

Railway Signalling.
Switching the points. Safely and reliably.

Datasheet
Double Wheel Sensor
Type: 2N59-1R-200-45
from Serial No. 2000 and higher

Data Sheet No. 8148-00-00

Double Wheel Sensor:
Type 2N59-1R-200-45



Sensor Data

Switch mounting:	On the inner side of the track. 45 mm below the surface of the track on a new rail typically
Activation:	By the wheel flange passing over the sensor
Rail profiles:	90 RA, 100 RE, 115 RE, 119 RE, 132 RE, 136 RE, 140 RE, 100 RA, 100 ASCE, enquire about others
Diameter of wheel:	300 mm to 1000 mm
Wheel flange sensed:	27.5 mm to 36 mm below the upper surface of the rail Wheel flanges lower than 27.5 mm in height may be detected accurately dependent on speeds and how switching distance on sensor has been set after attachment to rail
Lateral offset of wheel:	Up to 50 mm
Traversing speed:	≤ 37 mph
Rail wear:	18 mm (after 8 mm, the sensor is mounted 9 mm lower, the spacing disk is removed, or when using two-part spacing disks, the upper disk is removed)

Switching Characteristics

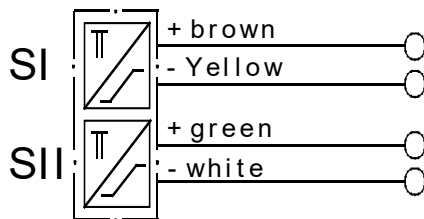
Switching distance:	45 mm / - 1 mm + 2 mm (Distance of static sensing) Switch tag ST 37 (80 mm x 200 mm x 1 mm thick)
Starting distance from center of sensor:	300mm wheel = 600mm wheel = 960mm wheel = 155mm left, 155mm right Ex. The detection range for System I or System II wheel diameter of 300mm This is the attenuation length when first entering the detection field of System I or System II and then leaving the field of System I or System II.
Attenuation length at wheel diameter of:	300 mm \geq 170 mm* 600 mm \geq 200 mm 1000 mm \geq 270 mm Ex. The detection range for System I or System II wheel diameter of 300mm This is the attenuation length when first entering the detection field of System I or System II and then leaving the field of System I or System II
Switching hysteresis:	\leq 2 mm (in direction of travel)
Repetition accuracy of switching point:	\leq 0.5 mm \leq 0.1 mm at constant temperature
Switch-on distance:	\geq 90 mm* The distance between detection at System I and then at System II. First the wheel will be detected at System I and then 90mm later the wheel will be detected at System II.
Overlapping coverage of systems:	\geq 70 mm* The detection area of 70mm is the area that both internal systems (System I and System II) are detecting the wheel at the same time. The area of 70mm is the overlapping coverage of both systems.

Dynamic Switching characteristic V = 37 mph

Pulse length:	$\geq 14.5 \text{ ms}^*$ If the speed is slower or the wheel is bigger the pulse is longer With an increasing speed, the impulses in traveling direction change (e.g. with 9 m/s for approx. 60 mm)
Offset between the systems:	$\geq 5 \text{ ms}^*$
Overlapping coverage of systems:	$\geq 9 \text{ ms}^*$ 37 mph with 300 mm wheel the minimum pulse length when both systems are detecting the wheel
Reliability of system against:	Eddy current braking
No effect of system:	Through magnetic rail brakes being turned on if assembly and setting of DSS are correct
* New rail; diameter of wheel 300 mm; Wheel flange 27.5 mm; Wheel offset 50 mm; temperature range $-30^\circ - +80^\circ$.	

Control circuit

Connection sketch:



Operating voltage:	$8.2 \text{ V} \pm 5\%$
Permanent allowable line resistance:	$\leq 200 \text{ Ohm}$
Intensity Amperage Undamped:	$\leq 2.65 \text{ mA}$
Average:	$\leq 2.95 \text{ mA}$ (annual average) Measured as per DIN 19234 item 4a
Intensity Amperage Damped:	$\leq 1.45 \text{ mA}$
Average:	$\leq 1.34 \text{ mA}$ (annual average) Measured as per DIN 19234 item 4b
Test voltage on system:	1 kV
Test voltage against earth:	2 kV
Lightning arrangement:	Suppressor diode 1.5 kW @ 1 ms

Wiring

Cable wires:	2 each per single rail sensor system
Cable wires:	Railway cable, twisted pair in accordance with the DB specification sheet DLK 1.013.20.LY or signal cable in accordance with VDE 0816

Housing

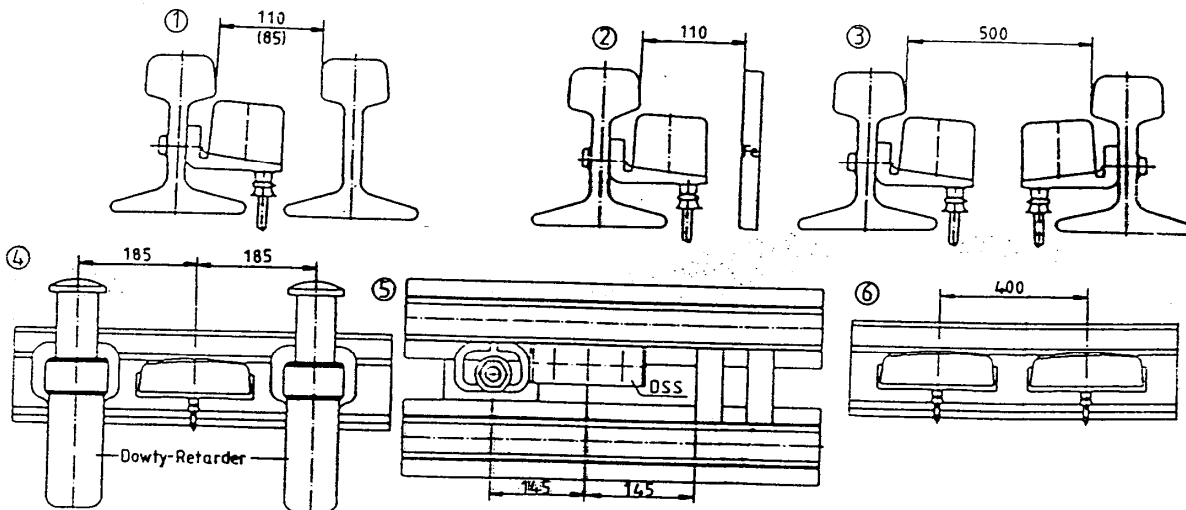
Base plate:	C-Cu-Zn 33 Pb (DIN 1709)
Cap:	Plastic, fully cast
Connection line:	2 x 0.75 mm ³ polyurethane 5 mm long integrally cast in the housing (PURWIL orange without protective hose can be used in gravel)
Overall Dimension:	7.25"L X 3"H X 3.5"D
Weight:	About 5.5 lbs
Color:	Grey

Environment

Ambient temperature:	-30C to +80C (- 22 °F to + 176°F)
Resistant to:	Lightning strike on the rail, through side mounting, effects of weather, UV radiation, greases, oils, bases and salts, acids with some conditions
Protective type (DIN 40050):	IP 67
MTBF calculation:	420,000 h at + 40 °C according to Mil manual 217 d
Mechanical vibrations:	60 g at a frequency range of 25-30 Hz
Mechanical load:	< 440 lbs. in the vertical direction

Assembly

Fastening:	By 2 Hex Screws M 12 x 35 DIN 609-5.6 by fitting sensor to the rail web. Drilling of rail web necessary for bolt on version (no reduction of rail solidity)
Preferred installation position:	Inner curve of rail
Facilitation of mounting:	Approved drilling jig for particular rail profile concerned
Maintenance:	See assembly instructions
Free zone:	The dimensions must not fall short of those in Figure 1 and 6. Exception: in the movable area of the tongues of the points the dimension 110 (Figure 1) can be reduced to 85 mm, provided that the DSS is not driven over from the adjacent rail.



If the installation dimensions are arranged favorably, changes in the height of the wheel cannot destroy the switch

If the rail head is worn away vertically, the switch can simply be moved lower vertically. Threaded drill holes provided for this purpose make it possible to reinstall it in the base plate with no problems.

Then another vertical wear of the rail head of 8mm is possible.

In case of lowered mounting of the sensor there is a lateral offset of 16mm towards the left hand side.