Filus EC-1

Single Rail Eddy Current Trolley to detect surface-breaking defects.
The FILUS EC-1 Trolley is a hand-pushed trolley, specially designed to check a single rail using Eddy current methods.

The trolley uses a single eddy current probe and is capable of continuous inspection of the rail for defects which break the surface of the head of the rail. Inspection of the gauge corner and face for head checks is also possible due to the unique design of the probe.

The on-board computer-controlled Eddy current flaw-detector can trigger an audible and visual warning should a defect be indicated; the display shows the presence of potential defects in the rail and the complete inspection is continuously recorded for later analysis.

Rugged, collapsible and totally self-contained, the FILUS EC-1 trolley for rail inspection can be easily carried to site. The FILUS EC-1 can be set up in a few minutes by only one operator without tools.

The FILUS EC-1 is hand-pushed along the track under test, at a normal walking pace, providing a highly accurate test of the rail surface.

The system uses a unique Probe designed to follow the shape of the top and gauge faces of the rail. The probe is held off the rail at a nominal 1mm gap. Sprung Diablo wheels and a floating mechanism ensure that the probe is kept in the correct orientation at all times, irrespective of the position of the trolley.

The Filus EC-1 system is composed of the following elements:-

The main trolley is composed of the main body (lower part) and a collapsible handle.

The trolley can be folded down in seconds to enable the operator to start testing as soon as inspection area is reached.

The probe carriage assembly held off the rails by adjustable height rollers to ensure a constant gap between probe and rail.

Sprung Diablo wheels to ensure a good reference to the gauge face.
**Operation**

The Filus EC-1 is straightforward in use. The operating parameters remain set for the majority of operation, the only setup required is calibration against a known-size slot in a test piece then the unit is placed on the rail and the probe block lowered onto the surface. The system is then ‘balanced’ (an automatic operation to null all readings on a clean section of rail) then the distance counter is reset and recording can be started. The display will show data at the current point.

When carrying out a continuous test we can get a trace -v-distance:-

Or as a Vector Display; Or both views can be shown simultaneously

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**ETher NDE Rail Probe (Widescan)**

Rail probes are used in conjunction with an ETher NDE portable flaw detector for rapid rail inspection, they can detect surface breaking flaws, lightness, and overcome consistency problems associated with ultrasonic couplant and higher surface speed capability.

These probes can be coupled to a manual or automatic trolley to aid inspection, I/O and data logging systems can be introduced to ensure comprehensive documentation of test results.

The Rail probe is also equally applicable to wheels and other rolling stock areas such as axles. Rail probes offers an extremely efficient and cost effective solution to detecting surface breaking flaws typical of rolling contact fatigue.

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A rotary encoder to provide distance information to the software and synchronise the sample rate with the speed.

The Rail probe, a single probe that is capable of detecting orientated flaws in one pass of the rail head, giving depth (size) of the flaw.

The Flaw detector, an Ether NDE ‘Railcheck’ hand-held Eddy current flaw detector, modified for specific rail inspection. The position of this can be adjusted by the operator using the ‘RAM’ mount.
**Specifications: ETHER NDE RailCheck - IRAL001**

### Probes
- Connectors: LEMO 2B 12 way
- Modes: Absolute, Bridge, Reflections, Conductivity and Rotary 600-3000 rpm ETHER Mercury Drive (ARD002).

### Frequency
- Overall: Dual Frequency 10Hz - 12.8MHz

### Gain
- Overall: -18 to +100 dB, 0.1, 1 and 6dB steps (100dB Max)
- Input: 0dB or 12dB
- Drive: 0dB, 6dB and 10dB (0dB ref 1mW into 50Ω)
- Max X/Y Ratio: +100dB

### 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, whichever 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, whichever is lower in 1 Hz steps.

### Balance
- Manual: 4 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: Fully configurable, Freeze, Tone or visual.
- Output: Open collector transistor (25v dc at 10mA max)

### 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. Screen 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
- Graticule: 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
- Position Readout: Display of all settings in Legacy Format

### Removable Data Storage
- Setup Storage: micro SD up to 32GB, holding over 10,000 settings
- Stored Screen Shots: 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 200km max per 2GB file.

### Outputs
- PC Connectivity: USB (Full PC remote control plus Real Time data)
- Digital Alarm: On Lemo 12-way Open collector transistor (25v dc at 10mA max).
- VGA: Full 15-way VGA output

### Languages
- English, French, Spanish, Russian, Japanese, Chinese, Turkish.

### Power
- External: 100-240 v 50-60Hz 30 Watts
- Battery: Internal 7.2V nominal @ 3100mAh = 22.32 watt.hr
- Running Time: Up to 8 hours with a 2MHz Pencil Probe 30% Back Light
- Charging Time: 2.5 hrs. charge time, Simultaneous charge and operation

### Technical Data - Trolley

#### Dimensions (depending on gauge and probes configuration):
- Length
  - Unit Stowed: 889mm (35”)
  - Operational above rail top: 664mm (26.2”)
- Width: 249mm (9.8”)
- Height
  - Unit stowed: 327mm (12.9”)
  - Operational above rail top: 963 mm (38”)
- Total mass in operating regime: 9.5kg (21lbs)

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