NUCLEAR POWER INSTRUMENTATION
NUCLEAR POWER INSTRUMENTATION

- Survive integrated gamma flux to $10^8$ rads
- Survives integrated neutron flux to $10^{10}$ N/cm²

PCB®’s charge accelerometers utilize piezo ceramic sensing elements to directly output an electrostatic charge signal that is proportional to applied acceleration. Charge accelerometers do not contain built-in signal conditioning electronics. As a result, external signal conditioning is required to interface their generated measurement signals to readout or recording instruments. The sensor’s charge output signals can be conditioned with an in-line, fixed charge amplifier.

Since there are no electronics built into charge accelerometers, they can operate and survive exposure to very high temperatures (up to +1200 °F/+649 °C for some models). In addition, charge accelerometers are used for thermal cycling requirements or to take advantage of existing charge amplifier signal conditioning equipment. It is important to note that measurement resolution and low frequency response for charge acceleration sensing systems are dependent upon the noise floor and discharge time constant characteristics of the signal conditioning and readout devices used.
RADIATION HARDENED HIGH TEMPERATURE
CHARGE ACCELEROMETERS

HIGH TEMPERATURE CHARGE ACCELEROMETER
MODEL 357B53
- Sensitivity: 100 pC/g
- Measurement Range: ±150 g pk
- Frequency Range: 3 kHz pk
- Electrical Connector: 10-32 coaxial jack

HIGH TEMPERATURE CHARGE ACCELEROMETER
MODEL 357B54
- Sensitivity: 100 pC/g
- Measurement Range: ±150 g pk
- Frequency Range: 3 kHz pk
- Electrical Connector: 10-32 coaxial jack

IN-LINE CHARGE AMPLIFIERS, RADIATION HARDENED

IN-LINE CHARGE AMPLIFIER
MODEL 422E65/A
- Sensitivity: 1 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -65 to +250 °F

IN-LINE CHARGE AMPLIFIER
MODEL 422E66/A
- Sensitivity: 10 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -65 to +250 °F

IN-LINE CHARGE AMPLIFIERS, RADIATION HARDENED

A Model 357B53 or 357B54 – Charge accelerometer
B Model 023FZXXXFZ – Cable with 10-32 plug to 10-32 plug
C Model M42E65/A or 422E66/A – In-line charge amplifier
D Model 023FZXXGA – Cable with 10-32 plug to 10-32 jack
E Model 003C03 – Cable with 10-32 plug to BNC plug
F ICP® sensor signal conditioner
G Model 012A03 – Cable with BNC plug to BNC plug
H Readout, recording, or data acquisition device

XXX = Denote cable length, 010 = 10 feet (Metric lengths available)
RADIATION HARDENED VERY HIGH TEMPERATURE CHARGE ACCELEROMETERS

**VERY HIGH TEMPERATURE CHARGE ACCELEROMETER**
MODEL 357A63
- Sensitivity: 0.53 pC/g
- Measurement Range: ±5000 g pk
- Frequency Range: 10 kHz pk
- Electrical Connector: 10-32 coaxial jack

MODEL 357B61
- Sensitivity: 10 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 5 kHz pk
- Electrical Connector: 10-32 coaxial jack

MODEL 357B69
- Sensitivity: 3.5 pC/g
- Measurement Range: ±500 g pk
- Frequency Range: 6 kHz pk
- Electrical Connector: 10-32 coaxial jack

**HARDLINE CABLE, RADIATION HARDENED**

**10-32 COAXIAL PLUG**
MODEL FZ

**COAXIAL HARDLINE CABLE**
MODEL 023XXX

**10-32 COAXIAL PLUG**
MODEL FZ

**IN-LINE CHARGE AMPLIFIER**
MODEL 422E65/A
- Sensitivity: (±2%) 1 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -65 to +250 °F

MODEL 422E66/A
- Sensitivity: (±2%) 10 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -65 to +250 °F

**IN-LINE CHARGE AMPLIFIERS, RADIATION HARDENED**

A Model 357A63 or 357B61 or 357B69 – Charge accelerometer
B Model 023FZXXXXFZ – Cable with 10-32 plug to 10-32 plug
C Model 422E65/A or 422E66/A – In-line charge amplifier
D Model 023FZXXXGA – Cable with 10-32 plug to 10-32 jack
E Model 003C03 – Cable with 10-32 plug to BNC plug
F ICP® sensor signal conditioner
G Model 012A03 – Cable with BNC plug to BNC plug
H Readout, recording, or data acquisition device

XXX = Denote cable length, 010 = 10 feet (Metric lengths available)
RADIATION HARDENED VERY HIGH TEMPERATURE CHARGE ACCELEROMETERS

**VERY HIGH TEMPERATURE CHARGE ACCELEROMETER MODEL 357A100**
- Sensitivity: 5 pC/g
- Measurement Range: ±200 g pk
- Frequency Range: 5 kHz pk
- Electrical Connector: 7/16-27 2-pin

**VERY HIGH TEMPERATURE CHARGE ACCELEROMETER MODELS 357C7X**
- Sensitivity: 10 pC/g (71), 50 pC/g (72), 100 pC/g (73)
- Measurement Range: ±1000 g pk (71) ±500 g pk (72) ±300 g pk (73)
- Frequency Range: 4 kHz pk (71) 2.5 kHz (72) 2KHz pk (73)
- Electrical Connector: 7/16-27 2-pin

**HARDLINE CABLE, RADIATION HARDENED**

**2-SOCKET PLUG, 7/16-27 THD MODEL GN**

**2-CONDUCTOR HARDLINE CABLE MODEL 013XXX**

**PTFE JACKETED CABLE**

**DIFFERENTIAL CHARGE AMPLIFIERS**

**DIFFERENTIAL CHARGE AMPLIFIER MODEL 422M183**
- Sensitivity: 6 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -60 to +185 ºF

**DIFFERENTIAL CHARGE AMPLIFIER MODEL 422M182**
- Sensitivity: 4 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -60 to +185 ºF

**DIFFERENTIAL CHARGE AMPLIFIER MODEL 422M196**
- Sensitivity: 10 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -60 to +185 ºF

**IN-LINE CHARGE AMPLIFIERS, RADIATION HARDENED**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Model 357A100 or 357C71 or 357C72 or 357C73 – Charge accelerometer</td>
</tr>
<tr>
<td>B</td>
<td>Model 013GNXXXGP – Cable with 2 socket plug to 2 pin jack</td>
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<td>C</td>
<td>Model 045M19B – Cable with PY connector to BP connector</td>
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<tr>
<td>D</td>
<td>Model 422M182 or Model 422M183 or Model 422M196 – Charge amplifier</td>
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<tr>
<td>E</td>
<td>Model 003D03 – Cable with BNC plug to BNC plug</td>
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<tr>
<td>F</td>
<td>ICP® sensor signal conditioner</td>
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<tr>
<td>G</td>
<td>Model 012A03 – Cable with BNC plug to BNC plug</td>
</tr>
<tr>
<td>H</td>
<td>Readout, recording, or data acquisition device</td>
</tr>
</tbody>
</table>

**Radiation Area** ≤ 900 ºF (482 ºC)

**Safe Zone** ≤ 185 ºF (85 ºC)
RADIATION HARDENED VERY HIGH TEMPERATURE CHARGE ACCELEROMETERS

VERY HIGH TEMPERATURE CHARGE ACCELEROMETER
MODEL 357A100
- Sensitivity: 5 pC/g
- Measurement Range: ±200 g pk
- Frequency Range: 5 kHz pk
- Electrical Connector: 7/16-27 2-pin

VERY HIGH TEMPERATURE CHARGE ACCELEROMETER
MODEL 357C7X
- Sensitivity: 10 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 4 kHz pk
- Electrical Connector: 7/16-27 2-pin

HARDLINE CABLE, RADIATION HARDENED

2-CONDUCTOR HARDLINE CABLE
MODEL 013XXX
PTFE JACKETED CABLE
MODEL 045M21B

DIFFERENTIAL CHARGE AMPLIFIERS

DIFFERENTIAL CHARGE AMPLIFIER
MODEL 421A3X
- Configurable sensitivity
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -22 to +185 °F

DIFFERENTIAL CHARGE AMPLIFIER
MODEL EX682A40
- Sensitivity: 10 mV/pC
- Voltage Output: ±2.5 V pk
- Temperature Range (Operating): -60 to +185 °F

IN-LINE CHARGE AMPLIFIERS, RADIATION HARDENED

A Model 357A100 or 357C71 or 357C72 or 357C73 – Charge accelerometer
B Model 013GNXXXGP – Cable with 2 socket plug to 2 pin jack
C Model 045M21B – Cable with PY connector to pigtails
D Model 421A3X or Model EX682A40 – Charge amplifier
E Model 003ACXXXAD – Cable with pigtails to BNC plug
F ICP® sensor signal conditioner
G Model 012A03 – Cable with BNC plug to BNC plug
H Readout, recording, or data acquisition device

XXX = Denote cable length, 010 = 10 feet (Metric lengths available)
RADIATION HARDENED EXTREME TEMPERATURE CHARGE ACCELEROMETERS

EXTREME TEMPERATURE CHARGE ACCELEROMETER
MODEL EX357E90
- Sensitivity: 5 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 2.5 kHz pk
- Output into sensor base

EXTREME TEMPERATURE CHARGE ACCELEROMETER
MODEL EX357E91
- Sensitivity: 5 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 2.5 kHz pk
- Output perpendicular to sensor base

EXTREME TEMPERATURE CHARGE ACCELEROMETER
MODEL EX357E92
- Sensitivity: 2.3 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 2.5 kHz pk
- Output into sensor base

EXTREME TEMPERATURE CHARGE ACCELEROMETER
MODEL EX357E93
- Sensitivity: 2.3 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range: 2.5 kHz pk
- Output perpendicular to sensor base

PTFE JACKETED CABLE

HARDLINE CABLE, RADIATION HARDENED

IN-LINE CHARGE AMPLIFIER
MODEL 422E35
- Sensitivity: 1 mV/pC
- Voltage Output: ±2.5 V pk
- Temperature Range (Operating): -65 to +250 °F

IN-LINE CHARGE AMPLIFIER
MODEL 422E36
- Sensitivity: 10 mV/pC
- Voltage Output: ±2.5 V pk
- Temperature Range (Operating): -65 to +250 °F
IMI Sensors, a division of PCB Piezotronics, Inc. manufactures industrial vibration monitoring instrumentation, such as accelerometers, vibration transmitters and switches that feature rugged stainless steel housings and survive in harsh environments like paper and steel mills, mines, gas turbines, water treatment facilities and power plants. Integrating with portable analyzers and PLC’s, IMI instrumentation helps maintenance departments reduce downtime and protect critical machinery. Visit IMI Sensors at www.pcb.com. 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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