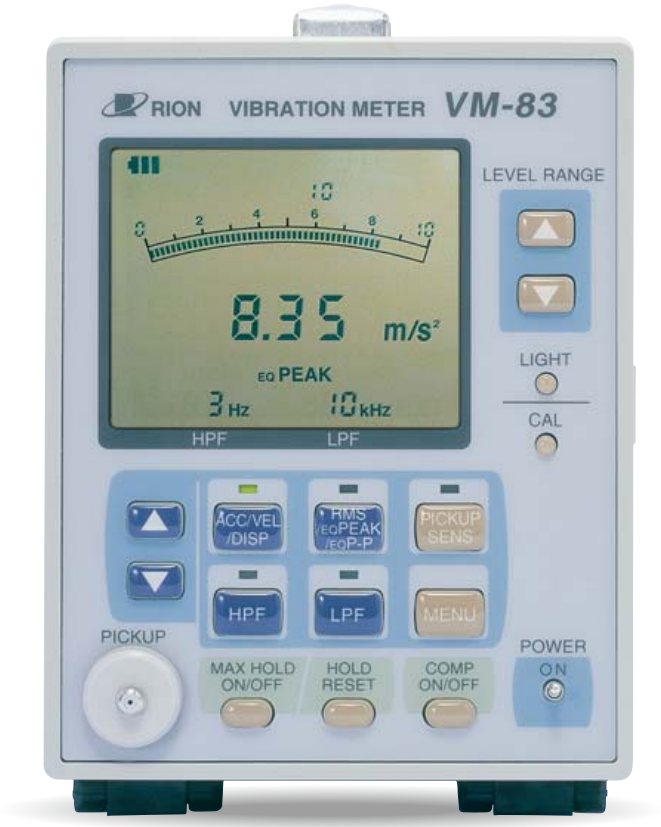
For Measurement of Acceleration, Velocity, Displacement

General-PurposeVibration Meter

VM-83

Measure and Evaluate Vibrations Detected with Piezoelectric Accelerometer



General-Purpose Vibration Meter

VM-83

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

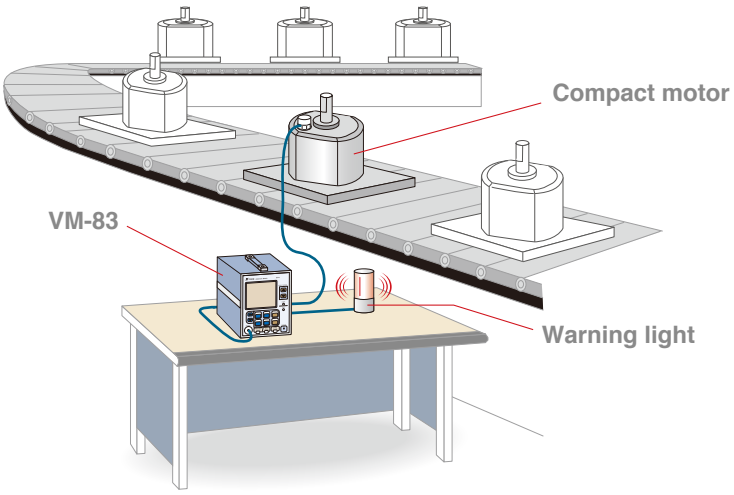
▶ Features

- 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

Application Examples

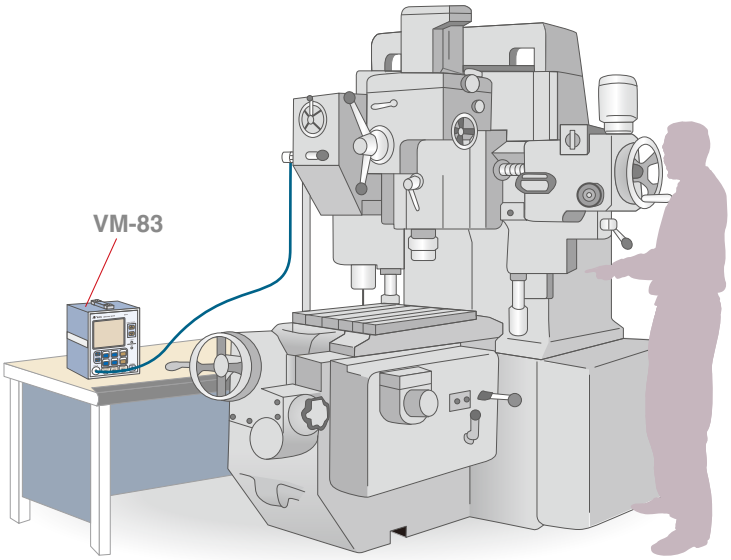
Product testing

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.



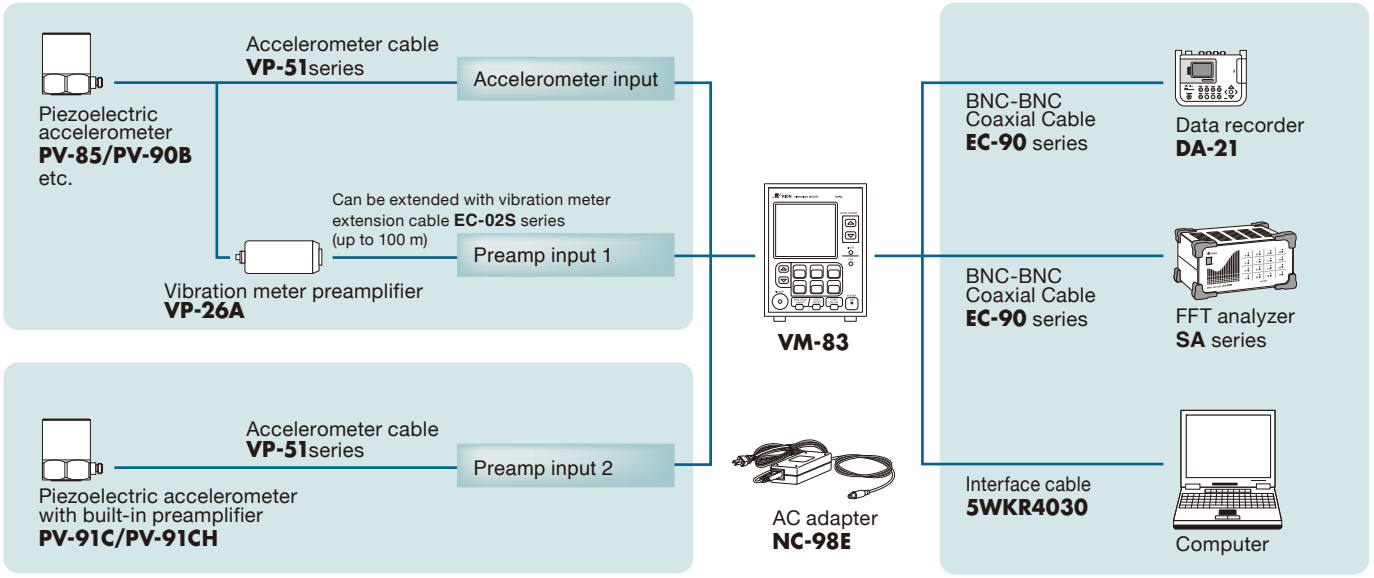
Equipment diagnosis

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 Connection Examples

Input side



Output side

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 × $\sqrt{2}$
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
Power requirements	IEC R14 (size D) batteries × 4, or AC adapter (NC-98E, 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 °C, 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
AC adapter	NC-98E
Piezoelectric accelerometer	Various
Standard Cable	VP-51 series (2 m and up)
Vibration meter preamplifier	VP-26A
Vibration meter extension cable	EC-02S series (3 m and up)
BNC-BNC Coaxial Cable	EC-90 series (2 m and up)
Interface cable	5WKR4030

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