

Not One But Two LCD Panels!



Vibration Level Meter **VM-53/53A**

Twin
Display

Sub display shows a wealth of auxiliary information



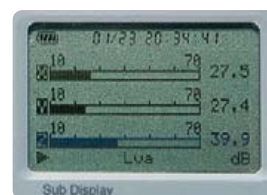
Vibration Level Meter VM-53/53A

Twin
Display

Store 3-axis measurement data Check vibration values on large on sub display



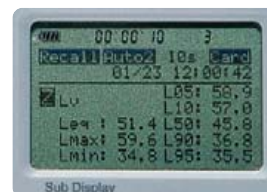
Sub display
screen example



Bar graph screen



Level-time screen



List screen

Outline

The VM-53/VM-53A consists of the main unit and the 3-axis accelerometer PV-83C. It conforms to the requirements specified by the Weight and Measure Act and the Japanese Industry Standard for vibration level meters (JIS C 1510: 1995). The unit is designed mainly for measuring ground vibrations in order to evaluate vibration pollution. It can measure vibration levels and display values weighted according to human vibration sensitivity characteristics. The VM-53/VM-53A can also be used to measure minute vibrations in structural objects. Sophisticated auto store and timer functions enable unattended long-term measurement. Data can be stored in the internal memory, and the VM-53A can also use memory cards (CompactFlash™ cards) to hold large amounts of measurement data.

The main unit features two backlit LCD panels. The large main display shows the instantaneous value, while the sub display can show a level-time waveform (3-axis or single-axis), bar graph (3-axis), list of numeric values, or other valuable information. This lets the user evaluate vibration phenomena much more accurately than with a conventional device.

Separate X, Y, Z signal outputs are provided. An I/O jack for connection to a printer or computer and a comparator output are also available. This makes the VM-53/VM-53A suitable for a wide range of measurement system applications.

The unit can be powered from IEC R14 (size C) batteries or from an AC adapter (option). A backup function to guard against data loss in case of a power failure is also implemented (when batteries and AC adapter are used together).

Features

- **Twin backlit LCDs.** Large main display shows instantaneous value while sub display shows level-time, bar graph, list, or other information.
- **Continuous recording of 3-axis instantaneous value data on memory card possible (VM-53A).**
(Approx.400 hours using supplied 64 MB card, 3-axis data, 1-second intervals)
- **Store processed values for maximum value, instantaneous level, and power average in internal memory or on memory card.**
- **1/1 and 1/3 octave real-time analyzer card VX-53RT (option) (VM-53A)**
- **Data management software VM-53PA1 Japanese version (option)**

Vibration pickup

3-axis accelerometer PV-83C

Reference sensitivity	: 60 mV/m/s ²
Waterproofing specifications	: JIS C 0920, class 7 (sealed)
Temperature range for operation	: -10 to +50 °C
Dimensions, weight	: Approx. 67 (dia.)x40.7 (H)mm, Approx. 335 g



PV-83C

in internal memory or on memory card (VM-53A) main display while monitoring level waveform

Option Management software

Vibration level data management software

VM-53PA1

This software supports the models VM-53/VM-53A and VM-52/VM-52A. Based on data stored with the vibration level meter, the software allows level waveform display, editing, processing, creating daily and weekly reports, and printing.

Supported operating systems:
Windows XP/Vista/7

* The VM-53PA1 software runs only under a Japanese operating system and the display language is Japanese only.

CompactFlash™ card

Manual store data, 1file 25 KB

Auto Store 1

Auto Store 2

Measurement time	Sampling		Number of data	
	100 ms	1 s	1 set	240 bytes
1 h	1.5 MB	0.15 MB	4500 set	1.1 MB
8 h	12 MB	1.2 MB		

Store data read-in method and display/edit capabilities

Processing type / Model	Data read-in method (Manual, AUTO 1, AUTO 2 data compatible)	Display/edit (AUTO1,AUTO2data only)	Create/display daily & weekly report (AUTO 1,AUTO 2data only)
VM-53 internal memory only	Serial communication	○	○
VM-53A internal memory/CF card	Serial communication and CF card	○	○
	Data read-in method (memory card data)	Display/edit	Create/display daily & weekly report
VM-52	Not supported	Not supported	Not supported
VM-52A SRAM card	Serial communication	○	○

* Memory card data files stored with management software VM-52PB1 can be used by VM-53PA1 for display, editing, and creation of daily & weekly reports.
* Remote measurement is possible with the four models VM-53/VM-53A and VM-52/VM-52A. (For remote measurement, the vibration level meter is connected to a PC via a serial link. Vibration level meter setup and processing measurement can then be controlled from the PC.)



Display / edit screen



Daily report screen

Option Program card

1/1 and 1/3 octave real-time analyzer card

VX-53RT (only for VM-53A)



Integrates 1/1 and 1/3 octave real-time analyzer function into the vibration level meter.

Media : CompactFlash™ card

Supported model : VM-53A

Applicable standards : IEC 61260 : 1995 Class 1
JIS C 1513 : 2002 Class 1
JIS C 1514 : 2002 Class 1

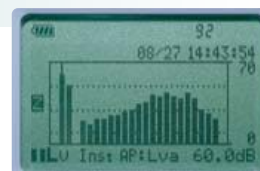
Analysis frequency bands : 1/1 octave bandpass filters 1 to 63 Hz (7 bands), L_{va} , L_v
1/3 octave bandpass filters 1 to 80 Hz (20 bands), L_{va} , L_v

Measurement modes : Inst, L_{eq} , L_{max} , L_5 , L_{10} , L_{50} , L_{90} , L_{95}
One measurement mode can be selected at a time.

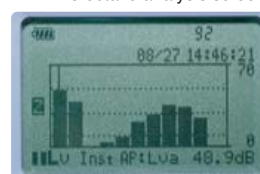
Memory : Manual store on VX-53RT program card
506 files (100 data per file)

Interface : Serial communication and printing supported

Data store format : Text files (CSV format), display and processing with spreadsheet software possible

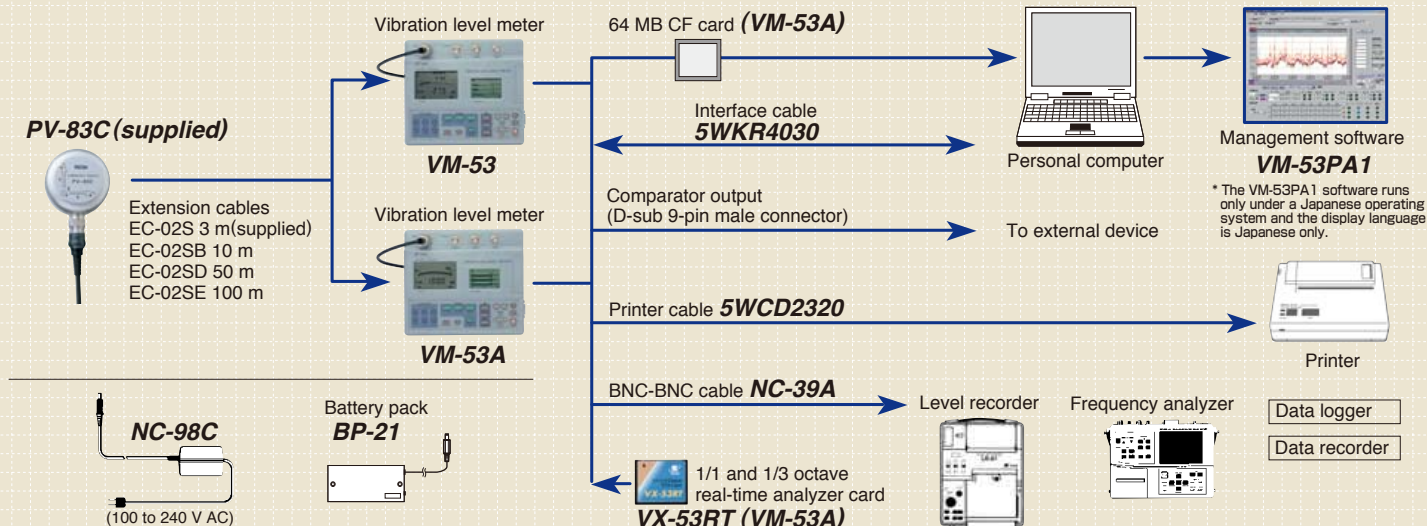


1/3 octave analysis screen



1/1 octave analysis screen

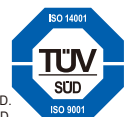
System diagram (devices except for vibration level meter, PV-83C, EC-02S and CF card are optional)



Specifications

		VM-53A (memory card compatible)	VM-53
Type approval number	No. W031		
Applicable standards	Weight and Measure Act (vibration level meters) JIS C 1510: 1995 (JIS C 1510: 1976)		
Measurement functions	Vibration level (L_v), vibration acceleration level (L_{va}), maximum value hold of vibration level or vibration acceleration level		
Processing functions	Power average of vibration level or vibration acceleration level (L_{veq} or L_{vaeq})		
	Time percentile level of vibration level or vibration acceleration level ($L_5, L_{10}, L_{50}, L_{90}, L_{95}$) Maximum value and minimum value of vibration level or vibration acceleration level (L_{max}, L_{min}) For each measurement, single-axis or 3-axis can be selected.		
Measurement frequency range	Vibration level 1 to 80 Hz Vibration acceleration level 1 to 80 Hz		
Measurement level range	Vibration level L_v -Z 25 to 120 dB, L_v -X, Y 30 to 120 dB Vibration acceleration level L_{va} 30 to 120 dB (0 dB=10 ⁻⁶ m/s ²)		
Residual noise	L_v -Z 19 dB max. L_v -X, Y 24 dB max. L_{va} 24 dB max. (0 dB=10 ⁻⁶ m/s ²)		
Frequency compensation	Vertical characteristics according to Weight and Measure Act or JIS, horizontal characteristics according to JIS, planar characteristics according to JIS		
Level range	10 dB steps, 6 ranges switchable, 3-axis independent 10 to 70, 20 to 80, 30 to 90, 40 to 100, 50 to 110, 60 to 120 dB		
Linearity range	70 dB		
Measurement time	Processing measurement in preset time possible. 10 seconds, 500 seconds, 1 minutes, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 1 hour, 4 hours, 8 hours, 24 hours, Manual (max. 199 h 59 m 59 s)		
RMS detection circuit	Digital processing Dynamic characteristics: 0.63 s		
Processing	Digital processing		
Sampling cycle	78 μ s (power average, L_{max}, L_{min} , max. hold)		125 μ s (power average, L_{max}, L_{min} , max. hold)
	100 ms (L_v) 5 seconds for measurement time 500 s		100 ms (L_v) 5 seconds for measurement time 500 s
Memory card functions	Data store capability on memory card (CompactFlash™ card, abbreviated as "CF card") Extended functions implemented by optional software on CF card supported		————
Store functions	Manual store, Auto Store 1, Auto Store 2. Internal memory data are backed up for up to 1.5 months by secondary battery (in power off state)		
Manual store	Vibration level (L_v) or vibration acceleration level (L_{va}) at store point and processing values (L_{veq} or $L_{vaeq}, L_{max}, L_{min}, L_5, L_{10}, L_{50}, L_{90}, L_{95}$) are saved at store point. When measurement mode is Max Hold, maximum hold level and processing values are saved.		
	CF card	Multiple files, with up to 100 data sets per file (up to capacity of card)	
Internal memory	Max. 100 sets of 3-axis data		
Auto Store 1	Continuous store of vibration level (L_v) or vibration acceleration level (L_{va}) instantaneous values. Store sampling 100 ms or 1 s, selectable Start/end of store can be timer controlled		
	CF card	Multiple files, with up to 199 h 59 m 59 s data per file (up to capacity of card)	
Internal memory	Max. 86 400 sets for single-axis measurement, max. 86 400 (28 800 × 3) for 3-axis (X/Y/Z) measurement		
Auto Store 2	Continuous store of processing values (L_{veq} or $L_{vaeq}, L_{max}, L_{min}, L_5, L_{10}, L_{50}, L_{90}, L_{95}$) as one set for each measurement time. Start/end of store can be timer controlled. Interval measurement at each full hour possible.		
	CF card	Multiple files, with up to 4 500 data sets per file	
Internal memory	Max 4 500 data sets for single-axis, 1 500 data sets for 3-axis (X/Y/Z)		
Pause function	Pause/resume possible during instantaneous value measurement, processing measurement, and Auto Store 2. During Auto 1 store, pause functions as marker. In Timer Auto1 and Timer Auto 2 mode, pause function is not available.		
Comparator function	Vibration level or vibration acceleration level based comparator. Output activated when setting level (30 to 120 dB, 1 dB steps) is exceeded.		
Supported channels	Single-axis channel selected for main display		
Comparator output	Open-collector output, max. applied voltage 24 V		
Comparator settings	Delay time: 0 to 9 s in 1 s steps, auto reset on/off selectable, auto reset time 0 to 90 s in 1 second steps		
Clock functions	Start time/end time setting for timer controlled Auto Store 1 and Auto Store 2		
Calibration output signal	Built-in oscillator (31.5 Hz, sine wave) for calibration of external equipment		
AC/DC output	BNC output: 3 separate channels, AC or DC selected by menu, output impedance 600 ohms, load impedance 10 kilohms or higher; output: 1 Vrms (full-scale), DC output 2.5 V (full-scale, 0.25 V/10 dB)		
Printer output	Allows instantaneous value, processing values, and recall data printing. Processed value printing: 3-axis instantaneous value and processed value print every 5 seconds.		
Interfaces	Serial interface: Allows external parameter setting control and output of data to a computer or a printer.		
Displays	Segment type (main) and 128 × 64 dot matrix type (sub) LCD, with backlight		
Main display	Single-axis instantaneous value (1-second update cycle) and bar graph (100 ms update cycle) always shown		
	Sub display	Mode and screen switching provides access to the following information 3-axis measurement value display. Setting information, 3-axis measurement values, level/time display, processing value display, recall data display, menu display	
Side panel	EXT DC (6 V) connector, interface connector (D-sub 9-pin male)		
Power supply	Four IEC R14 (size "C") batteries (LR14 or R14PU), AC adapter (option NC-98C), battery pack (option BP-21)		
Battery life	Approx. 35 hours (alkaline batteries LR14), approx. 12 hours (manganese batteries R14PU), approx. 100 hours (combined use of battery pack BP-21 with four size D batteries and four alkaline batteries (LR14) (at room temperature, 3-axis instantaneous value measurement, backlight OFF, communications OFF, AC output, VM-53A option OFF)		
Current consumption	Approx. 120 mA (at 6 V DC)		
Ambient conditions	-10 to +50 °C, max. 90 %RH		
Dimensions, weight	Approx. 56 (H) × 200 (W) × 175 (D) mm, approx. 1 kg (including batteries)		
Accelerometer	3-axis accelerometer: PV-83C, reference sensitivity: 60 mV/m/s ² ; waterproofing specifications: JIS C 0920 Class 7 (sealed), ambient conditions: -10 to +50 °C Dimensions, weight: 67 (dia.) × 40.7 (H) mm, approx. 335 g		
Supplied accessories	Extension cable EC-02S (3 m) × 1, IEC R14 (size "C") battery (manganese) × 4, BNC connector cover × 3, I/O connector cover × 1, carrying case × 1 128 MB CompactFlash card MC-128CF × 1 (VM-53A only)		

	Name	Model
Options	Analyzer card (only for VM-53A)	VX-53RT
	Management software	VM-53PA1
	Extension cable	EC-02S (3 m and up)
	Printer	DPU-414
	AC adapter (100 to 240 V)	NC-98C



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* Specification subject to change without notice.

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