

## RV-4 Sensors

Type CRV4A...

### Wheel Vector Sensors

For simultaneous measurement of all wheel positions and orientations in 5 axes.

- Complete acquisition of the wheel movements
- Robust design
- Easy and quick mounting
- Easy to extend with option for slip angle measurement
- Resistant to splash water, engine oil, and anti-freeze

#### Description

RV-4 sensors are mechanical systems which are designed for measuring space and direction coordinates of the vehicle wheel. The sensors carry out all movements with the wheel, except for the rotation about the wheel axis. Provided an adequate sampling rate of the articulation positions, it is possible to simulate wheel movements of a complete test drive.

RV-4 sensors consist of five absolutely measuring high precision angle transducers. Together, these measure the space coordinates in a vehicle-related coordinate system: Wheel deflection, camber, x-movement, y-movement, and z-movement (spring travel).

By using the RV-4 sensors with a wheel force transducer the forces and torques of a vehicle wheel can additionally be measured. An optional wheel pulse transducer can be used to determine wheel speed.

#### Application

RV-4 sensors are designed for various vehicle tests like e.g.:

- Weight shift and spring travel when braking
- Changes in camber angle when cornering
- Dynamic self-steering properties
- Tire strain
- Changes in wheel position, when braking or accelerating
- Rear-wheel tracking
- Recording of test and race tracks for simulators

Measurement results of the above tests provide the basis for tasks such as:

- Wheel-well clearance measurement and design
- Chassis development and refinement
- Spring and shock absorber development
- Wheel toe and camber angle adjustment
- Tire development
- Testing of driver assistance systems



#### Technical Data

##### Performance Specifications

Measuring range		
X-axis	mm	±150
Y-axis	mm	±150
Z-axis <sup>1)</sup>	mm	±200
Camber	°	±10
Steer	°	±45
Measurement accuracy		
X-axis	mm	±1
Y-axis	mm	±0,7
Z-axis	mm	±1
Camber	°	±0,2
Steer	°	±0,1
Reproducibility		
X-axis	mm	±0,5
Y-axis	mm	±0,5
Z-axis	mm	±0,5
Camber	°	±0,1
Steer	°	±0,05

<sup>1)</sup> If the entire measuring range of the z-axis (±200 mm) is utilized, the maximum measuring ranges of the y- and x-axis will be restricted.

**Technical Data (Continuation)**

**Signal Outputs <sup>2)</sup>**

Analog (per RV-4)		
X-, y-, z-axis	V	-10 ... 10
Default settings	mV/mm	60
Camber	V	-10 ... 10
Default settings	mV/°	1 000
Steering angle	V	-10 ... 10
Default settings	mV/°	200
DA converter resolution 16 bit (Default settings)	mm	<0,005
	°	<0,002
Adjustable filter time		unfiltered
or	ms	16 ... 1 024

**Interfaces**

CAN (Motorola/Intel)		2.0B
USB (Full Speed)		2.0
RS-232C		yes

**System Specifications**

Power supply	V	10 ... 28
Power consumption at 12 V		
if 1 sensor is connected	W	8
if 2 sensors are connected	W	11
Temperature range		
Operation (environmental temp.)	°C	-20 ... 60
Storage	°C	-40 ... 85
Relative humidity (non-condensing)	%	5 ... 80
Protection standard		
Sensor		IP67
Processor		IP30
Dimensions (LxWxH)		
Sensor arm	mm	s. Fig. 1+2
Electronics	mm	180x125x95
Weight		
1 x sensor + 1 x wheel mount + 4-point suction holder (approx.)	kg	12
2 x Sensor + 2 x wheel mount + 8-point suction holder (approx.)	kg	20
Moving mass at the wheel (approx.)	kg	2,5

<sup>2)</sup> All inputs and outputs are protected against overvoltage and short circuit

**Dimensions**

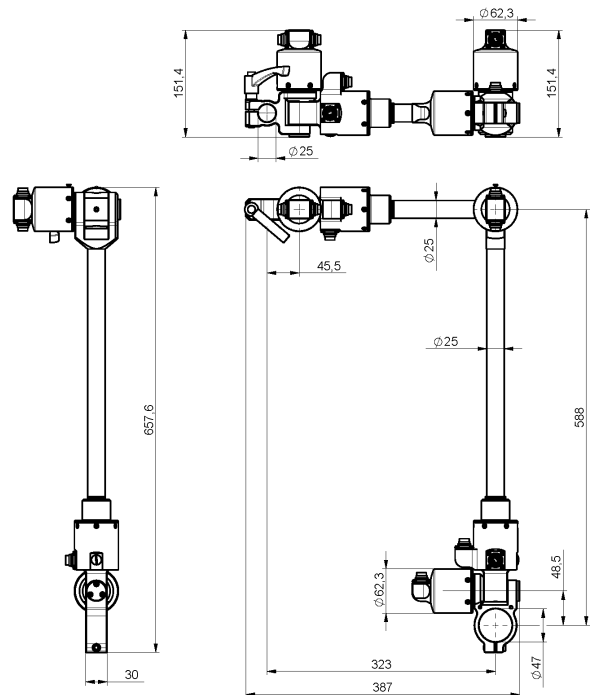


Fig. 1: Dimensions RV-4 sensor, passenger car version

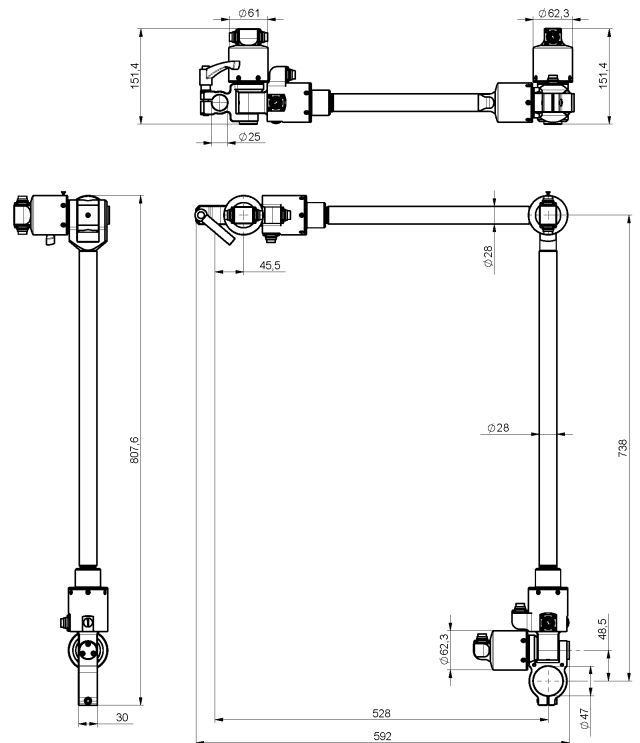


Fig. 2: Dimensions RV-4 sensor, truck version

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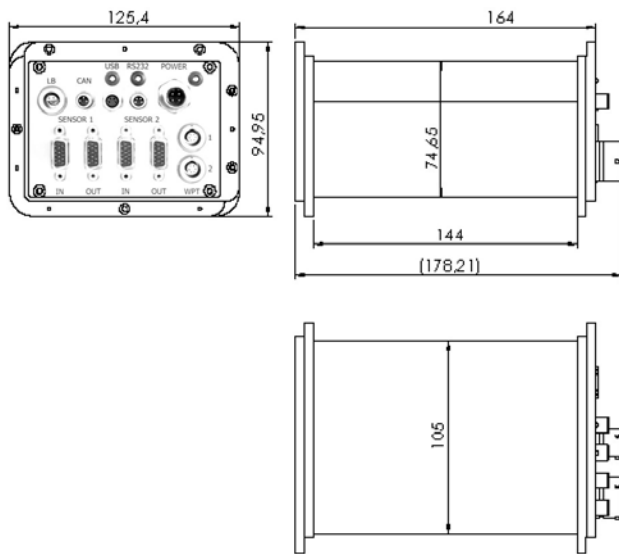


Fig. 3: Dimensions RV-4 processor

### Mounting Passenger Car Version

RV-4 sensors are mounted on the vehicle (car) by using the delivered wheel mounting units and collets (see "Included Accessories"). Fastening to the car body may be effected with the optional suction holders (see "Optional Accessories").



Fig. 4: RV-4 sensor, front wheel mounting with 4-point suction holder

### Included Accessories (passenger car\*)

	Type/Art. No.
• Power cable, l = 5 m	KCD14941
• Distribution cable, l = 1 m	KCD14824
• Centering star, 5-hole	KCD11296
• Centering star, 4-hole	KCD11297
• Centering star, 3-hole	KCD11298
• Plastic handle for centering stars, 6 pcs	KCD11860

• Collets 17 mm, 5 pcs	KCD10070
• Collets 19 mm, 5 pcs	KCD10071
• Collets 21 mm, 5 pcs	KCD10072
• Screw driver 5x200 T-handle	KCD11291
• Double-head open end wrench 10-13	KCD11281
• Hexagon wrench SW2-8	KCD11290
• Wheel mounting unit passenger car	KCD14582
• Transport case complete	KCD15183

\* accessories for truck version on request

### Additional for RV-4 with processor

	Type/Art. No.
• RV-4 processor	KCD14584
• Power cable, l = 2 m	KCD11343
• Connection cable CAN, l = 2 m	KCD13946
• Connection cable RS-232C, l = 2 m	KCD13425
• Connection cable USB, l = 2 m	KCD13947
• Distribution cable, l = 1 m	KCD10523
• Multimedia-CD incl. software & manuals	KCD11343

### Optional Accessories

	Type/Art. No.
• 4-point suction holder for 1 x RV-4	KCD14732
• 8-point suction holder for 2 x RV-4	KCD14731
• Wheel mount WPT	KCD15103
• Wheel mount SF, HF	KCD14905
• Wheel mount SL	KCD14906

### Ordering Key

		Type CRV4A
<b>Sensor Size</b>		
Passenger car	1	□ □
Truck	2	
<b>Processor</b>		
Without processor	0	□ □
With processor**	1	

### Ordering Example

For measurements on one wheel RV-4 sensor, passenger car, processor	<b>Type CRV4A11</b>
For measurements on one axle = two wheels RV-4 sensor, passenger car version, processor plus RV-4 sensor, passenger car, without processor	<b>Type CRV4A11</b> <b>Type CRV4A10</b>

\*\* Standard configuration