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
The EtherCheck is a combined Eddy Current and Bond Testing Flaw Detector which 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.

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

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 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.

### Bond Testing Applications

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

### 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.

**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 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

**WORKS THE WAY YOU DO!**

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

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

**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 to 12.8MHz, ensuring a diverse range of real world applications can be met.

**Area of Inspection:** Window Frames  
**Probe:** High & Low Frequency, Rotary

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

**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 EtherCheck has enhanced durability through a fully-fitted, custom-designed outer “protective boot” and integral hand-strap for even greater strength and easier grip in use.

“**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!**”
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 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 easily viewable outdoors.

Area of Inspection: Bulkhead
Probe: Low Frequency

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

EASY TO USE MENUS & ICON SYSTEM
The EtherCheck 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 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.

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
*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.*

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**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

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**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.

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**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.

**“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.

**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. 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)
- **KASUSB001 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)
### SPECIFICATIONS

**Eddy Current Flaw Detector**

<table>
<thead>
<tr>
<th>Probe</th>
<th>Connectors</th>
<th>12 Way Lemo 2b (Adaptilute, Bridge and Reflection) and Connection Lemo 00 (for single element absolute probes). Simultaneous probe operation possible using Lemo 12 way and Lemo 00. 600-3000 rpm - Ether RotaryDrive (ADR001), Hocking 33A100, Rohmann MR3, SR1 and SR2 Drive (special adapter required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Overall</td>
<td>Single Freq. = 10Hz - 20MHz with range variable resolution. Dual Freq. = 10Hz - 12.8MHz &amp; Mix -18 to +18dB on output</td>
</tr>
<tr>
<td>Gain</td>
<td>Overall Input</td>
<td>-18 to +10dB, 0.1, 1 and 6 dB steps (104dB maximum)</td>
</tr>
<tr>
<td>Drive</td>
<td>0dB or 12dB</td>
<td></td>
</tr>
<tr>
<td>Max X/Y Ratio</td>
<td>0dB, 6dB and 10dB (0dB reference 1mW into 50 ohm)</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Range</td>
<td>0.0-359.5, 0.1° steps</td>
</tr>
<tr>
<td>Filters</td>
<td>Normal High Pass</td>
<td>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). 1Hz to 2kHz or a quarter of the lowest test frequency, which ever is lower in 1 Hz steps.</td>
</tr>
<tr>
<td>Normal Low Pass</td>
<td>14 internal balance loads; 2.2µH, 5.0µH, 6.5µH, 7.0µH, 7.5µH, 8.2µH, 12µH, 15µH, 18µH, 22µH, 30µH, 47µH, 83µH</td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Box</td>
<td>Optimised balance load selection.</td>
</tr>
<tr>
<td>Sector</td>
<td>Fully configurable, Freeze, Tone or Visual.</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>Open collector transistor (32V dc at 10mA max) available on 12 way lemo. 5.7” (145mm), 18 bit Colour, daylight readable.</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>Type</td>
<td>115.2mm (Horizontal) x 86.4mm (Vertical) 640 x 480 pixels</td>
</tr>
<tr>
<td>Viewable Area</td>
<td>Resolution</td>
<td>Manual or automatic screen orientation change to enable left or right handed use.</td>
</tr>
<tr>
<td>Flip</td>
<td>Colour Schemes</td>
<td>User configurable Dark, Bright and White &amp; Black</td>
</tr>
<tr>
<td>Configurable Screen</td>
<td>Display Modes</td>
<td>Full Screen, Single, Dual Spot or Dual Pane with variable size and location and function e.g. XY, Timebase, Waterfall and Meter.</td>
</tr>
<tr>
<td>Spot</td>
<td>Time base (0.1-20 seconds x 1-200 sweeps and up to 55 seconds), Waterfall and Meter with peak hold and % readout.</td>
<td></td>
</tr>
<tr>
<td>Graticules</td>
<td>None, Grid (4 sizes 5, 10, 15 and 20% FSH), Polar (4 sizes 5, 10, 15 and 20% FSH)</td>
<td></td>
</tr>
<tr>
<td>Offsets</td>
<td>Position</td>
<td>Offset Spot: Y = -50 to +50, X = -65 to +65%</td>
</tr>
<tr>
<td>Digital Spot</td>
<td>Display in XY or R, R</td>
<td></td>
</tr>
<tr>
<td>Position Readout</td>
<td>Summary</td>
<td>Display of all settings in Legacy Format</td>
</tr>
<tr>
<td>Removable Data Storage</td>
<td></td>
<td>micro SD up to 32GB, holding over 10,000 settings</td>
</tr>
<tr>
<td>Store Screen</td>
<td>micro SD up to 32GB, holding over 10,000 screen shots</td>
<td></td>
</tr>
<tr>
<td>Shottet Storage</td>
<td>Comprehensive Record Replay and Storage</td>
<td></td>
</tr>
<tr>
<td>Record Replay</td>
<td>Up to 164 seconds on instrument and on PC over USB limited by Hard Drive capacity</td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td>PVC Connectivity</td>
<td>USB (Full PC remote control plus Real Time data) On Lemo 12 way Open collector transistor (36V dc at 10mA max).</td>
</tr>
<tr>
<td>Digital Volt Free</td>
<td>VEGA</td>
<td>Full 15 way VGA output</td>
</tr>
<tr>
<td>Alarm</td>
<td>Languages</td>
<td>English, French, Spanish, Italian, Portuguese, Russian, Japanese, Chinese, Turkish, Czech, Norwegian</td>
</tr>
<tr>
<td>Verification Level</td>
<td>The system includes on delivery a 2 year validity Verification Level 2 detailed functional check and calibration as per ISO 11548-1:2013</td>
<td></td>
</tr>
<tr>
<td>Power On Self Test</td>
<td>The system performs a self test on start up of external ram, sd ram, accelerometer, Micro SD card, LCD screen buffer.</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Test</td>
<td>100-240 x 50-60Hz 30 Watts Internal 7.2V nominal @ 3100mAh = 22.32 watt.hr</td>
</tr>
<tr>
<td>External Battery</td>
<td>Up to 8 hours with a 2MHz Pencil Probe 303 Back Light and up to 6 hours with a Rotary Drive at 300rpm 50% duty cycle. Up to 6 hours using Pitch-Catch Bond Testing Probe 2.5 hrs. charge time, Simultaneous charge and operation.</td>
<td></td>
</tr>
<tr>
<td>Running Time</td>
<td>Charging Time</td>
<td>25.1g. charge time, Simultaneous charge and operation.</td>
</tr>
<tr>
<td>Physical</td>
<td>Weight</td>
<td>1.2 kg, 2.7 lbs.</td>
</tr>
<tr>
<td>Size (w x h x d)</td>
<td>237.5mm x 144mm x 52mm / 9.4” x 5.7” x 2.1”</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Aluminium alloy Mg Si 0.5 powder-coated</td>
<td></td>
</tr>
<tr>
<td>Operating Temp</td>
<td>-20 to +60 °C</td>
<td></td>
</tr>
<tr>
<td>Storage Temp</td>
<td>Storage for up to 12 months -20 to +35 °C Nominal +20 °C</td>
<td></td>
</tr>
<tr>
<td>IP Rating</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>

### 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 the 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)
- **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**

### BOND TESTING SPECIFICATION

- **Operating Mode**: Pitch-Catch Tone Burst
- **Display Modes**: RF (A-scan waveform), Impedance Plane (Flying Spot), Frequency Spectrum, Time base Scan*, Encoded Scan*
- **Signal Processing**: Rectification: RF, Positive half wave, Negative half wave, Full wave
- **Filtering**: Low pass filtering of Amplitude / Phase
- **Pitch Catch Mode**: Waveform: Tone burst with fixed or swept frequency
- **Operating Voltage**: 6, 9, 12, 18, 24, 30, 36V
- **Operating Range**: 1kHz to 100 kHz – probe dependant
- **Sample Rate**: 440k/S
- **Time base range**: 100us to 2ms
- **Time base delay**: 0us to 1ms
- **Pitch-catch Probe**: Adjustable threshold, start and width
- **All Errors at 90% Confidence Level**
- **Multiple alarm regions, sector, box and circle**
- **Automatic inspection frequency with manual adjustment**
- **Ausable and visual alarm on instrument display and probe**

### Equipment Kit

**STANDARD ETHERCHECK KIT - KIETH001**

ETHERCHECK combined bond tester & dual frequency eddy current flaw detector including:

- NB. Probes and cables extra.

### OPTIONAL ACCESSORIES

- **AAER002** Hard Transit Case
- **AAER004** Protective Splash Proof Cover (WeldCheck2, WeldCheck+,
AeroCheck2, AeroCheck+)
- **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