8312A K-BEAM® CAPACITIVE ACCELEROMETERS

The Kistler Type 8312A K-Beam accelerometer series utilizes a silicon micro-machined variable capacitance sensing element. This high performance, solid state sensor is 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 at a substantially lower price. These sensors are insensitive to thermal transients and transverse acceleration. They can be mounted with adhesives or by using screw fasteners. The sensor and conditioning electronics are integrated into a single lightweight, epoxy sealed hard anodized aluminum housing. Ground isolation is provided by a hard anodized coating. The 4-pin Microtech receptacle provides the convenience

Continued

- Available in 2 *g*, 10 *g* and 25 *g* ranges
- Low power, 1.3 mA
- Frequency response 0 ... 300 Hz (± 5%)
- Noise 380 µ*g* (2 *g* version, 0…100 Hz)
- Bipolar output: ± 2 VFS, single supply
- High shock resistance, 6000 *g*
- Conforming to CE

Technical Data	Units	8312A2	8312A10	8312A25
Acceleration Range	*g*	±2	±10	±25
Sensitivity ±5 %	mV/*g*	1000	200	80
Zero g Output ±30 mV	V	0	0	0
Resolution (Threshold)	µ*g*	540	2830	8060
Amplitude Non-linearity	%FSO	± 0.8	± 0.8	± 0.8
Resonant Frequency nom.	Hz	1400	2700	5100
Frequency Response ±5%	Hz	0…300	0…180	0…100
Noise typ. (0 ... 100Hz)	μg_{rms}	380	2000	5700
Noise Density (0…100 Hz) typ.	$\mu g_{rms} / \sqrt{Hz}$	38	200	570
Phase Shift max.				
@ 0 Hz	degree	0	0	0
@ 10 Hz	degree	2	2	2
@100 Hz	degree	20	20	20
Sensitive Axis Misalignment typ. (max.)	mrad	<10 (30)	<10 (30)	<10 (30)
Transverse Sensitivity typ. (max.)	%	1 (3)	1 (3)	1 (3)
Environmental:				
Random Vibration 20… 2000 Hz	g_{rms}	20	20	20
Shock half sine, 500µs	g_{pk}	6000	6000	6000
Temperature Coeffecient Sensitivity typ. (max.)	%/°F	0.01 (0.018)	0.01 (0.018)	0.01 (0.018)
	%/°C	0.02 (0.032)	0.02 (0.032)	0.02 (0.032)
Bias typ. (max.)	mg/°F	0.11 (0.56)	0.56 (2.8)	1.5 (6.9)
	mg/°C	0.2 (1)	1 (5)	2.7 (12.5)
Temperature Range Operating	° F		-40…185	
	°C		-40…85	
Storage	°F		-65…255	
	°C		- 55 …125	
Output Impedance max.	Ω		350	
Load Resistance min.	kΩ		30	
Capacitive Load max.	µF		0.5	
Supply:				
Voltage	VDC		3.8 … 16	
Current nom.	mA		1.3	

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

000-219e-10.02 (DBK8.8312e)

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Technical Data	Units	8312A
Construction		
Sensing Element	type	capacitive
Housing/Base	material	Al. hard anodized
Sealing - housing/connector	type	Epoxy
Connector	type	4-pin Microtech pos.
Ground Isolation min.	MΩ	10
Weight	grams	12

of a detachable extension cable. The accelerometer's output signal format is bipolar at 0 ±2V. The unit is powered by a single supply between +3.8 and +16 V DC. The sensor's low power consumption, will provide approximately 2,000 hours of operation from a single 9 volt alkaline battery.

Suggested Measuring Chain

Kistler offers convenient interface packages to easily power and make signal connections to the 8312A K-BEAM. The 5210 is a convenient. Kistler power supply that features a panel-mounted DC offset adjustment with internal gain and filtering options.

Applications

- Vehicle ride analysis
- Structural analysis
- Building and bridge vibration
- Motion/stability control systems, steady-state and low level, low frequency acceleration measurements.

Principles of Operation

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 8312A 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.

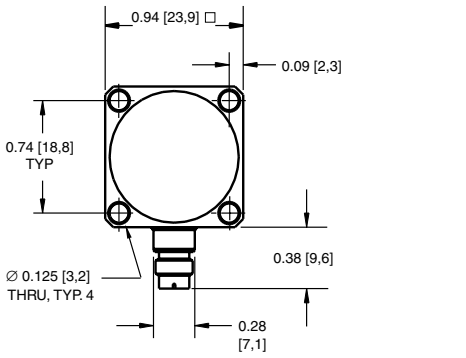
Supplied Accessories

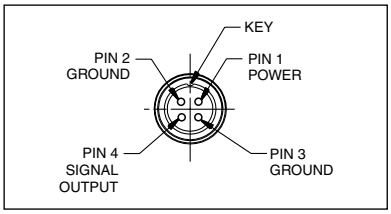
431-0491-001	(4) mounting screws, 4-40 UNC-2A x 5/8" long
431-0492-001	(4) mounting screws, M3 x 16mm long
8432	(1) mounting wax

Optional Accessory

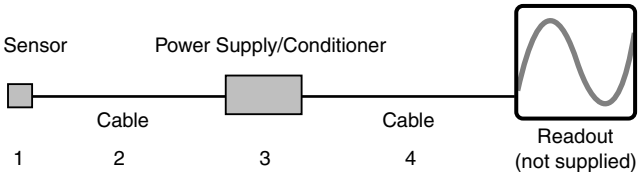
8518 triaxial mounting cube

Dimensions in inches [mm]





Ordering Information



Specify:

1 - 8312A...	accelerometer, specify range
2 - 1592M1	two-meter output cable, 4-pin Microtech neg. to pigtails, or
1592A...	cable, 4-pin neg. to 4-pin neg., specify length in meters (use only with 5210)
3 - 5210	single channel power supply or
1572	output/power supply interface module
4 - 1511...	output cable, BNC pos. to BNC pos., specify length in meters

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