


Installation instruction

Trainstop Sensor




Version: of 3.0 24. June 2024



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0 Description

The system of object recognition evaluates train-movements on tracks and sends the appropriate state via „Standard Endgeräte Schnittstelle“ of the „Deutsche Bahn AG“ to superior Systems (FIA-system).

The communication with the FIA-system is realized by LON, Ethernet, RS485 or by a switch contact.


The Hardware consists of compact casing with ultrasonic-unit, evaluation-electronics, indicator-unit (LEDs for every train-movement, see also picture 2) and a service probe (LON).

The sensor is able to send test telegrams.

By default there is a 4m sensor in the device, optionally a 6m sensor can be in the larger housings to increase the range.



Picture 1: ZHS-USMW in compact casing with mounting holder


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Picture 2: Indicator unit and service probe

red LED flashing = Entry, if with motion sensor, then motion impulse from the sensor
 red LED shining = Stop, at the same time motion impulse is visible on the green LED
 green LED flashing = Starting
 green LED shining = Exit

Button for setting test mode

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1 Terminal assignment

1.1 Terminal assignment RS-485 Version


1 Brown =	+	DC voltage
2 White =	-	DC voltage
3 Green =		LON A
4 Yellow =		LON B
5 Pink =		RS 485 A
6 Grey =		RS 485 B

1.2 Terminal assignment RS-485/SK2 Version

1 Brown =	+	DC voltage
2 White =	-	DC voltage
3 Green =		contact A Amplitude = DC Voltage
4 Yellow =		contact B Amplitude = DC voltage
5 Pink =		RS 485 A
6 Grey =		RS 485 B

1.3 Terminal assignment Ethernet Version

1 Brown =	+	DC Spannungsversorgung
2 White =	-	DC Spannungsversorgung
3 Green =		Rx +
4 Yellow =		Rx -
5 Pink =		Tx +
6 Grey =		Tx -

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1.4 Terminal assignment LON Version


- 1 Brown = + DC voltage
- 2 White = - DC voltage
- 3 Green = LON A
- 4 Yellow = LON B

1.5 Terminal assignment SK1 Version

- 1 Brown = + DC voltage
- 2 White = - DC voltage
- 3 Green = changer relay
- 4 Yellow = contact open, resting state
- 5 Grey = contact closed, setting state

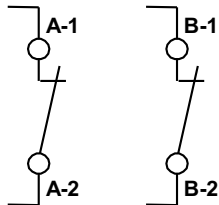
1.6 Terminal assignment SK2 Version

- 1 Brown = + DC Spannungsversorgung
- 2 White = - DC Spannungsversorgung
- 3 Green = potential-free contact A-1
- 4 Yellow = potential-free contact A-2
- 5 Grau = potential-free contact B-1
- 6 Rosa = potential-free contact B-2

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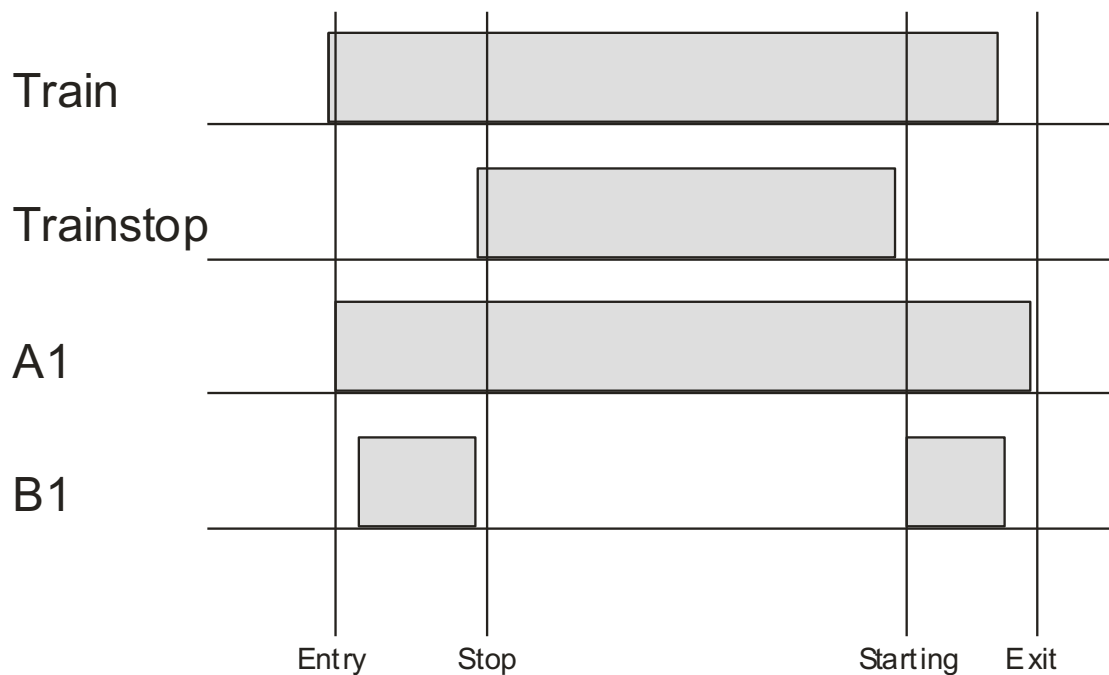
1.7 Explanations of the versions


The potential-free contacts of the SK2 version are closed (voltage-free). Optionally the contacts are available as “contact open” version.



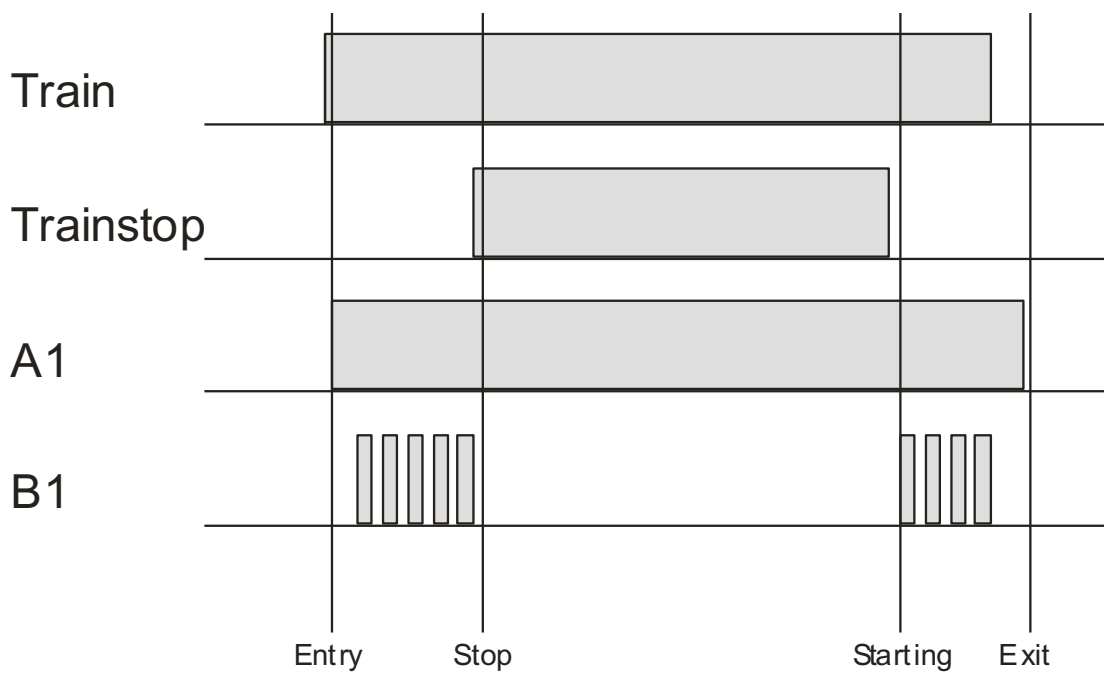
- There are several software versions for the SK2 version.


Version 1:



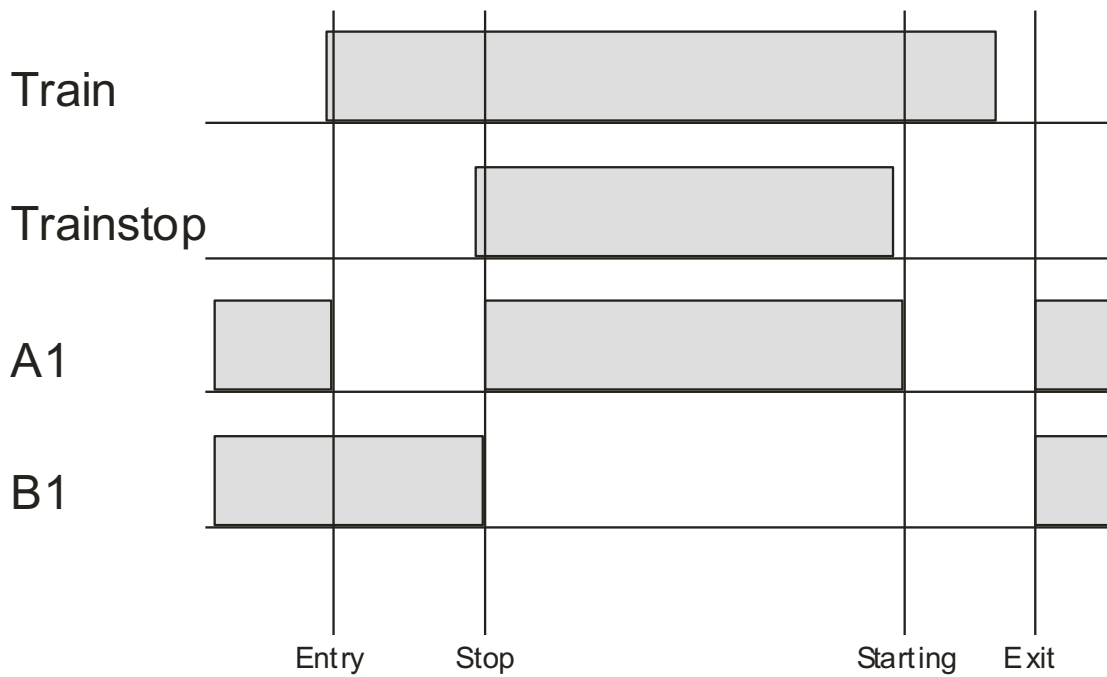
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Version 2:



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Version 3:

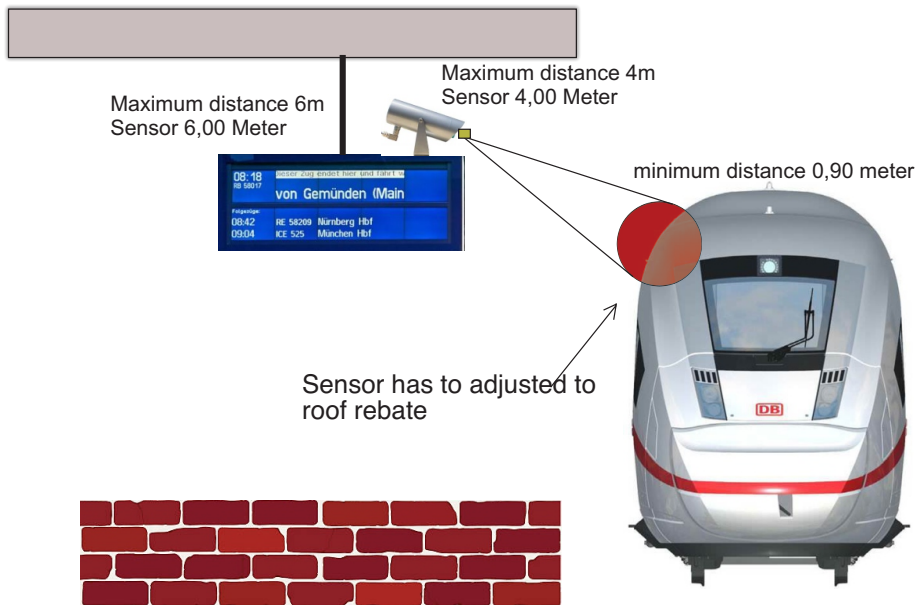


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2 Mounting informations


Mounting and positioning:

Sensor has to be adjusted in 90° angle to train




Picture 3: Positioning of the sensor system

The minimum value of the distance to the object to be scanned is 0,90m (blind zone) must not fall below.

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The following points should be noted when positioning the sensor:

- Enough free zone around sonic axis > 90 cm
- Distance between two opposing sensors
Without angular alignment, horizontal mounting
that means, sensors look directly to each other
 - 4m Sensor > 12 m
 - 6m Sensor > 18 m
- Distance between two opposing sensors
angled attachment, from $\alpha \geq 20^\circ$, as shown in the picture aligned with the fold
 - 4m Sensor > 6 m
 - 6m Sensor > 9 m
- Lateral distance to the sensor to walls ect. > 5 m

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3 Information of installation

Mounting and connecting of the device is shown in picture 3 and chapter 2 "Terminal assignment"

Check power supply and switch on.

Sensor system is in state of readiness.

3.1 Testmode of the Sensor

After installing the sensor must be checked.

This is possible with the test mode as follows:

The test mode is divided into two areas. The impulse input mode and the function test mode.

It is only possible to enter the function test mode when you are in the pulse mode.

3.1.1 Impulse input mode

- Keep the button pressed until both LED's start to flash.
- After the flashing time is ended (ca. 2-3 sec.) you are in impulse mode.
- At now the sensor state is displayed on the LED's. The red LED shows the motion impulse and the green LED the "object in area" signal of the ultrasonic sensor.

3.1.2 Function test mode


- Keep the button pressed until both LED's start to flash again.
- After the flashing time is ended (ca. 2-3 sec.) the device is in the function test mode.
- Now the individual train phases can be simulated each time the button is pressed.
- Entry – Stop – Starting – Exit – Entry – Stop - ...ect.....
- Depending on the version of the device, the corresponding interfaces are operated.

To end the "test mode", keep the button pressed until both LEDs start to flash again.

After the flashing time has ended (ca. 2-3 sec.) you are back in the operating state.

The test mode is also exited if there is no input for 4 minutes.

It doesn't matter whether you are in the pulse input mode or in the function test mode.

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3.2 Checking the Trainstop system

If a train is entering the railway station and in the scope of the Trainstop System, the sensor detects the train. The red LED is flashing, this is the phase „entry“.

If the train stops in the scope of the Trainstop System, the sensor detects this and the red LED is shining. This is the phase „stop“.

The phase „starting“ is initiated, when the train moves in the scope of the Trainstop System. The green LED is flashing.

After the train is out of the range of the Trainstop System, the green LED is shining a short time, this is the phase „exit“.

After every drive through of a train the phase „entry“ and at once the phase „exit“ are initiated.

Every switching of the train-phase the LEDs are automatically updated.

3.3 Time response of every single switch-cycle

The dwell time of the individual switching cycles basically depends on the behavior of the object.

Minimum dwell time of the individual switching cycles:

The duration of the entry signal to the stop signal when the train is stationary is 6 seconds.

The duration of the Halt signal until the Approach signal is at least 20 seconds.

The duration of the arrival signal to the exit signal is at least 4 seconds. (If no train movement is detected during the journey and the signal arrival is only switched when the train leaves)

The duration of the exit signal is at least 3 seconds.

The timing of the switching cycles can be changed via parameters.