

# NOVOTEST

## ULTRASONIC THICKNESS GAUGE NOVOTEST UT-1



### Operating Manual

2015

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This manual is designed to introducing with operating principle and operation of the thickness gauge NOVOTEST UT-1, hereinafter “device”.

## **1. General instructions**

### **1.1. Purpose and application of the device**

The device is designed to measure the thickness of products from structural metal alloys and non-metallic materials with one-way access to a controlled product.

### **1.2. Operating conditions of the device**

Ambient temperature for the device	from -10 to +40C°
Ambient temperature for the probes	-20 to +40C°
Relative humidity of air	to 98% at +35C°

## **2. Specifications**

### **2.1. Measuring range for steel**

Measuring range of the thickness gauge for steel:

Type of probe	Range of measuring, mm
P112-10-6/2	0,8-20
P112-10-4x4	0,8-30
P112-5-10/2	1,0-75
P112-5-6/2	1,0-30
P112-5-12/2	1,5-150
P112-2,5-12/2	2,0-200
Specialized	Individual

**2.2. The limits of the main permissible error of measurement of thickness at the substrate roughness  $R_a \leq 10 \mu\text{m}$  and a radius of curvature of not less than 200 mm:**

Type of probe	Error, mm
P112-10-6/2	$\pm(0,01h + 0,05)$
P112-10-4x4	$\pm(0,01h + 0,05)$
P112-5-10/2	$\pm(0,01h + 0,05)$
P112-5-6/2	$\pm(0,01h + 0,05)$
P112-5-12/2	$\pm(0,01h + 0,05)$
P112-2,5-12/2	$\pm(0,01h + 0,05)$

where **h** is a basic value of thickness, mm

**2.3. Overall dimensions:**

Name	Overall dimensions, mm, no more
Processing unit	125x60x25
Probes	$\varnothing 20 \times 60$

**2.4. Weight of the device and probes:**

Name	Weight, kg, no more
Processing unit	0,25
Probes	0,08

**2.5. Power and continuous operation**

2.5.1. The device is powered by two NiMH rechargeable batteries or batteries with a nominal voltage of 1.5 V.

2.5.2. Time of continuous operation, from the recharged battery, not less than 10 hours.

2.5.3. A device is automatically turned off in 1 minute from the moment of the last measuring.

### 3. Completeness:

3.1. Processing unit, 1pc.

3.2. Probe:

Type of transformer	Amount, pc
P112-10-6/2	
P112-10-4x4	
P112-5-10/2	
P112-5-6/2	
P112-5-12/2	
P112-2,5-12/2	
Specialized	

3.3. A standard sample \_\_\_\_\_ pc.

3.4. Battery – 2 pc.

3.5 Battery charger 1 pc.

3.6. Manual

3.7. Case

### 4. Labeling and packaging

On the front panel are applied:

- Unit designation with the trademark of the manufacturer;
- On the back cover of the device is applied serial number and year of manufacture.

## **5. Design, operation, display and operating unit**

### **5.1. The device design**

**5.1.1.** The design of the device includes processing unit and connected with the connector probe. Plug to connection is located on the upper side of the enclosure. Buttons and graphical display are on the front panel. On the back side of the device under the lid is a compartment for installing the batteries.

### **5.2. Principle of action of the device**

**5.2.1.** Processing unit of the thickness gauge produces a trigger pulse fed to emitting plate transmitter that emits an ultrasonic pulse through a delay line into the product. Ultrasonic pulse extends in the product to the inner surface, reflected from it, extends in the opposite direction and, after a delay line, made the reception plate. Extends time of the ultrasonic pulse is uniquely related to the thickness of the product. The calculated value of the thickness of the product is displayed on the thickness gauge indicator.

### **5.3. Display**

**5.3.1** The display of the device is designed to display the measured thickness of the product. On it also displays the state of battery charge and the presence of acoustic coupling.


## 5.4. Keyboard


5.4.1. Keyboard is shown in the figure below:





5.4.2. Buttons of the device:


5.4.2.1.  - on / off.

5.4.2.2.  - the calibration mode of ultrasonic velocity.

5.4.2.3.  - mode of minimum and maximum.

5.4.2.4.  - the mode of setting zero.

5.4.2.5.  - increasing of the editable values.

5.4.2.6.  - reduction of the editable values.

## 6. Intended use

### 6.1. Preparing for use

#### 6.1.1. Battery operation

1. Connect the probe to the connector.
2. Install the battery into the battery compartment following the polarity.



3. Switching on the device with long-pressing button and check the battery charge.
4. Battery level is shown at the top left side of the display symbol "battery." Completely dark sector inside the symbol indicates the battery is fully charged. As the battery discharge squares disappear sequentially, from left to right.

5. To recharge the battery, turn off the device by pressing



- button, and then remove the battery from the battery compartment and make the battery charge accordance with i.6.1.2.

#### 6.1.2. Battery recharge

To charge the batteries:

- Install the batteries in the charger;
- Connect the charger to the socket.

Time to full battery charge - 8 hours.

Do not leave the charger when the battery are charging. To avoid failure of the battery, during storage should be carried out with recharging, time interval of at least 2 months, even if it is not used.

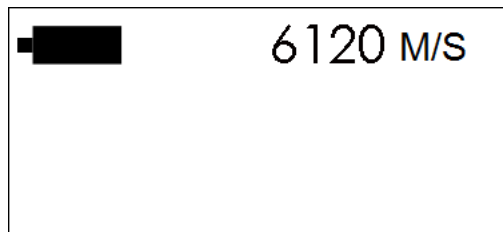


## 6.2. Switching on

Prepare the device to work and turn it by pressing a button



After pressing the button on the device screen saver appears briefly, then the device switches to the main mode and the display unit displays the following information:



where:

6120 m/s – value of the selected ultrasonic velocity.

The device is ready to measure.

## 6.3. Calibration of the device


### 6.3.1. Setting zero

To eliminate the effect of time of ultrasonic vibrations in the delay lines on the result before the measurements should be set zero:

**Attention!** Zeroing should be done only on the sample supplied with a thickness gauge.

6.3.1.1. Put on the supplied sample layer of thickness contact lubricant.



- 6.3.1.2. Press button . The device switches to the zero mode. The display will show the message "SET ON SAMPLE".
- 6.3.1.3. Install the probe on the contact surface of the standard sample and press tightly.
- 6.3.1.4. Waiting for ending setting zero. Indicator of the zero calibration is dynamically inverted inscription. If the probe was torn off before the end of the calibration, set it to the sample again. Setting zero will be continued.
- 6.3.1.5. At the end of the zero set on the display of the device will be briefly shown the measured time delay, after the device will go into basic mode.


**NOTE.** *The procedure of setting zero preferably held in the case of changes in operating conditions (a significant change in the ambient temperature), at first use of probe, after a long hard work to compensate mechanical wear of probe.*



## **6.3.2. Calibration on control samples**


Carried out at the control products with unknown speed ultrasound or if necessary measurements with high accuracy.

- 6.3.2.1. Prepare control samples that made of a material similar to the control material products, and measure the thickness of the given points.
- 6.3.2.2. Set zero according to i. 6.3.1.

6.3.2.3. Install the probe on a pre-greased fluid contact area control sample, with known thickness, to wait for a stable acoustic contact and display thickness, then tear off the probe from the sample. On the display of the device will show the measured thickness.

6.3.2.4. Press button . The indication of speed of ultrasound will be inverted.


6.3.2.5. With buttons  and  achieve compliance with indications on the display of the device thickness of the control sample.


6.3.2.6. Press button  for escape from calibration mode.


### **6.3.3. Calibration the speed of ultrasound**

Use if we know the velocity of ultrasound for material that will be controlled.

6.3.3.1. Set zero according to i. 6.3.1.

6.3.3.2. Press button . The indication of speed of ultrasound will be inverted.

6.3.3.3. Use buttons  and  to set the desired speed of ultrasound in the material.

6.3.3.4. Press button  for escape from calibration mode.

**NOTE.** *When changing the measurement object, differs greatly in characteristics (speed of dissemination of ultrasound) from the previous need calibration of the device on the new part.*

## 6.4. The measurement

- 6.4.1. Prepare device for operation in accordance with i.6.1. and switch on in accordance with i. 6.2.
- 6.4.2. Set the probe on the product normal to the surface and press it, avoiding rocking. Achieve stable, indicating the maximum acoustic contact (four marks in the upper middle of the display).
- 6.4.3. Achieve stable readings measured thickness on the indicator.




- 6.4.4. Tear off the probe from the surface and pick up into the air.
- 6.4.5. On the display there is the result of the last measurement of thickness that will change only after next measurement.

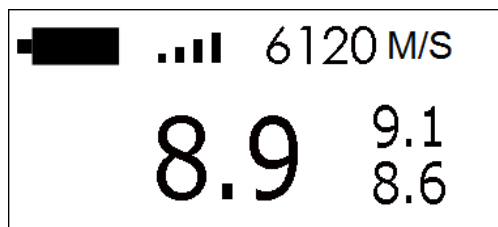
### 6.5. Measurements with minimum and maximum

In some cases, while testing is necessary to fix the minimum and maximum readings during the acoustic coupling (for example, when searching for local thinning).

**6.5.1.** To enter mode with the minimum and maximum

values in basic mode of operation press .

**6.5.2.** On the display of the device will display the current measured value, and the minimum and maximum value.




**6.5.3.** To reset the accumulated values press .

**6.5.4.** To exit with the minimum and maximum mode

press . Device returns to normal operation.

### 6.6. Switching off

**6.6.1.** Turn the device off by pressing .

**6.6.2.** If the measurements are not done within 1 minute, the device turns off automatically.

**7. Safety Precautions**

- 7.1. Operation thickness gauge is permitted only after reading the manual.
- 7.2. Of minor faults of the device is allowed after it is turned off, repairs are carried out exclusively by the manufacture.

**8. Storage and transportation**

- 8.1. The device should be stored at ambient temperature from +5 to +40 °C and relative humidity up to 80% at 25 °C.
- 8.2. The storage should be free of dust, fumes acids, alkalis and corrosive gases.
- 8.3. Transportation of the device in case may be made by any mode of transport in accordance with the requirements and rules of transportation operating in these types of transport.
- 8.4. During transportation, handling and storage of stock the device should be kept from shock, bumps and moisture.

**9. Maintenance**

- 9.1. Maintenance of the device is made by the manufacturer in the event of faults in the device operation.

**10. Warranty**

- 10.1. The manufacturer guarantees the normal operation of the unit for 12 months from date of purchase, and undertakes to make repair it during this time when a breakage, and failures.

- 10.2.** Warranty does not apply to breaches of operation, transportation and storage conditions and the presence of mechanical damage to the electronic unit and transducer.
- 10.3.** Warranty does not cover cables and batteries.

Date of manufacture \_\_\_\_\_ **Signature**

Sale date \_\_\_\_\_ **Signature**

*Notes:*

The manufacturer reserves the right to make without notice in the design of ultrasonic thickness change does not impair its performance and metrological characteristics.