

Type 8330A2.5

8330A2.5 ServoK-BEAM™ ACCELEROMETER

The Kistler Type 8330A2.5 ServoK-BEAM Accelerometer is an analog force feed back sensor incorporating a silicon micro-machined variable capacitance sensing element that provides excellent bandwidth, dynamic range, stability, and robustness. This high performance, solid state sensor features a 1500 mV/g sensitivity and a resolution of $0.8\mu\text{g}$ @ <1 Hz. High immunity to thermal transients and transverse acceleration makes the 8330 accelerometer ideally suited for applications requiring the measurement of low level

acceleration in a steady-state or low frequency environment. The sensor and conditioning electronics are integrated into a single lightweight, epoxy sealed aluminum housing. The hard anodized coating applied over the housing provides ground isolation while four through holes allows the unit to be securely mounted to the test structure with screw fasteners. The 4-pin Microtech equivalent receptacle provides the convenience of a detachable extension cable.

- Static Response
- 1500 mV/g scale factor
- $0.8\mu\text{g}$ resolution @ <1 Hz
- High thermal transient & transverse acceleration immunity
- 28 gram weight sensor
- $1500g_{pk}$ shock rating
- Conforming to CE



Technical Data	Units	8330A2.5
Acceleration Range	g_{pk}	± 2.5
Zero g Bias ± 200 mg	g	0
Sensitivity (Scale Factor) ± 5 %	mV/g	1500
Zero g Output Offset ± 300 mV	V	0
Resolution (Threshold) typ. (0...10 Hz)	μg	< 2.5
Amplitude Non-linearity	%FS	± 0.2
Resonant Frequency nom.	Hz	5000
Frequency Response $\pm 5\%$	Hz	0 ... 300
± 3 dB	Hz	0 ... 2000
Noise Density (0...100 Hz) typ.	$\mu\text{g}_{rms} / \sqrt{\text{Hz}}$	0.8
Phase Shift max.		
@ 0 Hz	degree	0
@ 100 Hz	degree	1
@ 1000 Hz	degree	5
Sensitive Axis Misalignment typ. (max.)	degree	< 0.4 (0.8)
Transverse Sensitivity typ. (max.)	%	0.4 (1)
Environmental:		
Random Vibration 20... 2000 Hz	g_{rms}	20
Shock half sine, 500 μs	g_{pk}	1500
Temperature Coefficient of: Sensitivity typ. (max.)	ppm/ $^{\circ}\text{F}$	27 (55)
	ppm/ $^{\circ}\text{C}$	50 (100)
Bias typ. (max.)	$\mu\text{g}/^{\circ}\text{F}$	55 (111)
	$\mu\text{g}/^{\circ}\text{C}$	100 (200)
Temperature Range Operating	$^{\circ}\text{F}$	-40...185
	$^{\circ}\text{C}$	-40...85
Storage	$^{\circ}\text{F}$	-65...255
	$^{\circ}\text{C}$	-55 ...125
Output Impedance	Ω	< 40
Load Resistance min.	k Ω	5

1 $g = 9.80665$ m/s², 1 inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.1129 Nm

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Load Resistance min.	k Ω	5
Capacitive Load max.	pF	10000
Supply: (bipolar)		
Voltage	VDC	$\pm 6 \dots \pm 15$
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 Microtech pos. Equivalent
Ground Isolation min.	M Ω	10
Weight	g	28.5

Sensor Operating Principle

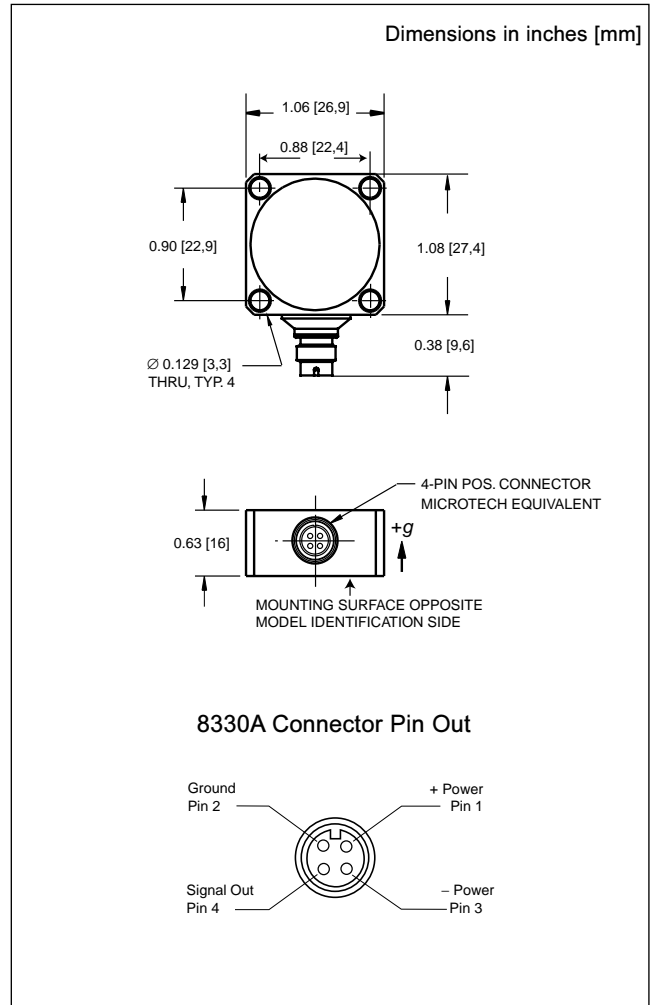
The **ServoK-BEAM** is a three terminal variable capacitance sensor made by a bulk MEMS process. The silicon proof mass is supported by silicon springs between the upper and lower fixed electrodes. A custom switched capacitor integrated circuit (ASIC) measures the mass position and provides the feedback 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. This differs from most conventional servo accelerometers that have magnetic components and feedback a current to generate a magnetic restoring force. This difference renders the servo MEMS virtually immune to external magnetic fields. To reduce acceleration noise due the Brownian motion of air molecules and other frictional sources the conventional servo uses a proof mass that relatively large and heavy and is critically damped or slightly under-damped. By contrast the ServoK-Beam sensor is sealed in a vacuum that reduces the air molecule source of noise and enables the low noise operation in the feedback loop which provides electronic damping.

Applications

The exceptional performance characteristics of the **ServoK-BEAM** makes it an ideal candidate to replace traditional servo accelerometers in applications requiring the measurement of low level acceleration in steady-state or low frequency environment.

Specific areas of applications:

- 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 earth quakes
- in-vehicle ride comfort and general vibration for automotive/truck vehicle dynamics



Supplied Accessories

431-0491-003	(4) mounting screws, 4-40 UNC-2A x 7/8" long
431-0492-002	(4) mounting screws, M3 x 20 mm long
8432	(1) mounting wax

Optional Accessories

1592M1	2 meter output cable, 4-pin Microtech neg. to pigtails
1788A(x)	power and signal output cable; 4-pin Microtech neg. equivalent to three power banana plugs and a BNC pos. signal connector. x = 2, 5, 10, 20 meter; sp user length specified in meters.
8530	triaxial mounting cube