A1550 IntroVisor

IntroVisor

IS AN ULTRASONIC FLAW DETECTOR AND TOMOGRAPH WITH AN ANTENNA ARRAY PROBE DIGITALLY FOCUSED TO ALL POINTS OF THE MATERIALS CROSS-SECTION.

THE A1550 IS LIGHT AND EASY-TO-USE AND DESIGNED TO HANDLE MOST ULTRASONIC FLAW DETECTION TASKS QUICKLY AND EASILY.

THE INTERNAL STRUCTURE OF THE TEST OBJECT IS REPRESENTED IN REAL-TIME AS A CROSS-SECTION IMAGE THAT MAKES INTERPRETATION MUCH EASIER AS COMPARED TO A TRADITIONAL DETECTOR. FLAW IMAGES ARE SHARPER AND BETTER FOCUSED THAN UTPA INSTRUMENTS.

SPEED AND EFFICIENCY

- Efficient, high-performance flaws location in welds, castings and forging as well as composites with documented test details.

TESTING RELIABILITY

- The A1550 IntroVisor works basing on the basis of a digitally focused array method (DFA) reconstructing tomographic images focused in every point of the interrogated materials cross-section, ensuring the best spatial resolution.
• The internal structure of the test piece represented in real time as cross-section images with 25 frames per second update date
• Possibility to perform ultrasonic flaw detection along the welding joint without time consuming zig-zag scanning, due to big aperture of the digitally focused array and scanning with virtual focus on long distances, which considerably reduces time for preparing the near-welding surface, increasing testing productivity.
• High frame update rate on the screen allows scanning speed up to 2 inches (50 mm/s).

**VISUALIZATION MODES**

The A1550 Tomograph offers five modes of discontinuity visualization. The mode is selected depending on the purposes of inspection and the nature of the test piece. Modes are marked with special symbols as shown below. Here is a general description of them:

<table>
<thead>
<tr>
<th>Testing object: half-space</th>
<th>Testing object: slab, T=10 - 100 mm (.4-4”)</th>
<th>Testing object: plate, T= &gt; 10 mm (.4”)</th>
<th>Testing object: slab or plate, t= &lt; 100 mm (4”)</th>
<th>Testing object: slab or plate, T= &lt; 100 mm (4”)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reflector:</strong> point</td>
<td><strong>Reflector:</strong> point</td>
<td><strong>Reflector:</strong> point</td>
<td><strong>Reflector:</strong> flat</td>
<td><strong>Reflector:</strong> volumetric</td>
</tr>
<tr>
<td><strong>Sounding:</strong> direct</td>
<td><strong>Sounding:</strong> direct and reflected</td>
<td><strong>Sounding:</strong> reflected</td>
<td><strong>Sounding:</strong> direct and reflected</td>
<td><strong>Sounding:</strong> direct and reflected</td>
</tr>
<tr>
<td><strong>Purpose:</strong> For objects of irregular shape, without definite thickness, or objects with rough back surface</td>
<td><strong>Purpose:</strong> For plane parallel objects with known thickness</td>
<td><strong>Purpose:</strong> For plane parallel objects with known thickness, small thickness objects while finding flaws near the surface</td>
<td><strong>Purpose:</strong> For detection of vertically-oriented flaws and plain surfaces, mirroring the ultrasound</td>
<td><strong>Purpose:</strong> Universal mode for plane-parallel objects with known thickness and all types of discontinuity flaws</td>
</tr>
</tbody>
</table>
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 display.
- Setting the scale and position of the visualization area in relation to the DFA Antenna Probe.
- Two fully adjustable 2D gates for automatic measuring of the flaw coordinates.
- On-line control of image contrast.
- Choice of a color template.
- Creating, saving and choosing settings for a specific object.
- Saving and viewing tomograms and echo-signals from memory.
- Semiautomatic sensitivity calibration by standard samples.
- 2D system of spatial sensitivity adjustment to find and evaluate small flaws according to common codes and size flaws and position correctly at the whole surface of the test piece.
- Inspection in the three-level reflector estimation system: «examination-reporting-acceptance» with color 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 (optional) makes it possible to get a reliable graphic view of the test piece cross-section in a form of C- and D-Scans.
SOFTWARE

With our special software A1550-IntroVisor you can send data saved on the device to an external PC so that results of inspection could be processed, documented as tomogram images and A-Scan echo-signals with parameters of inspection and archived afterwards.

OPERATION MODES

A1550 IntroVisor has three basic operation modes and a function of setting a configuration for every particular object to be promptly selected later:

TOMOGRAPH MODE

Works with DFA Antenna 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.

SCAN MODE

• Provides work with the DFA and the encoder while scanning along a welding joint.
• C- and D-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-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

In this mode the A1550 IntroVisor operates as a tradition ultrasonic flaw detector with classic normal or angle transducers. Signals are displayed as A-Scans.

The A1550 IntroVisor has all features of a modern flaw detector (built-in DGS-diagrams, TCG and DAC, multilevel digital monitor, programmable form of the emission pulse, etc. This mode provides correct evaluation of detected flaws according to standard code requirements.

SETUP MODE

Setup 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.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of image in pixels</td>
<td>256 x 256</td>
</tr>
<tr>
<td>Tomogram reconstruction interval, mm</td>
<td>0.1 – 2.0</td>
</tr>
<tr>
<td>Operation frequencies, MHz</td>
<td>1.0 – 10.0</td>
</tr>
<tr>
<td>Velocity range, m/s</td>
<td>1000 – 10000</td>
</tr>
<tr>
<td>Gain range, dB</td>
<td>0 – 100</td>
</tr>
<tr>
<td>Flaw depth measuring range with a normal transducer S3568 2.5:mm</td>
<td>5 – 7000</td>
</tr>
<tr>
<td>Flaw coordinate measuring range with an angled transducers, mm:</td>
<td></td>
</tr>
<tr>
<td>S5182 2.5: depth / distance on surface</td>
<td>3 – 1700 / 5 – 3600</td>
</tr>
<tr>
<td>S5096 5.0: depth / distance on surface</td>
<td>3 – 1400 / 7 – 3800</td>
</tr>
<tr>
<td>Flaw depth measuring range with DFA M9060, mm</td>
<td>10 – 320</td>
</tr>
<tr>
<td>Flaw coordinate measuring range with DFA M9065, mm: depth / distance on surface</td>
<td>6 – 320 / 6 – 250</td>
</tr>
<tr>
<td>Type / resolution display</td>
<td>TFT / 640 x 480</td>
</tr>
<tr>
<td>Power</td>
<td>lithium accumulator</td>
</tr>
<tr>
<td>Operation time with the accumulator, h</td>
<td>not less than 8</td>
</tr>
<tr>
<td>Rated power voltage, V</td>
<td>11.2</td>
</tr>
<tr>
<td>Size of the electronic unit, mm</td>
<td>280 x 165 x 85</td>
</tr>
<tr>
<td>Weight of the electronic unit, kg</td>
<td>1.9</td>
</tr>
<tr>
<td>Operation temperature, °C</td>
<td>from -10 to +55</td>
</tr>
</tbody>
</table>
TYPES OF DIGITALLY FOCUSED ARRAYS

For various fields of application the A1550 tomograph uses the following arrays:

• **M9060 4.0V0R40X10CL** – 16 elements longitudinal wave array with central operation frequency of 4 MHz and scan zone of ±50°. 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 80°. It is used to test welding joints including austenitic stainless steels. This array is distinguished by the absence of a large refracting prism.

Thanks to the DFAs construction the acoustic modules can be replaced as they wear out. The user can replace a out-worn acoustic module by hand and without tools or 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.
FEATURES OF DFA

- Various types of waves can be used:
- Shear waves to testing welding joints with a scan sector covering the whole range of ultrasonic entry angles required by code.
- Longitudinal waves for testing the main body of metal.
- The acoustic module of the DFA can be replaced by hand.
- Quick switching between different types of DFA.
- DFA Antenna Array Probes can be moved along the welding joint line without cross scanning thanks due to large aperture and long distance scanning with a virtual focus. It takes less time to prepare the near-welding surface of welding joints increasing the efficiency.
- DFA can be used with an encoder (supplied optionally).

DELIVERY SET

- A1550 IntroVisor – ultrasonic flaw detector - tomograph
- M9065 4.0V60R40X10CS antenna array
- M9060 4.0V0R40X10CL antenna array
- S3568 2.5A0D10CL transducer
- S5182 2.5A65D12CS transducer
- S5096 5.0A70D6CS transducer
- LEMO 00 – LEMO 00 single cable 1,2 m
- USB A – Micro B cable
- Detachable Lithium accumulator
- Power adaptor with cable
- Calibrating sample V2/25
- Soft cover
- Travel bag
- CD with documentation and software