SHOCK MEASUREMENT OFFERING FROM PCB® AND ENDEVCO®

PCB PIEZOTRONICS
AN AMPHENOL COMPANY

ENDEVCO
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PCB® and Endevco® manufacture leading-edge shock accelerometer designs that are contributing to the improved measurement of severe mechanical shock.

Our piezoresistive accelerometers are DC responding to avoid integration errors which is critical to the quality of your low frequency measurements. Piezoelectric ICP® accelerometers offer a very high signal output (+/- 5 volts full scale) and the ease of two-wire electrical connectivity.

Our technical experts can help you determine the optimal accelerometer for your measurement application. A brief summary of the technologies available are provided inside this brochure.

APPLICATIONS

- Mechanical shock testing
- Shock wave monitoring
- Drop and impact testing
- Portable electronic device testing
- High-shock data recorders
- Near and far-field pyroshock testing
- Weapons and rocket testing
- Fuze/safe and arm

PIEZORESISTIVE ACCELEROMETERS

Piezoresistive high g shock accelerometers are available in both undamped and lightly damped models to provide high-reliability shock and vibration measurements in extreme environments. With available measurement ranges from 2,000 to 200,000 g, these accelerometers feature rugged piezoresistive MEMS sensing elements.

Our in-house MEMS manufacturing techniques allow us to offer a product with compact size, high sensitivity, and exceptional overrange, while ensuring the repeatability and reliability required for mission critical applications. Product variations include single axis or triaxial configurations and screw, stud, and surface mounting options.

HIGHLIGHTS

- Multiple mounting configurations
- Minimal zero shift after shock
- High survivability in overrange environments
- DC response for long duration transient events
- Ranges up to 200,000 g
- Undamped for broad frequency response or damped for exceptional survivability
- Miniature SMT versions for embedded applications

UNDAMPED PIEZORESISTIVE ACCELEROMETERS

The Endevco brand of undamped shock accelerometers dates back over four decades and are used on many long standing programs that require high frequency. They are used by our most experienced customers primarily engaged in research and development applications, where careful preparation of the experiment is performed and attention is given to minute instrumentation details such as sample rate, anti-aliasing filter selection and detailed post process analysis.

SPECIFICATIONS					
Model Number	**Endevco 7270A**	**Endevco 7270AM4**	**Endevco 7270AM6**	**Endevco 7270AM7**	**Endevco 7274A**
Description	High resonance Undamped Shock standard	High resonance Undamped Stud mount	Rugged Mechanical filter Stud mount	Extremely rugged Undamped Low noise cable	Triaxial Undamped High resonance
Range (g)	±2000 / ±6000 / ±20000 / ±60000 / ±200000	±2000 / ±6000 / ±20000 / ±60000 / ±200000	±2000 / ±6000 / ±20000 / ±60000	±2000 / ±6000 / ±20000 / ±60000 / ±200000	±2000 / ±6000 / ±20000 / ±60000
Sensitivity (uV/V/g)	10 / 3 / 1 / .3 / .1	10 / 3 / 1 / .3 / .1	10 / 3 / 1 / .3	10 / 3 / 1 / .3 / .1	10 / 3 / 1 / .3
Frequency response (kHz +/-5%)	0-10 / 0-20 / 0-50 / 0-100 / 0-150	0-10 / 0-20 / 0-50 / 0-100 / 0-150	0-10	0-10 / 0-20 / 0-50 / 0-100 / 0-150	0-18 / 0-36 / 0-70 / 0-140
Shock limit (g pk)	10000 / 18000 / 60000 / 180000 / 200000	10000 / 18000 / 60000 / 180000 / 200000	10000 / 18000 / 60000 / 100000	10000 / 18000 / 60000 / 180000 / 200000	6000 / 18000 / 60000 / 180000
Temperature Range - Operating	-67 to +250 °F -55 to +121 °C	-67 to +150 °F -55 to +66 °C	-30 to +150 °F -34 to +66 °C	-67 to +250 °F -55 to +121 °C	-67 to +150 °F -55 to +66 °C
Dimensions (in(mm))	.56 x .28 x .11 (14.22 x 7.1 x 2.79)	.312 hex (7.92 dia.)	.675 x .580 x .621 (17.15 x 14.73 x 15.78)	.56 x .35 x .16 (14.22 x 8.9 x 4.06)	.0.56 x .304 x .245 (14.22 x 7.72 x 6.22)
Weight (gram)	1.5	1.5	8.4	4	2.9
Excitation voltage (V)	10	10	10	10	5
Mounting method	4-40 screws	1/4-28 UNF-3A stud	1/4-28 integral stud	4-40 screws	4-40 screws

UNDAMPED PIEZORESISTIVE SURFACE MOUNT ACCELEROMETERS

Endevco undamped surface mount configurations allow for use in circuit board OEM applications.

SPECIFICATIONS		
Model Number	**Endevco 71M**	**Endevco 75**
Description	Surface mount Undamped Low mass	Triaxial Undamped Surface mount LCC
Range (g)	±2000 / ±6000 / ±20000 / ±60000	±2000 / ±6000 / ±20000 / ±60000
Sensitivity (uV/V/g)	10 / 3 / 1 / .3	10 / 3 / 1 / .3
Frequency response (kHz +/-5%)	0-10 / 0-20 / 0-50 / 0-100	0-18 / 0-36 / 0-70 / 0-140
Shock limit (g pk)	10000 / 18000 / 60000 / 120000	10000 / 18000 / 60000 / 180000
Temperature Range - Operating	-65 to +150 °F -54 to +66 °C	-67 to +250 °F -55 to +121 °C
Dimensions (in(mm))	0.25 x .125 x 0.07 (6.35 x 3.18 x 1.78)	0.38 x 0.28 x 0.22 (9.65 x 7.11 x 5.59)
Weight (gram)	0.06	1.2
Excitation voltage (V)	10	5
Mounting method	Adhesive	SMT or Adhesive

DAMPED PIEZORESISTIVE ACCELEROMETERS

Damped MEMS high-amplitude shock accelerometers represent state-of-the-art industry technology for miniature, high amplitude, DC response acceleration sensors. This series is capable of measuring long duration transient motion, as well as responding to and surviving extremely fast rise times, typical of a high-g shock event as found in explosive, gun and impact testing.

SPECIFICATIONS		
Model Number	**Endevco 2262B**	**Endevco 7280AM4**
Description	High Sensitivity Multi-mode damping Rugged to 10000 g shocks	Extremely rugged Lightly damped
Range (g)	±1000 / ±2000 / ±6000	±2000 / ±20000 / ±60000
Sensitivity (uV/V/g)	0.45 / 0.3 / 0.015	30 / 1.6 / .5
Frequency response (kHz)	0 to 3000	0-5 / 0-10 / 0-13
Shock limit (g pk)	10000	10000 / 80000 / 240000
Temperature Range - Operating	-67 to 257 °F -55 to 125 °C	-67 to +250 °F -55 to +121 °C
Dimensions (in(mm))	0.935 x 0.625 x 0.79 23.68 x 15.88 x 20.1	0.312 HEX 7.92
Weight (gm)	22	2.1
Excitation voltage (V)	10	10
Mounting method	10-32 detachable stud	1/4-28 UNF-3A stud

SPECIFICATIONS			
Model Number	**Endevco 7280AM7**	**Endevco 7280A**	**Endevco 7284A**
Description	Extremely rugged Lightly damped Low noise cable	Extremely rugged Lightly damped Low power consumption	Thru hole mount Lightly damped
Range (g)	±2000 g / ±20000 g / ±60000	±2000 g / ±20000 g / ±60000	±2000 g /±20000 / ±60000
Sensitivity (uV/V/g)	30 / 1.6 / .5	30 / 1.6 / .5	30 / 1.6 / .5
Frequency response (kHz)	0-5 / 0-10 / 0-13	0-5 / 0-10 / 0-13	0-10 / 0-10 / 0-20
Shock limit (g pk)	10000 / 80000 / 240000	10000 / 80000 / 240000	10000 / 60000 / 180000
Temperature Range - Operating	-67 to 250 °F -55 to +121 °C	-67 to 250 °F -55 to +121 °C	-67 to +250 °F -55 to +121 °C
Dimensions (in(mm))	0.56 x 0.35 x 0.16 (14.2 x 8.90 x 4.06)	0.56 x 0.35 x 0.16 (14.2 x 8.90 x 4.06)	0.56 x .304 x .245 (14.22 x 7.72 x 6.22)
Weight (gm)	4	4	3.6
Excitation voltage (V)	10	10	5
Mounting method	4-40 screws	4-40 screws	4-40 screws

LIGHTLY DAMPED PIEZORESISTIVE SURFACE MOUNT SHOCK ACCELEROMETERS

Endevco brands of lightly damped shock accelerometers feature over range stops for improved survivability. Damping also helps improve data recorder resolution compared to undamped versions.

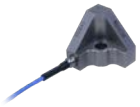
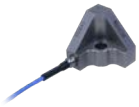
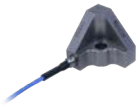
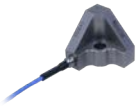
SPECIFICATIONS		
Model Number	**Endevco 72**	**Endevco 74**
Description	Lightly damped Rugged ESD protection	Triaxial Damped Surface mount LCC
Range (g)	±2000 / ±20000 / ±60000	±2000 / ±20000 / ±60000
Sensitivity (uV/V/g)	30 / 1.6 / .6	30 / 1.6 / .5
Frequency response (kHz)	0-10 / 0-10 / 0-20	0-5 / 0-10 / 0-13
Shock limit (g pk)	10000 / 80000 / 240000	10000 / 60000 / 180000
Temperature Range (Operating)	-65 to +160 °F -54 to +71 °C	-67 to +250 °F -55 to +121 °C
Dimensions (in(mm))	0.25 x 0.15 x .085 (6.35 x 3.81 x 2.16)	0.38 x 0.28 x 0.22 (9.65 x 7.11 x 5.59)
Weight (gm)	0.16	1.2
Excitation voltage (V)	5	5
Mounting method	SMT or adhesive	SMT or adhesive

ICP® MECHANICALLY ISOLATED & ELECTRICALLY FILTERED ACCELEROMETERS

Piezoelectric ICP® accelerometers afford a very high signal output (+/- 5 volts full scale) and the ease of two-wire electrical connectivity. Their inherent ruggedness enables them to be severely over ranged without damage. The addition of internal mechanical isolation minimizes the high frequency stress that is transferred to their sensing elements. This mechanical isolation, coupled with an internal 2-pole electrical filter built into the ICP® circuitry, tailors the overall accelerometer response to assure data quality to 10 kHz and up to 100,000 g's. Full scale linearity is verified through calibration in accordance with MIL-STD-810.




SPECIFICATIONS				
Model Number	**PCB 350C23**	**PCB 350C24**	**PCB 350D02**	**PCB 350B01**
Description	Single Axis Integral Cable Mechanically Isolated	Single Axis Integral Cable Mechanically Isolated	Single Axis Integral Cable Mechanically Isolated	Single Axis Integral Cable Mechanically Isolated
Range (g)	±10000 g pk	±5000 g pk	±50000 g pk	±100000 g pk
Sensitivity (mV/g)	0.5	1.0	0.1	0.05
Frequency response (Hz)	0.4 - 10000	0.4 - 10000	4 - 10000	4 - 10000
Shock limit (g pk)	±50000	±50000	±150000	±150000
Temperature Range (Operating)	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C
Dimensions (in(mm))	0.375 x 0.88 9.5 x 22.4	0.375 x 0.88 9.5 x 22.4	0.375 x 0.87 9.5 x 22.1	0.375 x 1.04 9.5 x 26.5
Weight (gm)	5.4	5.4	4.5	5.5
Excitation voltage (V)	20 - 30	20 - 30	20 - 30	20 - 30
Mounting method	1/4-28 UNF-3A stud	1/4-28 UNF-3A stud	1/4-28 UNF-3A stud	1/4-28 UNF-3A stud

SPECIFICATIONS				
Model Number	**PCB 350B41**	**PCB 350B42**	**PCB 350B43**	**PCB 350B44**
Description	Triaxial Hermetically Sealed Mechanically Isolated	Triaxial Hermetically Sealed Mechanically Isolated	Triaxial Hermetically Sealed Mechanically Isolated	Triaxial Hermetically Sealed Mechanically Isolated
Range (g)	±100000	±50000	±10000	±5000
Sensitivity (mV/g)	0.05	0.1	0.5	1.0
Frequency response (Hz)	4 - 10000	4 - 10000	0.4 - 10000	0.4 - 10000
Shock limit (g pk)	± 150,000	± 150,000	±50000	±50000
Temperature Range (Operating)	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C	-10 to +150 °F -23 to +66 °C
Dimensions (in(mm))	1.02 x 1.02 x 1.02 (26.0 x 26.0 x 26.0)	1.02 x 1.02 x 1.02 (26.0 x 26.0 x 26.0)	1.02 x 1.02 x 1.02 (26.0 x 26.0 x 26.0)	1.02 x 1.02 x 1.02 (26.0 x 26.0 x 26.0)
Weight (gm)	27	27	27	27
Excitation voltage (V)	20 - 30	20 - 30	20 - 30	20 - 30
Mounting method	Through Hole, 1/4-28 x .87 screw	Through Hole, 1/4-28 x .87 screw	Through Hole, 1/4-28 x .87 screw	Through Hole, 1/4-28 x .87 screw

SIGNAL CONDITIONING FOR HIGH-G SHOCK

SPECIFICATIONS			
Model Number	**ENDEVCO 4418**	**PCB 482C27**	**PCB 483C28**
Features	PR	PR / ICP®	PR / ICP®
Channels	1	4	8
Gain	1, 10, 100	0.1 to 200	0.1 to 200
Power Requirements (VAC)	Battery powered, rechargeable	AC	AC

SPECIFICATIONS	
Model Number	**ENDEVCO 4416C**
Features	ICP®
Channels	1
Gain	1,10, 100
Power Requirements (VAC)	Battery powered, rechargeable

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