

# Communication based train control

## Connectivity solutions

Edition 2012





Integrated solutions from one source







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### Your partner for system solutions

The HUBER+SUHNER Group is a leading international manufacturer of electrical and optical interconnectivity components and systems. Under one roof, we combine technological capabilities in the three core fields of radio frequency, fiber optics and low frequency.

As one of Europe's leading suppliers, HUBER+SUHNER offers a wide range of products which provide the platform to build modern rail vehicles and trackside infrastructure. New and innovative products based on our proven technologies support you in fulfilling the demanding requirements of the railway industry.

# Making mass transit operations reliable

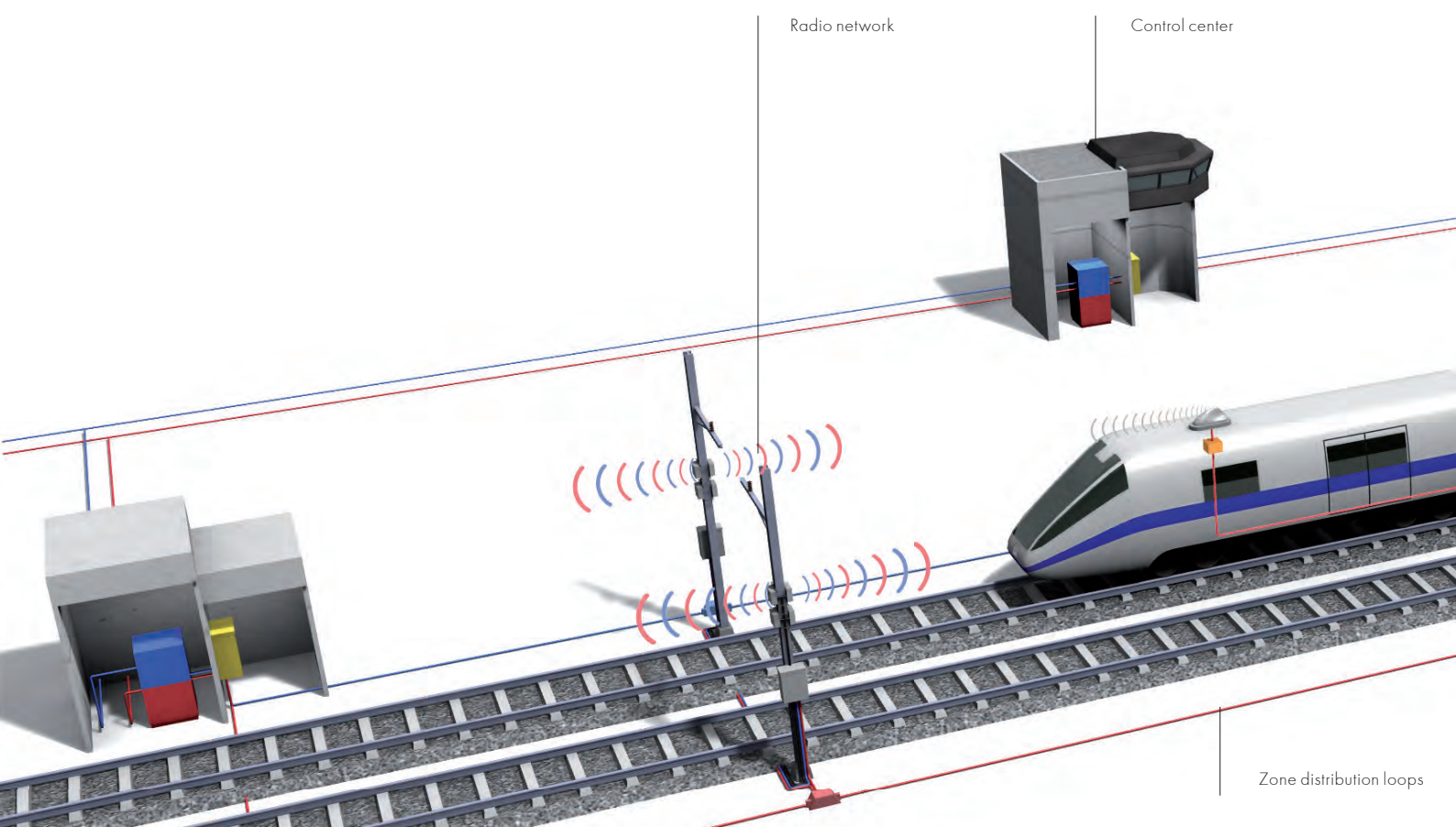
Communication based train control (CBTC) systems have evolved as dominating technology in the railway industry. Implementation of CBTC reduces headways thus increasing line capacity and enabling more flexible train operations. Furthermore CBTC ensures a higher level of safety. In order to guarantee system availability it is crucial that every single connectivity component in the data communication system continues to operate – regardless of external factors such as environmental, mechanical or operational constraints.

With HUBER+SUHNER you can collaborate with a single partner offering the entire range of passive components for such data communication systems. Smart plug and play solutions allow quick and easy installation while shortening migration to CBTC in upgrade as well as new projects.

## References

In numerous CBTC systems worldwide, HUBER+SUHNER products have proven reliable performance. The products are trusted by renowned manufacturers, system integrators and operators throughout the world. Among others, HUBER+SUHNER products are successfully in operation in the following CBTC projects:

- Toronto TTC Y-U-S Line
- Metro Sao Paulo Lines 1, 2, 3
- Metro Santiago L1
- Metro Mexico Line 12
- Metro Milan Line 1
- Metro Dubai Red Line
- Metro Shanghai L10
- Metro Beijing Line 2



## Standards

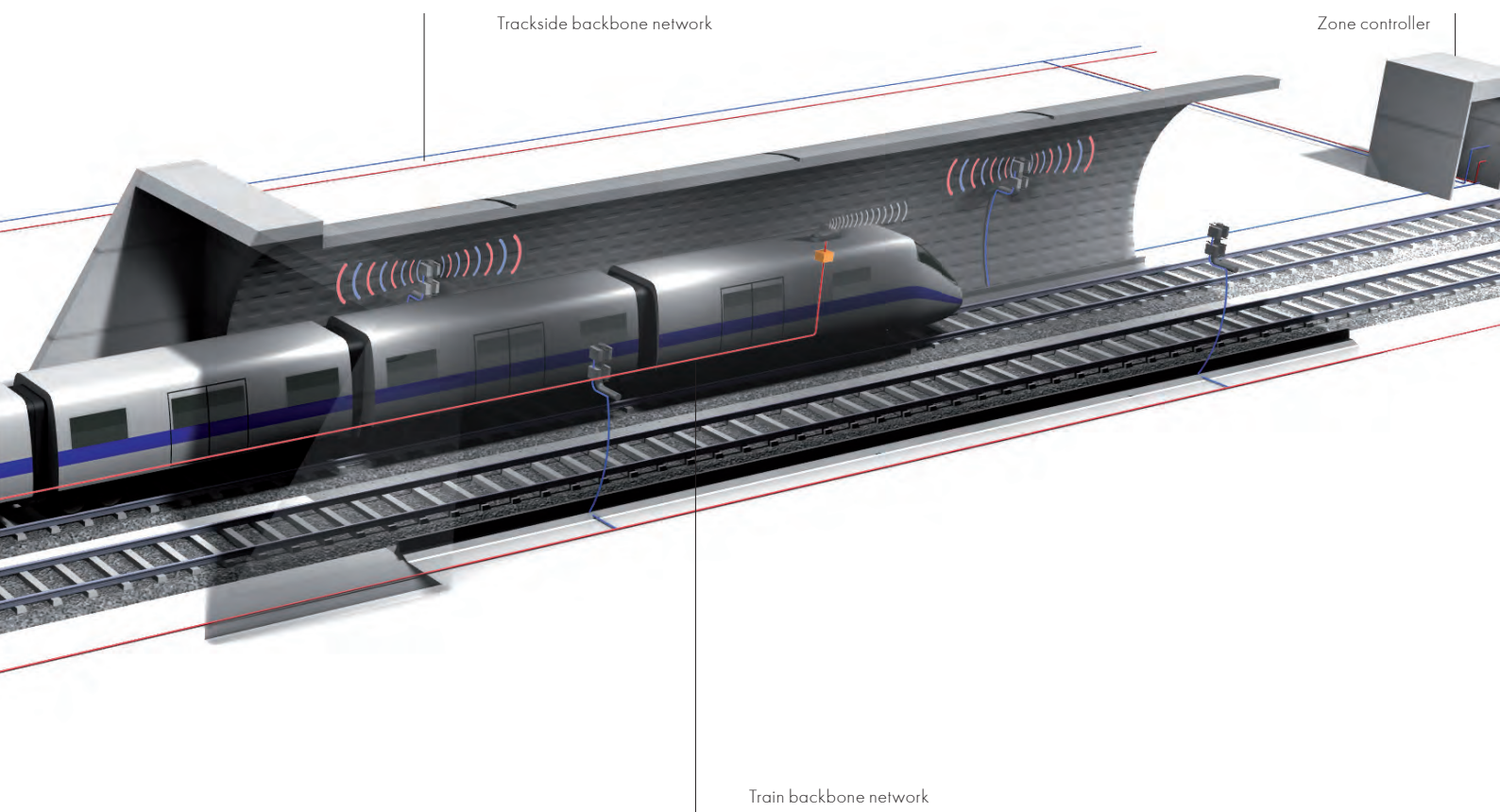
Products for trackside and rolling stock installations are exposed to harsh environmental conditions. Railway products from HUBER+SUHNER therefore comply with the following standards and certifications, depending on the area of application:

- Fire performance: DIN-5510-2; NF-F16 101/102; BS 6853; prEN 45545-2
- Environmental requirements: EN 50125-3; EN 50155
- IEEE 802.11 a/g/p/n

Trackside connectivity solutions can be tested according to country-specific or operator's requirements. Customised products can also be engineered on request.

## Features of HUBER+SUHNER products

- Proven performance
- Robust solutions
- High level of safety
- Easy and quick to install
- Compact design



# Components for the trackside backbone network

Radio-based CBTC enables continuous two-way communication between train and control centre. A fiber optic backbone connects the control centre with a chain of zone control units. In addition, the network redundancy ensures a secure and highly available communication link between train and control unit.

HUBER+SUHNER can serve the physical layer of backbone networks with high capacity, single mode fiber optic cables. These cables are made of selected sheath materials in order to comply with stringent fire and smoke performance requirements. They are also designed to withstand harsh environmental conditions such as acids, alkalis or tunnel-cleaning products.

Fiber management systems are also specifically tailored by our engineers to meet project and customer requirements.



## Fiber optic cables

- High fire safety performance
- Anti-termite jacket material
- Rodent protection (corrugated steel, fiber glass)
- Jelly-free
- Special approvals for tunnel use (e.g. London underground)



## LISA fiber optic management systems

- Customised frames, boxes, enclosures
- From low to high fiber capacity
- Suitable for indoor and outdoor environment



## Fiber optic splice closures

- Easy fiber management for looping through/uncut fibers
- Sealing optical fiber connections (IP 67)
- Re-opening and sealing without special tools
- Fittings to mast, walls, cable ducts or direct buried
- Splicing of up to 96 fibers



## Components for the radio network

The radio network ensures continuous and reliable data communication between the train and the trackside backbone network. HUBER+SUHNER provides all passive components to build up this train-to-track network, including trackside antennas, the corresponding low loss coaxial cables and accessories, such as lightning protectors and power splitters. The train borne RF equipment such as roof top antennas, multiplexers and the appropriate cabling solutions is also provided.

For the actual connection of the trackside radio and the fiber optic distribution loop, it is beneficial to use HUBER+SUHNER MASTERLINE systems. These pre-terminated cables are equipped with fiber optic connectors for trackside radio connection and are thus ready to install, providing a time-saving plug and play connection.





## SPOT-S and SPOT-M trackside antennas

- Directional trackside antenna
- Compact design for tunnel installations
- Excellent size-performance ratio
- Supports WiFi 2.4 or 5 GHz
- Different types: vertical polarisation, dual slant or MIMO

## RF cable assemblies

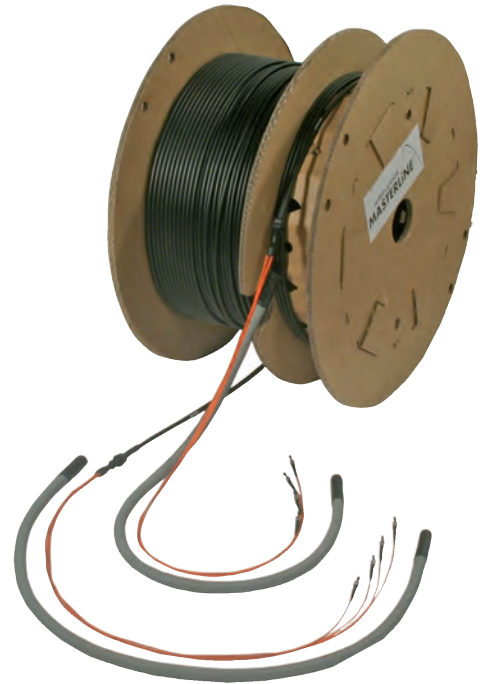
- Low loss feeder cables
- Highly flexible jumper cables
- Factory tested, customised cable assemblies with high return loss
- Flame-retardant, low smoke and halogen free
- Wide temperature range





## MASTERLINE - pre-terminated fiber optic cable systems

- Plug and play installation
- No more field terminations of connectors needed
- Customer-specific configurations available (fiber count, cable type, length, ...)



## SENCITY®Rail Excel vehicle antennas

- Directional and bi-directional rooftop antenna
- Extremely rugged design
- Supports WiFi 2.4 or 5 GHz
- Permits high data transfer rates
- High directivity for covering large distances between the base stations along the track
- High voltage and high current protection

For a detailed description of rooftop antennas please check our "Train-to-shore communication" brochure.



## Further products

- Power splitters
- Lightning protectors

# Components for on-board backbone networks

HUBER+SUHNER also offers reliable connections for safety-critical train backbone networks. Customers are able to freely combine their connections, regardless of the technologies on which the systems are based, or which data transmission protocol (TCN or Ethernet) is implemented.

RADOX® RAILCAT CAT5 and CAT7 as well as RADOX fiber optic cabling offer reliable transmission capabilities for safety-critical applications. These cables are ideal for use in the on-board CBTC bus.



## RADOX Databus cables

- RADOX electron-beam cross-linked cables
- Sheath material RADOX EM 104 according to EN 50264-1
- Developed and tested for rolling stock applications
- High data transmission rates
- High resistance to heat, cold, fluids and weathering
- Good mechanical properties
- Flame-retardant, halogen free, low smoke

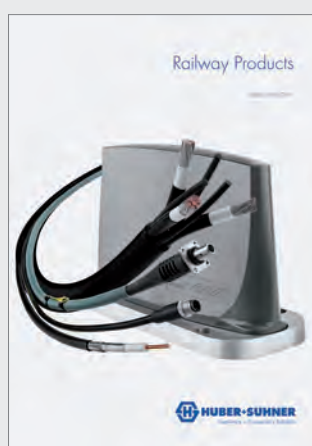


## Fiber optic components and systems

- RADOX electron-beam cross-linked cables
- Flame-retardant, halogen free, low smoke
- In-carriage and inter-vehicle cable systems
- Customer-specific designs
- 100 % tested optically and mechanically, ready-to-install



## Further publications



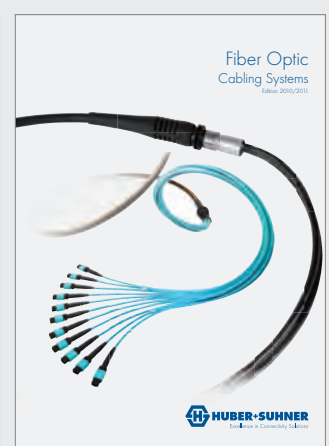
Railway products catalogue  
Item no. 84110507



Train-to-shore communication  
Item no. 84112422



CBTC Connectivity solutions  
White paper (online only)



Fiber Optic  
Cabling systems  
Item no. 84104358

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**Waiver**

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