



ACOUSTIC CONTROL SYSTEMS

DEVICES FOR NON-DESTRUCTIVE TESTING OF METALS, PLASTICS AND CONCRETE

DEVELOPMENT, PRODUCTION, SALE



PRODUCT CATALOGUE

2010

1. ABOUT ACSYS

The research and production company “ACSYS, Ltd” (“Acoustic Control Systems, Ltd”) was established in 1991. The company creates, produces and delivers high technology equipment for ultrasonic nondestructive testing of various structural materials.

At the moment ACSYS is one of the leading producers of nondestructive testing devices and it's respected and trusted by customers in many industries.

2. ACTIVITY

Core areas of the company's expertise and industry are:

- Scientific researches
- Development and batch production of the equipment for nondestructive testing of metals, plastics, concretes and composite materials:
 - ultrasonic thickness gauges, flaw detectors and tomographers;
 - electromagnetic-acoustic (EMA) thickness gauges and flaw detectors;
 - acoustic guided wave flaw detectors.
- Custom design and manufacturing of highly tailored devices for other companies
- Products sale and service

3. PRODUCTS

Our products have acquired a reputation as high-quality, up-to-date and competitive devices for manual testing not only in Russia but worldwide as well. More than 10% of the equipment produced by our company is exported to EU, USA, Japan and other countries.

Our products for nondestructive testing of concrete, composites and stones have no analogues anywhere in the world.

4. STAFF

More than 25 years of experience of working in the area allow our experts to create products combining top technical characteristics, maximum comfort and usability, great functionality and modern design.

There are two professors and two PhDs in the company as well as skilled engineers and managers. Our scientists and engineers regularly publish key results of their researches and developments at scientific and special magazines.

High qualification and experience of our staff provide the quality of our products to satisfy the needs of the most exacting customers.

PRODUCTS

ULTRASONIC DEVICES FOR INSPECTION OF METALS, PLASTICS AND COMPOSITE MATERIALS:

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EMA DEVICES FOR INSPECTION OF METALS:

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ULTRASONIC AND EMA TRANSDUCERS FOR INSPECTION OF METALS, PLASTICS AND COMPOSITE MATERIALS

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[A1207/A1207C]



ULTRASONIC THICKNESS GAUGE

Diminutive ultrasonic thickness gauge combining usability with all key functions of an up-to-date thickness gauge.

The device is designed in one piece with a transducer built in the electronic module. Ideal solution for express thickness measurement.

The device is offered in two modifications:

A1207 – with an embedded double-crystal transducer on 10MHz;

A1207C – with an embedded single-crystal transducer on 2,5 MHz.



FEATURES

- Easy to set up and to use
- Pocket size and light weight
- Four preset ultrasound velocities easy to select
- Custom velocity setting option
- Operating temperature from -30 to +50 °C
- Built-in NiMh accumulator
- Socket for an external power and charging unit

APPLICATION

- A1207 is suitable for thickness measurement of pipe walls, boilers, vessels, ship shels and other ferrous and nonferrous metals with surface roughness of up to Rz160 and minimum curvature radius of 10 mm.
- A1207C is used to estimate rail wear, for measuring objects with significant thickness and for measuring thickness of plastic items from 4 to 25 mm.



SPECIFICATION

Thickness measurement range (for steel)	
A1207	0,8 - 30,0 mm
A1207C	10,0 - 200,0 mm
Type and frequency of the built-in transducer	
A1207	double-crystal on 10 MHz
A1207C	single-crystal on 2,5 MHz
Transducer effective area diameter	
A1207	10 mm
A1207C	10 mm
Discreteness of thickness measuring	0,1 mm
Basic error of measurements	$\pm (0,005X + 0,1)$ mm
Units	mm, inches
Velocity range	1000 - 9000 m/s
Discreteness of velocity change	10 m/s
Display type	light-emitting diode
Power	embedded NiMh accumulator
Operation time without re-charging	24 hours
Operating temperature	from -300 to +50°C
Size	143 x 26 x 18 mm
Weight	55 g

DELIVERY KIT

A1207

- A1207 – an ultrasonic thickness gauge with an embedded accumulator and double-crystal transducer
- External power unit (USB)
- USB adapter for 220V
- Steel check sample
- Bag

A1207C

- A1207C - an ultrasonic thickness gauge with an embedded accumulator and single-crystal transducer
- External power unit (USB)
- USB adapter for 220V
- Bag

[A1208]

RF PATENT NO.2231753
RF PATENT NO.2082160

FROST-PROOF ULTRASONIC THICKNESS GAUGE

Frost-proof ultrasonic thickness gauge for difficult weather conditions (from -30 to +50 °C). The range of thickness measurement on steel is from 0,8 to 300 mm. Supports work with both single-crystal and double-crystal transducers.



The single-crystal wear-resistant transducer S3567 2.5A0D10CL allows to measure thickness of metals, cast iron and other materials with high ultrasound attenuation.



The double-crystal transducer D2763 10.0A0D6CL enables the search of pitting corrosion and measuring thickness of small diameter thin-walled pipes.

The large and contrast display, friendly interface and high functionality make it easy to master the use of the device.



FEATURES

- Solid body of light shockproof plastic
- Large, informative, contrast TFT display
- Embedded LiPol accumulator
- Automatic adaptation to transducers
- Variable discreteness of thickness measurement (0,1/0,01 mm)
- Various operating modes
- Indication of residual thickness of the tested object in per cent
- Velocity calibration on material with known thickness
- Nonvolatile memory for 50 000 measurements
- USB connection to PC for data transmission

EXTRA FUNCTIONS

- Sound indication
- Vibro indication
- Signal level indication
- Battery level indication
- Automatic switch off

OPERATING MODES

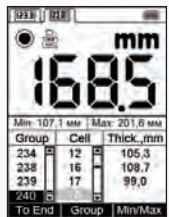


NORM mode

For quick thickness measuring with the possibility to set the range of automatical flaw alarm response and to detect the metal thickness derating.

Sound and vibro indications when violating the limits of permissible results together with graphic presentation of the depth gauge scale provide comfort work.

There is a possibility to measure thickness with indication of residual thickness of the testing object in per cent of value preset by defining the upper limit indicating 100% and the lower limit indicating spoilage standard.



MEMORY mode

For quick thickness measuring with the possibility to save the result to the nonvolatile memory. While saving the readings can be organized in groups which make further viewing and analysis more convenient.

SPECIFICATION

Thickness measurement range(for steel) with transducers:

S3567 2.5A0D10CL from 0,7 to 300,0 mm

D2763 10.0A0D6CL from 0,7 to 30,0 mm

Discreteness of thickness measuring for thickness range:

from 0,7 to 99,99 mm 0,01; 0,1 mm

from 100,0 to 300,0 mm 0,1 mm

Basic error of measurements with discreteness:

0,01 mm $\pm(0,05X+0,01)$ mm

0,1 mm $\pm(0,01X+0,1)$ mm

Permissible surface roughness Rz 160

Minimum curvature radius 10 mm

Ultrasound velocity range from 1000 to 9999 m/s

Display type TFT

Power built-in LiPol accumulator

Operation time without re-charging 8h

Operating temperature from -30 to +50 °C

Size of the electronic unit 157 x 70 x 23 mm

Weight of the electronic unit 250 g

DELIVERY KIT

- A1208 – frost-proof ultrasonic thickness gauge
- Transducers S3567 2.5A0D10CL
- Transducers D2763 10.0A0D6CL
- Single LEMO 00 – LEMO 00 cable 1,2 m
- Double LEMO 00 – LEMO 00 cable 1,2 m
- 220 B – USB adapter
- USB A - Micro B cable
- Bag

[A1209]

RF PATENT NO.2231753
RF PATENT NO.2082160

UNIVERSAL ULTRASONIC THICKNESS GAUGE

New performance for reliable measurements!

Large contrast display, integrated auxiliary features and various modes of measuring, possibility to work with all double-crystal transducers at the range from 2,5 to 10 MHz and embedded memory – everything to guarantee comfort work at any object to test.

The patented algorithm of automatic adaptation to the surface curvature and roughness (dynamical threshold) makes it possible to conduct measuring at corroded surfaces with small radius of curvature as well as at flat smooth surfaces without any extra setup or adjustments, which makes the work easier and faster.

The delivery kit contains the double-crystal transducer D1771 4.0A0D12CL, which has great wearing capacity and provides steady measuring at most objects.

Optionally the devices can be completed with a high-temperature transducer for operating at the temperature range from -20 to 200 °C.



FEATURES

- Light shockproof body
- Large informative contrast TFT display
- Built-in Lilon accumulator
- Automatic adaptation to transducers
- Discreteness of thickness measuring 0,01 or 0,1 mm
- Various operation modes
- Calibration at the tested object
- Indication of residual thickness of the tested object in per cent
- Nonvolatile memory for 50 000 measurements
- USB connection to PC for data transmission

EXTRA FUNCTIONS

- Sound indication of echo-signal reception
- Vibro indication
- Signal level indication
- Battery level indication
- Automatic switch off

OPERATION MODES

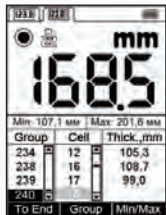


NORM mode

For quick thickness measuring with the possibility to set the range of automatical flaw alarm response and to detect the metal thickness derating.

Sound and vibro indications when violating the limits of permissible results together with graphic presentation of the depth gauge scale provide comfort work.

There is a possibility to measure thickness with indication of residual thickness of the testing object in per cent of value preset by defining the upper limit indicating 100% and the lower limit indicating spoilage standard.



MEMORY mode

For quick thickness measuring with the possibility to save the result to the nonvolatile memory.

While saving the readings can be organized in groups which make further viewing and analysis more convenient.

SPECIFICATION

Thickness measurement range(for steel) with transducer D1771 4.0A0D12CL	from 0,7 to 300,0 mm
Discreteness of thickness measuring for thickness range:	
from 0,7 to 99,99 mm	0,01; 0,1 mm
from 100,0 to 300,0 mm	0,1 mm
Basic error of measurements with discreteness:	
0,01 mm	$\pm(0,05X+0,01)$ mm
0,1 mm	$\pm(0,01X+0,1)$ mm
Permissible surface roughness	Rz 160
Minimum curvature radius	10 mm
Ultrasound velocity range	from 1000 to 9999 m/s
Display type	TFT
Power	built-in LiPol accumulator
Operating time without re-charging	10h
Operating temperature	from -20 to +50 °C
Size of the electronic unit	157 x 70 x 23 mm
Weight of the electronic unit	250 g

DELIVERY KIT

- A1209 –ultrasonic thickness gauge
- Transducer D1771 4.0A0D12CL
- Double LEMO 00 – LEMO 00 cable 1,2 m
- 220 B – USB adapter
- USB A - Micro B cable
- Bag

[A1210]

RF PATENT NO.2231753
RF PATENT NO.2082160

ULTRASONIC THICKNESS GAUGE WITH A-SCAN

State-of-the-art ultrasonic thickness gauge with extended function range.

The thickness gauge can operate at the mode of displaying the results as digital data or at the mode with graphic imaging of the signal A-Scan.

The A-Scan feature allows ruling out false results considerably increasing the inspection reliability, to conduct express-searches of foreign inclusions and laminations and to get true results of measuring through polymeric, varnish and paint and other types of insulated coating.

The thickness gauge A1210 has a whole range of features to provide comfort and effective work:

- double-crystal and single-crystal transducers
- patented system of automatic adaptation to the surface curvature and roughness
- patented auto correlated algorithm of measuring for pinpoint accuracy of results eliminating the influence of the single-crystal transducers' blind zone at small thickness.

The large TFT display ensures the full visual control of the inspection process with the help of color indications.

The magnetic holder helps to fix the thickness gauge safely to metal surfaces for comfort work at hard-to reach places and at heights.



FEATURES

- Colour high-contrast TFT display
- A-Scan mode with an option to save images to the memory
- Metal thickness measuring through insulated coating at the A-Scan mode
- Nonvolatile memory for 50 000 measurements including 4 000 A-Scan images
- USB connection to PC
- Automatic logging of the maximum and minimum values at multiple measurements or while scanning the object
- Automatic measuring of the ultrasonic wave velocity at a sample with known thickness
- Setting the range of measurements
- Indication of the range limits violation – with color, sound and vibro
- Indication of residual thickness of the tested object in per cent
- USB connection to PC for data transmission

EXTRA FUNCTIONS

- Discreteness of thickness measuring 0,01 or 0,1 mm
- Choice between mm and inches
- Vibro indication
- Signal level indication
- Battery level indication

SPECIFICATION

Thickness measurement range(for steel) with transducer D1771 4.0A0D12CL	from 0,7 to 300,0 mm
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Discreteness of thickness measuring for thickness range:

from 0,7 to 99,99 mm	0,01; 0,1 mm
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from 100,0 to 300,0 mm	0,1 mm
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Basic error of measurements with discreteness:

0,01 mm	$\pm(0,05X+0,01)$ mm
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0,1 mm	$\pm(0,01X+0,1)$ mm
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Permissible surface roughness	Rz 160
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Minimum curvature radius	10 mm
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Ultrasound velocity range	from 1000 to 9999 m/s
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Display type	TFT
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Power	built-in LiPol accumulator
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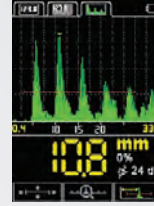
Operation time without re-charging	9h
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Operating temperature	from -20 to +50 °C
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Size of the electronic unit	157 x 70 x 23 mm
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Weight of the electronic unit	250 g
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OPERATION MODES



A-SCAN mode

For measurings with displaying signals as A-Scan.

This mode makes it possible to rule out inaccuracy of measurements caused by duplicated readings. There are four possible ways to conduct measuring: first overshoot of the strobe, maximum point at the strobe, between two signals and auto correlation function (ACF) in strobe.

The “between two signals” mode allows to measure the thickness of metal through polymeric and varnish and paint coatings without skinning.



NORM mode

For quick thickness measuring with the possibility to set the range of automatic flaw alarm response and to detect the metal thickness derating.

Sound and vibro indications when violating the limits of permissible results together with graphic presentation of the depth gauge scale provide comfort work.

There is a possibility to measure thickness with indication of residual thickness of the testing object in per cent of value preset by defining the upper limit indicating 100% and the lower limit indicating spoilage standard.



MEMORY mode

For quick thickness measuring with the possibility to save the result to the nonvolatile memory.

While saving the readings can be organized in groups which make further viewing and analysis more convenient.

DELIVERY KIT

- A1210 –ultrasonic thickness gauge with A-Scan
- Transducer S3567 2.5A0D10CL
- Transducer D1771 4.0A0D12CL
- Single LEMO 00 – LEMO 00 cable 1,2 m
- Double LEMO 00 – LEMO 00 cable 1,2 m
- 220 B – USB adapter
- USB A - Micro B cable
- Bag

[A1212 MASTER]

A1212 MASTER AND A1214 EXPERT UNIVERSAL ULTRASONIC FLAW DETECTORS

Portable handheld general-purpose ultrasonic flaw detectors. Provide realization of standard and special-purpose methods of ultrasonic inspection, high efficiency and accuracy of measurements.

APPLICATION AREA

- Weld inspection
- Finding places of corrosion, cracks, internal stratifications and other flaws
- Finding out the coordinates and evaluating the parameters of the flaw (damages of continuity and homogeneity) at metal and plastic objects
- Thickness gauging



[A1214 EXPERT]



A1212 MASTER FEATURES

- All features of an up-to-date flaw detector in a compact case
- Ideal for work at hard-to-reach places
- Light weight and small size allow to operate the device at difficult conditions and make it handy for travelling
- The most lightweight flaw detector – only 750 grams with the battery
- Maximum operation time – 15 hours
- Ergonomic case of shockproof plastic – the device can be held with one hand
- Liquid crystal display with high resolution (320 x 240 pixels) with illumination and heating, that allows to operate at temperature range from -20°C to +50°C

A1214 EXPERT FEATURES

- Classic version of an ultrasonic flaw detector with all up-to-date functions
- Large high-contrast edge-lighted display (ELD) (320 x 240 pixels) allows to work with the device for a long time without straining one's eyes
- User-friendly interface with shortcut keys
- Operating temperature range from -30 to +45 °C
- Maximum operating time – 12 hours
- Weight of the flaw detector with the battery – 1,9 kg
- Quick-detachable accumulator

PRODUCT CATALOGUE

SPECIFICATIONS

Maximum thickness of the tested object (echo method, steel)	3000 mm
Rated operating frequencies	0,5 – 15,0 MHz
Flaw detector dynamic range, not less than	100 dB
Time intervals measuring range	1 – 1200 µs
Material ultrasound velocity setting range	1000 – 15000 m/s
Receiver broadband frequency	from 0,14 to 21 MHz
Gain regulation range	from 0 to 90 dB
Dynamic DAC range, not less than	30 dB
Zonding pulse parameters	
number of periods	from 0,5 to 5
amplitude	20, 100, 200 V
leading edge, not more than	20 ns
zonding frequency	10, 25, 50, 100, 200 Hz
Operation time	
with illumination on:	
A1212 MASTER	15 h
A1214 EXPERT	12 h
with illumination off (A1212 MASTER):	
12 h	
with heating and indicator illumination on (A1212 MASTER)	
2 h	
Display type	
A1212 MASTER	LCD with heating and illumination
A1214 EXPERT	ELD
Display resolution	320 x 240 pixels
Display size	
A1212 MASTER	77 x 58 mm
A1214 EXPERT	115 x 86 mm
Operating temperature range	
A1212 MASTER	from –20 to +45 °C
A1214 EXPERT	from –30 to +45 °C
Electronic unit size	
A1212 MASTER	250 x 120 x 40 mm
A1214 EXPERT	250 x 160 x 80 mm
Weight with batteries	
A1212 MASTER	750 g
A1214 EXPERT	1,9 kg

There are two versions of A1212 MASTER available: LITE and PROFI
The LITE version lacks the DGS feature and the B-SCAN mode, power is supplied by batteries, not accumulators and the operating temperature range is shorter (from -10 to 45 °C)

DELIVERY KIT

A1212 MASTER LITE

- A1212 MASTER - flaw detector electronic unit
- S3568 2.5A0D10CL transducer
- S5182 2.5A65D12CS transducer
- S5096 5.0A70D6CS transducer
- LEMO 00 - LEMO 00 single cable, 1,2 m
- AA Alkaline 2,6 Ah batteries, set of 6 pcs
- Case

A1212 MASTER PROFI

- A1212 MASTER - flaw detector electronic unit with an embedded accumulator
- D1771 4.0A0D12CL transducer
- S3568 2.5A0D10CL transducer
- S5182 2.5A65D12CS transducer
- S5096 5.0A70D6CS transducer
- LEMO 00 - LEMO 00 double cable, 1,2 m
- LEMO 00 - LEMO 00 single cable, 1,2 m
- Charging and power supplying unit
- USB connection cable
- Calibrating sample V2/25
- Case
- Travel bag

A1214 EXPERT

- A1214 EXPERT – flaw detector electronic unit
- Detachable NiMH-4,5 Ah-12,0 B
- D1771 4.0A0D12CL transducer
- S3568 2.5A0D10CL transducer
- S5182 2.5A65D12CS transducer
- S5096 5.0A70D6CS transducer
- LEMO 00 - LEMO 00 double cable, 1,2 m
- LEMO 00 - LEMO 00 single cable, 1,2 m
- Charging and power supplying unit
- USB connection cable
- Calibrating sample V2/25
- Case
- Travel bag

[A1550 IntroVisor]

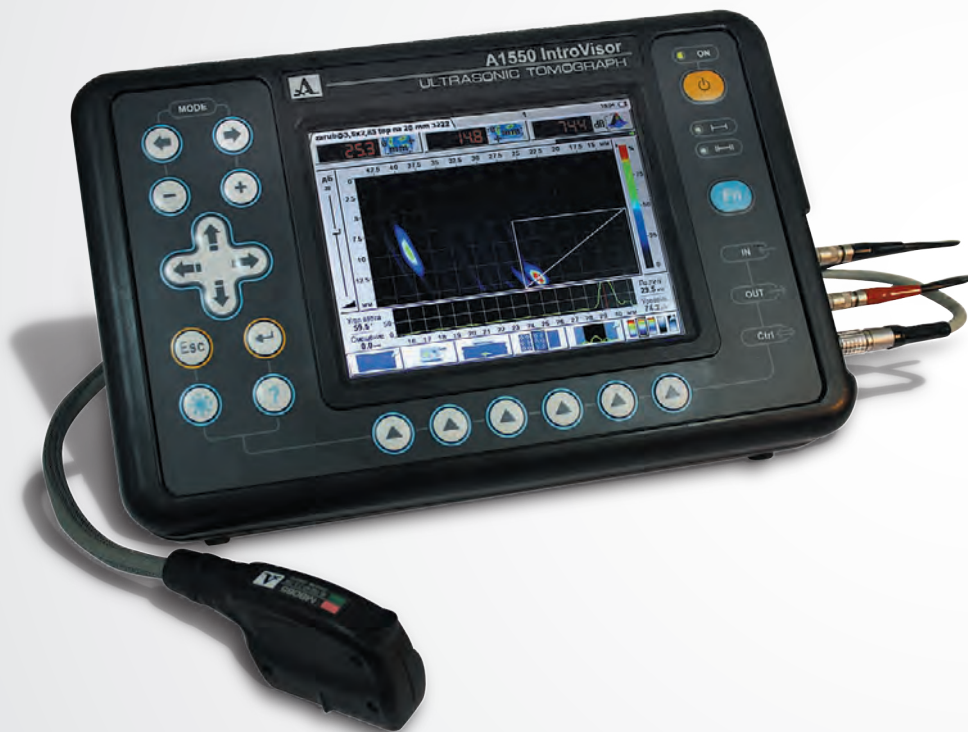
ULTRASONIC FLAW DETECTOR-TOMOGRAPH

The universal portable ultrasonic tomograph provides the object internal structure visualization as real-time section imaging, making the results interpretation much easier and more accessible in compare to an ordinary flaw detector.

The tomograph uses various types of phased arrays comparable by size with traditional transducers. Thanks to a special control algorithm a phased array substitutes a whole kit of standard transducers traditionally used for testing.

A1550 IntroVisor operates basing on the principle of ultrasound virtual focusing in every point of the visualized section, providing high efficiency and best results for spatial resolution and sensitivity.

The A1550 IntroVisor tomograph is designed to meet the challenge of quick and efficient flaw detection at metal, plastic and composite objects with detailed documenting of the results.



Easy insight into the metal...

ADVANTAGES

- Real-time visual imaging of the object internal structure
- Option to use various types of waves:
 - shear waves to inspect welds;
 - longitudinal waves to inspect base metal overlapping angular range used by standard methods of ultrasonic testing
- Enhanced resolution and sensitivity
- Possibility to measure discontinuity flaw size
- High testing efficiency
- Possibility to operate as a tomograph (B-Scan) and as a traditional flaw detector (A-Scan)

FUNCTIONS

- Signal level measurement and reflectors' positions determination at every point of the tomogram
- Changing the scale and imaging area of the tomographic mode in relation to the center of the antenna array
- Displaying multiple echo-signals when the thickness is known
- Two fully adjustable 2D gates
- Run-time control of the tomogram contrast
- Option of choosing a colour and brightness scale
- Creating, saving and selecting of the device settings configuration
- Saving and viewing tomograms and echo signals
- Output of the saved data to an external PC for further processing

ARRAY TYPES FOR THE TOMOGRAPH

The A1550 tomograph uses the following arrays for various fields of application:

- M9060 4.0V0R40X10CL – 16 elements longitudinal wave array with central operation frequency of 4 MHz and scan zone of $\pm 50^\circ$. It is used to test metal and plastic objects.
- M9065 4.0V60R40X10CS - 16 elements shear wave array with central operation frequency of 4 MHz and scan zone from 35° to 85° . It is used to test welds including austenitic. This array is distinguished with the absence of a large refracting prism.

FEATURES

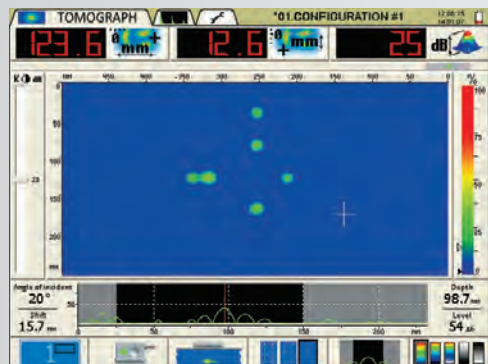
- Raster scanning of the tested object by sampling focus technique with reconstructing a right-angled image (B-Scan)
- Easy to set up and to operate
- Small size
- Large colour display provides presentation of the section graphic image as well as results of signals levels and coordinate measuring
- Easy-to-use intuitive interface with shortcuts to core settings, parameters and control allows to master the device quickly
- Fast-detachable accumulator
- Nonvolatile memory
- USB connection to PC
- Special software



OPERATION MODES

SETUP mode

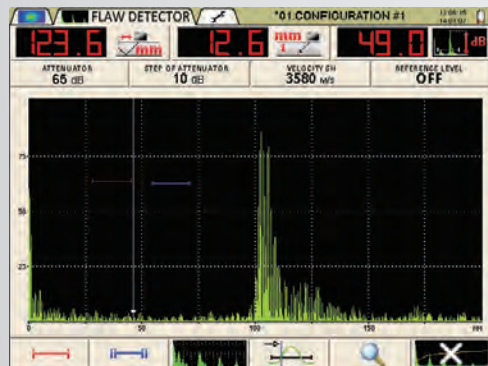
This mode is used to set up and select parameters and working configuration.



TOMOGRAPH mode

Provides operating with arrays and real-time tomogram forming. At this mode not only tomogram (B-Scan) is displayed but all service information as well, including strobes, cursors, digital indicators etc.

When a flaw is detected the user has an option to estimate its real or equivalent size in one of the following ways: using the classic method (comparing to the signal amplitude from the reference deflector) or the flaw-detecting method (measuring coordinates of the flaw image characteristic points and the distance between them directly at the reconstructed image)



FLAW DETECTOR mode

To operate as a conventional flaw detector with classic direct or angle beam transducers. Signals are displayed as A-Scan.

At this mode the device has all features of a modern flaw detector (built-in DGS-diagrams, multilevel digital automatic flaw alarm indication, programmable form of the transducers' outgoing pulse etc)

A1550 IntroVisor combines two devices: an industrial tomograph and a traditional universal ultrasonic flaw detector. It is a reliable and effective tool for most tasks of nondestructive testing.

In spite of the fact that the device is designed for quick manual testing it can be used as a part of automated systems.

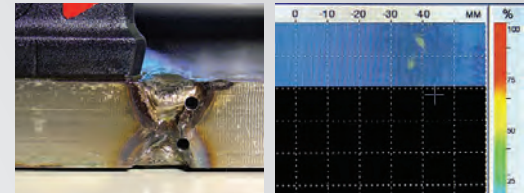
Additionally the A1550 IntroVisor tomograph can be adapted and updated for customer's special needs.

SPECIFICATION

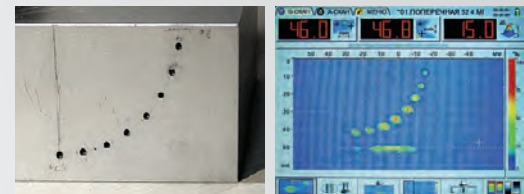
Number of elements in the array	16
Size of image in pixels	256 x 256
Tomogram reconstruction interval	0,1 – 2,0 mm
Operation frequencies	1,0; 1,25; 1,5; 1,8; 2,0; 2,25 2,5; 3,0; 3,5 4,0; 5,0; 6,0; 7,5; 8,0; 10,0 MHz
Velocity range	1000 – 9999 m/s
Attenuator range	0 – 80 dB
Attenuator interval	1, 6, 10 dB
Display type	TFT
Display resolution	640 x 480
Power	Accumulator
Rated power voltage	11,2 V
Operation time with the accumulator, not less than	8 h
Size of the electronic unit	258 x 164 x 110 mm
Weight of the electronic unit	1,9 kg
Operation temperature	from -10 to +55 °C

DELIVERY KIT

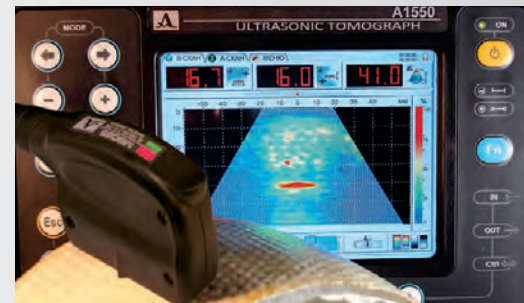
- A1550 IntroVisor – ultrasonic flaw detector - tomograph
- M9065 4.0V60R40X10CS array
- M9060 4.0V0R40X10CL array
- S3568 2.5A0D10CL transducer
- S5182 2.5A65D12CS transducer
- S5096 5.0A70D6CS transducer
- LEMO 00 - LEMO 00 single cable 1,2 m
- USB A - Mini B (5P) cable
- Detachable accumulator
- Power adaptor
- Calibrating sample V2/25
- Travel bag



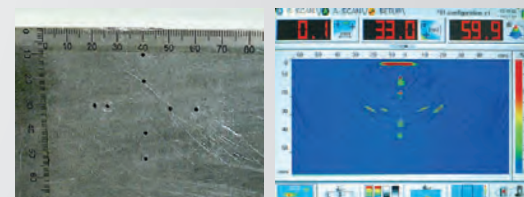
The image of the drilling which is 2,5 mm in diameter, made in austenitic weld with a thickness of 20 mm.



The image of the drilling which is 3,5 mm in diameter, made in aluminum weld with a thickness of 50 mm.



The image of the internal structure of a fiberglass sample with a thickness of 40 mm.



The image of the drilling which is 1 mm in diameter, made in aluminum sample in the form of a "cross".

[A1270]



ELECTRO-MAGNETIC ACOUSTIC THICKNESS GAUGE

Is applicable for measuring thickness of objects from steel and aluminum alloy without any contact liquid within the thickness range of from 0.7 to 100.0 mm.

Transducers, used with the EMA thickness gauge, provide measuring through coating or air gap both directly and with a specialized movable capsule, which enables to scan a testing object promptly, record the results and evaluate them.

Convenient interface with switching between modes and fast access to setup and functions makes work with the device considerably easier.

Small weight and size of the device allow to work under close conditions and make it convenient while transporting on business trips.



FEATURES

- Small size and weight of the device and the transducers
- Wide range of measured thicknesses:
 - from 0.7 to 100.0 mm for aluminium;
 - from 1.0 to 100.0 mm for steel
- Two different types of shear wave EMA transducers (with radial polarization, with linear polarization)
- The mode of completely automatic measurements by two signal analysis methods with intellectual choice of the most reliable result
- Mode of measurement with echo-signal observation in the form of A-scan and by manual selection from three signal analysis methods: on the first echo signal, on two neighboring echo signals ("echo-echo"), on repeated echo signals
- Easy to set up and use: calibration on material, automatic setup of ultrasonic waves velocity in the device
- Automatic adaptation of the device to EMA transducer parameters while adjusting
- Display of obtained results in digital format and as A-scan
- Memory for 19,800 measurements and 60 A-scans
- Connection with PC using a USB-port
- IP65 construction

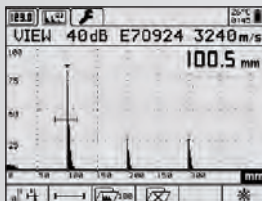


OPERATION MODES



SETUP mode

This mode is made for setting up the control parameters, automatic adaptation to the chosen EMA transducer, automatic determination of ultrasonic wave velocity while calibrating on a sample with known thickness. Also in this mode material parameters are adjusted, and configurations are formed, chosen and saved. At the same time thickness measurement results are displayed at the top of the screen, it allows to estimate indication precision when parameters are set, and to correct them in proper time for more precise setting of the device according to the problem being solved.

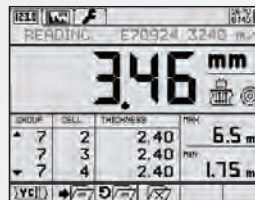


REVIEW mode

This mode is suitable for measuring thickness while watching the form of the echo-signals. This allows to improve the thickness measurement.

This mode enables:

- Controlling with application of one of three thickness measurement methods (threshold, two echo-signals, ACF).
- Using the ZOOM function while RF signals are presented.
- Saving the A-scans with all the corresponding parameters in the device memory.
- Working with images previously recorded in the device memory (browsing, clearing).



MEASUREMENT mode

It is intended for automatic measuring of the thickness of material being tested, determination of maximal and minimal thickness values from the measurements on the certain part of the testing object, saving of the measurement results into the device memory, editing of the results previously recorded into the memory, clearing the memory.

Besides the current thickness measurement result the information about measurement method and signal level as well as previously recorded measurement results are displayed on the device screen.

EMA TRANSDUCERS FOR WORKING WITH THICKNESS GAUGES

The following EMA transducers are used with the thickness gauge A1270:

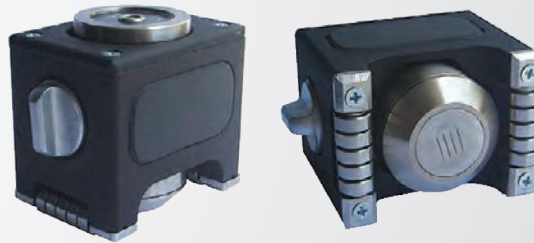
- S7392 3.0A0D10ES - rated frequency is 3 MHz, shear waves with radial polarization, aperture is 10 mm. Inspection of aluminum alloys within the range of from 0.7 to 100.0 mm, inspection of ferromagnetic steels within the range of from 1.0 to 30.0 mm. Minimal curvature radius of the test object is 20 mm.
- S7392 3.0A0D10ES - rated frequency is 3 MHz, shear waves with radial polarization, aperture is 10 mm. Inspection of aluminum alloys within the range of from 0.7 to 100.0 mm, inspection of ferromagnetic steels within the range of from 1.0 to 50.0 mm. Minimal curvature radius of the test object is 20 mm.

SPECIFICATION

Thickness measurement range (with EMA transducer S7392 3.0A0D10ES):	
for aluminum	from 0.7 to 100.0 mm
for steel	from 1.0 to 30.0 mm
Measuring error, not more than	$\pm (0.01X + 0.01)$ mm
Material velocity range	1000 - 9000 m/s
Working frequencies	2.5; 3.0 MHz
Quantity of objects in memory	19,800 measurements and 60 A-scans
Display type	liquid-crystal
Power supply (built-in rechargeable battery)	7,2 V
Operation time (with illumination)	10 (8) h
Operating temperature range	from -10 to +45 °C
Electronic unit size	250 x 120 x 40 mm
Weight of electronic unit	750 g

DELIVERY KIT

- A1270 – EMA thickness gauge
- EMA transducer S7392 3.0A0D10ES
- Movable capsule for transducer (S73 series)
- LEMO 00 - LEMO 00 single cable 1.2 m
- Charging unit with cables
- USB connection cable
- Aluminum sample with a thickness of 6.00 mm
- Case
- Travel bag



Movable capsule for transducer (S73 series).

[UK1401M Surfer]

RF PATENT NO.2082163 DE 10 2006 029 435 A1 US 7,587,943 B2

ULTRASONIC TESTER FOR CONCRETE INSPECTION

UK1401 ultrasonic tester is suitable for measuring time and velocity of ultrasonic waves in hard materials at surface sounding at a fixed base. The measurements are carried out to indicate the strength and integrity of materials and constructions.

The device is monoblock and has ergonomical body from light shockproof plastic.

Two dry point contact transducers are built-in in the body. It allows to test materials without any contact liquid. The transducers are wear-resistant and are not influenced by condition of surface allowing not to prepare the surface for inspection.



AREAS OF APPLICATION

- Evaluation of concrete strength on basis of correlation between velocity of ultrasonic waves in concrete and its mechanical parameters and physical condition
- Search of close-to-surface flaws in concrete objects by speed decreasing or increasing in the flaw spot
- Evaluation of the degree of anisotropy in composite materials
- Evaluation of the degree of concrete aging while building on the site
- Evaluation of the bearing ability of concrete supports and posts
- Evaluation of crack depth
- Evaluation of the age of material if its physical qualities change with time
- Evaluation of porosity and fissuring of the material.

FEATURES

- Built-in automatic gain control system (AGC)
- Sound indication of signal receiving
- Ability to save the results of measurements into memory: the device is equipped with nonvolatile memory for 4000 measurements with the ability to sort results in groups
- Infrared connection to PC
- User-friendly 5 button keyboard

DELIVERY KIT

- UK1401M – Ultrasonic tester
- Calibration sample
- Batteries AA Alkaline LR6, 2,8 Ah (3 pcs.)
- External IrDA adapter for connection to PC
- Bag



SPECIFICATION

Scanning base	150 mm
Time measurement range	15 - 100 μ s
Velocity measurement range	1500 – 9990 m/s
Crack deepness measurement range	10 - 50 mm
Measuring error, not more than	± 1 %
Working frequency	50 kHz
Zonding frequency	5 - 20 kHz
Quantity of objects in memory	4000
Operating temperature range	from -20 to +45 $^{\circ}$ C
Power	AA Alkaline batteries (3 pcs.)
Operation time	100 h
Size	200 x 120 x 35 mm
Weight of electronic unit	350 g

[A1220 MONOLITH]

EyeCon

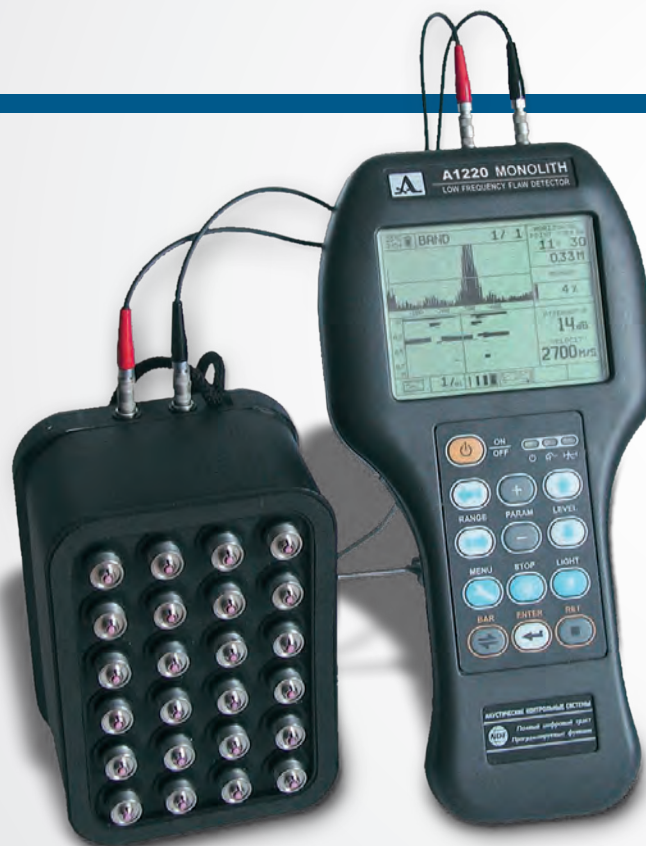
RF PATENT NO.2082163 DE 10 2006 029 435 A1 US 7,587,943 B2

LOW-FREQUENCY FLAW DETECTOR FOR CONCRETE

Low-frequency ultrasonic flaw detector A1220 MONOLITH is suitable for solving of thickness measuring and flaw detection tasks of constructions from concrete, rocks, asphalt, etc.

Uniqueness of the device is that it can test objects using echo-method at one-side access, which makes it possible to inspect the functional structures, such as biuldings, bridges, tunnels, etc.

One of the main advantages of the device is that the testing is performed without using any contact liquid, because of the dry-point-contact (DPC) transducers used in antenna array. The surface of testing doesn't need to be prepared preliminarily which makes the inspection process simple and fast.



AREAS OF APPLICATION

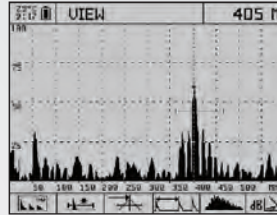
- Thickness measuring of constructions from concrete.
- Searching for foreign inclusions, cracks and pores inside of constructions from concrete, stone, plastics and alike materials at one-side access to the object of testing
- Analysis of the internal structure of large-grained materials

DESCRIPTION

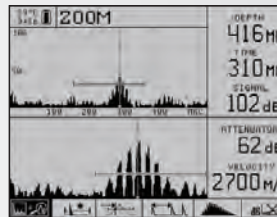


A1220 MONOLITH consists of electronic unit with a screen and a keyboard and a 24 element matrix antenna array, working on the principle of double-crystal transducer. The antenna array elements are spring-loaded, which allows to test uneven surfaces.

OPERATION MODES



following parameters is displayed on the screen: latency, distance, signal amplitude or gain.



REVIEW mode

The display of a A-scan in a real scale or with realizations averaging-out. The following measurements can be carried out: time interval between two signals or between the zonding pulse and the signal, distance measurement to the reflector, signal amplitude measurement. One of the

ZOOM mode

The feature of this mode is the increased quantity of displayed numeric parameters and measurement results on the device screen, and two display windows, showing the signals: general and zoomed signal.



BAND mode

This mode is intended for displaying the results as a cross-section of an object, perpendicular to the surface, while scanning an antenna array along one line with fixed scan step.

The cross-section on the screen is shown as a binary image, black colour marks areas where signal level is higher than the threshold and the other areas stay white. BAND building is convenient when testing an extensive object along one line. The option of getting results in colour mode and in half-tone mode is available while data processing on an external PC using special software.



MAP mode

MAP mode is intended for forming a number of cross-sections images of the test object perpendicular to the surface while scanning with an antenna array along marked lines with a fixed step, in other words a number of parallel bands of limited length. An image of the internal structure can be received when scan step is fixed vertically and horizontally.

FEATURES

The device can display the results in various forms:

In A-scan form:

It is a traditional form of signal display. Display of a signal in form of an A-scan is convenient for measuring thickness of the object, flaw searching and analysis in selected areas of the object.

The fully digital tract of the device provides signals display both in detected form and as a radio signal, which is particularly important for data analysis. This gives additional opportunities to interpret the signals, such as differentiate useful signals from noise, various reflectors, and so on.

In B-scan form:

The display of test results as a cross-section of test object which is perpendicular to the entry surface and parallel to scanning direction.

B-scan allows getting a more complete image of the internal structure of an object.

In spite of its multifunctionality A1220 MONOLITH is simple to setup and use, because of its intuitive interface and the icon menu, which provide fast access to the main settings and functions of the device. The ergonomic design of the flaw detector and its small weight (just 650 grams with a built-in battery) and a set of «hands-free» straps make the device a convenient instrument for working in hard-to-reach places. All of the test results are saved into nonvolatile memory of the device and can be transferred to external PC for further handling, analysis and backup.

DELIVERY KIT

- A1220 MONOLITH – ultrasonic flaw detector with rechargeable battery
- Antenna array M2502 0.05A0R100X60PS
- LEMO-LEMO cable, double, 1.2 m
- Charging device
- Power adapter with a cable
- USB connection cable
- Case
- Travel bag

The delivery kit can additionally contain the following:



Dry-point-contact (DPC) transducers for through and surface sounding of the object.

- S1802 0.05A0D2PS (shear waves; operating frequency 50 kHz)
- S1803 0.1A0D2PL (shear waves; operating frequency 100 kHz)



Liquid contact transducers for through sounding:

- S0205 0.025A0D25CL – (longitudinal waves; operating frequency 25 kHz)
- S0206 0.05A0D25CL – (longitudinal waves; operating frequency 50 kHz)
- S0208 0.1A0D25CL – (longitudinal waves; operating frequency 100 kHz)

SPECIFICATION

Maximum deepness of the echo-signals visualization (at transversal wave testing)	2150 mm
Maximum length of the signal realizations, visible on the device's screen	1600 μ s
Maximum measured thickness of concrete (in concrete grade M400)	600 mm
Minimal diameter of flaw in form of an air cylinder	12 mm
The error of measurements of flaw location thickness and depths	10 %
Time of one measurement processing and writing the result in memory	10 sec.
The number of single A-scans, that can be written into memory	200
Maximal length of a single B-scan (BAND mode)	10 m
Maximal area of inspecting surface (MAP mode)	10 m ²
Material velocity range	1000 – 9999 m/s
Amplitude of the zonding signal	20, 100, 200 V
The form of the zonding signal	Meander, 0,5-5,0 periods
The frequency of zonding signals	1 – 50 Hz
Receiving bandwidth	10 – 300 kHz
Gain setup range	from 0 to 106 with step of 1 dB
The quantity of the programmable points of DAC function	32
DAC function setup range	30 dB
Installable sweep length	150, 300, 450, 800, 1100, 1600 μ s
Threshold of sweep delay setting	0 – 120 μ s
Threshold of flaw detection signalizator	0 – 100 % of vertical screen scale
Discreteness of time range change	0,1 μ s
Power source	Built-in battery
Time of device operation from the battery without indicator lighting	14 h
Battery charging time	3 h
Operating temperature range	from –20 to +45 °C
Display type	LC with lighting (320 x 240)
Electronic unit size	250 x 120 x 40 mm
Electronic unit weight	750 g
Size of M2502 antenna array	140 x 88 x 74 mm
Weight of M2502 antenna array	750 g

[A1220 ANKER]

LOW-FREQUENCY FLAW DETECTOR FOR TESTING ANCHOR BOLTS

Low frequency ultrasonic flaw detector A1220 ANKER is suitable for testing anchor bolts of contact networks metal support foundations and metal searchlight masts with diameter from 24 to 36 mm.

The device allows testing integrity of the anchor bolts (with a length of 3.5 m) of the foundations without excavations when there is an access only to the top edge.

While testing composite anchor bolts it is possible to test only the top part of the bolt to the place of its welding to the reinforcing bar.

The device can also be used to test various lengthy objects (tubes, sticks, rods, sheets and etc) with guided wave method. Inspection is carried out on the object top edge.



DESCRIPTION



The device consists of an electronic unit with a display, where the results of testing are shown in the form of A-scan and a S0205 0.025A0D25CL low-frequency ultrasonic longitudinal wave transducer. The transducer is straight beam, single-crystal, broadband (relative bandwidth is not less than 100%) with liquid acoustic contact and working frequency of 25 kHz.

One of the main features of the transducer is a low level of its own reverberation acoustic noise, short transmitted acoustic pulse (1,5 - 2 periods) and high energy effectiveness.

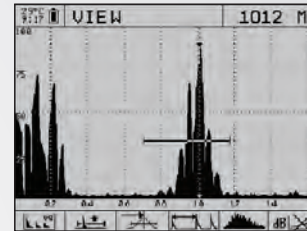
A1220 ANKER uses the echo-method, when the condition of the bolt is evaluated judging by the signal of the ultrasonic reflection from the opposite side of the anchor bolt.

SPECIFICATION

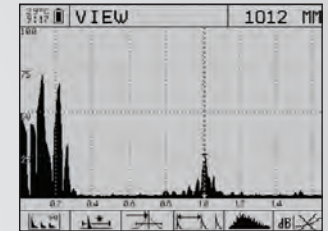
Maximum length of the anchor bolt	3.5 m
Material velocity range	1000 – 9999 m/s
The number of single A-scans, that can be written into memory	200
Power source	6 AA batteries
Operation time (with illumination)	15 (12) h
Operating temperature range	from -10 to +45 °C
Electronic unit size	250 x 120 x 40 mm
Electronic unit weight	750 g

SCREEN TYPES

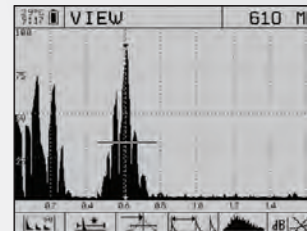
Test results are displayed in A-Scan form in the REVIEW mode.



non monolithic/ fully corroded bolt



without bolt corrosion



when bolt is broken

Test results can be saved in the built-in nonvolatile memory of the device as echo-signal images. The device enables saving more than 200 realizations. The saved results can be transferred to external PC for further handling, storage and printout.

DELIVERY KIT

- A1220 ANKER – ultrasonic flaw detector for testing anchor bolts
- Transducer S0205 0.025A0D25CL
- LEMO 00-LEMO 00 cable, double, 1.2 m
- Set of AA Alkaline 2.6 Ah batteries (6 pcs.)
- USB connection cable
- Case
- Travel bag

[A1040 MIRA]

RF PATENT NO.2082163
DE 10 2006 029 435 A1
US 7,587,943 B2

ULTRASONIC TOMOGRAPH FOR CONCRETE INSPECTION

Ultrasonic tomograph A1040 MIRA is applicable for testing constructions from concrete, reinforced concrete and stone at one-side access to them to evaluate material integrity in the object, to search foreign inclusions, holes, flaws, cracks, honeycombs ducts inside the material as well as to measure objects thickness. Objects with thickness up to 2 meters can be inspected.

Results are presented in a form of cross section image (tomogram) of B-type, which makes result easier to understand and is convenient for the object condition quick analysis. Specialized software allows to reconstruct any tomogram from three-dimensional data massive and to produce 3D image of the object internal structure.

Tomograph A1040 MIRA is designed in a monoblock form. It is easy and convenient in work. It has built-in computer, memory, big display and control buttons, which provides a comfortable work.

Antenna array of the tomograph consists of dry point contact (DPC) transducers; therefore inspection is carried out without contact liquid. Tomographic data procession (SAFT-algorithm) used for compilation of data, provides clear graphic picture of the internal structure of a testing object.

The tomograph can be used at manual control and composed to automatic plants.



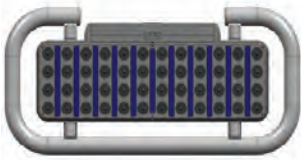
ADVANTAGES

- Visualization of the object internal structure at one-side access
- High efficiency – one tomogram reconstruction takes 3 seconds
- Easy to use
- High measurement accuracy and sensitivity to various reflectors
- The surface of the object doesn't need to be prepared preliminarily
- Wear-resistant transducer tips

FEATURES

- Light-weight shockproof plastic body
- Quick-detachable battery
- Independent work with data without an external computer
- Dry acoustic contact
- Adaptation of antenna array to the rough object surface
- Automatic measurement of the ultrasonic wave velocity in the testing object
- 3D presentation of the testing object internal structure and B-, C-, D-scans of any object section

DEVICE DESCRIPTION



A1040 MIRA tomograph for concrete is a completely independent measuring unit, which is used to conduct collection and tomographic processing of the received data. The measuring unit contains a matrix antenna array with low-frequency broadband shear wave transducers with a dry point contact and wear-resistant ceramic pins. It provides prolonged lifetime

even if used on rough surfaces. Each transducer has an independent spring load, which enables testing on uneven surfaces. Nominal operation frequency of array is 50 kHz.



Large and bright TFT display and a keyboard allow to tune up the device easy for the testing object, to select operation modes and carry out control, watching received results, which makes the preliminary analysis possible.

Small light body and repositionable handle make it comfortable to use the

device on horizontal, vertical and ceiling surfaces of the testing object.

Battery provides up to 5 hours of continuous work. Battery can be easily replaced with an extra one (optionally delivered), which increases time of independent work. And power can be delivered directly from AC network to the tomograph.

Inspection is conducted according to the scheme of step-by-step testing object scanning with data unification and volume reconstruction under the whole scanned testing object area.



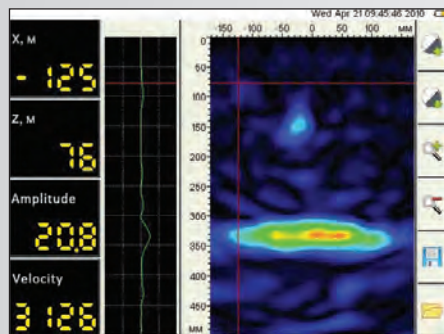
The device has a built-in computer, which provides processing data in the process of testing, displaying them on the screen and saving them into the memory. Data can be transmitted to an external PC for processing them with the specialized software.

DATA PROCESSING AND REPRESENTATION ON THE DISPLAY OF THE TOMOGRAPH

Synthetic aperture focusing technique with combinational method of sounding (SAFT-C) is used in the device, and ultrasound is focused in each half-space point. As a result an obvious image of testing object section is given. Reflection power of each visualized object point is coded by different colours, depending on the chosen colour scheme.

Different types of data presentation on the display of the tomography can be selected depending on installed mode.

OPERATION MODES

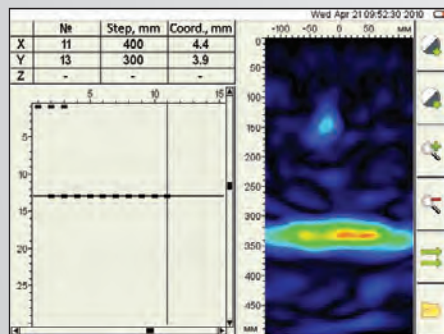


REVIEW mode

The mode is used for quick viewing of internal structure of the testing object in random places. B-scan on the depth of up to 2 meters is presented on the display.

In this mode it is additionally possible:

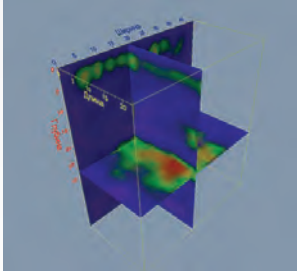
- To measure ultrasonic wave velocity automatically;
- To measure coordinates and levels of the image in the scan;
- To measure object thickness;
- To review A-scans.



MAP mode

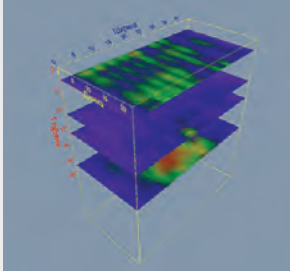
The mode is used for collecting data in a form of B-scan set (perpendicular to the surface) while inspection with an antenna array along marked lines with a fixed step. Any B-scan image can be displayed from the stored 3D data massive.

SOFTWARE

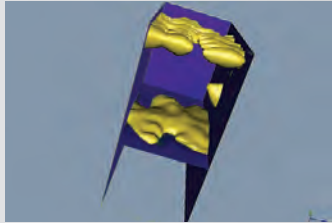
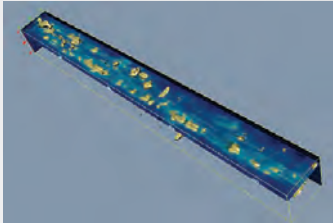
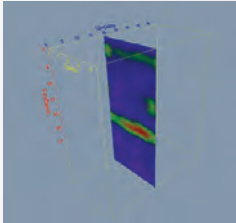
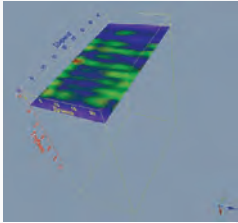
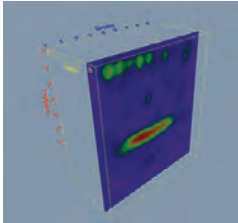


The device is delivered with specialized software for extended processing of collected data on an external PC.

The software provides reading data from the device and presenting it in a form of tomogram as well as in 3D form, which makes it easier to understand the internal structure of the concrete object.



It is possible to locate each reflector occurrence coordinate in the testing object.



SPECIFICATION

Specification of the system

Minimal thickness of testing object	50 mm
Maximum thickness of testing object	2 m
Minimal size of detected reflector	sphere with a diameter of 50 mm at a depth of 100 meters in concrete grade M400
Size and type of the display	5,7" TFT, color
Built-in memory	flash-memory
Power source	built-in quick-detachable battery/ac network
Battery operation time	5 h
Connection with a computer	USB
Operating temperature range	from -10 to +50 °C
Size	380 x 130 x 140 mm
Weight	4.5 kg

Transducer specification - elements of antenna array

Operating frequency	50 kHz
Bandwidth by the level – 6 dB in the emission/receiving mode	25 - 80 kHz
Operation type of waves	shear waves

DELIVERY KIT

- A1040 MIRA-tomograph ultrasonic unit
- Detachable battery
- Charging unit
- USB connection cable
- Check sample
- Notebook
- Sun shield
- Safety rope
- Additional stick-holder
- Transportation Case

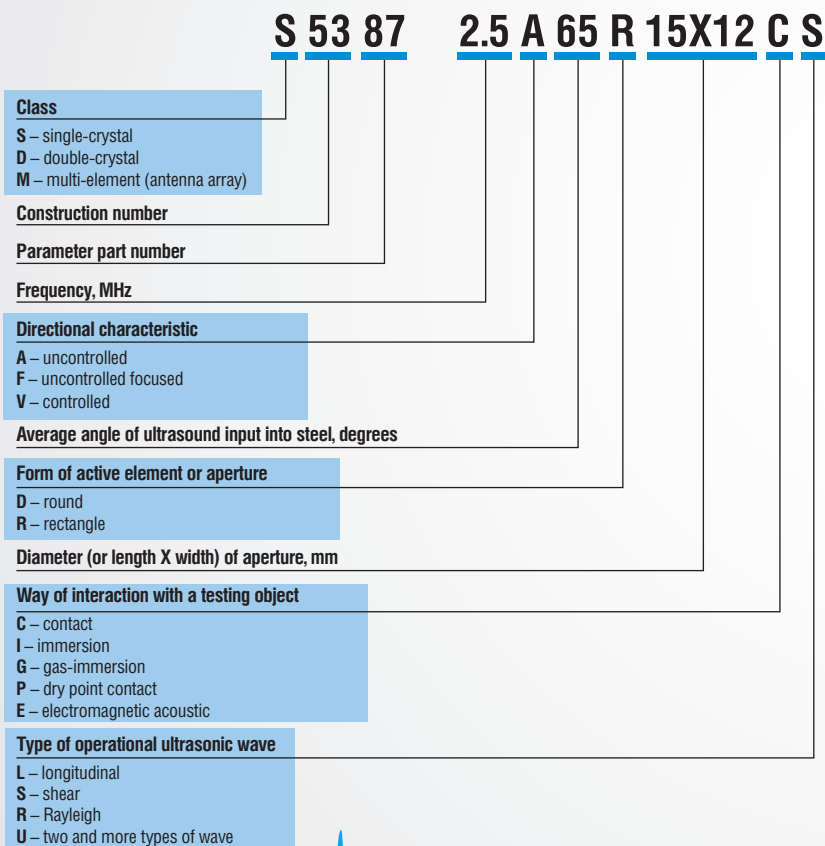
ULTRASONIC AND EMA TRANSDUCERS FOR TESTING METALS, PLASTICS AND COMPOSITES

ACSYS Ltd. has been producing ultrasonic transducers of different types, which are delivered both with the devices and as separate product.

The existing product line includes the following main types of transducers varying in construction, specification, facilities, features and application areas.

- contact straight beam single-crystal transducers;
- contact straight beam double-crystal transducers;
- contact angle single-crystal transducers;
- contact high-frequency antenna arrays;
- low-frequency dry point contact (DPC) transducers;
- low-frequency multiple-element arrays on the basis of transducers with a dry point contact (DPC);
- electromagnetic acoustic transducer.

NOTATION CONVENTION STRUCTURE FOR ULTRASONIC TRANSDUCERS AND ANTENNA ARRAYS





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