Model 682A09

IN-LINE ICP TO 4-20 MA OUTPUT VELOCITY CONVERTER

Installation and Operating Manual

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

Toll-free: 800-959-4464
24-hour SensorLine: 716-684-0001
Fax: 716-684-3823
E-mail: imi@pcb.com
Web: www.imi-sensors.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 682A09

Industrial in line ICP to 4 to 20 mA converter

Installation and Operating Manual

For assistance with the operation of this product, contact the IMI-Sensors Division of PCB Piezotronics, Inc.

Division toll-free:
24-hour SensorLine:
Fax: 716-684-3823
E-mail: imi@pcb.com

Document Number 43343
Revision: B
ECO: 46419

PCB PIEZOTRONICS
A PCB GROUP COMPANY

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 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

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:

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY 14043 USA
Toll-free: (800) 828-8840
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E-mail: info@pcb.com

Operating Guide with Enclosed Warranty Information

3425 Walden Avenue, Depew, New York 14043-2495

Phone (716) 684-0003

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IMI SENSORS
A PCB PIEZOTRONICS DIV.

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Introduction

The Model 682A09 Series Industrial in line ICP to 4-20mA converter transfers the signal from any 100 mV/g ICP industrial accelerometer to 4-20mA overall vibration velocity. The converter outputs a 4-20mA signal that is proportional to the overall velocity and raw acceleration of the machinery. Ideal for monitoring the vibration of process equipment such as fans, motors and pumps, the output of the converter is routed to a PLC, DCS or SCADA system and used for process control or predictive maintenance.

General Features

- Loop powered, works with an open analog channel on PLC, DCS or SCADA system.
- Vibration range in velocity scaled for 0-1 inches per second peak
- Allows for continuous vibration monitoring of critical applications.
- Reduces the need for sophisticated vibration analysis requirements.
- RV (Raw Vibration) output for conducting frequency analysis and machinery diagnostics.
- Readily interfaces to existing process control and predictive maintenance equipment.
- Rugged stainless steel construction for applications in harsh environments.

Operation and Wiring

Standard Wiring

The Model 682A09 Series operates from a standard 2-wire, 4-20mA loop. If using a loop power, attach at 3-Pin connector side the positive (+) input from the power supply to Pin A and the negative (-) input from the power supply to Pin B. Pin C is a buffered raw acceleration output (Fig. 1). At ICP side (2-Pin connector) attach Pin A (+) to positive terminal of ICP sensor and Pin B (-) to negative (common) terminal of ICP sensor (Fig. 2).

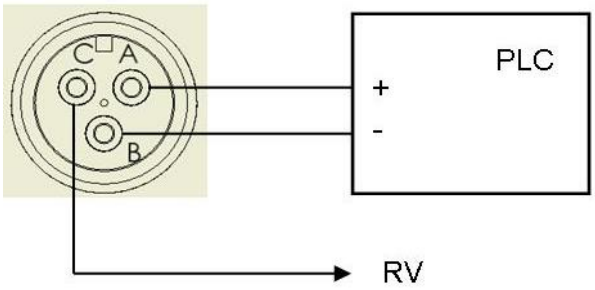

Figure 1 - wiring: loop powered

Suggested Cabling

For connecting 100 mV/g ICP accelerometer to 682A09 converter:

IMI suggests using model 052APXXXAP cable where XXX is the cable length in feet. For example, model 052AP010AP is a 10 ft. polyurethane cable, 2-socket MIL (AP) on each end. The 2-socket MIL connector (AP) mates to most any 2-pin MIL industrial accelerometer and also the model 682A09. Pictures of this cable and connector can be found at IMI's website www.imisensors.com.

For connecting 682A09 converter to PLC, DCS, SCADA system:

IMI suggests using model 059BVXXXBZ cable where XXX is the cable length in feet. For example, model 059BV010BZ is a 10 ft. polyurethane cable, 3-socket MIL (BV) to blunt termination. The 3-socket MIL (BV) connector mates to the output of the 682A09. Wiring to acquisition is color coded as follows:

Red - connect to pos (+) loop-powered input on PLC, DCS, SCADA system

Black or Green – connect to neg (-) loop-power input on PLC, DCS, SCADA system

White – 100 mV/g analog sensor signal for frequency analysis, route to BNC for walk-up measurement with portable data collector

RV Output

The RV (raw vibration) output is a pass-through for the 100 mV/g industrial accelerometer connected to the model 682A09. The frequency range and accuracy of the signal will be dependent upon the accelerometer used. Data collectors or analyzers can use this vibration signal for further analysis. Contact IMI if you require more information on the accelerometer being connected to model 682A09.

Notes:

- The RV Signal Negative has to be isolated from any grounding. If this terminal is grounded, the 4-20mA loop will short, causing no output.
- The RV output signal is ideally suited for use with portable battery powered data collectors or analyzers.

Model Number	IN-LINE ICP TO 4-20 MA OUTPUT VELOCITY CONVERTER	Revision: A
682A09		ECN #: 35125

Performance	**ENGLISH**	**SI**
Input Signal(ICP Accelerometer)	100 mV/g	10.2 mV/(m/s²)
Frequency Response(-3dB ±2dB)	600 to 60,000 cpm	10 to 1000 Hz
Measurement Range	0.0 to 1.0 in/sec pk	0.0 to 25.4 mm/s pk
Output Range	4 to 20 mA	4 to 20 mA
Broadband Resolution	0.01 in/sec pk	0.26 mm/s pk
Environmental		
Temperature Range	-40 to 185 ℉	-40 to 85 ℃
Temperature Response(Sensitivity Deviation)	≤ 15 %	≤ 15 %
Electrical		
Excitation Voltage	20 to 30 VDC	20 to 30 VDC
Electrical Isolation(Case)	$>10^8$ ohm	$>10^8$ ohm
Settling Time(within 2% of value)	<60 sec	<60 sec
Load Resistance	50 (Vs-20) ohm	50 (Vs-20) ohm
Physical		
Size (Height x Diameter)	4.0 in x 0.621 in	101.6 mm x 15.8 mm
Weight	2.5 oz	71 gm
Housing Material	Stainless Steel	Stainless Steel
Electrical Connector(#1)	2-Pin MIL-C-5015	2-Pin MIL-C-5015
Electrical Connection Position(#1)	Sensor End	Sensor End
Electrical Connections(#1)(Pin A)	AC IN Pos	AC IN Pos
Electrical Connections(#1)(Pin B)	AC IN Neg	AC IN Neg
Electrical Connector(#2)	3-Pin MIL-C-5015	3-Pin MIL-C-5015
Electrical Connection Position(#2)	Output End	Output End
Electrical Connections(#2)(Pin A)	4-20 mA Pos (+)	4-20 mA Pos (+)
Electrical Connections(#2)(Pin B)	4-20 mA Neg & AC OUT Neg	4-20 mA Neg & AC OUT Neg
Electrical Connections(#2)(Pin C)	AC OUT Pos	AC OUT Pos
Sealing	Welded Hermetic	Welded Hermetic

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.

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.

Entered: DMW	Engineer: JSQ	Sales: JMS	Approved: TB	Spec Number:
Date: 3/7/2011	Date: 3/7/2011	Date: 3/7/2011	Date: 3/7/2011	**43341**

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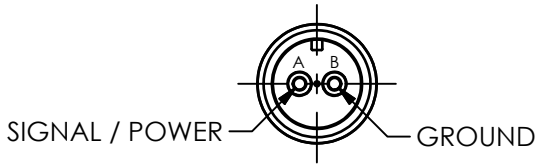
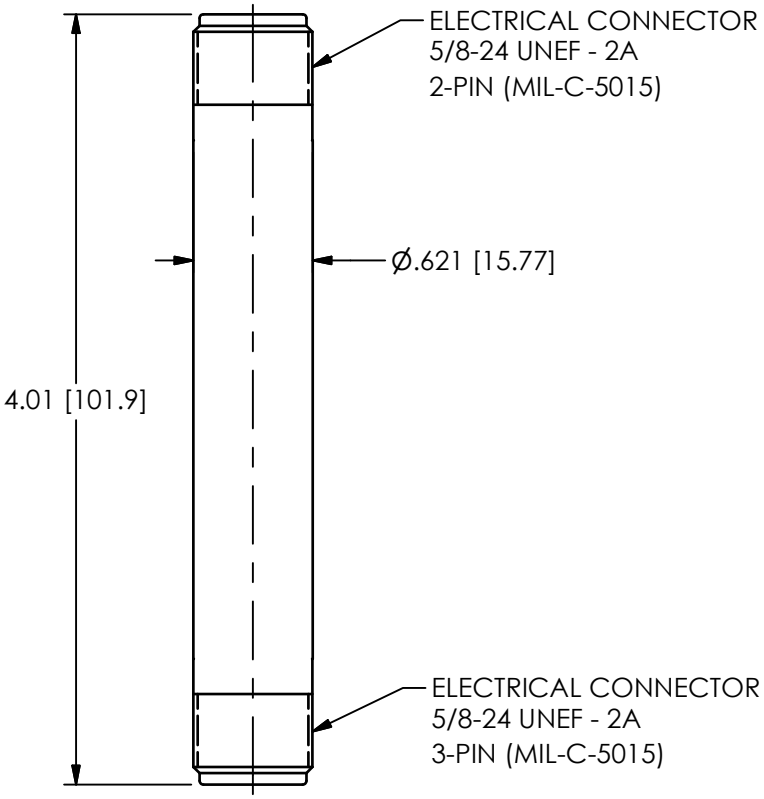
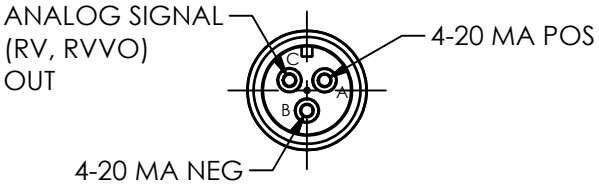
43342

REVISIONS		
REV	DESCRIPTION	DIN
B	UPDATED NOTCH	42942







UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DRAWN		CHECKED		ENGINEER	
DIMENSIONS IN INCHES	DIMENSIONS IN MILLIMETERS [IN BRACKETS]	JDM	5/23/14	ECB	5/23/14	GGS	5/23/14
DECIMALS XX ±.03 XXX ±.010	DECIMALS X ± 0.8 XX ± 0.25	TITLE					
ANGLES ± 2 DEGREES	ANGLES ± 2 DEGREES	OUTLINE DRAWING MODEL 682A09 VIBRATION TRANSMITTER					
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13						

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CODE IDENT. NO. 52681	DWG. NO. 43342
SCALE: FULL	SHEET 1 OF 1