



WSR and WSS Wheel Detectors

Contactless Switching and Indication

Transportation Systems

SIEMENS



Contactless Switching and Indication

The WSR and WSS Wheel Detectors

The WSR (Wheel Sensor Relay) and WSS (Wheel Sensor Single) Wheel Detectors are electronic switches which respond contactlessly to wheel flanges. They are suitable as a replacement for the track-installed switching devices S44, MK, WSSB-Impulsgeber and RSE 45.

Benefits for users

- > Interface compatibility with existing wheel sensors and intermittent track-installed switching devices for switching and indication functions from Siemens in applications with nominal operating voltages of 12 V to 60 V DC or 24 V to 60 V AC
- > Mounting and interface compatibility with S44, MK and WSSB-Impulsgeber switching contacts (attachment at rail base)
- > Mounting compatibility with the RSE Wheel Sensor (same drilling dimensions)
- > No additional interface board required in the indoor equipment
- > Cabling compatibility; no separate operating voltage supply necessary (in applications with nominal operating voltages of 18 V to 60 V DC or 24 V to 60 V AC)
- > No electronics required in the trackside connection box
- > No interference from magnetic brakes and Knorr-type eddy-current brakes
- > Maintenance-free; readjustment is dependent on the degree of wear of the rail
- > Rail web or rail base clamp attachment
- > Rail web mounting possible over a sleeper
- > Semi-automatic adjustment to the mounting location
- > Max. traversal speed of 450 kph
- > Development and approval according to CENELEC

The WSR Wheel Detector replaces mechanical or magnetic track-installed switching devices such as the S44, MK and WSSB-Impulsgeber without any modification to the cabling or existing evaluation equipment with a nominal operating voltage of 18 V to 60 V DC or 24 V to 60 V AC. The WSS Wheel Detector replaces the RSE Wheel Sensor without any modification to the cabling or existing evaluation unit.

Structure and connection

The electronics of the WSR and WSS Wheel Detectors is accommodated in a plastic housing. The wheel detector has a factory-mounted connecting cable, with six cores in the case of the WSR and two in the case of the WSS. A premounted flexible tube protects the cable against physical damage. The cores of the connecting cable are terminated at the terminal block of the trackside connection box or cable distribution box. The cores of the outgoing cable are connected at the terminal block to the relevant wires of the WSR or WSS Wheel Detector.

Installation

An adapter plate is used to mount the wheel detector to the rail web, match it to various rail profiles and adjust its height. Existing drill holes in the rail web 13 mm in diameter and 145 mm or 270 mm apart can be used. The wheel detector housing is bolted to the adapter plate, a series of notches allowing a fine adjustment of the mounting height. A simple adjustment gauge is used to check the height, perform a semi-automatic adjustment to the mounting location and carry out a final functional test.

Alternatively, the wheel detector can be fixed using a clamp at the rail base, in which case no holes need to be drilled in the rail web.

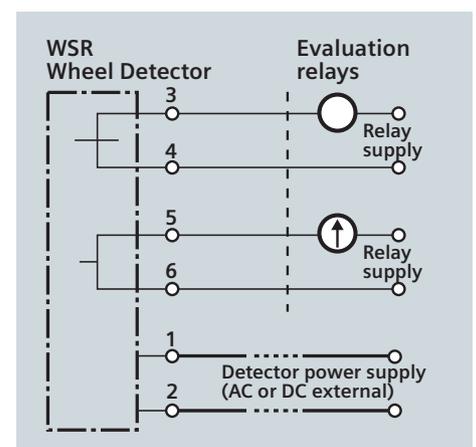
Semi-automatic adjustment to the mounting location

After the mounting and height adjustment, the operating voltage (from the interlocking or an external power source) is applied to the wheel detector. In a predetermined time window either the gauge or a steel plate large enough to cover the entire upper side of the wheel detector, is laid over it for 15 s to 45 s. When the gauge is removed, the wheel detector automatically adjusts itself to the mounting location. No further adjustments are necessary.

Electrical connection of the WSR Wheel Detector

The power supply of the detection equipment is freely selectable:

- > If a DC or AC supply is available at the installation site, the wheel detector can be fed externally (terminals 1 and 2). On account of their electrical isolation from each other and from the wheel detector electronics, both the switching stages can be used as floating switching contacts.

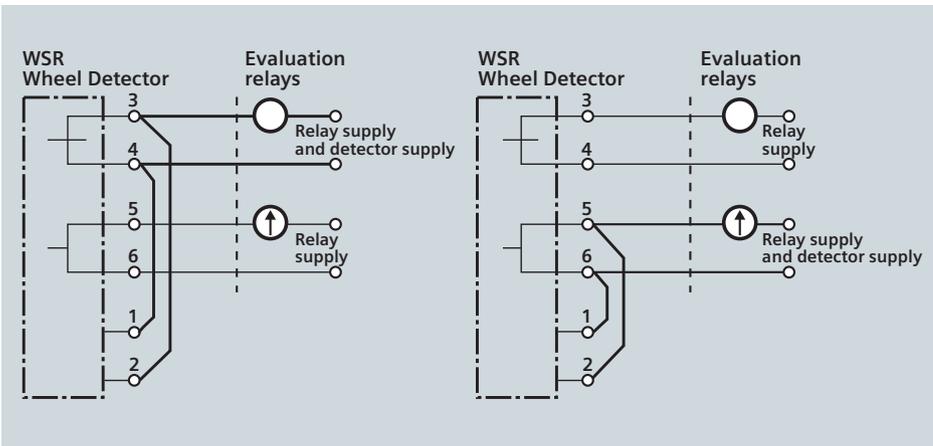


Electrical connection of the WSR wheel detector for external supply



> If no separate power supply is available at the installation site, the power is taken from the switching stage used for the transmission of indications. For this, the connections of either the NO contact (3 and 4) or the NC contact (5 and 6) are connected in parallel

with the supply (1 and 2). The switch output not used to obtain the power in either case is available as a floating contact. The switching stages can be used to control ohmic as well as predominantly inductive loads (relays, contactors) or capacitive loads directly.

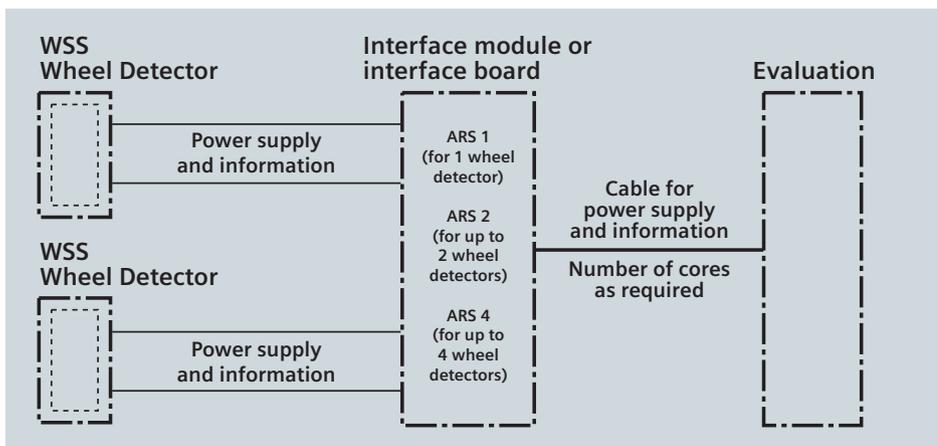


Electrical connection of the WSR Wheel Detector

Electrical connection of the WSS Wheel Detector

The ARS 1 interface module or the ARS 2 / ARS 4 interface boards are the link between the wheel detector and the series-connected evaluation equipment.

The wheel detector receives its power via the two wires from the interface module or the interface board.



Electrical connection of the WSS Wheel Detector

Electrical data, WSR

Operating voltage: 12 V to 60 V DC (-10 % to +20 %)
24 V to 60 V AC (-15 % to +10 %, 50 Hz to 60 Hz ±2 %)

With power obtained from the controlled switching stage:
18 V to 60 V DC (-10 % to +20 %)
24 V to 60 V AC (-15 % to +10 %, 50 Hz to 60 Hz ±2 %)

Connection variants, WSR:

- Two wires: Connection of a relay output (NC or NO contact)
- Three wires: Connection of both relay outputs as a two-way switch
- Four wires: Connection of both relay outputs separately as a break contact and a make contact

If a separate power supply is used, two additional wires are required per variant.

Cable type: freely selectable
Loop resistance: depends on interface option. The minimum operating voltage required at the wheel detector is 10 V DC (based on a current consumption of the detector of 3 mA) or 24 V AC (based on a theoretical current consumption of the detector of 11 mA).

Pulse duration: ≥ 12 ms ±10 % or ≥ 400 ms ±10 %, according to variant

Electrical data, WSS

Operating voltage: 18 V DC from ARS 1 interface module or ARS 2 / ARS 4 interface board

Connection of WSS:
Two wires: to ARS 1 interface module or ARS 2 / ARS 4 interface board

Loop resistance: $\leq 200 \Omega$

Pulse duration: $\geq 10 \text{ ms} \pm 10 \%$



Technical data, WSR and WSS

Line and vehicles

Detection:	wheel flange
Rail profiles:	all common profiles with heights between 134 mm and 180 mm* when new, channel rails with cutout
Wheel diameter:	300 mm to 2300 mm
Flange depth:	25 mm to 38 mm below top of rail*
Flange width:	≥ 20 mm, measured at 10 mm depth above measuring circle level/running tread*

Dynamic switching behaviour

Traversal speed:	≤ 80 kph for wheel diameter ≥ 300 mm ≤ 160 kph for wheel diameter ≥ 360 mm ≤ 250 kph for wheel diameter ≥ 600 mm ≤ 400 kph for wheel diameter ≥ 800 mm ≤ 450 kph for wheel diameter ≥ 900 mm
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Static switching behaviour

Switching state:	continuous occupied state for stationary wheel within the sensing range of the wheel detector
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Mechanical data

Connecting cable:	six-core for WSR and two-core for WSS, length 5 m (optionally 10 m)
Fixing:	two 13 mm Ø holes drilled in the neutral zone of the rail web, 145 mm or 270 mm apart, rail base clamp optional

Environmental data

Operating temperature:	-40 °C to +85 °C
IP rating:	IP 66 IP 68 (900 mm water gauge / 60 min)

*other dimensions on request

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The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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