

ServoK-Beam Accelerometer

Type 8330B3

Force Feedback Capacitive Accelerometer

A single axis capacitive accelerometer for measuring static acceleration or low-level, low-frequency vibration. Type 8330B3 features high resolution, excellent frequency response and insensitivity to thermal transients and transverse acceleration.

- Static and dynamic response
- 1200 mV/g sensitivity
- 1.3 µg resolution @ <10 Hz
- High immunity to thermal transients
- Low transverse acceleration
- 95 gram weight
- 1500 gpk shock rating
- Conforming to CE

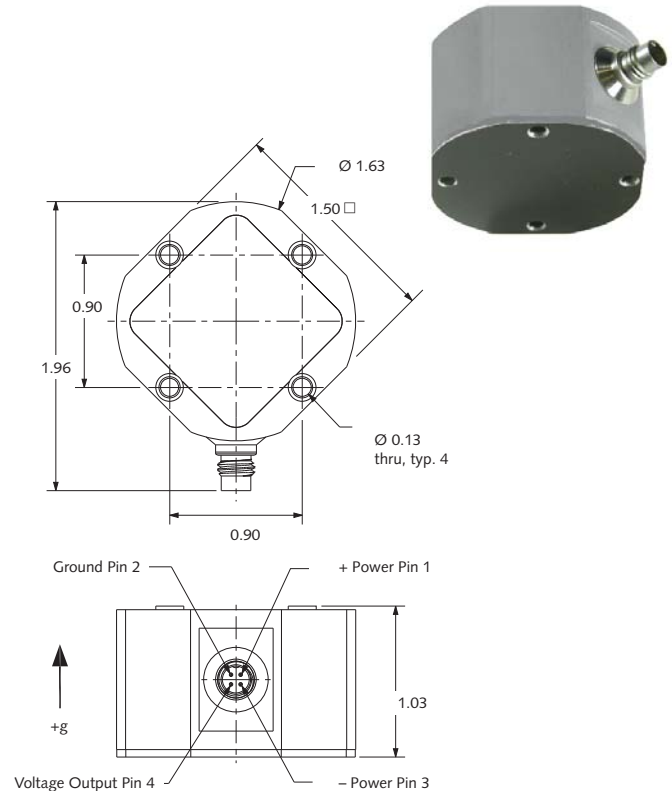
Description

Type 8330B3 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 hermetic titanium housing. A hard anodized housing provides ground isolation. The unit is powered by a bipolar supply between ±6 and ±12 V DC.

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 Instruction Manual for Type 8330B3 provides detailed information regarding mounting surface preparation.



Application

The characteristics of the ServoK-Beam make 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

Specification	Unit	Type 8330B3
Acceleration range	g	±3
Output clipping	g	±3.5
Sensitivity, ±10 % (ref 100 Hz)	mV/g	1200
Zero g output	mV	0 ±260
Resolution/threshold typ., 0 ... 10 Hz	µgrms	1.3
Amplitude non-linearity l input l ≤ 2 g 2 g < l input l ≤ 3 g	%FSO %FSO	±0.25 ±1
Resonant frequency nom.	Hz	6600
Frequency response, ±5 % min.	Hz	0 ... 500
Frequency response, ±5 % typ.	Hz	0 ... 1000
Frequency response, ±3 dB typ.	Hz	0 ... 2000
Noise density (0...100 Hz) typ.	µgrms/√Hz	0.4 (0.5 max.)
Noise 0...100 Hz (typ.)	µgrms	4
Phase shift max. @ 0 Hz	°	0
Phase shift max. @ 100 Hz	°	-0.25
Phase shift max. @ 1000 Hz	°	-1.6
Phase shift max. @ ±3 dB, typ.	°	-11
Sensitive axis misalignment typ.	mrad	0.25 (0.6 max)
Transverse sensitivity typ. (max. 1)	%	0.4

Environmental

Random vibration 20 ... 2000 Hz	grms	20
Shock (half sine, 0.5 ms pulse)	gpk	1500
Temperature coeff. of sensitivity typ.	ppm/°F	±212
Temperature coeff. of bias typ.	µg/°F	±212
Operating temperature range	°F	-40 ... 185
Storage temperature range	°F	-65 ... 185

Output

Impedance (nom.)	Ω	<40
Load resistance min.	kΩ	5000
Capacitive load max.	pF	10000

Power Supply

Voltage	VDC	±6 ... ±12
Current nom.	mA	12

Physical

Case		Titanium
Sensing element	Type	capacitive/ MEMS
Housing/base	material	Anodized Al.
Sealing - housing/connector	Type	Hermetic
Connector	Type	4-pin pos.
Ground isolated		yes
Mounting (0.13" dia hole)	Type	cap screw
Mass	grams	95

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

Accessories Included

- Mounting wax Type 8432
- (4) mounting screws, 4-40 UNC-3A x 1.25" long 431-0517-001
- (4) mounting screws, M3 x 30 mm long 431-0519-001

Optional Accessories

- 2 meter cable, 4-pin neg. Microtech equivalent to pigtailed power and signal output cable Type 1592M1
- Microtech equivalent to three power banana plugs and a BNC pos. output signal connector. x = 2, 5, 10 meter 1788A...
- Triaxial mounting cube 8530K01

Ordering Code

- ServoK-Beam accelerometer, ±3g Type 8330B3





Measure	Connect	Analyze
 Type 8330B3 Capacitive accelerometer	 Type 1788A 4-pin neg. BNC pos. (3) banana	 Readout not supplied
		Power Supply
		 Bi-polar power supply not supplied

Fig. 1: Measuring chain

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