

# VC-2100 Vibration Comparator

## Simple Operation Manual

---



# VC-2100 Operation manual

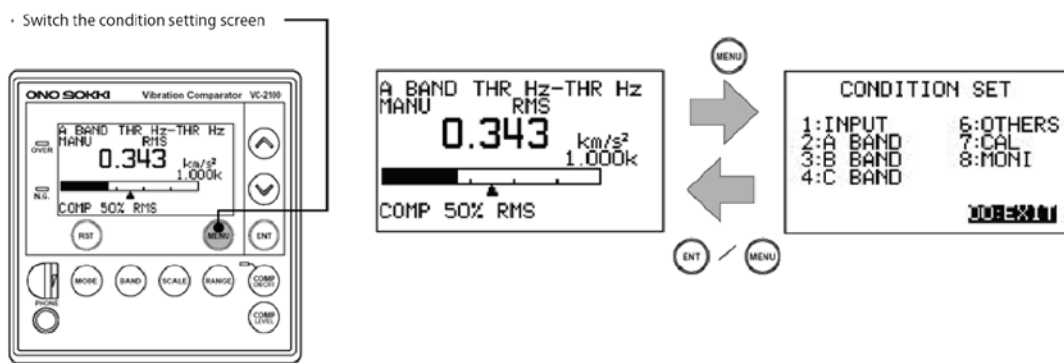
This manual describes the basic setting method for the measurement by the VC-2100 by using the NP-3331 Accelerometer. Although there is a method for direct setting with the key switch on the front panel, this manual describes the method by using the menu screen. Please refer to the instruction manual for detailed function and setting.

## ■Condition setting screen (CONDITION)

When the power is turned ON, the measurement screen is displayed. The switching method for the measurement screen, please refer to the (22) and (23).

1. Open the CONDITION SET with the MENU key.

The screen is returned to the measurement screen when ENT key or MENU key is pressed while CONDITION SET menu is displaying and the set the cursor to 00: EXIT.



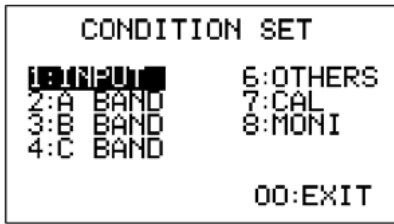
## CONDITION SET Setting contents list

| Item      | Setting contents                             |
|-----------|--|
| 1: INPUT  | Setting the input condition                  |
| 2: A BAND | Setting the A band condition                 |
| 3: B BAND | Setting the B band condition                 |
| 4: C BAND | Setting the C band condition (option VC-252) |
| 6: OTHER  | Setting the condition common to each band    |
| 7: CAL    | Output the reference calibration signal      |
| 8: MONI   | Check the input gain and protect condition   |

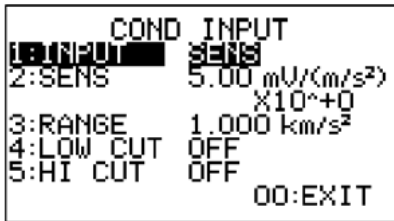
Each item of CONDITION SET menu screen is opened by selecting the item with  $\wedge$   $\vee$  keys and press ENT key. Set the condition in the order of item.

■ Input condition setting screen (COND INPUT SET)

(2) Condition setting screen (CONDITION INPUT)



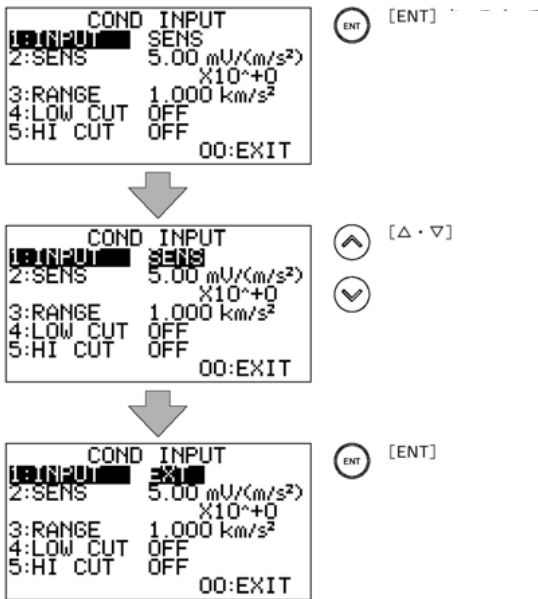
Move the cursor to 1: INPUT with the  $\wedge$   $\vee$  keys and press ENT key to open the COND INPUT SET menu.



Each item list of the COND INPUT menu

|             |  |
|-------------|--|
| 1 : INPUT   | Switch the input signal (SENS→EXT)               |
| 2 : SENS    | Sensor sensitivity setting                       |
| 3 : RANGE   | Input full scale range setting                   |
| 4 : LOW CUT | Analog low pass filter setting (off/10Hz)        |
| 5 : HI CUT  | Analog high pass filter setting (off/1kHz/10kHz) |

(3) Switching the input signal (1: INPUT)



Move the cursor to the 1: INPUT by  $\wedge$   $\vee$  keys and press ENT key. The cursor is moved to the setting (SENS or EXT). The SENS and EXT are alternately displayed by pressing the  $\wedge$   $\vee$  keys. When the NP-3331 accelerometer is connected, press ENT key to confirm.

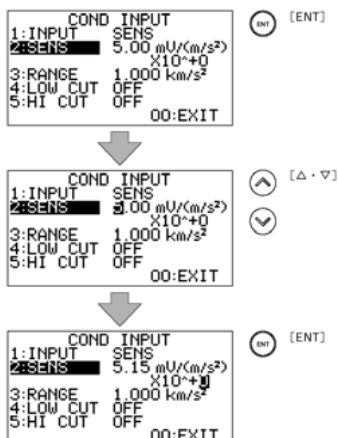
• SENS:

Using when the constant current supply sensor (for 2mA) such as NP-3331 accelerometer is connected.

• EXT:

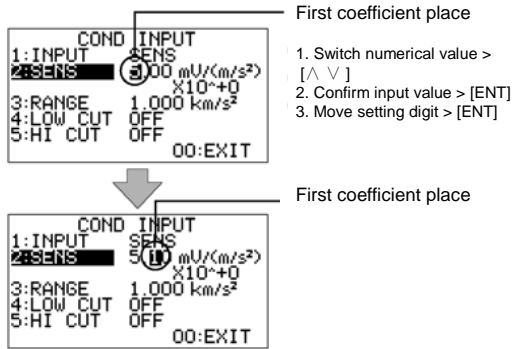
Using when the voltage signal ( $\pm 5V$ ) is inputted.

(4) Setting the sensor sensitivity (2 : SENS)



Move the cursor to 2: SENS by pressing  $\wedge$   $\vee$  keys and press ENT key.

The cursor is moved to the front of the setting number. Each line of the numerical value is selected by pressing ENT key after selecting the number with the  $\wedge$   $\vee$  keys.

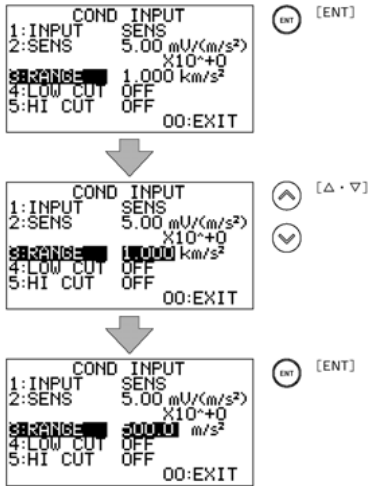


- First coefficient place
1. Switch numerical value > [Δ ∇]
  2. Confirm input value > [ENT]
  3. Move setting digit > [ENT]

Set the sensitivity which is written in the calibration chart attached to the NP-3331.

(Ex.)  
The setting value in 5.00mV/m/s<sup>2</sup> is 5.00mV/(m/s<sup>2</sup>)×10<sup>+0</sup>

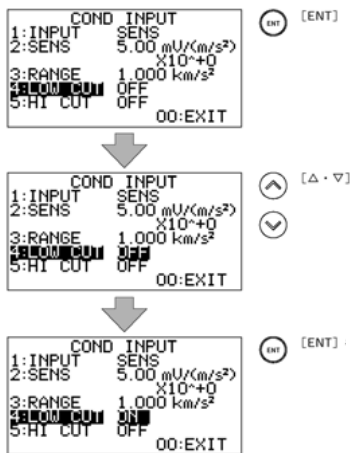
(5) Inputting the input range (3. RANGE)



Move the cursor to 3: RANG by pressing the Δ ∇ keys and press ENT key.  
The cursor is moved to the currently selected input range, so move the cursor to the range to be selected with the Δ ∇ keys, and press ENT to confirm it.

From the (4) SENS setting, the input voltage range is displayed with the unit of m/s<sup>2</sup> which is converted from the voltage (V). Set to a value that the bar indicator does not exceed during measurement.

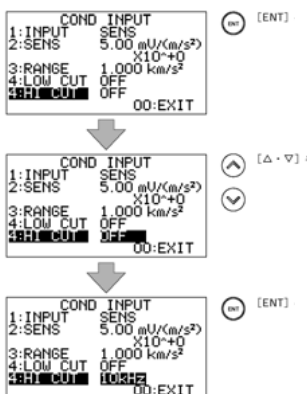
(6) Setting of the low pass filter (4: Low CUT)



Move the cursor to the 4: LOW CUT with the Δ ∇ keys and press ENT key.  
The cursor is moved to the currently setting condition, ON or OFF is alternately displayed with the Δ ∇ keys.

- OFF: Filter OFF
- ON: 10Hz High pass filter ON

(7) Setting of the high pass filter (5 : HI CUT)



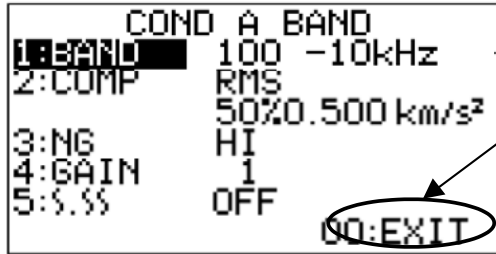
Move the cursor to the 5: HI CUT with the Δ ∇ keys and press ENT key.  
The cursor key is moved to the current setting condition, so select the condition with the Δ ∇ keys and press ENT key to confirm.

- OFF: Filter off
- 1 kHz: 1 kHz low pass filter on
- 10 kHz: 10 kHz low pass filter on

<Note>

LOW CUT and HI CUT analog filters are the function which removes the unnecessary signal beforehand from the input signal before calculation such as effective value calculation. This setting is given priority over the band condition setting (band pass).

(8) Returning to CONDITION SET

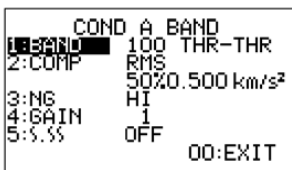
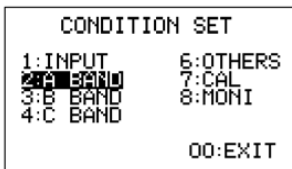


Move the cursor to the 00: EXIT and press the ENT key.

Press the  $\wedge$   $\vee$  keys to select 00: EXIT which appears in the lowest section and press ENT key.

■A band condition setting screen (COND A BAND)

(9) Move the cursor to 2: A BAND or 3: B BAND (or 4: C BAND option) with the  $\wedge$   $\vee$  keys in the CONDITION SET menu and press ENT key. The setting operation for them is the same, so explain with 2: A BAND in here. When select 2: A BAND, COND A BAND menu is displayed.



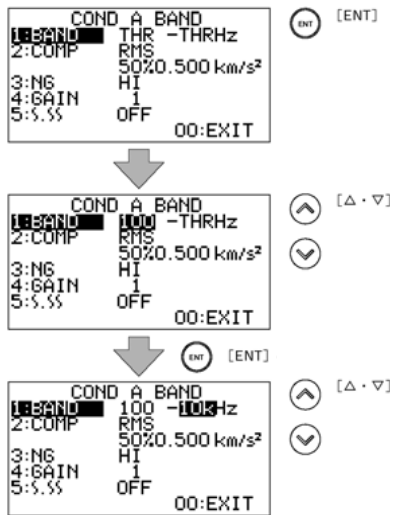
A BAND setting contents list

|                     |   |
|---------------------|---|
| 1: BAND             | Frequency band setting                                    |
| 2: COMP             | Comparator mode/ comparator level setting                 |
| 3: NG               | NG logic setting (More or less than judgment level is NG) |
| 4: GAIN             | Band gain setting for each band                           |
| 5: $\int \int \int$ | Use for measuring speed or displacement (option VP-0251)  |

<Supplement>

A signal from the accelerometer passes through the input condition setting analog filter. Also BAND processing (band pass: frequency band limit) which is selected in the COND A BAND setting menu is performed for the signal and effective value calculation, peak calculation are processed. The vibration acceleration value becomes smaller when the band is limited. The full scale in the bar indicator can be changed with the (13) band gain in order to supplement this phenomenon.

(10) Frequency band setting (1: BAND)



Move the cursor to the 1: BAND with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the current selected lower limit frequency (HPF) of the band pass.

Select the value with the  $\wedge \vee$  keys (it changes in order of THR→100→300→500→1k→3K→5k→10kHz →THR··) and press ENT key to confirm it.

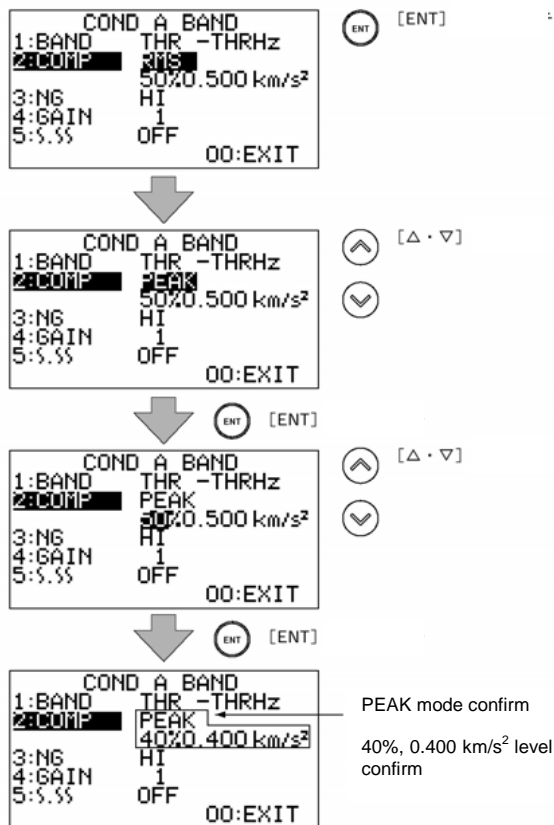
The cursor is moved to upper limit frequency (LPF), so select the value with the  $\wedge \vee$  keys and press ENT key to confirm it.

The figure shows the setting example of 100 Hz to 10 kHz band pass.

HPF: THR (off), 100 Hz, 300 Hz, 500 Hz, 1 kHz, 3 kHz, 5 kHz, 10 kHz

LPF: THR (off), 100 Hz, 300 Hz, 500 Hz, 1 kHz, 3 kHz, 5 kHz, 10 kHz

(11) Setting of comparator (2: COMP)



Move the cursor to 2: COMP with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the current selected measurement mode.

Select the value with the  $\wedge \vee$  keys (it changes alternately with RMS > PEAK) and press ENT key to confirm it. The cursor moves to the numerical value of the level, so it can be changed with upper and lower key digit by digit. Press ENT key to confirm. The full scale of the bar indicator is 100%. The number after % indicates the unit system which is converted from full scale.

When the RMS is selected, PEAK is selected by the effective value of the signal passed through the band pass, the instantaneous value of the signal passed through the band pass is taken as an absolute value, and the value is compared.

The figure shows the setting example of following settings;

Comparator mode: PEAK

Comparator level: 40% (0.4000 km/s<sup>2</sup>)

<Supplement>

The RMS setting is related to the time constant setting in the COND OTHERS which is explained in the following. Also, please refer to the other manual for the comparator operation.

(12) Setting of comparator logic (3: NG)

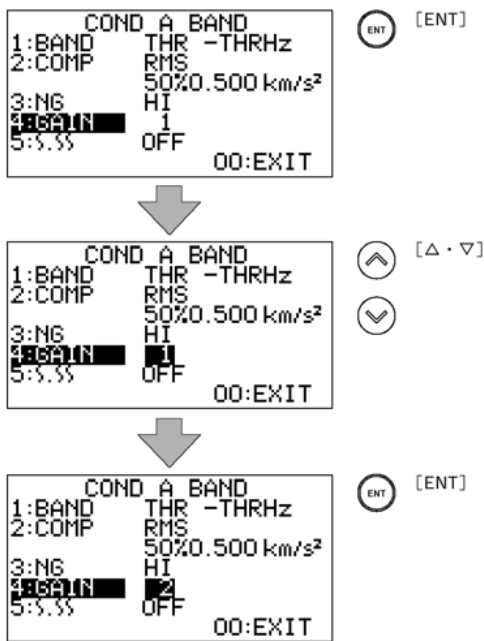


Move the cursor to 3: NG with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the current selected logic setting.

Select HI or LOW with the  $\wedge \vee$  keys and press ENT key to confirm.

Select HI: Output NG judgment when the measurement value is selected value or more.  
 Select LOW: Output NG judgment when the measurement value is selected value or less.  
 The figure is selecting LOW.

(13) Setting of band gain (4: GAIN)

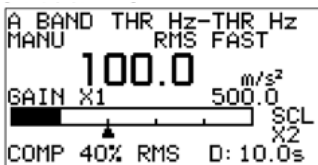


Move the cursor to 4: GAIN with the  $\wedge \vee$  keys and press ENT key.

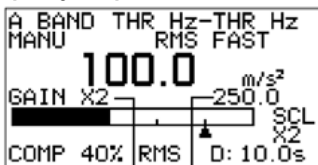
The cursor is move to the current selected GAIN (magnification).

Change the value with the  $\wedge \vee$  keys ( $x1 > x2 > x5 > x1 > \dots$ ) and press ENT key to confirm. GAIN can be selected for each band (A, B, C).

[Band gain: x1]

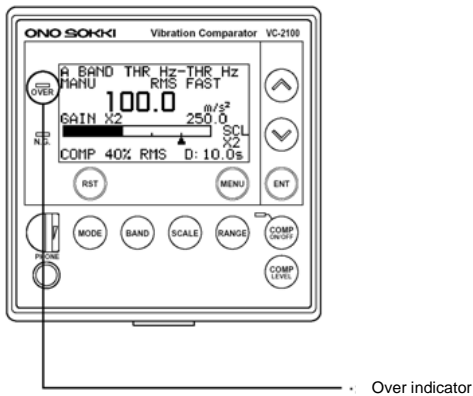


[Band gain: x2]



Input range value: 250.0 m/s<sup>2</sup>  
 Band gain: x2

When the band gain is changed from x1 to x2, and the full scale of the bar indicator is in the setting of (5) Input range (for example, 500 m/s<sup>2</sup> becomes 1/2 of 250 m/s<sup>2</sup>) and the sensitivity is increased.



<Note>

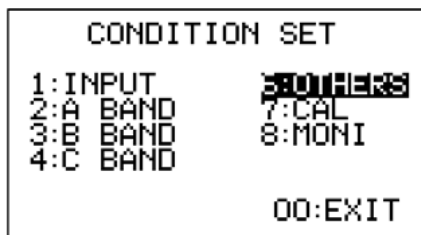
When make the GAIN excessively large, the over indicator is lit in red. The data which is obtained in this condition has no reliability. The comparator level setting changes as well because it is % display.

(14) Return to the CONDITION SET menu

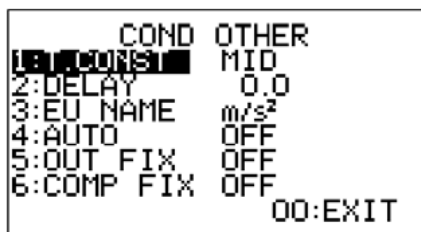
Continue to set the B BAND (C BAND option). Press the  $\wedge$   $\vee$  keys to set the cursor to 00: EXIT and press ENT to return to the CONDITION SET menu.

■Setting of common condition of each band (COND OTHERS)

(15) Open the COND OTHERS menu



Select the cursor to 6: OTHERS with the  $\wedge$   $\vee$  keys and press ENT key to open the COND OTHERS menu.



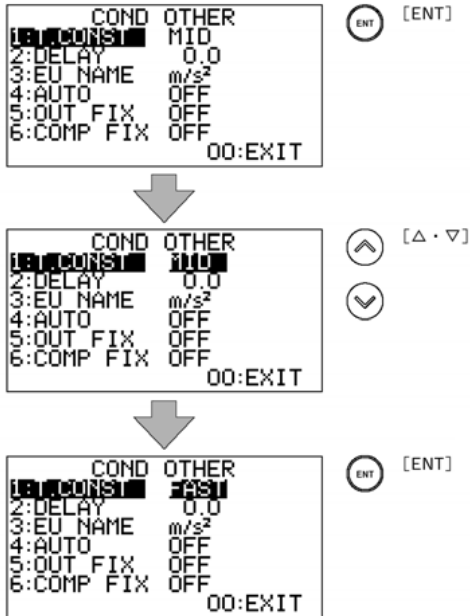
COND OTHER setting contents list

|             |  |
|-------------|--|
| 1 : T.CONST | Time constant setting for effective value calculation (MID/LOW/FAST) |
| 2 : DELAY   | Setting of comparator delay time                                     |
| 3 : EU NAME | Unit setting (m/s <sup>2</sup> , EU)                                 |
| 4 : AUTO    | Setting of automatic drive   |
| 5 : OUT FIX | Setting the relation of analog output and measurement display screen |
| 6 : COM FIX | Setting the relation of comparator mode and measurement mode         |



(16) Time constant setting for effective value

calculation (T.CONST)



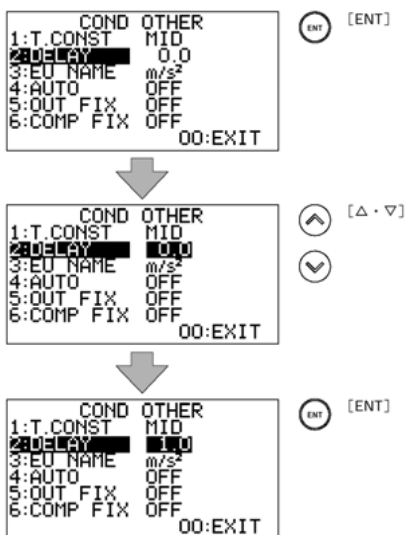
Select the cursor to 1: T.CONST with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the current selected time constant.

Select the value with the  $\wedge \vee$  keys (display is switched as FAST > MID > SLOW > FAST...in this order) and press the ENT key to confirm.

FAST: 0.125s  
MID: 0.25s  
SLOW: 1.0s

The larger the time constant, the slower the response and will be averaged.

(17) Setting of comparator delay time (2: DELAY)

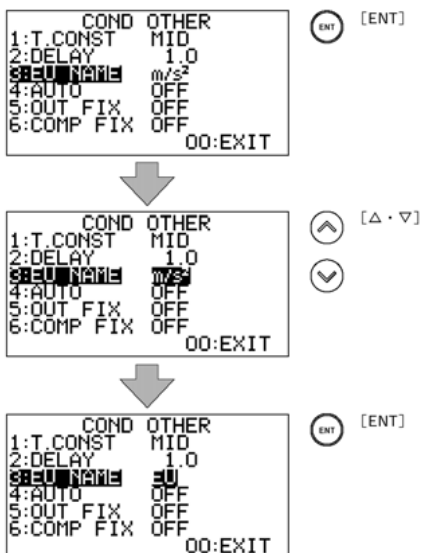


Select the cursor to 2: DELAY with the  $\wedge \vee$  keys and press ENT key.

The cursor is moved to the currently selected delay time. Select the value with the  $\wedge \vee$  keys (0 > 0.5 > 1.0 > 1.5 > 2.0 > 3.0 > 4.0...) and press ENT key to confirm.

By setting the comparator delay time, a judgment becomes available only when the judgment level or more vibration is continued for more than selected time. (Setting of delay time up to judgment is available.)

(18) Setting of the unit (3: EU NAME)

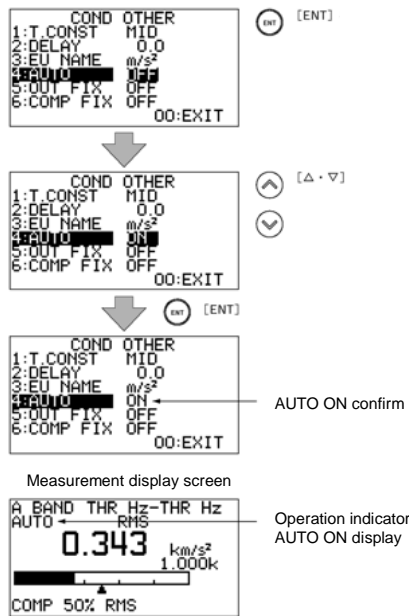


Move the cursor to the 3: EU NAME with the  $\wedge \vee$  keys and ENT key. The cursor is moved to the currently selected cursor.

Select the unit with the  $\wedge \vee$  keys and press ENT key to confirm.

<Note> The integration function (option) is only available when the unit is m/s<sup>2</sup>.

(19) Setting of automatic drive (4: AUTO)

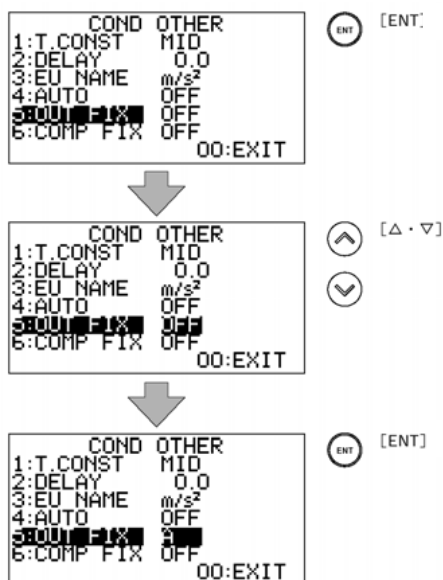


Move the cursor to 4: AUTO with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the currently selected condition. The condition is changed every time you press the  $\wedge \vee$  keys (ON > OFF). Select the condition and press ENT to confirm it. When ON is selected the control of the comparator judgment is available with the GATE terminal on the rear panel.

- OFF: Manual operation
- ON: Automatic operation

Terminal between No. 8 and 9 on the rear panel  
Short-circuit: Operation of comparator  
Open state: NO operation of comparator

(20) Condition setting of display screen and output signal (5: OUT FIX)

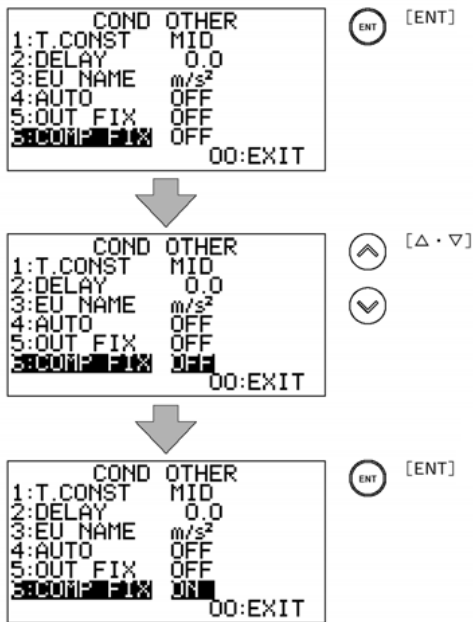


Move the cursor to the 5: OUT FIX with the  $\wedge \vee$  keys and press the ENT key. The cursor is moved to the currently selected condition. Select the condition with the  $\wedge \vee$  keys (condition is changed in order of OFF > A > B > OFF...) and press ENT key to confirm.

When the OUT FIX is OFF (initial setting state), AC or DC voltage signal is output with the currently displayed measurement display screen (A or B band). When the A or B is selected, it is fixed to the BAND regardless of the display screen. For example, you can display B band while recording the A band signal. The figure is the setting when the A band is fixed.

- OFF: Linked to the measurement screen
- A: Fixed to the A band
- B: Fixed to the B band

(21) Independent setting of comparator mode and measurement mode (6: COMP FIX)



Move the cursor to the 6: COMP FIX with the  $\wedge \vee$  keys and press ENT key. The cursor is moved to the currently selected condition. Select the condition with the upper and lower key (ON > OFF) and press ENT key to confirm it.

When COMP FIX is OFF, the comparator judgment is performed in the currently displayed measurement mode (display value) screen. When it is ON, the setting is fixed with the (11) 2: COMP. We recommend you to confirm the setting after turning the COMP ON.

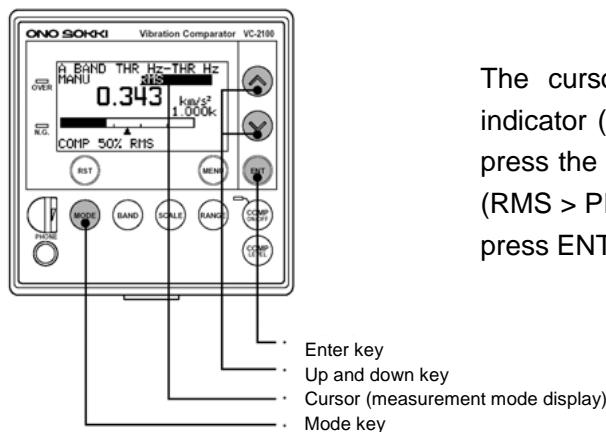
The figure is when the setting is ON.

OFF: Linked with the measurement mode of the screen display

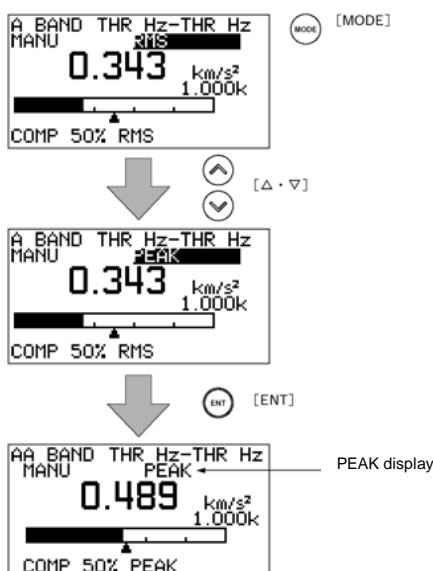
ON: Fixed with the (11) setting

■ Switching the measurement screen

(22) Switching method of the measurement mode

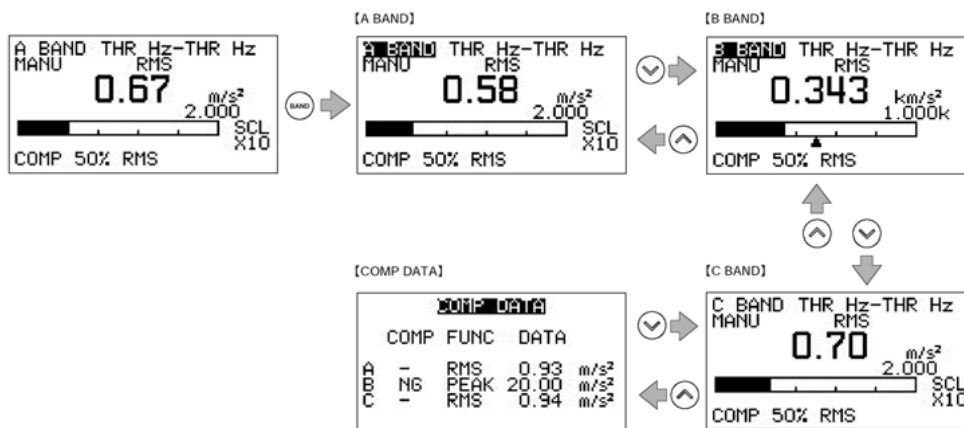


The cursor is moved to the measurement mode indicator (such as characteristics of RMS) when you press the MODE key. Select the measurement mode (RMS > PEAK > MAX > HOLD > PEAK HOLD...) and press ENT key to confirm it.



| Measurement mode | Measurement content  |
|------------------|--|
| RMS              | Calculate the effective value according to the time constant (FAST: 0.125s, MID: 0.25s, SLOW: 1s) and display the effective value at every 0.5s.   |
| PEAK             | The absolute value of the time waveform between 0.5s and its peak value are measured and displayed.  |
| MAX HOLD         | Store and display the maximum value of RMS after pressing the RESET key. To operate measurement again, press RESET key again. (Hold the maximum value of RMS)  |
| PEAK HOLD        | The maximum value and absolute value of the time waveform immediately after pressing the RESET key are saved and displayed. To re-measure, press the RESET key again. (Hold the maximum value of PEAK) |

(23) Switch the band of the measurement display screen (BAND key)



When pressing BAND key on the front panel, the screen is moved to the band mode display character of the measurement display screen. The display is changed in the following order every time you press the  $\wedge \vee$  keys: A BAND > B BAND > C BAND (option) > COMP DATA .... (When ENT key is pressed at this time, the cursor is moved to the frequency and entering to the BAND setting menu. Press the ENT key again to exit. Please refer to the instruction manual for the details.) Press BAND key again to return to the initial screen of A BAND.

END