ADELIX

ADL-UT25

Ultrasonic thickness gauge

Operating manual combined with the passport

2024

ЗМІСТ

1. DEVICE DESCRIPTION

The ultrasonic thickness gauge ADL-UT25 is designed for measuring the thickness of products made of structural metal alloys and isotropic non-metallic materials with one-way access to them.

The thickness gauge uses the method of providing acoustic contact by pressing the contact surface of the transducer to the surface of the controlled product. The device can work with a variety of piezoelectric transducers with single and double coupling at frequencies from 2.5 MHz to 10 MHz, providing high reliability of results in laboratory, shop and field conditions.

ADL-UT25 is implemented on a modern electronic basis, equipped with a bright color screen and built-in memory for saving settings, characteristics, and results. It has a simple and intuitive interface. The main advantage of the device is the ability to measure through a coating up to 3 mm thick. Also, a feature is working with specialized high-temperature sensors that allow one-sided monitoring of parts with a surface temperature of up to 350°C. Objects of control can be metal pipes or tanks without decommissioning, various steam pipelines, metal bars, and cast products before they are cooled.

Simple and quick calibration allows you to adjust the thickness gauge within 10 seconds. The device can be calibrated using the standard sample for setting the zero supplied in the kit, as well as the known thickness of any material. A light and convenient shockproof cover protects against dust and moisture in various operating conditions, resistant to falls from a height of up to 2 meters.

The device is used to quickly measure the thickness of metal and non-metal products (sheets, containers, pipes, pipelines, bridges, housings, transport, and other structures), during operation to determine their corrosion state or after manufacturing. It is used in energy, metallurgical, machine-building, shipbuilding, transport, and other industrial enterprises.

Features of the ultrasonic thickness gauge ADL-UT25:

- Many functionalities, which include modes: A-scan, B-scan.
- Digital thickness value mode.
- The limits mode signals when the thickness values exceed the set limits.
- High sensitivity.
- Convenience in work.
- Intuitively simple interface.
- Measurement methods: Echo-Echo-Echo and Probe-Echo, which allow measurements through the coating.
- Work with specialized high-temperature sensors up to 350°C.
- Measuring range from 0.6 to 500 mm.
- Flexible sensor configuration options.
- Bright color screen.
- Ability to record measurement results and transfer data to a computer.
- Large amount of memory (up to 5000 measurements).
- The built-in Li-Pol battery provides up to 8 hours of operation.
- Library of ultrasound speed in various materials;
- Small size and lightweight
- Rubberized dust-moisture-proof body of the device.
- 2 Lemo 00 connectors for connecting different types of transducers.
- Indication of acoustic contact.
- Automatic shutdown.

2. DELIVERY SET

№	Name	Quantity
1	Electronic block ADL-UT25	1
2	Transducer (optional)*	1
3	Cable Lemo 00 – Lemo 00	2
4	Standard thickness sample for zero setting	1
5	Protective case	1
6	USB Type-C cable	1
7	Mains charger	1
8	Carrying and storage bag	1
9	Technical documentation set: passport/operating manual (combined), warranty card	1
10	Calibration certificate	option

* The type and model of the piezoelectric transducer are agreed upon when ordering the device:

Model	Description
S111-5-К12	The range of measured thicknesses, mm = 2.0…200; The minimum radius of the controlled product, mm = 30; Measurement through the coating up to 3 mm, with a hard coating (such as paint) and normal adhesion to the base.
S112-5-4x4-T	The range of measured thicknesses, mm = 2.0 ... 50; The minimum radius of the controlled product, mm = 20; The temperature of the surface of the controlled object, ◦C = up to 350.
S112-10-6/2	The range of measured thicknesses, mm = 0,6-20; The minimum radius of the controlled product, mm = 10.
S112-5-10/2	The range of measured thicknesses, mm = 1,0-200; The minimum radius of the controlled product, mm = 20.
S112-2,5-12/2	The range of measured thicknesses, mm = 2,0-200; The minimum radius of the controlled product, mm = 30.

3. TECHNICAL SPECIFICATIONS

Parameter	Value	
Principle of measurement	ultrasonic	
Measurement methods	Echo-Echo-Echo, Probe-Echo	
Controlled thickness range (for steel) with double coupling transducers	0,6 – 500 mm	
Details of complex shape	The minimum radius of curvature of the product is 10 mm*	
The speed of propagation of ultrasound	1000 – 9999 m/s	
Measurement resolution	0,1; 0,01 mm	
The main error of measurement by ranges:	T**=0,6…10	±(0,01T+0,03) mm
	T=10…300	±(0,01T+0,1) mm
Display	2.4" TFT matrix 240x320 pixels	
Memory	up to 5000 measurements	
Settings	Correction of the “0” parameter, setting for a specific material, automatic shutdown time (1-10 minutes), brightness adjustment, sound notification, and alarm setting for deviations from the specified thickness values	
Connecting to a PC	USB-C	
Time of continuous work	up to 8 hours, low battery alarm	
Power supply	Li-Pol battery	
Dimensions	141x73x32 mm	
Weight	240 g	
Terms of use	Temperature: from -10 to +50°C	
Protection	IP-54	

* - depends on the type of sensor selected

** - “T” is the nominal value of the thickness, mm

4. USING THE DEVICE

The general view of the device is shown in Figure 1, the screen of the standard measurement in the figure 2.

Figure 1

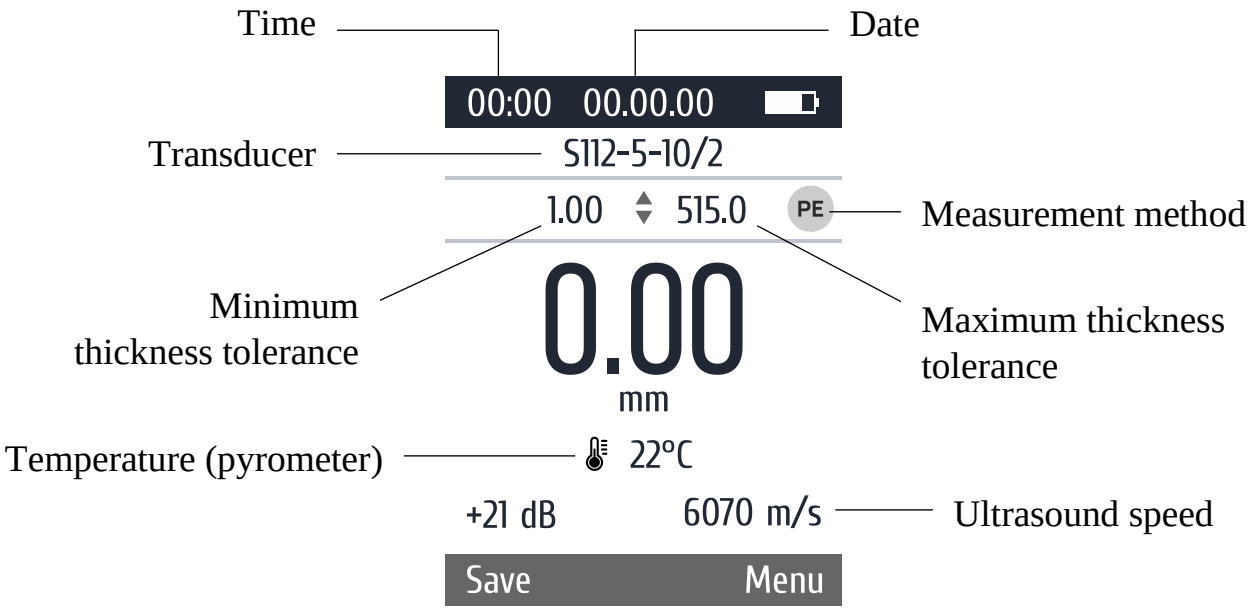

Figure 2

4.1 Turning on the device and setting general parameters

To turn on the device, press the button on the keyboard of the device (to turn it off, press this button for 2 seconds). A standard measurement screen with previously saved settings will appear (fig.2).

To set the device parameters and measurement parameters, go to the "Menu" by pressing the button on the right (fig.3). Moving through the "Menu" tabs is carried out using the buttons , selecting a tab - using the button on the right (Select), returning to the standard measurement screen (or from the open tab to the main Menu) - using the button .

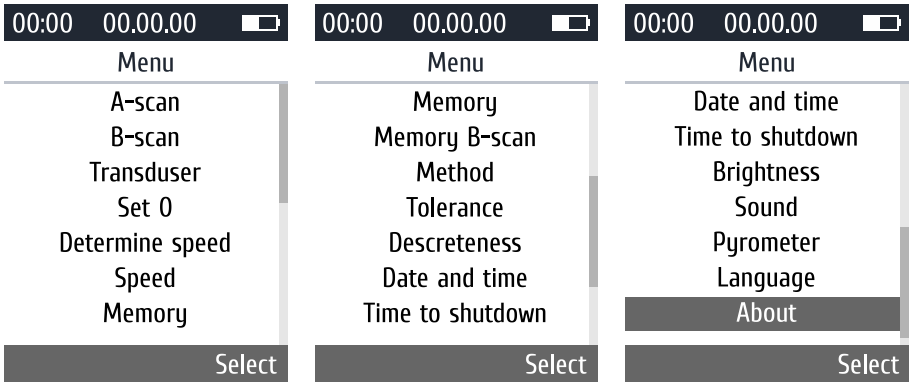

Figure 3

4.1.1 Setting the interface language

To select the device interface language, go to the "Language" menu tab and select one of the proposed ones.

4.1.2 Setting the date and time

To set the current date and time, go to the Date and Time menu tab. By pressing the button to the left (< Digit) select the cell (underlined) and use the buttons to set the desired values. To save the settings, click the button on the right (Save).

Figure 4

4.1.3 Setting the display brightness

Go to the menu tab "Brightness" and use the buttons ▼ ▲ to adjust the comfortable display brightness, then press the button ◄ to enter the main menu.

Figure 5

4.1.4 Setting of sound signals

Go to the "Sound" menu tab and use the buttons ▼ ▲ to turn on or off the sound signals when making a thickness gauge. To save the settings, click the button — on the right (Save).

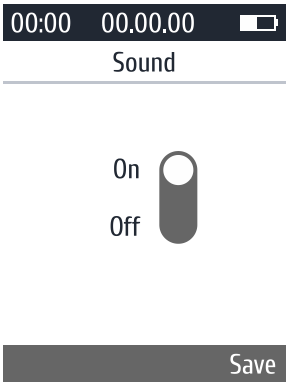

Figure 6

4.1.5 Setting the auto shutdown time

The thickness gauge has an automatic shutdown function when the device is inactive to save battery power.

Go to the "Time to shutdown" tab and use the buttons ▼ ▲ to set the time from 1 to 10 minutes or cancel this function (set the option to "No"). To save the settings, click the button — on the right (Save).

Figure 7

4.2 Connecting the transducer

With the device turned off, connect the piezoelectric transducer using the cable from the kit, observing the markings.

Go to the "Transducer" menu tab and use the buttons ▼ ▲ to select the connected transducer from the proposed list. Press the button — on the right (Select) to select this transducer and configure the device to work with it.

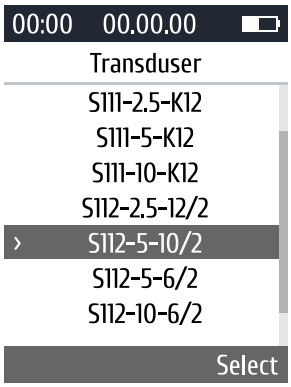

Figure 8

4.3 Setting the measurement parameters

To achieve accurate readings of the device, adjust the parameters at which the thickness measurement will take place.

4.3.1 Setting the speed of ultrasound

Go to the "Speed" menu tab. In this tab, you can specify or choose from the proposed ultrasound speed at which the thickness of the material will be measured.

Figure 9

4.3.1.1 If the grade of the material and the speed of ultrasound in it are known, select the "Indicate" tab (fig.9) and set the required speed (fig.10): by pressing the button — on the left (<Digit), select the cell (underlined) and use the buttons ▼ ▲ to set the required values. To save the set speed, press the button — on the right (Save).

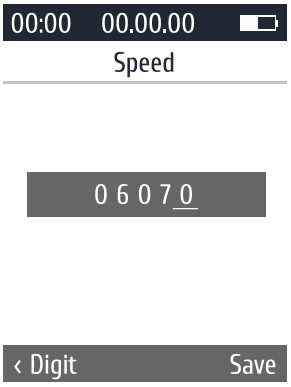

Figure 10

4.3.1.2 The ultrasound speed can be selected from the device library. For the convenience of the user, the materials are grouped under the following tabs:

- Iron alloys (fig. 11) – 31 grades.
- Aluminum alloys (fig. 12) – 17 grades.
- Copper alloys (fig.13) – 15 grades.
- Titanium alloys (fig. 14) – 7 grades.
- Others (fig. 15) – 12 materials.
- Own materials (fig.16) – 5 materials, the speed is set by the user.

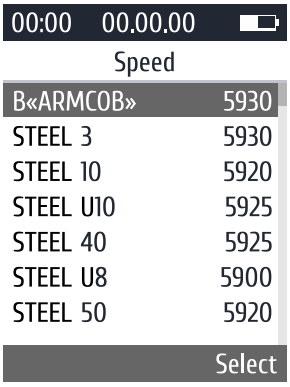

Figure 11

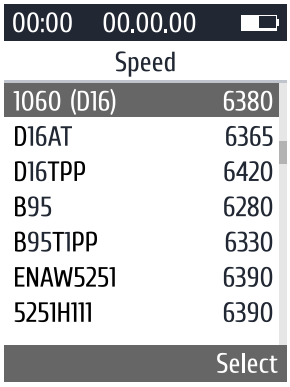

Figure 12

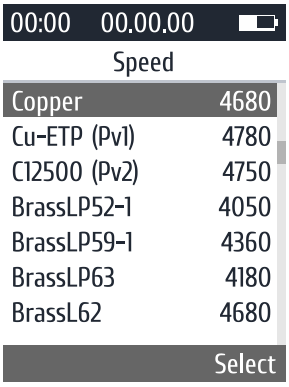

Figure 13

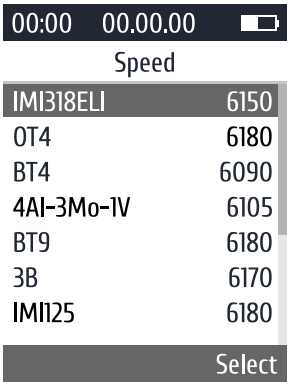

Figure 14

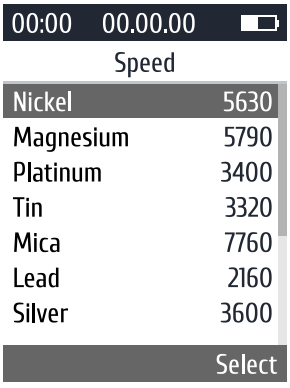

Figure 15

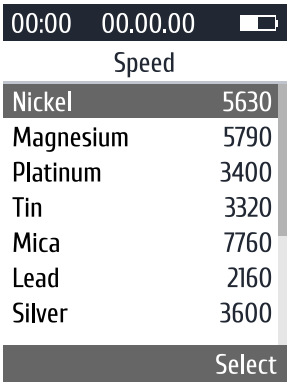

Figure 16

4.3.2 Automatic determination of ultrasound speed

If the material of the product is unknown, but there is a sample with a measured thickness of this material, go to the "Determine speed" menu tab.

By pressing the button — to the left (< Digit) select the cell (underline) and use the buttons ▼ ▲ to set the desired sample thickness values.

Apply contact fluid for ultrasonic control to the sample and install the transducer. When the readings stabilize, press the button — on the right (Save) to save and apply the determined speed value.

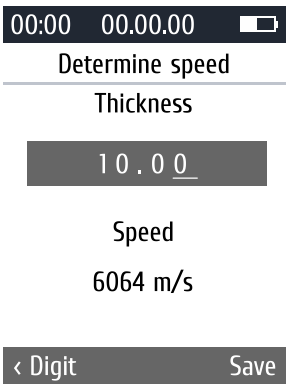

Figure 17

4.3.3 Setting the measurement method

The device implements 2 measurement methods: Echo-Echo-Echo (Auto) and Probe-Echo (Z-E).

Go to the "Measurement method" menu tab. and use the buttons ▼ ▲ to select the thickness measurement method. To confirm the selection, press the button — on the right (Save).

Figure 18

4.3.4 Setting the thickness measurement tolerance

This function is used to set the minimum and/or maximum thickness of the material, upon reaching which the device will signal the deviation of the measurement indicators: if the thickness is less than the set minimum or more than the set maximum during the measurement, the device will highlight this value in red on the measurement screen and will beep (if the sound function is on).

Go to the "Tolerance" menu tab. By pressing the button — to the left (< Digit) select the cell (underline) and using the buttons ▼ ▲ set the required values for the minimum and maximum thickness. To save the set values, press the button — on the right (Save).

Set 0 (zero) in all cells to cancel setting the minimum and/or maximum value.

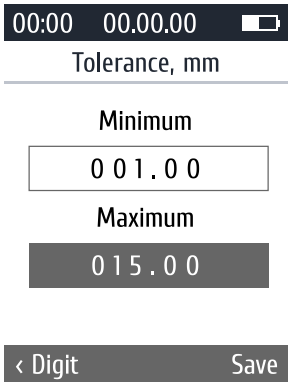

Figure 19

4.3.5 Settings of measurement discreteness

Go to the "Discreteness" menu tab and use the buttons ▼ ▲ to select the discreteness of displaying the measured material thickness. To confirm the selection, press the button — on the right (Save).

Figure 20

4.3.6 Settings of temperature measurement

A sensor designed to measure the temperature of the control object is built into the body of the device.

Go to the "Pyrometer" menu tab and use the buttons ▼ ▲ to enable or disable the temperature measurement function. To confirm the selection, press the button — on the right (Save).

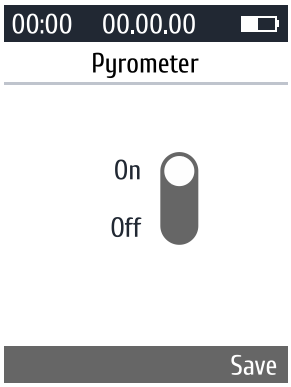

Figure 21

4.4 Set 0

When installing separate-compatible piezoelectric transducers (S112-x-x), it is necessary to correct their indicators. To do this, you need to perform the following actions:

1. Connect the transducer according to point 4.2 of this Manual.
2. Apply contact liquid for ultrasonic inspection to the thickness sample included in the instrument kit.
3. Set the speed for the thickness sample according to paragraph 4.3.1.1.
4. Go to the "Set 0" menu tab.
5. Set the thickness of the sample: by pressing the button — to the left (< Digit), select the cell (underlined), and use the buttons ▼ ▲ to set the desired values (fig.22).
6. Before starting to set 0, lift the transducer.
7. Mount the transducer on the sample and wait for the process to complete.
8. Press the button ◀ twice to enter the standard measurement mode. The thickness readings on the display should correspond to 0. If it differs from 0, check the marking of the cable connection to the device and the transducer, and set 0 again.

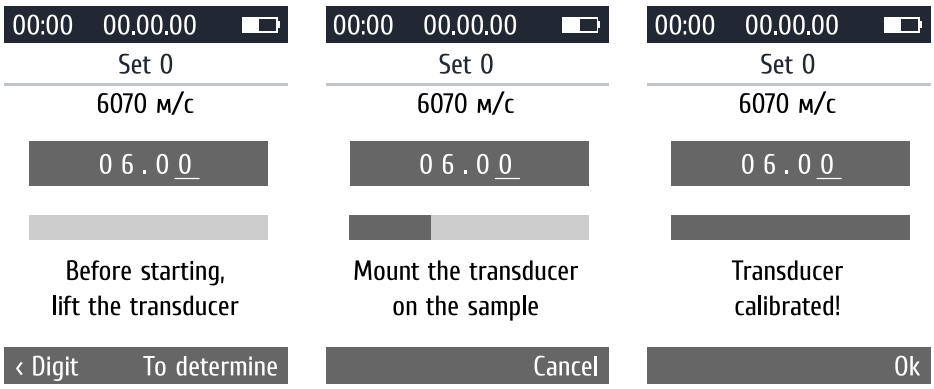

Figure 22

4.5 Taking measurements

In addition to measurement in standard mode, the device implements measurement functions in A-scan and B-scan modes. For measurements, use contact liquid for ultrasonic control.

4.5.1 Measurement in standard mode

Apply ultrasonic contact liquid to the thickness measurement area and install the probe. The device automatically displays the measured values on the display.

To save the measurement value, press the button — on the right (Save). All saved data will be written into the device's memory (see point 4.6).

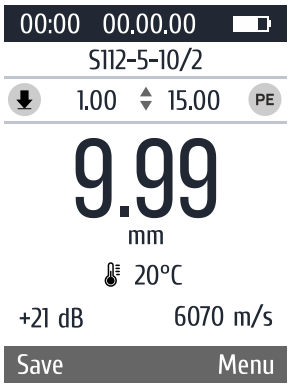

Figure 23

4.5.2 Measurement in A-scan mode

"A-scan" - a mode in which the signals received from the bottom of the product are graphically displayed on the screen of the thickness gauge. This mode allows you to exclude false positives from signals due to inhomogeneities in the material structure.

Go to the "A-scan" menu tab. Monte the transducer at the measurement location, and the measurement result will be displayed on the display. Using the button — on the right (Range) (fig.24), set the desired range (10, 30, 100, 300 or 500 mm).

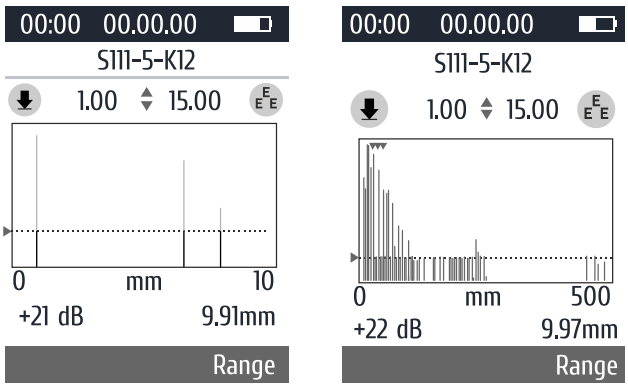

Figure 24

4.5.3 Measurement in B-scan mode

B-scan is a mode in which the bottom profile of the product will be visually displayed. Go to the "B-scan" menu tab. Mount the transducer on the measurement site, and press the button — on the right (Start) to start the measurement. The bottom profile will be displayed graphically. To stop and continue the measurement, press the button — on the right (Stop/Stop), to reset the result - press the button — on the left (Reset). The measurement result will be automatically saved in the device's memory after pressing the "Stop" button (see point 4.6).

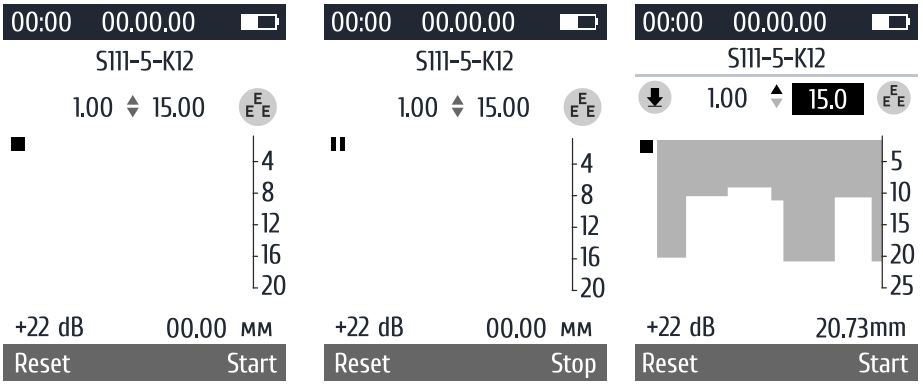

Figure 25

4.6 Viewing and processing of saved measurement results

To view measurement results in standard mode, open the "Memory" menu tab (Fig. 26). To view the results of measuring the profile of the bottom of the product, open the menu tab " Memory B-scan" (fig. 27) and use the buttons ▼ ▲ to select the desired file and press the button — on the right (Select).

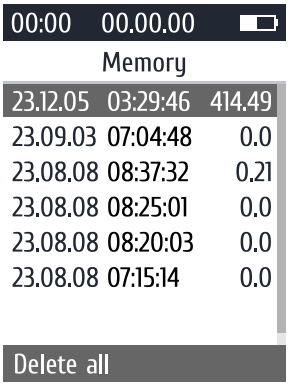

Figure 26

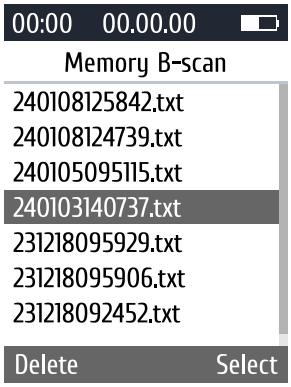

Figure 27

When connecting the device to a PC, data from the archives can be copied for further processing.

5. MAINTENANCE

Inspection of the technical condition of the ultrasonic thickness gauge to ensure its operability during the entire period of operation is carried out at least once a year in the following sequence:

1) Check the completeness of the thickness gauge according to item 2 Delivery set.

2) Carry out an external inspection of the device case, screen, cable, transducer and make sure there is no mechanical damage.

3) Check the functionality of the device on the standard thickness sample from the set.

4) If defects have been found, contact the manufacturer for their elimination.

Importantly! Opening the case of the device by a person not authorized by the manufacturer and independent repair of the device is not allowed.

6. TRANSPORTATION AND STORAGE

The ultrasonic thickness gauge in the transport package, which ensures its safety, is transported by rail, road, sea, or air transport in compliance with the relevant rules for the transportation of goods that apply to the specified modes of transport. In the case of transportation by air transport, transportation must be carried out in sealed heating compartments.

The device is stored in a case in a closed, heated room with an air temperature of (25±10) °C, relative humidity from 45 to 80%, and atmospheric pressure from 630 to 800 mm Hg. There should be no mold, acid vapors, reagents, paints, and other chemicals in the room. Sudden changes in temperature and air humidity, which cause the appearance of dew, should not be allowed in the room.

7. PRECAUTIONS

An ultrasonic thickness gauge is a technically complex measuring device that requires careful handling. It must be protected from:

- impacts, loads that can lead to mechanical damage;
- exposure to chemically aggressive environments;
- ingress of liquids;
- prolonged exposure to direct sunlight;
- other influences that may damage the device's performance.

It is not allowed to use the device under conditions of sudden temperature changes. In the case of a sharp drop in ambient temperature, wait at least 1 hour before switching on the device.

It is not allowed to open the electronic unit and sensors, as well as self-repair.

8. MANUFACTURER'S WARRANTIES

The manufacturing enterprise guarantees the compliance of the ultrasonic thickness gauge with the technical characteristics specified in the operating manual, subject to the conditions of operation, transportation, and storage.

The warranty period is 12 months or as agreed with the Customer.

In case of incorrect operation or the need for repair, you should contact the manufacturer.

Post-warranty repair of the ultrasonic thickness gauge is carried out by the manufacturer upon additional request.

The warranty does not cover:

- for mechanical damage and damage caused by the influence of aggressive environments, high temperatures, ingress of liquid or foreign objects into the device;
- for consumables and quickly wearing parts (cables, sensors, cases, covers, etc.);
- for products repaired during the warranty period by persons not authorized by the Supplier;
- for malfunctions resulting from non-compliance with the requirements of the operating instructions;
- for preventive maintenance and replacement of consumables.

9. CERTIFICATE OF ACCEPTANCE

Ultrasonic thickness gauge (Product name) ADL-UT25 (version) № _____ (serial number)

manufactured and accepted by the mandatory requirements of state (national) standards, current technical documentation, and recognized as fit for use

Year of manufacture: 202__

stamp _____ (personal signature) _____ (full name)

10. INFORMATION ABOUT THE MANUFACTURER

ADELIX INDUSTRIAL TEST EQUIPMENT MACHINERY IMPORT EXPORT INDUSTRY AND TRADE LIMITED COMPANY

KORKUTREIS MAH. LALE CAD. OZGE BUSINESS CENTER NO: 17
INTERNAL DOOR NO: 12
CANKAYA / ANKARA / TURKEY

Tel. +90 539 843 77 25
E-mail: equip@adelixturkiye.com

ADELIX Company

Production and service

adelixturkiye.com