



**ACOUSTIC
CONTROL
SYSTEMS**

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THE ULTIMATE TFM ULTRASONIC FLAW DETECTOR

A1525 SOLO



- **World's smallest and lightest phased array instrument**
- **Total Focusing Method using the Multi-SAFT technology**
- **Semiautomatic sensitivity calibration by standard calibration blocks**
- **B-Scan, C-Scan and D-Scan imaging capability**
- **Conventional A-Scan view in single channel Flaw Detector mode and Phased Array mode**

A1525 Solo

A compact, ergonomic and easy to handheld Phased Array unit based on Total Focusing Method for easy-going imaging of inspection objects with Two-dimensional and Three-dimensional visualization and evaluation of inspection results.

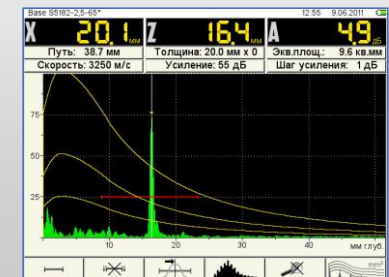
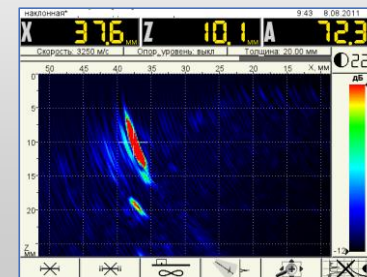
The instrument has ultra-compact design and is performed in lite-weight shockproof plastic housing. 800-gram weight allows one hand operation in hardly accessible locations. The Multi-SAFT image reconstruction technology offers unique flaw detection capability and extraordinary spatial resolution. Additional imaging and analysis functionality is provided by INTROVIEW visualization software.

The instrument is equipped with two phased array transducers suitable for most of the regular ultrasonic weld testing. Additional transducers can be purchased for casting and forging inspection.

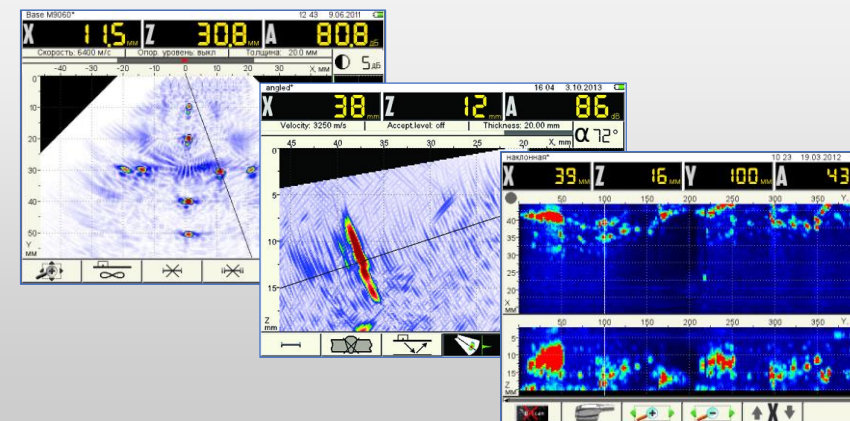


EXTRA FEATURES

- The A-SCAN function in TOMOGRAPH mode is provided to visualize the A-Scan impulse signal, plotted by a controlled line of the cross-section. It also evaluates the flaw depth and angle of probe, ensuring correct and quick choice of a single transducer when switching to the FLAW DETECTOR mode.
- Measuring signal level and coordinates of reflectors in every point of the tomogram.
- Setting the scale and position of the visualization area in relation to the TFM.
- Two fully adjustable 2D gates for automatic measuring of the flaw coordinates.
- On-line control of a contrast tomogram.
- Choice of a colour tomogram.



- Creating, saving and choosing settings for a specific object.
- Saving and viewing tomograms and echo-signals from the memory.
- Semiautomatic sensitivity calibration by standard samples.
- 2D system of spatial sensitivity adjustment to find and evaluate small flaws according to actual regulating documents and to size flaws up correctly at the whole surface of the object of inspection.
- Inspection in the three-level reflector estimation system: «examination-reporting-acceptance» with colour gradation of the tomogram image levels and automatic comparison to the reference level.
- Scanning along welding line with an antenna array equipped with an encoder (supplied optionally) makes it possible to get a reliable graphic view of the object inner structure in a form of C-Scan and D-Scans.



VISUALIZATION MODES

The A1525 Solo tomograph offers five modes of discontinuity flaw image visualization. The mode is selected depending on the purposes of inspection and the object nature. Modes are marked with special symbols as shown below. Here are general description of them:

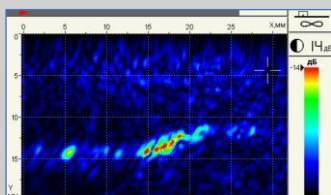


Testing object: half-space

Reflector: point

Sounding: direct

Purpose: For the objects of irregular shape, without definite thickness, or objects with rough back surface

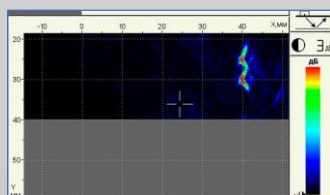


Testing object: slab,
 $10 < d \leq 100$ mm

Reflector: point

Sounding: direct and reflected

Purpose: For the plane-parallel objects with known thickness

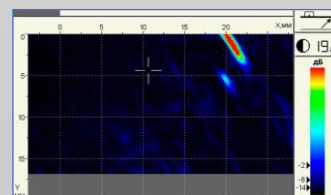


Testing object: plate,
 $d < 10$ mm

Reflector: point

Sounding: reflected

Purpose: For the plane-parallel objects with known thickness, small thickness objects while finding flaws near the surface

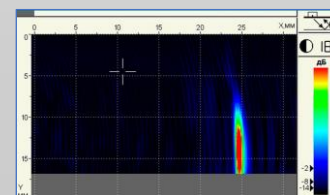


Testing object: slab or plate
 $d \leq 100$ mm

Reflector: flat

Sounding: direct and reflected

Purpose: For the detection of vertically-oriented flaws and plain surfaces, mirroring the ultrasound

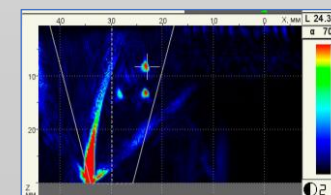


Testing object: slab or plate
 $d \leq 100$ mm

Reflector: volumetric

Sounding: direct and reflected

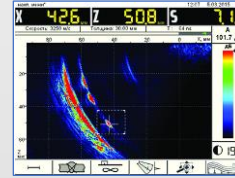
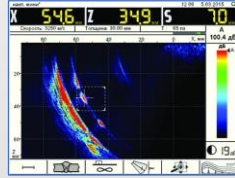
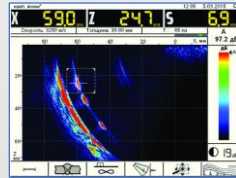
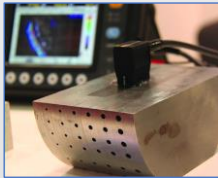
Purpose: Universal mode for plane-parallel objects with known thickness and all types of discontinuity flaws



OPERATION MODES

TOMOGRAPH MODE

- Provides work with arrays and real-time construction of tomograms. At this mode not only tomogram (B-Scan) is displayed but all service information as well, including gates, cursors, digital indicators, etc.
- When a flaw is located, it is evaluated and estimated by the following methods: classical (comparing to the reference reflectors signal amplitude) and by direct point measuring proximately by the flaw image.
- **TWO-DIMENSIONAL DGS – DIAGRAM IN TOMOGRAPH MODE:** This is automatic calculation of the equivalent area of discontinuity, recounted in flat bottom hole. This function allows operator to correctly estimate the validity of the detected defects, according to the current normative and methods of ultrasonic testing.



SCAN MODE

- Provides work with the TFM and the encoder while scanning along a welding joint.
- C-Scan and D-Scan tomograms are displayed in real time.
- When a flaw is located its real size can be evaluated with a cursor moving in three coordinates (distance, length, depth). It makes much easier to get information about the location and conventional length of the detected flaw.
- B-Scan tomograms can be displayed by moving the vertically oriented cursor along the reconstructed image for a graphic view of the inner structure of the testing object.

FLAW DETECTOR MODE

- At this mode the device operates as a tradition flaw detector with classic normal or angle transducers. Signals are displayed as A-Scan.
- The device has all features of a modern flaw detector (built-in DGS, TCG and DAC, multilevel digital monitor, programmable form of the emission pulse, etc).
- This mode provides correct evaluation of detected flaws according to actual regulations and documents.

SETUP MODE

- This mode is used to set and select parameters and working configuration.
- It is possible to create a number of working configurations for various objects of inspection saving them under unique names. The required configuration is selected from the list right at the object.

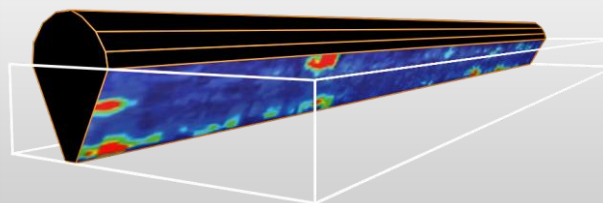
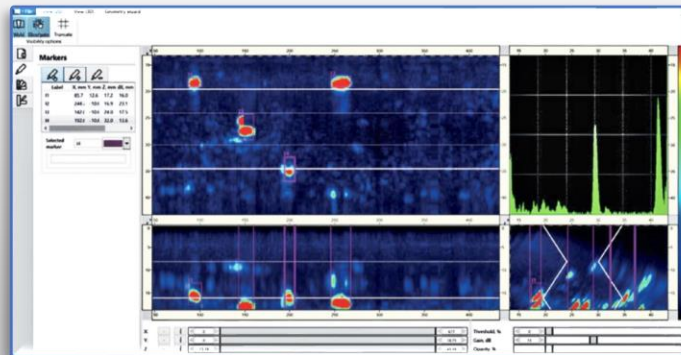
TYPES OF FOCUSED ARRAYS TRANSDUCER

- **M9060 4.0V0R40X10CL** – 16 elements longitudinal wave array, pitch 2.5 mm, aperture 40 x 10 mm with central operation frequency 4 MHz and scan zone from -50° to $+50^{\circ}$. It's used to test metal and plastic objects.
- **M9065 4.0V60R40X10CS** – 16 elements shear wave array, pitch 2.5 mm, aperture 40 x 10 mm with central operation frequency of 4 MHz and scan zone from 35° to 80° . It is used to test welding joints including austenitic. This array is distinguished by the absence of a large refracting prism.
- **M9170 4.0V60R26X10CS** – 16 elements shear wave, pitch 1.6 mm, aperture 26 x 10 mm with central operation frequency 4 MHz and sector of scanning from 35° to 80° . Used to test the weld joints. Decreased aperture is a peculiar feature of the antenna array allowing to inspect various objects in hard-to-reach locations and to minimise preparation of the near-welding surface.
- **M9171 4.0V0R26X10CL** – 16 elements longitudinal wave, pitch 1.6 mm, aperture 26 x 10 mm with central operation frequency 4 MHz and sector of scanning from -30° to $+30^{\circ}$. Decreased aperture is a peculiar feature of the antenna array allowing to inspect various objects in hard-to-reach locations.

Thanks to the Focused Array construction the acoustic array modules can be replaced as they wear out.

The user can replace a out-worn acoustic module by hands without extra operations. This way ultrasonic testing can be conducted practically non-stop, increasing efficiency.

The replaceable acoustic modules can be fitted to various diameters of pipes, expanding the range of tasks to be solved with the ultrasonic testing.



3D INTROVIEW® SOFTWARE

- Weld configuration wizard for common weld preparations.
- 2D-View modes: B, C & D-Scan / Cutting plane, gated volume.
- Synchronized 2D cursors for interactive flaw sizing.
- 3D-View modes: ISO-Surface Texture Mapping Maximum Intensity Projection.

SPECIFICATIONS

Phased Array data processing technique	Total Focusing Method	Flaw depth measuring range (in steel) with a longitudinal wave TFM M9060 4.0V0R40X10CL M9171 4.0V0R26X10CL	7.0 to 300 mm 2.0 to 300 mm
Number of array elements / channels	16	Flaw depth measuring range (in steel) with a shear wave TFM M9065 4.0V60R40X10CS and M9170 4.0V60R26X10CS	2.0 to 130 mm
Size of image	256 x 256 Pixels	Display resolution / Type	640 x 480 / TFT
Tomogram reconstruction interval	0.1 to 2.0 mm	Power	Lithium
Operation frequencies	1.0 to 10.0 MHz	Rated power voltage	11.2 V
Velocity range	1000 to 10000 m/s	Operation time with the accumulator, not less than	6.0 h
Gain range	0 to 80 dB	Dimensions of the electronic unit	260 x 157 x 43 mm
Flaw depth measuring range (in steel) with a normal transducers: S3568 2.5A0D10CL D1771 4.0A0D12CL	7 to 300 mm 2 to 300 mm	Weight of the electronic unit	0.8 kg
Flaw depth measuring range (in steel) with a angled transducers: S5182 2.5A65D12CS S5096 5.0A70D6CS	2 to 160 mm 2 to 160 mm	Operation temperature	-10 to +55° C
		Mean lifetime, at least	8 Years

DELIVERY KIT

A1525 Solo – TFM ultrasonic flaw detector – tomograph	Net adaptor with cable 110/220V-15V	Ultrasonic couplant, bottle 4 oz.
M9171 4.0V0R26X10CL phased array, longitudinal wave	Soft cover	Ruggedized carrying case
M9065 4.0V60R40X10CS phased array, shear wave	USB A - Micro B cable	Calibration certificate



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