

MIREL VZ1 Product Sheet

# Train Protection System MIREL VZ1



# HMH & MIREL VZ1

**HMH** is a recognized specialist in the field of rail transport safety, in which it has been active since 1993. The safety of train transport is a key area in its development and modernization. In the European Union, there are more than twenty national systems for safety railway travel. Until a unified European ETCS system is built, these systems represent a barrier to the smooth running of locomotives.

**The MIREL VZ1 train protection system represents a real alternative for all carriers looking for an effective solution to save time and money.**

The MIREL VZ1 system is the only one device on the market that integrates LS, EVM and SHP infrastructures. It can therefore drive without restriction and stop at the borders in Slovakia, the Czech Republic, Hungary and Poland. The MIREL VZ1 is also designed for connection with the ETCS train protection system from leading European manufacturers.

From Prague  
to Košice,  
from Gdańsk  
to Budapest.

4 countries, 4 national  
infrastructures  
– one system

# Advantages of MIREL VZ1

MIREL VZ1 includes years of own development, testing and know-how.

- |                            |                    |
|----------------------------|--------------------|
| ✓ Compact design           | ✓ Energy-efficient |
| ✓ High compatibility       | ✓ Low costs        |
| ✓ Long life and durability | ✓ Wide use         |
| ✓ Module extension         |                    |

## VZ1 – how it works, system mode

The MIREL VZ1 system is a mobile part of the train protection system powered by the on-board network. It is ready to use for the operation of single- as well as twin-driver's cab rail vehicles. It can operate on lines with and without line transmission. As an open system, it can transmit information in different ways according to the nature of the equipment and infrastructure. Currently, MIREL VZ1 is the only one device on the market that can integrate the safe driving system of locomotives in Slovakia, the Czech Republic, Hungary and Poland up to a speed of 160 km/h.

**The MIREL VZ1 train protection system can work in one of two system modes:**

- VZ1** – a stand-alone system without an active MIREL STB functional gateway.
- STM modul** – a system with an active MIREL STB functional gateway, which controls the switching of standby working and national modes.

# Safety functions of MIREL VZ1

**MIREL VZ1 has three main functions: control, information, safety.** The system evaluates information about the railway line, the progress of the journey and its safety in real time. The main functions of the MIREL VZ1 system include the following activities on vehicle:

- Vigilance control
- Maximum speed control
- Cooperation with track infrastructure
- Dynamic speed profile
- Direction control
- Remote stop
- Checks the braking of a rail vehicle at standstill
- Emergency stops of the vehicle
- Measurement of continuous values
- Indication
- Diagnostics
- STM module of the ETCS system

## Basic system composition of MIREL VZ1

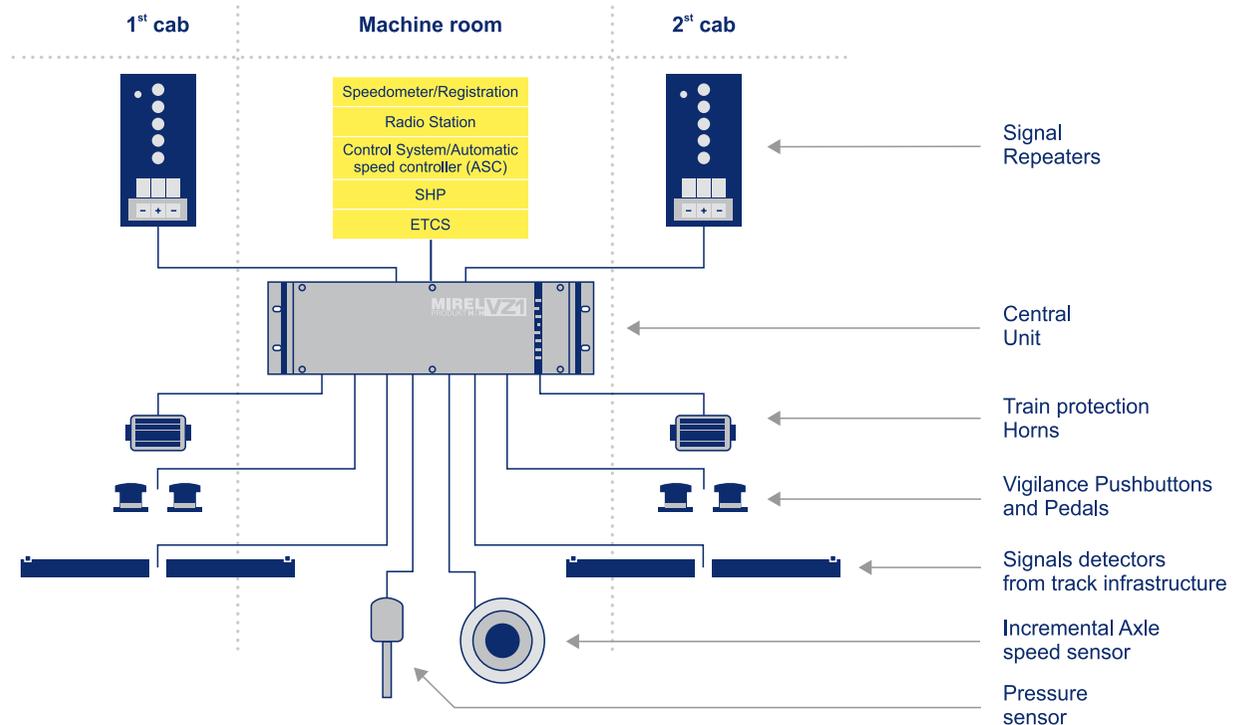
Central Unit

1<sup>st</sup> cab signal repeater

1<sup>st</sup> cab horn

2<sup>nd</sup> cab signal repeater

2<sup>nd</sup> cab horn



# Cooperating elements

The MIREL VZ1 train protection system cooperates with other devices and elements on the rail vehicle. Some are optional depending on the configuration, others are necessary for the correct operation of the protection system.

## MIREL VZ1 +

<b>Signal sensor (MIREL SN)</b>	<b>Axle speed sensor (MIREL IRC)</b>	<b>Pressure sensor (MIREL ST)</b>	<b>Functional gateway (MIREL STB)</b>	<b>Registration device (MIREL BB)</b>	<b>SHP generator (MIREL SHPE)</b>
The signal sensor ensures signal transmission from the LS and EVM track infrastructure to the mobile part of the train protection system. Connection of signal sensors to the MIREL VZ1 system is optional depending on the system configuration. If connections are required, a pair of sensors is placed under each front of the vehicle.	The axle speed sensor ensures the conversion of the mechanical rotation of the axle into a sequence of electrical pulses. The MIREL VZ1 system can determine the speed, acceleration, direction and travelled distance of the rail vehicle by further processing the impulses. Connection of the speed sensor to the system is necessary in every configuration.	The pressure sensor ensures pressure measurement in the main brake pipe of the rail vehicle. Connecting the sensor is necessary in every system configuration.	The functional gateway ensures the interface between the MIREL VZ1 train protection system and the on-board part of the ETCS system. Depending on the configuration, it can also provide the interface between the MIREL VZ1 system and the vigilance control system. The connection of the functional gateway to the MIREL VZ1 system is optional depending on the system configuration.	The registration device ensures the registration of information about the transmitted railway signals, about the operation of the vigilance button, about the maximum permitted speed, about the pressure in the main brake pipe and about other states of the train protection system. Connecting the registration device to the MIREL VZ1 system is possible in several ways, it is required in every configuration from version v04.	The SHP generator ensures the sensing and decoding of the signal from the SHP track infrastructure to the mobile part of the train protection system. Integration with the train protection system is possible by a binary or serial interface depending on the type of cooperating SHP generator. Connecting the SHP generator to the MIREL VZ1 system is optional depending on the system configuration.



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