General-PurposeVibration Meter
VM-83

For Measurement of Acceleration, Velocity, Displacement

CE

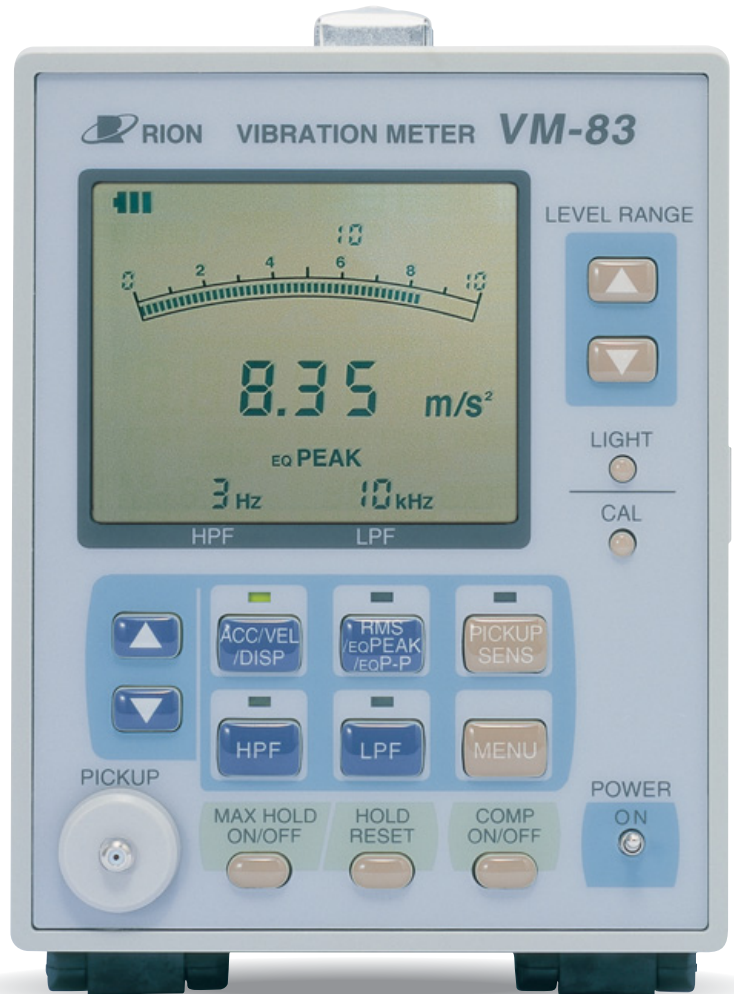# Measure and Evaluate Vibrations Detected with

General-Purpose Vibration Meter

VM-83

Four types of inputs and support for acceleration, velocity, and displacement measurements
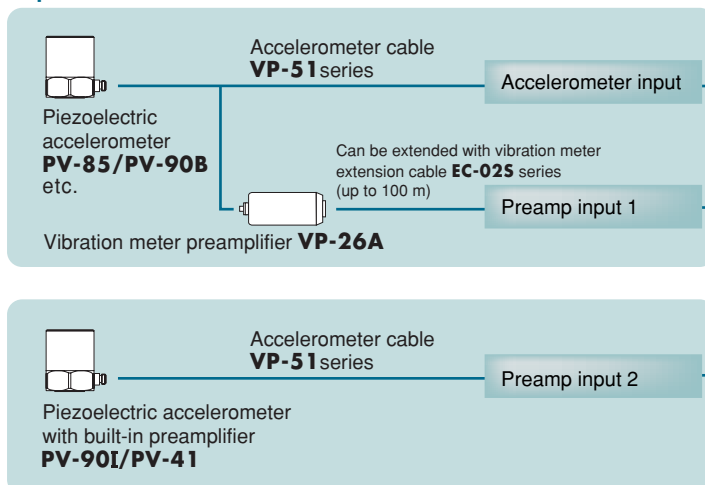
▶ Features

- ■ Connectivity for various kinds of accelerometers enables a wide range of vibration measurements
- ■ Comparator function with level evaluation output
- ■ Versatile display characteristics including rms, equivalent peak, equivalent peak-to-peak, maximum value hold, and peak hold
- ■ AC and DC output connectors
- ■ Serial interface for enhanced connectivity
- ■ Data printout capability via serial interface
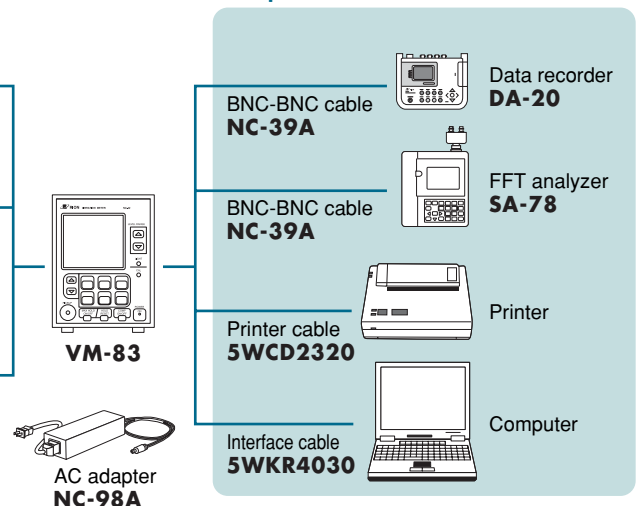- ■ VM-83 management software VM-83PB1 (Optional accessories)

VM-83 Connection Examples

Input side

Piezoelectric accelerometer **PV-85/PV-90B** etc.

Accelerometer cable **VP-51** series → Accelerometer input

Can be extended with vibration meter extension cable **EC-02S** series (up to 100 m)

Vibration meter preamplifier **VP-26A** → Preamp input 1

Piezoelectric accelerometer with built-in preamplifier **PV-90I/PV-41**

Accelerometer cable **VP-51** series → Preamp input 2

VM-83

AC adapter **NC-98A**

Output side

BNC-BNC cable **NC-39A** → Data recorder **DA-20**

BNC-BNC cable **NC-39A** → FFT analyzer **SA-78**

Printer cable **5WCD2320** → Printer

Interface cable **5WKR4030** → Computer

Piezoelectric Accelerometer

Product testing

Vibration meter allows detection of problems related to vibration phenomena. When vibrations above a certain threshold level continue for more than a preset time, an alarm signal is output by the built-in comparator. This allows automatic evaluation.

Compact motor

VM-83

Warning light
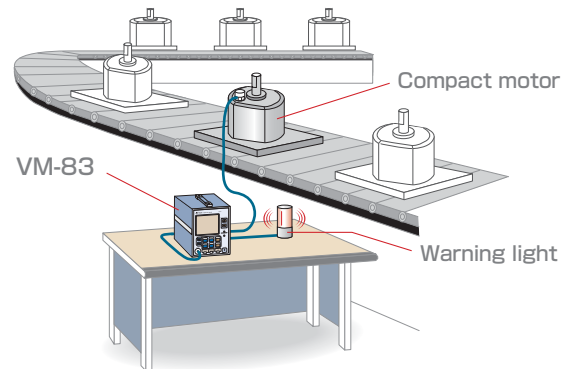
Equipment diagnosis

Detect various problem conditions of manufacturing equipment, ranging from low-frequency vibrations caused by unbalance or misalignment to high-frequency problems caused by bearing vibrations. The comparator function can be used for pass/fail evaluation based on vibration values.
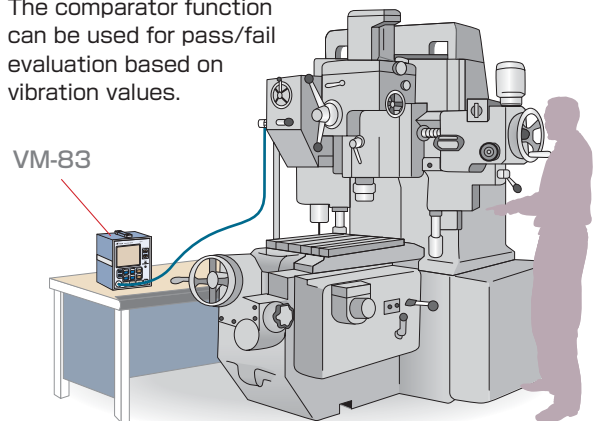
VM-83

VM-83 management software

VM-83PB1

(OS:Microsoft Windows98/98SE/ME/2000/XP)

VM-83PB1 is a software package which allows controlling settings and measurement operation of the VM-83 from a computer. Measurement data downloaded from the VM-83 can be displayed on the computer and converted to CSV format for further processing and storage. The program also allows control over cutoff frequencies of filters in the VM-83 (user filter function).

Main menu screen

Measurement screen example

■ Specifications

Input Section		
Accelerometer input		For piezoelectric accelerometers Maximum input charge 30 000 pC
Preamplifier input 1		For connection of piezoelectric accelerometers via preamplifier VP-26A
Preamplifier input 2		For connection of piezoelectric accelerometers with integrated preamplifier; voltage and current supply: 18 V, 2 mA
Measurement modes		
Acceleration (ACC)		m/s^2
Velocity (VEL)		mm/s
Displacement (DISP)		mm
Measurement range		
Piezoelectric		Accelerometer sensitivity 1.00 to 9.99 pC/（m/s^2）
	Acceleration	0.3, 1, 3, 10, 30, 100, 300, 1 000
	Velocity	3, 10, 30, 100, 300, 1 000
	Displacement	1, 3, 10, 30, 100, 300, 1 000 (HPF 1 Hz)
	Displacement	0.3, 1, 3, 10, 30, 100, 300, 1 000 (HPF 3 Hz)
	Displacement	0.03, 0.1, 0.3, 1, 3, 10, 30, 100 (HPF 10 Hz or higher)
		For accelerometer sensitivity 0.030 to 0.999 pC/ (m/s^2), multiply above figures by 10 For accelerometer sensitivity 10.0 to 99.9 pC/ (m/s^2), multiply above figures by 1/10
Vibration frequency range		
Piezoelectric		
	Acceleration	1 Hz to 20 kHz ± 5 %
	Velocity	1 Hz to 3 Hz ± 10 %, 3 Hz to 3 kHz ± 5 %
	Displacement	1 Hz to 3 Hz ± 20 %, 3 Hz to 500 Hz ± 10 %
Filters		
Piezoelectric		
	High-pass filter (HPF)	1, 3, 10, 20, 50 Hz (−10 % point, 3rd-order)
	Low-pass filter (LPF)	100, 300, 1 k, 3 k, 10 kHz (−10 % point, 3rd-order)
Display characteristics		
RMS		True RMS
Equivalent peak (EQ PEAK)		RMS ×√2
Equivalent peak-to-peak (EQ P-P)		RMS peak × 2
Maximum value hold		Holds maximum value in selected mode at selected display characteristics
Peak hold		Holds peak of acceleration waveform
Comparator function		Based on level evaluation
Comparator level setting		In steps of 2 % of full-scale range
Delay time setting		0 to 9 s in 1-s steps
Auto reset time		0 to 90 s in 1-s steps, ON, OFF
Comparator output		Open-collector output (maximum applied voltage 24 V, maximum drive current 25 mA) Buzzer output (on/off selectable), LCD flashing
LCD functions		
Bar graph		Linear scale, value sampled every 100 ms
Measurement value		4-digit numeric display (average of 20 instantaneous value samples taken at 100 ms intervals, display updated every 2 seconds)
Measurement mode		Display characteristics, filter, battery capacity (3-stage indication)
Calibration		
Accelerometer sensitivity		0.030 to 0.999 pC/ (m/s^2), 1.00 to 9.99 pC/ (m/s^2), 10.0 to 99.9 pC/ (m/s^2)
Calibration output		Signal for external equipment calibration
	AC	
	Piezoelectric	80 Hz ± 2 %, 2 V ± 2 %
	DC	2 V ± 2 %

Outputs		
AC output		Range full-scale 2 V, output impedance 600 Ω, BNC connector
Output voltage accuracy		
Piezoelectric (unit electrical characteristics, 80 Hz)		
	Acceleration	Range full-scale ± 2 %
	Velocity	Range full-scale ± 3 %
	Displacement	Range full-scale ± 5 %
DC output		Range full-scale 2 V, output impedance 600 Ω, BNC connector
Output voltage accuracy		
Piezoelectric (unit electrical characteristics, 80 Hz)		
	Acceleration	Range full-scale ± 2 %
	Velocity	Range full-scale ± 3 %
	Displacement	Range full-scale ± 5 %

Noise level (typical)

Noise level with accelerometer input, sensitivity 5.00 pC/ (m/s^2)

Measurement range	Measurement mode	HPF	LPF	Display	Noise level
Acceleration	0.3	OFF	OFF	RMS	0.004 m/s^2
Velocit	3	1 Hz	OFF	RMS	0.1 mm/s
Displacement	1	1 Hz	OFF	RMS	0.015 mm
Displacement	0.03	10 Hz	OFF	RMS	0.0003 mm

Noise level (example) with piezoelectric accelerometer connected

Accelerometer type	Measurement mode	Measurement range	HPF	LPF	Display	Noise level
PV-85	Acceleration	0.3	OFF	OFF	RMS	0.0034 m/s^2
	Velocity	3	10 Hz	OFF	RMS	0.004 mm/s
	Displacement	0.03	10 Hz	OFF	RMS	0.0002 mm
PV-90B	Acceleration	3	OFF	OFF	RMS	0.133 m/s^2
	Velocity	30	10 Hz	OFF	RMS	0.17 mm/s
	Displacement	0.3	10 Hz	OFF	RMS	0.007 mm

Interface		
Serial interface		For data output and remote control of VM-83
Printer output		For printing of measurement data (on CP-10, CP-11, DPU-414)
Power requirements		IEC R14 (size D) batteries × 4, or AC adapter (NC-98A, option)
Current consumption		Approx. 190 mA (varies depending on measurement conditions)
Continuous operation on batteries		Approx. 20 hours using alkaline batteries
Ambient conditions for use		−10 to 50 ℃, 20 to 90 % RH (no condensation)
Dimensions and weight		171 (H) × 120 (W) × 234 (D) mm, approx. 1.8 kg
Supplied accessories		Storage case × 1 IEC R14 (size D) batteries × 4 (manganese)

■ Optional accessories

Name	Model
VM-83 management software	VM-83PB1
AC adapter	NC-98A
Piezoelectric accelerometer	Various
Vibration meter preamplifier	VP-26A
Vibration meter extension cable	EC-02S series (3 m and up)
Printer cable	5WCD2320
Interface cable	5WKR4030
Printer	DPU-414

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∗ Specification subject to change without notice.

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Tel : 0755-28125115
Fax: 0755-28125225
：
http://www.i1718.com.cn
E-mail : 361904153@qq.com