



## MIZ<sup>®</sup>-21B

### The Most Powerful Handheld Eddy Current Tester

#### FEATURES & BENEFITS

##### ▶ Wheel Bead Seat Inspection

Early crack detection allows you to repair or replace damaged wheels before bigger problems develop. With Zetec's Bead Seat Probes, you can inspect this region with only one pass around the wheel, greatly increasing throughput.

##### ▶ Airframe Fastener Row Inspection

Rapidly detect longitudinal fatigue cracks between fastener holes, such as at lap splices, with the MIZ-21B and the Reflection (Driver-Pickup) Sliding Probe.

##### ▶ C-scan Display for Fastener Holes

The C-scan display is a unique way to present the "big picture" in fastener hole inspection. This method works exceptionally well with an indexing rotating scanner when fasteners are removed.

##### ▶ Probe Optimization

The MIZ-21B also includes a Probe Plot feature that plots probe response to both the test and reference specimens over a range of frequencies. This feature helps you choose the probe's optimum operating frequency for each application.



#### Superior Flaw Detection and Faster Aircraft Inspections

Take advantage of the reliable eddy current technology in a convenient handheld package that gives you more ways to find more defects in less time. Test for cracks, corrosion, heat damage, and more. Dual frequency capability and digital conductivity testing are included in the MIZ-21B.

The MIZ-21B incorporates the power of dual-frequency testing, digital conductivity testing, and nonconductive coating thickness measurement. Its industry standard 50-ohm probe drive provides the optimum balance between probe input and instrument output. Yet it's priced to provide excellent value when you need a dedicated eddy current instrument.

The MIZ-21B has seven different eddy current data display modes. Choose XY Impedance Plane, Bar Graph, Triggered Sweep, Auto Sweep (slow or fast), C-scan, and digital conductivity. For rapid analysis, the dual display feature can present signals side-by-side in sweep and XY modes. Or, you can view a reference signal and a live test signal simultaneously.

The MIZ-21B's dual-frequency mixing capability suppresses undesirable variables to let you more easily identify and size flaws. Digitally mark up to 10 display points on the screen. Signal size is identified as a percent of screen height using the ruler on the electronic graticule.

# MIZ<sup>®</sup>-21B

## The Most Powerful Handheld Eddy Current Tester

### Specifications

#### Case

- Dimensions: 11 L x 5 W x 2.5 D inches (28 x 13 x 6 cm)
- Weight: 3.9 lb (1.7 kg)

#### Power

- Batteries: internal, rechargeable, memory-free long-life nickel metal hydride (NiMH)
- 12-hr operation without additional accessories; more than 9 hours with backlight on
- On-screen message area for low battery and signal saturation
- Less than 2.5-hr quick charge
- Universal charger power input: 85-264 VAC / 47-63 Hz
- Optional external 12 VDC alkaline battery power pack

#### LCD Display with Backlight

- 240 x 320 pixels
- 2.25 x 4.50 inches (5.7 x 11.4 cm)
- Fast-responding, high-contrast
- Wide viewing angle (60°)
- Extended temperature range maintains clear visibility and speed at temperatures below freezing
- Backlight with long-life LED
- Operates in total darkness
- Maintains full contrast in brightest sunlight
- High-strength polycarbonate window with scratch-resistant coating

#### Inputs/Outputs

- Remote Connector (serial port) for PC interface, supports:
- Printing via Hewlett-Packard, Epson emulation, or Seiko DPU-414 Type II thermal printer
- Screen capture to PC
- Store or recall test configurations to PC
- Software revision updates
- Selectable horizontal and vertical analog outputs
- Probe Connector – auto-switches to interface with all standard probe configurations
- Battery Connector – charging and external power

#### Environmental

- Operating temperature range: 14° to 131°F (-10° to 55°C)
- Storage temperature range: 0° to 140°F (-17.7° to 60°C)
- Humidity: 0 to 100% noncondensing

#### Certification

- MIL-STD-810
- CE Mark
- ISO 9001

#### Flaw Detection

- Programmable analog drive and gain stages
- Noise-suppressing synchronous demodulation circuitry
- 16-bit A/D converter
- High-gain analog circuitry

#### Display Modes

- XY Impedance Plane
- Bar Graph
- Triggered Sweep
- Auto Sweep Slow
- Auto Sweep Fast
- C-scan (Plotted Waterfall)
- Screen data clearing is manual (CLR button) or automatic (variable persist mode)
- 2-signal display can show two signals side-by-side in sweep and XY modes

#### Scanner Support

- Supports HS Scanners
- Support for other manufacturers' scanners is available, consult Zetec for details

#### Memory

—Non-volatile (data retained with power off):

- Stores 50 test configurations
- Stores 10 screen images for review or comparison
- 8-second buffer memory: adjustable cursor scrolls through entire data buffer to select a range of data points for more in-depth review
- Stores up to 10 reference points

#### Conductivity Testing/Metal Sorting

- Conductivity and coating thickness measurement at 4 frequencies: 60, 120, 240 and 480 kHz
- Digital readout in 1 to 102 %IACS (0.5 to 70 MS/m)
- Meets BAC 5651 requirements

#### Autoset Phase/Autoset Gain

- Quickly and automatically set values for probe drive, gain, scale, and rotation. Autoset Phase sets the rotation so that the lift-off signal deflects horizontally to the left from the reference signal.

#### Frequency

- 50 Hz to 8 MHz
- 2 independent frequency selections to support dual frequency testing

#### Phase

- Manually adjustable in one- and ten-degree steps from 0° to 359°

#### Gain Adjustment Range

- Vertical and horizontal scale independently adjustable from 1 to 99

#### Probe Drive

- Adjustable to six output drive levels
- 50-ohm probe drive (industry standard) provides optimum balance between probe input and instrument output

#### Filters

- Adjustable high-pass, low-pass, and bandpass filters
- On-screen numeric read-out of cutoff frequency

#### Alarms

- Audio alarm with adjustable volume
- Visual LED alarm
- Alarm area is shown on the display; alarm box size and positioning are independently adjustable
- Alarms can be set for all display modes, as well as for conductivity limits
- In XY, YT, and Bar Graph display modes, alarm can trigger either inside or outside of the gated area
- TTL, visual, and adjustable audio output alarms are provided
- Headphone outputs

#### Probe Configuration

—Internally switches to interface with all standard probe configurations

- Single
- Differential (selectable internal or external balance load for single-coil operation)
- Reflection (Driver-Pickup)
- Differential Driver-Pickup



Zetec holds ISO 9001 and ISO/IEC 17025 certifications



— **MIZ<sup>®</sup>-21C** —

The Most Advanced Handheld With Surface Array Capability

**TRULY AFFORDABLE  
EDDY CURRENT**



# Truly Affordable Eddy Current

Introducing MIZ<sup>®</sup>-21C, the most advanced handheld instrument with surface array capabilities. The truly affordable MIZ-21C is ideal for aerospace, oil & gas, manufacturing and power generation applications. Its ergonomic design, long battery life and intuitive touchscreen mean you can inspect more areas faster than ever without fatigue. The MIZ-21C is compatible with a wide range of probes and scanners and comes in three models to meet your unique inspection needs and budget.

## Designed for a Wide Range of Applications.

MIZ-21C delivers an inspection advantage across numerous inspection applications including:

**Detecting Cracks Near Fastener Holes.** Pencil probes are ideal for detecting small cracks in close proximity to fastener holes. The inspector uses a known crack or notch standard to set up the MIZ-21C signal display. Then, while scanning the test piece, the inspector can estimate the depth and length of surface cracks by comparing the phase and amplitude of the generated eddy current signal to the standard's signal.

**Multi-Layer Corrosion Inspection.** Identifying corrosion is one of the most critical and complex aspects of airframe inspections. Changes in skin thickness as well as varying multi-layer structures usually make it difficult to recognize signals. The MIZ-21C has the power to penetrate thick sections. Exceptional signal-to-noise ratio helps inspectors distinguish even a small loss of material. Dual-frequency with mixing nearly eliminates the unwanted signals caused by varying air gaps between layers that can "mask" the signal of interest.

**Conductivity and Coating Thickness Measurement.** Use digital conductivity measurements (resistivity) to characterize/sort materials. Directly measure the conductivity of metals and alloys, such as aluminum structures, using dedicated conductivity probes that have a broad operating frequency range. Or measure a nonconductive coating such as paint. The MIZ-21C offers a wide measurement range for both conductivity and thickness.

## Save Time & Money.

MIZ-21C is a fast, highly portable and cost-effective replacement for Liquid Penetrant Testing (PT) and Magnetic Particle Testing (MT) inspections. The surface array option can reduce inspection time by up to 95% versus pencil probes. MIZ-21C's intuitive touchscreen and simple, yet powerful embedded software gets users inspecting in no time, offering quick set-up and hassle-free operation.

## Inspect More Areas.

The MIZ-21C is designed for user comfort. It can be held for twice as long as other Eddy Current portable devices. The small form factor enables users to inspect hard-to-reach areas and components that other instruments can't. MIZ-21C brings the power of surface array to places it has never been before.

## Improve Flaw Detection.

MIZ-21C features an industry-leading signal quality providing up to 25% better flaw detection capability. When coupled with surface array, users can be confident that MIZ-21C will deliver the most thorough inspection in its class.

# Specifications

Specifications in this document are subject to change

FEATURE	
Size (H × W × D)	267 × 122 × 38 mm (10.5 × 4.8 × 1.5 in)
Weight (including batteries and cover)	1.13 kg (2.5 lb)
Multi-Touch Display	5.7 in (480 x 640 pixels)
Battery Life	8 hr per charge
Cooling	Sealed and fanless
Eddy Current Connector	18-Pin Lemo
Eddy Current Array Connector	26-Pin Lemo
Connectivity	USB 2.0, Wi-Fi, Bluetooth
Encoders	2 axes, quadrature
Probe Recognition and Setup	Automatic, Zetec Coil ID Chip
Coil Inputs	MIZ-21C-SF: 1, MIZ-21C: 1, MIZ-21C-ARRAY: 3
Frequencies Per Timeslot	MIZ-21C-SF: 1, MIZ-21C: 2, MIZ-21C-ARRAY: 2
Data Channels	MIZ-21C-SF: 32, MIZ-21C: 64, MIZ-21C-ARRAY: 192
Maximum Probe Coils	MIZ-21C-SF: 2, MIZ-21C: 2, MIZ-21C-ARRAY: 32
Frequency Range	5 Hz to 10 MHz
Generator Output	Up to 19 Vpp
Injection Modes	Continuous and Super-Multiplex
Receiver Gain	10 – 53 dB, 43 dB range
Data Resolution	16 bits
Acquisition / Sampling Rate	Up to 25,000 per second
Probe Drive	50 Ohm
Filters	Adjustable CC, Median, High Pass, Low Pass, Bandpass, Spike
Alarms	Adjustable Box, Audio adjustable volume, Headphone support
Conductivity Frequency	60, 120, 240 and 480 kHz
Conductivity Specification	Digital readout in 0.9 to 110 %IACS (0.5 to 70 MS/m), Accuracy within ±0.5% IACS from 0.9% to 65% IACS and within ±1.0% of values over 65%
Non-Conductive Coating Thickness	Can measure non-conductive coating thickness from 0 mm to 1.000 mm. Accuracy of 0.025 mm (±0.001 in.) over a 0 mm to 0.64 mm range
Rotating Scanner	MIZ-21C-SF: No, MIZ-21C: Yes, MIZ-21C-ARRAY: Yes Zetec Rotating Scanner, Others
Maximum Data File Size	60 MB
Languages	English, Spanish, French, German, Chinese
Storage	8 GB SSD Internal, Any size through USB expansion
Instrument Calibration	Compliant with ISO 15548-1 / EN 61010-1

# Smart Features

## MIZ-21C is Packed With Features for an Inspection Advantage.

- **Surface Array in a Handheld.** Cost-effective, highly portable solution that delivers significant advantages over Liquid Penetrant Testing (PT) and Magnetic Particle Testing (MT).
- **Increase Uptime, Wherever You Go.** Features a minimum eight-hour battery life so users can operate the unit for an entire shift without recharging.
- **Ergonomic Design.** Small, lightweight and comfortable to handle in tight spaces. MIZ-21C minimizes arm fatigue common with other portable instruments.
- **Intuitive Touchscreen.** Quickly rotate, zoom and pan using the two finger capacitive display. The onscreen keyboard further increases user efficiency.
- **Universal Symbol Buttons & Multi-Language Software.** One model for worldwide use and deployment. Universal symbol buttons handle all functions and are ideal for gloved inspections.
- **Flexible Connectivity.** Interface and transfer files through USB, Wi-Fi, and Bluetooth technology.
- **Built for Demanding Environments.** Fully sealed and temperature rated for most outdoor conditions. Drop and vibration tested for rugged use.
- **Standard ¼-20 Fitting.** Connect thousands of off-the-shelf accessories for expanded functionality.

## AVAILABLE IN THREE MODELS

Feature	MIZ-21C-SF	MIZ-21C	MIZ-21C-ARRAY
Conductivity	✓	✓	✓
Single Frequency	✓	✓	✓
Dual Frequency		✓	✓
Rotating Scanner		✓	✓
Eddy Current Array			✓

## COVER WITH STAND INCLUDED!

Removable cover with adjustable hand straps and stand is included with all models for added protection, convenience and extended operation.



# Adaptable to Meet Your Needs

MIZ-21C offers a range of accessories designed to meet your specific inspection needs.

## ZM-5 Rotating Scanner for Small Diameter Holes.

Zetec's ZM-5 High-Speed Scanner is a convenient handheld tool designed for rapid and thorough inspection of small diameter holes, such as bolt hole and fastener holes. With an ergonomic design, the ZM-5 enables inspection of the hardest to reach areas. A rotating transformer couples the eddy current signals for an improved operating life over conventional slip rings. The ZM-5 uses a quick-disconnect cable design for easy replacement. Through adapters the MIZ-21C can drive other manufacturers' rotating scanners.

## Surf-X™ Array Probes for Faster Flaw Detection.

Introducing the Zetec Surf-X line of surface array probes. Featuring a unique flexible circuit design and proprietary X-Probe™ technology, Surf-X array probes can lower total cost of ownership while providing excellent data quality as well as faster, safer inspections when compared with other inspection methods.



**Inspecting Corrosion or Cracking in Pipes, Pressure Vessels, or Tanks.** Surf-X flexible array probes can conform to gradual changes in the geometry of pipes, pressure vessels, or tanks to detect surface and sub-surface flaws in a variety of materials including aluminum and stainless steel. Corrosion is a common flaw in non-pressurized components, while stress corrosion cracking is common in components subjected to sustained tensile stress in a corrosive environment. The Surf-X array probe can easily detect the locations of both types of defects using the high precision embedded encoder to track position.

**Assessing and Sizing Cracks in Raised Welds and Friction Stir Welds.** Surf-X flexible array probe can also conform to geometry changes associated with raised welds to simultaneously inspect for axial and transverse cracking in the weld cap, toe, and heat-affected zones. Surf-X array probes use position indicators on the probe to help with alignment to ensure the entire area of interest is inspected. The flexible nature of the Surf-X array probe allows for the inspection of flat surfaces including friction stir welds. The long-life wear surface has been tested to 10,000 ft, and is an inexpensive field replaceable component.



Small size. Easy to hold.

## General Specifications

Voltage: 100 to 240 VAC, Auto-Switching

Frequency: 50 to 60 Hz

Output Voltage: 15 VDC

Maximum Power: 40 W

IP Rating: Tested to IP-64

Operating Temperature Range: -10°C to 45°C (14°F to 113°F)

Storage Temperature Range: -20°C to 70°C (-4°F to 158°F)  
(w/out batteries)

Relative Humidity: 95% non-condensing

CE mark is an attestation of the conformity with all applicable directives and standards of the European Community. WEEE, RoHS.

## Accessories Ordering Information

### **111A801-00 - ZES-ADP-MIZ-21C\_26-PIN\_TO\_26-PIN\_SURF-X\_ARRAY\_PROBES**

6 ft detachable cable from MIZ-21C 26-Pin Lemo to 26-Pin Lemo Surface Array Probe

### **111A802-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_12-PIN\_GE\_SCANNER**

6 ft detachable cable from MIZ-21C 18-Pin Lemo to 12-Pin Lemo Rotating Scanners

### **111A803-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_16-PIN\_OLYMPUS\_SCANNER**

6 ft detachable cable from MIZ-21C 18-Pin Lemo to 16-Pin Lemo Rotating Scanners

### **111A804-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_MICRODOT\_PROBES**

6ft detachable cable from MIZ-21C 18-Pin Lemo to Coaxial Microdot Probes

### **111A805-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_TRIAX\_PROBES**

6 ft detachable cable from MIZ-21C 18-Pin Lemo to Triaxial Fischer Probes

### **111A806-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_3-PIN\_ZETEC\_PROBES**

6 ft detachable cable from MIZ-21C 18-Pin Lemo to 3-Pin Zetec Probes

### **111A807-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_4-PIN\_FISCHER\_PROBES**

1 ft detachable cable from MIZ-21C 18-Pin Lemo to 4-Pin Fischer Probes

### **111A810-00 - ZES-ADP-MIZ-21C\_18-PIN\_TO\_18-PIN\_ZETEC\_SCANNER**

6 ft detachable cable from MIZ-21C 18-Pin Lemo to 18-Pin Lemo Zetec Rotating Scanners

## Environmental Tests

As per MIL-STD-810G

Cold Storage - 502.5 procedure I

Cold Operation - 502.5 procedure II

Heat Storage - 501.4 procedure I

Heat Operation - 501.4 procedure II

Temperature Shock - 503.5 procedure II

Vibration - 514.6 procedure I

Transit Drop - ISTA 1G

Drop Test - 516.6 procedure IV, 1.2 m (4 ft) with cover

**Specifications included in this document are subject to change.**

## Ordering Information

### **111A901-00 - ZES-HHT-MIZ-21C-SF**

Fully integrated single frequency handheld Eddy Current system featuring 1 input and 32 active channels on up to 2 coil probes. Supports Conductivity. System purchase includes: MIZ-21C unit, 6 batteries, 1 AC adapter, 1 cover with stand, 1 USB flash drive with certification and user manual, and 1 hard carrying case.

### **111A902-00 - ZES-HHT-MIZ-21C**

Fully integrated dual frequency handheld Eddy Current system featuring 1 input and 64 active channels on up to 2 coil probes. Supports Conductivity and Rotating Scanner. System purchase includes: MIZ-21C unit, 6 batteries, 1 AC adapter, 1 cover with stand, 1 USB flash drive with certification and user manual, and 1 hard carrying case.

### **111A903-00 - ZES-HHT-MIZ-21C-ARRAY**

Fully integrated dual frequency handheld Eddy Current system featuring 3 inputs and 192 active channels on up to 32 coil probes. Supports Conductivity, Rotating Scanner, and Surface Array. System purchase includes: MIZ-21C unit, 6 batteries, 1 AC adapter, 1 cover with stand, 1 USB flash drive with certification and user manual, and 1 hard carrying case.

### **111A904-00 - ZES-HHT-MIZ-21C-SF\_WIRELESS\_LOCKED**

Wireless locked version of MIZ-21C-SF.

### **111A905-00 - ZES-HHT-MIZ-21C\_WIRELESS\_LOCKED**

Wireless locked version of MIZ-21C.

### **111A906-00 - ZES-HHT-MIZ-21C-ARRAY\_WIRELESS\_LOCKED**

Wireless locked version of MIZ-21C-ARRAY.



FOR MORE INFORMATION ABOUT MIZ-21C OR OTHER ZETEC PRODUCTS CONTACT US AT [info@zetec.com](mailto:info@zetec.com) OR VISIT [www.zetec.com](http://www.zetec.com).

## MIZ<sup>®</sup>-28

### Eddy Current Inspection For Heat Exchanger Tubing

#### FEATURES & BENEFITS

- ▶ **Combines both** multiplexed and simultaneous injection (SI) technologies into one box
- ▶ **Easy-to-use controls** with built-in language selection
- ▶ **Automatic voltage switching**
- ▶ **Optional RFT Amplifier** supplies the high drive voltages that generate the stronger magnetic field necessary to find flaws in magnetic tubing
- ▶ **500 GB internal hard drive** provides mass storage of recorded inspection data
- ▶ **Included USB portable flash drive** lets you easily store, transfer, and carry your data. PC compatible USB 1.1/2.0
- ▶ **Data files are compatible** with EddyNetPC/AN, EddyNetSuite Analysis, ET Analysis for Windows, or Velocity<sup>®</sup>/AN Software
- ▶ **Supports test plans** created with Zetec's EIMS-BOP, EddyNetPC/DM, or Velocity/DM software that plans, tracks, and provides professional reports of the inspection
- ▶ **Supports the Zetec High Speed 3D Probe Pusher** with optional conduit gun using a Model III Probe Pusher Control system
- ▶ **Rugged enclosure** ideally suited for heavy-duty use



#### High-Speed, High-Efficiency

Zetec's MIZ<sup>®</sup>-28 delivers more technology and performance for high-speed, high-efficiency inspection of heat exchanger tubing. Its data management features lead the industry with more on-board data storage and easy file transfer. And the MIZ-28 supports existing Zetec equipment and software already deployed for eddy current inspections.

The MIZ-28 combines both multiplexed and simultaneous injection (SI) technologies into one box that tests most tube materials including magnetic alloys such as carbon steel. Testing with multiplexed frequencies provides the best detection capabilities—from surface cracks to deep flaws—with speed

and reliability. Simultaneous injection eddy current technology offers the highest testing speeds and supports remote field testing (RFT).

Data files acquired with the MIZ-28 can be transferred to a computer for analysis with Zetec's EddyNetPC/AN, EddyNetSuite Analysis, ET Analysis for Windows, or Velocity<sup>®</sup>/AN software. You can easily import test plans created with Zetec's EIMS-BOP, EddyNetPC/DM, or Velocity/DM software that plans, tracks, and provides professional reports of the inspection. The MIZ-28 also supports the Zetec High Speed 3D Probe Pusher with optional conduit gun using a Model III Probe Pusher Control system.

# MIZ<sup>®</sup>-28

## Eddy Current Inspection For Heat Exchanger Tubing

### Specifications

**Test Method:** Multifrequency electromagnetic testing in multiplexed and simultaneous injection (SI) modes.

- **Multiplexed mode**—Supports 4 test frequencies.
- **SI mode**—Up to 4 frequencies or up to 8 coil pairs (number of test frequencies depends on number of boards installed and coils being used)

**Weight:** 16.0 lb (7.3 kg)

**Dimensions:** 8.0H x 11.5L x 13.5D in. (20.3 x 29.2 x 34.3 cm)

**Power:** 85 - 264 VAC 47 - 63 HZ 140 watts maximum, with all options

**Operating Temperature Range:** 32°F to 113°F (0°C to 45°C)

**Storage Temperature Range:** -40°F to 185°F (-40°C to 85°C)

**Frequency Range:** 5 Hz to 10 MHz

**Display:** Color 640 x 480 pixel (8.4-in.) active matrix display offers same resolution as computer monitor

**Drive:** 0 - 20 Vpp

#### Sample Rate - samples/second

- **Multiplexed mode**—Operator adjustable up to 15,600 s/s for 1 frequency; 3,900 s/s for 4 frequencies
- **SI mode**—Operator adjustable up to 15,600 s/s at 4 frequencies

#### Memory

- 500 GB internal hard drive
- Flash memory for configurations and firmware updates via USB key
- Non-volatile SRAM memory for storage of instrument settings

#### Data Recording

- USB Flash Drive, Magneto Optical Disk, Jaz Drive, Zip Drive
- 500 GB internal hard drive

#### User Interface Language Support

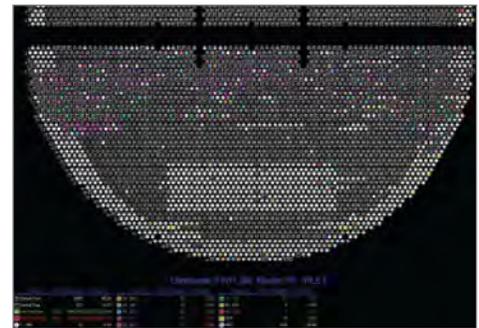
English, French, Italian, German, Spanish, others available by request

#### Input/Outputs

- Ethernet 10/100BaseT for network interface
- VGA—output display to VGA monitor or video output with external converter box
- RS-232—communication to Model III Probe Pusher Control
- USB for printer, keyboard, mass storage device

### Purchase includes

- MIZ-28 Eddy Current Test Instrument
- MIZ-28 Operating Guide (English)
- Calibration Certificate
- Bobbin Probe Adapter
- USB 16 GB Flash Drive
- USB Keyboard
- Power Cords (US and EU versions)
- Shipping Case
- 1 Year Warranty
- MIZ-28-8 Eddy Current Test Instrument supports up to 8 coil pairs



Zetec's Velocity/DM is inspection management software for organizing, tracking, and creating reports of eddy current inspection.

CURRENT TEST PLAN				
SOURCE: /ata0b/TEST_PLAN/water_box_2.TST				
ENTRIES: 20000				
ENTRY	TEST INFORMATION			
164	*8004	R001	T013	F/L
165	*8004	R001	T014	F/L
166	*8004	R001	T015	F/L
167	*8004	R001	T016	F/L
168	*8004	R001	T017	F/L
169	*8004	R002	T000	F/L
170	*8004	R002	T001	F/L
171	*8004	R002	T002	F/L
172	*8004	R002	T003	F/L
173	*8004	R002	T004	F/L
174	*8004	R002	T005	F/L
175	8004	R002	T006	F/L
176	8004	R002	T007	F/L
177	8004	R002	T008	F/L
178	8004	R002	T009	F/L
179	8004	R002	T010	F/L
180	8004	R002	T011	F/L

The MIZ-28 imports an inspection Test Plan and displays it for the operator.



Zetec holds ISO 9001 and ISO/IEC 17025 certifications



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Snoqualmie, WA 98065  
Toll Free: 800.643.1771  
P: 425.974.2700

GE  
Measurement & Control

# Mentor EM

More experience in every inspection.

Remotely collaborate with experts in real time. Introducing Mentor EM for eddy current weld inspection.



imagination at work

This powerful new technology makes eddy current weld inspections easier, more accurate, and faster. By allowing the workflows to be instantly accessible on the device, Mentor EM helps to ensure strict compliance with codes, guidelines, and standard practices.



## Transforming Nondestructive Testing

- Portable eddy current testing instrument with industry-defining signal-to-noise ratio
- Reduces need for paper and manuals
- Large, bright, high-definition touchscreen that can be used while wearing gloves
- No knobs, dials, or switches to mistakenly adjust during use
- Superior IP rating and rugged cast magnesium housing to withstand harsh work environments
- Multiple alarm gates, which can be set to color or sound, to warn of possible defects

### Specifications

Battery Size	62 watt-hours/air transport compliant
Battery Life	4 hours for most conditions 90-minute charge time Extended battery pack adds 6 hours
Generators	2 generators and 2 connectors 2 time slices max per generator 4 frequency simultaneous injection
Display	10.4" XGA 1024 x 768 Projected capacitive touch
Frequency Range	10 Hz–6 MHz
Sample Rate (max)	50 kHz
Receiver Gain	0–34 dB
Gain	0–120 dB in 0.1 dB steps
Drive Voltage	0.5, 1, 2, 4, 8, and 16 VPP
Gates Output	2 per channel
Alarm Outputs	2 total, TTL levels, one per input One LED on instrument face, audio through Bluetooth (headset protocol)
Operating Temperature	-20 to 55°C
Storage	8 GB SSD
Connectivity	Wi-Fi; 6 Bluetooth channels
Dimensions	2.5 kg without modules; 295 mm x 230 mm x 60 mm 2.9 kg with 2-probe connector module and connectivity module
Image Formats	BMP, JPG
Video Formats	MPEG 4, Type 10

# Workflow-On-Device



Workflow Launcher



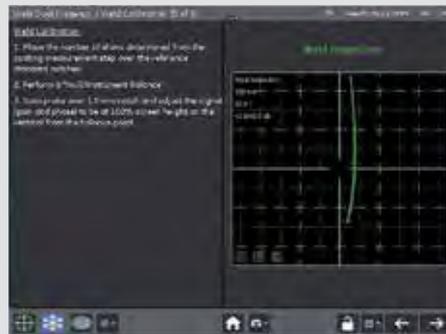
Workflow Description



Equipment Used



Picture/Video Instruction



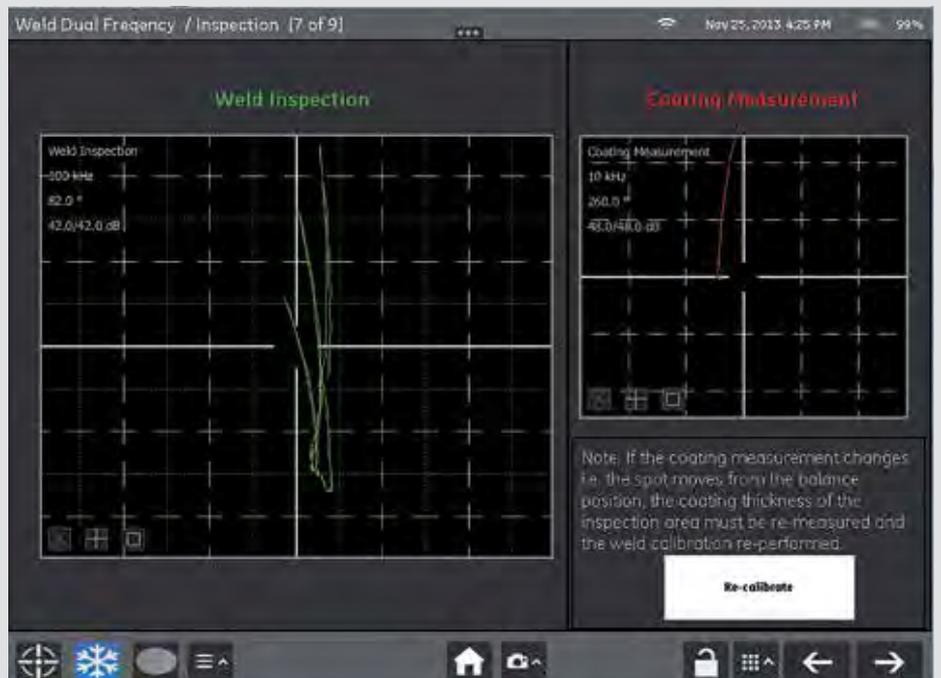
Calibrate for Weld



Calibrate for Paint Layer

## Instantly Collaborate and Access Information

- Connect to local network to share data and collaborate remotely with experts in real time
- Immediately download the most up-to-date procedures and workflows
- Bluetooth enabled



Perform Inspection

## Mentor Create Software

- Tailor on-device inspection workflow applications for technicians of all levels
- Aid inspectors by placing photos, procedures, and videos on device for reference while setting up, acquiring data, or analyzing data
- Limit range of adjustments available to the operator; and therefore limit the opportunity to make errors
- Use in “Expert Mode” as well as “Workflow-on-Device” mode



## Weld Probes for All Use Conditions

Straight Probes		Frequency	Cable Length		Disconnect
7/32" Straight		450 kHz–2.5 MHz	6"	632-267-002	Probe
			12"	632-267-012	
3/8" Straight		60 kHz–1.2 MHz	6"	632-266-002	632-266-008
			12"	632-266-012	
5/8" Straight		60 kHz–700 kHz	6"	632-265-002	632-266-009
			12"	632-265-012	
90° Tipped Probes					
7/32" inline, 1/4" drop		450 kHz–2.5 MHz	6"	632-267-102	632-267-108
			12"	632-267-112	
3/8" inline, 1/4" drop		60 kHz–1.2 MHz	6"	632-266-102	632-266-108
			12"	632-266-112	
5/8" inline, 1/4" drop		60 kHz–700 kHz	6"	632-265-102	
			12"	632-265-112	
5/8" 90°, 1/4" drop		60 kHz–700 kHz	6"	632-265-102	
			12"	632-265-112	
High-Wear Straight Probes					
3/8" High-wear (ceramic tip)		60 kHz–1.2 MHz			632-266-011
5/8" High-wear (ceramic tip)		60 kHz–700 kHz	6"	632-265-003	632-265-011
5/8" High-wear (SST)		60 kHz–700 kHz			632-265-018
High-Temperature Probes					
5/8" Straight Handle Length 6"		60 kHz–700 kHz			632-265-008

## Complete Line of Wide-Frequency Probes

Standard, high-wear, high-temperature, and cableized models for all job requirements



Straight



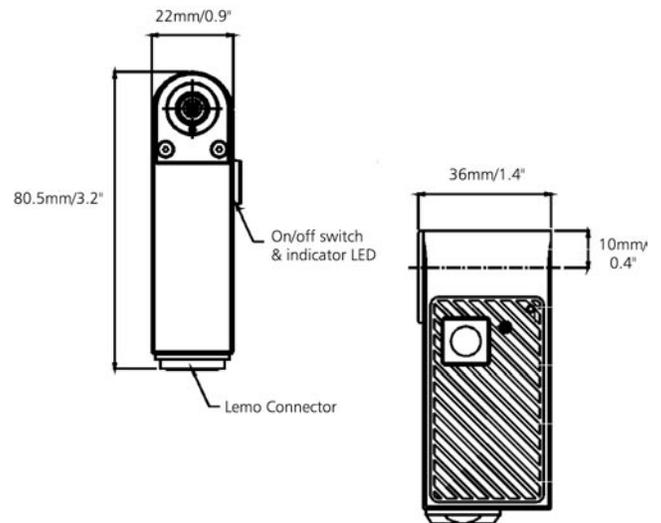
90° Inline Tip



90° Right Angle Tip

# Hocking MiniDrive

## Lightweight Rotating Probe Drive



### Flexibility

The GE Hocking MiniDrive is a small, lightweight, rotating eddy current probe drive. It has been designed to make the inspection of fastener holes in confined spaces simple and accurate. Its lightweight design (only 150 g/5 oz) prevents fatigue when a large number of fastener holes need to be inspected.

The MiniDrive utilizes a rotary transformer to allow transference of signals between the instrument and probe. Probe type used is generally a reflection differential.

Operating at a range of speeds from 600 rpm to 3000 rpm, over a frequency range of 200 kHz to 2.5 kHz, the MiniDrive offers the flexibility needed to satisfy a wide range of inspection requirements.

### Compatibility

The MiniDrive is compatible with the following Hocking instruments:

- Phasec 2200
- Phasec D62 and D62s
- Phasec 2s
- Phasec 2d

It can also be used with a range of eddy current instrument made by other manufacturers providing the correct adapter and cable is used.

### Specifications

**Weight:**

150 g (5 oz)

**Power:**

Supplied by instrument

**Dimensions:**

82 x 22 x 36 mm  
3.2 x 0.9 x 1.4"

**Clearance:**

11 mm/0.4" (Distance from top of case to centre of probe)

**Speeds:**

600, 1000, 1500, 2200, 3000 rpm

**Motor:**

12 V



# SIGMACHECK

FULLY FEATURED EDDY CURRENT CONDUCTIVITY METER



## SIGMACHECK

### APPLICATIONS

- Material Verification / Metal Sorting.
- Heat Treatment Verification.
- Heat or Fire Damage Investigation.
- Non-conductive Coating Thickness Measurement.
- Determining the Purity Composition of Materials. I.e. Gold Bullion and Coins, Bar Stock.
- Aircraft Structures. E.g. Paint Thickness Measurement
- Assessment of Ageing of Aluminium Profiles.

The SIGMACHECK Eddy Current Conductivity Meter is designed to give accurate conductivity measurements while offering the user the very best in reliability, usability, technology and cost-effectiveness.

The SIGMACHECK is extremely user friendly and can just as easily be operated by a semi-skilled Operator as by Experts. It will be equally at home in the Aerospace, Metals Processing, Casting, Maintenance and Quality Assurance industries as well as appealing to Heat Treatment Specialists and those determining the purity of materials such as gold bullion and coins.

# 1:1 IMAGE

## SIGMACHECK

This image shows the SIGMACHECK at its actual size.





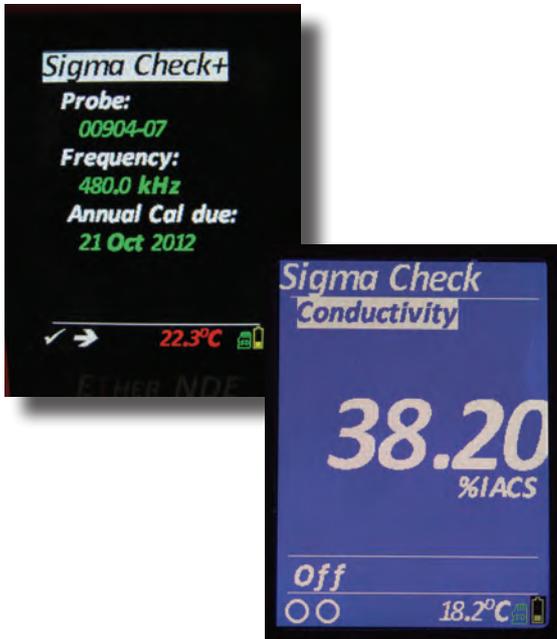
### ADVANTAGES

- High Resolution Colour Display (2.8", 320 pixels by 240 pixels).
- Accurate Conductivity Range (0.5% IACS to 110% IACS, 0.28-64 MS/m).
- Wide range of Frequencies for testing thin materials (60kHz, 120kHz, 240kHz, 480kHz). Option of 960kHz.
- Non-conductive Coating Thickness Measurement display up to 0.5mm.
- Lightweight (350 grams / 12 oz). Ergonomic Slim-Line Case design and easy to hold Probe with adjustable finger-grip.
- Two-Year Warranty on Instrument (excludes batteries).

### KEY BENEFITS

- User programmable display.
- 2GB of data storage. Able to store over one million data points.
- Uploaded data can be viewed using MS Excel.
- Intelligent charger via USB Port or AC Supply.
- Multiple languages available. E.g. English, German, French, Spanish.
- Excellent resistance to "edge effect".
- Rapid Display of Conductivity Results.
- Battery life (upto 6 hours).
- Firmware can be upgraded in field.
- Different probes may be configured by loading the appropriate probe map from SD Card.
- Real-time clock for time and date so that readings can be "stamped".
- Real-time PC control via USB or optional RS232 link.

## SIGMACHECK



### HIGH RESOLUTION DISPLAY

The full colour 2.8" LCD display screen is 320 x 240 pixels providing excellent resolution and displaying conductivity and lift-off results with up to three decimal places precision. The display features an adjustable LED backlight allowing the Operator to set their required screen brightness. The Operator can also customise both the background colours and text colours to meet their personal preference.

### RAPID DISPLAY OF CONDUCTIVITY RESULTS

The SIGMACHECK offers a choice of five frequencies (60, 120, 240, 480 and 960kHz) to allow the testing of a wide range of material thicknesses. The SIGMACHECK is noted for rapid display of conductivity results.

### EXCELLENT DATA REPORTING AND BATTERY LIFE

*ETher NDE* also offer Field Exchangeable Probes with their configuration provided via micro SD Card or PC download via USB for the SIGMACHECK. This removes the need for the Instrument to be sent back for matching with the Probe. By using a card reader or our PC Software, the new data for the Probe can simply be copied onto the SD Card in the Instrument, speeding up this process even further.

USB PC Connectivity is built into the SIGMACHECK for remote control and data logging. The USB Connection also offers real time data acquisition as well as eliminating any complicated driver installation. In addition, the USB Connection allows easy charging of the Instrument without having to swap the batteries.

### LIGHTWEIGHT AND ERGONOMICALLY DESIGNED

Weighing 350 grams (0.77 pounds) including batteries and measuring 163mm Long, 80mm Wide and 25mm Deep, the SIGMACHECK is compact and extremely lightweight. Housed in a sculpted case with a detachable flexible open-faced removable silicon rubber boot, the SIGMACHECK is designed to be fully hand-held. Further, the standard Probe has been designed to fit the hand well. Not only is the SIGMACHECK very accurate, its ergonomic design makes it a delight to use.



Electrical conductivity is the measurement of a materials ability to conduct an electric current. This is the inverse of electrical resistivity, measuring a materials ability to resist an electric current.

Conductivity in metal is established using Ohm's Law, which states that current through a conductor between two points, is directly proportional to the potential difference across the two points. The resistance of the material, which is a constant for that material, allows the usual mathematical equation for this relationship to be true.

### Ohms Law Equation:

$$I = \frac{V}{R}$$

**I = Current (Amps)**  
**V = Voltage (Volts)**  
**R = Resistivity (ohms)**

### Electrical Conductivity Equation:

$$\sigma = \frac{l}{RA}$$

**l = length (cm)**  
**A = Area (cm<sup>2</sup>)**  
**R = Electrical Resistance of a uniform specimen of the material (ohms)**  
 **$\sigma$  = Conductivity (ohm<sup>-1</sup> cm<sup>-1</sup>)**

OR

$$R = \frac{l}{\sigma A}$$

### Conductivity Test Block Holder.

Holds 5 Conductivity Test Blocks and 1 Dual Conductivity Reference Standard (Part number: ASIG003).



Conductivity is widely used to indicate material type and determine the state of heat treatment.

In order to give accurate readings the SIGMACHECK uses a three-point reference method. The first measurement with the probe in the air and then two further measurements are required which span the range of interest.

The SIGMACHECK is supplied with a detachable reference piece with two standards that span the range of commonly used metals.

*ETher NDE* also manufacture individual conductivity test blocks which may be used to match the clients own testing requirements. We can also provide a handy test block holder that can house up to five of these test blocks at any one time as shown above.

## SIGMACHECK

### STANDARD KIT



### OPTIONAL EXTRAS AVAILABLE

High-quality rugged transit case.



Small Probe (7mm) available.

Inspection Technology	Eddy Current.
Operating Frequencies	60 kHz, 120 kHz, 240 kHz, 480 kHz, 960 kHz.
Conductivity Range	0.5 % IACS to 110 % IACS, 0.28-64 MS/m
Accuracy	At 20 °C. At 10 % IACS: $\pm 0.1$ % IACS. At 100 % IACS: $\pm 0.5$ % IACS Over Range 0-40°C: At 10% IACS: $\pm 0.2$ % IACS. At 100% IACS: $\pm 0.8$ % IACS Probe in thermal equilibrium with metal.
Display Resolution	Up to 3 decimal places
Lift Off	13 mm probe compensated to 0.020" (0.5mm) 7 mm probe compensated to 0.010" (0.25 mm)
Temperature Measurement	In-probe sensor (accurate to 0.5 °C) Range 0 °C to + 50 °C
Automatic Temperature Compensation	Conductivity measurements are corrected to the 20°C value.
Environmental Range	0 to 95% relative humidity, 0°C to + 50°C for reliable operation
Display	2.8" (70mm) 320 x 240 pixels colour display. LCD with selectable backlight.
Construction & Storage	High impact, splash-proof, moulded UL94-5VA flame-retardant ABS case. Protective rubber boot to protect the unit, probes, probe cable, operator manual on USB, and removable stand.
Conductivity Standards	On top of unit. Removable for value verification, and when attached ensures thermal equilibrium.
Power	2 x 1.5 V AA NiMH Batteries, Approx up to 6 hrs life. Can also use non-rechargeable AA cells.
Size	163mm Long x 80mm Wide x 25mm Deep
Weight	350g (0.77 pounds) including batteries
Data Logger Memory	Removable 2GB micro SD Card allowing over 1 million readings to be stored.
PC Connectivity	USB port for charger and PC communications
Probes	12.7 mm diameter for 60 kHz to 480 kHz. 7 mm probe operates at 480 kHz & 960 kHz. Probes are interchangeable with simple operator resetting procedure. Probes are field exchangeable and do not require return to manufacturer for calibration.
Accessories	Settings Reference Blocks - A range of conductivity references standards traceable to US and European standards are available for in-field use. Up to five can be mounted on an aluminium anodised holding plate.

### PRODUCT PART NUMBERS

**KISIG001:** Kit, Instrument, SIGMACHECK Conductivity Meter.

**ASIG001:** Accessory, Dual Conductivity Reference Standards, Nominal Values 2.5% and 102% IACS (SIGMACHECK).

**ASIG002:** Accessory, Instrument Stand (SIGMACHECK).

**ASIG004:** Accessory. Hard Peli 1400 Case with custom shaped foam inserts (SIGMACHECK).

**PSIG001:** Probe, Conductivity, Dia 13.00mm, Straight, Lemo 5-Way (SIGMACHECK).

**ALL05-L05-012-SIG:** Accessory, Lead, 5-Way Lemo to 5-Way Lemo, 1.2m (SIGMACHECK).

**PSIG002:** Probe, Conductivity, Dia 7.00mm, Straight, Lemo 5-Way (SIGMACHECK)

EDDY CURRENT FLAW DETECTORS

# AEROCHECK SINGLE FREQUENCY

# AEROCHECK+ DUAL FREQUENCY



AEROCHECK - SINGLE FREQUENCY



AEROCHECK+ - DUAL FREQUENCY PLUS

- Large, Crisp Daylight Readable Display
- User Friendly Interface and Ergonomic Lightweight Design
- Rotary Capabilities As Standard
- Industry Standard Probe Connectors
- Eight Hour Battery Life
- Rapid 2.5 hour charging time
- Two-Year Warranty
- Advanced Features 'Loop', 'Guides' and 'Auto-mix' (AEROCHECK+ only)

# AEROCHECK AEROCHECK+

“ The AEROCHECK Flaw Detector offers the very best in Eddy Current performance with rotary inspection capabilities as standard. ”

## INDUSTRY STANDARD PROBE CONNECTORS

The AEROCHECK is able to use a wide range of eddy current probes meeting all the needs of the Aerospace Eddy Current Inspector. Absolute, bridge and reflection connected probes can use the industry standard 12 Way LEMO Connector and a LEMO 00 Connector is also provided for simpler connection of absolute probes.



## WIDE FREQUENCY RANGE

The single frequency AEROCHECK has a frequency range of 20Hz to 20MHz, whereas the dual frequency AEROCHECK+ offers 10Hz -12.8MHz, ensuring a diverse range of real world applications can be met.

**Area of Inspection: Fasteners**  
**Probe: Low Frequency, Slider**

## WORKS THE WAY YOU DO!



The AEROCHECK has the ability to work in left and right-handed mode; thanks to the “Auto Flip” function. This is not only helpful for left-handed

technicians but especially useful if the operator is inspecting in a restricted area like the Engine Mounts.

**Area of Inspection: Engine Mounts**  
**Probe: Surface**



**Window Frames**  
**Probe: High & Low Frequency, Rotary**

**Engine Blades & Discs**  
**Probe: High Frequency**

**Area of Inspection: Wing Surface & Hinges**  
**Probe: High & Low Frequency**

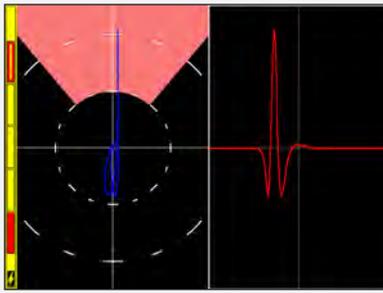
## LIGHTWEIGHT, RUGGED, “SURE GRIP” & ENHANCED PROTECTION

Weighing just 1.2kg (2.7lbs), housed in a tough aluminium alloy Mg Si 0.5 powder-coated outer case and fitted with rubber feet to aid grip, the AEROCHECK is as stable on a wing of an aircraft as it is on a laboratory bench.

Both Instruments have two integrated moulded “Sure Grip” handles on the rear of the case.

The AEROCHECK+ has enhanced durability through a fully-fitted, custom-designed outer “protective boot” and integral hand-strap for even greater ruggedness and easier grip in use (this is an Option on AEROCHECK).





**ROTARY CAPABILITIES AS STANDARD**

The AEROCHECK includes rotary capabilities as standard and can be used with the ETHER Mercury (mini) ARD002, Hocking 33A100 or the Rohmann MR3/SR1 and SR2 Drives (with special adapter cable).

**Area of Inspection: Door Access Points & Window Frames**

**Probe: Rotary**

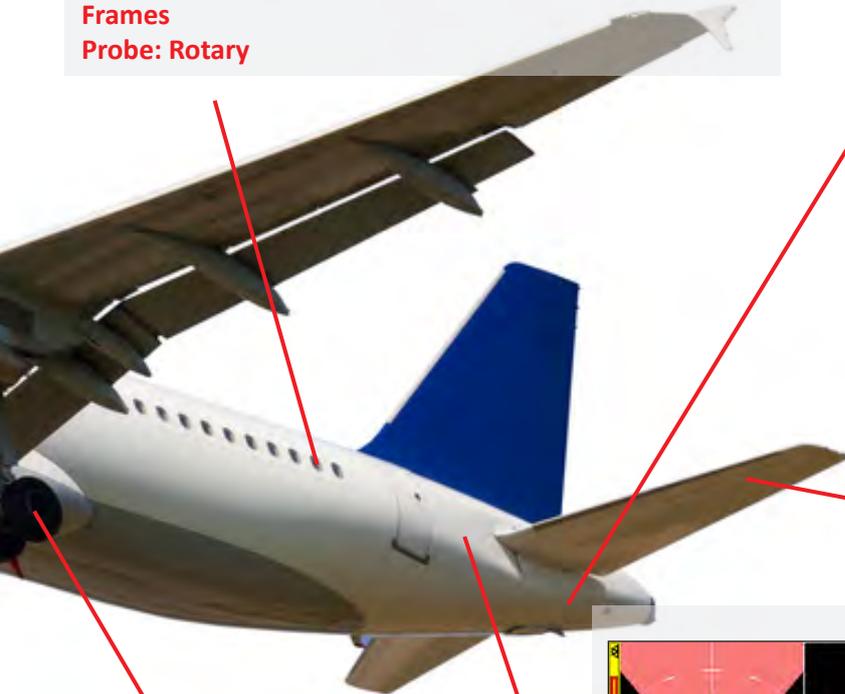
**DAYLIGHT READABLE, CLEAR, LARGE, CONFIGURABLE COLOUR SCREEN**

The AEROCHECK has a large 14.5cm (5.7 Inches) LCD Colour Screen of 640 x 480 pixels providing the Operator with excellent signal resolution and presentation and with the choice of configuring their own colour schemes and display types. It is easy to optimise the screen presentation regardless of the light conditions and it is possible to view a choice of up to two spot, time-base, waterfall or meter display types.

Not all NDT inspection on aircraft takes place in the comfort of an aircraft hangar so the daylight readable display is readily viewable outdoors.

**Area of Inspection: Bulkhead**

**Probe: Low Frequency**

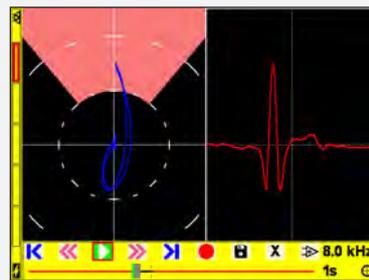


**Area of Inspection: Horizontal Stabilisers**

**Probe: High & Low Frequency**

**Wheels, Wheel Brakes, Landing Gear**

**Probe: High Frequency, Rotary**



**RECORD AND REPLAY**

Up to 164 seconds of live data may be recorded in real-time and then played back either on the instrument or on a PC. Using the desktop application ETHERAnalyser for subsequent analysis and review. The recorded data may be further optimised by adjusting many settings including phase, gain, filters, display and spot position.

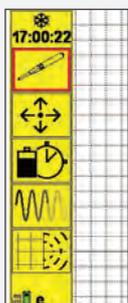
**Area of Inspection: Fuselage**

**Probe: Surface & Sub-Surface**

**EASY TO USE MENU & ICON SYSTEM**

The AEROCHECK menu system is simple and fast to navigate with the ability to add individually selectable soft key menu items to the sidebar as recognisable icons for rapid function access and a quick setting menu for easy set-up, review and adjustment.

With four operator-selectable soft keys and a fifth slot for the last menu function used, Technicians can quickly set up the system with their preferences. Each saved instrument setting can be associated with a unique, single press set of quick access soft keys. There are also two front panel hard keys that can be readily programmed for rapid single press access to frequently used functions.



Both the AEROCHECK and AEROCHECK+ are supplied with a standard “Two-Year Manufacturers Warranty”. This covers all components of the Instruments and only excludes customer damage or misuse.

The “Two-Year Warranty” can be extended to “Five Years” through purchase of “ETHERCover” extended warranty protection.

## SPECIFICATIONS

		AEROCHECK	AEROCHECK+
Probe	Connectors	12 Way Lemo 2b (Absolute, Bridge and Reflection) and Connection Lemo 00 (for single element absolute probes).	Simultaneous probe operation possible using Lemo 12 way and Lemo 00.
	Rotary	600-3000 rpm - ETHER Mercury Drive (ADR002), Hocking 33A100, Rohmann MR3, SR1 and SR2 Drive (special adapter needed)	
Frequency		Single Freq. = 20Hz – 20MHz with range variable resolution.	Dual Freq. = 10Hz - 12.8MHz
Gain	Overall Input Drive	-18 to + 100 dB, 0.1, 1 and 6dB steps (100dB maximum)	0dB or 12dB
	Max X/Y Ratio	0dB or 6dB (0dB reference 1mW into 50 ohm).	0dB, 6dB and 10dB (0dB reference 1mW into 50 ohm).
Phase	Range	0.0-359.9°, 0.1° steps	
	Auto Phase	Allows phase angle to be automatically set to a pre set angle	
Filters	Normal High Pass	DC to 2kHz or Low Pass Filter, which ever is the lower in 1 Hz steps. Plus variable adaptive balance drift compensation 0.01 - 0.5 Hz (6 steps).	
	Normal Low Pass	1Hz to 2kHz or a quarter of the lowest test frequency, which ever is lower in 1 Hz steps.	
Balance	Manual	14 internal balance loads; 2.2µH, 5.0µH, 6.0µH, 6.5µH, 7.0µH, 7.5µH, 8.2µH, 12µH, 15µH, 18µH, 22µH, 30µH, 47µH, 82µH	
	Automatic	Optimised balance load selection.	
Alarms	Box	Fully configurable, Freeze, Tone or visual.	
	Sector Output	Fully configurable, Freeze, Tone or visual. Open collector transistor (50v dc at 10mA max) available on 12 way lemo.	
Display	Type	5.7" (145mm), 18 bit Colour, daylight readable.	
	Viewable Area	115.2mm (Horizontal) x 86.4mm (Vertical)	
	Resolution	640 x 480 pixels	
	Flip	Manual or automatic screen orientation change to enable left or right handed use.	
	Colour Schemes	User configurable Dark, Bright and Black & White	
	Configurable Screen	Full Screen, Single, Dual Spot or Dual Pane with variable size and location and function e.g. XY, Timebase, Waterfall and Meter.	
	Display Modes	Spot, Time base (0.1-20 seconds x 1-200 sweeps and up to 55 seconds), Waterfall and Meter with peak hold and % readout.	
Graticules		None, Grid (4 sizes 5, 10, 15 and 20% FSH), Polar (4 sizes 5, 10, 15 and 20% FSH)	
	Offset	Spot Position: Y = -50 to +50, X = -65 to +65%	
	Digital Spot	Display in X,Y or R,θ	
Removable Data Storage	Setup Storage	microSD up to 2GB, holding over 500 saves.	micro SD up to 32GB, holding over 10,000 settings)
	Stored Screen Shots	microSD up to 2GB, holding over 500 saves.	micro SD up to 32GB, holding over 10,000 screen shots)
	Record Replay	Comprehensive Record Replay and Storage Real-time recording of trace data and Replay on instruments and desktop PC up to 164 seconds	
Outputs	PC Connectivity	USB (Full PC remote control plus Real Time data)	
	Digital volt free alarm	On Lemo 12 way Open collector transistor (36v dc at 10mA max).	
	VGA	Full 15 way VGA output	
Languages		English, French, Spanish, Russian, Japanese, Chinese, Turkish.	
Verification Level		The system includes on delivery a 2 year validity Verification Level 2 detailed functional check and calibration as per ISO 15548-1:2013	
Power on Self Test		The system performs a self test on start up of external ram, sd ram, accelerometer, Micro SD card, LCD screen buffer.	
Power	External Battery	100-240 v 50-60Hz 30 Watts	
	Running Time	Internal 7.2V nominal @ 3100mAh = 22.32 watt.hr Up to 8 hours with a 2MHz Pencil Probe 30% Back Light and up to 6 hours with a Rotary Drive at 3000rpm 50% duty cycle.	
	Charging Time	2.5 hrs. charge time, Simultaneous charge and operation.	
Physical	Weight	1.2 kg, 2.7 lbs.	
	Size (w x h x d)	223 x 141 x 50 mm / 8.8 x 5.6 x 2.0 inches	237.5mm x 144mm x 52mm / 9.4" x 5.7" x 2.1"
	Material	Aluminium alloy Mg Si 0.5 powder-coated	
	Operating Temp	-20 to +60 °C	
	Storage Temp	Storage for up to 12 months -20 to +35 °C Nominal +20 °C	
	IP Rating	54	

## AEROCHECK+ ADVANCED FEATURES

Advanced Features	Guides	Create and display a slide show containing instructions, tutorials and procedures using Microsoft PowerPoint.
	Attachments	Screenshots and Data Recordings are saved in a folder with the name of the Settings.
	Loop	Capture a live repetitive signal and then optimise the instrument settings (Phase, Gain, Filters) to simplify optimising the parameters
	Trace	Allows a calibration reference signal to be stored on the screen and then compared with the live signal
	Data Output	6 channel real-time post processed over USB at 8kHz overall for all 3 data pairs (X, Y and Mix) with DLL for embedding functionality into software.

## CONDUCTIVITY SPECIFICATION (AEROCHECK+ ONLY)

Frequency	One frequency only 60kHz standard (choice of 120, 240 and 480kHz)
Accuracy	0.5%-10% IACS better than +/-0.05% IACS 10%-25% IACS better than +/-0.25% IACS 25%-60% IACS better than +/-0.5% IACS 60%-110% IACS better than +/-1% IACS Lift Off corrected to 1.0mm No temperature compensation All Errors at 90% Confidence Level
Resolution	3 decimal points max Auto Resolution Mode AutoS = Legacy Instrument, Auto = SigmaCheck

## EQUIPMENT KITS

### STANDARD AEROCHECK SERIES KIT

**IAER001** Instrument, AeroCheck, Single Frequency (20Hz-20MHz), Hand Held Portable Flaw Detector, Software + Manual on USB Stick  
**AWEL002** AeroCheck, Power Adapter + Input Plugs (UK, EU, US & Australia)  
**AWEL003** Adjustable Shoulder Strap, Padded with Quick-Release  
**AC006** Instrument Soft Carry Case  
**A090** USB Cable, A to MIN B  
**40449** Quick Reference Card – AeroCheck  
**ALLCX-M02-015A** Lead, Lemo 00 to Microdot, 1.5m (Absolute)  
**ALL12-L04-015R** Lead, Lemo 12-Way - Lemo 4-Way (Reflection)

### OPTIONAL ACCESSORIES

**AWEL004** Hard Transit Case  
**AWEL005** Protective Splash Proof Cover / Rope Access (AEROCHECK only)  
**AWEL006** External, 8 x AA Battery Holder with On/Off Switch  
**AWEL007** Wrist Strap  
**AWEL008** In car Power Adapter  
**ALL12-L04-015R** Lead, Lemo 12-Way - Lemo 4-Way, 1.5m (Reflection)  
**ALL12-L04-015B** Lead, Lemo 12-Way - Lemo 4-Way, 1.5m (Bridge)  
**ALLCX-M02-015A** Lead, Lemo 00 to Microdot, 1.5m (Absolute)  
**ALLCX-B02-015A** Lead, Lemo 00 to BNC, 1.5m (Absolute)  
**ARD002** Mercury (mini) Rotary Drive  
**ALL12-L12-020M** Lead to connect Mercury (mini - ARD002) Rotary Drive, Lemo 12-Way, 2m  
**ALL12-F08-020ETH** Adapter, lead to connect Rohmann Rotary Drive MR3, SR1 and SR2, Lemo 12-Way, 2m.  
**40470 Tripod Bracket** To fit 1/4" Camera Tripod Mount with Male Screw  
**AAER003** Enhanced protection kit with hand strap(AEROCHECK+ only)  
**A244** Hand Strap for Enhanced Protection Kit (AEROCHECK+ only)

### PROBE KITS

**KASUR001 KIT** Surface Inspection (4 probes, lead and Al and Fe Test Block)  
**KASUBS001 KIT** Sub Surface Inspection, Low Frequency (2 probes, lead and test piece)  
**KAROT001 KIT** Mercury Rotary Drive and Cable Only  
**KACON001 KIT** Conductivity Kit (Probe, Calibration and Cable) - (AEROCHECK+ only)



# AEROCHECK AEROCHECK+

“ The AEROCHECK offers the right mix for features for any Eddy Current application need in an easy-to-use package designed entirely with the end user in mind. ”

## ALL POSSIBLE APPLICATIONS COVERED!

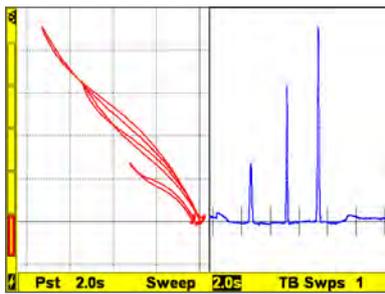
The AEROCHECK and AEROCHECK+ offers maximum flexibility when deciding which features are needed for your application. As well as the hand-held WELDCHECK, AEROCHECK and AEROCHECK+ instruments, the range also includes the VICTOR 2.2D for inline component testing solutions.

### KEY DIFFERENCES

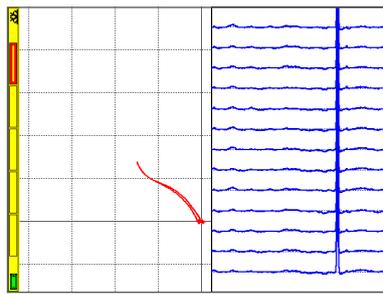
EQUIPMENT	FEATURES								
	ROTARY	DATA RECORDING	DUAL FREQUENCY WITH AUTO-MIX	CONDUCTIVITY	GUIDES	LOOP	TRACE	ENHANCED PROTECTION	FREQUENCY
AEROCHECK	●	●						✳	20Hz-20MHz
AEROCHECK+	●	●	●	●	●	●	●	●	10Hz-12.8MHz

● = As Standard    ✳ = Optional Extra

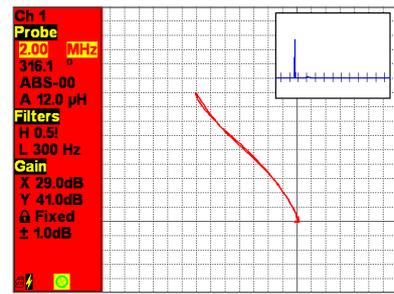
### EXCEPTIONAL SCREEN CLARITY FOR ANY APPLICATION



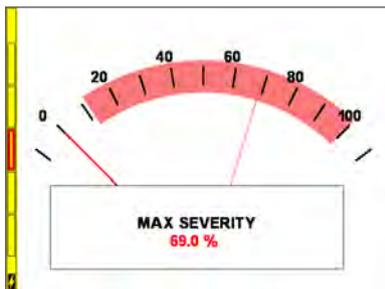
50/50 XY & Timebase



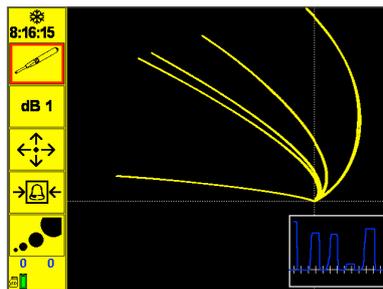
50/50 XY Waterfall with 12 2s time sweeps



XY with small timebase and Quick Menu



Meter Full Screen



Dark background polar graticule and soft-keys



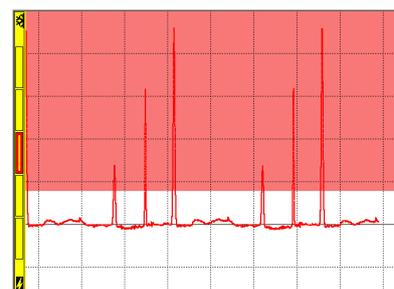
XY and Meter 50/50



XY Full screen with Box Alarm



XY with Small Meter



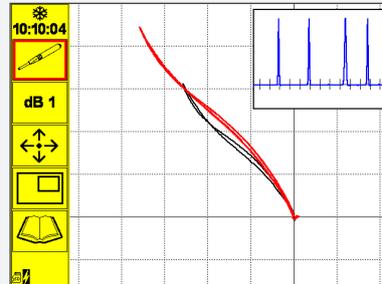
Timebase Full Screen with level arm

“ The AEROCHECK+ offers all the great features of the AEROCHECK plus Dual Frequency and Conductivity Measurement, with useful additions such as Auto-Mix, Guides, Loop and Trace. ”

## ADDITIONAL FEATURES AVAILABLE ON THE AEROCHECK+



**GUIDES FEATURE:** “Guides”, allows the user to display a slide show that can be created easily with commonly used desktop software. The benefit of this feature is that instructions, tutorials and procedures for an inspection can be added to the AEROCHECK+ very quickly and the NDT inspector can easily switch between the inspection itself and the “Guides” while performing a live test.

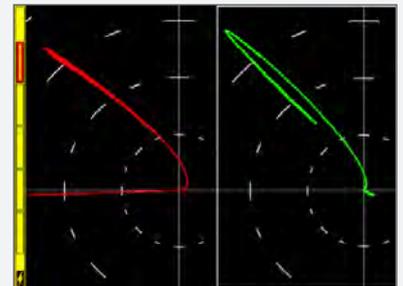


**TRACE FEATURE:** The trace function allows a reference waveform to be stored on the screen and appears along with the live spot. This allows the operator to readily compare the live data with the reference calibration.

**“LOOP” FEATURE:** “Loop” is a convenient way of capturing a short live repetitive signal and then optimizing the instrument settings through real time adjustments of the Phase, Gain, Balance, Filters and Display Configuration in order to simplify the task of optimising the parameters.

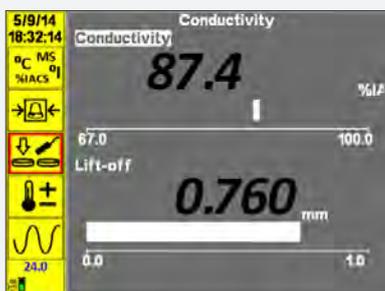
The “Loop” function is excellent for calibration set up especially for setting the filters for Rotary and Dual Frequency mix.

**DUAL FREQUENCY FEATURE:** At different frequencies, different signal indications (e.g. lift off and defect) have a different relative phase and amplitude response. By means of phase rotation and Gain change of the X Y signal components one of these indications can be manipulated to be almost identical in phase and amplitude as the other and then by subtraction (mixing), the unwanted component is minimised, giving an improved detection of the wanted signal.



**AUTO-MIX FEATURE:** A dual frequency mix exploits the phase and sensitivity change between two different types of indication to suppress one and enhance the other.

Auto-mix simplifies the sometimes complex procedure of mixing two different frequency signals and can be achieved on the AEROCHECK+ through a series of easy steps. Ultimately once set up, the Auto-mix itself is as simple as pressing one key.



**CONDUCTIVITY MEASUREMENT:** Many of the Aerospace procedures require that Conductivity Measurement is available on the designated Eddy Current Flaw Detector.

When connecting the Conductivity Probe, the AEROCHECK+ auto-detects the probe and seamlessly switches into conductivity mode. Removal of the probe switches the instrument back to flaw detection mode.

NB: The Conductivity Measurement Option is available through the purchase of the KACON001 KIT.

# VEESCAN

EC WHEEL INSPECTION SYSTEMS



“ Our VEESCAN product range offers our clients the choice of systems for both optimised productivity and value for money or maximum flexibility combined with lowest capital cost. ” John Hansen, MD



*ETHER NDE* is pleased to offer a range of solutions for aircraft wheel inspection. We understand that the key criteria for Aircraft Wheel Inspection Systems are the need to guarantee detection of defects, the requirement to operate reliably for twenty-four hours per day, 365 days per year, the demand for a simple and user-friendly interface and the business need to maximize speed of inspection and output. Balancing these objectives can be difficult, but we believe the VEESCAN measures up to the task.

The VEESCAN is available in a choice of models and can be configured with a wide choice of probes. This allows any Wheel Shop to select the system most compatible with their workload. The “Model H” is a proven design allowing maximum flexibility, while the “Model R” (Rapid) offers the potential for greater throughput due to the incorporation of the special WideScan probe with a scanning helix of 5mm.

## CUSTOMER BENEFITS:

- Proven mechanical design with established record of breakdown-free operation for 365 days or more.
- Choice of two probe configurations: “Model H” or “Model R” (Rapid) offering choice of maximum flexibility or optimised productivity.
- Adjustable-height Control Station on “Model H” - Allows Operator the most flexible and comfortable usage.
- Full choice of Operation Modes maximising Probability of Detection.
- Easy to operate with basic training.
- Easy to service - Manufactured from heavy-duty aluminum extrusion and incorporating standard readily available branded control and automation products.
- Intuitive set-up - A “teach and learn” system allows the machine to be trained to inspect a wheel, then manually adjust values to fine tune the setup and then save the setup for similar / the same wheels in the future.
- Versatile - the VeeScan has been designed to test the widest range of Aircraft Wheels from Helicopter Nose Wheels to A380 Main Wheels.
- Rapid and Reliable - Automated inspection allows the wheel to be inspected much more quickly than for a manual inspection whilst ensuring the required area of inspection is scanned 100%.
- Reporting - The fully digital reporting system archives the data for analysis and review either on the VEESCAN itself or remotely over a network. A simple 1 page A4 report may be saved and printed.
- Safety - A separate control plinth with dual push button activated start means the operator is not near the rotating wheel during the test. Both the “Model H” and “Model R” versions use systems of Wheel Clamping that are proven in the field over extended periods of time.

VEESCAN H is designed to lift the wheel and fix it with an automatic adaptor that uses the wheel inertia to centre it. VEESCAN H offers an integrated roller tray for easy manoeuvrability and integration into a conveyor system and also features an automatic hub size adaptor. VEESCAN H can test wheels up to 900mm diameter.

The H is designed with an adjustable-height Control Panel for operator comfort and can be positioned at a convenient distance from the main machine. Open on three sides, the VEESCAN H offers easy wheel loading as standard.

A circular absolute probe is positioned perpendicular to the surface to ensure uniform sensitivity regardless of wheel surface profile as the probe progresses through the wheel bead seat area. Recommended frequency is 200kHz.



## MAIN CHARACTERISTICS OF MODEL H

- Extruded aluminium structure covered with black Perspex panels.
- Separate Control Panel that may be positioned at a convenient distance from the main machine, which is height and angle adjustable.
- Teflon rotating table with three open sides for easy wheel loading.
- Roller tray to facilitate the wheel movement.

Veescan Model H ISO with wheel in place



Veescan Model H with moveable control panel



Veescan Model H Control Panel

## SPECIFICATION

<b>Unit Size</b>	112.5cm x 120cm x 95cm
<b>Instrument</b>	ViCTor 1 Channel WI
<b>Probe</b>	Differentially connected absolute(integral balance load) with circular head. Recommended Frequency 200kHz option 100kHz, 500kHz and 1.5 MHz. Recommended diameter 6mm (mm also available and narrow shaft for large wheels)
<b>Max Wheel Diameter</b>	900mm
<b>Typical Inspection Helix</b>	1.5mm
<b>Probe Position</b>	Adaptive contour following using dual axis pressure sensors
<b>Max Wheel Height</b>	400mm
<b>Power Supplies</b>	110- 240v ac 50/ 60Hz
<b>Max Load</b>	150Kg
<b>Pneumatic Pressure</b>	None (electric wheel raise) 250mm stroke
<b>Alarms</b>	Acoustic and visual
<b>Rotation Speed</b>	15-120 rpm, via surface speed control eg 250mm/s
<b>Frame</b>	Extruded Aluminium
<b>Wheel Position</b>	The wheel is lifted clear of the roller tray using a 250mm stroke electric actuator and then held under its own weight by an adaptive automatic grip mechanism
<b>Data Recording and Storage</b>	Yes
<b>Manual Hand-Held Inspection</b>	Yes, probe socket and switch on control station
<b>Automatic Calibration</b>	Yes, by means of dynamic standard option
<b>Automatic Stop on Defect</b>	Yes
<b>Turntable</b>	Roller Tray / Outer stainless steel, inner plastic. Easily adjustable end stops at both ends to prevent wheel falling off.
<b>Control Station</b>	External free standing. Height adjustable with machine and eddy current control. 7" screen. Use Uses virtual keyboard. Touch Pad 750 - 900mm adjustable.
<b>Operation Modes</b>	Automatic, Stop on defect and full manual



The VEESCAN R clamps the wheel with a pneumatic cylinder. With pneumatic control and electronics incorporated within the frame it allows access to the rotating table from three open sides. On the rotating table, three rollers assist the wheel movement. It is designed to be used with probes with both high and low inspection frequencies simultaneously.

The R is easily adaptable for use with the eddy current instrument plus an auxiliary computer for data storage and further evaluation.

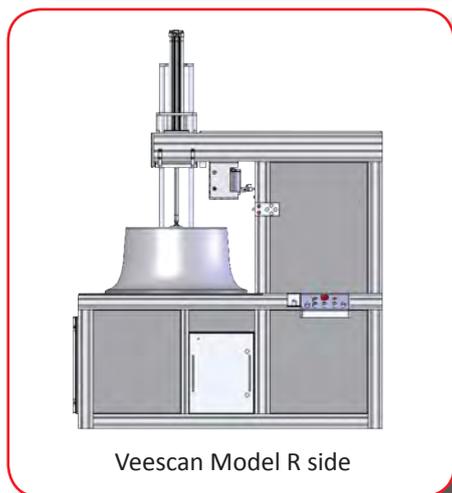
The Model R is manufactured in two sizes to accommodate two different wheel size categories; for wheels under 600mm in diameter and for wheels under 900mm in diameter.

## MAIN CHARACTERISTICS OF MODEL R

- Extruded aluminium structure and outer black Perspex panels.
- Compact design with pneumatic control and electronics fitted in a frame with complete access to the rotating table from three open sides.
- The control/handling post can be installed on the lateral sides or on the front side.
- Rotating table with three rollers to help wheels to move from the three open sides.
- Four bar guided wheel-centring device with removable Teflon cone (standard size) and stiffened support structure (horizontal) on top of the tower.
- Possibility to install encoders for vertical and turning movements in order to facilitate the synchronisation with software applications.
- Safety elements include two emergency stops (one fixed, the second free, positions to be fixed by the user), dual push button for safe activation of wheel centring movement and probe protection (emergency arm retraction).



Veescan Model R



Veescan Model R side



Veescan Model R in factory situation

## SPECIFICATION

Unit Size	a) 85cm x 220cm x 145cm or b) 120cm x 230cm x145cm*
Instrument	ViCTor 1 Channel WI
Probe	Differential - High Frequency multi-purpose bead seat
Max Wheel Diameter	a) 600mm or b) 900mm*
Typical Inspection Helix	5mm
Probe Position	Touching the wheel
Max Wheel Height	400mm
Power Supplies	110 - 240V AC 50 / 60Hz
Max Load	150Kg
Pneumatic Pressure	40 - 150 psi
Alarms	Acoustic and visual
Rotation Speed	5 - 50 rpm
Frame	Extruded Aluminium
Wheel Position	The wheel is clamped against the turntable face during the inspection by a pneumatically actuated cone
Data Recording and Storage	Yes
Manual Hand-Held Inspection	Yes, probe socket and switch on control station
Automatic Calibration	Yes, by means of dynamic standard option
Automatic Stop on Defect	Yes
Turntable	Option - Spring loaded ball rollers on the rotating plate to allow the inspection of wheels in trays.
Control Station	Control panel, integrated with main unit
Operation Modes	Automatic, Stop on defect and manual

**Please note:**

**\* highlights that a) represents Model R with 600mm max wheel diameter and b) represents Model R 900mm max wheel diameter.**

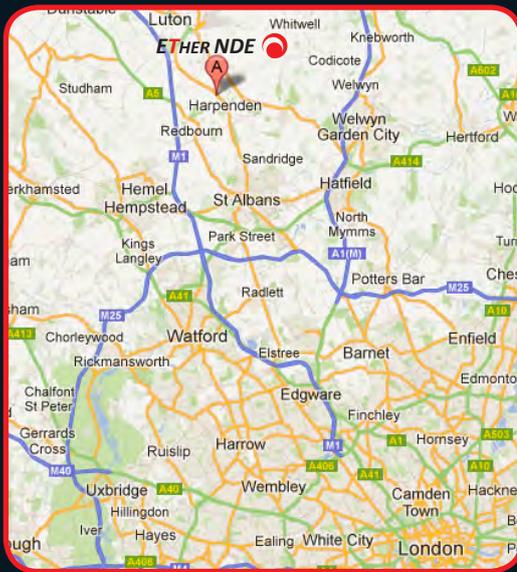
**ETHER NDE** continually strives to provide innovative solutions to eddy current testing in all possible inspection conditions.

Offering a range of innovative eddy current testing instruments and probes, **ETHER NDE** will endeavour to find the solution that best fits our clients specific needs.

At **ETHER NDE** we pride ourselves on our ability to remain client focussed, conducting our business with three simple promises to you:

1. The ability to speak to someone who understands our products and your application.
2. Industry leading delivery on goods and the ability to respond to your challenges.
3. That our products are second to none in both performance and quality.

Founded by John Hansen and Mike Reilly and supported by a skilled team, **ETHER NDE** boasts over 150 years of collective experience in non-destructive testing. Forward thinking and client responsive, **ETHER NDE** is the wise choice for all your eddy current testing needs.



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