Ultrasonic Thickness Gauge

CE

Operation Manual

Contents

Ⅰ. Preface

Please read the following information carefully before using the meter. The ultrasonic thickness gauge has been designed to measure the material thickness that calipers can’t measure, such as boiler, pressure vessels, armor of tank, ship hulls, glass wall, tubes and so on.

Ⅱ. Safety information

CE According to European Union’s CE safety norms

Please use it according to the following condition.

Environment conditions:

- Ambient temperature: -10~ +50℃、+14~ +122℉
- Storage and transport temperature: -4 0~+70℃

Maintenance & Save:

Do not clear the meter using alcohol and impregnant.

If you do not use it for a long time, please take out the batteries and place the instrument in a dry surrounding.

Ⅲ. Functions & Features

- Measuring thickness of various good ultrasonic wave conductors as steel, aluminum, copper, glass etc
- Ultrasonic wave velocity or thickness display
- Manual material selection
- Ultrasonic wave velocity adjustable
- Thickness unit “mm” or “inch” optional
- Ultrasonic wave velocity testing
- Coupling state display
- Shut down manually or automatically
- Low battery voltage indication
- Built-in calibration metal block (4.0mm)
- Software calibrating to insure high reliability

Ⅳ. Specifications

- the meter has been designed according to EMC directive: 2014/30/EU
- Ultrasonic wave frequency：5MHz.
- Digital display：4 digitals.
- Measurement range：1.2mm~220mm (steel).

- Tubes measurement：Minimum Φ20mm*3mm.
- Ultrasonic wave velocity：1000~9999 M/S.
- Resolution： 0.1mm.
  Resolution below 100mm: 0.01mm
- Accuracy： ±(1%H+0.1mm).
- Measurement rate：0.6 second.
- Power supply: AAA, 1.5V*3.
- Operating temperature ：-10 ~ +50℃.
- Storage temperature： -40 ~ +70℃, -40 ~+158℉.
- Dimensions：165 (L)× 60 (W)× 30 (H) mm.
- Weight ：approx 210g (including battery and probe).
- Accessories：Probe, coupling paste, operating manual, batteries.

V. Mounting battery and probe

Remove the battery cover on the back and put in three 1.5V AAA batteries according to the mark on the shell to insure putting batteries in correctly, and then close the battery cover. Insert two plugs of the probe into two sockets on the top of the meter.

VI. The method of usage

1. Press button “**On/Off**”, the meter selects material 1 automatically, and displays the velocity of ultrasonic wave in material 1.
2. Press button “**Select**” to choose a material you will measure. A number displays on the bottom of the screen to indicate the material. The numbers correspond to the materials listed in table (1). Smear a little of coupling paste on the surface of the measured object, put the probe on and press it. A coupling symbol would appear if coupling is all right. Synchronously the thickness of the measured object would display instead of ultrasonic wave velocity. If coupling isn’t good, the coupling symbol will not appear and can not get thickness.

Table (1)

Digit	Material	Ultrasonic wave speed
1	Iron/steel	5900 M/S
2	Aluminum	6320 M/S
3	Copper	4700 M/S
4	Brass	4430 M/S
5	Gold	3240 M/S

6	Silver	3600 M/S
7	Zinc	4170 M/S
8	Stannum	3320 M/S
9	Glass	5850 M/S
10	Plastic	2250 M/S
11	Toughened tile	5580 M/S
12	Water(20°C)	1480 M/S
13	Material 1	6500（user adjusting）
14	Material 2	5500（user adjusting）
15	Material 3	4500（user adjusting）
16	Material 4	3500（user adjusting）
17	Material 5	2500（user adjusting）
18	Material 6	3000（user adjusting）
19	Material 7	4000（user adjusting）

3. When take the probe out from object, the coupling symbol disappears, but thickness keeps displaying.
4. At the state of displaying thickness and do not measure, Press button “**mm/inch**”, thickness unit “mm” changes into “inch” or contrarily.

5. At the state of displaying thickness and do not measure, press button “**Select**” to display ultrasonic wave speed, thickness will disappear.
6. Material a~e (digit 13~19) is offered to user to set own material. Press button ▲ or ▼, its velocity is adjustable.
7. If user do not know the ultrasonic wave velocity of own material, can test it by oneself：
    A. Make a block with measured material (the thicker the block, the more exact the result is), measure its thickness by a caliper carefully.
    B. **Select** anyone of material 13~19, and measure its thickness by the probe. When the digits of thickness display steady, take the probe out from the block
    C. Press button ▲ or ▼ to change the digits until it is equal to the value measured by the calipers.
    D. Press button “**Select**”, the ultrasonic wave velocity of user’s material will appear. When

shut the meter down, the ultrasonic wave velocity will be saved into a memory automatically.

8. To set power off:

   When the meter is working, pressing and holding button **On/Off** will get shutdown immediately.

9. Automatic shutdown

   When the meter is working, and stop to press button for five minutes, shutdown will occur automatically. If you want to cancel the auto -shutdown function, please press and hold button "**Select**" and button "**On/Off**" at the same time to power on until the AP OFF symbol appears on the screen, and wait for about 5 seconds for the display to be normal, that is, to cancel the auto-shutdown.

10. Backlight：Hold and press button "**On/Off**" for 3 seconds to turn on the backlight. To turn off the backlight, hold and press button "**On/Off**" for 3 seconds again.

Ⅶ. Calibrating the meter

When changing a new probe, or the probe is abrased or the meter is used for a long time, you need to calibrate the meter by yourself, the method is follow：

Calibrate the “4.0 mm” and “20.0 mm”. Power on the meter, smear a little of coupling paste on the surface of the metal block built-in the shell of the meter. Put the probe on and press it, when coupling symbol appears, press, and hold button “**Adjust**” for three seconds, four bars appear on the screen. Keep pressing the probe, button “**Adjust**” can release. You can see the bars disappear gradually. Finally, “4.0 mm” and “20.0 mm” displays, the meter will be calibrated.

When calibrated conventionally, the method is follow：

Calibrate the “4.0 mm” and “20.0 mm”. Power on the meter, smear a little of coupling paste on the surface of the metal block built-in the shell of the meter. Put the probe on and press it, when coupling symbol appears, press and hold button “**Adjust**” for three seconds, four bars appear on the screen. Keep

pressing the probe, button “**Adjust**” can release. You can see the bars disappear gradually. Finally “4.0 mm” and “20.0 mm” displays, the meter will be calibrated.

VIII. Notices

1. When measuring thickness under 2.5mm, sometimes an error named as “double refraction” may occur. Another error is named as “pulse envelope or cycle jump”. They bring on a bigger result than actual thickness. So, when measuring thin object, should do it repeatedly to look for the least value. If necessary, make a thin block to compare measuring result.
2. The ultrasonic wave velocity listed in Table (1) is for reference. Because the component of your material may not be identical with that listed in Table (1), had better make sample block to test the wave velocity in it.

3. It is not a good ultrasonic wave conductor to the poriferous material, or uncompacted material, it can not be measured by the meter. Casting has large crystals, if its surface is rough; it is difficult for us to test thickness by the meter.
4. Rough surface may affect test, Burnish it by sand paper, and then measure.
5. When the surface has thick paint, scrape it off and then measure.
6. Coupling paste is necessary for test, it can eject air out off the gap between the probe and the object to get ultrasonic wave to pass. For slippery surface as glass, water can replace coupling paste. For rough surface, more viscous coupling paste must be used, such as lubricating oil.
7. To measure tubular object, change the direction of the probe for 90°, look for the minimum value.
8. For rough surface, don't press the probe when turning it or slipping it, to protect the probe.
9. When battery voltage is too low to work, a battery symbol appears on the screen. It reminds you to

change new batteries.

10. When you do not use the meter for a long time, please take out batteries to avoid damaging the meter by electrolyte.
11. Don’t store the meter in a high temperature or wet place.
12. After power off, to turn power on again, wait for two seconds.