SENSORS FOR ROAD LOAD MEASUREMENTS
Road load data is essential for analyzing the design, reliability, and structural integrity of vehicle components. Road load tests measure the transient and steady-state inputs of a vehicle as it operates over a road surface or test track, taking into account all projected vehicle and driving parameters such as mass, inertia, air and rolling resistance, road characteristics, engine loads, and vehicle speed.

Sensors for road load data acquisition (RLDA) must be robust and reliable to survive the shock, heat, humidity, and contamination associated with various measurement locations on the vehicle and test track. PCB’s line of rugged sensors for RLDA offer features such as hermetic titanium sealing, gas damping and overload protection, to provide a high level of confidence in data acquired during even the most aggressive road events.

PCB products are designed and manufactured in our state-of-the-art facilities. Through our global distribution network and Total Customer Satisfaction guarantee, you can rely on us to deliver products and solutions for your demanding requirements.

**COMMON APPLICATIONS:**
- Spindle force and motion testing
- Fluid pressure tests in shock, brake and steering systems
- Stress profiles on components
- Durability validation
- Modal analysis

**SENSOR TYPES:**
- Triaxial and single-axis DC accelerometers
- Load cells and strain sensors
- Triaxial ICP® accelerometers and force sensors
- ICP® quartz force rings
- Angular rate and 6 degrees of freedom (6DoF) sensors
LOW-FREQUENCY APPLICATIONS
DC RESPONSE ACCELEROMETERS

SINGLE-ENDED MEMS ACCELEROMETERS
SERIES 3711F & 3713F

- Measurement Ranges: ±2 g pk to ±200 g pk
- Frequency response from 0 Hz up to 2500 Hz (±10%)
- Hermetically sealed, titanium housing
- Available with integral cable or multipin, threaded electrical connector
- Available in single-axis or triaxial configurations

DIFFERENTIAL OUTPUT, SINGLE-ENDED MEMS ACCELEROMETERS
SERIES 3741F

- Sensitivities: 13.5 mV/g to 1350 mV/g (± 3%)
- Measurement Ranges: ±2 g pk to ±200 g pk
- Frequency response from 0 Hz up to 2500 Hz (±10%)
- Hard-anodized aluminum housing
- Integral, 4-conductor shielded cable

DIFFERENTIAL OUTPUT, TRIAXIAL MEMS DC ACCELEROMETERS
SERIES 3743F

- Sensitivities: 13.5 mV/g to 1350 mV/g (± 3%)
- Measurement Ranges: ±2 g pk to ±200 g pk
- Frequency response from 0 Hz up to 2500 Hz (±10%)
- Hermetically sealed titanium housing
- 9-Pin threaded electrical connector
RIDE QUALITY TRIAXIAL ICP® ACCELEROMETERS

Hybrid and electric vehicles present unique road load testing challenges due to vehicle complexity and potential for problems with electrical isolation. RLDA issues related to the addition of new electrical devices, gear whine, and vehicle resonances increase the number of areas and components to be tested. PCB's broad line of accelerometers are engineered to meet these challenges with ground and case isolation. These accelerometers are ideal for use in strong electrical fields generated by electric and hybrid vehicle systems. Electrical isolation reduces noise in these fields and eliminates ground loops.

GROUND ISOLATED TEDS TRIAXIAL ACCELEROMETER
MODELS J356A43, J356A44, J356A45
- Sensitivity: 10 mV/g, 50 mV/g, and 100 mV/g
- Frequency Range: 0.4 to 10000 Hz (±10%)
- Measurement Range: ±500, ±100, and ±50 g pk
- 1/4 - 28 4-pin connector
- Ground Isolated with Titanium shell, 5 sided

MINIATURE TRIAXIAL ICP® ACCELEROMETER
MODEL J356A03
- Sensitivity: 10 mV/g Measurement
- Frequency Range: 2 to 8000 Hz (±5%)
- Measurement Range: ±500 g pk
- Integral Cable to 1/4-28 4-Pin Connector
- Ground Isolated with Titanium shell, 3 sided

HIGH SENSITIVITY ICP® TRIAXIAL ACCELEROMETER
MODEL 356A15 & 356A16
- Sensitivity: 100 mV/g
- Frequency Range: 1.4 to 6000 Hz (±10 %)
- Measurement Range: ±50 g pk
- 1/4-28 4-Pin Connector
- Versions in Titanium or Anodized Aluminum

CASE ISOLATED HIGH SENSITIVITY TRIAXIAL ICP® ACCELEROMETER
MODEL 354B04 & 354B05
- Sensitivity: 10 and 100 mV/g
- Frequency Range: 0.4 to 10000 Hz (±5 %)
- Measurement Range: ±500 and ±50 g pk
- 1/4-28 4-Pin Connector
- Case Isolated, thru-hole mounted

UHT-12™ TRIAXIAL ICP® ACCELEROMETER
MODEL 339B31
- Sensitivity: 10 mV/g
- Frequency Range: 1.5 to 11000 Hz (±10%)
- Measurement Range: ±500 g pk
- 1/4-28 4-Pin Connector
- UHT-12™ element for low noise over thermal range

FILTERED LTC TRIAXIAL ICP® ACCELEROMETER
MODELS TLD339A36 & TLD339A37
- Sensitivity: 10 mV/g & 100 mV/g
- Frequency Range: 2 to 5000 Hz and 0.3 to 4000 Hz (±5%)
- Measurement Range: ±500 and ±50 g pk
- 1/4-28 4-Pin Connector
- Low Temperature Coefficient
- Integral low-pass filter limits signal saturation
ENDEVCO ANGULAR RATE SENSOR AND 6DOF

ANGULAR RATE AND 6 DOF SENSORS

The Endevco® Model 7310A is an angular rate sensor that utilizes unique silicon MEMS gyroscope technologies with custom electronics and packaging and provides reliable sensing performance even under excessive shock and vibration environments. This angular rate sensor is designed specifically for automotive safety testing and other system designs requiring accurate measurement of angular velocity.

The Model 7360A is a six degrees of freedom (6DoF) sensor that provides analog output for three axes of linear acceleration and three axes of angular rate in a compact, roughly one inch cube package. A sensor with analog output offers the advantage of being able to troubleshoot the data to its source and examine the output compared to its time history.

With this new 6DoF sensor, professionals in automotive development are now able to measure linear and rotational dynamics that previously required multiple sensors and much more space.

**ANGULAR RATE SENSOR**
MODEL 7310A
- 7 Angular Rate Ranges from 100 to 18K deg/sec
- Up to 2000 Hz bandwidth
- Lightweight, mass less than 3 grams

**SIX DEGREE OF FREEDOM SENSOR**
MODEL 7360A
- 5 Linear Acceleration ranges from ±2 to ±500 g
- 6 Angular Rate ranges from 100 to 18K deg/sec
- Shock limit 5000 g
COMPONENT STRESS PROFILING LOAD CELLS & STRAIN SENSORS

LOW PROFILE LOAD CELLS
MODELS 1203-01A / 03A / 05A
- Sensitivity: 2 / 2 / 3 mV/V
- Measurement Range: 500 / 2000 / 10,000 lb
- Overload Limit: 2.224 / 8.896 / 44.48 kN
- Non-Linearity: 750 / 3000 / 15,000 lb
- Excitation Voltage: -65 to +200 °F (-54 to +93 °C)

STRAIN SENSOR
MODEL 740B02
- Sensitivity: 50 mV/µε
- Measurement Range: 100 pk µε
- Frequency Range: 0.5 to 100,000 Hz
- Temperature Range: -65 to +250 °F (-53 to +121 °C)
**DURABILITY VALIDATION**

**FORCE SENSORS**

Charge mode versions of each of these models are also available.

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**TRIAXIAL, ICP® FORCE SENSOR**
**MODELS 260A01 & 260A02**

- **Measurement Range (z axis):** 1000 lb (4.45 kN) & 1000 lb (4.45 kN)
- **Measurement Range (x or y axis):** 500 lb (2.22 kN) & 1000 lb (4.45 kN)
- **Sensitivity (z axis):** 2.5 mV/lb (0.56 mV/N)
- **Sensitivity (x or y axis):** 10 mV/lb (2.25 mV/N) & 5 mV/lb (1.12 mV/N)
- **Weight:** 26 gm & 45 gm

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**TRIAXIAL, ICP® FORCE SENSOR**
**MODEL 260A03**

- **Measurement Range (z axis):** 10,000 lb (44.48 kN)
- **Measurement Range (x or y axis):** 4000 lb (17.79 kN)
- **Sensitivity (z axis):** 0.25 mV/lb (0.06 mV/N)
- **Sensitivity (x or y axis):** 1.25 mV/lb (0.28 mV/N)
- **Weight:** 271 gm

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**ICP® QUARTZ FORCE RING**
**MODEL 201B04 & 201B05**

- **Measurement Range (Compression):** 1000 lb (4.448 kN) & 5000 lb (22.24 kN)
- **Sensitivity:** 5 mV/lb (1124 mV/kN) & 1 mV/lb (224.8 mV/kN)
- **Maximum Static Force (Compression):** 6000 lb (26.69 kN) & 8000 lb (35.59 kN)
- **Weight:** 10 gm

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**ICP® QUARTZ FORCE RING**
**MODEL 202B**

- **Measurement Range (Compression):** 10 klb (44.48 kN)
- **Sensitivity:** 0.50 mV/lb (112.4 mV/kN)
- **Maximum Static Force (Compression):** 15 klb (66.72 kN)
- **Weight:** 19 gm

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**ICP® QUARTZ FORCE RING**
**MODEL 203B**

- **Measurement Range (Compression):** 20 klb (88.96 kN)
- **Sensitivity:** 0.25 mV/lb (56.2 mV/kN)
- **Maximum Static Force (Compression):** 25 klb (111.2 kN)
- **Weight:** 38 gm

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**ICP® QUARTZ FORCE RING**
**MODEL 204C**

- **Measurement Range (Compression):** 40 klb (177.92 kN)
- **Sensitivity:** 0.12 mV/lb (27 mV/kN)
- **Maximum Static Force (Compression):** 50 klb (222.4 kN)
- **Weight:** 57 gm