

*Acceleration, Velocity*

*RMS measurement, Metric & Imperial unit*

# **PEN VIBRATION METER**

**Model : PVB-820**



Your purchase of this PEN VIBRATION METER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.



**OPERATION MANUAL**

# TABLE OF CONTENTS

1 FEATURES.....	1
2 SPECIFICATIONS.....	2
2-1 General Specifications.....	2
2-2 Electrical Specifications.....	3
3 FRONT PANEL DESCRIPTION.....	5
3-1 Display.....	5
3-2 Power Button.....	5
3-3 Hold Button .....	5
3-4 Function Button .....	5
3-5 Battery Cover/Compartment.....	5
3-6 Vibration Sensor.....	5
3-7 Sensing head.....	5
3-8 Magnetic base.....	5
4. MEASURING PROCEDURE.....	6
5. ZERO ADJUSTMENT PROCEDURE.....	9
6. BATTERY REPLACEMENT.....	10
7. CARRYING CASE ( included ).....	10
8. CLASSIFICATION RANGES.....	11
9. SENSITIVITY RELATIVE TABLE ACCORDING ISO 2954.....	12

# 1. FEATURES

- \* Applications for industrial vibration monitoring :  
All industrial machinery vibrates. The level of vibration is a useful guide to machine condition. Poor balance, misalignment & looseness of the structure will cause the vibration level increase, it is a sure sign that the maintenance is needed.
- \* Pen type digital vibration meter, vibration sensor is built in, all in one.
- \* Acceleration, Velocity measurement, RMS measurement value.
- \* Metric & Imperial display unit
- \* Frequency range 10 Hz - 1 kHz, sensitivity relative meet ISO 2954.
- \* Microcomputer circuit, intelligent function, high accuracy.
- \* LCD display, easy read out.
- \* Complete set with the Test pin and the Magnetic base are the standard accessories.
- \* Built-in low battery indicator.
- \* Heavy duty & compact housing case.
- \* IP65 protection.
- \* Compact size, light weight.
- \* Soft carrying case is the optional accessory

## 2. SPECIFICATIONS

### 2-1 General Specifications

Display	LCD, size : 20 mm x 28 mm.	
Measurement	Velocity, Acceleration. * <i>RMS value.</i>	
Function	Acceleration	m/s <sup>2</sup> , g, ft/s <sup>2</sup>
	Velocity	mm/s, cm/s, inch/s
Frequency range	10 Hz to 1 KHz * <i>Sensitivity relative during the the frequency range meet ISO 2954 Refer to table 1, page. 12.</i>	
Circuit	Exclusive microcomputer circuit.	
Zero adjust	Build in the Zero adjustment VR, easy to make adjustment.	
Sampling time	Approx. 1 second.	
Operating temperature	0 to 50 °C ( 32 to 122 °F ).	
Operating humidity	Less than 80% RH.	
Power supply	DC 1.5V battery ( UM-4/AAA ) x 4 PCs.	
Power consumption	Approx. DC 12 mA.	
Weight	240 g ( 0.53 lb ).	
Dimension	Meter : 175 x 40 x 32 mm ( 6.9 x 1.6 x 1.3 inch ). * <i>Meter without sensing head,</i>	
	Sensing head : Round 9 mm Dia. x 30 mm.	
Accessories included	Instruction manual..... 1 PC. Meter with sensing head..... 1 Set Magnetic base..... 1 PC. Soft carrying case, CA-52A..... 1 PC.	

## 2-2 Electrical Specifications

### Acceleration ( RMS )

Unit	m/s <sup>2</sup>
Range	0.5 to 199.9 m/s <sup>2</sup>
Resolution	0.1 m/s <sup>2</sup>
Accuracy	± ( 5 % + 2 d ) reading @ 160 Hz, 80 Hz, 23 ± 5 °C
Calibration Point	50 m/s <sup>2</sup> ( 160 Hz )

Unit	g @ 1 g = 9.8 m/s <sup>2</sup>
Range	0.05 to 20.39 g
Resolution	0.01 g
Accuracy	± ( 5 % + 2 d ) reading @ 160 Hz, 80 Hz, 23 ± 5 °C
Calibration Point	50m/s <sup>2</sup> ( 160 Hz )

Unit	ft/s <sup>2</sup>
Range	2 to 656 ft/s <sup>2</sup>
Resolution	1 ft/s <sup>2</sup>
Accuracy	± ( 5 % + 2 d ) reading @ 160 Hz, 80 Hz, 23 ± 5 °C
Calibration Point	50 m/s <sup>2</sup> ( 160 Hz )

## Velocity ( RMS )

Unit	mm/s
Range	0.5 to 199.9 mm/s
Resolution	0. 1 mm/s
Accuracy	$\pm ( 5 \% + 2 d )$ reading <i>@ 160 Hz, 80 Hz, 23 <math>\pm</math> 5 <math>^{\circ}</math>C</i>
Calibration Point	50 mm/s ( 160 Hz )

Unit	cm/s
Range	0.05 to 19.99 cm/s
Resolution	0. 01 cm/s
Accuracy	$\pm ( 5 \% + 2 d )$ reading <i>@ 160 Hz, 80 Hz, 23 <math>\pm</math> 5 <math>^{\circ}</math>C</i>
Calibration Point	50 mm/s ( 160 Hz )

Unit	inch/s
Range	0.02 to 7.87 inch/s
Resolution	0.01 inch/s
Accuracy	$\pm ( 5 \% + 2 d )$ reading <i>@ 160 Hz, 80 Hz, 23 <math>\pm</math> 5 <math>^{\circ}</math>C</i>
Calibration Point	50 mm/s ( 160 Hz )

### 3. FRONT PANEL & LAYOUT DESCRIPTION

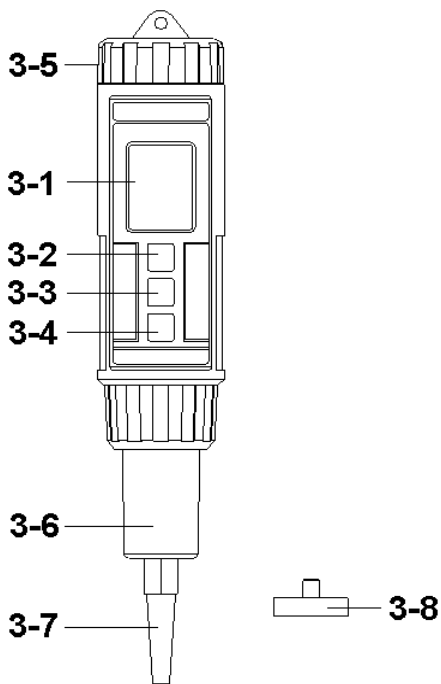


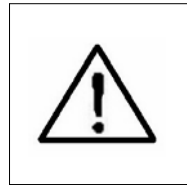
Fig. 1

- 3-1 Display
- 3-2 Power Button
- 3-3 Hold Button
- 3-4 Function Button
- 3-5 Battery Cover/Compartment
- 3-6 Vibration Sensor
- 3-7 Sensing Head
- 3-8 Magnetic Base

## 4. MEASURING PROCEDURE

### 1) Cooperate with the Sensing head

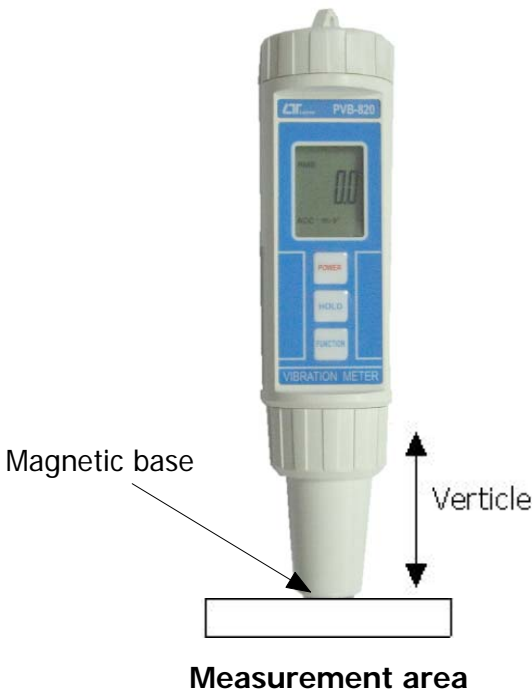
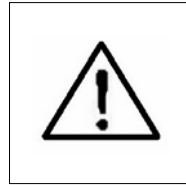
- a. Connect ( Screw ) the " Sensing Head " ( 3-7, Fig. 1 to the bottom of the " Vibration Sensor " ( 3-6, Fig. 1 ).
- b. Hold the meter's body by the hand loosely. Touch the front pin of the " Sensing head " to the area that intend to measure the vibration value.
- c. The Meter body should put in the perpendicular direction against with the measurement area, otherwise the measuring value will not be kept within the accuracy.





## 2) **Cooperate with the Magnetic base**

- a. If the surface material of measuring article is the ferrous material, it can install the " Magnetic base " ( 3-8, Fig. 1 ) on the " Measurement area ", then screw the " Magnetic base " ( 3-8, Fig. 1 ) to the bottom of " Vibration sensor " ( 3-6, Fig. 1 )
- b. When the vibration meter cooperate with the Magnetic base. The Meter body should put in the perpendicular direction with the measurement area, otherwise the measuring value will not be kept within the spec. accuracy.



### 3) Function Selection

Select the desired function by pressing the " Function Button " ( 3-4, Fig. 1 ) once the measurement Function will be present in sequence.

<i>Measurement</i>	<i>Metric unit</i>	<i>Imperial unit</i>
Acceleration	m/s <sup>2</sup> , g	ft/s <sup>2</sup>
Velocity	mm/s, cm/s	inch/s

The Display will show the indicator :

ACC	m/s <sup>2</sup>
ACC	g
ACC	ft/s <sup>2</sup>
VEL	mm/s
VEL	cm/s
VEL	inch/s

***ACC : Acceleration***

***VEL : Velocity***

### 4) Power ON :

Power on the meter by pressing the " Power Button " ( 3-2, Fig. 1 ) once, then the LCD Display ( 3-1, Fig. 1 ) will light on, the meter is ready for the measurement.

### 5) Data Hold :

During the measurement, push the " Hold button " ( 3-3, Fig. 1 ) will hold the measured value & the LCD will indicate " HOLD " symbol.

Push the " Data hold button " again to release the data hold function and the " HOLD " symbol will be disappeared.

## 5. ZERO ADJUSTMENT PROCEDURE

Due to drift of environment temperature value, battery power change or, meter used for a long time or other reasons. The display value may exist not zero value ( few digits ) in case of no signal into the " Vibration Sensor ". General speaking those not zero value will not effect the measurement typically. However if intend to make the precision measurement, the following zero adjustment procedures should be executed as :

- 1) Open the " Battery Cover " ( 3-5, Fig. 1 ).  
Use one finger to press the " Battery holder " to the battery snap can contact the batteries completely.
- 2) Power on the meter by pressing the " Power Button " ( 3-2, Fig. 1 ) once.
- 3) There is an " Zero Adjust VR " near the battery compartment,. Use the crew driver to adjust the " Zero VR " until the Display show zero value ( not show the minus symbol ), refer Fig, 2

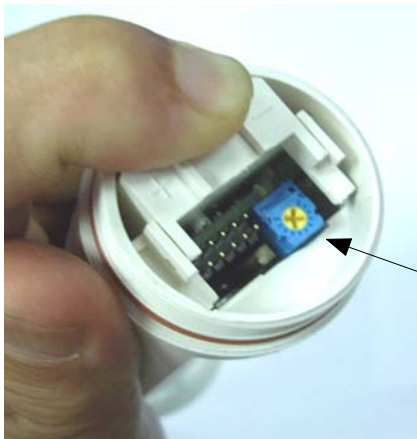



Fig. 2

Zero adjust VR

## 6. BATTERY REPLACEMENT

- 1) When the LCD display show "  ", It is necessary to replace the battery. However, in-spec measurement may still be made for several hours after Low Battery Indicator appears before the instruments instrument become inaccurate.
- 2) To replace the battery, rotate and remove the " Battery Cover " ( 3-5, Fig. 1 ), take out the old batteries, install new batteries :  
**DC 1.5V battery ( UM-4/AAA ) x 4 PCs.**
- 3) When install the batteries, should make attention the battery polarity.
- 4) After install the batteries, reinstall the battery cover again.

## 7. CARRYING CASE ( included )

<p>Soft carrying case</p> <p>CA-52A</p>	<p>Size : 200 x 80 x 50 mm.</p> 
---	--

## 8. CLASSIFICATION RANGES

For the valuation of machines and equipment in the ISO 2372 and VDI 2056, four different kinds of machine groups with four classification ranges and their limits for vibration severity ( mm/s ) are determined.

The classifications for each machine group are specified as follows :

### **Small machines, especially production electrical motors of up to 15 KW ( Group K )**

Good	0 to 0.71 mm/s
Acceptable	0.72 to 1.80 mm/s
Still permissible	1.81 to 4.5 mm/s
Dangerous	> 4.5 mm/s

### **Medium sized machines, especially electrical motors with 15 up to 75 KW output, without special foundations ( Group M )**

Good	0 to 1.12 mm/s
Acceptable	1.13 to 2.80 mm/s
Still permissible	2.81 to 7.1 mm/s
Dangerous	> 7.1 mm/s

### **Large machines on heavy foundations ( Group G )**

Good	0 to 1.80 mm/s
Acceptable	1.81 to 4.50 mm/s
Still permissible	4.51 to 11.2 mm/s
Dangerous	> 11.2 mm/s

### **Largest machines and turbo machines with a special foundations ( Group T ).**

Good	0 to 2.80 mm/s
Acceptable	2.81 to 7.10 mm/s
Still permissible	7.11 to 18.0 mm/s
Dangerous	> 18 mm/s

## **9. SENSITIVITY RELATIVE to the reference sensitivity at 80 Hz , according ISO 2954**

Frequency	Normal value	Relative sensitivity	
		Minimum value	Maximum value
10 Hz	1.0	0.8	1.1
20 Hz	1.0	0.9	1.1
40 Hz	1.0	0.9	1.1
80 Hz	1.0	1.0	1.0
160 Hz	1.0	0.9	1.1
500 Hz	1.0	0.9	1.1
1000 Hz	1.0	0.8	1.1

Table 1