TENMARS

Coating Thickness Tester

TM-292

User Manual

HB2TM2920001

Table of contents

1 Application

This meter is designed to measure the thickness of non-magnetic coatings on magnetic substrates (Fe) and insulating coatings on non-magnetic substrates (NFe). It can automatically identify whether the substrate is magnetic or non-magnetic during measurement.

2 Accessories

1	Coating Thickness Tester	1	Non-ferrous substrates (NFe)
1	User Manual	1	Plastic Sleeve
5	Calibration Foils	1	USB Cable
1	Ferrous substrates (Fe)	1	Carrying Case
2	Alkaline Battery 1.5V AA		

3 Safety Precaution

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

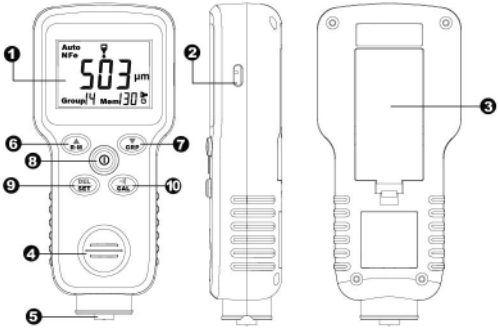
- Do not operate in environments with flammable gas or humid environments.
- Operating altitude: up to 2000M.
- Operating environment: Indoor use; Pollution degree 2.
- Clean with soft cloth when dirty, such as glasses cloth. Do not clean with chemicals and other solvents.

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

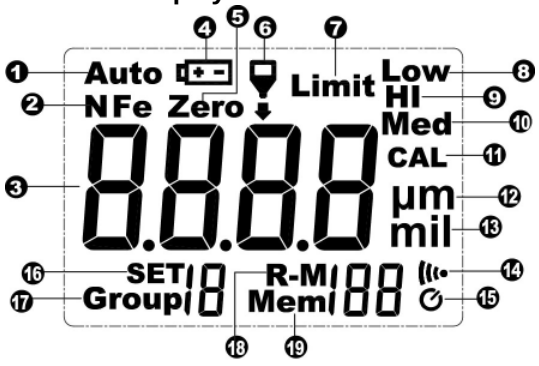
4.1 Feature and Function



1. LCD display	2. USB port
3. Battery cover	4. Measurement reference point
5. Probe	

No.	Button	Press	Press and hold
6.	R-M	Digit increase / Switch option	(**Mem**) Read memory
7.	GRP	Digit decrease / Switch option	Switch **Group**
8.	⏻	Power on/off	Cancel or Start ↻ auto power off
9.	DEL SET	Delete single record or confirm digit	Function settings
10.	CAL	Sound on/off or switch digit bit	Calibration mode

4.2 LCD Display

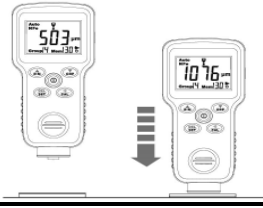
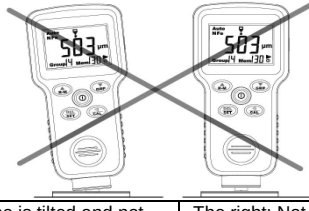


1.	Auto identify substrate	11.	Calibration mode
2.	Non-ferrous substrate (NFe)	12.	Metric units
3.	Readings	13.	Imperial units
4.	Battery low	14.	Buzzer
5.	Zero calibration	15.	Auto power off
6.	Measurement and calibration	16.	Function settings
7.	Limit exceeded alarm	17.	Record group
8.	Low point of calibration	18.	Read memory
9.	High point of calibration	19.	Number of records
10.	Middle point of calibration		

5 Operation

5.1 Measurement

1. Press ⏻ to power on and enter measurement mode.
2. Place the probe vertically and firmly on the surface to be measured. A beep will sound after the measurement is completed, and the reading will be automatically locked and saved.
3. **Measurement Mode:**
   - Pressing the probe for less than 2 seconds performs a single measurement.
   - Holding the probe for more than 2 seconds activates continuous measurement.

Correct

Incorrect

The left: Probe is tilted and not completely pressed. / The right: Not completely pressed.

⚠	When the LCD displays Err, it may indicate: 1. The measured substrate is neither Fe nor NFe. 2. The setting is Fe but the measured substrate is NFe, or vice versa.

5.2 Power On/Off

Press ⏻ to power on or off the meter.

⚠	When powered on, the last saved reading before shutdown will be displayed.

5.3 Calibration (CAL)

⚠	If no operation is performed within 15 seconds, the device will automatically return to measurement mode.

There are four calibration points to select (Zero/Low/Med/HI).

5.3.1 Zero Calibration:

⚠	Before measuring different substrates, be sure to perform a zero calibration on an uncoated substrate

1. Press and hold CAL. The LCD will display ⬇ and **Zero**, and ⬇ will flash (Figure 1).
2. Place the probe vertically and steadily on a no coating. A beep will sound after approx. (Buzzer on). 3 seconds, indicating successful Zero calibration. LCD will then display Low.
3. Click CAL, or wait for 15 seconds to exit.

Figure 1

5.3.2 Calibration for Low/Med/HI:

⚠	Recommended for improving measurement accuracy across various thicknesses. ※ Zero calibration must be completed first. ※ Calibration points should differ by at least 30 µm (e.g., Low = 50 µm, Med = 100 µm, HI = 150 µm).

1. Press and hold CAL, The LCD will display ⬇ and **Zero**, and ⬇ will flash (Figure 1).
2. Press CAL to switch from Zero to Low. Press again to switch to Med or HI as needed.
3. Place the calibration foil (e.g., 150 µm) on top of an uncoated substrate.
4. Press the probe vertically on the calibration foil. A beep will confirm calibration, and the display shows the 0 (Figure 2).
5. Use the CAL to select the digit position,then use the R-M or GRP to adjust the value until it matches the calibration foil's thickness. (Figure 3)
6. Press the DEL SET to save.

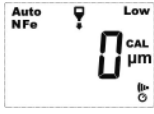


Figure 2

Figure 3

5.4 Function Settings (SET)

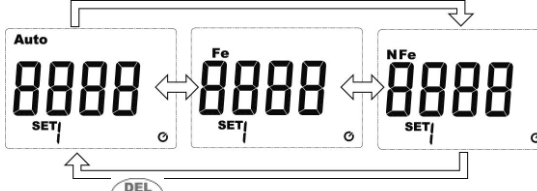
⚠	If no operation is performed within 15 seconds, the system will return to measurement mode.

Press and hold DEL SET, the LCD will display **SET1**. Click DEL SET to switch between SET1-SET5 options. The operations are as follows:

1. Press and hold the DEL SET to display **SET1**.
2. **Press** DEL SET to cycle through **SET1 to SET5.**
3. The description of each setting item is as follows:

SET1. Substrate Selection

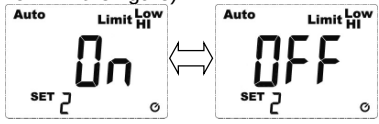
1. Press R-M or GRP to select **Auto**, **NFe**, or **Fe** (as shown in the figure).



2. Press DEL SET to enter **SET2.**

SET2. Alarm Function (Enable/Disable)

1. Press R-M or GRP to set alarm ON or OFF. (as shown in the figure).



2. Press DEL SET to enter **SET3**.
   When enabled, if the measured value exceeds the threshold, a beep and red backlight will activate. (Must be turned on with buzzer and backlight)

SET3. High Limit Alarm (Default: 1000 µm)

1. Press R-M or GRP to adjust value, and press CAL to change digit.

Example: An alarm will sound (if the buzzer is enabled) and the red backlight will flash (if the backlight is enabled) when the measured value exceeds 1000 µm.

2. Press DEL SET to enter **SET4**.

SET4. Low Limit Alarm (Default: 90 µm)

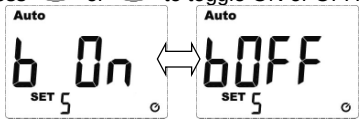
1. Press R-M or GRP to adjust the value, and press CAL to change digit.

Example: An alarm will sound (if the buzzer is enabled) and the red backlight will flash (if the backlight is enabled) when the measured value is below 90 µm.

2. Press DEL SET to enter **SET5**.

SET5. Backlight Function On/Off

1. Press R-M or GRP to toggle ON or OFF.



2. Press and hold DEL SET to exit.

5.5 Group Setting

1. Press and hold GRP, LCD displays **Group**, showing the latest record in the current group.
2. Use R-M or GRP to select Group 1–15.
3. Press and hold GRP to exit.

5.6 R-M Record Reading

1. Press and hold the R-M, LCD displays R-M, showing the latest record in the current group.
2. Use R-M or GRP to browse historical records.
3. Press and hold R-M to exit.

5.7 DEL Delete Single Record

1. Short press the DEL SET, the value on LCD blinks.
2. Press DEL SET again to confirm deletion.

If not confirmed within 15 seconds or before shutdown, the record will not be deleted.

5.8 Clear All Records:

⚠	Warning: This action is irreversible. All records will be permanently deleted.

To clear all stored measurement data, please power off the meter; then, Press and hold DEL SET + ⏻ for more than 1 second to power on the meter.

5.9 Buzzer On/Off

1. Click CAL to toggle ON/OFF.
2. When ON, keypress feedback and alarm sounds are enabled.

5.10 Factory Reset:

⚠	Factory reset will erase all records and cannot be undone. Please operate with caution.

1. With the device **powered off**, press and hold R-M + GRP + ⏻ for over 1 second.
2. LCD displays the startup screen, the LCD will display F CLr for 1 second. the factory reset and memory clearing will be completed. The restored settings are as follows:
   - Substrate: Auto
   - Alarm: OFF
   - Backlight : ON
   - Auto power-off: ON
   - Buzzer: ON
   - Calibration: factory defaults
   - Memory: cleared
   - Unit: µm

5.11 Unit Switching (µm/mil)

With the device **powered off**, press and hold DEL SET + CAL + ⏻ for over 1 second to switch between µm and mil.

5.12 Auto Power-Off Setting

1. While powered on, press and hold ⏻ to toggle auto-off ON/OFF.
2. When enabled, the LCD shows ↻, The device will automatically power off if idle for 3 minutes.
3. Any interaction (measurement or button press) resets the countdown.

6 Software Installation

1. Link website https://www.tenmars.com/

   or scan the following QR code:

1. Search for TM-292.
2. Click on the TM-292 image.
3. Click on "**File Download**" and then select "**Software Download**".
4. Download and unzip the software.
5. For the latest software information and installation instructions, please download **the software installation guide**.

7 General Specifications

- **LCD Display:** Max 2000 count, with white backlight.
- **Over-Range Display:** OL (Over Limit).
- **Substrate Modes:** Fe, NFe, Auto.
- **Auto Power-Off:** Selectable ON/OFF.
- **Sampling Time:** 0.5 seconds per measurement
- **Data Handling**: Automatic reading lock and storage.
- **Calibration:** Zero-point and multi-point.
- **Alarm Function:** Sound and red backlight when exceeding set limits
- **Error Message:** Displays Err if substrate is not Fe/NFe.
- **Memory Capacity:** 15 groups × 130 records = 1950 total.
- **Data Transfer:** Via USB with PC software support
- **PC Software Functions:** Total readings, average, max, min, standard deviation (SD).
- **Battery Life:** Approx. 50 hours.
- **Power Supply:**
  - 2 × 1.5V AA alkaline batteries
  - 5V USB Type-C input
- **Operating Temperature and Humidity:**
  - Temp: 0°C to 40°C (32°F to 104°F)
  - Humidity: ≤ 80% RH (non-condensing)
- **Storage Temperature and Humidity:**
  - Temp: -20°C to 50°C (-4°F to 122°F)
  - Humidity: ≤ 80% RH (non-condensing)
- **Dimensions:** 147 × 65.5 × 33 mm
- **Weight:** Approx. 130g (excluding batteries)

8 Electrical Specifications

Environment Conditions for Accuracy: 23°C ± 5°C, < 80%RH, using the supplied Fe & NFe substrates.

Probe (Sensor)	Fe：Electromagnetic induction NFe：Eddy current effect
Measurement Range	0~2000 µm 0~78.7 mil
Minimum Measurement Area	10x10mm(0.4x0.4 mil)
Minimum Substrate Thickness	0.4mm(0.016mil)
Accuracy	0~1000µm: ±(2% of reading +1.0µm) 0~39.3mil: ±(0.1% of reading +0.04mil) 1000µm and above: ±(5% of reading +1µm) 39.3mil and above: ±(0.2% of reading +0.1mil)
Response Rate	4 seconds
Resolution	0.1µm：(<100µm) 0.01mil:(<10.0mil) 1µm：(≥100µm) 0.1mil:(≥10.0mil)

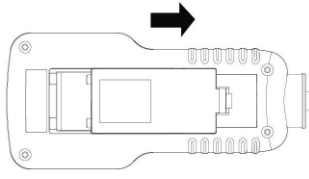
9 Maintenance and Repair

1. When the LCD displays  , it indicates the battery power is low. Please replace the battery immediately to ensure accuracy.
2. Use a soft cloth to clean the meter, such as a glasses cloth. Do not use chemicals or solvents.
3. Please remove the battery to prevent battery leakage and corrosion of internal components if the meter will not be used for more than one month.
4. If the meter malfunctions, it must be returned to an authorized service center or the manufacturer for repair.

10 Battery Replacement

	Caution
⚠	**Warning:** When the battery symbol "🔋"appears on the LCD, please replace the batteries immediately to ensure accuracy and reliable operation.

- Turn off the power.
- Open the battery cover on the back of the meter and remove the batteries.
- Install two new **1.5V AA alkaline batteries**, ensuring correct polarity.
- Close the battery cover.



11 Product Disposal

Note: This symbol indicates that the meter and its accessories must be separated and processed properly.

TENMARS
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Professional Electrical and Environment Test & Measurement Instruments

Battery Impedance, Capacity Tester, Tachometer, LED light meter, Temperature & Humidity meter, Infrared Thermometer, Sound Level Meter, Light meter, EMF meter, UV Light meter, Hot wire Anemometer, Anemometer, Lan cable tester, Co meter, Co2 meter, Solar Power Meter, Radiation meter, Clamp meter, Multimeter, Phase Rotation test, Digital Insulation tester

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