Coating Thickness Gauge

Model: LS225

User Manual V2.17

Please read this manual carefully before using and reserve it for reference.

I. Product Introduction

Coating thickness gauge is composed of the host and the probe. The host is mainly used for the display and statistics of measurement data. The probe uses digital technology, the data collection and processing is completed on the probe. According to the different substrates, one ferrous probe (F500) and two non-ferrous probes (N1500 and N2000) have been developed.

II. The Host

1. On/Off

On: Short press the "⏻" button to turn on the gauge. After turning on the gauge, the production information of the host and probe are displayed. Then the latest measurement record is displayed.

Off: Long press the "⏻" button to turn off the gauge; or the gauge will automatically turn off according to the scheduled shut down time (1-9 minutes) without any operation.

2. Parameters

Display	240×160 dot matrix LCD
Power supply	4pcs of 1.5V AAA alkaline battery
Operating temperature range	0℃~50℃, 0~85%RH(no condensation)
Storage temperature range	-10℃~60℃, 0~85%RH(no condensation)
Host size	148*76*26 mm
Weight(with battery)	194g
Supply voltage	DC5V
Operating current	20mA
Operating power consumption	100mW

3. Aviation plug connection

The aviation plug has a spring limit and can't be violently rotated or pulled. When pulling out the aviation plug, it needs to be pulled out as the pictures shown below.



Use fingers to pinch and pull up the "Aviation plug", the plug will be pulled out



Locked state



Unlocked state

III. F500/N1500/N2000 Probe

1. F500 Probe Introduction

F500 probe is a magnetic probe especially used to test the ultra-thin coating thickness. The high precision and good repeatability provide an effective method for measuring the thickness of thin coatings. The coatings, varnishes, enamels, chromium, galvanized and other non-ferromagnetic coatings can be measured on magnetic substrates, especially for thin coatings on small workpieces such as screws and bolts.

Product standards

- *GB/T 4956-2025 Non-magnetic coatings on magnetic substrates-Measurement of coating thickness-Magnetic method*
- *DIN EN ISO 2808 Paints and varnishes- Determination of film thickness*
- *JJG 818-2018 Magnet and Eddy Current Measuring gauge for coating thickness*

2. N1500 Probe Introduction

N1500 is a professional eddy current probe used to measure the ultra-thin coating thickness. The ultra-high measurement accuracy and repeatability provide an effective method for measuring the thickness of very thin coatings. It can be used for the coating thickness measurement of non-conductive coatings such as paint, anodic oxide layer and ceramics on non-magnetic metal substrates such as copper, aluminum, die-casting zinc, brass, etc.

Product standards

- GB/T 4957-2025 Non-conductive coatings on non-magnetic basis metals-Measurement of coating thickness-Eddy current
- DIN EN ISO 2808 Paints and varnishes- Determination of film thickness
- JJG 818-2018 Magnet and Eddy Current Measuring gauge for coating thickness



3. N2000 Probe Introduction

N2000 is professionally used to measure the thickness of coatings with a large flat area. The probe uses its own weight to ensure that the same force is used to press the probe during each measurement, making the measurement operation simple and the value stable. It is especially suitable for the measurement of PCB board paint thickness, but also for the measurement of non-conductive coatings such as paint, anodic oxide layer and ceramics on non-magnetic metal substrates such as copper, aluminum, die-cast zinc and brass.

4. F500/N1500/N2000 Parameters

Probe model	F500	N1500	N2000
Measuring principle	Magnetic Induction	Eddy current	
Substrate	Ferromagnetic metal	Non-ferromagnetic metal	
Measuring range	0.0-500μm	0.0-1500μm	0.0-2000μm
Resolution	0.1μm:(0μm - 99.9μm) 1μm:(100μm - 500μm)	0.1μm:(0μm - 99.9μm) 1μm:(100μm - 999μm) 0.01mm:(1.00mm – 1.50mm)	0.1μm:(0μm - 99.9μm) 1μm:(100μm - 999μm) 0.01mm:(1.00mm – 2.00mm)
Repeatability	≤±(0.8%H + 0.1μm) test with matching fixture		≤±(1%H + 0.2μm)
Accuracy	≤±(2%H + 0.3μm) after 5 points calibration		
Unit	μm / mil		
Measuring interval	1.5s(single measurement	0.8s(single measurement mode)	

	mode) 0.4s(continous measurement mode)	0.4s(continous measurement mode)	
Minimum curvature	Convex:1.5mm / Concave:10mm		/
Minimum substrate thickness	0.1mm	0.03mm	
Calibration	Support zero adjustment and 1 to 5-points calibration		
Probe size	110*φ15 mm (Without connecting cable)		φ30*95.5mm (Without connecting cable)
Weight(with battery)	81g		304g

Note: H is the standard value

5. F500/N1500/N2000 Features

(1) The probe uses digital oscillation technology and high-speed ADC acquisition to ensure ultra-high stability of the gauge.

(2) F500/N1500 ultra-small probe, especially suitable for thin coating or anodic coating measurement on small work pieces such as screws and bolts.

(3) N2000 uses its own weight to trigger measurement, consistent pressure and stable value

(4) Multi-point calibration: Correct the measurement data to the standard data so as to make the measurement more accurate.

(5) Statistics function: Automatically calculate the maximum, minimum, average values and standard deviation of the last 9 measured values.

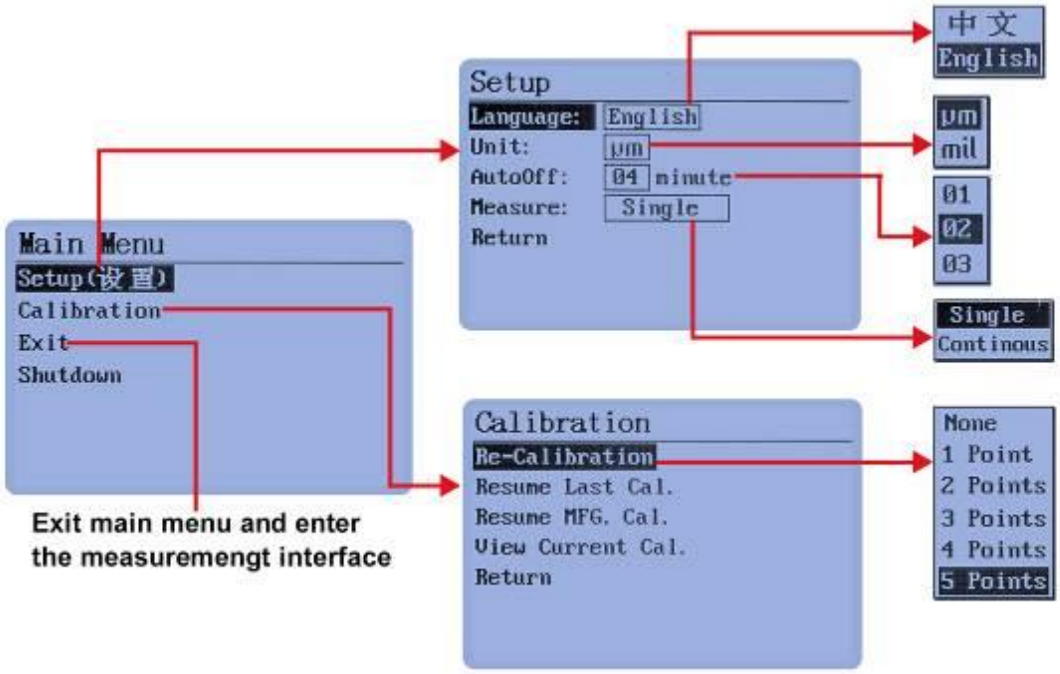
(6) The hardness probe ensures long-term effective use of the gauge.

(7) Adopting advanced digital probe technology, digital signal processing is done directly on the probe. The probe has strong anti-jamming capacity and provides excellent accuracy. The measurement won't be affected even if the temperature change, the data remains stable. This technology ensures very good repeatability throughout the measurement process.

(8) Equipped with a matching test fixture (F500/N1500 optional), which not only makes the measurement more convenient, but also eliminates measurement errors caused by human factors.

6. Operation of F500, N1500 and N2000 Probes

6.1 Settings and Calibration



Setup/Calibration Schematic diagram

In the off state, long press the "⏻" button for 3s or short press the "⏻" button in the measurement mode to enter the display interface [Main Menu]. There are four sub-options: use "▲" "▼" to select [Setup / Calibration / Exit / Shutdown] and short press the "CAL" button to confirm the selection.

A. Setup Menu

- Language: Short press the "CAL" button to set the language, use "▲" "▼" to select Chinese or English. Then press the "CAL" button to confirm the language setting;
- Unit: Short press the "CAL" button to set the unit, use "▲" "▼" to select μm or mil. Then press the "CAL" button to confirm the unit setting;
- Auto Off: Short press the "CAL" button to set the automatically shutdown time, use "▲" "▼" to set the time from 1 to 9 minutes. Then press the "CAL" button to confirm the shutdown time;
- Measurement mode: Shortly press "CAL" button and enter measurement mode selection interface,

use“ ▲ ” “ ▼ ”to select single-shot or continuous measurement mode, then shortly press“ CAL ” button to confirm;

- Return: Short press the “ CAL ” button to exit the setting mode. At the same time, the current setting will be saved and the system will return to the main menu.

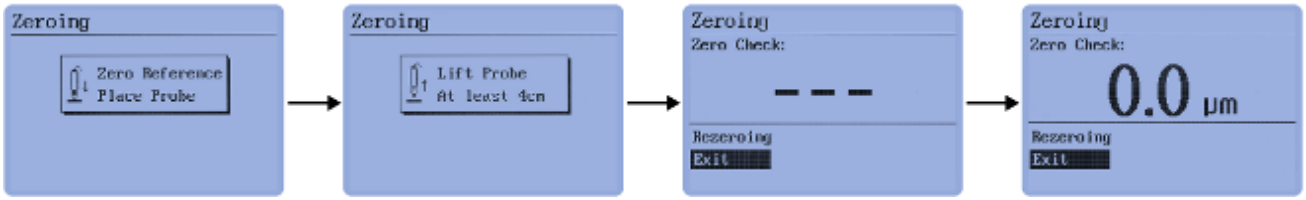
B. Calibration Menu

- Calibration: Short press the “ CAL ” button to set the calibration, use “ ▲ ” “ ▼ ” to select 1 to 5-points calibration. Then short press the “ CAL ” button to confirm.

➢ **Perform zero adjustment before calibration:**

Due to the ambient temperature changes and different performance parameters such as magnetic and conductive properties of the material, certain measurement errors will be caused. In order to reduce the subsequent measurement error, the zero adjustment must be performed first.

Before calibration, the gauge will prompt “Zero Reference, Place Probe”, please prepare uncoated standard work piece or zero adjustment plate and follow the instructions.



Zero adjustment schematic diagram

When the gauge prompts “Zero Reference, Place Probe ", press the probe vertically on the center of the zero-adjusting plate or uncoated standard workpiece. Keep the probe stable without tilting or shaking.

After hearing the buzzer sound, the gauge prompts "Lift Probe At Least 4cm", lift the probe up to 4cm.

After hearing the buzzer sound again, the gauge prompts "Zero Check". At this time, place the probe on the Fe zero adjustment plate and check the result.

Select "Rezeroing" to repeat the above zero adjustment operation; select “Exit” to quit the zero adjustment and enter the calibration operation.

➢ **Multi-point calibration:**

When multi-point calibration is selected, the standard films should be calibrated in order from thin to thick. The thickness between each film is more than 5 μm.

The following five-point calibration is taken as an example. It is assumed that the thickness of the five pcs of standard films are 25μm, 50μm, 100μm, 200μm and 450μm, respectively.

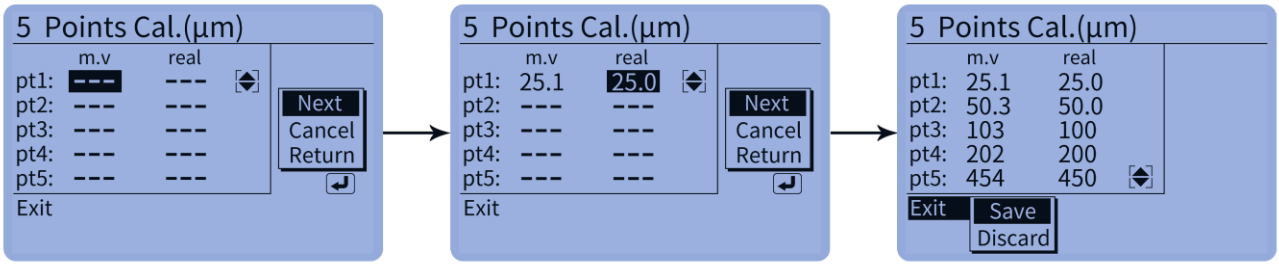
When measuring “piece 1”, select a standard film whose thickness is 25μm and place it on the Fe zero

adjustment plate or the uncoated standard workpiece for measurement. Adjust the measured value to the real thickness of 25μm by pressing "▲" "▼".

After the adjustment is completed, short press the "CAL" button to measure the "piece 2". After the measurement is completed, adjust the measured value of piece 2 to the real thickness.

As above, perform the calibration of "piece 3", "piece 4", "piece 5", when the calibration of "piece 5" is completed, short press the "CAL" button to enter to "Exit".

Select "Save" or "Discard" to end the calibration.



Test standard films **Adjust the measured value to real value** **Calibration completed**

- Resume last calibration: In addition to the data of the current calibration data, if there is the data of the last calibration, you can view and restore by [Resume Last Calibration].
- Restore MFG calibration: Delete the current user calibration data and keep the current calibration data (if any) as the last calibration data.
- View current calibration: View the current calibration data.
- **Return:** Short press the "CAL" button to exit the calibration menu and return to the main menu.

C. Exit

Short press the "CAL" button to exit the main menu and switch to the measurement interface.

D. Shutdown

Short press the "CAL" button to turn off the gauge.

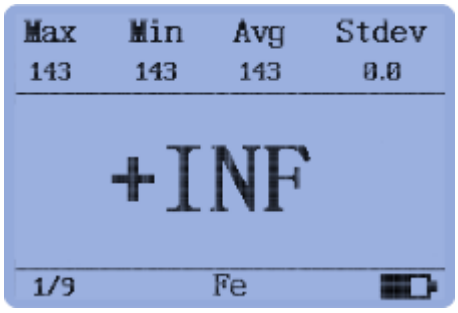
6.2 Measurement

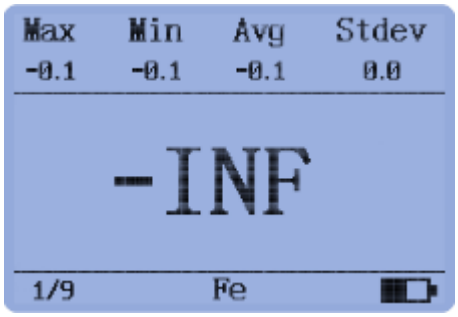
A. Finger hold the probe with anti-slip pattern (F500/N1500) or the middle of the probe (N2000). If the optional hand pressure test rack, fix the probe in the rack probe fixing hole (F500/N1500)

B. Press the probe vertically on the measured object surface, keep the probe stable and do not tilt or shake, the measurement results will appear on the interface with buzzer sound.

C. Lift the probe away from the measured object and then follow step 2) again to continue the measurement.

- When measuring, the following interfaces may appear:





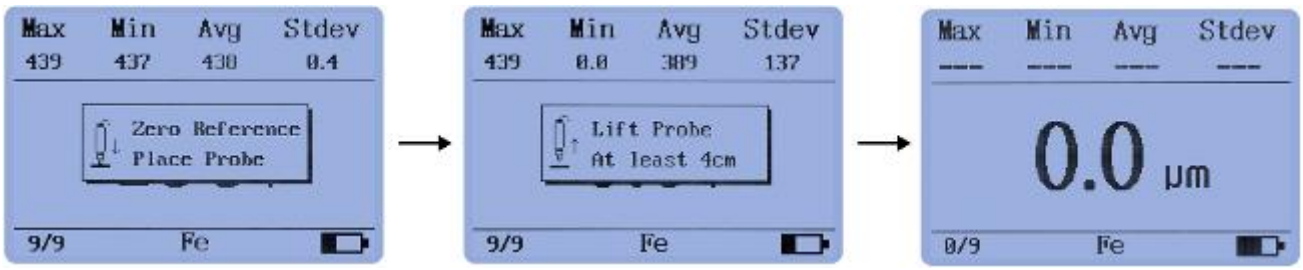
- +INF: The measurement range is exceeded or the substrate is not a valid Ferromagnetic substrate or non-metal substrate.
- -INF: The measured value is less than -25μm and zero adjustment needs to be performed again.

D. The measurement interface simultaneously displays the maximum (Max), minimum (Min), average (Avg) and standard deviation (Stdev) of the current statistics (Note: + INF and -INF will not be counted) and the number of measured data. The statistics are the last 9 valid measurement data. When there are less than 9 data, the actual number shall prevail.

E. Delete statistics: In measurement mode, long press the "CAL" button for 3s to delete the currently recorded data.

F. Perform zero adjustment during measurement: If there are no uncoated substrates, you can use the provided zero adjustment plate to perform zero adjustment.

- Short press the "CAL" button in the measurement mode, the gauge prompts "Zero Reference, Place Probe". Then place the probe on the Fe zero adjustment plate or the center of the uncoated standard workpiece, please keep the probe stable and don't shake it.
- After hearing the buzzer sound, the gauge prompts "Lift Probe At Least 4cm". At this time, lift the probe up to 4cm.
- After hearing the buzzer sound again, the LCD displays 0.0. The existing data record is cleared at the same time and the zero adjustment is completed.



If the time is out or the substrate does not meet the requirements, the gauge will prompt "Zero Reference Error".

Note: Due to workpiece surface roughness, dust, scratches, etc., the measurement data may not be displayed as 0 μm when measuring the same position after zero adjustment. The operation of the gauge must be correct and proficient, otherwise the measurement value will be unstable.

6.3 View Measurement Records

In the measurement mode, press the “▲” “▼” button to enter the browsing interface to view the historical data. The gauge stores a total of 9 sets of data. When the data exceeds 9 sets of data, the earliest recorded value is automatically deleted. No.1 is the earliest test data, which is pushed backward in order. Recorded data is not lost after shutting down.

When you press the “▲” button to view the data, the data record number increases from the first one.

When you press the “▼” button to view the data, the data record number decreases from the largest to the lowest. After viewing all the data, the gauge will automatically return to the measurement interface.

In the date view mode, long press the “CAL” button for 3 seconds to delete the current record.

6.4 Precautions

(1) For precision measurement, single measurement mode is the best choice because of its high stability.

(2) During the measurement, the probe should be kept on the center of the measured point and the probe should not be suspended outside the measured surface.

(3) Keep away from strong magnets (magnets, audio equipment, etc.) and strong electromagnetic fields (transformers, induction cookers, etc.) during measurement.

(4) Before using the gauge, it is recommended to perform multi-point calibration.

(5) Make sure that the measured object surface is clean. Dust and dirt on the measured object surface will affect the measurement accuracy.

(6) When the gauge prompts low battery, please replace old battery with new battery.

6.5 Packing List

No.	Description	Quantity	Unit
1	Coating thickness gauge host	1	Set

2	Probe	Number of probes ordered	
3	Zero-adjustment plate	Configure according to probe	
4	Standard films	5	pcs
5	User manual	1	pcs
6	Plastic engineering case	1	pcs

IV. Matching Test Fixture (F500/N1500 probe optional)

In order to ensure the demanding accuracy when measuring ultra-thin coating thickness, our company also provides test fixtures, which can greatly reduce the error caused by human operation, especially when measuring small workpieces such as screws and bolts. When using the test fixture to measure a small workpiece, it is recommended to remove the small black positioning sleeve on the front of the probe and then make measurement before performing multi-point calibration again on the uncoated standard workpiece.



V. Service

1. The gauge has one-year warranty. If the gauge works abnormally, please send the whole gauge to our company for maintenance.

2. Provide users with spare parts and lifelong maintenance services.
3. Provide the users with the gauge calibration service.
4. Free technical support for long term.

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