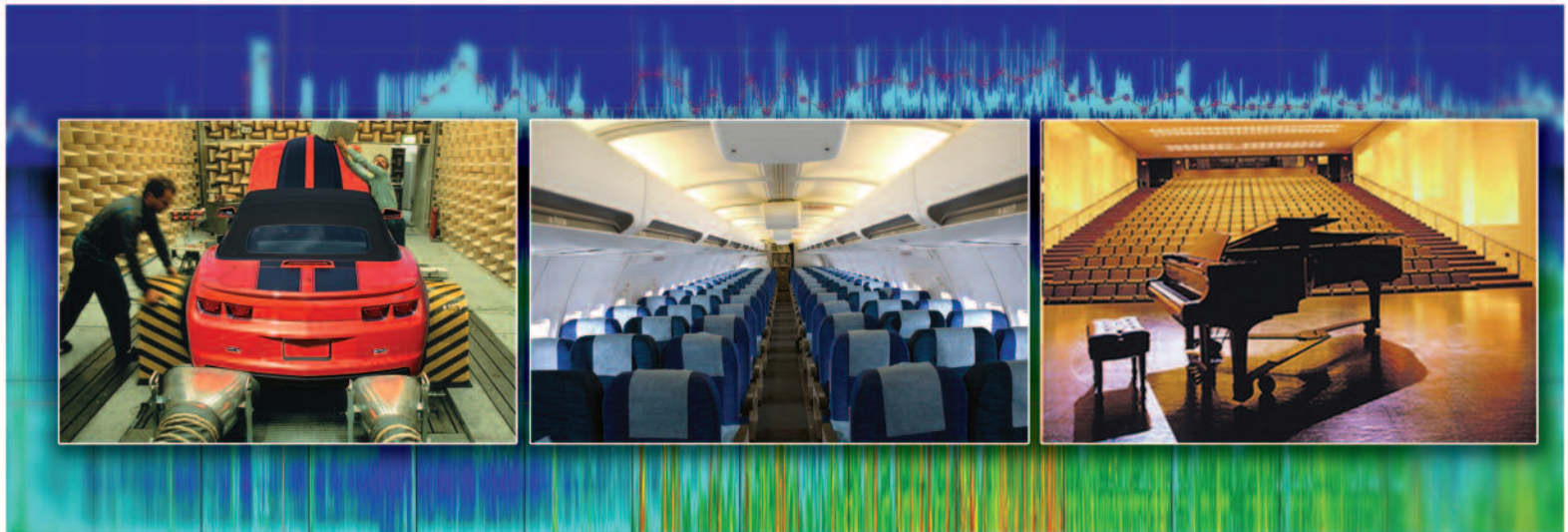


Acoustic Measurement Sensors & Instrumentation



NVH TESTING GUNSHOT ANALYSIS CABIN NOISE TESTING BUILDING ACOUSTICS
SOUND POWER HOLOGRAPHY OCCUPATIONAL HEALTH PASS-BY TESTING
MACHINERY MONITORING ENVIRONMENTAL NOISE WIND ENERGY NOISE IDENTIFICATION SOUND INTENSITY
LOUDSPEAKER DESIGN





PCB® – the Global Leader in Sensing Technologies

Trusted by Companies and Laboratories Worldwide



PCB Piezotronics, Inc. offers a variety of acoustic measurement products, including modern prepolarized and traditional externally polarized condenser, array, probe, low-profile surface, and special purpose microphones. Microphone products are complemented by an assortment of preamplifiers, signal conditioners, A-weighting filters, handheld calibrators, and accessories.

All PCB® acoustic products are made from the highest quality materials and are used in a variety of industries including: automotive, aerospace & defense, OEM's, universities, consultants, white goods (appliance) manufacturers and more.



Manufacturing Sensors Since 1967!

Over 40 Years Experience:

As a global supplier, PCB® has dedicated itself to the development of sensor technology and today employs over 1000 people worldwide. A large engineering staff and skilled employees, including Ph.Ds in acoustics and related technologies, enable PCB® to offer a wide variety of product offerings ranging from our acoustic sensors to accelerometers, force, torque, pressure, load, MEMS sensors, dosimeters and sound level meters. We know the relationships between different test and measurement requirements, and the environmental effects to be concerned about, and can recommend the best solution for your application.

Innovation:



PCB® is the founder of ICP® technology, which all the modern prepolarized acoustic designs are based upon. PCB® invests in employees and equipment to be a leader in technology. Whether it is being nominated for a top sensor design like the industry exclusive high temperature HT378B02, or pioneering microelectronics, or enabling our business partners to measure the lowest noise level in the world with our 3" microphone, you can be assured that PCB® is on the leading edge of acoustic designs.



Model HT378B02

Friendly Knowledgeable Support:

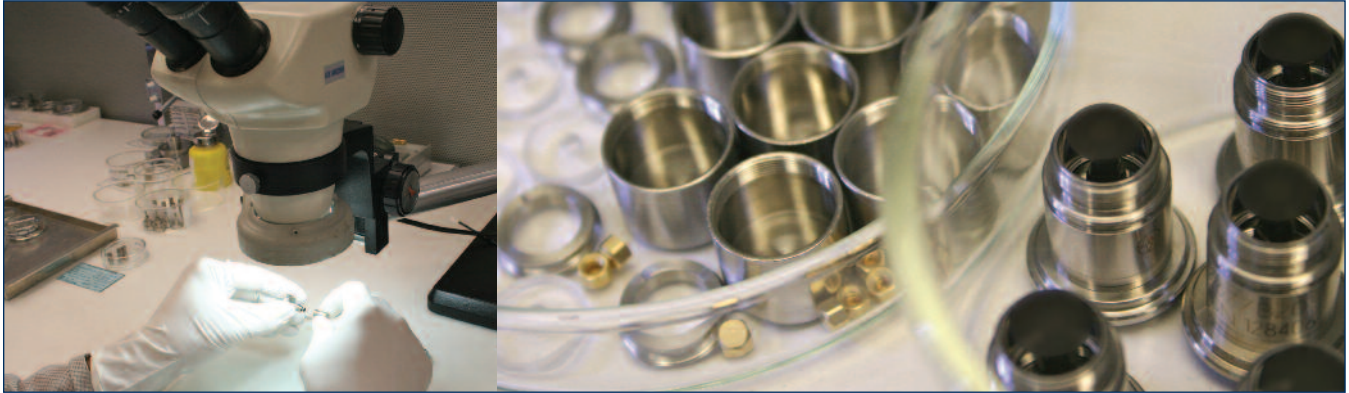
PCB® proudly stands behind their products with services you value most, including toll-free customer service, 24-hour SensorLineSM, a global distribution network, and guarantees **Total Customer Satisfaction** through its warranties.



Why pay for extended warranties when you can have the confidence of Lifetime Warranty? In addition to our commitment to your satisfaction, **our best selling products are enhanced with Lifetime Warranty Plus and can ship from stock in 3 days or less!** Look for the specially marked products throughout this brochure.



Look for this symbol for Products Guaranteed for life!



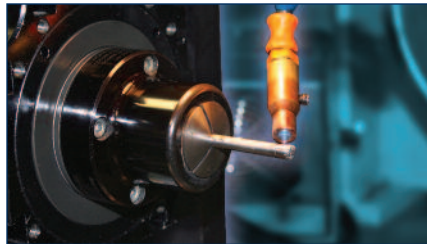
In-house Manufacturing

All PCB® acoustic products are made from the highest quality materials. PCB's in-house manufacturing capabilities allows us to control all the factors that affect quality, and delivery. We know what it takes to manufacture the best products and do not out-source parts to machine shops that do not fully understand sensor manufacturing and the effects of contamination. This is why PCB® has invested in clean rooms and multiple machining facilities.



High Volume Robotic Machining Cells

PCB's self-sufficient facilities control factors that affect quality, quantity and delivery. This reduced dependency on outside sources, allows PCB® to meet urgent needs, keeps cost down and then pass along the savings to the customer.



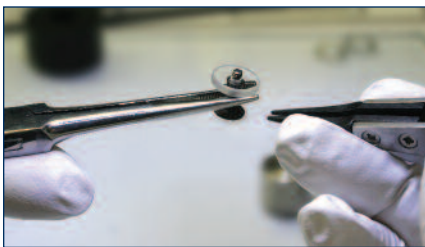
Laser Welding

Welded diaphragms are made in-house and in clean areas to provide more reliable stability for sensitivity and added robustness.



Enhanced Control of Quality

Equipped with multiple clean rooms, PCB® manufactures and assembles its microelectronics by certified professionals, enhancing noise floor and temperature capabilities.



Clean Rooms

Parts are assembled in clean rooms by trained technicians ensuring consistency and compatibility to Type 1, Class 1 and working class IEC standards.



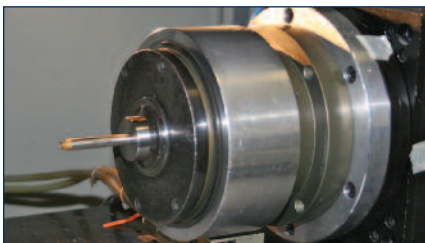
Environmental Chambers

Environmental stress relieving and testing ensures long term stability in the harshest environments.



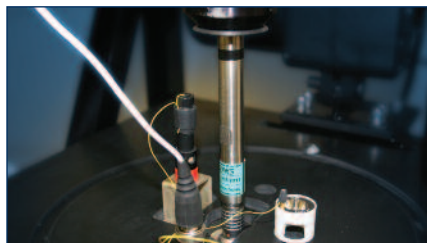
Nitrogen Storage Chambers

All critical components and assemblies are stored in nitrogen chambers to minimize contamination and maximize stability.



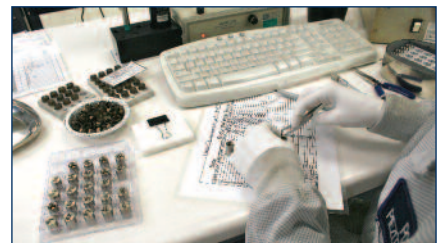
Laser Etching

Provides accessibility to part number and serial numbers. Disassembly is not required for easy-to-read model and serial number designation.



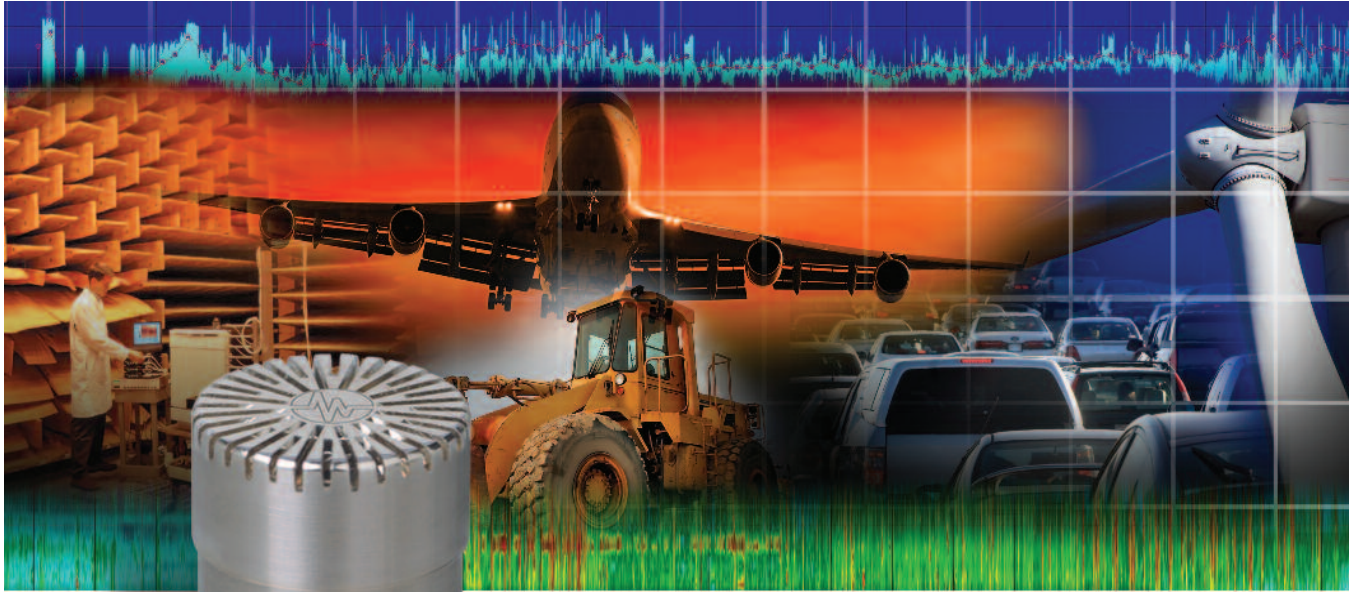
Calibration

Every PCB® microphone and preamplifier is calibrated with traceable certifications. Some competitors only offer sensitivity readings or certifications of compliance.



Inspection

Every PCB® microphone and preamplifier is individually inspected to ensure a quality product gets shipped each and every time.



Selecting the Right Microphone

There are a number of models and choices when deciding to purchase a system to measure noise. In some cases multiple microphone and preamplifier models will do the job for the same application. The following information will help you choose the system that will work best for the application. For additional information please visit our website: www.pcb.com and download the PCB® Microphone Handbook.

Microphones Field Types

Free-field

There are three common sound fields for precision condenser microphones. The first and most common is the free-field type. The free-field microphone is most accurate when measuring sound pressure levels that radiate from a single direction and source, which is pointed directly (0° incidence angle) at the microphone diaphragm, and operated in an area that minimizes sound reflections. **A free-field microphone** is designed to measure the sound pressure at the diaphragm, as it would appear if the microphone were not present. When a microphone is placed in a sound field, diffraction effects will alter the sound pressure when the frequency is high enough so that the wavelengths are similar in size to the dimension of the microphone. The effect is accounted for in the design of the microphone and the resulting correction factors are applied to the actuator response during calibration. These microphones work best in open areas where there are no hard or reflective surfaces. Anechoic chambers, or larger open areas, are ideal for these Free Field microphones.



Sound Source Location on White Goods for Noise Reduction

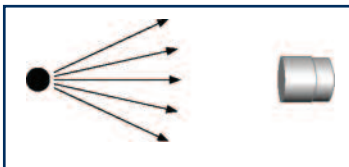


Fig 1. Free-Field



Pressure-field

The second type is called a **Pressure-field**. A Pressure Field microphone is designed to measure the sound pressure that exists in front of the diaphragm. It is described to have the same magnitude and phase at any position in the field. It is commonly used in an enclosure, or cavity, which is small when compared to wavelength. The microphone will include the measurement changes in the sound field caused by the presence of the microphone. The sound being measured is typically coming from a single source. Testing of pressure exerted on walls, exerted on airplane wings, or inside structures such as tubes, housings or cavities are examples of Pressure Type microphone applications.

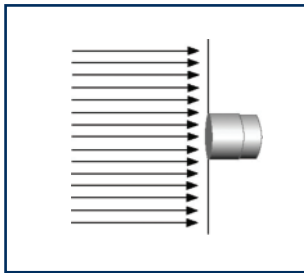


Fig 2. Pressure-field



Photo Courtesy of Troy Acoustics

Gun Shot and Blast Testing to Prevent Hearing Damage

Random Incidence

The third type is called a **Random Incidence** Microphone. This is also referred to as a "Diffuse Field Type." The Random Incidence type of microphone is designed to be omnidirectional and measure sound pressure coming from multiple directions, multiple sources and multiple reflections. The random incidence microphone will compensate for its own presence in the field. An average of the net effect of all the calibrated incidence angles will be taken into account, in order to come up with a net zero correction factor. When taking sound measurements in a cabin, music hall, church, or in an area with hard, reflective walls, you would utilize this type of microphone.

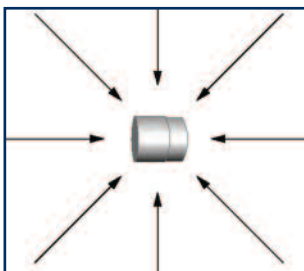


Fig 3. Random Incidence

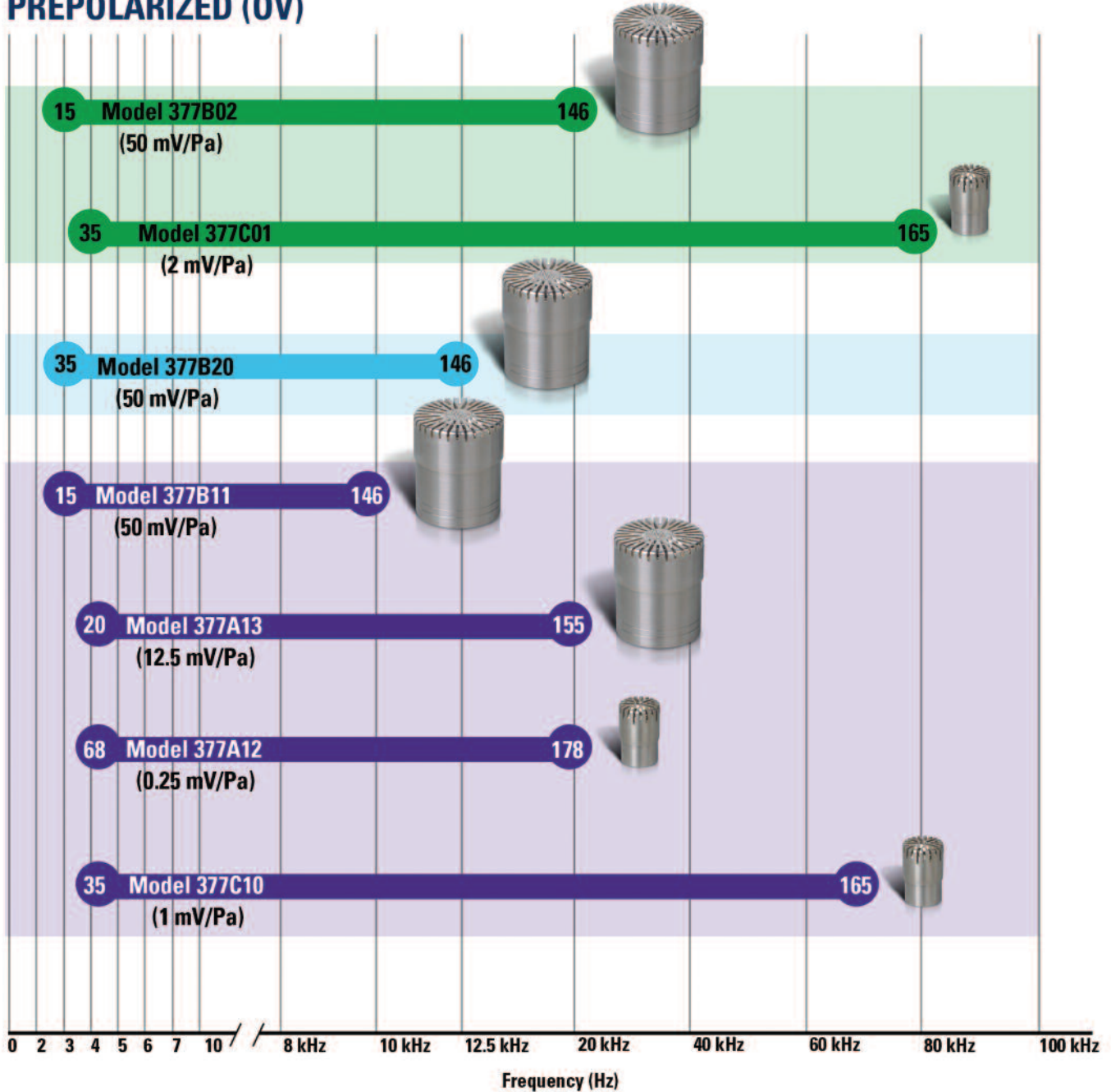


Cabin Noise Measurement for Operator Comfort

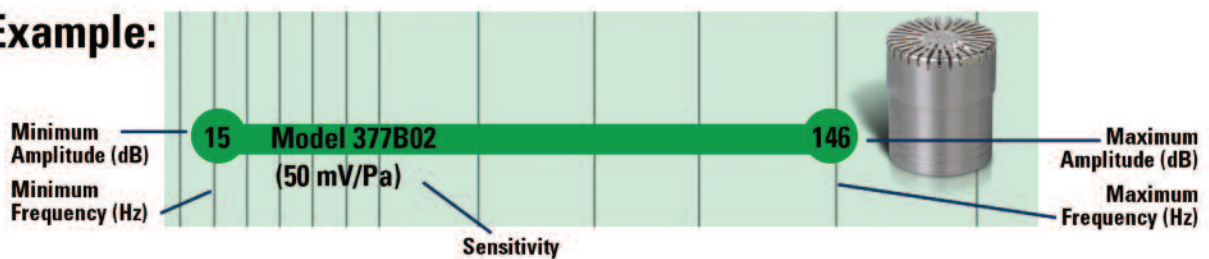


Microphone Comparison

Modern PREPOLARIZED (0V)

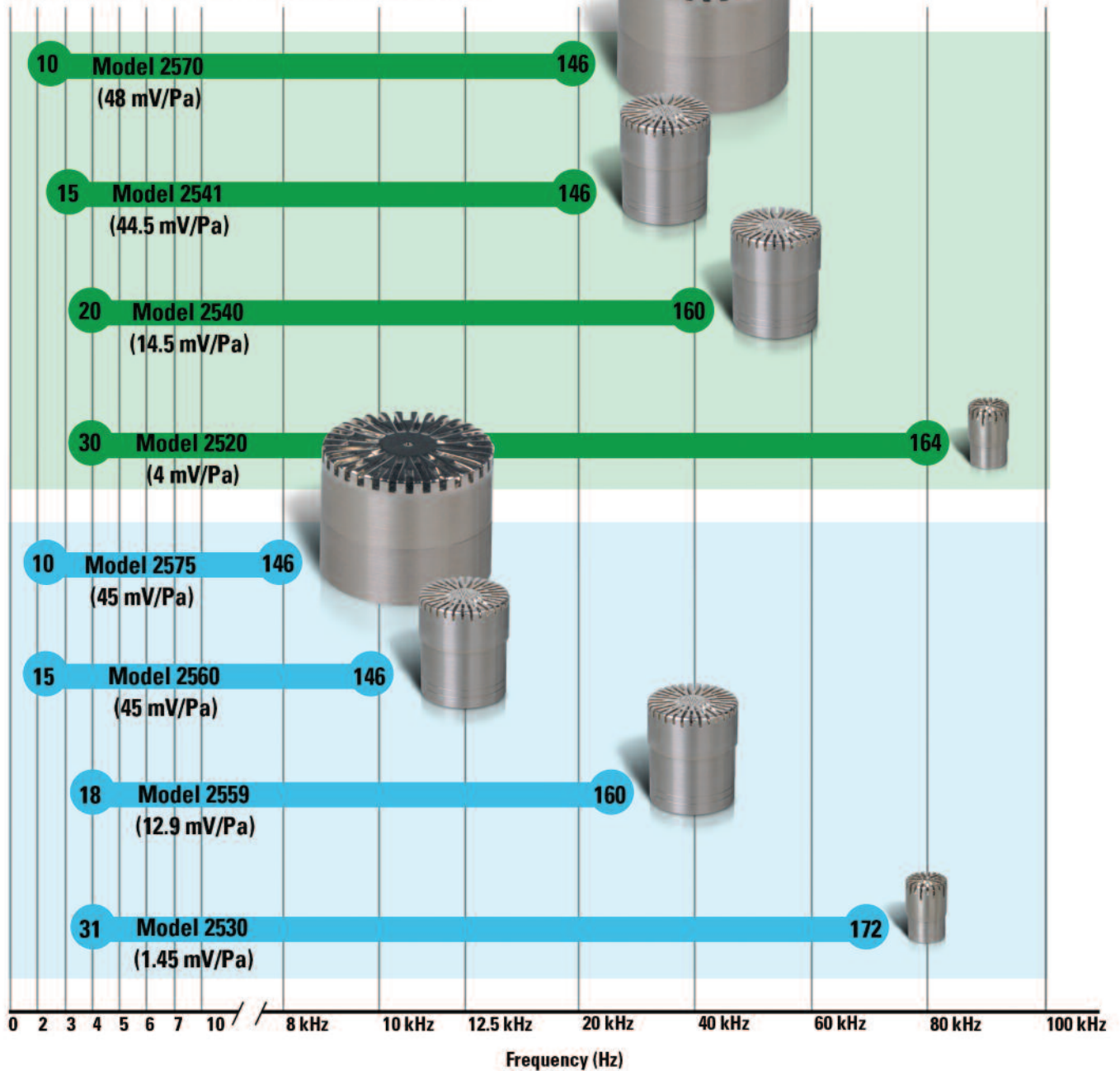


Example:





Traditional EXTERNALLY (200 V) POLARIZED



Response Type:



Free-field
Random Incidence
Pressure-field

Size:





Modern Prepolarized Precision Condenser Microphones and Preamplifiers

Prepolarized microphones were designed a few decades after their counterpart the traditional externally polarized microphones were developed. Prepolarized microphones have many advantages over the externally polarized models. This design utilizes power circuitry that PCB® invented for sensors, called ICP® power. By applying a polymer coating to the top of the backplane and embedding a charge on it, you can now eliminate costly 200V power supplies and use an 2-20 mA constant current supply or signal conditioner as a power source.

Prepolarized models are better suited for portable applications or ones that may see high humidity. An added benefit is their interchangeability with other NVH test equipment, for example most accelerometers or piezoelectric pressure sensors. This allows the use of low cost coaxial cables with 10-32, SMB or BNC connectors. With a multiple channel power supply, you can perform your vibration and acoustic tests within the same set-up, saving both time and money.



= Lifetime Warranty, plus Delivery Now! See page 2 for details.

TEDS Microphone & Preamplifier Systems, IEEE (P)1451.4 Compliant

	Free-field System			Pressure-field System			Random Incidence System
TEDS Version 0.9	378C01	378B02	HT378B02	378C10	378B11	378A13	378B20
TEDS Version 1.0	TLD378C01	TLD378B02	HTTLD378B02	TLD378C10	TLD378B11	TLD378A13	TLD378B20
Mated Pair	377C01	377B02	377B02	377C10	377B11	377A13	377B20
System Components	426B03	426E01	HT426E01	426B03	426E01	426E01	426E01
Diameter	1/4 in	1/2 in	1/2 in	1/4 in	1/2 in	1/2 in	1/2 in
Notes	High Amplitude, High Frequency Measurements	Audible Range, Low - Medium (dB) Amplitudes, Most Common	High Temperature Version of 378B02	High Frequency, High Amplitude Measurements	High Sensitivity, Low Frequency, Low Noise Measurements	Mid Range Frequency and Amplitude Measurements	Audible Range, High Sensitivity, Low - Medium (dB) Amplitudes
Application	Ultrasound, Blast, Gun Shot, Noise Identification	Pass-by, Noise Identification, Sound Power, Sound Intensity, Type 1 Sound Level Meters	Engine Analysis, Exhaust Testing, HVAC, Leak Detection	Ultrasound, Impedance Tubes, Cavity Analysis	Infrasound, Impedance Tubes, Cavity Analysis, Panel Testing	Impedance Tubes, Cavity Analysis, Panel Testing	Cabin Testing, Environmental Noise, Room Acoustics, Type 1 Sound Level Meters

* Note for individual specifications see the next page or visit our website: www.pcb.com

Transducer Electronic Data Sheets (TEDS) enhance the identification of each microphone. All PCB® Microphone & Preamplifier Systems come standard with TEDS functionality and are compliant with the IEEE (P)1451.4 standard. TEDS version is dependent upon your reader or data acquisition system.

Engineered to Maximize System Performance

PCB® matches the microphone and preamplifier to compliment each other to maximize performance. Educated acousticians know the effects a preamplifier has on the measurement system. High quality IEC 61094-4 compliant working standard microphones are mechanical devices which require electronics in the form of a preamplifier. While most manufacturers devote their design efforts on the microphone, PCB® engineers concentrate their R&D on the complete system design. What good is having a microphone that can be used to 120° C, if your preamplifier is the limiting factor and rated for 60° C? PCB® preamplifiers have a very low noise floor, minimal attenuation effects and maximum temperature range. The result is that your "System Performance" has enhanced dynamic range and can remain accurate in the widest temperature range for the toughest applications.



Analysis of Engine Noise



Modern Prepolarized (0 V) Precision Condenser Microphones

Model Number	Free-field		Pressure-field				Random Incidence
	377C01	377B02	377C10	377A12	377B11	377A13	377B20
Diameter	1/4 in	1/2 in	1/4 in	1/4 in	1/2 in	1/2 in	1/2 in
Open Circuit Sensitivity	2 mV/Pa	50 mV/Pa	1 mV/Pa	0.25 mV/Pa	50 mV/Pa	12.5 mV/Pa	50 mV/Pa
Frequency Range (± 2 dB)	5.4 to 80k Hz	3.15 to 20k Hz	4 to 70k Hz	4 to 20k Hz	3.15 to 10k Hz	4 to 20k Hz	3.14 to 12.5k Hz
Dynamic Range - 3% Distortion Limit [1]	165 dB	146 dB	165 dB	187 dB	146 dB	155 dB	146 dB
Dynamic Range - Cartridge Thermal Noise [1]	35 dB (A)	15 dB (A)	35 dB (A)	68 dB (A)	15 dB (A)	20 dB (A)	15 dB (A)
Temperature Range	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C	-40 to +248 °F -40 to +120 °C

Notes

[1] re 20 μPa

ICP® Preamplifiers for Prepolarized Microphones

Model Number	426B03	426E01	HT426E01	426A10	426A11
Diameter	1/4 in	1/2 in	1/2 in	1/2 in	1/2 in
Gain (Attenuation)	-0.08 dB [1]	-0.05 dB [1]	-0.06 dB [2]	-0.1 dB [1]	-0.16 dB [1]
Frequency Response (± 0.1 dB)	5 to 126k Hz	6.3 to 125k Hz	6.3 to 126k Hz	80 to 125k Hz	5 to 125k Hz
Electrical Noise (A-weight)	≤ 3.2 μV [1]	≤ 2.8 μV [1]	≤ 4.9 μV [2]	≤ 3.6 μV [1]	≤ 7.5 μV [1]
Electrical Noise (Linear)	≤ 5.6 μV [1]	≤ 5 μV [1]	≤ 13.4 μV [2]	≤ 11.2 μV [1]	≤ 5.7 μV [1]
Output Voltage (Maximum)	± 8 V pk	± 7 V pk	± 7 V pk	± 7 V pk	± 5 V pk
Temperature Range	-40 to +158 °F -40 to +70 °C	-40 to +176 °F -40 to +80 °C	-40 to +248 °F -40 to +120 °C	-40 to +176 °F -40 to +80 °C	-4 to +158 °F -20 to +70 °C
Output Connector	10-32 Coaxial Jack	BNC Jack	BNC Jack	BNC Jack	BNC Jack
TEDS IEEE P1451.4	Yes	Yes	Yes	Yes	Yes
Application	General Purpose	General Purpose	High Temperature	High Pass Filter	Gain, Filter

Notes

[1] Measured with an 18 pF reference microphone [2] Measured with a 12 pF reference microphone

These low-noise, general purpose, prepolarized microphone preamplifiers are powered by any constant current (2-20 mA) ICP® sensor power supply. All models are supplied with TEDS capability and are designed to be used with prepolarized microphones.



= Lifetime Warranty, plus Delivery Now! See page 2 for details.



Prepolarized ICP® Array Microphones

Prepolarized ICP® Array microphones are a cost-effective alternative to the 377 series and are suitable for measuring sound within the normal range of the human hearing capability. PCB®'s 130 series of array microphones are single piece units that include a built-in preamplifier. The array microphones have excellent phase specifications. Using multiple microphones and spacing them in a predetermined pattern coordinated with the proper software, special transformation of a complex sound field is projected to effectively map the acoustic energy flow. End users can now pin point the noise source, and determine the speed and direction of sound. With the value that the array microphones offer this makes them an excellent choice for noise identification, near field acoustic holography, sound pressure mapping, beamforming and other large channel count applications.

Transducer Electronic Data Sheets (TEDS) enhance the identification of each microphone. All PCB® array microphones come standard with TEDS functionality and are compliant with the IEEE (P)1451.4 standard.

Highlights

- Low per channel cost
- Powered by ICP® sensor signal conditioners
- Integrated preamplifier

Applications

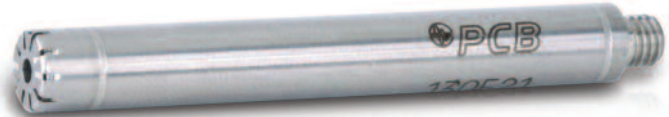
- Holography
- Sound Pressure Mapping
- Noise Source Identification
- Beamforming



Consumer Goods R&D Laboratory Testing



Model 130E20 (BNC Connector)



Model 130E21 (10-32 Connector)



Model 130E22 (SMB Connector)



Model 130A40 Low Profile Surface Microphone Pad



= Lifetime Warranty, plus Delivery Now! See page 2 for details.

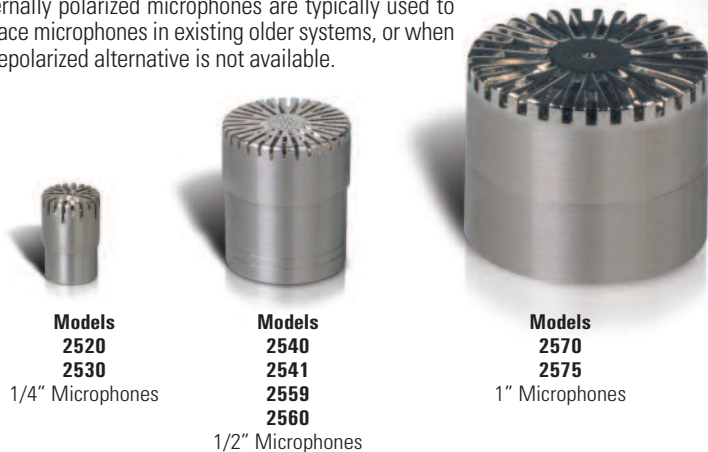
ICP® Array Microphones with Integral Preamplifier

Model Number	130E20	130E21	130E22	130A40
Microphone Diameter	1/4 in	1/4 in	1/4 in	1/4 in
Response	Free-Field	Free-Field	Free-Field	Pressure
Sensitivity (± 3 dB at 250 Hz)	45 mV/Pa	45 mV/Pa	45 mV/Pa	45 mV/Pa
Frequency Response (± 1 dB)	100 to 4000 Hz	100 to 4000 Hz	100 to 4000 Hz	100 to 4000 Hz
Frequency Response (-2 to +5 dB)	20 to 20k Hz	20 to 20k Hz	20 to 20k Hz	20 to 10k Hz (± 2dB)
Dynamic Range (10 to 10k Hz, ref. 20 µPa)	< 30 to > 122 dB	< 30 to > 122 dB	< 30 to > 122 dB	30 to 122 dB
Polarization Voltage	0 V	0 V	0 V	0 V
Temperature Range	+14 to +122 °F -10 to +55 °C	+14 to +122 °F -10 to +55 °C	+14 to +122 °F -10 to +55 °C	+14 to +122 °F -10 to +55 °C
Connector	BNC Jack	10-32 Jack	SMB Socket	10-32 Jack



Traditional Externally Polarized Precision Condenser Microphones and Preamplifiers

Externally polarized microphones were the original standard for all test and measurement acoustic applications. This design utilizes a separate 200V power supply and special cables with 7 pin style connectors. Their ease of design enables a large product offering. Externally polarized microphones are typically used to replace microphones in existing older systems, or when a prepolarized alternative is not available.



Models
2520
2530
1/4" Microphones

Models
2540
2541
2559
2560
1/2" Microphones

Models
2570
2575
1" Microphones



Building and Room Acoustic Analysis

Externally Polarized (200 V) Precision Condenser Microphone Cartridges

Model Number	Free-field				Pressure-field/ Random Incidence	Random Incidence		
	2520	2540	2541	2570	2530	2559	2560	2575
Diameter	1/4 in	1/2 in	1/2 in	1 in	1/4 in	1/2 in	1/2 in	1 in
Open Circuit Sensitivity	4 mV/Pa	14.5 mV/Pa	44.5 mV/Pa	48 mV/Pa	1.4 mV/Pa	12.9 mV/Pa	45.2 mV/Pa	45 mV/Pa
Frequency Range (± 2 dB)	4 to 80k Hz	4 to 40k Hz	3.15 to 20k Hz	2.6 to 20k Hz	4 to 7010 Hz	4 to 25k Hz	2.6 to 10k Hz	2.6 to 8000 Hz
Dynamic Range - 3% Distortion Limit [1]	164 dB	160 dB	146 dB	146 dB	172 dB	160 dB	146 dB	146 dB
Dynamic Range - Cartridge Thermal Noise [1]	30 dB (A)	20 dB (A)	15 dB (A)	10 dB (A)	31 dB (A)	18 dB (A)	15 dB (A)	10 dB (A)
Temperature Range	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C	-40 to +302 °F -40 to +150 °C
Notes								
[1] re 20 µPa								

Preamplifiers for Externally Polarized Microphones

Model 426A30 is a rugged 1/2-inch diameter preamplifier optimized for use with externally polarized microphones. It is compatible with microphones as defined in the international standard IEC 61094, and connects to a 200 V power supply requiring a 7-pin cable with connectors. Model 426A31 is a 1/4-inch diameter preamplifier with integral 3 m (10 ft) cable that terminates with a 7-pin connector.



Model 426A30 Preamplifier



Model 426B31 1/4" Preamplifier

Preamplifiers

Model Number	426B31	426A30
Diameter	1/4 in	1/2 in
Gain (Attenuation)	-0.14 dB [2]	-0.2 dB [1]
Frequency Response (± 0.1 dB)	10 to 126k Hz	10 to 126k Hz
Electrical Noise (A-weight)	≤ 4.8 µV [2]	≤ 2.8 µV [1]
Electrical Noise (Linear) [1]	≤ 12 µV [2]	≤ 5 µV [1]
Output Voltage (Maximum)	± 25 V pk	± 14 V pk
Temperature Range	-4 to +167 °F -20 to +75 °C	-40 to +185 °F -40 to +85 °C
Output Connector	Integral Cable with 7-Pin	7-Pin
TEDS IEEE (P)1451.4	Yes	No
Notes		
[1] Measured with an 18 pF reference microphone [2] Measured with a 6.8 pF reference microphone		

Microphone Power Supply

- 0 and 200 Volt polarization voltage
- Extended battery life (40 hours)
- 0, 20, and 40 dB gain
- Selectable flat (Z), A, and C-weighting

Model 2221
Microphone
Preamplifier
Power Supply

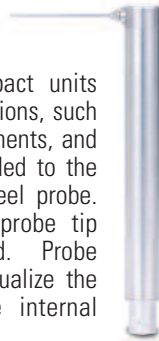




Additional Acoustic Products and Accessories

High Temperature Probe Microphone

Model 377A26 probe microphones are compact units designed for use in difficult measurement situations, such as those found in small cavities, harsh environments, and high temperatures. The acoustic signal is guided to the microphone through a detachable, stainless-steel probe. The high acoustic input impedance of the probe tip minimizes its influence on the acoustic field. Probe microphones are internally compensated to equalize the static pressure at the probe tip with the internal microphone pressure.



In-line "A-weighting" Filter

Model 426B02 In-line A-weighting Filter is powered by constant current excitation and is compatible with ICP® microphone preamplifiers. When using this filter, however, a minimum of 4 mA excitation current is required of the ICP® sensor signal conditioner or readout device, which incorporates ICP® sensor power.



Model 426B02
A-weighting Filter



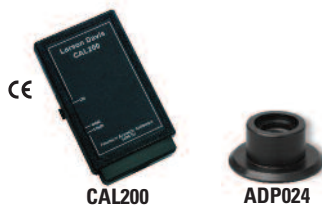
Adaptors

- ADP043 – 1/4 inch Microphone to 1/2 inch Preamplifier Adaptor
- ADP009 – 1/2 inch Microphone to 1/4 inch Preamplifier Adaptor
- ADP008 – 1 inch Microphone to 1/2 inch Preamplifier Adaptor
- 079A24 – Tripod Stand Adaptor to Convert 5/8 inch Stud to 1/4 inch For Microphone Holder
- 079A29 – Swivel Head, Stand to Holder Adaptor



Cables (Additional Lengths Available)

- EXA010 – 10 Foot Cable with 7 Pin Connector
- 003C10 – 10 Foot Coaxial Cable with 10-32 Plug and BNC Plug
- 003D10 – 10 Foot Coaxial Cable with BNC Plugs
- 003U10 – 10 Foot Coaxial Cable with SMB Plugs
- 003V10 – 10 Foot Coaxial Cable with SMB Plug and BNC Plug



CAL200

ADP024

Calibration Equipment



CAL250

079A31

394A40

CAL200 – 1 kHz, 94 and 114 dB, Calibrator

ADP024 – CAL200 to 1/4 inch Microphone Adaptor

CAL250 – 250 Hz, 114 dB Calibrator

ADP021 – CAL250 to 1/4 inch Microphone Adaptor

079A31 – 8-Channel Coupler for the CAL250 Calibrator

394A40 – 250 Hz, 114 dB Pistonphone Calibrator

079A30 – Pistonphone to 1 inch Microphone Adaptor

Acoustic Measurement Products



079A07



079A06



EPS2106



079B20



079B21



EPS2108

Environmental Protection

079A06 – 3-1/2 inch Windscreen for 1/2 inch Microphone

079A07 – 3-1/2 inch Windscreen for 1/4 inch Microphone

079B20 – Nose Cone for 1/4 inch Microphone

079B21 – Nose Cone for 1/2 inch Microphone

EPS2106 – Short Term Outdoor Protection, 3/4 inch Mount

EPS2108 – Short Term Outdoor Protection, 1/4 inch Side Exit Mount



079A10



079A11



079B23



079A32

Holders

079A10 – Holder for 1/4 inch Microphone

079A11 – Holder for 1/2 inch Microphone

079B23 – Holder for Both 1/4 inch and 1/2 inch Microphone

079A32 – Clip Holder for 1/4 inch Microphone



079A15



079B16



079A17



079A18

Stands and Mounts

079A15 – Tripod Stand with Boom Arm

079B16 – Miniature Tripod Stand with Adjustable Legs

079A17 – Camera Tripod Stand

079A18 – Adjustable Clamp



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plus Delivery Now!
See page 2 for details.



Model 480C02
Battery Powered ICP® Sensor
Signal Conditioner



Model 485B36
USB Dual Channel ICP® Sensor
Signal Conditioner



480B21
3-Channel Battery Powered Sensor
Signal Conditioner



Series 481A
16-Channel Line-powered
Signal Conditioner



483C05
8-Channel Sensor
Signal Conditioner



482C05
4-Channel Sensor
Signal Conditioner



Additional Acoustic Products offered by the PCB Group



Sound Level Meters

Model 831:

The Model 831 is Larson Davis' most recent sound level meter platform. Advances in technology provide up to 2GB of internal memory, with superior performance and a reliable design. Various firmware modules expand the functionality of Model 831 for a variety of Environmental Noise and Architectural Acoustics measurements. The Model 831 also includes the easy-to-use personal health and safety measurement features of other advanced SLM products.



Soundtrack LxT®:

The SoundTrack LxT® Sound Level Meter represents a significant advance in Performance, Reliability and Ease-of-Use. This ergonomically designed meter ensures that gathering, analyzing and presenting detailed workplace and environmental noise data is simple, fast and accurate.



Please visit www.LasonDavis.com for further details.



Environmental Protection Shrouds:

Environmental Shrouds are complete weather protection systems for 1/2 inch microphones and preamplifiers. The environmental shrouds are the perfect choice for longer-term measurements in inclement weather. Their special acoustic windscreen material and configuration protect the microphones from rain, sleet, and snow. The shrouds seal the preamplifier in a desiccated chamber, thus preserving performance in high humidity environments. The desiccant volume is many times greater than that of inline desiccant cartridges, for lasting protection without interference between the microphone and preamplifier. The shroud is also equipped with "bird-spikes" to deter winged intruders.



Permanent Outdoor Microphone with Remote Humidity Sensing

The 426A12 Outdoor Microphone has been designed for permanent outdoor use in any weather condition. It is constructed of stainless steel to resist corrosion, and its profile minimizes both wind resistance and acoustic reflections. It includes a rain hat, wind screen and bird spikes and an electrostatic actuator which can be controlled remotely for on-site calibration checks. With the proper choice of microphone, it can provide frequency response characteristics consistent with precision sound level meter requirements for free-field or random incidence measurements. Equipped with A, C and Z-weighting filters and a 20 dB gain, the 426A12 is ideal for use with any electronic sound measurement system.



Acoustic Calibration Products

Precision Handheld Acoustic Calibrators

PCB® offers calibrators for microphones that meet IEC and ANSI standards. These units are easy to use and available with optional adaptors for use with a variety of microphone diameters. Calibrators are lightweight, portable, and battery operated.



Precision Calibrators			
Model Number	CAL200	CAL250	394A40
Microphone Sizes	1/4", 1/2"	1/8", 1/4", 1/2", 1"	1/8", 1/4", 1/2", 1"
Frequency	1 kHz ± 1%	250 Hz ± 0.8%	250 Hz ± 0.5%
Output Level (re 20 µPa)	94 dB, 114 dB ± 0.2 dB	114 ± 0.1 dB	114 ± 0.08 dB
Barometric Pressure Compensation	Automatic	Automatic	Manual
ANSI S1.40	Yes	Yes	N/A
IEC 60942 Class 1	Yes	Yes	Yes
Notes:	* With optional adaptors		

Turnkey Acoustic Calibration Workstation, Model 9350C

The Precision Acoustic Calibration Workstation Model 9350C is an accurate, turnkey, automated, PC-based system. The 9350C offers efficient and cost-effective calibration of 1/4", 1/2" and 1" microphone cartridges (open-circuit sensitivity), microphone cartridges with preamplifiers (closed-circuit sensitivity) and microphone frequency response function. In addition, the system provides for conformance testing of microphone preamplifiers and acoustic calibrators.

The 9350C generates ISO 17025 compliant calibration certificates for:

- Microphone Cartridge Calibration
- Microphone and Preamplifier Calibration
- Preamplifier Conformance Test
- Source Calibration (example: pistonphone)



Precision Acoustic Calibration Workstation

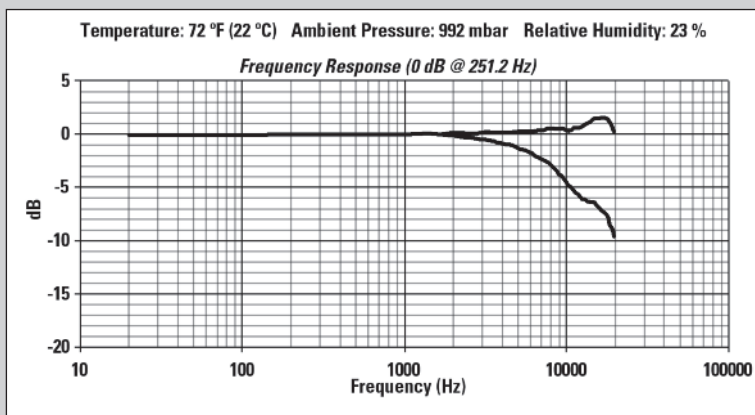
The Modal Shop also provides extensive rental services through a vast inventory of microphones, preamplifiers and sound level meters. Please visit www.modalshop.com for further details.



Acoustic Calibration Services

PCB® Has a "State-of-the-Art" Acoustic Calibration System

All acoustic microphone calibrations come complete with test documentation showing the actuator pressure response, and corrected responses, the conditions under which the calibration was performed and the equipment used. PCB® is 9001 certified and all calibrations are NIST traceable and compliant with ISO 10012-1, ANSI/NCSL Z540-1-1994 and ISO 17025. Reference microphones are traceable through PTB and the 377 series calibrations are A2LA compliant and uncertainty factors are provided. PCB® is equipped to calibrate most competitor's microphones and preamplifiers.

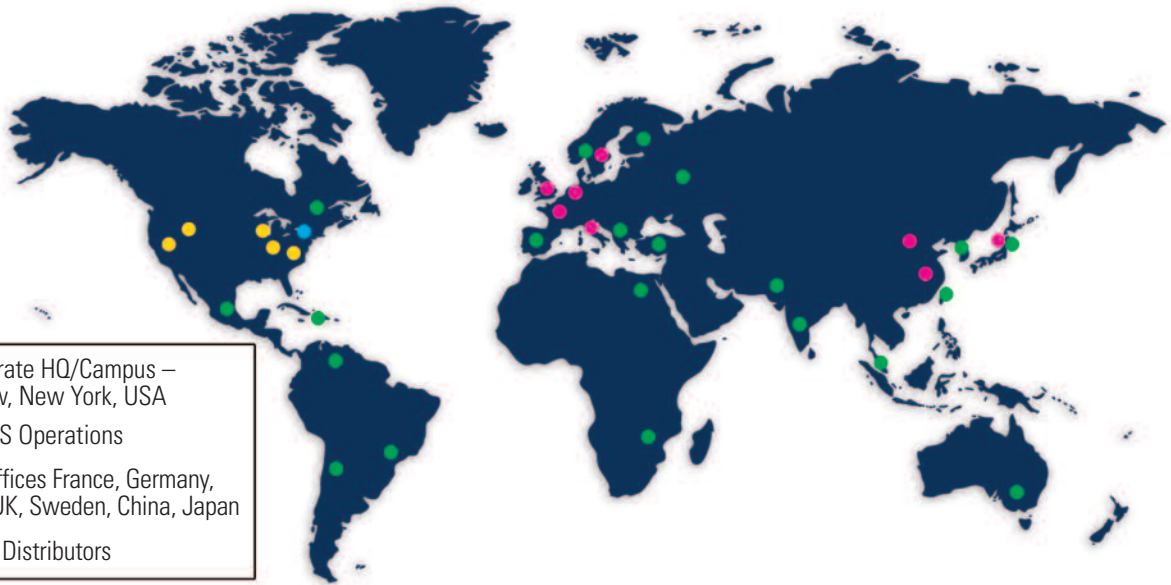


Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)
20.0	-0.08	-0.08	1584.9	-0.14	0.07	6683.4	-2.14	0.38
25.1	-0.02	-0.02	1678.8	-0.16	0.07	7079.5	-2.35	0.43
31.6	0.00	0.00	1778.3	-0.17	0.08	7498.9	-2.61	0.46
39.8	0.01	0.01	1883.7	-0.19	0.09	7943.3	-2.94	0.45
50.1	0.01	0.01	1995.3	-0.22	0.09	8414.0	-3.24	0.49
63.1	0.02	0.02	2113.5	-0.24	0.10	8912.5	-3.58	0.53
79.4	0.02	0.02	2238.7	-0.26	0.11	9440.6	-3.98	0.54
100.0	0.02	0.02	2371.4	-0.30	0.11	10000.0	-4.54	0.41
125.9	0.01	0.01	2511.9	-0.33	0.13	10592.5	-4.98	0.42
158.5	0.01	0.01	2660.7	-0.37	0.14	11220.2	-5.32	0.54
199.5	0.01	0.01	2818.4	-0.41	0.15	11885.0	-5.77	0.55
251.2	0.00	0.00	2985.4	-0.46	0.16	12589.3	-6.06	0.71
316.2	0.00	0.01	3162.3	-0.51	0.17	13335.2	-6.16	1.03
398.1	-0.01	-0.01	3349.7	-0.57	0.17	14125.4	-6.41	1.18
501.2	-0.02	0.02	3548.1	-0.64	0.18	14962.4	-6.50	1.47
631.0	-0.03	0.01	3758.4	-0.72	0.18	15848.9	-6.83	1.52
794.3	-0.04	0.05	3981.1	-0.82	0.18	16788.0	-7.13	1.59
1000.0	-0.06	0.06	4217.0	-0.91	0.20	17782.8	-7.63	1.48
1059.3	-0.07	0.06	4466.8	-1.01	0.22	18836.5	-8.50	1.01
1122.0	-0.08	0.06	4731.5	-1.12	0.25	19952.6	-9.83	0.10
1188.5	-0.08	0.07	5011.9	-1.25	0.28	-	-	-
1258.9	-0.09	0.07	5308.8	-1.41	0.29	-	-	-
1333.5	-0.10	0.08	5623.4	-1.57	0.31	-	-	-
1412.5	-0.11	0.08	5956.6	-1.75	0.32	-	-	-
1496.2	-0.13	0.07	6309.6	-1.94	0.35	-	-	-

Upper curve: Free-field response of microphone at 0° sound incidence with grid cover
 Lower curve: Pressure-field response as tested with electrostatic actuator



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