MIPRO RAILWAY SOLUTIONS

INTERLOCKING SYSTEM

MAXIMUM SAFETY AND AVAILABILITY

MIPRO

MIPRO INTERLOCKING SYSTEM

Mipro's computer-based fail-safe interlocking system monitors and controls train movements and the wayside equipment, and indicates their status allowing reliable traffic management. It provides a unique combination of safety, efficiency, availability and scalability based on

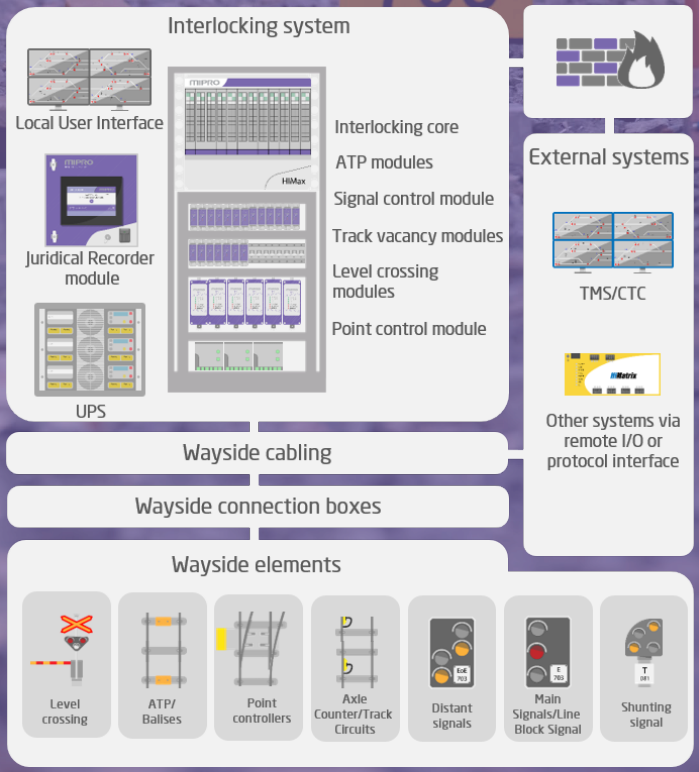
- Safety Integrity Level SIL4 certified system hardware and software implemented in accordance with CENELEC standards EN 50126, EN 50128 and EN 50129
- Redundant two-out-of-two (2oo2) system architecture ensuring high availability and efficient use of railway capacity
- Modular design, configuration and Commercial Off-The-Shelf (COTS) components allowing fast implementation, later modifications and easy maintenance
- Interoperability and easy integration into external systems
- Compatibility with ETCS (European Train Control System) L1&L2 and EULynx.

MAXIMUM SAFETY AND AVAILABILITY

Mipro's interlocking system is based on a modular, parametric and scalable system architecture which easily adapts to customer-specific requirements and various operating environments. The system is suitable for controlling mainlines, low density lines, urban lines, marshalling yards, depots and industrial railways.

The system platform is based on COTS components and modern technology from well-known manufac-turers. It enables full redundancy covering the intelligent system core software and hardware up to data communicati-on. The CPU processors of the system are internally redundant based on the two-out-of-two architecture which guarantees the highest safety integrity level and availability.

The availability is further enhanced by the built-in features of the system platform that allow CPUs and all active modules to be duplicated, thus operating in full hot-standby. Consequently, a failure of one module does not cause failure of the entire interlocking.



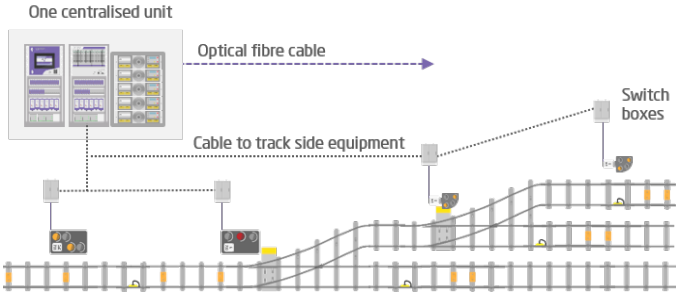
CENTRALISED, DISTRIBUTED OR MIXED ARCHITECTURE

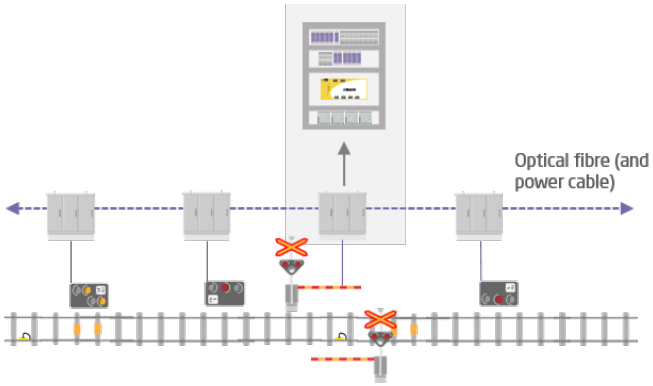
Mipro's interlocking system supports distributed, centralised and mixed system architectures. Thus it provides an appropriate architecture for each environment and helps optimise the need for cabling and device facilities.

The system hardware consists of modules that can be installed as stand-alone units or furnished in compact rack and cabinet structures.

These can be freely located: distributed in various locations along the trackside or on the marshalling yard, or centralised in one control centre.

In the third option, the interlocking modules are installed centrally in one location and the object controllers are distributed in controller cabinets.





MODULAR SOFTWARE ARCHITECTURE

The interlocking system is based on function blocks that follow the customer's rail geometry. Predefined and tested software blocks used for configuration ensure fast and safe project implementation. They also allow to add easily new functions and make modifications during the whole system lifetime.

The system provides multiple tools fulfilling IEC 61131-3 standard for integrity checking and diagnostic and integrated simulation functions for testing and training.

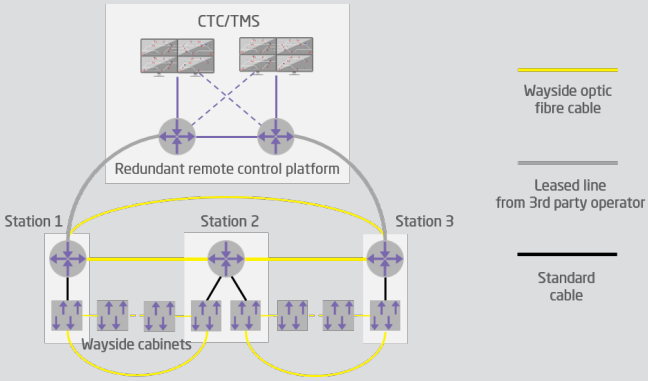
ADAPTABLE INTERFACES

Mipro has the knowledge and know-how to integrate various systems and make them function safely together. Mipro's interlocking system supports standard and custom-made interfaces. The system provides easy integration into existing infrastructures and interfaces with several types of point machines, interlocking, signalling, track circuit, train detection and ATP equipment. It connects seamlessly with other external systems as well, such as electrification and heating systems.

RELIABLE COMMUNICATION IN CRITICAL NETWORKS

Mipro's interlocking system connects to external systems through open standardised interfaces. The communication is based on the SafeEthernet protocol that fulfills the standard EN 50129 SIL4 and guarantees a reliable data transmission without delays.

The standard solution consists of fibre optics cabling and a ring topology allowing redundant and separated networks for high availability applications. The solution supports custom-made and third-party networks and devices as well.



SAFETY
A SIL4 certified system

EFFICIENCY
Customer-specific configuration

AVAILABILITY
Modern COTS components

SCALABILITY
Modular system design

FEATURES

- High availability and reliability
- Compatibility with existing trackside equipment and systems
- Long product lifecycle through future-oriented technology
- Online diagnostics and test system
- Easy modifications without affecting operation in other areas
- Scalability through modular configuration
- Two-out-of-two architecture for all modules

REFERENCES

Our references are strong evidence of our competitiveness and know-how in comprehensive and technically demanding (SIL4) projects. For example

- Kokkola-Ylivieska double track signalling system project (2013-2017)
- Renewal of signalling systems for three marshalling yards in eastern Finland - Niirala, Kotolahti-Mussalo in Kotka, and Vainikkala (2016-2018)
- Renewal of the signalling system on the Lääne-Harju track section in Estonia (2018 -)

READ MORE

For information about our traffic management and situational awareness solutions, please see the brochures:

- Mipro Railway Solutions : Traffic Management System
- Mipro Railway Solutions: Mipro REGO Situational Awareness

MIPRO

Mipro is specialised in railway and industrial systems. Our systems are used for safety management in railway and metro services and industry processes as well as for controlling processes in water and energy management.

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Our operations are managed in accordance with an integrated management system certified according to ISO 9001 standard, and an environmental system certified according to ISO 14001.