

LAW FREQUENCY ULTRASONIC FLAW DETECTOR

A1220 MONOLITH (EyeCon)

A compact handheld ultrasonic flaw detector is designed for ultrasonic thickness measurements and flaw detection of concrete and reinforced concrete constructions and rocks

APPLICATION

- Thickness measurement of the concrete objects up to 3000 mm and reinforced concrete objects up to 600 mm.
- Search for internal foreign inclusions, cavities, voids and cracks of the products and constructions made of reinforced concrete, stone and similar materials at one-sided and two-sided access.
- Search for embedded flaws of bronze castings.
- Inspection of the internal structure of the coarse-grained materials.
- Diagnostics of the anchor bolts from 20 to 40 mm in diameter of understructures without excavation when access is granted to the upper end surface of the bolts with overall length up to 3000 mm.

FUNCTIONAL CAPABILITIES AND FEATURES

- Dimensions of detectable discontinuities:
 - from Ø20 mm – a cylinder-shaped image of the flaw;
 - from Ø50 mm – a spherical image of the flaw.
- A traditional form of displaying signals as A-Scans of detected as well as undetected (radio signal) types. Hence, perform testing objects with a lot of structural noises and to distinguish signal and noises, various types of reflectors, etc.
- Inspection can be carried out by pulse-echo method and through transmission method.
- Inspection can be carried out without using contact liquid thanks to the dry-point-contact transducers used in the antenna array - there is no need to prepare the surface.
- Antenna array adjusts to uneven surfaces.
- Results of the ultrasonic inspection are presented as longitudinal and cross-sections of the testing object, parallel or perpendicular to the surface onto which the antenna array is being placed. B-, C-, D-Scans give more detailed representation of the internal structure of the object.

DESCRIPTION



The flaw detector represents an compact electronic unit is equipped with a large high-contrast TFT display and a keyboard.

A 24-element matrix antenna array is connected to the electronic unit by the LEMO-LEMO double cable. This antenna array operates like a double-crystal transducer. Its elements are spring-loaded thus allowing operation on rough and uneven surfaces.

Despite multifunctionality, the instrument is easy to use due to its intuitive interface and icons menu providing quick access to main settings and functions of the instrument.

Ergonomic design of the flaw detector and its light weight (as little as 800 grams), as well as capability of fastening the electronic unit in the specialized pad, provide convenient operation of the instrument in hard-to-reach areas and allow its working at height.

All inspection results are recorded into the instrument's memory and can be transferred via the USB-port to the external PC for further processing, registration and archiving.

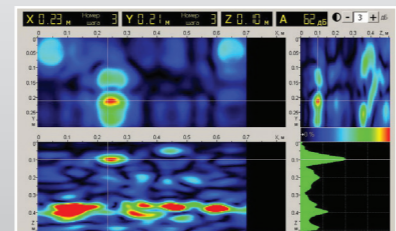


RF PATENT №2082163
DE PATENT 10 2006 029 435 A1
US PATENT 7,587,943 B2

SOFTWARE

Delivery kit of the instrument includes the dedicated "Planevisor" software. The software provides SAFT processing of data on the external PC.

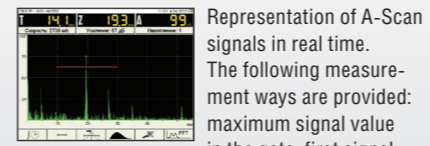
The inspection results are represented as tomograms (B-, C-, D-Scans). Occurrence coordinates of each reflector in the testing object can be determined.



OPERATION MODES

A1220 MONOLITH has two main operation modes: A-SCAN and MAP, as well as the SETTINGS service mode designed to configure the inspection parameters according to the testing object. These parameters are suitable for further on-line selection.

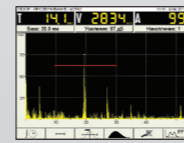
A-SCAN MODE (PULS-ECHO METHOD)



Representation of A-Scan signals in real time. The following measurement ways are provided: maximum signal value in the gate, first signal

overshoot of the gate, summation of all signals at the gate (ACF function). Instrument's screen displays A-Scan workspace and key measurement parameters – propagation time, depth of the discontinuity and signal amplitude.

A-SCAN MODE (THROUGH TRANSMISSION MODE)

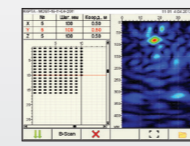


A-Scan signal is represented averaged. This method is designed for surface and through transmission of testing objects with a fixed base

of measurements. Inspection is performed with two transducers, separately connected to the electronic unit, placed in line or facing each other (depending on the selected measurement method).

Instrument's display shows A-Scan workspace and key measurement parameters – propagation time, ultrasonic velocity and signal amplitude.

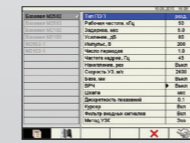
MAP MODE



The MAP mode is designed for create a set of the cross-section images of the testing object perpendicular to the surface when

scanning with an antenna array along previously marked lines with a constant step, i.e. a set of parallel bands limited in length. Setting a scan step vertically and horizontally it is possible to get an idea of the internal structure of the whole object.

SETTINGS MODE



At this mode an operator can set and select the parameters and working configurations.

There is a possibility to create and save a set of working configurations under unique names for different testing objects. Required configuration is further selected from the saved list directly on the testing object.

DELIVERY KIT

- A1220 MONOLITH – ultrasonic flaw detector with a built-in battery
- Antenna array M2502 0.05A0R100X60PS
- LEMO-LEMO double cable 1.2 m
- Power adapter with a cable
- USB A – Micro B cable
- Specialized pad
- Soft cover
- Transportation case
- CD with documentation and software

ADDITIONAL ACCESSORIES CAN BE INCLUDED:



Dry-point-contact (DPC) transducers for surface and through transmission technique:

- S1802 0.05A0D2PS (shear waves; operation frequency 50 kHz)
- S1803 0.1A0D2PL (longitudinal waves; operation frequency 100 kHz)
- S1823 0.1V0D2PU (multimode (shear and longitudinal waves); operation frequency 100 kHz)



Transducers with liquid contact for through transmission technique:

- S0205 0.025A0R20X20CL (longitudinal waves; operation frequency 25 kHz)
- S0206 0.05A0R20X20CL (longitudinal waves; operation frequency 50 kHz)
- S0208 0.1A0R20X20CL (longitudinal waves; operation frequency 100 kHz)



Dry-point-contact (DPC) antenna arrays for through transmission technique of the testing objects with large thickness:

- M2102 0.05A0D60PS (shear waves; operation frequency 50 kHz)
- M2103 0.1A0D60PL (longitudinal waves; operation frequency 100 kHz)



ACOUSTIC CONTROL SYSTEMS

Devices for non-destructive testing of metals, plastics and concrete. Development, manufacture, delivery

ULTRASONIC INSTRUMENTS FOR INSPECTION OF CONCRETE



QUALITY AND RELIABILITY – YOUR NOWADAYS AND TOMORROW

LOW FREQUENCY ULTRASONIC TOMOGRAPH A1040 MIRA

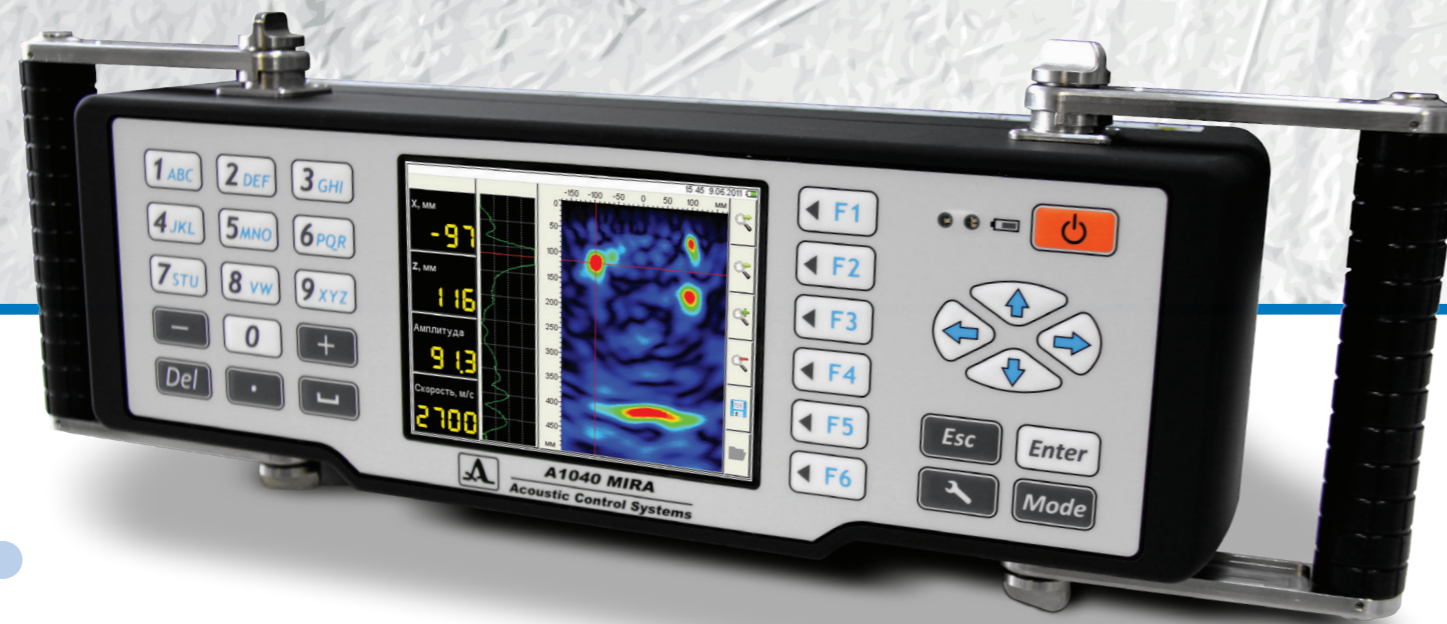
A portable handheld ultrasonic tomograph is designed for imaging of the internal structure of concrete at one-sided access

APPLICATION

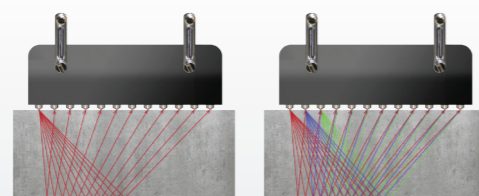
- Inspection of concrete constructions up to 2500 mm thickness for the purpose of evaluation of consistency of the construction.
- Inspection of reinforced concrete constructions up to 800 mm thickness for the purpose of evaluation of consistency of the construction.
- Search for foreign inclusions, cavities, voids, delaminations, leaks of filling and cracks in the concrete objects, reinforced concrete objects and natural stone.
- Inspection of constructions made of marble and granite up to 2000 mm thickness.
- Search for plastic and metal pipes of a diameter more than 10 mm in reinforced concrete.
- Inspection of the internal structure of carbon rods of a diameter more than 900 mm.
- Evaluation of condition of the channels with stressed reinforcement in reinforced concrete bridges.
- Inspection of understructures, columns, overhead covers in cast-in-place constructions to detect voids and leaks of filling.
- Search for voids and cavities back of liner plates of underground and railway tunnels.
- Inspection of refractory blocks of the glass blowing furnace.
- Estimation of the thickness of the concrete cover and depth of coverage reinforcement.
- Thickness measurement of the testing object at one-sided access.
- Detailed registration of the results obtained.

FUNCTIONAL CAPABILITIES AND FEATURES

- Imaging of the internal structure of the testing object at one-sided access.
- Dimensions of detectable discontinuities:
 - from Ø10 mm – cylinder-shaped image of the flaw;
 - from Ø25 mm – spherical image of the flaw.
- High efficiency – reconstruction time of a single tomogram takes just several seconds.
- Ease of use.
- Light-weight shockproof plastic body.
- Dry point acoustic contact (DPC) – inspection is carried out without using contact liquid, there is no need to prepare the surface.
- Antenna array adjusts to uneven surfaces.
- Wear resistant tips of the transducers.
- High measurement accuracy and instrument sensitivity to different kind of defects.
- Automated measurement of velocity of propagation ultrasonic shear wave in the testing object.
- Self-contained operation with data stored in the instrument's memory and function of 3D imaging of internal structure of the testing object as B-, C-, D-Scans of any object's section by using an external computer.



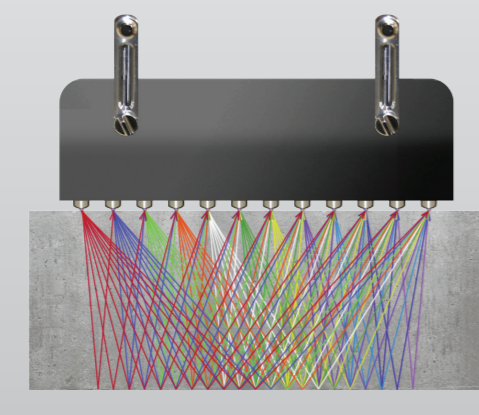
PROCESSING AND DATA PRESENTATION THE TOMOGRAPH'S SCREEN



The synthetic aperture focusing technique with combinational sounding (SAFT-C) is used in the instrument whereby focusing in every point of the half-space is made.

Data array is formed by information acquisition from all measuring pairs of the tomograph's antenna device.

As a result a visual image of the cross-section of the testing object is generated, where the reflecting power of every point of the visualized volume is coded in different colors (depending on the chosen palette).



DELIVERY KIT

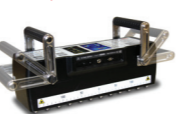
- A1040 MIRA – ultrasonic tomograph
- Notebook type computer
- Charging unit
- Cable USB A – Micro B
- Checking sample
- Transportation case
- CD with documentation and softwar

DESCRIPTION

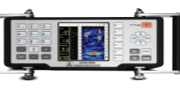
The tomograph represents fully-autonomous measurement unit for collection and tomographic processing of the data obtained. Measurement unit contains a matrix antenna array from 48 (12 blocks, each containing 4 elements) law-frequency broad banded transducers of shear waves with dry-point-contact and ceramic wear resistant tips. Hence they can work with rough surfaces for the long time. Each transducer is equipped with an independent spring suspension, thus allowing inspection on the uneven surfaces. Nominal frequency of the array is 50 kHz.



Instrument's interface allows working with laser beams which are projected on a surface of the testing object. Hence the operator can correctly maintain a shift step of the antenna array during a complete technical diagnostics of the testing object.



Handheld light-weight body and a repositionable handle provide convenient working with the instrument on the horizontal, vertical and roof surfaces. A reference scale on the lower part of the instrument's body is designed for convenient localization of the defects relative to the antenna device.



Large and bright TFT display and a keyboard allow easy adjustment of the instrument to the testing object, selection of the required operation modes and conduct an inspection, watching the results obtained, which allows their initial analysis.



An internal rechargeable battery provides operation of the instrument during 5 hours. Increased charge-discharge cycle enhances reliability of the tomograph for long-term application. Besides, the tomograph can be powered directly from the AC mains.



The instrument allows data transfer to the external PC for advanced processing by means of the dedicated software.



Inspection is carried out as step-by-step sounding of the testing object with data combining and volume reconstruction over the whole scanned surface of the testing object.

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OPERATION MODES

The tomograph has two main operation modes, as well as an adjustment function of the inspection parameters for each testing object suitable for further on-line selection. The instrument allows to select different types of data representation on the tomograph's screen during operation depending on the set operation mode.

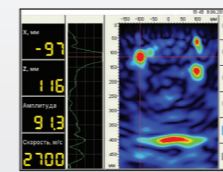
VIEW MODE

This mode is designed for quick viewing the inner structure of the testing object in random places.

The B-Scan is displayed on the screen to a depth up to 2.5 meters.

Additionally in this mode:

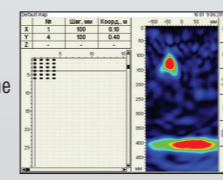
- Automatic determination of velocity of propagation ultrasonic wave.
- Measurement of the coordinates and image levels in the tomogram.
- Thickness measurement of the testing object.
- B-Scans save and view.
- A-Scans view.



MAP MODE

The mode is intended for generation of the data arrays in a form of the B-Scans set of the testing object (perpendicular to the surface) when scanning with the antenna array along the marked lines with a constant step.

Any B-Scan from the collected three-dimensional data set can be shown on the screen.

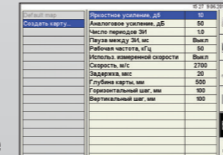


SETTINGS MODE

The mode is used for choosing and setting the parameters and working configurations.

There is a possibility to create and save a set of working configurations under unique names for for different testing objects.

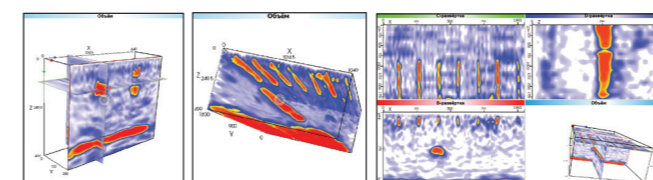
Required configuration is further selected from the saved list directly on the real object.



SOFTWARE

The delivery kit of the instrument includes a dedicated software for advanced processing of the collected data by means of the external PC. Software allows reading data from the instrument and represents them as tomograms

as well as 3D images, thus the operator can easily understand the configuration of the internal structure of the concrete testing object. Occurrence coordinates of each reflector in the testing object can be determined.



ULTRASONIC TESTER UK1401 (SURFER)

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US PATENT 7.587.943 B2

A compact, ergonomic and handheld ultrasonic tester for concrete inspection

APPLICATION

- Evaluation of the durability of concrete. The evaluation is based on correlation between time of propagation/velocity of longitudinal ultrasonic waves in concrete. Measurements are performed by the surface scanning with a fixed base.
- Search for near-surface flaws in the concrete structures by abnormal decreasing of ultrasound velocity or increasing of the propagation time in the flaw area.
- Evaluation of anisotropy in composite materials.
- Evaluation of concrete curing during building of poured-in-place concrete method and sliding shuttering.
- Evaluation of the load-carrying ability of concrete backbones and posts.
- Evaluation of the depth of the outcrop cracks.
- Evaluation of porosity and fissuring of the material.
- Evaluation of the age of material if its physical properties change with time.



FUNCTIONAL CAPABILITIES AND FEATURES

- Mono-block form factor body made of light-weight shockproof plastic.
- Fixed base of measurements of the instrument (150 mm).
- Built-in transducers with dry-point-contact.
- Wear resistant tips of the transducers are insensitive to the surface condition. Hence, there is no need to prepare the surface for measuring.
- Built-in automatic gain control system (AGC).
- FRONT dedicated mode for evaluation of the durability of concrete backbones and posts.
- Sound indication when ultrasonic signals are being received.
- Non-volatile memory allows storing of 4000 measurements. The results can be grouped.
- Infrared USB port for transfer of the saved data to the external PC.
- Software for documentation and archiving of the saved measurement results.

DELIVERY KIT

- UK1401 – ultrasonic tester
- AA Alkaline, LR6, 2.8 Ah batteries (3 pcs)
- Calibration sample
- USB IrDA adapter for connection to PC
- Bag
- CD with documentation and software

