



Model 377B26

Probe Microphone ICP®

Installation and Operating Manual

This manual contains the 012A10, 426B03 installation and operating manuals that comprise a Model 377B26 Probe Microphone ICP® kit.

**For assistance with the operation of this product,
contact the PCB Piezotronics, Inc.**

**Toll-free: 716-684-0001
24-hour SensorLine: 716-684-0001
Fax: 716-684-0987
E-mail: info@pcb.com
Web: www.pcb.com**



Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

For a complete list of distributors, global offices and sales representatives, visit our website, www.pcb.com.

Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:



DANGER

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

**CAUTION**

Refers to hazards that could damage the instrument.

**NOTE**

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	O	O	O	O	O	O
PCB板	X	O	O	O	O	O
电气连接器	O	O	O	O	O	O
压电晶体	X	O	O	O	O	O
环氧	O	O	O	O	O	O
铁氟龙	O	O	O	O	O	O
电子	O	O	O	O	O	O
厚膜基板	O	O	X	O	O	O
电线	O	O	O	O	O	O
电缆	X	O	O	O	O	O
塑料	O	O	O	O	O	O
焊接	X	O	O	O	O	O
铜合金/黄铜	X	O	O	O	O	O
本表格依据 SJ/T 11364 的规定编制。						
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。						
铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O
This table is prepared in accordance with the provisions of SJ/T 11364. O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572. X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572. Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.						

MODEL 377B26 PROBE MICROPHONE **OPERATING GUIDE**

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1.0 General Description

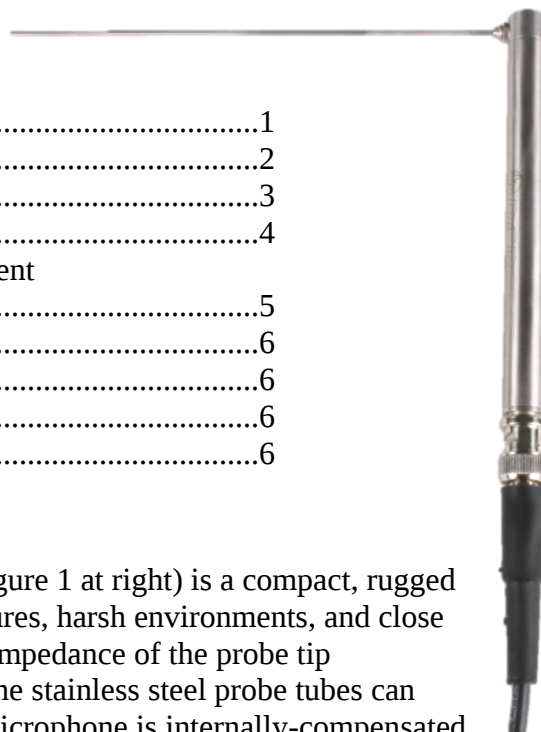
The PCB® Model 377B26 Probe Microphone (see Figure 1 at right) is a compact, rugged unit for sound pressure measurement in small enclosures, harsh environments, and close proximity to sound sources. The high acoustic input impedance of the probe tip minimizes the influence on the acoustic field, while the stainless steel probe tubes can withstand temperatures of up to 800° C. The Probe Microphone is internally-compensated to equalize the static pressure at the probe tip with the internal microphone pressure.

Figure 1: 377B26 Probe Microphone

The probe is constructed with a detachable stainless steel probe tip, which guides the acoustical signal to a microphone inside the probe housing. The probe can be used with both stainless steel probe tips and flexible tube tips of different lengths. After being measured, the acoustical pressure wave is passed on to an impedance-matched wave guide, which eliminates internal reflections. This results in a smooth frequency response from 2 Hz to 20 kHz. The internal microphone is connected to a low noise preamplifier with high dynamic range.

The Probe Microphone consists of probe tips, a 1/4" microphone, a preamplifier, and an impedance matching tube. The microphone has a BNC connector termination for connection to ICP® signal conditioning devices.

The sound pressure at the probe tip is transmitted through the probe tip tube to the microphone and impedance matching tube inside the Probe Microphone. The microphone measures the pressure fluctuations on the microphone diaphragm, and the preamplifier converts the high impedance microphone output signal to a low impedance signal suitable for connection to a standard signal analyzer or other measurement equipment. The impedance matching tube reduces reflections and ensures a smooth frequency response of the probe microphone.



The impedance matching tube ends with a small opening inside the probe housing, ensuring that the static pressure at the probe tip is transmitted inside the Probe Microphone. The static pressure is then transmitted to the rear of the microphone to ensure that the static pressure inside the microphone is identical to the static pressure at the probe tip.

The Probe Microphone is ideal for measurements inside small enclosures or very close to a sound source, such as inside a vehicle exhaust system. In this application, the probe tip is inserted into the exhaust system pipe wall through a small 1.3 mm diameter hole.

2.0 Operation

The Probe Microphone is supplied with various accessories to calibrate the probe and to adapt the probe for special measurement situations. The carrying case (see Figure 2 below) includes the Probe Microphone unit and stainless steel probe tips of varying lengths. The probe set also includes a flexible probe tip and additional flexible tubing to make custom probe tips of different lengths. The length of the stainless steel probe tips can be reduced for a specific application using the file and pliers included in the set (see [Figure 3](#) on page 3).



Figure 2: Probe Microphone Set



Figure 3: Probe Microphone Tools

The probe set includes calibration adaptors for frequency response calibration and level calibration. The two level calibration adaptors fit into a Pistonphone or calibrator intended for 1/2" microphones, and allow precise calibration with both stainless steel probe tips and flexible probe tips. Because the outer diameter of the stainless steel probe tips and the flexible tube are not the same, two different calibration adaptors are provided. The probe set also includes a calibration adaptor for frequency response calibration. This is intended for use with one 1/2" microphone and one 1/4" microphone used as emitting and receiving microphones respectively (these microphones are not included in the probe system). The probe set's aluminum disc acts both as a heat shield and as a tool to loosen and tighten the probe tips in the probe housing. Additionally, a tube of o-ring grease is included for sealing small leaks.

3.0 Changing the Probe Tips

The Probe Microphone includes four (4) stainless steel probe tips of different lengths (see Figure 4 at right). To change probe tips, use the disc tool to remove the probe tip from the probe housing. Apply a very thin layer of o-ring grease to the end of the new probe tip (be very careful not to block the probe tip hole with the grease). Mount the new probe tip on the probe housing, and tighten it with the disc tool. The flexible tube probe tips are changed in the same way.

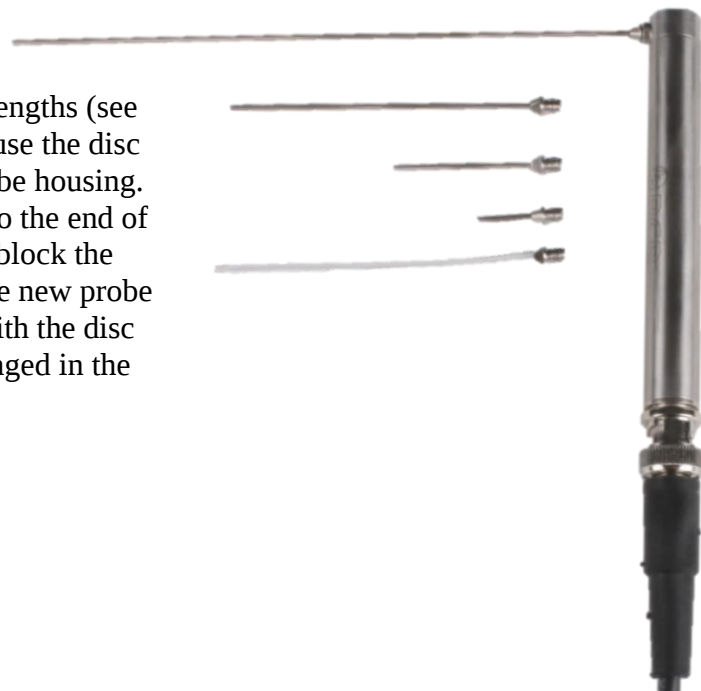


Figure 4: Probe Tips

The frequency response of the Probe Microphone depends on the probe tip length and diameter. Due to the damping of the pressure wave in the thin tubes, a long tube will reduce the transmitted signal at higher frequency. Figure 5 below shows the signal reductions as a function of frequency caused by different lengths of stainless steel probes. To obtain the pressure response for a specific probe tube length, the response should be corrected with the appropriate value, as shown in Figure 5. The values are provided in [Table 1](#) on page 5. For lengths other than those shown in the table, interpolate between the stated values.

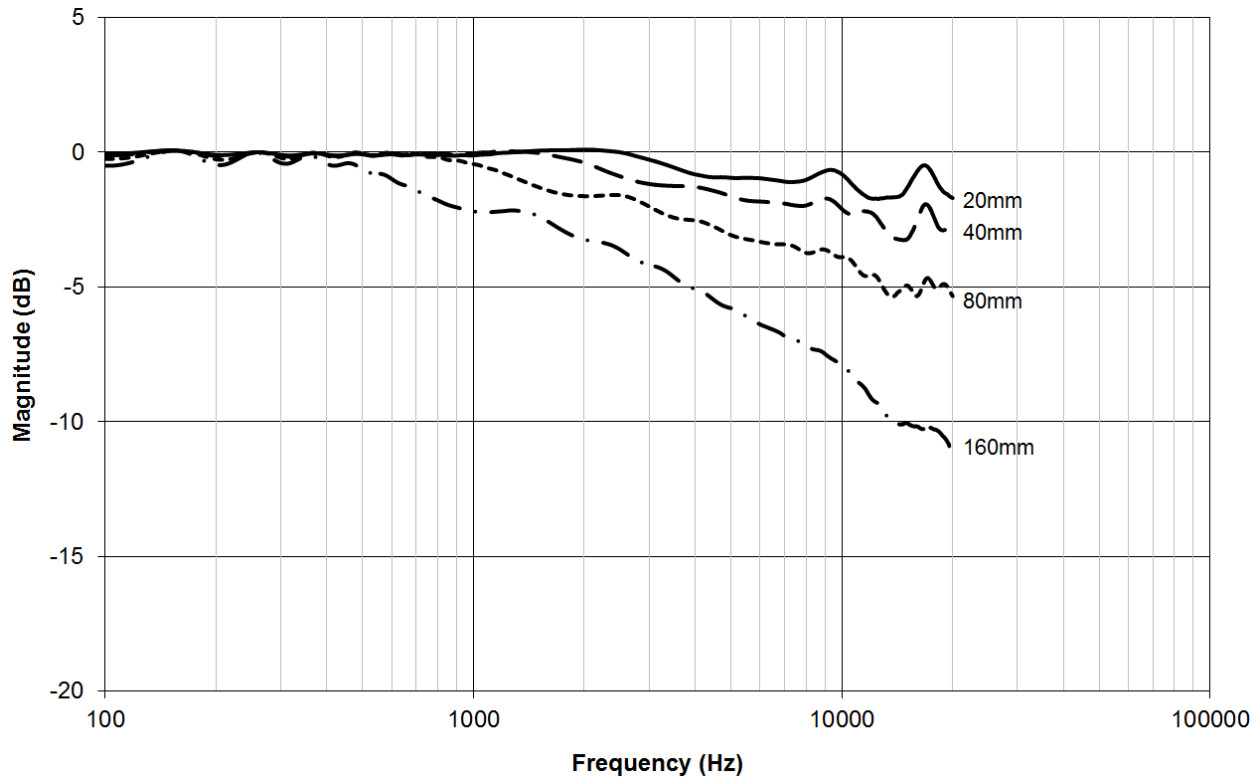


Figure 5: Typical Frequency Response for Different Probe Tip Lengths

4.0 Other Probe Tip Lengths

The stainless steel tubes can be cut to length using the supplied pliers and file. Insert the probe tube into the pliers in slot A (see Figure 6 at right), near the position where the tube should be cut. Use the file to file a groove around the circumference of the tube, and gently break off the tube.

The flexible tube can be cut with a pair of scissors. The flexible tube in the probe tip thread can be removed or exchanged. To remove the flexible tube from the probe tip thread, insert the flexible tube into the pliers in slot B. Unscrew the probe tip thread by turning it in a clockwise direction. To mount a new flexible tube in the probe tip thread, insert the flexible tube into the pliers in slot B and screw the probe tip thread onto the flexible tube by turning it in a counter-clockwise direction.

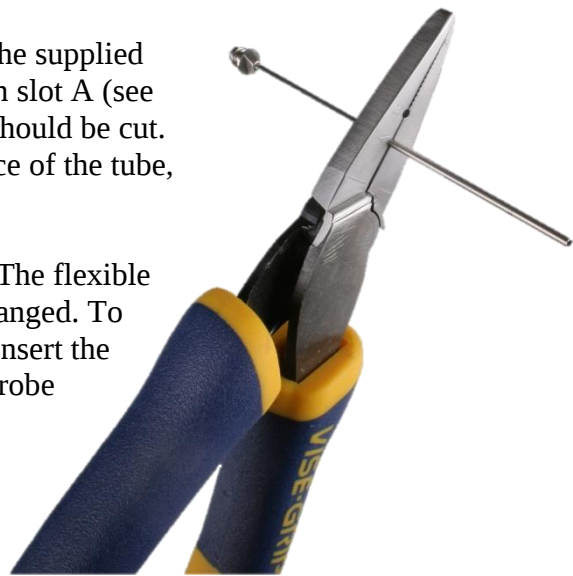


Figure 6: Probe tip in lower diameter slot of pliers

5.0 Tabulated Typical Response Values for Different Probe Tip Lengths

1. Table 1 Tabulated Typical Responses

<i>Frequency (Hz)</i>	<i>20mm</i>	<i>40mm</i>	<i>80mm</i>	<i>160mm</i>
2.0	0.63	0.63	0.63	0.63
2.5	0.63	0.63	0.63	0.63
3.2	0.63	0.63	0.63	0.63
4.0	0.63	0.63	0.63	0.63
5.0	0.63	0.63	0.63	0.63
6.3	0.63	0.63	0.63	0.63
8.0	0.63	0.63	0.63	0.63
10	0.63	0.63	0.63	0.63
13	0.63	0.63	0.63	0.63
16	0.63	0.63	0.63	0.63
20	0.59	0.59	0.59	0.59
25	0.54	0.54	0.54	0.54
32	0.45	0.45	0.45	0.45
40	0.36	0.36	0.36	0.36
50	0.27	0.27	0.27	0.27
63	0.18	0.18	0.18	0.18
80	0.14	0.14	0.14	0.14
100	0.09	0.09	0.09	0.09
125	0.05	0.05	0.05	0.05
160	0.00	0.00	0.00	0.00
225	0.00	0.00	0.00	0.00
250	0.00	0.00	0.00	0.00
315	0.00	0.00	0.00	-0.20
400	0.00	0.00	0.00	-0.40
500	0.00	0.00	-0.10	-0.60
630	0.00	0.00	-0.20	-1.00
800	0.00	-0.10	-0.30	-1.40
1000	0.00	-0.20	-0.50	-1.80
1250	-0.20	-0.30	-0.70	-2.20
1600	-0.26	-0.40	-0.90	-2.60
2000	-0.32	-0.50	-1.10	-3.00
2500	-0.44	-0.80	-1.50	-3.40
3150	-0.68	-1.10	-1.90	-4.00
4000	-0.80	-1.40	-2.30	-4.80
5000	-0.92	-1.70	-2.90	-5.60
6300	-1.16	-2.00	-3.50	-6.60
8000	-1.16	-2.30	-4.10	-7.60
10000	-1.16	-2.60	-4.70	-8.60
12500	-1.42	-2.90	-5.30	-9.60
16000	-1.64	-3.20	-5.90	-10.60
20000	-1.86	-3.50	-6.50	-11.60

6.0 Temperature Rating

Tip Length	Part No.	Degrees F	Degrees C
80 mm Flexible Tubing	55455-01	500	260
20 mm Stainless Steel	53434-01	752	400
40 mm Stainless Steel	53434-02	1472	800
80 mm Stainless Steel	53434-03	1472	800
160 mm Stainless Steel	53434-04	1472	800

7.0 High Temperature Shielding

For very high temperature applications, only a stainless steel probe tip should be used. To protect from heat conduction through the probe tip, mount the disc tool on the probe tip between the hot end of the probe tip and the probe body. If the probe tip remains below the rated temperature for its length, there will be no significant increase in the temperature of the probe body. The operating temperature of the probe system is limited only by the length of the probe tip chosen for a particular application.

8.0 Level Calibration

To calibrate the Probe Microphone with a Pistonphone or handheld speaker calibrator (such as the PCB® Model CAL250), insert the appropriate 1/2" calibration adaptor into the calibrator. The probe set comes with two 1/2" calibration adaptors, one for the stainless steel probe tips and one for the flexible tube probe tips. Insert the 20mm probe tip into the calibration adaptor and turn on the handheld calibrator. When calibrating with longer tips, make sure that the metal tip does not exceed 1/16" inch (1.5mm) past the bottom of the adapter to ensure it does not come into contact with the internal calibration speaker's components. A tip to achieve this is to mark the outside of the tube, noting the depth, before placing the adapter into the calibrator. For the Model CAL250, the sound pressure at the probe tip will be 114 dB re 20 µPa. The CAL250 automatically compensates for changes in the barometric pressure.

9.0 Frequency Response Calibration

The frequency response can be performed either as a free-field calibration using a suitable 1/4" microphone in an anechoic chamber, or as a pressure calibration using the frequency calibration adaptor included with the Probe Microphone. To use the adaptor, an additional emitting microphone and receiving microphone are required. These are not included with the Probe Microphone.

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Model 426B03
Microphone Preamplifier
Installation and Operating Manual

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电子	O	O	O	O	O	O
厚膜基板	O	O	X	O	O	O
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Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
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PRODUCT GUIDE **377 SERIES MICROPHONES** **426 SERIES PREAMPLIFIERS**



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1.0 Introduction

Thank you for your purchase of a PCB high quality microphone. These microphones offer highly accurate and reliable acoustic measurements and are typically used in research and design applications. They are accurate enough for laboratory usage, yet rugged enough for field-testing.

Sound within the typical 20 to 20,000 Hz audible range of a healthy human ear can either be pleasing to the ear, as in music, or unpleasant (or harmful), as in noise. As a result, many applications, from the development of consumer products to research in acoustics, measure sound, even sound outside the range of human hearing. The instrument typically used to measure sound is the microphone, which is designed, like the human ear, to transform pressure oscillations into a corresponding voltage oscillation.

2.0 Standards

Before selecting an acoustical instrument, it is important to identify which acoustical standards are appropriate for the application in which the instrument will be used. Whether for legal purposes or for quality assurance programs, these standards will help determine the required quality, accuracy and consistency of the instrument. Standards that correspond to the performance requirements, dimensions and characteristics of acoustical components are established for microphones, sound level meters, calibrators, or other related components. The most common organizations producing these standards are the American National Standards Institute (ANSI) and the International Electrotechnical Commission (IEC). IEC 1094-4 establishes specifications for the mechanical dimensions and certain electroacoustic characteristics for standard industrial microphones. The performance specification sheet supplied with each PCB microphone identifies the standards to which the microphone is compliant.

3.0 Setting up a Microphone Measurement System

After the proper microphone has been selected, the corresponding preamplifier, cabling, power supplies, signal conditioning and data acquisition selections are ready to be installed. Not all of these components are required for all test set-ups. The figures below show typical set-ups for externally polarized and prepolarized microphone systems.

A prepolarized microphone can be used with a standard Microphone Power Supply designed for externally polarized microphones, and its preamplifier, provided the supply voltage is set to zero.

Phantom powered microphone systems use a 3 pin XLR connector. A phantom powered microphone system should use a 48V phantom power supply or signal conditioner for optimum performance; however these microphone systems may be powered with a 24V or a 12V phantom power supply, but this will limit the maximum output voltage.



Externally Polarized Microphone System

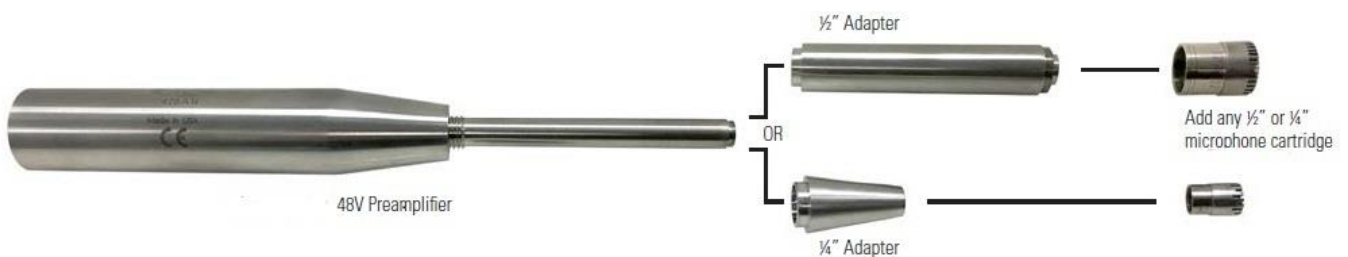


Prepolarized Microphone System



Phantom Powered Microphone System

The phantom powered preamp may be used with either a 1/4" or a 1/2" microphone cartridge by using the adapter provided. All IEC 61094-4 compliant microphones can be used with the phantom powered preamp.



Adapters for Phantom Powered Preamp

4.0 Taking Measurements

The following formula is used to calculate the pressure measured by the microphone from the output voltage signal. The sensitivity of a microphone is typically measured at 250 Hz.

$$\text{Pressure (Pa)} = \text{Voltage (mV)} / \text{Sensitivity (mV/Pa)}.$$

The lowest amplitude a healthy human ear can detect is 20 millionths of a Pascal (20μPa). Another scale more commonly used to describe sound pressure level is the decibel (dB). To convert the output voltage signal (measured in V_{rms}) to sound pressure level (measured in decibels), use the following formula:

$$SPL = \left(20 \text{ Log} \left(\frac{V_{rms}}{S P_{ref}} \right) \right) dB$$

where S is the sensitivity of the microphone in mV/Pa, and P_{ref} is the reference pressure in air, which is 20×10^{-6} Pa. The decibel scale is logarithmic and more closely matches the response reactions of the human ear to the pressure fluctuations. Some examples of typical sound pressure levels are shown in the table below.

dB	Pressure	Example
0	0.00002 Pa	Threshold of Hearing
60	0.02 Pa	Business Office
80	0.2 Pa	Shop Noise
94	1 Pa	Large Truck
100	2 Pa	Jackhammer
120	20 Pa	Airplane Take-Off
140	200 Pa	Threshold of Pain

At very high-pressure amplitudes, the microphone's diaphragm will start to distort the measured sound pressure. The maximum rated sound pressure level of a microphone is expressed as the amplitude at which the Total Harmonic Distortion (THD) reaches a specified amount, typically 3% THD. It is important to note that the highest sound pressure level that can be measured with a microphone system may be limited by other parts of the system, such as the preamplifier, signal conditioner, or instrumentation. Conversely, the Cartridge Thermal Noise (CTN) specification provides the lowest measurable sound pressure level that can be detected above the electrical noise inherent within the microphone.

Temperature and pressure will affect the sensitivity of a microphone but these effects can be accounted for by adjusting the recorded microphone values using the coefficients specified for each microphone model. Simply calculate the difference in temperature and ambient pressure from those recorded during calibration and multiply this value by the proper coefficient to determine the sensitivity offset. In most cases, the offset will be very small and is therefore unnecessary.

5.0 Accessories & Miscellaneous

Transducer Electronics Data Sheet (TEDS)

Preamplifiers can incorporate TEDS devices, which have a built in read/write memory that contains relevant information about the sensor and its use. Information includes manufacturer name, model number, serial number, sensitivity, etc. The operation of TEDS devices is defined by IEEE P1451.4. A TEDS microphone system includes a microphone mated with a preamplifier that contains the TEDS memory programmed with both the microphone and preamplifier information. This is particularly helpful when using large channel count systems and array set-up.

A-Weight Inline Filter

The inline filter is used in conjunction with an ICP® preamplifier to provide A-weighting for acoustical measurements. The filter's frequency response is weighted according to the A-weighting filter portion of both ANSI S1.4 and IEC 60651 Type 1 Sound Level Meter Standards. ICP® signal conditioners of 4 mA or greater are recommended when using inline filters.

Windscreens and Nose cones

Wind induced noise can be reduced by using a windscreen. This can offer some protection against dust particles and mechanical damage. In the presence of high-speed airflow from a well-defined direction, such as wind tunnels, a nose cone is recommended. When using windscreens and noise cones, the frequency response of the microphone will be attenuated at higher frequencies.

Clamps and stands

When holding a microphone in place, it is important to minimize the influence of the stand on the sound being measured. This can be accomplished by using low profile stands and clamps available from PCB.

Cables and Electronics

PCB carries LEMO® cables as well as coaxial cables with BNC and 10-32 connectors. Traditional externally polarized microphone power supplies along with a variety of ICP® signal conditioners are available that will fit almost any need.

6.0 Maintenance

Microphones are very stable over long periods of time, provided they are handled and stored properly. The microphone contains fragile components that can be damaged by misuse, in particular the diaphragm, which is made up of a very thin proprietary material and should be kept clean of dust, dirt, moisture and free any type of imperfection (scratch, dent, etc.).

The microphone's grid cap is designed to let the true sound pressure level through to the diaphragm while preventing items from coming in contact with it. We do not recommend that you ever remove the grid cap or clean the microphone. If you take the precautionary measures to keep the microphone clean and dry, it should not be necessary. Should you need to remove the grid cap to replace it with PCB's enhanced rugged grid cap (shown below, and as an independent part of a rugged kit) to extend the lifespan of the precision measuring device, caution should be taken to ensure the delicate diaphragm sensing element remains untouched and safe.



Use of accessories, like windscreens, and desiccants will help keep moisture off the microphone and maintain the specified sensitivity level. Nose cones will help keep turbulence off the microphone diaphragm and allow the sound pressure to be measured with greater accuracy.

Keep the microphone and preamplifier assembled while preparing for testing. Keep the rubber maintenance caps on the preamplifier's electrical connector only. Do not place these rubber caps over the microphone. This will create a vacuum and undo pressure on the microphone diaphragm, which can stretch the diaphragm and cause a change in sensitivity. Store the microphones and preamplifiers in their protective cases when not in use.

Dust, rain, oil, moisture or exposure to extreme temperatures may adversely affect the microphone and preamplifier's performance. If the microphone or the inside of the connection area of the preamplifier becomes contaminated, use a light pressure rubber bulb to gently blow clean, dry air onto the unit in order to remove the dust. In the event that you absolutely must take off the grid cap and clean the microphone diaphragm, we recommend using a blow bulb or a light pressure, clean and dry air hose to gently blow contamination off the diaphragm. The direction of the air should be parallel with the diaphragm, not directly (0 degree incidence) pointed at the diaphragm. Do not touch the microphone's diaphragm with your fingers or let it come in contact with any sharp or pointed object. Please note that any contact to the microphone's diaphragm can negatively impact the sensitivity and long term stability of the microphone.

If the microphone is ever dropped (the effects of this can be minimized by PCB's rugged grid cap or utilizing rugged microphone kits), or comes into contact with any contamination, or is exposed to extreme temperatures, immediate recalibration of the microphone should be performed. When using a rugged grid cap, a handheld calibrator with a 1" diameter (example CAL250, or pistonphone) is required for recalibration, along with the larger (079A59) calibration adapter. Please note that heat from your hands can affect the calibration results. It is always good practice to wait a minimum of 30 seconds after placing the microphone on a test system before taking a calibration reading in order to minimize the effect that heat from your hands has on the calibration. Changes in the environmental conditions: temperature, humidity or atmospheric pressure, may cause a change in your microphones sensitivity and thus, changes in your output accuracy. It is always recommended to calibrate both before and after your test, within the test environment. Performing a single point handheld calibrator check, both before and after your test, ensures reliability of the test data. With proper maintenance, the microphone and preamplifier should provide stable and accurate results for years to come.

7.0 Calibration

PCB offers recalibration services for our precision microphones, as well as units produced by other A2LA manufacturers. Our internal metrology laboratory is certified to ISO 9001, accredited by A2LA to ANSI/IEC 17025 and ANSI/NCSL Z540-1, complies with ISO 10012-1 (and former MIL-STD-45662A), and uses equipment directly traceable to one or more of the following National Labs (NIST, PTB or DFM). Our investment in equipment, traceability and conformance to industry standards ensures accurate calibration against relevant specifications. We also carry a line of acoustic calibrators that can be used to calibrate microphone sensitivity on site as needed.

Hand calibration of sensitivity for most prepolarized microphones may be performed with a Larson Davis CAL250 or CAL200 (or equivalent). The CAL250 produces 114 dB SPL at 251.2 Hz. The CAL 200 produces either 94 dB or 114 dB (user selectable) at 1000 Hz. Note that both the CAL250 and CAL 200 are compliant with ANSI S1.40-2006, Specifications and Verification Procedures for Sound Calibrators, Class1 and IEC 60942-2003, Class 1, Sound Calibrators.

8.0 Warranty and Service

All equipment and repair services provided by PCB Piezotronics, Inc. are covered by a warranty against defective material and workmanship under a **Total Customer Satisfaction** policy. If, at any time, for any reason, you are not completely satisfied with any PCB product, PCB will repair, replace, or exchange it at no charge. You may also choose to have your purchase price refunded. See the supplemental sheet, contained with this manual, for information on our service, repair and return policies, procedures and instructions. When unexpected problems arise, call our 24-Hour SensorLineSM (716-684-0001) to speak with an Application Engineer. Visit www.pcb.com for a complete statement of our warranty.

3425 Walden Avenue, Depew, NY 14043-2495

E-Mail: info@pcb.com

Website: www.pcb.com

24-hour SensorLineSM: 716-684-0001

U.S.A. Fax: 716-684-0987

Toll-free (in the U.S.A.): 800-828-8840

A PCB GROUP COMPANY

ISO 9001 CERTIFIED

A2LA ACCREDITED to ISO 17025

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Manual Number: 27042

Manual Revision: F

ECO 51020



Printed in the U.S.A.

Model Number
426B03

MICROPHONE PREAMPLIFIER

Revision: E
ECN #: 49878

Performance	ENGLISH	SI	
Nominal Microphone Diameter	1/4"	1/4"	
Gain	- 0.19 dB	- 0.19 dB	[1][2]
Frequency Response(± 0.1 dB)(re 1 kHz)	5 to 126,000 Hz	5 to 126,000 Hz	
Frequency Response(± 0.2 dB)(re 1 kHz)	3.2 to 126,000 Hz	3.2 to 126,000 Hz	
Frequency Response(- 3 dB)(re 1 kHz)	< 0.7 Hz	< 0.7 Hz	
Phase Linearity(< 1 °)	63 to 20,000 Hz	63 to 20,000 Hz	
Electrical Noise(A-weight)	< 3.2 µV	< 3.2 µV	[2]
Electrical Noise(A-weight)	1.9 µV	1.9 µV	[1][2]
Electrical Noise(Flat 20 Hz to 20 kHz)	< 5.6 µV	< 5.6 µV	[2]
Electrical Noise(Flat 20 Hz to 20 kHz)	3.4 µV	3.4 µV	[1][2]
Distortion(3 V rms input at 1 kHz)	< -70 dB	< -70 dB	
Output Slew Rate	2 V/µS	2 V/µS	[1]
TEDS Compliant	Yes	Yes	[3]
Environmental			
Temperature Range(Operating)	-40 to 176 °F	-40 to 80 °C	[4]
Temperature Range(Storage)	-40 to 185 °F	-40 to 85 °C	
Temperature Response	< 0.03 dB	< 0.03 dB	[5]
Humidity Range(Non-Condensing)	0 to 95 %RH	0 to 95 %RH	
Humidity Sensitivity	< 0.03 dB	< 0.03 dB	
Electrical			
Excitation Voltage	20 to 32 VDC	20 to 32 VDC	
Constant Current Excitation	2 to 20 mA	2 to 20 mA	
Impedance(Input)	2x10 ¹⁰ Ohm	2x10 ¹⁰ Ohm	[1]
Capacitance(Input)	0.15 pF	0.15 pF	[1]
Output Bias Voltage	10 to 14 VDC	10 to 14 VDC	
Impedance(Output)	< 50 Ohm	< 50 Ohm	
Output Voltage(Maximum)	± 8 Vpk	± 8 Vpk	[1]
Physical			
Housing Material	Stainless Steel	Stainless Steel	
Size - Diameter	0.25 in	6.4 mm	
Size - Length	1.74 in	44.2 mm	
Weight	0.21 oz	6 gm	[1]
Electrical Connector	10-32 Coaxial Jack	10-32 Coaxial Jack	
Mounting Thread(Microphone to Preamplifier)	0.2244 - 60 UNS	5.7 mm - 60 UNS	

CE

[6]

NOTES:

[1]Typical.

[2]Measured with an 18 pF reference microphone.

[3]TEDS Capable Digital Memory and Communication, compliant with IEEE P1451.4

[4]Limited to 70°C if ICP current > 10mA

[5]From -40 to 158°F (-40 to +70°C)

[6]See PCB Declaration of Conformance PS076 for details.

SUPPLIED ACCESSORIES:

Model ERC-16 Calibration of microphone preamplifier (1)

Entered: Ink	Engineer: MJN	Sales: MV	Approved: BAM	Spec Number:
Date: 08/21/2019	Date: 08/21/2019	Date: 08/21/2019	Date: 08/21/2019	22760

PCB

PIEZOTRONICS

3425 Walden Avenue, Depew, NY 14043

Phone: 716-684-0001

Fax: 716-684-0987

E-Mail: info@pcb.com

All specifications are at room temperature unless otherwise specified.

In the interest of constant product improvement, we reserve the right to change specifications without notice.

ICP® is a registered trademark of PCB Piezotronics, Inc.



Model 377B26

Probe Microphone ICP®

Installation and Operating Manual

This manual contains the 012A10, 426B03 installation and operating manuals that comprise a Model 377B26 Probe Microphone ICP® kit.

**For assistance with the operation of this product,
contact the PCB Piezotronics, Inc.**

**Toll-free: 716-684-0001
24-hour SensorLine: 716-684-0001
Fax: 716-684-0987
E-mail: info@pcb.com
Web: www.pcb.com**



Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

For a complete list of distributors, global offices and sales representatives, visit our website, www.pcb.com.

Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:



DANGER

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

**CAUTION**

Refers to hazards that could damage the instrument.

**NOTE**

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	O	O	O	O	O	O
PCB板	X	O	O	O	O	O
电气连接器	O	O	O	O	O	O
压电晶体	X	O	O	O	O	O
环氧	O	O	O	O	O	O
铁氟龙	O	O	O	O	O	O
电子	O	O	O	O	O	O
厚膜基板	O	O	X	O	O	O
电线	O	O	O	O	O	O
电缆	X	O	O	O	O	O
塑料	O	O	O	O	O	O
焊接	X	O	O	O	O	O
铜合金/黄铜	X	O	O	O	O	O
本表格依据 SJ/T 11364 的规定编制。						
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。						
铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O
This table is prepared in accordance with the provisions of SJ/T 11364. O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572. X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572. Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.						

Model Number 377B26		PROBE MICROPHONE ICP®		Revision: C ECN #: 46429	
Performance		ENGLISH		SI	
Sensitivity(at 250 Hz)		2.15 mV/Pa		2.15 mV/Pa	
Sensitivity(± 2dB)(at 250 Hz))		-53.35 dB re 1 V/Pa		-53.35 dB re 1 V/Pa	
Frequency Range(+2.2/-4.9 dB)		2 to 20,000 Hz		2 to 20,000 Hz	
Frequency Response.		See Graph		See Graph	
Lower Limiting Frequency(-3 dB)		0.25 to 3.0 Hz		0.25 to 3.0 Hz	
Inherent Noise		44 dB(A) re 20 µPa		44 dB(A) re 20 µPa	
Dynamic Range(3% Distortion Limit)		165 dB re 20 µPa		165 dB re 20 µPa	
Environmental					
Temperature Range(Operating)		-40 to +158 °F		-40 to +70 °C	
Temperature Range(160mm Probe Tip)		-40 to +1472 °F		-40 to +800 °C	
Temperature Range(20mm Probe Tip)		-40 to +752 °F		-40 to +400 °C	
Temperature Range(40mm Probe Tip)		-40 to +1472 °F		-40 to +800 °C	
Temperature Range(80mm Probe Tip)		-40 to +1472 °F		-40 to +800 °C	
Influence of Axial Vibration(0.1g (1 m/s²))		62 dB re 20 µPa		62 dB re 20 µPa	
Electrical					
Polarization Voltage		0 V		0 V	
Excitation Voltage		20 to 32 VDC		20 to 32 VDC	
Constant Current Excitation		2 to 20 mA		2 to 20 mA	
Output Bias Voltage		10 to 14 VDC		10 to 14 VDC	
Maximum Output Voltage		+/-8 Vpk		+/-8 Vpk	
Output Impedance		<50 Ohm		<50 Ohm	
Physical					
Housing Material		Stainless Steel		Stainless Steel	
Probe Material		Stainless Steel		Stainless Steel	
Electrical Connector		BNC Jack		BNC Jack	
Size (Diameter)(with grid)		0.5 in		12.7 mm	
Size (Length)		4.4 in		111 mm	
Weight		1.9 oz		55 gm	
Typical Frequency Response					
OPTIONAL VERSIONS					
Optional versions have identical specifications and accessories as listed for the standard model except where noted below. More than one option may be used.					
NOTES:					
[1] Prepolarized					
[2] Probe microphone body.					
[3] At probe tip end					
[4] With heat sink.					
[5] Typical.					
[6] Individually calibrated with 20mm probe tip.					
[7] Individually calibrated with 20mm probe tip (20 Hz to 20 kHz).					
[8] 20mm probe tip.					
[9] 25mm probe tip.					
[10] G.R.A.S. data derived from 40SC Product Manual, Revision 31 07 2007.					
[11] Bruel & Kjaer data derived from 4182 Product Datasheet, BP 0659-15 95/04.					
[12] Information based on published specifications of G.R.A.S. and Bruel & Kjaer at time of posting					
[13] See PCB Declaration of Conformance PS076 for details.					
SUPPLIED ACCESSORIES:					
Model 012A10 Extension cable, black coaxial (RG58/U), 10-ft, BNC plug to BNC plug (1)					
Model 100-11129-30 FILE (1)					
Model 100-11509-90 GREASE (1)					
Model 51606-01 HEAT SINK/DISC TOOL (1)					
Model 51607-01 CALIBRATION ADAPTOR FOR METAL PROBE (1)					
Model 51607-02 CALIBRATION ADAPTOR FOR FLEXABLE PROBE (1)					
Model 53434-01 20mm PROBE TIP (1)					
Model 53434-02 40mm PROBE TIP (1)					
Model 53434-03 80mm PROBE TIP (1)					
Model 53434-04 160mm PROBE TIP (1)					
Model 54073-01 CLEANING TUBE (1)					
Model 55103-01 PLIERS (1)					
Model 55454-01 FLEXIBLE TUBING (1)					
Model 55455-01 80mm FLEXIBLE PROBE TIP (1)					
Model 56508-01 CALIBRATION COUPLER (1)					
Model ACS-42 Calibration of microphone with preamplifier (1)					
Entered: LK		Engineer: MJN		Sales: MV	
Date: 4/28/2017		Date: 4/28/2017		Date: 4/28/2017	
Approved: MT		Spec Number:		54896	
3425 Walden Avenue, Depew, NY 14043					
Phone: 716-684-0001					
Fax: 716-684-0987					
E-Mail: info@pcb.com					

All specifications are at room temperature unless otherwise specified.
In the interest of constant product improvement, we reserve the right to change specifications without notice.

ICP® is a registered trademark of PCB Group, Inc.

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2

1

PCB Piezotronics Inc. claims proprietary rights in the information disclosed hereon. Neither it nor any reproduction thereof will be disclosed to others without the written consent of PCB Piezotronics Inc.

REVISIONS

REV	DESCRIPTION	DIN
A	ADDED MODEL 378M26, UPDATED OVERALL HEIGHT	47215

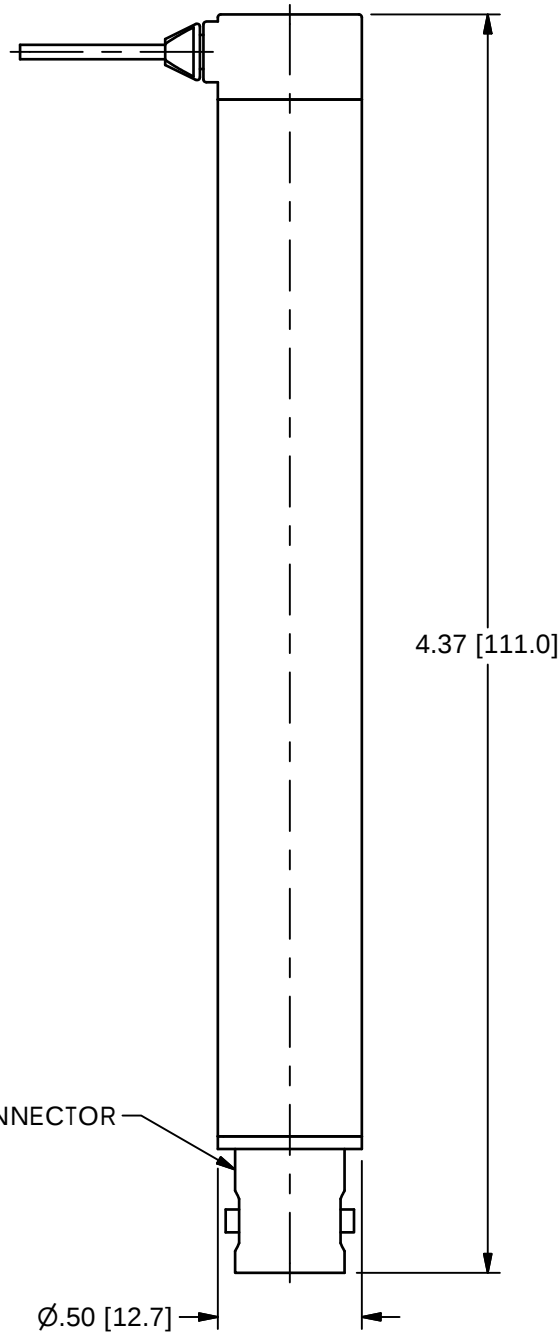
54895

B

B

A

A



4.37 [111.0]

ELECTRICAL CONNECTOR
BNC $\varnothing .50$ [12.7]

1.) SHOWN WITH 20MM TIP INSTALLED

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

DRAWN

CHECKED

ENGINEER

PCB PIEZOTRONICS™3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 E-MAIL: sales@pcb.comCODE
IDENT. NO.
52681

DWG. NO.

54895

SCALE: 1.5X

SHEET 1 OF 1

DIMENSIONS IN INCHES

DECIMALS XX $\pm .03$
XXX $\pm .010$ ANGLES ± 2 DEGREESFILLETS AND RADII
.003 - .005DIMENSIONS IN MILLIMETERS
[IN BRACKETS]DECIMALS X ± 0.8
XX ± 0.25 ANGLES ± 2 DEGREESFILLETS AND RADII
0.07 - 0.13

JDM

10/11/17

JDM

10/11/17

RMB

10/11/17

TITLE

OUTLINE DRAWING
MODEL 377B26, 378M26
ICP PROBE MICROPHONE

2

1



Model 426B03
Microphone Preamplifier
Installation and Operating Manual

**For assistance with the operation of this product,
contact PCB Piezotronics, Inc.**

Toll-free: 800-828-8840
24-hour SensorLine: 716-684-0001
Fax: 716-684-0987
E-mail: info@pcb.com
Web: www.pcb.com



Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

For a complete list of distributors, global offices and sales representatives, visit our website, www.pcb.com.

Safety Considerations

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Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:



DANGER

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

**CAUTION**

Refers to hazards that could damage the instrument.

**NOTE**

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	O	O	O	O	O	O
PCB板	X	O	O	O	O	O
电气连接器	O	O	O	O	O	O
压电晶体	X	O	O	O	O	O
环氧	O	O	O	O	O	O
铁氟龙	O	O	O	O	O	O
电子	O	O	O	O	O	O
厚膜基板	O	O	X	O	O	O
电线	O	O	O	O	O	O
电缆	X	O	O	O	O	O
塑料	O	O	O	O	O	O
焊接	X	O	O	O	O	O
铜合金/黄铜	X	O	O	O	O	O
本表格依据 SJ/T 11364 的规定编制。						
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。						
铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364.

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

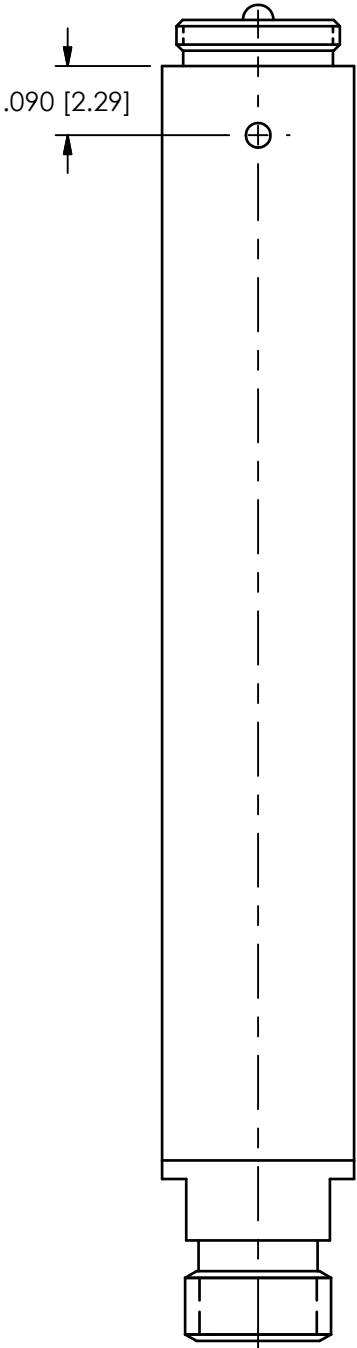
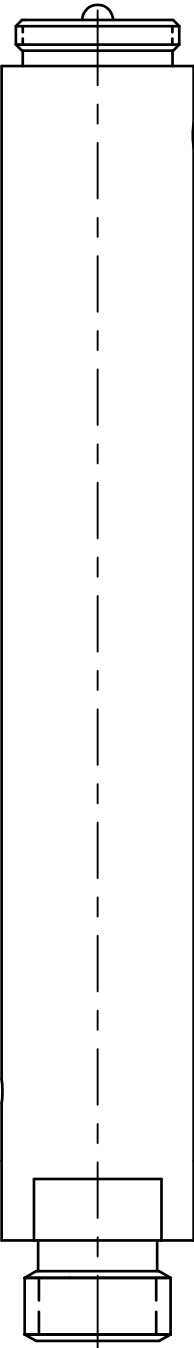
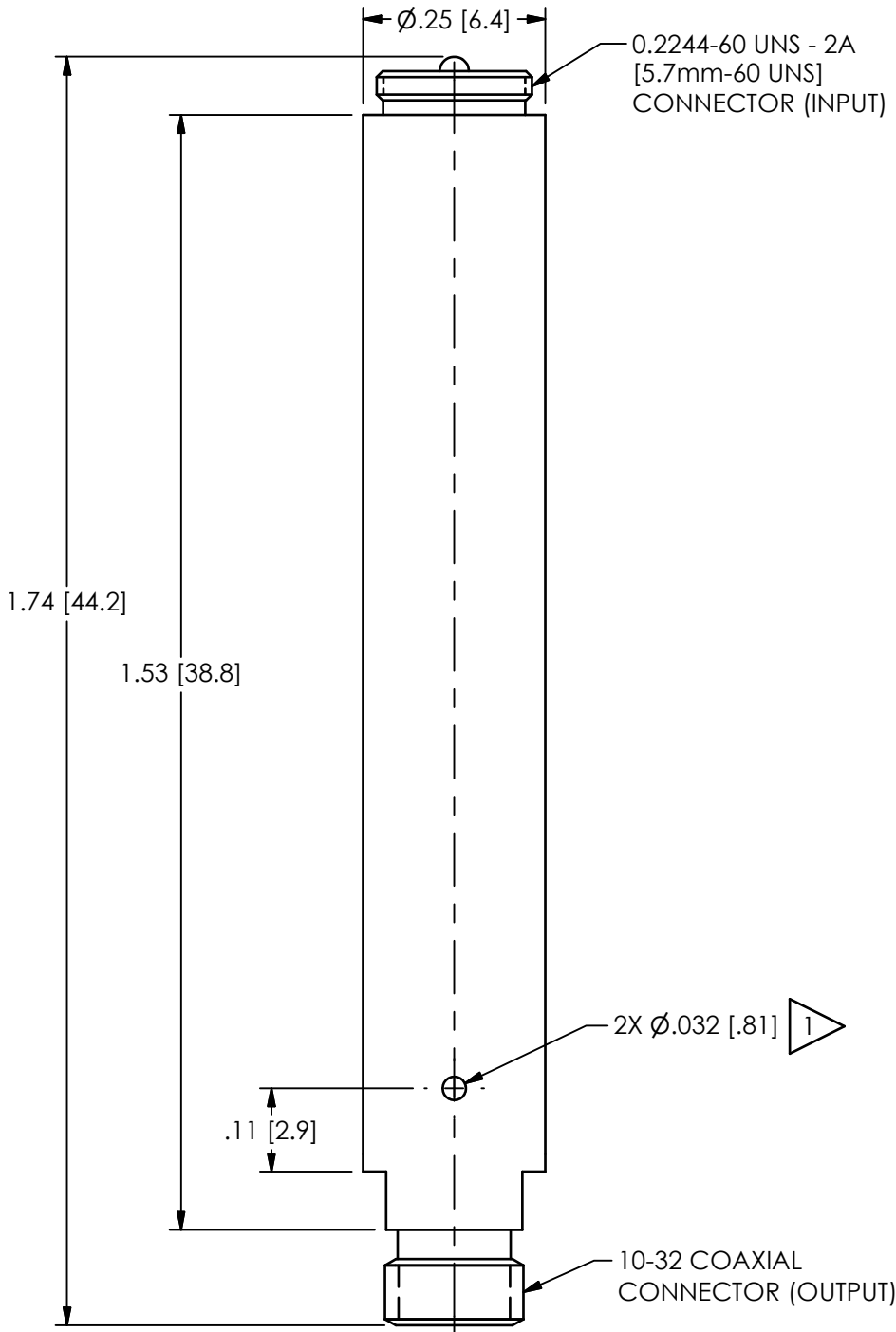
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Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

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REVISIONS		
REV	DESCRIPTION	DIN
B	ADDED ADDITIONAL VENT HOLE	43127



1 VENT HOLES PRESENT ON MODEL 426B03 ONLY.

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DRAWN		CHECKED		ENGINEER		 PCB PIEZOTRONICS™ 3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0001 E-MAIL: sales@pcb.com
DIMENSIONS IN INCHES	DIMENSIONS IN MILLIMETERS [IN BRACKETS]	JDM	7/7/14	ECB	7/7/14	NJL	7/7/14	
DECIMALS XX ±.03 XXX ±.010	DECIMALS X ± 0.8 XX ± 0.25	TITLE OUTLINE DRAWING 1/4" MICROPHONE PREAMPLIFIER						
ANGLES ± 2 DEGREES	ANGLES ± 2 DEGREES							
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13							CODE IDENT. NO. 52681
								DWG. NO. 23553
								SCALE: 4X
								SHEET 1 OF 1

Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

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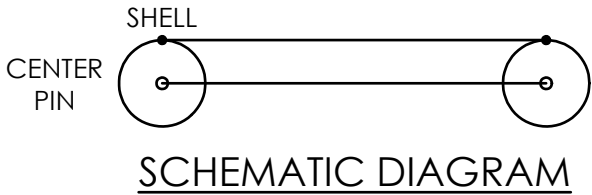
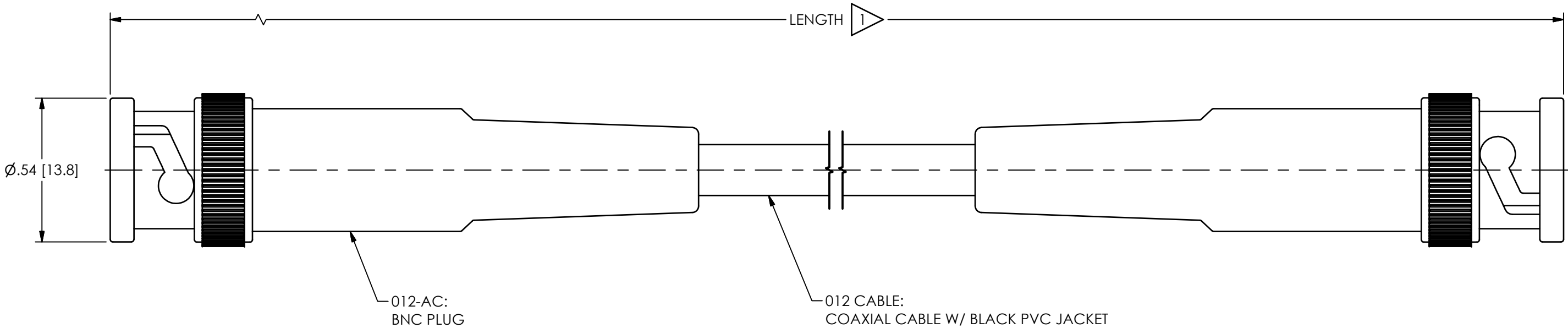
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REVISIONS		
REV	DESCRIPTION	DIN
A	ADDED CONNECTOR TO OPPOSITE END	50504



1 LENGTH WILL VARY IN FEET OR METERS DEPENDING ON THE MODEL

CABLE LENGTH TOLERANCE	
LENGTH	TOLERANCE
1'-11"	+1"/-0"
1'-4'	+4"/-0"
5'-99'	+6"/-0"
99'+	+1'/-0"

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DIMENSIONS IN INCHES		DIMENSIONS IN MILLIMETERS [IN BRACKETS]		NJF	02/18/20	NJF	02/18/20		
DECIMALS XX ±.03 XXX ±.010	DECIMALS X ± 0.8 XX ± 0.25	TITLE OUTLINE DRAWING 012AXX SERIES & 012ACXXXAC SERIES COAXIAL CABLE W/ BNC PLUG						CODE IDENT. NO. 52681	DWG. NO. 72786
ANGLES ± 2 DEGREES	ANGLES ± 2 DEGREES							SCALE: 2.5X	SHEET 1 OF 1
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13								