



Application Report

Slim design, powerful switching: How the RIC20-R reliably switches resistive and inductive DC loads

Partner Vossloh Rolling Stock GmbH, Kiel
Area Railway technology

Railway technology

Switching

Motor control

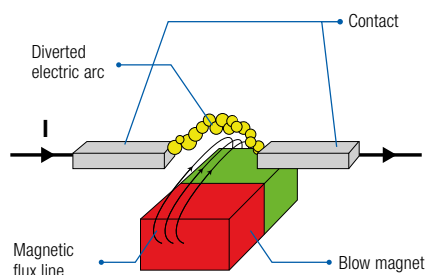
Redundancy & safety

The DE 18 locomotive, approved for operation throughout Europe, relies on compact control cabinet concepts without compromising performance, safety, or reliability. The contactors used perform key switching functions within the SmartHybrid system, including switching control voltage for battery main contactors, control systems, insulation monitoring devices, and display units on and off.

Additional applications include switching the fuel filter heater, voltage switching for central processing units and digital I/O modules, as well as controlling DC/DC converters and relays. At the same time, the components must operate reliably under vibration, temperature fluctuations, and harsh environmental conditions while complying with the railway standards EN 50155 and EN 45545-2.

High Switching Capacity in a Minimal Footprint

With an installation width of just 17.5 mm in the 2-pole version and 35 mm in the 4-pole version, the RIC-R family ranks among the most compact railway contactors available on the market. Despite its space-saving design, it reliably switches loads of up to 4 A at 110 V DC (DC-5), making it ideally suited for the wide variety of switching tasks found in modern rail vehicles.



Operating principle: The magnetic blowout magnet deflects and elongates the arc until it is safely extinguished.



The RIC20-110-SR/DC24V railway contactor performs key switching functions in the DE 18 locomotive and ensures reliable switching of DC loads under demanding operating conditions.

Its high power density enables compact control cabinet layouts while delivering more than 300,000 switching cycles under rated load conditions. As a result, the RIC20-R is designed for long-term use in railway applications where safety and availability are critical.

Reliable Switching of DC Loads

Particularly when switching inductive loads such as battery main contactors or relays, electrical arcs can occur that increase contact wear. The integrated magnetic blowout technology actively deflects the arc and accelerates its extinction.

This reduces contact erosion, preserves contact quality over the long term, and extends the service life of the contactor. As a result, it makes a significant contribution to the reliability of the overall system.

Safe Monitoring of the Switching Status

The RIC20-110-SR/DC24V variant features integrated mirror contacts for monitoring the status of the power contacts. The combination of main and mirror contacts has been tested in accordance with EN 60947-4-1.

Partner

Vossloh Rolling Stock GmbH, based in Kiel, Germany, is one of Europe's leading manufacturers of modern universal locomotives for both shunting and mainline operations. Since receiving TSI certification, the DE 18 locomotive has been sold more than 130 times across Europe, combining a continuous power output of 1,800 kW with redundant drive, braking, and power supply systems.



ComatReleco products in use

- RIC20-200-SR/DC24V – rail contactor with mirror contacts (NO + NC)
- RIC20-110-SR/DC24V – switching relay with integrated TVS diode

As long as a main contact is closed, the corresponding mirror contact cannot be closed.

This provides clear and unambiguous status feedback and supports redundant safety concepts without the need for additional monitoring components.

Designed for Railway Applications

The RIC-R family complies with the relevant railway standards EN 50155, EN 45545-2, and EN 61373, allowing it to be used in rolling stock without additional qualification efforts. This helps reduce both integration and certification costs.

In addition, the RIC20-SR variants feature an integrated TVS diode. It protects control and electronic systems from voltage spikes that can occur when switching inductive loads, thereby enhancing the operational reliability of the overall system.

Conclusion

With the RIC-R family, Vossloh has found a solution that combines high DC switching performance, compact dimensions, and full railway compliance. The combination of magnetic blowout technology, mirror contacts, and integrated surge protection supports the reliable operation of key functions within the DE 18 while minimizing the required space in the control cabinet.

Key Benefits at a Glance

- Compact design with installation widths of only 17.5 mm and 35 mm
- Switching capacity of up to 4 A at 110 V DC (DC-5)
- More than 300,000 switching cycles under rated load
- Magnetic blowout technology for reliable switching of inductive loads
- Mirror contacts according to EN 60947-4-1
- Integrated TVS diode for protecting control and electronic systems
- Railway compliance according to EN 50155, EN 45545-2, and EN 61373