ULTRASONIC THICKNESS

METER

User's Manual

1. SUMMARIZE

1.1. Scope of use

This meter is suitable for measuring materials that are good ultrasonic conductor, such as metal, plastic, ceramic, glass etc., as long as the measured part in two parallel surfaces for measurement of thickness.

1.2. Basic principle

The principle of ultrasonic thickness measurement is similar to that of light wave measurement. The ultrasonic pulse emitted by the probe is transmitted to the measured object and transmitted in the object. When it reaches the interface of the material, it is reflected back to the probe. It can determine the thickness of the measured material by accurately measuring the transmission time of the ultrasonic wave in the measured object

1.3. Basic configuration and each part of the instrument name

1. 3. 1. Basic Configuration: Host: 1PC

Probe1PC (5MHZq10mm)

Coupling agent1 bottle (50ml)

9V battery 1PC

1.3.2. Main

componentsasshowninFigure1:

- 1. Ultrasonic probe socket
- 2. LCD Screen
- 3. Operating keyboard
- 4. 304 stainless steel 4mm



calibration thickness key

5. Ultrasonic thickness sensor

1. 3. 3. Key function description



3. 4. Operating instruction (1) Start up & Shutdown

Power ON: short press the power button and the screen will light up. there will a startup prompt tone if the buzzer is on.

Power OFF: Long press the power button until the screen prompts POWER OFF, and then release it.

(2) Measurement interface instruction



Num: record the number. Avg: measure the average value Min: Minimum value Max: Maximum value

- Battery power display
- : coupling sign

4.0: Current measured value

mm: thickness unit

Lo: low limit value Hi: high limit value

5740m/s: Current sound velocity

(3) Set the menu interface

At normal measurement mode, short press the Setting/OK key to enter the menu setting mode



From above down, first left, then right.

Sound setting, backlight setting, unit setting, sound velocity selection and sound velocity measurement

setting, continuous test setting, upper limit setting, lower limit setting, restore the factory setting, base point calibration, delete record data

• Prompt tone setting

Select the prompt tone setting ic by the value Up/Down key. short press the Setting/OK key to enter the prompt tone setting menu. Open/Close prompt tone by the value Up/Down key, short press Setting/OK key to confirm or short press the Undo/delete key to exit.

Backlight brightness Setting

Select the backlight brightness setting icon by value Up/Down key, and short press the Setting/OK key to enter the backlight brightness setting menu for use.

Set the backlight brightness by Value up/Down key, short press Setting/OK key to confirm or short press the Undo/delete key to exit.

• Unit setting

Select the unit setting icon by value Up/Down key, and short press the Setting/OK key to enter the unit setting menu.

Set the metric and imperial unit by Value up/Down key, short press Setting/OK key to confirm or short press the Undo/delete key to exit

Sound velocity selection and sound velocity measurement

Setting (described in detail behind)

• Continuous measurement mode setting.

Select the continuous measurement mode setting icon by value Up/Down key, and short press the Setting/OK key to enter the continuous measurement mode setting menu. Open or Close continuous measurement mode by the value Up/Down key, short press the key to confirm or to exit. When the continuous measurement mode opened, the instrument will continue to measure after press the measurement key.

• Upper limit setting

Select the upper limit setting icon sy value Up/Downkey, and short press the Setting/OK key to enter the upper limit setting menu

Short press value Up/Down to add or subtract 1 at units digit; and long press to add or subtract 1 at tens digit (hold press the key and not released can adjust the value quickly); short press Setting/OK key to confirm or short press the Undo/delete key to exit

At normal measurement mode, when the measurement value exceeds the upper limit value, the color of the measurement value will turn red.

● Lower limit setting

Select the lower limit setting icon[■] by value Up/Down key, and short press the Setting/OK key to enter the lower limit setting menu

Short press value Up/Down to add or subtract 1 at units digit; and long press to add or subtract 1 at tens digit (hold press the key and not released can adjust the value quickly); short press the key to confirm or to exit

At normal measurement mode, when the measurement value is less than the lower limit value, the color of the measurement value will turn red.

When the measured value is between the upper limit and

lower limit, the color of the measured value is white

• Restore the factory setting menu

Select restore the factory setting icon sy value Up/Down key, and short press the Setting/OK key to enter the restore the factory setting menu

• Base point calibration (described in detail behind)

Delete record data

Select delete record data setting icon by value Up/Down key, and short press the Setting/OK key to enter the delete record data setting menu

short press Setting/OK key to confirm the deleted data, or short press the Undo/delete key to exit.

Note: This operation will clear the recorded data in the meter memory.

(4) Single point judgment mode interface

Long press the value down key to enter single point judgment mode and multi-points average interface, you can press OK key to select single point judgment



Under the single point judgment interface, short press the Setting/OK key to enter the upper and lower limits. Set the target thickness lower limit by the value Up/Down key, and short press the Setting/OK key to confirm.

Use this meter to measure the measured object's coating thickness, LCD screen immediately displays the measurement value and decision result, and prompts "PASS" or "FAIL";

Press ESC to exit the single point judgment mode.

(5) Multi-points judgment mode interface

Select Multi-points average and press OK



Under Multi-points judgment interface, set the target thickness value by Setting/OK key, the operation method is the same as above single point

Use this meter to measure the measured object's coating thickness,

Taking three measurements near the same location, and the meter will count the average of the three measurements into point A

Change a position to measure the coating thickness of the measured object. Take three measurements near the new location, and the meter will count the average of the three measurements into point B

Measuring 5 points in total A, B, C, D and E according to the above method.

After the measurement is completed, the LCD screen will immediately display the average of 5 points and judgment result, and prompt "PASS" and "FAIL".

Short press ESC to return and exit the five points judgment mode

(6) Historical data interface



Under the normal measurement interface, long press the value Up key to enter the historical measurement data list. It can display 512 groups data. You can move the cursor by short

press the up and down key, and long press the up and down key to turn the page display. short press the Setting/OK key. A prompt message "Delete this?" will pop up , asking whether to delete this record. short press the OK key to confirm deletion or short press ESC to cancel deletion.

(7) Clear data statistics

If you want to clear the current statistics, long press the undo/clear key for two seconds and release it. the stored data is cleared and the statistics value are reset to zero (Statistical number Num, Average AvE, Minimum Mim, Maximum Max are all turned to zero).Subsequent measurement value will be re-counted.

• Performance index

Measuring range:

Flat measuring range: 1.2mm ~ 300.0mm (steel) Tubing measurement lower limit: $\Phi 20mm \times 3.0mm$ Measurement error: $\pm (1\%H+0.1mm)$, H is the actual thickness of the measured object

Sound velocity adjustment range: 1000-9999m/s

Known anti-side sound velocity of thickness:: measuring range 1000-9999m/s, test block thickness <20mm, the measurement accuracy of sound velocity is not more than ± 1 mm/H*100%, Test block thickness >20mm, the measurement accuracy error of sound velocity is not more than 5%.

Probe operating frequency: 5MHz

Resolution: 0.1mm

Sound velocity adjustment range: 1000-9999m/s

Display mode: 24 digit color LCD display

Power Supply: a 9V battery (6F22)

Power consumption: working current <50mA

Surface temperature of the measured object: $0^{\circ}C \sim 40^{\circ}C$ Weight: 400g

2. Main Functions

2.1. Sound velocity selection and setting function

the meter has built-in several common materials ultrasonic typical velocity values, Before measuring thickness, you should select the current sound velocity as the actual velocity value of the measured material.

Common materials as shown in table 1.

Table 1

Material	Sound velocity (m/s)	Material	Sound velocity (m/s)
Aluminum	6420	Hard Aluminum	6320
7 Hummum	0420	Thata / Mainimuni	0320
Steel	5900	Stainless Steel	5740
Quartz	5720	Glass	5440
Copper	5010	Cast Iron	4500
Brass	4700	Zinc	4210
Tin	3320	Nylon	2620
Hard Rubber	2500	Polyethylene	1950

2.1.1. Sound velocity selection

Press Setting/OK key to enter the setting menu interface.

interface



 Ultrasonic Velocity

 Aluminum:
 6240

 Hard Aluminum:
 6320

 Steel:
 5900

 Stainless Steel:
 5740

 Quarts:
 5740

 Class:
 5440

 Copper:
 5010

 Cast Iron:
 4500

 Brams:
 4700

 Zine:
 4210

velocity selection location with by press the value Up/Down key. press the OK key to enter the sound velocity selection

Move the cursor to the sound

Press OK key again to see some kinds of common materials typical velocity values of ultrasonic.

2.1.2. Sound velocity setting

If the transmission velocity value of the test object is not among the several common options, you can set the sound velocity by yourself

Press the Setting/OK key to enter the setting menu interface. Press the Value Up/Down key to move the cursor to the sound velocity selection position and press the OK key to enter the sound velocity selection interface



Press the value down key to enter

Press the OK key to enter the following screen



V Test

C

Selectthe sound velocityclose to needed setting by press the value Up/ Down key. Press the OK key to enter



"5000m/s" is a place we set the soundvelocity Press the value Up/Down key to move the cursor to needed change position,then press OKkey.At this moment, the cursor will turn

red; press the value Up/Down keyto change the value, if the change is good and press the OK key to turn the cursor back to blue; long press the OK keyagain to return to the sound velocity menu interface; press the exit key to return to the measurement interface, and the sound velocity will be set to the desired sound velocity.

2.2. Thickness measurement function

After normal starting up, select the corresponding velocity value of the current measured object, take the calibration block on the table as an example, and set the velocity to 5740m/s.The measured object is 304 stainless steel, 4mm standard thickness block. The standard

thickness block is coated with a certain coupling agent to keep the ultrasonic probe and the measured object completely close contact.

As shown below



At this time, press the measurement key, and the LCD screen will immediately displays the thickness value of the current measured object, and have coupling mark "---".As shown below



(Note: Whenmeasuring the same thickness block two times,but the thickness value appears larger fluctuation and instability, it indicates that the probe and the measured object is not well coupled. it will

affect the measurement accuracy. Treatment method: There should be enough coupling agent between the probe and the back side, and keep a stable contact between the probe and the measured object. Taking several measurements, and record the final minimum stable value as the current measured value. When at a coupling state ,it can start to detect and update the new sign only after the measurement key is pressed)

2.3. Thickness value storage and management function

At the normal measurement interface, long press the Setting/OK key to enter historical measurement data list . 512 groups data will be display, you can move the cursor by short press the up and down key, and long press the up and down key to turn the page display. Short press the Setting/OK key. a prompt message "Delete this?" will pop up , and asking whether to delete this record. short press the OK key to confirm deletion or short press ESC to cancel deletion.

2.4. Sound velocity measurement and sound velocity storage management function

(1) Sound velocity measurement

The meter also has the function of sound velocity measurement for the material with unknown transmission velocity. it is convenient to measure unknown material thickness blocks.

Press the Setting/OK key to enter the setting menu interface. Press the Value Up/ Down key to move the cursor to the sound velocity selection position and press the OK key to enter the sound velocity selection interface

interface

Press the value down key to enter







Velocity Test

User1

050.00

5000

Selectthe sound velocityclose to needed setting by press the value Up/ Down key. Press the OK key to enter

Press the OK key to enter the following

"050.00 mm"is a place to modify the measured material thickness "5000 m/s" is is a place to measure sound velocity

Changing the material thickness to the actual thickness value Press the value Up/Down key to move the cursor to needed change position,then press OK key.At this moment, the cursor will turn red; press the value Up/Down key to change the value, if the change is good and press the OK key to turn the cursor back to blue; Coating coupling agent on the surface of material to keep the

ultrasonic probe and the measured object completely close contact.

Press the measurement key for measurement, and the sound velocity value of the measured material displaysat"5000 m/s" place on the screen

Velocity Test



Long press the OK keyagain to return to the sound velocity menu interface, press the exit key to return to the measurement interface, and the sound velocity will be set to the

sound velocity of the measured material.

2.5. System calibration function

This meter is equipped with automatic calibration function, which is convenient for users to use in different use environments, eliminate dynamic interference, and improve measurement accuracy.Press the Setting/OK key to enter the setting menu interface. Press the Value Up/Down key to move the cursor to and press the OK key to enter the calibration interface.

Before entering the calibration interface, the sound speed should be set at 5740m/s, so that the probe and the 4mm standard thickness block are fully coupled, press the measurement key to measure.



2. 5. 1. The basis of whether calibration operations are necessary or not :

Select the sound speed as 5740m/s. wipe off the oil film of the fixed thickness calibration block attached to the instrument, apply evenly the coupling agent, and then press firmly the ultrasonic probe on the standard thickness block to achieve the reliable and stable coupling effect each other.

According to the previous measurement steps to measure the standard thickness block of the instrument build-in standard 4.0mm, check whether the measurement result is 4.0, if the average error obtained by multiple measurements is greater than 0.1mm, it means that you should perform a calibration operation again, and ensure that the probe is well coupled to the standard thickness block during entire process

2.6. Power supply management

This meter powered by a 9V laminated battery, After 3 minutes without any operation, it will shuts down automatically to prolong the battery lifetime. And shows residual power of the battery by mark

3. Maintenance and Notes

3.1 The attachment of oil dust will cause the cable of probeto gradually age and break, so you should clean the dirt on the cable in time after use.

3.2 Please take outthe battery when the instrument is not used for a long time. in order to prevent the pole piece of the battery box are corroded.

3.3 Collision and humidity should be strictly avoided. 3.4 After using, wipe offthe coupling agent the on the 4mmstandard thickness block, and coated with certain oil to prevent corrosion.,and affect the calibration accuracy (any corrosion prevention engineoil), when you want to use it again, you should wipe up the oil.

3.5 When a low voltage warning displays, you should replace the battery in new one, so as not to affect the measurement accuracy.

3.6 Thesurface of probe is acrylic resin, which is sensitive toscratch again on rough surfaces, so it shouldpress lightly in this case.

3.7 The surface temperature of the measured object shouldnot exceed 60 degrees, otherwise the probe will be damaged.

3.8 Dust (iron filings, carbon particles, etc.) should be avoided from entering the instrument

3.9If surface roughness of workpiece is too large, resulting in poor coupling effect between probe and contact surface, low reflectionecho, or even unable to receive echo signal. For equipment with extremely poor coupling effect on surface rust, the surface can be treated by sand, grinding, frustration and other methods to reduce roughness, but also can remove the surface oxide and paint layer, exposing the metal luster, in order to achieve good coupling effect between the probe and the measured object through the coupling agent

3.10 If the detection surface is not parallel with the ground, the sound wave will generate scattering when it encounters the ground, and the probe cannot receive the echo signal.

3.11 Due to uneven organization or coarse crystal grainsof castings and austenitic steel,ultrasonic waves will generate scattering back and forth and transmit along complex paths, which may cause echo annihilated and fail to be measured normally.

3.12Selection and influence of coupling agent. Coupling agent is used to eliminate the air between the probe and the measured object, so that the ultrasonic wave can effectively cross the workpiece to achieve the purpose of detection. If the choice of type or methodofapplication is not correct, it will cause errors or poor coupling so that it cannot be measured. Choose the right kind according to the use situation, when used on smooth material surface, you can use low cloggy coupling agent; When used on rough surfaces, vertical surfaces and top surfaces, you should use high cloggycoupling agent.

3.13 Before measuring the workpiece, check whether the selected speedcurrently is correct, otherwise the measurement error will be amplified.

3.14 Effect on surface oxides of metalor paint coating. Although the dense oxide or paint anticorrosive coating produced on the metal surface is closely combined with the basis material and has no obvious interface, the propagation speed of sound velocity in the

two substances is different, resulting in errors, and with the different thickness coating, the error size is also different.

4.1 View the storedmeasurement data on the upper computer software, and can output by Excel, PDF and picture format.

Open the upper computer software, connect the meter with the computer, click "Connect" on the upper left of the software, if "Connect" becomes "DisConnect", indicating the meter connects successfully with the computer.

You can download the measurement data into the software by click "Download" on the upper left of the software

🛷 VICTOR 852C+ For ultrasonic thickness measurement

DisConnect Run Screenshot PDF Import DownLoad

Nucl. O. Annu	h	List Histogram Diagram				
Min: O Mor:	0	ID	Time	Thickness	Uni t	
min. o max. o	0	0	2021-03-02 07:41:13	150.29	mm	
100	mm	1	2021-03-02 07:41:13	150.29	mm	
		2	2021-03-02 07:41:13	150.29	mm	
		3	2021-03-02 07:41:13	150.29	mm	
- RealTime		- 4	2021-03-02 07:41:13	150.29	mm	
Live Data		5	2021-03-02 07:41:13	150.29	mm	
🚊 - DownLoad		6	2021-03-02 07:41:13	150.29	mm	
20210302_1541	13. dat	7	2021-03-02 07:41:13	150.29	mm	
🚍 Excel		8	2021-03-02 07:41:13	150.29	mm	
20210302_15423	32. x1 s	9	2021-03-02 07:41:13	150.29	mm	
ficture	7 :					
D. PDF	1. JPS					
20210302 15424	40. pdf					
	-					

List: Data list

Histogrm: Displays the number of data in a specified range

Diagrm: Displays the measurement data for each measurement point

Excel format output: Right-click the file to be output in Excelformat under the DownLoad directory on the left of the software and choose "Export". You can see the correspondingfile in Excel format under the "Excel "directory.

Picture Format output: Click "Screenshot" at the top of the App and then you can see the corresponding picture files under the "picture" directory.

PDF format output: Click "PDF" at the top of the software, and you can see the corresponding PDF file under the "pdf" directory.

Note: The output file names above three formats are named after the output time of each format The output files are stored in the LiveData fileunder the

software installation directory.

4.2 Real-time data Function

When the meter is connected with the computer, the data measured by the meter can be displayed directly on the computer Click "Run" at the top of the software, and when "Run" becomes

"Stop", you can measure it

Press the measurement key for measuring and the measurement data can be displayed directly on the software

Excel format output: Save first and then convert, Right-click "Live Data"under the "RealTime" directory on the left of the software and choose "Save" to save. The newly saved file will appear at"RealTime".

Right-click the just saved file name and choose "Export". You can see the corresponding Excel file under the Excel directory.

Pictureformat output: Click "Screenshot" at the top of the app and then you can see the corresponding picture files under the "picture" directory.

PDF format output: Click "PDF" at the top of the software, and you can see the corresponding PDF file under the "pdf" directory.