

# TENMARS

## ST-141 Dual Channel Vibration Meter ST-141D Recording 2-Channel Vibration Meter User's Manual



HB2TM1410000



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## 1 Introduction

This meter can measure the vibration by the rotator and the reciprocator, as well as the damage of bearings. The items include acceleration, velocity, and displacement; through the meter, you can determine if to repair or renew the machines.

## 2 Accessories

- 1 Meter
- 1 User's Manual
- 2 Accelerometer
- 2 Low noise cable
- 2 Magnetic base
- 6 1.5V LR6/AA battery
- 1 Carrying case
- 1 9V AC to DC adaptor
- 1 USB cable and Installation disk (ST-141D)
- 1 Handheld probe + round probe + pointed probe

## 3 Safety Precaution

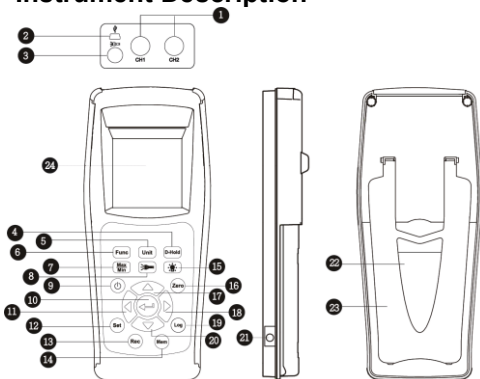
	Caution! Please refer to this manual. Improper use may damage the meter and its components.
	Complies with European Directive

- Do not operate in environments with flammable gas or humid environments.
- Operating altitude: up to 2000M.
- Operating environment: Indoor use; Pollution degree 2.
- Clean with soft cloth when dirty, such as glasses cloth. Do not clean with chemicals and other solvents.

EMC: EN61326-1:CISPR 11:Group 1, Class B






- ◇ Class B—Equipment for use in all establishments other than domestic.
- ◇ Group 1—RF energy generated is needed for internal functioning.





## 4 Instrument Description





- |  |  |
|--|--|
| 1. Accelerometer input                     | 13. Single record function button              |
| 2. USB port (ST-141D)                      | 14. Access record function button              |
| 3. Led working light                       | 15. Backlight function Button                  |
| 4. Freeze window function button           | 16. Zero setting function button               |
| 5. Unit selection function button          | 17. Up / acceleration HI function button       |
| 6. Function selection button               | 18. Rightward function button                  |
| 7. Maximum / minimum value function button | 19. Automatic recording function button        |
| 8. LED working light function button       | 20. Downward / acceleration LO function button |
| 9. Determining function button             | 21. External power of DC 9V                    |
| 10. Power switch function button           | 22. Battery cover                              |
| 11. Leftward function button               | 23. Tilt stand                                 |
| 12. Setting function button                |  |

## 5 Operation

1. Assemble the accelerometer and the magnet base. Lock one end of the cable, and mount the other end of the cable on the accelerometer input of the meter. Then, make the accelerometer suck against the DUT (device under test).
2. The other way is to assemble the accelerometer and the handheld probe. Lock one end of the cable, and mount the other end of the cable to the accelerometer input of the meter. Then, take the probe with hand and detect the DUT.
3. In boot state, press  to turn on or off, press  for more than 1 second to disable the function of automatic shutdown, the automatic shutdown sign on the LCD will also disappear.  
\* In setup mode, the power cannot be turned off. Please exit the setup mode in advance.
4. Press  to select the measurement mode: Acceleration (ACC) True root mean square value (RMS) → Acceleration (ACC) Peak value (PEAK) → Velocity (VEL) True root mean square value (RMS) → Velocity (VEL) Peak value (PEAK) → Displacement (DISP) peak to peak value (PP). Every time when button is pressed, the measurement condition is switched.
5. In the acceleration (ACC) measurement mode, press  or  to select HI or LO range (For the measured frequency, HI range is 10Hz ~ 5KHz, LO range is 10Hz ~ 1KHz.), The measurement is through the filter circuit and complies to ISO 2954.

6. Press  to select the measurement unit. Every time when  is pressed, the measurement condition is switched.
7. Read the measured value displayed on the LCD.
8. Press  for more than 1 second to turn on the LED working light as auxiliary lighting; quickly press  to disable this function.


### 5.1 Turn on the backlight

In boot state, press  to light on the backlight; press  again to turn off the backlight function.



\*The backlight will auto turn off after it is lighted on for 15 seconds.

\*If the meter is connected with an external power supply, the backlight will turn on automatically.





### 5.2 Manual recording for each single data file

Press  to save one data file, then LCD will display the "REC" sign and its final file number, for example: 0001. Every time when the button is pressed, the file number is plus 1.





### 5.3 Record for a long time

Press  to start for a long time recording; at the moment, LCD will display the "REC" sign and disable the automatic shutdown function. Press  for more than 1 second to cancel the long time recording. For the sampling time, please read the step 2 in the section 5.10 function settings.



## 5.4 Access the data recorded in the memory

For accessing the recording data, please first press , LCD will display "MEM" sign at the moment; then enter the memory reading mode to access the data file in the memory. Press / to switch the data file, press  again to exit this mode.

## 5.5 Lock the maximum and minimum reading


In the measurement mode, press , both MAX / MIN start at the same moment. Every time when  button is pressed, the mode will be displayed according to the cycle of . Press  for more than 1 second to stop the function.

## 5.6 Freeze window function

Press  to freeze the window and stop updating the temperature reading value. And then press  for more than 1 second to cancel the freezing window.

\*In addition to the power button, backlight button, working light, all other buttons are invalid.

## 5.7 Automatic shutdown function

The device will automatically turn off after 15 minutes if no action. Press  for more than 1 second to turn on or off the automatic shutdown function



## 5.8 Zero function

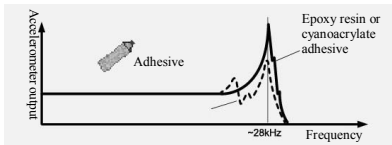
In the measurement mode, press **Zero** to turn on the zero function, and press **Zero** again to turn off the zero function.



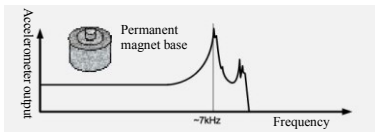
1. In the measurement mode, press **Zero** for more than 1 second to enter the zero setting.
2. Press **Func** to select the zero function, press **Left** or **Right** to select the zero channel.
3. Press **Enter**, this meter will automatically access the desired zero value and display it on the LCD.
4. After setting, press **Zero** again to exit the zero setting and enter the measurement mode.

## 5.9 Installation of accelerometer

If you need to set up a permanent measurement point on a machine, but you expect not to drill any hole on the machine, you may use the stud of bonding type which can be fixed with a rigid adhesive on the measurement point. We recommend using the epoxy resin type or the cyanoacrylate adhesive type, because the soft adhesive type will significantly reduce the valid frequency range of the accelerometer.

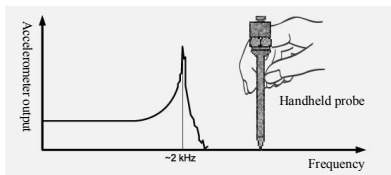


If the measuring point is a plane, you may use the permanent magnet base to achieve a simple installation. However, this method will make the resonant frequency of the test accelerometer reduced to 7kHz; therefore, it cannot be applied on the measurement of more than 2kHz. The suction force of the magnet can withstand vibration force up to 1000 - 2000m/s<sup>2</sup>, which is dependent on the size of the accelerometer.





If the accelerometer is mounted on the top of a handheld probe, it can help the rapid measuring work. Because the overall stiffness reduces, the

considerable tolerance in measurement will arise. Do not expect the repeatable results. In order to limit the measurement range to be about 1000Hz, the low-pass filter should be used.



## 5.10 Function settings






Press  for more than 1 second to enter the setting mode.

Press  to exit this mode.

### Step 1. Set the year, month, date and time:





1. Enter the setting mode of year, month, date and time.



2. Press  or  to select the item to be corrected; the number of the selected item will flash.
3. Press  or  to modify the preset value.
4. Press  again to enter step 2.

## Step 2. Set the auto recording time:





1. Press  or  to select the items to be corrected.
2. Press  or  button to modify the auto recording time.

Press  button again to enter step 3.

## Step 3. Erase single data file saved in the memory:

1. If no record, this step will be automatically disable.
2. Entering the single data file mode, the LCD displays the total number of data files, and the "onE" sign will flash.





3. Press  to clear one data file.
- Press  button again to enter step 4.

### Step 4. : Erase the all data files recorded in the memory:

1. If no record, this step will be automatically disable.
2. Entering the all data file mode, both the total number of data files on the LCD displays and the “onE” sign will flash.






Press , both the total number of data files on the LCD displays and the “CLR” sign will flash; then, press  button again to enter step 5.

### Step 5. Return to the original default settings

- 1 The RESET sign “no” flashes on the LCD displays



- 2 Press   to determine whether to return to the factory settings.
- 3 The RESET sign “YES” will flashes on the LCD display. Press  again to confirm the factory settings and return to step 1.

## 6 Software Installation:

OS: XP/Windows7/Windows 8.1/Windows10

Download the PL-2303 software:

- Install the CD into the PC to install the software first.
- Execute the program of PC desktop software:




- Connect the USB cable to connect the meter and the computer according to the drawing.



- Select the desktop icon and click twice on left key of the mouse to run the procedure.



## 7 General Specifications

- The maximum dots of liquid crystal display (LCD): 1999.
- Measurement items: VEL (velocity), /ACC (acceleration), /DISP (displacement)
- Function: acceleration (RMS, PEAK, MAX, min) .
- velocity (RMS, PEAK, MAX, min).
- displacement (P-P, MAX, min , P-P).
- Unit: acceleration:  $m/s^2$ ,  $g$ ,  $ft/s^2$ .
- velocity:  $mm/s$ ,  $cm/s$ ,  $inch/s$ .
- displacement:  $mm$ ,  $inch$ .
- Frequency characteristics:  
LO range: 10hz ~ 1khz. meet the international standard ISO 2954-2012.  
HI range: 10hz ~ 5khz.
- Auto power off and disable auto power off.
- Over load sign: "OL"
- The manual recording can be saved up to 199 data files (ST-141), or the manual recording plus automatic recording can be saved up to 15000 data files (ST-141D).
- Low battery status: "  " symbol.
- Battery: 1.5V×6 pcs. (LR6 SIZE AA 1.5V).
- Battery life: about 80 hours (alkaline battery).
- Operating consumption current: less than 30mA @ 9V.
- Operating temperature of the accelerometer: -20°C to 70°C.
- Operating temperature and humidity of the meter: -10°C to 50°C, less than 80% RH.
- Storage temperature and humidity: -10°C to 60°C (14°F to 140°F), < 70%RH
- Weight: about 730 g (including protective cover and accelerometer).
- Dimension: 240 (L) x 100 (W) x 45 (H) mm.
- AC to DC Adaptor

External AC 100~240V converted to DC 9V/0.5A power supply  
Plug: The connection pin in the center is the positive electrode, and the outer case is negative.  
Diameter: 5.5mm; inner diameter: 2.1mm



## 8 Electrical Specification:

The environmental temperature range of measurement:  
23±3°C

Acceleration ACC (RMS, PEAK, MAX HOLD) 1g = 9.81m/s<sup>2</sup>

Range	0.5~199.9 m/s <sup>2</sup>	0.05~20.3 9g	2~656 ft/s <sup>2</sup>
Resolution	0.1 m/s <sup>2</sup>	0.01g	1 ft/s <sup>2</sup>
Accuracy	±(5%+5d) @79.4Hz and158Hz	±(5%+5d) @79.4Hz and158Hz	±(5%+5d) @79.4Hz and158Hz
Calibration point	50m/s <sup>2</sup> (158Hz)	50m/s <sup>2</sup> (158Hz)	50m/s <sup>2</sup> (158Hz)

Velocity VEL (RMS, PEAK, MAX HOLD)


Range	0.5~199.9 mm/s	0.05~19.99 cm/s	0.02~7.87 inch/s
Resolution	0.1 mm/s	0.01cm/s	0.01inch/s
Accuracy	±(5%+5d) @79.4Hz and158Hz	±(5%+5d) @79.4Hz and158Hz	±(5%+5d) @79.4Hz and158Hz
Calibration point	50mm/s (158Hz)	50 mm/s (158Hz)	50 mm/s (158Hz)

Displacement DISP (P-P, MAX HOLD P-P)

Unit	mm	inch
Range	0.005~1.999mm	0.002~0.078inch
Resolution	0.001 mm	0.001 inch
Tolerance	±(5%+5d) @79.4Hz and158Hz	±(5%+5d) @79.4Hz and158Hz
Calibration point	0.141mm(158Hz )	0.141mm(158Hz)



## 9 Maintenance or Repair

1. When the LCD shows the symbol “”, it means that the electric quantity is low, please replace with batteries immediately to ensure accuracy.
2. When the meter is dirty, please wipe it with a soft cloth, such as glasses cloth, and do not wipe it with chemical solvents.
3. If not using for a long time, please remove the batteries to prevent the leakage of battery electrolyte solution which will corrode the internal components.
4. If fault on the meter, it can only be sent to the service suppliers who are authorized, or sent back to the original factory for maintenance.

## 10 Battery Replacement

1. Turn off the power.
2. Open the bracket and the battery cover on the back of meter, and remove the batteries.
3. Install six new batteries of AA type and comply with the polarity positions of positive and negative.
4. Install the battery cover and the bracket back.

## 11 Product Disposal



Caution: This symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal.





# TENMARS



## **Professional Electrical and Environment Test & Measurement Instruments:**

LED light meter, Temperature & Humidity meter, Infrared Thermometer, Sound level meter, Light meter, EMF meter, UV Light meter, RF meter, Hot wire Anemometer, Co meter, Anemometer, Lan cable tester, Co2 meter, Solar power meter, Radiation meter, Clamp meter, Multimeter, Phase Rotation test, Digital Insulation tester

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