Trackguard Simis IS
The Standard for Individual Operating Conditions

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For Increased Railway Requirements

Increasing traffic volumes and shorter headways are imposing new requirements on interlocking systems. Safety, availability, degree of automation, remote-controllability and networkability are a few keywords in this connection.

With Trackguard Simis® IS, Siemens offers a compact electronic interlocking with a modular structure which meets state-of-the-art requirements and makes operations management considerably more efficient.

For mainline and regional traffic
The Simis IS electronic interlocking is a cost-effective solution for mainline and regional traffic.

Modular structure
Its modular structure enables this new interlocking generation to be adjusted to local conditions and the operational requirements of the respective railway company both simply and fast.

Flexible and cost-effective
In the design of Simis IS, specific attention has been paid to flexible interfaces to both existing and future systems and components.

Thanks to the smart combination of standardised interfaces with flexible software, the interlocking can be exactly tailored to existing requirements by means of parameters. This means that control and monitoring tasks are performed cost-effectively and with a low level of equipment.

Universally operable
Irrespective of whether electric or diesel traction is involved, Simis IS is independent of the type of traction and can be operated under a wide range of very different climatic conditions.

Fail-safe and proven
Simis IS operates according to the proven and fail-safe Simis principle (fail-safe microcomputer system from Siemens). Electronic interlockings equipped with Simis computers have been successfully produced by Siemens for over 20 years.

To date, considerably more than 300 interlockings with Simis computers have been commissioned. Simis IS has been developed according to the highest-level safety requirements stipulated by the European CENELEC standards for railway applications.

Diverse benefits
- maximum safety (SIL 4 according to CENELEC)
- high level of availability
- automated operations
- low space requirements
- flexible system interfaces
- low-maintenance hardware
- rapid diagnostics and repairs
- online and remote diagnostics
- ETCS-capable
- generic type approval
Simis IS interlocking system

**Low space requirements**
Simis IS interlockings need little space since they are housed in compact 19” cabinets. This ensures a high level of operator safety and, at the same time, protects components against external impact (e.g. electromagnetic interference). The cabinets are accommodated in existing buildings.

**Expandable**
Its interface concept means that Simis IS can be altered and extended without difficulty. Hardware and software modifications are possible during short out-of-service periods without interrupting railway operations for long periods of time.

**Open for the future**
Thanks to the modular design of its computers, the system is optimally prepared for technical refinements and, at the same time, enables existing operational systems to be connected.

The very different systems can be connected to the interlocking computer either directly or via interface converters. For example:
- track vacancy detection systems
- train control systems
- coded track circuits
- block systems
- level-crossing protection systems
- command button cases
- signals and points
- LEUs with Eurobalises
- MSTT Signal with Eurobalise
- RBC (Radio Block Center)
- and much more
Good features are taken over
Existing components or systems from the indoor and outdoor equipment can largely be taken over.

Low purchase costs
The interlocking can be rapidly installed and cabled. Due to the fact that point machines and signal lamps are switched in the computer, this permits direct cabling between the peripheral boards and the cable termination rack.

Minimum life-cycle costs
A small number of board types incurs lower spare parts and maintenance costs.

High cost-effectiveness
In short, there are different reasons for the high level of cost-effectiveness featured by the Simis IS interlocking:
- cost reduction due to the usage of a standardised system platform
- low space requirements due to a compact design
- minimum stocking of spare parts due to a limited number of boards
- minimised hardware outlay due to the use of integrated peripheral boards
- efficient operation thanks to route coupling interconnection and partial route release
High Level of Convenience in Everyday Operations

With the full range of its benefits being used, the state-of-the-art technology featured by Trackguard Simis IS results in simpler and more convenient operations management.

Flexible and universal
The integration of operating rules and regulations via software parameters ensures short project durations and minimum servicing costs. Later modifications to the interlocking functions can be implemented in next to no time at all. The interlocking table system as a basis for routes – with the possibility of setting up special links to other system elements – offers a high degree of flexibility in implementing your operating rules and regulations.

Fast and efficient for modifications
Existing interlockings of the Simis IS type are particularly efficient when it comes to extensions and alterations. During configuration, modifications can be drawn up at the factory, tested on a test installation and then approved. Innovations are documented and printed out as hardcopies for purposes of review. Modifications to the Simis IS structure can be prepared and rapidly implemented during the alteration phase. Adjustments to the cable system are performed at an early stage. Additional element operating modules or interface boards can be simply inserted into the operational computer.

Expandability
The functionality of Simis IS can be expanded or modified quite easily. Implementation, testing and approval are effected within a short period of time.

If required, new components or systems are connected to the interface board via an interface converter so that no modifications to existing interfaces are required.

Maintenance without problems
Using high-reliability hardware, maintenance work can be kept to a low level. Boards can be withdrawn and reinserted with the power on. This means that the interlocking computer does not need to be switched off and restarted.

Simis IS is supported by an optional PC-based service and diagnostic system. This provides user-prompted online diagnostics and thus enables fast, target-driven troubleshooting on site.
High-performance Standardised Boards

The state-of-the-art compact hardware forms the basis of Trackguard Simis IS. Even for customised solutions, only a few standardised components are required. With regard to the renewal of partial systems, particular importance is attached to compatibility with existing equipment.

Structure and configuration
The main components of Simis IS are the element operating module (EOM) ECCs (Element Control Computer) and the Simis PC system. The EOM ECCs contain the peripheral boards for control of the outdoor components. The hardware core of the EOM ECC works on the basis of the well-proven Simis principle. This hardware core is connected to the Simis PC which is the sequential platform for compute-intensive signalling applications.

Element operating module ECC
The ECC consists of three levels: the power supply frame, the base frame and the extension frame.

- **Power supply frame**
  The power supply frame accommodates the power supply boards. Depending on the computer configuration, the power supply frame accommodates two or three power supply boards, each of these boards being responsible for powering one processor board.

- **Base frame**
  The base frame contains the hardware core and can accommodate peripheral boards, interface boards or a mixture of the two.

- **Extension frame**
  With an extension frame, additional peripheral or interface boards can be used. The base frame and extension frame are linked by connecting cables at the rear.

Hardware core
The processor boards are fitted with powerful, high-speed 32 bit processors. Each ECC has at least two processor boards, which process the same information with clock synchronism. In order to increase availability, an additional processor board can be added to the hardware core to create a 2-out-of-3 configuration. Simis IS continues to operate without interruption in the event of a failure of the processor board.

Communications
The communication boards link the individual interlocking computers for the exchange of information. The fail-safety of the interlocking bus is ensured by an error detection procedure. The bus is duplicated for redundancy to increase availability.

Peripheral boards
For the control and detection of points and signals, integrated peripheral boards are used. The power for the connected element is switched on these boards and passed directly to the lamp or point machine.

The signal operating module (Som) is used to activate steady and flashing signal aspects. Main/auxiliary filament switchover is performed by an external circuit directly at the signal. Point machines are controlled and detected by the point operating module (Pom).
Interface boards
The digital input/output operating module (Inom) and the universal input/output operating module (Unom) enable external components or systems to be connected, such as track vacancy detection equipment, block systems, level crossings and numerous other facilities.

Interlocking interconnection
Depending on the interlocking type involved, Simis IS is connected to adjacent interlockings either via a block interface or via a route coupling interface. This route interface is implemented using Profibus or Ethernet. Several Simis IS can be interconnected and installed either centrally or in decentralised mode.

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| **Field of application of Simis IS**  
Railways with AC, DC and diesel traction |
| **EOM ECC**  
Boards: processor, power supply and peripheral boards such as Pom, Som, Inom and Unom |
| **Simis PC**  
2x2-out-of-2 computer system based on industrial PCs of diverse design |
| **Simis IS operation area**  
Stations for mainline and regional traffic with a control distance of max. 6.5 km. With MSTT-Signal System distance up to 10 km are possible. |
| **Computer cabinet**  
0.6 m x 0.6 m x 2.2 m (or 1.6 m), if required trackside outdoor cabinet; 19" mounting frames, EMC protection |
| **Interfaces**  
Compliant with Profibus or Ethernet industry standard |
| **Safety**  
Safety integrity level SIL 4 in line with CENELEC standard |

The benefits of Trackguard Simis IS at a glance:
- compact, flexible and universally applicable
- permits customised solutions
- meets your functional and technical requirements cost-effectively
- implements interlocking functions in line with the interlocking table principle
- simple links to other system elements
- operation of future systems and extensions via flexible interfaces
- power is switched directly in the computer by compact electronic peripheral boards for point machines and signals
- short configuration, installation and testing times reduce purchase costs
- connection of a wide range of different operator control systems
- trend-setting product combined with reliable partnership