Rail Signalling Protection Systems

Design the future of energy

BENDER

Approved supplier NetworkRail

Bender is one of the world's leading providers of solutions that make electrical infrastructures smart and safer. Our advanced electrical safety solutions minimise downtime and enhance operational safety and efficiency by ensuring continuous power. By detecting faults early, we can prevent system outages, which helps to reduce boots on ballast and avoid costly delays and penalties. Our products are designed to meet stringent railway standards to maintain power reliability and safeguard passenger safety.

An approved supplier to Network Rail, Bender design and manufacture quality, high performance electrical monitoring solutions for use in the UK's rail infrastructure in areas such as signal systems, trackside power installations and signal boxes.

Rail operators are responsible for ensuring the safety of the UK's rail networks and maximising the availability of thousands of miles of track every day. Smart monitoring solutions developed by Bender deliver continuous monitoring of electrical systems and equipment for earth faults and insulation failure – immediately informing maintenance teams of potential problems which could result in train delays and significant financial penalties for rail operators.

Continuous monitoring of the various power supply systems (an integral part of the track structure which guarantees electrical safety) is a key element in ensuring that operations run smoothly.

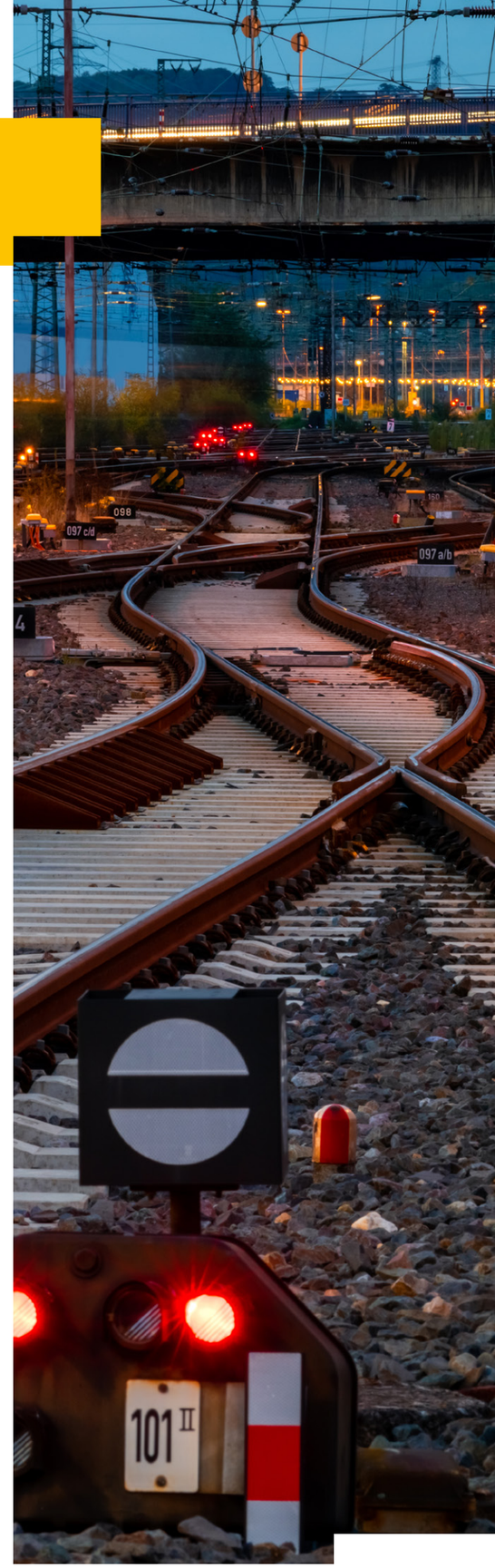
Bender worked with Network Rail to develop and approve custom rail signalling protection systems for use in UK rail applications.

Our rail system protection capability includes monitoring of rail switch points heating units and motors, and control voltage network monitoring for railway crossings.

Keeping your network moving!

- Ensure high availability with proactive monitoring
- Accurately locate and pinpoint electrical faults
- Advanced warning of degradation and failure
- Reduce boots on ballast with cloud-based monitoring
- Increase personnel safety with remote maintenance

Rail Signalling Power Protection



Intelligent insulation monitoring and earth fault location technology

Rail operators must ensure the safety and availability of rail networks, safeguard personnel and prevent disruption to passenger services that result in costly fines and penalties.

Electrical signal power systems keep the track infrastructure moving each day. Any insulation faults, failure or damage preventing trains from operating effectively has serious consequences for Network Rail, train operators and passenger journeys.
Bender Rail Signalling (RS) integrated insulation monitoring and earth fault location equipment provides protection for railway electrical systems.

Bender RS4 solutions

Bender has a proven track record in UK railways with over 1500 rail signalling protections systems installed. The current RS4 solution with enhanced features and capabilities delivers a more accurate and holistic overview of cable health in rail electrical infrastructure.

Employing tried and trusted Bender measuring technology combined with two decades of product innovation, RS4 variants have increased sensitivity and faster first fault location, enabling engineers to identify issues in advance of failure and respond more quickly.

RS4 solutions deliver multi-tier smart cable insulation monitoring and fault location in order to monitor, provide early warning and pinpoint insulation problems – to prevent rail downtime and improve operations.

Upgrading to RS4

Bender RS2 and RS3 systems have served the railway signalling industry well, but the future demands more. RS4 system technology complies with NR/L2/SIGELP/27725, for Insulation Monitoring and Fault Location Systems used on Signal Power Systems. The RS4 is designed to meet modern challenges head-on, offering unparalleled speed, connectivity, and reliability. As RS2 and RS3 components become increasingly obsolete, now is the time to upgrade and secure the future of your operations.

RS4 Tier 1, 2 & 3 Solutions

RS4 Tier 1
RS4 Tier 1 is our most advanced Rail Signalling Protection System. It delivers the highest level of signal power system insulation monitoring of all the RS4 solutions. It provides full insulation resistance measurement of the system, feeder and individual feeders, monitoring individual subsections of cable and functional supply points (FSP).

Incorporating an earth fault locator (EDS440) and Type B current transformers (CTs) inside FSPs, it evaluates and locates fault sources in a very short time period. The installation in FSP renders the Tier 1 variant class 2 compliant, eliminating the need for earth connection, with all trackside equipment able to be fully integrated into existing FSP enclosures.

The compact and cost-effective RS4 Tier 1 solution is available in 650V mains or 110V supply option, retrofittable to Class 2 and Class 1 equipment, reducing ongoing operational costs. It offers remote fault location to FSP or cable length with exact manual fault finding at 100kΩ. The RS4 Tier 1 data and communications options can be customised to suit specific projects and customer requirements.

Benefits

- The most advanced of the RS4 solutions
- For compliance with NR/L2/SIGELP/27725 Tier 1
- Delivers improved Tier 1 remote fault identification and location at 100kΩ
- Enables earth fault identification and location at FSP level
- Compact for use in SIN119 remedial works
- Available as new or retrofit solution for cost-effective equipment upgrades
- Bespoke data and communication options tailored to individual projects
- Eliminates 650V or earth reference requirement making Tier 1 fully class 2
- Prevent rail downtime through predictive maintenance and fault finding

Features

- Identifies decline in insulation resistance (IR) values
- Individual cable sub-section monitoring at FSP level monitoring for Tier 1 compliance
- Incorporates GSM-enabled data logger equipped for real time direct communication with the Intelligent Infrastructure
- Immediately identifies earth leakage faults in the power system arising from damaged cables, faulty connections, breaks in insulation, and rodent damage
- Portable earth fault location system pinpoints location for maintenance teams
- Delivers enhanced reliability and simplified installation and commissioning
- Facilitates planned maintenance interventions
- Dual adjustable insulation alarms – pre-warning and alarm
- Standardised for use across Network Rail installations
- Supplied in self-contained cabinet, tested and ready for 'plug and play' installation and commissioning alongside existing power infrastructure systems up to AC 650V
- Integral automatic and manual test facility
- Lockable front hinged door with viewing window

RS4 Tier 1

RS4 Tier 2
This mid-range RS4 Tier 2 delivers enhanced monitoring and measurement capabilities over the RS4 Tier 3.
This compliant solution enables further increased system availability by providing the full insulation resistance (IR) levels of individual feeders.

Tier 2 compliance is achieved by the use of additional system components including Bender Type B current transformers (CT) and Bender COM465IP condition monitor to enable complex individual feeder measurements.

It provides comprehensive data readings and information on cable health to enable operators a clearer overall assessment of the condition of the Signal Power System.

This product delivers the same functionalities as the Tier 1 solution at PSP level, it is fully upgradable to deliver a Tier 1 solution with the addition of an EDS440 fault evaluator and Type B CT at FSP level.

Benefits

- RS4 Tier 2 comprises of RS4 Tier 3 with additional components
- For compliance with NR/L2/SIGELP/27725 Tier 2
- Provides full insulation resistance at individual feeder level
- Contains additional COM465IP condition monitor for system overview
- Incorporates Type B CTs for enhanced measurement
- Cost effective uplift from the RS4 Tier 3
- Easily upgradable from Tier 3 to Tier 2
- Prevent rail downtime through predictive maintenance and fault finding

Features

- Identifies decline in insulation resistance (IR) values
- Incorporates GSM-enabled data logger equipped for real time direct communication with the Intelligent Infrastructure
- Immediately identifies earth leakage faults in the power system arising from damaged cables, faulty connections, breaks in insulation, and rodent damage
- Portable earth fault location system pinpoints location for maintenance teams
- Delivers enhanced reliability and simplified installation and commissioning
- Facilitates planned maintenance interventions
- Dual adjustable insulation alarms – pre-warning and alarm
- Standardised for use across Network Rail installations
- Supplied in self-contained cabinet, tested and ready for 'plug and play' installation and commissioning alongside existing power infrastructure systems up to AC 650V
- Integral automatic and manual test facility
- Lockable front hinged door with viewing window

RS4 Tier 3

RS4 Tier 3 is an integrated insulation monitoring and earth fault location system. Utilising proven Bender technology seen in previous variants (RS3), this Tier 3 compliant RS4 is designed to comply with Network Rail standard NR/L2/SIGELP/27725. This cutting edge technology is available as a new or retrofit solution, to deliver monitoring and protection for railway electrical systems on the UK's rail infrastructure.

RS4 Tier 3 enables monitoring and fault location with improved accuracy and advanced sensitivity capabilities. The increased sensitivity strengthens fault location from the 20kΩ pre-warning level to 100kΩ.

The Tier 3 system provides overall IR measurements, as well as feeder level fault location. Housed within a Class II GRP enclosure, Tier 3 is lighter and more compact in comparison to the previous RS3 version.

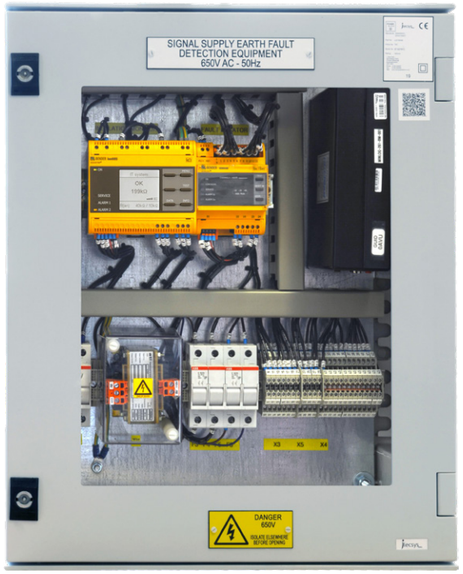
Simple to retrofit and update existing RS3 units, RS4 Tier 3 offers a cost-effective upgrade to legacy equipment that is compatible with existing intelligent infrastructure remote condition monitoring through data loggers.

Benefits

- For compliance with NR/L2/SIGELP/27725 Tier 3
- Improved fault location from 20kΩ to 100kΩ
- Cost effective and easy to upgrade to legacy equipment
- Housed in Class II GRP enclosure for lighter and compact design

Features

- Identifies decline in insulation resistance (IR) values
- Incorporates GSM-enabled data logger equipped for real time direct communication with the Intelligent Infrastructure
- Immediately identifies earth leakage faults in the power system arising from damaged cables, faulty connections, breaks in insulation, and rodent damage
- Portable earth fault location system pinpoints location for maintenance teams
- Delivers enhanced reliability and simplified installation and commissioning
- Facilitates planned maintenance interventions
- Dual adjustable insulation alarms – pre-warning and alarm
- Standardised for use across Network Rail installations
- Supplied in self-contained cabinet, tested and ready for 'plug and play' installation and commissioning alongside existing power infrastructure systems up to AC 650V
- Integral automatic and manual test facility
- Lockable front hinged door with viewing window
- Also available as upgrade components



RS4 Tier 3

Portable Fault Location Solutions

Bender portable fault location solutions offer a more flexible and instant method for engineers to locate faults in the field.

Portable Earth Fault Location System EDS3090

The EDS3090 portable earth fault location system can be used to precisely locate feeder earth faults line side, allowing the repair process to be carried out faster, minimising disruption to rail track and reducing system downtime.

The handheld tester is designed to pinpoint a network earth fault to a specific cable or transformer by detecting the test signal from Bender devices and does not require the cable or transformer to be disconnected.

The unit simply clamps to the cable to carry out the evaluation, enabling spot checks to discover whether a fault is present, in addition to pinpointing faults identified in the vicinity.

RS/PELI Portable Insulation Monitor

This portable insulation monitoring unit is designed to be used trackside to measure and analyse specific sections of the power network to prioritise installation programmes.

The unit is self-powered through connection to the trackside signal electrical network and delivers live monitoring of the system status to immediately indicate if there is an earth fault and the status of the insulation.

Portable case RS/PELI

The RS/PELI portable unit can also be used to provide independent verification of the installed RS system performance.

Portable case EDS3090

Features & Benefits (EDS3090)

- Increased sensitivity for faster fault location
- Application main and control circuits
- Current probes Ø 20/52/115 mm
- Residual current measurement in TN/TT systems
- Mobile insulation fault location systems for IT systems AC 42…460Hz 0…790V / DC 0…960V or de-energised systems
- Measuring clamps 20/52 mm (115 mm optional)
- Robust aluminium case, convenient to carry
- Test devices PGH18… with variable test current 1…25mA
- Integrated test voltage for de-energised systems (PGH186)
- Insulation fault evaluator EDS195P
- Response value insulation fault location:
  - 2…10mA for main circuits
  - 0.2…1mA for control circuits
- Response value residual current measurement 10mA…10A

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