

KI 160

Kinematic model: Ackermann steering mechanism



Description

■ investigation of the steering geometry according to Ackermann

When it comes to steering, the entire vehicle's wheel should be exactly on a circular path. To achieve this, the extensions of all the axles must intersect at the centre of the circle (Ackermann's steering principle). This requires that the wheel inside of the curve drives more than the wheel outside of the circle. This is approximately achieved with a steering trapezoid, comprising an axle, a track rod and two track-rod arms on the wheels.

The KI 160 unit can be used to study a steering trapezoid. The experimental unit comprises two track rods with drag link, two track-rod arms and two steering pins, where, in theory, the wheels are attached. The length of the axis corresponds to the distance between the steering pins.

The lengths of the two track rods are independently adjustable.

To set the zero position of the steering angle, the mechanism is fixed via a lock on the drag link. The steering angle on the inside wheel is set; the angle of the outside wheel changes according to the geometry and is read. The difference between the two angles is the lead angle or relative steering angle. The difference between the calculated and measured steering angles is the steering error. Disadvantages of an incorrectly set track rod can be demonstrated.

The elements are mounted on a base plate, which can also be mounted on a wall.

Learning objectives/experiments

- verifying Ackermann's steering principle
- calculate the wheelbase
- determine the lead angle and the steering error

Specification

- [1] investigate a steering trapezoid
- [2] investigate the steering geometry according to Ackermann
- [3] adjustment of the track rod lengths
- [4] read the steering angle on the scales
- [5] adjustment of the zero position of the steering angle by locking the mechanism
- [6] adjustment of the steering angle of the inside wheel
- [7] measure the steering angle of the outside wheel
- [8] base plate with handles suitable as benchtop model and for wall mounting

Technical data

Track rods

- individually adjustable

Distance between the steering pins

- 465mm

Measuring range of the steering angle

- $\pm 50^\circ$
- scale graduation: 1°

LxWxH: 620x280x60mm

Weight: approx. 6kg

Scope of delivery

- 1 kinematic model
- 1 set of instructional material

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Ackermann steering demonstrator

Optional accessories

020.30009

WP 300.09

Laboratory trolley