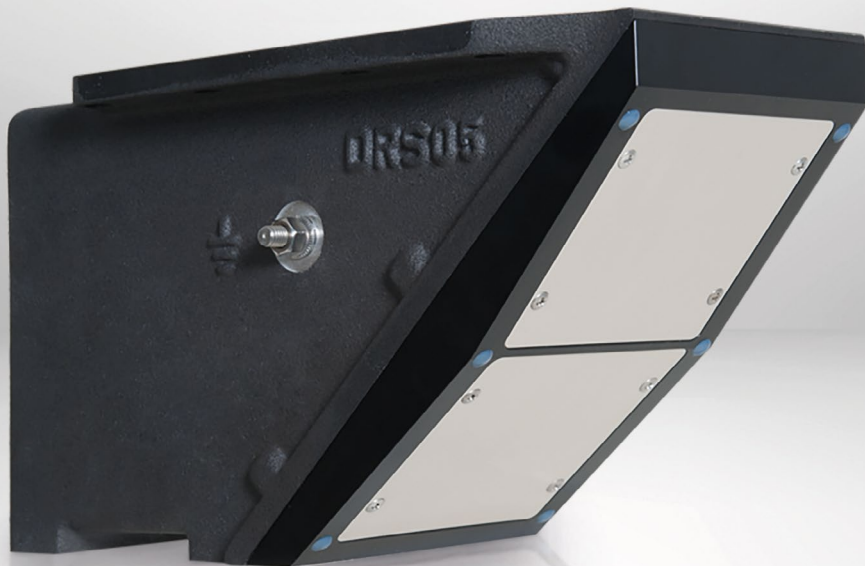
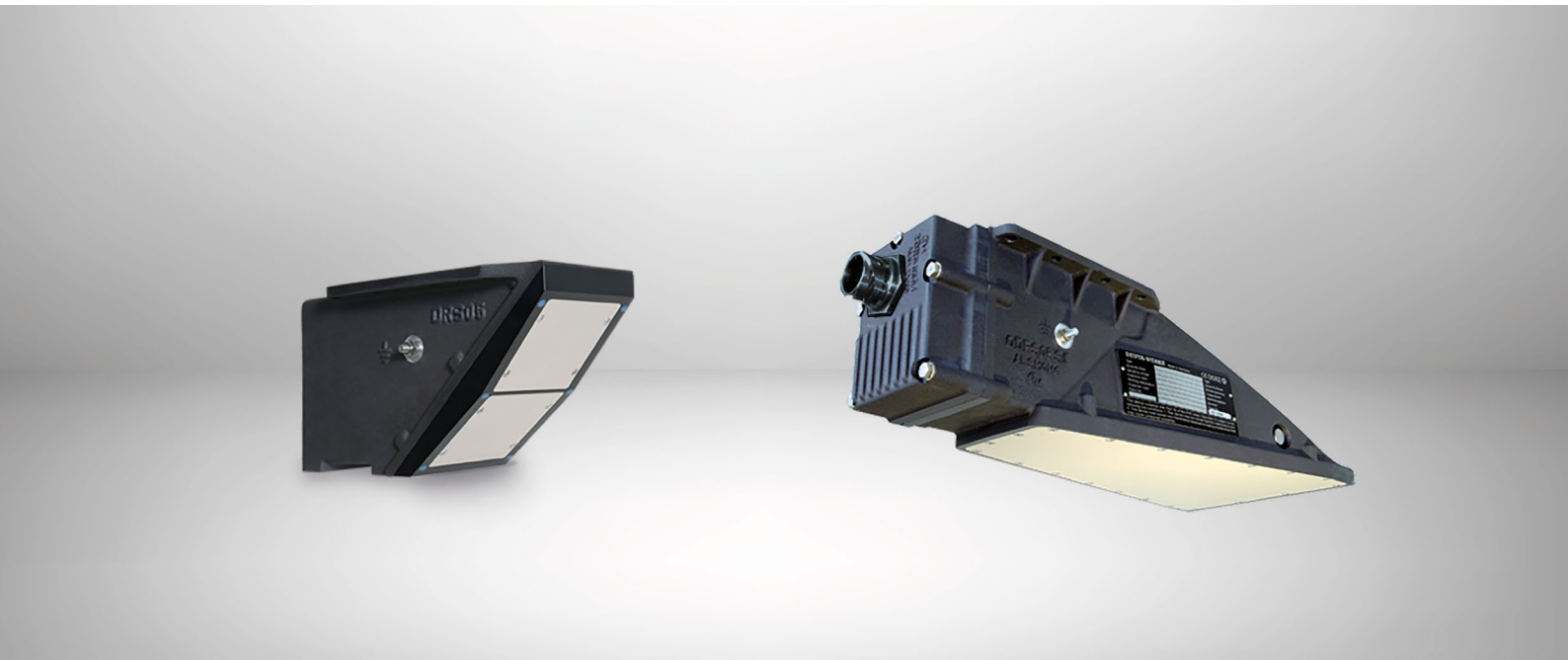


DEUTA Doppler Radar Sensors





»DEUTA Doppler Radar Sensors –

Speed not affected by slip and spin!«

- DRS05/3S1 with integrated protective cover against impact of stones
- Suitable for ETCS, CBTC, high-speed trains and metro vehicles
- Supports traction control functions

DEUTA radar sensors provide a contact-free way of measuring speed and distance by using the Doppler principle of microwaves.

Minimal Life-Cycle Costs (LCC)

These radar sensors are designed with no moving parts, ensuring zero mechanical wear and delivering precise measurement data throughout their entire service life. Their low maintenance and servicing requirements result in an unrivalled cost-benefit ratio over the whole life cycle.

Unlimited deployment options

DRS05 radar sensors can be deployed worldwide. Declarations of conformity are available, for example, for Europe, the UK, Canada, the USA, Japan and Australia.

Exceptionally robust to cope with the harshest of conditions

The DRS05/3S1 features an integrated protective cover that extends the service life of the radar sensors by preventing stone damage. In the DRS05/3S1h variant, the radome heating increases availability in winter conditions.

Special applications

Beyond their proven performance on conventional rail vehicles, these radar sensors are ideal for unconventional transport systems such as magnetic-levitation trains and monorail systems. DEUTA's experienced engineers are ready to support you from the earliest stages of your project, offering expert guidance on radar sensors, speed measurement, and seamless integration with your odometry systems.

DEUTA radar sensors

Feature/Specification	DRS05/3S0a#	DRS05/3S1a#	DRS05/3S1h#
Working principle	Dual-channel speed sensor	Dual-channel speed sensor	Dual-channel speed sensor with heated radome
Recordable speed range	0.2 km/h to max. 600 km/h	0.2 km/h to max. 600 km/h	0.2 km/h to max. 600 km/h
Measurement noise (standard deviation) (1σ)	<0.4 km/h (v <100 km/h) <0.4% (v >100 km/h)	<0.4 km/h (v <100 km/h) <0.4% (v >100 km/h)	<0.4 km/h (v <100 km/h) <0.4% (v >100 km/h)
Error due to variation of the trackbed	<1% typical	<1% typical	<1% typical
Distance measurement reproducibility (1σ)	<0.1% from 1000 m distance	<0.1% from 1000 m distance	<0.1% from 1000 m distance
Supply voltage	15 to 150 V DC, extended-range power, galvanically isolated, battery potential permitted	15 to 150 V DC, extended-range power, galvanically isolated, battery potential permitted	15 to 150 VDC, extended-range power, galvanically isolated, battery potential permitted
Power consumption	max. 10 W	max. 10 W	max. 10 W
Standard interfaces	1. Digital RS485, 2-wire bus, unidirectional, serial 2. Analogue: Pulse output (open collector)	1. Digital RS485, 2-wire bus, unidirectional, serial 2. Analogue: Pulse output (open collector)	1. Digital RS485, 2-wire bus, unidirectional, serial 2. Analogue: Pulse output (open collector)
Forward/backward detection	yes	yes	yes
Reverse polarity protection/short-circuit-proof	yes/yes	yes/yes	yes/yes
Radome heater power consumption	-	-	120 W
Operating temperature	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
Dimensions	Approx. 244 mm × 134 mm × 140 mm (L×W×H, excluding plug and cable)	Approx. 481 mm × 214 mm × 140 mm (L×W×H, excluding plug and cable)	Approx. 481 mm × 214 mm × 140 mm (L×W×H, excluding plug and cable)
Distance to the reflection surface	Approx. 200 mm to 1000 mm, depending on the application	Approx. 200 mm to 1000 mm, depending on the application	Approx. 200 mm to 1000 mm, depending on the application
Housing material	Die-cast aluminium, anodised, cover PEEK	Die-cast aluminium, anodised, cover PEEK	Die-cast aluminium, anodised, cover PEEK
Protection category	IP66/IP67/IP69 (with plug and cable)	IP66/IP67/IP69 (with plug and cable)	IP66/IP67/IP69 (with plug and cable)
Weight	Approx. 2.6 kg (without plug and cable)	Approx. 4.7 kg (without plug and cable)	Approx. 4.7 kg (without plug and cable)



»DRS05/3S1h# –

Maximum availability – even in winter!«

DRS05 radar sensors are, of course, designed to operate in winter too. However, under certain weather conditions – especially at temperatures close to the freezing point – wet snow or ice can accumulate on the antennas and affect measurements.

The DRS05/3S1h# Doppler radar sensors with integrated radome heating, ensuring a reliable speed signal even in challenging weather conditions. Fully form-fit-function compatible with the DRS05/3S1, the DRS05/3S1h# is the ideal speed sensor for winter operating conditions.

Depending on the ambient temperature, the internal heating of the DRS05/3S1h# can be activated or deactivated by using the EZ163 heating control unit, which is available as an accessory.

- Heating power: 120 W
- Power supply: 24 VDC – 110 VDC wide-range



»DRS05 Sensor fusion algorithm–

Twice as nice with an accelerometer«

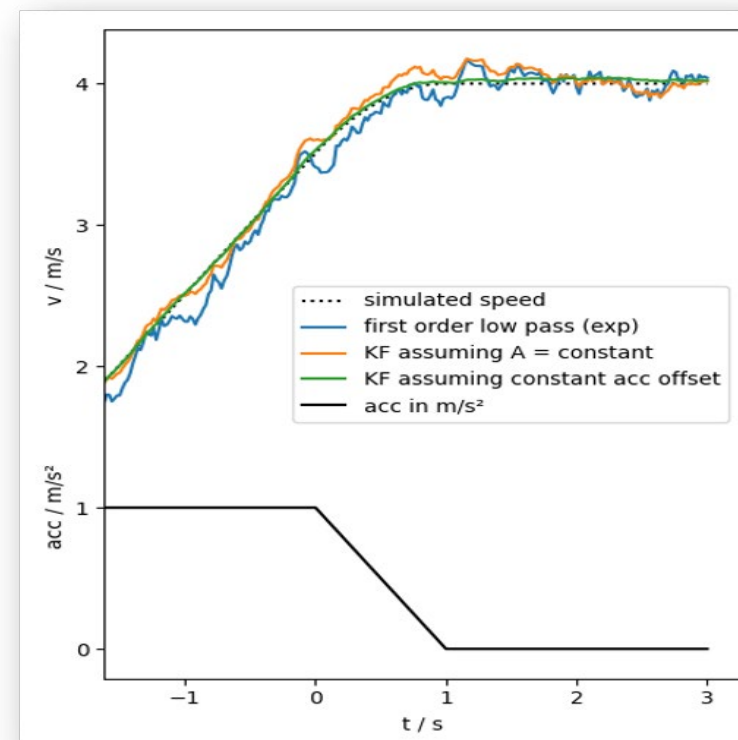


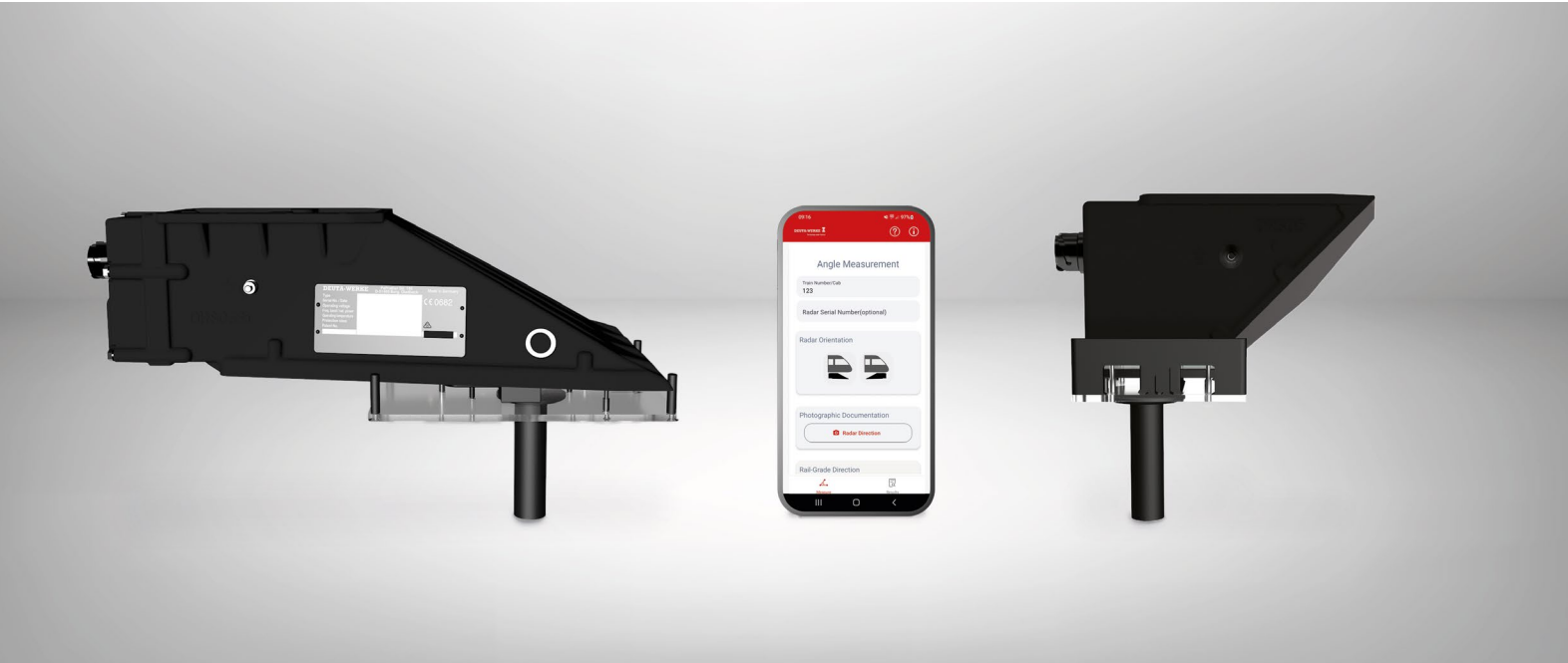
In addition to the Doppler radar antennas, the current DRS05 sensors from DEUTA feature an integrated accelerometer. It supports the speed measurement and leads to an even reduced speed signal noise, while keeping dynamic deviations to a minimum.

Short periods of unavailable Doppler signals can be bridged and interference in standstill is effectively suppressed. The internal fusion of Doppler and acceleration signals ensures unbeatable accuracy and outstanding availability of speed measurement with radar sensors.

This DRS05 fusion algorithm delivers outstanding performance:

- Very smooth and stable speed signals
- Minimal dynamic deviations
- Reliable operation even over track depressions, water puddles, or derailment protection devices on the track
- Higher speed signal reliability in standstill





»DEUTA SmaRT-App -

The convenient inclinometer app«

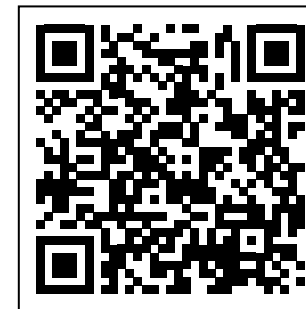
SmaRT App - SmaRT Radar Tool

The mounting position of the DEUTA radar sensors is determined in close collaboration with our customers and is fine-tuned during the integration phase. The angle between the track and the radar sensor's mounting surface directly affects speed measurement accuracy. Customers use an electronic inclinometer to calibrate the sensor's angle of inclination.

The inclinometer procedure – now made even simpler!

DEUTA has revolutionised the inclinometer process with its SmaRT Tool, which combines the SmaRT App with a practical SmaRT phone holder. SmaRT phone holders are available directly from DEUTA-WERKE. The SmaRT App is compatible with Android and iOS smartphones and can be downloaded from the corresponding app stores. It guides users step by step through the measurement process and automatically calculates the calibration factor at the end. It also manages calibration factors for different vehicles and mounting positions.

- Cost-effective
- A single tool for measuring inclination, calculating and managing calibration factors
- User-guided measurement process
- Supports calibration factor management for multiple vehicles and mounting positions
- Easy integration into users' maintenance workflows



App Store is a trademark of Apple Inc.



Google Play is a trademark of Google LLC.



»DEUTA Radar Test Bench RTD-10

Test bench for Doppler radar sensors

The RTD-10 verifies the functional characteristics of DEUTA Doppler radar sensors independently and unaffected by weather conditions or external influences in a laboratory environment. It supports all variants of Doppler radar sensors type DRS05. Following testing, the test bench automatically outputs the results and generates a test report.

Simulation of a moving ground

Doppler Radar sensors are mounted on the underside of vehicles. They send microwaves to the ground and measure the speed by evaluating the Doppler effect of the microwaves that are backscattered from moving objects on the ground. The RTD-10 also provides moving targets leading to a Doppler effect that can be evaluated by DRS05 Doppler radar sensors. This allows to perform a function test of a DRS05 without having to move the entire vehicle.

Component testing in the workshop

RTD-10 radar testers play a key role in quality assurance. They are used to perform functional tests during and after maintenance or repair work.

RTD-10 Radar Tester Benches for railway operators and maintenance providers:

- Maintenance, servicing, repair
- Functional testing of replacement components prior to installation in the vehicle
 - Testing of components that have been in storage (incoming and outgoing goods)
 - Error diagnosis of system components in maintenance workshops

RTD-10 Radar Test Bench

Feature/Specification	
Supply voltage range	AC 220 V to 240 V, 50Hz to 60 Hz
Power consumption	max. 80 W
Temperature range	0°C to +50°C (operation) 0°C to +50°C (storage)
EN standards	EN 61010-1, EN 61326-1
Fire protection	EN 61010-1
Sound pressure level	< 60 dB(A) at 50 cm distance
Speed range	approx. 2 km/h to 40 km/h
Direction simulation	Forward, backward
Test method	Fully automatic, manual
Interfaces	USB DRS05 Radar interface

Dimensions	
Width	765 mm
Height	266 mm
Depth	852 mm
Weight	approx. 53 kg
Protection category	IP 20



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