UNI-T
UNI-TREND TECHNOLOGY（CHINA）CO., LTD.
No.6, Gong Ye Bei 1st Road,
Songshan Lake National High-Tech Industrial
Development Zone, Dongguan City,
Guangdong Province, China
Tel: (86-769) 8572 3888
http://www.uni-trend.com

P/N:110401111158X
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UNI-T

Ultrasonic Thickness Gauge

UT345A

Operating Manual

1. Overview

This product is an intelligent ultrasonic thickness gauge that adopts the latest high performance and low power consumption microprocessor technology. Based on the principle of ultrasonic measurement, it can measure the thickness and sound speed of metal and other materials. It can detect the thinning of pipes and pressure vessels after corrosion, and can make accurate measurements of plates and machined parts. The gauge can be widely used in petroleum, chemical, metallurgy, shipbuilding, aviation, aerospace and other fields.

1.1 Operating Principle

When measuring the thickness, the ultrasonic pulse is generated by the probe to reach the measured body through the coupling agent. Part of the ultrasonic signal is reflected from the bottom of the object, and the probe receives the reflected echo. The gauge calculates the round trip time of the ultrasonic wave and the thickness value according to the following formula, and then displays the calculated results.

$$H = \frac{v \times t}{2}$$

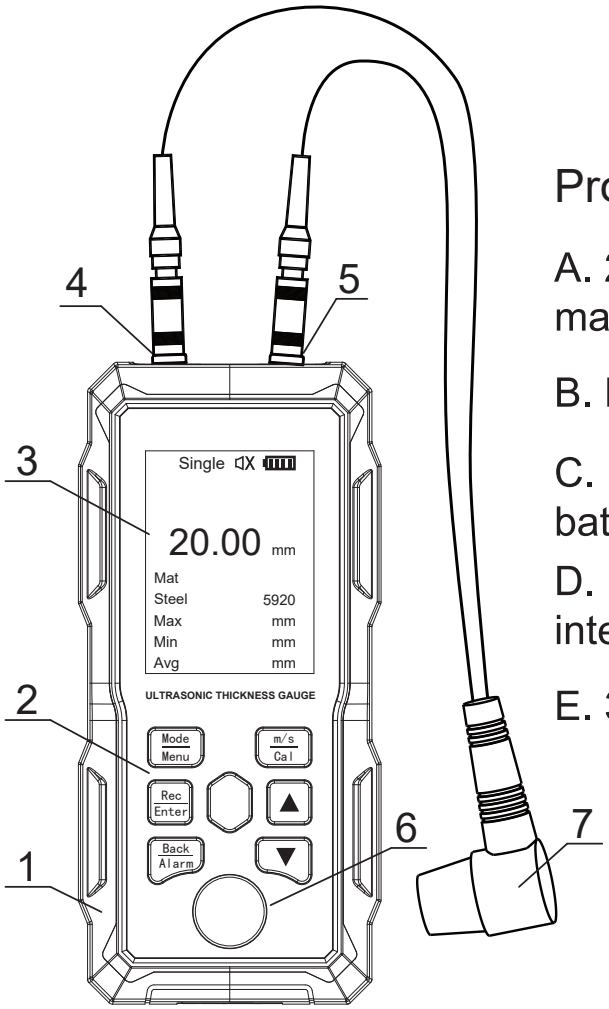
In the formula: H-Measured thickness; V-Material sound velocity; t-Round trip time of ultrasonic wave in specimen

1.2 Specifications

Display	2.4" monochrome dot matrix screen
Language	English/Chinese
Measurement range	1.00~300.00mm
Sound velocity range	(1000～9999) m/s
Unit	0.1mm/0.01mm/0.01in
Accuracy	H<10mm, ±0.1mm, H is the actual thickness; H≥10mm, ±(1%H+0.1)mm
Lower limit of pipe measurement	Φ20×3mm (steel)
Data storage	300 groups, including material, sound velocity, unit, measured value, MAX, MIN and AVG of each group
Main functions	Single measurement, continuous measurement, alarm, sound velocity measurement, auto calibration
Battery	Built-in 3.7V 2000mAh lithium battery
Charging specification	DC5V 1A, Type-C interface
Operating time (full battery)	About 16h
Operating temperature and humidity	0℃~40℃ 10%RH~80%RH
Storage temperature and humidity	-10℃~50℃ 10%RH~70%RH
Product size	140×66×28.5mm

Note: 1) Oil coupling agent cannot be used for the standard probe, otherwise the probe will be damaged. After using the probe, please wipe the residual coupling agent on it to extend its service life.
2) Please avoid using the product in oily environment as far as possible. If unavoidable, minimize the contact time with oily substances, and wipe the probe surface with oil-absorbing paper after use.

2. Structure and Appearance



Product features

A. 2.4" monochrome dot matrix screen

B. English/Chinese interface

C. Built-in 2000mAh lithium battery

D. DC5V/1A, Type-C charging interface

E. 300 groups of data storage

1. Outer shell 2. Buttons 3. Display

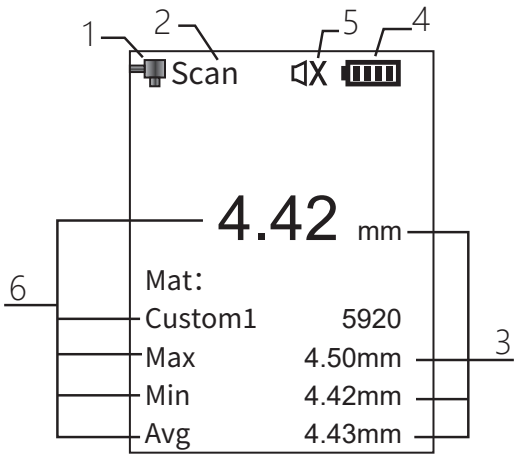
4. Transmitting socket 5. Receiving socket

6. Standard thickness block

7. Probe

2.1 Main Interface

After the gauge is turned on, it will automatically enter the main interface, as shown below:



1) Coupling state: The coupling state of the probe and the measured workpiece

2) Mode: Display the current measurement mode

3) Unit: mm (metric), or in (imperial)

4) Battery status: Display the remaining battery power

5) Sound: Alarm sound on/off

6) Information display: Display measured thickness, material, sound velocity, MAX, MIN and AVG

3. Battery Charging and Maintenance

The product is equipped with a non-removable 3.7V 2000mAh lithium battery.
When the product cannot be turned on or the battery is empty, please charge it in time.
Charge the product with a DC5V adapter larger than 1A and the charging interface is Type-C.
When charging, the battery icon scrolls. When fully charged, the battery icon becomes full.

Note: When not in use for a long time, the product should be fully charged and recharged every six months to avoid battery damage.

4. General Measurement Process

A. Prepare the object to be measured, refer to 5.1 Treatment of Measured Workpiece Surface.

B. Insert the probe and turn on the gauge.

C. Gauge calibration, refer to 6.5 Calibration.

D. Sound velocity measurement. The sound velocity of the workpiece is uncertain, refer to 6.6 Sound Velocity Measurement.

E. Measure the thickness. Measure the thickness of the workpiece of the same material with the sound velocity.

5. Preparation

5.1 Treatment of Measured Workpiece Surface

If the measured object surface is rough or seriously rusted, please use the following methods:

- Use coupling agent on the measured object surface
- Use rust remover, wire brush or sandpaper to treat the surface
- Multiple measurements near the same point

6. Operation

6.1 Power On/Off

Insert the probe into the gauge and short press  to power on.Long press  to power off.

Auto power off: The product will shut down automatically when there is no operation. The default time is 5 minutes.

Users can select the auto power off time, refer to 6.18 Power Off.

Force shutdown: Long press the Power button for more than 10s.

6.2 Single Measurement

Evenly smear the coupling agent on the area to be measured. Tightly couple the probe to the material surface, and the thickness of the measured area will show on the screen. When the probe is well coupled to the material, the screen will display the coupling symbol . If the coupling symbol flickers or there is no coupling symbol, it indicates that the coupling condition is bad and the coupling agent needs to be added. After the probe is removed, the coupling symbol disappears and the thickness value remains.

Figure 1 Add the coupling agent

Figure 2 Evenly smear the coupling agent and tightly couple the probe to the material surface.

6.3 Continuous Measurement

Evenly smear the coupling agent on the area to be measured and couple the probe to the material surface. Move the probe along the surface. The gauge will display the current measured value, MAX, MIN and AVG in real time.

6.4 Alarm

Users can monitor the unqualified materials with the alarm function. Long press [redacted] to turn on/off the alarm.
If  is displayed on the screen, the alarm is turned on.
If  is displayed on the screen, the alarm is turned off.
For example:

Standard value: 4.00mm, limit: ±0.1mm. When the measured thickness is less than 3.90mm or greater than 4.10mm, the gauge will give an alarm sound, indicating that the thickness is not qualified. Users can press any button to exit the alarm, or continue measuring.

6.5 Calibration

Note: Calibration should be carried out when the probe is replaced, the ambient temperature changes greatly or the measurement deviation occurs.

Calibrate the gauge if it is used for the first time or not used for a long time. Calibration must be done using the standard thickness block. After calibration, the material automatically changes to steel, and the sound velocity changes to 5920m/s (0.233in/us).

Calibration steps:

1) Long press  to enter the calibration mode. "Please Calibrate" will show on the screen.

2) Refer to Figure 1 and Figure 2 in 6.2 Single Measurement to evenly smear the coupling agent on the surface of the standard thickness block. Press the probe on the coupling agent to make it tightly contact with the block surface. (Note: the coupling agent should not be too thick. Otherwise the gauge will count the thickness of the coupling agent, resulting in calibration errors).

3) Press  to save the calibration data. (Note: Before pressing  , the value displayed might not be 4mm. When the value is stable, press  . After calibration, the displayed value should be within the range of 4±0.04mm, otherwise recalibrate).

6.6 Sound Velocity Measurement

Different materials have different sound velocities. The materials and velocities listed in Appendix A are for r eference only.This function is used to measure the sound velocities of materials. The steps are as follows:

1) First calibrate the gauge.

2) Use a caliper to measure the thickness of the workpiece.

3) Use the gauge to measure the thickness of the workpiece.

4) Press  or  to make the thickness measured by the gauge the same as the value measured by the caliper.

5) Press  to calculate the workpiece sound velocity.

6) At this point, the correct sound velocity can be obtained, and the correct thickness can be obtained by measuring the same material with the sound velocity.

Note: The thickness adjustment range is ±20mm (±0.79in) (for customized materials, ±250mm (±9.84in)). The upper limit is 300mm, and the lower limit is 1mm. In case of misoperation, users can refer to 6.7 Sound Velocity Selection.

6.7 Sound Velocity Selection

Users can select the sound velocity according to the material. When the current unit is mm, the unit of sound velocity is m/s. When the unit is in, the unit of sound velocity is in/us. In the main interface, short press [ ] to select the material. The gauge has three types of custom materials. If users do not know which material to select, they can select the custom materials and then measure the sound velocity of the material, refer to 6.6 Sound Velocity Measurement.

Material selection interface

MAT	
Steel	5920
Stainless	5740
Brass	4399
Copper	4720
Iron	5930
Cast iron	5110
Plumbum	2400

1) [▲] Press to step through the options upwards.

2) [▼] Press to step through the options downwards.

3) [ ] Press to confirm the selected material and enter the sound velocity adjustment interface.

4) [ ] Press to return to the main interface.

Sound velocity adjustment interface

SPD

Adjust range
5720 - 6120

▲

5920 m/s

▼

1) Press [▲] to add the value. Long press it to scroll up.

2) Press [▼] to subtract the value. Long press it to scroll down.

3) Press [ ] to confirm the sound velocity and return to the main interface.

4) Press [ ] to return to the material selection interface.

6.8 Clear Measured Results

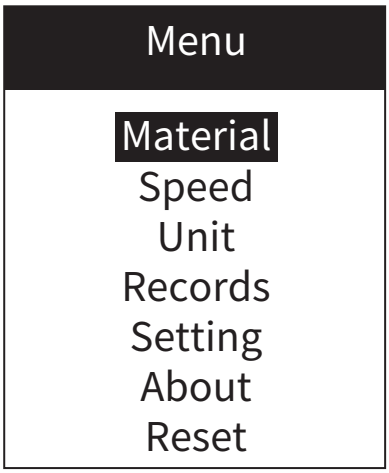
In the single and continuous measurement interfaces, short press  to clear the current measured results (including MAX, MIN and AVG). In the continuous measurement mode, the results can only be cleared after the probe is removed.

6.9 Data Storage

In the single and continuous measurement interfaces, long press  to save records. Each record includes the current measured value, MAX, MIN, AVG and material sound velocity. A maximum of 300 groups of data can be stored. To view and delete records, refer to 6.14 Records. In the continuous measurement mode, the data can only be saved after the probe is removed to avoid storing unstable data.

6.10 Menu

Long press [MENU] to enter the menu. The options include Material, Speed, Unit, Records, Setting, About and Reset.



1) Press [▲] to step through the options upwards.

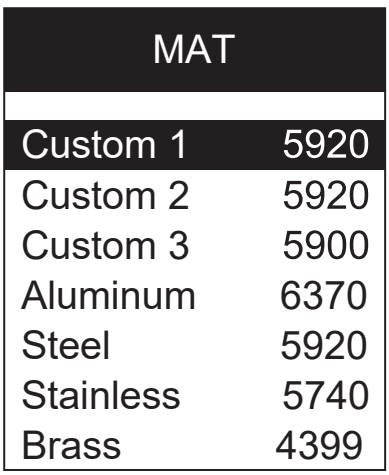
2) Press [▼] to step through the options downwards.

3) Press [MENU] to enter the interface of the selected option.

4) Press [MENU] to exit the menu and return to the main interface.

6.11 Material

In the material selection interface:



1) Press [▲] to step through the materials upwards

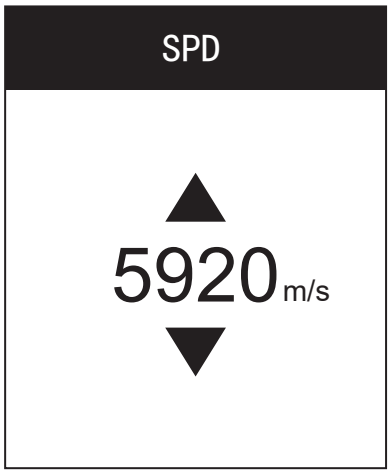
2) Press [▼] to step through the materials downwards.

3) Press [MENU] to confirm the selected material and return to the menu.

4) Press [MENU] to return to the menu.

6.12 Speed

The default value is ±200m/s (0.008in/us). The adjustment range of custom materials is 1000m/s to 9999m/s (0.039in/us to 0.394in/us).



1) Press ▲ to add the value. Long press it to scroll up.

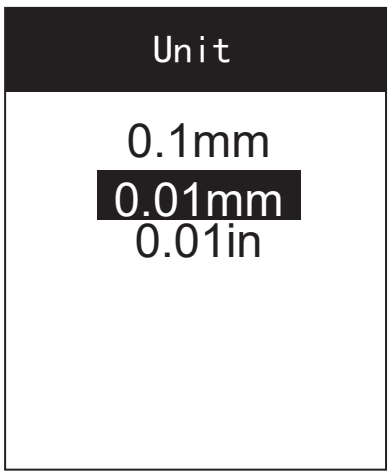
2) Press ▼ to subtract the value. Long press it to scroll down.

3) Press [redacted] to save and return to the menu.

4) Press [redacted] to return to the menu.

6.13 Unit

In the unit selection interface:



1) Press ▲ to step through the units upwards.

2) Press ▼ to step through the units downwards.

3) Press [redacted] to save and return to the menu.

4) Press [redacted] to return to the menu.

6.14 Records

In the menu, select "Records" and press to enter the records interface. When there is no record, the screen will display "No records", and the gauge cannot enter the records interface.

1) Press ▲ to step through the options upwards.

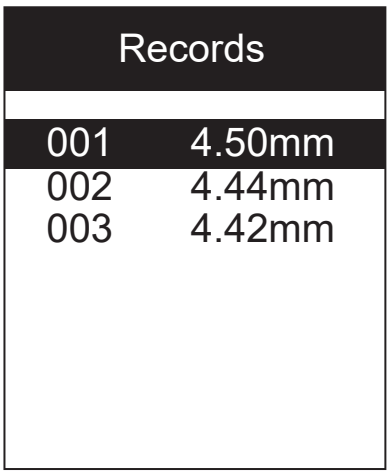
2) Press ▼ to step through the options downwards.

3) Press to enter the interface of the selected option.

4) Press to return to the menu.

6.14.1 First Page

Select "First page" and the screen will display the records from the first page. The number and value of each record will also be displayed.



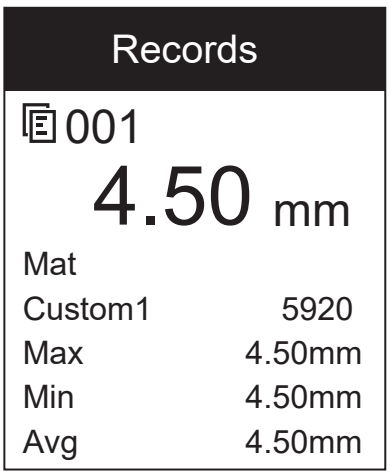
1) Press ▲ to page up.

2) Press ▼ to page down

3) Press to select a record.

4) Press to return to the records interface.

When a record is selected, press ▲ or ▼ to step through the records upwards or downwards. Short press [ ] to view the detailed information of the selected record (NO., measured value, MAX, MIN and AVG). Short press [ ] to return to the record list.



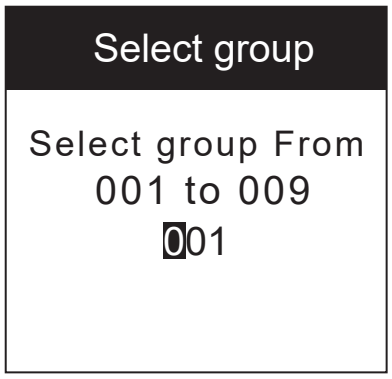
When viewing a record, users can long press [ ] to delete this record. Press ▲ or ▼ to view the previous or next record.

6.14.2 Last Page

Select "Last page" and the screen will display the records from the last page. The number and value of each record will also be displayed, refer to 6.14.1 First Page.

6.14.3 Selected Item

In the records interface, select "Selected item" to choose a record to be viewed. The screen will display the record list starting from the page where the selected record is located. The number and value of each record will also be displayed.



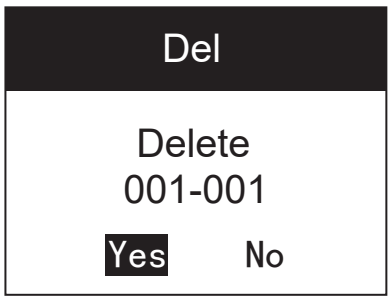
1) Press ▲ or ▼ to adjust the record number.
2) Press [Menu/Enter] to confirm the adjusted digit (tens digit/tens digit/ units digit). After the units digit is confirmed, it will enter the page where the selected record is located.
3) Press [Esc] to return to the records interface.

6.14.4 Delete the Item

In the records interface, select "Delete the item" to choose the record to be deleted.

1) Press ▲ or ▼ to adjust the record number.
2) Press [Menu/Enter] to confirm the adjusted digit (tens digit/tens digit /units digit). After the units digit is confirmed, a prompt will pop up.
3) Press [Esc] to return to the records interface.

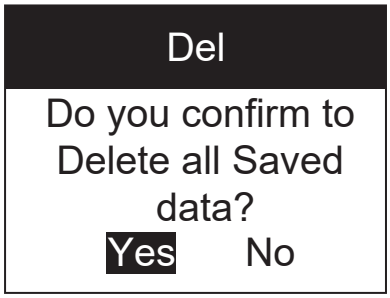
When the prompt pops up, users can press ▲ or ▼ to select Yes/No, and then press [Menu/Enter] to delete or not. Press [Esc] to return to the previous interface.



Deleting records takes a while.

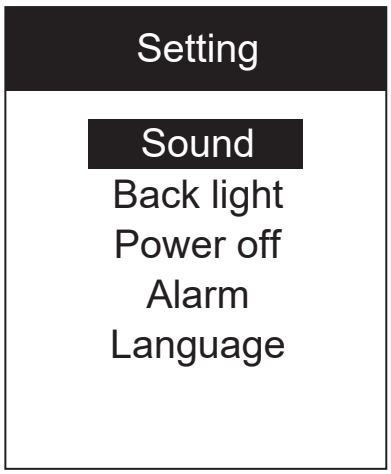
6.14.5 Delete All

In the records interface, select "Delete all" to delete all records. Press ▲ or ▼ to select Yes/No, and then press [ ] to delete or not. Press [ ] to return to the records interface.



6.15 Setting

In the setting interface:



1) Press ▲ to step through the options upwards.

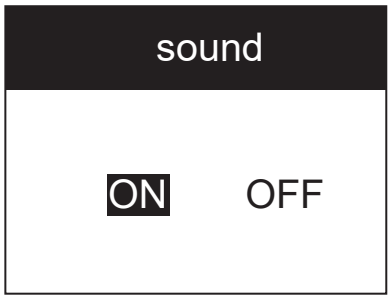
2) Press ▼ to step through the options downwards.

3) Press [ ] to enter the interface of the selected option.

4) Press [ ] to return to the menu.

6.16 Sound

In the sound interface:



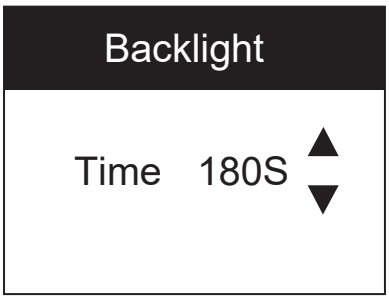
1) Press ▲ or ▼ to select ON/OFF.

2) Press [ ] to save.

3) Press [ ] to return to the setting interface.

6.17 Backlight

In the backlight interface:



1) Press ▲ to add the backlight time.

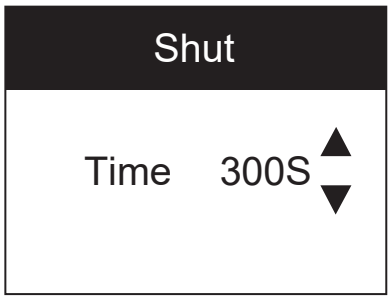
2) Press ▼ to subtract the backlight time.

3) Press [ ] to confirm.

4) Press [ ] to return to the setting interface.

6.18 Power Off

In the power off interface:



1) Press ▲ to add the power off time.

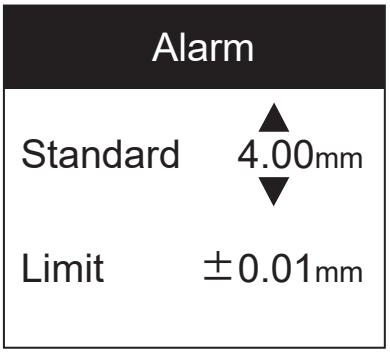
2) Press ▼ to subtract the power off time.

3) Press [ ] to confirm.

4) Press [ ] to return to the setting interface.

6.19 Alarm

In the alarm interface, first adjust the standard value, and then adjust the limit. Long press ▲ or ▼ to quickly adjust the value.



1) Press ▲ to add the standard/limit.

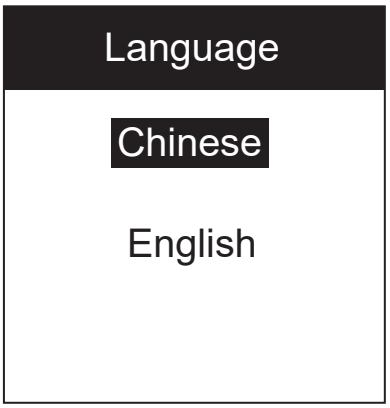
2) Press ▼ to subtract the standard/limit.

3) Press [redacted] to confirm.

4) Press [redacted] to return to the setting interface.

6.20 Language

In the language interface:



1) Press ▲ to step through the options upwards.

2) Press ▼ to step through the options downwards.

3) Press [redacted] to save.

4) Press [redacted] to return to the setting interface.

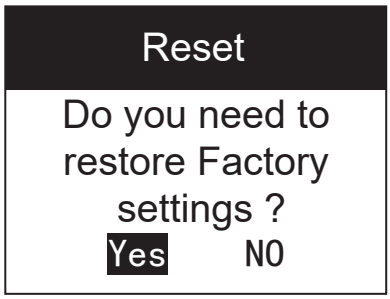
6.21 About

Press [ ] to return to the setting interface in the about interface.

The content will be updated later. The actual situation prevails.

6.22 Reset

In the reset interface:



1) Press ▲ or ▼ to select Yes/No.

2) Press [ ] to confirm.

3) Press [ ] to return to the setting interface.

7. Measurement Applications

7.1 Measurement Modes

●Single point measurement: Use the probe to measure any point of the measured object. The displayed value is the thickness.

●Two-point measurement: Use the probe to measure the same point of the measured object twice. The probe parting plane is 90°, and the smaller value is the thickness.

●Multi-point measurement: Multiple measurements are made in a circle with a diameter of about 30mm, and the minimum value is the thickness.

●Continuous measurement: Continuously measure along a specified route with the single point method. The distance between each point is not less than 5mm, and the minimum value is the thickness.

7.2 Tube Wall Measurement

The probe split surface can measure along the axis of the pipe or the axis of the vertical pipe. If the pipe diameter is large, the measurement should be in the direction of the vertical axis. When the pipe diameter is small, it should be measured in both directions, and take the minimum value as the thickness.

8. Maintenance and Cautions

8.1 General Cautions

●The gauge and probe should be avoided from strong vibration.

●Do not place the gauge in a damp environment.

●Do not rotate the probe when inserting or removing it to avoid damaging the cable core.

●The attachment of oil and dust will make the probe cable gradually aging and fracture. After use, the dirt on the cable should be removed.

8.2 Cautions during Measurement

●Good measurements are made only when stable coupling symbol appears;

●When there is a large amount of coupling agent on the object surface, it will cause mismeasurement. Therefore, at the end of the measurement, the probe should be quickly removed from the surface.

●The probe surface is acrylic resin and should be gently pressed when used. When measuring rough surface, try to reduce the probe scratching on it.

●When measuring at room temperature, the surface of the measured object should not exceed 60℃, otherwise the probe can no longer be used.

●If the probe wears, the indicating value will be unstable. Please replace it.

8.3 Clean the Standard Thickness Block

The standard thickness block should avoid rust. Wipe the block after use, and don't come into contact with sweat. If not used for a long time, a little grease should be coated on the surface of the block, and the grease can be wiped after the next use.

8.4 Clean the Outer Shell

Alcohol and diluent have corrosive effect on the casing, so wipe it gently with a wet cloth.

8.5 Repair

When there are problems with the gauge (such as inability to measure, abnormal LCD display, large error and button operation failure or confusion), please do not disassemble or adjust any parts, and contact after-sales.

Appendix A Material Sound Velocity

Note: The sound velocities listed are approximate and are for reference only.

Material	Sound velocity	
	in/μs	m/s
User define 1	0.233	5920
User define 2	0.233	5920
User define 3	0.233	5920
Aluminum	0.250	6340-6400
Steel, common	0.233	5920
Steel, stainless	0.226	5740
Brass	0.173	4399
Copper	0.186	4720
Iron	0.233	5930
Cast Iron	0.173-0.229	4400－5820
Lead	0.094	2400
Nylon	0.105	2680
Silver	0.142	3607
Gold	0.128	3251
Zinc	0.164	4170
Titanium	0.236	5990
Tin	0.117	2960
Acrylic resin	0.109	2760
Epoxy resin	0.100	2540
Ice	0.157	3988
Nickel	0.222	5639
Plexiglass	0.106	2692
Porcelain	0.230	5842
PVC	0.094	2388
Quartz glass	0.222	5639
Rubber, vulcanized	0.091	2311

Appendix B FAQ and Solutions

B.1 Influence of Surface Conditions on Measurement Results

B.1.1 Surface Coverings

Before measurement, remove dust, dirt, rust, paint and other coverings on the object surface.

B.1.2 Rough Surfaces

Too rough surface can cause error, or even no reading. The material surface should be as smooth as possible. Grinding, polishing, filing and other methods are helpful, and a high-viscosity coupling agent can also be used.

B.1.3 Roughwrought Surfaces

Regular grooves created by roughwrought surfaces (such as lathes or machines) can also cause errors, as described above. In addition, adjust the angle between the probe partition board (through the bottom center of the probe metal thin layer) and the measured material groove, so that the partition board and the groove are vertical or parallel to each other. Take the minimum value as the thickness.

B.1.4 Cylindrical Surfaces

When measuring cylindrical materials, such as pipes, oil drums, etc., it is very important to correctly choose the included angle between the probe partition board and the axis of the measured material. The probe is coupled with the measured material, and the probe partition board is parallel or perpendicular to the material axis. Slowly shake the probe vertically along the axis, and the reading on the screen will change regularly. Take the minimum value as the thickness.

Select the angle between the probe partition board and the axis according to the curvature of the material. For pipe with large diameter, the probe partition board is perpendicular to the pipe axis. For pipe with small diameter, the probe partition board is perpendicular or parallel to the pipe axis. Take the minimum value as the thickness.

B.1.5 Composite Shapes

The method described above can be used when measuring materials with composite shapes (such as pipe elbows). The difference is that two measurements are made, reading the probe partition and axis perpendicular and parallel values respectively. Take the smaller value as the thickness.

B.1.6 Unparallel Surfaces

To obtain a stable and reliable value, the other surface of the material must be parallel or coaxial to the measured surface.

B.2 Influence of Temperature on Measurement Results

The thickness and the velocity of ultrasonic wave in the material are affected by temperature. When higher accuracy is needed, the blocks with the same material and approximate thickness can be measured under the same temperature. The temperature compensation coefficient can be obtained, and the measured value of the workpiece can be corrected with this coefficient.

B.3 Influence of Material Attenuation on Measurement Results

Fiber, porous, coarse crystal materials will cause a lot of ultrasonic scattering and energy attenuation, so that the gauge may have abnormal reading or no reading (abnormal reading is usually less than the actual thickness). In this case, the material is not suitable for measurement with this gauge.

B.4 Reference Blocks

The closer the material of the calibrated block is to the measured material, the more accurate the measurement will be. An ideal reference block would be a set of blocks of different thicknesses of the measured material, which would provide instrumental compensatory correction factors (such as material microstructure, heat treatment conditions, particle orientation, surface roughness, etc.). In most cases, satisfactory measurement accuracy can be obtained by using only one reference block. The block shall be of the same material and of a similar thickness as the measured material. The uniform material can be used as a block after measuring with a micrometer.

For thin materials, a block may be used to determine the exact lower limit when its thickness approaches the lower limit measured by the probe. Do not measure material below the lower limit of thickness. If the thickness range is estimable, the thickness of the block shall be the upper limit. When the material to be tested is thick, especially the alloy with a complex internal structure, one of the blocks close to the measured material should be selected to facilitate calibration.

The internal structure of most forgings and castings is directional. The sound velocity will vary in different

directions. To solve this problem, the test block should have an internal structure in the same direction as the measured material, and sound waves should travel in the same direction in the test block as in the material. In certain cases, the reference block can be replaced by the sound velocity table of the known material. But this is only approximating the substitution of some reference blocks. In some cases, the values in the sound velocity table differ from the actual measurements because of differences in the physical and chemical conditions of the material. This method is often used to measure mild steel, but only as a rough measurement. This gauge has the function of measuring the sound velocity, so it can measure the sound velocity first, and then measure the workpiece with the sound velocity.

B.5 Casting Measurement

The grain size of casting material is coarse and the structure is not dense enough, which will cause great attenuation of sound energy. In addition, the measurement is often carried out in the state of wool, so it is difficult to measure. The degree of attenuation is closely related to grain size and ultrasonic frequency. At the same frequency, the attenuation increases with the increase of grain diameter, but when it exceeds the highest point, the attenuation tends to a fixed value. For probes with different frequency, the attenuation increases with the increase of frequency. When the coarse grain and casting in the presence of coarse heterogeneous structure, the ultrasonic signal will produce abnormal reflection, grass echo or tree echo, resulting in the

reading error.
Coarse grain size and inconsistent densification of tissues at different positions in the workpiece will cause differences in sound velocity and make the measurement results inaccurate.

Note:

● When measuring the casting with rough surface, a coupling agent with high viscosity must be used.

● It is recommended to calibrate the sound velocity of the material with a block of the same material and direction as the measured object.

B.6.4 Probe Wear

The probe surface is acrylic resin. Long-term use will increase its roughness, resulting in a decrease in sensitivity. If the probe is badly worn, sandpaper or whetstone can be used to smooth the surface. If the measured value is still unstable, replace the probe.

B.6.5 Multilayer and Composite Materials

It is impossible to measure multilayer materials with incompact bonding surfaces because ultrasonic waves cannot penetrate uncoupled surfaces. Ultrasonic waves cannot spread at uniform speed in composite materials, so the gauges measuring thickness by ultrasonic reflection principle are not suitable for measuring multilayer and composite materials.

B.6.6 Influence of Oxide Layer on Metal Surface

Some metals, such as aluminum, have a dense oxide layer on their surfaces. This oxide layer is closely bonded with the matrix, but the spread speeds of ultrasonic wave in these two substances are different, so it will cause error. Please pay attention to this condition when using. Users can select a sample block from the same batch of measured materials, measure its thickness with micrometer or caliper, and calibrate the gauge with this sample block.

B.6.7 Abnormal Thickness Reading

Operators should be able to identify abnormal readings, which are usually caused by rust spots, corrosion pits, and internal defects. Solutions can be found in the relevant sections of this manual.

B.6.8 Selection and Use of Coupling Agents

The coupling agent is used as the carrier of ultrasonic signal spread between the probe and the measured material. If the type or use method of coupling agent is improper, it may cause error, or the coupling symbol flickers, and the measured value cannot be stable. The coupling agent should be applied in appropriate amount and coated evenly. Low viscosity coupling agents can be used on smooth surfaces. High viscosity coupling agents can be used on rough, vertical and top surfaces.

B.7 Methods for Reducing Errors

B.7.1 Ultra-Thin Materials

With any ultrasonic thickness gauge, errors will occur when the measured material thickness falls below the lower limit of the probe.
When measuring ultra-thin materials, a false result called "double refraction" sometimes occurs: the reading is twice as thick as it actually is. Another type of false result is called "pulse envelope, cycle jump": the measured value is greater than the actual thickness. In order to prevent such errors, the ultra-thin material measurements should be checked repeatedly.

B.7.2 Rust Spots and Corrosion Pits

Rust pits on another surface of the measured material (small rust spots are sometimes difficult to detect) will cause irregular changes in the reading and in extreme cases no reading at all. When pits are found, this area should be measured with great care. Multiple measurements can be performed by selecting the orientation of the probe partition board at different angles.

B.7.3 Material Identification Error

When the gauge is calibrated with one material and then measures another, the wrong result will be obtained. Please select the correct sound velocity.

9. Packing List

	NO.	Item	Quantity	Remarks
Standard accessories	1	Ultrasonic thickness gauge	1	
	2	Probe (5MHz Φ10)	1	
	3	Coupling agent	1	
	4	Carrying bag	1	
	5	Data cable	1	
	6	User manual	1	