SENSORS FOR EXTREME TEMPERATURE AUTOMOTIVE TESTING
WHAT IS UHT-12™?

PCB® offers specially designed and tested ICP® accelerometers for conducting vibration and shock measurements under demanding environmental conditions of up to 356 °F (180 °C). These sensors combine proven quartz and ceramic shear sensing technology with specialized, built-in microelectronic signal conditioning circuitry to achieve dependable operation in extreme temperatures and through repetitive temperature cycling.

Charge mode output accelerometers from PCB use piezo-ceramic sensing elements that output an electrostatic charge signal proportional to the applied acceleration. These sensors can operate at extremely high temperatures (up to 1200 °F/ 649 °C) because they do not contain the built-in signal conditioning electronics that limit the temperature range of ICP® accelerometers.

UHT-12™ technology reduces the effects of temperature variation. Pyroelectricity phenomenon may occur during large temperature fluctuations, generating “spikes” and disrupting behavior of the accelerometer and the test results. Accelerometers made with UHT-12™ technology have an improved data quality.

APPLICATIONS

Vibration testing of automotive exhaust, turbocharger and engine systems requires accelerometers that are designed to withstand very high temperatures. PCB’s accelerometers for research and development are manufactured from tough low mass materials such as titanium and Inconel, are hermetically sealed and have no moving parts.

The UHT-12™ family of accelerometers include Model 320C52, 320C53, 339B31, 339B32, 357A64, 339A30, 339A32, EX357E90, EX357E91, EX357E92, EX357E93, 357A63, EX356A73, EX611A00 and TLD339A37. UHT-12™ Pressure sensors are also available, such as series 176.

HIGHLIGHTS

Absence of pyroelectric noise spikes up to 1200 °F (649 °C)
Sensitivity that remains more consistent over a wide temperature change
Shear mode crystals isolated from base strain & transverse measurement errors
Proprietary crystal technology comes sealed in a hermetic package and has proven reliable performance in hundreds of automotive powertrain NVH installations for research and monitoring.

PCB® ACCELEROMETERS ARE AVAILABLE TO 1200 °F (650 °C)

ICP® accelerometers available in single and triaxial versions to 356°F/180°C
Charge output accelerometers for testing or continuous monitoring cover temperature ranges to 1200 °F (650 °C)
Testing of turbocharger, exhaust systems and catalytic converters requires an ultra high temperature sensor. These sensors are designed specifically for demanding automotive testing environments and feature integral hard line cables.

**UHT-12™ CHARGE OUTPUT ACCELEROMETERS**

**EXTREME TEMPERATURE, DIFFERENTIAL CHARGE ACCELEROMETER**
MODEL EX611A00
- Sensitivity: (±5%) 10.0 pC/g
- Measurement Range: ±200 g pk
- Frequency Range: (±5%) 2.8 kHz
- Hazardous area approved

**CHARGE OUTPUT ACCELEROMETER, WITH UHT-12™ SHEAR SENSING CRYSTAL**
MODELS EX357E90 & EX357E91
- Sensitivity: (±10%) 5 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: (±5%) 3 kHz
- Hazardous area approved

**CHARGE OUTPUT ACCELEROMETER, WITH UHT-12™ SHEAR SENSING CRYSTAL**
MODELS EX357E92 & EX357E93
- Sensitivity: (±10%) 2.3 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: (±5%) 3 kHz
- Hazardous area approved

**VERY HIGH TEMPERATURE, SINGLE-ENDED CHARGE TRIAXIAL ACCELEROMETER**
SERIES EX356A73
- Sensitivity: (±5%) 3.12 pC/g
- Measurement Range: 500 g pk
- Frequency Range: (+/-5%) 4 kHz
- Hazardous area approved

**VERY HIGH TEMPERATURE, SINGLE-ENDED CHARGE ACCELEROMETER**
MODEL 357A64
- Sensitivity: (±10%) 1.15 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: (±10%) 10 kHz
LOW THERMAL COEFFICIENT ACCELEROMETERS FOR STABLE SENSITIVITY OVER A WIDE TEMPERATURE RANGE

PCB® single and triaxial ICP® accelerometers are designed with a low thermal coefficient, wide operating temperature range, and good broadband resolution, making them ideal for powertrain development and powertrain NVH applications and for any vibration measurement requiring tight control of amplitude sensitivity over a wide thermal gradient.

UHT-12™ TRIAXIAL ICP® ACCELEROMETER
MODEL 339B31 & 339B31/NC

Sensitivity: (± 10%) 10 mV/g
Measurement Range: ±500 g pk
Broadband Resolution: 0.008 g rms
Model 339B31/NC does not include mating cable

ICP® ACCELEROMETER
MODELS 320C52 & 320C53

Sensitivity: (±10%) 10 mV/g / (±20%) 1 mV/g
Measurement Range: ±500 g pk / ±5000 g pk
Broadband Resolution: 0.004 g rms / 0.04 g rms

UHT-12™ TRIAXIAL ICP® ACCELEROMETER
MODELS 339B31 & 339B31/NC

Sensitivity: (± 10%) 10 mV/g
Measurement Range: ±500 g pk
Broadband Resolution: .008 g rms
Model 339B31/NC does not include mating cable

Temperature coefficient as low as 0.005%/F (0.009%/C)
Available in stud, adhesive and through hole configurations
Measurement frequency to 10 kHz at +/- 5%
Titanium housed & hermetically sealed
ICP® up to 356°F/180°C
TRIAXIAL ICP® ACCELEROMETER MODELS 339B32 & 339B32/NC

Sensitivity: (±10%) 10 mV/g
Measurement Range: ±500 g pk
Broadband Resolution: 0.003 g rms
Model 339B32/NC does not include mating cable

QUARTZ SHEAR TRIAXIAL ICP® ACCELEROMETER MODELS TLD339A34 & TLD339A36

Sensitivity: (±10%) 50 mV/g / 10 mV/g
Measurement Range: ±100 g pk / ±500 g pk
Broadband Resolution: .005 g rms / .003 g rms

UHT-12™ SHEAR TRIAXIAL ICP® ACCELEROMETER MODEL TLD339A37

Sensitivity: (±10%) 100 mV/g (10.2 mV/(m/s²))
Measurement Range: ±100 g pk (±490.5 m/s² pk)
Broadband Resolution: .002 g rms

ACCESSORIES

CHARGE CONVERTERS

In-line ICP® charge converters serve to convert high impedance charge mode piezoelectric sensor signals into low impedance voltage signals for input into readout, recording, and analysis instruments. Powered by ICP® sensor signal conditioners, series 422 converters are placed between the sensor and signal conditioner. They can also connect directly to a DAQ system or readout device if the system includes ICP® power.

IN-LINE CHARGE CONVERTER MODEL 422E38

Sensitivity: 0.1 mV/pC
Input range: 25000 pC
Low frequency (-5%): 5 Hz

IN-LINE CHARGE CONVERTER MODEL 422E35

Sensitivity: 1 mV/pC
Input range: 2500 pC
Low frequency (-5%): 5 Hz

MODEL 422M182

In-line differential charge converter
Sensitivity: (±5%) 4 mV/pC
2-pin Mil input to BNC output
SIGNAL CONDITIONERS

The 482C/483C series are 4 and 8 channel signal conditioners that range from units with simple stand-alone operation to more complex units with front panel keypad / display, RS-232, or Ethernet control. All models power ICP® sensors and in-line ICP® charge converters. Models directly compatible with charge output piezoelectric sensors are also available.

**MODEL 482C15**

- 4-channel
- Line-powered
- ICP® sensor signal conditioner
- x1, x10, x100 gain

**MODEL 482C16**

- 4-channel
- Line-powered
- ICP® sensor signal conditioner
- Incremental gain, RS-232

**MODEL 482C64**

- 4-channel
- Line-powered
- ICP®/Charge sensor signal conditioner
- TEDS, Incremental gain, RS-232, Ethernet

**MODEL 483C41**

- 8-channel
- Line-powered
- ICP®/Charge sensor signal conditioner
- Incremental gain, Selectable LPF, Ethernet
## COMPLETE HIGH TEMPERATURE ACCELEROMETER LISTING

<table>
<thead>
<tr>
<th>Temp</th>
<th>Model</th>
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<tbody>
<tr>
<td>≥ 325 to &lt; 500 °F</td>
<td>320C15</td>
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<tr>
<td>(162 °C &lt; 260 °C)</td>
<td>320C18</td>
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<td>320C52</td>
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<td>339B31*</td>
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<td>TLD339A36</td>
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<td>TLD339A37*</td>
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| ≥ 500 to < 1200 °F    | 357A07/NC              |
| (≥ 260 °C to < 650 °C)| 357A100*               |
|                       | 357A63*                |
|                       | 357B03                 |
|                       | 357B04                 |
|                       | 357B11                 |
|                       | 357B61                 |
|                       | 357B61/NC              |
|                       | 357B69                 |
|                       | 357B69/NC              |
|                       | 357C71                 |
|                       | 357C72                 |
|                       | 357C73                 |
|                       | EX356A73*              |
|                       | EX600B1X*              |

| ≥ 1200 °F             | 357A64*                |
| (≥ 650 °C)            | EX357E90*              |
|                       | EX357E91*              |
|                       | EX357E92*              |
|                       | EX357E93*              |
|                       | EX357A94*              |
|                       | EX357A95*              |
|                       | EX611A20               |

*UHT-12™ sensing technology