

# RAILCHECK & 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.

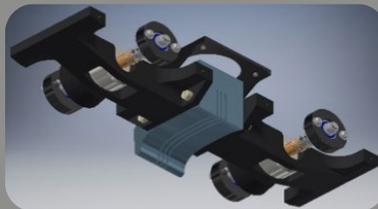
The system uses a unique Probe designed to follow the shape of the top and gauge faces of the rail. The probe is held off the rail at a nominal 1mm gap. Sprung Diablo wheels and a floating mechanism ensure that the probe is kept in the correct orientation at all times, irrespective of the position of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

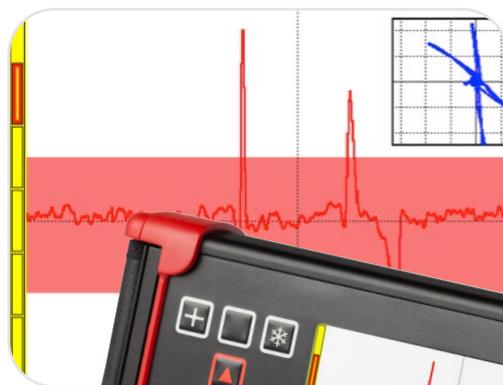
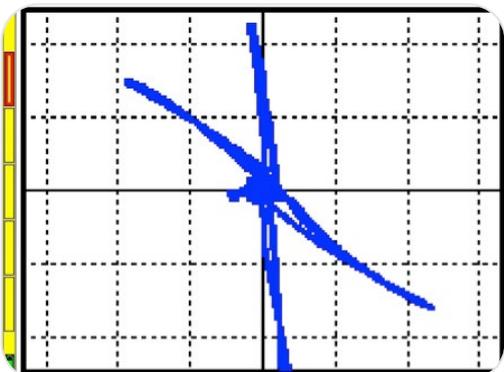
## Operation

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.

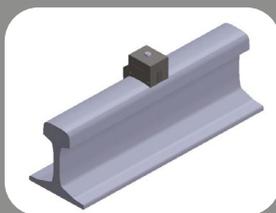
When carrying out a continuous test we can get a trace -v-distance:-



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



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



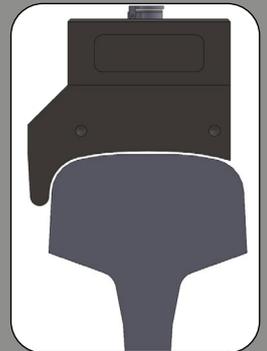
The Rail probe, a single probe that is capable of detecting orientated flaws in one pass of the rail head, giving depth (size) of the flaw.

## 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.



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		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/YRatio	+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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