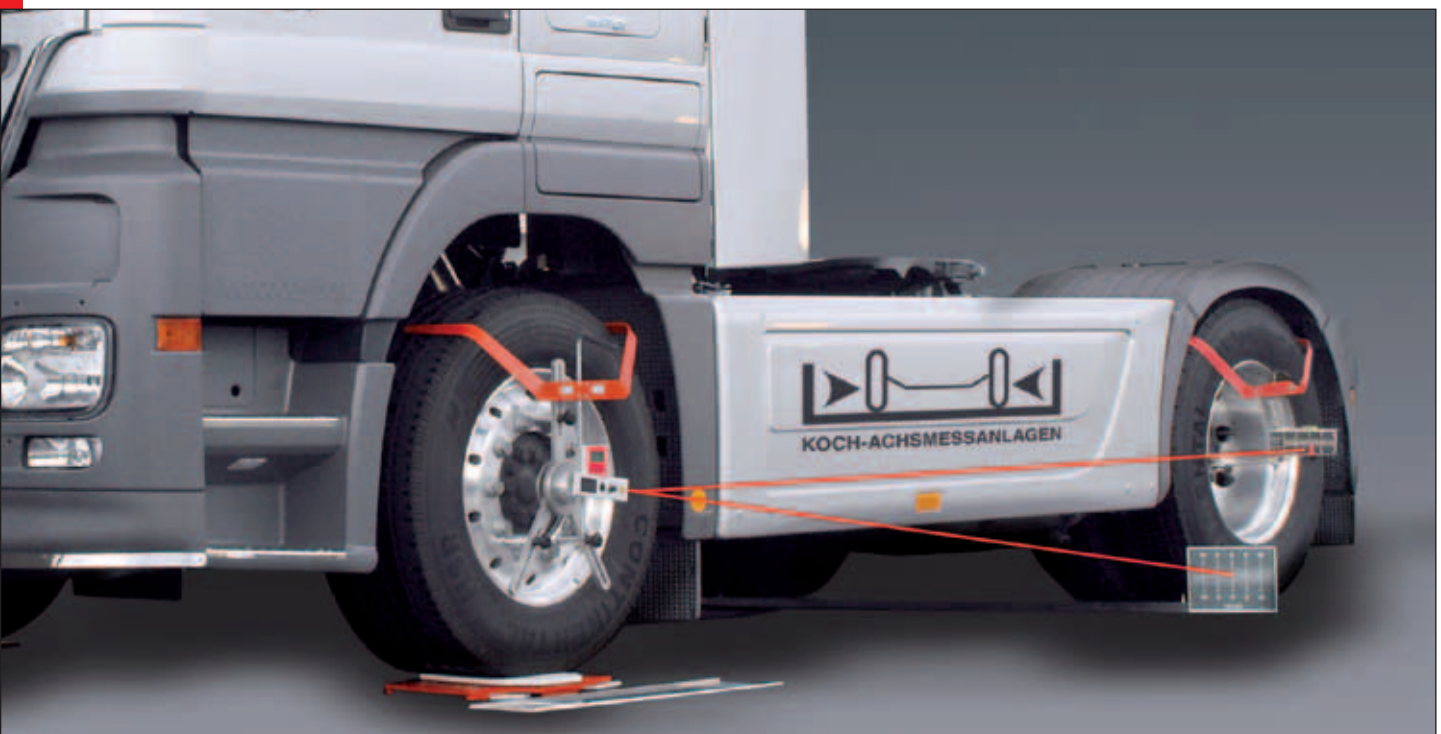


KOCH-ACHSMESSANLAGEN

Operating Instructions Laser Wheel Aligner

HD-30 EasyTouch



KOCH-ACHSMESSANLAGEN

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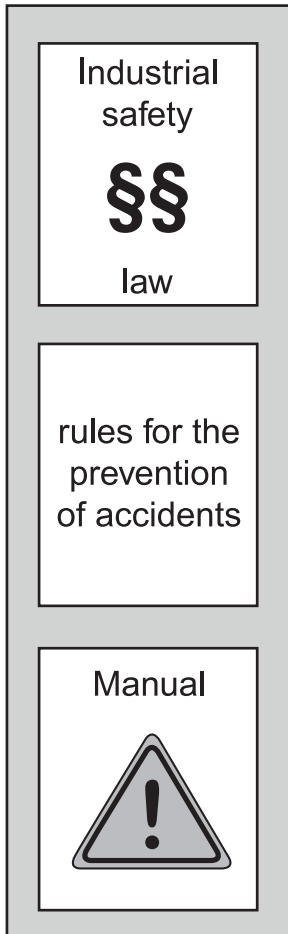


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1. General safety precautions

1.1 Operator's responsibility



Laser Aligner HD-30 EasyTouch has been designed and manufactured in accordance with harmonized standards. It is thus state of art and provides maximum security during operation.

Structural changes of Laser Aligner require written approval of manufacturer!

Operational safety can only be achieved, if all required measures are carried out. It is due to the responsibility of the operator to consider these measures and to control their implementation.

In particular the operator has to ensure that

- the device is only used appropriately to its agreed functionality
- the device is only used if proper functionality is provided
- complete operating instructions are provided in legible form at point of location of device
- only suitably trained and authorized personnel operates the device
- the personnel is regularly instructed in all aspects of operational safety and familiar with operating instructions and contained safety precautions
- all warning and safety precaution labels maintain attached to the device in legible form

1.2 Description of applied symbols

These operating instructions contain accurate safety precautions, following symbols have been applied for indication



Attention

This symbol indicates general risk for the device and materials.



Warning of hazardous electric voltage

This symbol indicates risks for humans, device and materials.



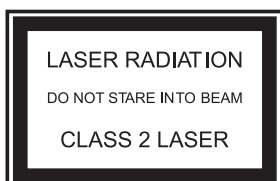
Note

This symbol indicates no safety concerns but information's for a better understanding of operating cycles.

Symbols attached to laser measuring heads are placed close to laser beam output opening.



Warning of laser irradiation.
This symbol indicates risks for humans.
(danger to life and health)

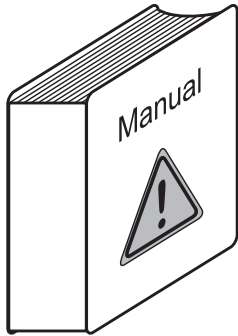


Separate label indicating laser class.

Attached to device in conjunction with safety symbol for laser irradiation.

Right and left always related to driving direction.

1.3 General safety measures



Laser Aligner HD-30 EasyTouch must only be operated by suitably trained and authorized personnel that is familiar with these operating instructions and capable of proper implementation.

Check Laser Aligner before any operation for visual damage and ensure proper functionality of device! In case of defect inform manager of workshop!



**Laser
CLASS 2
TYP 1**



Laser devices require general considerations:

- **Do never look directly into laser beam!**
- Define laser beam paths accurately, use laser absorbing means to avoid stray laser irradiation! Hazardous reflections are particularly caused by reflecting and shining surfaces.
- Level laser beam path above or below eye level if possible!
- Laser beam paths should not cross operational areas. If this is inevitable mark laser operating area significantly and set up required warning signs.
- Switch off laser after operation!

You can find more safety precautions in:

Safety of laser products; Part 1: Equipment classification, requirements and user's guide (IEC 825-1:1993)



Note

It is the responsibility of the operator to ensure proper operation and implementation of safety precautions.

Right and left always related to driving direction.

2. Shipment

2.1 Dimensions and Weight

Length x Width x Height

130 cm x 60 cm x 90 cm

Shipment weight:

gross:	net:
135 kg	115 kg



2.2 Information's for general handling and storage



Attention

Avoiding damages and injuries during shipment:

- industrial trucks must be in accordance with regulations for prevention of accidents
- shipment activities must only be carried out by suitably trained and authorized personnel
- heavy impacts during shipment must be avoided



Keep device always dry.

This applies in particular to shipment and storage of complete instrument cabinet.

Ensure that storage location is dry and dust free.



Note

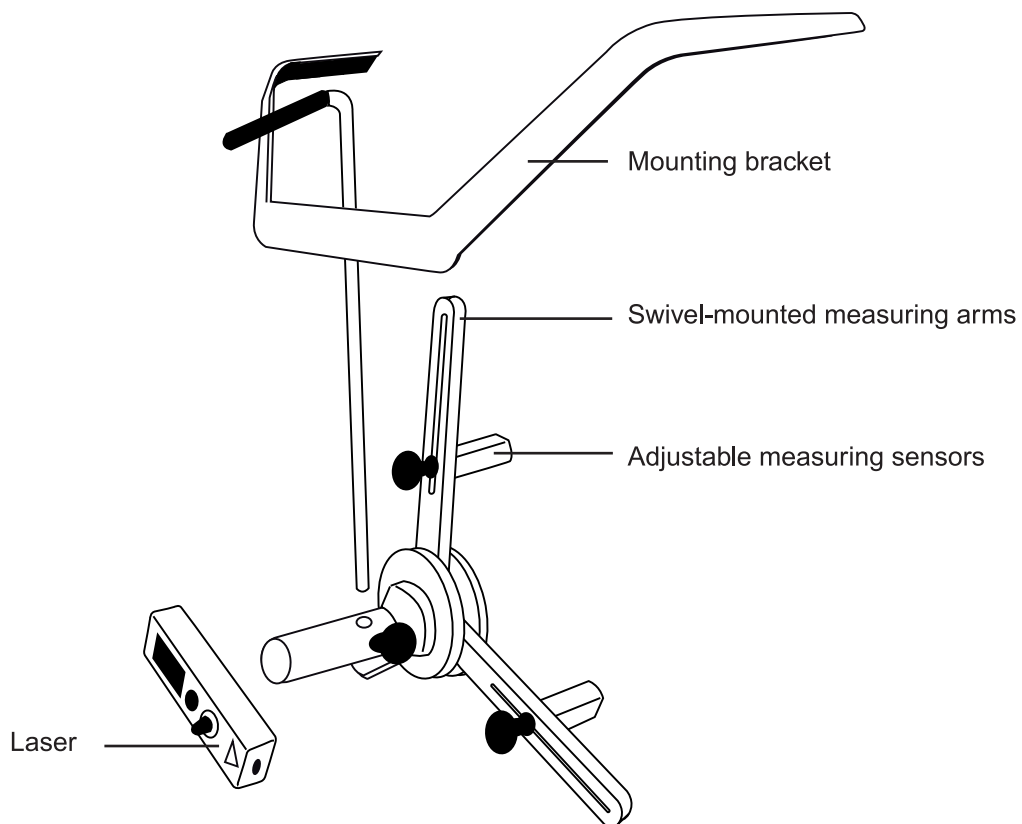
Locate instrument cabinet close to a mains supply to enable convenient charging of laser accumulator packs and safe storage of instruments.

Right and left always related to driving direction.

3. Product Description

3.1 Design of laser measurement head

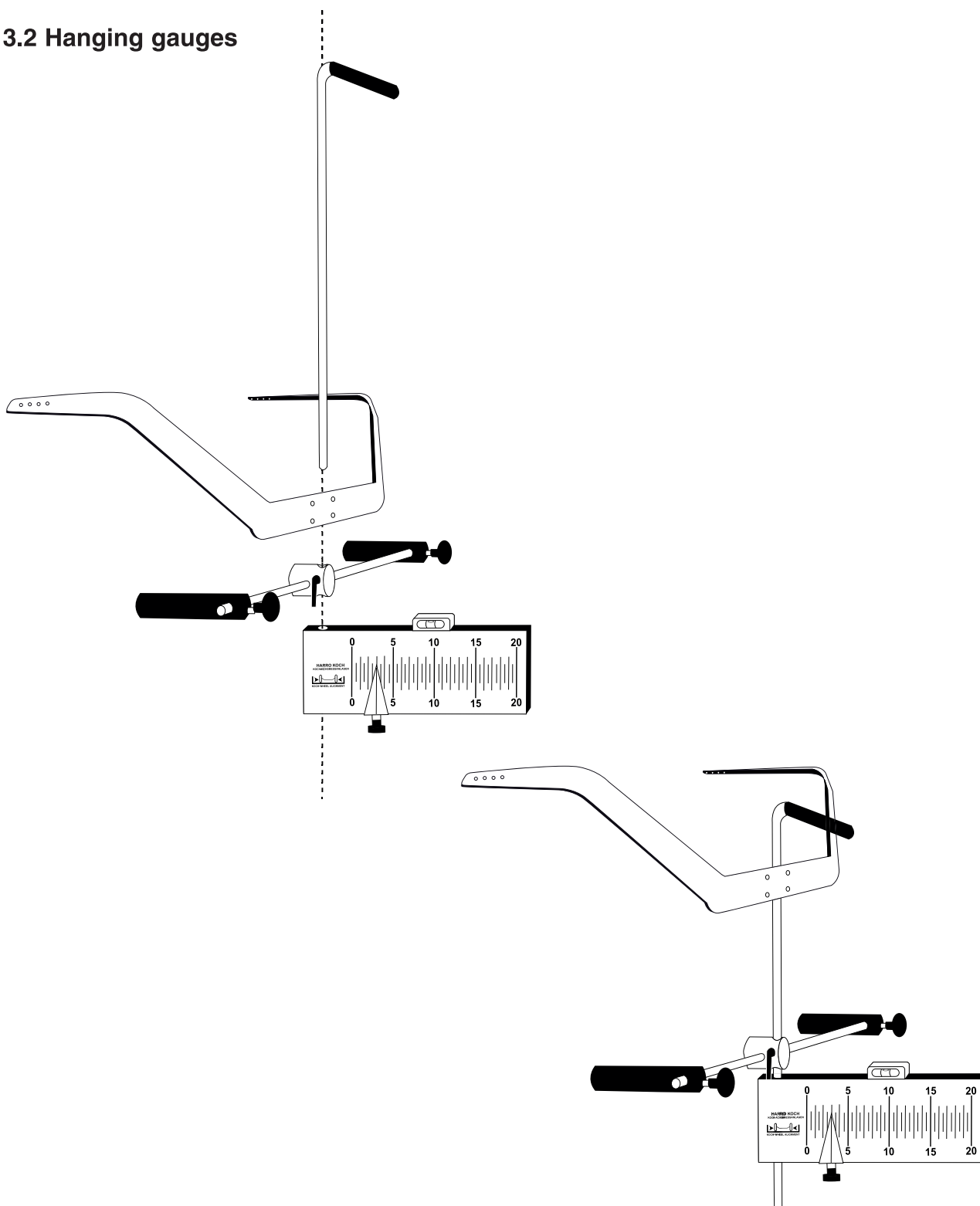
Laser head and main components:



Laser head is free rotatable. Ensure that laser beam output opening is directed downward to the floor after mounting of laser heads and before switch on of diode laser.

Right and left always related to driving direction.

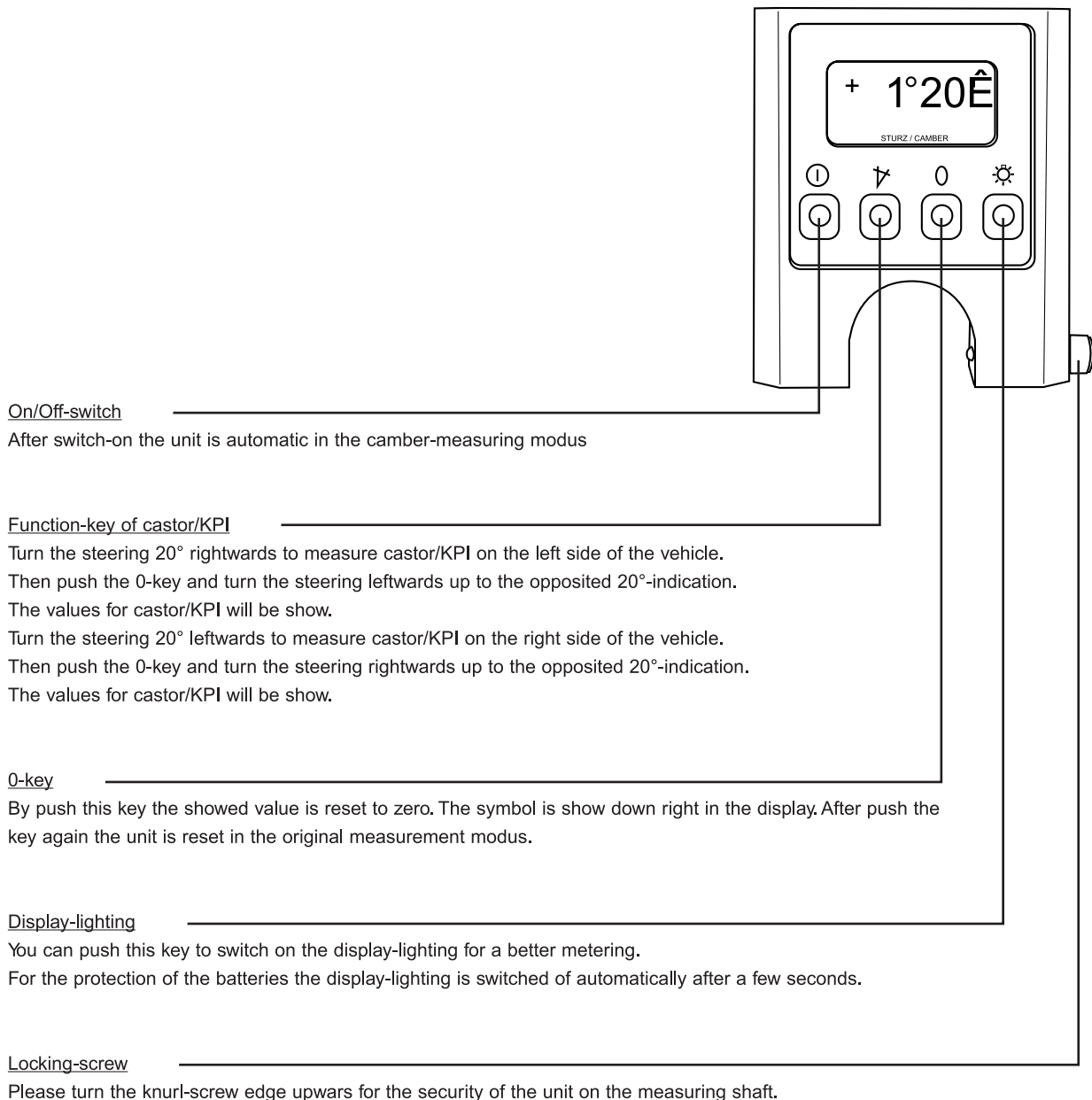
3.2 Hanging gauges



Right and left always related to driving direction.

3.3 Inclinator

For the measurement of camber, castor and KPI*



*For the measurement of KPI: push the brake / use the brake lockers



Note

Please pay attention that the inclinometer is a precision measurement system which has to be handled carefully. Protect this system against vibrations, wetness and soiling.

Right and left always related to driving direction.

3.4 Technical Data

Measuring Accuracy:

Toe	+/- 2.5 min.
Camber	+/- 5.0 min.
Caster	+/- 5.0 min.
Relative steering angle	+/- 10.0 min.
Axle torsion	+/- 2.5 min.

Turning plate carrying capacity	7 t/piece (truck)
---------------------------------	-------------------

Laser:

Model LG650-5	
Operating voltage	3 Volt
Power P_0	<1 mW
Wave range λ	650 nm
Range	20 m
Laser class	2 DIN EN 608251:199407
Power supply	2x Volt AA Mignon Batteries, 1,5 V

Electronic inclinometer:

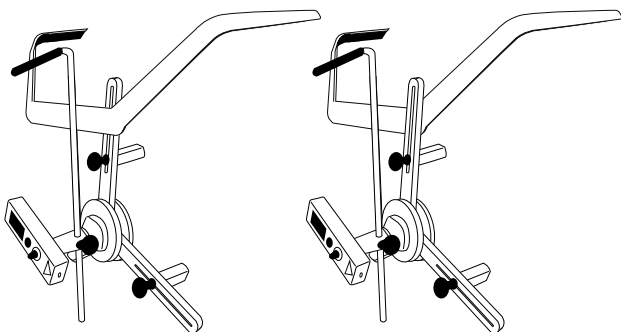
Resolution	+/- 5'
Accuracy	+/- 5' each horizontal and vertical others with a max. error source of +/- 5'
Service temperature	- 5°C bis 50°C
Storage temperature	-20°C bis 50°C
Weight	289 g
Operation	3x AA Mignon Batteries, 1,5 V
Cross-axle-errors	minimal
Battery service life	max. 300 h

Total weight of equipment	115 kg (net)
---------------------------	--------------

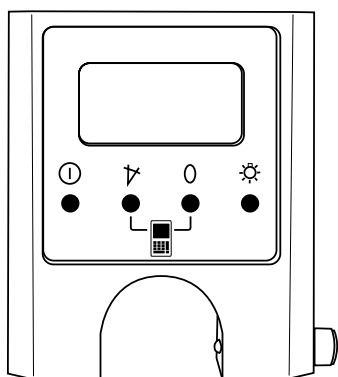
Warranty	1 Year
----------	--------

4. Equipment

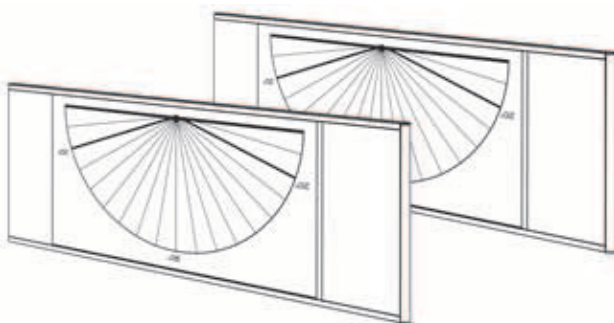
4.1 Part list basic version of HD-30 EasyTouch



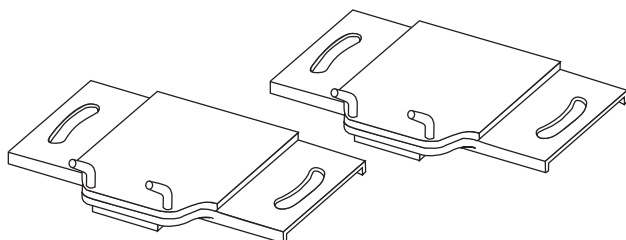
2 pcs. Laser measuring heads with mounting bracket



1 pcs. Electronic Inclinometer

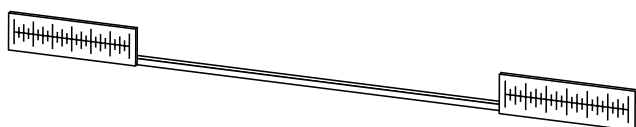


2 pcs. Scales for total turning radius

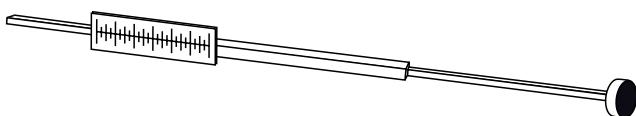


2 pcs. Turning plates

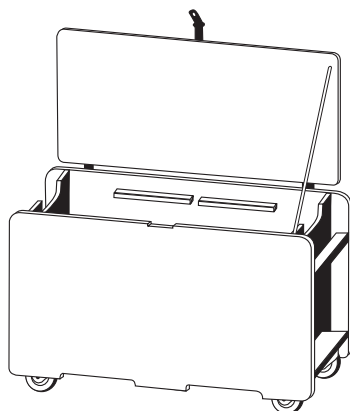
Right and left always related to driving direction.



1 pcs. Toe scale
(min 3110 - max. 4440 mm)



1 pcs. Magnetic scale

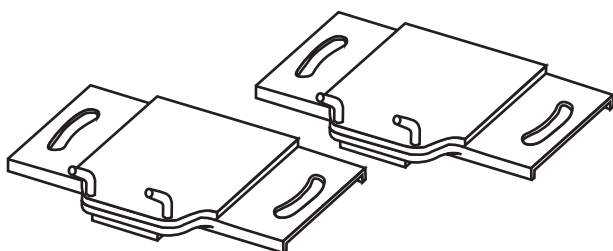


1 pcs. Storage box on wheels

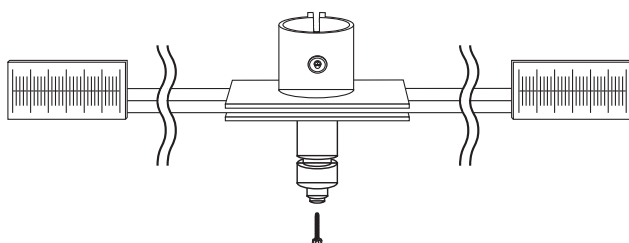


1 pcs. CD "Measuring records"

4.2 Accessories

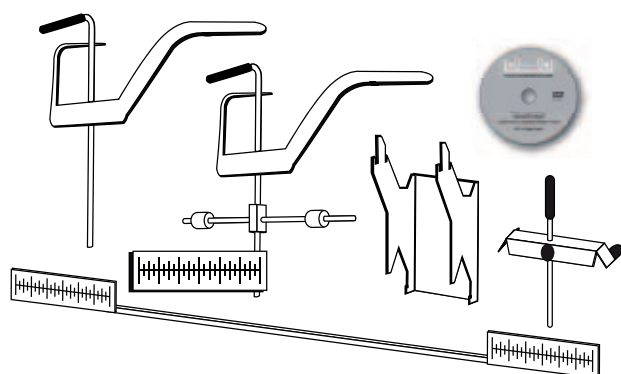


- 2 pcs. Additional turning plates
(for measurement of second steering axle)



- 1 set AL-30 for semi trailer
measurement

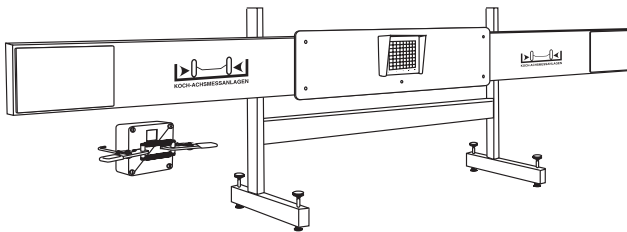
Left and right scale and king pin
adapter



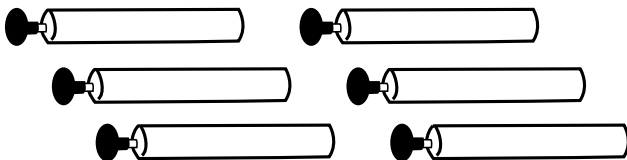
- 1 set PKW-30

- 2 pcs. mounting bracket
- 2 pcs. rear axle scale
- 2 pcs. wall bracket
- 1 pcs. toe scales
- 1 pcs. steering wheel holder
- 1 pcs. HD-10 EasyTouch
operating instruction DVD

Right and left always related to driving direction.



1 set. ACC-Adjustment LC-40
with Wabco adapter



Standard for HD-30 LM

6 pcs. Magnetic feet
measuring (315mm)
of agricultural machinery
and tractors

5. Front Wheel Alignment

5.1 Preparations

- Carry out alignment on level ground.
- Remove protective caps of wheel nuts or caps respectively.
- Clean rim between wheel nuts.
- Check tire pressure and, if necessary, adjust as specified.

Drive vehicle onto turning plates

- Place turning plates centrally in front of the wheels.
- Fasten turning plates with bolt to avoid torsion.
- Drive vehicle on turning plates. The wheel centre shall be positioned in the turning plate centre.



**Pay attention to laser beam
output opening before switch on!**

5.2 Mounting of laser measuring heads

- Put up the laser measuring head with the mounting bracket loosely on the wheel (tire). (Illustration 1)

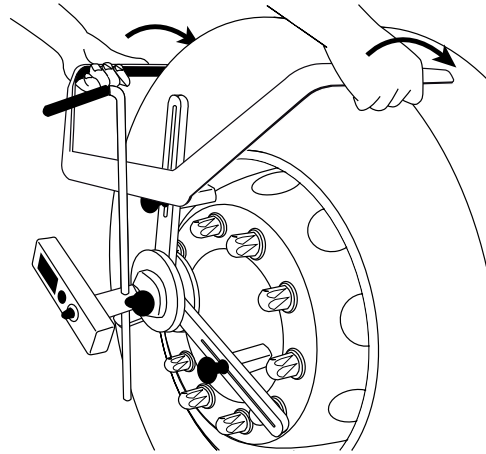


Illustration 1

- Loose the knurled screw in the middle and move the measuring head on the axle above or below.) (Illustration 2)
- The laser measuring head must be on the wheel center. (Illustration 3)

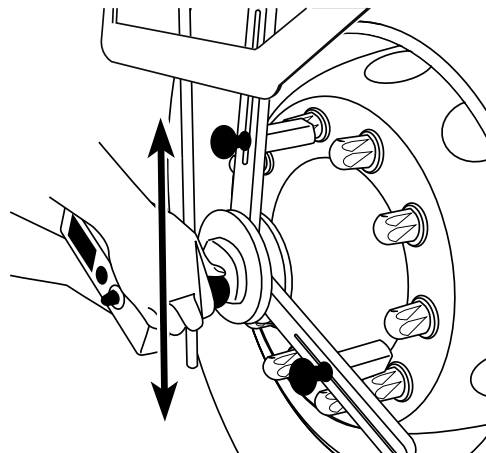


Illustration 2

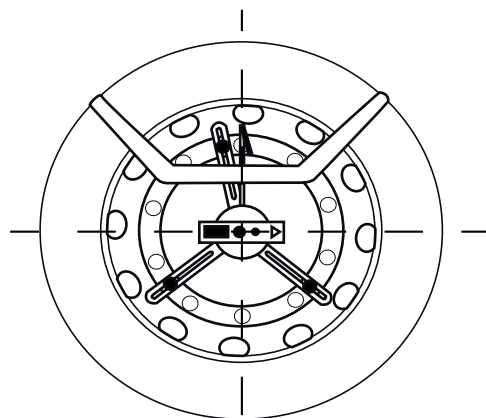


Illustration 3

Right and left always related to driving direction.

- Place the swivel-mounted measuring arms and the adjustable measuring sensors between the lug nuts. (Illustration 4)

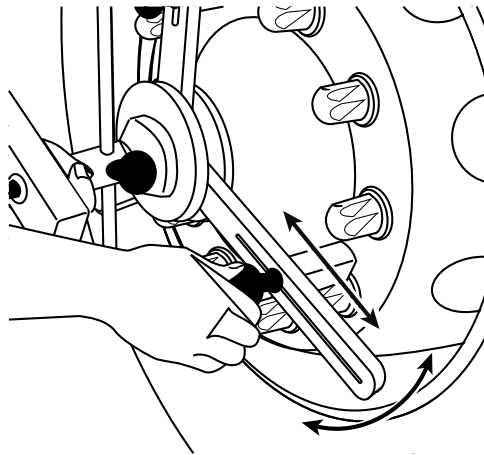


Illustration 4

- Slightly jack up the complete measuring head and replace it that all measuring sensors even fitted. (Illustration 5)

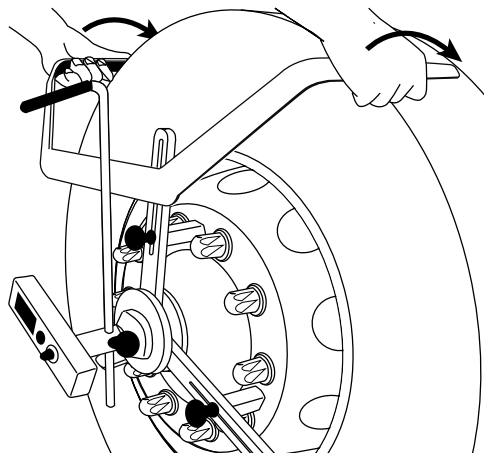


Illustration 5

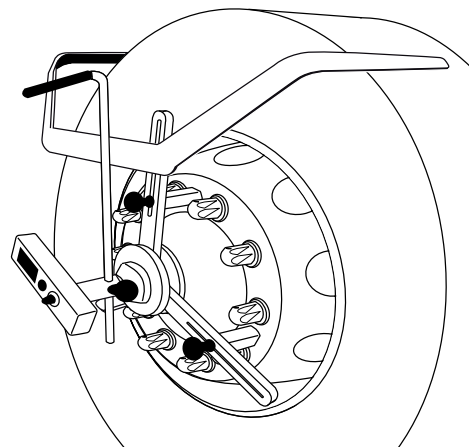


Illustration 6

Right and left always related to driving direction.

5.3 Rear axle hanging gauges adjust on the 1. rear axle

- a Hang the rear axle hanging gauges on the first rear axle (Illustration 7)

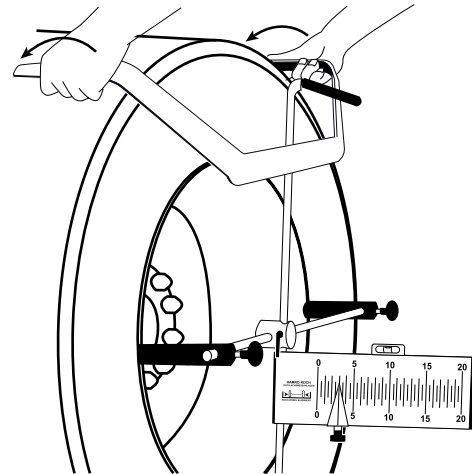


Illustration 7

- b Make sure that the water level is correct (Illustration 8)

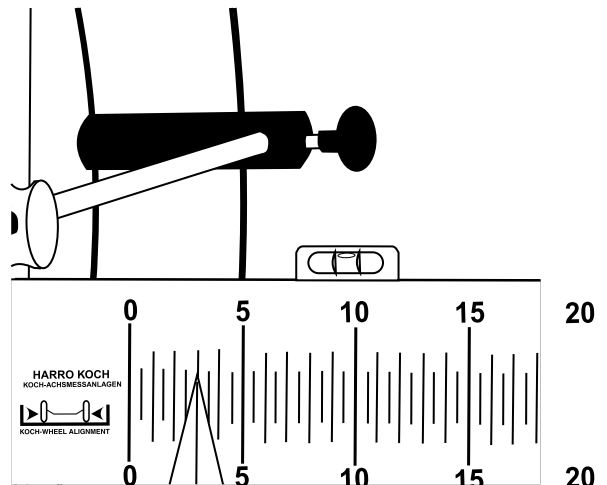


Illustration 8

5.4 Ensure the driving position is "straight-ahead"

Point laser dots at the scales at the rear axle on both sides and turn the steering wheel until the same value is shown on both scales. (For example 6,5)

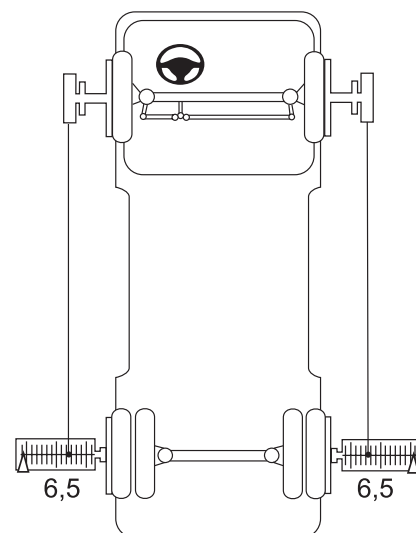


Illustration 9

5.5 Toe measurement and alignment

- a Put the toe gauge in front of the front axle. Ensure - the toe gauge is parallel to the front axle. Use the line of the bumper as a reference.
- b Arrange both lasers on the toe gauge. (Illustration 10)
- c Adjust the toe gauge so that the lasers align to the zero mark on both scale boards. Adjust as necessary.

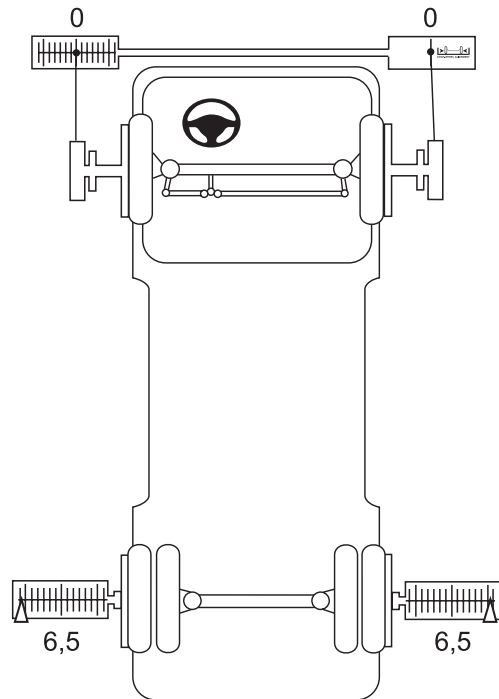


Illustration 10

- d Move the toe gauge 3,40 m to the rear of its original position. (Mark the floor with chalk.) The drivers side has to be at zero. (Illustration 11)

- e Read the toe value at the passenger side:

1 long mark at scale = 10'

1 half mark at scale = 5'

1 quarter mark at scale = 2,5'

Laser dot shows 0 \triangleq toe is zero

Laser dot shows inward \triangleq toe out

Laser dot shows outward \triangleq toe in

Example: The total toe is +27,5'.

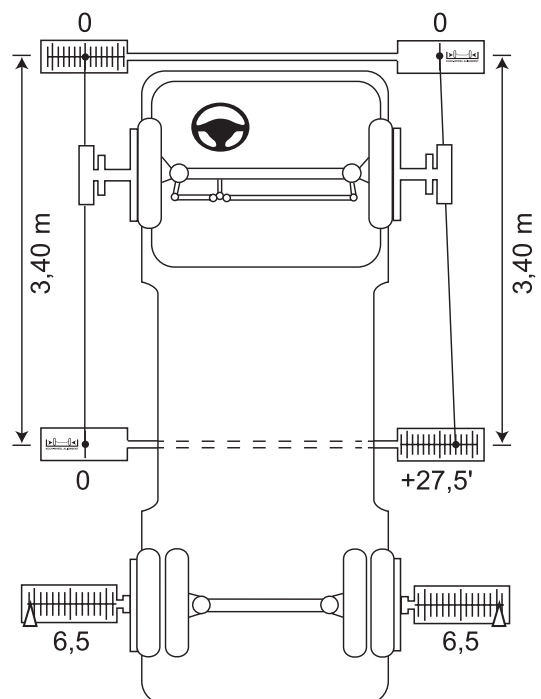


Illustration 11

5.6 Input of the indicated values in the inclinometer

a Input of the indicated values in the inclinometer

- Turn on with the ① button.
- Press angle and zero button (↗ and 0) at the same time for 3 seconds.

Toe assist is activated.

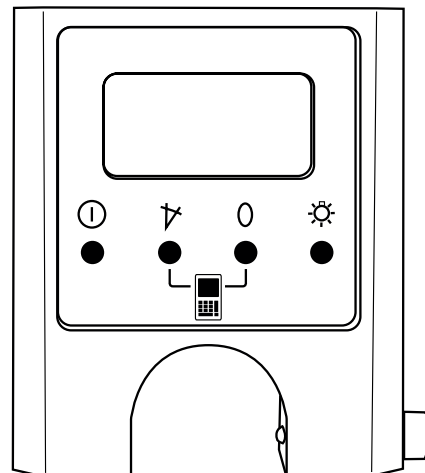


Illustration 12

- Select front axle or rear axle with + or - button and confirm with ENTER

Axle
 front axle
 - + Enter

- Put in the value shown at the rear axle hanging gauges left and right by pressing the + or - buttons and confirm with ENTER. (Read these button functions from the screen.)

Value left
 6.500
 - + Enter

Value right
 6.500
 - + Enter

Example: Value left 6,5, Value right 6,5

- Enter the desired toe value by pressing + or - button and confirm with ENTER.

Mind the correct prefix!

Desired toe value
 0.0'
 - + Enter

Example: The desired toe value is zero.

- Enter the existing toe value by pressing + or - buttons and confirm with ENTER.

Mind the correct prefix!

Existing toe value
 + 27,5'
 - + Enter

Example: The existing toe value amounts to +27,5'.

- Enter the wheelbase by pressing + or - buttons and confirm with ENTER. (Use a tape measure to measure from the middle of front axle to the middle of the first rear axle).

Wheelbase
 3250 mm
 - + Enter

Example: Wheelbase amounts to 3250 mm.

Right and left always related to driving direction.

- Adjust both rear hanging gauges to show the value of the inclinometer by sliding the red arrows on both rear axle gauges so that they both read the same. (Illustration 13+14)

Example: Value to adjust 5,3

Value left / right		
5,3		
-	+	Enter

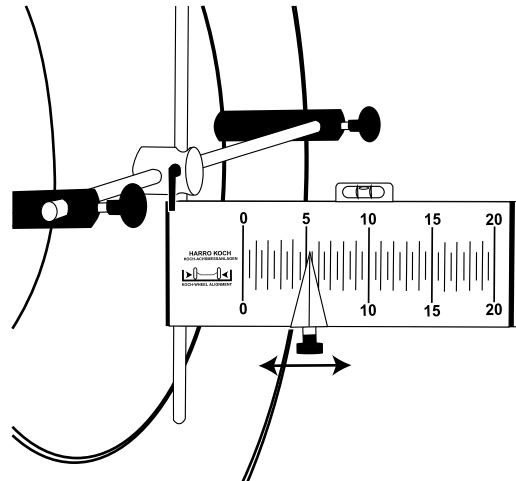


Illustration 13

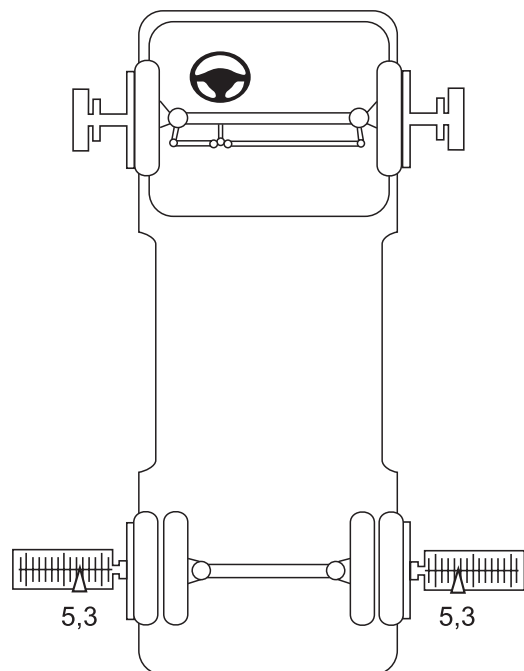


Illustration 14

Right and left always related to driving direction.

5.7 Adjustment of the total toe

- a Turn both lasers on the rear axle gauges.
- b Turn the steering wheel until the laser dot on the drivers side hits the mark on the rear axle gauge. (Illustration 15)

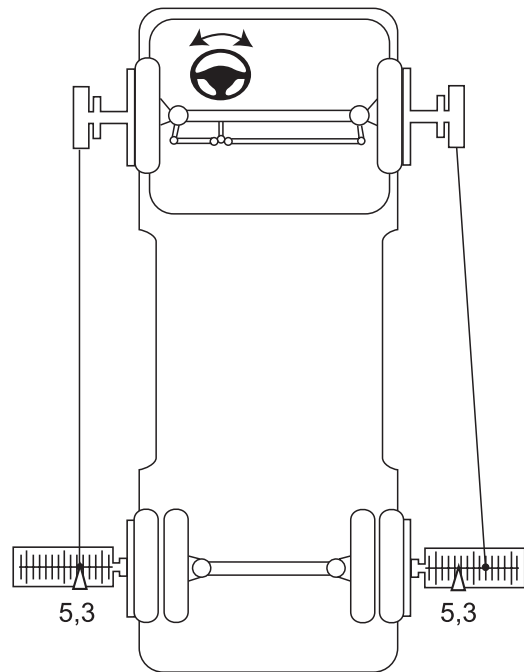


Illustration 15

- c Adjust the tie rod until the laser dot on the passenger side also hits the mark on the rear axle gauge. (Abbildung 14)

Now the total toe is set to zero.

Important: Make sure that the value on the drivers side is not changed while adjusting the tie rod. Check the alignment mark on the steering box and adjust if necessary.

- d After alignment check the total toe with the toe gauge!

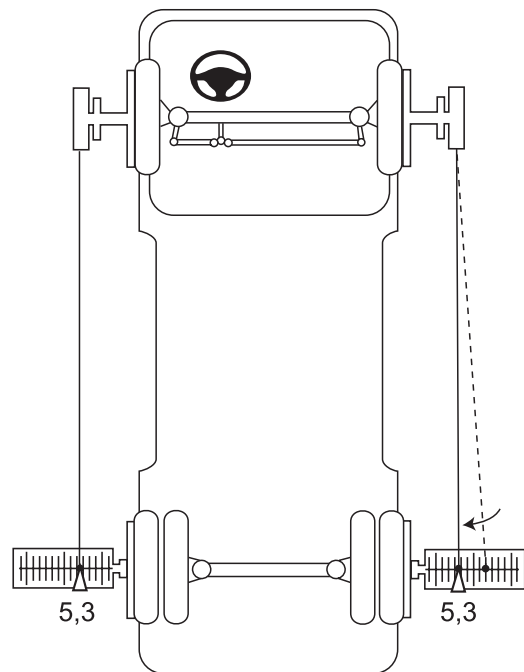


Illustration 16

5.8 Check of Steering Wheel Center Position

- a Check the steering wheel center position at the steering box.
- b If the mark at the steering box is off-center, the drag link has to be adjusted until both marks are in alignment. (Box neutral position.)

Important: The position of the two laser points on the magnetic scales must change. Adjust, if necessary.

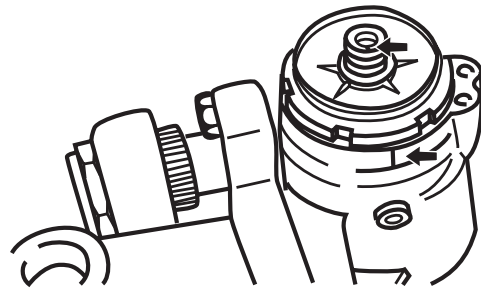


Illustration 17

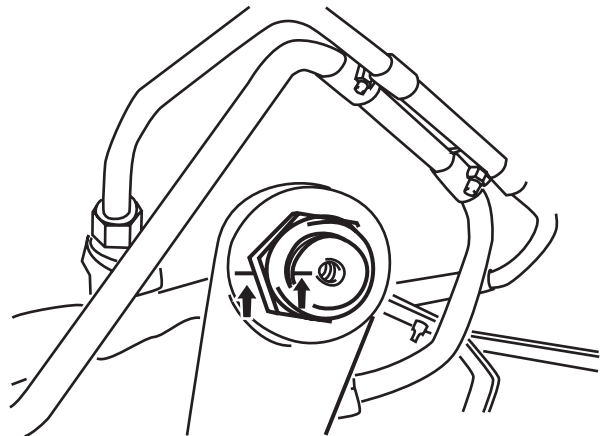


Illustration 18

5.9 Camber measurement

- Turn the steering wheel until the front wheels are in „straight-ahead position“ (magnetic scales = 0).
- Put the electronic inclinometer onto measuring head shaft and lock with the knurled screw.
- Switch-on electronic inclinometer with **I**-key - and read the camber value.
- Repeat the same procedure on the other side of the vehicle.
- Write down the measurement values in the test record.
- Switch-off electronic inclinometer with **I**-key.

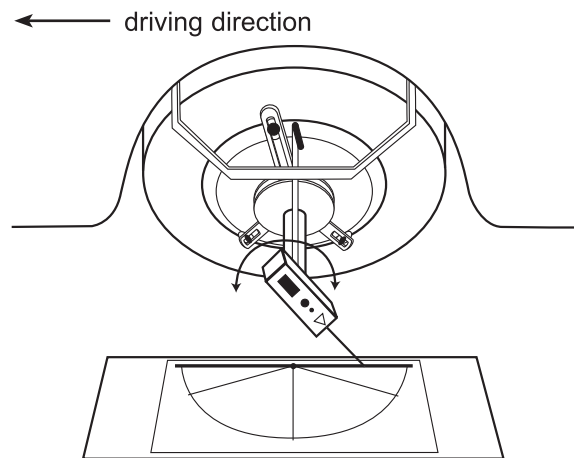


Illustration 19

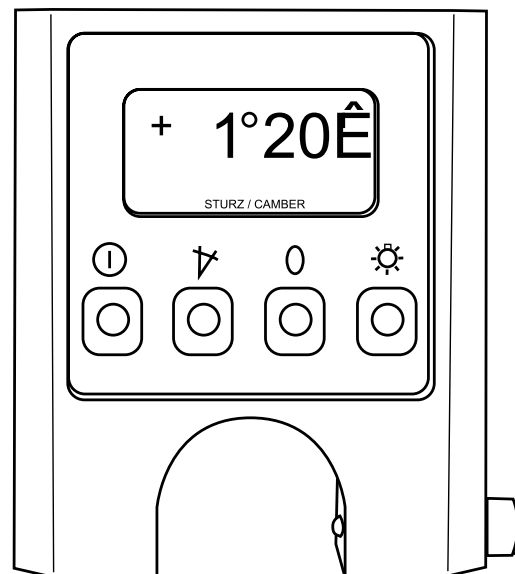
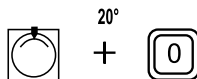


Illustration 20

5.10 Caster and Inclination

- Turn the steering wheel until the front wheels are in „straight-ahead position“. Both lasers have to point at the same value (zero) on the magnetic scales attached to the frame.
- Turn the laser housing so that the laser beam points at the floor. Adjust the laser by using the bubble level in the laser housing to position it perfectly vertical.
- Place the floor scales for the checking of the 20° wheel angle on the ground beside the front wheel so that the laser point points at the zero mark on the scale. The zero mark is the intersecting point of the 0° line and the „center line“ adjusting line.
- The center line of the scale is positioned parallel to the wheel. Adjust the scale so that the laser beam does not deviate from the center line when the laser housing is turned. (Illustration 21)
- Put the electronic inclinometer onto the shaft of the left measuring head and lock with the knurled screw.
- Switch-on electronic inclinometer with **I**-key.
- Press **↖**-key. The display shows:



- Turn the left wheel to the right side. (About 1½ turn on the steering wheel)
 - Turn the laser point onto the zero line.
 - Slide the inner scale until the laser points onto the zero mark.
 - Now turn the laser outwards and read the value. Optimise this procedure until the laser point follows exactly the line from zero to 20°.
- (Illustration 22)
- Press 0-key on the electronic inclinometer.
 - Turn back the wheel to the left side until the laser point follows exactly the line zero to 20°.
- (Illustration 23)
- Read the caster and KPI values and write down in the test record.
 - Repeat the same procedure on the other side.

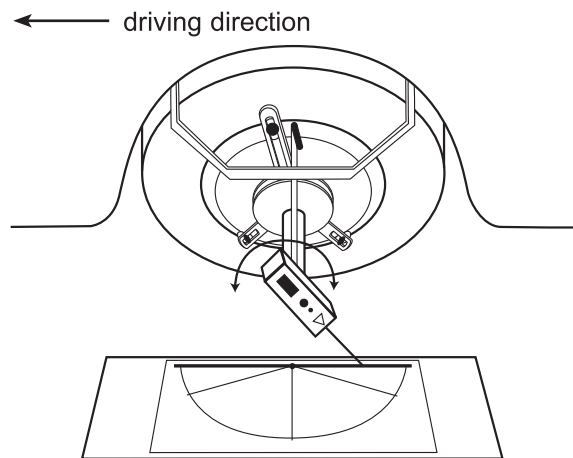


Illustration 21

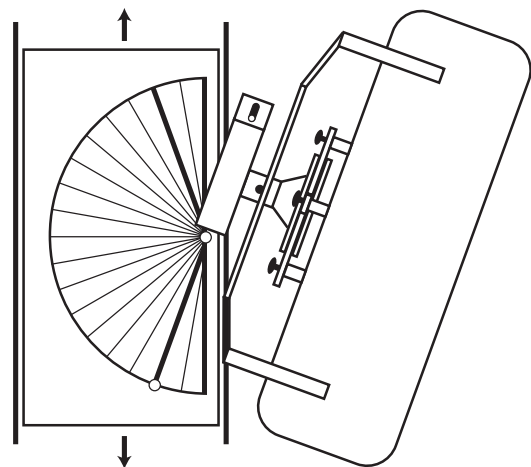


Illustration 22

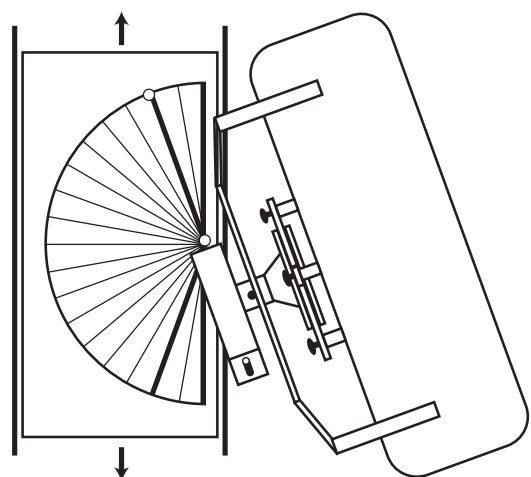


Illustration 23

Right and left always related to driving direction.

5.11 Relative Steering Angle (toe out on turns)

- Turn the steering wheel until the front wheels are in „straight-ahead position“. Both lasers have to point at the same value (zero) on the magnetic scales attached to the frame.
- Turn the laser housing so that the laser beam points at the floor. Adjust the laser by using the bubble level in the laser housing to position it perfectly vertical.
- Place the floor scales for the checking of the 20° wheel angle on the ground beside the front wheel so that the laser point points at the zero mark on the scale. The zero mark is the intersecting point of the 0° line and the „center line“ adjusting line.
- The center line of the scale is positioned parallel to the wheel. Adjust the scale so that the laser beam does not deviate from the center line when the laser housing is turned. (Illustration 24)
- Turn the left wheel to the left side. (About 1½ turn on the steering wheel)
- Turn the laser point onto the zero line.
- Move the inner scale until the laser points onto the zero mark.
- Now turn the laser outwards and read the value. Optimise this procedure until the laser point follows exactly the line from zero to 20°.
- (Illustration 25)
- Read the relative steering angle value on the other side.
- Repeat the same procedure on the other side.

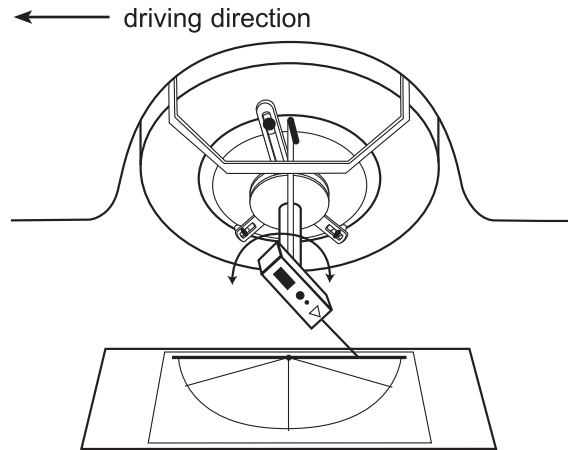


Illustration 24

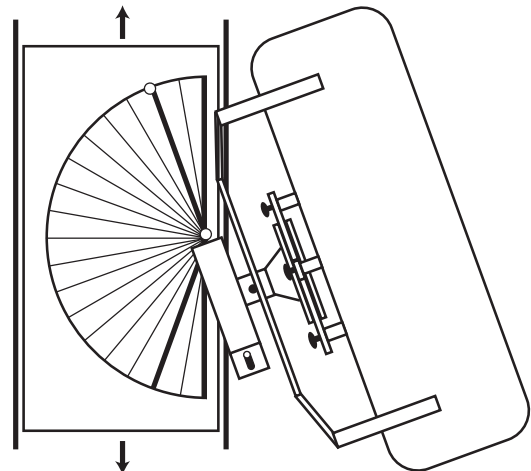


Illustration 25

Example:

The laser points at 20° at the left wheel (wheel at the inner circle). The laser points at 17°30' at the right wheel (wheel at the outer circle). The relative steering angle at the right-hand side amounts to 2°30'. (Illustration 26)

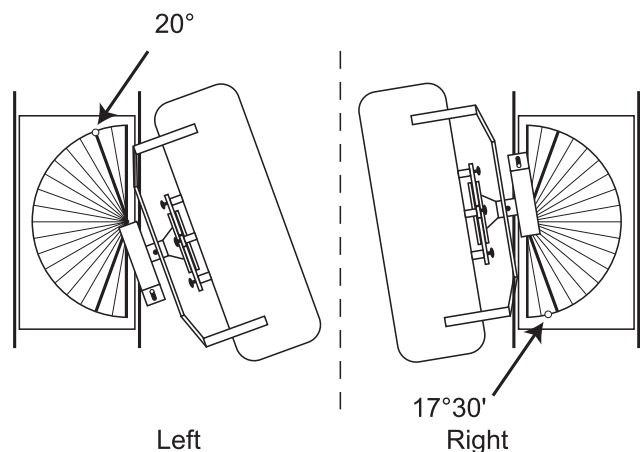


Illustration 26

6. Rear Wheel Alignment

6.1 Preparations

The front wheels are aligned.

- For the rear wheel alignment retract the measuring sensors. (Illustration 27)
- Adjust the measuring head by putting the retracted measuring sensors flat on the rim edge. (Illustration 28)

Remark:

The rims and the measuring sensor have to be clean.

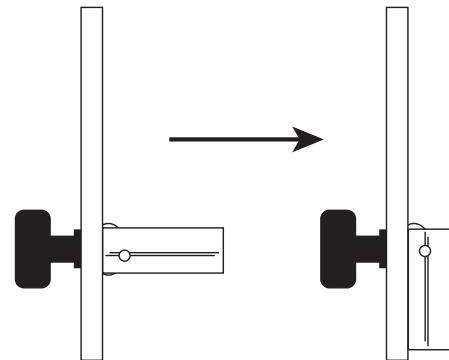


Illustration 27

6.2 Hang the laser measuring heads on the rear axle

- Ensure that the measuring adapters are folded in!
- Make sure that all three adapters have contact with the rim in a flat plane.

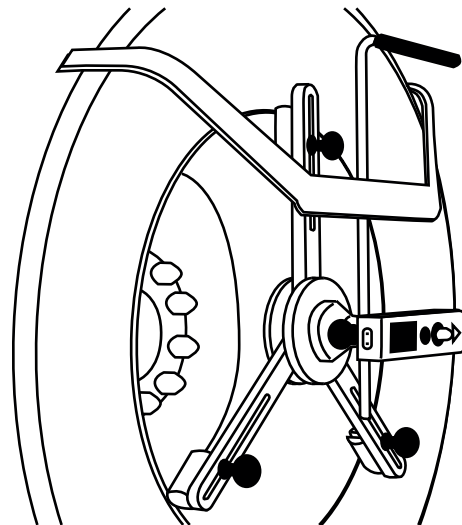


Illustration 28

6.3 Hang the hanging gauges on the front axle

- Make sure that the water level is aligned

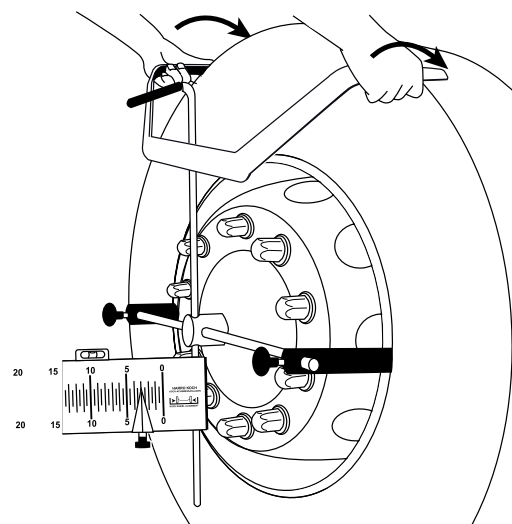


Illustration 29

Right and left always related to driving direction.

a Point the lasers on the scales of the front axle.
(Illustration 30)

b Compare the values left and right.

Example: Value left: 5,5
Value right: 9,0

c If possible, align the rear axle so the same value is achieved on both sides.

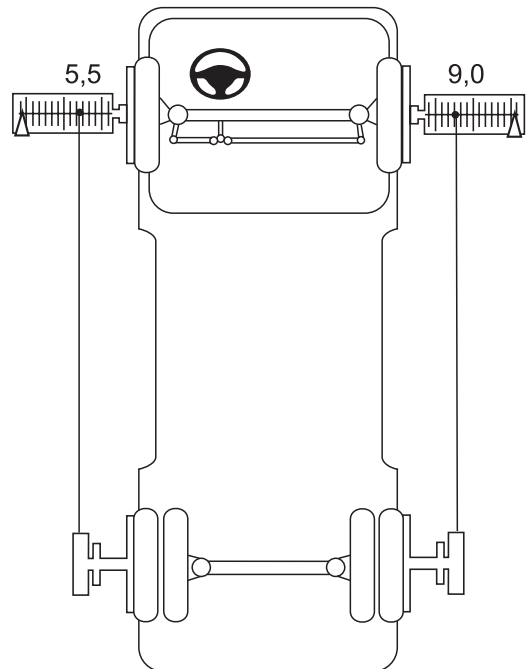


Illustration 30

6.4 Axle offset to the front axle

- a Turn the laser to the hanging gauges at the front.
(Illustration 31)
- b Compare the values left and right.

Example: Value left: 5,5
Value right: 9,0

Half of the difference is the axle offset to the front axle. (In minuts see page 54.)

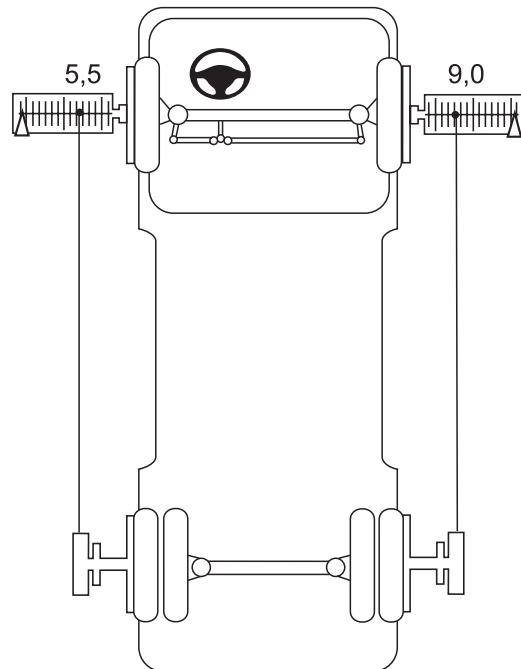


Illustration 31

6.5 Axle offset (For air suspended rear)

a Enter the shown values in inclinometer

- Press the ① button to turn on the inclinometer.
- Press the angle and the zero button (↗ and 0) at the same time for 3 seconds.

Toe assist is activated.

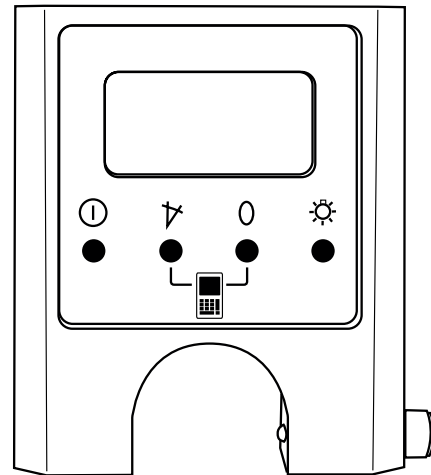


Illustration 32

- Select front axle or rear axle with + or - button and confirm with ENTER.

Axle

rear axle

- + Enter

- Put in the value shown at the rear axle hanging gauges left and right by pressing the + or - buttons and confirm with ENTER. (Read these button functions from the screen.)

Value left

5.500

- + Enter

Value right

9.000

- + Enter

Example: Value left 6,5, Value right 6,5

- Enter the desired toe value by pressing + or - button and confirm with ENTER.

Mind the correct prefix!

Desired toe value

0.0'

- + Enter

Example: The desired toe value is zero.

- Enter the existing toe value by pressing + or - buttons and confirm with ENTER.

Mind the correct prefix!

Existing toe value

+ 0'

- + Enter

Example: The existing toe value amounts to zero.

- Enter the wheelbase by pressing + or - buttons and confirm with ENTER. (Use a tape measure to measure from the middle of front axle to the middle of the first rear axle).

Wheelbase

3250 mm

- + Enter

Example: Wheelbase amounts to 3250 mm.

Right and left always related to driving direction.

6.5 Axle offset (Continuation) (For air suspended rear)

- The inclinometer shows the value (7,25) left and right. Arrows mark the position of this value. (Illustration 33)

Example: Value to be align is 7,25

- b** Align the rear axle to the same value which is reached on both sides.

Value left / right		
7,25		
-	+	Enter

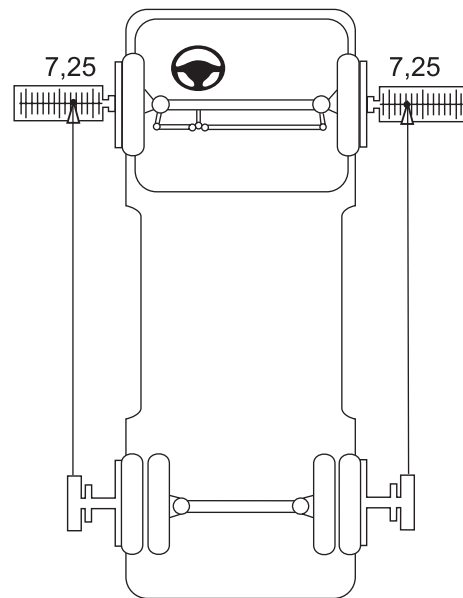


Illustration 33

7. Alignment of Twin Steering Front Axles

7.1 Preparations

- a Align on level floor.
- b Remove the wheel nut protection
- c Clean the rims between the wheel nuts or caps
- d Check the tire pressure

7.2 Drive the vehicle on four turning plates

- a Set four turning plates centered in front of the wheels of both steering axles
- b Drive the vehicle on the turning plates. The middle of the wheel has to be in the center of the turning plates.

7.3 Mount the measuring heads

- a Put up the laser measuring head with the mounting bracket loosely on the wheel (tire). (Illustration 34)

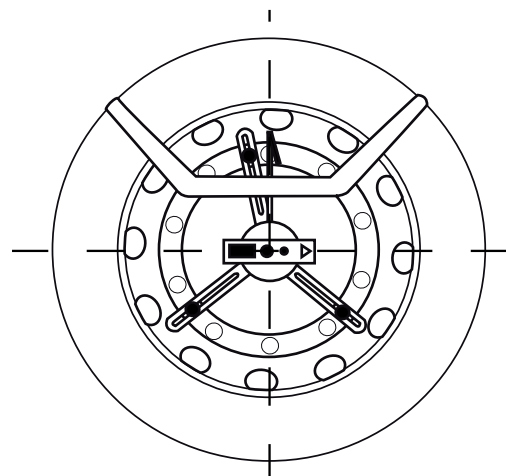


Illustration 34

- b Loose the knurled screw in the middle and move the measuring head on the axle above or below. (Illustration 35)
The laser measuring head must be on the wheel center.

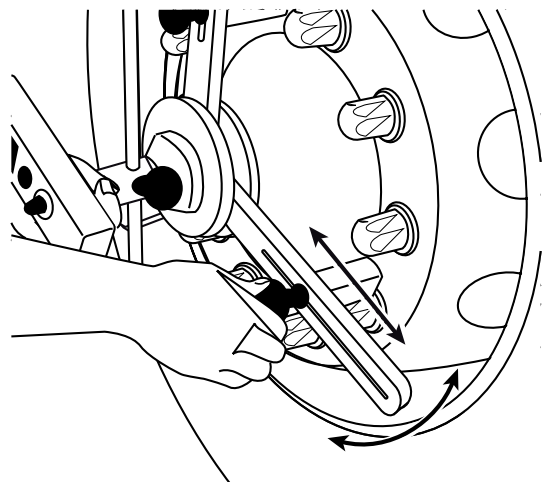


Illustration 35

Right and left always related to driving direction.

7.4 Rear axle hanging gauges adjust on the 1. rear axle

- a Hang the rear axle hanging gauges on the first rear axle (Illustration 36)

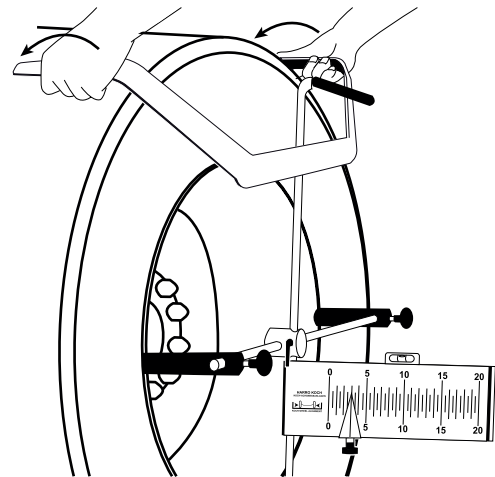


Illustration 36

- b Make sure that the water level is correct (Illustration 37)

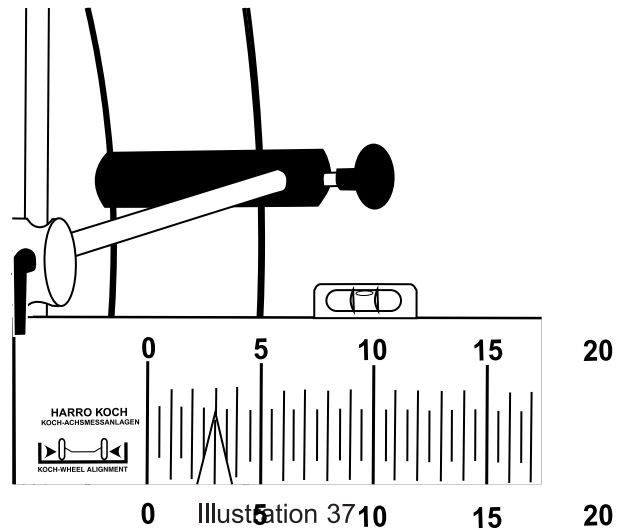


Illustration 37

7.5 Driving position "straight-ahead"

- a Set both lasers on the scales on the rear axle and turn the steering wheel that you read on both sides the same value.

Example: On both rear axle scales is shown the value "6,5" that means - the front wheels are in "straight-ahead" position. (Illustration 38)

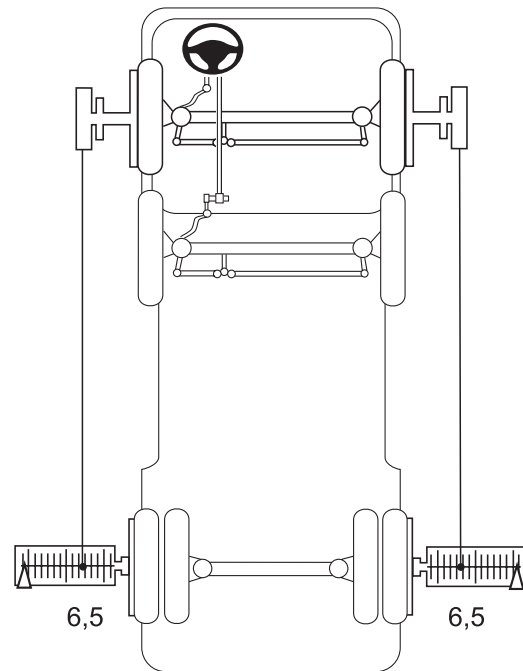


Illustration 38

7.6 Adjust the toe gauge

- a Place the toe gauge before the front axle. (parallel to the front axle.) Use the line of the bumper as reference and mark it with chalk.
- b Both laser dots have to be on zero. Look the gauge with the wing screw. (Illustration 39)
- c Measure with the tape measure 3,40 m from your front chalk mark to the back and mark on both sides with a chalk line.

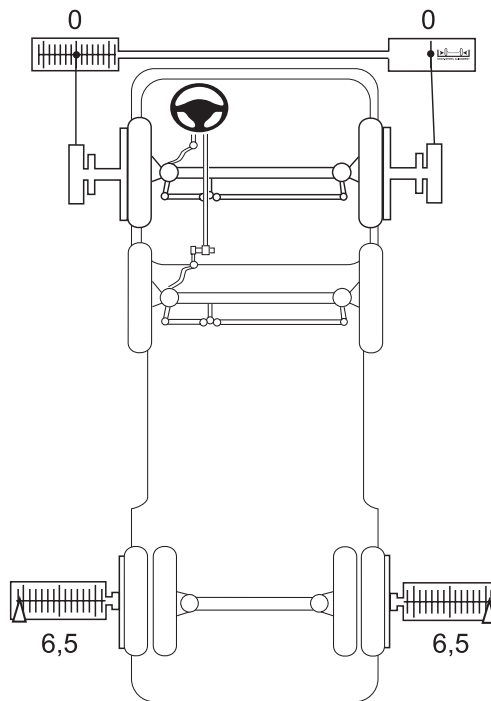


Illustration 39

- d Place the toe gauge on the back chalk mark. Turn the laser at the drivers side on the scale. Move the gauge to zero. (Illustration 40)
- e Turn the laser on the co-drivers side at the gauge.
- f Read the results:

- 1 long mark at scale = 10'
- 1 half mark at scale = 5'
- 1 quarter mark at scale = 2,5'

Laser dot shows 0 $\hat{=}$ toe is zero
 Laser dot shows inward $\hat{=}$ toe out
 Laser dot shows outward $\hat{=}$ toe in

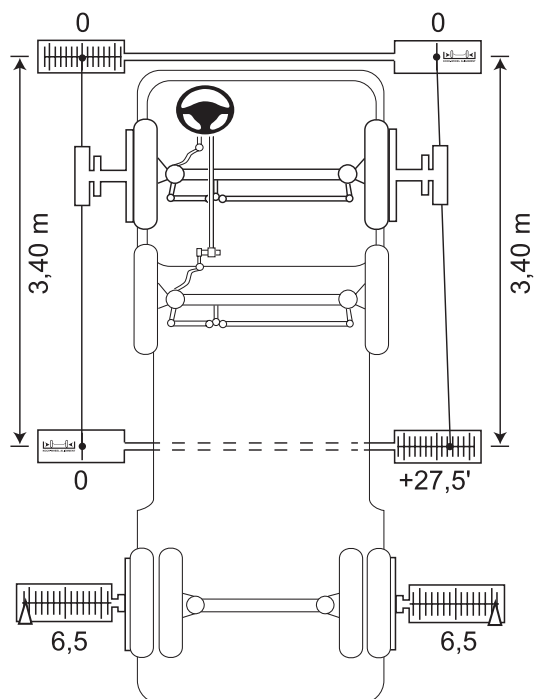





Illustration 40

Example: The total toe is +27,5'.

- g If the toe meets the specified values:
 - Enter value on the measurement form
 - Check the "straight-ahead" position and the center of the steering wheel.

7.7 Align the toe

a Input of the indicated values in the inclinometer

- Turn on with the  button.
- Press angle and zero button ( and ) at the same time for 3 seconds.

Toe assist is activated.

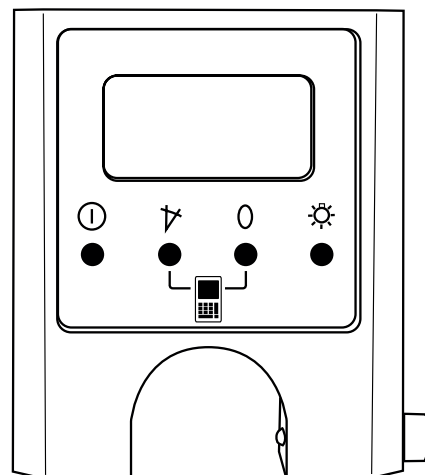


Illustration 41

- Select front axle or rear axle with + or - button and confirm with ENTER

Axle
 front axle
 - + Enter

- Put in the value shown at the rear axle hanging gauges left and right by pressing the + or - buttons and confirm with ENTER. (Read these button functions from the screen.)

Value left
 6.500
 - + Enter

Value right
 6.500
 - + Enter

Example: Value left 6,5, Value right 6,5

- Enter the desired toe value by pressing + or - button and confirm with ENTER.

Mind the correct prefix!

Desired toe value
 0.0'
 - + Enter

Example: The desired toe value is zero.

- Enter the existing toe value by pressing + or - buttons and confirm with ENTER.

Mind the correct prefix!

Existing toe value
 + 27,5'
 - + Enter

Example: The existing toe value amounts to +27,5'.

- Enter the wheelbase by pressing + or - buttons and confirm with ENTER. (Use a tape measure to measure from the middle of front axle to the middle of the first rear axle).

Wheelbase
 3250 mm
 - + Enter

Example: Wheelbase amounts to 3250 mm.

Right and left always related to driving direction.

7.7 Align the toe (Continuation)

- Place the value left and right with the arrows at the hanging gauges. (Illustration 42+43)

Example: Value 5,3

Value left / right		
5,3		
-	+	Enter

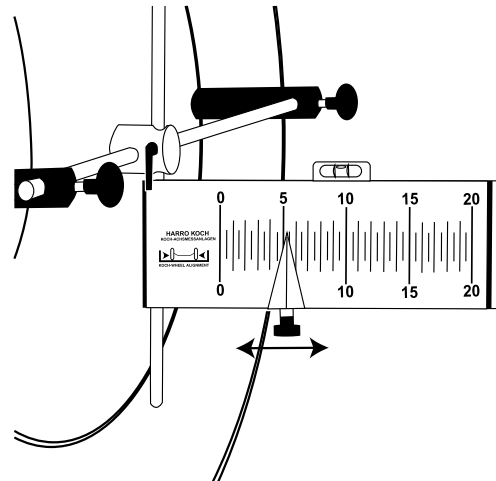


Illustration 42

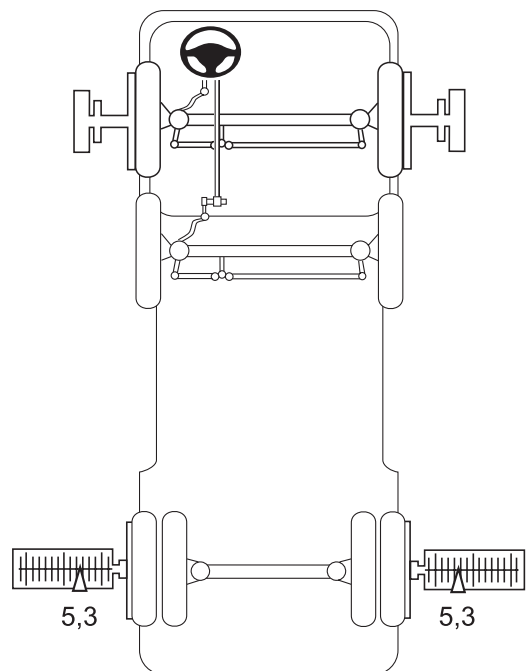


Illustration 43

Right and left always related to driving direction.

7.7 Align the toe (Continuation)

- b Turn both laser on the scales at the rear axle.
- c Turn the steering wheel till the laser dot at the drivers side meets the arrow at the hanging gauge. (Illustration 44)

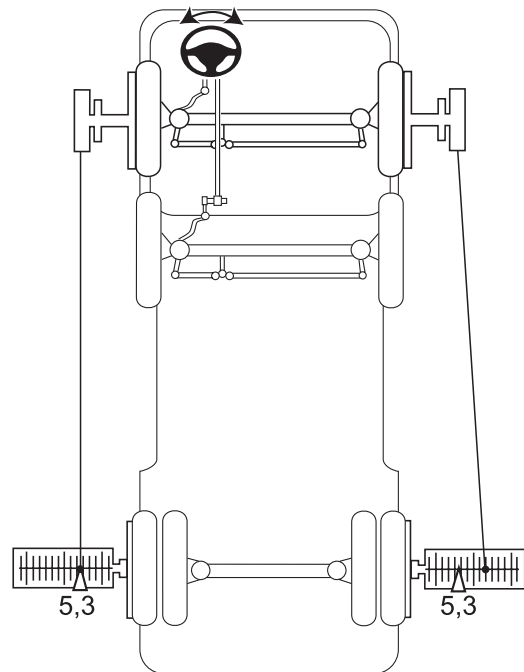


Illustration 44

- d Resolve the tie rod.
Turn the tie rod till the laser dot on the co-drivers side meets also the arrow at the hanging gauge. (Illustration 45)

Now the total toe "zero" is aligned.

Attention: On the drivers side the value does not change when turning the tie rod. If necessary, adjust with the steering wheel.

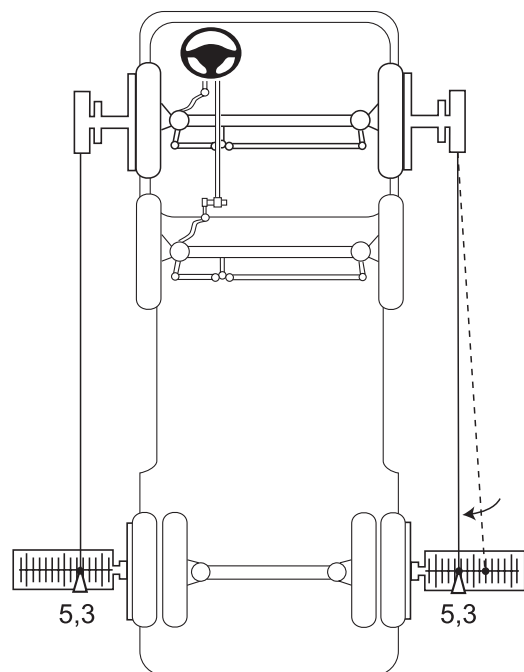


Illustration 45

7.8 Steering center position check

- a Check steering center position at the steering gear.
- b Is the marking on off-center steering gear, the connecting rod can be adjusted to match both marks.

Attention: Both laser dots on the scales does not change. If necessary, adjust!

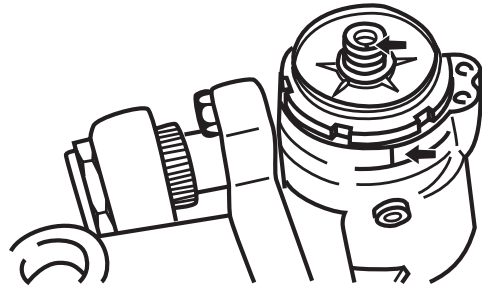


Illustration 46

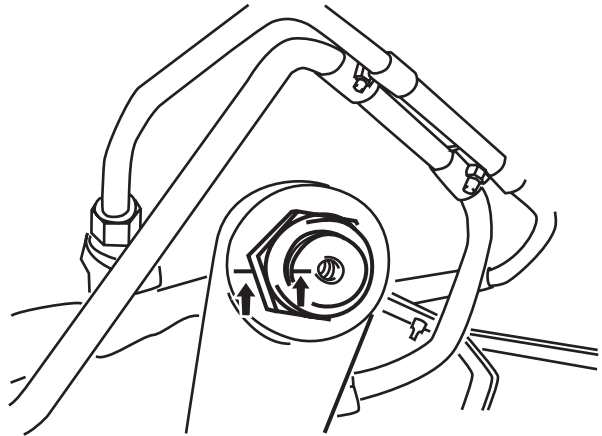


Illustration 47

7.9 Align driving position "straight-ahead" (2. Front axle)

- a Point the lasers on the hanging gauges to the front axle. (Illustration 48)
- b Compare the values to the left and to the right.

Example: Value left: 4,0
Value right: 8,75

With the same values on the left and right on the rear axle - the front wheels are straight-ahead driving.

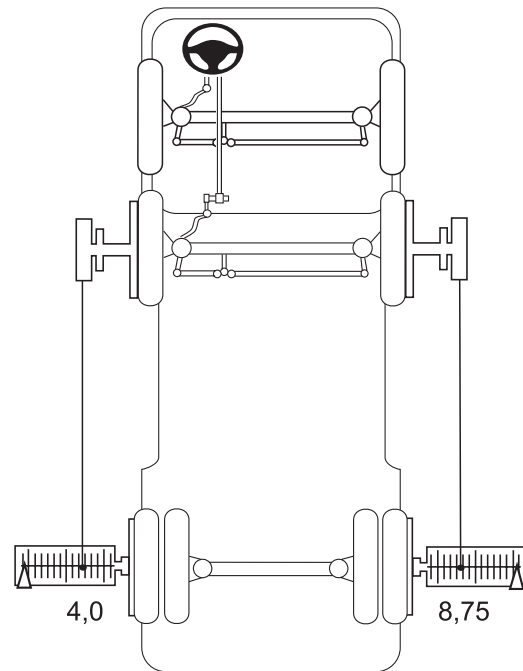


Illustration 48

7.10 Align toe gauge (2. Front axle)

- a Place the toe gauge before the front axle. (parallel to the front axle.) Use the line of the bumper as reference and mark it with chalk.
- b Both laser dots have to be on zero. Look the gauge with the wing screw. (Illustration 49)
- c Measure with the tape measure 3,40 m from your front chalk mark to the back and mark on both sides with a chalk line.

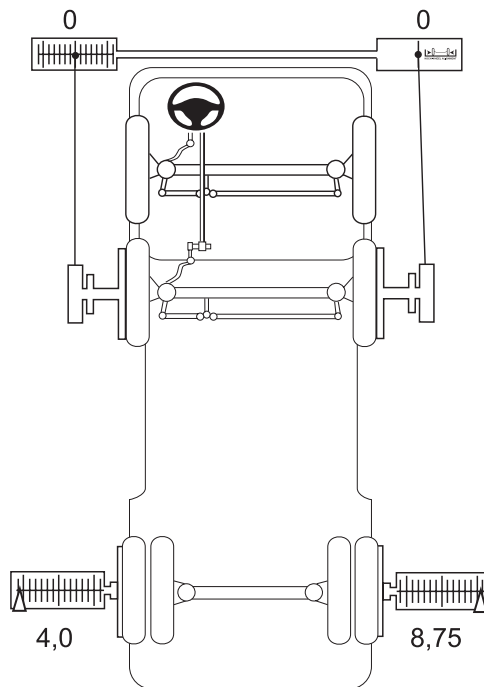


Illustration 49

- d Place the toe gauge on the back chalk mark. Turn the laser at the drivers side on the scale. Move the gauge to zero. (Illustration 50)
- e Turn the laser on the co-drivers side at the gauge.
- f Read the results:

- 1 long mark at scale = 10'
- 1 half mark at scale = 5'
- 1 quarter mark at scale = 2,5'

Laser dot shows 0 \triangleq toe is zero
 Laser dot shows inward \triangleq toe out
 Laser dot shows outward \triangleq toe in

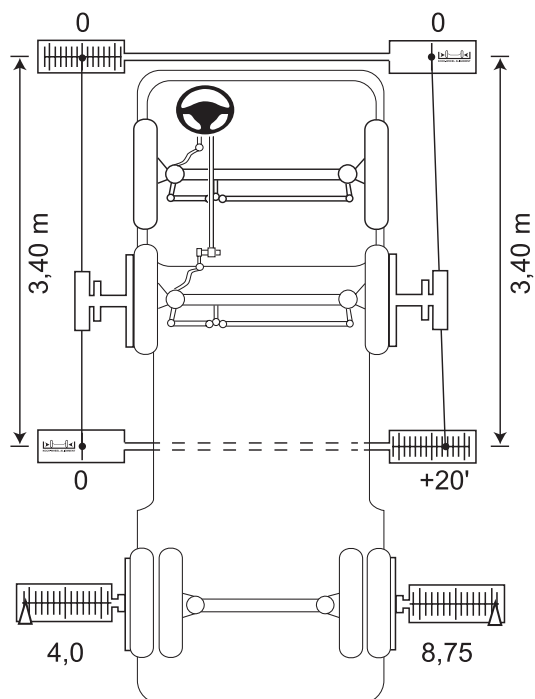


Illustration 50

Example: The total toe is +27,5'.

- g If the toe meets the specified values:
 - Enter value on the measurement form
 - Check the "straight-ahead" position and the center of the steering wheel.

7.11 Setting up the lane (2. Front axle)

- a Input of the indicated values in the inclinometer
- Turn on with the ① button.
 - Press angle and zero button (↗ and 0) at the same time for 3 seconds.
- Toe assist is activated.

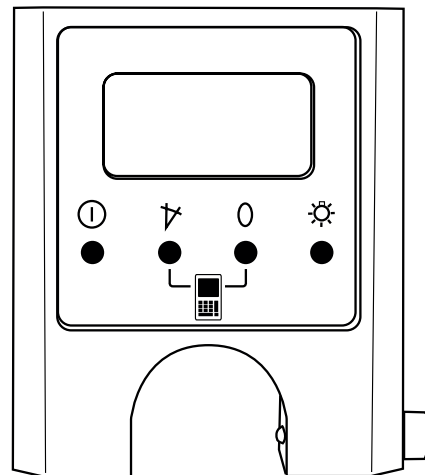


Illustration 51

- Select front axle or rear axle with + or - button and confirm with ENTER
- Put in the value shown at the rear axle hanging gauges left and right by pressing the + or - buttons and confirm with ENTER. (Read these button functions from the screen.)

Example: Value left 4,0, Value right 8,75

Axle
 front axle
 - + Enter

Value left
 4.000
 - + Enter

Value right
 8.750
 - + Enter

- Enter the desired toe value by pressing + or - button and confirm with ENTER.
Mind the correct prefix!

Example: The desired toe value is zero.

Desired toe value
 0.0'
 - + Enter

- Enter the existing toe value by pressing + or - buttons and confirm with ENTER.
Mind the correct prefix!

Example: The existing toe value amounts to +20'.

Existing toe value
 + 20'
 - + Enter

- Enter the wheelbase by pressing + or - buttons and confirm with ENTER. (Use a tape measure to measure from the middle of front axle to the middle of the first rear axle).

Example: Wheelbase amounts to 2850 mm.

Wheelbase
 2850 mm
 - + Enter

Right and left always related to driving direction.

7.11 Setting up the lane (Continuation) (2. Front axle)

- Place the value left and right with the arrows at the hanging gauges. (Illustration 52+53)

Example: Value 5,8

Value left / right		
5,8		
-	+	Enter

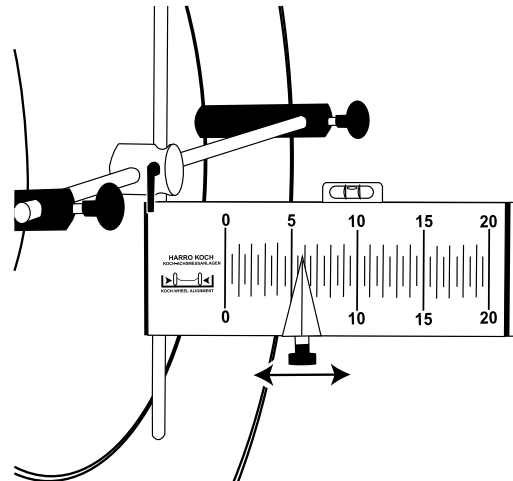


Illustration 52

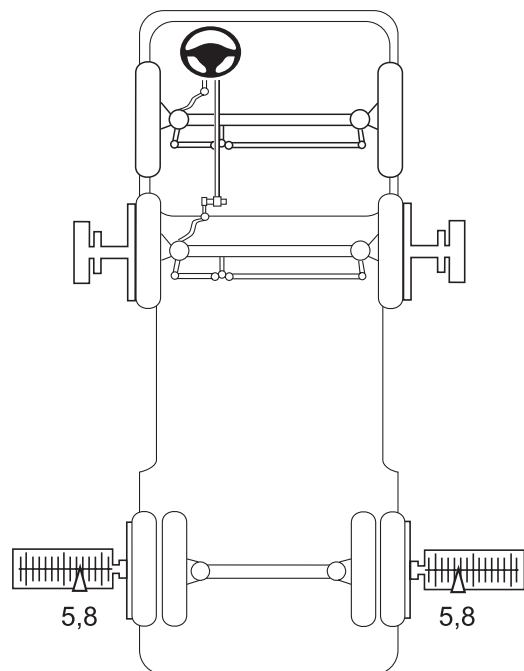


Illustration 53

Right and left always related to driving direction.

7.12 Toe Alignment (2. Front axle)

- b Move the laser measuring head on the co-drivers side to the front axle at the drivers side and point both lasers on the hanging gauge at the rear axle. (Illustration 54)

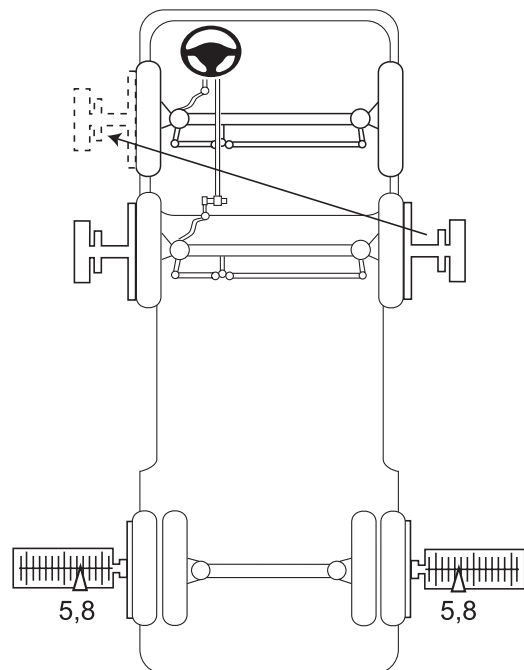


Illustration 54

- c Remove the connection rod between the first and second axle and correct the laser dot on the drivers side of the mark on the hanging gauge. (Illustration 55) While leaving the engine running remove with light steering movements any existing tension in the steering system. Bring back the value at the first axle and then readjust the position of the second axle on the connection rod if necessary.

Example: Value first axle: 5,3
Value second axle: 5,8

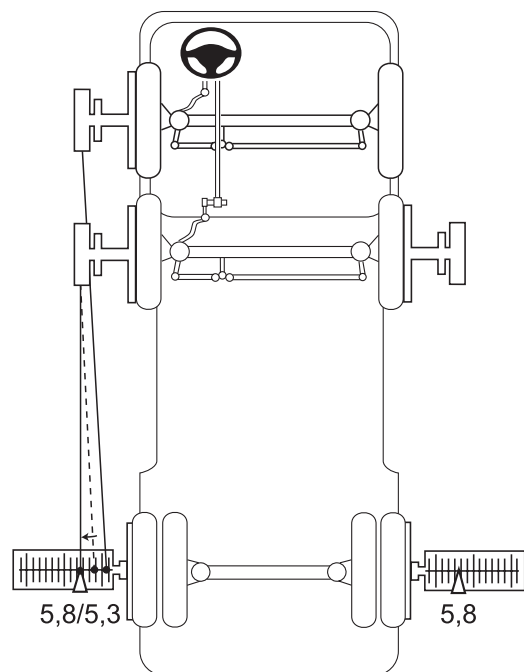


Illustration 55

7.12 Toe Alignment (Continuation) (2. Front axle)

- d Move the laser measuring head on the first front axle to the second axle at the co-drivers side and point the laser on the hanging gauge at the rear axle. (Illustration 56)

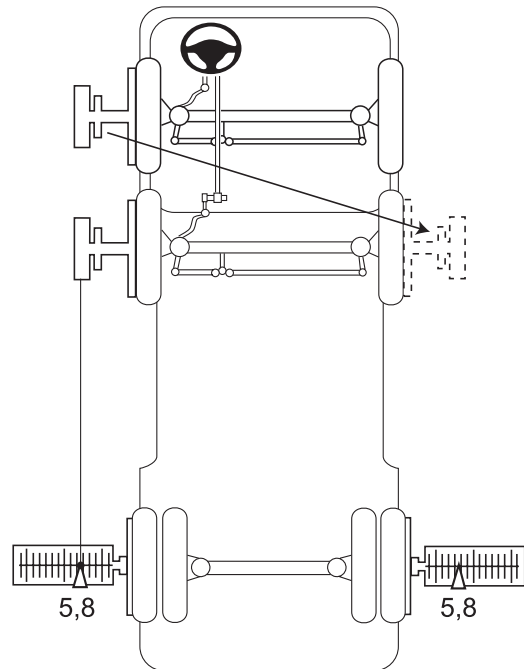


Illustration 56

- e Remove the tie rod and turn it till the laser dot on the co-drivers side meets the mark at the hanging gauge, too.

Attention: On the drivers side the value does not change when turning the tie rod. If necessary adjust with the connecting rod.

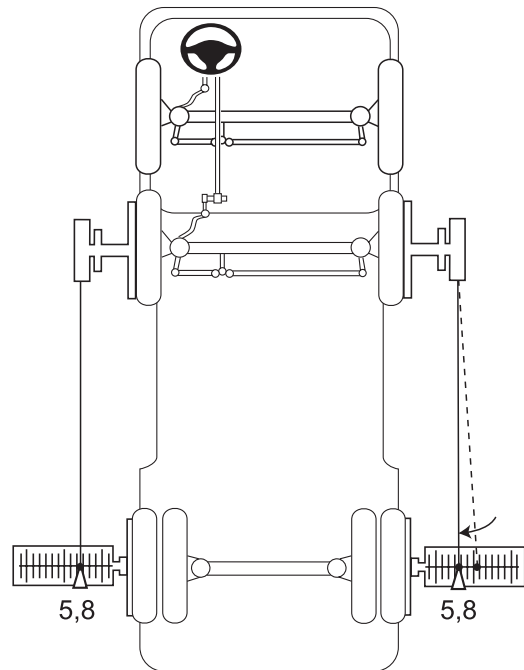


Illustration 57

8. Trailer Measurement

- a** To measure the rear fold of the adjustable measuring sensors of the both measuring heads. (Illustration 58)

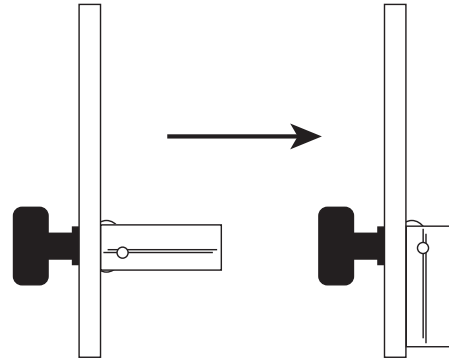


Illustration 58

- b** Jack up the measuring head slightly at the rear wheel.
- c** Move the arms and measuring sensors that they lie flat on the rim. (Illustration 59)
- d** Make sure that all measuring sensors even fitted at 3 points.

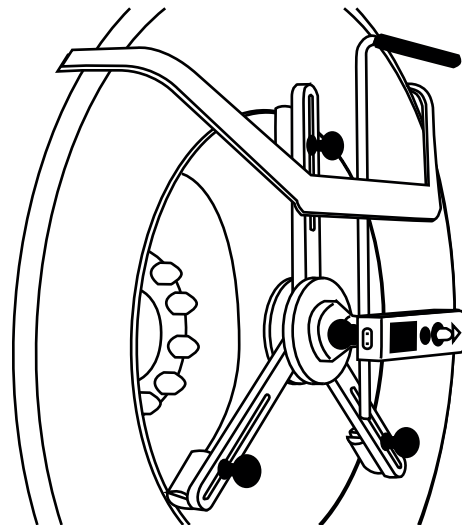


Illustration 59

- d** Mounting on the trailer gauge at the Kingpin and align. (Illustration 60)

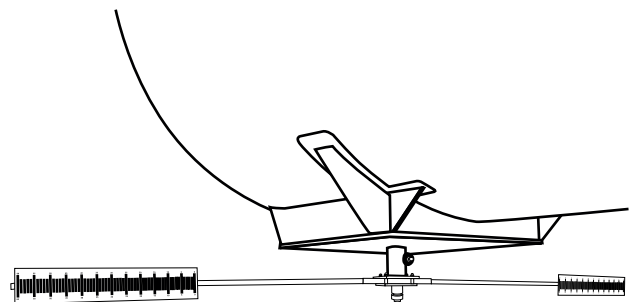


Illustration 60

Trailer Measurement

- e Point the laser dot on the scale of the trailer gauge and compare the values to the left and right. (Illustration 61)

Example: Value left: 30
Value right: 50

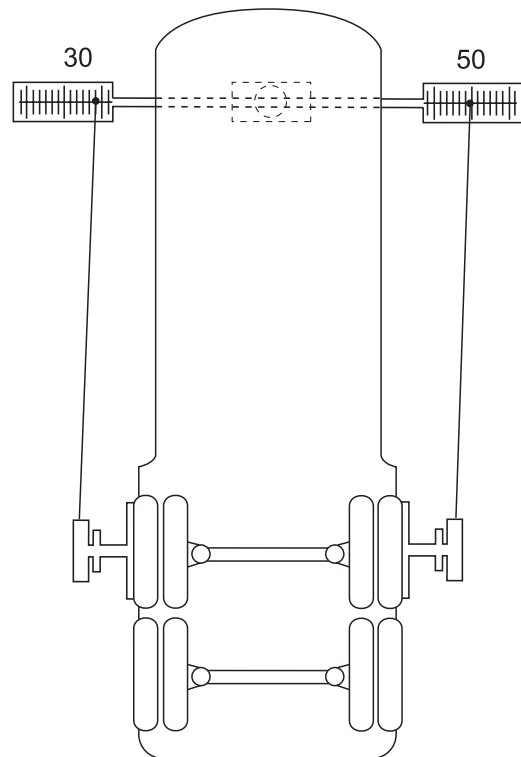


Illustration 61

- f Align the axle till the values are the same at both sides. (Illustration 62)

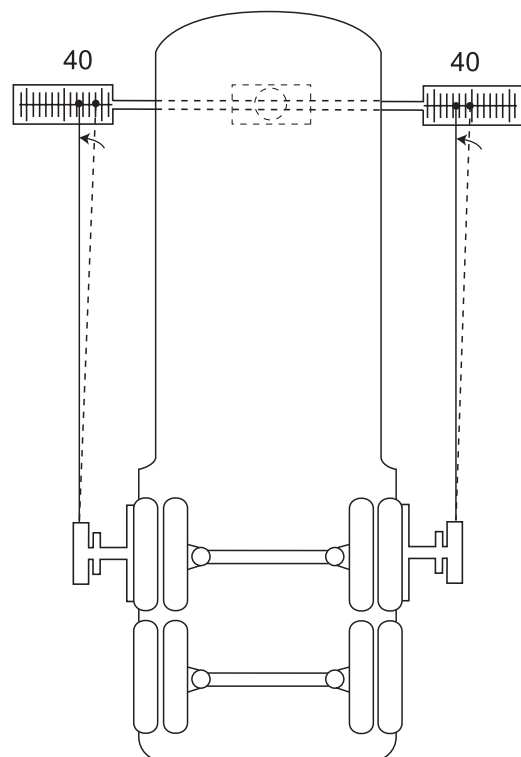


Illustration 62

Measurement of ..

...camber, see page 25.

...toe, see page 20.

9. Runout Compensation

To compensate the runout:

- a Lift the axle.
- b Divide the wheel in 3 ranges and mark it. (Abbildung 63)
- c Hang on the measuring head.
- d Put the toe gauge 2 m in front that the laser shows "zero".
- e Remove the measuring head and turn the wheel 120° - measure again and read the value at the toe gauge.
- f Remove the measuring head and turn the wheel 120° - measure again and read the value at the toe gauge.
- g Turn the wheel till the laser dot is in the middle of the total tolerance and settle down the axle.

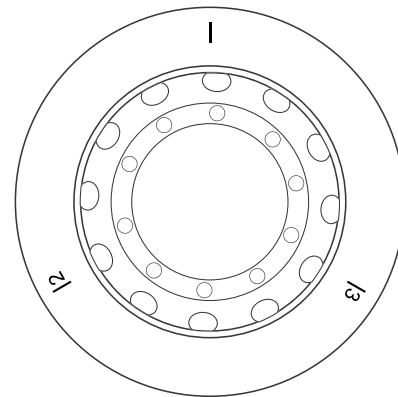


Illustration 63

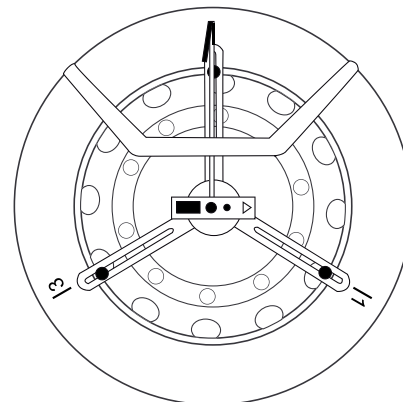


Illustration 64

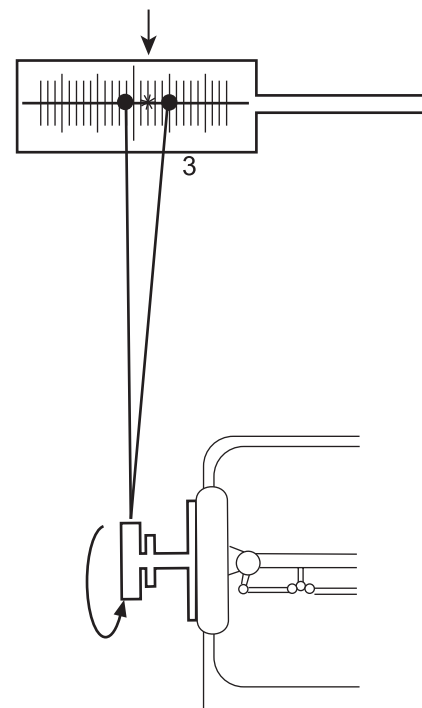


Illustration 65

Right and left always related to driving direction.

10. Maintenance



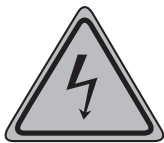
Attention

Please consider that the laser measuring heads and the accessories are precision instruments.

Make sure that these instruments are used and maintained with utmost care.

The surfaces of the magnetic feet have to be kept clean of dirt, as only that way an all-over and firm attachment to the rim can be ensured.

The lense of the laser head can be cleaned with a dry and soft cloth, if necessary. Do never clean with alcohol or any other liquids.



The electronic inclinometer has generally not to be maintained. Battery life is 200-300 hours.

To repair your damaged laser wheel aligner please send it to our production on the following address:

Koch-Achsmessanlagen
Production
Heisterweg 7
D-30974 Wennigsen/Germany

If you are interested in the big range of Koch-wheel alignment systems or to become more familiar with our units please ask for lessons in our modern training center. Please contact:

Koch-Achsmessanlagen
Training Center
Heisterweg 7
D-30974 Wennigsen/Germany
Phone: +49 (0)3722 - 591790

11. Error description



Attention

Operator must only correct such malfunctions that evidently result from faulty operation or maintenance.

description	possible causes	error correction
Laser beam ashes during switch on of Laser Aligner.	Insufcient battery power	Change batteries
Laser Aligner is not rmly attached to the rim	<ul style="list-style-type: none"> • Dirt on rim surface • Dir on measuring sensors • No all-over attachment of measuring sensors to rim. 	Switch-off Laser Aligner! <ul style="list-style-type: none"> • Clean rim surface • Clean surface of magnetic foot. • Adjust measuring sensors again.
"Lo bAt" is indicated on display of electronic inclinometer	Insufficient charg of integrated battery.	Open casing lid with appropriate screw driver and replace battery.



Note

Supply used up batteries and accumulators in specific collecting containers to a recycling system.

12. CE-Declaration of Conformity

The manufacturer:

**Koch-Achsmessanlagen
Hauptstr. 26
D-30974 Wenningsen/Germany**herewith declares that the following
described device**Laser Wheel Aligner HD-30 EasyTouch**complies with safety and health
requirements of following EC guidelines**EC-Low voltage guideline 72/23/EWG
EMV-guideline 89/336/EWG**

Applied Harmonized standards:

Safety of laser devices	DIN EN 60825 - Part 1 7/1994 DIN V VDE V 0837 - Part 6 10/1998
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Applied national standards and technical specifications:

Laser irradiation VBG 93	
Technical documentation	VDI 4500 Blatt 1

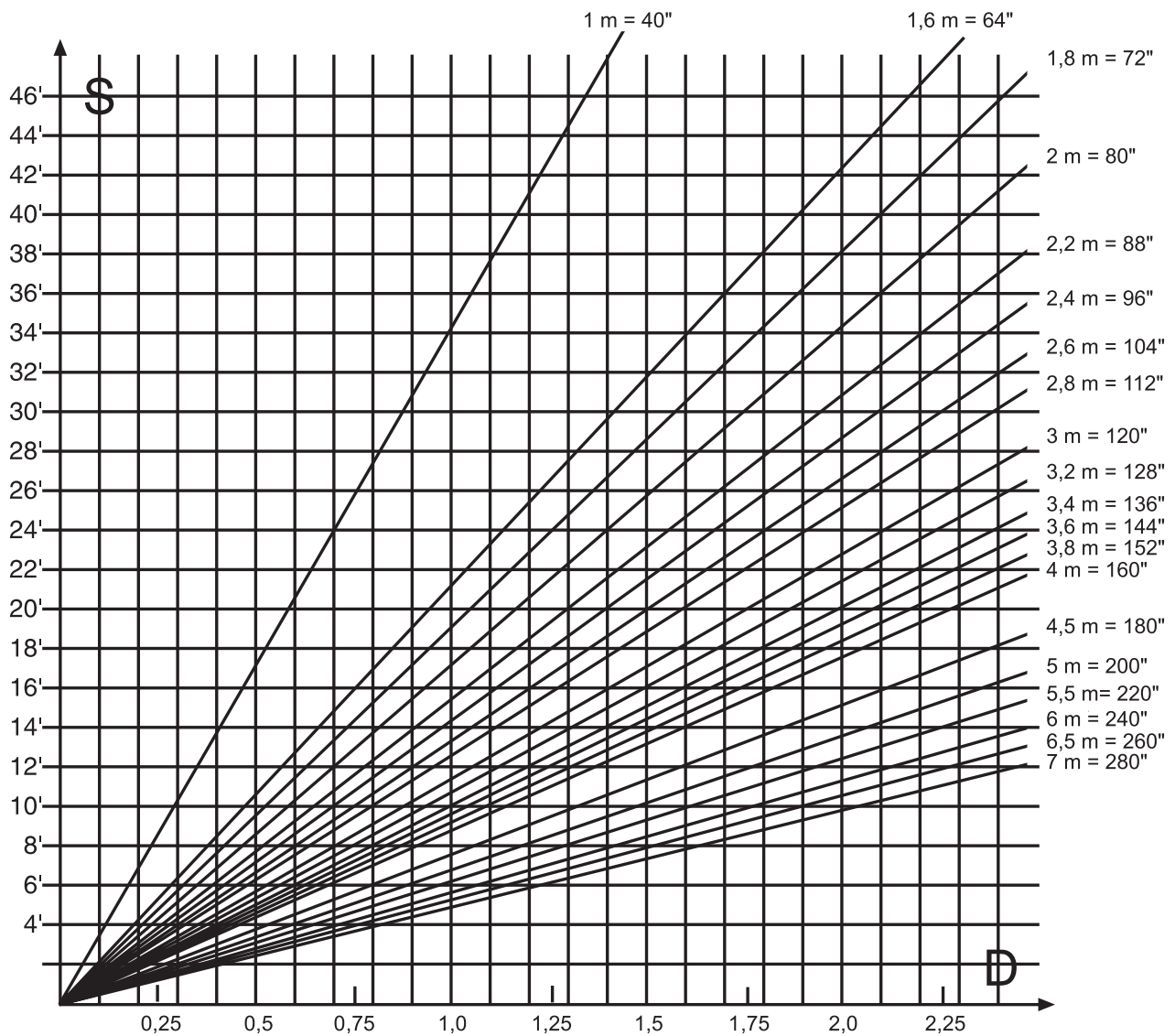
In case of structural alterations that effect technical data and agreed functionality as described in these operation instructions this declaration will lose its validity.

Wenningsen, 07.06.2007

Managing Director
Harro KochA handwritten signature in black ink, appearing to read 'Harro Koch', is written over a horizontal line.
(signature)

13. Annex

13.1 Diagram for Determination of Axle Offset (optical measurement)



- S** = Offset (in angular minutes)
D = Halved difference on scale blocks (in cm)
R = Wheel base (in meters)

Right and left always related to driving direction.

13.2 Conversion Table from Millimetres into Degrees

Toe in mm	Wheel Size						
	10"	12"	13"	14"	15"	16"	17"
0.5	0°6'	0°5'	0°5'	0°4'	0°4'	0°4'	0°4'
1.0	0°12'	0°10'	0°9'	0°9'	0°8'	0°8'	0°7'
1.5	0°19'	0°16'	0°14'	0°13'	0°12'	0°12'	0°11'
2.0	0°25'	0°21'	0°19'	0°18'	0°17'	0°16'	0°15'
2.5	0°31'	0°26'	0°24'	0°22'	0°21'	0°19'	0°18'
3.0	0°37'	0°31'	0°28'	0°26'	0°25'	0°23'	0°22'
3.5	0°43'	0°37'	0°33'	0°31'	0°29'	0°27'	0°25'
4.0	0°50'	0°42'	0°38'	0°35'	0°33'	0°31'	0°28'
4.5	0°56'	0°47'	0°42'	0°40'	0°37'	0°35'	0°32'
5.0	1°2'	0°52'	0°47'	0°44'	0°41'	0°39'	0°35'
5.5	1°8'	0°57'	0°52'	0°48'	0°45'	0°43'	0°39'
6.0	1°14'	1°2'	0°57'	0°53'	0°50'	0°47'	0°42'
6.5	1°20'	1°8'	1°1'	0°57'	0°54'	0°51'	0°46'
7.0	1°27'	1°13'	1°5'	1°1'	0°58'	0°54'	0°49'
7.5	1°33'	1°18'	1°10'	1°6'	1°2'	0°58'	0°53'
8.0	1°39'	1°23'	1°15'	1°10'	1°6'	1°2'	0°57'
8.5	1°45'	1°29'	1°20'	1°14'	1°10'	1°6'	1°0'
9.0	1°51'	1°34'	1°24'	1°19'	1°14'	1°10'	1°4'
9.5	1°58'	1°39'	1°29'	1°23'	1°18'	1°14'	1°7'
10.0	2°4'	1°45'	1°34'	1°28'	1°22'	1°18'	1°11'
10.5	2°10'	1°50'	1°39'	1°32'	1°26'	1°21'	1°14'
11.0	2°16'	1°55'	1°43'	1°36'	1°31'	1°25'	1°18'
11.5	2°22'	2°0'	1°48'	1°41'	1°35'	1°29'	1°22'
12.0	2°28'	2°5'	1°53'	1°45'	1°39'	1°33'	1°24'

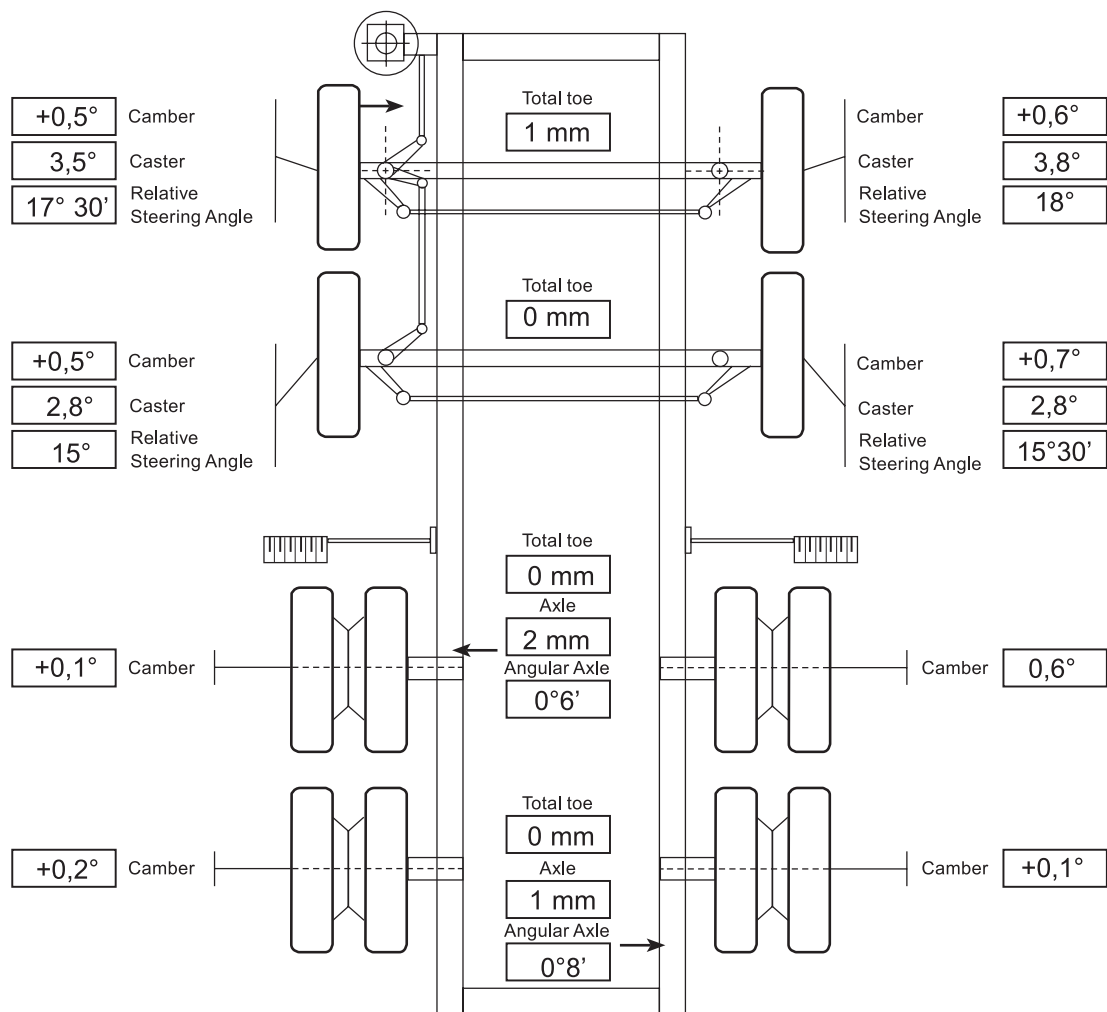
Right and left always related to driving direction.

Annex

13.2 Conversion Table from Milimetres into Degrees

Toe in mm	Wheel Size						
	19.5"	20"	22"	22.5"	24"	24.5"	
0.5	0°3'	0°3'	0°3'	0°3'	0°2'	°2'	
1.0	0°6'	0°6'	0°5'	0°5'	0°5'	0°5'	
1.5	0°9'	0°9'	0°8'	0°8'	0°7'	0°7'	
2.0	0°12'	0°12'	0°11'	0°11'	0°10'	0°10'	
2.5	0°16'	0°16'	0°13'	0°13'	0°12'	0°12'	
3.0	0°19'	0°19'	0°16'	0°16'	0°15'	0°15'	
3.5	0°22'	0°22'	0°19'	0°19'	0°17'	0°17'	
4.0	0°26'	0°25'	0°21'	0°21'	0°20'	0°20'	
4.5	0°29'	0°28'	0°24'	0°24'	0°22'	0°22'	
5.0	0°32'	0°31'	0°27'	0°26'	0°24'	0°23'	
5.5	0°35'	0°34'	0°29'	0°28'	0°27'	0°26'	
6.0	0°39'	0°38'	0°32'	0°31'	0°29'	0°28'	
6.5	0°42'	0°41'	0°34'	0°33'	0°32'	0°31'	
7.0	0°45'	0°44'	0°37'	0°36'	0°34'	0°33'	
7.5	0°48'	0°47'	0°40'	0°39'	0°37'	0°36'	
8.0	0°51'	0°50'	0°42'	0°41'	0°39'	0°38'	
8.5	0°55'	0°53'	0°45'	0°44'	0°41'	0°40'	
9.0	0°58'	0°56'	0°48'	0°47'	0°44'	0°43'	
9.5	1°1'	0°59'	0°50'	0°49'	0°46'	0°45'	
10.0	1°4'	1°2'	0°53'	0°49'	0°46'	0°45'	
10.5	1°7'	1°5'	0°56'	0°55'	0°51'	0°50'	
11.0	1°10'	1°8'	0°58'	0°57'	0°54'	0°53'	
11.5	1°13'	1°11'	1°1'	1°0'	0°56'	0°55'	
12.0	1°17'	1°15'	1°3'	1°2'	0°59'	0°58'	

13.3 Test Record for Axle Measurement



Type:	Km:
Registration No.:	Date:
Proprietor:	Mechanic:
Chassis No.:	
Remark:	



Right and left always related to driving direction.