SENSORS FOR VEHICLE & POWERTRAIN NVH TESTING

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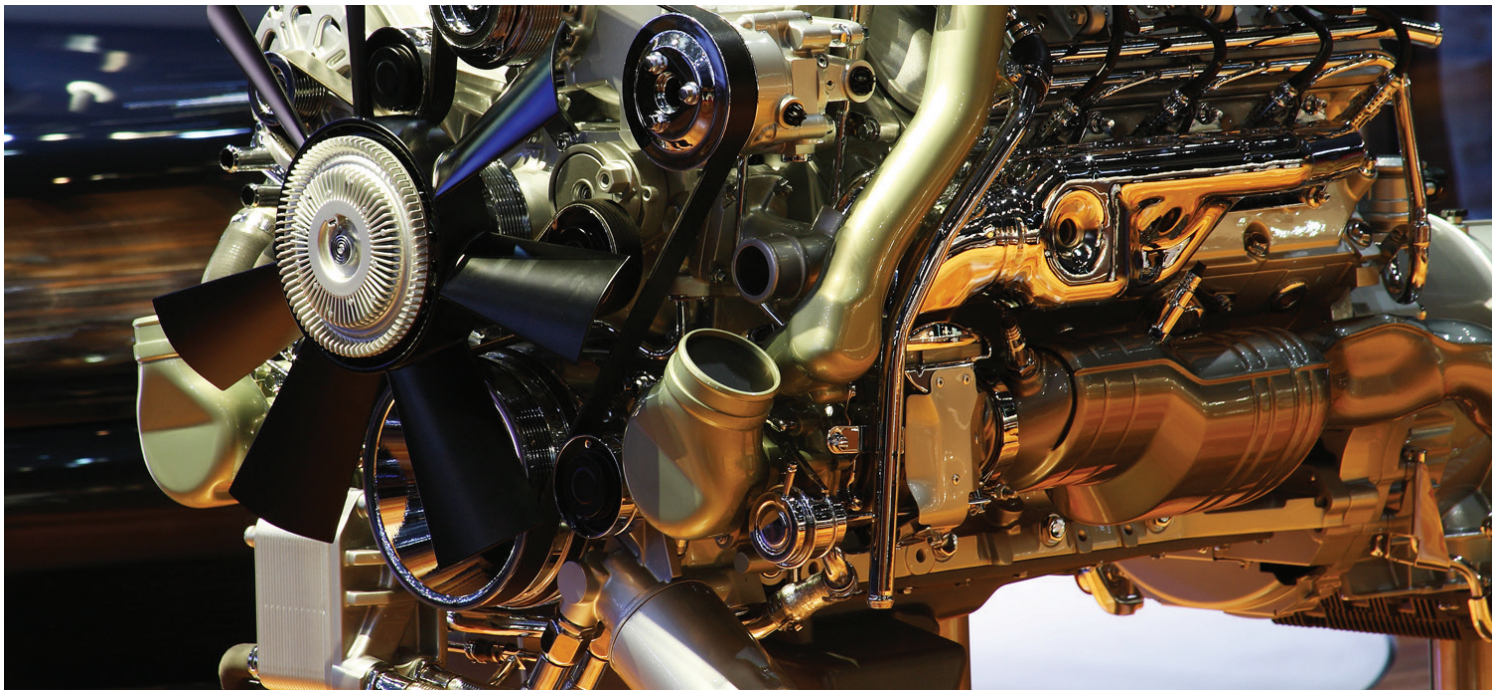


SENSORS FOR VEHICLE NOISE, VIBRATION & SHOCK TESTING

As a leader in sensor technology, PCB® understands the critical role Noise, Vibration, and Harshness (NVH) testing plays in vehicle development. NVH analysis targets the detection, measurement, and reduction of unwanted sounds and vibrations—elements that directly impact driving dynamics, occupant comfort, and perceived quality. For automotive engineers, controlling these factors is essential to meet stringent regulatory standards while satisfying customer demand for a quiet, refined ride.

Our sensors empower NVH testing across the development lifecycle. In the concept phase, simulation-driven insights—enabled by precise data—help you anticipate and address noise and vibration challenges early. As prototypes take shape, our solutions support rigorous lab and road testing, delivering the accuracy needed to optimize vehicle performance. By production, comprehensive NVH evaluation, backed by our technology, ensures disruptive noise and vibrations are minimized, reducing warranty risks and elevating driver satisfaction—all while reinforcing your brand's commitment to excellence.

PCB's comprehensive sensor portfolio is engineered to address a wide range of NVH challenges, providing the precision and flexibility required for even the most demanding automotive applications. Whether you're analyzing structural dynamics or fine-tuning powertrain acoustics, our sensors offer accurate, repeatable results tailored to your needs.

Key testing areas include:

- Structural computer aided engineering (CAE) and modal analyses
- Dynamic system simulations
- Powertrain mounting strategies
- Body mounting concepts
- Suspension configurations
- Vehicle simulations
- Competitor benchmarking

GENERAL PURPOSE ICP® ACCELEROMETERS

LIGHTWEIGHT ICP® ACCELEROMETER

MODEL 352C22

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10%): 0.7 to 13k Hz
- Weight: 0.017 oz (0.5 gm)
- Ground isolated

MINIATURE ICP® ACCELEROMETER

MODELS 352C65 & 352C68

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range (±10%): 0.3 to 12k Hz
- Weight: 0.07 oz (2 gm)
- Ground isolation models available

GENERAL PURPOSE ICP® ACCELEROMETER

MODELS 352C03 & 352C04

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10%): 0.3 to 15k Hz
- Weight: 0.20 oz (5.8 gm)
- Ground isolation, water resistant and TEDS models available

MINIATURE TRIAXIAL ICP® ACCELEROMETER

MODELS 356A01 & 356A03

- Sensitivity: 5 / 10 mV/g
- Measurement Range: ±1000 / ±500 g pk
- Frequency Range (±1 dB): 2 to 8k Hz
- Small 0.25 in (6.4 mm) adhesive mount cube
- Weight: 0.04 oz (1.0 gm)

TRIAXIAL ICP® ACCELEROMETER

MODEL 356A33

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±5%): 2 to 10k Hz
- Small 0.4 in (10.2 mm) stud mountable cube
- Weight: 0.19 oz (5.3 gm)

HIGH FREQUENCY ICP® TRIAXIAL ACCELEROMETER

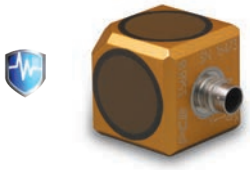
MODEL 356A19

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10%): 0.6 to 15k Hz
- Weight: 0.14 oz (4 gm)
- TEDS IEEE 1451.4 enabled

HIGH SENSITIVITY ICP® TRIAXIAL ACCELEROMETER

MODEL 356A15

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range(±10%): 1.4 to 6.5k Hz
- Electrical Connector: 1/4-28 4-Pin



HIGH SENSITIVITY ICP® TRIAXIAL ACCELEROMETER

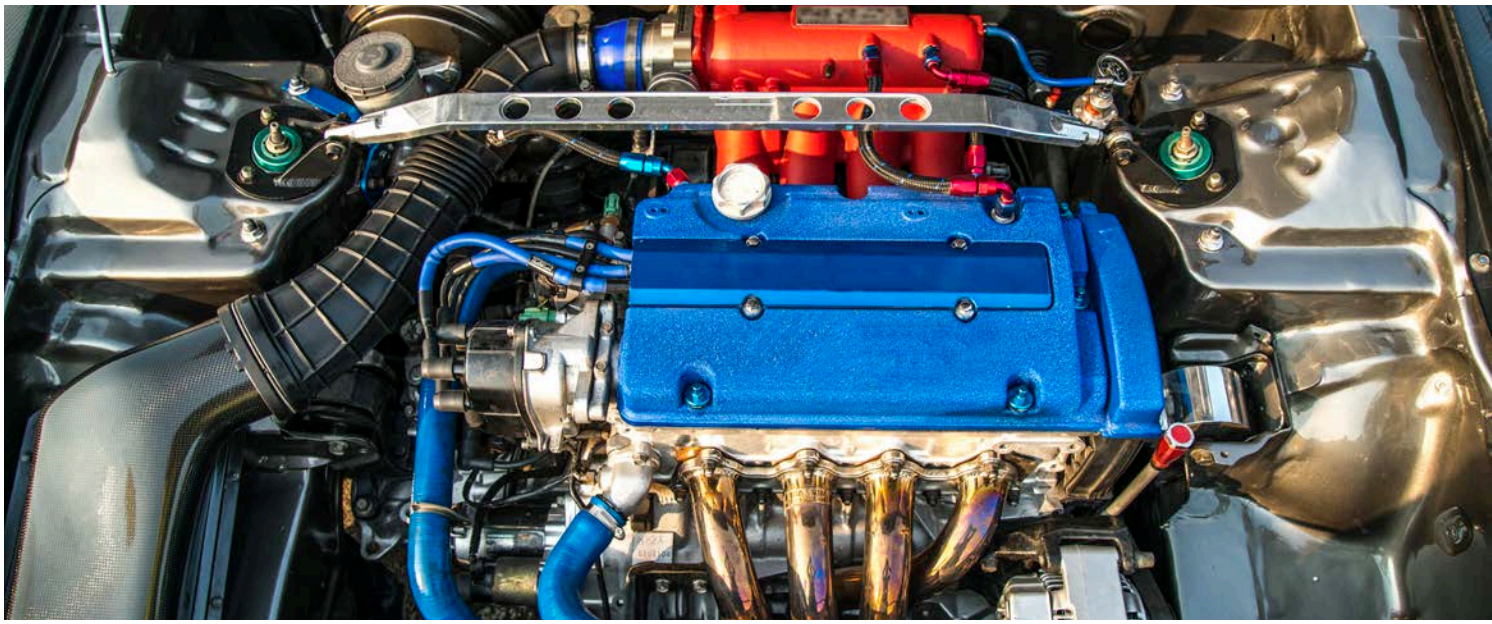
MODEL 356B18

- Sensitivity: 1000 mV/g
- Measurement Range: ±5 g pk
- Frequency Range (±10%): 0.3 to 5k Hz
- Electrical Connector: 1/4-28 4-Pin

GROUND ISOLATED TRIAXIAL HIGH SENSITIVITY ICP® ACCELEROMETER

MODEL 354C03

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range (±10%): 0.5 to 4k Hz
- Electrical Connector: 1/4-28 4-Pin



RUGGED SENSORS FOR HIGH SHOCK & EXTREME HEAT

Engine and powertrain NVH testing pushes sensors to their limits—high shock, extreme heat, and unrelenting vibration all demand exceptional resilience. PCB meets these challenges head-on with a portfolio of electrically filtered and thermally stable sensors, precision-engineered for the harshest powertrain environments.

ELECTRICALLY FILTERED FOR HIGH-SHOCK APPLICATIONS

In powertrain and driveline testing—whether for internal combustion and electric systems—mechanical shock can overwhelm unfiltered sensors, saturating signals and skewing results. PCB's electrically filtered sensors feature integrated low-pass filtering to suppress resonance from piezoelectric crystals, delivering clean, accurate measurements even in high-shock scenarios like gear impacts or sudden load changes.

THERMALLY STABLE FOR EXTREME TEMPERATURES

Extreme heat can destabilize sensor output, introducing errors that undermine data quality. PCB counters this with thermally stable solutions, including UHT-12® crystal technology for broad temperature sensitivity and low temperature coefficient (LTC) designs for precision up to 356°F (180°C). Housed in hermetically sealed titanium, these sensors reduce noise and strain interference, providing steady performance in conditions that challenge typical accelerometers.

MINIATURE THERMALLY STABLE ICP® ACCELEROMETER

MODEL 320C52 & 320C53

- Sensitivities: 10 / 1 mV/g
- Measurement Range: ±500 / ±5k g pk
- Frequency Range: 0.6 to 15k Hz / 0.6 to 10k Hz
- Temperature Range: -100 to +325 °F (-73 to 163 °C)
- Weight: .065 oz (1.85 gm)

THERMALLY STABLE ICP® ACCELEROMETER

MODEL 320C20

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10 %): 1.5 to 10k Hz
- Temperature Range: -100 to +325 °F (-73 to 163 °C)

HIGH FREQUENCY ICP® ACCELEROMETER

MODEL 352A60

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±3dB): 5 to 60k Hz
- Temperature Range: -65 to +250 °F (-54 to 121 °C)

UHT-12™ TRIAXIAL ICP® ACCELEROMETER

MODEL HT339C31

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10%): 1.5 to 11k Hz
- Temperature Range: -65 to 325°F (-54 to 163°C)

FILTERED LTC TRIAXIAL ICP® ACCELEROMETER

MODELS TLD339A36 & TLD339A37

- Sensitivities: 10 / 100 mV/g
- Measurement Range: ±500 g pk / ±50 g pk
- Frequency Range (±10%): 1 to 8k / 0.2 to 7k Hz
- Temperature Ranges: -65 to 325 / 356°F (-54 to 163 / 180°C)

HIGH FREQUENCY ICP® TRIAXIAL ACCELEROMETER

MODELS 356A24

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±10%): 0.5 to 12k Hz
- Temperature Range: -65 to +250 °F (-54 to 121 °C)

TRIAXIAL CHARGE ACCELEROMETER

MODEL 357A67

- Sensitivity: 3.0 pC/g
- Measurement Range: ±1000 g pk
- Frequency Range (±10 %): 1 to 10K Hz
- Temperature Range: -76 to +392 °F (-60 to +200 °C)

VERY HIGH TEMPERATURE, SINGLE-ENDED CHARGE ACCELEROMETER

MODEL 357A63

- Sensitivity: 0.53 pC/g
- Measurement Range: ±5k g pk
- Frequency Range (±10 %): 1 to 10k Hz
- Temperature Range: -65 to +900 °F (-54 to 482 °C)

MINIATURE HIGH TEMPERATURE CHARGE ACCELEROMETER

MODEL 357A08

- Sensitivity: 0.35 pC/g
- Measurement Range: ±1k g pk
- Frequency Range (±10 %): 1 to 20k Hz
- Temperature Range: -100 to 350°F (-73 to 177°C)
- Weight: 0.006 oz (0.16 gm)

ELECTRICALLY ISOLATED SENSORS FOR ELECTRIC VEHICLES

Hybrid and electric vehicles present unique NVH challenges due to high-voltage systems, gear whine, and lower masking noise from the absence of combustion engines. PCB's broad line of isolated accelerometers reduces electrical interference and prevents ground loops in these environments, providing stable and accurate measurements in the face of strong electromagnetic fields.

HIGH-VOLTAGE TRIAXIAL ICP® ACCELEROMETER

MODEL HV356A03

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±5%): 2 to 6.8k Hz
- Rated for direct contact up to 2000 VDC

HIGH-VOLTAGE TRIAXIAL ICP® ACCELEROMETER

MODELS HV356A44 & HV356A45

- Sensitivity: 50 / 100 mV/g
- Measurement Range: ±100 / 50 g pk
- Frequency Range (±5%): 0.7 to 5k Hz
- TEDS compliant
- Rated for direct contact up to 2000 VDC

GROUND ISOLATED TEDS TRIAXIAL ACCELEROMETER

MODELS J356A43, J356A44, J356A45

- Sensitivities: 10 mV/g / 50 mV/g / 100 mV/g
- Measurement Range: ±500 g pk / ±100 g pk / ±50 g pk
- Frequency Range (±10%): 0.4 to 10k Hz
- TEDS compliant

MINIATURE TRIAXIAL ICP® ACCELEROMETER

MODEL J356A03

- Sensitivity: 10 mV/g
- Measurement Range: ±500 g pk
- Frequency Range (±5%): 2 to 8k Hz
- Small 0.28 in (7.1 mm) adhesive mount cube
- Weight: 0.04 oz (1 gm)

MINIATURE CERAMIC SHEAR ICP® ACCELEROMETER

MODEL 352A24

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range (±10%): 0.8 to 10k Hz
- Weight: 0.03 oz (0.8 gm)

HIGH SENSITIVITY ICP® ACCELEROMETER

MODEL J352C33

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range(±10 %): 0.3 to 15k Hz
- Integral ground isolation base

CASE ISOLATED HIGH SENSITIVITY TRIAXIAL ICP® ACCELEROMETER

MODELS 354B04 & 354B05

- Sensitivity: 10 and 100 mV/g
- Measurement Range: ±500 g pk / ±50 g pk
- Frequency Range (±5 %): 0.6 to 10k Hz
- TEDS compliant

VC MEMS ACCELEROMETERS FOR LOW-FREQUENCY MEASUREMENTS

PCB® variable capacitance (VC) MEMS accelerometers measure vibration down to 0 Hz, making them ideal for applications like road load data acquisition (RLDA), drivability, ride and handling, and other low-frequency NVH studies. With full-scale ranges from ±2 g to ±200 g, they offer high resolution, low spectral noise, and robust silicon MEMS elements for reliable, repeatable performance—even under high frequency overload.

SINGLE-ENDED VC MEMS ACCELEROMETERS

SERIES 3711F & 3713F

- Sensitivities: 6.75 mV/g to 675 mV/g
- Measurement Range: ±2 g pk to ±200 g pk
- Frequency Range : 0 to 1.5k Hz
- Case isolated, hermetically sealed titanium housing
- Available in single-axis or triaxial configurations

DIFFERENTIAL OUTPUT, SINGLE AXIS VC MEMS ACCELEROMETERS

SERIES 3741F

- Sensitivities: 13.5 mV/g to 1350 mV/g
- Measurement Range: ±2 g pk to ±200 g pk
- Frequency Range (±5%): 0 to 1.5k Hz (±5%)
- Ground isolated, hard-anodized aluminum housing
- Integral, 4-conductor shielded cable

DIFFERENTIAL OUTPUT, TRIAXIAL VC MEMS ACCELEROMETERS

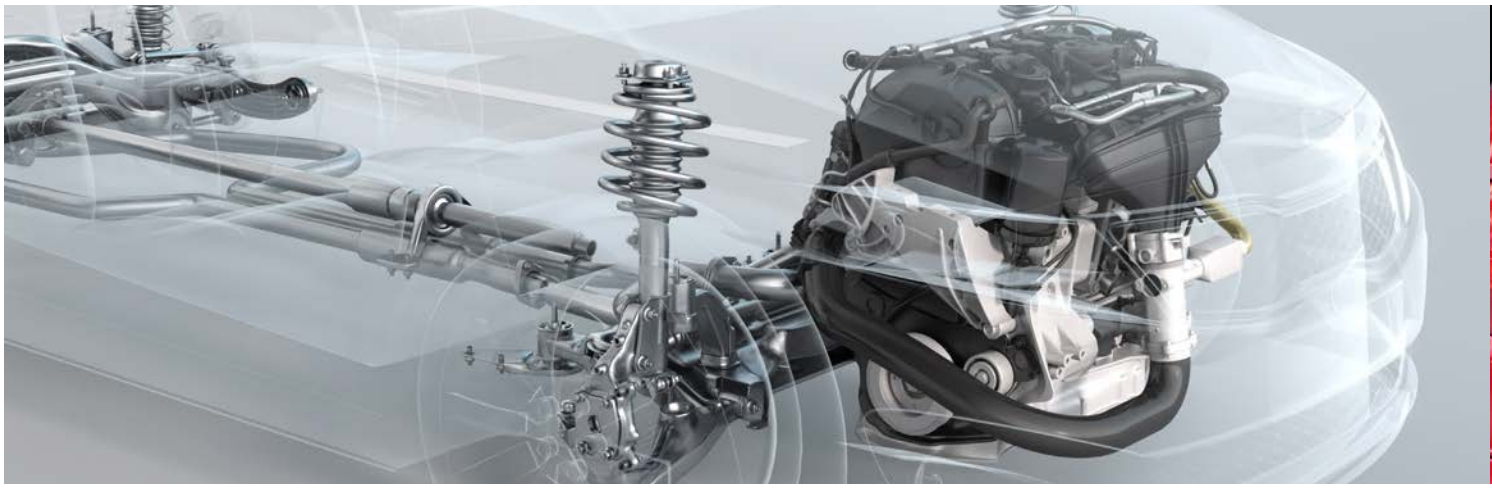
SERIES 3743G

- Sensitivity: 13.5 mV/g to 1350 mV/g
- Measurement Range: ±2 to ±200 g pk
- Frequency Range (±5%): 0 to 1.5k Hz
- Case isolated, hermetically sealed stainless steel housing
- M8x1 8-pin connector (3743G11) / integral cable - IP67 (3743G12)

COMPACT TRIAXIAL VC MEMS ACCELEROMETER

MODEL 3753A

- Sensitivity: 50 mV/g to 1000 mV/g
- Measurement Ranges: ±2g to ±40g
- Frequency Range (±5%): 0 to 750 Hz
- Anodized aluminum housing, rated IP67
- Integral 10 foot silicone cable



ACOUSTIC SENSORS FOR NOISE SOURCE IDENTIFICATION

PCB microphones—available in a variety of prepolarized, externally polarized, array, probe, and special-purpose designs—excel at tests such as buzz, squeak, and rattle (BSR), noise path/transfer path analysis (NPA/TPA), and pass-by noise. Challenging measurement environments such as under-hood and in wheel-well can easily be addressed with microphones specially designed for use in extreme temperatures, high humidity and dirty environments. Prepolarized microphones simplify setups with common coaxial cables and ICP® compatibility, and all PCB microphones include TEDS for reduced configuration time.

1/2" PREPOLARIZED LOW NOISE MICROPHONE SYSTEM

MODEL 378A04

- Sensitivity: 450 mV/Pa
- Frequency Range (±2 dB): 5 to 16k Hz
- Inherent Noise: 5.5 dB(A) re 20 µPa
- Dynamic Range: (3% Distortion Limit) >80 dB re 20 µPa
- Noise Floor: 5.5 dB(A)
- TEDS compliant

1/2" PREPOLARIZED FREE-FIELD CONDENSER MICROPHONE

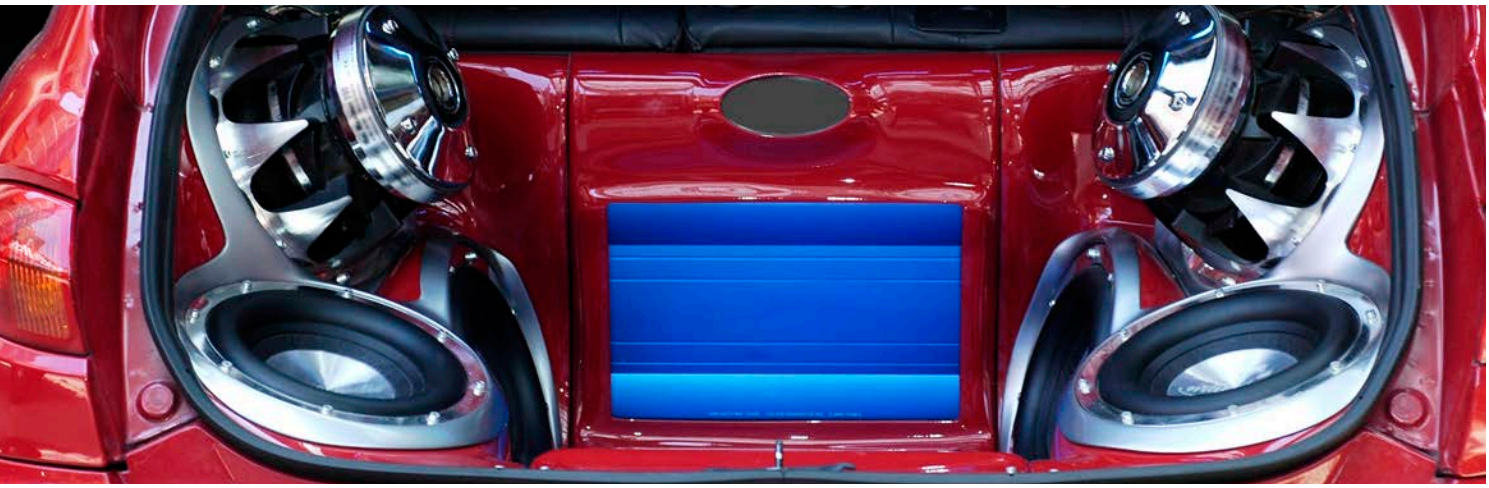
MODEL 378B02

- Sensitivity: 50 mV/Pa
- Frequency Range (±2 dB): 3.75 Hz to 20 kHz
- Inherent Noise: 15.5 dB(A) re 20 µPa
- Dynamic Range: 137 dB re 20 µPa
- TEDS compliant

1/2" PREPOLARIZED RANDOM INCIDENCE CONDENSER MICROPHONE

MODEL 378C20

- Sensitivity: 50 mV/Pa
- Frequency Range (± 2 dB): 3.75 Hz to 20 kHz
- Inherent Noise: 16 dB(A) re 20 µPa
- Dynamic Range: 137 dB re 20 µPa
- TEDS compliant



HIGH TEMPERATURE PROBE MICROPHONE

MODEL 377B26

- Sensitivity: 2.15 mV/Pa
- Frequency Range(+2.2/-4.9dB): 2 to 20k Hz
- Inherent Noise: 44 dB(A) re 20 µPa
- Dynamic Range: 165 dB re 20 µPa
- Temperature Range: -40 to +1472° F (-40 to +800°C)

ICP® ARRAY MICROPHONE

MODELS 130F20, 130F21,130F22

- Sensitivity: 45 mV/Pa
- Frequency Range: (±3dB) 10 to 16k Hz
- Inherent Noise: 29 dB re 20 µPa
- Dynamic Range: 122 dB re 20 µPa
- TEDS compliant

1/2" ICP® MICROPHONE SYSTEM

MODEL 376B02

- Sensitivity: 50 mV/Pa
- Frequency Range (±2 dB): 3.75 to 20k Hz
- Inherent Noise: <16.5 dB(A) re 20 µPa
- Dynamic Range:135 dB re 20 µPa
- TEDS compliant, also available for random incidence and pressure response

ICP® WATER RESISTANT ARRAY MICROPHONE

MODEL 130A24

- Sensitivity: 10 mV/Pa
- Frequency Range (±3dB): 20 to 16k Hz
- Inherent Noise: <30 dB(A) re 20 µPa
- Dynamic Range: 143 dB re 20 µPa
- TEDS compliant

1/4" LOW NOISE ICP® PREPOLARIZED MICROPHONE SYSTEM

MODEL 378A08

- Sensitivity: 50 mV/Pa
- Frequency Range: (±2 dB) 12 to 20k Hz
- Inherent Noise: ≤25 dB(A) re 20 µPa
- Dynamic Range: 123 dB re 20 µPa
- TEDS compliant

1/4" PREPOLARIZED PRESSURE MICROPHONE

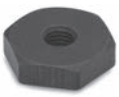
MODEL 378C10

- Sensitivity: 1 mV/Pa
- Frequency Range (±2dB): 5 to 70k Hz
- Dynamic Range: 173 dB re 20 µPa
- Inherent Noise: 50 dB(A) re 20 µPa
- TEDS compliant

IMPACT / MODAL HAMMERS

ICP® MODAL HAMMERS						
Model Number	**086E80**	**(TLD)086C01**	**(TLD)086C02**	**(TLD)086C03**	**(TLD)086C04**	**(TLD)086D05**
Sensitivity	100 mV/lbf	50 mV/lbf		10 mV/lbf	5 mV/lbf	1 mV/lbf
Measurement Range	50 lbf pk	±100 lbf pk		±500 lbf pk	1,000 lbf pk	5,000 lbf pk
Resonant Frequency	≥100 kHz	≥15 kHz	≥22 kHz	≥22 kHz	≥22 kHz	
Non-Linearity	≤1 %					
Discharge Time Constant	≥100 sec	≥500 sec		≥2,000 sec	≥2,000 sec	
Typical Applications	Resonance detection, mode analysis, transfer characteristics, crack and fatigue detection					

RECOMMENDED SENSOR ACCESSORIES



ADHESIVE MOUNTING BASE
MODEL 080A

TRIAXIAL MOUNTING ADAPTER
MODEL 080B16

ADHESIVE
MODEL 080A90

MOUNTING CLIP
MODEL 080A237

PETRO WAX
MODEL 080A109

REMOVAL TOOL
MODEL 039A08

4-CONDUCTOR, SHIELDED, FEP CABLE
MODEL 034WXX

4-CONDUCTOR, SHIELDED, POLYURETHANE CABLE
MODEL 078WXX

4-CONDUCTOR, SHIELDED, FEP CABLE
MODEL 010T10

RECOMMENDED ACOUSTIC ACCESSORIES

ADAPTER
MODEL ADP043

NOSE CONE
MODEL 079B21

WINDSCREEN
MODEL 079A06
MODEL 079A07

PREAMPLIFIER HOLDER
MODEL 079A11

SWIVEL HEAD ADAPTER
MODEL 079B23

MICROPHONE STAND
MODEL 079A15

MODAL SHAKERS FROM THE MODAL SHOP

THE MODAL SHOP
AN AMPHENOL COMPANY

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The Modal Shop's modal shakers are a proven solution in automotive testing laboratories throughout the world. With force ratings from 2 to 60 lbf (9 to 133 N), these shakers are suitable for a wide range of applications from body-in-white testing, to active vibration control, to a range of modal analysis testing. When performing experimental modal analysis and structural testing, the choice of excitation function and system will make the difference between a good measurement and a poor one. For many applications, an electrodynamic shaker system is the ideal choice.

The Modal Shop's line of modal shakers is designed to be highly portable, rugged, and easy to set up in order to facilitate the best testing results. The exciter size and excitation connection options allow a diversity of placement locations relative to the test structure, while minimizing any unwanted interaction between the exciter and test structure.

- Ensures simple stinger setup and adjustment via through-hole armature design with chuck and collet attachment
- Easier test setup with lightweight and portable designs from 0.56 lb (0.25 kg) to 37 lb (17 kg)
- Provides flexibility when mounting and aligning the shaker to the structure with trunnion base and EasyTurn™ handles
- Extended stroke and broad frequency range supply adequate input energy for modal applications

MODEL 2060E

MODEL 2025E

MODELS 2004E & 2007E

SmartShaker™ MODELS K2004E01 & K2007E01

MODEL 2002E

SPECIFICATIONS

Model Number	2060E	2025E	2007E [1]	SmartShaker™ K2007E01 [1]	2004E [1]	SmartShaker™ K2004E01 [1]	2002E [3]
Max Force: lbf (N) pk	60 (267)	13 (58)	7 (31)	7 (31)	4.5 (20)	4.5 (20)	2 (9)
Max Frequency: Hz [2]	6,000	9,000	9,000	9,000	11,000	11,000	3,000
Stroke: in (mm) pk-pk	1.4 (36)	0.75 (19)	0.5 (13)	0.5 (13)	0.2 (5)	0.2 (5)	0.35 (8.9)
Weight: lb (kg)	37 (17)	13 (6)	6 (3)	7 (3)	6 (3)	7 (3)	0.56 (0.25)
Notes	[1] Models 2004E/2007E and SmartShaker™ have no through-hole armature [2] Load dependent [3] No stingers used, mounting hardware included						

PCB PIEZOTRONICS
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