Ultrasonic Thickness Gauge

Code: 86212

User Manual V2.2

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

I. Product introduction

Ultrasonic thickness gauge adopts the principle of the reflected plus ultrasonic measurement, which is specialized in thickness measurement of materials that can transmit ultrasonic waves such as metals (e.g. steel, aluminum, copper, etc.), plastics, ceramics, glass, etc. The instrument employs a professional design of time-chip with a resolution of up to 0.001 mm.

The product conforms to the standard: JJF1126-2004 Calibration Specification for Ultrasonic Thickness Gauge.

II. Parameter

1. Probe specifications and parameters

Probe	Standard Probe	Micro-diameter Probe	Coarse Crystal Probe	High Temperature Probe
Probe Model	5MHZφ10	7MHZ PT-06	2MHZ ZT-12	5MHZ GT-12
Minimum measuring area	φ10mm	φ6mm	φ12mm	φ12mm
Probe size	φ18*26mm	φ15*25mm	φ18*28mm	φ43*48mm
Measuring Range(45#steel)	0.8-350mm	0.75-80mm	3-200mm	3-200mm
Accuracy(H is the standard value)	H<10mm:±0.05 H>=10mm:±0.5%H	H<10mm:±0.05 H>=10mm:±0.5%H	H<10mm:±0.1 H>=10mm:±1%H	H<10mm:±0.05 H>=10mm:±0.5%H
Exposure temperature	-10~60℃	-10~60℃	-10~60℃	-10~500℃
Pipe measurement lower limit(45# steel)	φ20*3mm	φ20*2mm	φ30*4mm	φ30*4mm
Application	Measure conventional workpieces	Measure surfaces and small workpieces	Cast iron and some materials with large crystal particles	Measure high temperature workpieces

2. Host parameters

Resolution	0.8-10mm:0.001mm 10-100mm:0.01mm 100-350mm:0.1mm
Sound Velocity Range	1000~9999m/s
Display	240×160 dot matrix LCD
Unit	mm/inch
Power Supply	2pcs of 1.5V AA alkaline battery
Host Size	142*72*28 mm
Weight	About 230g
Operation Temperature Range	-10~50℃，0~85%RH（No condensation）
Storage Temperature Range	-10~60℃，0~85%RH（No condensation）

III. Characteristics

1. The instrument adopts a professional design of time-chip with a resolution of up to 0.001 mm and it has good stability and measurement accuracy.
2. With the function of gain automatic change, the instrument automatically selects the appropriate gain according to the material type and thickness so as to achieve the best measurement effect.
3. It has ultra-high measuring range: 0.8-350mm. (Standard probe applicable.)
4. With the function of penetrating the coating to measure the thickness of the substrate (standard probe applicable).
5. With QC judging function, it can judge whether the materials are qualified according to the upper and lower specification limits to realize the rapid detection of materials.
6. With statistical function, it can automatically count the maximum, minimum and average values of the latest 9 measured values.
7. The instrument can adjust sound velocity in 3 ways: setting sound velocity based on material/ thickness/ manually.
8. The instrument intelligently identifies the model of the probe, and the instrument adapts the display interface according to the probe type.

IV. Operation

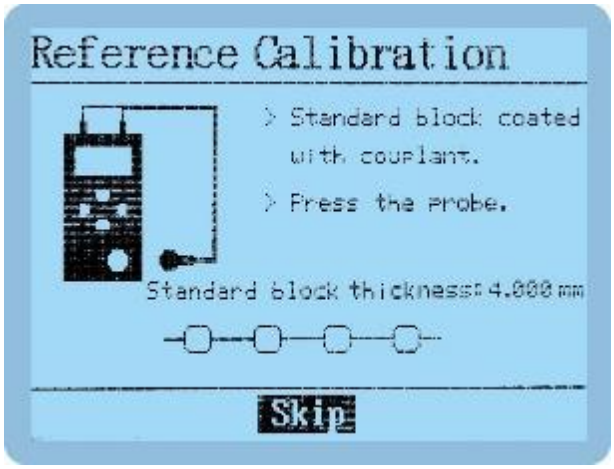
1. Turn on/off

Turn on: Short press on the button Enter to boot, the version number and a serial number of the instrument will be displayed, and then enter the interface of benchmark adjustment.

Turn off: Long press on the button Enter or click "turn off" in the menu bar to power off the instrument. The instrument will automatically shut off when the time of no operation is longer than the setting automatic shutdown time.

2. Reference calibration

After entering the interface of "Reference Calibration", the user can perform the operation of reference calibration according to the animate calibration of hint, or skip the step. When the instrument has not been used for a long time, it is recommended to calibrate it.



If it prompts that the calibration fails, the possible reasons are as follows:

- The calibration block used is wrong. Please use the standard block in the lower right corner of the instrument to calibrate.
- The fluid coupling applied to the standard block is not enough. Please apply enough fluid coupling, press the probe tightly against the standard block and keep it still until the calibration is prompted.
- Instrument malfunction and it need to be repaired returning to the factory.

3. General Measurement

Apply coupling fluid on the surface of the material, press the probe of the instrument tightly and keep it still, then the user can get the thickness of the material. When the probe is well coupled with the material to be tested, the coupling mark on the right side of the screen will remain still and a buzzer will prompt.

The instrument has the following two measurement modes:

(1) Statistical mode

The interface of statistics mode is shown in the figure below (left). The instrument simultaneously displays the maximum, minimum and average values of the current statistical data, as well as the number of valid data. The number of statistics is the latest 9 valid measurements. When it is less than 9 data, the actual data volume shall prevail.

(2) QC mode

The interface of QC mode is shown in the figure below (right). The instrument judges whether the measured value is qualified according to the upper and lower specification limits.

Note: The sound velocity of various materials is different. Please set different sound velocity according to different materials to avoid measurement errors.

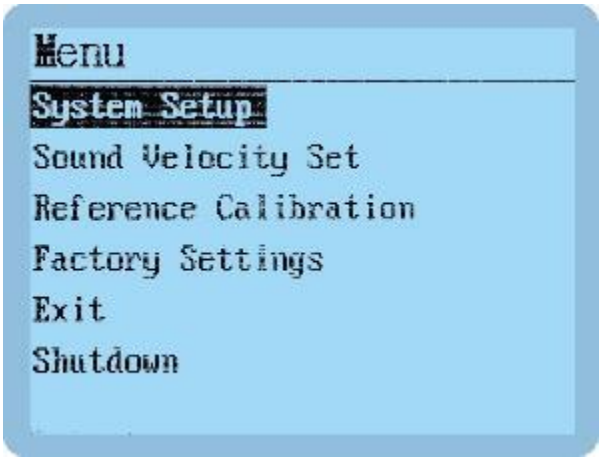
4. Penetrating coating measurement

When the surface of the workpiece has a coating or paint layer, it will make the measurement results error, the standard probe with penetration coating measurement, without removing the coating on the surface of the workpiece, that can accurately measure the actual thickness of the substrate under the workpiece coating. This function is achieved by measuring two consecutive bottom echoes of the substrate, which can penetrate the coating thickness of 0.2~2.5mm and measure the thickness of the substrate (45# steel) of 4~60mm.

In the system setting interface there is a switch selection for the penetration coating function, set the penetration coating to on to make the measurement of the penetration coating, and the measurement interface is shown as follows:

5. Setting and Calibration

A long press on the button Enter for 3 seconds in the off state or a short press on the button Enter in the measurement state enters the [main menu] of the instrument. There are six sub-options. The user can use the buttons ▲▼ to select the options of [system Setup/sound velocity set/Reference calibration/Factory Settings /Exit/Shutdown]. Short press on the button Enter to confirm your selection.



(1) System Setup

Language: Short press the button Enter or Del to enter the language selection. These two buttons ▲ or ▼ are available to select language. A short press on the button Enter completes the setting.

Unit: Short press on the button Enter to enter the unit selection. These two buttons ▲ or ▼ are available to select units. A short press on the button Enter completes the setting.

AutoOff: Short press on the button Enter or Del to enter the selection of shutdown time. These two buttons ▲ or ▼ are available to select shutdown time. A short press on the button Enter completes the setting.

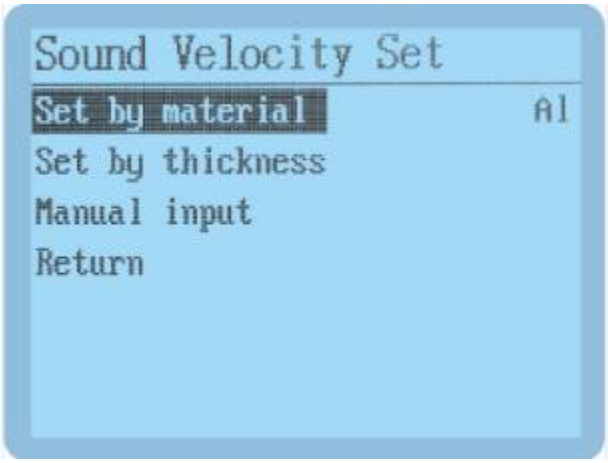
Mode: Short press the button Enter or Del to enter the mode selection. These two buttons ▲ or ▼ are available to select measuring modes. A short press on the button Enter completes the setting.

Limit Set: The limit setting is only displayed in QC mode. Short press the button Enter to enter the interface of limit settings. These two buttons ▲ and ▼ are available to select [upper limit/lower limit/return]. Short press on the button Enter to enter the value adjustment, and short press the buttons Cal Del ▲▼ to adjust the value. A short press on the button Enter confirms the selection.

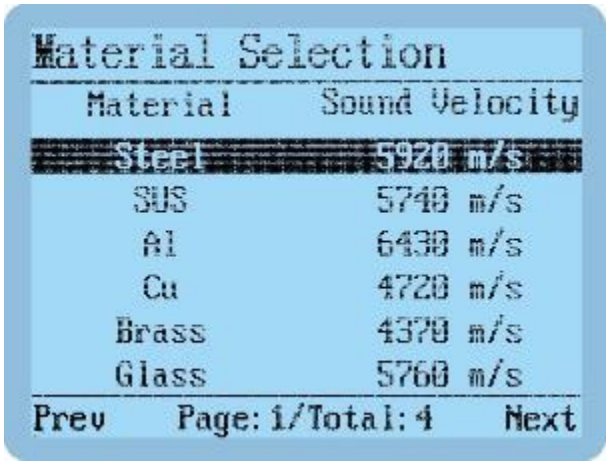
E-E Mode: Short press the button Enter or Del to enter the switch selection of through the coating, These two buttons ▲ and ▼ are available to switch [On/Off], short press on the button Enter confirms the selection.

(2) Sound velocity Set

Short press the buttons ▲▼ to select [Set by material/Set by thickness/Manual input/Return]. A short press on the button Enter confirms the selection.

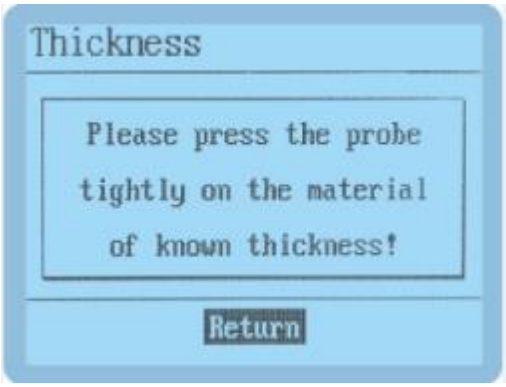


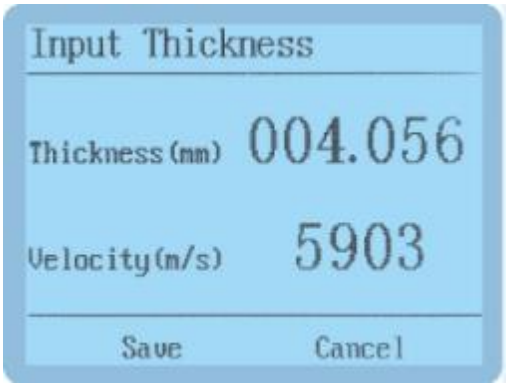
Set by material: The user can set the sound velocity according to the known material. Short press the button Enter to enter the interface of material selection, and short press the buttons Cal Del ▲▼ to select the corresponding materials. A short press on the button Enter confirms the selection. The setting is completed.



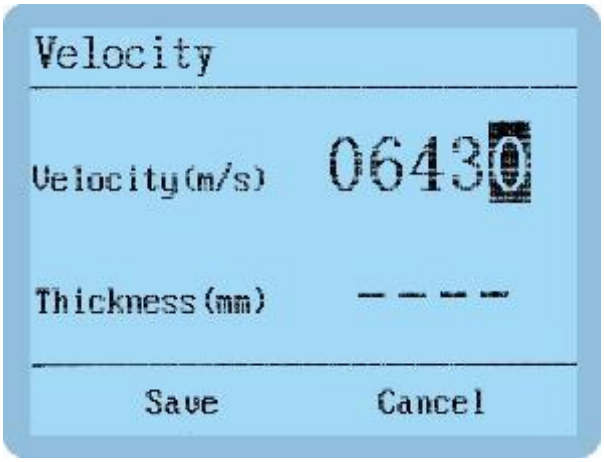
Set by thickness: Knowing the thickness of the material, the user can measure the sound velocity through the thickness, and then use the back-measured sound velocity to measure the quality of the material and the thickness of the material with similar thickness. Short press the button Enter to enter the prompt interface "Please press the probe tightly against the material with known thickness". Press the probe of the instrument tightly against the surface of the material with couplant and keep it still. The instrument will automatically jump to the interface of "Enter the actual thickness of the material" where

the user can short press the buttons Cal Del ▲▼ to adjust the value to be consistent with the thickness of the material. A short press on the button Enter selects [Save]. The setting is completed.





Manual input: Short press the button Enter to enter the interface of setting the sound velocity manually and short press the buttons Cal Del ▲▼ to adjust the value. The user can check whether the thickness displayed on the interface is consistent with the thickness of the currently measured material during the adjustment process. A short press on the button Enter selects [Save]. The setting is completed.



(3) Reference calibration

The function of " Reference Calibration" in the main menu is the same as that of "Benchmark Calibration" when the instrument is powered on.

(4) Exit

A short press on the button Enter exists the main menu and enters the measurement interface.

(5) Shutdown

A short press on the button Enter turns off the instrument.

6. Quickly set the sound velocity

In the measurement mode, when the measurement is completed, short press the button- Cal to enter the interface of the sound velocity manual setting, and adjust the current sound velocity according to the measured value. The detailed operation is the same as 4.4.2 Manual setting of the sound velocity.

7. Check measurement records

In the measurement mode, short press the buttons ▲▼ to enter the browsing interface to view historical data. The instrument stores a total of 9 sets of data. When more than 9 sets of data are exceeded, the oldest recorded value is automatically deleted. Record 1 is the earliest test data, and it is pushed back in turn. Recorded data is not lost when the instrument powers off.

When press the button ▲ to check, the number of recorded data increases successively from the first one; when press the button ▼ to check, the number of recorded data decreases from the maximum to the bottom.

In the mode of historical browse or measurement, short press the button Del to display the prompt interface of data deletion, and select [Yes] with a short press on the button Enter to delete all recorded data.

8. 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:

V. Bluetooth connection APP function

The instrument has built-in Bluetooth communication module, which can be connected to cell phone APP.

VI. APP Function

1. APP Installation

The measuring instrument APP supports 7.0 and above Android operating system, search “UT and HL” on google play, follow the instructions to download and install the APP.

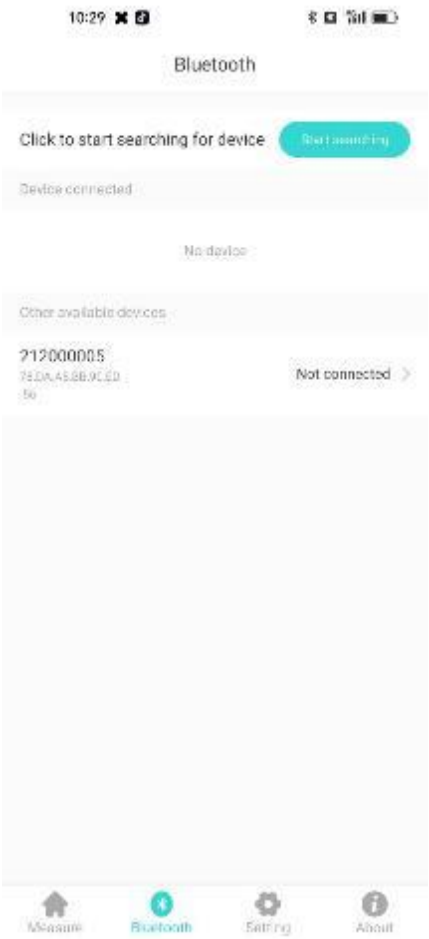
APP icon

Cautions:

During installation or open the APP after the first installation, the phone will prompt permission settings, customers need to set all to allow, otherwise it will appear that APP can not search the device and will not be able to use APP.

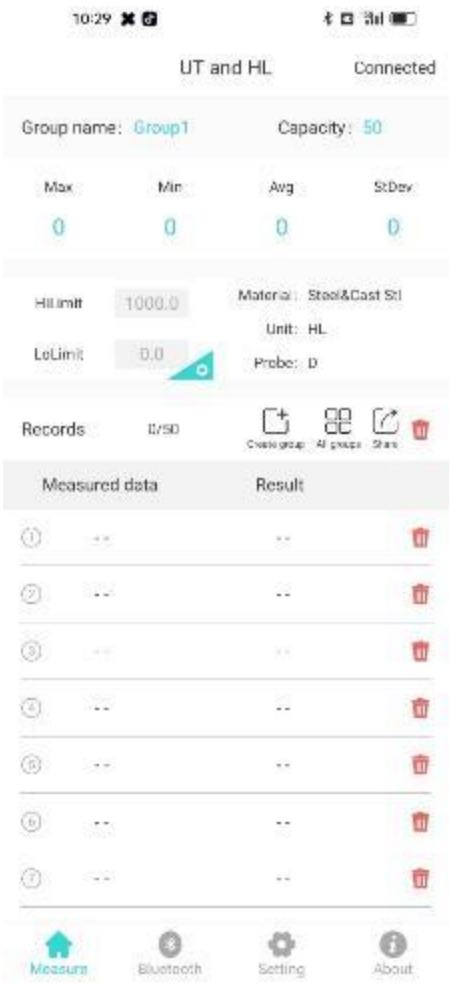
2. Device connection

The instrument is turned on, open the APP software, firstly display the LOGO interface. 3 seconds after the LOGO display, if there is no bound Bluetooth device, then enter the Bluetooth interface. Click "Start Searching", prompt "Searching for device", and list the available Bluetooth devices searched; click "Stop Searching" button to stop searching for Bluetooth devices. Click on the device matching the SN number of the instrument, wait for the device to connect, after successful connection, it will jump to the "Measurement" interface.



Bluetooth connection interface

If the APP has a bound Bluetooth device, the logo interface will automatically search and connect the bound Bluetooth device after 3 seconds, and the successful connection will automatically enter the "measurement" interface.



Measurement interface

3. Measurement interface

(1) Bluetooth connection status

The APP is connected successfully, the upper right corner of the interface shows "Connected", and the APP is disconnected, showing "Not connected". When not connected, tap it, and the APP will automatically reconnect the bound device.

(2) Data group modification operations

Click the data group name, the interface pops up, you can modify the name. Click the quantity area to modify the amount of test data in the data group.

(3) Statistical information

The statistical information area displays the max. value, min. value, average value and standard deviation of the measured data.

(4) Upper and lower limit setting

Set the upper and lower limits, which are used to judge whether the measured value is qualified.

(5) Instrument information

Display instrument setup material, unit, connected probe type.

(6) Create groups

Click Create Groups icon to automatically save the previous group and generate a new group.

(7) All groups

Click All Groups icon to select a set of data for open and delete operations.

(8) Share

Click the Share icon, enter the file name first, choose one of the four file formats of PDF, PNG, CSV and TXT, and then share the file with your friends through QQ, WeChat, etc.

(9) Delete

Click the Delete icon and ask "Clear all historical records?", select “Cancel” to return, and select “OK” to delete all measured values. You can also delete a single record in the measurement list.

(10) Measurement records

Displays the total number of current groups and the number measured.

4. APP measurement

Every time the instrument measures, the measured value will be automatically uploaded to the APP, and the APP will display the measured value in the form of a list on the measurement interface and judge whether it is qualified or not.

5. Set up

Set the APP measuring sound, alarm sound and testing vibration, vibration alarm.

VII. 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. The other surface of the tested material must be parallel or coaxial with the tested surface.
4. For coarse-grained materials such as cast iron, it will cause a lot of scattering of ultrasonic waves, which requires the use of coarse crystalline probes for measurement.5. The probe is easy to be

scratched on the rough surface. Try to reduce the sliding of the probe on the rough surface. If the probe is seriously worn, it should be replaced in time.

6. 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.
7. When the instrument displays Low battery, it needs to be replaced with a new battery.
8. The probe and standard block should be cleaned to prevent them from being corroded after using.
9. The recommended calibration cycle is one year, and the company provides calibration services.
10. When measuring curved surfaces, the split surface of the probe should be measured perpendicular to the axis of the surface.

VIII. Packing List

Number	Products' name	Quantity
1	Ultrasonic Thickness Gauge	1
2	Test Probe	Number of probes ordered
3	1.5V AA Alkaline battery	2
4	Fluid Coupling	1
5	Silicone Case	1
6	Instructions	1
7	Certificate/Warranty Card	1
8	Calibration Report	1

IX. 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.