

INSTRUCTION MANUAL

1/3 Octave Real-time Analysis Program

VX-56RT

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Organization of this manual

This manual describes functions and other operation principles of the 1/3 Octave Real-time Analysis Program VX-56RT.

The manual consists of the chapters listed below. You should also consult the documentation for the Tri-axial Groundborne Vibration Meter VM-56.

Outline

Gives basic information on the functions of the VX-56RT.

Change the function to the VX-56RT

Explains how to change to the function of the VX-56RT.

Reading the display

Explains various items that appear on the display and menu screen.

Measurement

Explains the basic procedures for measurement.

Store data format and file structure

Explains the format of stored data and how the files are organized.

Card capacity and store time

Explains the relationship between rated memory card capacity and store time.

Recall

Explains screen and display settings of the recall data.

Default settings

Lists the factory default settings of the VX-56RT.

Communication commands

Explains additional commands that become available when the 1/3 octave real-time analysis program is loaded.

Reference information

Explains the 1/3 octave band filter characteristics and battery life etc.

Specifications

Lists the technical specifications of the VX-56RT.

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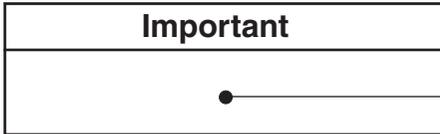
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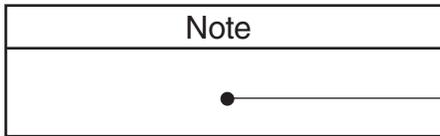
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FOR SAFETY

In this manual, important safety instructions are specially marked as shown below. To prevent the risk of severe damage to the program or peripheral equipment, make sure that all instructions are fully understood and observed.



Disregarding instructions printed here incurs the risk of program damage or data loss.



Denotes special information that is helpful in utilizing the capabilities of the program but that is not directly related to safety.

Contents

Software Usage License Agreement	iii
FOR SAFETY	vi
Outline	1
Change the function to the VX-56RT	2
VX-56RT installation	2
Switching to the VX-56RT function	2
Reading the display	3
Measurement screen	3
Menu list screen	6
Explanation of menu screen items	6
Measurement	14
Measurement procedure	14
Store data format and file structure	16
Card capacity and store time	20
Using auto store	20
When performing waveform recording (when the VX-56WR is installed)	21
Recall	22
Default settings	23
Communication commands	24
List of commands	24
Command description	25
Reference information	32
1/3 Octave band filter characteristics	32
Noise floor	33
Battery life	34
Specifications	35

Outline

This program card contains software that adds 1/3 octave band real-time analysis capability to the Tri-axial Groundborne Vibration Meter VM-56.

Measurement data are displayed as graphs.

Data are stored in CSV format, which allows processing on a computer, using general application software.

A measurement data processing macro can be downloaded from the RION website.

This makes it easy to import auto store data and display them in graph format.

With regard to vibration acceleration level and frequency-weighted bands, 1/3 octave band analysis can be carried out for the following items. It is also possible to specify user weighting values for each band separately.

- Time-weighted instantaneous value Inst
- Time-averaged value Calc
- Time-weighted maximum value Calc Max

With the Auto Store, Timer Auto and Standard “General” settings, user-weighting can be applied to the effective instantaneous acceleration values for individual band data collected at 1/3 octave intervals, to measure the OA tri-axial synthesis “aw,i” value.

- Tri-axial synthesis value aw,i

For display on the main unit, the maximum value (aw) of “aw,i” during the overall measurement time is shown as the “Law” value, which is level-converted using the reference acceleration of 10^{-6} m/s².

For details on the VM-56 including information on how to use the operation keys, please refer to the Instruction Manual of the VM-56.

Analysis of recorded information on the VM-56 is not possible.

Important

Use SD memory cards provided by Rion. The performance of other cards is not guaranteed.

Change the function to the VX-56RT

VX-56RT installation

Follow the procedure described in the separate “Optional program installation / uninstallation” to install the VX-56RT program in the VM-56 unit.

Important
Never format the optional program card with SD memory card formatting software (such as SD Formatter, etc.). Otherwise the program data on the card will be erased and the respective functions can no longer be used. Restoration of the erased program is not warranted.
Upgrade the firmware of the VM-56 to the latest version before installing the optional program. The latest version firmware can be downloaded from “Software downloads” of Support Room on our web site (http://www.rion.co.jp/english/).

Switching to the VX-56RT function

On the menu list screen of the VM-56, select [Option] and press the MENU/ENTER key.

The option screen appears. Use the Δ/∇ keys to move to the [VX-56RT 1/3 Octave Real-time Analysis Program] and press the MENU/ENTER key.

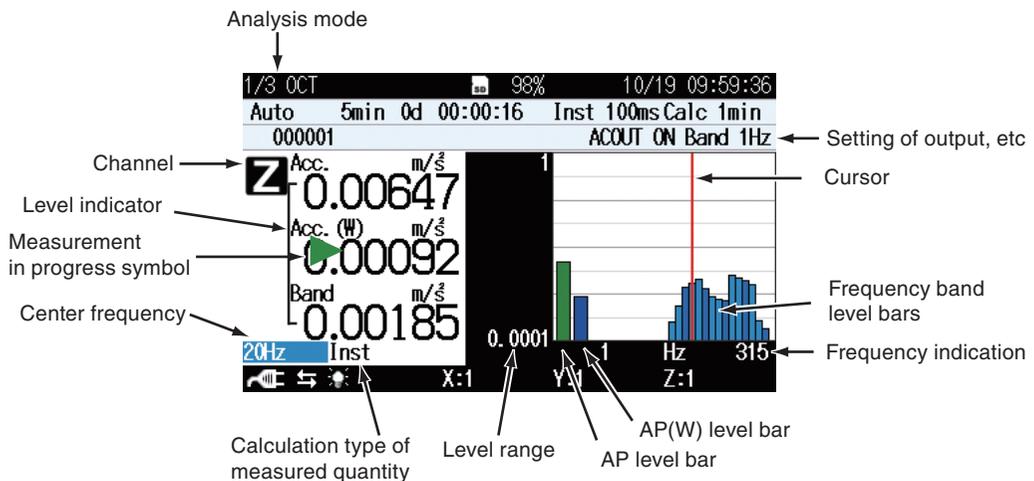
When the message “Please wait” disappears, the function switching procedure is completed, and the unit shows the VX-56RT measurement screen.

Reading the display

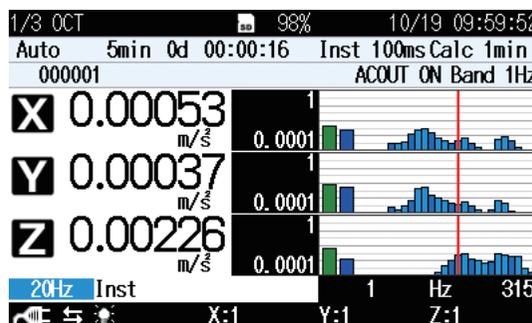
Measurement screen

The measurement screen provides linear or decibel based indication. You can switch between the two display types using the [Display / I/O] screen accessed from the menu list screen. Measurement data are stored as linear values.

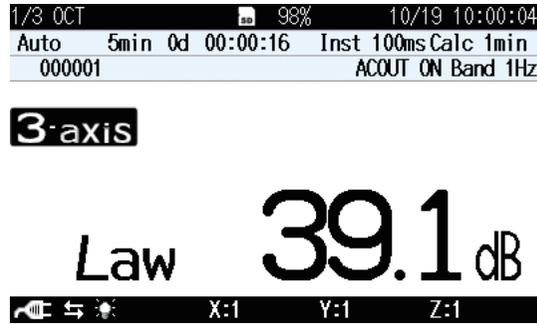
Graph (1 channel display and 3 channels display)



Graph (1 channel display)



Graph (3 channels display)



Law display

Note
“Law” is not shown when the measurement mode is SBR or when the store mode is “Manual”.

Analysis mode

Indicates the condition of the display screen. “1/3 OCT” indicates 1/3 octave band analysis.

Setting of output, etc

The selected output signal on the [Output▼] of the [Display / I/O] screen is shown here (see page 6).

Cursor

Selects frequency band in the currently displayed graph. Use the </> keys to move the cursor in the following order:

[AP] ↔ [AP(W)] ↔ [1Hz] ↔ [1.25Hz] ↔ ... ↔ [315Hz] ↔ [AP] ↔ ...

Frequency band level bars

Show the level value in each frequency band as a bar graph. For 1/3 octave analysis, 26 bands from 1 Hz to 315 Hz are shown.

Frequency indication

Indicators for 1 Hz and 315 Hz are shown here on a horizontal axis, as a guide to the frequencies of the level bar graph display. (There are 26 bands.)

AP level bar

The level of the AP is shown by this blue bar.

AP(W) level bar

The level of the AP(W) is shown by this green bar.

Level range

Indicators for lower to upper limit are shown here on a vertical axis, as a guide to the level graph display. The range can be changed using the LEVEL RANGE key on the control section.

The following two settings are available: [1], [10] (m/s²).

The following two settings are available: [0.0001 to 1], [0.001 to 10]

Calculation type of measured quantity

Shows the calculation type of measured quantity selected with the cursor (see page 14).

Center frequency

Shows the center frequency of the frequency band selected with the cursor.

Measurement in progress symbol

Flashes during measurement.

Level indicator

Shows the each frequency band level selected by the cursor. The display content differs depending on the channel display. During single channel display, the AP(W) bar graph level, AP bar graph level, and the calculation type selected with the frequency band measurement setting are shown. During 3-channel display, the level of each frequency band currently selected by the cursor for the 3 axes (XYZ) is shown.

Channel

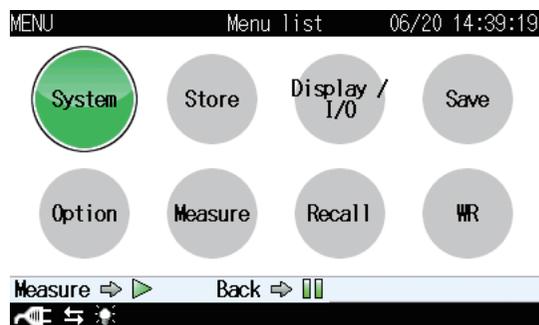
Shows the selected channel.

Menu list screen

When the measurement screen is displayed, pressing the MENU/ENTER key brings up the menu list screen as shown below.

Use the Δ / ∇ / \triangleleft / \triangleright keys to select the desired menu and press the MENU/ENTER key.

Pressing the PAUSE/CONT key or the START/STOP key switches back to the measurement screen.

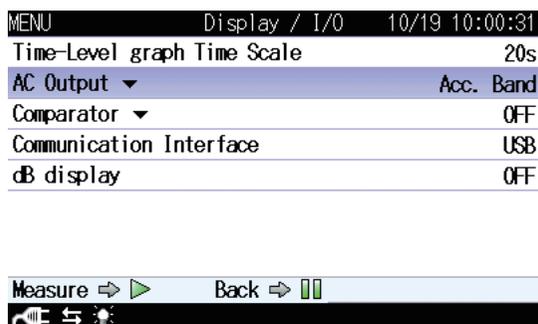


Explanation of menu screen items

This section explains items on the various menu screens that are related to the VX-56RT function. For information on other items, please refer to the Instruction Manual of the VM-56.

Display / I/O

This screen sets the measurement calculation and other items displayed on the measurement screen.(See page 14)



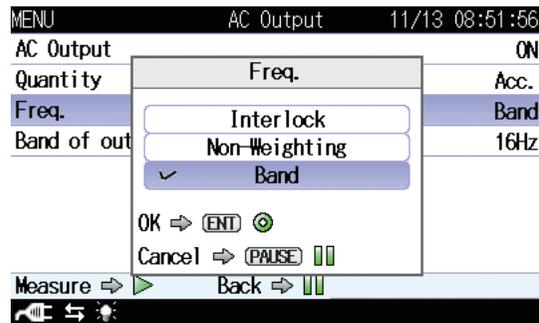
Note

The vertical axis of the graph is always a linear unit, and dB is not reflected..

AC Output ▾

This screen sets the type of output signal etc.

Selecting [AC Output ▾] and pressing the MENU/ENTER key. The AC Output setting screen appears.



Note

The VM-56 has a measurement value comparator signal output function, but there is no comparator output function for VX-56RT measurement values.

AC Output

Select [Output] and press the MENU/ENTER key. The AC Output setting screen appears.

Use the Δ/∇ keys to select [ON] or [OFF] and press the MENU/ENTER key.

Frequency

Displays the screen to select the type of frequency weighting characteristic of the signal output from the AC Output connector of the unit.

This item is shown when [AC Output] was set to [ON].

Select [Freq] and press the MENU/ENTER key. The frequency weighting characteristic setting screen appears.

Use the Δ/∇ keys to select the [Inter lock], [Non-Weighting] or [Band] setting and press the MENU/ENTER key.

If [Inter lock] was selected, the characteristics or band selected with the cursor on the measurement screen graph display will be output.

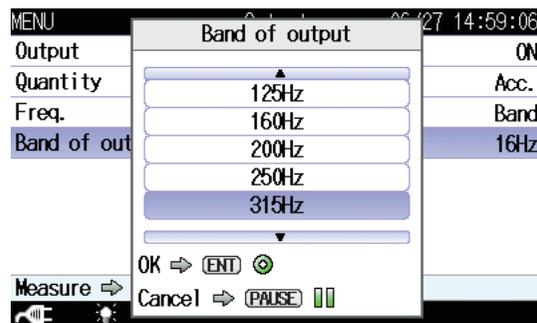
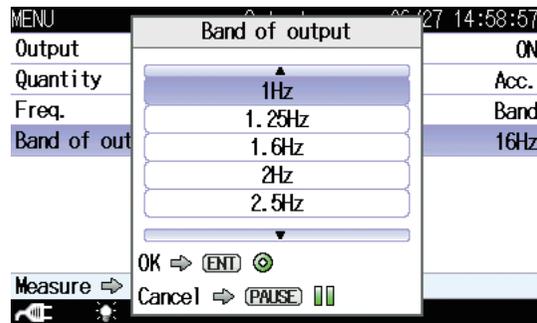
When [Band] is selected, the signal for the frequency band selected under [Band of output] is output.

Band of output

This setting is shown when [Band] is selected for the [Freq]. Selects the frequency band for which a corresponding signal is output at the output connector of the unit.

Select [Band of output] and press the MENU/ENTER key. The frequency band selection screen appears. Use the Δ/∇ keys to select the frequency band and press the MENU/ENTER key.

The available settings are as follows: [1Hz], [1.25Hz], [1.6Hz], [2Hz], [2.5Hz], [3.15Hz], [4Hz], [5Hz], [6.3Hz], [8Hz], [10Hz], [12.5Hz], [16Hz], [20Hz], [25Hz], [31.5Hz], [40Hz], [50Hz], [63Hz], [80Hz], [100Hz], [125Hz], [160Hz], [200Hz], [250Hz], [315Hz].



Measure

Displays the screen to select the frequency weighting and time weighting for a frequency band.

MENU	Measure	06/20 15:15:32
Band Weighting(Freq.)	User Weighting	
User Weighting (Band Only) ▾		
Band Weighting(Time)		1s
Freq. Weighting for Acc. X-axis ▾	Non-Weighting	
Freq. Weighting for Acc. Y-axis ▾	Non-Weighting	
Freq. Weighting for Acc. Z-axis ▾	Non-Weighting	
Non-Weighting Freq. Band Freq.		
Lower limit		1Hz
Measure ⇨ ▶	Back ⇨	

MENU	Measure	06/20 15:15:38
Lower limit		1Hz
Upper limit		80Hz
Freq. Range for Vel. and Disp. (Building Damage)		
Lower limit		1Hz
Upper limit		80Hz
Freq. Range for Vel. (Human Exposure)		
Lower limit		1Hz
Upper limit		80Hz
Measure ⇨ ▶	Back ⇨	

MENU	Measure	06/20 15:15:44
Lower limit		1Hz
Upper limit		80Hz
Freq. Range for Vel. (Human Exposure)		
Lower limit		1Hz
Upper limit		80Hz
Dominant Frequency Line		No Line
Delay Time		OFF
Standard		General
Measure ⇨ ▶	Back ⇨	

Band frequency weighting characteristics



Sets the frequency weighting characteristics for a specific band.

Non-Weighting

The band limit filter as set by “Freq. Weighting for Acc” applies.

If the “Freq. Weighting for Acc” setting is “Non-Weighting”, the value will be the same as the AP and AP(W) value.

Weighting

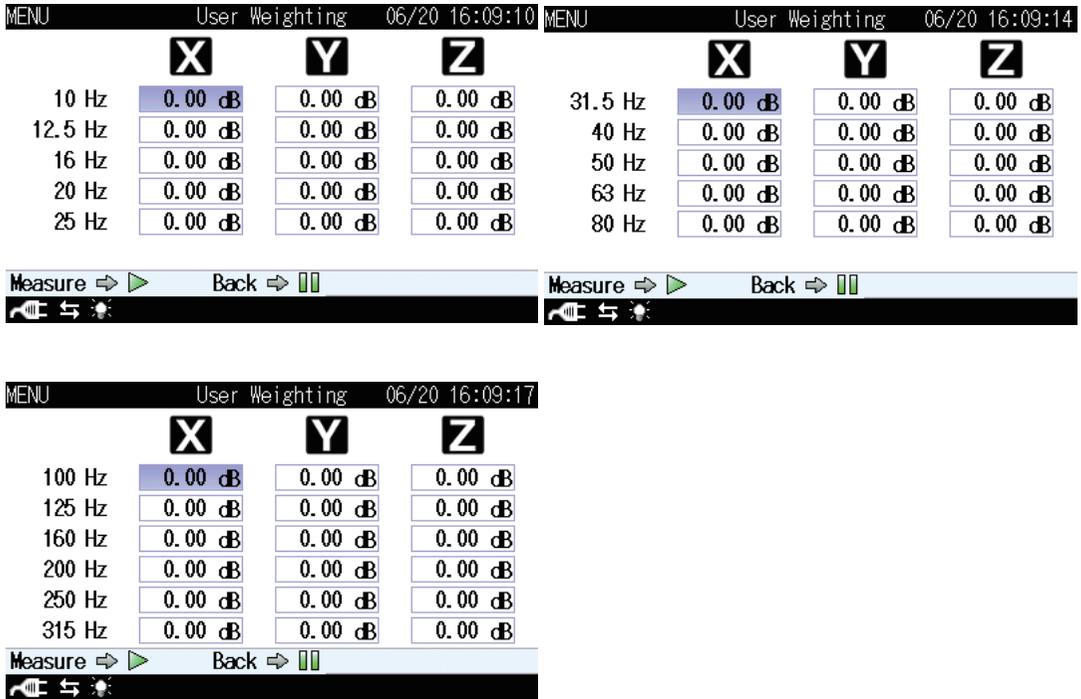
The weighting characteristic as set by “Freq. Weighting for Acc” applies.

User Weighting

Selecting “User Weighting” brings up the “User Weighting (Band Only)” dialog box. Press the MENU/ENTER key to move to the setting screen.

MENU User Weighting 06/20 10:34:05				MENU User Weighting 06/20 16:09:07			
	X	Y	Z		X	Y	Z
1 Hz	0.00 dB	0.00 dB	0.00 dB	3.15 Hz	0.00 dB	0.00 dB	0.00 dB
1.25 Hz	0.00 dB	0.00 dB	0.00 dB	4 Hz	0.00 dB	0.00 dB	0.00 dB
1.6 Hz	0.00 dB	0.00 dB	0.00 dB	5 Hz	0.00 dB	0.00 dB	0.00 dB
2 Hz	0.00 dB	0.00 dB	0.00 dB	6.3 Hz	0.00 dB	0.00 dB	0.00 dB
2.5 Hz	0.00 dB	0.00 dB	0.00 dB	8 Hz	0.00 dB	0.00 dB	0.00 dB

Navigation options: Measure →, Back →



Weighting values from +3.00 dB to -70.00 dB can be set freely for each of the 26 bands for the X, Y, Z axes.

Band time weighting characteristics

1 s (Slow) or 0.125 s (Fast) can be selected.



The time weighting setting is reflected in the Inst and Calc Max values, but not in the AP, AP(W), and Calc values.

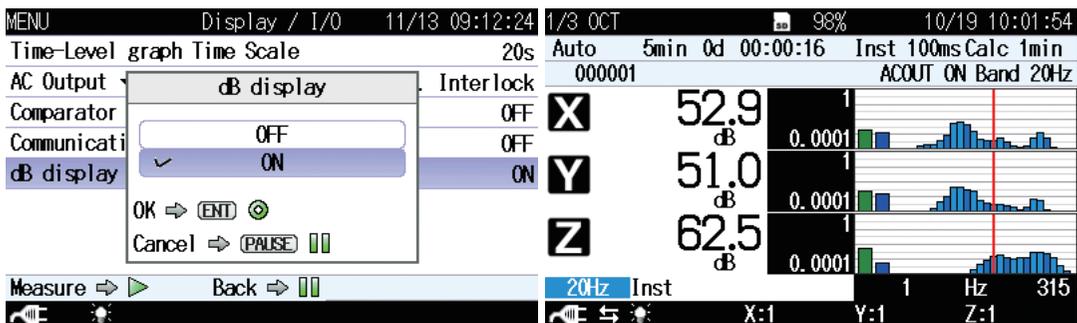
Note

When user weighting is specified, the lower limit of the band limit filter is fixed to 0.5 Hz and the upper limit is sensor-dependent.
The BAND output from AC OUT does not reflect the user weighting setting.

Measurement

Measurement procedure

1. Press the POWER key to turn the unit on.
After the power-on screen has been shown, the measurement screen appears.
The measurement parameter settings that were active before the unit was turned off will show on the screen. Therefore the actual display may not always be the same.
2. To display the values as decibels, set the “dB display” item in the [Display / I/O] menu list screen to ON.



3. Set the required items under “Measure” in the menu list screen.
4. Using the [Store] item in the menu list screen, select the store mode and the measurement parameters.
5. Return to the measurement screen and press the START/STOP key to start the measurement.

While the measurement is in progress, the ► symbol flashes and the elapsed time is displayed. In addition, the indicator LED flashes red. When the measurement time has elapsed, the measurement is terminated automatically.

To terminate the measurement before the allocated time, press the START/STOP key.

During measurement, the PAUSE/CONT key can be used to pause and resume the measurement (only manual store mode). During pause, the pause symbol (II) is shown and the indicator LED flashes blue.

- Pressing the DISPLAY key during or after measurement switches the measured quantity shown on the display screen in the following order.

Inst (instantaneous value) → Calc → Calc Max → VM-56 (Acc. rms / C.F. / MTVV / VDV) → VM-56 (PPV / D.F. / Disp. / KBFmax / KBFT / PVS) → T-L → Law → Inst (instantaneous value)...

- While the graph display screen is shown during or after measurement, the ◀/▶ keys can be used to move the cursor that selects the center frequency to display. The frequency band under the cursor and its numeric value reading are shown at the lower left part of the screen. The center frequencies for the band level bar graphs are as follows.

1 Hz, 1.25 Hz, 1.6 Hz, ..., 315 Hz

- While no measurement is in progress, pressing the PAUSE/CONT key will pause the vibration level displayed at that point. Press the PAUSE/CONT key again to cancel the display pause.

Note
After installation is complete, the SD memory card from which the VX-56RT program was installed can be used as a memory card for storing data.
Before using an SD card to store measurement data, it is recommended to first format it in a computer.
When the store mode is “Auto” and “Timer Auto” is selected, the measurement cannot be started if no SD card is inserted.
“Law” is used for display only and not stored as data. “aw,i” is stored as data. If the measurement mode is SBR or the store mode is Manual, “aw,i” is not stored and “Law” is not displayed on the screen.
The MAX HOLD key is not used in the VM - 56RT

Store data format and file structure

Data stored on the SD memory card are in CSV format (.rnd). Various files and subfolders are created on the card.

Folder and file names that are used for saving data differ, depending on the selected store mode.

Store destination folder

Files are saved in the store folder specified by store name. The store name specified on the menu screen is created as a 4-digit number under the sub-folder name.

When a file with the same name exists in the same folder, it will always be overwritten.

File name of recording data

Recording files are named as shown below.



Store mode: The file name varies depending on the store mode.

Manual store: MANU

Auto store: Calc , Inst

Store name: 0000 to 9999

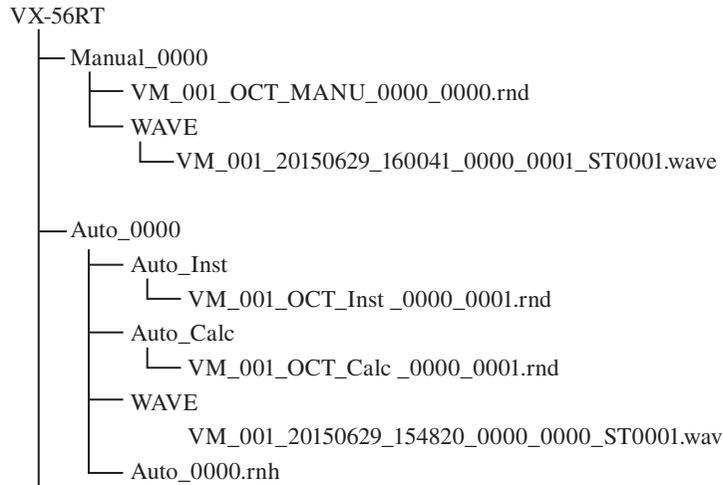
Partitioned file number: Manual store is fixed to 0000

Note

The performance about the file after the 10,000th will not be guaranteed.

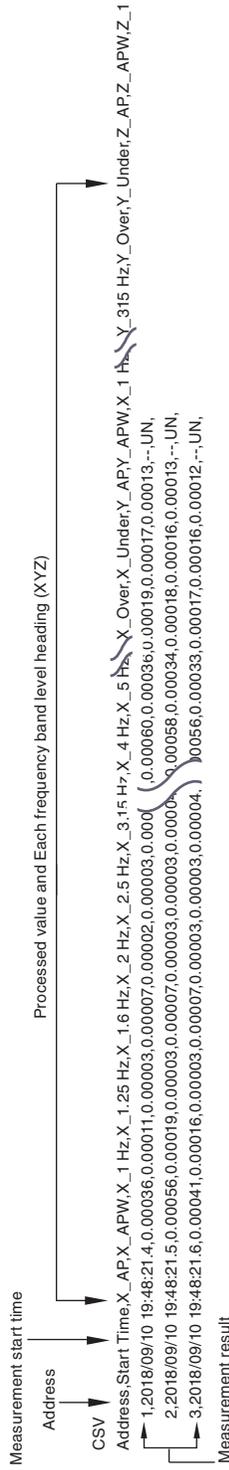
When a file with the same name exists in the same directory, it will always be overwritten.

A sample configuration is shown below.

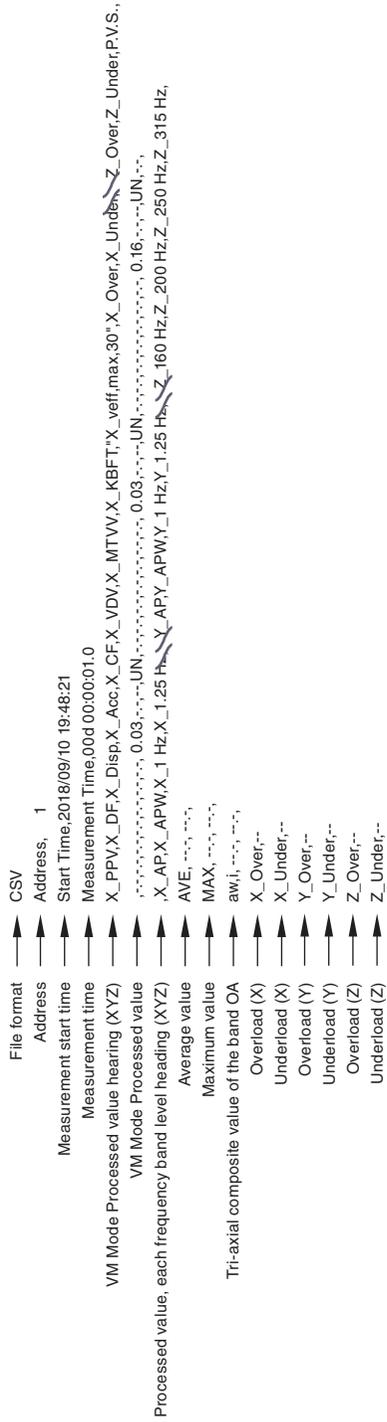


Important
Use SD memory cards provided by Rion. The performance of other cards is not guaranteed
Note that we assume no responsibility for any damage or loss of stored measurement data. Data recommends to get a backup.

Auto store (Inst) file example



Auto store (Calc) file example



Card capacity and store time

The measurement duration for which data can be stored on an SD memory card depends on the capacity of the inserted card. Approximate times are listed below.

Using auto store

1/3 Octave band analysis

Only Inst store interval set

	SD memory card capacity		
Inst store interval 100 ms	512 MB	2 GB	32 GB
Store time	Approx. 15 hours	Approx. 60 hours	Approx. 960 hours

Only Calc store interval set

	SD memory card capacity		
Calc store Interval 30 s	512 MB	2 GB	32 GB
Store time	Approx. 600 sets	Approx. 2,400 sets	Approx. 38,400 sets

Number of bytes per header file

About 1 KB per file.

When performing waveform recording (when the VX-56WR is installed)

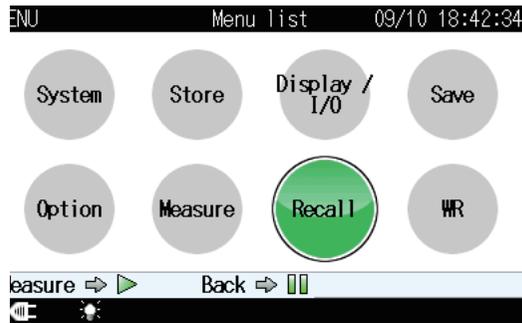
Using auto store, Inst. store interval 100 ms

		SD memory card capacity		
Bit length		512 MB	2 GB	32 GB
	16 bit	Approx. 5 hours	Approx. 24 hours	Approx. 450 hours
	24 bit	Approx. 4 hours	Approx. 19 hours	Approx. 350 hours

The duration of recording with 24 bit becomes shorter than that with 16 bit because the data volume of 24 bit is about 1.5 times more.

Recall

Use the Recall item in the menu list screen to check saved measurement data (see the VM-56 Instruction Manual).



Menu list screen

Default settings

The factory default settings of the unit are listed below.

Displayed channel	Z axis
Range.....	0.001 m/s ² to 10 m/s ²
[System]	
Backlight Auto Off	30 s
Backlight brightness.....	2
LCD Auto off at Auto Store	OFF
Battery Type	Alkaline
Index.....	1
Eco Setting	OFF
[Store]	
Store mode.....	Manual
Store name	0000
Measurement Time	10 min
[Display / I/O]	
Time-Level graph Time Scale	20 s
AC Output.....	Acc. Inter lock
Comparator	OFF
Communication Interface.....	OFF
dB display	ON
[Measure]	
Band Weighting (Freq.).....	Non-Weighting
User Weighting (Band Only)(When Band Weighting(Freq.) is User Weighting)	0.00 dB
Band Weighting (Time).....	1 s
Freq. Weighting for Acc.....	Wm
Freq. Range for Vel. and Disp. (Building Damage)	1 Hz to 100 Hz
Freq. Range for Vel. (Human Exposure)	1 Hz to 80 Hz
Dominant Frequency Line	No Line
Delay Time	OFF
Standard.....	General
[WR] (When installing VX-56WR)	
Wave Rec Mode.....	OFF

When you turn power to the unit on while holding down the START/STOP key, the unit will be initialized to the above settings. When wishing to set the unit to the factory default values, select [menu list] → [System – Read/Save Setup File ▼] → [Load Default Settings] and then press the MENU/ENTER key (please refer to the chapter “Setup Files” of the VM-56 instruction manual). The time, language and store data are not initialized.

Communication commands

This section lists commands that are added to the Tri-axial Groundborne Vibration Meter VM-56 when the 1/3 octave real-time analysis program function is installed. For information on other commands, please refer to the instruction manual of the VM-56.

List of commands

S: Setting command (for making VX-56RT settings)

R: Request command (for obtaining information on VX-56RT status and the measurement results)

Command	Function	See page
Output Band	Output band characteristic (S/R)	25
Output Band Frequency	Output band frequency (S/R).....	25
Output Band Offset	Output band frequency offset (S/R) ..	26
DOD	Output displayed value (R)	27
DOD Calc	Output calculation value (R).....	29

Command description

Output Band

Output frequency characteristic

Setting output frequency characteristic

Setting command	Output _ Band, p1
Parameter	p1= "not-weighted" (In the case of VEL: Building Damage) p1= "Interlock" (In the case of VEL: Human Exposure) p1= "Band" (only RT mode)
Request command	Output _ Band?
Response data	d1
Returned value	Same as for setting command

Output Band Frequency

Output band frequency

Setting frequency band for BAND output of AC signal

Setting command	Output _ Band _ Frequency, p1
Parameter	p1= "1Hz" p1= "2Hz" p1= "4Hz" p1= "8Hz" p1= "16Hz" p1= "31Hz" p1= "63Hz" p1= "125Hz" p1= "250Hz"
Request command	Output _ Band _ Frequency?
Response data	d1
Returned value	Same as for setting command

Output Band Offset

Output band frequency offset

Setting output band offset

Divides the frequency of the output band into three values

Example: When the output band is set to “16Hz”, “Low” will be 12.5 Hz, “Center” 16 Hz, and “High” 20 Hz.

Setting command	Output □ Band □ Offset, p1
Parameter	p1= “Low” p1= “Center” p1= “High”
Request command	Output □ Band □ Offset?
Response data	d1
Returned value	Same as for setting command

DOD

Output displayed value

Getting displayed value

Send the request command at one second interval or longer.

Request command	DOD?	
Response data	d1, d2, ..., d320	
Returned value	d1 = "xxx.x"	Acc. of X channel (Inst value)
	d2 = "xxx.x"	P.P.V. of X channel (Inst value)
	d3 = "xxx.x"	D.F. of X channel (Inst value)
	d4 = "xxx.x"	Disp. of X channel (Inst value)
	d5= 0 or 1	Inst Overload information (1: Yes, 0: No)
	d6= 0 or 1	Inst Under-range information (1: Yes, 0: No)
	d7 = "xxx.x"	Acc. of X channel (Max hold value)
	d8 = "xxx.x"	P.P.V. of X channel (Max hold value)
	d9 = "xxx.x"	D.F. of X channel (Max hold value)
	d10 = "xxx.x"	Disp. of X channel (Max hold value)
	d11= 0 or 1	Max hold Overload information (1: Yes, 0: No)
	d12= 0 or 1	Max hold Under-range information (1: Yes, 0: No)
	d13 = "xxx.x"	P.P.V. of X channel (Calc value)
	d14 = "xxx.x"	D.F. of X channel (Calc value)
	d15 = "xxx.x"	Disp. of X channel (Calc value)
	d16 = "xxx.x"	Acc. of X channel (Calc value)
	d17 = "xxx.x"	C.F. of X channel (Calc value)
	d18 = "xxx.x"	MTVV of X channel (Calc value)
	d19 = "xxx.x"	VDV of X channel (Calc value)

d20 = "xxx.x"	KBFT or veff,max,30 of X channel (Calc value) (General Mode:KBFT value , SBR Mode: veff,max,30 value)
d21 = 0 or 1	Calc Overload information (1: Yes, 0: No)
d22 = 0 or 1	Calc Under-range information (1: Yes, 0: No)
d23 to d44 :	Y channel information (Same format as X channel)
d45 to d66 :	Z channel information (Same format as X channel)
d67 = "xxx.x"	P.V.S. (Tri axial combine value for P.PV.)
d68 = "xxx.x"	AP of X channel (Inst value)
d69 = "xxx.x"	AP of X channel (Calc value)
d70 = "xxx.x"	AP of X channel (Max value)
d71 = "xxx.x"	AP(W) of X channel (Inst value)
d72 = "xxx.x"	AP(W) of X channel (Calc value)
d73 = "xxx.x"	AP(W) of X channel (Max value)
d74 = "xxx.x"	1 Hz of X channel (Inst value)
d75 = "xxx.x"	1.25 Hz of X channel (Inst value)
	•
	•
d99= "xxx.x"	315 Hz of X channel (Inst value)
d100= "xxx.x"	1 Hz of X channel (Calc value)
d101 = "xxx.x"	1.25 Hz of X channel (Calc value)
	•
	•
d125= "xxx.x"	315 Hz of X channel (Calc value)
d126= "xxx.x"	1 Hz of X channel (Max value)
d127= "xxx.x"	1.25 Hz of X channel (Max value)

	•	
	•	
d151=	“xxx.x”	315 Hz of X channel (Max value)
d152 to d235 :		Y channel information (Band)
d236 to d319:		Z channel information (Band)
d320=	“xxx.x”	aw,i

* “xxx.x” is fixed at 5 digit length. Higher digits are padded with spaces as required.

There is no setting command.

DOD Calc

Output calculation value

Send the request command at one second interval or longer.

Request command	DOD Calc?	
Response data	d1, d2, ..., d320	
Returned value	d1 = “xxx.x”	Acc. of X channel (Inst value)
	d2 = “xxx.x”	P.P.V. of X channel (Inst value)
	d3 = “xxx.x”	D.F. of X channel (Inst value)
	d4 = “xxx.x”	Disp. of X channel (Inst value)
	d5= 0 or 1	Inst Overload information (1: Yes, 0: No)
	d6= 0 or 1	Inst Under-range information (1: Yes, 0: No)
	d7 = “xxx.x”	Acc. of X channel (Max hold value)
	d8 = “xxx.x”	P.P.V. of X channel (Max hold value)
	d9 = “xxx.x”	D.F. of X channel (Max hold value)
	d10 = “xxx.x”	Disp. of X channel (Max hold value)
	d11= 0 or 1	Max hold Overload information (1: Yes, 0: No)

d12= 0 or 1	Max hold Under-range information (1: Yes, 0: No)
d13 = "xxx.x"	P.P.V. of X channel (Calc value)
d14 = "xxx.x"	D.F. of X channel (Calc value)
d15 = "xxx.x"	Disp. of X channel (Calc value)
d16 = "xxx.x"	Acc. of X channel (Calc value)
d17 = "xxx.x"	C.F. of X channel (Calc value)
d18 = "xxx.x"	MTVV of X channel (Calc value)
d19 = "xxx.x"	VDV of X channel (Calc value)
d20 = "xxx.x"	KBFT or veff,max,30 of X channel (Calc value) (General Mode:KBFT value , SBR Mode: veff,max,30 value)
d21 = 0 or 1	Calc Overload information (1: Yes, 0: No)
d22 = 0 or 1	Calc Under-range information (1: Yes, 0: No)
d23 to d44 :	Y channel information (Same format as X channel)
d45 to d66 :	Z channel information (Same format as X channel)
d67 = "xxx.x"	P.V.S. (Tri axial combine value for P.P.V.)
d68 = "xxx.x"	AP of X channel (Inst value)
d69 = "xxx.x"	AP of X channel (Calc value)
d70 = "xxx.x"	AP of X channel (Max value)
d71 = "xxx.x"	AP(W) of X channel (Inst value)
d72 = "xxx.x"	AP(W) of X channel (Calc value)
d73 = "xxx.x"	AP(W) of X channel (Max value)
d74 = "xxx.x"	1 Hz of X channel (Inst value)
d75 = "xxx.x"	1.25 Hz of X channel (Inst value)
	•
	•
d99= "xxx.x"	315 Hz of X channel (Inst value)

d100= “xxx.x”	1 Hz of X channel (Calc value)
d101 = “xxx.x”	1.25 Hz of X channel (Calc value)
•	
•	
d125= “xxx.x”	315 Hz of X channel (Calc value)
d126= “xxx.x”	1 Hz of X channel (Max value)
d127= “xxx.x”	1.25 Hz of X channel (Max value)
•	
•	
d151= “xxx.x”	315 Hz of X channel (Max value)
d152 to d235 :	Y channel information (Band)
d236 to d319:	Z channel information (Band)
d320= “xxx.x”	aw,i

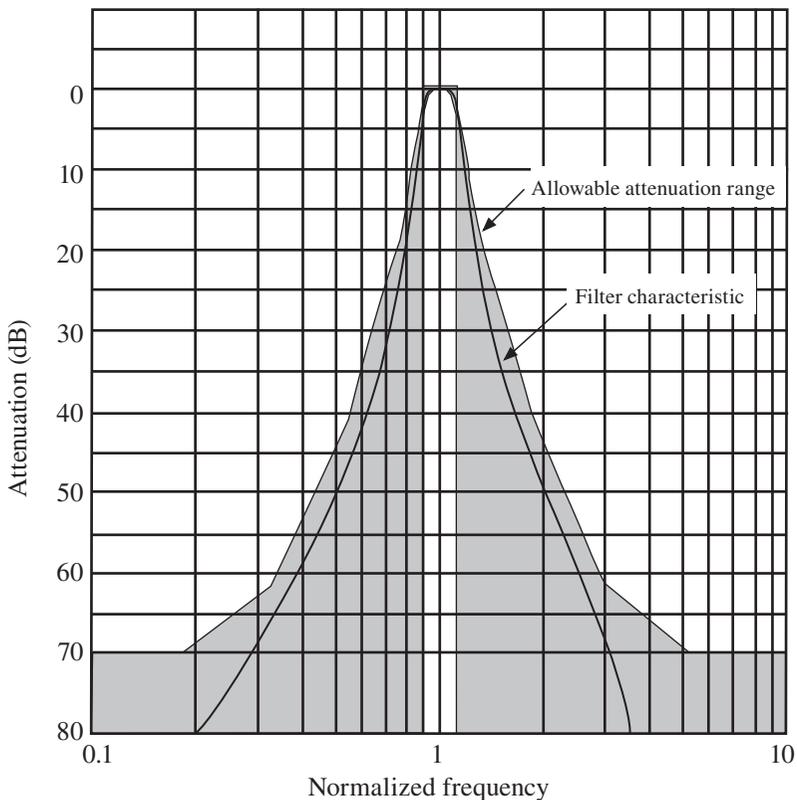
Reference information

1/3 Octave band filter characteristics

The characteristics of the octave and 1/3 octave band filter in the VX-56RT correspond to the IEC 61260: 2014 class 1.

1/3 Octave band filter characteristics

The graph below shows the allowable attenuation tolerance according to IEC, and the actual characteristics of the octave band filter in the VX-56RT.



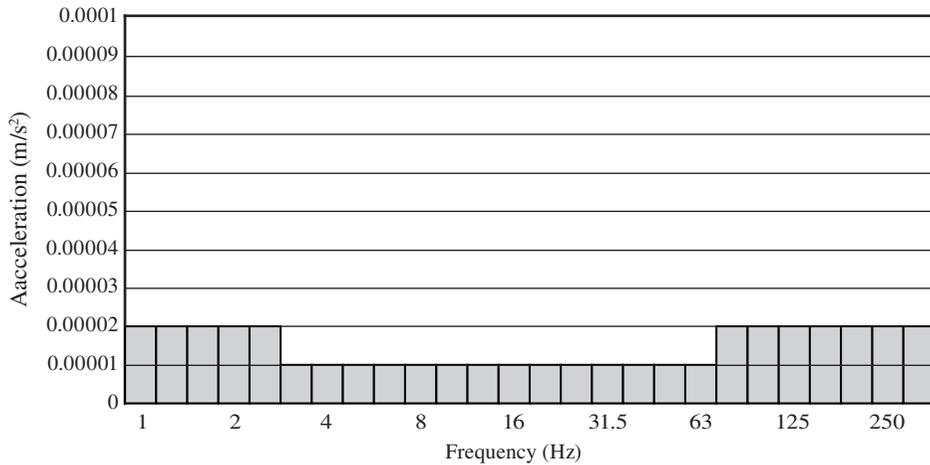
Frequency ratio f/f_c (f : Frequency, f_c : Center frequency at 31.5 Hz)
Attenuation tolerance according to IEC 61260:2014 class 1 and
1/3 octave band filter characteristics of VX-56RT

Noise floor

Indicates the residual noise of the unit.

Band limit filter is 0.5 ~ sensor-dependent.

The result of using the octave band-pass filter for frequency analysis is shown below.



Freq. range for Acc.

Lower limit: 0.5 Upper limit: Sensor dependent

Range: 1

Battery life

Important

Battery life varies depending on the setting of this unit.
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Examples of the battery life when measuring continuously

20 hours

Operating condition:

- The PV-83D is connected to the VX-56RT
- Eco setting is ON
- Inst store interval is OFF
- Calculation interval is 1 min

Specifications

Compatible model	Tri-axial Groundborne Vibration Meter VM-56
Applicable standards	IEC 61260-1: 2014 (0.5 Hz ~ Sensor dependent only) CE marking
Media	SD memory card 512 MB
Measurement function	Tri-axis simultaneous measurement supported
Frequency range	1 Hz to 315 Hz (26 bands)
Residual noise (AP value)	Vibration acceleration 0.0001 m/s ² or less Range 1 (1 m/s ² range, no weighting, measurement frequency range 1 Hz to 80 Hz)
Frequency correction	No weighting (Common band limit filter for ISO and DIN / SBR band limit filter) VM-56 (Vibration acceleration/velocity/displacement): No weighting, Wb, Wd, Wm characteristics VX-56RT (acceleration only): No weighting, Wb, Wd, Wm characteristics, user weighting (band limits fixed to 0.5 Hz ~ sensor-dependent)
1/3 octave band analysis	Time weighting Calc Maximum acceleration value Calc Max Band OA tri-axial synthesis value (linear value) aw,i aw,i maximum value hold Law * “Law” is for display only, not stored as data
Measurement range	2 switchable ranges, separate for 3 axes: 0.001 m/s ² to 10 m/s ² 0.0001 m/s ² to 1 m/s ²

RMS detection circuit

Digital processing method

Time constant 1 s, 125 ms

Band time constant can be selected from menu

Time constant setting affects band values but not AP, AP(W) values. Time constant cannot be set individually for bands (affects all bands)

Sampling frequency 2 kHz

Store mode Three store modes: Manual, Auto, and Timer Auto

Manual Measurement results stored with measurement start time in one memory address

Data stored either in internal memory or on SD card

Internal memory allows storage of up to 1,000 data sets (data for 3 axes are one set). Number of data sets that can be stored on SD card depends on card capacity

Processing value store

Various processing values obtained in manual mode are stored

Auto Continuous storing of various types of processing results for each calculation cycle

Data stored on SD card (Internal memory cannot be used)

Available store types are instantaneous store and calculation store

For instantaneous store, Acc.rms data are stored every 100 ms. For calculation store, various evaluation values are stored for every calculation cycle

Timer auto Various calculated values are continuously recorded for each store cycle at the set measurement start / stop time

Sleep function (power save mode until measurement start) available

Data stored on SD card (Internal memory is not used)

Available store types are instantaneous store and calculation store

	For instantaneous store, Acc.rms data are stored every 100 ms. For calculation store, various evaluation values are stored for every calculation cycle
Measurement time (for manual store mode)	Processing measurement in preset time possible 10 s 30 s, 1 min, 5 min, 10 min, 15 min, 1 h, 8 h, 24 h, User setting (1 s to 59 s, 1 m to 59 m, 1 h to 24 h) Up to 24 h
Total measurement time (for Auto / Timer Auto mode)	Processing measurement in preset time possible 10 s 1 min, 5 min, 10 min, 15 min, 30 min, 1 h, 8 h, 24 h, User setting (1 s to 59 s, 1 m to 59 m, 1 h to 24 h) * For KB_{FT} and $v_{eff,max,30}$, the $v_{eff,max,30}$ calculation cycle is fixed to 30 seconds, and user settings are not displayed
Data recall	Store data name and time browsing, and waveform yes/no check are possible
Setting memory	Up to 5 sets of settings can be stored in internal memory and on SD card, for later recall. VX-56RT provides a setting memory function separate from VM-56 Startup with settings stored in a file on the SD card is possible
Signal output	2.5 mm dia. output jacks, 3 separate channels
AC output	Output impedance: 600 Ω Load impedance: 10 k Ω or more AC output: 1 Vrms (full-scale) Frequency weighting for instantaneous value display and for AC output can be set separately Frequency range: 0.5 Hz to 315 Hz AC OUT available for VM-56 or for one specified band (same for 3 axes). Band selection range: 1 Hz to 315 Hz (in 1/3 octave steps) * User-weighted output not supported

User weighting	User weighting possible for any band from 1 Hz to 315 Hz Weighting can be specified individually for 3 axes Weighting range: +3.00 dB to -70.00 dB Measurement target is acceleration only When user weighting is selected, bandwidth is fixed as follows Lower limit: 0.5 Hz Upper limit: sensor-dependent (to prevent duplicated band limitation)
Power requirements	Eight AA batteries or external power supply When both are available, external power supply has priority
Battery life	At least 20 hours of continuous operation When using auto store: LCD off, AC OUT off * Calculation cycle: 10 min
AC adapter	NC-98 series (100 V to 240 V AC) * NC-98C or later Factory default settings: approx. 8 VA (using NC-98C at 220 V AC)
External power supply	5 V to 7 V (rated voltage 6 V)
Current consumption	Approx 100 mA (12 V DC, Eight batteries) With factory default settings AC OUT: ON
Ambient conditions for use	-20°C to +50°C, 90 % RH or less (no condensation)
Ambient conditions for storage	-20°C to +50°C, 90 % RH or less (no condensation)
Dimensions	32 mm (H) × 24 mm (W) × 2.1 mm (D) (maximum)
Weight	Approx. 5 g
Supplied accessories	Inspection certificate 1



This product is environment-friendly. It does not include toxic chemicals on our policy.