


VERTICAL OPENING PLATFORM SAFETY DEVICE





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ROPE SCREEN DOOR

**IMPROVING PASSENGER SAFETY,
IMPROVING THE QUALITY OF LIFE**



WHAT IS A ROPE SCREEN DOOR?

The Rope Screen Door (RSD) is platform safety device technology.

RSD can be installed in train and subway station platforms.

The system's primary objective is to increase the safety levels of passengers on the platform and to restrict access to the track to authorized individuals only. Operation optimization is also achieved for boarding, alighting and train movement-in the platform area.

As a part of a railway system, the RSD system is designed to be safe, robust and easy to operate and maintain, and also fully integrated with the environmental condition and platform structure of the station.

RSD uses elastic metal ropes that allow a quick escape in case of an emergency.



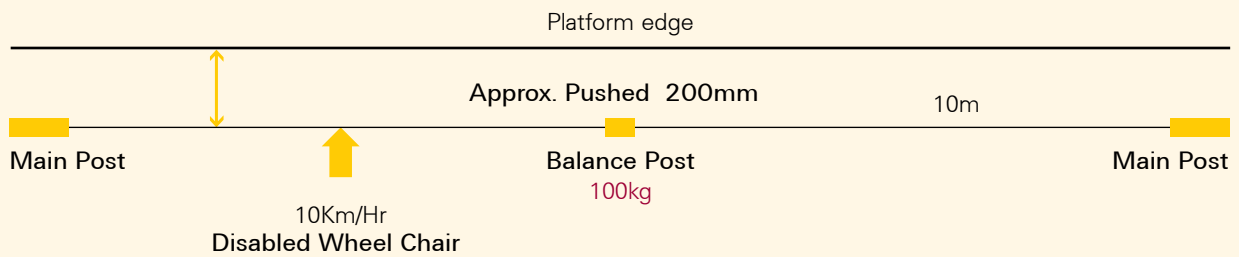


RSD DESIGN CONCEPT & SYSTEM-ADVANTAGES

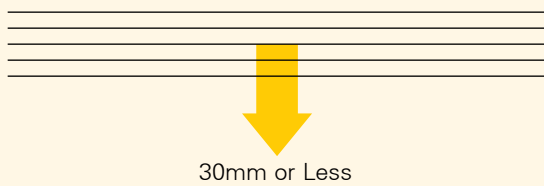
- Operates with different train types with different door arrangement
- Highest safety level
- Architectural aesthetic integration
- Passenger platforms protection
- No train schedule interference
- Applicable with both automatic and non-automatic train operation
- Improves passenger experience in public transport
- Maintains climate change resilience features
- Adaptable with features to enable net zero carbon emissions in operation
- Operational reliability by simple structure 99,99%



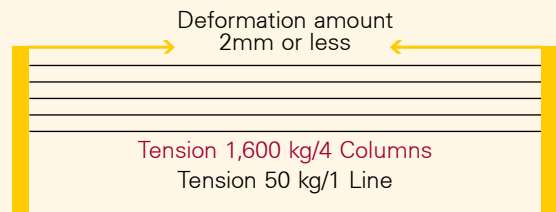
Inflection Amount



Deflection Amount



Deformation according to the Tension



Operation Speed

3.0~4.5 sec. (Adjustable)

Durability

More than 1,000,000 times consecutive operations

Application Load

Fixed Load	Pressure (concentrated) Load	Wire Rope Load	Wind Load	Seismic Load
0.3 KN/m	3.67 KN	16 KN	2.7 KN/m ² (instantaneous wind speed 60m/s)	0.2g (Horizontal direction)

Shock Absorption

1st: Wire Absorption 2nd: Wheel Absorption 3rd: Rail Absorption → Minimize structural transmission shock

ROPE-TYPE SCREEN DOOR SYSTEM BASED ON INNOVATIVE TECHNOLOGY

CHOOSE THE SAFE PUBLIC TRANSPORT

Public and rail transport is the choice for green mobility. The RSD System improves passenger experience and makes the choice easy and attractive. The innovative system:

- Is applicable at platforms in mixed traffic operation, irrespective of train length and door configuration
- Meets the requirements of **SIL 4**
- Integrates aesthetically in any architectural design
- Is highly reliable in protecting any kind of passenger platforms
- Does not interfere with passenger flows and train schedule
- Is applicable with both automatic and non-automatic train operation
- Improves passenger experience in public transport
- Provides for maximising natural daylight and ventilation
- Minimises at overhaul works embodied carbon for key building materials and waste at source



RSD WORLDWIDE



Sweden
Stockholm Åkeshov
Station (2014)



Sofia
Metro Station (2021)



Korea
Gwangju Nokdong
Station (2006)



Korea
Chungnam Nonsan
Station (2017)



Japan
Tsukimino
Station (2014)



The company ATCO TRADE was the Project consortium leader of the world first full-scale commercial project applying the concept of large span rope vertical opening screen doors for protection of passenger train platforms. A prototype of the RSD product has been presented by our Korean partners at previous InnoTrans exhibitions. In 2013 the Korean Ministry of Land, Infrastructure and Transport designated the new technology as a Core Future Strategy. Such platform protection doors have up to now been executed in several locations worldwide,

As test installations:

- **Korea** – Year 2013 – pilot installation at Munyang Station in Daegu (currently in operation)
 - **Korea** – Year 2017 – Nonsan Station in Chungnam (4-season test with KTX high-speed)
- Nonsan Station in Chungnam** – Year 2017 (4-season test with KTX high-speed trains operation in a mixed traffic with four other types of conventional trains)
- **Japan** – Year 2014 – pilot installation at Tsukimino Station on the Tokyo Metropolitan City Line (9-month pilot operation and verification)
 - **Sweden** – Year 2014 – Stockholm Åkeshov Station (verified winter operation)

As full-scale commercial project:

- **Bulgaria** – Year 2019-2022 – 24-platform edge installations at Sofia Metro (in operation)

The project in Bulgaria is the first one to have been awarded through a tender procedure on a commercial basis. The RSD system was mounted in 24-platform edge installations at the Sofia Metro for the operation of **3 different train type and size configurations**. The system has demonstrated the highest possible **Reliability, Availability, Maintainability and Passenger Safety**, preventing platform accidents and non-authorized track access. Since 1999, ATCO TRADE has had a good-record in installation and maintenance activities in the public sector electric transport, including warranty and post-warranty services. We have shown the ability to organize and coordinate installation, testing and commissioning-activities, successfully-managing a supply chain of more than 100 design & manufacturing companies in several Sofia Metro projects. Based on our experience, we apply the same approach in partnership with local companies, adding value by access to a pool of Bulgarian signaling and electric engineers who have been involved in railway electrification and signaling modernization projects in the EU.

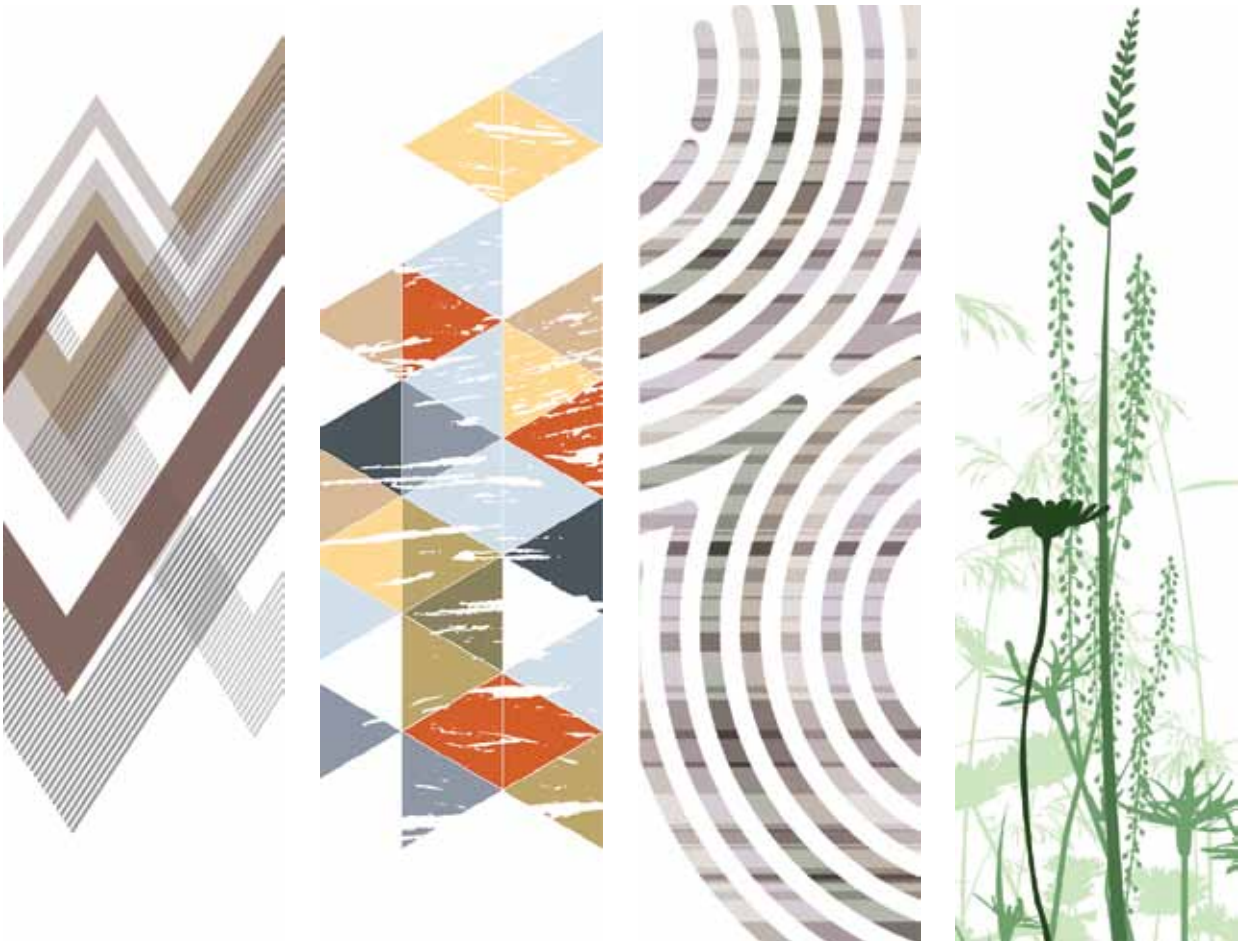
RSD SYSTEM – PRODUCT APPLICATIONS

- RSD System offers the seamless platform safety improvement
- RSD System allows for installation with civil works intervention at platform level only
- RSD System allows free air flow ventilation and does not affect the station air conditioning
- RSD System can be easily installed standard or tailor made, completely digitized
- RSD System can be complemented with a Train Dispatcher System
- RSD System standard protection area – 10 m span x 1.7 m height
- RSD System provides for incorporation of energy efficient technologies

RSD SYSTEM - DESIGN

We perform the RSD design according to the conditions of the station, the types of trains and the customer requirements. In addition to the basic structure and control elements, we can also install additional-devices, such as lamps, speakers and screens.

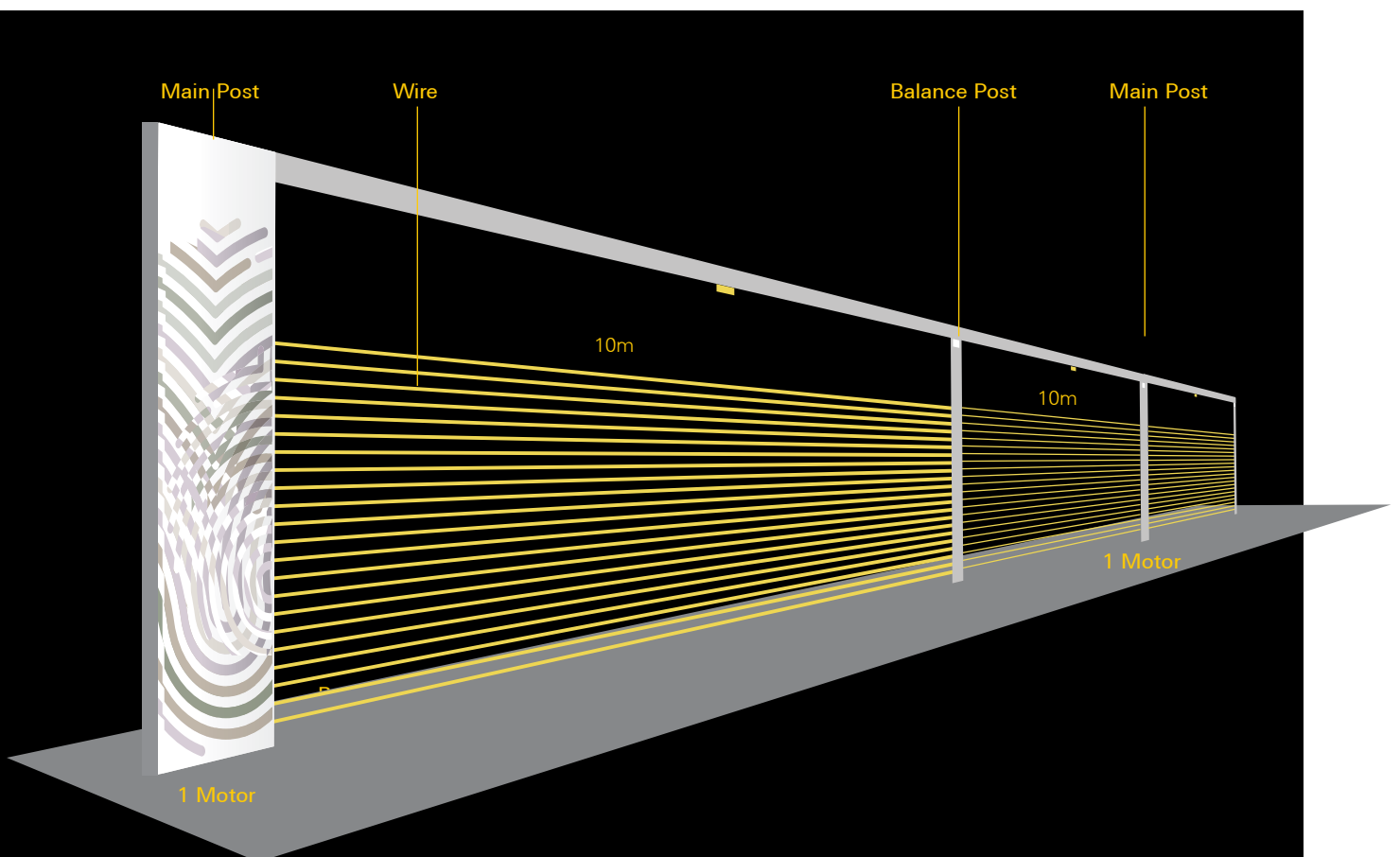
We can offer different appearances of the RSD posts and ropes to fit the architecture and look of the particular station. These are some of our executed projects:



PRODUCT DEVELOPMENT POTENTIAL

The RSD System main application focus is the rapid installation with minimum interference in operation of mixed traffic on passenger station platforms. The extremely flexible and energy saving solution makes the RSD system attractive for use not only in conventional train or metro lines, but also in new high speed or light train projects. The advantages of the RSD System tailor made solutions can meet the challenges of urbanized and country-side areas in locations with higher risk of traffic conflicts requiring additional safety measures. At major overhaul of transport systems, the RSD System is suitable for meeting the BREEAM criteria for mitigation the Global Warming Potential.

Rope-type Screen Doors SYSTEM – an Innovative Approach to Passenger Safety with a clear thought of future climate change resilience





The devices are installed in the subway facilities, elevated and ground station platforms, to protect passengers and prevent unauthorized track access and crashes. Using wire rope panels made of metal with strong elasticity allows for the application of a minimum number of motors-per a long-span section. Work is under way to secure the certification of the „SAFETY INTEGRITY LEVEL 4“ of the RSD system in compliance with the European railway safety standards (EN50126/50128/50129).



BUSINESS – This technology is the proper basis for developing new business culture. Mutual trust and joint responsibility set the standard of uninterrupted multinational communication-aimed at balancing the rapidly changing economic environment with passionate customer service.



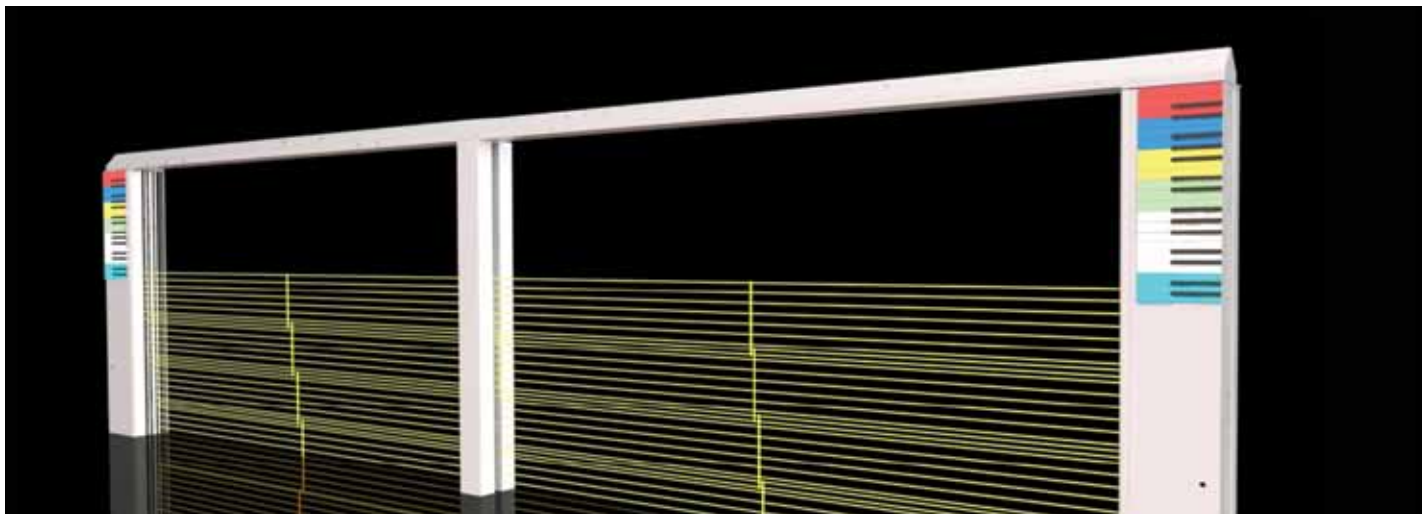
INNOVATION – This technology is the proper basis for creativity in mobilizing both local and international system resources to add value to the customer expectations.



RELIABILITY – This technology is the proper basis for meeting the requirements of the highest safety standards. Continuous RAMS analysis at the Sofia Metro prove 99.99% operational reliability by simple-to-maintain lightweight structure.



RESPONSIBILITY – This technology is the proper basis for long-term customer relationship. The high level of digitalization of the RSD System provides for accessible and affordable warranty and post-warranty services delivered by a qualified and reliable supplier.



THINK GLOBALLY – ACT LOCALLY

The RSD Metro Sofia Project has successfully resolved a local safety problem by applying an innovative Korean technology globally tested in Asia and Europe. Sofia Metro passengers enjoy the benefits of improved platform safety combined with relaxing aesthetic environment at 12 underground stations. The tailored approach to specific stations design and the flexibility of standardized components of the RSD System allowed for the quick implementation of the innovative project without any interference in the trains operation.



RSD SYSTEM – OUR INNOVATIVE APPROACH

FEATURES

- Designed for Metro but applicable in any Public & Rail Transport or Locations with high risk of Traffic Conflicts
- Rapid installation without interference in traffic operation
- High digitalization allowing for the application in both automatic and non-automatic traffic management
- Large Spans & Light Weight eliminating the need of emergency escape doors
- Improved passenger safety with attractive aesthetic design adaptable to any station environment

RESILIENCE

- Minimum number of motors, structural flexibility and low energy consumption
- Extended service life with guaranteed high RAMS indicators
- 100% reusable & recyclable materials
- Facilitated incorporation of air source heat pumps and LED lighting
- Solar panels powering to generate zero carbon electricity

RSD SYSTEM PROTECTION – IMPROVED PASSENGER EXPERIENCE

- Wire rope flexibility minimizes the risk of injury in case of impact by the structure
- Practically no restrictions regarding length and doors location in trains
- Wire rope structure is not affected by meteorological conditions, train wind, crowd load, etc.
- Under power-off or fire conditions, emergency escape is facilitated by large door spans and light weight rope panels
- Laser technology and area sensors guarantee easy identification of residual passengers and gap monitoring obstacles





RSD SYSTEM – EXTENDED SERVICE LIFE

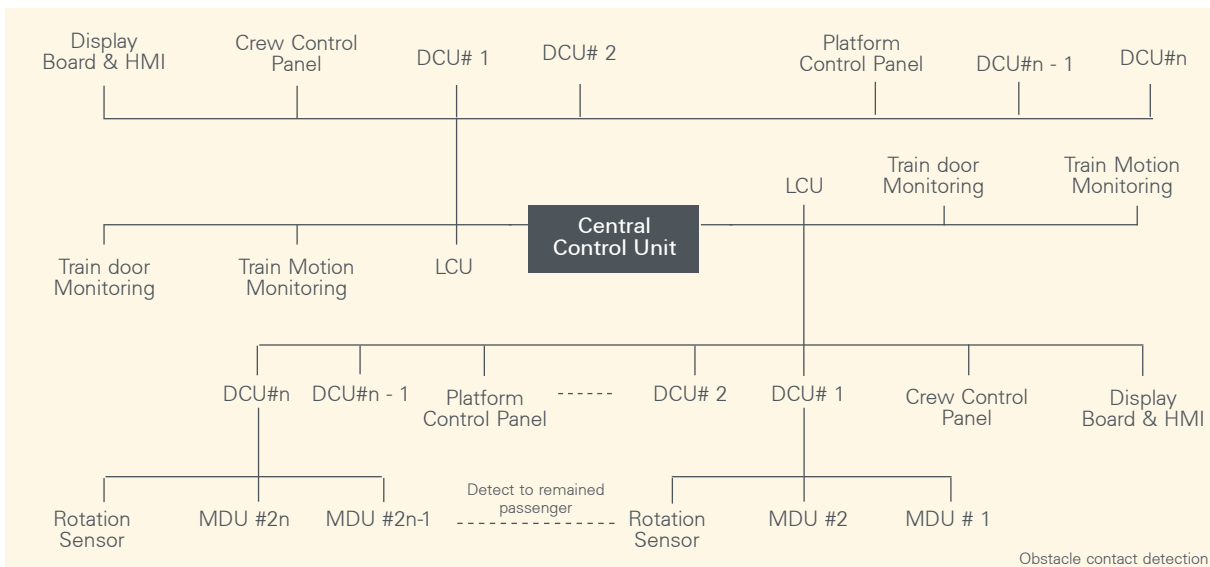
PARTNERSHIP SINCE THE VERY BEGINNING


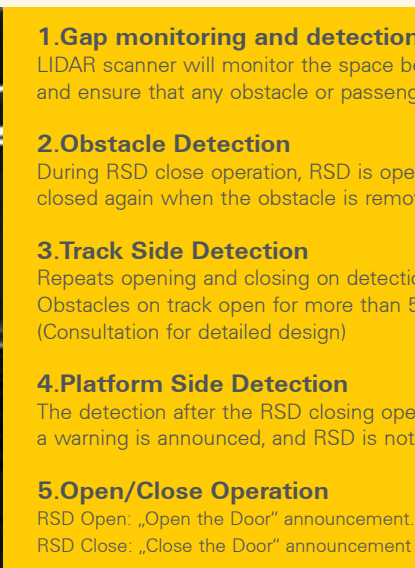
Our Consortium offers the Customer highly qualified services with Professional Indemnity Insurance from the concept design to the commissioning, including manufacture, testing, warranty service and post-warranty maintenance:

- Concept development
- Tailored design
- Prototype test
- Manufacturing & acceptance
- Installation
- Commissioning tests
- Life cycle service
- RAMS analyses & On-line support




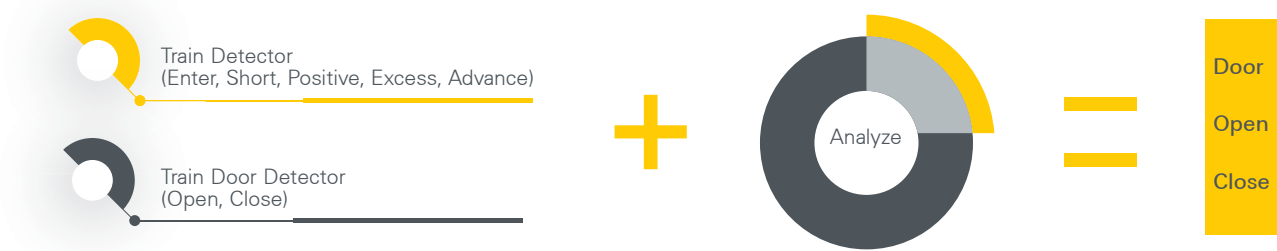
RSD SYSTEM – HIGHLY DIGITIZED CONTROL TO GUARANTEE RAMS



- 1. Gap monitoring and detection**
LIDAR scanner will monitor the space between train and the RSD and ensure that any obstacle or passenger is identify.
- 2. Obstacle Detection**
During RSD close operation, RSD is opened when an obstacle is detected and closed again when the obstacle is removed. (Remains open after 5 or more iterations.)
- 3. Track Side Detection**
Repeats opening and closing on detection within 10 seconds of RSD full closure. Obstacles on track open for more than 5 seconds in the absence of the train. (Consultation for detailed design)
- 4. Platform Side Detection**
The detection after the RSD closing operation is completed, a warning is announced, and RSD is not opened. „Step back!“ announcement
- 5. Open/Close Operation**
RSD Open: „Open the Door“ announcement.
RSD Close: „Close the Door“ announcement





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