

# K-Beam® Accelerometer

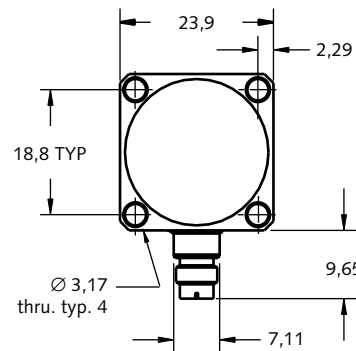
Type 8312B...

## Light Weight, Ground Isolated Capacitive Accelerometers

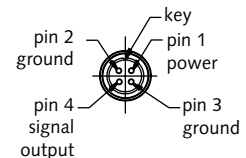
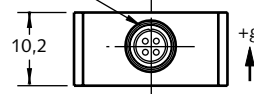
The single axis capacitive accelerometer models measure static acceleration or low-level, low-frequency vibration. Featuring excellent frequency response, an insensitivity to thermal transients and transverse acceleration, the 8312B... is available in two measuring ranges and a bipolar output.



- Available in 2 and 10g ranges
- Low power, 1,3 mA
- Wide supply voltage range up to +32VDC
- Frequency response 0 ... 250 Hz ( $\pm 5\%$ ), 2g version
- Noise 380  $\mu\text{g}$  (2g version, 0...100 Hz)
- Bipolar output:  $\pm 2$  VFS, single supply
- High shock resistance, 6000g
- Conforming to CE



4-pin pos. connector  
microtech equivalent



### Description

The 8312B... K-Beam accelerometer series utilizes a silicon micro-machined variable capacitance sensing element. The sensing element consists of a very small inertial mass and a flexure element cantilever positioned between two plates. As the mass deflects under acceleration, the capacitance between these plates changes. AC excitation and synchronous amplitude demodulation circuitry contained in the accelerometer's signal conditioner provides an analog output signal proportional to the applied acceleration. The output signal format is bipolar at  $0 \pm 2\text{V}$ . and the unit is powered by a single supply between +3,8 and +32 V DC. The accelerometer's low power consumption, will provide approximately 2,000 hours of operation from a single 9 volt alkaline battery.

The sensing element and electronics are contained in light-weight, aluminum housing environmentally protected by an epoxy seal. Ground isolation is provide by a hard anodized finish.

### Application

These high performance, solid state sensors are ideally suited for applications requiring the measurement of low level acceleration in a steady-state or low frequency environment. K-Beam performance is similar to larger servo accelerometers but at a substantially lower price. Vehicle stability control and ride analysis; automotive vibration, structural analysis; robotics and/or platform motion control systems, building and bridge vibration measurements are but a few areas of application.

8312B\_000-567e-01.07

**Technical Data**

Type	Unit	8312B2	8312B10
Acceleration Range	g	±2	±10
Sensitivity ±5%	mV/g	1000	200
Zero g Output (5%)	mV	0 ±30	0 ±30
Resolution/Threshold	µg	540	2830
Amplitude Non-linearity	%FSO	0,8	0,8
Resonant Frequency nom.	Hz	1400	2700
Frequency Response	Hz	0 ... 250	0 ... 180
Noise typ. (0 ... 100Hz)	µgrms	380	2000
Noise Density (0...100 Hz) typ.	µgrms /√ Hz	38	200
Phase Shift max.	@ 0 Hz	degree	0
	@ 10 Hz	degree	2
	@ 100 Hz	degree	20
Sensitive Axis Misalignment typ. (max.)	mrad	≤10 (≤30)	≤10 (≤30)
Transverse Sensitivity typ. (max.)	%	1 (3)	1 (3)
Environmental:			
Random Vibration 20... 2000 Hz	grms	20	20
Shock half sine, 500µs	gpk	6000	6000
Temperature Coefficient Sensitivity typ. (max.)	ppm/°C	200 (320)	200 (320)
Temperature Coefficient Sensitivity typ. (max.)	%/°C	0,02 (0,032)	0,02 (0,032)
Temperature Coefficient of Bias, typ. (max.)	mg/°C	0,2 (1)	1 (5)
Temperature Range Operating	°C	-40 ... 85	-40 ... 85
Temperature Range Storage	°C	-55 ... 125	-55 ... 125
Output:			
Impedance max.	Ω	350	350
Load Resistance min.	kΩ	30	30
Capacitive Load max.	µF	0,5	0,5
Supply:			
Voltage	VDC	3,8 ... 32	3,8 ... 32
Current nom.	mA	1,3	1,3
Construction:			
Sensing Element	type	Capacitive	Capacitive
Housing/Base	material	Al, Hard Anodized	Al, Hard Anodized
Sealing - housing/connector	type	Epoxy	Epoxy
Connector	type	4-pin pos.	4-pin pos.
Ground Isolation	MΩ	10	10
Mounting	type	4-40 thread / Adhesive	4-40 thread / Adhesive
Weight	grams	12	12

1 g = 9,80665 m/s<sup>2</sup>, 1 Inch = 25,4 mm, 1 gram = 0,03527 oz, 1 lbf-in = 0,1129 Nm

**Mounting**

The K-Beam accelerometer’s sensing element consists of a very small inertial mass and a flexure element chemically etched from a single piece of silicon. The seismic mass is cantilever positioned between two plates, which act as electrodes. As the mass deflects under acceleration, the capacitance between these plates changes. Under very large accelerations (or shocks), the motion of the mass is limited by the two stationary plates; this limits the stress placed on the suspension and prevents damage. The damping of the mass by entrapped gas creates a “squeeze film” providing an optimized frequency response over a wide temperature range. Additionally, the differential capacitive design assures immunity from thermal transients.

The integrated signal conditioner of the 8312B... family of accelerometers incorporates AC excitation and a synchronous amplitude demodulator. The signal conditioner also provides an analog output signal proportional to the acceleration signal.

**Mounting**

Reliable and accurate measurements require that the mounting surface be clean and flat. The accelerometers can be attached to the test structure with adhesive or with the supplied screws. The Operating Instruction Manual for the 8312B... provides detailed information regarding mounting surface preparation.

**Accessories Included**

- |  | <b>Type</b>  |
|--|--------------|
| • (4) mounting screws, 4-40 UNC-2A x 5/8" long | 431-0491-001 |
| • (4) mounting screws, M3 x 16mm long          | 431-0492-001 |
| • (1) mounting wax                             | 8432         |

**Optional Accessories**

- |                          | <b>Type</b> |
|--------------------------|-------------|
| • triaxial mounting cube | 8518        |

**Ordering Key**

Range		8312B <input type="checkbox"/>
±2g	2	↑
±10g	10	

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