

ServoK-Beam Accelerometer

Type 8330A...

Force Feedback Capacitive Accelerometer

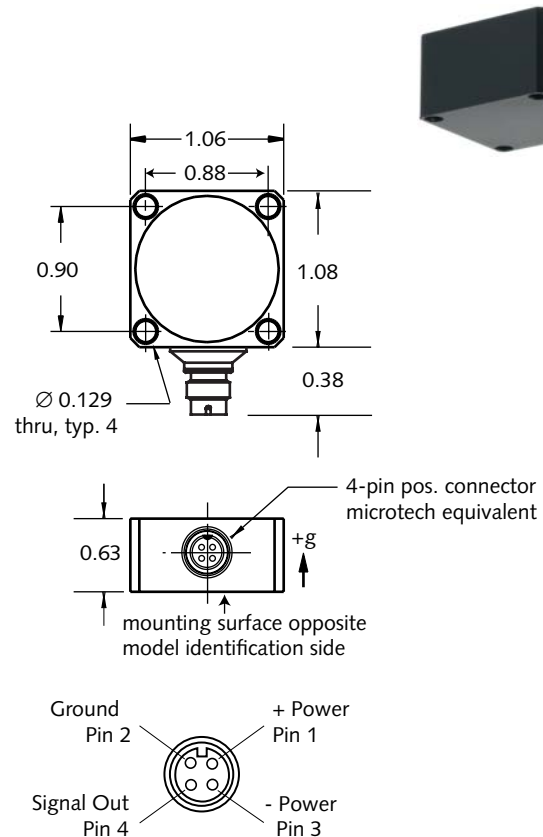
A single axis capacitive accelerometer for measuring static acceleration or low-level, low-frequency vibration. Featuring $1.3\mu\text{g}$ @ $<10\text{ Hz}$ resolution, excellent frequency response and insensitivity to thermal transients and transverse acceleration.

- Static Response
- 1200 mV/g sensitivity
- $1.3\mu\text{g}$ resolution @ $<10\text{ Hz}$
- High immunity to thermal transients
- Low transverse acceleration
- 28.5 gram weight
- 1500gpk shock rating
- Conforming to CE

Description

The 8330A3 ServoK-Beam Accelerometer is an analog force feedback sensor incorporating a silicon micro-machined variable capacitance sensing element that provides excellent bandwidth, dynamic range, stability, and robustness. The ServoK-Beam is a three terminal variable capacitance sensor made by a bulk MEMS process. The silicon proof mass is supported by silicon springs between the upper and lower fixed electrodes. A custom switched capacitor integrated circuit (ASIC) measures the mass position and provides the feedback force to restore the mass to the center position. The sensing circuit determines the position of the proof mass by measuring the charge difference between the upper and lower electrodes. A compensation circuit generates an electrostatic feedback voltage which when applied to the proof mass electrode restores the mass to the center position where the capacitance of both sides are equal.

The sensing element and conditioning electronics are integrated into a single lightweight, epoxy sealed aluminum housing. A hard anodized housing provides ground isolation. The unit is powered by a bipolar supply between ± 6 and $\pm 15\text{ V DC}$.



Application

The characteristics of the ServoK-Beam makes it an ideal candidate in applications requiring the measurement of low level acceleration in steady-state or low frequency environment.

Specific areas of applications:

- Large structural modal testing (such as bridges)
- active vibration control during optical or precision manufacturing processes
- platform leveling; pitch and roll measurements
- high speed trains; tilt and lateral vibration measurements
- measuring seismic events on structures during quakes
- in-vehicle ride comfort and general vibration for automotive/truck vehicle dynamics

Technical Data

Type	Unit	8330A3
Acceleration Range	gpk	±3
Acceleration Limit	gpk	±3.5
Sensitivity, ±10%	mV/g	1200
Og Bias	mg	±200
Resolution (Threshold) typ. (0...10 Hz)	μgrms	< 1.3
Amplitude Non-linearity	%FSO	± 0.1
Resonant Frequency typ.	Hz	6600
Frequency Response, ±5% min.	Hz	0 ... 500
Frequency Response, ±3dB typ.	Hz	0 ... 2700
Noise Density (f = 100 Hz) typ.	μgrms/√Hz	0.4
Sensitive Axis Misalignment typ. (max.)	degree	<0.25 (0.6)
Transverse Sensitivity typ. (max.)	%	0.4 (1)
Phase Shift max.		
@ 0 Hz	degree	0
@ 100 Hz	degree	0.25
@1000 Hz	degree	1.6
Environmental:		
Random Vibration 20... 2000 Hz	grms	20
Shock (half sine, 0.5 μs)	gpk	1500
Temperature Coefficient of:		
Sensitivity typ.	ppm/°F	±55.56
Bias typ.	μg/°F	±55.56
Temperature Range Operating	°F	-40 ... 255
Temperature Range Storage	°F	-65 ... 255
Output Impedance nom.	Ω	< 40
Load Resistance min.	kΩ	5
Capacitive Load max.	pF	10000
Supply: (bipolar)		
Voltage	VDC	±6 ... ±15
Current nom.	mA	8.5
Construction:		
Sensing Element	type	MEMS
Housing/Base	material	Al. hard anodized
Sealing - housing/connector	type	Epoxy
Connector	type	4-pin pos.
Ground Isolation min.	MΩ	>10
Weight	grams	28.5

1 g = 9.80665 m/s², 1 inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.113 Nm

Mounting

Reliable and accurate measurements require that the mounting surface be clean and flat. The accelerometer can be attached to the test structure with adhesive or with the supplied screws. The Operating Instruction Manual for the 8330A... provides detailed information regarding mounting surface preparation.

Accessories Included

- | | |
|--|--------------|
| • (4) mounting screws, 4-40 UNC-2A x 7/8" long | 431-0491-003 |
| • (4) mounting screws, M3 x 0.79 in long | 431-0492-002 |
| • Mounting wax | 8432 |

Optional Accessories

- | | |
|---|----------|
| • 2 meter output cable, 4-pin neg. Microtech equivalent to pigtails power and signal output cable; 4-pin neg. | 1592M1 |
| • Microtech equivalent to three power banana plugs and a BNC pos. signal connector. x = 2, 5, 10, meter | 1788A... |
| • Triaxial mounting cube | 8530 |

Ordering Key

Measuring Range	8330A	☐
±3g	3	↑