

# Miniature PiezoBeam® Accelerometer

Type 8640A...

## Light Weight IEPE TEDS Accelerometer

World Patent: W0/2007/062532  
European Patent: 2006790940  
U.S. Patent: 12088325

The 8640A... is a high sensitivity single axis accelerometer. The sensor is designed primarily for modal analysis applications and has selective use as a general purpose vibration sensor.

- IEPE,  $\pm 5$  g,  $\pm 10$  g, and  $\pm 50$  g ranges
- Smallest PiezoBeam single axis accelerometer with lowest mass
- High sensitivity, low noise and high dynamic range
- Choice of ranges and sensitivities
- Ground Isolated Mounts
- TEDS Option
- Conforming to CE

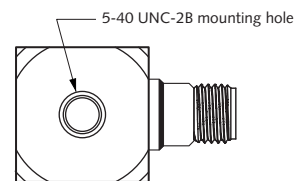
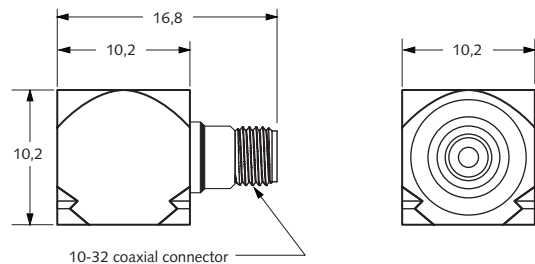
### Description

Type 8640A... is a miniature and lightweight single axis accelerometer which reduces mass loading on thin-walled structures important to multichannel modal applications or general vibration measurements.

Internal of the PiezoBeam accelerometer is a unique sensing element consisting of a ceramic beam supported by a center post that when bending occurs as a result of being subjected to vibration, the cantilevered beam element yields an electrical charge. The charge signal is converted by the internal low noise charge amplifier to a proportional high level voltage signal at an output impedance of less than 500 ohms. Patented methods are used to thermally compensate the sensing element.

Type 8640A... single axis accelerometer, has an integral 10-32 connector and is designed for easy installation in confined areas. Type 8640A... has a welded titanium housing and is ground isolated when mounted with the mounting clip or adhesive mounting adapter. The sensing element design provides outstanding amplitude and phase response over a wide frequency range.

The accelerometer operates directly from the internal power source found in most FFT analyzers, from several Kistler Piezotron® power supply couplers or any industry standard IEPE (Integrated Electronic Piezo Electric) compatible power source.



### Application

This miniature and light weight, single axis accelerometer series is ideally suited for multiple channel modal analysis on small components or subsystems and well as full vehicle testing for aviation, space, automotive as well as a wide range of general test structures.

### Accessing TEDS Data

Accelerometers with a "T" suffix are variants of the standard version incorporating the "Smart Sensor" design (PiezoSmart®). Viewing an accelerometer's data sheet requires an Interface/Coupler such as Kistler's Type 5134B... 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.

**Technical Data**

Specification	Unit	Type 8640A5 Type 8640A5T	Type 8640A10 Type 8640A10T	Type 8640A50 Type 8640A50T
Acceleration range	g	±5	±10	±50
Acceleration limit	gpk	±8	±16	±80
Threshold (1 ... 10 kHz)	grms	0,00014	0,00016	0,00036
Sensitivity (±10 %)	mV/g	1 000	500	100
Resonant frequency mounted, nom.	kHz	17	17	25
Frequency response (±5 %)	Hz	0,5 ... 3 000	0,5 ... 3 000	0,5 ... 5 000
Phase shift <5°	Hz	2 ... 3 000	2 ... 3 000	2 ... 5 000
Amplitude non-linearity	%FSO	±1	±1	±1
Time constant nom.	s	1,1	1,1	1,1
Transverse sensitivity typ. (max. 3 %)	%	1,5	1,5	1,5
<b>Environmental</b>				
Base strain sensitivity @ 250 µε	g/µε	0,004	0,004	0,004
Random vibration max.	grms	50	50	100
Shock limit (1 ms pulse)	gpk	7 000	7 000	10 000
Temperature coeff. of sensitivity	%/°C	0,12	0,16	0,16
Operating temperature range	°C	-40 ... 55	-40 ... 65	-40 ... 65
<b>Output</b>				
Bias nom.	VDC	13	13	13
Impedance	Ω	≤100	≤100	≤100
Voltage Full Scale	V	±5	±5	±5
<b>Power Supply</b>				
Voltage	VDC	22 ... 30	22 ... 30	22 ... 30
Constant current	mA	2 ... 20	2 ... 20	2 ... 20
<b>Construction</b>				
Sensing element	Type	PiezoBeam	PiezoBeam	PiezoBeam
Housing/base	material	Titanium	Titanium	Titanium
Sealing housing/ connector (EN 60529)	Type	IP 68	IP 68	IP 68
Connector	Type	10-32 coaxial with accessory	10-32 coaxial with accessory	10-32 coaxial with accessory
Ground isolated				
Mass	grams	3,5	3,5	3,5
Mounting	Type	wax, adhesive, Clip, magnet, stud (5-40 UNC-2B)	wax, adhesive, Clip, magnet, stud (5-40 UNC-2B)	wax, adhesive, Clip, magnet, stud (5-40 UNC-2B)
Mounting torque, stud	N-m	0,7	0,7	0,7

1 g = 9,80665 m/s<sup>2</sup>, 1 Inch = 25,4 mm, 1 Gramm = 0,03527 oz, 1 lbf-in = 0,113 N-m

8640A\_000-842e-03.11

### Mounting

The cube shape configuration of the single axis accelerometer allows for the sensor to be attached to the test surface using any available side with wax, adhesive and/or tape. The ground isolated mounting clip is used to mount and orient the 8640A... in one orientation. The primary mounting surface also has a 5-40 UNC threaded hole which is compatible with ground isolated screw-on mounting accessories, namely, an adhesive mounting base and a magnetic mounting base. The specified frequency response is unaffected when the adhesive mounting base or magnetic mounting base is used. When the ground isolated mounting clip is used, the upper frequency limits are as follows:

- Without grease 1 kHz ( $\pm 5\%$ ) for all ranges
- With grease 3 kHz ( $\pm 5\%$ ) for 5 g and 10 g ranges
- With grease 4 kHz ( $\pm 5\%$ ) for the 50 g range.

Reliable and accurate measurements require that the mounting surface be clean and flat. The instruction manual for the Type 8640A... series provides detailed information regarding mounting surface preparation.



Fig. 1: Mounting accessories

### Accessories Included

- Ground isolated mounting clip 800M156
- Ground isolated adhesive mounting base 800M158
- Mounting wax 8432

### Optional Accessories

- Magnetic mounting base 800M160

### Optional Cables

- Teflon® jacketed cable, 10-32 (pos.) to BNC (pos.) 1761B...
- Teflon® jacketed cable, 10-32 (pos.) to 10-32 (pos.) 1762B...
- Flexible PVC jacketed cable, 10-32 pos to BNC (pos.) 1768A...K01
- Flexible PVC jacketed cable 10-32 (pos.) to 10-32 (pos.) 1768A...K02

### Ordering Key

Type 8640A

#### Measuring Range

$\pm 5$ g	5
$\pm 10$ g	10
$\pm 50$ g	50

#### TEDS Templates / Variants

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

Measure	Connect	Amplify	Output	Analyze
Type 8640A... Low impedance IEPE	Type 1761B... 10-32 pos BNC pos.	Type 51... Power supply / signal conditioner	Type 1511 BNC pos. BNC pos.	not supplied

Fig. 2: Measuring chain

Teflon® is a registered trademark of DuPont

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