



Rowe Hankins Ltd

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Products & Services Guide



Proud to be part of



**Railway Industry
Association**

The voice of the UK rail supply community

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Introduction

Now under new ownership and management, Rowe Hankins specialise in innovative trainborne and wayside products and systems for the worlds railways. Working closely with rolling stock manufacturers, fleet operators, track owners and infrastructure contractors our experienced engineers have a long and successful track record of providing the highest level of service to rail projects worldwide.

For over thirty years and with a global reputation for quality, reliability and innovation, Rowe Hankins have been designing, manufacturing and supplying a diverse range of products including:

- Geartooth Tachometers & Speed Sensors
- Magnetic Encoders
- AC & DC Non-Intrusive Current Monitors
- RCBO's & Circuit Protection
- Intelligent Friction Modifier and Lubrication Systems

In addition, the UK manufacturing site has a dedicated repair and overhaul facility providing a high quality and cost effective service for a range of electro-mechanical and electronic products for high voltage, and high current AC & DC systems.

For more information contact:

+44 (0) 161 765 3000 | sales@rowehankins.com | www.rowehankins.com

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Our Services

Type E Ub48V (+25%, -30%)
20°C: $2,5\Omega \pm 8\%$
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HBM 431204 P1



Service & Overhaul

High Current DC Testing

Engineering Design & Consultancy



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Engineering Design & Consultancy



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For over 30 years and with global reputation for quality, reliability and innovation. Rowe Hankins have been designing, manufacturing and supplying a diverse range of products & systems.



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What can we do?

Our professional engineers have a wealth of global railway knowledge and experience. By growing their experience in the rail industry for many years, our engineering team have the expertise to meet the requirements demanded by the industry standards, our customers and the Safety Approval Authority.

By developing new systems and products from design concept through to in-service maintenance; our engineers work closely with, and help guide our customers throughout the development life cycle.

Rowe Hankins Ltd. is committed to continual improvement, development and growth with a complete understanding of their customer, end-user and future rail market requirements.



The electro-mechanical service department carries out a variety of work, specifically overhaul, service and repair of:



DC Circuit Breakers



Pressure Switches



Contactors

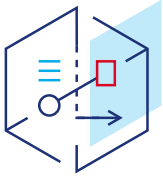


Delta Switches



Overcurrent Relays





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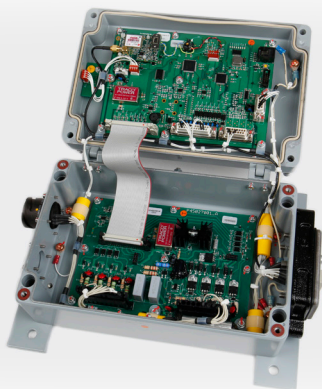
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Engineering & Consultancy

The Rowe Hankins engineering department has a team of professional engineers with electrical, electronic & mechanical principles who deliver all stages from conceptual design, product & system development to final build, test and commissioning.

Industry recognised project management and governance is observed with key milestones and deliverables reported to our customers throughout each stage of the project.



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High Current DC Testing

WARNING!
ATTENTION THERE
BEING MAGNETIC
LOADING OUTPUT
CONNECTIONS.
PROLONGED
TERMINALS
HOT.
OPERATION OUTPUT
RUN AT A SAFE
LEVEL BUT HIGH
CURRENTS THEREFORE DO
NOT SHORT
INDUCTIVE ITEMS
TERMINALS.



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What can we do?

Due to our experience working in the DC Traction Sector, Rowe Hankins have the facilities and are capable of carrying out a detailed high current testing.

Given the parameters required, Rowe Hankins can design a comprehensive testing procedure to meet our clients needs. Such as Contactors, Relays, Circuit Breakers, Bonds and Traction Current Carrying Conductors.

A recent review stated "A "world class" report of the process and testing data was provided to our client upon completion.". This was in relation to a designed testing programme for a Track Impedance Bond.

For high current DC Circuit Breakers, final testing and calibration is carried out by using dedicated high current injection test equipment (up to 5000 Amps). Instantaneous, ramping and continuous currents can be given as an output from the test equipment. For every unit that is repaired, serviced or overhauled at Rowe Hankins, a detailed report is produced for traceability and for customer assurance & compliance documentation.

Overhaul contracts are regularly undertaken to customer service schedules, in low or high volumes.

Rowe Hankins can offer conditional assessments and overhaul capabilities for most electro-mechanical products including reverse engineering where obsolescence is a real world problem.



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Service & Overhaul



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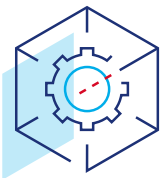
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What can we do?

Our professional engineers have a wealth of global railway knowledge and experience. By growing their experience in the rail industry for many years, our engineering team have the expertise to meet the requirements demanded by the industry standards, our customers and the Safety Approval Authority.

By developing new systems and products from design concept through to in-service maintenance; our engineers work closely with, and help guide our customers throughout the development life cycle.

Rowe Hankins Ltd. is committed to continual improvement, development and growth with a complete understanding of their customer, end-user and future rail market requirements.



Electronic Servicing

The Rowe Hankins electronic service department specialises in service, repair and maintenance of various traction systems including OTMR's (On Train Monitor Recorder).

The diagnostic software/hardware is used to test a range of OTMR's. Bespoke system test equipment to represent all OTMR interfaces can be designed, ensuring full functionality is tested before returning to the customer. With capability to test/repair many other trainborne systems & components such as ; 'Optical Pulse Generators' used for train speed measurement.



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Working with rolling stock manufacturers, train operating companies, track owners and infrastructure contractors, Rowe Hankins provides innovative trainborne and wayside electro-mechanical equipment for safer and more efficient operations.



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Our Products



AC & DC Current Monitoring

Circuit Breakers

Data Loggers

Electrical Harnesses

Judicial Data Recorders (JRU)

Overspeed Protection System

RCBO

Railway Asset Condition Monitoring

Small Signal Current Monitoring (NIC)

Speed Sensors

Tachometers

Wheel Flange & Top of Rail Lubrication

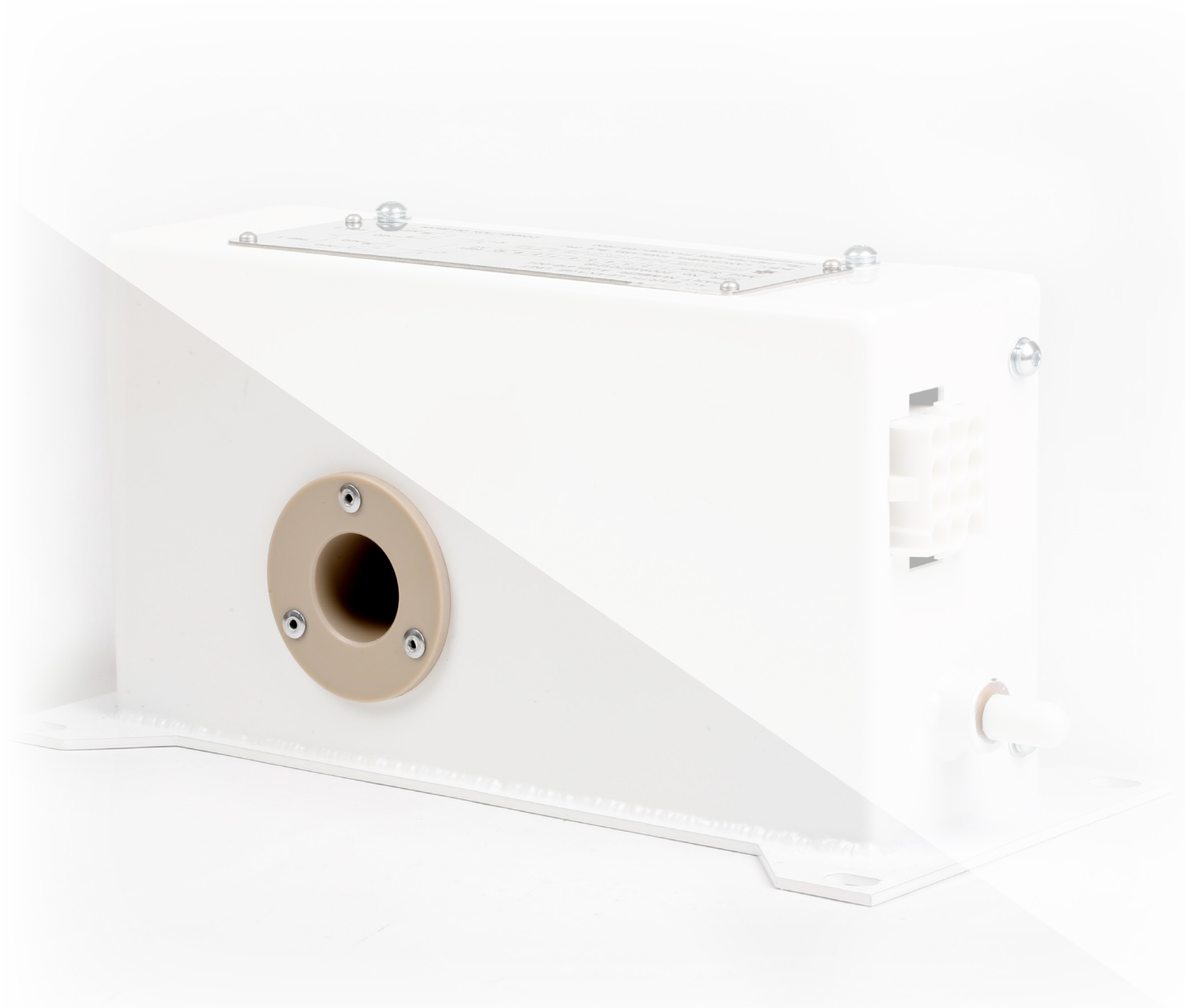


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AC & DC Earth Leakage



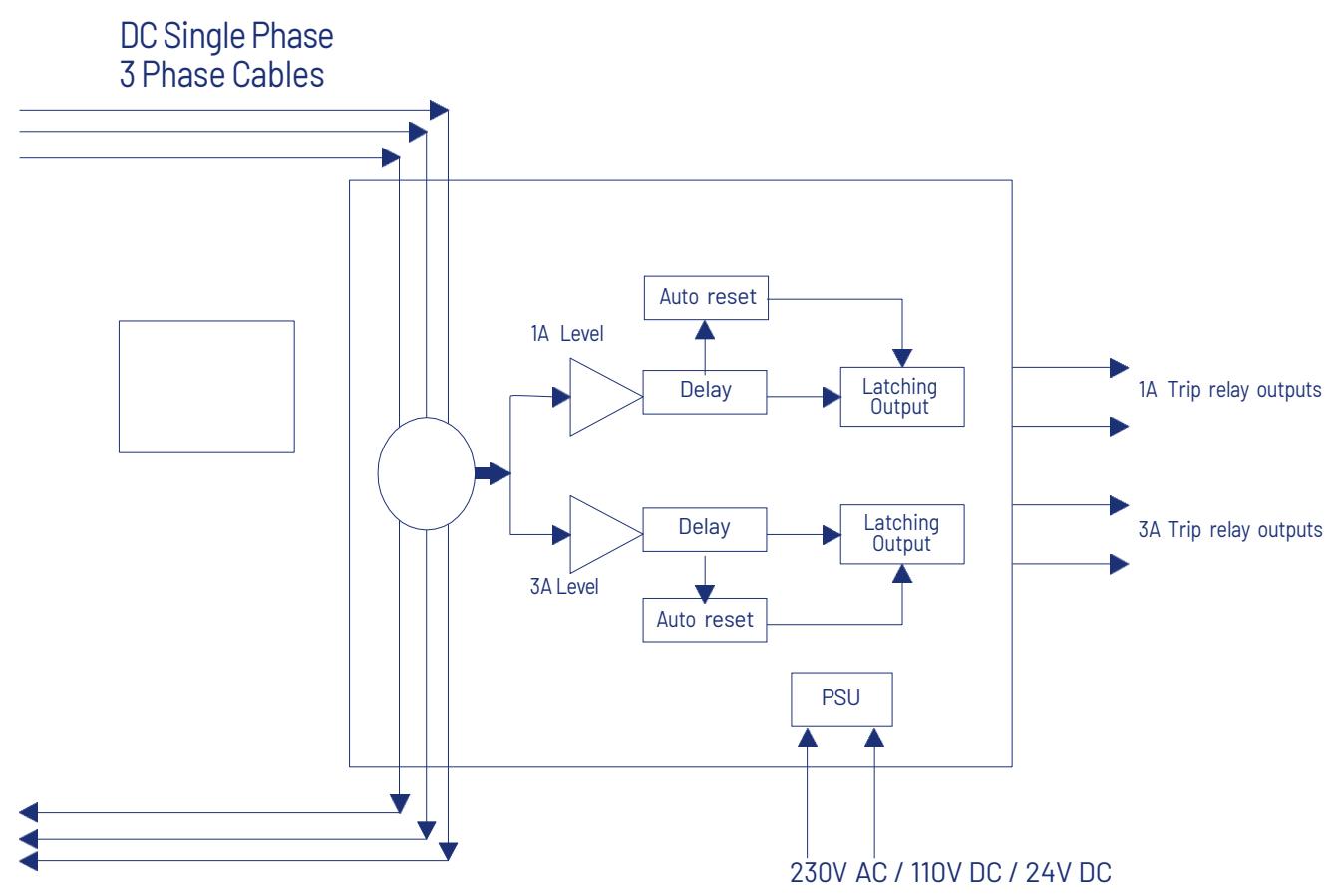
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An Earth Leakage Unit detects current imbalance or earth leakage in AC or DC power supply circuits.

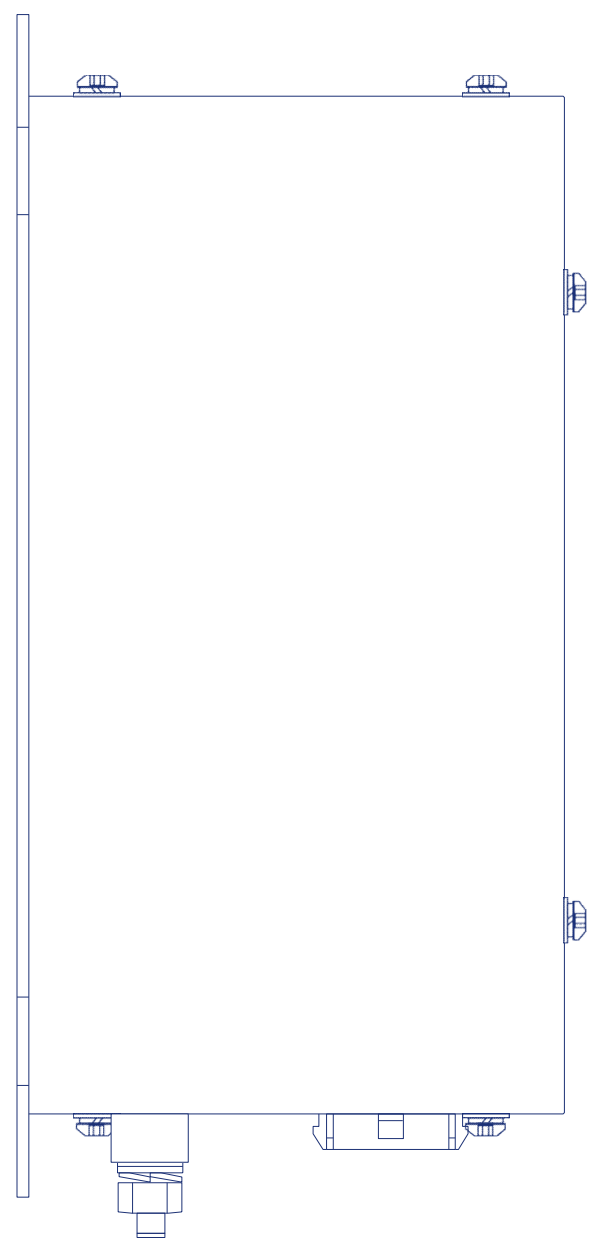
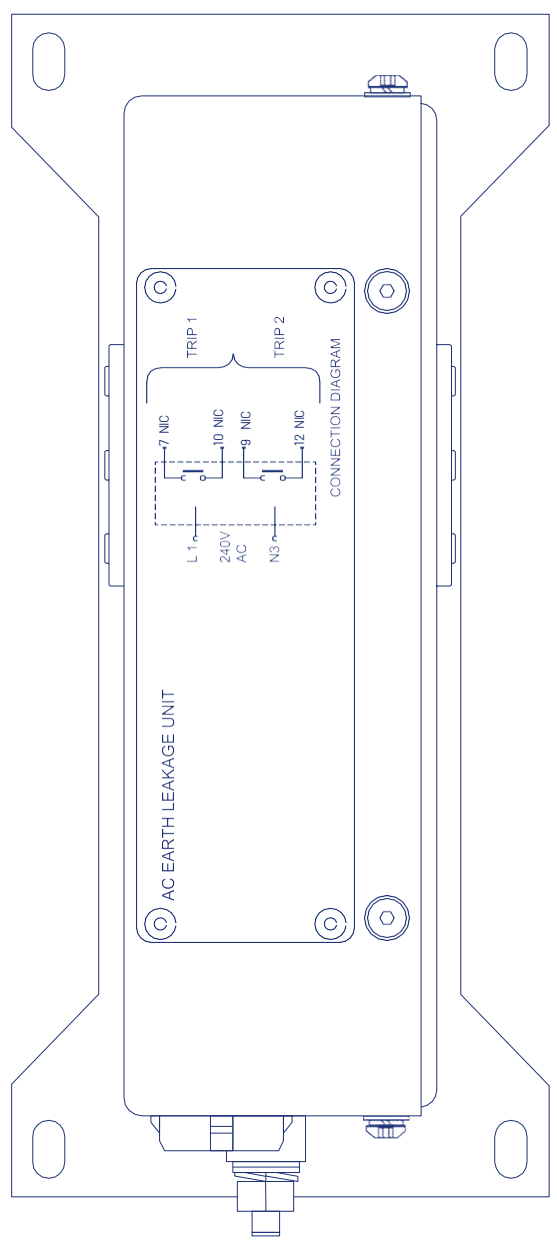
This allows disconnection of supply in a specified time period at a specified leakage current.







The primary conductors of the system are passed through a current transformer or transducer allowing any imbalance or leakage to be detected. Any detected current signal is filtered and processed, and if it exceeds a set limit for a set time, a fault signal is generated. Output fault signals can take the form of voltage free relay contacts.




The faulty state may be latched, requiring unit power-up reset or fault is reset automatically after a specified time if no current imbalance is detected.

Rowe Hankins new dual trip AC Earth Leakage Unit is digitally programmed and is the next evolution of current imbalance detection.



Features & Benefits

-  For protection of AC/DC power supply circuits.
-  Locked fault output requiring active reset.
-  Compact IP20 rated steel enclosure
~(Length: 252mm, Height: 117mm, Width: 100mm).
-  Cable aperture is ~14mm in diameter.

-  Bespoke settings for customer requirements.
-  Compact steel IP20 rated enclosure
-  Compliant to Standards:
BS EN 50155:2007, BS EN 60529:1992,
BS EN 50121-3-2:2006, BS EN 61373:2010

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Circuit Breakers



Precise, nuisance-free circuit protection

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Hydraulic magnetic circuit breakers offer high performance with high current applications. They provide precision protection and offer great advantages, such as elimination of nuisance tripping and continuous operation at 100% of current. The circuit breakers are immediately resettable and are temperature independent. They are available with a choice of non-delayed or time-delayed trip characteristics.



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Rowe Hankins supply two main ranges of Circuit Breakers, the RH and the MRH range to suit a wide application range. With current ratings up to 100A (for specific applications) employing the use of hydraulic magnetic technology.


Features & Benefits


 Continuous operation at 100% rated current at temperatures between -40°C and +85°C.


 Low smoke and zero halogen.


 1-6 poles are available with multiple poles internally coupled; series or relay configuration with auxiliary contacts.


 The range has a minimum of 10,000 switching operations.

 DC, 50/60Hz, AC/DC and 400Hz options.

 A simple On/Off toggle switch, this signage enables the Circuit Breaker to be fitted in either standard or reverse orientation.

 Increased shock and vibration parameters.

 Available with M5, M6 or UNC stud terminals.

 There is a choice of various trip curves available, instant, motor start and high inrush.


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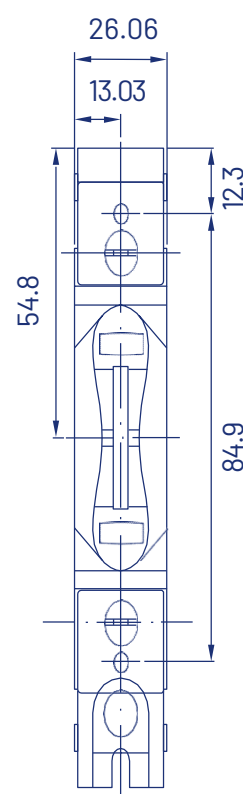
The RH Range

The RH Circuit Breaker family is available from single pole units up to 6 poles. Each pole can be independently configured in terms of each terminal type and trip configuration to suit any application requirement.

The RH Circuit Breaker is designed to protect systems that in particular may have a high inrush current present upon start up, without the sacrifice of functionality or longevity of the products lifespan. Also, for systems that may be susceptible to a high interrupt capacity.

Terminal configuration

The RH range of Circuit Breakers can be supplied with a variety of different terminal configurations; screw terminals, stud terminals or solderless connections. The choice of stud terminals is available with rear connections. Alternatively, screw terminals or solderless connections are available with front connections.



All dimensions are in millimeters



Mounting

The RH Circuit Breaker mounting is achieved with the use of M4 mounting inserts.

Description	<p>Single or Multi-pole general purpose medium current Circuit Breaker.</p> <p>Compact E-Frame configuration.</p> <p>Wide choice of trip delays; remote off, shunt trip, auxiliary switch, relay trip & high inrush.</p>
Handle colour and marking	White toggle as standard with Black I/O identification.
Current & Voltage Rating	<p>100A at 600V, 20 to 60Hz from a sinusoidal supply, or 125VDC.</p> <p>The contact is capable of rupturing short-circuit currents of up to 7,500A under certain conditions.</p>
Operating Temperature and Environmental conditions	-40°C to +85°Cm Relative Humidity: 0-100%. Atmosphere Saline.
Auxiliary Contacts	NO / NC contacts activated by the function of the Circuit Breaker. The maximum rating of the auxiliary contacts is 10A, 250Vac, 50/60Hz.
Insulation	<p>Circuit Breaker withstands voltage ratings. Test conditions; (AC, RMS, 50Hz for 1 minute).</p> <p>Main Contacts - mounting points 3,100V</p> <p>Main Contacts - auxiliary contacts 3,100V</p> <p>Auxiliary Contacts - mounting point 2,500V</p>
Terminal configuration and Torque settings	<p>M6 45mm terminals are standard.</p> <p>Maximum torque on main terminals studs are 34-40Nm.</p>
Approvals	<p>EN 45545-2</p> <p>EN 60934</p> <p>EN 60529</p> <p>EN 50125-1</p> <p>EN 61373</p> <p>EN 600628-2-38</p> <p>EN 690068-2-11</p> <p>UL recognised</p> <p>CSA certified</p> <p>VDE approved</p> <p>CE compliant</p> <p>CC approved NF</p> <p>F62-001 NF</p> <p>F16-101 REACH</p> <p>RoHs</p>
Trip curve data sheet, available on request.	



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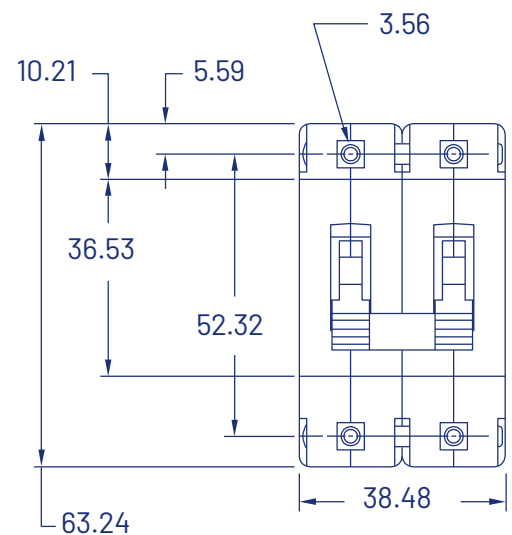
The MRH Range

The MRH Circuit Breaker family is available in a single pole and up to 4 poles as standard. 5 and 6 poles units are subject to availability. Each pole can be independently configured in terms of terminal type and trip configuration.

The MRH Circuit Breaker is designed to protect systems that in particular may have a linear inrush current present upon start. Also, for systems that may be susceptible to high interrupt capacity, typically up to and including 5KA.

Terminal configuration

The MRH range of Circuit Breakers can be supplied with a variety of different terminal configurations; stud terminals, (M6, 1/4-20, M5, 10-32) screw terminals, clip terminals and bullet terminals. All terminal variants are available with the rear connection.



All dimensions are in millimeters



Mounting

Circuit Breaker mounting is achieved by M3 mounting inserts.

Description	Single or Multi-Pole general, with current monitoring capabilities of up to 100A for 24Vac systems and 50A for 425Vac systems. A wide choice of trip delays; remote off; shunt trip, auxiliary switch, relay trip & high inrush.
Handle colour and marking	Black toggle as standard with black I/O marking.
Current & Voltage Rating	5-100A, 110VDC to 240Vac, 5-100A, 240Vac 50/60Hz 5-50A, 415Vac 50/60Hz, Units rated for 240/415Vac and above 50A. Not suitable for across the line motor starting.
Operating Temperature and Environmental conditions	-40°C to +85°C, Relative Humidity: 0-100%. Atmosphere Saline.
Auxiliary Contacts	Non VDE approved switches have a maximum UL rating of 10A, 250Vac, 50/60Hz: 3A, 50Volts DC. The maximum VDE ratings are 1A, 125 Volts, 60Hz and 0.1A, 125 Volts, 60Hz. Connection achieved via 2.8mm quick connect terminals.
Insulation Dielectric strength	The MRH Range protectors withstand 3750Vac, 60Hz for 60 seconds between all electrically isolated terminals. The auxiliary switch terminals shall withstand 600Vac, 60Hz. Four terminal dual coil and relay construction will withstand 1500Vac.
Terminals	M5 terminals are standard unless the current rating is 80A or over in which case M6 terminals are used. Maximum torque settings are 2mm, 3mm and 4mm respectively.
Approvals	EN 45545-2 EN 60934 EN 60947-2 EN 60529 EN 50125-1 EN 61373 EN 600628-2-38 EN 60068-2-11 UL recognised CSA certified VDE approved CE compliant CC approved NF F16-101 REACH RoHs

Trip curve data sheet, available on request.



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Data Loggers



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On-train (Trainborne) multi-input data loggers for vehicle fault & crash data acquisition and interrogation.



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Industry proven data logger for digital, analogue and speed signals.

The data loggers collect all mandatory and additional signals. The data is stored in a crash protected memory with a chronological time-stamp and also allow for real-time monitoring.



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What are Data Loggers used for?

Real-time monitoring, data capture and recording.
The loggers can be configured for functional outputs to other trainborne systems, such as TCMS.

They are predominantly used for time-stamped data analysis in the event of a vehicle, driver or signaling incident.

Inputs and outputs may be fully customised for various vehicle types, utilising an industry standard 19" rack mount, one-euro-card hot replaceable / swappable in a chassis mount unit.

Features & Benefits

 Safety Integrity Level 2 compliant. Crash Protected Memory Modular Construction 19" rack system. Software is supplied with the product. Proven use with ETCS & CBTC. Multi-vehicle BUS as standard. Live event data via on-board connectivity. Pulse / voltage or current I/O available. Compatible for all forms of speed sensors.

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Electrical Harnesses



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Cable harnesses for rail vehicles, mobile plant equipment, crane and gantry-cranes.

Applications

- Industrial
- Military
- Trackside / Wayside

Key Functions

- Loom Assembly
- Cable Harness
- Engine Bay
- Oil Resistant
- High Temperature
- Low Smoke
- Zero Halogen
- EN 45545
- EN 61373
- EN 50121



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From a basic single-core setup to multi-core configurations, including high-speed data lines and RF-screened cables designed to prevent electromagnetic interference.


Harnesses designed and configured for specific applications and environments, such as those containing high-moisture, dust, oils, chemicals and localised heat.


What can we do?


We provide a full design and manufacturing service complete with technical drawings, installation manuals and test and servicing plans.


Features & Benefits

 We are able to produce wire looms and harnesses with various connectors and interfaces.

 Looms and harnesses can be designed to meet stringent fire safety regulations.

 Can be designed and manufactured to operate in high temperature and oil environments.

 RF and telecoms interconnection systems with low-loss transmission characteristic and system impedance matching.

 Harnesses made for specific routing and fixing requirements and easy maintenance.


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Judicial Data Recorders (JRU)



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Judicial Data Recorders (JRU) are a crucial part of any rail vehicle system integrity regarding train control and monitoring system (TCMS) and its interaction with signalling systems such as ERTMS and CBTC.



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SIL2 certificated for use on rail vehicles for modern on-board signalling.


What do JRU's do?

JRU's monitor and log at a high-data capture rate, crucial safety, critical systems on a rail vehicle that can be used for analysing time-stamped data in the event of an incident.

JRU's contain crash protected memory to ensure that data is recoverable in the event of an incident.


The system is certified to SIL2 (Safety and Integrity Level 2) to meet the requirements of ERTMS / ETCS.


Features & Benefits


 Compatible with onboard and trackside signalling systems.


 Software is supplied with the product.


 Safety Integrity Level 2 compliant.


 Crash Protected Memory


 Modular Construction 19" rack system.

 In the case of incidents vehicle conditions and driver actions can be retrieved.

 Each with 2 input signal.

 Data logs can be extracted and analysed through analysis software.

 Proven use with ETCS & CBTC.

 Two safety analogue outputs with signals in current or voltage proportional to the speed.


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Overspeed Protection System



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Overspeed protection for trams, trolley-bus, industrial locomotive and rail plant.

Intelligent overspeed protection.

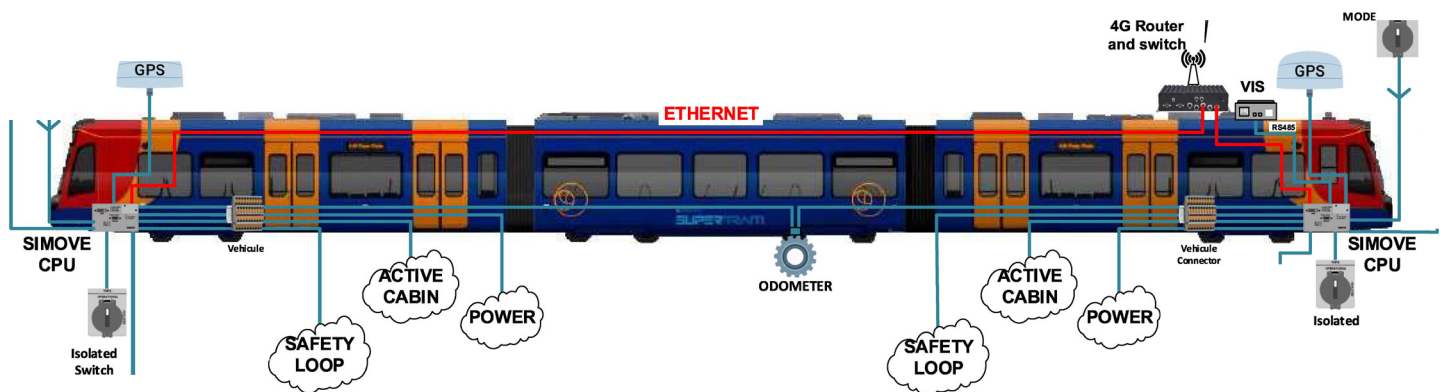
What is an Overspeed Protection System?

An Overspeed Protection System is a common hardware, software configured system that utilises speed reference data, GPS and operators control inputs to manage fixed and temporary speed restriction limits on a mapped topological network.

The system learns both the route of the vehicle and the operators / drivers behaviour to create a smooth operating system that safely protects key over-speed areas with limited operator / driver interaction.

The system also offers realtime data and configuration for temporary speed restrictions to be sent to the vehicles over a secure LTE network connection and shall further feedback relevant vehicle movement data and high traffic load conditions.

We provide flexibility in the installation design to fit most applications.



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RCBO: Residual Current Breaker Overload



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The RCBO is a hydraulic magnetic Circuit Breaker with the added benefit of residual current protections, the RCBO family is available in both 2 pole and 4 pole configurations.

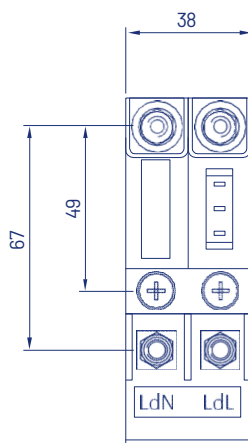
The time delay of the RCBO can be chosen for either fixed or inverse time delay according to customer specifications, typically 80ms or 100ms fixed time delay. Current imbalance trip levels range from 5mA up to 300mA depending again on the customer requirements, typical trip levels are 30mA, 100mA and 300mA.

The functionality and the operation of the RCBO can be verified in situ with the use of a test button. A test signal is injected into the internal circuitry, thus verifying the mechanical and electrical functionality of the RCBO.

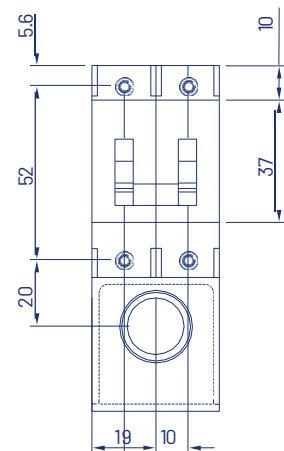
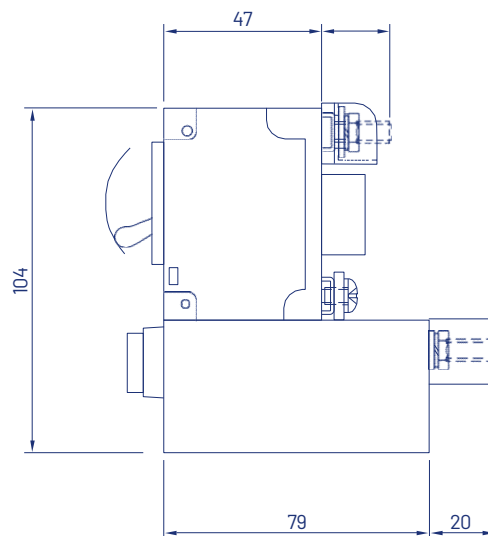
Terminal configuration

Electrical connections to the units are achieved via M6 stud terminals as standard. M5 terminals are also available upon request including UNC imperial sizes.

N/O and N/C auxiliary contact are supplied with the RCBO as standard, allowing the state of the Circuit Breaker to be continuously monitored.



All dimensions are in millimeters

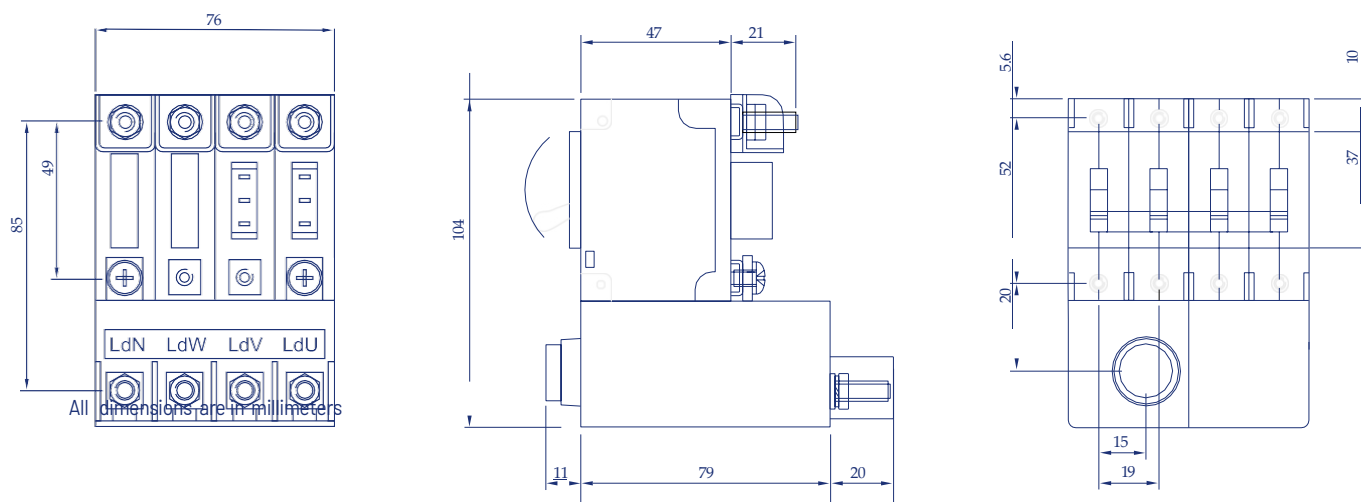


Mounting

The Circuit Breaker mounting is achieved by M3 mounting inserts.

Description	2 and 4 pole configurations are available to protect 24Vac systems and 415Vac systems with current ratings up to 50A.		
Handle colour and marking	Black toggle as standard with black I/O marking.		
Current & Voltage Rating	5-50A	240Vac	50/60Hz
	5-50A	415Vac	50/60Hz
	Units rated for 240/415Vac up to and including 50A.		
Operating Temperature and Environmental conditions	-40°C to +85°C, Relative Humidity: 0-100%. Atmosphere: Saline.		
Auxiliary Contacts	Non VDE approved switches have a minimum UL rating of 10A, 250 Vac, 50/60Hz: 3A. 50Volts DC. The maximum VDE ratings are 1A, 125 Volts, 60Hz and 0.1A, 125 Volts, 60Hz. Connection achieved via 2.8mm quick connect terminals.		
Terminals	M6 stud terminals as standard, M5 stud terminals available upon request.		
Approvals	EN 45545-2 EN 60947-2 EN 50125-1 EN 600628-2-38 UL recognised VDE approved CC approved NF F16-101 RoHs	EN 60934 EN 60529 EN 61373 EN 60068-2-11 CSA certified CE compliant NF F62-001 REACH	

Trip curve data sheet, available on request.



The background of the slide is a close-up photograph of a complex mechanical part of a railway engine, likely a valve gear or similar component. The metal is dark and shows signs of wear and oil. The image is partially obscured by a large, semi-transparent white diagonal shape that serves as a design element. In the top right corner, there is a list of three items, each preceded by a red-outlined hexagon containing a white plus sign.

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Railway Asset Condition Monitoring

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Real-Time Railway Asset Condition Monitoring System

Introducing the RH-xR Condition Monitoring System

A sophisticated blend of advanced signal processing algorithms combined with the prowess of machine learning, AI, and real-time machine operating state analysis with 96.60% accuracy

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Bogie Main Bearing

- Outer race
- Inner race
- Ball damage
- Cooked bearing on the shaft
- Cooked bearing in the housing
- Cage damage
- Creeping damage
- Radial and axial clearance
- Overload



The Wheel-Rail Mechanism

- Wheel wear
- Rail crack or breakage
- Rail wear and slippage
- Rail joint intricacies
- Generator grounding issues



Coupling

- Coupling unbalance
- Parallelism in coupling faces
- Coupling wear
- Coupling misalignment
- Locked coupling
- Wedge damage



Gear Boxes

- Tooth skiving
- Tooth wear
- All Gear-mesh frequencies
- Overload
- Eccentricity
- Misalignment
- Backlash
- Cracked and broken teeth
- Hunting tooth frequency



Main Engine

- Broken / cracked rotor bars
- Loose rotor bar joints
- Stator eccentricity
- Eccentric rotor
- Thermal rotor bow
- Loose rotor on the shaft
- Loose stator windings
- Shorted laminations
- Loose connector phasing
- Leakage defects



Compliance and Certifications

- IP69K
- EN 50155:2007
- EMC Directive 2004/108/EC
- MIL-STD-461E
- MIL-STD-461F
- MIL-STD-461G
- MIL-STD-810H
- EN 61010-1
- 2006/95/EC Low Voltage



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Real-Time Monitoring:

1. Continuous data collection from the mechanical system in real-time.
2. Sensors for vibration, speed, and temperature offer a holistic system health overview.

Embedded AI and Machine Learning:

1. AI-driven analysis using embedded Machine Learning algorithms.
2. Enhances anomaly detection for potential issues.

Mobile App Interface:

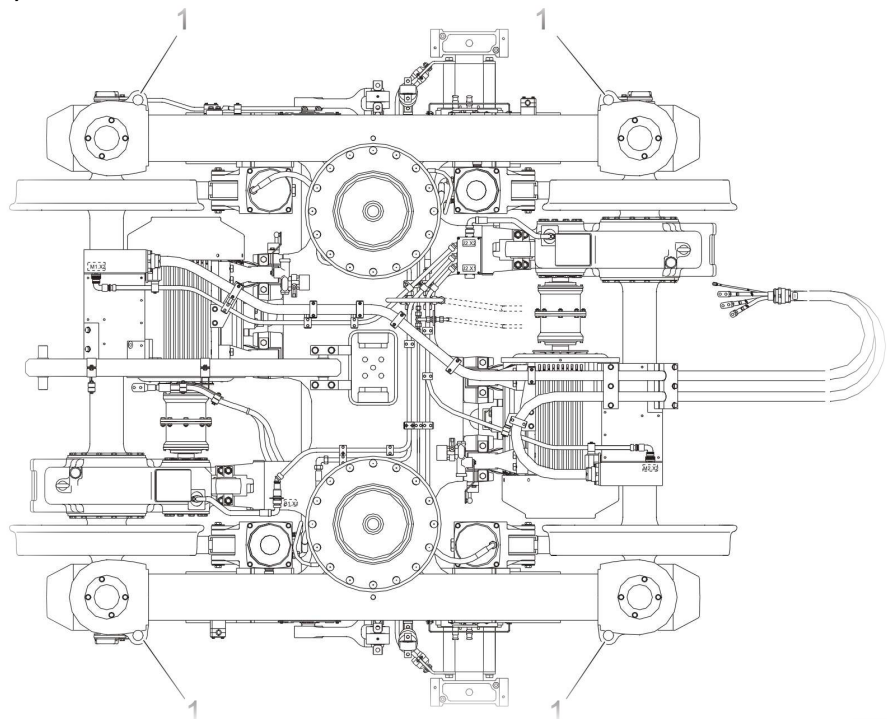
1. User-friendly mobile app delivers AI analysis results.
2. Empowers quick decision-making for operators and maintenance personnel.

Integration of IoT, Big Data, AI, and Telematics:

1. IoT ensures seamless connectivity and data exchange.
2. Big Data analytics extracts actionable insights.
3. AI enables predictive maintenance for early problem anticipation.

Has been successfully implemented in;

- TCDD Turkish Railway State
- SBB Cargo AG Swiss Railway
- UZ Ukrainian Railway
- Metro Istanbul
- Metrorex Bucharest Metro (Alstom)
- Transelectrica AG Romania
- BaulN Osterreich GmbH Germany
- Un-Ro.Ro Marine Türkiye
- Tos Çelik A.Ş. Türkiye
- Krom Çelik San. A.Ş. Türkiye
- MeylDiageo Türkiye



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Small Signal Current Monitoring (NIC)



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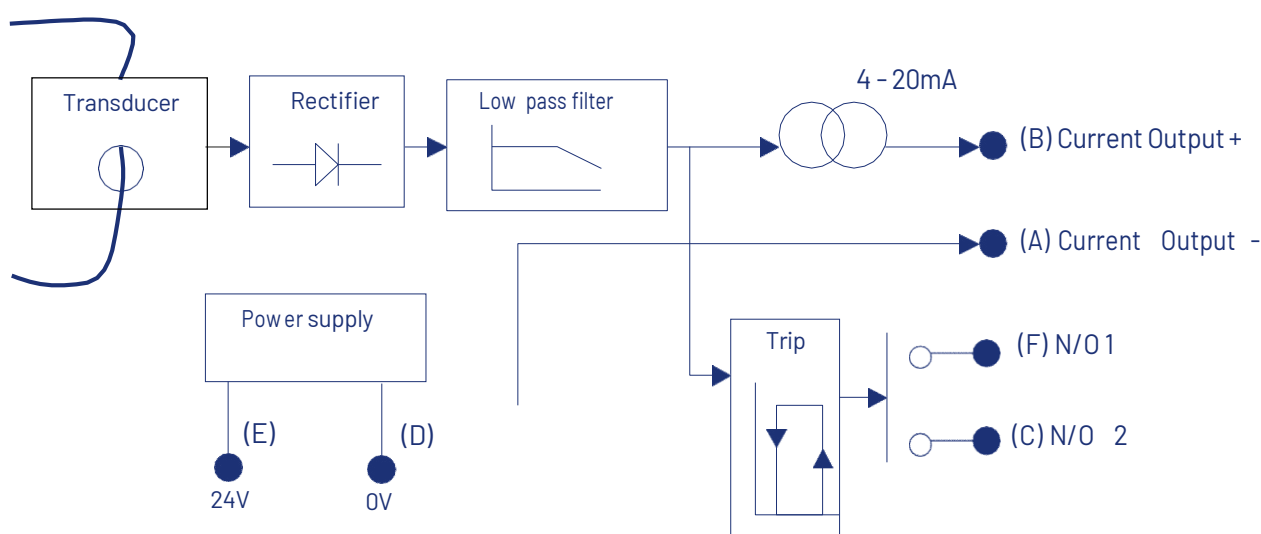
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Non-intrusive Current Monitors (NIC's) are used for wayside applications to assist in preventative maintenance in signalling AC and DC currents.

Indicating signalling and other wayside equipment requires repair or replacement before failure.

The NIC Unit has 4-20mA current loop output and volt-free contacts which activate when the threshold of the device is reached.

Functional block diagram

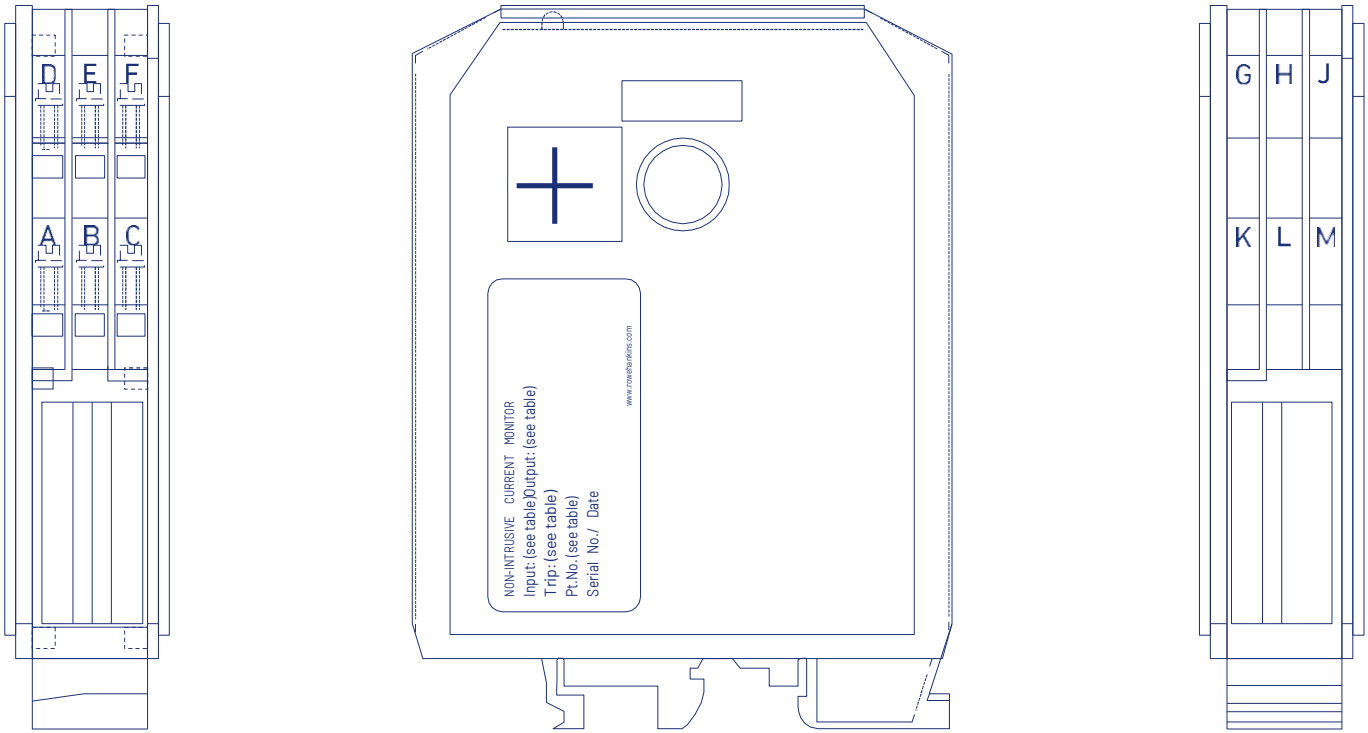


The current carrying conductor of the circuit that requires to be monitored is passed through the aperture of the NIC Unit, internally the conductor passes through a current transducer which provides a voltage proportional to the current being measured. The signal output is then passed through signal processing circuitry (amplification, full wave rectification and filtration) to then provide a 4-20mA current output proportional to the current range being measured.







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




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Features & Benefits

-  Intelligent infrastructure initiative for remote condition monitoring and proactive maintenance.
-  Ability for equipment to be 'fixed before failure'.
-  Enables significant reduction in manual routine inspections.
-  Non-contact measurement of DC currents up to $\pm 600\text{mA}$.
-  4 to 20mA current output.
-  Current trip with relay output.

-  LED trip level indicator.
-  24V DC power supply.
-  Reverse Supply Polarity protection.
-  DIN rail mounting.
-  Unipolar versions are also available.
-  Network Rail approved.
-  The product is RoHs and WEEE Compliant.



Primary Current I_{pmax}	Value	Units	Notes
	± 100	mA	Type 1
	± 200	mA	Type 2
	± 400	mA	Type 4
	± 600	mA	Type 6
	± 600	mA	Type 6a. This is a unipolar monitor.
Output Current			
at $I_p=0$	4	mA	
at $I_p=I_{pMax}$	20	mA	
Low resistance max	500	ohms	
Trip Level (Optional)	5 to 90% of I_{pmax}	%	Factory set
Hysteresis	30	%	
Trip LED	Red		
Relay Output (Optional)			Only available if trip level set
Voltage	110V dc max	V	
Current	500 mA max	mA	Resistive load
Power Supply			
Volts	24V dc $\pm 10\%$	V	
Current	< 100mA	mA	@20mA load
Power on LED	Green		
Frequency Response	DC to 40Hz DC to 5Hz (Type 6a)	Hz	3dB
Step response	50 ms typical	ms	To 90%
Accuracy	± 2	%	
Operating temperature	-20 to +85	$^{\circ}\text{C}$	

Electrical Connections

Signal	Terminal	Notes
+24V	E	
0V	D	
Output O/P+	B	
Output O/P-	A	
Relay Output N/O1	F	Connections only available if unit has trip setting
Relay Output N/O2	C	
Primary Current	N/A	Cable passed through side hole

Mechanical Data

Case - DIN Rail	Value	Units	Notes
Width	22.5	mm	
Depth	60.5	mm	
Height	98	mm	
Primary cable hole diameter	11	mm	
Material	Polyamide		
Mass	110	g	Maximum



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Speed Sensors



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A wide range of non-contact, multi-channel Speed and direction Sensors, designed for safety critical systems to operate in harsh environments.









Our range of Speed Sensors use Hall Effect & GMR technology to achieve accurate speed and direction sensing. The maximum air gap is determined by the type of Sensor and the Target/Gear Wheel tooth profile.

Speed Sensors supplied with up to 4-galvanically isolated outputs, allowing for customer application flexibility in the number of channels required.

The 4 Channel Speed Sensor can be used to replace existing single and dual channel Speed Sensors, as the physical footprint is of the same form of sensors used in typical applications. This means fewer Speed Sensors per train, having a novel design that improves product cost, life expectancy and reliability.

Various output channel drive circuits are available such as: open collector, supply tracking, push-pull and current output. The Speed Sensors are suitable for generating phase-shifted square wave signals proportional to the rotational speed. Pulse generation can be guaranteed down to zero speed corresponding to a frequency of 0Hz.

Features & Benefits

-  Designed to be installed in the harsh rail environment.
-  Various signal output types are available.
-  Single, Dual or multi-channel outputs up to four channels.
-  Capable of measuring from 0Hz to 20Hz.
-  Reverse supply voltage polarity protected.
-  Stainless steel housing in various styles protecting against corrosion.
-  Various terminal connections or connectors.
-  High reliability.



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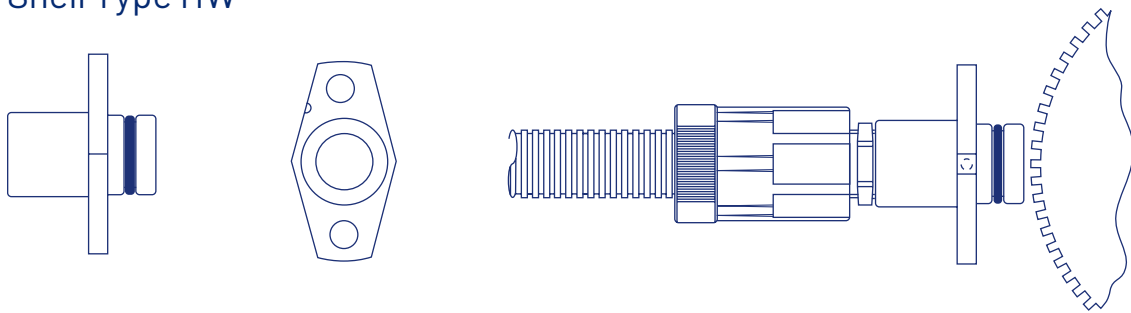
 Deliver

All of our Speed Sensors are designed and manufactured as bespoke products to meet customer requirements.

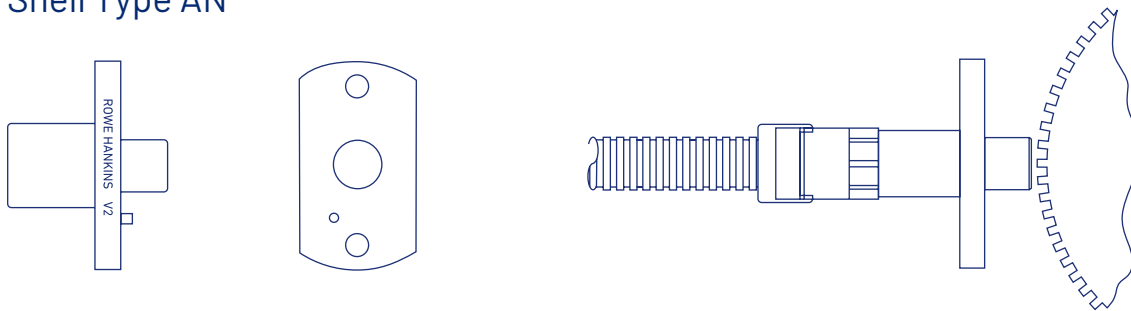
Rowe Hankins selection of standard sensor shell housing styles can be manufactured as shown below. Bespoke standard sensor shells can be designed also.

- Typical standard shell type examples: HW, AN and ST;

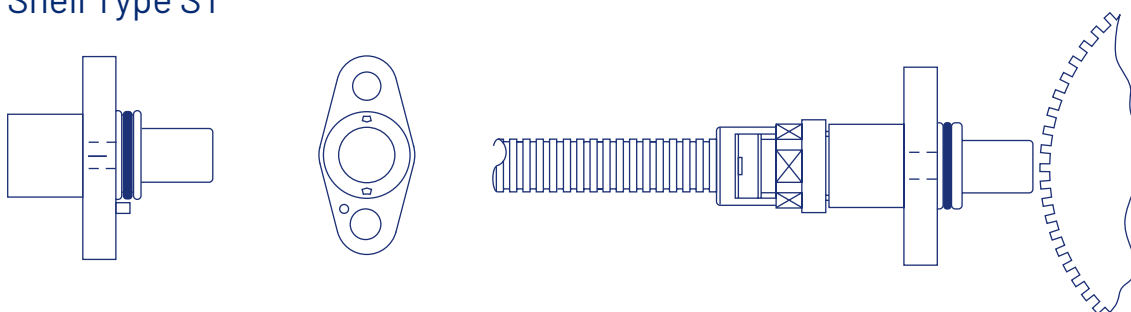
Shell Type HW



Shell Type AN



Shell Type ST





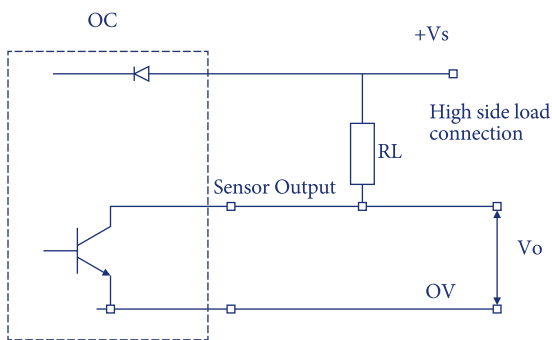
Variations of Speed Sensors.

Industry standard / recognised Sensor electrical configurations are available in four different types;

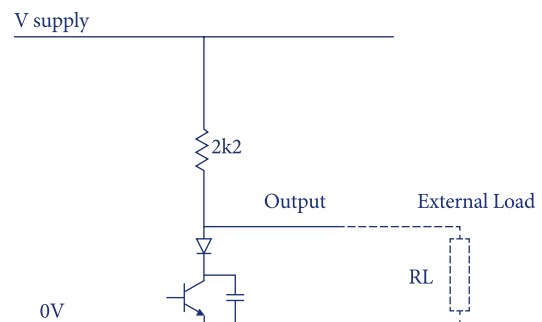
open collector, supply tracking, push pull and current output.

- Industry leading cable manufacturers are used, with bespoke customer specifications also available.
- Connector types are typically MIL-C 5015 bayonet or thread locking. AB, Amphenol, Harting, Souriau, or others upon request.
- Cable protection as required - using PMA conduit as a standard or other types to meet the customers specification.

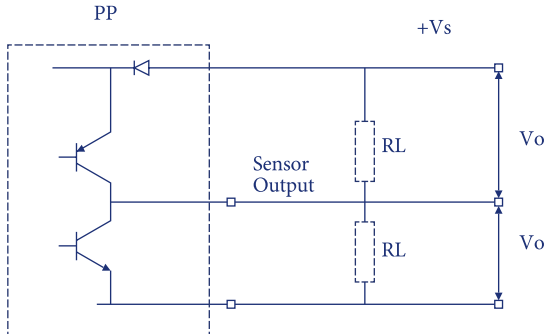
Open Collector



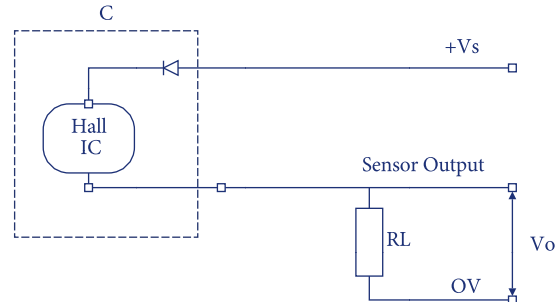
Supply Tracking



Push-Pull



Current Output



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Mechanical

Air Gap:	Typically $1.0 \pm 0.5\text{m}$ (target dependent)
Ambient temperature range:	-40°C to 120°C
Thermal shock:	$\pm 35^{\circ}\text{C}$ over 30 seconds
Relative humidity:	0-98% condensing
Protection class (IEC60529):	IP67
Impervious to:	Oil mist, salt spray, conductive dust
Shock and vibration:	EN 61373 category 3
Sensor housing material:	Stainless steel, grade SAE 30303



Electrical

Sensor Output Type:	Open Collector	Supply Tracking	Push-Pull	2-wire
Power Supply (Vs):	10V-24V DC	10V-24V DC	10V-30V DC	10V-24V DC
Current consumption:	< 12mA for single channel, < 36mA for 4 channels (without load)			
Insulation resistance and test:	Insulation resistance > 100M0hm Flash test @ 600Vrms, 50Hz			
Maximum output source current:	n/a	14mA @Vs=30V	20mA	16mA per channel
Maximum output sink current:	20mA	20mA	20mA	n/a
Number of signal outputs:	1 to 4			
Output waveform:	Square wave			
Signal output low voltage:	Vs < 1.0V @ 20mA	Vs < 1.0V @ 20mA	Vs < 1.8V @ 20mA	n/a
Signal output high voltage:	Supply and load dependant	$(V_s/2k_2+R_L) * R_L$	>Vs - 2V@ 20mA	n/a
Signal output low current:	n/a	n/a	n/a	4-8.4mA
Signal output high current:	n/a	n/a	n/a	16-16mA
Signal output frequency:	0 to 20kHz	0-8kHz		
Phase displacement (2 signal pairs):	90° +/- 45° (target & alignment dependent)			
Duty Cycle:	30%-70% (target & alignment dependent)			
Electromagnetic compatibility:	EN 50121-3-2			
Cable screen termination at sensor end:	According to customer requirements			
Cable (screened):	2 to 8 core, Low smoke, Zero Halogen			
Conduit for cable protection (if required):	Low smoke, Zero Halogen			
Connector (if required):	Typically, MIL-C5015 Bayonet			



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Tachometers



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TACHO Units (axle end mounting)

The Speed Sensor is derived from the standard range of Sensors, typically a dual channel Sensor, that allows for detection of vehicle direction and operates down to zero speed. A steel toothed Target Wheel will typically have 60 to 100 teeth, which is bolted onto the axle end or may be magnetically attached.

An axle end housing, made from stainless steel, supports the mounting of the Speed Sensor, together with cable/ conduit strain relief if required. The housing with the Sensor is securely bolted onto the axle end.

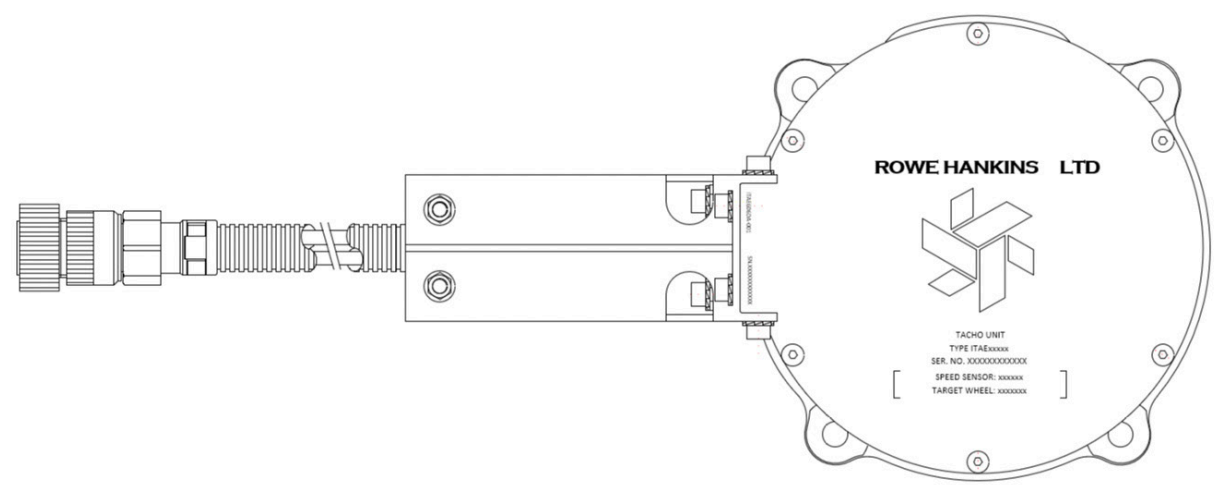
The benefit of Rowe Hankins supplying a Tacho Unit is that it is designed and tested as a subsystem ready to install onto the vehicle.

A complete Tacho Unit design meets mandatory and customer specific verification requirements which are governed by the following BS EN standards.

BS EN 50155 - Railway Applications
Electronic equipment used on rolling stock.

BS EN 50121-3-2 - Railway Applications, Electromagnetic compatibility (pt3-2 Rolling stock - apparatus).

BS EN 61373 Category 3 - Axle mounted equipment.
Shock and Vibration.



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Typical technical properties are listed below:

General

Numer of pulses per revolution:	110
Number of output channels:	2
Air gap (between sensor and target):	1.0mm ±0.5
Ambient temperature range:	-25°C to 80°C
Thermal shock:	+/- 35°C (95°F) over 30 seconds
Relative humidity:	0-98% condensing
Protection class (BS EN 60529):	IP67
Shock and Vibration:	IEC 61373 category 3 - Axle mounted equipment
Cable & Conduit Type:	2 x 4 core screened cable, low smoke, zero halogen
Cable length:	~2m
Connector type:	10-way plug (MIL-C-5015)
Estimated mass:	Tacho housing & Sensor ~6kg Target ~2.8kg

Electrical Properties

Power supply V's:	Nominal in the range 15-24VDC
Current consumption:	Less than 60mA @ 24V
Number of signal outputs:	Two
Output waveform:	Square wave
Signal output low voltage:	0.03V @ 6mA (sink current)
Signal output high voltage:	< Vs * 0.7 at 6mA
Signal output frequency:	0 to 3 kHz
Duty cycle:	50% ± 15
Phasing between channel 1 & 2:	90° ± 36°

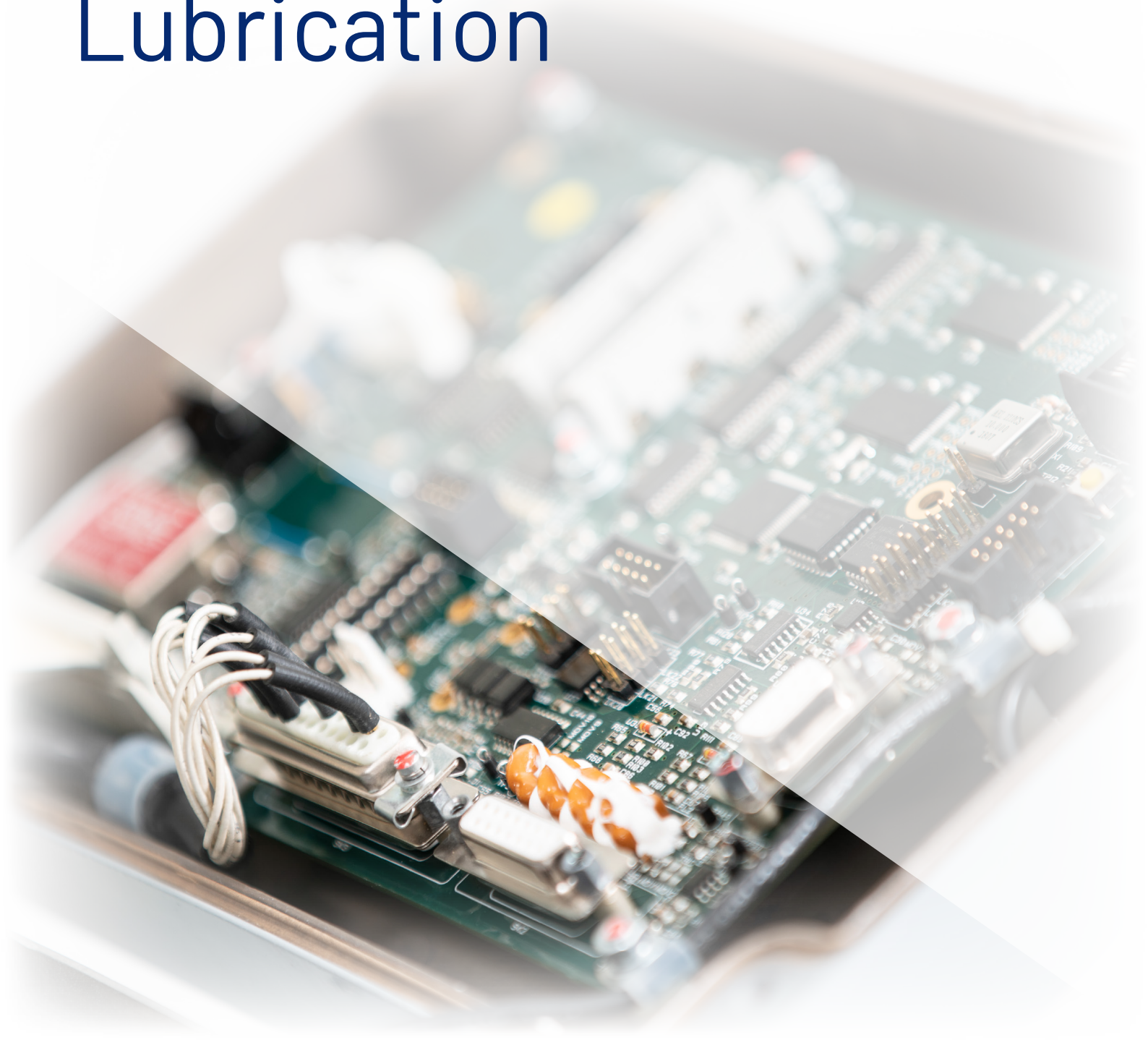


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Wheel Flange & Top of Rail Lubrication



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Rowe Hankins has supplied a UK Government-backed project on Crossrail with an intelligent wheel flange lubrication system that enables asset managers to extend the lifecycle of wheel wear & rail infrastructure that makes passenger journeys greener and quieter.

Lubrication serves to reduce abrasion wear of wheel flanges and railheads, which occurs especially on track curves and at track switch points. Rowe Hankins offers the intelligent Wheel Flange Lubrication System (iWFL) as an innovative and cost effective trainborne solution.

The iWFL system is easy to integrate onto the bogie and the vehicle environment. The system incorporates a proven robust design that uses compressed air available either from the vehicle or can be supplied from a dedicated compressor.





We offer bespoke user configurations, to allow the end user to configure route spray parameters, using GPS or track data.

Lubrication consists of spraying a biodegradable lubricant from nozzles onto the wheels. The nozzles are located and are directed precisely.



The iWFL system improves infrastructure and rolling stock service life, as well as overall safety by reducing both wheel and track wear. The reduced wear of the wheels, means wheels need to be re-profiled less frequently in addition to reducing friction on the track. As a result, the green iWFL system uses less energy and fuel to run the rail vehicle compared to without.

System design

The iWFL System consists of line replacement units:

-  Fluid tank (typically 5L, 10L, up to 20L).
-  Pneumatic Unit fitted with two or four outputs to the nozzles.
-  Intelligent Controller (Falcon Unit).
-  Nozzles.

With options such as:

-  Air compressor, should train air be unavailable.
-  Independent GPS antenna or serial data link for track data from the train.



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Basic System Operation

The lubricant in the tank is not pressurised and is transferred to a pneumatic control unit by an air actuated hydraulic pump located inside the tank. The lubrication is then mixed with air in the pneumatic control unit to a predetermined consistency, which is then sent to the vehicles wheels via a dedicated spray nozzle. The complete process is intelligently controlled by a Flange Area Local Control unit (FALCON).



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Each nozzle can be individually switched or activated and provides a targeted application of lubrication only to a wheel flange. This prevents wastage of the lubricant.

Whole spray operation is controlled and triggered by the programmable flange area lubrication control unit (Falcon).

The intelligent spray activation is possible in three ways:

- At intervals of time or distance. The spraying pulses are triggered after the programmable pause time or the travelled distance.
- The spray intervals are triggered by a specially designed sensor which detects when the vehicle is on a curved section of track.
- By GPS/Track Balise/TCMS signals allowing lubrication at specified predefined positions on the track.

Cost benefits of iWFL

Description	Stick Lubrication	Rowe Hankins Ltd. iWFL
Frequency of refilling per year:	25 to 30	6 to 9
Track and Wheel Benefits:	Life x 2	Life x 2 plus*
Lubricant:	Continuous Usage	Intelligent conditional dispensing

The lubricant produced by Rowe Hankins for the iWFL system is biodegradeable.

**Track and Wheel benefits are subject to track layout and nature of operational service, including timetable schedules.*



Top of Rail Friction Modifier is engineered to reduce vehicle noise through curved track sections and switches, and further reduce rail corrugation by the application of a friction modification lubricant to the top of the rail.



The application of Friction Modifier is achieved by a bespoke compressed air system which transfers the Friction Modifier to the top of the rail. The Friction Modifier is also subsequently picked up by other passing wheels.

The friction modifier reduces rail contact fatigue, making both the rail and wheel more durable and long-lasting. This reduction in contact fatigue improves the environmental impact due to the frequency of replacement materials required, which in turn decreases downtime and costs.








The Wheel-Rail interface is a critical, targetable cost driver for performance, cost of inspection, maintenance, deterioration and renewal, all highly dependent upon the frictional interfaces.

Cost effective management of this interface to extend rail and wheel life by intelligent dispensing of customised Friction Modifiers from trainborne systems gives assurance and improved financial performance to operators and asset owners.








Basic System Operation

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Reduced Noise in Vehicle and Operating Environment

-  Active noise reduction for train / platform operatives, pedestrians and businesses located adjacent to the railway or tramway.
-  Increased driver awareness of in-cab audible signals.
-  Control of station approach curve noise exposure levels for platform staff and passengers.
-  Improved intelligibility of public address systems at stations.
-  Significantly reduces noise levels, contributing to quieter residential areas.
-  Bio degradable lubricant which is safer for the environment and nature.
-  Fewer refills lead to a reduced carbon footprint.

With options such as:

-  Accurate spray profiles for any rail or tram route.
-  Low lubrication consumption compared with stick lube and trackside applications.
-  Selective wheel spraying - Flange / Back of Flange or ToRFM
-  Highly durable Friction Modifier developed for ToRFM.
-  Extension of wheel inspection periods.
-  Extension of wheel life.
-  Reduced wear and vibration in propulsion drive transmission systems.





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