other accessories include:

- Mating connectors
- Cable assemblies
- Foot mounts
- K-type thermocouples
- Shunt calibration module (supplied for some models)
- Active and passive speed sensors for select units



Series 8159



Series 8161



Series 8162



Models 8120-400/410A



Load & Torque Measurements?

We Do!

We do it all - sensors to measure vibration, acoustics, force, pressure, load, strain, shock and torque - Sure we do!



World-Class Products and Customer Support

We pride ourselves on being able to respond to customers' needs, and offers unmatched customer service and technical support. Our experienced applications engineers can help you select the best product for your needs. Strategic investment in machinery, capabilities and personnel also allow us to design, test and manufacture products for specialized applications. Please contact us to discuss any special requirements.

From ready-to-ship stock products to custom-made specials, we proudly stands behind all products with services you value most, including 24-hour technical support, a global distribution network, and the industry's only commitment to Total Customer Satisfaction.

Contact us with your next project today!



PCB Load & Torque, Inc.



PCB Load & Torque, Inc., is a wholly-owned subsidiary of **PCB Piezotronics, Inc.**, the industry leader in sensor technology for more than 40 years. PCB Load & Torque manufactures high quality, competitively priced precision load cells, torque transducers and telemetry systems for test and measurement applications in industries such as aerospace and defense, automotive, medical rehabilitation, energy, and material testing. Located in Farmington Hills, Michigan, the A2LA accredited, ISO 9001 certified facility also offers calibration services for load, torque and related instrumentation. PCB® proudly stands behind their products with services you value most, including toll-free customer service, 24-hour technical assistance, a global distribution network, and the industry's only commitment to Total Customer Satisfaction. Visit us at www.pcbloadtorque.com.

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LT-LoadAndTorqueSensors-0513

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