OLYMPUS®

Your Vision, Our Future

Eddy Current and Bond Testing Flaw Detector

OmniScan MX

omniscan

OmniScan® MX with ECA/ECT Modules

Discover Eddy Current Color Imaging

- Large, high-resolution and full-color display in a portable format
- Eddy current array made easy
- Replacement for traditional NDT methods
- Analysis and archiving
- Bond testing C-scan

The OmniScan® MX Flaw Detector

Field Proven and Dependable

With thousands of units being used throughout the world, the OmniScan MX flaw detector is built to withstand harsh and demanding inspection conditions. Compact and lightweight, its two Li-ion batteries provide up to 6 hours of manual or semiautomated inspection time.

The highly legible, 8.4 in. (213 mm) real-time color display enables you to see defects and details under any light conditions. Navigate your way through the instrument's simple and intuitive interface using the scroll knob and function keys or by connecting a USB mouse to facilitate the inspection analysis.

Three Technologies, More Flexibility

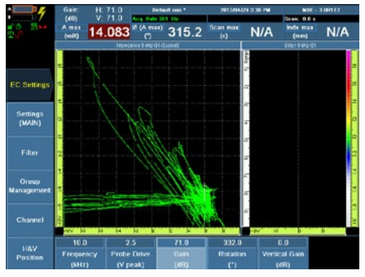
Whether your procedure calls for an eddy current, eddy current array, or bond testing test, the OmniScan® MX1 flaw detector with the eddy current array module has the right tools and specifications for the job. The instrument's software, MXE for eddy current and eddy current array and MXB for bond testing, share a similar intuitive interface, so switching from one to the other is simple.

OmniScan MX1 flaw detector with the eddy current array module

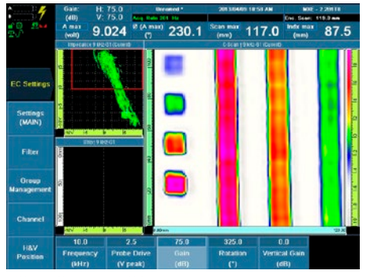
Most conventional NORTEC® ECT probes are supported (separate adaptors or cables required).

Eddy current array probes with up to 32 channels or up to 64 with the external multiplexer (optional).

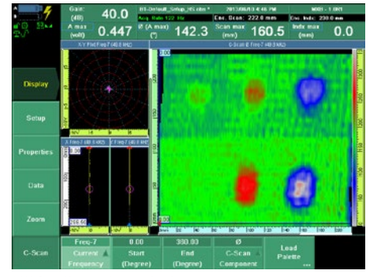
A bond testing C-scan requires a separate adaptor to work.



MXE software in ECT mode



MXE software in ECA mode

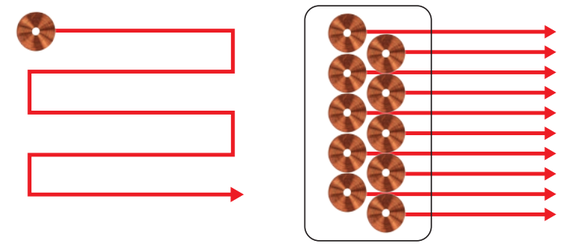


MXB software (bond testing)

ECA Is Just Like ECT

Large Coverage, Fast Scanning, and a Higher Probability of Detection

Eddy current array (ECA) technology incorporates several traditional bridge or reflection (driver-pickup) probe coils to achieve much larger coverage in a single inspection pass. Additionally, each ECA probe model is carefully designed to maintain a high probability of detection of a targeted defect range, all along the probe length. With the OmniScan® MX ECA flaw detector, you can use ECA probes at fast manual inspection speeds, offering a powerful and productive inspection with color representation and archiving capability.



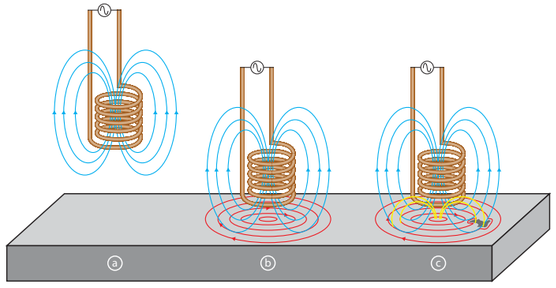
Single coil: raster scanning

Array probe: one-line scanning

Inspection through Thin Coatings

Eddy current testing (ECT) technology works on the principle of magnetic coupling of a probe sensor (coil) close to a test specimen (conductive material, ferromagnetic or non-ferromagnetic), generating eddy currents inside the test specimen and displaying signals on the instrument's impedance plane. With eddy current technology, you can detect defects through thin coatings (such as paint), as long as the distance from the probe to the metal is kept reasonably low—typically in the order of 0.5 mm to 2.0 mm.

As eddy current array and ECT technology share the same basic principles (and physics), it can also perform inspections through paint while offering all the advantages of ECA, including large coverage, fast scanning, high probability of detection, and color imaging.



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.

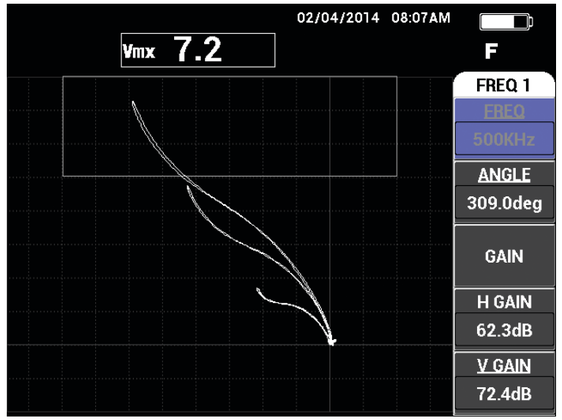
Increased Power, Decreased Complexity

MXE 3.0 Software

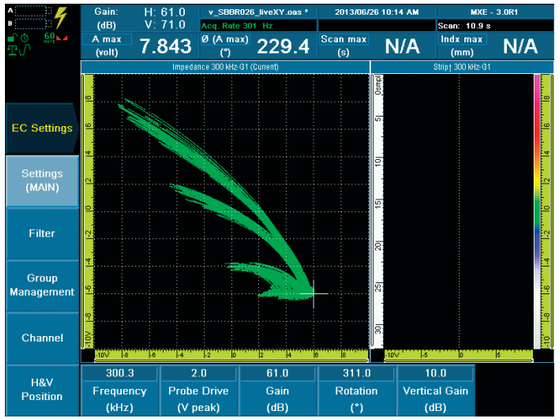
With the exception of the added capacity to electronically switch between elements, eddy current array (ECA) technology is essentially the same as ECT technology. Eddy current array is easy to operate and calibrate. The OmniScan® MXE 3.0 ECA software has been redesigned to facilitate the transition from a conventional ECT instrument (such as the Olympus NORTEC 600 flaw detector) and to offer the power of ECA in a much more accessible way.

Single channel ECT

32 simultaneous channels



NORTEC 600 **Main** menu



OmniScan MXE 3.0 **Main** menu

Live Impedance Plane

Calibration of ECA is done in a nearly identical fashion as conventional ECT. The principles of lift-off, gain, and null adjustments are maintained, so calibration is no more complex or time-consuming than usual.

Generate live lift-off signals with an ECA probe – just like with a conventional ECT probe.

Adjust the phase angle in real time with the OmniScan knob. Gain, vertical gain, and null point (H/V) can also be adjusted the same way.

Encoded Scans for Easier Data Interpretation

Optimized 1-2-3 Calibration

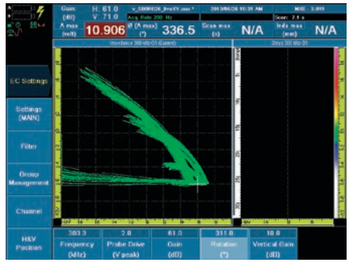
The OmniScan® MX ECA flaw detector not only displays ECA signals in a conventional ECT impedance plane view but also offers several other views and layouts where the user will begin to recognize the true power of encoded ECA technology. These displays can be made part of the calibration workflow and can make eddy current testing highly visual and even go/no-go, based on user-defined acceptance criteria.

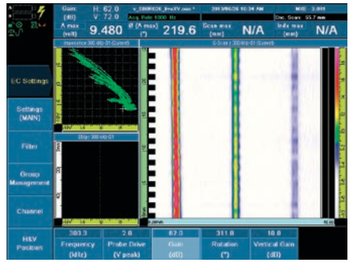
Thanks to its intuitive interface design, the OmniScan MX ECA instrument is fast and easy to configure and operate. It is as simple as one, two, three.

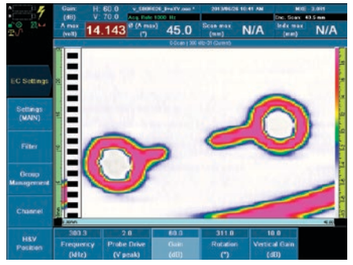
1 Adjust the usual ECT controls in real time using the live impedance plane.

2 Activate the encoder and C-scan display.

3 Fine-tune the settings and get ready to perform the inspection.







Contrast adjustment using the gain in full C-scan display.

Continuous Encoder Mode

The advantage of time-based inspection is its virtually unlimited scanning capacity with minimal instrument interaction, whereas the benefit of encoded scans (C-scan images) is the ability to produce valuable color-coded images and information related to flaw position, shape, and dimensions.

The MXE 3.0 ECA software offers a continuous encoder mode that enables encoder-corrected imaging while maintaining the ease of use of a time-based inspection. With this mode, inspections are highly productive, with indications being recorded at your discretion.

Powerful Color Imaging

Estimate Flaw Depth with Color-Coded C-Scans

As with conventional eddy current technology, flaw severity is closely correlated to the return EC signal amplitude in most surface or near-surface applications. By using an amplitude-based color code and plotting each channel's return signal with encoded-position information, the resulting C-scan display is highly visual and intuitive. These scans can be saved to the removable CF card or generated into a report onboard the instrument.

A reference standard with known depth defects is necessary to calibrate the sensitivity and contrast of ECA.

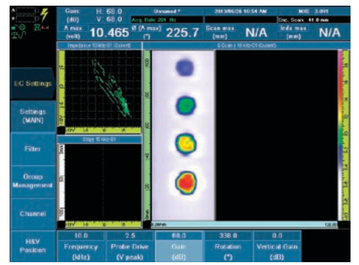
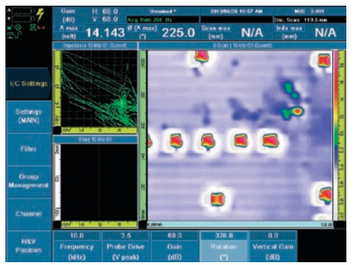


Image of a calibrated ECA scan showing different colors for each defect depth range.

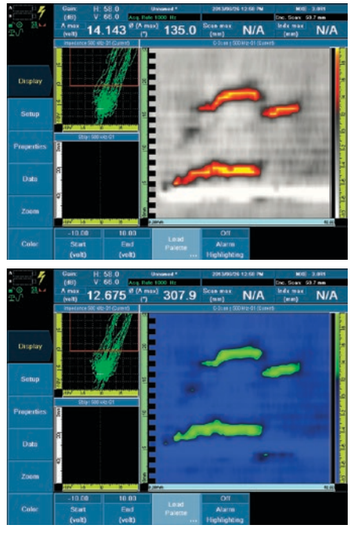


Actual aircraft skin showing corrosion indications. The colors indicate the depth of the defects.

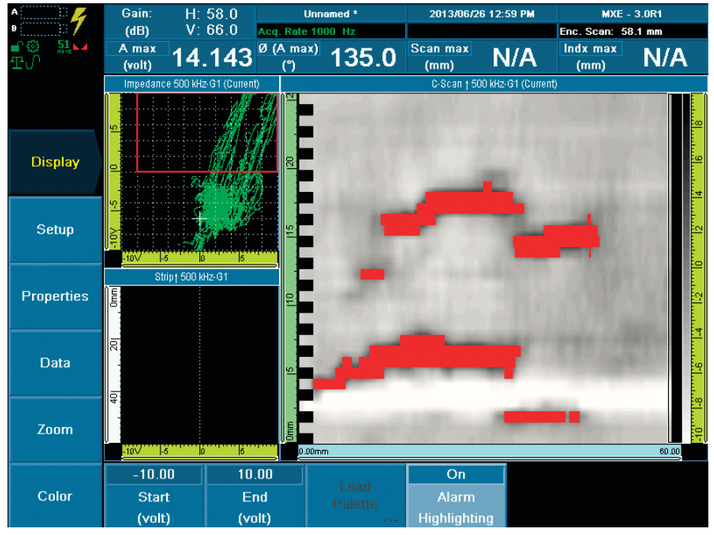
Accept or Reject Flaws Based on Threshold

With the OmniScan® MX ECA flaw detector, you can accept or reject indications based on the C-scan color display. The MXE 3.0 ECA software contains a wide range of factory-tested color palettes that optimize the signal display for any ECA application.

Additionally, the C-scan alarm feature simplifies the gating of reject signals, as it instantly changes the C-scan colors when the impedance plane signal enters the alarm zones.



A variety of application-specific color palettes come preloaded with the MXE 3.0 ECA software (patent rights protected).

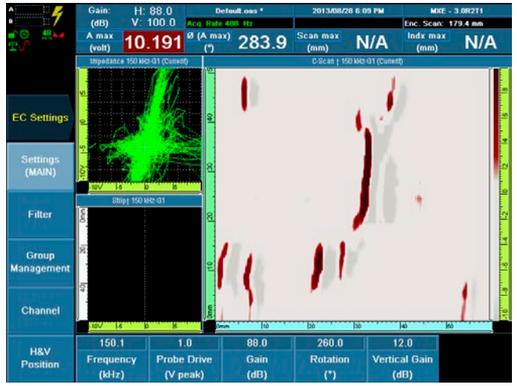


With the alarm feature, the C-scan changes color whenever a signal enters the reject zone.

Replacement of Traditional NDT Methods
Paint Removal is Obsolete

Eddy current array has a unique ability to perform inspections through thin coatings on conductive material. This capability provides a tremendous advantage over existing methods, such as penetrant testing, magnetic particle, or magneto-optical imaging (MOI), as the need to remove and then reapply paint or coating is eliminated. Over time, this provides you with significant cost-savings, and, most importantly, your inspections will be chemical-free.

Part inspected with penetrant testing (visible red dye)



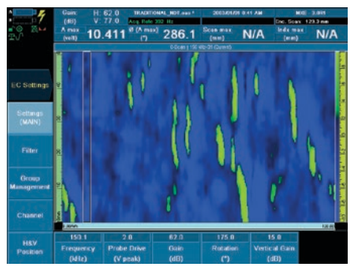
Scan using a standard ECA probe that features the same color representation as the red dye PT (patent rights protected). The sensitivity can be adjusted to reveal more or fewer defects.

Key Advantages:

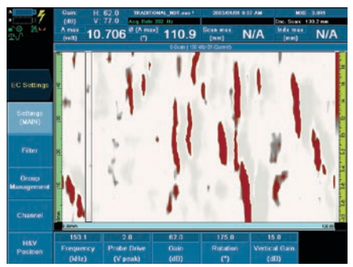
- No need for paint removal.
- Imaging and archiving.
- One-step inspection, high scan speed, and instant results.
- Major time-savings (typically 10:1 and over).
- Drastically reduced turnaround time.
- Defect depth evaluation capability.
- Adjustable sensitivity and post-process analysis.
- No chemicals required.

A Variety of Familiar Color Palette Choices, Offering More Possibilities

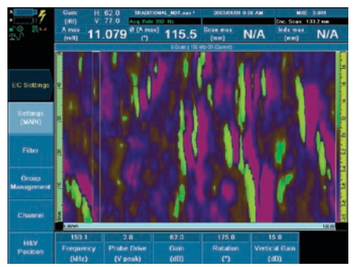
The MXE 3.0 ECA software features a range of patent-rights-protected color palette representations that replicate the look of traditional NDT methods and facilitate the intuitive display of ECA signals.



Penetrant testing (fluorescent)



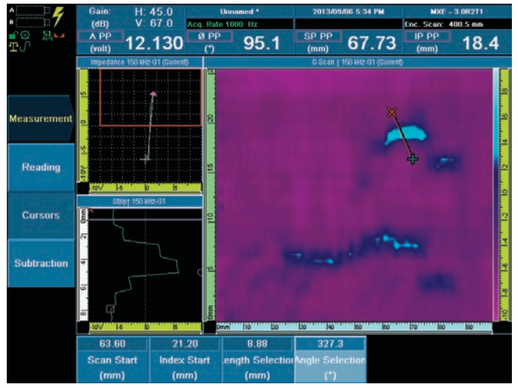
Magnetic particle (red powder)



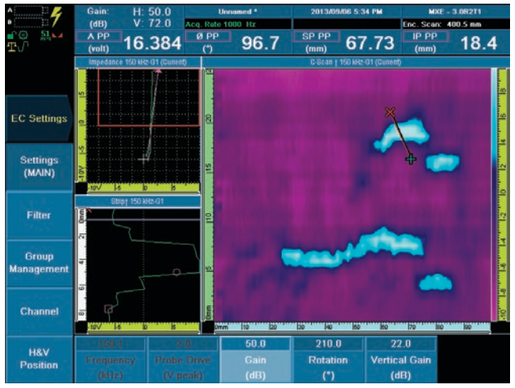
Magnetic particle (fluorescent)

Analyzing, Reporting, and Archiving
Confirm or Revisit Inspections after Completion

Even after an in-field inspection has been completed, the OmniScan® MX ECA flaw detector continues to provide value thanks to integrated data storage, analysis, and reporting functionalities. The instrument enables you to review individual indications and apply corrections as needed. The MXE 3.0 ECA software features newly redesigned, intuitive data cursors that can be operated directly from the instrument (on site) or with a mouse connected by USB (office use).



New MXE 3.0 selection cursors are intuitive and enable you to quickly select any indication.

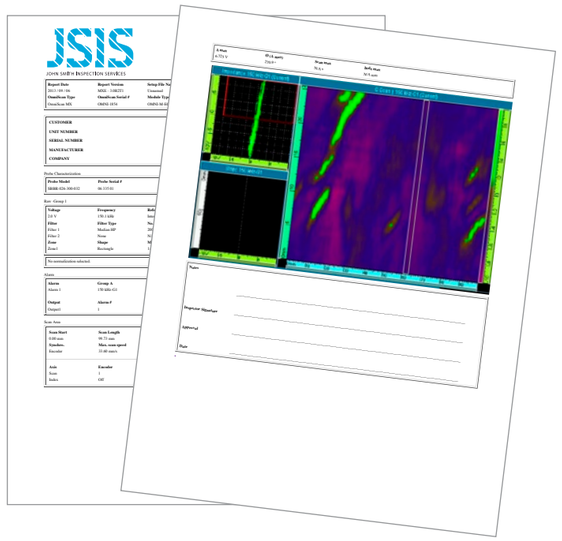


Corrections can be easily done on recorded data. The above example shows gain (contrast) adjustment.

Instant Reporting and Easy Archiving

The OmniScan MX flaw detector features built-in reporting at the touch of a key. Reports can also be configured and customized by advanced users. However, the factory-default report format already includes a screen shot and carefully selected, preloaded data fields that aim to eliminate the need for customization.

Archiving inspection data files is also very easy; at any time (during acquisition or analysis), a single press of a key will instantly store the data on the instrument's memory card.



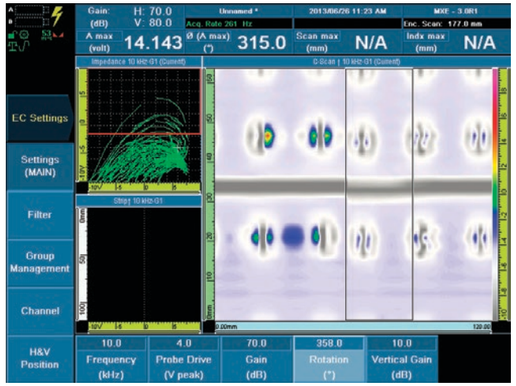
Perform data analysis quickly and efficiently with mouse input. Archive files to a PC using a compact flash reader.

OmniScan MX in ECT Mode, a Powerful Flaw Detector

The Power of ECA and ECT Combined

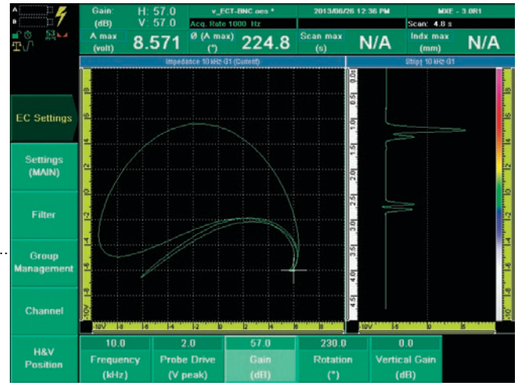
Some inspection procedures may specifically require ECT while ECA can easily help you save time and find problem areas. With the OmniScan® MX ECA flaw detector, you don't need to commit to just one technology at the start of an inspection. Pressing and holding the menu key anytime during an inspection enables instant switching between ECA and ECT modes. Both probes can remain connected and configuration setups remain active.

Simultaneously connecting of ECA and ECT probes provides the best tool for the job without the need to stop and reconfigure your hardware setup.



ECA interface (blue) is as easy to use as the ECT mode or a NORTEC 600 flaw detector.

Press and hold menu key…

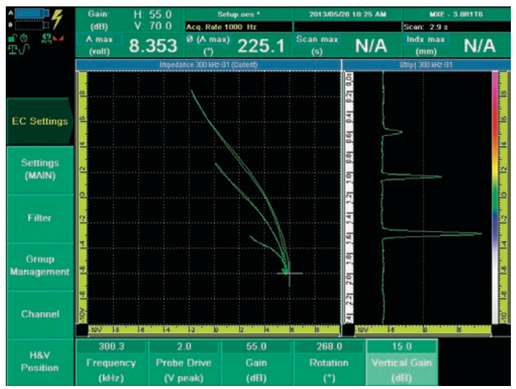


ECT interface (green) includes several features for procedure compatibility, such as an adjustable null position.

High-Quality Signals, Existing Probes

The OmniScan MX flaw detector in ECT mode includes a high-quality signal digitizer and all-digital signal processing chain for minimal signal loss or distortion. This, combined with its bright, large display, makes the instrument in ECT mode an excellent ECT flaw detector, displaying high-quality signals.

The OmniScan MX flaw detector in ECT mode also enables most NORTEC® ECT probes to be used through the use of new cables and adaptors.

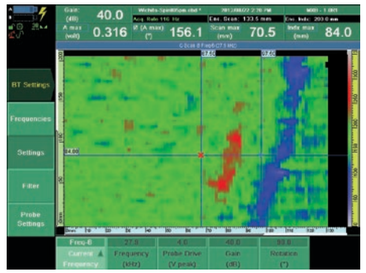


Bond Testing Imaging

Ready for the Composite Era

As composite materials are increasingly engineered into structural and critical components, validating their integrity beyond traditional tap testing has become a necessity. By offering the ability to drive Olympus BondMaster® pitch-catch probes, both of the OmniScan MX modules help meet this rising demand.

The use of bond testing (BT) technology on the OmniScan MX ECA/ECT instrument is made possible by the shared similarities between BT and ECT technologies. In addition to an Olympus X-Y scanning device, the BT C-scan mode requires an adaptor and the new MXB software (factory-loaded). This MXB software is dedicated exclusively to the bond testing C-scan and features the same user-friendly interface as the MXE software, which helps to minimize the learning curve.



For maximum detection, the MXB software features 8-frequency scanning and amplitude and phase C-scan display.

Olympus Solutions

We offer solutions that are tailored to specific applications and problems. Please visit www.olympus-ims.com regularly for the latest eddy current array, bond testing, and other innovative solutions.

Basic Specifications*

OmniScanMX1 [Q1000033]	
Overall dimensions (W × H × D)	321 mm × 209 mm × 125 mm (12.6 in. × 8.2 in. × 5.0 in.)
Weight	4.6 kg (10.1 lb), including module and one battery
Display	21 cm (8.4 in.) TFT LCD display, 800 pixels × 600 pixels, 16 million colors
Power supply	Smart Li-ion batteries (up to 2), and DC-in voltage 15 V to 18 V (min. 50 W)
Battery Life	Minimum 6 hours with two batteries; minimum 3 hours per battery under normal operating conditions
Data storage	Compact flash card, most standard USB storage devices, or through fast Ethernet, internal 32-MB DiskOnChip
I/O ports	3 USB ports, video output video out (SVGA), ethernet 10/100 Mbps, 2-axis encoders, 4 digital inputs (TTL).
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
MX Module Compatibility	
OMNI-M1-ECA4-32 [Q2700052]	Supports eddy current arrays, conventional eddy current, and bond testing C-scan (adaptors not included)

Online Videos

Watch the OmniScan MX ECA product demonstration video, and training videos, at www.olympus-ims.com

ECT/BT and ECA modules	
Connectors	BNC Absolute Probe (ECT), 4-channel Universal Fischer 19 pins (ECT and BT), and OmniScan connector for ECA probes
Number of channels	1 to 4 (ECT); 32 (ECA), expandable up to 64 with external multiplexer; 1 (BT) with adaptor
Probe compatibility	Absolute, differential, bridge, reflection (driver-pickup) for both ECT and ECA probes; supports select BondMaster pitch-catch probes through use of an adaptor (scanner also required)
Probe recognition	Automatic probe recognition and setup for ECA and BT probes
Frequencies	2 typical for most ECA and ECT setups or up to 8 on custom ECT applications or bond testing C-scan
Operating frequency	20 Hz to 6 MHz
Maximum voltage	12 Vp-p into 10 Ω
Gain	ECT and ECA: 34 dB to 74 dB. BT: 28 dB to 68 dB; additional adjustable software gain of 0 dB to 30 dB
Phase rotation	0° to 360° with increments of 0.1°
Acquisition (measurement) rate	1 Hz to 15 kHz, variable depending on configurations.
A/D resolution	16 bits
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	True automatic mixing, sensitivity normalization, and encoder calibration
Encoders	Time-based, one-line scan or raster scan (2 axis)
Alarms	3 alarms, each configurable as Pie, Box, Ring/Circle; alarm output as visual, TTL, and sound
Analog outputs	Yes - one channel only

* For a complete list of the OmniScan MX flaw detector and the ECT/ECA/BT specifications, please download the OmniScan MX and OmniScan ECA module product manuals found at www.olympus-ims.com.

Cables and Adaptors Ordering Information

Part Number	Item Number	Description
F19-L16	U8779805	Universal NORTEC® 16-pin LEMO® adaptor
COS-TF-6	U8800284	Probe cable, Triax connector, bridge configuration
CROS-TF-6	U8800411	Probe cable, Triax connector, reflection configuration
COS-7L-6	U8801390	Probe cable, PowerLink (7-pin LEMO) connector
CROS-MSE-6	U8800654	Probe cable, dual Micro-dot connectors, reflection configuration
COS-4F-6	U8800282	Probe cable, 4-pins Fischer connector, bridge configuration
OMNI-A-OBTC	U8779469	Bond Testing adaption kit for OmniScan ECA/ECT, adaptor, and MXB software

Product availability varies by region. Please contact your local Olympus sales office for additional information.

OmniScan_MX_EN_201802 • Printed in the USA • P/N: 920-270-EN Rev. B