VIBRATION TESTER

RVM-4001

This Vibration Tester is small in size, light in weight, easy to carry,it is convenient to use and operate. Its ruggedness will allow many years of use if proper operating techniques are followed. Please read the following instructions carefully and always keep this manual within easy reach.

1. FEATURES

* Can display the parameters of Displacement, Velocity and Acceleration simultaneously.
* In accordance with ISO 2954, used for periodic measurements, to detect out-of-balance, misalignment and other mechanical faults in rotating machines.
* specially designed for easy on site vibration measurement of all rotating machinery for quality control, commissioning, and predictive maintenance purposes.
* Individual high quality accelerometer for accurate and repeatable measurements
* Bearing condition monitoring function
* LCD digital display
* Lightweight and easy to use.
* Wide frequency range (10Hz.To 10kHz.) in acceleration mode.
* Automatic power shut off to conserve power.
* AC output socket for headphones and recording.
* Optional headphones for use as electronic stethoscope.
* Can communicate with PC computer for statistics and printing by the optional cable and the software for RS232C interface .

2. SPECIFICATIONS

Display: 4 digit LCD backlit
Accuracy: 5% of reading + 2 digits
Measurement Parameters & Ranges:
Displacement: 0.001-4.000mm
Equivalent Peak-Peak; 0.04-160.0 mil ,
Acceleration: 0.1-400.0 m/s²
Equivalent Peak; 0.3-1312 ft/s² ; 0.0-40g
Velocity: 0.01-400.0 mm/s
True RMS; 0.004-16.00 inch/s
Frequency: 5Hz. ~ 1kHz
Frequency Range:
Displacement: 10Hz. ~ 1kHz.
Acceleration: 10Hz. ~ 1kHz
Velocity:10Hz. ~10kHz.
Metric/ Imperial conversion
Analogue Output: AC output 0~2.0V peak full scale(load resistance: above 10k)
With Max. value hold and low battery indication.
PC interface: RS232C (Cable and software is not included)
Power off : Manual off at any time or auto power off is enabled by user
Operating conditions:
Temperature : 0-50° C
Humidity : below 95% RH
Power supply: 2x1.5vAA (UM-3)Battery
Size:130x76x32mm
Weight: about 310 g (Not including Batteries)
Standard Accessories:
* Powerful rare earth magnet
* Measurement sensors
* Stinger probe (Cone)
* Stinger probe (Ball)
* Carrying case
* Operational instruction manual

Optional Accessories:
* Headphones for use as electronic stethoscope
* Cable and software for RS232C or USB
* Bluetooth

3. FRONT PANEL DESCRIPTIONS

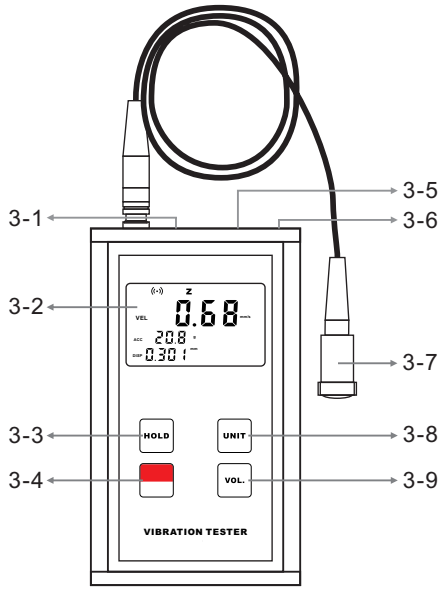

Fig-1

3. FRONT PANEL DESCRIPTIONS

3-1	RS-232 data line jack
3-2	LCD display
3-3	Peak hold key
3-4	
3-5	Headphone jack
3-6	Battery Cover
3-7	Measurement sensors
3-8	Unit conversion key
3-9	Vol control keys

4. MEASURING PROCEDURE

4.1 Connect the Accelerometer to the input connector and turn it until the connector locks in position.
4.2 Mount the accelerometer at the measurement point using the powerful magnet supplied, ensuring that the mounting surface is clean and flat, or use direct stud (M5) mounting if this is available.
4.3 Depress the power key and release to power on the meter.
4.4 Each time the Function key is depressed and released quickly, the meter will step to the next vibration measurement parameter with the corresponding unit showing on the display.
4.5 Each time the Metric/Imperial key is depressed and released quickly, the measurement unit will be changed to the other measurement system.
4.6 When several machinery or bearings are used under the same operating conditions, evaluation can be carried out by listening to the audio signals to determine changes. This method will help to locate the defective machinery or bearing quickly. Measure all machines at the same points and compare the results. The sound volume can be adjusted by Sound key. There are 8 levels from 1 to 8. Every time depressing and releasing the sound key quickly, the sound level will increase 1. The larger the sound level number, the louder the listening sound.

5. CONSIDERATIONS

5.1 Which Parameters Should be Measured?
* Acceleration, velocity, and displacement are the three tried and tested parameters, which give accurate and repeatable results.
* Acceleration is normally measured in m/s² peak (meters per second squared) or ft/s², has excellent high frequency measurement capabilities, and is therefore very effective for determining faults in bearings or gearboxes.
* Velocity is the most commonly used vibration parameter. It is used for vibration severity measurements in accordance with ISO 2372, BS 4675 or VDI 2056, which are guidelines for acceptable vibration levels of machinery in different power categories. These are presented as a table in section 4 of this manual. Velocity is typically measured in cm/s or inch/s RMS (centimeters or millimeters per second). Note: This instrument measures in cm/s. If you are more familiar with measurements in mm/s, or wish to compare your measured values directly with the vibration severity chart in section 4, multiply the displayed value by 10.
* Displacement is typically used on low-speed machines because of its good low

frequency response, and is relatively ineffective when monitoring bearings. Units areover a period of time, the resulting graph shows the progress or deterioration of a particular machine.

* Typically this will have the general shape shown in the diagram below, regardless of the type of machine being considered. For a short time after installation, whether it is a new or a repaired machine, vibration levels may fall slightly as the machine is run in, followed by a long period of unchanging levels during the machine's normal operating lifetime. Then comes a period of rising levels as machine parts wear out prior to failure. Such a trend enables the maintenance engineer to predict the time of failure and maximize use of the machine, while ordering spares and planning it`s maintenance for a time convenient to the production schedule.

6. BATTERY REPLACEMENT

6.1 When the battery symbol appears on the display, it is time to replace the battery.

6.2 Slide the Battery Cover away from the instrument and remove the battery..

6.3 Install batteries paying careful attention to polarity.

7. Appendix: Vibration standards

A. Rank of machine vibration (ISO 2372)

Vibration Amplitude	Machine sort			
Vibration Velocity V rms (mm/s)	I	II	III	IIII
0~0.28	A	A	A	A
0.28~0.45				
0.45~0.71				
0.71~1.12	B			
1.12~1.8		B		
1.8~2.8	C		B	
2.8~4.5		C		B
4.5~7.1	D		C	
7.1~11.2		D		C
11.2~18			D	
18~28				D
28~45				
>45				

Note:

(1) Class I is small motor (power less than 15 kw). Class II is medium motor (power between 15 ~75kw). Class III is high power motor (hard base). Class is high power motor (stretch base)

(2) A, B, C, D are vibration Rank. “A” means good, “B”means satisfying, “C” means not satisfying, “D” means forbidden. Vibration velocity should be taken from the three perpendicular axes on the motor shell.

B. ISO/IS2373 Motor quality standard according as vibration velocity

Quality rank	Rev (rpm)	H: high of shaft (mm) Maximum vibration velocity (rms) (mm/s)		
		80 < H < 132	132 < H < 225	225 < H < 400
Normal	600~3600	1.8	2.8	4.5
Good (R)	600~1800	0.71	1.12	1.8
	1800~3600	1.12	1.8	2.8
Excellent (S)	600~1800	0.45	0.71	1.12
	1800~3600	0.71	1.12	1.8

Limit of rank “N” is suitable for common motor. When the request is higher than that in the table, limit can be gotten by dividing the limit of rank 'S' with 1.6 or multiples of 1.6.

C. Maximum vibration of motor that power larger than 1 horsepower. (NEMA MG1-12.05)

Rev (rpm)	Displacement (P-P) (um)
3000~4000	25.4
1500~2999	38.1
1000~1499	50.8
≤999	63.6

For AC motor, rev is maximum synchronous rev. For DC motor, it is maximum power rev. For motor in series, it is work rev.

D. Maximum vibration of high power induction drive motor. (NEMA MG1-20.52)

Rev (rpm)	Displacement (P-P) (um)
≥3000	25.4
1500~2999	50.8
1000~1499	63.6
≤999	76.2

National Electric Manufacturers Association (NEMA) Establishes two standards above.