



Model 682M57

DIFFERENTIAL DIN RAIL CHARGE AMPLIFIER

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**





| |
|--|
| 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.

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 ensure 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 ensure 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.

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, NY14043 USA
Toll-free: (800) 828-8840
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E-mail: info@pcb.com



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.

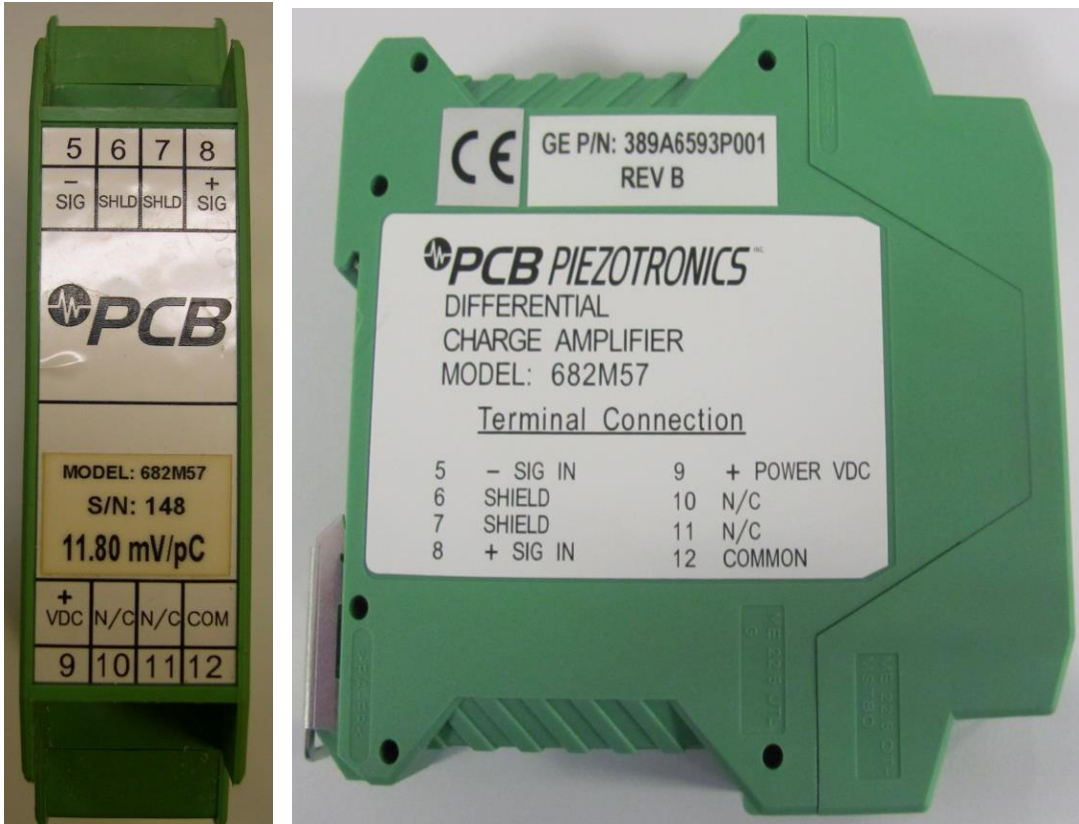
Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

DOCUMENT NUMBER: 21354

DOCUMENT REVISION: **D**

ECN: 46162

Model 682M57 and 682M74 Differential Charge Amplifier



Operating Guide with Enclosed Warranty Information

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MANUAL NUMBER: 48301
MANUAL REVISION: A
ECN NUMBER: 44204

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Introduction

The models 682M57 and 682M74 are differential charge input amplifiers, designed to interface with differential output charge sensors. The unit will convert the charge signal from any differential output charge sensor into a voltage output. The front end differential charge amplifiers are designed to handle low sensor resistance that is common at very elevated temperatures (>500°F). An ICP® Din Rail signal conditioner is required for use with the differential charge amplifier, to provide the appropriate power supply.

General Features

- Din Rail Mount
- Removable Terminal Blocks for easy wiring
- 35mm (1.38in) Din Rail Mount configuration
- Space saving 22.5mm (0.9in) wide design

Installation and Wiring

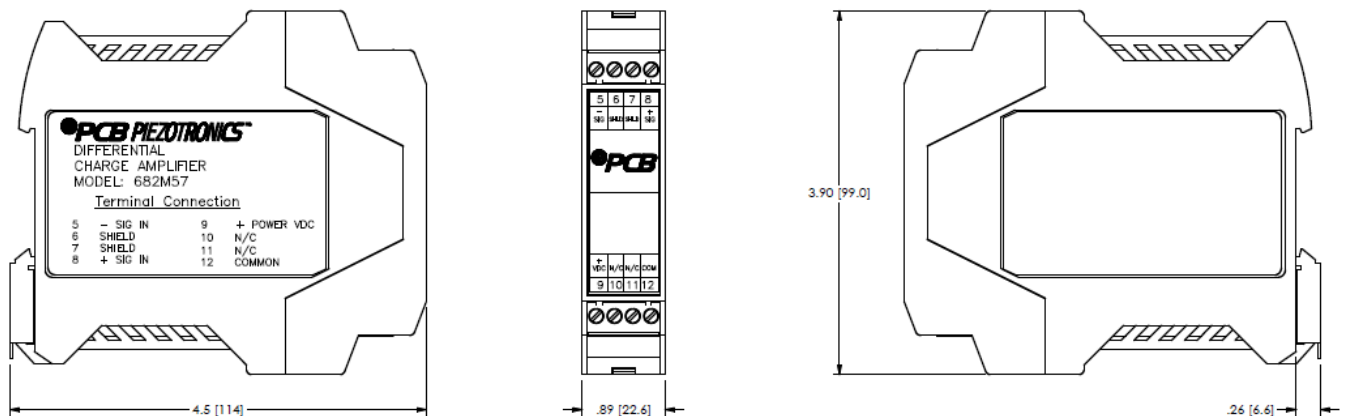
Installation

The 682M57 and 682M74 are designed to be mounted on a 35mm Din Rail. Do not install in a harsh area where it can be exposed to cleaning fluids or machine oils. The unit should be mounted in a NEMA type enclosure to protect the electronics from contamination.

CE Requirements

The 682M57 and 682M74 are CE marked (see Declaration of Conformity for specific standards). To meet the requirement, the unit must be installed in a grounded metallic enclosure and sensor cable shield terminated to enclosure. Failure to do so can cause erroneous readings where high frequency noise is present.

Outline Drawing



Connector and Pinout Diagram

The 682M57 and 682M74 use plug-in type screw terminal connectors for all input and output connections.

Strip off ~8mm of insulation from the connection wire ends. Using a small screwdriver, remove the terminal block from the enclosure in either the up or down direction, terminate the wire in the correct location. Do not exceed a torque of 0.5Nm. Do not leave excess uninsulated wire which can short to adjacent wiring. Re-install the terminal block.

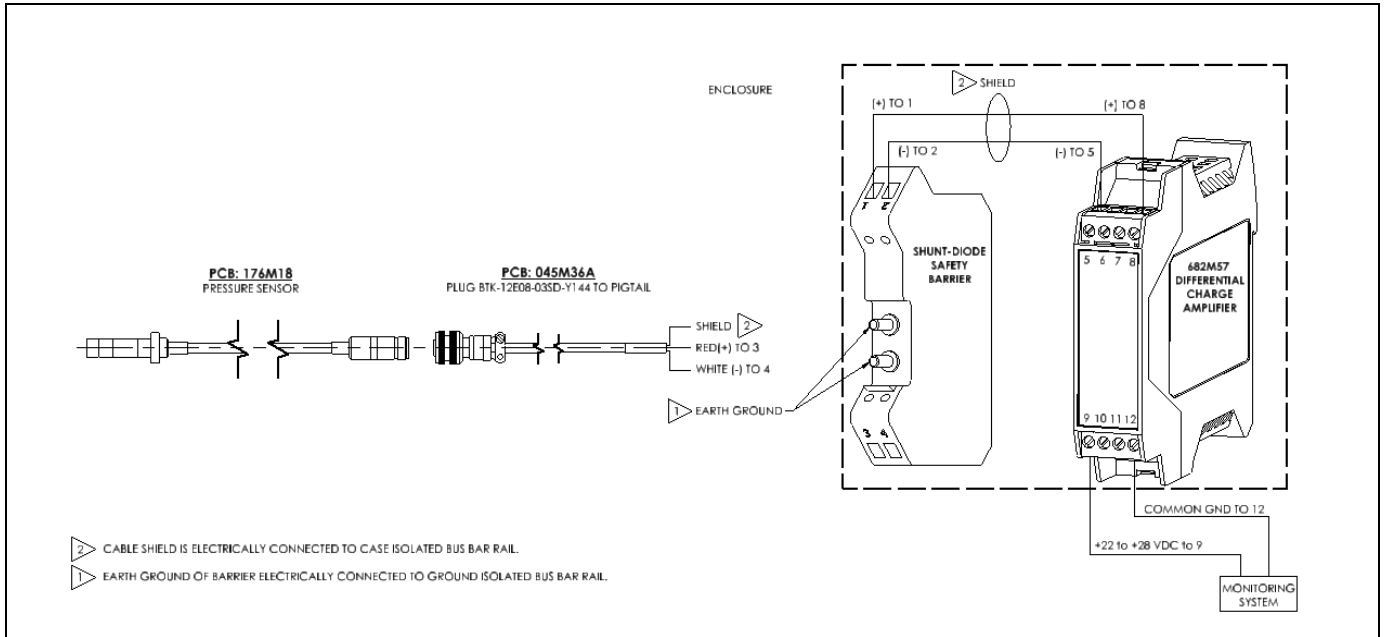
This easy to assemble connection method allows devices to be exchanged easily and the electrical connection to be visibly isolated.



Pin Descriptions:

- Pin 5: Sig -**
Negative Charge Input Signal
- Pin 6: Shield**
Attach cable shield if available. This pin connects to the Din Rail bar that the amplifier is mounted on.
- Pin 7: Shield**
Same as Pin 6
- Pin 8: Sig +**
Positive Charge Input Signal
- Pin 9: VDC +**
Attach to the positive of ICP[®] power supply
- Pin 10: N/C**
No Connection
- Pin 11: N/C**
No Connection
- Pin 12: Common**
Attach to the negative of ICP[®] power supply

Typical Wiring Diagram



Warning 1 – ESD sensitivity

The power supply/signal conditioner should not be opened by anyone other than qualified service personnel. This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid injury.

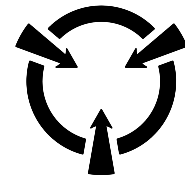
Warning 2 – ESD sensitivity

This equipment is designed with user safety in mind; however, the protection provided by the equipment may be impaired if the equipment is used in a manner not specified by PCB Piezotronics, Inc.

Caution 1 – ESD sensitivity

Cables can kill your equipment. High voltage electrostatic discharge (ESD) can damage electrical devices. Similar to a capacitor, a cable can hold a charge caused by triboelectric transfer, such as that which occurs in the following:

- *Laying on and moving across a rug,*
- *Any movement through air,*
- *The action of rolling out a cable, and/or*
- *Contact with a non-grounded person.*



CAUTION
ELECTROSTATIC
DISCHARGE SENSITIVE

The PCB solution for product safety:

- *Connect the cables only with the AC power off.*
- *Temporarily “short” the end of the cable before attaching it to any signal input or output.*

Caution 2 – ESD sensitivity

ESD considerations should be made prior to performing any internal adjustments on the equipment. Any piece of electronic equipment is vulnerable to ESD when opened for adjustments. Internal adjustments should therefore be done ONLY at an ESD-safe work area. Many products have ESD protection, but the level of protection may be exceeded by extremely high voltage.

Warranty

IMI instrumentation is warranted against defective material and workmanship for 1 year unless otherwise expressly specified. Damage to instruments caused by incorrect power or misapplication, is not covered by warranty. *If there are any questions regarding power, intended application, or general usage, please consult with your local sales contact or distributor.* Batteries and other expendable hardware items are not covered by warranty.

Service

Because of the sophisticated nature of IMI instrumentation, field repair is typically **NOT** recommended and may void any warranty. If factory service is required, return the instrumentation according to the "Return Procedure" stated below. *A repair and/or replacement quotation will be provided prior to servicing at no charge.* Before returning the unit, please consult a factory IMI applications engineer concerning the situation as certain problems can often be corrected with simple on-site procedures.

Return procedure

To expedite returned instrumentation, contact a factory IMI applications engineer for a RETURN MATERIAL AUTHORIZATION (RMA) NUMBER. Please have information available such as model and serial number. Also, to insure efficient service, *provide a written description of the symptoms and problems with the equipment to a local sales representative or distributor, or contact IMI if none are located in your area.*

Customers outside the U.S. should consult their local IMI distributor for information on returning equipment. For exceptions, please contact the International Sales department at IMI to request shipping instructions and an RMA. For assistance, please call (716) 684-0003, or fax us at (716) 684-3823. You may also receive assistance via e-mail at imi@pcb.com or visit our web site at www.pcb.com.



Customer Service

IMI, a division of PCB Piezotronics, guarantees **Total Customer Satisfaction**. If, at any time, for any reason, you are not completely satisfied with any IMI product, IMI will repair, replace, or exchange it at no charge. You may also choose, within the warranty period, to have your purchase price refunded.

IMI offers to all customers, at no charge, 24-hour phone support. This service makes product or application support available to our customers, day or night, seven days a week. When unforeseen problems or emergency situations arise, call the **IMI Hot Line at (716) 684-0003**, and an application specialist will assist you.



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*ICP® is a registered trademark of PCB Group, Incorporated,
which uniquely identifies PCB sensors that incorporate built-in microelectronics.*

| | <u>ENGLISH</u> | <u>SI</u> | |
|--|-----------------------|-----------------------|-----|
| Performance | | | |
| Sensitivity(+/-5 %) | 11.8 mV/pC | 11.8 mV/pC | |
| Input Range | +/-212.5 pC | +/-212.5 pC | |
| Low Frequency Response | 5 Hz | 5 Hz | |
| High Frequency Response | 5 kHz | 5 kHz | [2] |
| Amplitude Linearity | ≤ 1 % | ≤ 1 % | |
| Environmental | | | |
| Temperature Range(Operating) | -40 to +176 °F | -40 to +80 °C | |
| Temperature Response | ≤ 1 % | ≤ 1 % | |
| Relative Humidity | <95 % | <95 % | |
| Electrical | | | |
| Excitation Voltage | 22 to 28 VDC | 22 to 28 VDC | |
| Constant Current Excitation | 3.1 to 4.1 mA | 3.1 to 4.1 mA | |
| Output Voltage | +/-2.5 Vpk | +/-2.5 Vpk | |
| Output Bias Voltage | 11 to 13 VDC | 11 to 13 VDC | |
| Broadband Electrical Noise(1 to 10,000 Hz) | 200 μV | 200 μV | [1] |
| Spectral Noise(1 Hz) | 50 μV/√Hz | 50 μV/√Hz | [1] |
| Spectral Noise(10 Hz) | 15 μV/√Hz | 15 μV/√Hz | [1] |
| Spectral Noise(100 Hz) | 5 μV/√Hz | 5 μV/√Hz | [1] |
| Spectral Noise(1 kHz) | 2 μV/√Hz | 2 μV/√Hz | [1] |
| Spectral Noise(10 kHz) | 2 μV/√Hz | 2 μV/√Hz | [1] |
| Discharge Time Constant | >0.25 sec | >0.25 sec | |
| Resistance | 50,000 Ohm | 50,000 Ohm | |
| Source Capacitance Loading | 0.0001 %/pF | 0.0001 %/pF | |
| Output in Relation to Input | In Phase | In Phase | |
| Physical | | | |
| Electrical Connector(Input) | Terminal Strip | Terminal Strip | |
| Electrical Connector(Output) | Terminal Strip | Terminal Strip | |
| Weight | 3.4 oz | 96 gm | |
| Mounting | DIN Rail | DIN Rail | |
| Case Material | Injected Molded Nylon | Injected Molded Nylon | |

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]Typical value.
 [2]Tested using voltage source and input capacitor equal to the feedback capacitor, to simulate a charge output sensor.
 [3]See PCB Declaration of Conformance PS115 for details.

| | | | | |
|-----------------|-----------------|-----------------|-----------------|--------------|
| Entered: JM | Engineer: gs | Sales: PM | Approved: BAM | Spec Number: |
| Date: 6/30/2015 | Date: 6/30/2015 | Date: 6/30/2015 | Date: 6/30/2015 | 47686 |



^[3]
 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.

PCB PIEZOTRONICS™

3425 Walden Avenue, Depew, NY 14043

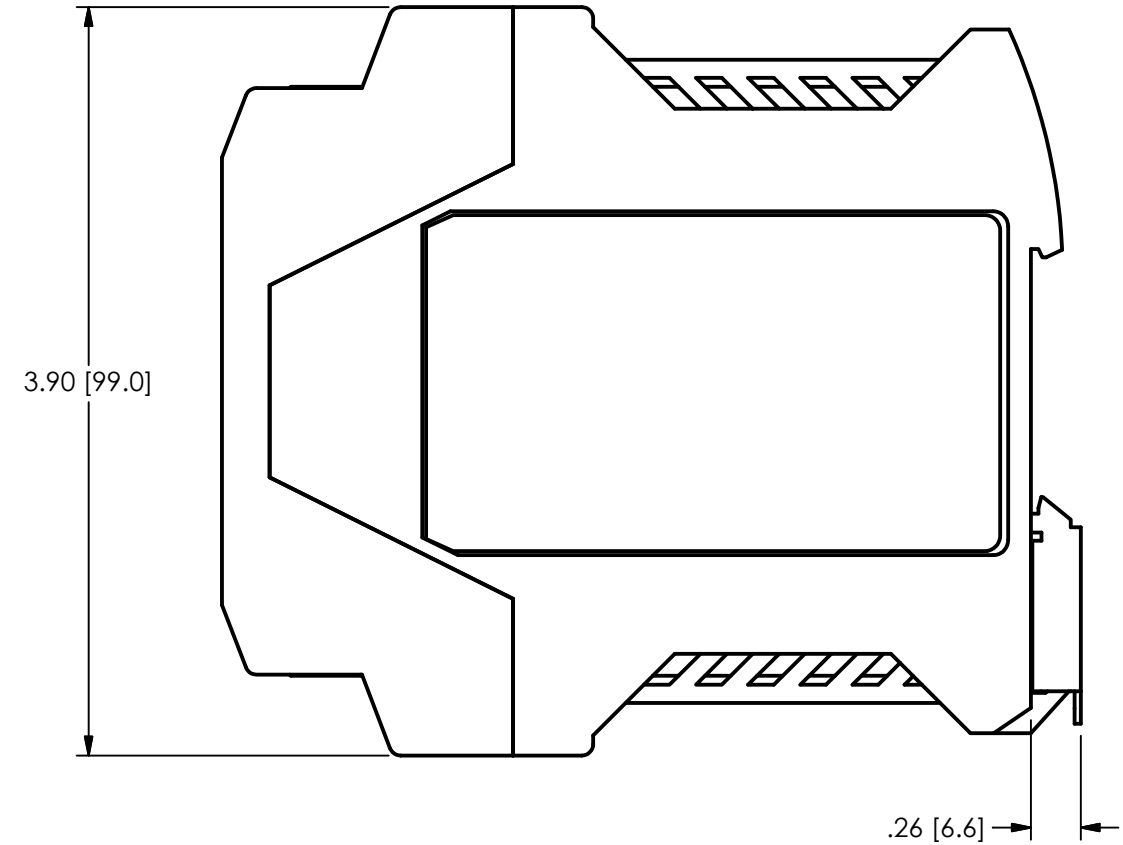
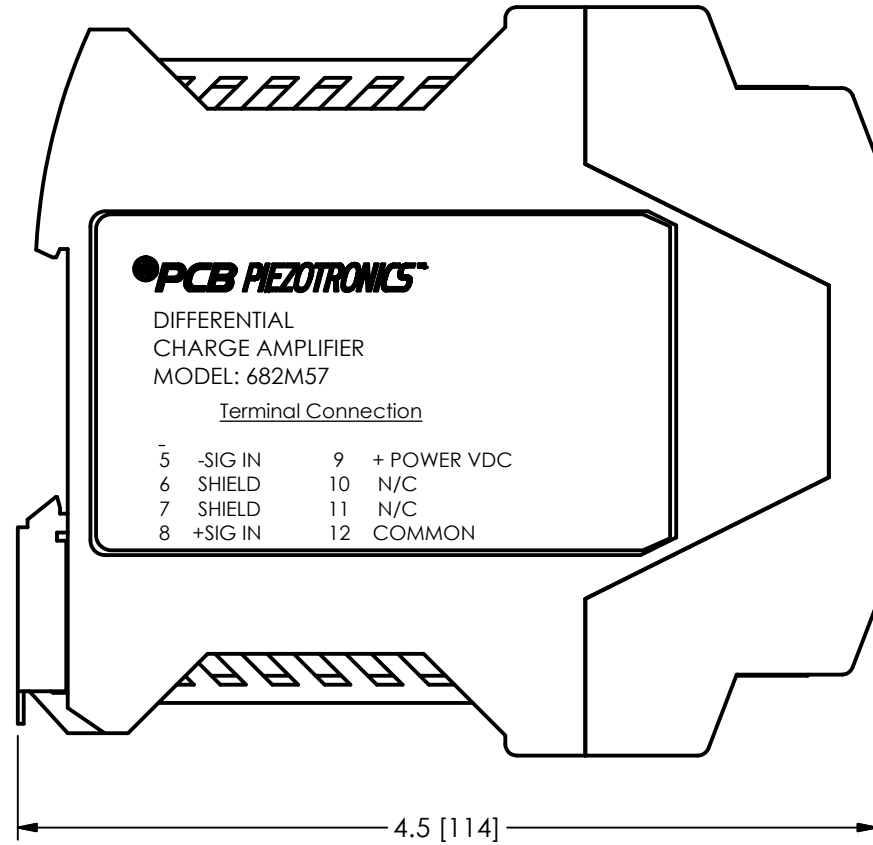
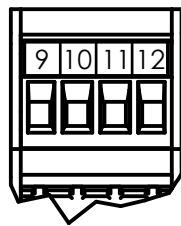
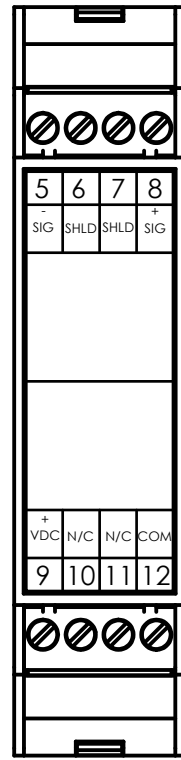
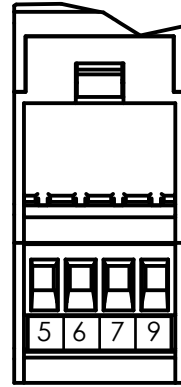
Phone: 716-684-0001
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 E-Mail: info@pcb.com

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48297

REVISIONS

| REV | DESCRIPTION | DIN |
|-----|-----------------------|-------|
| A | REMOVED CONTROL BLOCK | 43742 |



1.) HOUSING MATERIAL: INJECTION MOLDED NYLON 66 (POLYAMIDE) RATED UL 94-V0.

| UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: | | DRAWN | | CHECKED | | ENGINEER | | |
|--|---|---|----------|-------------------|----------|--------------------------|----------|--|
| DIMENSIONS IN INCHES | DIMENSIONS IN MILLIMETERS [IN BRACKETS] | BB | 01/29/15 | ECB | 01/29/15 | GS | 01/29/15 | |
| DECIMALS XX ±.03 XXX ±.010 | DECIMALS X ±0.8 XX ±0.25 | TITLE OUTLINE DRAWING MODEL 682M57 AMPLIFIER | | | | | | |
| ANGLES ± 2 DEGREES | ANGLES ± 2 DEGREES | | | | | | | 3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0001 E-MAIL: sales@pcb.com |
| FILLETS AND RADII .003 - .005 | FILLETS AND RADII 0.07 - 0.13 | CODE IDENT. NO. 52681 | | DWG. NO. 48297 | | SCALE: FULL SHEET 1 OF 1 | | |