

# ISONIC 2010 EL

Entry Level Phased Array  
Ultrasonic Flaw Detection Package



## One-Touch Coverage and Smart Imaging

- ▶ Lightest weight / smallest size ever Phased Array / TOFD instrument
- ▶ PA Modality: **16:16** – parallel, no multiplexing, upgradeable to **32:32**
- ▶ Conventional and TOFD Modality: **1** channel
- ▶ **8192** independently adjustable focal laws
- ▶ Bi-polar square wave initial pulse: up **300 Vpp** – PA / **300 Vpp** – conventional and TOFD
- ▶ **100 dB** analogue gain / **32 taps** digital filter
- ▶ Equalized cross sectional coverage sensitivity for Sector- and B-Scan
- ▶ Built-in comprehensive beam tracer – scan plan builder
- ▶ True to geometry imaging for simple and complex shapes
- ▶ Built-in coupling monitor / lamination tester for wedged PA probe
- ▶ Encoded and time-based multi-group single and dual side scanning – Top (C-Scan), Side, End, and 3D viewing
- ▶ **100%** raw data A-Scans recording for every modality
- ▶ **FMC/TFM** protocol for the data acquisition and imaging
- ▶ Automatic generating of editable defects list
- ▶ Advanced defects sizing and pattern recognition
- ▶ Powerful postprocessing and data reporting toolkit

**CLASSIC OUTLINE** ▽ **SUPERIOR MODERN PERFORMANCE** ▽ **INTUITIVE OPERATION**



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Item	Part ##
<b>Li-ion Rechargeable Battery</b> <ul style="list-style-type: none"> <li>• 9 AH</li> <li>• 14.8 V</li> <li>• 4 A limited charge / discharge current</li> <li>• 59.2 WH max</li> <li>• automatic shortcut discharge protection &lt;20 ms cut off time</li> <li>• armored hard shell case preventing breakage of the cells</li> <li>• 0.95 kg max</li> </ul>	SK 2005192
<b>AC/DC Converter for powering the instrument from mains and charging the battery inside Travel Hard Case</b> <b>Backup USB Key - Stylus</b> <b>Rescue USB Key</b>	SK 3500103 SK 2005104 SPRFM4U2010 SPRFM97G2010
<b>Phased Array Modality Inspection SW Application: Expert - Weld Inspection - planar cross section butt welds / girth welds:</b> <ul style="list-style-type: none"> <li>⇒ True-To-Geometry Weld Overlay Volume Corrected Imaging - Cross Sectional and Top(C-Scan)- / Side- / End-View and 3D</li> <li>⇒ Sector-Scan and B-Scan (Linear Scan) Cross Sectional Coverage</li> <li>⇒ DAC / TCG Normalization</li> <li>⇒ Built-In Weld Bevel Editor and Ray Tracer</li> <li>⇒ Independent on TCG Angle Gain Compensation / Gain Per Focal Law Correction</li> <li>⇒ Automatic Coupling Monitor</li> <li>⇒ Encoded and Time based C-Scan</li> <li>⇒ 100% Raw Data Capturing</li> <li>⇒ Automatic Defects Alarming Upon C-Scan Acquisition Completed</li> <li>⇒ Automatic Creation of Editable Defects List</li> <li>⇒ Puzzling Suitable C-Scan Inspection Record - Ability of Scanning Weld In Several Shots from Both Side with Storing a Number of Files Mergeable Into a Single File Inspection Report</li> </ul>	SWA 910804
<b>PA-4M16E0.5P</b> - LINEAR ARRAY PROBE Frequency: <b>4 MHz</b> Pitch Size: <b>0.5 mm</b> Number of Elements: <b>16</b> Elevation: <b>9 mm</b>	S 4922104377
<b>VKPA-8/16</b> - 36° wedge (55° central angle for shear wave in low carbon steel) for S 4922104376 and S 4922104377 probes - flat contact face	S 4922104378
<b>V20PA-8/16</b> - 20 mm delay line for S 4922104376 and S 4922104377 probes - flat contact face	S 4922104681 SWA 909844
<b>Postprocessing SW Package for PC: ISONIC PA Office</b> <ul style="list-style-type: none"> <li>⇒ comprehensive postprocessing of inspection results files captured by ISONIC 2009 UPA-Scope and ISONIC 2010 - PA Modality using Inspection SW Applications of all types <ul style="list-style-type: none"> <li>→ Recovery and Evaluation of Captured A-Scans from the Recorded Cross Sectional Views (Sector Scan / B-Scan / Tandem B-Scan) and C-Scans</li> <li>→ Recovery of Cross Sectional Views from the Recorded C-Scans</li> <li>→ Converting Recorded C-Scans or their Segments into 3D Images</li> <li>→ Off-Line Gain Manipulation</li> <li>→ Off-Line DAC Normalization of the Recorded Images / DAC Evaluation</li> <li>→ Numerous Filtering / Reject Options ( by Geometry / Position / By Amplitude db-toDAC / etc )</li> <li>→ Defects Sizing</li> <li>→ Creation of Defect List and Storing it Into a Separate File</li> </ul> </li> <li>⇒ automatic creating of inspection reports - hard copy / Editable MS Word File / PDF File</li> </ul>	SWA 909848
<b>Postprocessing SW Package for PC: ISONIC W-Puzzle</b> <ul style="list-style-type: none"> <li>⇒ composing W-PUZZLE file comprising raw data from several PA Modality Sector Scan / ABI-Scan based C-Scan Weld Scanning Files captured by Sonotron NDT's portable PA flaw detectors of any type</li> <li>⇒ integrating any number of C-Scan files captured from both sides of the weld with / without overlap</li> <li>⇒ comprehensive off-line analysis / postprocessing of 3D W-PUZZLE data</li> </ul>	SWA99C0203
<b>Postprocessing SW Package for PC: IOFFICE - ISONIC Office: comprehensive postprocessing of inspection results files captured by ISONIC 2005, ISONIC 2006, ISONIC 2007, ISONIC 2008, ISONIC 2009 UPA Scope (Conventional and TOFD Probes), ISONIC 2010 (Conventional and TOFD Probes), ISONIC 3510 (Conventional and TOFD Probes)</b> <ul style="list-style-type: none"> <li>⇒ comprehensive postprocessing of inspection results files captured by ISONIC 2005, ISONIC 2006, ISONIC 2007, ISONIC 2008, ISONIC 2009 UPA Scope (Conventional and TOFD Probes), ISONIC 2010 (Conventional and TOFD Probes), ISONIC 3510 (Conventional and TOFD Probes)</li> <li>⇒ automatic creating of the Inspection Report in MS Word® format</li> </ul>	

Notes:

- ▶ All optional inspection SW Applications for ISONIC 2010 are suitable for ISONIC 2010 EL as well
- ▶ At time of ordering Inspection SW Application Expert may be replaced with any other desired by the customer

## ISONIC 2010 EL – Technical Data

### PA Modality

<b>Structure:</b>	1 X 16:16 switchable to 1 X 32:32* / 1 X 64:64* *- with use of corresponding active PA functionality extension adapters
<b>Initial Pulse:</b>	Bipolar Square Wave with Boosted Rising and Falling Edges, Guaranteed Shell Stability, and Active Damping
<b>Transition:</b>	≤7.5 ns (10-90% for rising edges / 90-10% for falling edges)
<b>Amplitude:</b>	Smoothly tunable (12 levels) 50V ... 300 Vpp into 50 Ω
<b>Half Wave Duration:</b>	50...600 ns controllable in 5 ns step
<b>Emitting aperture:</b>	1...16 adjustable as fully or partially matching OR mismatching with the receiving aperture
<b>Receiving Aperture:</b>	1...16 adjustable as fully or partially matching OR mismatching with the emitting aperture
<b>Phasing - emitting and receiving:</b>	0...100 μs with 5 ns resolution independently controllable
<b>Analogue Gain:</b>	0...100 dB controllable in 0.5 dB resolution
<b>Advanced Low Noise Design:</b>	85 μV peak to peak input referred to 80 dB gain / 25 MHz bandwidth
<b>Frequency Band:</b>	0.2 ... 25 MHz
<b>A/D Conversion:</b>	100 MHz 16 bit
<b>Digital Filter:</b>	32-Taps FIR band pass with controllable lower and upper frequency limits; non-linear acoustics technique supported
<b>Superimposing of receiving aperture signals:</b>	On-the-fly, no multiplexing involved
<b>Phasing (receiving aperture):</b>	On-the-fly 0...100 μs with 5 ns resolution
<b>Dynamic Focusing:</b>	Supported
<b>FMC, TFM, Back Diffraction Technique with / without and Mode Conversion:</b>	Supported
<b>A-Scan:</b>	<ul style="list-style-type: none"><li>• RF</li><li>• Rectified (Full Wave / Negative or Positive Half Wave)</li><li>• Signal's Spectrum (FFT Graph)</li></ul>
<b>DAC / TCG:</b>	<ul style="list-style-type: none"><li>• One Per Focal Law</li><li>• Multi-curve</li><li>• Slope ≤ 46 dB/μs</li><li>• Available for the rectified and RF A-Scans</li><li>• Theoretical – through entering dB/mm (dB/" ) factor</li><li>• Experimental – through recording echoes from several reflectors; capacity - up to 40 points</li></ul>
<b>Gates:</b>	<ul style="list-style-type: none"><li>• 2 Independent gates per focal law (<b>A</b> and <b>B</b>) with the <b>Start / Width</b> controllable over entire time base in 0.1 mm /// 0.001" resolution</li><li>• <b>IE</b> gate per focal law for the standard <i>Interface Echo start</i> function controllable over entire time base in 0.1 mm /// 0.001" resolution</li></ul>
<b>Threshold:</b>	5...95 % of A-Scan height controllable in 1 % resolution
<b>Phased Array Probes:</b>	<ul style="list-style-type: none"><li>• 1D Array – linear (LA), rings (RA), daisy (DA), and the like</li></ul>
<b>Number of focal laws:</b>	8192 independently adjustable gain / time base per focal law
<b>Scanning and Imaging:</b>	<ul style="list-style-type: none"><li>• Cross-Sectional B-Scan (E-Scan) – regular and/or Volume Overlay True-To-Geometry</li><li>• Cross-Sectional Sector Scan (S-Scan) – regular and/or Volume Overlay and True-To-Geometry</li><li>• Multi-group image composed of several cross-sectional B- and S-Scans</li><li>• Horizontal Plane S-Scan</li><li>• FMC/TFM synthetic aperture images</li><li>• Back-diffraction image</li><li>• Strip Chart</li><li>• Top (C-Scan), Side, End View imaging formed through encoded / time-based line scanning, 3D-Viewer</li><li>• Top (C-Scan), Side, End View imaging formed through encoded XY- scanning, 3D-Viewer</li><li>• Scanning Performance Strip representing Coupling Loss and Over-Speed events</li><li>• Quantitative Scanning Integrity Report</li></ul>
<b>Data Storage:</b>	100% raw data capturing
<b>Postprocessing:</b>	<ul style="list-style-type: none"><li>• Built-in means for the comprehensive postprocessing in the instrument</li><li>• ISONIC PA Office - freely distributable postprocessing package for the computer running under W'XP, W'7, W'8, W'10</li></ul>
<b>Conventional UT and TOFD Channel</b>	
<b>Initial Pulse:</b>	Bipolar Square Wave with Boosted Rising and Falling Edges, Guaranteed Shell Stability, and Active Damping
<b>Transition:</b>	≤7.5 ns (10-90% for rising edges / 90-10% for falling edges)
<b>Amplitude:</b>	Smoothly tunable (12 levels) 50V ... 300 Vpp into 50 Ω
<b>Half Wave Duration:</b>	50...600 ns independently controllable in 10 ns step
<b>Modes:</b>	Single / Dual
<b>Analogue Gain:</b>	0...100 dB controllable in 0.5 dB resolution

<b>Advanced Low Noise Design:</b>	85 µV peak to peak input referred to 80 dB gain / 25 MHz bandwidth
<b>Frequency Band:</b>	0.2 ... 25 MHz Wide Band
<b>A/D Conversion:</b>	100 MHz 16 bit
<b>Digital Filter:</b>	32-Taps FIR band pass with controllable lower and upper frequency limits
<b>A-Scan:</b>	<ul style="list-style-type: none"> <li>• RF</li> <li>• Rectified (Full Wave / Negative or Positive Half Wave)</li> <li>• Signal's Spectrum (FFT Graph)</li> </ul>
<b>DAC / TCG:</b>	<ul style="list-style-type: none"> <li>• Multi-curve</li> <li>• Slope <math>\leq 46</math> dB/µs</li> <li>• Available for the rectified and RF A-Scans</li> <li>• Theoretical – through entering dB/mm (dB/" ) factor</li> <li>• Experimental – through recording echoes from several reflectors; capacity - up to 40 points</li> </ul>
<b>DGS:</b>	Standard Library for 18 probes / unlimitedly expandable
<b>Gates:</b>	2 Independent gates ( <b>A</b> and <b>B</b> ) with the <b>Start / Width</b> controllable over entire time base in 0.1 mm /// 0.001" resolution
<b>Threshold:</b>	5...95 % of A-Scan height controllable in 1 % resolution
<b>HW Gates:</b>	Standard Option
<b>Interface Echo:</b>	Standard Option
<b>Digital Readout:</b>	<ul style="list-style-type: none"> <li>• 27 automatic functions</li> <li>• Dual Ultrasound Velocity Measurement Mode for Multi-Layer Structures</li> <li>• Curved Surface / Thickness / Skip correction for angle beam probes</li> <li>• Ultrasound velocity and Probe Delay Auto-Calibration for all types of probes</li> </ul>
<b>Freeze A-Scan:</b>	<ul style="list-style-type: none"> <li>• Freeze All</li> <li>• Freeze Peak</li> </ul> <p>Note: signal evaluation, manipulating Gates and Gain is possible for the frozen A-Scans as for live</p>
<b>Scanning and Imaging - Single Channel:</b>	<ul style="list-style-type: none"> <li>• Thickness Profile B-Scan</li> <li>• True-To-Geometry Angle / Skip Corrected Cross-sectional B-Scan</li> <li>• High Resolution B-Scan</li> <li>• Horizontal Plane View CB-Scan</li> <li>• TOFD</li> </ul>
<b>Standard Length of a Single Line Scanning record:</b>	50...20000 mm (2"...800"), automatic scrolling
<b>Data storage:</b>	100% raw data capturing
<b>Postprocessing:</b>	<ul style="list-style-type: none"> <li>• Built-in means for the comprehensive postprocessing in the instrument</li> <li>• ISONIC Office L - postprocessing package for the computer running under W'XP, W'7, W'8, W'10</li> </ul>
<b>General</b>	
<b>PRF:</b>	10...5000 Hz controllable in 1 Hz resolution
<b>On-Board Computer CPU:</b>	<ul style="list-style-type: none"> <li>• Dual Core Intel Atom N2600 CPU 1.6 GHz / units manufactured after 2017-04-30</li> <li>• AMD LX 800 - 500MHz / units manufactured on or before 2017-04-30</li> </ul>
<b>RAM:</b>	<ul style="list-style-type: none"> <li>• 2 GB / units manufactured after 2017-04-30</li> <li>• 1 GB / units manufactured on or before 2017-04-30</li> </ul>
<b>Quasi HDD:</b>	<ul style="list-style-type: none"> <li>• SSD Card 128 GB / units manufactured after 2017-04-30</li> <li>• CF Card 4 GB / units manufactured on or before 2017-04-30</li> </ul>
<b>Screen:</b>	Sun readable 6.5" touch screen 640 x 480
<b>Controls:</b>	Sealed keyboard and mouse
<b>Standard Ports:</b>	<ul style="list-style-type: none"> <li>• 2 x USB (optionally expandable up to 8)</li> <li>• Ethernet</li> <li>• sVGA</li> <li>• Wi Fi (optional – through optional external USB dongle)</li> <li>• 3,4,5G (optional – through optional external USB dongle)</li> </ul>
<b>Operating System:</b>	<ul style="list-style-type: none"> <li>• W'7PROEmb / units manufactured after 2017-04-30</li> <li>• W'XPEmb / units manufactured on or before 2017-04-30</li> </ul>
<b>Encoder Port:</b>	<ul style="list-style-type: none"> <li>• Single Axis Incremental TTL encoder – Direct Connection</li> <li>• Multi-Axis (2, 3, 4, etc) Incremental TTL Encoder – Through Miniature Scanner Mounted Optional Multi-Axis Encoder Interface Box</li> </ul>
<b>Remote Control:</b>	<ul style="list-style-type: none"> <li>• From an external computer running under W'XP, W'7, W'8, W'10 through Ethernet or Wi Fi</li> <li>• From 3,4,5G Cell Phone</li> <li>• No special software required</li> <li>• All calibration and inspection data is stored in the control computer</li> </ul>
<b>Ambient Temperature:</b>	<ul style="list-style-type: none"> <li>• -30°C ... +60°C (operation)</li> <li>• -50°C ... +60°C (storage)</li> </ul>
<b>Housing:</b>	<ul style="list-style-type: none"> <li>• Rugged aluminum case with carrying handle</li> <li>• IP 65</li> <li>• No air intake</li> <li>• The cooling is not required</li> </ul>
<b>Dimensions:</b>	<p>265x156x101 mm (10.43"x6.14"x3.98") - without battery</p> <p>265x156x130 mm (10.43"x6.14"x5.12") - with battery / units manufactured after 2017-04-30</p> <p>265x156x139 mm (10.43"x6.14"x5.47") - with battery / units manufactured on or before 2017-04-30</p>

**Weight:** 2.500 kg (5.50 lbs) – without battery  
 3.430 kg (7.55 lbs) – with battery

The zero point test and annual verification procedures of **ISONIC 2010 EL** are fully compliant with the international standards below and the corresponding national norms

**PA channels**

- ISO 18563-1. Non-destructive testing – Characterization and verification of ultrasonic phased array equipment. Part 1: Instruments
- ISO 18563-3. Non-destructive testing – Characterization and verification of ultrasonic phased array equipment. Part 3: Combined systems

**Conventional channels**

- EN 12668-1 / ISO 22232-1. Non-destructive testing – Characterization a verification of ultrasonic examination equipment. Part 1: Instruments
- EN 12668-3 / ISO 22232-3. Non-destructive testing – Characterization a verification of ultrasonic examination equipment. Part 3: Combined Equipment

