Specific Declarations:

Our company shall hold no any responisibility resulting from using output from this product as an direct or indirect evidence.

We reserves the right to modify product design and specification without notice.

Version：WT100A/WT130A-EN-02

wintact®

MODEL：WT100A
WT130A

Ultrasonic Thickness Gauge
Instruction Manual

目　　录

1、Introduction

The intelligent and hand-held ultrasonic thickness gauge is controlled by a microprocessor, which can measure thickness and sound speed of various materials quickly, accurately and without damage by ultrasonic measurement. This instrument is capable of accurate measurement for different materials or parts in industrial production, as well as monitoring pipelines and pressure vessels of production equipment, and corrosion degree of various parts in use. It can also be widely used in manufacturing, metal processing, commodity inspection and other testing areas. Any material that allows ultrasonic to transmit at a constant speed and that is distinguishable from waves reflected from the back side is applicable to this instrument.

1.1. Application scope

The thickness of any good conductor for ultrasonic waves with top and bottom surfaces parallel to each other, like metal, plastic, ceramic and glass, can be measured with the instrument. For example: aluminum, copper, gold, resin, water, glycerin, etc. The internal particles of cast iron are too big for this instrument!

2、Attention

2.1. This gauge is equipped with Ni-MH rechargeable batteries. Please do not install non-rechargeable batteries.
2.2. Please keep the instrument away from flammable or explosive environment.
2.3. Please keep the instrument away from dangerous voltage in ase of accidents.
2.4. Please keep the instrument away from strong impact, high temperature and water immersion.
2.5. Batteries should be taken out if not in use for a long time.
2.6. Please install batteries in correct direction. Please charge or replace batteries when the power is low.
2.7. Please do not disassemble the instrument or try to change internal parts.
2.8. Alcohol and diluents are corrosive to case and screen, which can be cleaned with a little water.

3、Part name and display instruction

3.1. Part name

3.2. Button function instruction:

VEL：Sound speed adjustment button

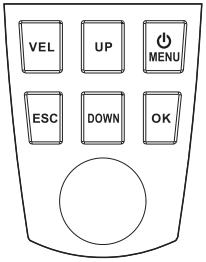
UP：Switch button of selection\Adjustment

⏻/MENU：Power On\Shutdown\Menu

ESC：Exit button

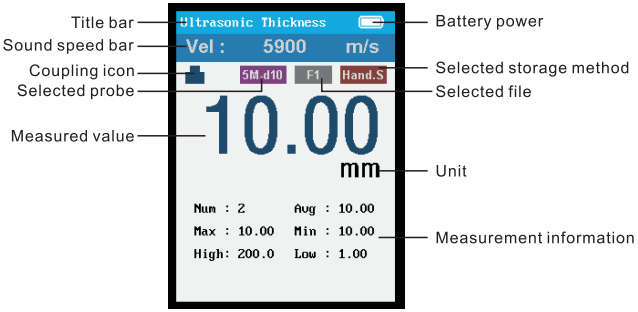
DOWN：Switch button of selection\Adjustment

OK：Confirmation button



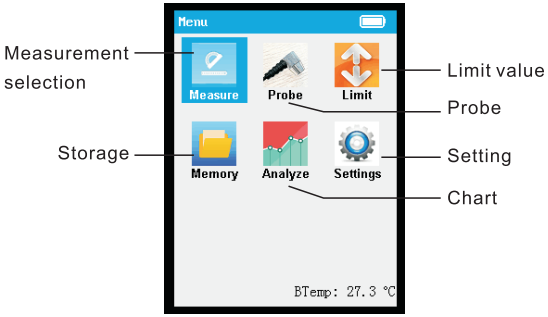
button

3.3. Instruction of measurement interface display



Measurement interface

3.4. Menu interface display instruction



Main menu display

4、Technical parameters

	WT100A	WT130A
Measuring range	1.00～225.0mm	1.00～300.0mm
Data storage	500	1500
Probe selection	×	√
Operation frequency	5MHz	5MHz/2.5MHz
Measurement error	±(0.5%H+0.05) mm	
Resolution	0.01mm(1.00 to 99.99mm) 0.1mm(100 to 225mm)	0.01mm(1.00 to 99.99mm) 0.1mm(100 to 300mm)
Lower limit of pipe measurement	Φ20x3mm (steel)	
Adjustment range of sound speed	1000～9999m/s	
Temperature range of operation	0～40℃	
Battery	3 Ni-MH rechargeable batteries of 1.2V	
USB charging	5V 1A	
Dimensions	65x146x30mm	
Weight	130G	

	WT100A	WT130A
Probe	Measurement parameters	Measurement parameters
5Md10	1.0～225.0mm	1.0～300.0mm
5Md6	×	1.0～50.0mm
2. 5M	×	1.2～300.0mm
High temperature	×	1.2～300.0mm

5、Operation preparation

5.1. Battery installation;

First insert the probe into host probe socket, and install batteries in battery compartment, pay attention to the polar of batteries. Check battery power after powering on; if battery power is low, please charge them in time.

⚠ **Note: Please do not install non-rechargeable battery.**

5.2. Power on/off;

Press " MENU " to turn on the instrument and enter into sound speed measurement interface. At this point, the measurement can be started. (As shown), long press " MENU " button to manually shut down.

Measurement interface of sound velocity

6、Measurement

6.1. Apply coupling agent evenly to the measured points on the surface of tested object.

6.2. Thickness can be measured by gently pressing the probe on the object surface with coupling agent.

7、Main menu operation and function introduction

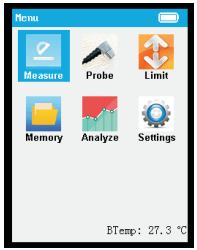
7.1. Introduction to main menu operation;

a. Enter into main menu
Press " MENU " button in measurement interface to enter into main menu.

b. Select menu item
Press UP or DOWN button under menu interface to select menu item.

c. Enter into menu item
Press OK to enter into selected menu item

d. Exit menu item
Press ESC to return to the previous menu



Main menu

7.2. Introduction to main menu functions;

1）Measurement options;

Make measurement settings under this menu, including:
a. Sound speed of measurement. (sound speed bar of measurement interface)
b. Measurement unit of
c. Measurement resolution

2）Probe

Under this menu, select the probe to use in measurement (selected probe icon in measurement interface).

3）Limit value

Make limit value settings under this menu.
a. Set high and low limit value of measurement
b. Turn on/off sound alarm for exceeding limit values.

4）Storage

Storage related operations can be performed under this menu:
a. Select the file to save when saving data (the selected file label of the measurement interface)
b. View saved data by file
c. Delete the data of the selected file

5）Chart

In this menu, you can view the data saved in the file inform of trend graph.

a. View basic information such as data number, maximum value, minimum value, and average value in this file.

b. Zoom the whole trend graph

c. Use cursor to view specific data value in the file.

6）Settings

Make other settings for the instrument under this menu, including:

a. Language

b. Automatic shutdown time

c. Button sound

d. Backlight brightness

e. Color

f. Software version number

g. Restore factory settings

8、Bottom menu operation and function introduction

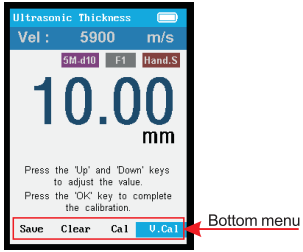
8.1. Introduction to bottom menu operation;

a、Enter into bottom menu:
Press ESC under measurement interface to enter into bottom menu.

b、Select menu item:
Press UP or DOWN button to select menu item.

c、Enter into selected menu item:
Press OK to enter into selected menu item.

d、Exit menu item:
Press ESC button to exit bottom menu.



8.2. Introduction to bottom menu functions;

a. Storage:
Save current measured values to the selected file.

b. Delete:
Delete measured values and measurement information (except for limit values).

c. Calibration:
Refer to calibration instruction for details.

d. Sound speed calibration:
Refer to sound speed calibration instruction for details.

9、Calibration instruction

9.1. Press ESC under measurement interface to enter into bottom menu. Select calibration item and press OK button.

9.2. The interface is displayed as shown on the right:

9.3. The sound speed in calibration is automatically set as 5900m/s during.

9.4. Press the probe on calibration sample to calibrate. 5 circles on the bottom of screen will be filled in turn.

9.5. After the calibration is completed, it will automatically return to measurement interface.

10、Instruction of sound speed calibration

10.1. Enter into bottom menu and select sound speed calibration item

10.2. The interface is displayed as shown on the left:

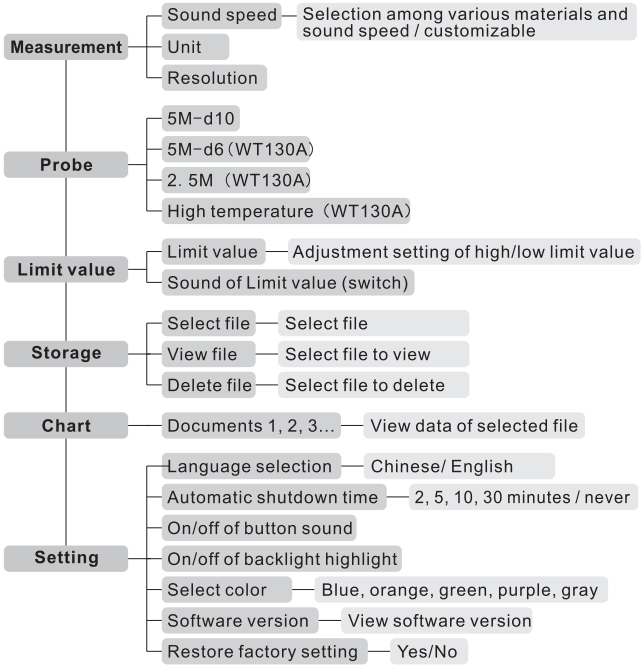
10.3. As shown in the figure, press UP/DOWN button to adjust value.

10.4. After the value adjustment is completed, press OK to complete calibration.

11、Instruction of other functions

Refer to the divergence chart of menu for other functions(as shown below).
Probe label: 5Md10, 5Md6, 2.5M, H.T (high temperature)
File label: F1 ~ F5 (WT100A), F1 ~ F15 (WT130A)
Storage label: Hand.S (manually saved), Auto.S (automatically saved)

Divergence chart of menu functions:



12、Technology of measurement

12.1. Clean surface

Before measurement, all the dust, dirt and rust on the surface of the object to be tested should be cleaned, and the covering such as paint should be removed.

12.2. Reduce roughness

Excessively rough surfaces can cause measurement errors or no readings on the instrument. Before measurement, the material surface should be as smooth as possible through sanding, grinding, polishing, rasping, or using high-viscosity coupling agent.

12.3. Surface made by crude machinery:

Regular fine grooves on surfaces made by crude machinery (such as lathe or planer) can also cause measurement errors, and the correction way is the same as 12-2; besides, adjust the angle between the crosstalk spacer of probe (metal folium in the middle of the probe bottom) and the fine groove of the tested material (orthogonal or parallel) may also achieve better results.

12.4. Measurement of cylindrical surface:

To measure cylindrical objects, such as pipes, oil drums and so on, it is important to adjust the angle between the crosstalk spacer of probe and the axis of the tested material. Briefly, coupling the probe to the tested material, the crosstalk spacer of probe is parallel or perpendicular to the axis of the tested material. Slowly move the probe perpendicular to the axis of the tested material, and the readings on the screen will change regularly. Select the minimum value among readings as the accurate thickness of the material.

The criterion for selecting the direction of the crosstalk spacer of probe and the axis of the tested material depends on the curvature of the material. For the pipe with larger diameter, the crosstalk spacer of probe should be perpendicular to the axis of the pipe; for the pipe with smaller diameter, the crosstalk spacer of probe can be either parallel or vertical to the axis of material. The minimum reading is selected as the measured thickness.

12.5. Measurement of composite shape:
When measuring materials of composite shapes (such as elbow of pipe), the method described in 12-4 can be adopted, except that the measurement should be performed for two times to get two readings by placing the crosstalk spacer of probe vertical or parallel with the axis, the smaller of which is the thickness of the measured point.

12.6. Non-parallel surfaces:
In order to obtain a satisfactory ultrasonic response, the other surface of the material to be tested must be parallel or coaxial with the surface to be measured, otherwise it will cause measurement errors or no reading.

12.7. Effects of material's temperature:
The thickness of material and the transmission speed of ultrasonic wave are affected by temperature. For high measurement accuracy, separately measure samples of the same material under the same temperature condition, then calculate the measurement error caused by temperature, and correct error with parameterS. For steel, high temperatures will cause big error (measured values are smaller than actual data), and this way can also be used to correct errors.

12.8. Materials of attenuation:
For some materials with fibers, pores, and coarse particles, they cause great scattering and energy attenuation of ultrasonic waves, resulting in abnormal readings or even no readings (usually the abnormal reading is smaller than the actual thickness), in which case the material is not suitable to be tested with this thickness gauge.

12.9. Samples for reference:
A material of known thickness or sound speed helps calibrate the instrument. At least one sample for reference is required to calibrate the instrument. The ultrasonic thickness gauge is equipped with a steel sample with thickness of 4.0 mm. Please refer to calibration instruction in item 9 of this manual for calibration method.

13、Avoid measurement error

13.1. Ultra-thin material
With any ultrasonic thickness gauge, if the thickness of the tested material falls below the probe's lower limit, measurement errors will appear. If necessary, the minimum thickness limit can be measured by sample comparison.
When measuring ultra-thin materials, sometimes an error called "double refraction" occurs, in which the measured value is equal to twice the actual thickness. Another error is called "pulse envelope and loop jump", in which the measured value is bigger than the actual thickness. To avoid such errors, repeat checking measurement of critical thin material.

13.2. Rust spots and corrosion pits
Rust spots and corrosion pits on the other surface of the tested material will cause readings to change irregularly or no reading in extreme cases, and small rust spots are sometimes difficult to detect. When pits are found or suspected, be careful with the measurement of this area, and place the crosstalk spacer of probe at different angles for multiple tests.

13.3. Material identification error
If you have calibrated the instrument with one material and use it to test another material, an erroneous result will occur. You should be careful when selecting the correct sound speed. Or, if the sound speed in the actual test displays certain deviation from that of calibration, errors may also occur. Please make adjustment in use.

13.4. Probe abrasion
The surface of probe is made of acrylic resin. After the instrument is used for a long time, the roughness of probe surface will increase, resulting in a decrease of sensitivity. If the user can determine errors caused by this, the probe surface can be polished with a small amount of 500# sandpaper or whetstone to smooth surface and ensure parallelism.
If the result is still unstable, you may need to replace the probe.

13.5. Laminated material, composite material

It is impossible to measure uncoupled laminate materials because ultrasonic waves cannot penetrate the uncoupled space. Since ultrasonic waves cannot transmit at a constant velocity in composite materials, instruments that measure thickness by ultrasonic reflection are not suitable for measuring laminated materials and composite materials.

13.6. Effects of oxide layer on metal surface

Some metals can produce a dense oxide layer on the surface, such as aluminum. This layer of oxide is tightly bonded to the substrate with no obvious interface. However, the transmission speed of ultrasonic waves in these two substances is different, thus resulting in errors. Different thickness of oxide layer causes different errors, to which the user shall pay attention. You can carve a piece of the same material with a micrometer or caliper as sample to calibrate the instrument.

13.7. Use and selection of coupling agent

Coupling agent is used to transfer high-frequency ultrasonic energy between the probe and the tested material. Inappropriate type or improper usage may cause errors or failed measurement with lable of coupling agent flashing. It should be used in an appropriate amount and applied evenly.

Coupling agent is usually applied to the surface of tested material. When the temperature is high, coupling agent is applied to the bottom of probe.

It is important to choose the right type of coupling agent. For materials with smooth surface, coupling agents of low viscosity (such as randomly mixed coupling agent, light machine oil, etc.) are suitable. For rough surface, vertical surface and top surface or aluminum, higher-viscosity coupling agents (such as glycerin creams, greases, etc.) can be used.
Coupling agents of various formulations are available in many places.

14、Maintenance and warranty

14.1. Probe protection:

The surface of the probe is acryl resin, which is sensitive to grooves on rough surface and should be handled with care in use. When measuring rough surface, please reduce the slide of probe on the surface; the surface temperature of the measured object should not exceed 60 °C (high temperature probe for high temperature surface), otherwise the probe will fail to work; oil and dust on the surface will gradually age the cable in probe, and cause it to break. So clean the dirt on cable after use.

a. Cleaning of case:

Alcohol and diluents have a corrosive effect on case, especially the window, so when cleaning case, gently wipe it with a little water.

b.Cleaning of test samples:

When using random test sample to calibrate the instrument, apply coupling agent to prevent it from rusting. After finishing, please wipe coupling agent off test sample. Do not drip sweat on test sample when the temperature is high. If it is not in use for a long time, apply a little fat oil on the surface of random test sample (all kinds of anti-rust oil will also do). When using it again, please wipe anti-rust oil off test sample first and then start to perform.

c. Note: remember to avoid collision, humidity, etc.

14.2. Maintenance

If any of the following problems occur, please contact our company or agent:

a. The instrument device is damaged and cannot measure with no output.
b. LCD does not work properly.
c. In normal use, the error is too large.
d. Keyboard operation is out of order or in confusion.

14.3. This ultrasonic thickness gauge is a high-tech product, so the maintenance work should be subject to professional staff. Please do not disassemble and repair the instrument on your own.

15、Notices for users

15.1. Warranty and Maintenance Regulations

After you purchase our company's products, please fill in <warranty registration card> and stamp official seal. If our products have quality problems within one year from the date of purchase (excluding products of non-warranty), please send purchase invoice and warranty card (or photocopy) to customer service department of our company within warranty period. Our company will not guarantee warranty for users with no warranty card .

If warranty period (one year) expires, local agencies will be responsible for after-sales service and maintenance for products of quality problems,. Besides, the maintenance fee will be charged according to our company's regulations. The maintenance fee for "special configuration" out of our company's regular products will be charged according to relevant standards.

Our company does not guarantee warranty for the following circumstances: any user's disassembling products on his/her own, improper transportation or storage after purchase, product damage caused by improper operation and not following product manual, defacement of warranty card, and no purchase certificate.

15.2. Non-warranty list

Color screen, battery, probe, test sample, case, coupling agent.

16、Table of sound velocity

Sound velocities of common materials

Material	Velocity(m/s)	Material	Velocity(m/s)
Aluminum	6320	Acetate resin	2670
Zinc	4170	Phosphor bronze	3530
Silver	3600	Turpentine	4430
Gold	3240	Glass	5440
Tin	3230	Incoloy alloy	5720
Iron/Stee	5900	Magnesium	6310
Brass	4640	Monel alloy	6020
Copper	4700	Nickle	5630
SUS	5790	Steel 4330（mild）	5850
Acrylic resin	2730	Steel 330	5660
Water（20℃）	1480	Titanium	6070
Glycerinl	1920	Zirconium	4650
Soluble glass	2350	Nylon	2620