

Film/Coating Thickness Gauge Instruction manual



Version: GM200-EN-02



I. Product Description

This product is a portable coating thickness gauge for fast, accurate and nondestructive measurement of the thickness of non-magnetic coatings (such as paint and film) on magnetic metal substrates. This product has seen wide application in manufacture, metal working, chemical industry, commodity inspection and other fields.

Product Specifications:

Measurement ranges	0 ~1.80mm/0 ~71.0mil
Resolution	0.01 mm/1mil
Measurement error	± (3%H+0.03)mm
Min. diameter of substrate	50mm
Min. thickness of substrate	0.5mm
Power supply	2*1.5V AAA batteries
Operating temperature range	10 ~35°C
Operating humidity range	10-80%RH
Overall dimensions	61.98*30.57*104.99mm
Weight	63.98g(excluding of batteries)

- 2 -

II. Product Functions

1. Thickness measurement of surface coatings on metal substrates
2. Single measurement, continuous measurement and differential measurement available
3. Zero-point calibration, 2-point calibration and basic calibration available
4. Metric and imperial units of measurement optional
5. Automatic shutdown

III. Buttons

1. Key: Power on/off, zero-point calibration .
2. Key: Measurement mode switching and calibration data increment.
3. Key: Measurement unit switching and calibration data decrement.

IV. Measurement of Coating Thickness

1. Press the power-on button in the air to activate

- 3 -

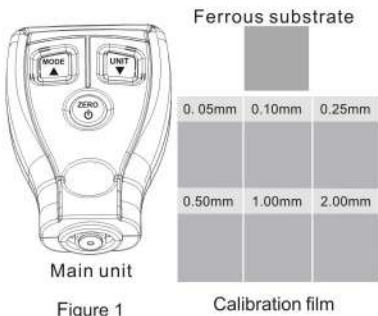
- the LCD screen. You can hear a "BI" sound, indicating that the gauge is ready for measurement. Upon each power-on, the gauge is under single measurement mode by default.
2. Place the probe lightly onto the coating of a metal substrate. The gauge beeps twice. The LCD displays the measured coating thickness value while on its top left corner is a "Fe" symbol.
3. You can press MODE to select measurement mode. Single measurement, continuous measurement and differential measurement are selectable.
4. Single measurement means only one data is measured in each measurement. Under the mode of continuous measurement, the gauge measures thickness incessantly until the probe leaves the substrate surface. In differential measurement, the difference between current measurement and the last measurement is measured.
5. Press UNIT to select the units of measurement. mm, mil can be selected.
6. If you turn on power with the thickness gauge placed on the ferrous substrate, then the LCD will display ERR and the gauge will shut down automatically. This is an indication for incorrect power-on.

- 4 -

V. Calibration Procedures

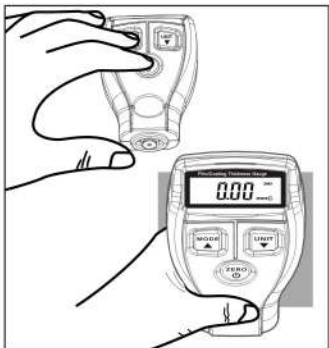
This thickness gauge has three ways of calibration:

1. Basic calibration: Basic calibration is required upon initial use or long-time nonuse of the thickness gauge, or when the substrate material is replaced. There are 7 calibration points and the unit is mm.
- a. Prepare six standard blocks which respectively have their lengths at 0.04~0.06, 0.09~0.11, 0.22~0.28, 0.45~0.55, 0.90~1.05 and 1.90~2.00 in unit millimeter. If the measured coating is on material as zinc, then the zinc substrate is required, and so as to iron block for iron substrate and



- 5 -

- aluminum block for aluminum substrate. However, the diameter of the substrate should be bigger than 50mm. Now we take iron substrate as example to illustrate the process of calibration. (Figure 1)
- b. Remove the probe from the surface. The LCD displays a value about 50mm. Carry out the second calibration by, put the 0.05mm calibration block on the iron substrate. Then lightly press the probe onto the ferrous substrate where the calibration film locates. Beeping twice indicates that calibration of the second point finishes. (Figure 2)



- 6 -

- c. Lightly press the probe onto the ferrous substrate surface without coating. The LCD displays 0.00 and then beeps twice. Carry out 0.00 calibrations. (Figure 3)

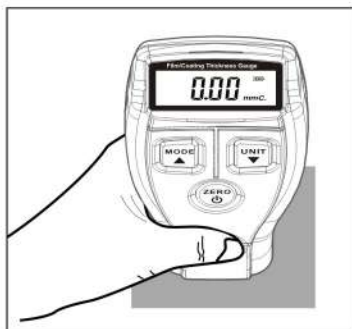


Figure 3

- 7 -

- d. Remove the probe from the surface. The LCD displays a value about 0.05mm. Carry out the second calibration, put the 0.05mm calibration block on the iron substrate. Then lightly press the probe onto the ferrous substrate where the calibration film locates. Beeping twice indicates that calibration of the second point finishes. (Figure 4, figure 5)



Figure 4



Figure 5

- 8 -

- e. Remove the probe from the surface. The third data is displayed on LCD. Calibrate in turns as per the preceding methods until the last calibration film is calibrated. Then the LCD displays OVER, beeps twice and shuts down. Calibration is finished. (Figure 6, figure 7, figure 8, figure 9, figure 10)



Figure 6



Figure 7

- 9 -



Figure 8



Figure 9



Figure 10

- 10 -

- f. After completion of basic calibration, the gauge can be used to measure the thickness of coatings on any materials same to that of the substrates used for calibration.
2. Zero-point calibration: Turn on power of the gauge in the air, lightly press the probe onto the substrate surface and press the ZERO key. The LCD displays 0.00 . Then carry out zero-point calibration.
3. Two-point calibration:
 - a. First carry out zero-point calibration.
 - b. Take a calibration film (1000mm) and get a measured value of 1005mm. Without loosening the probe, press the calibration data increment or decrement key until the LCD displays 1000mm. Then loosen the probe. Zero-point calibration finishes.

VI. LCD and Buttons

1. LCD full screen: (Figure 11)
 - (1). **nFe** : Not used
 - (2). **SNG** : Single measurement
 - (3). **CTN** : Continuous measurement
 - (4). **DIF** : Differential measurement
 - (5). Indicates the measured value

- 11 -

- (6). : Remaining battery power
- (7). **μm** : Not used
- (8). **mil** : A metric unit (1mil=0.0254mm)
- (9). **C** : Under calibration status
- (10). **mm** : An imperial unit (1mm=39.4mil)



Figure 11

2. Components: (Figure 12)

- A. LCD screen.
- B. : Used to switch between measurement modes, or for data increment under calibration status.
- C. : Used to switch between units of measurement, or for data decrement under calibration status.
- D. : Power on/off, zero-point calibration
- E. Probe
- F. Battery door

- 12 -

VII. Other Precautions

Precautions:

1. Factors affecting measuring accuracy and their description:
 - a. Thickness of substrate metal: Each type of thickness gauge has a permissible critical thickness of substrate metal. Measurement is not affected by any thickness of substrate metal that is greater than this critical thickness. See Product Specification for the critical substrate thickness required ($\geq 0.5\text{mm}$) for this thickness gauge.
 - b. Edge effect: This gauge is sensitive to abrupt change of surface shape on the measured substrate. Therefore, measurement near the edge or inner corner of the measured substrate is unreliable.
 - c. Curvature: Curvature of the measured substrate has an effect on measurement. This effect always increases with the decrease of the radius of curvature.
 - d. Surface roughness: The surfaces of both the substrate metal and its coating have an effect on measurement. This effect ises with the increase of the roughness. Surface roughness will lead to system errors and occasional errors. Therefore in each measurement, it

- 14 -

- is needed to increase the number of measurements at each position so as to overcome these occasional errors. If the substrate metal is rough, zero-point calibration of the gauge must be carried out at several positions on the substrate metal with similar roughness which has not been coated, or a solvent without corrosion to the substrate metal should be used to dissolve the coating before zero-point calibration of the gauge.
- e. Surface cleanliness: Prior to measurement, clear away any substances on the surface, such as dust, grease and corrosive substances, but do not remove any coating substance.
- f. There is no difference between iron substrate and noniron substrate for this device.
- g. This device can only measure noniron film thickness.

- 15 -

VIII. Attention

1. If the product is calibrated on the substrate of a certain metal, it will not be used to measure the coating on a different metal substrate, for example, if the product is calibrated on the iron substrate then it cannot be used to measure the coating on the aluminum substrate.
2. We offer 2 blocks of common materials of iron substrate and aluminum substrate which may result in oxidation in operation that is beyond our guarantee policy. If the user need to measure the coating on the other metal surface, an according flat metal substrate shall be prepared by the user themselves.
3. The default calibration is for iron substrate.

- Specific Declarations: Our company shall hold no any responsibility resulting from using output from this product as an direct or indirect evidence. We reserves the right to modify product design and specification without notice.



- 16 -

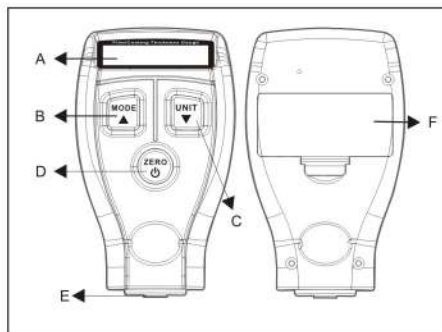


Figure 12

- 13 -