



Model 685B0001A13

Electronic vibration switch, internal ICP® accel., 0-1.5 ips, AC powered, 10A form C relays, std enclosure, single port with 1/2" NPT conduit hub

Installation and Operating Manual

**For assistance with the operation of this product,
contact the 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	0	0	0	0	0	0
PCB板	X	0	0	0	0	0
电气连接器	0	0	0	0	0	0
压电晶体	X	0	0	0	0	0
环氧	0	0	0	0	0	0
铁氟龙	0	0	0	0	0	0
电子	0	0	0	0	0	0
厚膜基板	0	0	X	0	0	0
电线	0	0	0	0	0	0
电缆	X	0	0	0	0	0
塑料	0	0	0	0	0	0
焊接	X	0	0	0	0	0
铜合金/黄铜	X	0	0	0	0	0
本表格依据 SJ/T 11364 的规定编制。						
0：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

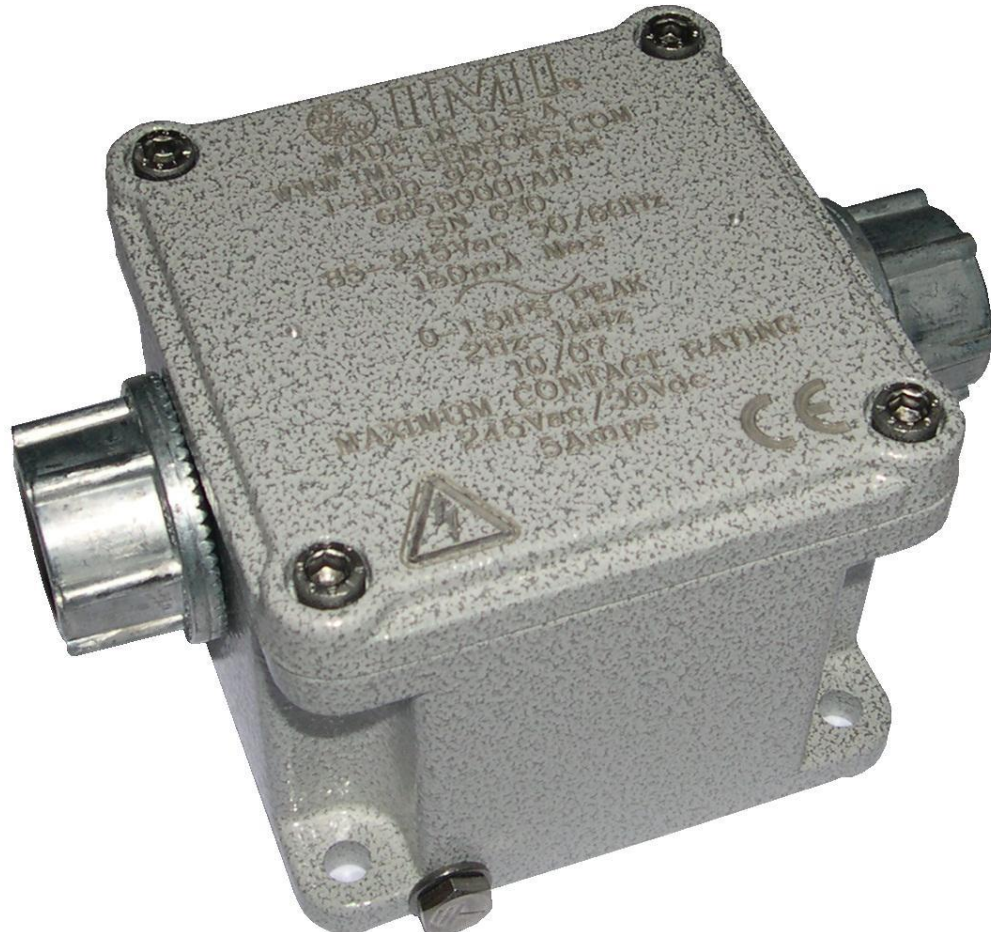
This table is prepared in accordance with the provisions of SJ/T 11364.

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.

685B-Series Electronic Vibration Switch



Operating Guide with Enclosed Warranty Information

3425 Walden Avenue, Depew, New York 14043-2495

Phone (716) 684-0003

Fax (716) 684-3823

Toll Free Line 1-800-959-4IMI

MANUAL NUMBER: 34181
MANUAL REVISION: **H**
ECO# **47640**

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Introduction

The 685B-Series is an electronic vibration switch designed to monitor vibration levels and trip an alert when a specified limit is exceeded. A second onboard relay trips an alarm that can be used to shut down a piece of equipment or act as a secondary alert level. An onboard accelerometer with precision electronics insures reliability and accuracy.

General Features

- Embedded or external piezoelectric accelerometer for improved accuracy and frequency response.
- Vibration range can be measured in acceleration, velocity or displacement (factory set).
- Provides dual 5 Amp Triac (SPST) or 10 Amp Form C (SPDT) relay outputs.
- Adjustable trip limits and time delay via single turn potentiometers.
- Accommodates normally open (NO) and normally closed (NC) wiring schemes.
- Continuous or latching switch action.
- Local reset button and remote reset capability.
- LED indicators for power, alert and alarm.
- Screw terminal blocks for easy wiring.
- Mounts directly to the equipment being monitored via four bolt pattern.
- Flexible design allows for various custom requirements.
- 4-20 mA field calibration feature for improved accuracy.
- Raw vibration & 4-20 mA outputs as standard.

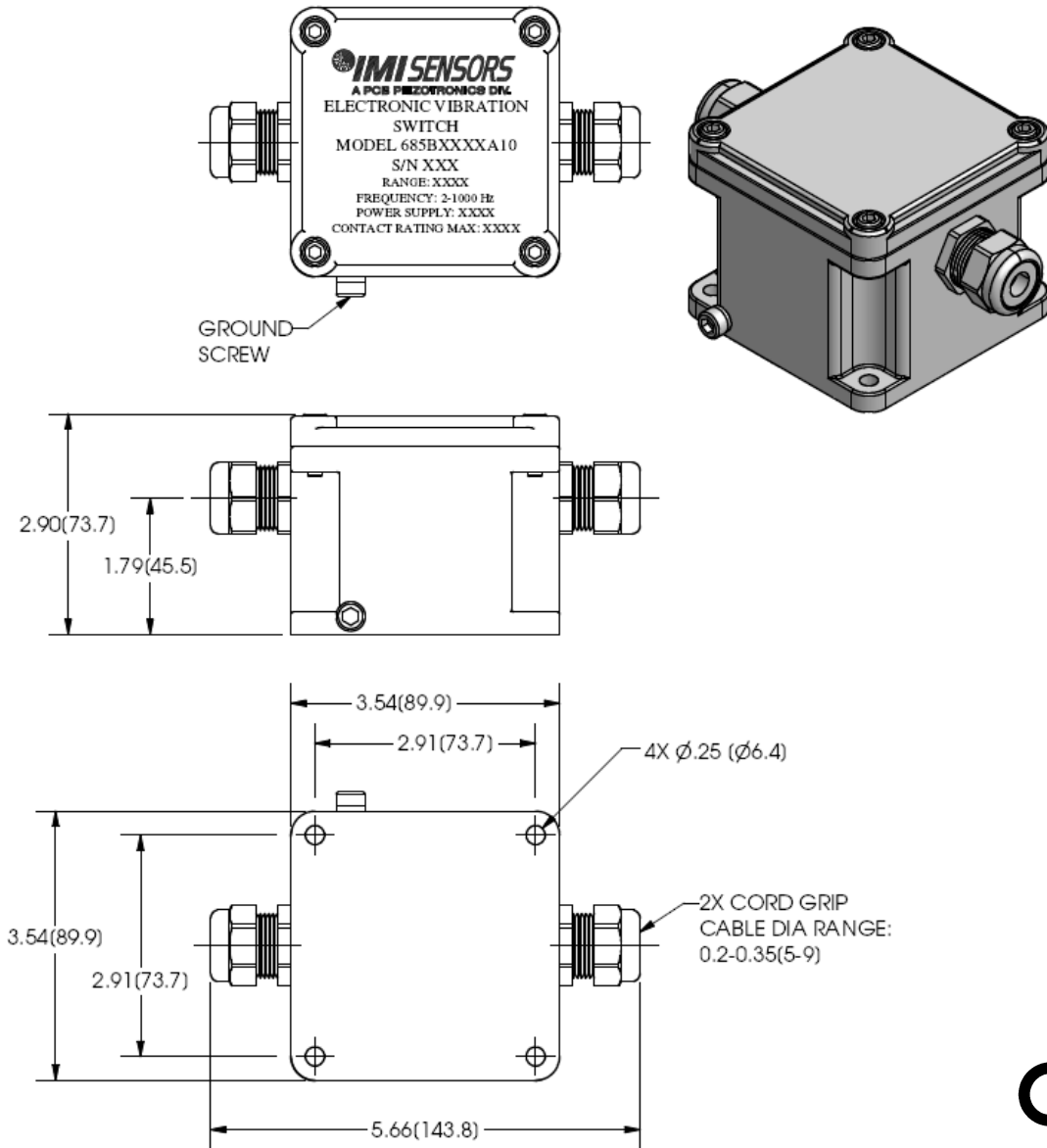
Specifications

- **Power Supply Voltage:** 85-240 VAC, 12-30 VDC (factory set)
- **Power Supply Current:** 150 mA max
- **Sensor Type:** Piezoelectric Sensing Element
- **Standard Vibration Ranges:** 0-5g pk, 0-1.5 ips pk, 0-3 ips pk, 0-50 mils pk-pk, 0-15 mils pk-pk (factory set)
- **Frequency Response +/-3dB:** 2Hz to 1Khz (120 – 60,000cpm)
- **Turn on Time Delay:** 20 seconds
- **Alert/Alarm Time Delay:** 0-45 seconds
- **Alert/Alarm Function Select:** Latch or Continuous
- **Alert/Alarm Switches:** 5A/245Vac Triac (SPST) or 10A/245Vac – 5A/30Vdc Form C Relay (SPDT)
- **Operating Temperature Range:** -22 to 158°F (-30 to 70°C)
- **Storage Temperature Range:** -40 to 257°F (-40 to 125°C)
- **Relative Humidity:**..... NEMA 4X Rating
- **Case Dimension W x H x D:** 3.5 x 2.8 x 3.5in. (90 x 70 x 90mm)
- **Weight:** 1.85 lbs. (839 grams)
- **Case Material:** Aluminum Alloy
- **Input/Output Electrical Connectors:** Screw Terminals
- **Screw Terminal Wire Size:** 24-14 AWG (0.2-2.5 mm²)
- **Wiring Interface:** Cord Grips (wire comp. dia. 0.2”- 0.35”) or ½” NPT Conduit Hubs
- **Mounting Hole Size:** 0.21 inches
- **Mounting Screw Torque:** 2- 5 ft. lbs. (3-7Nm)
- **LED Indicators:**
 - Power: - Green
 - Alarm: - Red
 - Alert: - Yellow
- **Alert/ Alarm Setpoint:** Single Turn Potentiometer (10-100% Full Scale Range)
- **Reset Function:** Momentary Pushbutton Switch and/or Remote to Common.

Installation and Wiring

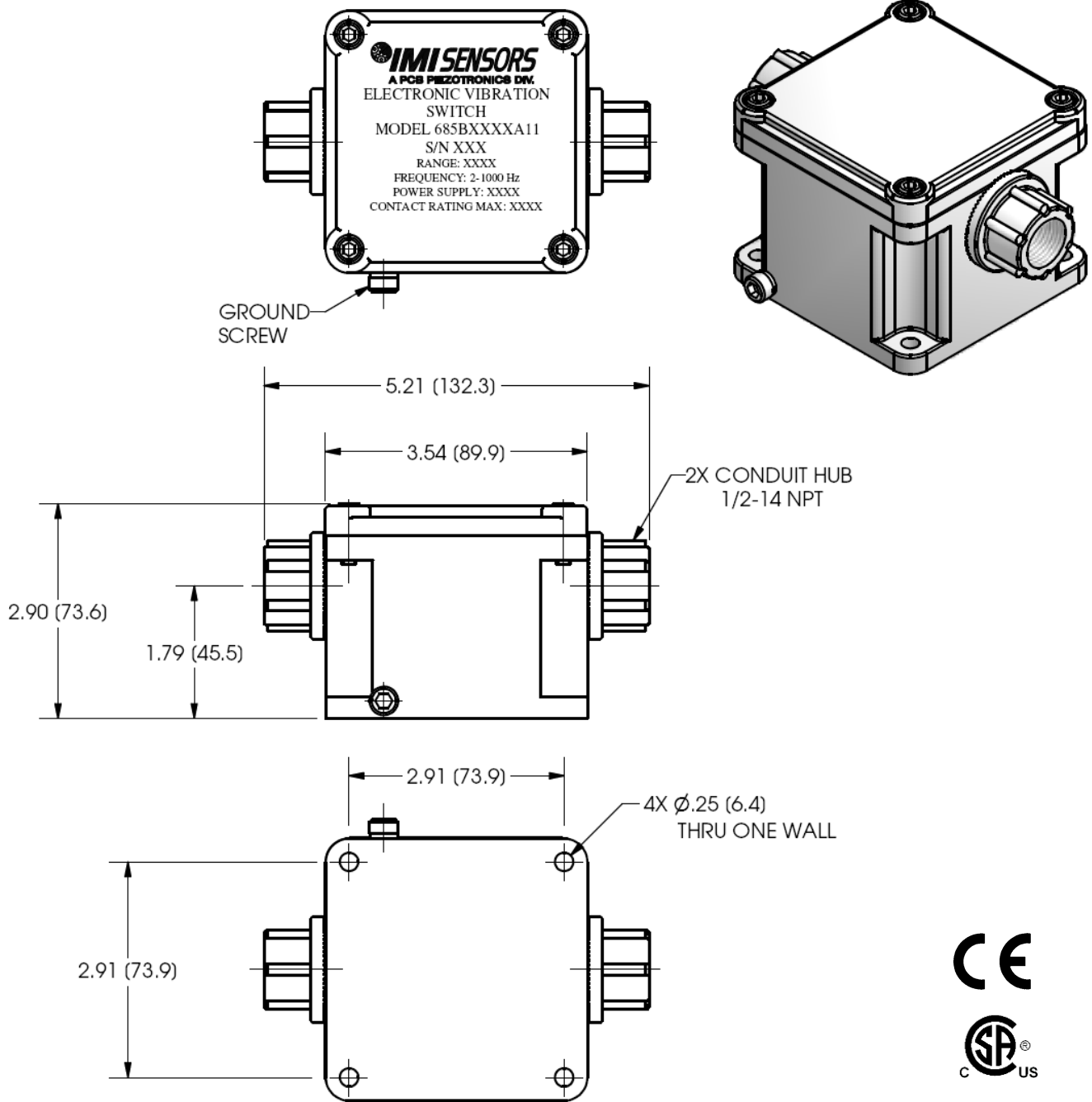
Installation

The 685B-Series is designed to be mounted directly on the equipment to be monitored using a four-bolt pattern. There are also options to retrofit existing 3 bolt pattern installations. (Model 080A209 mounting plate required-see optional accessories on page 13). Use grease between all surfaces to insure specified frequency response, otherwise performance will be degraded. The axis of vibration measured by models with internal accelerometers is perpendicular to the mounting orientation of the unit.

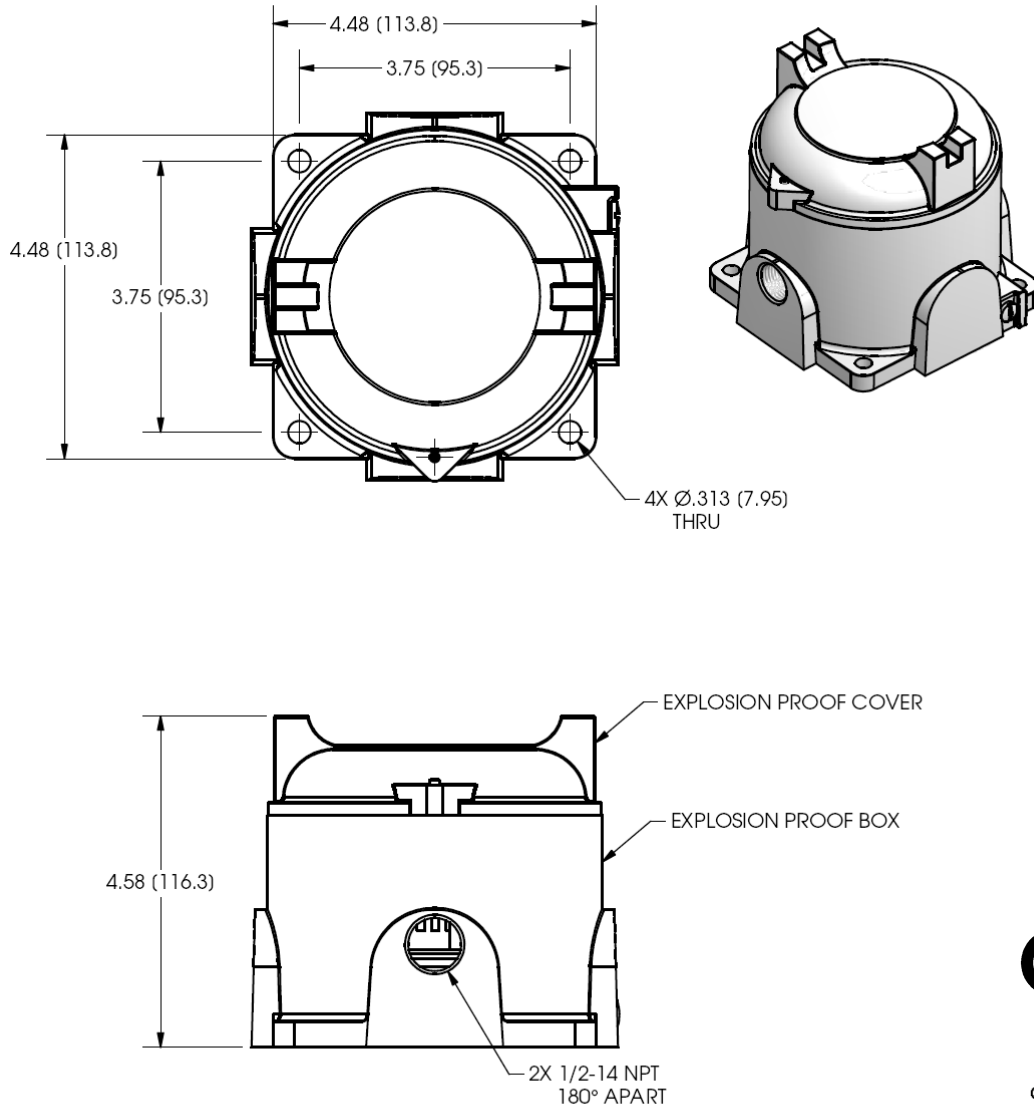


Standard Model Dimension Drawing with Cord Grips

Inch (mm)



Standard Model Dimension Drawing with 1/2" NPT Conduit Hubs
Inch (mm)



Explosion Proof Model Dimension Drawing
Inch (mm)



WARNING

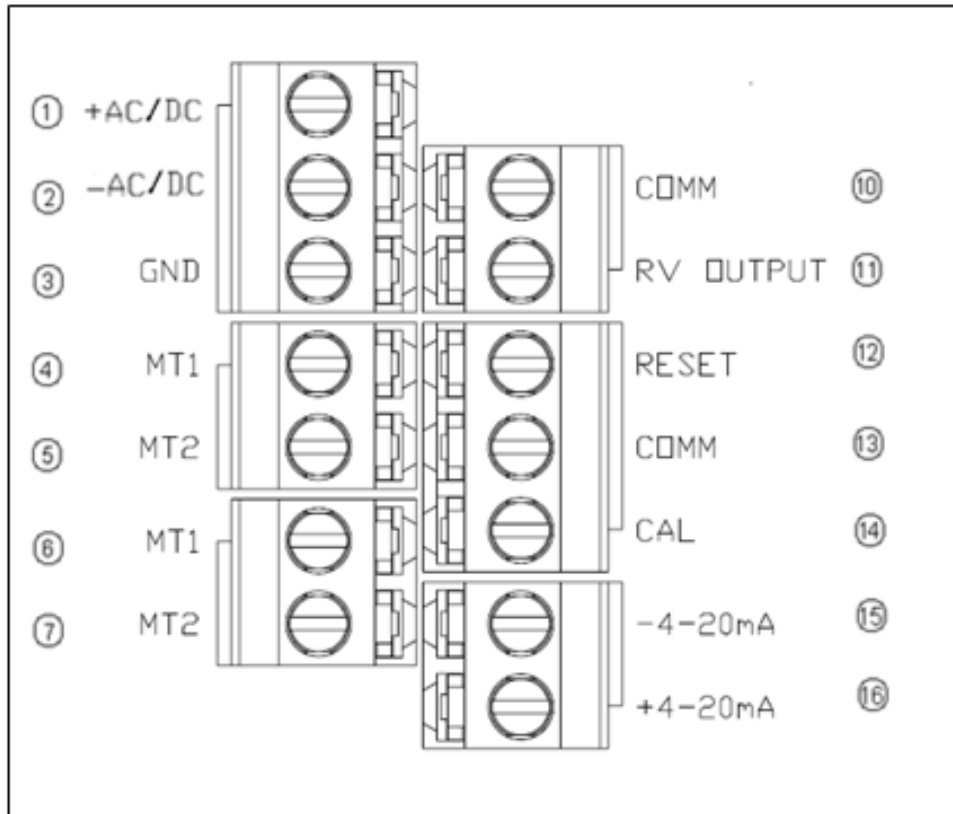
AC and DC input signals and power supply voltages could be hazardous. DO NOT connect live wires to screw terminal plugs, and DO NOT insert, remove, or handle screw terminal plugs with live wires connected.

Connector and Pinout Diagram

The 685B-Series uses screw terminal connectors for all input and output connections.

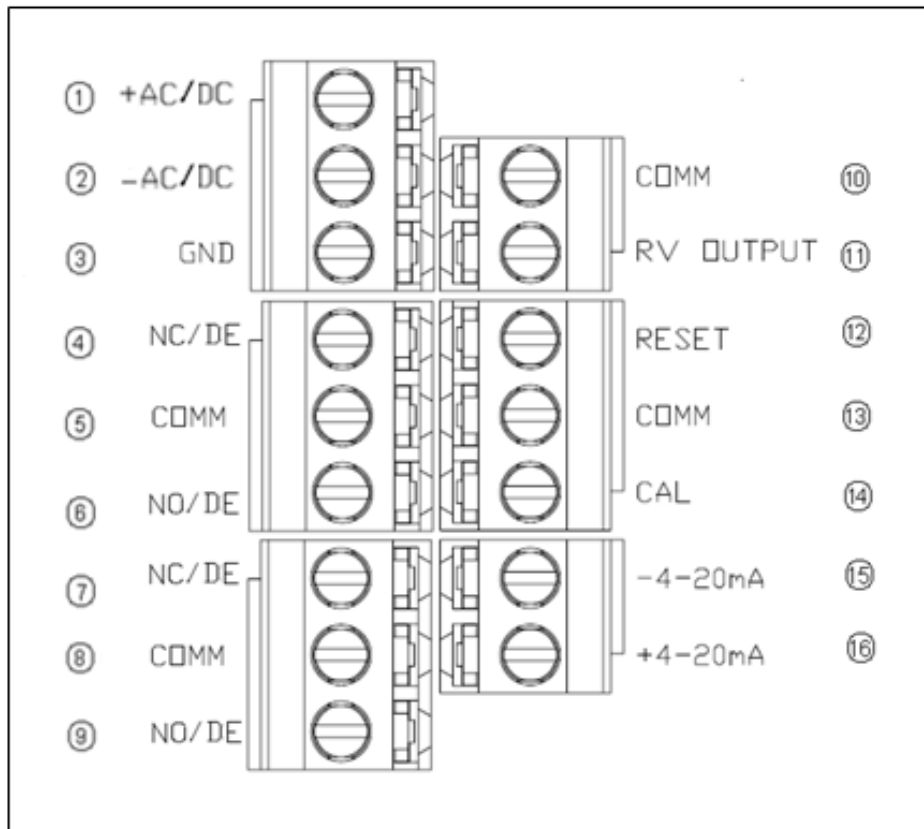
Strip off 0.3" (8mm) of insulation from the connection wire ends. Feed the wire through the access ports, and terminate the wire in the correct location. Once connected, tug lightly on the wire to confirm connection is secure.

Pin Location Diagram- Models with Internal Accelerometer and Triac Relays



Pin	Category	Description
1	AC Power	+ Power
2		- Power/Common
3		Earth Ground (Also connect to enclosure safety lug)
4	Alarm Output	Main Terminal 1
5		Main Terminal 2
6	Alert Output	Main Terminal 1
7		Main Terminal 2
8	N/A	N/A
9		N/A
10	Raw Vibration Output	Common
11		+Signal
12	Control Configurations	Remote Reset Connection (Do not apply power)
13		Common Connection
14		Calibration Connection
15	Current Output	- 4-20 mA
16		+ 4-20 mA

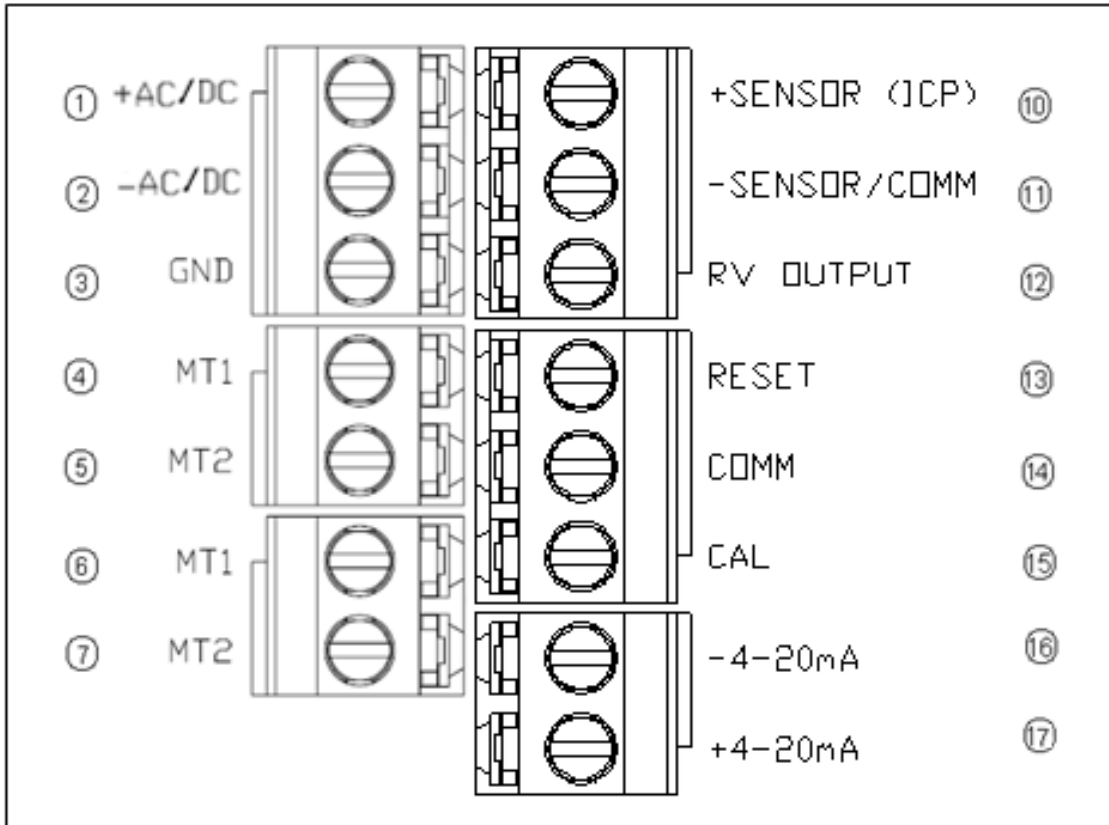
Pin Location Diagram- Models with Internal Accelerometer and Electromechanical Relays



Pin	Category	Description
1	AC Power	+ Power
2		- Power/Common
3		Earth Ground (Also connect to enclosure safety lug)
4	Alarm Output	Normally Closed (when dipswitch is in de-energized position)
5		Common connection
6		Normally Open (when dipswitch is in de-energized position)
7	Alert Output	Normally Closed (when dipswitch is in de-energized position)
8		Common connection
9		Normally Open (when dipswitch is in de-energized position)
10	Raw Vibration Output	Common
11		+Signal
12	Control Configurations	Remote Reset Connection (Do not apply power)
13		Common Connection
14		Calibration Connection
15	Current Output	- 4-20 mA
16		+ 4-20 mA

Pin Location Diagram- Models with External Accelerometer and Triac Relays

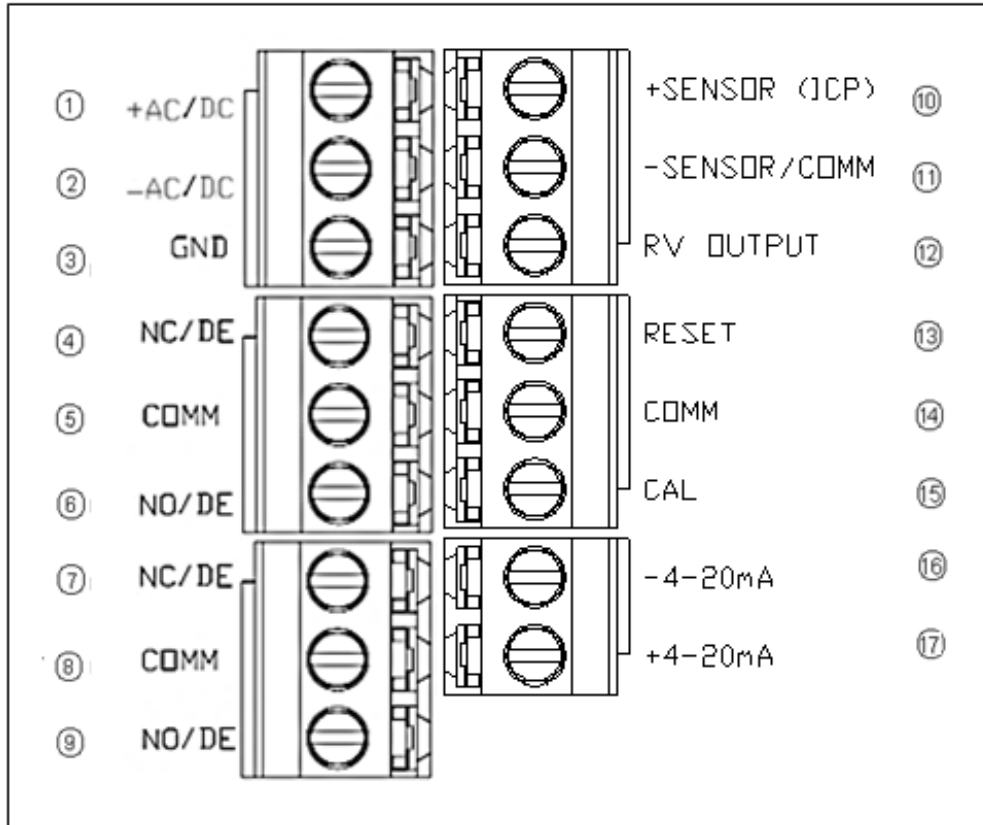
When the external 100mV/g ICP® sensor option is specified, an additional terminal block location is added to the 685B-Series. The external accelerometer is connected to +Sensor and –Sensor positions as indicated in the above figure and on the product label locate inside the top cover. The cable shield to the accelerometer should be grounded as required by local codes as well as to limit RFI/EMI interference.



Pin	Category	Description
1	AC Power	+ Power
2		- Power/Common
3		Earth Ground (Also connect to enclosure safety lug)
4	Alarm Output	Main Terminal 1
5		Main Terminal 2
6	Alert Output	Main Terminal 1
7		Main Terminal 2
8	N/A	N/A
9		N/A
10	Sensor Input & Raw Vibration Output	+ Sensor
11		- Sensor/Common
12		+Signal
13	Control Configurations	Remote Reset Connection (Do not apply power)
14		Common Connection
15		Calibration Connection
16	Current Output	- 4-20 mA
17		+ 4-20 mA

Pin Location Diagram- Models with External Accelerometer and Electromechanical Relays

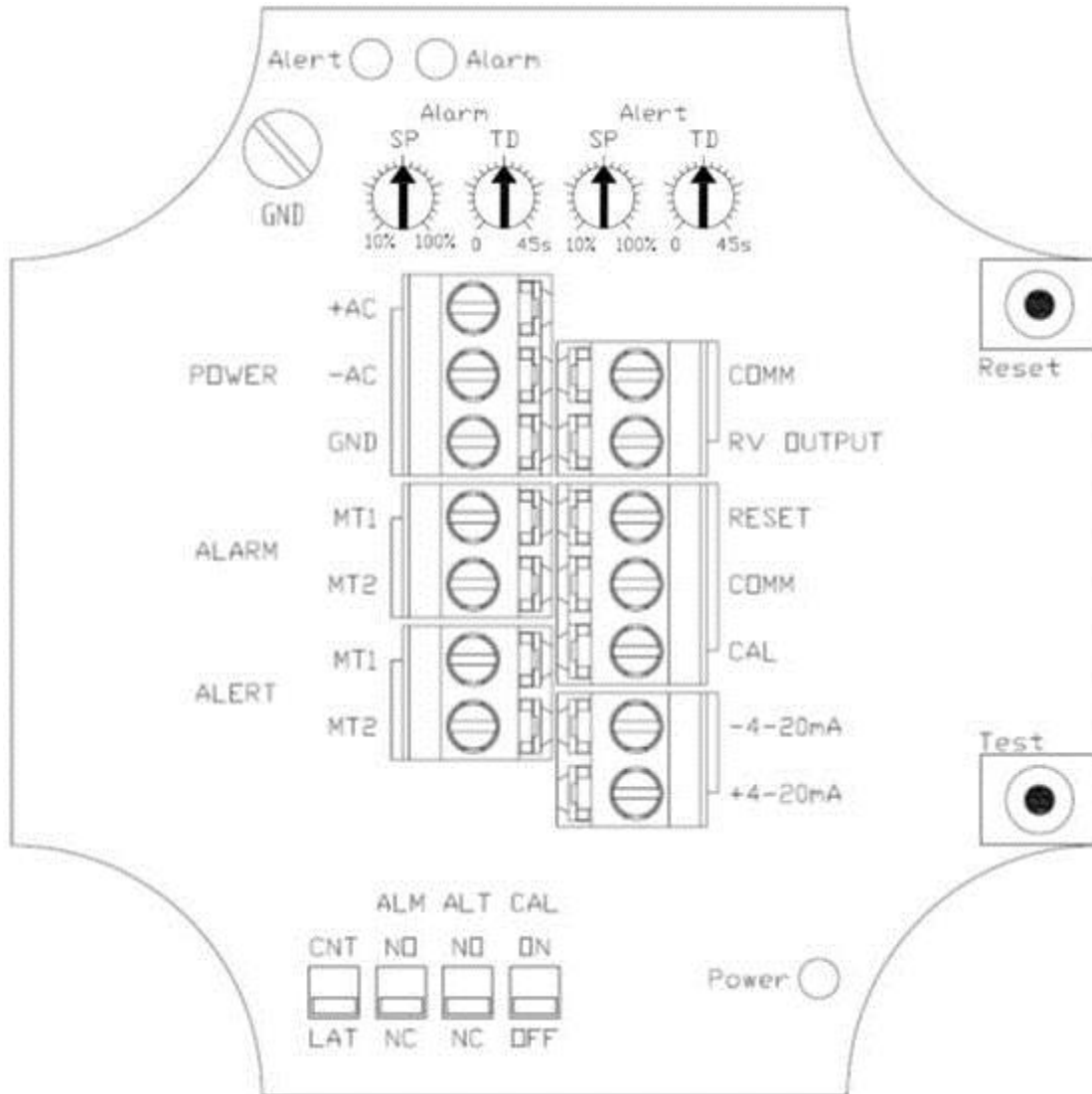
When the external 100mV/g ICP® Sensor option is specified, an additional terminal block location is added to the 685B-Series. The external accelerometer is connected to +Sensor and –Sensor positions as indicated in the above figure and on the product label locate inside the top cover. The cable shield to the accelerometer should be grounded as required by local codes as well as to limit RFI/EMI interference.



Pin	Category	Description
1	AC Power	+ Power
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3		Earth Ground (Also connect to enclosure safety lug)
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5		Common connection
6		Normally Open (when dipswitch is in de-energized position)
7	Alert Output	Normally Closed (when dipswitch is in de-energized position)
8		Common connection
9		Normally Open (when dipswitch is in de-energized position)
10	Sensor Input & Raw Vibration Output	+ Sensor
11		- Sensor/Common
12		+Signal
13	Control Configurations	Remote Reset Connection (Do not apply power)
14		Common Connection
15		Calibration Connection
16	Current Output	- 4-20 mA
17		+ 4-20 mA

Configuring the 685B-Series

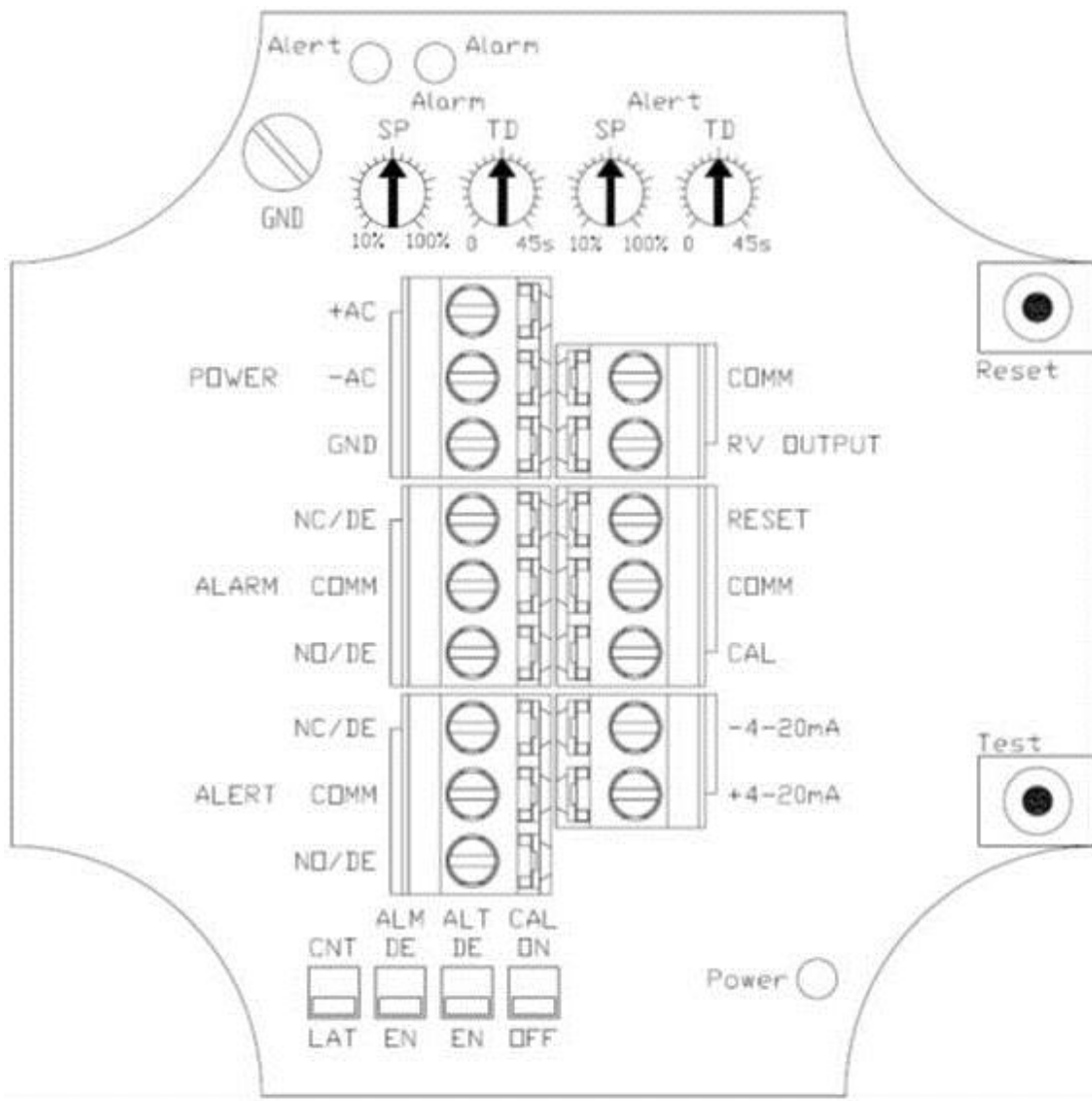
Internal Diagram- Models with Triac Relays



The internal diagram displays the location of the control features for the triac versions of the 685B-Series. The alert and alarm set points are adjusted via the single turn potentiometers. The alarm relay is set using the first potentiometer, and the alert relay is set using the third. The alert relay trips when the set percentage of the alarm value is reached. Time delays for both functions are controlled using the second and fourth potentiometers. Alert and alarm relays can be reset remotely by using the RESET and COMM pins or by using the internal reset switch as seen on the upper right hand corner of the diagram.

Using the dipswitches beneath the terminal connectors, relay operation can be selected to be either latch or continuous, and each relay can be separately configured to be normally open (de-energized) or normally closed (energized). There is also a dipswitch to activate the **calibration mode** for condition simulation during the setup process. This is explained in detail on page 13.

Internal Diagram- Models with Electromechanical Relays



The internal diagram displays the location of the control features for the relay versions of the 685B-Series. The alert and alarm set points are adjusted via the single turn potentiometers. The alarm relay is set using the first potentiometer, and the alert relay is set using the third. The alert relay trips when the set percentage of the alarm value is reached. Time delays for both functions are controlled using the second and fourth potentiometers. Alert and alarm relays can be reset remotely by using the RESET and COMM pins or by using the internal reset switch as seen on the upper right hand corner of the diagram.

Using the first dipswitch beneath the terminal connectors, relay operation can be selected to be either latch or continuous. The second and third dipswitches set the alert and alarm relay configuration to be energized or de-energized. The diagram above indicates the contacts that are normally open and normally closed when the dip switch is set to “de-energized”. When the dipswitch is changed to “energized”, the normally open and normally closed contacts would be reversed. The fourth dipswitch is used to activate the **calibration mode** for condition simulation during the setup process. This is explained in detail on page 12.

Using Calibration Mode

The 685B-Series has the unique ability to be calibrated using a 4-20 mA simulator. (IMI Sensors model 699A05, see “Accessories” page) This allows for a much more accurate and quantifiable calibration versus manually attuning the switch. The following steps allow for simple calibration using this configuration.

- 1) Connect the 4-20 mA simulator signal across the COMM and CAL pins.
- 2) Turn the calibration dipswitch to “on”. This will disable the switch’s ability to measure physical vibration.
- 3) Turn both time delay potentiometers to “zero” for calibration purposes. This can be adjusted to desired delay after calibration.
- 4) Assume that 4 mA equals zero vibration and 20 mA equals full scale vibration. Then calculate, in mA, the vibration level for which the alert and alarm switches should trip.
- 5) Using the 4-20 mA simulator, send the appropriate alarm signal based on the calculation in the previous step for the alarm signal.
- 6) Adjust the “SP” Alarm set point potentiometer to the point when the red Alarm LED illuminates.
- 7) Using the 4-20 mA simulator, repeat step 5 for the Alert signal.
- 8) Adjust the “SP” Alert set point potentiometer to the point where the yellow Alert LED illuminates. It is important to set the Alarm potentiometer first because the Alert signal acts as a percentage of the value set for Alarm.
- 9) Disconnect the 4-20 mA simulator.
- 10) Turn “off” the calibration dipswitch.

**** Warning: To avoid damage, insure 685B-Series is under power prior to applying the 4-20mA signal from the simulator. ****

Testing the Calibration

Pushing the “Test” button inside the housing simulates full scale vibration and should illuminate both the alert and alarm LED’s. This feature can be used to adjust time delays to the desired values. This can be accurately calculated using the “Test” button and a stopwatch.

Connecting the Remote Reset

The 685B-Series allows for remote reset when the switch is in latch mode via a short between the RESET and COMM pins.

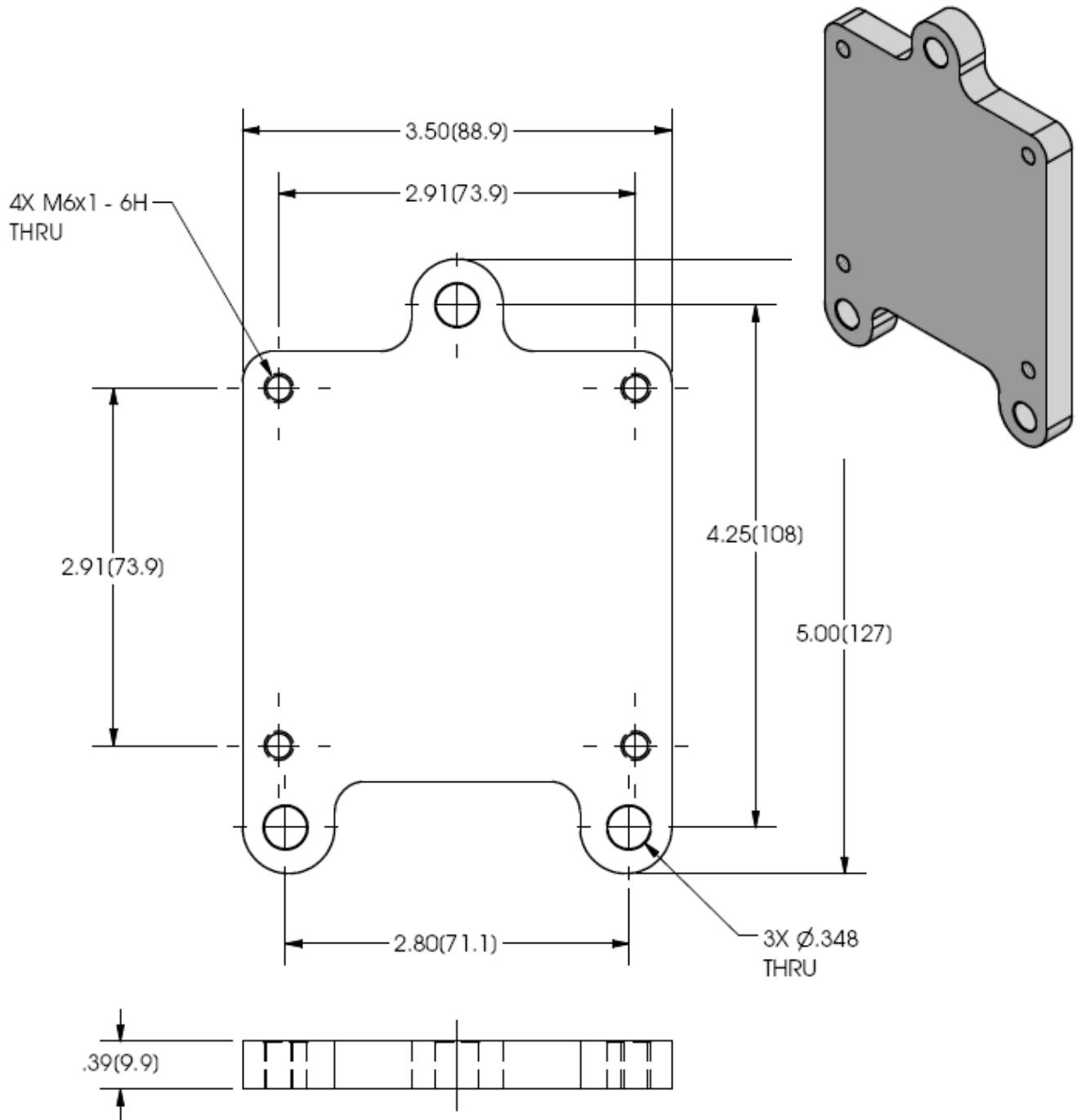
Connecting the Raw Vibration Output

All models in the 685B-Series offer the option for obtaining accelerometer’s raw vibration signal. Models with internal accelerometers output 100 mV/g. To obtain this signal using digital analyzer, turn the ICP® power **OFF** at the digital analyzer input. Connect the analyzer to the RV OUTPUT and COMM pins with the common connection on the COMM pin and the signal connection on the RV OUTPUT pin.

Optional Accessories

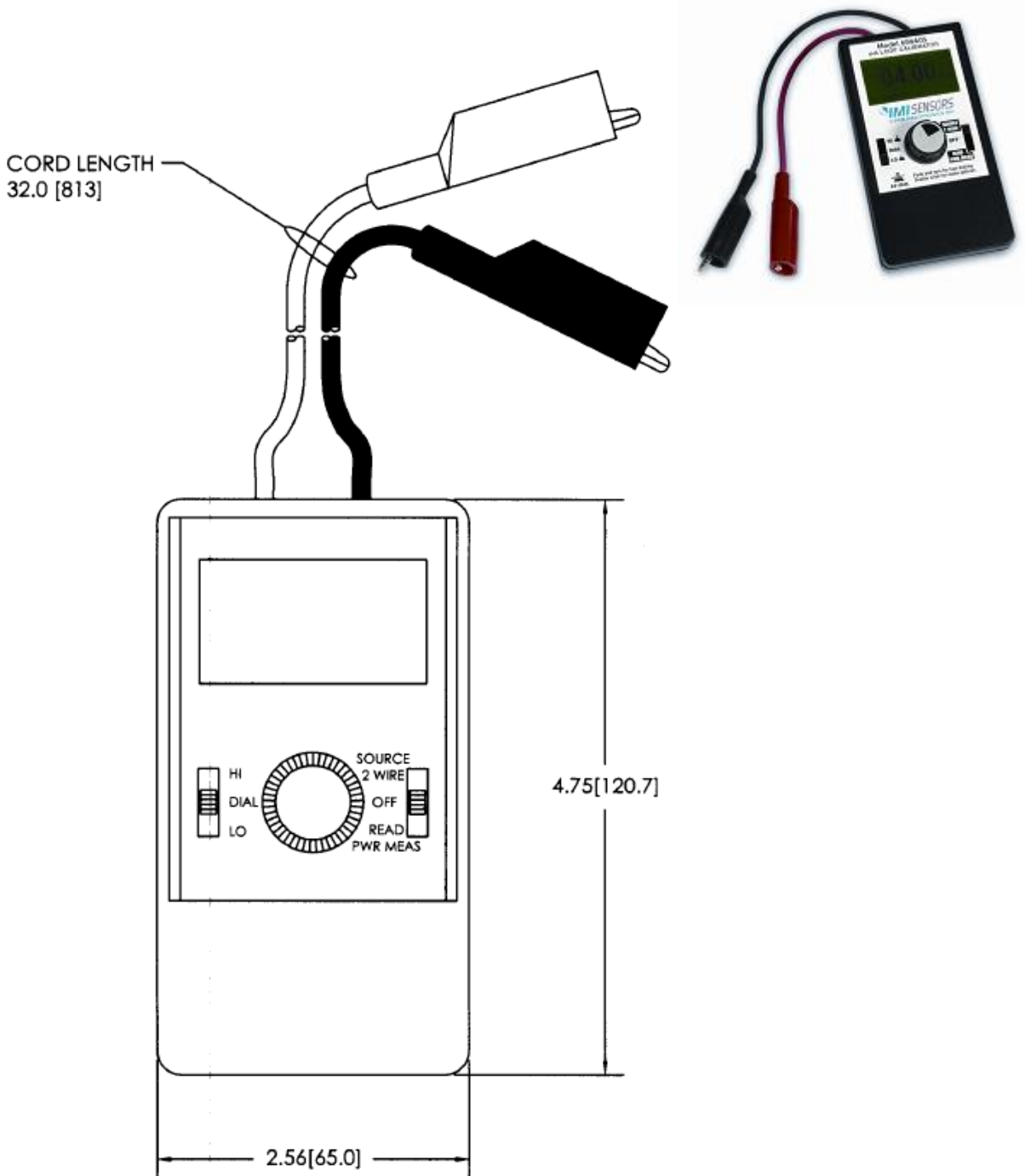
Model 080A209 Adapter Plate

To retrofit old style vibration switch bolt patterns



Model 699A05 Portable 4-20 mA Calibrator

Provides current output for 685B-Series testing, read-out and calibration purposes. Also receives and displays current signal from 4-20 mA proportional output from the 685B-Series.



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.

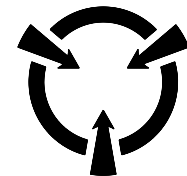
Caution 1 – ESD sensitivity

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.*

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
ELECTROSTATIC
DISCHARGE SENSITIVE

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.

Ordering Information/ Model Matrix

IMI Part Number: **685B** 0 0 0 0 **A1** 0

Basic Model Series _____

685B

Sensor Option _____

- 0 *Internal 100 mV/g ICP Sensor*
- 1 External 100mV/g ICP® Sensor
- 2 External 100 mV/g ICP Sensor (Low Frequency)
- 3 *Internal 100 mV/g ICP Sensor (Low Frequency)*
- 4 External 100mV/g ICP® Sensor (Sensor Fault Detection)
- 5 External 100mV/g ICP® Sensor (Sensor Fault Detection)

Scale Factor _____

- 0 *0-1.5 in/sec peak*
- 1 *0-5 g peak*
- 2 *0-15 mils peak to peak displacement*
- 3 *0-50 mils peak to peak displacement*
- 4 *0-3.0 in/sec peak*

Power Required _____

- 0 *85-245 VAC, 50/60 Hz*
- 1 *24 VDC ±10%*

Relay Type (two provided) _____

- 0 *Triac, 5A/245vac*
- 1 *Form C Relay (SPDT) 10A/245Vac – 5A/30Vdc*

Enclosure Type/ Hazardous Area Approval _____

- A1 *Basic enclosure, internal pushbutton for remote reset*
- A2 Same as A1, plus external pushbutton for remote reset
- A3 Same as A1, plus acceleration signal through external BNC
- A4 Same as A1, plus A2 & A3
- C1 Explosion Proof Enclosure (must select option 4 connection)

Connection Interface _____

- 0 Dual openings, cord grips
- 1 *Dual openings, ½" NPT conduit hubs*
- 2 Single opening, cord grip
- 3 *Single opening, ½" NPT conduit hub*
- 4 Dual openings, ½" NPT conduit hubs (for C1 enclosures only)
- 5 Dual openings, cord grip on left, ½" NPT conduit hub on right
- 6 Dual openings, cord grip on right, ½" NPT conduit hub on left

CSA Class I, Division 2 approval is supplied as standard for switches that are NOT using the C1 enclosure but are using all italicized options.

DYNAMIC PERFORMANCE

Frequency Response (± 3 dB)
 Alarm Setpoint
 Alert Setpoint
 Alert/Alarm Time Delay
 Turn on Time Delay

ENGLISH

120-60,000cpm
 10 to 100% of Vibration Range
 10 to 100% of Alarm Setpoint
 0 - 45 seconds
 20 seconds

SI

2-1000Hz
 10 to 100% of Vibration Range
 10 to 100% of Alarm Setpoint
 0 - 45 seconds
 20 seconds

ELECTRICAL

Power Supply Current
 Sensor Type
 Output (Current)
 Raw Vibration Output ($\pm 20\%$)
 Calibration Input

<150mA
 Piezoelectric Sensing Element
 4 to 20mA
 100mV/g
 4 to 20mA

<150mA
 Piezoelectric Sensing Element
 4 to 20mA
 100mV/g
 4 to 20mA

ENVIRONMENTAL

Operating Temperature Range
 Storage Temperature Range
 Relative Humidity

-22 to 158°F
 -40 to 257°F
 NEMA4X

-30 to 70°C
 -40 to 125°C
 IP66

MECHANICAL

Case Dimension W x H x D:
 Weight
 Material
 Input/Output Electrical Connectors
 Screw Terminal Wire Size
 Cover Screw Torque (Maximum)
 Mounting Hole Size (max. diameter)
 Mounting Screw Torque

3.5" x 2.8" x 3.5"
 1,85lbs
 Aluminum Alloy
 Screw Terminals
 24-14AWG
 4.1 lb-ft
 0.21 inch
 2-5 ft. lbs.

90mm x 70mm x 90mm
 839 grams
 Aluminum Alloy
 Screw Terminals
 0.2 - 2.5 mm²
 5.7 N-m
 5.4 mm
 3-7 Nm

INDICATOR/CONTROLS

Power LED
 Alarm LED
 Alert LED
 Setpoint Adjustment
 Time Delay Adjustment
 Reset Function
 Self Test Function
 Alarm/Alert Function Select
 Switch Mechanism Function Select
 Calibration Mode

Green
 Red
 Yellow
 Single Turn Potentiometer
 Single Turn Potentiometer
 Momentary Pushbutton Switch
 Momentary Pushbutton Switch
 Latch or Continuous
 NO/NC
 ON/OFF

Green
 Red
 Yellow
 Single Turn Potentiometer
 Single Turn Potentiometer
 Momentary Pushbutton Switch
 Momentary Pushbutton Switch
 Latch or Continuous
 NO/NC
 ON/OFF

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.

Accelerometer Configuration: 685BX000000

0 Internal

Vibration Range: 685B0X00000

- 0 0 to 1.5 in/s pk (0 to 38.1 mm/s pk)
 1 0 to 5 g's pk (0 to 49 m/s² pk)
 2 0 to 15 mils pk to pk (0 to 381 pm pk to pk)
 3 0 to 50 mils pk to pk (0 to 1.27 mm pk to pk)
 4 0 to 3.0 in/s pk (0 to 76.2 mm/s pk)

Input Power: 685B00X0000

0 85-245Vac 50/60Hz

Alert and Alarm Switch Mechanism: 685B000X000

- 0 Triac 5A, 240Vac, WOOVac Isolation
 1 Relay 10A, 240Vac/30Vdc, Form C (SPDT), IOOVac Isolation

Enclosure: 685B0000XX0

A1 Internal and Remote Reset

Interface: 685B000000X

- 1 Dual 1/2" NPT Conduit Hubs
 3 Single 1/2" NPT Conduit Hub

Mounting: 685B0000X00

D Optional Model 080A209 Mounting Plate/Adapter

NOTES:

- 1) To obtain 1000Hz frequency response, grease must be applied to all mechanical couplings. Otherwise, frequency response is limited to approximately 500Hz.
- 2) Factory Set.
- 3) Active only during calibration mode
- 4) Reset can also be engaged via external connection to common.
- 5) Current will fluctuate at frequencies below 5 Hz
- 6) See PCB Declaration of Conformance PS051 for details.
- 7) CL I, DIV2GR A, B, C, D
- 8) Reference PCB drawing 37476 for installation requirements.



All specifications are at room temperature unless otherwise specified.

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

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

Form DD030 Rev F 2/23/99

Drawn: NAD

Engineer: NF

Sales: JL

Approved: NF

Spec Number:

Date: 7/10/2023

Date: 7/10/2023

Date: 7/10/2023

Date: 7/10/2023

38866

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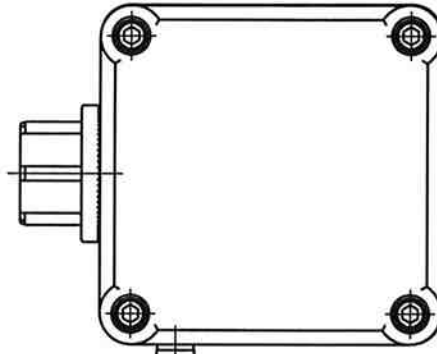
REVISIONS

REV	DESCRIPTION	ECN	APP'D
NR	RELEASED TO DRAFTING		ECB 9/06
A	REPLACE CONDUIT HUB	27505	DMW/27

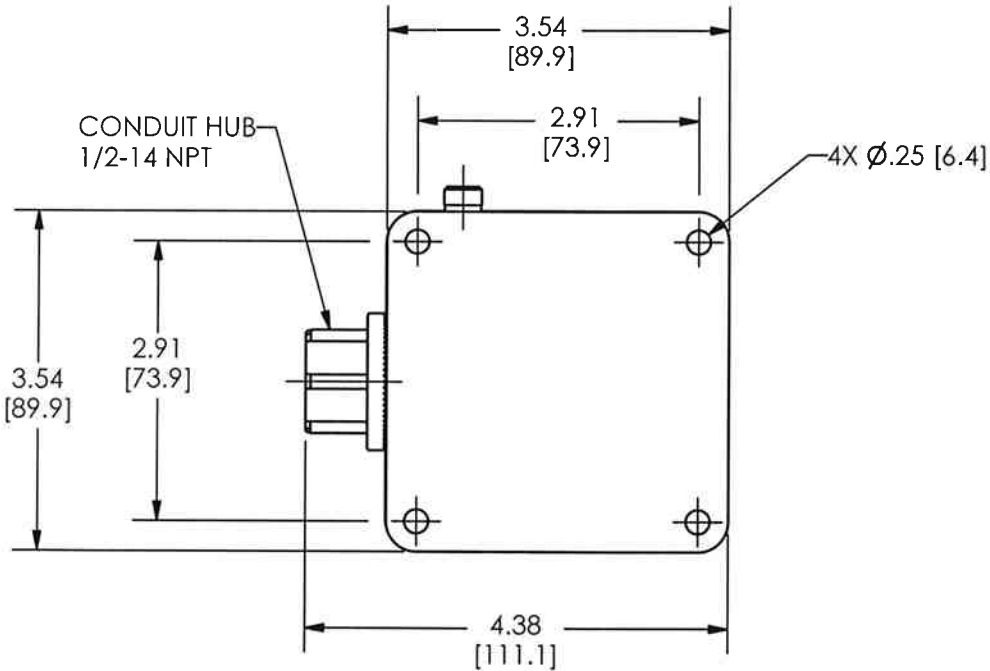
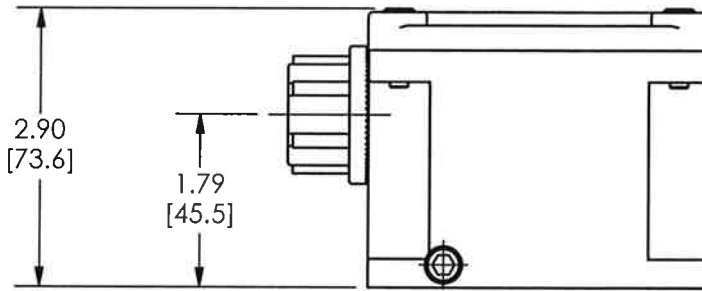
35360

Related Drawing

No modifications permitted without the approval of the authorized person



GROUND SCREW



UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

DIMENSIONS IN INCHES

DECIMALS XX ± .03
XXX ± .010
ANGLES ± 2 DEGREES

DIMENSIONS IN MILLIMETERS [IN BRACKETS]

DECIMALS X ± 0.8
XX ± 0.25
ANGLES ± 2 DEGREES

FILLETS AND RADII
.003 - .005

FILLETS AND RADII
[0.07 - 0.13]

DRAWN	MDT	10/16/07	MFG	JR	10/16/07
CHK'D	DM	10/19/07	ENGR	MJI	10/16/07
APP'D	NF	10/16/07	SALES	JJ	10/16/07

TITLE
OUTLINE DRAWING
MODEL 685BXXXXA13 SERIES
ELECTRONIC VIBRATION SWITCH

PCB PIEZOTRONICS^{INC}
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 E-MAIL: sales@pcb.com

CODE IDENT. NO. 52681	DWG. NO. 35360
SCALE: .5 X	SHEET 1 OF 1



Certificate of Compliance

Certificate: 1819674

Master Contract: 184981

Project: 1916501

Date Issued: 2007/10/11

Issued to: Industrial Monitoring Instr. (IMI)

A Div. of PCB Piezotronics, Inc.
3425 Walden Ave
Depew, NY 14043
USA
Attention: Mr. Mitch Illig

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US'



Issued by: Ron Wildish

Authorized by: Peter Schimmoeller, Manager
of Certification Services

PRODUCTS

- CLASS 2258 82** - PROCESS CONTROL EQUIPMENT - For Hazardous Locations -
Certified to US Standards
- CLASS 2258 02** - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Div. 1, Groups B, C and D; Class II, Div. 1, Groups E, F and G; Class III, Div. 1:

The 'C' and 'US' indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. National Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.



Certificate: 1819674

Master Contract: 184981

Project: 1916501

Date Issued: 2007/10/11

Model 685B0X01C14 Electronic Vibration Switch; input supply rated 85-245 Vac, 50/60 Hz, 150 mA max; Output (optional) rated 15 Vdc, 4-20 mA; 5 Vdc, 1 mA; Relay Contact Rated 245 Vac, 10A; 30 Vdc, 5A; Temperature Code T6; -25 Deg. C < Ambient < + 70 Deg. C; installed as per Interconnection drawing 34917; Enclosure Type 4; IP 66.

Class I, Div. 2, Groups A, B, C and D:

Model 685B0X01A11, 685B0X01A13, 685B0X01D11 and 685B0X01D13 Electronic Vibration Switch; input supply rated 85-245 Vac, 50/60 Hz, 150 mA max; Output (optional) rated 15 Vdc, 4-20 mA; 5 Vdc, 1 mA; Relay Contact Rated 245 Vac, 10A; 30 Vdc, 5A; Temperature Code T6; -30 Deg. C < Ambient < + 70 Deg. C; installed as per Interconnection drawing 37476; Enclosure Type 4X.

Model 685B0X00A11, 685B0X00A13, 685B0X00D11 and 685B0X00D13 Electronic Vibration Switch; input supply rated 85-245 Vac, 50/60 Hz, 150 mA max; Output (optional) rated 15 Vdc, 4-20 mA; 5 Vdc, 1 mA; Triac output Contact Rated 245 Vac, 5A; Temperature Code T6; -30 Deg. C < Ambient < + 70 Deg. C; installed as per Interconnection drawing 37476; Enclosure Type 4X.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91 - General Requirements – Canadian Electrical Code, Part II

C22.2 No. 25-1966 - Enclosures for Use in Class II, Groups E, F and G Hazardous Locations

C22.2 No. 30-M1986 - Explosion-Proof Enclosures for Use in Class I Hazardous Locations

CAN/CSA-C22.2 No. 94-M91 - Special Purpose Enclosures

C22.2 No. 142-M1987 - Process Control Equipment

C22.2 No. 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

CAN/CSA-C22.2 No. 60529:05 - Degrees of protection provided by enclosures (IP Code)

UL 50, 11th Ed. - Enclosures for Electrical Equipment

UL 916, 3rd Ed. - Energy Management Equipment

UL 1203, 4th Ed. - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations



Certificate: 1819674

Master Contract: 184981

Project: 1916501

Date Issued: 2007/10/11

UL 1604 (3rd Ed.) - Electrical Equipment for Use in Class I and II, Division 2; Class III Hazardous (Classified) Locations

ANSI/ISA 12.12.01-2000 - Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

ANSI/IEC 60529:2004 - Degrees of Protection Provided by Enclosures (IP Code)



Supplement to Certificate of Compliance

Certificate: 1819674

Master Contract: 184981

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
1916501	2007/10/11	Update to include Model 685B0X01A1x, 685B0X01D1x, 685B0X00A1x and 685B0X00D1x (Division 2 version of Electronic Vibration Switch) for hazardous locations.
1819674	2007/04/27	Model 685B0X01C14 Electronic Vibration Switch - Explosion-proof for Hazardous Locations.

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SCHEDULE DRAWING

NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

37476

REVISIONS		
REV	DESCRIPTION	DIN
A	ADDING CS685YZZZ	46985

POWER SUPPLY
SIGNAL CONDITIONER

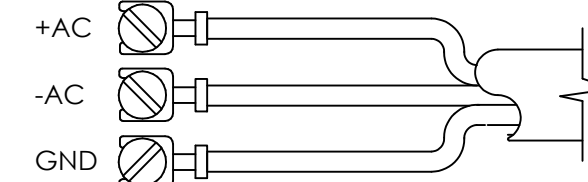
NON-HAZARDOUS / SAFE AREA
OR DIV 2 / ZONE 2

HAZARDOUS AREA
DIV 2

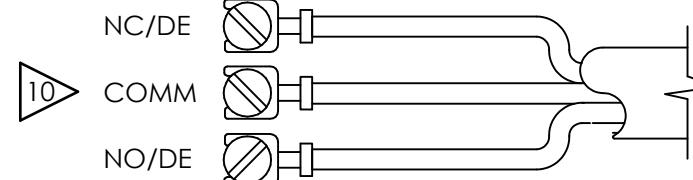
CONDUIT/CABLE

VIBRATION SWITCH
PN CS685YZZZ

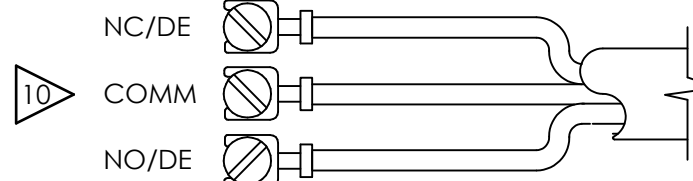
POWER SUPPLY
85 to 245Vac 50/60Hz
150mA MAXIMUM



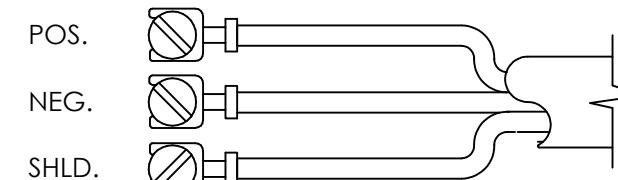
ALARM RELAY
SPDT
10Aac/5Aac 245Vac/30Vdc MAXIMUM



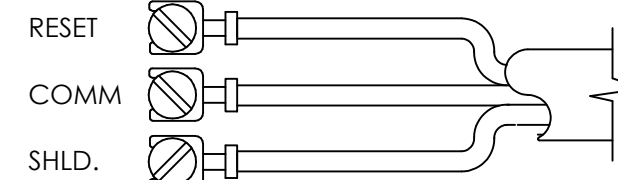
ALERT RELAY
SPDT
10Aac/5Aac 245Vac/30Vdc MAXIMUM



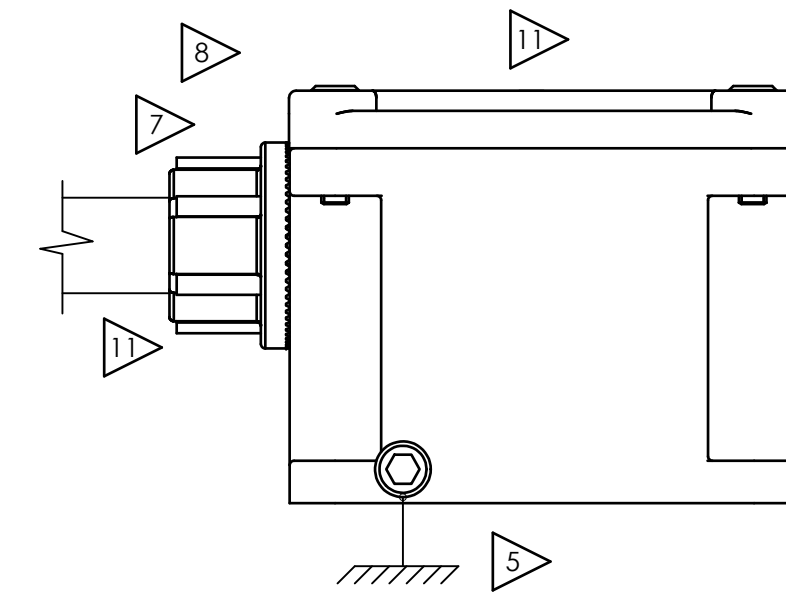
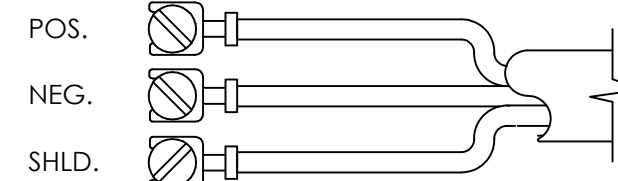
4-20mA/15Vdc OUTPUT



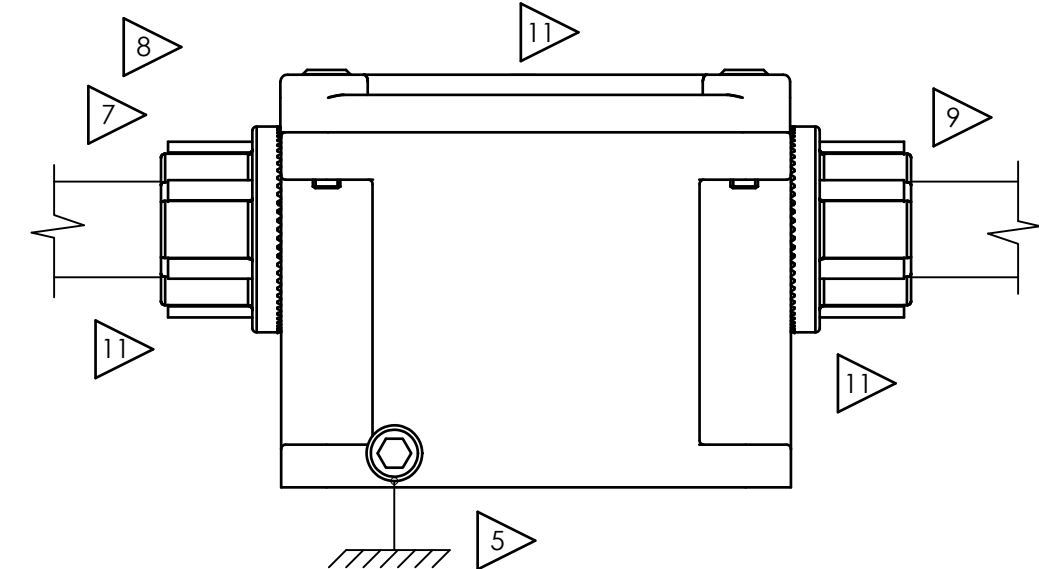
REMOTE RESET 5Vdc/1mA
MOMENTARILY CONNECT
RESET TO COMM



RAW VIBRATION OUTPUT
100mV/G
10G MAXIMUM



VIBRATION SWITCH
PN 685B0X01A1X



- 11 THE INSTALLER SHALL INSURE THAT THE TOP COVER INTERNAL GASKET AND CONDUIT HUB THREADS ARE COATED WITH SUPPLIED SILICON GREASE TO MAINTAIN TYPE 4X/NEMA 4X INTEGRITY.
- 10 THE RELAY OUTPUTS MAY BE CONNECTED TO DIFFERENT PHASES ONLY FOR VOLTAGES UP TO 125VAC. FOR VOLTAGES ABOVE 125VAC THE RELAYS SHALL BE CONNECTED TO SAME PHASE CIRCUITS ONLY.
- 9 IF ONLY ONE CONDUIT ENTRY IS USED, THE UNUSED ENTRY MUST BE SEALED WITH A FITTING COMPLIANT TO HAZARDOUS RATINGS AS REQUIRED BY THE APPLICATION AND LOCAL GOVERNING AGENCY.
- 8 INTERNAL GROUND SCREW MUST BE CONNECTED TO POWER SUPPLY GROUND WITH WIRE SIZE EQUAL TO OR GREATER THAN 14 AWG.
- 7 ALL CONDUIT AND JUNCTION BOXES MUST MEET THE CLASS, DIVISION, GROUP, AND INSTALLATION METHOD AS REQUIRED BY THE APPLICATION AND LOCAL GOVERNING AGENCY.
- 6 SHIELDS TO BE EARTHED AT POWER SUPPLY END.
- 5 THE INSTALLER SHALL INSURE THAT THE VIBRATION SWITCH MOUNTING STRUCTURE IS AT THE SAME GROUNDING POTENTIAL AS THE SUPPLY SOURCE GROUND. TOTAL EARTH LOOP IMPEDANCE SHALL BE LESS THAN ONE OHM.

- 4.) FOR GUIDANCE ON CANADIAN INSTALLATION, REFER TO CEC PART I. FOR GUIDANCE ON U.S. INSTALLATION, INSTALL IN ACCORDANCE WITH NEC [ANSI/NFPA70] AND [ANSI/ISA RP12.6].
- 3.) CERTIFIED BY THE APPROPRIATE APPROVAL AUTHORITY FOR INSTALLATION IN THE FOLLOWING AREAS:
CLASS 1, DIV 2, GROUPS A,B,C,D
CLASS 1, ZONE 2, GROUPS IIC T6
- 2.) WIRING (685B0X01A1X) & CS685YZZZ:
MULTICONDUCTOR
.5in [12.7mm] X 1000ft [305m] MAX.
- 1.) PART NUMBERS IS 685B0X01A1X WHERE X INDICATES RANGE, FREQUENCY RESPONSE, AND NUMBER OF CONDUIT HUBS. 685B0X01D1X DENOTES INSTALLED MOUNTING PLATE.

WARNING - EXPLOSION HAZARD
DO NOT DISCONNECT EQUIPMENT
UNLESS POWER HAS BEEN SWITCHED
OFF OR THE AREA IS KNOWN TO BE
NON-HAZARDOUS

AVERTISSEMENT - RISQUE D'EXPLOSION
NE PAS DÉCONNECTER L'ÉQUIPEMENT
À MOINS QUE LA PUISSANCE SOIT
COMMUTE OFF OU LA ZONE EST
CONNUE POUR ÊTRE NON DANGEREUX

NO CHANGES WITHOUT CSA APPROVAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMALS X ± .05 XX ± .01 XXX ± .005 XXXX ± .0005 ANGLES ± 2 DEGREES FILLETS AND RADII .003 - .005 HEX DIMENSIONS ARE: ≤ .5 + .000 / - .003 ≥ .5 + .000 / - .005 INTERNAL THREAD DEPTH MIN. REMOVE ALL BURRS SHARP = R.000 - R.003	DRAWN JDM 7/17/17	CHECKED JDM 7/17/17	ENGINEER GGS 7/17/17	<p>3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0002 E-MAIL: sales@pcb.com</p>
	TITLE CSA APPROVAL 685B0X01A1X & CS685YZZZ INTERCONNECTION			

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SCHEDULE DRAWING

NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

37476

REVISIONS		
REV	DESCRIPTION	DIN
- SEE SHEET 1 -		

POWER SUPPLY
SIGNAL CONDITIONER

POWER SUPPLY
85 to 245Vac 50/60Hz
150mA MAXIMUM

ALARM TRIAC
SPST
5A dc 245Vac MAXIMUM

ALERT TRIAC
SPST
5A dc 245Vac MAXIMUM

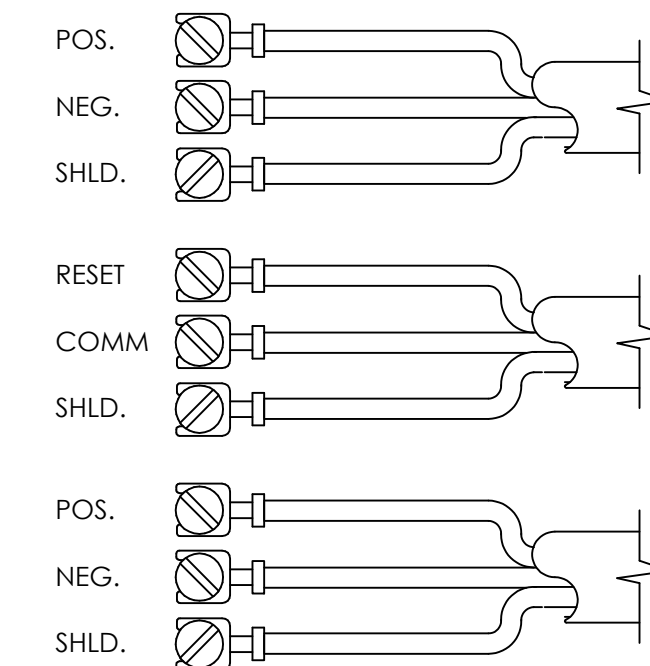
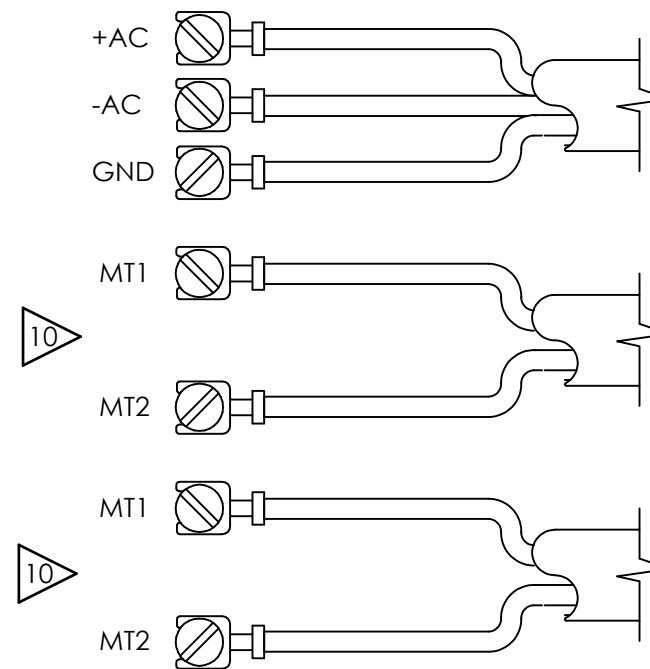
4-20mA/15Vdc OUTPUT

REMOTE RESET 5Vdc/1mA
MOMENTARILY CONNECT
RESET TO COMM

RAW VIBRATION OUTPUT
100mV/G
10G MAXIMUM

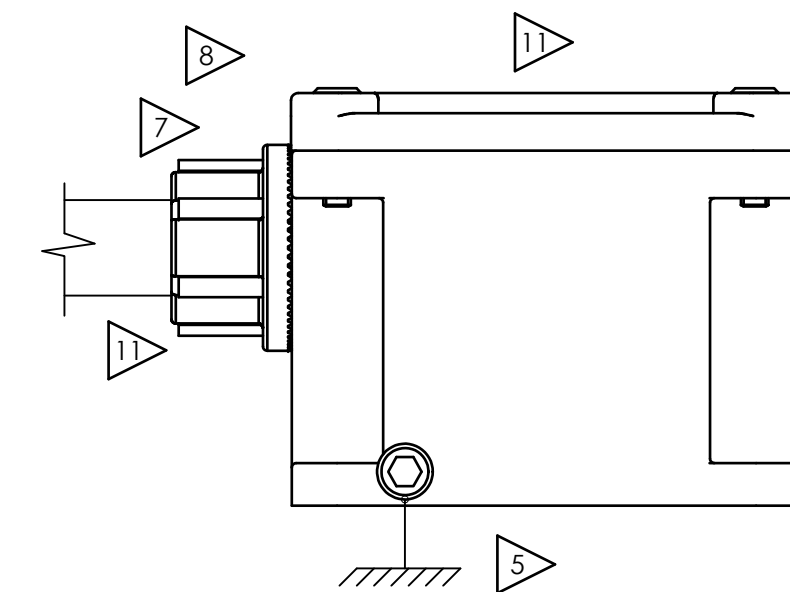
NON-HAZARDOUS / SAFE AREA
OR DIV 2 / ZONE 2

CONDUIT/CABLE

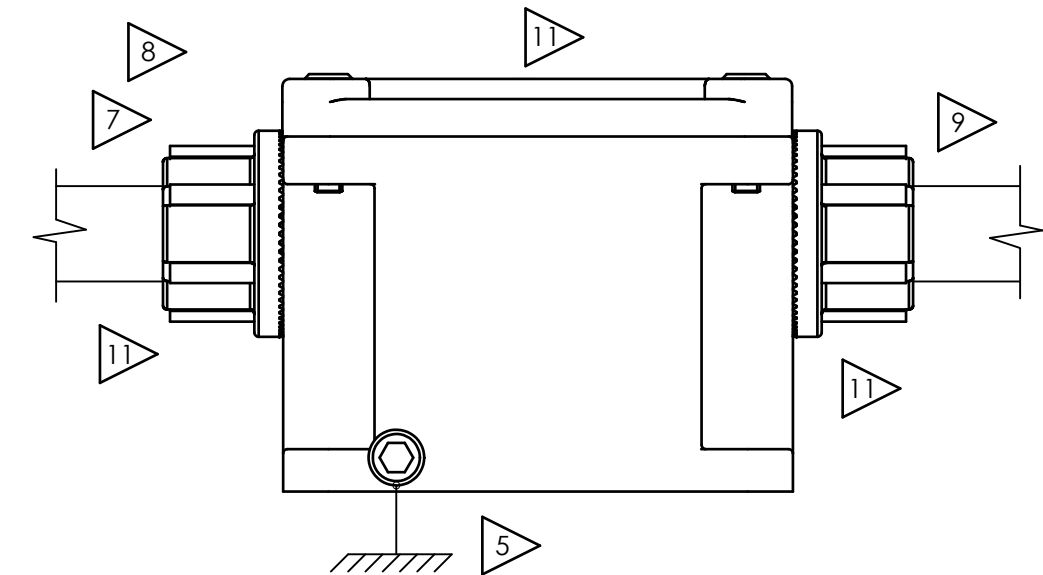


HAZARDOUS AREA
DIV 2

VIBRATION SWITCH
PN CS685YZZZ



VIBRATION SWITCH
PN 685B0X00A1X



- 11 THE INSTALLER SHALL INSURE THAT THE TOP COVER INTERNAL GASKET AND CONDUIT HUB THREADS ARE COATED WITH SUPPLIED SILICON GREASE TO MAINTAIN TYPE 4X/NEMA 4X INTEGRITY.
- 10 THE RELAY OUTPUTS MAY BE CONNECTED TO DIFFERENT PHASES ONLY FOR VOLTAGES UP TO 125VAC. FOR VOLTAGES ABOVE 125VAC THE RELAYS SHALL BE CONNECTED TO SAME PHASE CIRCUITS ONLY.
- 9 IF ONLY ONE CONDUIT ENTRY IS USED, THE UNUSED ENTRY MUST BE SEALED WITH A FITTING COMPLIANT TO HAZARDOUS RATINGS AS REQUIRED BY THE APPLICATION AND LOCAL GOVERNING AGENCY.
- 8 INTERNAL GROUND SCREW MUST BE CONNECTED TO POWER SUPPLY GROUND WITH WIRE SIZE EQUAL TO OR GREATER THAN 14 AWG.
- 7 ALL CONDUIT AND JUNCTION BOXES MUST MEET THE CLASS, DIVISION, GROUP, AND INSTALLATION METHOD AS REQUIRED BY THE APPLICATION AND LOCAL GOVERNING AGENCY.
- 6 SHIELDS TO BE EARTHED AT POWER SUPPLY END.
- 5 THE INSTALLER SHALL INSURE THAT THE VIBRATION SWITCH MOUNTING STRUCTURE IS AT THE SAME GROUNDING POTENTIAL AS THE SUPPLY SOURCE GROUND. TOTAL EARTH LOOP IMPEDANCE SHALL BE LESS THAN ONE OHM.

- 4.) FOR GUIDANCE ON CANADIAN INSTALLATION, REFER TO CEC PART I. FOR GUIDANCE ON U.S. INSTALLATION, INSTALL IN ACCORDANCE WITH NEC [ANSI/NFPA70] AND [ANSI/ISA RP12.6].
- 3.) CERTIFIED BY THE APPROPRIATE APPROVAL AUTHORITY FOR INSTALLATION IN THE FOLLOWING AREAS:

CLASS 1, DIV 2, GROUPS A,B,C,D
CLASS 1, ZONE 2, GROUPS IIC T6

- 2.) WIRING (685B0X00A1X) & CS685YZZZ:
MULTICONDUCTOR
.5in [12.7mm] X 1000ft [305m] MAX.

- 1.) PART NUMBERS IS 685B0X00A1X WHERE X INDICATES RANGE, FREQUENCY RESPONSE, AND NUMBER OF CONDUIT HUBS. 685B0X00D1X DENOTES INSTALLED MOUNTING PLATE.

WARNING - EXPLOSION HAZARD
DO NOT DISCONNECT EQUIPMENT
UNLESS POWER HAS BEEN SWITCHED
OFF OR THE AREA IS KNOWN TO BE
NON-HAZARDOUS

AVERTISSEMENT - RISQUE D'EXPLOSION
NE PAS DÉCONNECTER L'ÉQUIPEMENT À MOINS
QUE LA PUISSANCE SOIT COMMUTE OFF OU LA
ZONE EST CONNUE POUR ÊTRE NON
DANGEREUX

NO CHANGES WITHOUT CSA APPROVAL

<small>UNLESS OTHERWISE SPECIFIED</small> <small>DIMENSIONS ARE IN INCHES</small> DECIMALS X ± .05 XX ± .01 XXX ± .005 XXXX ± .0005 ANGLES ± 2 DEGREES FILLETS AND RADII .003 - .005 HEX DIMENSIONS ARE: ≤ .5 + .000 / - .003 > .5 + .000 / - .005 INTERNAL THREAD DEPTH MIN. REMOVE ALL BURRS SHARP = R.000 - R.003	<small>DRAWN</small> JDM 7/17/17	<small>CHECKED</small> JDM 7/17/17	<small>ENGINEER</small> GGS 7/17/17	3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0002 E-MAIL: sales@pcb.com
	<small>TITLE</small> CSA APPROVAL 685B0X00A1X AND CS685YZZZ INTERCONNECTION			
<small>SCALE:</small> NONE				<small>DWG. NO.</small> 37476
<small>SHEET</small> 2 OF 2				