

5411 Series

COATING THICKNESS GAUGE OPERATION MANUAL



www.insize.com



MN-5411 Series-E

V1

<https://m.insize.com/5411.html>



EN – Please scan the QR code or visit the website for operation manual.

IT – Scansiona il codice QR oppure visita il sito web per il manuale d'uso.

CZ – Pro návod prosím naskenujte QR kód nebo navštivte webovou stránku.

ES – Por favor, escanee el código QR o visite la página web para ver el manual de instrucciones.

FR – Veuillez scanner le QR Code ou visiter notre site web pour accéder aux manuels d'utilisation.

DE – Bitte scannen Sie den QR-Code oder besuchen Sie die Website für die Bedienungsanleitung.

PT – Para aceder ao manual de instruções, por favor, faça a leitura do código QR ou visite o nosso site.



1. Instrument Overview

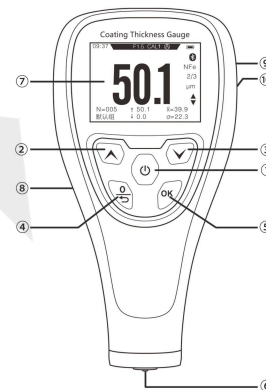
The **5411 Series** coating thickness gauge is suitable for both ferrous (Fe) and non-ferrous (NFe) substrates for non-destructive measurement: Non-magnetic coatings (e.g., aluminum, chrome, copper, enamel, rubber, paint, etc.) on ferrous substrates (steel, iron, alloys, etc.); Non-conductive coatings (e.g., enamel, plastic, rubber) on non-ferrous substrates (aluminum, copper, zinc, etc.).

The instrument performs fast, non-destructive, and precise thickness measurements in both laboratory and field environments. It is widely used in manufacturing, metal processing, chemical industries, and quality inspection.

Key Features:

- * Automatic substrate recognition (Fe/NFe).
- * High accuracy and stability, capable of measuring ultra-thin coatings.
- * High speed: 0.3 seconds per measurement.
- * Wide measurement range with high resolution.
- * Four display modes: Readings Only, Readings& Statistics, Readings& Bar Graph, Readings& Run Chart.
- * Statistical functions: Average ($\bar{x}$), Max/Min, Standard Deviation (σ), Count (N).
- * Four calibration modes: Zero Calibration, One Point Calibration, Two Point Calibration, Five Point Calibration.
- * Upper and lower limits can be set, over-limit alarm alert
- * Large storage capacity: 16 groups, 100 data points per group (total 1600).
- * Color LCD screen automatically rotates for different angles.
- * Unibody design, lightweight and portable.

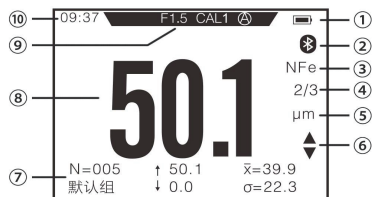
2. Description



①	Power	②	Increment/Up
③	Decrement/Down	④	Return/Quick Zero Calibration
⑤	Confirm/Menu	⑥	Probe
⑦	Display Screen	⑧	Data port
⑨	Wrist strap hole	⑩	Battery cover

Additional functions:

1. In measurement mode, press to quickly scroll through 100 historical data entries in the current group.
2. In measurement mode, single-press to delete the last reading in the current group.
3. In measurement mode, rapidly double-press to delete all the readings in the current group.
4. In measurement mode, long press for 2 seconds to quick enter zero calibration.



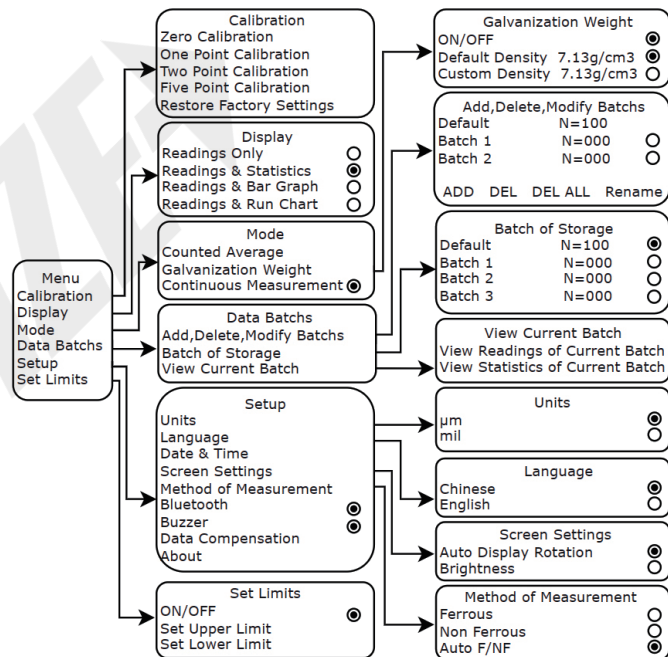
①	Battery level	②	Bluetooth status
③	Substrate type	④	Average count (N)
⑤	Measurement unit	⑥	Alarm indicators
⑦	Statistics (N, Max, Avg, Min, σ)	⑧	Thickness reading
⑨	Probe info/Calibration status	⑩	Time/Date

3. Technical Specifications

Code	5411-TC15	5411-TC30	5411-TF50
Measuring range	FE/NFE (auto recognition): 0~1500μm	FE/NFE (auto recognition): 0~3000μm	FE: 0~5000μm
Accuracy	±(2%L+1μm): ≤1500μm ±(3%L+1.5μm): >1500μm, L is measuring thickness in μm		
Resolution	0.1μm (0~99.9μm), 1μm (100μm~3000μm)		
Measuring principle	FE mode: magnetic induction NFE mode: eddy current effect		
Calibration mode	zero calibration, one point calibration, two-point calibration, five-point calibration		
Measuring mode	single mode, continuous mode, average mode, zinc coating weight mode (for FE mode only)		
Minimum curvature radius	convex: 5mm; concave: 25mm		
Minimum measuring area	Ø6mm		
Minimum substrate thickness	0.3mm		
Storage	1600 (100×16 groups)		
Operation environment	temperature: -10°C~50°C; humidity: <80% (non-condensing)		
Unit	μm, mil		
Language	English, Chinese		
Power supply	2×1.5V AA batteries or USB		
Dimensions (L×W×H)	134×67×38mm		
Net weight	135g		

Caution: The probe may damage the smooth metal surfaces.

4. Menu Structure



5. Measurement Steps

5.1 Press or long-press  to turn on the instrument. It will enter standby measurement mode and automatically restore the parameter settings from the previous shutdown.

5.2 Begin measurements after verifying calibration accuracy. If prior calibration is in doubt, perform recalibration. Detailed calibration procedures are described in the **Calibration** section of this manual.

5.3 Grip the instrument with your thumb and index finger at the groove. Press the probe vertically against the test surface **with consistent speed to avoid manual measurement errors caused by excessive slowness.**

5.4 For subsequent measurements, lift the probe at least 1cm above the surface before repeating the steps above.

6. Calibration

The instrument provides multiple calibration methods: **Zero Calibration**, **One Point Calibration**, **Two Point Calibration**, **Five Point Calibration**, and **Factory Reset**. Typically, **Factory Reset** and **Zero Calibration** deliver sufficient accuracy for general use. For enhanced precision or specialized substrates (e.g., varying materials, thicknesses, or geometries), **Multi-Point Calibration** (Two Point or Five Point) is recommended.

Calibration Procedure Recommendations:

The following steps need not all be performed. After completing each step, verify measurement accuracy. If results are unsatisfactory, proceed to the next step; if accurate, no further action is required. Once calibrated successfully, results are automatically stored and retained for subsequent measurements unless accuracy is questioned.

- 1) Zero Calibration
- 2) Factory Reset
- 3) Repeat Zero Calibration
- 4) One Point/Two Point/Five Point Calibration
- 5) Contact the distributor or manufacturer if inaccuracies persist after completing the above steps.

6.1 Zero Calibration

6.1.1 In measurement standby mode, press  to navigate to **Zero Calibration** via the menu structure diagram, or long-press  (2 seconds) in the measurement interface to enter Quick Zero Calibration.

6.1.2 Upon entering the calibration interface, the screen prompts **"Measure Uncoated Substrate."** Press the probe firmly against the reference block (or uncoated substrate) without movement. A **"beep"** confirms contact and the screen prompts **"Lift Probe Up"**. Lift the probe to a height >10cm until another **"beep"** sounds. The screen displays:

"n1=0.0μm (zero value of the first measurement), **$\bar{x}$ =0.0μm** (average of all measurements)."

Note: The displayed value may not always be 0.0μm during operation. Follow on-screen instructions.

- If issues arise, repeat the measurement or return to the calibration menu and enter again.
- If no issues, press the  to finalize. The screen shows "Calibration Succeeded".

Critical: Ensure audible "beeps" during probe placement/lifting and a lift height ≥10 cm. Short press  will exit calibration and return to previous menu.

6.1.3 After calibration, the result should approximate **0μm** when measuring the uncoated substrate used for calibration. If not, repeat Zero Calibration.

6.2 Foil Calibration (One/Two/Five Point) & Factory Reset

6.2.1 Foil Calibration (Single/Two/Five-Point):

In measurement standby mode, press  to select **One / Two / Five Point Calibration**.

For Five Point Calibration:

- 1) Complete **Zero Calibration** as per Section 6.1.
- 2) The screen prompts **"Measure Foil: NO.1 "**, Place a foil (within the instrument's range) on the reference block or the uncoated substrate. Press the probe firmly against the foil until a **"beep"** sounds, **"Lift Probe Up"** will display on the screen.

- 3) Lift the probe **>10cm**. The screen displays:

"n1=100μm (first foil measurement), **$\bar{x}$ =100μm** (average of all measurements, subsequent adjustments use this average).

- If measurements vary significantly (e.g., **n2, n3, n4**), the system alerts **"Calibration Failed"**.
- If valid, adjust values using the  or  to match the foil's certified thickness. Press the  to proceed to the next foil. Repeat until all five foils are calibrated.

6.2.2 One/Two Point Calibration follows the same procedure.

6.2.3 Calibration foil intervals must exceed **10%**. Calibration values are based on the initial displayed average, not post-adjustment values.

6.2.4 Factory Reset:

In measurement standby mode, press  to navigate to Factory Reset. Select NO to cancel or YES to confirm.

7. Display

7.1 Readings Only: Large numeric display ensures intuitive readout.



7.2 Readings & Statistics: Shows Data Batch, N, Max, Min, $\bar{x}$, σ .



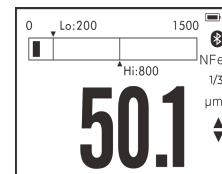
7.3 Readings & Bar Graph:

0–1500: Indicates the current probe's measurement range.

▼ Lo:200: Lower limit alarm threshold set to 200 μm.

▲ Hi:800: Upper limit alarm threshold set to 800 μm.

When the measured value is within 200–800 μm, the threshold indicator bar turns green; values outside this range are displayed in red.



7.4 Readings & Run Chart:

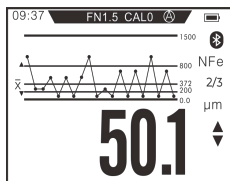
0–1500: Indicates the current probe's measurement range.

$\bar{x}$: Indicates the average value of all measurements.

▼ **200:** Lower limit alarm threshold set to 200 μm .

▲ **800:** Upper limit alarm threshold set to 800 μm .

When the measured value is within 200–800 μm , the data point is displayed in black. Values outside this range appear in red. The full screen displays up to 20 measurement points, with new data overwriting the oldest entries.



8. Mode

8.1 N-Point Averaging:

Press the ∇ or $\checkmark$ keys to set the number of averaging points (N). Setting to 00 disables this function. This feature is primarily used for workpieces with rough surfaces to improve measurement accuracy by averaging multiple readings.

8.2 Zinc Coating Weight:

A solid circle indicates the default zinc density is enabled. Users may adjust the density based on specific zinc types or retain the default setting if uncertain. This function supports galvanized workpieces, displaying both coating weight (**g/m^2**) and thickness (**μm**) simultaneously.

8.3 Continuous Measurement:

A solid circle activates continuous measurement mode, while a hollow circle switches to single-shot measurement.

9. Data Batches

9.1 Add/Delete/Modify Batch:

Up to **15 Batches** (excluding the default group) can be created. Groups can be deleted individually or all at once. Users may rename groups to categorize workpieces for streamlined data management.

9.2 Storage Batch :

Select the required data batch.

9.3 View Current Batch :

- **Measurement List:** Displays up to 100 data points per group (overwrite enabled).
- **Statistical Values:** Includes:
 - Number of measurements (N)
 - Maximum (Max)
 - Minimum (Min)
 - Average ($\bar{x}$)
 - Standard deviation (σ)
 - Coefficient of variation (CV%).

10. Setup

10.1 Units: $\mu\text{m}/\text{mil}$

10.2 Language: Chinese/English

10.3 Date & Time: Set according to local time.

10.4 Screen Settings:

(1) Press **OK** (●) to enable **Rotation**, allowing the screen to auto-rotate during measurements for improved readability and user experience.

(2) Press **OK** (●) to adjust **Brightness** across 6 levels:

- Levels 1–5: Power-saving mode.
- Level 6: Sunlight mode.

Note: Lower levels conserve power; higher levels increase consumption. Select based on needs.

10.5 Method of Measurement:

- Ferrous (F): For iron-based substrates.
- Non-Ferrous (NF): For non-iron substrates.
- Auto F/NF: Automatic substrate recognition.

10.6 Bluetooth:

- (●): Bluetooth enabled.

10.7 Buzzer:

- (●): Sound enabled.
- (○): Sound disabled.

10.8 About:

- Product Name
- Instrument Model
- Serial Number

11. Upper/Lower Limit Alarms

11.1 Upper Limit Alarm: Values exceeding the alarm threshold are highlighted in red.

11.2 Lower Limit Alarm: Values below the alarm threshold are highlighted in red.

Users can configure these thresholds based on coating thickness requirements to facilitate quality control processes.

12. Battery Replacement

12.1 The battery status icons on the display indicate:

: **Full charge.**

: **Half remaining.**

: **Low battery.**

 (blinking): **Critical level (replace batteries immediately).**

12.2 Open the battery cover and remove the old batteries.

12.3 Install new batteries according to the polarity symbols inside the battery compartment.

12.4 Remove batteries during prolonged storage to prevent leakage or corrosion damage.

13. Measurement Precautions

13.1 To minimize the influence of substrate material on measurement accuracy, it is recommended to use an uncoated substrate or a standard reference block with the same material composition as the product's base material for calibration.

13.2 For accurate measurement of ultra-thin coatings ($\leq 10 \mu\text{m}$), perform calibration on a **bare substrate** (uncoated reference block) to ensure measurement accuracy.

13.3 After measurement, press and hold the  for 2 seconds to power off, or allow the instrument to shut down automatically after 3 minutes of inactivity.

13.4 Avoid exposing the instrument to severe vibration or impact. After use, clean surface contaminants and store it in the provided case.

13.5 Do not slide the probe, strike the test surface, or subject the probe to mechanical shocks, as this may degrade measurement performance.

14. APP

Search "INSIZE SmartStation" on the App Store or scan the QR code:

Note: After downloading and installing the app, please grant all required permissions (such as Bluetooth pairing, audio, camera, etc.).

Android Download



iOS Download

