INSTRUCTION MANUAL

DATA COLLECTOR

VA-11C

RION CO., LTD.

3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan

Organization of this manual

Be sure to read and observe the precautions and safety instructions printed at the beginning of this manual.

The VA-11C is a portable vibration analyzer with a dedicated data collector mode for performing diagnostic routines on various kinds of equipment. The functions that provide the data for the data collector mode (vibration meter mode and analyzer mode) allow use of the unit also as a regular vibration analyzer. The instruction manual therefore first briefly explains the basic functions and operation steps for vibration analysis. A separate section then describes how to use the data collector mode.

This manual contains the following sections.

Outline

Gives basic information on 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 how to prepare the unit for use, including information on making connections, inserting batteries and the compact flash card.

Display Explanation

Describes symbols and other information appearing on the display. Menu screens are also explained in this section.

Trigger Functions

Explains the use of trigger signals.

Processing Principles

Explains the relation between the various measurement functions and the trigger function.

Measurement

Describes the basic steps and procedures for measurement.

Recall Mode

Describes how to redisplay data stored in the memory of the unit.

Data collector mode operation

Describes the steps for performing data collection. Other chapters describe the vibration analysis mode that forms the basis for data collector function.

Printing

Describes the basic print functions.

Compact Flash Card

Describes how to use the supplied dedicated compact flash card for the data collector mode. Also gives information on how to use separately available compact flash cards for data storage in vibration meter mode and analyzer mode.

Default Setting

Lists the default settings of the unit (the condition in which it is shipped from the factory).

Specifications

Lists the technical specifications of the unit.

CE

The product described in this manual is in conformity with the following European standards;
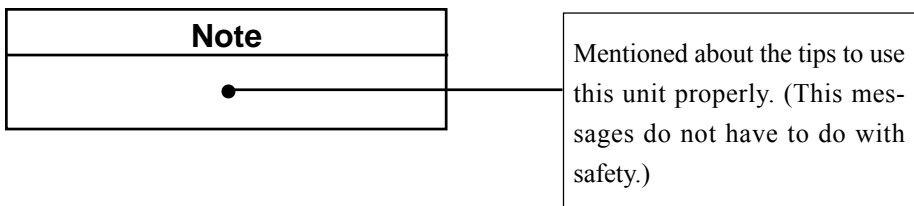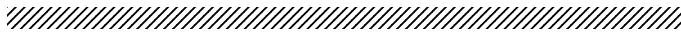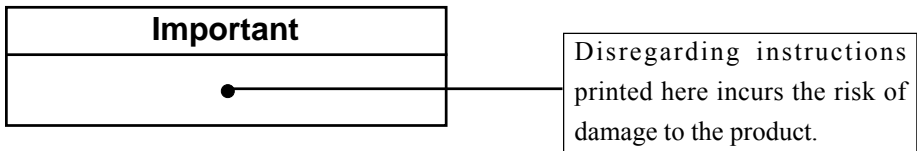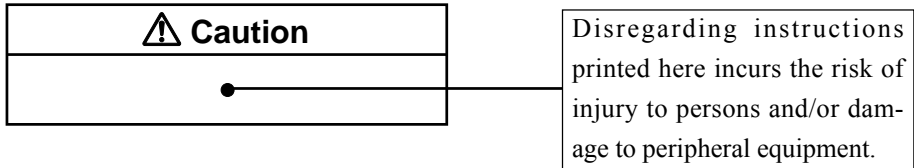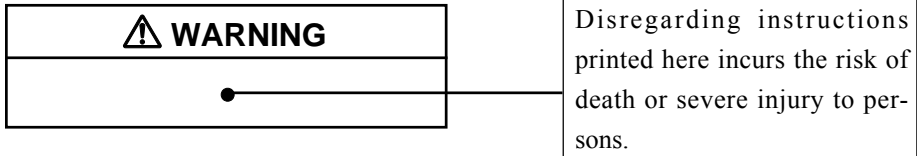
EN50081-1 (1992)
EN50082-2 (1995)

Note: CE requirements are met provided that a core filter is fitted to every cable.

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.

⚠ **WARNING**
●

Disregarding instructions printed here incurs the risk of death or severe injury to persons.

⚠ **Caution**
●

Disregarding instructions printed here incurs the risk of injury to persons and/or damage to peripheral equipment.

Important
●

Disregarding instructions printed here incurs the risk of damage to the product.

Note
●

Mentioned about the tips to use this unit properly. (This messages do not have to do with safety.)

⚠ WARNING

● When making measurements on exposed rotating parts or power train parts of machinery, proceed with utmost care to ensure that the accelerometer or accelerometer cable do not get caught in the machine.

● When making measurements on exposed rotating parts or power train parts of machinery, do not use the shoulder belt or carrying strap.

Precautions

- Operate the unit only as described in this manual.

- Do not touch any parts of the unit other than necessary for operation.

- Do not drop the unit. Protect it from shocks and vibration.

- The permissible ambient temperature range for operation of the unit is 0 to +40ºC. Relative humidity must be between 20% and 90%.
  Do not use or store the unit in locations which may be subject to water, direct sunlight, high temperatures or humidity. Also protect the unit from air with high salt or sulphur content, gases or the influence of chemicals.

- Do not forget to turn the unit off after use. Remove the batteries if the unit is not to be used for some time.

- When disconnecting cables, always hold the plug and do not pull the cable.

- To clean the unit, use only a dry cloth or a cloth lightly moistened with water. Do not use chemical cleaning cloths, solvents or alcohol-based cleaners to prevent the possibility of deformation and discoloring.

- Do not insert any objects such as pins, metal scraps, conducting plastic etc. into any opening on the unit.

- Do not disassemble the unit or attempt internal alterations.

- In case of malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.

Contents

Outline

The VA-11C is a portable vibration analyzer with a dedicated data collector mode for performing diagnostic routines on various kinds of equipment. It has a basic but highly useful array of functions.

Three measurement modes are available, namely the vibration meter mode for vibration measurement, the analyzer mode for FFT analysis, and the data collector mode for data collection.

In vibration meter mode, simultaneous measurement of acceleration, velocity, and displacement is carried out. Velocity rms value, peak value, and crest factor can also be displayed simultaneously. In analyzer mode, FFT analysis is used to determine the power spectrum and vibration waveform. The capability to perform envelope processing before FFT analysis is highly useful for equipment diagnostics.

In data collector mode, a predetermined numbered route is used to periodically check equipment and collect data for centralized diagnosis and management. The optional ProCon11C Analysis software for condition monitoring (compatible with Windows 95/98 and Windows NT 4.0) is used to manage data on a computer.

Except for envelope processing, all processing functions are carried out in the digital domain. The data collector mode always uses a dedicated compact flash card. In other modes, the compact flash card slot can also be used for easy storage and export of data to a computer. (A different flash card from the dedicated card for data collector mode must be used.)

Features
- DSP chip performs digital processing of integral value and rms value
- Simultaneous display of acceleration, velocity, displacement
- 16-bit A/D converter achieves 80 dB dynamic range for FFT analysis
- Simple operation with only 10 controls
- Internal memory holds up to 500 data sets of any type
- Timer allows automatic storing of data at preset intervals

- 10 sets of unit control settings can also be stored
- Capability to record and re-analyze time waveform data
- Data collector function for collecting measurement data along a predetermined route
- Supplied route management software allows easy creation and maintenance of an equipment data base with up to 500 measurement points
- Built-in compact flash card slot allows easy data exchange with a computer
- Route management software runs under Microsoft Windows and is easy and intuitive to use

Configuration

VA-11C
(Hardware)

Computer

Data collector function

Vibration meter /
analyzer function
(VA-11)

Analysis software for
condition monitoring
ProCon11C (option)

Compact flash card

Block diagram

Input connector

ATT

ENVELOPE
HPF   LPF

1 kHz | 50 kHz | Envelope detector

Overload detector

Overload signal

Pickup start switch

External trigger connector

CPU

A/D

High-pass filter (HPF)
3 Hz
10 Hz
1 kHz

Low-pass filter (LPF)
1 kHz
5 kHz
20 kHz

Vibration meter

PEAK HOLD
RMS DET
RMS DET   VEL
RMS DET
DISP

Integrator
Integrator

ACC
ENVELOPE

FFT
Aliasing filter

Power supply voltage monitor

Batteries

External power supply

Power supply circuit

To power supply points in various sections

RAM 768 kB

FLASHROM 512 kB

G RAM

RTC

Beeper

PCMCIA

RS-232-C

Key controller

LCD controller

Analog control

Panel switches

Display

Backlight switch

Contrast control

Computer

Analysis software for condition monitoring ProCon11C (option)

3

Controls and Features

This section describes the key operation principles for vibration meter mode and analyzer mode which form the basis of the data collector mode.

For information on key operation in the data collector mode, please refer to the paragraph "Key Operation" in the section "Data Collector Mode Operation" (page 75).

Front Panel

Display

PRINT key

MENU (ENTER) key

SETUP (ESC) key

△, ▽ keys

◁, ▷ keys

PAUSE/CONT key

START key

STORE key

Carrying strap
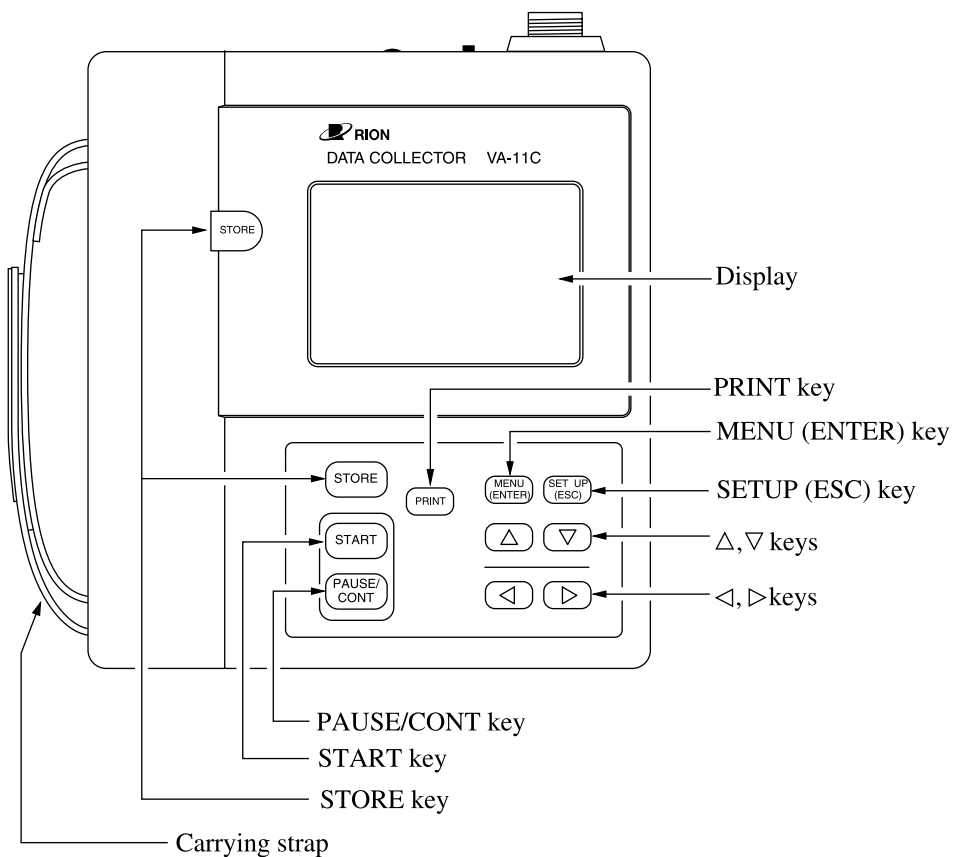
Display

Measured waveforms, menus, and other data are shown here.

PRINT key

Pressing this key causes the currently displayed measurement screen or data stored in memory to be printed out.

Do not press the PRINT key when a computer is connected to the I/O connector. Otherwise communication will be impaired.

MENU (ENTER) key

Allows changing the measurement parameters using the menus.

SETUP (ESC) key

Allows changing the measurement parameters directly on the measurement screen.

△, ▽ keys

Used to select setting items when changing the measurement parameters.

◁, ▷ keys

Used for cursor movement and for changing measurement parameters.

START key

Used to start the measurement.

PAUSE/CONT key

Used to pause and restart the measurement.

STORE key

Used to store data in the memory.

There are two keys labelled STORE. You can press either key.

Carrying strap

For carrying, hold the unit as shown below.
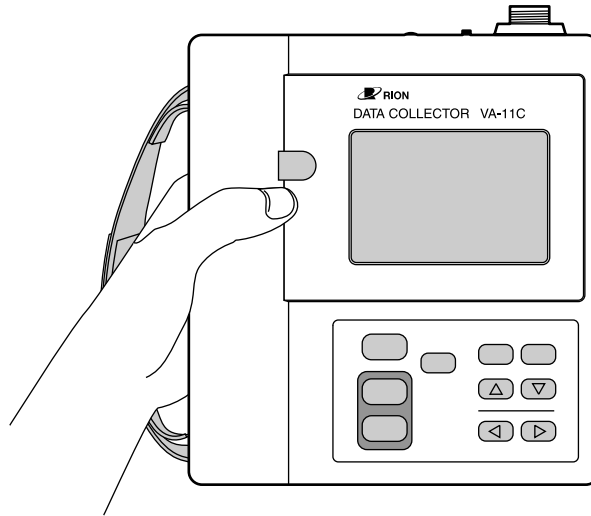
┌─────────────────────────────────┐
│   ⚠ **WARNING**   │
├─────────────────────────────────┤
│ **When making measurements on exposed** |
│ **rotating parts or power train parts of ma-** |
│ **chinery, proceed with utmost care to ensure** |
│ **that the pickup or pickup cable do not get** |
│ **caught in the machine.** |
└─────────────────────────────────┘

Side Panel

POWER switch
EXT DC IN jack
TRIG IN jack
Card slot

POWER   EXT DC IN   TRIG IN   PCMCIA

OFF   ON   4-6V ⊕-ⵦ-⊖   ↑UP
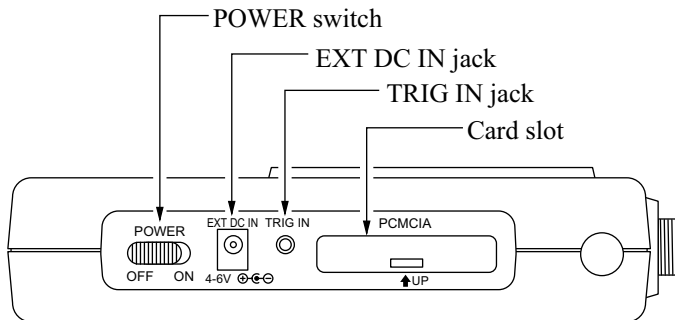
POWER switch

Turns the unit OFF and ON.

EXT DC IN jack

The optional AC adapter NC-94A can be connected here for operation on
AC power.

Important
Use only the supplied AC adapter NC-94A to prevent the possibility of damage.

TRIG IN jack

Allows controlling the measurement with a trigger signal.

Card slot

Separately available compact flash cards can be inserted here to store mea-
surement data and transfer them to a computer for further processing (see
page 16).

Top Panel

Accelerometer connector
LIGHT switch
CONTRAST control
I/O connector
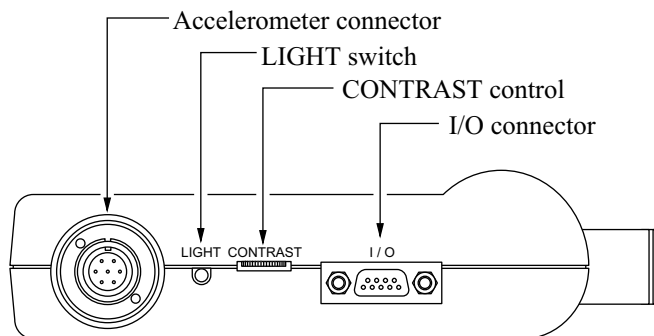
LIGHT CONTRAST   I/O

Accelerometer connector

The supplied accelerometer PV-57 is connected here. (Other compatible accelerometers: PV-55, VP-26C)

LIGHT switch

Pressing this switch turns on the display backlight, and pressing the switch again turns it off. The backlight also turns itself off automatically after three minutes of inactivity.

When the unit is operated on batteries and the battery indicator shows less than three segments, the backlight will not come on even if the switch is pressed. Only three short beeps will be heard.

CONTRAST control

Serves to adjust the display contrast.

I/O connector

Serial interface connector for connection of the separately available printer CP-11 or a computer.

Bottom Panel

Battery compartment
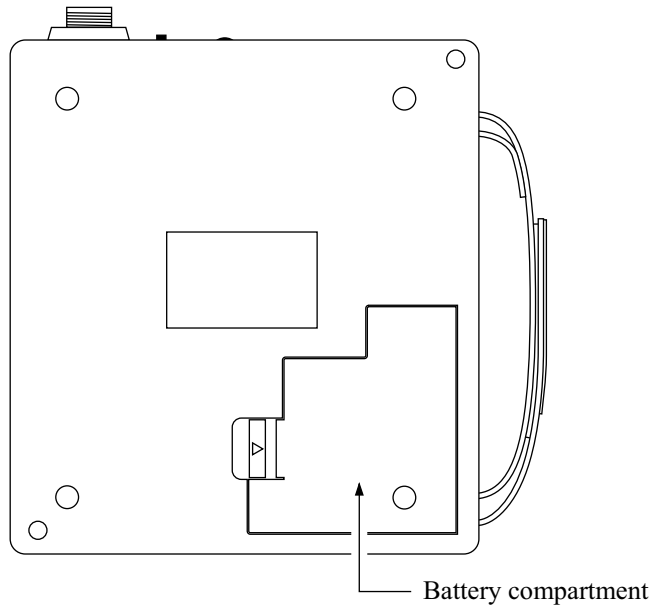
Battery compartment

Four IEC R14 (size C) batteries and one lithium battery are inserted here.

Preparations

Power Supply

Inserting the batteries

1. Set the POWER switch to OFF.
2. Open the cover of the battery compartment.

Battery compartment cover

Push the section marked ▽ in the arrow direction and remove the cover.
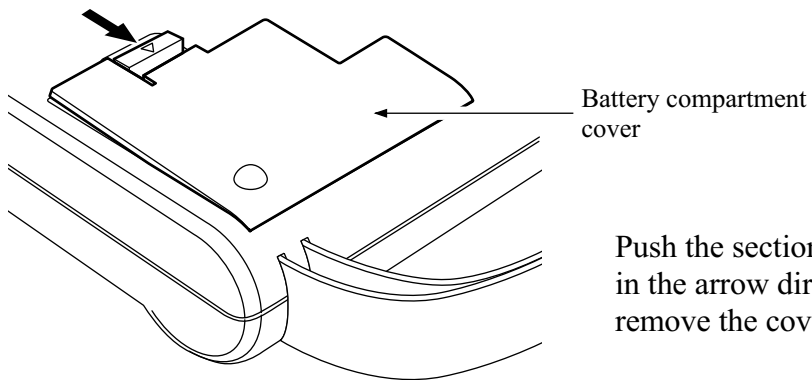
The illustration below shows the unit with the cover removed. Pay attention to correct polarity.

Groove
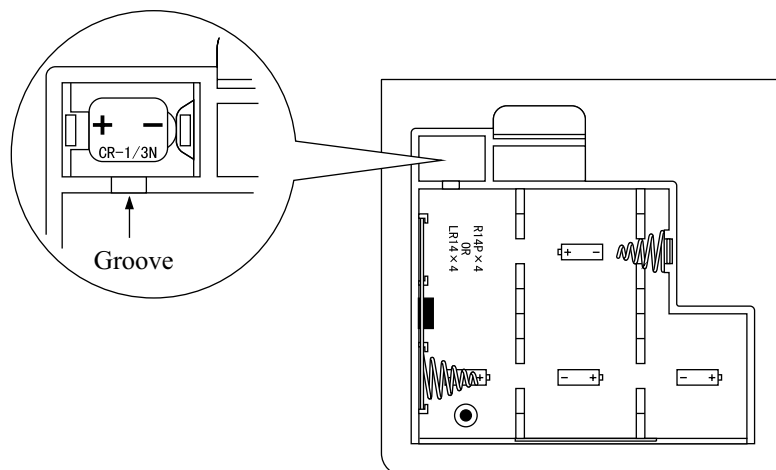
3. Insert four IEC R14 (size C) batteries with correct polarity, as shown in the illustration below.

4. Insert the lithium battery with correct polarity.

5. Replace the battery compartment cover.

Lithium battery CR-1/3N   Four IEC R14 (size C) batteries
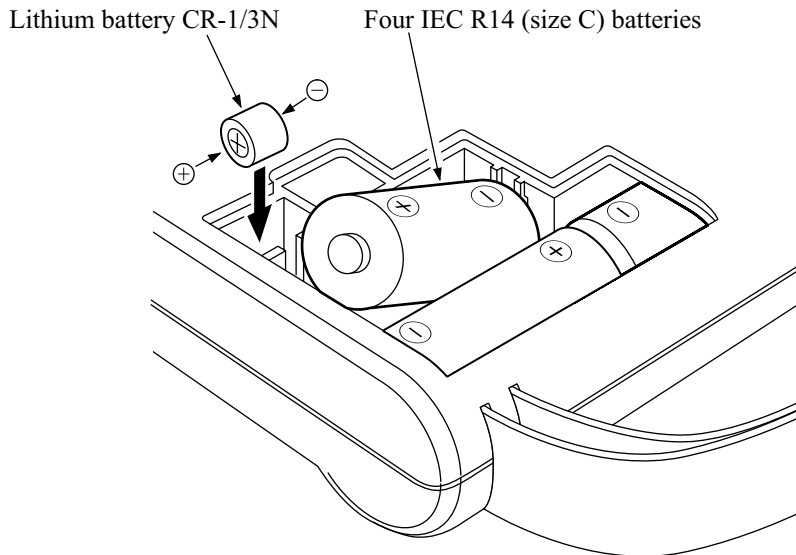
Important

● Take care not to mix up [+] and [-] polarity when inserting the batteries.

Replace all four batteries at the same time, and do not mix battery types.

When not in use, remove the batteries from the unit.

● The lithium battery serves for backup of the built-in calendar/clock IC. It has a life of about 2 years, but there is no means of checking the remaining battery capacity. To be on the safe side, you should replace the battery every 1 to 1-1/2 years.

When to replace the batteries

The battery indicator at the top right of the display gives an indication of battery status. The number of lit segments decreases as the batteries are depleted. When only one segment is shown, you should replace the batteries.

When using alkaline batteries, the approximate battery life is 22 hours of continuous operation. With manganese batteries, the approximate battery life is 10 hours (at approx. 20ºC, without using backlight and compact flash card).

Battery indicator

MESUR
SPEC ACC ▮▮▮▮ 12 : 34
1
TRG

Display

▯▮▮▮ Battery capacity OK
▯▮▮

Data collector inoperative

Card mark flashes

Limit of battery capacity reached

Flashing: replace batteries immediately

Battery indicator function
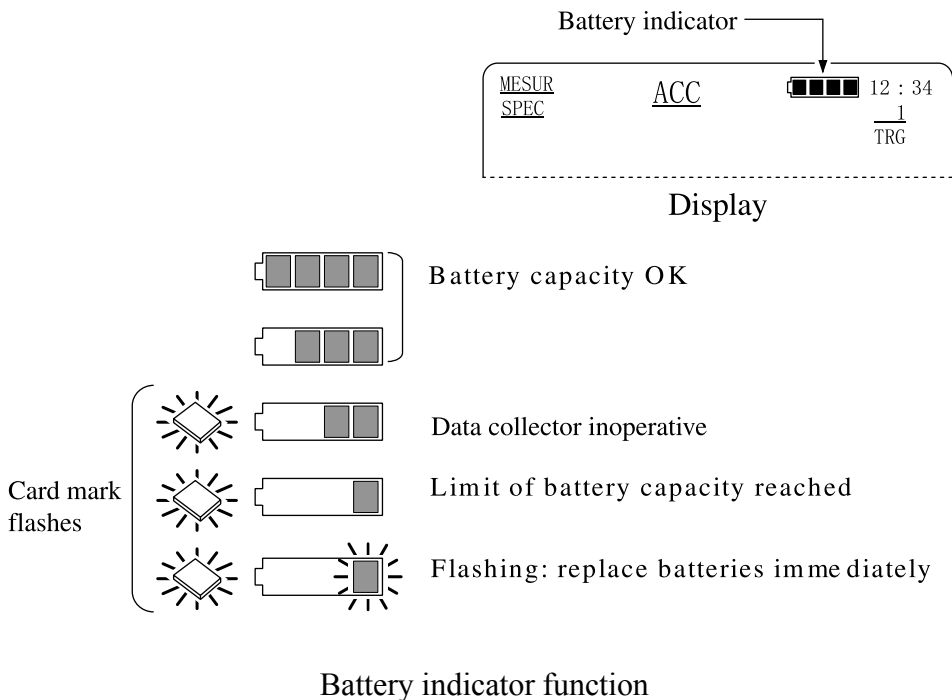
When the batteries are almost exhausted, the last segment will flash for about 30 seconds and a continuous beep is heard (if the buzzer setting is ON; see page 44).

After automatic shutdown, the display will be off and the keys of the unit have no effect. Set the POWER switch to OFF and replace the batteries as described on pages 10 to 11.

When the POWER switch is turned on, the Rion logo will normally be shown on the display for five seconds, and then the measurement screen appears. If the battery capacity is low, the logo screen stays on the display. In such a case, set the POWER switch to OFF and replace the batteries as described on pages 10 to 11.

When compact flash cards are used, the battery life will be shorter. See the "Note" on page 90.

AC adapter

To use the optional AC adapter, connect it to the unit as shown below.
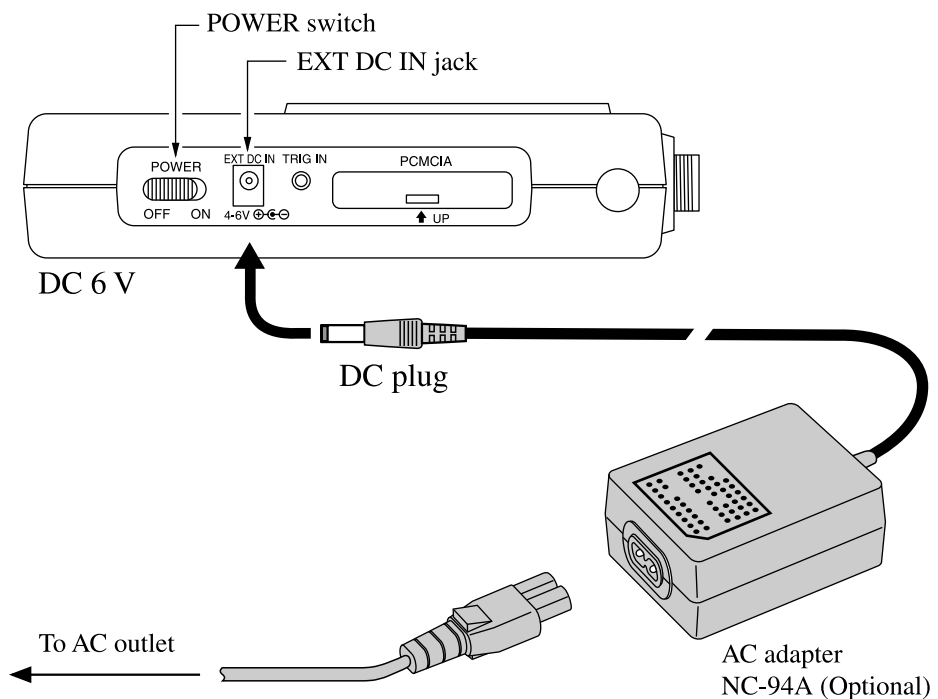
Important
Use only the optional AC adapter NC-94A to prevent the possibility of damage.

Power cord plug

After use, always disconnect
the plug from the AC outlet.

AC outlet
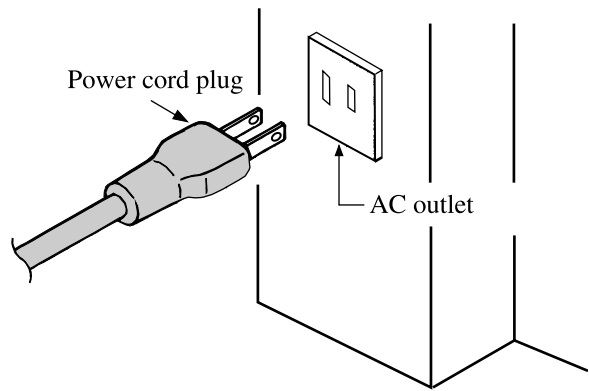
Important
Do not coil or twist the power cord of the AC adapter. Do not cover the AC adapter or the power cord with cloth, paper or any other object, to prevent the possibility of heat buildup.

Connecting the Accelerometer PV-57

Connect the acceleration accelerometer PV-57 as shown below.

Connector ring

Connector

Accelerometer connector

Accelerometer PV-57
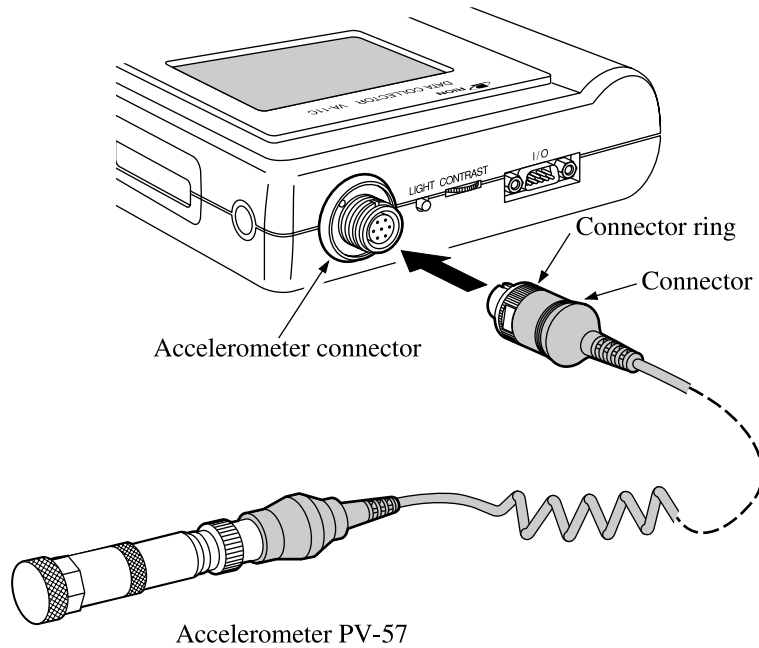
After inserting the plug into the connector, rotate the connector ring clockwise to firmly lock the plug.

The start switch on the accelerometer operates in the same way as the START key on the unit.

Inserting the Compact Flash Card

To use the data collector function, the supplied dedicated VA-11C compact flash card must be inserted in the unit. To insert the card, proceed as follows.

1. Turn off power to the VA-11C.
2. Push the cover of the slot labelled "PCMCIA" fully up, so that the slot becomes accessible.
3. Insert the compact flash card fully into the slot, with the rib facing up, as shown in the illustration.

Insert card with rib facing up.

Compact flash card

Slide cover in arrow direction to access slot.
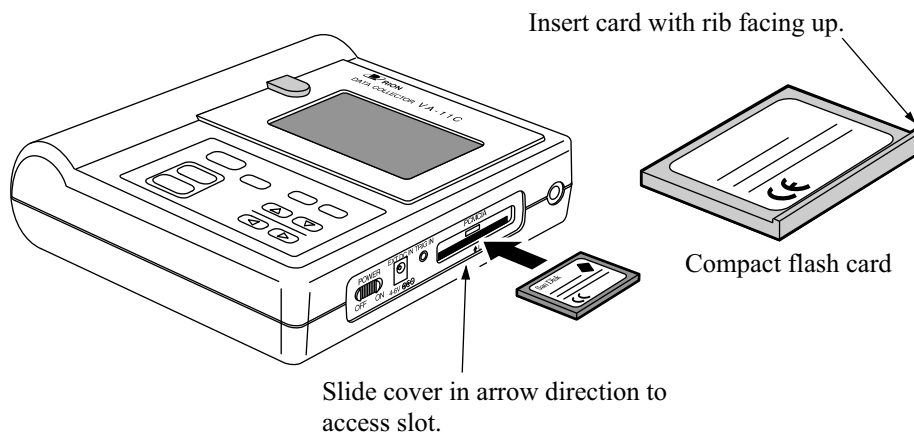
Important
● Take care not to insert the card in reverse.
● If a card is inserted or removed while the VA-11C is turned on, data on the card may be lost.
● To prevent the possibility of damage, do not use any cards other than the type specified.

Note
Close the slot cover when no card is used.

Trigger Input

The trigger function (see page 47) can be used to control the measurement.

BNC to phono plug cable CC-24
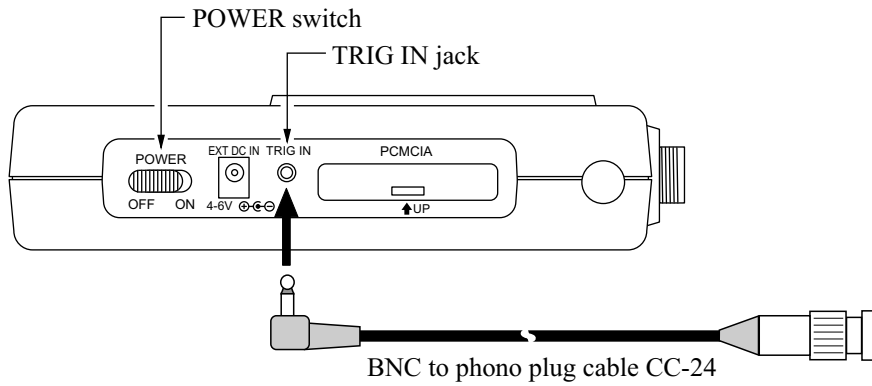
Printer and Computer Connections

To connect the printer DPU-414, CP-11 or CP-10 (option) to the I/O connector on the VA-11C, use a commercially available RS- 232-C interface cable (straight cable). To connect a computer to the I/O connector on the VA-11C, use a commercially available RS-232-C interface cable (cross-wired or null modem cable).

I/O connector

Two screw fasteners
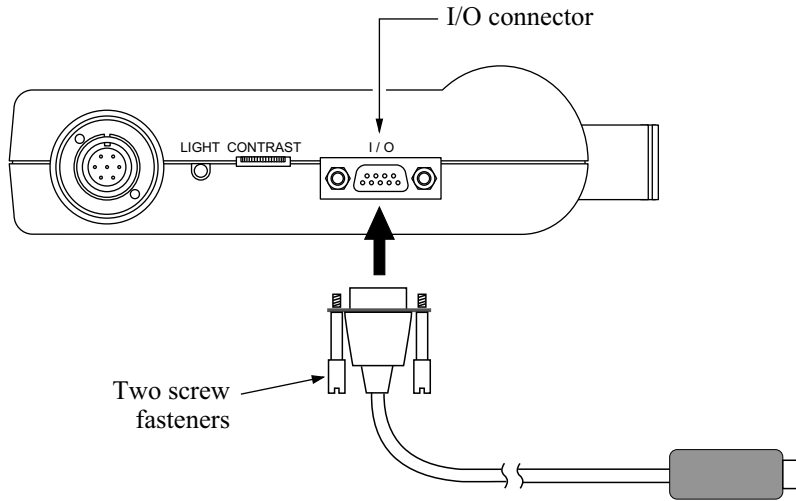
Connection to printer DPU-414, CP-11 or CP-10
  : straight cable

Connection to computer
  : cross-wired (null modem) cable

DIP switch setting on printer DPU-414

Set the DIP switches of the printer as shown below.

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

(9600 bps fixed)

SW-1	1	OFF
	2	ON
	3	ON
	4	OFF
	5	ON
	6	OFF
	7	ON
	8	ON
SW-2	1	ON
	2	ON
	3	ON
	4	ON
	5	ON
	6	ON
	7	ON
	8	ON
SW-3	1	ON
	2	ON
	3	OFF
	4	ON
	5	OFF
	6	ON
	7	ON
	8	ON

DIP switch setting on printer CP-11 or CP-10

Set the DIP switches of the printer as follows.

DIP switch bank 1 (8 switches)	DIP switch bank 2 (8 switches)

CP-11

DIP switch bank 1 (8 switches)	DIP switch bank 2 (6 switches)

CP-10
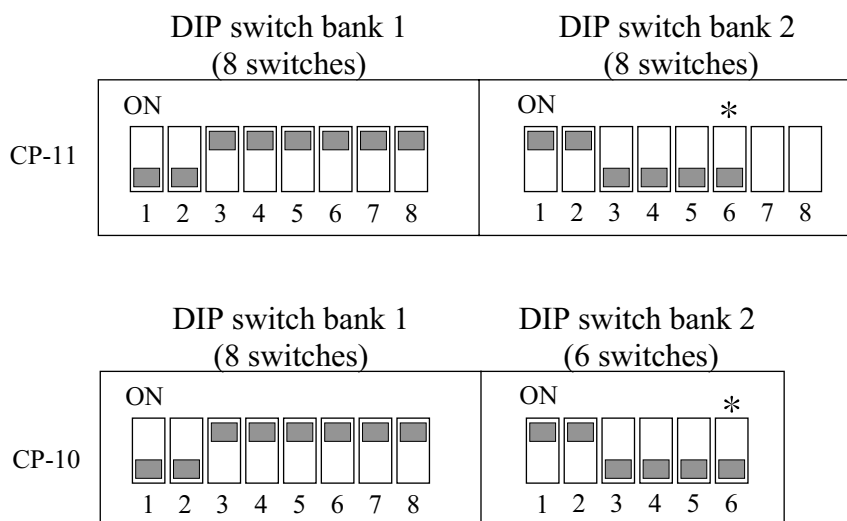
Note

The switch marked with an asterisk (switch 6 of DIP switch bank 2) serves for setting the data transfer speed. The ON position means 4800 bps and the OFF position 9600 bps.

For the VA-11C, use the 9600 bps setting.
Switches 7 and 8 of DIP switch bank 2 of printer CP-11 are set at the factory and should not be changed. Otherwise, correct printing may not be possible.

Setting the Date and Time

Before using the unit, you must set the date and time for the built-in calendar/clock.

(The calendar/clock is not set at the factory before shipping.)

1. Set the POWER switch to ON.
2. After the measurement screen has appeared, press the MENU (ENTER) key once to call up the MAIN MENU screen.
3. Use the △, ▽ keys to move the reverse cursor to the CALENDAR item.
4. Press the MENU (ENTER) key once more. The CALENDAR menu screen appears.
5. Use the △, ▽ keys to move the reverse cursor to the item you want to set.
6. Use the ◁, ▷ keys to change the numerical value. (Each brief push of the key changes the value by one increment. Keeping the key depressed results in a continuous change.)
7. Press the SETUP (ESC) key twice to return to the measurement screen.

Note
The calendar/clock IC has an accuracy of ±25 ppm. The time will be off by about one minute in one month. Before making an important measurement, be sure to check the time and set the clock if required.

CALENDAR

DISPLAY	TIME	Reverse cursor
HOUR	12	Hours
MINUTE	34	Minutes
YEAR	98	Year
MONTH	4	Month
DAY	30	Day
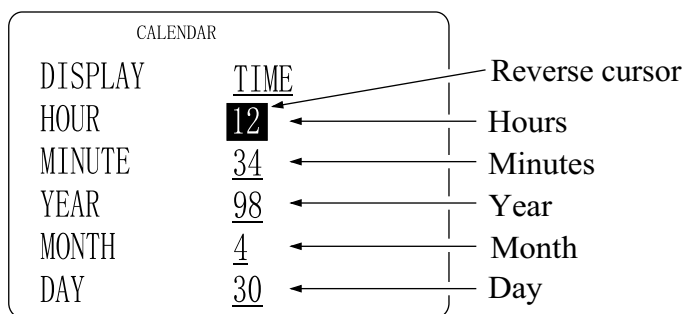
CALENDAR menu screen

Note

The built-in calendar displays years as follows:
 .... $98 \rightarrow 99 \rightarrow 0 \rightarrow 1 \rightarrow .... \rightarrow 9 \rightarrow 10 \rightarrow ....$
 	
 The years from 2000 to 2009 are indicated as a single digit. However, when data stored internally in the unit are written to a memory card, the year information will be in four digits, as shown below.
 	
     VA-11C data   Data on memory card
       0 to 89   2000 to 2089
       90 to 99   1990 to 1999

Using the shoulder belt

The supplied shoulder belt can be used to support the unit during a measurement. Hook the straps of the belt into the metal fittings on the soft carrying case, as shown in the illustration.
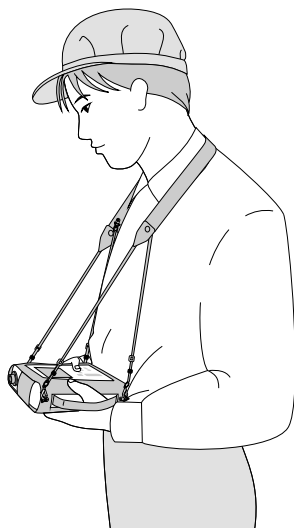
⚠ WARNING
When making measurements on exposed rotating parts or power train parts of machinery, do not use the shoulder belt to prevent the possibility of the belt getting caught in the machine.

Display Explanation

Display Layout

Information appearing on the display screen can be divided into three main categories:

- Current measurement data (MESUR) or recalled measurement data (RECLL)
- Measurement parameter settings (MENU)
- Data collector mode operation information

Details of these are explained below.

Data collector mode screen

MAIN MENU -- COLLECTOR

See page 73

The information appearing on this screen is explained in the section "Data Collector Mode Operation".

Measurement parameters (MENU)

```
                                        See page
MAIN MENU ──────── UNIT             36
                ── TRIGGER          37
                ── MASS MEMORY      38
                ── PCMCIA CARD      39 to 40
                ── INPUT            41
                ── SPECTRUM         42
                ── SETUP MEMORY     43
                ── OTHERS           44
                └─ CALENDAR         21, 45
```

Current measurement data (MESUR) or recalled measurement data (RECLL)

		See page	
		Display Explanation	Measurement
MESUR See page 25	VM (Vibration meter)	25 to 26	56 to 57
	SPEC (Spectrum graph)	27 to 29	58
	(Spectrum list)	29 to 30	59
	TIME (Time waveform graph)	31 to 32	60 to 61
RECLL Recalling transient store data See page 64	SPEC (Spectrum graph)		
	(Spectrum list)		
	TIME (Time waveform graph)		
RECLL Recalling manual store data See page 68	VM (Vibration meter)		
	SPEC (Spectrum graph)		
	(Spectrum list)		
	TIME (Time waveform graph)		

Note
If the dedicated data collector compact flash card is not inserted, only the vibration meter mode and analyzer mode screens are shown.

Measurement Screens

This section explains the screens for the vibration meter mode and analyzer mode which are the basis for the data collector mode and which appear if the data collector compact flash card is not inserted.

For an explanation of the data collector mode screen, please refer to the relevant parts in the section "Data Collector Mode Operation" (page 73).

The actual display may differ from the screen samples shown here.
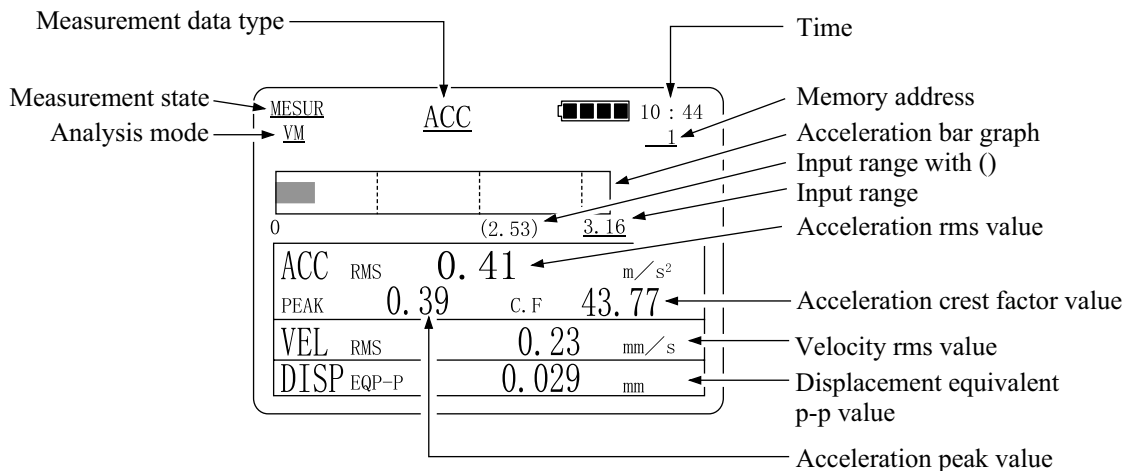
Vibration meter display

Items which are underlined on screen can be changed on the measurement screen by pressing the SETUP (ESC) key.

Measurement data type

    ACC: Acceleration   VEL: Velocity   DISP: Displacement

Measurement state

    MESUR: Measurement   RECLL: Recall

Analysis mode

    VM: Vibration meter   SPEC: Spectrum   TIME: Time waveform

Time (date) display

    Current time (date) is shown.

    (Use CALENDAR menu to switch between time and date display.)

Memory address

    1 to 500

Input range with ( )

Full-scale value when accelerometer with different sensitivity than PV-57 is used (normally not shown).

Input range

Determined by combination of vibration quantity and unit, as shown below.

Acceleration	1	3.16	10	31.6	100	316	m/s²	(RMS)
	0.1	0.316	1	3.16	10	31.6	G	(RMS)
Velocity	3.16	10	31.6	100	316	1000	mm/s	(RMS)
	0.125	0.394	1.25	3.94	12.5	39.4	inch/s	(RMS)
Displacement	0.089	0.283	0.894	2.83	8.94	28.3	mm	(EQp-p)
	3.52	11.1	35.2	111	352	1114	mils	(EQp-p)

Bar graph scale

LIN: Linear scale

LOG: Log scale

rms value

Root mean square of instantaneous value
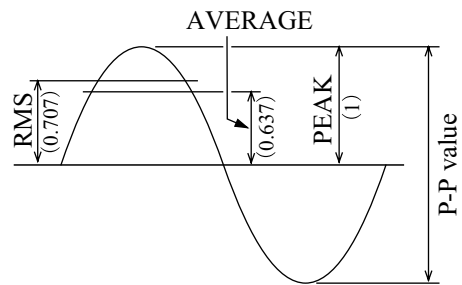
Equivalent p-p value

rms value $\times 2\sqrt{2}$

Peak value

Maximum of single-amplitude
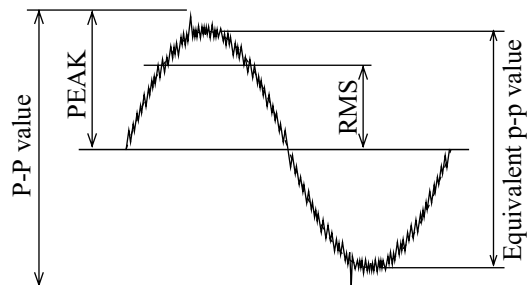
Crest factor

Peak value / rms value

Spectrum display

Items which are underlined on screen can be changed on the measurement screen by pressing the SETUP (ESC) key.

Measurement data type

ACC: Acceleration   VEL: Velocity   DISP: Displacement

ACCe: Envelope curve

Measurement state

MESUR: Measurement   RECLL: Recall

Analysis mode

VM: Vibration meter   SPEC: Spectrum TIME: Time waveform

Time (date) display

Current time (date) is shown.

(Use CALENDAR menu to switch between time and date display.)

Memory address

1 to 500

Averaging type

INST: Instantaneous value   LIN: Linear averaging

EXP: Exponential averaging MAX: Maximum value

27

Total averaging count

1 to 1023

Shows the selected number for exponential averaging, linear averaging, and maximum value.

Input range

Acceleration	1	3.16	10	31.6	100	316	m/s² （RMS）
	0.1	0.316	1	3.16	10	31.6	G 　　（RMS）
Velocity	3.16	10	31.6	100	316	1000	mm/s （RMS）
	0.125	0.394	1.25	3.94	12.5	39.4	inch/s （RMS）
Displacement	0.089	0.283	0.894	2.83	8.94	28.3	mm 　（EQp-p）
	3.52	11.1	35.2	111	352	1114	mils 　（EQp-p）

Frequency span

100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k (Hz)

Frequency zoom setting

Zoom ratio ×1, ×2, ×4, ×8

Y axis zoom

Y dB: ×1 = 80 dB display　　×2 = 40 dB display　　×4 = 20 dB display

LIN: Full scale / 2^N　　　　N = 0 to 10

Y axis scale

dB　　LIN

Display upper limit level

Can be changed for Y axis dB display and Y axis zoom factor of 2 or above

Display upper limit frequency

Highest frequency of graph shown on display

Can be changed for frequency zoom factor of 2 or above

Cursor

When no reverse menu item is shown, the cursor moves left and right with the ◁, ▷ keys. Keeping a key depressed moves the cursor continuously.

Cursor Y axis unit

Can be switched between dB and LINEAR with SPECTRUM menu.

Set separately from Y axis scale.

Cursor X axis unit

Can be switched between Hz, KCPM, and ORDER with SPECTRUM menu.

Overall value

Full power spectrum value excluding DC component. Cursor position frequency display shows "AP".

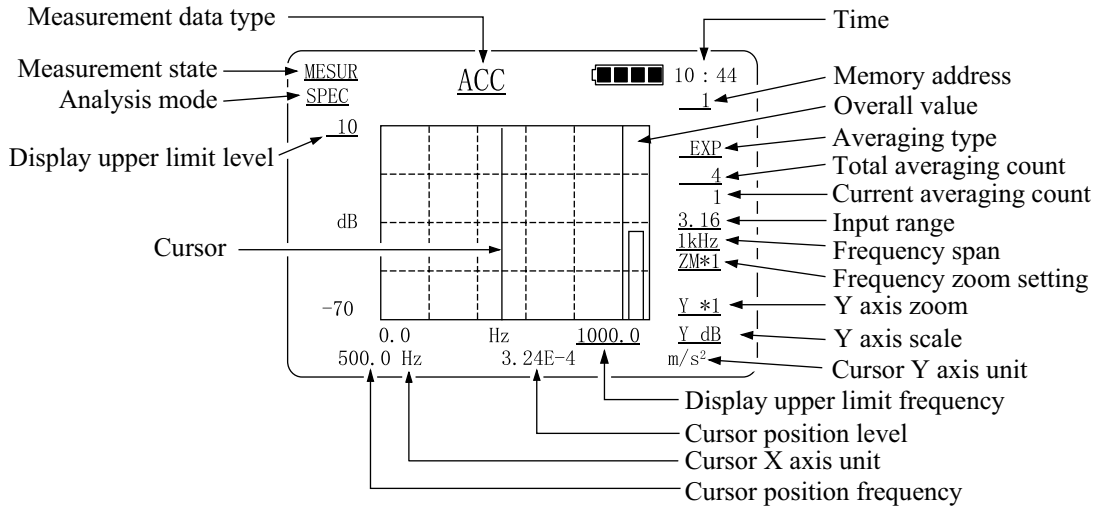## Spectrum list display

Items which are underlined on screen can be changed on the measurement screen by pressing the SETUP (ESC) key.

Measurement data type

ACC: Acceleration   VEL: Velocity   DISP: Displacement

ACCe: Envelope curve

Measurement state

MESUR: Measurement   RECLL: Recall

Analysis mode

VM: Vibration meter   SPEC: Spectrum   TIME: Time waveform

Time (date) display

Current time (date) is shown.

(Use CALENDAR menu to switch between time and date display.)

Memory address

1 to 500

Averaging type

INST: Instantaneous value   LIN: Linear averaging

EXP: Exponential averaging   MAX: Maximum value

Total averaging count

1 to 1023

Input range

Acceleration	1	3.16	10	31.6	100	316	m/s² (RMS)
	0.1	0.316	1	3.16	10	31.6	G (RMS)
Velocity	3.16	10	31.6	100	316	1000	mm/s (RMS)
	0.125	0.394	1.25	3.94	12.5	39.4	inch/s (RMS)
Displacement	0.089	0.283	0.894	2.83	8.94	28.3	mm (EQp-p)
	3.52	11.1	35.2	111	352	1114	mils (EQp-p)

Frequency span

100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k (Hz)

Frequency zoom setting

Zoom ratio ×1, ×2, ×4, ×8

Cursor Y axis unit

Can be switched between dB and LINEAR with SPECTRUM menu. Set separately from Y axis scale.

Cursor X axis unit

Can be switched between Hz, KCPM, and ORDER with SPECTRUM menu.

Time waveform display

Items which are underlined on screen can be changed on the measurement screen by pressing the SETUP (ESC) key.

Measurement data type

    ACC: Acceleration   VEL: Velocity   DISP: Displacement

    ACCe: Envelope curve

Measurement state

    MESUR: Measurement RECLL: Recall

Analysis mode

    VM: Vibration meter   SPEC: Spectrum TIME: Time waveform

Time (date) display

    Current time (date) is shown.

    (Use CALENDAR menu to switch between time and date display.)

Memory address

    1 to 500

Input range

Acceleration	1	3.16	10	31.6	100	316	m/s² （RMS）
	0.1	0.316	1	3.16	10	31.6	G （RMS）
Velocity	3.16	10	31.6	100	316	1000	mm/s （RMS）
	0.125	0.394	1.25	3.94	12.5	39.4	inch/s （RMS）
Displacement	0.089	0.283	0.894	2.83	8.94	28.3	mm （EQp-p）
	3.52	11.1	35.2	111	352	1114	mils （EQp-p）

Frequency span

100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k (Hz)

Frequency zoom setting

Zoom ratio ×1, ×2, ×4, ×8

X axis zoom (can be changed for frequency zoom factor of 2 or above)

X   ×1, ×2, ×4, ×8, (up to frequency zoom ratio)

Y axis zoom

Y   ×1, ×2, ×4, ×8, ×16, ..., ×1024

Display upper limit time

Highest time value of graph shown on display

Can be changed for X axis zoom factor of 2 or above

Cursor

When no reverse menu item is shown, the cursor moves left and right with the $\triangleleft$, $\triangleright$ keys. Keeping a key depressed moves the cursor continuously.

Operation status indicators

Battery indicator

```
 ┌────────────────────────────────────────┐
 │ MESUR      ACC      ▐████  10 : 44      │
 │ SPEC                                    │
 │ OVER    PSE    STOR    TIMER      1      │
 │                                 TRG     │
 └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
```

Trigger indicator

Timer indicator

Store indicator

Pause indicator

Overload indicator
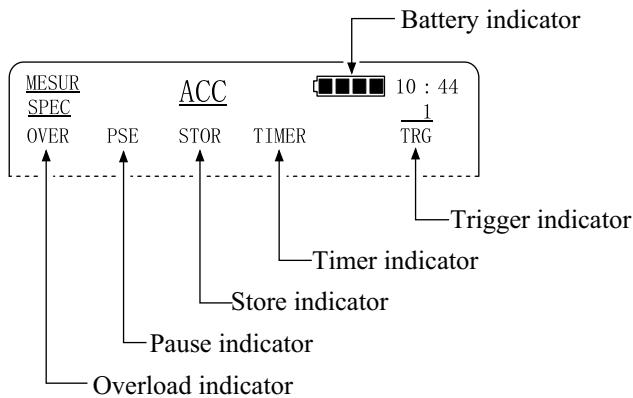
Battery indicator

Shows the remaining capacity of the dry-cell batteries in the unit (see page 11).

Trigger indicator (only in analyzer mode)

In free-run mode, nothing is displayed here. In other modes, "TRG" is shown. When the unit is waiting for trigger activation, the reverse indication [WAIT] flashes in 0.5 second intervals. When the trigger is generated, "WAIT" changes to "TRG".

Timer indicator

When the timer is ON, the indication "TIMER" appears here. When the unit is waiting for timer activation, the reverse indication [TIMER] flashes in 0.5 second intervals. When store is completed, the reverse indication changes to "TIMER".

Store indicator

This indication appears during store in timer measurement and transient measurement. When store is completed, the indication disappears. When a store state has occurred, the reverse indication [STOR] flashes in 0.5 second intervals.

Pause indicator

The indication "PSE" appears while the unit is in the pause mode during analysis. At other times, the indication is out.

Overload indicator

The indication "OVER" appears if an acceleration signal has exceeded the input range by 0.5 dB or more.

Menu Screens

Pressing the MENU (ENTER) key brings up the MAIN MENU screen. This screen allows the user to select measurement parameters to be changed. Pressing the MENU (ENTER) key again brings up the selected menu.

Press MENU key ──────   Press MENU key ──────

| Measurement screen | MAIN MENU screen | Nested menus |

─── Press SETUP (ESC) key   ─── Press SETUP (ESC) key
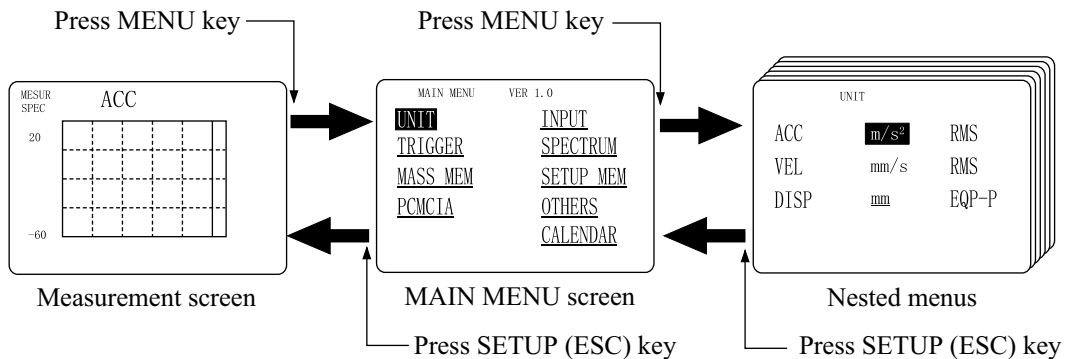
MAIN MENU items

UNIT:	Measurement units
TRIGGER:	Trigger details
MASS MEM:	Memory details
PCMCIA CARD:	Compact flash card operation items
COLLECTOR:	Call up the route selection screen (page 78) of data collector mode. See "Data Collector Mode Operation" (page 73).
INPUT:	Input settings (sensitivity setting, analog filter)
SPECTRUM:	Spectrum display details (window, cursor read value, list display)
SETUP MEM:	Measurement parameter memory operation
OTHERS:	Other settings (printer, baud rate, buzzer)
CALENDAR:	Date and time setting

1. Use the $\triangle$, ∇ keys to select the menu item.
2. Press the MENU (ENTER) key to open the selected menu.
3. Use the $\triangleleft$, $\triangleright$ keys to change the settings.

UNIT menu screen

```
              UNIT

    ACC       m/s²      RMS
    VEL       mm/s      RMS
    DISP       mm       EQP-P

```
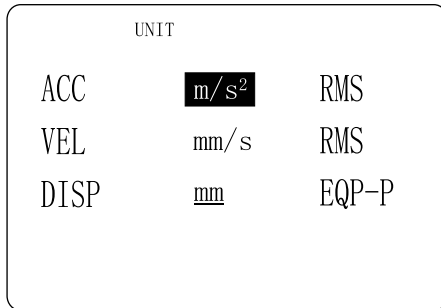
UNIT menu screen

UNIT menu screen items

ACC: Acceleration unit	m/s²	G	Unit: RMS
VEL: Velocity unit	mm/s	inch/s	Unit: RMS
DISP: Displacement unit	mm	mils	Unit: EQp-p

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.

Not available during recall.

TRIGGER menu screen

```
                TRIGGER
    MODE          FREE
    SOURCE        LEVEL
    TRIG POINT    255
    PRE／POST      OFF
    LEVEL          6／8
        SLOPE      +
```

TRIGGER menu screen

TRIGGER menu screen items

  MODE: Trigger operation mode

FREE: Free-run trigger

REPEAT: Repeat trigger

SINGLE: Single trigger

  SOURCE: Trigger source

LEVEL: Level trigger

EXTERNAL: External trigger

  TRIG POINT: Trigger point (settable in 16 steps)

Zoom   ×1   0 to 240   ×2   0 to 496

            ×4   0 to 1008   ×8   0 to 2032

  PRE/POST: Pre/post trigger function

OFF: Not used

PRE: Pre-trigger

POST: Post-trigger

  LEVEL: Trigger setting level

7/8 to -7/8 in 1-unit steps

  SLOPE: Trigger slope   +/-

1. Use $\triangle$, $\triangledown$ keys to select menu item.

2. Use $\triangleleft$, $\triangleright$ keys to change settings.

    Not available during recall.

MASS MEMORY menu screen

```
                MASS  MEMORY
   TYPE            MANUAL
   TIMER           OFF
      HOUR           0
      MINUTE         0
      DURATION      10  M
      COUNT        500
```

MASS MEMORY menu screen

MEMORY menu screen items

TYPE: Memory store type

MANUAL: Manual store

TRANSIENT: Transient store

TIMER: Timer operation

ON: Timer operates

OFF: Timer is off

HOUR: 0 to 23 in 1-hour steps (timer start time)

MINUTE: 0 to 59 in 1-minute steps (timer start time)

DURATION: 1 to 60 in 1-minute steps (store interval)

COUNT: 1 to 500 in 1-count steps (store count)

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.

 Not available during recall.

PCMCIA CARD menu screen

```
        PCMCIA CARD

DIR              OFF
BLOCK     99  98/04/30
SAVE MEMORY    OFF
DELETE         OFF
FORMAT         OFF
SAVE DISPLAY   OFF
```

PCMCIA CARD menu screen

PCMCIA CARD menu screen items

DIR: Select directory display

Use ◁, ▷ keys to change "OFF" to "EXEC".

EXEC: Press MENU (ENTER) key to execute.

```
        PCMCIA CARD DIRECTORY
BLK   DATE      BLK   DATE

 1  98/01/06    2  98/01/07
 3  98/01/09    4  98/02/02
 5  98/02/05    6  98/02/06
 7  98/02/07    8  98/02/08
 9  98/03/03   10  98/03/15
```

Directory display example

One screen shows up to 10 blocks with the respective store date. When there are more blocks, the △, ▽ keys can be used to scroll the display. Use the SETUP (ESC) key to return to the PCMCIA CARD menu screen.

BLOCK: Specifies a block of data on the card, along with the store date.

∗.∗:   Block number (1 to 99)

Use ◁, ▷ keys to specify

DATE: Store date of block.

Eight asterisks are shown if no data are present.

SAVE MEMORY:

               Select save

               EXEC: Press MENU (ENTER) key to execute.

DELETE: Select delete

               EXEC: Press MENU (ENTER) key to execute.

FORMAT: Select format

               EXEC: Press MENU (ENTER) key to execute.

               Formats a card to create directory structure and key file.

SAVE DISPLAY:

               Controls the direct card write function that allows writing data directly to the card. To activate the actual write operation, the STORE key is used.

  ON: Direct card write function is enabled.

               When STORE key is pressed in measurement mode, all data including data outside the current display range are stored directly on the card.

  OFF: Direct card write function is disabled.

               When STORE key is pressed in measurement mode, only the currently displayed data are stored in the internal memory.

Note
For example, when the unit is in analyzer mode and the ZOOM ratio is set to 2x, the total amount of data will be 202 lines. With SAVE DISPLAY set to ON, data for all 202 lines are written directly to the card. With SAVE DISPLAY set to OFF, only the displayed 102 lines are stored in the internal memory.

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.

Error message Meaning

"NO CARD":	No card is inserted.
"BAD CARD":	Type of inserted card does not match the unit.
"READ/WRITE ERROR":	Read or write cannot be performed.
"NO SPACE":	There is not enough empty space on the card.

INPUT menu screen

```
            INPUT

SENSITIVITY    100  ×
               0.1  mV/ms⁻²

LOW  PASS      5kHz
HIGH PASS      3Hz

```
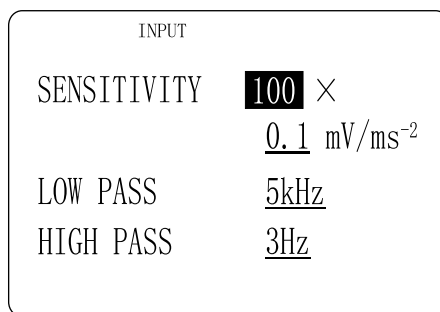
INPUT menu screen

INPUT menu screen items

SENSITIVITY: Enter sensitivity of accelerometer in use
              Numeral (accelerometer sensitivity) × multiplication factor
              Numeral: 100 to 999 mV/ms^{-2}
              Factor: 0.1   0.01 0.001

LOW PASS: Select low-pass filter
              1 kHz   5 kHz   20 kHz
HIGH PASS: Select high-pass filter
              3 Hz   10 Hz   1 kHz

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.
   Not available during recall.

SPECTRUM menu screen

```
                SPECTRUM
    WINDOW          HANNING
    X-CURSOR        ORDER
    Y-CURSOR        dB
    PEAK LIST       OFF
```
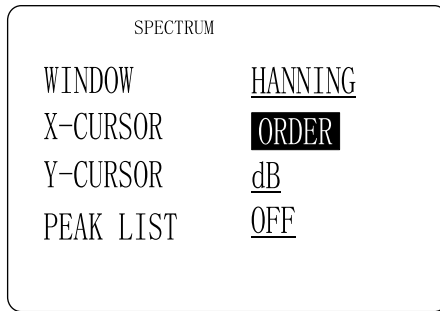
SPECTRUM menu screen

SPECTRUM menu screen items

WINDOW:	Time window type(cannot be set while recalling)
RECTANGLE:	Rectangular window
HANNING:	Hanning type window
FLATTOP:	Flat-top type window

X-CURSOR: Cursor X axis unit: Hz, KCPM, ORDER

When ORDER is selected, the current cursor position becomes the fundamental frequency.

KCPM: Kilocycles per minute

Y-CURSOR: Cursor Y axis unit: dB, LINEAR

PEAK LIST: Display of ten highest levels ON/OFF

1. Use △, ▽ keys to select menu item.
2. Use ◁, ▷ keys to change settings.

SETUP MEMORY menu screen

```
        SETUP  MEMORY

  ADDR       1    98/04/30
  SAVE            OFF
  LOAD            OFF
  DELETE          OFF

```
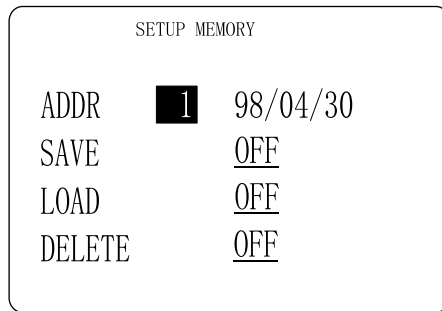
SETUP MEMORY menu screen

SETUP MEMORY menu screen items

    ADDR: Address and store date display

            Address: 0 to 10

            Store date: Eight asterisks are shown if no setting data are present.

    SAVE: Save setting data in specified address.

            Use $\triangleleft$, $\triangleright$ keys to change "OFF" to "EXEC".

            EXEC: Press MENU (ENTER) key to execute.

    LOAD: Load setting data from specified address.

            Use $\triangleleft$, $\triangleright$ keys to change "OFF" to "EXEC".

            EXEC: Press MENU (ENTER) key to execute.

            Not available during recall.

    DELETE: Delete setting data from specified address.

            Use $\triangleleft$, $\triangleright$ keys to change "OFF" to "EXEC".

            EXEC: Press MENU (ENTER) key to execute.

            Not available during recall.

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.

Address 0 contains the default setting data. LOAD is possible, but not SAVE or DELETE.

After loading default setting data, the measurement screen appears immediately.

OTHERS menu screen

```
            OTHERS

  PRINTER        SINGLE
  ADDR            1  ~
                 500
  BAUD RATE      9600
  BUZZER         ON
```
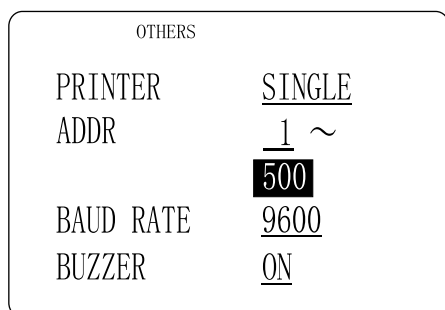
OTHERS menu screen

OTHERS menu screen items

PRINTER: Printer output type

SINGLE: Only the displayed screen is printed.

SUCCESSIVE: Data stored in the memory are printed suc-
                      cessively.

(Possible only for manual store data)

To execute printing, return to the measurement screen and
press the PRINT key. If the PRINT key is pressed while the
menu screen is shown, the menu screen will be printed.

ADDR: Address range for continuous printing
                  Start address (1 to 500) to end address (1 to 500)

BAUD RATE: Baud rate for connection to computer
                        9600   19200   38400

BUZZER: Enable beep tones (ON) / disable beep tones (OFF)
                  Key press confirmation: 1 beep
                  Error: 3 beeps

1. Use △, ▽ keys to select menu item.
2. Use ◁, ▷ keys to change settings.

CALENDAR menu screen

```
                CALENDAR
    DISPLAY        TIME
    HOUR           12
    MINUTE         34
    YEAR           98
    MONTH          4
    DAY            30
```
CALENDAR menu screen

CALENDAR menu screen items

DISPLAY: Select item to be shown at top right of measurement screen

DATE: Show date

TIME: Show time

OFF: Show nothing

HOUR: Set hours (0 to 23)

MINUTE: Set minutes (0 to 59)

YEAR: Set year (0 to 99)

MONTH: Set month (1 to 12)

DAY: Set day (1 to 31)

1. Use $\triangle$, $\triangledown$ keys to select menu item.
2. Use $\triangleleft$, $\triangleright$ keys to change settings.

Menu Operation on Measurement Screen

Measurement parameters can also be changed while the measurement screen is displayed. To do this, proceed as follows.

1. Press the SETUP (ESC) key to display the reverse cursor.
2. Use the $\triangle$, $\triangledown$ keys to move the reverse cursor.
   Items that can be changed are shown with an underline.
3. Use the $\triangleleft$, $\triangleright$ keys to change the settings.
4. When the setting is terminated, press the SETUP (ESC) key again to turn the reverse cursor off.

```
 MESUR        ACC        ▮▮▮▮  10 : 44
 SPEC                               1
          PSE                     TRG
  3. 20                           EXP
  E+0                               4
                                 0000
  m／s²                          3. 16
                                 1kHz
                                 ZM*1

                                  Y *1
   0                              Y LIN
     0. 0        Hz      1000. 0
   500. 0  Hz    3. 24E-4         m／s²
```
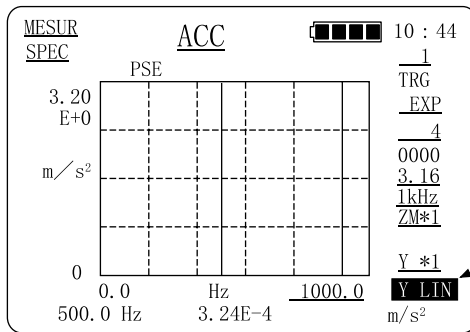
Reverse cursor
Move with△, ▽keys
Change setting with◁, ▷keys

Trigger Functions

The trigger functions of the VA-11C are available only in analyzer mode. By pressing the START key on the pickup or the main unit, the trigger standby condition is activated. Time waveform sampling as well as FFT processing and averaging then will start automatically when the trigger condition is met. To enable the trigger function, the MODE item on the TRIGGER menu must be set to REPEAT or SINGLE.

Storing with the trigger is valid only for transient store.

Trigger source

External signal: Set the SOURCE item on the TRIGGER menu to EXTERNAL.

Trigger is activated at the falling edge of a TTL signal input to the TRIG IN jack, or when the TRIG IN jack terminals are shorted.

Pulse width 10 µs or more
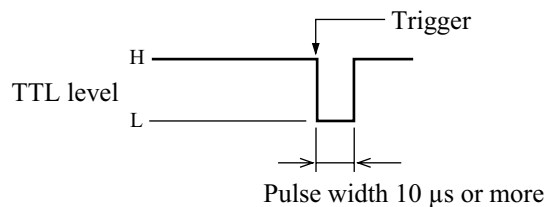
Input level: Set the SOURCE item on the TRIGGER menu to LEVEL.

Trigger is activated when the time waveform crosses the set level. The level can be set in steps of 1/8 of the full-scale unilateral amplitude, and the slope can also be selected, to determine whether triggering occurs when the waveform crosses the level from above or below.

Set slope (+) | Trigger activated

Trigger level

Processing starts

Set slope (-)

Trigger activated

Trigger level

Processing starts
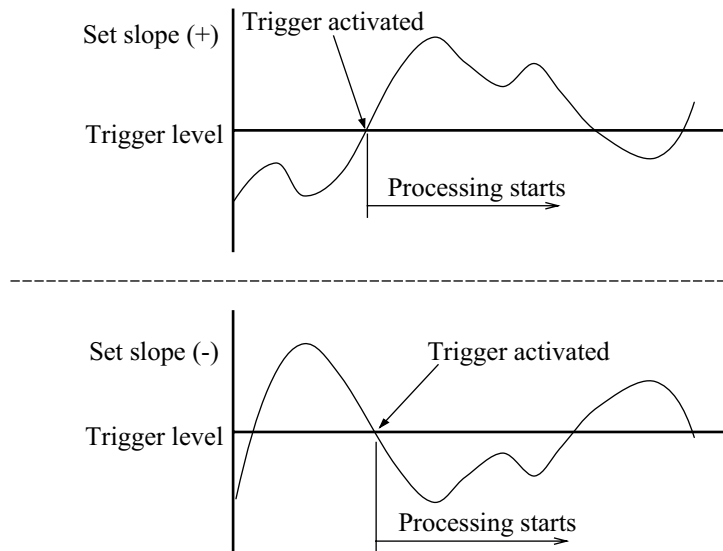
Trigger operation

Free-run: Processing continues regardless of trigger state.

Repeat: Processing is carried out for each trigger occurrence.

Trigger   Trigger   Trigger

START key pressed

Processing   Processing   Processing
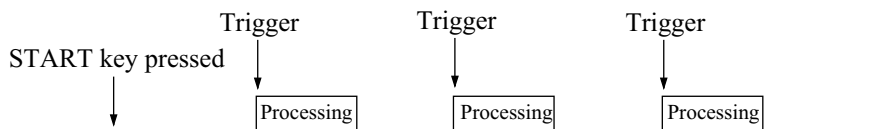
Single: When trigger occurs, processing is carried out once. Subsequent trigger occurrences are ignored until START key is pressed again.

Trigger

START key pressed

Trigger   Trigger   Trigger

Processing

Processing not carried out
regardless of trigger state
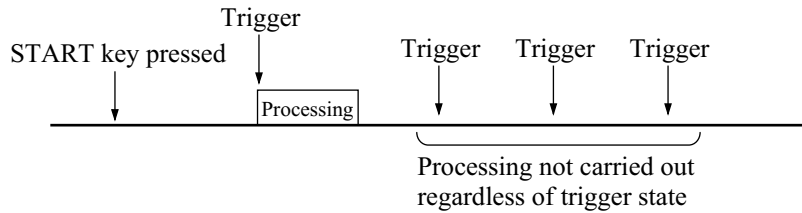
Pre-trigger and post-trigger functions

Pre-trigger: Processing starts from a specified number of data before trigger occurrence.

Post-trigger: Processing starts from a specified number of data after trigger occurrence.
Set with the TRIG POINT item on the TRIGGER menu.
Setting can be made in 16-steps units, up to -16 from the sampling point.

Pre-trigger   Processing start

Processing

16-step units
Settable from 0 to 2032 *

Trigger activated

Post-trigger   Processing start

Processing

16-step units
Settable from 0 to 2032 *

Trigger activated
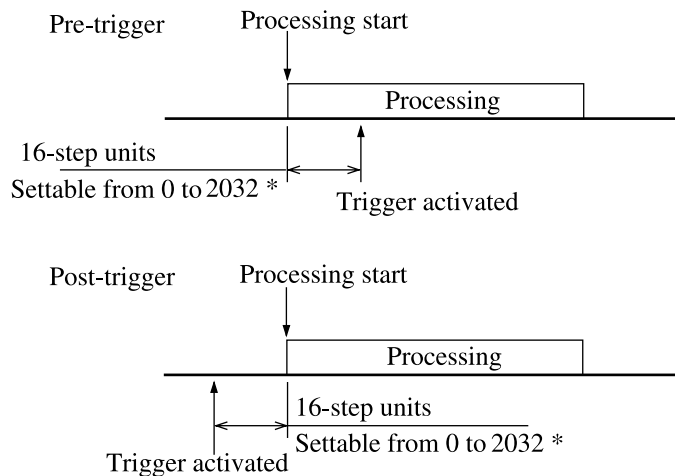
* ZOOM   ×1:   0 to 240
         ×2:   0 to 496
         ×4:   0 to 1008
         ×8:   0 to 2032

Processing Principles

Processing operation

Processing starts when the START key is pressed or when one of the measurement parameters listed below is changed.

Measurement parameters that cause processing start:

- Measurement state
- Analysis mode
- Measurement data
- Averaging type
- Averaging count
- Input range
- Frequency span
- Frequency zoom
- UNIT menu item
- INPUT menu item (sensitivity, high-pass filter, low- pass filter)
- SPECTRUM menu item (window)

The processing operation depends on the combination of trigger settings and averaging type settings.

Linear averaging, peak hold

Free-run

START key pressed | Averaging end

Averaging start | Start standby

Time

Single

START key pressed | Trigger | 1 frame end | START key pressed | Trigger | 1 frame end

1 frame processing | 1 frame processing

Trigger standby | Start standby | Trigger standby | Start standby
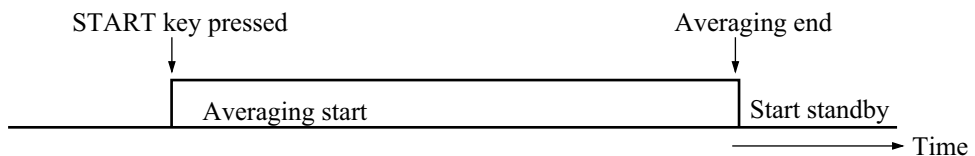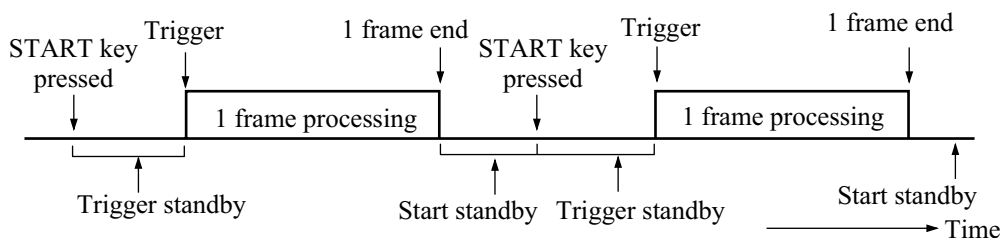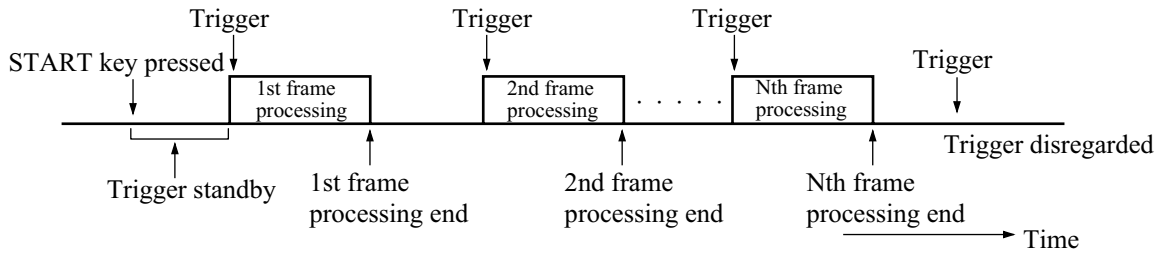
Time

Repeat

N: specified averaging count

Instantaneous value, exponential averaging

Free-run
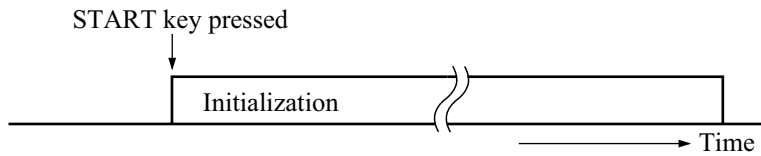
Single
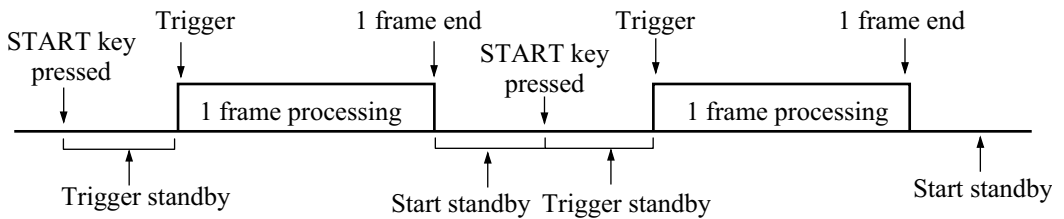
Repeat
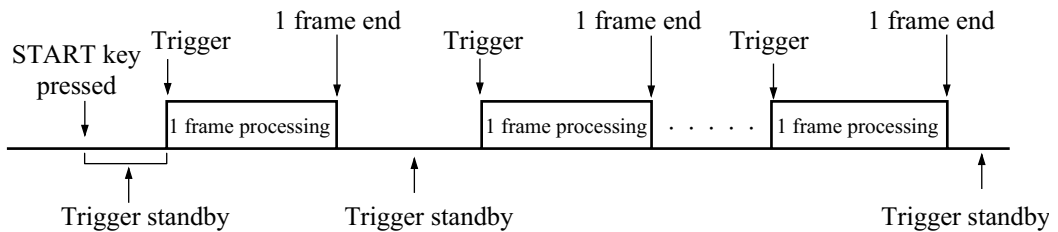
FFT processing cycle (1 frame processing time)

The FFT processing cycle depends on the zoom (ZM) setting, as listed below.

	100 Hz	200 Hz	500 Hz
Zoom × 1	250 msec	125 msec	50 msec
Zoom × 2	500 msec	250 msec	100 msec
Zoom × 4	1 sec	500 msec	200 msec
Zoom × 8	2 sec	1 sec	400 msec

The cycle for 1 kHz and above is the same as for 500 Hz.

The data of 2 kHz and below are available for real time analysis.

Memory

The VA-11C incorporates a memory for storing measurement results and measurement parameters for the vibration meter mode and analyzer mode. The number of memory slots is 500, identified by a memory address.

Important
If you hold down the STORE key on the sheet switch panel while turning on the power, all data in the mass memory will be cleared.

Data store

There are two types of functions for data storing: manual store and transient store. These are selected by setting the TYPE item in the MEMORY menu to MANUAL or TRANSIENT.

When the store type was changed, all previous data will be cleared at the point when the first store operation is carried out.

Manual store

Pressing the STORE key causes the currently displayed measurement results and measurement parameters to be stored in the specified address. This applies also if the unit is currently in pause mode or if averaging is in progress.

After storing, the address number is automatically incremented by 1. After address number 500 is reached, number 1 is selected again. If the specified address already contains data, these will be overwritten.

Transient store

This store function is available only in analyzer mode. It stores the time waveform continuously at a cycle that is 2.56 times the frequency span.

Store time: $(256 \times 500) / (\text{frequency span} \times 2.56)$

When the STORE key is pressed, transient store starts. After data for 500 addresses (256 data per address) have been stored, the store process is terminated automatically. Storing always starts from address 1.

If the STORE key is pressed again while storing is in progress, store is terminated at that point.

If the trigger function is enabled, continuous store starts when the trigger is activated. Repeat is not performed.
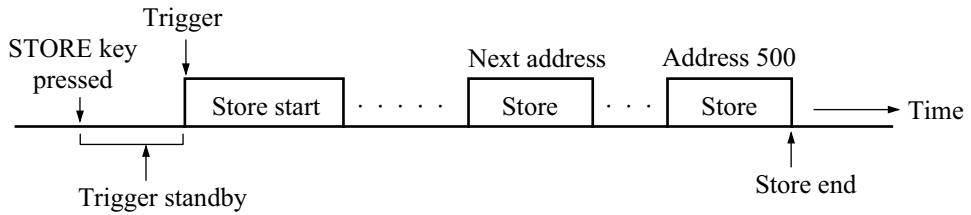
- If the POWER switch is set to OFF during transient store, store continues until address 500, and the unit then turns itself off after 10 seconds.
- For 10 seconds after transient store has ended, recall cannot be carried out.

Timer store

It is also possible to carry out storing under timer control, by specifying a start time, repeat interval, and store count. The level trigger or external trigger cannot be used.

Set the TIMER item on the MEMORY menu to ON.

If the STORE key is pressed again while storing is in progress, store is terminated at that point.

Manual store

The store start address is the currently specified memory address.

Example: Storing starts at address 490. When address 500 is reached, it
            continues from address 1.

When linear averaging and peak hold are selected, averaging begins at the start time and store is carried out when averaging ends.

Instantaneous value, exponential averaging, vibration meter mode

Preset time
Store executed
Repeat
Store executed
Process ends after
specified count
STORE key pressed

Time

User sets
desired time
Time standby
Repeat interval
(DURATION)

Linear averaging, peak hold

Preset time
Averaging ends
Averaging ends
Repeat
Process ends after
specified count
STORE key pressed
Averaging starts
Averaging starts

Store
executed
Time

User sets
desired time
Time standby
Repeat interval
(DURATION)
Store executed

Time

If the averaging end time is later than the next averaging start time, store is not carried out.

Transient store

When the start time is reached, storing begins from address 1 and continues to address 500. The repeat interval (DURATION) setting is disregarded.

Preset time
Address 1
Next address
Store end
STORE key pressed
Address 500
Store start

User sets
desired time
Time standby
Data of address 1
Data of address 500
Time
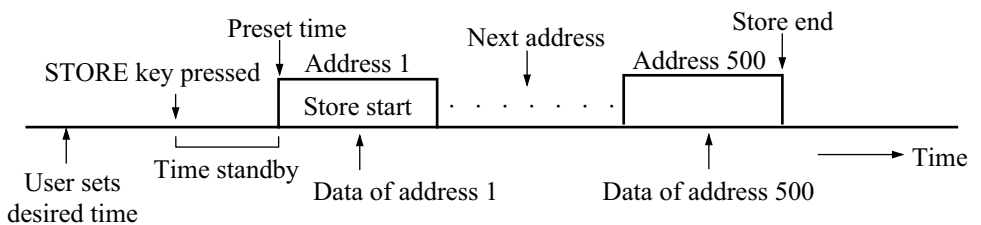
Measurement

Before starting the measurement, be sure to set the date and time as described on pages 21 and 45.

This section explains the operation steps for the vibration meter mode and analyzer mode which are the basis for the data collector mode.

For an explanation of the steps in data collector mode, please refer to the section "Data Collector Mode Operation" (page 73).

Use As a Vibration Meter
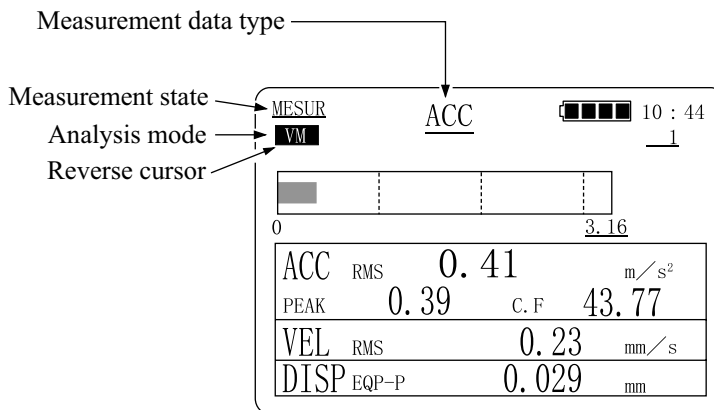
Measurement data type ─────────────

Measurement state ─────→ MESUR   <u>ACC</u>   ▮▮▮▮ 10 : 44
Analysis mode ─────→ VM   1
Reverse cursor ─────→

0   <u>3.16</u>

ACC   RMS   0.41   m/s^2
PEAK   0.39   C.F   43.77
VEL   RMS   0.23   mm/s
DISP   EQP−P   0.029   mm

1. Press the SETUP (ESC) key to call up the reverse cursor.
2. Use the $\triangle$, $\triangledown$ keys to move the reverse cursor to the "measurement state" field.
3. Use the $\triangleleft$, $\triangleright$ keys to select "MESUR".
4. In the same way, set the analysis mode to "VM".
5. In the same way, select the measurement data type.
   ACC: Acceleration   VEL: Velocity   DISP: Displacement
6. Press the SETUP (ESC) key to turn the reverse cursor off.
7. Set the accelerometer sensitivity on the INPUT menu (page 41).
8. Set the desired unit on the UNIT menu (page 36).

9. Make any other required settings (such as filter etc.) with the menu screens (pages 35 to 45).

10. Press the SETUP (ESC) key to return to the measurement screen.

In vibration meter mode, the trigger function is not active. Operation is either timer-controlled or free-run.

Measurement

Carry out the measurement by pushing the tip of the accelerometer PV-57 at a right angle against the measurement object.

If an excess signal is input, the overload indication appears, as shown below, and the numerical reading becomes ∗∗∗.

Use the reverse cursor to select the input range field and choose a higher range.

Use As a Spectrum Analyzer

Measurement data type

Measurement state

Analysis mode

Reverse cursor

Cursor

MESUR   ACC   ████ 10 : 44
SPEC   1
 10   EXP
                               4
dB   1
                            3. 16
                            1kHz
                            ZM*1
−70   Y *1
    0. 0   Hz   1000. 0   Y dB
  500. 0 Hz   3. 24E−4   m/s²

1. Press the SETUP (ESC) key to call up the reverse cursor.
2. Use the △, ▽ keys to move the reverse cursor to the "measurement state" field.
3. Use the ◁, ▷ keys to select "MESUR".
4. In the same way, set the analysis mode to "SPEC".
5. In the same way, select the measurement data type.
   ACC: Acceleration   VEL: Velocity
   DISP: Displacement   ACCe: Envelope
   When ACCe is selected, the 1 kHz high-pass filter and 50 kHz low-pass filter is activated, regardless of the selected filter setting.
6. Press the SETUP (ESC) key to turn the reverse cursor off.
7. Set the accelerometer sensitivity on the INPUT menu (page 41).
8. Set the desired unit on the UNIT menu (page 36).
9. Make any other required settings (such as filter etc.) with the menu screens (pages 35 to 45).
10. Press the SETUP (ESC) key to return to the measurement screen.

Measurement

Carry out the measurement by pushing the tip of the accelerometer PV-57 at a right angle against the measurement object.

Use the START key and STORE key to control the measurement.

Spectrum List Display

The spectrum list display shows the ten highest level data out of the graph display range.

To use this function, set the PEAK LIST item in the SPECTRUM menu to ON.

Measurement data type ─────────┐

Measurement state ──→ MESUR   ACC   [▮▮▮▮ 10 : 44
Analysis mode ──→ SPEC   1

[Hz]	[m/s²]	
AP	1.20E−2	EXP
20.0	6.45E−3	4
40.0	5.46E−3	2
80.0	5.79E−3	3.16
100.0	3.28E−3	1kHz
60.0	2.29E−3	ZM*1
180.0	1.20E−3	
1000.0	1.09E−3	
120.0	1.09E−3	
340.0	9.83E−4	

1. Press the SETUP (ESC) key to call up the reverse cursor.

2. Use the △, ▽ keys to move the reverse cursor to the "measurement state" field.

3. Use the ◁, ▷ keys to select "MESUR".

4. In the same way, set the analysis mode to "SPEC".

5. In the same way, select the measurement data type.

   ACC: Acceleration   VEL: Velocity

   DISP: Displacement   ACCe: Envelope

6. Press the SETUP (ESC) key to turn the reverse cursor off.

7. Set the accelerometer sensitivity on the INPUT menu (page 41).

8. Set the desired unit on the UNIT menu (page 36).

9. Set the PEAK LIST item in the SPECTRUM menu to ON.

10. Make any other required settings (such as filter etc.) with the menu screens (pages 35 to 45).

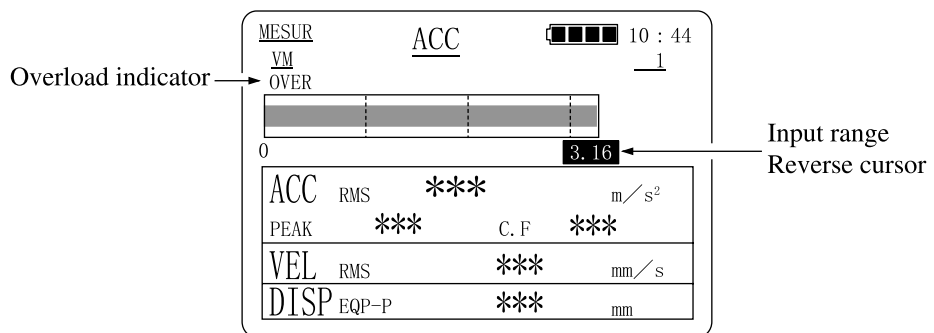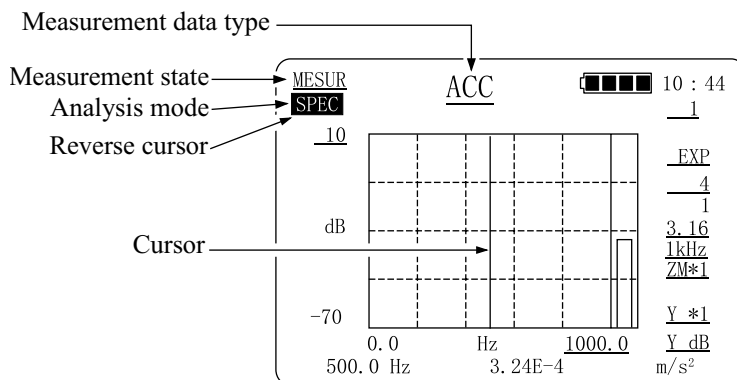11. Press the SETUP (ESC) key to return to the measurement screen.

Measurement

Carry out the measurement by pushing the tip of the accelerometer PV-57 at a right angle against the measurement object.

Use the START key and STORE key to control the measurement.

Time Waveform Display
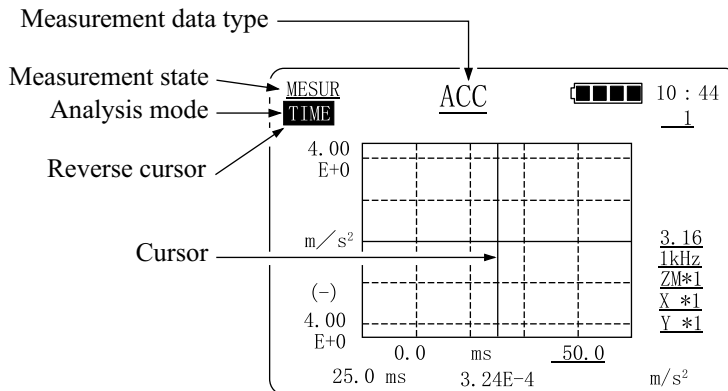
Measurement data type

Measurement state

Analysis mode

Reverse cursor

Cursor

MESUR
TIME
ACC
10 : 44
1

4. 00
E+0

m／s²

(−)
4. 00
E+0

3. 16
1kHz
ZM*1
X *1
Y *1

0. 0   ms   50. 0

25. 0 ms   3. 24E−4   m／s²

1. Press the SETUP (ESC) key to call up the reverse cursor.

2. Use the $\triangle$, $\triangledown$ keys to move the reverse cursor to the "measurement state" field.

3. Use the $\triangleleft$, $\triangleright$ keys to select "MESUR".

4. In the same way, set the analysis mode to "TIME".

5. In the same way, select the measurement data type.
    ACC: Acceleration   VEL: Velocity
    DISP: Displacement   ACCe: Envelope

6. Press the SETUP (ESC) key to turn the reverse cursor off.

7. Set the accelerometer sensitivity on the INPUT menu (page 41).

8. Set the desired unit on the UNIT menu (page 36).

9. Make any other required settings (such as filter etc.) with the menu screens (pages 35 to 45).

10. Press the SETUP (ESC) key to return to the measurement screen.
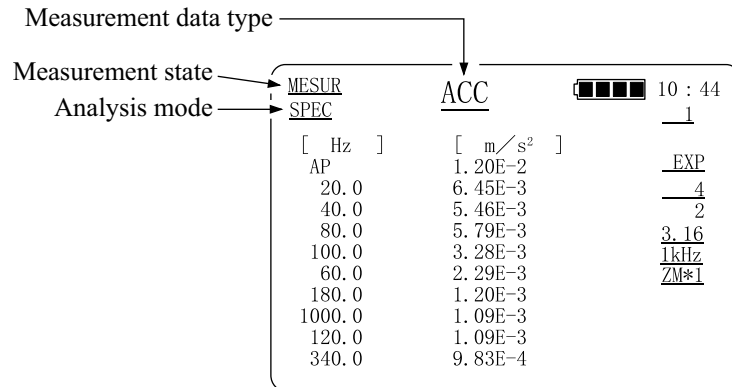
Measurement

Carry out the measurement by pushing the tip of the accelerometer PV-57 at a right angle against the measurement object.

Use the START key and STORE key to control the measurement.

In time waveform display, only the first 128 data out of the sampled data are shown. If required, these are compressed for display. When the zoom factor is 1, 256 data are sampled but only 128 data are displayed. When the zoom factor is 2, 512 data are sampled, and the first 256 data are compressed and displayed as 128 data. By setting the X axis zoom factor to 2, the compressed part can be enlarged for display.

Overflow indication

Because only the first half of the sampled data is displayed, it is possible that the overload indicator appears although the waveform shown on the display does not exhibit overload. This means that overload has occurred in the second half of the sampled data.

Cursor Control

To move the cursor on the spectrum display and time waveform display during measurement, and on the recall display, use the SETUP (ESC) key to turn the reverse cursor off and then use the $\triangleleft$, $\triangleright$ keys to move the cursor.
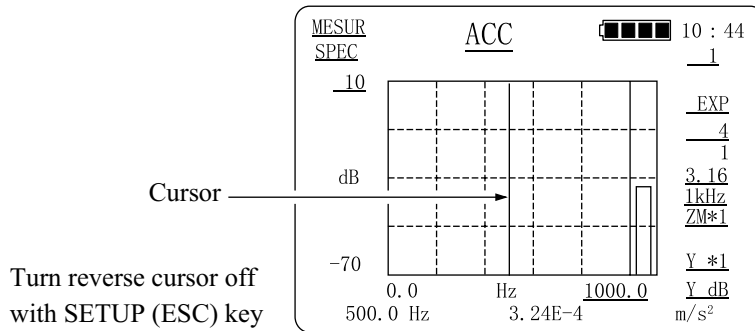
The frequency and level at the cursor are displayed as follows.
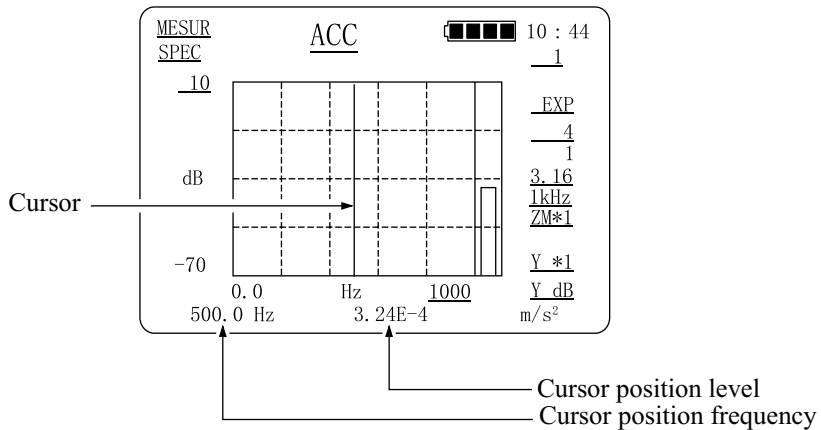
Spectrum display example

Cursor position level
> 3.24E-4 stands for 3.24×10^{-4}

Cursor position frequency
> Numerals are in Hz. DC indicates direct current, and AP all-pass (overall) value.

Recall Mode

The explanation of this section is valid only for the vibration meter mode and analyzer mode.

When recall mode is selected, stored measurement results are displayed, along with the measurement parameters that were active at the time when the data were stored.

Recall is carried out for each address individually.

Activating the recall screen

1. Press the SETUP (ESC) key to call up the reverse cursor.
2. Use the $\triangle$, $\triangledown$ keys to move the reverse cursor to the "measurement state" field.
3. Use the $\triangleleft$, $\triangleright$ keys to select "RECLL" (RECALL).

Note
When switching from the measurement screen to the recall screen, key presses are not registered for about 10 seconds after transient store is completed.

Changing the memory address

1. Press the SETUP (ESC) key to activate the reverse cursor.
2. Use the $\triangle$, $\triangledown$ keys to move the cursor to the memory address field.
3. Use the $\triangleleft$, $\triangleright$ keys to change the address.

Recalling Transient Store Data

Type of stored measurement data
Reverse cursor
Measurement state
Analysis mode
Display upper limit level
Cursor

RECLL
SPEC
10
ACC
dB
−70
0. 0   Hz   1000. 0
500. 0 Hz   3. 24E−4

10 : 44
1
1
INST
4
3. 16
1kHz
ZM*1
Y *1
Y dB
m/s²

Store end time (date)
Memory address
Start position

Overall value
Input range
Frequency span
Frequency zoom
Y axis zoom
Y axis scale
Cursor unit
Display upper limit frequency
Cursor position level
Cursor position frequency

Spectrum display recall example

Type of stored measurement data
Reverse cursor
Measurement state
Analysis mode

RECLL
TIME
ACC
4. 00
E+0
m/s²
(−)
4. 00
E+0
0. 0   ms   50. 0
25. 0 ms   3. 24E−4

10 : 44
1
1
3. 16
1kHz
ZM*1
X *1
Y *1
m/s²

Store end time (date)

Memory address
Start position

Input range
Frequency span
Zoom
X axis zoom
Y axis zoom
Cursor unit
Display upper limit frequency
Cursor position level
Cursor position frequency

Time display recall example

Cursor control

1. Press the SETUP (ESC) key to turn off the reverse cursor.
2. Use the ◁, ▷ keys to move the cursor.

Type of stored measurement data

Reverse cursor

Measurement state

Analysis mode

Store end time (date)

Memory address

Unit

Input range

Frequency span

Zoom

```
RECLL       ACC        ▮▮▮▮  10 : 44
SPEC                          1
[  Hz  ]    [  m ∕ s² ]
  AP          1. 20E−2        INST
  20. 0       6. 45E−3          4
  40. 0       5. 46E−3
  80. 0       5. 79E−3        3. 16
 100. 0       3. 28E−3        1kHz
  60. 0       2. 29E−3        ZM＊1
 180. 0       1. 20E−3
1000. 0       1. 09E−3
 120. 0       1. 09E−3
 340. 0       9. 83E−4
```
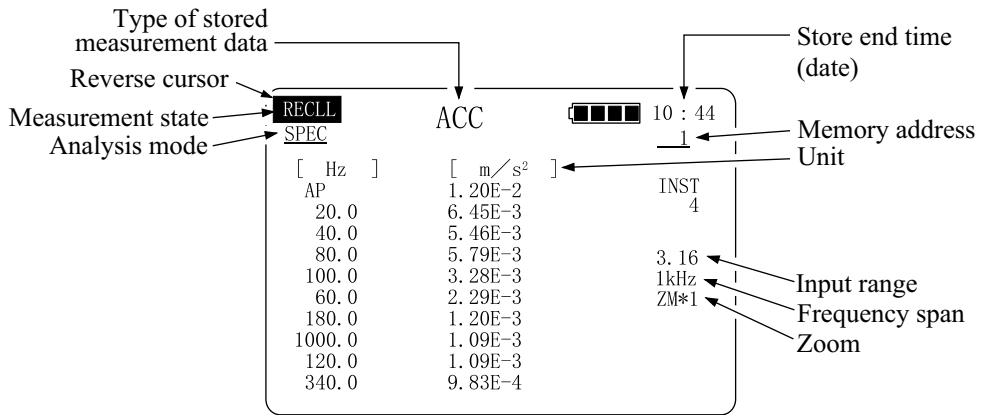
Spectrum list display recall example

Time waveform re-analysis function

Time waveform data stored with the transient store function can be re-analyzed. To use this function, store data in analyzer mode using transient store. When recalling these data, the data in a specified address range can be analyzed again. The address range is specified in units of 1 address (256 data). Re-analyzing can start from any specified data position in the specified address.

In vibration meter mode, re-analysis is not available.

1. Carry out transient store.
   (Use a suitable frequency span and input range.)
2. Activate recall mode. The re-analysis function is automatically activated at this time. The screen shows the time waveform display if the stored data are time waveform data, and the spectrum display if the stored data are spectrum data.
3. Select the part you want to analyze.
   Set the display to time waveform.
   When the address number is changed, the display position changes in 256-point intervals.
   When the start position is changed, the display position changes in 1-point intervals.
   When the analysis mode is set to spectrum, re- analysis is carried out automatically.

Transient store data

Address 1
256 points

Address 2
256 points

128 points 128 points 128 points 128 points

Address 500

128 points

40 points

RECLL
TIME   ACC   J : 44
                        2   ← Address
4.00   0   ← Start
E+0   position
m/s²   3.16
                       1kHz
                       ZM*1
(-)   X *1
4.00   Y *1
E+0   0.0   ms   25.0
12.5 ms   3.24E-4   m/s²

Time waveform display

RECLL
TIME   ACC   10 : 44
                        2   ← Address
4.00   40   ← Start
E+0   position
m/s²   3.16
                       1kHz
                       ZM*1
(-)   X *1
4.00   Y *1
E+0   0.0   ms   25.0
12.5 ms   3.24E-4   m/s²

Time waveform display

Zoom factor 1: data of 1 address
Zoom factor 2: data of 2 addresses   are used for analysis
Zoom factor 4: data of 4 addresses
Zoom factor 8: data of 8 addresses

Time waveform display

  Zoom factor 1: maximum number of recall addresses is 500

  Zoom factor 2: maximum number of recall addresses is 500

  Zoom factor 4: maximum number of recall addresses is 499

  Zoom factor 8: maximum number of recall addresses is 497

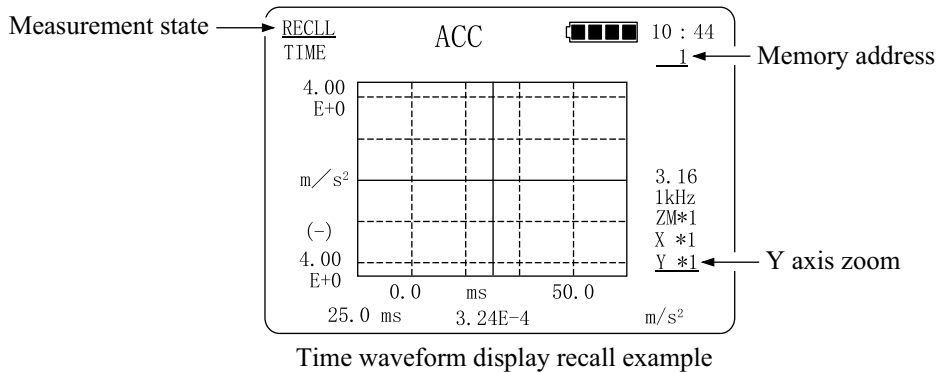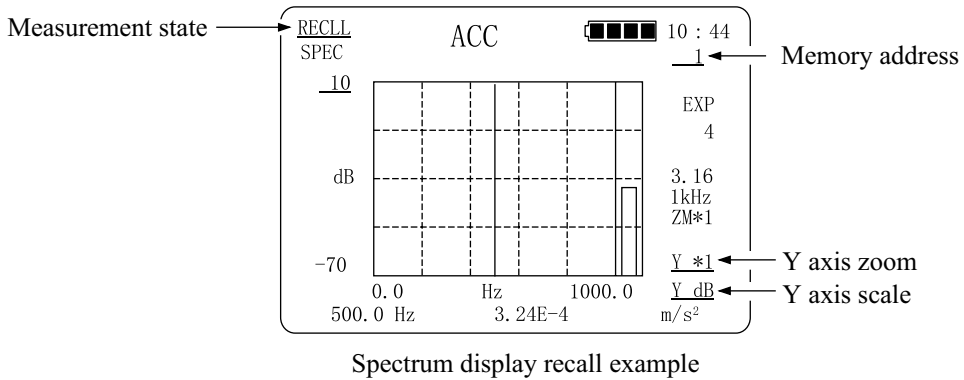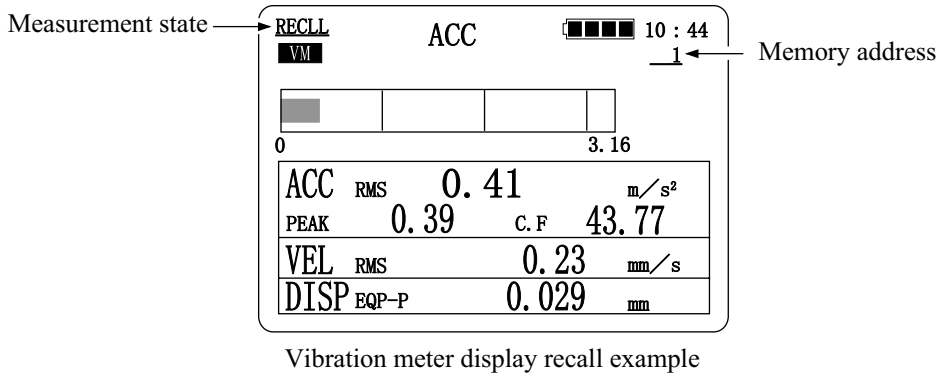Spectrum display

  Zoom factor 1: maximum number of recall addresses is 500

  Zoom factor 2: maximum number of recall addresses is 499

  Zoom factor 4: maximum number of recall addresses is 497

  Zoom factor 8: maximum number of recall addresses is 493

Recalling Manual Store Data

Measurement state ⟶

Memory address

RECLL VM	ACC	▮▮▮▮ 10 : 44 1

```
0                    3.16
ACC  RMS    0.41        m/s²
PEAK    0.39    C.F   43.77
VEL  RMS        0.23   mm/s
DISP EQP-P    0.029    mm
```

Vibration meter display recall example

Measurement state ⟶

Memory address

```
RECLL        ACC        ▮▮▮▮ 10 : 44
SPEC                        1
  10
                            EXP
                             4
 dB                        3.16
                           1kHz
                           ZM*1
-70                        Y *1  ← Y axis zoom
     0.0    Hz    1000.0   Y dB  ← Y axis scale
   500.0 Hz    3.24E-4    m/s²
```

Spectrum display recall example

Measurement state ⟶

Memory address

```
RECLL        ACC        ▮▮▮▮ 10 : 44
TIME                        1
 4.00
 E+0
                           3.16
 m/s²                      1kHz
                           ZM*1
 (-)                       X *1
 4.00                      Y *1  ← Y axis zoom
 E+0  0.0    ms    50.0
   25.0 ms    3.24E-4    m/s²
```

Time waveform display recall example

The settings that can be changed are different from transient store.

Manual store data when using frequency zoom

The number of data per address is fixed. For spectrum display, it is 102 and for time waveform display 128 data.

When a frequency zoom ratio of 2 or higher is used, the number of data increases accordingly, but not all data can be stored. The principle shown below is applied.

Spectrum: 102 data (as shown on display)

Time waveform: leftmost 128 data of data shown on display

Regardless of X axis zoom setting during store, X axis zoom is set to maximum during recall.

Example: Measurement screen   Recall screen

Frequency zoom (ZM $\times$ 4)   ZM $\times$ 4

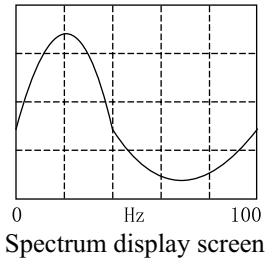X axis zoom (X $\times$ 2)   X $\times$ 4

Cursor control

1. Press the SETUP (ESC) key to turn off the reverse cursor.
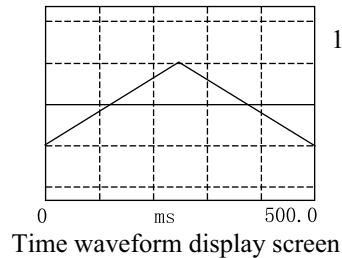2. Use the $\triangleleft$, $\triangleright$ keys to move the cursor.

Frequency Zoom Display Examples

Zoom ×1 display screens

The screens of Measurement and recall are the same.

 102-point data

0   Hz   100

Spectrum display screen
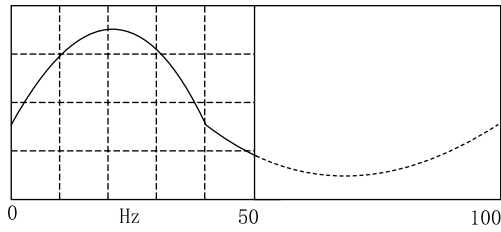
 128-point data

0   ms   500. 0

Time waveform display screen

Note
When recalling data from transient store, each address holds 256 data, but only the first 128 data are shown, as in the above time waveform display example. To view the remaining half of the data, use the re-analysis function or use frequency zoom and X axis zoom.

Zoom ×2 display screens

Spectrum display screen
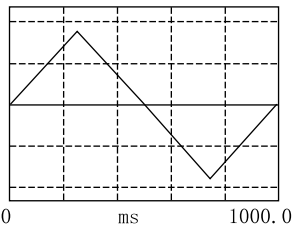
Time waveform display screen

(X axis zoom × 1)
256-point data are compressed and
shown as 128-point data
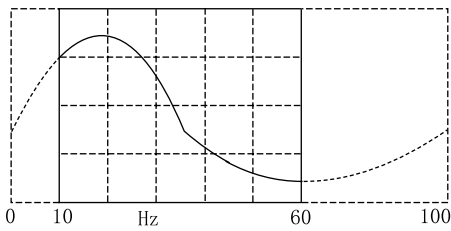
Spectrum display screen

By changing the display upper limit frequency,
the display can be shifted.
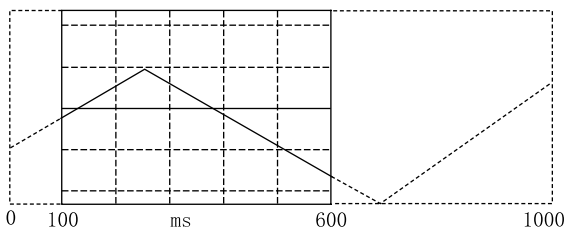
Time waveform display screen

(X axis zoom × 2)
No compression
Display screen can be shifted.

Using a zoom ratio of ×4 or ×8 results in more detailed display.

Y Axis Zoom Display Examples

The screens of Measurement and recall are the same.

Zoom x1 display screens
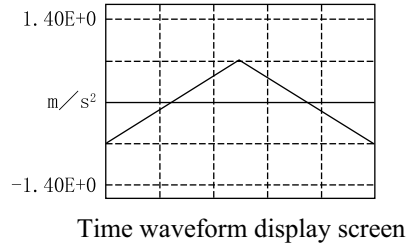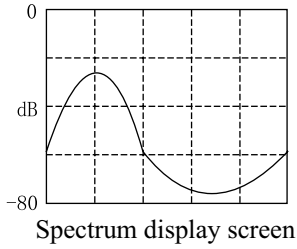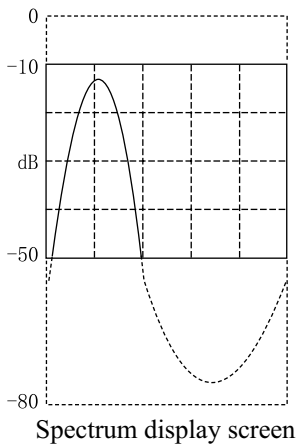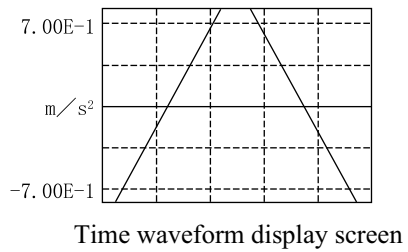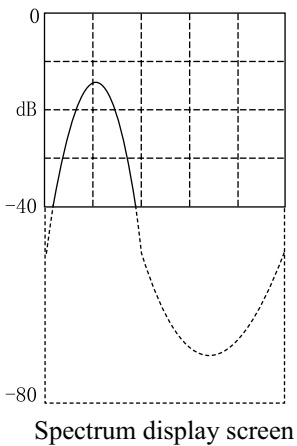
Spectrum display screen

Time waveform display screen

Zoom x2 display screens

Spectrum display screen

Time waveform display screen

By changing the display upper limit frequency, the display can be shifted.

Spectrum display screen

Using a Y axis zoom ratio of ×4 to ×1024 results in more detailed display.

Data Collector Mode Operation

General Operation Flow

The general operation flow in data collector mode is described below.

1. Create the route table (comprising diagnosis points and measurement parameters) on the computer using the optional VA-11C analysis Software (ProCon11C). Store the route on the supplied compact flash card.

Important
Be sure to use only the dedicated compact flash card for data collector mode.
Note
The route table cannot be modified with the VA-11C unit.

2. Insert the compact flash card with the stored route table in the VA-11C (see page 16).
3. Turn on the VA-11C. The menu screen (see page 35) appears. Select the data collector mode. The route selection screen (see page 78) appears. For details on operation, see "Measurement in Data Collector Mode " on page 86.
4. Select the desired route number.
5. The unit enters the measurement mode (data collector mode measurement screen).
6. Perform measurement. If necessary, switch the measurement range to prevent overload.
7. Store the data. The unit returns to the route selection screen.
8. Repeat steps 4 through 7.
9. After measurement is completed, turn off the VA-11C.
10. Remove the compact flash card from the VA-11C.
11. Insert the compact flash card into the compact flash card reader of the computer and import the measurement data, using the VA-11C Route

Management Software. For details, please refer to the separate documentation for the software.

Important
Do not format the dedicated compact flash card for data collector mode. Otherwise the card will become unusable.

Card backup
All directories and files on the card can be copied to the hard disk of the computer. Then copy the backup data to a new MELCO INC. RCF-4M card (operation verified).

Note
If the battery indicator shows ⊏▢▢, data collector mode operation is not possible. Please refer to page 91.

Key Operation

This section explains how the operation keys of the unit (shown on page 4) work in data collector mode. The operation is different, depending on whether the route selection screen or measurement screen is shown.

Key operation at route selection screen

MENU (ENTER) key

Press to select a measurement point.

SETUP (ESC) key

Press to return from the data collector mode to the main menu screen.

△ key

Press to move the cursor up. Keeping the key depressed will scroll the display (see page 82).

▽ key

Press to move the cursor down. Keeping the key depressed will scroll the display (see page 83).

◁ key

Press to move the cursor to route number 001, regardless of the current number (see page 84).

▷ key

Press to move the cursor to the nearest route number for which no measurement has been performed yet. If there is no such number, the key has no effect (see page 85).

Key operation at measurement screen

STORE key

Press to store measurement data on the compact flash card. After storing, the unit shows the route selection screen.

SETUP (ESC) key

Press to return to the route selection screen without storing data.

START key

Pressing this key starts measurement if averaging processing has been set.

PAUSE/CONT key

Used to pause and restart the measurement.

△, ▽ keys

Press to move the highlight among underlined items on the screen.

◁, ▷ keys

Press to change parameters that can be set.

Pressing the ◁ key decreases the parameter value and pressing the ▷ key increases it.

Display Explanation

This section explains the screens shown in data collector mode. Identical items already explained in the section "Display Explanation" on page 23 are omitted here. For these items, please refer to the earlier explanation.

The actual display may differ from the screen samples shown here.

MAIN MENU screen

When the compact flash card is inserted and the unit is turned on, the following main menu screen is shown.

If the compact flash card is not inserted, the item COLLECTOR does not appear on the main menu screen.

```
    MAIN MENU    VER 1.0
  UNIT          INPUT
  TRIGGER       SPECTRUM
  MASS MEM      SETUP MEM
  PCMCIA        OTHERS
  COLLECTOR     CALENDAR
```
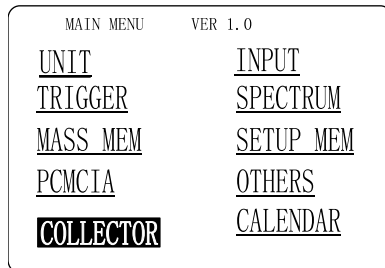
Route selection screen

This screen appears when COLLECTOR is selected at the main menu screen. For information on operation steps, please refer to page 82.


```
                    Point number   Vibration direction
          Route indication                    Measurement mode
                         ROUTE        S   M         Measurement indication
Route number              011   11-231-V   S   *
                          012   12-232-V   S   *
                          013   13-233-A   S   -
                          014   21-231-H   S   -
         Cursor          ■015   31-232-H   S   *
                          016   21-131-V   S   *
                          017   22-234-V   S
                          018   11-232-V   S
                          019   12-233-V   S   *
                          020
Measurement point name   - - - - - - - - - - - -    Blank
                         Kokubunji Factory
                         R & D Dept.
```
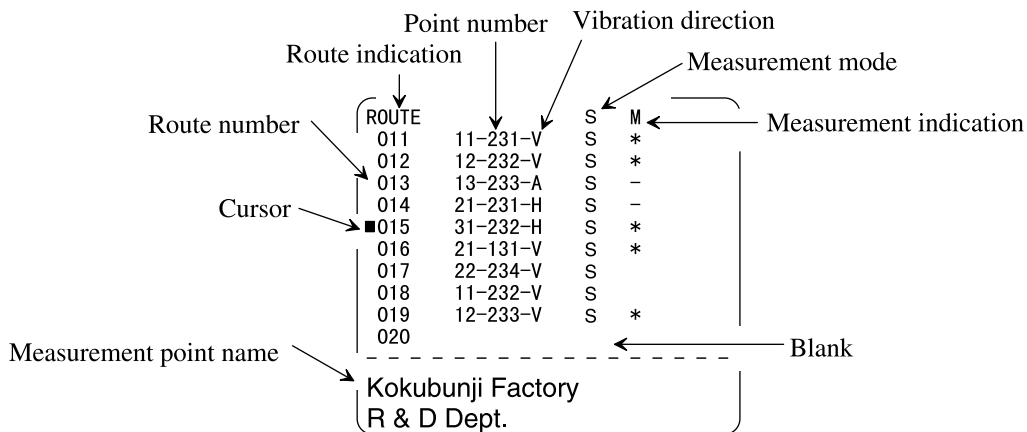
Cursor

Use the △, ▽ keys to move the cursor. Keeping a key depressed moves the cursor quickly.

Route indication and number

These numbers are assigned to diagnosis points using the VA-11C Route Management Software. The available number range is 001 through 500.

Point number

Identification number for a diagnosis point, in the format "2-digit number" - "3-digit number".

Vibration direction

V: vertical   H: horizontal   A: axial
O: other

Measurement mode

S: spectrum

Measurement indication

    Shows whether measurement is completed or no

    *: measurement completed   -: no measurement scheduled

    blank: measurement not completed

Blank

    Indicates that no diagnosis point has been stored for this number.

    Each screen shows ten numbers. Lines for unregistered numbers are blank.

Measurement point name

    Shows the name assigned to the route number where the cursor is currently located.

    While the cursor is being moved, nothing is displayed.

Measurement screen -- Spectrum display

This section explains the main items that can be changed in data collector mode. For more information on the display, see the section "Display Explanation" (page 23).

Items which are underlined on screen can be changed by moving the highlight with the △, ▽ keys and changing the setting with the ◁, ▷ keys.

The display example shows the acceleration measurement screen. Besides this, the velocity screen, displacement screen, and envelope screen are also available, depending on which type of measurement is chosen.
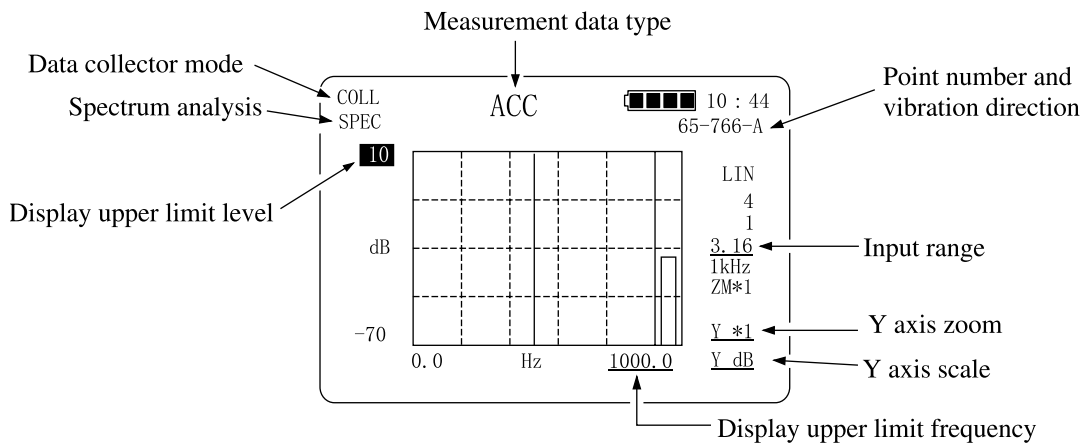
Measurement data type

ACC: acceleration   VEL: velocity   DISP: displacement

ACCe: envelope

Input range

Depending on the vibration amount and the selected unit, the input range is as shown in the following table.

Acceleration	1	3.16	10	31.6	100	316	m/s² （RMS）
	0.1	0.316	1	3.16	10	31.6	G （RMS）
Velocity	3.16	10	31.6	100	316	1000	mm/s （RMS）
	0.125	0.394	1.25	3.94	12.5	39.4	inch/s （RMS）
Displacement	0.089	0.283	0.894	2.83	8.94	28.3	mm （EQp-p）
	3.52	11.1	35.2	111	352	1114	mils （EQp-p）

Y axis zoom

Y   dB: $\times 1$ = 80 dB display $\times 2$ = 40 dB display

                $\times 4$ = 20 dB display

     LIN: Full scale / 2^N N = 0 to 10

Y axis scale

dB   LIN

Display upper limit level

Can be changed for Y axis dB display and Y axis zoom factor of 2 or above

Display upper limit frequency

Highest frequency of graph shown on display

Can be changed for frequency zoom factor of 2 or above

Cursor Operation on Route Selection Screen

Pressing △ key several times

The explanation uses the sample screens shown below.

1. The cursor is at route number 016.

   The indication "Main building, 4F, motor" is shown in the measurement point name field.

2. Pressing the △ key once moves the cursor to route number 015. Each subsequent key press moves the cursor up by one number.

3. When the cursor is at the top-most line and the △ key is pressed once more, the route selection screen changes to numbers 001 to 010, and the cursor is positioned on the line for route number 010.

   The route selection numbers are always shown in groups of ten, with the first line having the number ending in "1".

Keeping △ key depressed (2 seconds or more)

The cursor moves up quickly and stops when the key is released. While the cursor is moving, the measurement point name field is not updated.

```
ROUTE              S    M
  011     44-001-V    S
  012     44-002-H    S
  013     55-003-A    S
  014     55-001-V    S
  015     55-002-H    S
■ 016     66-003-A    S
  017     66-001-V    S
  018     66-002-H    S
  019
  020
- - - - - - - - - - - - - - -
 Main Bldg.
 4th fl. Motor
```

```
ROUTE              S    M
  011     44-001-V    S
  012     44-002-H    S
  013     55-003-A    S
  014     55-001-V    S
■ 015     55-002-H    S
  016     66-003-A    S
  017     66-001-V    S
  018     66-002-H    S
  019
  020
- - - - - - - - - - - - - - -
 Main Bldg.
 3rd fl. Motor
```

```
ROUTE              S    M
  001     11-001-V    S
  002     11-002-H    S
  003     11-003-A    S
  004     22-001-V    S
  005     22-002-H    S
  006     22-003-A    S
  007     33-001-V    S
  008     33-002-H    S
  009     33-003-A    S
■ 010     44-001-V    S
- - - - - - - - - - - - - - -
 Main Bldg.
 1st fl. Pump4
```

Pressing ▽ key several times

The explanation uses the sample screens shown below.

1. The cursor is at route number 001.

   The indication "Main building, 1F, pump 1" is shown in the measurement point name field.

2. Pressing the ▽ key once moves the cursor to route number 002. Each subsequent key press moves the cursor down by one number.

3. When the cursor is at the bottom line and the ▽ key is pressed once more, the route selection screen changes to numbers 011 to 020, and the cursor is positioned on the line for route number 011.

   The route selection numbers are always shown in groups of ten, with the last line having the number ending in "0".

Keeping ▽ key depressed (2 seconds or more)

The cursor moves down quickly and stops when the key is released. While the cursor is moving, the measurement point name field is not updated.

```
ROUTE                    S    M
■ 001      11−001−V       S
  002      11−002−H       S
  003      11−003−A       S
  004      22−001−V       S
  005      22−002−H       S
  006      22−003−A       S
  007      33−001−V       S    −
  008      33−002−H       S    −
  009      33−003−A       S
  010      44−001−V       S
- - - - - - - - - - - - - - - -
Main Bldg.       ⟵
1st fl. Pump1
```

```
ROUTE                    S    M
  001      11−001−V       S
■ 002      11−002−H       S
  003      11−003−A       S
  004      22−001−V       S
  005      22−002−H       S
  006      22−003−A       S
  007      33−001−V       S    −
  008      33−002−H       S    −
  009      33−003−A       S
  010      44−001−V       S
- - - - - - - - - - - - - - - -
Main Bldg.       ⟵
1st fl. Pump2
```

```
ROUTE                    S    M
  011      44−001−V       S
  012      44−002−H       S
  013      55−003−A       S
  014      55−001−V       S
■ 015      55−002−H       S
  016      66−003−A       S
  017      66−001−V       S
  018      66−002−H       S
  019
  020
- - - - - - - - - - - - - - - -
Main Bldg.       ⟵
4th fl. Pump3
```

Pressing ◁ key

The explanation uses the sample screens shown below.

1. The cursor is at route number 101.

   The indication "New building, roof, pump 1" is shown in the measurement point name field.

```
ROUTE              S    M
■101    11-001-V    S
 102    11-002-H    S
 103    11-003-A    S
 104    22-001-V    S
 105    22-002-H    S
 106    22-003-A    S
 107    33-001-V    S    -
 108    33-002-H    S    -
 109    33-003-A    S
 110    44-001-V    S
- - - - - - - - - - - - - - -
 New Bldg.
 Rooftop. Pump1
```

2. Pressing the ◁ key once moves the cursor to route number 001.

```
ROUTE              S    M
■001    11-001-V    S
 002    11-002-H    S
 003    11-003-A    S
 004    22-001-V    S
 005    22-002-H    S
 006    22-003-A    S
 007    33-001-V    S    -
 008    33-002-H    S    -
 009    33-003-A    S
 010    44-001-V    S
- - - - - - - - - - - - - - -
 Main Bldg.
 1st fl. Pump1
```

Pressing ▷ key

The explanation uses the sample screens shown below.

1. The cursor is at route number 001.

    The indication "Main building, 1F, pump 1" is shown in the measurement point name field.

```
┌─────────────────────────────┐
│ ROUTE              S    M    │
│ ■ 001    11-001-V  S    *    │
│   002    11-002-H  S    *    │
│   003    11-003-A  S    *    │
│   004    22-001-V  S    *    │
│   005    22-002-H  S    *    │
│   006    22-003-A  S    *    │
│   007    33-001-V  S    -    │
│   008    33-002-H  S    -    │
│   009    33-003-A  S         │
│   010    44-001-V  S         │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─   │
│ ┌─────────┐                 │
│ │Main Bldg.│    ←           │
│ │1st fl. Pump1│             │
│ └─────────┘                 │
└─────────────────────────────┘
```

2. Pressing the ▷ key once moves the cursor to route number 009. Each key press moves the cursor to the next route number where measurement is to be carried out. In the example, this is 009.

```
┌─────────────────────────────┐
│ ROUTE              S    M    │
│   001    11-001-V  S    *    │
│   002    11-002-H  S    *    │
│   003    11-003-A  S    *    │
│   004    22-001-V  S    *    │
│   005    22-002-H  S    *    │
│   006    22-003-A  S    *    │
│   007    33-001-V  S    -    │
│   008    33-002-H  S    -    │
│ ■ 009    33-003-A  S         │
│   010    44-001-V  S         │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─   │
│ ┌─────────┐                 │
│ │Main Bldg.│    ←           │
│ │1st fl. Pump3│             │
│ └─────────┘                 │
└─────────────────────────────┘
```

3. Pressing the ▷ key again moves the cursor to the next route number where measurement is to be carried out, namely route number 015.

    The next key press moves the cursor to route number 018. Further keypresses will not move the cursor because there are no data to jump to.

```
┌─────────────────────────────┐
│ ROUTE              S    M    │
│   011    44-001-V  S    *    │
│   012    44-002-H  S    *    │
│   013    55-003-A  S    *    │
│   014    55-001-V  S    *    │
│ ■ 015    55-002-H  S         │
│   016    66-003-A  S         │
│   017    66-001-V  S         │
│   018    66-002-H  S         │
│   019                        │
│   020                        │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─   │
│ ┌─────────┐                 │
│ │Main Bldg.│    ←           │
│ │2nd fl. Pump2│             │
│ └─────────┘                 │
└─────────────────────────────┘
```

Measurement in Data Collector Mode

Operation Procedure

1. Display the main menu screen.

2. Use the △, ▽ keys to move the cursor to the COLLECTOR item.

3. Press the MENU (ENTER) key.
   The route selection screen appears.

4. Use the △, ▽ keys to move the cursor to the route number for the desired diagnosis point. Verify that the desired name is shown in the measurement point name field.

5. If the selection is correct, press the MENU (ENTER) key.
   The measurement screen for the preset mode appears on the display.

6. Change the underlined settings on the measurement screen as needed.
   Make absolutely sure that no overload occurs in the measured values.

7. When the measurement results are as desired, press the STORE key. The unit reverts to the route selection screen.

8. Repeat steps 4 through 7.

```
   MAIN MENU      VER 1.0
  UNIT              INPUT
  TRIGGER           SPECTRUM
  MASS MEM          SETUP MEM
  PCMCIA            OTHERS
  COLLECTOR         CALENDAR
```

MENU (ENTER) Key

SET UP (ESC) Key

```
ROUTE                 S   M
 001     11-111-V      S   *
 002     22-222-H      S   *
 003     33-333-A      S   *
 004     44-444-V      S   *
 005     55-555-H      S   *
 006     66-666-A      S   *
■007     77-777-H      S
 008     88-888-8      S
 009
 010
- - - - - - - - - - - - - - - - -
Main Bldg.
1st fl. Pump1
```

MENU (ENTER) Key

STORE Key

Measurement screen of
Data collector mode
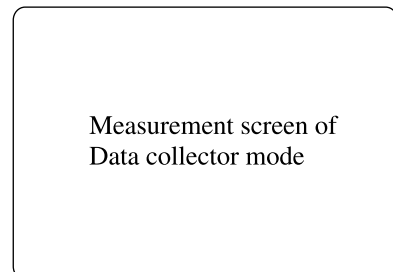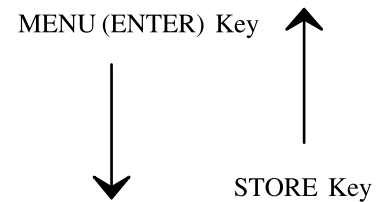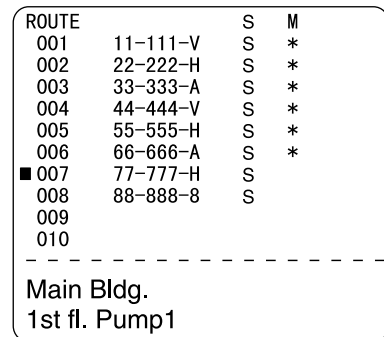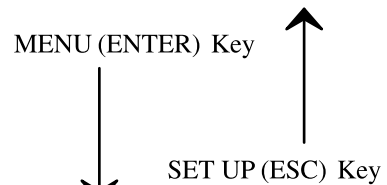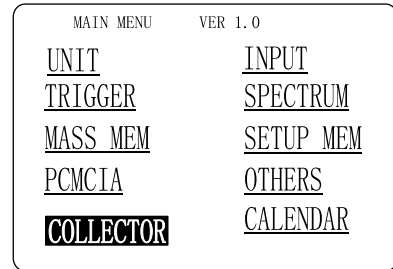
Printing

To use a printer, proceed as follows.

1. Select SINGLE (print current screen only) or SUCCESSIVE (continuous print) from the OTHERS menu (page 44).
2. Return to the measurement screen and press the SETUP (ESC) key to display the reverse cursor.

    To perform continuous printing
3. Use the △, ▽ keys to move the cursor to the measurement state field.
4. Use the ◁, ▷ keys to select "RECLL".
5. Press the PRINT key to activate printout.

    Continuous printing is possible only with data collected with manual store.

    When the reverse cursor is shown on the display, it will also be visible in the printout. When wishing to prevent this, turn the reverse cursor off by pressing the SETUP (ESC) key before starting the printout.

The single print function is useful to print only the current measurement screen, a menu screen, or list display.

```
            OTHERS

  PRINTER       SINGLE
  ADDR           1  ~
                 500

  BAUD RATE     9600
  BUZZER        ON
```

OTHERS menu screen

Compact Flash Card

This section explains how to use the compact flash card for vibration meter mode and analyzer mode.

The data stored in the memory of the VA-11C can be transferred to a compact flash card (available separately), for example to transfer the data to a computer at another location for further processing.

For information on how to insert the compact flash card, please refer to the section "Preparations" on page 16.

Before inserting or removing a compact flash card into and from the VA-11C, set the POWER switch of the VA-11C to OFF. Insert the card fully into the slot, until it is firmly seated.

Important
● Do not format the dedicated compact flash card for data collector mode. Otherwise the card will become unusable.
● Do not store vibration meter mode or analyzer mode data on the dedicated compact flash card for data collector mode. Otherwise the unit may not operate properly.
● If a card is removed while the VA-11C is turned on, data on the card may be lost.
● To prevent the possibility of damage, do not use any cards other than the type specified.
● Observe the precautions printed on the rear of the card.

Writing Data

The entire contents of the memory are written to the card as one MS-DOS format ASCII file. The size of the file depends on the type and amount of data contained in the memory of the VA-11C. The following figures are given as an approximate reference.

Transient data, 500 addresses: approx. 1.56 megabytes

Spectrum data, 500 addresses: approx. 0.5 megabytes

Time display data: approx. 1710 bytes per address

Spectrum dB data: approx. 1016 bytes per address

Spectrum linear data: approx. 1242 bytes per address

1. Insert a compact flash card in the slot, as described on the previous page.
2. Call up the PCMCIA CARD menu.
3. Use the $\triangle$, $\triangledown$ keys to select BLOCK.
4. Use the $\triangleleft$, $\triangleright$ keys to specify the block number.
   If the specified block contains data, the store date is displayed. If the specified block contains no data, only "********" is displayed.
5. Use the $\triangle$, $\triangledown$ keys to select SAVE.
6. Use the $\triangleleft$, $\triangleright$ keys to select EXEC.
7. Press the MENU (ENTER) key.
   The data in the memory are written to the card.

Note
Data can only be written on cards that were formatted with the FORMAT command of the VA-11C. If another card is inserted, the error message BAD CARD appears.

Note

When using a compact flash card, pay close attention to the battery indicator. If the remaining battery capacity is insufficient, the write process may not be completed correctly.

Card can be used.

Card cannot be used.
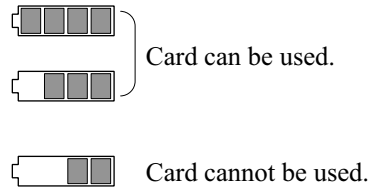
When using compact flash cards, it is recommended to power the VA-11C from the optional AC adapter NC-94A.

Displaying the data directory of a card

You can view a display showing the block numbers and store date of data contained on a compact flash card.

1. Insert a compact flash card in the slot, as described above.
2. Call up the PCMCIA CARD menu.
3. Use the △, ▽ keys to select DIR "OFF".
4. Use the ◁, ▷ keys to change the setting to "EXEC".
5. Press the MENU (ENTER) key.

```
         PCMCIA CARD

   DIR             OFF
   BLOCK      19  98／04／30
   SAVE            OFF
   DELETE          OFF
   FORMAT          OFF
```

PCMCIA CARD menu screen

```
         PCMCIA CARD  DIRECTORY
   BLK   DATE      BLK   DATE

   1   98／01／06    2  98／01／07
   3   98／01／09    4  98／02／02
   5   98／02／05    6  98／02／06
   7   98／02／07    8  98／02／08
   9   98／03／03   10  98／03／15
```

Directory display example

A directory of the data on the card is shown. One screen shows up to 10 blocks with the respective store date. When there are more blocks, the △, ▽ keys can be used to scroll the display.

Use the SETUP (ESC) key to return to the PCMCIA CARD menu screen.

Direct Card Write Function

When the SAVE DISPLAY item on the PCMCIA card menu is set to ON, pressing the STORE key in the measurement mode causes all data including data outside of the current display range to be stored directly on the card (direct card write function).

For example, when the unit is in analyzer mode and the ZOOM ratio is set to 2×, the total amount of data will be 202 lines, but only 102 lines are displayed. With regular mass memory store, only the data for the displayed 102 lines will be written to the card. With the direct card write function, the data for all 202 lines are written to the card. In this case, an "F" is shown in front of the address indication.

Address indication example: F 123

Card symbol

Measurement mode indication

Analysis function

File address
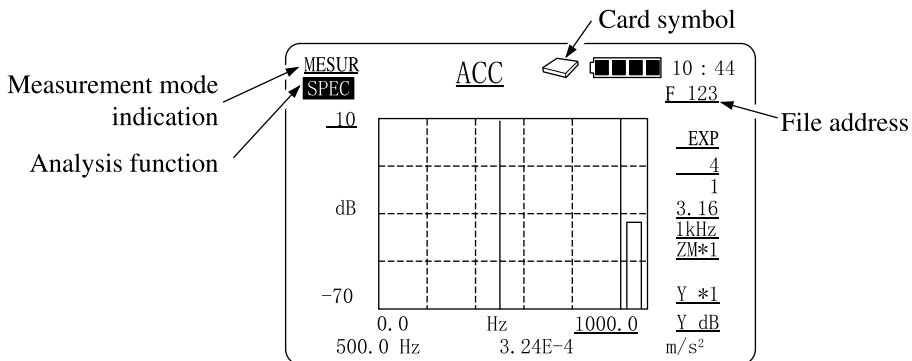
Note
When the direct card write function is ON, a data writing operation corresponding to transient store is not possible. When the direct card write function is ON, the mass memory recall operation is not possible.

When a card related error has occurred, the card symbol on the display flashes. If no card is inserted, the card symbol flashes and the address indication shows "F∗∗∗∗".

Card symbol flashes

Measurement mode
indication

Analysis function

File address

MESUR
SPEC
ACC
10 : 44
F****
10
EXP
4
1
dB
3. 16
1kHz
ZM*1
−70
Y *1
0. 0   Hz   1000. 0   Y dB
500. 0 Hz   3. 24E−4   m/s^2
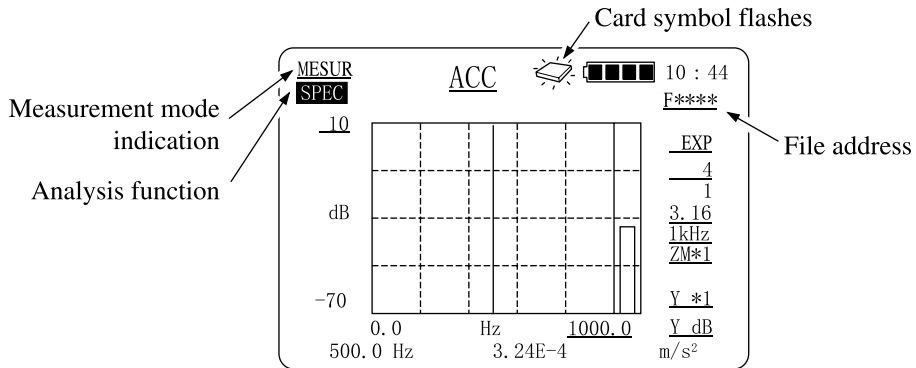
Deleting a File From the Card

The VA-11C has no function for deleting files directly written to the compact flash card. To erase a file that is no longer needed, insert the card into the card slot of a computer and proceed as follows.

1. Insert the card into the card slot of the computer.

2. Right-click the Start button on the Windows taskbar. On the menu that appears, left-click on "Explorer".

3. In Explorer, left-click on the drive assigned to the card to show a list of files on the card.

4. Left-click on the name of the file you want to delete and press the [Delete] key on the keyboard.

Deleting data from a card

Data can be deleted from a compact flash card in block units.

1. Insert a compact flash card in the slot, as described above.
2. Call up the PCMCIA CARD menu.
3. Use the $\triangle$, $\triangledown$ keys to select "BLOCK".
4. Use the $\triangleleft$, $\triangleright$ keys to select the number of the block you want to delete.
5. Use the $\triangle$, $\triangledown$ keys to select "DELETE".
6. Use the $\triangleleft$, $\triangleright$ keys to change the setting to "EXEC".
7. Press the MENU (ENTER) key.

   All data in the specified block are deleted.

Formatting a card

1. Insert a compact flash card in the slot, as described above.
2. Call up the PCMCIA CARD menu.
3. Use the $\triangle$, $\triangledown$ keys to select "FORMAT".
4. Use the $\triangleleft$, $\triangleright$ keys to change the setting to "EXEC".
5. Press the MENU (ENTER) key.

   The card is formatted to create the directory structure and key file.

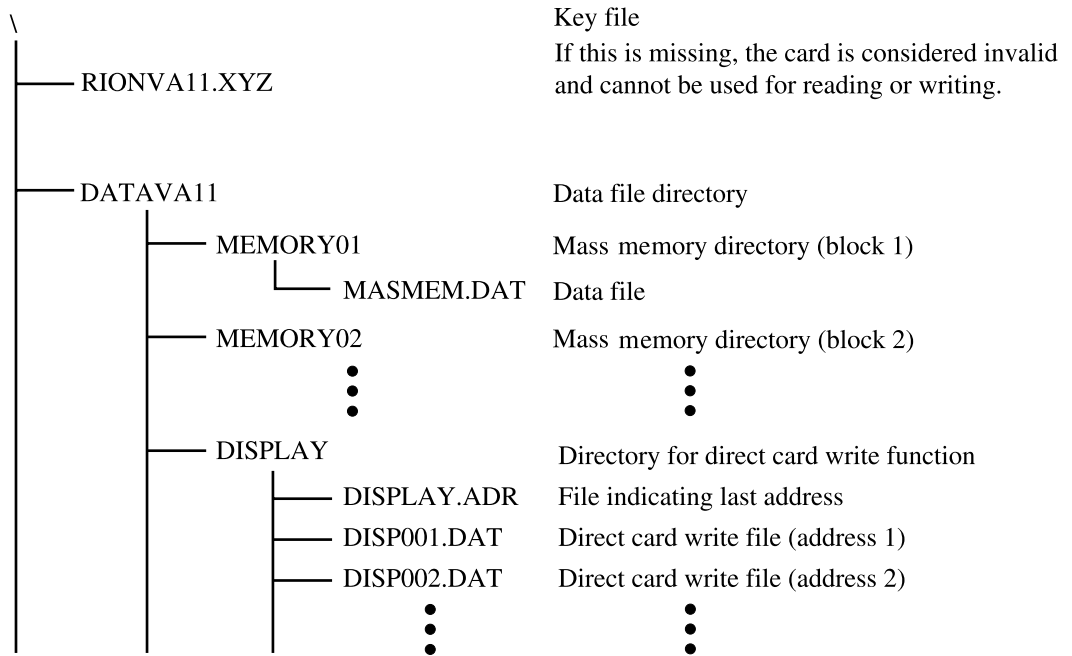| Note |
| --- |
| Before using a card for the first time, it must be formatted. |

Error indication

If there is a problem with the card, one of the following error messages appears.

Error message	Meaning
NO CARD	No card is inserted.
BAD CARD	Type of inserted card does not match the unit.
READ/WRITE ERROR	Read or write cannot be performed.
NO SPACE	There is not enough empty space on the card.

Card Contents

Directory configuration

```
\                                      Key file
                                       If this is missing, the card is considered invalid
├── RIONVA11.XYZ                       and cannot be used for reading or writing.


├── DATAVA11                           Data file directory
│       ├── MEMORY01                   Mass memory directory (block 1)
│       │       └── MASMEM.DAT         Data file
│       ├── MEMORY02                   Mass memory directory (block 2)
│                  ⋮                              ⋮
│       ├── DISPLAY                    Directory for direct card write function
│               ├── DISPLAY.ADR        File indicating last address
│               ├── DISP001.DAT        Direct card write file (address 1)
│               ├── DISP002.DAT        Direct card write file (address 2)
                       ⋮                              ⋮
```

(Directory names and file names are fixed.)

Data file contents

[Position]	[Sample data]	[Description]	[Bytes]
0000	"001"	Address (001 to 500)	3
0003	", "	Comma	1
0004	"VA-11"	Keyword	5
0009	", "	Comma	1
0010	"Ver1.00"	Version number	8
0018	", "	Comma	1
0019	"01"	File type *	2
0021	", "	Comma	1
0022	"YYYY:MM:DD"	Measurement date	10
0032	", "	Comma	1
0033	"HH:MM"	Time	5
[Position]	[Sample data]	[Description]	[Bytes]
0038	", "	Comma	1
0039	Measurement parameters	Measurement parameters **	255
0294	", "	Comma	1
0295	"*****"	Number of measurement data bytes	5
0300	", "	Comma	1
0301	Analysis result	Measurement data ***	L
0301+L	<CR><LF>		2
0303+L			

Subsequently, 000 - 0303 + L are repeated for each address.

Data file contents (2) (Data file for direct writing)

[Position]	[Sample data]	[Description]	[Bytes]
0000	" "	Space	3
0003	", "	Comma	1
0004	"VA-11"	Keyword	5
0009	", "	Comma	1
0010	"Ver1.00"	Version number	8
0018	", "	Comma	1
0019	"05"	File type *	2
0021	", "	Comma	1

0022	"YYYY:MM:DD"	Measurement date	10
0032	", "	Comma	1
0033	"HH:MM"	Time	5
0038	", "	Comma	1
0039	Measurement parameters	Measurement parameters **	255
0294	", "	Comma	1
0295	"*****"	Number of measurement data bytes	5
0300	", "	Comma	1
0301	Analysis result	Measurement data ***	L
0301+L	<CR><LF>		2

* See 2.1   ** See 2.2   *** See 2.3

File type

00: Not used

01: Standard memory (manual store)

02: Standard memory (timer measurement)

03: Transient store

05: Direct card write file

Measurement parameters

[Common settings for vibration meter and analyzer]

Measurement data type

Measurement data type	0: Acceleration, 1: Velocity, 2: Displacement, 3: Envelope
Acceleration unit	0: m/s^2, 1: G
Velocity unit	0: mm/s, 1: inch/s
Displacement unit	0: mm, 1: mils
Analysis mode	0: Vibration meter, 1: Spectrum, 2: Time waveform
Input range	0: minimum to 5: maximum
Pickup sensitivity	mV/ms^{-2} (numeral, multiplication factor)
Numeral	***: 100 to 999
Multiplication factor	100: ×0.1, 010: ×0.01, 001: ×0.001
High-pass filter filter	0: 3 Hz, 1: 10 Hz, 2: 1 kHz

Low-pass filter filter	0: 1 kHz, 1: 5 kHz, 2: 20 kHz
Timer store	0: OFF, 1: ON
Time	HH:MM in 24-hour notation
Store interval	MM in minutes (2 digits)
Store count	∗∗∗: 001 to 500

[Analyzer settings]

Zoom ratio	0: ×1, 1: ×2, 2: ×4, 3: ×8
Time window	0: Rectangular 1: Hanning 2: Flat-top
Frequency span	0 to 7: 100 Hz to 20 kHz
Trigger operation	0: Free-run 1: Repeat 2: Single
Trigger source	0: Level trigger 1: External trigger
Trigger position	±∗∗∗∗: ± four-digit numeral
Level trigger position	-7 to +7: -7/8 to +7/8
Level trigger slope	0: -, 1: +
Averaging type	0: Instantaneous value 1: Linear averaging
	2: Exponential averaging 3: Maximum value
Averaging count	∗∗∗∗: 0001 to 1023

Spectrum display conditions

X axis shift count	∗∗: 00 to 35
Y axis scale	0: dB 1: Linear
Y axis zoom (dB)	0: ×1, 1: ×2, 2: ×4
Y axis level shift (dB)	∗∗: 00 to 80
Y axis zoom (Linear)	∗∗: 00 to 10
Cursor X axis position	0: Hz 1: KCPM 2: ORDER
Cursor Y axis position	0: dB 1: Linear
Top ten peak list display	0: OFF 1: ON
Cursor position, from left	∗∗∗: 000 to 101

Time waveform display conditions

X axis zoom	0: ×1, 1: ×2, 2: ×4, 3: ×8, 4: ×16
X axis shift count	∗∗: 00 to 75
Y axis zoom	∗∗: 00 to 10
Cursor position, from left	∗∗∗: 000 to 127
Overload information	0: No overload 1: Overload

[Position]	[Sample data]	[Description]	[Bytes]
Common settings for vibration meter and analyzer			
0000	"0"	Measurement data type	1
0001	", "	Comma	1
0002	"0"	Acceleration unit	1
0003	", "	Comma	1
0004	"1"	Velocity unit	1
0005	", "	Comma	1
0006	"1"	Displacement unit	1
0007	", "	Comma	1
0008	"1"	Analysis mode	1
0009	", "	Comma	1
0010	"3"	Input range	1
0011	", "	Comma	1
0012	"510. 010"	Accelerometer sensitivity	7
0019	", "	Comma	1
0020	"0"	High-pass filter	1
0021	", "	Comma	1
0022	"2"	Low-pass filter	1
0023	", "	Comma	1
0024	"1"	Timer store	1
0025	", "	Comma	1
0026	"13:52"	Timer store time	5
0031	", "	Comma	1
0032	"15"	Timer store interval	2
0034	", "	Comma	1
0035	"135"	Timer store count	3
0038	", "	Comma	1
0039	" "	Reserved space	12
0051	", "	Comma	1
Analyzer settings			
0052	"0"	Zoom ratio	1
0053	", "	Comma	1
0054	"1"	Time window	1

0055	", "	Comma	1
0056	"7"	Frequency span	1
0057	", "	Comma	1
0058	"0"	Trigger operation	1
0059	", "	Comma	1
0060	"0"	Trigger source	1
0061	", "	Comma	1
0062	"-0012"	Trigger position	5
0067	", "	Comma	1
0068	"-5"	Level trigger position	2
0070	", "	Comma	1
0071	"1"	Level trigger slope	1
0072	", "	Comma	1
0073	"1"	Averaging type	1
0074	", "	Comma	1
0075	"0102"	Averaging count	4
0079	", "	Comma	1
0080	"24"	Spectrum X axis shift count	2
0082	", "	Comma	1
0083	"1"	Spectrum Y axis scale	1
0084	", "	Comma	1
0085	"2"	Spectrum Y axis zoom (dB)	1
0086	", "	Comma	1
0087	"05"	Spectrum Y axis zoom (Linear)	2
0089	", "	Comma	1
0090	"24"	Spectrum Y axis shift (dB)	2
0092	", "	Comma	1
0093	"0"	Spectrum cursor X axis unit	1
0094	", "	Comma	1
0095	"0"	Spectrum cursor Y axis unit	1
0096	", "	Comma	1
0097	"0"	Spectrum list display	1
0098	", "	Comma	1
0099	"025"	Spectrum cursor position	3

0102	", "	Comma	1
0103	"4"	Time waveform X axis zoom	1
0104	", "	Comma	1
0105	"17"	Time waveform X axis shift count	2
0107	", "	Comma	1
0108	"09"	Time waveform Y axis zoom	2
0110	", "	Comma	1
0111	"105"	Time waveform cursor position	3
0114	", "	Comma	1
0115	" "	Reserved space	1
0116	", "	Comma	1
0117	" "	Reserved space	3
0120	", "	Comma	1
0121	" "	Extra space	16
0137	", "	Comma	1
0138	"1"	Overload information	1
0139	", "	Comma	1
0140	" "	Vibration meter bar graph scale	1
0141	", "	Comma	1
0142	" "	Overall extra space	114

Measurement data

Measurement data are written in ASCII format, using commas as delimiters.

Vibration meter mode

Number of data: 5

Data sequence: Acceleration rms value, acceleration peak value, acceleration crest factor, velocity rms value, displacement equivalent P-P value

Data structure of rms, peak, equivalent P-P value:

$$+ A_1.A_2A_3A_4E \pm A_5A_6 \text{ (10 bytes)}$$

$+ A_1.A_2A_3A_4$: mantissa, $\pm A_5A_6$: exponent; given as (mantissa $\times 10^{\wedge}$ exponent)

Crest factor data structure:

$$A_1A_2.A_3A_4 \text{ (5 bytes)}$$

FFT analyzer mode

Number of data:	102
Data sequence:	Ordered from left side of display.
	DC value, minimum frequency, ..., maximum frequency, AP value
Linear data structure:	$+ A_1.A_2A_3A_4E\pm A_5A_6$ (10 bytes)
	$+ A_1.A_2A_3A_4$: mantissa, $\pm A_5A_6$: exponent; given as (mantissa $\times 10^\wedge$ exponent)
dB data structure:	Data structure of crest factor
	$\pm A_1A_2A_3.A_4$ (6 bytes)
	given as ($\pm A_1A_2A_3.A_4$) dB

Linear data or dB data are selected depending on the Y axis setting at the store point.

Time waveform mode

Number of data:	Manual store 128
	Transient store 256
Data sequence:	Time based
Data structure:	$\pm A_1.A_2A_3A_4E\pm A_5A_6$ (10 bytes)
	$+ A_1.A_2A_3A_4$: mantissa, $\pm A_5A_6$: exponent; given as (mantissa $\times 10^\wedge$ exponent)

Default Settings

The default settings of the unit established at the time of shipping are listed below.

Menu screen	Default setting
UNIT menu	
ACC (acceleration unit)	m/s^2
VEL (velocity unit)	mm/s
DISP (displacement unit)	mm
TRIGGER menu	
MODE	FREE
SOURCE	LEVEL
TRIG POINT	0
PRE/POST	OFF
LEVEL	$N = +2$
SLOPE	+
MEMORY menu	
TYPE	MANUAL
TIMER	OFF
HOUR	0
MINUTE	0
DURATION	10
COUNT	500
PCMCIA menu	
DIR	OFF
BLOCK	1 ********
SAVE	OFF
DELETE	OFF
FORMAT	OFF

INPUT menu

    SENSITIVITY 510×0.01

    LOW PASS   20 kHz

    HIGH PASS   3 Hz

SPECTRUM menu

    WINDOW   HANNING

    X-CURSOR   Hz

    Y-CURSOR   LINEAR

    PEAK LIST   OFF

SETUP MEM menu

    ADDR   1   ********

    SAVE   OFF

    LOAD   OFF

    DELETE   OFF

OTHERS menu

    PRINTER   SINGLE

    ADDR   1 to 1

    BAUD RATE   9600

    BUZZER   OFF

CALENDAR menu

    DISPLAY   TIME

    HOUR   Undefined

    MINUTE   Undefined

    YEAR   Undefined

    MONTH   Undefined

    DAY   Undefined

These default settings can be established by loading the address number 0 in the SETUP MEM menu.

Specifications

Input section

Number of input channels	1
Input connector	Standard accelerometer connector (Standard accelerometer is PV-57)

Vibration measurement quantities

Acceleration:	signal from accelerometer
Acceleration envelope:	1 kHz to 50 kHz acceleration envelope signal (in analyzer mode only)
Velocity:	integrated from acceleration signal
Displacement:	double-integrated from acceleration signal

Units

Acceleration:	m/s^2, G
Velocity:	mm/s, inch/s
Displacement:	mm, mils

Input range

Acceleration:	1, 3.16, 10, 31.6, 100, 316 m/s^2 (rms)
Acceleration envelope:	1, 3.16, 10, 31.6, 100, 316 m/s^2 (rms)
Velocity:	3.16, 10, 31.6, 100, 316, 1000 mm/s (rms)
Displacement:	0.089, 0.283, 0.894, 2.83, 8.94, 28.3 mm (EQp-p)

Measurement frequency range (electrical)

Acceleration:	3 Hz to 20 kHz
Acceleration envelope:	1 Hz to 50 kHz
Velocity:	3 Hz to 3 kHz
Displacement:	3 Hz to 500 Hz

Measurement level range

Acceleration:	0.02 to 316 m/s^2 (rms)
Velocity:	0.1 to 1000 mm/s (rms)
Displacement:	0.003 to 28.3 mm (EQp-p)

Pre-stage filters

    High-pass filter: 3 Hz, 10 Hz, 1 kHz (-10% point),

                                  attenuation -18 dB/oct

    Low-pass filter: 1 kHz, 5 kHz, 20 kHz (-10% point),

                                  attenuation -18 dB/oct

Acceleration envelope filters

    High-pass filter: 1 kHz (-10% point),

                                  attenuation - 18 dB/oct

    Low-pass filter: 50 kHz (-10% point),

                                  attenuation -12 dB/oct

A/D conversion

    16-bit, delta sigma principle, 51.2 kHz sampling

Vibration meter mode

    Detection characteristics   rms, peak

    Processing items

        Simultaneous processing of following items (digital)

        Acceleration: rms, peak, crest factor

        Velocity: rms

        Displacement: equivalent p-p value

    Sampling cycle   51.2 kHz

    rms time constant   1 s

    Peak value   updated every second

    Crest factor   updated every second

Analyzer mode

    Processing items

        Time waveform: from sampled time-based data

        Spectrum: power spectrum derived by FFT process-

                                  ing of above time waveform

    Sampling cycle   Frequency span ×2.56

    Number of samples   256, 512, 1024, 2048

        Normally 256; with frequency zoom ratio   ×2: 512

                                                    ×4: 1024

                                                  ×8: 2048

Time window function	Rectangular, Hanning, flat-top
Frequency span	100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k (Hz)
Anti-aliasing filter	100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k (Hz)
	14th-order anti-aliasing filter
Attenuation:	-85 dB at frequency span ×1.56 frequency point
Frequency zoom	×2, ×4, ×8

Data collector mode

Serves for collecting data using pre-specified functions of analyzer mode. (Functions that can be specified are subject to limitations.)

	Using a route table (diagnosis point route and measurement parameter settings) measurement at diagnosis points is performed and measurement data are stored on a compact flash card.
Unavailable functions	Time waveform acceleration envelope processing, etc.
	Other functions not available in data collector mode are marked with an * for each item.

Average processing

Time waveform   Instantaneous value

Spectrum

    Instantaneous value: FFT processing result without averaging, continuous processing without end point

    Exponential averaging: Exponential average value

$$Y_n = Y_{n-1} - (Y_{n-1}-X_n)/N$$

Y_n: current averaging value

Y_{n-1}: previous (frame) averaging value

X_n: Processing result for each frame

N: Averaging count (1 to 1023)

Continuous processing without end point

    Linear averaging: Linear averaging value

$$Y_n = \Sigma X_n / N$$

Y_n: current averaging value

X_n: Processing result for each frame

N: Averaging count (1 to 1023)

When specified averaging count is completed, processing is carried out. No further processing until restart.

    Peak hold*:   Maximum value for each frequency of specified FFT processing cycles (1 to 1023)

When specified averaging count is completed, processing is carried out. No further processing until restart.

  * Not used in data collector mode

Trigger

Trigger source*:

External signal:	Trigger is activated at falling edge of TTL signal supplied to external trigger input
Input level:	Trigger is activated when time waveform crosses set level. Level can be set in steps of 1/8 of full-scale unilateral amplitude.
Slope:	+ / -

Trigger operation

Free-run:	Processing is carried out regardless of trigger state
Repeat*:	Processing is carried out at each trigger occurrence
Single*:	Processing is carried out only once at the first trigger occurrence

Pre and post trigger functions*

Pre-trigger:	Processing starts from a specified number of data before trigger occurrence
Post-trigger:	Processing starts from a specified number of data after trigger occurrence

Trigger position can be specified in 16 steps.

(Maximum position: number of samples -16)

* Not used in data collector mode

Display section

Display

LCD dot resolution:	192×128
Display size:	77.5×54 mm
Backlight:	EL backlight

Display data

Measurement data	Processing results, cursor, measurement parameters

Status indication	Overload, trigger standby, store
Date/time indication	Date: MM:DD
	Time: HH:MM (24-hour notation)
Power supply indication:	4-segment battery status indicator

Display data

   Vibration meter display   Acceleration, velocity, displacement (bar graph and numeric indication)

   Spectrum display   Graph, list

       Graph display

       X axis: 102 lines (frequency spectrum 101 lines + overall value)

       Y axis: dB, LINEAR

                    dB display range: 20, 40, 80 dB

                    Linear zoom: 2 to 1024 (multiple integers of 2)

       List display: upper 10 levels and frequency, readout

   Time waveform display

       X axis: 128 data, with frequency zoom and shift function

       Y axis: linear display

                    Linear zoom: 2 to 1024 (multiple integers of 2)

Cursor functions*

       Spectrum X axis: Hz, KCPM, ORDER

       Spectrum Y axis: Linear (G, m/s^2, mm/s, inch/s, mm, mils) dB

       Time waveform X axis: Time (ms)

       Time waveform Y axis: Amplitude (G, m/s^2, mm/s, inch/s, mm, mils)

   * Not used in data collector mode

Memory

Data memory*

Manual store Measurement parameters and analysis results are stored in specified address

Capacity 500 data sets, regardless of vibration meter mode or analyzer mode

Transient store Continuous store of time waveform and frequency span

(store cycle: frequency span × 2.56)

Only available in analyzer mode

Frequency	Recording time	Frequency	Recording time
100 Hz	500 s	2 kHz	25 s
200 Hz	250 s	5 kHz	10 s
500 Hz	100 s	10 kHz	5 s
1 kHz	50 s	20 kHz	2.5 s

Timer store function*

Start time, repeat interval, number of store data can be specified for storing data in data memory

Available for manual store and transient store

Re-analysis function*

Data stored in transient memory can be re-analyzed.

Measurement settings memory*

10 sets, for storing and recalling all measurement parameters

* Not used in data collector mode

PCMCIA card

ATA type compact flash card

• The dedicated compact flash card for data collector mode (supplied)

Data exchange with ProCon 11C (Analysis software for condition monitoring

• The compact flash card except for data collector mode (optional)

Contents of entire data memory are written to the card as one ASCII file in MS-DOS format

Cards are available separately

Inputs/outputs

RS-232-C interface*

Dual-function port:	RS-232C interface and printer output
Protocol:	yes
Baud rate:	9600, 19200, 38400 bps
Data word length:	8 bit
Stop bits:	2
Parity:	none
Function:	Control of VA-11C from computer and transfer of measurement data to computer

Printer output

Compatible printers:	DPU-414, CP-10, CP-11 (available separately)
Baud rate:	9600 bps
Function:	Hard copy of current display screen Continuous printout of specified address range in memory
Cable type:	Commercially available straight serial cable

External trigger input*:	TTL level falling edge
Beep tone	When storing and as error warning

* Not used in data collector mode

Ambient conditions for operation

0 to +40ºC, 20 to 90% RH (no condensation)

Power supply

Four IEC R14 (size C) batteries or AC adapter NC-94A

Dimensions

Approx. 156 (W) × 174 (H) × 45.7 (thickness) mm (without protruding parts)

Weight

Approx. 770 g (including batteries)

Supplied accessories

Accelerometer	PV-57	1
Accelerometer cable	VP-51K	1
Magnet attachment	VP-53S	1
M6 screws	VP-53A	1
8 MB Compact flash card for VA-11C		1
Card adapter for compact flash card		1
Soft carrying case	VA-11-014	1
Shoulder belt	VA-11-015	1
Size C battery	IEC R14	4
Lithium battery	CR-1/3N	1
Instruction manual		1
Serial interface manual		1

Optional software

ProCon11C　Analysis software for condition monitoring
(NÅIDEN TEKNIK AB, Sweden)

Optional accessories

ATA type compact flash card

ADTEC Co., Ltd.	ADV-CF4M
	ADV-CF10M
	ADV-CF15M
SanDisk Corporation	SDCFB-4-101
	SDCFB-10-101

* The above memory cards have been verified for compatibility with this unit. Operation with other memory cards is not assured.

Hard case	CF-21; also holds CP-11
AC adapter	NC-94A

Top view

Front view

Side view
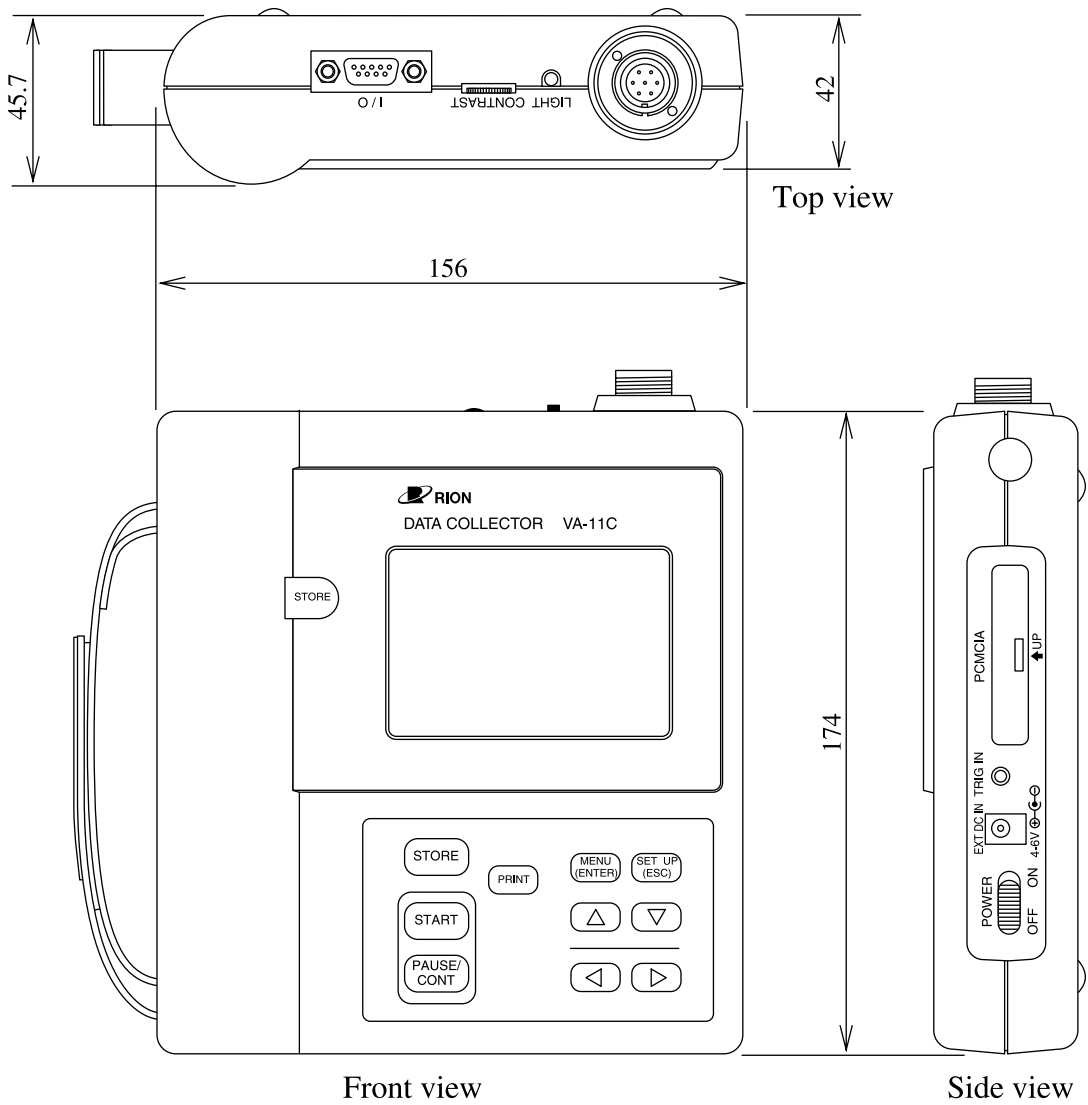
Unit: mm

Dimensional drawing of DATA COLLECTOR VA-11C