Model 687A02

Handheld Vibration Meter

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

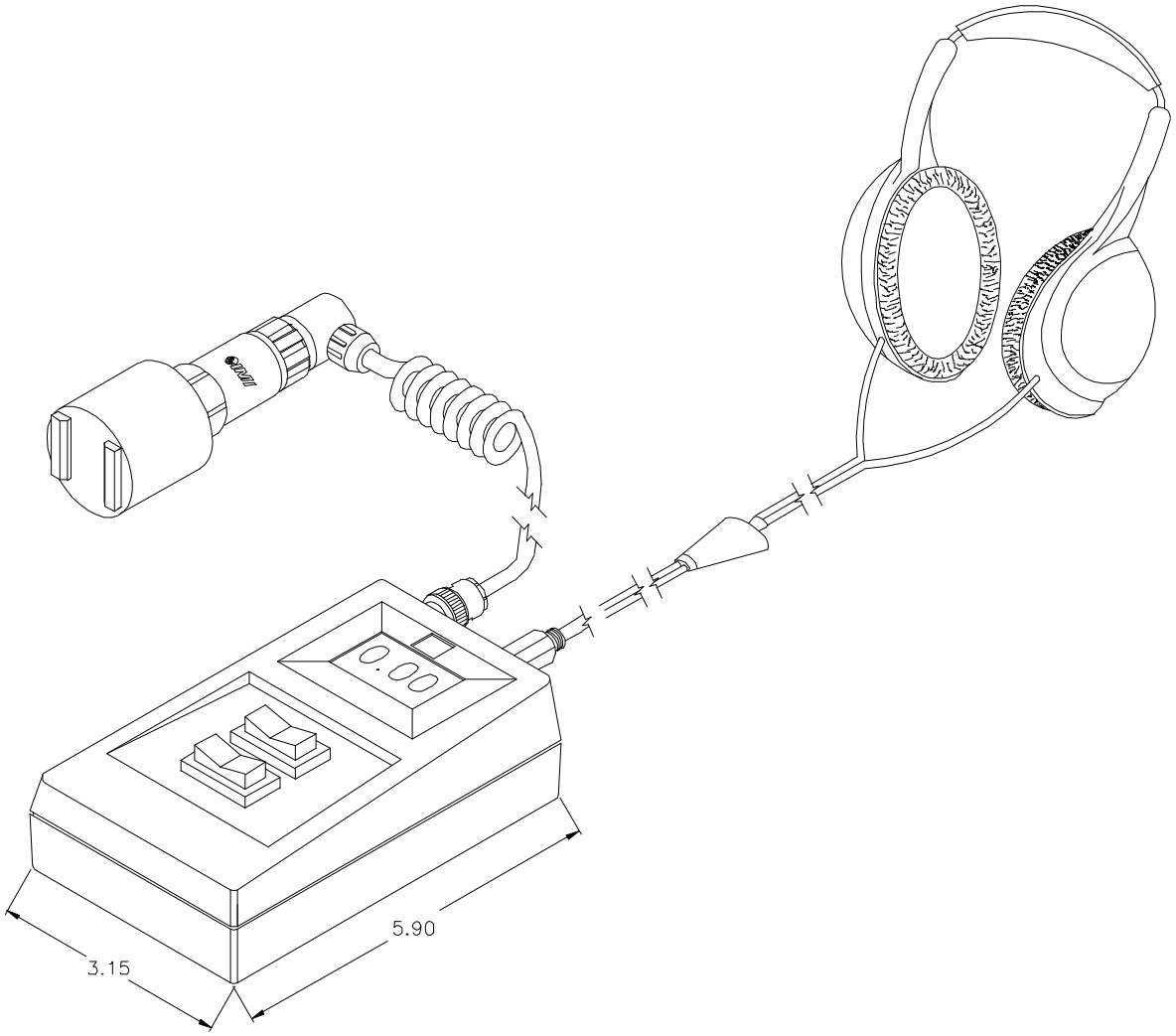
Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	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.

The Model 687A01 & 687A02 Hand Held Vibration Meter Kits



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: 18411
MANUAL REVISION: B
ECN NUMBER: 18769

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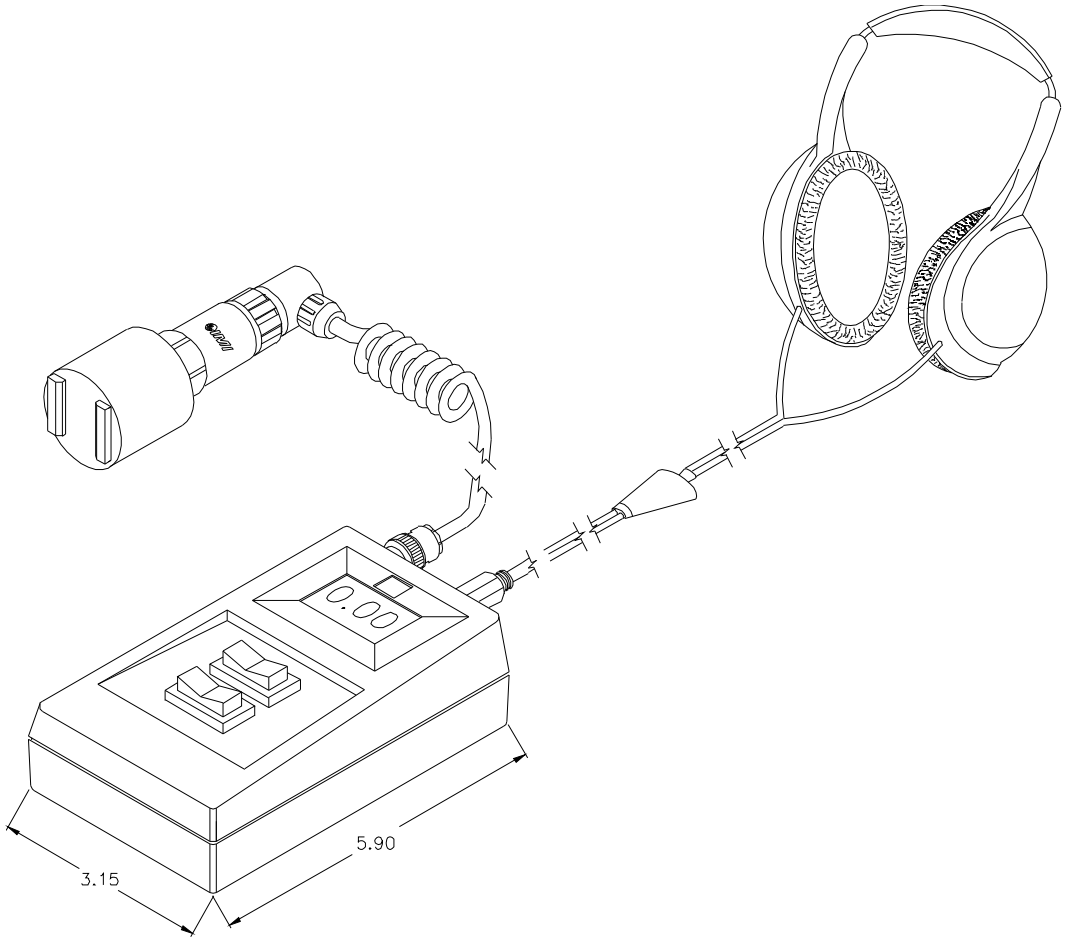
introduction

The Model 687A01 Hand Held Vibration Meter Kit consists of a digital vibration meter, a general purpose accelerometer, an accelerometer cable assembly, magnet, and headphones. The kit is designed for general purpose, overall vibration readings on all types of machines. When unpacking the kit, be sure to note that the following accessories are included:

- ❑ 687A02 Meter
- ❑ 603C01 Industrial Accelerometer
- ❑ 050BQ006AC Cable Assembly
- ❑ 080A131 Magnetic Mounting Base
- ❑ 070A47 Headphones

figure 1 - model 687A01 hand held vibration meter kit



description

The meter provides two types of measurements — overall acceleration and overall velocity. In the velocity mode, the meter measures in the frequency range of 10 Hz to 1 kHz, and complies with ISO2954 standard. It measures overall RMS velocity to a maximum of two inches per second. In acceleration mode, the meter measures in the frequency range of 50 Hz to 50 kHz. The maximum overall RMS acceleration reading is 20 g's. To toggle between acceleration and velocity measurements, use the rocker switch labeled "**ACC/VEL**." To turn the unit on, move the rocker switch labeled "**0/I/Bias**" to the "**I**" position. The "**0**" position shuts the unit off, while the bias is a momentary toggle for monitoring the bias voltage of the sensor.

The meter provides three input connectors that are located at the top of the unit. The input for the sensor (labeled SENSOR) is a standard BNC Jack. The headphones can be connected through the 1/8 inch stereo jack (labeled with the appropriate symbol), and the input for the recharger (labeled CHARGE) is a 2.5 mm plug.

The unit is powered by a 9-volt alkaline battery which is housed in the battery compartment located at the bottom of the meter. To remove this cover, use a small standard screwdriver, pry the cover up, and the push it up towards the top of the meter. Since the meter is supplied with alkaline batteries, **DO NOT ATTEMPT TO RECHARGE ALKALINE BATTERIES. IT MAY CAUSE A POTENTIAL FIRE AND/OR EXPLOSION.**

The unit has a low battery indicator on the front panel LCD display. The indicator will light when the battery voltage is approximately 7.5 volts. Please replace the battery or recharge the rechargeable battery if supplied.

If the optional recharger was purchased, plug-in the recharger in the appropriate connector located on the top of the meter. Turn unit off, and plug the charger into an electrical outlet. Recharge the battery for approximately 12 hours.

sensor – model 603C01

The sensor supplied with the kit is a general purpose industrial accelerometer, Model 603C01. Please refer to the enclosed specifications on the 603C01 for proper operation of the sensor.

headphones – model 070A47

The headphones are stereo-type with built-in, individual volume controls. The volume knobs are located on the side of the cuffs. Please keep volume to a comfortable level in order to maintain audio safety.

magnetic mounting base – model 080A131

The supplied magnet can be used for either curved or flat surfaces. To maximize frequency response, always dab a layer of silicone grease or equivalent between the sensor and the magnet. To minimize errors in readings, proper surface preparation should be observed. See sensor manual for further information.

cable assembly – model 050BQ006AC

The cable assembly supplied is a 6 ft coiled cable with a right-angle military connector on one end to a BNC plug on the other. Screw the military connector onto the sensor, and make sure it is hand tight. The BNC plug is then inserted into the BNC jack on the meter labeled sensor.

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 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.

3425 Walden Avenue, Depew, NY 14043-2495
Phone: (716) 684-0003 • USA Fax: (716) 684-3823 • INTL Fax: (716) 684-4703

Model Number	HANDHELD VIBRATION METER	Revision: C
687A02		ECN #: 47534

Performance	**ENGLISH**	**SI**	
Frequency Response(+10 to -20 %)	600 to 60,000 cpm	600 to 60,000 cpm	[5]
Frequency Response(+/-3 dB)	3 to 3000 kcpm	99 to 3,000,000 cpm	[5]
Acceleration Range	0.01-199.99 g rms	0.01-19.99 g rms	
Resolution	± 2 counts	± 2 counts	[1]
Velocity Range	0.001-1.999 in/sec rms	NA	
Accuracy	± 3 %	± 3 %	[1]
Environmental			
Temperature Range	+32 to +122 °F	0 to +50 °C	[4]
Electrical			
Excitation Voltage(+/-1 VDC)	24 VDC	24 VDC	
Constant Current Excitation(+/-0.6 mA)	2 mA	2 mA	
Bias Voltage	0.00 to 19.99 VDC	0.00 to 19.99 VDC	
Battery Life(Alkaline)	10 hours	10 hours	[1]
Battery Life(Rechargeable Ni Cad)	3 hours	3 hours	[2][3]
Physical			
Size (Length x Width x Height)	5.9 in x 3.15 in x 1.2 in	150 mm x 80 mm x 30 mm	
Weight(with battery)	0569 lb	0569 lb	
Connector(Input)	BNC Jack	BNC Jack	
Connector(Headphones)	1/8" Stereo Jack	1/8" Stereo Jack	
ROHS Compliant	No	No	

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.

R - Rechargeable option, includes rechargable batteries and charger.
Supplied Accessory : Model 017A01 Power Cord (1)
Supplied Accessory : Model 073A09 Rechargeable NiCad battery (9V) (1)
Supplied Accessory : Model 073M12 External Charger (1)

NOTES:
[1] Typical value.
[2] Typical.
[3] Varta TR7/8 or Eveready N88 for rechargeable version.
[4] Non-condensing.
[5] 1Hz = 60 cpm (cycles per minute).

Entered: LK	Engineer: RB	Sales: MC	Approved: BAM	Spec Number:
Date: 5/15/2018	Date: 5/15/2018	Date: 5/15/2018	Date: 5/15/2018	**11285**

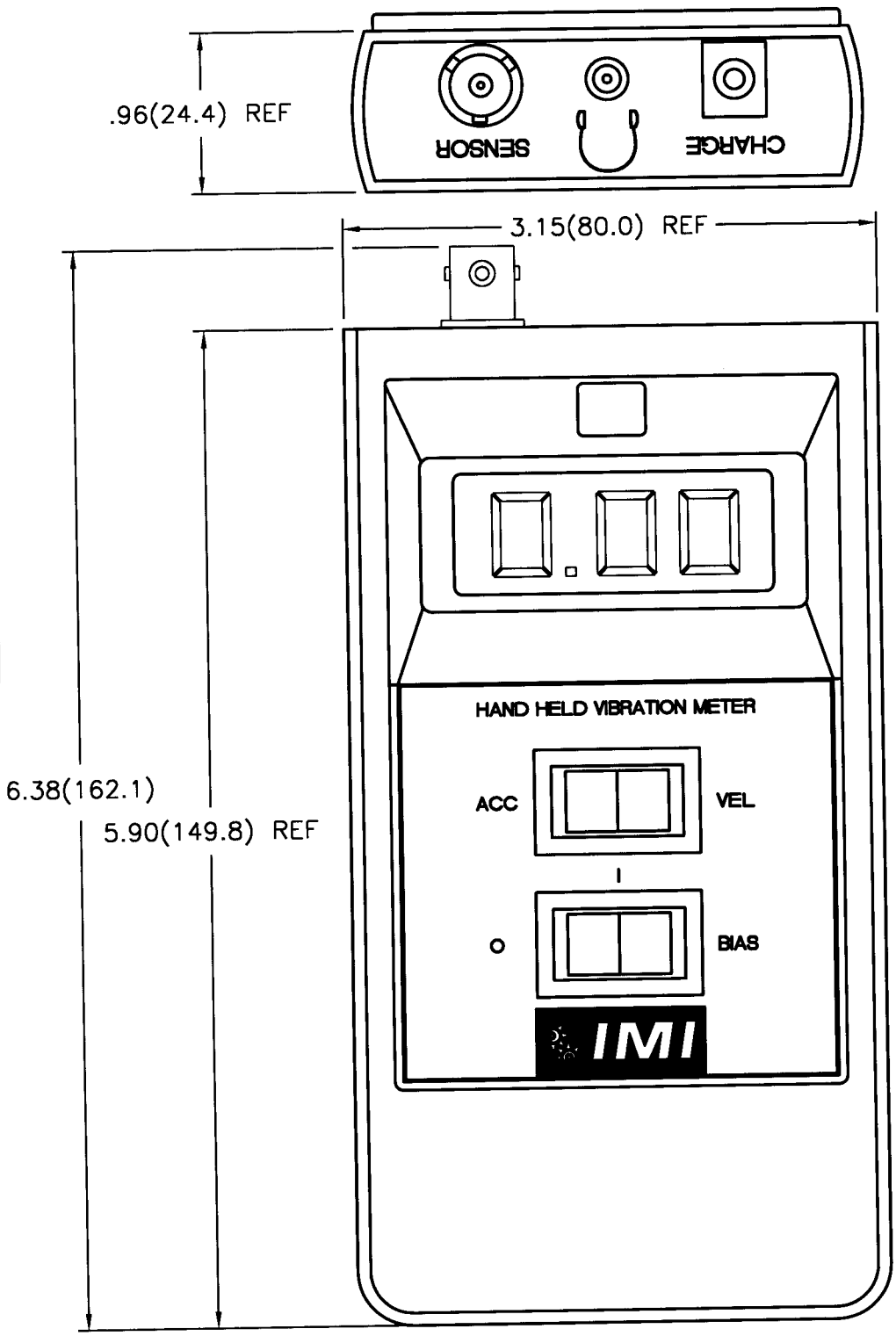
IMI SENSORS
A PCB PIEZOTRONICS DIV.
3425 Walden Avenue, Depew, NY 14043

Phone: 800-959-4464
Fax: 716-684-3823
E-Mail: imi@pcb.com

APPLICATION		
NEXT ASS'Y	USED ON	VAR

REVISIONS				
REV	DESCRIPTION	ECN	DATE	APP'D

10972



UNLESS SPECIFIED TOLERANCES	
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ±2 DEGREES	DIMENSIONS IN MILLIMETERS (IN PARENTHESIS) DECIMALS XX ±0.3 XXX ±0.13 ANGLES ±2 DEGREES
FILLETS AND RADII .003 - .005	FILLETS AND RADII (0.07 - 0.13)
DD011 REV. B 03/13/98	

DRAWN	TW	5/18/99	MFG	R. W	5/18/99
CHK'D	DM	5/18/99	ENGR	JL	5/18/99
APP'D	W.F	5/19/99			

TITLE
OUTLINE DRAWING
MODEL 687A02
HAND HELD VIBRATION METER

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 EMAIL: SALES@PCB.COM

CODE IDENT. NO.	DWG. NO.
52681	10972

SCALE: FULL | SHEET 1 OF 1