

# K-Shear Accelerometers

Type 8702B500...  
8704B500...

## General purpose, voltage mode accelerometers

Small, relatively lightweight, general purpose accelerometers for vibration measurements in wide range of applications. Available in high and low operating temperature versions; two with a ground isolated option, these accelerometers feature a rugged, hermetically sealed construction.

- Low impedance, voltage mode
- Quartz-shear sensing elements
- Ultra-low base strain
- Hermetic, titanium construction
- Minimal, thermal transient response
- Lightweight, hermetically sealed titanium case
- Conforming to  $\text{CE}$

### Description

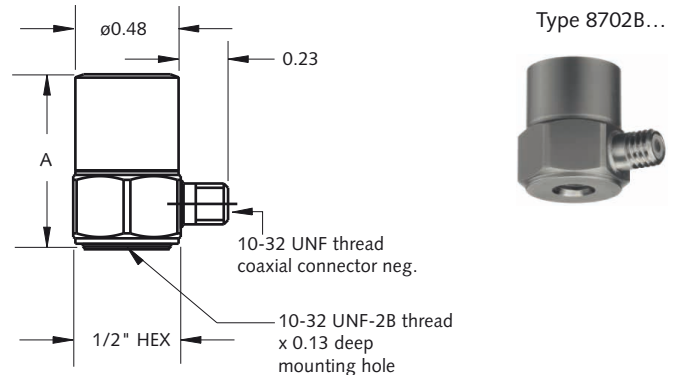
Type 8702B500... series side connector and Type 8704B500... top connector accelerometer series use a unique shear mode sensing element made of stable quartz crystals. The quartz sensing elements afford excellent long-term stability that ensure repeatable, accurate measurements for many years. Additionally the shear element design provides low transverse sensitivity along with an insensitivity to base strain and thermal transients.

All units are hermetically sealed and are constructed entirely of titanium or a combination of titanium and stainless steel. An internal circuit Piezotron® impedance converter provides a high signal level at low impedance output.

Models identified with an M1 and M3 are ground isolated versions. Type 8702B500M5 extends the operating temperature range to 330 °F, while Type 8702B500M8 operates at a low cryogenic temperature of -320 °F.

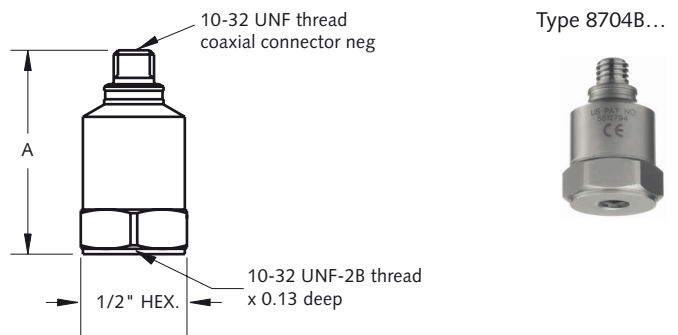
### Application

All types are designed for general purpose vibration measurement in a laboratory or industrial environment. They can be used for environmental testing (with or without temperature cycling), ESS, vehicle tests, automotive NVH testing, rotating machinery vibration analysis.



Dim.	Type 8702B500...	Type 8702B500M1, M3	Type 8702B500M5 / M8
A	0.63	0.67	0.80

Dimensions are shown in [in], unless otherwise noted.



Dim.	Type 8704B500...	Type 8702B500M1, M3
A	0.83	0.85

Dimensions are shown in [in], unless otherwise noted.

### Accessing TEDS data

Accelerometers with a "T" suffix are variants of the standard version incorporating the "Smart Sensor" design. Viewing an accelerometer's data sheet requires an Interface/Coupler such as Kistler's Type 5165A... or Type 5000M04 with TEDS Editor software. The interface provides negative current excitation (reverse polarity) altering the operating mode of the PiezoSmart sensor allowing the program editor software to read or add information contained in the memory chip.

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## Technical data

Type number	Unit	8702B500...	8704B500...
Acceleration range	g	±500	±500
Acceleration limit	g <sub>pk</sub>	±1,000	±1,000
Transverse acceleration limit	g <sub>pk</sub>	±1,000	±1,000
Threshold, nom. (noise 130 µV <sub>rms</sub> )	g <sub>rms</sub>	0.01	0.01
Sensitivity, ±5 %	mV/g	10	10
Resonant frequency mounted, nom.	kHz	54	54
Type 8702B500M5, M8	kHz	73	-
<b>Frequency response, ±5 %</b>			
Type M1, -5 ... 10%	Hz	1 ... 10,000	1 ... 10,000
Type M3	Hz	0.5 ... 10,000	0.5 ... 10,000
Type 8702B500M5	Hz	2 ... 7,000	-
Amplitude non-linearity	%FSO	±1	±1
Time constant, nom.	s	1	1
Type M3	s	2	2
Type 8702B500M5, M8	s	0.5	-
Transverse sensitivity, nom. (max. 3)	%	1.5	1.5
Long-term stability	%	±1	±1

## Environmental

Base strain sensitivity @ 250 µε	g/µε	0.01	0.01
Random vibration max.	g <sub>rms</sub>	2,000	2,000
Shock limit (1 ms pulse)	g <sub>pk</sub>	5,000	5,000
Temperature coeff. of sensitivity	%/°F	-0.03	-0.03
Operating temperature range	°F	-65 ... 250	-65 ... 250
Type 8702/8704B500T	°F	-65 ... 210	-65 ... 210
Type 8702B500M5	°F	-65 ... 330	-
Type 8702B500M8	°F	-320 ... 250	-
Storage temperature range	°F	-100 ... 300	-100 ... 250

## Output

Bias nom.	VDC	11	11
Impedance	Ω	<100	<100
Voltage full-scale	V	±5	±5
Current	mA	2	2

## Source

Voltage	VDC	20 ... 30	20 ... 30
Constant current			
Type 8702B500M5/M8 = 2 ... 18	mA	4	4
Impedance min.	kΩ	100	100

## Construction

Sensing element	type	quartz-shear	quartz-shear
Housing/base	material	titanium	titanium
Sealing-housing/connector	type	hermetic	hermetic
Connector	type	10-32 neg.	10-32 neg.
Ground isolated		yes	yes
Weight	grams	8.2	7.1
Type 8702/8704B500M1, M3, M5	grams	9.2	7.6
Mounting (10-32 thd, x 0.13 dp)	type	stud	stud
Mounting torque, Type 8702B500M5, M8	lbf-in	18	18

1 g = 9.80665 m/s<sup>2</sup>, 1 in = 25.4 mm, 1 Gram = 0.03527 oz, 1 lbf-in = 0.113 N-m

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This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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## Mounting

A threaded 10-32 UNF stud provides positive attachment of the accelerometer to the test structure. Reliable and accurate measurements require that the mounting surface be clean and flat. The operating instruction manual for Type 8702B... and Type 8704B... series accelerometers provides detailed information regarding mounting surface preparation.

### Accessories included with Type 8702B/8704B500...

- 10-32 mounting stud **Type 8402**
- Mounting stud. 10-32 to M6 **8411**

### Optional accessories

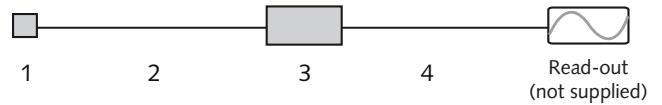
- Mounting magnet **Type 8452A**
- Triaxial mounting cube **8502**
- Adhesive mounting base **8436**

### Ordering key

Type 8702B...		
<b>Measuring range</b>		
±500 g	500	□
<b>Variant</b>		
Standard	-	□
Ground isolated	M1	□
High temperature	M5	□
Low temperature	M8	□
<b>TEDS templates</b>		
Standard	-	□
Default, IEEE 1451.4 V0.9 Template 0 (UTID 1)	T	□
IEEE 1451.4 v0.9 Template 24 (UTID 116225)	T01	□
LMS Template 117, Free format Point ID	T02	□
LMS Template 118, Automotive Format (Field 14 Geometry = 0)	T03	□
LMS Template 118, Aerospace Format (Field 14 Geometry = 1)	T04	□
P1451.4 v1.0 Template 25 – Transfer Function Disabled	T05	□
P1451.4 v1.0 Template 25 – Transfer Function Enabled	T06	□

## Measuring chain

- |   |                                      |                         |
|---|--------------------------------------|-------------------------|
| 1 | Low impedance sensor                 | <b>Type</b> 8702/04B... |
| 2 | Sensor cable, 10-32 pos. to BNC pos. | 1761B...                |
| 3 | Power supply/signal conditioner      | 51...                   |
| 4 | Output cable, BNC pos. to BNC pos.   | 1511                    |



### Ordering key

Type 8704B...		
<b>Measuring range</b>		
±500 g	500	□
<b>Variant</b>		
Standard	-	□
Ground isolated	M1	□
Long time constant and ground isolated	M3	□
<b>TEDS templates</b>		
Standard	-	□
Default, IEEE 1451.4 V0.9 Template 0 (UTID 1)	T	□
IEEE 1451.4 v0.9 Template 24 (UTID 116225)	T01	□
LMS Template 117, Free format Point ID	T02	□
LMS Template 118, Automotive Format (Field 14 Geometry = 0)	T03	□
LMS Template 118, Aerospace Format (Field 14 Geometry = 1)	T04	□
P1451.4 v1.0 Template 25 – Transfer Function Disabled	T05	□
P1451.4 v1.0 Template 25 – Transfer Function Enabled	T06	□

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