



Model 482B11

Line Powered Signal Conditioner for ICP® Sensors

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
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Web: www.pcb.com**





Warranty, Service, Repair, and Return Policies and Instructions

The information contained in this document supersedes all similar information that may be found elsewhere in this manual.

Total Customer Satisfaction – PCB Piezotronics guarantees Total Customer Satisfaction. 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 in lieu of the repair, replacement, or exchange of the product.

Service – Due to the sophisticated nature of the sensors and associated instrumentation provided by PCB Piezotronics, user servicing or repair is not recommended and, if attempted, may void the factory warranty. Routine maintenance, such as the cleaning of electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the physical material of construction, is acceptable. Caution should be observed to insure that liquids are not permitted to migrate into devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth and never submerged or have liquids poured upon them.

Repair – In the event that equipment becomes damaged or ceases to operate, arrangements should be made to return the equipment to PCB Piezotronics for repair. User servicing or repair is not recommended and, if attempted, may void the factory warranty.

Calibration – Routine calibration of sensors and associated instrumentation is recommended as this helps build confidence in measurement accuracy and acquired data. Equipment calibration cycles are typically established by the users own quality regimen. When in doubt about a calibration cycle, a good “rule of thumb” is to recalibrate on an annual basis. It is also good practice to recalibrate after exposure to any severe temperature extreme, shock, load, or other environmental influence, or prior to any critical test.

PCB Piezotronics maintains an ISO-9001 certified metrology laboratory and offers calibration services, which are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to the normally supplied calibration, special testing is also available, such as: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For information on standard recalibration services or special testing, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment – *Following these procedures will insure that your returned materials are handled in the most expedient manner.* Before

returning any equipment to PCB Piezotronics, contact your local distributor, sales representative, or factory customer service representative to obtain a Return **Warranty, Service, Repair, and Return Policies and Instructions** Materials Authorization (RMA) Number. This RMA number should be clearly marked on the outside of all package(s) and on the packing list(s) accompanying the shipment. A detailed account of the nature of the problem(s) being experienced with the equipment should also be included inside the package(s) containing any returned materials.

A Purchase Order, included with the returned materials, will expedite the turn-around of serviced equipment. It is recommended to include authorization on the Purchase Order for PCB to proceed with any repairs, as long as they do not exceed 50% of the replacement cost of the returned item(s). PCB will provide a price quotation or replacement recommendation for any item whose repair costs would exceed 50% of replacement cost, or any item that is not economically feasible to repair. For routine calibration services, the Purchase Order should include authorization to proceed and return at current pricing, which can be obtained from a factory customer service representative.

Warranty – All equipment and repair services provided by PCB Piezotronics, Inc. are covered by a limited warranty against defective material and workmanship for a period of one year from date of original purchase. Contact

PCB for a complete statement of our warranty. Expendable items, such as batteries and mounting hardware, are not covered by warranty. Mechanical damage to equipment due to improper use is not covered by warranty. Electronic circuitry failure caused by the introduction of unregulated or improper excitation power or electrostatic discharge is not covered by warranty.

Contact Information – International customers should direct all inquiries to their local distributor or sales office. A complete list of distributors and offices can be found at www.pcb.com. Customers within the United States may contact their local sales representative or a factory customer service representative. A complete list of sales representatives can be found at www.pcb.com. Toll-free telephone numbers for a factory customer service representative, in the division responsible for this product, can be found on the title page at the front of this manual. Our ship to address and general contact numbers are:

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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	○	○	○	○	○	○
PCB板	X	○	○	○	○	○
电气连接器	○	○	○	○	○	○
压电晶体	X	○	○	○	○	○
环氧	○	○	○	○	○	○
铁氟龙	○	○	○	○	○	○
电子	○	○	○	○	○	○
厚膜基板	○	○	X	○	○	○
电线	○	○	○	○	○	○
电缆	X	○	○	○	○	○
塑料	○	○	○	○	○	○
焊接	X	○	○	○	○	○
铜合金/黄铜	X	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。						
○：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.

DOCUMENT NUMBER: 21354

DOCUMENT REVISION: C

ECN: 45605

1.0 INTRODUCTION

The Model 482B11 is a line-operated signal conditioner for the ICP[®] transduction system with a 3-position switch for gains for 1, 10 and 100.

The unit provides constant current excitation to the built-in transducer amplifier (or in-line adaptor amplifiers) and decouples the signal from the DC bias voltage. (See guide G-0001 for more detailed coverage of the ICP concept.)

The unit also contains provision for fault monitoring as well as provisions for varying the constant current output over the range of 2 to 20 mA. The constant current output is factory set at 4mA.

2.0 DESCRIPTION

The Model 482B11 signal conditioner contains a well-regulated 24 VDC power supply and one constant current circuit to provide power for one transducer channel.

The rear panel contains BNC jacks for transducer connection ("XDCR") and for signal output ("SCOPE") connection.

The signal information is decoupled from the transducer bias level by a coupling capacitor and brought out to the "output" jack through the gain amplifier.

The bias monitor consists of a color-coded front panel voltmeter. The meter permanently monitors the transducer bias level. The green area indicates the proper bias for operation. If the meter indication is red, this indicates a short in the transducer, cable or connections. If the meter pointer moves to the yellow, it is reading the supply voltage and is indicating an open circuit.

3.0 INSTALLATION

See the installation drawing supplied as part of this manual for outline dimensions, as well as jack and control locations.

Install power unit in proximity to the readout instrument. It is necessary only to provide access at the rear panel for electrical connections. No ventilation is required for these units. PCB Model 400A03 Rack Mounted Adaptor will hold up to 8 Model 482B11s.

4.0 OPERATION

Plug 3-wire line cord into a VAC power source and switch to "on."

To convert from 115VAC to 230VAC operation see Figure 1. Unplug unit from power source and remove the top cover of the unit. Remove the two suitcase jumper wires illustrated in Figure 1A and place one as shown in Figure 1B for 230VAC operation. With no transducer connected to the "XDCR" connector, the front panel bias indication meter will indicate full scale (yellow) which corresponds to open circuit power supply voltage.

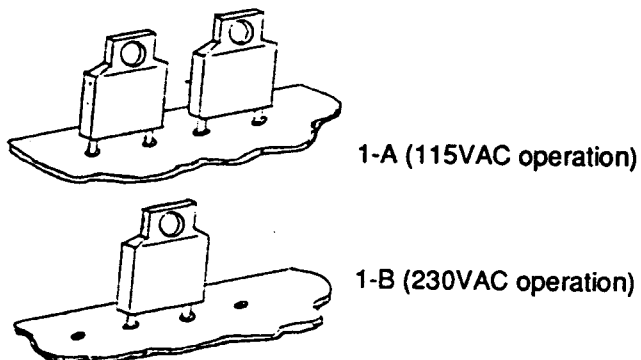


Figure 1 Converting to 230VAC operation

When an ICP transducer (or adaptor or in-line amplifier) is connected to the input jack of an channel, the front monitor meter will indicate approximately midscale (green) if the transducer or amplifier is functioning properly.

It will not read midscale if the transducer bias is 3V to 5V.

If a transducer cable is faulty (open) or if the transducer's built-in amplifier is open, the meter will indicate in the yellow (full scale) area.

Should a cable or transducer be shorted, the meter will indicate zero volts. (red).

Adjust gain selector to proper setting. The internal coupling capacitor will begin charging. This charging will cause an apparent "drifting" of the output signal until the capacitor is fully charged, a normal condition.

The small amount of leakage through the coupling capacitor will normally result in a ± 30 mV maximum offset.

4.1 COUPLING TIME CONSTANT, AC COUPLED

The coupling time constant is the product of the coupling capacitor (22 μ F) and the internal resistance of the 482B11 (100k Ω) which results in a 2-second time constant.

$$TC(\text{sec}) = C (\text{farads}) \times R (\text{ohms})$$

$$TC = 22 \mu\text{F} \times 100\text{k} \text{ ohm}$$

$$TC = 2 \text{ sec}$$

4.2 GALVANOMETERS

Low current galvanometers can be driven by the 482B11 series power units, but a series resistor is needed to range the galvanometer.

This may be provided as a part of the galvanometer input. To determine the approximate value of the necessary series resistor, divide the full scale transducer output

voltage by the full-scale galvo current, e.g., for a transducer with 5 volt F.S. output signal and a galvo which requires 5 mA full-scale input current:

$$R = \frac{5V}{5mA} = 1k \text{ ohm}$$

Remember that the low resistance load will affect the low frequency response of the system and may cause some signal loss.

This signal conditioner will maintain good frequency response due to the fact it contains a buffer amplifier.

4.3 SETTING THE CONSTANT CURRENT

To set the constant current, remove the protective outer case by removing the four screws in the rubber feet at the bottom surface. Locate the current adjust potentiometer. (See Figure 2).

Connect a 0-30mA DC meter (or multimeter) to the "XDCR" jack.

The constant current value is read directly on the multimeter when connected as shown.

Vary the setting of the current adjust pot to set current to a new level.

CAUTION

Do not exceed 20mA. Operating an ICP transducer or amplifier above 20mA may be harmful to the unit.

Use care to avoid shorting components with metal screwdriver blades.

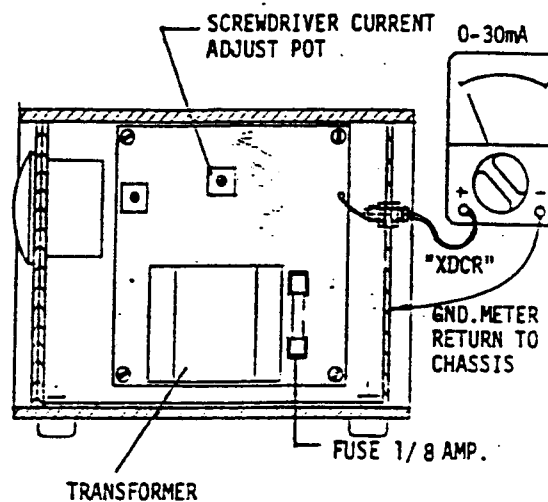


Figure 2 Current adjust pot location

5.0 MAINTENANCE AND REPAIR

Aside from the current setting, there are no other adjustments to perform in the Model 482B11 unit.

No maintenance is required for these units, but should trouble occur, it is suggested that the factory be contacted for assistance.

If it is determined that the unit should be returned, please include a brief note describing the problem.

MANUAL NUMBER: 19182
MANUAL REVISION: NR

Performance	<u>ENGLISH</u>	<u>SI</u>
Channels	1	1
Voltage Gain(± 1 %)	x1 x10 x100	x1 x10 x100
High Frequency Response(-5 %)(Gain x1)	85 kHz	85 kHz
High Frequency Response(-5 %)(Gain x10)	85 kHz	85 kHz
High Frequency Response(-5 %)(Gain x100)	60 kHz	60 kHz
Fault/Bias Monitor/Meter(meter)	24 VDC FS	24 VDC FS
Environmental		
Temperature Range	+30 to +130 °F	-1.1 to +54.4 °C
Electrical		
AC Power(50-400Hz)	105 to 125 VAC	105 to 125 VAC
AC Power	0.25 amps	0.25 amps
Excitation Voltage(To Sensor)	+24 VDC	+24 VDC
DC Offset(Maximum)	± 30 mV	± 30 mV
Constant Current Excitation(To Sensor)	2 to 20 mA	2 to 20 mA
Discharge Time Constant	3 sec	3 sec
Spectral Noise(1 Hz)	4.3 µV/√Hz	-107 dB
Spectral Noise(10 Hz)	1.3 µV/√Hz	-118 dB
Spectral Noise(100 Hz)	0.37 µV/√Hz	-129 dB
Spectral Noise(1 kHz)	0.16 µV/√Hz	-136 dB
Spectral Noise(10 kHz)	0.12 µV/√Hz	-138 dB
Broadband Electrical Noise(1 to 10,000 Hz)(Gain x1)	29 µV	-91 dB
Spectral Noise(1 Hz)	31 µV/√Hz	-90 dB
Spectral Noise(10 Hz)	13 µV/√Hz	-98 dB
Spectral Noise(100 Hz)	3.7 µV/√Hz	-109 dB
Spectral Noise(1 kHz)	1.8 µV/√Hz	-115 dB
Spectral Noise(10 kHz)	0.80 µV/√Hz	-122 dB
Broadband Electrical Noise(1 to 10,000 Hz)(Gain x10)	198 µV	-74 dB
Spectral Noise(1 Hz)	274 µV/√Hz	-78 dB
Spectral Noise(10 Hz)	126 µV/√Hz	-88 dB
Spectral Noise(100 Hz)	39 µV/√Hz	-96 dB
Spectral Noise(1 kHz)	15 µV/√Hz	-104 dB
Spectral Noise(10 kHz)	6.6 µV/√Hz	-113 dB
Broadband Electrical Noise(1 to 10,000 Hz)(Gain x100)	2.2 mV	-71 dB
Physical		
Electrical Connector(Input, sensor)	BNC Jack	BNC Jack
Electrical Connector(Output)	BNC Jack	BNC Jack
Size (Height x Width x Depth)	4.3 in x 1.8 in x 6.0 in	109.2 mm x 45.7 mm x 152.4 mm
Weight	2 lb	907.2 gm
<i>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.</i>		
ICP® is a registered trademark of PCB Group, Inc.		

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] Unit set to 230 VAC when ordered as model F482B11.
 [2] User adjustable, factory set at 4 mA (± 0.5 mA).

SUPPLIED ACCESSORIES:
 Model 017AXX Power Cord (1)

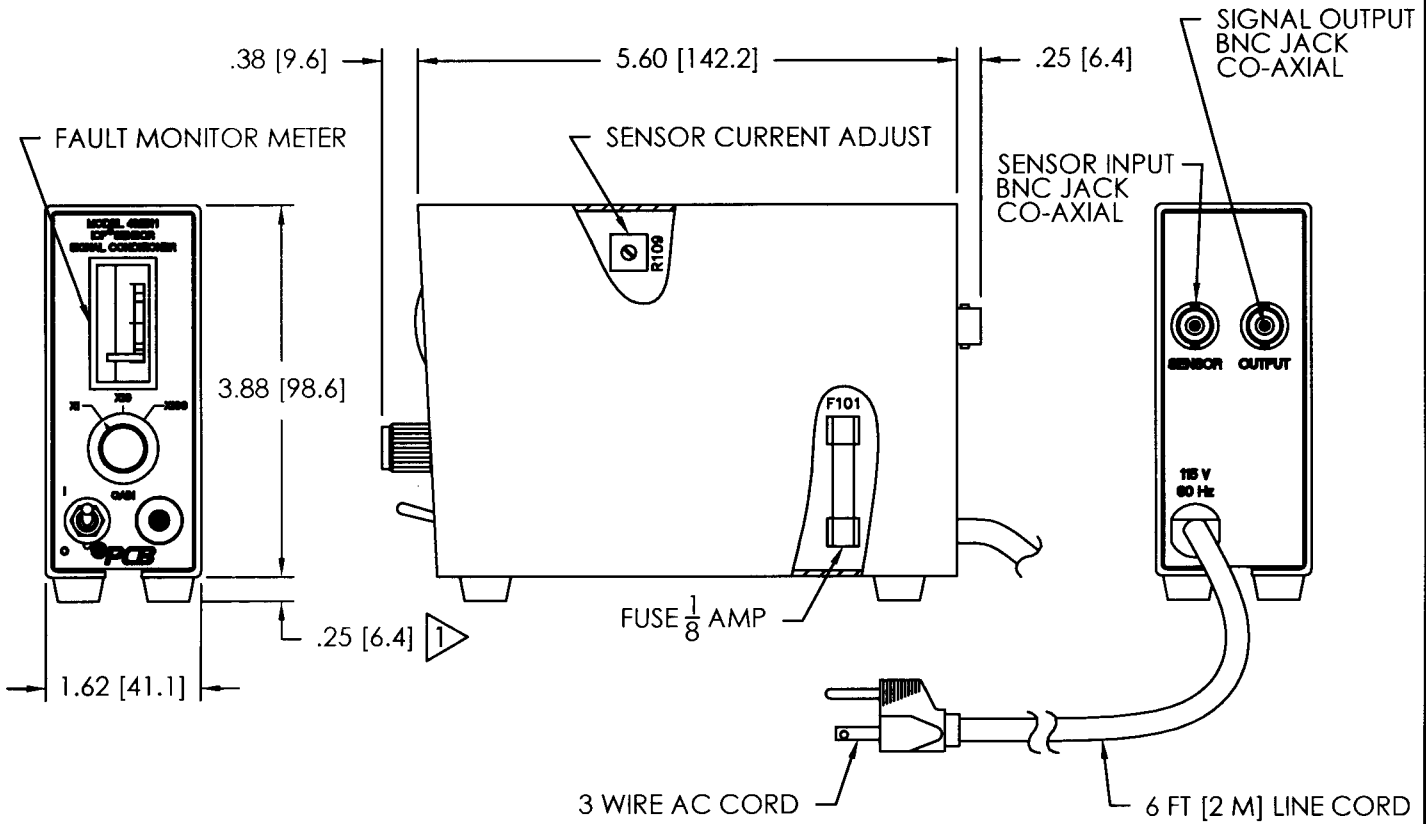
Entered: AP	Engineer: AK	Sales: JJM	Approved: JWH	Spec Number:
Date: 2/5/2013	Date: 2/5/2013	Date: 2/5/2013	Date: 2/5/2013	482-2110-80

	Phone: 716-684-0001 Fax: 716-684-0987 E-Mail: info@pcb.com
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482-2110-95

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REVISIONS			
REV	DESCRIPTION	ECN	APP'D
NR	RELEASED TO DRAFTING		DM 11-92
A	UPDATED ARTWORK	28210	



EXTERNAL COVER MAY BE REMOVED BY REMOVING SCREWS IN RUBBER FEET.

UNLESS SPECIFIED TOLERANCES		DRAWN	SMB	3/7/08	MFG	NSC	2/13/08	 PCB PIEZOTRONICS [™] 3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0001 EMAIL: SALES@PCB.COM
DIMENSIONS IN INCHES	DIMENSIONS IN MILLIMETERS [IN BRACKETS]	CHK'D			ENGR	CPH	1/29/08	
DECIMALS XX ±.03 XXX ±.010	DECIMALS X ±0.8 XX ±0.25	APP'D	EB	2/3/08	SALES	JJM	3/7/08	
ANGLES ±2 DEGREES	ANGLES ±2 DEGREES	TITLE		OUTLINE DRAWING MODEL 482B11 ICP POWER SUPPLY		CODE IDENT. NO. 52681	DWG. NO. 482-2110-95	
FILLETS AND RADII .003 - .005	FILLETS AND RADII [0.07 - 0.13]	DD011 REV. D 01/17/08		SCALE: .5X		SHEET 1 OF 1		