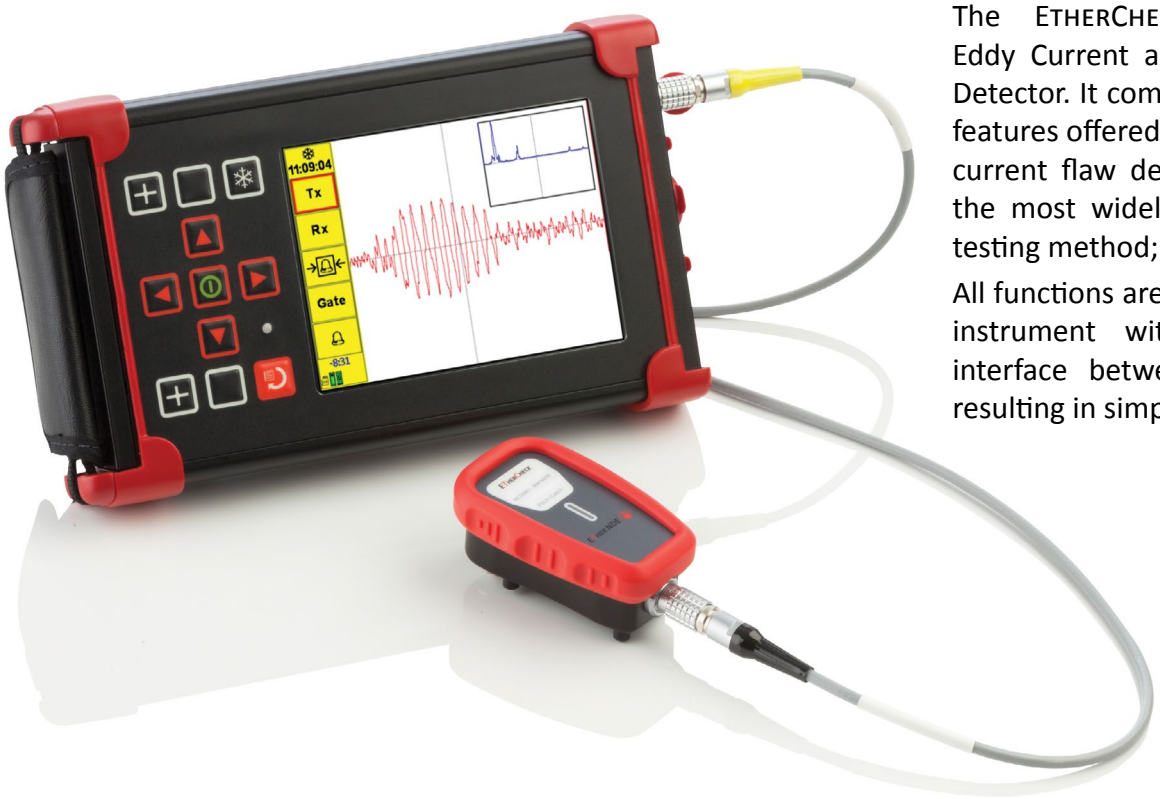
COMBINED EDDY CURRENT & BOND TESTING FLAW DETECTOR

ETHERCHECK

- General Eddy current, plus Rotary, plus Conductivity, plus Pitch-Catch.
- "Two instruments in one".
- The leading features of the best in class AEROCHECK+ Eddy Current Flaw Detector combined with excellent Pitch-Catch functionality.
- Pitch-Catch dry coupled bond testing mode allows rapid detection of defects in laminate, bonded and sandwich structures.
- Automatic test frequency optimisation.
- Waveform, time-base and phase / frequency plots.

ETHER NDE

"Reduced CapEx, reduced training costs, lower calibration and maintenance costs with a three-year warranty as standard."



The ETHERCHECK is a combined Eddy Current and Bond Testing Flaw Detector. It comes with a rich range of features offered by a best in class eddy current flaw detector combined with the most widely used acoustic bond testing method; Pitch-Catch.

All functions are in a single lightweight instrument with a common user interface between the two modes, resulting in simple operator led set up.

The ETHERCHECK Pitch-Catch probe offers the best in design and durability. Ergonomically designed and manufactured from CNC-machined Aluminium with rubber hand grips, the ETHERCHECK Pitch-Catch probe is both comfortable to use and suitably robust.

The transmitter and receiver sensor guide feet can be positioned by the operator to suit the inspection task. The transmit and receive probe tips are interchangeable with rounded and flat tip profiles available.

The sensors are positioned close to the edge of the housing to allow inspection in tight areas.

The ETHERCHECK Pitch-Catch Probe offers Automatic Probe ID by storing its own default settings which can be programmed by the operator.

The ETHERCHECK also works with other manufacturers probes.

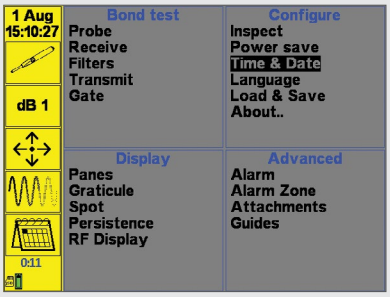
Bond Testing Applications

Bond Testing sees a wide range of applications in modern composite structures with materials such as carbon fibre, honeycomb and Nomex. In addition glued/bonded joints may be inspected for integrity of adhesion.

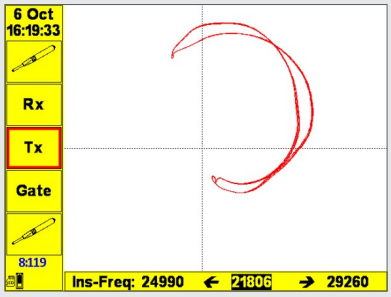
Application	Capability
CFRP skin to fibre/metal honeycomb near disbond	Best
CFRP skin to fibre/metal honeycomb core crush	Best
Honeycomb structure impact damage	Best
CFRP skin to fibre/metal honeycomb far disbond	Good
Bonded stiffener disbond	Good
GRP skin to foam or wood core	Good
Multi-layer CFRP laminate delaminations, voids	Fair
Metal to metal bonded skins	Fair

Simplicity, Clarity & Accuracy in Bond Testing Mode

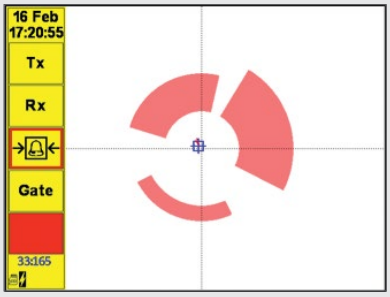
The screens for the Bond Testing mode of the EtherCheck have a familiarity with the screens of the AeroCheck+. By doing this, we are able to make moving between the eddy current and bond testing modes seamless, simple and intuitive.



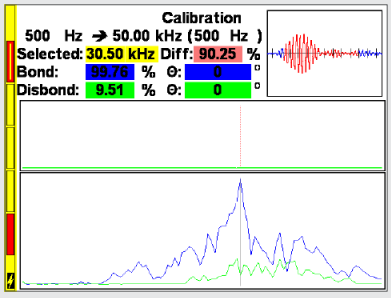
Bond Test Mode Menu System



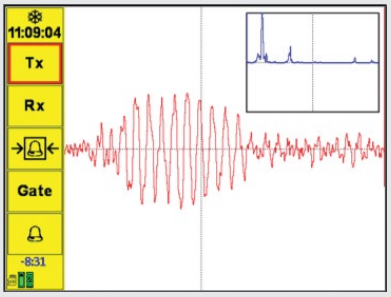
Sweep Mode



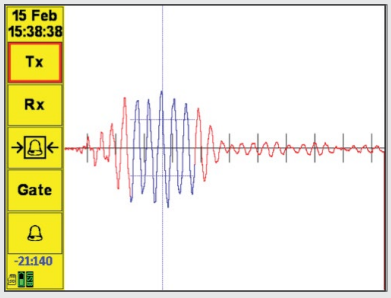
Impedance Plane (XY) Trace with multiple sector gates



Pitch-Catch Mode calibration showing the bond and dis-bond spectrum.



RF (A-Scan Waveform) with Frequency Spectrum Inset



RF waveform with gate region highlighted

Probes & Leads for Bond Testing

PETH001 Pitch-Catch Bond Testing Probe

ALL10-L08-015PC Lemo 10 Way to 8 Way, 1.5m

ATB022 Composite Test Coupon based on ST8871D

"The AeroCheck+ is a delight to work with; rugged, easy and quick to set-up and it lasted the whole day (8 hours). The screen is very clear, even in the full summer sun at 33 degrees!"

INDUSTRY STANDARD PROBE CONNECTORS

The EtherCheck in AeroCheck+ mode uses 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. A LEMO 00 Connector is also provided for simpler connection of Absolute probes.

WIDE FREQUENCY RANGE

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

Area of Inspection: Fasteners
Probe: Low Frequency, Sliding

Window Frames
Probe: High & Low Frequency, Rotary

Cowling
Probe: Pitch-Catch

WORKS THE WAY YOU DO!

The EtherCheck has the ability to be used in left and right-handed mode; thanks to the "Auto Flip" function. This is especially useful if the operator is inspecting in a restricted area like the Engine Mounts.

Area of Inspection: Engine Mounts
Probe: Surface

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 enhanced durability through a fully-fitted, custom-designed outer "protective boot", an integral hand-strap for even greater strength and easier grip in use plus two integrated moulded "Sure Grip" handles on the rear of the case.

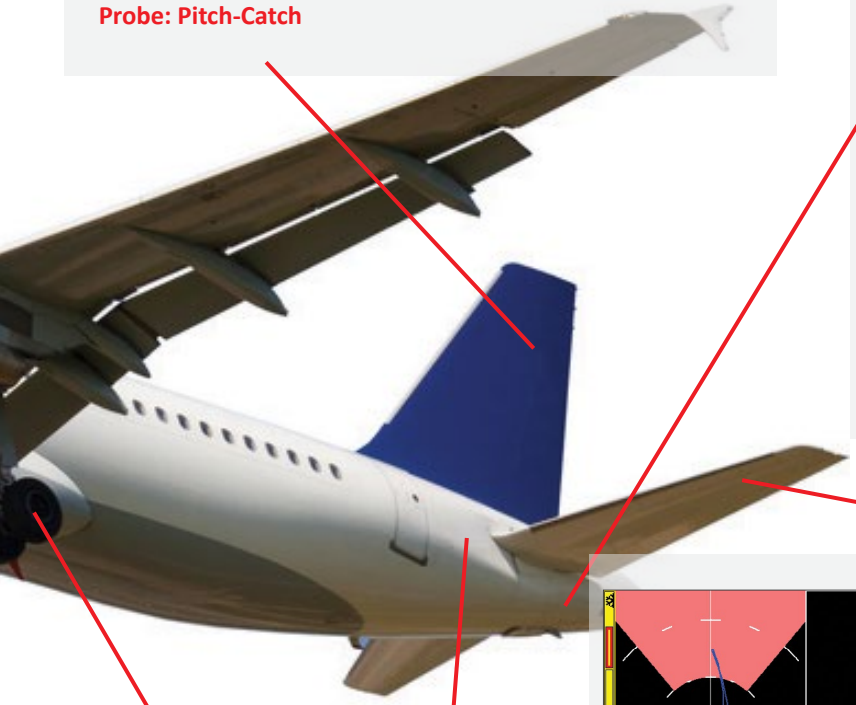
Rudder
Probe: Pitch-Catch

DAYLIGHT READABLE, CLEAR, LARGE, CONFIGURABLE COLOUR SCREEN

The ETHERCHECK 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 together 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.

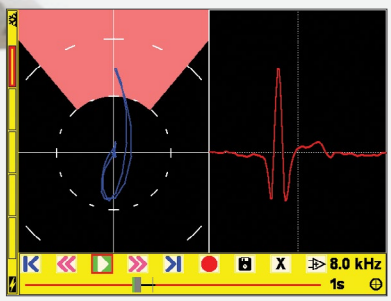
Not all NDT inspection on aircraft takes place in the comfort of an aircraft hangar so the daylight readable display is easily viewable outdoors.

Area of Inspection: Bulkhead
Probe: Low Frequency



Area of Inspection: Horizontal Stabilisers
Probe: High & Low Frequency, Pitch-Catch

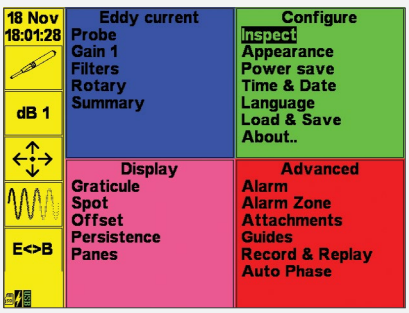
Wheels, Wheel Brakes, Landing Gear
Probe: High Frequency, Rotary



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



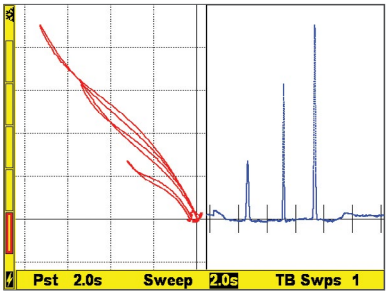
EASY TO USE MENUS & ICON SYSTEM

The ETHERCHECK menu system is simple and fast to navigate. It has the ability to add individually selectable soft key menu items to the sidebar for rapid function access and a “quick-setting menu” for easy set-up, review and adjustment.

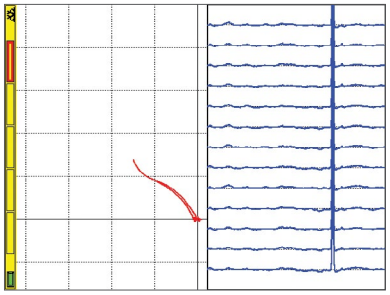
With four operator selectable soft keys and a fifth slot for the last menu function used, technicians can quickly modify the system with their preferences. Each saved instrument setting can be associated with a unique, single press set of quick access soft keys. There are also two front panel hard keys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

The EtherCheck offers the right mix for features for any Eddy Current application need plus bond testing abilities in an easy-to-use package designed entirely with the end user in mind.

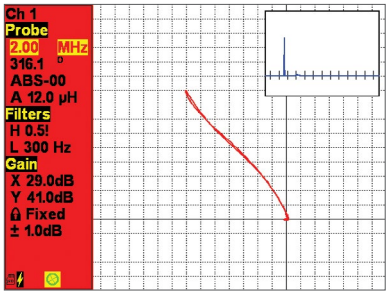
Exceptional Screen Clarity For Any Eddy Current Application



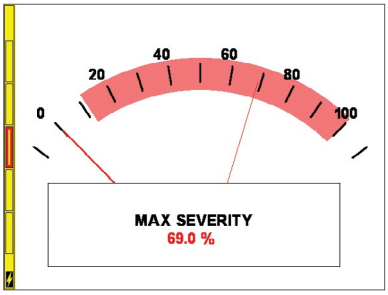
50/50 XY & Timebase



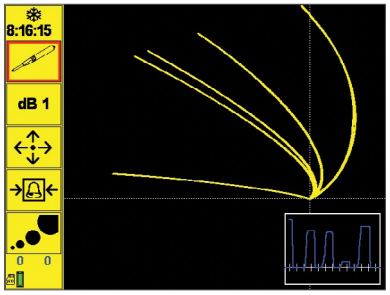
50/50 XY Waterfall with 12 2s time sweeps



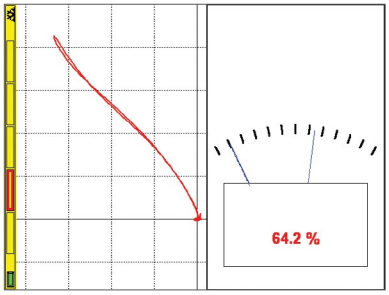
XY with small timebase and Quick Menu



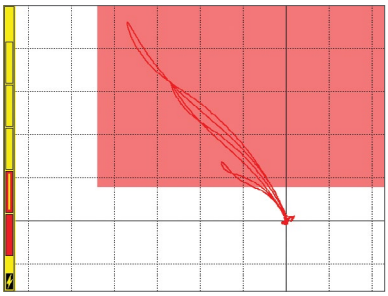
Meter Full Screen



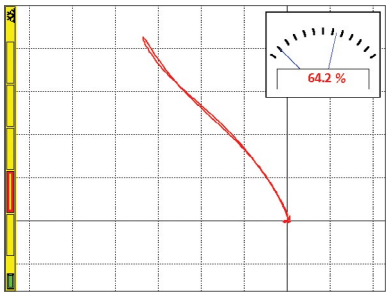
Dark background polar graticule and soft-keys



XY and Meter 50/50



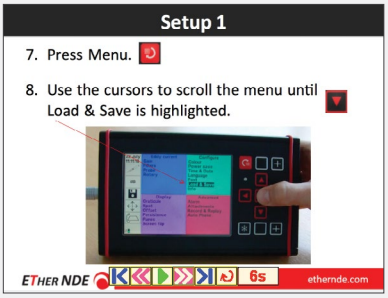
XY Full screen with Box Alarm



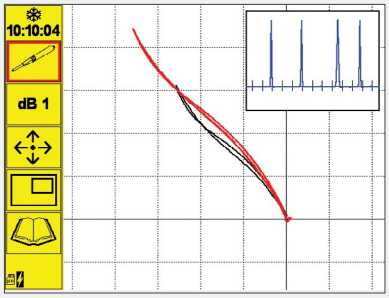
XY with Small Meter

Timebase Full Sceen with level arm

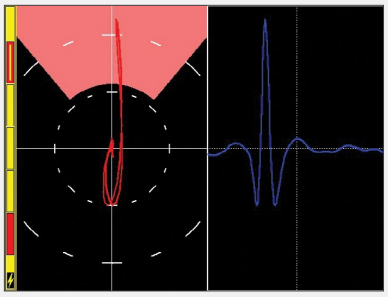
AeroCheck+ Key Features



Guides Feature: "Guides" allows the user to display a slide show that can be created easily with commonly used desktop software. 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 trace to be stored on the screen and appears along with the graticule behind the live spot. This allows the operator to readily compare the live data with the reference calibration.



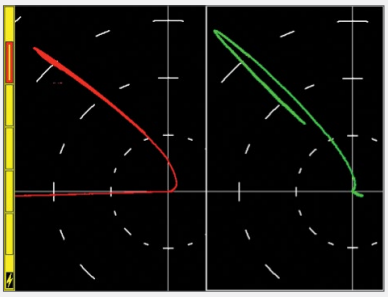
ROTARY CAPABILITIES AS STANDARD:

The AEROCHECK series 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).

"LOOP" FEATURE: "Loop" is a convenient way of capturing a short live repetitive signal and then optimising 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.

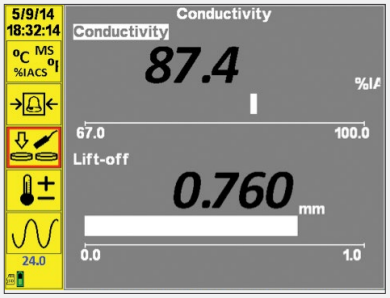
The "Loop" function is excellent for calibration set up, especially for setting the filters for Rotary and Dual Frequency mix.

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 required 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, it can be achieved on the AEROCHECK+ through a series of easy steps. 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.

OPTIONAL EDDY CURRENT LEADS & PROBES

ALLCX-M02-015A Lead, Lemo 00 to Microdot, 1.5m (Absolute)
ALL12-L04-015R Lead, Lemo 12-Way - Lemo 4-Way (Reflection)
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

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)

The ETHERCHECK is supplied with a standard "Three-Year Manufacturer Warranty".
This covers all components of the Instruments and only excludes customer damage or misuse.
The "Three-Year Warranty" can be extended to "Six Years" through purchase of "ETHERCover" Extended Warranty Protection.

SPECIFICATIONS

Eddy Current Flaw Detector

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 Rotary Drive (ARD002), Hocking 33A100, Rohmann MR3, SR1 and SR2 Drive (special adapter required)
Frequency		Single Freq. = 10Hz – 20MHz with range variable resolution. Dual Freq. = 10Hz - 12.8MHz & Mix -18 to +18dB on output
Gain	Overall Input Drive Max X/Y Ratio	-18 to + 104dB, 0.1, 1 and 6dB steps (104dB maximum) 0dB or 12dB 0dB, 6dB and 10dB (0dB reference 1mW into 50 ohm). +/-100.0 dB
Phase	Range Auto Phase	0.0-359.9°, 0.1° steps Allows phase angle to be automatically set to a pre-set angle
Filters	Normal High Pass Normal Low Pass	DC to 2kHz or Low Pass Filter, which ever is the lower in 1Hz steps. Plus variable adaptive balance drift compensation 0.01 - 0.5Hz (6 steps). 1Hz to 2kHz or a quarter of the lowest test frequency, which ever is lower in 1Hz steps.
Balance	Manual Automatic	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 Optimised balance load selection.
Alarms	Box Sector Output	Fully configurable, Freeze, Tone or Visual. Fully configurable, Freeze, Tone or Visual. Open collector transistor (32v dc at 10mA max) available on 12 way lemo.
Display	Type Viewable Area Resolutiion Flip Colour Schemes Configurable Screen Display Modes Graticules Offset Digital Spot Position Readout Summary	5.7" (145mm), 18 bit Colour, daylight readable. 115.2mm (Horizontal) x 86.4mm (Vertical) 640 x 480 pixels Manual or automatic screen orrientation change to enable left or right handed use. User configurable Dark, Bright and Black & White Full Screen, Single, Dual Spot or Dual Pane with variable size and location and function e.g. XY, Timebase, Waterfall and Meter. Spot, Time base (0.1-20 seconds x 1-200 sweeps and up to 55 seconds), Waterfall and Meter with peak hold and % readout. None, Grid (4 sizes 5, 10, 15 and 20% FSH), Polar (4 sizes 5, 10, 15 and 20% FSH) Spot Position: Y =-50 to +50, X =-65 to +65% Display in X,Y or R,θ Display of all settings in Legacy Format
Removable Data Storage	Setup Storage Stored Screen Shots Record Replay	micro SD up to 32GB, holding over 10,000 settings micro SD up to 32GB, holding over 10,000 screen shots Comprehensive Record Replay and Storage Up to 164 seconds on instrument and on PC over USB limited by Hard Drive capacity
Outputs	PC Connectivity Digital Volt Free Alarm VGA	USB (Full PC remote control plus Real Time data) On Lemo 12 way Open collector transistor (36v dc at 10mA max). Full 15 way VGA output
Languages		English, French, Spanish, Italian, Portuguese, Russian, Japanese, Chinese, Turkish, Czech, Norwegian
Verification Level		On delivery, the system includes 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 Running Time Charging Time	100-240 v 50-60Hz 30 Watts 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. Up to 6 hours using Pitch-Catch Bond Testing Probe 2.5 hrs. charge time, Simultaneous charge and operation.
Physical	Weight Size (w x h x d) Material Operating Temp Storage Temp IP Rating	1.2 kg, 2.7 lbs. 237.5mm x 144mm x 52mm / 9.4" x 5.7" x 2.1" Aluminium alloy Mg Si 0.5 powder-coated -20 to +60 °C Storage for up to 12 months -20 to +35 °C Nominal +20 °C 54

EQUIPMENT KIT

Standard Kit - KIETH001

ETHERCHECK combined bond tester & dual frequency eddy current flaw detector including:
ETHERCHECK Unit, Power Adapter, Shoulder Strap, Soft Carry Case, USB Cable, Quick Reference Guide and Manual.

OPTIONAL ACCESSORIES

AAER002 Hard Transit Case
AAER004 Protective Splash Proof Cover (WELDCHECK2, WELDCHECK+, AEROCHECK2, AEROCHECK+, ETHERCHECK)
AWEL006 External, 8 x AA Battery Holder with On/Off Switch
AWEL008 In Car Power Adapter
40470 Tripod Bracket to fit 1.4" Camera Tripod Mount with Male Screw

Document number 5036: Issue 4

EDDY CURRENT 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 along with 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 compared with the live signal.
Data Output	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

Frequency	One frequency only 60kHz standard (choice of 120, 240 and 480kHz)
Acccuracy	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

BOND TESTING SPECIFICATION

Operating Mode	Bond Testing	Pitch-Catch Tone Burst
Display Modes		RF (A-Scan waveform), Impedance Plane (Flying Spot), Frequency Spectrum, Time base Scan*, Encoded Scan*
Signal Processing	Main Gain Rectification Filtering	0 to 60dB in 1dB steps RF, Positive half wave, Negative half wave, Full wave Low pass filtering of Amplitude / Phase
Pitch-Catch Mode	Waveform Type Output Voltage Frequency Range Sample Rate Time base range Time base delay RF mode gates Y-T mode gates Calibration mode Bond/ Dis-bond alarm	Tone burst with fixed or swept frequency 6, 8, 10, 12, 18, 24, 30, 36V 1kHz to 100kHz – probe dependant 440kS/s 100us to 2ms 0us to 1ms Adjustable threshold, start and width Multiple alarm regions, sector, box and circle Automatic inspection frequency with manual adjustment. Audible and visual alarm on instrument display and probe
Pitch-Catch Probe	Operating frequencies	30kHz (suitable for 10kHz to 50kHz operation)
Specification	Probe separation Linear travel Probe auto-recognition Alarm LED Probe tips Probe housing material Connector	17mm >5mm Yes, with default inspection settings stored in probe Yes, follows instrument alarm state Rounded end and flat end, user replaceable Anodised aluminium, with stainless steel probe housings, rubber grip 8 pin Lemo

ETHER NDE Ltd,
Endeavour House, Unit 18,
Brick Knoll Park, Ashley Rd.,
St. Albans, AL1 5UG, UK
Tel: +44 (0)1727 648050
sales@ethernde.com
ethernde.com

Certificate No: 15820
ISO 14001, ISO 9001