

# INSTRUCTION MANUAL

Vibration Level Meter

## VM-55

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This manual describes about the Vibration Level Meter VM-55 in which the optional Extended Function Program VX-55EX was installed. When the VX-55EX is installed, the following function is added to the VM-55.

- Comparator output
- Auto / Timer Auto store
- Continuous data output by serial interface
- Installation of various optional program

## Organization of this manual

This manual describes the features, operation and other aspects of the vibration level meter VM-55. If the unit is used together with other equipment to configure a measurement system, consult the documentation of all other components as well. Pages iii and following contain important information about safety. Be sure to read and observe these in full.

This manual contains the following sections.

### Outline

Gives basic information on the configuration and features of the unit, and contains a block diagram.

### Controls and features

Briefly identifies and explains all parts of the unit.

### Preparations

Describes power supply and pre-use checks, installation, connections, key settings, and other steps.

### Reading the display

Explains symbols and other information shown on the display of the unit.

### Measurement

Describes the steps for measurement.

## Store Operations

Explains how to store measurement data.

## Card capacity and store time

Lists the data store time corresponding to the SD memory card capacity, etc.

## Input/output connectors

Explains the input and output connectors of the unit.

## Default Settings

Lists the factory default settings of the unit.

## Setup Files

Explains how to start up the unit using settings saved in a setup file.

## Optional Accessories

Explains how to use the optional extension cord, printer, and level recorder with the unit.

## Serial Interface

Describes how to use the internal serial interface for connection to a computer, to control measurement parameters and export measurement data.

## Reference Information

Lists the battery life and INPUT connector.

## Description for JIS C 1517

Lists the information materials corresponding to JIS C 1517.

## Specifications

Lists the technical specifications of the unit

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# FOR SAFETY

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

<b>⚠ WARNING</b>	Disregarding instructions printed here incurs the risk of death or severe injury to persons.
•	

<b>⚠ Caution</b>	Disregarding instructions printed here incurs the risk of injury to persons and/or damage to peripheral equipment.
•	

<b>Important</b>	Disregarding instructions printed here incurs the risk of damage to the product.
•	

	Indicates a prohibited action. This information is given to prevent accidents and ensure safe use of the unit.
•	



<b>Note</b>	Additional information about using the unit. (These notes do not directly affect safety.)
•	

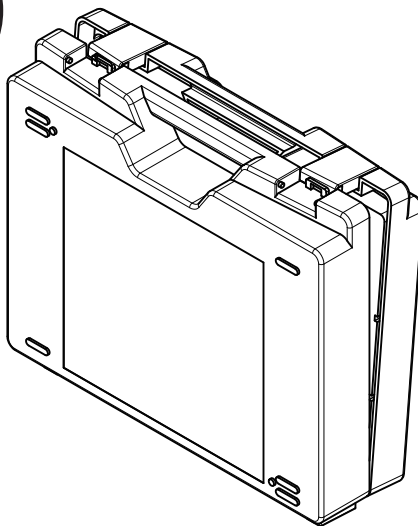
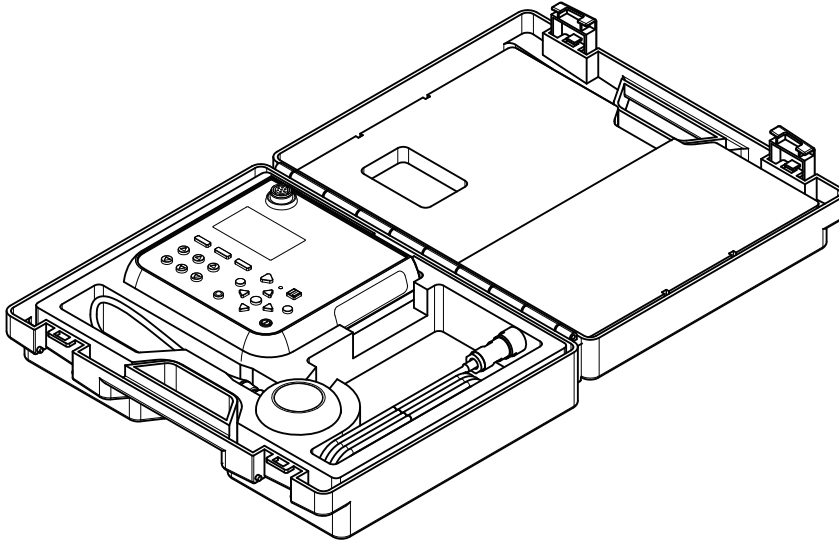
# Precautions

- Operate the unit only as described in this manual.
- Take care not to drop the unit, and protect it from shocks and vibrations.
- Take care not to drop the accelerometer, and protect it from shocks.
- Ambient conditions for operation of the unit are as follows: temperature range  $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ , relative humidity up to 90%RH.  
Protect the unit from water, dust, extreme temperatures, humidity, and direct sunlight during storage. Also keep the unit away from air with high salt or sulphur content, gases, and stored chemicals during storage and use.
- Always turn the unit off after use. Remove the batteries from the unit if it is not to be used for a long time. Otherwise battery fluid may leak, posing a risk of corrosion and damage.
- When disconnecting cables, always grasp the plug and do not pull the cable.
- Store this unit in the right place in the supplied storage case.
- Clean the unit only by wiping it with a soft, dry cloth or, when necessary, with a cloth lightly moistened with water. Do not use any solvents, cleaning alcohol or chemical cleaning agents.
- Do not tap the LCD panel or other surfaces of the unit with a pointed object such as a pen, pencil, screwdriver, etc.
- Take care that no conductive objects such as wire, metal scraps, conductive plastics etc. can get into the unit.
- Do not try to disassemble or alter the unit. In case of an apparent malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.

- In order to maintain the “water and dust resistant performance” of the unit, observe the following precautions.
  - Make sure that the battery compartment lid, the side cover and the top cover of the unit are firmly closed.
  - Do not open the battery compartment lid while the unit is wet.
  - Do not leave the unit in a wet state. Always wipe off any moisture and properly dry the unit.
  - Have the unit regularly checked and calibrated, to ensure continued “water and dust resistant performance”.
  - We recommend to have the packing inside the case, the side cover and the top cover replaced regularly (fare-paying service). The recommended replacement cycle is two years. If more than two years have elapsed, the “water and dust resistant performance” of the unit will no longer be guaranteed. Regarding replacement of the packing, the side cover and the top cover, please contact your supplier.
- The life of the backup battery for the internal clock of the unit is limited. You should have the battery replaced about once every two years. Regarding replacement of the battery, please contact your supplier.
- Please note that this product is warranted up to the product purchase price against defects in material.
- Never format optional program cards such as the VX-55EX and VX-55WR 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.
- Dispose of the unit and of batteries only according to national and local regulations at the place of use.

# Precautions for opening the case

Before opening the case and removing any equipment, place the case on sturdy, flat table or on the floor. Then open the case fully as shown below.



Never open the case while it is standing upright. Otherwise equipment may fall out, possibly causing damage and accidents.



This product can be used in any areas including residential areas.

To conform to the EU requirement of the Directive on Waste Electrical and Electronic Equipment, the symbol mark on the right is shown on the instrument.



이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

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# Outline

The VM-55 is a vibration level meter compliant with the requirements of the Measurement Act and of the Japanese Industrial Standards for Vibration Level Meters (JIS C 1510:1995, JIS C 1517:2014).

The unit is designed mainly for measuring ground vibrations in order to evaluate vibration pollution. It can measure vibration levels in the vertical and horizontal plane and display values weighted according to human vibration sensitivity characteristics. The system consists of the main unit and the 3-axis accelerometer PV-83C.

The VM-55 is equipped to measure the vibration level and vibration acceleration level as well as the time percentile level, equivalent continuous level, maximum and minimum value in three axis. Measurement results data are stored on the internal memory or inserted SD memory card of the unit.

By installing the Extended Function Program VX-55EX, functions such as automated long-term continuous data recording on SD memory card and comparator output can be added. Installing the Waveform Recording Program VX-55WR provides support for waveform recording and installing the 1/3 Octave Real-time Analysis Program VX-55RT provides support for 1/3 octave real-time analysis.

Separate X, Y, Z outputs can be connected to a level recorder, analyzer, or data recorder. Communication with a computer is possible via the built-in I/O connector and USB connector. Because the USB connector conforms to storage specifications, the unit will be recognized as a removable disk when connected to a computer.

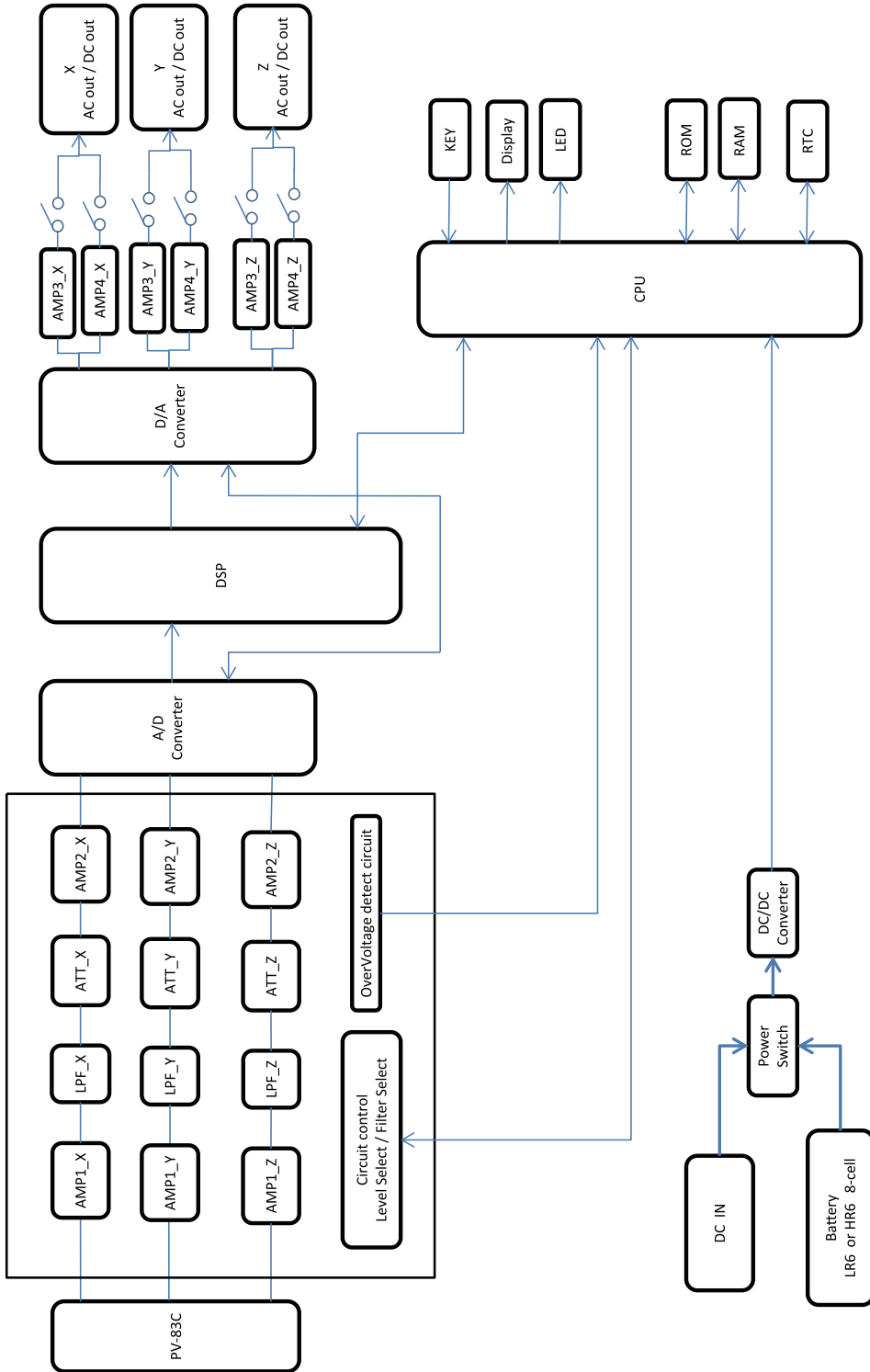
The RS-232C interface allows sending measurement data to a printer.

The unit is designed for power saving, so operates continuously for up to 24 hours on eight size AA batteries.

Also, in consideration of environment, nickel metal hydride rechargeable batteries can be used to help reduce the amount of battery waste.

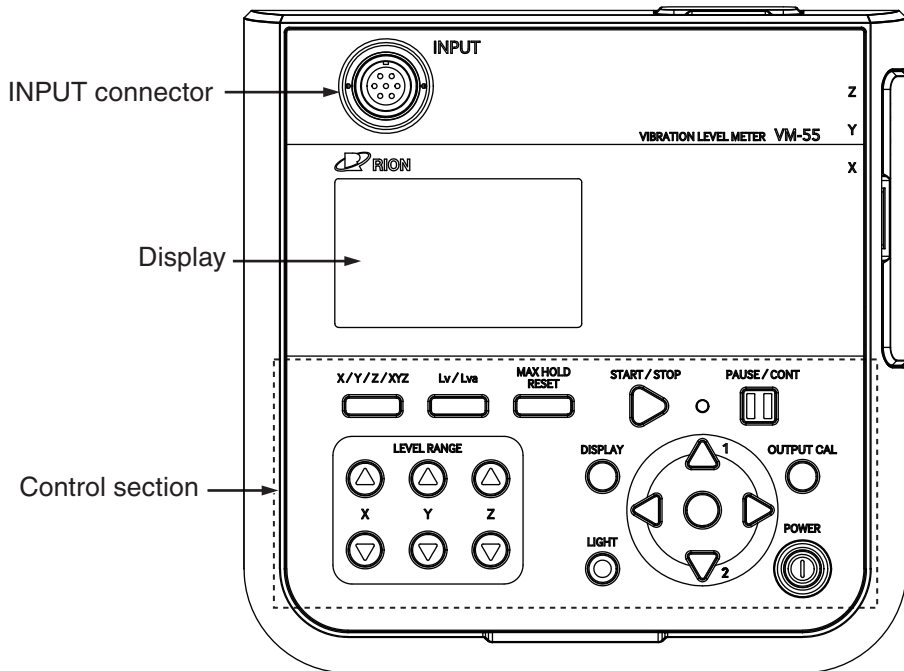
And the unit can be connected the external power supply for the long time measurement.

# Block diagram



# Controls and features

## Front view



### INPUT connector

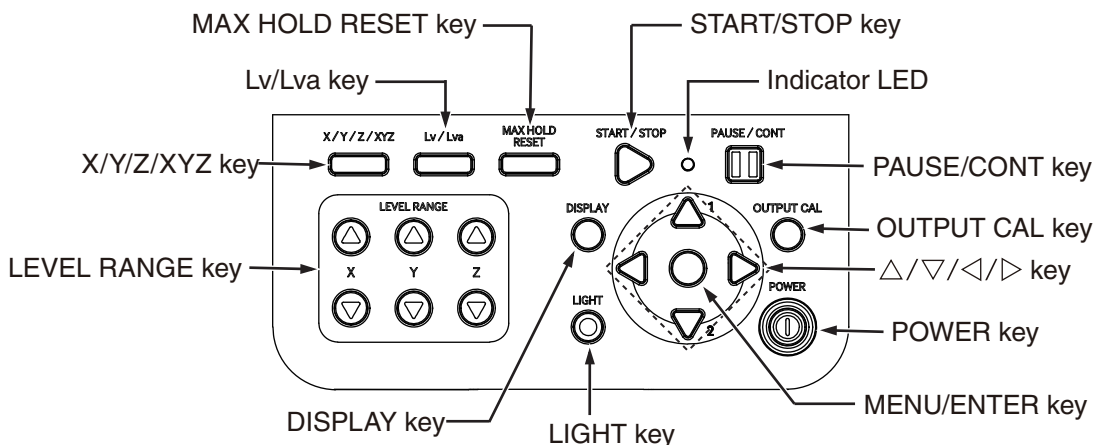
The 3-axis accelerometer PV-83C is to be connected here, using the supplied EC-54S cord. If the accelerometer is to be installed at a greater distance, optional extension cord can also be used.

### Display

The display of the unit is a backlit LCD panel. It shows the measured vibration level and vibration acceleration level as a numeric indication, as a bar graph and as a time-level graph. "--." is shown when the indicated value is  $-10$  dB or lower.

It also indicates the operation status of the unit and shows measurement parameters as well as warning indications and other information.

## Control section



### LEVEL RANGE keys

These keys control the level range for the X, Y, Z axis.

The  $\triangle$  key switches the level range up, and the  $\nabla$  key switches the level range down.

The following six settings are available: [0 to 70], [10 to 80], [20 to 90], [30 to 100], [40 to 110], [50 to 120]

### X/Y/Z/XYZ key

Switches the vibration axis to be shown on the display.

With each push of the key, the display cycles through the settings in the order  $X \rightarrow Y \rightarrow Z \rightarrow XYZ \rightarrow X$  etc.

### Lv/Lva key

Switches between vibration level ( $L_v$ ) and vibration acceleration level ( $L_{va}$ ).

### MAX HOLD RESET key

Resets the value of the max hold function.

### START/STOP key

Serves to start / stop processing for the following functions:

Equivalent continuous level ( $L_{eq}$ )

Time percentile level ( $L_5, L_{10}, L_{50}, L_{90}, L_{95}$ )

Maximum value ( $L_{max}$ )

Minimum value ( $L_{min}$ )



## Indicator LED

Lights/flashes in red or blue to indicate the operation or status of the unit.

## PAUSE/CONT key

Press the key to pause measurement (processing), and press the key again to resume measurement (processing).

During pause in manual processing, the indicator LED flashes in blue.

Note
The PAUSE key does not function while the store mode is Auto or Timer Auto (when the optional VX-55EX is installed).

## OUTPUT CAL key

This key serves for level matching between the unit and peripheral equipment.

## △/▽/◀/▶ keys

These four keys serve for selecting and setting items on menu screens.

## POWER key

Turns power to the unit on and off. The key must be held down for at least 2 seconds to take effect.

## MENU/ENTER key

Press this key to make or finalize the setting of an item in a menu or any other setting.

When the key is pressed at the measurement screen, the menu list screen comes up.

## LIGHT key

This key turns on the display backlight, for easier reading in a dark location. Press the key again to turn the backlight off.

When the automatic light out function was selected from the menu, the backlight will turn itself off automatically after the preset time (see page 34).

Also press this key when you want to check the measurement settings in power-saving standby condition (see page 61).

## DISPLAY key

This key switches measurement screen display.

Each push of the key cycles through the settings in the following order:  
Measurement screen → Max Hold screen → Processed data screen →  
Time-level screen → Measurement screen

In addition, this key is used to bring up an explanation of the item on the screen by the help system.

## Key lock

Pressing the ◁ and ▷ keys together activates the key lock. A lock symbol appears in the bottom left corner of the display (see page 44), and the operation keys except for the LIGHT key are disabled.

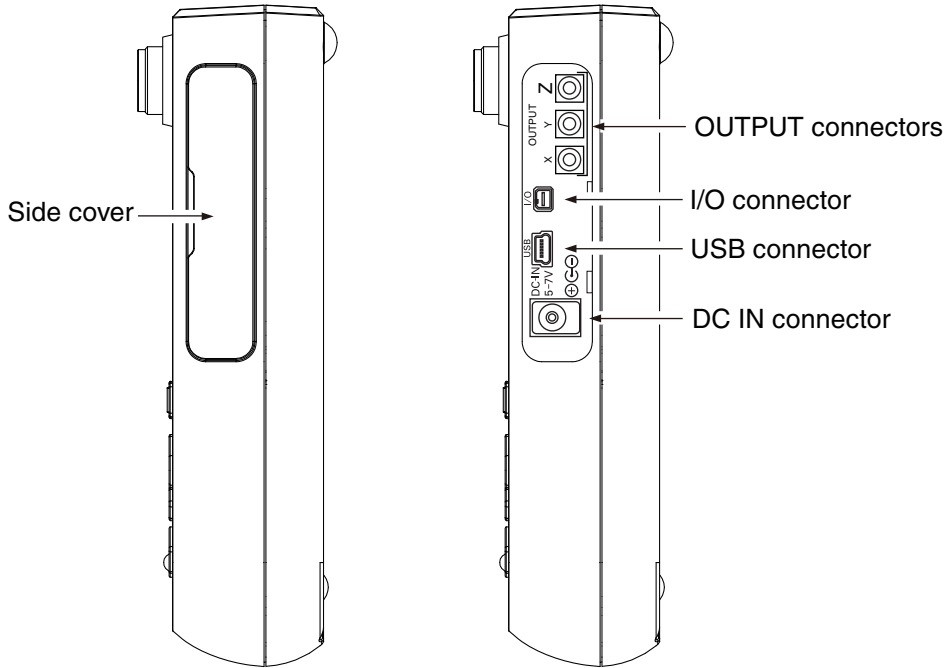
If a key other than the LIGHT key is pressed, a key lock indication appears.

Pressing the ◁ and ▷ keys together once more cancels the key lock.

To turn the unit off, you must first cancel the key lock and then hold down the POWER key.

The key lock does not function on the menu list screen and calibration screen.

## Right side view



### Side cover

This cover protects the connectors on the right side during transport or storage. Removing the cover gives access to the connectors shown above.

#### **Important**

To keep the water and dust resistant performance, close tightly the side cover of the unit.

### OUTPUT connectors

These are BNC connectors which carry the output signal for the X, Y, and Z axis.

An AC signal corresponding to frequency weighting or a DC signal corresponding to vibration level is output here.

The [Display/ I/O] on the menu list screen allows selection of alternating current (AC) or direct current (DC) output.

### I/O connector

Serves for RS-232C connection (including printer) or a comparator signal is output here.

## USB connector (mini B)

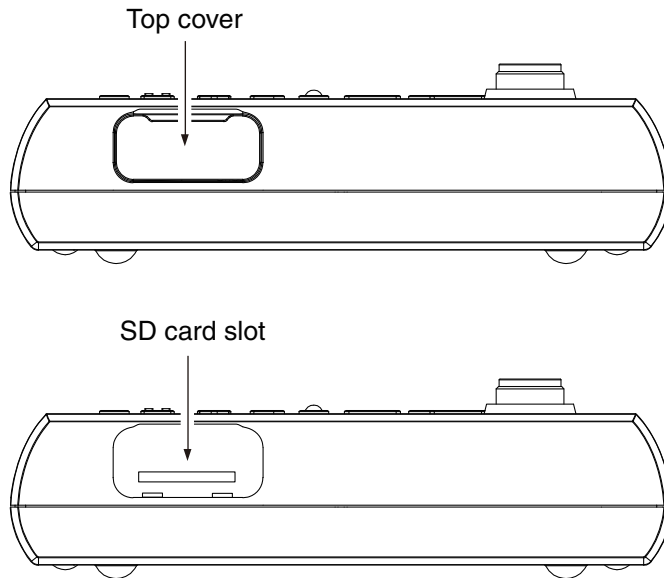
Serves for connection to a computer.

## DC IN connector

The optional AC adapter NC-98 series can be connected here for powering the unit from an AC outlet (100 V to 240 V AC ). The optional battery pack BP-21A can also be connected here.

<b>Important</b>
To prevent the risk of damage, do not use any AC adapter and battery pack other than the specified type.

## Top view



### Top cover

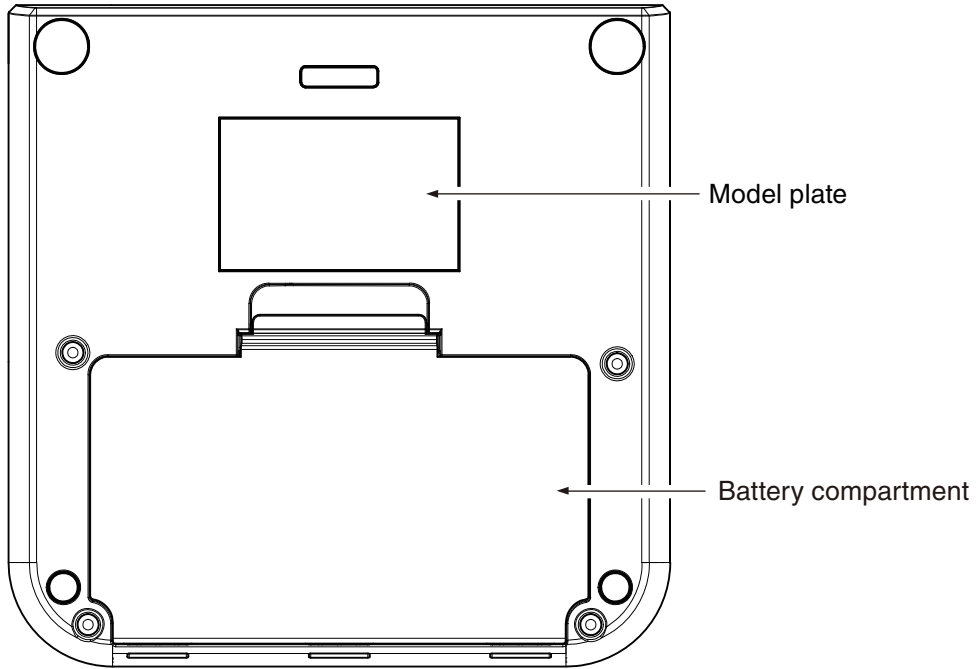
This cover protects the connectors on the top during transport or storage. Removing the cover gives access to the connectors shown above.

<b>Important</b>
To keep the water and dust resistant performance, close tightly the top cover of the unit.

### SD card slot

The SD memory card can be inserted in this slot.

## Bottom view



### Name plate

Shows the serial number of the unit and the accelerometer as well as the manufacturing date of the unit and other information.

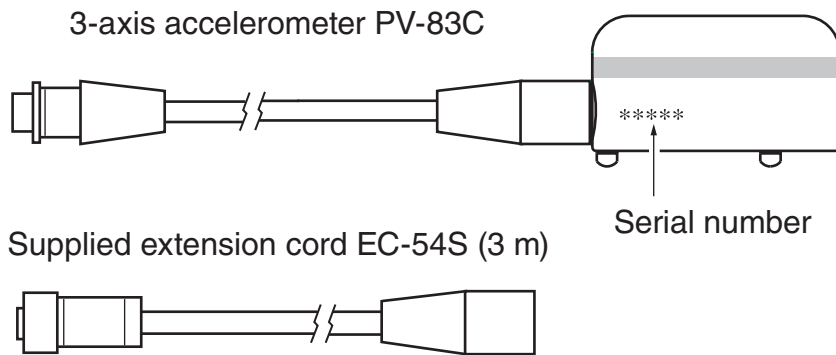
### Battery compartment

Eight batteries (IEC R6, size AA) are inserted here. The [power-on mode] switch is in the battery compartment (see page 18).

## Accelerometer and extension cord

For measurement, the 3-axis accelerometer PV-83C is required. Plug one end of the supplied EC-54S cord into the accelerometer and plug the other end into the INPUT connector on the unit.

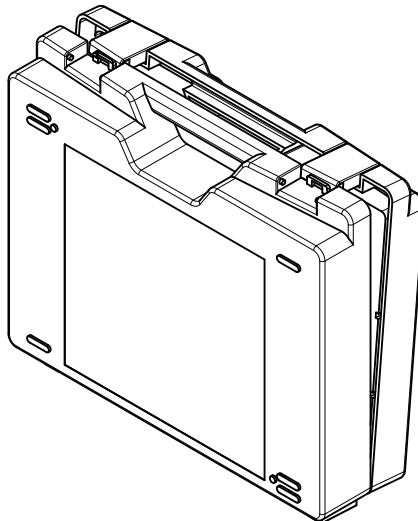
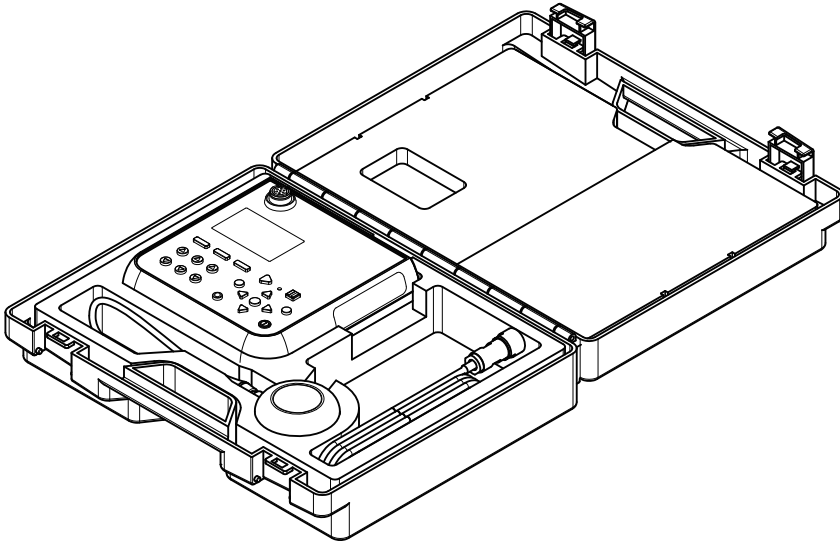
For more information, see the section on accelerometer placement and connection in “Preparations” on page 19.



# Preparations

## Removing the equipment from the case

Before opening the case and removing any equipment, place the case on sturdy, flat table or on the floor. Then open the case fully as shown below.



### **⚠ Caution**

Never open the case while it is standing upright. Otherwise equipment may fall out, possibly causing damage and accidents.



## Power

The unit can be powered by eight IEC R6, size AA batteries (alkaline, rechargeable nickel metal-hydride), the optional AC adapter NC-98 series, and the optional battery pack BP-21A.

Rechargeable nickel metal-hydride batteries can be used, but the unit does not have a facility for charging the batteries.

### **⚠ WARNING**

If the unit is heated during use or the unit produces smoke or smell of burning, immediately remove the batteries from the unit or disconnect the AC adapter plug from the outlet, and then contact your supplier.

### Note

When the AC adapter is connected, the unit will be powered from the adapter, also when batteries are inserted. (The AC adapter has priority.)

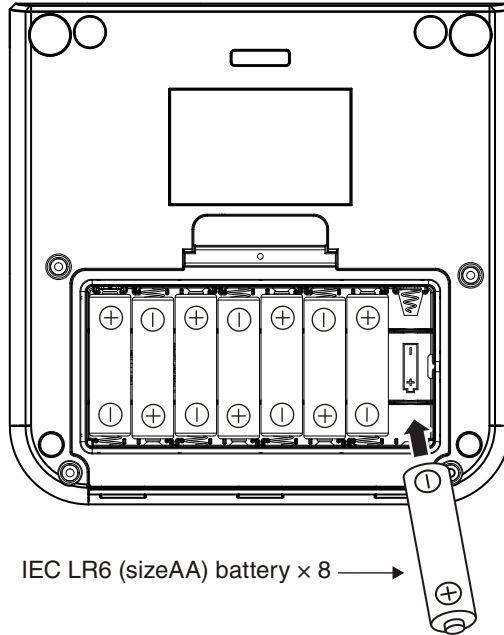
In case of a power failure or other interruption of AC power, the unit will automatically switch to battery power and continue operation.

When the unit is operated on only AC adapter or BP-21A, the file auto close function and auto shutdown function will not be executed. We recommend that new batteries be set in the unit.

When using the AC adapter NC-98 series, the unit responds to the momentary stop up to 50 ms.

## Inserting the batteries

1. Remove the battery compartment lid as shown below.
2. Insert eight IEC LR6, size AA batteries, paying attention to the polarity as indicated in the compartment.
3. Replace the cover.



### **⚠ Caution**

Take care not to reverse the (+) and (-) polarity when inserting the batteries. Incorrect setting of the batteries may cause battery explosion and leakage.

To prevent the risk of battery fluid leakage, remove the batteries from the unit when the unit is not used.

If the fluid from inside the battery sticks to your skin or clothing, wash it off immediately with clean water.

### **Important**

Always replace all eight batteries together. To prevent the risk of damage, do not mix old and new batteries or batteries of different type.

The life of a set of batteries is shown below when the VX-55EX is installed, Eco setting is ON,  $L_{eq}$  calculation interval is 10 min, and  $L_v$  store interval is OFF.

Battery life (at 23°C)	Alkaline batteries	LR6	27 hours
	Nickel metal-hydrde batteries		27 hours

The battery life shortens by 5 % to 50 % when the display backlight continuously ON (different according to the backlight brightness setting).

When either AC OUT or DC OUT is ON, battery life will be about 25 % shorter (see pages 105 to 109).

When auto store is used, battery life will be 20% to 40 % shorter.

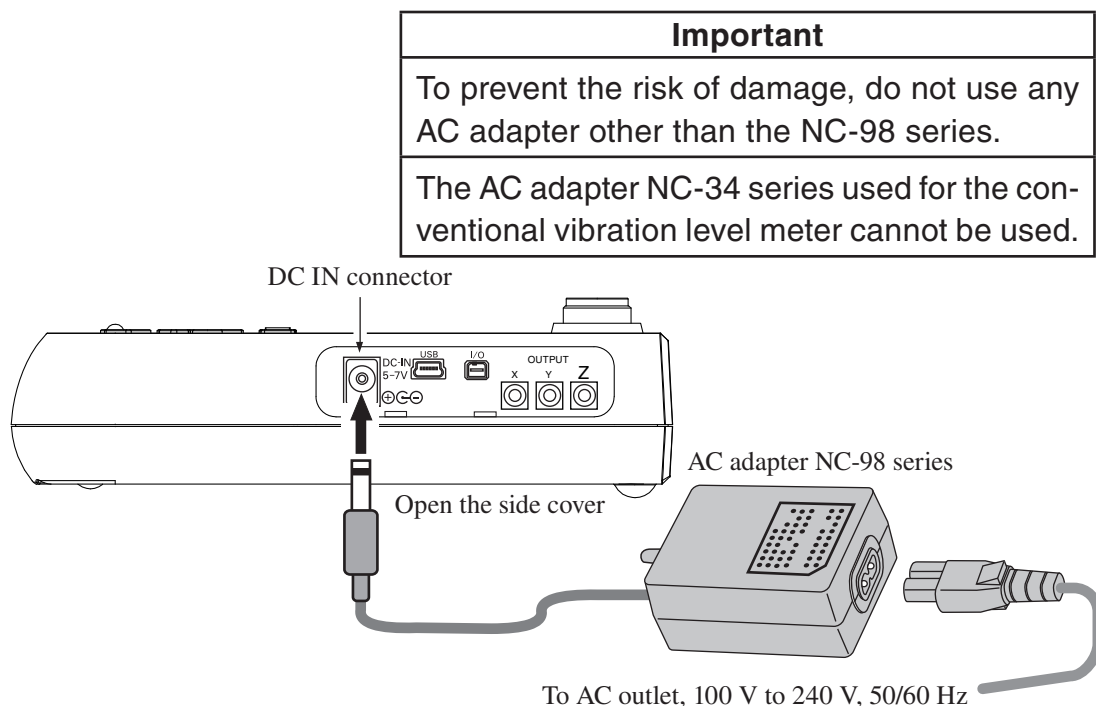
Battery life may also be shorter when the program option is operating.

<b>Important</b>
The rechargeable nickel metal-hydrde battery is not charged by the VM-55.
Select the used battery type by the [System (Language)] on the menu list screen (see page 56).

<b>Note</b>
The life of rechargeable nickel metal-hydrde battery depends on the battery type and charge condition.
In the factory default condition, OUTPUT is set to "ON". To extend the battery life, select [System (Language)] from the menu list screen and set [Eco Setting] (see page 36), or select [Display / I/O] and set the OUTPUT to "OFF" (see page 105).

## AC adapter

To operate the unit with the AC adapter, connect it as shown below.



## Backup battery

The unit uses a backup battery (rechargeable battery) to operate the clock.

While power to the unit is on, the backup battery will be charged. It will also be charged while power to the unit is off if external power is connected.

The relationship between charging time and retention period is shown below.

A full charge of the backup battery is achieved after 24 hours.

Charging time	Retention period
1 hour	2 days
12 hours	30 days
24 hours	45 days

Use the AC adapter when connecting external power for battery charge while the unit is turned off. The service life of the backup battery is limited. You should have the battery replaced about once every two years. Please contact your supplier.

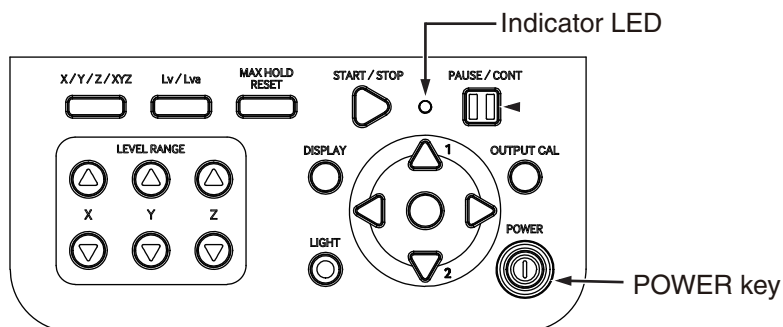
<b>Note</b>
The charging time, retention period and service life of the backup battery may vary depending on the operating condition.
When the backup battery is old, the retention period will be shorter.

## Power on/off

### To turn the unit on

Hold down the POWER key until the power-on screen appears (at least 2 seconds). When the screen is shown, release the POWER key. After the unit has been started, the measurement screen appears.

During start up, the indicator LED flashes red → blue → red → ...



### To turn the unit off

Hold down the POWER key until the unit is turned off (several seconds). When the power-off screen appears, release the POWER key.

#### Important

Remove the batteries from the unit if it is to be stored for a long time with the POWER key set to OFF to prevent possible damage caused by battery leakage, and disconnect the AC adapter or battery pack BP-21A.

#### Note

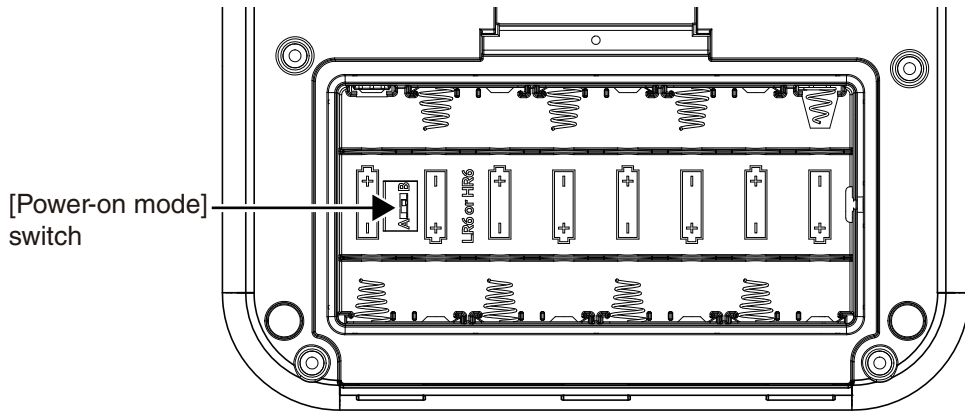
After turning the unit off, wait at least 10 seconds before turning it on again.

If the key lock has been activated, pressing the POWER key has no effect. Press the ◁ key and ▷ key simultaneously to cancel the key lock condition, and then press the POWER key.

If the key lock has been activated, pressing and holding the POWER key for at least 10 seconds will force a power-down even if the Power-on mode switch (see next page) has been set to the “B” position. In this case, the unit can be turned on again by pressing the POWER key, but you should wait at least 10 seconds before doing so.

## Power-on mode switch

Opening the battery compartment as shown below gives access to a switch labeled “A-B”. Normally the “A” position is used. Setting this switch to the “B” position allows the unit to be turned on simply by supplying power to the DC IN connector. In this case, the POWER key on the operation key panel of the unit has no effect.



### Important

When using the unit with the switch in the “B” position, do not insert batteries.

If the unit is turned off immediately after changing the setting while using the unit with the switch in the “B” position, the setting may not be resumed. After changing the setting, wait at least 10 seconds before turning the unit off.

## Accelerometer placement and connection

### Vibration axis

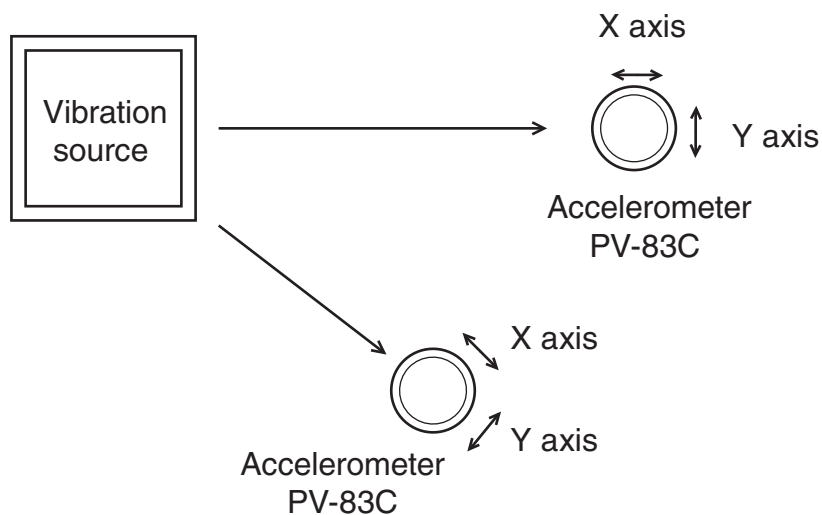
Environmental vibrations are normally measured in two horizontal planes (front/back and left/right) and one vertical plane. This means that complex vibration phenomena are reduced to three axes (X, Y, Z), for easier observation.

The axes are defined as follows (facing the vibration source).

Horizontal front/back: X

Horizontal left/right: Y

Vertical: Z



#### Note

In the horizontal plane, the X axis and Y axis will be reversed when seen centered on the movement direction of the vibration source.

## Accelerometer placement

### On hard surfaces

On hard surfaces such as concrete, asphalt, wood, or solid ground, choose a level area and place the accelerometer carefully on the surface.

### On soft surfaces

For measurements on soft ground, you should first harden the surface, for example by treading the ground with your feet. For measurements on a grassy surface, the grass should be cut first. Then place the accelerometer on the ground and push it slightly into the surface.

Extremely soft surfaces such as sand, or thick carpeting within buildings should be avoided.

<b>Important</b>
Avoid locations exposed to direct sunlight or to drastic temperature changes. Such conditions can cause changes in accelerometer sensitivity, which will impair the accuracy of measurement results.

## Accelerometer connection

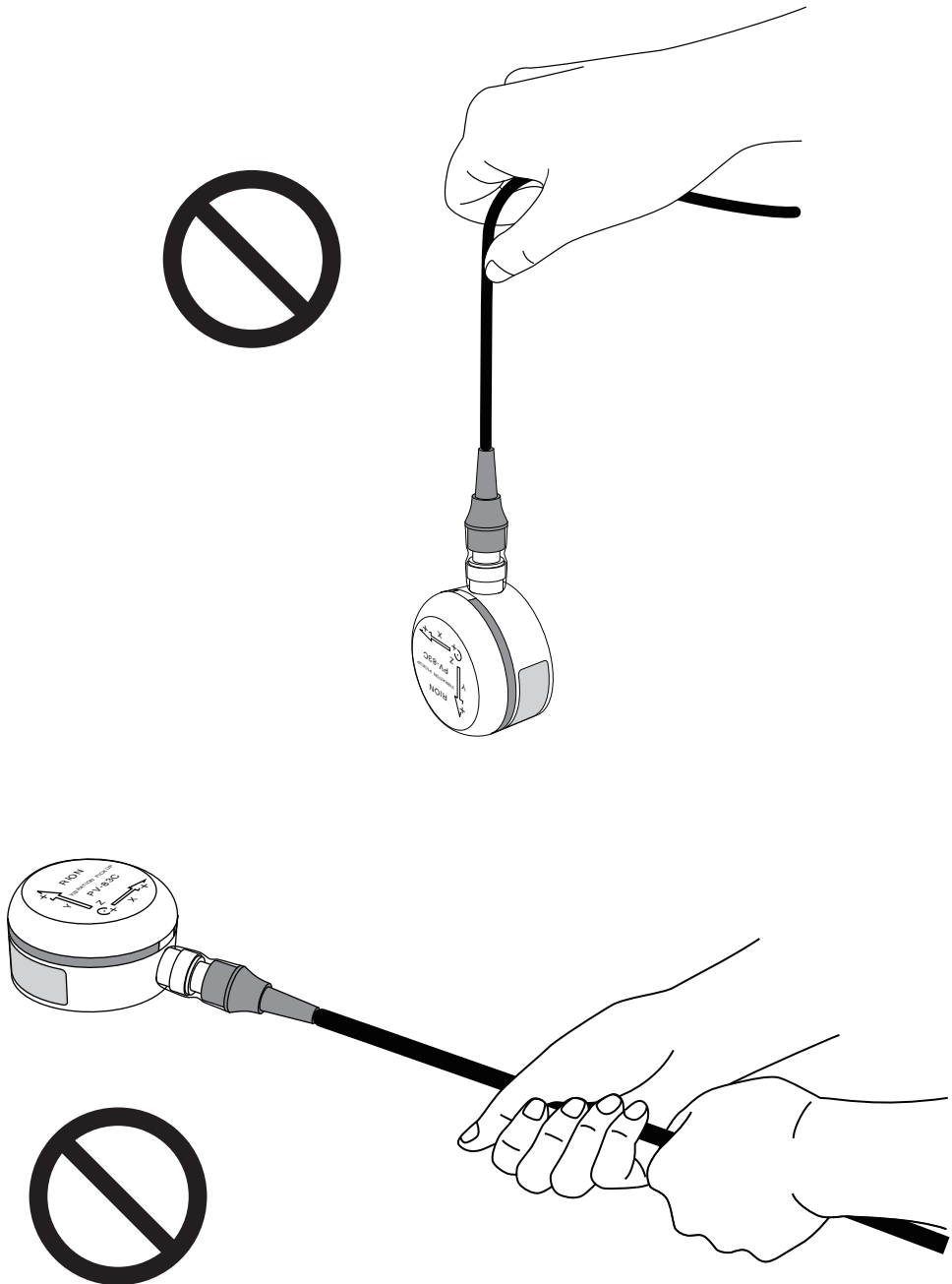
1. Insert the plug of the supplied extension cord EC-54S (3 meters) into the connector on the tip of the accelerometer, aligning the guide on the plug with the connector. Turn the locking ring clockwise to fasten the plug.
2. Insert the plug at the other end of the cord into the Input connector on the VM-55, aligning the guide on the plug with the connector. Turn the locking ring clockwise to fasten the plug.

<b>Important</b>
The accelerometer is a precision device. Never drop it or subject it to shocks.



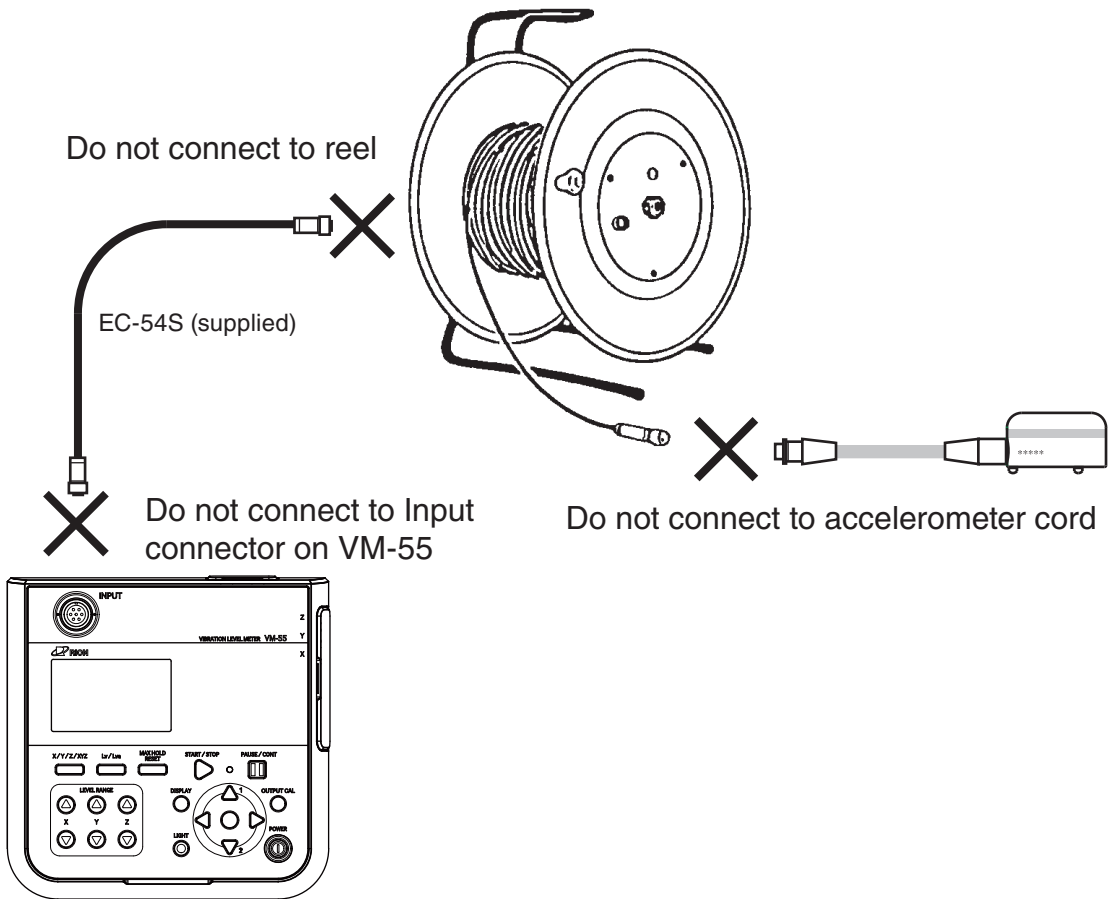
**Important**

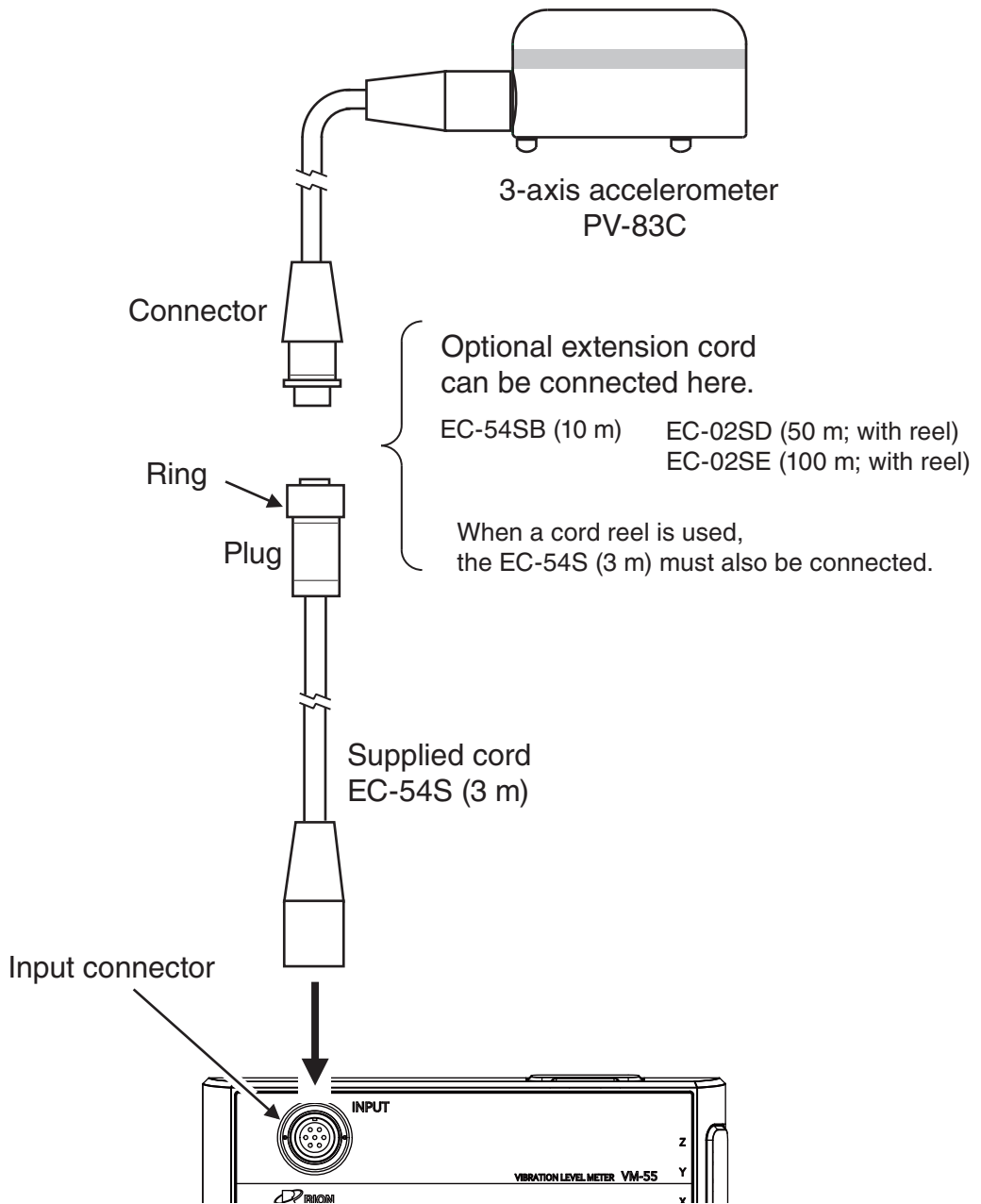
Never suspend the accelerometer by its cord or pull at the cord. Otherwise cord breaks may occur.



### Important

When installing or dismantling a system, always make sure that all connection cords are disconnected from the cord reel. Otherwise cord breaks due to twisting may occur.





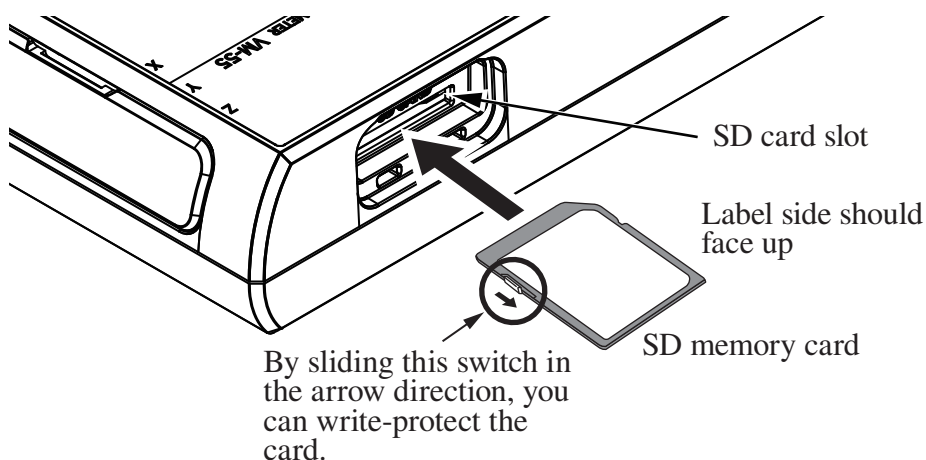
## SD memory card and program cards

Measurement data can be stored on an SD memory card for use and further processing in a computer. Optional program cards can also be used for installing software into the unit to expand the measurement functions of the unit.

### Inserting a card

Important
Make sure that power is OFF before inserting or removing a card.
Take care to insert the SD memory card with correct orientation.
If the SD memory card is removed while data is being read or written to the card, the data may be destroyed.
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.

1. Open the top cover of the unit.
2. Insert the SD memory card into the card slot on the top of the unit with the label of the card facing up. Push the card in until it is locked in place.
3. To remove the card, push the card a bit further in, the card is released and pops out of the card slot.



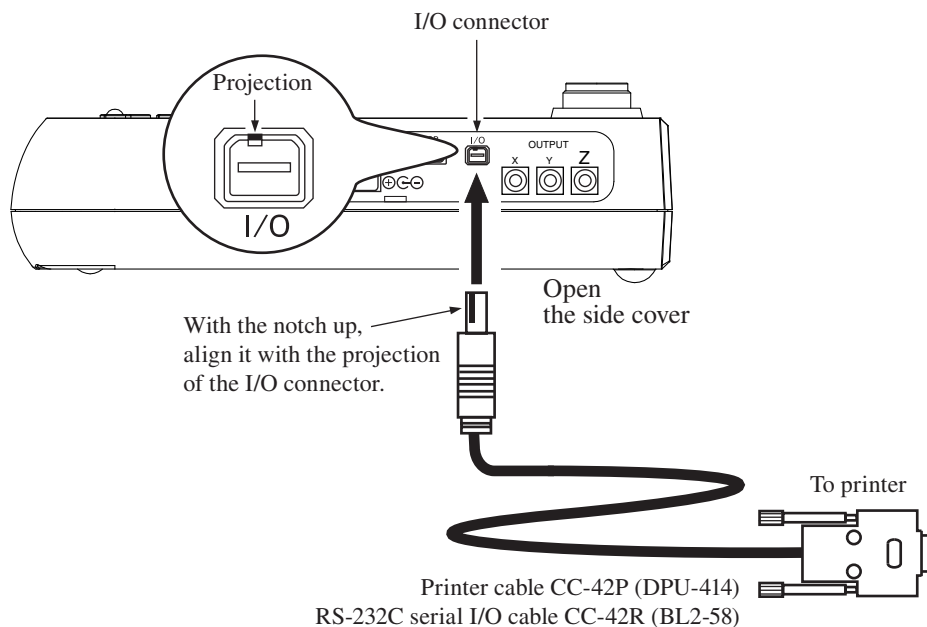
## Connection to printer (DPU-414, BL2-58)

Refer to the illustration below and connect the I/O connector on the right side of the VM-55 to the input of the printer, using the separately available printer cable. The correct combination of printer model and cable is as follows. Correct operation with other cables is not assured.

Printer	Cable
DPU-414	CC-42P
BL2-58	CC-42R

### Important

Do not insert the cable connector to the I/O connector reversely.



## Vibration level meter settings when using a printer

When using a printer, perform the following steps to set the baud rate for the vibration level meter.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Communication Interface] and press the MENU/ENTER key. The communication control function screen appears.
4. Use the  $\Delta/\nabla$  keys to select [RS-232C] and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [Baud rate] on the display / I/O screen and press the MENU/ENTER key. The baud rate screen appears.
6. Set the baud rate according to the printer in use.
  - For DPU-414: Use the  $\Delta/\nabla$  keys to select [19200bps] and press the MENU/ENTER key.
  - For BL2-58: Use the  $\Delta/\nabla$  keys to select the same baud rate as set at the BL2-58 and press the MENU/ENTER key (see page 28).
7. Press the START/STOP key to return to the measurement screen.

## Setting the software DIP switches of the DPU-414

Turn on the power while holding down the ON LINE key of the DPU-414.

A printout showing the current status of the printer is produced.

An example showing suitable software DIP switch settings for use of the printer with the VM-55 is shown below. (The actual printout will be in a different font.)

[DIP SW setting mode]

### Dip SW-1

- 1 (OFF) : Input = Serial
- 2 (ON) : Printing Speed = High
- 3 (ON) : Auto Loading = ON
- 4 (OFF) : Auto LF = OFF
- 5 (ON) : Setting Command = Enable
- 6 (OFF) : Printing
- 7 (ON) : Density
- 8 (ON) : 100 %

### Dip SW-2

- 1 (OFF) : Printing Columns = 80
- 2 (ON) : User Font Back-up = ON
- 3 (ON) : Character Select = Normal
- 4 (ON) : Zero = Normal
- 5 (ON) : International
- 6 (ON) : Character
- 7 (ON) : Set
- 8 (ON) : =Japan

### Dip SW-3

- 1 (ON) : Data Length = 8 bits
- 2 (ON) : Parity Setting = No
- 3 (OFF) : Parity Condition = Even
- 4 (OFF) : Busy Control = XON / XOFF
- 5 (OFF) : Baud
- 6 (ON) : Rate
- 7 (ON) : Select
- 8 (OFF) : = 19200 bps

For details, please refer to the documentation of the DPU-414.

## **BL2-58 setting**

Perform the following steps to change the setting.

1. Turn power to the BL2-58 on while holding down the SELECT button.  
The mode selection is printed.
2. Use the FEED button to select the function setting mode.
3. Using the FEED button to enter YES and the SELECT button to enter NO, make the setting as follows.
  - BAUD RATE: Select one of the available settings:  
9600, 19200, 38400, 57600, 115200 (bps)
  - \* Match the setting to the setting of the VM-55.Leave all other printer settings in the default condition.
4. When the setting is complete, the indication [SETTING MODE END] is printed.

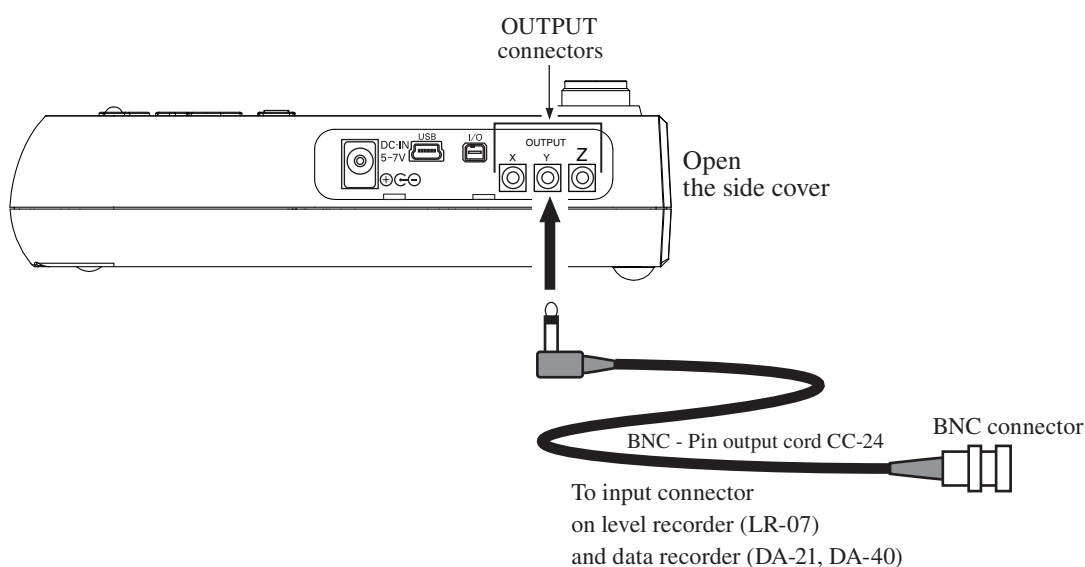
For information on the printer default settings, refer to the Instruction Manual of the BL2-58.



## Connection to a level recorder (LR-07) and data recorder (DA-21, DA-40)

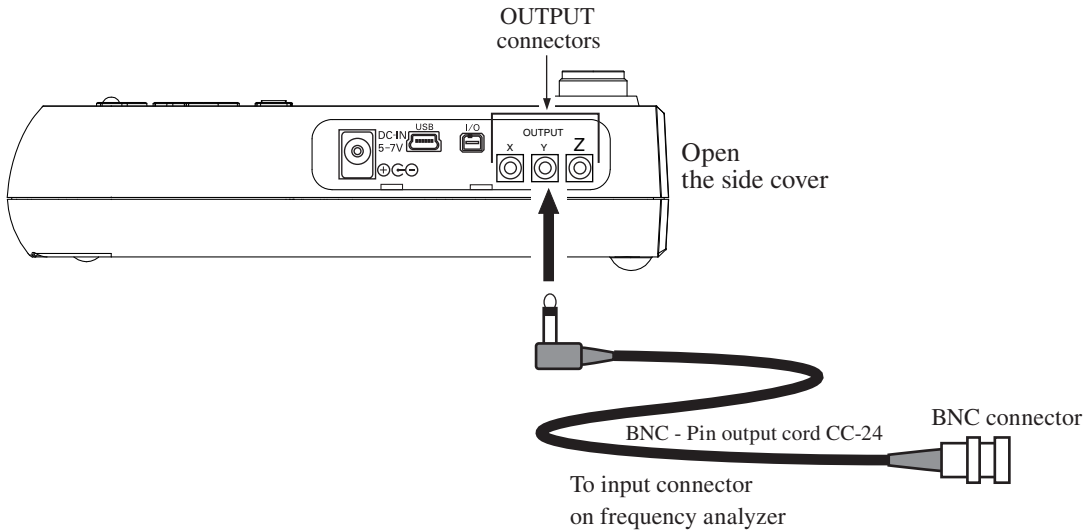
Connect the OUTPUT connector on the right side of the VM-55 with an input connector of level recorder (LR-07) and data recorder (DA-21, DA-40), using the optional BNC - Pin output cord CC-24 as shown below. The performance of other cables is not guaranteed.

To make settings for signal output ON/OFF and AC/DC selection, use the Display/ I/O screen. (Set [Output] to “ON” and [Type] to “AC OUT”. See page 122 for details.)



## Connection to a frequency analyzer

Connect the OUTPUT connector on the right side of the VM-55 with an input connector of frequency analyzer, using the optional BNC - Pin output cord CC-24 as shown below. The performance of other cables is not guaranteed.



## Connection to a computer

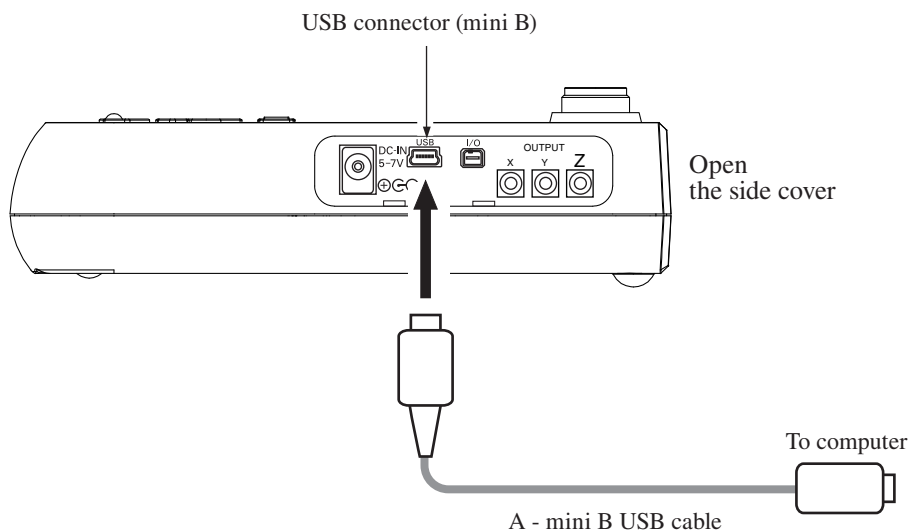
Connect the USB connector on the right side of the VM-55 with a USB connector of a computer, using the optional (generic) A - mini B USB cable as shown below.

An SD memory card inserted in the unit will be recognized as a removable disk by the computer when connected via USB, without having to install a USB driver.

### Note

If the store operation is being carried out, the unit will not be recognized as a removable disk by the computer.

To control the setting of the VM-55 with USB commands using the communication function, select the [Display / I/O] from the menu list and set the [Communication Interface] to [USB] (see page 63).



## Setting the date and time

The unit incorporates a clock which allows recording the date and time along with measurement data.

Set the date and time as described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Clock Setting] and press the MENU/ENTER key. The clock setting screen appears.
4. Use the  $\triangleleft/\triangleright$  keys to select [Year], [Month], [Day], [Hour], [Minute] and [Second].
5. Use the  $\Delta/\nabla$  keys to change the setting of the selected item.
6. Repeat the steps 4 and 5. Press the MENU/ENTER key to complete the setting change. The clock starts moving with the new setting.
7. Press the START/STOP key to return to the measurement screen.

### Important

If the unit is not to be used for an extended period, the main batteries should be taken out to prevent possible damage due to battery fluid leakage. After reinserting the batteries, be sure to set the date and time.

### Note

The clock in this unit has an error of about 1 minute per month. Before measurement, be sure to check and set the time if required.

An internal rechargeable backup battery serves to keep clock setting on the unit. The backup battery is automatically charged by the main batteries, but the retention period for clock setting depends on charging time (see page 16). Full charge of the backup battery requires approximate 24 hours.

MENU	System	04/20 19:32:56
Read/Save Setup File ▾		
Clock Settings		2015/04/20 19:32:56
Backlight/LCD Settings ▾		
Battery Type		Alkaline
Printer Type		DPU-414
Card Format		Free space 445MB / SD card capacity 452MB
Index		1
Measure →	▶	Back →     Help → (Display)
☰ ↵ 🔦		

## System screen

MENU	Clock Settings			20 19:33:03
Read/Save S	Year	Month	Day	20 19:33:03
Clock Setti	+	+	+	
Backlight/L	2015	4	20	
Battery Typ	-	-	-	Alkaline
Printer Typ	Hour	Minute	Second	DPU-414
Card Format	+	+	+	
Fre	19	33	0	acity 452MB
Index	-	-	-	1
Measure →	OK → (ENT) Ⓞ			→ (Display)
☰ ↵ 🔦 Cancel → (PAUSE)				

## Clock settings screen

## Measurement in a dark location

Pressing the LIGHT key will turn on the display backlight, for easier reading in a dark location. The backlight operation pattern can be controlled via a menu, as follows.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\triangle/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
3. Use the  $\triangle/\nabla$  keys to select [Backlight/LCD Settings] and press the MENU/ENTER key. The backlight/LCD settings screen appears.
4. Use the  $\triangle/\nabla$  keys to select [Backlight Auto Off] and press the MENU/ENTER key. The backlight auto off screen appears.
5. Use the  $\triangle/\nabla$  keys to select the automatic turn-off interval (30 sec, 3 min, Continue) and press the MENU/ENTER key.
6. Use the  $\triangle/\nabla$  keys to select [Backlight brightness] and press the MENU/ENTER key. The level of brightness screen appears.
7. Use the  $\triangle/\nabla$  keys to select the level of brightness (level 1 to level 4) and press the MENU/ENTER key. (level 1 is dark, and level 4 is bright.)
8. Press the START/STOP key to return to the measurement screen.

To turn the backlight off before the automatic turn-off point, press the LIGHT key.

The [level 4] setting for backlight brightness will reduce battery life by about 30 percent, and the [level 1] setting by about 5 percent.

Note
When there is only one segment (red) on the battery status indicator, the display backlight does not turn on.

MENU	System	04/20 19:33:10
Read/Save Setup File ▾		
Clock Settings		2015/04/20 19:33:10
Backlight/LCD Settings ▾		
Battery Type		Alkaline
Printer Type		DPU-414
Card Format		
Free space 445MB / SD card capacity 452MB		
Index		1
Measure ⇒	▶	Back ⇒     Help ⇒ (Display)
☰ ↻ 🔆		

## System screen

MENU	Back Light LCD	04/20 19:24:53
Backlight Auto Off Continue		
Backlight brightness		4
LCD Auto Off (Auto Store)		OFF

Measure ⇒	▶	Back ⇒     Help ⇒ (Display)
☰ ↻ 🔆		

## Backlight/LCD settings screen

## Eco setting (Power-saving mode)

The Eco setting enables the power saving feature. A long-time measurement can be performed using batteries only.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Eco Setting] and press the MENU/ENTER key. The confirmation screen appears.
4. Use the  $\Delta/\nabla$  keys to select [YES] and press the MENU/ENTER key. The eco setting is executed.
5. Press the START/STOP key to return to the measurement screen.

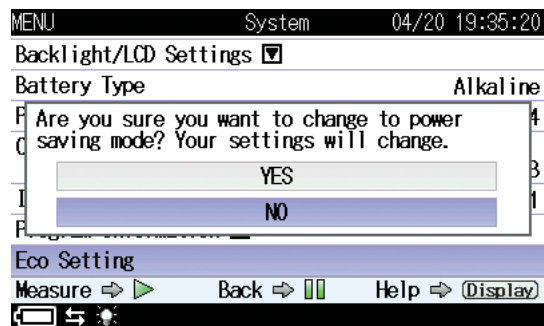
When the eco setting is executed, the setting of the item is changed automatically as follows.

Backlight auto off	30 sec
Backlight brightness	1
OUTPUT	OFF
Communication interface	OFF
LCD auto off at auto store	1 min
	(only when optional VX-55EX is installed)
Comparator	OFF
	(only when optional VX-55EX is installed)





## System screen



## Execution confirmation screen

## Comparator output

This is an open collector output that can be used to control external equipment such as alarm device. When the optional Extended Function Program VX-55EX is not installed, the comparator output cannot be set.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Comparator] and press the MENU/ENTER key. The comparator screen appears.
4. Press the MENU/ENTER key. The ON/OFF setting screen appears.
5. Use the  $\Delta/\nabla$  keys to select [ON] and press the MENU/ENTER key.
6. Use the  $\Delta/\nabla$  keys to select [Comparator level] and press the MENU/ENTER key. The comparator level screen appears.
7. Use the  $\triangleleft/\triangleright$  keys to select the first digit and use the  $\Delta/\nabla$  keys to set the value.
8. Use the  $\triangleleft/\triangleright$  keys to select the two lower digits and use the  $\Delta/\nabla$  keys to set the value. Then press the MENU/ENTER key. (Setting range 30 dB to 120 dB, 1 dB steps)
9. Use the  $\Delta/\nabla$  keys to select [Comparator channel] and press the MENU/ENTER key. The comparator channel screen appears.
10. Use the  $\Delta/\nabla$  keys to select the comparator channel (X, Y, Z) and press the MENU/ENTER key.
11. Use the  $\Delta/\nabla$  keys to select [Comparator band] and press the MENU/ENTER key. The comparator band screen appears.
12. Use the  $\Delta/\nabla$  keys to select the comparator band ( $L_v$ ,  $L_{va}$ ) and press the MENU/ENTER key.
13. Press the START/STOP key to return to the measurement screen.

MENU	Display / I/O	04/20 19:26:17
Time-Level graph	Time Scale	20s
Output	<input checked="" type="checkbox"/>	OFF
Comparator	<input checked="" type="checkbox"/>	OFF
Communication Interface		OFF

Measure →  Back →  Help → [\(Display\)](#)

## Display / I/O screen

MENU	Comparator	04/20 19:27:15
Comparator		ON
Comparator level		30 dB
Comparator chanel		X
Comparator band		Lv

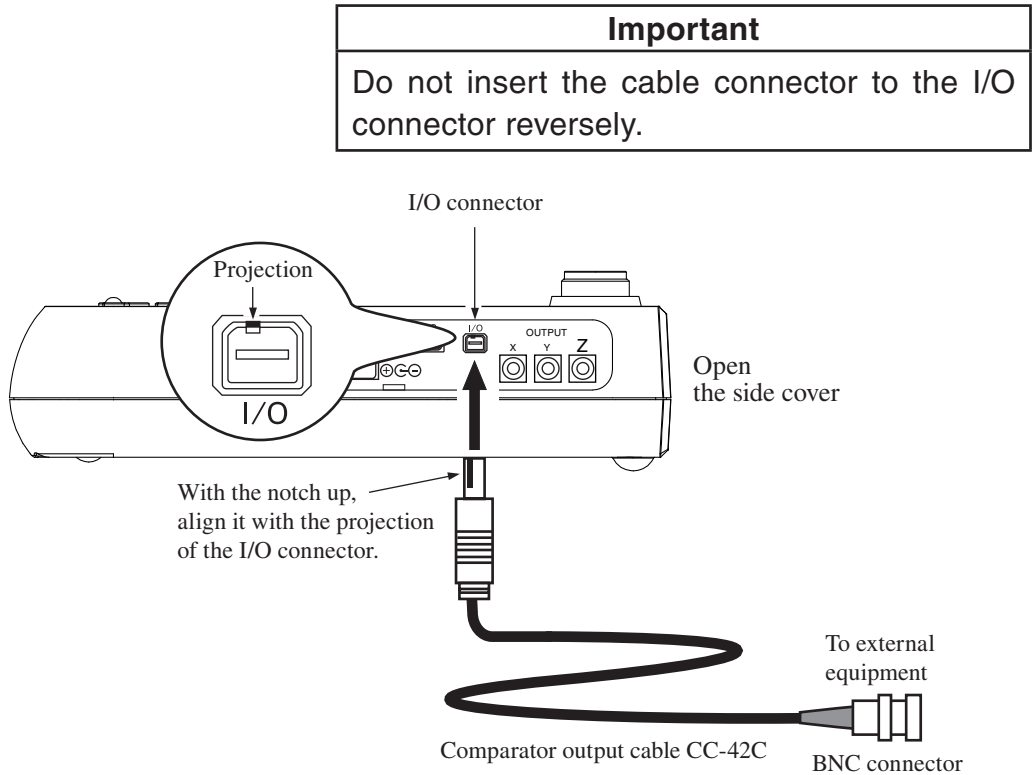
Measure →  Back →  Help → [\(Display\)](#)

## Comparator screen

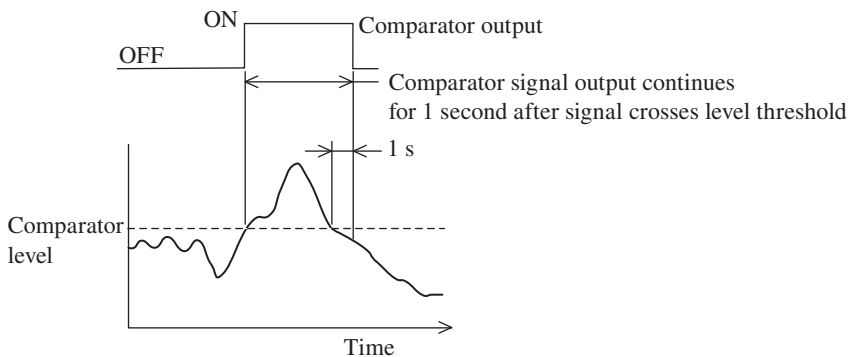
## Connecting external equipment

Connect the I/O connector on the right side of the VM-55 with an input connector of external equipment, using the optional comparator output cable CC-42C as shown below. The performance of other cables is not guaranteed.



## About the comparator output

The comparator signal output timing pattern is as shown below (see page 110).



## Language selection

The language used for displaying messages and menus can be selected as follows.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Language] and press the MENU/ENTER key. The language screen appears.
4. Use the  $\Delta/\nabla$  keys to select the type of language and press the MENU/ENTER key.
5. Press the START/STOP key to return to the measurement screen.  
The language selection is memorized by the unit and will be active also the next time the unit is turned on.

### Note

Descriptions in this instruction manual are based on the premise that the [Language] is set to [English].



### System screen



### Language screen

## Calibration

When using external equipment to record measurement data, level calibration should be performed as follows.

1. Press the MENU/ENTER key to bring up the menu list screen.

2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.

MENU	Display / I/O	04/20 19:29:48
Time-Level graph	Time Scale	20s
Output <input checked="" type="checkbox"/>		OFF
Comparator <input checked="" type="checkbox"/>		OFF
Communication Interface		OFF



3. Use the  $\Delta/\nabla$  keys to select [Output] and press the MENU/ENTER key. The output screen appears.
4. Press the MENU/ENTER key. The ON/OFF setting screen appears.

MENU	Output	04/20 19:30:21						
Output		OFF						
<table border="1"> <tr> <td colspan="2" style="text-align: center;">Output</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">ON</td> </tr> </table>			Output		<input checked="" type="checkbox"/>	OFF	<input type="checkbox"/>	ON
Output								
<input checked="" type="checkbox"/>	OFF							
<input type="checkbox"/>	ON							
OK $\Rightarrow$ (ENT)								
Cancel $\Rightarrow$ (PAUSE)								

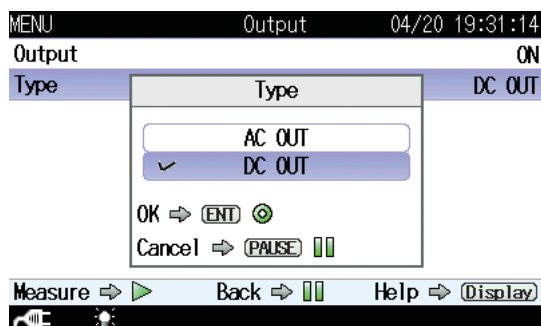


5. Use the  $\Delta/\nabla$  keys to select [ON] and press the MENU/ENTER key.

MENU	Output	04/20 19:31:00
Output		ON
Type		DC OUT



6. Use the  $\Delta/\nabla$  keys to select [Type] and press the MENU/ENTER key. The type screen appears.



7. Use the  $\Delta/\nabla$  keys to select the type (AC OUT, DC OUT) and press the MENU/ENTER key.

AC OUT: The OUTPUT connectors provide AC signal.

DC OUT: The OUTPUT connectors provide DC signal.

Select the output type that is appropriate for the equipment to be connected.

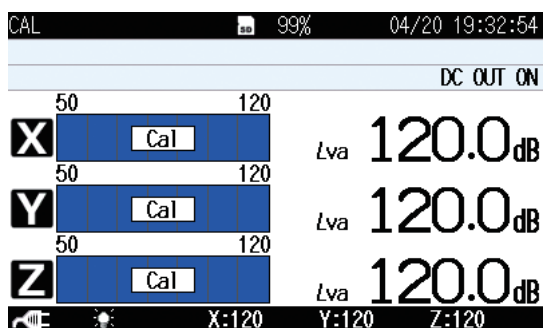
#### Note

It is not possible to select different AC OUT or DC OUT settings for individual channels.

8. Press the START/STOP key to return to the measurement screen.
9. Press the OUTPUT CAL key.

The display switches to calibration indication.

Verify that the measurement value reading is the same as the maximum value for the level range in each axis (X, Y, Z).



During calibration, the OUTPUT connectors supply the following signal.

AC : 31.5 Hz, 1 Vrms (OUTPUT setting is "AC OUT" )

DC: 2.5 V (OUTPUT setting is "DC OUT" )

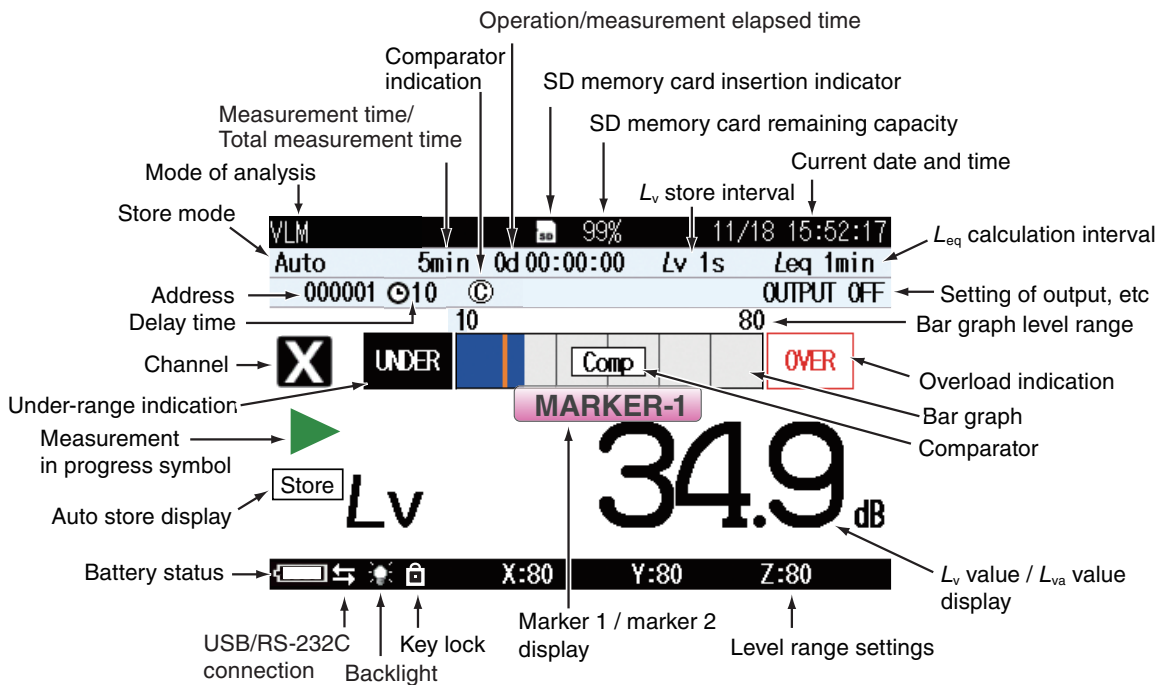
Use this signal to calibrate the external equipment such as a level recorder or analyzer.

10. Press the Output Cal key again to cancel the calibration mode.

# Reading the Display

## Measurement screen display

The illustration below shows all elements of the display for explanation purposes. In actual operation, such a screen will not be shown. (In case of 1 channel screen indication,)





## Mode of analysis

Indicates the condition of the display screen.

## Measurement time/Total measurement time

When the store mode is Manual, the measurement time is displayed.

When the store mode is Auto, the total measurement time is displayed (see page 82, 88).

## Comparator indication

Appears when the comparator function is being used (see page 38).

## Operation/measurement elapsed time

Shows the elapsed time from the start of measurement.

## SD memory card insertion indicator

Shown when an SD memory card is inserted in the unit (see page 24).

## SD memory card remaining capacity

Shows the remaining capacity of an inserted SD memory card.

Note
Even when a new SD memory card is inserted, the remaining capacity may sometimes be shown as 99% rather than 100%.

## $L_v$ store interval

When the store mode is Auto or Timer Auto, the  $L_v$  store interval is displayed (see page 88, 94).

## Current date and time

Shows the current date and time.

## $L_{eq}$ calculation interval

When the store mode is Auto or Timer Auto, the  $L_{eq}$  calculation interval is displayed (see page 89, 94).

## Setting of output, etc

The selected output signal on the [OUTPUT] of the [Display / I/O] screen is shown here (see page 62).

## Bar graph level range

Shows the upper and lower limit of the bar graph. The range can be changed using the LEVEL RANGE key on the control section.

## Overload indication

When a signal overload condition of the vibration level or the vibration acceleration level is detected, the indication **OVER** (white on black) is shown for at least 1 second.

If processed data contain signal overload data, the indication **OVER** is shown. This indication remains on the processed data display screen until the next processing measurement is started.

## Bar graph

Shows the vibration level or the vibration acceleration level as a bar graph indication. (The display is updated every 100 msec.)

## Comparator

When the comparator function has been set to ON, the comparator level is shown as an orange line on the bar graph. When a signal exceeds that level, the indication [Comp] appears, and a signal is output from the I/O connector on the right side panel (see page 38).

Note
When the optional Extended Function Program VX-55EX is not installed, the comparator cannot be selected.

## $L_v$ value / $L_{va}$ value display

Shows the measured vibration level or vibration acceleration level. (The display is updated every second.)

## Level range settings

Shows the upper limit of the level range (X, Y, Z). **OVER** is shown here when a signal overload condition has been detected, and **UNDER** is shown when a signal under-range condition has been detected.

## Marker 1 / marker 2 display

During measurement, pressing the  $\Delta$  key will bring up the indication “MARKER-1” and pressing the  $\nabla$  key will bring up the indication “MARKER-2” on the display, and the respective marker will be recorded along with the measurement data (see page 92). This applies when the store mode is Auto or Timer Auto, and the  $L_v$  store interval has been set.

## Key lock

Indicates that the key lock function has been set to ON (see page 6).

## Backlight

Indicates that the display backlight has been lit up (see page 34).

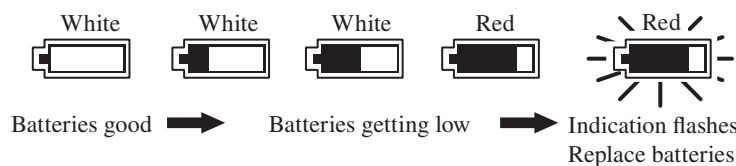
If the remaining battery capacity indication or the power supply plug symbol is shown in red, the backlight will not come on.


## USB/RS-232C connection

Indicates that the communication control function has been set to USB or RS-232C (see page 63).

## Battery status

When the unit is operated on battery power, you should regularly check this indication. The number of white segments will decrease as the batteries get used up. When the indication starts to flash in red, measurement can no longer be performed. Replace the batteries with a fresh set.



When the unit is being powered from an AC adapter or a battery pack, the  symbol is shown. If the indication turns red and stays lit, do not perform any further measurements, and check the power supply condition.

## Auto store display

When the store mode is Auto or Timer Auto, this indication flashes during measurement. The indication is off when data are stored in memory.

During waveform recording using the optional Waveform Recording Program VX-55WR, the indications “Store” and “REC.” are shown alternately on the display

## Measurement in progress symbol

When a measurement is in progress, the ► symbol flashes. The indicator LED also flashes in red.

During auto store, the ► symbol also flashes. The indicator LED flashes in red.

During measurement standby, the ■ symbol is shown. The indicator LED flashes in blue once every 5 seconds.

During measurement pause, the || symbol is shown. The indicator LED flashes in blue.

## Under-range indication

When a signal under-range condition of the vibration level or the vibration acceleration level is detected, the indication **UNDER** (white on black) is shown for at least 1 second.

If processed data contain signal under-range data, the indication **UNDER** is shown. This indication remains on the processed data display screen until the next processing measurement is started.

## Channel

Shows the selected channel.

## Delay time

Shows the delayed measurement time set by “Delay Time” (see page 75).

## Address

Shows the current memory address. In manual store mode, the indication is red if there are data in that address.

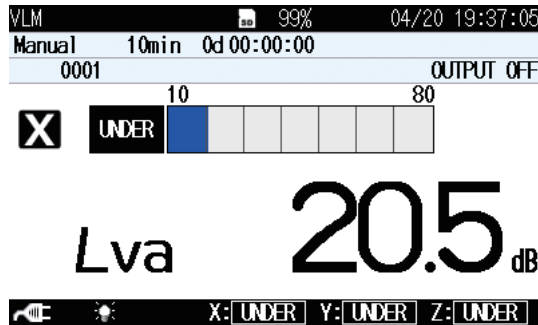
## Store mode

Shows the selected mode for storing data in memory (Manual, Auto, or Timer Auto) (see page 78).

Note
When the optional Extended Function Program VX-55EX is not installed, the Auto and Timer Auto cannot be selected.

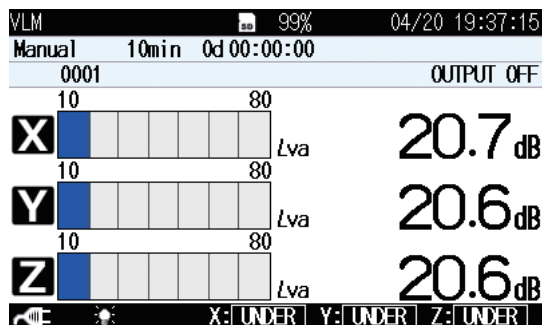
## Measurement screen

When the measurement screen is displayed, pressing the Lv/Lva key changes the  $L_v/L_{va}$  value display as shown below.



## Measurement screen (3 channels display)

When the measurement screen is displayed, pressing the X/Y/Z/XYZ key changes the channel display as shown below. Pressing the Lv/Lva key changes the  $L_v/L_{va}$  value display.



## Max Hold display screen

When the measurement screen is displayed, pressing the DISPLAY key brings up the Max Hold display screen as shown below.

Pressing the X/Y/Z/XYZ key switches the vibration axis (channel) to be shown on the display.

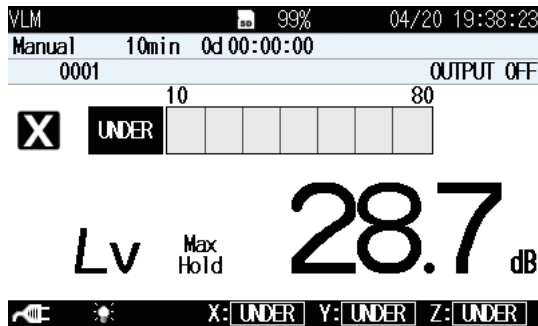
Pressing the MAX HOLD RESET key resets the value of the max hold function.

Pressing the Lv/Lva key changes the  $L_v/L_{va}$  value display.

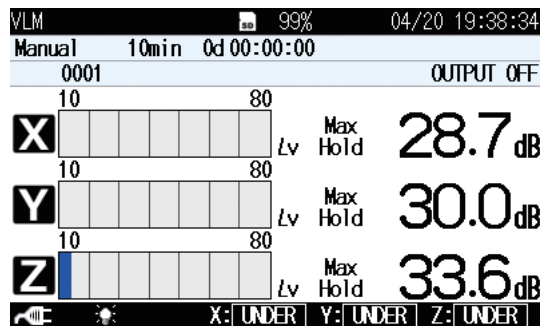
**Note**

To perform a MAX HOLD measurement, press the MAX HOLD RESET key before the measurement to reset the value.

### 1 channel display



### 3 channel display



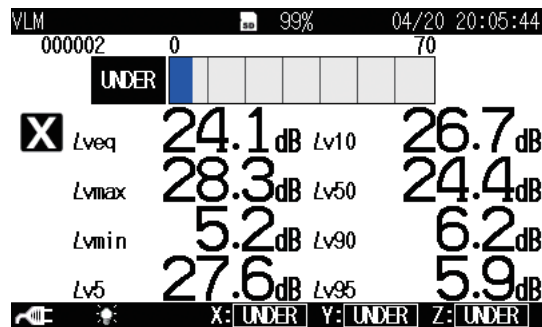
## Processed data display screen

When the Max Hold display screen is displayed, pressing the DISPLAY key brings up the processed data display screen as shown below.

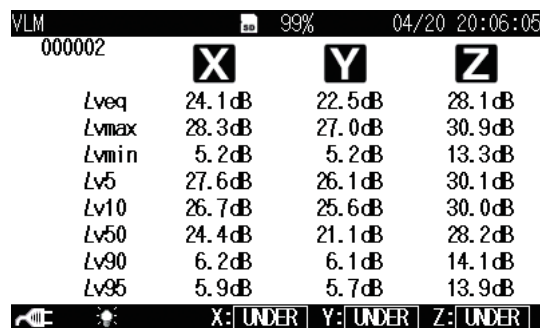
Pressing the X/Y/Z/XYZ key switches the vibration axis (channel) to be shown on the display.

Pressing the MAX HOLD RESET key resets the value of the max hold function.

### 1 channel display



### 3 channel display



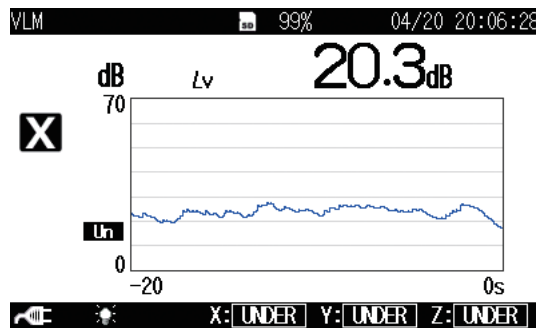
## Time-level display screen

When the processed data display screen is displayed, pressing the DISPLAY key brings up the time-level display screen as shown below.

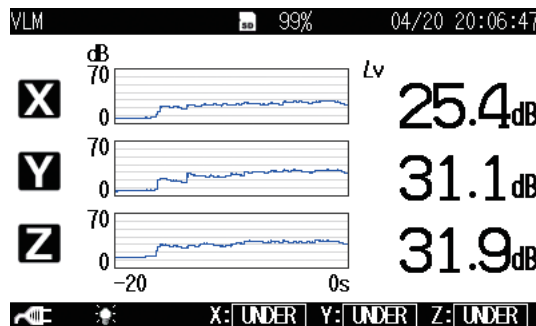
Pressing the X/Y/Z/XYZ key switches the vibration axis (channel) to be shown on the display.

Pressing the MAX HOLD RESET key resets the value of the max hold function.

### 1 channel display



### 3 channel display





## Indicator messages

When keys such as START/STOP or PAUSE/CONT are pressed, indicator messages such as shown below will appear on the display for about 1 second.

START

When START/STOP key was pressed and processing has started

PAUSE

When PAUSE/CONT key was pressed and operation is paused

CONTINUE

When PAUSE/CONT key was pressed and processing has resumed

STOP

When START/STOP key was pressed and processing has ended

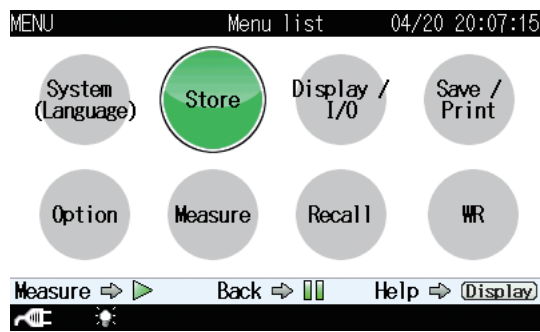
## Menu list screen

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

Use the  $\Delta$  /  $\nabla$  /  $\triangleleft$  /  $\triangleright$  keys to select the desired menu and press the MENU/ENTER key.

Pressing the DISPLAY key displays explanation screen of the item that has been selected.

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



### Note

When optional Waveform Recording Program VX-55WR is not installed, "WR" is not displayed on the menu list screen.

## System (Language)

This screen sets the item concerning the system of the unit.

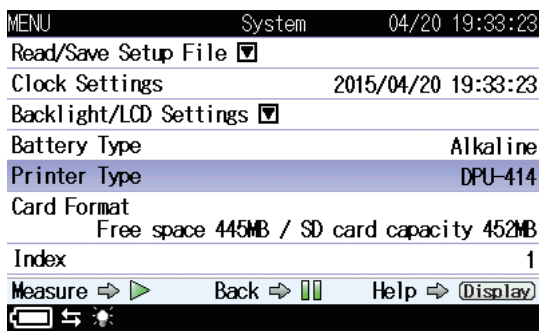
Use the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.

Each item of the system screen is selected using the  $\Delta$ / $\nabla$  key.

Pressing the DISPLAY key displays explanation screen of the item that has been selected.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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



### Read/Save setting $\nabla$

Displays the screen to save a setting for the unit and read the saved setting. Select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears (see page 114).

### Clock Settings

Displays the screen to set date and time of the internal clock of the unit. Select [Clock Settings] and press the MENU/ENTER key. The clock settings screen appears (see page 32).

### Backlight/LCD Settings $\nabla$

Displays the screen to set the function of the backlight and the LCD of the unit.

Select [Backlight/LCD Settings] and press the MENU/ENTER key. The backlight/LCD settings screen appears (see page 34).

## Battery Type

Displays the screen to select the type of battery used for the unit. The battery power corresponding to the selected battery is displayed on the measurement screen.

Select [Battery type] and press the MENU/ENTER key. The battery type screen appears.

Use the  $\Delta/\nabla$  keys to select the battery type (Alkaline, Ni-MH[Nickel-metal hydride]) and press the MENU/ENTER key.

## Printer Type

Selects the model of the connected printer.

Select [Printer type] and press the MENU/ENTER key. The screen for selecting the printer model appears. Use the  $\Delta/\nabla$  keys to select [DPU-414] or [BL2-58] and press the MENU/ENTER key.

## Card Format (can only be selected when SD memory card is inserted)

Formats the inserted SD memory card.

Select [Card Format] and press the MENU/ENTER key. The confirmation screen appears.

Select [YES] and press the MENU/ENTER key to format the card.

Select [NO] and press the MENU/ENTER key when not formatting the card.

## Free space / SD card capacity

Displays the free space and the memory capacity of the inserted SD memory card. The both free space and memory capacity are read by the automatic operation, and cannot be changed.

Note
If the following operation is performed while the USB cable is connected, the free space will not be displayed correctly. In this case, cycle the power to the unit, or remove the SD memory card and insert it again.  * Have this unit recognized as a removable disk, move the data to a computer and then move the data back to the unit.
Even when a new SD memory card is inserted, the remaining capacity may sometimes be shown as 99% rather than 100%.

## Index

Displays the screen to set the identification number of the unit when multiple units are used in a parallel measurement.

Select [Index] and press the MENU/ENTER key. The index screen appears. Use the ◀/▶ keys to select the digit, and use the △/▽ keys to set the value (1 to 255). Then press the MENU/ENTER key. The index is also recorded in store data.

Note
Measurement data cannot be selected when recalling it on a unit with a different index number (viewing impossible).

## Program Information ▾

Displays the version information screen of the program of the unit.

Select [Program Information] and press the MENU/ENTER key. The program information screen appears.

## Eco Setting (Power saving mode)

Enters the power-saving mode.

Select [Eco Setting] and press the MENU/ENTER key. The confirmation screen appears (see page 36).

## Language

Displays the screen to select the language used for displaying messages and menus.

Select [Language] and press the MENU/ENTER key. The language screen appears (see page 41).

## Store

This screen sets the mode that stores the operation result data.

Use the  $\Delta/\nabla/\leftarrow/\rightarrow$  keys to select [Store] and press the MENU/ENTER key.

The store screen appears.

Each item of the store screen is selected using the  $\Delta/\nabla$  key.

Pressing the DISPLAY key displays explanation screen of the item that has been selected.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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

As for the store screen, the displayed set item is different depending on the set store mode.

For details, please refer to “Store Operation” on page 78.

MENU	Store	04/21 09:11:40
Store Mode	Manual	
Store Name	0006	
Measurement channel	XYZ	
Measurement Time	10min	

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)
-----------------------	--------------------	------------------------------

### Manual

MENU	Store	04/21 09:12:03
Store Mode	Auto	
Store Name	0006	
Measurement channel	XYZ	
Total Measurement Time	User setting	
User setting	1000h	
Lv Store Interval	OFF	
Leq Calculation Interval	10s	

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)
-----------------------	--------------------	------------------------------

### Auto

MENU	Store	04/21 09:12:50
Store Mode	Timer Auto	
Store Name	0006	
Measurement channel	XYZ	
Lv Store Interval	OFF	
Leq Calculation Interval	10s	
Timer Auto Start	2015/04/21 09:17	
Timer Auto Stop	2015/04/21 18:28	
Timer Auto Interval	5min	

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)
-----------------------	--------------------	------------------------------

MENU	Store	04/21 09:13:01
Store Name	0006	
Measurement channel	XYZ	
Lv Store Interval	OFF	
Leq Calculation Interval	10s	
Timer Auto Start	2015/04/21 09:17	
Timer Auto Stop	2015/04/21 18:28	
Timer Auto Interval	5min	
Sleep Mode	OFF	

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)
-----------------------	--------------------	------------------------------

### Timer Auto

## Store Mode

Displays the screen to select the store mode.

Select [Store Mode] and press the MENU/ENTER key. The store mode setting screen appears.

Use the  $\Delta/\nabla$  keys to select the store mode (Manual, Auto, Timer Auto) and press the MENU/ENTER key.

Note
When the optional Extended Function Program VX-55EX is not installed, the Auto and Timer Auto cannot be selected.

## Store Name (common to each mode)

Displays the screen to set the identification number of the store data (0000 to 9999).

Select [Store Name] and press the MENU/ENTER key. The store name screen appears.

## Measurement channel (common to each mode)

Displays the screen to select the measurement channel (Z, XYZ).

Select [Measurement channel] and press the MENU/ENTER key. The measurement channel screen appears.

## Measurement Time (Manual mode)

Displays the screen to select the measurement time in the Manual mode.

Select [Measurement Time] and press the MENU/ENTER key. The measurement time screen appears.

Note
When the Measurement Time is set to “500s”, time percentile level $L_N$ is calculated based on the instantaneous value every 5 seconds. When set to a value other than “500s”, $L_N$ is calculated based on the instantaneous value every 100 milliseconds.

### Total Measurement Time (Auto mode)

Displays the screen to select the total measurement time in the auto mode. Select [Total Measurement Time] and press the MENU/ENTER key. The total measurement time screen appears.

### User setting (Manual mode and Auto mode)

When [Manual] is selected from [Measurement Time] of the Manual mode or [Total Measurement Time] of the Auto mode, the user setting items will be displayed and measurement time can be set arbitrarily.

The maximum settable time is 24 hours with the Manual mode and 1000 hours with the Auto mode.

### L<sub>v</sub> Store Interval (Auto mode and Timer Auto mode)

Displays the screen to select the L<sub>v</sub> store interval in the Auto mode or Timer Auto mode.

Select [L<sub>v</sub> Store Interval] and press the MENU/ENTER key. The L<sub>v</sub> store interval screen appears.

### L<sub>eq</sub> Calculation Interval (Auto mode and Timer Auto mode)

Displays the screen to select the L<sub>eq</sub> calculation interval in the Auto mode or Timer Auto mode.

Select [L<sub>eq</sub> Calculation Interval] and press the MENU/ENTER key. The L<sub>eq</sub> calculation interval screen appears.

Note
When the L <sub>eq</sub> Calculation Interval is set to “500s”, time percentile level L <sub>N</sub> is calculated based on the instantaneous value every 5 seconds. When set to a value other than “500s”, L <sub>N</sub> is calculated based on the instantaneous value every 100 milliseconds.

### Start (Timer Auto mode)

Displays the screen to set the measurement start time in the Timer Auto mode.

Select [Start] and press the MENU/ENTER key. The start time setting screen appears.

When the start time setting screen is displayed for the first time, the time after 5 minutes from current time is indicated.



### Stop (Timer Auto mode)

Displays the screen to set the measurement stop time in the Timer Auto mode.

Select [Stop] and press the MENU/ENTER key. The stop time setting screen appears.

### Timer Auto Interval (Timer Auto mode)

Displays the screen to select the timer auto interval in the Timer Auto mode.

Select [Timer Auto Interval] and press the MENU/ENTER key. The timer auto interval screen appears.

### Sleep Mode (Timer Auto mode)

Displays the screen to select whether to set the sleep mode.

Select [Sleep Mode] and press the MENU/ENTER key. The ON/OFF setting screen appears.

When sleep mode is enabled, the unit will enter a power-saving standby condition at 60 seconds after pressing the START/STOP key and during intervals between measurements. In this mode, power consumption is reduced to about 1/10. The LCD panel is off, and the indicator LED flashes in blue once every 5 seconds. 90 seconds before the start of measurement, the unit will wake up and go into standby until measurement begins.

To check the measurement settings in standby condition, press the LIGHT key. The display will come on temporarily and will turn itself off again if no further operation steps are taken. During sleep mode, the LCD panel is off, and the AC and DC outputs, USB connector, RS-232C, comparator functions etc. are also disabled. If one of these functions is required, set the sleep mode to OFF.

## Display / I/O

This screen sets the type of output signal etc.

Use the  $\Delta/\nabla/\leftarrow/\rightarrow$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.

Each item of the display / I/O screen is selected using the  $\Delta/\nabla$  key.

Pressing the DISPLAY key displays explanation screen of the item that has been selected.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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

MENU	Display / I/O	04/21 09:13:26
Time-Level graph Time Scale		20s
Output $\nabla$		OFF
Comparator $\nabla$		OFF
Communication Interface		OFF



### Time-Level graph Time Scale

Displays the screen to select the time scale of the time-level graph.

Select [Time-Level graph Time Scale] and press the MENU/ENTER key.

The Time-Level graph Time Scale setting screen appears.

Use the  $\Delta/\nabla$  keys to select the time scale (20s, 1min, 2min) and press the MENU/ENTER key.

### Output $\nabla$

Displays the screen to select the signal output from the OUTPUT connectors of the unit.

Select [Output] and press the MENU/ENTER key. The output screen appears (see page 105).

## Comparator ▼

Displays the screen to set the comparator signal output (open collector output can be used to control external equipment) from the I/O connector of the unit.

Select [Comparator] and press the MENU/ENTER key. The comparator screen appears (see page 38).

Note
When the optional Extended Function Program VX-55EX is not installed, the comparator cannot be selected.

## Communication Interface

Displays the screen to select a type of communication with a computer or printer to be connected to the unit.

Select [Communication Interface] and press the MENU/ENTER key. The communication interface screen appears.

Use the  $\Delta/\nabla$  keys to select the communication type (OFF, USB, RS-232C) and press the MENU/ENTER key.

## Baud rate

Displays the screen to select the baud rate value when [Communication Interface] is set to "RS-232C".

Select [Baud rate] and press the MENU/ENTER key. The baud rate screen appears.

Use the  $\Delta/\nabla$  keys to select the baud rate value (9600bps, 19200bps, 38400bps, 57600bps, 115200bps) and press the MENU/ENTER key.

## Flow control

Displays the screen to select the baud rate value when [Communication Interface] is set to "RS-232C".

Select [Flow control] and press the MENU/ENTER key. The flow control screen appears.

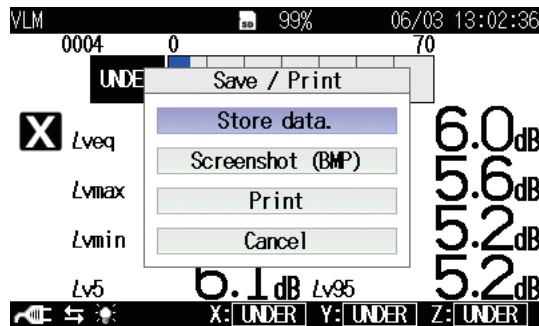
Use the  $\Delta/\nabla$  keys to select the flow control type (OFF, HARD, SOFT) and press the MENU/ENTER key.

## Save / Print

The measurement data or recall data displayed on the screen can be saved or printed on the save/print screen.

Use the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys to select [Save / Print] and press the MENU/ENTER key. The save/print screen appears.

Each item of the save/print screen is selected using the  $\Delta$ / $\nabla$  key.



### Store data

Stores the displayed measurement data. This is displayed when Manual measurement (processing) data exist.

Select [Store data] and press the MENU/ENTER key.

### Screenshot (BMP)

Saves the displayed measurement screen to the internal memory in BMP (bitmap) format.

Select [Screenshot (BMP)] and press the MENU/ENTER key.

The data capacity is approximately 300 kB per file.

Screen data can also be saved by holding down the DISPLAY key and pressing the  $\triangleright$  key of the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys (see page 102). Saved screen data can be viewed by holding down the DISPLAY key and pressing the  $\Delta$  key of the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys (see page 102).

### Print

Prints the displayed measurement data to the printer connected with the unit.

Select [Print] and press the MENU/ENTER key.

### Cancel

Shuts the save/print screen.

Select [Cancel] and press the MENU/ENTER key.

## Option

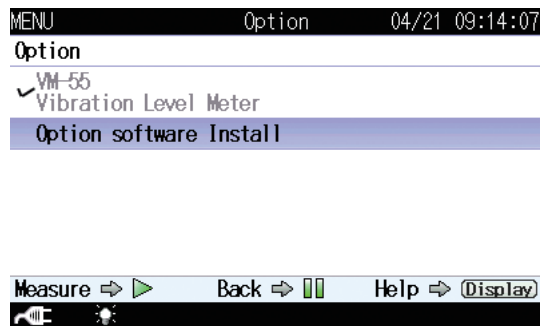
This screen switches the function from the unit to each program when an optional program is installed.

Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Option] and press the MENU/ENTER key. The option screen appears.

Each item of the switch function screen is selected using the  $\Delta/\nabla$  key.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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



## Option

Select a desired program name to switch the function.

Select the program name to be used and press the MENU/ENTER key.

Program names which are not installed will not be displayed.

## Measure

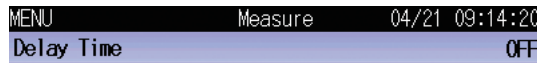
This screen sets the delay time

Use the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys to select [Measure] and press the MENU/ENTER key. The measurement setting screen appears.

Pressing the DISPLAY key displays explanation screen of the item that has been selected.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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



## Delay Time

Displays the screen to select the delayed measurement time that is an interval starting at the point the start key is pressed.

Select [Delay Time] and press the MENU/ENTER key. The delay time screen appears (see page 75).

The delayed measurement is invalid at Timer Auto store.

## Recall

This screen displays a stored data on internal memory or SD memory card. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The recall screen appears.

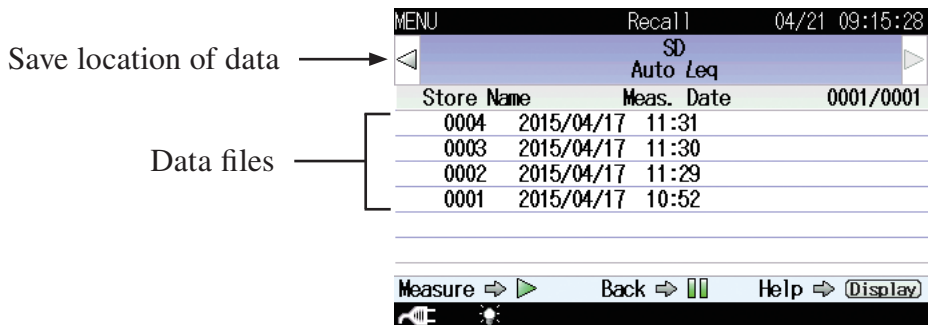
Use the  $\triangleleft/\triangleright$  keys to select a save location of data and the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select a data file.

Pressing the PAUSE/CONT key switches back to the menu list screen.

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

**Note**

It may take some time to read data and display the recall screen if the volume of stored data is large.

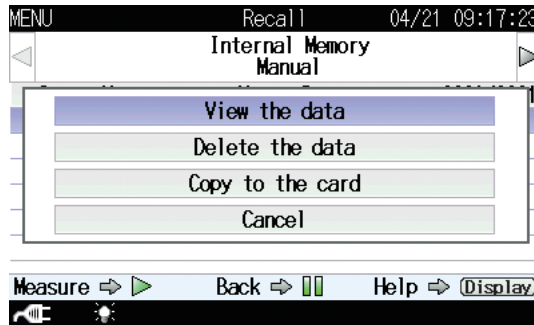


The save location of data can be “Internal Memory Manual”, “SD Manual”, “SD Auto Lv” or “SD Auto Leq”. Without an SD memory card, only “Internal Memory Manual” is available.

**Note**

If a data file saved on a computer is copied or manipulated, and the copied file is then loaded back into the VM-55, the displayed measurement date and time may not match the actual time stamp of the measurement.

Select data file and press the MENU/ENTER key. The file processing screen appears.

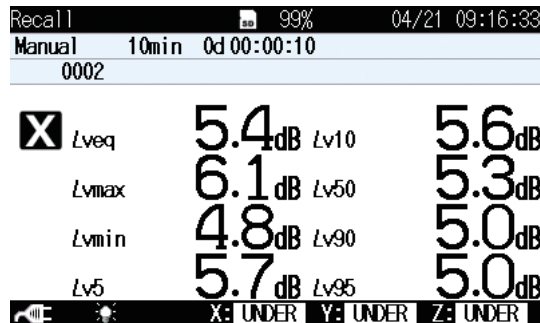


### View the data

Displays the measurement data of the selected data file.

Select [View the data] and press the MENU/ENTER key.

You can use the  $\Delta/\nabla$  keys to display data stored at higher or lower address numbers.



### Delete the data

Deletes the selected data file.

Select [Delete the data] and press the MENU/ENTER key. The confirmation screen appears.

Use the  $\Delta/\nabla$  keys to select [Yes] and press the MENU/ENTER key.

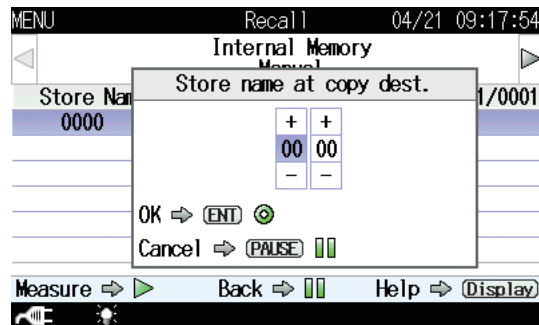


## Copy to the card (only internal memory data)

Copies the selected internal memory data file to the inserted SD memory card.

Select [Copy to the card] and press the MENU/ENTER key. The store name set screen appears.

Set the store name (number of four digits) at the copy destination and press the MENU/ENTER key.



## Cancel

Shuts the file processing screen.

Select [Cancel] and press the MENU/ENTER key.

## **WR**

Select this screen to record the waveform using optional program VX-55WR.

If VX-55WR is not installed, it is not possible to select this screen.

For details, please refer to the instruction manual of Waveform Recording Program VX-55WR.

## MENU list items

<b>System (Language)</b>	
Read/Save Settings ▾	-----Load Default Settings Internal Memory---- List of setting groups on internal memory Startup File
Clock Settings	
Backlight/LCD Settings ▾	-----Backlight Auto Off Backlight brightness LCD Auto Off (Auto Store)
Battery Type---- Alkaline / Ni-MH	
Card Format	
Index	
Program Information ▾	-----Model, Version
Eco Setting	
Language---日本語 /English/ 한국어	
<b>Store</b>	
Store Mode----	Manual / Auto* <sup>1</sup> / Timer Auto* <sup>1</sup>
Manual----	Store Name* <sup>2</sup> , Measurement channel, Measurement Time
Auto----	Store Name, Measurement channel, Total Measurement Time, <i>L<sub>v</sub></i> Store Interval, <i>Leq</i> Calculation Interval
Timer Auto----	Store Name, Measurement channel, <i>L<sub>v</sub></i> Store Interval, <i>Leq</i> Calculation Interval, Timer Auto Start, Timer Auto Stop, Timer Auto Interval, Sleep Mode
<b>Display / I/O</b>	
Timer-Level graph Time scale	
Output ▾	-----Output ON/OFF, Type, Freq
Comparator* <sup>1</sup> ▾	----- Comparator ON/OFF, Comparator level, Comparator channel, Comparator band
Communication Interface----OFF / USB / RS-232C (When RS-232C is selected: Baud rate, Flow control)	
<b>Save / Print</b>	
<b>Option</b>	
<b>Measure</b>	
Delay Time	
<b>Recall</b>	
Recall data list	
<b>WR*<sup>3</sup></b>	

▾-----: Items displayed when proceeding to next menu level

\*1: When optional VX-55EX is installed

\*2: When SD memory card is inserted

\*3: When optional VX-55WR is installed

# Measurement

All processing functions provided by the unit ( $L_{eq}$ ,  $L_{max}$ ,  $L_{min}$ ,  $L_5$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ ,  $L_{95}$ ) are carried out simultaneously. When equivalent continuous level is measured, the maximum value, minimum value and percentile vibration level are also determined.

When the [Store] screen selected from the menu list screen has been used to set the measurement channels to “XYZ”, measurement and calculation processing are carried out for the three axes. If the measurement channel has been set to “Z”, measurement and calculation processing are carried out only for the Z axis.

Before starting measurement, be sure to set the date and time as described on page 32.

## Vibration level ( $L_v$ ) and vibration acceleration level ( $L_{va}$ ) measurement

The procedure for measurement is described below.

Preparations as described in the “Preparations” chapter must be completed first.

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 be established again. Therefore the actual display may not always be the same.

Note
After turning power on, wait at least one minute before starting measurement, in order to allow the circuitry of the unit to stabilize. Compared to the VM-53/53A, the time required for stabilization is somewhat longer.

2. Set the measurement channel displayed on the measurement screen. Use the  $\triangle/\nabla/\triangleleft/\triangleright$  keys on the menu list screen to select [Store] and press the MENU/ENTER key. The store screen appears.

3. Use the  $\Delta/\nabla$  keys to select [Measurement channel] and press the MENU/ENTER key. The measurement channel setting screen appears.
4. Use the  $\Delta/\nabla$  keys to select the measurement channel (Z, XYZ) and press the MENU/ENTER key.

When the “Z” setting has been selected, measurement is carried out only for the Z axis.

When the “XYZ” setting has been selected, measurement is carried out for all three axes.

5. Use the Lv/Lva key on the control section to select the displayed level.
6. Use the X/Y/Z/XYZ key on the control section to select the vibration axis.
7. Select the level range with the LEVEL RANGE keys.

The upper and lower limit of the bar graph can be set even on the measurement screen.

If [ **OVER** ] or [ **UNDER** ] is shown frequently, change the level range setting.

8. The level indication shows the currently measured vibration level. The reading is updated once every second.

The PAUSE/CONT key can be used to pause and resume the updating of level indication. The bar graph indication will be updated also during pause. In the pause condition, a pause symbol (II) appears on the display.

The DISPLAY key in the control section can be used to switch between the Max Hold screen and the Time-Level screen.

Note
If the measurement channel has been set to “Z”, measurement value of the x axis and the y axis will be displayed as “--.-”.

## Equivalent continuous level ( $L_{veq} / L_{vaeq}$ ) measurement

The procedure for measurement is described below.

Preparations as described in the “Preparations” chapter must be completed first.

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 be established again. Therefore the actual display may not always be the same.  
For information about how to store data, refer to the section “Store operation” on page 78.
2. Set the store mode.  
Use the  $\Delta / \nabla / \triangleleft / \triangleright$  keys on the menu list screen to select [Store] and press the MENU/ENTER key. The store screen appears.
3. Use the  $\Delta / \nabla$  keys to select [Store Mode] and press the MENU/ENTER key. The store mode screen appears.
4. Use the  $\Delta / \nabla$  keys to select [Manual] and press the MENU/ENTER key.
5. Set the measurement channel.  
Use the  $\Delta / \nabla$  keys to select [Measurement channel] and press the MENU/ENTER key. The measurement channel setting screen appears.
6. Use the  $\Delta / \nabla$  keys to select the measurement channel (Z, XYZ) and press the MENU/ENTER key.  
When the “Z” setting has been selected, measurement is carried out only for the Z axis.  
When the “XYZ” setting has been selected, measurement is carried out for all three axes.
7. Set the measurement time.  
Use the  $\Delta / \nabla$  keys to select [Measurement Time] and press the MENU/ENTER key. The measurement time screen appears.

8. Use the  $\Delta/\nabla$  keys to select the measurement time (500s [seconds], 10s, 1min [minute], 5min, 10min, 15min, 30min, 1h [hour], 8h, 24h, User setting) and press the MENU/ENTER key.

When “User setting” is selected, arbitrary measurement time can be set (At most for 24 hours).

Press the PAUSE/CONT key to return to the menu list screen.

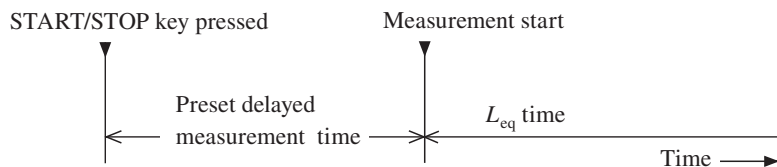
9. If necessary, set the delayed measurement time. When START/STOP key is pressed, measurement will start after the preset delayed measurement time.

Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Measure] and press the MENU/ENTER key. The measurement setting screen appears.

10. Use the  $\Delta/\nabla$  keys to select [Delay Time] and press the MENU/ENTER key. The delay time screen appears.

11. Use the  $\Delta/\nabla$  keys to select the delayed measurement time (OFF, 1s [second], 3s, 5s, 10s) and press the MENU/ENTER key.

Press the START/STOP key to return to the measurement screen.



Time graph for delayed measurement time

12. Use the DISPLAY key on the control section to display the processed data screen.
13. Use the Lv/Lva key on the control section to select the displayed level.
14. Use the X/Y/Z/XYZ key on the control section to select the vibration axis.
15. Select the level range with the LEVEL RANGE keys.

The upper and lower limit of the bar graph can be set even on the measurement screen.

If [ **OVER** ] or [ **UNDER** ] is shown frequently, change the level range setting.

16. Press the START/STOP key to start the measurement.

At this point, previous measurement values are cleared.

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 set in step 8 has elapsed, the measurement is terminated automatically.

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

If signal overload or an under-range condition occurs at least once during measurement, the indication **OVER** or **UNDER** appears, to indicate that overload or under-range data are comprised in the processed values.

### Important

During measurement, the  $\Delta/\nabla$  keys function as markers (for the case the store mode is set to Auto or Timer Auto, and the  $L_v$  store interval is specified). Pressing and holding the  $\Delta/\nabla$  keys can add a marker to specify an interval.

Be sure to complete all settings before starting the measurement.

### Note

During measurement, the equivalent continuous level at a given moment can be checked on the processed data screen. (This applies only to the numeric level indication. The bar graph shows the vibration level.)

During measurement, the PAUSE/CONT key can be used to pause and resume the measurement. During pause, the pause symbol (II) is shown. (The paused interval is not included in the measurement time.)



17.  $L_{veq}$  or  $L_{vaeq}$  means that the equivalent continuous level is displayed on the processed data screen.

If the indication **OVER** is shown, the processed data include an overload condition.

If the indication **UNDER** is shown, the processed data include an under-range condition.

The Lv/Lva key in the control section can be used to toggle the indicated level and the X/Y/Z/XYZ key to select the vibration axis. The DISPLAY key in the control section can be used to switch between the Max Hold screen and the Time-Level screen.

## Other processed value measurement

Other processed value listed below are all measured at the same time as the equivalent continuous level.

- Maximum value of vibration level ( $L_{vmax}$ ) and vibration acceleration level ( $L_{vamax}$ )
- Minimum value of vibration level ( $L_{vmin}$ ) and vibration acceleration level ( $L_{vamin}$ )
- Percentile level of vibration level ( $L_{v5}$ ,  $L_{v10}$ ,  $L_{v50}$ ,  $L_{v90}$ ,  $L_{v95}$ ) and vibration acceleration level ( $L_{va5}$ ,  $L_{va10}$ ,  $L_{va50}$ ,  $L_{va90}$ ,  $L_{va95}$ )

Note
To perform a MAX HOLD measurement, press the MAX HOLD RESET key before the measurement to reset the value.

# Store Operation

The VM-55 can store measurement data (processed data such as vibration level and equivalent continuous level, and measurement parameters) in the internal memory or on SD memory card.

This chapter describes how to store data in memory and how to recall data from memory. There are three different modes of storing data, as listed below. When the optional Extended Function Program VX-55EX is not installed, only the manual mode can be operated.

Store names cannot be set when no SD memory card is inserted.

Important
Use SD memory cards provided by Rion. The performance of other cards is not guaranteed (see page 100).

Note
Prior to measurement, it is recommended first to format the memory card for storing data with this unit (see page 101).

## Manual

Only processed data are considered as a single data set, and an operator stores the data set one-by-one manually.

When an operator performs store operation after a measurement, each processed value and measurement condition will be stored with the time value.

If no SD memory card is inserted, the data will be stored in the internal memory of the unit. If an SD memory card is inserted, the data will automatically be stored on the card.

Internal memory capacity: max. 1000 data sets

SD memory card capacity: max. 1000 data sets per store name

## Auto (only when the VX-55EX is installed)

The processing result which is obtained using the selected vibration level and specified interval by the store interval setting will be recorded continuously.

When the following one of conditions occurred, the store is stopped and data is saved.

- When the total measurement time reached the set value.
- When the  $L_{eq}$  store reached 999,999 sets.
- When the capacity of the SD memory card became insufficient.

### $L_V$ store

The vibration level and vibration acceleration level of up to 1,000 hours can be stored continuously and automatically.

This function becomes available when an SD memory card is inserted.

This is useful when recording the vibration level waveform.

The store interval can be selected from 100 ms (milliseconds), 1 s (second).

### $L_{eq}$ store

All processed data except vibration level and vibration acceleration level are considered as a single data set, and up to 999,999 data sets can be stored continuously and automatically.

This function becomes available when an SD memory card is inserted.

This is suitable for a measurement with a specified long period of time.

The processing interval can be selected from 500 s (seconds), 10 s, 1 min (minute), 5 min, 10 min, 30 min, 1 h (hour), 8 h, 24 h and manually selected time (user setting; up to 24 hours).

## Timer Auto (only when the VX-55EX is installed)

Executes Auto store by fixed interval from the start time to stop time.

When the following one of conditions occurred, the store is stopped and data is saved.

- When the total measurement time reached the 1,000 hours.
- When the  $L_{eq}$  store reached 999,999 sets.
- When the capacity of the SD memory card became insufficient.

<b>Important</b>
Never turn off power to the unit or remove the SD memory card while a store operation is in progress. Otherwise internal data can be destroyed.
If an SD memory card is inserted in the slot while the store mode is Manual, use of the internal memory for store is not possible.
An SD memory card has to be inserted in the slot while the store mode is Auto or Timer Auto.

<b>Note</b>
A processing start time is used for a time stamp of measurement and processed data. For example, when performing one-minute processing with $L_{eq}$ store, the time stamp 00:01:02 indicates that the data is obtained for one minute from 00:01:02.

## Notes for using the data management software AS-60

- Since AS-60 cannot read Manual store data, perform measurement with Auto or Timer Auto store to handle measurement data using AS-60.
- When  $L_v$  store is executed with a store interval of 1 s on VM-55, AS-60 calculates the time takt-max  $L_v$  of measurement data as  $L_{max}$ , and takt-min  $L_v$  as  $L_{min}$ . To obtain the more accurate values of  $L_{max}$  and  $L_{min}$ , execute  $L_v$  store with a store interval of 100 ms. In this case,  $L_{max}$  and  $L_{min}$  are measured with  $L_v$  at every store interval of 100 ms.

## Manual mode operation

### Memory store

When an operator performs store operation on the confirmation screen displayed after processing finishes, each processed data will be stored.

If no SD memory card is inserted, the data will be stored in the internal memory of the unit. If an SD memory card is inserted, the data will automatically be stored on the card.

The procedure is as follows.

1. Press the POWER key to turn the unit on.
2. Press the MENU/ENTER key to bring up the menu list screen.
3. Use the  $\Delta$  /  $\nabla$  /  $\triangleleft$  /  $\triangleright$  keys to select [Store] and press the MENU/ENTER key. The store screen appears.
4. Use the  $\Delta$  /  $\nabla$  keys to select [Store Mode] and press the MENU/ENTER key. The store mode settings screen appears.
5. Use the  $\Delta$  /  $\nabla$  keys to select [Manual] and press the MENU/ENTER key. When the optional Extended Function Program VX-55EX is not installed, only the [Manual] can be selected.

MENU	Store	04/21 09:11:40
Store Mode		Manual
Store Name		0006
Measurement channel		XYZ
Measurement Time		10min

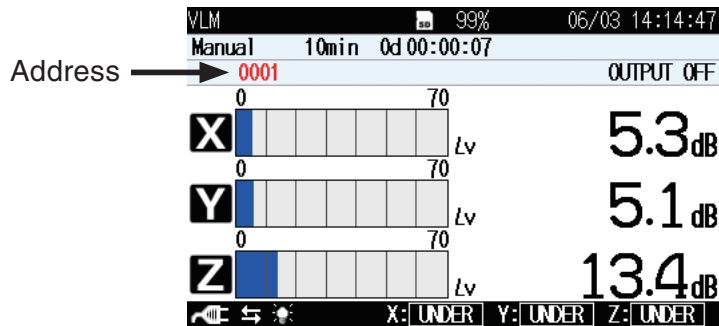


**Store screen when Manual mode is selected**

6. Specify the store name (number of four digits: when SD memory card is inserted).
  - 6-1. Use the  $\triangle/\nabla$  keys to select [Store Name] and press the MENU/ENTER key. The store name screen appears.
  - 6-2. Use the  $\triangleleft/\triangleright$  keys to select the first two digits, and use the  $\triangle/\nabla$  keys to set the value.
  - 6-3. Use the  $\triangleleft/\triangleright$  keys to select the final two digits, and use the  $\triangle/\nabla$  keys to set the value. Then press the MENU/ENTER key.
7. Set the measurement channel.
  - 7-1. Use the  $\triangle/\nabla$  keys to select [Measurement channel] and press the MENU/ENTER key. The measurement channel setting screen appears.
  - 7-2. Use the  $\triangle/\nabla$  keys to select the measurement channel (Z, XYZ) and press the MENU/ENTER key.
8. Set the measurement time.
  - 8-1. Use the  $\triangle/\nabla$  keys to select [Measurement Time] and press the MENU/ENTER key. The measurement time screen appears.
  - 8-2. Use the  $\triangle/\nabla$  keys to select the measurement time (500s, 10s, 1min, 5min, 10min, 15min, 30min, 1h, 8h, 24h, User setting) and press the MENU/ENTER key.
  - 8-3. When “User setting” is selected, [User setting] is displayed on the store screen. Select [User setting] and press the MENU/ENTER key.
  - 8-4. The measurement time setting screen appears. Set arbitrary measurement time (At most for 24 hours).  
The shortest time value that can be set with “User setting” is 1 second and the longest is 24 hours.
9. Press the START/STOP key to return to the measurement screen.

10. Specify the store address.

The currently selected address is shown on the screen. If the address is shown in red, it already contains data.



The  $\Delta/\nabla$  keys can be used to specify the address in the range from 0001 to 1000. Any data already present in the selected address will be overwritten (erased and replaced by the new data). For information on how to check existing data, see the section “Recalling stored data”.

**Note**

In Manual mode, no data overwrite warning will be shown. Proceed with care, as data will be forcibly overwritten.

11. Start a measurement. When it finishes, a confirmation screen will be displayed. Use the  $\Delta/\nabla$  keys to select “Store data” and press the MENU/ENTER key to store the processing results.

The store process takes about 1 second. When it is completed, the address is incremented by one step. The stored data includes the following information: date and time when processing was started, measurement time, conditions and processing results, overload and under-range information, other information.

The T-L (time-level graph) display screen is not stored.

**Important**

Any measurement data present in the currently displayed address will be overwritten. If the address is shown in red, it contains data. Take care not to accidentally overwrite data.

<b>Note</b>
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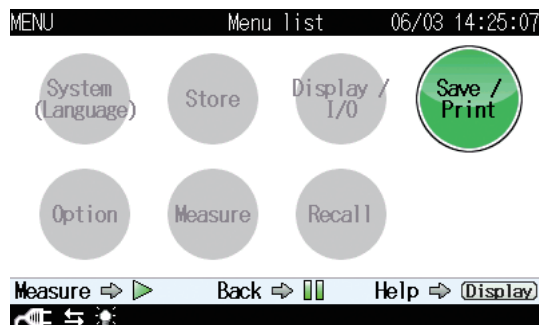
<p>When the number of address for storing data is 1000, it will not be incremented and it flashes on the display. If you change the address with the <math>\Delta</math> or <math>\nabla</math> key in this condition, the flashing will stop, and data can be stored in the newly selected address.</p>
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## Saving the instantaneous value and maximum hold (MAX HOLD) value

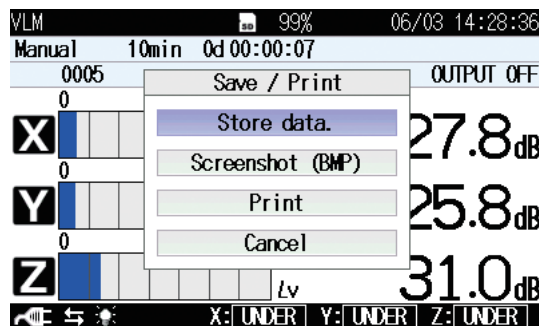
In Manual mode, the instantaneous value and maximum hold value for the vibration level and vibration acceleration level can be saved by pressing the PAUSE key in the instantaneous value display (current) condition.

To use this function, proceed as follows.

1. While processing is stopped (current condition), press the PAUSE/CONT key. Updating of the screen is temporarily paused.
2. Press the MENU/ENTER key to bring up the menu list screen. In this condition, only [Save / Print] can be selected from the menu list screen.



3. Press the MENU/ENTER key. The save/print screen appears.





4. Use the  $\Delta/\nabla$  keys to select [Store data.] and press the MENU/ENTER key. The current data are saved in memory, and the measurement screen appears again.
5. Pressing the PAUSE/CONT key once more cancels the pause condition and causes screen updating to resume.

## Recalling stored data

The procedure for recalling data stored in memory using Manual mode is described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The file selection screen appears.
3. Save location of data, “Internal Memory Manual”, “SD Manual”
4. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select the data you want to recall and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [View the data] and press the MENU/ENTER key. The data stored in memory are displayed.

## Deleting stored data

The procedure for deleting data stored in memory using Manual mode is described below.

Note
Data are deleted in store name units. It is not possible to selectively delete data for a specific address.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The file selection screen appears.
3. Use the  $\Delta/\nabla$  keys to select the save location of the data. To recall data saved in internal memory, use the  $\triangleleft/\triangleright$  keys to select [Internal Memory Manual]. To recall data saved on SD memory card, use the  $\triangleleft/\triangleright$  keys to select [SD Manual].

4. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select the data you want to delete and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [Delete the data] and press the MENU/ENTER key.
6. The confirmation screen appears. Use the  $\Delta/\nabla$  keys to select [Yes] and press the MENU/ENTER key. The selected data are deleted.

### **Copying stored data in internal memory to SD memory card**

The procedure for copying stored data in internal memory to SD memory card is described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The file selection screen appears.
3. Use the  $\Delta/\nabla$  keys to select the save location of the data. To delete data saved in internal memory, use the  $\triangleleft/\triangleright$  keys to select [Internal Memory Manual]. To delete data saved on SD memory card, use the  $\triangleleft/\triangleright$  keys to select [SD Manual].
4. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select the internal memory data you want to copy to SD memory card and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [Copy to the card] and press the MENU/ENTER key.
6. The [Store name at copy dest.] screen appears. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to set the store name and press the MENU/ENTER key.

Note
If the entered store name already exists, a message asking for overwrite confirmation appears.

## Auto mode operation


### Memory store

Note
The optional Extended Function Program VX-55EX should be installed.
An SD memory card should be inserted.
With the Auto mode, $L_v$ store and $L_{eq}$ store are executed simultaneously (separate operation also possible).

The procedure for storing data using Auto mode is as follows.

Confirm the SD memory card has been inserted in the card slot.

1. Press the POWER key to turn the unit on.
2. Press the MENU/ENTER key to bring up the menu list screen.
3. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Store] and press the MENU/ENTER key. The store screen appears.
4. Use the  $\Delta/\nabla$  keys to select [Store Mode] and press the MENU/ENTER key. The store mode settings screen appears.
5. Use the  $\Delta/\nabla$  keys to select [Auto] and press the MENU/ENTER key.

MENU	Store	04/21 09:12:03
Store Mode	Auto	
Store Name	0006	
Measurement channel	XYZ	
Total Measurement Time	User setting	
User setting	1000h	
$L_v$ Store Interval	OFF	
$L_{eq}$ Calculation Interval	10s	
Measure $\Rightarrow$ 	Back $\Rightarrow$ 	Help $\Rightarrow$ 

### Store screen when Auto mode is selected

6. Specify the store name.
  - 6-1. Use the  $\Delta/\nabla$  keys to select [Store name] and press the MENU/ENTER key. The store name screen appears.
  - 6-2. Use the  $\triangleleft/\triangleright$  keys to select the first two digits, and use the  $\Delta/\nabla$  keys to set the value.
  - 6-3. Use the  $\triangleleft/\triangleright$  keys to select the final two digits, and use the  $\Delta/\nabla$  keys to set the value. Then press the MENU/ENTER key.
7. Set the measurement channel.
  - 7-1. Use the  $\Delta/\nabla$  keys to select [Measurement channel] and press the MENU/ENTER key. The measurement channel setting screen appears.
  - 7-2. Use the  $\Delta/\nabla$  keys to select the measurement channel (Z, XYZ) and press the MENU/ENTER key.
8. Set the total measurement time.
  - 8-1. Use the  $\Delta/\nabla$  keys to select [Total Measurement Time] and press the MENU/ENTER key. The total measurement time screen appears.
  - 8-2. Use the  $\Delta/\nabla$  keys to select the total measurement time (500s, 10s, 1min, 5min, 10min, 15min, 30min, 1h, 8h, 24h, User setting) and press the MENU/ENTER key.
  - 8-3. When “User setting” is selected, [User setting] is displayed on the store screen. Select [User setting] and press the MENU/ENTER key.
  - 8-4. The total measurement time setting screen appears. Set arbitrary total measurement time . The shortest time value that can be set with “User setting” is 1 second and the longest is 1,000 hours.
9. Set the  $L_v$  store interval.
  - 9-1. Use the  $\Delta/\nabla$  keys to select [ $L_v$  Store Interval] and press the MENU/ENTER key. The  $L_v$  store interval screen appears.
  - 9-2. Use the  $\Delta/\nabla$  keys to select the  $L_v$  store interval (OFF, 100ms, 1s) and press the MENU/ENTER key.  
If the  $L_v$  store interval set to OFF,  $L_v$  is not stored.

10. Set the  $L_{eq}$  calculation interval.
  - 10-1. Use the  $\Delta/\nabla$  keys to select [Leq Calculation Interval] and press the MENU/ENTER key. The  $L_{eq}$  calculation interval screen appears.
  - 10-2. Use the  $\Delta/\nabla$  keys to select the  $L_{eq}$  calculation interval (OFF, 500s, 10s, 1min, 5min, 10min, 15min, 30min, 1h, 8h, 24h, User setting) and press the MENU/ENTER key.  
If the  $L_{eq}$  calculation interval set to OFF,  $L_{eq}$  is not stored.
  - 10-3. When “User setting” is selected, [User setting] is displayed on the store screen. Select [User setting] and press the MENU/ENTER key.
  - 10-4. The  $L_{eq}$  calculation interval setting screen appears. Set arbitrary interval. The shortest time value that can be set with “User setting” is 1 second and the longest is 24 hours.

Note
Both $L_v$ store interval and $L_{eq}$ calculation interval cannot be set to OFF.

11. Press the START/STOP key to return to the measurement screen.
12. Press the START/STOP key to start measurement. The measurement value will be stored automatically at every interval set for  $L_v$  store interval and  $L_{eq}$  calculation interval.  
When it is completed, the address is incremented by one step.  
Measurement will stop when the end of the total measurement time is reached.  
To stop the process earlier, press the START/STOP key.

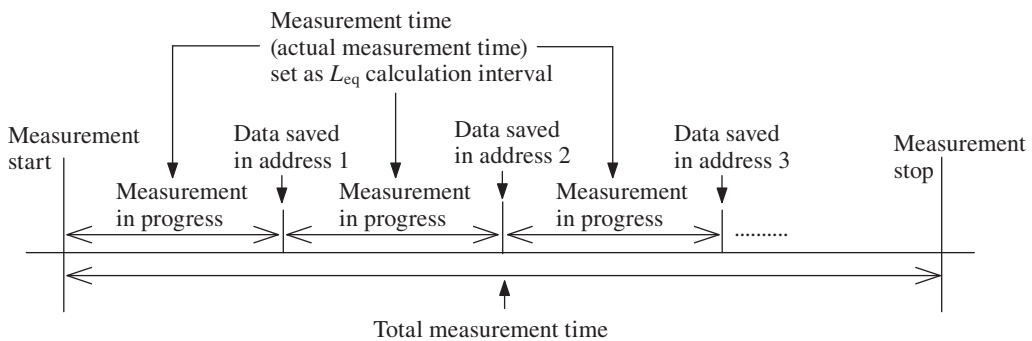
## Note

**Relationship between elapsed measurement time and number of data**

When using Auto mode and 100-ms sampling, 10 data sets are stored per second. Therefore, when 10 seconds of measurement time have elapsed, the number of stored data is 100 (10 when using 1-second sampling).

During Auto mode, the pause function cannot be used.

During Auto mode, the address indication is based on number of  $L_{eq}$  calculation. The number of  $L_{eq}$  calculation is not displayed when  $L_{eq}$  calculation interval is OFF.



## Recalling stored data

The procedure for recalling data stored in memory using Auto mode is described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The file selection screen appears.
3. Use the  $\Delta/\nabla$  keys to select the data store location. To display stored  $L_v$  data, use the  $\triangleleft/\triangleright$  keys to select [SD Auto Lv]. To display stored  $L_{eq}$  data, use the  $\triangleleft/\triangleright$  keys to select [SD Auto Leq].
4. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select the data you want to recall and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [Confirm the data] and press the MENU/ENTER key. The data stored in memory are displayed.

## Deleting stored data

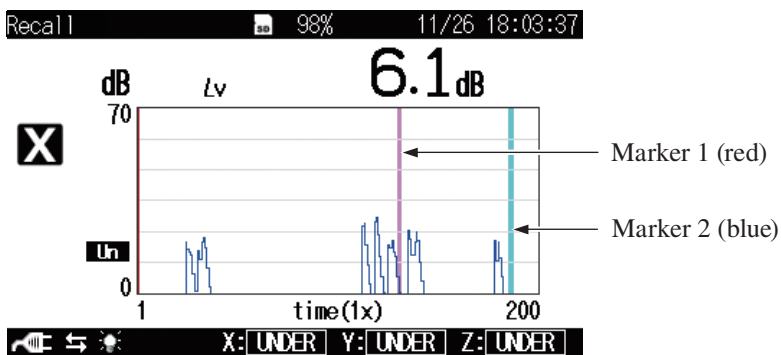
The procedure for deleting data stored in memory using Auto mode is described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The file selection screen appears.
3. Use the  $\Delta/\nabla$  keys to select the data store location. To delete stored  $L_v$  data, use the  $\triangleleft/\triangleright$  keys to select [SD Auto Lv]. To delete stored  $L_{eq}$  data, use the  $\triangleleft/\triangleright$  keys to select [SD Auto Leq].
4. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select the data you want to delete and press the MENU/ENTER key.
5. Use the  $\Delta/\nabla$  keys to select [Delete the data] and press the MENU/ENTER key.
6. The confirmation screen appears. Use the  $\Delta/\nabla$  keys to select [Yes] and press the MENU/ENTER key. The selected data are deleted.

## Marker

When the store mode is set to Auto or Timer Auto, and the  $L_v$  store interval is specified, a marker can be added to the data.

1. Select [Store] from the menu list screen and set the store mode to Auto or Timer Auto.  
Also set the required measurement parameters such as  $L_v$  store interval.
2. Press the START/STOP key to set the unit to the measurement condition.
3. The  $\triangle$  (marker 1) and  $\nabla$  (marker 2) keys now function as markers. Pressing a key will insert the corresponding marker into the screen.
4. Wait until the preset measurement time has ended, or stop the measurement with the START/STOP key.
5. Use the  $\triangle/\nabla$  keys to select [Recall] on the menu list screen and press the MENU/ENTER key.
6. Use the  $\triangle/\nabla$  keys to select save location of data and use the  $\triangle/\nabla$  keys to select "SD Auto  $L_v$ ".
7. Use the  $\triangle/\nabla/\triangle/\nabla$  keys to select data file and press the MENU/ENTER key. The file processing screen appears.
8. Use the  $\triangle/\nabla$  keys to select [View the data] and press the MENU/ENTER key. The recall data is displayed.
9. Press the DISPLAY key to switch the display. A time-level screen appears showing the marker information.



**Time-Level screen**



## Timer Auto mode operation

### Memory store

Note
The optional Extended Function Program VX-55EX should be installed.
An SD memory card should be inserted.
With the Timer Auto mode, $L_v$ store and $L_{eq}$ store are executed simultaneously.

The procedure for storing data using Timer Auto mode is as follows.  
Confirm the SD memory card has been inserted in the card slot.

1. Press the POWER key to turn the unit on.
2. Press the MENU/ENTER key to bring up the menu list screen.
3. Use the  $\Delta/\nabla/\leftarrow/\rightarrow$  keys to select [Store] and press the MENU/ENTER key. The store screen appears.
4. Use the  $\Delta/\nabla$  keys to select [Store Mode] and press the MENU/ENTER key. The store mode settings screen appears.
5. Use the  $\Delta/\nabla$  keys to select [Timer Auto] and press the MENU/ENTER key.

MENU	Store	04/21 09:12:50
Store Mode	Timer Auto	
Store Name	0006	
Measurement channel	XYZ	
$L_v$ Store Interval	OFF	
$L_{eq}$ Calculation Interval	10s	
Timer Auto Start	2015/04/21 09:17	
Timer Auto Stop	2015/04/21 18:28	
Timer Auto Interval	5min	
Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$

MENU	Store	04/21 09:13:01
Store Name	0006	
Measurement channel	XYZ	
$L_v$ Store Interval	OFF	
$L_{eq}$ Calculation Interval	10s	
Timer Auto Start	2015/04/21 09:17	
Timer Auto Stop	2015/04/21 18:28	
Timer Auto Interval	5min	
Sleep Mode	OFF	
Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$

### Store screen when Timer Auto mode is selected

6. Specify the store name.
  - 6-1. Use the  $\triangle/\nabla$  keys to select [Store Name] and press the MENU/ENTER key. The store name screen appears.
  - 6-2. Use the  $\triangleleft/\triangleright$  keys to select the first two digits, and use the  $\triangle/\nabla$  keys to set the value.
  - 6-3. Use the  $\triangleleft/\triangleright$  keys to select the final two digits, and use the  $\triangle/\nabla$  keys to set the value. Then press the MENU/ENTER key.
7. Set the measurement channel.
  - 7-1. Use the  $\triangle/\nabla$  keys to select [Measurement channel] and press the MENU/ENTER key. The measurement channel setting screen appears.
  - 7-2. Use the  $\triangle/\nabla$  keys to select the measurement channel (Z, XYZ) and press the MENU/ENTER key.
8. Set the  $L_v$  store interval.
  - 8-1. Use the  $\triangle/\nabla$  keys to select [ $L_v$  Store Interval] and press the MENU/ENTER key. The  $L_v$  store interval screen appears.
  - 8-2. Use the  $\triangle/\nabla$  keys to select the  $L_v$  store interval (OFF, 100ms, 1s) and press the MENU/ENTER key.  
If the  $L_v$  store interval set to OFF,  $L_v$  is not stored.
9. Set the  $L_{eq}$  calculation interval.
  - 9-1. Use the  $\triangle/\nabla$  keys to select [ $L_{eq}$  Calculation Interval] and press the MENU/ENTER key. The  $L_{eq}$  calculation interval screen appears.
  - 9-2. Use the  $\triangle/\nabla$  keys to select the  $L_{eq}$  calculation interval (OFF, 500s, 10s, 1min, 5min, 10min, 15min, 30min, 1h, 8h, 24h, User setting) and press the MENU/ENTER key.  
If the  $L_{eq}$  calculation interval set to OFF,  $L_{eq}$  is not stored.
  - 9-3. When “User setting” is selected, [User setting] is displayed on the store screen. Select [User setting] and press the MENU/ENTER key.

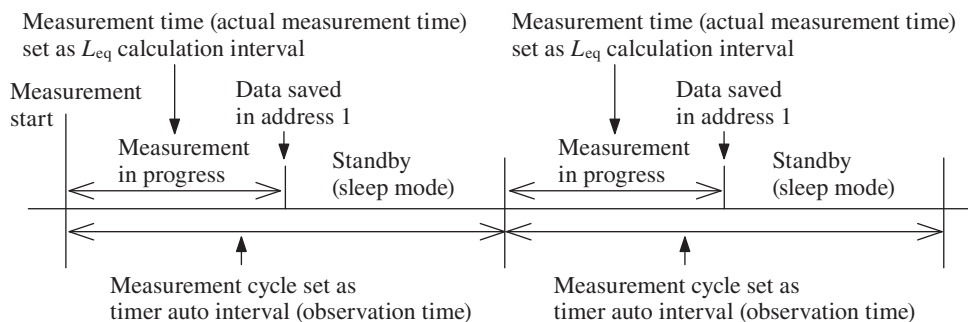
- 9-4. The  $L_{eq}$  calculation interval setting screen appears. Set arbitrary interval. The shortest time value that can be set with “User setting” is 1 second and the longest is 24 hours.

Note
Both $L_v$ store interval and $L_{eq}$ calculation interval cannot be set to OFF.

10. Set the start time. The measurement is started at the preset start time.
- 10-1. Use the  $\triangle/\nabla$  keys to select [Start] and press the MENU/ENTER key. The start time setting screen appears. When the start time setting screen is displayed for the first time, the time after 5 minutes from current time is indicated.
- 10-2. Use the  $\triangleleft/\triangleright$  keys to select the setting parameter (year, month, day, hour, minute), and use the  $\triangle/\nabla$  keys to set the value.
- 10-3. Repeat the step 10-2. When all the settings are completed, press the MENU/ENTER key.
11. Set the stop time. The measurement is stopped at the preset stop time.
- 11-1. Use the  $\triangle/\nabla$  keys to select [Stop] and press the MENU/ENTER key. The stop time setting screen appears.
- 11-2. Use the  $\triangleleft/\triangleright$  keys to select the setting parameter (year, month, day, hour, minute), and use the  $\triangle/\nabla$  keys to set the value.
- 11-3. Repeat the step 11-2. When all the settings are completed, press the MENU/ENTER key.

12. Set the timer auto interval. The “timer auto interval” is the time between measurements.
  - 12-1. Use the  $\triangle/\nabla$  keys to select [Timer Auto Interval] and press the MENU/ENTER key. The timer auto interval screen appears.
  - 12-2. Use the  $\triangle/\nabla$  keys to select the timer auto interval (OFF, 5min, 10min, 15min, 30min, 1h, 8h, 24h) and press the MENU/ENTER key.

### When timer auto interval is set



#### Note

When setting measurement parameters, the measurement time (actual measurement time) set with the  $L_{eq}$  calculation interval parameter may not exceed the measurement cycle (observation time) set with the timer auto interval parameter. Otherwise an error message will appear at the start of the measurement. If the measurement start time and end time are set to the same setting, measurement will not be performed.

13. Set the sleep mode (see page 61).
  - 13-1. Use the  $\triangle/\nabla$  keys to select [Sleep Mode] and press the MENU/ENTER key. The ON/OFF setting screen appears.
  - 13-2. When you use the sleep mode, select [ON] and press the MENU/ENTER key.

14. Press the START/STOP key. Measurement will start at the preset start time. The measurement value will be stored automatically at every interval set for  $L_v$  store interval and  $L_{eq}$  calculation interval. When it is completed, the address is incremented by one step. Measurement will stop at the preset stop time. To stop the process earlier, press the START/STOP key.

Note
<p><b>Relationship between elapsed measurement time and number of data</b></p> <p>When using Timer Auto mode and 100-ms sampling, 10 data sets are stored per second. Therefore, when 10 seconds of measurement time have elapsed, the number of stored data is 100 (10 when using 1-second sampling).</p>
<p>During Timer Auto mode, the pause function cannot be used.</p>
<p>During Timer Auto mode, the address indication is based on number of <math>L_{eq}</math> calculation. The number of <math>L_{eq}</math> calculation is not displayed when <math>L_{eq}</math> calculation interval is OFF.</p>
<p>If the final measurement would be shorter than the specified measurement time, that measurement is not performed. In this case, the operation ends with the preceding measurement.</p>

## **Recalling stored data**

Same procedure as for Auto mode (see page 91).

## **Deleting stored data**

Same procedure as for Auto mode (see page 91).

## **Marker**

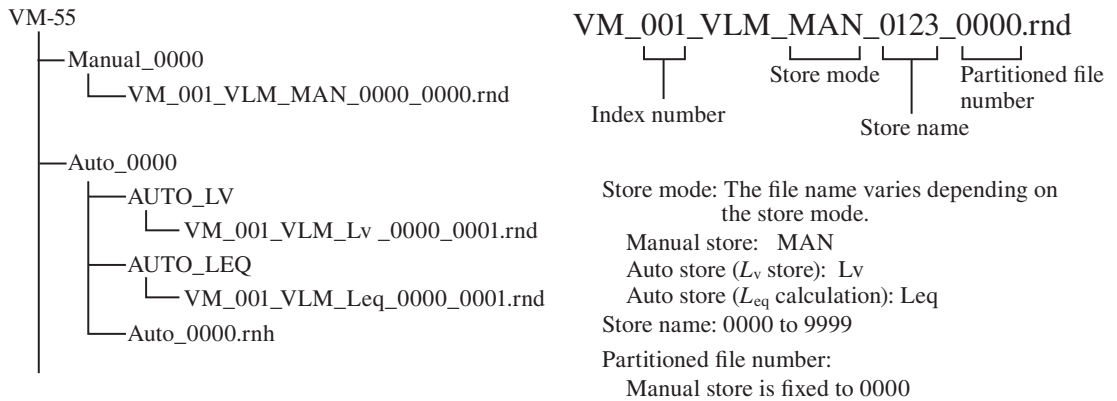
Same procedure as for Auto mode (see page 92).

## About the store data format

Data stored on the SD memory card are in CSV format. Various files and subdirectories are created on the card.

The store name specified on the menu screen is created as a 4-digit number under the subdirectory name.

The file of one per one address is made.



### Note

The measurement date and time information shown in the recall menu is taken from the date/time when the respective folder was created. Note that the measurement date/time information displayed in the recall list may change when data were stored in a computer and then copied to an SD memory card. The measurement date/time information for individual data does not change.

## About SD memory cards

The memory cards that can be used in this unit are SD memory cards. Be sure to use optional SD memory cards for VM-55 provided by Rion. SD memory cards even from the same manufacturer and of the same type exhibit certain variations in specifications which may cause problems. For this reason, be sure to use only the SD memory cards for VM-55 provided by Rion. The performance of other cards is not guaranteed.

An SD memory card inserted in the unit will be recognized as a removable disk by the computer when connected via USB, without having to install a USB driver.

To make the connection, use a generic USB cable (standard A male to mini B male connector). When not using the communication function, set the Communication Interface to OFF from the [Display / I/O] screen. When USB communication is enabled, a message requesting installation of a USB driver for USB communication will appear when the unit is connected to a computer.

Note
When using spreadsheet software or other programs on a computer to retrieve data from SD memory cards, some programs may not be able to read the original file names from the card. In such a case, rename the file using the extension “txt” (for example “VM_001_VLM_MAN_0123_0000.txt”). For software that identifies files by the file name extension, set the software up for reading text files.
If measurement data in the SD memory card is moved to a computer and then moved back to VM-55, the measurement date (time stamp) may be different from the actual date.



## Formatting an SD memory card

Important
Never format optional program cards such as the VX-55EX and VX-55WR 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.

Note
When an SD memory card is formatted (initialized), all data present on the card will be lost.

In the following cases, you should format the SD memory card:

- When using the SD memory card in the VM-55 for the first time
- When wishing to delete all data from the SD memory card

To format an SD memory card, proceed as follows.

1. Select [Card Format] on the [SYSTEM (Language)] screen and press the MENU/ENTER key.
2. The confirmation screen appears. Press the MENU/ENTER key.

Note
When formatting the SD memory card in a computer, select FAT or FAT32 as file system.

## Screen hard copy

When you press the  $\triangleright$  key of  $\triangle/\nabla/\triangleleft/\triangleright$  keys while holding down the DISPLAY key, the “Screenshot was saved to the card” message is displayed and the current screen contents will be saved as a bitmap file on the SD memory card.

Store target folder:	VM-55\Screenshot\
File name:	Time at which the file was stored
File name extension:	.BMP
Data capacity:	Approximately 300 kB per file



Saved screen data can be shown by using the  $\triangle/\nabla/\triangleleft/\triangleright$  keys while holding down the DISPLAY key. Pressing the  $\triangle$  key while showing screen data switches to another data set. Press the DISPLAY key to terminate the function.

# 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 (when the VX-55EX is installed)

### Only $L_v$ store interval set

		SD memory card capacity		
		512 MB	2 GB	32 GB
$L_v$ store interval	100 ms	Approx. 60 hours	Approx. 250 hours	Approx. 4000 hours
	1 s	Approx. 550 hours	Approx. 2250 hours	Approx. 36000 hours

### Only $L_{eq}$ processing interval set

		SD memory card capacity	
		512 MB	2 GB
Data sets		Approx. 3,352,000 sets	Approx. 13,481,000 sets

### Number of bytes per header file

About 1 kB per file

## When performing waveform recording (when the VX-55WR is installed)

Using Auto store,  $L_v$  store interval 100 ms, measurement channel XYZ

		SD memory card capacity		
		512 MB	2 GB	32 GB
Bit length	16 bit	Approx. 13 hours	Approx. 55 hours	Approx. 950 hours
	24 bit	Approx. 9 hours	Approx. 40 hours	Approx. 690 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.

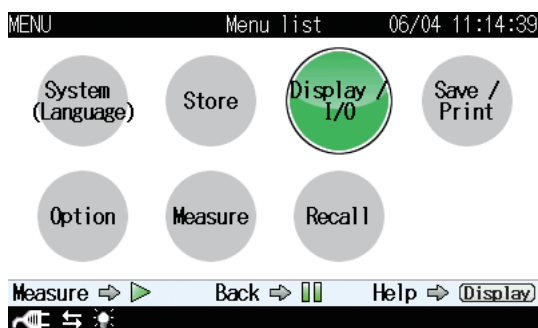
When the measurement channel is Z, the recording time will be about 2 times of the above list.

# Input/Output Connectors

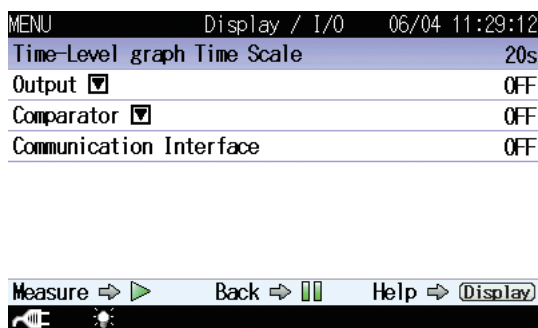
## OUTPUT connector

Set the signal output from the OUTPUT connector of the unit. Each signal of X, Y and Z axis is output from OUTPUT connector.

1. Press the MENU/ENTER key to bring up the menu list screen.



2. Use the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.



- Use the  $\Delta/\nabla$  keys to select [Output] and press the MENU/ENTER key. The output screen appears.

MENU	Output	06/04 11:17:55
Output		OFF

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)

- Use the  $\Delta/\nabla$  keys to select [Output] and press the MENU/ENTER key. The ON/OFF setting screen appears.

MENU	Output	06/04 11:18:06
Output		OFF

Output	
<input checked="" type="checkbox"/>	OFF
<input type="checkbox"/>	ON
OK $\Rightarrow$ (ENT)	
Cancel $\Rightarrow$ (PAUSE)	

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)

- Use the  $\Delta/\nabla$  keys to select [ON] and press the MENU/ENTER key. The [Output] setting becomes “ON”, and the [Type] and [Freq] items are shown on the output selection screen.

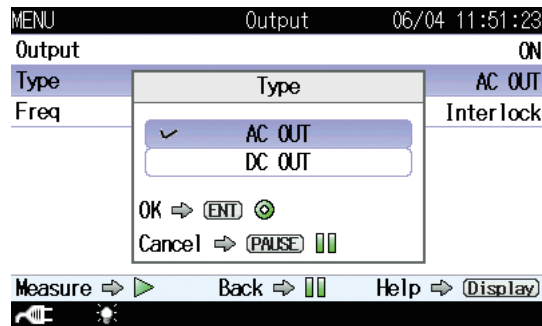
MENU	Output	06/04 11:43:35
Output		ON
Type		AC OUT
Freq		Interlock

Measure $\Rightarrow$	Back $\Rightarrow$	Help $\Rightarrow$ (Display)

6. Use the  $\Delta/\nabla$  keys to select [Type] and press the MENU/ENTER key. The type setting screen appears.
7. Use the  $\Delta/\nabla$  keys to select the signal type (AC OUT, DC OUT) and press the MENU/ENTER key.

When [AC OUT] is selected, an alternating current signal corresponding to the frequency characteristic selected in step 9 is output.

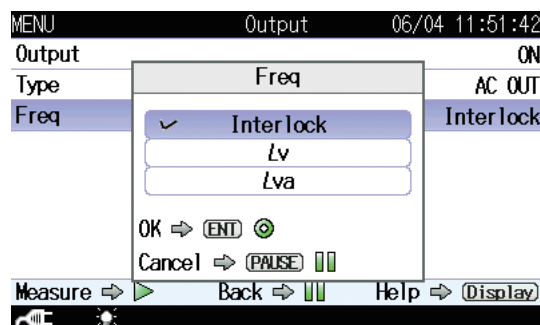
When [DC OUT] is selected, a direct current signal linked with the screen output setting is output.



8. Use the  $\Delta/\nabla$  keys to select [Freq] and press the MENU/ENTER key. The freq setting screen appears.
9. Use the  $\Delta/\nabla$  keys to select the frequency characteristic (Inter lock, Lv, Lva) and press the MENU/ENTER key.

When [Inter lock] is selected, a signal of the frequency characteristic shown on the measurement screen and of the type selected with the [Type] item is output.

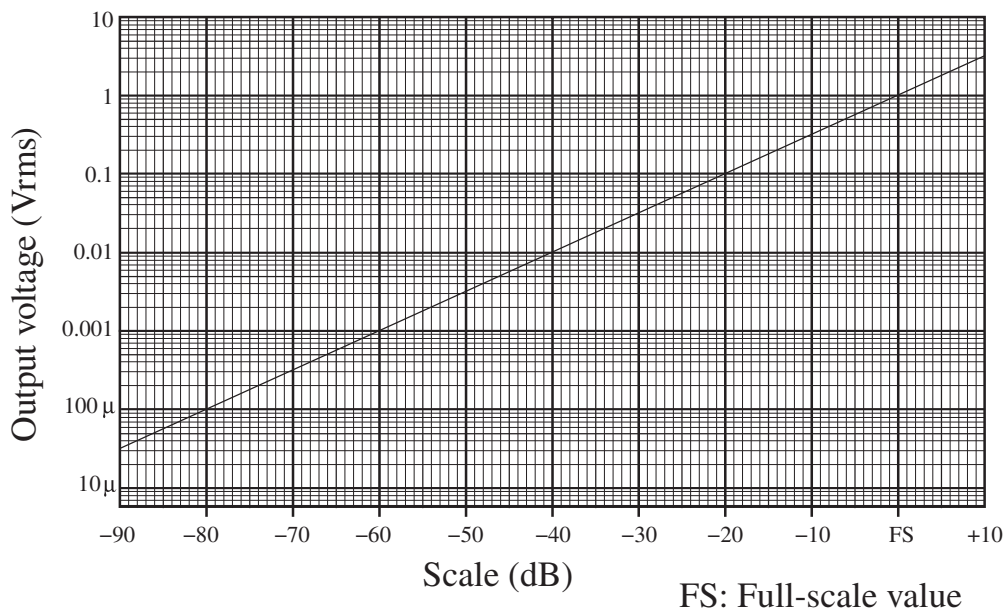
When [Lv] or [Lva] is selected, a signal of the selected frequency characteristic and of the type selected with the [Type] item is output.



## AC output characteristic

Output voltage:	1 Vrms (at Level Range Upper)
Output impedance:	600 $\Omega$
Load impedance:	10 k $\Omega$ or more
Suitable cable:	Output cord CC-24 (BNC - mini plug cable) The performance of other cables is not guaranteed.

The relationship between the display value shown by the unit and the output voltage is indicated below.



### Ideal characteristics of the display value and the output voltage

When the unit is set to the calibration mode, the output signal is 31.5 Hz, 1.0 Vrms.

#### Important

Using this feature will reduce battery life by about 25 percent.

### Delay

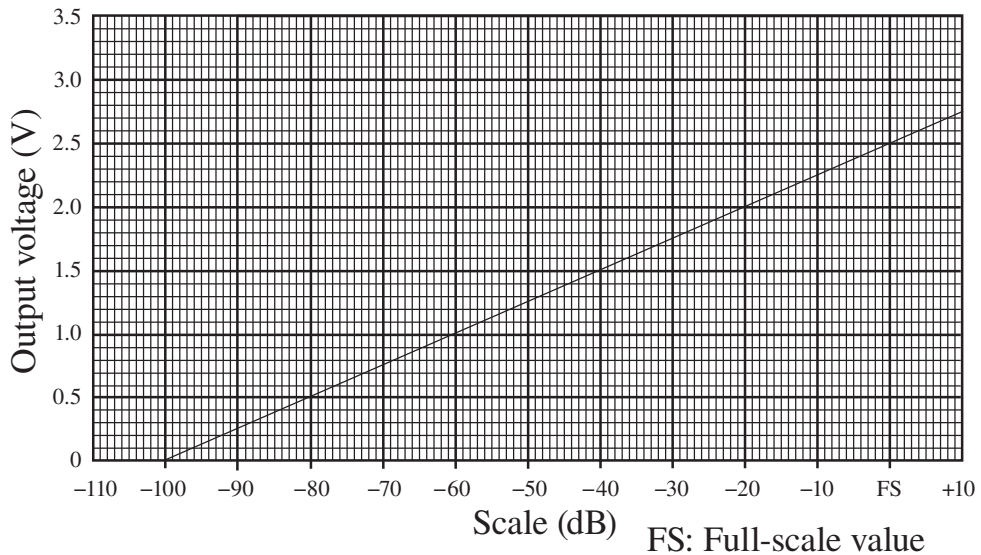
The unit incorporates an A/D converter which converts the microphone input signal into digital format for processing by a DSP chip. The result is then returned to analog format by a D/A converter and output as an AC signal. Due to this process, the output signal has a constant delay time with regard to the microphone input signal. The delay time is about 700  $\mu$ s in waveform recording, and about 1.3 ms in AC OUTPUT.



## DC output characteristic

Output voltage:	2.5 V (at Level Range Upper), 25 mV/dB
Output impedance:	600 $\Omega$
Load impedance:	10 k $\Omega$ or more
Suitable cable:	Output cord CC-24 (BNC - mini plug cable) The performance of other cables is not guaranteed.

The relationship between the display value shown by the unit and the output voltage is indicated below.



### Ideal characteristics of the display value and the output voltage

When the unit is set to the calibration mode, the output signal is 2.5 V.

#### Important

Using this feature will reduce battery life by about 25 percent.

## I/O connector

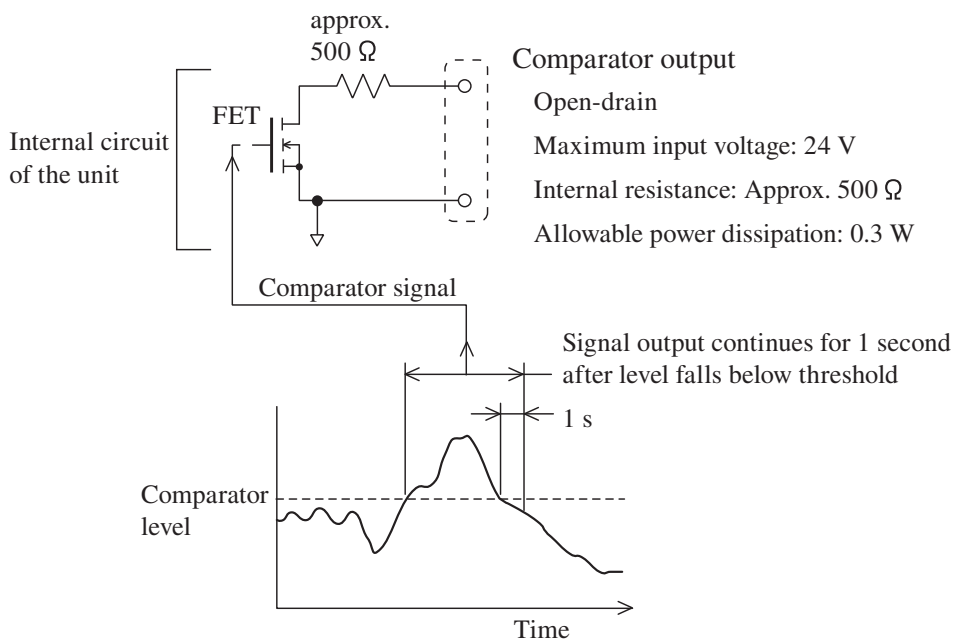
The I/O connector is located at the right side of the unit and used for RS-232C communication or comparator output.

To use this connector for RS-232C communication and connect to a printer, see page 25. For comparator output, see page 38.

### Note

The RS-232C communication and the comparator output cannot be used at the same time.

## Comparator output



# Default Settings

The factory default settings of the unit are listed below.

Displayed level.....	$L_v$
Displayed channel.....	X axis
Level range .....	50 to 120 (dB)
Backlight auto off .....	30 s
Backlight brightness.....	2
LCD auto off at auto store (when VX-55EX is installed)....	OFF
Battery type .....	Alkaline
Index.....	1
Eco setting .....	OFF
Store mode.....	Manual
Store name .....	0000
Measurement channel .....	XYZ
Measurement time.....	10min
Time scale of Time-Level graph .....	20s
OUTPUT .....	ACOUT Inter lock
Comparator (VX-55EX).....	OFF
Communication interface .....	OFF
Baud rate.....	19200bps
Flow control.....	OFF
Delay time .....	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] → [system – Read/Save Setting] → [Load Default Settings] and then press the MENU/ENTER key (see page 113). The time, language and store data are not initialized.

# Setup Files

## Resume function

When power to the unit is turned on, the measurement screen appears. The settings active at this point are the same as were selected before the unit was last turned off (resume function).

### Note

When the unit is started while a start up file exists on the inserted SD memory card, the start up file load function (see the following description) will be executed first.

## Loading a start up file at startup

If a start up file exists on the inserted SD memory card, a selection screen such as shown at bottom will appear.

Selecting [Yes] at the screen will load the start up file.

Selecting [No] at the screen will cause the resume function to re-establish the same settings as before the last time the unit was turned off.

Refer to page 116 about setting of start up file.

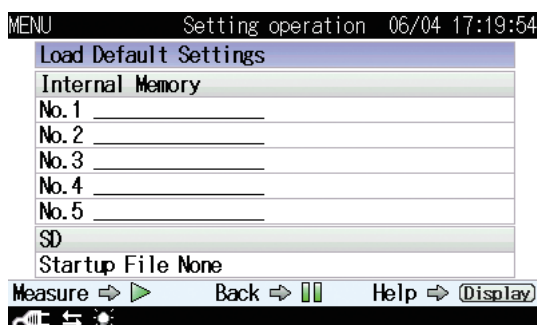


## Restoring default settings (factory default settings)

Follow the steps below to restore the default settings.

1. Use the  $\Delta/\nabla/\leftarrow/\rightarrow$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
2. Use the  $\Delta/\nabla$  keys to select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Load Default Settings] and press the MENU/ENTER key. The confirmation screen appears.
4. Use the  $\Delta/\nabla$  keys to select [Yes] and press the MENU/ENTER key.

For information on items that will be default, see the “Default Settings” section on page 111.



**Setting operation screen**

## Using setup files

Setup files enable the following functions.

- Establish settings quickly and precisely by loading from a file prepared beforehand and stored on internal memory
- Return settings that were accidentally changed to the previous condition by loading from a file stored on internal memory

Setup files can be saved up to five in the internal memory of the unit.

### Saving the current settings

1. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
2. Use the  $\Delta/\nabla$  keys to select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears.
3. Use the  $\Delta/\nabla$  keys to select the desired number and press the MENU/ENTER key. The setting file processing screen appears.
4. Use the  $\Delta/\nabla$  keys to select [Save the setting] and press the MENU/ENTER key. The current settings is saved in the selected number. If there is already a setup file at the selected number, an overwrite confirmation screen appears. Use the  $\Delta/\nabla$  keys to select [Yes] and press the MENU/ENTER key.

#### Note

The recall screen settings are not saved. Only the settings of the immediately preceding measurement screen will be saved.



**Setting file processing screen**

## Loading a setup file

Note
When you load settings from a file, the current settings will be overwritten. If necessary, you should save the current settings before loading a new set of settings.

1. Use the  $\triangle/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
2. Use the  $\triangle/\nabla$  keys to select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears.
3. Use the  $\triangle/\nabla$  keys to select the desired number and press the MENU/ENTER key. The setting file processing screen appears.
4. Use the  $\triangle/\nabla$  keys to select [Load the setting] and press the MENU/ENTER key. The confirmation screen appears.
5. Use the  $\triangle/\nabla$  keys to select [Yes] and press the MENU/ENTER key. The file contents of the selected number will be reflected to the setting of the unit.

## Deleting a setup file

1. Use the  $\triangle/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
2. Use the  $\triangle/\nabla$  keys to select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears.
3. Use the  $\triangle/\nabla$  keys to select the desired number and press the MENU/ENTER key. The setting file processing screen appears.
4. Use the  $\triangle/\nabla$  keys to select [Delete] and press the MENU/ENTER key. The confirmation screen appears.
5. Use the  $\triangle/\nabla$  keys to select [Yes] and press the MENU/ENTER key. The file of selected number is deleted.

## Setting a start up file

When a setting is saved in a start up file, the unit can be started using the setting.

1. Set the unit to the intended condition, so that measurement parameters and other settings are as desired.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [System (Language)] and press the MENU/ENTER key. The system screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Read/Save setting] and press the MENU/ENTER key. The setting operation screen appears.
4. Use the  $\Delta/\nabla$  keys to select [Startup File None] of [SD] and press the MENU/ENTER key. The [Save the setting]/[Cancel] selecting screen appears.

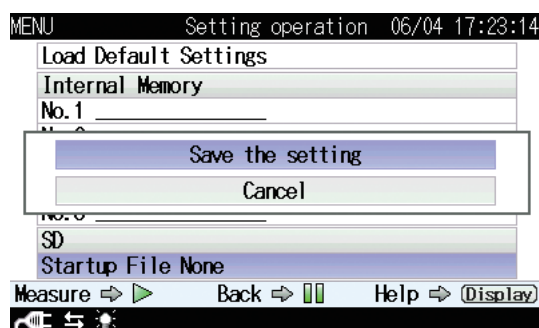
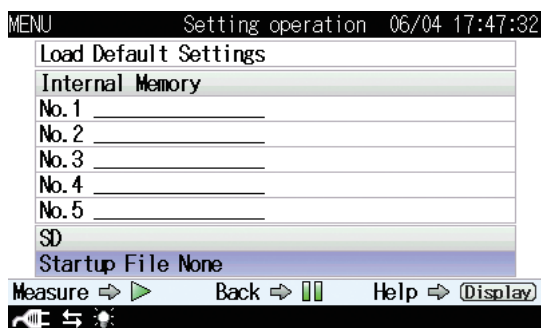
### Note

When a start up file has already been saved, select [Startup File Exist].

5. Use the  $\Delta/\nabla$  keys to select [Save the setting] and press the MENU/ENTER key. When “The setting was saved” is displayed, it means that the saving process has been completed.

### Note

When selecting [Startup File Exist] to overwrite the data, select [Yes] on the confirmation screen.





# Optional Accessories

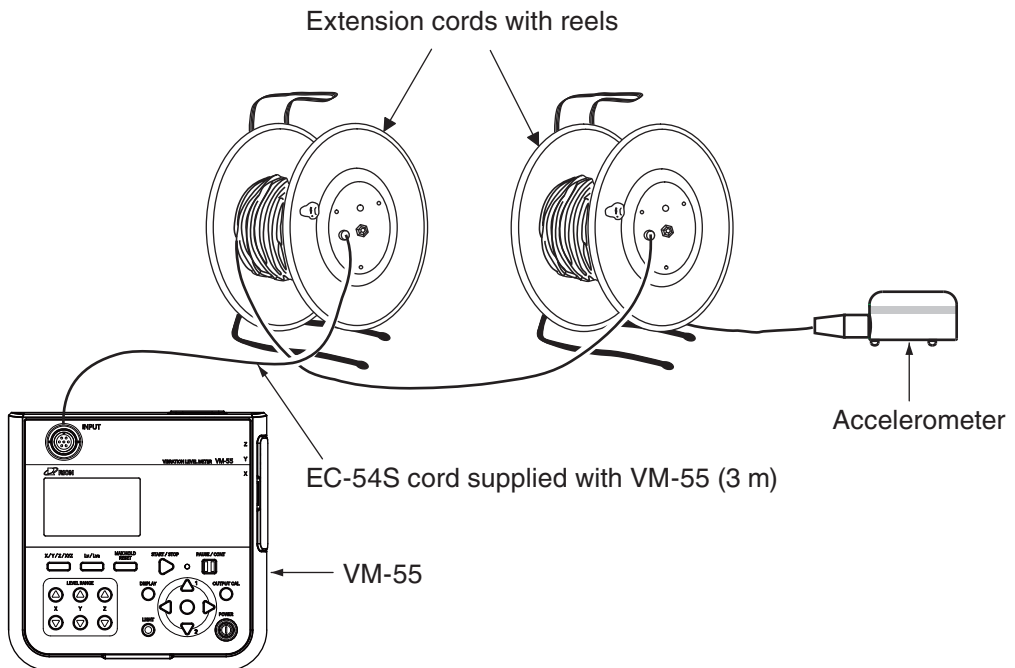
## Extension cord

If the accelerometer is to be positioned at a distance from the main unit, you can use the following extension cord(s).

Type	Length
EC-54SB	10 m
EC-02SD	50 m (with reel)
EC-02SE	100 m (with reel)

Extension cords with reels can be joined.

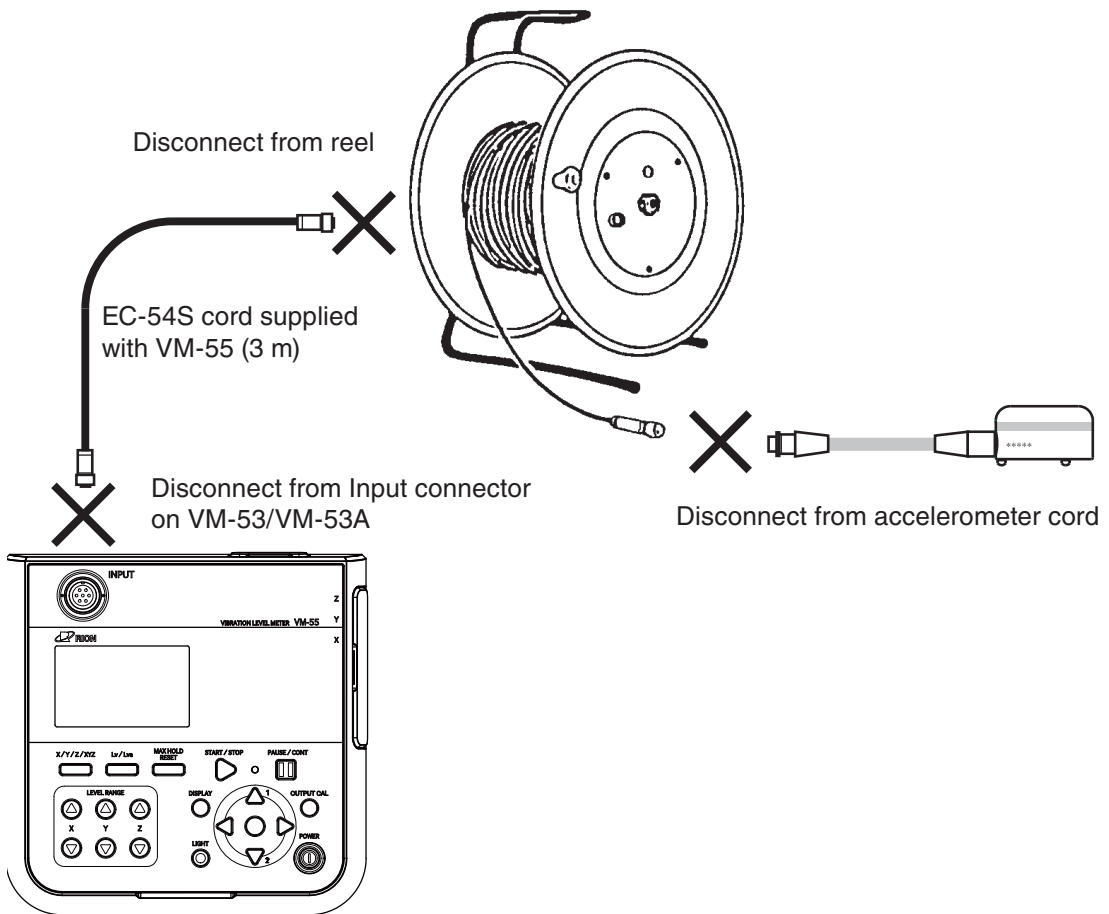
\* Extension cords without reel cannot be joined.



## Precautions for using extension cord with reel

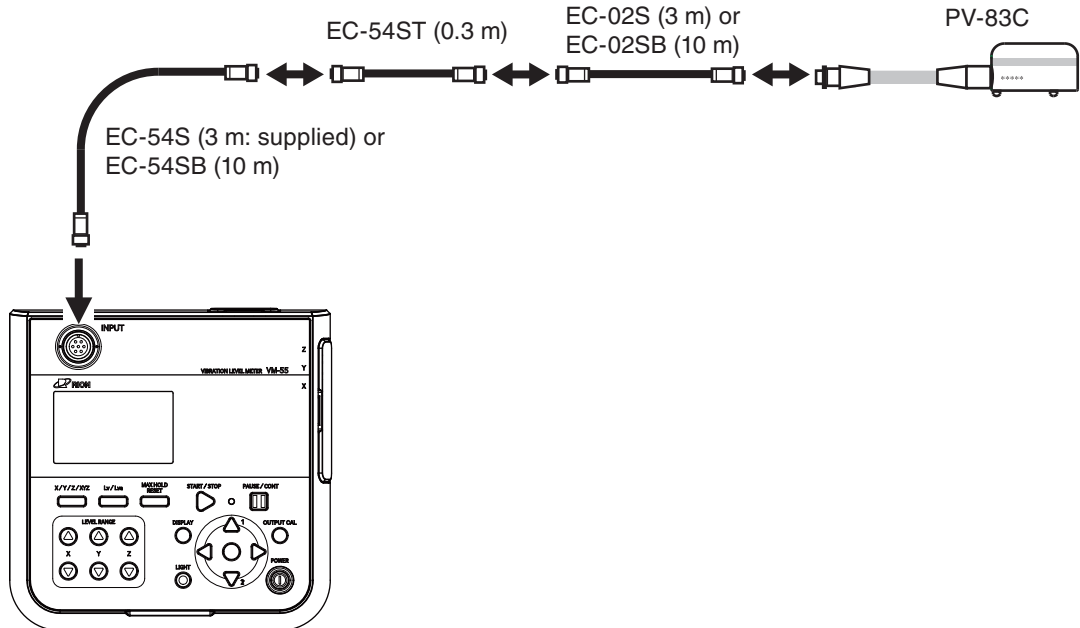
### Important

When installing or dismantling a system, always make sure that all connection cords are disconnected from the cord reel. Otherwise cord breaks due to twisting may occur.



## EC-02S – EC-54S conversion cord EC-54ST

EC-54ST is the conversion cord to connect the EC-02S (3 m) or EC-02SB (10 m) used by conventional vibration level meter to EC-54S (3 m: supplied) or EC-54SB (10 m).



## Printer DPU-414 / BL2-58

Allows printout of measurement screen hard copy and of data stored in the internal memory or on the SD card (printer, printer paper, connection cable required).

The procedure for printing data measured with the VM-55 is as follows.

Turn power to the VM-55 and the printer on and set the printer to the online state. It is assumed that the steps described in “Preparations” (starting on page 11) have been completed.

For information on how to connect the DPU-414, how to set the baud rate, and how to set the DIP switches of the DPU-414, refer to pages 25–27. For information on how to connect the BL2-58 and how to set the baud rate etc., refer to pages 25, 26, and 28.

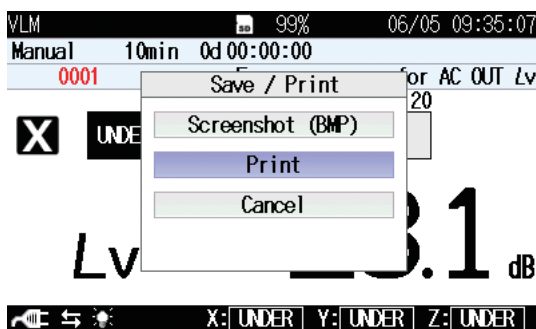
For details about printer operation, refer to the documentation supplied with the printer.

## Printing a measurement screen

The steps for printing hard copy of a measurement screen are described below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta$  /  $\nabla$  /  $\triangleleft$  /  $\triangleright$  keys to select [Save / Print] and press the MENU/ENTER key. The save/print screen appears.
3. Use the  $\Delta$  /  $\nabla$  keys to select [Print] and press the MENU/ENTER key. The screen is printed.

To cancel the process, select [Cancel] and press the MENU/ENTER key.



## Printing stored data

The steps for printing hard copy of a stored data are described below.

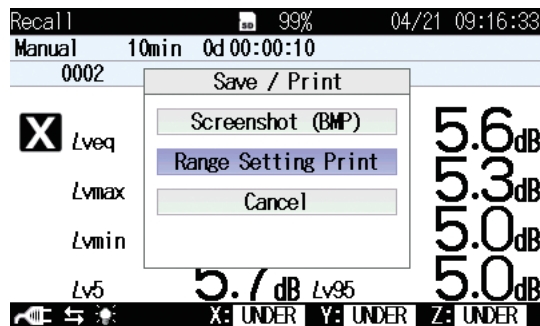
1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta$  /  $\nabla$  /  $\triangleleft$  /  $\triangleright$  keys to select [Recall] and press the MENU/ENTER key. The recall screen appears.
3. Use the  $\Delta$  /  $\nabla$  /  $\triangleleft$  /  $\triangleright$  keys to select the desired data and press the MENU/ENTER key. The data processing screen appears.
4. Use the  $\Delta$  /  $\nabla$  keys to select [View the data] and press the MENU/ENTER key. The stored data screen appears.



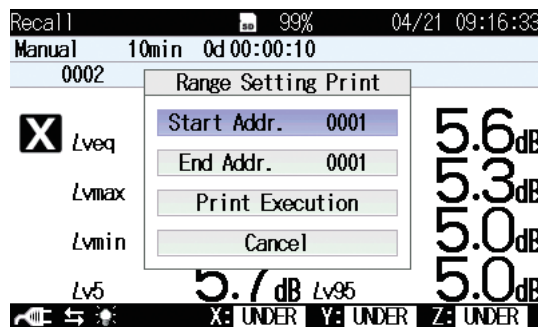
- When the stored data screen is displayed, pressing the MENU/ENTER key brings up the menu list screen for stored data.



- Use the  $\Delta$ / $\nabla$ / $\triangleleft$ / $\triangleright$  keys to select [Save/Print] and press the MENU/ENTER key. The save/print screen appears.



- Use the  $\Delta$ / $\nabla$  keys to select [Range Setting Print] and press the MENU/ENTER key. The range setting print screen appears.



- Set the [Start Addr.] and [End Addr.] and then select [Print Execution] and press the ENTER key. The data within the area specified by the entered addresses will be printed

## Level recorder LR-07

By connecting a level recorder to the unit, the vibration level and vibration acceleration level changes over time can be recorded.

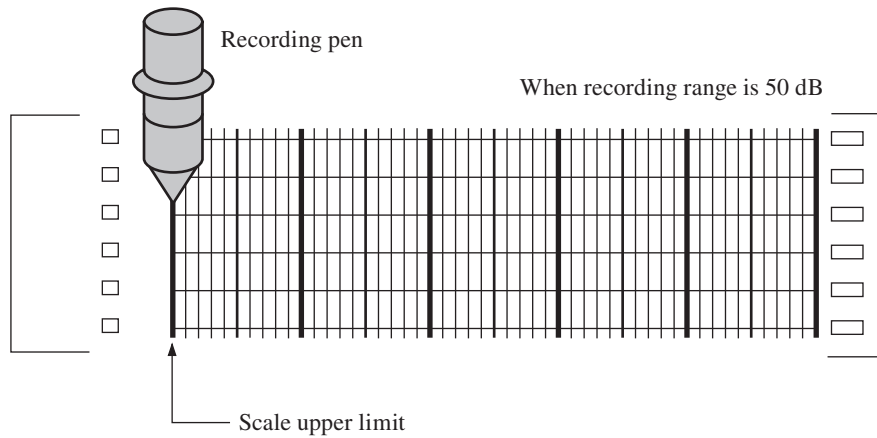
### Vibration level and vibration acceleration level recording

The procedure for recording vibration level and vibration acceleration level changes over time is described below. Turn power to the VM-55 and the level recorder on. The steps described in the chapter “Preparations” (page 12) should be completed.

For details about level recorder operation, refer to the documentation supplied with the level recorder.

1. To select the AC signal output to the recorder, press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.
3. Use the  $\Delta/\nabla$  keys to select [OUTPUT] and press the MENU/ENTER key. The OUTPUT setting screen appears.
4. Set the [OUTPUT] to [ON], and set the [Type] to [AC OUT]. Select the frequency characteristic (Inter lock, *Lv*, *Lva*) by [Freq].
5. Press the START/STOP key to return to the measurement screen.
6. To adjust the level of the recorder, press the OUTPUT CAL key to set the VM-55 to the internal calibration mode.

- Adjust the level control (Level adj) of the level recorder so that the pen registers the top of the scale.



- Press the CAL key once more to return the VM-55 to the measurement mode.
- Use the Lv/Lva key to display the screen for the output signal selected with the [Freq] setting.
- Use the LEVEL RANGE key to set the level range. Make the setting so as to avoid overload and under-range conditions (as indicated by the OVER and UNDER indications).

The upper limit of the level range selected for the VM-55 becomes the scale upper limit of the level recorder.

For example, when the level range upper limit is set to 100 dB, the scale upper limit will correspond to 100 dB. In this case, if the recording range of the level recorder is 50 dB, the scale lower limit will correspond to 50 dB.

## Program options

The unit can make use of a range of program options.

For details on usage, refer to the documentation supplied with the respective program.

### Note

Once the Extended Function Program VX-55EX has been installed, it can no longer be uninstalled.

# Serial Interface

The VM-55 incorporate a serial interface. This interface allows the use of a computer to make measurement parameter settings and to control the measurement. It is also possible to send measurement results (current results as well as data stored in the memory of the VM-55) to the computer for further processing.

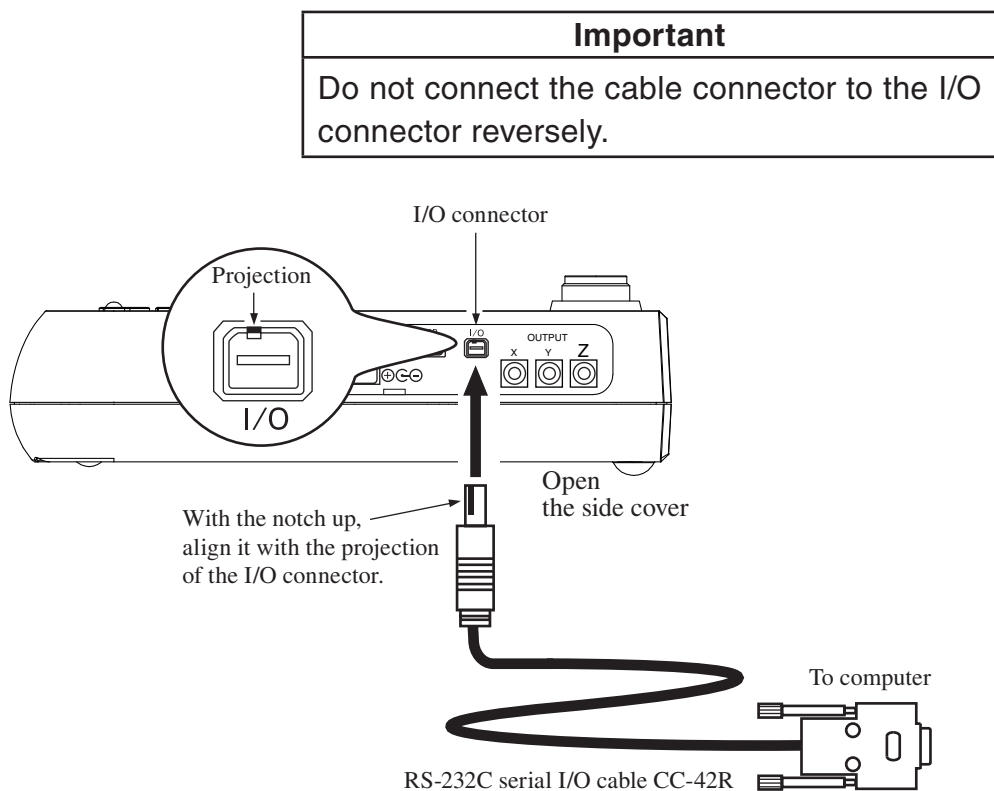
Standard terminal software (Hyper Terminal, etc.) can also be used as communication client.

## RS-232C

### Connection to a computer

Connect the I/O connector on the right side of the VM-55 with a RS-232C connector of a computer, using the optional RS-232C serial I/O cable CC-42R as shown below. The performance of other cables will not be guaranteed.

Note that the performance of multiple units connection with RS-232C will not be guaranteed.



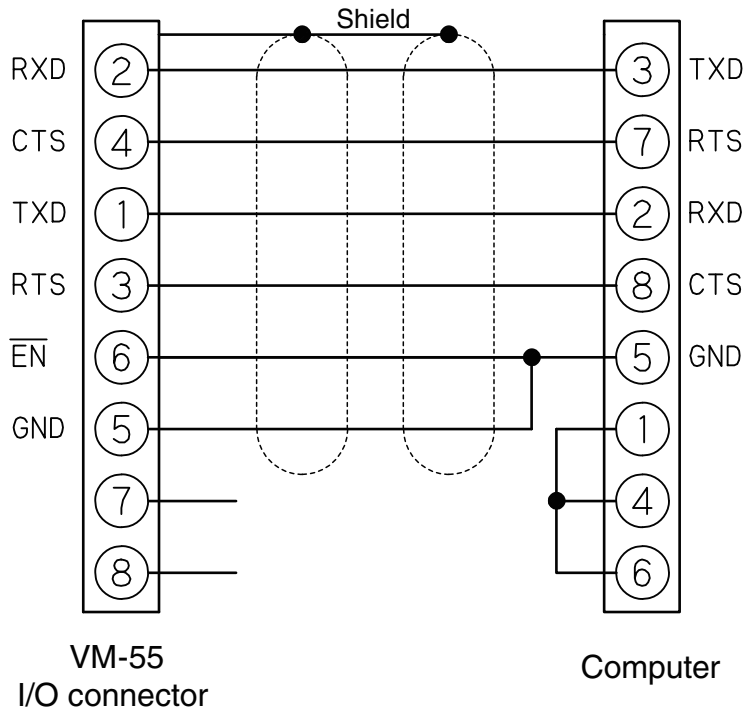


## Setting of the VM-55 when using the RS-232C

When using RS-232C, set the communication interface for the VM-55 following the steps below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Communication Interface] and press the MENU/ENTER key. The communication control function screen appears.
4. Use the  $\Delta/\nabla$  keys to select [RS-232C] and press the MENU/ENTER key.
5. Select the [Baud rate] on the display / I/O screen and press the MENU/ENTER key. The baud rate screen appears.
6. Use the  $\Delta/\nabla$  keys to select baud rate (9600bps, 19200bps, 38400bps, 57600bps, 115200bps) and press the MENU/ENTER key.
7. Select the [Flow control] on the display / I/O screen and press the MENU/ENTER key. The flow control screen appears.
8. Use the  $\Delta/\nabla$  keys to select flow control (OFF, HARD, SOFT) and press the MENU/ENTER key.
9. Press the START/STOP key to return to the measurement screen.

The CC-42R serial I/O cable uses a 9-pin connector (female).  
The cable is optional.



#### Note

When VM-55 is connected to a computer, the minimum measurement level of VM-55 may rise by the noise from a computer.

## Transfer protocol

Transfer principle:	full duplex
Sync principle:	asynchronous
Baud rate:	9600 / 19200 / 38400 / 57600 / 115200 bps
Data word length:	8 bit
Stop bits:	1 bit
Parity check:	none
Flow control:	X parameter

## USB

### About USB

The VM-55 can use a USB connection for operation control and transfer of data. To use the USB interface, a USB driver must be installed on the computer. Please download USB driver from our web site (<https://rion-sv.com/>). Installation and operation procedures are explained in this manual. Note that the performance of multiple units connection with USB will not be guaranteed.

### Operating environment

#### Supported Operating Systems

- Microsoft Windows 7 Professional (32 bit/64 bit\*)
  - \* The update by security program of Microsoft Windows (KB3033929) is necessary to 64 bit Windows 7.  
Please refer to [Control Panel]-[Programs and Features]-[View installed updates] of the computer for confirmation of the update.
- Microsoft Windows 8.1 Pro (32 bit/64 bit)
- Microsoft Windows 10 Pro (32 bit/64 bit)

## Installing the USB driver

By connecting the VM-55 to a computer with a USB cable, the VM-55 can be controlled remotely from the computer, and measurement data can be sent to the computer in real time. To enable use of these functions, you must first download driver software from the RION Corporation web site and install this driver on the computer to be used with the VM-55. The driver will create a virtual COM port on the computer.

### Installation procedure

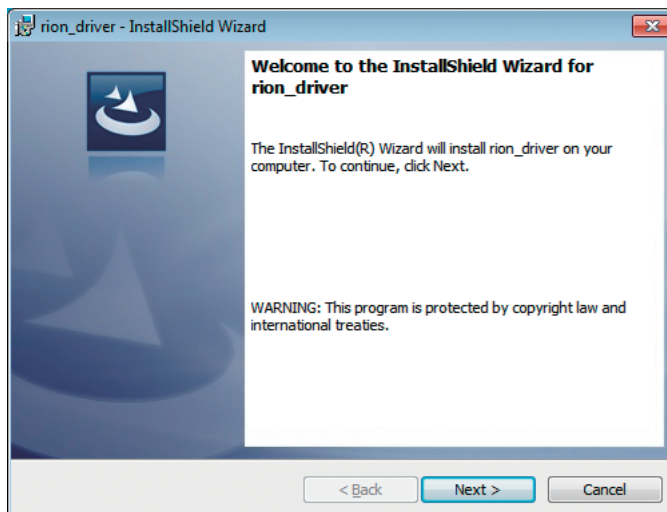
When connecting the VM-55 and the computer for the first time, install the USB driver as follows.

1. Download the latest USB driver from the RION Co., LTD. web site (<https://rion-sv.com/>).

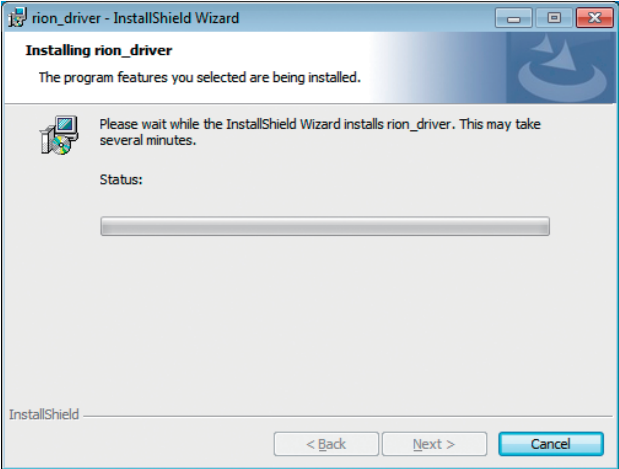
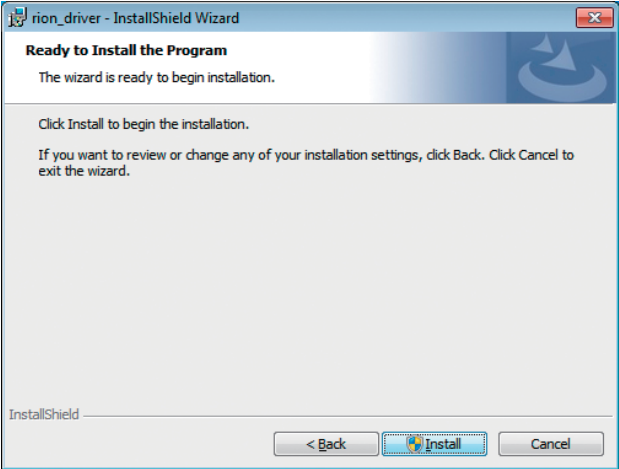
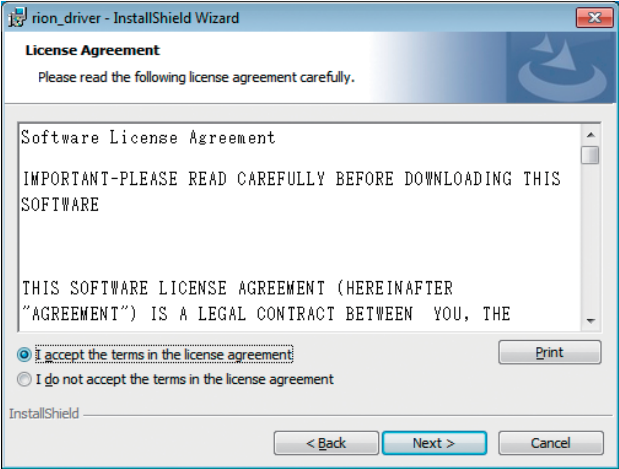
When using 32 bit OS, execute the file “setup.exe” located in the “installer\_x86” folder.

When using 64 bit OS, execute the file “setup.exe” located in the “installer\_x64” folder.

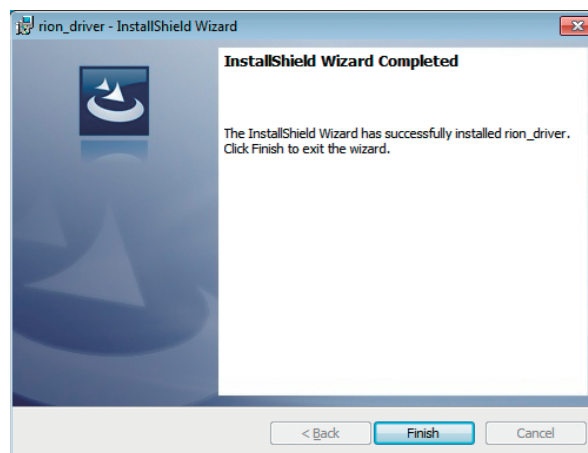
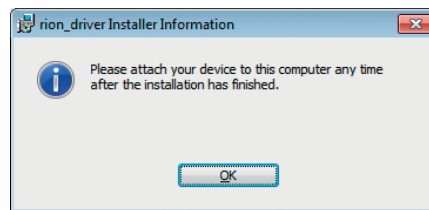
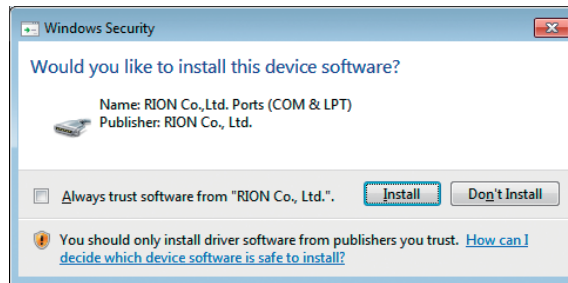
The installation starts.



Follow the wizard to complete the installation.  
Screens during installation are as follows.



Depending on your environment, [Windows Security] may be displayed.  
Click on “Install” or “Continue”.



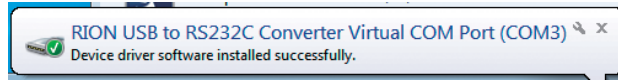
2. Turn power to the VM-55 on, select [Display / I/O] and set [Communication Interface] to “USB”.

<b>Important</b>
The above steps must be completed before connecting the USB cable.

3. Connect the VM-55 to the computer with a USB cable (see page 128).

<b>Important</b>
Connect the VM-55 directly with the USB cable to the computer. If the VM-55 is connected via a USB hub, normal operation is not assured.

When the computer detects the VM-55, the device driver software installation is started automatically. When the installation has been completed, USB communication is enabled.

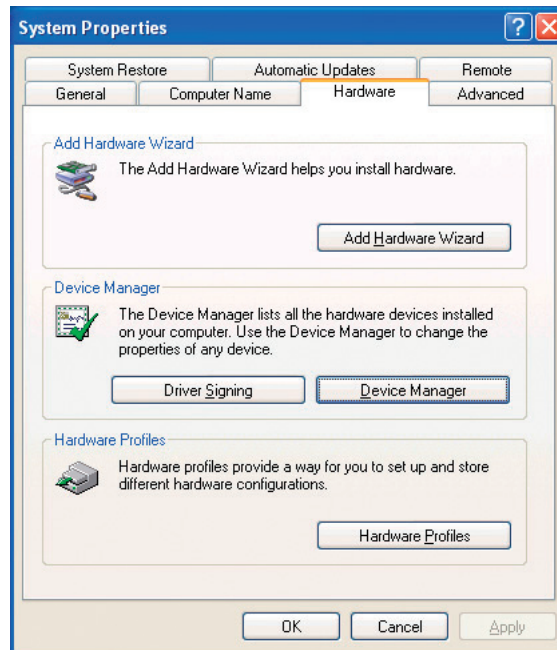


The driver installation creates a virtual COM port in the computer. For information on how to verify that the installation was successful, see the section “Checking the virtual COM port” on next page.

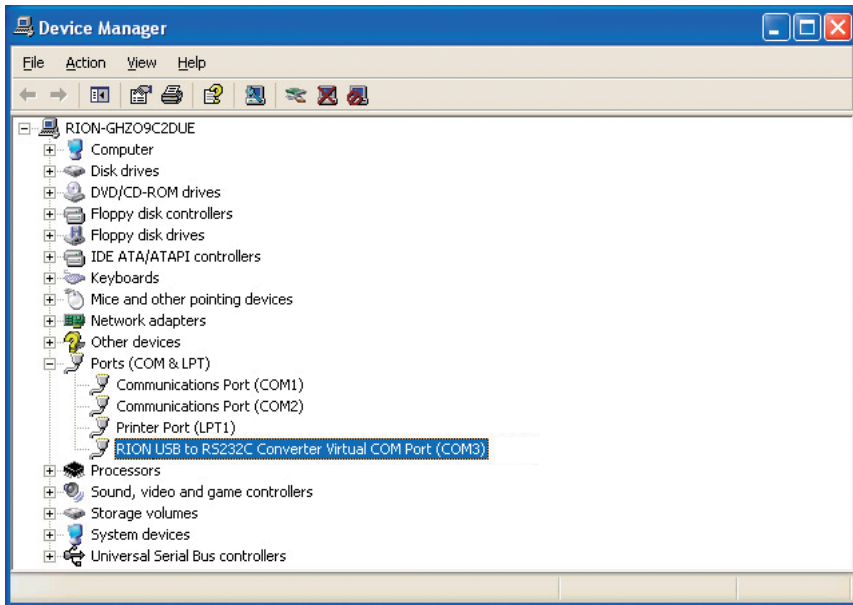


## Checking the virtual COM port

1. After installing the driver, set [Communication Interface] to “USB” at the VM-55 and connect the USB cable.
2. Open the Device Manager (“Hardware” tab under “Properties” in My Computer).



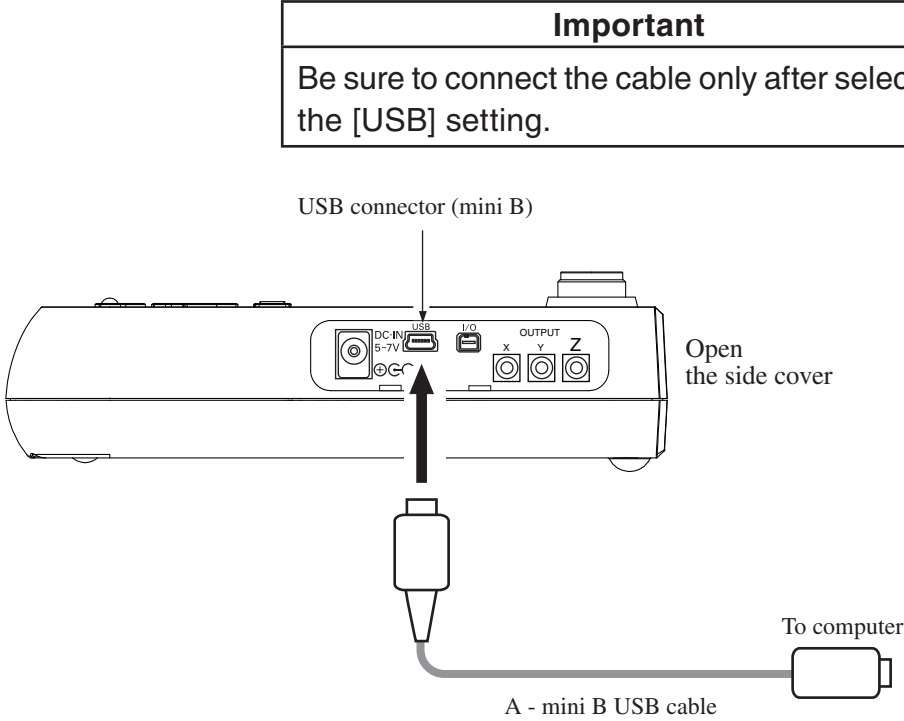
3. Click on the + at the left of “Ports (COM & LPT)”.



The indication “RION USB to RS232C Converter Virtual COM Port” should be shown as COM port name. If this is not shown, check the connection between the VM-55 and the computer (step 1). If there is an “x” over the icon, the port is not functioning normally. Install the driver again.

## Connection to a computer

Connect the USB connector on the bottom of the VM-55 with a USB connector of a computer, using the optional (generic) A - mini B USB cable as shown below.



### Setting of the VM-55 when using the USB

When using USB, set the communication interface for the VM-55 following the steps below.

1. Press the MENU/ENTER key to bring up the menu list screen.
2. Use the  $\Delta/\nabla/\triangleleft/\triangleright$  keys to select [Display / I/O] and press the MENU/ENTER key. The display / I/O screen appears.
3. Use the  $\Delta/\nabla$  keys to select [Communication Interface] and press the MENU/ENTER key. The communication control function screen appears.
4. Use the  $\Delta/\nabla$  keys to select [USB] and press the MENU/ENTER key.
5. Press the START/STOP key to return to the measurement screen.

## Disconnection from the computer

VM-55 will be recognized as “removable media”. Consequently, the correct procedure as described below must be followed when disconnecting the VM-55.

1. Click on the “Safely remove hardware” icon in the right section of the taskbar, and select “Safely remove USB Mass Storage Device - Drive (\*1)”.

\*1: The drive letter (E in the example shown) will differ, depending on the computer configuration.



2. When the message shown below appears, disconnect the USB cable.



The VM-55 is now properly disconnected.

## **Communication cutoff**

### **Sleep mode**

When sleep mode is enabled, the unit enters the sleep state after the current block has been sent. In the sleep state, the VM-55 does not send or accept commands.

### **ECO setting**

When ECO setting is selected, it will be enabled after a transmission of current command is completed. After that, the VM-55 does not send or accept commands (ECO setting disables the communication control function).

### **Power off**

During power off processing, communication is terminated after the current command was sent.

### **Auto shutdown**

Same as power off.

## Rated values

### Guaranteed values

Case	Rated Values	Remarks
VM-55 response time	Max. 3 s	Result code 0004 (state error) response if due to processing reasons
Send character interval	Max. 100 ms	–
Interval until VM-55 enters idling state after sending data	Max. 200 ms	After receiving data from the VM-55, wait at least 200 ms before sending the next command (For DOD?, at least 1 s)

### Rated values

Case	Rated Values	Remarks
Receive character interval timeout	No limit	–

## Command

### Command types

There are two types of commands: setting commands and request commands.

#### Setting command

This type of command serves for changing the VM-55 status or measurement parameters. Only some commands of this type will produce a response from the VM-55. The response consists of status information returned after the setting command has been processed.

#### Request command

This type of command serves for getting information about unit settings and for obtaining measurement data including display data and stored data. The VM-55 returns the requested data.

### Command format

#### Setting command

Command = "\$" + "command name" + "," + "parameter" + [CR] + [LF]

The basic components of a setting command are the command name and the parameter. "\$" at the beginning represents the processing state of the command and is automatically displayed. During the processing of the command, "\$" is not displayed and does not accept the command input. A comma is used as delimiter between the command name and parameter, and the setting command is terminated by a [CR]+[LF] (carriage return + line feed). The setting command uses the CSV format.

#### Prohibited items of setting command

- Spaces in a command name may not be omitted.
- Spaces in a command name may not be doubled.
- The "," (comma) after the command name may not be omitted.
- Japanese full-width characters are not allowed.

## Permitted items of setting command

- Lower case may be used instead of upper case.
- Upper case may be used instead of lower case.

## Setting command examples

LCD_Auto_Off,Short[CR][LF] ↑	Valid	Space after “;” may be omitted.
lcd_auto_off,_short_[CR][LF] ↑  ↑      ↑   ↑	Valid	Command name in all lower case is permitted.
LCDAuto__Off,_Short[CR][LF] ↑      ↑	Invalid	Spaces in command name may not be omitted.
LCD_Auto_Off_Short[CR][LF] ↑	Invalid	Comma after command name may not be omitted.

“\_” stands for a space.

## Request command

Command = “command name” + “?” + [CR] + [LF]

The request command is a structure to put up the “?” behind the command name. The request command is terminated by a [CR]+[LF] (carriage return + line feed). The request command uses the CSV format.

## Prohibited items of request command

- Spaces in a command name may not be omitted.
- Spaces in a command name may not be doubled.

## Permitted items of request command

- Lower case may be used instead of upper case.
- Upper case may be used instead of lower case.

## Echo back

When the echo back function is set to ON, a string of a transmitted command is sent back from a destination to let operators know that the command has been entered properly.

The Echo command is used to turn ON/OFF the echo back function and check the current setting.



## Result code

This is a response data that indicates execution results of commands. The structure of a result code is shown below.

Result code = “R+” + “four-digit number”

The four-digit number following the prefix character “R+” indicates the situations described below.

Numbers	Contents
0000	<b>Normal end</b> This is a response to the situation where the command (setting or request) is executed normally.
0001	<b>Command error</b> This is a response to the situation where the specified command cannot be recognized.
0002	<b>Parameter error</b> This is a response to the situation where the number of parameters and the parameter type allowed for the specified command are not met.
0003	<b>Designation error</b> This is a response to the situation where a setting is made with a command which can only handle requests, or a request is made with a command which can only handle settings.
0004	<b>Status error</b> This is a response to the situation where the command (setting or request) cannot be executed in a current situation.

## Transfer codes

The codes (control codes) used for communication with the VM-55 are as follows.

Code	Hex notation	Meaning
[CR]	0DH	Terminator, (1st character)
[LF]	0AH	Terminator, (2nd character)
[SUB]	1AH	Stop request

## Command list

S: Setting command (command for making a VM-55 setting)

R: Request command (command for obtaining status information or measurement data from VM-55)

### Communication

Command	Function	See page
Echo	Echo back (S/R) .....	146
Remote Control	Remote mode (S/R) .....	146

### System

Command	Function	See page
System Version	System version information (R).....	147
Clock	Current date and time (S/R).....	147
Language	Displayed language (S/R).....	148
Calibration	Calibration (S/R).....	148
Index Number	Index number (S/R) .....	148
Key Lock	Key lock (S/R) .....	149
Backlight	Backlight (S/R) .....	149
Backlight Auto Off	Backlight auto off (S/R) .....	149
LCD	LCD (S/R).....	150
LCD Auto Off	LCD auto off (S/R).....	150
Backlight Brightness	Backlight brightness (S/R).....	150
Battery Type	Battery type (S/R) .....	151
SD Card Total Size	SD memory card capacity (R) .....	151
SD Card Free Size	SD memory card free space (R) ....	151
SD Card Percentage	SD memory card free space percentage (R).....	151

### Display, performance

Command	Function	See page
Time Level Time Scale	Time scale of time-level display (S/R) .....	152
Level Range X	Xch level range upper limit (S/R) ...	152
Level Range Y	Ych level range upper limit (S/R) ...	152
Level Range Z	Zch level range upper limit (S/R) ...	153

Display Channel Setting	Display channel setting (S/R) .....	153
Display Lva Setting	Display $L_v$ / $L_{va}$ setting(S/R) .....	153
Max Hold Reset	Max hold reset (S) .....	154

## I/O

Command	Function	See page
OUTPUT	Output setting (S/R) .....	154
OUTPUT Mode	Output type (S/R) .....	154
OUTPUT Band	Output frequency characteristic (S/R) .....	155
IO Setting	Comparator setting (S/R) .....	155
Comparator Level	Comparator level (S/R) .....	155
Comparator Channel	Comparator channel (S/R) .....	156
Comparator Band	Comparator band (S/R) .....	156
Communication Interface	Communication interface (S/R) .....	156
Baud Rate	RS-232C baud rate (S/R) .....	156

## Store

Command	Function	See page
Store Mode	Store mode (S/R) .....	157
Store Name	Store name (S/R) .....	158
Leq Calculation Interval Preset	$L_{eq}$ calculation interval (S/R) .....	157
Leq Calculation Interval (Num)	$L_{eq}$ calculation interval of user setting (number) (S/R) .....	159
Leq Calculation Interval (Unit)	$L_{eq}$ calculation interval of user setting (unit) (S/R) .....	160
Measurement Time Preset Manual	Measurement time of manual store (S/R) .....	160
Measurement Time Manual (Num)	Measurement time of user setting on manual store (number) (S/R) .....	161

Measurement Time Manual (Unit)	Measurement time of user setting on manual store (unit) (S/R) .....	161
Measurement Time Preset Auto	Total measurement time of auto store (S/R) .....	161
Measurement Time Auto (Num)	Total measurement time of user setting on auto store (number) (S/R) .....	161
Measurement Time Auto (Unit)	Total measurement time of user setting on auto store (unit) (S/R).....	162
Measurement Time Preset	Measurement time of manual store / Total measurement time of auto store (S/R) .....	162
Measurement Time (Num)	Measurement time of user setting on manual store (number) / Total measurement time of user setting on auto store (number) (S/R) .....	164
Measurement Time (Unit)	Measurement time of user setting on manual store (unit) / Total measurement time of user setting on auto store (unit) (S/R).....	164
Timer Auto Start Time	Timer auto start time (S/R) .....	165
Timer Auto Stop Time	Timer auto stop time (S/R) .....	165
Timer Auto Interval	Timer auto measurement interval (S/R) .....	166
Sleep Mode	Sleep mode (S/R).....	166
Manual Address	Manual store address (S/R).....	167
Measure	Measurement (S/R) .....	167
Pause	Pause (S/R).....	167
Manual Store	Manual store (S).....	168

Measurement Start Time	Measurement (operation) start time (R).....	168
Measurement Stop Time	Measurement (operation) stop time (R).....	168
Measurement Elapsed Time	Measurement elapsed time (R) .....	169

## Measurement

Command	Function	See page
Delay Time	Delay time (S/R) .....	169

## Operation

Command	Function	See page
Underrange Lv X	Xch underrange $L_v$ (R).....	169
Underrange Leq X	Xch underrange $L_{eq}$ (R) .....	170
Overload Lv X	Xch overload $L_v$ (R) .....	170
Overload Leq X	Xch overload $L_{eq}$ (R).....	170
Underrange Lv Y	Ych underrange $L_v$ (R) .....	171
Underrange Leq Y	Ych underrange $L_{eq}$ (R) .....	171
Overload Lv Y	Ych overload $L_v$ (R).....	171
Overload Leq Y	Ych overload $L_{eq}$ (R).....	172
Underrange Lv Z	Zch underrange $L_v$ (R).....	172
Underrange Leq Z	Zch underrange $L_{eq}$ (R) .....	172
Overload Lv Z	Zch overload $L_v$ (R) .....	173
Overload Leq Z	Zch overload $L_{eq}$ (R).....	173
Measure Channel Setting	Operation channel (S/R).....	174

## Data output

Command	Function	See page
DOD	Output displayed value (R) .....	174
DRD	Continuous output (R) .....	175

## Command description

### Communication

#### Echo

##### Echo back

Setting ON/OFF of echo back

Setting command Echo, p1

Parameter p1= "Off"

p1= "On"

Request command Echo?

Response data d1

Returned value Same as for setting command

#### Remote control

##### Remote mode

Setting ON/OFF of remote mode

When remote mode is "On", the key operation of the unit is invalid (only the POWER key and the LIGHT key are effective). When remote mode is "Off", the key operation of the unit is valid.

Setting command Remote  $\square$  Control, p1

Parameter p1= "Off" (Remote mode is OFF)

p1= "On" (Remote mode is ON)

Request command Remote  $\square$  Control?

Response data d1

Returned value Same as for setting command

# System

## System version

### System version information

Request system version information

Request command	System _ Version?p1
Parameter	p1= "VM"
	p1= "EX" (when VX-55EX is installed)
	p1= "WR" (when VX-55WR is installed)
Response data	d1= "x.x" (x is 0 to 9)

There is no setting command

When the parameter p1 is omitted, the request command means "System \_ Version?VM"

## Clock

### Current date and time

Setting current date and time

Setting command	Clock, p1/p2/p3 _ p4:p5:p6
Parameter	p1= 2015 or after (year)
	p2= 1 to 12 (month)
	p3= 1 to 31 (date)
	p4= 0 to 23 (hour)
	p5= 0 to 59 (minute)
	p6= 0 to 59 (second)

Request command	Clock?
Response data	d1/d2/d3 _ d4:d5:d6
Returned value	Same as for setting command

## Language

### Displayed language

#### Setting displayed language

Setting command	Language, p1
Parameter	p1= “Japanese” p1= “English”
Request command	Language?
Response data	d1
Returned value	Same as for setting command

## Calibration

### Calibration

#### Transition to calibration state

Setting command	Calibration, p1
Parameter	p1= “Off” p1= “On”
Request command	Calibration?
Response data	d1
Returned value	Same as for setting command

## Index Number

### Index number

#### Setting index number

Setting command	Index _ Number, p1
Parameter	p1= 1 to 255
Request command	Index _ Number?
Response data	d1
Returned value	Same as for setting command



## Key Lock

### Key lock

Setting ON/OFF of key lock

Setting command	Key _ Lock, p1
Parameter	p1= "Off" p1= "On"
Request command	Key _ Lock?
Response data	d1
Returned value	Same as for setting command

## Backlight

### Backlight

Setting ON/OFF of backlight

Setting command	Backlight, p1
Parameter	p1= "Off" p1= "On"
Request command	Backlight?
Response data	d1
Returned value	Same as for setting command

## Backlight Auto Off

### Backlight auto off

Setting time of backlight auto off

Setting command	Backlight _ Auto _ Off, p1
Parameter	p1= "Short" (30 seconds) p1= "Long" (3 minutes) p1= "Cont" (continue)
Request command	Backlight _ Auto _ Off?
Response data	d1
Returned value	Same as for setting command

## LCD

### LCD

Setting ON/OFF of LCD

Setting command	LCD, p1
Parameter	p1= "Off" p1= "On"
Request command	LCD?
Response data	d1
Returned value	Same as for setting command

### LCD Auto Off

#### LCD auto off

Setting time of LCD auto off

Setting command	LCD _ Auto _ Off, p1
Parameter	p1= "Off" p1= "Long" (10 minutes) p1= "Short" (1 minute)
Request command	LCD _ Auto _ Off?
Response data	d1
Returned value	Same as for setting command

### Backlight Brightness

#### Backlight brightness

Setting backlight brightness

Setting command	Backlight _ Brightness, p1
Parameter	p1= "0" p1= "1" p1= "2" p1= "3"
Request command	Backlight _ Brightness?
Response data	d1
Returned value	Same as for setting command

## Battery Type

### Battery type

Setting battery type

Setting command	Battery _ Type, p1
Parameter	p1= "Alkaline" p1= "Nickel"
Request command	Battery _ Type?
Response data	d1
Returned value	Same as for setting command

## SD Card Total Size

### SD memory card capacity

Request capacity of SD memory card

Request command	SD _ Card _ Total _ Size?
Response data	d1= 0 to 32768 (MB)

There is no setting command

## SD Card Free Size

### SD memory card free space

Request free space of SD memory card

Request command	SD _ Card _ Free _ Size?
Response data	d1= 0 to 32768 (MB)

There is no setting command

## SD Card Percentage

### SD memory card free space percentage

Request percentage of free space

Request command	SD _ Card _ Percentage?
Response data	d1= 0 to 100

There is no setting command

## Display, performance

### Time Level Time Scale

#### Time scale of time-level display

##### Setting time scale of time-level display

Setting command	Time _ Level _ Time _ Scale, p1
Parameter	p1= "20s" p1= "1m" p1= "2m"
Request command	Time _ Level _ Time _ Scale?
Response data	d1
Returned value	Same as for setting command

### Level Range X

#### Xch level range upper limit

##### Setting of X channel level range

Setting command	Level _ Range _ X, p1
Parameter	p1= 70 to 120 (dB : 10 step)
Request command	Level _ Range _ X?
Response data	d1
Returned value	Same as for setting command

### Level Range Y

#### Ych level range upper limit

##### Setting of Y channel level range

Setting command	Level _ Range _ Y, p1
Parameter	p1= 70 to 120 (dB : 10 step)
Request command	Level _ Range _ Y?
Response data	d1
Returned value	Same as for setting command

## Level Range Z

### Zch level range upper limit

Setting of X channel level range

Setting command	Level _ Range _ Z, p1
Parameter	p1= 70 to 120 (dB : 10 step)
Request command	Level _ Range _ Z?
Response data	d1
Returned value	Same as for setting command

## Display Channel Setting

### Display channel setting

Setting of display channel

Setting command	Display _ Channel _ Setting, p1
Parameter	p1= "X" (Xch)
	p1= "Y" (Ych)
	p1= "Z" (Zch)
	P1= "XYZ" (Three axis)
Request command	Display _ Channel _ Setting?
Response data	d1
Returned value	Same as for setting command

## Display Lva Setting

### Display $L_v$ / $L_{va}$ setting

Setting of display characteristic type

Setting command	Display _ Lva _ Setting, p1
Parameter	p1= "Lv" (Vibration level)
	p1= "Lva" (Vibration acceleration level)
Request command	Display _ Lva _ Setting?
Response data	d1
Returned value	Same as for setting command

## Max Hold Reset

### Max hold reset

Reset the max hold value

Setting command	Max _ Hold _ Reset, p1
Parameter	p1= "Off" p1= "On"

The value is reset regardless of a parameter.

This command is invalid except for when the max hold screen is displayed.

## I/O

### OUTPUT

#### Output setting

Setting signal output

Setting command	OUTPUT, p1
Parameter	p1= "Off" p1= "On"
Request command	OUTPUT?
Response data	d1
Returned value	Same as for setting command

### OUTPUT Mode

#### Output type

Setting output signal type

Setting command	OUTPUT _ Mode, p1
Parameter	p1= "AC" p1= "DC"
Request command	OUTPUT _ Mode?
Response data	d1
Returned value	Same as for setting command

## OUTPUT Band

### Output frequency characteristic

Setting output frequency characteristic

Setting command	OUTPUT _Band, p1
Parameter	p1= "Lv" p1= "Lva" p1= "Disp" (Inter lock)
Request command	OUTPUT _Band?
Response data	d1
Returned value	Same as for setting command

## IO Setting

### Comparator setting

Setting ON/OFF of comparator

Setting command	IO _Setting, p1
Parameter	p1= "Off" p1= "Comparator" (when VX-55EX is installed)
Request command	IO _Setting?
Response data	d1
Returned value	Same as for setting command

## Comparator Level

### Comparator level

Setting comparator level

Setting command	Comparator _Level, p1
Parameter	p1= 30 to 120 (1 steps)
Request command	Comparator _Level?
Response data	d1
Returned value	Same as for setting command

## Comparator Channel

### Comparator channel

#### Setting comparator channel

Setting command	Comparator _ Channel, p1
Parameter	p1= "X" p1= "Y" p1= "Z"
Request command	Comparator _ Channel?
Response data	d1
Returned value	Same as for setting command

## Comparator Band

### Comparator band

#### Setting comparator band

Setting command	Comparator _ Band, p1
Parameter	p1= "Lv" p1= "Lva"
Request command	Comparator _ Band?
Response data	d1
Returned value	Same as for setting command

## Communication Interface

### Communication interface

#### Setting communication interface

Setting command	Communication _ Interface, p1
Parameter	p1= "Off" p1= "USB" p1= "RS232C"
Request command	Communication _ Interface?
Response data	d1
Returned value	Same as for setting command



## Baud Rate

### RS-232C baud rate

Setting RS-232C baud rate

Setting command	Baud _ Rate, p1
Parameter	p1= "9600" p1= "19200" p1= "38400" p1= "57600" p1= "115200"
Request command	Baud _ Rate?
Response data	d1
Returned value	Same as for setting command

## Store

### Store Mode

#### Store Mode

Setting store mode

Setting command	Store _ Mode, p1
Parameter	p1= "Manual" p1= "Auto" (when VX-55EX is installed) p1= "Timer Auto" (when VX-55EX is installed)
Request command	Store _ Mode?
Response data	d1
Returned value	Same as for setting command

## Store Name

### Store Name

Setting store name

Setting command    Store \_Name, p1

Parameter            p1= 0 to 9999

Request command    Store \_Name?

Response data        d1

Returned value      Same as for setting command

## Lv Store Interval

### $L_v$ store interval

Setting  $L_v$  store interval

Setting command    Lv \_Store \_Interval, p1

Parameter            p1= "Off"

p1= "100ms"

p1= "1s"

Request command    Lv \_Store \_Interval?

Response data        d1

Returned value      Same as for setting command

## Leq Calculation Interval Preset

### $L_{eq}$ calculation interval

#### Setting $L_{eq}$ calculation interval

Setting command	Leq _ Calculation _ Interval _ Preset, p1
Parameter	p1= "Off" p1= "10s" p1= "1m" p1= "5m" p1= "10m" p1= "15m" p1= "30m" p1= "1h" p1= "8h" p1= "24h" p1= "Manual" (user setting) p1= "500s"
Request command	Leq _ Calculation _ Interval _ Preset?
Response data	d1
Returned value	Same as for setting command

## Leq Calculation Interval (Num)

### $L_{eq}$ calculation interval of user setting (number)

Setting value when "Leq \_ Calculation \_ Interval \_ Preset" command parameter is "Manual"

Setting command	Leq _ Calculation _ Interval _ (Num), p1
Parameter	p1= 1 to 59 (Time unit is s [second] or m [minute]) p1= 1 to 24 (Time unit is h [hour])
Request command	Leq _ Calculation _ Interval _ (Num)?
Response data	d1
Returned value	Same as for setting command

## Leq Calculation Interval (Unit)

$L_{eq}$  calculation interval of user setting (unit)

Setting time unit when “Leq \_ Calculation \_ Interval \_ Preset” command parameter is “Manual”

Setting command	Leq _ Calculation _ Interval _ (Unit), p1
Parameter	p1= “s” p1= “m” p1= “h”
Request command	Leq _ Calculation _ Interval _ (Unit)?
Response data	d1
Returned value	Same as for setting command

## Measurement Time Preset Manual

Measurement time of manual store

Setting measurement time of the manual store mode

Setting command	Measurement _ Time _ Preset _ Manual, p1
Parameter	p1= “10s” p1= “1m” p1= “5m” p1= “10m” p1= “15m” p1= “30m” p1= “1h” p1= “8h” p1= “24h” p1= “Manual” (user setting) p1= “500s”
Request command	Measurement _ Time _ Preset _ Manual?
Response data	d1
Returned value	Same as for setting command

### Measurement Time Manual (Num)

Measurement time of user setting on manual store (number)

Setting value when “Measurement  $\square$  Time  $\square$  Preset” command parameter is “Manual” on manual store mode

Setting command	Measurement $\square$ Time $\square$ Manual $\square$ (Num), p1
Parameter	p1= 1 to 59 (Time unit is s [second] or m [minute]) p1= 1 to 24 (Time unit is h [hour])

Request command	Measurement $\square$ Time $\square$ Manual $\square$ (Num)?
Response data	d1
Returned value	Same as for setting command

### Measurement Time Manual (Unit)

Measurement time of user setting on manual store (unit)

Setting time unit when “Measurement  $\square$  Time  $\square$  Preset” command parameter is “Manual” on manual store mode

Setting command	Measurement $\square$ Time $\square$ Manual $\square$ (Unit), p1
Parameter	p1= “s” p1= “m” p1= “h”

Request command	Measurement $\square$ Time $\square$ Manual $\square$ (Unit)?
Response data	d1
Returned value	Same as for setting command

## Measurement Time Preset Auto

### Total measurement time of auto store

Setting total measurement time of the auto store mode

Setting command	Measurement _ Time _ Preset _ Auto, p1
Parameter	p1= "10s" p1= "1m" p1= "5m" p1= "10m" p1= "15m" p1= "30m" p1= "1h" p1= "8h" p1= "24h" p1= "Manual" (user setting) p1= "500s"
Request command	Measurement _ Time _ Preset _ Auto?
Response data	d1
Returned value	Same as for setting command

## Measurement Time Auto (Num)

### Total measurement time of user setting on auto store (number)

Setting value when "Measurement \_ Time \_ Preset" command parameter is "Manual" on auto store mode

Setting command	Measurement _ Time _ Auto _ (Num), p1
Parameter	p1= 1 to 59 (Time unit is s [second] or m [minute]) p1= 1 to 1000 (Time unit is h [hour])
Request command	Measurement _ Time _ Auto _ (Num)?
Response data	d1
Returned value	Same as for setting command

## Measurement Time Auto (Unit)

Total measurement time of user setting on auto store (unit)

Setting time unit when “Measurement  $\square$  Time  $\square$  Preset” command parameter is “Manual” on auto store mode

Setting command	Measurement $\square$ Time $\square$ Auto $\square$ (Unit), p1
Parameter	p1= “s” p1= “m” p1= “h”
Request command	Measurement $\square$ Time $\square$ Auto $\square$ (Unit)?
Response data	d1
Returned value	Same as for setting command

## Measurement Time Preset

Measurement time of manual store/Total measurement time of auto store

Setting measurement time of the manual store mode and total measurement time of the auto store mode

Setting command	Measurement $\square$ Time $\square$ Preset, p1
Parameter	p1= “10s” p1= “1m” p1= “5m” p1= “10m” p1= “15m” p1= “30m” p1= “1h” p1= “8h” p1= “24h” p1= “Manual” (user setting) p1= “500s”
Request command	Measurement $\square$ Time $\square$ Preset?
Response data	d1
Returned value	Same as for setting command

## Measurement Time (Num)

Measurement time of user setting on manual store/

Total measurement time of user setting on auto store (number)

Setting value when “Measurement \_ Time \_ Preset” command parameter is “Manual” on manual store mode and when “Measurement \_ Time \_ Preset” command parameter is “Manual” on auto store mode

Setting command	Measurement _ Time _ (Num), p1
Parameter	p1= 1 to 59 (Time unit is s [second] or m [minute]) p1= 1 to 1000 (Time unit is h [hour])

Request command	Measurement _ Time _ (Num)?
-----------------	-----------------------------

Response data	d1
---------------	----

Returned value	Same as for setting command
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## Measurement Time (Unit)

Measurement time of user setting on manual store/

Total measurement time of user setting on auto store (unit)

Setting time unit when “Measurement \_ Time \_ Preset” command parameter is “Manual” on manual store mode and when “Measurement \_ Time \_ Preset” command parameter is “Manual” on auto store mode

Setting command	Measurement _ Time _ (Unit), p1
Parameter	p1= “s” p1= “m” p1= “h”

Request command	Measurement _ Time _ (Unit)?
-----------------	------------------------------

Response data	d1
---------------	----

Returned value	Same as for setting command
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## Timer Auto Start Time

### Timer auto start time

Setting timer auto start time

Setting command	Timer _ Auto _ Start _ Time, p1/p2/p3 _ p4:p5:p6
Parameter	p1= 2015 or after (year) p2= 1 to 12 (month) p3= 1 to 31 (date) p4= 0 to 23 (hour) p5= 0 to 59 (minute) p6= 0 (second: only 0)
Request command	Timer _ Auto _ Start _ Time?
Response data	d1/d2/d3 _ d4:d5:d6
Returned value	Same as for setting command

## Timer Auto Stop Time

### Timer auto stop time

Setting timer auto stop time

Setting command	Timer _ Auto _ Stop _ Time, p1/p2/p3 _ p4:p5:p6
Parameter	p1= 2015 or after (year) p2= 1 to 12 (month) p3= 1 to 31 (date) p4= 0 to 23 (hour) p5= 0 to 59 (minute) p6= 0 (second: only 0)
Request command	Timer _ Auto _ Stop _ Time?
Response data	d1/d2/d3 _ d4:d5:d6
Returned value	Same as for setting command

## Timer Auto Interval

### Timer auto measurement interval

Setting timer auto measurement interval

Setting command	Timer _ Auto _ Interval, p1
Parameter	p1= "Off" p1= "5m" p1= "10m" p1= "15m" p1= "30m" p1= "1h" p1= "8h" p1= "24h"
Request command	Timer _ Auto _ Interval?
Response data	d1
Returned value	Same as for setting command

## Sleep Mode

### Sleep mode

Setting ON/OFF of sleep mode

Setting command	Sleep _ Mode, p1
Parameter	p1= "Off" p1= "On"
Request command	Sleep _ Mode?
Response data	d1
Returned value	Same as for setting command

## Manual Address

### Manual store address

Setting manual store address

Setting command	Manual _ Address, p1
Parameter	p1= "1 to 1000"
Request command	Manual _ Address?
Response data	d1
Returned value	Same as for setting command

## Measure

### Measurement

Measurement start and stop

Setting command	Measure, p1
Parameter	p1= "Start" p1= "Stop"
Request command	Measure?
Response data	d1
Returned value	Same as for setting command

When executing the command on the address in which data exists already, the data is overwritten.

## Pause

### Pause

Pause a measurement

Setting command	Pause, p1
Parameter	p1= "Pause" p1= "Clear"
Request command	Pause?
Response data	d1
Returned value	Same as for setting command

## Manual Store

### Manual store

Storing the calculated value in manual store

Setting command	Manual _ Store, p1	
Parameter	p1= "Start"	(Execute store)

There is no request command

## Measurement Start Time

### Measurement (operation) start time

Request measurement (operation) start time

Request command	Measurement _ Start _ Time?	
Response data	d1/d2/d3 _ d4:d5:d6	
Returned value	d1= 2015 or after	(year)
	d2= 1 to 12	(month)
	d3= 1 to 31	(date)
	d4= 0 to 23	(hour)
	d5= 0 to 59	(minute)
	d6= 0 to 59	(second)

There is no setting command

## Measurement Stop Time

### Measurement (operation) stop time

Request measurement (operation) stop time

Request command	Measurement _ Stop _ Time?	
Response data	d1/d2/d3 _ d4:d5:d6	
Returned value	d1= 2015 or after	(year)
	d2= 1 to 12	(month)
	d3= 1 to 31	(date)
	d4= 0 to 23	(hour)
	d5= 0 to 59	(minute)
	d6= 0 to 59	(second)

There is no setting command

## Measurement Elapsed Time

### Measurement elapsed time

Request measurement elapsed time (second)

Request command Measurement \_ Elapsed \_ Time?

Response data d1= 0 to 3600000 (second)

There is no setting command

## Measurement Delay Time

### Delay time

Setting delayed measurement time

Setting command Delay \_ Time, p1

Parameter p1= "Off"  
 p1= "1s"  
 p1= "3s"  
 p1= "5s"  
 p1= "10s"

Request command Delay \_ Time?

Response data d1

Returned value Same as for setting command

## Operation

### Underrange Lv X

#### Xch underrange $L_v$

Request presence of underrange  $L_v$  information of X channel

Request command Underrange \_ Lv \_ X?

Response data d1

Returned value d1= "Off" (there is no information)  
 d1= "On" (there is information)

There is no setting command

## Underrange Leq X

### Xch underrange $L_{eq}$

Request presence of underrange information in processed data of X channel

Request command Underrange  $\square$  Leq  $\square$  X?

Response data d1

Returned value d1= "Off" (there is no information)  
d1= "On" (there is information)

There is no setting command

## Overload Lv X

### Xch overload $L_v$

Request presence of overload  $L_v$  information of X channel

Request command Overload  $\square$  Lv  $\square$  X?

Response data d1

Returned value d1= "Off" (there is no information)  
d1= "On" (there is information)

There is no setting command

## Overload Leq X

### Xch overload $L_{eq}$

Request presence of overload information in processed data of X channel

Request command Overload  $\square$  Leq  $\square$  X?

Response data d1

Returned value d1= "Off" (there is no information)  
d1= "On" (there is information)

There is no setting command

### Underrange Lv Y

Ych underrange  $L_v$

Request presence of underrange  $L_v$  information of Y channel

Request command	Underrange $\_Lv \_Y?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

### Underrange Leq Y

Ych underrange  $L_{eq}$

Request presence of underrange information in processed data of Y channel

Request command	Underrange $\_Leq \_Y?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

### Overload Lv Y

Ych overload  $L_v$

Request presence of overload  $L_v$  information of Y channel

Request command	Overload $\_Lv \_Y?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

## Overload Leq Y

### Ych overload $L_{eq}$

Request presence of overload information in processed data of Y channel

Request command	Overload $\_Leq \_Y?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

## Underrange Lv Z

### Zch underrange $L_v$

Request presence of underrange  $L_v$  information of Z channel

Request command	Underrange $\_Lv \_Z?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

## Underrange Leq Z

### Zch underrange $L_{eq}$

Request presence of underrange information in processed data of Z channel

Request command	Underrange $\_Leq \_Z?$	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command



### Overload Lv Z

#### Zch overload $L_v$

Request presence of overload  $L_v$  information of Z channel

Request command	Overload _Lp _Z?	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

### Overload Leq Z

#### Zch overload $L_{eq}$

Request presence of overload information in processed data of Z channel

Request command	Overload _Leq _Z?	
Response data	d1	
Returned value	d1= "Off"	(there is no information)
	d1= "On"	(there is information)

There is no setting command

### Measure Channel Setting

#### Operation channel

Setting operation channel

Setting command	Measure _Channel _Setting, p1	
Parameter	p1= "Z"	
	p1= "XYZ"	

Request command	Measure _Channel _Setting?	
Response data	d1	
Returned value	Same as for setting command	

## Data output

### DOD

#### Output displayed value

Send the request command at one second interval or longer.

Request command	DOD?	
Response data	d1,d2,...,d45	
Returned value	d1 = "xxx.x"	$L_v$ or $L_{va}$ of X channel (Displayed characteristics)
	d2 = 0 or 1	Overload information (1: Yes, 0: No)
	d3 = 0 or 1	Under-range information (1: Yes, 0: No)
	d4 = "xxx.x"	$L_v$ or $L_{va}$ of X channel (Max hold value)
	d5 = 0 or 1	Overload information (1: Yes, 0: No)
	d6 = "xxx.x"	$L_{veq}$ or $L_{vaeq}$ of X channel
	d7 = "xxx.x"	$L_{vmax}$ or $L_{vamax}$ of X channel
	d8 = "xxx.x"	$L_{vmin}$ or $L_{vamin}$ of X channel
	d9 = "xxx.x"	$L_5$ of X channel ( $L_v$ or $L_{va}$ )
	d10 = "xxx.x"	$L_{10}$ of X channel ( $L_v$ or $L_{va}$ )
	d11 = "xxx.x"	$L_{50}$ of X channel ( $L_v$ or $L_{va}$ )
	d12 = "xxx.x"	$L_{90}$ of X channel ( $L_v$ or $L_{va}$ )
	d13 = "xxx.x"	$L_{95}$ of X channel ( $L_v$ or $L_{va}$ )
	d14 = 0 or 1	Overload information (1: Yes, 0: No)
	d15 = 0 or 1	Under-range information (1: Yes, 0: No)
	d16 to d30 :	Y channel information (Same format as X channel)
	d31 to d45 :	Z channel information (Same format as X channel)

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

\* When operation channel is set to Z, d1 to d30 are returned as "-".

There is no setting command

## DRD (only when optional VX-55EX is installed)

### Continuous output

Data are sent periodically to the computer every 100 msec.

To stop the data transfer, send the stop request transfer code <SUB> (hexadecimal notation: 1A<sub>H</sub>).

Request command	DRD?	
Response data	d0,d1,d2,...,d24	
Returned value	d0 = "xxx"	Counter (1 to 600)
	d1 = "xxx.x"	$L_v$ or $L_{va}$ of X channel (Displayed characteristics)
	d2 = "xxx.x"	$L_{veq}$ or $L_{vaeq}$ of X channel
	d3 = "xxx.x"	$L_{vmax}$ or $L_{vamax}$ of X channel
	d4 = "xxx.x"	$L_{vmin}$ or $L_{vamin}$ of X channel
	d5 = 0 or 1	Overload information (1: Yes, 0: No)
	d6 = 0 or 1	Under-range information (1: Yes, 0: No)
	d7 = "xxx.x"	$L_v$ or $L_{va}$ of X channel (Max hold value)
	d8 = 0 or 1	Overload information (1: Yes, 0: No)
	d9 to d16 :	Y channel information (Same format as X channel)
	d17 to d24 :	Z channel information (Same format as X channel)

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

\* When operation channel is set to Z, d1 to d30 are returned as "-".

There is no setting command

## Command example

The example of a setting by a command is shown.

Using a request command after a setting is recommended.

### Basic setting

Setting the display channel to “XYZ”

Display \_ Channel \_ Setting, XYZ

Setting the display characteristic type to “L<sub>v</sub>”

Display \_ Lva \_ Setting, Lv

Setting the time scale of time-level display to “20s”

Time \_ Level \_ Time \_ Scale, 20s

Setting the level range upper limit of X channel, Y channel and Z channel to “120 dB”

Level \_ Range \_ X, 120

Level \_ Range \_ Y, 120

Level \_ Range \_ Z, 120

### When operating auto store

Setting the Store Mode to “Auto”

Store \_ Mode, Auto

Setting the Store Name to “0100”

Store \_ Name, 100

Setting the Total Measurement Time to “10min”

Measurement \_ Time \_ Preset \_ Auto, 10m

Setting the L<sub>v</sub> Store Interval to “100ms”

Lv \_ Store \_ Interval, 100ms

Setting the L<sub>eq</sub> Calculation Interval to “1min”

Leq \_ Calculation \_ Interval \_ Preset, 1m

Measurement start / stop (store)

Measure, Start \* No confirmation about overwriting.

Measure, Stop

Measurement data acquisition

DOD?

**When operating manual store**

Setting the Store Mode to “Manual”

Store \_ Mode, Manual

Setting the Store Name to “0200”

Store \_ Name, 200

Setting the Measurement Time to “15min”

Measurement \_ Time \_ Preset \_ Manual, 15m

Measurement start / stop

Measure, Start

Measure, Stop

Saving of the store result

Manual \_ Store, Start

Measurement data acquisition

DOD?

“ \_ ” stands for a space

# Reference Information

## Battery life

### Important

Battery life varies depending on the setting of this unit.

Examples of the battery life when measuring continuously

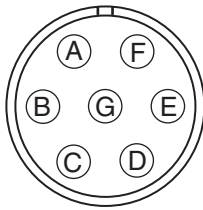
Battery type Operating temperature	Alkaline batteries	Nickel metal-hydride batteries
-10°C	Approx. 12 hours	Approx. 26 hours
+23°C	Approx. 27 hours	Approx. 27 hours
+50°C	Approx. 29 hours	Approx. 29 hours

Operating condition:

- The PV-83C is connected to the VM-55
- Eco setting is ON
- $L_v$  store interval is OFF
- $L_{eq}$  calculation interval is 1 min

## INPUT connector

The input connector is wired as shown below.



Top view

- A: Unused
- B: Ground
- C: Z channel signal input
- D: Unused
- E: X channel signal input
- F: Y channel signal input
- G: Pickup power supply

<b>Important</b>
Do not connect anything else besides the supplied 3-axis accelerometer PV-83C or supplied extension cord EC-54S to this connector. Otherwise damage may occur.

# Description for JIS C 1517

Standard paragraph	Description	Remark
9 a)	Reference vibration acceleration level	100 dB
9 b)	Reference level range	30 dB to 100 dB range
9 c)	Starting point of level linearity error test	Refer to the table of “Upper/lower limit for linear dynamic range of vibration level/vibration acceleration level” on next page
9 d)	The minimum load impedance for an analog output terminal	10 k $\Omega$



### Upper/lower limit for linear dynamic range of vibration level/ vibration acceleration level

Range		Vibration level (vertical)		Vibration level (horizontal)		Vibration acceleration level	
		6.3 Hz	31.5 Hz	6.3 Hz	31.5 Hz	6.3 Hz	31.5 Hz
120	Upper limit	129	117	122	108	129	129
	Starting point	100	100	100	100	100	100
	Lower limit	50	50	50	50	50	50
110	Upper limit	119	107	112	98	119	119
	Starting point	90	90	90	90	90	90
	Lower limit	40	40	40	40	40	40
100	Upper limit	109	97	102	88	109	109
	Starting point	80	80	80	80	80	80
	Lower limit	30	30	30	30	30	30
90	Upper limit	99	87	92	78	99	99
	Starting point	70	70	70	70	70	70
	Lower limit	25	25	30	30	30	30
80	Upper limit	89	77	82	68	89	89
	Starting point	60	60	60	60	60	60
	Lower limit	25	25	30	30	30	30
70	Upper limit	79	67	72	58	79	79
	Starting point	50	50	50	50	50	50
	Lower limit	25	25	30	30	30	30

# Specifications

Conformity standards Weight and Measure Act (vibration level meters) of  
Japan

JIS C 1510: 1995

JIS C 1517: 2014

CE marking

WEEE Directive, Chinese RoHS

Measurement functions

3-axis or Z-axis can be selected.

Vibration level ( $L_v$ )

Vibration acceleration level ( $L_{va}$ )

Maximum value hold of vibration level or vibration  
acceleration level

Processing measurement

Equivalent continuous level 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 ( $L_{max}$ ), Minimum value ( $L_{min}$ ) of  
vibration level or vibration acceleration level

Measurement frequency range

Vibration level: 1 Hz to 80 Hz

Vibration acceleration level: 1 Hz to 80 Hz

Measurement level range (at 6.3 Hz sinusoidal wave)

Vibration level, vertical:

25 dB to 129 dB

Vibration level, horizontal:

30 dB to 122 dB

Vibration acceleration level:

30 dB to 129 dB

Inherent noise	<p>Vibration level, vertical: 19 dB or less</p> <p>Vibration level, horizontal: 24 dB or less</p> <p>Vibration acceleration level: 24 dB or less (Extension cord up to 103 m) 28 dB or less (Extension cord 203 m or less)</p>
Frequency weighting	<p>Vertical characteristics</p> <p>Horizontal characteristics</p> <p>Flat characteristics</p>
Level range	<p>10 dB steps, 6 ranges switchable, 3-axis independent</p> <p>0 dB to 70 dB</p> <p>10 dB to 80 dB</p> <p>20 dB to 90 dB</p> <p>30 dB to 100 dB</p> <p>40 dB to 110 dB</p> <p>50 dB to 120 dB</p>
Linear operating range	80 dB
RMS detection circuit	Digital processing
Time constant	0.63 s
Sampling time	<p><math>L_{eq}</math>, <math>L_{max}</math>, <math>L_{min}</math>, max. hold</p> <p>125 <math>\mu</math>s (sampling frequency: 8 kHz)</p>
Time percentile level	<p>100 ms</p> <p>Calculated based on the instantaneous value every 5 seconds when the Measurement Time or Leq Calculation Interval is set to “500s”</p>

## Store mode

### Manual

Measurement result is stored on an address to internal memory or inserted SD memory card

Up to 1000 data sets (3-axis) in the internal memory

External memory depends on the SD memory card capacity

Store the instantaneous value and the max hold value

Store the processed data

### Instantaneous value and maximum hold value store

Vibration level  $L_v$  and vibration acceleration level  $L_{va}$  instantaneous values and maximum hold values (current at the point when the PAUSE key is pressed) can be stored

### Processing value store

Various processing values obtained in manual mode are stored

### Auto (when the VX-55EX is installed)

The processing result obtained using the specified time interval will be recorded on SD memory card continuously

### Timer Auto (when the VX-55EX is installed)

Executes Auto store by fixed interval from the start time to stop time

Sleep function (power save mode until measurement start) available

The processing result will be recorded on SD memory card continuously

## Measurement time (for manual store mode)

Processing measurement in preset time possible

500 seconds, 10 seconds, 1 minute, 5 minutes, 10 minutes,

15 minutes, 30 minutes, 1 hour, 8 hours, 24 hours, User

setting (1s to 59s, 1m to 59m, 1h to 24h)

Total measurement time (for Auto/Timer Auto mode)	<p>Processing measurement in preset time possible</p> <p>500 seconds, 10 seconds, 1 minute, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 1 hour, 8 hours, 24 hours, User setting (1s to 59s, 1m to 59m, 1h to 1000h)</p>
$L_v$ store interval	<p>100 ms, 1s</p> <p>Store interval for instantaneous value data in Auto and Timer Auto store modes</p>
$L_{eq}$ calculation interval	<p>500 seconds, 10 seconds, 1 minute, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 1 hour, 8 hours, 24 hours, User setting (1s to 59s, 1m to 59m, 1h to 24h)</p> <p>Calculation interval for <math>L_{eq}</math>, <math>L_N</math> and other data in Auto and Timer Auto store modes</p>
Pause function	<p>Pause/resume possible during instantaneous value (current) display and manual processing measurement</p> <p>Pause function not available in Auto/Timer Auto mode</p> <p>Also not available during waveform recording</p>
Marker (when the VX-55EX is installed)	<p>Two types of marker functions available</p> <p>Can be used only in Auto and Timer Auto store modes when <math>L_v</math> store cycle is set</p>
Data recall	Allows viewing of store data
Setup memory	<p>Up to five setup configurations can be saved in the internal memory and SD memory card for later recalls</p> <p>The unit can be started using the setting file stored in the SD memory card beforehand</p>
Clock functions	Time stamping of store data, timer controlled processing measurement with start time/end time setting

Display	Backlit semitransparent color TFT LCD display WQVGA (400 × 240 dots)
Bar graph update frequency	100 ms
Numeric display update frequency	1 s
Language	English/Japanese/Korean
Help function	Allows viewing of help display
Alarm display	
Overload	Full scale +10.0 dB
Underload	Full scale -70.5 dB or off-scale low -0.5 dB
Calibration output signal	For calibration of external equipment AC output: 31.5 Hz, 1 Vrms DC output: 2.5 V
AC/DC output	AC or DC selected by menu 2.5 mm dia. output, 3 separate channels
AC output	Output impedance: 600 Ω Load impedance: 10 kΩ or higher Output voltage: 1 Vrms (full-scale) Frequency weighting for instantaneous value display and for AC output can be set separately
DC output	Output impedance: 600 Ω Load impedance: 10 kΩ or higher Output voltage: 2.5 V (full-scale, 25 mV/dB)
USB	
Mass storage class	Connected to a computer as a storage device, and recognized as a removable disk
Communication device class	Allows control with communication commands using communication device class

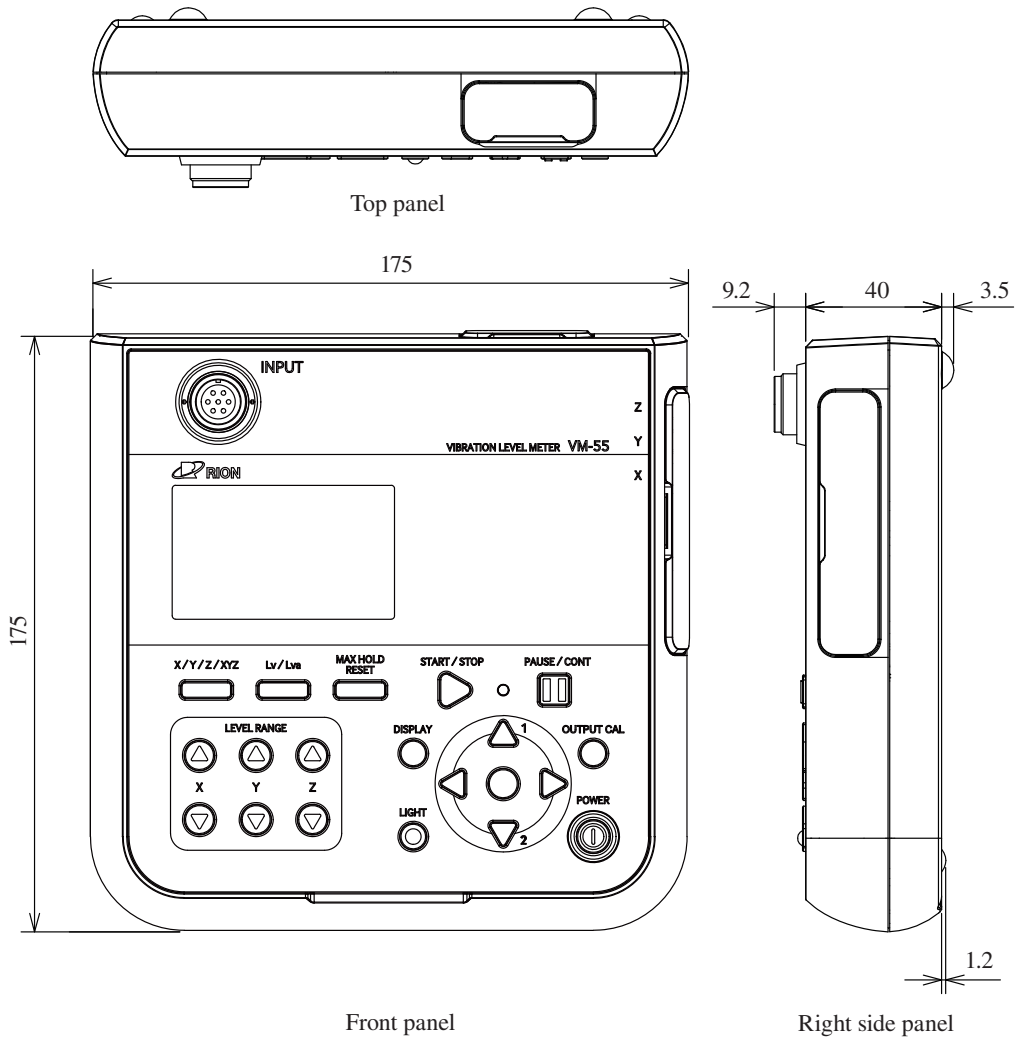
RS-232C communication	Allows RS-232C communication using the dedicated cable (I/O connector is used)
Screen capture	Screen capture data can be saved as BMP files.
Printout	Dedicated printer DPU-414 or BL2-58 can be used to print measurement results (using I/O connector)
Screen print mode	Makes one copy of displayed screen.
Comparator (when the VX-55EX is installed)	Vibration level or vibration acceleration level based comparator. Output activated when setting level (30 dB to 120 dB, 1 dB steps) is exceeded.
Supported channels	Single-axis channel selected for main display
Comparator output	Open-drain output (I/O connector is used) Maximum input voltage: 24 V Internal resistance: Approx. 500 $\Omega$ Allowable power dissipation: 0.3 W
Power requirements	Eight AA batteries or external power supply
Battery life (at 23°C):	Alkaline batteries LR6: Approx. 27 hours Ni-MH secondary batteries (eneloop XX): Approx. 27 hours When used in conjunction with battery pack BP-21A (Alkaline batteries LR20) Approx. 90 hours Battery life varies depending on the setting of this unit.
AC adapter	NC-98 series
External DC power supply	5 V to 7 V (rated voltage 6 V)
Current Consumption	Approx. 80 mA (12 V DC)
Water and dust resistant performance	IP54

Ambient conditions for use	–10°C to +50°C, 90% RH or less (no condensation)	
Ambient conditions for storage	–10°C to +50°C, 90% RH or less (no condensation)	
Dimensions	Approx. 53 mm (H) × 175 mm (W) × 175 mm (D) (Maximum)	
Weight	Approx. 780 g (including batteries)	
Accelerometer	3-axis accelerometer PV-83C	
Reference sensitivity	60 mV/(m/s <sup>2</sup> )	
Ambient conditions	–10°C to +50°C (no condensation)	
Waterproofing specifications	IPx7	
Dimensions	Approx. 67 mm dia. × 41 mm (H) (excluding connection cord)	
Weight	Approx. 335 g	
SD memory card	SD/SDHC (maximum capacity 32 GB)	
SD memory card format	Using a SD formatter or correspondent	
LED	Two colors (red/blue)	
Supplied accessories		
Extension cord (3 m)	EC-54S	1
Alkaline batteries LR6		8
Instruction manual		1
(CD-ROM: Included option program manual and USB driver)		
Carrying case		1
Inspection certificate		1

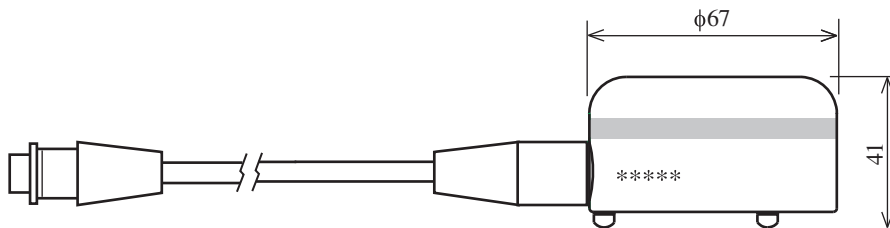


## Optional accessories

SD Card 512 MB	MC-51SD1
SD Card 2 GB	MC-20SD2
SD Card 32 GB	MC-32SP3
AC adapter (100 V to 240 V)	NC-98 series
Battery pack	BP-21A
Extension cord	EC-54S (3 m)
	EC-54SB (10 m)
	EC-02SD (50 m, with reel)
	EC-02S (3 m)
	EC-02SE (100 m, with reel)
EC-02S–EC-54S conversion cord	EC-54ST
BNC - Pin output cord	CC-24
Comparator output cable	CC-42C
Printer	DPU-414/BL2-58
Printer cable	CC-42P
USB cable (A - mini B)	Commercially available
RS-232C serial I/O cable	CC-42R
Data management software for environmental measurement	AS-60VM/AS-60VMRT
Data recorder	DA-21
Level recorder	LR-07
Program option	
Extended Function Program	VX-55EX
Waveform Recording Program	VX-55WR
1/3 Octave Real-time Analysis Program	VX-55RT



Unit: mm  
Dimensional Drawing of VM-55



Unit: mm  
Dimensional Drawing of PV-83C





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