ZP 43
Electronic Wheel Detection Equipment

Reliable and economical track vacancy detection

Transportation Systems

SIEMENS

The ZP 43 Electronic Wheel Detection Equipment

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The safety of mass transit and main-line transport depends on the safety of numerous individual components. For efficient rail services, trouble-free operation of the signalling and safety systems and equipment is essential.

Siemens Transportation Systems has the right solution whatever your needs. With trend-setting technology and specific know-how, we are world leaders in the field of signalling and safety systems for railways. Over 200 rail operators from more than 50 countries have come to trust our signalling and safety products.

The electronic axle counting systems from Siemens make an important contribution to efficient rail transport. They supply reliable information about the state of the track vacancy detection sections. The ZP 43 electronic wheel detection equipment serves as a component of axle counting systems for train operators in mass transit and main-line services, as well as private and industrial railways. It successfully and convincingly meets the stringent requirements of many rail operators with respect to safety and cost-effectiveness.

Efficiency in the rail services
The ZP 43 electronic wheel detection equipment makes a major contribution to the operational efficiency of the rail services. It operates safely and reliably, ensuring trouble-free rail operation. Wheel detection equipment (WDE) is characterised by low life-cycle costs:

> Long service life
> Low fault liability
> Low-cost spare parts' stockage
> Flexible application options in a broad speed range

Benefits for the user

> Detection of all wheels whose dimensions fully or largely conform to the EBO (German Railway Building and Operation Instructions)

> Compatibility with most common standard rail profiles up to the maximum permissible level of wear

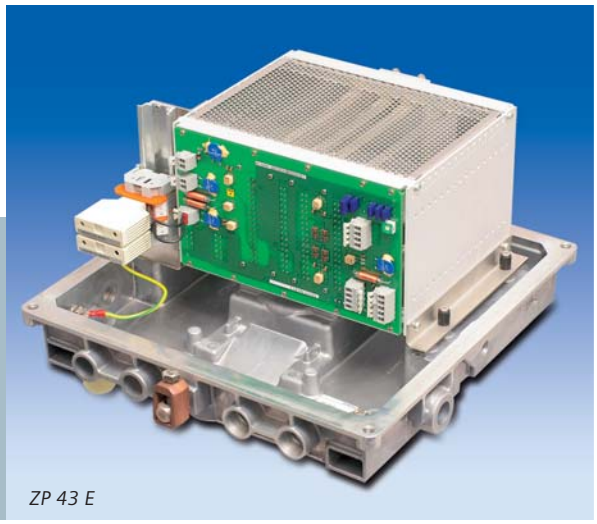
> High mechanical stability

> Reliable for very short wheel pulses (train speeds up to 450 kph)

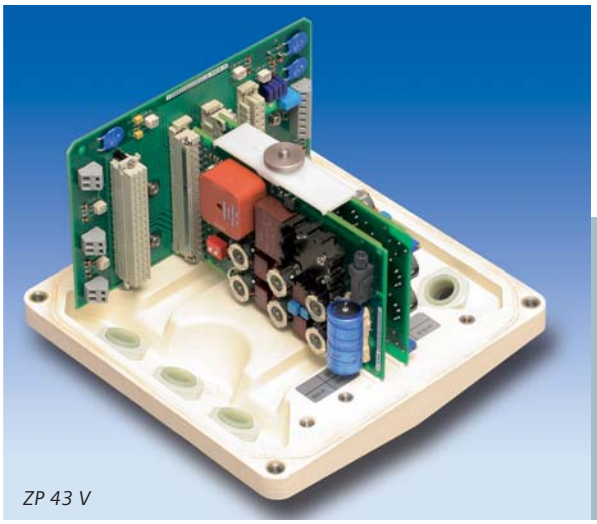
> Immune to
– reverse currents
– current step changes in the traction network
– electromagnetic faults
– magnetic rail brakes
– eddy-current brakes
– balise train-mounted antennas

> Fault-free operation at ambient temperatures of –40 °C to +80 °C and in icy, snowy and humid conditions as well as when briefly immersed in water due to flooding

> Integrated overvoltage protection



ZP 43 E



ZP 43 V

Application and mode of operation of the ZP 43
The ZP 43 is a wheel detection component in track vacancy detection systems using the axle counting method. It is used as a component in the Siemens Az S (M) 350, Az S 350 U and Az S M axle counting systems.

The ZP 43 uses the electromagnetic wheel detection method with a generator frequency of 43 MHz. When a wheel enters the detection area of the double wheel detector, it changes the strength of the alternating electromagnetic field, thereby generating signal pulses. These pulses are transmitted via trackside cables to an evaluation computer located in the interlocking.

Components of the ZP 43
The ZP 43 consists of a DEK 43 double wheel detector with the associated connecting cables and a trackside connection box.Two or more ZP 43 units delimit a track vacancy detection section.

DEK 43 double wheel detector
Each DEK 43 double wheel detector consists of a transmitter section and a receiver section. The transmitters and receivers respectively of the two detectors are accommodated each in a single common housing. The transmitter housing is located on the outer side and the receiver housing on the gauge side of the rail.

Trackside connection box
Two versions of the ZP 43 can be supplied: the ZP 43 E and ZP 43 V, both of which can be connected to evaluation computers.

The trackside connection box of the ZP 43 E version consists of a base plate and cover made of aluminium. A mounting rack with a total of five slots for circuit boards is fitted to the base plate.

The trackside connection box of the ZP 43 V version is made of plastic. Instead of a mounting rack, it contains a four-layer backplane, which is fixed to the base plate by means of brackets. The backplane contains the connectors for the circuit boards and the attachment of a measuring instrument as well as the lightning protection components, and tuning components for the 43 kHz generator frequency.

Application variants of the ZP 43
Double usage
With an additional board, the WDE signals can be made available twice. This enables them to be used by two adjacent evaluation computers.

Foreign power supply
The ZP 43 V can be powered from an external AC or DC supply if the distance between the evaluation computer and wheel detection equipment is greater than 6.5 km.

The ZP 43 is fitted with the appropriate components depending on the application variant.

Technical data	
Traversal speed for wheel diameters ≥ 850 mm	450 kph
Operating conditions Operating distance from wheel detection equipment to evaluation computer	
– standard	≤ 6.5 km
– depending on the cabling	≤ 21 km (with additional measures)
Cable type	telecommunications cable, two-core or star-quad
Sleepers	wood, steel, concrete
Ballast resistance	0 Ω to ∞ Ω
Rail profiles (examples)	S49, S54, UIC 60 and R65
Wheel diameter	≥ 300 mm
Wheel width	≥ 115 mm
Wheelbase	≥ 700 mm
Wheel material	steel or cast iron
Distance between double wheel detector and trackside connection box	≤ 4.2 m, ≤ 9 m or ≤ 14.2 m
Protective device (optional)	deflector
Ambient temperature range	–40 °C to +80 °C
Protection against ingress of foreign bodies and water in accordance with EN 60529	IP 68 (double wheel detector) IP 67 (trackside connection box)

Technical data

Electrical data

Operating frequency	43 kHz
Signal frequency f_1	3.60 kHz
Signal frequency f_2	6.52 kHz
Supply voltage – at wheel detection equipment	30 V DC to 72 V DC
– optional at WDE	22 V AC to 50 V AC
Test voltage (double wheel detector to rail)	10 kV DC
Transmission level, adjustable	0 Np +0.5 Np +0.8 Np
Transmission level for external power supply, adjustable	+0.4 Np +0.9 Np +1.2 Np
Output impedance	150 Ω
Power consumption	approx. 2.5 W

Mechanical data

Dimensions, trackside connection box (mm) – version ZP 43 E – version ZP 43 V	 360 x 360 x 210 241 x 241 x 174

Standards

Low-voltage switchgear and controlgear assemblies
Part 1: Type-tested and partially type-tested assemblies **EN 60439-1** (04/04)

Electromagnetic compatibility (EMC)
Part 6–2: Generic standards – Immunity for industrial environments **EN 61000-6-2** (10/01)

Electromagnetic compatibility (EMC)
Part 6–4: Generic standards – Emission standard for industrial environments **EN 61000-6-4** (10/01)

Electromagnetic compatibility (EMC)
Part 4: Emission and immunity of the signalling and telecommunications apparatus **EN 50121-4** (09/00)

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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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