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Model 487C08

Portable ICP® vibration monitor (includes Models 487C08, 353B33, cables

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





PCB PIEZOTRONICS INC.
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 traceablility 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
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E-mail: info@pcb.com

DOCUMENT NUMBER: 21354
DOCUMENT REVISION: B
ECN: 17900

1.0 INTRODUCTION

The Model 487C08 Vibration Monitor is a self-contained, portable system designed to measure true RMS vibration levels within a total system range of from 0.01g to 25 g's.

The Model 487C08 is a battery powered DC meter unit calibrated to read g's RMS direct. The unit features three full-scale ranges and a frequency response between 5 and 3000 Hz.

A four-position selector switch permits the selection of 0.25g, 2.5g or 25g full scale ranges or off.

2.0 DESCRIPTION

The battery powered Model 487C08 Meter provides power to the accelerometer (100mV/g sensitivity), decouples the vibration signal and displays the RMS vibration level on a front panel meter.

The Model 487C08 is designed and calibrated to read the True RMS value for vibrations - not shock transients.

Controls for operating the 487C08 Vibration Monitor are located on the front panel. These include the system "ON-OFF" / range selector switch and the bias and battery test switch.

Two BNC output jacks designated "XDCR" and "SCOPE" are located on the front panel to connect to the transducer and to permit monitoring of the accelerometer output. The scope jack can be connected to an oscilloscope, if desired, to monitor amplitude and waveform. Left of the meter face is an LED which lights when the system is energized. On the right of the meter is a jack labeled "BATT CHG" for plugging in a Model 488A02 Battery Charger.* With the system on "OFF" the LED with light when the battery charger is plugged in.

3.0 INSTALLATION

Connect cable from accelerometer to "XDCR" input on lower left face of meter. Because system ground return is provided by the cable retaining nuts, they should be adequately tight. Tighten by hand only.

*Use battery charger only with rechargeable batteries and with range selector switch in "OFF" position.

4.0 OPERATION

Constant current to operate the ICP Accelerometer is supplied by a 2mA constant current diode in the Model 487C08 Vibration Meter.

The vibration signal is decoupled from the bias voltage by an internal 10uF coupling capacitor in the vibration meter.

If the "SCOPE" connection is used to monitor the waveform, immediately upon connecting the oscilloscope to the output jack, the 10uF coupling capacitor will begin charging through the input resistance of the oscilloscope.

This will cause an apparent "drifting" of the output signal until the capacitor is fully charged. Grounding the scope input momentarily will correct this problem.

A slight leakage through the 10uF coupling capacitor will result in a +30mV maximum offset with a 1 megohm readout load.

Turn system on with the range selector switch and select the desired range, 0.25, 2.5 or 25g RMS.

Above the range selector switch is a two-way rocker switch for testing batteries and bias voltage.

Rock the battery test switch to the right. With new or rechargeable batteries, needle should deflect to +18 or 20 which can be read in volts as well as g's because the meter on the 487C08 Vibration Monitor functions as a DC voltmeter fault monitor as well as a vibration level indicator calibrated in g's. (Range selector switch must be in "ON" position to test batteries).

NOTE: To assist in determining if the Model 487C08 is in "GO" condition, an LED located to the left of the meter scale will light when the system is energized.

To test the system bias voltage, press the rocker switch to the left. With the accelerometer connected, the meter should indicate between 9 and 13 volts. With the accelerometer disconnected, the needle will deflect to +18 volts or total battery voltage. A zero reading will indicate a short in cable, connectors or amplifier.

If, in the "OFF" position, the indicator needle does not return to zero, locate the adjusting screw below the meter dial. With the screwdriver, return needle to zero.

4.1 COMPUTING OTHER VALUES FROM METER READING

In addition to the vibration level reading to g's RMS, average, peak and peak-to-peak; readings for any sine wave input can be calculated.

The "Average" value of the reading can be calculated by multiplying by 0.900.

The "Peak" value of the reading is derived by multiplying the RMS value by 1.414.

To find "Peak-to-Peak" value, multiply the calculated peak value by 2.0.

Average = 0.900 x RMS
Peak = 1.414 x RMS
Peak-to-Peak = 2.828 x RMS

5.0 OPTIONS

The Model 488A02 Battery Charger is available as an option; with the 487C08 True RMS Vibration Monitor System. This unit plugs into the BATT/CHG jack on the meter and provides 8 volts for charging the two internal NiCd batteries in series. (Range selector switch should be in OFF position to charge batteries). The standard 488A02 operates from 110V and 220V power.

6.0 MAINTENANCE AND REPAIRS

Except for the zero adjustment described above, there are no other adjustments to make on the Model 487C08 True RMS Vibration Monitor System.

The NiCd batteries should be recharged after approximately 12 hours of operation or if the meter reading is 16V or below. Batteries will charge faster with accelerometer disconnected.

Should the unit require maintenance, the factory should be contacted for assistance.

If the unit must be returned, please include a brief note describing the nature of the problem.

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PCB® PIEZOTRONICS

SPECIFICATIONS

True RMS Vibration Meter

Model No. 487C08

Revisions

ELECTRICAL			
Ranges	g rms	0.25, 2.5, 25	
Resolution	g rms	0.01	
Accelerometer Input Sensitivity	mV/g rms	100	
Frequency Response	Hz	5 to 10K	±5%
DC Offset (max) (with 1 megohm load at "scope" output)	mV	30	
Coupling Capacitor	μ F	10	
Supply Voltage	volts	18-20	
Supply Current (through internal current limiting diode)	mA	2	
Batteries (2)	volt	9, NEDA 1604A (alkaline)	
PHYSICAL			
Size: H x W x D	inch	4 x 2.9 x 1.5	
Size: H x W x D	mm	101.6 x 73.7 x 38.1	
Weight (including batteries)	oz [grams]	11.46 [325]	
Battery Charger Connector	type	#722 Switchcraft Jack	
Connector: Input	coaxial	BNC	
Connector: Output	coaxial	BNC	
ENVIRONMENTAL			
Temperature Range	°F [°C]	0 to +122 [-17 to +50]	

OPTIONAL ACCESSORIES:

488A02 NiCad Battery Charger

(2) 9 Volt NiCad Varta TR7/8 or Equivalent

Approved	EJV	1-28-94	Spec No.
Engineer	JRH	1-28-94	**487-3080-80**
Sales	LZ	1/94	Sheet 1 of 1

PCB® PIEZOTRONICS

SPECIFICATIONS

True RMS Vibration Meter

Model No. 487C08

Revisions

ELECTRICAL			
Ranges	g rms	0.25, 2.5, 25	
Resolution	g rms	0.01	
Accelerometer Input Sensitivity	mV/g rms	100	
Frequency Response	Hz	5 to 10K	±5%
DC Offset (max) (with 1 megohm load at "scope" output)	mV	30	
Coupling Capacitor	μ F	10	
Supply Voltage	volts	18-20	
Supply Current (through internal current limiting diode)	mA	2	
Batteries (2)	volt	9, NEDA 1604A (alkaline)	
PHYSICAL			
Size: H x W x D	inch	4 x 2.9 x 1.5	
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Battery Charger Connector	type	#722 Switchcraft Jack	
Connector: Input	coaxial	BNC	
Connector: Output	coaxial	BNC	
ENVIRONMENTAL			
Temperature Range	°F [°C]	0 to +122 [-17 to +50]	

OPTIONAL ACCESSORIES:

488A02 NiCad Battery Charger

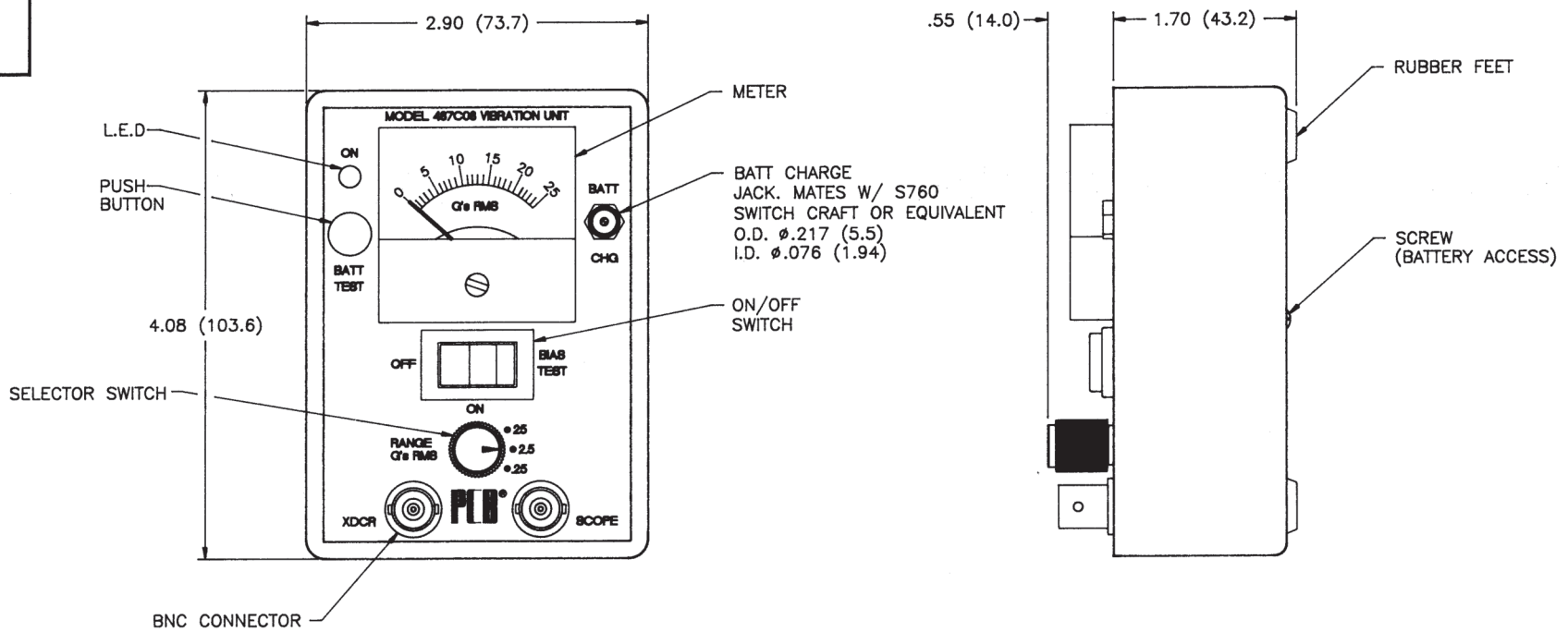
(2) 9 Volt NiCad Varta TR7/8 or Equivalent

Approved	EJV	1-28-94	Spec No.
Engineer	JRH	1-28-94	**487-3080-80**
Sales	LZ	1/94	Sheet 1 of 1

APPLICATION		
NEXT ASS'Y	USED ON	VAR
	487C08	-01

REVISIONS					
ZONE	REV	DESCRIPTION	ECN	DATE	APP'D
	A	REVISED PER ECR	5443	1/3/95	

1355



UNLESS SPECIFIED TOLERANCES	
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ±2 DEGREES	DIMENSIONS IN MILLIMETERS (IN PARENTHESIS) DECIMALS X ±0.3 XX ±0.13 ANGLES ±2 DEGREES
FILLETS AND RADII .003 – .006 (0.07 – 0.13)	

DRAWN		1/3/95	MFG		1/3/95
CHK'D		1/3/95	ENGR		1/3/95
APP'D		1/3/95			1/3/95

TITLE: OUTLINE DRAWING
MODEL 487C08
VIBRATION MONITOR

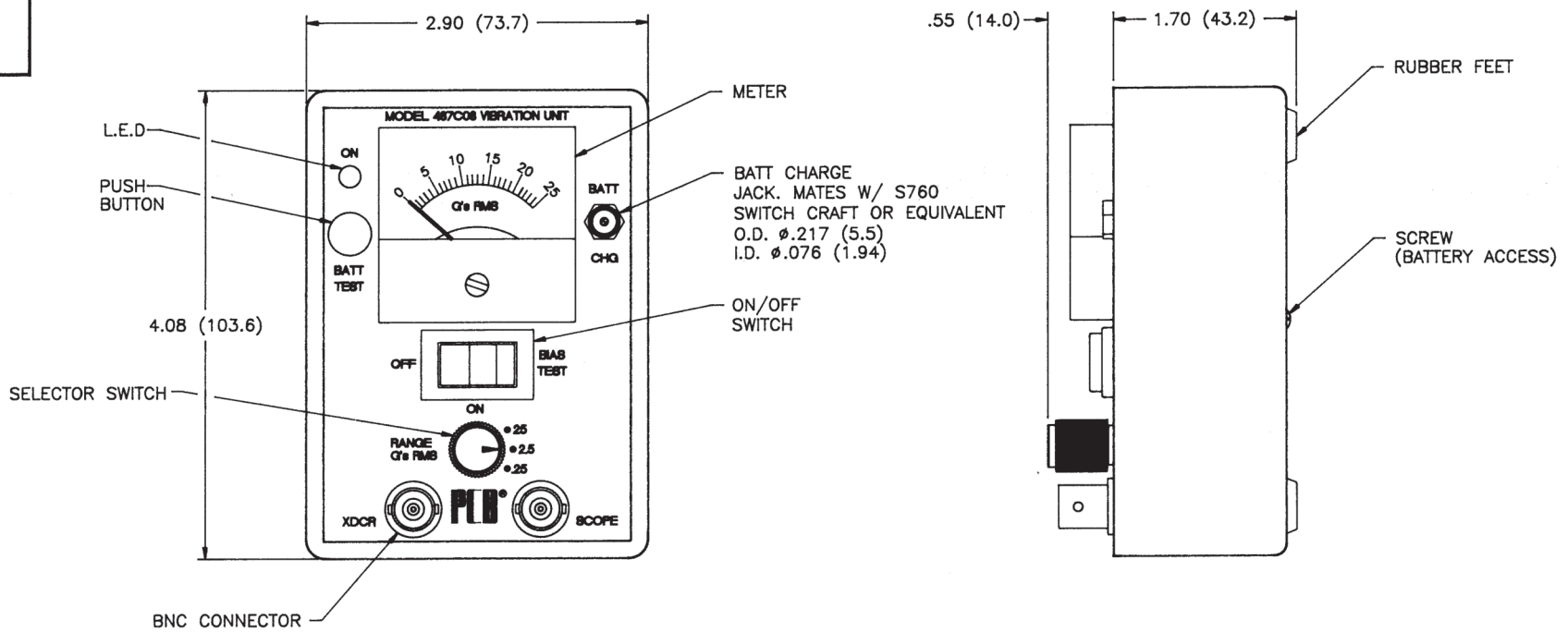
PCB PIEZOTRONICS, INC.
3425 WALDEN AVE. DEPEW, NEW YORK 14043
PHONE: (716) 684-0001

CODE IDENT. NO.	DWG. NO.
52681	1355
SCALE: FULL	SHEET 1 OF 1

APPLICATION		
NEXT ASS'Y	USED ON	VAR
	487C08	-01

REVISIONS					
ZONE	REV	DESCRIPTION	ECN	DATE	APP'D
	A	REVISED PER ECR	5443	1/3/95	

1355



UNLESS SPECIFIED TOLERANCES	
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ±2 DEGREES	DIMENSIONS IN MILLIMETERS (IN PARENTHESIS) DECIMALS X ±0.3 XX ±0.13 ANGLES ±2 DEGREES
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DRAWN		1/3/95	MFG		1/3/95
CHK'D		1/3/95	ENGR		1/3/95
APP'D		1/3/95			1/3/95

TITLE: OUTLINE DRAWING
MODEL 487C08
VIBRATION MONITOR

PCB PIEZOTRONICS, INC.
3425 WALDEN AVE. DEPEW, NEW YORK 14043
PHONE: (716) 684-0001

CODE IDENT. NO.	DWG. NO.
52681	1355
SCALE: FULL	SHEET 1 OF 1

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