OLYMPUS®

Your Vision, Our Future

MULTITECHNOLOGY FLAW DETECTOR: UT, PA, EC, ECA

omniscan

OmniScan® MX

- Portability
- Modularity
- Color Imaging
- Data Storage

OmniScan® MX

With thousands of units being used throughout the world, the OmniScan MX is Olympus NDT's most successful portable and modular phased array and eddy current array test instrument. The OmniScan family includes the innovative phased array and eddy current array test modules, as well as the conventional eddy current and ultrasound modules, all designed to meet the most demanding NDT requirements. The OmniScan MX offers a high acquisition rate and powerful software features—in a portable, modular instrument—to efficiently perform manual and automated inspections.

Rugged, Portable, and Battery Operated

The OmniScan is built to work in the harshest field conditions. A solid polycarbonate-based casing and rubber bumpers make it a rugged instrument capable of withstanding drops and shocks.

The OmniScan is so compact and lightweight (only 4.6 kg, 10.1 lb) that it can be carried easily and handled anywhere, inside or outside. The OmniScan will run for 6 hours with its two Li-ion batteries.

User Interface

The highly legible 8.4-inch real-time display (60-Hz A-scan refresh rate) with an SVGA resolution of 800 x 600 allows you to clearly see defects and details under any light conditions. A scroll knob and function keys make it easy to browse through and select functions. A mouse and keyboard can also be connected for users looking for a more PC-like interface.

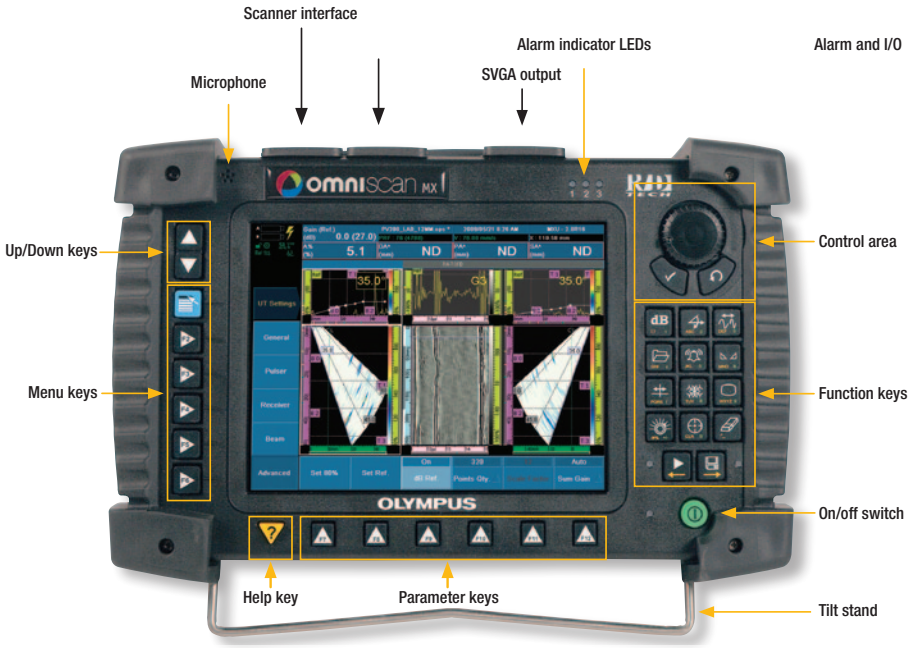
Modular Instrument

The instrument allows you to switch between its different test modules on location. When a new module is connected, the instrument detects the module and its supported technology so that the configuration and test environment are set automatically.

OmniScan Connector

The OmniScan connector has a probe ID feature that enables physical detection and recognition of the probe connected to the instrument.

- Sets the probe to an appropriate frequency to prevent probe damage.
- Sets C-scan resolution for ECA probes.
- Loads the correct probe parameters.



Eddy current array module | 8-channel UT module | 16:16M phased array module | 16:128 phased array module | 32:128 phased array module

Adapters able to connect to probes from other manufacturers are available.

Setup and Reporting

- Setup storage is compatible with Microsoft Windows (exportable using a CompactFlash card).
- Complete report setups, including reading configurations, that can be customized using HTML page layouts.
- Easy report generation, from acquired data to complete report in seconds
- On-screen interactive help that can be customized for procedure-oriented setups using HTML script templates
- Setup preview
- Predefined setups

Connectivity, Data Storage, and Imaging

The OmniScan® offers alarm outputs and standard PC ports: USB, SVGA out, and Ethernet. It offers internal data storage capability and extended storage via a CF (CompactFlash) card slot as well as any USB or network storage.

Typical Applications

Girth Weld Inspection

Olympus NDT developed a circumferential weld inspection system for the oil and gas industry based on the OmniScan PA. This phased array system is qualified to inspect tubes with diameters ranging from 48 mm to 1524 mm and thicknesses from 5 mm to 25 mm in compliance with the ASME Boiler and Pressure Vessel Code, Section V. The semiautomated system offers better inspection speed and detection, and makes interpretation of the indications significantly easier.

Pressure Vessel Weld Inspection

The combination of time-of-flight diffraction (TOFD) and pulse-echo techniques means that a complete inspection can be performed in a single scan, significantly reducing the inspection time when compared to conventional raster scanning or radiography. Inspection results are instantly available, allowing you to find problems with the welding equipment and fix it right away. Based on our vast experience in the nuclear and petrochemical industries, this system includes all the functions that are needed for code-compliant weld inspections.

Scribe Marks Inspection with No Paint Removal

The *Flight Standards Information Bulletin for Airworthiness* (FSAW 03-10B), issued in November 2003, reports damage along fuselage skin lap joints, butt joints, and other areas of several aircraft caused by the use of sharp tools used during paint and sealant removal.

The OmniScan allows scribe marks inspections to be performed without paint removal, which is a huge time-saver. The inspections are performed in a single pass using 60º to 85º SW sectorial scans. The OmniScan PA is now referenced in the Boeing NTM manuals, 737 NDT Manual, Part 4, 53-30-06, July 2005.

Aircraft Fuselage Inspection

The OmniScan ECA (eddy current array) provides the ability to detect hidden corrosion and cracks in multilayer structures. Currently, material loss of 10 % of the lap-splice thickness can be detected in aluminum at a depth of 5 mm. Surface and subsurface cracks can be detected in the skin, at the fastener, or at the lap-joint edges.

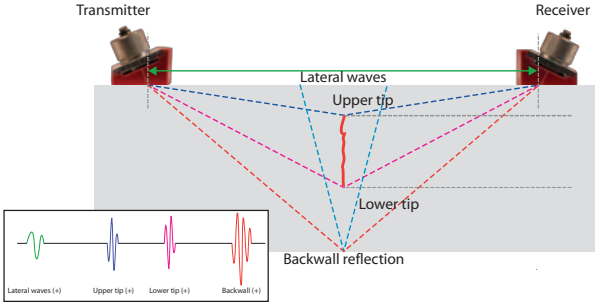
Ultrasound Inspection

Time-of-Flight Diffraction Testing

Time-of-flight diffraction (TOFD) is a technique that uses two probes in pitch-catch mode. TOFD detects and records signals diffracted from defect tips allowing both detection and sizing. The TOFD data is displayed in a grayscale B-scan view. TOFD offers wide coverage and amplitude-independent sizing complying with the ASME-2235 code.

- One-line scan for full-volume inspection
- Setup independent of weld configuration
- Very sensitive to all kinds of defects and unaffected by defect orientation

The TOFD hand scanner is a small, light-weight, efficient, low-cost, and versatile weld inspection solution.
It can accommodate a full range of probes and wedges, including the CentraScan™ composite product line.



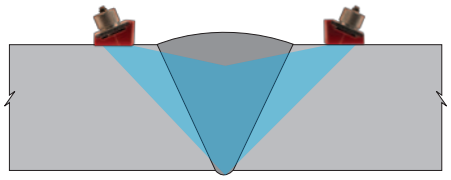
General view of TOFD setup for linear weld inspection showing lateral wave, backwall echo, and diffracted signals on the A-scan.

TOFD and Pulse-Echo Testing

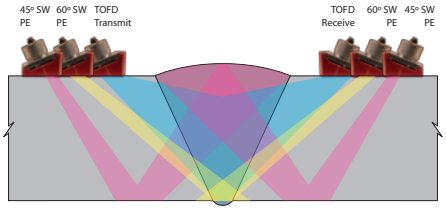
While TOFD is a very powerful and efficient technique, its coverage is limited as a result of two inspection dead zones: one dead zone is near the surface, the other is at the backwall.

The OmniScan® UT allows inspections that simultaneously combine TOFD with conventional pulse echo. Pulse echo complements TOFD, covering the dead zones.

- TOFD inspection
- 45° pulse echo for weld cap inspection on either side of the weld
- 60° pulse echo for weld root inspection on either side of the weld



Weld inspection using TOFD.



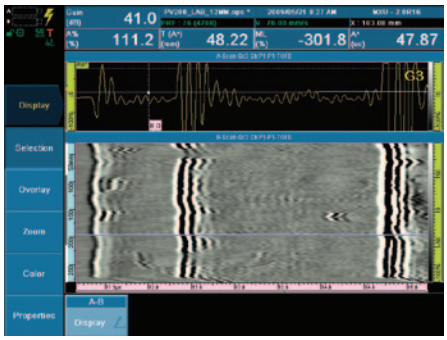
Weld inspection using combined TOFD and pulse echo (PV-100).

0-Degree Testing (Corrosion and Composite)

0-degree testing measures the time-of-flight and amplitude of ultrasonic echoes reflecting from the part into gates in order to detect and measure defects.

- C-scan imaging
- Full A-scan recording with C-scan postprocessing

HSMT-Flex scanner used for TOFD applications (PV-100).



Weld inspection with TOFD.

Ultrasound Transducers

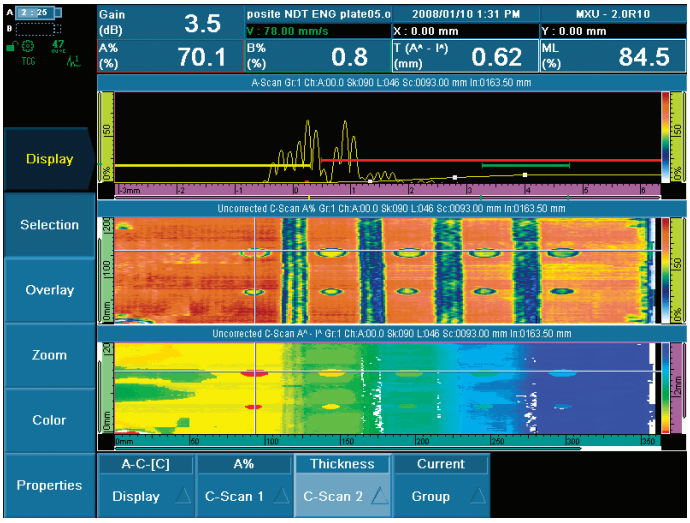
Olympus NDT offers a selection of thousands of transducers in standard frequencies, element diameters, and connector styles.

- Contact and immersion transducers
- Dual transducers
- Angle-beam transducers and wedges
- Replaceable delay line transducers
- Protected face transducers
- Normal incidence shear-wave transducers

Ultrasound Software

Full-Featured C-Scan

- Monitors amplitude, peak position, crossing level position, and thickness on each gate.
- Automatic gate synchronizes from previous gate for higher dynamic range of thickness.
- A-scan data storage and C-scan postprocessing capabilities



- Optional IF gate for surface-following synchronization or measurement gate, or TCG/DAC curves
- Positive or negative gate on RF signal (independent for each gate)
- Eight completely configurable alarms on single-gate events or multiple-gate events, filter for *n* occurrences from one or multiple channels
- Customizable color palette for amplitude and thickness C-scans
- Adjustable 256-level color palette
- 2-axis mechanical encoding with data-acquisition synchronization on mechanical movement
- Optional data library to access A-scans and/or C-scans on PCs for custom processing

Full-Featured B-Scan

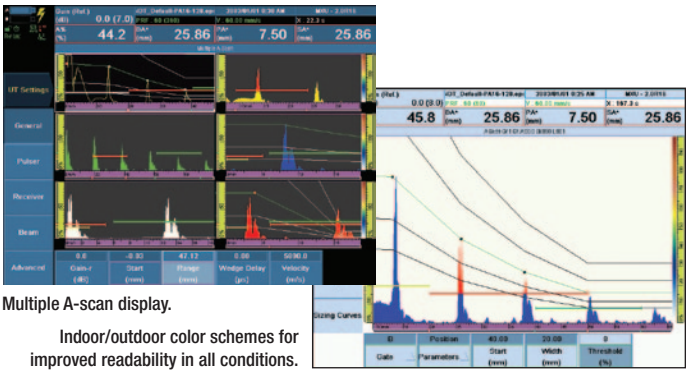
- Easy-to-interpret cross-sectional view of inspected part
- Excellent display of corrosion mapping for boilers, pipes, and storage tanks
- Visual identification of acquired thickness values
- Encoded TOFD capability for amplitude-independant defect sizing

Full-Featured A-Scan

- Color-selectable A-scan display
- Reject mode
- Hollow mode
- Peak-hold mode (always keeps the signal that shows the maximum amplitude in gate A)
- Gate threshold-level crossing (changes the color of the curve that is over the gate level)
- 60 Hz A-scan refresh rate with overlays of envelope and peak inside the gate

Step-by-Step Calibration Wizards

All calibration procedures are guided using step-by-step wizards.



Multiple A-scan display.

Indoor/outdoor color schemes for improved readability in all conditions.

- Sound velocity calibration
- Wedge delay calibration
- TOFD calibration
- TCG calibration
- Encoder calibration

TOFD Option

- B-scan encoded data imaging and storage
- Grayscale color palette, adjustable for brightness and contrast
- 100 MHz A-scan digitizing
- TOFD calibration wizard, online and offline
- Hyperbolic cursor and reading for TOFD sizing
- Lateral wave resynchronization

Live switching between conventional UT and phased array UT

Phased Array Inspection

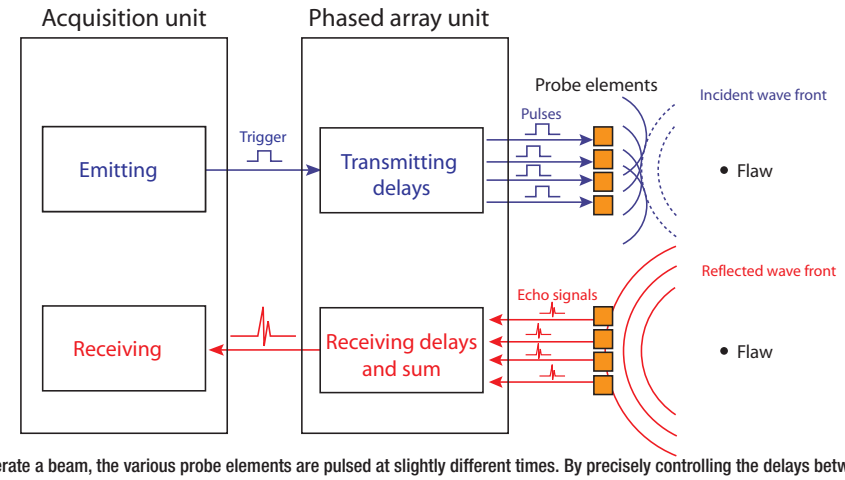
Phased Array Technology

Phased array technology enables the generation of an ultrasonic beam where parameters such as angle, focal distance, and focal point size are controlled through software. Furthermore, this beam can be multiplexed over a large array. These capabilities open a series of new possibilities. For instance, it is possible to quickly vary the angle of the beam to scan a part without moving the probe itself. Phased arrays also allow replacing multiple probes and mechanical components. Inspecting a part with a variable-angle beam also maximizes detection regardless of the defect orientation, while optimizing signal-to-noise ratio.

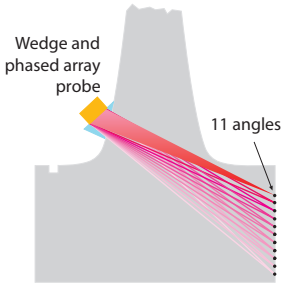
Benefits of Phased Arrays

Phased array technology offers the following benefits:

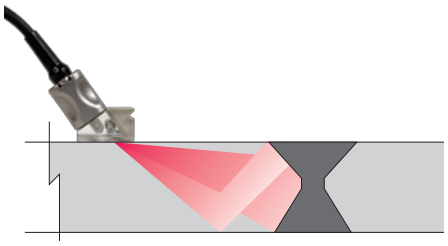
- Software control of beam angle, focal distance, and spot size
- Multiple-angle inspection with a single, small, electronically-controlled multielement probe
- Greater flexibility for the inspection of complex geometry
- High-speed scans with no moving parts



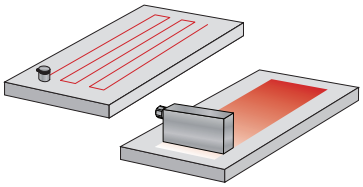
To generate a beam, the various probe elements are pulsed at slightly different times. By precisely controlling the delays between the probe elements, beams of various angles, focal distances, and focal spot sizes can be produced. The echo from the desired focal point hits the various transducer elements with a computable time shift. The signals received at each transducer element are time-shifted before being summed together.



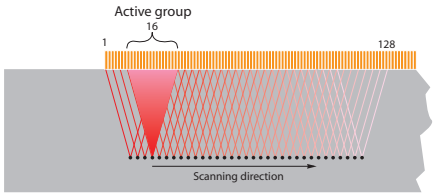
Multiple-angle inspection with one multielement probe.



Greater flexibility for the inspection of complex geometry.



The use of phased array probes enables one-line scanning and eliminates one axis of a two-axis scan.



High-speed scans with no moving parts.
Compared to a wide, single-element transducer, phased array technology offers a much higher sensitivity due to the use of a small focused beam.

Phased Array Probes

Olympus standard phased array probes are divided into three categories:

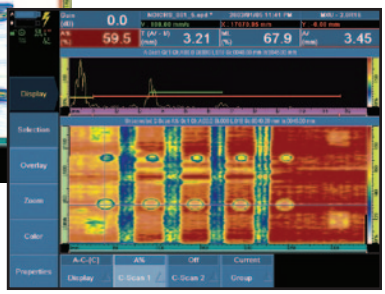
- Angle beam probes with external wedges (1) (2)
- Angle beam probes with integrated wedge (3)
- Immersion probes (4)

Numerous accessories, such as encoders (5) are also available.

Phased Array Software

Full-Featured A-Scans, B-Scans, and C-Scans

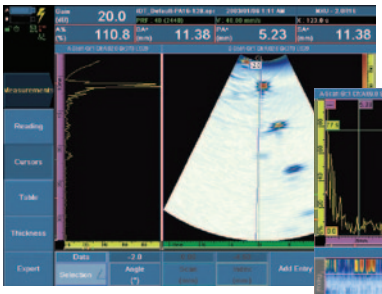
B-scan display



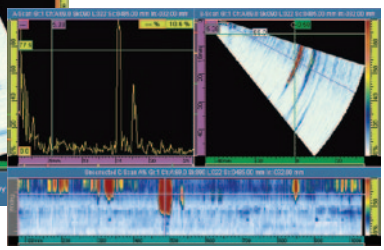
A-scan and C-scan displays

The OmniScan® PA builds upon the OmniScan UT feature set and offers full-featured A-scan, B-scan, and C-scan displays.

Full-Featured Sectorial Scan



Sectorial scan display



Real-time data processing

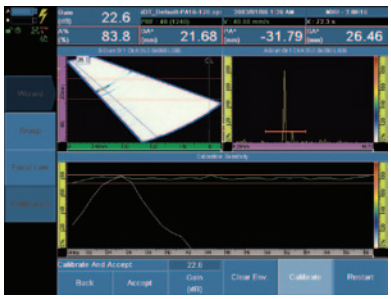
- Real-time volume-corrected representation
- Higher than 20 Hz refresh rate (up to 40 Hz)

Advanced Real-Time Data Processing

- Real-time data interpolation to improve spatial representation of defects during acquisition of data
- User-selectable high-pass and low-pass filters to enhance A-scan and imaging quality
- Projection feature allows the operator to view vertically positioned A-scan simultaneously with sectorial scan image.

Calibration Procedures and Parameters

All calibration procedures are guided by a step-by-step menu using Next and Back navigation.



Example of sensitivity calibration

Wizards for Groups and Focal Laws

- The Group Wizard allows you to enter all probe, part, and beam parameters, and generate all focal laws in one step instead of generating them with each change.

Examples of the Focal Law Wizard

- The step-by-step approach prevents the user from missing a parameter change.
- Online help provides general information on parameters to be set.

Multiple-Group Option

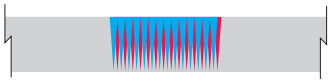
It is now possible to manage more than one probe with two different configurations: different skews, different scanning types, different inspection areas, and other parameters.

Possible Configurations for Multiple-Group Inspection

A Use one single phased array probe of 64 or more elements and create 2 different groups:

- Linear scan at 45° to cover the upper part using skips on the bottom surface
- Linear scan at 60° to cover the lower part

B Use one single phased array probe of 64 or 128 elements and create 2 different groups:



- Linear scan at 0° at low gain
- Linear scan at 0° at higher gain

C Use one phased array probe of 64 or 128 elements and create 3 different groups:

- Linear scan at 45° to cover the upper part using skips on the bottom surface
- Linear scan at 60° to cover the lower part
- Sectorial scan from 35° to 70° to increase probability of detection

D Use two phased array probes of 16 or 64 elements and create 2 different groups:

- Sectorial scan from 35° to 70° for inspection from left side of the part using skips on the bottom surface
- Sectorial scan from 35° to 70° for inspection from right side of the part using skips on the bottom surface

Eddy Current Inspection

Eddy Current Technology

Eddy current testing (ECT) is a method for the inspection of metallic parts. The probe, excited with an alternating current, induces an eddy current in the part being inspected. Any discontinuities or material property variations that change the eddy current flow in the part are detected by the probe as a potential defect.

Over the years, probe technology and data processing have continuously progressed so that the eddy current technique is now recognized to be fast, simple, and accurate. This is why the technique is widely used in the aerospace, automotive, petrochemical, and power generation industries in the detection of surface or near-surface defects in materials such as aluminum, stainless steel, copper, titanium, brass, Inconel, and even carbon steel (surface defect only).

Benefits of Eddy Currents

Eddy currents offers the following benefits:

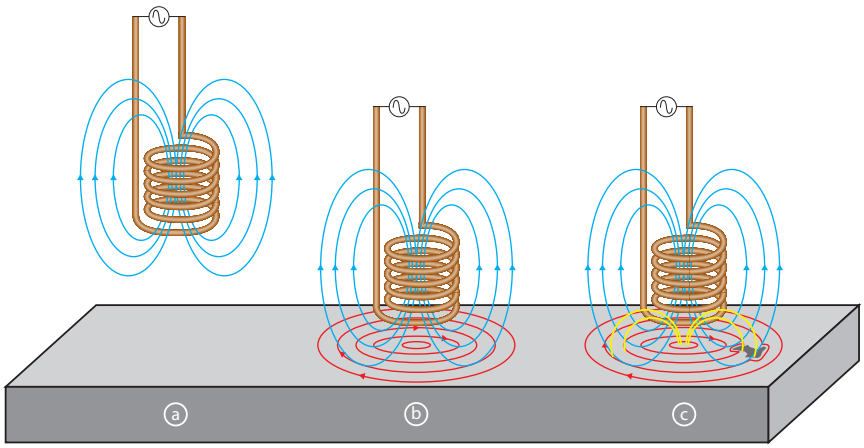
- A quick, simple, and reliable inspection technique to detect surface and near-surface defects in conductive materials
- Can be used to measure the electrical conductivity of materials.
- Measurement of nonconductive coatings
- Hole inspection with the use of a high-speed rotating scanner and surface probe

Eddy Current Probes

Olympus NDT standard eddy current probes are available in different configurations:

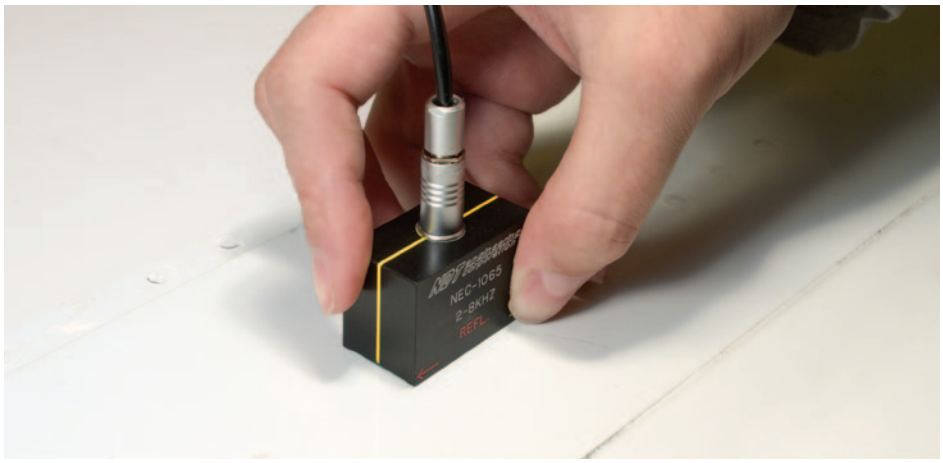
- Bolt hole probes
- Surface probes, in various shapes and configurations
- Low-frequency Spot and Ring probes
- Sliding probes
- Wheel probes
- Conductivity probes
- Speciality probes made for specific applications

Reference standards with EDM notches can be manufactured according to the application specifications.



Probes used to perform eddy current inspections are made with a copper wire wound to form a coil. The coil shape can vary to better suit specific applications.

1. The alternating current flowing through the coil at a chosen frequency generates a magnetic field around the coil.
2. When the coil is placed close to an electrically conductive material, an eddy current is induced in the material.
3. If a flaw in the conductive material disturbs the eddy current circulation, the magnetic coupling with the probe is changed and a defect signal can be read by measuring the coil impedance variation.



Surface preparation is minimal. Unlike liquid penetrant or magnetic particle inspection, it is unnecessary to remove the paint from the surface to inspect the parts.

Eddy Current Software

Impedance Plane and Strip Chart Display

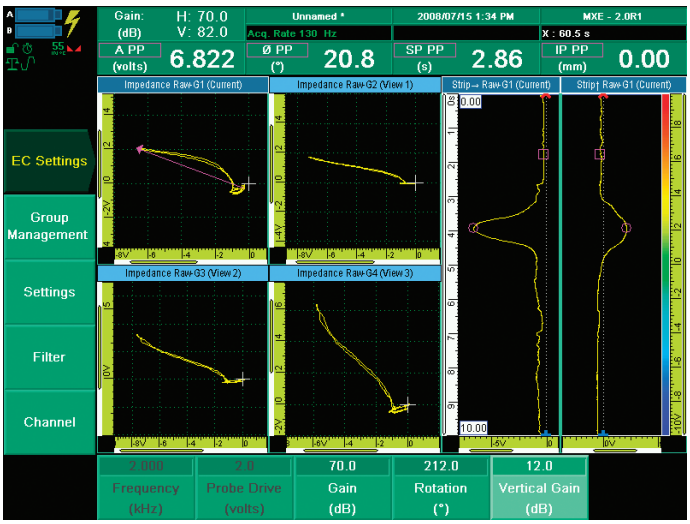
- User-selectable screen persistence
- Reference signal overlays can be kept on the screen for easier signal interpretation.
- Freeze mode allows signal rotation and gain adjustment without having to hold the probe on the part.
- Zoom and Best Fit functions

C-Scan Surface Mapping

- Support of two encoder inputs to connect various scanners
- Real-time C-scan mapping display with impedance plane and strip chart view

Multifrequency Operation and Automatic Mixing Capability

- Up to 8-frequency operation (1 channel: 8 frequencies; 2 channels: 4 frequencies; 4 channels: 2 frequencies)
- Automatic mixing capability



Advanced Real-Time Data Processing

- Three alarms can be defined with various shapes to activate LED, buzzer, or TTL output.
- High-pass, low-pass, and specialized filters (IIR and FIR filtering available

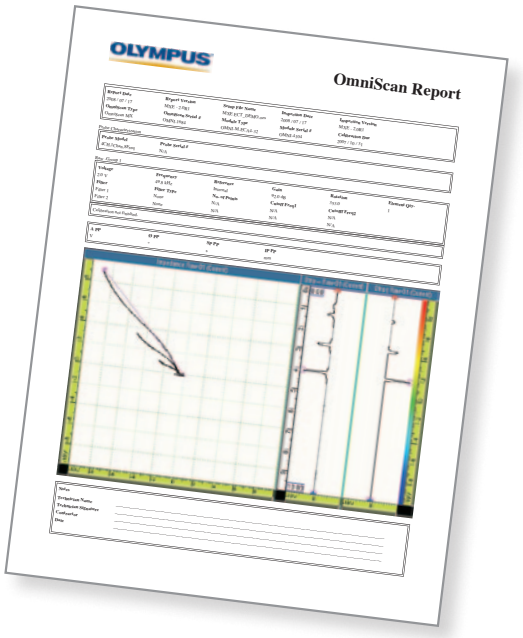
Alarms

Alarm zone in impedance plane on the OmniScan® ECT.

- Full range of user-selectable alarms (pie, rectangular, ring)
- Simple and quick to set up
- Full control of alarm output

Eddy Current Reports

- Simple and fast report generation
- HTML reporting format for flexibility can be quickly e-mailed and viewed on any Web browser.
- Predefined and user-customizable reports



Live switching between eddy current and eddy current array

Eddy Current Array Inspection

Eddy Current Array Technology

Eddy current array (ECA) technology provides the ability to electronically drive and read several eddy current sensors positioned side by side in the same probe assembly. Data acquisition is made possible through the use of multiplexing, which avoids mutual inductance between individual coils.

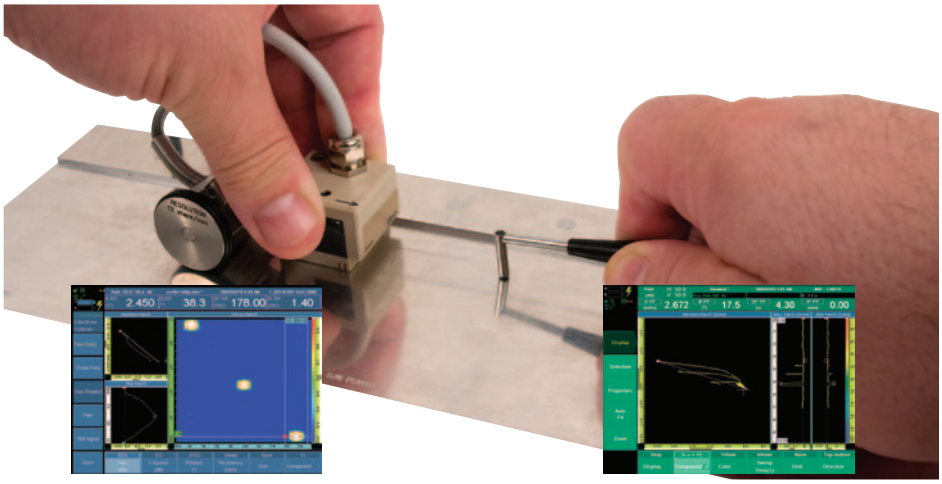
The OmniScan® ECA test configuration supports 32 sensor coils (up to 64 with an external multiplexer) working in bridge or transmit-receive mode. The operating frequency ranges from 20 Hz to 6 MHz with the option of using multiple frequencies in the same acquisition.

Multiplexing principle between elements. Coils are shown for illustration purposes only.

Benefits of Eddy Current Arrays

Compared to single-channel eddy current technology, eddy current array technology provides the following benefits:

- Dramatically reduces inspection time.
- Covers a large area in a single pass.
- Reduces the complexity of mechanical and robotic scanning systems.
- Provides real-time cartography of the inspected region, facilitating data interpretation.
- Is well suited to complex part geometry.
- Improves reliability and probability of detection (POD).

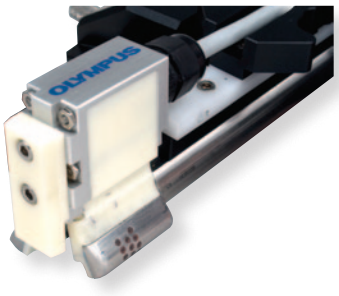


Eddy current array probes can replace one axis of a two-axis scan and offer greater flexibility in the eddy current setup.

Eddy Current Array Probes

Olympus NDT manufactures ECA probes for a wide range of applications. Probes can be designed to detect a specific type of flaw or to follow the shape of the part being inspected. Standard designs are available to detect defects such as cracks and pitting, and subsurface defects such as cracks in multilayer structures, as well as corrosion.

ECA technology is invaluable in aerospace maintenance applications



Probes can be made in different shapes and sizes to follow, with ease, the contour of the part under inspection.

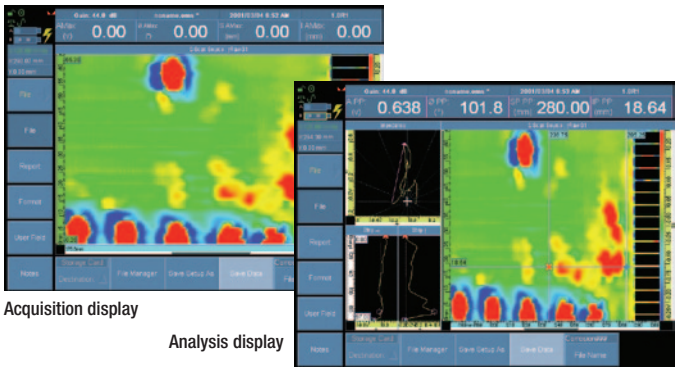
Transmit-receive probe for corrosion detection down to 6 mm (0.25 in.) in aluminum

Transmit-receive probe for surface-crack detection shown with optional encoder

Absolute probe for surface crack detection

Eddy Current Array Software

Simple Acquisition and Analysis Displays



Acquisition display

Analysis display

- Data acquisition in a C-scan view for quick and efficient defect detection
- Data selection in Analysis mode to review the signal in the impedance plane and strip charts
- Amplitude, phase, and position measurement
- Adjustable color palette
- Large impedance plane and strip chart views to accommodate conventional single-channel ECT probe inspection

Calibration Wizard

Fastener inspection using two frequencies and a dual C-scan display.

- Step-by-step process
- All the channels of a group are calibrated simultaneously, each channel having its own gain and rotation.
- Amplitude and phase can be set on different reference flaws.

Alarms

- Three alarm outputs can combine LED, buzzer, and TTL output.
- Various alarm zone shapes can be defined in the impedance plane (sectorial, rectangular, ring, etc.).

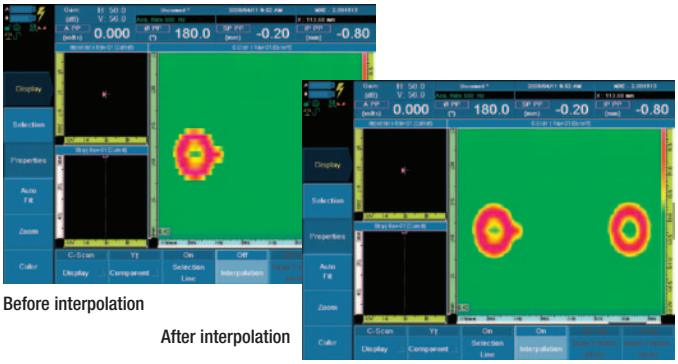
Automatic Probe Detection and Configuration

- C-scan parameters and multiplexing sequence are automatically set when the probe is connected.
- Frequency range protection to avoid probe damage

Subtraction Tools in Analysis Mode

This function can be used to remove the lift-off variation that is shown between adjacent channels.

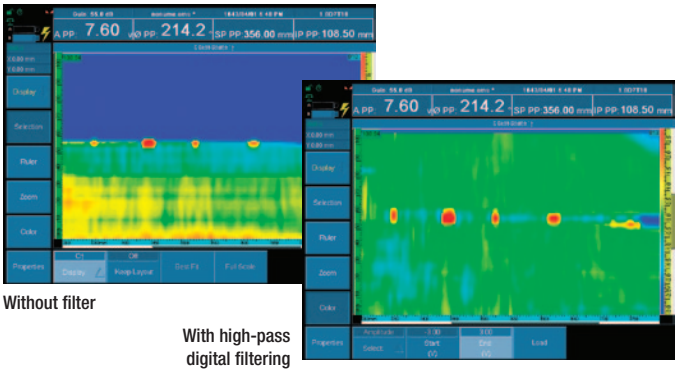
Advanced Real-Time Data Processing



Before interpolation

After interpolation

- Real-time data interpolation to improve the spatial representation of defects
- When working with two frequencies, a MIX signal can be generated to remove unwanted signals (for example, lift-off, fastener signals, etc.).
- Several filters can be applied to the data such as high-pass, low-pass, median, and averaging filters. The illustrations below represent an application where cracks are located at the edge of a lap-joint which has a sharp thickness variation. The filtered data may improve detection, especially for small cracks.



Without filter

With high-pass digital filtering

OmniScan Specifications

OmniScan MX Specifications

Overall dimensions (W x H x D)	321 mm x 209 mm x 125 mm (12.6 in. x 8.2 in. x 5.0 in.)
Weight	4.6 kg (10.1 lb), including module and one battery
Data storage	
Storage devices	CompactFlash card, most standard USB storage devices, or through fast Ethernet, internal 32-MB DiskOnChip
Data file size	160 MB
I/O ports	
USB ports	3
Speaker out	Yes
Microphone input	Yes
Video output	Video out (SVGA)
Video input	Video input (NTSC/PAL)
Ethernet	10/100 Mbps
I/O lines	
Encoder	2-axis encoder line (quadrature, up, down, or clock/direction)
Digital input	4 digital TTL inputs, 5 V
Digital output	4 digital TTL outputs, 5 V, 10 mA
Acquisition on/off switch	Remote acquisition enable TTL, 5 V
Power output line	5 V, 500 mA power output line (short-circuit protected)
Alarms	3 TTL, 5 V, 10 mA
Analog output	2 analog outputs (12 bits) ±5 V in 10 kΩ
Pace input	5 V TTL pace input
Display	
Display size	21 cm (8.4 in.) (diagonal)
Resolution	800 pixels x 600 pixels
Number of colors	16 million
Type	TFT LCD
Power supply	
Battery type	Smart Li-ion battery
Number of batteries	1 or 2 (battery chamber accommodates two hot-swappable batteries)
Battery life	Minimum 6 hours with two batteries; minimum 3 hours per battery under normal operating conditions
DC-in voltage	15 V to 18 V (min. 50 W)
Environmental specifications	
Operating temperature range	0 °C to 40 °C; 0 °C to 35 °C with 32:128 PA (32 °F to 104 °F; 32 °F to 95 °F with 32:128 PA)
Storage temperature range	–20 °C to 70 °C (–4 °F to 158 °F)
Relative humidity	0 % to 95 % noncondensing. No air intake; splashproof design.

Ultrasound Module Specifications

Overall dimensions (W x H x D)	244 mm x 182 mm x 57 mm (9.6 in. x 7.1 in. x 2.1 in.)
Weight	1 kg (2.2 lb)
Connectors	LEMO 00 (2, 4, or 8)
Pulser	
Number of pulsers	2, 4, or 8
Pulse output	50 V, 100 V, 200 V, 300 V ±10 % (variable pulse width)
Pulse width	Adjustable from 30 ns to 1000 ns ±10 %, resolution of 2.5 ns
Fall time	Less than 7 ns
Pulse shape	Negative square wave
Output impedance	Less than 7 Ω
Receiver	
Number of receivers	2, 4, or 8
Receiver gain range	0 dB to 100 dB, by steps of 0.1 dB
Maximum input signal	20 Vp-p (screen at 128 %)
Minimum sensitivity	200 µVp-p (screen at 128 %)
Noise referred to input	160 µVp-p (26 µV RMS) (128 %)
Input impedance	50 Ω
Input filter (100 % bandwidth)	Centered at 1 MHz (1.5 MHz), centered at 2 MHz (2.25 MHz), centered at 5 MHz (4 MHz), centered at 10 MHz (12 MHz), centered at 15 MHz, centered at 20 MHz; 0.25 MHz to 2.5 MHz, 2 MHz to 25 MHz BB
System bandwidth	0.25 MHz to 32 MHz (–3 dB)
Rectifier	Both, positive, negative
Mode	PE (pulse-echo), PC (pitch-catch), TT (through-transmission). In PC mode the maximum number of pulsers equals the number of channels divided by 2.
Smoothing	Digital
DAC	
Number of points	16
DAC range	Up to 40 dB
Maximum gain slope	20 dB/µs
Data acquisition	
A-scan acquisition rate	6000 A-scans/s (512-point A-scan)
Maximum pulsing rate	1 channel at 12 kHz (C-scan)
Data processing	
Real-time averaging	2, 4, 8, or 16
Gates	
Quantity	3: I (synchro), A and B (measure)
Synchronization	I, A, B referenced on main bang; A and B referenced on gate I (post-synchronization)
Data storage	
A-scan recording (TOFD)	6000 A-scans/s (512-point A-scan) (3 MB/s transfer rate)
C-scan type data recording	12 000 (A1, A2, A3, T1, T2, T3) (3 gates) 12 kHz (lower frequency for corrosion mapping)
Data visualization	
Refresh rate	60 Hz
Data synchronization	
On time	1 Hz to 12 kHz
On encoder	On 1 or 2 axes divided into 1 to 65 536 steps
Alarms	
Number of alarms	3
Conditions	Any logical combination of gates
Signal	Amplitude or TOF of gate A or B

Eddy Current Modules Specifications

	Eddy Current Array	Eddy Current
Overall dimensions (W x H x D)	244 mm x 182 mm x 57 mm (9.6 in. x 7.1 in. x 2.1 in.)	
Weight	1.2 kg (2.6 lb)	
Connectors	1 OmniScan® connector for eddy current array probes	N/A
	1 19-pin Fischer eddy current probe connector	
	1 BNC connector	
Number of channels	32 channels with internal multiplexer 64 channels with external multiplexer	4 channels
Probe recognition	Automatic probe recognition and setup	
Generator		
Number of generators	1 (with internal electronic reference)	
Maximum voltage	12 Vp-p into 10 Ω	
Operating frequency	20 Hz to 6 MHz	
Bandwidth	8 Hz to 5 kHz (in single coil). Inversely proportional to the time-slot duration and set by the instrument in multiplexed mode.	
Receiver		
Number of receivers	1 to 4	
Maximum input signal	1 Vp-p	
Gain	28 dB to 68 dB	
Internal multiplexer		
Number of generators	32 (4 simultaneously on 8 time slots; up to 64 with external multiplexer)	N/A
Maximum voltage	12 Vp-p into 50 Ω	
Number of receivers	4 differential receivers (8 time slots each)	
Maximum input signal	1 Vp-p	
Data acquisition		
Digitizing frequency	40 MHz	
Acquisition rate	1 Hz to 15 kHz (in single coil). The rate can be limited by the instrument's processing capabilities or by delays set by the multiplexed excitation mode.	
A/D resolution	16 bits	
Data processing		
Phase rotation	0° to 360° with increments of 0.1°	
Filtering	FIR low-pass, FIR high-pass, FIR band-pass, FIR band-stop (adjustable cutoff frequency), median filter (variable from 2 points to 200 points), mean filter (variable from 2 points to 200 points)	
Channel processing	Mixing	
Data storage		
Maximum file size	Limited to available internal flash memory: 180 MB (or 300 MB optional)	
Data synchronization		
On internal clock	1 Hz to 15 kHz (single coil)	
External pace	Yes	
On encoder	On 1 or 2 axes	
Alarms		
Number of alarms	3	
Alarm zone shape	Pie, inverted pie, box, inverted box, and ring	
Output type	Visual, audio, and TTL signals	
Analog outputs	1 (X or Y)	

Phased Array Module Specifications

(Applies to OMNI-M-PA16128)

Overall dimensions (W x H x D)	244 mm x 182 mm x 57 mm (9.6 in. x 7.1 in. x 2.1 in.)
Weight	1.2 kg (2.6 lb)
Connectors	1 OmniScan connector for phased-array probes 2 BNC connectors (1 pulser/receiver, 1 receiver for conventional UT) (BNC not available on models 32:32 and 32:128)
Number of focal laws	256
Probe recognition	Automatic probe recognition and setup
Pulser/Receiver	
Aperture	16 elements*
Number of elements	128 elements
Pulser	
Voltage	80 V per element
Pulse width	Adjustable from 30 ns to 500 ns, resolution of 2.5 ns
Fall time	Less than 10 ns
Pulse shape	Negative square wave
Output impedance	Less than 25 Ω
Receiver	
Gain	0 dB to 74 dB, maximum input signal 1.32 Vp-p
Input impedance	75 Ω
System bandwidth	0.75 MHz to 18 MHz (–3 dB)
Beamforming	
Scan type	Azimuthal and linear
Scan quantity	Up to 8
Active elements	16*
Elements	128
Delay range transmission	0 µs to 10 µs in 2.5-ns increments
Delay range reception	0 µs to 10 µs in 2.5-ns increments
Data acquisition	
Digitizing frequency	100 MHz (10 bits)
Maximum pulsing rate	Up to 10 kHz (C-scan)
Acquisition depth	29 meters in steel (L-wave), 10 ms with compression. 0.24 meter in steel (L-wave), 81.9 µs without compression
Data processing	
Number of data points	Up to 8000
Real-time averaging	2, 4, 8, 16
Rectifier	RF, full wave, halfwave +, halfwave –
Filtering	Low-pass (adjusted to probe frequency), digital filtering (bandwidth, frequency range)
Video filtering	Smoothing (adjusted to probe frequency range)
Data storage	
A-scan recording (TOFD)	6000 A-scans per second (512-point, 8-bit A-scan)
C-scan type data recording	I, A, B, up to 10 kHz (amplitude or TOF)
Maximum file size	Limited to available internal flash memory: 180 MB (or 300 MB optional)
Data visualization	
A-scan refresh rate	Real time: 60 Hz
Volume-corrected S-scan	Up to 40 Hz
Data synchronization	
On internal clock	1 Hz to 10 kHz
On encoder	On 1 or 2 axes
Programmable time-corrected gain (TCG)	
Number of points	16 (1 TCG curve per channel for focal laws)
Alarms	
Number of alarms	3
Conditions	Any logical combination of gates
Analog outputs	2

* Models 16:16, 16:16M, 16:64M, 32:32, and 32:128 also available

Olympus NDT Training Academy

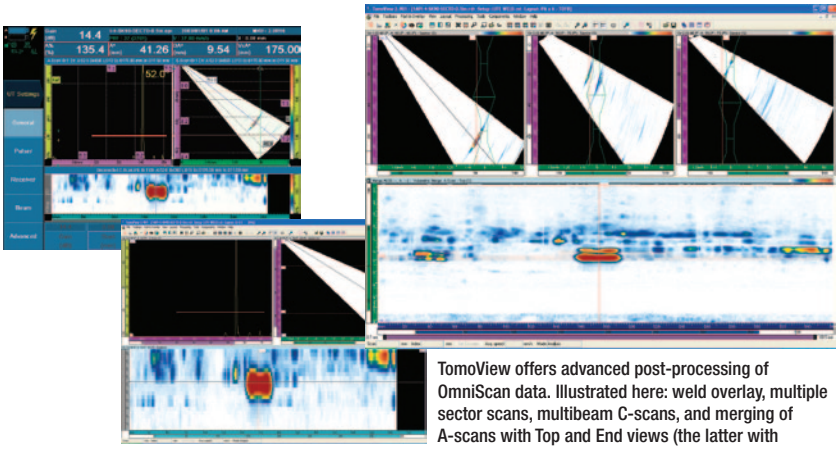
The unique Olympus NDT Training Academy offers comprehensive courses in phased array technology and applications. Courses range from a two-day “Introduction to Phased Array” program to a two-week, in-depth “Level II Phased Array” course. In all cases, students experience practical training using the portable OmniScan® phased array unit.

Courses are currently being offered in training facilities at participating companies as well as at customer-determined locations worldwide. Customized courses can also be arranged.
Check the latest course schedule at **www.olympus-ims.com.**

OmniScan Data Analysis with TomoView

TomoView™ is the perfect companion for the OmniScan® family of instruments. Seamlessly import OmniScan files for advanced processing and analysis in TomoView.

- Import OmniScan data files and display volume-corrected views as well as multiple B-scan views.
- Correct potential operator errors in acquisition parameters (incorrect skew, index offsets, etc.) by reading back raw acquisition data without altering original data.
- Import and merge several OmniScan data files. For simplified interpretation, merge several groups into one.



TomoView offers advanced post-processing of OmniScan data. Illustrated here: weld overlay, multiple sector scans, multibeam C-scans, and merging of A-scans with Top and End views (the latter with rebound display).

OLYMPUS NDT INC. is ISO 9001 certified.

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