

K-Shear® Accelerometer

Type 8742A...

High Resonant Frequency, Shock Accelerometer, Optional Ground Isolation

Quartz shock accelerometer for measuring short duration impulse and impact shocks. Type 8742A... shock accelerometers have a rugged welded construction, integral stud and are available in four measuring ranges.

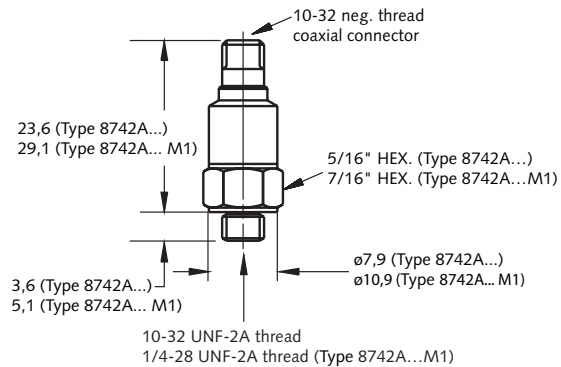
- Low impedance, voltage mode
- Unique quartz shear sensing element
- Ranges 5 000 g to 50 000 g
- Optional ground isolation
- Low transverse sensitivity
- Rugged connector for repeated connections
- Wide bandwidth, high resonant frequency
- Conforming to CE

Description

The sensing element contained within this shock accelerometer series features a unique, shear mode four quartz crystal configuration combined with an annular preload sleeve and seismic mass. The element design provides over 100 kHz resonance frequency ensuring accurate measurement of high speed events with zero shift and internal amplifier saturation virtually eliminated. These shock sensors exhibit insensitivity to thermal transients, and have extremely low transverse and base strain sensitivity. Using quartz as the sensing material adds another performance benefit in that quartz will not depolarize if exposed to high shock. The ground isolated option uses a patented technique that ensures high resonant frequency while providing electrical isolation.

Poor connector pin continuity resulting from an applied shock can momentarily interrupt a measured event. To ensure reliable shock measurements, Type 8742A... accelerometer contains an improved spring insert made of a gold plated Beryllium-Copper. Beryllium Copper provides the elastic physical properties that promote positive contact and resists aging.

An internal microelectronic Piezotron® signal conditioning circuit



converts the charge developed in the quartz element as a result of the accelerometer being subjected to shock, into a useable high level voltage output signal at a low impedance level. The low impedance output provides high immunity to noise and insensitivity to cable motion.

Application

Type 8742A... accelerometer is ideally suited for impact and impulse shock measurements where metal-to-metal impact occurs; where package and product survivability drop shock tests are of interest and where vehicle crash data is collected.

Mounting

The case isolated Type 8742A... is attached to the test structure by its integral 1/4-28 UNF stud and the non isolated Type 8742 version, uses an integral 10-32 UNF stud. Reliable and accurate measurements require that the mounting surface be clean and flat. The instruction manual for the shock accelerometer series provides detailed information regarding mounting surface preparation.

Technical Data

Specification	Unit	Type 8742A5	Type 8742A10	Type 8742A20	Type 8742A50
Acceleration range	g	±5 000	±10 000	±20 000	±50 000
Acceleration limit	gpk	±6 000	±12 000	±24 000	±60 000
Threshold (noise ≤130 μV _{rms}), nom.	grms	0,13	0,25	0,5	1,3
Sensitivity, ±5 %	mV/g	1	0,5	0,25	0,1
Resonant frequency mounted, nom.	kHz	100	100	100	100
Frequency response, ±7 % (M1: ±10 %)	Hz	1 ... 10 000	1 ... 10 000	1 ... 10 000	1 ... 10 000
Amplitude non-linearity	%FSO	±1	±1	±1	±1
Time constant, nom.	s	≥0,5	≥0,5	≥0,5	≥0,5
Transverse sensitivity, nom. (max. 5)	%	1,5	1,5	1,5	1,5

Environmental	Unit	Type 8742A5	Type 8742A10	Type 8742A20	Type 8742A50
Base strain sensitivity @ 250 $\mu\epsilon$	$g/\mu\epsilon$	0,005	0,005	0,005	0,005
Shock limit	gpk	50 000	50 000	50 000	100 000
Temperature coeff. of sensitivity	%/°C	-0,06	-0,06	-0,06	-0,06
Operating Temperature range	°C	-55 ... 120	-55 ... 120	-55 ... 120	-55 ... 120

Output

Bias, nom.	VDC	11	11	11	11
Impedance	Ω	<100	<100	<100	<100
Voltage full scale	V	± 5	± 5	± 5	± 5

Source

Voltage	VDC	18 ... 30	18 ... 30	18 ... 30	18 ... 30
Constant current	mA	2 ... 20	2 ... 20	2 ... 20	2 ... 20

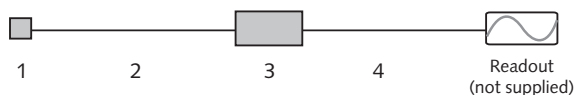
Construction

Sensing element	Type	quartz-shear	quartz-shear	quartz-shear	quartz-shear
Housing/Base	material	Titan./St. Stl.	Titan./St. Stl.	Titan./St. Stl.	Titan./St. Stl.
Sealing Housing/Connector (EN 60529)		IP68	IP68	IP68	IP68
Connector	Type	10-32 neg.	10-32 neg.	10-32 neg.	10-32 neg.
Ground isolation		with pad	with pad	with pad	with pad
Type 8742A...M1		yes	yes	yes	yes
Mass	grams	4,5	4,5	4,5	4,5
Type 8742A...M1	grams	8,2	8,2	8,2	8,2
Mounting (10-32 x 3,6)	Type	stud	stud	stud	stud
Type 8742A...M1 (1/4-28 x 5,1)					
Mounting torque	N·m	2	2	2	2
Type 8742A...M1	N·m	3,4	3,4	3,4	3,4

1 g = 9,80665 m/s², 1 Inch = 25,4 mm, 1 gram = 0,03527 oz, 1 lbf-in = 0,1129 N·m

Measuring Chain

- 1 Low impedance sensor
- 2 Sensor cable, 10-32 pos. to BNC pos.
- 3 Power supply/signal conditioner
- 4 Output cable BNC pos. to BNC pos.



Type

8742A...
 1761B...
 51...
 1511

Ordering Key

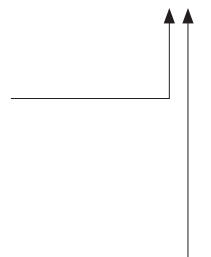
Range

$\pm 5\ 000\ g$	5
$\pm 10\ 000\ g$	10
$\pm 20\ 000\ g$	20
$\pm 50\ 000\ g$	50

Variants

Standard	-
Ground isolated	M1

8742A



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