**4-102/4-103**

**Vibration Transducer**

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### Description

The fluid-damped moving elements in CEC’s 4-102 and 4-103 Vibration Transducers are free of friction, assuring long life and reliability. This frictionless design also features outstanding dynamic range. It can be used to measure displacement to 0.5 inches, with low-levels limited only by system noise.

These transducers are used to measure vibration in many applications, such as fans, high speed motors, rotating machinery, in test cells and on dynamic balancing equipment. The output signal is proportional to velocity, often considered the best measurement for machine health monitoring. The low impedance, high level output can drive AC meters and recorders without using special amplifiers, simplifying your system.

These transducers use a seismic mass magnet suspended by springs, and a coil fixed to the case. The output signal results from relative movement between the magnet and coil when the case vibrates. The system is fluid damped, and operates above its natural frequency. The special “C” springs, which support the mass, withstand high transverse accelerations and rough handling. Positive hermetic sealing prevents damage to the instrument when used in severe environments.

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### Application

- Vibration Analysis and Monitoring
- Dynamic Balancing Equipment
- Engineering Test and Research
- Production & Quality Testing
- Compressors

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### Features

- Friction-free design for large dynamic range and long life
- Self-generated, high level, low impedance output simplifies your system

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ANSI RAB QMS ACCREDITED
4-102/4-103 Vibration Transducer

4-102 Specifications

Sensitivity: 110 mV ±2 mV/in/sec at 100 Hz
1 in/sec peak velocity at +77°F (+25°C)
into a 10,000 ohm resistive load.

Dynamic Range
Frequency Response: 8 to 700 Hz
Amplitude: 0.5" peak-to-peak, maximum
Acceleration: 50 g's peak

Frequency Response: ±5% of mean sensitivity, between 8
and 700 Hz at +77°F (+25°C)

Linearity: ±5% at 100 Hz within the dynamic range

Transverse Response: 2% minimum

Temperature Range: +32°F to +150°F (0°C to +66°C)

Thermal Coefficient of Sensitivity: +0.06%/°F

Damped Resonant Frequency: 6 Hz nominal

Excitation: Self-generating

Insulation Resistance: 50 megohm minimum over
temperature range at 45 VDC

Polarity: Pin B to be positive with an upward velocity of the case

Shock: 100 g's peak maximum
in the sensitive axis

Weight: 1 lb. maximum, including cable

Static Acceleration: 2.2 g's along sensitive axis
produces full travel of moving mass

Electrical Connection: 18" cable with connector type
MS3451W10SL-3P
(CEC P/N 700775-00-0002)

Transducer Mating Connector: Type MS3456W10SL-3S
(CEC P/N 700775-00-0001)

Warning
Do not open. Damping fluid mixture contains tetrachloroethylene
which is known to the state of California to cause cancer.

Ordering Information

When ordering, specify Type 4-102-0001 or 4-103-0001. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC's policy of continuing product improvement, specifications may be changed without notice.

4-103 Specifications

Note - Specifications match that of the Model 4-102 except as follows:

Sensitivity: 110 mV ±2 mV/in/sec at 100 Hz,
1 in/sec peak velocity at +225°F (+107°C)
into a 10,000 ohm resistive load.

Frequency Response: ±7% of mean sensitivity between 8
and 700 Hz at +225°F (+107°C)

Temperature Range: +150°F to +250°F (+66°C to +121°C)

Thermal Coefficient of Sensitivity: +0.05%/°F
CEC’s miniature 4-118 Vibration Transducers are especially valuable where space is limited, and where heavier transducers would invalidate your results. These transducers can be used in high temperatures, have low sensitivity to transverse accelerations, and can be mounted in any plane. The measurement system is simplified because the low impedance, high level output can drive AC meters and recorders without using special amplifiers. These features make them suitable for many applications on jet engines, turbines, high speed motors, superchargers, internal combustion engines and in test cells.

CEC’s 4-118 Vibration Transducers use a seismic mass coil, suspended by springs, moving on bearings of gold and sapphire. A high flux magnet is attached to the base. The output signal results from relative movement between the magnet and coil when the case is in motion. This magnetically damped system operates above its natural frequency so the output is proportional to velocity. The gold on sapphire bearings provide nearly friction-free movement, extending the instrument life and reliability. These instruments are available in two configurations: the 4-118-0001 with an integral cable, and the 4-118-0002 with a top connector for a detachable cable.

Applications
- Vibration Analysis and Monitoring
- Dynamic Balancing Equipment
- Engineering Test and Research
- Production and Quality Testing

Features
- Miniature, for space limited applications
- Self-generated, high level, low impedance output
- Operates to +500°F (+260°C)
- Weighs only 2.2 ounces
4-118 Vibration Transducer

Specifications

Sensitivity: 105 ±5 mV/in/sec referenced at 77°F (+25°C) at 250Hz, 0.5 ips RMS in the vertical position, into a 10,000 ohm resistive load.

Dynamic Range
- Frequency: 50 Hz to 500 Hz
- Amplitude: 0.2 inch peak-to-peak, maximum 1g to 50g

Frequency Response: ±10% of mean sensitivity

Transverse Response: 2% maximum

Linearity: ±5% of the 10 g’s output within the dynamic range

Temperature Range: -65°F to +300°F continuous, to +500°F intermittent (100 max)

Thermal Coefficient of Sensitivity: ±0.10%/°F

Damped Resonant Frequency: 30 Hz nominal

Excitation: Self-generating

Coil Resistance: 800 ohms ±15% 77°F

Insulation Resistance: 100 megaohm, minimum

Polarity: Output is positive when the case is moved upward

Maximum Static Acceleration: 8 g’s in sensitive axis produces full travel of moving mass

Shock: 100 g’s peak without damage

Weight:
-0001: 2.2 oz maximum
-0002: 1.5 oz maximum

Electrical Connection:
-0001: Integral 3-foot shielded cable with tinned leads
-0002: 2-pin connector on top of case

<table>
<thead>
<tr>
<th>Case</th>
<th>-0001</th>
<th>-0002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>Red</td>
<td>Pin 2</td>
</tr>
<tr>
<td>Output</td>
<td>White</td>
<td>Pin 1</td>
</tr>
</tbody>
</table>

Optional Accessories
-0002: 3-foot cable and mating connector, Part No. 82406-0036

Ordering Information
When ordering, specify type 4-118-0001 or 4-118-0002. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC's policy of continuing product improvement, specifications may be changed without notice.

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(626) 938-0200 • (800) 468-1345 • Fax: (626) 938-0202 • www.cecvp.com
4-123 Vibration Transducer

Applications
- Aircraft Engines
- Industrial Turbines
- Power Generators
- Test Cells
- Test and Research

Features
- Self-generated, high level, low impedance output
- Operates to +500°F (+260°F C)
- Weighs only 4.25 ounces

CEC’s 4-123 Vibration Transducers are particularly suited to turbine applications. They operate to 500°F, have low sensitivity to transverse accelerations, and can be mounted in any plane. The low impedance, high level output requires no special amplifiers, simplifying your measurement system. Precision jewel bearings provide nearly function-free movement for long life and reliability.

These vibration transducers use a seismic mass magnet, positioned by springs moving on ruby and sapphire bearings. A coil is attached to the base. The output signal results from relative motion between the magnet and coil when the case vibrates. The air damped system operates above its natural frequency, producing an output proportional to velocity. The sealed, lightweight aluminum case insures complete and permanent protection from contamination.
4-123 Vibration Transducer

Specifications

Sensitivity: 135 mV ±2mV/in/sec at 100 Hz, 2 in/sec velocity into a 10,000 ohm load at +77°F (+25°C)
Dynamic Range:
  Frequency: 45 Hz to 2000 Hz
  Amplitude: 0.15 inch peak-to-peak, max.
  Acceleration: 0.5 g to 50 g
Frequency Response: ±8% of mean sensitivity, 45 to 2000 Hz throughout the operating temperature range
Linearity: ±3% within the dynamic range
Transverse Response: Less than 2%
Temperature Range: -40°F to +500°F
Thermal Coefficient of Sensitivity: ±0.03%/°F
Sensitivity Shift with Position: ±3% of the mean sensitivity between vertical and horizontal
Damped Resonant Frequency: 18 Hz nominal
Excitation: Self-generating
Insulation Resistance: 1 megohm, minimum
Polarity: Pin 1 is positive when case moved upward
Maximum Static Acceleration: 6 g’s in sensitive axis produces full travel of the moving mass
Shock: 100 g’s at 11ms without damage
Weight: 4.5 oz. (121 grams)

Optional Accessories

1. Cable and connector assembly P/N 82406-XXXX (length is identified in inches; e.g.; 36-inch cable is P/N 82406-0036)
2. Connector P/N 173960
3. Operation and Maintenance Manual P/N 992175

Ordering Information

When ordering, specify Type 4-123-0001. Mating connector and cable assemblies are not furnished and must be ordered separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

VIBRATION NOMOGRAPH
Model 4-123 Operating Range
4-125 Description

CEC designed the 4-125 Vibration Transducer for turbine applications. You can use them in turbine hot sections, such as the turbine case, where high temperatures can cause problems with other transducers. The low impedance, high level output requires no special amplifiers, simplifying your measurement system. They have low sensitivity to transverse accelerations, and you can mount them in any plane.

CEC’s 4-125 Vibration Transducers use a seismic magnet that moves on gold bearings. A coil is attached to the case, and movement between the magnet and coil produces the output signal when the case vibrates. This air damped system operates above its natural frequency so the output is proportional to velocity. Rugged construction and design simplicity insure high reliability and long service life.

Applications
- Aircraft Engines
- Industrial Turbines
- Test Cells

Features
- Self-generated, high level, low impedance output
- Operates to +700°F (+371°C)
- Field Repairable
4-125 Vibration Transducer

Specifications

Sensitivity: 105 ±3 mV/in/sec at 100 Hz, 75°F (+24°C) into a 10,000 ohm resistive load impedance

Dynamic Range
Frequency: 45 Hz to 1500 Hz
Amplitude: 0.1 inch peak-to-peak, maximum
Acceleration: 1 g to 50 g

Frequency Response: ±6% of the mean sensitivity
Transverse Response: 2% of maximum
Linearity: ±1% of output at 20 g’s within dynamic range (vertical at 100 Hz)

Temperature Range: -65°F to +700°F (-54°C to +371°C)

Thermal Coefficient of Sensitivity: ±0.02%/°F
Sensitivity Shift with Position: ±10% maximum
Damped Resonant Frequency: 15 Hz nominal
Excitation: Self-generating
Coil Resistance: 465 ohms ±24% max. at 75°F
Insulation Resistance: 0.1 megohm, minimum
Polarity: Pin 1 is positive when the case is moved upward

Maximum Static Acceleration: 2.2 g’s in sensitive axis produces full travel of moving mass
Shock: 50 g’s maximum in any direction
Weight: 8 oz. nominal

Optional Accessories
1. Cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. Connector P/N 173960
3. Operation and Maintenance Manual: P/N 992330

Ordering Information
When ordering, specify type 4-125-0001. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

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CEC designed the 4-126 Vibration Transducer for turbine applications. You can use them in turbine hot sections, such as the turbine case, where high temperatures can cause problems with other transducers. The low impedance, high level output requires no special amplifiers, simplifying your measurement system. They have low sensitivity to transverse accelerations, and you can mount them in any plane.

CEC’s 4-126 Vibration Transducers use a seismic magnet that moves on gold bearings. A coil is attached to the case, and movement between the magnet and coil produces the output signal when the case vibrates. This air damped system operates above its natural frequency so the output is proportional to velocity. The sealed case insures complete protection from contamination. Rugged construction and design simplicity insure high reliability and long service life.

Applications

- Aircraft Engines
- Industrial Turbines
- Test Cells

Features

- Self-generated, high level, low impedance output
- Operates to +700°F (+371°C)
4-126 Vibration Transducer

Specifications

Sensitivity: 145 ±4 mV/in/sec at 100 Hz, 2 ips RMS at +75°F (+24°C) into a 10,000 ohm resistive load impedance

Dynamic Range:
- Frequency: 45 Hz to 1500 Hz
- Amplitude: 0.15 inch peak-to-peak, maximum
- Acceleration: 1g to 50g

Frequency Response: ±7% of the mean sensitivity

Transverse Response: 2% of maximum

Linearity: ±1% of output at 20 g's within dynamic range (vertical at 100 Hz)

Temperature Range: -65°F to +700°F (-54°C to +371°C)

Thermal Coefficient of Sensitivity: ±0.02%/°F from reference 77°F

Sensitivity Shift with Position: 10% maximum

Damped Resonant Frequency: Less than 15 Hz nominal

Excitation: Self-generating

Insulation Resistance: 100K ohms, minimum

Polarity: Pin 1 is positive when the case is moved upward

Shock: 50 g's maximum in any direction

Weight: 6 oz. nominal

Calibration: Calibration record furnished

Environmental Tests: Meets requirements of applicable procedures of MIL-E-5272C for temperature, humidity, altitude, salt spray, vibration, fungus, sand dust, immersion, shock and acceleration.

Optional Accessories

1. Cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. Connector P/N 173960

Ordering Information

When ordering, specify type 4-126-0001. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC's policy of continuing product improvement, specifications may be changed without notice.
Description

CEC designed the 4-128 Vibration Transducer for turbine applications. You can use them in turbine hot sections where high temperatures can cause problems with other transducers. The system is simplified due to the low impedance, high level output that can drive AC meters, recorders, and control electronics without using special amplifiers. They have low sensitivity to transverse accelerations, and you can mount them in any plane.

These instruments are especially valuable where space is limited, and where heavier transducers would invalidate test results. They adapt easily to your installation because models are available in a variety of mounting configurations, connector orientations and sensitivities.

Rugged construction and design simplicity insure high reliability and long service life. The 4-128 is factory repairable.

CEC’s 4-128 Vibration Transducers use a seismic magnet that moves on gold bearings. A coil is attached to the case, and movement between the magnet and coil produces the output signal when the case vibrates. This air damped system operates above its natural frequency so the output is proportional to velocity.

Applications

- Aircraft Engines
- Industrial Turbines
- Test Cells

Features

- Self-generated, high level, low impedance output
- Operates to +700°F (+900°F versions are available)
- Weighs only 2 ounces
4-128 Vibration Transducer

Specifications

Sensitivity: 60 mV/in/sec through 105 mV/in/sec at +77°F into a 10,000 ohm load at 100 Hz

Dynamic Range

Frequency: 45 Hz to 1500 Hz
Amplitude: 0.10 inch peak-to-peak, maximum
Acceleration: 0.5g to 50g (vertical position)

Frequency Response: ±6% of the mean sensitivity, 45 to 1500 Hz throughout the operating temperature range

Linearity: ±6% within dynamic range

Transverse Response: Less than 2%

Temperature Range: -65°F to +700°F; (-53°C to +371°C)

Thermal Coefficient of Sensitivity: -0.02%/°F

Damped Resonant Frequency: 15 Hz nominal

Excitation: Self-generating

Insulation Resistance: 0.1 megaohm, minimum

Polarity: Pin 2 is positive when the case is moved upward

Shock: 50 g's maximum in any direction

Maximum Static Acceleration: 3 g's in the sensitive axis produces full travel of moving mass

Weight: 2.0 oz. nominal

Optional Accessories

1. Cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. Connector P/N 173960

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<thead>
<tr>
<th>Type Number</th>
<th>Sensitivity</th>
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<tbody>
<tr>
<td>4-128-0001</td>
<td>60 ± 2 mV/in/sec</td>
</tr>
<tr>
<td>4-128-0002</td>
<td>60 ± 2 mV/in/sec</td>
</tr>
<tr>
<td>4-128-0005</td>
<td>105 ± 3 mV/in/sec</td>
</tr>
<tr>
<td>4-128-0006</td>
<td>105 ± 3 mV/in/sec</td>
</tr>
<tr>
<td>4-128-0009</td>
<td>105 ± 3 mV/in/sec</td>
</tr>
<tr>
<td>4-128-0010</td>
<td>105 ± 3 mV/in/sec</td>
</tr>
</tbody>
</table>

Note:
1. Units available on special order with higher sensitivity and/or lower frequency units.
2. The four cap screws must be safety wired together and to the connector to prevent inadvertent disassembly. Safety wires are provided in the cap screws

Ordering Information

When ordering, use table above. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

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4-130/4-137 Vibration Transducer

Description

CEC’s 4-130/4-137 Vibration Transducers offer a technology breakthrough in velocity output vibration transducer design. These transducers use a special advanced technology bearing system that extends their service life. Yet, this design preserves the simplicity and reliability that is typical of CEC’s self generating, low impedance vibration transducers.

We designed the 4-130/4-137 Vibration Transducers for turbine applications. Use them in hot sections where high temperatures cause problems with other instruments. They simplify your system because low impedance, high level output does not require special amplifiers or low-noise cables. They have low sensitivity to transverse accelerations, and you can mount them in any plane. Their rugged construction and new bearing system insure high reliability and long service life.

These instruments are especially valuable where space is limited. They adapt easily to your installation because models are available in a variety of mounting configurations and sensitivities.

CEC 4-130/4-137 Vibration Transducers use a seismic mass magnet that moves on special ceramic bearings. A coil is attached to the case, and movement between magnet and coil produces the output signal when the case vibrates. This air damped system operates above its natural frequency so the mV output is proportional to velocity.

Applications

- Aircraft Engines
- Industrial Turbines
- Test Cells

Features

- Ceramic bearings provide exceptional service life
- Self-generated, high level, low impedance output
- Operates to +700°F
**4-130/4-137 Vibration Transducer**

**Performance Specifications**

Sensitivity: (Refer to Table 1) Measured at +77°F (+25°C) in the vertical position, with a sinusoidal driving force applied perpendicular to the base at 100 Hz, 1 in/sec RMS (25 mm/sec). Load impedance is 10,000 ohms ±2%

Dynamic Range
- **Frequency:** 45 to 1500 Hz
- **Amplitude:** 0.10 inch peak-to-peak, maximum
- **Acceleration:** 1.0g to 50g peak vertical 1.5g to 50g horizontal
- **Acceleration Threshold:** 0.3g peak in the vertical position 1.0g peak in the horizontal position

Frequency Response: 45 to 1500 Hz ±6% referenced to 100 Hz at +77°F (+25°C) and 1 in/sec RMS (25 mm/sec)

Linearity: The sensitivity at 100 Hz, measured through the acceleration range of 1 g to 50 g's peak, shall not vary more than ±5% from the mean sensitivity.

Transverse Sensitivity: 2% maximum

Temperature Range
- **4-130:** -65°F to +500°F (-54°C to +260°C)
- **4-137:** -65°F to +700°F (-54°C to +371°C)

Thermal Coefficient of Sensitivity: ±0.02%/°F from reference +77°F(±0.036%/°C from reference 25°C)

Damped Resonant Frequency: 20 Hz

Excitation: Self-generating

Coil Resistance: 450 ohms ±25%

Insulation Resistance: 0.1 megohm minimum at +700°F (+371°C)

Polarity: Pin 2 is positive when case is moved upward

Shock: The maximum shock in any direction is 50 g's

Sealing: Hermetically sealed, all welded construction

Weight
- Triangular base: 2.5 oz. (70.9 g) maximum
- Square base: 3.5 oz. (99.2 g) maximum

**Ordering Information**

When ordering, specify the full type number (i.e. 4-130-0001 or 4-137-0001). Refer to Table 1 and the outline drawings to identify the desired unit. Other configurations and sensitivities are available. Please contact CEC for details. Order mating connectors and cable assemblies separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

<table>
<thead>
<tr>
<th>Type</th>
<th>Sensitivity</th>
<th>Configuration</th>
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<tbody>
<tr>
<td>4-130/4-137-0001</td>
<td>60 ±2</td>
<td>Triangle Base, connector</td>
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<tr>
<td>4-130/4-137-0002</td>
<td>105 ±3</td>
<td>Triangle Base, connector</td>
</tr>
<tr>
<td>4-130/4-137-0003</td>
<td>105 ±3</td>
<td>Square Base, connector</td>
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<tr>
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<td>135 ±3</td>
<td>Square Base, connector</td>
</tr>
<tr>
<td>4-130/4-137-0005</td>
<td>145 ±3</td>
<td>Square Base, connector</td>
</tr>
</tbody>
</table>

**Optional Accessories**

1. High-temperature connector and cable assembly P/N 169500-XXXX (Length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060).

2. High temperature connector P/N 173960
Applications

• Aircraft Engines
• Industrial Turbines
• Test Cells

Features

• Ceramic bearings provide exceptional service life
• Self-generated, high level, low impedance output
• Operates to +700°F (+371°C)

Description

CEC’s 4-130/4-137 Vibration Transducers offer a technology breakthrough in velocity output vibration transducer design. These transducers use a special advanced technology bearing system that extends their service life. Yet, this design preserves the simplicity and reliability that is typical of CEC’s self-generating, low impedance vibration transducers.

We designed the 4-130/4-137 Vibration Transducers for turbine applications. Use them in hot sections where high temperatures cause problems with other instruments. They simplify your system because low impedance, high level output does not require special amplifiers or low-noise cables. They have low sensitivity to transverse accelerations, and you can mount them in any plane. Their rugged construction and new bearing system insure high reliability and long service life.

These instruments are especially valuable where space is limited. They adapt easily to your installation because models are available in a variety of mounting configurations and sensitivities.

CEC 4-130/4-137 Vibration Transducers use a seismic mass magnet that moves on special ceramic bearings. A coil is attached to the case, and movement between the magnet and coil produces the output signal when the case vibrates. This air damped system operates above its natural frequency so the mV output is proportional to velocity.
Performance Specifications

Sensitivity: (Refer to Table 1) Measured at +77°F (+25°C) in the vertical position, with a sinusoidal driving force applied perpendicular to the base at 100 Hz, 1 in/sec RMS (25mm/sec). Load impedance is 10,000 Ω ±2%.

Dynamic Range

Frequency: 45 Hz to 1500 Hz
Amplitude: 0.10 inch peak-to-peak max
Acceleration: 1.0 g to 50 g peak vertical
1.5 g to 50 g horizontal
Acceleration Threshold: 0.3 g peak in the vertical position
1.0 g peak in the horizontal position

Frequency Response: ±5% through frequency range referenced to 100 Hz at +77°F (+25°C) and 1 in/sec RMS (25 mm/sec)

Linearity: The sensitivity at 100 Hz, measured through the acceleration range of 1 g to 50 g’s peak, shall not vary more than ±5% from the mean sensitivity.

Temperature Range

4-130: -65°F to +500°F (-54°C to +260°C)
4-137: -65°F to +700°F (-54°C to +371°C)

Thermal Coefficient of Sensitivity: ±0.02%/°F from reference +77°F (±0.036%/°C from reference +25°C)

Damped Resonant Frequency: 20 Hz
Excitation: Self-generating
Coil Resistance: 450 Ω ±25%
Insulation Resistance: 0.1 megaohm minimum at +700°F (+371°C)
Polarity: Pin 2 is positive when case is moved upward
Shock: The maximum shock in any direction is 50 g’s
Sealing: Hermetically sealed, all welded construction

Weight

Triangular base: 2.5 oz. (70.9 g) maximum
Square base: 3.5 oz. (99.2 g) maximum

Hazardous Approvals

[Symbol] North America
CSA C/US Class I, Division I, Groups A, B, C and D
Class I, Division 2, Groups A, B, C and D

[Symbol] European
ATEX EEx ia IIB or IIC T6 - T1
EEx nA II T6 - T1 X

Optional Accessories

1. High temperature cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. High temperature connector P/N 173960

Ordering Information

When ordering, specify the full part number (i.e. 4-130-0001 or 4-137-0001). Refer to Table 1 and the outline drawings to identify the desired unit. Other configurations and sensitivities are available. Please contact CEC for details. Order mating connectors and cable assemblies separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

*Note Frequency Range = 45 Hz to 2000 Hz

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<td>135 ±3</td>
<td>Square Base, Connector</td>
</tr>
<tr>
<td>4-130/4-137-0005</td>
<td>145 ±3*</td>
<td>Square Base, Connector</td>
</tr>
</tbody>
</table>

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4-131 Vibration Transducer

Applications
- Industrial Turbines
- Turbine-Driven Power Generators and Gas Pumping Systems

Features
- Friction-free design for long life
- Self-generated, high level, low impedance output
- Operates to +700°F (+900°F versions are available)

The friction-free moving elements in CEC’s 4-131 Vibration Transducers assure long life and reliability. Designed for industrial applications on fixed turbines, you can use this instrument in turbine hot sections where high temperatures cause problems with other transducers. The system is simplified due to the low impedance, high level output that can drive AC meters, recorders, and control electronics without using special amplifiers.

The frictionless design also allows measurement of extremely low vibration levels, critical when monitoring precision balanced turbine systems. The low level is limited only by system noise.

These transducers use a seismic mass magnet suspended by springs and a coil attached to the case. The output signal results from relative movement between the magnet and coil when the case vibrates. The air damped system operates above its natural frequency, so the output signal is proportional to velocity. The sealed case prevents damage to the instrument when used in difficult environments.
4-131 Vibration Transducer

Specifications

Sensitivity: ........................................ 135 mV/in/sec ±3% at 80 Hz, and 77°F (25°C) ±4°F at 0.5 ips drive

Dynamic Range:
  Frequency: .................................... 15 Hz to 2000 Hz
  Amplitude: .................................... 0.07 inch peak-to-peak, maximum
  Acceleration: .................................. 0.02 g to 50 g

Frequency Response: ................................... ±15% over the frequency range, referenced to 80 Hz

Linearity: ........................................ Included in frequency response

Temperature Range: ...................... -65°F to +700°F; (-65°F to +900°F available on special order)

Thermal Coefficient of Sensitivity: ... ±0.02%/°F from reference 77°F

Sensitivity Shift with Position: ...... 10% maximum

Damped Resonant Frequency: ...... Less than 15 Hz nominal

Excitation: ........................................ Self-generating

Insulation Resistance: .................... 100K ohms, minimum

Polarity: ......................................... Pin 1 is positive when the case is moved upward

Shock: ........................................ 50 g's maximum in any direction

Weight: ......................................... 5.8 oz. nominal

Cross Axis: ..................................... Must not exceed 2 g's maximum in continuous operation

Optional Accessories

1. Cable and connector assembly P/N 169500-XXXX
   (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. Connector P/N 173960

Ordering Information

When ordering, specify Type 4-131-0001. Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC's policy of continuing product improvement, specifications may be changed without notice.
Applications
- Industrial Turbines
- Turbine-Driven Machinery
- Power Generators
- Gas Pumping Systems

Features
- Friction-free design for long life
- Self-generated, high level, low impedance output
- Operates to +700°F (+900°F versions are available)

Description
The friction-free moving elements in CEC's 4-131 Vibration Transducers assure long life and reliability. Designed for industrial applications on fixed turbines, you can use this instrument in turbine hot sections where high temperatures cause problems with other transducers. The system is simplified due to the low impedance, high level output that can drive AC meters, recorders, and control electronics without using special amplifiers.

These transducers use a seismic mass magnet suspended by springs and a coil attached to the case. The output signal results from relative movement between the magnet and coil when the case vibrates. The air damped system operates above its natural frequency, so the output signal is proportional to velocity. The sealed case prevents damage to the instrument when used in difficult environments.

The frictionless design also allows measurement of extremely low vibration levels, critical when monitoring precision balanced turbine systems. The low level is limited only by system noise.
### 4-131 Vibration Transducer

#### Performance Specifications

**Sensitivity:** (refer to table 1) mV/in/sec ±3% at 80 Hz and +77°F (+25°C) ±4°F at 0.5 in/sec (ips), load impedance is 10,000 Ω ±2%

**Dynamic Range**
- **Frequency:** 15 Hz to 2000 Hz
- **Amplitude:** 0.07 inch peak-to-peak, maximum
- **Acceleration:** 0.2 g to 50 g
- **Acceleration Threshold:** 0.01 g peak
- **Linearity:** ±6% along straight line between 0.1 & 1.0 ips at 80 Hz & 77°F
- **Frequency Response:** ±15% of reference sensitivity through the frequency range
- **Temperature Range:** -65°F to +700°F (-54°C to +371°C) +900°F available on special order
- **Thermal Coefficient of Sensitivity:** ±0.02%/°F from reference +77°F
- **Sensitivity Shift with Position:** 10% maximum
- **Damped Resonant Frequency:** Less than 15 Hz nominal
- **Excitation:** Self-generating
- **Insulation Resistance:** 100K Ω, minimum
- **Polarity:** Pin 1 is positive when the case is moved upward
- **Shock:** 50 g’s maximum in any direction
- **Weight:** 5.8 oz. nominal
- **Cross Axis:** Must not exceed 2 g’s maximum in continuous operation
- **Coil Resistance:** 450 to 550 Ω @ 77°F ±4°F

#### Approvals

North American:
- Intrinsically Safe Class I, Division 1, Groups A, B, C & D
- Hazardous Locations (without barrier)
- Class I, Division 2, Groups A, B, C, & D

European:
- EEx ia IIB or IIC T1...T6
- EEx nA II T1...T6 X

#### Ordering Information

In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

#### Optional Accessories

1. Cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)
2. Connector P/N 173960

---

**Table 1**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Sensitivity</th>
<th>Max Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-131-0001</td>
<td>135 mV</td>
<td>+700°F (+371°C)</td>
</tr>
<tr>
<td>4-131-0103</td>
<td>150 mV</td>
<td>+700°F (+371°C)</td>
</tr>
<tr>
<td>4-131-0107</td>
<td>145 mV</td>
<td>+700°F (+371°C)</td>
</tr>
<tr>
<td>4-131-0116</td>
<td>200 mV</td>
<td>+700°F (+371°C)</td>
</tr>
<tr>
<td>4-131-0123</td>
<td>135 mV</td>
<td>+900°F (+482°C)</td>
</tr>
</tbody>
</table>

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CEC Vibration Products • 746 Arrow Grand Circle • Covina, California 91722 • USA
(626) 938-0200 • (800) 468-1345 • Fax: (626) 938-0202 www.cecvp.com
**Vibration Transducer**

**Description**

The friction-free moving elements in CEC’s 4-138 Vibration Transducers assure long life and reliability. Designed for industrial applications on fixed turbines, you can use this instrument in turbine hot sections where high temperatures cause problems with other transducers. The system is simplified due to the low impedance, high level output that can drive AC meters, recorders, and control electronics without using special amplifiers.

The frictionless design also allows measurement of extremely low vibration levels, critical when monitoring precision balanced turbine systems. The low level is limited only by system noise.

The 4-138 is a seismic mass type velocity transducer designed for measuring vertical vibrations at low frequencies and high temperatures up to +700°F (+371°C). A coil is suspended by springs around a stationary magnet which is attached to the case. The output signal results from relative movement between the coil and magnet when the case vibrates. This magnetic damped system operates above its natural frequency. The self-generated sensor output is proportional to velocity.

**Applications**
- Industrial Turbines
- Turbine-Driven Machinery
- Power Generators
- Gas Pumping Systems

**Features**
- Friction-free design for long life
- Self-generated, high level, low impedance output
- Operates to +700°F
4-138 Vibration Transducer

Specifications

Sensitivity: (refer to table) measured at 80 Hz and +77°F (+25°C) ±4% at 1.0 in/sec (ips) peak, load impedance is 100,000 ohms ±2%

Dynamic Range

Frequency: 15 Hz to 2000 Hz
Amplitude: 0.07 inch peak-to-peak, max
Acceleration: 0.02 g to 50 g
Acceleration Threshold: 0.01 g peak

Frequency Response:

Linearity: ±3% along straight line between 0.1 & 1.0 ips peak at 80 Hz & 77°F

Temperature Range: -65°F to +700°F (-54°C to +371°C)

Thermal Coefficient of Sensitivity: <±0.02% / °F

Sensitivity Shift with Position: ±10%

Damped Resonant Frequency: <15 Hz

Excitation: self-generating

Insulation Resistance: >10 megohms at +77°F >0.5 megohm at +500°F

Polarity: pin 1 is positive with an upward vertical movement

Shock: 50 g's peak in sensitive axis, 2 g's peak in cross axis

Weight: 7.0 to 7.5 oz.

Cross Axis: < ±5% of specified sensitivity

Ordering Information

When ordering, specify type 4-138-XXXX (see table). Mating connectors and cable assemblies are not furnished and must be ordered separately. In keeping with CEC’s policy of continuing product improvement, specifications may be changed without notice.

Approvals

CSA C/US certified:
Intrinsically safe Class I, Division I, Groups A, B, C & D
Hazardous Locations (without barrier)
Class I, Division 2, Groups A, B, C & D

LCIE certificate of conformity (pending)
EEEx ia IIB or IIC T1, T2, T3, T4, T5 or T6
Ex nA IIC T1, T2, T3, T4, T5 or T6 (pending)

Optional Accessories

1. Cable and connector assembly P/N 169500-XXXX (length is identified in inches; e.g.: 60-inch cable is P/N 169500-0060)

2. Connector P/N 173960

Part Number Cable Length Output Sensitivity
4-138-0001 -XXX 135 mV/ips, Peak
4-138-0002 -XXX 145 mV/ips, Peak
4-138-0003 -XXX 150 mV/ips, Peak
4-138-0004 -XXX 200 mV/ips, Peak
4-138-1001 -XXX 135 mV/ips, Peak
4-138-1002 -XXX 145 mV/ips, Peak
4-138-1003 -XXX 150 mV/ips, Peak
4-138-1004 -XXX 200 mV/ips, Peak

Where -XXX = length of cable in feet
Standard Cable lengths available

REV A  
CEC Vibration Products ● 746 Arrow Grand Circle ● Covina, California 91722 ● USA  
(626) 938-0200 ● (800) 468-1345 ● Fax: (626) 938-0202 ● www.cecvp.com