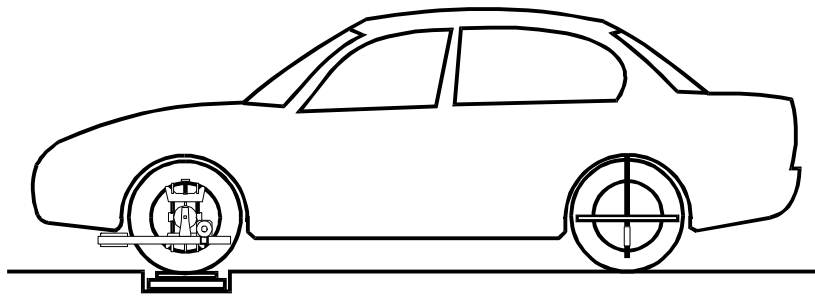


# **EWJ LASER WHEEL ALIGNER 1001**



**OPERATORS MANUAL**  
**(EUROPEAN STANDARD)**

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**EWJ**  
**Laser wheel aligner**  
**1001**

For cars and vans with 12"-19" wheels

Maximum axle load 2500 kg  
Maximum outer tyre diameter 830mm

Power supply: Battery operated. 4 batteries 1.5 volt, size AA (Ø14x50mm) in each measuring head  
Lasers: Class II, max 1.2-mil watt

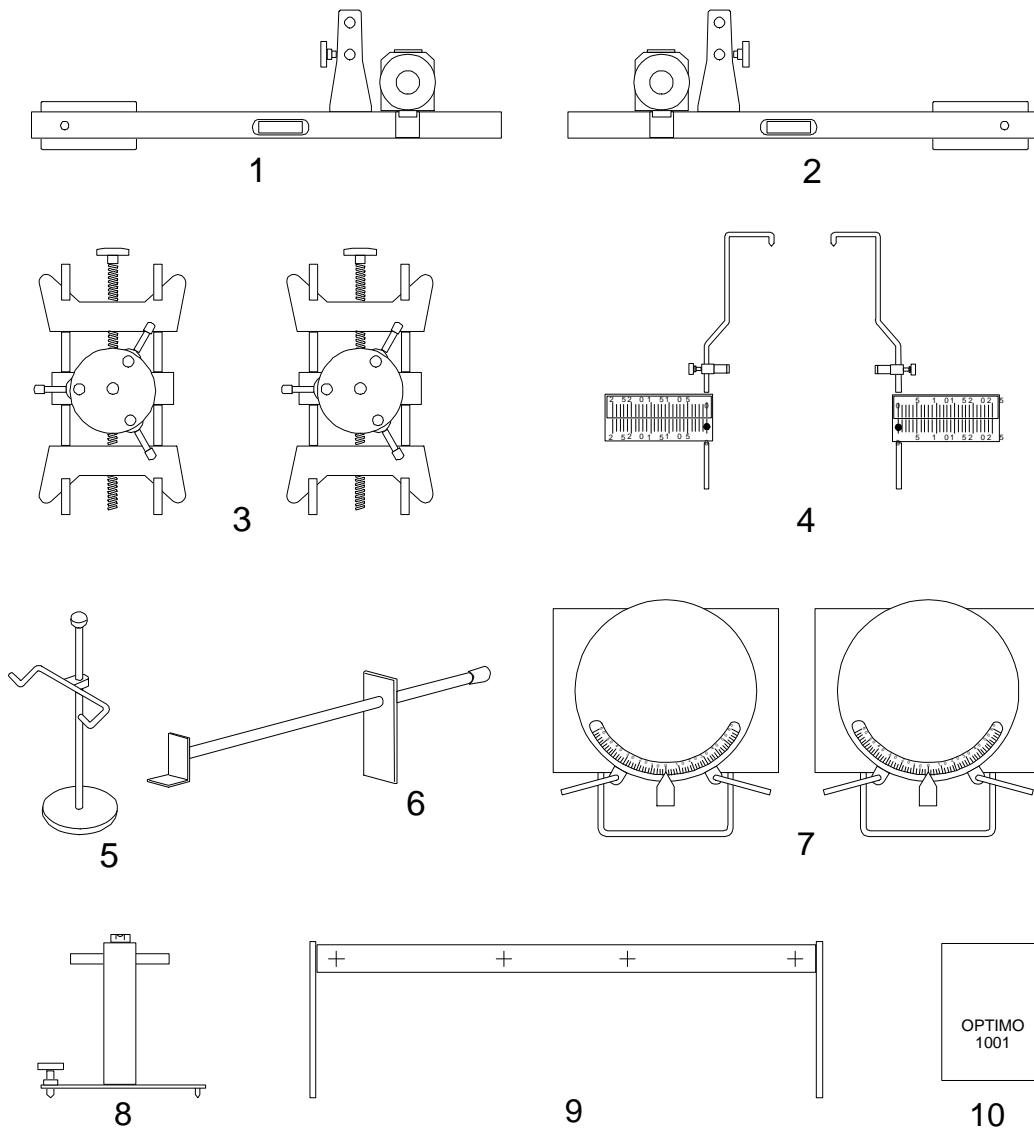
*Warning: Do not look into the laser beams*

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## Chapter 1. Technical information

EWJ laser wheel aligner 1001 is as standard supplied with the following accessories:

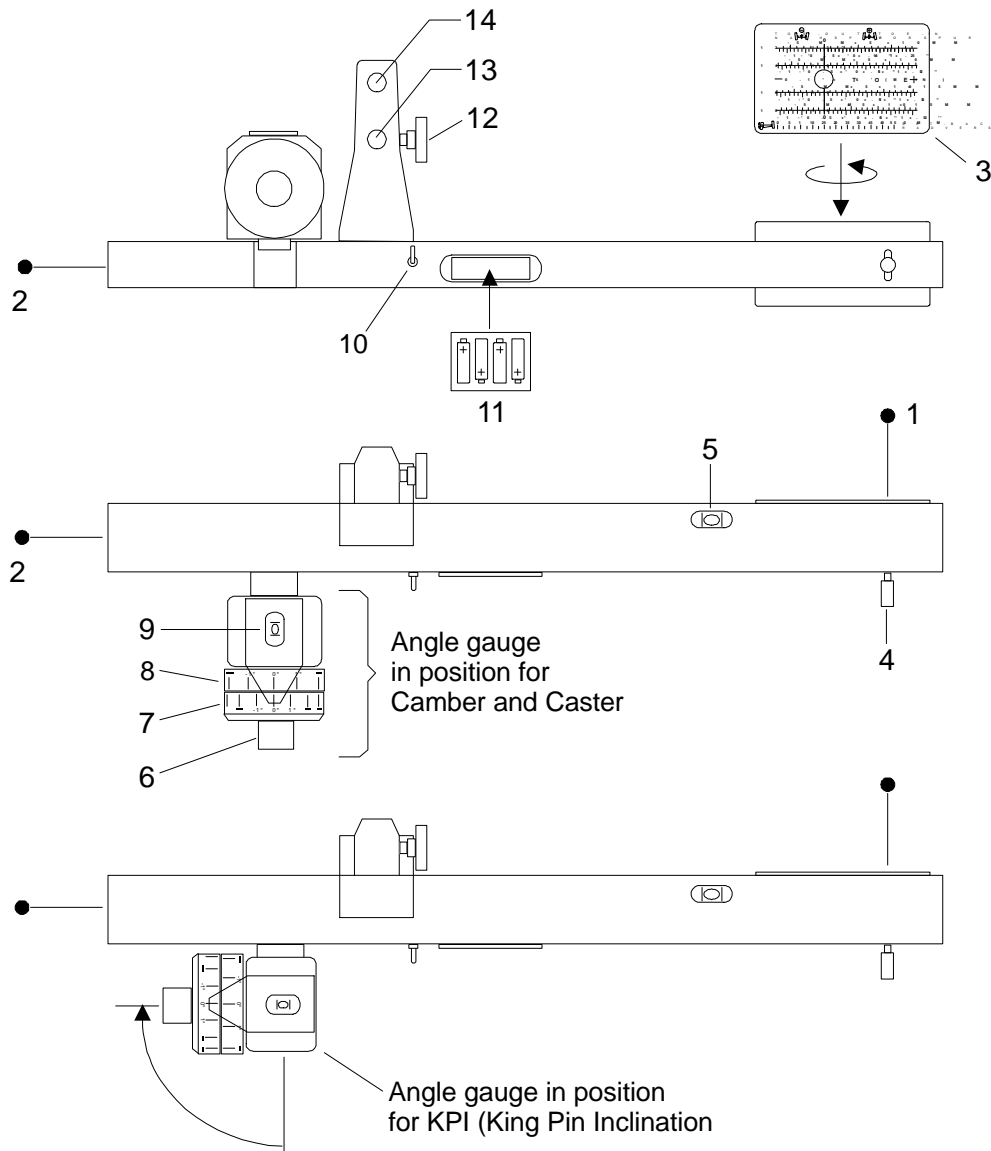


1. Measuring head, left. 1 piece
2. Measuring head, right. 1 piece
3. Self-centring wheel clamp for 12"-19" wheels, 2 pieces
4. Centring scale with hangers, for 12"-19" wheels. 1 pair
5. Steering wheel holder, 1 piece
6. Brake pedal depressor, 1 piece
7. Full floating turntable with scale 60°-0°-60°, maximum axle load 2500 kg. 2 pieces
8. Calibration stand for checking and calibration of the measuring heads, 1 piece
9. Calibration rod for checking and calibration of the measuring heads, 1 piece
10. Operators manual, 1 piece

### Measuring range:

Total Toe	: -15 to +30 mm and -2° to +4°
Camber	: -4° to +8°
Caster	: -2° to +15°
King Pin incl. (SAI)	: -2° to +15
Front wheel Set-back	: 0 to 50 mm
Turning angle	: 0° to 60° inward and outward

Measuring head, right

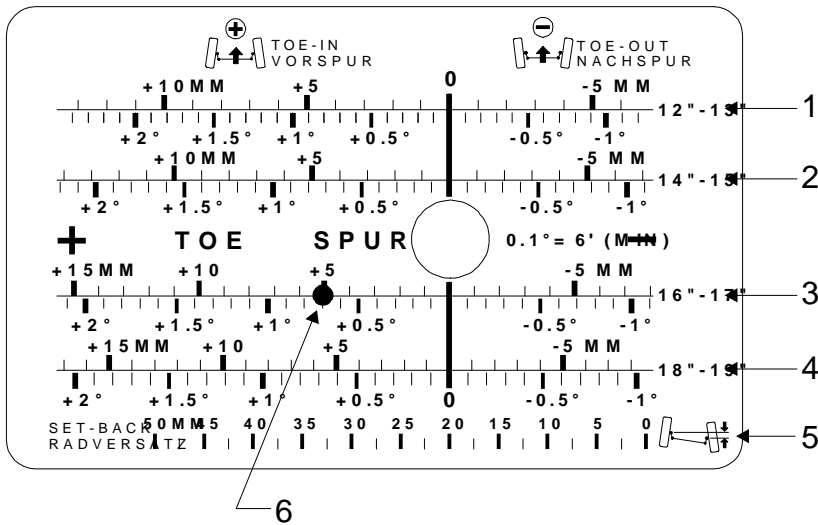


1. Laser beam transverse. For measuring of Toe and Set-back
2. Laser beam pointing rearward for reference front wheels to rear wheels
3. Scale for Toe and Set-back
4. Control lever for vertical adjustment of the transverse laser beam
5. Spirit level for arm
6. Scale knob for Camber scale and spirit level of the angle gauge
7. Scale for Caster and King Pin inclination (SAI)
8. Scale for Camber
9. Spirit level
10. On/off switch for laser beams
11. Battery holder with 4 batteries type AA -1.5 Volt (Ø14x50mm)
12. Locking screw. For fastening the measuring head on the wheel clamp
13. Standard adapter hole for attachment to the wheel clamp
14. Additional adaptor hole, used by alignment of cars with low front end.

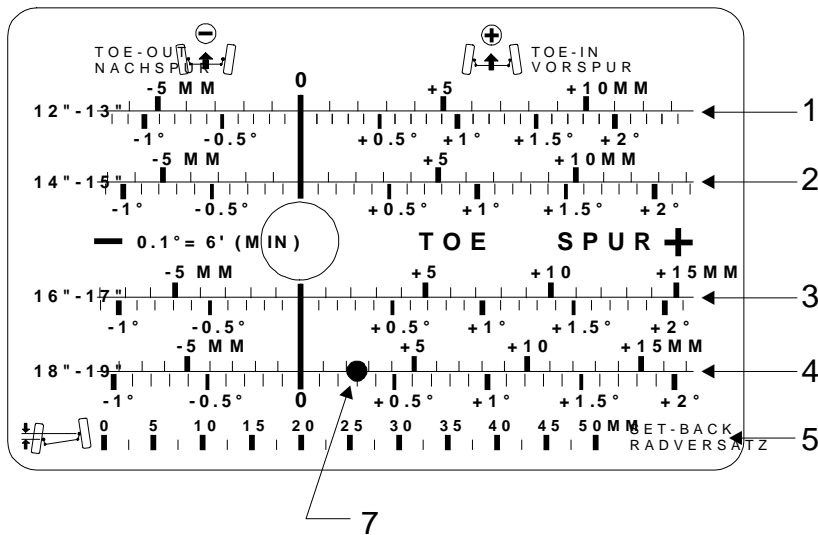
The left measuring head is like the right head, only mirrored.

Toe scales of left and right measuring head

TOE SCALE LEFT



TOE SCALE RIGHT



The plates have 4 Toe-scales representing the different wheel sizes and at the bottom a scale for Set-back readings in mm of the front wheel Set-back.

The upper part of the Toe-scales are for Toe readings in millimetres, graduation 1 mm. Readings versus the rims according to European standard, see page 8.

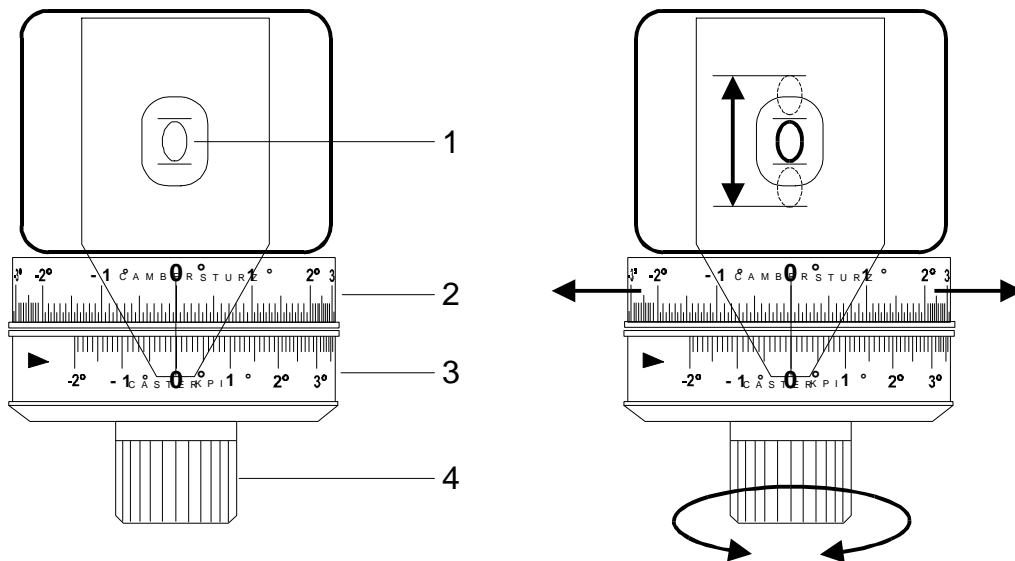
The lower part of the Toe-scales are for Toe readings in degrees and decimals of a degree, graduation 0.1 degree = 6 minutes of a degree. See page 8.

The transverse laser spots should be tilted to point at the horizontal line for the actual wheel size.

1. Toe scale for cars with 12"-13" wheels
2. Toe scale for cars with 14"-15" wheels
3. Toe scale for cars with 16"-17" wheels
4. Toe scale for cars with 18"-19" wheels
5. Set-back scale
6. Example: Laser spot pointing at +5 mm/0.7° for 16"-17" wheels
7. Example: Laser spot pointing at +2.5mm/0.3° for 18"-19" wheels

Total Toe of front or rear wheels is the sum of left and right toe scale readings.

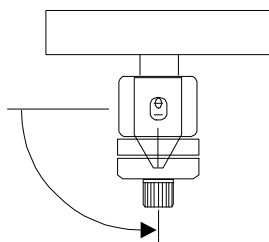
Angle gauge unit for measuring of Camber, Caster and King Pin inclination (SAI)



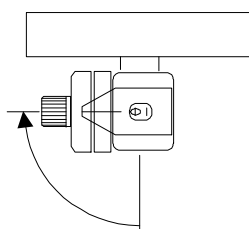
The angle gauge contains a tilt able spirit level, a camber scale that is fixed connected to the scale knob and an independent slide able scale for Caster and King Pin inclination. When turning the scale knob, the scales are turned and the spirit level is tilted. The readings are taken under the target line when the bubble of the spirit level is in centre position.

1. Spirit level, tilt able. Fix connected to the scale knob.
2. Scale for Camber. Graduation in degrees and decimals of a degree. 0.1 degree = 6 minutes of a degree. Fix connected to the scale knob.
3. Scale for Caster and King Pin inclination (SAI). Graduation in degrees and decimals of a degree, 0.1 degree = 6 minutes of a degree. Independent slide able.
4. Scale knob

The angle gauge can be turned in two positions, depending of which type of angle is to be measured.

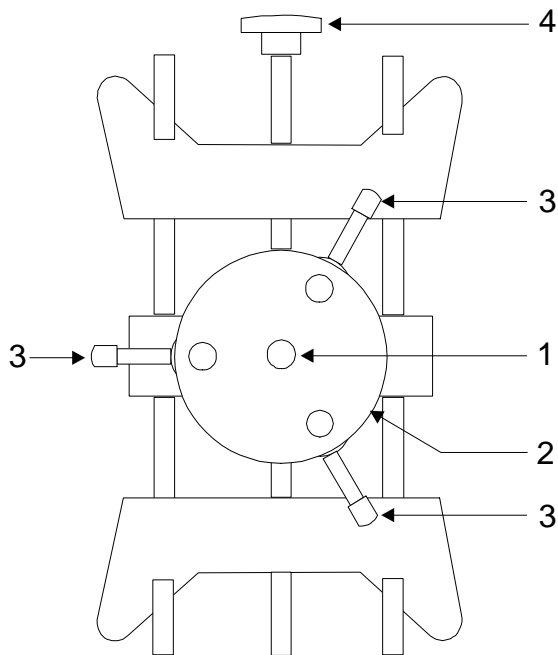


Angle gauge turned square to the arm for measuring of Camber and Caster



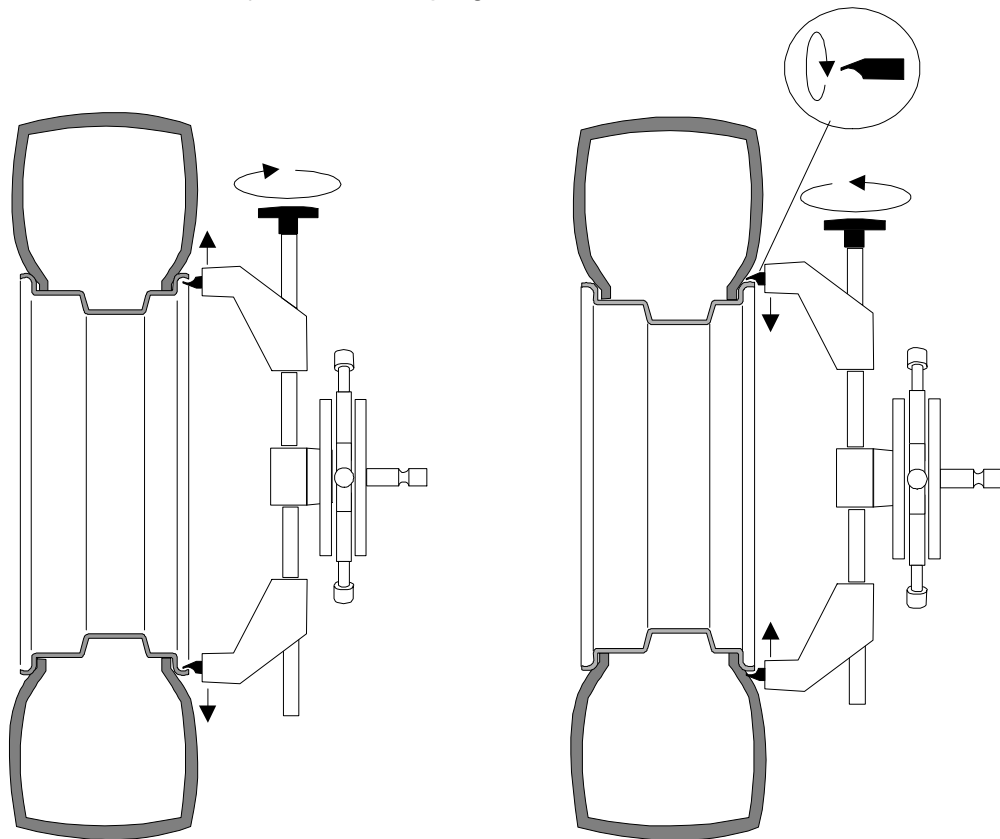
Angle gauge turned backward, parallel to the arm. For measuring of King Pin inclination (SAI)

Wheel clamp with run-out compensator, self-centring



1. Adapter pivot for measuring head
2. Run-out compensator
3. Compensator handle
4. Clamping handle. Turn left or right for clamping either inside or outside on the rim.

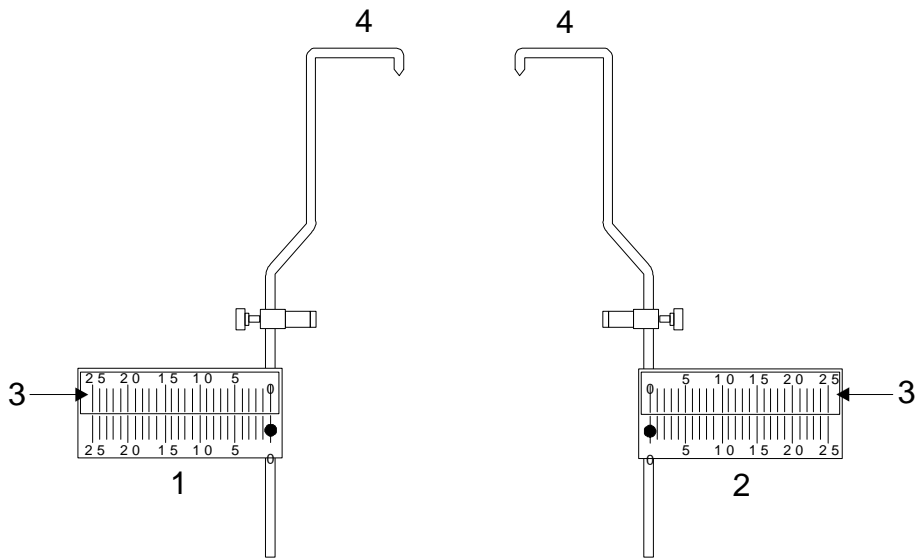
The jaws of the wheel clamp can be turned for clamping inside or outside on the rim as shown below. Make sure that all four jaws are clamping at the rim.



Clamping on rim from inside

Clamping on rim from outside

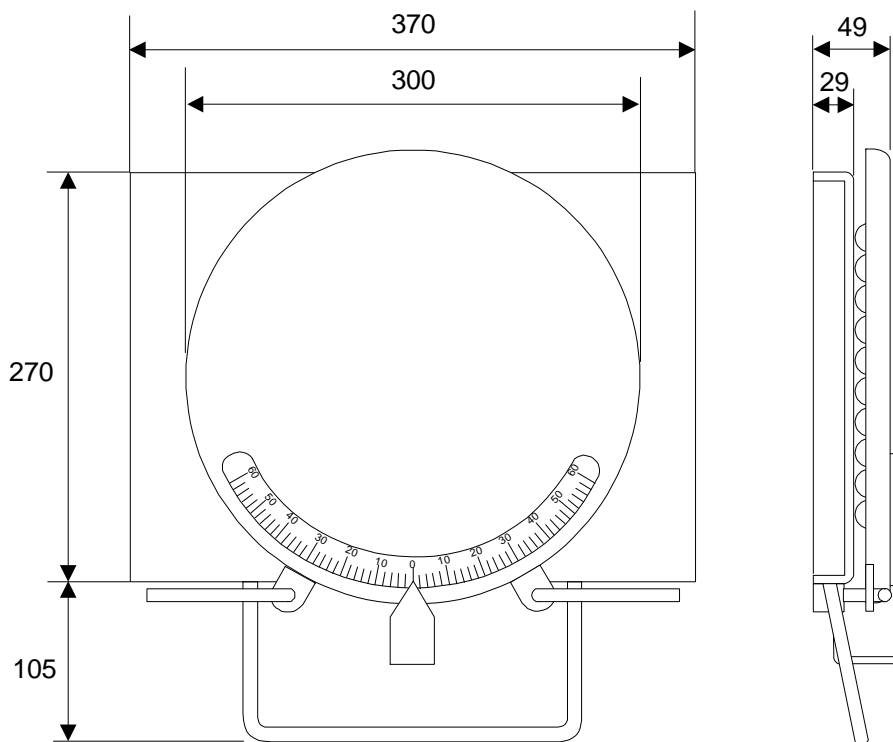
Centring scales, for centre line alignment



1. Right scale
2. Left scale
3. Slide able scale
4. Hanger. To be hanging on the tyre

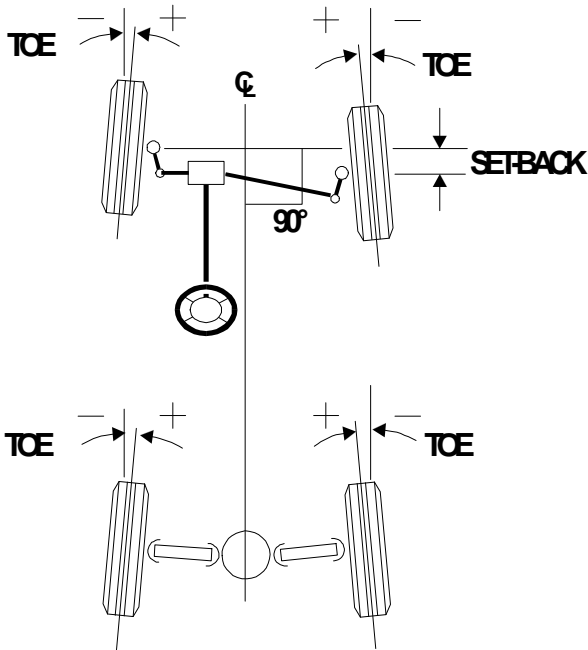
**Turntable**

Maximum axle load 2500 kgs





Wheel alignment angles

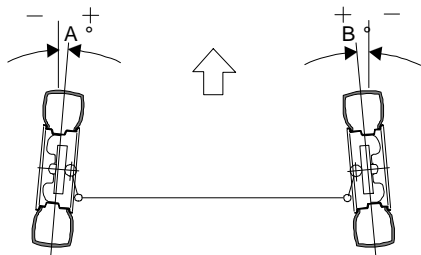


**Front and rear wheel Toe**

Toe is the difference between straight forward position of the wheels and the inward or outward position of the wheels.  
 Inward position = positive = Toe-in  
 Outward position = negative = Toe-out  
 (Note: For Renault cars the factory use opposite positive / negative terms).  
 The manufacturers specification for Toe is normally the Total Toe, which is the sum of Toe for left and right wheel.  
 The measurements for Toe can be specified in degrees or millimetres as shown below.

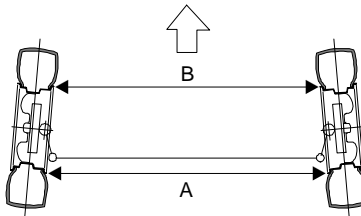
**Set-back of front wheels**

Set-back is a condition where one front wheel is rearward the opposite front wheel.  
 Set-back is measured in millimetres versus a line square to the centre line connecting the midpoints of front and rear axle.



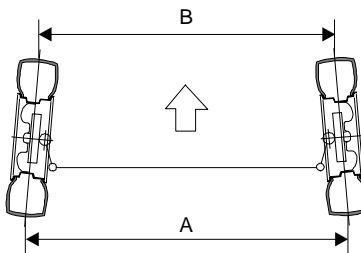
**Toe measurement in degrees and fractions of a degree.**

Toe is measured as the angle between straightforward position and inward or outward position of the wheel.  
 Specifications for Toe in degrees are normally available for most types of cars.



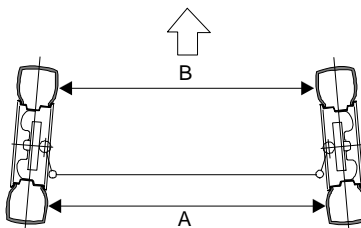
**Toe measurements in mm ref. European standard.**

The measurements are defined as the difference in distance "A" between the rear of the rims and the distance "B" between the front of the rims, measured at the wheel centre height.  
 The toe scales in mm of the measuring heads are for readings according to European standard



**Toe measurements in mm taken at centre of tyre tread**

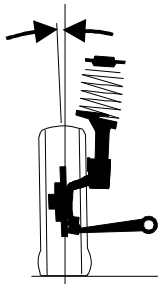
The measurements are defined as the difference in distance "A" between the rears of the tyre treads and the distance "B" between the front of the tyre treads, measured at the wheel centre height.  
 The readings in mm on the toe scales should be multiplied by the proportion between rim and tyre diameter.



**Toe measurements in mm taken at side of tyre wall**

The measurements are defined as the difference in distance "A" between the rear of the tyre walls and the distance "B" between the front of the tyre walls, measured at the wheel centre height.  
 The readings in mm on the toe scales should be multiplied by half the proportion between rim and tyre diameter.

Wheel alignment angles

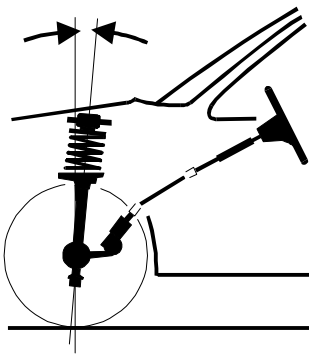


**CAMBER**

Inclination of the wheel from vertical position in transverse plane.

Inclination away from the vehicle: Positive angle

Inclination towards the vehicle: Negative angle

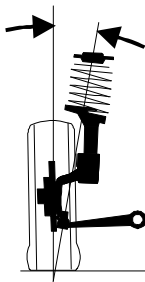


**CASTER**

Inclination of the steering axis from vertical position in lengthwise direction.

Inclination backwards: Positive angle

Inclination forwards: Negative angle

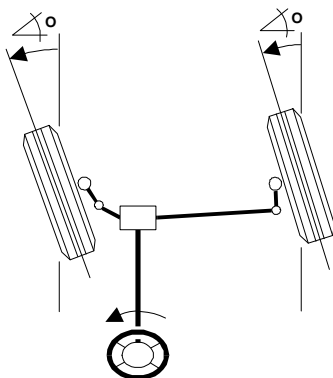


**KING PIN INCLINATION (SAI)**

Inclination of the steering axis from vertical position in transverse direction.

Inclination towards the vehicle: Positive angle

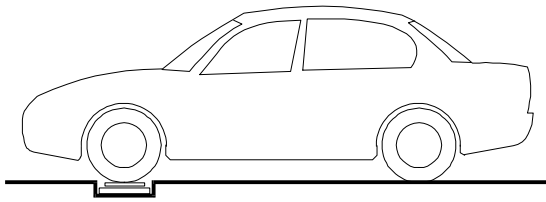
Inclination away from the vehicle: Negative angle



**TOE-OUT ON TURNS**

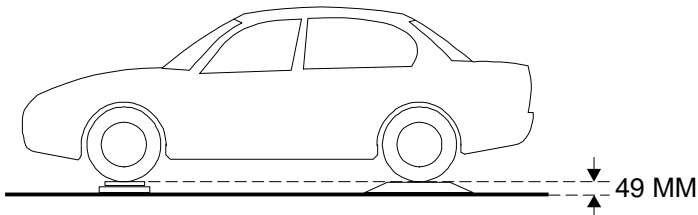
The difference between the turning angles of left and right front wheel when driving in curves

### Alignment place



In order to assure correct wheel alignment, all wheels of the vehicle should be located on an area which is level in transverse and longitudinal direction.

Admissible level tolerance: Left to right 2 mm, front to rear 4 mm.



When the turntables are placed upon the floor or the platforms of a lift, ramps with a height of 49 mm should be placed under the rear wheels.

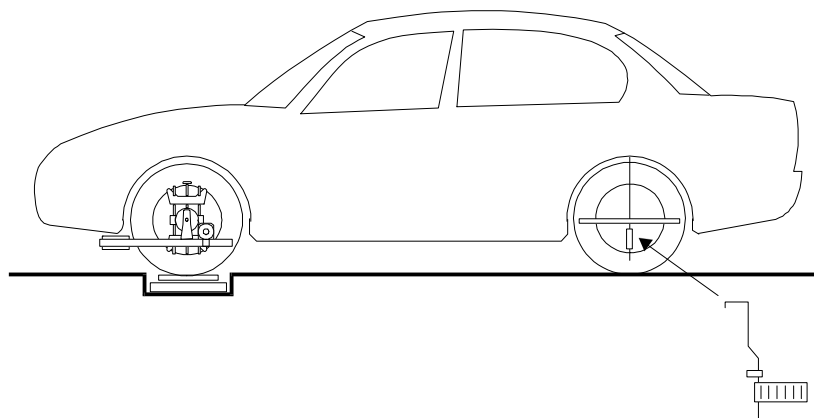
To protect the turntables, don't drive on them, but wait and place them under the front wheels after they has been raised for run-out compensation.

### Necessary checks and repair before performing the wheel alignment:

The suspension, steering system and wheel should be serviced to normal condition prior to wheel alignment.

- \* Check for correct tyre size and adjust tyre pressure of all wheels
- \* Inspect for uneven and worn tyres
- \* Inspect all suspension and steering linkage for wear and damage
- \* Inspect rims for damage and excessive run-out
- \* Check loading of vehicle in accordance with manufactures specifications

### Attaching the wheel aligner

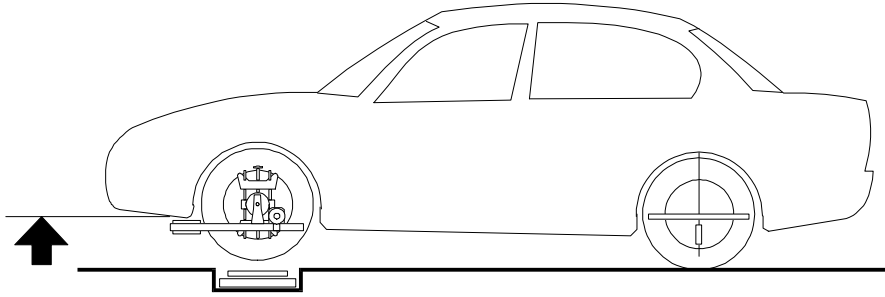


Attach the measuring heads to the wheel clamps.

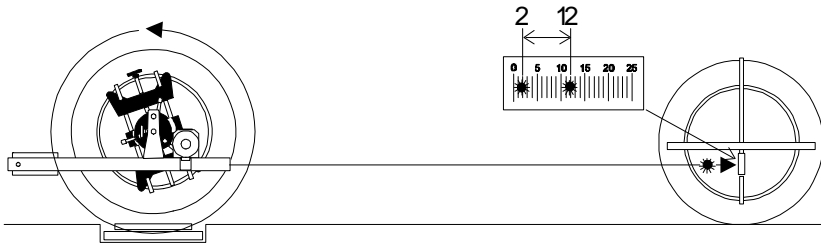
Set the jaws of the wheel clamps for inside and outside clamping at the rims and attach the wheel clamps to the front wheels. Make sure that the clamping is reliable by shacking the clamps.

Attach the centring scales to the rear wheels. The scales should be facing forward.

*To make the wheel alignment independent of run-out in wheel rims and skew mounted wheel clamps, run-out compensation should be performed as described in the following pages.*



**3.1** Raise the front wheels to clear the turntables.

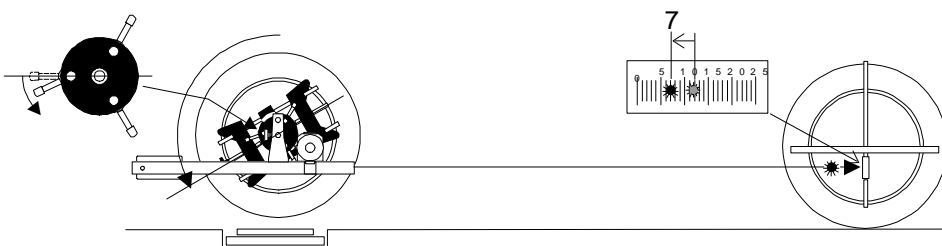


**3.2** Point the rear laser beam to the scale at the rear wheel. Rotate the front wheel. The laser spot will move between a minimum and a maximum reading on the scale.

Example: Minimum reading = 2, maximum reading = 12

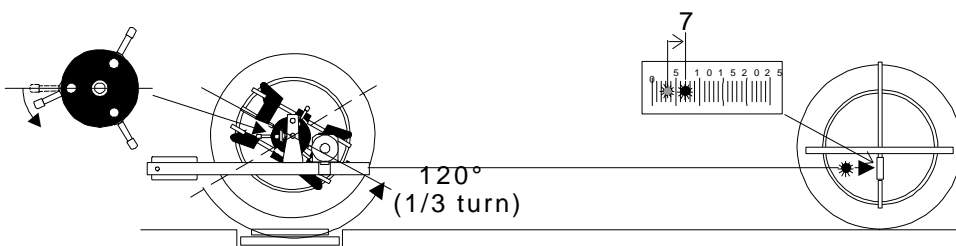


**3.3** Stop the front wheel when the reading on the scale is at maximum. Example: max. = 12



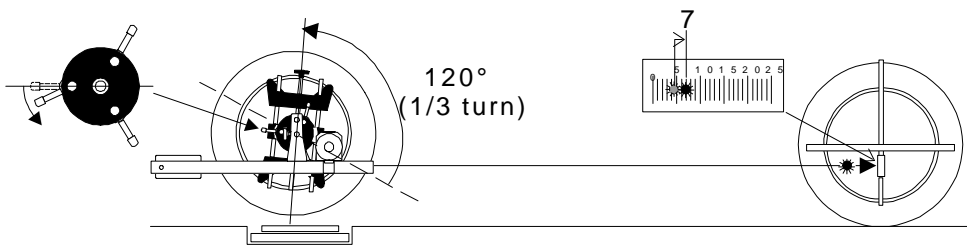
**3.4** Turn the compensator handle closets to horizontal wheel centre line until the reading on the scale at the rear wheel is at the medium between min. and max. reading.

Example: Medium =  $(2 + 12):2 = 14:2 = 7$



**3.5** Rotate the front wheel 120° (1/3 turn). Turn the compensator handle closets to horizontal wheel centre line until the reading again is at the medium.

Example: Medium = 7

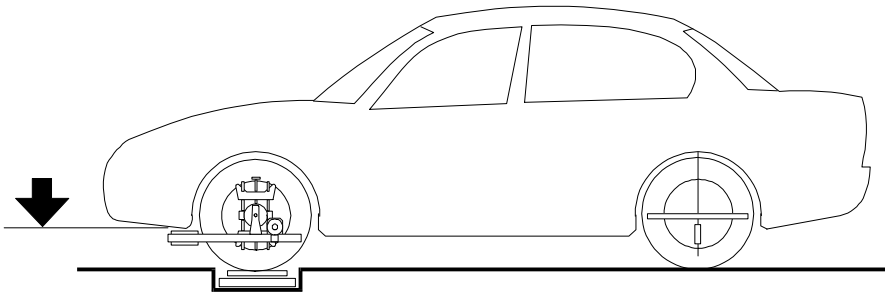


**3.6** Rotate the front wheel 120° (1/3 turn). Turn the compensator handle closest to horizontal wheel centre line until the reading again is at the medium.

Example: Medium = 7

Repeat the run-out compensation procedure until the movement of the laser spot on the scale at the rear wheel is less than 3 mm.

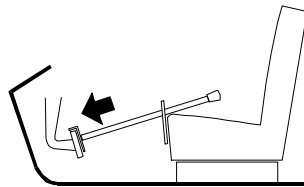
**3.7** Repeat run-out compensation for the other front wheel



**3.8** Centre the turntables under the front wheels and remove their locking pins.

**3.9** Lower the front wheels slowly onto the turntables.

Bump the front end of the vehicle to bring the suspension to normal drive position.



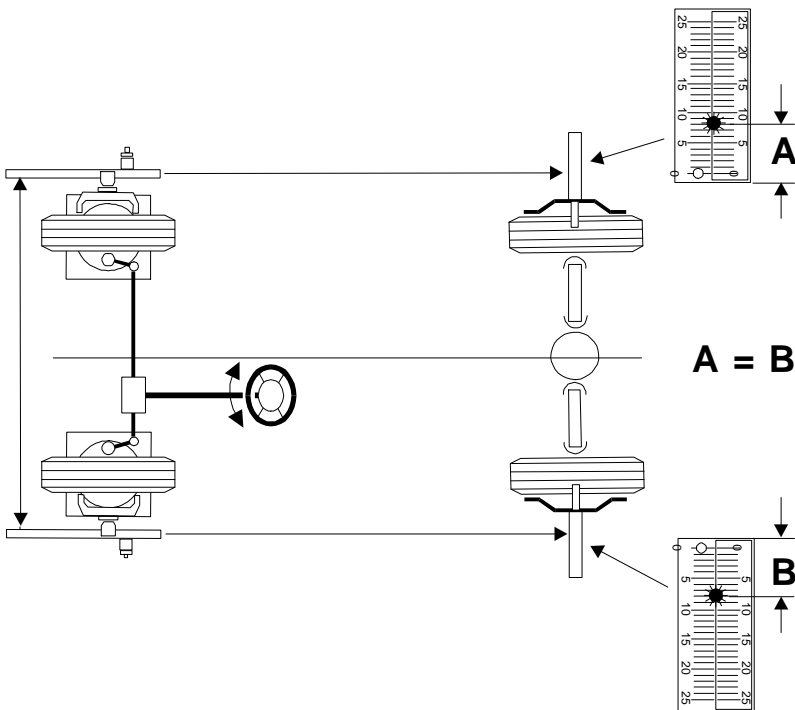
**3.10** Apply the brake pedal depressor to activate the brakes thereby locking the wheels. The wheels should remain locked during the alignment procedure.

**3.11** When prescribed from car manufacturer load the car according to specifications.

*The alignment can now be performed as described on the next pages.*

## Chapter 4. Measuring of front Toe, Camber and Set-back

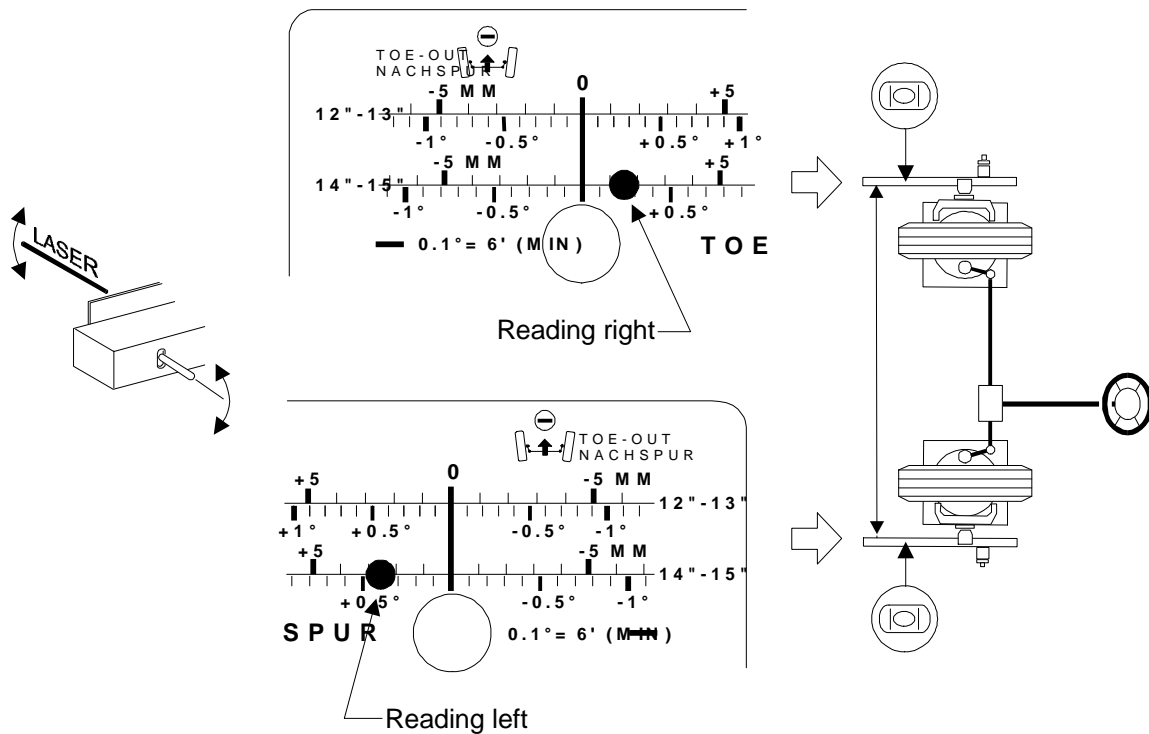
Run-out compensation on the front wheels should be performed as described in chapter 3 before any measurements are taken.



### 4.1

Steer the front wheels until the readings on left and right scale at the rear wheels are the same ( $A = B$ ).

The front wheels are now in straight ahead position.



### 4.2 Toe readings

Level the arm of the measuring units and tighten the locking screw at the console.

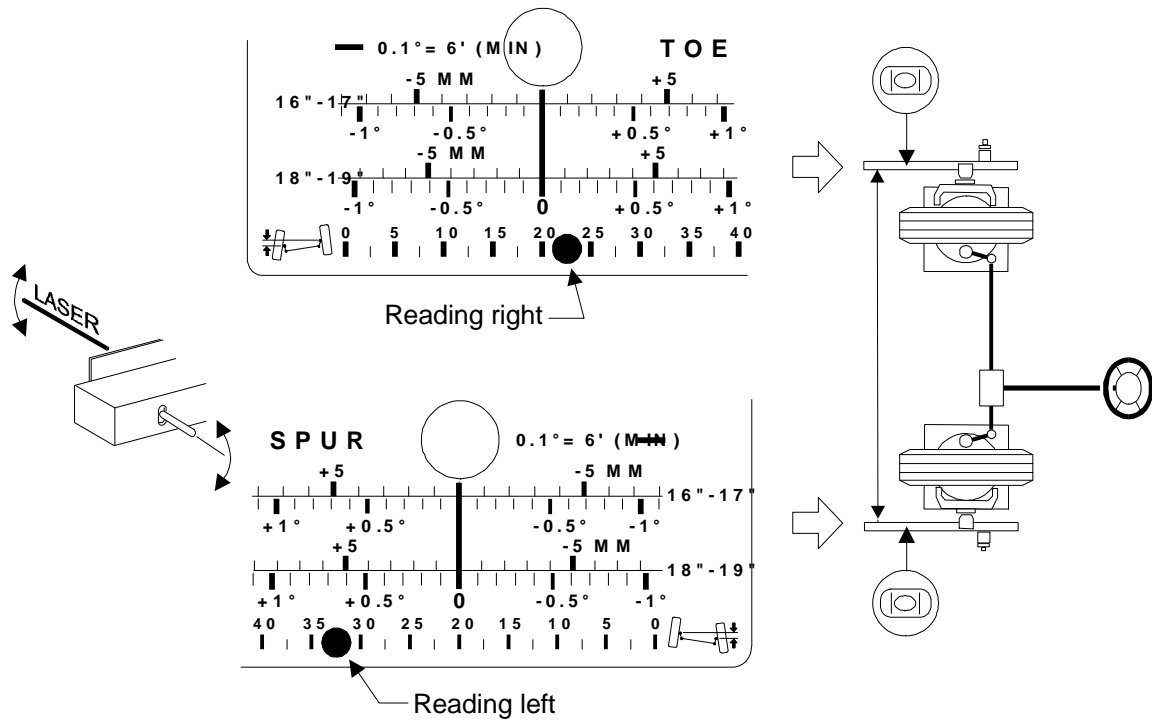
Tilt the laser control levers until left and right laser beam points hit the horizontal line marked with the actual wheel size.

Take left and right reading in degrees or mm.

**Total front Toe** is the sum of left and right reading.

Since the front wheels are steered straight ahead, individual Toe of each front wheel is half the measured total front toe.

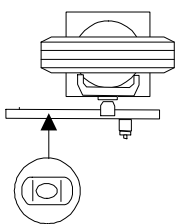
**Set-Back**



**4.3 Set-back readings**

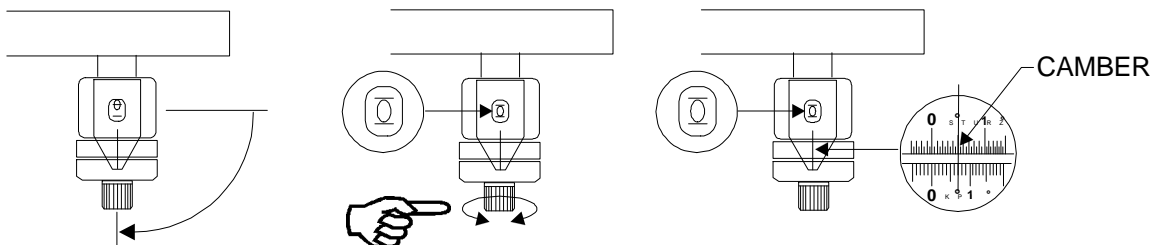
The front wheels should be steered straight ahead as shown in paragraph 4.1. Level the arm of the measuring units and tighten the locking screw at the console. Tilt the laser control levers until left and right laser beam points hit the Set-back scale at the bottom. Take left and right reading in mm. **Set-back** in mm is the difference between left and right reading. The wheel where the lowest reading is shown is rearward the opposite front wheel.

**Camber**



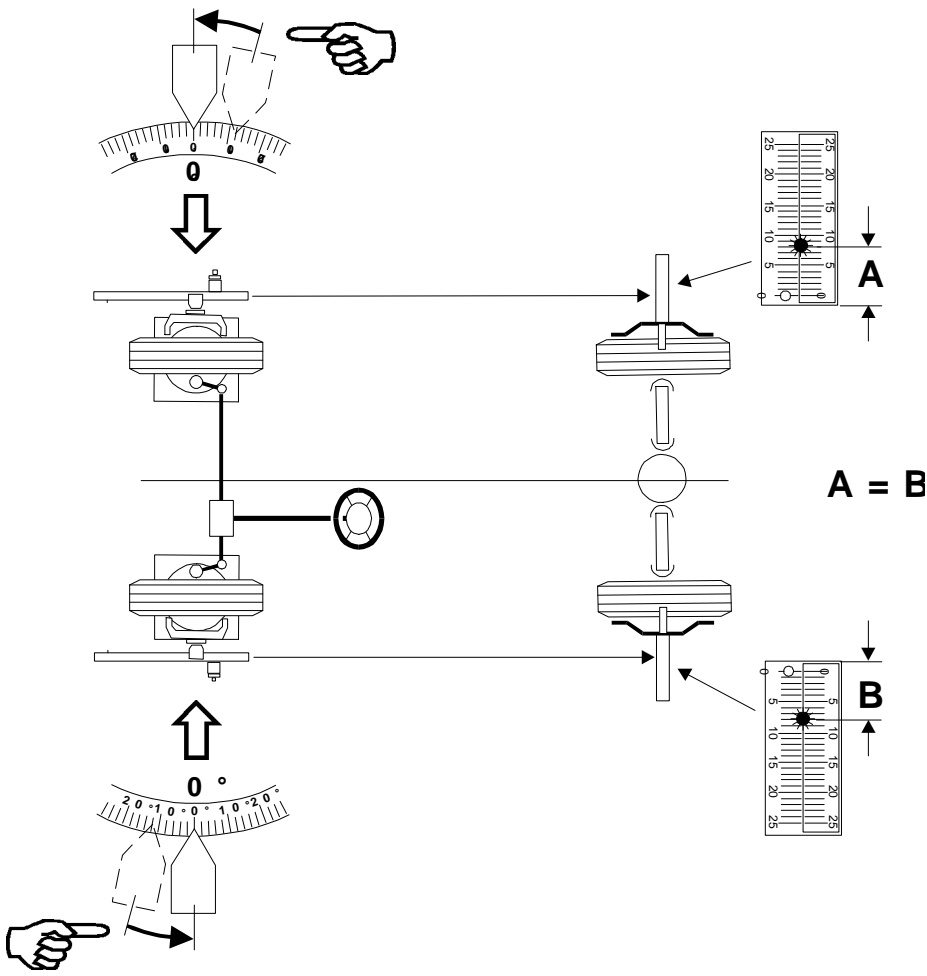
**4.4**

The front wheels should be steered straight ahead as shown in paragraph 4.1. Level the arm of the measuring units and tighten the locking screw at the console.



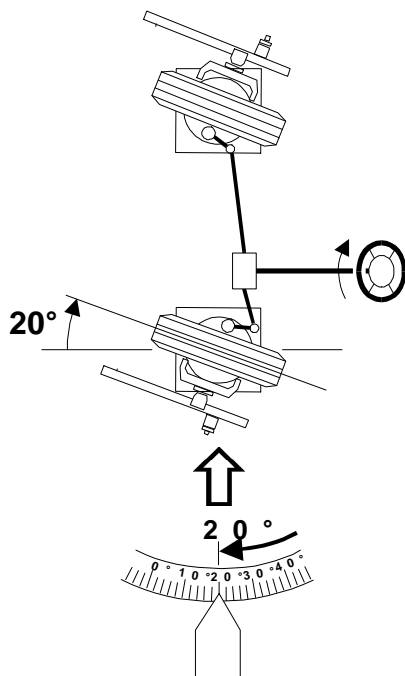
**4.5**

Turn the angle gauge square to the arm. Turn the scale knob until the spirit level is in centre position. **Camber reading** in degrees and decimals of a degree is taken on the yellow Camber scale below the target line. Read Camber of the other front wheel in the same way.



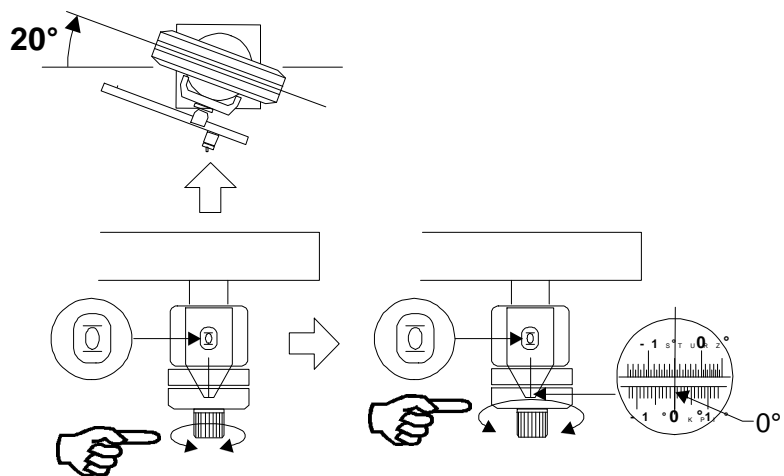
**5.1**

Steer the front wheels until the readings on left and right scale at the rear wheels are the same ( $A = B$ ). The front wheels are now in straight ahead position. Set the pointer at left and right turntable on  $0^\circ$ .



**5.2**

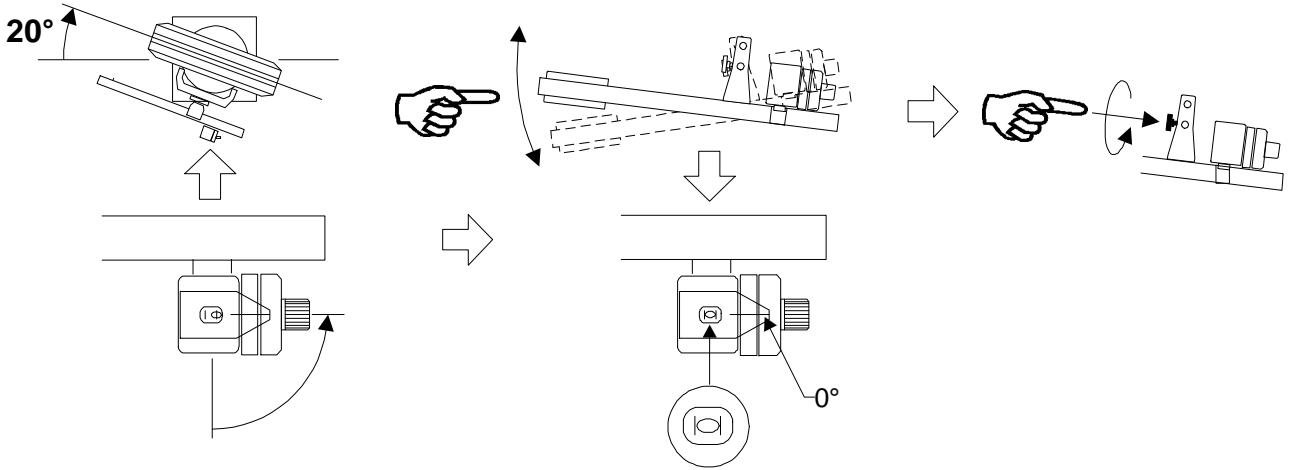
Steer left front wheel  $20^\circ$  inward and hold the position.



**5.3 Zero setting for Caster**

The angle gauge should be square to the arm of the head. Turn the scale knob until the spirit level is in zero position. Hold this position and slide the red Caster scale to  $0^\circ$  under the target line.



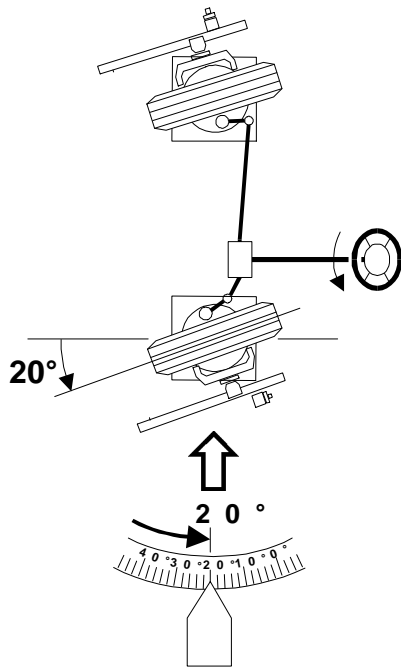


**5.4 Zero setting for King Pin inclination**

*When only Caster should be measured, skip paragraphs 5.4 and 5.6.*

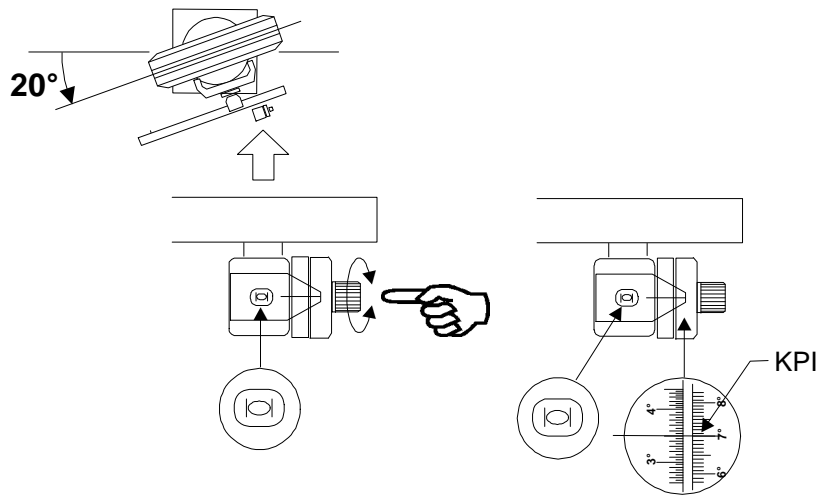
Turn the angle gauge backward parallel to the arm of the measuring head.

Loosen the locking screw at the console and tilt the measuring head up or down until the spirit level is in centre position. Then fasten the locking screw at the console.



**5.5**

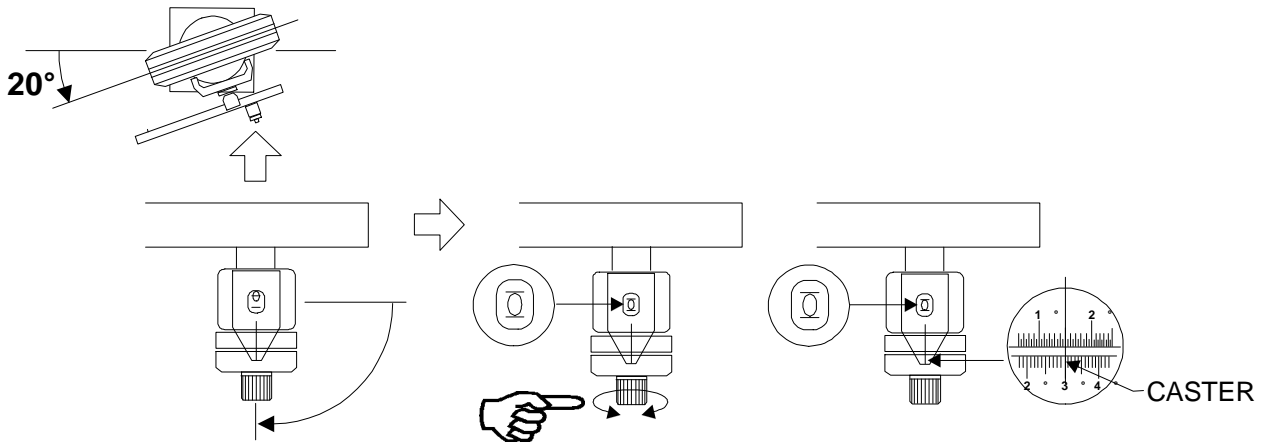
Steer left front wheel 20° outwards and keep this position.



**5.6 King Pin Inclination (SAI)**

Turn the scale knob until the spirit level is in centre position.

**King Pin inclination reading** in degrees and decimals of a degree is taken on the red Caster/KPI scale below the target line.



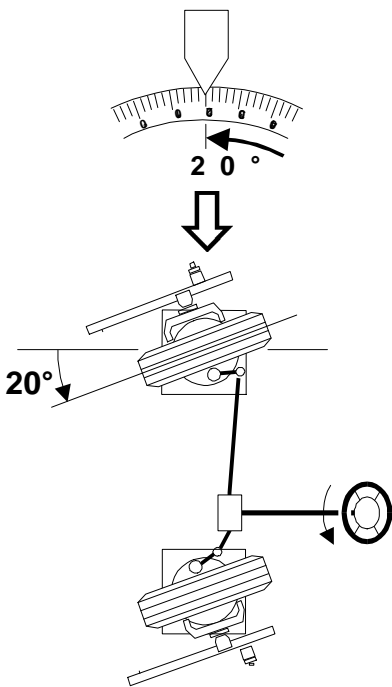
**5.7**

Keep the wheel turned 20° outward.

Turn the angle gauge square to the arm of the measuring head.

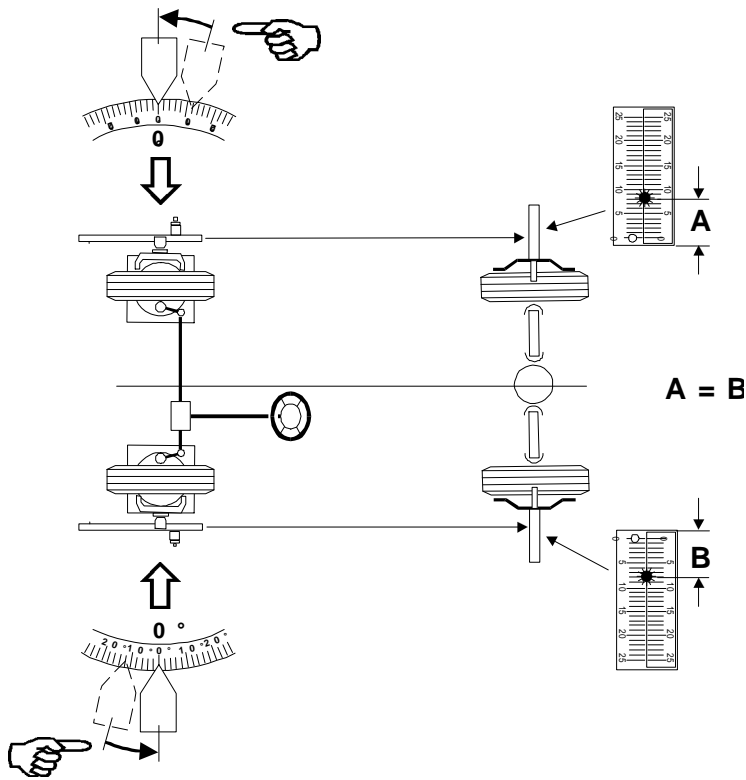
Turn the scale knob until the spirit level is en centre position.

**Caster reading** in degrees and decimals of a degree is taken on the red Caster/KPI scale below the target line.



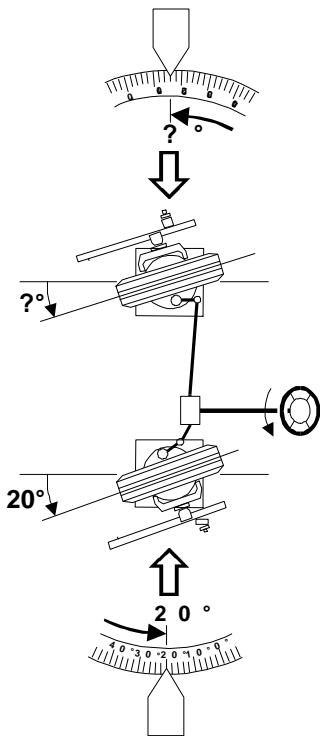
**5.8 Caster and King Pin inclination of right front wheel**  
Steer right front wheel 20° inward and measure Caster and King Pin inclination as described for left front wheel.

*When the angles of Caster or King Pin Inclination is bigger than the scale range, measure the angles by turning the wheels 10° inward and outward instead of the customary 20° and multiply the readings by 2.*



**6.1**

Steer the front wheels until the readings on left and right scale at the rear wheels are the same ( $A = B$ ). The front wheels are now in straight ahead position. Set the pointer at left and right turntable on  $0^\circ$ .



**6.2**

Steer left front wheel  $20^\circ$  outward.

Read the turning angle of right front wheel.

**Toe-out on turns** is the difference between the turning angles of left and right front wheel.

**6.3**

Steer right front wheel  $20^\circ$  outward and read the turning angle of left front wheel.

*Some cars require other turns than  $20^\circ$  for measuring of Toe-out on turns. Refer to manufacturers specification.*