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**ISU-100D  
ULTRASONIC THICKNESS GAUGE  
OPERATION MANUAL**

PLEASE SCAN QR CODE TO  
WATCH THE OPERATION  
VIDEO OF PRODUCTS.



**Attention**

- ◆ In order to obtain good measurement precision, you need to clear away the rusty, sundry, grease, etc. on the working surface.
- ◆ Please use the couplant on the working surface, measure repeatedly around the target area and take average value.
- ◆ Please clean the couplant on the transducer and working surface after measure.
- ◆ Please don't pull the transducer cable when use the instrument.
- ◆ Please don't apply couplant to the transducer before turning on.
- ◆ This ultrasonic thickness gauge is a basic type, un-adjustable gain, and equipped with a fixed probe, which frequency is 5Mz. It is not suitable for measuring loose material such as castings and aluminum workpieces.

**Overview**

This Ultrasonic Thickness Gauge could be used in industrial sector to check thickness of metal, plastic, ceramic, and any other good ultrasonic wave conductor. This model is also used in check and testing thickness of pipes and pressure vessel as well as thickness after corrosion.

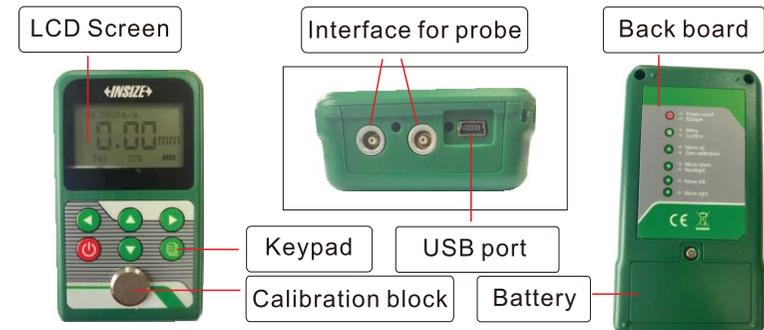
- 1 Specification:  
 Resolution: 0.01mm (range<100mm), 0.1mm (range ≥ 100mm)  
 Accuracy: ±0.05mm (range < 10mm)  
               ±(0.05+0.1%H)mm (range10~100mm)  
               ±(H/333)mm (range≥100mm)  
 H is the thickness to be measured.  
 Velocity: 1000~9999m/s

- 2 Measuring principle:  
 The digital ultrasonic thickness gauge determines the thickness of a part or structure by accurately measuring the time required for a short ultrasonic pulse generated by a transducer to travel through the thickness of the material, reflect from the back or inside surface, and be returned to the transducer. The measured two-way transit time is divided by two to account for the down and back travel path, and then multiplied by the velocity of sound in the material. The result is expressed in the well-known relationship:

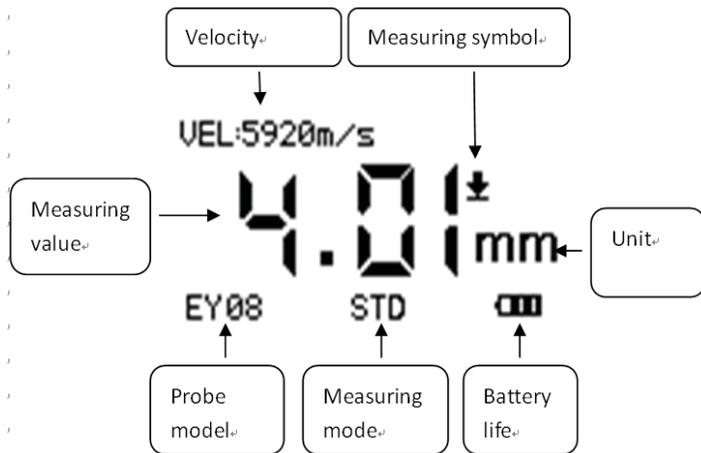
$$H = \frac{v \times t}{2}$$

H is the thickness, v is the velocity, t is the time.

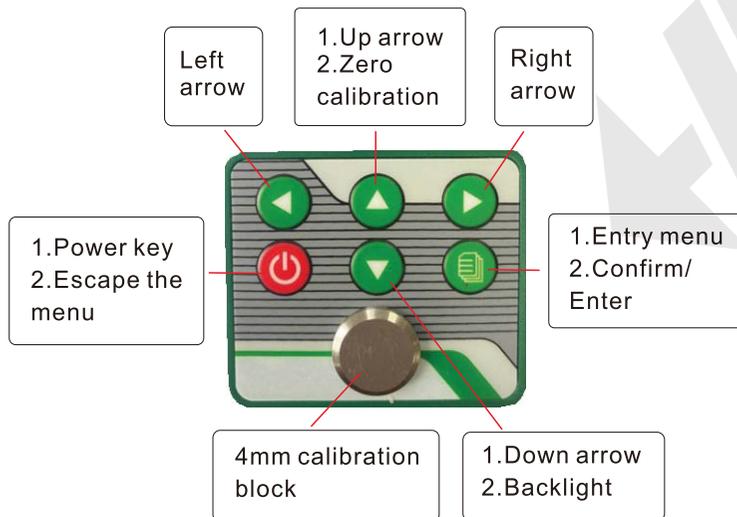
- 3 Structure:



### Screen display



### Key Functions



### Preparation

When the surface to be measured is too rough or rusty heavily, please perform the treatment according to the following methods:

- ① Clean the measured surface by grinding, polishing or filing, etc. or use coupling agent with high viscosity for that.
- ② Use coupling agents on the work piece surface to be measured.
- ③ Take multiple measurements around the same testing point.

### Basic operations

- ① Power on and off
  - ◆ Insert the plus of the probe into the socket on the instrument.
  - Press the key until the screen displays the Series No. and the version number.
  - ◆ Long press the key to power off the instrument.
- ② Backlight
  - Press to turn on / off the backlight.(Under the measurement state)
- ③ Calibration
  - Please do calibration if probe is changed or high derivation of the real thickness value. The right way is as follows:
    - ◆ Put couplant on the calibration test block, then place the probe on the block.
    - ◆ Press to change the value until it shows 4.0mm.
    - ◆ Press to confirm.
- ④ Measurement mode
  - Two measurement modes are offered. They are Standard and Minimum value measurement. Users could choose according to different testing conditions.
    - ◆ Press into 1. Measurement and press again to select the desired mode with up and down keys.
    - ◆ Press to confirm and press to exit.
  - ◆ Standard measurement
    - Display the current value, satisfied with the normal measuring needs.

◆ Minimum value measurement

Among one measurement, display the minimum value of the current measured point. It is suitable for testing the curvature surface or needs to get the minimum value which is widely used in the thickness measurement of pipeline.

**Important: It is not recommended to use this function when measuring cast iron or alloy materials.**

5 Velocity Rate

Sound velocity plays an important role in measurement. Different material is of different sound velocity. If the sound velocity is incorrect, it will cause wrong measured results. In general testing for normal resolution, the velocity in theory for this material could meet the requirement, but for high resolution, velocity plays an important role and there is great impact on the test result. On the basis of taking reference for velocity in theory, it is necessary to master how to correctly measure velocity.

Many velocity options are offered by this model. Users could choose according to different testing conditions. The operation in detail is as follows:

- ◆ Press  into menu and press right arrow key to select the .
- ◆ Press  to confirm and select the desired item with up and down keys.
- ◆ Press  to confirm and press  to exit.

**Notice: The 9 values are just the theoretic values, if users want to get accurate measurements, please refer to the “Velocity measurement” and get the more accurate sound velocity.**

6 Velocity Measurement

Owing to the workpiece that is made from various materials and even the same material with different content and processing technology, the sound velocity will change and this change will cause measuring error. If the error is not enough to influence the measuring accuracy, it can be neglect, otherwise it is necessary to get the accurate sound velocity of the workpiece to be measured.

Measuring the workpiece which thickness is known (Using any velocity), get one measurement value.

- ◆ Press  into menu and select Vel. measurement. the measurement value you just test and a velocity show on the LCD.

- ◆ Press left and right keys move to next column.

- ◆ Press up and down keys to change the velocity value to determine the thickness as the same as the value of sample that is measured.

- ◆ Press  to confirm, Screen will display 4 places for selection one to store this new velocity, press up and down keys to select one, then press  to confirm.

- ◆ Press  to Esc. Menu and into the measurement. This new velocity will be stored. And it can be found from “2. Velocity rate”- “Vel. Storage” for further use.

## Maintenance

1 Power check

There is a signal appear when it is in low battery. Under this condition, battery should be replaced. For free of large power consumption, it is not recommended to open backlight for long time.

2 Protection of main unit and probe

For longevity use of main unit and probe, they are not exposed to high humidity environment and strong vibration. When change probe, your hand should be put on shell of probe and pull of it, not turn around for good protection of probe.

3 Attention in measurement

Good measurement should be the value when it is steady and signal appears.

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Good measurement should be the value when it is steady and signal appears.

Probe should be moved off if there are much couplant on the surface of object for free of wrong measurement.

Probe should be replaced when it is worn out and there is value blinks.

**Sound velocity**

The following sound velocities are approximate, just for reference.

Material	Sound Velocity	
	Inch/ $\mu$ S	M/s
Air	0.013	330
Aluminum	0.250	6300
Alumina Oxide	0.390	9900
Beryllium	0.510	12900
Boron Carbide	0.430	11000
Brass	0.170	4300
Cadmium	0.110	2800
Copper	0.180	4700
Glass(crown)	0.210	5300
Glycerin	0.075	1900
Gold	0.130	3200
Ice	0.160	4000
Inconel	0.220	5700
Iron	0.230	5900
Iron (cast)	0.180	4600
Lead	0.085	2200
Magnesium	0.230	5800
Mercury	0.057	1400
Molybdenum	0.250	6300
Monel	0.210	5400
Neoprene	0.063	1600
Nickel	0.220	5600
Nylon, 6.6	0.100	2600
Oil (SAE 30)	0.067	1700
Platinum	0.130	3300
Plexiglass	0.110	1700

Polythylene	0.070	1900
Polystyrene	0.093	2400
Polyurethane	0.0700	1900
Quartz	0.230	5800
Rubber, Buty	0.070	1800
Silver	0.140	3600
Steel, Mild	0.233	5920
Steel, Stainless	0.228	5800
Teflon	0.060	1400
Tin	0.130	3300
Titanium	0.240	6100
Tungsten	0.200	5200
Uranium	0.130	3400
Water	0.584	1480
Zinc	0.170	4200