

High sensitivity accelerometers



SERIES 393

SENSORS FOR SEISMIC TESTING



- Piezoelectric ICP® accelerometers, cables, and signal conditioners
- High sensitivity output
- Extended low frequency measurement capability
- Resolution down to 1.0 μg rms
- Hermetically sealed, stainless steel or titanium housings
- Durable, water resistant connectors

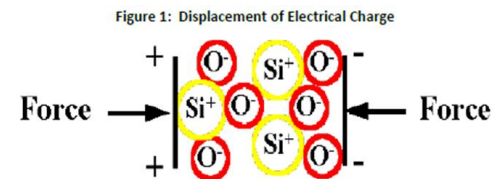
TYPICAL APPLICATIONS

- Smart infrastructure - foundation, floor vibration, and security monitoring
- Earthquake detection / sway fatigue analysis
- Structural testing of bridges and foundations
- Process monitoring inside machinery that is susceptible to low level vibration

LOW FREQUENCY, HIGH OUTPUT ICP® ACCELEROMETERS

Earth tremors, foot, truck and automobile, road and bridge traffic, trains or other seismic events impart low frequency vibration on foundations intended to support these daily activities. These vibratory loads accumulate as stress and may degrade the structure. Smart infrastructure includes active measurement with real-time data logging that informs operators on structural integrity; critical during unforeseen loading scenarios. Cities of the future will manage not only new structures but those with critical or historical value, reducing potential for catastrophic failure.

PCB® is supporting advancements in sensor technology to take low frequency measurements to micro-g levels with ICP® accelerometers. In doing so, structural integrity data can be obtained on a routine, real-time basis. Permanently installed, high-output accelerometers are being mounted to bridges, walkways, highways, buildings, and other large structures to capture important trending data. Information gathered will aid engineers in evaluating structural integrity and alert communities when safety thresholds are approaching. This type of preventive maintenance can warn engineers that structural repair is necessary before a major catastrophe occurs.



SPECIFICATIONS

Model Number	393A03	393B04	393B32	393B12	393B05	393B31
Performance						
Sensitivity	1.0 V/g	1.0 V/g	5.0 V/g	10 V/g	10 V/g	10 V/g
Measurement Range	± 5.0 g pk	± 5.0 g pk	± 1.0 g pk	± 0.5 g pk	± 0.5 g pk	± 0.5 g pk
Frequency Range ($\pm 5\%$)	0.5 to 2,000 Hz	0.06 to 450 Hz	0.2 to 200 Hz	0.15 to 1,000 Hz	0.7 to 450 Hz	0.1 to 200 Hz
Resonant Frequency	$\geq 10,000$ Hz	$\geq 2,500$ Hz	≥ 700 Hz	$\geq 10,000$ Hz	$\geq 2,500$ Hz	≥ 700 Hz
Broadband Resolution	0.00001 g rms	0.00003 g rms	0.00002 g rms	0.00008 g rms	0.00004 g rms	0.00001 g rms
Non-Linearity	$\leq 1\%$	$\leq 1\%$	$\leq 1\%$	$\leq 1\%$	$\leq 1\%$	$\leq 1\%$
Transverse Sensitivity	$\leq 7\%$	$\leq 5\%$	$\leq 5\%$	$\leq 7\%$	$\leq 5\%$	$\leq 5\%$
Overload Limit (Shock)	± 5000 g pk	± 300 g pk	± 40 g pk	± 5000 g pk	± 300 g pk	± 40 g pk
Base Strain Sensitivity	≤ 0.0005 g/ μ	≤ 0.0005 g/ μ	≤ 0.0005 g/ μ	≤ 0.0005 g/ μ	≤ 0.0005 g/ μ	≤ 0.0005 g/ μ
Temperature Range	-65 to +250 °F	-15 to +176 °F	-15 to +150 °F	-50 to +180 °F	-15 to +176 °F	-15 to +150 °F
Electrical						
Excitation Voltage	18 to 30 VDC	18 to 30 VDC	24 to 28 VDC	18 to 30 VDC	18 to 30 VDC	24 to 28 VDC
Constant Current Excitation	2 to 20 mA	2 to 10 mA	2 to 10 mA	2 to 20 mA	2 to 10 mA	2 to 10 mA
Output Impedance	< 250 Ohm	< 500 Ohm	≤ 500 Ohm	< 1500 Ohm	< 500 Ohm	≤ 500 Ohm
Output Bias Voltage	8 to 12 VDC	7 to 12 VDC	8 to 14 VDC	8 to 12 VDC	7 to 12 VDC	8 to 14 VDC
Discharge Time Constant	1 to 3 sec	5 to 15 sec	≥ 2 sec	≥ 3.5 sec	0.5 to 2.0 sec	≥ 5 sec
Settling Time	< 15 sec	< 100 sec	≤ 10 sec	< 60 sec	< 100 sec	60 sec
Spectral Noise (1 Hz) (Typical)	2 $\mu\text{g}/\sqrt{\text{Hz}}$	0.30 $\mu\text{g}/\sqrt{\text{Hz}}$	0.12 $\mu\text{g}/\sqrt{\text{Hz}}$	1.30 $\mu\text{g}/\sqrt{\text{Hz}}$	0.50 $\mu\text{g}/\sqrt{\text{Hz}}$	0.06 $\mu\text{g}/\sqrt{\text{Hz}}$
Spectral Noise (10 Hz) (Typical)	0.5 $\mu\text{g}/\sqrt{\text{Hz}}$	0.10 $\mu\text{g}/\sqrt{\text{Hz}}$	0.02 $\mu\text{g}/\sqrt{\text{Hz}}$	0.32 $\mu\text{g}/\sqrt{\text{Hz}}$	0.10 $\mu\text{g}/\sqrt{\text{Hz}}$	0.01 $\mu\text{g}/\sqrt{\text{Hz}}$
TEDS 1.0 version available (TLD)	-	Yes	-	-	Yes	-
Physical						
Sensing Element	Ceramic					
Sensing Geometry	Shear	Flexural	Flexural	Shear	Flexural	Flexural
Housing Material	Stainless Steel	Titanium	Stainless Steel	Stainless Steel	Titanium	Stainless Steel
Size - Diameter / Hex	1.18 in	0.99 in	2.25 in	1.18 in	0.99 in	2.25 in
Size - Height	2.18 in	1.22 in	2.80 in	2.18 in	1.22 in	2.80 in
Weight	210 gm (7.4 oz)	50 gm (1.8 oz)	635 gm (22.4 oz)	210 gm (7.4 oz)	50 gm (1.8 oz)	635 gm (22.4 oz)
Electrical Connector	2-Pin MIL-C-5015	10-32 Coaxial Jack	2-Pin MIL-C-5015	2-Pin MIL-C-5015	10-32 Coaxial Jack	2-Pin MIL-C-5015
Mounting Thread	1/4-28 Female	10-32 Female	1/4-28 Female	1/4-28 Female	10-32 Female	1/4-28 Female