

Wheel alignment

WARNING!

- ◆ *Do not re-use any fasteners that are worn or deformed in normal use.*
- ◆ *Some fasteners are designed to be used only once, and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual-replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.*

The wheel alignment should be measured using VW/Audi approved wheel alignment equipment.

Wheel alignment checks must always include both the front and the rear axles. Otherwise the proper running characteristics of the vehicle cannot be ensured.

Notes:

- ◆ *The wheel alignment should not be checked before the vehicle has completed 1000-2000 km (600-1200 miles) so that the coil springs have time to settle.*

- ◆ *When making adjustments, the relevant specifications should be adhered to as closely as possible.*

Suspension codes, checking requirements

Information on weight codes (code number)

From m.y. 1998 ➤, spring/shock assemblies will be classified according to weight codes (code number) so that suspension components can be matched easily.

The spring/shock assembly installed in the vehicle is indicated by the weight code on the vehicle data label.

Specified values for wheel alignment

1BA = Standard suspension

1BC = Special purpose suspension

Special purpose vehicles suspension -1BC- have the same specified values for wheel alignment as the standard suspension -1BA-.

FAHRZG.-IDENT-NR. VEHICLE-IDENT-NO.	52-6-2392	926	96
TYPE	WAUZZZ 4B z	WN000227	
TYPE	4B2 DRC		
	A6 Lim.	TDI	2.5
	110KW/EG2 M6S		
MOTORKB./GETR.KB. ENG.CODE/TRANS.CODE	---	---	---
LACKNR./INNENAUSST PAINT NO./INTERIOR	LYZM/LYZM	N4G/BN	
M-AUSST./OPTIONS	X9X BOA C6U GOK H6S J1G M5V Q1A 1AJ 1G3 2PG 1N3 5RQ 5SL T6T 3SO 4UE OG1 8AD 8GD 8FA 9VD 1KD 1LB 3FA 1BA		
	900 0,0 0,0 0,0		A44-0063



Example of vehicle data label

In this example the vehicle is installed with the standard suspension, version 1BA (arrow).

The vehicle data label is located in the spare wheel recess and in the vehicle Maintenance booklet.

Factory codes for the suspension:

- ◆ 1BA: Standard suspension
- ◆ 1BE: Sport suspension
- ◆ 1BB: Heavy duty suspension (approx. 20 mm (3/4 in.) higher)
- ◆ 1BC: Special purpose suspension
- ◆ 1BD: Sport suspension, Audi S4
- ◆ 1BH: USA
- ◆ 1BT: Heavy duty suspension (approx. 7 mm or 1/4 in. higher)
- ◆ 1BP: Heavy duty suspension (same ride height as 1BA but with limited bump)

Requirements

- Test equipment must be properly adjusted and attached to vehicle (refer to equipment manufacturer's instructions)
- Equal tread depth for both tires on each axle, with difference between two not more than 2 mm (0.079 in.)
- Tires inflated to correct pressure
- Sliding plates and turntables not positioned against any stop when checking wheel alignment
- Vehicle at correct curb weight 1)
- Vehicle accurately positioned, suspension bounced and rocked several times and allowed to settle
- Suspension, steering and steering linkage in proper condition with no damage or excessive play
- Carry out axial wheel run-out compensation. Since some wheel run-out is allowable,

checking alignment without first compensating for axial wheel run out may indicate that the toe-in tolerance is already exceeded. If this is the case it is not possible to set toe-in without first compensating for wheel run-out

1) Curb weight is defined as: the weight of the vehicle ready for the road (fuel tank completely full, spare wheel, vehicle tool kit and vehicle jack all in specified positions).

Wheel alignment must be checked if

- ◆ There are problems with vehicle performance.
- ◆ There is accident damage.
- ◆ Tires are worn on one side.
- ◆ Axle components have been removed ⇒ table below.

Front axle component removed or replaced	Alignment check required		S-point adjustment required		Rear axle component removed or replaced	Alignment check required	
	Yes	No	Yes	No		Yes	No
Rear upper link		X		X	Shock absorber		X
Front upper link	X		X				
Guide link with hydraulic-bushing		X		X	Coil spring		X
Suspension strut		X		X			
Track control link		X		X	Upper control arm 1)	X	
Mounting bracket	X		X		Lower control arm 1)	X	
Wheel bearing housing	X		X		Wheel bearing housing1)	X	
Tie rod	X		X		Track rod 1)	X	
Steering gear	X		X		Subframe 1)	X	

Subframe	X		X		Torsion beam axle assembly (FWD)	X	
Stabilizer bar		X			Stabilizer bar		X

1) Only affects vehicles with all wheel drive

Wheel alignment specifications (front-wheel-drive vehicles)

◆ Specifications valid for all engine versions

Front axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1)
Camber	-25 ' ± 25 '	-40 ' ± 25 '	-15 ' ± 25 ' -30 ' ± 25 ' 1)
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Toe setting for each wheel (curb weight)	+10 ' ± 2 '	+10 ' ± 2 '	+10 ' ± 2 '
Toe check value for each wheel (curb weight)	+10 ' ± 5 '	+10 ' ± 5 '	+10 ' ± 5 '
Toe constant for each wheel (setting value)	+7 ' ± 2 '	+7 ' ± 2 '	+7 ' ± 2 '
Toe constant for each wheel (check value)	+7 ' ± 7 '	+7 ' ± 7 '	+7 ' ± 7 '
Toe-out on turns at 20°	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

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Rear axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1))
Camber	-1 ° 30 ' ± 20 '	-1 ° 30 ' ± 20 '	-1 ° 30 ' ± 20 '
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Overall toe	+20 ' +15 ' /-10 '	+28 ' +15 ' /-10 '	+14 ' +15 ' /-10 ' +17 ' +15 ' /-10 ' 1)
Maximum allowable difference in direction of travel relative to longitudinal vehicle center line (thrust angle)	± 15 '	± 15 '	± 15 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

Wheel alignment specifications (all-wheel-drive vehicles)

◆ Specifications valid for all engine versions

Front axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1)
Camber	-25 ' ± 25 '	-40 ' ± 25 '	-15 ' ± 25 ' -30 ' ± 25 '
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Toe setting for each wheel (curb weight)	+10 ' ± 2 '	+10 ' ± 2 '	+10 ' ± 2 '
Toe check value for each wheel (curb weight)	+10 ' ± 5 '	+10 ' ± 5 '	+10 ' ± 5 '
Toe constant for each wheel (setting value)	+7 ' ± 2 '	+7 ' ± 2 '	+7 ' ± 2 '
Toe constant for each wheel (check value)	+7 ' ± 7 '	+7 ' ± 7 '	+7 ' ± 7 '
Toe-out on turns at 20°	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

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Rear axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1))
Camber	-40 ' ± 30 '	-40 ' ± 30 '	-40 ' ± 30 '
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Overall toe	+8 ' ± 5 '	+8 ' ± 5 '	+8 ' ± 5 '
Maximum allowable difference in direction of travel relative to longitudinal vehicle center line (thrust angle)	± 10 '	± 10 '	± 10 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

Wheel alignment specifications (front-wheel-drive vehicles with aluminium mounting bracket)

◆ Specifications valid for all engine versions

Front axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1)
Camber	-35 ' ± 25 '	-50 ' ± 25 '	-20 ' ± 25 ' -30 ' ± 25 '
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Toe setting for each wheel (curb weight)	+10 ' ± 2 '	+10 ' ± 2 '	+10 ' ± 2 '
Toe check value for each wheel (curb weight)	+10 ' ± 5 '	+10 ' ± 5 '	+10 ' ± 5 '
Toe constant for each wheel (setting value)	+9 ' ± 2 '	+9 ' ± 2 '	+9 ' ± 2 '
Toe constant for each wheel (check value)	+9 ' ± 7 '	+9 ' ± 7 '	+9 ' ± 7 '
Toe-out on turns at 20°	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

Wheel alignment specifications (all-wheel-drive vehicles with aluminium mounting bracket)

◆ Specifications valid for all engine versions

Front axle	Standard suspension (1BA) Special suspension (1BC) Heavy duty suspension (1BP)	Sport suspension (1BE)	Heavy duty suspension (1BB), (1BT1)
Camber	-35 ' ± 25 '	-50 ' ± 25 '	-20 ' ± 25 ' -30 ' ± 25 '
Maximum allowable difference in camber between two sides	30 '	30 '	30 '
Toe setting for each wheel (curb weight)	+10 ' ± 2 '	+10 ' ± 2 '	+10 ' ± 2 '
Toe check value for each wheel (curb weight)	+10 ' ± 5 '	+10 ' ± 5 '	+10 ' ± 5 '
Toe constant for each wheel (setting value)	+9 ' ± 2 '	+9 ' ± 2 '	+9 ' ± 2 '
Toe constant for each wheel (check value)	+9 ' ± 7 '	+9 ' ± 7 '	+9 ' ± 7 '
Toe-out on turns at 20°	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '	-1° 20 ' ± 30 '
1) Applies only to vehicles with heavy duty suspension (1BT)			

Wheel alignment specifications, sport suspension (1BD)

Front axle	Sport suspension (1BD)
Camber	-50 ' ± 25 '
Maximum allowable difference in camber between two sides	30 '
Toe setting for each wheel (curb weight)	+10 ' ± 2 '
Toe check value for each wheel (curb weight)	+10 ' ± 5 '
Toe constant for each wheel (setting value)	+7 ' ± 2 '
Toe constant for each wheel (check value)	+7 ' ± 7 '
Toe-out on turns at 20°	-1° 30 ' ± 30 '
Rear axle	
	Sport suspension (1BD)
Camber	-55 ' ± 15 '
Maximum allowable difference in camber between two sides	30 '
Overall toe	+8 ' ± 5 '
Maximum allowable difference in direction of travel relative to longitudinal vehicle center line (thrust angle)	± 10 '

Wheel alignment, preparations for checking

Special tools, test requirements and auxiliary items

VAG1907	VAG1941	VAG1925
VAG1925/3	VAG1925/4	VAG1925/6
Electronic alignment unit; e.g. VAG1813		

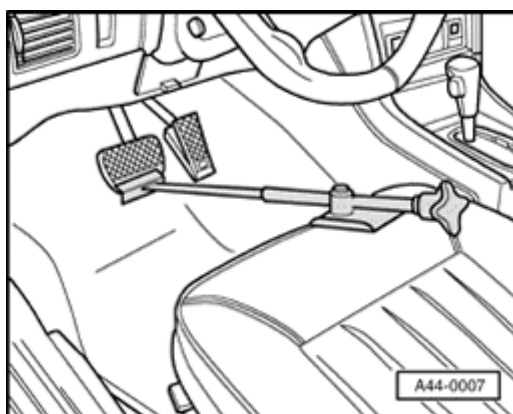
- Carry out wheel run-out compensation.

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- Install brake pedal depressor.

Note:

On accident damaged vehicles, use special tool VAG1907 to make certain that the rack is in the center position.



Wheel alignment, mandatory sequence of operations for checking

Overview of sequence of operations for measuring wheel alignment

- Vehicle must only be measured at curb weight

Note:

Exception: when measuring the toe-in curve as described in the alignment program instructions.

The following work sequences must be adhered to

1 - Check front axle camber centering and adjust if necessary ⇒ [page 44-24](#) .

2 - Check rear axle camber and adjust if necessary:

FWD vehicles ⇒ [page 44-20](#)

AWD vehicles ⇒ [page 44-22](#)

3 - Check rear axle and adjust if necessary:

FWD vehicles ⇒ [page 44-21](#)

AWD vehicles ⇒ [page 44-23](#)

4 - If necessary, check toe-in curve on front axle.

To determine if the toe-in curve or toe constant "S" needs adjusting ⇒ [table on page 44-10](#) and also page ⇒ [Page 44-27](#) .

5 - Check front axle toe with vehicle at curb weight and adjust if necessary ⇒ [page 44-38](#) .

Rear axle camber (front-wheel-drive vehicles), checking

Wheel alignment specifications ⇒ [page 44-11](#) .

The rear axle camber can be checked but not adjusted on vehicles with front wheel drive.

If the readings are outside the allowable tolerances the axle beam must be checked for damage and replaced if necessary.

Rear axle toe (front-wheel-drive vehicles), centering

Individual toe settings on the rear axle cannot be adjusted.

By moving the rear axle within the elongated holes it is possible to center the individual toe settings.

- Loosen securing bolts on mounting brackets.
- Center individual toe settings by moving axle beam within elongated holes at mounting brackets.

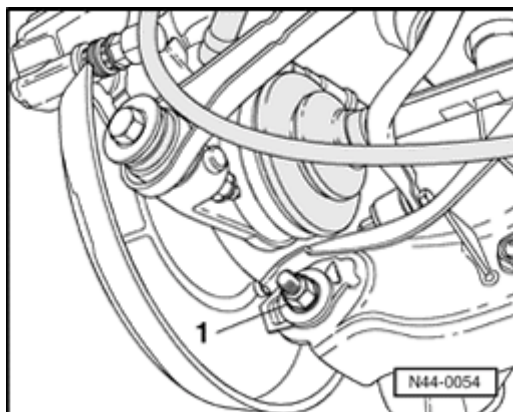
If the overall toe setting is outside the allowable tolerance, or if it is not possible to center the individual settings, the axle beam must be checked for damage and replaced if necessary.

The body alignment must also be checked/measured in the area of the rear axle mounting points and serviced as necessary.

⇒ Repair Manual, Body Collision Repair

Rear axle camber (all-wheel-drive vehicles), adjusting

Wheel alignment specifications ⇒ [page 44-13](#)



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- Loosen mounting nuts -1-.
- Adjust camber by turning eccentric bolt.

Note:

The maximum adjustment range is 90° to the left or right of the center position.

- Tighten mounting nut, check camber again and if necessary re-adjust.

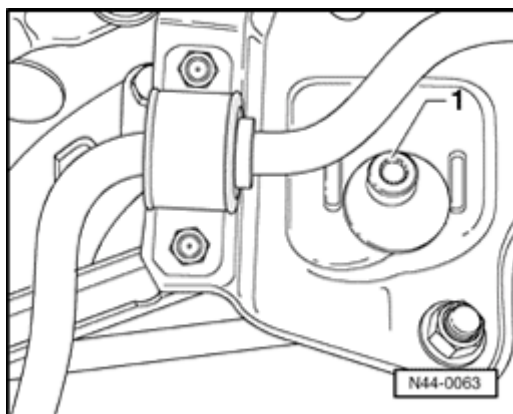
Rear axle toe (all-wheel-drive vehicles), setting

Wheel alignment specifications ⇒ [page 44-13](#)

- Loosen mounting nut -1-.

Notes:

- ◆ *The maximum adjustment range is 90° to the left or right of the center position.*
- ◆ *Adjusting the individual toe settings automatically alters the thrust angle of the axle.*



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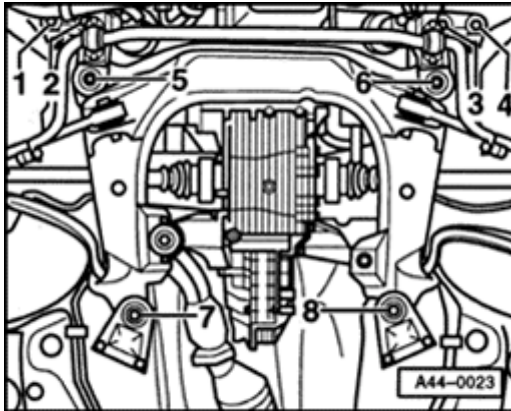
- Adjust individual toe settings as necessary by turning eccentric bolt.
- Tighten mounting nut, check settings again and if necessary re-adjust.

Front axle camber, adjusting

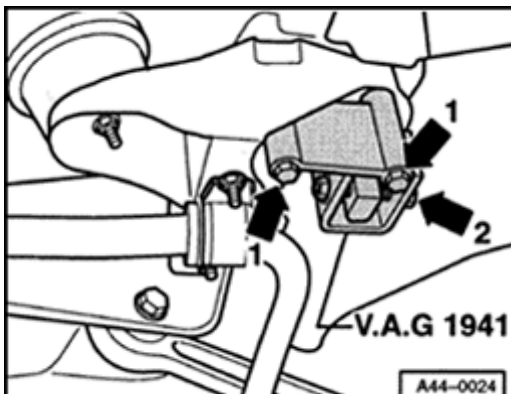
The camber cannot be adjusted.

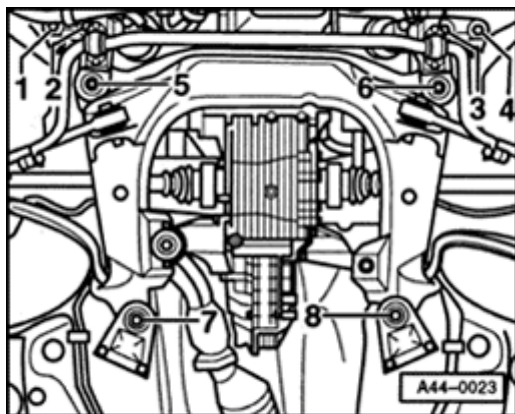
By moving the subframe it is possible to center the camber uniformly within the specified tolerance range.

- Remove noise insulation panel.
- Remove bolts -3- and -4-.

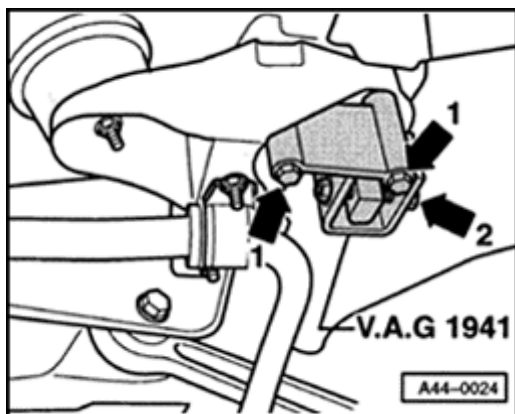


- Install VAG1941 camber adjustment tool.
Tightening torque of bolts -1-: 10 Nm (7 ft lb)





- A
- Loosen bolts -1-, -2-, -5-, -6-, -7- and -8-.



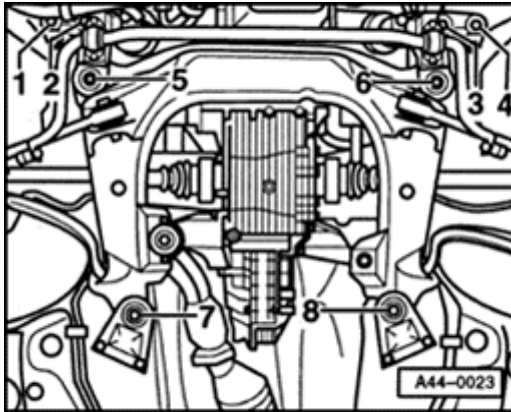
- A
- Turn bolt -2- until specifications are achieved.

Wheel alignment specifications ⇒ [page 44-13](#) .

- Relieve tension on bolt -2- and check readings obtained. If necessary, correct camber again.

Removing VAG1941 camber adjustment tool

- ◆ At least two bolts must always be tightened so that the position of the subframe does not change.
- ◆ Bolts -5-, -6-, -7- and -8- must always be replaced.

**A**

- Tighten bolts -7- and -8-.
Tightening torque: 110 Nm (81 ft lb) + 1/4-turn (90°)
- Remove VAG1941 camber adjustment tool.
- Tighten both forward bolts -5- and -6-.
Tightening torque: 110 Nm (81 ft lb) + 1/4-turn (90°)
- Tighten bolts -1-, -2-, -3- and -4-.
Tightening torque: 60 Nm (44 ft lb)

CAUTION!

Whenever the camber is adjusted, all wheel alignment settings must be re-checked.

Front axle toe-in curve, adjusting

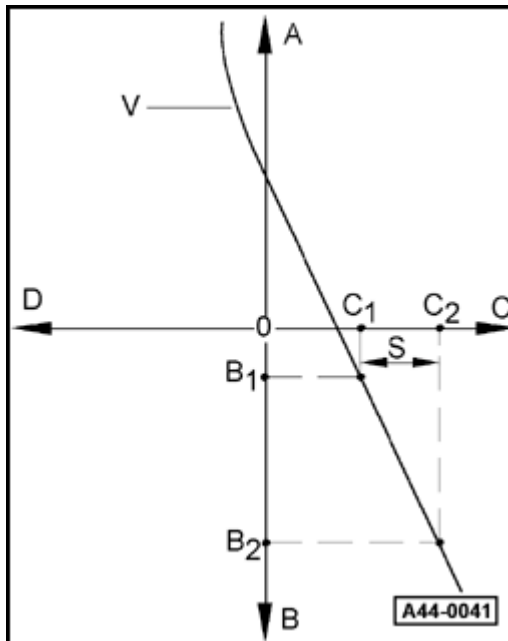
General

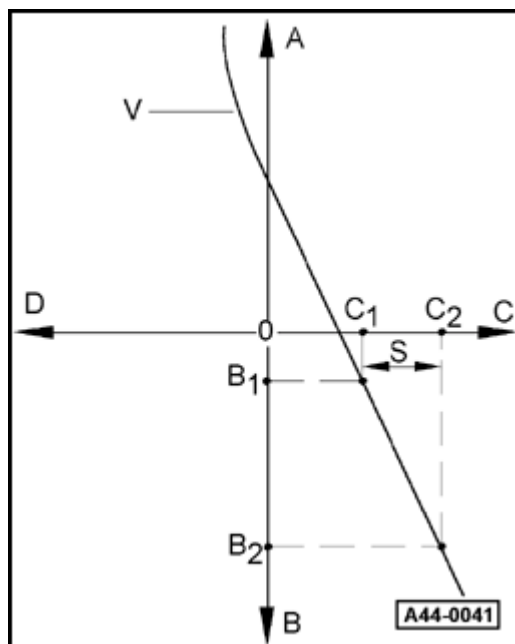
Toe-in curve

Notes:

◀ Explanation of the term "toe-in curve":

- ◆ When the suspension is compressed (bumped) or extended (rebounded) the toe of the wheel changes relative to the amount of compression or extension.
- ◆ The resulting toe values can be plotted on a graph to obtain the toe-in curve.
- ◆ The shape of this curve is determined by toe value C_1 (measured with the wheel in a defined starting position B_1) and by toe value C_2 measured at a rebound, or extension, of 40 mm or 1.57 in. (for heavy duty suspension 1BB) or of 60 mm or 2.36 in. (for all other suspensions) relative to starting position B_1).
- ◆ The resulting change in toe-in, ($C_2 - C_1$) is defined as "toe constant S ."





Sport suspension 1BE



A Spring compression

B Spring extension (rebound)

B1 Defined starting position (vehicle at curb weight)

On vehicles with sport suspension, suspension must be extended 20 mm (0.78 in.) to this position.

B2 Vehicle suspension extended 60 mm (2.36 in.) compared to position B1 ⇒ [page 44-31](#)

C Toe-in

C1 Toe-in measured in position B1

C2 Toe-in measured in position B2

D Toe-out

V Toe-in curve

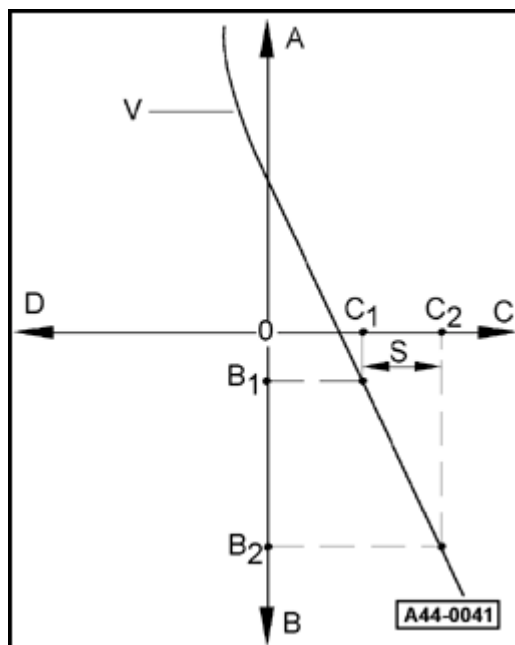
S Toe constant, C2 - C1

Notes:

The toe-in curve must also be checked in the following cases (in addition to those specified in table ⇒ [page 44-10](#)):

- ◆ If the vehicle has been in an accident or sustained damage to the suspension components and/or bodywork.
- ◆ If the vehicle does not maintain direction of travel over bumps and when braking or accelerating.

Standard suspension 1BA, special suspension (1BC) and heavy duty suspension 1BP



➤ On vehicles with standard running gear, the toe-in measurement C1 is measured in the defined starting position (vehicle at curb weight) B1 ⇒ [page 44-30](#) .

B2 Vehicle suspension extended 60 mm (2.36 in.) compared to position B1

C2 Toe-in measured in position B2

Heavy duty suspension 1BB (vehicle ride height 20 mm higher)

On vehicles with heavy duty suspension 1BB:

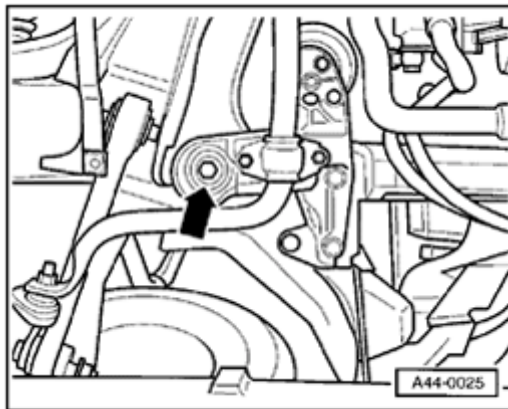
C1 Toe-in measured in position B1 (defined starting position) ⇒ [page 44-32](#)

C2 Toe-in measured in position B2

Setting suspension to starting position B1 (⇒ [page 44-27](#)) on vehicles with standard suspension (1BA), special suspension (1BC) and heavy duty suspension (1BP)

Note:

Depending on the type of wheel alignment equipment used, it may be necessary to raise the front of the vehicle in order to position the VAG1925 spacer. After lowering the vehicle again the suspension must be bounced.



A

- Insert VAG1925 spacer together with VAG1925/4 adapters and screw both threaded spindles out until they just rest against front subframe bolts (arrow).

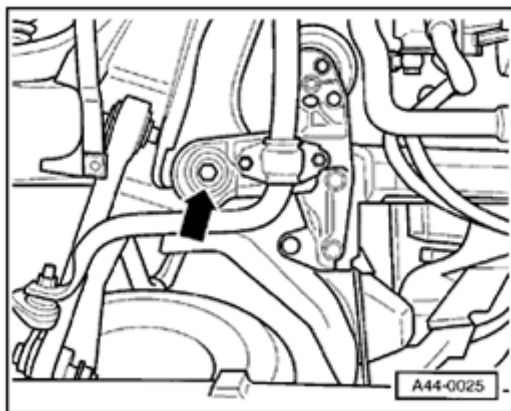
Do not raise the vehicle using the above procedure

The vehicle is now in the defined starting position B1 (for vehicles with standard suspension (1BA), special suspension (1BC) and heavy duty suspension (1BP)).

Setting suspension to starting position B1 (⇒ [page 44-27](#)) on vehicles with sport suspension

Note:

Depending on the type of wheel alignment equipment used, it may be necessary to raise the front of the vehicle in order to position the VAG1925 spacer. After lowering the vehicle again the suspension must be bounced.

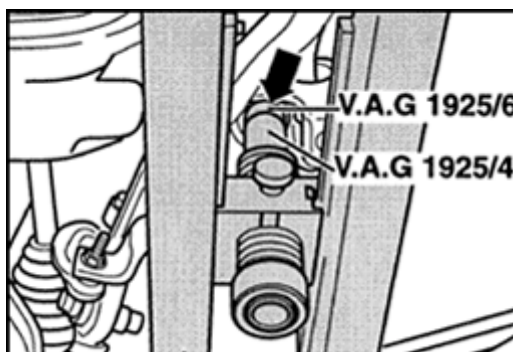


A

- Insert VAG1925 spacer together with VAG1925/4 adapters and screw both threaded spindles out until they just rest against front subframe bolts (arrow).

Make sure vehicle is not raised using the above procedure

- Raise vehicle at front lifting points.



A

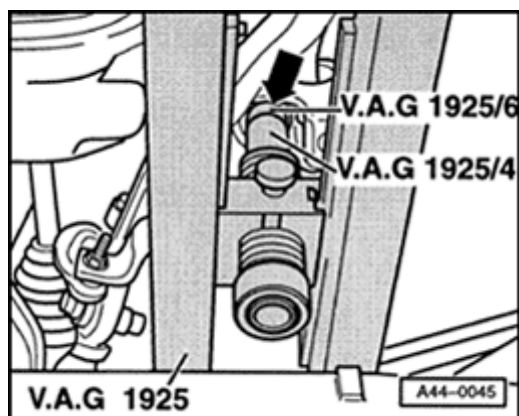
- Insert VAG1925/6 adapter onto VAG1925/4 adapter for spacer gauge.
- Lower vehicle onto adapters.

The vehicle is now in defined starting position B1 (for vehicles with sport suspension).

Bring vehicles with heavy duty suspension 1BB (vehicle ride height 20 mm higher) into defined starting position B1 ⇒ [page 44-28](#)

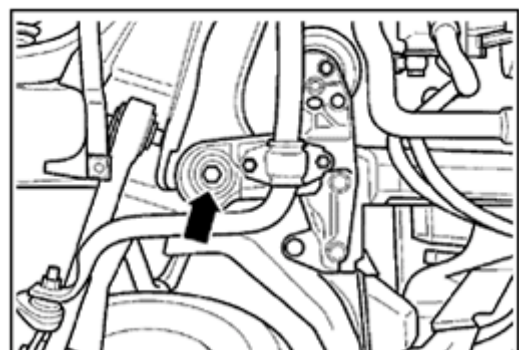
Note:

Depending on the type of wheel alignment equipment used, it may be necessary to raise the front of the vehicle in order to position the VAG1925 spacer. After lowering the vehicle again the suspension must be bounced.



A

- Insert VAG1925 spacer together with VAG1925/4 adapters and screw both threaded spindles out...



A

- ...until they just rest against front subframe bolts (arrow).

Make sure vehicle is not raised using the above procedure

- Vehicle with heavy duty suspension 1BB is now in defined starting position B1

Notes:

For all suspension versions (1BA, 1BC, 1BE, 1BP and 1BB):

- ◆ *The defined starting position B1 is the position the springs must be in when using the wheel alignment program to check the actual toe-in setting C1 for each wheel (⇒ [page 44-27](#)). Setting C1 should match the specification + 10` ± 30` (rough pre-adjustment). If necessary, the toe-in must be corrected by adjusting the tie rod length.*
- ◆ *Wheel alignment specifications ⇒ [page 44-11](#).*
- ◆ *If the settings need to be corrected, this will be indicated by the wheel alignment program.*

CAUTION!

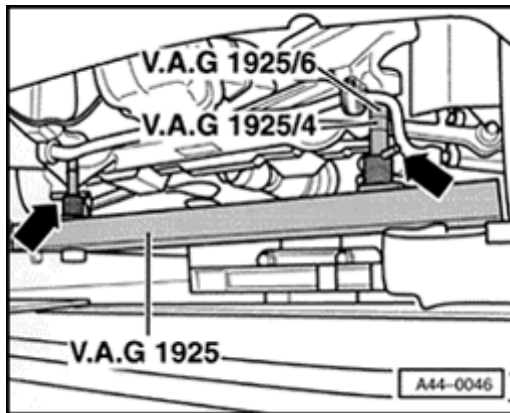
- ◆ ***Make sure that the wheels do not lose contact with the turntables during the lifting operation.***
- ◆ ***If wheels do lose contact, do not move the turntables. Otherwise incorrect measurements will result.***

Extending the springs (standard, sport and heavy duty (1BP) suspensions)

CAUTION!

- ◆ **Make sure that the wheels do not lose contact with the turntables during the lifting operation.**
- ◆ **If wheels do lose contact, do not move the turntables. Otherwise incorrect measurements will result.**

- Raise vehicle at front jacking points.



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- Lift cylinders out of threaded spindles and secure in position using locking pins.
 - Make sure locking pins (arrows) are correctly positioned.
- Lower vehicle down onto spacer gauge.

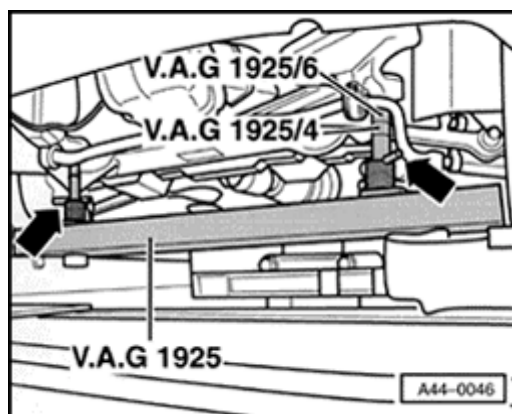
Vehicle is now in position B2 ⇒ [page 44-27](#)

Extending the springs (heavy duty suspension (1BB))

CAUTION!

- ◆ **Make sure that the wheels do not lose contact with the turntables during the lifting operation.**
- ◆ **If wheels do lose contact, do not move the turntables. Otherwise incorrect measurements will result.**

- Raise vehicle at front jacking points.



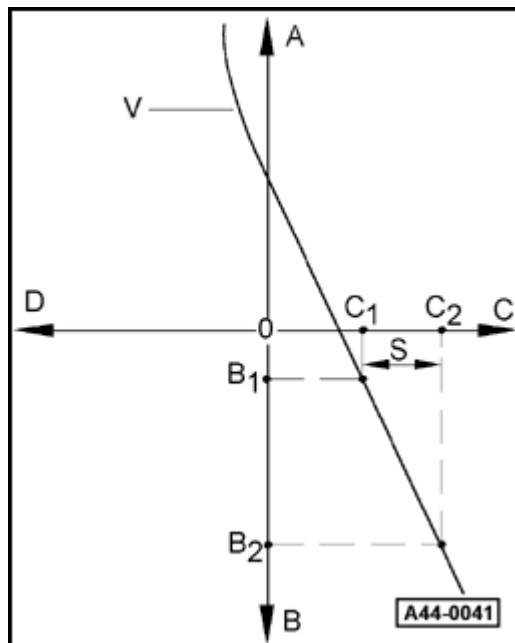
A

- Lift cylinders out of threaded spindles and secure in position using locking pins.
 - Make sure locking pins (arrows) are correctly positioned.
- Remove VAG1925/6 adapter.
- Lower vehicle down onto spacer gauge.

Vehicle is now in position B2 ⇒ [page 44-27](#)

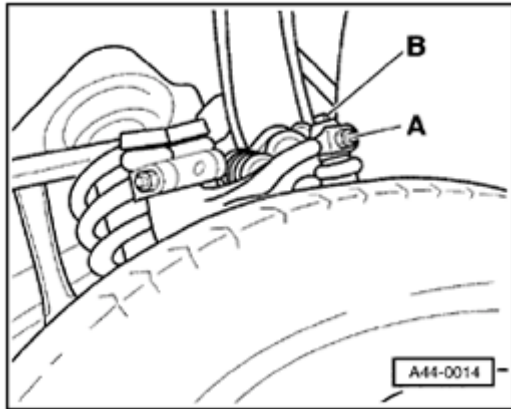
Note:

The wheel alignment program determines the current right and left toe constant (actual values of $C2 - C1 \Rightarrow$ [page 44-27](#)). The program checks whether the current toe constant (actual value) lies within the tolerance (control value) \Rightarrow [vehicle alignment specifications tables, pages 44-11](#) and \Rightarrow [Page 44-13](#) .



A

- If toe constant actual value lies outside control value tolerance, adjust toe value constant within adjusting value tolerance.
 - ◆ Front-wheel-drive vehicles \Rightarrow [page 44-11](#)
 - ◆ All-wheel-drive vehicles \Rightarrow [page 44-13](#)



A

Adjusting toe constant "S"

- Loosen nut -A-.
- Back out bolt -B- approx. 4 mm (1/8 in.).
- Push tie rod end downward onto stop.
- Turn in adjusting bolt -B- until exact specifications are achieved.
- Tighten nut -A- to 45 Nm (33 ft lb) and check values.
- Tighten bolt -B- to 7 Nm (62 in. lb).
- Lower vehicle to defined starting position B1.
- Screw threaded spindle down.
- On vehicles with standard suspension, bounce suspension several times.

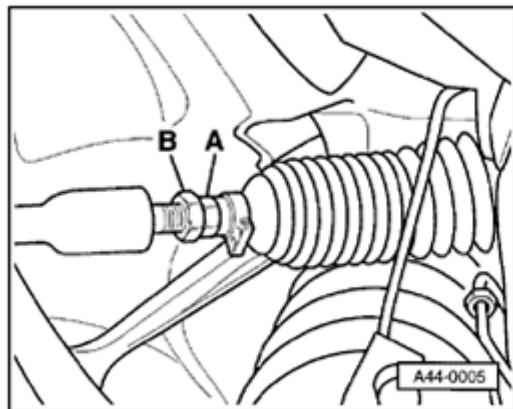
Checking toe constant after adjusting

The alignment unit checks the toe constant again.

- ◆ If the second check shows that the values are within the check value tolerance, the setting is OK.
- ◆ If the values are outside the check value tolerance, the setting must be adjusted again in position B2.
- ◆ Position B2: + 60 mm (2.36 in.).

Front axle toe-in, setting

- Loosen lock nut -B-.



A

- Adjust toe on left and right at hex -A-.

Make sure that the boots are not twisted after turning the tie rods

Note:

Twisted boots will wear out quickly.

- Tighten lock nut -B- and check toe-in again.

Tightening torque: 40 Nm (30 ft lb)

After tightening lock nut -B- it is possible that the toe value may deviate slightly.

If the measured toe lies within the tolerances, the adjustment is correct.