Ultrasonic Thickness Gauge

Code: 86216

User Manual V2.01

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

I. Product introduction

This instrument is designed based on the pulse-echo ultrasonic measurement principle. Pluggable probes are available according to different probe frequencies. One main unit can support multiple probes simultaneously, and the instrument can intelligently identify the probe type.
Probes of different frequencies are applicable to various industries. At present, two types of ultrasonic probes with different frequencies have been developed.

No.	Probe Model	Ultrasonic Frequency	Probe Face Diameter	Application Industry
1	15M-X0 Probe	15 MHz	Φ6 mm	Surface coatings on non-metallic substrates such as plastics, wood and glass
2	2.5M-X0 Probe	2.5 MHz	Φ10 mm	Coatings on concrete surfaces, e.g. polyurethane, polyurea, etc.

The product conforms to the standard:

GB/T 37361-2019 Determination of the film thickness—Ultrasonic thickness gauge method

JJF1126-2004 Calibration Specification for Ultrasonic Thickness Gauge.

Working principle:

The probe emits a high-frequency ultrasonic pulse that travels through the coupling agent (with negligible delay) and enters the coating. Upon reaching the interface of coatings with different densities, part of the ultrasonic wave will be reflected to become a new ultrasonic pulse, while the remainder continues through the material. The new ultrasonic pulse is received by the probe's sensor. The instrument then processes the signal to determine the ultrasonic wave's propagation time within the coating and accurately calculates the coating thickness.

II. Parameter

1. Probe parameters

Probe Model	15M-X0 Probe	2.5M-X0 Probe
Probe Frequency	15MHz	2.5MHz
Probe End Diameter	Φ6mm	Φ10mm
Measuring Range	13 – 5500 μm (Sound velocity 2200 m/s)	50 – 8360 μm (Sound velocity 2200 m/s)
Sound Velocity Setting Range	1000 – 9999 m/s (Default: 2200 m/s)	
Layer Thickness	50 μm	500 μm

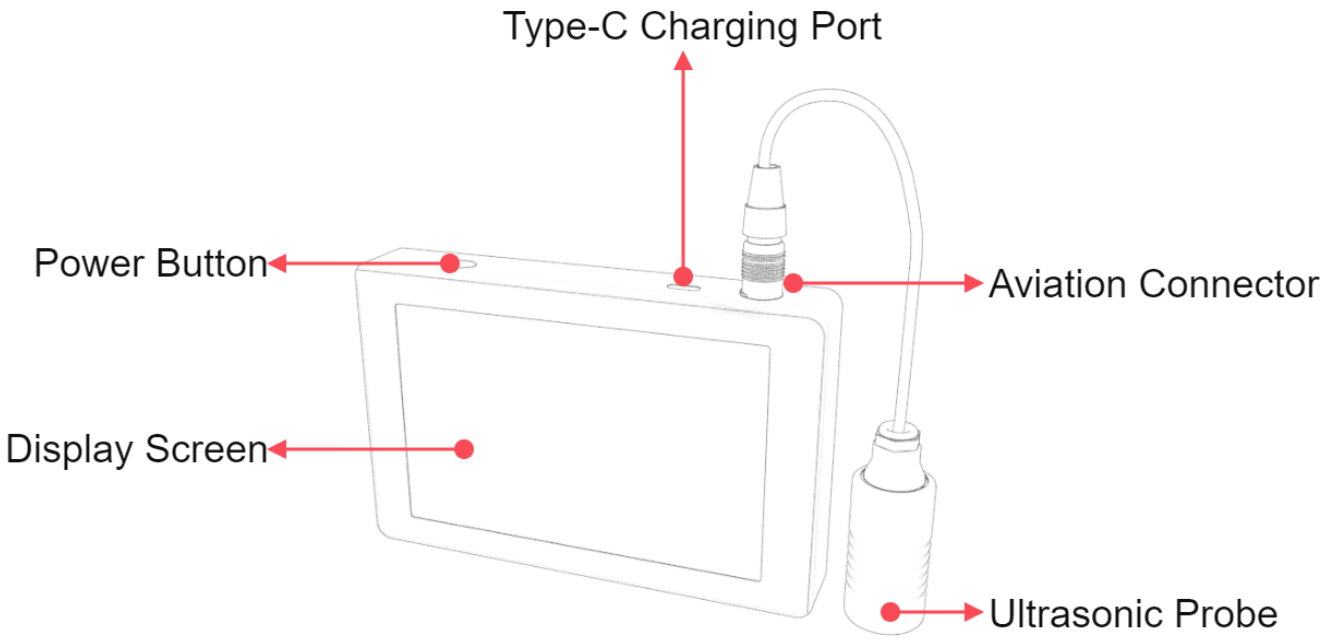
Measurement Accuracy (H=actual coating thickness)	±(3μm + 3%H)	±(20μm + 3%H)
Resolution	1μm	
Optional Units	μm (default), mil	
Probe Dimensions	Φ22mm × 60mm	Φ25mm × 65.2mm

2. Main unit parameters

Host Dimensions	141.7 * 91.1 * 22.6 mm
Display	800 * 480 dot matrix IPS color screen
Lnstrument Weight	475g
System Language	Simplified Chinese, English
Power Supply	3.7V 4000mAh rechargeable lithium battery
Charging Interface	USB (Type-C)
Supply Voltage	DC 5V
Operating Temperature Range	0℃~50℃, 0~85%RH(no condensation)
Storage Temperature Range	-10℃~60℃, 0~85%RH(no condensation)
Probe Connection Method	Push-pull self-locking (snap-on) connector
Supply Voltage	DC 5V
Operating Current	447 mA
Operating Power Consumption	1475 mW

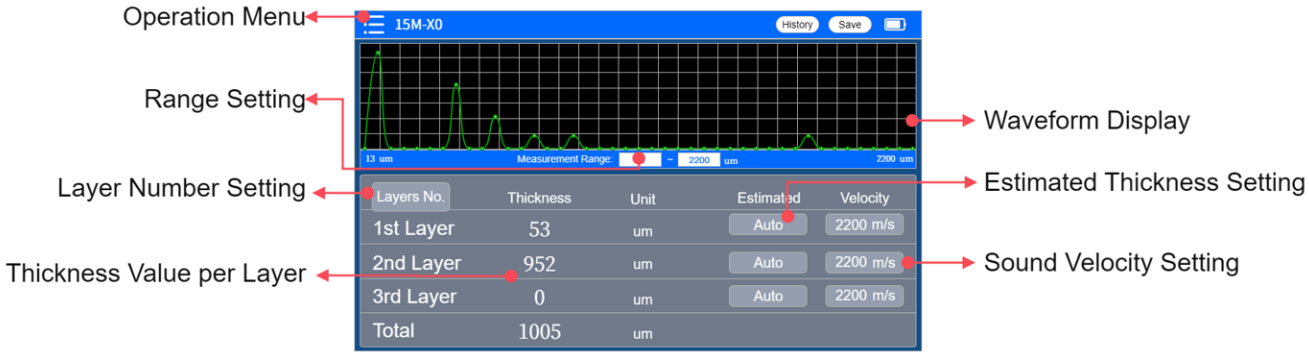
III. Operation

1. Instrument structure



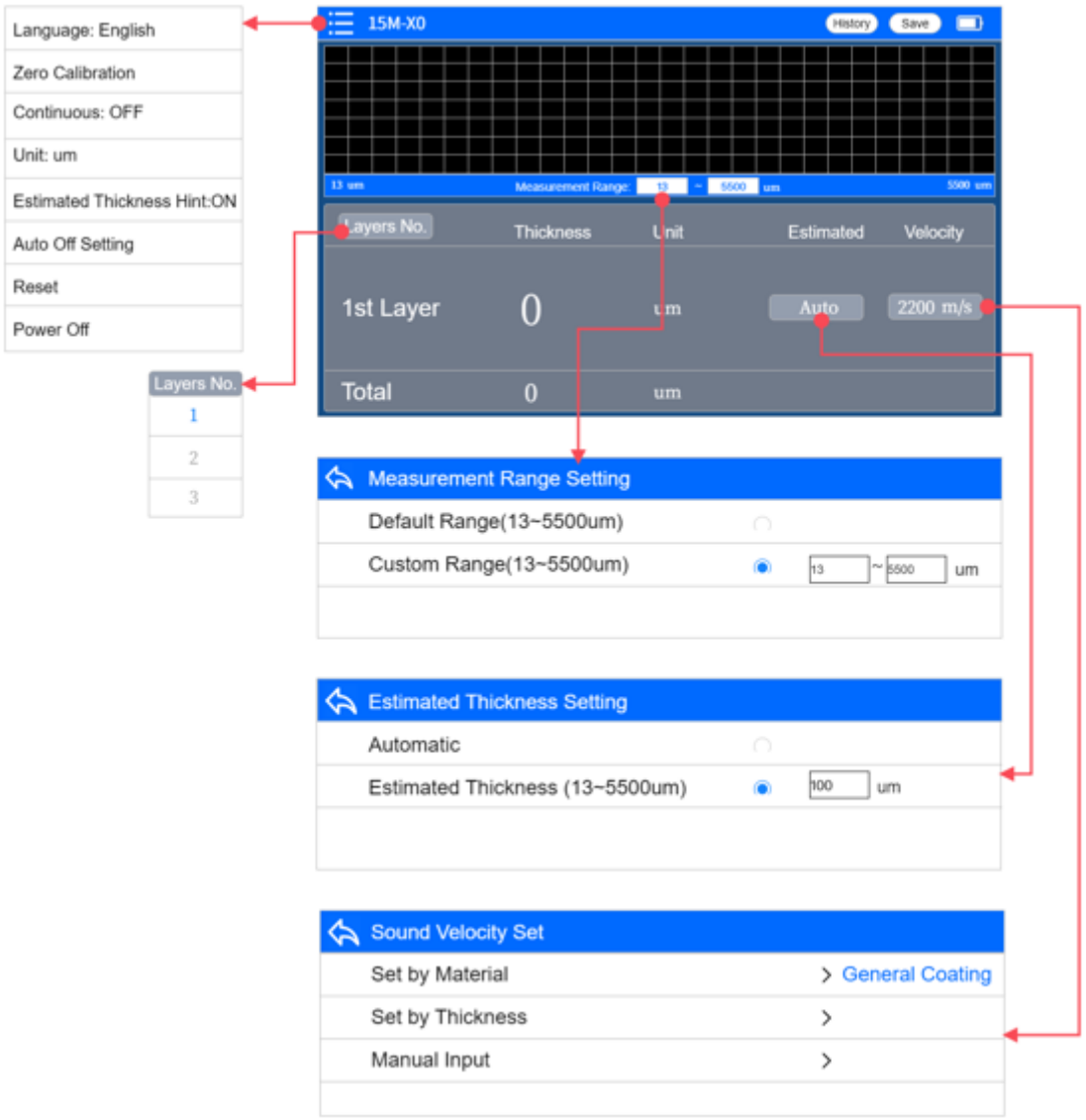
2. Measurement

Apply the coupling agent evenly to the surface of the material to be measured. Firmly press the probe onto the coated surface and keep it steady. When the buzzer sounds, the measurement is complete, and the thickness of the material is displayed.



Thickness measurement results of 3 layers

3. Parameter settings



Parameter setting process

- **Layers No.:** 1-3 layers can be set. Setting the correct number of layers will make the measurement more accurate.
- **Measurement range setting:** Reasonable setting of the measurement range can effectively avoid interference from stray peaks and improve accuracy.
- **Sound velocity set:** Accurately set the sound velocity of each layer of material and accurately measure the thickness of each layer.
- **Estimated thickness setting:** Set the correct estimated thickness so that the instrument can find the peak more accurately.
- **Menu bar:** Click the icon in the upper left corner to pop up the menu bar, where you can set: language, zero calibration, continuous measurement, unit, estimated thickness hint, auto off setting, and reset.

4. Aviation plug connection

It cannot be rotated or pulled violently because the aviation plug connector has a spring limit. Please refer to the following figure below for correct operation:

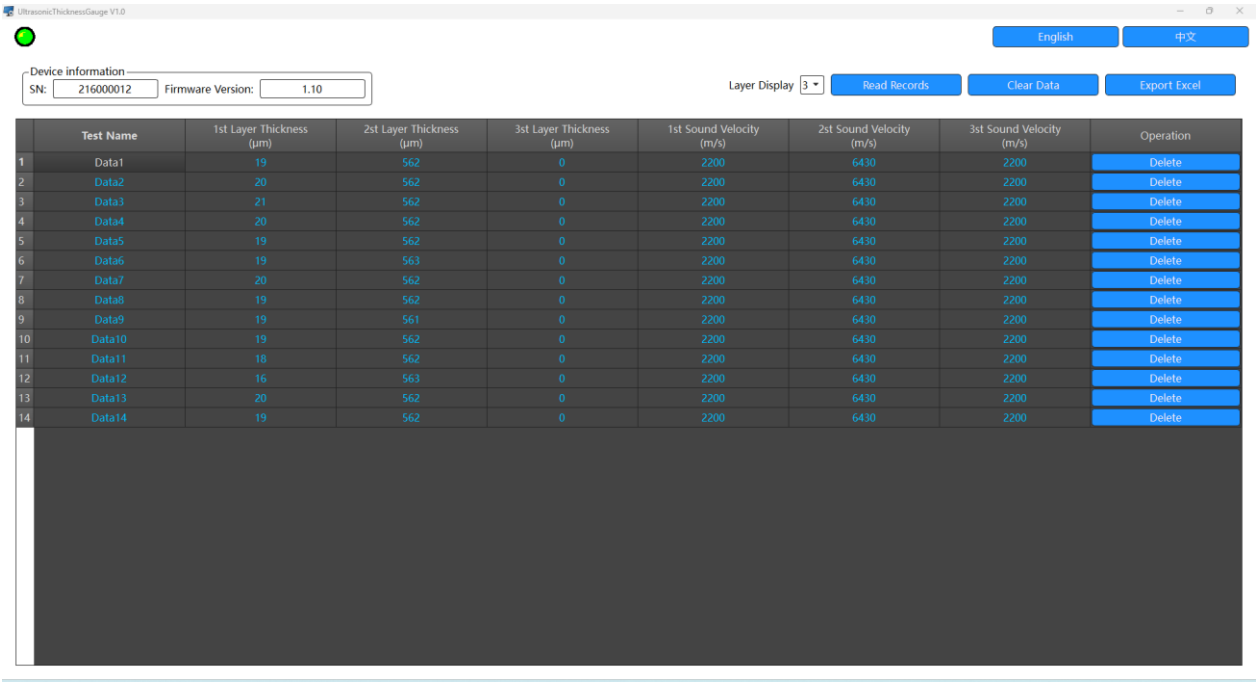
Use fingers to pinch and pull up the "Plug-in", the plug will be pulled out

Locked state

Unlocked state

5. PC Software

The ultrasonic thickness gauge can be connected to a computer via USB for operation with the dedicated PC software.The software supports real-time measurement synchronization, measurement data reading, and data export to Excel, among other functions.



	Test Name	1st Layer Thickness (μm)	2st Layer Thickness (μm)	3st Layer Thickness (μm)	1st Sound Velocity (m/s)	2st Sound Velocity (m/s)	3st Sound Velocity (m/s)	Operation
1	Data1	19	562	0	2200	6430	2200	Delete
2	Data2	20	562	0	2200	6430	2200	Delete
3	Data3	21	562	0	2200	6430	2200	Delete
4	Data4	20	562	0	2200	6430	2200	Delete
5	Data5	19	562	0	2200	6430	2200	Delete
6	Data6	19	563	0	2200	6430	2200	Delete
7	Data7	20	562	0	2200	6430	2200	Delete
8	Data8	19	562	0	2200	6430	2200	Delete
9	Data9	19	561	0	2200	6430	2200	Delete
10	Data10	19	562	0	2200	6430	2200	Delete
11	Data11	18	562	0	2200	6430	2200	Delete
12	Data12	16	563	0	2200	6430	2200	Delete
13	Data13	20	562	0	2200	6430	2200	Delete
14	Data14	19	562	0	2200	6430	2200	Delete

IV. Precautions

1. The sound velocity is a key parameter for ultrasonic thickness measurement. Only by setting the correct sound velocity can an effective thickness value be obtained. It is recommended to use the material of known thickness and the same material as the object to be measured to set the sound velocity.

2. The probe should be kept in the center of the point to be measured, and the periphery of the probe should not be suspended outside the surface to be measured.
3. Please ensure that the sample is uniform and the surface is flat and clean, otherwise it will affect the measurement accuracy.
4. When the instrument has worked for a long time, it is recommended to perform reference calibration to avoid the influence of the external environment on the instrument.
5. The probe and standard block should be cleaned to prevent them from being corroded after using.
6. When measuring smooth coatings, water or detergent can be used as coupling agent. When measuring rough coatings, please use the coupling agent configured by the manufacturer or similar thick liquids. Be careful whether the coupling agent will damage the coating.
7. Slight wear of the probe can be compensated by zero calibration.

V. Packing List

No.	Description	Quantity	Unit
1	Ultrasonic Thickness Gauge	1	pcs
2	Ultrasonic Probe	Number of probes already ordered	
3	USB Cable	1	pcs
4	Fluid Coupling	1	pcs
5	User Manual	1	pcs
6	Calibration Report	1	pcs

VI. 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 manufacturer.