Workshop Manual

Audi A5 Cabriolet 2009 ➤
Audi A5 Coupé 2008 ➤
Audi A5 Sportback 2010 ➤

Running gear, front-wheel drive and four-wheel drive

Edition 10.2011

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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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00 – Technical data

1 Technical data

⇒ „1.1 Running gear“, page 1

⇒ „1.2 Steering“, page 3

1.1 Running gear

Front axle	Five-link front suspension with top and bottom transverse links, anti-roll bar and twin-tube, gas-filled shock absorbers
Rear axle	Track-controlled independent suspension, top and bottom transverse links, anti-roll bar, twin-tube gas-filled shock absorbers with coil springs

		Front-wheel drive / four-wheel drive			
		Coupé			
		Standard running gear 1BA [1] Running gear with electronic damping control 1BL [1]	Sports running gear 1BE [1] Sports running gear 1BD [1]	Sports running gear 1BV [2]	Sports running gear 2MS/2MC (RS 5)[3]
Wheelbase	mm	approx. 2755	approx. 2755	approx. 2756	approx. 2756
Track width (front)	mm	approx. 1591	approx. 1591	approx. 1589	approx. 1599
Track width (rear)	mm	approx. 1580	approx. 1580	approx. 1578	approx. 1597
Maximum steering angle at inside wheel	Degrees	39° 57'	39° 57'	39° 57'	39° 57'

1) Front/rear track width only applicable to tyre size 225/50/R17 ET28 (ET= rim offset).

2) Front/rear track width only applicable to tyre size 245/40/R18 ET29 (ET= rim offset).

3) Front/rear track width only applicable to tyre size 265/35/R19 ET28 (ET= rim offset).

Note

- *These specifications are applicable for all engines.*
- *Different track width figures will apply if wheels with different rim offset are installed.*

		Front-wheel drive / four-wheel drive		
		Cabriolet		
		Standard running gear 1BA [4] Running gear with electronic damping control 1BL [4]	Sports running gear 1BE [4] Sports running gear 1BD [4]	Sports running gear 1BV [5]
Wheelbase	mm	approx. 2754	approx. 2754	approx. 2754
Track width (front)	mm	approx. 1591	approx. 1591	approx. 1589

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		Front-wheel drive / four-wheel drive		
		Cabriolet		
		Standard running gear 1BA [4] Running gear with electronic damping control 1BL [4]	**Sports running gear 1BE [4] Sports running gear 1BD [4]**	**Sports running gear 1BV [5]**
Track width (rear)	mm	approx. 1580	approx. 1580	approx. 1577
Maximum steering angle at inside wheel	Degrees	39° 57'	39° 57'	39° 57'

4) Front/rear track width only applicable to tyre size 225/55/R16 ET28 (ET= rim offset).

5) Front/rear track width only applicable to tyre size 245/45/R18 ET29 (ET= rim offset).

Note

- *These specifications are applicable for all engines.*
- *Different track width figures will apply if wheels with different rim offset are installed.*

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		Front-wheel drive / four-wheel drive			
		Sportback			
		Standard running gear 1BA[6]	**Sports running gear 1BE [6]**	**Sports running gear 1BV [7]**	**Running gear with electronic damping control 1BL [6]**
Wheelbase	mm	approx. 2813	approx. 2815	approx. 2816	approx. 2814
Track width (front)	mm	approx. 1591	approx. 1591	approx. 1590	approx. 1591
Track width (rear)	mm	approx. 1580	approx. 1580	approx. 1578	approx. 1580
Maximum steering angle at inside wheel	Degrees	39° 57'	39° 57'	39° 57'	39° 57'

6) Front/rear track width only applicable to tyre size 225/50/R17 ET28 (ET= rim offset).

7) Front/rear track width only applicable to tyre size 245/45/R18 ET28 (ET= rim offset).

Note

- *These specifications are applicable for all engines.*
- *Different track width figures will apply if wheels with different rim offset are installed.*

1.2 Steering

Hydraulic steering box

Steering box	Maintenance-free rack-and-pinion steering with power assistance
Turning circle diameter	approx. 11.40 m

Electromechanical steering box

Steering box	Electro-mechanically assisted, maintenance-free rack-and-pinion steering
Turning circle diameter	approx. 11.40 m

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2 Proper disposal procedures for oil-filled and gas-filled components

⇒ „2.1 Releasing gas and draining gas-filled shock absorbers (front)“, page 4

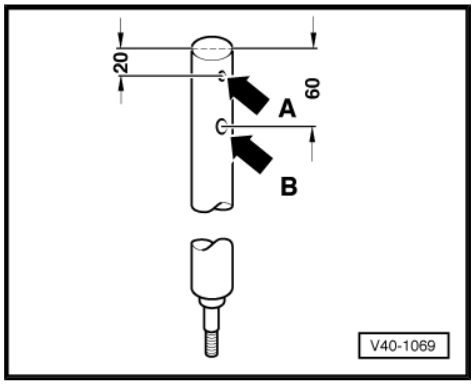
⇒ „2.2 Releasing gas in gas-filled shock absorbers (rear)“, page 5

⇒ „2.3 Draining power steering box“, page 6

2.1 Releasing gas and draining gas-filled shock absorbers (front)

A - Releasing gas by drilling

– Clamp gas-filled shock absorber vertically in vice, with piston rod pointing downwards.



WARNING

Safety goggles must be worn when drilling.

– Drill a 3 mm ∅ hole -arrow A- through outer tube of shock absorber.

Note

Gas will escape during drilling.

– Continue drilling until inner tube is fully penetrated (approx. 25 mm deep).

– Drill a second 6 mm ∅ hole -arrow B- through outer and inner tubes of shock absorber.

– Hold shock absorber over a drip tray and move piston rod up and down several times through entire stroke until no more fluid comes out.

B - Opening with pipe cutter

Special tools and workshop equipment required

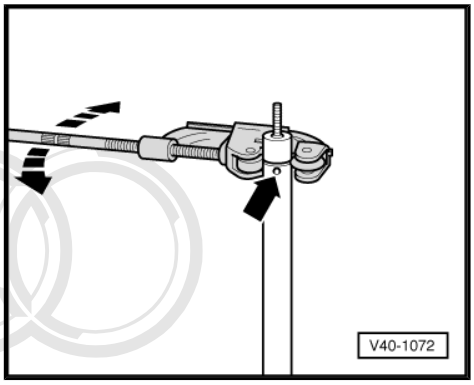
♦ Pipe cutter (commercially available type)

WARNING

Safety goggles must be worn while drilling and cutting.

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– Drill a 3 mm ∅ hole -arrow- through outer tube of shock absorber, or saw through side of tube.



Note

Gas will escape when drilling or sawing.

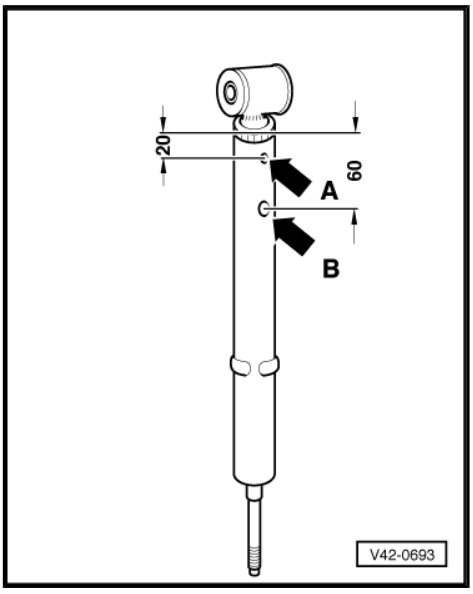
– Apply pipe cutter (commercially available type) as shown in illustration and cut through outer tube of shock absorber.
– Pull the piston rod upwards, at the same time holding the inner tube securely with pliers and pressing it downwards, so that it remains in the outer tube when the piston rod is slowly pulled upwards.
– Pull piston rod off inner tube of shock absorber.
– Drain shock absorber tube.

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2.2 Releasing gas in gas-filled shock absorbers (rear)

A - Releasing gas by drilling

– Clamp gas-filled shock absorber vertically in vice, with piston rod pointing downwards.



WARNING

Safety goggles must be worn when drilling.

– Drill a 3 mm ∅ hole -arrow A- through outer tube of shock absorber.

Note

Gas will escape during drilling.

– Continue drilling until inner tube is fully penetrated (approx. 25 mm deep).
– Drill a second 6 mm ∅ hole -arrow B- through outer and inner tubes of shock absorber.
– Hold shock absorber over a drip tray and move piston rod up and down several times through entire stroke until no more fluid comes out.

B - Opening with pipe cutter

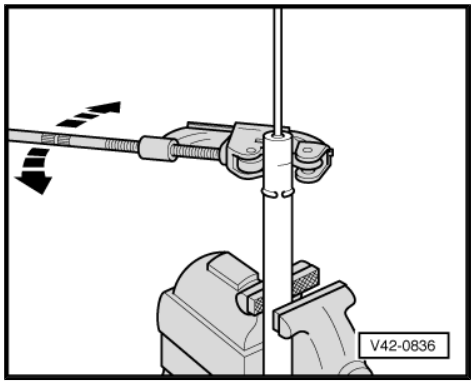
Special tools and workshop equipment required

♦ Pipe cutter (commercially available type)

WARNING

Safety goggles must be worn while drilling and cutting.

– Drill a 3 mm ∅ hole -arrow- through outer tube of shock absorber, or saw through side of tube.



Note

Gas will escape when drilling or sawing.

– Apply pipe cutter (commercially available type) as shown in illustration and cut through outer tube of shock absorber.
– Pull the piston rod upwards, at the same time holding the inner tube securely with pliers and pressing it downwards, so that it remains in the outer tube when the piston rod is slowly pulled upwards.
– Pull piston rod off inner tube of shock absorber.
– Drain shock absorber tube.

2.3 Draining power steering box

Note

Room temperature should be at least 20 °C when draining the power steering box.

– Hold power steering box over drip tray and and allow hydraulic fluid to drain off.
– Clamp power steering box horizontally into vice with connections facing downwards.
– Place drip tray underneath power steering box.
– By pushing and pulling track rod, move steering rack approx. 6 times backwards and forwards between its end positions.
– Dispose of power steering box.

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3 Checking shock absorbers

⇒ „3.1 Leaks at shock absorbers“, page 7

⇒ „3.2 Noises from shock absorbers“, page 7

⇒ „3.3 Checking shock absorbers when removed“, page 7

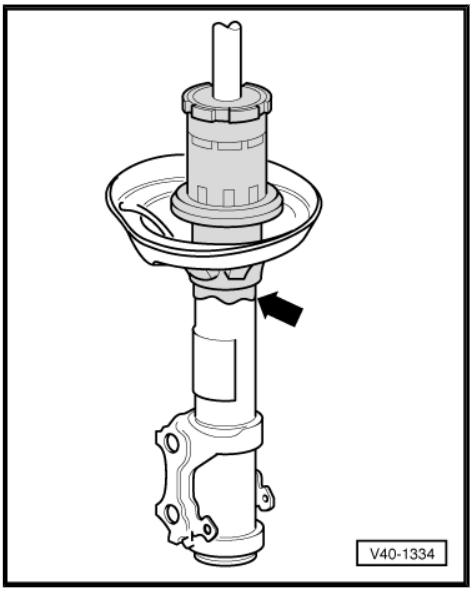
⇒ „3.4 Checking shock absorbers on shock tester“, page 8

3.1 Leaks at shock absorbers

Shock absorbers are often replaced because of externally visible leakage. Inspections on the test rig and in the vehicle have shown that in the majority of cases this replacement is not justified.

Slight loss of fluid („sweating“) at the piston rod seal is not a reason for replacing a shock absorber. A shock absorber with slight fluid leakage can be accepted as "OK" under the following conditions:

- Fluid seepage (as shown in the shaded part of the illustration) is visible, but the fluid is dull and possibly dried by dust.
- The fluid seepage extends only from the top shock absorber seal (piston rod oil seal) down to the bottom spring plate -arrow-.



Note

Slight fluid leakage is actually beneficial, as it lubricates the piston rod oil seal and thus extends the life of the shock absorber. This applies to shock absorbers on both the front and rear axles.

3.2 Noises from shock absorbers

Shock absorbers are often replaced because of noises (rumbling, etc.) experienced by the customer. Inspections on the test rig and in the vehicle have shown that in approx. 70 % of these cases the complaints and subsequent replacement are not justified.

In the case of complaints regarding rumbling or knocking noises please proceed as follows:

– Perform a test drive with the customer on a dry uneven road surface to establish where, when and how the noise becomes apparent.

Note

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These noises are only very rarely caused by the shock absorbers.

3.3 Checking shock absorbers when removed

Defective shock absorbers can be identified by loud rumbling noises when driving, caused by wheel hopping, especially on bad roads. Heavy fluid leakage is an additional visual indication.

Note

Shock absorbers are maintenance-free; shock absorber fluid cannot be topped up.

After removal, a shock absorber can be checked by hand as follows:

– Compress shock absorber by hand.

♦ The piston rod should move smoothly over the entire stroke with uniform resistance and without jolts.

– Release piston rod.

♦ If the shock absorber has sufficient gas pressure the piston rod will return by itself to its original position.

Note

♦ *If this is not the case, the shock absorber does not necessarily need to be renewed. Provided there has been no major loss of fluid, it will still be as effective as a conventional shock absorber.*

♦ *Even without gas pressure, the shock absorber will provide full damping effect as long as there has been no major loss of fluid. However, it may produce more noise.*

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3.4 Checking shock absorbers on shock tester

The shock tester allows shock absorbers to be tested without removing them from the vehicle. The damping effect can be assessed on the basis of the pointer deflection or the print-out.

Special tools and workshop equipment required

♦ Boge shock tester or

♦ Sachs shock tester -V.A.G 1975- or

♦ Maha shock absorber tester -VAS 1990-

Note

♦ *Temperature +10 ... +40 °C.*

♦ *Driver in vehicle.*

♦ *Tyre pressure OK*

♦ *Wheels of vehicle in a central and straight position on the tyre contact plates.*

♦ *Front wheels in straight-ahead position.*

♦ *Handbrake not applied, brake pedal not depressed.*

Test results

The condition of the shock absorbers can only be evaluated as follows:

♦ Satisfactory damping effect

or

- Unsatisfactory damping effect

Note

- *It is not possible to obtain more detailed readings specifying the exact degree of impairment of damping effect.*
- *A forecast of the remaining service life is not permissible.*
- *Test results will be falsified if the suspension contacts the bump stops when the readings are taken.*

The following values apply only to tests conducted on the test equipment listed above. If the maximum values listed below are exceeded, the effectiveness of the shock absorber has deteriorated significantly and renewal is recommended.

Example:

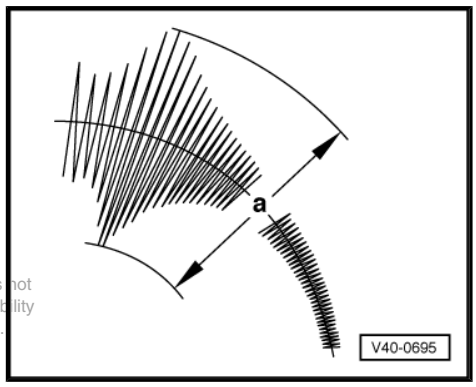
Maximum value = 70

- a = higher than 70: unsatisfactory damping effect
- a = lower than 70: satisfactory damping effect

The damper combinations fitted in the vehicle are indicated by the corresponding PR No. on the vehicle data sticker.

Explanatory notes on production control numbers (PR Nos.) ⇒ page 311

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Maximum values „a“ in mm

Note

- *If the reading is higher than the maximum value „a“ listed in the table, the damping effect is unsatisfactory ⇒ renew the shock absorber.*
- *If the reading is lower than the maximum value „a“ listed in the table, the damping effect is satisfactory ⇒ the shock absorber does not have to be renewed.*

Coupé/Cabriolet

Model/version	Front axle	Rear axle	Remarks
1BA standard running gear, front axle	53	/	Applies to front-wheel drive and four-wheel drive
1BA standard running gear, rear axle	/	50	Applies to front-wheel drive and four-wheel drive
1BE sports running gear, front axle	53	/	Applies to front-wheel drive and four-wheel drive
1BE sports running gear, rear axle	/	50	Applies to front-wheel drive and four-wheel drive
1BD sports running gear, front axle	53	/	Applies to four-wheel drive
1BD sports running gear, rear axle	/	50	Applies to four-wheel drive
1BL running gear with electronic damping control, front axle	46	/	Applies to front-wheel drive and four-wheel drive

Model/version	Front axle	Rear axle	Remarks
1BL running gear with electronic damping control, rear axle	/	38	Applies to front-wheel drive and four-wheel drive
1BV sports running gear, front axle	53	/	Applies to front-wheel drive and four-wheel drive
1BV sports running gear, rear axle	/	50	Applies to front-wheel drive and four-wheel drive
		/	Applies to four-wheel drive
	/		Applies to four-wheel drive

Sportback

Model/version	Front axle	Rear axle	Remarks
1BA standard running gear, front axle	55	/	Applies to front-wheel drive and four-wheel drive
1BA standard running gear, rear axle	/	54	Applies to front-wheel drive and four-wheel drive
1BE sports running gear, front axle	53	/	Applies to front-wheel drive and four-wheel drive
1BE sports running gear, rear axle	/	50	Applies to front-wheel drive and four-wheel drive
1BD sports running gear, front axle	53	/	Applies to four-wheel drive
1BD sports running gear, rear axle	/	50	Applies to four-wheel drive
1BL running gear with electronic damping control, front axle	46	/	Applies to front-wheel drive and four-wheel drive
1BL running gear with electronic damping control, rear axle	/	38	Applies to front-wheel drive and four-wheel drive
1BV sports running gear, front axle	53	/	Applies to front-wheel drive and four-wheel drive
1BV sports running gear, rear axle	/	50	Applies to front-wheel drive and four-wheel drive

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40 – Front suspension

1 General notes

⇒ „1.1 General information“, page 11

⇒ „1.2 Contact corrosion“, page 12

⇒ „1.3 Repairing damaged threads in longitudinal member (sub-frame to body)“, page 12

⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

⇒ „1.5 Exploded views of front axle“, page 15

1.1 General information

All contact surfaces must be cleaned when installing wax-coated components. The contact surfaces must be free of wax and grease.

Tightening torques refer to unoiled bolts and nuts.

Always renew self-locking bolts/nuts.

Always renew bolts and nuts which are tightened by turning through a specified angle.

Load-bearing components and other suspension parts must not be welded or straightened.

Do not subject coil springs to hammer blows or weld splashes and do not make any new colour markings.

Do not perform welding or cutting operations (using power grinders) near the coil springs or suspension struts. Cover up coil springs or suspension struts if necessary.

Make sketches or take photographs when unfastening or removing and installing hydraulic or pneumatic pipes or electrical wires. This ensures re-installation at the original location.

Any cable ties, brackets or fasteners removed during repair work must be re-attached at their original standard locations.

Do not let drive shaft hang down under its own weight when performing repair work, as otherwise excessive bending could damage inner CV joint.

Do not attempt to move the vehicle without the drive shafts fitted; this would result in wheel bearing damage. If the vehicle does have to be moved, always note the following points:

– Fit an outer joint in place of the drive shaft.
– Tighten bolt securing drive shaft to wheel hub to 200 Nm.

Bonded rubber bushes can only be turned to a limited extent. The suspension must therefore always be in the unladen position or the reference position when the suspension link attachments are tightened.

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♦ ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13 .

In model year 2010, plastic coupling rods were introduced gradually instead of aluminium coupling rods. Mixed installation of different coupling rods on the same axle is not permissible; for correct type, refer to ⇒ Electronic parts catalogue .

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe mounting, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

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If the wheel alignment has to be checked and adjusted at a later stage, all bolts and nuts which need to be slackened to make adjustments should initially only be tightened to the specified torque figure. After wheel alignment has been checked and adjusted, bolts and nuts must then be fully tightened by turning them through the specified angle.

WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

WARNING

Risk of personal injury caused by automatic engine start on vehicles with start/stop system.

- *On vehicles with activated start/stop system (indicated by a symbol in the instrument cluster) the engine can start automatically under certain conditions.*
- *When working on the vehicle, it is therefore important to ensure that the start/stop system is deactivated (switch off ignition and switch on again if required).*

1.2 Contact corrosion

Contact corrosion can occur if unsuitable fasteners (bolts, nuts, washers ...) are used.

For this reason, all the fasteners on the vehicle have a special surface coating (Dacromet). These components can be recognised by their greenish colour.

In addition, rubber parts, plastic parts and adhesives are made of non-conductive material.

Always install new parts if you are not sure whether used parts can be refitted.

Note:

Use only genuine parts. These have been tested and are compatible with aluminium.

Accessories must be approved by AUDI AG.

Damage resulting from contact corrosion is not covered under the warranty.

1.3 Repairing damaged threads in longitudinal member (subframe to body)

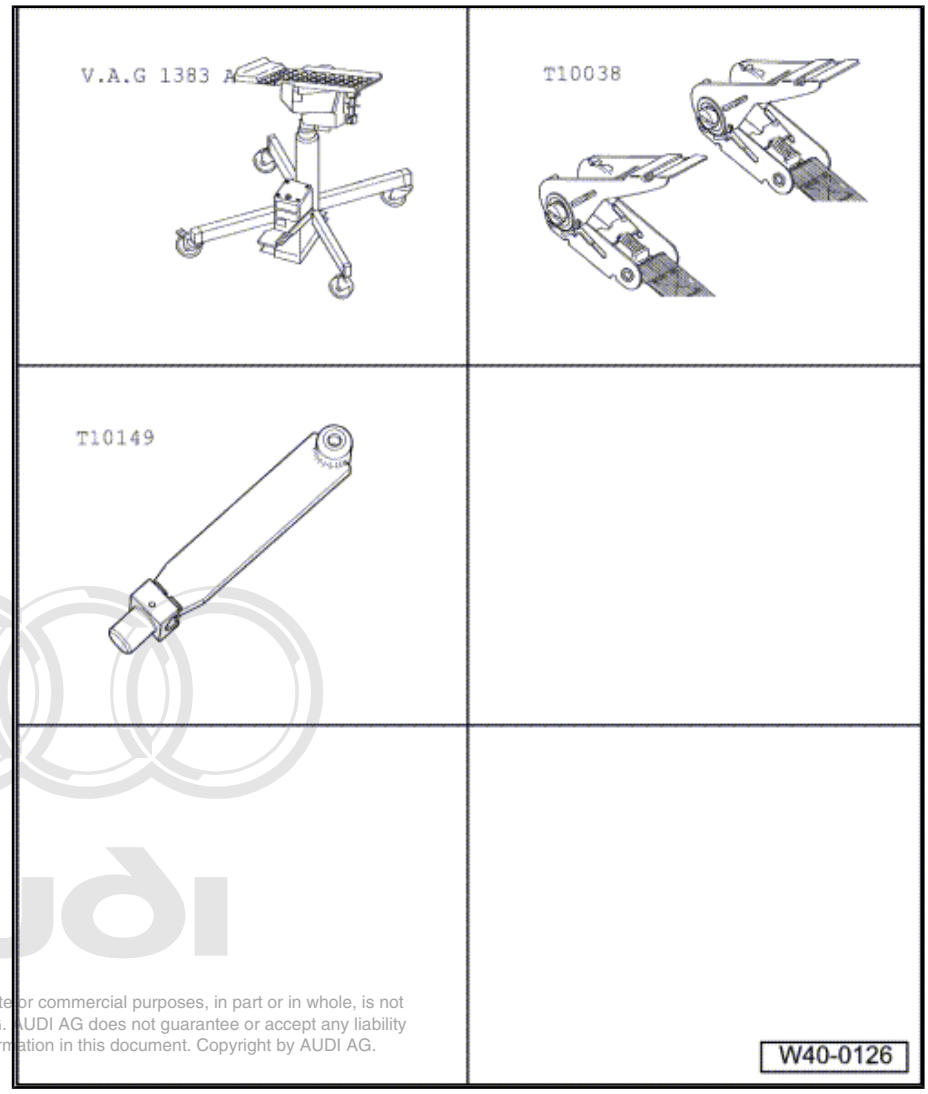
Damaged threads can be repaired with wire inserts (Helicoil).

- Have all thread repairs checked by foreman or supervisor.
- The thread insert must be of the same length as the thread in the body.
- Make good any damage to underseal ⇒ General Information; Body Repairs, General Body Repairs .

1.4 Lifting suspension to unladen position (vehicles with coil springs)

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-
- Tensioning strap -T10038-
- Support -T10149-



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Note

All bolts on running gear components with bonded rubber bushes must always be tightened with the suspension in the unladen position (vehicle unladen).

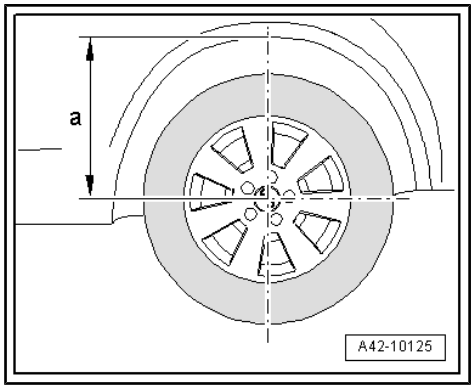
Bonded rubber bushes can only be turned to a limited extent.

Therefore, before tightening the bolts, suspension components with bonded rubber bushes must be brought into a position corresponding to the normal position of the unladen vehicle while driving (unladen position).

Otherwise, the bush would be subject to torsion loading and its service life would be shortened.

This position can be simulated on the lifting platform by raising the appropriate part of the suspension with the engine and gearbox jack -V.A.G 1383 A- and support -T10149- .

– Before commencing work, use measuring tape or similar to measure dimension -a- from wheel centre to lower edge of wheel housing.



This measurement must be taken with the suspension in the unladen position (vehicle unladen).

– Make a note of the measured value. This will be needed when tightening the bolts and/or nuts on the suspension.

Before raising wheel unit, secure vehicle to arms of lifting platform using tensioning straps -T10038- .

If vehicle is not secured, there is a risk of it slipping off the lifting platform.

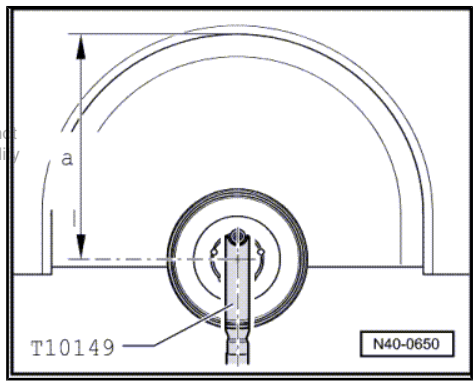
– Remove wheel.

– Turn wheel hub until one of the wheel bolt holes is at the top.

– Attach support -T10149- to wheel hub using wheel bolt.

The bolts/nuts on the relevant suspension mountings must not be tightened until the distance -a- between the wheel centre and the lower edge of the wheel arch is the same as the distance measured before commencing work.

– Raise wheel bearing housing with engine and gearbox jack -V.A.G 1383 A- until distance -a- is obtained.



WARNING

- *Do not raise or lower vehicle when engine and gearbox jack is under vehicle.*
- *Do not leave engine and gearbox jack -V.A.G 1383 A- under vehicle for longer than necessary.*

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– Tighten relevant bolts/nuts.

– Lower wheel bearing housing.

– Pull out engine and gearbox jack from underneath vehicle.

– Remove support -T10149- .

1.5 Exploded views of front axle

I -
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

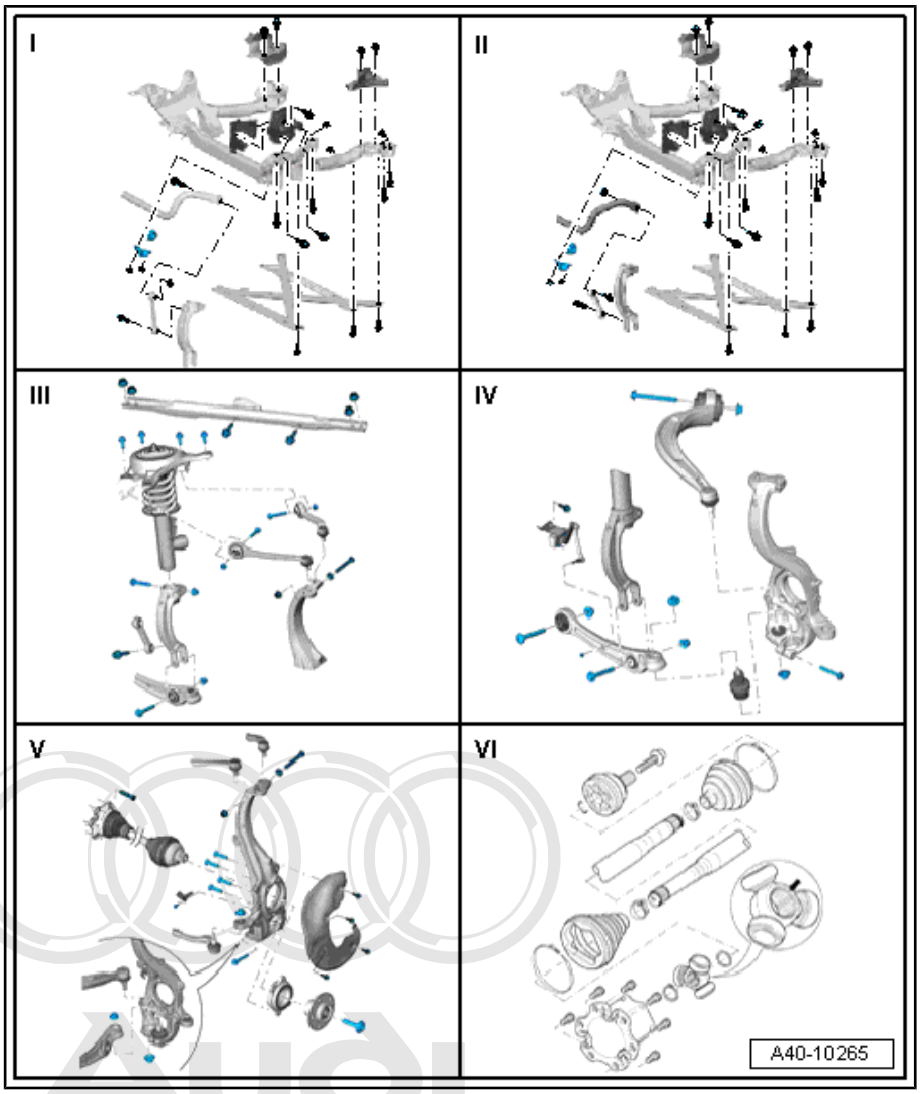
II -
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

III -
⇒ „3 Suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

IV -
⇒ „4 Track control link, swivel joint, guide link, vehicle level sender“, page 57

V -
⇒ „5 Wheel bearing housing, wheel bearing unit“, page 79

VI -
⇒ „6 Drive shaft“, page 92



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2 Subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield

⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

⇒ „2.3 Removing and installing subframe“, page 22

⇒ „2.4 Removing and installing subframe cross brace (Coupé/ Sportback)“, page 27

⇒ „2.5 Removing and installing subframe cross brace (Cabriolet)“, page 28

⇒ „2.6 Removing and installing diagonal strut (Cabriolet)“, page 30

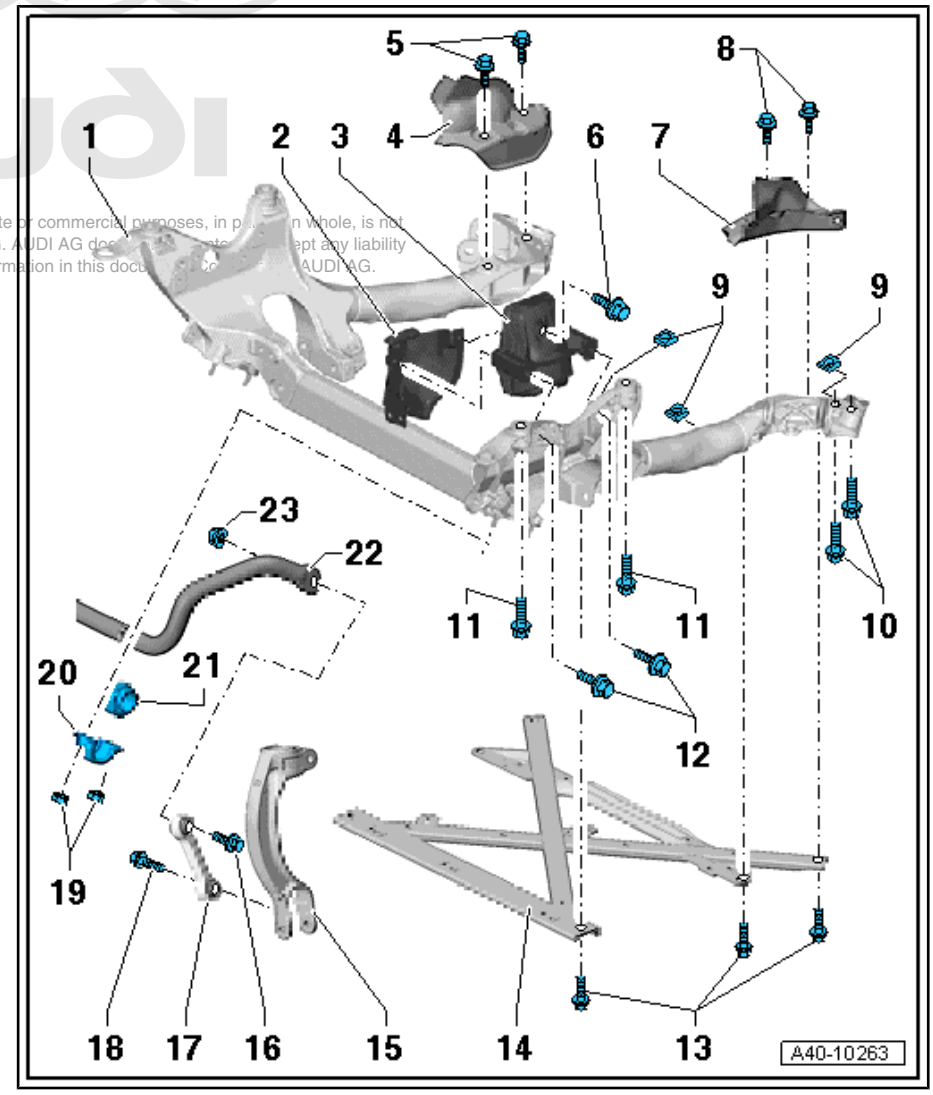
⇒ „2.7 Removing and installing anti-roll bar“, page 31

⇒ „2.8 Removing and installing coupling rod“, page 33

⇒ „2.9 Removing and installing subframe shield“, page 35

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2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)



1 - Subframe

- ❑ Removing and installing ⇒ page 22

2 - Connector

3 - Engine mounting

4 - Shield

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5 - Bolt

- ❑ 20 Nm

6 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 10

7 - Shield

8 - Bolt

- ❑ 20 Nm

9 - Square nut

- ❑ Always renew if removed

10 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Tightening sequence/ procedure for attachment of subframe ⇒ page 26

11 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Tightening sequence/ procedure for attachment of subframe ⇒ page 26

12 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 10

13 - Bolt

- ❑ 90 Nm +135°
- ❑ Always renew if removed

14 - Cross brace for subframe

- ❑ Removing and installing (Coupé) ⇒ page 27

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

15 - Shock absorber fork

16 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

17 - Coupling rod

- ❑ Removing and installing ⇒ page 33

18 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

19 - Nut

- ❑ 25 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

Note

20 - Clamp

21 - Rubber bush

- ❑ The rubber bush must be installed with the opening facing towards the subframe.
- ❑ The anti-roll bar and rubber bush must be installed free of grease.

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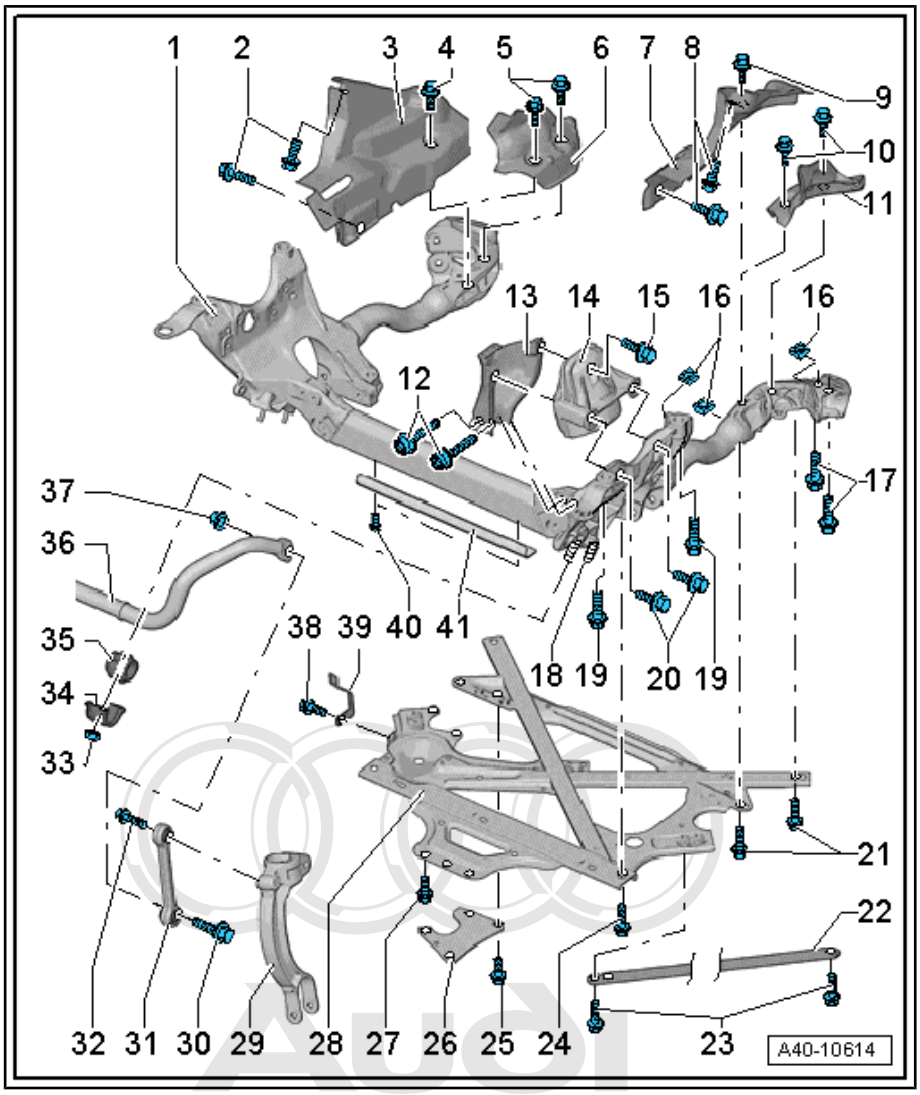
22 - Anti-roll bar

- ❑ Removing and installing ⇒ page 31

23 - Nut

- ❑ Always renew if removed

2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)



1 - Subframe
- ❑ Removing and installing ⇒ page 22

2 - Bolt
- ❑ 9 Nm

3 - Subframe shield
- ❑ Not fitted on all engine versions
- ❑ Removing and installing ⇒ page 35

4 - Bolt
- ❑ 20 Nm

5 - Bolt
- ❑ 20 Nm

6 - Shield
- ❑ Not fitted on all engine versions

7 - Subframe shield
- ❑ Not fitted on all engine versions
- ❑ Removing and installing ⇒ page 35

8 - Bolt
- ❑ 9 Nm

9 - Bolt
- ❑ 20 Nm

10 - Bolt
- ❑ 20 Nm

11 - Subframe shield
- ❑ Not fitted on all engine versions

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12 - Bolt
- ❑ Tightening torque ⇒ Rep. gr. 10

13 - Retaining plate
- ❑ For engine mounting

14 - Engine mounting
- ❑ Removing and installing ⇒ Rep. gr. 10

15 - Bolt
- ❑ Tightening torque ⇒ Rep. gr. 10

16 - Square nut
- ❑ Always renew if removed
- ❑ For vehicles with electromechanical power steering, no square nuts are fitted in front position

17 - Bolt
- ❑ 115 Nm +90°
- ❑ Always renew if removed

- ❑ Tightening sequence/procedure for attachment of subframe ⇒ page 26

18 - Stud

- ❑ Can be renewed if damaged. For correct version refer to ⇒ Electronic parts catalogue

19 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Tightening sequence/procedure for attachment of subframe ⇒ page 26

20 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 10

21 - Bolt

- ❑ 90 Nm +135°
- ❑ Always renew if removed

22 - Diagonal strut

- ❑ Only on Cabriolet
- ❑ Removing and installing ⇒ page 30
- ❑ Side of diagonal strut with recessed edge in area of bolt holes should face towards bolt heads
- ❑ -Arrow- on diagonal strut points in direction of travel

23 - Bolt

- ❑ Initial tightening torque: 5 Nm
- ❑ Final tightening torque: 50 Nm + turn 90° further
- ❑ Observe correct tightening sequence ⇒ page 31
- ❑ Always renew if removed

24 - Bolt

- ❑ Vehicles with hydraulic power steering: 90 Nm+135°
- ❑ Vehicles with electromechanical power steering: 90 Nm+90°
- ❑ Always renew if removed

25 - Bolt

- ❑ 20 Nm +90°
- ❑ Always renew if removed

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26 - End piece

- ❑ Only on Cabriolet

27 - Bolt

- ❑ 24 Nm
- ❑ Only on Cabriolet

28 - Cross brace for subframe

- ❑ Removing and installing (Coupé/Sportback) ⇒ page 27
- ❑ Removing and installing (Cabriolet) ⇒ page 28
- ❑ Illustration shows cross brace for Cabriolet. Cross brace for Coupé/Sportback is slightly different ⇒ Item 14 (page 17)

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

29 - Shock absorber fork

30 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

31 - Coupling rod

- ❑ Different versions (aluminium and plastic); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible
- ❑ Removing and installing ⇒ page 33

32 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

33 - Nut

- ❑ 25 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

34 - Clamp

35 - Rubber bush

- ❑ The rubber bush must be installed with the opening facing towards the subframe.
- ❑ The anti-roll bar and rubber bush must be installed free of grease.

36 - Anti-roll bar

- ❑ Removing and installing ⇒ page 31

37 - Nut

- ❑ Always renew if removed

38 - Bolt

- ❑ 9 Nm
- ❑ Fitted on vehicles with ⇒ Item 3 (page 19)

39 - Bracket

- ❑ Fitted on vehicles with ⇒ Item 3 (page 19)

40 - Bolt

- ❑ 20 Nm
- ❑ Fitted on vehicles with electromechanical steering (not Cabriolet)

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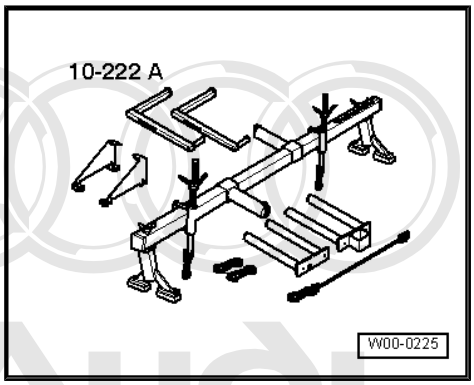
41 - Guard plate

- ❑ Fitted on vehicles with electromechanical steering (not Cabriolet)

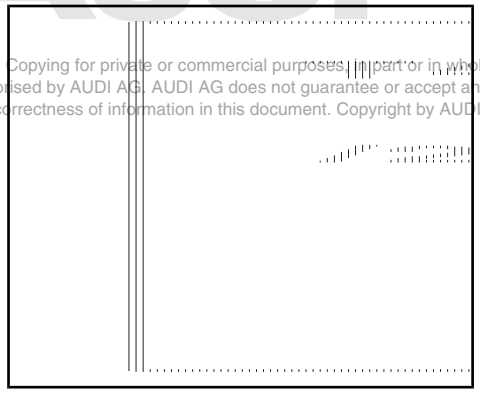
2.3 Removing and installing subframe

Special tools and workshop equipment required

- ♦ The following list includes all tools for all engine versions. The tools required for a particular engine version are shown in the individual description for that engine ⇒ Rep. gr. 10 .
- ♦ Support bracket -10-222 A-

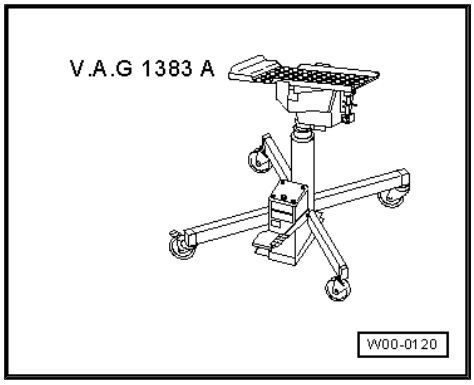


- ♦ Engine support bracket, supplementary set -T40093-

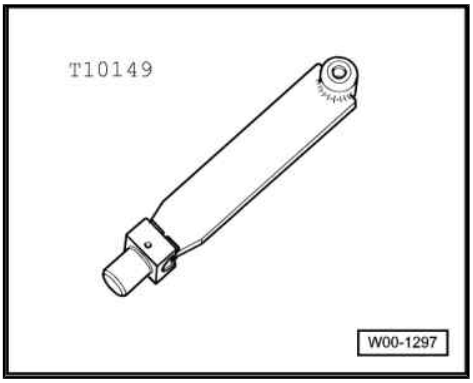


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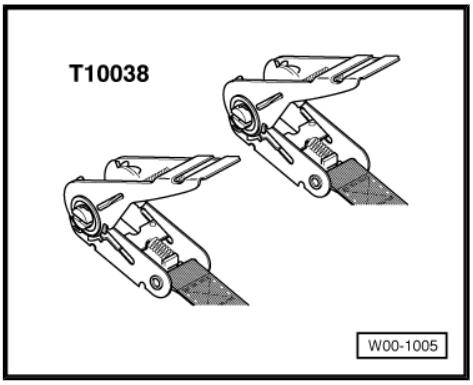
- ♦ Engine and gearbox jack -V.A.G 1383 A-



♦ Support -T10149-

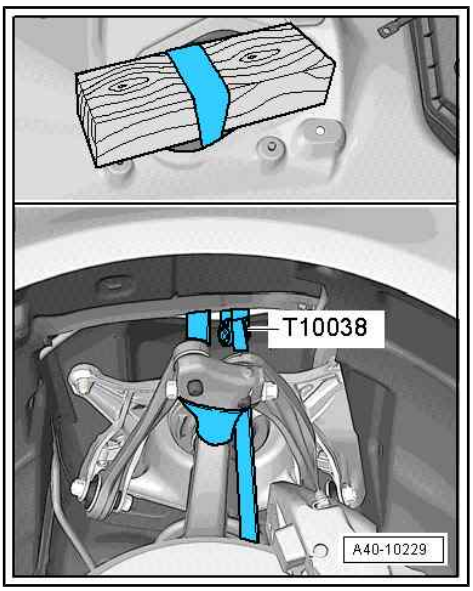


♦ Tensioning strap -T10038-



Removing

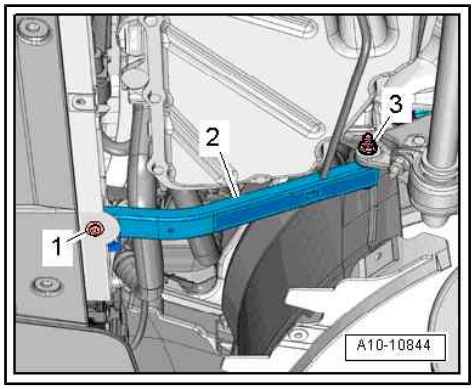
– Remove wheels.
– Remove noise insulation ⇒ Rep. gr. 66 .
– Remove left and right wheel housing liner ⇒ Rep. gr. 66 .
– Remove cross brace (Coupé/Sportback) ⇒ page 27 .
– Remove cross brace (Cabriolet) ⇒ page 28 .
– If fitted, remove subframe shield (left and right) ⇒ page 35 .
– Remove anti-roll bar ⇒ page 31 .
– Remove vehicle level senders, if fitted ⇒ page 76 .
– Tie up wheel bearing housing with tensioning strap -T10038- on both sides as shown in illustration.
– Remove track control link on both sides ⇒ page 59 .
– Remove steering box ⇒ „5.2 Removing and installing hydraulic power steering box (LHD vehicles)“, page 402 .
– Remove steering box ⇒ „4.2 Removing and installing electromechanical power steering box“, page 381 .
– Take up full weight of engine with support bracket ⇒ Rep. gr. 10 .



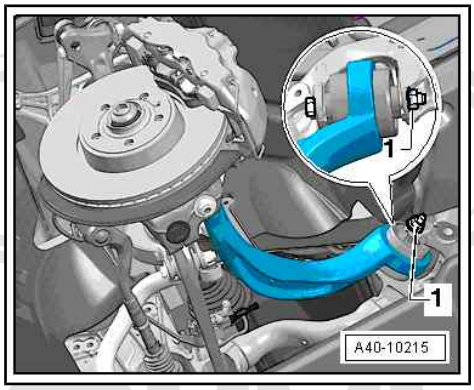
♦ Support bracket -10-222 A-
♦ Engine support supplement set -T40093- may be required, depending on engine version. For a detailed description of the steps required to support the engine, refer to ⇒ Rep. gr. 10 .

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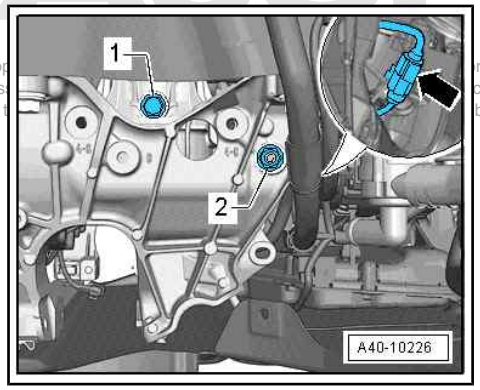
– Unscrew left and right bolts -1- and nuts -3- and take out longitudinal struts -2-.



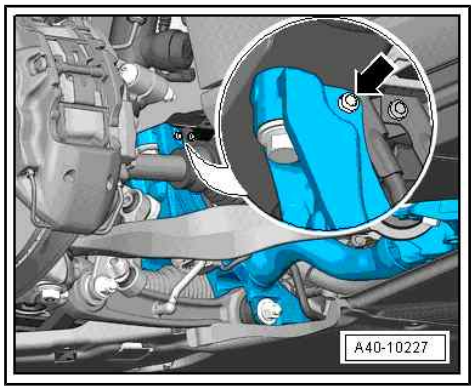
– Detach bolt connection -1-.
– Swivel out guide link and tie up to body with wire or similar.



– On vehicles with electro-hydraulic engine mountings, unplug connector -arrow- for left electro-hydraulic engine mounting solenoid valve -N144- and right electro-hydraulic engine mounting solenoid valve -N145- .
– Depending on engine version, unscrew nut -2- for bracket with electrical wiring on right side of vehicle.

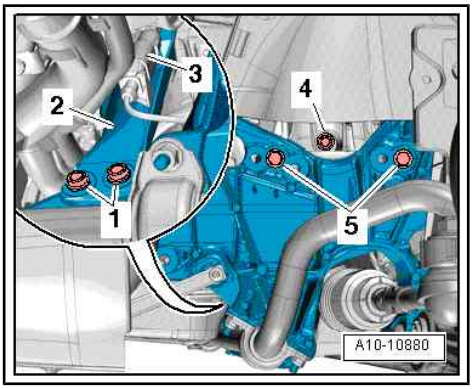


– If fitted, remove bolt from bracket for power steering line -arrow-.



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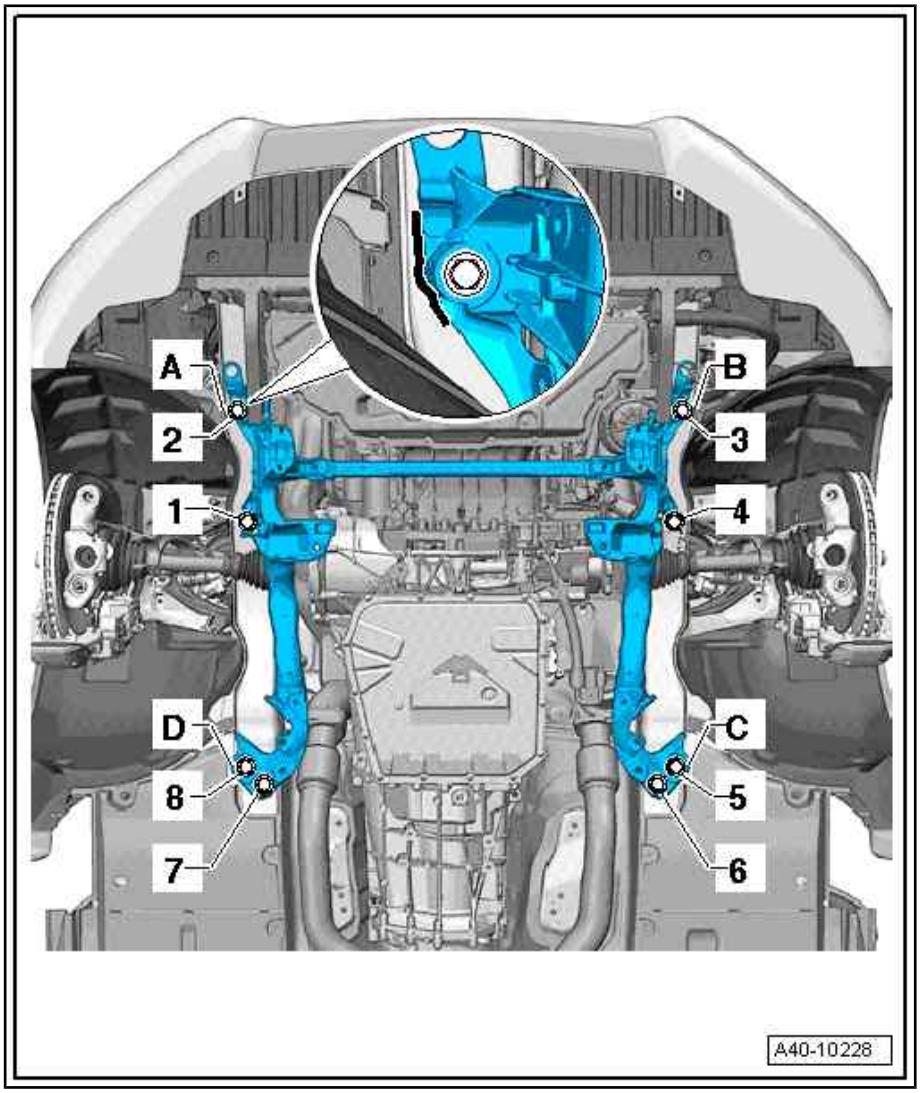
– Remove bolts -1 and 5- for engine mounting (left and right).
– Move aside retaining plate -2- for engine mounting (left and right).
– Before lowering the subframe, check that all electrical wiring has been disconnected.



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Note

Mark installation position of subframe -A- to -D- using a felt-tip pen or similar.



– Remove bolts -1- to -8- and take out subframe.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

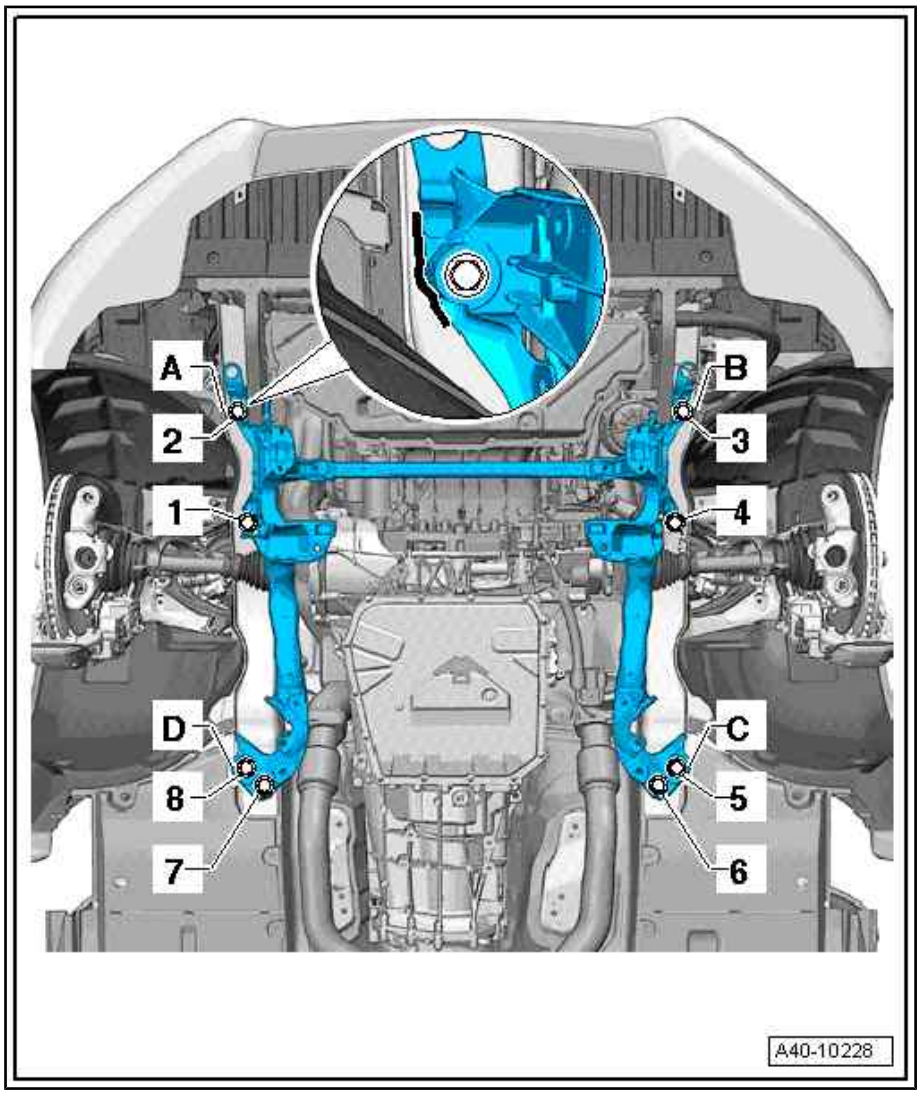
Tightening torques
⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

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Procedure for attachment of subframe:



– Fit subframe and align with markings -A- and -B- made earlier. Tighten bolts -2- and -3- to specified torque setting (but do NOT turn further through specified angle).
– Press subframe into place at markings -C- and -D-. Tighten bolts -5- and -8- to specified torque.
– Screw in bolts -1-, -4-, -6- and -7- and tighten to specified torque.
– Tighten bolts -1- to -8- through specified angle to final setting.

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lifting suspension to unladen position*
  ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

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– On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .
– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 .
– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

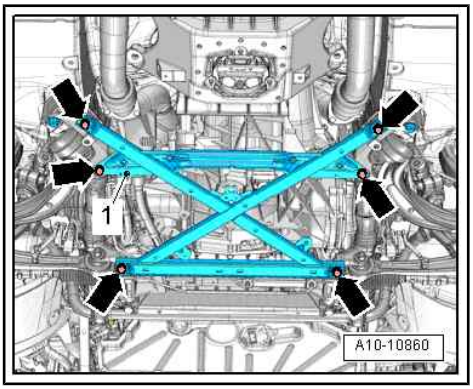
2.4 Removing and installing subframe cross brace (Coupé/Sportback)

Removing

– Remove noise insulation ⇒ Rep. gr. 66 .

Vehicles with hydraulic power steering

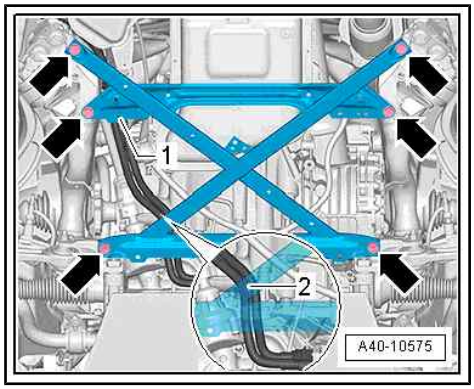
– Remove bolt -1- from bracket for power steering line.
– Remove bolts -arrows- and detach cross brace.



Vehicles with electromechanical power steering

– Disconnect electrical wiring at cross brace -1- and -2-.

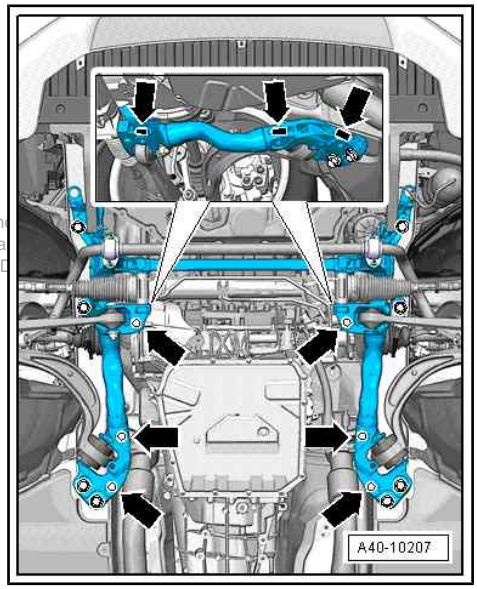
– Remove bolts -arrows- and detach cross brace.



All vehicles (continued):

– If fitted, remove subframe shield (left and right) ⇒ page 35 .

– Take square nuts -arrows- out of castings.



Note

For vehicles with electromechanical power steering, no square nuts are fitted in front position.

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Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

If vehicle is to be moved, cross brace must be fitted with old bolts and square nuts and tightened to specified torque without turning further through specified angle.

Installing

Installation is carried out in the reverse sequence. Note the following points:

- On vehicles with subframe shields, square nuts ⇒ Item 16 (page 19) must be inserted in slots on casting before installing subframe shields.

Tightening torques
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

2.5 Removing and installing subframe cross brace (Cabriolet)

Removing

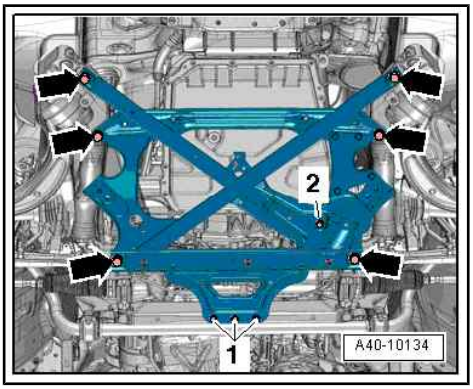
– Remove noise insulation ⇒ Rep. gr. 66 .

– Remove diagonal struts (front) ⇒ page 30 .

Vehicles with hydraulic power steering

– Remove bolt -2- for power steering hydraulic fluid line.

– Remove bolts -1- and -arrows- and detach subframe cross brace.



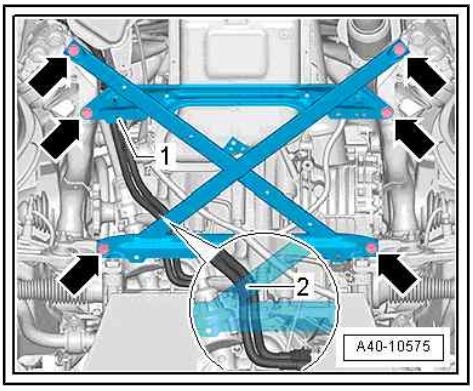
Vehicles with electromechanical power steering

– Disconnect electrical wiring at cross brace -1- and -2-.

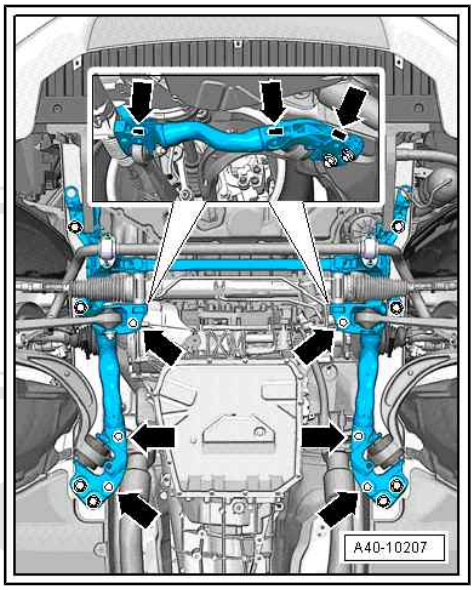
– Remove bolts -arrows- and detach cross brace.

All vehicles (continued):

– If fitted, remove subframe shield (left and right) ⇒ page 35 .



– Take square nuts -arrows- out of castings.



Note

For vehicles with electromechanical power steering, no square nuts are fitted in front position.

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

If vehicle is to be moved, cross brace must be fitted with old bolts and square nuts and tightened to specified torque without turning further through specified angle.

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Installing

Installation is carried out in the reverse sequence. Note the following points:

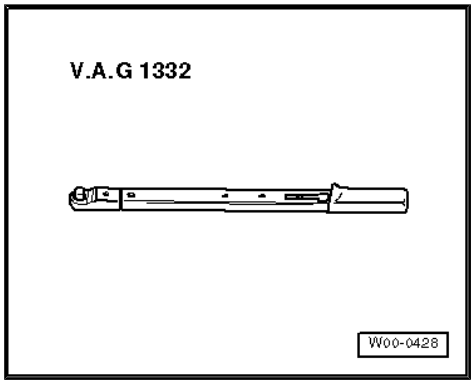
- On vehicles with subframe shields, square nuts ⇒ Item 16 (page 19) must be inserted in slots on casting before installing subframe shields.

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

2.6 Removing and installing diagonal strut (Cabriolet)

Special tools and workshop equipment required

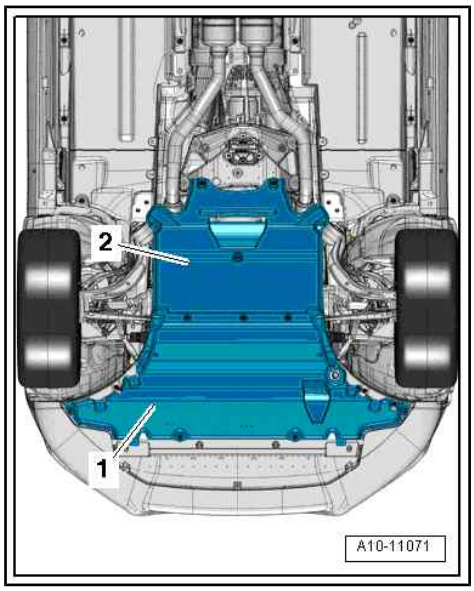
- Torque wrench -V.A.G 1332-



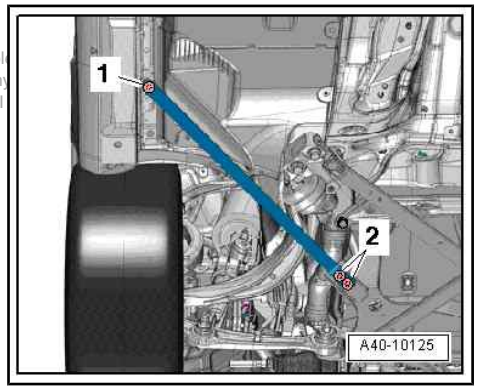
Removing

– Raise vehicle on lifting platform.

– Remove rear noise insulation -2- ⇒ Rep. gr. 66 .



– Remove bolts -1- and -2- and detach diagonal strut.



Installing

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Installation is carried out in the reverse sequence. Note the following points:

Note

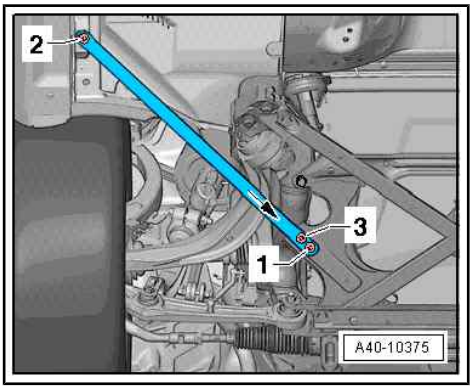
- *Side of diagonal strut with recessed edge in area of bolt holes should face towards bolt heads*
- *Note tightening sequence and initial tightening torque for bolts.*

Installation position and tightening sequence:

– Fit diagonal strut in correct position (-arrow- should point in direction of travel).

– Tighten bolts shown in illustration in sequence -1, 2 and 3- initially to 5 Nm and then to final torque ⇒ Item 23 (page 20) .

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19



2.7 Removing and installing anti-roll bar

Removing

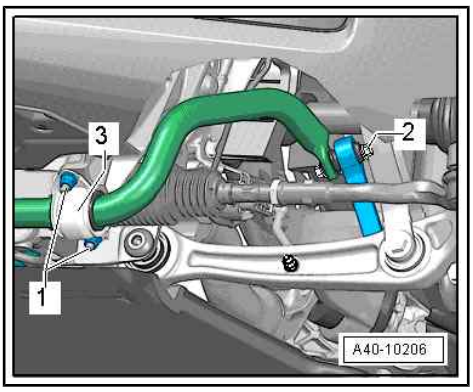
– Remove noise insulation ⇒ Rep. gr. 66 .

Vehicles up to August 2007:

– Detach bolt connection -2- on both sides.

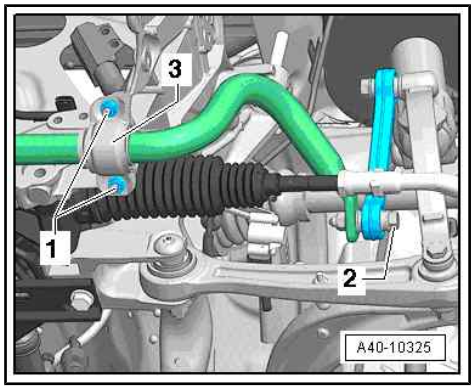
– Unscrew nuts -1- on both sides and detach clamps -3-.

– Take out anti-roll bar.



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Vehicles from September 2007 onwards:



– Detach bolt connection -2- on both sides.
– Unscrew nuts -1- on both sides and detach clamps -3-.
– Take out anti-roll bar.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

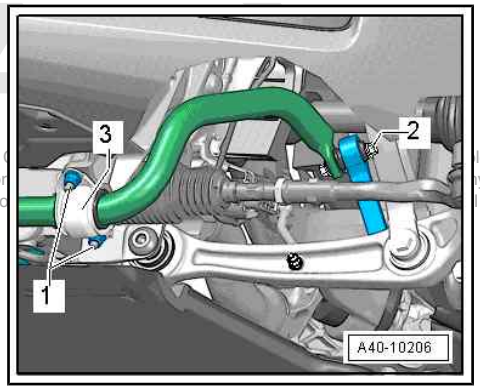
Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lifting suspension to unladen position*
  ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

Note

- *If renewing the anti-roll bar, check the suspension version fitted on the vehicle.*
- *Anti-roll bar and bushes must be free of grease.*
- *Fit the rubber bush with the opening facing towards the contact surface of the subframe.*

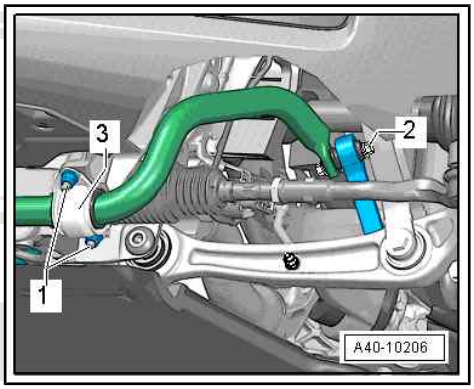
Vehicles up to August 2007:



– Fit nuts -1-, but do not tighten.
– Fit bolts -2- on both sides, but do not tighten.

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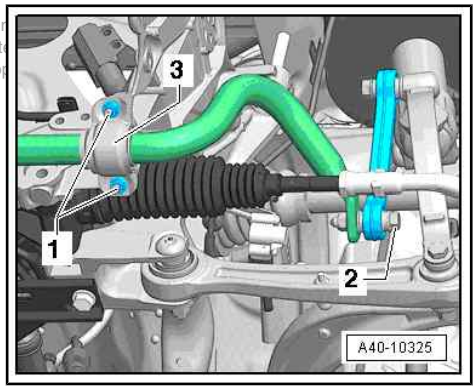
– Lifting suspension to unladen position
⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13
– Tighten bolt connections -1- and -2- to specified torque.



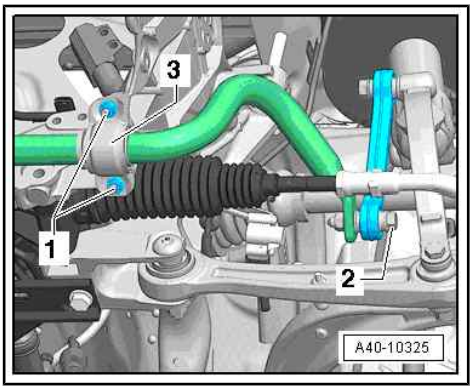
Vehicles from September 2007 onwards:

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with respect to the correctness of information in this document. Co

– Fit nuts -1-, but do not tighten.
– Fit bolts -2- on both sides, but do not tighten.



– Lifting suspension to unladen position
⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13
– Tighten bolt connections -1- and -2- to specified torque.



2.8 Removing and installing coupling rod

Note

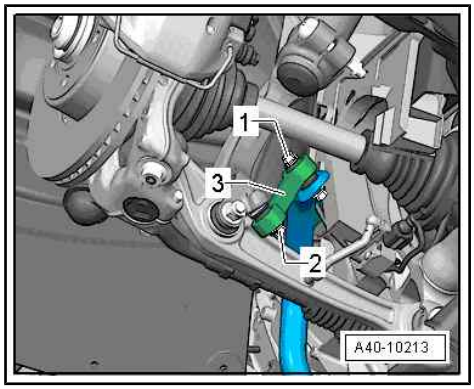
In model year 2010, plastic coupling rods were introduced gradually instead of aluminium coupling rods. Mixed installation of different coupling rods on the same axle is not permissible; for correct type, refer to ⇒ Electronic parts catalogue .

Removing

Vehicles up to August 2007:

– Detach bolt connections -1- and -2-.

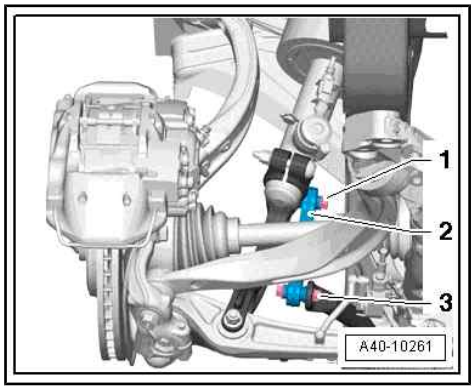
– Take out coupling rod -3-.



Vehicles from September 2007 onwards:

– Detach bolt connections -1- and -3-.

– Take out coupling rod -2-.



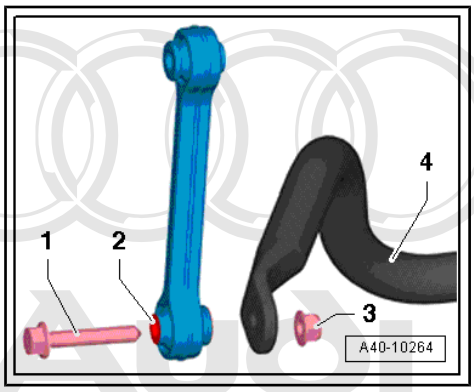
Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

- *Note installation position of coupling rod.*
- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lifting suspension to unladen position*
  ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

– Bolt -1- for connecting coupling rod to anti-roll bar -4- must be affixed to „small“ face -2- of coupling rod collar and secured with nut -3-.



Tightening torques
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

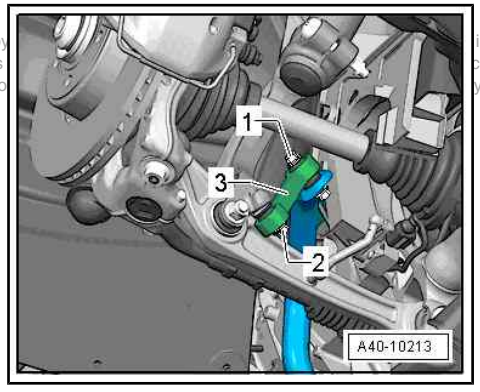
– Note installation position of coupling rod.

Vehicles up to August 2007:

– Fit bolts -1- and -2- but do not tighten.

– Lifting suspension to unladen position
⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

– Tighten bolt connections -1- and -2- to specified torque.



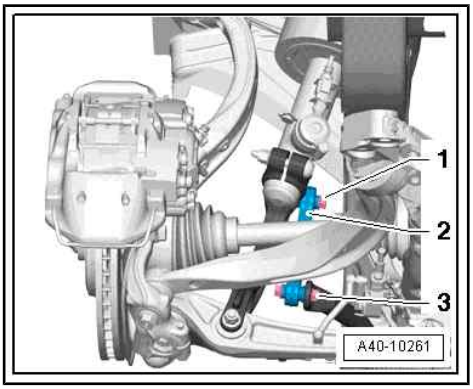
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Vehicles from September 2007 onwards:

– Fit bolts -1- and -3- but do not tighten.

– Lifting suspension to unladen position
⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13

– Tighten bolt connections -1- and -3- to specified torque.



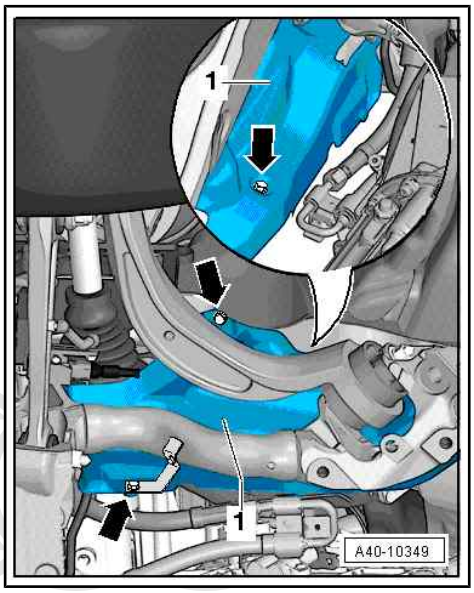
2.9 Removing and installing subframe shield

– Remove cross brace (Coupé/Sportback) ⇒ page 27 .

– Remove cross brace (Cabriolet) ⇒ page 28 .

– Remove bolts -arrows-.

– Detach subframe shield -1- towards inside and remove.



Installing

Installation is carried out in the reverse sequence. Note the following points:

• Insert square nuts ⇒ Item 16 (page 19) in slots on casting before installing subframe shield.

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

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3 Suspension strut with mounting bracket, shock absorber fork, upper links, body brace

⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

⇒ „3.2 Removing and installing suspension strut with mounting bracket“, page 37

⇒ „3.3 Servicing suspension strut and mounting bracket“, page 43

⇒ „3.4 Removing and installing shock absorber fork“, page 49

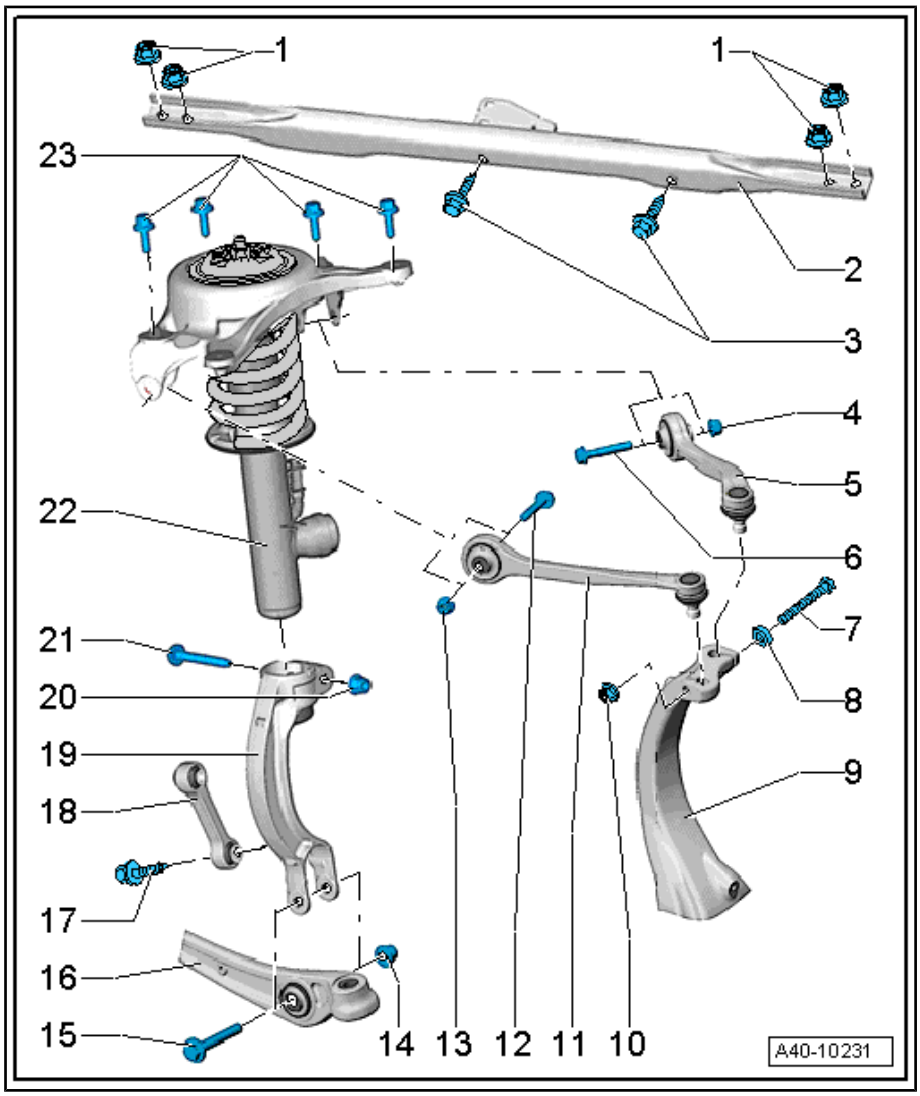
⇒ „3.5 Removing and installing upper links“, page 53

⇒ „3.6 Renewing bushes for front and rear upper links“, page 54

⇒ „3.7 Removing and installing body brace“, page 55

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3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace



1 - Nuts
- ❑ 30 Nm

2 - Body brace
- ❑ Removing and installing ⇒ page 55

3 - Bolts
- ❑ 7 Nm

4 - Nut
- ❑ Always renew if removed

5 - Upper link (rear)
- ❑ Removing and installing ⇒ page 53

6 - Bolt
- ❑ 50 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

7 - Bolt
- ❑ Always renew if removed

8 - Washer

9 - Wheel bearing housing

10 - Nut
- ❑ 40 Nm
- ❑ Always renew if removed

11 - Upper link (front)
- ❑ Removing and installing ⇒ page 53

12 - Bolt

- ❑ 50 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

13 - Nut

- ❑ Always renew if removed

14 - Nut

- ❑ 90 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

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15 - Bolt

- ❑ Always renew if removed

16 - Track control link

17 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

18 - Coupling rod

- ❑ Note correct installation position ⇒ page 33
- ❑ Different versions (aluminium and plastic); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

19 - Shock absorber fork

- ❑ Removing and installing shock absorber fork ⇒ page 49

20 - Nut

- ❑ 40 Nm +180°
- ❑ Always renew if removed

21 - Bolt

- ❑ Always renew if removed

22 - Suspension strut

- ❑ Removing and installing suspension strut and mounting bracket ⇒ page 37
- ❑ Servicing suspension strut and mounting bracket ⇒ page 43
- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ Defective shock absorbers must always be degassed and drained before disposal ⇒ page 7
- ❑ Checking shock absorber following removal ⇒ page 7

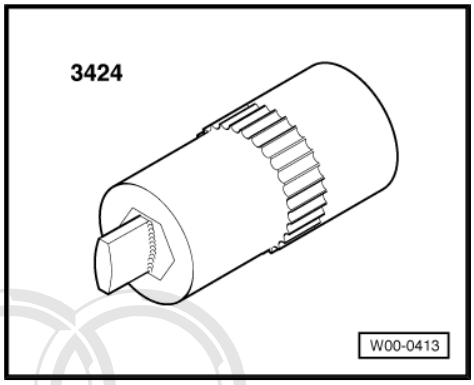
23 - Bolts

- ❑ 40 Nm +90°
- ❑ Observe correct tightening sequence ⇒ page 42
- ❑ Always renew if removed

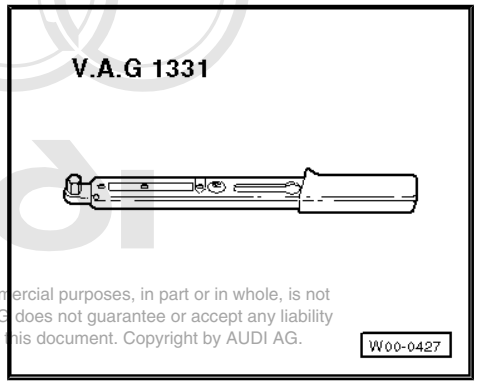
3.2 Removing and installing suspension strut with mounting bracket

Special tools and workshop equipment required

- Spreader -3424-

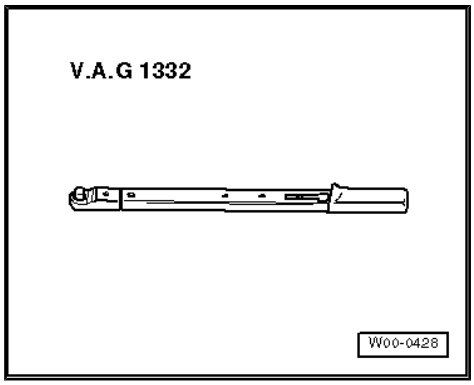


- Torque wrench -V.A.G 1331-

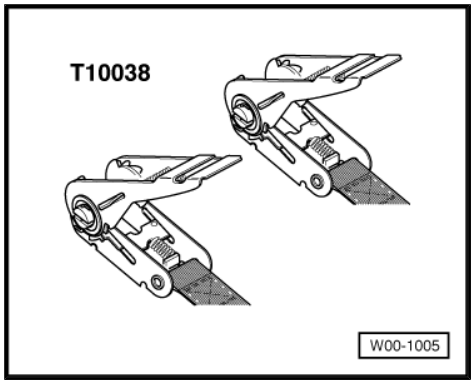


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- Torque wrench -V.A.G 1332-



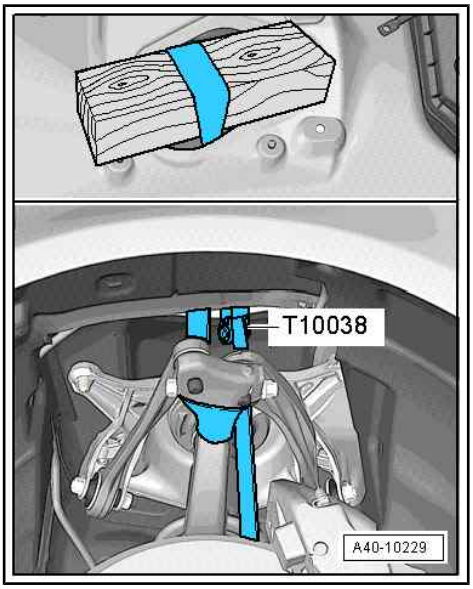
- Tensioning strap -T10038-



Removing

– Remove wheel.

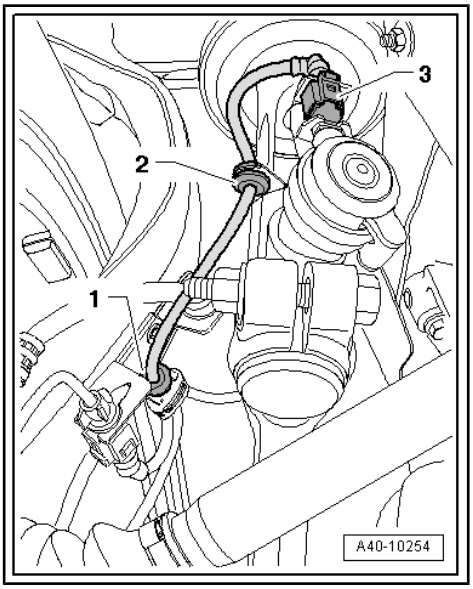
– Tie up wheel bearing housing with tensioning strap -T10038- as shown in illustration.



Vehicles with electronic damping control:

– Release and unplug connector -3-.

– Remove retainers -1- and -2-.



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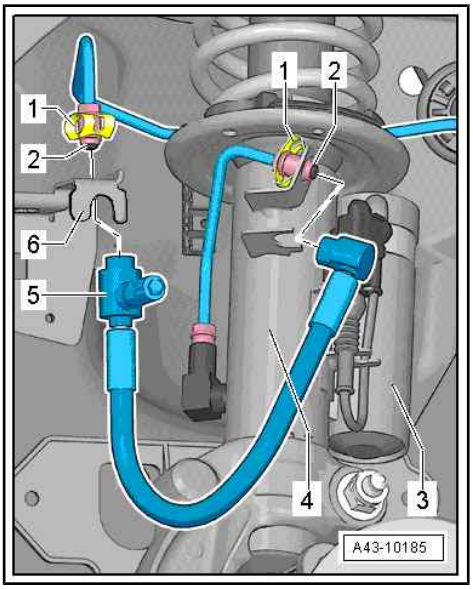
Vehicles with Dynamic Ride Control (DRC)

– Drain DRC system ⇒ page 284 .

– If vehicle is equipped with driver-adjustable DRC and variable damping, unplug electrical connector on additional element with integral DC motor and move clear.

– Remove union nut -2- and move hose clear.

• Protect open connections from dirt.



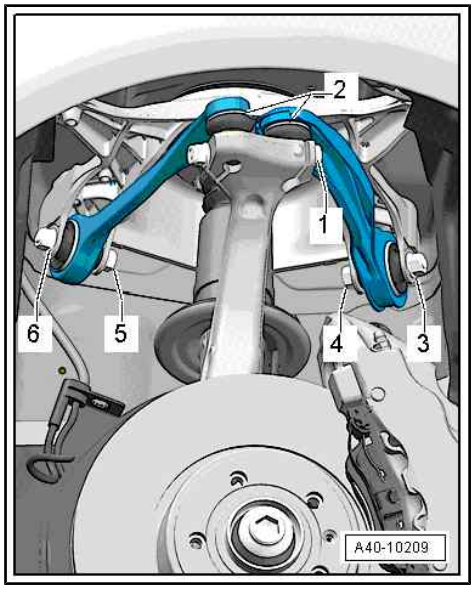
All vehicles (continued):

Remove shock absorber fork ⇒ page 49 .

– Detach bolt connection -1-.

– Take both joint pins of upper links -2- out of wheel bearing housing.

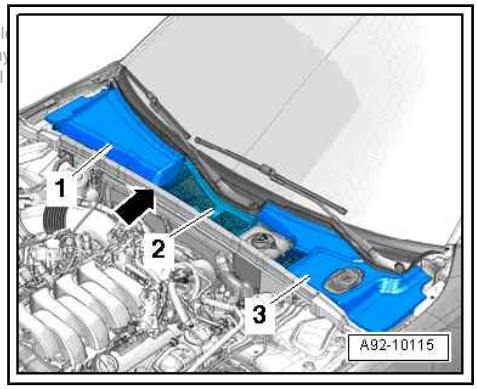
Do not attempt to enlarge slots in wheel bearing housing using a chisel or similar.



Left side of vehicle:

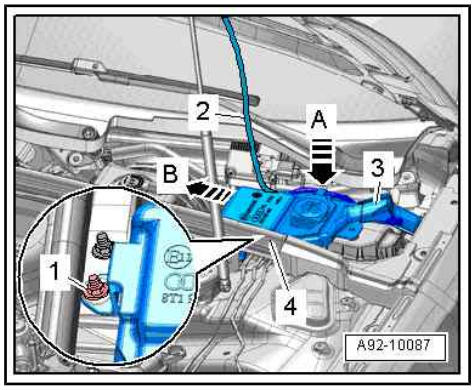
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– Unclip and detach plenum chamber cover -3-.

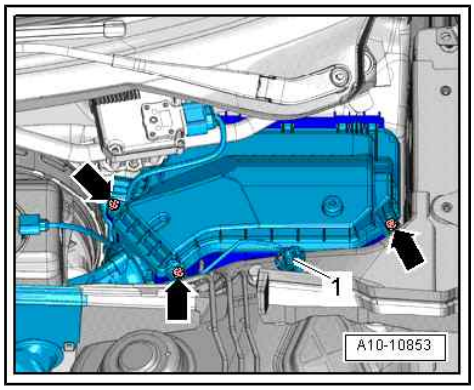


– Unscrew nut -1-.

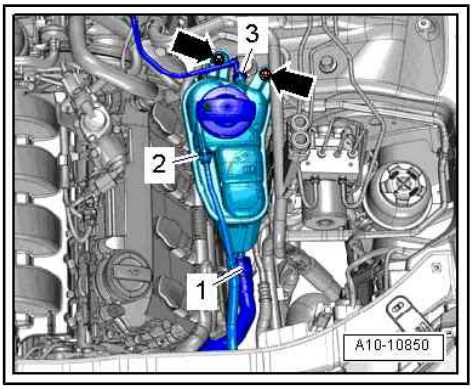
– Take filler neck -3- with filler pipe out of washer fluid reservoir and out through body opening -arrow B-.



– Remove bolts -arrows- and detach lid of electronics box (left-side).

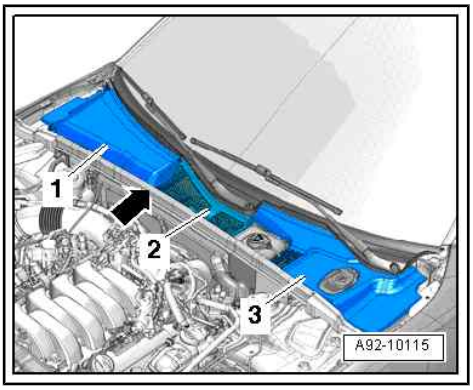


– Unscrew nuts -arrows-, lift out coolant expansion tank and place aside.



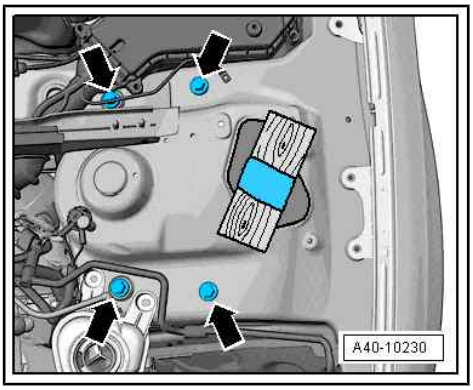
Right side of vehicle:

– Unclip and detach plenum chamber cover -1-.



Both sides of vehicle:

– Remove bolts -arrows- and take out suspension strut with mounting bracket.

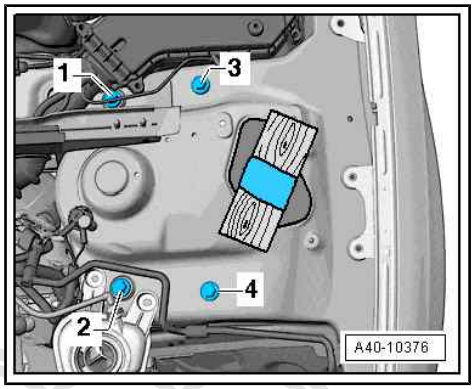


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Installing

Installation is carried out in the reverse sequence. Note the following points:

– Fit bolts shown in illustration in sequence -1, 2, 3- and -4- and tighten
.



Note

Observe correct sequence for tightening bolts securing mounting bracket and suspension strut to suspension turret.

Tightening torques
⇒ „2.1 Exploded view of subframe, cross brace, anti-roll bar, coupling rod (vehicles up to August 2007)“, page 17

Tightening torques
⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

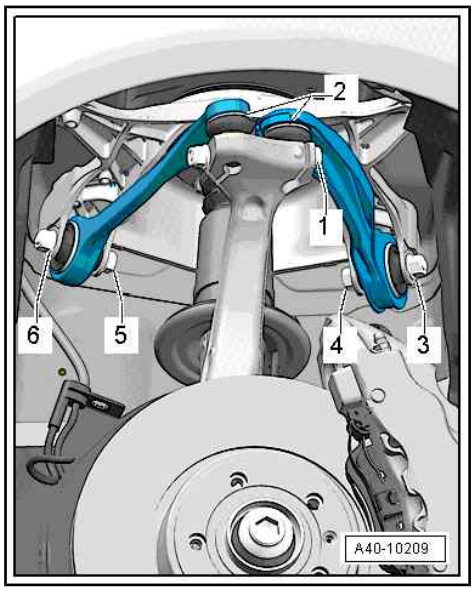
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Tightening torques: union nut at hose on DRC shock absorber
⇒ page 281

Note

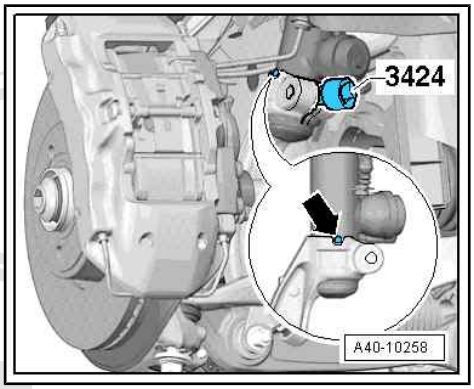
Press down upper links as far as possible while tightening nut.

– Tighten bolt connection -1- to specified torque.



Note

When fitting, ensure T-bolt -arrow- engages in groove of shock absorber fork.



Note

Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.

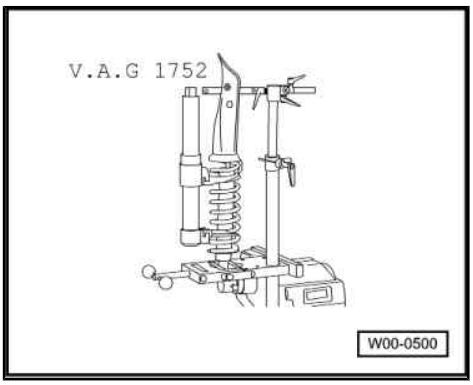
- Charge DRC system ⇒ page 284 .
- Lifting suspension to unladen position ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13
- On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .
- If the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted on vehicles with electronic damping control ⇒ page 273 ⇒ Vehicle diagnostic tester.
- If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
- Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
- Check and adjust wheel alignment as required, see chart ⇒ page 310 .

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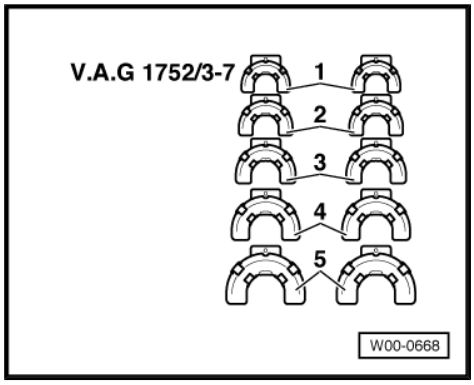
3.3 Servicing suspension strut and mounting bracket

Special tools and workshop equipment required

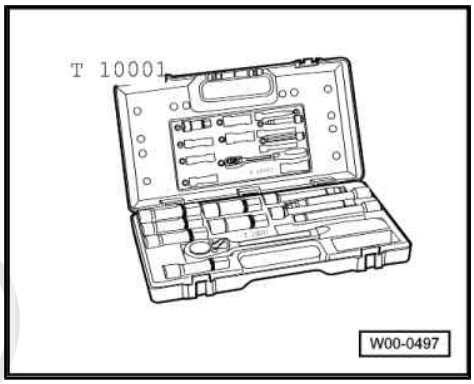
- Spring compressor -V.A.G 1752/1-
- Strut holder -V.A.G 1752/2-



- Spring retainer -V.A.G 1752/7-



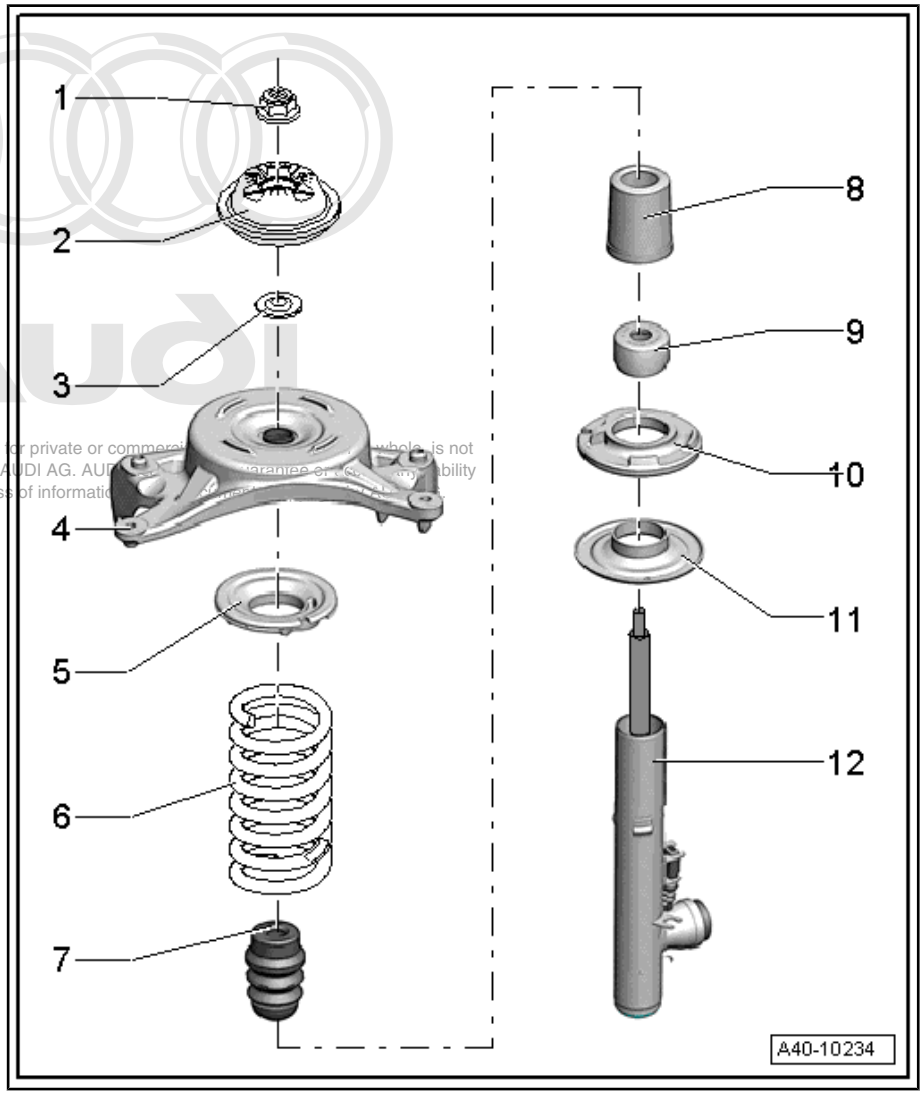
- Knurled screw from -V.A.G 1752/18-
- Rod, extended -V.A.G 1752/18-3-
- Clamp plate -V.A.G 1752/19-1-
- Suspension strut adjuster gauge -V.A.G 1752/19-
- Shock absorber set -T10001/3-



- Shock absorber set -T10001/4-
- Shock absorber set -T10001/7-
- Shock absorber set -T10001/11-

Exploded view

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1 - Nut

- ❑ 50 Nm
- ❑ Always renew if removed

2 - Shock absorber mounting

3 - Washer

4 - Mounting bracket

5 - Top spring seat

6 - Coil spring

- ❑ Removing ⇒ page 46
- ❑ Installing ⇒ page 47
- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ For correct version refer to ⇒ Electronic parts catalogue

7 - Auxiliary spring

8 - Protective sleeve

9 - Protective cap

10 - Bottom spring seat

11 - Bottom spring plate

12 - Shock absorber

- ❑ Renewing ⇒ page 47
- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ Defective shock absorbers must always be degassed and drained before disposal
- ❑ For correct version refer to ⇒ Electronic parts catalogue

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Explanatory notes on production control numbers (PR Nos.)
⇒ page 311

The damper combinations fitted in the vehicle are indicated by the corresponding PR No. on the vehicle data sticker.

Removing coil spring

1 - Spring compressor -V.A.G 1752/1-

2 - Socket -T10001/7-

3 - Ratchet -T10001/11-

4 - Socket -T10001/3-

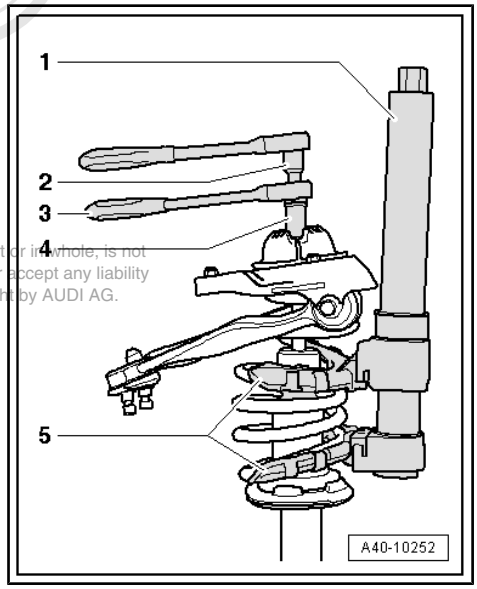
5 - Spring retainer -V.A.G 1752/7-

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– Clamp suspension strut in vice with shock absorber fork attached.

– Mark installation position of mounting bracket relative to T-bolt on shock absorber tube (use a felt-tip pen).

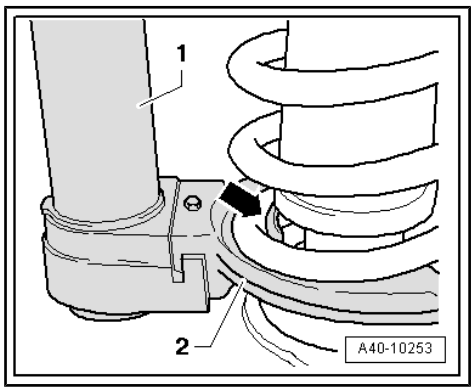
– Compress coil spring using spring compressor -V.A.G 1752/1- and spring retainers -V.A.G 1752/7- until top spring seat is free.



– Ensure that coil spring is correctly seated in spring retainer -2-.

1 - Spring compressor -V.A.G 1752/1-

2 - Spring retainer -V.A.G 1752/7-



– Unscrew nut from piston rod using tools -2-, -3- and -4-.

1 - Spring compressor -V.A.G 1752/1-

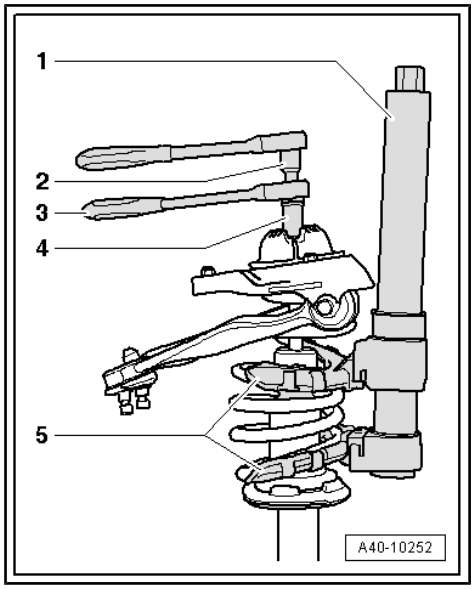
2 - Socket -T10001/7-

3 - Ratchet -T10001/11-

4 - Socket -T10001/3-

5 - Spring retainer -V.A.G 1752/7-

– Take off suspension strut components and compressed coil spring together with spring compressor -V.A.G 1752/1- .

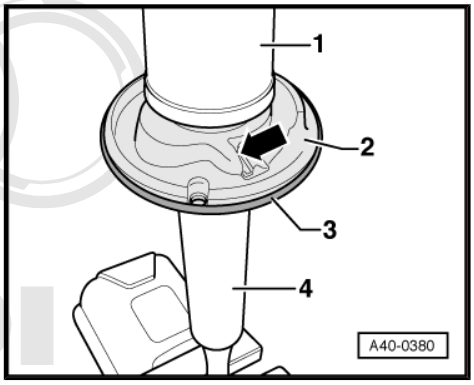


Renewing shock absorber

– Take off protective cap -1- and bottom spring seat -2-.

– Knock spring plate -3- loose using plastic-headed hammer and lift off.

– Using plastic-headed hammer, knock spring plate onto new shock absorber.

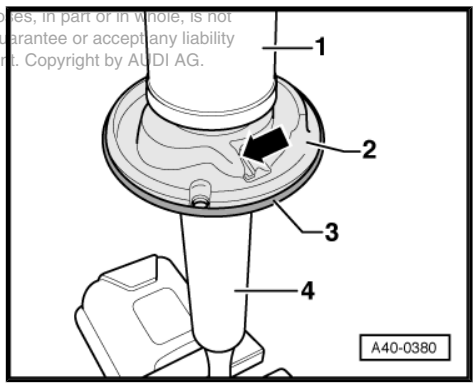


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Installing coil spring

– Install bottom spring seat and protective cap.

– Position compressed coil spring on bottom spring seat. End of spring coil must make contact with stop -arrow- (maximum permissible clearance 2 mm).

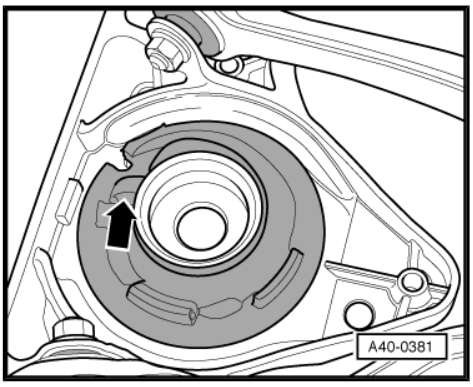


Install mounting bracket with spring seat on compressed coil spring so that spring seat makes contact with end of spring coil -arrow- (maximum permissible clearance 2 mm).

– Fit component parts of suspension strut.

– Tighten nut using special tools ⇒ Item 1 (page 45) .

– Align marking on mounting bracket relative to T-bolt on shock absorber tube and release tension on spring.



Installation position of mounting bracket

– Attach strut holder -V.A.G 1752/2- as shown in illustration.

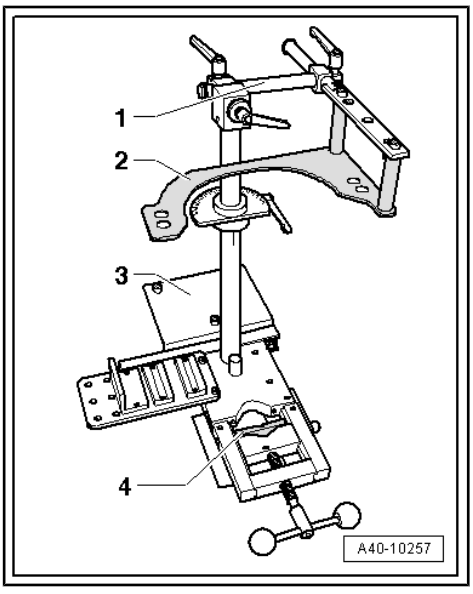
1 - Rod, extended -V.A.G 1752/18-3-

2 - Suspension strut adjuster gauge -V.A.G 1752/19-

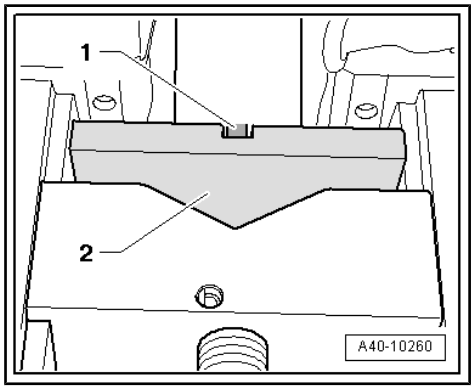
3 - Strut holder -V.A.G 1752/2-

4 - Clamp plate -V.A.G 1752/19-1-

– Clamp suspension strut with spring compressor vertically in strut holder -V.A.G 1752/2- .

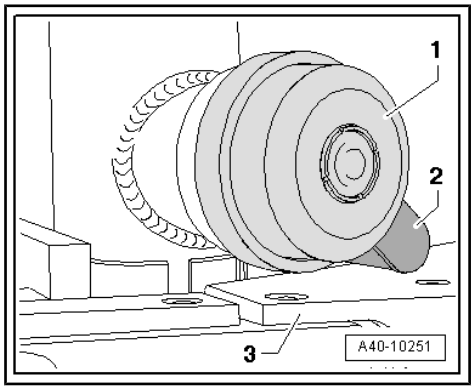


– Clamp suspension strut so that pin -1- engages in recess on clamp plate -2-.



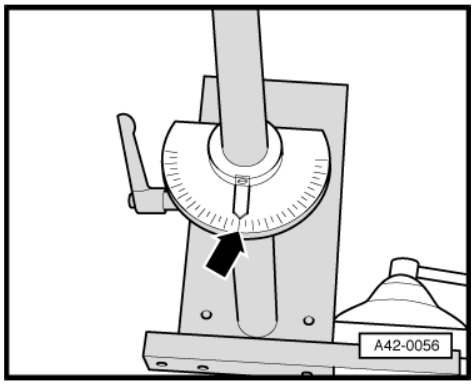
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– When attaching suspension strut to clamp, make sure that front damping adjustment valve -1- and electrical wiring connection -2- are not resting on strut holder -3-.



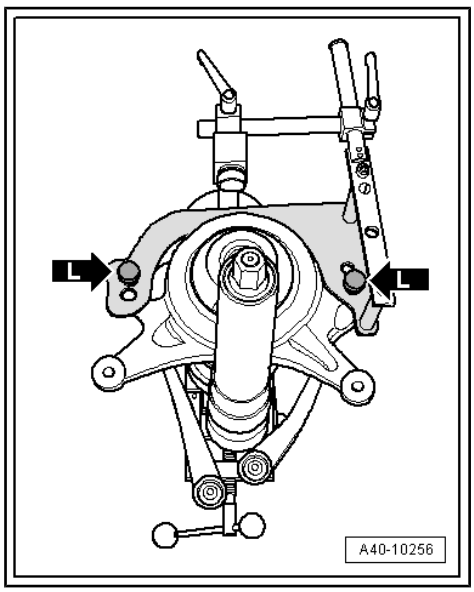
– Release clamping lever and set pointer to 0° -arrow-. Then tighten clamping lever again.

– Adjust mounting bracket so that suspension strut adjuster gauge -V.A.G 1752/19- (for relevant side) can be bolted onto mounting bracket.



Left side of vehicle:

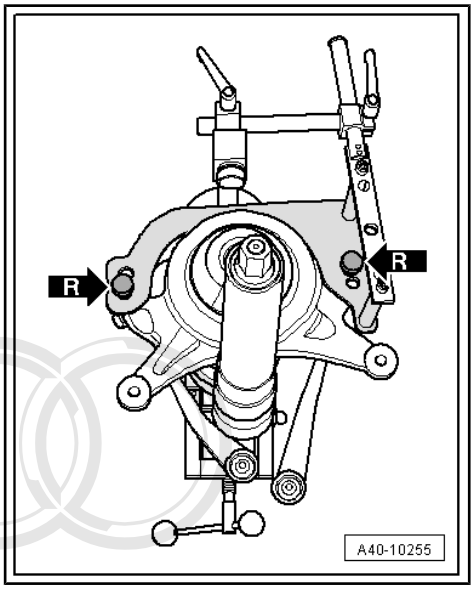
– Bolt suspension strut adjuster gauge -V.A.G 1752/19- to mounting bracket -arrows L-.



Right side of vehicle:

– Bolt suspension strut adjuster gauge -V.A.G 1752/19- to mounting bracket -arrows R-.

– Now slacken off and remove spring compressor -V.A.G 1752/1- .



Note

When slackening spring compressor, make sure that ends of spring are in contact with stops on bottom spring seat and spring seat on mounting bracket.

– Check adjustment and repeat procedure if necessary.

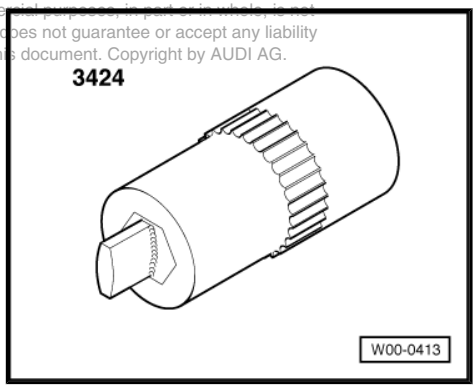
Maximum permissible misalignment: ± 2°

3.4 Removing and installing shock absorber fork

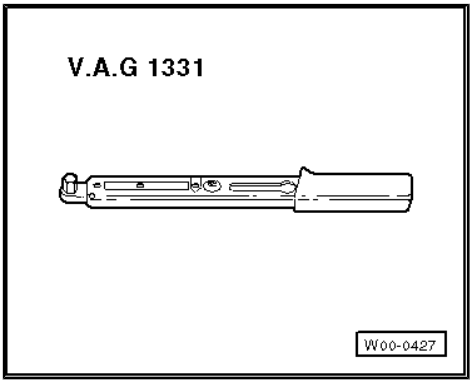
Special tools and workshop equipment required

♦ Spreader -3424-

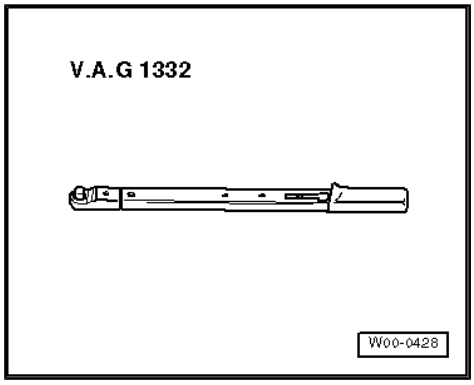
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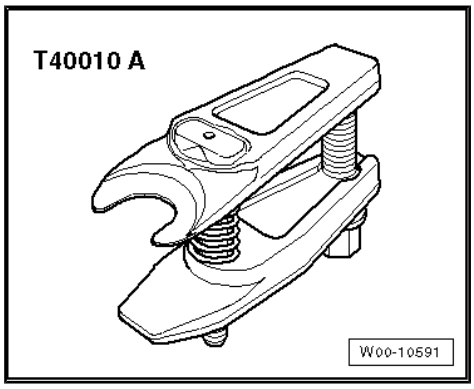
♦ Torque wrench -V.A.G 1331-



♦ Torque wrench -V.A.G 1332-

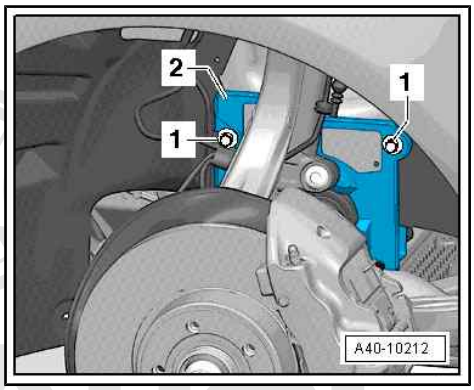


♦ Ball joint puller -T40010 A-

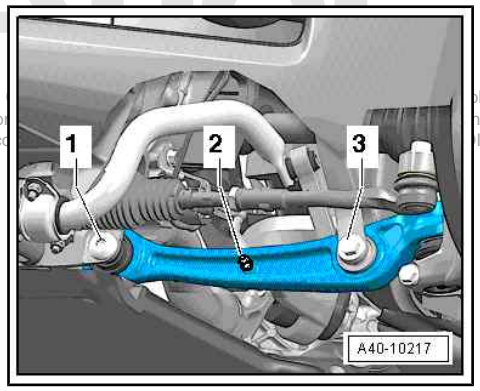


Removing

– Remove wheel.
– Unscrew nuts -1- and detach cover -2-.
– Remove noise insulation ⇒ Rep. gr. 66 .



– On vehicles with vehicle level sender, unscrew nut -2-.
– Detach bolt connection -2-.

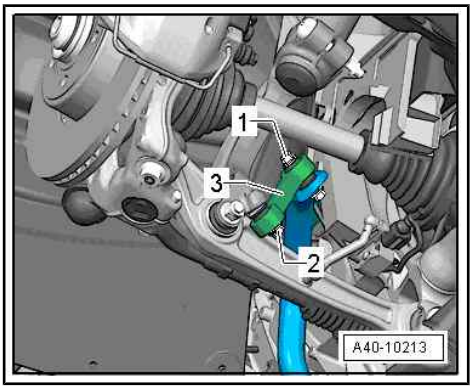


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Vehicles up to August 2007:

– Detach bolt connections -1- and -2-.

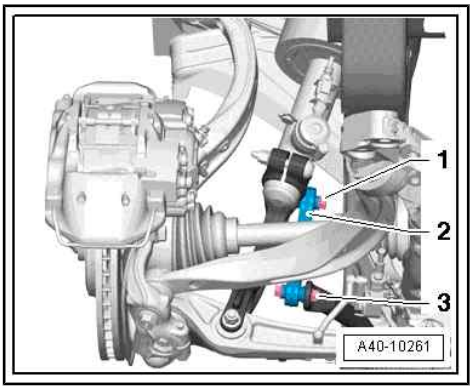
– Take out coupling rod -3-.



Vehicles from September 2007 onwards:

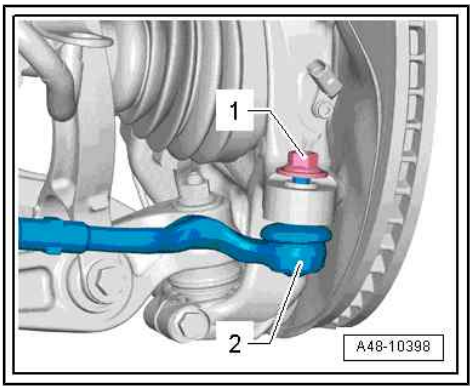
– Detach bolt connections -1- and -3-.

– Take out coupling rod -2-.



All vehicles (continued):

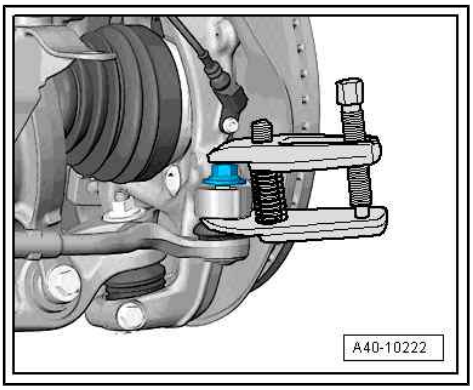
– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



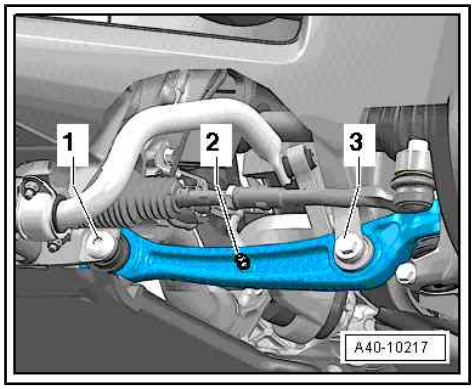
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Leave nut screwed on a few turns to protect threads on joint pin.

– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.



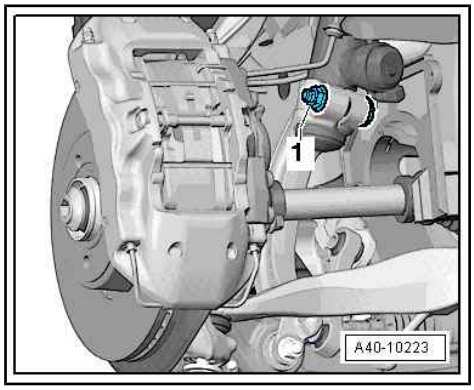
– Detach bolt connection -3-.
– Detach bolt connection -1-, guide out track control link and swivel forwards.



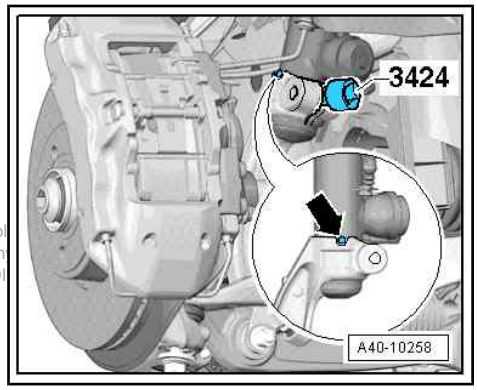
Note

To remove bolt -1-, turn steering box fully to left or right depending on which side of the vehicle you are working on.

– Detach bolt connection -1-.



– Insert spreader -3424- in slot in wheel bearing housing.
– Turn ratchet handle through 90° and pull ratchet handle off spreader -3424- .
– Pull shock absorber fork -1- downwards off shock absorber tube and remove.



Installing

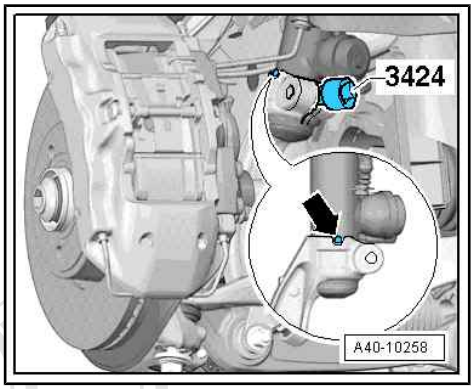
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Installation is carried out in the reverse sequence. Note the following points:

– Install coupling rod ⇒ page 33 .

Tightening torques
⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

Tightening torques
⇒ „4.2 Removing and installing track control link“, page 59



Note

When fitting, ensure T-bolt -arrow- engages in groove of shock absorber fork.

Note

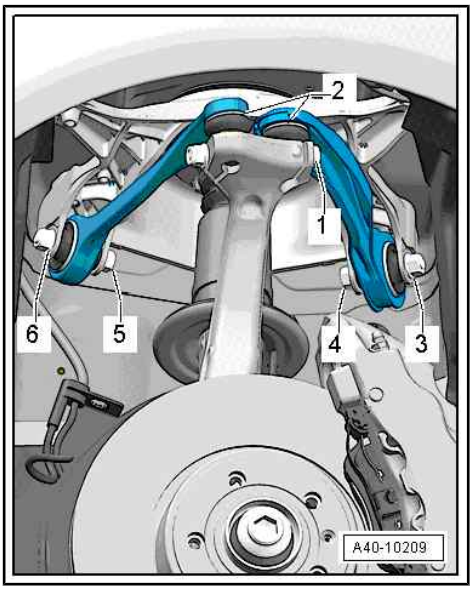
Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.

- Lifting suspension to unladen position ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13
- On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .
- If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.
- If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
- Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
- Check and adjust wheel alignment as required, see chart ⇒ page 310 .

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3.5 Removing and installing upper links

Removing



- Remove wheel.
- Detach bolt connection -1-.
- Take both joint pins of upper links -2- out of wheel bearing housing.

Do not attempt to enlarge slots in wheel bearing housing using a chisel or similar.

- Remove nuts -3- and -6-.
- Remove bolts -4- and -5- and detach upper links.

Installing

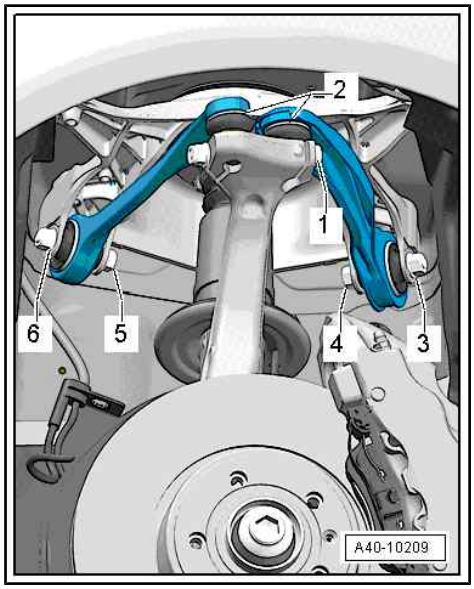
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

Note

Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.

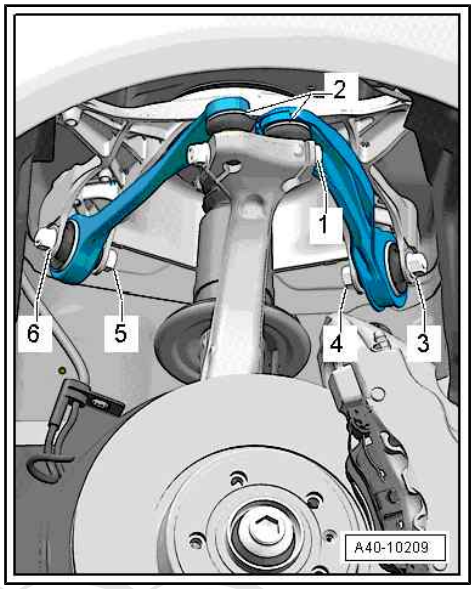
– Fit upper links and insert bolts -4- and -5-.
– Fit nuts -3- and -6- and hand-tighten.
– Fit both joint pins of upper links -2- into wheel bearing housing and insert bolt -1-.



Note

Press down upper links as far as possible while tightening nut.

– Tighten bolt connection -1- to specified torque.
– Lifting suspension to unladen position
⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13



Note

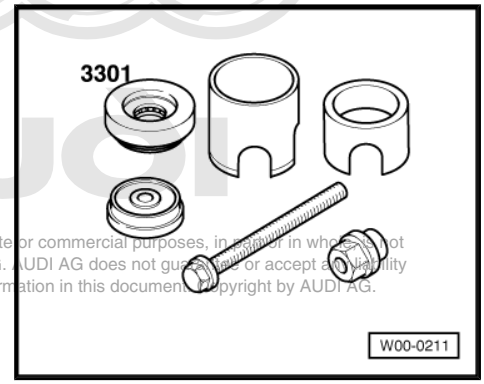
When tightening nuts -3- and -6-, upper links must be pressed towards inside of vehicle.

– Tighten nuts -3- and -6-.
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart
⇒ page 310 .

3.6 Renewing bushes for front and rear upper links

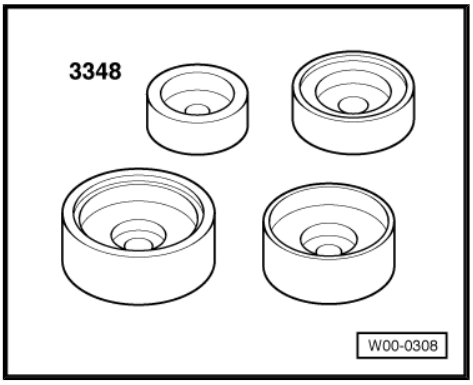
Special tools and workshop equipment required

♦ Assembly tool -3301-



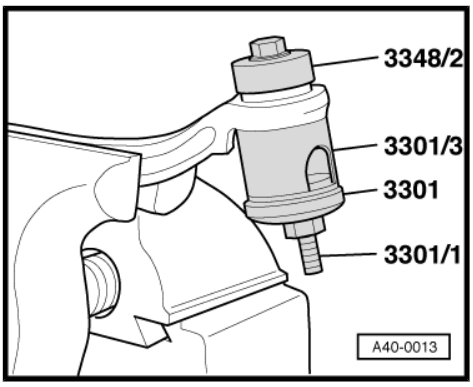
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- Assembly tool -3348-



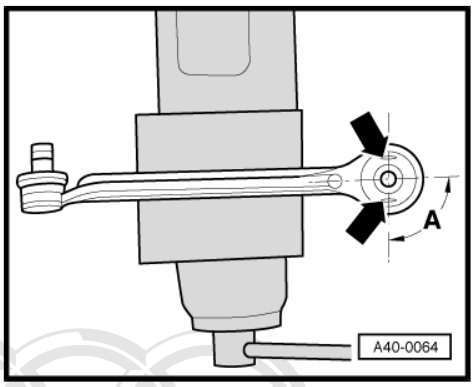
Always use soft jaws when clamping suspension links in a vice.

Pulling out bush



Installation position of bush

A = ~ 90° ± 5°

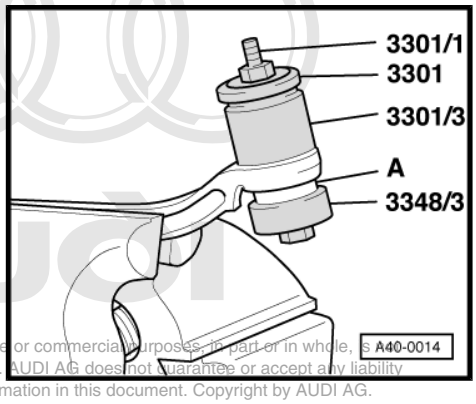


Installing bush

A = Bush

Note

Do not use lubricant.

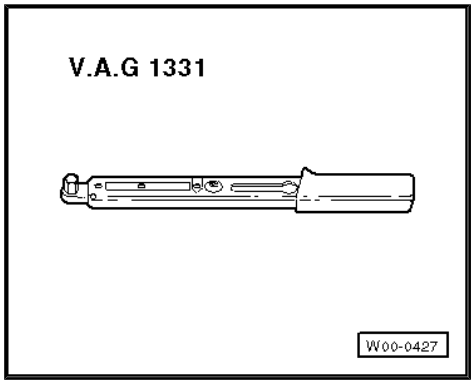


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3.7 Removing and installing body brace

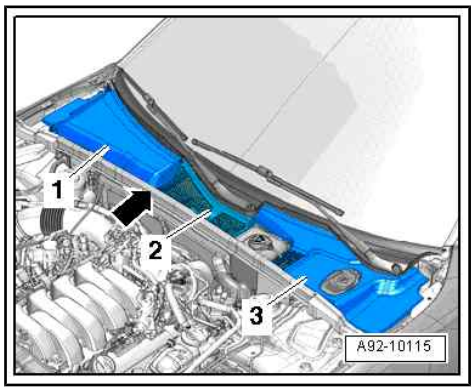
Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-

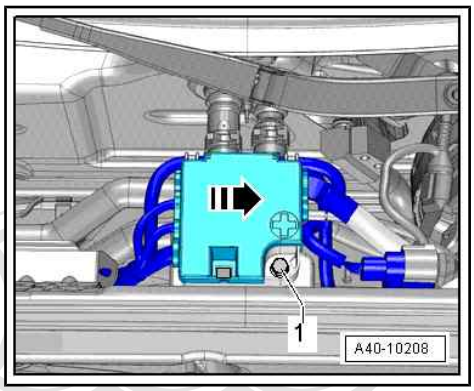


Removing

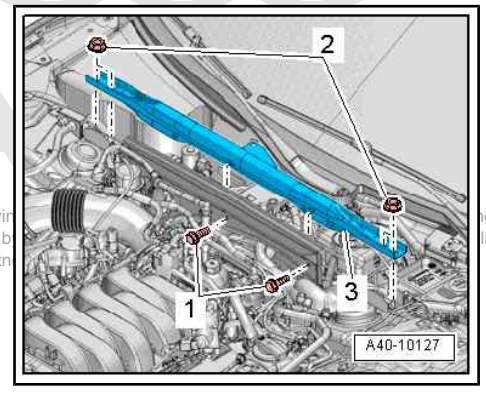
– Unclip and detach plenum chamber cover -1- and -3-.



– Remove bolt -1- and guide electronics box off body brace in direction of -arrow-.



– Unscrew bolts -1- and nuts -2- and take out body brace -3-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques

⇒ „3.1 Exploded view of suspension strut with mounting bracket, shock absorber fork, upper links, body brace“, page 36

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4 Track control link, swivel joint, guide link, vehicle level sender

⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

⇒ „4.2 Removing and installing track control link“, page 59

⇒ „4.3 Renewing bush for track control link“, page 62

⇒ „4.4 Removing and installing swivel joint“, page 67

⇒ „4.5 Removing and installing guide link“, page 68

⇒ „4.6 Renewing conventional bonded rubber bush (65 mm ∅) for guide link“, page 71

⇒ „4.7 Renewing hydraulic bonded rubber bush (75 mm ∅) for guide link“, page 73

⇒ „4.8 Removing and installing vehicle level sender“, page 76

4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender

1 - Bolt

- ❑ Always renew if removed

2 - Guide link

- ❑ Removing and installing ⇒ page 68
- ❑ Different versions (with conventional or hydraulic bonded rubber bush); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible
- ❑ Renewing conventional bonded rubber bush (65 mm ∅) for guide link ⇒ page 71
- ❑ Renewing hydraulic bonded rubber bush (75 mm ∅) for guide link ⇒ page 73

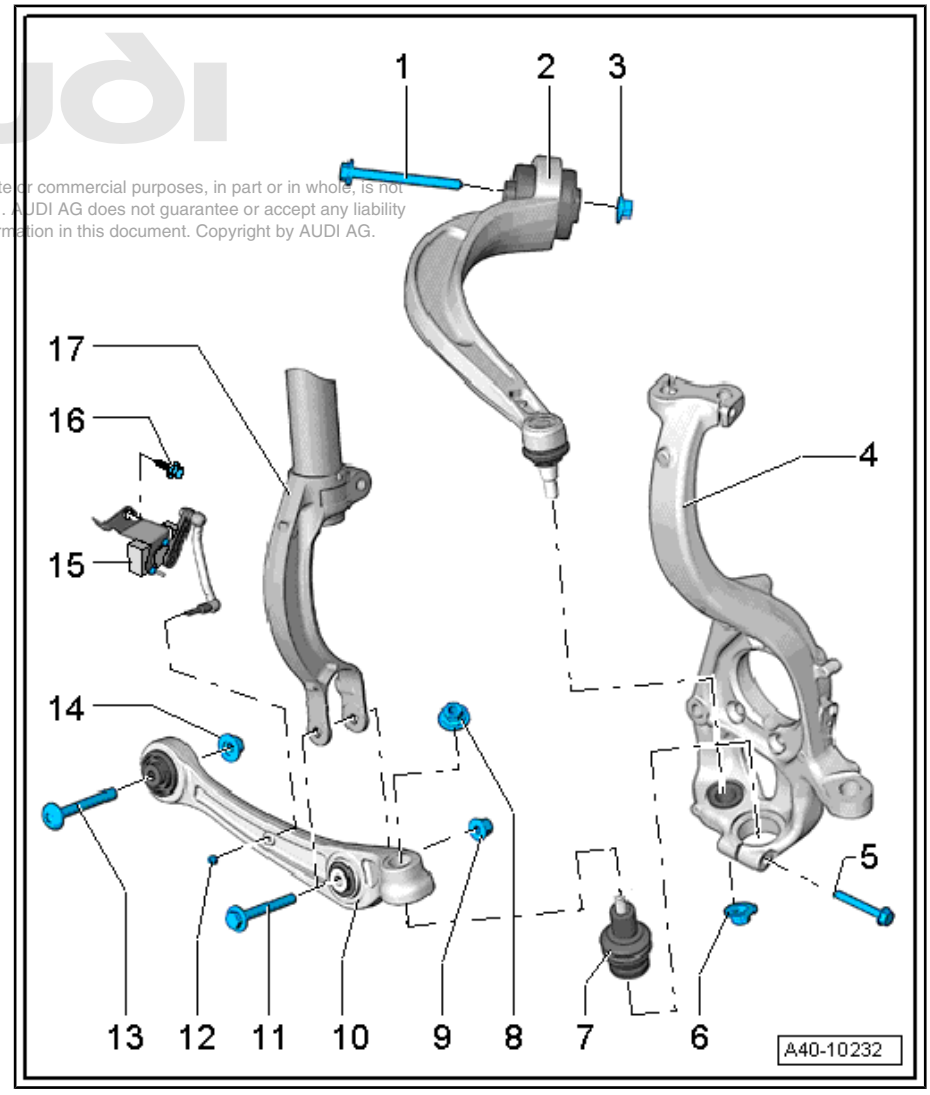
3 - Nut

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

4 - Wheel bearing housing

5 - Bolt

- ❑ 40 Nm
- ❑ Always renew if removed



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6 - Nut

- ❑ Always renew if removed
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 59
- ❑ After detaching guide link from wheel bearing housing, remove residual adhesive from thread of joint pin.

7 - Swivel joint

- ❑ Removing and installing ⇒ page 67
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue

Note

8 - Nut

- ❑ Always renew if removed
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 59
- ❑ After detaching swivel joint from wheel bearing housing, remove residual adhesive from thread of joint pin.

9 - Nut

- ❑ 90 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

10 - Track control link

- ❑ Removing and installing ⇒ page 59
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renewing bush for track control link ⇒ page 62

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11 - Bolt

- ❑ Always renew if removed

12 - Nut

- ❑ 9 Nm

13 - Bolt

- ❑ Always renew if removed

14 - Nut

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 13

15 - Front left vehicle level sender -G78-; front right vehicle level sender -G289-

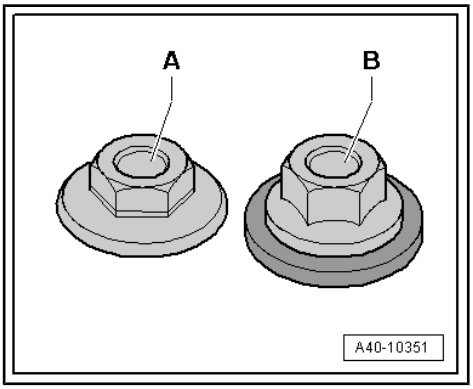
- ❑ Always install senders of the same version
- ❑ Remove/install and renew only as a complete assembly ⇒ page 76
- ❑ Lever of sender must face towards rear
- ❑ Check basic adjustment of headlights if sender mountings are loosened ⇒ Rep. gr. 94
- ❑ If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

16 - Bolt

- ❑ 20 Nm

17 - Shock absorber fork

Nut versions for securing track control link and guide link



- Hexagon flange nut -A- (M12) width across flats: 21 mm

Tightening torque: 145 Nm

- Hexagon nut with washer -B- (M12) width across flats: 18 mm

Tightening torque: 110 Nm

- Hexagon nut with washer -B- (M12) width across flats: 21 mm

Tightening torque: 120 Nm

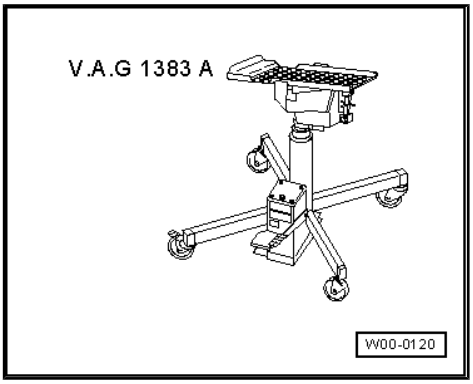
- Hexagon nut with washer -B- (M14) width across flats: 21 mm

Tightening torque: 140 Nm

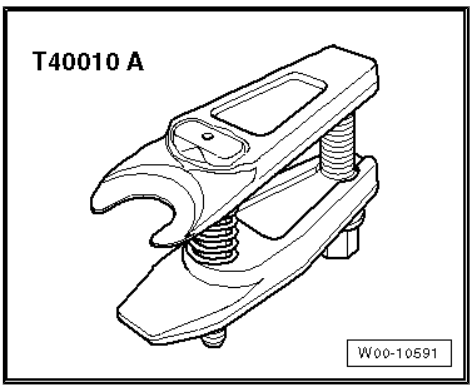
4.2 Removing and installing track control link

Special tools and workshop equipment required

- Engine and gearbox jack -V.A.G 1383 A-

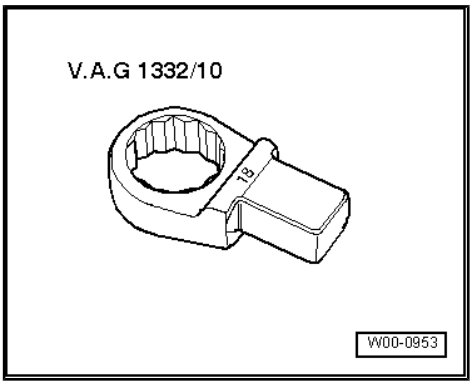


- Ball joint puller -T40010 A-

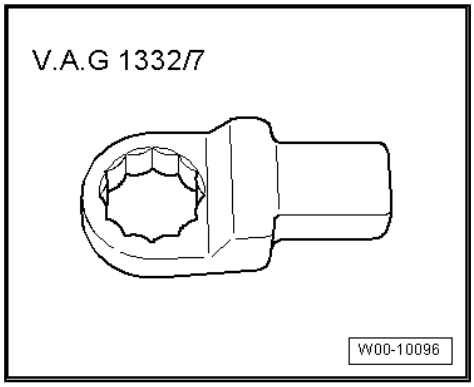


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- Ring spanner insert -V.A.G 1332/10-



♦ or ring spanner insert -V.A.G 1332/7-



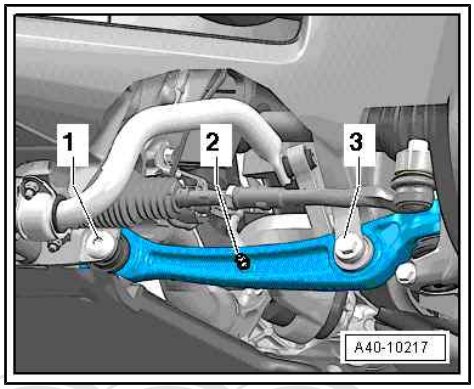
Removing

– Remove wheel.

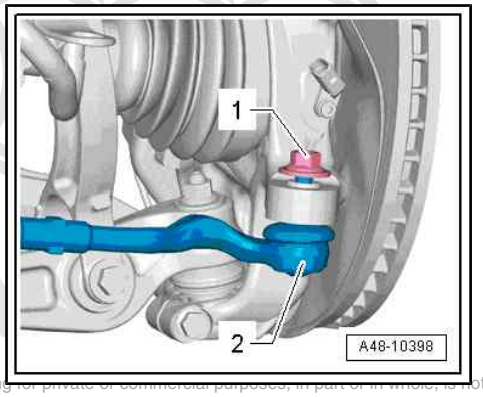
– Remove noise insulation ⇒ Rep. gr. 66 .

– On vehicles with vehicle level sender, unscrew nut -2-.

– Detach bolt connection -3-.



– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



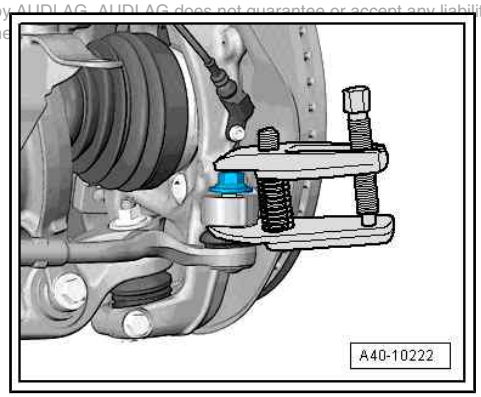
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Leave nut screwed on a few turns to protect threads on joint pin.

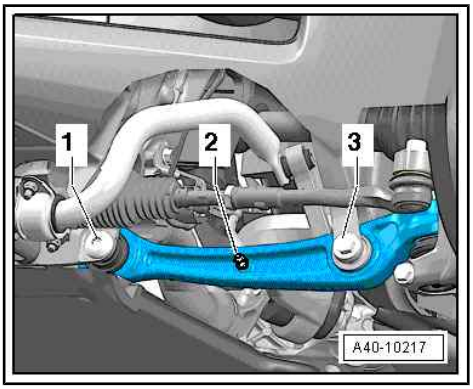
– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.



– Detach bolt connection -1-.



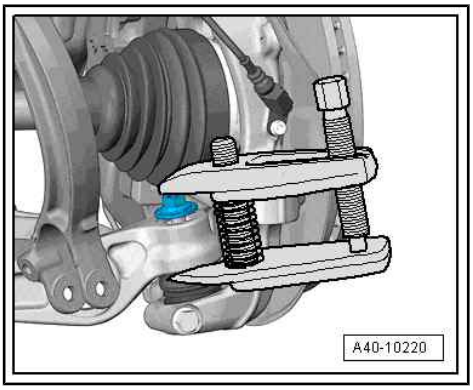
Note

To remove bolt -1-, turn steering box fully to left or right depending on which side of the vehicle you are working on.

– Guide out track control link from subframe and swivel towards rear.

– Unscrew nut on swivel joint pin until it is flush with end of thread. Counterhold if necessary when loosening.

– Press swivel joint pin out of tapered seat using ball joint puller -T40010 A- .



Note

- *Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.*
- *Take care not to damage drive shaft boot.*
- *To avoid damage to joints of upper links, support wheel bearing housing (e.g. using engine and gearbox jack - V.A.G 1383 A-) to prevent the suspension from extending too far.*

– Remove nut from joint pin of track control link.

– Take out track control link.

Installing

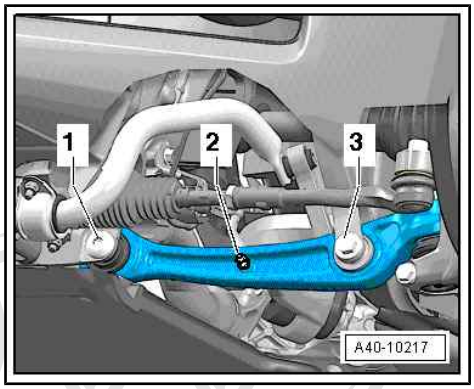
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

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Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lifting suspension to unladen position ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13*
- *When tightening bolt connection -1-, track control link must be pressed towards inside of vehicle.*



– Remove remaining adhesive from thread of joint pin on swivel joint.

– On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .

– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.

– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

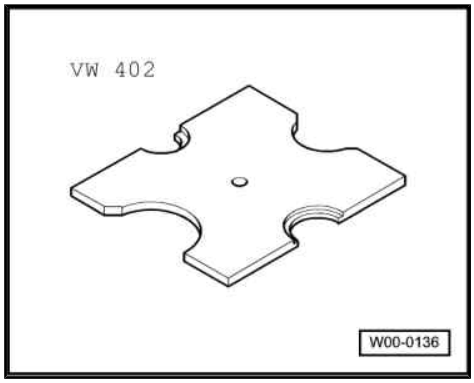
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4.3 Renewing bush for track control link

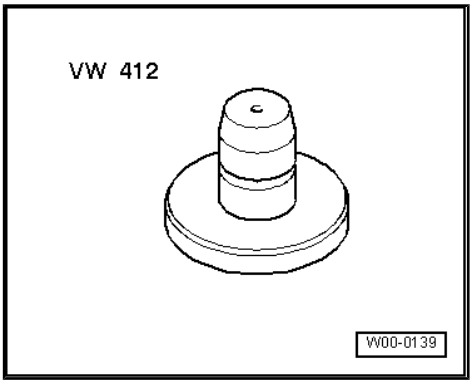
Pressing out / pressing in bush for track control link (wheel bearing housing end)

Special tools and workshop equipment required

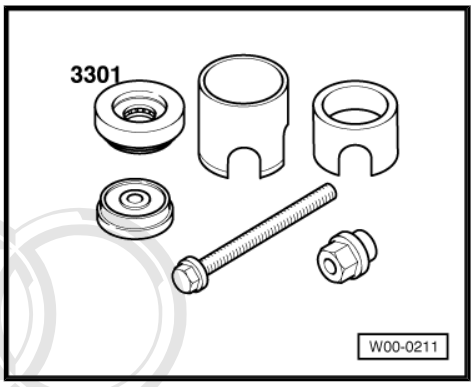
- Thrust plate -VW 402-



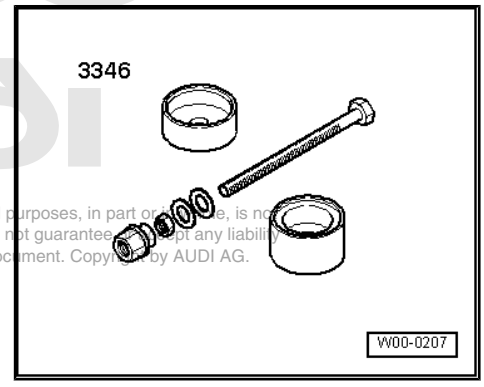
- Press tool -VW 412-



- Assembly tool -3301-

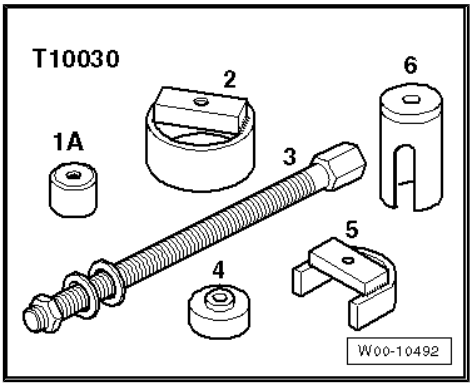


- Assembly tool -3346-



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- Assembly tool -T10030-



- Assembly paste

Note

Track control link must be held in position while bush is being removed or installed.

Pressing out bush

– Remove track control link ⇒ page 59 .

– Mark position (installation depth) of bush -1- on bush -arrow-.

Use a waterproof felt-tip pen or similar for marking.

– Apply special tools as shown in illustration.

1 - Press tool -VW 412-

2 - Thrust piece -T10030/1-

3 - Bush

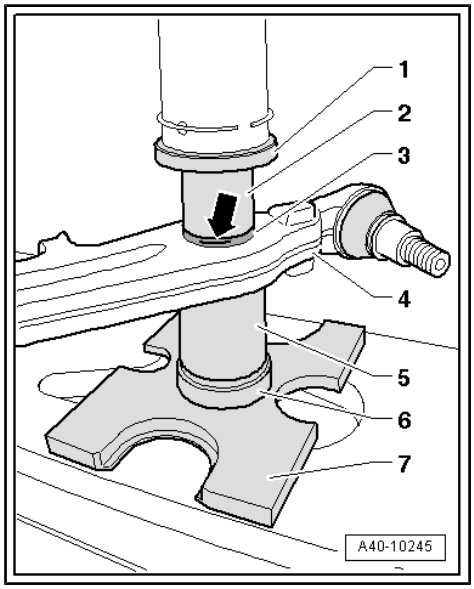
4 - Track control link

5 - Support sleeve -3301/3-

6 - Assembly tool -3301/1-

7 - Thrust plate -VW 402-

– Press bush -3- out of track control link -4-.



Pressing in bush

– Transfer marking for installation position from old bush to new bush.

– Lightly lubricate bush with assembly paste ⇒ Electronic parts catalogue .

– Locate bush -3- in track control link -4-.

– Apply special tools as shown in illustration.

1 - Press tool -VW 412-

2 - Thrust piece -T10030/1-

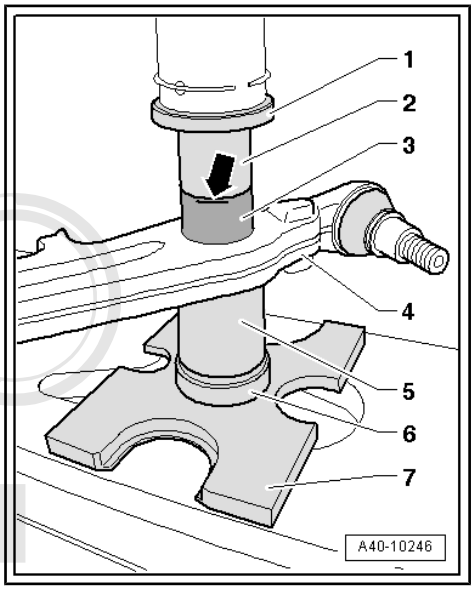
3 - Bush

4 - Track control link

5 - Thrust piece -3346/1-

6 - Assembly tool -3301/1-

7 - Thrust plate -VW 402-



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Note

Make sure bush remains straight while pressing in.

– Press bush -3- into track control link -4-.

– Refit to marking made before removal -arrow-.

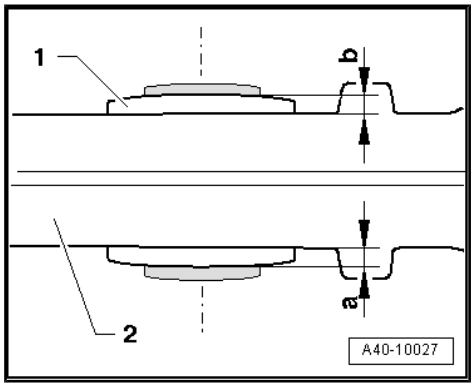
– Check installation depth of bush -1- in track control link -2-.

Dimensions -a- and -b- must be equal.

– Press bush -1- in further if dimensions -a- and -b- are not equal.

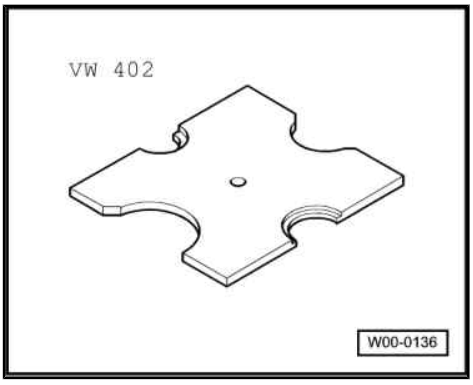
– Install track control link ⇒ page 59 .

Pressing out / pressing in bush for track control link (subframe end)

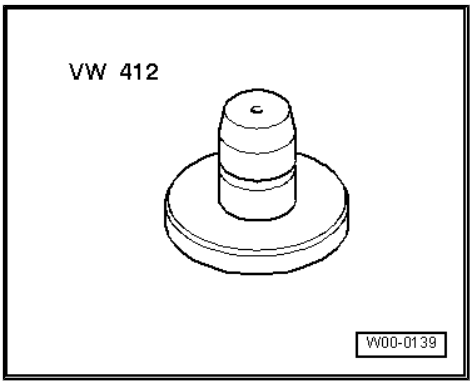


Special tools and workshop equipment required

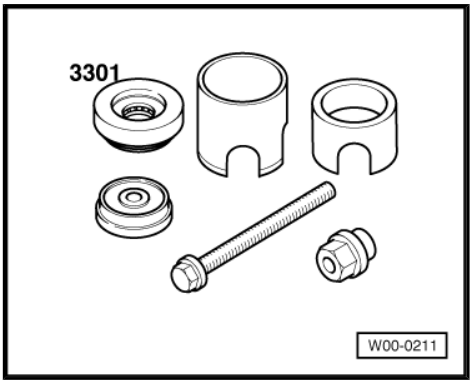
- Thrust plate -VW 402-



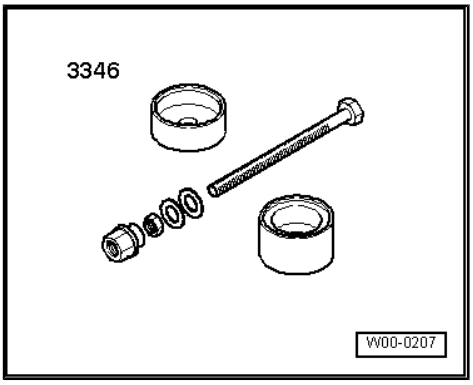
- Press tool -VW 412-



- Assembly tool -3301-



- Assembly tool -3346-



- Assembly paste

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Note

Track control link must be held in position while bush is being removed or installed.

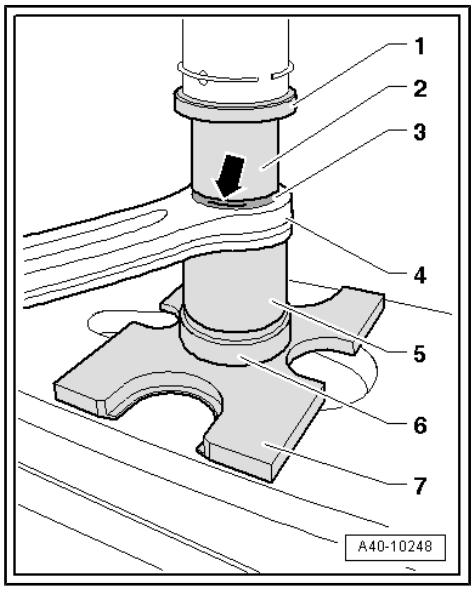
Pressing out bush

– Remove track control link ⇒ page 59 .

– Mark position (installation depth) of bush -3- on bush -arrow-.

Use a waterproof felt-tip pen or similar for marking.

– Apply special tools as shown in illustration.



1 - Press tool -VW 412-

2 - Thrust piece -3346-

3 - Bush

4 - Track control link

5 - Support sleeve -3301/4-

6 - Assembly tool -3301/1-

7 - Thrust plate -VW 402-

– Press bush -3- out of track control link -4-.

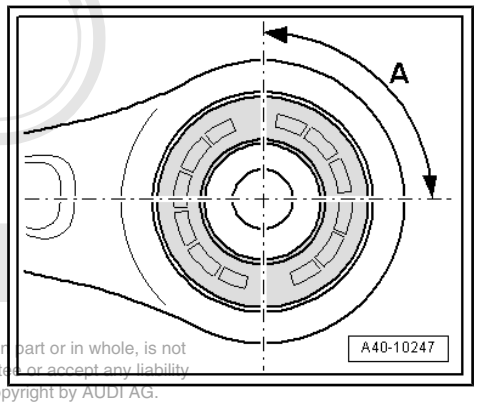
Pressing in bush

– Transfer marking for installation position from old bush to new bush.

Installation position of bush

A = ~ 90° ± 5°

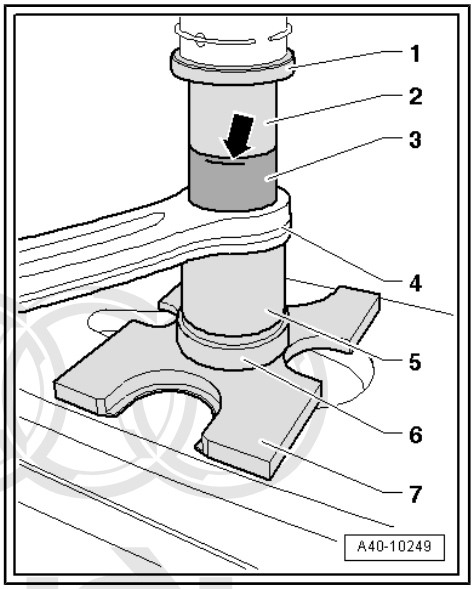
– Lightly lubricate bush with assembly paste ⇒ Electronic parts catalogue .



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– Locate bush -1- in track control link -2-.
– Apply special tools as shown in illustration.

1 - Press tool -VW 412-
2 - Thrust piece -3346-
3 - Bush
4 - Track control link
5 - Support sleeve -3301/3-
6 - Assembly tool -3301/1-
7 - Thrust plate -VW 402-



Note

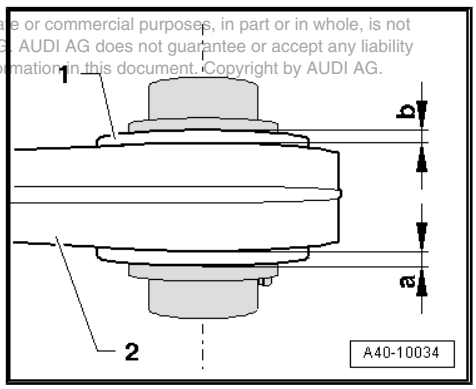
Make sure bush remains straight while pressing in.

– Press bush -3- into track control link -4-.
– Refit to marking made before removal -arrow-.
– Check installation depth of bush -1- in track control link -2-.

Dimensions -a- and -b- must be equal.

– Press bush -1- in further if dimensions -a- and -b- are not equal.
– Install track control link ⇒ page 59 .

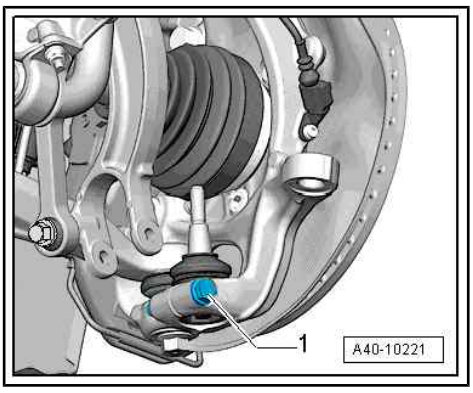
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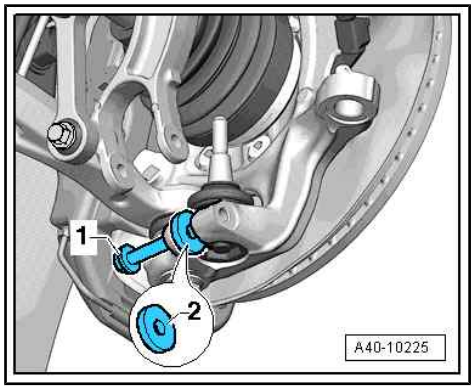
4.4 Removing and installing swivel joint

Removing

– Remove track control link ⇒ page 59 .
– Remove bolt -1-.



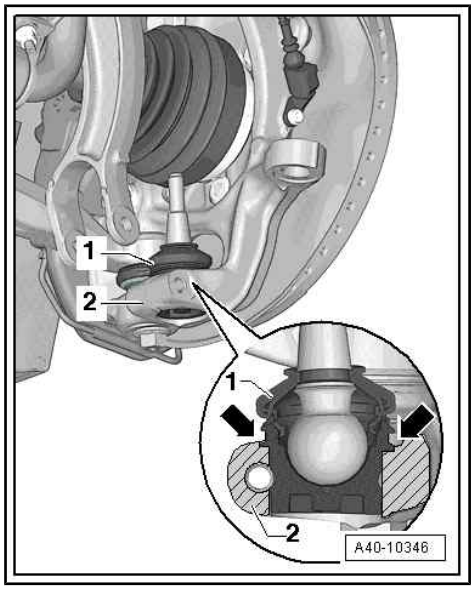
– Insert washer -2- (or similar part) into slot on wheel bearing housing. Choose a washer (or similar part) with the same width as the slot.
– Screw in bolt -1- from rear side until it makes contact with washer (or similar part).
– Widen slot on wheel bearing housing by screwing bolt -1- further in (half a turn).
– Take swivel joint out of wheel bearing housing.



Installing

Installation is carried out in the reverse sequence. Note the following points:

– Insert swivel joint -1- all the way onto contact surface -arrows- on wheel bearing housing -2-.



Note

If the swivel joint -1- does not make proper contact with the surface -arrows-, damage may occur in the area of the bolt connection on the wheel bearing housing -2-.

Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

– Install track control link ⇒ page 59 .
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

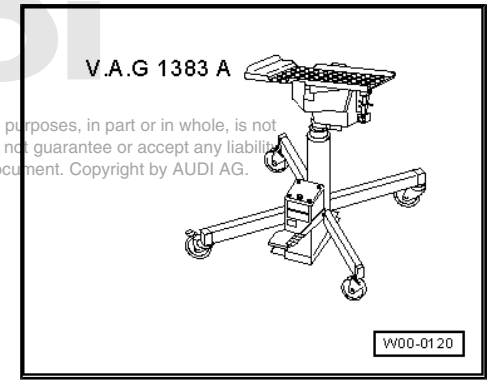
4.5 Removing and installing guide link

Note

In model year 2010, guide links with a hydraulic bonded rubber bush were introduced gradually instead of guide links with a conventional bonded rubber bush. Mixed installation of guide links with different bonded rubber bushes on the same axle is not permissible; for correct type, refer to ⇒ Electronic parts catalogue .

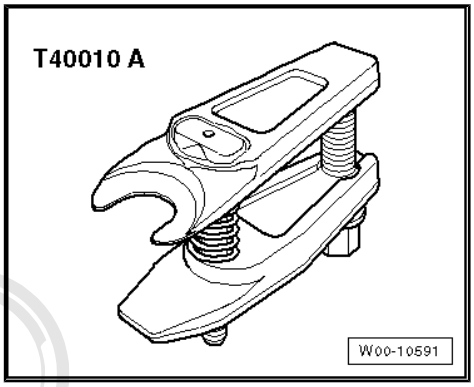
Special tools and workshop equipment required

♦ Engine and gearbox jack -V.A.G 1383 A-



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♦ Ball joint puller -T40010 A-



Removing

– Remove wheel.

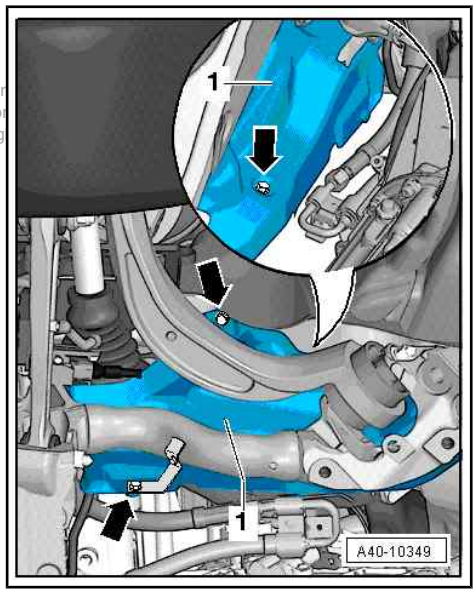
– Remove noise insulation ⇒ Rep. gr. 66 .

– If fitted, remove diagonal strut ⇒ page 30 .

– If fitted, remove bolts -arrows- and place subframe shield -1- to one side.

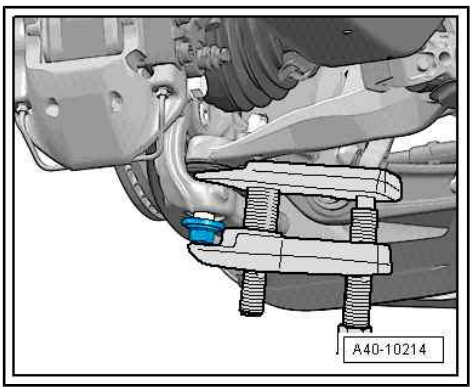
– Unscrew nut on joint pin of guide link until it is flush with end of thread. Counterhold joint pin if necessary.

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Leave nut screwed on a few turns to protect threads on joint pin.

– Press joint pin of guide link out of tapered seat using ball joint puller -T40010 A- .



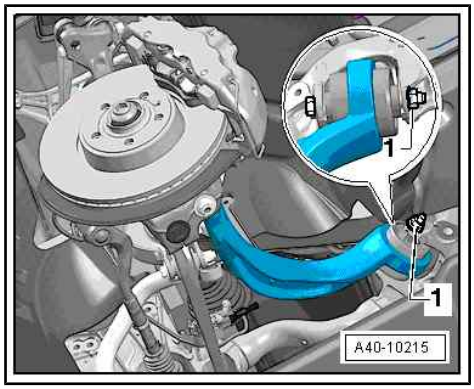
Note

♦ *Take care not to damage drive shaft boot.*

♦ *Make sure the two lever arms of the puller are parallel when maximum force is exerted.*

– Detach bolt connection -1-.

– Take out guide link.



Installing

Installation is carried out in the reverse sequence. Note the following points:

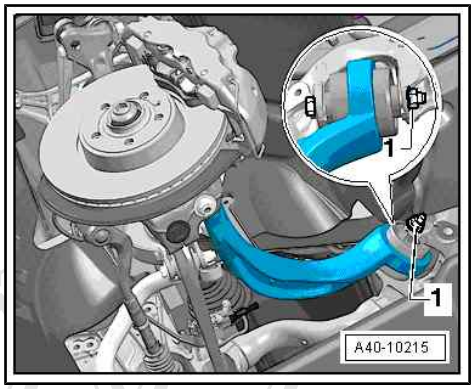
Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

– Remove remaining adhesive from thread of joint pin on guide link.

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lifting suspension to unladen position ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 13*
- *When tightening bolt connection -1-, guide link must be pressed towards inside of vehicle.*



– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

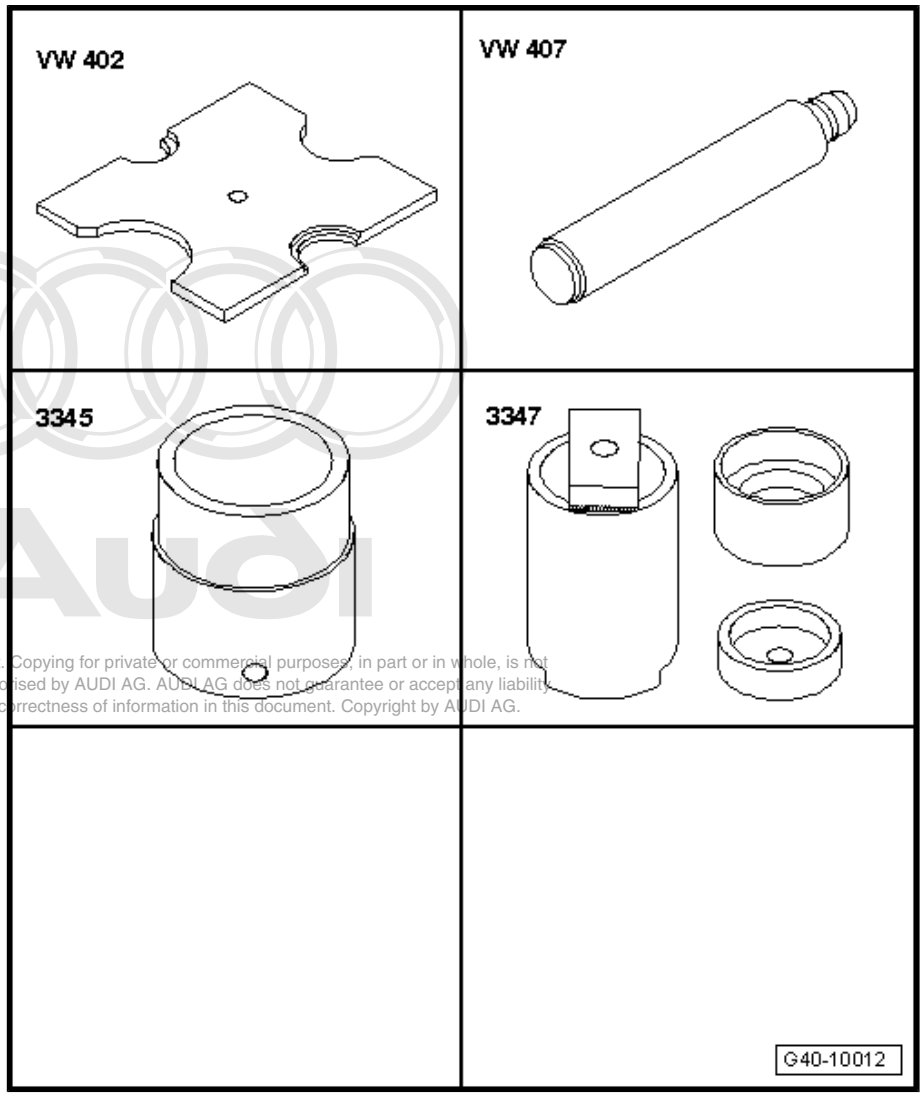
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

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4.6 Renewing conventional bonded rubber bush (65 mm ∅) for guide link

Special tools and workshop equipment required

- Thrust plate -VW 402-
- Press tool -VW 407-
- Wheel bearing tube -3345-
- Assembly tool -3347/1-



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Note

Guide link must be held in position while bush is being removed or installed.

Pressing out bush

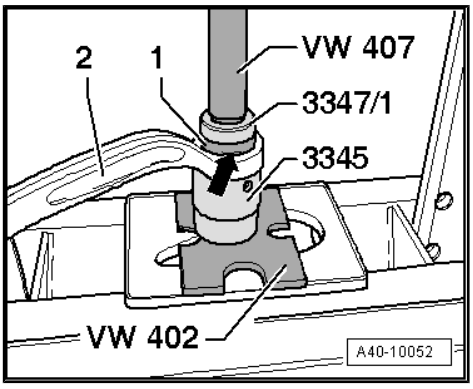
– Remove guide link ⇒ page 68 .

– Mark position (installation depth) of bush -1- on bush -arrow-.

Use a waterproof felt-tip pen or similar for marking.

– Apply special tools as shown in illustration.

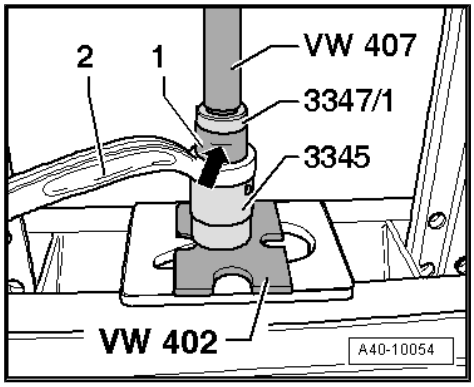
– Press bush -1- out of guide link -2-.



Pressing in bush

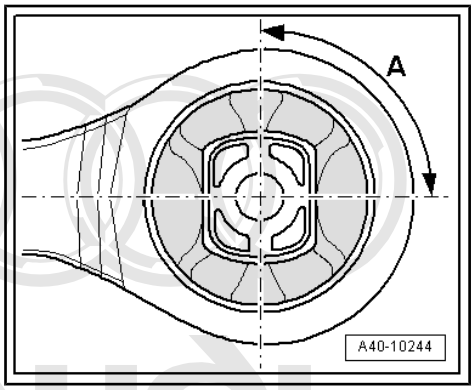
– Transfer marking for installation position from old bush to new bush -arrow-.

– Lightly lubricate bush with assembly paste ⇒ Electronic parts catalogue .



Installation position of bush

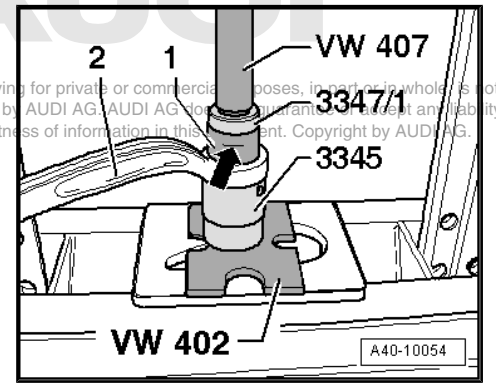
A = ~ 90° ± 5°



– Locate bush -1- in guide link -2-, making sure bush is positioned correctly.

– Apply special tools as shown in illustration.

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Note

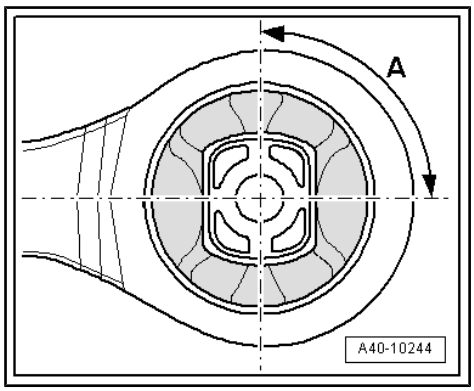
Make sure bush remains straight while pressing in.

– Press bush -1- into guide link -2-.

– Refit to marking made before removal -arrow-.

– Check that bush -1- is positioned correctly in guide link -2-.

A = ~ 90° ± 5°

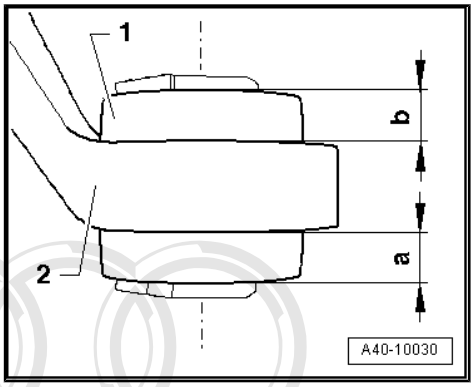


– Check installation depth of bush -1- in guide link -2-.

Dimensions -a- and -b- must be equal.

– Press bush -1- in further if dimensions -a- and -b- are not equal.

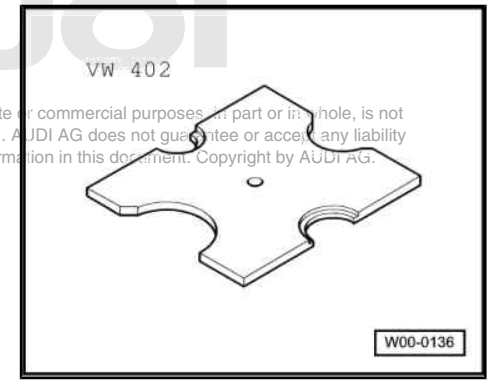
– Install guide link ⇒ page 68 .



4.7 Renewing hydraulic bonded rubber bush (75 mm ∅) for guide link

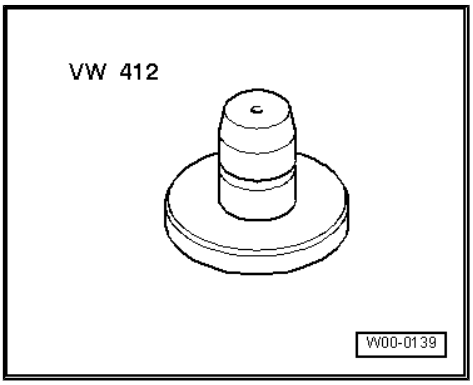
Special tools and workshop equipment required

♦ Thrust plate -VW 402-

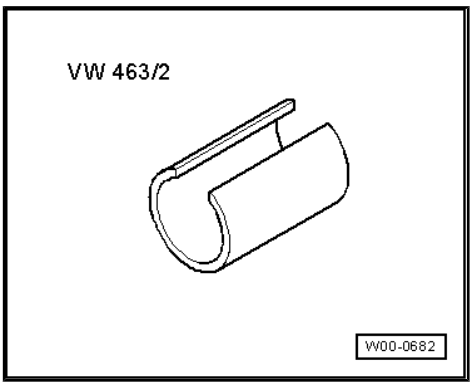


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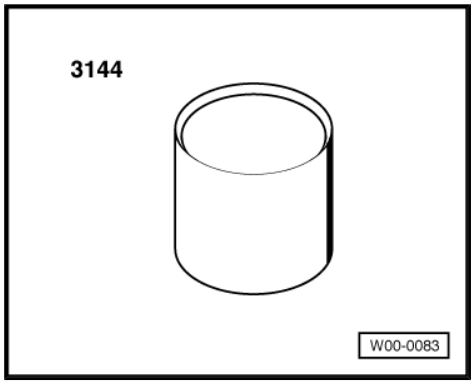
♦ Press tool -VW 412-



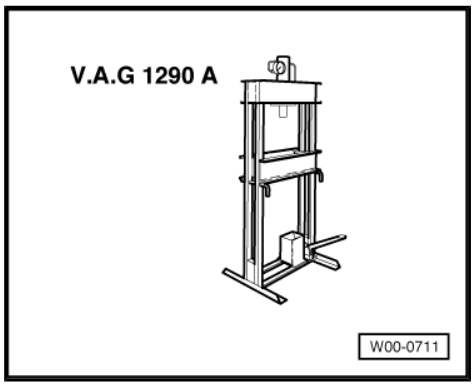
♦ Tube -VW 463/2-



- Sleeve -3144-



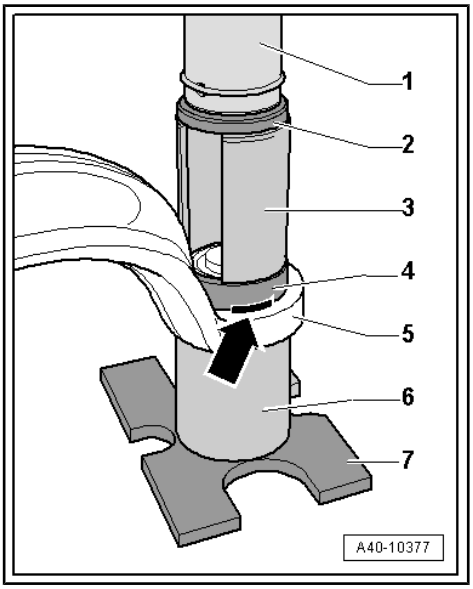
- Workshop press -V.A.G 1290A-



- Assembly lubricant (diluted 1:20 with water); for correct type refer to ⇒ Electronic parts catalogue

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Pressing out hydraulic bonded rubber bush



- Guide link removed ⇒ page 68

– Mark installation position -arrow- on hydraulic bonded rubber bush -4-.

Use a waterproof felt-tip pen or similar for marking.

– Set up special tools as shown in illustration:

1 - Press tool of workshop press -V.A.G 1290A-

2 - Press tool -VW 412-

3 - Tube -VW 463/2-

4 - Hydraulic bonded rubber bush

5 - Guide link

6 - Sleeve -3144-

7 - Thrust plate -VW 402-

– Press hydraulic bonded rubber bush -4- out of guide link -5-.

Note

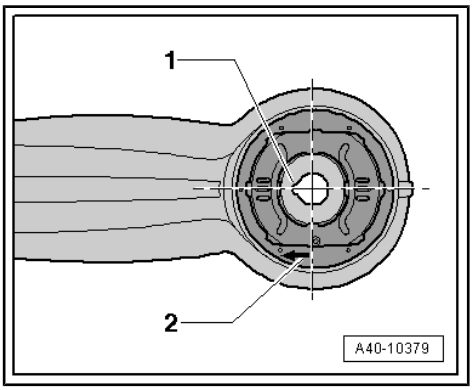
Hold the guide link when pressing the hydraulic bonded rubber bush in or out.

Pressing in hydraulic bonded rubber bush

– Transfer marking for installation position from old hydraulic rubber bush to new bush.

– Lightly lubricate new bush with assembly lubricant ⇒ Electronic parts catalogue .

Installation position of hydraulic bonded rubber bush



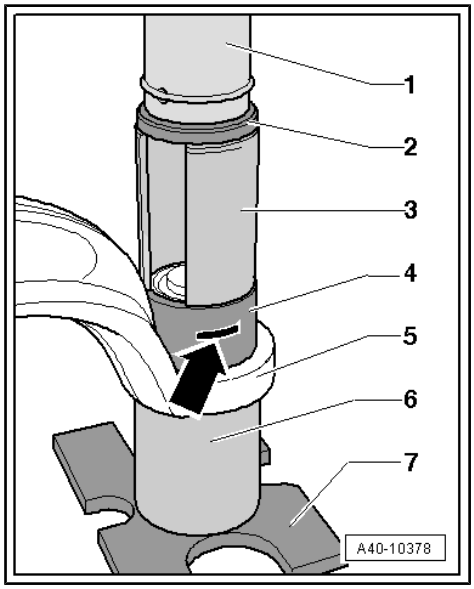
Notch -1- should be parallel with guide link and should point towards inside of guide link.

Arrow -2- should point towards inside of guide link.

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– Fit hydraulic bonded rubber bush -4- into guide link -5- (note correct installation position).
– Set up special tools as shown in illustration:

1 - Press tool of workshop press -V.A.G 1290A-
2 - Press tool -VW 412-
3 - Tube -VW 463/2-
4 - Hydraulic bonded rubber bush
5 - Guide link
6 - Sleeve -3144-
7 - Thrust plate -VW 402-



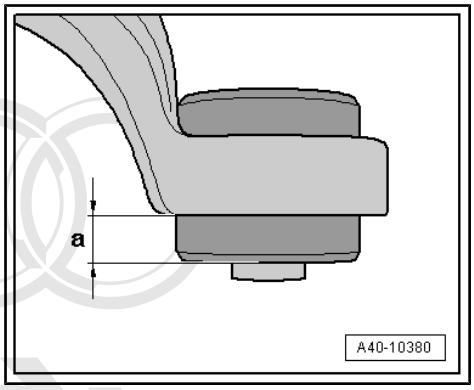
Note

Make sure hydraulic bonded rubber bush remains straight while pressing in.

– Press hydraulic bonded rubber bush -4- into guide link -5-.
– Note marking made before removal -arrow-.
– Check installation position -a- of hydraulic bonded rubber bush in guide link.

Dimension -a- = 18 mm

– If dimension -a- is not attained, press hydraulic bonded rubber bush in further.
– Install guide link ⇒ page 68 .



4.8 Removing and installing vehicle level sender

General notes:

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Vehicles with electronic damping control and/or gas discharge lamps have automatic headlight range control fitted as standard equipment ⇒ Rep. gr. 94 .

The electronic damping control and the automatic headlight range control functions require information on the compression and rebound travel at the front and rear suspension.

For this purpose, the position of the left/right track control link in relation to the body is transferred to the front left vehicle level sender -G78- and the front right vehicle level sender -G289- via a coupling rod. The senders then transmit electrical signals to the electronically controlled damping control unit -J250- and/or the left/right gas discharge bulb control unit -J343/344- .

Servicing left/right gas discharge bulb control unit -J343/344- ⇒ Rep. gr. 94

On the rear axle these signals are supplied by the rear left vehicle level sender -G76- and rear right vehicle level sender -G77- to the electronically controlled damping control unit -J250- and/or the left/right gas discharge bulb control unit -J343/344- .

These signals are required for calculating the current attitude of the vehicle.

The automatic headlight range control reacts to changes in the suspension height (attitude of the vehicle).

The following situations may produce a change in the suspension height:

- Towing a trailer/caravan
- Different loads (vehicle unladen, partly laden or fully laden)

Note

The basic headlight setting must always be checked and, on vehicles with electronic damping control, the reference position of the suspension must always be re-adapted in the following cases:

- Track control link has been removed and installed or renewed,
- Subframe has been renewed,
- Work has been performed on the vehicle level sender,
- Vehicle level sender has been renewed,
- Coupling rod for vehicle level sender has been detached from track control link.

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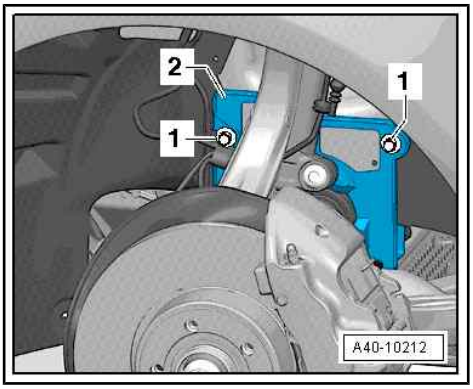
Basic setting of headlights ⇒ Rep. gr. 94

Re-adapting reference position on vehicles with electronic damping control ⇒ page 273 ⇒ Vehicle diagnostic tester

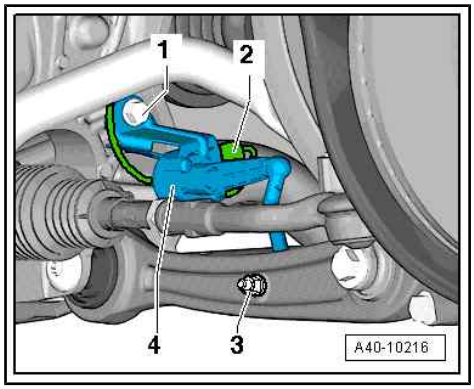
If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

Removing

– Unscrew nuts -1- and detach cover -2-.



– Unplug connector -2-.
– Remove nut -3-.
– Remove bolt -1-.
– Take out vehicle level sender -4-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

The same sender versions must be installed on both sides.

Tightening torques
⇒ „4.1 Exploded view of track control link, swivel joint, guide link, vehicle level sender“, page 57

Locating hook on sender bracket must engage on subframe.

Lever of sender must face towards rear.

Check basic adjustment of headlights if sender mountings are loosened ⇒ Rep. gr. 94

– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.
– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

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5 Wheel bearing housing, wheel bearing unit

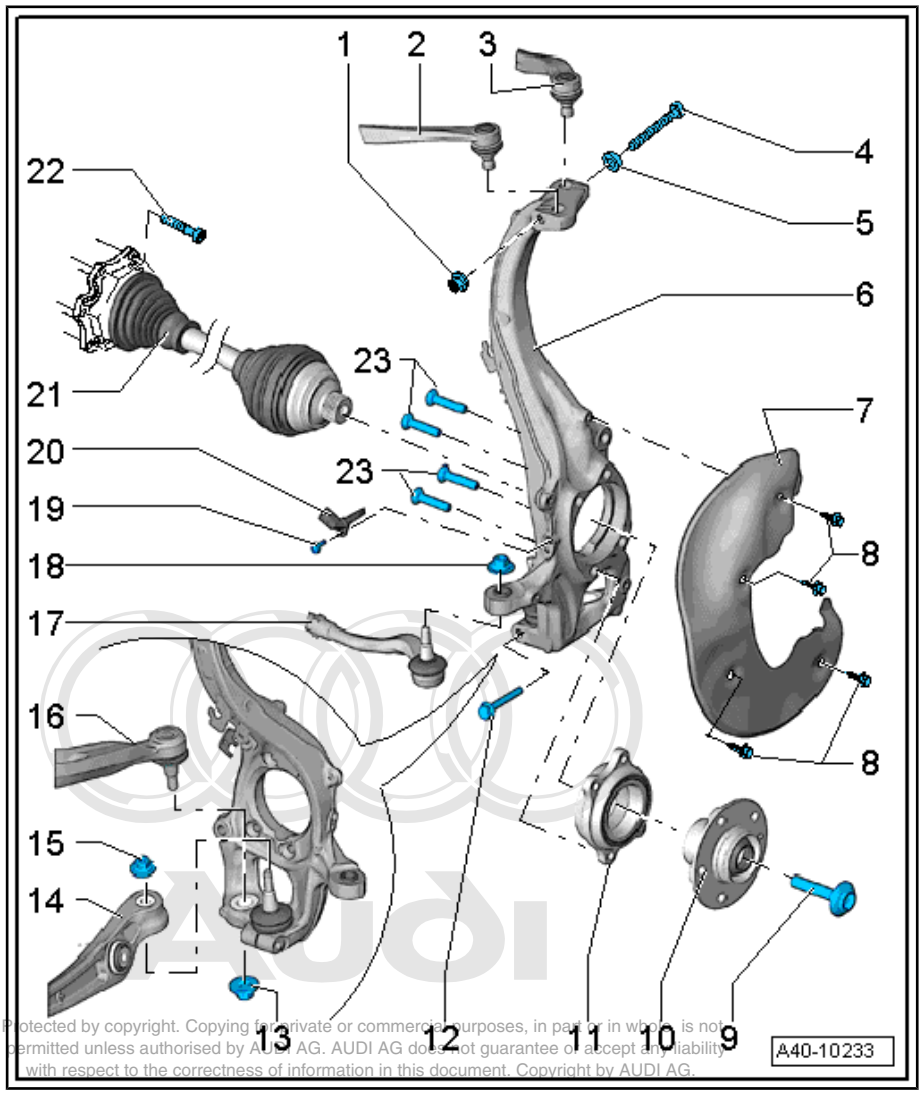
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

⇒ „5.2 Removing and installing wheel bearing housing“, page 82

⇒ „5.3 Removing and installing wheel bearing unit“, page 85

⇒ „5.4 Servicing wheel bearing unit“, page 88

5.1 Exploded view of wheel bearing housing, wheel bearing unit



1 - Nut

- ❑ 40 Nm
- ❑ Always renew if removed

2 - Upper link (front)

3 - Upper link (rear)

4 - Bolt

- ❑ Always renew if removed

5 - Washer

6 - Wheel bearing housing

- ❑ Removing and installing ⇒ page 82
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Distinguishing feature ⇒ page 82

WARNING

When renewing the wheel bearing housing, make sure that the thread of the pin on the track rod ball joint is long enough (the thread should project about 5 mm beyond the steering arm). If this is not the case, a new track rod ball joint with a longer pin thread must also be fitted; for correct version refer to ⇒ Electronic parts catalogue .

7 - Splash plate for brakes

8 - Bolt

- ❑ 10 Nm

9 - Bolt

- ❑ 200 Nm +180°

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- ❑ Always renew if removed ⇒ page 92
- ❑ Before securing, clean the threads in the CV joint using a thread tap

10 - Wheel hub

- ❑ Removing and installing ⇒ page 88

11 - Wheel bearing

- ❑ Removing and installing ⇒ page 88

Caution

Avoid dirtying or damaging the seal when laying it down or placing it in storage ⇒ page 81 .

12 - Bolt

- ❑ 40 Nm
- ❑ Always renew if removed

13 - Nut

- ❑ Always renew if removed
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 82
- ❑ After detaching guide link from wheel bearing housing, remove residual adhesive from thread of joint pin.

14 - Track control link

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue

15 - Nut

- ❑ Always renew if removed
- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 82
- ❑ After detaching swivel joint from wheel bearing housing, remove residual adhesive from thread of joint pin.

16 - Guide link

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue

17 - Track rod ball joint

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue

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18 - Nut

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 81
- ❑ Always renew if removed

19 - Bolt

- ❑ 9 Nm

20 - Speed sensor

21 - Drive shaft

22 - Bolt

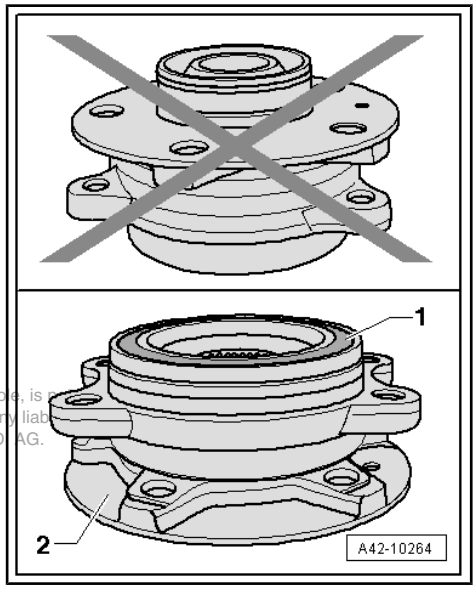
- ❑ 70 Nm
- ❑ Always renew if removed

23 - Countersunk bolts

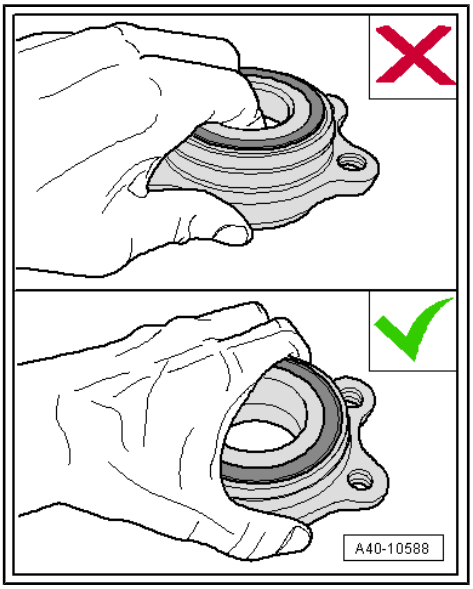
- ❑ 80 Nm +90°
- ❑ Always renew if removed

Avoiding dirtying or damaging the seal when laying it down or placing it in storage

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- The wheel bearing -1- must always be pointing upwards.
- Always put down the wheel bearing unit with the wheel hub -2- facing downwards.
- Do not touch the inside of the wheel bearing when you pick it up.
- Always take hold of the outside of the wheel bearing.



Nut versions for securing track rod ball joint

- Hexagon flange nut -A-

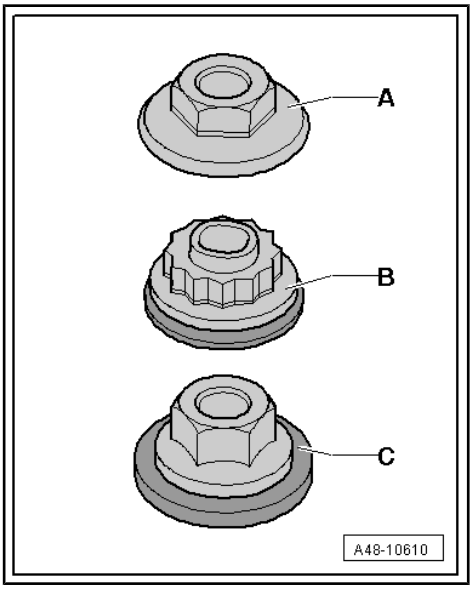
Tightening torque: 20 Nm + 90°

- Twelve-point nut with washer -B-

Tightening torque: 100 Nm

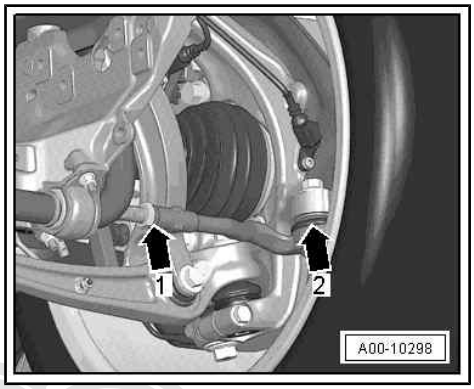
- Hexagon nut with washer -C-

Tightening torque: 110 Nm



Different wheel bearing housings with different steering arm thicknesses

- Different versions of wheel bearing housing are available. The thickness of the steering arm -2- is not the same on the two different versions.



Nut versions for securing track control link and guide link

- Hexagon flange nut -A- (M12) width across flats: 21 mm

Tightening torque: 145 Nm

- Hexagon nut with washer -B- (M12) width across flats: 18 mm

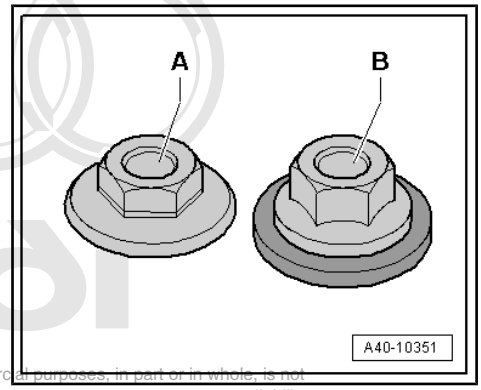
Tightening torque: 110 Nm

- Hexagon nut with washer -B- (M12) width across flats: 21 mm

Tightening torque: 120 Nm

- Hexagon nut with washer -B- (M14) width across flats: 21 mm

Tightening torque: 140 Nm



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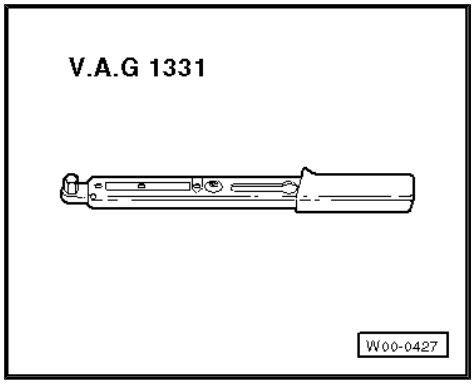
5.2 Removing and installing wheel bearing housing

Note

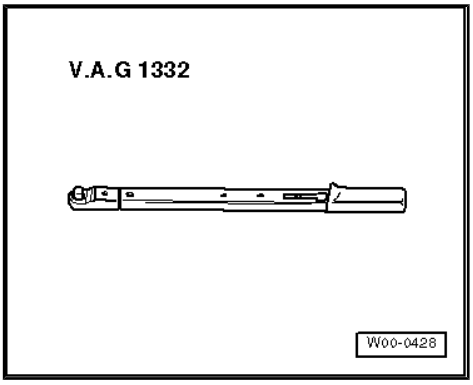
- *Two different versions of wheel bearing housing were used at the start of production. The thickness of the steering arm on the wheel bearing housing is not the same on the two different versions. For correct version refer to ⇒ Electronic parts catalogue .*
- *When renewing the wheel bearing housing, make sure that the thread of the pin on the track rod ball joint is long enough (the thread should project about 5 mm beyond the steering arm). If this is not the case, a new track rod ball joint with a longer pin thread must also be fitted; for correct version refer to ⇒ Electronic parts catalogue .*
- *Distinguishing feature* *⇒ page 82*

Special tools and workshop equipment required

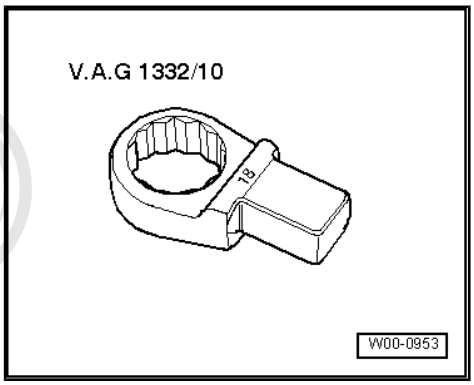
- Torque wrench -V.A.G 1331-



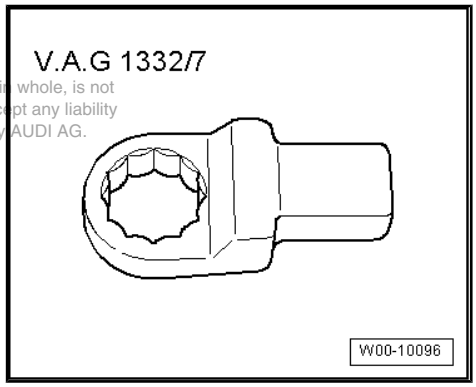
♦ Torque wrench -V.A.G 1332-



♦ Ring spanner insert -V.A.G 1332/10-



♦ or ring spanner insert -V.A.G 1332/7-

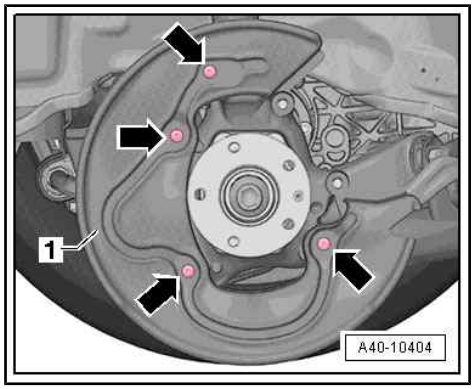


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Removing

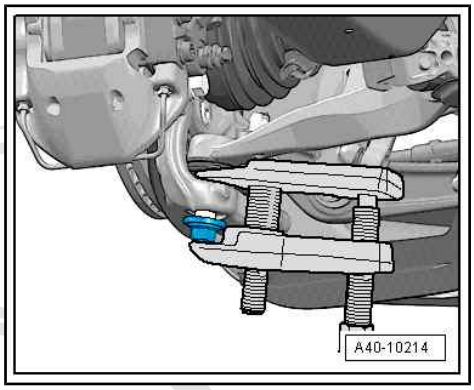
– Slacken bolt securing drive shaft to wheel hub ⇒ page 92 .
– Remove track control link ⇒ page 59 .
– Detach bracket for brake line and electrical wiring from wheel bearing housing.
– Remove front speed sensor ⇒ Rep. gr. 45 .
– Detach brake caliper and secure to body so that weight of brake caliper does not stretch or damage brake hose or brake pipe.
– Remove brake disc.

– Remove bolts -arrows- and take off splash plate -1-.
– Unscrew nut on joint pin of guide link until it is flush with end of thread. Counterhold if necessary when loosening.



Leave nut screwed on a few turns to protect threads on joint pin.

– Press joint pin of guide link out of tapered seat using ball joint puller -T40010 A- .

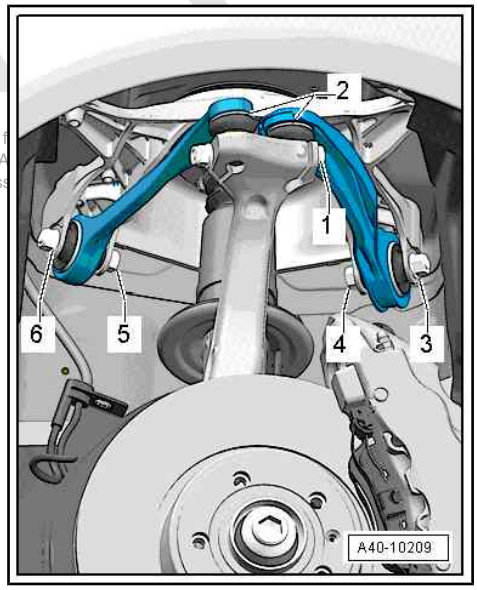


– Detach bolt connection -1-.
– Take both joint pins of upper links -2- out of wheel bearing housing.

Do not attempt to enlarge slots in wheel bearing housing using a chisel or similar.

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– Pull wheel bearing housing off drive shaft splines and remove.



Note

- *Do not let the drive shaft hang down under its own weight, as otherwise excessive bending could damage the inner CV joint.*
- *Tie up drive shaft to body with wire.*

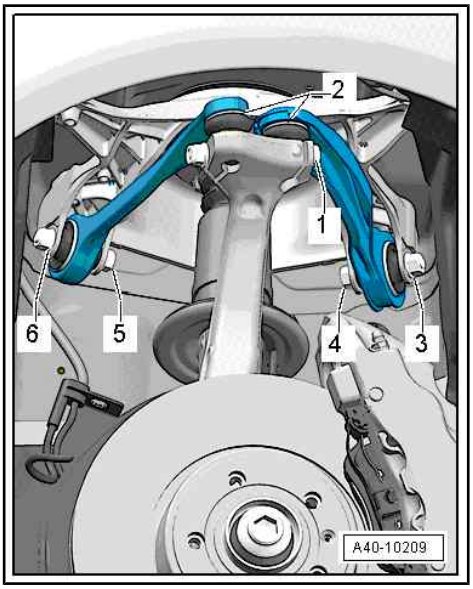
Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

– Push wheel bearing housing onto drive shaft splines.

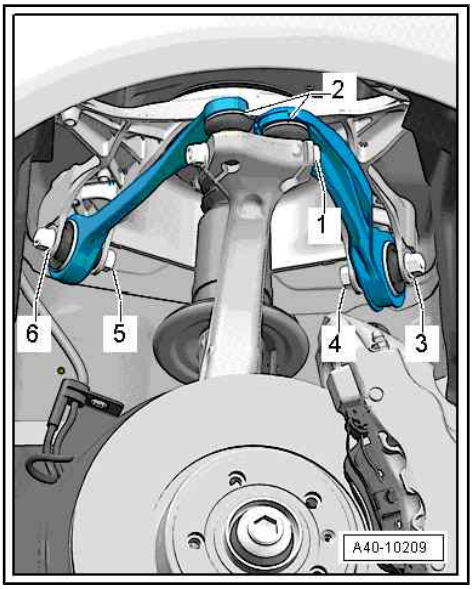
– Fit both joint pins of upper links -2- into wheel bearing housing and insert bolt -1-.
– Remove remaining adhesive from thread of joint pin on swivel joint and guide link.
– Attach guide link to wheel bearing housing and tighten.
– Install track control link ⇒ page 59 .
– Attach track rod ball joint to wheel bearing housing ⇒ page 415 .



Note

Press down upper links as far as possible while tightening nut.

– Tighten bolt connection -1- to specified torque.
– Attach brake disc and brake caliper ⇒ Rep. gr. 46 .
– Tighten bolt securing drive shaft to wheel hub ⇒ page 92 .
– On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .
– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.
– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

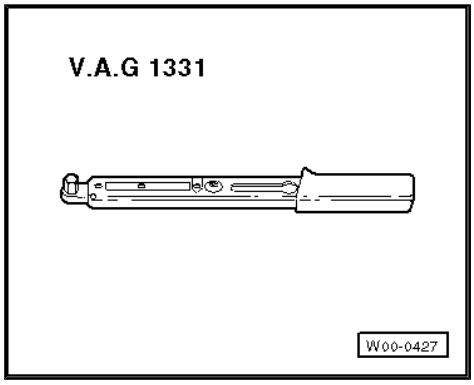


5.3 Removing and installing wheel bearing unit

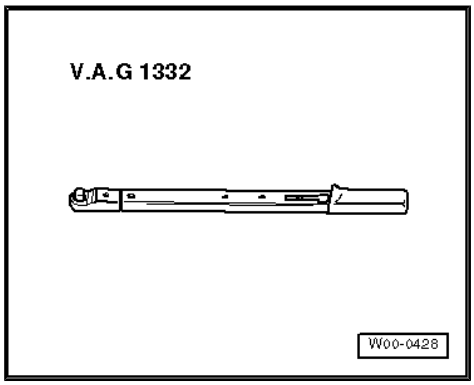
Special tools and workshop equipment required

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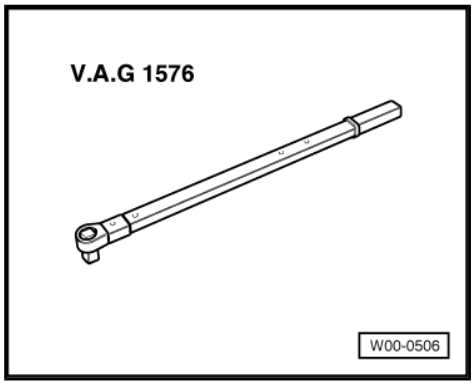
♦ Torque wrench -V.A.G 1331-



♦ Torque wrench -V.A.G 1332-



♦ Torque wrench -V.A.G 1576-



Removing

– Remove drive shaft ⇒ page 93 .

– Fit both joint pins of upper links -2- into wheel bearing housing and insert bolt -1-.

Note

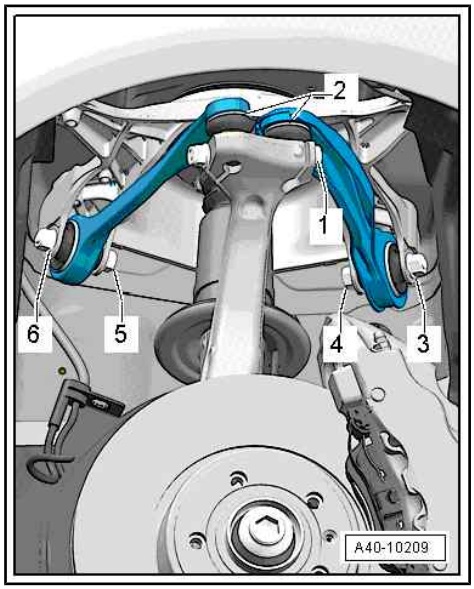
This step prevents damage to suspension parts when loosening and tightening the countersunk bolts.

– Detach brake caliper and secure to body so that weight of caliper does not stretch or damage brake hose or brake pipe ⇒ Rep. gr. 46 .

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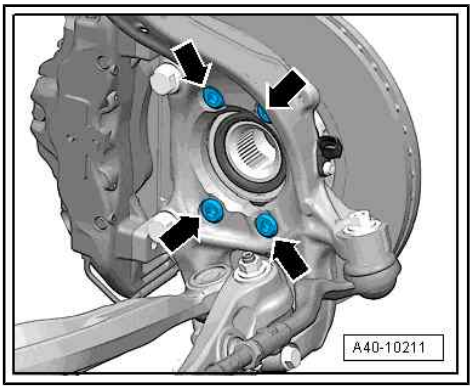
– Remove brake disc.

– Remove front speed sensor ⇒ Rep. gr. 45 .



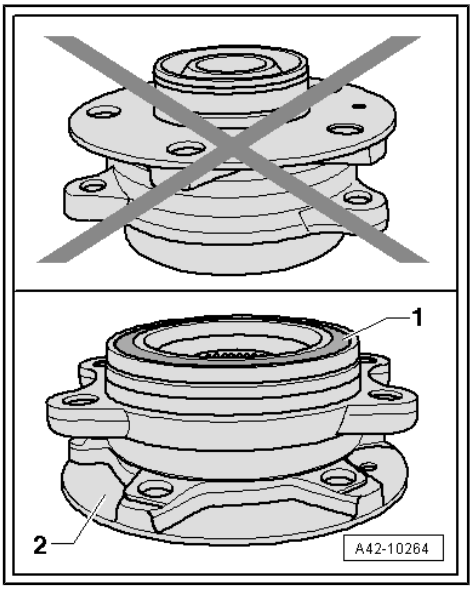
– Remove countersunk bolts -arrows-.

– Take out wheel bearing unit.



Caution

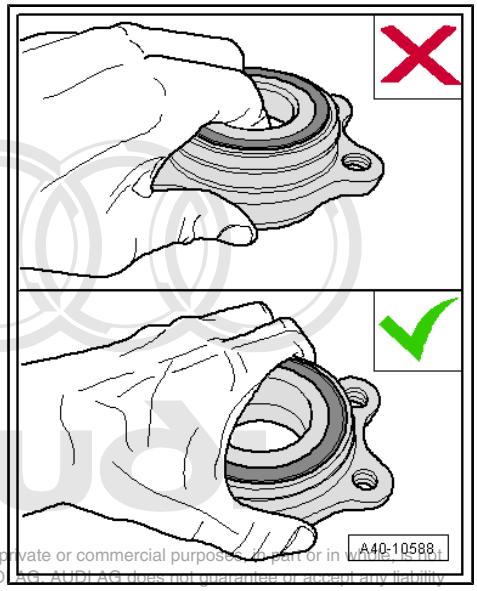
- *Avoid dirtying or damaging the seal when laying down or storing the wheel bearing.*



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- The wheel bearing -1- must always face upwards when laying down the wheel bearing unit.
- Always put down the wheel bearing unit with the wheel hub -2- facing downwards.
- Do not touch the inside of the wheel bearing when you pick it up.
- Always take hold of the outside of the wheel bearing.

– Servicing wheel bearing unit ⇒ page 88 .



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

– Install drive shaft ⇒ page 93 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .

– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 ⇒ Vehicle diagnostic tester.

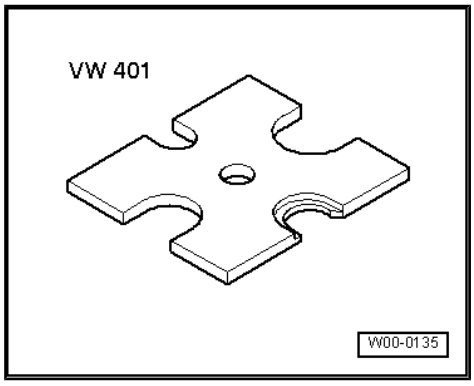
– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

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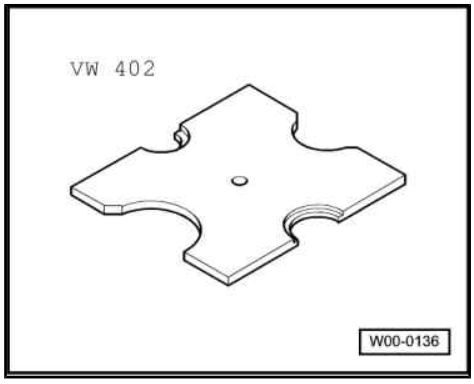
5.4 Servicing wheel bearing unit

Special tools and workshop equipment required

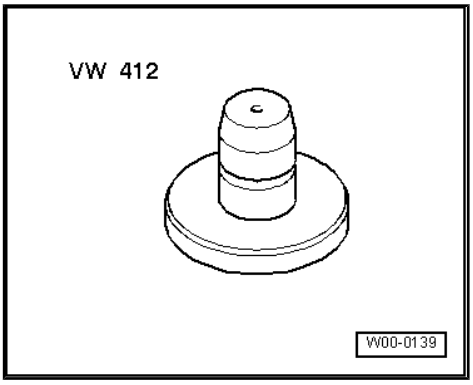
♦ Thrust plate -VW 401-



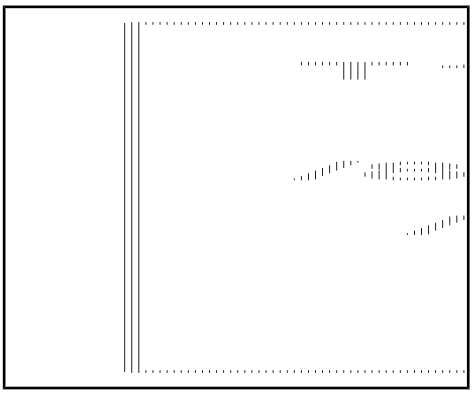
♦ Thrust plate -VW 402-



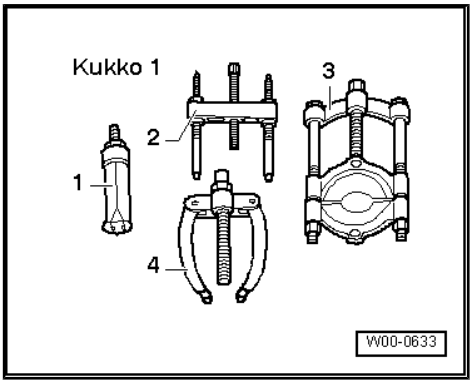
♦ Press tool -VW 412-



♦ Assembly tool -T10230-



♦ -3- Splitter -Kukko 15/3 mit 17/3-



- Wheel bearing unit removed ⇒ page 85

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Pressing wheel hub out of wheel bearing

– Apply special tools as shown in illustration.

1 - Press tool -VW 412-

2 - Sleeve T10230/3 from assembly tool -T10230-

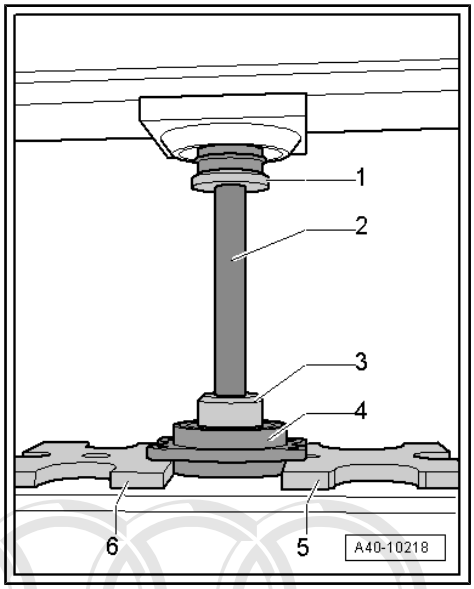
3 - Thrust piece T10230/8 from assembly tool -T10230-

4 - Wheel bearing unit

5 - Thrust plate -VW 402-

6 - Thrust plate -VW 401-

– Press wheel hub out of wheel bearing.

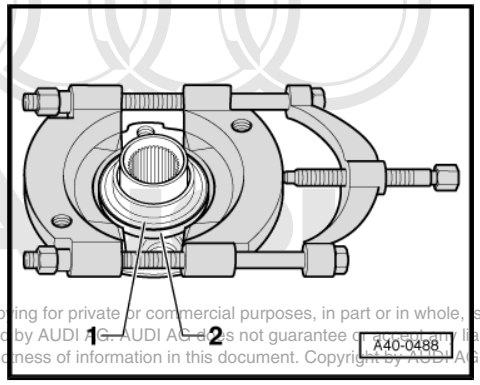


Pressing inner bearing race off wheel hub

– Apply splitter between inner bearing race -1- and wheel hub -2- and tighten spindle.

Note

Use commercially available splitter, e.g. Kukko 15/3 with 17/3.



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– Apply special tools as shown in illustration.

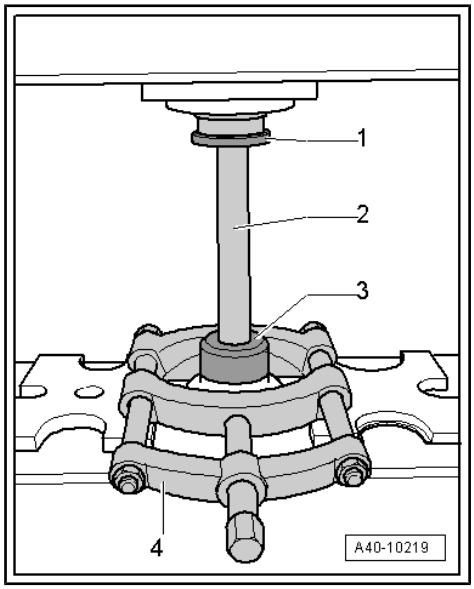
1 - Press tool -VW 412-

2 - Sleeve T10230/3 from assembly tool -T10230-

3 - Thrust piece T10230/8 from assembly tool -T10230-

4 - Kukko 15/3 with 17/3

– Press inner bearing race off wheel hub.



Pressing wheel hub into wheel bearing

– Apply special tools as shown in illustration.

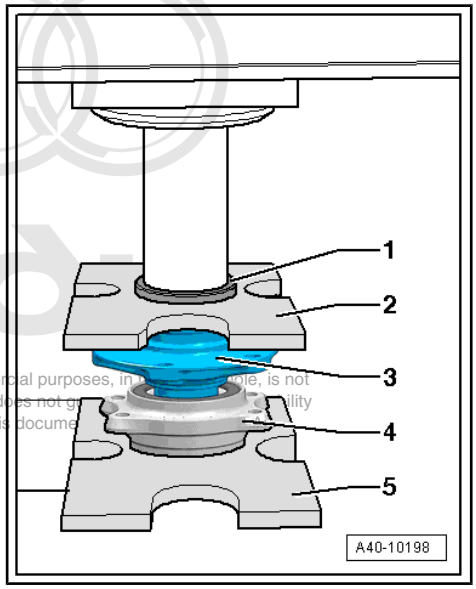
1 - Press tool -VW 412-

2 - Thrust plate -VW 402-

3 - Wheel hub

4 - Ball bearing

5 - Thrust plate -VW 401-



Note

The machined surface of the wheel bearing outer race faces downwards.

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Caution

Make sure no dirt gets between thrust plate -VW 401- -5- and ball bearing -4- when pressing in the hub or when the parts are placed on a workbench, etc.

– Press wheel hub into wheel bearing.

– Install wheel bearing unit ⇒ page 85 .

6 Drive shaft

⇒ „6.1 General notes:“, page 92

⇒ „6.2 Loosening and tightening bolt securing drive shaft to wheel hub“, page 92

⇒ „6.3 Removing and installing drive shaft“, page 93

⇒ „6.4 Exploded view of drive shaft“, page 96

⇒ „6.5 Dismantling and assembling peened triple roller joint AAR 2600 i or 3300 i“, page 99

⇒ „6.6 Servicing outer constant velocity joint“, page 105

⇒ „6.7 Checking outer constant velocity joint“, page 107

⇒ „6.8 Tightening large and small clips on triple roller joint and outer joint“, page 108

6.1 General notes:

Wheel bearings must not be subjected to load after loosening bolt securing drive shaft at wheel hub.

If the wheel bearings are subjected to the full weight of the vehicle they will be overloaded, resulting in reduced service life. Therefore please note the following:

- Procedure for slackening bolt securing drive shaft to wheel hub ⇒ page 92

Do not attempt to move the vehicle without the drive shafts fitted; this would result in wheel bearing damage. If the vehicle does have to be moved, always note the following points:

– Fit an outer joint in place of the drive shaft.

– Tighten the outer joint to 200 Nm.

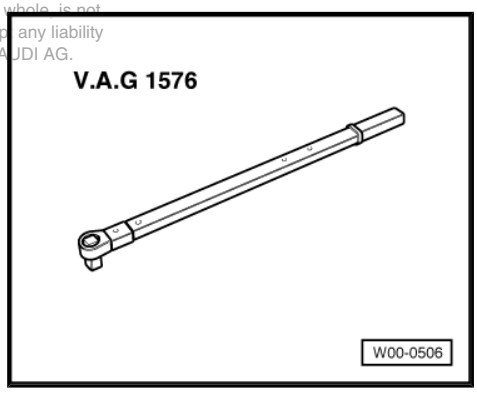
Do not let drive shaft hang down under its own weight when performing repair work, as otherwise excessive bending could damage inner CV joint.

6.2 Loosening and tightening bolt securing drive shaft to wheel hub

Special tools and workshop equipment required

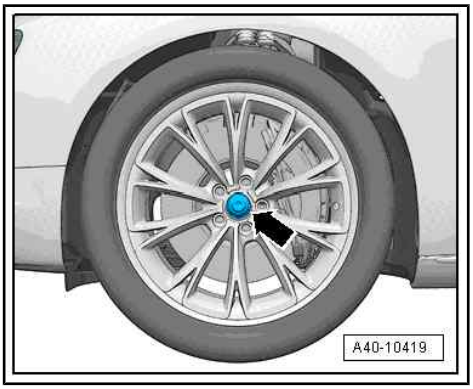
- Torque wrench -V.A.G 1576-

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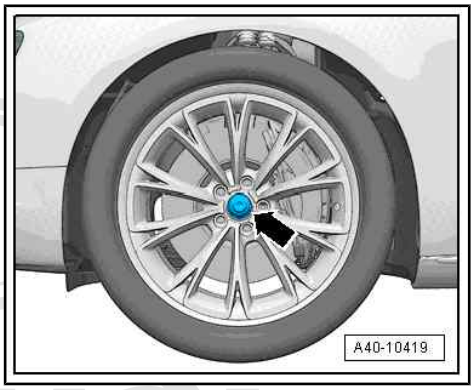
Loosening bolt securing drive shaft to wheel hub

– To avoid damage to wheel bearing, slacken off bolt no further than 90° with vehicle standing on its wheels.
– Raise vehicle so that wheels are off the ground.
– Have a second mechanic press the brake pedal.
– Remove bolt -arrow-.



Tightening bolt securing drive shaft to wheel hub

– Renew bolt -arrow-.



Note

- *Before securing, clean the threads in the CV joint using a thread tap.*
- *The wheels must not be in contact with the ground when initially tightening the drive shaft bolt; otherwise the wheel bearing can be damaged.*

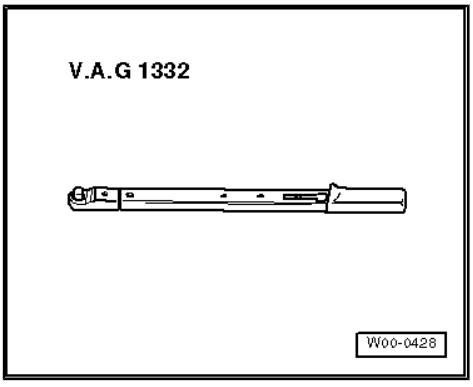
– Have a second mechanic press the brake pedal.
– Tighten bolt to 200 Nm.
– Lower vehicle onto its wheels.
– Turn bolt 180° further.

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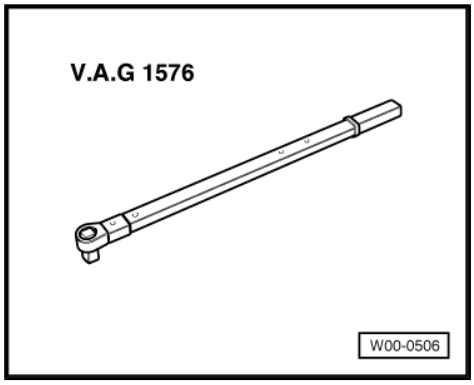
6.3 Removing and installing drive shaft

Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-

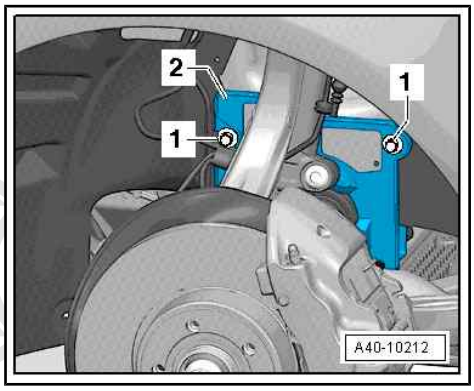


♦ Torque wrench -V.A.G 1576-

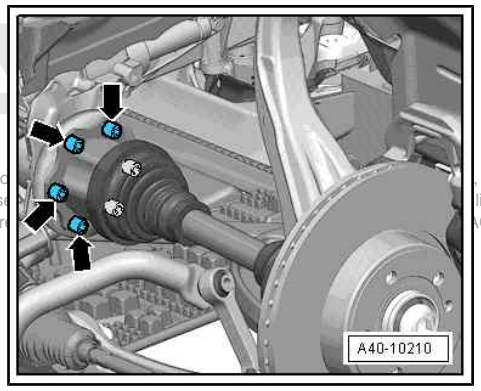


Removing

– Slacken bolt securing drive shaft to wheel hub ⇒ page 92 .
– Remove wheel.
– Unscrew nuts -1- and detach cover -2-.



– Remove bolts -arrows- from flange shaft on gearbox.
– Take out drive shaft.



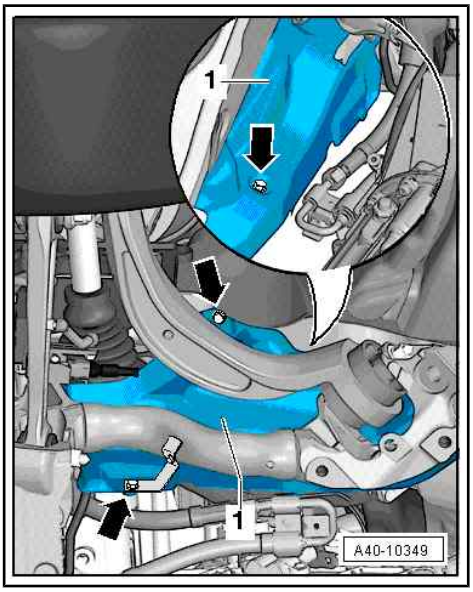
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Applies to vehicles with subframe shield:

Perform the following steps if there is not enough clearance to take out the drive shaft.

– Remove bolts -arrows- and place subframe shield -1- to one side.

– Detach bracket for brake hose and ABS wiring from wheel bearing housing.

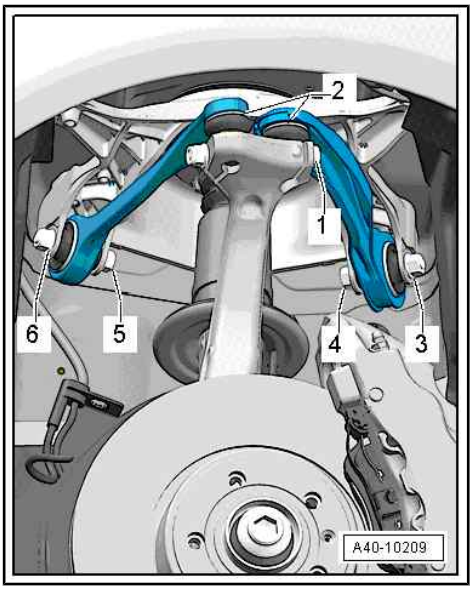


– Separate bolt connection -1- and pull out both upper links -2- upwards.

Do not attempt to enlarge slots in wheel bearing housing using a chisel or similar.

– Swing wheel bearing housing away to the side, and at the same time pull end of drive shaft out of wheel hub.

– Take out drive shaft.



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Installing

Installation is carried out in the reverse sequence. Note the following points:

– Fit both joint pins of upper links -2- into wheel bearing housing and insert bolt -1-.

Note

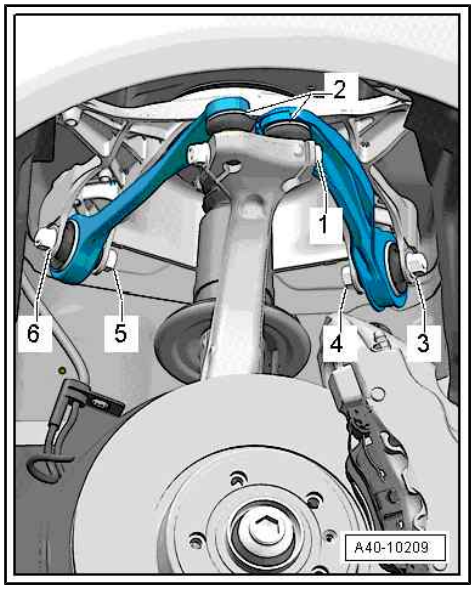
Press down upper links as far as possible while tightening nut.

– Tighten bolt connection -1- to specified torque.

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit“, page 79

Tightening torques
⇒ „2.2 Exploded view of subframe, cross brace, diagonal strut, anti-roll bar, coupling rod, subframe shield (vehicles from September 2007 onwards)“, page 19

– Tightening torque for securing drive shaft to flange shaft on gearbox ⇒ page 79 .
– Fit wheel.
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Tighten bolt securing drive shaft to wheel hub ⇒ page 92 .



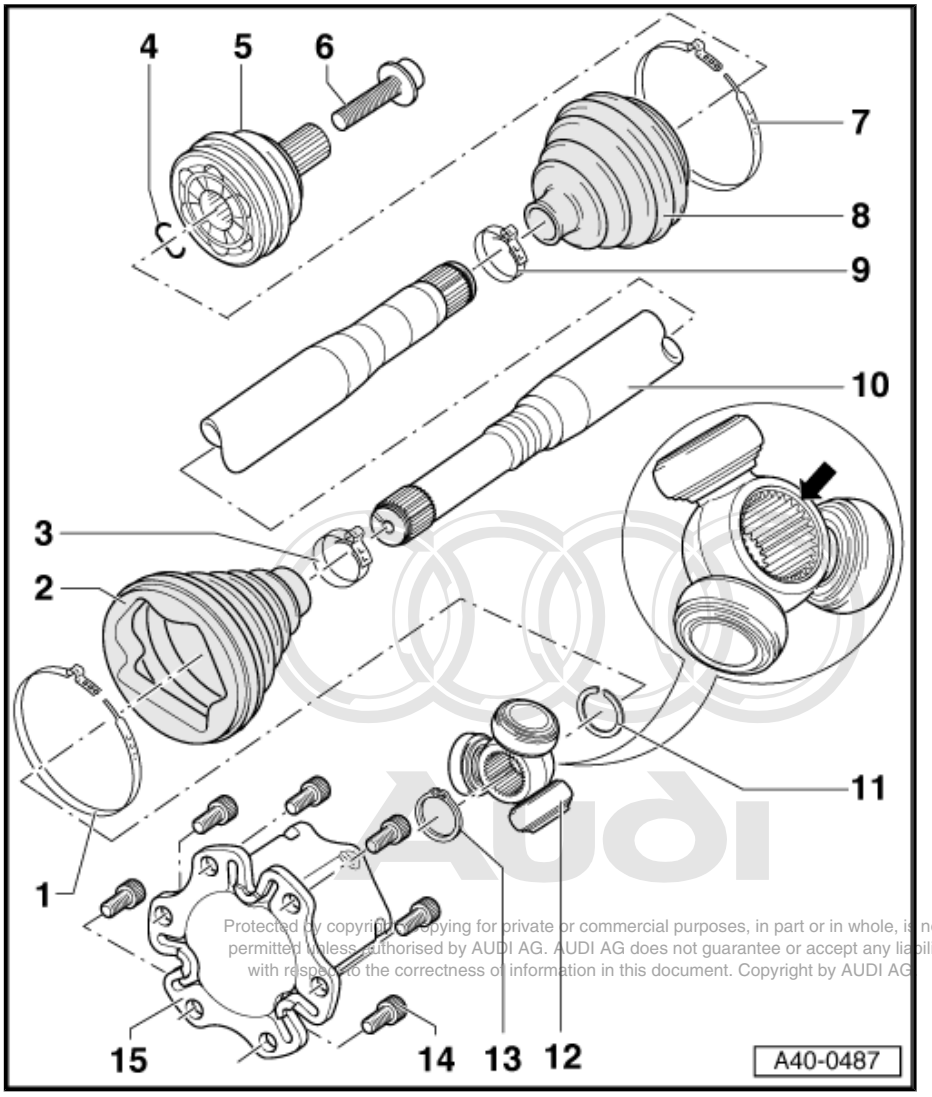
6.4 Exploded view of drive shaft

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Peened triple roller joint AAR 2600 i with outer constant velocity joint (85/88 mm dia.)

Peened triple roller joint AAR 3300 i with outer constant velocity joint (94/100 mm dia.)

Peened triple roller joint AAR 3300 i with outer constant velocity joint (99/106 mm dia.)



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1 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 108

2 - Boot with adapter for triple roller joint

- ❑ Boot must rest in groove and on contour of joint body.
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

3 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 108

4 - Circlip

- ❑ Always renew if removed
- ❑ Fit into annular groove on shaft before installing (no longer visible once joint is installed)
- ❑ Before fitting constant velocity joint, align circlip centrally with opening facing upwards.

5 - Outer constant velocity joint

- ❑ Renew only as complete unit
- ❑ Removing ⇒ page 105
- ❑ Checking ⇒ page 107
- ❑ Installing ⇒ page 106
- ❑ Greasing ⇒ page 98
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

6 - Bolt

- ❑ 200 Nm +180°
- ❑ Always renew if removed
- ❑ Before securing, clean the threads in the CV joint using a thread tap.
- ❑ Keep to specified sequence when loosening and tightening bolt securing drive shaft to wheel hub ⇒ page 92

7 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 108

8 - Boot for outer constant velocity joint

- ❑ Check for splits and chafing
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

9 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 108

10 - Drive shaft

- ❑ Removing and installing ⇒ page 93

11 - Circlip

- ❑ For correct version refer to ⇒ Electronic parts catalogue

12 - Triple roller spider

Chamfer -arrow- faces towards drive shaft splines

- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting triple roller spider onto drive shaft

13 - Circlip

- ❑ Always renew if removed
- ❑ Insert in groove on shaft

14 - Bolt

- ❑ Always renew if removed
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Tightening torque ⇒ Item 22 (page 80)

15 - Joint body

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Grease quantity and type

Regrease joint when renewing boot.

For required grease filling of joints, refer to ⇒ Electronic parts catalogue .

Note

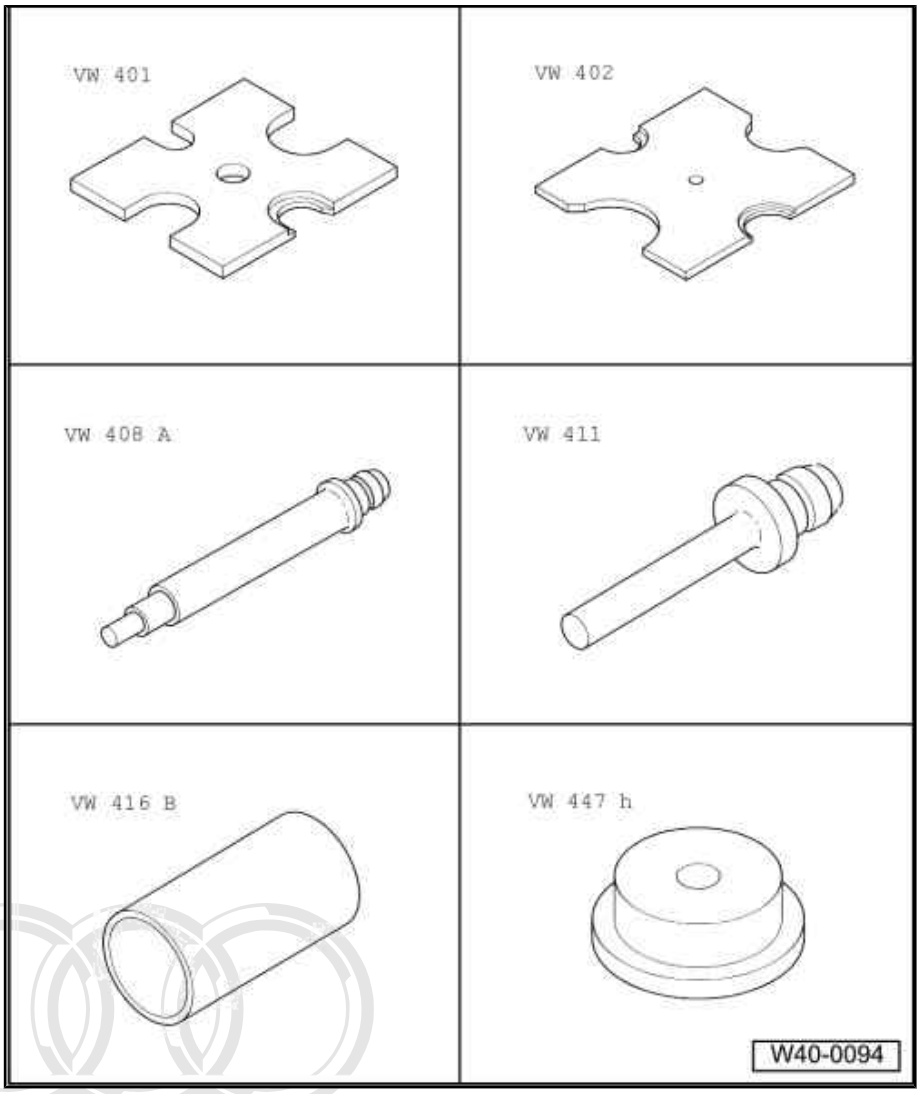
Note that different types of grease are required for outer and inner joints.

	Grease	of which in:	
Outer joint	**Total quantity**	**Joint**	**Boot**
∅ mm	[g]	[g]	[g]
85/88	128/90	64/50	6040
94/100	194/140	100/80	94/60
99/106	280	100	180
Inner joint			
	160	80	80

6.5 Dismantling and assembling peened triple roller joint AAR 2600 i or 3300 i

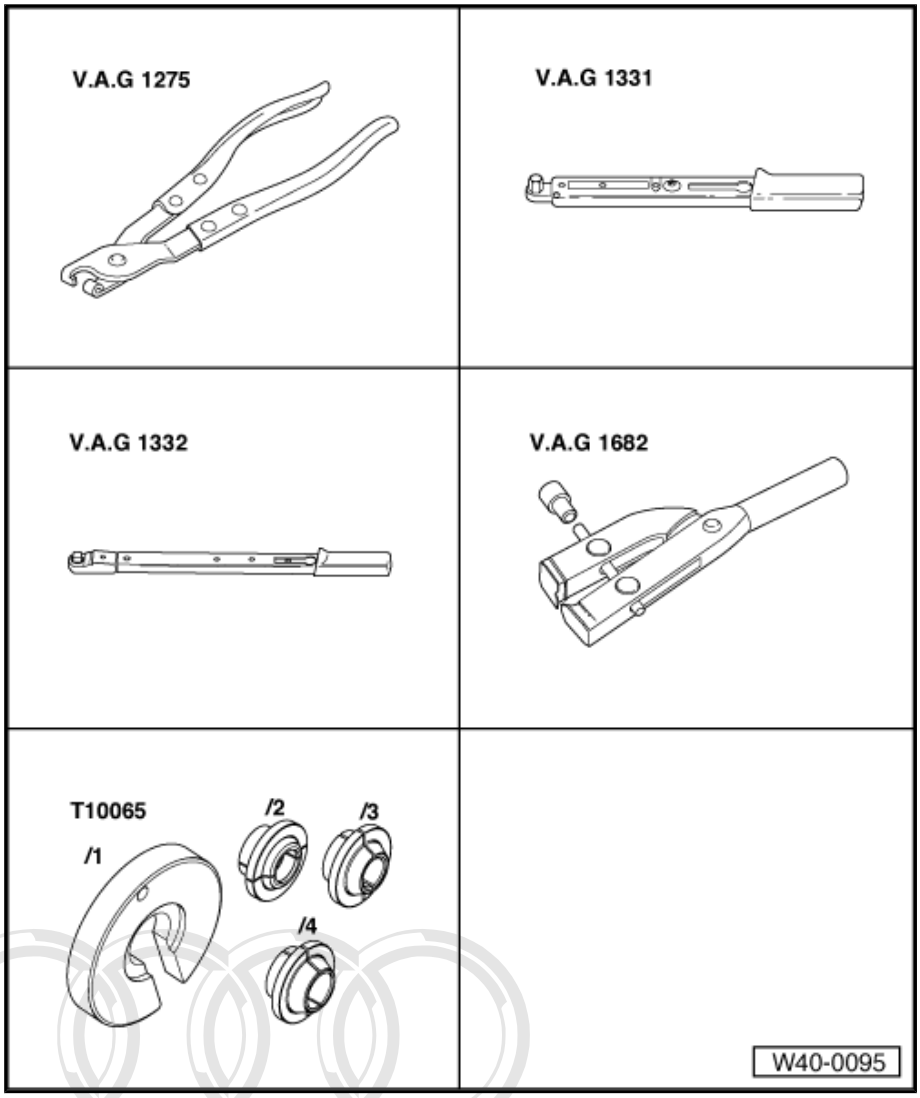
Special tools and workshop equipment required

- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 408 A-
- Press tool -VW 411-
- Tube -VW 416 B-
- Thrust plate -VW 447 H-

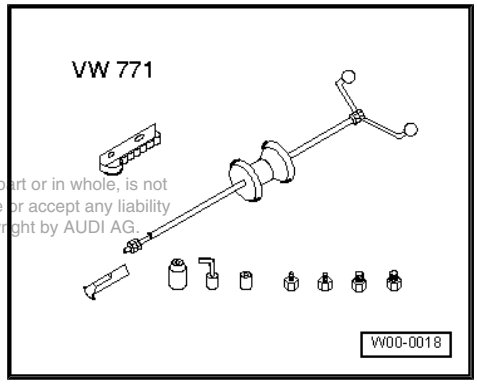


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- Hose clip pliers - V.A.G 1275-
- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Clamp tensioner - V.A.G 1682-
- Assembly tool -T10065-

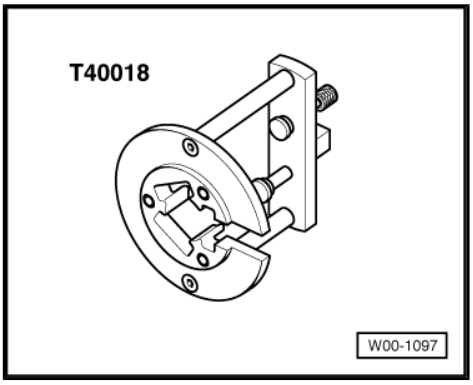


- Multi-purpose tool -VW 771-

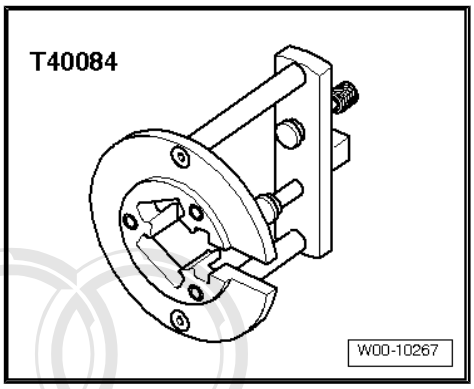


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- Assembly tool -T40018- for triple roller joint AAR 3300 i



- or assembly tool -T40084- for triple roller joint AAR 2600 i



- Brass/copper drift

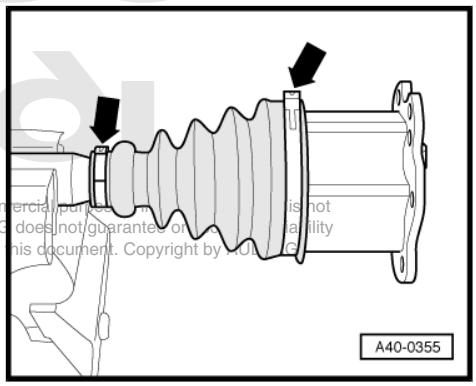
Dismantling triple roller joint AAR 2600 i or 3300 i

– Clamp drive shaft horizontally in vice.

Note

- *Use jaw protectors for vice.*
- *Take care not to damage drive shaft.*

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– Mark position of joint body relative to drive shaft.

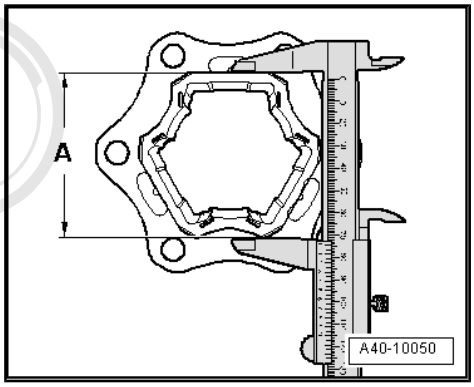
The joint may be noisy if these parts are not marked and reinstalled in their original positions.

Use a waterproof felt-tip pen for marking.

– Open hose clips -arrows-.

– Push back boot.

Distinguishing features of drive shafts AAR 2600 i and AAR 3300 i



– Measure dimension -A- as shown.

♦ Dimension -A- 74 mm = drive shaft AAR 2600 i

♦ Dimension -A- 77 mm = drive shaft AAR 3300 i

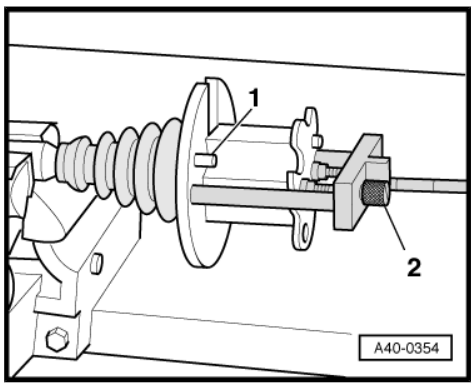
Caution

It is important to use the correct special tools for the different drive shafts.

– Apply removal and assembly tool -T40018- for triple roller joint AAR 3300 i (or assembly tool -T40084- for triple roller joint AAR 2600 i) behind joint body.

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Locating pin -1- must lie against outside of joint body.



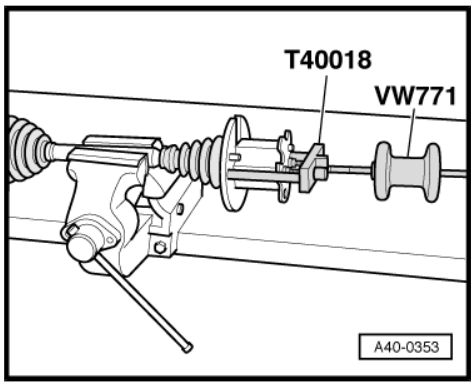
– Bring assembly tool into contact with joint body by turning knurled screws -2-.

Note

♦ *Joint body must be fixed in removal and assembly tool -T40018- or -T40084- without play.*

♦ *Tighten screws -2- only hand-tight.*

– Screw multi-purpose tool -VW 771- into removal and assembly tool -T40018- or -T40084- .



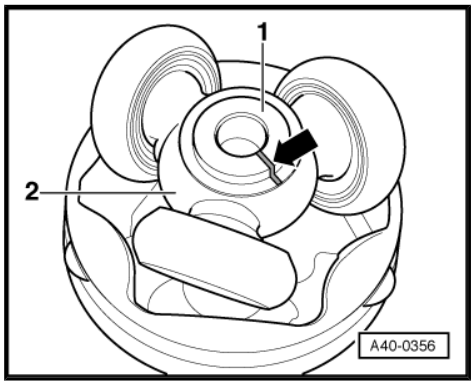
The illustration shows removal and assembly tool -T40018- for drive shaft AAR 3300 i.

When working on drive shaft AAR 2600 i use assembly tool -T40084- .

– Remove joint body by knocking horizontally.

Leave joint body clamped in removal and assembly tool -T40018- or -T40084- .

– Mark installation position of components -1- and -2- as shown.



The joint may be noisy if these parts are not marked and reinstalled in their original positions.

Use a waterproof felt-tip pen for marking.

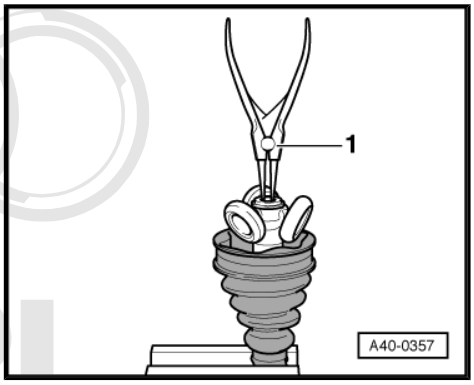
1 - Drive shaft

2 - Triple roller spider

– Remove grease with a lint-free cloth.

– Remove circlip.

1 - Pliers (commercial type)



– Press triple roller spider off drive shaft.

– Use the special tools shown in the illustration.

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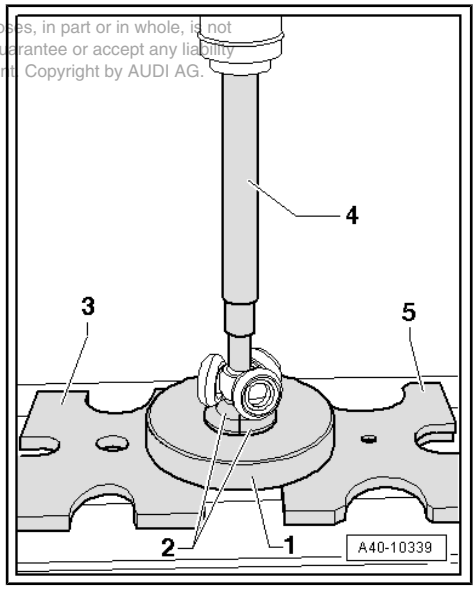
1 - Assembly tool -T10065/1-

2 - Assembly tool -T10065/5- , must make contact with base of triple roller spider

3 - Thrust plate -VW 401-

4 - Press tool -VW 408 A-

5 - Thrust plate -VW 402-



Assembly tool -T10065/5- must not rest on rollers (swivel the rollers aside if necessary).

– Pull off boot.

– Remove grease from shaft splines.

– Check rollers and roller races for wear.

– Clean drive shaft and housing.

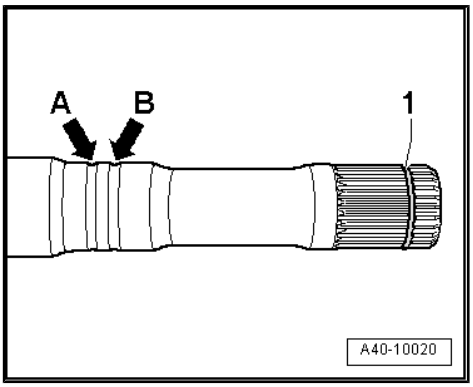
Assembling triple roller joint AAR 2600 i or 3300 i

– Push on small hose clip with joint boot and bring boot into position on drive shaft (position varies depending on version).

Version with identification groove:

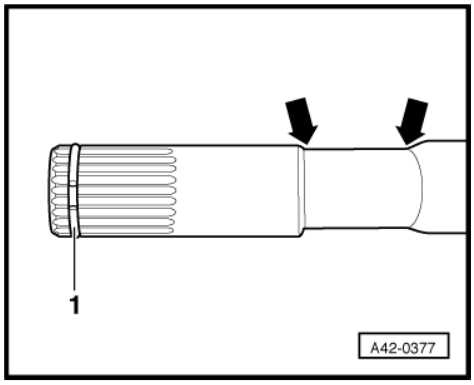
– Position boot in outer groove -arrow B-.

Inner groove -arrow A- remains visible („identification groove“ for correct boot assembly).



Version with drop-centre:

– Position boot between -arrows-.

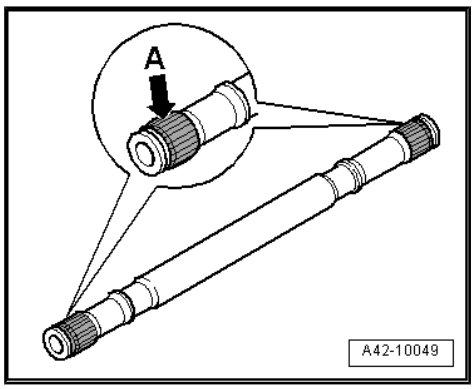


Pressing triple roller spider onto drive shaft

Chamfer on triple roller spider faces towards drive shaft and is used as an assembly aid.

– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint or triple roller spider onto drive shaft.

– Fit triple roller spider onto shaft so that markings are aligned and drive home onto stop.



Use assembly tool -T10065/6- and make sure it grips drive shaft at bottom seam -arrow-.

– Use the special tools shown in the illustration.

1 - Assembly tool -T10065/1-

2 - Assembly tool -T10065/6- (assembly tool must grip drive shaft at bottom seam -arrow-)

3 - Thrust plate -VW 401-

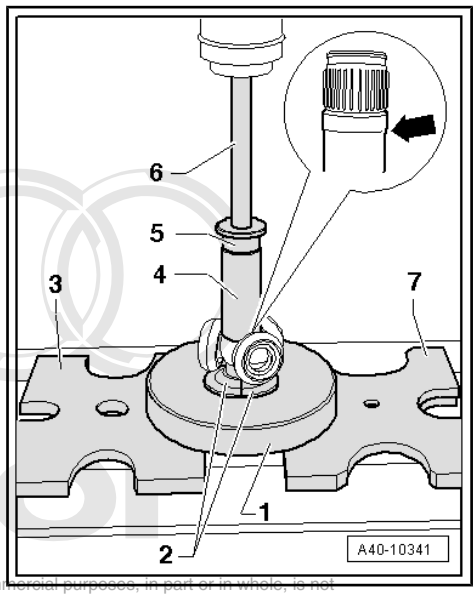
4 - Tube -VW 416 B-

5 - Thrust plate -VW 447 H-

6 - Press tool -VW 411-

7 - Thrust plate -VW 402-

Assembly tool -T10065/6- must not rest on rollers (swivel the rollers aside if necessary).



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– Fit circlip.

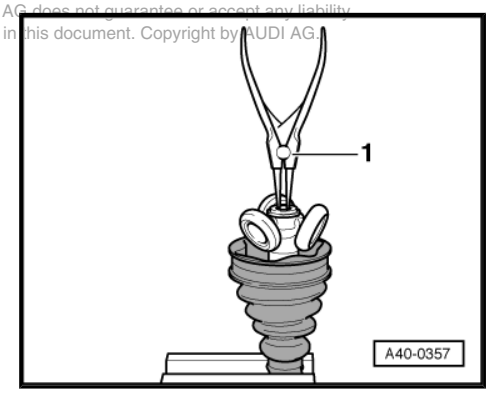
– Circlip must engage audibly. Triple roller spider must lie directly against circlip (zero gap).

1 - Pliers (commercial type)

– Pack approx. 60 % of drive shaft grease from repair kit into rear of triple roller joint.

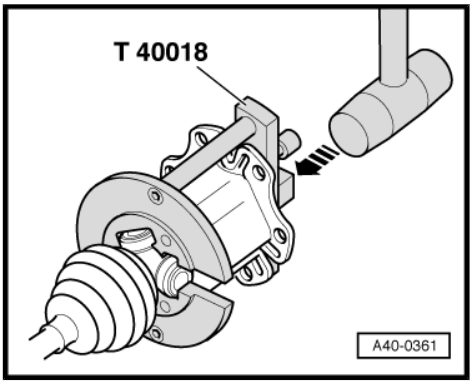
– Lightly grease the rollers.

Make sure rollers are aligned straight.



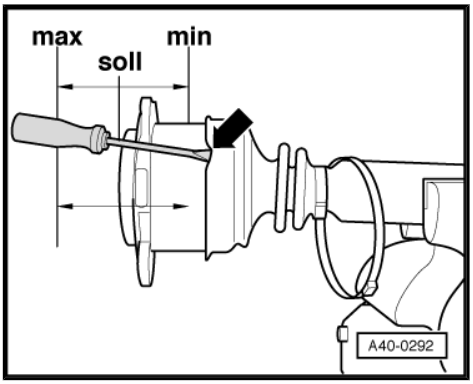
– Use plastic-headed hammer to drive joint body over triple roller spider.

The illustration shows removal and assembly tool -T40018- for drive shaft AAR 3300 i.



– Pack remaining quantity of grease into boot.
– Make sure boot is properly positioned on joint body.
– Boot must rest in groove and on contour of joint body.

– Position joint body in central position. See min/max positions in illustration.



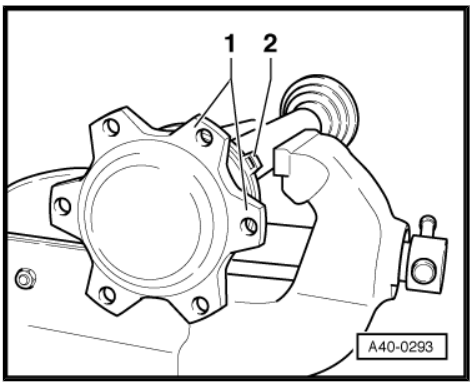
Note

When setting joint body to centre position, use screwdriver or similar to vent boot -arrow-.

– Install hose clip.

Note

To facilitate fitting of multi-point socket head bolts when installing drive shaft, fastener lug -2- on hose clip must be positioned between mounting flanges -1- on joint body.



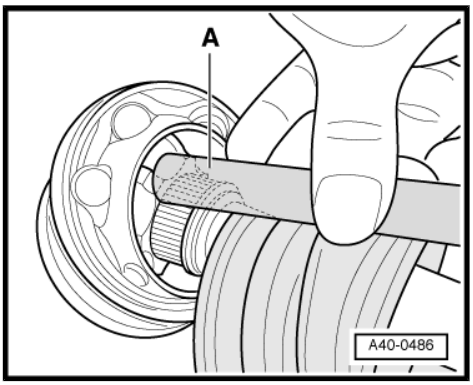
– Tighten hose clips on triple roller joint ⇒ page 108 .

6.6 Servicing outer constant velocity joint

Removing outer constant velocity joint

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– Clamp drive shaft in vice using protective jaw covers.
– Unfasten both clips and detach boot from outer joint.
– Use hammer to tap copper or brass drift -A- against inner race of constant velocity joint.
– Detach joint and boot.

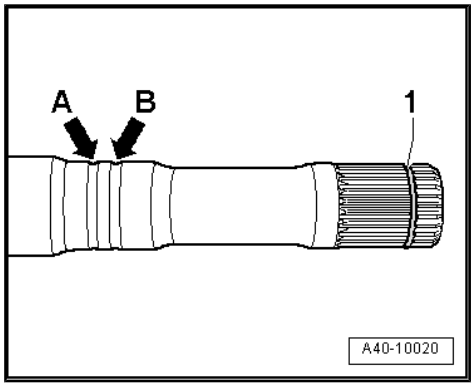


Installing outer constant velocity joint

Boot and drive shaft must be free from grease.

– Always renew circlip -1-.

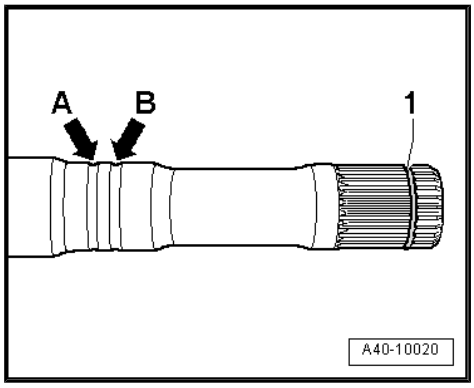
– Push on small hose clip with joint boot and bring boot into position on drive shaft (position varies depending on version).



Version with identification groove:

– Position boot in outer groove -arrow B-.

Inner groove -arrow A- remains visible („identification groove“ for correct boot assembly).

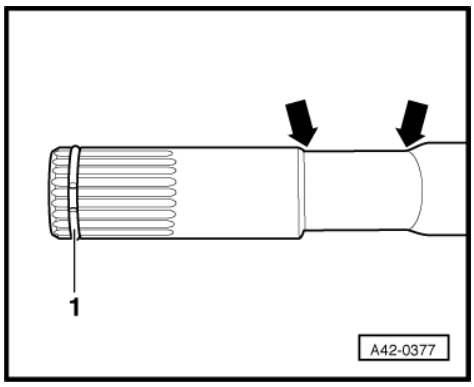


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Version with drop-centre:

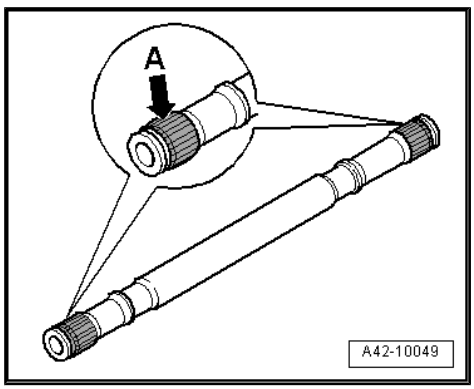
– Position boot between -arrows-.

– Refer to table ⇒ page 98 and pack indicated quantity of grease inside joint body.

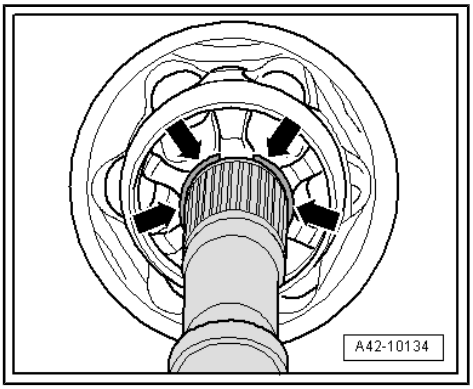


– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint body onto drive shaft.

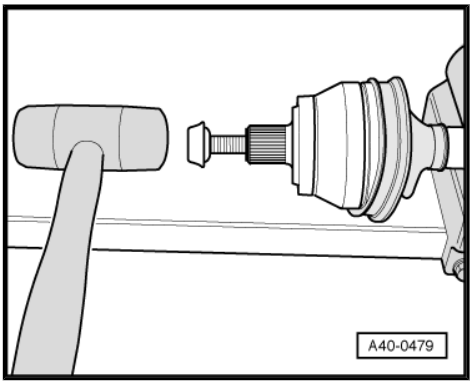
– Fit circlip in groove on shaft.



– Slide on constant velocity joint as far as circlip.
– Align circlip so that opening faces upwards -arrows-.



– Screw old drive shaft bolt into joint body as shown.
– Use plastic hammer to drive joint onto drive shaft until circlip engages.
– Refer to table ⇒ page 98 and pack indicated quantity of grease into boot side of joint body.
– Push boot onto joint body.
– Vent air from boot.
– Make sure boot is properly positioned on joint body.
– Boot must rest in groove and on contour of joint body.
– Tighten hose clips on outer joint ⇒ page 108 .



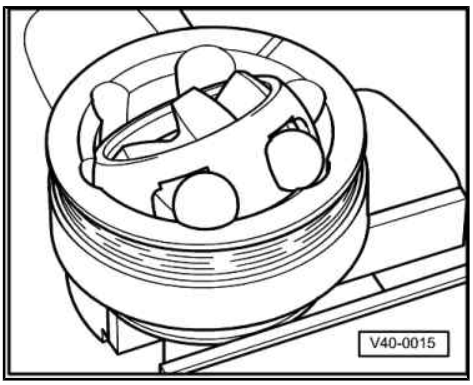
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6.7 Checking outer constant velocity joint

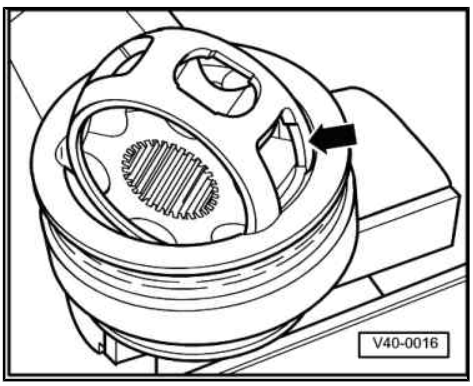
The joint should be dismantled to renew dirty grease or for checking the balls and ball races for wear and damage.

Dismantling

– Before dismantling, mark position of ball hub in relation to ball cage and joint body with an electric scriber or oil stone.
– Swivel ball hub and ball cage.
– Take out balls one after the other.

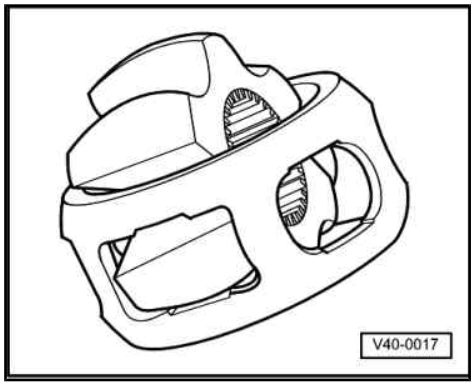


– Turn the cage until the two rectangular openings -arrow- are level with the joint body.
– Lift out cage together with hub.



– Swivel segment of hub with short lobe into square cage opening.

– Pivot hub out of cage.



Checking

The balls in each joint belong to one tolerance group. Check stub axle, hub, cage and balls for pitting and signs of seizure. Excessive backlash in the joint will cause knocking or jolts under load change; in such cases the joint must be renewed. Polished areas and visible tracks in the ball races do not justify renewal of the joint.

Assembling

– Fit cage with hub into joint body.

Note

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Make sure cage is inserted in correct position (i.e. sides facing in same direction as original position).

– Press in balls one after the other from opposite sides, taking care to re-establish original position of hub relative to cage and joint body.

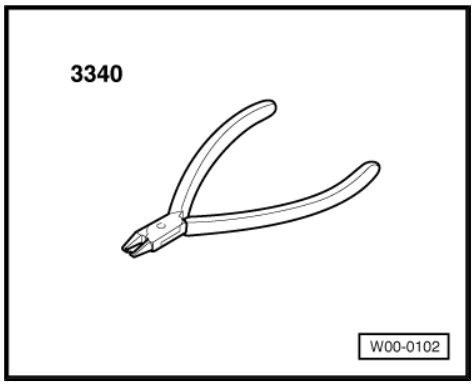
– Pack required amount of grease into joint body ⇒ page 98 .

6.8 Tightening large and small clips on triple roller joint and outer joint

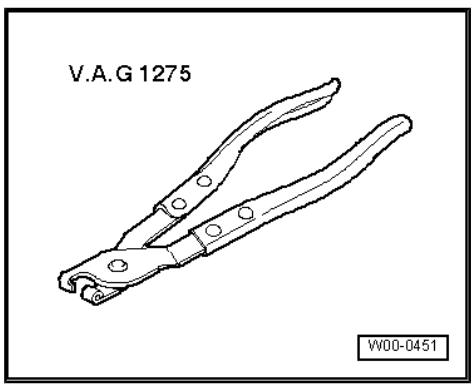
Use the following tools depending on type of hose clip:

Special tools and workshop equipment required

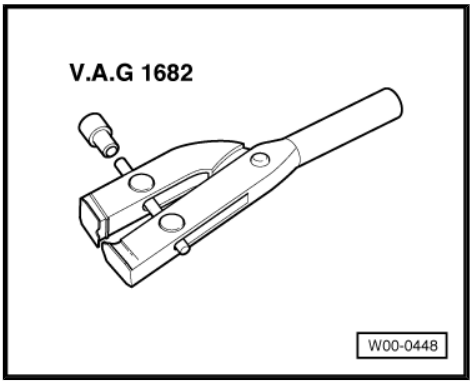
♦ Pliers -3340-



♦ Hose clip pliers -V.A.G 1275-

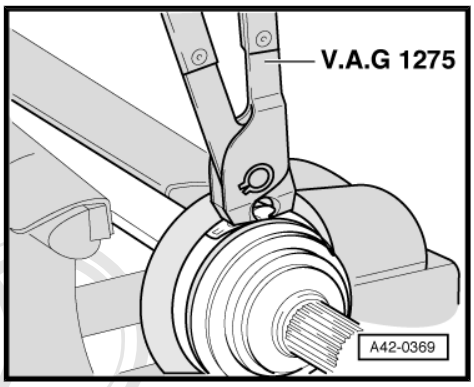


♦ Clamp tensioner -V.A.G 1682-



Use hose clip pliers -V.A.G 1275- to fit and tighten galvanised clips, as shown in illustration.

– Ensure jaws of pliers grip niches on crimping ear.



Use clamp tensioner -V.A.G 1682- to fit and tighten stainless steel clips, as shown in illustration.

– Ensure jaws of tool grip niches -arrows B- on crimping ear.

– Tighten clip by turning spindle with torque wrench -C- (take care to keep tool straight).

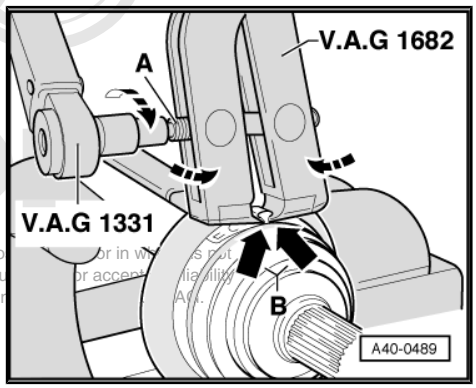
♦ Due to the hard material of the CV joint boot (as opposed to rubber), a stainless steel hose clip is required; this can only be tightened using clamp tensioner -V.A.G 1682-.

♦ Tightening torque: 20 Nm.

♦ Use torque wrench with 5…50 Nm adjustment range (e.g. -V.A.G 1331-).

♦ Make sure thread of spindle on tool -A- turns freely. Lubricate with MoS_2 grease if necessary.

♦ If the thread is stiff (e.g. due to dirt), the required clamping force will not be attained at the hose clip when the specified tightening torque is applied.

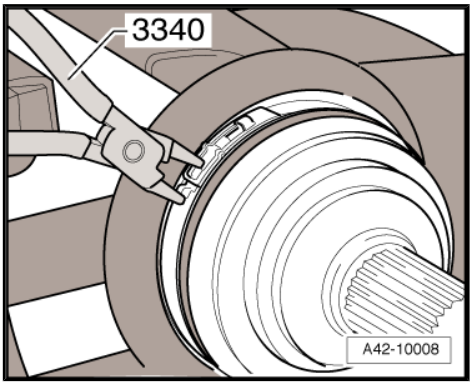


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Use pliers -3340- to fit and tighten clips with retaining lugs, as shown in illustration.

– Engage hose clip by hand at first lug.

– Use pliers -3340- to fasten hose clip.



42 – Rear suspension

1 General notes

⇒ „1.1 General information“, page 110

⇒ „1.2 Contact corrosion“, page 111

⇒ „1.3 Repairing damaged threads in longitudinal member (sub-frame to body)“, page 111

⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 112

⇒ „1.5 Rear axle - overview“, page 114

1.1 General information

All contact surfaces must be cleaned when installing wax-coated components. The contact surfaces must be free of wax and grease.

Tightening torques refer to unoiled bolts and nuts.

Always renew self-locking bolts/nuts.

Always renew bolts and nuts which are tightened by turning through a specified angle.

Load-bearing components and other suspension parts must not be welded or straightened.

Do not subject coil springs to hammer blows or weld splashes and do not make any new colour markings.

Do not perform welding or cutting operations (using power grinders) near the coil springs or suspension struts. Cover up coil springs or suspension struts if necessary.

Make sketches or take photographs when unfastening or removing and installing hydraulic or pneumatic pipes or electrical wires. This ensures re-installation at the original location.

Any cable ties, brackets or fasteners removed during repair work must be re-attached at their original standard locations.

Do not let drive shaft hang down under its own weight when performing repair work, as otherwise excessive bending could damage inner CV joint.

Do not attempt to move the vehicle without the drive shafts fitted; this would result in wheel bearing damage. If the vehicle does have to be moved, always note the following points:

– Fit an outer joint in place of the drive shaft.

– Tighten bolt securing drive shaft to wheel hub to 200 Nm.

Bonded rubber bushes can only be turned to a limited extent. The suspension must therefore always be in the unladen position or the reference position when the suspension link attachments are tightened.

♦ Lifting suspension to unladen position ⇒ „1.4 Lifting suspension to unladen position (vehicles with coil springs)“, page 112

From model year 2010 onwards, steel track rods are being introduced gradually instead of aluminium track rods. Mixed installation of different track rods on the same axle is not permissible; for correct type, refer to ⇒ Electronic parts catalogue .

If the wheel alignment has to be checked and adjusted at a later stage, all bolts and nuts which need to be slackened to make ad-

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justments should initially only be tightened to the specified torque figure. After wheel alignment has been checked and adjusted, bolts and nuts must then be fully tightened by turning them through the specified angle.

WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

WARNING

Risk of personal injury caused by automatic engine start on vehicles with start/stop system.

- *On vehicles with activated start/stop system (indicated by a symbol in the instrument cluster) the engine can start automatically under certain conditions.*
- *When working on the vehicle, it is therefore important to ensure that the start/stop system is deactivated (switch off ignition and switch on again if required).*

1.2 Contact corrosion

Contact corrosion can occur if unsuitable fasteners (bolts, nuts, washers ...) are used.

For this reason, all the fasteners on the vehicle have a special surface coating (Dacromet). These components can be recognised by their greenish colour.

In addition, rubber parts, plastic parts and adhesives are made of non-conductive material.

Always install new parts if you are not sure whether used parts can be refitted.

Note:

Use only genuine parts. These have been tested and are compatible with aluminium.

Accessories must be approved by AUDI AG.

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Damage resulting from contact corrosion is not covered under the warranty.

1.3 Repairing damaged threads in longitudinal member (subframe to body)

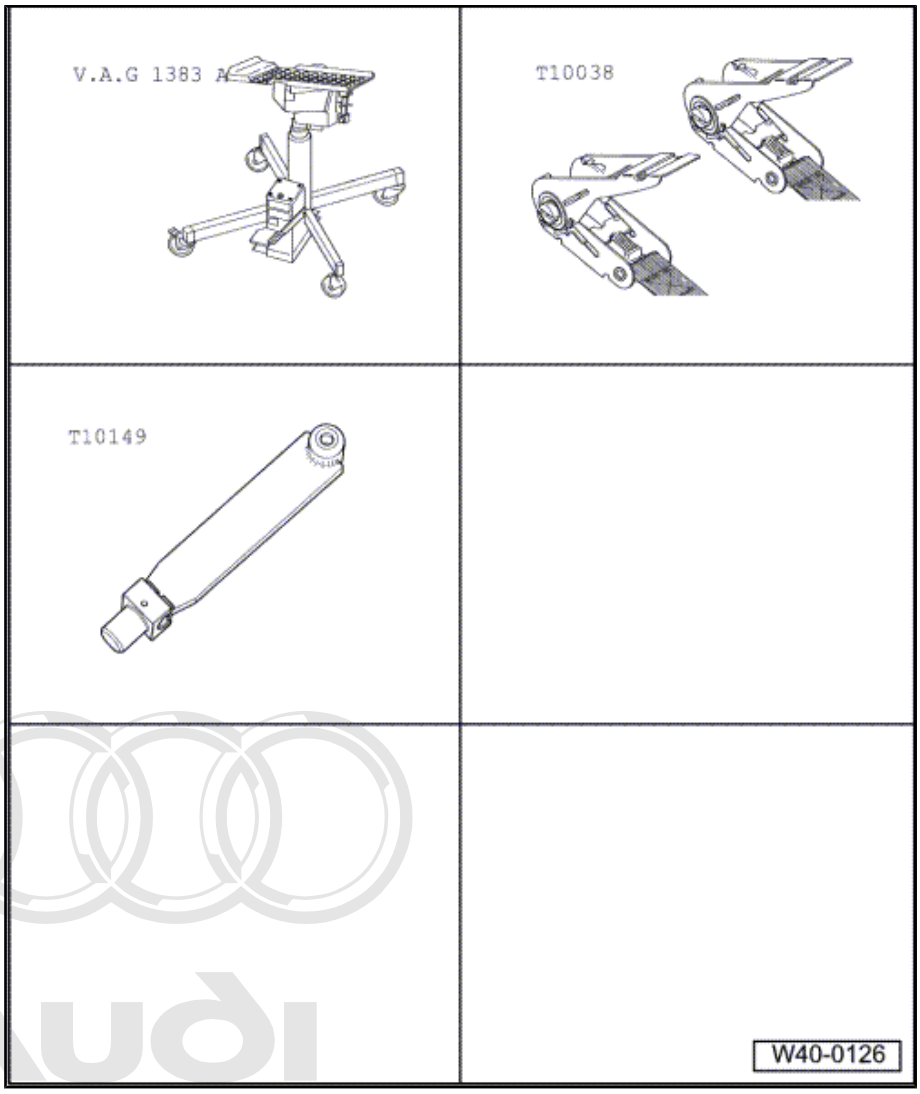
Damaged threads can be repaired with wire inserts (Helicoil).

- Have all thread repairs checked by foreman or supervisor.
- The thread insert must be of the same length as the thread in the body.
- Make good any damage to underseal ⇒ General Information; Body Repairs, General Body Repairs .

1.4 Lifting suspension to unladen position (vehicles with coil springs)

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-
- Tensioning strap -T10038-
- Support -T10149-



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Note

All bolts on running gear components with bonded rubber bushes must always be tightened with the suspension in the unladen position (vehicle unladen).

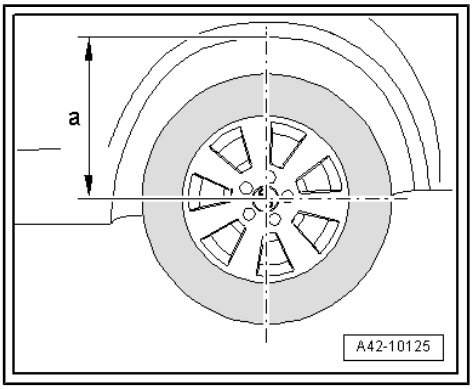
Bonded rubber bushes can only be turned to a limited extent.

Therefore, before tightening the bolts, suspension components with bonded rubber bushes must be brought into a position corresponding to the normal position of the unladen vehicle while driving (unladen position).

Otherwise, the bush would be subject to torsion loading and its service life would be shortened.

This position can be simulated on the lifting platform by raising the appropriate part of the suspension with the engine and gearbox jack -V.A.G 1383 A- and support -T10149- .

– Before commencing work, use measuring tape or similar to measure dimension -a- from wheel centre to lower edge of wheel housing.



This measurement must be taken with the suspension in the unladen position (vehicle unladen).

– Make a note of the measured value. This will be needed when tightening the bolts and/or nuts on the suspension.

Before raising wheel unit, secure vehicle to arms of lifting platform using tensioning straps -T10038- .

If vehicle is not secured, there is a risk of it slipping off the lifting platform.

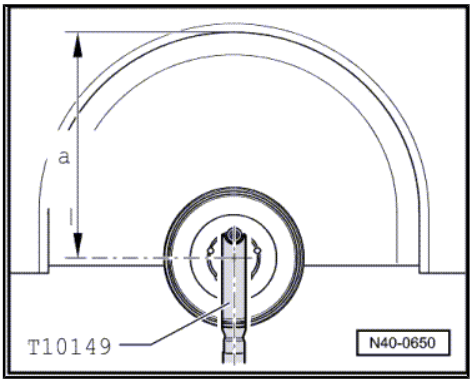
– Remove wheel.

– Turn wheel hub until one of the wheel bolt holes is at the top.

– Attach support -T10149- to wheel hub using wheel bolt.

The bolts/nuts on the relevant suspension mountings must not be tightened until the distance -a- between the wheel centre and the lower edge of the wheel arch is the same as the distance measured before commencing work.

– Raise wheel bearing housing with engine and gearbox jack -V.A.G 1383 A- until distance -a- is obtained.



WARNING

- *Do not raise or lower vehicle when engine and gearbox jack -V.A.G 1383 A- is under vehicle.*
- *Do not leave engine and gearbox jack -V.A.G 1383 A- under vehicle for longer than necessary.*

– Tighten relevant bolts/nuts.

– Lower wheel bearing housing.

– Pull out engine and gearbox jack -V.A.G 1383 A- from underneath vehicle.

– Remove support -T10149- .

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1.5 Rear axle - overview

I -
⇒ „2 Subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

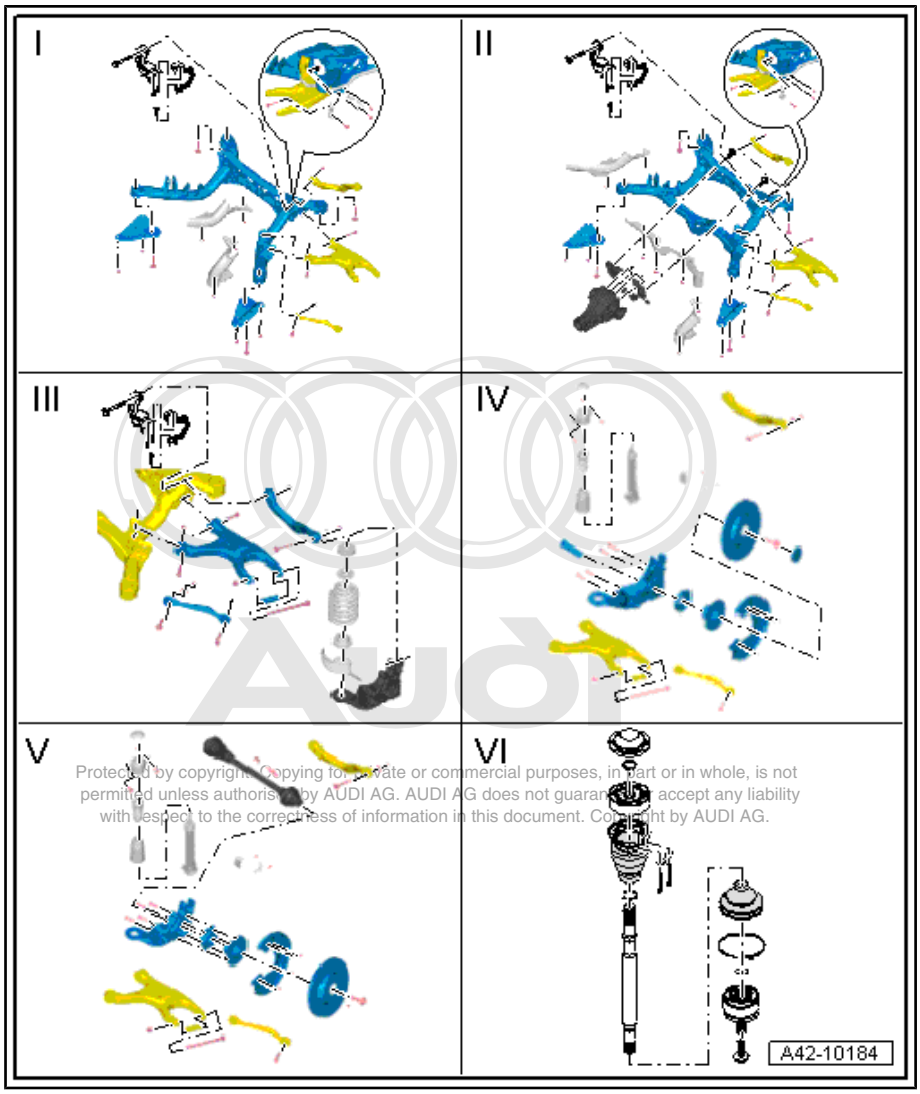
II -
⇒ „3 Subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 138

III -
⇒ „4 Upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender“, page 173

IV -
⇒ „5 Wheel bearing housing, wheel bearing unit, shock absorber - front-wheel drive vehicles“, page 196

V -
⇒ „6 Wheel bearing housing, wheel bearing unit, shock absorber - four-wheel drive vehicles“, page 218

VI -
⇒ „7 Drive shaft“, page 240



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2 Subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles

⇒ „2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

⇒ „2.2 Removing and installing subframe with attachments - front-wheel drive vehicles“, page 118

⇒ „2.3 Renewing conventional/hydraulic bonded rubber bushes for subframe - front-wheel drive vehicles“, page 123

⇒ „2.4 Removing and installing coupling rod and anti-roll bar - front-wheel drive vehicles“, page 133

⇒ „2.5 Removing and installing diagonal strut (Cabriolet)“, page 135

⇒ „2.6 Removing and installing diagonal strut (Sportback)“, page 136

2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles

1 - Clamp

- ❑ Is renewed together with rubber bush and anti-roll bar
- ❑ Rubber bush and clamp must not be separated from anti-roll bar

2 - Bolt

- ❑ 25 Nm +90°
- ❑ Always renew if removed
- ❑ Tighten evenly

3 - Bolt

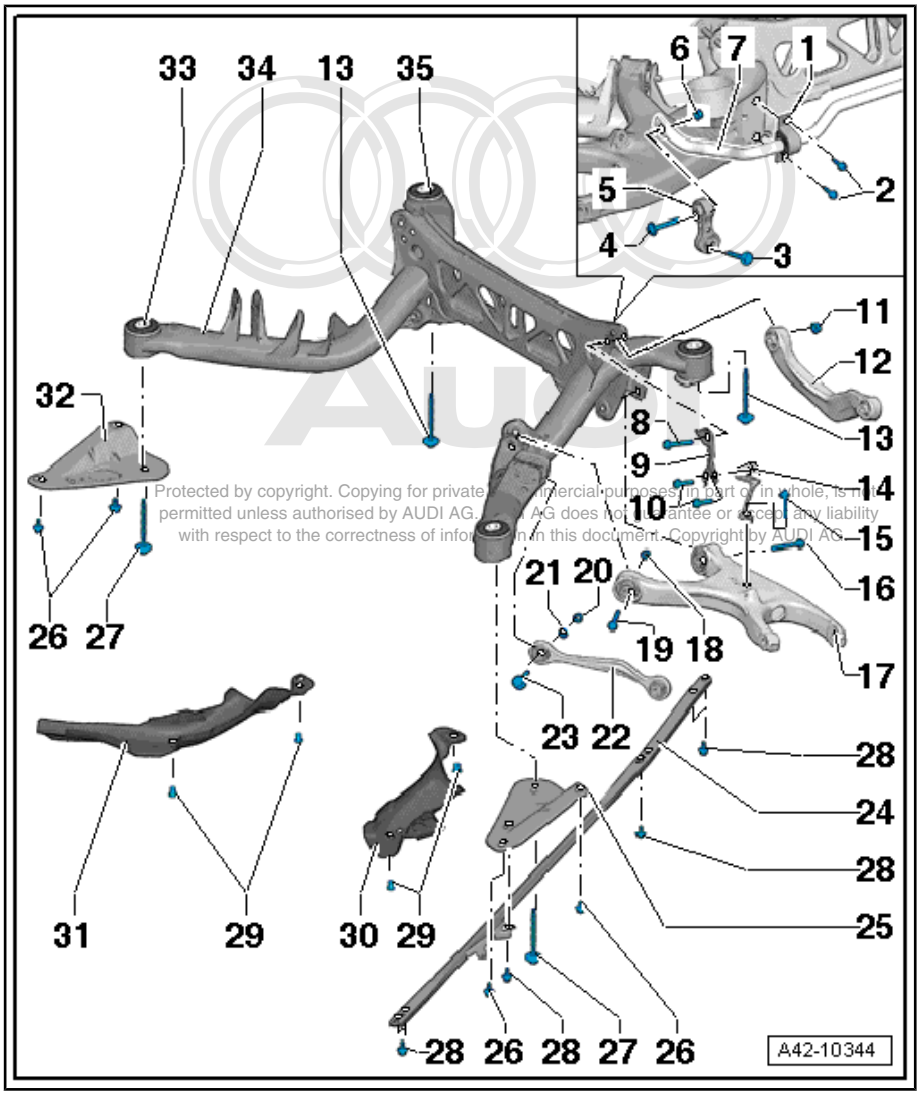
- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

4 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

5 - Coupling rod

- ❑ Coupling rod is removed together with anti-roll bar
- ❑ Removing and installing ⇒ page 133



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6 - Nut

- ❑ Always renew if removed

7 - Anti-roll bar

- ❑ Rubber bush and clamp must not be separated from anti-roll bar
- ❑ Anti-roll bar is removed together with coupling rod
- ❑ Removing and installing ⇒ page 133

8 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

9 - Retaining bracket

10 - Bolt

- ❑ 5 Nm

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11 - Nut

- ❑ Always renew if removed

12 - Upper transverse link

13 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Bolts must not be loosened or tightened while springs are still installed. Before loosening or tightening bolts, slacken coil springs using spring compressor

14 - Rear left vehicle level sender -G76-

- ❑ The same sender versions must be installed on both sides.
- ❑ Complete with mounting parts
- ❑ Lever of sender faces outwards
- ❑ Renewing in vehicle ⇒ page 194
- ❑ Check basic adjustment of headlights if sender mountings are loosened ⇒ Rep. gr. 94
- ❑ If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 . ⇒ Vehicle diagnostic tester
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

15 - Bolt

- ❑ 9 Nm

16 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

17 - Lower transverse link

18 - Nut

- ❑ Always renew if removed

19 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

20 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed

- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

21 - Eccentric washer

22 - Track rod

- ❑ Different versions (aluminium and steel); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

23 - Eccentric bolt

24 - Diagonal strut

- ❑ Removing and installing (Cabriolet) ⇒ page 135
- ❑ Removing and installing (Sportback) ⇒ page 136

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25 - Support (left-side)

26 - Bolt

- ❑ 55 Nm

27 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Bolts must not be loosened or tightened while springs are still installed. Before loosening or tightening bolts, slacken coil springs using spring compressor

28 - Bolt

- ❑ Initial tightening torque: 5 Nm
- ❑ Final tightening torque: 50 Nm + turn 90° further
- ❑ Always renew if removed

29 - Clip

- ❑ Not fitted on all vehicles

30 - Stone deflector (left-side)

- ❑ Not fitted on all vehicles

31 - Stone deflector (right-side)

- ❑ Not fitted on all vehicles

32 - Support (right-side)

33 - Bonded rubber bush (front)

- ❑ For subframe mounting
- ❑ A conventional or hydraulic bonded rubber bush is fitted, depending on model ⇒ page 118 ; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Oil stains on a hydraulic bonded rubber bush are a sign of wear
- ❑ Renewing ⇒ page 123
- ❑ Always renew on both sides

34 - Subframe

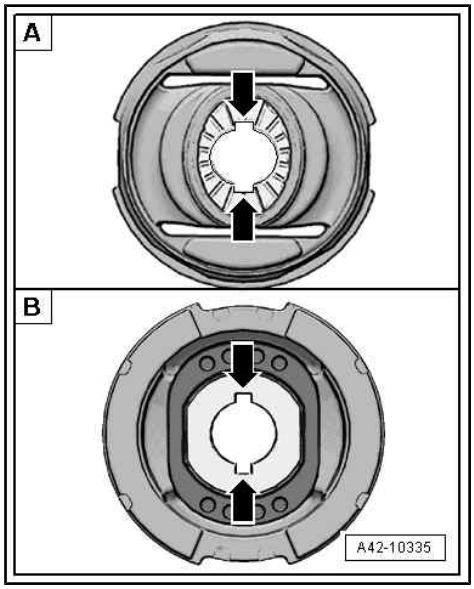
- ❑ Removing and installing subframe with attachments ⇒ page 118

35 - Bonded rubber bush (rear)

- ❑ For subframe mounting
- ❑ A conventional or hydraulic bonded rubber bush is fitted, depending on model ⇒ page 118 ; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Oil stains on a hydraulic bonded rubber bush are a sign of wear
- ❑ Renewing ⇒ page 123
- ❑ Always renew on both sides

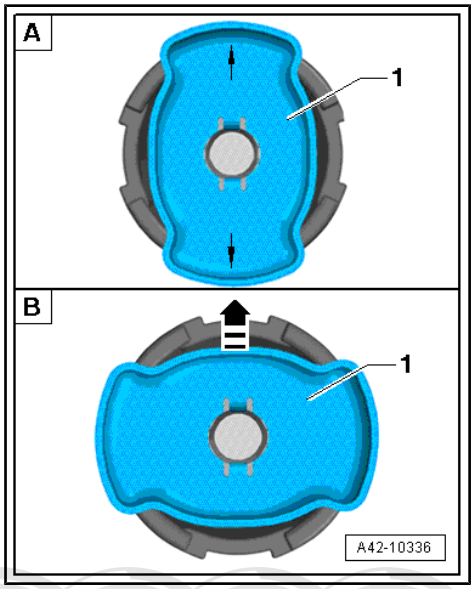
Bonded rubber bush (front)

- -A- Conventional bonded rubber bush
- -B- Hydraulic bonded rubber bush



Bonded rubber bush (rear)

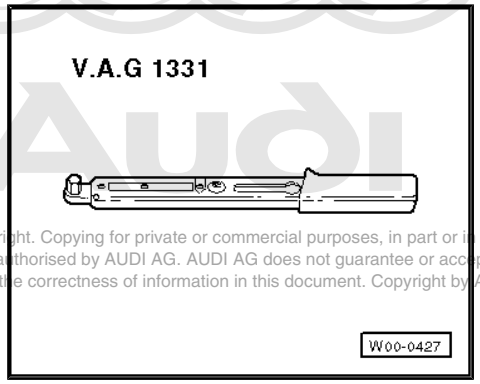
- -A- Conventional bonded rubber bush
- -B- Hydraulic bonded rubber bush



2.2 Removing and installing subframe with attachments - front-wheel drive vehicles

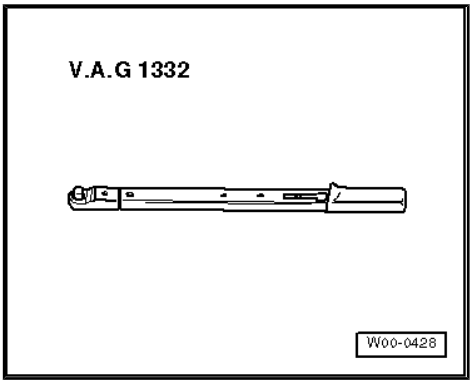
Special tools and workshop equipment required

- Torque wrench -V.A.G 1331-

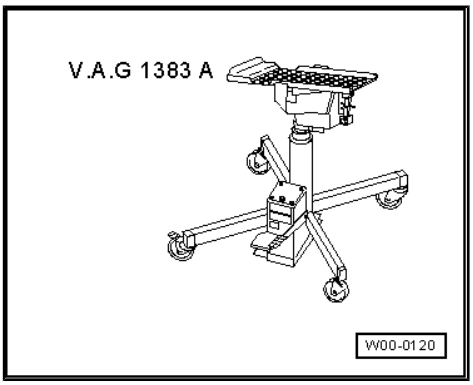


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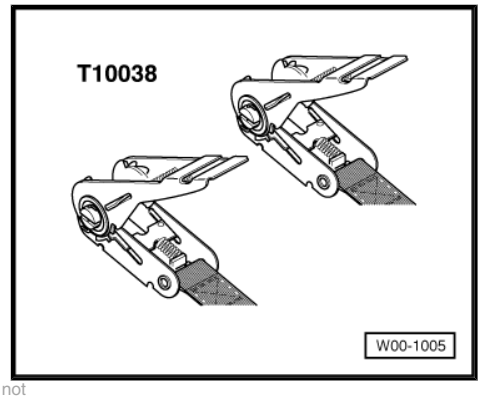
- Torque wrench -V.A.G 1332-



- Engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2-



- Tensioning strap -T10038-



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- 2 blocks of wood

Removing subframe with attachments

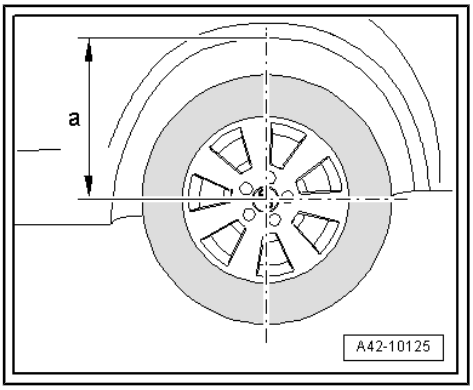
– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

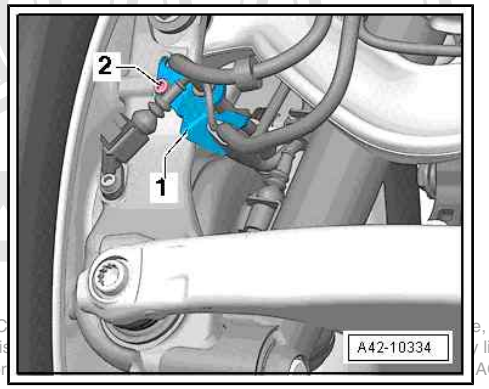
– Remove wheels.

– Remove coil springs ⇒ page 184 .

– Remove rear silencer(s) ⇒ Rep. gr. 26 .

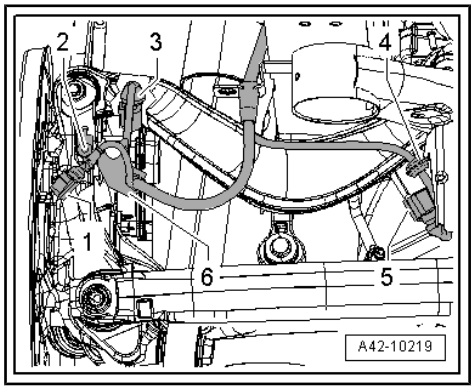


– Unscrew bolt -2- on both sides and detach bracket -1- with wiring.

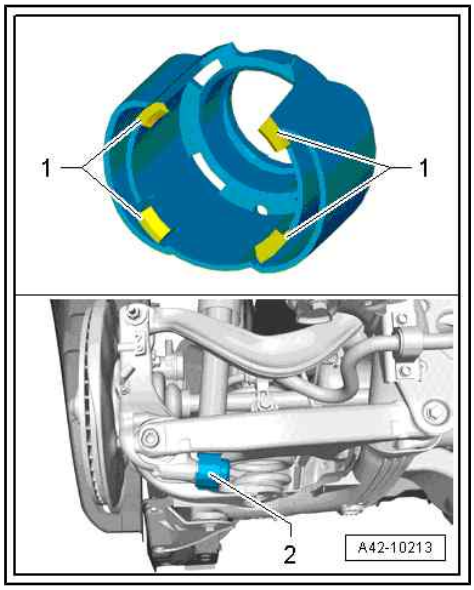


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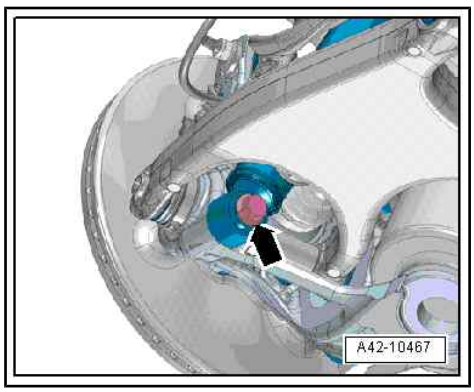
– Release and unplug connector -1- from rear left speed sensor -G46- and rear right speed sensor -G44- .
– Release and unplug connector -3- for electromechanical parking brake (both sides).
– Release and unplug connector -5- from rear left vehicle level sender -G76- and, if fitted, rear right vehicle level sender -G77- .
– Unclip wiring harness -4- on left and, if fitted, on right.
– On vehicles with electronic damping control, unplug connector at shock absorber and move wiring harness clear.



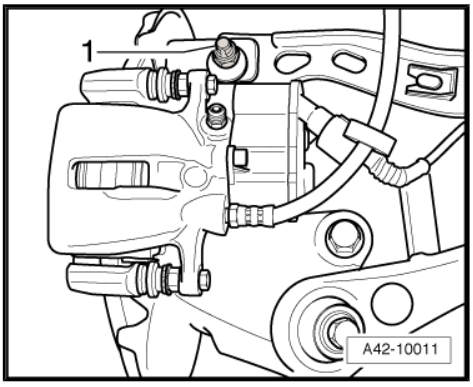
– Unclip retaining tabs -1- and detach stone deflector -2-.



– Remove bolt -arrow- and take off washer.

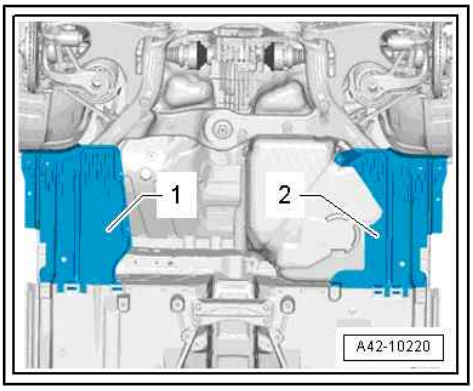


– Detach bolt connection -1-.
– Detach brake calipers ⇒ Rep. gr. 46 .
– Guide brake calipers past suspension and secure to body so that weight of calipers does not stretch or damage brake hose or brake pipe.
– Attach upper transverse link to wheel bearing housing (hand-tight) -1-.
– Remove diagonal struts (Cabriolet) ⇒ page 135 .
– Remove diagonal struts (Sportback) ⇒ page 136 .



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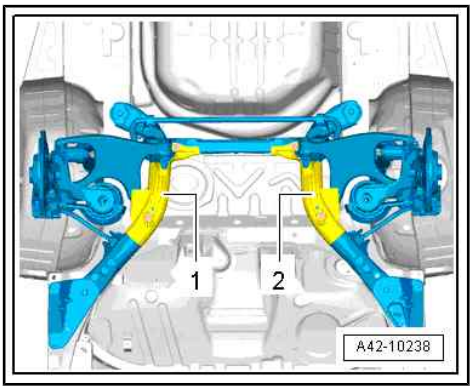
– Remove covers -1- and -2- ⇒ Rep. gr. 66 .



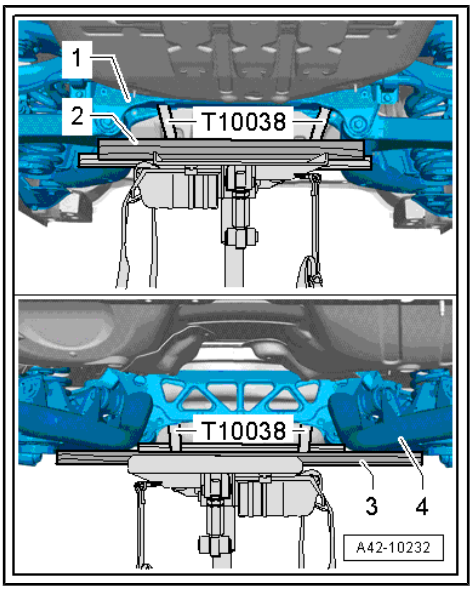
– If fitted, remove stone deflectors -1- and -2-.

WARNING

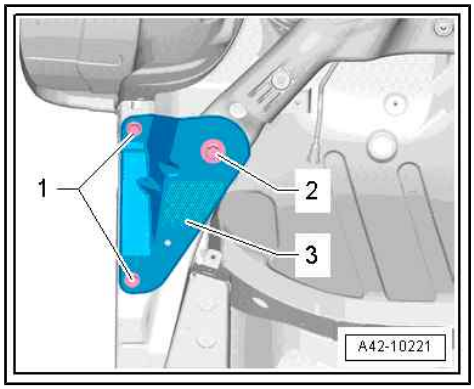
Before slackening subframe bolts, secure vehicle against tipping over (e.g. by placing a weight of approx. 50 kg in the luggage compartment).



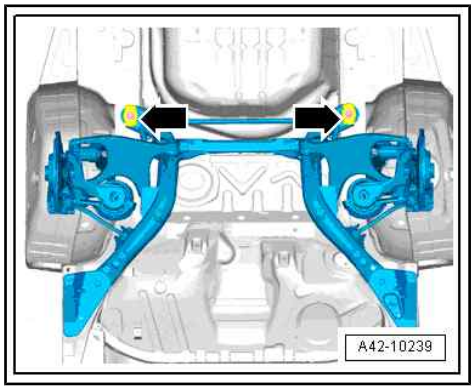
– Position engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2- beneath subframe and secure with tensioning strap -T10038- .
– Support rear of subframe -1- with a suitable block of wood -2-.
– Support front of subframe -4- with a suitable block of wood -3-.
– Guide tensioning strap -T10038- through between subframe and fuel tank.
– Route tensioning strap -T10038- below universal gearbox support -V.A.G 1359/2- and tighten strap.



– Remove bolts -1- and -2- on both sides.
– Detach support -3- on both sides.



– Remove bolts -arrows-.
• Before lowering the subframe, check that all electrical wiring has been disconnected.
– Carefully lower subframe with attachments. Look out for brake calipers and their lines when doing so.



Installing subframe with attachments

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles“, page 196

Note

◆ *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*

◆ *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

– Bores in subframe mountings must be aligned centrally with mounting points on body.

Note

Do not install coil springs until subframe bolts have been tightened to specified torque.

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

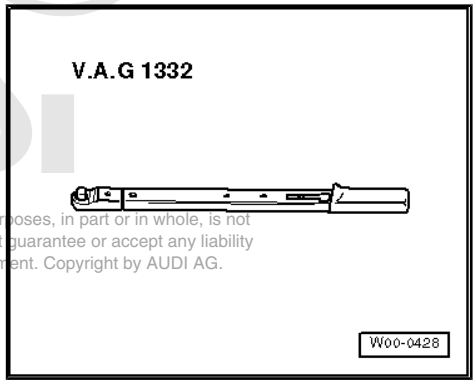
Front and rear wheel alignment must always be checked and adjusted if necessary using VW/Audi approved equipment.

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2.3 Renewing conventional/hydraulic bonded rubber bushes for subframe - front-wheel drive vehicles

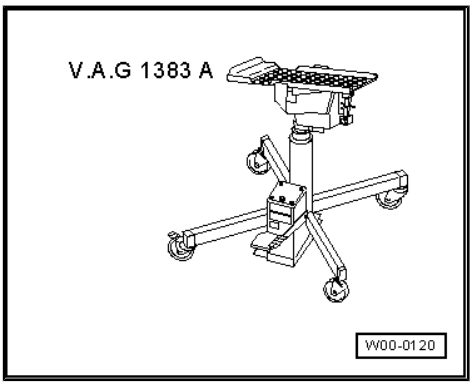
Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-

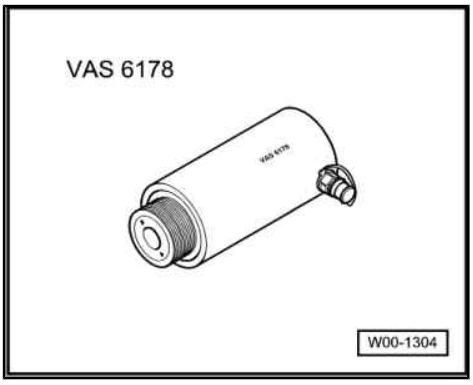


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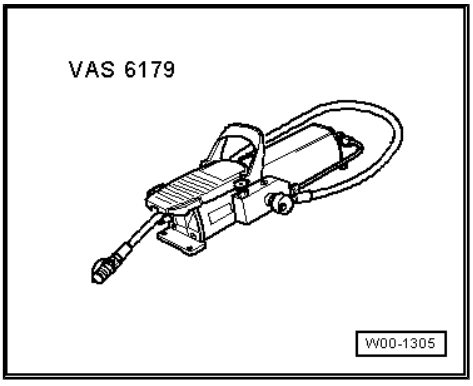
- Engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2-



- Hydraulic press -VAS 6178-

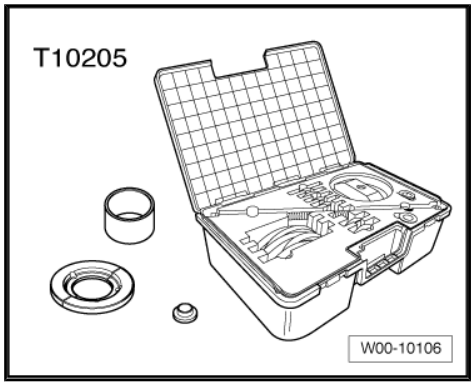


- Foot pump -VAS 6179-

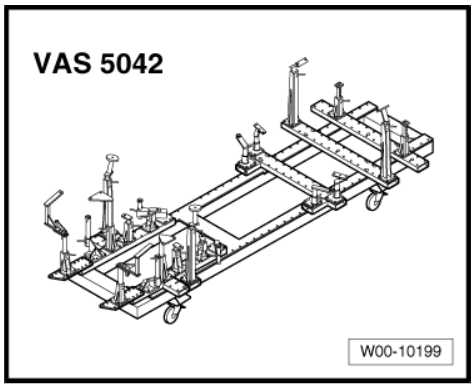


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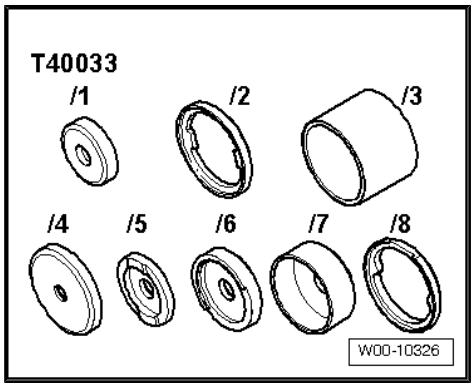
- Assembly tool -T10205-



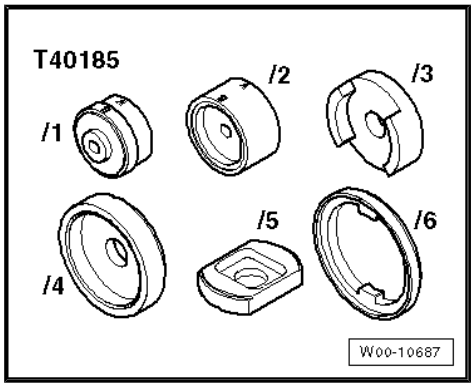
- Assembly tool -T10263-



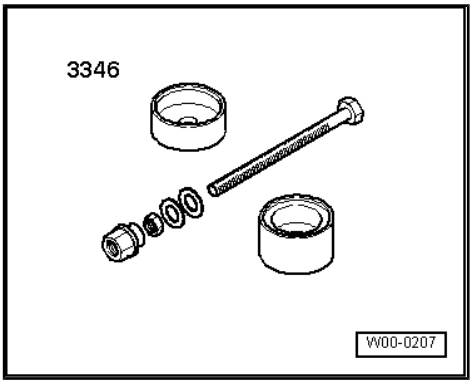
- Assembly tool -T40033-



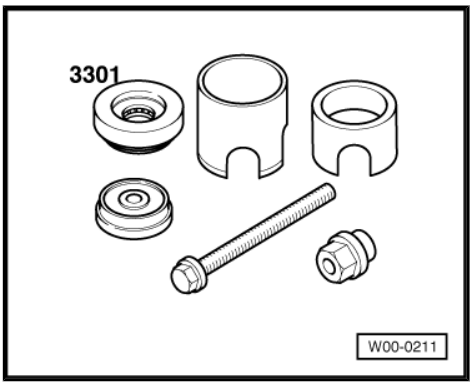
- Assembly tool -T40185-



- Assembly tool -3346-



- Assembly tool -3301-



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Note

- *If a bonded rubber bush on one side is defective, the bush on the other side must be renewed at the same time. For correct version refer to ⇒ Electronic parts catalogue .*
- *Also check the other bushes before renewing a defective bonded rubber bush.*
- *If cracks, oil stains or other damage is visible, these bonded rubber bushes must also be renewed.*
- *Different versions of bonded rubber bush (conventional and hydraulic) are fitted, depending on the model ⇒ page 118 ⇒ page 118 . For correct version refer to ⇒ Electronic parts catalogue .*

– Raise vehicle on lifting platform.
– Remove wheels.
– Remove coil springs ⇒ page 184 .

Note

- *The front or rear part of the subframe is lowered in order to renew the bonded rubber bushes. The subframe does not have to be removed.*
- *Lower the subframe at each end separately. This avoids the need for checking and adjusting wheel alignment.*
- *Do not lower the subframe more than 4 cm.*
- *Mark the position of the bonded rubber bushes in relation to the subframe before removing them.*

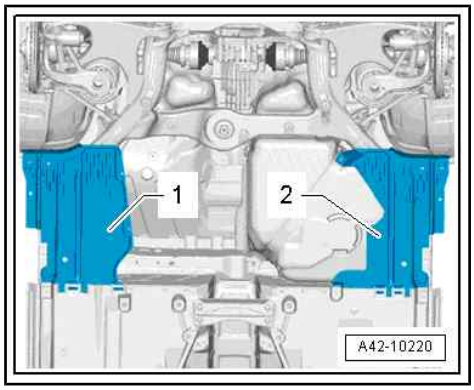
Renewing bonded rubber bush (front)

Applies to all versions:

– Remove covers -1- and -2- ⇒ Rep. gr. 66 .

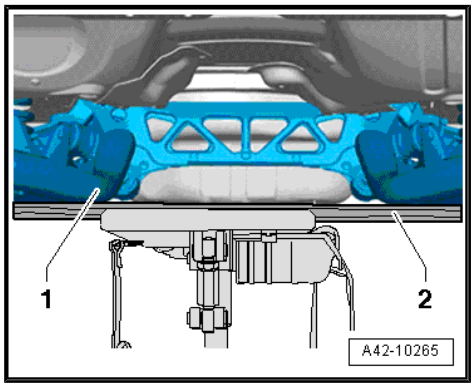
– Remove diagonal struts (Cabriolet) ⇒ page 135 .

– Remove diagonal struts (Sportback) ⇒ page 136 .



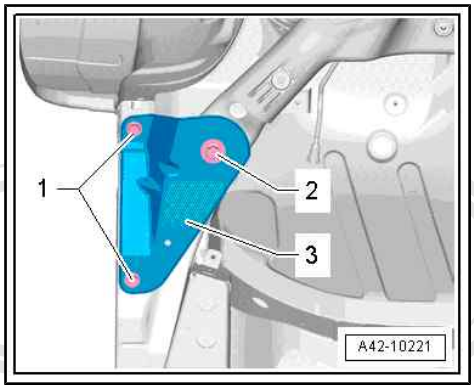
– Bring engine and gearbox jack with universal gearbox support -V.A.G 1359/2- into position under subframe -1-.

– Insert a suitable block of wood -2- under subframe -1-.



– Remove bolts -1- and -2- on both sides.

– Detach support -3- on both sides.

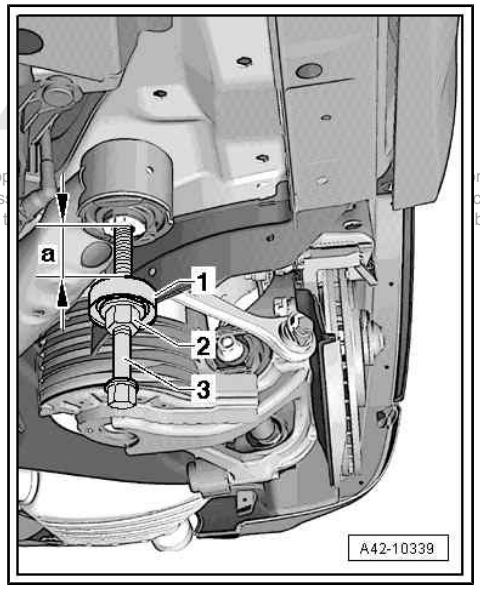


– Using assembly tool -3301- and nut -3346/3- , as shown in illustration, screw spindle -3346/2- approx. 1.5 cm into body on side opposite bonded rubber bush to be renewed.

1 - Assembly tool -3301-

2 - Nut -3346/3-

3 - Spindle -3346/2-



Note

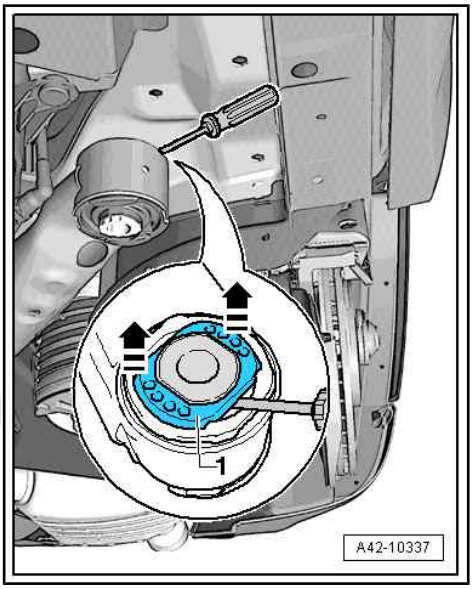
Screw nut -3346/3- onto spindle -3346/2- until distance -a- reaches 4 cm.

– Lower subframe not more than 4 cm.

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Applies to hydraulic bonded rubber bush:

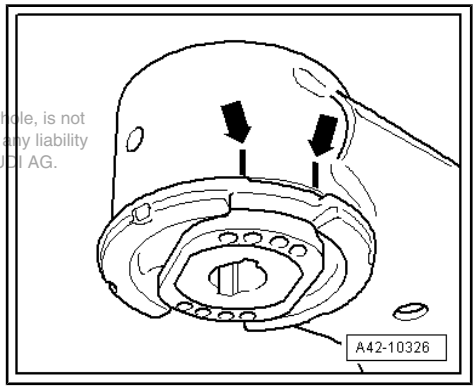
– Lift out plastic insert -1-, as shown in illustration.



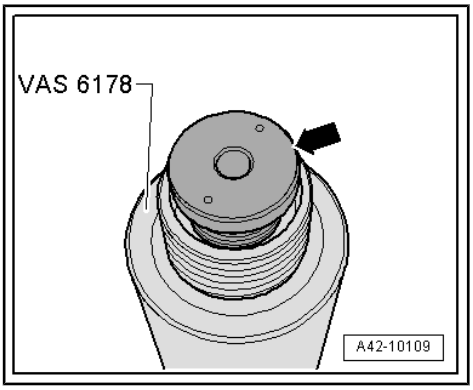
Applies to all versions:

– Mark installation position of bonded rubber bush in relation to subframe -arrows- using a felt-tip pen or similar.

The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.

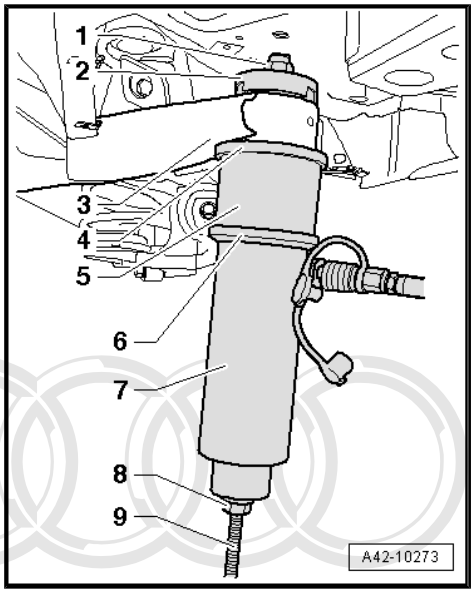


– If necessary, unscrew small-diameter support -arrow- from hydraulic press -VAS 6178- and screw in support -T10205/13- in its place.



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– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10263/5-

2 - Thrust piece -T40185/5- Recess faces towards bonded rubber bush.

3 - Subframe

4 - Support ring -T40185/6- Tapered end faces upwards and projections engage in recesses in bonded rubber bush.

5 - Tube -T40033/3-

6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

WARNING

- *Hold hydraulic press -VAS 6178- securely during pressing operation.*
- *The bonded rubber bush will come loose suddenly. Injuries can be caused if the tools and the bonded rubber bush are allowed to drop.*

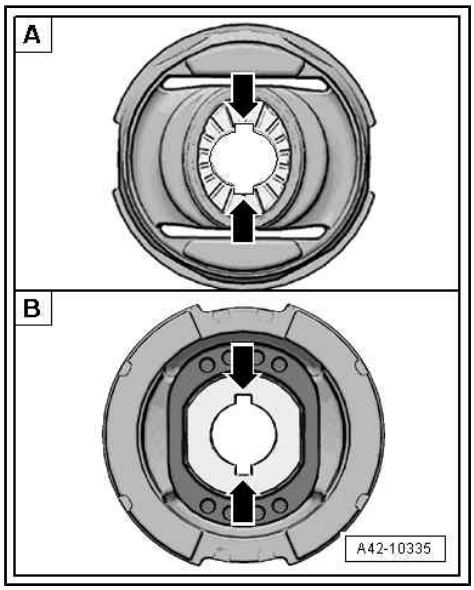
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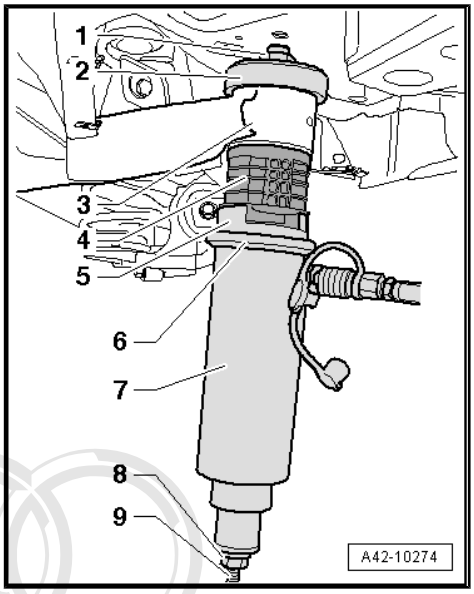
Installation position of front bonded rubber bush

Grooves -arrows- are in line with direction of travel.

- -A- Conventional bonded rubber bush
- -B- Hydraulic bonded rubber bush



– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10263/5-

2 - Thrust piece -T40185/4-

3 - Subframe

4 - Conventional or hydraulic bonded rubber bush

5 - Thrust piece -T40185/3-

6 - Support ring -T10205/4-

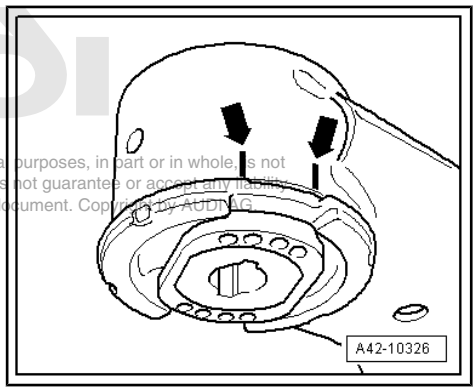
7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

– Align bonded rubber bush with markings made earlier and press in at the correct position until collar is flush with subframe bushing. If necessary, slacken cylinder and then press home again. Ensure that the bonded rubber bush remains straight during the first stage of installation, otherwise the outer ring may be damaged.

– Ends of rubber bead on bonded rubber bush must align with markings -arrows- made earlier on subframe.



The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.

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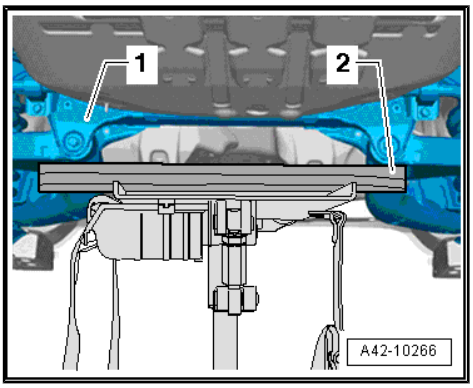
Note

After renewing the bushes, make good any paint damage on the subframe with anti-corrosion coating, primer and black topcoat.

Remaining installation steps are carried out in reverse sequence.

Renewing conventional or hydraulic bonded rubber bush (rear)

Applies to all versions:



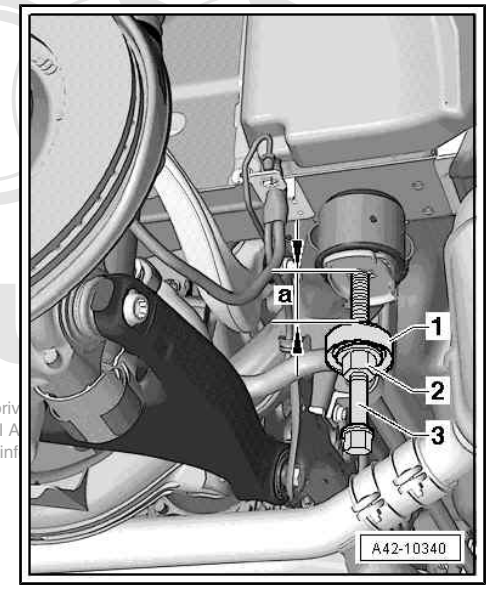
– Unscrew nuts on both brackets for rear silencers as far as end of thread.

– Bring engine and gearbox jack with universal gearbox support -V.A.G 1359/2- into position under subframe -1-.

– Insert a suitable block of wood -2- under subframe -1-.

– Remove rear subframe bolts ⇒ Item 13 (page 116) .

– Using assembly tool -3301- and nut -3346/3- , as shown in illustration, screw spindle -3346/2- approx. 1.5 cm into body on side opposite bonded rubber bush to be renewed.



1 - Assembly tool -3301-

2 - Nut -3346/3-

3 - Spindle -3346/2-

Note

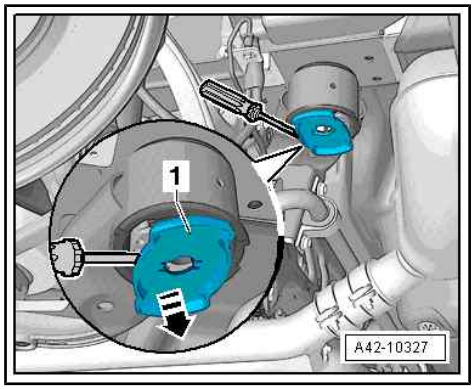
Screw nut -3346/3- onto spindle -3346/2- until distance -a- reaches 4 cm.

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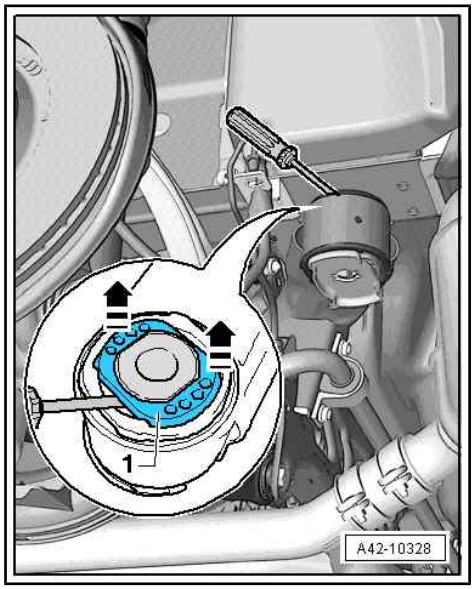
– Lower subframe not more than 4 cm.

Applies to hydraulic bonded rubber bush:

– Carefully lever locating element -1- off hydraulic bonded rubber bush in several stages on alternate sides by applying a screwdriver or similar tool in area of retaining lugs.



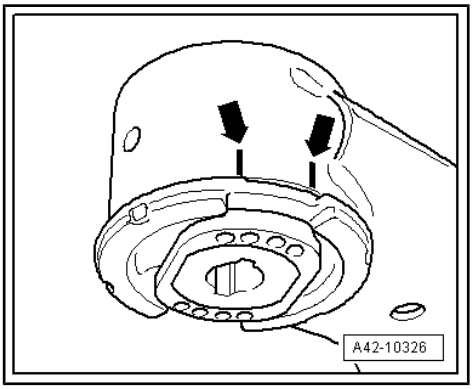
– Lift out plastic insert -1-, as shown in illustration.



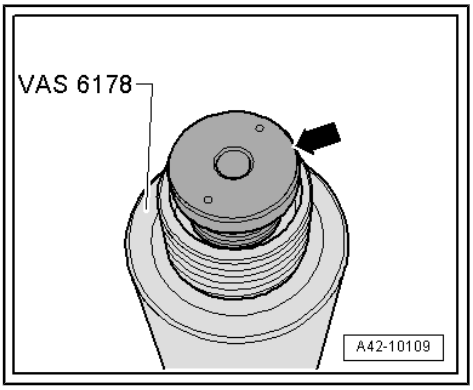
Applies to all versions:

– Mark installation position of bonded rubber bush in relation to subframe -arrows- using a felt-tip pen or similar.

The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.



– If necessary, unscrew small-diameter support -arrow- from hydraulic press -VAS 6178- and screw in support -T10205/13- in its place.



– Apply special tools to front bonded rubber bush as shown in illustration.

1 - Nut -T10263/5-

2 - Thrust piece -T40185/5- Recess faces towards bonded rubber bush.

3 - Subframe

4 - Support ring -T40185/6- Tapered end faces upwards and projections engage in recesses in bonded rubber bush.

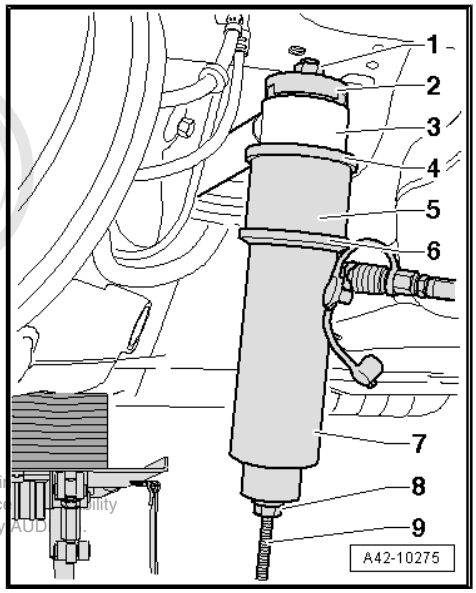
5 - Tube -T40033/3-

6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4-. Pin on end of spindle faces downwards.



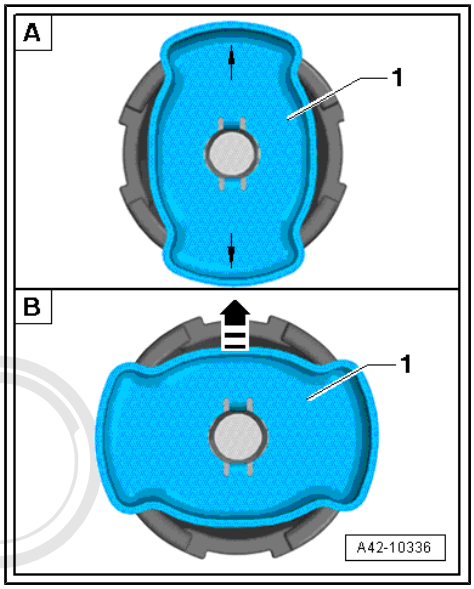
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WARNING

- *Hold hydraulic press -VAS 6178- securely during pressing operation.*
- *The bonded rubber bush will come loose suddenly. Injuries can be caused if the tools and the bonded rubber bush are allowed to drop.*

Installation position of rear bonded rubber bush

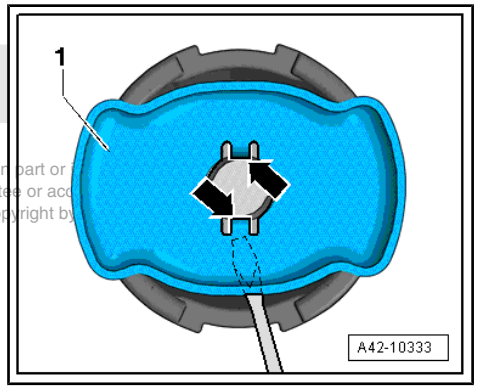
- -A- Conventional bonded rubber bush (arrows are in line with direction of travel)
- -B- Hydraulic bonded rubber bush (locating element -1- is perpendicular to direction of travel, -arrow- is pointing in direction of travel)



Applies to hydraulic bonded rubber bush:

Before installing hydraulic bonded rubber bush (rear), carefully lever locating element -1- off hydraulic bonded rubber bush in several stages on alternate sides by applying a screwdriver or similar tool in area of retaining lugs -arrows-.

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Applies to all versions:

– Apply special tools to rear bonded rubber bush as shown in illustration.

1 - Nut -T10263/5-

2 - Thrust piece -T40185/4-

3 - Subframe

4 - Conventional or hydraulic bonded rubber bush

5 - Thrust piece -T40185/3-

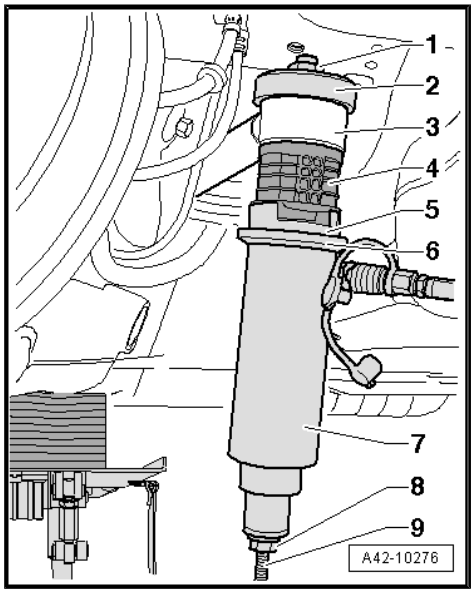
6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

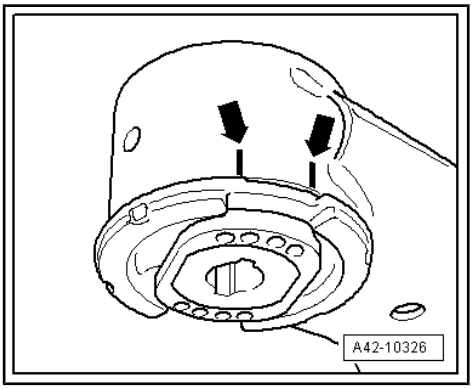
9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

– Align bonded rubber bush with markings made earlier and press in at the correct position until collar is flush with subframe bushing. If necessary, slacken cylinder and then press home again. Ensure that the bonded rubber bush remains straight during the first stage of installation, otherwise the outer ring may be damaged.



– Ends of rubber bead on bonded rubber bush must align with markings -arrows- made earlier on subframe.

The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.



Note

After renewing the bushes, make good any paint damage on the subframe with anti-corrosion coating, primer and black topcoat.

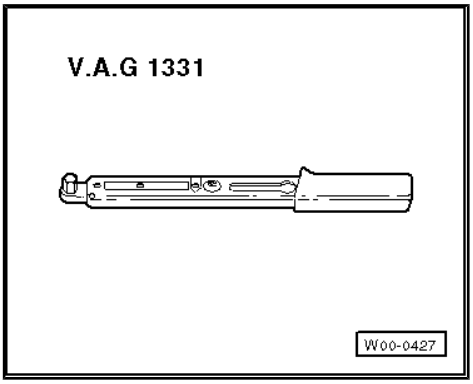
– Fit locating element on hydraulic bonded rubber bush.

Remaining installation steps are carried out in reverse sequence.

2.4 Removing and installing coupling rod and anti-roll bar - front-wheel drive vehicles

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-



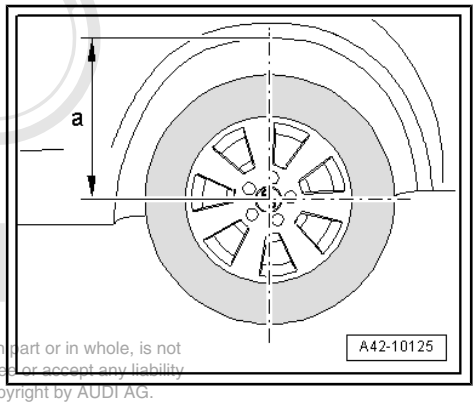
♦ Assembly lubricant

Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

– Remove wheels.

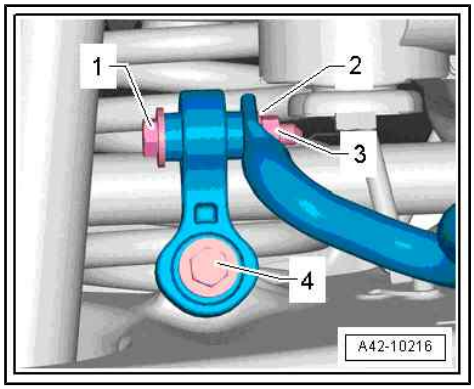


Caution

- *Take care not to damage paintwork on anti-roll bar during removal and installation.*

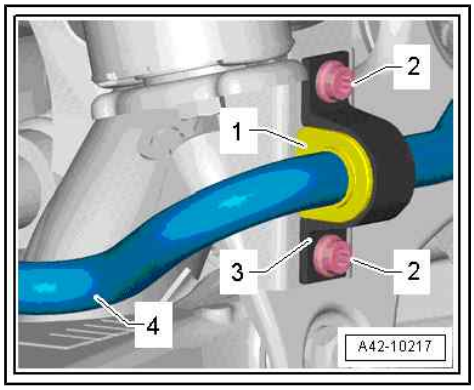
Audi
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– First remove bolt -4-.
– Unscrew nut -3-, take off washer -2- and remove bolt -1-.



The anti-roll bar -4- is removed and installed complete with the rubber bushes -1- and clamps -3-. Do not detach clamps and rubber bushes.

– Remove bolts -2- on both sides and detach anti-roll bar -4-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

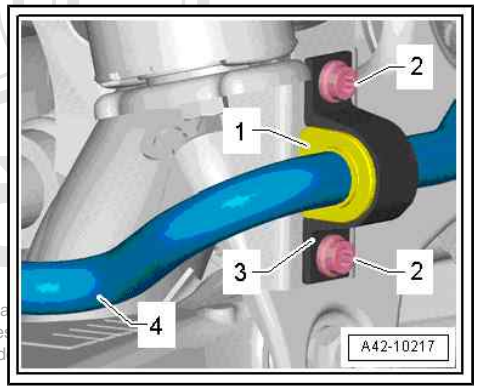
Tightening torques
⇒ „2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

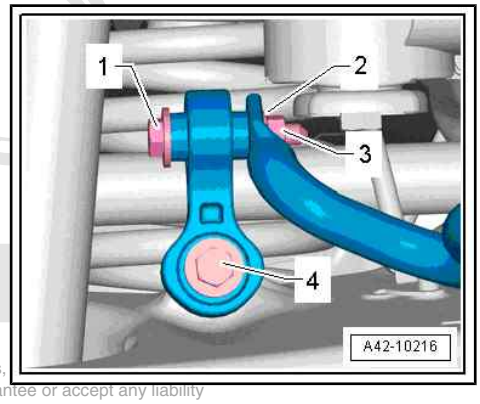
– Install anti-roll bar and screw in bolts loosely.

– First screw in bolts -2- loosely on both sides.
– Then tighten bolts -2- evenly on both sides.



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with respect to the correctness of information in this d

– Fit bolt -1- with washer -2- and tighten nut -3- (both sides).
– Tighten bolt -4- on both sides.
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

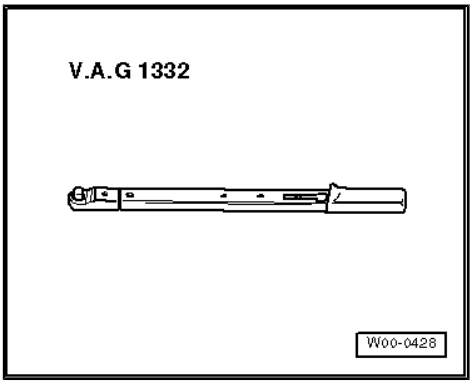


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2.5 Removing and installing diagonal strut (Cabriolet)

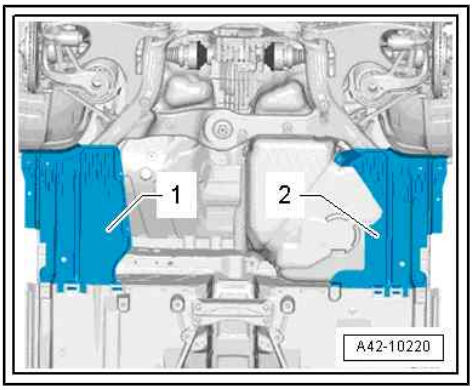
Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1332-



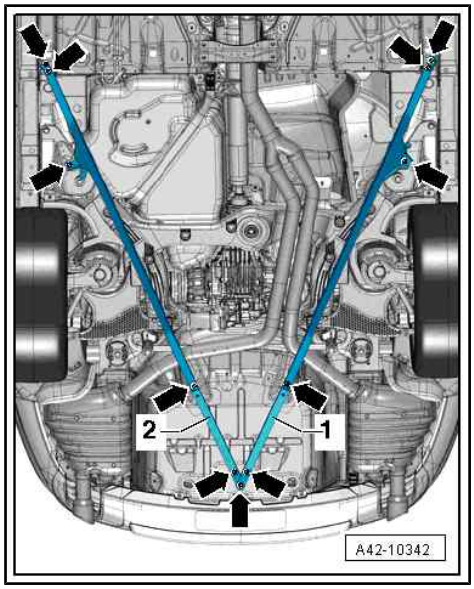
Removing

– Raise vehicle on lifting platform.
– Remove covers -1- and -2- ⇒ Rep. gr. 66 .



– Remove bolts -arrows- on both sides and detach diagonal struts.

• First detach diagonal strut (left-side) -1-, then detach diagonal strut (right-side) -2-.



Installing

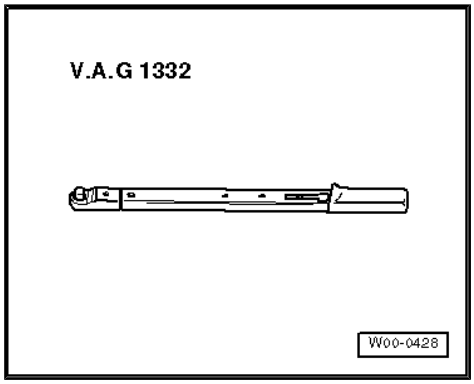
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

2.6 Removing and installing diagonal strut (Sportback)

Special tools and workshop equipment required

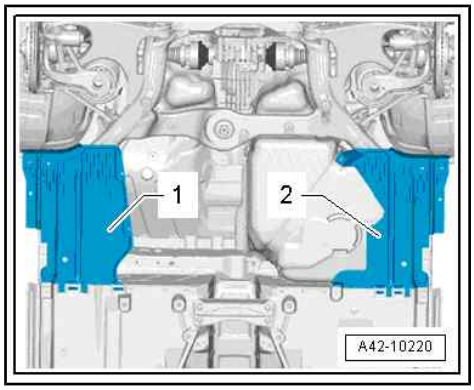
♦ Torque wrench -V.A.G 1332-



Removing

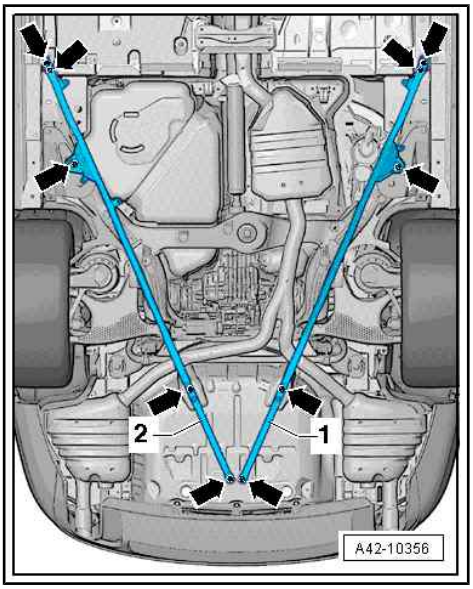
– Raise vehicle on lifting platform.

– Remove covers -1- and -2- ⇒ Rep. gr. 66.



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– Remove bolts -arrows- and detach diagonal struts -1- and -2-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - front-wheel drive vehicles“, page 115

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3 Subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles

⇒ „3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 139

⇒ „3.2 Removing and installing subframe with attachments - four-wheel drive vehicles“, page 142

⇒ „3.3 Renewing conventional/hydraulic bonded rubber bushes for subframe - four-wheel drive vehicles“, page 148

⇒ „3.4 Renewing front bonded rubber bush for rear final drive - four-wheel drive vehicles“, page 158

⇒ „3.5 Renewing rear bonded rubber bushes for rear final drive - four-wheel drive vehicles“, page 165

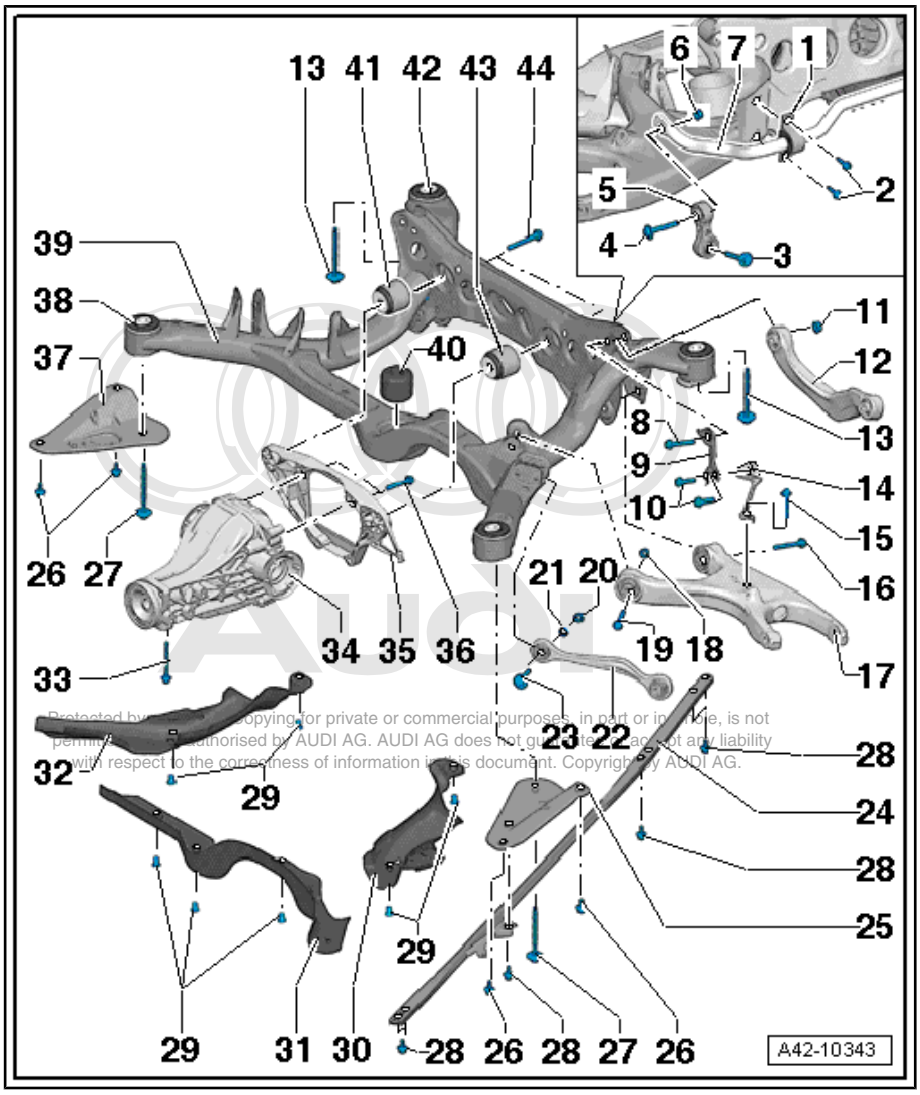
⇒ „3.6 Removing and installing coupling rod with anti-roll bar - four-wheel drive vehicles“, page 168

⇒ „3.7 Removing and installing diagonal strut (Cabriolet)“, page 170

⇒ „3.8 Removing and installing diagonal strut (Sportback)“, page 171

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3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles



1 - Clamp

- ❑ Is renewed together with rubber bush and anti-roll bar
- ❑ Rubber bush and clamp must not be separated from anti-roll bar

2 - Bolt

- ❑ 25 Nm +90°
- ❑ Always renew if removed
- ❑ Tighten evenly

3 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

4 - Bolt

- ❑ 40 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

5 - Coupling rod

- ❑ Coupling rod is removed together with anti-roll bar
- ❑ Removing and installing ⇒ page 168

6 - Nut

- ❑ Always renew if removed

7 - Anti-roll bar

- ❑ Anti-roll bar is removed together with coupling rod
- ❑ Removing and installing ⇒ page 168
- ❑ Rubber bush and clamp must not be separated from anti-roll bar

8 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

9 - Retaining bracket

10 - Bolt

- ❑ 5 Nm

11 - Nut

- ❑ Always renew if removed

12 - Upper transverse link

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13 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed
- ❑ Bolts must not be loosened or tightened while springs are still installed. Before loosening or tightening bolts, slacken coil springs using spring compressor

14 - Rear left vehicle level sender -G76-

- ❑ The same sender versions must be installed on both sides.
- ❑ Complete with mounting parts
- ❑ Lever of sender faces outwards
- ❑ Renewing in vehicle ⇒ page 194
- ❑ Check basic adjustment of headlights if sender mountings are loosened ⇒ Rep. gr. 94
- ❑ If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 . ⇒ Vehicle diagnostic tester
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

15 - Bolt

- ❑ 9 Nm

16 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

17 - Lower transverse link

18 - Nut

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- ❑ Always renew if removed

19 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

20 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

21 - Eccentric washer

22 - Track rod

- ❑ Different versions (aluminium and steel); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

23 - Eccentric bolt

24 - Diagonal strut

- ❑ Removing and installing (Cabriolet) ⇒ page 170
- ❑ Removing and installing (Sportback) ⇒ page 171

25 - Support (left-side)

26 - Bolt

- ❑ 55 Nm

27 - Bolt

- ❑ 115 Nm +90°
- ❑ Always renew if removed

- ❑ Bolts must not be loosened or tightened while springs are still installed. Before loosening or tightening bolts, slacken coil springs using spring compressor

28 - Bolt

- ❑ Initial tightening torque: 5 Nm
- ❑ Final tightening torque: 50 Nm + turn 90° further
- ❑ Always renew if removed

29 - Clip

- ❑ Not fitted on all vehicles

30 - Stone deflector (left-side)

- ❑ Not fitted on all vehicles

31 - Stone deflector (centre)

- ❑ Not fitted on all vehicles

32 - Stone deflector (right-side)

- ❑ Not fitted on all vehicles

33 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 39

34 - Rear final drive

- ❑ Removing and installing ⇒ Rep. gr. 39

35 - Cross member for differential

- ❑ Removing and installing ⇒ Rep. gr. 39
- ❑ Not fitted on vehicles with sport differential

36 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 39

37 - Support (right-side)

38 - Bonded rubber bush (front)

- ❑ For subframe mounting
- ❑ A conventional or hydraulic bonded rubber bush is fitted, depending on model ⇒ page 142 ; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Oil stains on a hydraulic bonded rubber bush are a sign of wear
- ❑ Renewing ⇒ page 148
- ❑ Always renew on both sides

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39 - Subframe

- ❑ Removing and installing subframe with attachments ⇒ page 142

40 - Bonded rubber bush (front)

- ❑ For rear final drive mounting
- ❑ Renewing ⇒ page 158

41 - Bonded rubber bush (rear)

- ❑ For rear final drive mounting
- ❑ Renewing ⇒ page 165

42 - Bonded rubber bush (rear)

- ❑ For subframe mounting
- ❑ A conventional or hydraulic bonded rubber bush is fitted, depending on model ⇒ page 142 ; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Oil stains on a hydraulic bonded rubber bush are a sign of wear
- ❑ Renewing ⇒ page 148
- ❑ Always renew on both sides

43 - Bonded rubber bush (rear)

- ❑ For rear final drive mounting
- ❑ Renewing ⇒ page 165

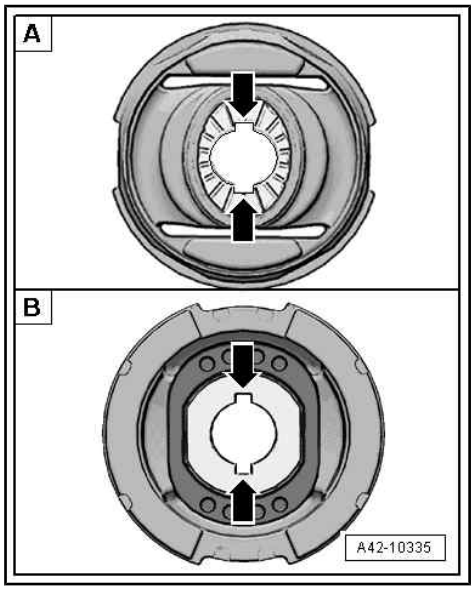
44 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 39

Bonded rubber bush (front)

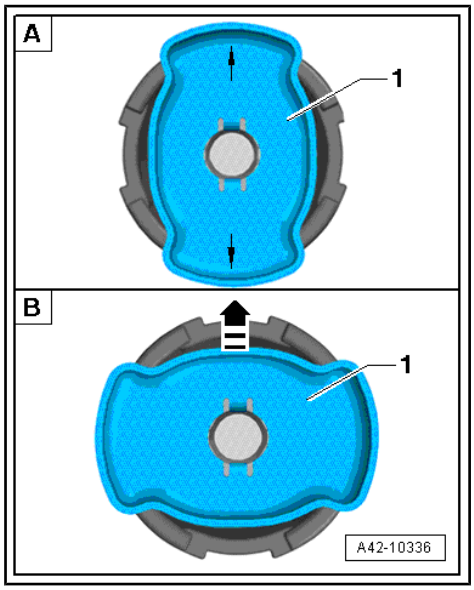
- ◆ -A- Conventional bonded rubber bush
- ◆ -B- Hydraulic bonded rubber bush

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Bonded rubber bush (rear)

- ◆ -A- Conventional bonded rubber bush
- ◆ -B- Hydraulic bonded rubber bush

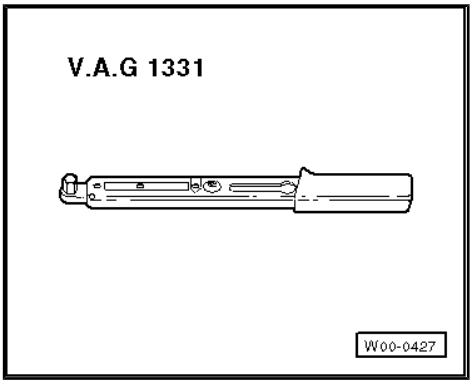


3.2 Removing and installing subframe with attachments - four-wheel drive vehicles

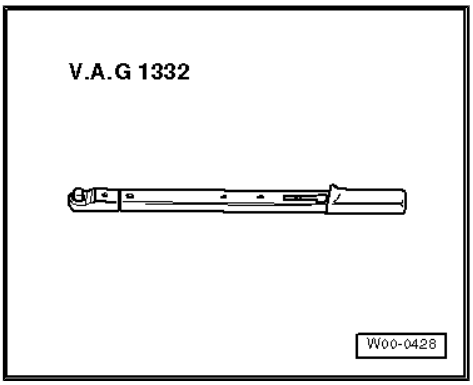
Special tools and workshop equipment required

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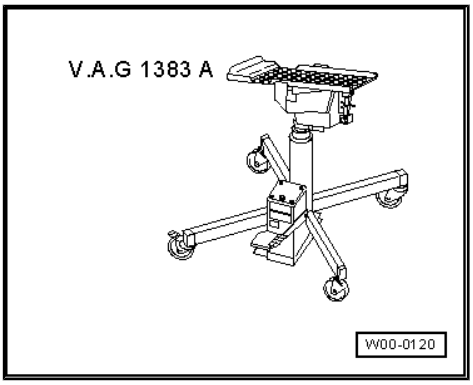
- Torque wrench -V.A.G 1331-



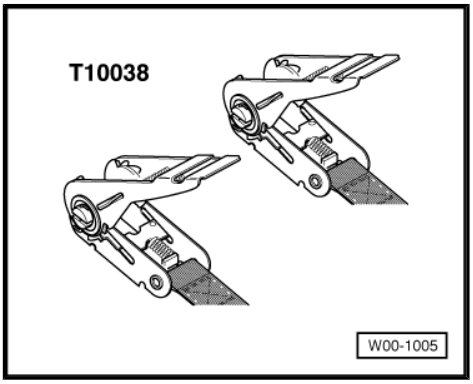
- Torque wrench -V.A.G 1332-



- Engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2-



- Tensioning strap -T10038-

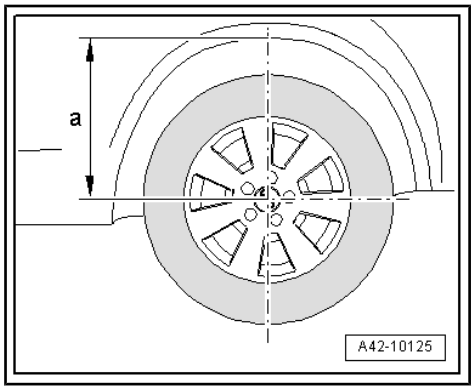


Removing subframe with attachments

Note

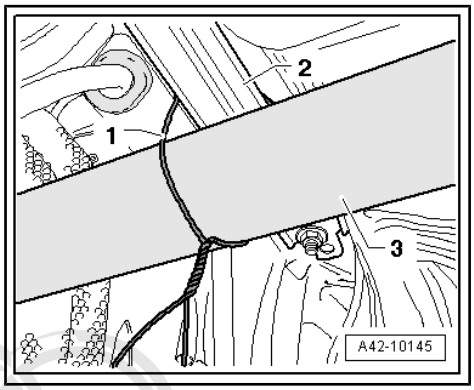
If the bolt securing the drive shaft to the wheel hub has to be slackened for subsequent operations, remember that this must be done with the vehicle standing on its wheels. Slacken bolt securing drive shaft to wheel hub ⇒ page 240 .

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.



– Raise vehicle on lifting platform.
– Remove wheels.
– Remove coil springs ⇒ page 184 .
– Remove rear silencer(s) ⇒ Rep. gr. 26 .
– Detach propshaft from rear final drive ⇒ Rep. gr. 39 .

– Tie up propshaft -3- to vehicle body -2- with a wire -1-.
– Push rear propshaft tube towards gearbox as far as possible.

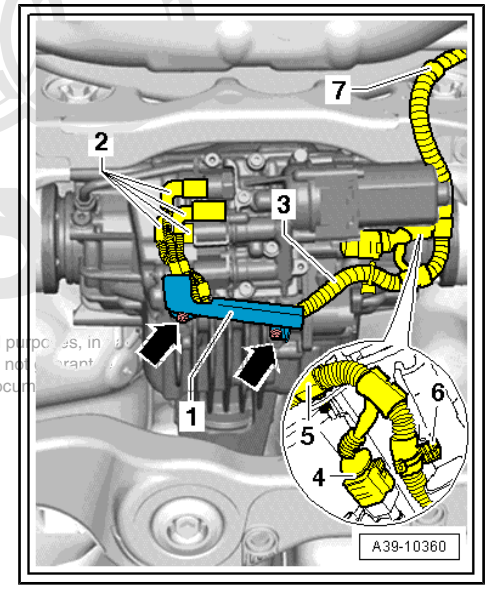


– On vehicles with sport differential, remove bolts -arrows- and detach bracket -1- from rear final drive.

Note

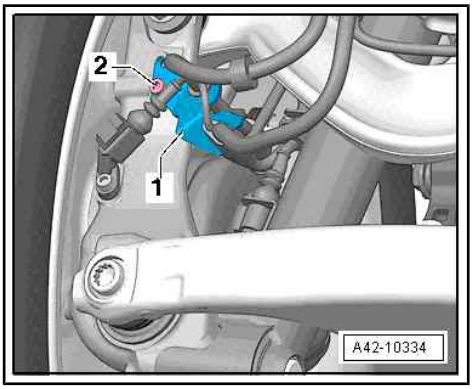
Mark connectors -2- for oil pressure and oil temperature senders and clutch valves .

– Unplug connectors -2- from oil pressure and oil temperature senders and clutch valves .
– Then unplug connector -4- from four-wheel drive pump - V415- .
– Now unclip wiring harness -3- from final drive and subframe -items 5…7- and tie up.

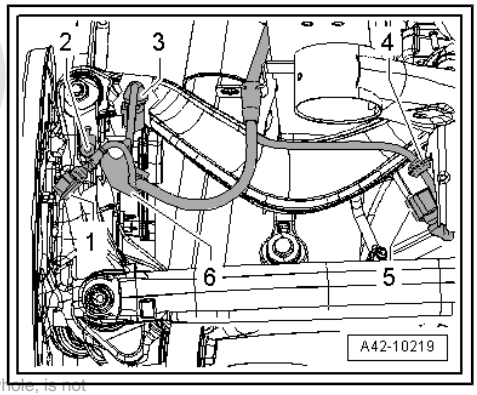


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– Unscrew bolt -2- on both sides and detach bracket -1- with wiring.

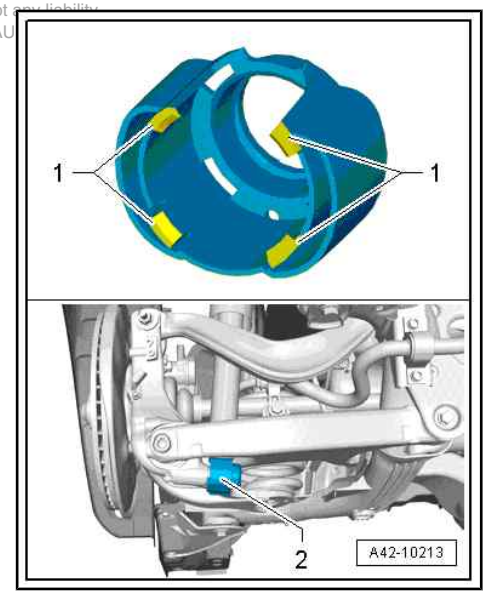


– Release and unplug connector -1- from rear left speed sensor -G46- and rear right speed sensor -G44- .
– Release and unplug connector -3- for electromechanical parking brake (both sides).
– Release and unplug connector -5- from rear left vehicle level sender -G76- and, if fitted, rear right vehicle level sender -G77- .
– Unclip wiring harness -4- on left and, if fitted, on right.
– On vehicles with electronic damping control, unplug connector at shock absorber and move wiring harness clear.

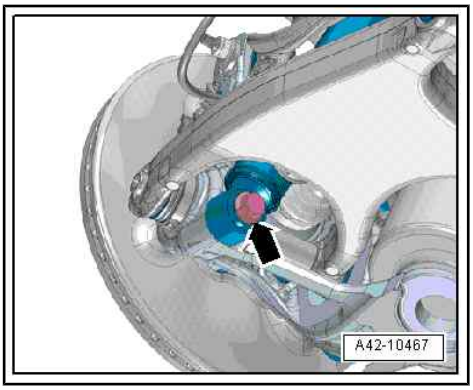


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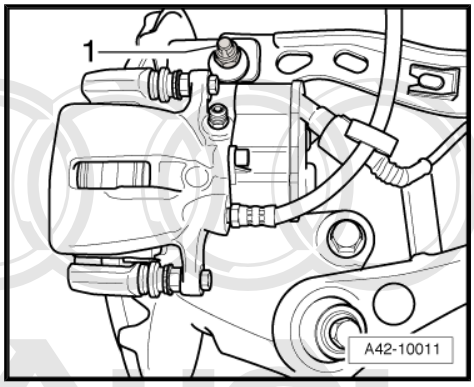
– Unclip retaining tabs -1- and detach stone deflector -2-.



– Remove bolt -arrow- and take off washer.

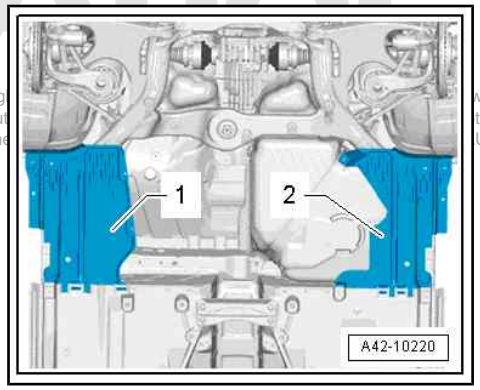


– Detach bolt connection -1-.
– Detach brake calipers ⇒ Rep. gr. 46 .
– Guide brake calipers past suspension and secure to body so that weight of calipers does not stretch or damage brake hose or brake pipe.
– Attach upper transverse link to wheel bearing housing (hand-tight) -1-.



– Remove covers -1- and -2- ⇒ Rep. gr. 66 .
– Remove diagonal struts (Cabriolet) ⇒ page 135 .
– Remove diagonal struts (Sportback) ⇒ page 136 .

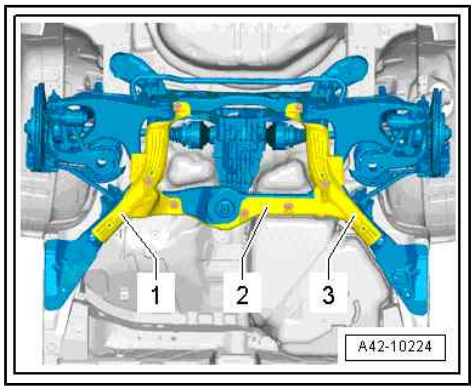
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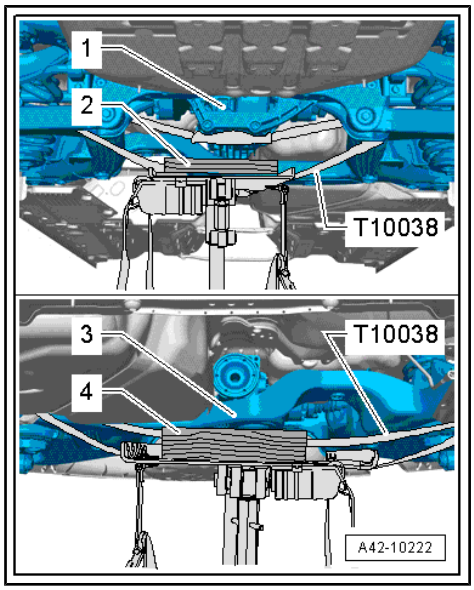
– If fitted, remove stone deflectors -1-, -2- and -3-.

WARNING

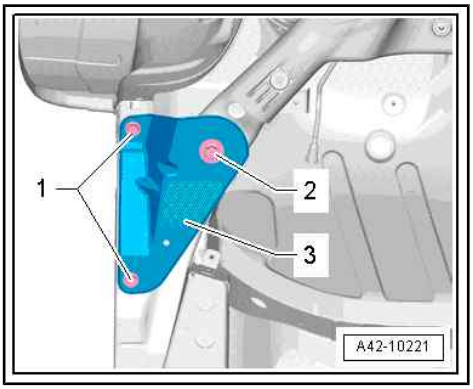
Before slackening subframe bolts, secure vehicle against tipping over (e.g. by placing a weight of approx. 50 kg in the luggage compartment).



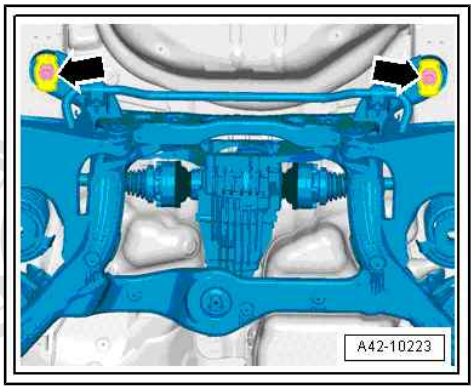
– Position engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2- beneath subframe and secure with tensioning strap -T10038- .
– Support rear final drive -1- with a suitable block of wood -2-.
– Support front of subframe with a suitable block of wood -4- below cross member -3-.
– Secure subframe with tensioning strap -T10038- on engine and gearbox jack -V.A.G 1383 A- .
– Tie tensioning strap -T10038- around subframe roughly beneath drive shaft and feed strap past rear final drive.
– Route tensioning strap -T10038- below universal gearbox support -V.A.G 1359/2- and tighten strap.



– Remove bolts -1- and -2- on both sides.
– Detach support -3- on both sides.



– Remove bolts -arrows-.



• Before lowering the subframe, check that all electrical wiring has been disconnected.
– Carefully lower subframe with attachments. Look out for brake calipers and their lines when doing so.

Installing subframe with attachments

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 139

Tightening torques
⇒ „6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles“, page 219

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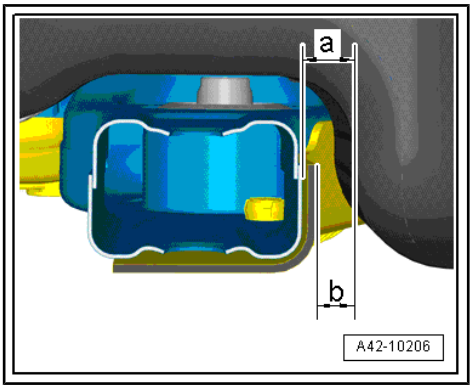
Note

♦ *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*

♦ *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* .

– Bores in subframe mountings must be aligned centrally with mounting points on body.

– Align subframe centrally so that dimension -a- (on vehicles without stone deflector) is 19 mm and dimension -b- (on vehicles with stone deflector) is 14 mm.



Note

Do not install coil springs until subframe bolts have been tightened to specified torque.

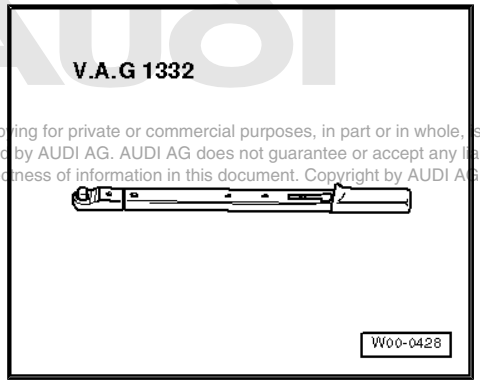
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Front and rear wheel alignment must always be checked and adjusted if necessary using VW/Audi approved equipment.

3.3 Renewing conventional/hydraulic bonded rubber bushes for subframe - four-wheel drive vehicles

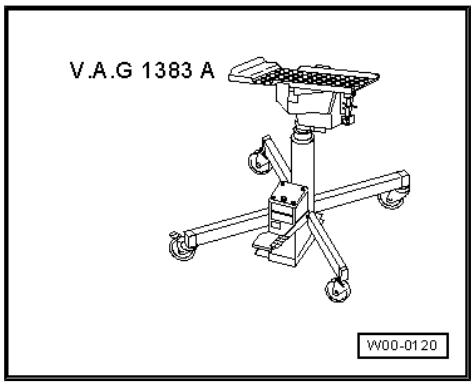
Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-

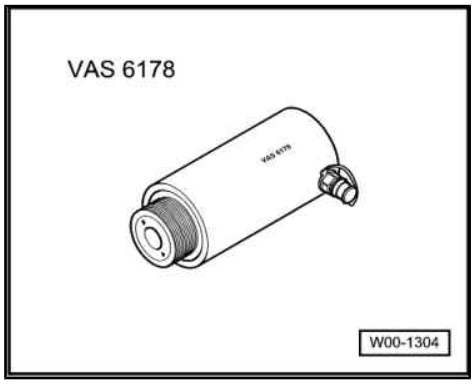


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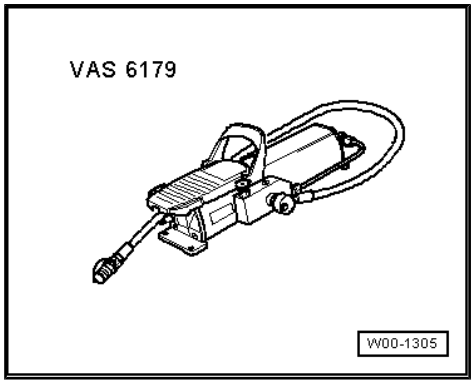
- Engine and gearbox jack -V.A.G 1383 A- with universal gearbox support -V.A.G 1359/2-



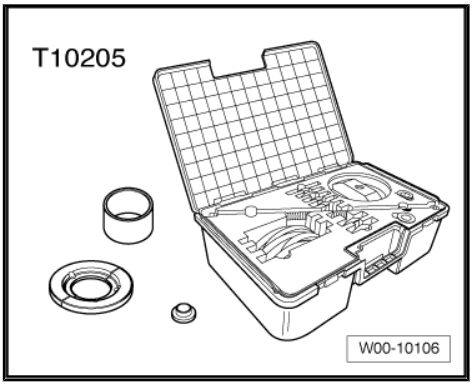
- Hydraulic press -VAS 6178-



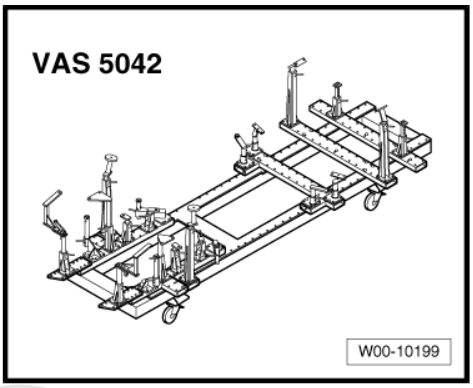
- Foot pump -VAS 6179-



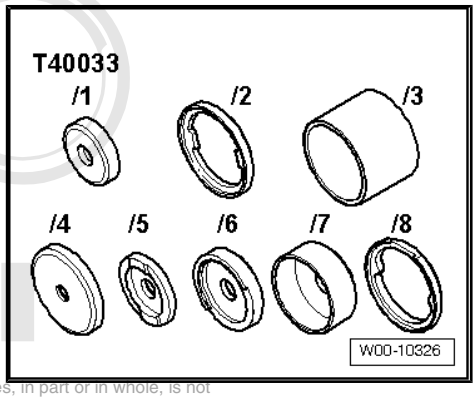
- Assembly tool -T10205-



- Assembly tool -T10263-

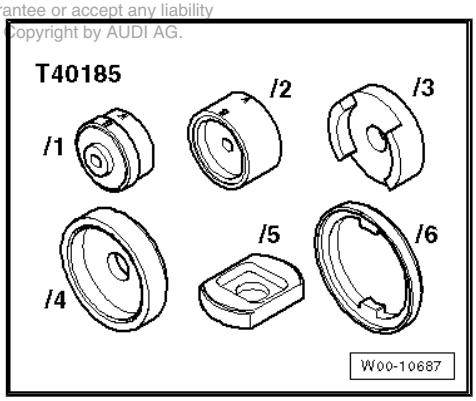


- Assembly tool -T40033-

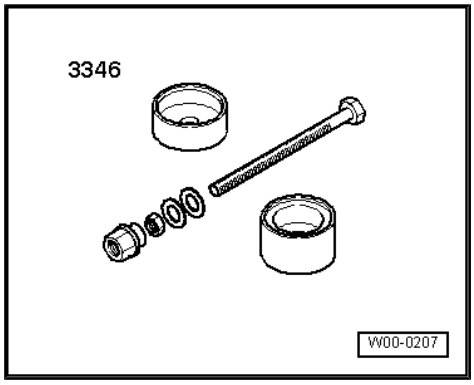


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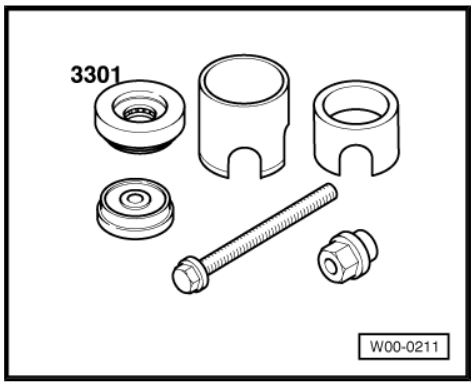
- Assembly tool -T40185-



- Assembly tool -3346-



- Assembly tool -3301-



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Note

- *If a bonded rubber bush on one side is defective, the bush on the other side must be renewed at the same time. For correct version refer to ⇒ Electronic parts catalogue .*
- *Also check the other bushes before renewing a defective bonded rubber bush.*
- *If cracks, oil stains or other damage is visible, these bonded rubber bushes must also be renewed.*
- *Different versions of bonded rubber bush (conventional and hydraulic) are fitted, depending on the model ⇒ page 142 ⇒ page 142 . For correct version refer to ⇒ Electronic parts catalogue .*

– Raise vehicle on lifting platform.
– Remove wheels.
– Remove coil springs ⇒ page 184 .

Note

- *The front or rear part of the subframe is lowered in order to renew the bonded rubber bushes. The subframe does not have to be removed.*
- *Lower the subframe at each end separately. This avoids the need for checking and adjusting wheel alignment.*
- *Do not lower the subframe more than 4 cm.*
- *Mark the position of the bonded rubber bushes in relation to the subframe before removing them.*

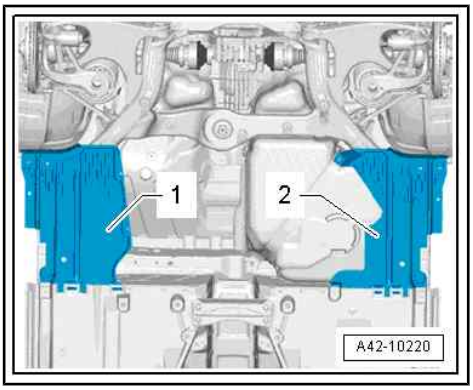
Renewing conventional or hydraulic bonded rubber bush (front)

Applies to all versions:

– Remove covers -1- and -2- ⇒ Rep. gr. 66 .

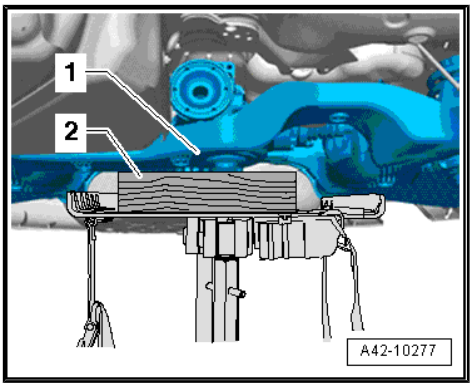
– Remove diagonal struts (Cabriolet) ⇒ page 135 .

– Remove diagonal struts (Sportback) ⇒ page 136 .



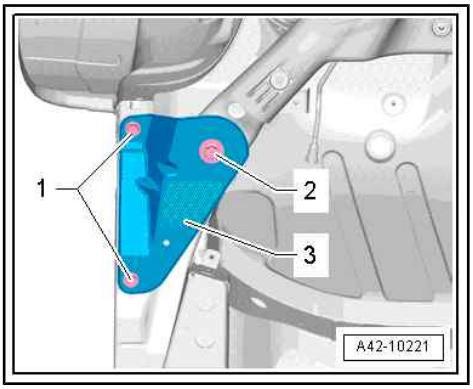
– Bring engine and gearbox jack with universal gearbox support -V.A.G 1359/2- into position under subframe -1-.

– Insert a suitable block of wood -2- under subframe -1-.



– Remove bolts -1- and -2- on both sides.

– Detach support -3- on both sides.

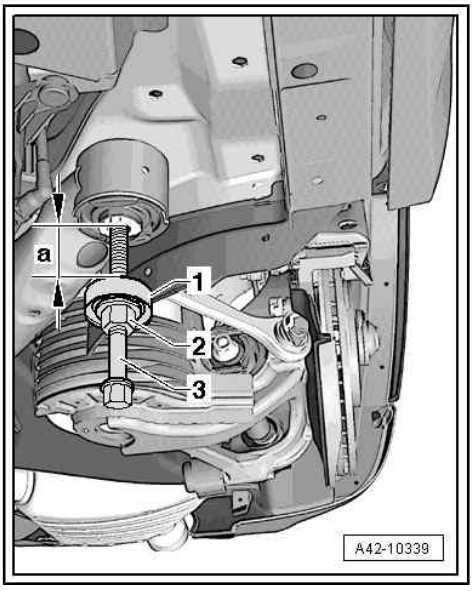


– Using assembly tool -3301- and nut -3346/3- , as shown in illustration, screw spindle -3346/2- approx. 1.5 cm into body on side opposite bonded rubber bush to be renewed.

1 - Assembly tool -3301-

2 - Nut -3346/3-

3 - Spindle -3346/2-



Note

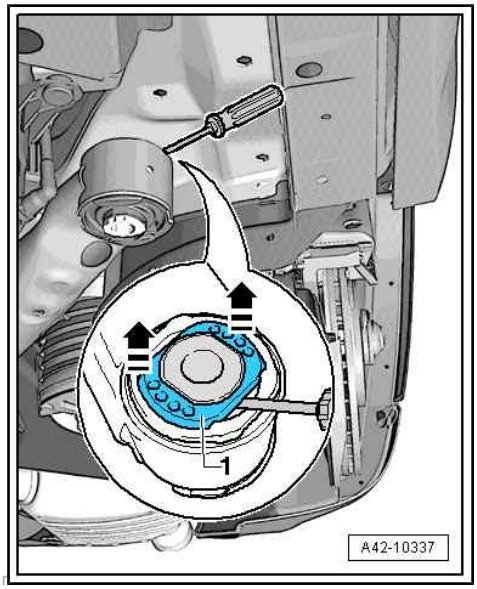
Screw nut -3346/3- onto spindle -3346/2- until distance -a- reaches 4 cm.

– Lower subframe not more than 4 cm.

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Applies to hydraulic bonded rubber bush:

– Lift out plastic insert -1-, as shown in illustration.

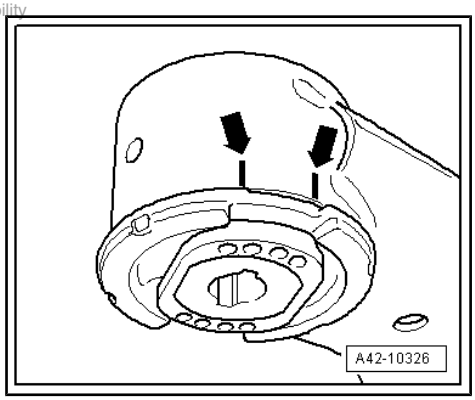


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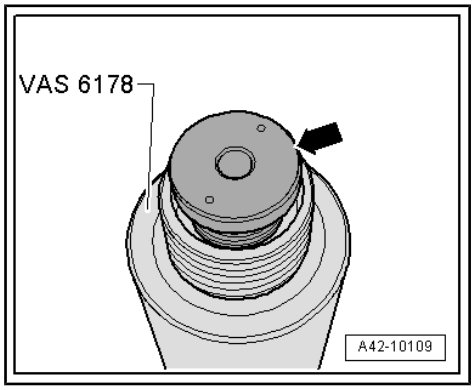
Applies to all versions:

– Mark installation position of bonded rubber bush in relation to subframe -arrows- using a felt-tip pen or similar.

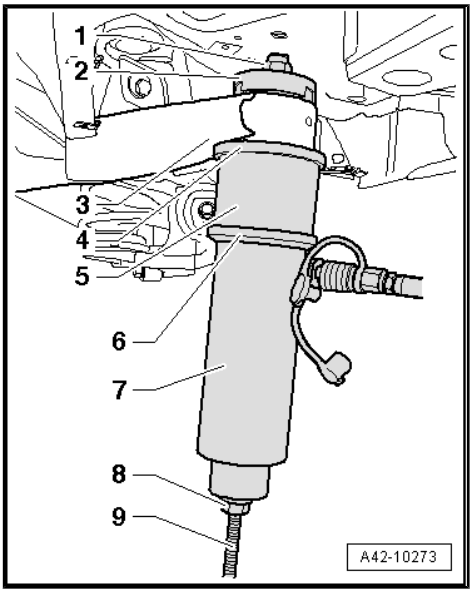
The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.



– If necessary, unscrew small-diameter support -arrow- from hydraulic press -VAS 6178- and screw in support -T10205/13- in its place.



– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10263/5-

2 - Thrust piece -T40185/5- Recess faces towards bonded rubber bush.

3 - Subframe

4 - Support ring -T40185/6- Tapered end faces upwards and projections engage in recesses in bonded rubber bush.

5 - Tube -T40033/3-

6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

WARNING

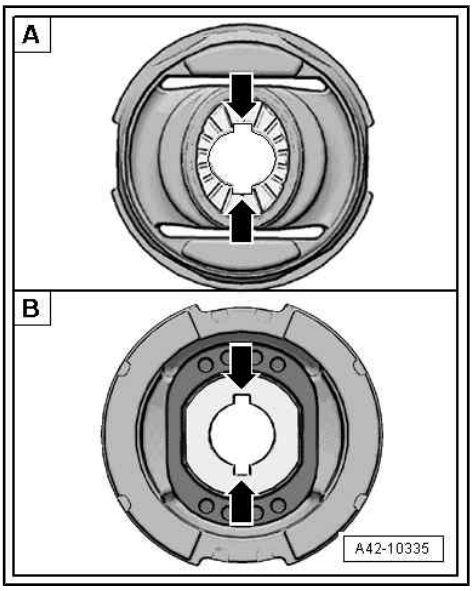
- *Hold hydraulic press -VAS 6178- securely during pressing operation.*
- *The bonded rubber bush will come loose suddenly. Injuries can be caused if the tools and the bonded rubber bush are allowed to drop.*

Installation position of front bonded rubber bush

Grooves -arrows- are in line with direction of travel.

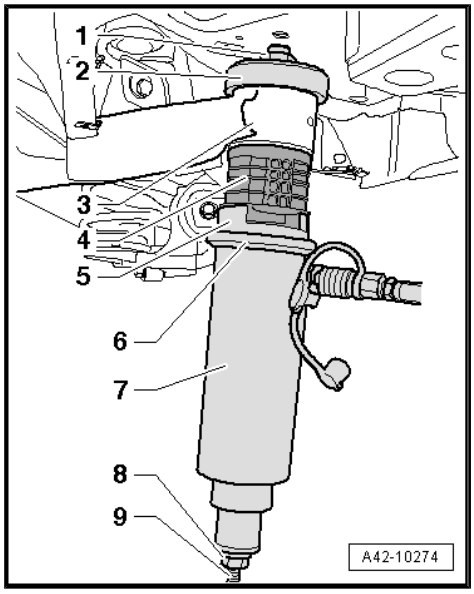
- -A- Conventional bonded rubber bush
- -B- Hydraulic bonded rubber bush

Grooves -arrows- are in line with direction of travel.



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– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10263/5-

2 - Thrust piece -T40185/4-

3 - Subframe

4 - Conventional or hydraulic bonded rubber bush

5 - Thrust piece -T40185/3-

6 - Support ring -T10205/4-

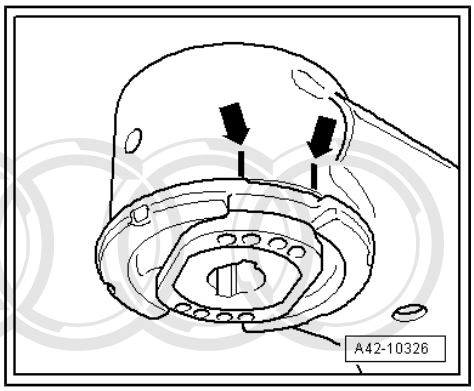
7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

– Align bonded rubber bush with markings made earlier and press in at the correct position until collar is flush with subframe bushing. If necessary, slacken cylinder and then press home again. Ensure that the bonded rubber bush remains straight during the first stage of installation, otherwise the outer ring may be damaged.

– Ends of rubber bead on bonded rubber bush must align with markings -arrows- made earlier on subframe.



The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.

Note

After renewing the bushes, make good any paint damage on the subframe with anti-corrosion coating, primer and black topcoat.

Remaining installation steps are carried out in reverse sequence.

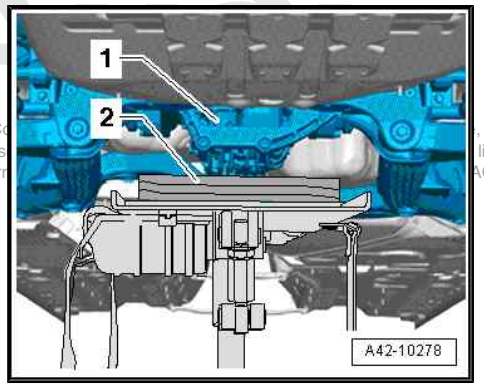
Renewing conventional or hydraulic bonded rubber bush (rear)

Applies to all versions:

– Unscrew nuts on both brackets for rear silencers as far as end of thread.

– Bring engine and gearbox jack with universal gearbox support -V.A.G 1359/2- into position under subframe -1-.

– Insert a suitable block of wood -2- under subframe -1-.



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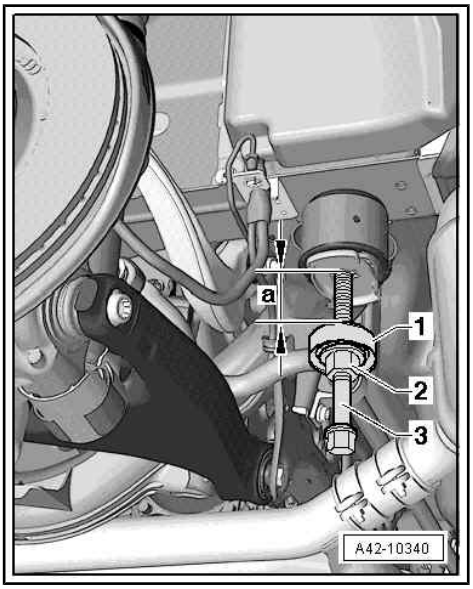
– Remove rear subframe bolts ⇒ Item 13 (page 139) .

– Using assembly tool -3301- and nut -3346/3- , as shown in illustration, screw spindle -3346/2- approx. 1.5 cm into body on side opposite bonded rubber bush to be renewed.

1 - Assembly tool -3301-

2 - Nut -3346/3-

3 - Spindle -3346/2-



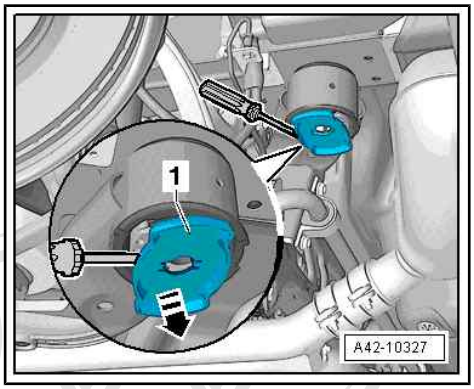
Note

Screw nut -3346/3- onto spindle -3346/2- until distance -a- reaches 4 cm.

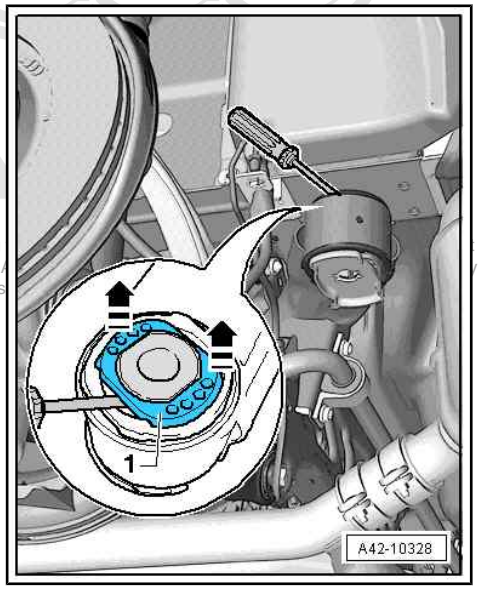
– Lower subframe not more than 4 cm.

Applies to hydraulic bonded rubber bush:

– Carefully lever locating element -1- off hydraulic bonded rubber bush in several stages on alternate sides by applying a screwdriver or similar tool in area of retaining lugs.



– Lift out plastic insert -1-, as shown in illustration.

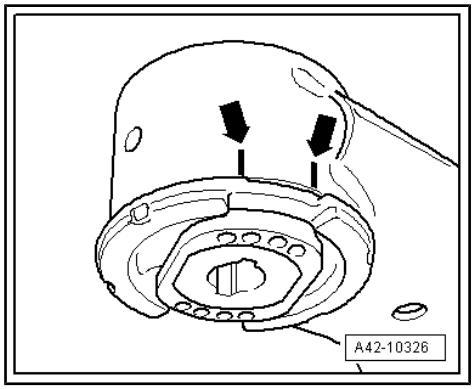


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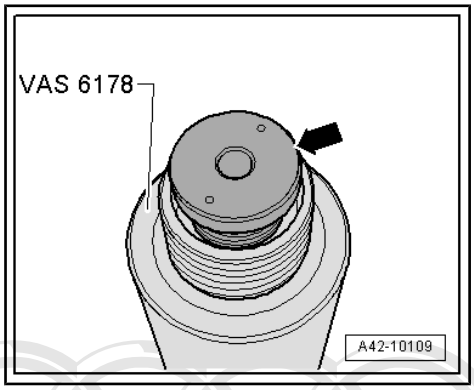
Applies to all versions:

– Mark installation position of bonded rubber bush in relation to subframe -arrows- using a felt-tip pen or similar.

The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.



– If necessary, unscrew small-diameter support -arrow- from hydraulic press -VAS 6178- and screw in support -T10205/13- in its place.



– Apply special tools to front bonded rubber bush as shown in illustration.

1 - Nut -T10263/5-

2 - Thrust piece -T40185/5- Recess faces towards bonded rubber bush.

3 - Subframe

4 - Support ring -T40185/6- Tapered end faces upwards and projections engage in recesses in bonded rubber bush.

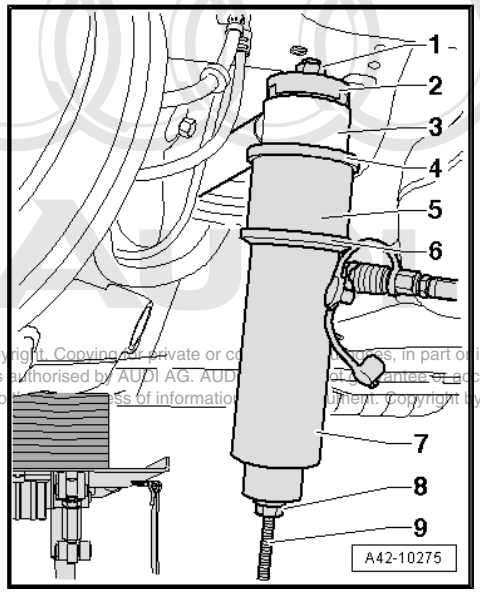
5 - Tube -T40033/3-

6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.



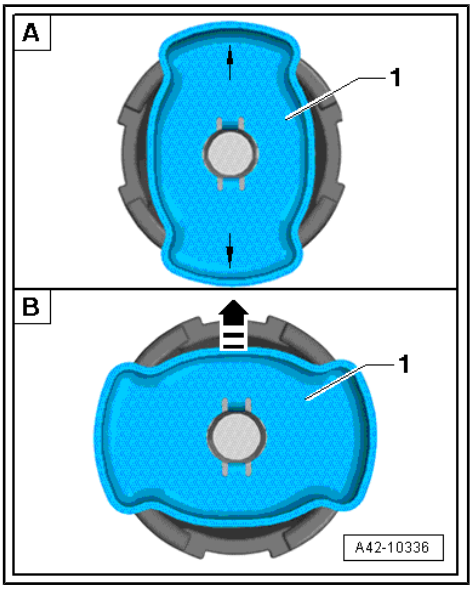
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WARNING

- *Hold hydraulic press -VAS 6178- securely during pressing operation.*
- *The bonded rubber bush will come loose suddenly. Injuries can be caused if the tools and the bonded rubber bush are allowed to drop.*

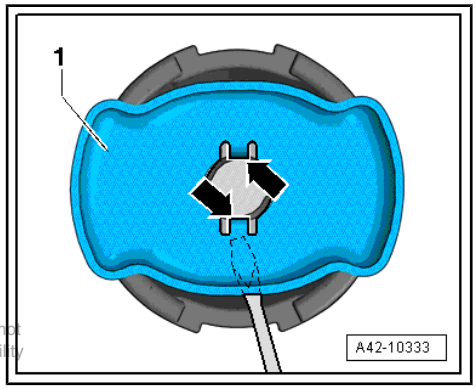
Installation position of rear bonded rubber bush

- -A- Conventional bonded rubber bush (arrows are in line with direction of travel)
- -B- Hydraulic bonded rubber bush (locating element -1- is perpendicular to direction of travel, -arrow- is pointing in direction of travel)



Applies to hydraulic bonded rubber bush:

Before installing hydraulic bonded rubber bush (rear), carefully lever locating element -1- off hydraulic bonded rubber bush in several stages on alternate sides by applying a screwdriver or similar tool in area of retaining lugs -arrows-.



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Applies to all versions:

– Apply special tools to rear bonded rubber bush as shown in illustration.

1 - Nut -T10263/5-

2 - Thrust piece -T40185/4-

3 - Subframe

4 - Conventional or hydraulic bonded rubber bush

5 - Thrust piece -T40185/3-

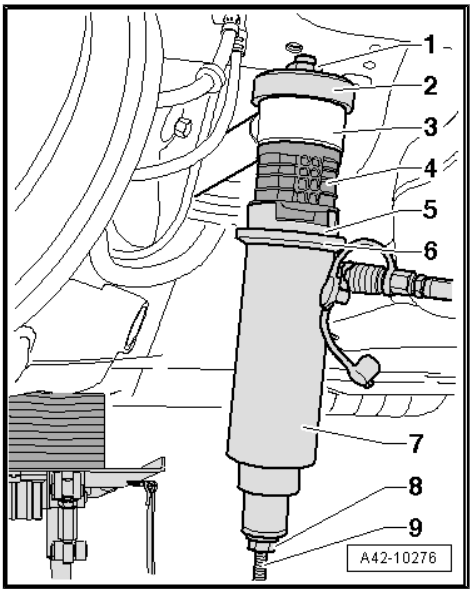
6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T10263/5-

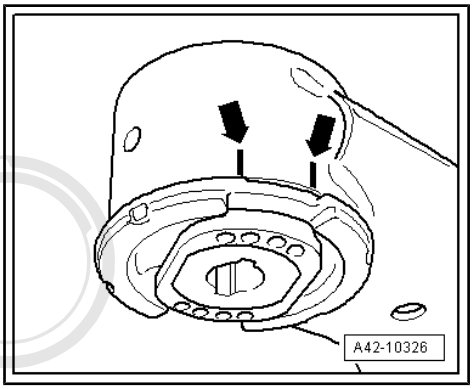
9 - Spindle -T10263/4- . Pin on end of spindle faces downwards.

– Align bonded rubber bush with markings made earlier and press in at the correct position until collar is flush with subframe bushing. If necessary, slacken cylinder and then press home again. Ensure that the bonded rubber bush remains straight during the first stage of installation, otherwise the outer ring may be damaged.



– Ends of rubber bead on bonded rubber bush must align with markings -arrows- made earlier on subframe.

The illustration shows a hydraulic bonded rubber bush. On conventional bonded rubber bushes, the recesses on the rubber beads are displaced by 90°.



Note

After renewing the bushes, make good any paint damage on the subframe with anti-corrosion coating, primer and black topcoat.

– Fit locating element on hydraulic bonded rubber bush.

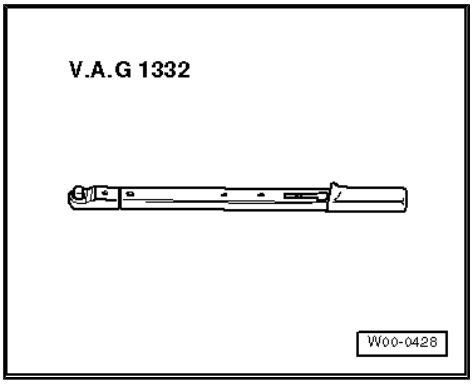
Remaining installation steps are carried out in reverse sequence.

3.4 Renewing front bonded rubber bush for rear final drive - four-wheel drive vehicles

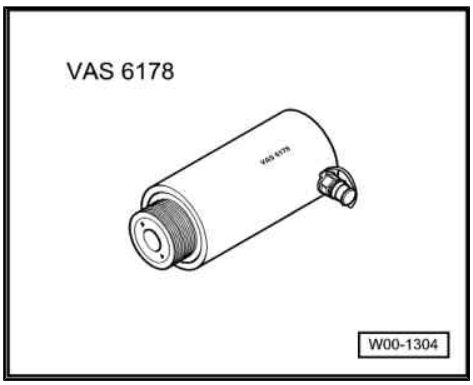
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Special tools and workshop equipment required

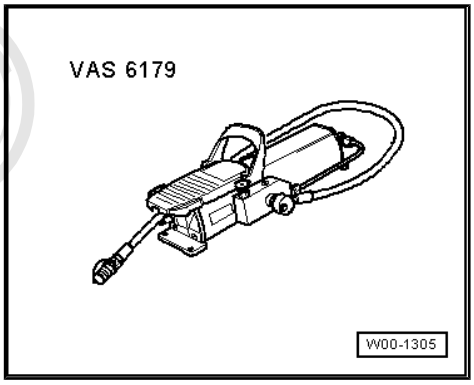
♦ Torque wrench -V.A.G 1332-



♦ Hydraulic press -VAS 6178-

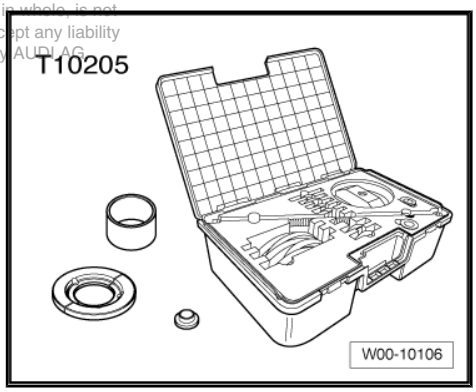


- Foot pump -VAS 6179-

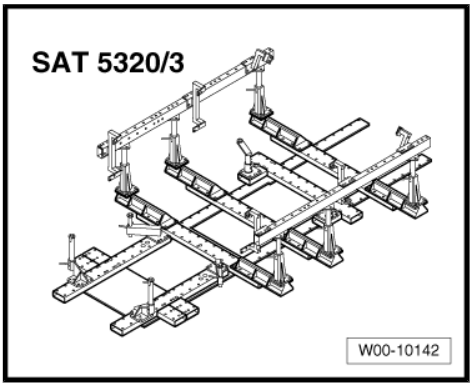


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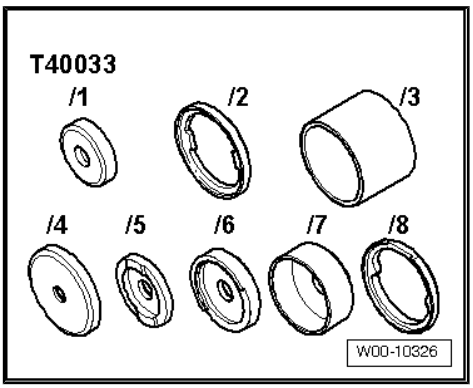
- Assembly tool -T10205-



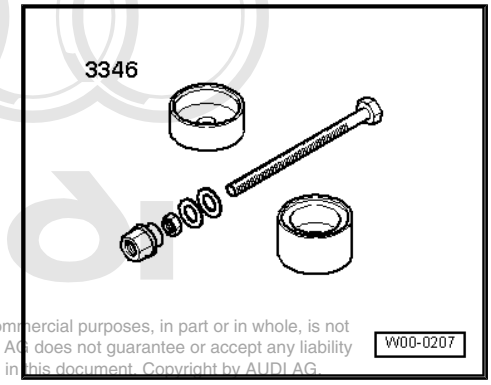
- Assembly tool -T10254-



- Assembly tool -T40033-

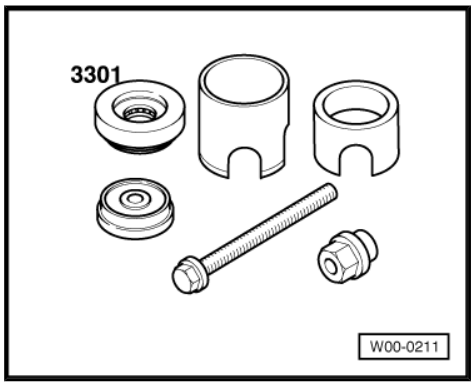


- Assembly tool -3346-

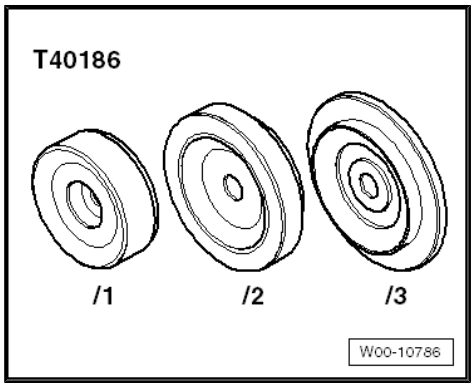


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- Assembly tool -3301-



- Assembly tool -T40186-



Removing

– Raise vehicle on lifting platform.

– Remove coil springs ⇒ page 184 .

Note

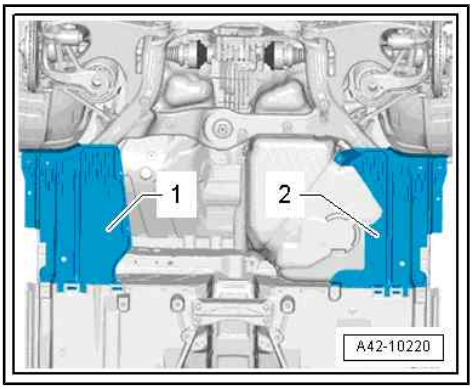
The front part of the subframe is lowered in order to renew the bonded rubber bush. The subframe does not have to be removed.

Renewing bonded rubber bush (front)

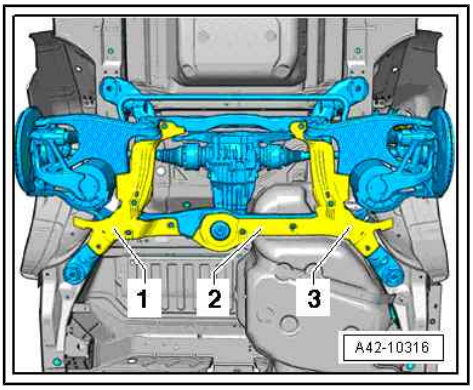
– Remove covers -1- and -2- ⇒ Rep. gr. 66 .

– Remove diagonal struts (Cabriolet) ⇒ page 135 .

– Remove diagonal struts (Sportback) ⇒ page 136 .

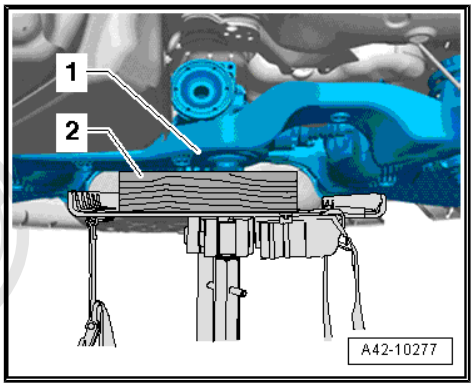


– If fitted, remove stone deflector -2-.



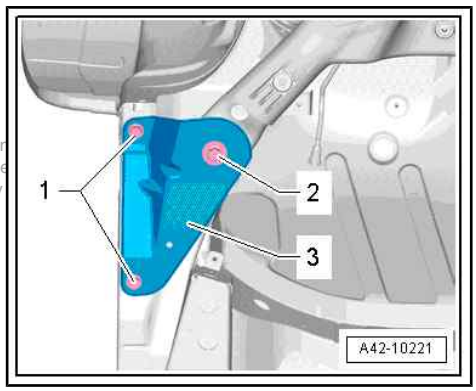
– Bring engine and gearbox jack with universal gearbox support -V.A.G 1359/2- into position under subframe -1-.

– Insert a suitable block of wood -2- under subframe -1-.



– Remove bolts -1- and -2- on both sides.

– Detach support -3- on both sides.



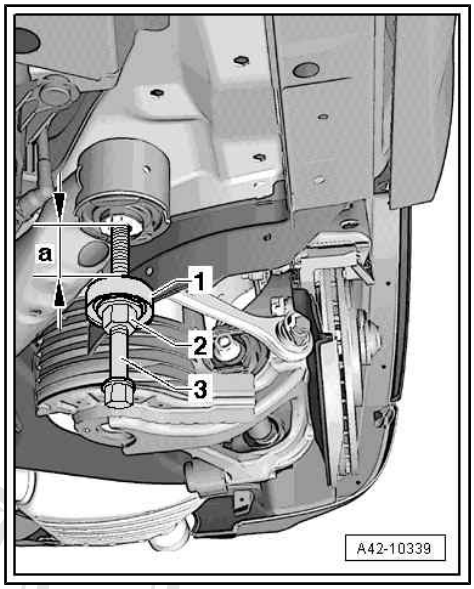
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– Using assembly tool -3301- and nut -3346/3- , as shown in illustration, screw spindle -3346/2- approx. 1.5 cm into body.

1 - Assembly tool -3301-

2 - Nut -3346/3-

3 - Spindle -3346/2-



Note

Screw nut -3346/3- onto spindle -3346/2- until distance -a- reaches 4 cm.

– Remove bolt -2-.

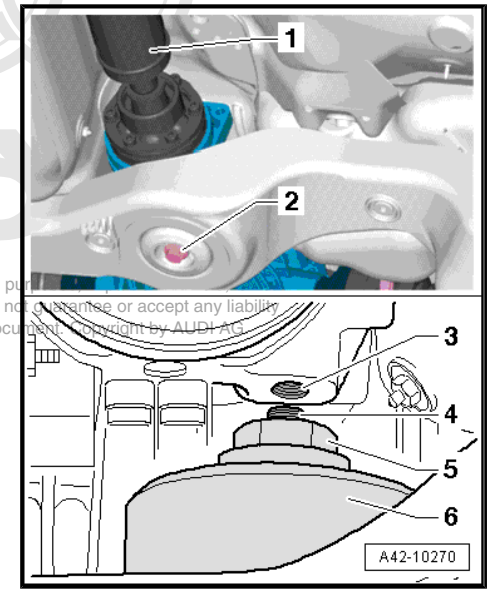
– Lower subframe not more than 4 cm.

– Push final drive upwards by means of propshaft-1-. At the same time, insert thrust piece -T40186/1- and spindle -T10254/5- with nut -T10254/4- (2nd mechanic required).

4 - Spindle -T10254/5- . Pin on end of spindle faces downwards.

5 - Nut -T10254/4-

6 - Thrust piece -T40186/1-



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– When removing and installing bonded rubber bush, make sure that spindle -4- does not contact threaded hole -3- in final drive.

If spindle -T10254/5- cannot be pushed through access hole in inner core of bonded rubber bush, access hole will have to be drilled out.

Note

- *Drill bits of different diameters should be used to drill out in several stages.*
- *During the drilling procedure, ensure that the threaded hole -3- in the final drive is not damaged by the drill bit (if necessary cover the hole with a suitable object).*

WARNING

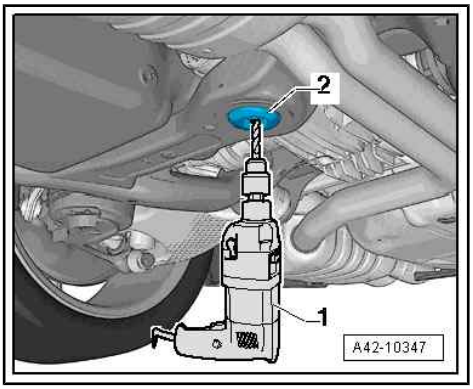
Safety goggles must be worn when drilling.

– Apply drill -1- to bonded rubber bush -2-, as shown in illustration, and drill out access hole in several stages.

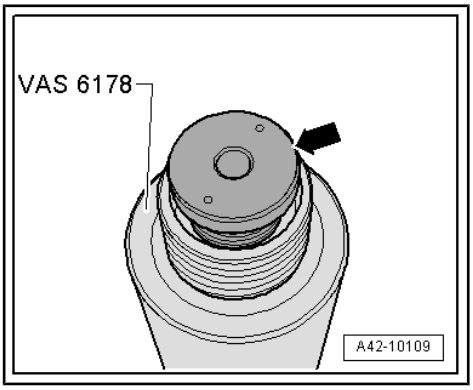
1 - Step 1: drill bit, 11 mm ∅

2 - Step 2: drill bit, 11.5 mm ∅

3 - Step 3: drill bit, 12 mm ∅

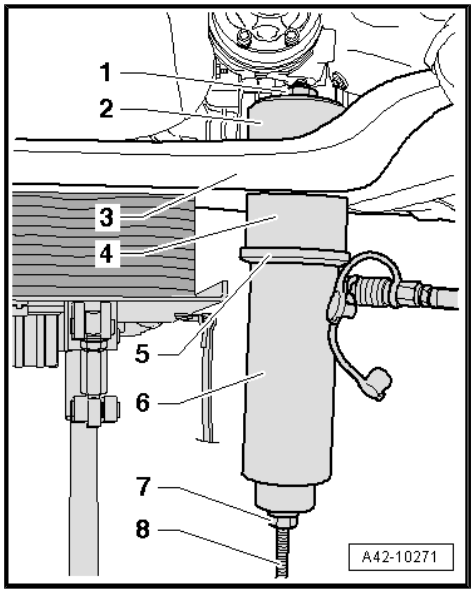


– If necessary, unscrew support -T10205/13- from hydraulic press -VAS 6178- and screw in support with small internal diameter -arrow- in its place.



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– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10254/4-

2 - Thrust piece -T40186/1-

3 - Subframe

4 - Tube -T40033/3-

5 - Support ring -T10205/4-

6 - Hydraulic press -VAS 6178-

7 - Nut -T10254/4-

8 - Spindle -T10254/5- . Pin on end of spindle faces downwards.

WARNING

- *Hold hydraulic press -VAS 6178- securely during pressing operation.*
- *The bonded rubber bush will come loose suddenly. Injuries can be caused if the tools and the bonded rubber bush are allowed to drop.*

Installing

Installation is carried out in the reverse sequence. Note the following points:

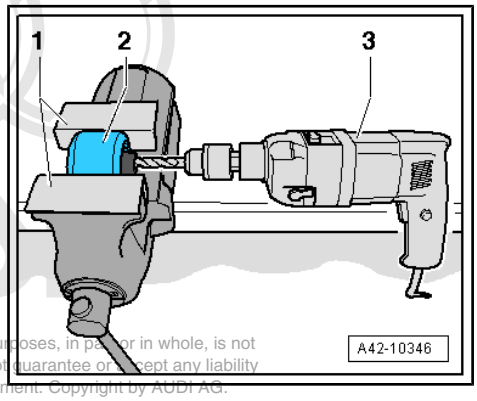
- Before installing bonded rubber bush, check that spindle -T10254/5- can be pushed through access hole in inner core of bonded rubber bush. If spindle -T10254/5- cannot be pushed through access hole in inner core of bonded rubber bush, access hole will have to be drilled out.

WARNING

Safety goggles must be worn when drilling.

– Lightly clamp new bonded rubber bush -2- horizontally in jaws of vice -1-, as shown in illustration (use protective jaw covers and take care not to damage outer shell of bonded rubber bush).

– Apply drill -3- to bonded rubber bush -2-, as shown in illustration, and drill out access hole in several stages.



1 - Step 1: drill bit, 11 mm ∅

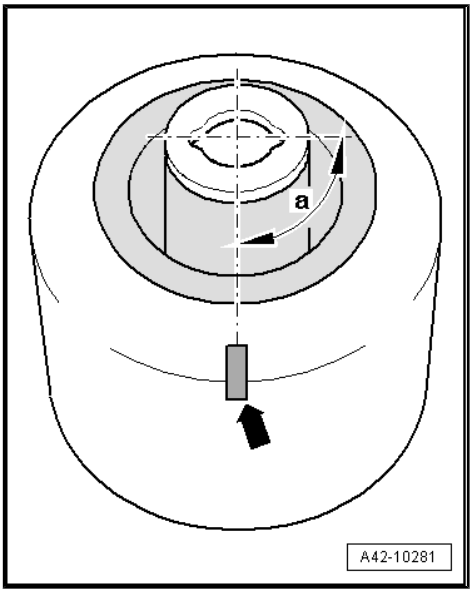
2 - Step 2: drill bit, 11.5 mm ∅

3 - Step 3: drill bit, 12 mm ∅

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– Apply a continuous marking -arrow- at 90° to the grooves.

a = 90°



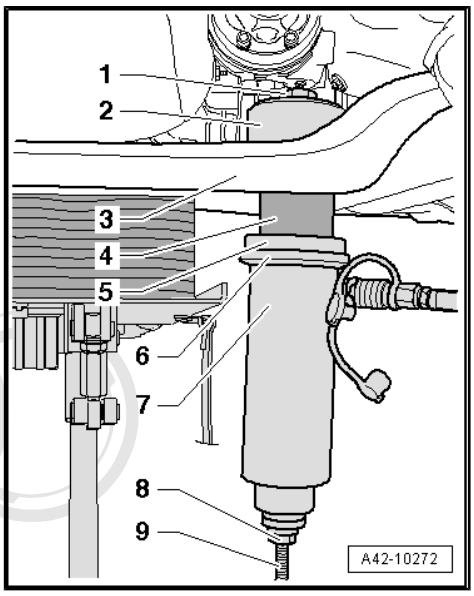
Note

- *This marking is required for aligning the bush with the subframe.*
- *The slots are concealed by the tools when the bush is being installed.*

– Before installing, apply assembly lubricant to bonded rubber bush where it contacts subframe.

– Position bonded rubber bush in subframe so that previously made marking -arrow- points exactly in direction of travel.

– Apply special tools to front bonded rubber bush as shown in illustration.



1 - Nut -T10254/4-

2 - Thrust piece -T40033/7-

3 - Subframe

4 - Bonded rubber bush

5 - Thrust plate -T40186/2-

6 - Support ring -T10205/4-

7 - Hydraulic press -VAS 6178-

8 - Nut -T102544-

9 - Spindle -T10254/5- . Pin on end of spindle faces downwards.

– Pull bush into subframe as far as stop.

Note

If the paint on the subframe has been damaged when renewing the bushes, make good the damage with anti-corrosion coating, primer and black topcoat.

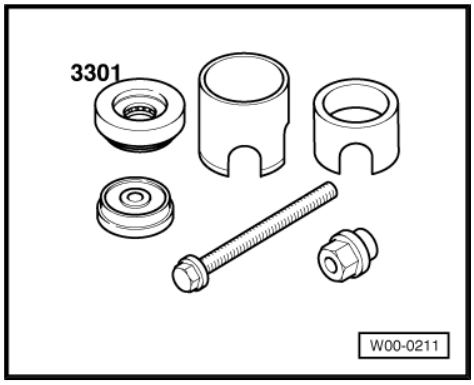
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Remaining installation steps are carried out in reverse sequence.

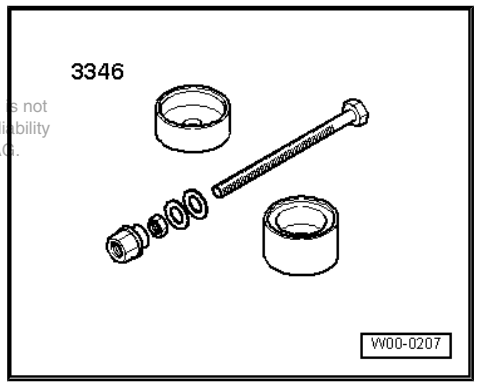
3.5 Renewing rear bonded rubber bushes for rear final drive - four-wheel drive vehicles

Special tools and workshop equipment required

- Assembly tool -3301-

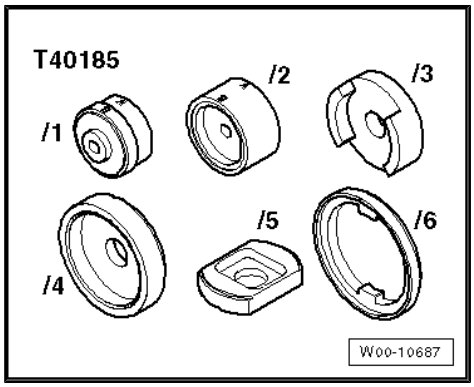


- Assembly tool -3346-

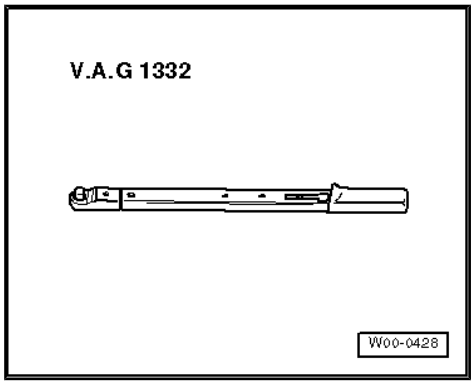


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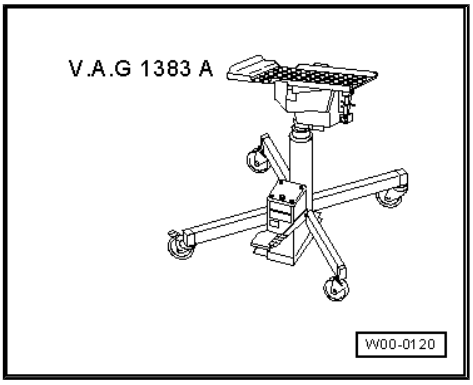
- Assembly tool -T40185-



- Torque wrench -V.A.G 1332-



♦ Engine and gearbox jack -V.A.G 1383 A-



Removing

– Remove rear final drive ⇒ Rep. gr. 39 .

– Set up tools on subframe as shown in illustration.

1 - Tube -T40185/1- . Side „A“ must face towards subframe.

2 - Pressure bearing -3301-

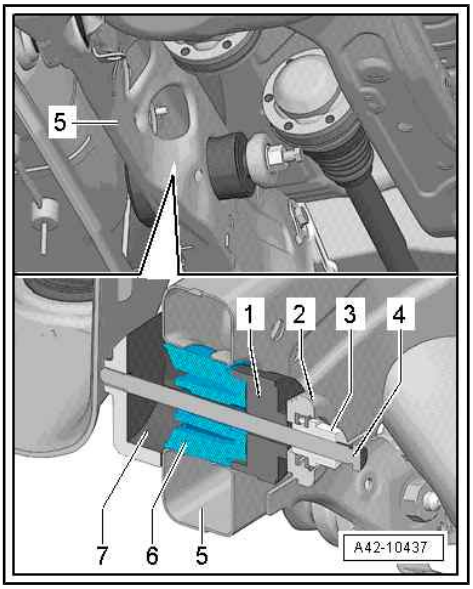
3 - Nut -3346/3-

4 - Spindle -T40185/9-

5 - Subframe

6 - Bonded rubber bush

7 - Tube -T40185/7- . Open side faces upwards



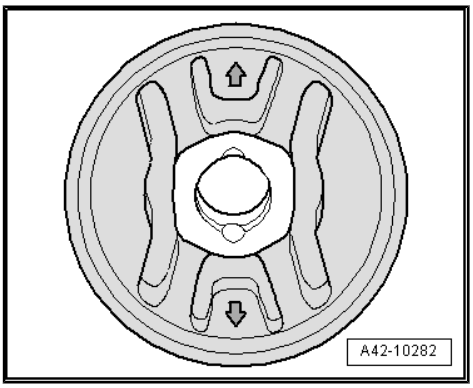
– Pull bush out of subframe by turning nut -3346/3- and counterholding spindle -T40185/9- .

Installing

Installation is carried out in the reverse sequence. Note the following points:

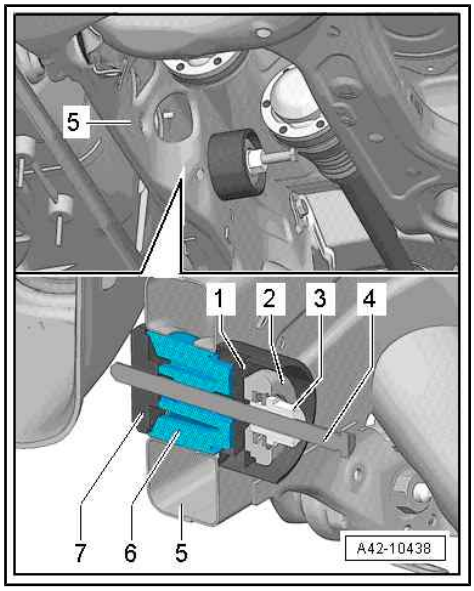
– Note installation position of bonded rubber bushes.

– Arrows on rear side of bonded rubber bush should face vertically upwards or downwards.



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– Set up tools and bonded rubber bush on subframe as shown in illustration.



1 - Tube -T40185/2- . Side „B“ must face towards subframe.

2 - Pressure bearing -3301-

3 - Nut -3346/3-

4 - Spindle -T40185/9-

5 - Subframe

6 - Bonded rubber bush

7 - Thrust plate -T40185/8-

– Pull bush into subframe as far as stop by turning nut -3346/3- and counterholding spindle -T40185/9- .

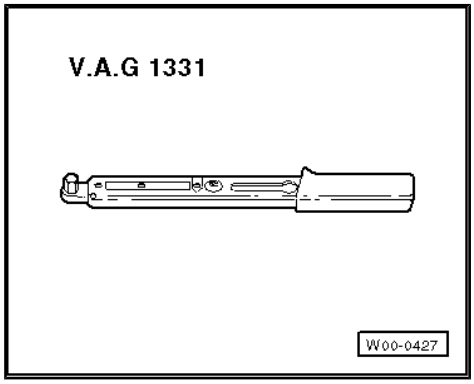
Note

If the paint on the subframe has been damaged when renewing the bushes, make good the damage with anti-corrosion coating, primer and black topcoat.

3.6 Removing and installing coupling rod with anti-roll bar - four-wheel drive vehicles

Special tools and workshop equipment required

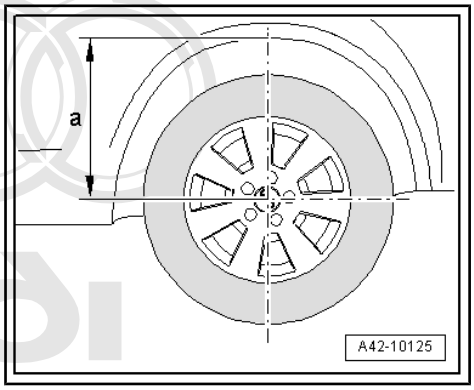
♦ Torque wrench -V.A.G 1331-



♦ Assembly lubricant

Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.



– Raise vehicle on lifting platform.

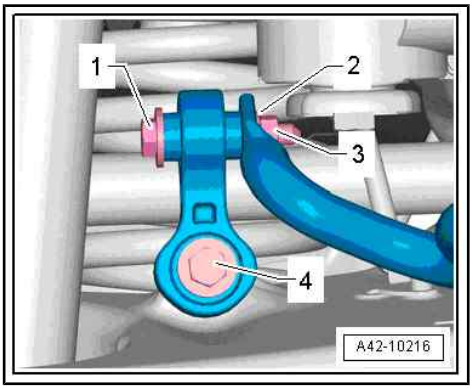
– Remove wheels.

Caution

- *Take care not to damage paintwork on anti-roll bar during removal and installation.*

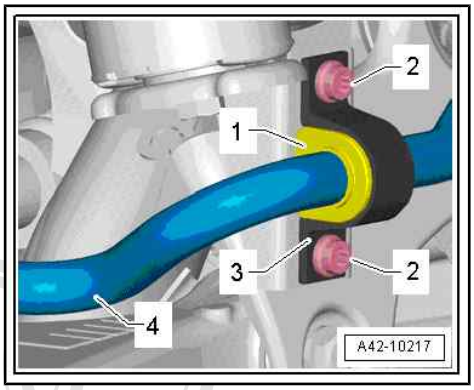
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– First remove bolt -4-.
– Unscrew nut -3-, take off washer -2- and remove bolt -1-.



The anti-roll bar -4- is removed and installed complete with the rubber bushes -1- and clamps -3-. Do not detach clamps and rubber bushes.

– Remove bolts -2- on both sides and detach anti-roll bar -4-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

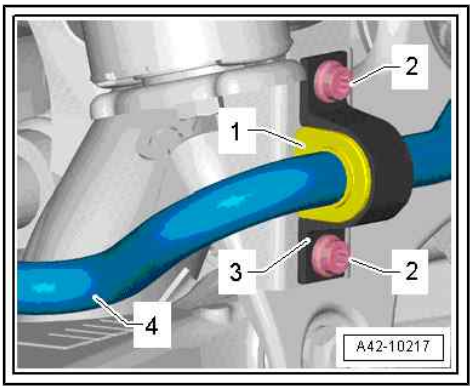
Tightening torques
⇒ „3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 139

Note

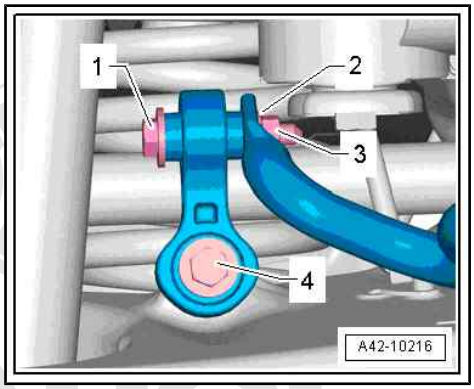
- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

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– Fit anti-roll bar and screw in bolts (right-side) loosely.
– First screw in bolts -2- loosely on both sides.
– Then tighten bolts -2- evenly on both sides.



– Fit bolt -1- with washer -2- and tighten nut -3- (both sides).
– Tighten bolt -4- on both sides.
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

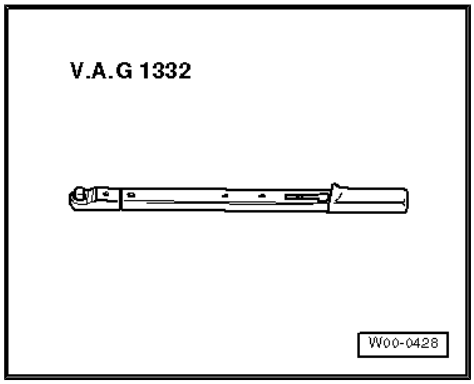


3.7 Removing and installing diagonal strut (Cabriolet)

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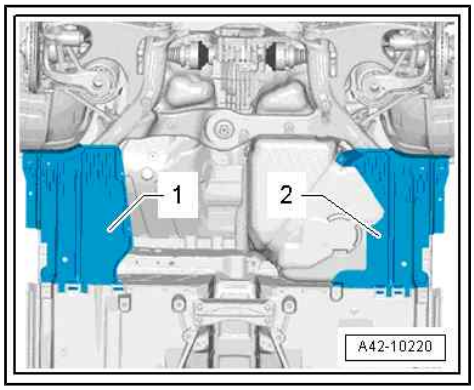
Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1332-



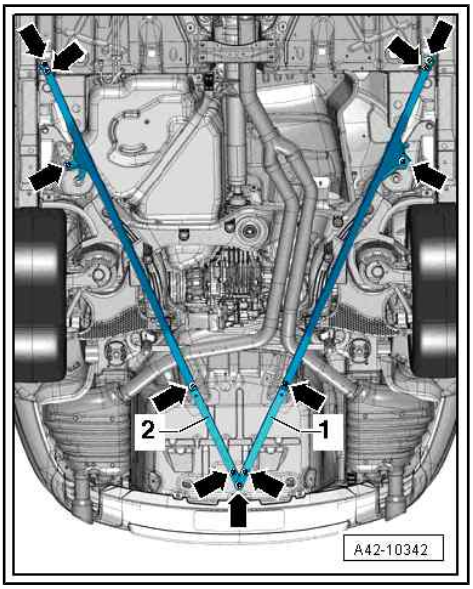
Removing

– Raise vehicle on lifting platform.
– Remove covers -1- and -2- ⇒ Rep. gr. 66 .



– Remove bolts -arrows- on both sides and detach diagonal struts.

• First detach diagonal strut (left-side) -1-, then detach diagonal strut (right-side) -2-.



Installing

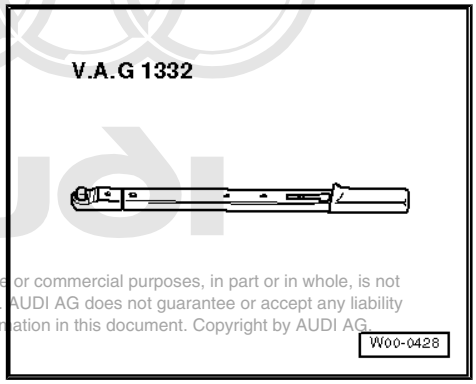
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 139

3.8 Removing and installing diagonal strut (Sportback)

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1332-

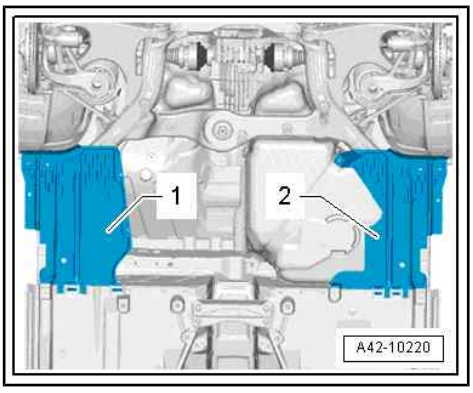


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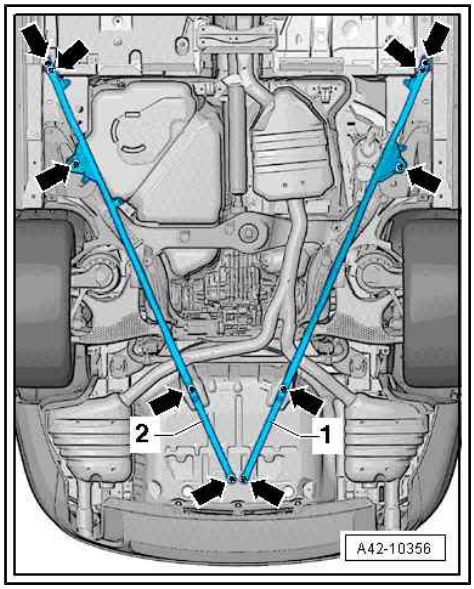
Removing

– Raise vehicle on lifting platform.

– Remove covers -1- and -2- ⇒ Rep. gr. 66 .



– Remove bolts -arrows- and detach diagonal struts -1- and -2-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „3.1 Exploded view of subframe, anti-roll bar, coupling rod, diagonal strut - four-wheel drive vehicles“, page 139

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4 Upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender

⇒ „4.1 Exploded view of upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender“, page 173

⇒ „4.2 Removing and installing lower transverse link“, page 175

⇒ „4.3 Removing and installing upper transverse link“, page 178

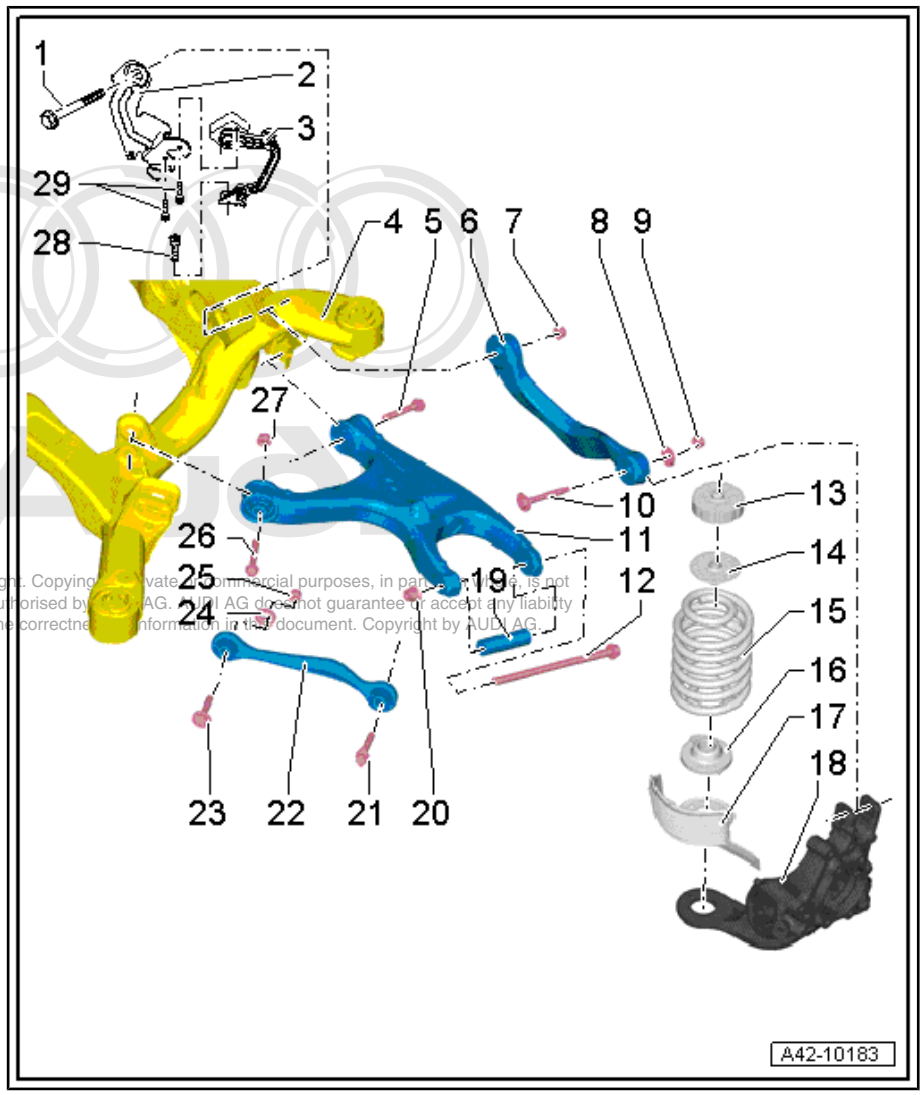
⇒ „4.4 Removing and installing track rod“, page 180

⇒ „4.5 Modifying spring compressing system VAS 6274 “, page 181

⇒ „4.6 Removing and installing coil spring“, page 184

⇒ „4.7 Removing and installing vehicle level sender“, page 194

4.1 Exploded view of upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender



1 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

2 - Retaining bracket

3 - Rear left vehicle level sender -G76-

- ❑ The same sender versions must be installed on both sides.
- ❑ Complete with mounting parts
- ❑ Lever of sender faces outwards
- ❑ Renewing in vehicle ⇒ page 194
- ❑ Check basic adjustment of headlights if sender mountings are loosened ⇒ Rep. gr. 94
- ❑ If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 . ⇒ Vehicle diagnostic tester
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

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4 - Subframe

5 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

6 - Upper transverse link

- ❑ Removing and installing ⇒ page 178

7 - Nut

- ❑ Always renew if removed

8 - Shim

9 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

10 - Adjuster screw

11 - Lower transverse link

- ❑ Removing and installing ⇒ page 175

12 - Bolt

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- ❑ 120 Nm +360°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

Note

13 - Spacer for top spring seat

14 - Top spring seat

- ❑ Only fitted on heavy-duty running gear version and Sportback

15 - Coil spring

- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ Removing and installing ⇒ page 184

16 - Bottom spring seat

17 - Stone deflector for coil spring

18 - Wheel bearing housing

19 - Spacer

- ❑ Always renew if removed

20 - Nut

- ❑ Always renew if removed

Caution

The bolt connection must not be tightened by the nut.

Note

21 - Bolt

- ❑ 90 Nm +90°

- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

22 - Track rod

- ❑ Removing and installing ⇒ page 180
- ❑ Note correct installation position
- ❑ Different versions (aluminium and steel); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

23 - Bolt

24 - Eccentric washer

25 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

26 - Bolt

- ❑ 70 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

27 - Nut

- ❑ Always renew if removed

28 - Bolt

- ❑ 9 Nm

29 - Bolt

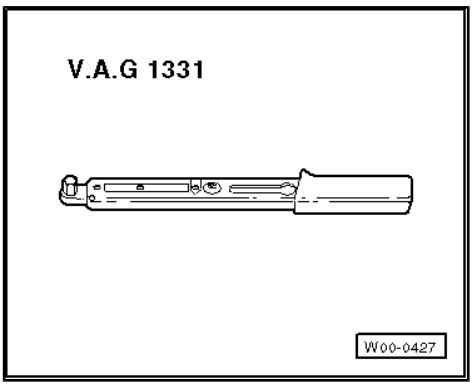
- ❑ 5 Nm

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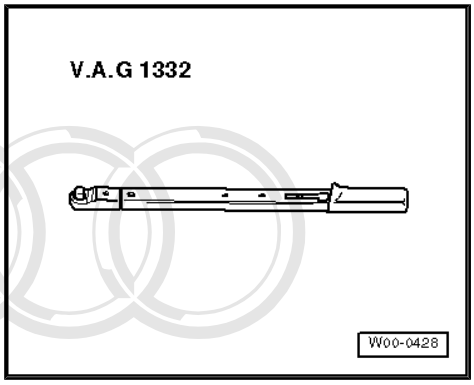
4.2 Removing and installing lower transverse link

Special tools and workshop equipment required

- ♦ Torque wrench -V.A.G 1331-



♦ Torque wrench -V.A.G 1332-



Removing

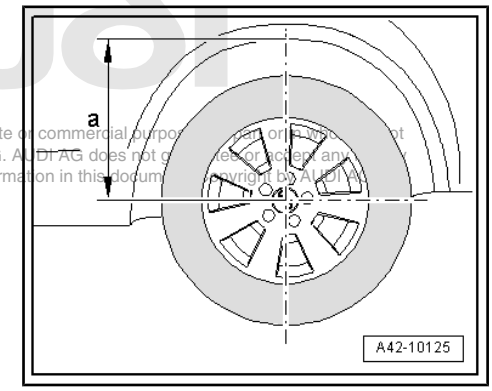
– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

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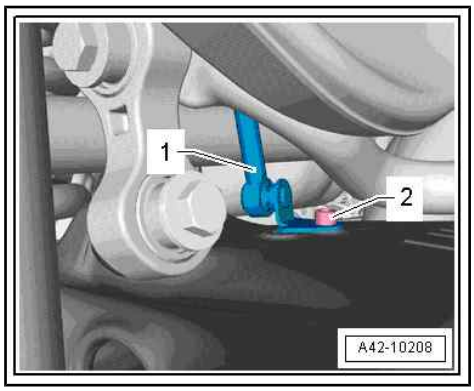
– Raise vehicle on lifting platform.

– Remove wheel.

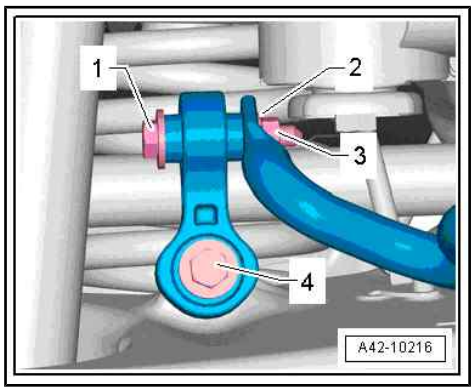
– Remove coil spring ⇒ page 184 .



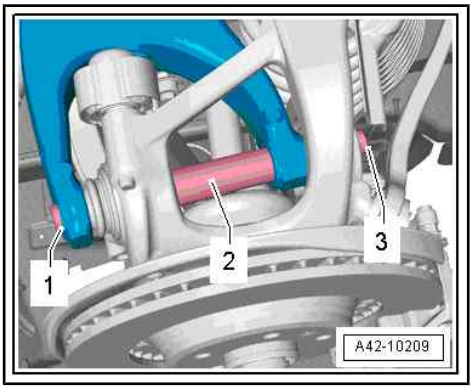
– On vehicles with vehicle level sender -1-, remove bolt -2-.



– Remove bolt -4-.



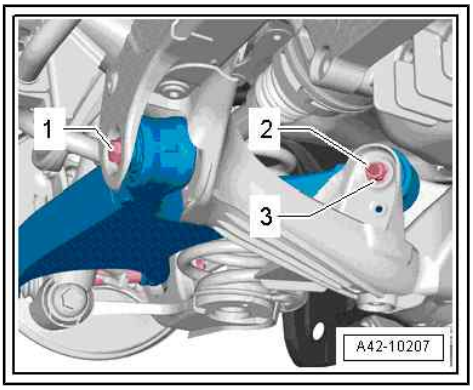
– Remove nut -3-.
– Remove bolt -1- and detach spacer -2-.



Note

The wheel alignment must be checked if nut -3- is slackened or bolt -1- is removed.

– Remove bolt -1-.
– Unscrew nut -3- and remove bolt -2-.
– Take out lower transverse link.



Installing

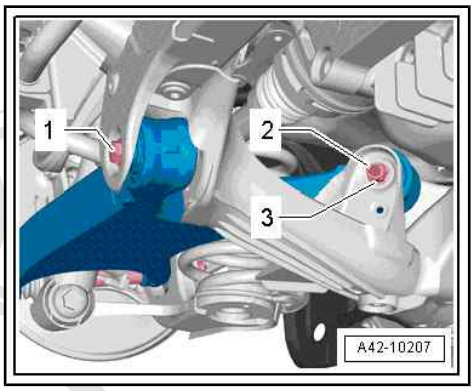
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „4.1 Exploded view of upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender“, page 173

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

– Fit lower transverse link and screw in bolt -1- loosely initially.



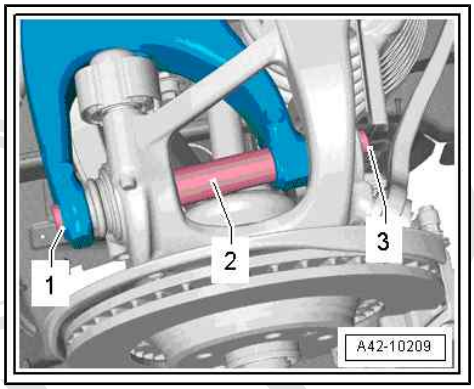
Note

To provide access to the bolt head when tightening bolt -2-, the aerodynamic fairing (Cd panel) and wheel spoiler must be removed ⇒ Rep. gr. 66 .

– Fit bolt -2- and screw on nut -3- loosely.

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– Fit bolt -1- with spacer -2- and screw on nut -3- loosely.



Caution

- *The bolt connection must not be tightened by the nut -3-.*

– Tighten bolt -1-.

– Tighten remaining bolts.

– Install coil spring ⇒ page 184 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Front and rear wheel alignment must always be checked and adjusted if necessary using VW/Audi approved equipment.

– On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .

– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 . ⇒ Vehicle diagnostic tester

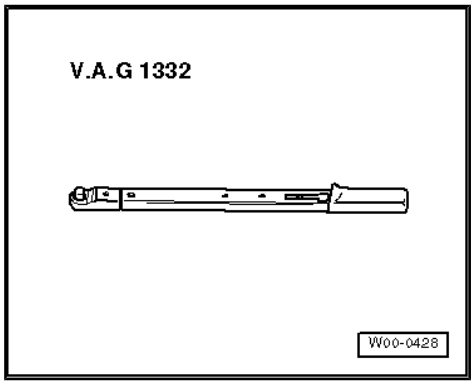
– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

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4.3 Removing and installing upper transverse link

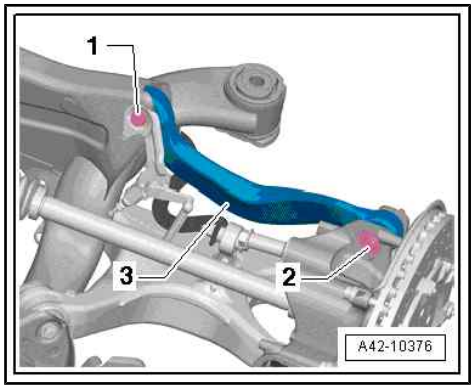
Special tools and workshop equipment required

◆ Torque wrench -V.A.G 1332-



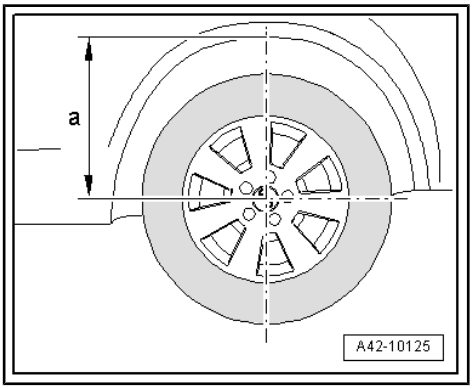
Note

As inner bolt -1- is inaccessible, upper transverse link can only be removed after taking out subframe.



Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.



– Raise vehicle on lifting platform.

– Remove wheels.

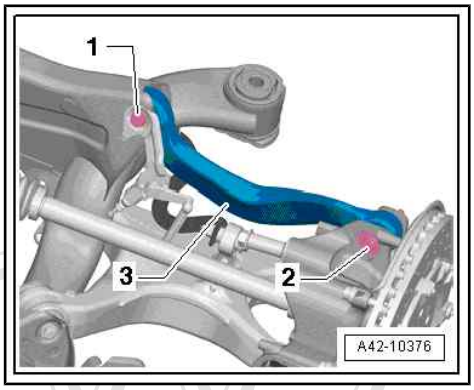
– Remove subframe (vehicles with front-wheel drive ⇒ page 118).

– Remove subframe (vehicles with four-wheel drive ⇒ page 142).

– Using a felt-tip pen or similar, mark position of eccentric washer -2- on wheel bearing housing.

– Unscrew bolt connections -1- and -2-.

– Take out upper transverse link -3-.



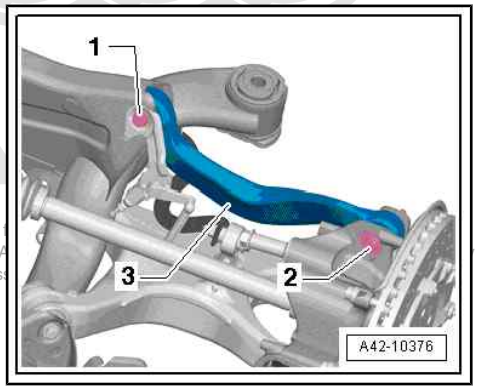
Installing

Note

Renew bolts and self-locking nuts.

Installation position of upper transverse link on subframe

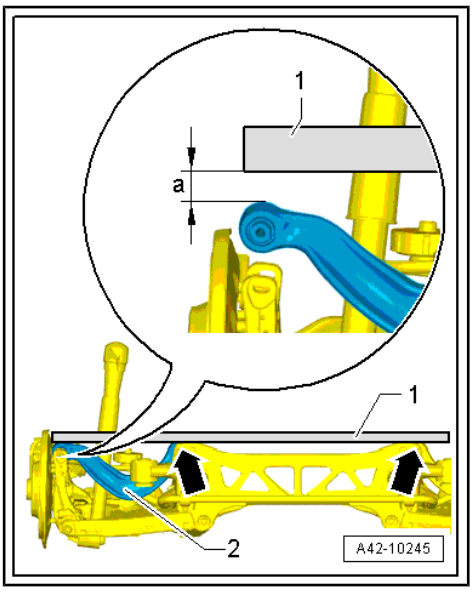
– Bolt upper transverse link -3- loosely to subframe at mounting -1-.



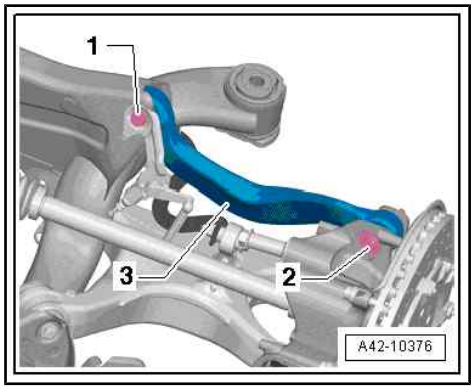
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– Lay straightedge or straight bar -1- flat on upper transverse links -arrows-.

– Position upper transverse link -2- so dimension a = 8 mm ± 1 mm is attained between straight edge -1- and burr of upper transverse link -2-.

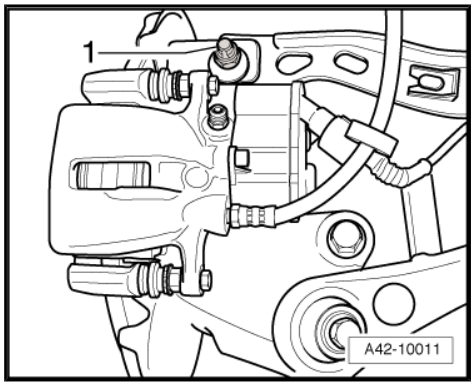


– Secure upper transverse link -3- to subframe in this position.
– Attach wheel bearing housing to transverse link and tighten new nut to 20 Nm. Note position of eccentric washer -2-.
– Install subframe (vehicles with front-wheel drive ⇒ page 118).
– Install subframe (vehicles with four-wheel drive ⇒ page 142).



– Loosen bolt connection -1-.
– Lift suspension to unladen position ⇒ page 112 and tighten bolt connection -1-.

Tightening torques
⇒ „4.1 Exploded view of upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender“, page 173



– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment ⇒ page 309 .

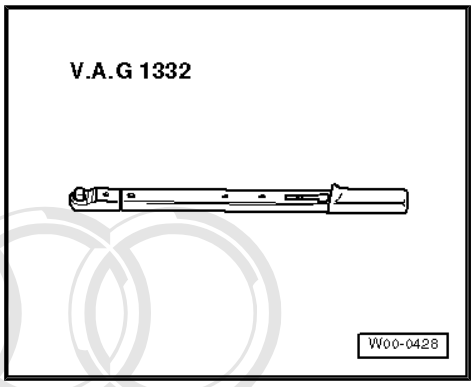
Wheel alignment must always be checked and adjusted if necessary using VW/Audi-approved equipment.

4.4 Removing and installing track rod

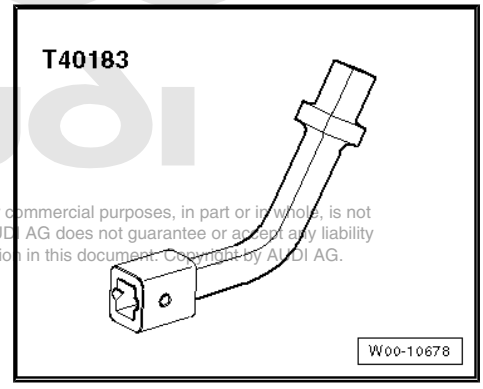
From model year 2010 onwards, steel track rods are being introduced gradually instead of aluminium track rods. Mixed installation of different track rods on the same axle is not permissible; for correct type, refer to ⇒ Electronic parts catalogue .

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1332-



♦ Socket -T40183-



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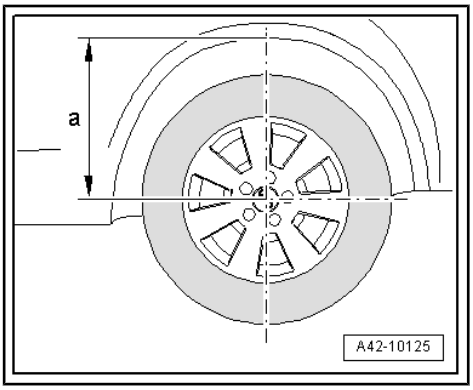
♦ Commercially available fine-tooth ratchet (not illustrated)

Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

– Remove wheel.

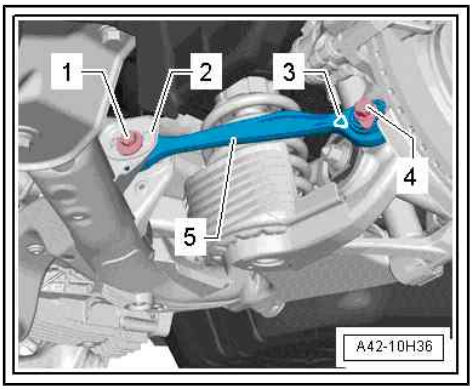


– First remove bolt -4-.

– Mark position of bolt -1- in relation to subframe -2-.

– Unscrew nut and take out bolt -1-.

– Take out track rod -5-.



Installing

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Installation is carried out in the reverse sequence. Note the following points:

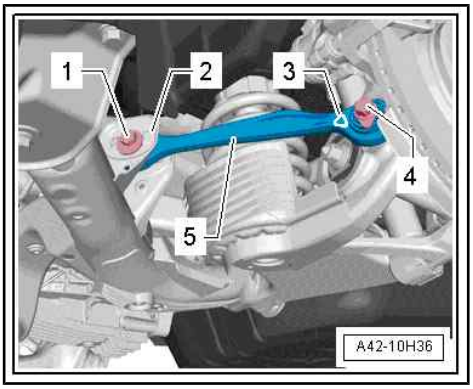
Tightening torques
⇒ „4.1 Exploded view of upper transverse link, track rod, coil spring, lower transverse link, vehicle level sender“, page 173

Note

♦ *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*

♦ *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

– Fit track rod -5-.



Marking -3 (Δ)- must be on outside. Tip of marking -3- points upwards.

– First insert bolt -1- fully and align it with marking made previously.

– Insert bolt -4- and tighten.

– Hand-tighten new nut for bolt -1-. Do not tighten nut for bolt -1- to specified torque until wheel alignment has been checked and adjusted.

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

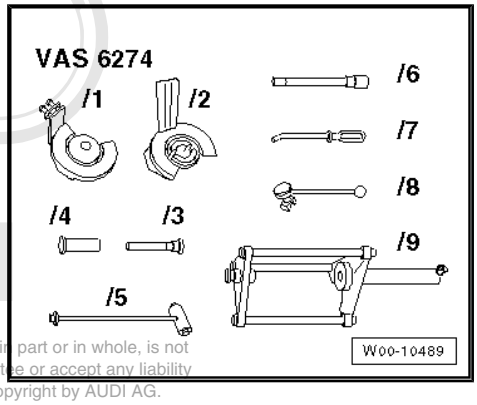
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Wheel alignment must always be checked and adjusted if necessary using VW/Audi-approved equipment.

4.5 Modifying spring compressing system - VAS 6274-

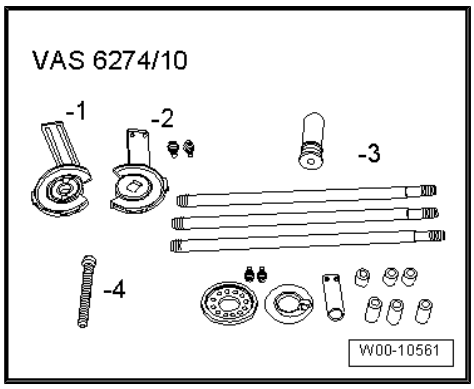
Special tools and workshop equipment required

- Spring compressing system -VAS 6274-



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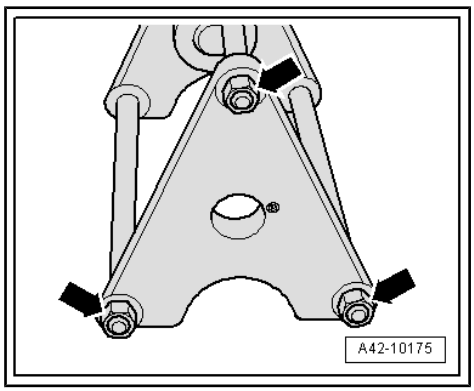
- Supplementary set -VAS 6274/10-



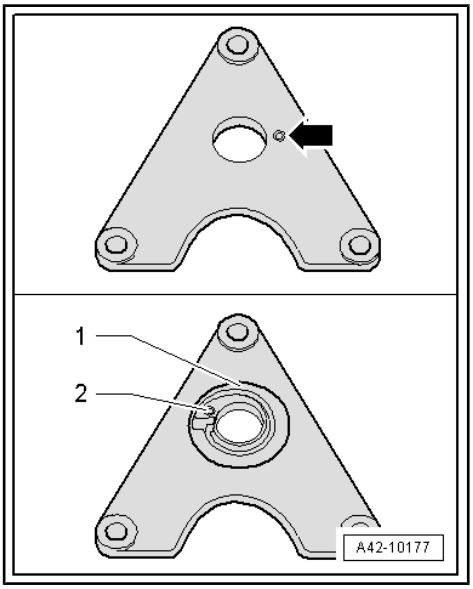
Note

The equipment only needs to be modified once. It is not necessary to convert the equipment back to its original condition.

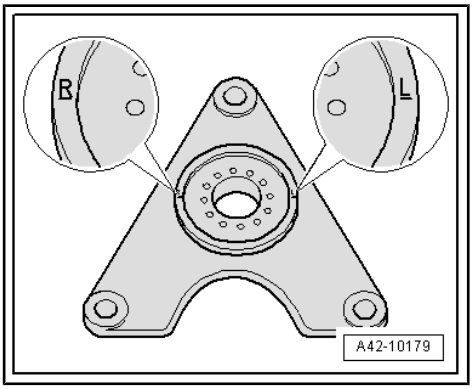
– Remove nuts -arrows- (6x) from spring compressor.
– Detach plate and pull rods out of spring compressor.



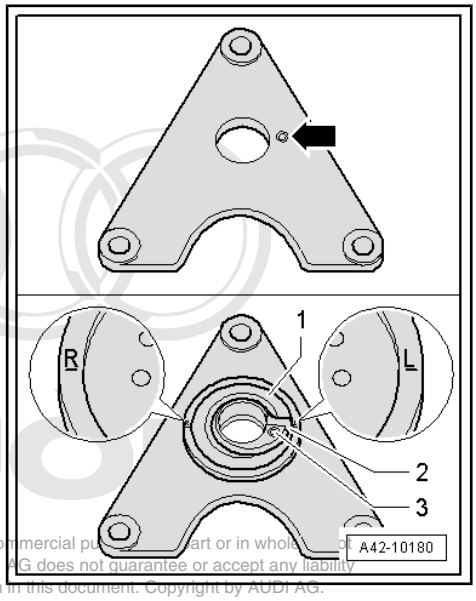
– Remove bolt -arrow- and detach existing spring retainer -1- with non-countersunk hole -2-.



– Insert new retainer with threaded holes from supplementary set into plate so that markings „R“ and „L“ are aligned horizontally on plate.

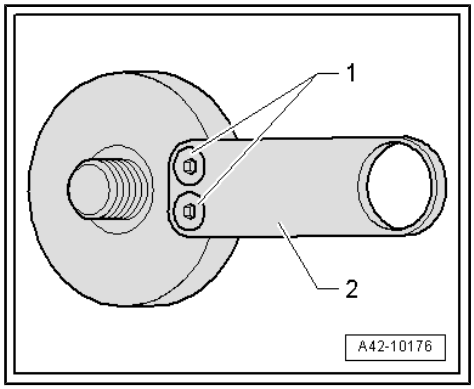


– Tighten new retainer with new bolt -arrow- from supplementary set. Do not turn retainer when doing so.
– Fit new spring retainer -1- with countersunk bore -3- from supplementary set.
– Fit new spring retainer -1- so that stop -2- is opposite marking „L“.
– Tighten new spring retainer -1- with new bolt from supplementary set.
– Detach spring retainer at hydraulic cylinder end.

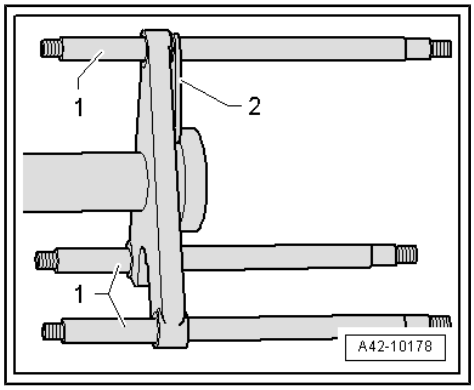


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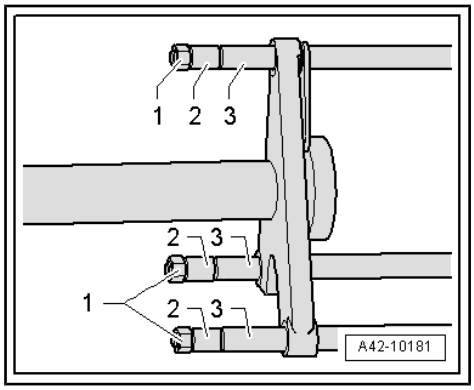
– Remove plate -2- and replace with new plate from supplementary set.
– Tighten new plate -2- with new bolts -1- from supplementary set.
– Screw spring retainer very lightly onto spring compressor as far as stop and then slacken off slightly again.



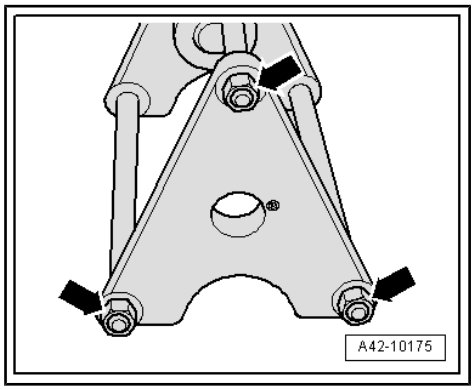
– Insert new rods with long taper -1- into plate on spring compressor.
– While doing so, insert upper rod through plate -2-.
– Fit spring retainer plate onto rods.



– Fit sleeves -2- and -3- from supplementary set and lightly tighten nuts -1-.



– Place spring compressor down on a flat surface and tighten nuts -arrows-.

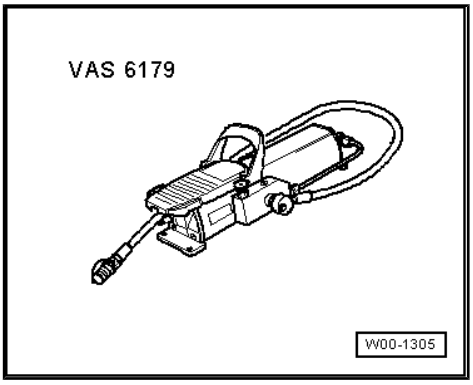


4.6 Removing and installing coil spring

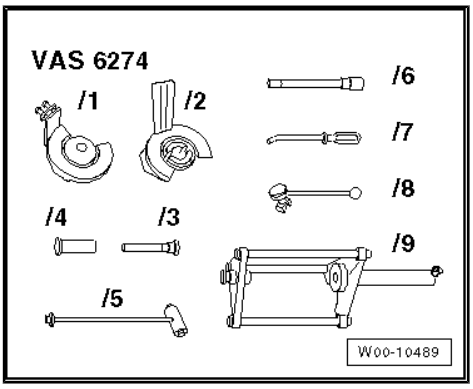
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Special tools and workshop equipment required

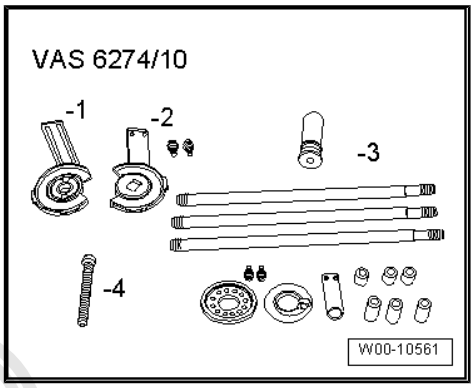
- Foot pump -VAS 6179-



- Spring compressing system -VAS 6274-



- Supplementary set -VAS 6274/10-



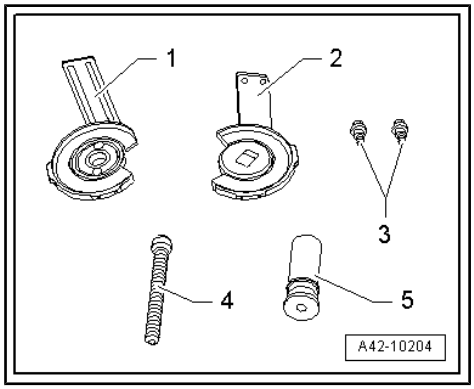
WARNING

- *Before removing and installing the coil spring, the spring compressing system -VAS 6274- must be modified with supplementary set -VAS 6274/10- .*
- *Modifying spring compressing system -VAS 6274- with supplementary set -VAS 6274/10- ⇒ page 181 .*

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Note

In the following operations the remaining tools from the supplementary set -VAS 6274/10- are required.



1 - Thrust plate with swivel mounting -VAS 6274/10-1-

2 - Thrust plate with securing plate -VAS 6274/10-2-

3 - Bolts for locating bracket

4 - Spindle -VAS 6274/10-4-

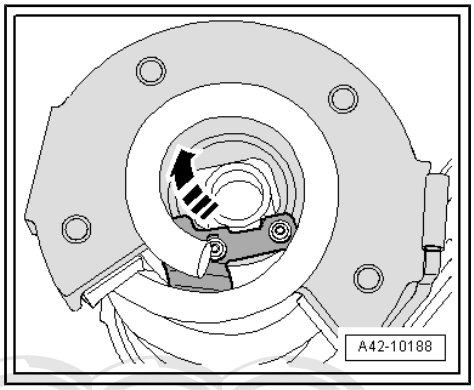
5 - Sleeve

Removing

– Raise vehicle on lifting platform.

– Remove wheels.

– If necessary, push back locking lever in opposite direction of -arrow-.



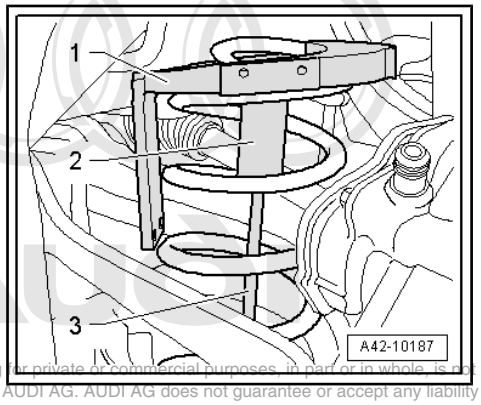
Note

For greater clarity, the stone deflector is removed in the following illustrations.

– Working from the outside, insert new thrust plate with securing plate -VAS 6274/10-2- with locating bracket from supplementary set.

1 - Thrust plate with securing plate -VAS 6274/10-2-

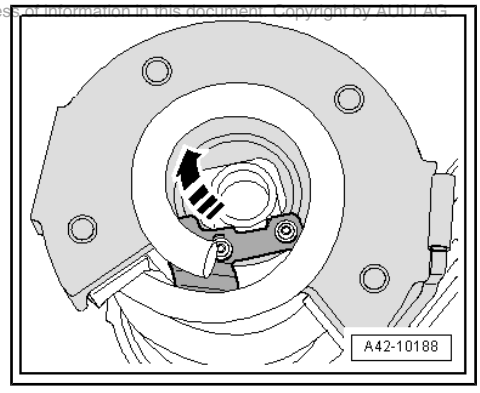
– Insert plunger -2- with T-bar -3- into thrust plate. To do so, push back locking lever on thrust plate outwards (to open) as necessary.



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– Press locking lever in direction of -arrow- to secure plunger.

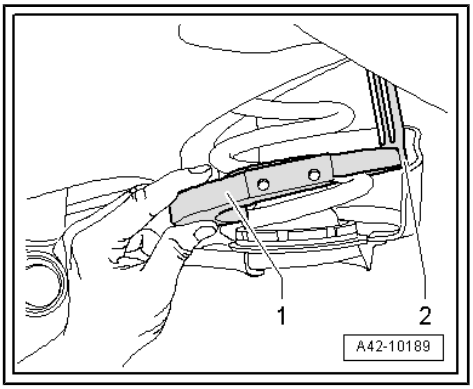
– Rotate thrust plate with securing plate all the way up.



– Insert new thrust plate with swivel mounting -VAS 6274/10-1- with locating bracket from supplementary set from the inside.

1 - Thrust plate with swivel mounting -VAS 6274/10-1-

Locating bracket -2- must be bolted on at front, as seen in direction of travel.



– Rotate thrust plate with swivel mounting all the way down.

Caution

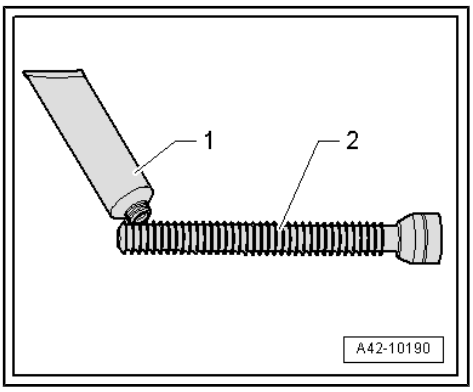
- ***Before removing and installing any of the springs, always lubricate the front of the spindle lightly with the grease supplied.***
- ***Lubricate the spindle only with the grease supplied. If other greases are used the spindle will be damaged.***

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– Lubricate the front of the new spindle -VAS 6274/10-4- lightly with the grease supplied.

1 - Grease tube from spring compressing system -VAS 6274- or from supplementary set -VAS 6274/10-

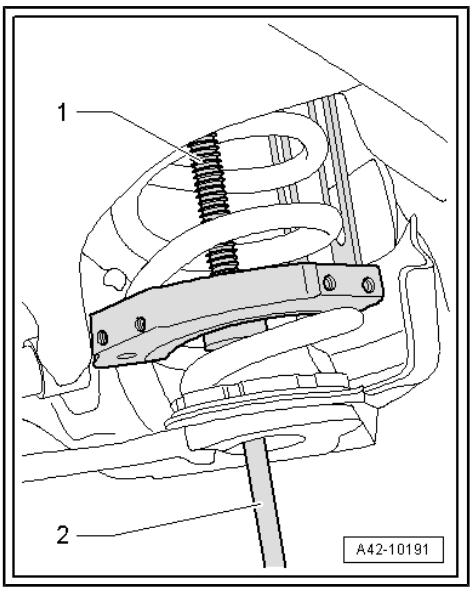
2 - Spindle -VAS 6274/10-4-



– Hand-tighten new spindle -VAS 6274/10-4- using socket -VAS 6274/6- .

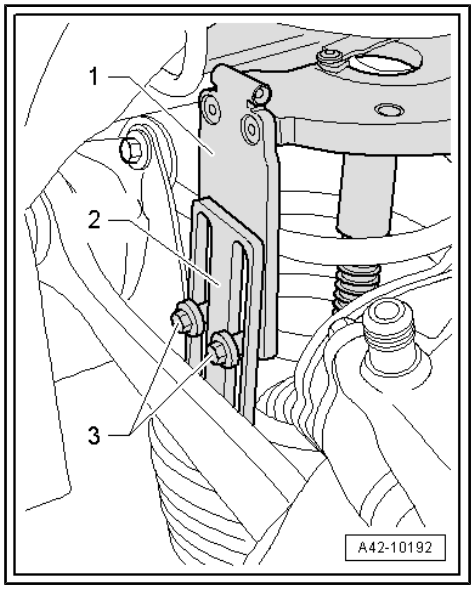
1 - Spindle -VAS 6274/10-4-

2 - Socket -VAS 6274/6-



– Bolt the locating brackets -1- and -2- of the two thrust plates together.

– Screw in new bolts -3- hand-tight to do so.



WARNING

- *The coil spring must be compressed or released only when the two locating brackets -1- and -2- are joined together by the two bolts -3-.*

– First pre-tension thrust plates slightly using new spindle -VAS 6274/10-4- .

– Check that coil spring is correctly seated in thrust plates.

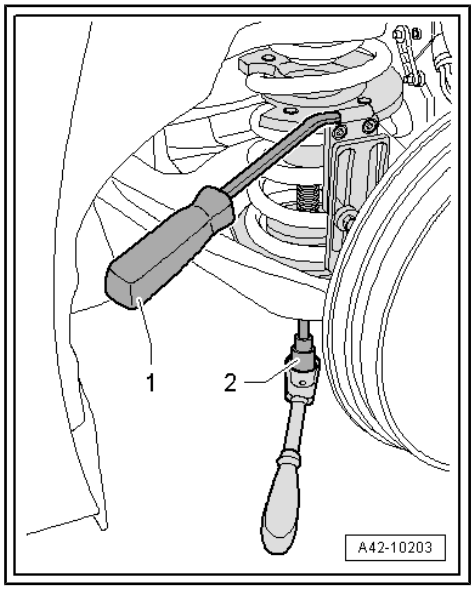
Note

When compressing the coil spring, the locating brackets must be pointing forwards (in direction of travel).

– Compress coil spring with socket -VAS 6274/6- (use counterhold tool -VAS 6274/7-).

1 - Counterhold tool -VAS 6274/7-

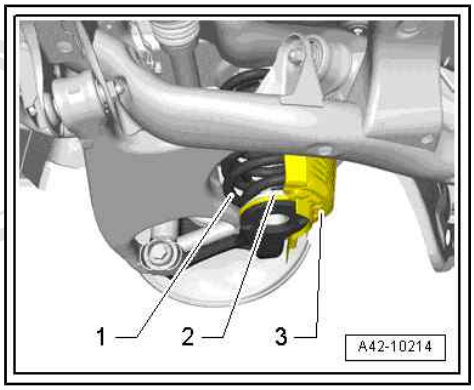
2 - Socket -VAS 6274/6-



Caution

- *Do not use impact wrenches to compress the coil spring.*
- *Use a standard commercially available ratchet to compress the spring.*

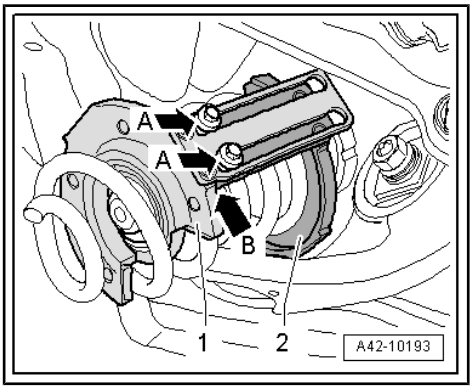
– Compress coil spring -1- until stone deflector -3- and bottom spring seat -2- can be taken out. Compress coil spring -1- further if necessary.



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Caution

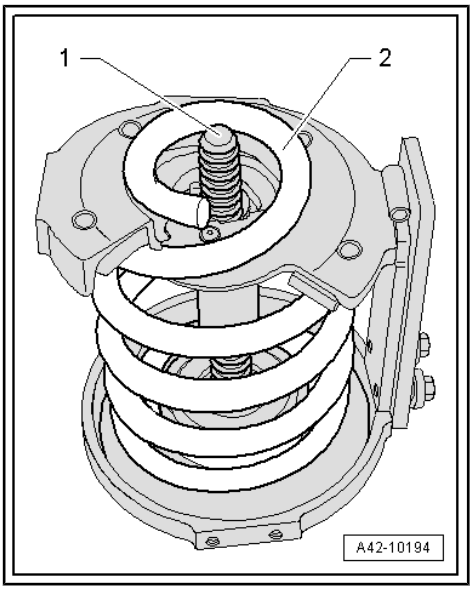
- *When compressing the coil spring, make sure the bolts -arrows A- do not make contact with the stop on the thrust plate -1-.*
- *Similarly, the locating bracket on the thrust plate -2- must not make contact with the stop -arrow B- on the thrust plate -1-.*



– Remove coil spring downwards and forwards.

Slackening coil spring in spring compressing system -VAS 6274-

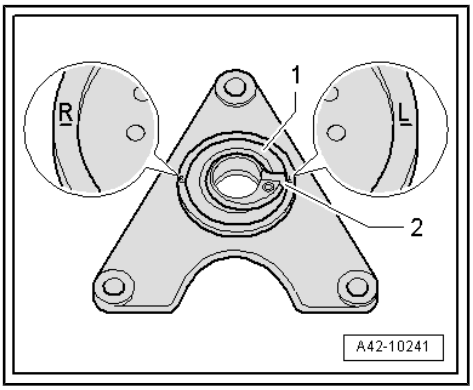
– Slacken off spindle -1- slightly if necessary. Spindle -1- must not protrude beyond end of coil spring -2-.



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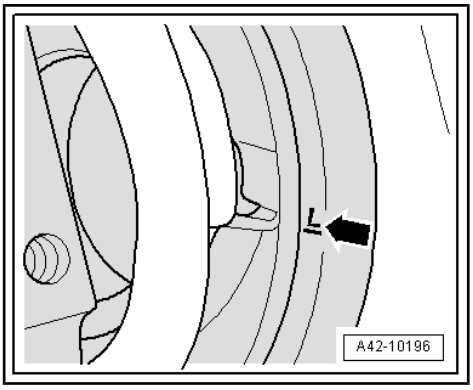
– Insert left coil spring in spring retainer -1- so that stop -2- is opposite marking „L“. This only applies to coil spring on left side of vehicle.

For coil spring on right side of vehicle, stop -2- must be opposite marking „R“.

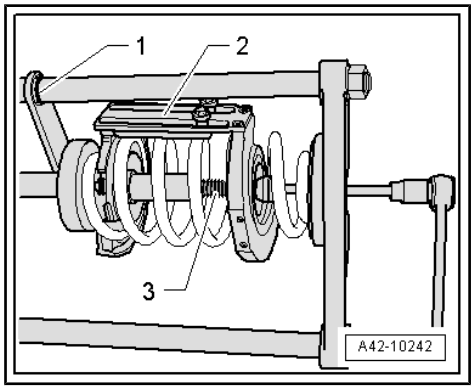


– Position underside of end of left coil spring in spring compressing system -VAS 6274- at marking „L“ -arrow-.

Position underside of end of right coil spring in spring compressing system -VAS 6274- at marking „R“.



– Apply marking -1- using a felt-tip pen or similar.



Note

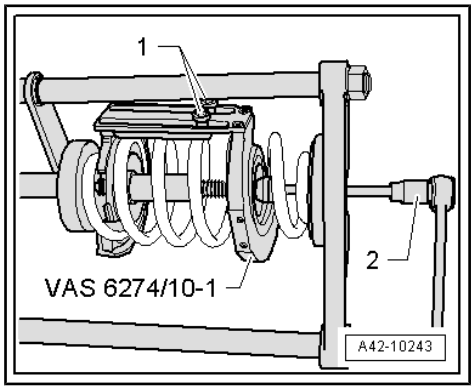
The marking -1- is required when compressing the spring during installation.

Locating element -2- faces upwards.

– Lightly hand-tighten bolts -1-.

2 - Socket -VAS 6274/6-

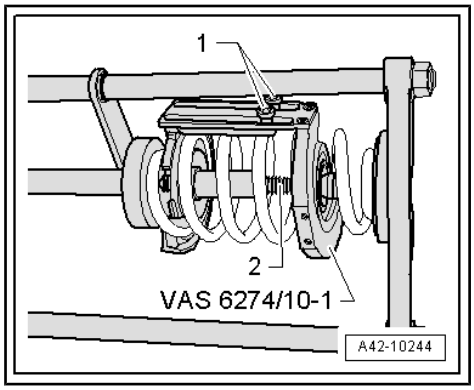
– Slacken coil spring using socket -VAS 6274/6- . At the same time slacken coil spring via spring compressing system -VAS 6274- and foot pump -VAS 6179- .



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– When coil spring has been slackened, unscrew spindle -2-.

– Remove bolts -1- from locating bracket and take out thrust plate with swivel mounting -VAS 6274/10-1- .



– Push back locking lever -1-.

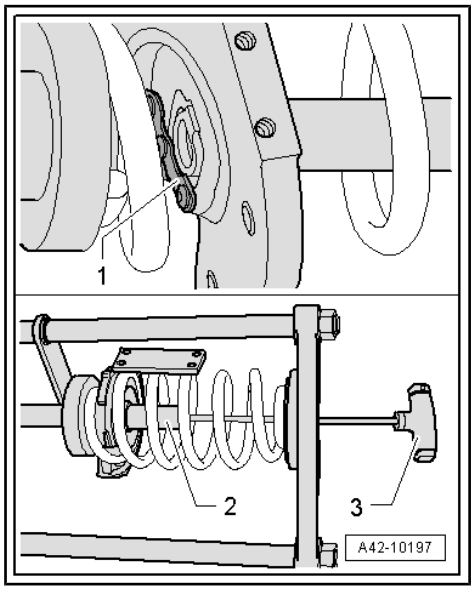
– Remove plunger -2- with T-bar -3-.

– Release coil spring completely.

Installing

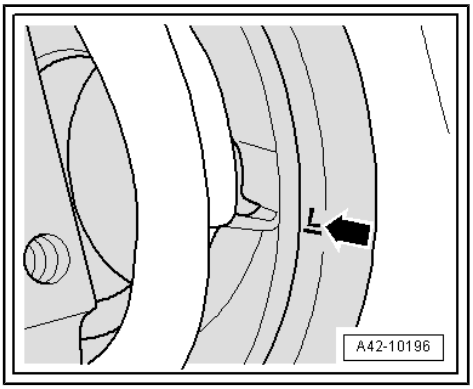
Installation is carried out in the reverse sequence. Note the following points:

– Insert underside of coil spring into spring compressing system -VAS 6274- .



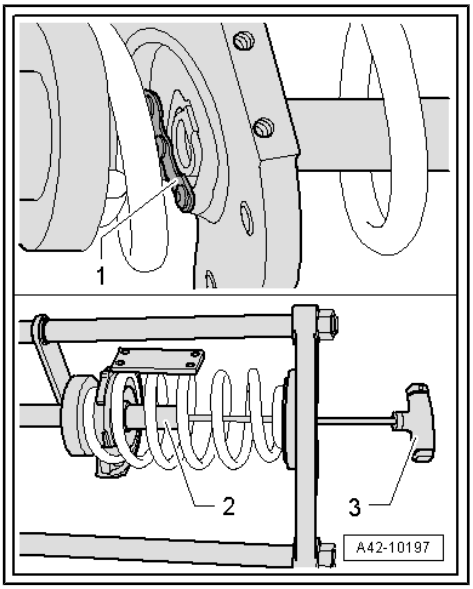
– Position end of left coil spring in spring compressing system - VAS 6274- at marking „L“ -arrow-.

Position end of right coil spring in spring compressing system - VAS 6274- at marking „R“.

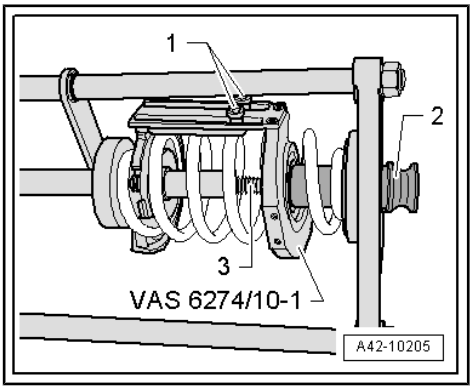


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– Fit thrust plate with securing plate -VAS 6274/10-2- and install plunger -2- with T-bar -3-.
– Secure plunger -2- with locking lever -1-.

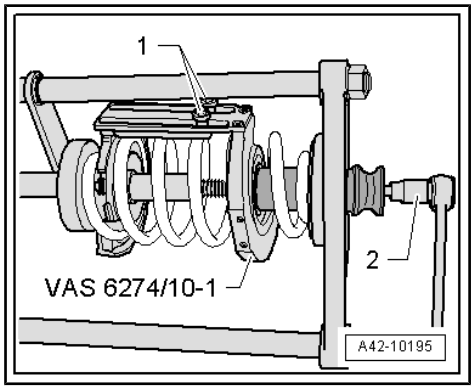


– Fit thrust plate with swivel mounting -VAS 6274/10-1- .
– Screw in bolts for locating bracket -1- loosely.
– Insert spindle -3-.
– Insert sleeve -2- as far as it will go.



– Lightly hand-tighten bolts -1- for locating bracket. Locating element must be pointing upwards when compressing coil spring.
– Compress coil spring using socket -VAS 6274/6- , At the same time apply pressure via spring compressing system -VAS 6274- and foot pump -VAS 6179- .

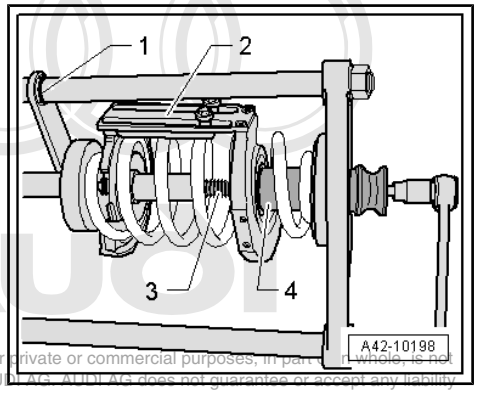
2 - Socket -VAS 6274/6-



Caution

- *When compressing the coil spring, make sure the bolts on the locating bracket do not make contact with the stop on the thrust plate with swivel mounting -VAS 6274/10-1- .*
- *Similarly, the locating bracket on the thrust plate with securing plate -VAS 6274/10-2- must not make contact with the stop on the thrust plate with swivel mounting -VAS 6274/10-1- .*

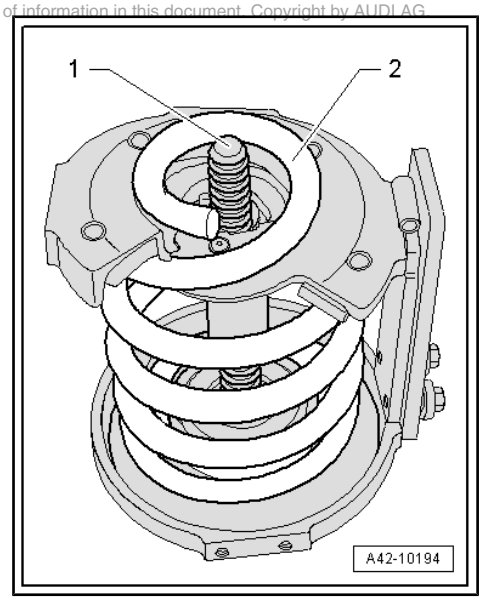
– Compress coil spring only as far as marking -1- made previously. Locating element -2- must be pointing upwards.
– When using spindle -3- to compress coil spring, make sure that sleeve -4- does not slip out of thrust plate with swivel mounting -VAS 6274/10-1- .
– Release spring compressing system -VAS 6274- and take out coil spring together with spring compressor.



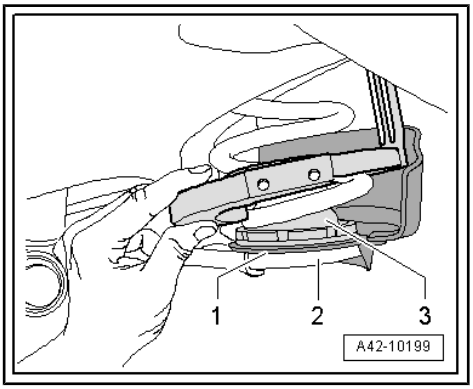
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– If necessary, use spindle -1- to compress coil spring -2- further.

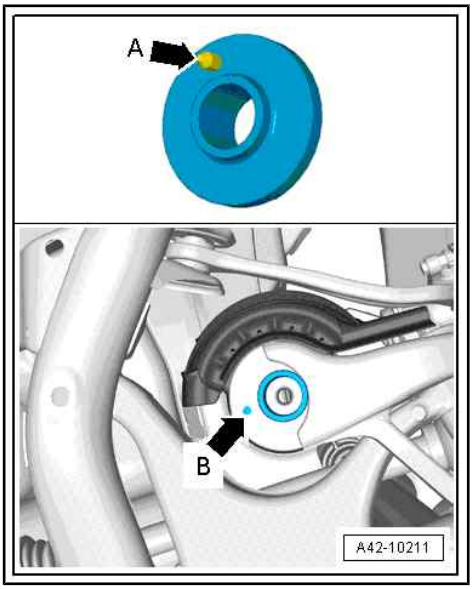
Spindle -1- must not protrude too far beyond coil spring -2- otherwise it will not be possible to position top spring plate properly on coil spring.



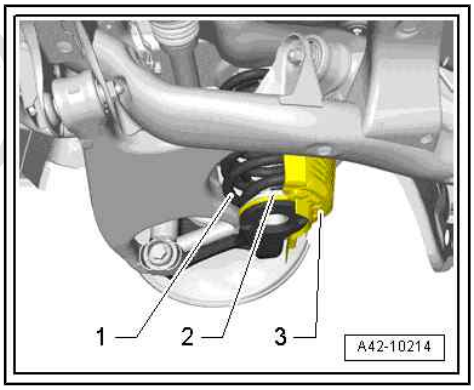
– Position coil spring with bottom spring seat -3- and stone deflector -1- on wheel bearing housing -2-.
– Check that top spring seat is installed. Install if necessary.



– Insert pin -arrow A- of bottom spring seat into hole -arrow B- on wheel bearing housing.



– Screw coil spring -1- into bottom spring seat -2- as far as stop.
– Then release coil spring.
– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .



Note

The basic headlight setting must always be checked ⇒ Rep. gr. 94 and, on vehicles with electronic damping control, the reference position of the suspension must always be re-adapted ⇒ page 273 if the coil springs have been renewed.

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– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 .
⇒ Vehicle diagnostic tester
– If the vehicle level sender has been detached or removed on vehicles with lane departure warning function, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

4.7 Removing and installing vehicle level sender

General notes:

Vehicles with electronic damping control and/or gas discharge lamps have automatic headlight range control fitted as standard equipment ⇒ Rep. gr. 94 .

The electronic damping control and the automatic headlight range control functions require information on the compression and rebound travel at the front and rear suspension.

For this purpose, the position of the left/right trapezium link in relation to the body is transferred to the rear left vehicle level sender -G76- and the rear right vehicle level sender -G77- via a coupling rod. The senders then transmit electrical signals to the electronically controlled damping control unit -J250- and/or the gas discharge light control units (left/right) -J343/344- .

Servicing left/right gas discharge bulb control unit -J343/344- ⇒ Rep. gr. 94

On the front axle these signals are supplied by the front left vehicle level sender -G78- and front right vehicle level sender -G289- to the electronically controlled damping control unit -J250- and/or the gas discharge light control units (left/right) -J343/344- .

These signals are required for calculating the current attitude of the vehicle.

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The automatic headlight range control reacts to changes in the suspension height (attitude of the vehicle).

The following situations may produce a change in the suspension height:

- Towing a trailer/caravan
- Different loads (vehicle unladen, partly laden or fully laden)

Note

On vehicles with electronic damping control, the basic headlight setting must always be checked and the reference position of the suspension must always be re-adapted in the following cases:

- Lower transverse link has been removed and installed or renewed,
- Upper transverse link has been removed and installed or renewed,
- Subframe has been renewed,
- Work has been performed on the vehicle level sender,
- Vehicle level sender has been renewed,
- Coil springs have been renewed,
- Coupling rod for vehicle level sender has been unbolted from transverse link.

Basic setting of headlights ⇒ Rep. gr. 94

Re-adapting reference position on vehicles with electronic damping control ⇒ page 273 ⇒ Vehicle diagnostic tester

If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

Renewing vehicle level sender with subframe in vehicle

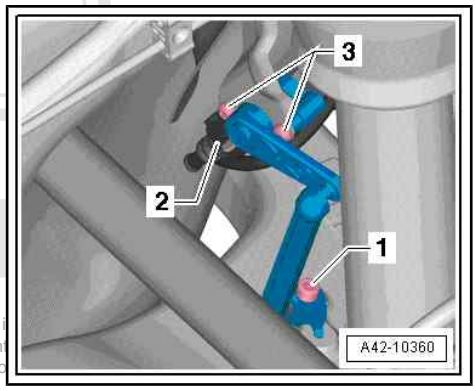
– Remove wheel.

– Unplug connector -2-.

– Remove bolt -1-.

– Unscrew bolts -3- with angled spanner. Take care not to bend upper retaining plate.

– Take out vehicle level sender.



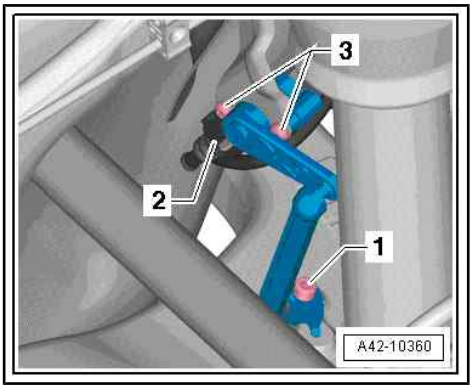
Note

The same sender versions must be installed on both sides.

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– Prepare replacement part accordingly and install.

– Screw in bolts -3- with angled spanner. Take care not to bend upper retaining plate.



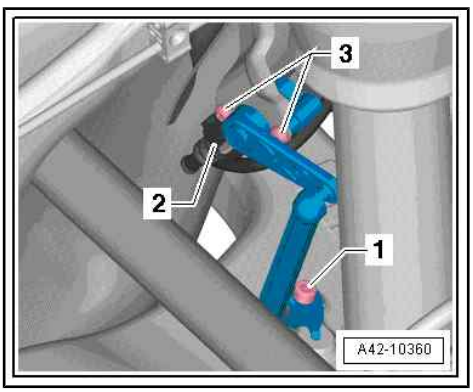
Note

Hold vehicle level sender while tightening bolts -3-.

Lever of sender must face outwards.

– Screw in bolt -1-.

– Attach connector -2-.



Tightening torques ⇒ page 173

– Perform basic setting of headlights ⇒ Rep. gr. 94 .

– If, on vehicles with electronic damping control, the vehicle level sender has been removed and refitted or the linkage detached, the reference position must be re-adapted ⇒ page 273 . ⇒ Vehicle diagnostic tester

– If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

5 Wheel bearing housing, wheel bearing unit, shock absorber - front-wheel drive vehicles

⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles“, page 196

⇒ „5.2 Removing and installing wheel bearing housing - front-wheel drive vehicles“, page 199

⇒ „5.3 Removing and installing wheel bearing unit - front-wheel drive vehicles“, page 205

⇒ „5.4 Renewing bonded rubber bush for wheel bearing housing - front-wheel drive vehicles“, page 209

⇒ „5.5 Removing and installing shock absorber - front-wheel drive vehicles“, page 213

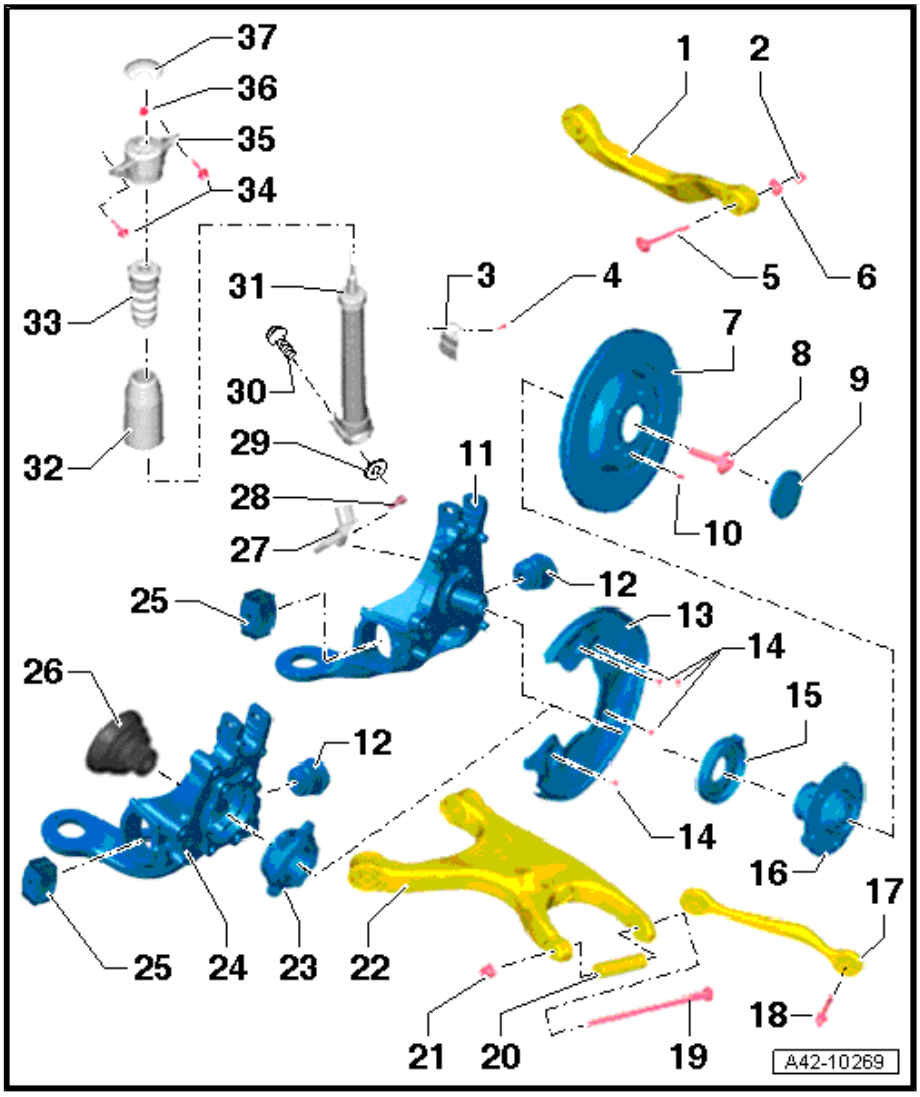
⇒ „5.6 Servicing shock absorber - front-wheel drive vehicles“, page 215

5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles

Note

- *2 different types of wheel bearing housing are used on front-wheel drive vehicles.*
- *The „front-wheel drive“ wheel bearing housing and the „four-wheel drive“ wheel bearing housing were fitted over an indefinite period. The type of wheel bearing housing fitted must therefore be checked before starting work.*

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1 - Upper transverse link

2 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

3 - Bracket

- ❑ For brake hose, brake caliper wiring harness and wiring harness for rear speed sensor

4 - Bolt

- ❑ 10 Nm

5 - Bolt

6 - Eccentric washer

7 - Brake disc

8 - Flange bolt

- ❑ 200 Nm +180°
- ❑ Always renew if removed

9 - Protective cap

- ❑ Remove with hub grease cap puller -VW 637/2-
- ❑ Always renew if removed

10 - Bolt

- ❑ 5 Nm

11 - Wheel bearing housing

- ❑ With stub axle
- ❑ Only fitted in conjunction with ⇒ Item 15 (page 197) and ⇒ Item 16 (page 197)
- ❑ Removing and installing ⇒ page 199

12 - Bonded rubber bush

- ❑ Cannot be renewed separately

13 - Splash plate for brakes

14 - Bolt

- ❑ 10 Nm

15 - Additional seal

16 - Wheel bearing unit

Caution

Avoid dirtying or damaging the seal when laying it down or placing it in storage ⇒ page 199 .

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- ❑ Removing and installing ⇒ page 205
- ❑ Wheel bearing unit cannot be repaired

17 - Track rod

- ❑ Different versions (aluminium and steel); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

18 - Bolt

- ❑ 90 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

19 - Bolt

- ❑ 120 Nm +360°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

Note

20 - Spacer

- ❑ Always renew if removed

21 - Nut

- ❑ Always renew if removed

Caution

The bolt connection must not be tightened by the nut.

Note

22 - Lower transverse link

23 - Ball bearing

Caution

Avoid dirtying or damaging the seal when laying it down or placing it in storage ⇒ page 221 .

- ❑ Removing and installing wheel bearing unit
  ⇒ „6.3 Removing and installing wheel bearing unit - four-wheel drive vehicles“, page 226
- ❑ Servicing wheel bearing unit
  ⇒ „6.4 Servicing wheel bearing unit - four-wheel drive vehicles“, page 227

24 - Wheel bearing housing

- ❑ Without stub axle
- ❑ Only fitted in conjunction with ⇒ Item 23 (page 198) and ⇒ Item 26 (page 198)
- ❑ Removing and installing
  ⇒ 6.2 Removing and installing wheel bearing housing - four-wheel drive vehicles“, page 222

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25 - Bonded rubber bush

- ❑ Renewing ⇒ page 209

26 - Drive shaft butt

- ❑ Only fitted in conjunction with ⇒ Item 24 (page 198)

27 - Bolt

- ❑ 9 Nm

28 - Speed sender (rear)

29 - Washer

- ❑ For corrosion protection
- ❑ Always use

30 - Bolt

- ❑ 150 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

31 - Shock absorber

- ❑ Removing and installing ⇒ page 213

32 - Protective sleeve

33 - Bump stop

34 - Bolt

- ❑ 50 Nm +45°
- ❑ Always renew if removed

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35 - Shock absorber mounting (top)

- ❑ Installation position ⇒ page 215

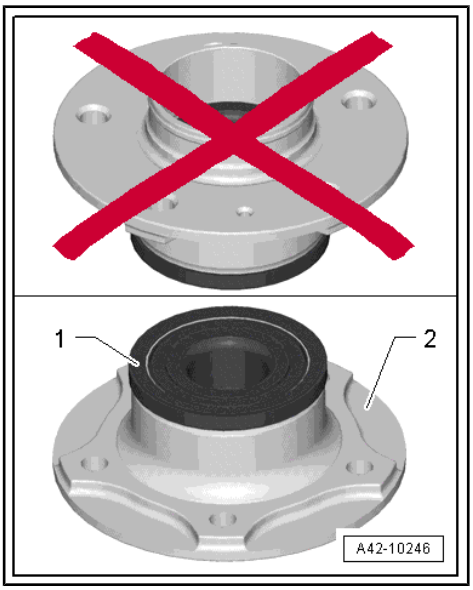
36 - Nut

- ❑ 35 Nm
- ❑ Always renew if removed

37 - Protective cap

Avoiding dirtying or damaging the seal when laying it down or placing it in storage

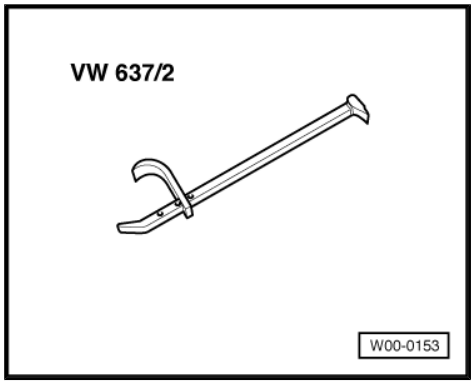
- ♦ The wheel bearing -1- must always be pointing upwards.
- ♦ Always put down the wheel bearing unit with the wheel hub -2- facing downwards.



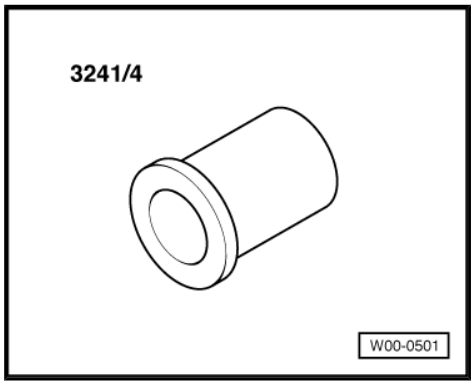
5.2 Removing and installing wheel bearing housing - front-wheel drive vehicles

Special tools and workshop equipment required

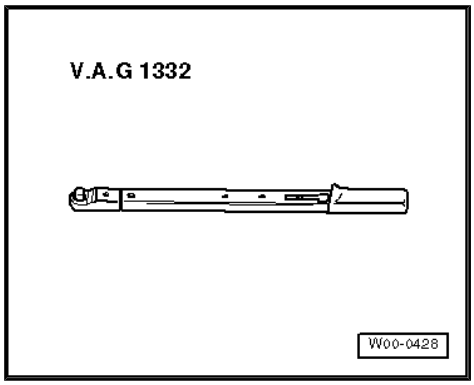
- Hub grease cap puller -VW 637/2-



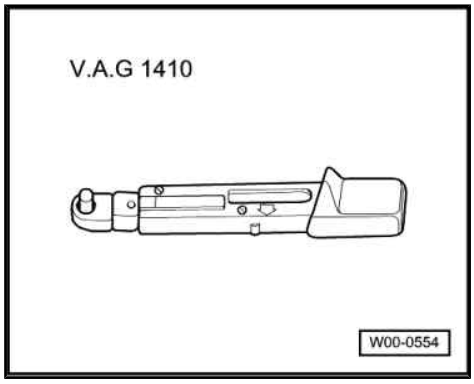
- Fitting sleeve -3241/4-



- Torque wrench -V.A.G 1332-



- Torque wrench -V.A.G 1410-



- Lubricating paste

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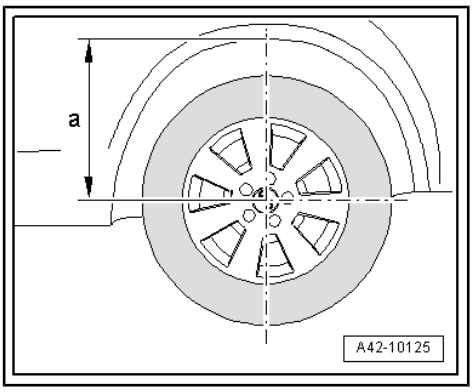
Removing

Note

- *2 different types of wheel bearing housing are used on front-wheel drive vehicles.*
- *The „front-wheel drive“ wheel bearing housing and the „four-wheel drive“ wheel bearing housing were fitted over an indefinite period. The type of wheel bearing housing fitted must therefore be checked before starting work.*
- *Removing and installing „four-wheel drive“ wheel bearing housing* ⇒ page 222 .

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

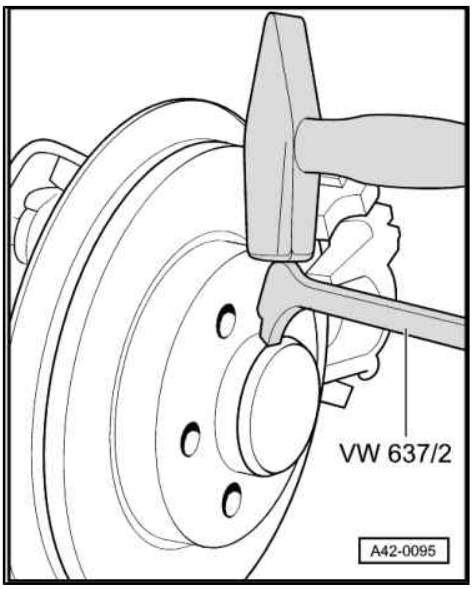
– Raise vehicle on lifting platform.



Only if wheel bearing housing is being renewed

– Detach grease cap by tapping lightly on hub grease cap puller -VW 637/2- .

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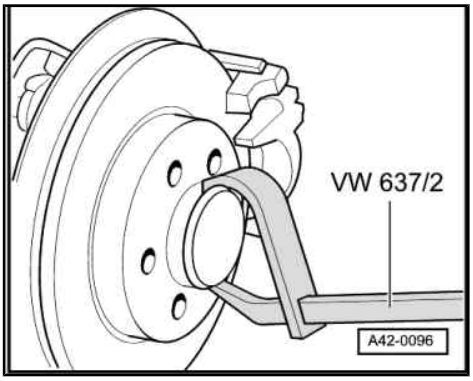


– Lever off grease cap with hub grease cap puller -VW 637/2- .

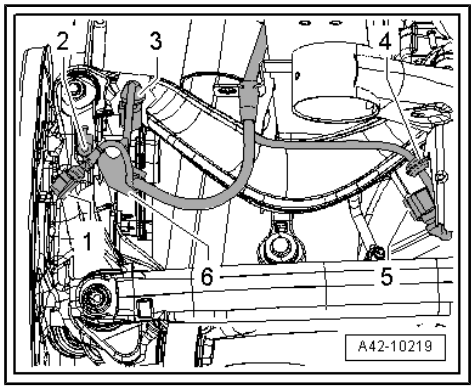
– Loosen flange bolt securing wheel bearing unit (loosen only when vehicle is standing on its wheels - risk of accident) ⇒ page 240 .

Removing (continued)

– Remove wheel.



– Release and unplug connector -1- from rear speed sensor .
– Release and unplug connector -3- for electromechanical parking brake.
– Remove bolt -2- and detach bracket -6- with wiring.
– Detach brake caliper and brake disc ⇒ Rep. gr. 46 .
– Secure brake caliper to body so that weight of caliper does not stretch or damage brake hose or brake pipe.

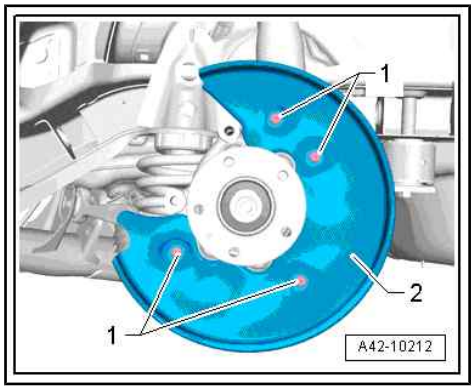


Only if wheel bearing housing is being renewed

– Remove bolts -1- from splash plate -2-.

Caution

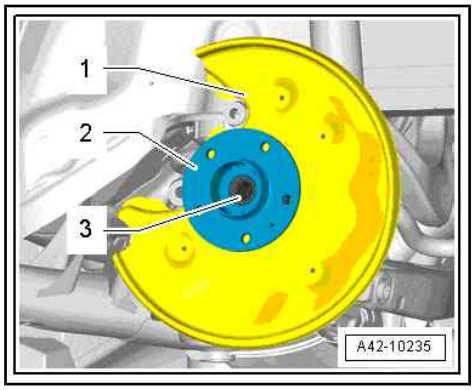
- *Do NOT detach the wheel bearing unit by pulling on the outer bearing race (wheel hub).*



– Use splash plate -1- to pull wheel bearing unit -2- slightly off stub axle -3-.

Note

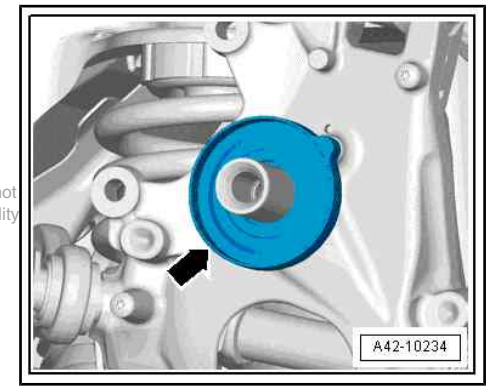
If the wheel bearing unit can be pulled off the wheel bearing housing by hand, the wheel bearing unit is OK and does not have to be renewed.



– As soon as stub axle is sufficiently exposed, reach behind seal -arrow-. Use seal -arrow- to pull off wheel bearing unit and splash plate (neither shown in illustration).

Caution

- *Avoid dirtying or damaging the seal when laying down or storing the wheel bearing.*

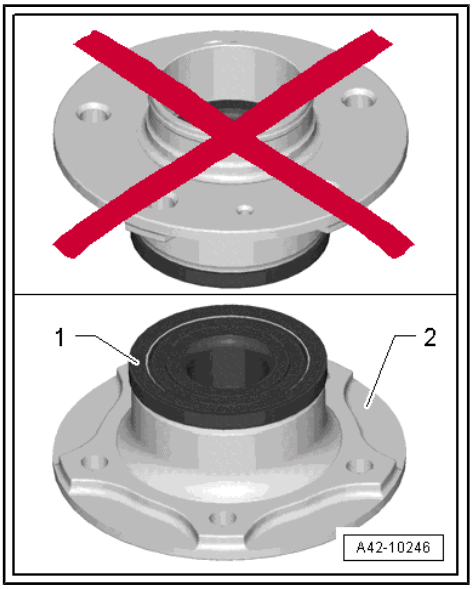


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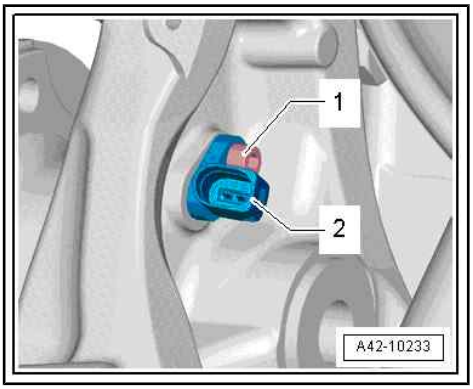
The wheel bearing -1- must always be pointing upwards.

– Always put down the wheel bearing unit with the wheel hub -2- facing downwards.

– Clean additional seal.



– Remove bolt -1- and detach rear speed sensor -2-.



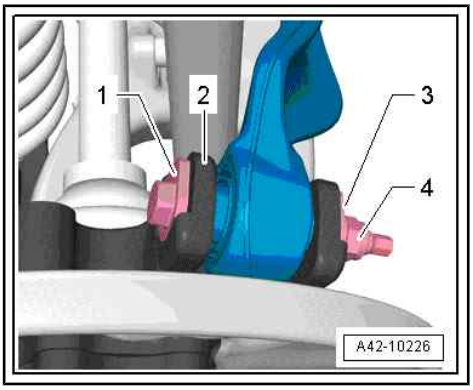
Removing (continued)

– Remove coil spring ⇒ page 184 .

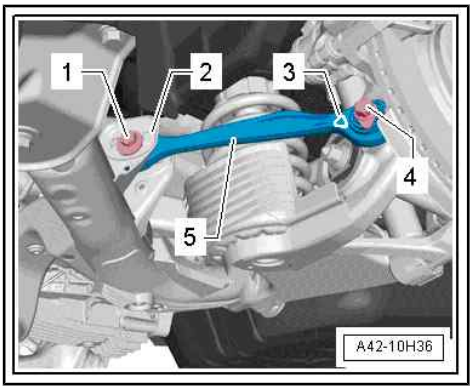
– Mark position of bolt -1- in relation to wheel bearing housing -2-.

– Unscrew nut -4- and take off eccentric washer -3-.

– Remove bolt -1-.

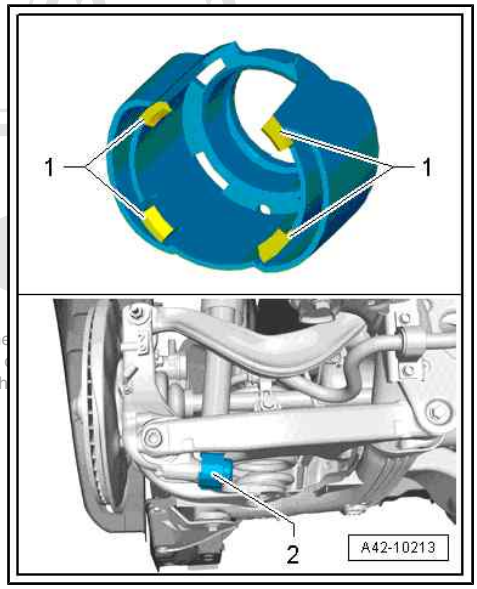


– Remove bolt -4-.



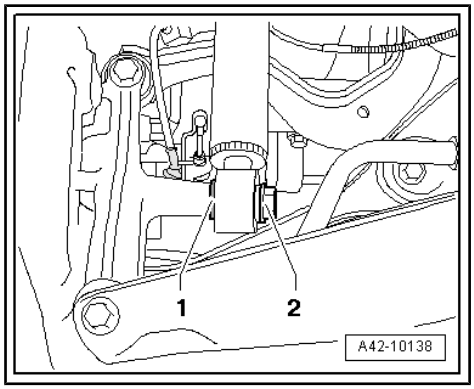
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– Unclip retaining tabs -1- and detach stone deflector -2-.

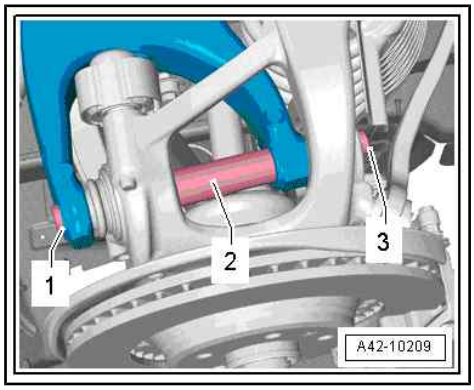


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– Remove bolt -2- and take off washer -1-.



– Remove nut -3-.
– Remove bolt -1- and detach spacer -2-.
– Take out wheel bearing housing.



Installing

Installation is carried out in the reverse sequence. Note the following points:

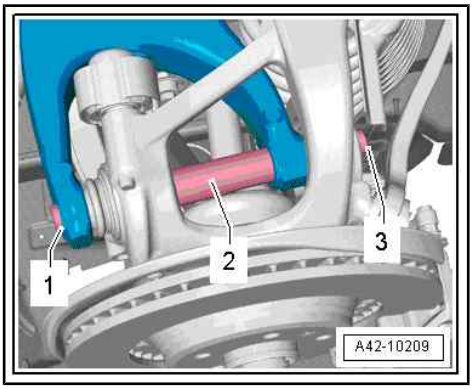
Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles“, page 196

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs)* *⇒ page 112* *.*

– Fit wheel bearing housing.

– Fit bolt -1- with spacer -2- and screw on nut -3- loosely.



Caution

- *The bolt connection must not be tightened by the nut -3-.*

– Tighten bolt -1-.

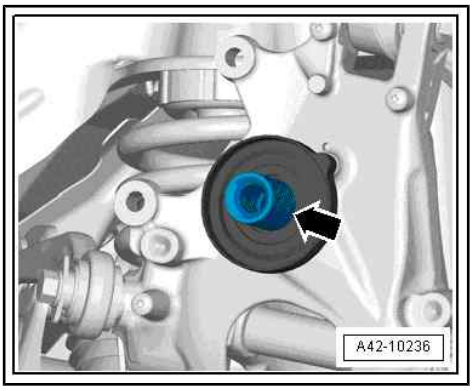
– Install coil spring ⇒ page 184 .

– Fit brake caliper and brake disc ⇒ Rep. gr. 46 .

Only if wheel bearing housing has been renewed

– Install rear speed sensor ⇒ Rep. gr. 45 .

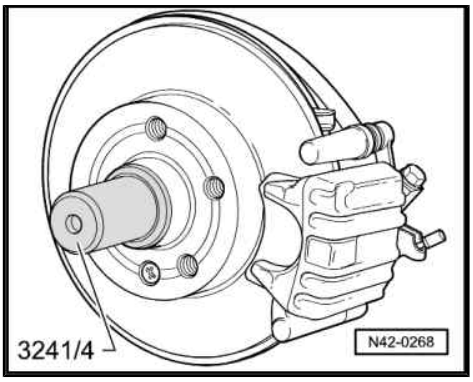
– Fit additional seal and lubricate stub axle -arrow- lightly with lubricating paste .



Note

- *Always renew damaged (dented) grease caps.*
- *A damaged (dented) grease cap may allow moisture to enter the bearing. For this reason it is important to use the tool shown in the illustration.*

– Drive in grease cap with fitting sleeve -3241/4- .



Installing (continued)

– Fit wheel.

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

Only if wheel bearing housing has been renewed

– Tighten flange bolt securing wheel bearing unit (tighten only when vehicle is standing on its wheels - risk of accident) ⇒ page 240 .

Installing (continued)

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

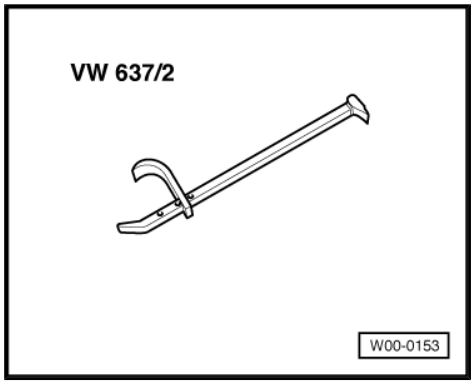
Front and rear wheel alignment must always be checked and adjusted if necessary using VW/Audi approved equipment.

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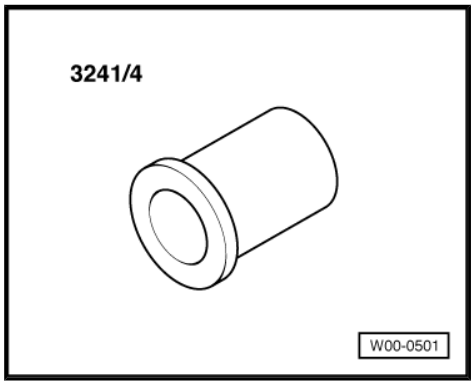
5.3 Removing and installing wheel bearing unit - front-wheel drive vehicles

Special tools and workshop equipment required

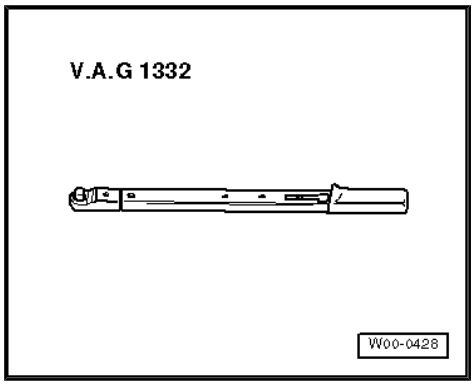
- Hub grease cap puller -VW 637/2-



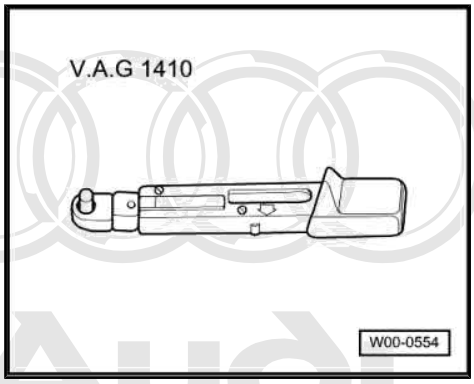
- Fitting sleeve -3241/4-



- Torque wrench -V.A.G 1332-



- Torque wrench -V.A.G 1410-



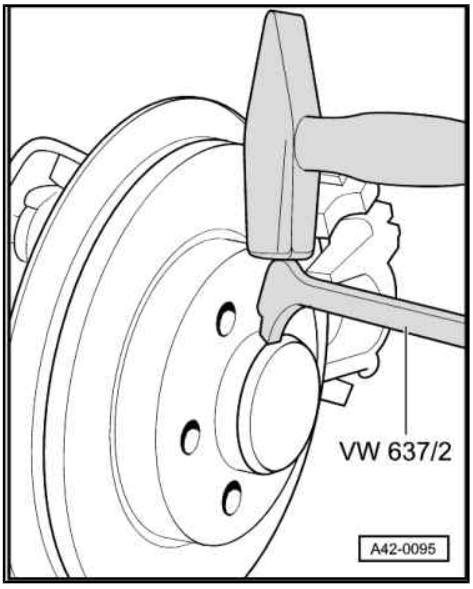
- Lubricating paste

Removing

– Raise vehicle on lifting platform.

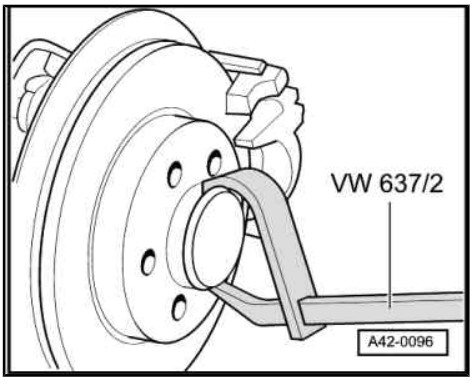
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– Detach grease cap by tapping lightly on hub grease cap puller -VW 637/2- .



– Lever off grease cap with hub grease cap puller -VW 637/2- .

– Loosen flange bolt securing wheel bearing unit (loosen only when vehicle is standing on its wheels - risk of accident) ⇒ page 240 .



– Remove wheel.

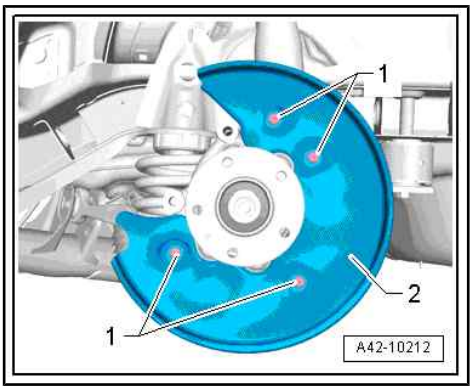
– Detach brake caliper and brake disc ⇒ Rep. gr. 46 .

– Secure brake caliper to body so that weight of caliper does not stretch or damage brake hose or brake pipe.

– Remove bolts -1- from splash plate -2-.

Caution

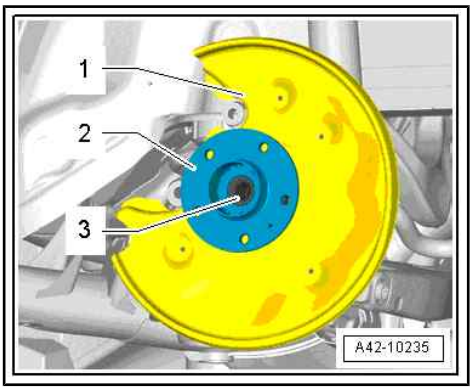
- *Do NOT detach the wheel bearing unit by pulling on the outer bearing race (wheel hub).*



– Use splash plate -1- to pull wheel bearing unit -2- slightly off stub axle -3-.

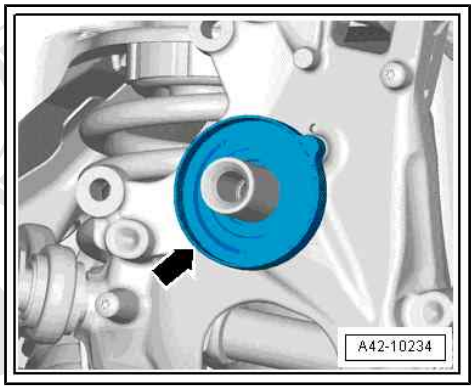
Note

If the wheel bearing unit can be pulled off the wheel bearing housing by hand, the wheel bearing unit is OK and does not have to be renewed.



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– As soon as stub axle is sufficiently exposed, reach behind seal -arrow-. Use seal -arrow- to pull off wheel bearing unit and splash plate (neither shown in illustration).



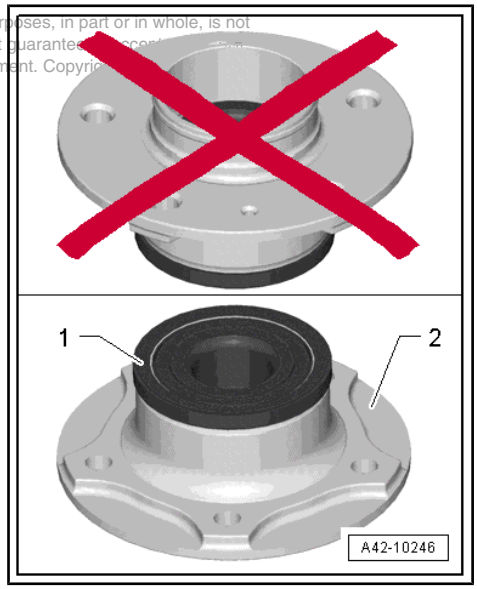
Caution

- *Avoid dirtying or damaging the seal when laying down or storing the wheel bearing.*

The wheel bearing -1- must always be pointing upwards.

– Always put down the wheel bearing unit with the wheel hub -2- facing downwards.

– Clean additional seal.



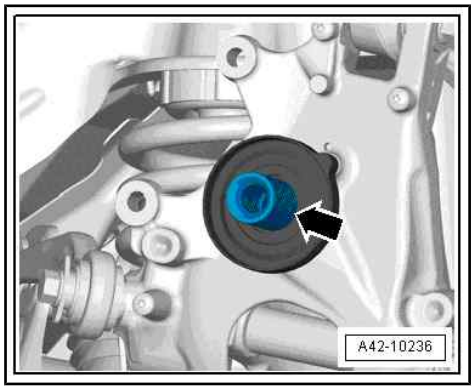
Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles“, page 196

– Fit additional seal and lubricate stub axle -arrow- lightly with lubricating paste .

– Fit brake caliper and brake disc ⇒ Rep. gr. 46 .



Note

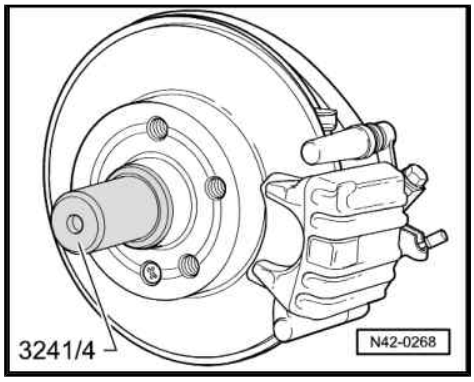
- *Always renew damaged (dented) grease caps.*
- *A damaged (dented) grease cap may allow moisture to enter the bearing. For this reason it is important to use the tool shown in the illustration.*

– Drive in grease cap with fitting sleeve -3241/4- .

– Fit wheel.

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Tighten flange bolt securing wheel bearing unit (tighten only when vehicle is standing on its wheels - risk of accident) ⇒ page 240 .

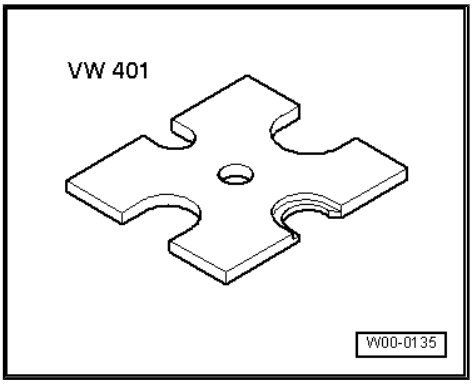


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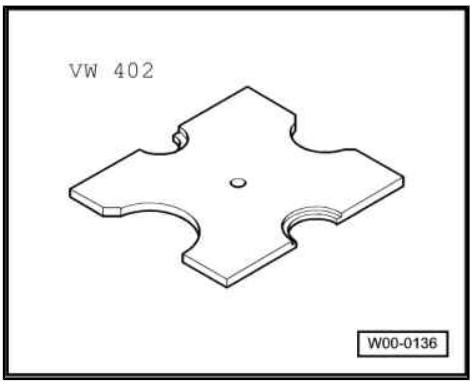
5.4 Renewing bonded rubber bush for wheel bearing housing - front-wheel drive vehicles

Special tools and workshop equipment required

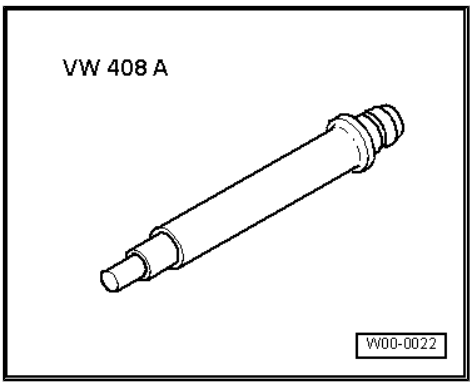
- Thrust plate -VW 401-



- Thrust plate -VW 402-

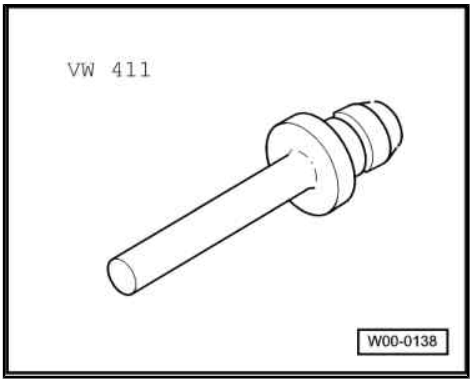


- Press tool -VW 408 A-

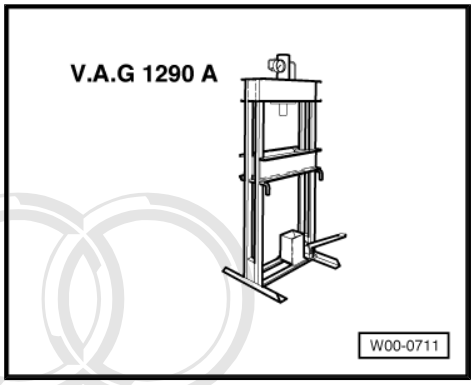


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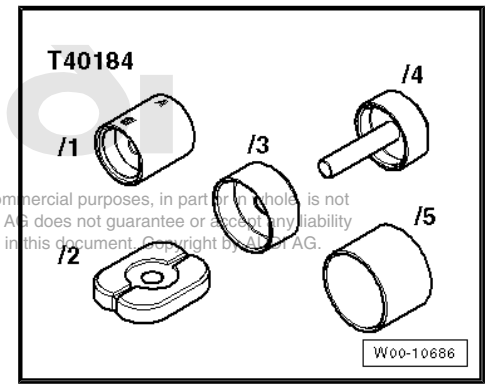
- Press tool -VW 411-



♦ Workshop press -V.A.G 1290 A-



♦ Assembly tool -T40184-

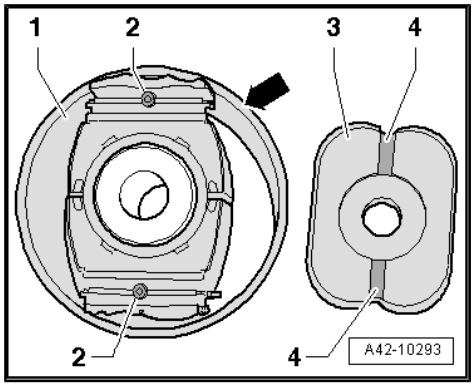


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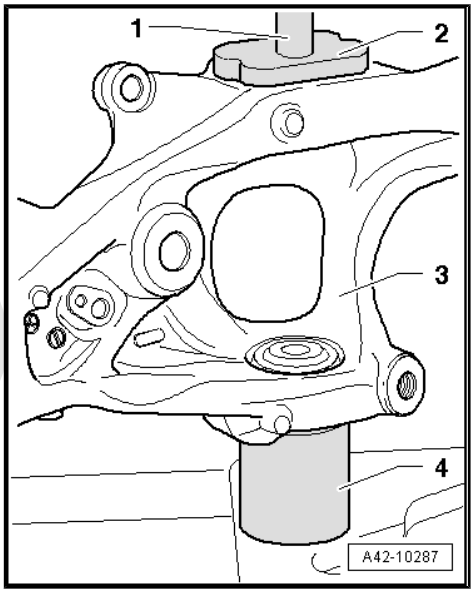
Removing front bonded rubber bush

– Remove wheel bearing housing ⇒ page 199 .

To press out front bonded rubber bush, thrust plate -T40184/2- -3- must be positioned on front bonded rubber bush so that studs -2- engage in grooves -4-.



– Apply tools to front bonded rubber bush and wheel bearing housing as shown in illustration.



Note

When positioning the wheel bearing housing on the sleeve -T40184/1- , make sure the rubber sleeve of the rear bonded rubber bush is not damaged / moved.

1 - Press tool -VW 411-

2 - Thrust plate -T40184/2-

3 - Wheel bearing housing

4 - Sleeve -T40184/1- . Side with groove must face wheel bearing housing. If bonded rubber bush has a „positioning lug“, this fits into groove on sleeve -T40184/1- .

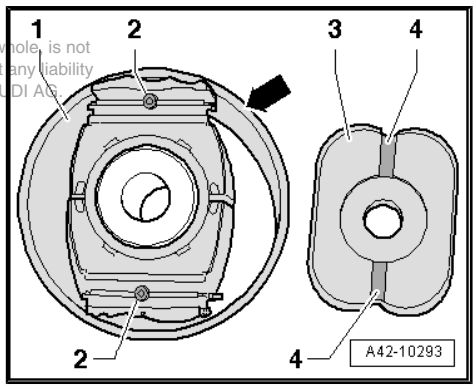
– Press out front bonded rubber bush.

Installing front bonded rubber bush

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– Insert front bonded rubber bush into sleeve -T40184/3- . Thin collar -arrow- must face upwards.

To press in front bonded rubber bush, position thrust plate -T40184/2- -3- on front bonded rubber bush so that studs -2- engage in grooves -4-.



– Press in front bonded rubber bush until it makes contact with thrust plates -1- and -6-.

1 - Thrust plate -VW 401- . Position as shown in illustration.

2 - Sleeve -T40184/3-

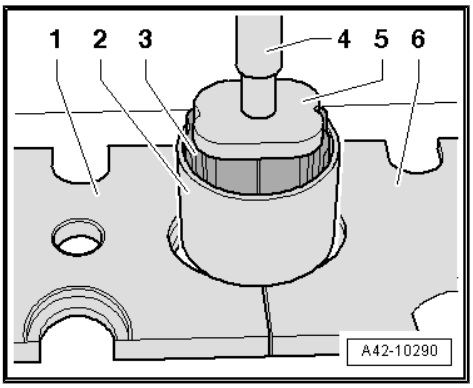
3 - Bonded rubber bush (front)

4 - Press tool -VW 408 A-

5 - Thrust plate -T40184/2-

6 - Thrust plate -VW 402- . Position as shown in illustration.

– Then pull thrust plates -1- and -6- apart slightly.

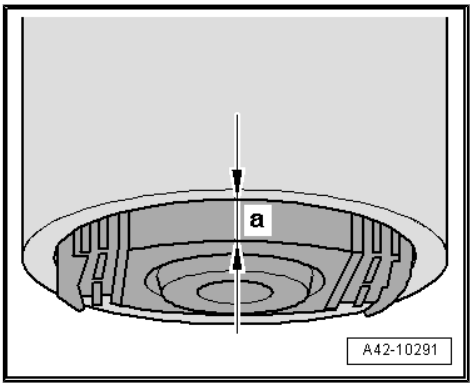


– Press front bonded rubber bush approx. 2 mm out of sleeve -T40184/3- .

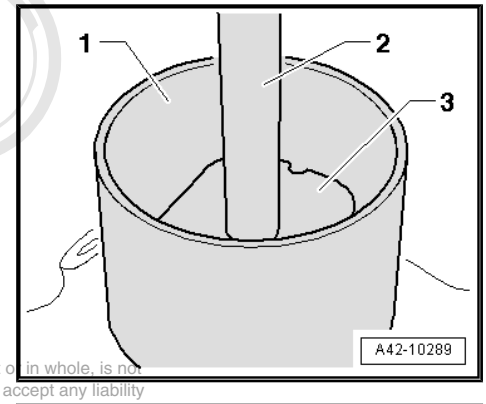
a = 2 mm

– Detach press tool -VW 408 A- and insert press tool -VW 411- .

– Position wheel bearing housing on workshop press -V.A.G 1290 A- .



– Position front bonded rubber bush (not visible in illustration), thrust plate -3- and sleeve -1- on wheel bearing housing.



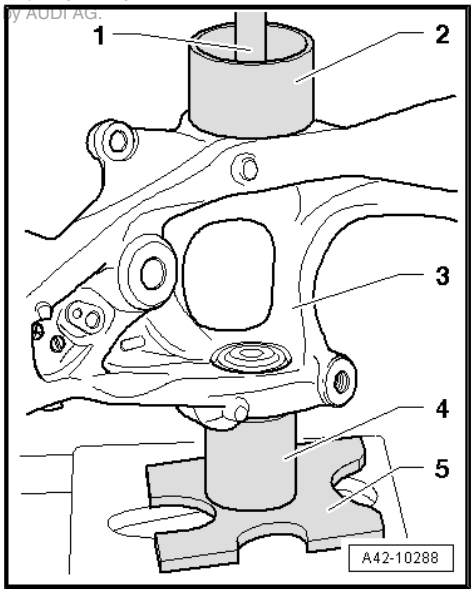
1 - Sleeve -T40184/3-

2 - Press tool -VW 411-

3 - Thrust plate -T40184/2- . Note installation position on front bonded rubber bush.

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– Apply tools to front bonded rubber bush and wheel bearing housing -3- as shown in illustration.



Note

When positioning the wheel bearing housing on the sleeve -T40184/1- , make sure the rubber sleeve of the rear bonded rubber bush is not damaged / moved.

– Slowly press in front bonded rubber bush (not visible in illustration) until sleeve -2- can be lifted off.

1 - Press tool -VW 411-

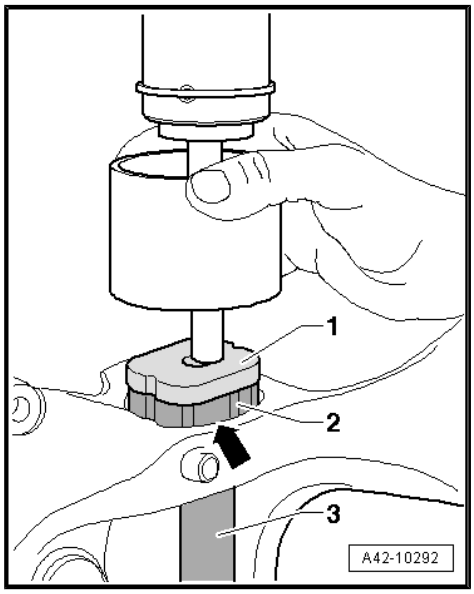
2 - Sleeve -T40184/5-

3 - Wheel bearing housing

4 - Sleeve -T40184/1- . Side with groove must face wheel bearing housing. If bonded rubber bush has a „positioning lug“, this fits into groove on sleeve -T40184/1- .

5 - Thrust plate -VW 402-

Item -3- can be disregarded.



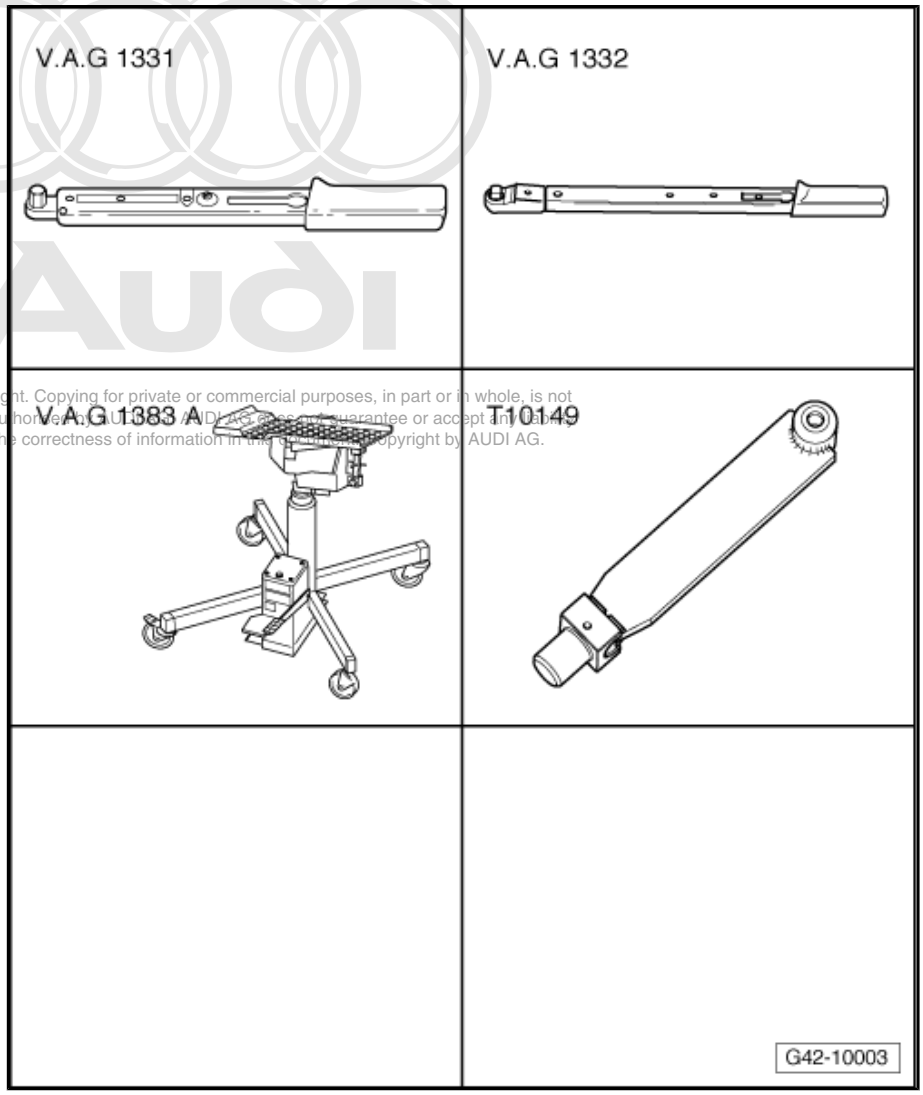
– Slowly press in front bonded rubber bush -2- until it is flush with edge of wheel bearing housing -arrow-.

– Install wheel bearing housing ⇒ page 199 .

5.5 Removing and installing shock absorber - front-wheel drive vehicles

Special tools and workshop equipment required

- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Engine and gearbox jack - V.A.G 1383 A-
- Support -T10149-



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Removing

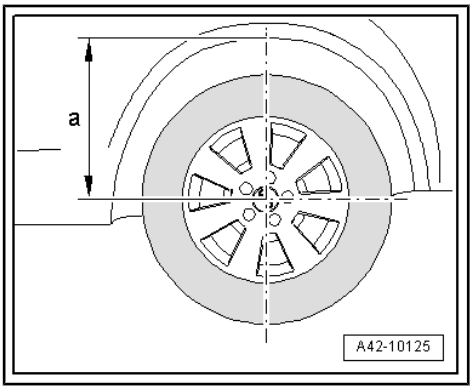
– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

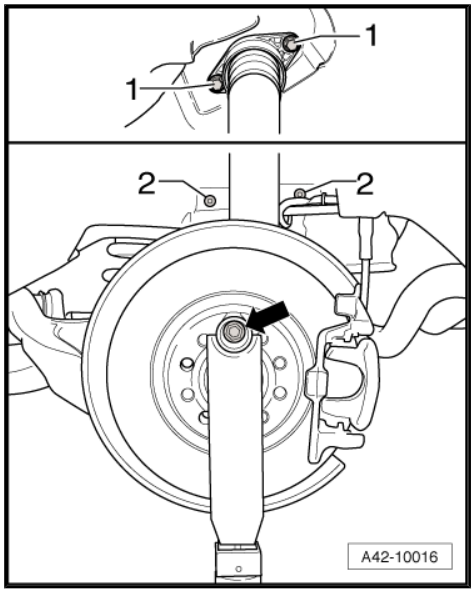
– Remove wheel.

– Remove wheel housing liner ⇒ Rep. gr. 66 .

– Turn the wheel hub until one of the bores for the wheel bolts is at the top.



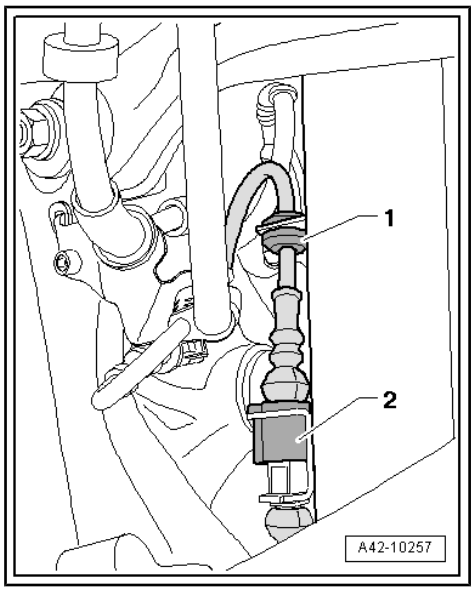
– Attach support -T10149- with wheel bolt -arrow-.
– Fit support -T10149- in engine and gearbox jack - V.A.G 1383 A- and raise wheel bearing housing slightly.
– Remove bolts -1-.



Vehicles with electronic damping control:

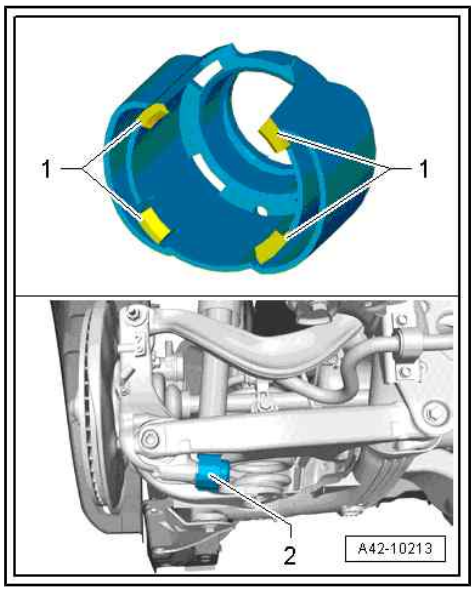
– Release and unplug connector -2-.
– Detach retainer -1-.

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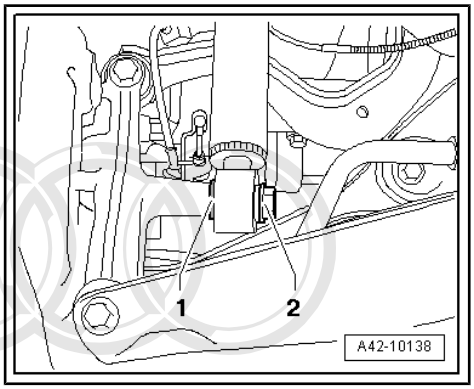
All vehicles (continued):

– Unclip retaining tabs -1- and detach stone deflector -2-.



– Remove bolt -2- and take off washer -1-.

– Take out shock absorber downwards.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - front-wheel drive vehicles“, page 196

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs)* ⇒ page 112 .

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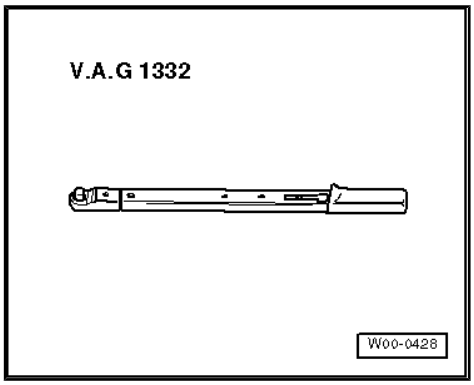
– Install wheel housing liner ⇒ Rep. gr. 66 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

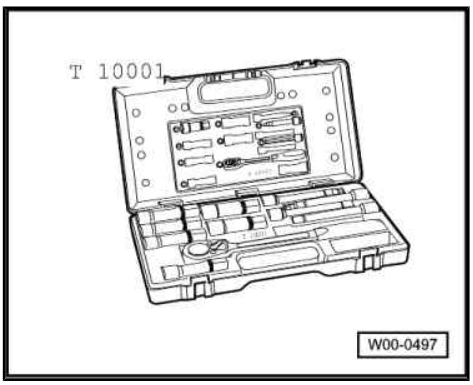
5.6 Servicing shock absorber - front-wheel drive vehicles

Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-



- Shock absorber set -T10001-



1 - Stone deflector

2 - Shock absorber

- ❑ Shock absorbers with identical Part Nos. must be fitted on both sides
- ❑ Removing and installing ⇒ page 213
- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ Defective shock absorbers must always be degassed and drained before disposal ⇒ page 7
- ❑ Checking shock absorber following removal ⇒ page 7

3 - Washer

- ❑ Always use

4 - Protective sleeve

5 - Bump stop

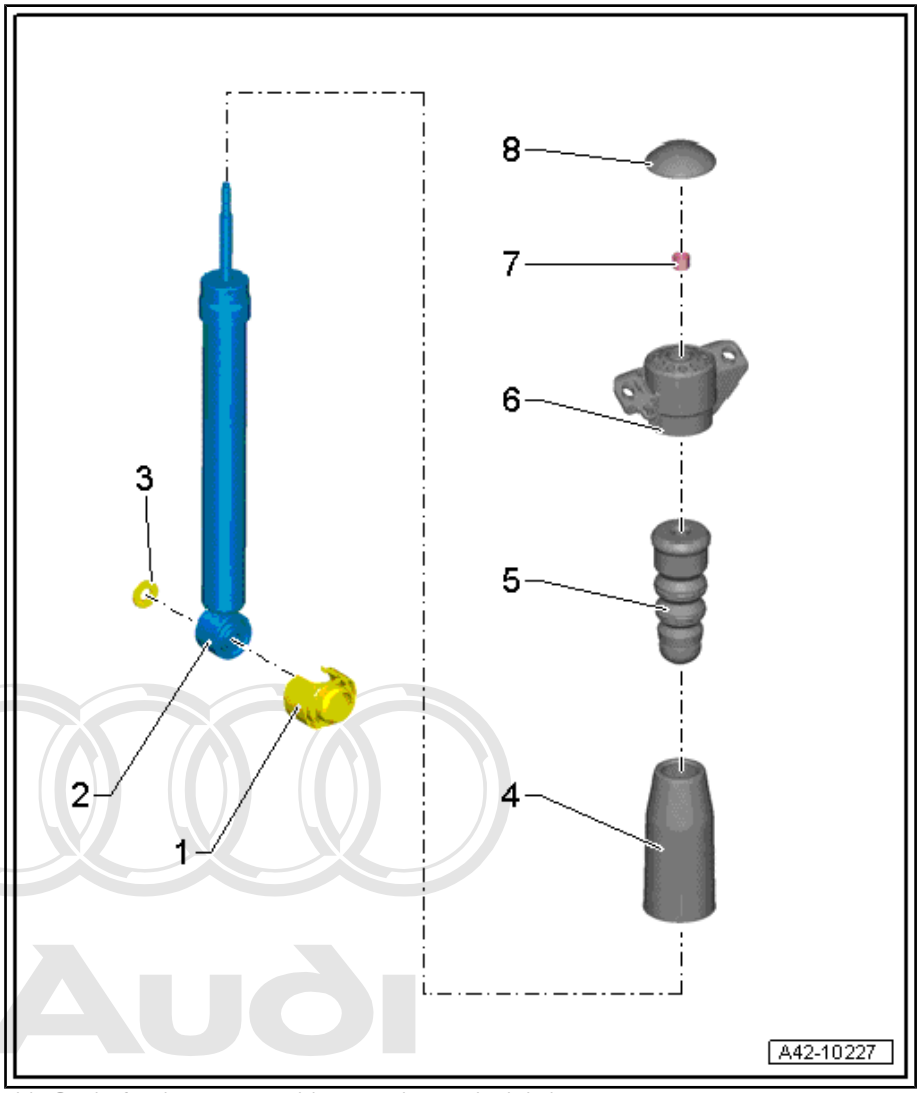
6 - Shock absorber mounting (top)

- ❑ Installation position ⇒ page 217

7 - Nut

- ❑ 35 Nm
- ❑ Always renew if removed
- ❑ Unscrewing and tightening ⇒ page 216

8 - Cover



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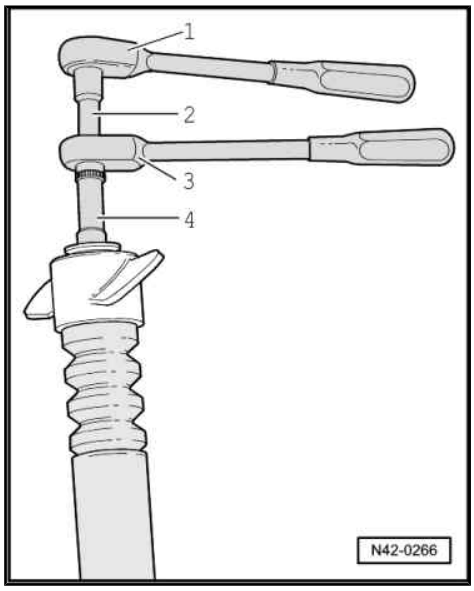
Unscrewing and tightening nut

1 - Commercially available ratchet

2 - Socket -T10001/9-

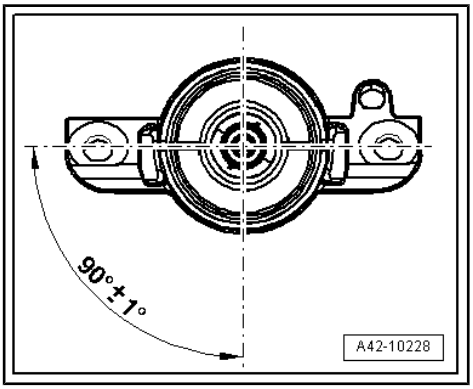
3 - Ratchet -T10001/11-

4 - Socket -T10001/1-



Installation position of shock absorber mounting (top)

– Bolt on top shock absorber mounting at a 90° angle to bottom shock absorber mounting.



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6 Wheel bearing housing, wheel bearing unit, shock absorber - four-wheel drive vehicles

⇒ „6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles“, page 219

⇒ „6.2 Removing and installing wheel bearing housing - four-wheel drive vehicles“, page 222

⇒ „6.3 Removing and installing wheel bearing unit - four-wheel drive vehicles“, page 226

⇒ „6.4 Servicing wheel bearing unit - four-wheel drive vehicles“, page 227

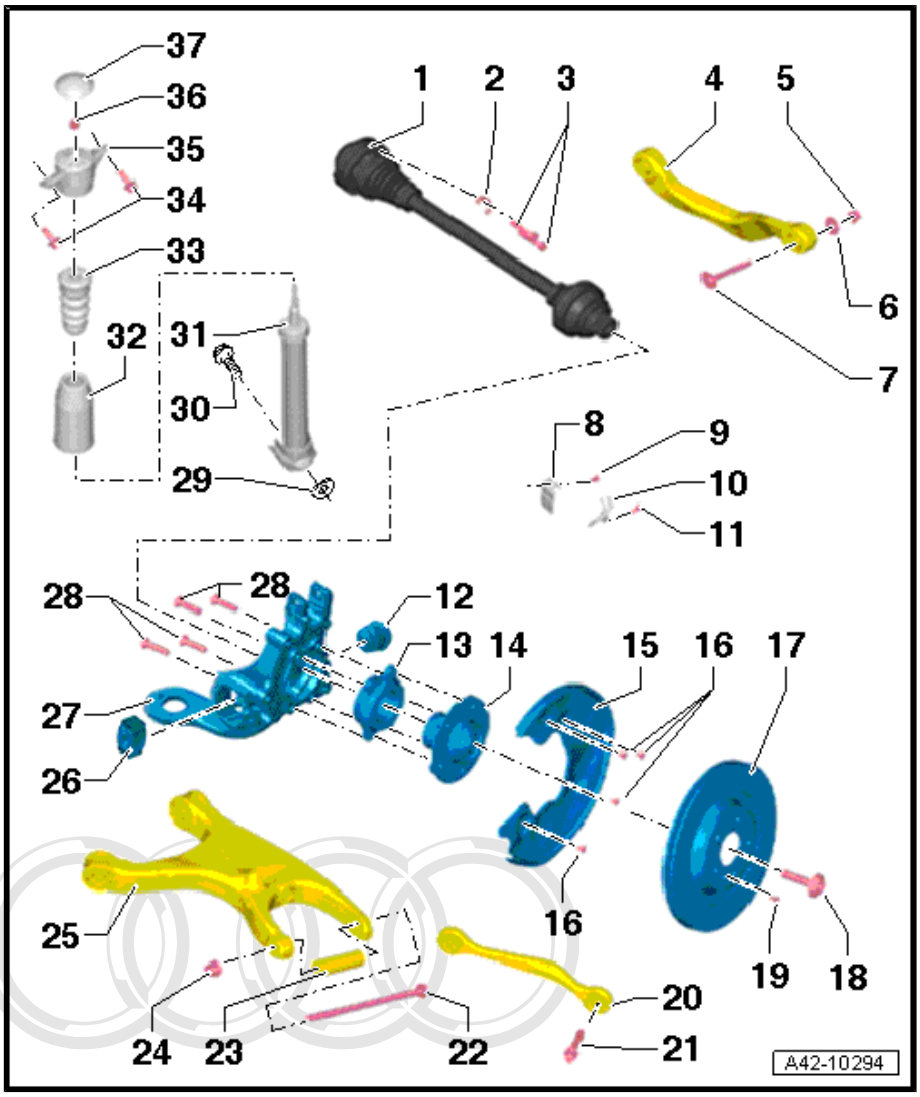
⇒ „6.5 Renewing bonded rubber bush for wheel bearing housing - four-wheel drive vehicles“, page 230

⇒ „6.6 Removing and installing shock absorber - four-wheel drive vehicles“, page 234

⇒ „6.7 Servicing shock absorber - four-wheel drive vehicles“, page 237

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6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles



1 - Drive shaft

- ❑ Different versions available ⇒ Electronic parts catalogue

2 - Lock plate

3 - Bolt

- ❑ Tightening torque ⇒ page 240

4 - Upper transverse link

5 - Nut

- ❑ 95 Nm
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

6 - Eccentric washer

7 - Bolt

8 - Bracket

- ❑ For brake hose, brake caliper wiring harness and wiring harness for rear speed sensor

9 - Bolt

- ❑ 10 Nm

10 - Speed sender (rear)

11 - Bolt

- ❑ 9 Nm

12 - Bonded rubber bush

- ❑ Cannot be renewed separately

13 - Ball bearing

Caution

Avoid dirtying or damaging the seal when laying it down or placing it in storage ⇒ page 221 .

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- ❑ Removing and installing wheel bearing unit ⇒ page 226
- ❑ Servicing wheel bearing unit ⇒ page 227

14 - Wheel hub

Caution

Avoid dirtying or damaging the seal when laying it down or placing it in storage ⇒ page 221 .

- ❑ Removing and installing wheel bearing unit ⇒ page 226
- ❑ Servicing wheel bearing unit ⇒ page 227

15 - Splash plate for brakes

16 - Bolt

- ❑ 10 Nm

17 - Brake disc

18 - Flange bolt

- ❑ 200 Nm +180°
- ❑ Always renew if removed

19 - Bolt

- ❑ 5 Nm

20 - Track rod

- ❑ Different versions (aluminium and steel); for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Mixed installation is not permissible

21 - Bolt

- ❑ 90 Nm +90°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

22 - Bolt

- ❑ 120 Nm +360°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

Note

23 - Spacer

- ❑ Always renew if removed

24 - Nut

- ❑ Always renew if removed

Caution

The bolt connection must not be tightened by the nut.

Note

25 - Lower transverse link

26 - Bonded rubber bush

- ❑ Renewing ⇒ page 230

27 - Wheel bearing housing

- ❑ Removing and installing ⇒ page 222

28 - Bolt

- ❑ 80 Nm +90°
- ❑ Always renew if removed

29 - Washer

- ❑ For corrosion protection
- ❑ Always use

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30 - Bolt

- ❑ 150 Nm +180°
- ❑ Always renew if removed
- ❑ Vehicle must be in unladen position when tightening ⇒ page 112

31 - Shock absorber

- ❑ Removing and installing ⇒ page 234

32 - Protective sleeve

33 - Bump stop

34 - Bolt

- ❑ 50 Nm +45°
- ❑ Always renew if removed

35 - Shock absorber mounting (top)

- ❑ Installation position ⇒ page 215

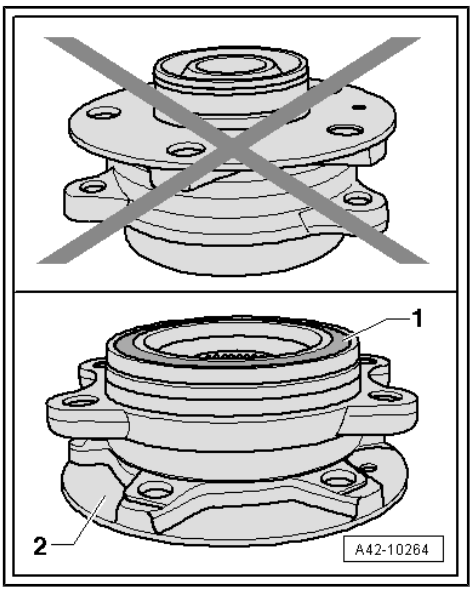
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36 - Nut

- ❑ 35 Nm
- ❑ Always renew if removed

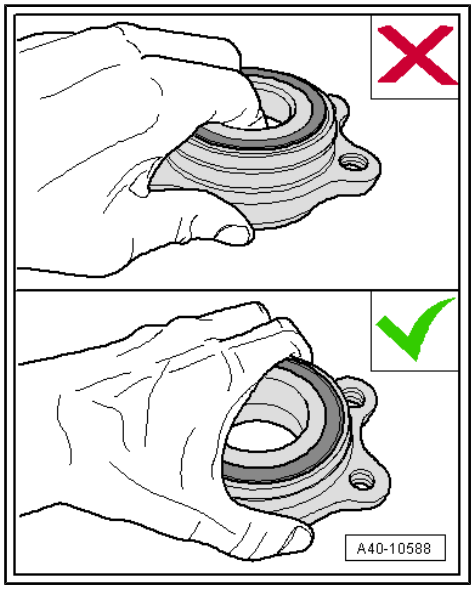
37 - Protective cap

Avoiding dirtying or damaging the seal when laying it down or placing it in storage



- Wheel bearing -1- must always face upwards
- Always put down the wheel bearing unit with the wheel hub -2- facing downwards
- Do not touch the inside of the wheel bearing when you pick it up.
- Always take hold of the outside of the wheel bearing.

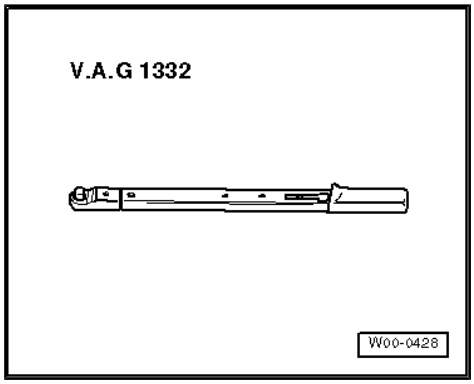
The same procedure applies to the wheel bearing without wheel hub.



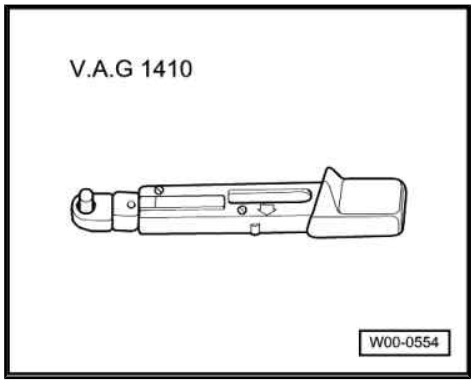
6.2 Removing and installing wheel bearing housing - four-wheel drive vehicles

Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-



- Torque wrench -V.A.G 1410-



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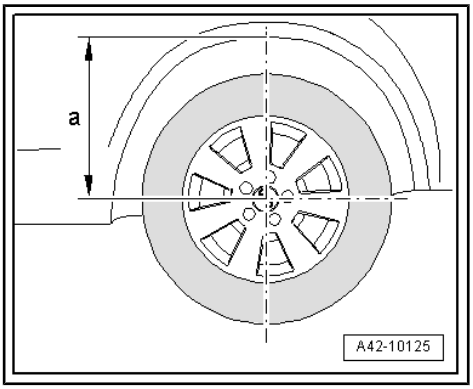
Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

Slacken bolt securing drive shaft to wheel hub ⇒ page 240 .

– Remove wheel.



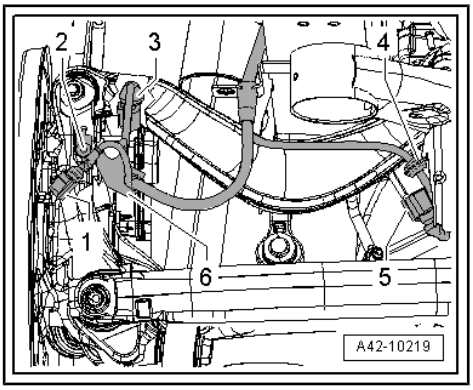
– Release and unplug connector -1- from rear speed sensor .

– Release and unplug connector -3- for electromechanical parking brake.

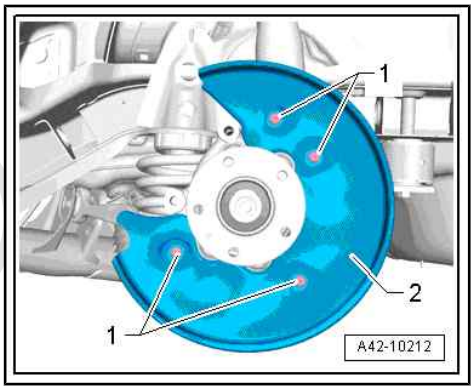
– Remove bolt -2- and detach bracket -6- with wiring.

– Detach brake caliper and brake disc ⇒ Rep. gr. 46 .

– Secure brake caliper to body so that weight of caliper does not stretch or damage brake hose or brake pipe.

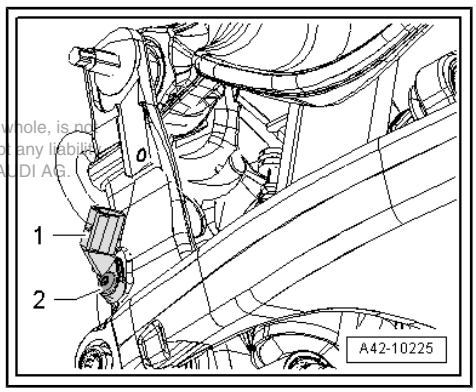


– Remove bolts -1- and take out splash plate -2-.



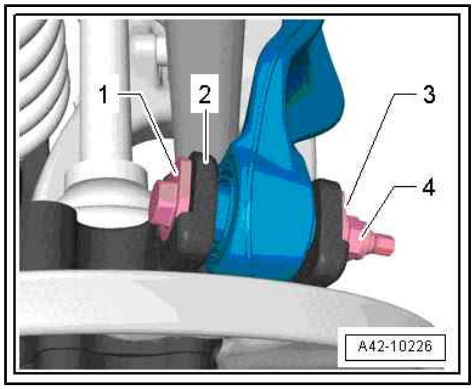
– Remove bolt -2- and detach rear speed sensor -1-.

– Remove coil spring ⇒ page 184 .

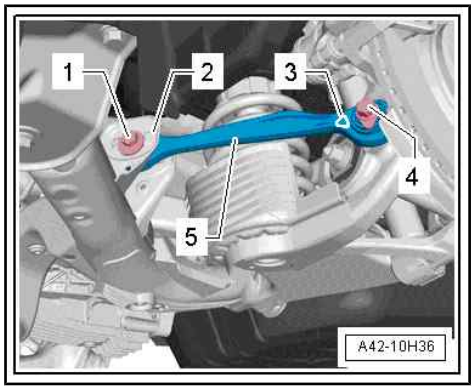


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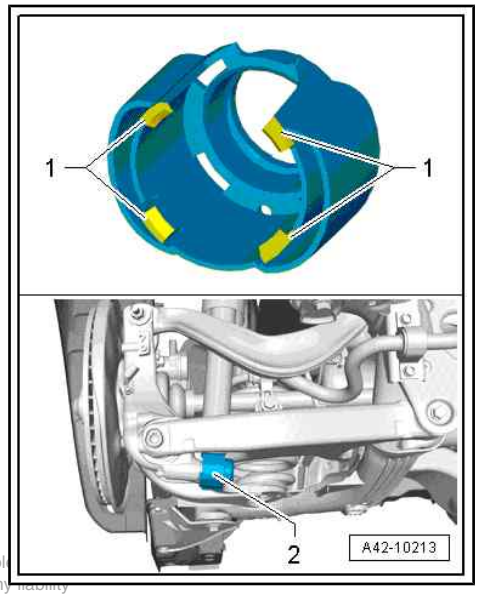
– Mark position of bolt -1- in relation to wheel bearing housing -2-.
– Unscrew nut -4- and take off eccentric washer -3-.
– Remove bolt -1-.



– Remove bolt -4-.

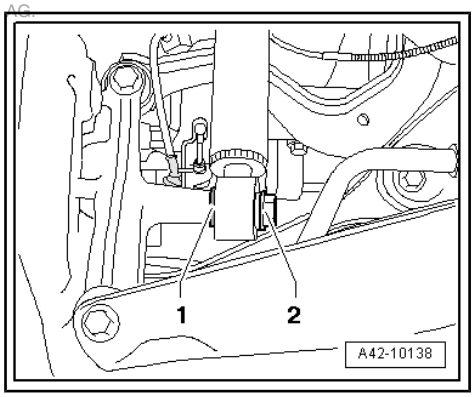


– Unclip retaining tabs -1- and detach stone deflector -2-.



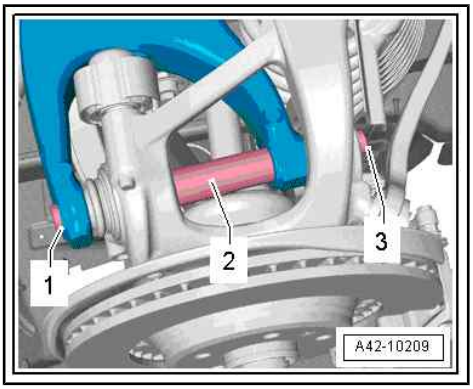
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– Remove bolt -2- and take off washer -1-.



– Remove nut -3-.

– Remove bolt -1- and detach spacer -2-.



Note

The wheel alignment must be checked if nut -3- is slackened or bolt -1- is removed.

– Pivot wheel bearing housing to the side and pull drive shaft out of wheel bearing housing.

– Take out wheel bearing housing.

Remove wheel bearing unit ⇒ page 226 .

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles“, page 219

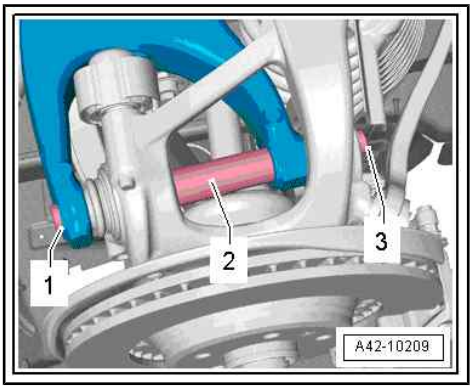
Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs) ⇒ page 112*

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– Fit wheel bearing housing.

– Fit bolt -1- with spacer -2- and screw on nut -3- loosely.



Caution

- ***The bolt connection must not be tightened by the nut -3-.***

– Tighten bolt -1-.

– Install coil spring ⇒ page 184 .

– Fit brake caliper and brake disc ⇒ Rep. gr. 46 .

– Install rear speed sensor ⇒ Rep. gr. 45 .

– Fit wheel.

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

Tighten bolt securing drive shaft to wheel hub ⇒ page 240 .

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Front and rear wheel alignment must always be checked and adjusted if necessary using VW/Audi approved equipment.

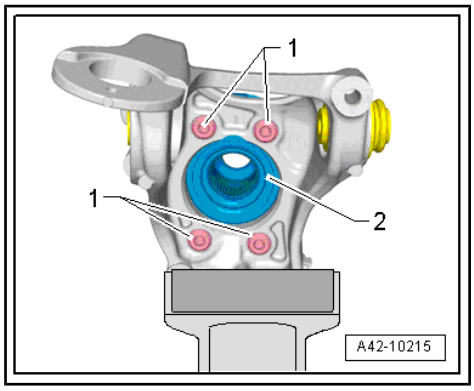
6.3 Removing and installing wheel bearing unit - four-wheel drive vehicles

Removing

– Remove wheel bearing housing ⇒ page 222 .

– Clamp wheel bearing housing in jaws of vice. Use protective jaw covers.

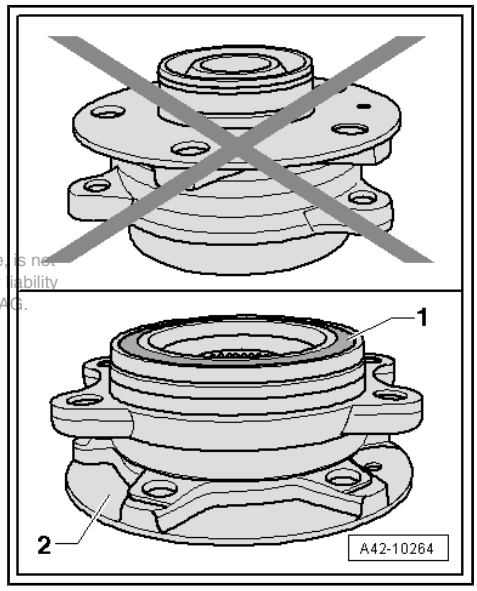
– Remove bolts -1- and detach wheel bearing unit -2-.



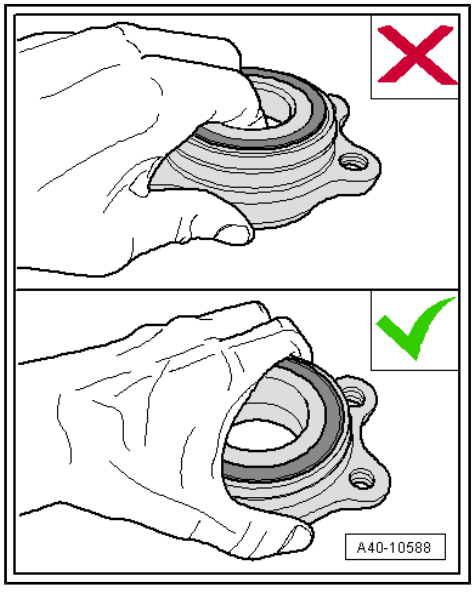
Caution

- *Avoid dirtying or damaging the seal when laying down or storing the wheel bearing.*

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- The wheel bearing -1- must always face upwards when laying down the wheel bearing unit.
- Always put down the wheel bearing unit with the wheel hub -2- facing downwards.
- Do not touch the inside of the wheel bearing when you pick it up.
- Always take hold of the outside of the wheel bearing.



The same procedure applies to the wheel bearing without wheel hub.

Installing

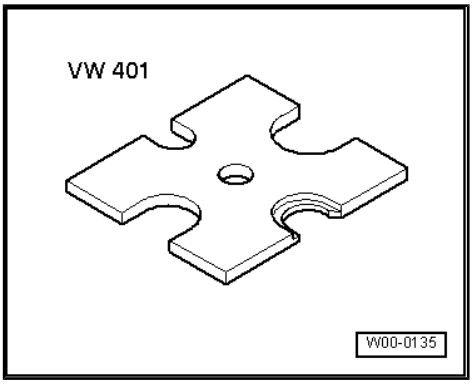
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles“, page 219

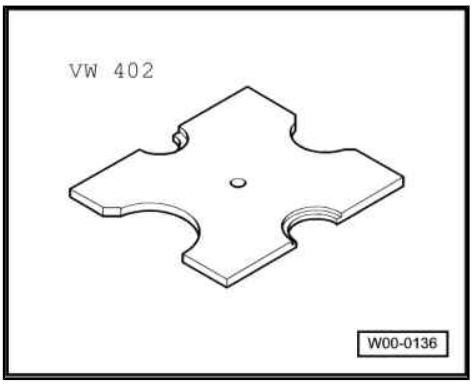
6.4 Servicing wheel bearing unit - four-wheel drive vehicles

Special tools and workshop equipment required

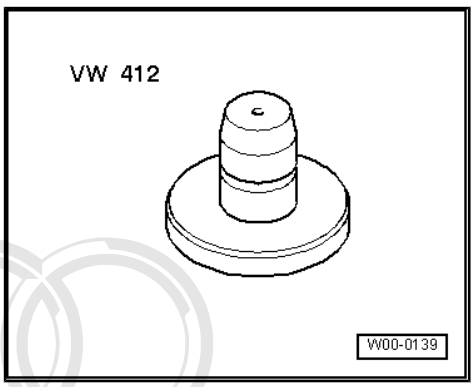
- Thrust plate -VW 401-



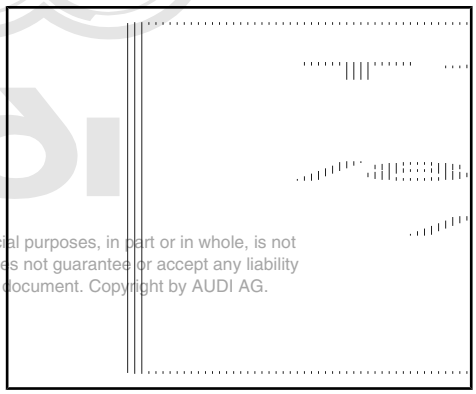
- Thrust plate -VW 402-



- Press tool -VW 412-

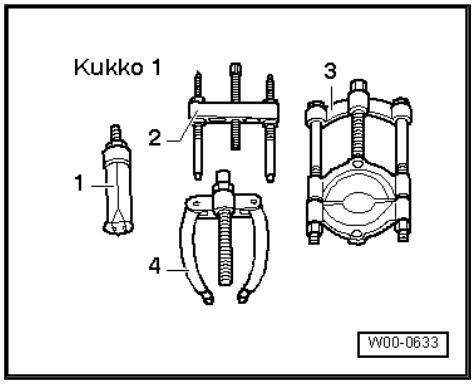


- Assembly tool -T10230-



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♦ -3- Splitter -Kukko 15/3 mit 17/3-



• Wheel bearing unit removed ⇒ page 226

Pressing wheel hub out of wheel bearing

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– Apply special tools as shown in illustration.

1 - Press tool -VW 412-

2 - Sleeve T10230/3 from assembly tool -T10230-

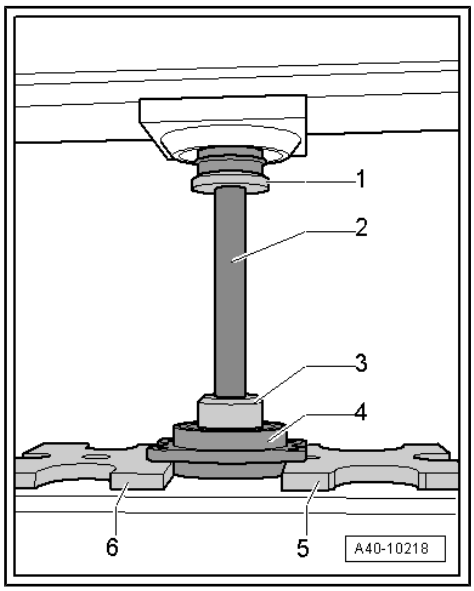
3 - Thrust piece T10230/8 from assembly tool -T10230-

4 - Wheel bearing unit

5 - Thrust plate -VW 402-

6 - Thrust plate -VW 401-

– Press wheel hub out of wheel bearing.

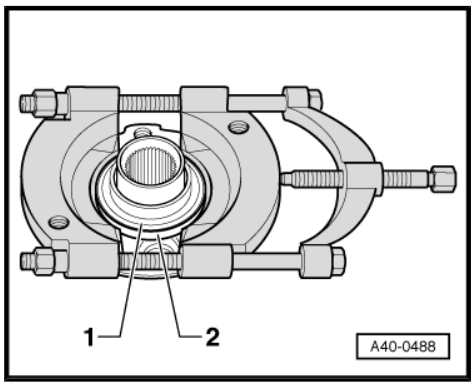


Pressing inner bearing race off wheel hub

– Apply splitter between inner bearing race -1- and wheel hub -2- and tighten spindle.

Note

Use commercially available splitter, e.g. Kukko 15/3 with 17/3.



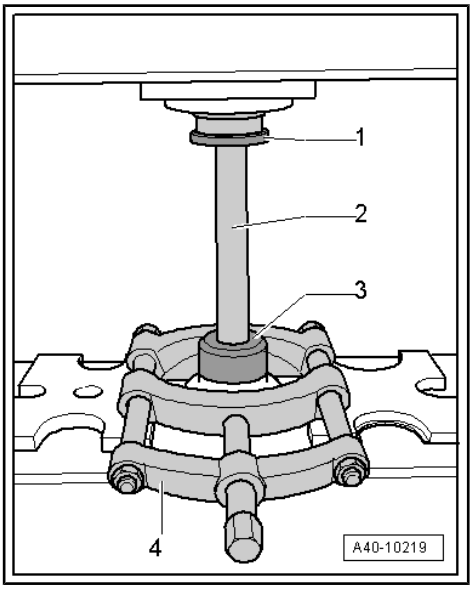
– Apply special tools as shown in illustration.

1 - Press tool -VW 412-

2 - Sleeve T10230/3 from assembly tool -T10230-

3 - Thrust piece T10230/8 from assembly tool -T10230-

4 - Kukko 15/3 with 17/3



– Press inner bearing race off wheel hub.

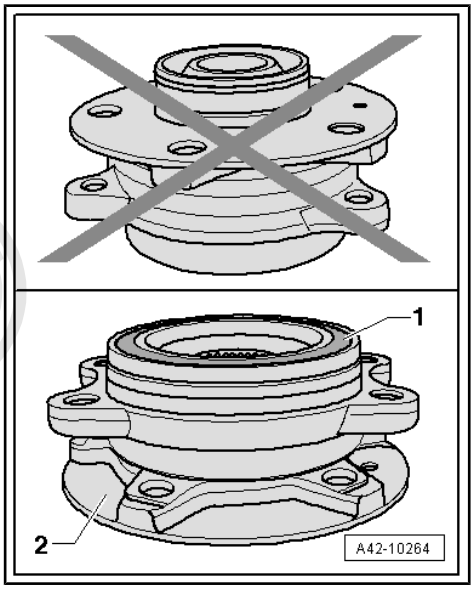
Pressing wheel hub into wheel bearing

Caution

- *Avoid dirtying or damaging the seal when laying down or storing the wheel bearing.*

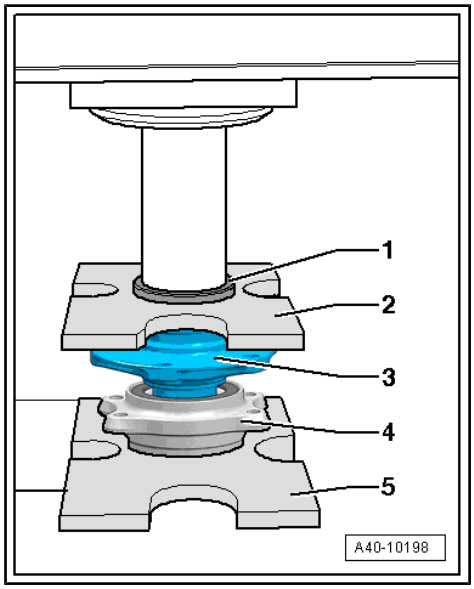
The wheel bearing -1- must always be pointing upwards.

– Always put down the wheel bearing unit with the wheel hub -2- facing downwards.



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– Apply special tools as shown in illustration.



1 - Press tool -VW 412-
2 - Thrust plate -VW 402-
3 - Wheel hub
4 - Ball bearing
5 - Thrust plate -VW 401-

Note

The machined surface of the wheel bearing outer race faces downwards.

Caution

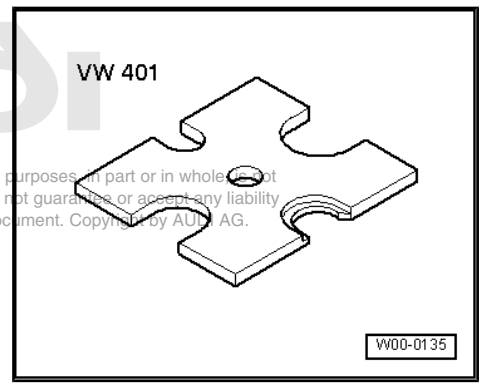
Make sure no dirt gets between thrust plate -VW 401- -5- and ball bearing -4- when pressing in the hub or when the parts are placed on a workbench, etc.

– Press wheel hub into wheel bearing.
– Install wheel bearing unit ⇒ page 226 .

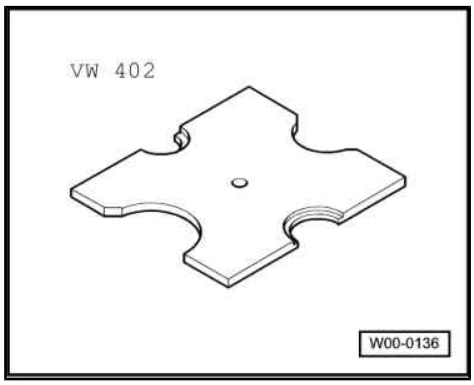
6.5 Renewing bonded rubber bush for wheel bearing housing - four-wheel drive vehicles

Special tools and workshop equipment required

♦ Thrust plate -VW 401-

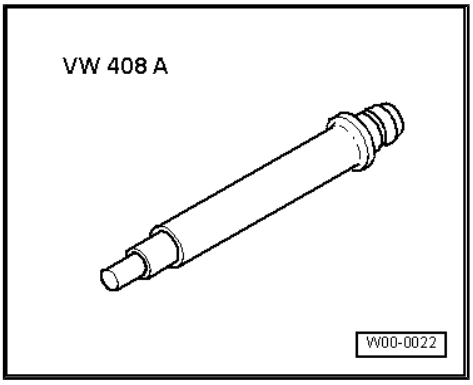


♦ Thrust plate -VW 402-

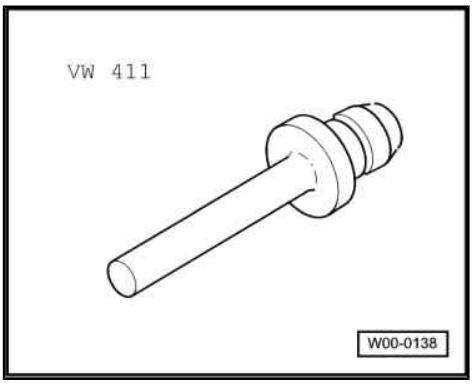


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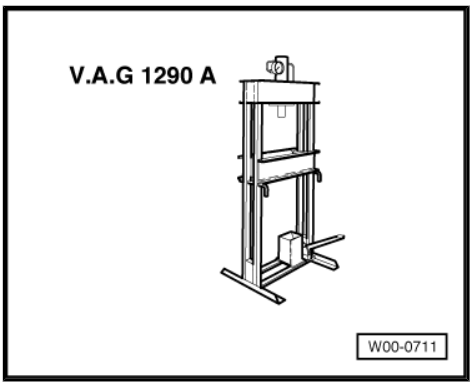
♦ Press tool -VW 408 A-



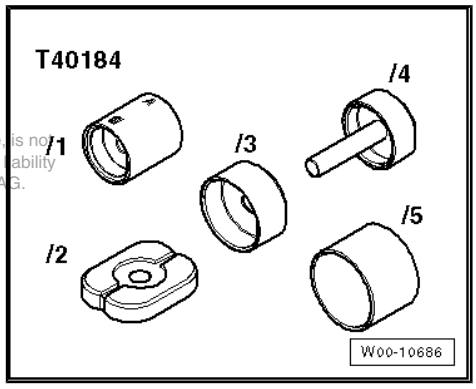
♦ Press tool -VW 411-



♦ Workshop press -V.A.G 1290 A-



♦ Assembly tool -T40184-

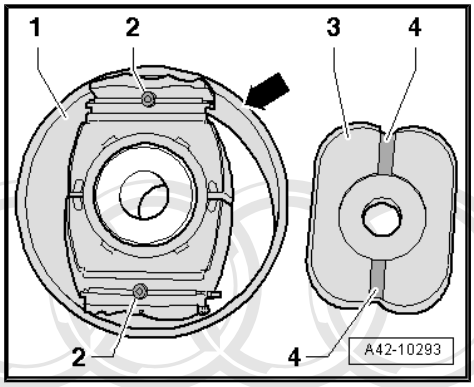


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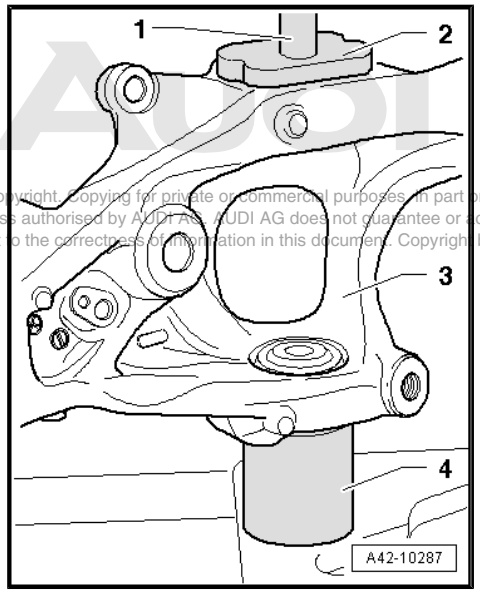
Removing front bonded rubber bush

– Remove wheel bearing housing ⇒ page 199 .

To press out front bonded rubber bush, thrust plate -T40184/2- -3- must be positioned on front bonded rubber bush so that studs -2- engage in grooves -4-.



– Apply tools to front bonded rubber bush and wheel bearing housing as shown in illustration.



Note

When positioning the wheel bearing housing on the sleeve -T40184/1- , make sure the rubber sleeve of the rear bonded rubber bush is not damaged / moved.

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1 - Press tool -VW 411-

2 - Thrust plate -T40184/2-

3 - Wheel bearing housing

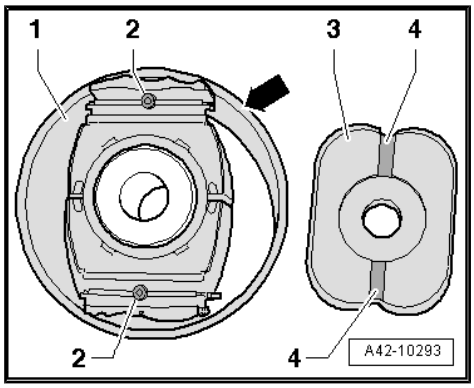
4 - Sleeve -T40184/1- . Side with groove must face wheel bearing housing. If bonded rubber bush has a „positioning lug“, this fits into groove on sleeve -T40184/1- .

– Press out front bonded rubber bush.

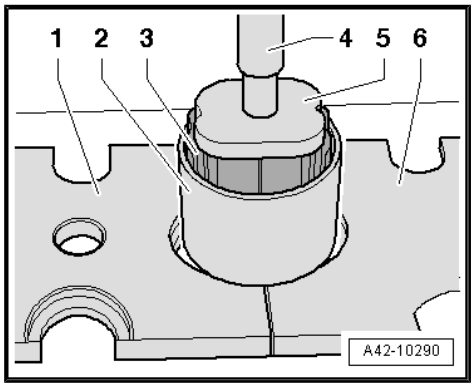
Installing front bonded rubber bush

– Insert front bonded rubber bush into sleeve -T40184/3- . Thin collar -arrow- must face upwards.

To press in front bonded rubber bush, position thrust plate -T40184/2- -3- on front bonded rubber bush so that studs -2- engage in grooves -4-.



– Press in front bonded rubber bush until it makes contact with thrust plates -1- and -6-.



1 - Thrust plate -VW 401- . Position as shown in illustration.

2 - Sleeve -T40184/3-

3 - Bonded rubber bush (front)

4 - Press tool -VW 408 A-

5 - Thrust plate -T40184/2-

6 - Thrust plate -VW 402- . Position as shown in illustration.

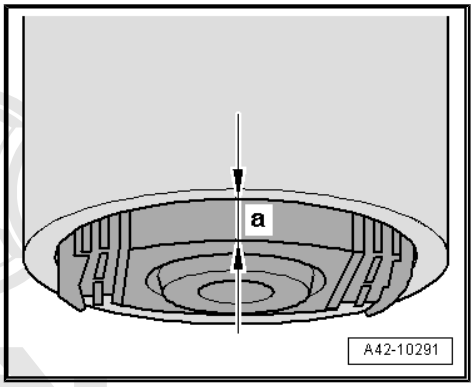
– Then pull thrust plates -1- and -6- apart slightly.

– Press front bonded rubber bush approx. 2 mm out of sleeve -T40184/3- .

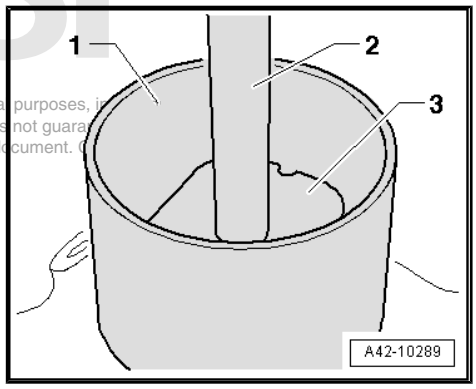
  a = 2 mm

– Detach press tool -VW 408 A- and insert press tool -VW 411- .

– Position wheel bearing housing on workshop press -V.A.G 1290 A- .



– Position front bonded rubber bush (not visible in illustration), thrust plate -3- and sleeve -1- on wheel bearing housing.



Note

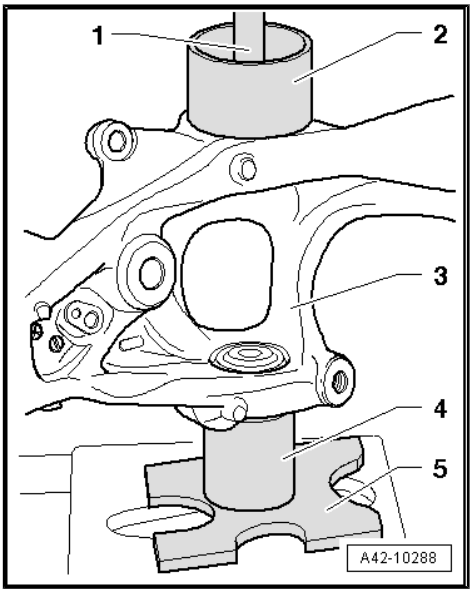
When positioning the wheel bearing housing on the sleeve -T40184/1- , make sure the rubber sleeve of the rear bonded rubber bush is not damaged / moved.

1 - Sleeve -T40184/3-

2 - Press tool -VW 411-

3 - Thrust plate -T40184/2- . Note installation position on front bonded rubber bush.

– Apply tools to front bonded rubber bush and wheel bearing housing -3- as shown in illustration.



Note

When positioning the wheel bearing housing on the sleeve -T40184/1- , make sure the rubber sleeve of the rear bonded rubber bush is not damaged / moved.

– Slowly press in front bonded rubber bush (not visible in illustration) until sleeve -2- can be lifted off.

1 - Press tool -VW 411-

2 - Sleeve -T40184/3-

3 - Wheel bearing housing

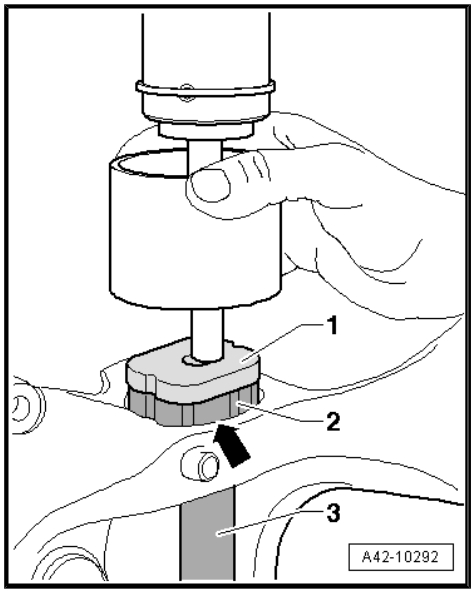
4 - Sleeve -T40184/1- . Side with groove must face wheel bearing housing. If bonded rubber bush has a „positioning lug“, this fits into groove on sleeve -T40184/1- .

5 - Thrust plate -VW 402-

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Item -3- can be disregarded.

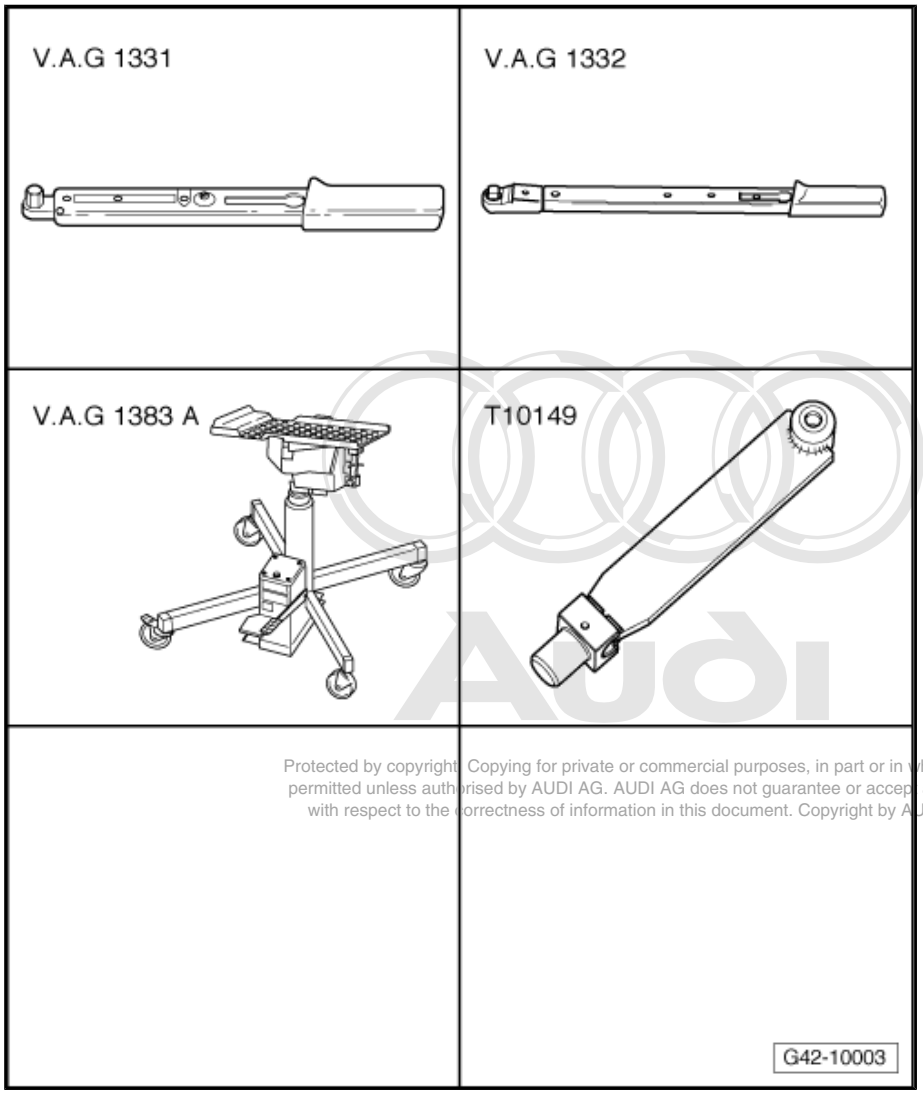
– Slowly press in front bonded rubber bush -2- until it is flush with edge of wheel bearing housing -arrow-.
– Install wheel bearing housing ⇒ page 199 .



6.6 Removing and installing shock absorber - four-wheel drive vehicles

Special tools and workshop equipment required

- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Engine and gearbox jack - V.A.G 1383 A-
- Support -T10149-



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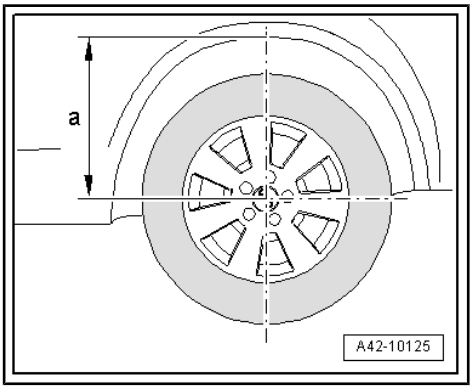
Removing

– Before starting work, measure distance -a- from centre of wheel to lower edge of wheel housing with vehicle standing on its wheels.

– Raise vehicle on lifting platform.

– Remove wheel.

– Remove wheel housing liner ⇒ Rep. gr. 66 .



Vehicles with Dynamic Ride Control (DRC)

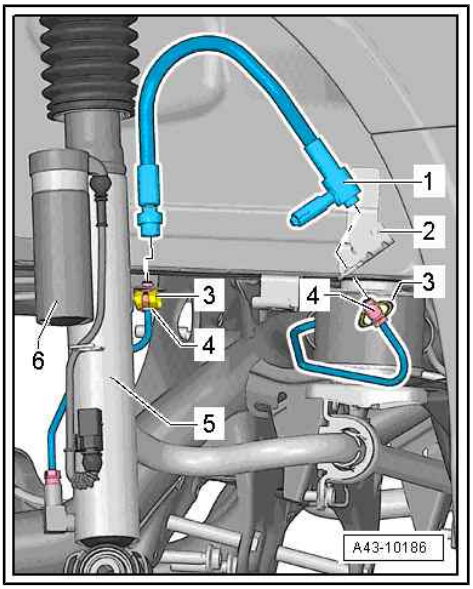
– Drain DRC system ⇒ page 284 .

– If vehicle is equipped with driver-adjustable DRC and variable damping, unplug electrical connector on additional element with integral DC motor and move clear.

– Remove union nut -4- and move hose clear.

• Protect open connections from dirt.

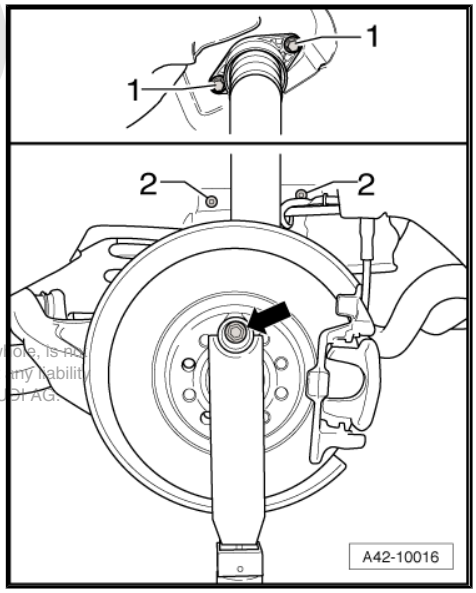
– Turn the wheel hub until one of the bores for the wheel bolts is at the top.



– Attach support -T10149- with wheel bolt -arrow-.

– Fit support -T10149- in engine and gearbox jack - V.A.G 1383 A- and raise wheel bearing housing slightly.

– Remove bolts -1-.

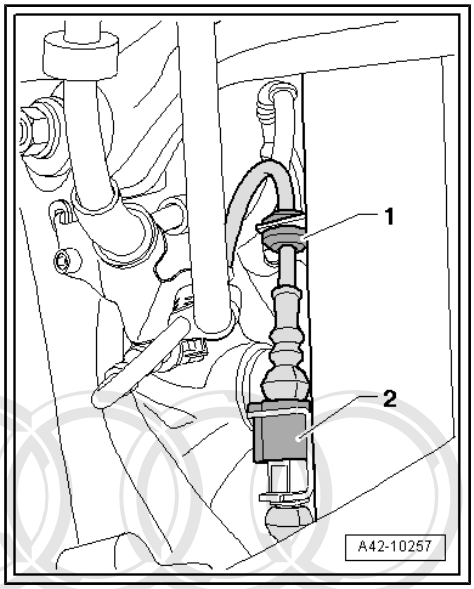


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Vehicles with electronic damping control:

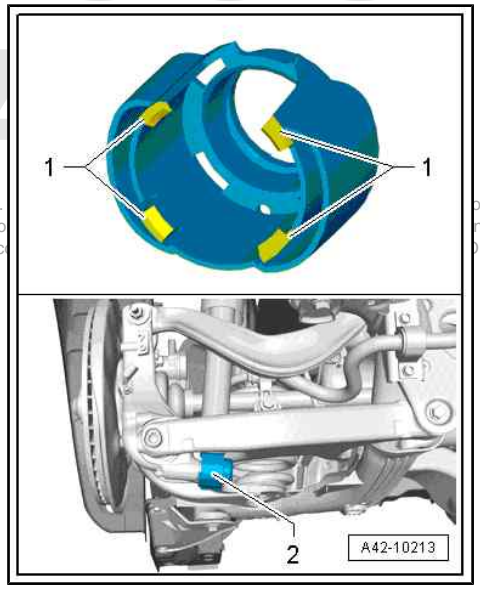
– Release and unplug connector -2-.

– Detach retainer -1-.



All vehicles (continued):

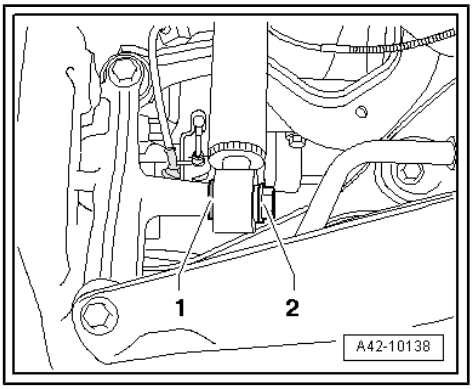
– Unclip retaining tabs -1- and detach stone deflector -2-.



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– Remove bolt -2- and take off washer -1-.

– Take out shock absorber downwards.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „6.1 Exploded view of wheel bearing housing, wheel bearing unit, shock absorber for coil springs - four-wheel drive vehicles“, page 219

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Tightening torques: union nut at hose on DRC shock absorber ⇒ page 281

Note

- *Bonded rubber bushes can only be turned to a limited extent. The suspension mountings must therefore only be tightened when the suspension is in the unladen position or reference position.*
- *Lift suspension to unladen position (vehicles with coil springs) ⇒ page 112 .*

– Charge DRC system ⇒ page 284 .

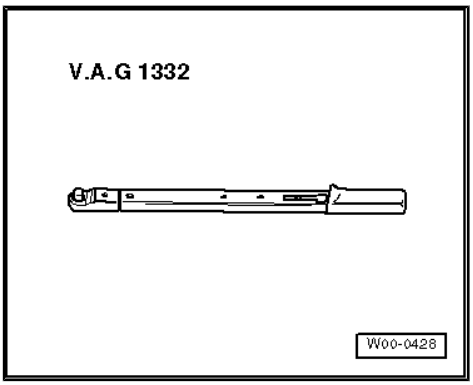
– Install wheel housing liner ⇒ Rep. gr. 66 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

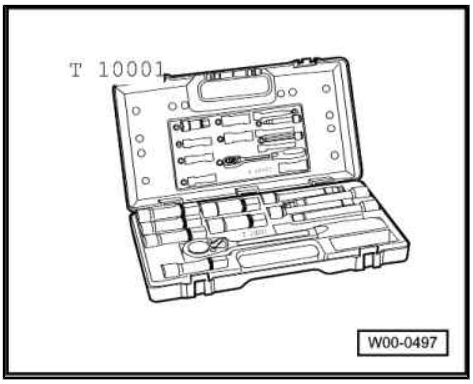
6.7 Servicing shock absorber - four-wheel drive vehicles

Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-



- Shock absorber set -T10001-



1 - Stone deflector

2 - Shock absorber

- ❑ Shock absorbers with identical Part Nos. must be fitted on both sides
- ❑ Removing and installing ⇒ page 234
- ❑ Note different running gear versions; see vehicle data sticker ⇒ page 311
- ❑ Defective shock absorbers must always be degassed and drained before disposal ⇒ page 7
- ❑ Checking shock absorber following removal ⇒ page 7

3 - Washer

- ❑ Always use

4 - Protective tube

5 - Bump stop

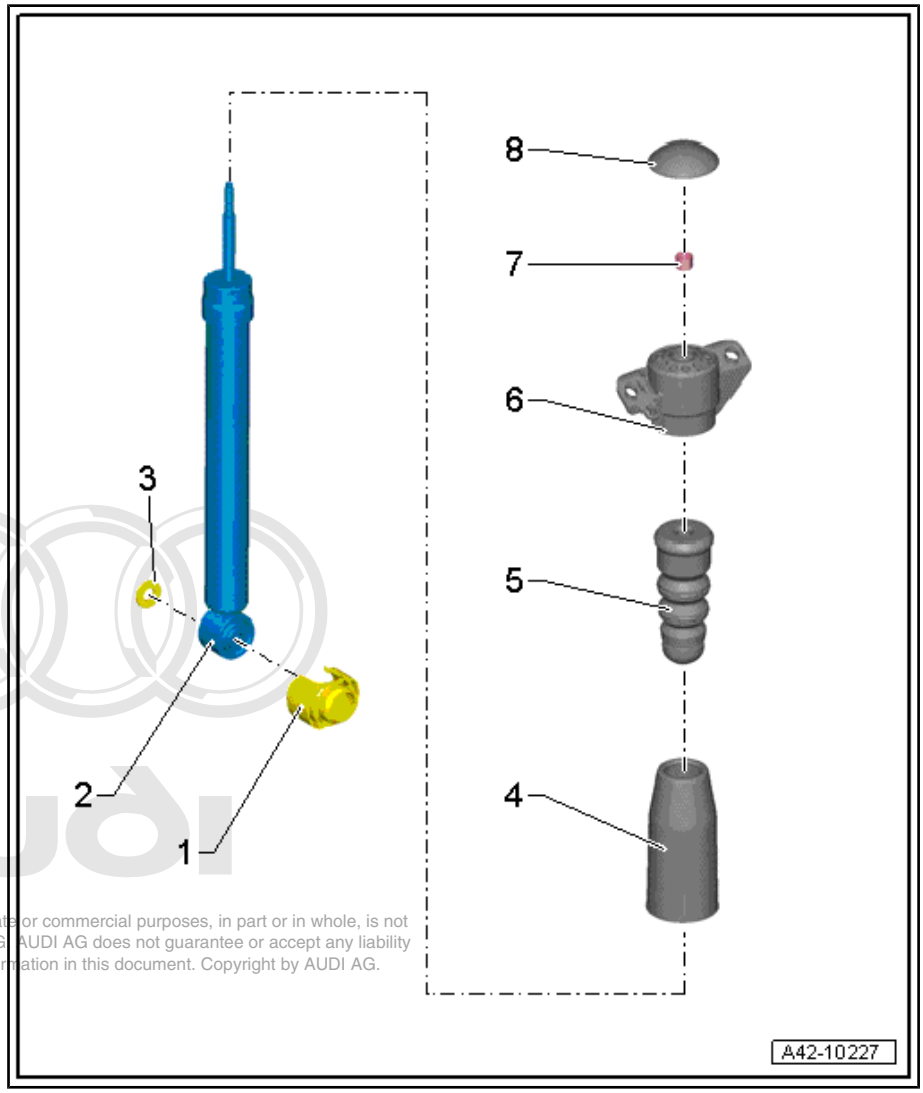
6 - Shock absorber mounting (top)

- ❑ Installation position ⇒ page 239

7 - Nut

- ❑ 35 Nm
- ❑ Always renew if removed
- ❑ Unscrewing and tightening ⇒ page 238

8 - Cover



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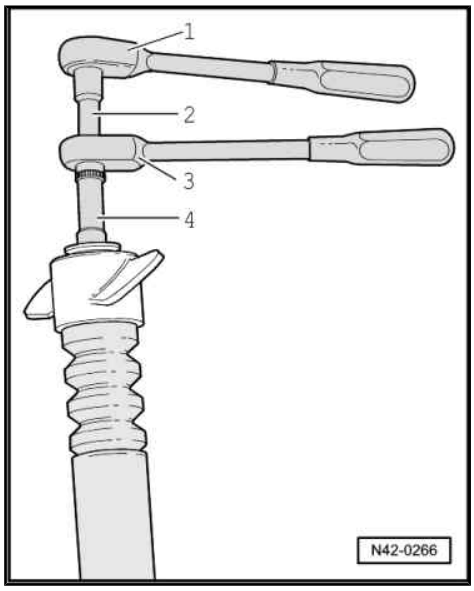
Unscrewing and tightening nut

1 - Commercially available ratchet

2 - Socket -T10001/9-

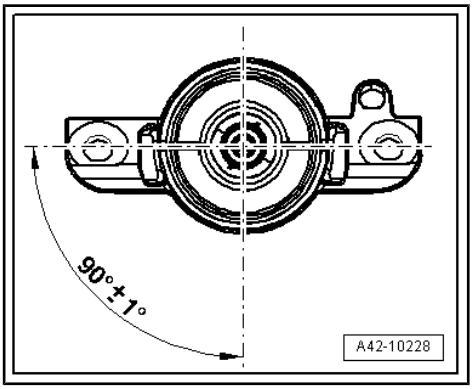
3 - Ratchet -T10001/11-

4 - Socket -T10001/1-



Installation position of shock absorber mounting (top)

– Bolt on top shock absorber mounting at a 90° angle to bottom shock absorber mounting.



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7 Drive shaft

⇒ „7.1 General notes:“, page 240

⇒ „7.2 Loosening and tightening bolt securing drive shaft to wheel hub“, page 240

⇒ „7.3 Removing and installing drive shaft“, page 241

⇒ „7.4 Exploded view of drive shaft with 88 mm dia. outer constant velocity joint and 100 mm dia. inner sliding constant velocity joint“, page 243

⇒ „7.5 Exploded view of drive shaft with 100 mm dia. outer constant velocity joint and 108 mm dia. inner sliding constant velocity joint“, page 245 .

⇒ „7.6 Exploded view of drive shaft with 88/98 mm dia. outer sliding constant velocity joint and 100/108 mm dia. inner sliding constant velocity joint (with cap)“, page 247

⇒ „7.7 Servicing outer constant velocity joint (88 mm or 100 mm dia.)“, page 249

⇒ „7.8 Servicing inner sliding constant velocity joint (100 mm or 108 mm dia.)“, page 251

⇒ „7.9 Servicing outer sliding constant velocity joint (88 mm or 98 mm dia.)“, page 256

⇒ „7.10 Servicing inner sliding constant velocity joint with cap (100 mm or 108 mm dia.)“, page 259

⇒ „7.11 Checking outer constant velocity joint“, page 265

⇒ „7.12 Checking inner sliding CV joint“, page 266

7.1 General notes:

Wheel bearings must not be subjected to load after loosening bolt securing drive shaft at wheel hub.

If the wheel bearings are subjected to the full weight of the vehicle they will be overloaded, resulting in reduced service life. Therefore please note the following:

♦ Procedure for slackening bolt

Do not attempt to move the vehicle without the drive shafts fitted; this would result in wheel bearing damage. If the vehicle does have to be moved, always note the following points:

– Fit an outer joint in place of the drive shaft.

– Tighten bolt securing outer joint to wheel hub to 200 Nm.

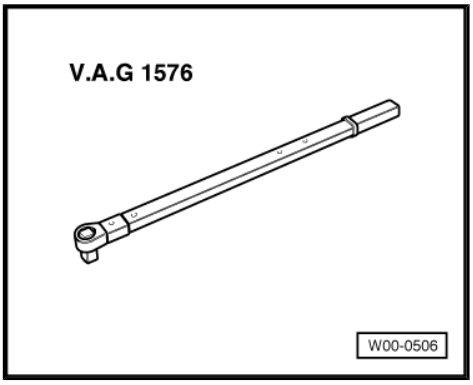
Do not let drive shaft hang down under its own weight when performing repair work, as otherwise excessive bending could damage inner CV joint.

7.2 Loosening and tightening bolt securing drive shaft to wheel hub

Special tools and workshop equipment required

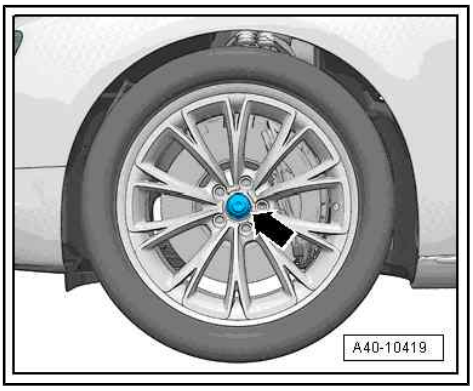
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♦ Torque wrench -V.A.G 1576-



Loosening bolt securing drive shaft to wheel hub

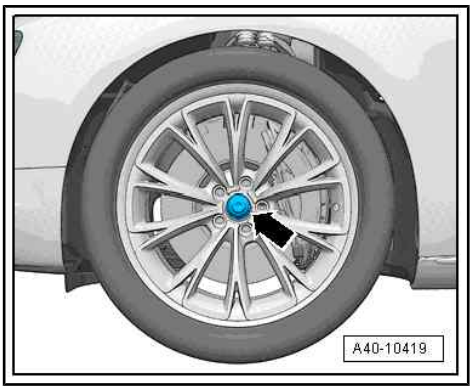
– To avoid damage to wheel bearing, slacken off bolt no further than 90° with vehicle standing on its wheels.
– Raise vehicle so that wheels are off the ground.
– Have a second mechanic press the brake pedal.
– Remove bolt -arrow-.



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Tightening bolt securing drive shaft to wheel hub

– Renew bolt -arrow-.



Note

♦ *Before securing, clean the threads in the CV joint using a thread tap.*
♦ *The wheels must not be in contact with the ground when initially tightening the drive shaft bolt; otherwise the wheel bearing can be damaged.*

– Have a second mechanic press the brake pedal.
– Tighten bolt to 200 Nm.
– Lower vehicle onto its wheels.
– Turn bolt 180° further.

7.3 Removing and installing drive shaft

Removing

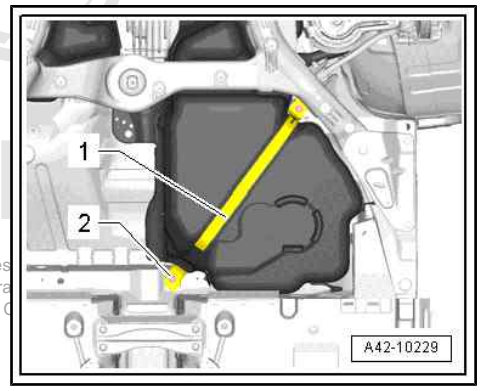
– Slacken bolt securing drive shaft to wheel hub ⇒ page 240 .
– Remove wheel.
– Remove coil spring ⇒ page 184 .

– Remove rear silencer(s) with brackets ⇒ Rep. gr. 26 .

– Remove rear final drive ⇒ Rep. gr. 39 .

Applies only to left drive shaft:

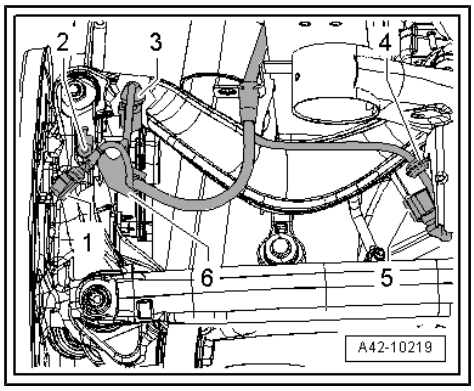
– Re-attach tensioning strap -1-. Tighten bolt -2- only hand-tight.



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– Release and unplug connector -5- from rear left vehicle level sender -G76- .

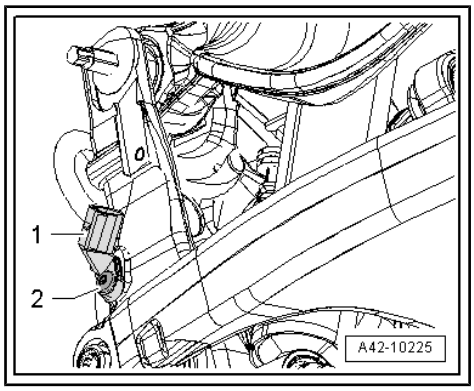
– If fitted, unclip wiring harness -4-.



Applies to both drive shafts (continued):

– Remove bolt -2- and detach rear speed sensor -1-.

– Take out drive shaft from the inside.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torque for drive shaft
⇒ „7.4 Exploded view of drive shaft with 88 mm dia. outer constant velocity joint and 100 mm dia. inner sliding constant velocity joint“, page 243

Tightening torque for drive shaft
⇒ „7.5 Exploded view of drive shaft with 100 mm dia. outer constant velocity joint and 108 mm dia. inner sliding constant velocity joint“, page 245

– Install rear final drive ⇒ Rep. gr. 39 .

– Install rear silencer(s) with brackets ⇒ Rep. gr. 26 .

– Attach fuel tank tensioning strap ⇒ Rep. gr. 20 .

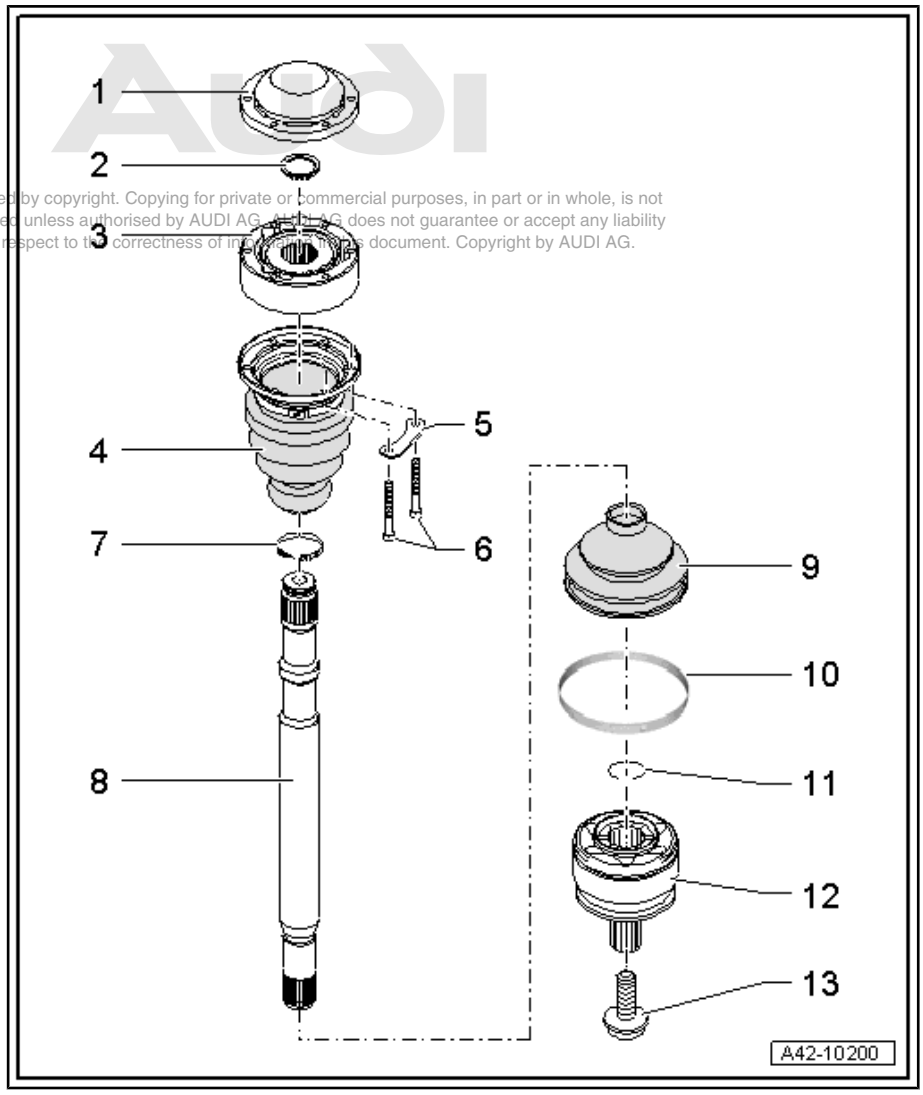
– Install coil spring ⇒ page 184 .

– Install rear speed sensor ⇒ Rep. gr. 45 .

– Secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Tighten bolt securing drive shaft to wheel hub ⇒ page 240 .

7.4 Exploded view of drive shaft with 88 mm dia. outer constant velocity joint and 100 mm dia. inner sliding constant velocity joint



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1 - Cover

- ❑ Drive off cover carefully with drift
- ❑ Always renew
- ❑ Sealing surfaces between cover and inner CV joint must be free from grease on assembly
- ❑ Before attaching to constant velocity joint, apply sealant to sealing surface ⇒ page 254

2 - Circlip

- ❑ Use normal commercial circlip pliers when removing and installing
- ❑ Always renew

3 - Inner sliding constant velocity joint

- ❑ Outside diameter: 100 mm
- ❑ Renew only as complete unit
- ❑ Checking ⇒ page 266
- ❑ Pressing off ⇒ page 251
- ❑ Pressing on ⇒ page 254
- ❑ Grease quantity and type ⇒ page 244
- ❑ Sealing surfaces between cover and inner CV joint and between boot and inner CV joint must be free from grease on assembly
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

4 - Boot with cap for inner sliding constant velocity joint

- ❑ Without vent hole
- ❑ Drive cap off carefully with drift
- ❑ Always renew
- ❑ Check inner constant velocity joint if boot is damaged ⇒ page 266
- ❑ Before attaching to constant velocity joint, apply sealant to sealing surface ⇒ page 254
- ❑ Align cover with bolt holes
- ❑ Sealing surfaces between boot and inner CV joint must be free from grease on assembly
- ❑ Sealing surfaces between boot and drive shaft must be free from grease on assembly
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

5 - Lock plate

6 - Bolt

- ❑ 20 Nm +90°
- ❑ Always renew if removed

7 - Hose clip

- ❑ Always renew
- ❑ Tightening ⇒ page 256

8 - Drive shaft

- ❑ Removing and installing ⇒ page 241

9 - Boot for outer constant velocity joint

- ❑ Without vent hole
- ❑ Check for splits and chafing, renew if necessary
- ❑ Check outer constant velocity joint if boot is damaged ⇒ page 265
- ❑ Sealing surfaces between boot and outer CV joint must be free from grease on assembly
- ❑ Sealing surfaces between boot and drive shaft must be free from grease on assembly
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

10 - Hose clip

- ❑ Unfastening ⇒ page 249
- ❑ Tightening ⇒ page 251

11 - Circlip

- ❑ Always renew
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fit into annular groove on shaft before installing (no longer visible once joint is installed)
- ❑ Before fitting constant velocity joint, align circlip centrally with opening facing upwards.

12 - Outer constant velocity joint

- ❑ Outside diameter: 88 mm
- ❑ Renew only as complete unit
- ❑ Checking ⇒ page 265
- ❑ Driving off ⇒ page 249
- ❑ Installing: drive onto shaft with plastic hammer until compressed circlip seats
- ❑ Circlip must fit in chamfer on joint when installing; guide with pliers if necessary
- ❑ Grease quantity and type ⇒ page 244
- ❑ Sealing surfaces between boot and outer CV joint must be free from grease on assembly
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

13 - Bolt

- ❑ Always renew
- ❑ Observe instructions for loosening and tightening ⇒ page 240
- ❑ 200 Nm +180°

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Grease quantity and type

Regrease joint when renewing boot.

For required grease filling of joints, refer to ⇒ Electronic parts catalogue .

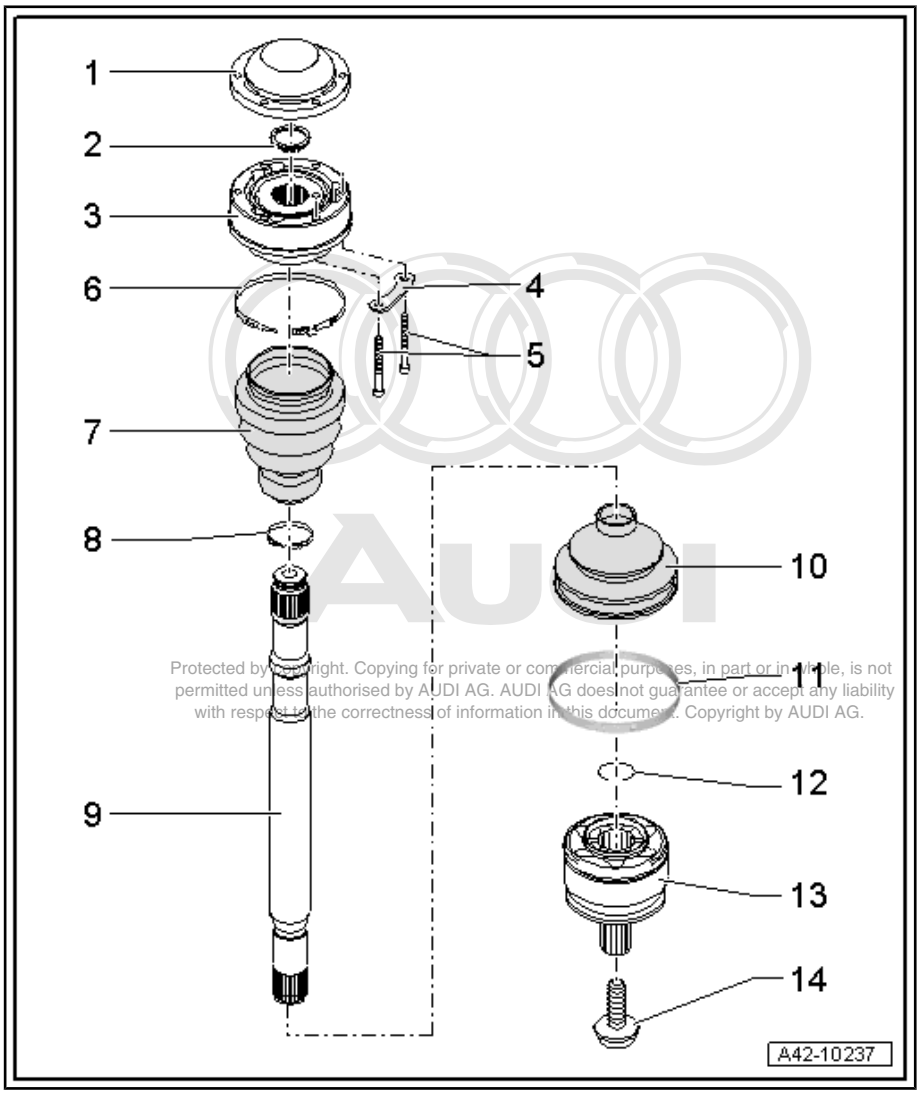
Note

Note that different types of grease are required for outer and inner joints.

	Grease quantity	of which in:	
Outer joint	Total quantity	Joint	Boot
[mm]	[g]	[g]	[g]

	Grease quantity	of which in:	
88	90	40	50
Inner joint		Put in grease through ball bearing races	
100	90		

7.5 Exploded view of drive shaft with 100 mm dia. outer constant velocity joint and 108 mm dia. inner sliding constant velocity joint



1 - Cover

- ❑ Drive off cover carefully with drift
- ❑ Always renew
- ❑ Sealing surfaces between cover and inner CV joint must be free from grease on assembly
- ❑ Before attaching to constant velocity joint, apply sealant to sealing surface ⇒ page 254

2 - Circlip

- ❑ Use normal commercial circlip pliers when removing and installing
- ❑ Always renew

3 - Inner sliding constant velocity joint

- ❑ Outside diameter: 108 mm
- ❑ Renew only as complete unit
- ❑ Checking ⇒ page 266
- ❑ Pressing off ⇒ page 251
- ❑ Pressing on ⇒ page 254
- ❑ Grease quantity and type ⇒ page 246
- ❑ Adhesive surfaces must be free of oil and grease
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

4 - Lock plate

5 - Bolt

- ❑ 70 Nm
- ❑ Always renew if removed

6 - Hose clip

- ❑ Always renew
- ❑ Tightening ⇒ page 256

7 - Boot for inner sliding constant velocity joint

- ❑ Without vent hole

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- ❑ Check inner constant velocity joint if boot is damaged ⇒ page 266
- ❑ Sealing surfaces between boot and drive shaft must be free from grease on assembly
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

8 - Hose clip

- ❑ Always renew
- ❑ Tightening ⇒ page 256

9 - Drive shaft

- ❑ Removing and installing ⇒ page 241

10 - Boot for outer constant velocity joint

- ❑ Without vent hole
- ❑ Check for splits and chafing, renew if necessary
- ❑ Check outer constant velocity joint if boot is damaged ⇒ page 265
- ❑ Sealing surfaces between boot and outer CV joint must be free from grease on assembly
- ❑ Briefly lift boot to equalise pressure before tightening hose clip

11 - Hose clip

- ❑ Unfastening ⇒ page 249
- ❑ Tightening ⇒ page 251

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12 - Circlip

- ❑ Always renew
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fit into annular groove on shaft before installing (no longer visible once joint is installed)
- ❑ Before fitting constant velocity joint, align circlip centrally with opening facing upwards

13 - Outer constant velocity joint

- ❑ Outside diameter: 100 mm
- ❑ Renew only as complete unit
- ❑ Checking ⇒ page 265
- ❑ Driving off ⇒ page 249
- ❑ Installing: drive onto shaft with plastic hammer until compressed circlip seats
- ❑ Circlip must fit in chamfer on joint when installing; guide with pliers if necessary
- ❑ Grease quantity and type ⇒ page 246
- ❑ Sealing surfaces between boot and outer CV joint must be free from grease on assembly
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

14 - Bolt

- ❑ Always renew
- ❑ Observe instructions for loosening and tightening ⇒ page 240
- ❑ 200 Nm +180°

Grease quantity and type

Regrease joint when renewing boot.

For required grease filling of joints, refer to ⇒ Electronic parts catalogue .

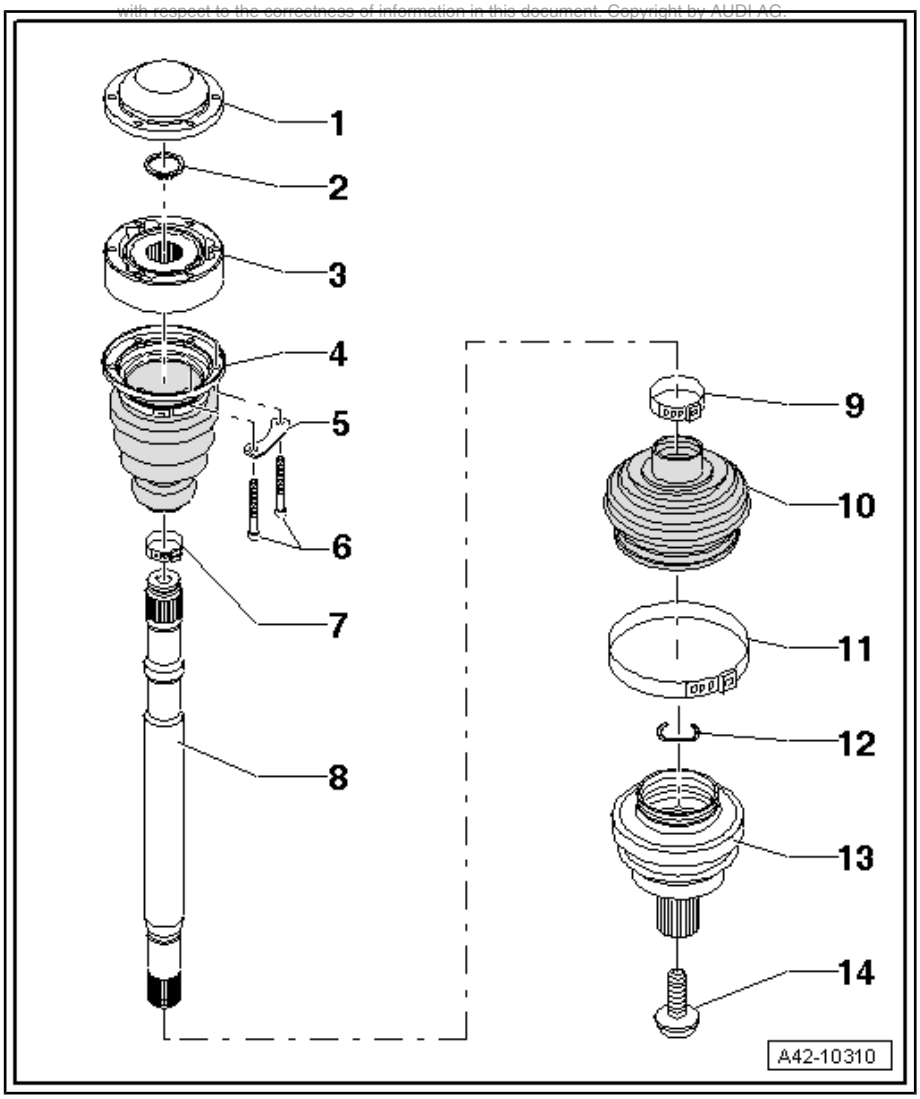
Note

Note that different types of grease are required for outer and inner joints.

	Grease quantity	of which in:	
Outer joint	Total quantity	Joint	Boot
[mm]	[g]	[g]	[g]
100	120	70	50
Inner joint		Put in grease through ball bearing races	
108	120		

7.6 Exploded view of drive shaft with 88/98 mm dia. outer sliding constant velocity joint and 100/108 mm dia. inner sliding constant velocity joint (with cap)

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1 - Cover

- ❑ Drive cover off carefully with drift; renew if damaged
- ❑ Sealing surfaces between cover and inner sliding constant velocity joint must be free from grease on assembly
- ❑ Before attaching to sliding constant velocity joint, apply sealant to sealing surface

2 - Circlip

- ❑ Use normal commercial circlip pliers when removing and installing
- ❑ Always renew if removed

3 - Inner sliding constant velocity joint

- ❑ Renew only as complete unit
- ❑ Checking ⇒ page 266
- ❑ Grease quantity and type ⇒ page 248
- ❑ Adhesive surfaces must be free of oil and grease
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

4 - Boot with cap for inner sliding constant velocity joint

- ❑ Without vent hole
- ❑ Drive cap off carefully with drift; renew if damaged
- ❑ Check inner sliding constant velocity joint if boot is damaged ⇒ page 266
- ❑ Sealing surfaces between cap and inner sliding constant velocity joint must be free from grease on assembly

5 - Lock plate

6 - Bolt

- ❑ M10

- ❑ 70 Nm
- ❑ Always renew if removed

7 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 263

8 - Drive shaft

- ❑ Removing and installing ⇒ page 241

9 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 251

10 - Boot for outer sliding constant velocity joint

- ❑ Without vent hole
- ❑ Check for splits and chafing, renew if necessary
- ❑ Sealing surfaces between boot and outer metal cap must be free from grease on assembly
- ❑ Sealing surfaces between boot and drive shaft must be free from grease on assembly

11 - Hose clip

- ❑ Always renew if removed
- ❑ Tightening ⇒ page 251

12 - Circlip

- ❑ Always renew
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fit into annular groove on shaft before installing (no longer visible once joint is installed)
- ❑ Before fitting sliding constant velocity joint, align circlip centrally with opening facing upwards.

13 - Outer sliding constant velocity joint

- ❑ Renew only as complete unit
- ❑ Driving off ⇒ page 249
- ❑ Installing: drive onto shaft with plastic hammer until compressed circlip seats
- ❑ Circlip must fit in chamfer on joint when installing; guide with pliers if necessary
- ❑ Grease quantity and type ⇒ page 248
- ❑ Sealing surfaces between boot and outer sliding constant velocity joint must be free from grease on assembly
- ❑ Grease splines on drive shaft lightly with grease used in joint when fitting joint onto drive shaft

14 - Bolt

- ❑ 200 Nm +180°
- ❑ Always renew if removed
- ❑ Observe instructions for loosening and tightening ⇒ page 240

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Grease quantity and type

Regrease joint when renewing boot.

For required grease filling of joints, refer to ⇒ Electronic parts catalogue .

Note

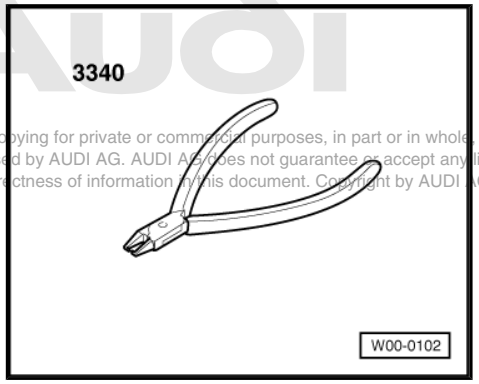
Note that different types of grease are required for outer and inner joints.

	Grease quantity	of which in:	
Outer joint	Total quantity	Joint	Boot
[mm]	[g]	[g]	[g]
88/98	80/105	Distribute grease filling evenly in joint	
Inner joint			
100/108	80/105	Pack grease into joint through ball races	

7.7 Servicing outer constant velocity joint (88 mm or 100 mm dia.)

Special tools and workshop equipment required

- Pliers -3340-



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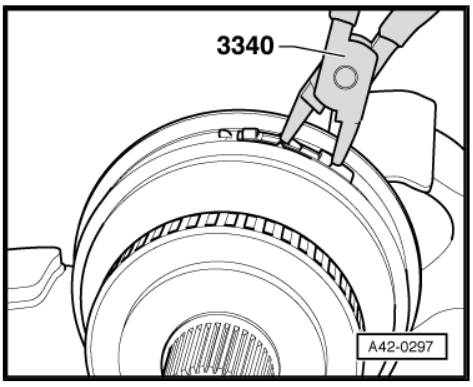
- Circlip pliers (commercially available)
- Sealant ⇒ Electronic parts catalogue

Removing outer constant velocity joint (88 mm or 100 mm dia.)

– Clamp drive shaft in vice using protective jaw covers.

– Use pliers -3340- to unfasten hose clip.

Pliers -3340- must be applied to rear of clip as shown.

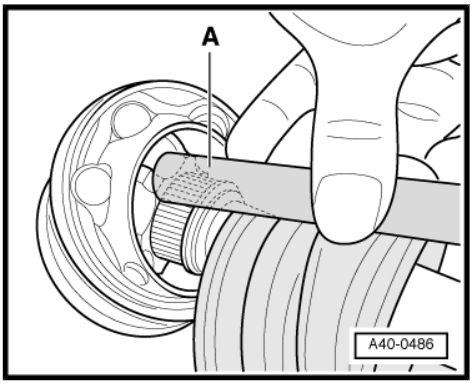


– Push back boot.

– Use hammer to tap copper or brass drift -A- against inner race of constant velocity joint.

– Detach joint and boot.

– Detach circlip.



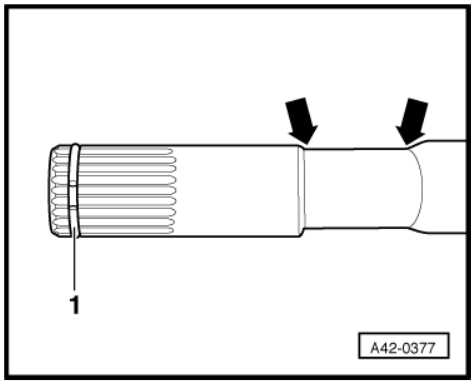
Installing outer constant velocity joint (88 mm or 100 mm dia.)

– Push joint boot onto drive shaft.

Boot and drive shaft must be free from grease.

– Position boot between -arrows-.

1 - Circlip (always renew)



Outer constant velocity joint (88 mm dia.)

– Pack 40 g of drive shaft grease inside joint body.

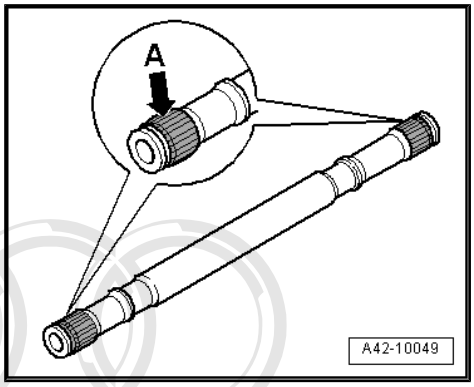
Outer constant velocity joint (100 mm dia.)

– Pack 70 g of drive shaft grease inside joint body.

Both constant velocity joints (continued):

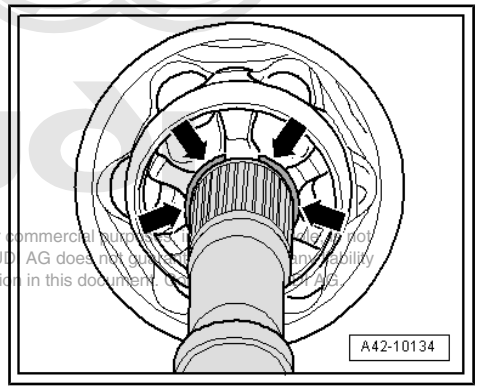
– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint body onto drive shaft.

– Fit circlip in groove on shaft.



– Slide on constant velocity joint as far as circlip.

– Align circlip so that opening faces upwards -arrows-.



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– Screw old bolt into CV joint as shown.

– Use plastic hammer to drive joint onto drive shaft until circlip engages.

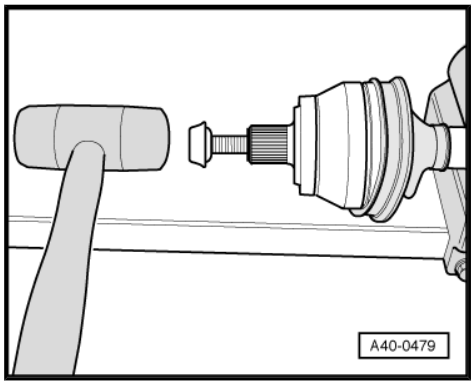
– Pack 50 g of drive shaft grease into joint (boot side).

– Install boot on outer joint.

– Vent air from boot.

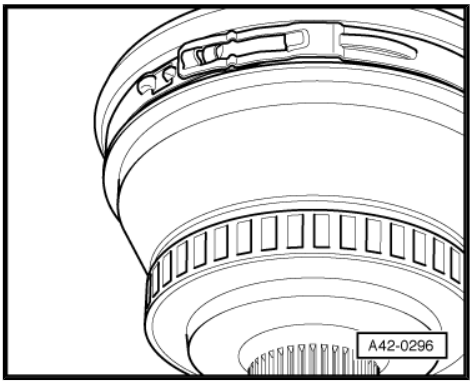
– Make sure boot is properly positioned on joint body.

– Boot must rest in groove and on contour of joint body.



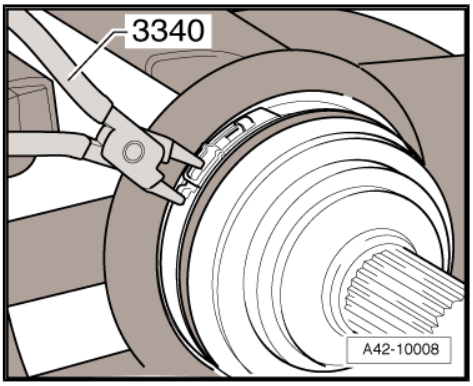
Tightening hose clip on outer joint (88 mm or 100 mm dia.)

– Engage hose clip by hand at first lug.



– Use pliers -3340- to fasten hose clip.

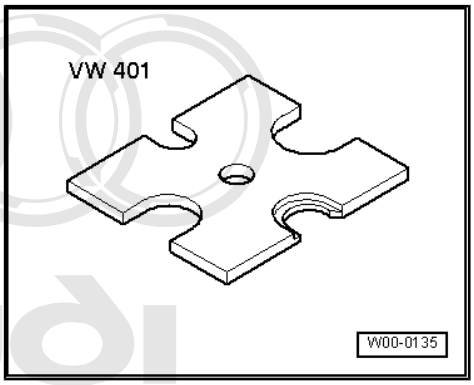
Pliers -3340- must be applied to front of clip as shown.



7.8 Servicing inner sliding constant velocity joint (100 mm or 108 mm dia.)

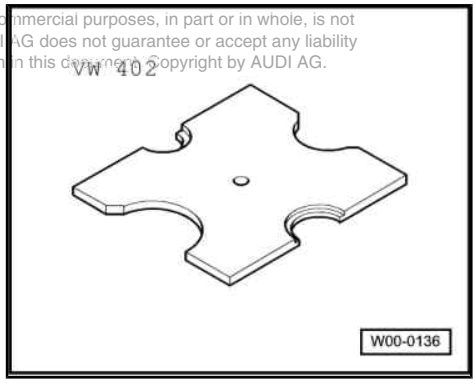
Special tools and workshop equipment required

♦ Thrust plate -VW 401-

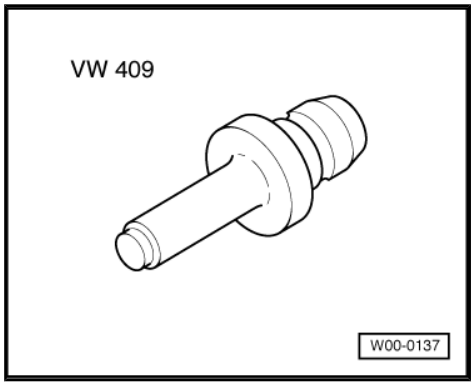


♦ Thrust plate -VW 402-

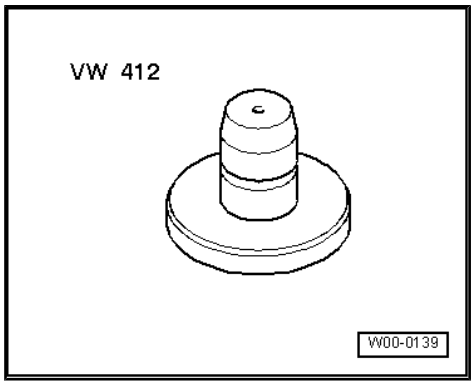
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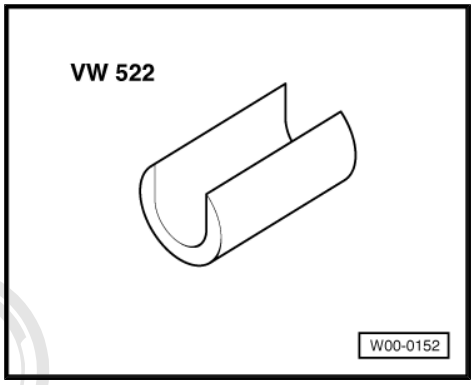
- Press tool -VW 409-



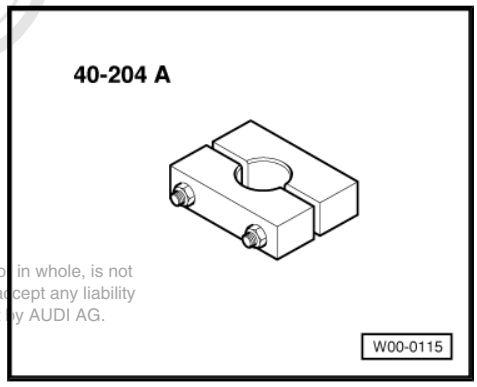
- Press tool -VW 412-



- Support sleeve -VW 522-



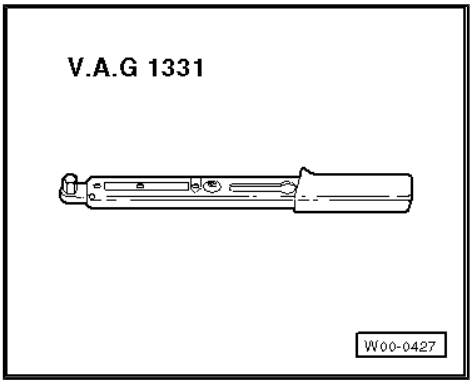
- Clamp -40 - 204 A-



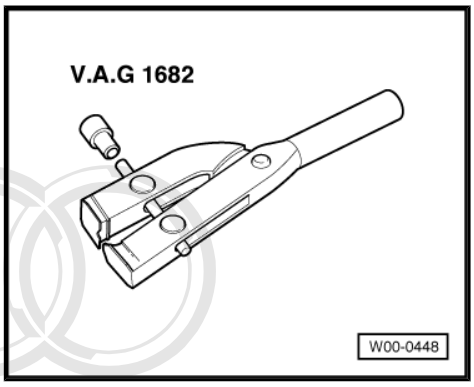
- Assembly tool -40-204 A- can also be used instead of tensioner -T10065-

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- Torque wrench -V.A.G 1331-



- Clamp tensioner -V.A.G 1682-



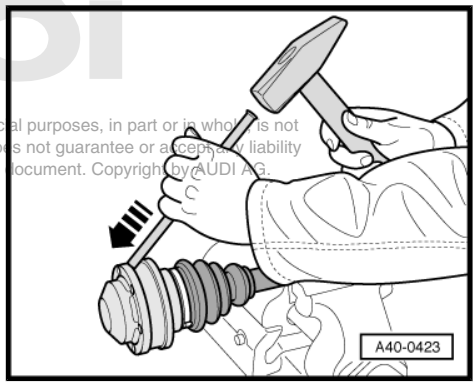
- Circlip pliers (commercially available)

Removing inner sliding constant velocity joint (100 mm or 108 mm dia.)

– Clamp drive shaft in vice using protective jaw covers.

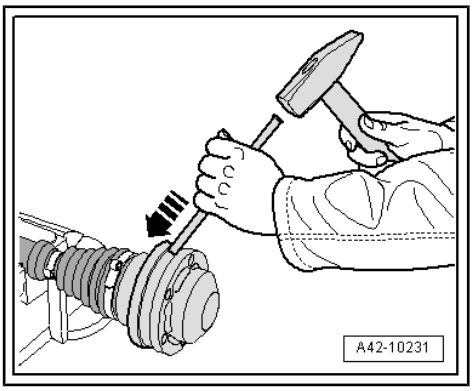
– Drive off cover with a copper or brass drift.

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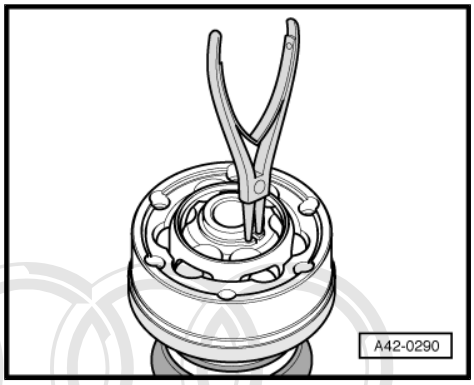


– Drive off cover with a copper or brass drift.

– Unfasten and detach only the „small“ hose clip.



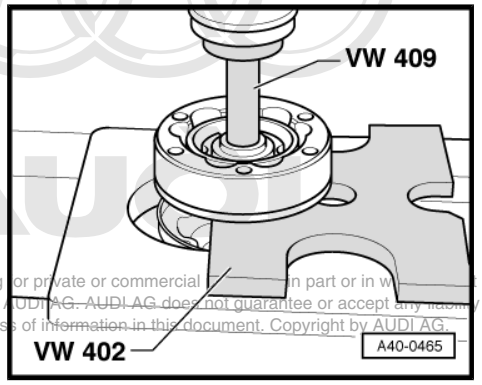
– Remove circlip.



– Press inner sliding constant velocity joint off drive shaft using special tools shown in illustration.
– Pull boot off drive shaft.

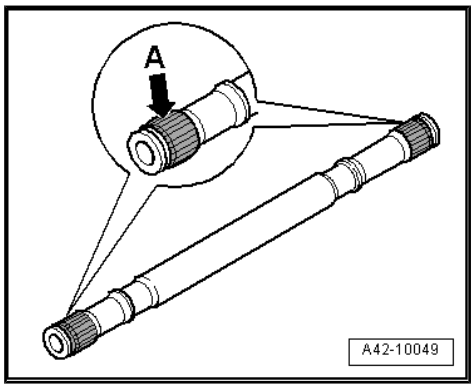
Installing inner sliding constant velocity joint (100 mm or 108 mm dia.)

– Push boot with „small“ hose clip onto drive shaft.



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– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint body onto drive shaft.



– Press on joint as far as stop.

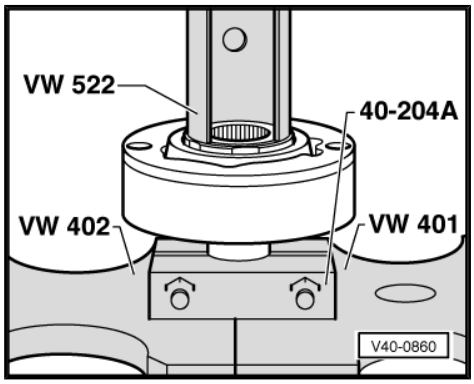
Chamfer on internal diameter of ball hub (splines) must face contact collar of drive shaft.

Use the special tools shown in the illustration.

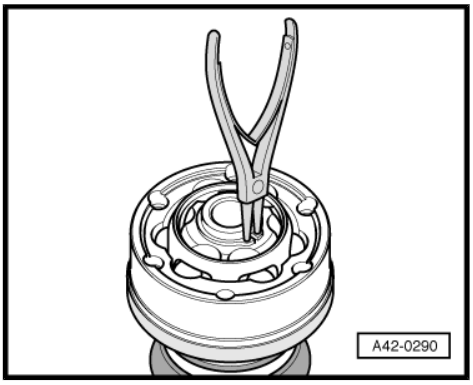
Assembly tool -40-204 A- can also be used instead of tensioner -T10065-

Tensioner -40-204 A- or assembly tool -T10065- and clamping surface on drive shaft must be free of grease.

Always renew circlip.



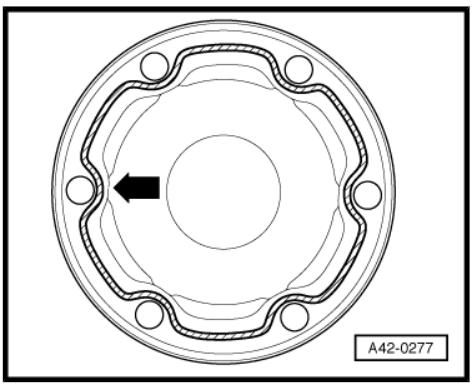
– Fit circlip.
– Check that circlip is properly seated.
– Before fitting boot, pack 50 g of drive shaft grease into joint body from boot side of joint.
– Degrease contact surface for cover.



– Apply sealant „hatched area“ on clean inner surface of cover on CV joint boot. Route continuous bead of sealant (2..3 mm ∅) around inside of holes -arrow-.
– Use sealant ⇒ Electronic parts catalogue .

Boot and contact surface of cap must be free of grease.

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– Using bolts -arrows-, align new cover in relation to bolt holes.

The alignment must be very accurate, because no further alignment is possible once the part has been hammered on.

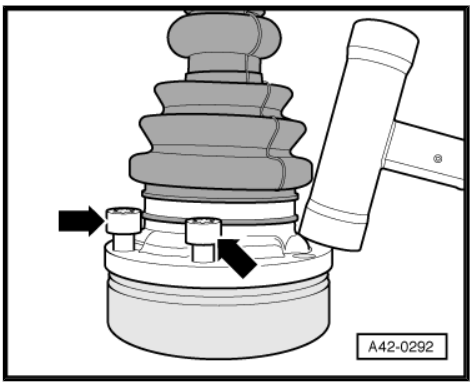
– Drive on cover using a plastic hammer.
– Remove surplus sealant immediately as it is pressed out.

Inner sliding constant velocity joint (100 mm dia.)

– Pack 40 g of drive shaft grease into joint through ball races.

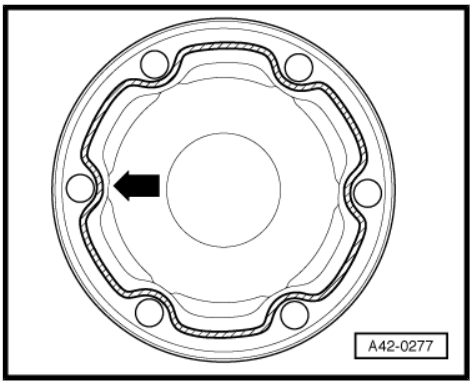
Inner sliding constant velocity joint (108 mm dia.)

– Pack 70 g of drive shaft grease into joint through ball races.



Both types of joint (continued):

– Degrease contact surface for cover.
– Apply sealant „hatched area“ to clean inner surface of cover. Route continuous bead of sealant (2..3 mm ∅) around inside of holes -arrow-.
– Use sealant ⇒ Electronic parts catalogue .

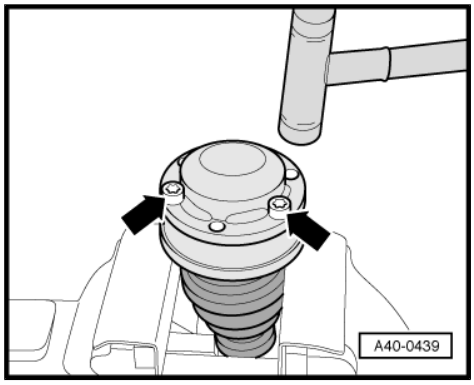


– Using bolts -arrows-, align new cover in relation to bolt holes.

The alignment must be very accurate, because no further alignment is possible once the part has been hammered on.

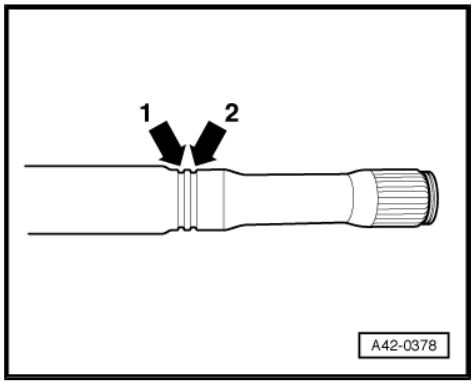
– Drive on cover using a plastic hammer.

– Remove surplus sealant immediately as it is pressed out.



– Position boot in outer groove -arrow 2-.

Inner groove -arrow 1- remains visible („identification groove“ for correct boot assembly).



Fitting and tightening hose clips on inner joint

– Apply clamp tensioner -V.A.G 1682- as shown. Ensure jaws of tool grip niches -arrows B- on crimping ear.

– Tighten clip by turning spindle with torque wrench -C- (take care to keep tool straight).

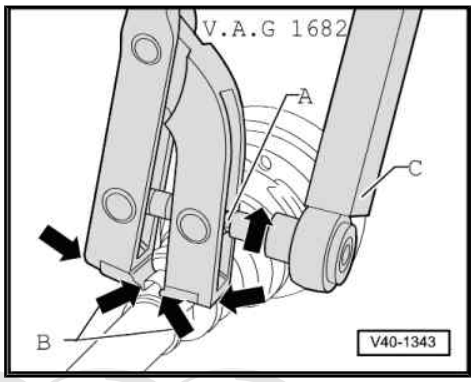
♦ Due to the hard material of the CV joint boot (as opposed to rubber), a stainless steel hose clip is required; this can only be tightened using clamp tensioner -V.A.G 1682- .

♦ Tightening torque: 20 Nm.

♦ Use torque wrench with 5…50 Nm adjustment range (e.g. -V.A.G 1331-).

♦ Make sure thread of spindle on tool -A- turns freely. Lubricate with MoS_2 grease if necessary.

♦ If the thread is stiff (e.g. due to dirt), the required clamping force will not be attained at the hose clip when the specified tightening torque is applied.



7.9 Servicing outer sliding constant velocity joint (88 mm or 98 mm dia.)

Special tools and workshop equipment required

♦ Circlip pliers (commercially available)

♦ Copper or brass drift

♦ For correct sealant refer to ⇒ Electronic parts catalogue

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Removing outer sliding constant velocity joint (88 mm or 98 mm dia.)

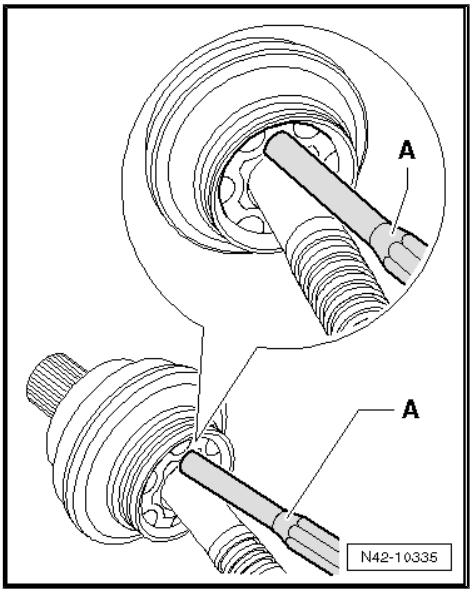
– Clamp drive shaft in vice using protective jaw covers.

– Open hose clips.

– Push back boot.

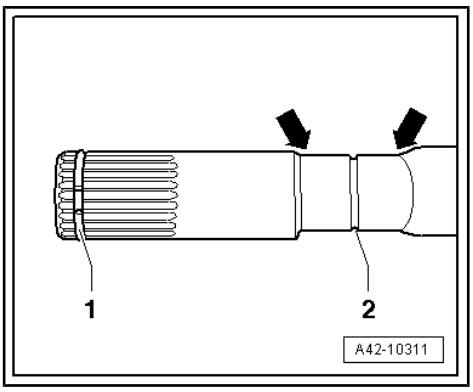
– Use drift -A- to force sliding constant velocity joint off drive shaft.

Drift -A- must be positioned exactly on triple roller spider of sliding constant velocity joint.



– Detach joint and boot.

– Detach circlip -1-.



Installing outer sliding constant velocity joint (88 mm or 98 mm dia.)

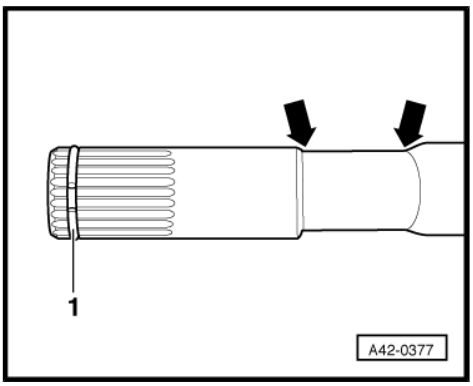
– Push joint boot onto drive shaft.

• Boot and drive shaft must be free from grease.

– Position boot between -arrows-.

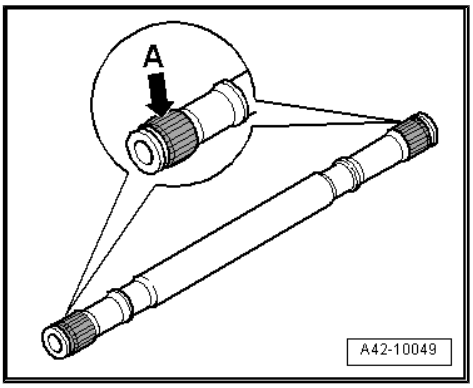
– Pack 60 % of drive shaft grease evenly into inside of joint body.

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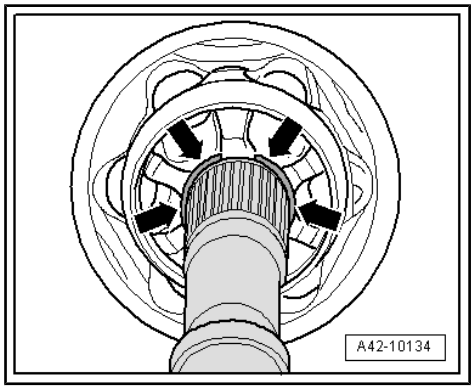


– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint body onto drive shaft.

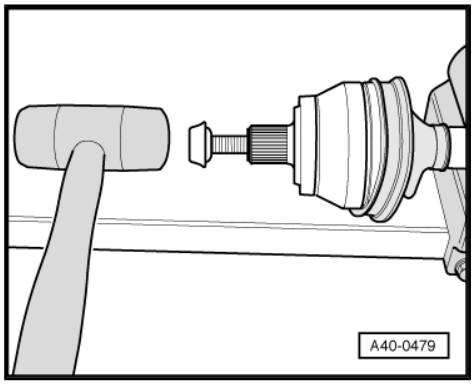
– Fit circlip in groove on shaft.



– Slide on constant velocity joint as far as circlip.
– Align circlip so that opening faces upwards -arrows-.



– Screw old bolt into CV joint as shown.
– Use plastic hammer to drive joint onto drive shaft until circlip engages.
– Fit boot on metal cap.
– Vent air from boot.
– Tighten hose clips on outer joint.



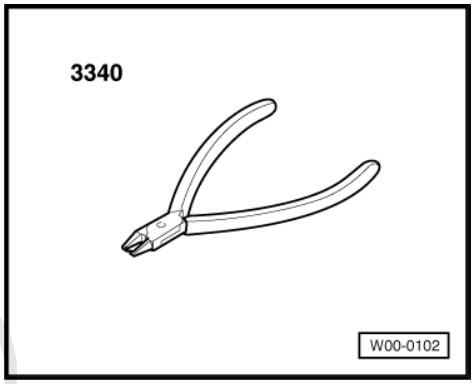
Tightening hose clip on outer joint

Applies to small and large hose clips.

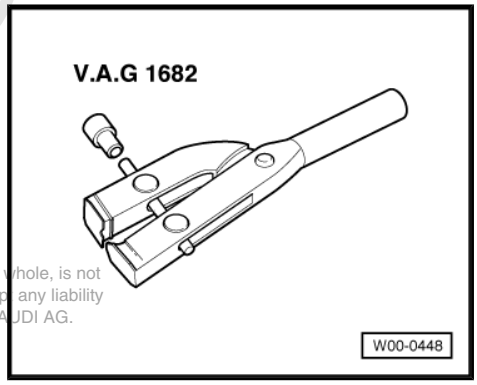
Use the following tools depending on type of hose clip:

Special tools and workshop equipment required

♦ Pliers -3340-

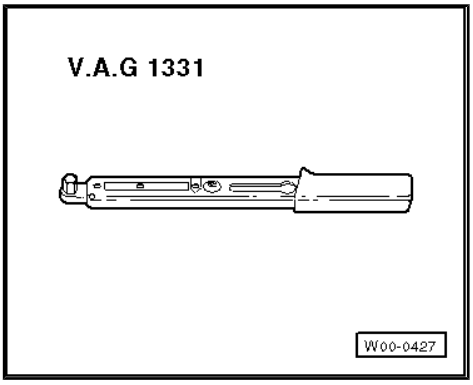


♦ Clamp tensioner -V.A.G 1682-

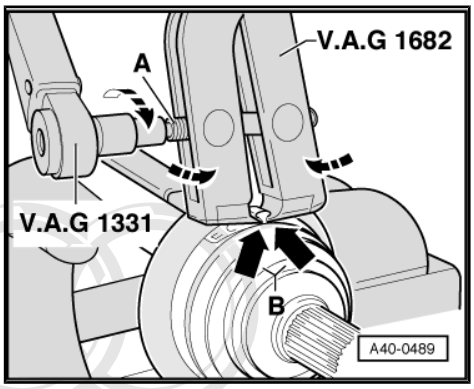


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- Torque wrench -V.A.G 1331-



Use clamp tensioner -V.A.G 1682- to fit and tighten stainless steel clips, as shown in illustration.

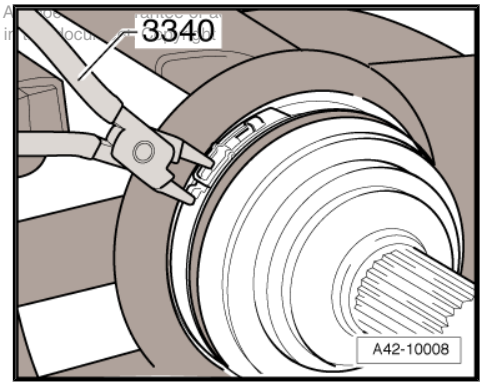


– Ensure jaws of tool make contact with lugs -arrows B- on hose clip.
– Tighten hose clip by turning spindle with torque wrench (take care to keep clamp tensioner straight).

- Due to the hard material of the CV joint boot (as opposed to rubber), a stainless steel hose clip is required; this can only be tightened using clamp tensioner -V.A.G 1682- .
- Tightening torque: 20 Nm.
- Use torque wrench with 5…50 Nm adjustment range (e.g. -V.A.G 1331-).
- Make sure thread of spindle on tool -A- turns freely. Lubricate with MoS_2 grease if necessary.
- If the thread is stiff (e.g. due to dirt), the required clamping force will not be attained at the hose clip when the specified tightening torque is applied.

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Use pliers -3340- to fit and tighten clips with retaining lugs, as shown in illustration.

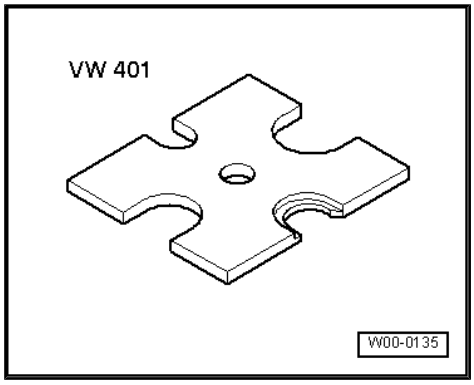


– Engage hose clip by hand at first lug.
– Use pliers -3340- to fasten hose clip.

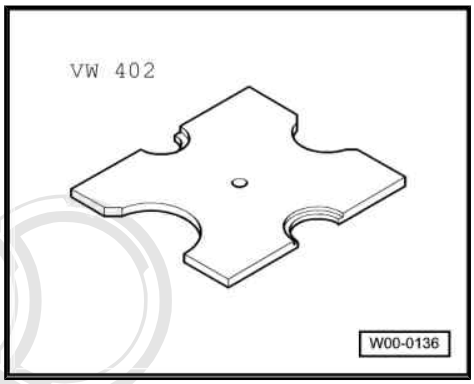
7.10 Servicing inner sliding constant velocity joint with cap (100 mm or 108 mm dia.)

Special tools and workshop equipment required

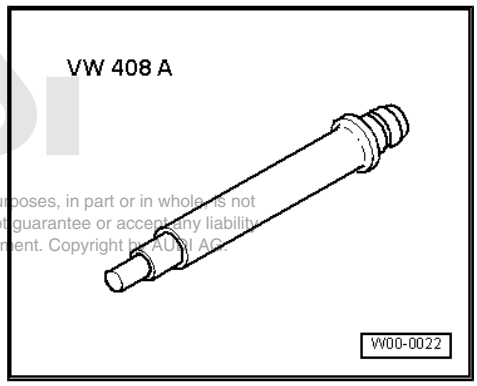
- Thrust plate -VW 401-



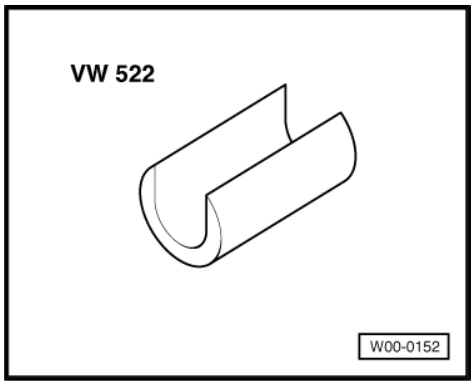
- Thrust plate -VW 402-



- Press tool -VW 408 A-



- Support sleeve -VW 522-



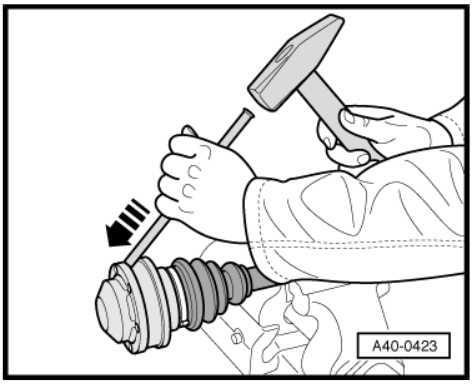
- Circlip pliers (commercially available)
- Copper or brass drift
- Sealant ⇒ Electronic parts catalogue

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Removing inner sliding constant velocity joint (100 mm or 108 mm dia.)

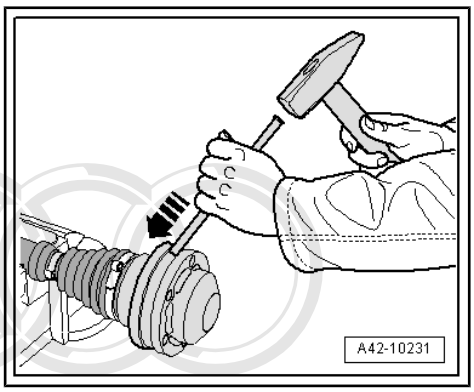
– Clamp drive shaft in vice using protective jaw covers.

– Drive off cover with a copper or brass drift.

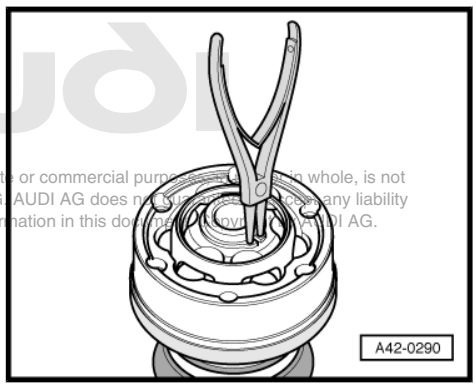


– Drive off cap with a copper or brass drift.

– Unfasten and detach only the „small“ hose clip.



– Remove circlip.



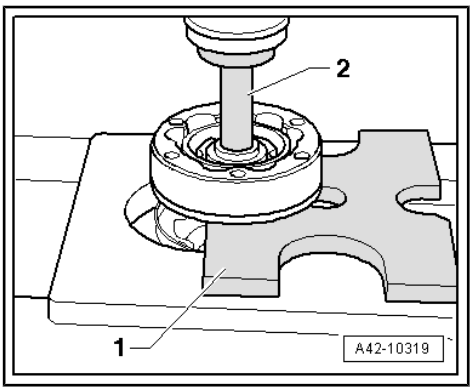
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– Press inner sliding constant velocity joint off drive shaft using tools shown in illustration.

1 - Thrust plate -VW 401- or thrust plate -VW 402-

2 - Press tool -VW 408 A-

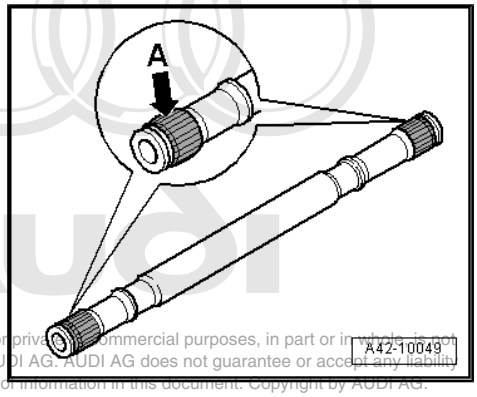
– Pull boot off drive shaft.



Installing inner sliding constant velocity joint (100 mm or 108 mm dia.)

– Push boot with „small“ hose clip onto drive shaft.

– Grease splines -A- on drive shaft lightly with grease used in joint before fitting joint body onto drive shaft.



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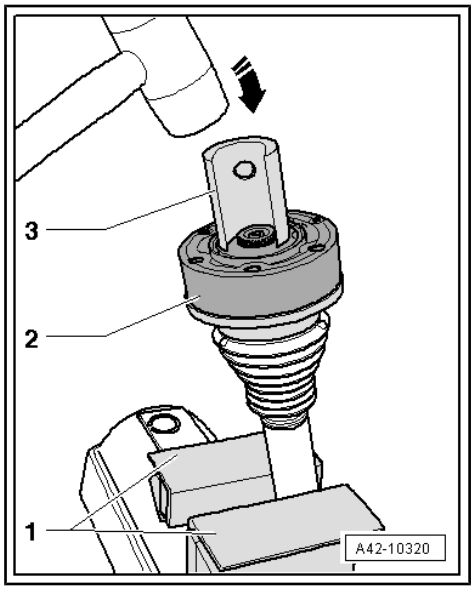
– Clamp drive shaft in vice using protective jaw covers.
– Carefully fit joint onto drive shaft and drive home onto stop with a hammer, making use of the support sleeve -VW 522- .

1 - Protective jaw covers

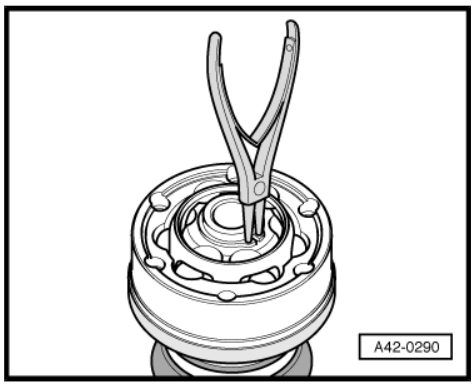
2 - Inner sliding constant velocity joint

3 - Support sleeve -VW 522-

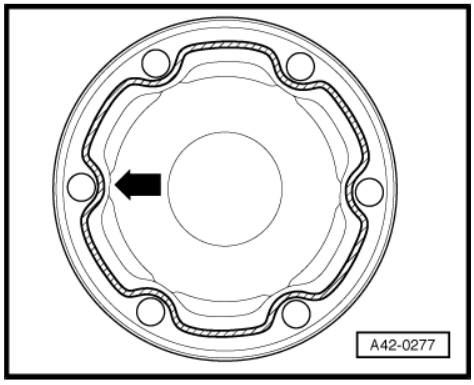
If there is a chamfer on the internal diameter of the ball hub (splines), it should face the contact collar of the drive shaft.



– Fit a new circlip.
– Check that circlip is properly seated.
– Before fitting boot, pack half the drive shaft grease provided into joint from boot side of joint.
– Degrease contact surface for cover.



– Apply sealant (hatched area) to clean surface on inside of cap on CV joint boot.
– Apply a continuous sealant bead of ∅ 2 - 3 mm.
– Route sealant bead around inside of holes -arrow-.
– Use sealant ⇒ Electronic parts catalogue .



Boot and contact surface of cap must be free of grease.

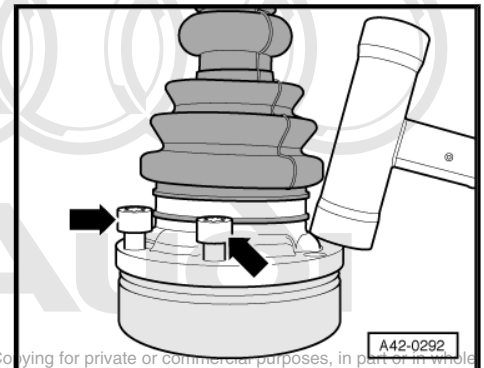
– Align cap and bolts -arrows- with bolt holes.

The alignment must be very accurate, because no further alignment is possible once the part has been hammered on.

– Drive on cover using a plastic hammer.

– Remove surplus sealant immediately as it is pressed out.

– Pack remainder of drive shaft grease into constant velocity joint through ball races.



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– Degrease contact surface for cover and for constant velocity joint.

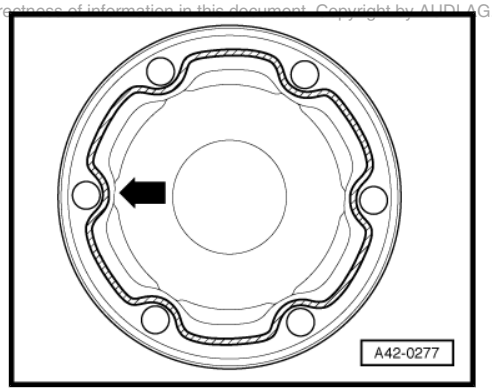
– Degrease contact surface for cover and for constant velocity joint.

– Apply sealant -hatched area- to clean inner surface of cover.

– Apply a continuous sealant bead of ∅ 2 - 3 mm.

– Route sealant bead around inside of holes -arrow-.

– Use sealant ⇒ Electronic parts catalogue .

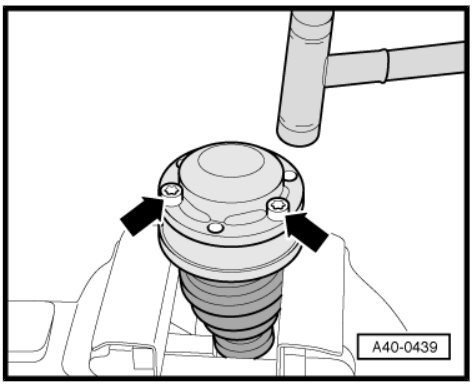


– Align cover and bolts -arrows- with bolt holes.

The alignment must be very accurate, because no further alignment is possible once the part has been hammered on.

– Drive on cover using a plastic hammer.

– Remove surplus sealant immediately as it is pressed out.



Boot and drive shaft must be free from grease.

– Push joint boot onto drive shaft.

Boot and drive shaft must be free from grease.

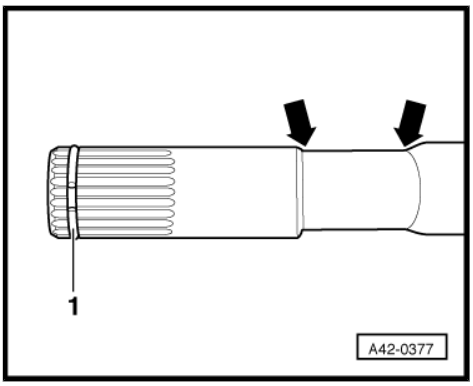
– Position boot between -arrows-.

Disregard item -1-.

– Make sure boot is properly positioned on drive shaft.

– Tighten hose clips on inner joint.

Tightening hose clips on inner joint



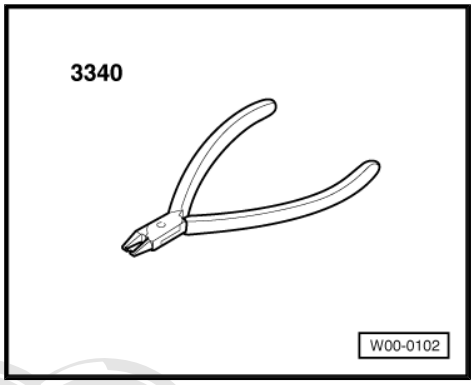
Note

When installing the large hose clip, position the fastener between two holes.

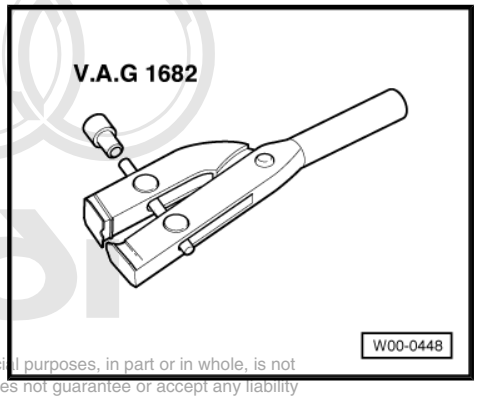
Use the following tools depending on type of hose clip:

Special tools and workshop equipment required

- Pliers -3340-

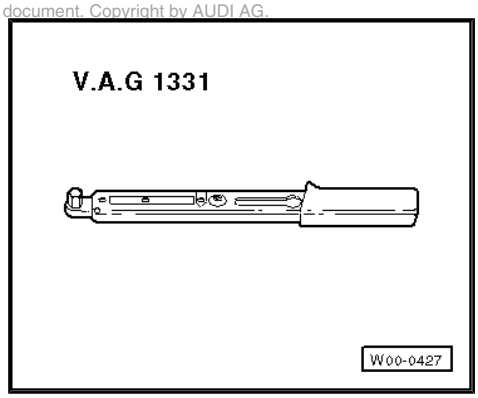


- Clamp tensioner -V.A.G 1682-

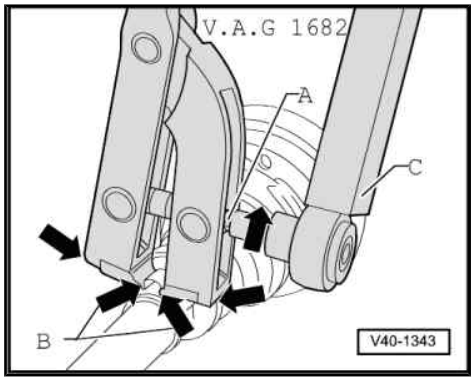


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- Torque wrench -V.A.G 1331-



Use clamp tensioner -V.A.G 1682- to fit and tighten stainless steel clips, as shown in illustration.



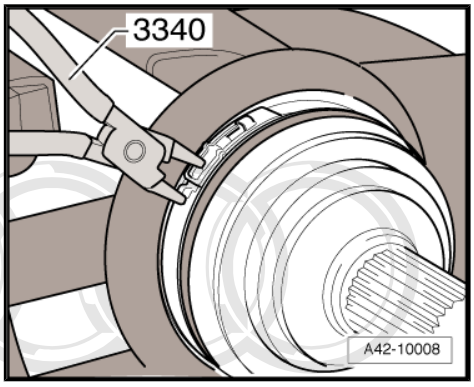
– Apply clamp tensioner -V.A.G 1682- as shown. Ensure jaws of tool make contact with lugs -arrows B- on hose clip.
– Tighten clip by turning spindle with torque wrench -C- (take care to keep tool straight).

- Due to the hard material of the CV joint boot (as opposed to rubber), a stainless steel hose clip is required; this can only be tightened using clamp tensioner -V.A.G 1682- .
- Tightening torque: 20 Nm.
- Use torque wrench with 5…50 Nm adjustment range (e.g. -V.A.G 1331-).
- Make sure thread of spindle on tool -A- turns freely. Lubricate with MoS_2 grease if necessary.
- If the thread is stiff (e.g. due to dirt), the required clamping force will not be attained at the hose clip when the specified tightening torque is applied.

Use pliers -3340- to fit and tighten clips with retaining lugs, as shown in illustration.

– Engage hose clip by hand at first lug.

– Use pliers -3340- to fasten hose clip.



7.11 Checking outer constant velocity joint

The joint should be dismantled to renew dirty grease or for checking the balls and ball races for wear and damage.

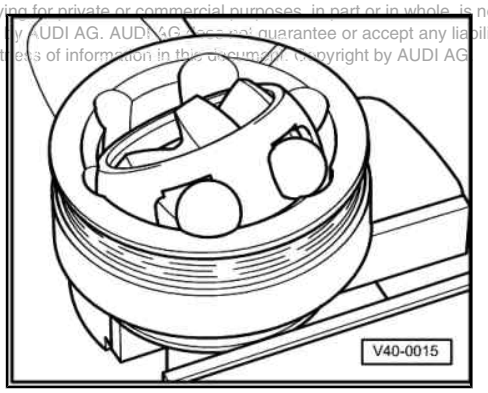
Dismantling

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– Before dismantling, mark position of ball hub in relation to ball cage and joint body with an electric scriber or oil stone.

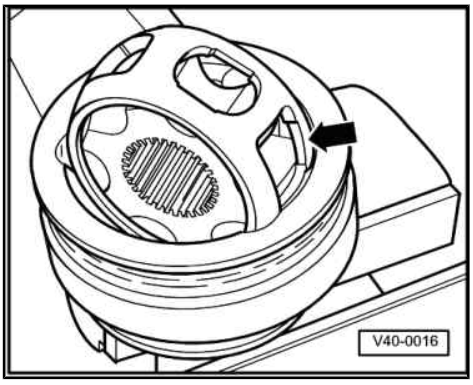
– Swivel ball hub and ball cage.

– Take out balls one after the other.



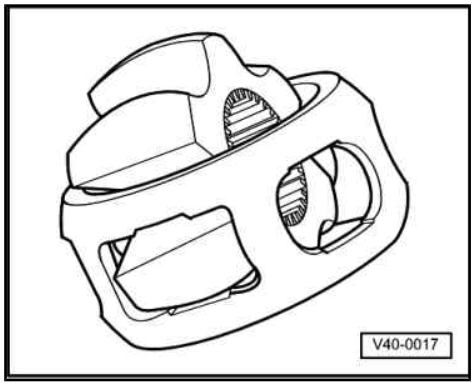
– Turn the cage until the two rectangular openings -arrow- are level with the joint body.

– Lift out cage together with hub.



– Swivel segment of hub with short lobe into square cage opening.

– Pivot hub out of cage.



Checking

The balls in each joint belong to one tolerance group. Check stub axle, hub, cage and balls for pitting and signs of seizure. Excessive backlash in the joint will cause knocking or jolts under load change; in such cases the joint must be renewed. Polished areas and visible tracks in the ball races do not justify renewal of the joint.

Assembling

– Fit cage with hub into joint body.

Note

Make sure cage is inserted in correct position (i.e. sides facing in same direction as original position).

– Press in balls one after the other from opposite sides, taking care to re-establish original position of hub relative to cage and joint body.

– Pack required amount of grease into joint body.

Refer to ⇒ page 244 for quantities and type of grease required for drive shaft with 88 mm or 100 mm dia. outer constant velocity joint.

7.12 Checking inner sliding CV joint

The joint should be dismantled to renew dirty grease or for checking the balls and ball races for wear and damage.

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Dismantling

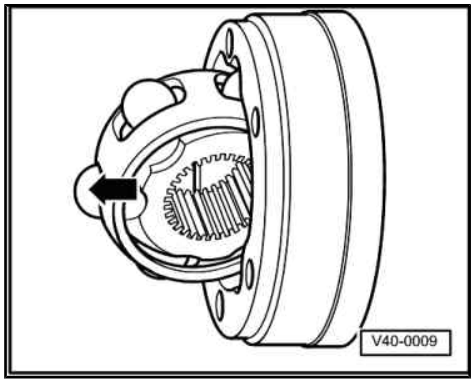
Note

Ball hub and joint body are paired and must be marked before dismantling. Ensure that the balls run in the same races after assembly.

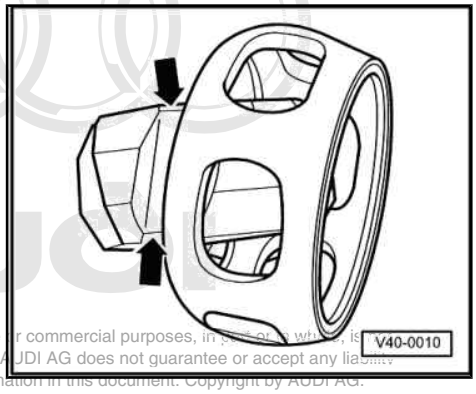
– Swivel ball hub and ball cage.

– Press out joint body in direction of -arrow-.

– Push balls out of cage.



– Align ball hub with cage as shown -arrows- and pivot hub out of cage.
– Check joint, ball hub, ball cage and balls for pitting and signs of seizure.



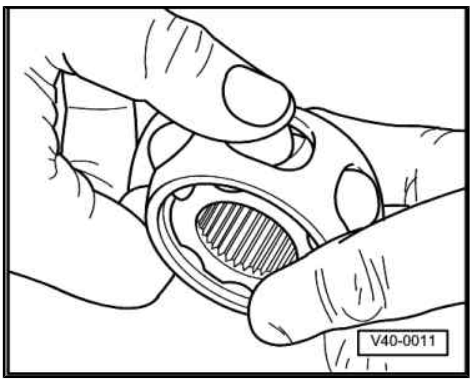
Note

Excessive backlash in the joint will cause knocking or jolts under load change. In such cases the joint must be renewed. Polished areas and visible tracks in the ball races are not a reason for renewing the joint.

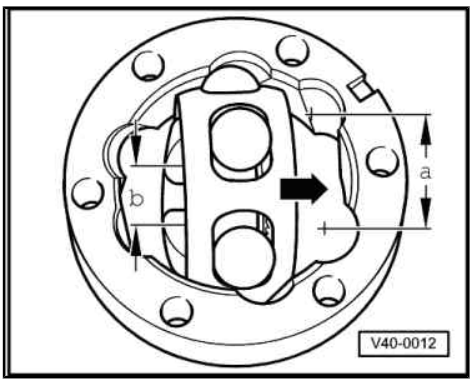
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Assembling

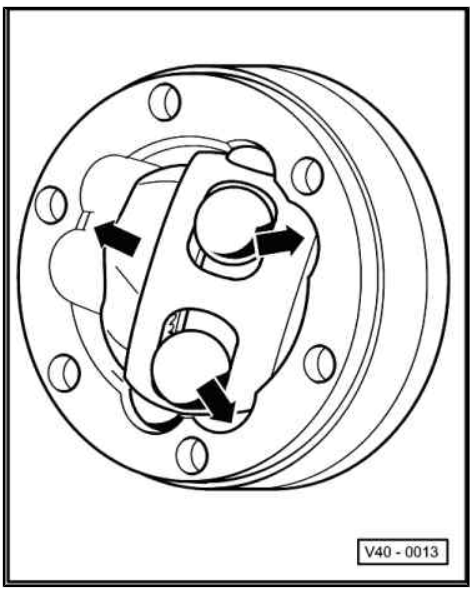
– Insert hub into cage via the two chamfers. No specific installation position is required. Push balls into cage.
– Insert hub with cage and balls at a right angle to the joint body.



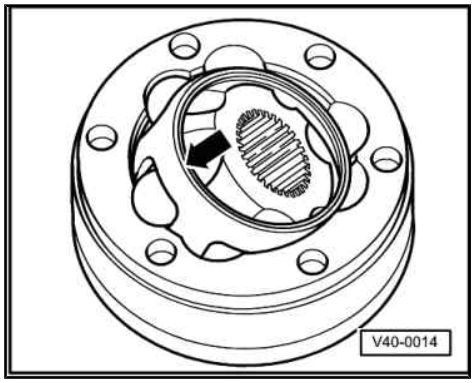
♦ When inserting, ensure that the wide spacing -a- on the joint body is aligned with the narrow spacing -b- on the hub after swivelling in.
♦ Chamfer on internal diameter of ball hub (splines) must face drive shaft.



– Swivel the hub into the joint body; at the same time the hub must be swivelled out of the cage -arrows- far enough to allow the balls to fit into the ball races.



– Swivel in the hub with balls by applying firm pressure on the cage -arrow-.



Checking function of sliding constant velocity joint

The sliding constant velocity joint has been correctly assembled if the ball hub can be moved by hand backwards and forwards over its entire axial range of movement.

– Pack required amount of grease into joint body.

Refer to ⇒ page 244 for quantities and type of grease required for drive shaft with 108 mm dia. inner sliding constant velocity joint.

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43 – Self-levelling suspension

1 General notes

⇒ „1.1 General information“, page 269

⇒ „1.2 Gaskets and seals“, page 269

⇒ „1.3 Bolts and nuts“, page 270

⇒ „1.4 Electrical components“, page 270

1.1 General information

To achieve the desired results when performing repairs it is important to work with the greatest possible care and cleanliness, and to use proper tools in good condition. Always observe the basic safety rules when performing servicing procedures.

To avoid repetition, a number of notes that are generally applicable to the individual procedures described in this manual are summarised here. They apply for this individual Workshop Manual.

- Thoroughly clean all unions and the adjacent areas before disconnecting.
- Place removed parts on a clean surface and cover them up to keep them clean. Use plastic sheeting or paper for this purpose. Do not use fluffy cloths.
- Make sure to install clean parts: only remove replacement parts from packaging immediately prior to installation.
- Use only the grease and sealants with the Part No. stated.
- Carefully cover or seal open components if repairs are not to be carried out immediately.

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WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

WARNING

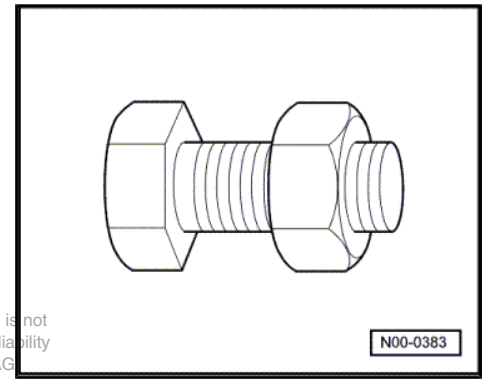
Risk of personal injury caused by automatic engine start on vehicles with start/stop system.

- *On vehicles with activated start/stop system (indicated by a symbol in the instrument cluster) the engine can start automatically under certain conditions.*
- *When working on the vehicle, it is therefore important to ensure that the start/stop system is deactivated (switch off ignition and switch on again if required).*

1.2 Gaskets and seals

- Always renew gaskets and seals.
- Check contact surfaces on housing or shafts for burrs and damage after removing gaskets/seals or rubber boots, and repair as required.

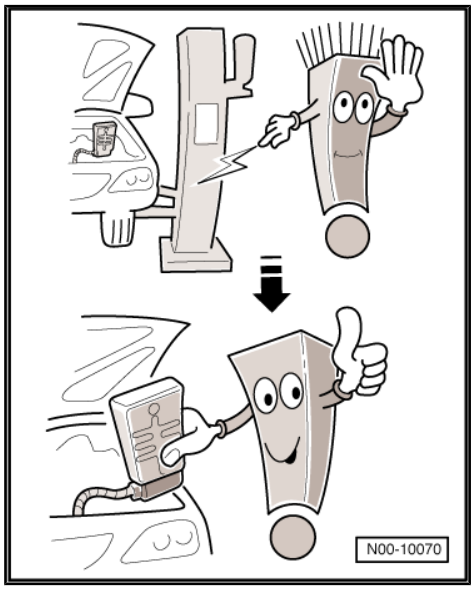
1.3 Bolts and nuts



- Loosen and tighten bolts and nuts securing covers and housings in diagonal sequence.
- Take care to keep sensitive components straight. They should only be unfastened and tightened diagonally and in stages.
- Tightening torques refer to unoiled bolts and nuts.
- Always renew self-locking bolts/nuts.
- Always renew bolts and nuts which are tightened by turning through a specified angle.

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1.4 Electrical components



You have certainly experienced light electric shocks when touching metal objects. This is due to the electrostatic charge accumulated by the human body. This charge can cause malfunctions if you touch the electric components.

– Before working on electrical components, touch an earthed object (e.g. water pipe or lifting platform). Do not touch the contact pins of the electrical connectors.

2 Electronic damping control

⇒ „2.1 Exploded view of electronic damping control“, page 271

⇒ „2.2 Removing and installing electronically controlled damping control unit J250 “, page 272

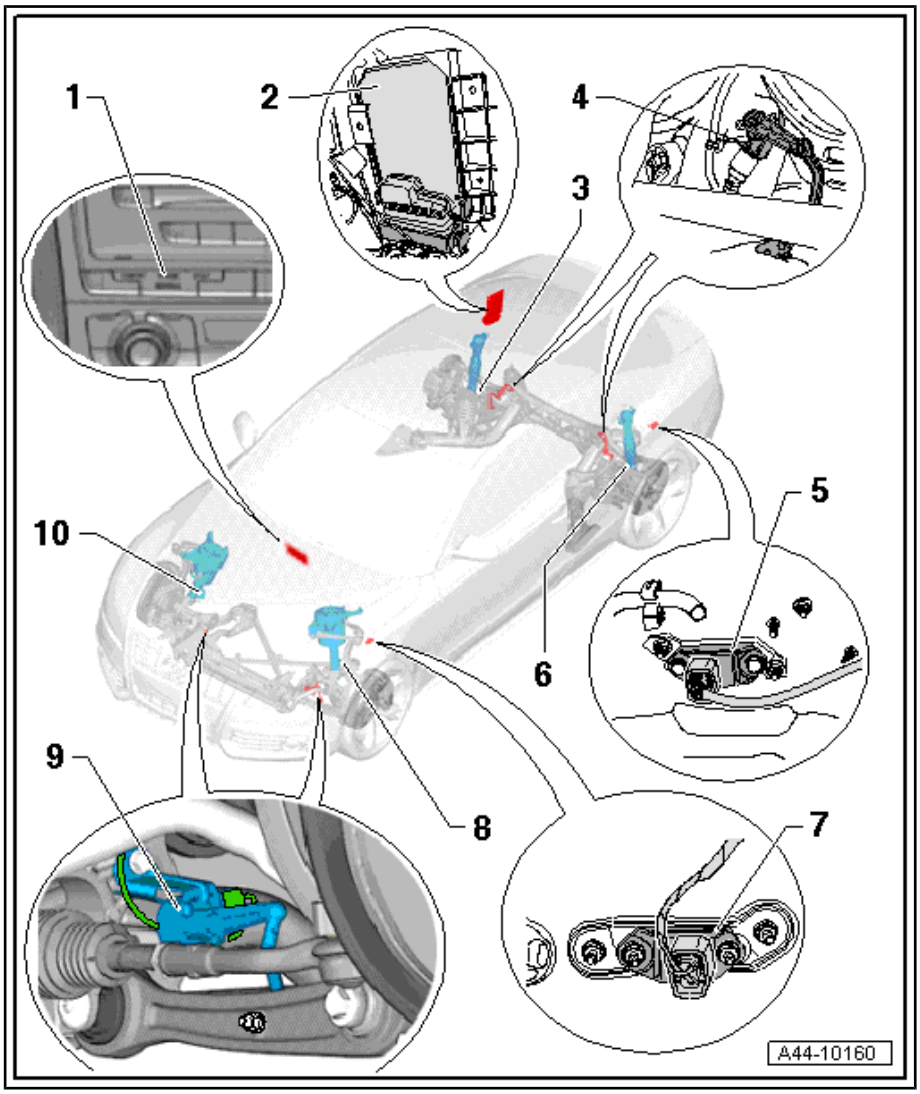
⇒ „2.3 Re-adapting reference position with vehicle diagnosis, testing and information system VAS 5051B “, page 273

⇒ „2.4 Removing and installing front left body acceleration sender G341 and front right body acceleration sender G342 “, page 274

⇒ „2.5 Removing and installing rear body acceleration sender G343 “, page 275

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2.1 Exploded view of electronic damping control



1 - Switch module for Charisma -E592-

- ❑ Fitting location: switch module for Charisma -592- is fitted in dash panel

2 - Electronically controlled damping control unit -J250-

- ❑ Removing and installing ⇒ „2.2 Removing and installing electronically controlled damping control unit J250 “, page 272
- ❑ Fitting location: electronically controlled damping control unit -J250- is located behind luggage compartment side trim (right-side)
- ❑ Reference position of suspension must be re-adapted if electronically controlled damping control unit -J250- is renewed ⇒ page 273 vehicle diagnosis, testing and information system -VAS 5051B-
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .

3 - Shock absorber with rear right shock absorber damper adjustment valve -N339-

- ❑ ⇒ „5.5 Removing and installing shock absorber - front-wheel drive vehicles“, page 213
- ❑ ⇒ „6.6 Removing and installing shock absorber - four-wheel drive vehicles“, page 234

4 - Rear left vehicle level sender -G76- and rear right vehicle level sender -G77-

- ❑ Removing and installing ⇒ „4.7 Removing and installing vehicle level sender“, page 194

- ❑ If the rear left vehicle level sender -G76- and rear right vehicle level sender -G77- are removed and refitted or if the linkage is detached, the reference position must be re-adapted on vehicles with electronic damping control ⇒ page 273 ⇒ Vehicle diagnostic tester
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
- ❑ On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .

5 - Rear body acceleration sender -G343-

- ❑ Removing and installing
  ⇒ „2.5 Removing and installing rear body acceleration sender G343 “, page 275

6 - Shock absorber with rear left shock absorber damper adjustment valve -N338-

- ❑ ⇒ „5.5 Removing and installing shock absorber - front-wheel drive vehicles“, page 213
- ❑ ⇒ „6.6 Removing and installing shock absorber - four-wheel drive vehicles“, page 234

7 - Front left body acceleration sender -G341- and front right body acceleration sender -G342-

- ❑ Removing and installing
  ⇒ „2.4 Removing and installing front left body acceleration sender G341 and front right body acceleration sender G342 “, page 274

8 - Shock absorber with front left shock absorber damper adjustment valve -N336-

- ❑ Removing and installing suspension strut
  ⇒ „3.2 Removing and installing suspension strut with mounting bracket“, page 37
- ❑ Servicing suspension strut ⇒ „3.3 Servicing suspension strut and mounting bracket“, page 43

9 - Front left vehicle level sender -G78- and front right vehicle level sender -G289-

- ❑ Removing and installing ⇒ „4.8 Removing and installing vehicle level sender“, page 76
- ❑ If the front left vehicle level sender -G78- and front right vehicle level sender -G289- are removed and refitted or the linkage is detached, the reference position must be re-adapted on vehicles with electronic damping control ⇒ page 273 Vehicle diagnostic, testing and information system -VAS 5051B-
- ❑ If the reference position has been re-adapted on vehicles with lane departure warning, the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .
- ❑ On vehicles with automatic headlight range control, carry out basic adjustment of headlights ⇒ Rep. gr. 94 .

10 - Shock absorber with front right shock absorber damper adjustment valve -N337-

- ❑ Removing and installing suspension strut
  ⇒ „3.2 Removing and installing suspension strut with mounting bracket“, page 37
- ❑ Servicing suspension strut ⇒ „3.3 Servicing suspension strut and mounting bracket“, page 43

2.2 Removing and installing electronically controlled damping control unit -J250-

Removing

The electronically controlled damping control unit -J250- is located behind the luggage compartment side trim (right-side).

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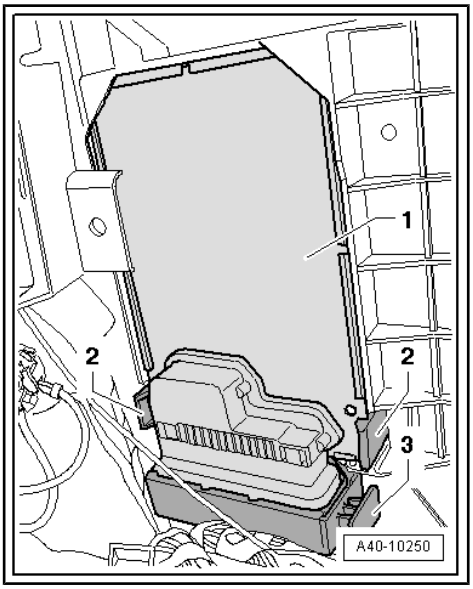
– Switch off all electrical equipment.

– Remove ignition key.

– Remove cover from storage compartment in luggage compartment (right-side).

– Release connector -3- and unplug.

– Push clips -2- aside and detach electronically controlled damping control unit -J250- -1-.



Installing

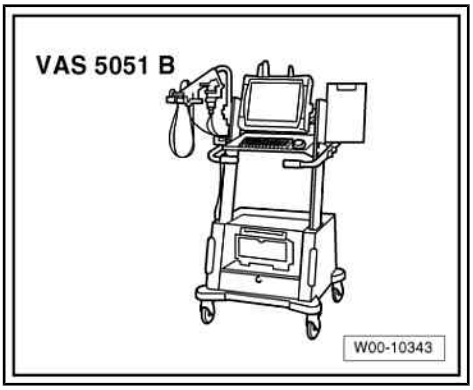
Installation is performed in reverse sequence; note the following:

– Re-adapt electronically controlled damping control unit -J250- ⇒ page 273 ⇒ Vehicle diagnostic tester.

2.3 Re-adapting reference position with vehicle diagnosis, testing and information system -VAS 5051B-

Special tools and workshop equipment required

♦ Vehicle diagnosis, testing and information system -VAS 5051B- with appropriate diagnosis lead



WARNING

- ***Test equipment must always be secured to the rear seat when road-testing the vehicle.***
- ***While the vehicle is moving this equipment must be operated by a second person; NOT by the driver.***

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– Connect diagnostic tester to vehicle with appropriate diagnosis cable.

– Switch on diagnostic tester .

The diagnostic tester is ready for operation when the selector „buttons“ for the operating modes appear on the screen.

– Switch on ignition.

Requirements

- The vehicle must be standing on a level surface.
- The vehicle must be unladen.

- Electronically controlled damping control unit -J250- must be correctly coded.
- The event memory must not contain any faults relating to vehicle level senders .

Note

When control units or other electrical/electronic components have been renewed, the relevant component(s) must be adapted via „Guided Functions“.

– Touch the Guided Functions button on the display screen.

Then:

– Select the relevant program in „Guided Functions“.

– Follow the instructions on the screen.

Note

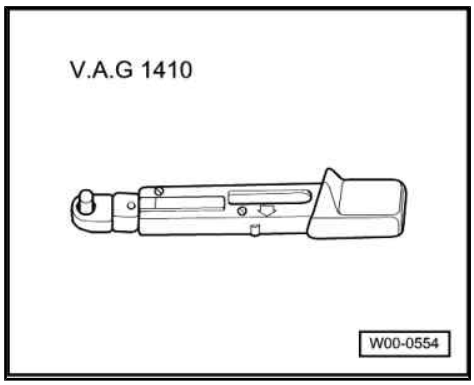
If the reference position has been re-adapted, on vehicles with lane departure warning function the lane departure warning control unit -J759- with integral camera must be recalibrated
⇒ page 352 .

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2.4 Removing and installing front left body acceleration sender -G341- and front right body acceleration sender -G342-

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1410-



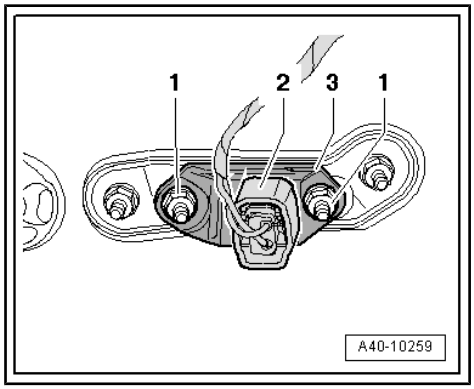
Removing

– Remove wheel.

– Remove front wheel housing liner ⇒ Rep. gr. 66 .

– Release connector -2- and unplug.

– Unscrew nuts -1- and detach sender -3-.



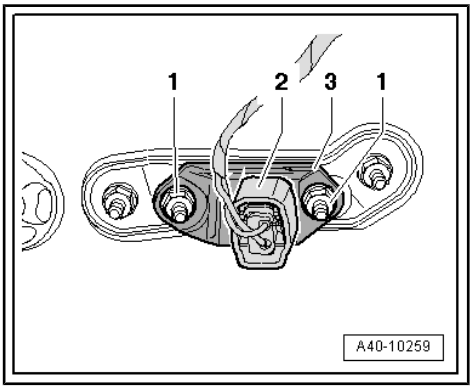
Installing

Installation is carried out in the reverse sequence. Note the following points:

– Note correct position of sender when installing.

– Install sender as shown in illustration.

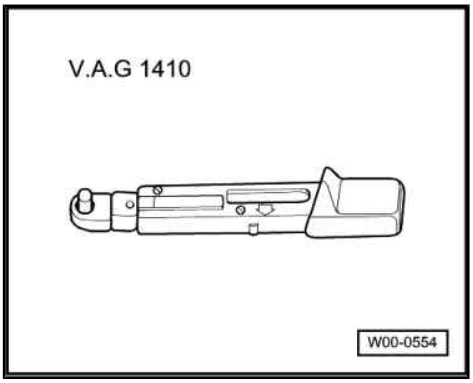
– Fit nuts -1- and tighten to 5 Nm.



2.5 Removing and installing rear body acceleration sender -G343-

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1410-



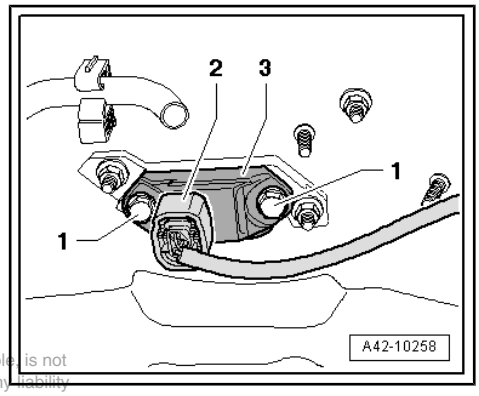
Removing

– Remove wheel.

– Remove wheel housing liner (rear left) ⇒ Rep. gr. 66 .

– Release connector -2- and unplug.

– Remove bolts -1- and detach sender -3-.



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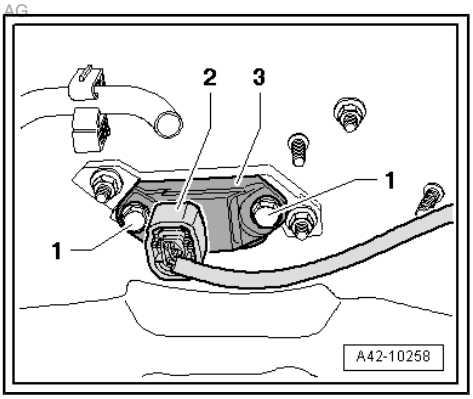
Installing

Installation is carried out in the reverse sequence. Note the following points:

– Note correct position of sender when installing.

– Install sender as shown in illustration.

– Fit bolts -1- and tighten to 5 Nm.



3 Dynamic Ride Control (DRC)

⇒ „3.1 General information on DRC“, page 276

⇒ „3.2 Fitting locations“, page 278

⇒ „3.3 Removing and installing electronically controlled damping control unit J250 (DRC)“, page 278

⇒ „3.4 Exploded view of central valves“, page 280

⇒ „3.5 DRC fault-finding“, page 281

⇒ „3.6 DRC system pressure test“, page 282

⇒ „3.7 Discharging and charging Dynamic Ride Control (DRC)“, page 284

⇒ „3.8 Removing and installing central valve“, page 293

3.1 General information on DRC

The DRC wheel damping system counteracts the pitch and roll of the body about the longitudinal and transverse axes to permit optimum handling. A driver-adjustable DRC with variable damping is installed on the Audi RS 5.

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In addition to the suppression of pitch and roll (comparable to the purely hydraulic DRC), the driver-adjustable DRC with variable damping offers the further option of setting different levels of damper stiffness by way of the Audi drive select controls. To achieve this, each shock absorber is provided with an additional element with integrated DC motor. The DC motors are activated by the electronically controlled damping control unit -J250- .

The driver can select several different damper settings:

- „COMFORT“
- „DYNAMIC“
- „AUTO“
- „INDIVIDUAL“

Use only the approved type of fluid when charging and topping up the system. Please refer to ⇒ Electronic parts catalogue

Caution

The „COMFORT“ damper setting must be activated when draining, evacuating and charging the DRC system on vehicles with variable damping.

Charging may only be performed at room temperature (approx. 20° Celsius).

Replacement shock absorbers and pipes are supplied empty.

Pipes/shock absorbers and central valves may only be drained, evacuated and charged when they are connected and installed in the vehicle.

The vehicle must never be lowered onto its wheels when the DRC system is separated from the individual components (e.g. connection between pipe/shock absorbers/central valve).

When charging the DRC system, the gas accumulator leading to the pressure chambers at the piston in the central valve is automatically checked for leaks.

If the pressure of 22 bar could not be obtained, or if the pressure drops continuously when charging the DRC system, check all the

separating couplings and connections for leaks and damage. If no irregularities are visible on the outside, the piston of the gas accumulator inside the central valve leading to the pressure chambers is leaking, so the central valve must be renewed.

Draining, evacuating or charging the DRC system can only be performed at the drain/charge valve (front) and at the drain/ charge valve (rear) of the shock absorbers in the relevant section of the system. Note the following points:

WARNING

Safety goggles must be worn for all operations.

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Drain the relevant section of the system completely before removing or disconnecting any DRC components.

Shock absorbers may only be charged when they are installed in the vehicle and connected.

The vehicle must never be lowered onto its wheels when the system is closed (and charged) and the central valves are closed off. This would invariably cause leakage and system failure.

Pipes must not be bent.

The small quantity of fluid escaping from the connection when the pressure tester -V.A.S 6209/2- is connected and disconnected with the central valve shut off is not critical. Repeated measurements should be avoided because the system loses a small amount of fluid every time the pressure tester -V.A.S 6209/2- is connected. The pressure reading will be about 0.3 bar lower than the previous value when the tester is reconnected. Several repeated measurements will thus cause the pressure in the system

to drop below the minimum limit, or can cause failure of the system.

3.2 Fitting locations

Dynamic Ride Control (DRC)

1 - Front suspension strut with drain/charge valve
⇒ page 281

- ❑ Additional element with integrated DC motor on vehicles with variable damping

2 - Warning lamp

- ❑ On vehicles with variable damping

3 - Operating unit for Audi drive select

- ❑ On vehicles with variable damping

4 - Electronically controlled damping control unit -J250-

- ❑ On vehicles with variable damping
- ❑ Removing and installing ⇒ page 278

5 - Central valves

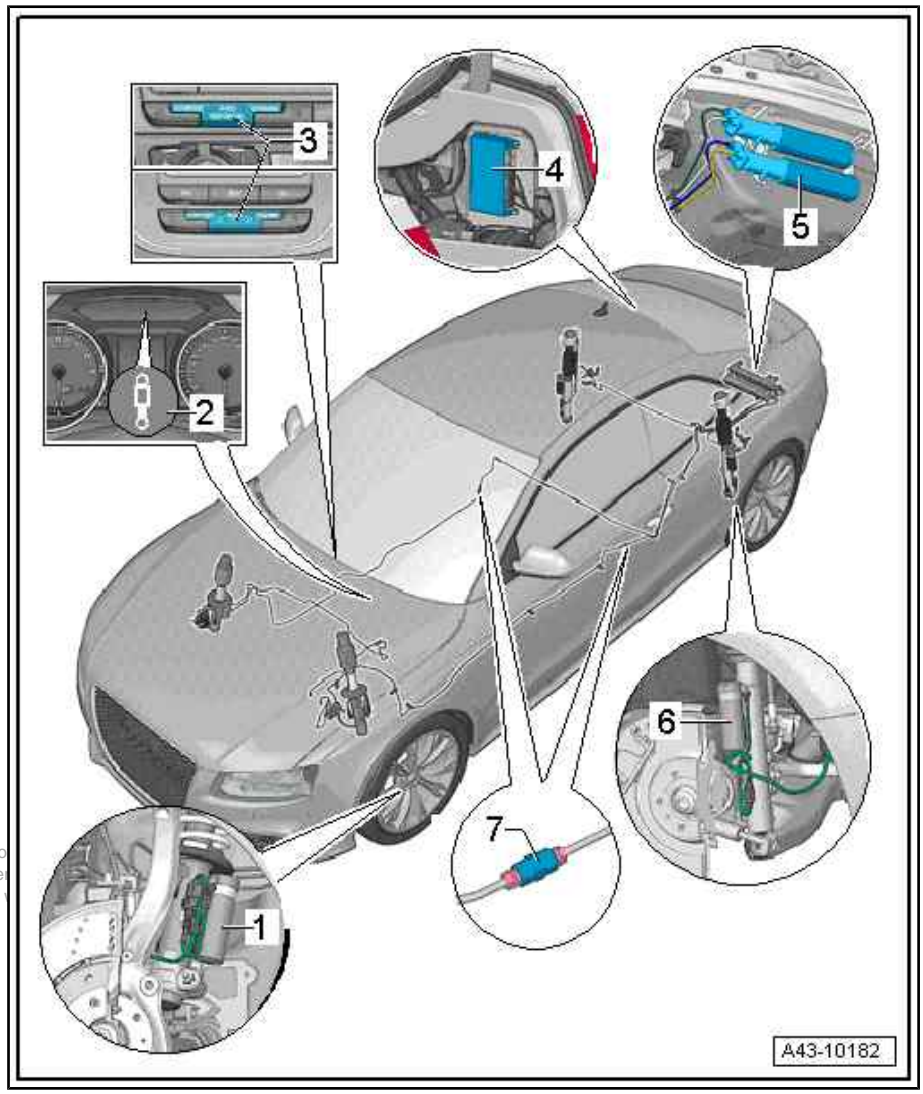
- ❑ Removing and installing ⇒ page 293

6 - Rear shock absorber with drain/charge valve
⇒ page 281

- ❑ Additional element with integrated DC motor on vehicles with variable damping

7 - Connecting piece to front suspension strut (right/left)

- ❑ 14 Nm



3.3 Removing and installing electronically controlled damping control unit -J250- (DRC)

Replacement of the control unit does not require encoding and adaption. For this reason the „Replacement“ function cannot be performed in the „Guided Fault Finding“ routine by way of the vehicle diagnostic, testing and information system -VAS 5051 A- .

The new electronically controlled damping control unit -J250- can be started up directly.

Note

Electronically controlled damping control unit -J250- is located behind side trim in luggage compartment (right-side)

Removing

– Switch off all electrical equipment.

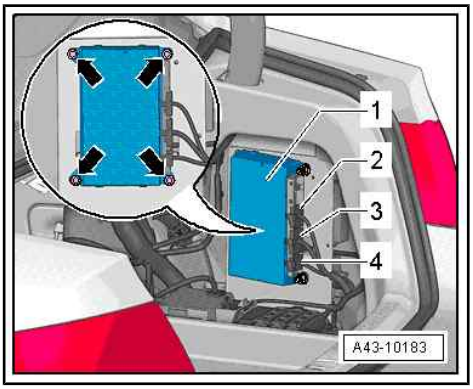
– Remove ignition key.

– Remove cover from storage compartment in luggage compartment (right-side).

– Unscrew nuts -arrows-.

– Release and detach electrical connectors -2 to 4- on control unit.

– Detach control unit -1- from bracket.

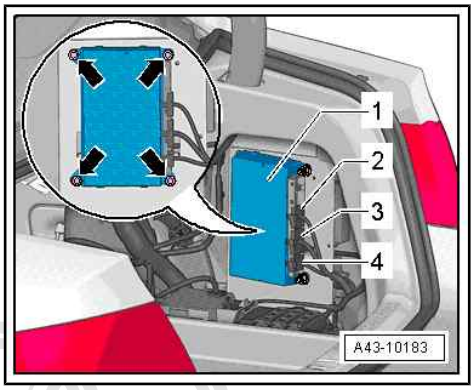


Installing

Installation is carried out in the reverse sequence. Note the following points:

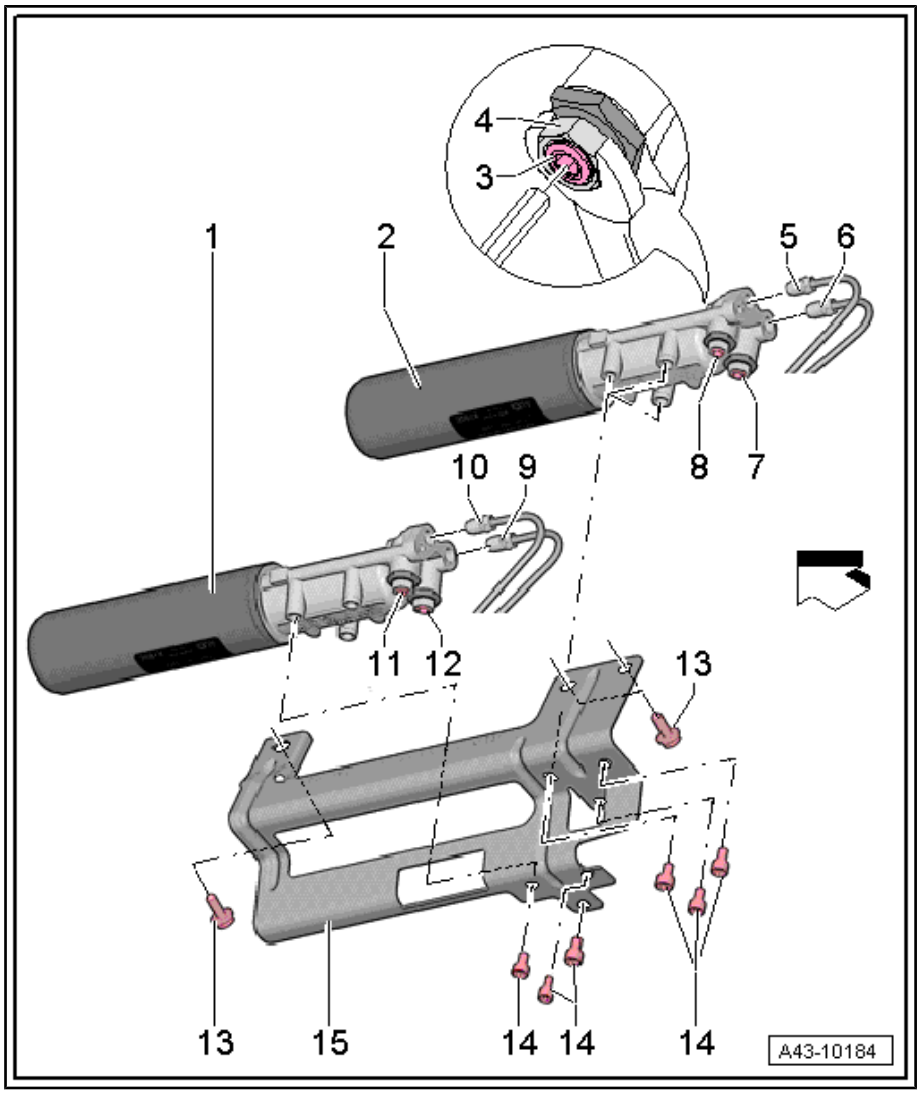
– Attach electrical connectors -2 to 4-.

– Screw in nuts -arrows- and tighten to 2 Nm.



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3.4 Exploded view of central valves



1 - Central valve for front left and rear right

- ❑ Removing and installing ⇒ page 293

2 - Central valve for front right and rear left

- ❑ Removing and installing ⇒ page 293

3 - Shut-off valve

- ❑ 5 Nm
- ❑ To shut off, turn clockwise as far as it will go
- ❑ To open, turn anti-clockwise as far as it will go

4 - Lock nut for shut-off valve

- ❑ 12 Nm

5 - DRC pipe to shock absorber (rear left)

- ❑ 14 Nm
- ❑ Green marking

6 - DRC pipe to shock absorber (front right)

- ❑ 14 Nm
- ❑ White marking

7 - Shut-off valve

- ❑ 5 Nm
- ❑ To shut off, turn clockwise as far as it will go
- ❑ To open, turn anti-clockwise as far as it will go

8 - Shut-off valve

- ❑ 5 Nm
- ❑ To shut off, turn clockwise as far as it will go
- ❑ To open, turn anti-clockwise as far as it will go

9 - DRC pipe to shock absorber (rear right)

- ❑ 14 Nm
- ❑ Blue marking

10 - DRC pipe to shock absorber (front left)

- ❑ 14 Nm
- ❑ Yellow marking

11 - Shut-off valve

- ❑ 5 Nm
- ❑ To shut off, turn clockwise as far as it will go
- ❑ To open, turn anti-clockwise as far as it will go

12 - Shut-off valve

- ❑ 5 Nm
- ❑ To shut off, turn clockwise as far as it will go
- ❑ To open, turn anti-clockwise as far as it will go

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13 - Bolt

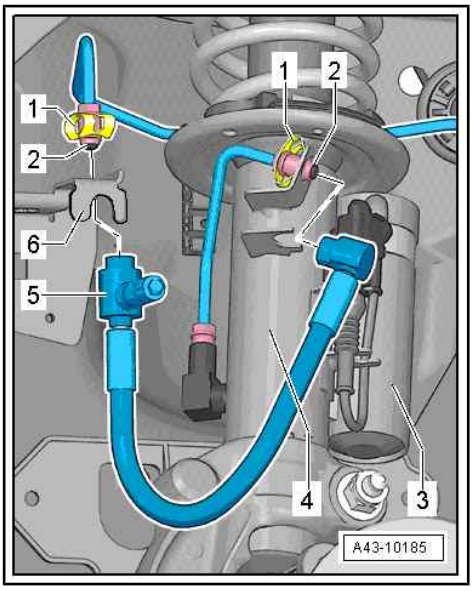
- ❑ 20 Nm

14 - Bolt

- ❑ 20 Nm

15 - Retainer

Suspension strut (front)



-1- Clamp

-2- Union nut, 14 Nm

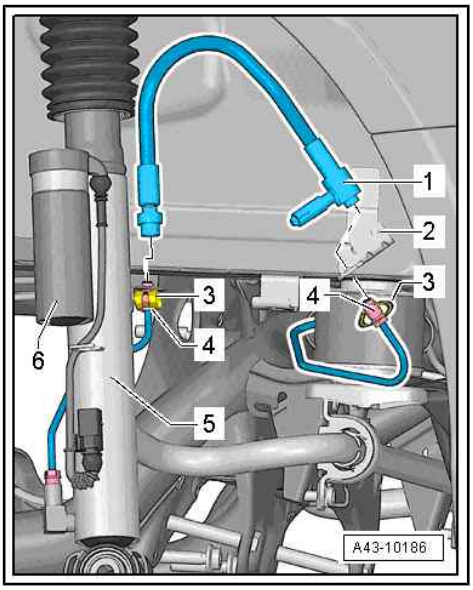
-3- Additional element with control motor, fitted on vehicles with variable damping

-4- DRC shock absorber

-5- Drain/charge valve with hose; ensure strain-free installation

-6- Bracket

Shock absorber (rear)



-1- Drain/charge valve with hose; ensure strain-free installation

-2- Bracket

-3- Clamp

-4- Union nut, 14 Nm

-5- DRC shock absorber

-6- Additional element with control motor, fitted on vehicles with variable damping

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3.5 DRC fault-finding

Start				
Rattling noise coming from suspension or rear of vehicle when driving over rough surfaces				Excessive body roll when entering a bend
→	Visible fluid leakage?			←
	↓		↓	

♦ Check components ♦ Check shock absorbers, pipes and unions at central valves ♦ Renew leaking shock absorbers	← Yes		No →	Check shock absorbers, pipes and all unions at central valves
↓			↓	
↓			Problem eliminated?	
↓			↓	↓
↓			No ↓	Yes ↓
↓			Check system pressure in both sections of system. (Central valves must be closed when connecting and disconnecting pressure tester.)	↓
↓			↓	↓
↓		System pressure higher than 18 bar?		↓
↓		No ↓	Yes ↓	↓
Drain, evacuate and charge the entire DRC section using filling device for DRC system -VAS 6544- ; check for leakage ⇒ page 284 .			↓	↓
↓			↓	↓
↓				↓
↓				
End				

3.6 DRC system pressure test

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Special tools and workshop equipment required

- Pressure tester -V.A.S 6209/2-
- Hand vacuum pump -VAS 6213-

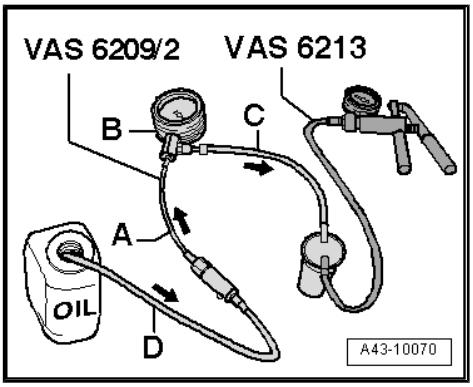
Bleeding pressure tester -V.A.S 6209/2-

Use only the approved type of fluid for this bleeding procedure.
Please refer to ⇒ Electronic parts catalogue

Note

- *The pressure tester -V.A.S 6209/2- must always be bled before it is used for the first time.*
- *Bleeding is not required if the pressure tester -V.A.S 6209/2- still indicates a residual pressure in excess of 0.5 bar (e.g. from a previous measurement).*

– Set up special tools as illustrated in order to bleed pressure gauge -B- and connecting line -A-.



Note

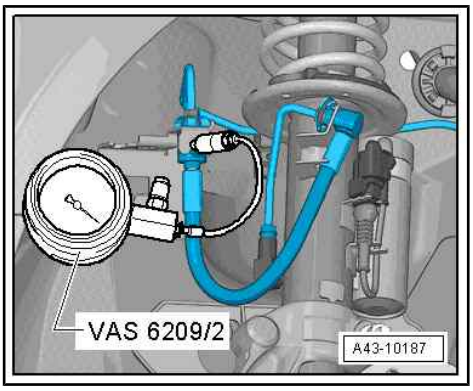
The illustration shows the bleeding method involving drawing in hydraulic fluid with hand vacuum pump -VAS 6213- .

– Continue bleeding until no more air bubbles are visible in hose -C-.

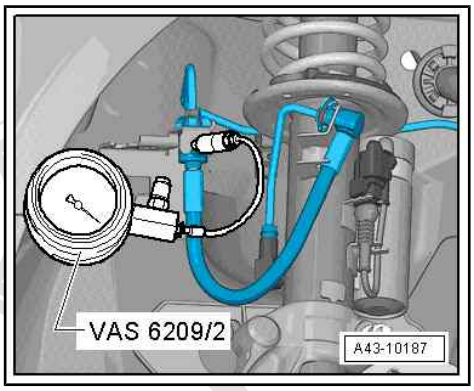
– Disconnect hoses -C- and -D- and perform system pressure test.

The system pressure test is carried out at the front shock absorber of the section of the system that is to be tested.

– Unscrew dust cap from drain/charge valve and connect pressure tester -V.A.S 6209/2- .



– Read off system pressure at pressure tester -V.A.S 6209/2- .

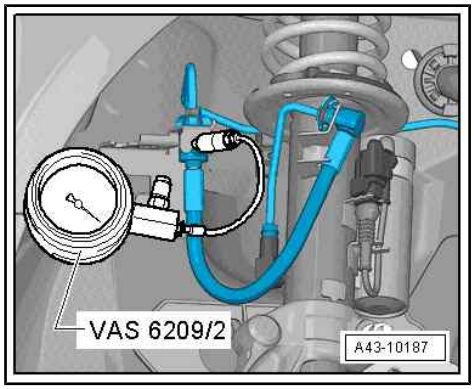


Note

The pressure at pressure tester -V.A.S 6209/2- only builds up gradually; the process takes approx. 2 minutes. Do not read off the system pressure until the gauge needle of -V.A.S 6209/2- has finally come to rest.

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– Disconnect pressure tester -V.A.S 6209/2- and screw on dust cap.



Note

When connecting and disconnecting pressure gauge -V.A.S 6209/2- , a small amount of fluid will always escape at the connection, but this is not critical. Repeated measurements should be avoided because the system loses a small amount of fluid every time the pressure tester -V.A.S 6209/2- is connected. The pressure reading will be about 0.3 bar lower than the previous value when the gauge is reconnected. Several repeated measurements will thus cause the pressure in the system to drop below the minimum limit, or can cause failure of the system.

– If the pressure is not OK, trace the cause of the fault and repair the system.

DRC system pressure values

These pressure values are based on a reference temperature of 20 °C.

- 20 bar = Operating pressure
- 19 bar – 20 bar = Central valve new or in as-new condition
- 18 bar – 19 bar = Normal working range; system OK
- < 18 bar = System leaking or not fully charged; air trapped in system; central valve depressurised/empty.

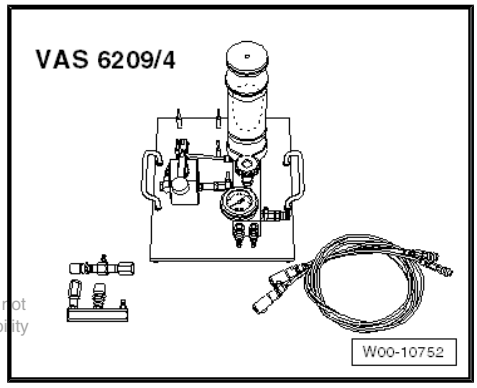
3.7 Discharging and charging Dynamic Ride Control (DRC)

Note

Draining, evacuating and charging the entire section of the DRC system (pipes/shock absorbers and central valve) is performed using the filling device for DRC system -VAS 6544- . Depending on the equipment available in your workshop for the DRC system, it may be necessary to modify/convert the existing equipment with the appropriate supplementary, upgrade or retrofit kits to meet the standard of the filling device for DRC system -VAS 6544- . The following equipment is available:

Special tools and workshop equipment required

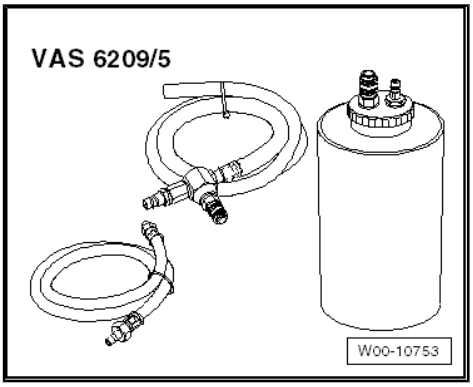
- Upgrade kit, filling device DRC system -VAS 6209/4-



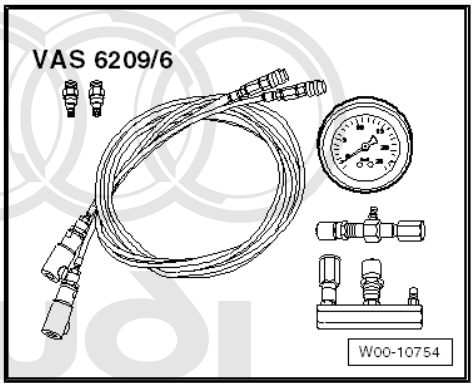
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- The upgrade kit, filling device DRC system -VAS 6209/4- is used as an upgrade kit for the charging device for Audi RS 6 DRC system -VAS 6209- already available in the workshop.

- Retrofit kit, filling device DRC system -VAS 6209/5-

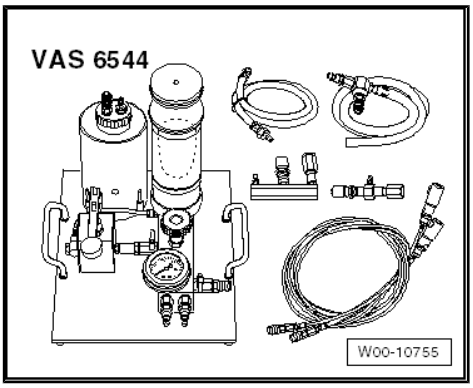


- The retrofit kit, filling device DRC system -VAS 6209/5- is required by workshops equipped with the central valve filler, Audi RS4/RS6 -VAS 6209/3- wishing to upgrade this to the technical standard of the filling device for DRC system -VAS 6544- . The supplementary kit, filling device DRC system -VAS 6209/6- must also be obtained.
- Supplementary kit, filling device DRC system -VAS 6209/6-



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- The supplementary kit, filling device DRC system -VAS 6209/6- is required to upgrade the existing central valve filler, Audi RS4/RS6 -VAS 6209/3- to the technical standard of the filling device for DRC system -VAS 6544- . As a basic requirement, the workshop must already be equipped with the charging device for Audi RS6 DRC system -VAS 6209- . If the workshop is not equipped with the charging device for Audi RS6 DRC system -VAS 6209- the retrofit kit, filling device DRC system -VAS 6209/5- must be obtained additionally.
- Filling device for DRC system -VAS 6544-



Note

The equipment for the DRC system only needs to be modified once in your workshop. It is not necessary to convert the equipment back to its original condition. The further procedure for discharging and charging the entire DRC system is described for the filling device for DRC system -V.A.S 6544- .

Use only the approved type of fluid when charging and topping up the system. Please refer to ⇒ Electronic parts catalogue „ET-KA“ .

Replacement shock absorbers and pipes are supplied empty.

Charging may only be performed at room temperature (approx. 20° Celsius).

Pipes/shock absorbers and central valves may only be drained, evacuated and charged when they are connected and installed in the vehicle.

Note

The shut-off valve for the pipe connection at the central valve must remain open when draining, evacuating and charging the DRC system (pipes/shock absorbers and central valve).

Caution

The „COMFORT“ damper setting must be activated when draining, evacuating and charging the DRC system on vehicles with variable damping.

When charging the DRC system, the gas accumulator leading to the pressure chambers at the piston in the central valve is automatically checked for leaks.

WARNING

Safety goggles must be worn for all operations.

The valves on the workshop equipment are open when the cut-off lever is in line with the direction of flow.

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Note

The valves must be kept closed for transport and storage of the filling device for DRC system -VAS 6544- .

Pipes must not be bent.

Workshop equipment required

1 - Adapter for front shock absorber

- ❑ Does not apply to this model

2 - Adapter for rear shock absorber

- ❑ Does not apply to this model

3 - Charging lines with quick-release couplings

4 - Venturi nozzle with air outlet hose

- ❑ From charging device for Audi RS6 DRC system -VAS 6209-

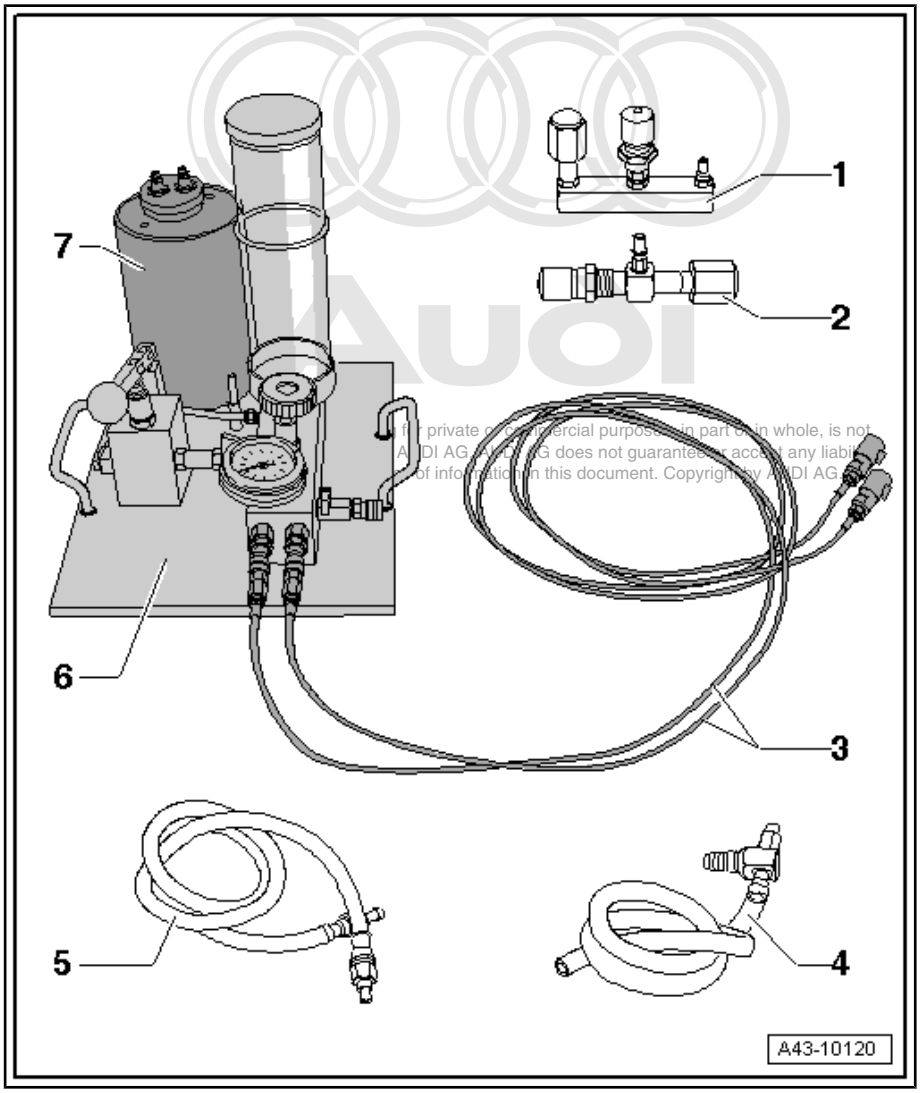
5 - Connecting hose

- ❑ From charging device for Audi RS6 DRC system -VAS 6209-

6 - Filling device for DRC system -VAS 6544-

7 - Used fluid container

- ❑ Empty before starting work
- ❑ Identified by red dot



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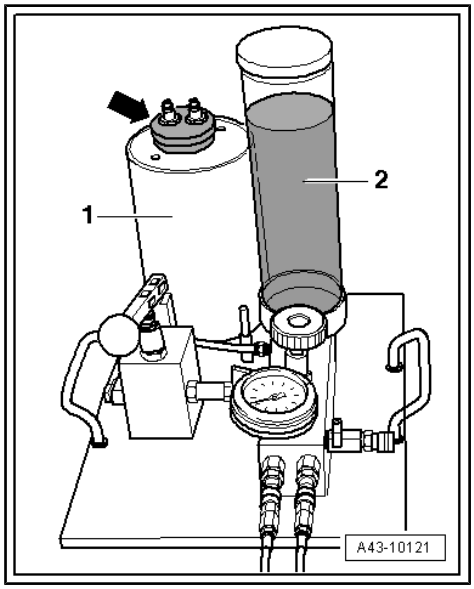
Note

- ♦ *Before starting to charge the DRC system, it is important to ensure that the fluid container of the filling device for DRC system -VAS 6544- and the connecting line between the pressure pump and the fluid container are filled with fluid.*
- ♦ *The used fluid container of the filling device for DRC system -VAS 6544- must be empty and must be drained after each extraction.*

Draining used fluid container

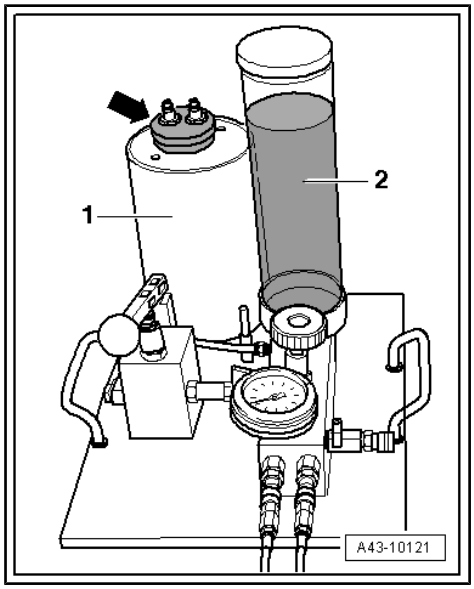
– Unscrew the cap -arrow- on the used fluid container -1- and dispose of the used fluid.

– Screw the cap -arrow- onto the used fluid container -1-.



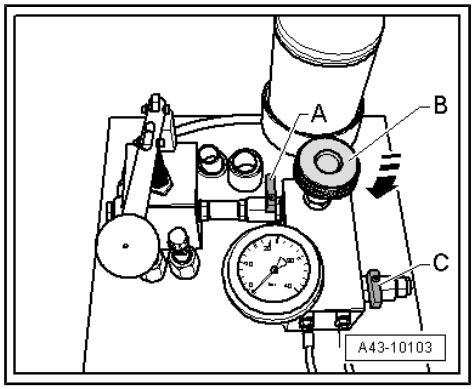
Filling and bleeding filling device for DRC system -VAS 6544-

– Fill up the fluid container -2- with fresh fluid as far as the mark and position the O-ring in line with the fluid level ⇒ Electronic parts catalogue .



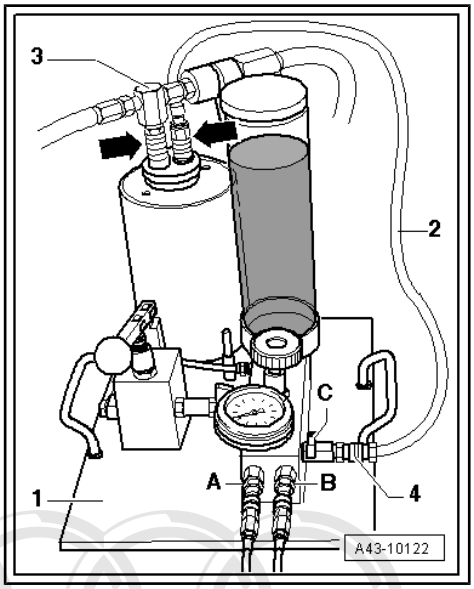
– Close shut-off valves -A- and -C- of filling device for DRC system -VAS 6544- .

– Close needle valve -B-.



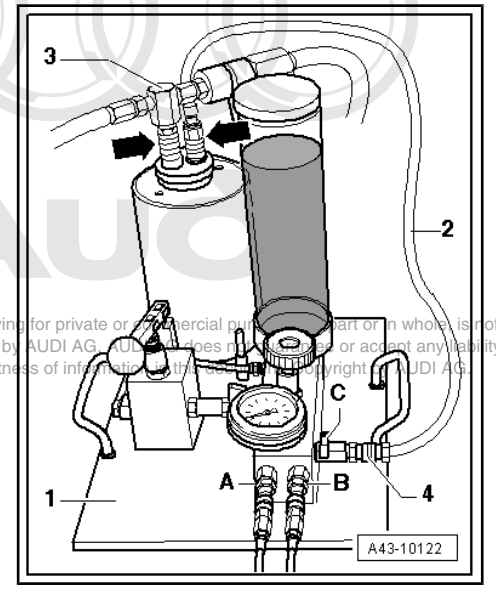
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– Connect hose -2- to used fluid container -arrow- and quick-release coupling -4- of filling device for DRC system -VAS 6544- .



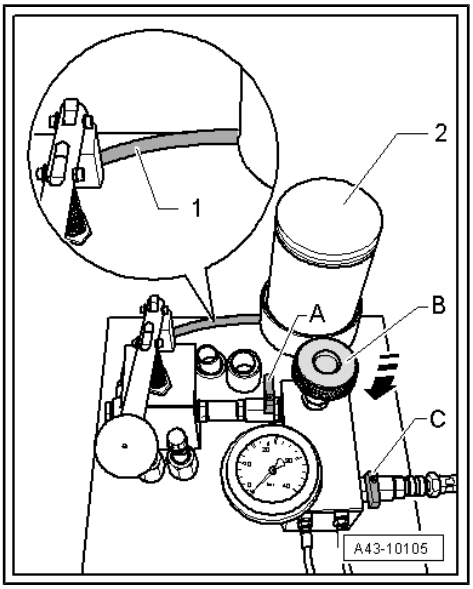
– Connect venturi nozzle -3- with air outlet hose to used fluid container -arrow- as shown in illustration.

– Connect compressed air line to venturi nozzle -3-.

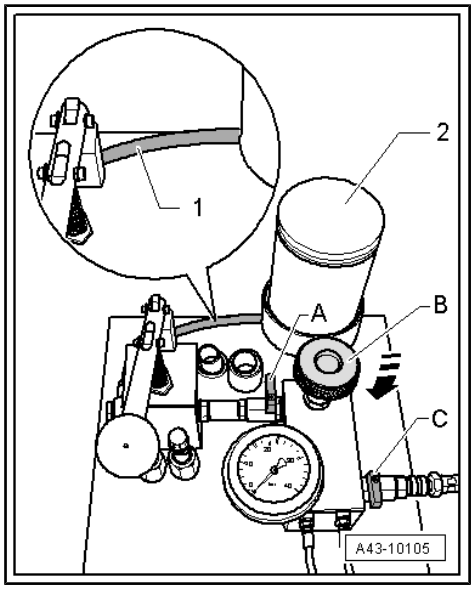


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– Open shut-off valve -C-.



– Open shut-off valve -A- briefly (for about 1-2 seconds) until line -1- between fluid tank -2- and pressure pump is filled with bubble-free fluid.
– Close shut-off valve -C-. Disconnect compressed air line from venturi nozzle.



Discharging

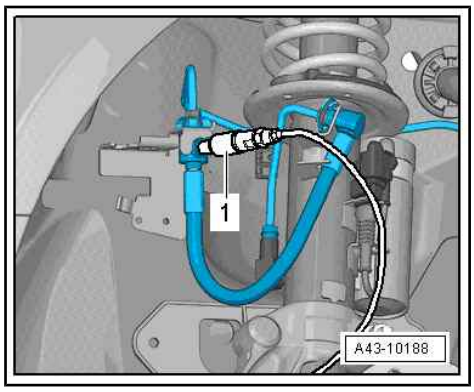
Caution

The „comfort" damper setting must be activated when draining, evacuating and charging the DRC system on vehicles with 3-stage variable damping.

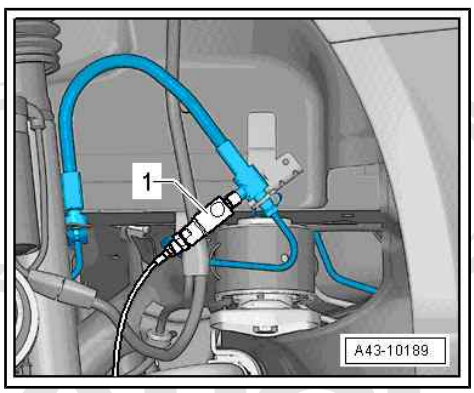
WARNING

Safety goggles must be worn for all operations.

– Turn the front wheel outwards on the side to be drained.
– Unscrew dust cap from drain/charge valve (front).
– Connect charging line with quick-release coupling -1- of filling device for DRC system -VAS 6544- ⇒ Item 3 (page 287) to drain/charge valve (front) on the pipe connection to be drained.
– Remove the rear wheel on the side of the pipe connection to be drained.
– Move clear wheel housing liner at drain/charge valve (rear).
– Unscrew dust cap from drain/charge valve (rear).

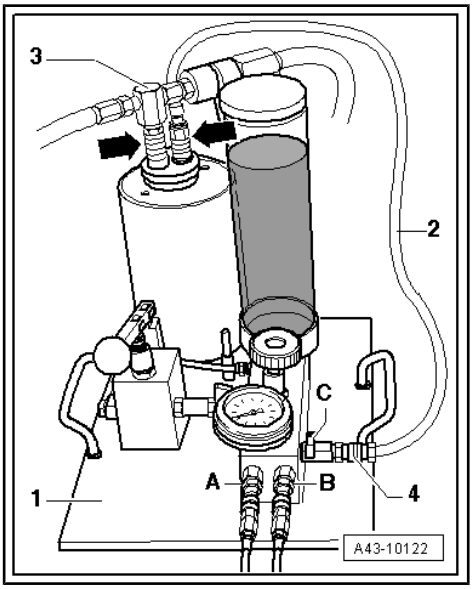


– Connect charging line with quick-release coupling -1- of filling device for DRC system -VAS 6544- ⇒ Item 3 (page 287) to drain/charge valve (rear) on the pipe connection to be drained.



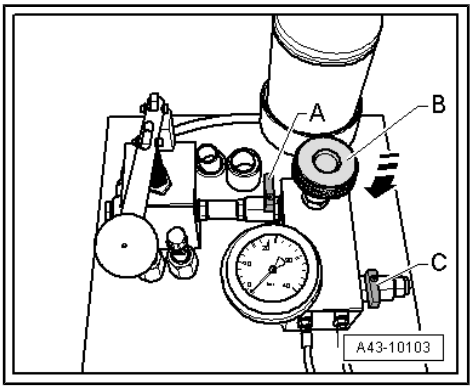
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– Connect charging lines ⇒ Item 3 (page 287) to connections -A- and -B- of the filling device for DRC system -VAS 6544- .

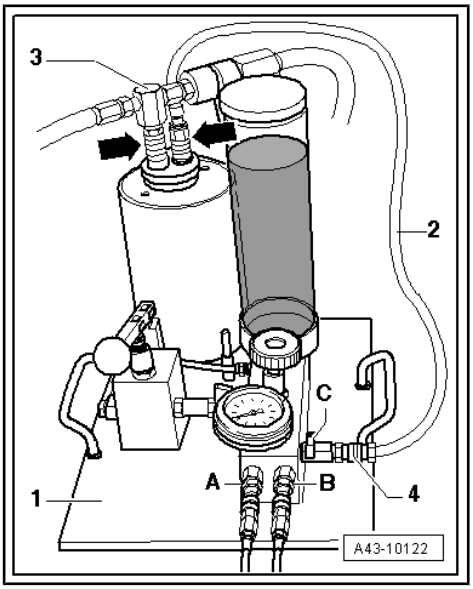


Shut-off valves -A- and -C- of filling device for DRC system -VAS 6544- closed.

Needle valve -B- closed.



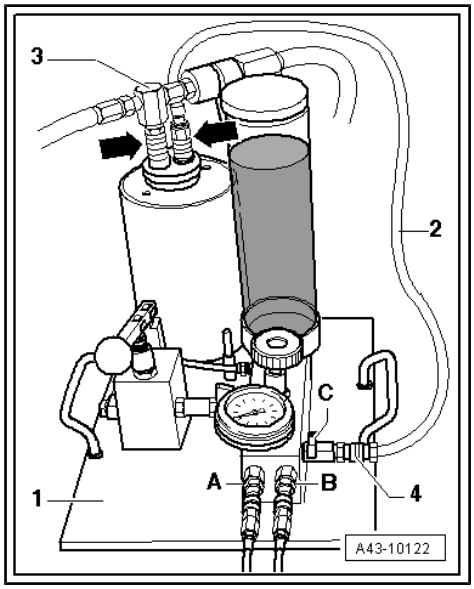
Hose -2- connected to used fluid container -arrow- and to filling device for DRC system -VAS 6544- -4-.



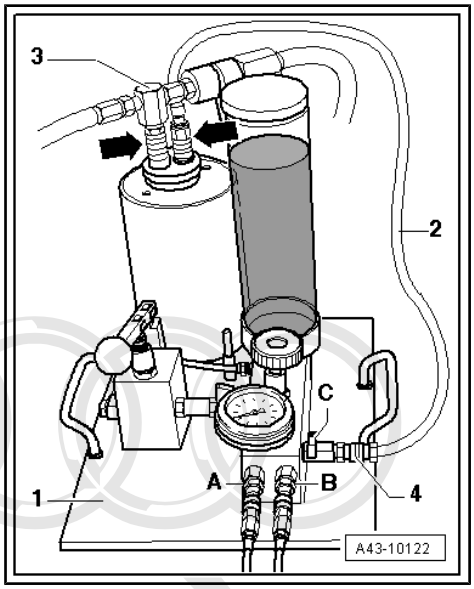
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Venturi nozzle -3- with air outlet hose connected to used fluid container -arrow- of filling device for DRC system -VAS 6544- .

Compressed air connected to venturi nozzle -3-.



– Open valve -C- until fluid is drained out of DRC system down to the smallest possible remainder. (This is visible at return hose -2- going to used fluid container).
– At a pressure gauge reading of approx. minus 0.9 bar, close valve -C- and disconnect compressed air line from venturi nozzle.
• Check for leakage.



Note

Vacuum must be maintained stable at minus 0.9 bar for at least 2 minutes.

– Check fluid level in fluid container, fill up fluid container with fresh fluid as far as the mark (if necessary) and position O-ring in line with fluid level ⇒ Electronic parts catalogue .

Caution

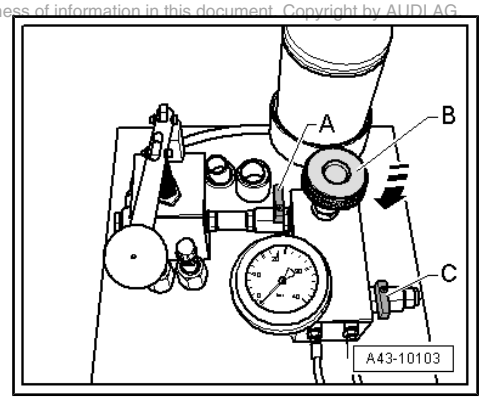
The „COMFORT" damper setting must be activated when draining, evacuating and charging the DRC system on vehicles with variable damping.

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Charging

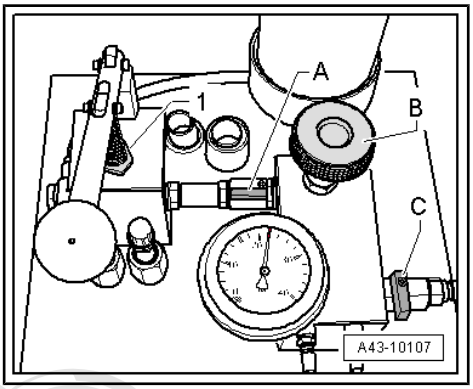
– Open needle valve -B- about two turns, allowing fluid to be drawn out of fluid container of filling device for DRC system -VAS 6544- and into evacuated DRC system.

The fluid will flow out of the fluid container and into the connected DRC system. This can be seen from the dropping fluid level in the fluid container. This process may take several minutes, depending on the quantity of fluid remaining after drainage. The rate at which the fluid level drops decreases as system charging progresses. When the fluid level stops dropping, the first step in the charging process is complete.



– Close needle valve -B-.

– Open valve -A- and charge DRC system to 22 bar by repeatedly pumping lever of hand-operated pump -1-.



Note

Make sure the fluid container of the filling device for DRC system -VAS 6544- does not run empty when charging. Top up the fluid container with fresh fluid if necessary.

- When a pressure of 22 bar has been reached, close valve -A- and stop pumping lever of hand-operated pump.

Note

- *The quality of the filling process is not improved if the maximum pressure of 22 bar is exceeded. Caution: this can damage the DRC system components and filling device for DRC system -VAS 6544- !*
- *If the pressure of 22 bar cannot be reached, or if the pressure drops continuously, check all the separating couplings and connections for leaks and damage. If no irregularities are visible on the outside, the piston of the gas accumulator inside the central valve leading to the pressure chambers is leaking, so the central valve must be renewed.*

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– Open needle valve -B- slightly and allow pressure to drop to 20 bar.

- When needle on pressure gauge reaches 20 bar mark, close valve -B-.

Note

On some versions of the pressure gauge, the 16 bar graduation has a green marking. This marking is irrelevant to the application described here and must be ignored.

Charging of the DRC system is now completed.

– Disconnect charging line with quick-release coupling of filling device for DRC system -VAS 6544- ⇒ Item 3 (page 287) from drain/charge valves (front and rear).

– Fit rear wheel.

– Screw on dust cap for drain/charge valves (front and rear).

3.8 Removing and installing central valve

Removing

The central valves are bolted on the impact bar under the rear bumper cover (left-side).

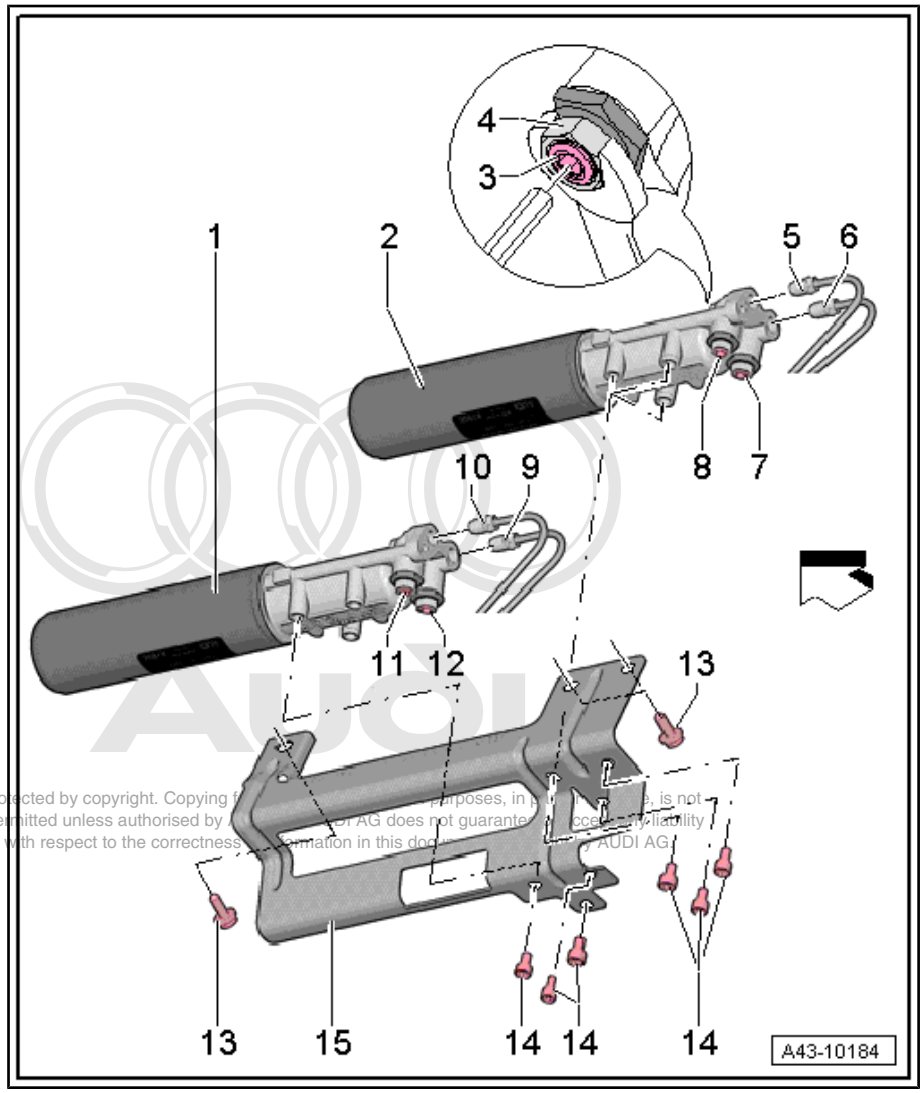
– Remove rear bumper cover ⇒ Rep. gr. 63 .

WARNING

Safety goggles must be worn for all operations.

Note

- *Before disconnecting the DRC pipes from the central valve, the relevant section of the system must be drained* *⇒ page 284* .
- *This step must be repeated for both sets of pipes connected to the relevant central valve.*



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– Unscrew union nuts -7- and -8- or -11- and -12- on relevant central valve.
– Unscrew bolts -13- and take out central valve.

Installing

– Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „3.4 Exploded view of central valves“, page 280

– Fit central valve on retainer.
– Screw in securing bolts.

– Connect DRC pipes to relevant central valve.

Note

- *The new central valve is charged and the shut-off valves are closed.*
- *Only if a new central valve is installed: Open shut-off valves on new central valve and secure with appropriate lock nut ⇒ page 280 .*

Charge DRC system
⇒ „3.7 Discharging and charging Dynamic Ride Control (DRC)“, page 284 .

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44 – Wheels, tyres, vehicle geometry

1 Wheels and tyres

This information is contained in the Workshop Manual on Wheels and tyres ⇒ Wheels and tyres; Rep. gr. 44 .

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2 Tyre monitor display (TMD+)

⇒ „2.1 General notes“, page 297

2.1 General notes

Please observe the instructions in the ⇒ Owner's Manual .

If the vehicle is equipped with a tyre monitor display, this is indicated by the corresponding production control number (PR No.) on the vehicle data sticker or in ELSA in the ⇒ Vehicle-specific notes in the document „Vehicle data“ ⇒ page 312 .

The tyre monitor display uses information from the ABS speed sensors to compare the rolling circumference and the vibration characteristics of the individual wheels. Any changes on one or more wheels are indicated on the dash panel display. If only one tyre is affected, the tyre position is indicated.

The tyre monitor display is a software module in the ABS/ESP control unit designed to detect gradual losses of tyre pressure at one wheel. Using the signals from the ABS speed sensors, the TMD+ compares the wheel speeds and thus the rolling circumference of the individual wheels. The tyre monitor display in the instrument cluster lights up if the rolling circumference of one of the wheels changes. The rolling circumference of the tyre may change under the following circumstances:

- If the tyre pressure is too low.
- If the tyre is damaged.
- If the wheels or the inflation pressures have been changed and the new tyre pressures not saved.
- If the vehicle is loaded unevenly.
- If the wheels of one axle are subjected to a greater load (e.g. when pulling a trailer or when driving uphill and downhill).
- When driving with snow-tyres.
- When driving with the temporary spare wheel.
- If one wheel has been changed on each axle (this also includes changing round the wheels from front to rear or vice versa).
- If the left and right wheels run on different surfaces for a sustained period of time.

If the tyre pressure warning appears

The tyre pressure warning on the instrument cluster indicates if the tyre pressure is too low or when there is a system malfunction.

System fault in tyre monitor display (TMD+)

If the warning lamp flashes for about 1 minute after switching on the ignition and then remains steadily lit, there is a system fault. „TPMS“ also appears in the instrument cluster.

A system fault is stored in the event memory of the ABS/ESP control unit and indicated by the yellow TMD+ warning lamp in the instrument cluster remaining continuously lit. The TMD+ lamp cannot be turned off by pressing the button on the multimedia system operating unit -E380- . Proceed as follows if a fault is stored in the event memory:

– Connect up the vehicle diagnosis, testing and information system -VAS 5051 B- and select „Guided Fault Finding“ ⇒ Vehicle diagnostic tester.
– Select the relevant program in „Guided Functions“.

Audi
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– Follow the instructions on the screen.

Performing calibration: (re-adaption of tyre pressure)

The tyre pressures must be stored on the MMI or sound system (depending on the equipment in the vehicle) following any changes to the inflation pressures or after changing a tyre on the vehicle.

– Switch on ignition, press „CAR“ function selector button, turn rotary pushbutton on multimedia system operating unit -E380- to select tyre pressure monitoring and press rotary pushbutton to save tyre pressure.

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3 Tyre Pressure Monitoring System (TPMS)

⇒ „3.1 General notes“, page 299

⇒ „3.2 Overview of Tyre Pressure Monitoring System“, page 300

⇒ „3.3 Operation of Tyre Pressure Monitoring System“, page 300

⇒ „3.4 Removing and installing tyre pressure monitor control unit J502 “, page 302

⇒ „3.5 Exploded view of tyre pressure sensor “, page 305

⇒ „3.6 Changing a tyre“, page 305

⇒ „3.7 Removing and installing tyre pressure sensor “, page 306

3.1 General notes

Please observe the instructions in the ⇒ Owner's Manual .

If the vehicle is equipped with a tyre monitor display, this is indicated by the corresponding production control number (PR No.) on the vehicle data sticker or in ELSA in the ⇒ Vehicle-specific notes in the document „Vehicle data“ ⇒ page 312 .

The Tyre Pressure Monitoring System monitors the inflation pressure of the tyres on the four road wheels while the vehicle is moving.

For safety reasons, the tyre pressure sensors must be renewed if they are damaged.

Do not use steam cleaners or a powerful jet of compressed air to clean the tyre pressure sensors .

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For safety reasons, the tyre pressure sensor must be renewed and the wheel rim must be cleaned if tyre sealing compound has been used.

The Tyre Pressure Monitoring System consists of a control unit, a central aerial integrated in the control unit and a tyre pressure sensor in each wheel.

If the wheels are changed or rotated to a different position on the vehicle, if the tyre pressure sensors are renewed, or if the tyre pressures are altered, the new status must always be confirmed by storing the pressures in the control unit.

Note

After changing wheels with tyre pressure sensors , for instance from summer to winter tyres, the tyre pressures must be checked and the sensors re-adapted to the control unit.

A fault may be detected and registered in the event memory:

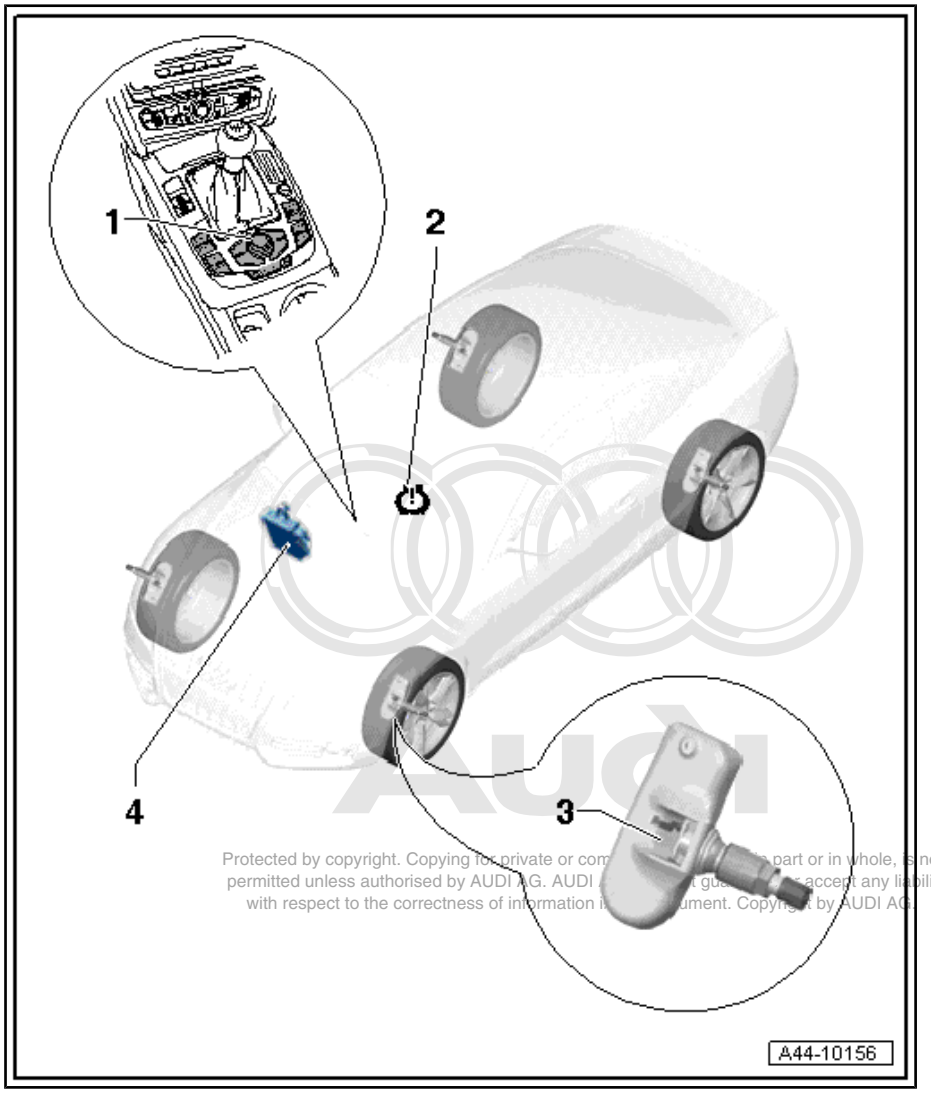
If there is a system malfunction.

If fewer than four wheels are fitted with tyre pressure sensors .

If the wrong type of tyre pressure sensor is fitted on the tyres, or if tyres without tyre pressure sensors are fitted. (In this case the yellow warning lamp with the „system fault“ pictogram will light up in the instrument cluster; this cannot be deactivated via the system.)

If the system has detected new sensors, but the button on the multimedia system operating unit -E380- has not been pressed in order to confirm the current inflation pressures. (In this case the system fault is cancelled when the button is pressed.)

3.2 Overview of Tyre Pressure Monitoring System



1 - Multimedia system operating unit -E380-

- Fitting location: The multimedia system operating unit -E380- is fitted in the centre console.
- „Tyre pressure monitoring“ can be selected by pressing the „CAR“ function selector button and then using the rotary pushbutton to select „Systems “ from the Car menu.

2 - Display in instrument cluster

- See vehicle diagnostic, testing and information system -VAS 5051 B-

3 - Tyre pressure sensor, front left -G222- , front right -G223- , rear left -G224- and rear right -G225-

- Removing and installing ⇒ page 306
- If the wheels are changed or rotated to a different position on the vehicle, if the tyre pressure sensors are renewed, or if the tyre pressures are altered, the new status must always be confirmed by storing the pressures in the control unit ⇒ page 300 .

4 - Tyre pressure monitor control unit -J502-

- The system must be re-coded if the tyre pressure monitor control unit -J502- is renewed ⇒ page 300 .
- Removing and installing ⇒ page 302

3.3 Operation of Tyre Pressure Monitoring System

Function:

The Tyre Pressure Monitoring System is operated via the multimedia system operating unit -E380- , which is installed in the centre console.

The system monitors the tyre pressures on the four road wheels that have been set by the operator and stored as reference values.

– The tyre pressures must first be checked and corrected, and then stored on the multimedia system operating unit -E380- via the „CAR“ menu by selecting „Systems“, „Tyre pressure monitoring“.

– Start by checking and correcting the inflation pressure of the tyres on the vehicle (including spare wheel) according to the figures listed on the sticker on the fuel filler flap or on the B-pillar.

Tyre pressure warning active

If the Tyre Pressure Monitoring System detects a loss of pressure in one or more tyres, the tyre pressure warning lamp in the instrument cluster lights up continuously to warn the driver. A tyre pressure warning symbol also lights up in the driver information system in the instrument cluster, together with the text „Check tyre pressures“. In this case the tyre pressures must be checked according to the figures listed on the sticker on the tank flap/B-pillar. If a severe loss of pressure has occurred at one or more tyres, check the tyres for damage and foreign bodies. Renew the tyre if necessary ⇒ page 305 .

– When the cause of the tyre pressure warning has been rectified, correct the inflation pressures and store the new pressures via the multimedia system operating unit -E380- .

System fault in Tyre Pressure Monitoring System

A system fault is stored in the tyre pressure monitor control unit -J502- . If a system fault is present or occurs while the vehicle is being driven, the yellow fault warning lamp in the instrument cluster will flash for 1 minute and then remain lit continuously every time the ignition is switched on. The yellow fault warning lamp cannot be cancelled by pressing the button on the multimedia system operating unit -E380- in the centre console, unless 1 - 4 tyre pressure sensors have been detected but the new pressures have not been stored. The letters „TPMS“ and the text „Tyre pressure ! System malfunction“ will also appear in the instrument cluster display. If a system fault has been detected, connect -VAS 5051 B- and select „Guided Fault Finding“ ⇒ Vehicle diagnostic tester.

Recoding tyre pressure monitor control unit -J502-

The new control unit must be coded if the tyre pressure monitor control unit -J502- is renewed. Proceed as follows:

– Connect -VAS 5051 B- , start Guided Fault Finding sequence for the vehicle in question and use Go to button to select „Function /Component Selection“.

– Select the relevant program in „Guided Functions“.

– Follow the instructions on the screen.

Storing tyre pressures

To ensure reliable operation of the Tyre Pressure Monitoring System, it is important to store the reference pressures correctly.

After changing the wheels or renewing a tyre pressure sensor , the button on the multimedia system operating unit -E380- in the centre console must be pressed briefly in the tyre pressure monitor menu with the ignition switched on and the vehicle stationary.

The new tyre pressures must be stored as reference values whenever the inflation pressures are changed intentionally. The system is adapted while the vehicle is driven.

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Changing a wheel or renewing a tyre pressure sensor

To ensure reliable operation of the Tyre Pressure Monitoring System, it is important to store the reference pressures from the tyre pressure sensors correctly.

After changing the wheels or renewing a tyre pressure sensor , the button on the multimedia system operating unit -E380- in the centre console must be pressed briefly in the tyre pressure monitor menu with the ignition switched on and the vehicle stationary.

The vehicle must now remain stationary for 20 minutes and then be driven for 10 minutes at a speed above 25 km/h to allow the control unit to learn the new pressures.

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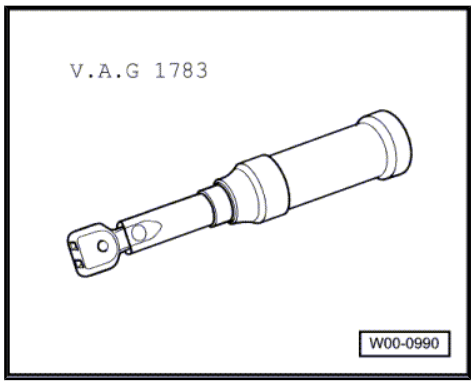
If the button on the multimedia system operating unit -E380- is not pressed, the system will adapt itself to the new sensors, but will still activate the warning lamp to remind the driver to confirm the current inflation pressures.

If the vehicle is not left stationary for 20 minutes, the control unit will not be ready to learn the pressures and the system will register a fault in the radio data transmission. It will not initialise the tyre pressure sensors automatically until the vehicle has been stationary for 20 minutes. Measured value block 126 „YES/NO“ will indicate whether or not the control unit is ready for adaption.

3.4 Removing and installing tyre pressure monitor control unit -J502-

Special tools and workshop equipment required

- Torque wrench -V.A.G 1783-



Removing

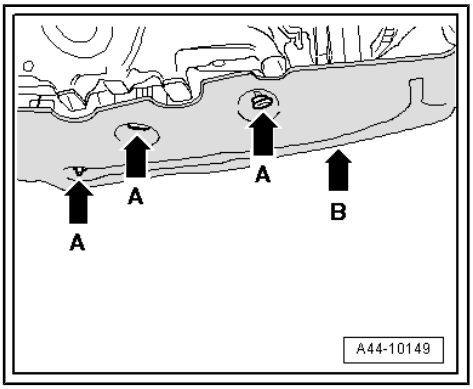
The tyre pressure monitor control unit -J502- is located in the front right footwell, beneath the dash panel.

Before removing the tyre pressure monitor control unit -J502- , start Guided Fault Finding and select „Replace control unit“.

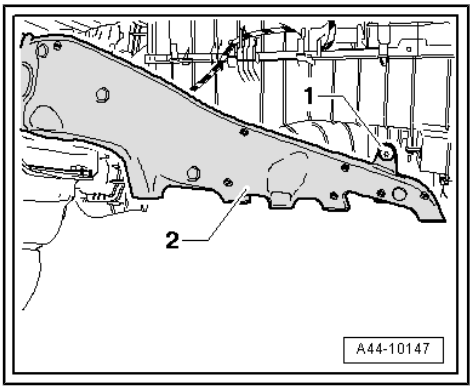
– Remove glove box ⇒ Rep. gr. 69 .

– Remove sill panel trim ⇒ Rep. gr. 70 .

– Remove fasteners -arrows A- and detach cover -arrow B-.



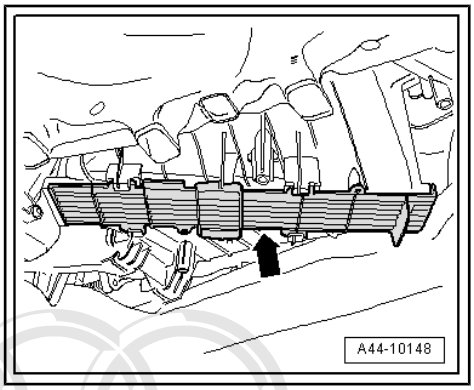
– Remove bolt -1- and detach vent -2-.



– Detach cover -arrow- and remove pollen filter.

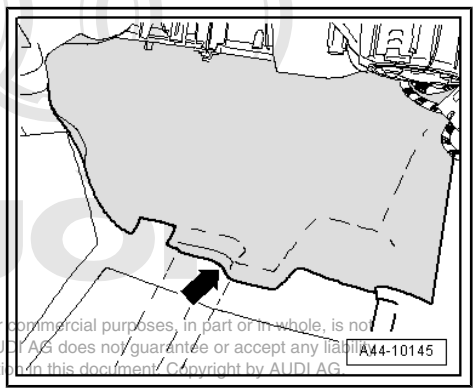
Caution

- *Take care not to tear floor covering when moving it.*



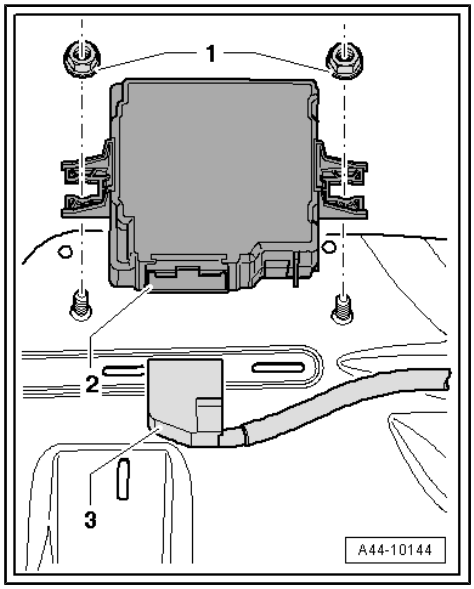
– Carefully move floor covering aside with the aid of a second mechanic.

– Turn up insulating mat -arrow-.



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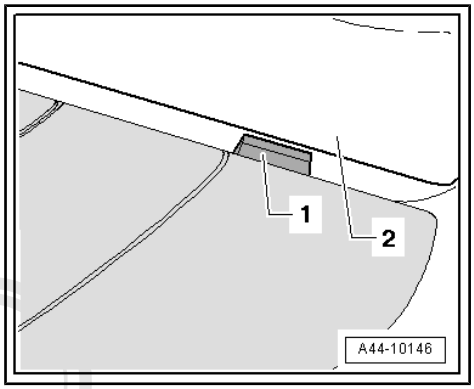
– Release and unplug connector -3-.
– Remove nuts -1- and lift out tyre pressure monitor control unit -J502- -1-.



Installing

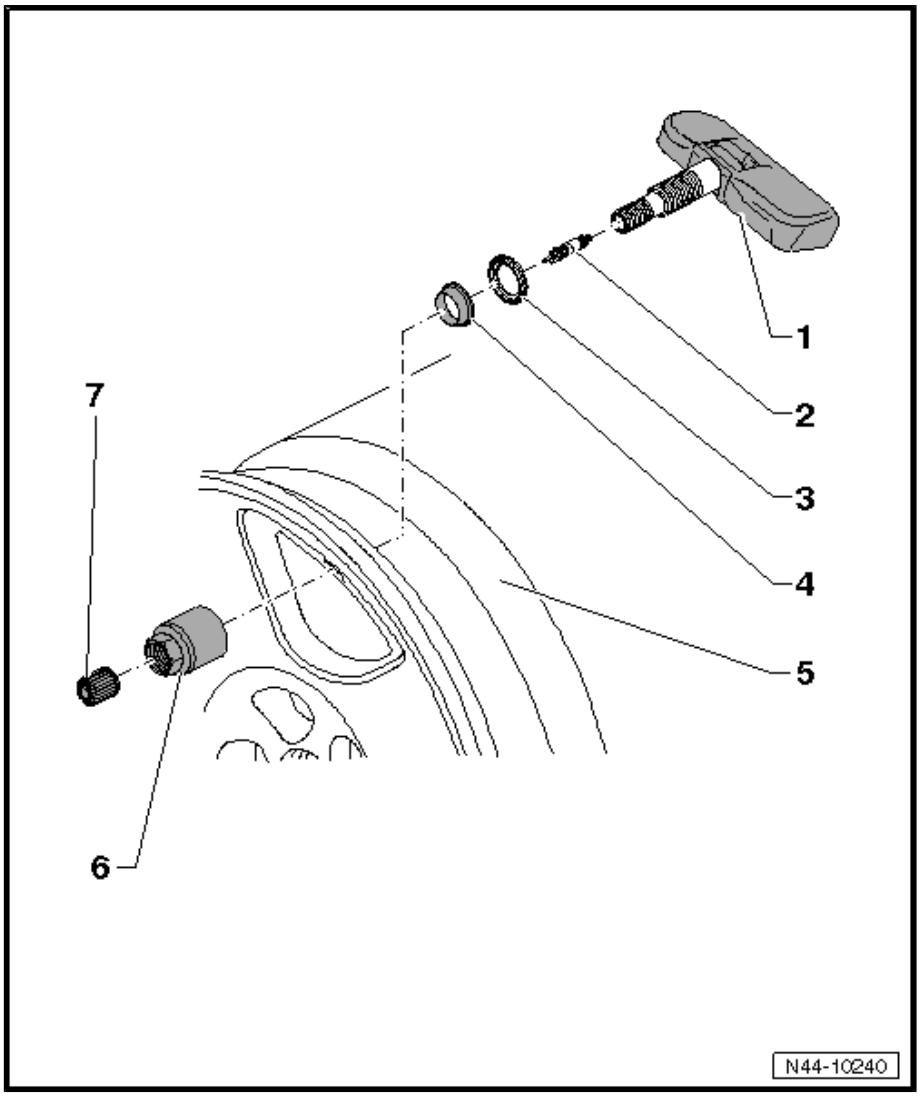
Installation is carried out in the reverse sequence. Note the following points:

– If centre console was pulled out of dash panel when pulling back floor covering, refit centre console (slide lug -1- into dash panel -2-).
– Fit nuts -1- and tighten to 2 Nm.
– The system must be re-coded if the tyre pressure monitor control unit -J502- is renewed ⇒ page 300 ⇒ Vehicle diagnostic tester.



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3.5 Exploded view of tyre pressure sensor



1 - Tyre pressure sensor, front left -G222- , front right -G223- , rear left -G224- or rear right -G225-

- ❑ Always renew valve core when new tyres are fitted ⇒ Electronic parts catalogue
- ❑ When re-installing used tyre pressure sensors , renew union nut, valve core, seal, sealing washer and valve cap ⇒ Electronic parts catalogue
- ❑ After installation, perform a visual inspection to check that the sensor is seated firmly against the base of the rim
- ❑ Always renew damaged sensors
- ❑ Do not use steam cleaners or a powerful jet of compressed air for cleaning sensors
- ❑ Removing and installing ⇒ page 306

2 - Valve core

- ❑ Always renew damaged valves
- ❑ Renew valve core if tyre is changed

3 - Sealing washer

- ❑ Hold the valve body when sliding on the new sealing washer to prevent it from being pushed out. If the connection breaks, renew the tyre pressure sensor .

4 - Seal

- ❑ Hold the valve body when sliding on the new seal to prevent it from being pushed out. If the connection breaks, renew the tyre pressure sensor .

5 - Rim

- ❑ Removing and fitting tyre ⇒ page 305

6 - Union nut

- ❑ 8 Nm

7 - Valve cap

- ❑ Use only genuine valve caps from repair kit ⇒ Electronic parts catalogue
- ❑ Do not use convenience valve caps or metal valve caps

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3.6 Changing a tyre

The nickel-plated valve core must always be renewed if a tyre is changed ⇒ Electronic parts catalogue .

The tyre pressure sensor can be re-installed.

– For safety reasons, renew the tyre pressure sensor and clean the rim after using a tyre sealant.
– Release air from tyre by unscrewing nickel-plated valve core.
– Remove tyre ⇒ page 306 .
– Renew valve core ⇒ Item 2 (page 305) if the tyre is changed.
– Do not use steam cleaners or a powerful jet of compressed air for cleaning sensors.
– When re-installing used tyre pressure sensors , inspect the parts to check whether the connection between the sensor and the metal valve is damaged.

Renew damaged sensors.

Caution

- *Hold the valve body when sliding on the new seal and sealing washer to prevent it from being pushed out.*
- *If the connection breaks, renew the tyre pressure sensor .*

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– Fit tyre ⇒ page 306 .
– Screw in new nickel-plated valve core.
– Inflate tyre.
– Balance wheel.

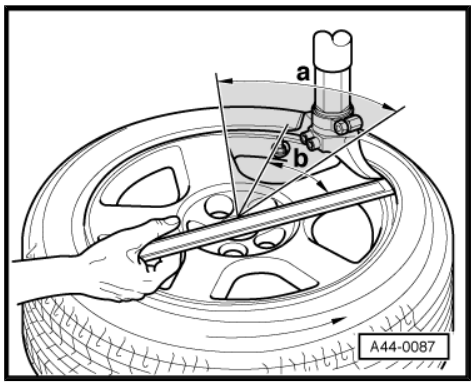
Removing tyre

Roll off or unseat tyre.

When using an unseating tool, first press off the tyre on the side opposite the valve.

Unseating tools must not be used in hatched area -a-.

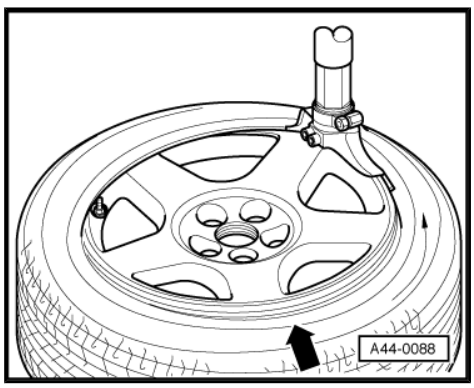
– Position head of installing tool close to valve so that tyre iron can be applied approx. 30° -b- away from valve.
– Then pull off the tyre in the valve area first.



Fitting tyre

Unseating tools must not be used in valve area.

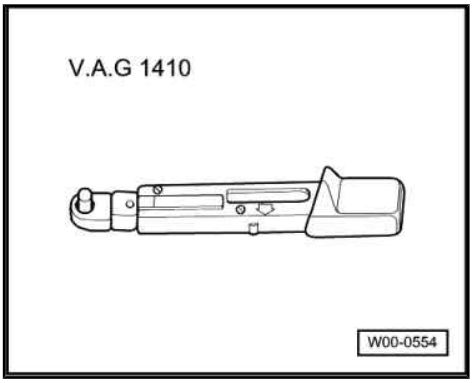
– Position tyre pressure sensor approx. 180° opposite head of installing tool.
– Press tyre into well base approx. 90° in front of installing tool -arrow-.
– Fit tyre.



3.7 Removing and installing tyre pressure sensor

Special tools and workshop equipment required

- Torque wrench -V.A.G 1410-



Removing

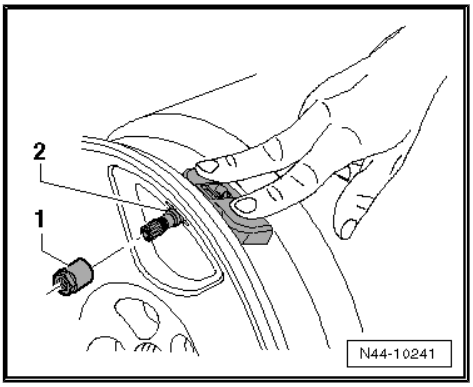
– Remove union nut -1-.

– Remove tyre pressure sensor -2- from base of rim.

Installing

Note

- *Always renew damaged sensors.*
- *When fitting used tyre pressure sensors, inspect the connection between the sensor and the valve for damage.*
- *For safety reasons, the tyre pressure sensor must be renewed and the wheel rim must be cleaned if tyre sealing compound has been used.*
- *Do not use steam cleaners or a powerful jet of compressed air to clean the tyre pressure sensor.*
- *Hold the valve body when sliding on the new seal and sealing washer to prevent it from being pushed out (this could damage the aerial connection).*

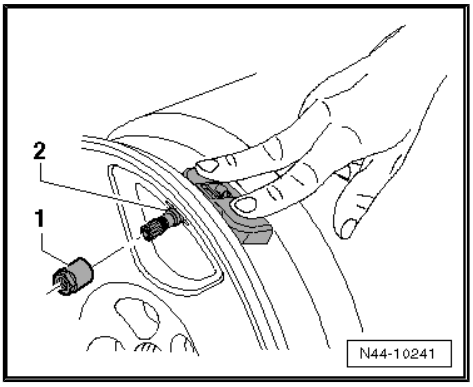


– Insert sensor -2- with new seal and sealing washer through rim from inside and press seal into centre of valve hole ⇒ Electronic parts catalogue . Perform a visual inspection to check that the valve stem is located centrally in the valve hole.

– Screw union nut -1- onto tyre pressure sensor -2-. At the same time, press sensor against base of rim and hold in position.

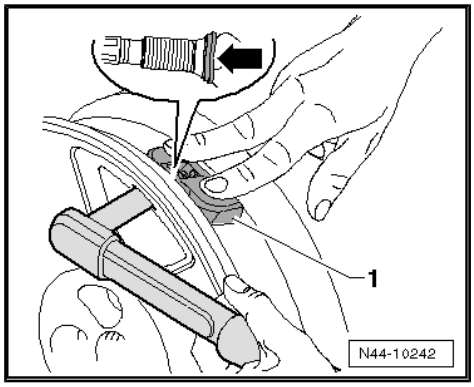
Caution

- ***When tightening the union nut, avoid exerting excessive pressure on the union nut and tool.***



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– Press tyre pressure sensor -1- against base of rim and tighten union nut ⇒ page 305 .



Note

- *After installation, the tyre pressure sensor must be seated firmly against the base of the rim.*
- *The sealing washer -arrow- will be deformed slightly when the nut is tightened.*

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4 Wheel alignment

⇒ „4.1 General notes“, page 309

⇒ „4.2 Wheel alignment must be checked:“, page 310

⇒ „4.3 Explanatory notes on production control numbers (PR Nos.)“, page 311

⇒ „4.4 Preparations required before calibration/adjustment of driver assist systems“, page 312

⇒ „4.5 Wheel alignment specifications“, page 313

⇒ „4.6 Test requirements for wheel alignment“, page 316

⇒ „4.7 Preparations for measurement“, page 317

⇒ „4.8 Sequence of operations for checking and adjusting wheel alignment“, page 318

⇒ „4.9 Checking centre position of steering rack (mechanical method)“, page 319

⇒ „4.10 Wheel runout compensation“, page 319

⇒ „4.11 Checking full steering lock“, page 319

⇒ „4.12 Checking camber at front wheels and centralising if necessary“, page 320

⇒ „4.13 Adjusting camber at rear wheels“, page 323

⇒ „4.14 Adjusting toe setting at rear wheels“, page 323

⇒ „4.15 Adjusting toe setting at front wheels“, page 324

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4.1 General notes

Wheel alignment must always be performed using wheel alignment equipment approved by VW/Audi.

The alignment check must always include both the front and the rear axles.

This is important to achieve proper handling and road behaviour.

Note

- *To allow running gear to fully settle, wheel alignment should not be checked before the vehicle has completed 1000 to 2000 km.*
- *When making adjustments, try to obtain the specified settings as accurately as possible.*

WARNING

If adjustments are made to the suspension geometry, the steering angle sender -G85- must be calibrated on vehicles with ESP or ABS ⇒ diagnostic tester .

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe mounting, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

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WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

WARNING

Risk of personal injury caused by automatic engine start on vehicles with start/stop system.

- *On vehicles with activated start/stop system (indicated by a symbol in the instrument cluster) the engine can start automatically under certain conditions.*
- *When working on the vehicle, it is therefore important to ensure that the start/stop system is deactivated (switch off ignition and switch on again if required).*

4.2 Wheel alignment must be checked:

- In the event of handling problems
- Following accident damage
- If suspension components have been removed.
- If tyres are worn unevenly.

Front suspension component renewed:	Wheel alignment check required		Rear suspension component renewed:	Wheel alignment check required	
	Yes	**No**		**Yes**	**No**
Upper link (rear)		X	Coil spring		X
Upper link (front)		X	Upper transverse link	X	
Guide link (bottom)		X	Lower transverse link	X	
Track control link (bottom)		X	Bonded rubber bush		X
Swivel joint		X			
Suspension strut		X	Shock absorber		X
Shock absorber fork		X			
Wheel bearing housing		X	Wheel bearing housing	X	
Track rod	X		Track rod	X	
Track rod ball joint	X				
Steering box	X				
Subframe	X		Subframe	X	
Anti-roll bar		X	Anti-roll bar		X
Coupling rod		X	Coupling rod		X

Front suspension component removed and re-installed:	Wheel alignment check required		Rear suspension component removed and re-installed:	Wheel alignment check required	
	Yes	**No**		**Yes**	**No**
Upper link (rear)		X	Coil spring		X
Upper link (front)		X	Upper transverse link	X	
Guide link (bottom)		X	Lower transverse link	X	
Track control link (bottom)		X	Bonded rubber bush		X
Swivel joint		X			
Suspension strut		X	Shock absorber		X
Shock absorber fork		X			
Wheel bearing housing		X	Wheel bearing housing	X	
Track rod	X		Track rod	X	
Steering box	X				
Subframe	X		Subframe	X	
Anti-roll bar		X	Anti-roll bar		X
Coupling rod		X	Coupling rod		X

4.3 Explanatory notes on production control numbers (PR Nos.)

The PR No. on the vehicle data sticker indicates the type of running gear (for front axle and rear axle) and which version of the Tyre Pressure Monitoring System is fitted in the vehicle.

The vehicle data sticker can be found in the spare wheel well and in the Service Schedule.

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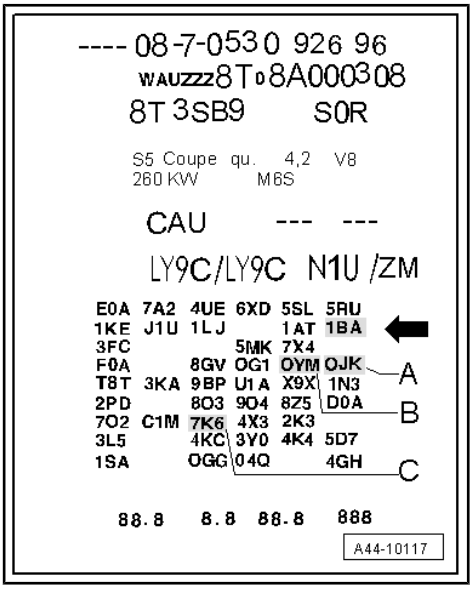
Front axle/rear axle

The PR Nos. for the front axle and rear axle are shown in the illustration: -A- and -B-.

– -A- indicates front axle PR No.

– -B- indicates rear axle PR No.

The PR numbers can be used to identify the correct shock absorber combination in the ⇒ Electronic parts catalogue .



Running gear versions

The PR No. for the different running gear versions is indicated by the -arrow- in the illustration.

In this example the vehicle is fitted with standard running gear, version 1BA.

1BA = Standard running gear

1BE = Sports running gear

1BD = Sports running gear (S model)

1BL = Running gear with electronic damping control

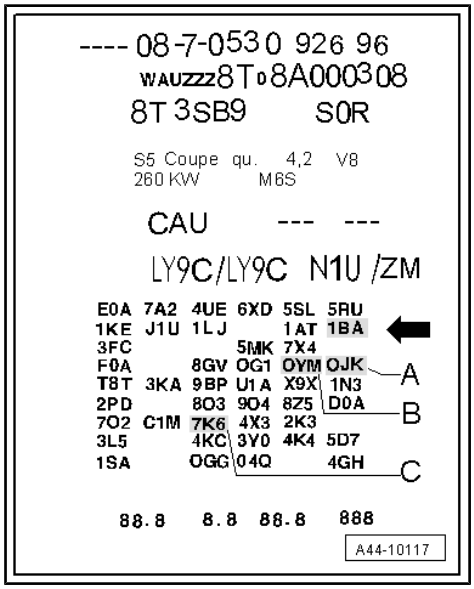
1BV = Sports running gear (S line)

1BB = China city running gear

2MS = Standard running gear (quattro GmbH RS 5)

2MC = Sports running gear with variable damping (quattro GmbH RS 5)

1BU = Sports running gear (quattro GmbH RS 5)



Tyre Pressure Monitoring Systems/ tyre monitor display

The PR number for the Tyre Pressure Monitoring System can be found in ELSA in the ⇒ Vehicle-specific notes in the document „Vehicle data“.

7K0 = Not equipped with Tyre Pressure Monitoring System

7K6 = Tyre monitor display

7K8 = Tyre Pressure Monitoring System, frequency 315 MHz Basic

Driver assist systems

The PR number for the driver assist systems can be found in ELSA in the ⇒ Vehicle-specific notes in the document „Vehicle data“.

7Y2 = Lane departure warning

7Y3 = Lane change assist plus lane departure warning

8T4 = Adaptive cruise control (ACC)

4.4 Preparations required before calibration/adjustment of driver assist systems

The following steps are required if one or more driver assist systems on the vehicle are to be calibrated or adjusted via the „Quick-start“ procedure (i.e. without first checking and adjusting the wheel alignment):

- Before driving the vehicle onto the alignment platform, make sure there is sufficient space between the vehicle and the setting device. The distance between the setting device and the vehicle must be 120 cm ± 2.5 cm.
- If the available space is not adequate, drive the vehicle backwards onto the alignment platform as required.
- Before commencing calibration/adjustment, interrogate event memory and rectify any faults.
- Vehicle accurately aligned, suspension bounced and rocked several times.
- Ensure that the sliding plates and turntables are not touching the end stop when checking the alignment.

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- Activate Wheel change mode: see instructions in ⇒ Owner's Manual .
- Connect up battery charger ⇒ Rep. gr. 27 .
- Set front wheels to straight-ahead position.
- Connect up diagnostic tester to vehicle and run diagnostic cable out through open window.
- Exterior lighting switched off.
- All vehicle doors closed.
- Press button to select required calibration/adjustment on wheel alignment computer.

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4.5 Wheel alignment specifications

Front-wheel drive and four-wheel drive (Coupé)

These specifications are applicable for all engines.

Front axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)	Variable damping RS 5 (2MC) Standard running gear RS 5 (2MS)	Sports running gear RS 5 (1BU)
Camber	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°13′ ± 23′	- 1°18′ ± 23′	- 1°31′ ± 23′
Maximum permissible difference between left and right	30′	30′	30′	30′	30′	30′
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′
Toe-out on turns at 20 degrees steering angle 8)	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′
Outer wheel steering angle at full lock	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°
Inner wheel steering angle at full lock	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°

8) The wheel on the outside of a curve is turned in less than the inside wheel. This value shows the difference in the steering angles. It can be displayed as a negative value on the wheel alignment computer, depending on the manufacturer.

Rear axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)	Variable damping RS 5 (2MC) Standard running gear RS 5 (2MS)	Sports running gear RS 5 (1BU)
Camber	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′
Maximum permissible difference between left and right	30′	30′	30′	30′	30′	30′

Rear axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)	Variable damping RS 5 (2MC) Standard running gear RS 5 (2MS)	Sports running gear RS 5 (1BU)
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Maximum permissible deviation in direction of travel relative to longitudinal axis of vehicle	10′	10′	10′	10′	10′	10′

Additional data for vehicles with front-wheel drive and four-wheel drive:

The additional data listed here are intended only to facilitate diagnosis after an accident.

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Table ⇒ page 1

Front-wheel drive and four-wheel drive (Cabriolet)

These specifications are applicable for all engines.

Front axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)
Camber	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°14′ ± 23′
Maximum permissible difference between left and right	30′	30′	30′	30′
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′
Toe-out on turns at 20 degrees steering angle [9]	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′
Outer wheel steering angle at full lock	33° 12′ + 1° 30′ - 2°	33° 12′ + 1° 30′ - 2°	33° 12′ + 1° 30′ - 2°	33° 12′ + 1° 30′ - 2°
Inner wheel steering angle at full lock	39° 36′ + 1° 30′ - 2°	39° 36′ + 1° 30′ - 2°	39° 36′ + 1° 30′ - 2°	39° 36′ + 1° 30′ - 2°

9) The wheel on the outside of a curve is turned in less than the inside wheel. This value shows the difference in the steering angles. It can be displayed as a negative value on the wheel alignment computer, depending on the manufacturer.

Rear axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)
Camber	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′

Rear axle	Standard running gear (1BA)	Sports running gear (1BE/1BD)	Running gear with electronic damping control (1BL)	Sports running gear (1BV)
Maximum permissible difference between left and right	30′	30′	30′	30′
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Maximum permissible deviation in direction of travel relative to longitudinal axis of vehicle	10′	10′	10′	10′

Additional data for vehicles with front-wheel drive and four-wheel drive:

The additional data listed here are intended only to facilitate diagnosis after an accident.

Table ⇒ page 1

Front-wheel drive and four-wheel drive (Sportback)

These specifications are applicable for all engines.

Front axle	Standard running gear (1BA)	Running gear with electronic damping control (1BL)	Sports running gear (1BE/1BD)	Sports running gear (1BV)	China city running gear (1BB)
Camber	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°5′ ± 23′	- 1°13′ ± 23′	- 44′ ± 23′
Maximum permissible difference between left and right	30′	30′	30′	30′	30′
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′
Toe-out on turns at 20 degrees steering angle [10)]	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′
Outer wheel steering angle at full lock	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°	33° 12' + 1° 30' - 2°
Inner wheel steering angle at full lock	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°	39° 36' + 1° 30' - 2°

10) The wheel on the outside of a curve is turned in less than the inside wheel. This value shows the difference in the steering angles. It can be displayed as a negative value on the wheel alignment computer, depending on the manufacturer.

Rear axle	Standard running gear (1BA)	Running gear with electronic damping control (1BL)	Sports running gear (1BE/1BD)	Sports running gear (1BV)	China city running gear (1BB)
Camber	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′
Maximum permissible difference between left and right	30′	30′	30′	30′	30′

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Rear axle	Standard running gear (1BA)	Running gear with electronic damping control (1BL)	Sports running gear (1BE/1BD)	Sports running gear (1BV)	China city running gear (1BB)
Toe setting for each wheel (specification when making adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe setting for each wheel (specification when checking adjustment)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Maximum permissible deviation in direction of travel relative to longitudinal axis of vehicle	10′	10′	10′	10′	10′

Additional data for vehicles with front-wheel drive and four-wheel drive:

The additional data listed here are intended only to facilitate diagnosis after an accident.

Table ⇒ page 1

4.6 Test requirements for wheel alignment

- Check suspension, steering and steering linkage for excessive play or damage and service if necessary.
- Tread depth difference of no more than 2 mm on one axle.
- Tyres inflated to correct pressures.
- Drive vehicle onto wheel alignment unit and ensure that suspension is not under stress, if necessary by moving vehicle backwards and forwards several times.
- Vehicle accurately aligned, suspension bounced and rocked several times.
- Sensors must be properly attached and adjusted; refer to operating instructions of equipment manufacturer.
- Ensure that the sliding plates and turntables are not touching the end stop when checking the alignment.
- Before starting the initial measurement and before making any adjustments, make sure that the steering is returned correctly to the centre position by turning the steering wheel uniformly in both directions using the steering wheel balance -VAS 6458- .
- Vehicle in unladen condition. „Unladen“ means: ready for the road (full tank, full windscreen washer/headlight washer fluid reservoir, spare wheel, vehicle tools and vehicle jack) but without driver.

Spare wheel, vehicle tool kit and jack must be in their specified positions.

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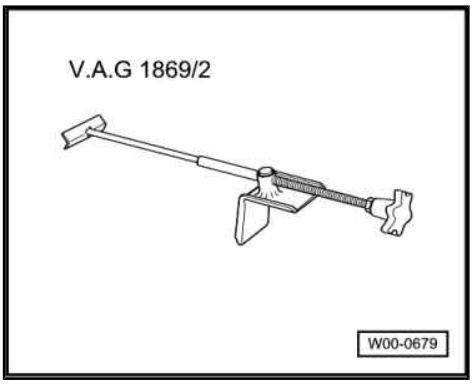
- Perform compensation of wheel rim runout: A certain amount of axial runout at the wheel rims is permissible, but this may already exceed the specified toe-in tolerance. In such cases it is not possible to set the toe-in correctly without first compensating for the wheel runout.
- Wheel alignment platforms and computer measuring equipment can lose their original levelling setting and calibration over a period of time.

- Wheel alignment platforms and computer equipment should therefore be serviced and calibrated at least once a year.
- Precision equipment of this type should be treated with appropriate care.
- If necessary, contact the manufacturer for familiarisation with the proper use of the wheel alignment equipment.

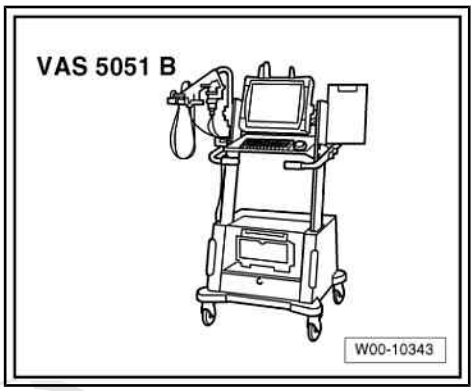
4.7 Preparations for measurement

Special tools and workshop equipment required

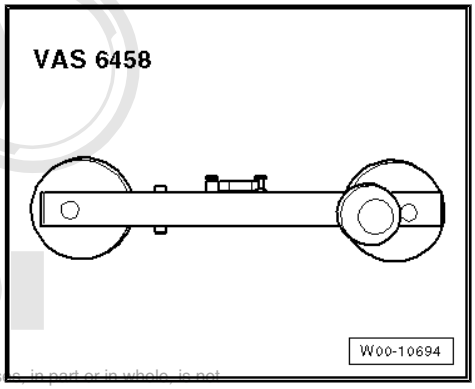
- Brake pedal actuator -V.A.G 1869/2-



- Vehicle diagnostic, testing and information system -VAS 5051 B- with appropriate diagnosis cable



- Steering wheel balance -VAS 6458-



- Wheel alignment computer

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Sensors must be properly attached and adjusted; refer to operating instructions of equipment manufacturer.

Ensure that the sliding plates and turntables are not touching the end stop when checking the alignment.

Drive vehicle onto wheel alignment unit and ensure that suspension is not under stress, if necessary by moving vehicle backwards and forwards several times.

Before starting the initial measurement and before making any adjustments, make sure that the steering is returned correctly to the centre position by turning the steering wheel uniformly in both directions using the steering wheel balance -VAS 6458- .

4.8 Sequence of operations for checking and adjusting wheel alignment

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Note

- *The vehicle must always be in unladen condition when measuring wheel alignment ⇒ page 316 .*
- *Check which running gear version is fitted in vehicle. This information is listed on the vehicle data sticker ⇒ page 311*

Always keep to the following sequence of operations.

1 - Drive vehicle onto wheel alignment unit and ensure that suspension is not under stress, if necessary by moving vehicle backwards and forwards several times.

2 - Before starting the initial measurement and before making any adjustments, make sure that the steering is returned correctly to the centre position by turning the steering wheel uniformly in both directions using the steering wheel balance -VAS 6458- .

3 - Check centre position of steering rack ⇒ page 319 .

4 - Carry out wheel rim runout compensation ⇒ page 319 .

5 - Check full steering lock ⇒ page 319 .

6 - Check camber at front wheels and centralise if necessary ⇒ page 320 .

7 - Check camber at rear wheels and adjust if necessary ⇒ page 323 .

8 - Check toe setting at rear wheels and adjust if necessary ⇒ page 323 .

9 - Check toe setting at front wheels and adjust if necessary ⇒ page 324 .

10 - If settings have been altered at the front wheels, perform calibration of dynamic steering ⇒ page 328 .

11 - If suspension settings have been changed, perform zero compensation of steering angle sender -G85- ⇒ Vehicle diagnostic tester.

12 - If settings have been altered at the rear wheels, perform calibration of dynamic steering ⇒ page 328 ⇒ Vehicle diagnostic tester.

13 - If rear axle settings have been altered, ACC adjustment ⇒ page 332 and/or calibration of the lane departure warning function ⇒ page 352 must be performed.

4.9 Checking centre position of steering rack (mechanical method)

The centre position of the steering rack can be checked approximately via the corresponding markings on the power steering box (mechanical method) ⇒ page 407 .

4.10 Wheel runout compensation

The existing lateral runout of the wheel rims must be compensated accordingly. Otherwise false results will be obtained.

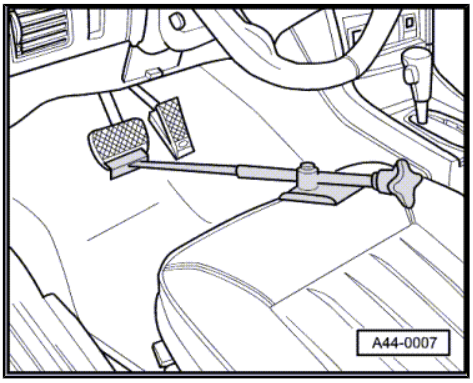
A certain amount of axial runout at the wheel rims is permissible, but this may already exceed the specified toe-in tolerance. In such cases it is not possible to set the toe-in correctly without first compensating for the wheel runout.

The toe-in cannot be set correctly without performing wheel runout compensation.

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– Please observe the operating instructions provided by the manufacturer of the wheel alignment unit.

– Set up brake pedal actuator -V.A.G 1869/2- .

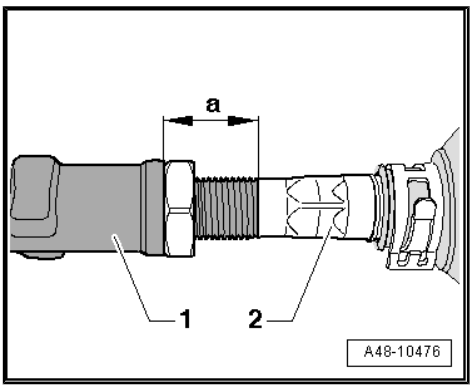


4.11 Checking full steering lock

– If the value was outside the tolerance when determining the full steering lock on the wheel alignment unit, inspect the steering and suspension for any damage or distortion and check the symmetry of the track rods. If necessary, shorten the „longer“ track rod ball joint (by screwing it further onto the track rod) and renew any damaged components.

– If the steering wheel was found to be out of alignment when checking the centre position of the steering on the wheel alignment unit, inspect the steering and suspension for damage or distortion and renew any damaged parts. Also check the symmetry of the track rods.

– Measure dimension -a- on „shorter“ track rod ball joint. Shorten the „longer“ track rod ball joint to the same dimension. To do so, screw track rod ball joint -1- further onto track rod -2-.



Dimension -a- on track rod ball joint (right-side) = dimension -a- on track rod ball joint (left-side); maximum permissible difference between right and left < 2.5 mm.

– When returning steering to centre position, allow steering wheel to „settle“ by rocking it evenly back and forth past centre position a few times.

4.12 Checking camber at front wheels and centralising if necessary

The camber cannot be adjusted.

By moving the subframe, it is possible to centralise the camber setting symmetrically within the specified tolerance range.

– Remove noise insulation ⇒ Rep. gr. 66 .

– Slacken bolts securing diagonal struts (if fitted) ⇒ page 30 .

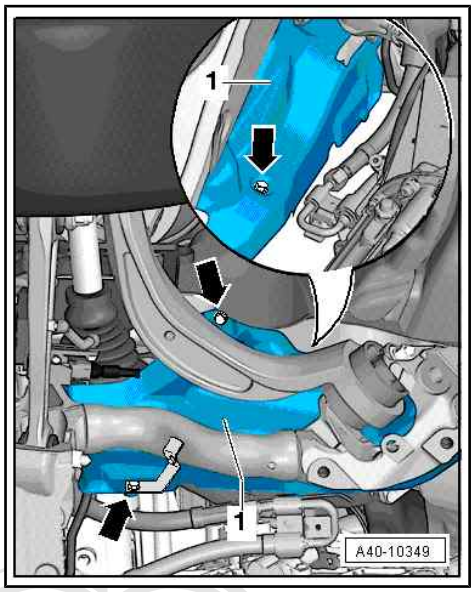
Note

- *Before centralising the camber, the tunnel cross-member must be unfastened ⇒ Rep. gr. 34 or ⇒ Rep. gr. 37 .*
- *The tunnel cross-member has to be unfastened to avoid straining the gearbox mountings.*

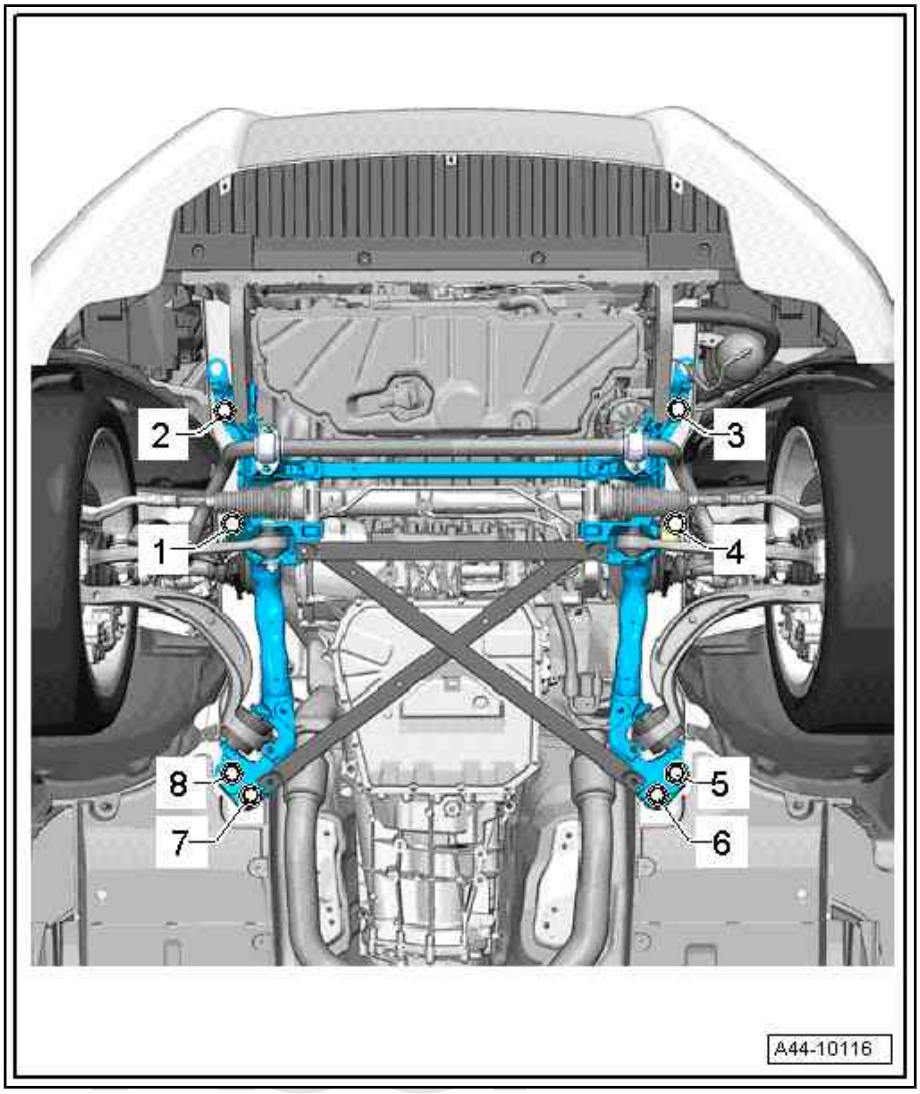
Unfasten subframe shield (not fitted on all engine versions) so that plastic-coated tyre iron can be used to move subframe.

– Remove bolts -arrows-.

– Place subframe shield -1- to one side.



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– Slacken bolts -1- to -8-.

The following steps are required in order to slacken bolt -1- (depending on engine version):

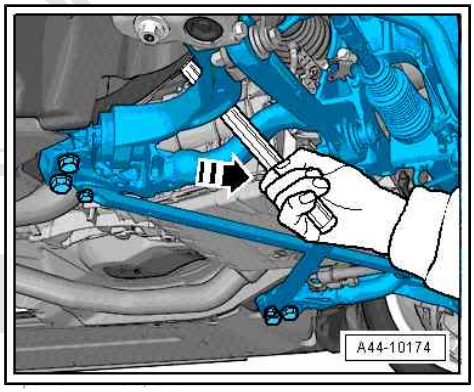
- Detach shield for drive shaft (if fitted).
- Remove one clip from wheel housing liner.
- Swivel wheel housing liner aside slightly.

Note

When moving the subframe (in order to centralise the camber setting), the vehicle must be raised at the front by positioning the axle lift under the jacking points for the lifting platform.

– Use plastic-coated tyre iron to move subframe (with engine mountings and anti-roll bar) to required position.

Position tool in centre of subframe near track control link and apply pressure between subframe and longitudinal member on body.



If no plastic-coated tyre iron is available, wrap adhesive tape around a conventional tyre iron.

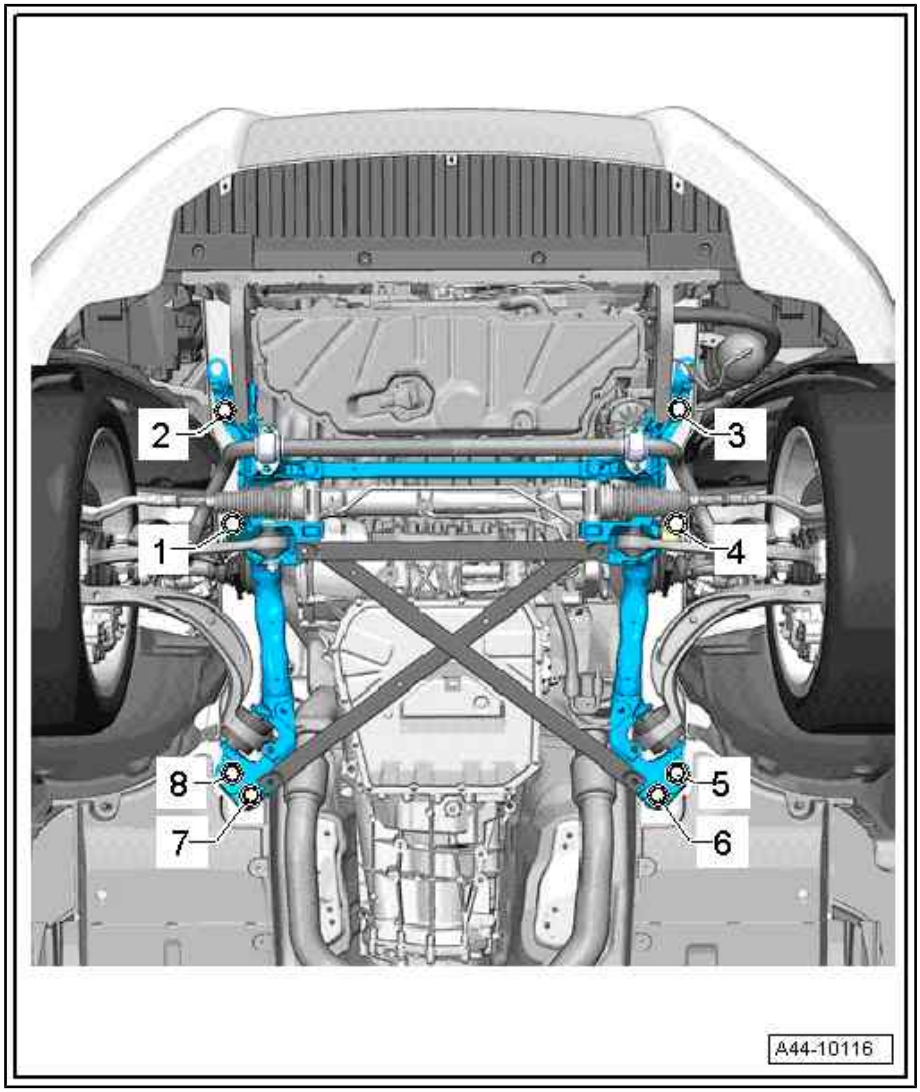
– Before checking the camber values, the vehicle must be bounced several times at the front axle.

WARNING

Take care not to damage any components.

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Wheel alignment specifications ⇒ page 313



– Tighten bolts -2- and -3- to specified torque.
– Screw in and tighten new bolts -1- and -4- in turn ⇒ page 17 .
– Screw in and tighten new bolts -2- and -3- in turn ⇒ page 17 .
– Screw in and tighten new bolts -8- and -5- in turn ⇒ page 17 .
– Screw in and tighten new bolts -7- and -6- in turn ⇒ page 17 .

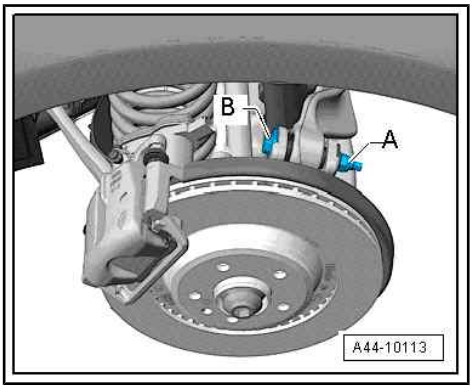
– Tighten tunnel cross member ⇒ Rep. gr. 34 or ⇒ Rep. gr. 37 .
– Now check camber setting again ⇒ page 313 .
– Install shield for drive shaft (right-side) and fastener for wheel housing liner (if removed).
– Install subframe shield (if removed). Tightening torque ⇒ page 19
– Tighten bolts for diagonal struts (if fitted). Tightening torque ⇒ page 19
– Fit noise insulation ⇒ Rep. gr. 66 .

Please note:

All wheel alignment settings must be checked if camber setting has been altered.

4.13 Adjusting camber at rear wheels

– Unscrew nut -A- at wheel bearing housing/upper link, and screw on new nut as far as stop.
– Adjust camber by turning adjuster screw -B-. Adjuster screw -B- can also be turned via hexagon flats at tip of screw.



Wheel alignment specifications ⇒ page 313

Note

- *The maximum adjustment range is 135° to the left or right of the centre position.*
- *When the end position of the adjuster screw -B- is reached, do not turn further; otherwise components will be damaged.*
- *For illustration purposes the camber adjustment is shown with the wheel removed.*

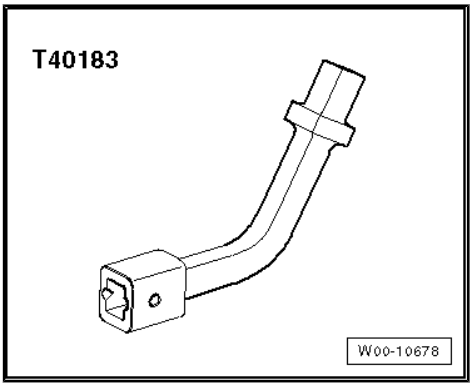
– Tighten nut -A- ⇒ Item 9 (page 174) .
– Check camber value again after tightening nut -A- ⇒ page 313 .

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4.14 Adjusting toe setting at rear wheels

Special tools and workshop equipment required

- Socket -T40183-

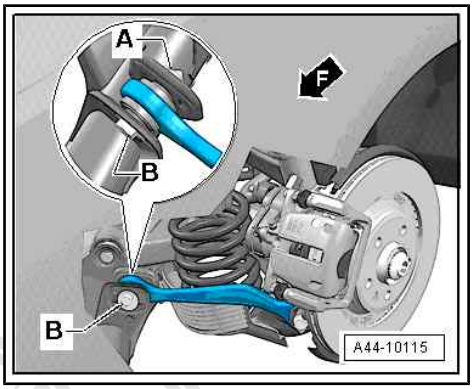


- Commercially available fine-tooth ratchet (not illustrated)

– Unscrew nut -A- at track rod/subframe, and screw on new nut as far as stop.
– Adjust toe setting by turning eccentric bolt -B-.

Wheel alignment specifications ⇒ page 313

– Tighten nut -A- using socket -T40183- ⇒ Item 25 (page 175) .
– Check toe setting again after tightening nut -A- ⇒ page 313 .



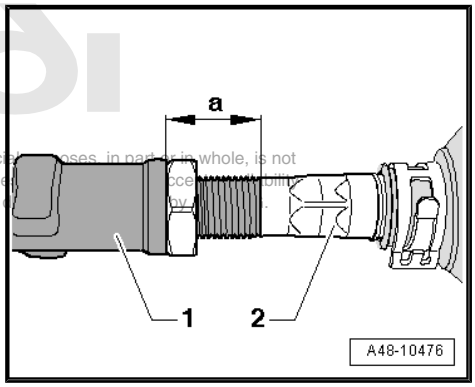
Note

- *The maximum adjustment range is 90° to the left or right of the centre position.*
- *Adjusting the individual toe settings automatically alters the geometric running direction of the axle.*

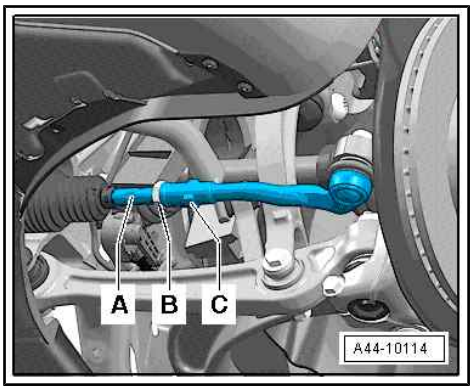
4.15 Adjusting toe setting at front wheels

– Measure and note down dimension -a- between track rod ball joint -1- and track rod -2- on both sides. Dimension -a- should be the same on the left and right prior to and after adjustment.

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– Loosen lock nut -B-.



Note

Counterhold track rod ball joint -C- when slackening lock nut -B-.

– Adjust toe setting at left and right wheels via hexagon flats -A-.

Make sure that rubber boot is not twisted after turning track rod.

Twisted rubber boots wear out quickly.

– Tighten lock nut -B- ⇒ page 407 and check toe-in value again.

The setting may change slightly after tightening lock nut -B-.

However, the adjustment is correct if the measured toe value is still inside the tolerance.

5 Dynamic steering

⇒ „5.1 General notes on dynamic steering“, page 325

⇒ „5.2 Exploded view of dynamic steering“, page 326

⇒ „5.3 Removing and installing active steering control unit J792 “, page 327

⇒ „5.4 Basic setting for dynamic steering“, page 328

5.1 General notes on dynamic steering

In conventional steering systems there is a direct mechanical connection between the steering wheel and the steering gear. This establishes a fixed ratio between the steering wheel lock angle and the turn angle of the steered wheels. In this design, only one transmission ratio can be implemented on a vehicle at a time. Selecting the appropriate transmission ratio always represents a compromise in meeting the different - and sometimes conflicting - requirements.

The key requirements can only be optimally met by a variable transmission ratio. A transmission ratio of this kind varies the actual turn angle of the wheels depending on the vehicle speed and steering angle. The dynamic steering system generally implements two variable transmission ratios, with comfort and performance-oriented characteristics respectively.

The variable transmission ratios are implemented by means of an additional electro-mechanical drive of the steering pinion, which is superimposed on the steering input from the driver. In an emergency - that is, if this drive fails - the steering operates just like a conventional steering system. The mechanical connection between the steering wheel and the front axle is not broken.

However, there are many other advantages to dynamic steering. In interaction with the ESP and its sensors, the system is also activated when critical driving states are impending. By targeted variation of the front wheel turn angle, the dynamic steering system assists the ESP at the limits of the vehicle's handling.

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The „adjuster“ on the steering column is permanently installed. The steering column must be renewed if the „adjuster“ is defective.

The „valve“ on the power steering pump is permanently installed. The power steering pump must be renewed if the „valve“ is defective.

The basic setting for the dynamic steering system must be performed correctly to ensure proper functioning.

Note

The steering angle sender -G85- must be calibrated using the steering wheel balance -VAS 6458- before the basic setting can be performed.

The basic setting must be performed if:

- The active steering control unit -J792- is renewed.
- The front axle toe setting is changed.
- The rear axle toe setting is changed.
- The running gear of the vehicle is modified in any way – e.g. conversion from standard running gear to sports running gear.
- The steering angle sender -G85- has been calibrated.

- The steering column has been renewed.
- The steering wheel is not straight when driving in a straight line.

Note

Before performing the basic setting on the dynamic steering system, check the event memory and rectify any faults. The basic setting for the dynamic steering system must always be performed using the wheel alignment equipment approved by VW/ Audi.

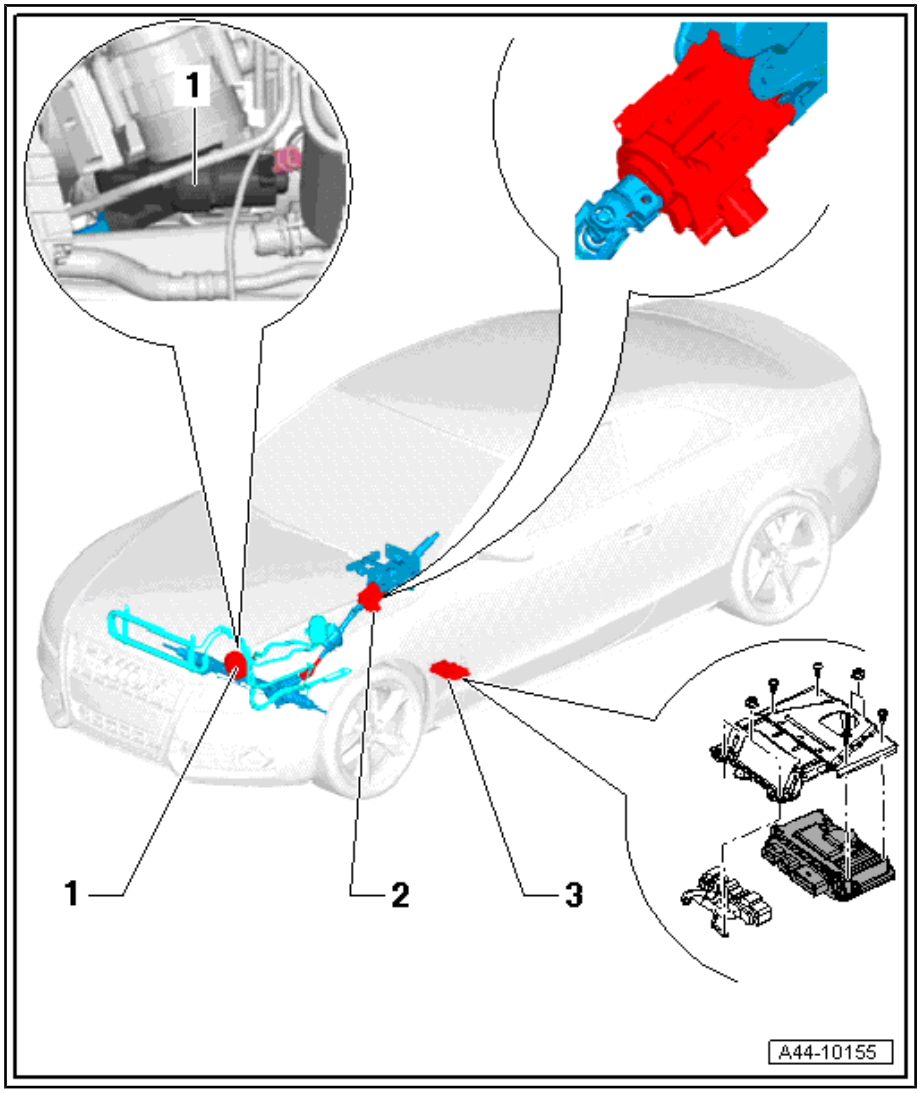
5.2 Exploded view of dynamic steering

Note

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For more information on the dynamic steering system refer to ⇒ Self-study programme No. 402 : Audi dynamic steering .

The illustration below shows the arrangement of components -2- and -3- on a left-hand drive vehicle. The arrangement of components -2- and -3- on a right-hand drive vehicle is symmetrically opposite.



1 - Power steering pump

- ❑ With electrically operated regulating valve
- ❑ Regulating valve is fitted only in vehicles with 6 or 8-cylinder engine
- ❑ Power steering pump and regulating valve are combined as one component and renewed together
- ❑ Fitting location on vehicles with 4 or 6-cylinder engine: on front left side of engine (belt drive)
- ❑ Fitting location on vehicles with 8-cylinder engine: on rear left side of engine (chain drive)

2 - Adjuster

- ❑ Must not be detached or disconnected from steering column
- ❑ Adjuster and steering column are combined as one component and renewed together
- ❑ System must be recalibrated if adjuster is renewed ⇒ page 328
- ❑ Removing and installing ⇒ page 368

3 - Active steering control unit -J792-

- ❑ System must be recali-

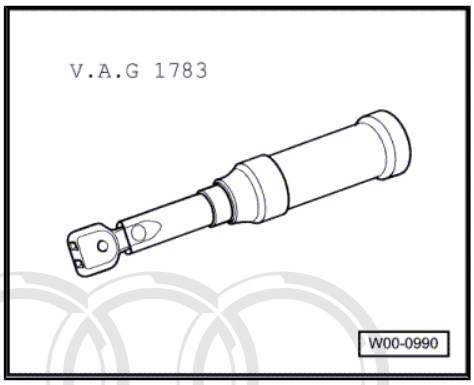
brated if active steering control unit -J792- is renewed ⇒ page 328 .

❑ Removing and installing ⇒ page 327

5.3 Removing and installing active steering control unit -J792-

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1783-



Removing

The active steering control unit -J792- is located in the footwell beneath the driver's seat.

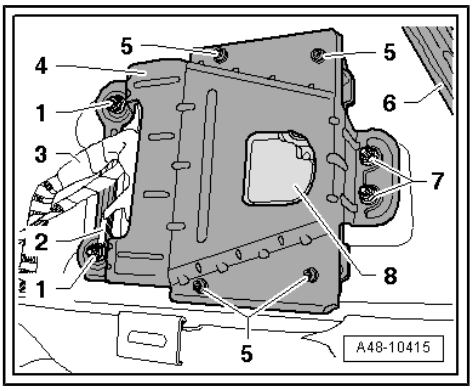
Before removing the control unit, read out the coding via Guided Fault Finding using the function „Replace control unit“.

– Unscrew driver's seat and push backwards with wiring still attached.

– Remove sill panel trim ⇒ Rep. gr. 70 .

– Remove foot rest ⇒ Rep. gr. 70 .

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– Detach floor covering and support with a suitable block of wood -6-.

– On right-hand drive vehicles, detach electronics box for telephone transmitter and receiver unit -R36- (if fitted) and place to one side ⇒ Rep. gr. 91 .

– Remove nuts -7-.

– Remove nuts -1- and detach earth connection -2- from stud.

– Carefully unfasten clip attachment of wiring harness -3- from bracket -4-.

– Unplug connectors of wiring harness -3- from control unit -8-.

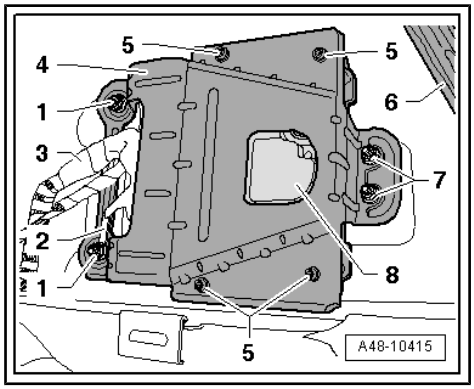
– Remove bolts -5- from control unit -8- and detach bracket -4-.

Installing

Installation is carried out in the reverse sequence. Note the following points:

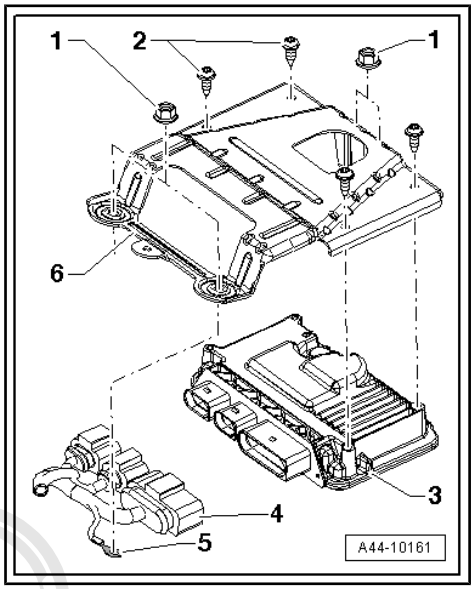
Follow sequence when installing control unit:

– Fit bracket -4- onto control unit -8- and tighten bolts -5- to 8 Nm.
– Plug connectors of wiring harness -3- into control unit -8-.
– Clip wiring harness -3- into bracket -4-.
– Install control unit with bracket.
– Attach earth connection -2- to stud and tighten nuts -1- to 6 Nm.
– Tighten nuts -7- to 6 Nm.
– System must be recalibrated if active steering control unit -J792- is renewed ⇒ page 328 .



Tightening torques:

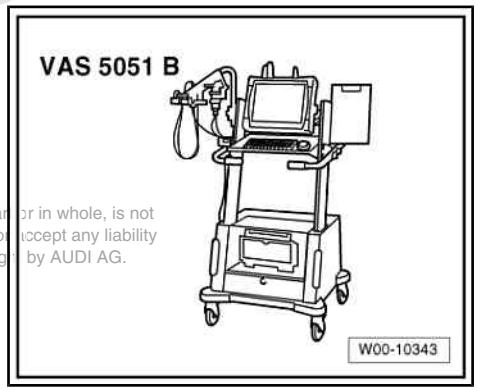
Component	Nm
Bracket -6- and earth wire -5- (integrated into wiring harness of connectors -4-) with nut -1- to stud	6
Bracket -6- with bolts -2- to control unit -3-	8



5.4 Basic setting for dynamic steering

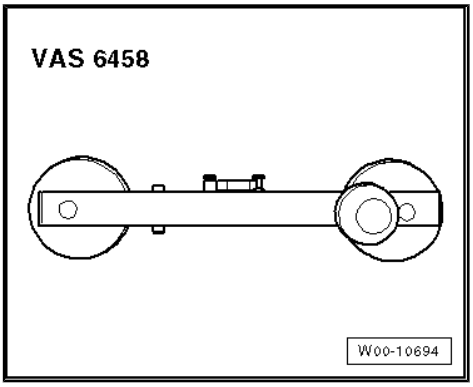
Special tools and workshop equipment required

♦ Vehicle diagnostic, testing and information system -VAS 5051 B- with appropriate diagnosis cable



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- Steering wheel balance -VAS 6458-



- Wheel alignment computer

Please note preparations required before calibration/adjustment of driver assist systems ⇒ page 312 .

There are two options for performing the basic setting on the dynamic steering system:

„Quick-start“

This procedure should be selected if:

- The active steering control unit -J792- has been renewed.
- The steering angle sender -G85- has been calibrated.
- The steering column has been renewed.
- The steering wheel is not straight when driving in a straight line.

„Full wheel alignment“

This procedure should be selected if:

- The suspension geometry has been adjusted when checking wheel alignment.
- The front axle toe setting has been changed.
- The rear axle toe setting has been changed.
- The running gear of the vehicle has been modified in any way – e.g. conversion from standard running gear to sports running gear.

Note

- *The two procedures are programmed on the wheel alignment computer.*
- *Each procedure runs automatically.*
- *All you have to do is select the relevant program.*

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„Quick-start“ procedure:	„Full wheel alignment“ procedure:
Drive vehicle onto test platform	Drive vehicle onto test platform
Activate measuring system	Activate measuring system
Select model	Select model
Carry out wheel rim runout compensation ⇒ page 319 .	Carry out wheel rim runout compensation ⇒ page 319 .
Wheel alignment computer indicates „Front wheels straight-ahead“	Perform initial wheel alignment ⇒ page 309

„Quick-start“ procedure:	„Full wheel alignment“ procedure:
Connect vehicle diagnosis, testing and information system	Align wheels
Select „Function/component selection“ ⇒ page 330 .	Perform final wheel alignment
	Answer prompt: „Dynamic steering fitted?“
	Wheel alignment computer indicates „Front wheels straight-ahead“
	Connect vehicle diagnosis, testing and information system
	Select „Function/component selection“ ⇒ page 330 .

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Note

- *Before starting basic setting procedure, the steering angle sender -G85- must be calibrated with the steering wheel balance -VAS 6458- .*
- *Before starting basic setting procedure, interrogate event memory and rectify any faults.*

– Connect battery charger ⇒ Rep. gr. 27 .
– Connect vehicle diagnosis, testing and information system - VAS 5051 B- to vehicle.
– Select calibration procedure for dynamic steering system on wheel alignment computer.
– Attach quick-release clamps to all four wheels.
– Attach wheel alignment sensors to front and rear wheels.
– Carry out wheel rim runout compensation ⇒ page 319 .
– Set front wheels to straight-ahead position when instructed to do so by wheel alignment computer.

Note

- *Disregard the steering wheel position!*
- *Only the display on the wheel alignment computer applies!*

The remaining steps are now performed using the vehicle diagnosis, testing and information system .

– Switch on ignition.
– Touch the `Guided Fault Finding` button on the display screen.
– Select the following:

- Make
- Model
- Model year
- Version
- Engine code letters

– Confirm the entered information.

Wait until the vehicle diagnostic, testing and information system has interrogated all the control units in the vehicle.

– Press the Go to button and select the option „Function/component selection“.
– Select the relevant program in „Guided Functions“.

Then follow basic setting instructions on screen.

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6 Adaptive Cruise Control (ACC)

⇒ „6.1 General information on ACC“, page 332 .

⇒ „6.2 Exploded view of sensor for adaptive cruise control G550 “, page 333 .

⇒ „6.3 Removing and installing sensor for adaptive cruise control G550 “, page 333 .

⇒ „6.4 Renewing clip on adaptive cruise control unit (from Model Year 2012 onwards)“, page 335

⇒ „6.5 Preparing ACC setting device VAS 6190 for adjustment procedure“, page 337 .

⇒ „6.6 Adjustment procedure using ACC setting device VAS 6190 “, page 339 .

⇒ „6.7 Adjustment procedure using ACC setting device VAS 6430 “, page 344

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6.1 General information on ACC

The adaptive cruise control sensor and adaptive cruise control unit -J428- are installed together in a single housing. The entire unit has to be replaced if the sensor or the control unit are defective.

In the following description the combined sensor/control unit is referred to as the „sensor“.

Sensor is located in front bumper behind air intake grille (right-side).

Malfunctions can occur if the sensor is dirty. Remove air intake grille in front of sensor as described in Workshop Manual and clean sensor.

From Model Year 2012 onwards, a new-generation sensor with a modified bracket was phased into production; refer to ⇒ Electronic parts catalogue .

Before performing ACC adjustment, read out event memory and rectify faults as necessary.

„Measured value block 2“ of the ACC control unit will indicate whether or not the sensor is only slightly out of adjustment.

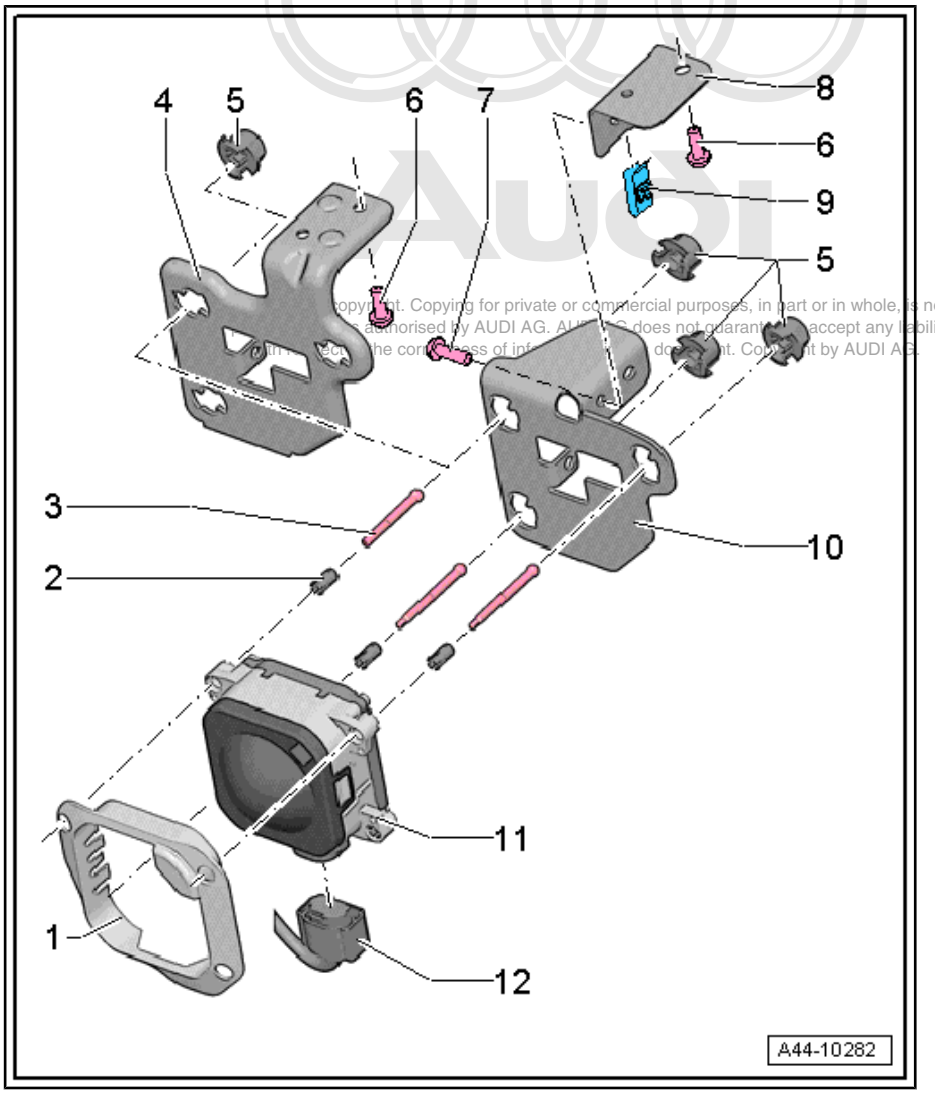
Use only wheel alignment and adjustment equipment approved by VW/Audi for ACC adjustment.

Correct adjustment is essential for proper ACC operation.

Note

- *Re-adjustment is required:*
- *If rear axle toe setting is adjusted.*
- *If complete sensor for adaptive cruise control -G550- is renewed.*
- *If longitudinal member (right-side) has been straightened.*
- *If front end of vehicle is damaged.*
- *If misalignment angle is greater than – 0.8° to + 0.8°.*

6.2 Exploded view of sensor for adaptive cruise control -G550-



1 - Cover

2 - Clip

- ❑ Fitted on vehicles from model year 2012 onwards
- ❑ Always renew clip if stud -item 3- is removed
- ❑ Removing and installing ⇒ page 335

3 - Stud

- ❑ If stud is removed, clip -item 2- must always be renewed
- ❑ Note setting dimension when installing ⇒ page 335

4 - Bracket

- ❑ For vehicles up to Model Year 2012

5 - Nut

6 - Bolt

- ❑ 8 Nm

7 - Bolt

- ❑ 8 Nm

8 - Bracket

- ❑ Fitted on vehicles from model year 2012 onwards

9 - Speed nut

10 - Bracket

- ❑ For vehicles from model year 2012 onwards
- ❑ When carrying out repairs, replace bracket with bracket -item 4-; refer to ⇒ Electronic parts catalogue

11 - Sensor for adaptive cruise control -G550-

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 333

12 - Connector

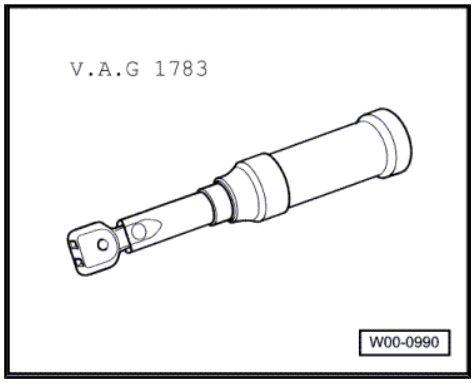
- ❑ Compress both catches to release

6.3 Removing and installing sensor for adaptive cruise control -G550-

The sensor for adaptive cruise control -G550- is located in the front bumper behind the air intake grille (right-side).

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1783-



Removing

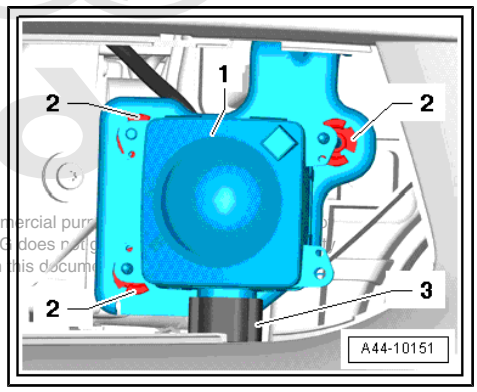
If adaptive cruise control unit is being renewed, start the appropriate program on ⇒ Vehicle diagnostic tester in „Guided Functions“.

– Detach front air intake grille (right-side) ⇒ Rep. gr. 63 .
– Audi RS 5: Remove front bumper cover ⇒ Rep. gr. 63 and unclip air duct for auxiliary radiator ⇒ Rep. gr. 19 .
– Remove cover ⇒ Item 1 (page 333) from sensor for adaptive cruise control -G550- .

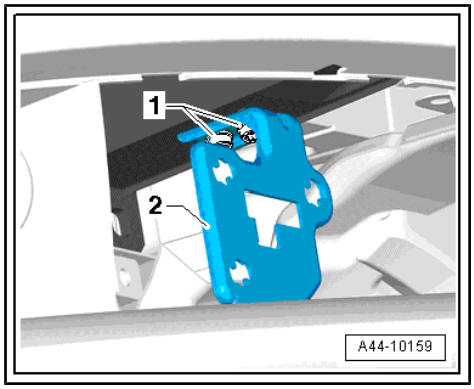
Vehicles up to model year 2012

– Turn nuts -2- approx. 45° anti-clockwise and detach.
– Release and unplug connector -3-.
– Remove sensor for adaptive cruise control -G550- -1- from front through bumper cover.

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– Remove bolts -1- and detach bracket -2-.

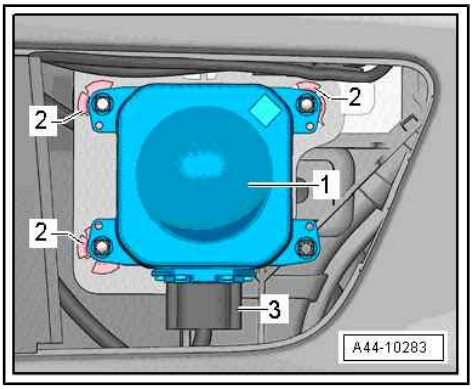


Vehicles from model year 2012 onwards

– Turn nuts -2- approx. 45° anti-clockwise and detach sensor for adaptive cruise control -G550- -1- with studs from nuts.

– Release and unplug connector -3-.

– Remove sensor for adaptive cruise control -G550- -1- from front through bumper cover.



– Unscrew bolt -1- until tip of bolt no longer protrudes from speed nut.

– Remove bolts -2- and -3- and detach bracket.

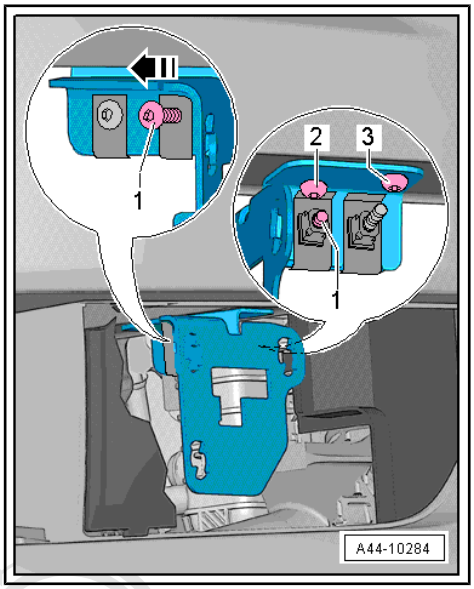
Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

The studs in the bracket are pre-adjusted. This setting should be corrected if necessary.

– Place sensor for adaptive cruise control -G550- on a soft clean surface.



Measure distance -a- for all studs.

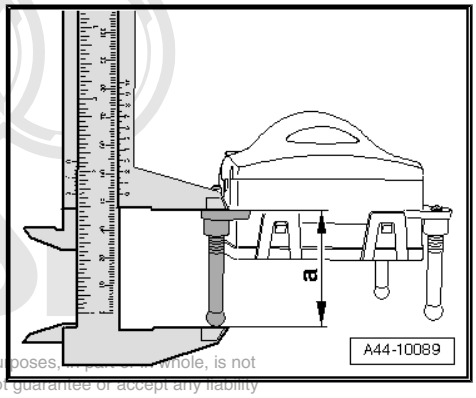
Dimension -a- should be 43 mm.

– Fit bracket and tighten bolts.

Tightening torque ⇒ page 333

– Insert sensor for adaptive cruise control -G550- , carefully press nuts onto studs in sensor for adaptive cruise control -G550- by hand and lock in position.

– Perform adjustment of ACC ⇒ page 339 .



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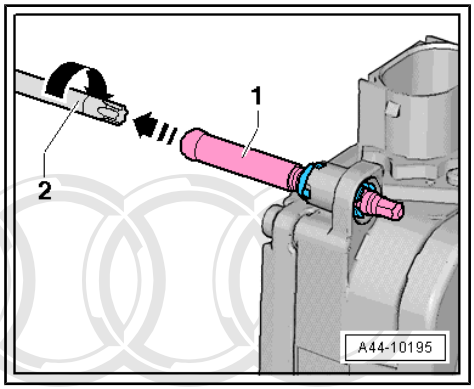
6.4 Renewing clip on adaptive cruise control unit (from Model Year 2012 onwards)

If stud ⇒ Item 3 (page 333) is removed during assembly work, clip ⇒ Item 2 (page 333) must always be renewed.

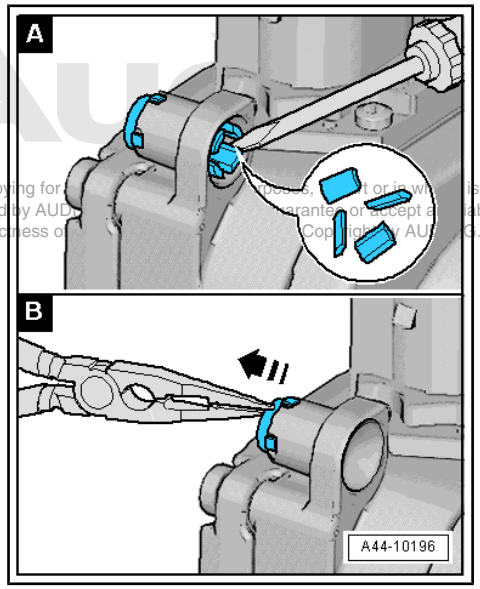
It is not possible to remove the clip without destroying it.

- Sensor for adaptive cruise control -G550- removed and nuts detached from studs.

– Unscrew stud -1- using a suitable tool -2-.

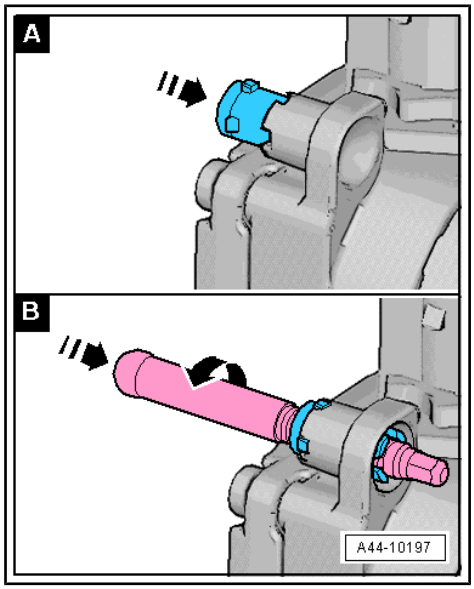


– Insert screwdriver between tab and housing.
– Using screwdriver as a lever, bend tab towards centre until you hear it break off.
• Repeat until all tabs have broken off.
– Use long-nose pliers to remove tabs from inside clip so that they don't get caught in the housing.
– Extract clip using long-nose pliers, as shown in illustration, and dispose of clip.



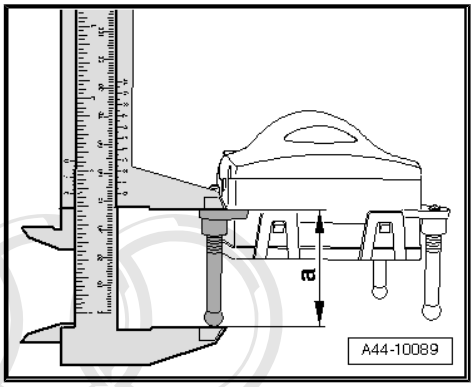
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– Insert new clip from left side into drilling on housing and press in by hand until you hear clip engage.
• Make sure retainer tabs are in correct position.
– Apply stud and make sure it is parallel to drilling.
– Stud can be screwed in after it has been aligned correctly.



– Screw in stud until dimension -a- is attained.

Dimension -a- = 43.3 mm

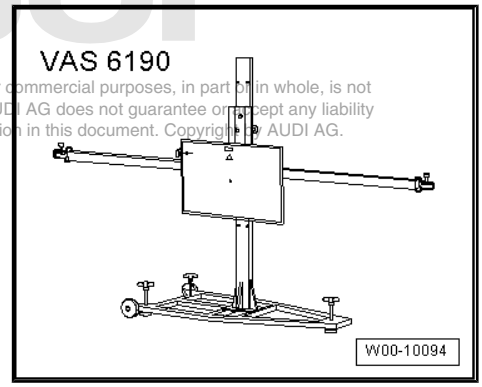


– Repeat this procedure for other clips if necessary.
– Then install ACC sensor in bracket and perform ACC adjustment
⇒ „6.6 Adjustment procedure using ACC setting device VAS 6190 “, page 339 and
⇒ „6.7 Adjustment procedure using ACC setting device VAS 6430 “, page 344 .

6.5 Preparing ACC setting device -VAS 6190- for adjustment procedure

Special tools and workshop equipment required

♦ ACC setting device -VAS 6190-

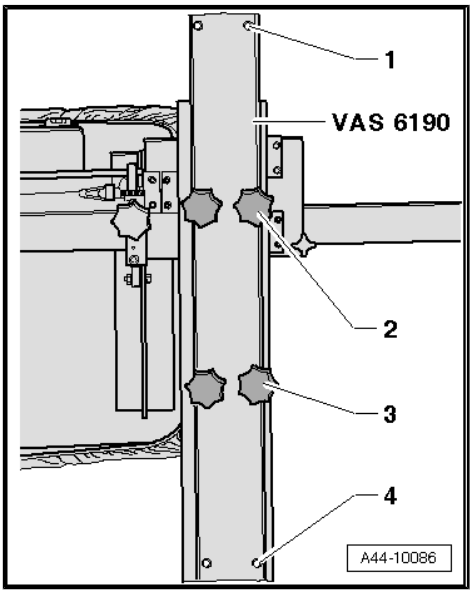


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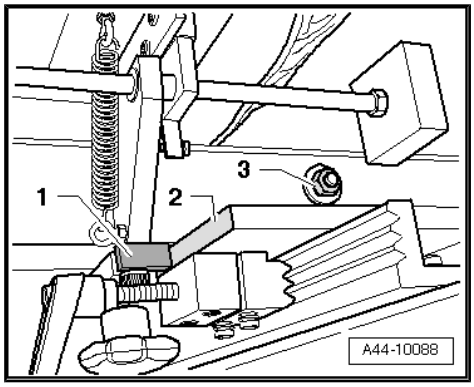
Before commencing the adjustment procedure, check which mountings the vertical slide on the ACC setting device -VAS 6190- is attached to. If necessary, the position of the attachments on the ACC setting device -VAS 6190- must be changed before performing the adjustment.

The attachments on the ACC setting device -VAS 6190- must be changed BEFORE performing the adjustment. If this is done during the adjustment procedure, the pre-adjustment of the ACC setting device -VAS 6190- will have to be repeated.

– Prior to the adjustment procedure, the vertical slide must be fitted in mountings -1- to -4- so that the laser beam (vertical alignment) coincides approximately with the centre of the sensor lens.



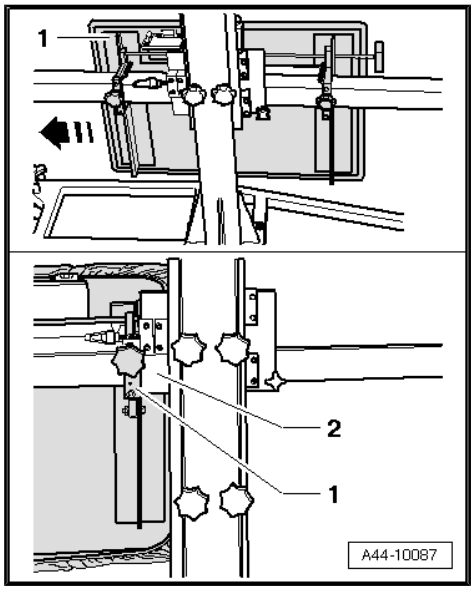
– The original nut at the top of the horizontal slide must be replaced with a nut -3- (normal commercially available type).



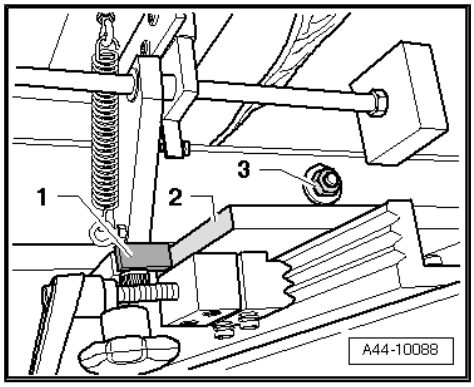
Note

The original nut at the top of the horizontal slide has to be replaced with a nut of the normal commercially available type so that the mirror can be moved far enough towards the centre.

– The centrally mounted mirror -1- must be detached and refitted at the extreme left -arrow-, next to the vertical slide -2-.



– The mirror -1- on the horizontal slide must then be moved as far as at will go against the vertical slide -2-.



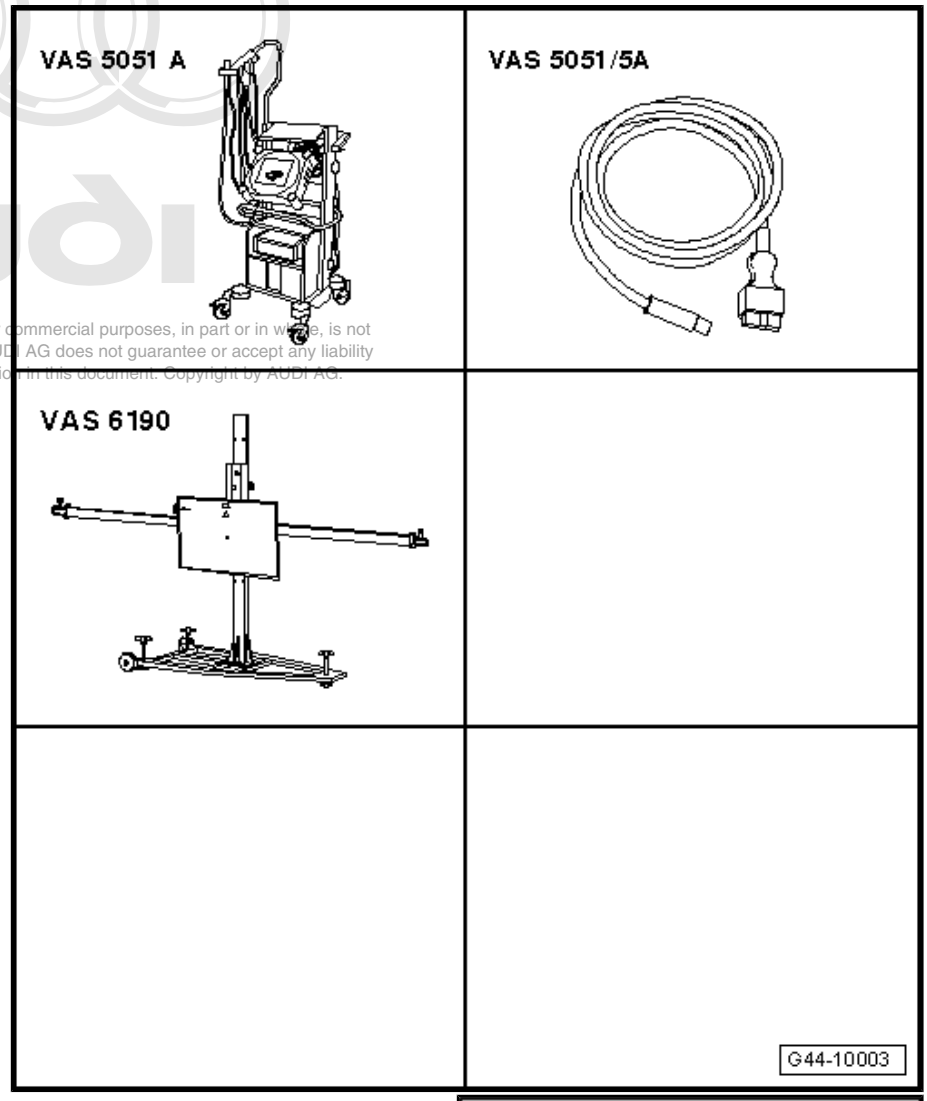
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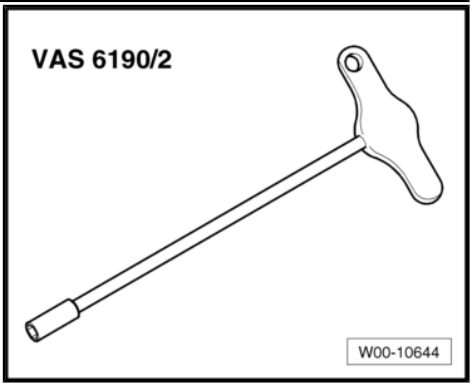
6.6 Adjustment procedure using ACC setting device -VAS 6190-

Special tools and workshop equipment required

- Vehicle diagnostic, testing and information system -VAS 5051 A-
- Diagnosis cable -VAS 5051/5A-
- ACC setting device -VAS 6190-
- Adjusting tool -VAS 6190/2-
- Wheel alignment computer

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Note

- *If necessary, the ACC setting device -VAS 6190- must be suitably prepared before commencing the adjustment procedure ⇒ page 337 .*
- *Before driving the vehicle onto the alignment platform, make sure there is sufficient space between the vehicle and the ACC setting device -VAS 6190- . The distance between the ACC setting device -VAS 6190- and the vehicle must be 120 cm ± 5 cm.*
- *If the available space is not adequate, drive the vehicle backwards onto the alignment platform as required.*

- Before commencing adjustment procedure, interrogate event memory and rectify any faults.

The adjustment procedure described here is based on ACC setting device -VAS 6190- . However, you can also use ADC adjustment device -VAS 6041- and ACC reflective mirror -VAS 6041/1- .

Note

The steps listed under „Adjustment procedure (when wheel alignment has not been previously checked)“ are only required if no wheel alignment check has already been performed.

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Please note preparations required before calibration/adjustment of driver assist systems ⇒ page 312 .

Adjustment procedure (when wheel alignment has not been previously checked)

– Connect battery charger ⇒ Rep. gr. 27 .
– Press button to select ACC adjustment procedure in wheel alignment computer.
– Attach quick-release clamps to rear wheels.
– Attach rear wheel alignment sensors.
– Carry out wheel rim runout compensation for rear wheels.

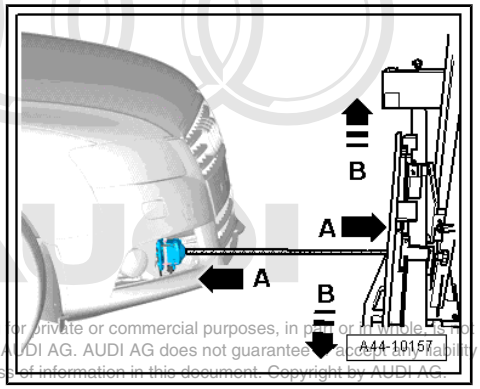
Note

Do not take hold of the cross bar when moving the - VAS 6190- .

Adjustment procedure (irrespective of previous wheel alignment check)

– Detach front air intake grille (right-side) ⇒ Rep. gr. 63 .
– Remove any dirt from sensor lens.

– Position ACC setting device -VAS 6190- so that distance -A- between sensor lens and surface of reflector is 120 cm ± 5 cm.

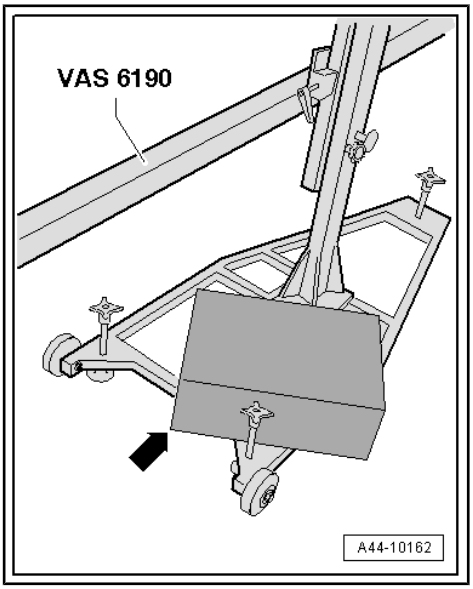


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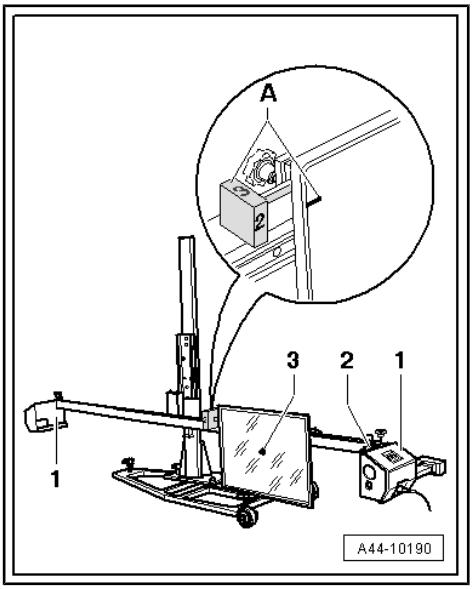
– Weight down the -VAS 6190- as shown in illustration -arrow-.

WARNING

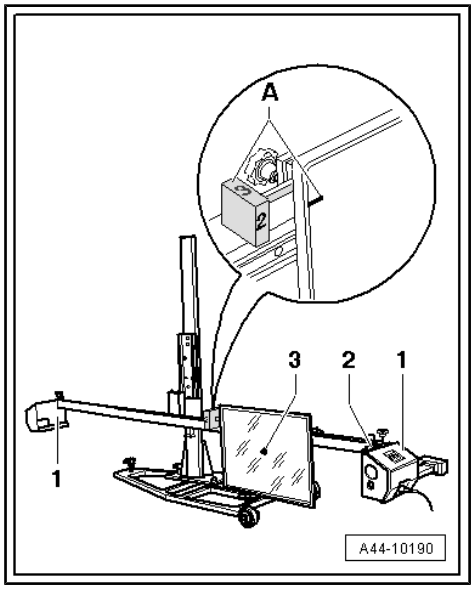
- *Before mounting the wheel alignment sensors and adjusting the mirror on the cross bar, place a tool box or similar object weighing around 5 to 7 kg on the -VAS 6190- .*
- *If the -VAS 6190- is not weighted down, the -VAS 6190- may tip over when the mirror is being adjusted and/or when attaching the wheel alignment sensors.*



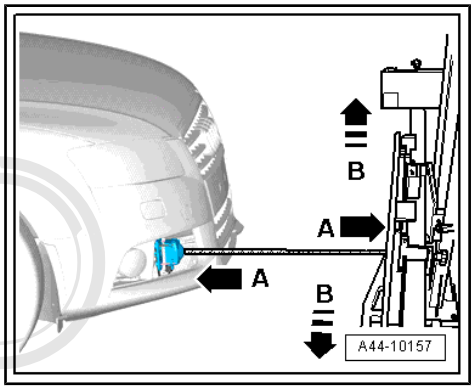
– Attach front wheel alignment sensors -1- to -VAS 6190- .



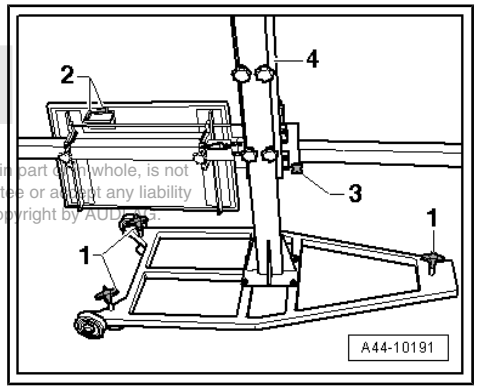
– In area -A-, align number -2- on rotary knob with mark on mirror (number 2 on rotary knob must face vehicle).



– By moving it sideways -arrows B-, set -VAS 6190- so that laser beam coincides with centre of sensor lens in the horizontal plane.

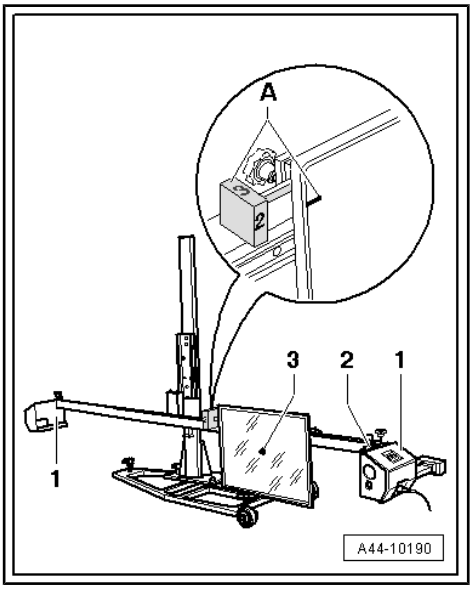


– Use adjusting screws -1- to bring spirit levels -2- on -VAS 6190- into horizontal position.
– Set vertical slide -4- of -VAS 6190- so that laser beam coincides with centre of sensor lens in vertical plane.
– Set identical individual front axle toe values with fine adjustment screw -3-.
– Difference between individual toe values must be less than 6' or equal.



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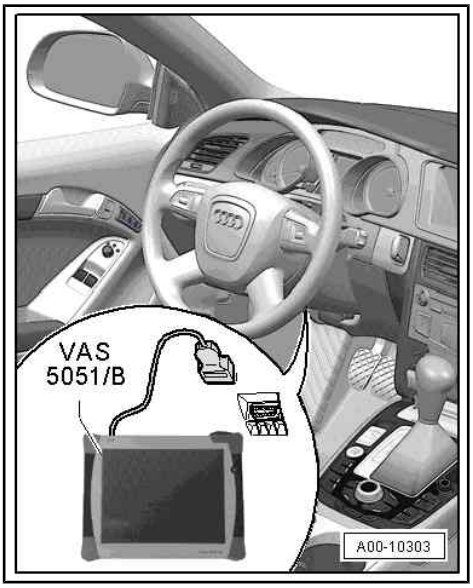
– Balance out spirit levels -2- on wheel alignment sensors -1-.
– Then check that laser beam -3- from -VAS 6190- coincides with sensor lens.



Note

- *-VAS 6190- is correctly aligned if the laser beam still coincides with the sensor lens at this stage, after the identical toe values have been set.*
- *The alignment of -VAS 6190- must be repeated if the laser beam does not coincide with the sensor lens.*

– Connect vehicle diagnostic, testing and information system -VAS 5051 B- .



– Plug in connector of diagnosis cable -VAS 5051/5A- at diagnostic connection.
– Switch on vehicle diagnostic, testing and information system .

The vehicle diagnostic, testing and information system is ready for operation when the selector buttons for the operating modes appear on the screen.

– Switch on ignition.
– Touch the Guided Fault Finding button on the display screen.
– Select the following:

- Make
- Model
- Model year
- Version
- Engine code letters

– Confirm the entered information.

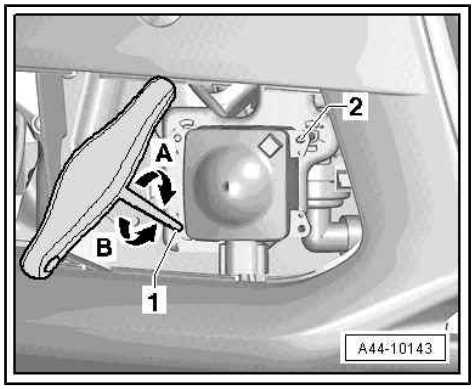
Wait until the vehicle diagnostic, testing and information system has interrogated all the control units in the vehicle.

– Press the Go to button and select the option „Function/component selection“.
– Select the relevant program in „Guided Functions“.

Then follow adjustment instructions on screen.

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– For fine adjustment in „Guided Fault Finding“, use screws -2- (top) and -1- (bottom); turn adjusting tool -VAS 6190/2- in direction of arrow -A or B-



WARNING

ACC adjustment is not completed until -VAS 5051/B- displays „Final control element diagnosis ended“.

– Switch off ignition.

– Detach connector of diagnosis cable -VAS 5051/5A- at diagnostic connection.

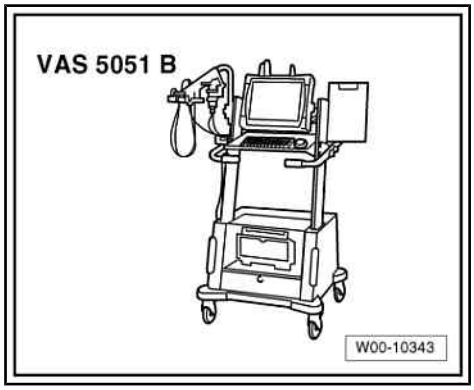
– Disconnect battery charger ⇒ Rep. gr. 27 .

– Install air intake grille ⇒ Rep. gr. 63 .

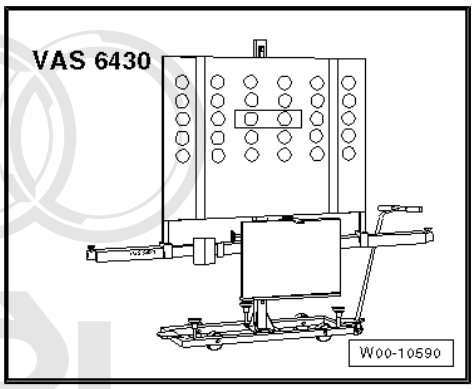
6.7 Adjustment procedure using ACC setting device -VAS 6430-

Special tools and workshop equipment required

♦ Vehicle diagnostic, testing and information system -VAS 5051 B- with appropriate diagnosis cable



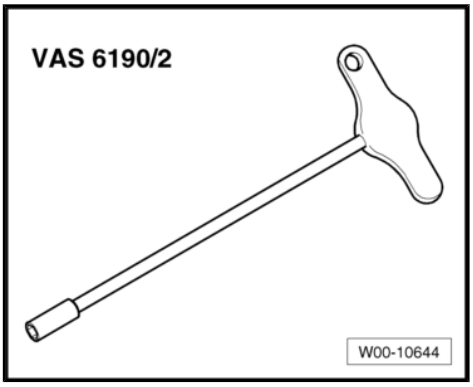
♦ ACC setting device -VAS 6430-



♦ Wheel alignment computer

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♦ Adjusting tool -VAS 6190/2-



Note

♦ *Before driving the vehicle onto the alignment platform, make sure there is sufficient space between the vehicle and the ACC setting device -VAS 6430- . The distance between the ACC setting device -VAS 6430- and the vehicle must be 120 cm ± 5 cm.*

♦ *If the available space is not adequate, drive the vehicle backwards onto the alignment platform as required.*

♦ *Before commencing the adjustment procedure, check in which position the adjustment mirror is located. If necessary, the adjustment mirror must be repositioned before performing the adjustment.*

♦ *The attachments on the ACC setting device -VAS 6430- must be changed BEFORE performing the adjustment. If this is done during the adjustment procedure, the pre-adjustment of the ACC setting device -VAS 6430- will have to be repeated.*

Audi
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• Before commencing adjustment procedure, interrogate event memory and rectify any faults.

The adjustment procedure described here is based on ACC setting device -VAS 6430- .

Note

The steps listed under „Adjustment procedure (when wheel alignment has not been previously checked)“ are only required if no wheel alignment check has already been performed.

Please note preparations required before calibration/adjustment of driver assist systems ⇒ page 312 **.**

Adjustment procedure (when wheel alignment has not been previously checked)

– Connect battery charger ⇒ Rep. gr. 27 .

– Press button to select ACC adjustment procedure in wheel alignment computer.

– Attach quick-release clamps to rear wheels.

– Attach rear wheel alignment sensors.

– Carry out wheel rim runout compensation for rear wheels.

Note

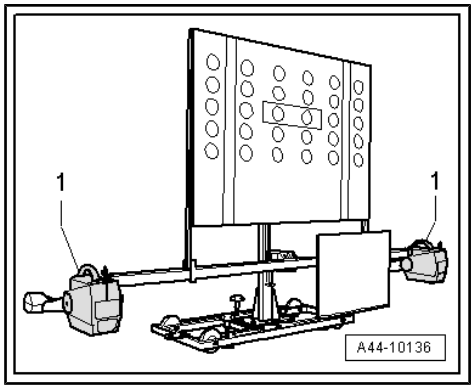
Do not take hold of the cross bar when moving the -VAS 6430- .

Adjustment procedure (irrespective of previous wheel alignment check)

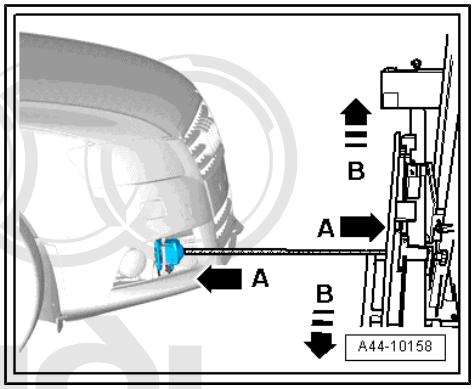
– Detach front air intake grille (right-side) ⇒ Rep. gr. 63 .

– Remove any dirt from sensor lens.

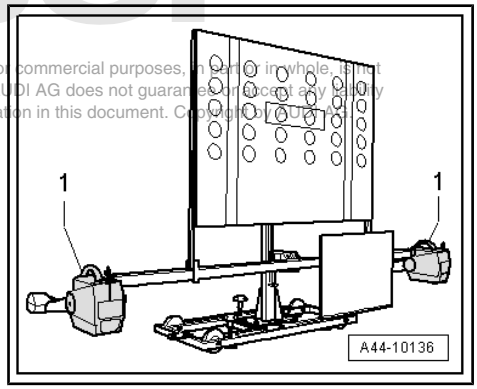
– If necessary, detach the mirror from the centre position and reattach it at the extreme right, next to the vertical slide.



– Position ACC setting device -VAS 6430- so that distance -A- between sensor lens and surface of reflector is 120 cm ± 5 cm.

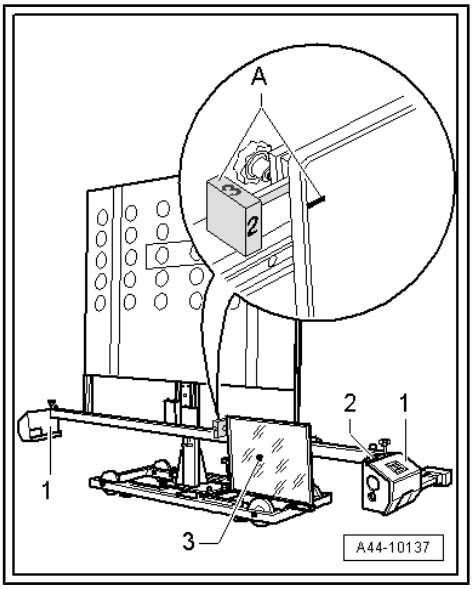


– Attach front wheel alignment sensors -1- to -VAS 6430- .

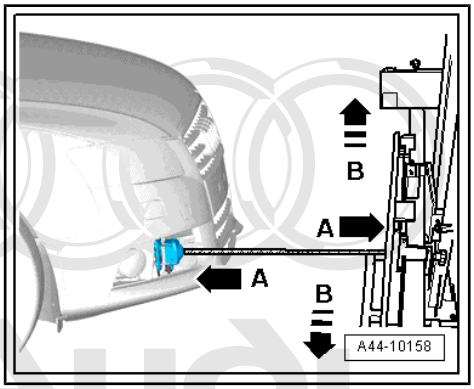


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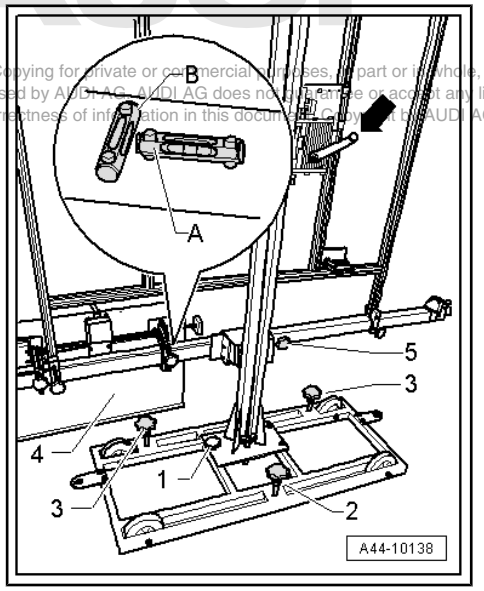
– In area -A-, align number -2- on rotary knob with mark on mirror (number 2 on rotary knob must face vehicle).



– By moving it sideways -arrows B-, set -VAS 6430- so that laser beam coincides with centre of sensor lens in the horizontal plane.

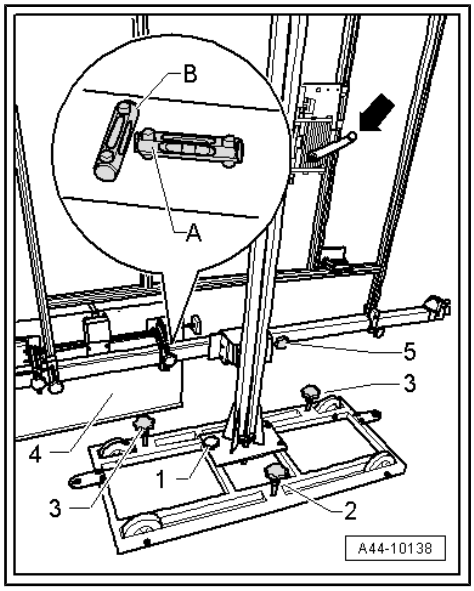


– Use adjusting screws -1-, -2- and -3- to bring spirit levels -A- and -B- on -VAS 6430- into horizontal position.

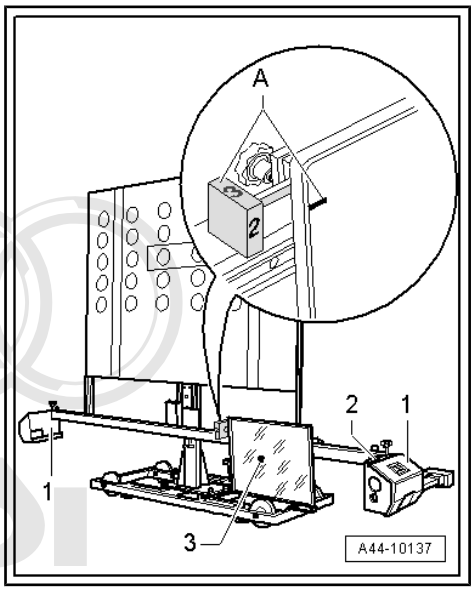


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– Using crank handle -arrow- on -VAS 6430- , set mirror -4- so that laser beam coincides with centre of sensor lens in vertical plane.
– Set identical individual front axle toe values with fine adjustment screw -5-.
– Difference between individual toe values must be less than 6' or equal.



– Balance out spirit levels -2- on wheel alignment sensors -1-.
– Then check again that laser beam -3- from -VAS 6430- coincides with sensor lens.



Note

- *-VAS 6430- is correctly aligned if the laser beam still coincides with the sensor lens at this stage, after the identical toe values have been set.*
- *The alignment of -VAS 6430- must be repeated if the laser beam does not coincide with the sensor lens.*

– Connect vehicle diagnosis, testing and information system -VAS 5051 B- .

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– Plug in connector of diagnosis cable -VAS 5051/5A- at diagnostic connection.

– Switch on vehicle diagnostic, testing and information system .

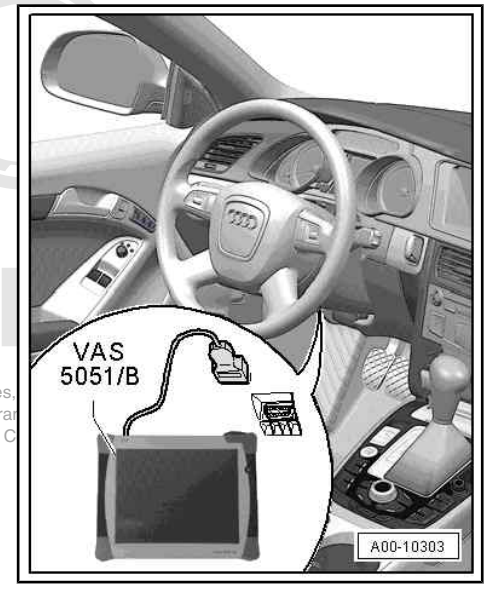
The vehicle diagnostic, testing and information system is ready for operation when the selector buttons for the operating modes appear on the screen.

– Switch on ignition.

– Touch the Guided Fault Finding button on the display screen.

– Select the following:

- Make
- Model
- Model year
- Version
- Engine code letters



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– Confirm the entered information.

Wait until the vehicle diagnostic, testing and information system has interrogated all the control units in the vehicle.

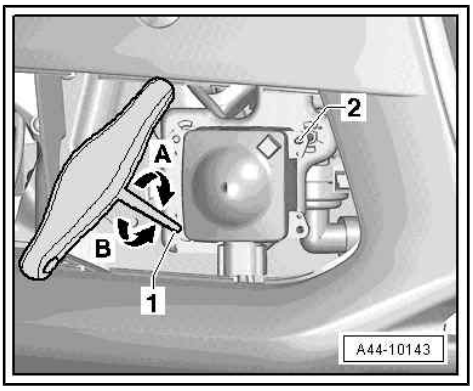
– Press the Go to button and select the option „Function/component selection“.

Then

– Select the relevant program in „Guided Functions“.

Then follow adjustment instructions on screen.

– For fine adjustment in „Guided Fault Finding“, use screws -2- (top) and -1- (bottom); turn adjusting tool -VAS 6190/2- in direction of arrow -A or B-



WARNING

ACC adjustment is not completed until -VAS 5051/B- displays „Final control element diagnosis ended“.

– Switch off ignition.

– Detach connector of diagnosis cable -VAS 5051/5A- at diagnostic connection.

– Disconnect battery charger ⇒ Rep. gr. 27 .

– Install air intake grille ⇒ Rep. gr. 63 .

7 Lane departure warning (Audi lane assist)

⇒ „7.1 General notes on lane departure warning function“, page 350

⇒ „7.2 Removing and installing lane departure warning control unit J759 and backlight masking screen“, page 351

⇒ „7.3 Calibration procedure“, page 352

7.1 General notes on lane departure warning function

The lane departure warning function assists the driver in keeping the vehicle in its lane. If the vehicle approaches one of the detected lane markings while the system is active, the steering wheel vibrates to warn the driver that the vehicle might be about to cross one of the markings. If the driver operates the turn signal before crossing one of the lane markings (while the system is active), the system will detect that the lane change is intended and will not warn the driver.

The steering wheel is equipped with a vibration motor to generate the required warning vibration. The vibration motor is located under a layer of foam in the lower right spoke of the steering wheel. The vibration in the steering wheel is generated by an eccentric weight that is rotated by the motor. The motor cannot be renewed separately. If the vibration motor is defective the complete steering wheel must be renewed ⇒ page 361 . The duration of the steering wheel vibration is normally approx. one second, but varies according to the driver's reaction.

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The camera and the lane departure warning control unit -J759- are installed together in a single housing. The entire unit has to be replaced if the camera or the control unit are defective.

The lane departure warning control unit -J759- is located at the top of the windscreen in the centre, level with the interior mirror. It is attached to a bracket which is bonded to the windscreen.

Anything that restricts the view of the camera, such as stone chips or stickers applied to the windscreen, can cause malfunctions of the system.

The lane departure warning button -E517- is integrated in the turn signal lever. The system can be switched on and off by pressing the button. If the lane departure warning button -E517- is defective, the complete unit (including the CCS switch -E45- and intermittent wiper switch -E22-) must be renewed ⇒ Rep. gr. 94 .

Note

The message „Audi lane assist not available: currently no sensor vision“ will appear in the display if the camera is not able to detect the lane markings for longer than a defined period. This can be caused by the following:

- Camera vision is obstructed by dirt or ice, etc. This should be rectified accordingly.
- Camera vision is obstructed by condensation. Wait for condensation to clear.
- Lane markings not visible for long periods due to road conditions (e.g. snow-covered surface).

If the condensation does not clear by itself, or if the inside of the windscreen is very dirty (in the camera's range of vision), the rel-

evant area must be cleaned by hand. To do this, remove the control unit and the backlight masking screen and clean the windscreen with cleaning fluid . Removing control unit and backlight masking screen ⇒ page 351 .

The lane departure warning must be calibrated correctly to ensure proper function.

Re-calibration is required when:

- The fault „No or incorrect basic setting / adaption“ is registered in the event memory.
- The lane departure warning control unit -J759- is renewed.
- The windscreen is removed or renewed.
- The rear axle toe setting is changed.
- The running gear of the vehicle is modified in any way – e.g. conversion from standard running gear to sports running gear.
- The vehicle level senders have been re-adapted on vehicles with electronic damping control.

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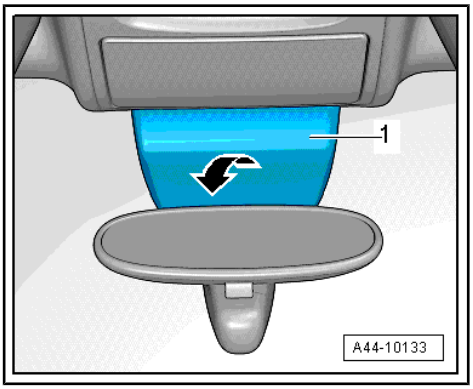
Note

Before performing a calibration of the lane departure warning system, read out the event memory and rectify any faults as necessary. The direction of travel of the vehicle must be determined in order to provide the reference position of the setting device -VAS 6430- when calibrating the lane departure warning system. Calibration of the lane departure warning system must always be performed using the wheel alignment equipment approved by VW/Audi. Always use the setting device -VAS 6430- for calibrating the lane departure warning system.

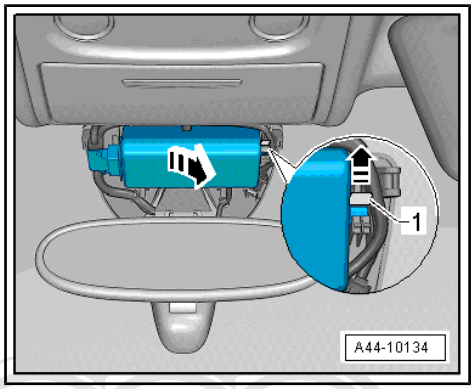
7.2 Removing and installing lane departure warning control unit -J759- and backlight masking screen

Removing

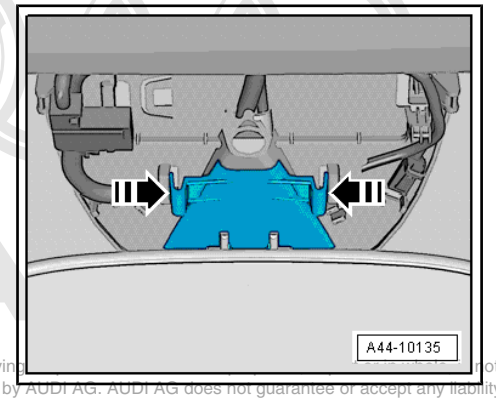
– Detach trim cover -1- from bracket by pulling down in direction of -arrow-.



– Press retaining clip -1- in direction of -arrow- and detach lane departure warning control unit -J759- from bracket by moving it downwards and to one side.
– Unplug electrical connector and take out lane departure warning control unit -J759- .



– Press clips -arrows-, pull backlight masking screen out of bracket and remove towards the rear.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

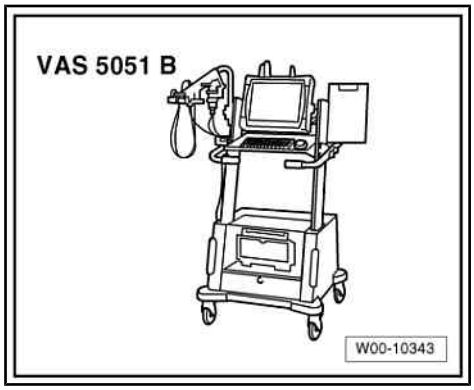
- *The camera's area of vision on the inside of the windscreen must not be obstructed by condensation or dirt. If necessary, clean this part of the glass by hand using cleaning fluid.*
- *If the lane departure warning control unit -J759- is renewed, the camera and the lane departure warning control unit -J759- must be recalibrated ⇒ page 352 .*

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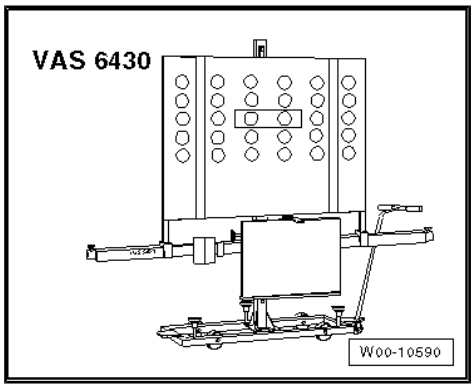
7.3 Calibration procedure

Special tools and workshop equipment required

- Vehicle diagnostic, testing and information system -VAS 5051 B- with appropriate diagnosis cable



- ACC setting device -VAS 6430-



- Wheel alignment computer

Note

- *Check that the lane departure warning control unit -J759- is seated correctly in the bracket.*
- *Check that the camera vision is unobstructed (visual inspection).*
- *Before commencing calibration, interrogate event memory and rectify any faults.*
- *Before driving the vehicle onto the alignment platform, make sure there is sufficient space between the hub centres of the front wheels and the setting device -VAS 6430- . The distance between -VAS 6430- and the hub centres of the front wheels must be 150 cm ± 2.5 cm.*
- *If the available space is not adequate, drive the vehicle backwards onto the alignment platform as required.*
- *Check the position of the calibration screen on the cross bar and align the calibration screen centrally if necessary.*

– Observe test requirements for wheel alignment check ⇒ page 316 .

– Connect battery charger ⇒ Rep. gr. 27 .

– Connect vehicle diagnosis, testing and information system - VAS 5051 B- to vehicle. (Run diagnosis cable through open window.)

Note

During the calibration, make sure that all doors are closed on the vehicle and that the exterior lights are switched off.

– Set front wheels to straight-ahead position.

– Select calibration procedure for lane departure warning system in wheel alignment computer.

– Attach quick-release clamps to all four wheels.

– Attach rear wheel alignment sensors.

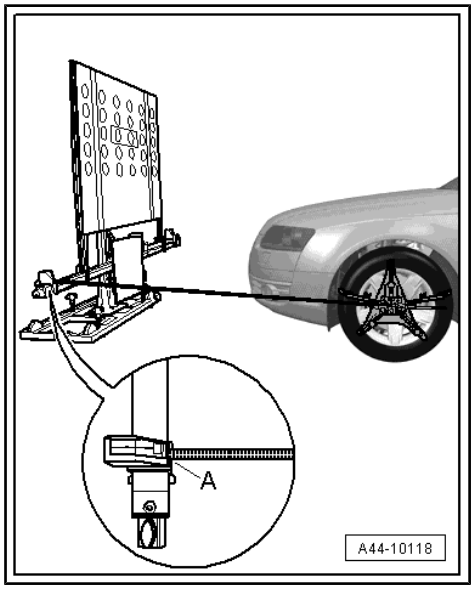
– Carry out wheel rim runout compensation for rear wheels.

Note

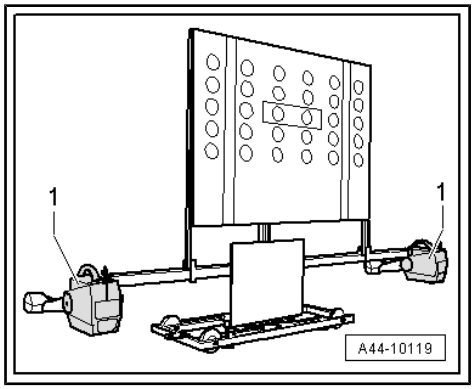
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Do not take hold of the cross bar when moving the -VAS 6430- .

– Set up -VAS 6430- as shown in illustration so that distance -A- measured from hub centres of front wheels to cross bar of -VAS 6430- is 150 cm ± 2.5 cm.



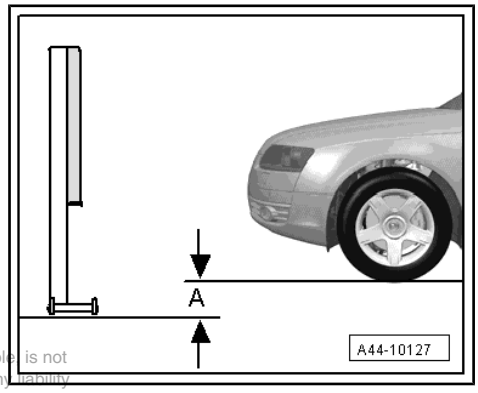
– Attach front wheel alignment sensors -1- to -VAS 6430- .



Note

For the next step the wheel alignment platform must be set at the lowest available position.

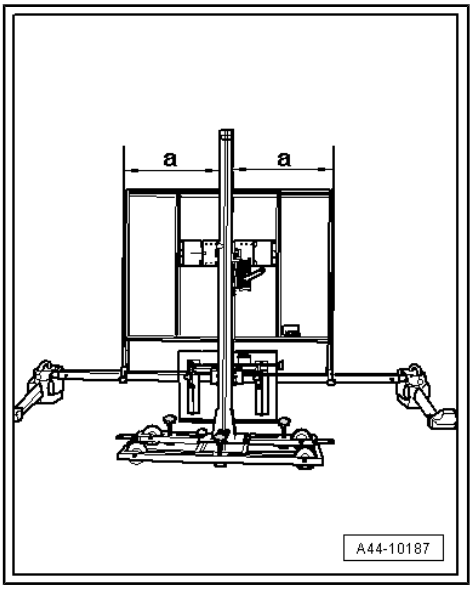
– Determine height difference -A- between floor level where -VAS 6430- is set up and tyre contact surface as shown in illustration and enter this value in the wheel alignment computer.



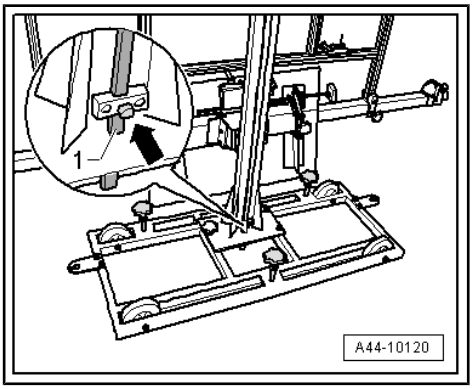
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– Check the position of the calibration screen on the cross bar and align the calibration screen centrally if necessary.

a = a



– Loosen bolt -arrow- and set measuring bar -1- on floor.

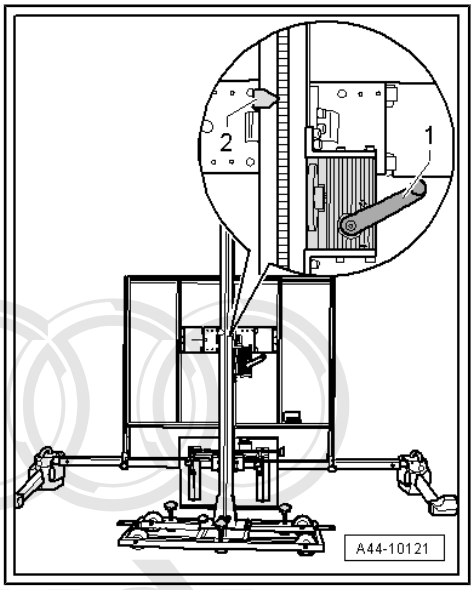


– Using crank -1-, adjust calibration screen to specified height -2- as indicated by wheel alignment computer.

When specified height -2- has been set, move measuring bar up slightly and tighten securing bolt.

Note

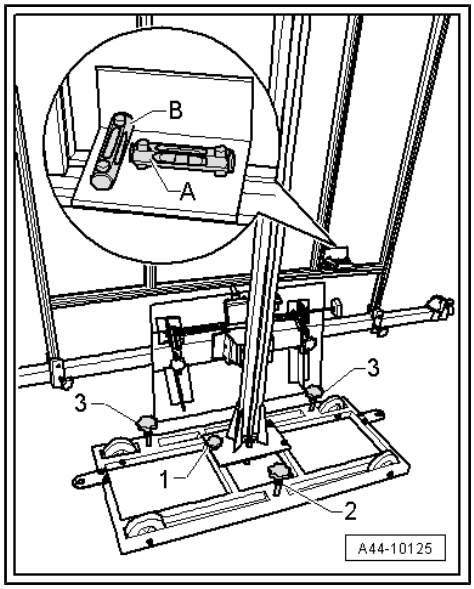
If the height of the calibration screen has to be corrected at a later stage of the procedure, the measuring bar must be set on the floor when making the adjustment.



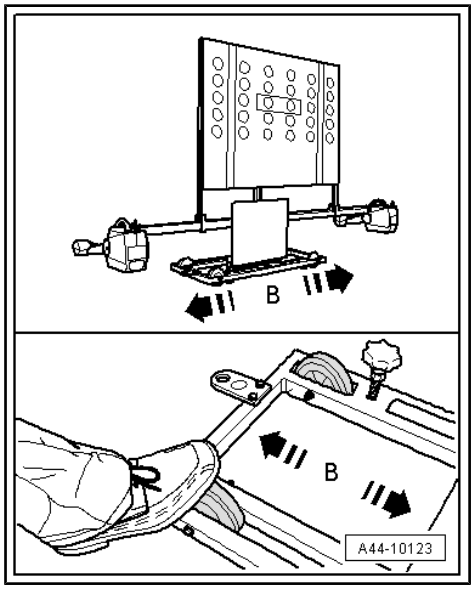
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– Set spirit level -A- to horizontal position with adjuster screw -1-.

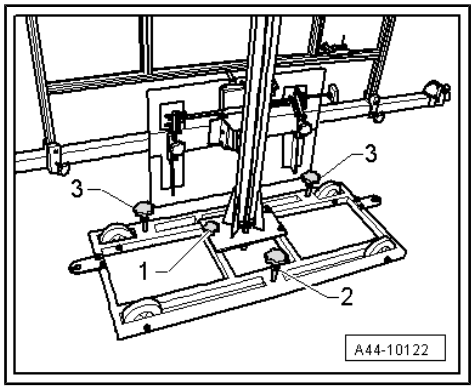
The spirit level -A- has to be adjusted at this point to compensate for any floor irregularities.



– Move -VAS 6430- sideways -arrow B- until display on wheel alignment computer is within tolerance.

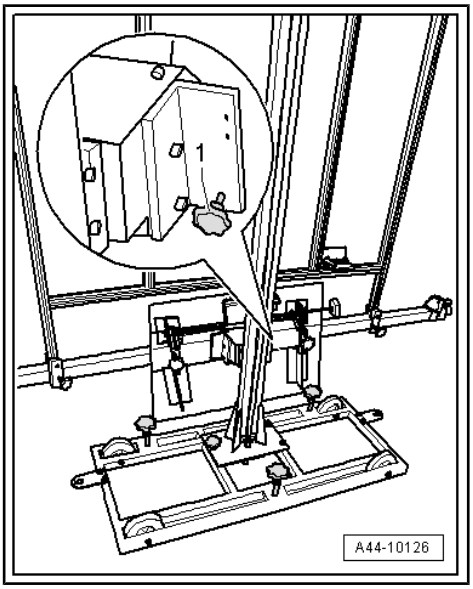


– Secure by tightening bolts -2- and -3- -VAS 6430- lightly. (This will prevent the -VAS 6430- from rolling away).

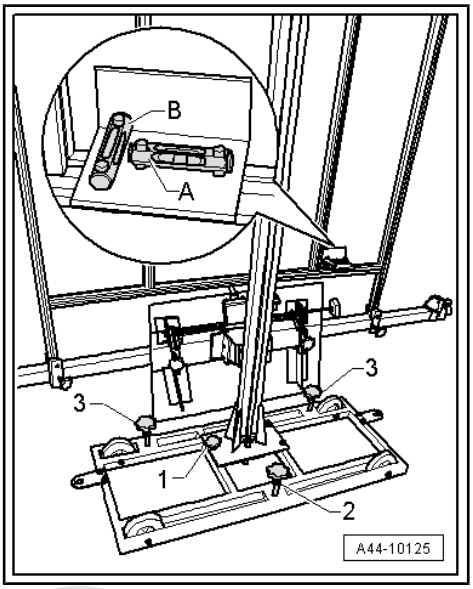


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– Turn fine adjustment screw -1- until display on wheel alignment computer is within tolerance.

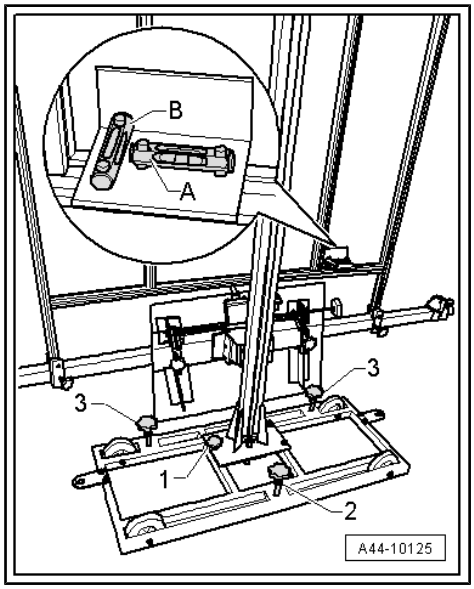


– Set spirit level -A- to horizontal position with adjuster screw -1-.



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– Set spirit level -B- to horizontal position with adjuster screw -2-.



The remaining steps are now performed using vehicle diagnosis, testing and information system .

– Switch on ignition.
– Touch the Guided Fault Finding button on the display screen.
– Select the following:

- Make
- Model
- Model year
- Version
- Engine code letters

– Confirm the entered information.

Wait until the vehicle diagnostic, testing and information system has interrogated all the control units in the vehicle.

– Press the Go to button and select the option „Function/component selection“.
– Select the relevant program in „Guided Functions“.

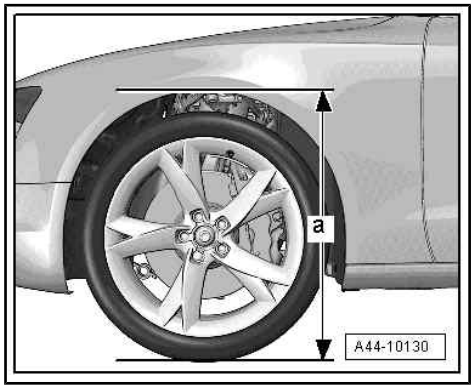
Then follow the instructions on the screen to perform the calibration.

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Note

The next step required in the Guided Fault Finding program is to measure the height of the body.

– Measure height of body -a- at all four wheels between tyre contact surface and bottom edge of wing panel at centre of wheel.



48 – Steering

1 General notes

⇒ „1.1 General information“, page 359

⇒ „1.2 Steering box“, page 359

⇒ „1.3 Gaskets and seals“, page 360

⇒ „1.4 Bolts and nuts“, page 360

⇒ „1.5 Electrical components“, page 360

1.1 General information

To achieve the desired results when performing repairs on the steering box it is important to work with the greatest possible care and cleanliness, and to use proper tools in good condition. Always observe the basic safety rules when performing servicing procedures.

To avoid repetition, a number of notes that are generally applicable to the individual procedures described in this manual are summarised here. They apply for this individual Workshop Manual.

Caution

Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe mounting, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

WARNING

Risk of personal injury caused by automatic engine start on vehicles with start/stop system.

- *On vehicles with activated start/stop system (indicated by a symbol in the instrument cluster) the engine can start automatically under certain conditions.*
- *When working on the vehicle, it is therefore important to ensure that the start/stop system is deactivated (switch off ignition and switch on again if required).*

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1.2 Steering box

- Thoroughly clean all unions and the adjacent areas before disconnecting.
- Place removed parts on a clean surface and cover them up to keep them clean. Use plastic sheeting or paper for this purpose. Do not use fluffy cloths.

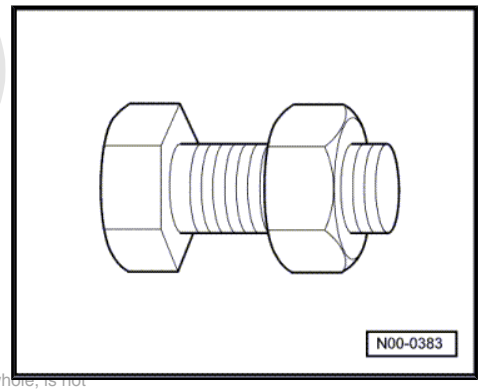
- Make sure to install clean parts: only remove replacement parts from packaging immediately prior to installation.
- Use only the grease and sealants with the Part No. stated.
- Carefully cover or seal open components if repairs are not to be carried out immediately.

1.3 Gaskets and seals

- Always renew gaskets and seals.
- Check contact surfaces on housing or shafts for burrs and damage after removing gaskets/seals or rubber boots, and repair as required.
- Clean off all residues of liquid gasket thoroughly; make sure that no remaining material enters the steering box housing.

1.4 Bolts and nuts

- Loosen and tighten bolts and nuts securing covers and housings in diagonal sequence.
- Take care to keep sensitive components straight. They should only be unfastened and tightened diagonally and in stages.
- Tightening torques refer to unoiled bolts and nuts.
- Always renew self-locking bolts/nuts.
- Always renew bolts and nuts which are tightened by turning through a specified angle.

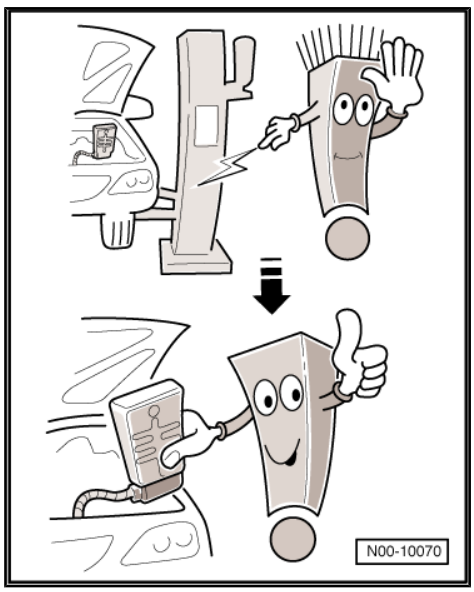


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1.5 Electrical components

You have certainly experienced light electric shocks when touching metal objects. This is due to the electrostatic charge accumulated by the human body. This charge can cause malfunctions if you touch the electric steering box components.

– Before working on electrical components, touch an earthed object (e.g. water pipe or lifting platform). Do not touch the contact pins of the electrical connectors.

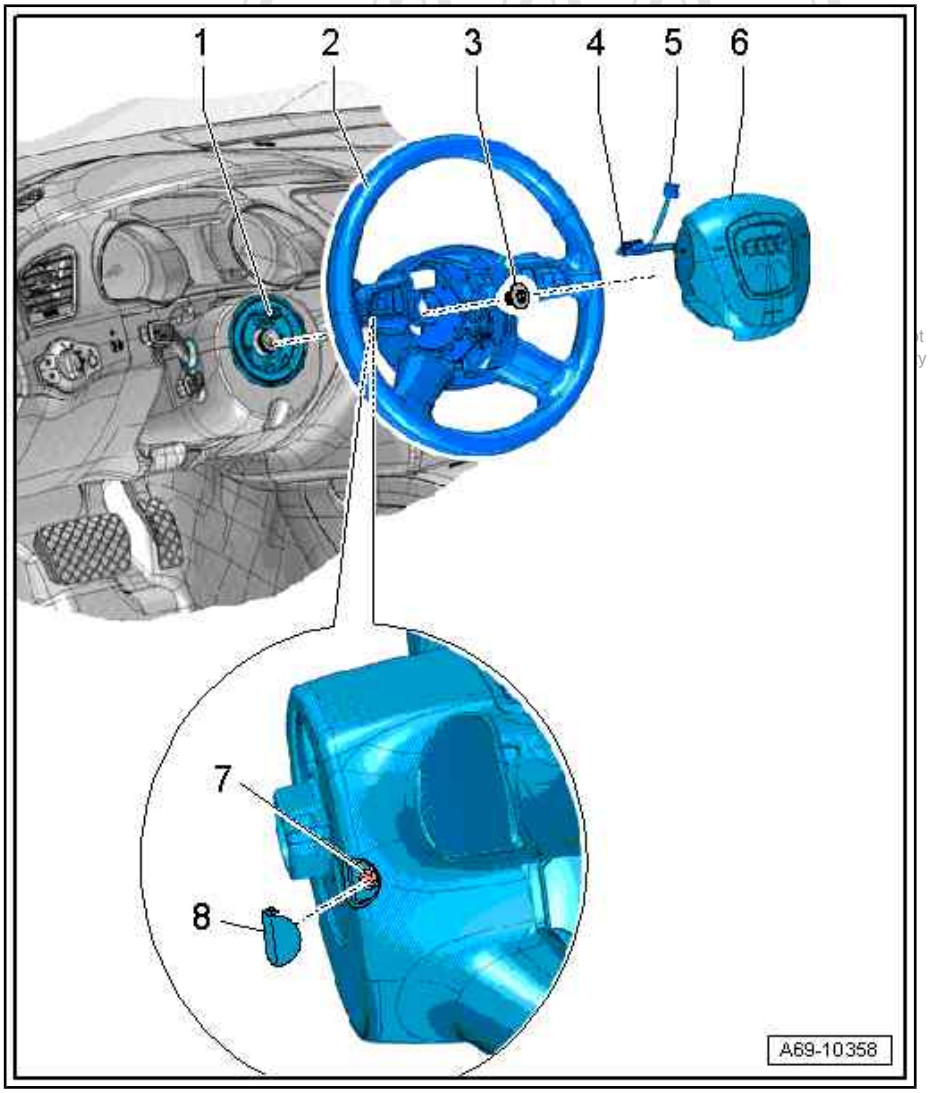


2 Airbag steering wheel

⇒ „2.1 Exploded view of airbag steering wheel“, page 361

⇒ „2.2 Removing and installing airbag steering wheel“, page 361

2.1 Exploded view of airbag steering wheel



1 - Airbag coil connector and return ring with slip ring -F138-

- ❑ Removing and installing ⇒ Rep. gr. 94

2 - Steering wheel

- ❑ Removing and installing ⇒ page 361

3 - Bolt

- ❑ Tightening torque (Coupé): 50 Nm
- ❑ Tightening torque (Cabriolet/Sportback): 30 Nm + 90°
- ❑ Always renew if removed

4 - Electrical connector

5 - Electrical connector

6 - Driver's airbag unit

- ❑ Removing and installing ⇒ Rep. gr. 69 ; General body repairs, interior

WARNING

Observe safety precautions for working on airbags ⇒ Rep. gr. 69 ; General body repairs, interior .

7 - Bolt

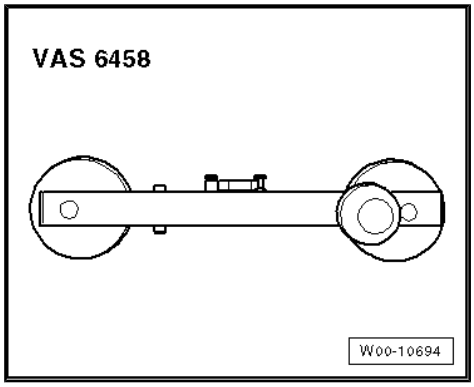
- ❑ Tightening torque ⇒ Rep. gr. 69 ; General body repairs, interior

8 - Trim cap

2.2 Removing and installing airbag steering wheel

Special tools and workshop equipment required

- Steering wheel balance -VAS 6458-



Removing

Note

- *Applies to vehicles with dynamic steering:*
- *Before detaching it from the steering column, the steering wheel must be aligned accurately in a horizontal position using the steering wheel balance -VAS 6458- . Use the steering wheel balance -VAS 6458- to align the new steering wheel horizontally on the steering column.*
- *After completing the above step, check the steering wheel position on the steering angle sender -G85- . To do so, select the corresponding measured value block in the self-diagnosis for the steering column electronics control unit -J527- . If the value displayed is > 0.5°, the steering angle sender -G85- must be re-calibrated and the dynamic steering re-adapted. To do so, select the corresponding program in Guided Fault Finding* *⇒ page 328* .

– Turn wheels to straight ahead position.

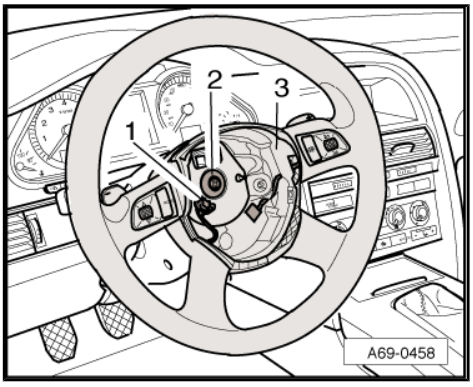
– Move steering wheel upwards and rearwards as far as possible, using the full range of the steering column adjuster.

– Remove airbag unit ⇒ Rep. gr. 69 ; General body repairs, interior .

Note

The steering must be in the centre position (wheels straight-ahead) when the steering wheel is removed and installed.

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– Remove bolt -2-.
– Mark relative position of steering wheel to steering column with a felt-tip pen.
– Pull steering wheel -3- off steering column.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „2.1 Exploded view of airbag steering wheel“, page 361

Before fitting steering wheel, make sure wheels are in straight ahead position.

– If installing original steering wheel: Make sure marks on steering column and steering wheel coincide.
– If installing new steering wheel (no marks): Steering wheel must be mounted in centre position (spoke horizontal and wheels in straight-ahead position).
– Install steering wheel.
– Install airbag unit ⇒ Rep. gr. 69 ; General body repairs, interior .
– Test-drive vehicle.
– If steering wheel is not straight, remove it again and adjust it on steering column splines.

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3 Steering column

⇒ „3.1 Exploded view of steering column“, page 364

⇒ „3.2 Removing and installing intermediate steering shaft“, page 365

⇒ „3.3 Removing and installing steering column“, page 368

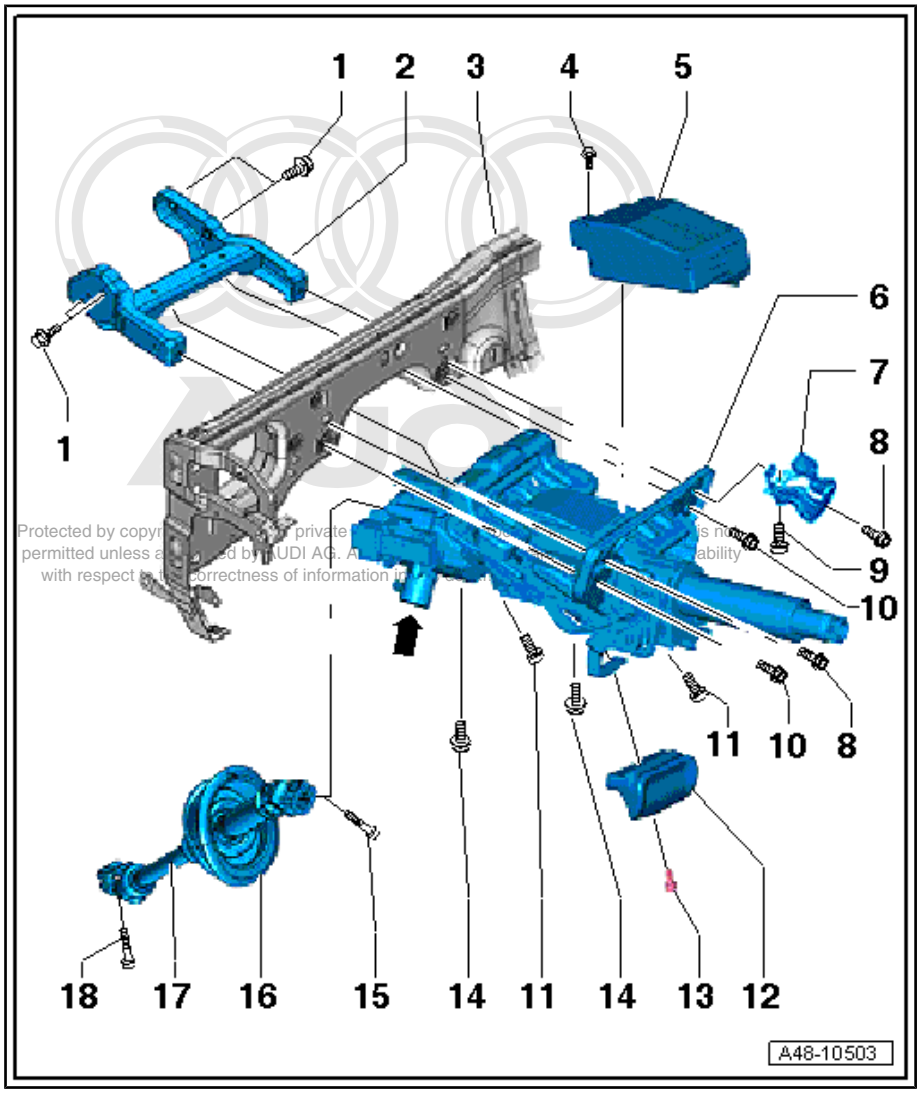
⇒ „3.4 Handling and transporting steering column“, page 373

⇒ „3.5 Checking steering column for damage“, page 374

⇒ „3.6 Removing and installing electronic steering column lock control unit J764 “, page 374

⇒ „3.7 Removing and installing safety lock for active steering (locking solenoid)“, page 377

3.1 Exploded view of steering column



1 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 70

2 - Mounting bracket

3 - Central tube

4 - Bolt

- ❑ 5 Nm

5 - Electronic steering column lock control unit -J764-

- ❑ Fitted on vehicles with safety ignition lock
- ❑ Removing and installing ⇒ page 374
- ❑ If electronic steering column lock control unit -J764- has been renewed, further steps are necessary using ⇒ Vehicle diagnostic tester. Select the relevant program in „Guided Functions“ and follow the instructions on the screen.

6 - Steering column

- ❑ Different steering column versions are fitted to suit the type of steering installed (with or without dynamic steering function). For correct version, refer to ⇒ Electronic parts catalogue .
- ❑ Adjuster -arrow- fitted on vehicles with dynamic steering.
- ❑ Adjuster -arrow- must not be detached or disconnected from the steering column.
- ❑ The adjuster and steering column are combined as one component and renewed together. For correct version, refer to ⇒ Electronic parts catalogue .
- ❑ The adjuster -arrow- is fitted with a „safety lock for active steering“ (locking solenoid).

- ❑ Removing and installing „safety lock for active steering“ (locking solenoid) ⇒ page 377
- ❑ The basic setting for the dynamic steering must be performed if the steering column with adjuster is renewed ⇒ page 328 .
- ❑ Removing and installing ⇒ page 368
- ❑ Checking for damage ⇒ page 374

7 - Bracket for knee bolster (right-side)

- ❑ Not fitted on all country-specific versions

8 - Bolt

- ❑ 20 Nm
- ❑ 22 Nm on Cabriolet version
- ❑ 2x
- ❑ Bolt also secures bracket for knee bolster on driver's side, depending on country-specific version
- ❑ Note correct installation sequence ⇒ page 372

9 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 70

10 - Bolt

- ❑ 20 Nm
- ❑ 2x
- ❑ Note correct installation sequence ⇒ page 372

11 - Bolt

- ❑ 20 Nm
- ❑ 2x
- ❑ Note correct installation sequence ⇒ page 372

12 - Handle

13 - Bolt

- ❑ 3 Nm

14 - Bolt

- ❑ 20 Nm
- ❑ 2x
- ❑ Note correct installation sequence ⇒ page 372

15 - Bolt

- ❑ 30 Nm +90°
- ❑ Always renew if removed
- ❑ The tapped hole for the bolt must always be cleaned (e.g. with a thread tap)

16 - Sealing boot

- ❑ Set the arrow to the „12 o'clock position“

17 - Intermediate steering shaft

- ❑ Removing and installing ⇒ page 365

18 - Bolt

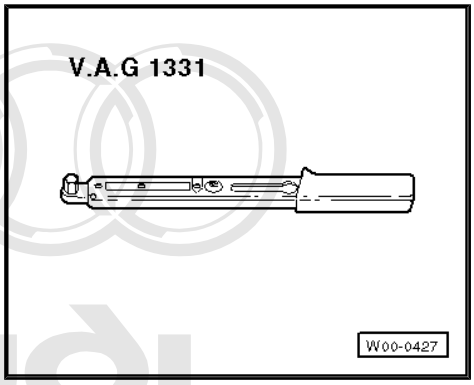
- ❑ 30 Nm +90°
- ❑ Always renew if removed
- ❑ The tapped hole for the bolt must always be cleaned (e.g. with a thread tap)

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3.2 Removing and installing intermediate steering shaft

Special tools and workshop equipment required

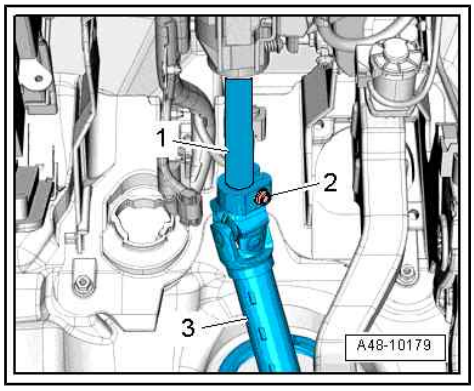
♦ Torque wrench -V.A.G 1331-



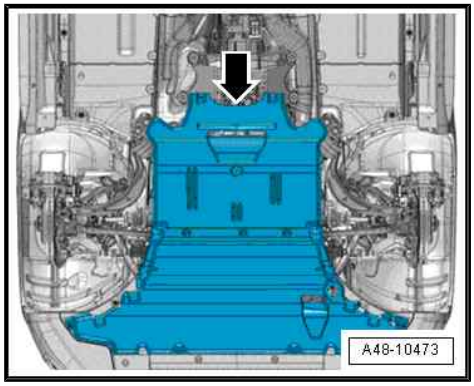
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Removing

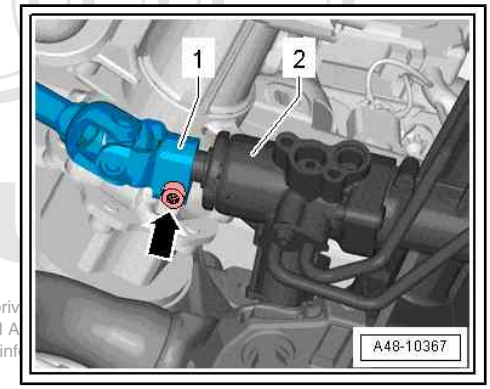
– Turn wheels to straight ahead position.
– Move steering wheel downwards and rearwards as far as possible, using the full range of the steering column adjuster.
– Turn steering wheel to centre position (wheels in straight-ahead position).
– Move driver's seat back as far as possible.
– Remove bolt -2- and detach intermediate steering shaft -3- from steering column -1-.
– Raise vehicle on lifting platform.



– Remove rear noise insulation -arrow-.



– Remove bolt -arrow-.
– Detach intermediate steering shaft -1- from steering box -2-.

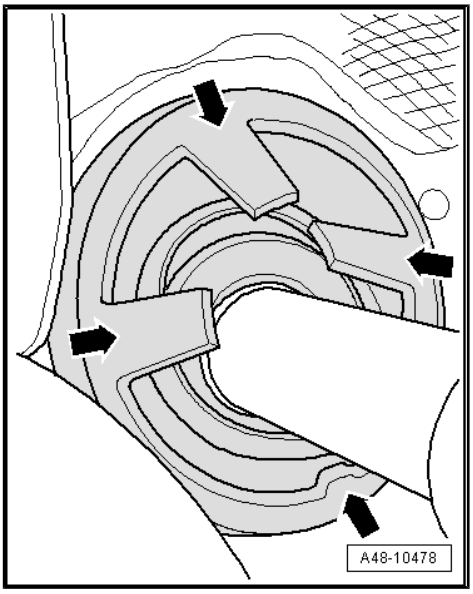


WARNING

- *Risk of burns from the exhaust system depending on the type of engine.*

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– Detach sealing boot from body at lugs -arrows-.
– Detach intermediate steering shaft downwards.



Installing

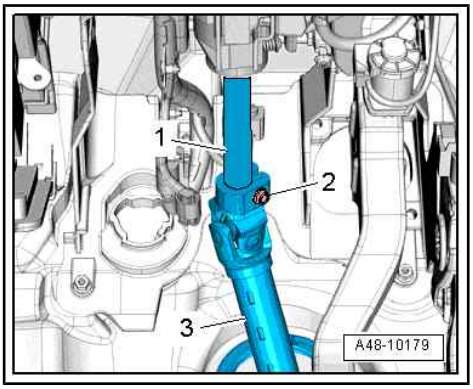
Installation is carried out in the reverse sequence. Note the following points:

– Always clean threaded holes for bolts (using a thread tap or similar).

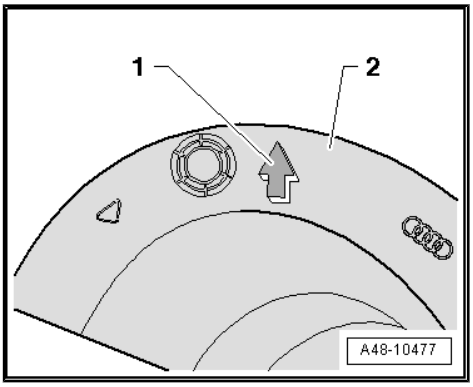
Tightening torques ⇒ page 364

– Install intermediate steering shaft from passenger compartment end.

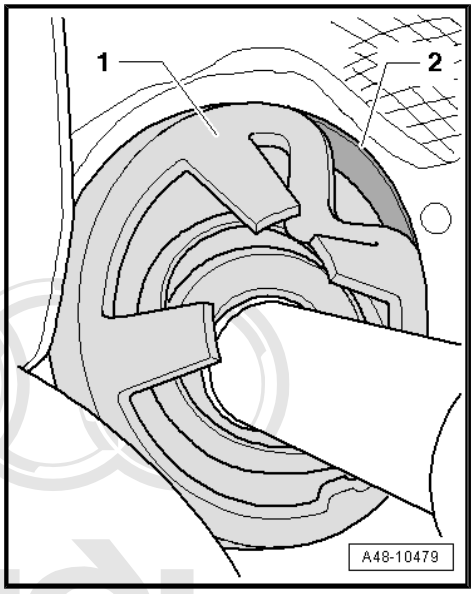
– Push intermediate steering shaft -3- onto steering column -1- as far as stop and tighten bolt -2-.



– Insert sealing boot -2- as far as possible. Make sure arrow -1- is pointing vertically upwards.

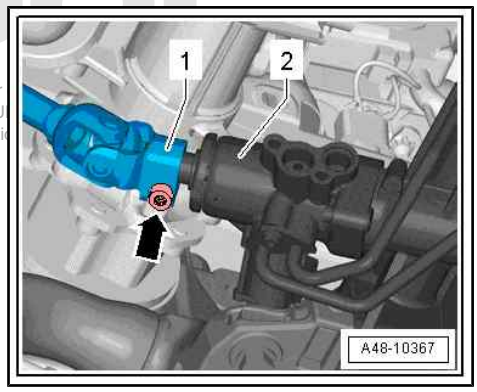


– Pull sealing boot -1- through opening.
– Taking care to keep it straight, attach sealing boot -1- fully onto collar -2-.
– Then check mark on passenger compartment side to verify that sealing boot is installed in correct position. If necessary, unfasten sealing boot and turn it to correct installation position.



– Then push intermediate steering shaft -1- onto steering box -2- as far as stop and tighten bolt -arrow-.

Remaining installation steps are carried out in reverse sequence.

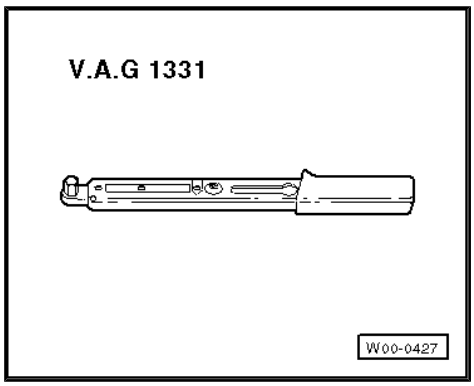


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3.3 Removing and installing steering column

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-



WARNING

Before removing the steering column, please note the following points:

Draw a sketch showing

- *the layout of the electrical wiring harnesses*
- *the attachment of the electrical wiring harnesses*
- *the fitting locations of the cable ties.*

This applies particularly to the wiring harness for the electronic steering column lock control unit -J764- .

Before installing the steering column, please note the following points:

- *Restore the layout of the electrical wiring harnesses exactly as it was prior to removal.*
- *Restore the attachments of the electrical wiring harnesses exactly as they were prior to removal.*
- *All cable ties unfastened or cut open when removing the steering column must be re-attached in the same position when refitting it.*
- *When adjusting the steering column, check that the wiring harness leading to the electronic steering column lock control unit -J764- is not trapped and does not come into contact with any sharp edges.*

Removing

Note

- *The replacement steering column is only supplied as a complete unit. Repair is not possible.*
- *Only the electronic steering column lock control unit -J764- can be renewed separately.*

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– Turn wheels to straight ahead position.

– Move steering wheel downwards and rearwards as far as possible, using the full range of the steering column adjuster.

– Remove driver's airbag unit ⇒ Rep. gr. 69 ; General body repairs, interior .

– Remove airbag steering wheel ⇒ page 361 .

– Remove dash panel trim on driver's side ⇒ Rep. gr. 68 .

– If fitted, remove knee airbag (driver's side) ⇒ Rep. gr. 69 .

– If fitted, remove bracket for right knee bolster (driver side) ⇒ Rep. gr. 68 .

– Remove footwell vent on driver's side ⇒ Rep. gr. 87 .

– Remove steering column trim panels ⇒ Rep. gr. 68 .

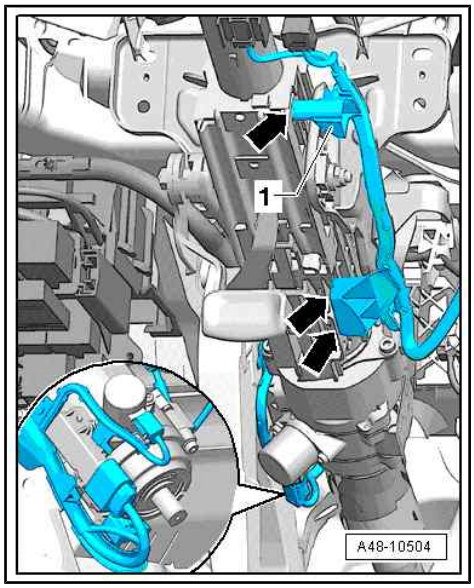
– Remove steering column switch module ⇒ Rep. gr. 94 .

WARNING

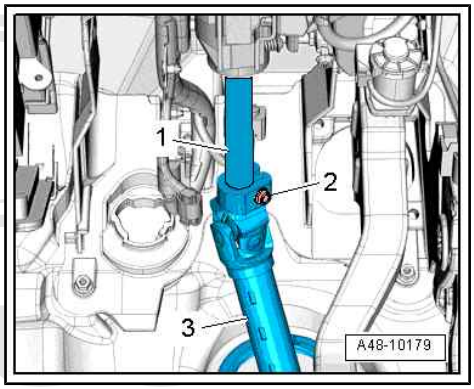
On steering columns for dynamic steering, never slacken or remove the bolts for the dynamic steering unit.

– Detach wiring guide -1- from steering column -arrows- and place aside.

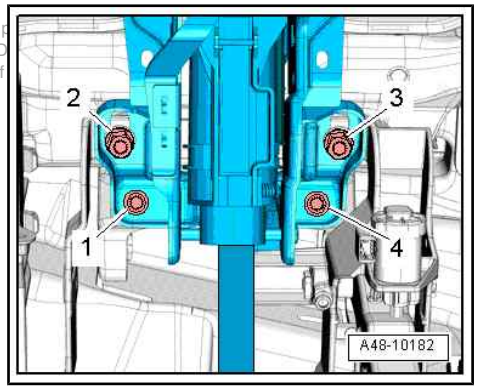
– On vehicles with dynamic steering, unplug connectors at adjuster and move wiring guide clear at steering column (left-side).



– Remove bolt -2- and detach intermediate steering shaft -3- from steering column -1-.

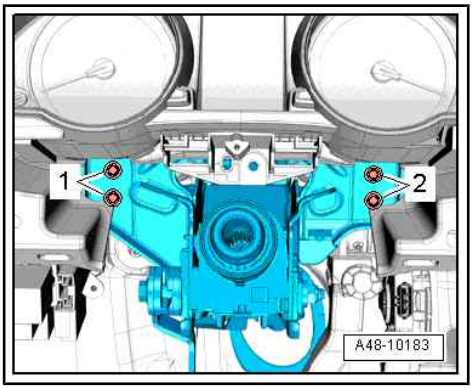


– Remove bolts -1 … 4- for steering column (bottom) from mounting bracket and pedal bracket.

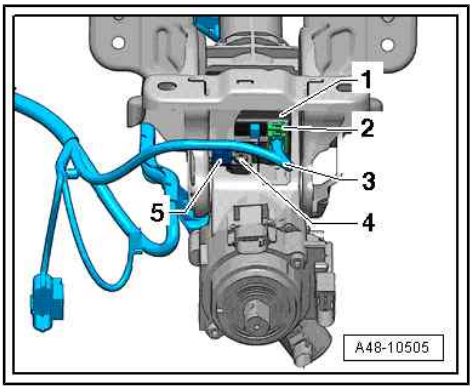


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– Unscrew bolts -1- and -2- for steering column from central tube, supporting steering column by hand from below.
– Pull steering column back slightly, detach from positioning holes on central tube and lower.



– For vehicles with safety ignition lock unplug electrical connector -2- at electronic steering column lock control unit -J764- -1-, detach clip -5-, move wiring harness -3- clear and detach steering column.



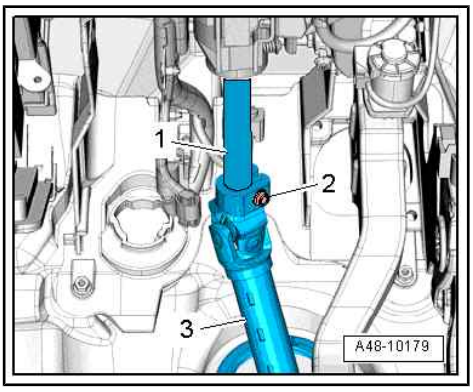
Installing

Installation is carried out in the reverse sequence. Note the following points:

- For vehicles with safety ignition lock, if steering column has been renewed, use bolt fitted in new steering column ⇒ Item 4 (page 364) for securing electronic steering column lock control unit -J764- .

Tightening torques
⇒ „3.1 Exploded view of steering column“, page 364

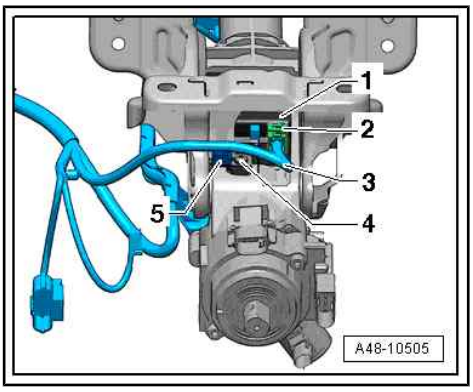
– Before fitting new bolt -2-, clean threaded hole with a thread tap or similar.



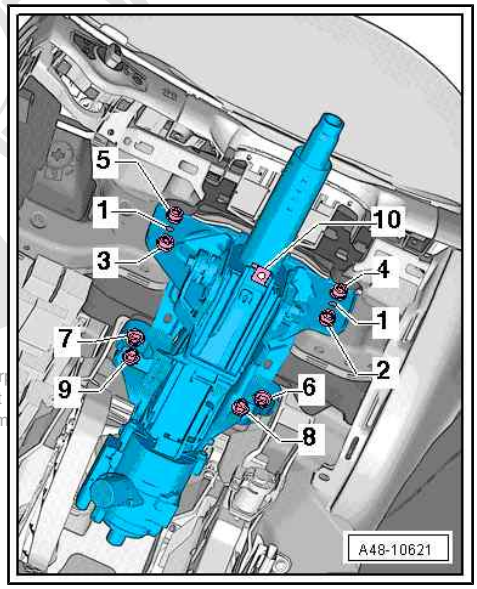
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Vehicles with safety ignition lock

- After plugging in connector -2-, make sure wiring harness -3- is secured by clip -5- at the appropriate location.
- Check that wiring harness -3- leading to electronic steering column lock control unit -J764- -1- does not become trapped and does not come into contact with sharp edges when steering column is adjusted.

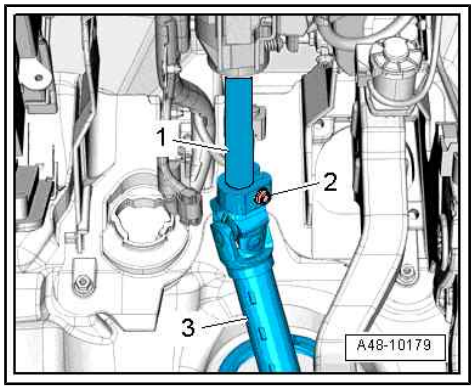


Note correct installation sequence



- Fit positioning pins -1- on steering column into positioning holes on central tube.
- Screw in all bolts only loosely.
- First tighten bolt -2- to specified torque.
- Then tighten bolt -3- to specified torque.
- Now tighten bolts -4- and -5- to specified torque.
- If fitted, install bracket for right knee bolster (driver side) ⇒ Rep. gr. 68 .
- Then tighten bolts -6- and -7- to specified torque.
- Tighten bolts -8- and -9- to specified torque.
- Renew speed nut -10- if steering column has been renewed.

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- Push intermediate steering shaft -3- onto steering column -1- as far as stop and tighten bolt -2-.
- Install steering column switch module ⇒ Rep. gr. 94 .
- Install steering column trim panels ⇒ Rep. gr. 68 .
- Install footwell vent on driver's side ⇒ Rep. gr. 87 .
- If fitted, install knee airbag (driver's side) ⇒ Rep. gr. 69 .
- Install dash panel trim on driver's side ⇒ Rep. gr. 68 .
- Install airbag steering wheel ⇒ page 361 .
- Install driver's airbag unit ⇒ Rep. gr. 69 ; General body repairs, interior .
- If the electronic steering column lock control unit -J764- is renewed, the control unit must be adapted to the immobilizer.

Note

If the same steering column and the same electronic steering column lock control unit -J764- are being re-installed, the electronic steering column lock control unit -J764- does not have to be adapted.

- Connect vehicle diagnosis, testing and information system -VAS 5052- and start Guided Functions for the vehicle in question.
- Select the relevant program in „Guided Functions“.
- Follow the instructions on the screen.
- After installing steering column switch module, calibrate steering angle sender -G85- .
- Connect vehicle diagnosis, testing and information system -VAS 5052- and start Guided Functions for the vehicle in question.
- Follow the instructions on the screen.

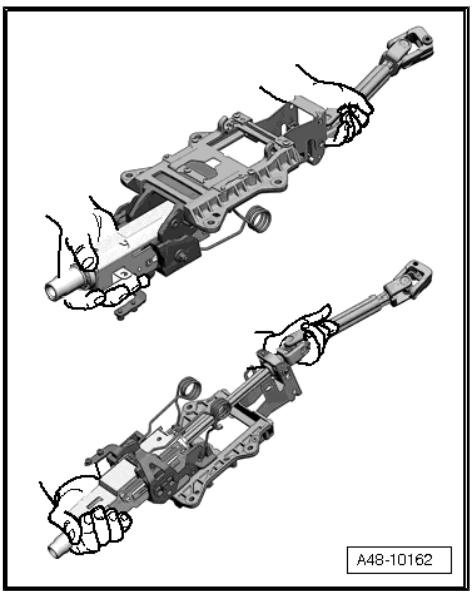
3.4 Handling and transporting steering column

WARNING

- *These instructions for handling the steering column MUST be observed at all times.*
- *Incorrect handling can damage the steering column and thus cause a safety risk.*

Correct handling and transportation of steering column

- Use both hands to carry the steering column.
- Take hold of the steering column at the top column tube and the upper universal joint.



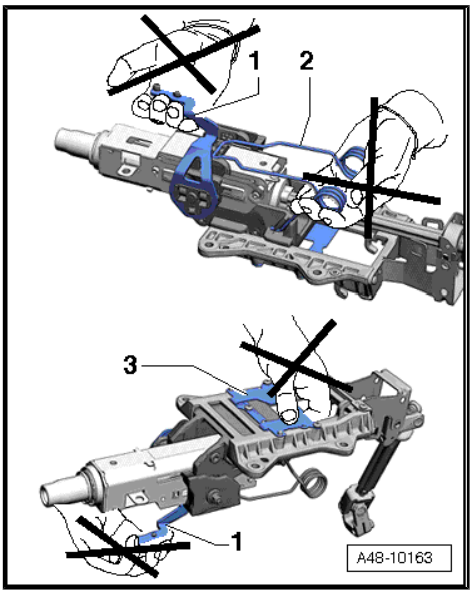
Incorrect handling of steering column

Carrying the steering column by the following parts will cause damage:

1 - Clamping lever

2 - Balance springs

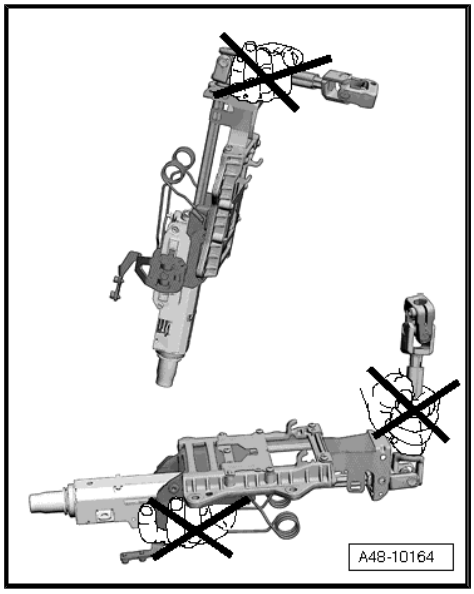
3 - Deformation element



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The bushes of the universal joint at the lower steering column bearing will be damaged by:

- Picking up and carrying the steering column by the jointed shaft with one hand.
- Bending the universal joints further than 90°



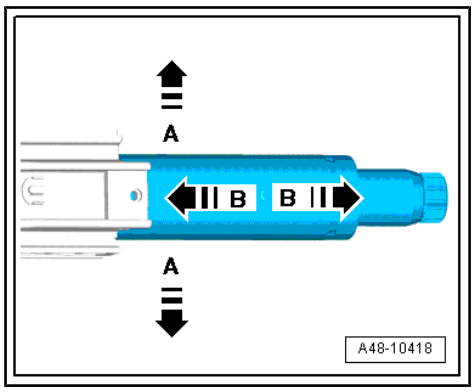
3.5 Checking steering column for damage

Visual inspection

– Check all parts of steering column for damage.

Checking function

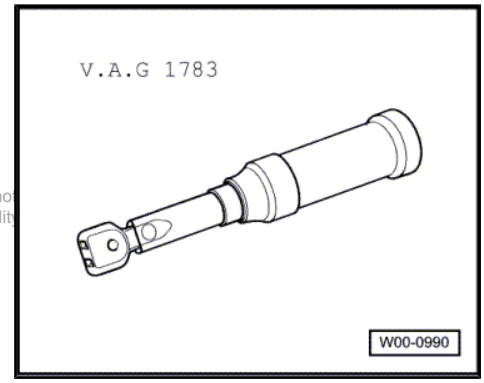
– Check that steering column turns easily and smoothly.
– Check that steering column can be adjusted for height and reach without sticking.
– Check whether the tube moves clearly in direction of arrow -A- or -B-.
– If it does, the steering column must be renewed.



3.6 Removing and installing electronic steering column lock control unit -J764-

Special tools and workshop equipment required

- Torque wrench -V.A.G 1783-



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Removing

WARNING

Before removing the steering column, please note the following points:

Draw a sketch showing

- *the layout of the electrical wiring harnesses*
- *the attachment of the electrical wiring harnesses*
- *the fitting locations of the cable ties.*

This applies particularly to the wiring harness for the electronic steering column lock control unit -J764- .

Before installing the steering column, please note the following points:

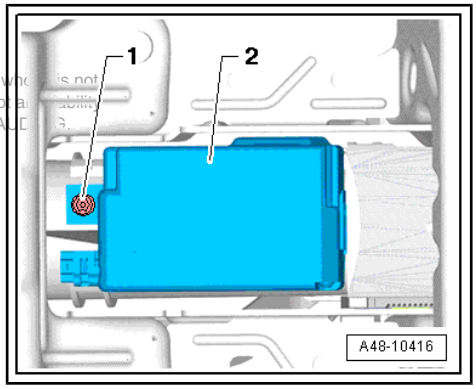
- *Restore the layout of the electrical wiring harnesses exactly as it was prior to removal.*
- *Restore the attachments of the electrical wiring harnesses exactly as they were prior to removal.*
- *All cable ties unfastened or cut open when removing the steering column must be re-attached in the same position when refitting it.*
- *When adjusting the steering column, check that the wiring harness leading to the electronic steering column lock control unit -J764- is not trapped and does not come into contact with any sharp edges.*

When renewing electronic steering column lock control unit -J764- , only the following components need to be detached from steering column:

- Driver's airbag unit ⇒ Rep. gr. 69 ; General body repairs, interior
- Steering wheel ⇒ page 361
- Steering column trim ⇒ Rep. gr. 68
- Necessary electrical wiring and connectors

– Remove steering column ⇒ page 368 .

– Remove bolt -1- and detach electronic steering column lock control unit -2-.



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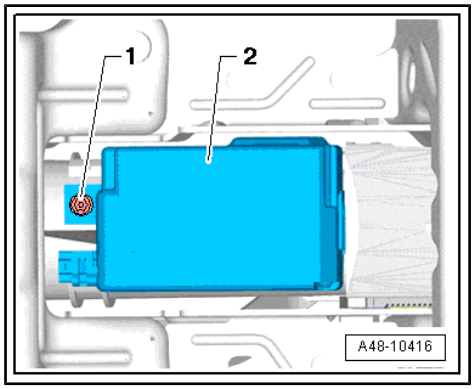
WARNING

- *After removing the control unit, make sure no dirt or foreign bodies get into the steering column.*

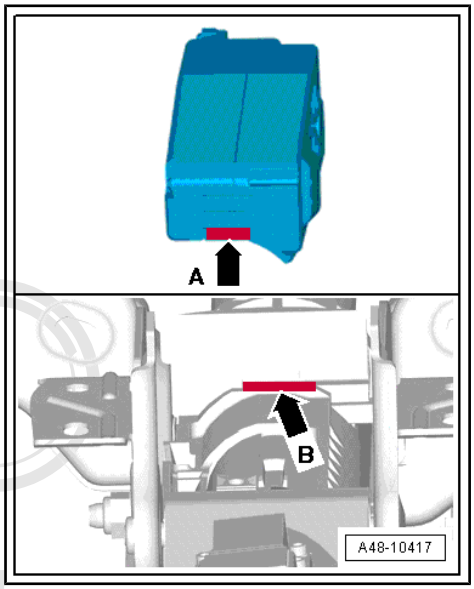
Installing

Installation is carried out in the reverse sequence. Note the following points:

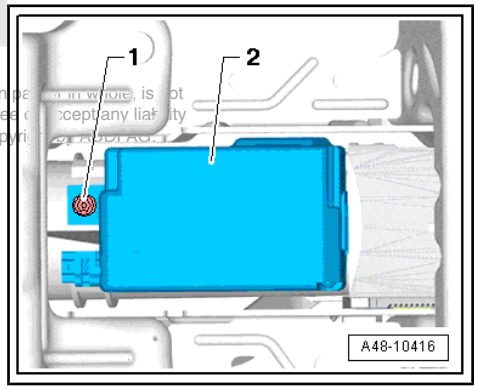
- If only electronic steering column lock control unit -J764- -2- has been renewed, original bolt -1- for securing control unit can be re-used.
- If steering column has been renewed, use bolt -1- fitted in new steering column for securing electronic steering column lock control unit -J764- -2-.



– To install electronic steering column lock control unit , insert lug -arrow A- into groove -arrow B- on steering column and press electronic steering column lock control unit firmly onto steering column by hand.



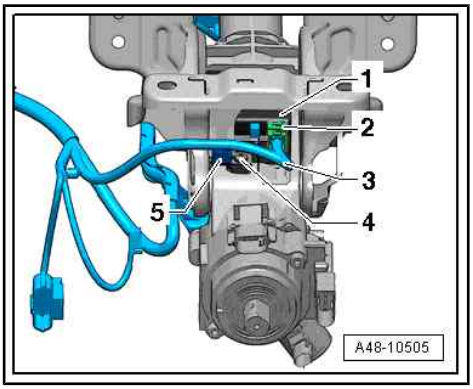
– When entire surface of electronic steering column lock control unit -2- makes flush contact with the steering column, fit bolt -1- and tighten.



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– After plugging in connector -2-, make sure wiring harness -3- is secured by clip -5- at the appropriate location.

Check that wiring harness -3- leading to electronic steering column lock control unit -J764- -1- does not become trapped and does not come into contact with sharp edges when steering column is adjusted.

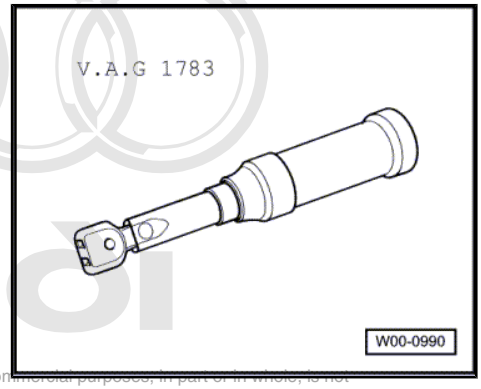


- Tightening torque
  ⇒ „3.1 Exploded view of steering column“, page 364
- If electronic steering column lock control unit -J764- has been renewed, further steps are necessary using ⇒ Vehicle diagnostic tester. Select the relevant program in „Guided Functions“ and follow the instructions on the screen.
- If warning lamp for steering angle sender -G85- lights up in the instrument cluster after renewing, use „Guided Fault Finding“ function on vehicle diagnosis, testing and information system -VAS 5051 B- to rectify the fault. The system may need to be recalibrated ⇒ page 328 .

3.7 Removing and installing safety lock for active steering (locking solenoid)

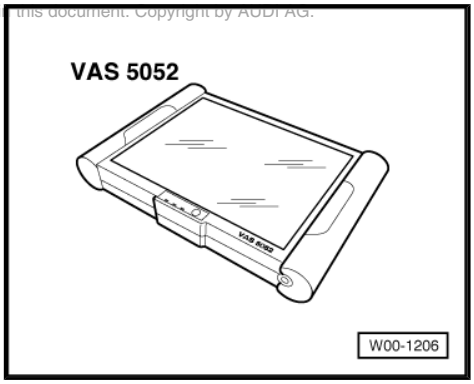
Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1783-



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♦ Diagnostic tester e.g. -VAS 5052- with appropriate diagnosis lead



WARNING

Note the following before working on the steering column.

- *Steering components are safety components!*
- *For reasons of safety, all work on the steering system must be carried out by suitably trained and qualified personnel. Work that is not performed properly can result in serious accidents.*
- *Restore the layout of the electrical wiring harnesses exactly as it was prior to removal.*
- *Restore the attachments of the electrical wiring harnesses exactly as they were prior to removal.*

Removing

Note

The steering wheel must not be turned and the straight-ahead position or the steering angle of the front wheels must not altered when the locking solenoid has been removed. Otherwise the steering wheel may not be properly centred after the work is completed. It is important to keep all components clean when carrying out the following steps.

– Turn steering wheel to straight-ahead position (front and rear wheels must be in line) and allow steering lock to engage in straight-ahead position if possible.

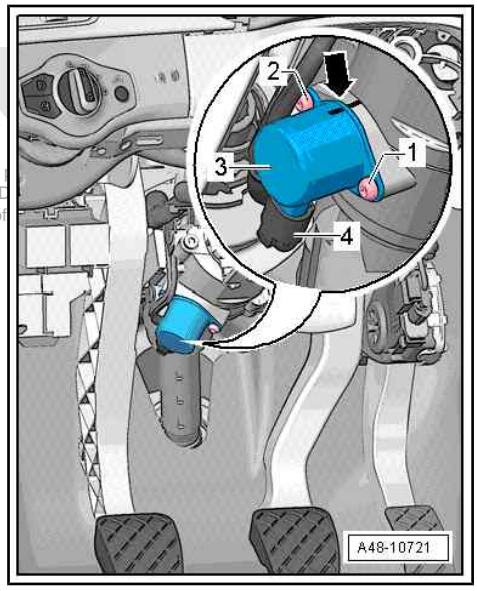
– Switch off ignition and remove ignition key.

– Mark installation position of locking solenoid -arrow- (required for subsequent installation).

– Unplug electrical connector -4- from locking solenoid -3-.

– Clean paint residue out of heads of Torx bolts -1 and 2-.

– Remove bolts -1 and 2- and detach locking solenoid -3- from steering column.



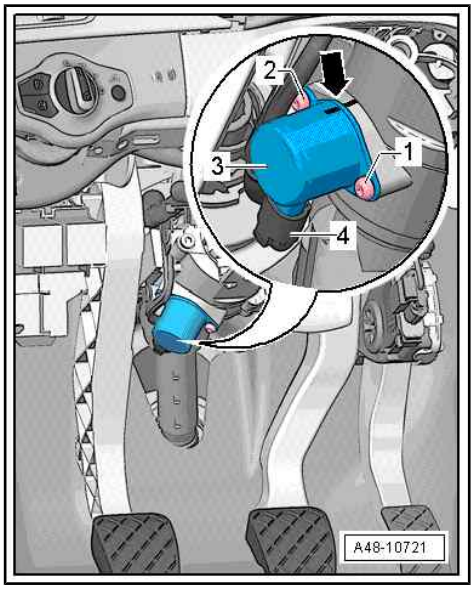
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Installing

Installation is carried out in the reverse sequence. Note the following points:

- After renewing the locking solenoid you must perform a software update of the active steering control unit -J792- ; start the corresponding program on the ⇒ diagnostic tester .
- When installing a new locking solenoid, transfer the marking from the old part onto the new one.

– Fit new locking solenoid according to marking made before removal and secure with two new bolts -1 and 2- (tighten in correct sequence to specifications in table below using tool supplied).



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Sequence	Bolt No.	Tightening torque
1	1	2 + 2 Nm
2	2	4 + 2 Nm
3	1	8 + 2 Nm
4	2	8 + 2 Nm

– Plug in electrical connector at locking solenoid.

– Erase event memory.

– Drive vehicle to initialise system - turn wheels to approx. 45° from the straight-ahead position in both directions.

Checking function

Road test vehicle in an area closed to traffic and check the function of the steering:

- ♦ Steering force
- ♦ Self-centring
- ♦ Play
- ♦ Noise
- ♦ Warning lamp

- Read out event memory after road test. The event memory must not show any faults.

4 Electromechanical power steering box

⇒ „4.1 Exploded view of electromechanical power steering box with track rods“, page 380

⇒ „4.2 Removing and installing electromechanical power steering box“, page 381

⇒ „4.3 Centralising steering“, page 384

⇒ „4.4 Exploded view of electromechanical power steering box“, page 384

⇒ „4.5 Removing and installing track rod ball joint“, page 387

⇒ „4.6 Removing and installing track rod“, page 390

⇒ „4.7 Renewing boot“, page 394

4.1 Exploded view of electromechanical power steering box with track rods

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1 - Electromechanical steering box with track rods

- ❑ With power steering control unit -J500-
- ❑ Removing and installing ⇒ page 381
- ❑ Servicing ⇒ page 384
- ❑ Different versions available ⇒ Electronic parts catalogue

2 - Bolt

- ❑ 80 Nm +180°
- ❑ Always renew if removed

3 - Subframe

4 - Nut

- ❑ Inserted into subframe
- ❑ Always renew if removed

5 - Intermediate steering shaft

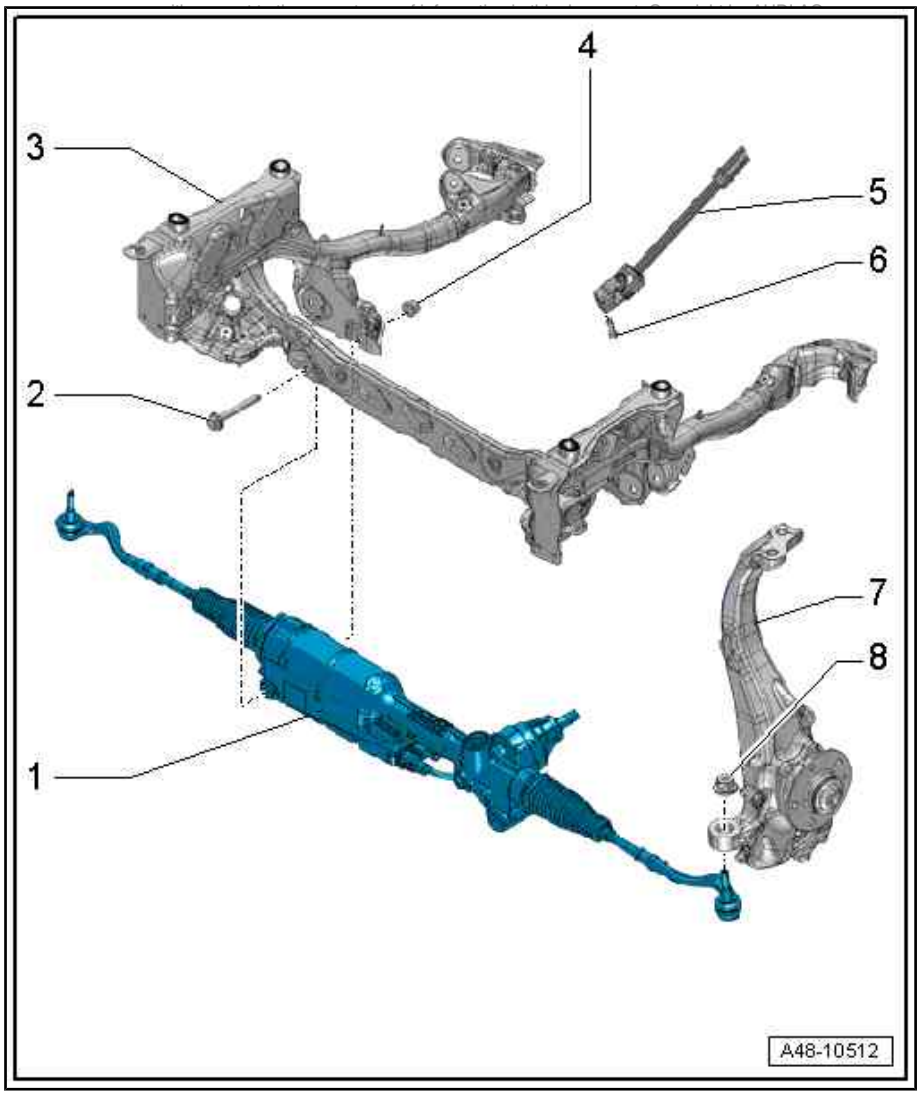
6 - Bolt

- ❑ Tightening torque ⇒ Item 18 (page 365)

7 - Wheel bearing housing

8 - Nut

- ❑ 100 Nm
- ❑ Always renew if removed



4.2 Removing and installing electromechanical power steering box

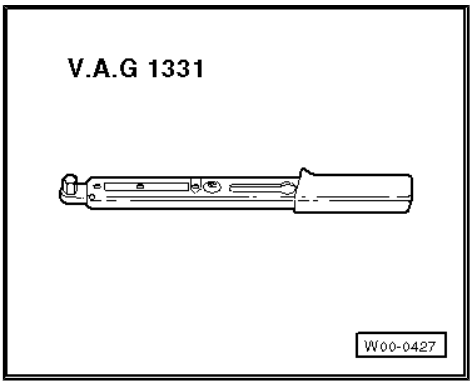
Note

The power steering box is removed and installed complete with track rods.

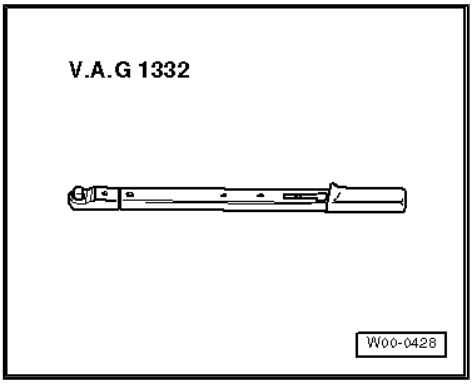
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Special tools and workshop equipment required

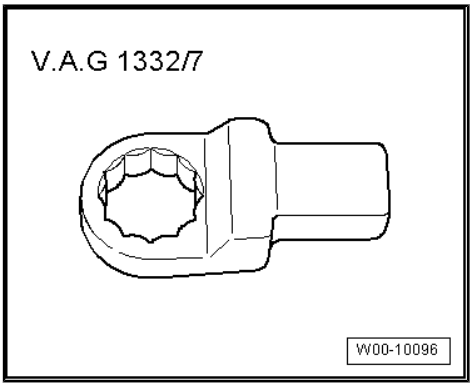
- Torque wrench -V.A.G 1331-



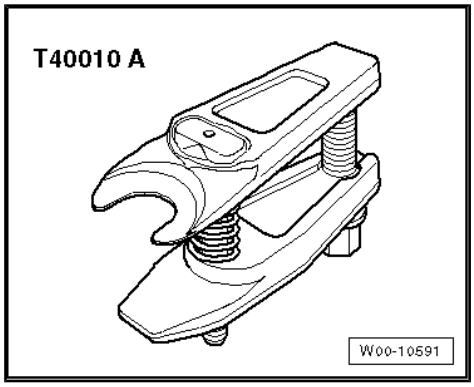
- Torque wrench -V.A.G 1332-



- Ring spanner insert -V.A.G 1332/7-



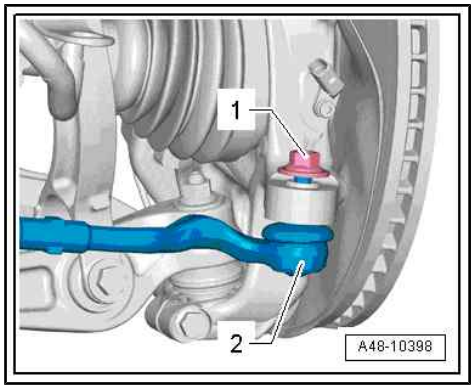
♦ Ball joint puller -T40010 A-



Removing

– Remove front wheels ⇒ Wheels and tyres; Rep. gr. 44 .

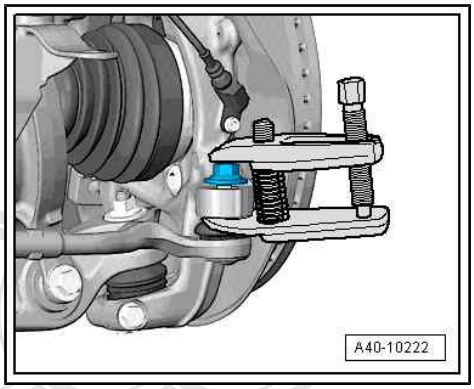
– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



Note

Leave nut screwed on a few turns to protect threads on joint pin.

– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.



Note

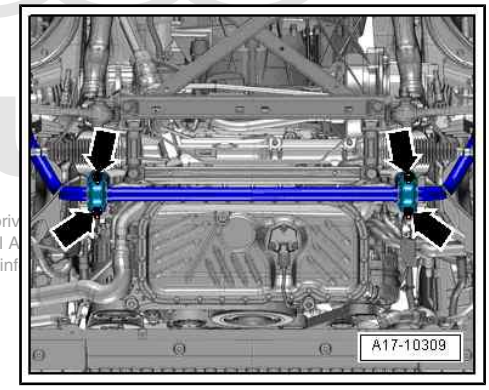
Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

– Remove noise insulation ⇒ Rep. gr. 66 .

– Unscrew nuts -arrows- and lower anti-roll bar.

– Remove cross brace ⇒ „2.4 Removing and installing subframe cross brace (Coupé/ Sportback)“, page 27 .

– Remove cross brace ⇒ „2.5 Removing and installing subframe cross brace (Cabriolet)“, page 28 .



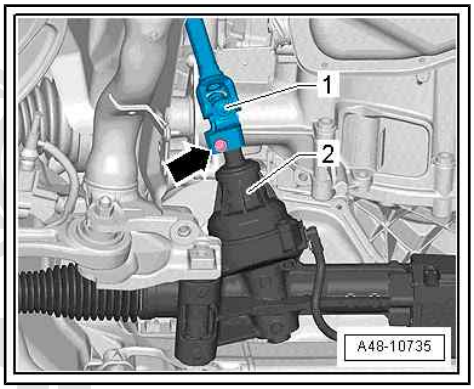
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Caution

Risk of damage to running gear components.

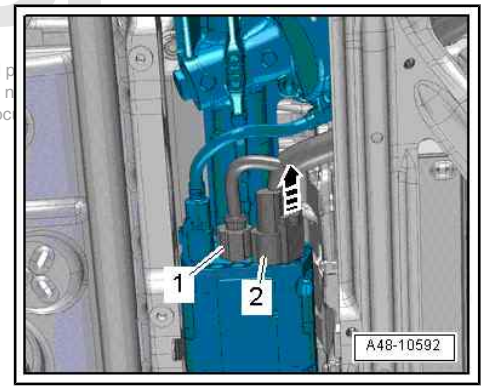
- ***Never place the vehicle on its wheels if the subframe mounting, steering box or subframe cross brace is not correctly installed!***
- ***The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!***

– Remove bolt -arrow-.
– Detach intermediate steering shaft -1- from steering box -2-.

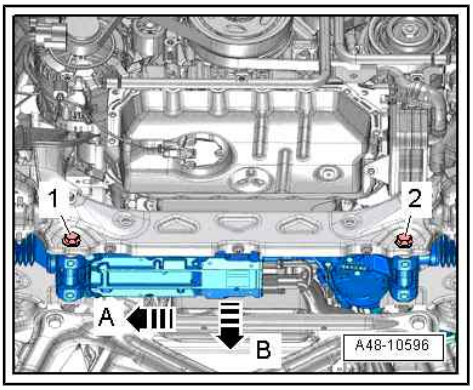


– Release retainer, press catch downwards and unplug electrical connector -1- for signal wires (CAN-BUS and terminal 15) at power steering control unit -J500-.
– Unplug electrical connector -2- for voltage supply (terminal 30) at power steering control unit -J500- (release retainer -arrow- and push catch downwards).

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– Remove bolts -1 and 2-.
– Push steering box slightly to the side-arrow A- and take out from below -arrow B-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „4.1 Exploded view of electromechanical power steering box with track rods“, page 380

– Screw in both bolts -1- loosely at first, then tighten.
– Install anti-roll bar
⇒ „2.7 Removing and installing anti-roll bar“, page 31 .
– Install cross brace
⇒ „2.4 Removing and installing subframe cross brace (Coupé/Sportback)“, page 27 .
– Install cross brace
⇒ „2.5 Removing and installing subframe cross brace (Cabriolet)“, page 28 .

If a new electromechanical steering box has been installed, the program `J 500 Replace control unit` must be started in the vehicle diagnostic tester using the `Guided Fault Finding` function.

– Check and adjust wheel alignment ⇒ page 309 .

4.3 Centralising steering

Note

- *The purpose of centralising the steering is merely to „align“ the steering for subsequent work.*
- *The precise steering wheel centre point is determined by measuring the steering wheel lock using the wheel alignment computer.*
- *If the steering wheel is found to be out of alignment after determining the centre position of the steering, inspect the steering and suspension for damage or distortion and renew any damaged parts. Also check the symmetry of the track rods* *⇒ page 319* .

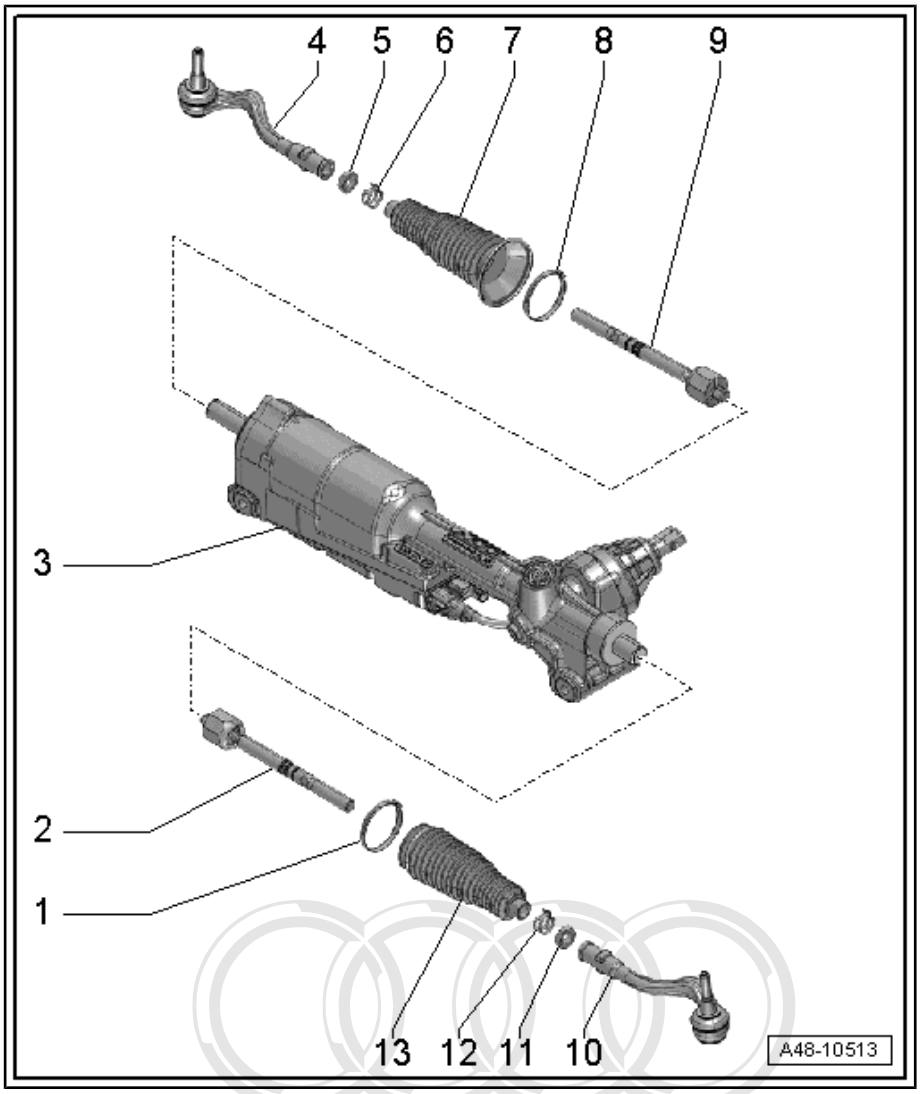
4.4 Exploded view of electromechanical power steering box

This overview is applicable to LHD and RHD vehicles (layout is similar).

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Note

- *Renew self-locking nuts and bolts.*
- *Welding and straightening work on steering components is not permitted.*
- *Use only power steering box grease to grease steering rack (pinion side) and ball races (motor side). Important: different types of grease are required for the left and right sides; for correct type refer to ⇒ Electronic parts catalogue .*
- *Hose clips -1 and 8- are tightened with different tightening torques.*



1 - Hose clip

- ❑ Always renew if removed
- ❑ Use clamp tensioner to tighten hose clip ⇒ page 387

Note

- ❑ For correct version refer to ⇒ Electronic parts catalogue

2 - Track rod

- ❑ 100 Nm
- ❑ Removing and installing ⇒ page 390
- ❑ Grease joint with power steering box grease

3 - Electromechanical steering box

- ❑ Removing and installing ⇒ page 381
- ❑ Grease steering rack with power steering box grease . Important: different types of grease are required for the left and right sides; for correct type refer to ⇒ Electronic parts catalogue
- ❑ Different versions available ⇒ Electronic parts catalogue

4 - Track rod ball joint

- ❑ Removing and installing ⇒ page 387
- ❑ Check that grease caps are seated correctly and not damaged
- ❑ Specified dimension ⇒ page 387

5 - Nut

- ❑ 80 Nm
- ❑ Counterhold track rod ball joint when loosening and tightening

6 - Spring-type clip

- ❑ Always renew if removed
- ❑ Installing spring-type clip ⇒ page 394

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7 - Boot

- ❑ Check for damage
- ❑ Always renew if removed
- ❑ Before installation, grease evenly all round inside of boot seating surfaces with power steering box grease ⇒ ETKA - Electronic parts catalogue .
- ❑ Before installation, check boot seating surface on steering box housing for damage. If sealing surface on steering box housing is damaged, steering box must be renewed.
- ❑ Must not be twisted when adjusting toe setting
- ❑ Must be installed correctly ⇒ page 394
- ❑ Renewing ⇒ page 394

8 - Hose clip

- ❑ Always renew if removed
- ❑ Use clamp tensioner to tighten hose clip ⇒ page 387

Note

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- ❑ For correct version refer to ⇒ Electronic parts catalogue

9 - Track rod

- ❑ 100 Nm
- ❑ Removing and installing ⇒ page 390
- ❑ Grease joint with power steering box grease

10 - Track rod ball joint

- ❑ Removing and installing ⇒ page 387
- ❑ Check that grease caps are seated correctly and not damaged
- ❑ Specified dimension ⇒ page 387

11 - Lock nut

- ❑ 80 Nm
- ❑ Counterhold track rod ball joint when loosening and tightening

12 - Spring-type clip

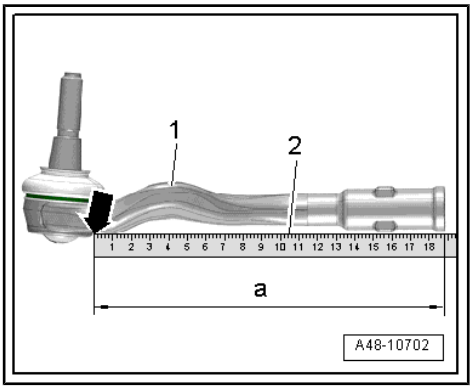
- ❑ Always renew if removed
- ❑ Installing spring-type clip ⇒ page 394

13 - Boot

- ❑ Check for damage
- ❑ Always renew if removed
- ❑ Before installation, grease evenly all round inside of boot seating surfaces with power steering box grease ⇒ ETKA - Electronic parts catalogue .
- ❑ Before installation, check boot seating surface on steering box housing for damage. If sealing surface on steering box housing is damaged, steering box must be renewed.
- ❑ Must not be twisted when adjusting toe setting
- ❑ Must be installed correctly ⇒ page 394
- ❑ Renewing ⇒ page 394

Specified dimension for track rod ball joint

- Apply steel ruler -2- to track rod ball joint -1- and slide as far as rolled edge -arrow- on end of track rod ball joint.
- The entire steering box with track rod with track rod ball joint must be renewed if dimension -a- is less than 188 mm.



Tightening hose clip (inner)

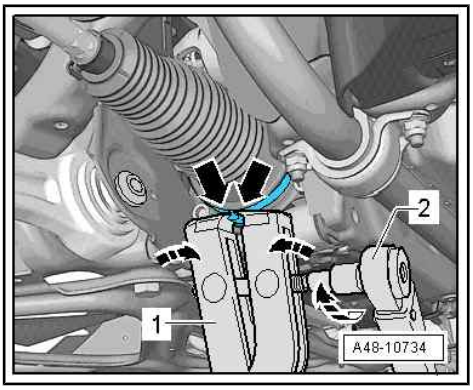
– Apply clamp tensioner -1-, as shown in illustration. Ensure jaws of tool make contact with lugs -arrows- on hose clip.

– Tighten clip by turning spindle with torque wrench -2- (take care to keep tool straight).

♦ Use torque wrench -2- with adjustment range 5 … 50 Nm (e.g. -V.A.G 1331-).

♦ Make sure thread of spindle on tool -1- turns freely. Lubricate with MoS_2 grease if necessary.

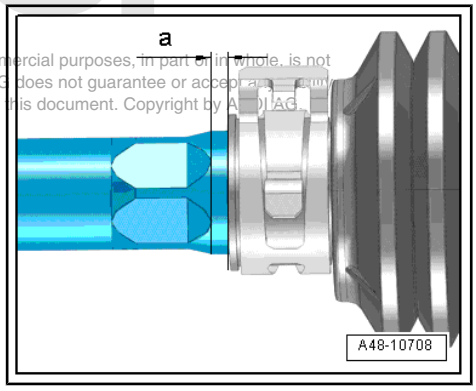
♦ If the thread is stiff (e.g. due to dirt), the required clamping force will not be attained at the hose clip when the specified tightening torque is applied.



Type of hose clip	Clamp tensioner - V.A.G 1682 A- (Hazet)	Clamp tensioner - V.A.G 1682- (Ötiker)
Hose clip ∅ 85 mm (passenger side) ⇒ Item 8 (page 386)	7 Nm	9 Nm
Hose clip ∅ 59 mm (driver side) ⇒ Item 1 (page 385)	10 Nm	12 Nm

Installing rubber boot (outer):

- Dimension -a- = 2 mm

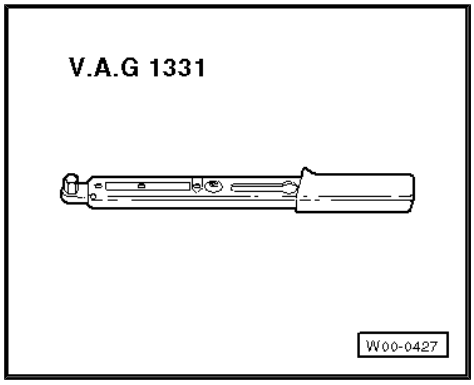


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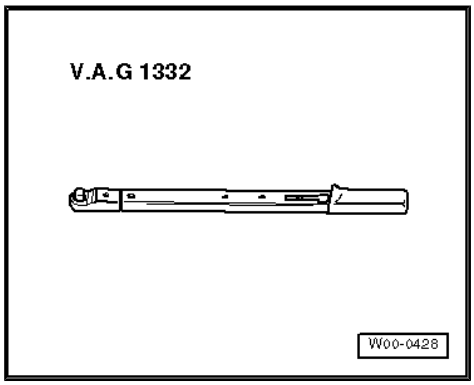
4.5 Removing and installing track rod ball joint

Special tools and workshop equipment required

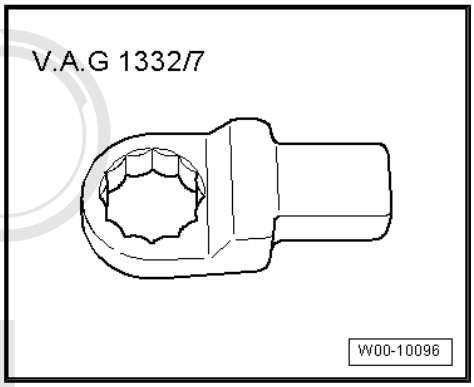
- Torque wrench -V.A.G 1331-



- Torque wrench -V.A.G 1332-

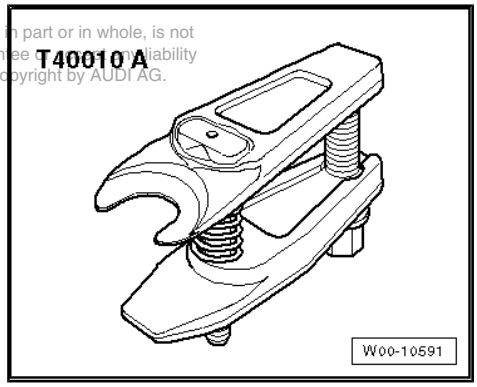


- Ring spanner insert -V.A.G 1332/7-



- Ball joint puller -T40010 A-

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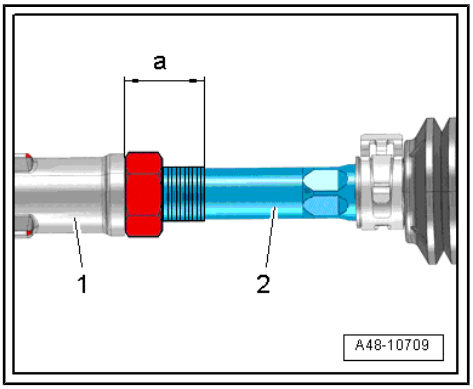


Removing

– Remove front wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Measure and note down dimension -a- between track rod ball joint -1- and track rod -2- on both sides. Dimension -a- should be the same on both sides after installation.

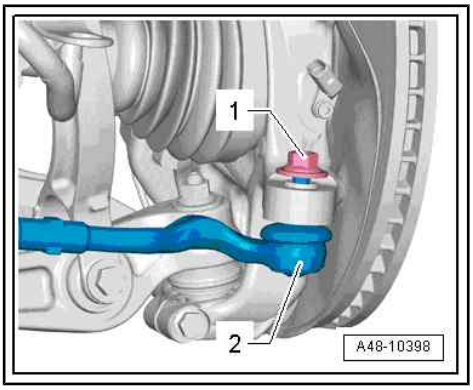
– If necessary, shorten the „longer“ track rod ball joint (by screwing it further onto the track rod).



– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.

Note

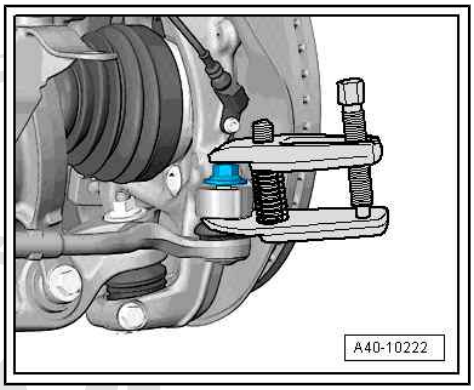
Leave nut screwed on a few turns to protect threads on joint pin.



– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

Note

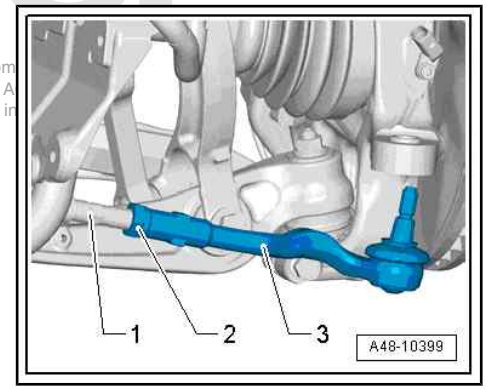
Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.



– Loosen nut -2- but do not remove (counterhold track rod ball joint -3-).

– Unscrew track rod ball joint -3-.

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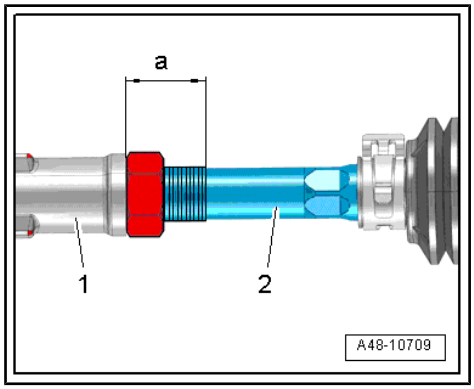
Installing

Installation is carried out in the reverse sequence. Note the following points:

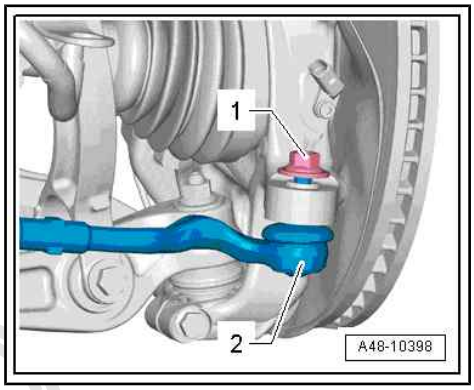
Tightening torques
⇒ „4.4 Exploded view of electromechanical power steering box“, page 384

Tightening torques
⇒ „4.1 Exploded view of electromechanical power steering box with track rods“, page 380

– Screw track rod ball joint -1- onto track rod -2- until dimension -a- measured on removal is obtained.
– Align track rod so that pin of track rod ball joint -1- is in installation position.
– Insert track rod ball joint into wheel bearing housing as far as the stop.

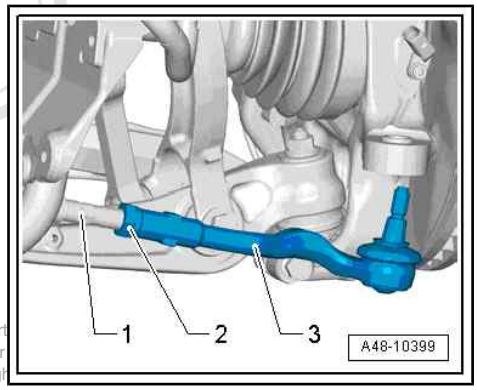


– Tighten nut -1-. Counterhold if necessary when tightening.



– Tighten nut -2-.
– Fit front wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Wheel alignment must always be checked and adjusted if necessary using VW/Audi-approved equipment.

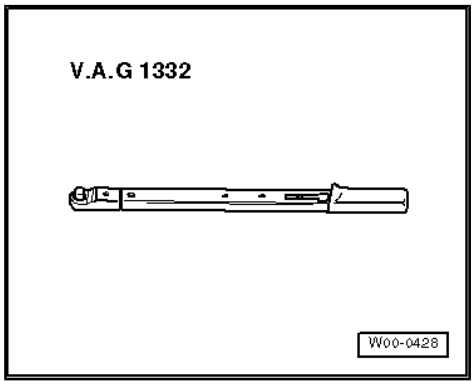


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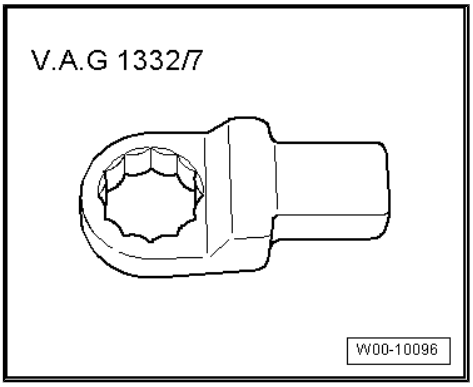
4.6 Removing and installing track rod

Special tools and workshop equipment required

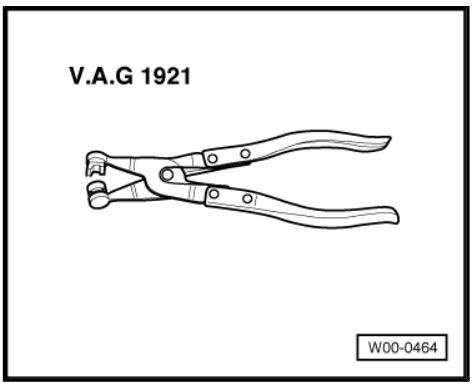
◆ Torque wrench -V.A.G 1332-



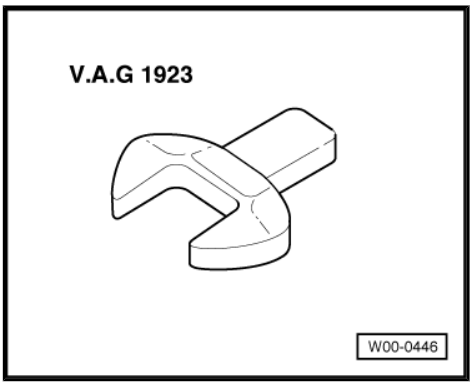
- Ring spanner insert -V.A.G 1332/7-



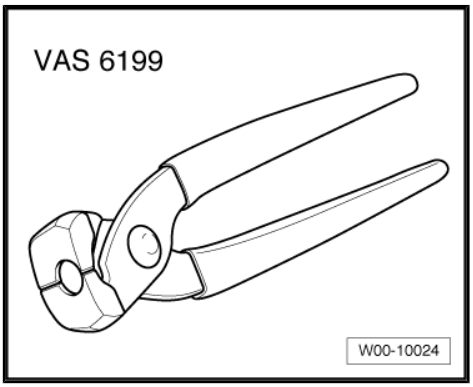
- Hose clip pliers -V.A.G 1921-



- Open-end spanner attachment -V.A.G 1923-

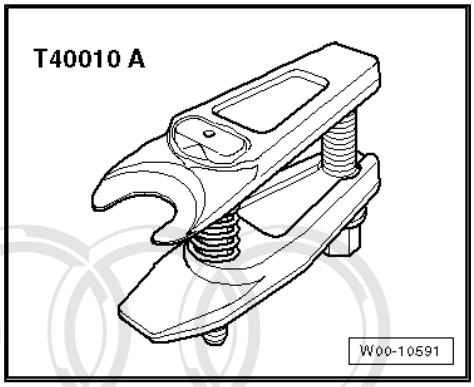


- Locking pliers for steering box -VAS 6199-



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♦ Ball joint puller -T40010 A-



Removing

The track rods can be removed and installed with the steering box in the vehicle.

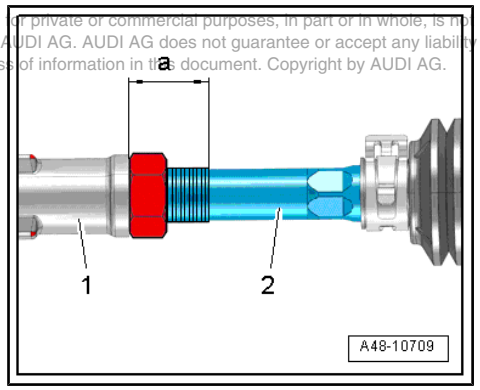
– Remove front wheel ⇒ Wheels and tyres; Rep. gr. 44 .

– Remove noise insulation ⇒ Rep. gr. 66 .

– Measure and note down dimension -a- between track rod ball joint -1- and track rod -2- on both sides. Dimension -a- should be the same on both sides after installation.

– If necessary, shorten the „longer“ track rod ball joint (by screwing it further onto the track rod).

– Clean power steering box and subframe in vicinity of rubber boot.



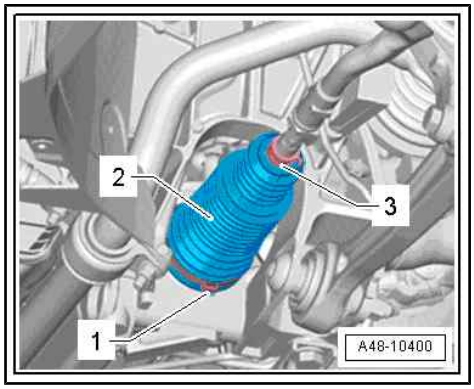
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Caution

Take care to prevent dirt from entering the power steering box and boot when renewing the track rod.

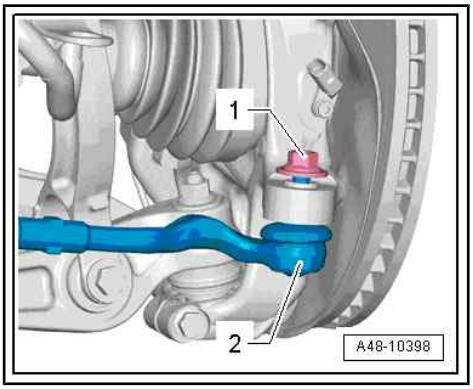
– Release spring-type clip -3- using hose clip pliers - V.A.G 1921- and detach.

– Detach hose clip -1- and pull boot -2- outwards off power steering box.



– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.

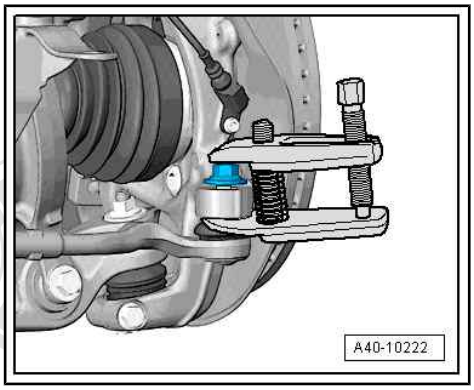
Leave nut screwed on a few turns to protect threads on joint pin.



– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

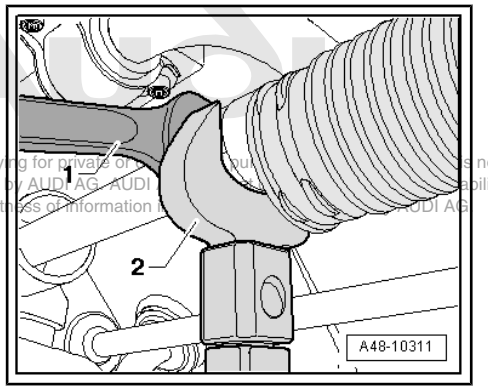
Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.



– Unscrew track rod. When doing so, counterhold piston rod of power steering box using open-end spanner -1-.

2 - Open-end spanner attachment -V.A.G 1923-



Installing

Installation is carried out in the reverse sequence. Note the following points:

Boot must always be renewed following removal.

Before installation, grease evenly all round inside of boot seating surfaces with steering box grease ⇒ ETKA - Electronic parts catalogue .

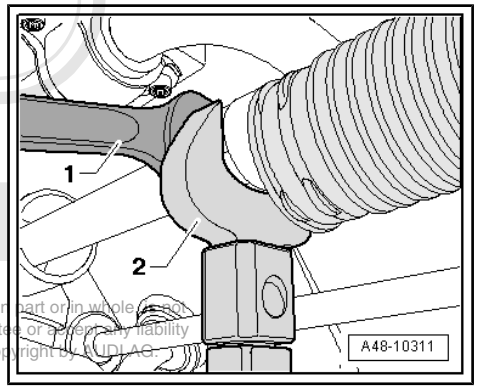
Before installation, check boot seating surface on steering box housing for damage. If sealing surface on steering box housing is damaged, steering box must be renewed.

Tightening torques
⇒ „4.4 Exploded view of electromechanical power steering box“, page 384

Tightening torques
⇒ „4.1 Exploded view of electromechanical power steering box with track rods“, page 380

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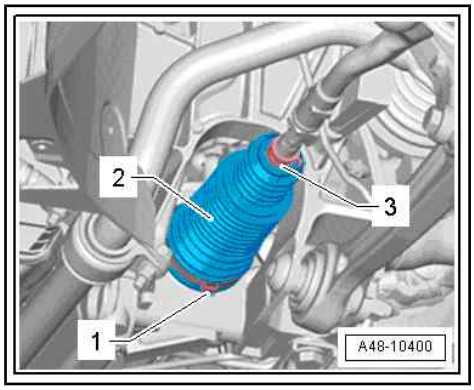
– Attach track rod using open-end spanner attachment - V.A.G 1923- -2-. When doing so, counterhold piston rod of power steering box using open-end spanner -1-.
– Renew spring-type clip -3- and O-type hose clip -1-.



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Installing O-type hose clip:

– Fit new O-type hose clip -1- and tighten using clamp tensioner ⇒ page 387 .

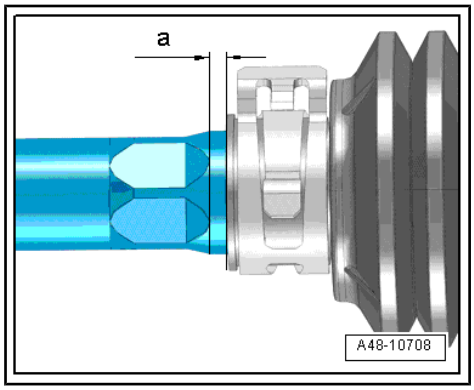


Installing rubber boot

- Dimension -a- = 2 mm

– Align track rod so that pin of track rod ball joint is in installation position.
– Insert track rod into wheel bearing housing as far as the stop.
– Fit front wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

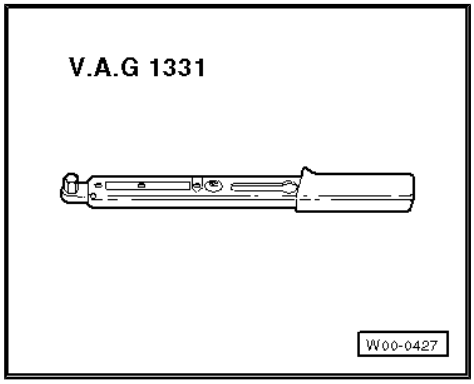
Wheel alignment must always be checked and adjusted if necessary using VW/Audi-approved equipment.



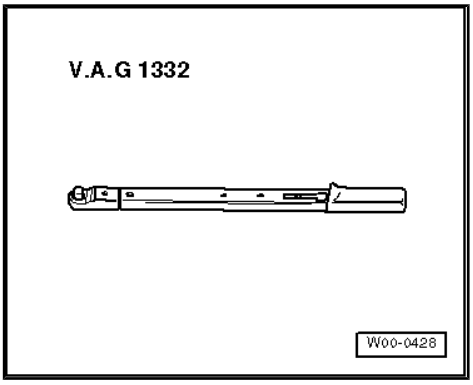
4.7 Renewing boot

Special tools and workshop equipment required

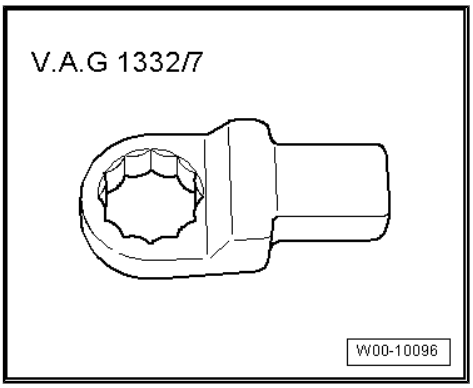
◆ Torque wrench -V.A.G 1331-



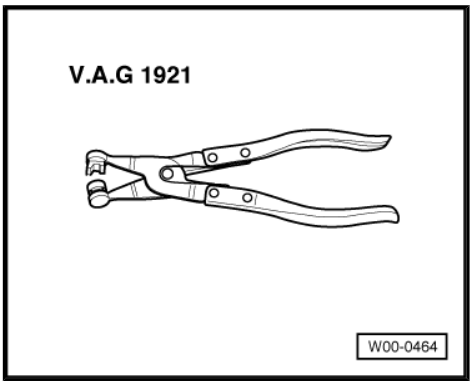
- Torque wrench -V.A.G 1332-



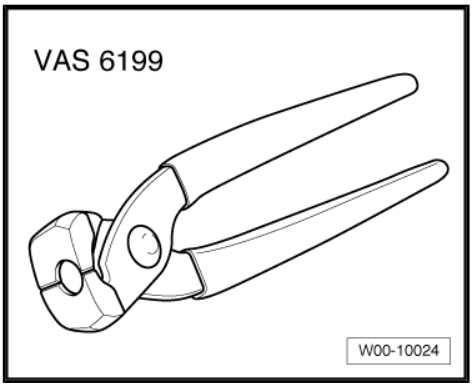
- Ring spanner insert -V.A.G 1332/7-



- Hose clip pliers -V.A.G 1921-

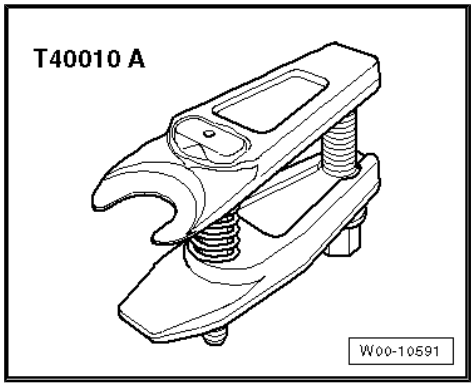


- Locking pliers for Phaeton steering box -VAS 6199-



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♦ Ball joint puller -T40010 A-



Removing

Boot must always be renewed following removal.

Caution

Moisture and dirt will enter the steering box if the rubber boot is defective. It should be possible to feel a film of lubricant on and around the teeth of the steering rack. Renew steering box if no film of lubricant can be felt. Also renew steering box if there are signs of corrosion, damage or wear on the steering rack.

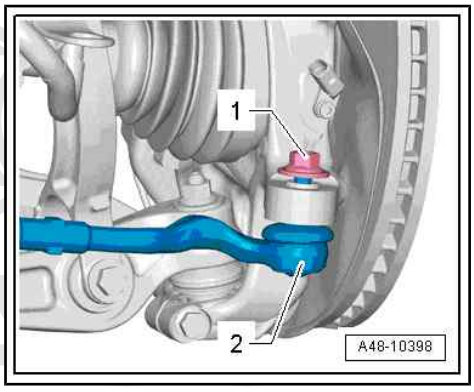
– Remove front wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Turn wheels to straight ahead position.
– Remove noise insulation ⇒ Rep. gr. 66 .
– Clean power steering box and subframe in vicinity of rubber boot.

Caution

- ***No dirt must be allowed to enter the steering box through a defective rubber boot during this operation.***

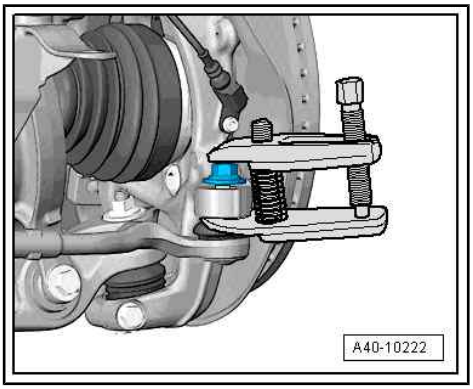
– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.

Leave nut screwed on a few turns to protect threads on joint pin.



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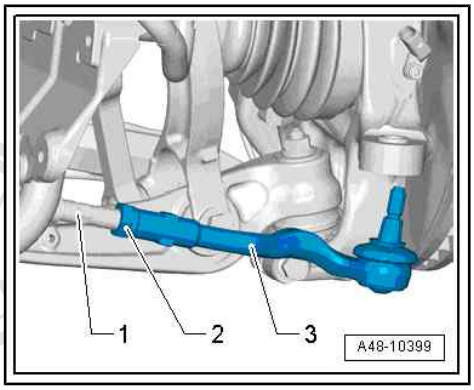
– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.



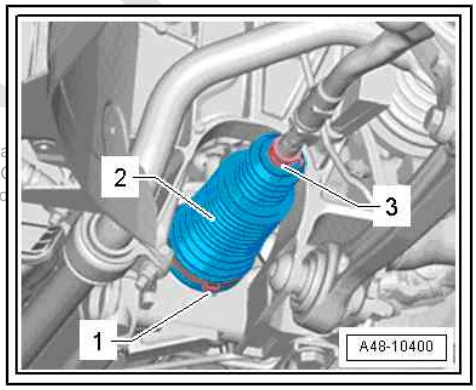
Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

– Mark position of nut -2- on track rod -1- for refitting.
– Loosen nut -2- (counterhold track rod ball joint -3-).



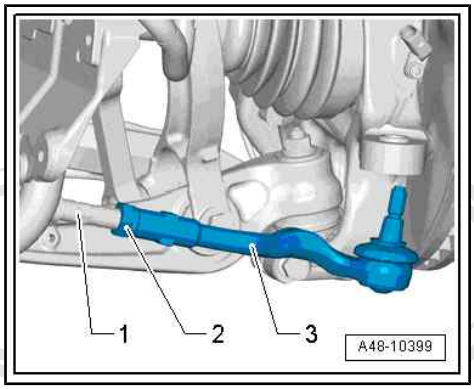
– Release spring-type clip -3- using hose clip pliers - V.A.G 1921- and detach.
– Detach hose clip -1- and pull boot -2- outwards off power steering box.



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– Unscrew track rod ball joint -3- and nut -2- from track rod -1-.

– Detach rubber boot with spring-type clip from track rod.



Note

- *Renew complete steering box if there are signs of corrosion, damage, wear or dirt on the steering rack.*
- *The complete steering box must also be renewed if there is no visible lubricating film on the steering rack.*

Installing

Installation is carried out in the reverse sequence. Note the following points:

- Boot must always be renewed following removal.
- Before installation, grease evenly all round inside of boot seating surface with power steering box grease ⇒ ETKA - Electronic parts catalogue .
- Before installation, check boot seating surface on steering box housing for damage. If sealing surface on steering box housing is damaged, steering box must be renewed.
- The steering rack must be lubricated with grease supplied in the repair kit before installing.

Caution

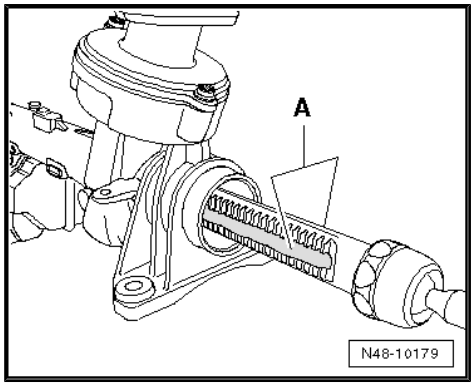
Do NOT use any other type of grease.

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– For this procedure turn steering to full lock in both directions.

A removed steering box is shown for ease of illustration.

– Grease the steering rack on the side with the teeth -A- and on the side that contacts the thrust pieces.



Note

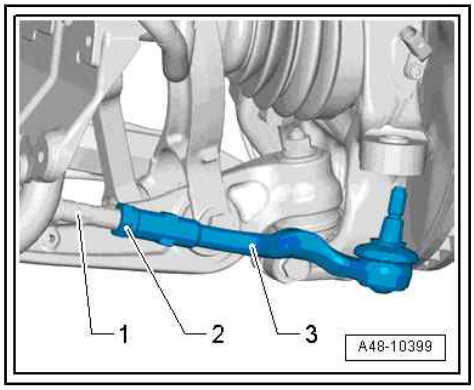
Use only power steering box grease for greasing steering rack. Important: different types of grease are required for the left and right sides; for correct type refer to ⇒ Electronic parts catalogue .

– Turn wheels to straight ahead position.

– Fit new hose clips and rubber boot onto track rod.

– Screw in nut -1- and track rod ball joint -3- as far as marking made when removing.

– Tighten nut -2- to specified torque. Counterhold at track rod ball joint -3-.



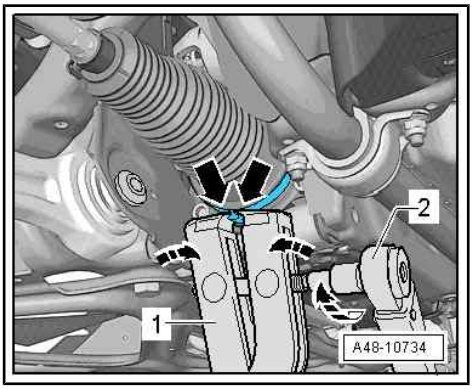
The sealing surface between the boot and power steering box must be free from grease when the parts are assembled.

– Fit rubber boot with new hose clip onto steering box housing.

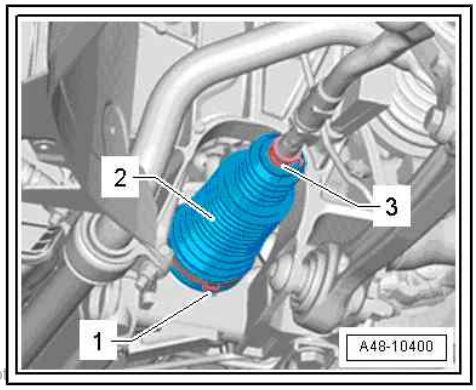
– Make sure that boot is correctly seated on power steering box.

– Boot must engage in groove and make contact with contour of power steering box.

Installing hose clip ⇒ page 387

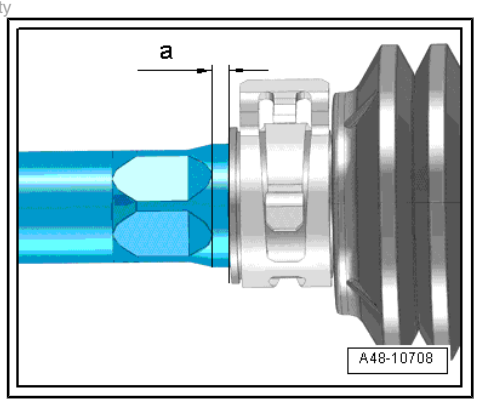


– Secure spring-type clip -3- on boot -2- with hose clip pliers - V.A.G 1921- .



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Installing rubber boot:



- Dimension -a- = 2 mm

Remaining installation steps are carried out in reverse sequence.

Tightening torques
⇒ „4.4 Exploded view of electromechanical power steering box“, page 384

Tightening torques
⇒ „4.1 Exploded view of electromechanical power steering box with track rods“, page 380

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

Wheel alignment must always be checked and adjusted if necessary using VW/Audi-approved equipment.

5 Hydraulic power steering box

⇒ „5.1 Exploded view of hydraulic power steering box“, page 400 .

⇒ „5.2 Removing and installing hydraulic power steering box (LHD vehicles)“, page 402 .

⇒ „5.3 Centralising steering“, page 407

⇒ „5.4 Servicing hydraulic power steering box“, page 407 .

⇒ „5.5 Removing and installing servotronic solenoid valve N119 “, page 410

⇒ „5.6 Adjusting hydraulic power steering box“, page 411 .

⇒ „5.7 Removing and installing track rod ball joint“, page 412 .

⇒ „5.8 Removing and installing track rods“, page 415 .

⇒ „5.9 Removing and installing boot“, page 418

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5.1 Exploded view of hydraulic power steering box

The power steering box is removed and installed complete with track rods.

1 - Subframe

2 - Cross brace

3 - Steering column

4 - Bolt
- ❑ 30 Nm +90°
- ❑ Always renew if removed
- ❑ The tapped hole for the bolt must always be cleaned (e.g. with a thread tap)

5 - Nut
- ❑ Always renew if removed

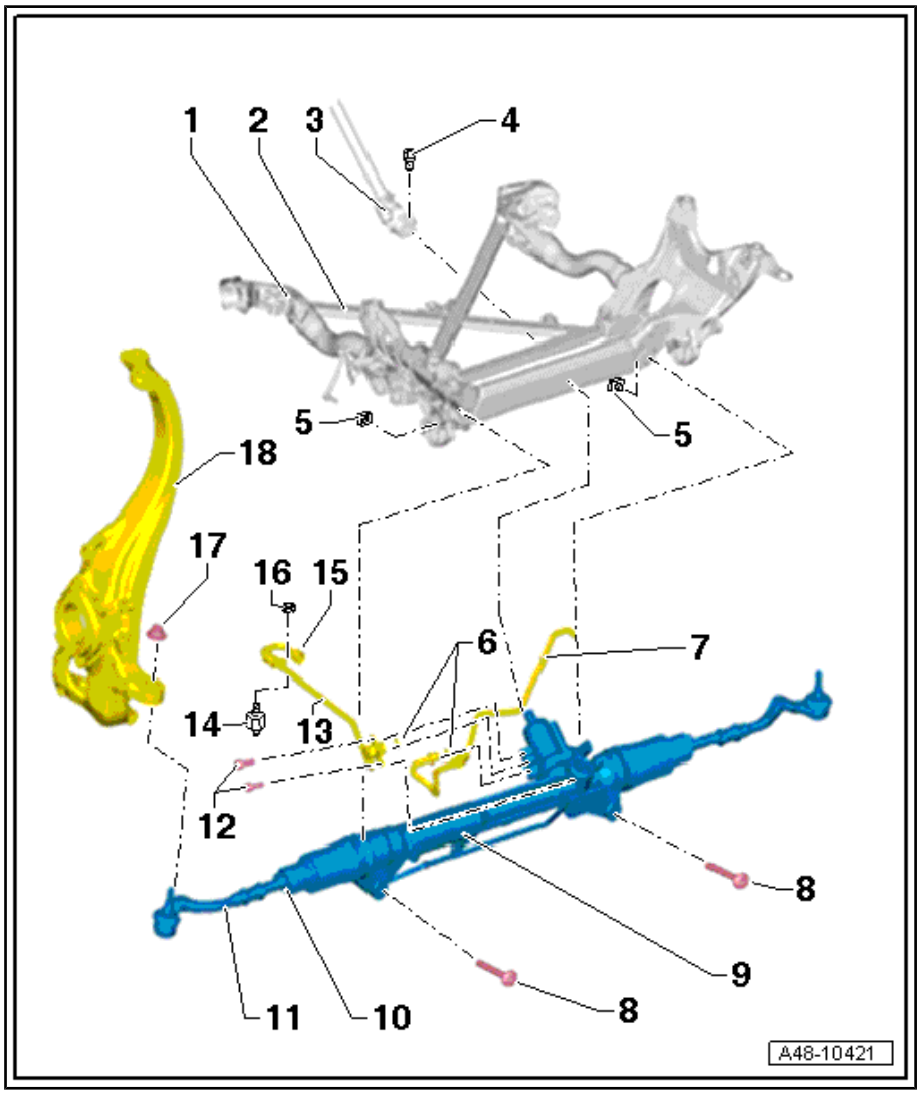
6 - Seal
- ❑ Always renew if removed

7 - Return line

> **Caution**
> *Fully insert return line when installing.*

- ❑ Different versions available ⇒ Electronic parts catalogue

8 - Bolt
- ❑ 80 Nm +180°
- ❑ Always renew if removed



9 - Hydraulic power steering box with track rods

- ❑ Removing and installing (LHD) ⇒ page 402
- ❑ Servicing ⇒ page 407
- ❑ Adjusting ⇒ page 411
- ❑ Different versions available ⇒ Electronic parts catalogue

10 - Track rod

- ❑ Removing and installing ⇒ page 415

11 - Track rod ball joint

- ❑ Different versions with long or short pin thread; for correct version, refer to ⇒ Electronic parts catalogue

WARNING

When renewing, make sure that the thread of the pin on the track rod ball joint is long enough (the thread should project about 5 mm beyond the steering arm). If this is not the case, a track rod ball joint with a longer pin thread must be fitted; for correct version refer to ⇒ Electronic parts catalogue .

- ❑ Removing and installing ⇒ page 412

12 - Bolt

- ❑ 20 Nm

13 - Pressure line

- ❑ Different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue

Caution

Fully insert pressure line when installing.

14 - Rubber mounting

- ❑ 6 Nm

15 - Union nut

- ❑ 40 Nm
- ❑ Union nut not fitted on pressure line without connecting point

16 - Nut

- ❑ 6 Nm

17 - Nut

- ❑ Different versions; for correct version, refer to ⇒ Electronic parts catalogue
- ❑ Note different nut versions and tightening torques ⇒ page 402
- ❑ Always renew if removed

18 - Wheel bearing housing

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Nut versions for securing track rod ball joint

- Hexagon flange nut -A-

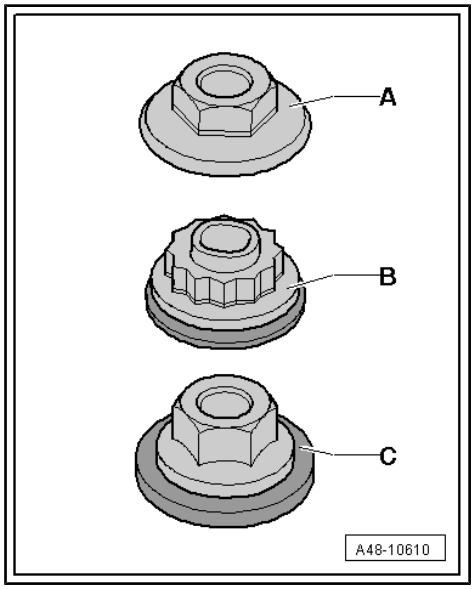
Tightening torque: 20 Nm + 90°

- Twelve-point nut with washer -B-

Tightening torque: 100 Nm

- Hexagon nut with washer -C-

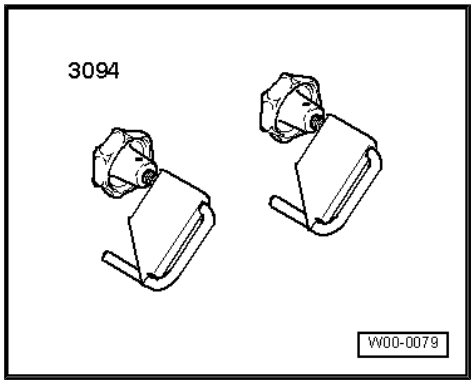
Tightening torque: 110 Nm



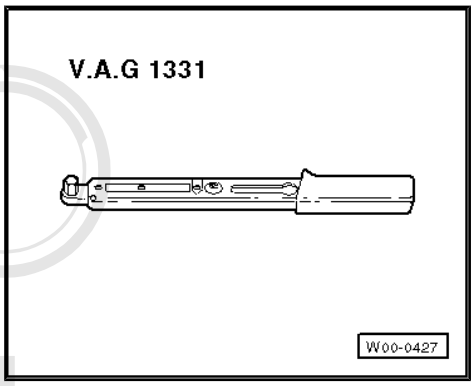
5.2 Removing and installing hydraulic power steering box (LHD vehicles)

Special tools and workshop equipment required

- Hose clamps up to 25 mm ∅ -3094-

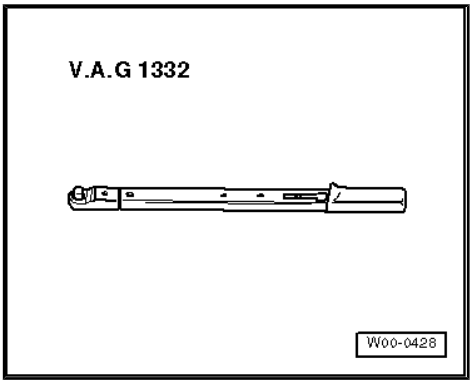


- Torque wrench -V.A.G 1331-



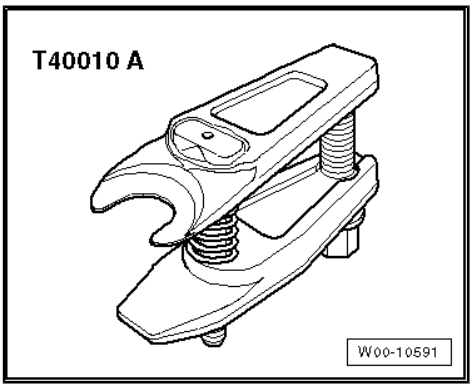
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♦ Torque wrench -V.A.G 1332-



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♦ Ball joint puller -T40010 A-



♦ Engine bung set -VAS 6122-

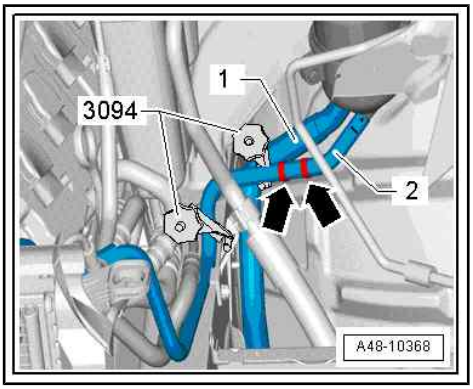
Removing

– Raise vehicle on lifting platform.

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

Caution

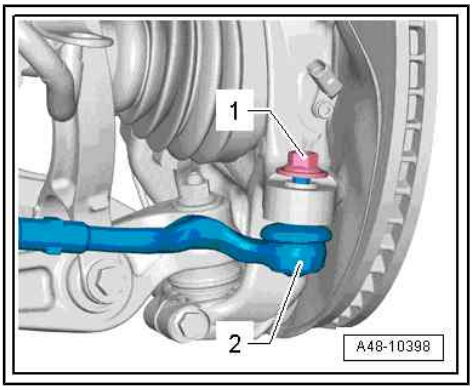
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*



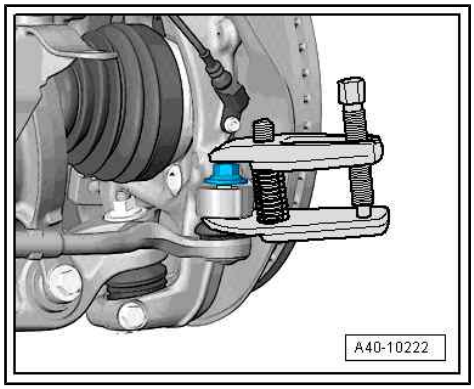
– Remove front wheels.

– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.

Leave nut screwed on a few turns to protect threads on joint pin.



– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

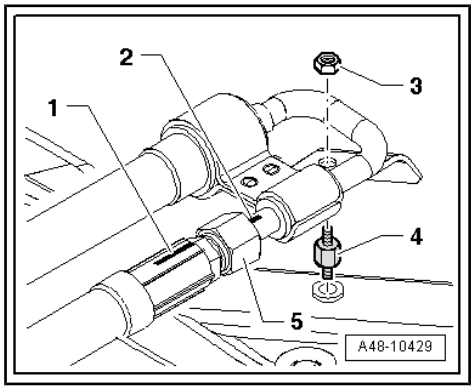


Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

– Remove noise insulation ⇒ Rep. gr. 66 .

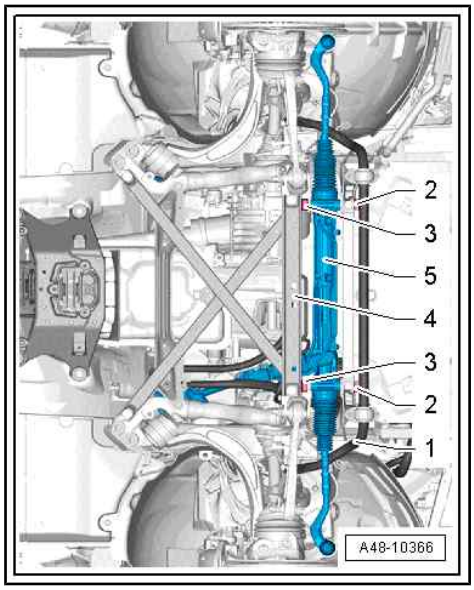
– Unscrew nut -3- from rubber mounting -4-.



– Remove anti-roll bar -1- ⇒ page 31 .

– Remove cross brace -4-
⇒ „2.4 Removing and installing subframe cross brace (Coupé/ Sportback)“, page 27 .

– Remove cross brace -4-
⇒ „2.5 Removing and installing subframe cross brace (Cabriolet)“, page 28 .



Caution

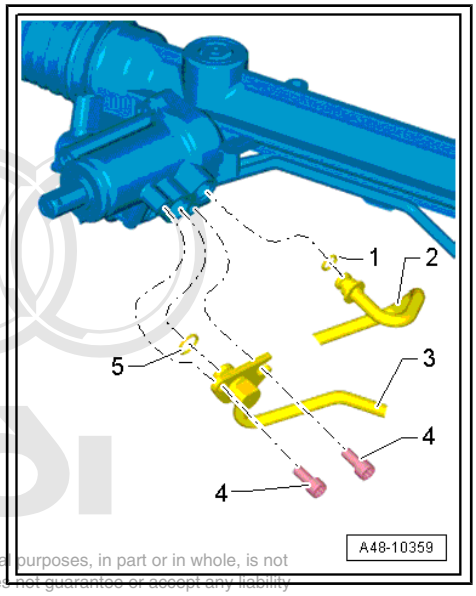
Risk of damage to running gear components.

Never place the vehicle on its wheels if the subframe mounting, steering box or subframe cross brace is not correctly installed!

The vehicle must not be supported on the subframe or the subframe cross brace (e.g. using a trolley jack or similar)!

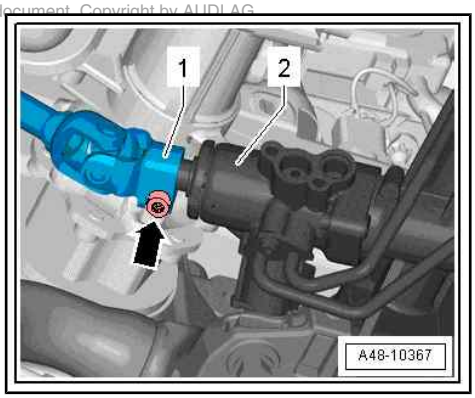
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– Remove bolts -4- and detach pressure line -3-.
– Detach return line -2-. If necessary, use a screwdriver to lever return line -2- out of power steering box.
– Seal off connections on power steering box with clean plugs.
– Seal off pressure line -3- and return line -2- with a clean plug.



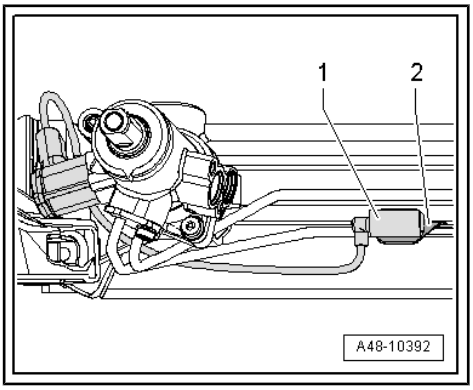
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– Remove bolt -arrow-.
– Detach steering column -1- from steering box -2-.



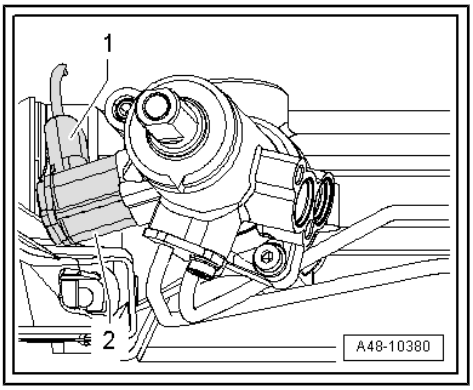
Vehicles with 8-cylinder FSI engine:

– Unplug connector -1- and detach from bracket -2-.



All other engines:

– Unplug connector -1- and detach from servotronic solenoid valve -N119- -2-.



All engines (continued):

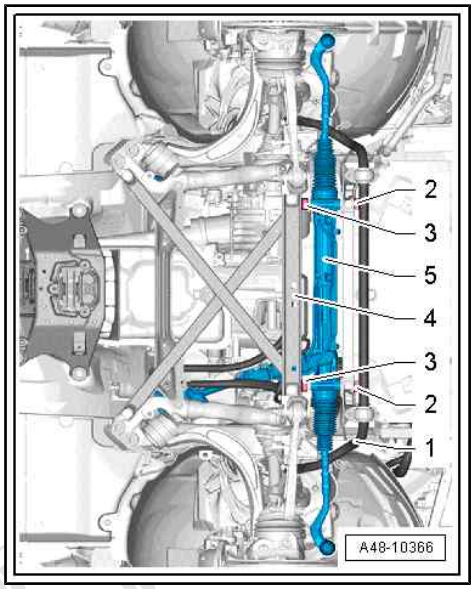
– Unscrew bolts -2- and remove nuts -3-.

– Guide steering box -5- slightly to right and take out.

Installing

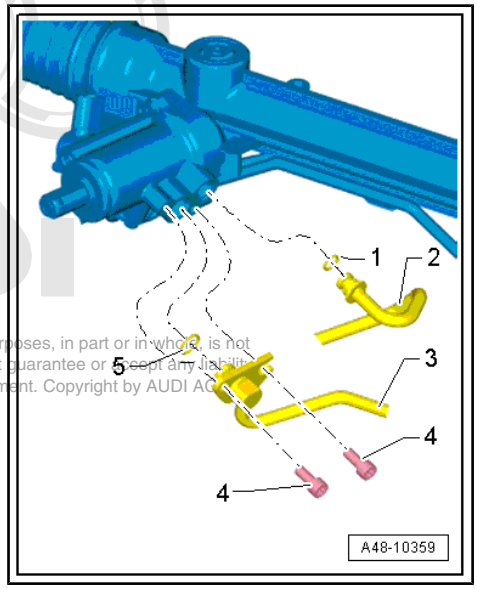
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.1 Exploded view of hydraulic power steering box“, page 400



– Apply a small quantity of hydraulic fluid to seals -1- and -5- before fitting.

– Fully insert pressure line -3- and return line -2- when installing.



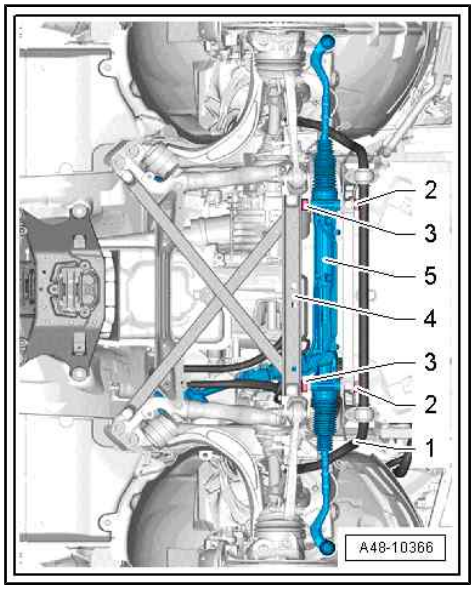
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– Install anti-roll bar -1- ⇒ page 31 .

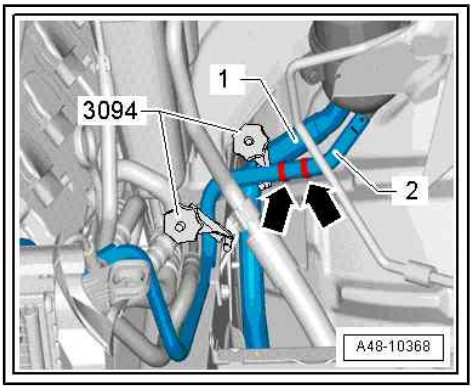
– Screw in both bolts -2- loosely at first, then tighten.

– Install cross brace -4- ⇒ „2.4 Removing and installing subframe cross brace (Coupé/Sportback)“, page 27 .

– Install cross brace -4- ⇒ „2.5 Removing and installing subframe cross brace (Cabriolet)“, page 28 .



– Remove hose clamps -3094- from suction hose -1- and return hose -2-.
– Bring power steering box into centre position ⇒ page 407 .
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .
– Check and adjust wheel alignment ⇒ page 309 .



5.3 Centralising steering

All vehicles

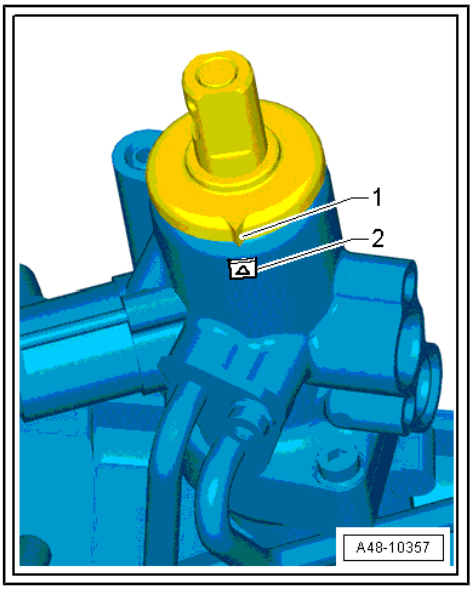
Note

- *The purpose of centralising the steering is merely to „align“ the steering for subsequent work.*
- *The precise steering wheel centre point is determined by measuring the steering wheel lock using the wheel alignment computer.*
- *If the steering wheel is found to be out of alignment after determining the centre position of the steering, inspect the steering and suspension for damage or distortion and renew any damaged parts. Also check the symmetry of the track rods ⇒ page 319 .*

– Remove noise insulation ⇒ Rep. gr. 66 .
– Bring power steering box into centre position.

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Pointed section -1- must be opposite marking -2-. Distance from track rod ball joint to power steering box must be identical on both sides.



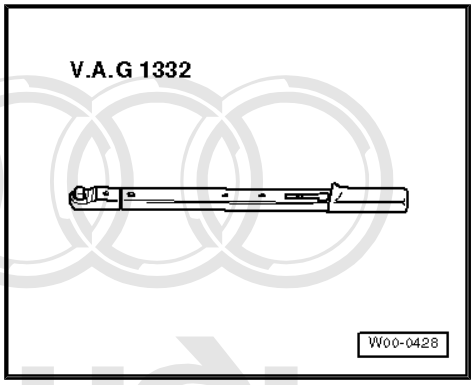
Note

This information serves only as a rough guide for centralising the steering.

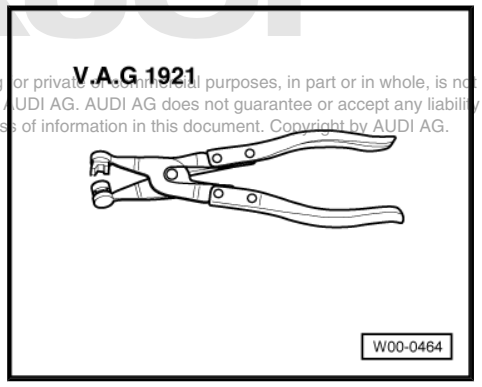
5.4 Servicing hydraulic power steering box

Special tools and workshop equipment required

- Torque wrench -V.A.G 1332-

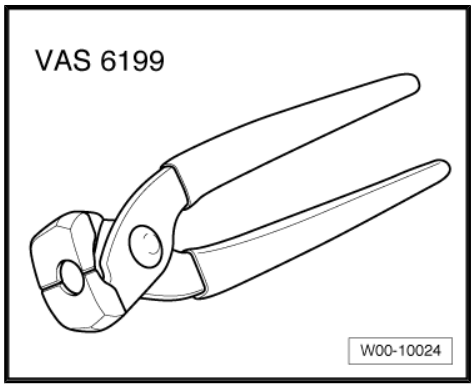


- Hose clip pliers -V.A.G 1921-



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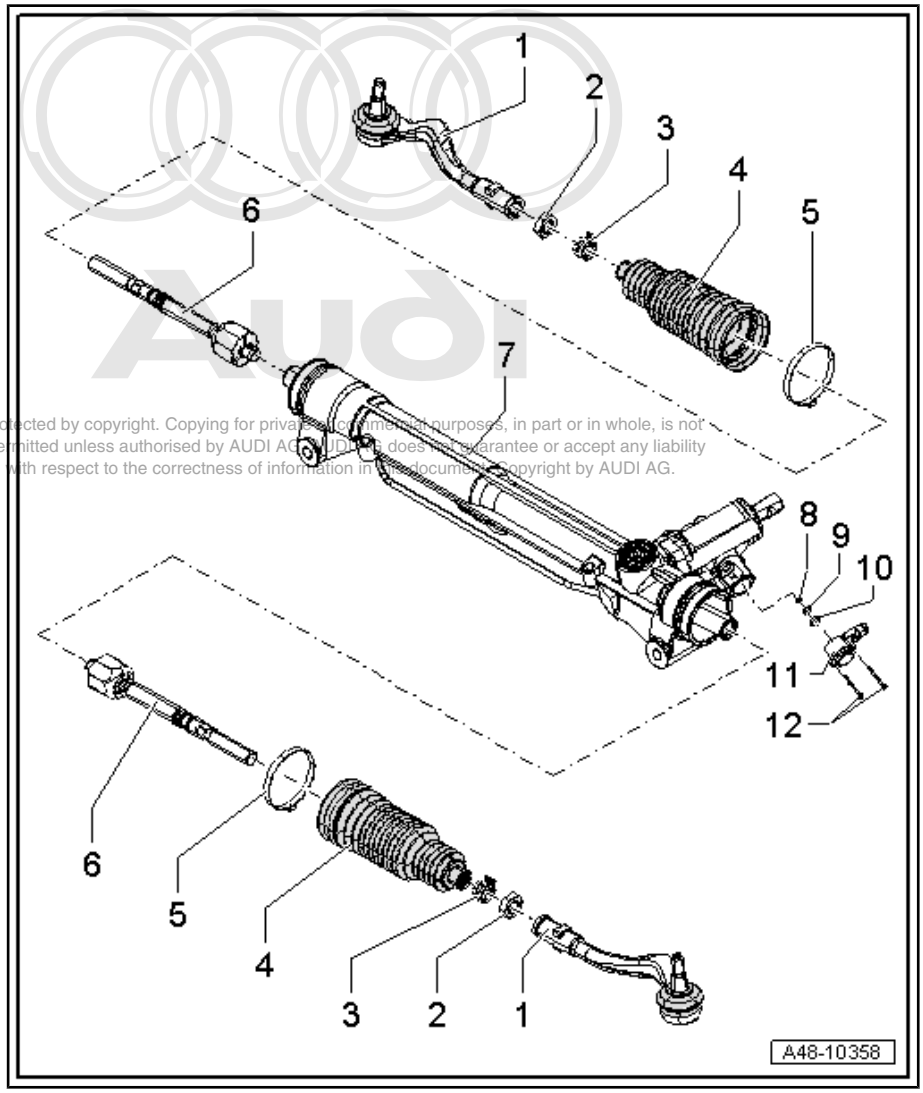
- Locking pliers for steering box -VAS 6199-



- Steering box grease

Note

- *Renew self-locking nuts and bolts.*
- *Welding and straightening work on steering components is not permitted.*
- *Use only steering box grease for greasing steering rack.*



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1 - Track rod ball joint

- ❑ Different versions with long or short pin thread; for correct version, refer to ⇒ Electronic parts catalogue

> **WARNING**
> *When renewing, make sure that the thread of the pin on the track rod ball joint is long enough (the thread should project about 5 mm beyond the steering arm). If this is not the case, a track rod ball joint with a longer pin thread must be fitted; for correct version refer to ⇒ Electronic parts catalogue .*

- ❑ Check that grease caps are seated correctly and not damaged
- ❑ Removing and installing ⇒ page 412

2 - Nut

- ❑ 60 Nm

3 - Spring-type clip

- ❑ Always renew if removed
- ❑ For correct version refer to ⇒ Electronic parts catalogue

4 - Boot

- ❑ Check for damage
- ❑ Must not be twisted after adjusting toe setting
- ❑ Can be renewed with steering box installed
- ❑ Renewing ⇒ page 418

5 - Hose clip

- ❑ Always renew if removed
- ❑ Installing hose clip ⇒ page 418

6 - Track rod

- ❑ 90 Nm
- ❑ Removing and installing ⇒ page 415
- ❑ Grease joint with steering box grease

7 - Power steering box

- ❑ Grease steering rack with steering box grease
- ❑ Different versions available ⇒ Electronic parts catalogue

8 - Strainer

- ❑ Always renew if removed

9 - Seal

- ❑ Always renew if removed

10 - Seal

- ❑ Always renew if removed

11 - Servotronic solenoid valve -N119-

- ❑ Removing and installing ⇒ page 410
- ❑ The following values can be displayed with -VAS 5051- :

- ♦ speed signal
- ♦ power supply from onboard power supply control unit 2 -J520-
- ♦ status of solenoid valve
- ♦ electrical current values for activation of solenoid valve
  - – Connect -VAS 5051- and select Fault finding (via „Function/component selection“) ⇒ Vehicle diagnostic tester.
  - – Then select „Body“
  - – „Electrical system“
  - – „01 - Self-diagnosis compatible systems“
  - – „Onboard supply control unit J520“
  - – „Electrical components“
  - – „Servotronic solenoid valve N119“

12 - Bolt

- ❑ 3 Nm

Caution

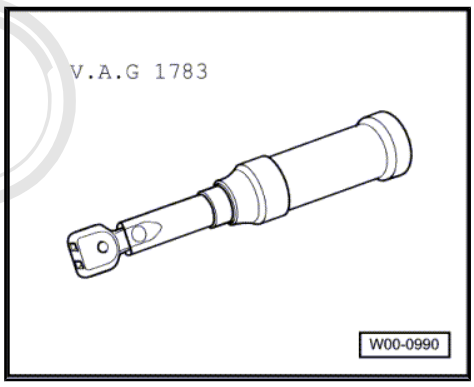
Important: Observe correct tightening sequence of bolts.

- ❑ Tightening sequence ⇒ page 410

5.5 Removing and installing servotronic solenoid valve -N119-

Special tools and workshop equipment required

- ♦ Torque wrench -V.A.G 1332-



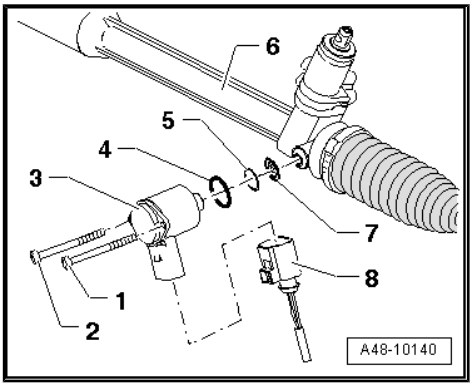
- ♦ Steering box grease

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Removing

Steering box must be removed in order to renew this component.

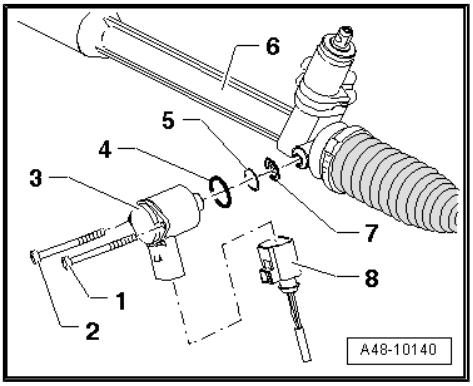
– Remove steering box ⇒ page 402 .
– Thoroughly clean steering box -6- in vicinity of solenoid valve -3-.
– Make sure that no dirt enters steering box -6-.
– Unplug connector -8-.
– Make sure that no dirt enters connector -8-.
– Remove bolts -1- and -2-.
– Pull solenoid valve -3- out of steering box -6-.
– Take strainer -7- out of steering box -6-; clean steering box if necessary.



Installing

Installation is carried out in the reverse sequence. Note the following points:

– Install new strainer -7-.
– Lightly grease seals -4- and -5- with steering box grease and fit seals.
– Insert solenoid valve -3- into steering box -6- as far as stop. Take care to keep solenoid valve straight when installing.



Caution

♦ *Important: Observe correct tightening sequence of bolts.*

– Tighten bolts -1- and -2- as follows:

1 - Tighten bolt -1- to 0.5 Nm.
2 - Tighten bolt -2- to 1.5 Nm.
3 - Tighten bolt -1- to 3.0 Nm.
4 - Tighten bolt -2- to 3.0 Nm.

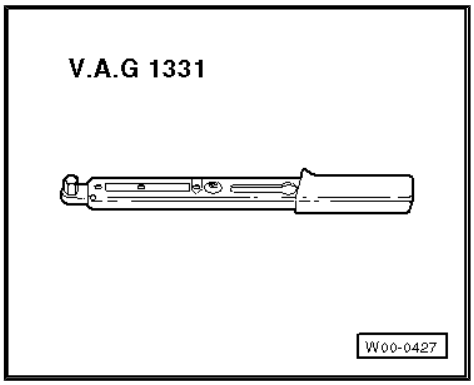
– Install steering box ⇒ page 402 .

5.6 Adjusting hydraulic power steering box

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Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-



Note

Two mechanics are required to perform adjustment. Perform adjustment with engine switched off.

- Remove noise insulation ⇒ Rep. gr. 66 .
- Bring power steering box into centre position ⇒ page 407 .
- If there is excessive play in the steering, a knocking noise will be audible when the steering wheel is turned backwards and forwards (about 30° either side of centre position).
- In this case, have the second mechanic carefully screw in the adjusting screw -arrow- until the knocking noise can no longer be heard inside the vehicle.
- Road-test vehicle.
- Check that the steering centres smoothly by itself back to the straight-ahead position after a turn. Correct the adjustment if necessary.

5.7 Removing and installing track rod ball joint

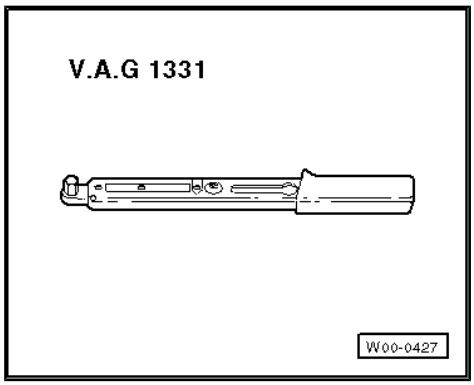
Two different versions of track rod ball joint were used at the start of production. The length of the pin thread is not the same on the two different versions. For correct version refer to ⇒ Electronic parts catalogue .

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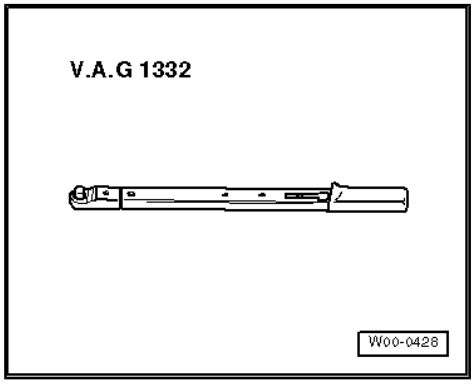
When renewing the track rod ball joint, make sure that the thread of the pin on the track rod ball joint is long enough (the thread should project about 5 mm beyond the steering arm). If this is not the case, a new track rod ball joint with a longer pin thread must be fitted; for correct version refer to ⇒ Electronic parts catalogue .

Special tools and workshop equipment required

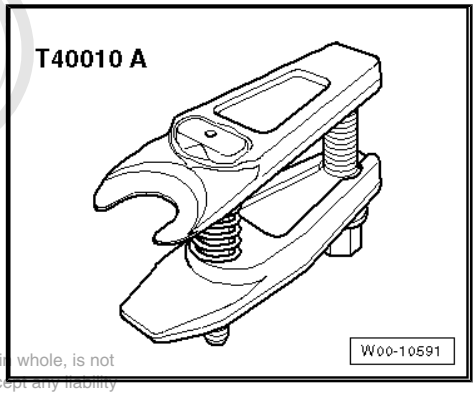
- Torque wrench -V.A.G 1331-



- Torque wrench -V.A.G 1332-

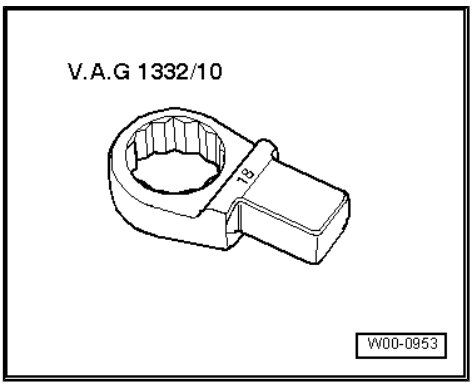


- Ball joint puller -T40010 A-

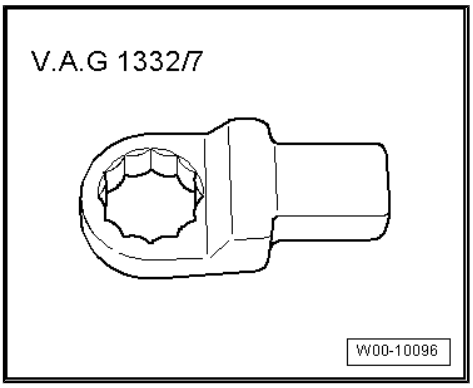


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- Ring spanner insert -V.A.G 1332/10-



- or ring spanner insert -V.A.G 1332/7-



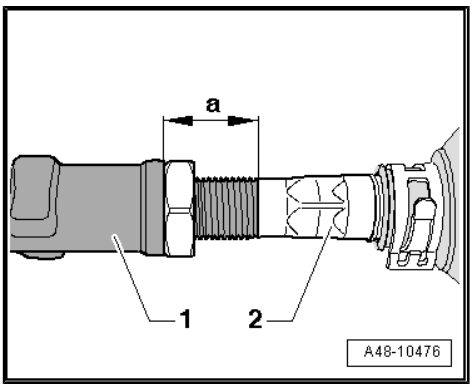
Removing

– Raise vehicle on lifting platform.

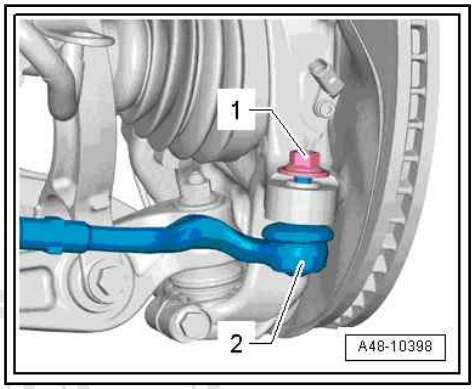
– Remove wheel.

– Measure and note down dimension -a- between track rod ball joint -2- and track rod -1- on both sides. Dimension -a- should be the same on both sides after installation.

– If necessary, shorten the „longer“ track rod ball joint (by screwing it further onto the track rod).

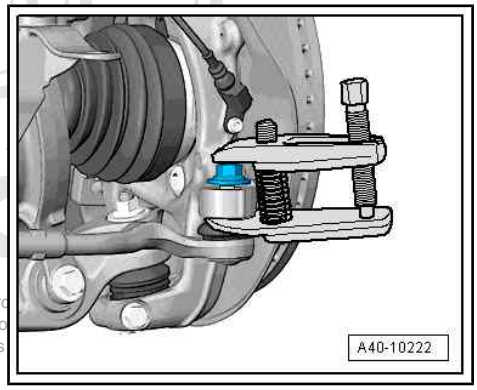


– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



Leave nut screwed on a few turns to protect threads on joint pin.

– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.



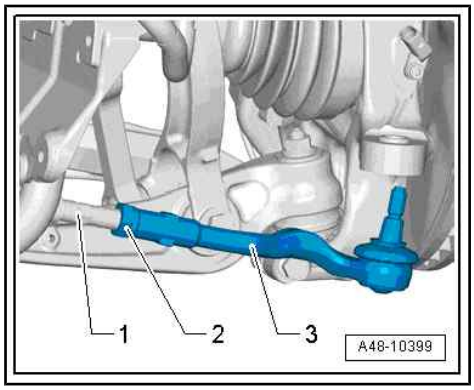
Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

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with respect to the correctness of information in this

– Loosen nut -2- but do not remove (counterhold track rod ball joint -3-).

– Unscrew track rod ball joint -3-.



Installing

Installation is carried out in the reverse sequence. Note the following points:

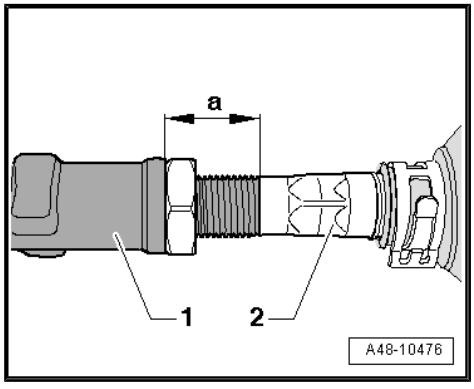
Tightening torques
⇒ „5.4 Servicing hydraulic power steering box“, page 407

Tightening torques
⇒ „5.1 Exploded view of hydraulic power steering box“, page 400

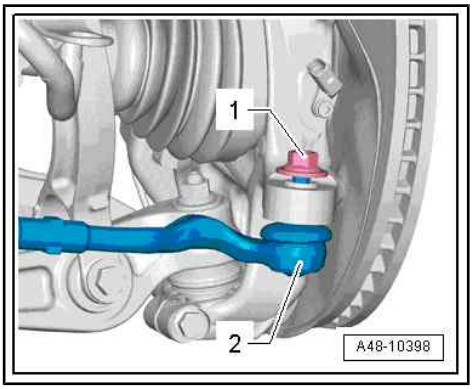
– Screw track rod ball joint -2- onto track rod -1- until dimension -a- measured on removal is obtained.

– Align track rod so that pin of track rod ball joint -2- is in installation position.

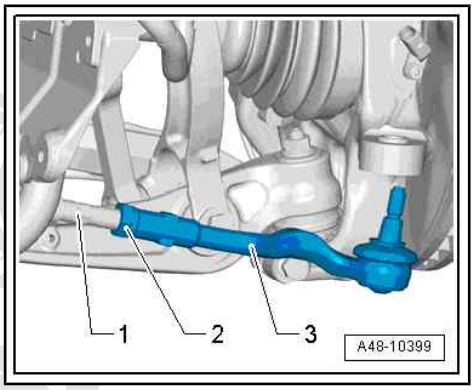
– Insert track rod ball joint into wheel bearing housing as far as the stop.



– Tighten nut -1-. Counterhold if necessary when tightening.



– Tighten nut -2-.
– Fit and secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

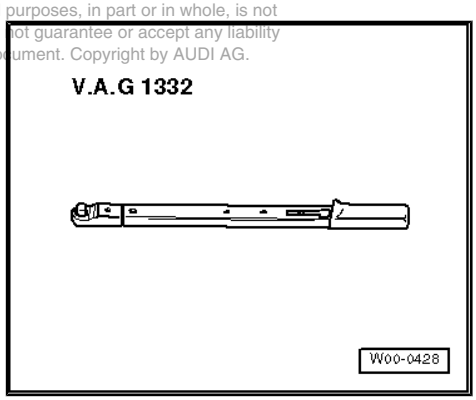


5.8 Removing and installing track rods

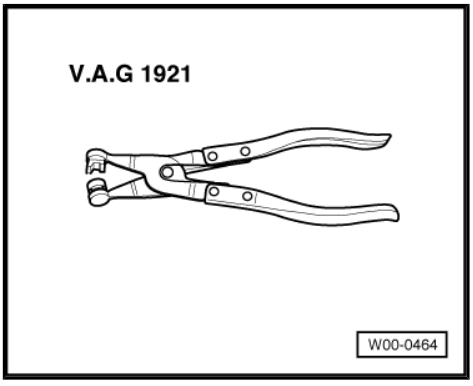
Special tools and workshop equipment required

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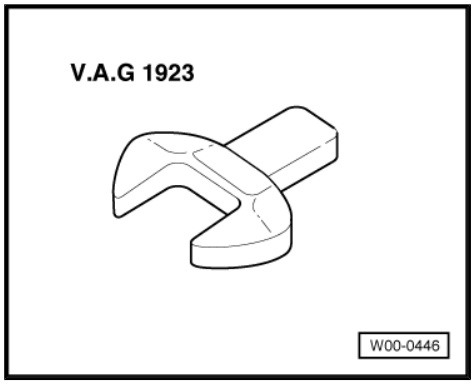
♦ Torque wrench -V.A.G 1332-



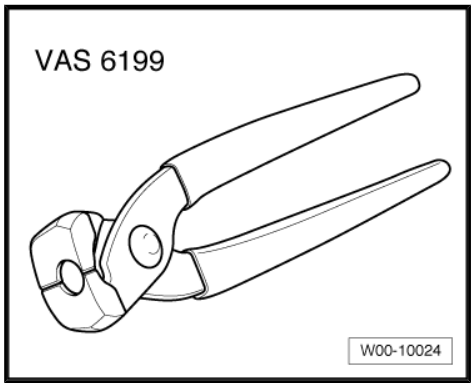
♦ Hose clip pliers -V.A.G 1921-



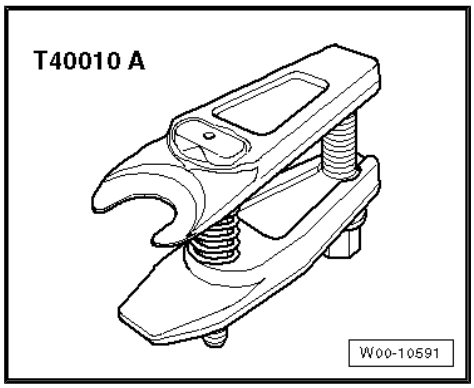
- Open-end spanner attachment -V.A.G 1923-



- Locking pliers for steering box -VAS 6199-



- Ball joint puller -T40010 A-



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Removing

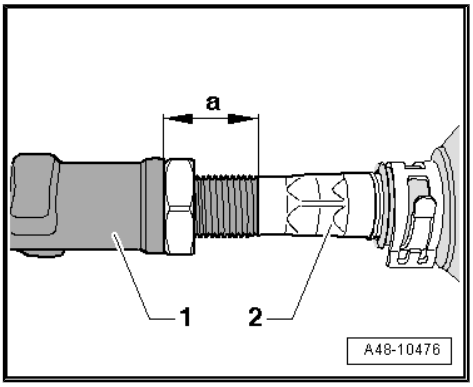
The track rods can be removed and installed with the steering box in the vehicle.

– Raise vehicle on lifting platform.

– Remove wheel.

– Remove noise insulation ⇒ Rep. gr. 66 .

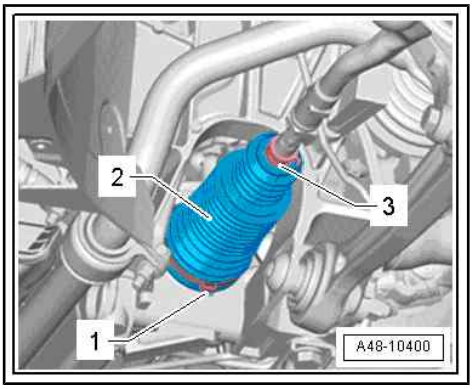
– Measure and note down dimension -a- between track rod ball joint -2- and track rod -1- on both sides. Dimension -a- should be the same on both sides after installation.
– If necessary, shorten the „longer“ track rod ball joint (by screwing it further onto the track rod).
– Clean power steering box and subframe in vicinity of rubber boot.



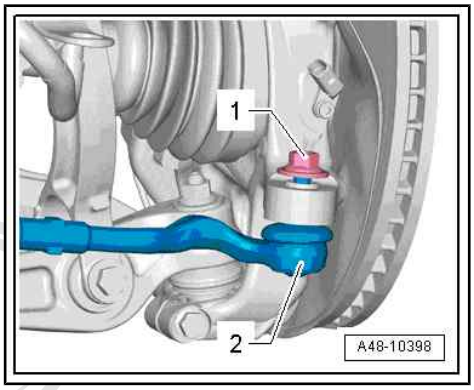
Caution

Take care to prevent dirt from entering the power steering box and boot when renewing the track rod.

– Release spring-type clip -3- using hose clip pliers - V.A.G 1921- and detach.
– Detach hose clip -1- and pull boot -2- outwards off power steering box.

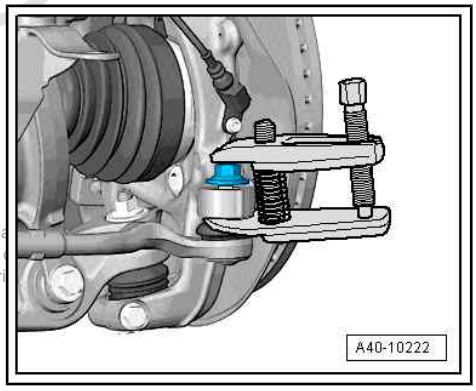


– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



Leave nut screwed on a few turns to protect threads on joint pin.

– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

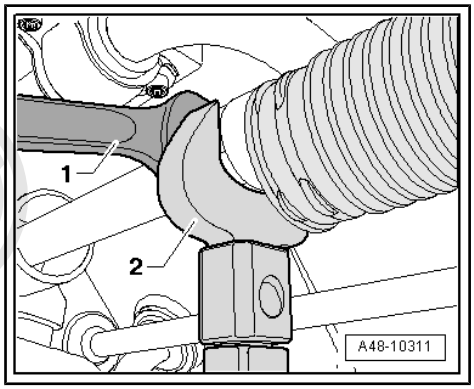


Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

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– Unscrew track rod. When doing so, counterhold piston rod of power steering box using open-end spanner -1-.



2 - Open-end spanner attachment -V.A.G 1923-

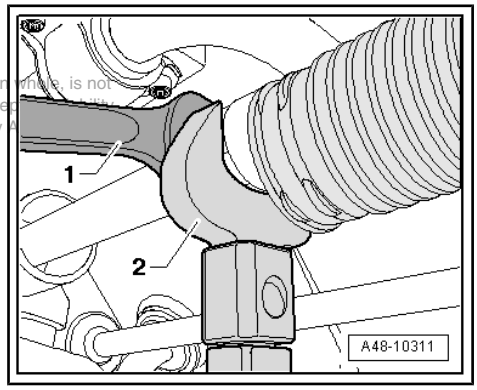
Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques
⇒ „5.4 Servicing hydraulic power steering box“, page 407

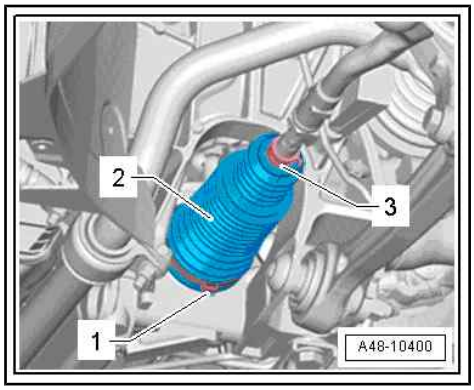
Tightening torques
⇒ „5.1 Exploded view of hydraulic power steering box“, page 400

– Attach track rod using open-end spanner attachment -V.A.G 1923- -2-. When doing so, counterhold piston rod of power steering box using open-end spanner -1-.



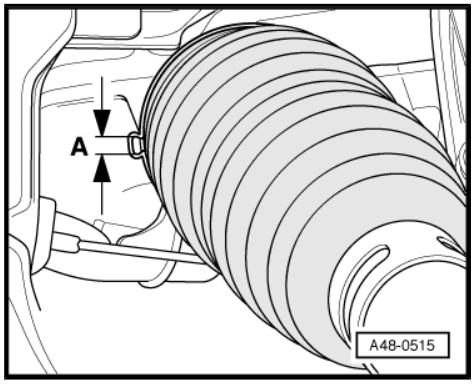
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– Renew spring-type clip -3- and O-type hose clip -1-.



Installing O-type hose clip:

Make sure that dimension -A- is not greater than 5.7 mm. Dimension -A- must never exceed 5.7 mm, as otherwise leakage can occur.

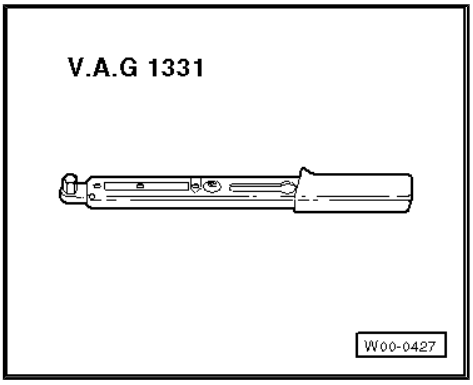


– Install new hose clip and tighten clip using locking pliers for steering box -VAS 6199- .
– Align track rod so that pin of track rod ball joint is in installation position.
– Insert track rod into wheel bearing housing as far as the stop.
– Fit and secure wheel ⇒ Wheels and tyres; Rep. gr. 44 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

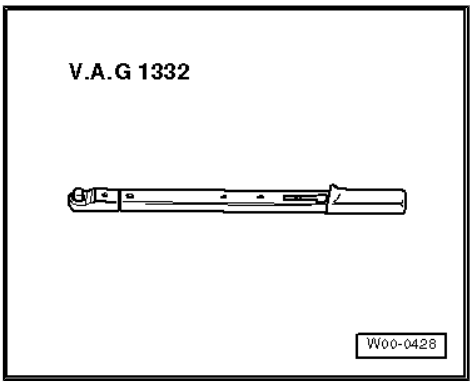
5.9 Removing and installing boot

Special tools and workshop equipment required

- Torque wrench -V.A.G 1331-

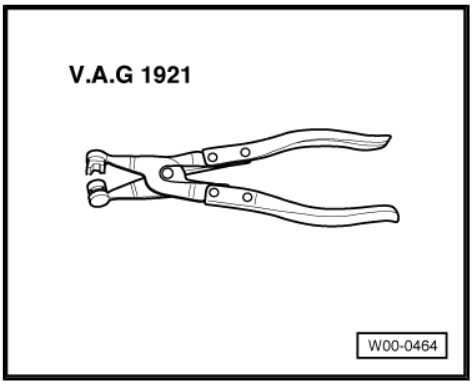


- Torque wrench -V.A.G 1332-

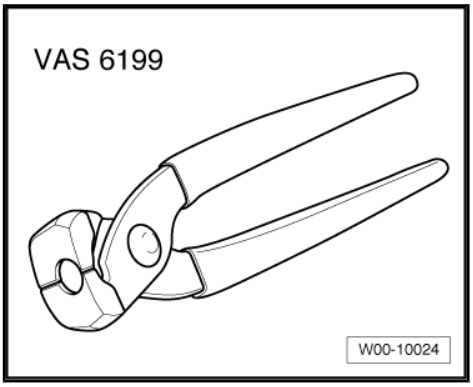


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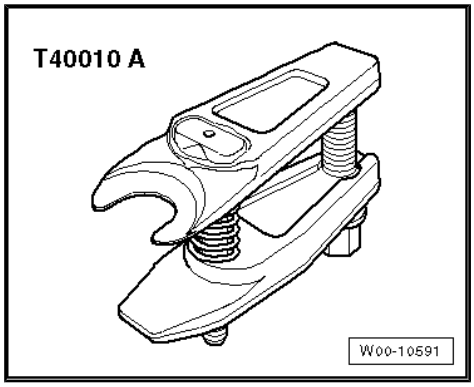
- Hose clip pliers -V.A.G 1921-



- Locking pliers for Phaeton steering box -VAS 6199-



♦ Ball joint puller -T40010 A-



Removing

Note

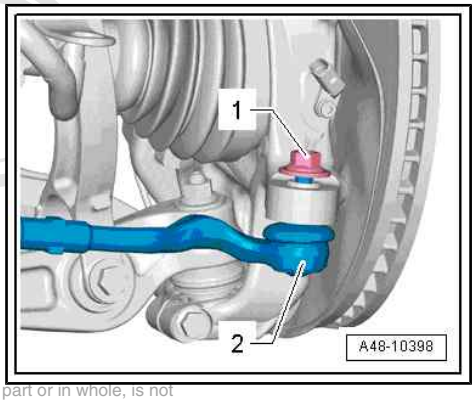
Moisture and dirt will enter the steering box if the rubber boot is defective. It should be possible to feel a film of lubricant on and around the teeth of the steering rack. Renew steering box if no film of lubricant can be felt. Also renew steering box if there are signs of corrosion, damage or wear on the steering rack.

– Raise vehicle on lifting platform.
– Remove wheel.
– Turn steering wheel to straight-ahead position.
– Remove noise insulation ⇒ Rep. gr. 66 .
– Clean power steering box and subframe in vicinity of rubber boot.

Caution

- ***No dirt must be allowed to enter the steering box through a defective rubber boot during this operation.***

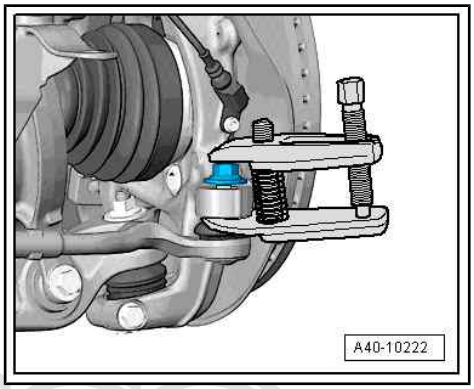
– Unscrew nut -1- on joint pin -2- of track rod ball joint until it is flush with end of thread. Counterhold if necessary when loosening.



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Leave nut screwed on a few turns to protect threads on joint pin.

– Press track rod ball joint off wheel bearing housing using ball joint puller -T40010 A- . Then remove nut.

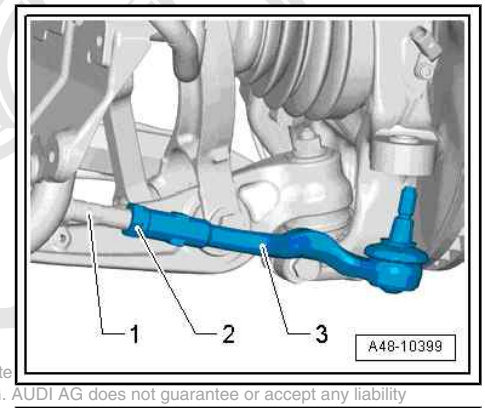


Note

Make sure the two lever arms of the puller are parallel when maximum force is exerted; adjust as necessary.

– Mark position of nut -2- on track rod -1- for refitting.

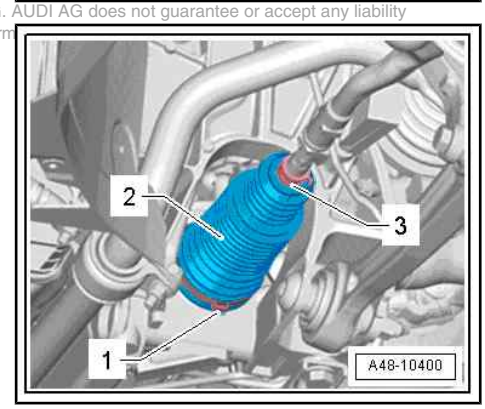
– Loosen nut -2- (counterhold track rod ball joint -3-).



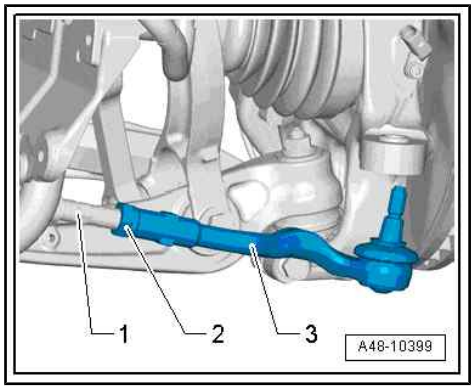
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– Release spring-type clip -3- using hose clip pliers - V.A.G 1921- and detach.

– Detach hose clip -1- and pull boot -2- outwards off power steering box.



– Unscrew track rod ball joint -3- and nut -2- from track rod -1-.
– Detach rubber boot with spring-type clip from track rod.



Note

- *Renew complete steering box if there are signs of corrosion, damage, wear or dirt on the steering rack.*
- *The complete steering box must also be renewed if there is no visible lubricating film on the steering rack.*

Installing

The steering rack must be lubricated with grease supplied in the repair kit before installing.

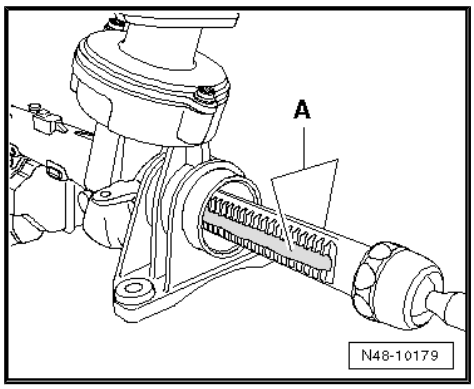
Caution

Do NOT use any other type of grease.

For this procedure turn steering to full lock in both directions.

A removed steering box is shown for ease of illustration.

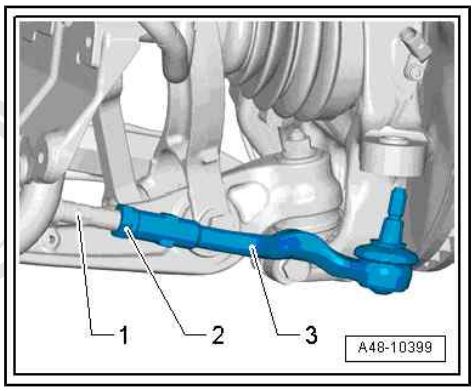
– Grease the steering rack on the side with the teeth -A- and on the side that contacts the thrust pieces.
– Turn steering wheel to straight-ahead position.
– Fit new hose clips and rubber boot onto track rod.



– Screw in nut -1- and track rod ball joint -3- as far as marking made when removing.
– Tighten nut -2- to specified torque. Counterhold at track rod ball joint -3-.

The sealing surface between the boot and power steering box must be free from grease when the parts are assembled.

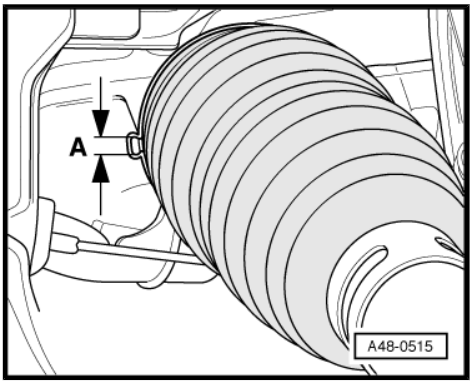
– Fit rubber boot with new hose clip onto steering box housing.
– Make sure that boot is correctly seated on power steering box.
– Boot must engage in groove and make contact with contour of power steering box.



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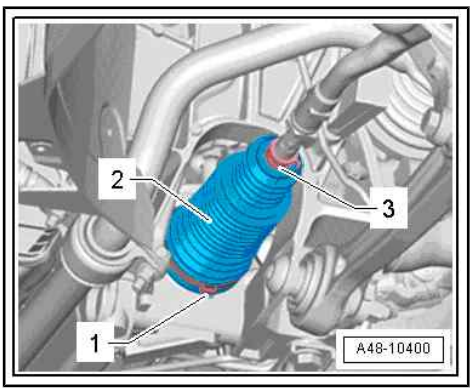
Installing hose clip

Make sure that dimension -A- is not greater than 5.7 mm. Dimension -A- must never exceed 5.7 mm, as otherwise leakage can occur.



– Tighten hose clip -1- using locking pliers for Phaeton steering box -VAS 6199- .

– Secure spring-type clip -3- on boot -2- with hose clip pliers - V.A.G 1921- .



Remaining installation steps are carried out in reverse sequence.

Tightening torques
⇒ „5.4 Servicing hydraulic power steering box“, page 407

Tightening torques
⇒ „5.1 Exploded view of hydraulic power steering box“, page 400

– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

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6 Checking fluid level, bleeding steering system and checking for leaks

⇒ „6.1 Checking fluid level of power steering“, page 424 .

⇒ „6.2 Bleeding steering system after repairs“, page 425 .

⇒ „6.3 Checking steering system for leaks“, page 426 .

6.1 Checking fluid level of power steering

– Do not start engine. Set front wheels to straight-ahead position.

When fluid is cold (approx. 20°C):

– Unscrew filler cap.

– Wipe dipstick with a clean cloth.

– Screw filler cap on hand tight and unscrew again.

Note

The cap must first be fully screwed on in order to obtain an accurate fluid level reading.

– Check fluid level: fluid level should be in area -A-.

When fluid is at operating temperature (approx. 80 °C):

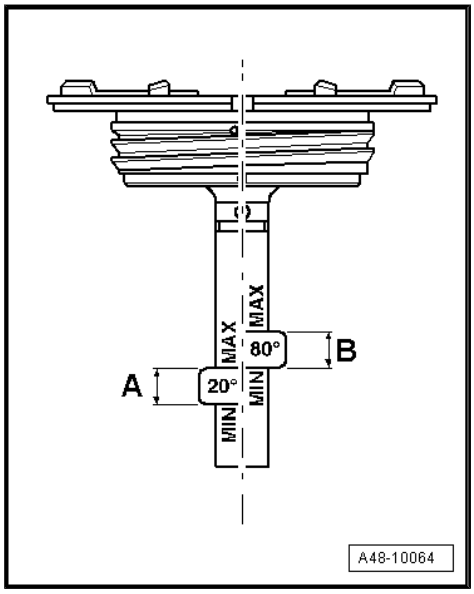
– Unscrew filler cap.

– Wipe dipstick with a clean cloth.

– Screw filler cap on hand tight and unscrew again.

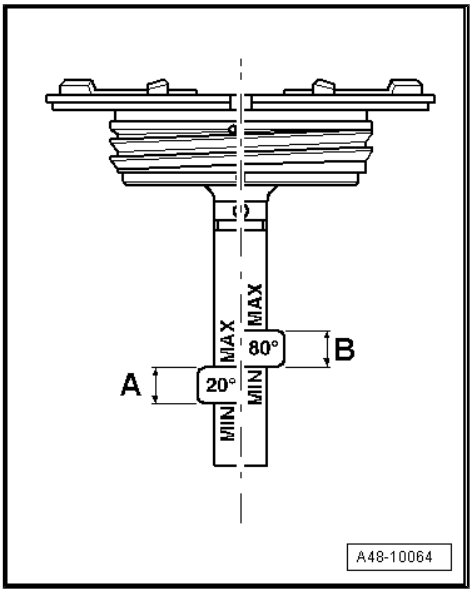
Note

The cap must first be fully screwed on in order to obtain an accurate fluid level reading.



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– Check fluid level: fluid level should be in area -B-.



Note

- *Excess fluid must be drained off if the level is above the range specified above.*
- *If the fluid level is below the range specified, the hydraulic system must be checked for leaks. In this case it is not sufficient to merely top up the fluid.*
- *Do not re-use hydraulic fluid which has been drained off.*

6.2 Bleeding steering system after repairs

Different bleeding procedures are required after repairs to the steering system, depending on which components have been removed or renewed.

Bleeding system after replacement of entire steering system or steering box:

– Fill reservoir completely.

– Raise vehicle so that all wheels are free.

• Engine switched off.

– With engine switched off, turn steering wheel 10 times from lock to lock.

– Fill reservoir completely.

– Start engine and let it run briefly (2 seconds maximum).

Pump must not draw in air. Steering wheel must not be turned.

Wait approx. 30 seconds between engine starts.

– Check hydraulic fluid level and top up if necessary.

– Keep repeating this procedure until fluid level remains constant.

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– With engine switched off, turn steering wheel 10 times from lock to lock.

– Check hydraulic fluid level and top up if necessary.

– Start engine.

– Turn steering wheel 10 times from lock to lock.

– Check hydraulic fluid level and top up if necessary.

Any air remaining in the steering system will dissipate when the vehicle has been driven 10…20 km.

Bleeding system after removing one or more steering system components with the exception of the steering box:

– Check hydraulic fluid level and top up if necessary.

– Start engine and let it run briefly (2 seconds maximum).

Pump must not draw in air; steering wheel must not be turned.

Wait approx. 30 seconds between engine starts.

– Check hydraulic fluid level and top up if necessary.
– Keep repeating this procedure until fluid level remains constant.
– Start engine and let it run for 2 - 3 minutes without turning steering wheel.

Any air remaining in the steering system will dissipate when the vehicle has been driven 10…20 km.

6.3 Checking steering system for leaks

Note

The steering system must be checked for leaks after repair work and if the hydraulic fluid level in the reservoir is low.

– Remove noise insulation ⇒ Rep. gr. 66 .
– Start engine.
– Turn steering to full lock on both sides and hold briefly.

This builds up the maximum possible pressure.

Note

To avoid damaging the pump, the steering wheel must not be held on full lock for more than 10 seconds during this test.

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Check the following components for leaks with the steering in this position:

- Pinion seal on steering box valve housing
- All pipe connections
- All unions
- Power steering pump
- Steering rack seals

Rubber boots must be pushed back before checking components.

– Open hose clips (spring-type clip and clip with lug fastener) on rubber boots.
– Push back rubber boots.

The steering box must be renewed if fluid is visible in the steering box housing and/or in the rubber boots.

7 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 4-cylinder diesel engine)

⇒ „7.1 Exploded view (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)“, page 427

⇒ „7.2 Exploded view (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)“, page 430

⇒ „7.3 Exploded view of pipes and hoses (vehicles with 4-cylinder diesel engine, vehicles with and without dynamic steering)“, page 433

⇒ „7.4 Checking delivery pressure of power steering pump (vehicles with 4-cylinder diesel engine, vehicles with and without dynamic steering)“, page 436

⇒ „7.5 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)“, page 441

⇒ „7.6 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)“, page 448

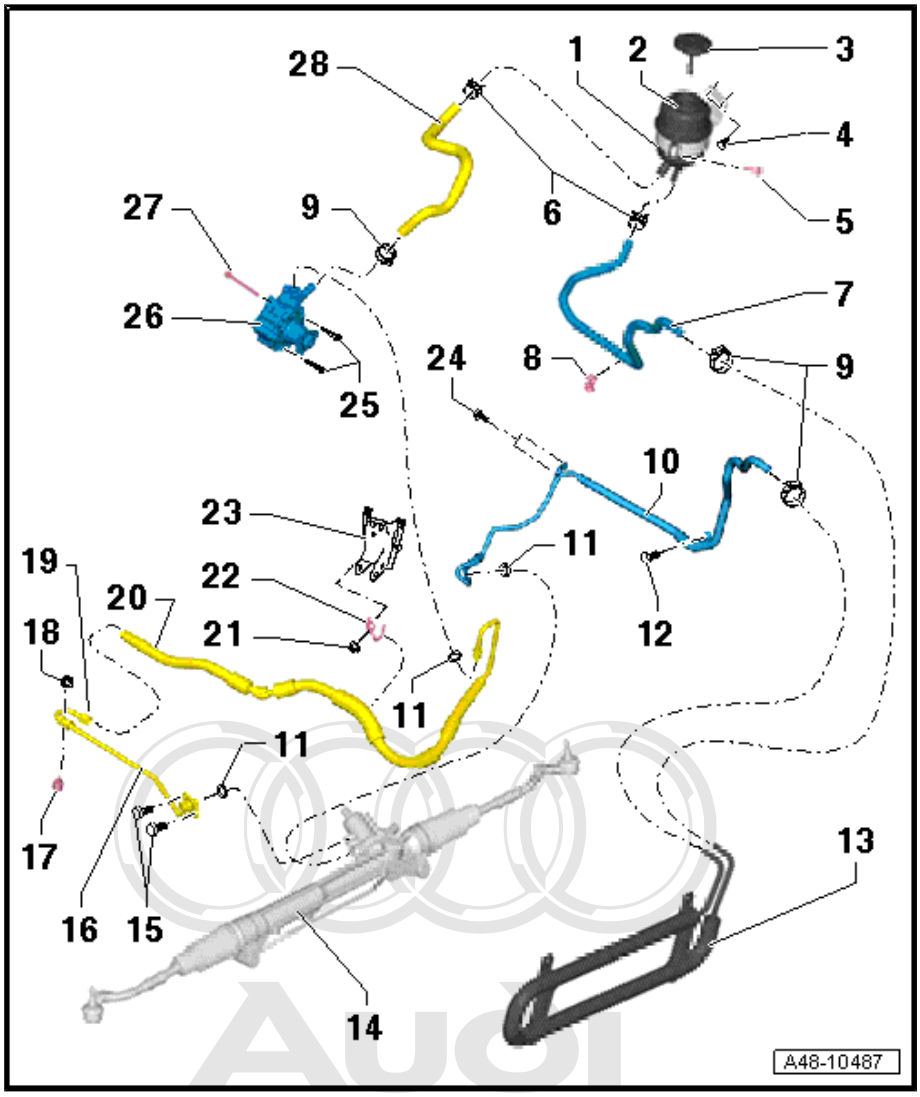
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7.1 Exploded view (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 433

2 - Reservoir

- ❑ Note correct installation position ⇒ page 433
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Return hose

- ❑ From hydraulic fluid cooler to reservoir
- ❑ Securing to longitudinal member ⇒ page 433
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

8 - Clip

9 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

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10 - Return line

- ❑ From power steering box to hydraulic fluid cooler

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 433
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

- ❑ Installation position at line connection ⇒ page 623

11 - Seal

- ❑ Always renew if removed

12 - Bolt

- ❑ 9 Nm

13 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 433
- ❑ Removing and installing ⇒ page 618

14 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

15 - Bolt

- ❑ 20 Nm

16 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

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- ❑ Securing to cross brace ⇒ page 433
- ❑ Installation position of line connection ⇒ page 433

17 - Rubber mounting

- ❑ 6 Nm

18 - Nut

- ❑ 6 Nm

19 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 433

20 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Tightening torque of union nut: 38 Nm
- ❑ Securing to engine mounting ⇒ page 433
- ❑ Installation position of line connection ⇒ page 433

21 - Nut

- ❑ 9 Nm

22 - Retainer

23 - Connector

- ❑ For engine mounting

24 - Bolt

- ❑ 9 Nm

25 - Bolt

- ❑ 25 Nm

26 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 436
- ❑ Removing and installing ⇒ page 441

27 - Bolt

- ❑ 25 Nm

28 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 441

7.2 Exploded view (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)

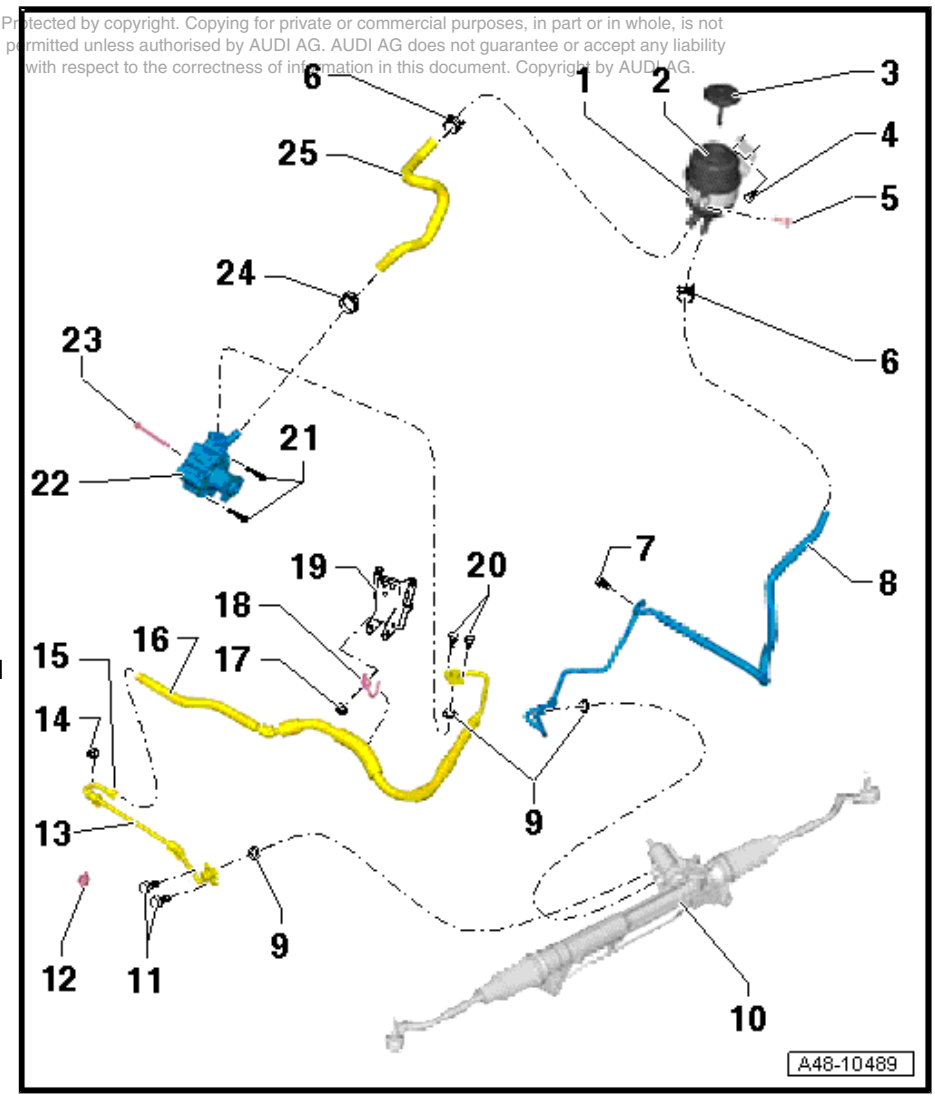
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*

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1 - Securing strap

- ❑ Securing to body ⇒ page 433

2 - Reservoir

- ❑ Note correct installation position ⇒ page 433
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Bolt

- ❑ 9 Nm

8 - Return line

- ❑ From power steering box to reservoir

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 433
- ❑ Note correct position on reservoir ⇒ page 623

9 - Seal

- ❑ Always renew if removed

10 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

11 - Bolt

- ❑ 20 Nm

12 - Rubber mounting

- ❑ 6 Nm

13 - Pressure line

- ❑ From power steering pump to power steering box; different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue
- ❑ Securing to cross brace ⇒ page 433
- ❑ Installation position of line connection ⇒ page 433

Caution

Fully insert pressure line when installing.

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14 - Nut

- ❑ 6 Nm

15 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 433
- ❑ Union nut not fitted on pressure line without connecting point

16 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Securing to engine mounting ⇒ page 433
- ❑ Installation position of line connection ⇒ page 433

17 - Nut

- ❑ 9 Nm

18 - Retainer

19 - Connector

- ❑ For engine mounting

20 - Bolt

- ❑ 9 Nm

21 - Bolt

- ❑ 25 Nm

22 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 436
- ❑ Removing and installing ⇒ page 448

23 - Bolt

- ❑ 25 Nm

24 - Hose clip

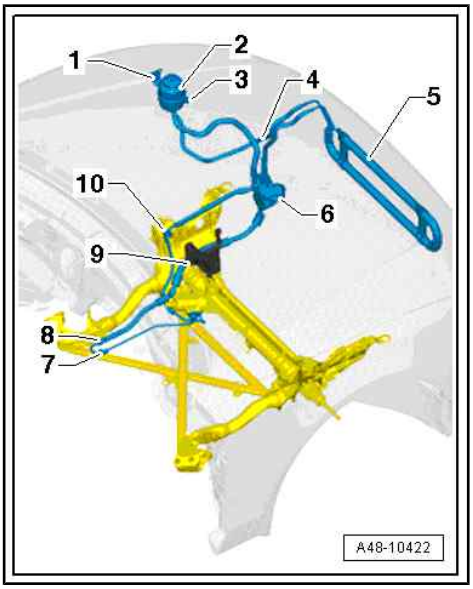
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

25 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623

❑ Note correct position on power steering pump ⇒ page 448

7.3 Exploded view of pipes and hoses (vehicles with 4-cylinder diesel engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 433

2 - Reservoir in bracket ⇒ page 434

3 - Bolt in bracket ⇒ page 433

4 - Clip for securing return hose to longitudinal member ⇒ page 434 and clip for securing suction hose to pressure pipe ⇒ page 434

5 - Hydraulic fluid cooler to condenser ⇒ page 435

6 - Power steering pump in bracket ⇒ „7.5 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)“, page 441 or ⇒ „7.6 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)“, page 448

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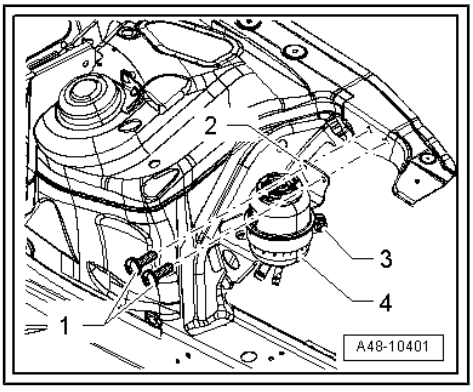
7 - Pressure line to cross brace ⇒ page 435

8 - Installation position of pressure line connection ⇒ page 435

9 - Pressure line to engine mounting ⇒ page 435

10 - Return line to subframe ⇒ page 436 , return line bracket to longitudinal member ⇒ page 435

Bracket for reservoir to body

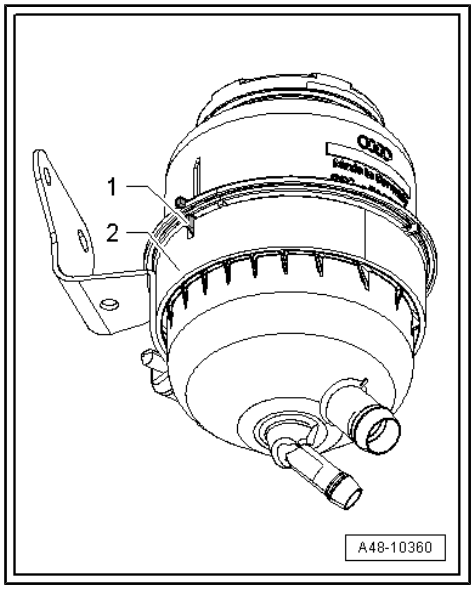


– Secure bracket -2- to body with bolts -1-.

– Secure reservoir -4- in bracket -2- with bolt -3-.

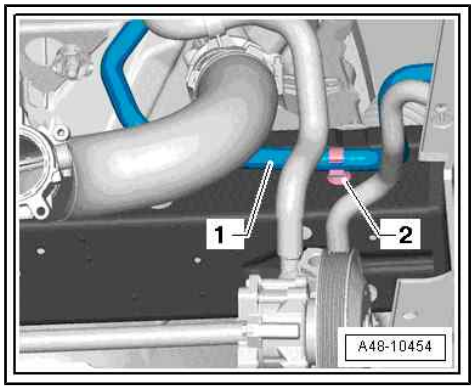
Reservoir in bracket

– Fit reservoir (insert lug -1- into recess in bracket -2-).



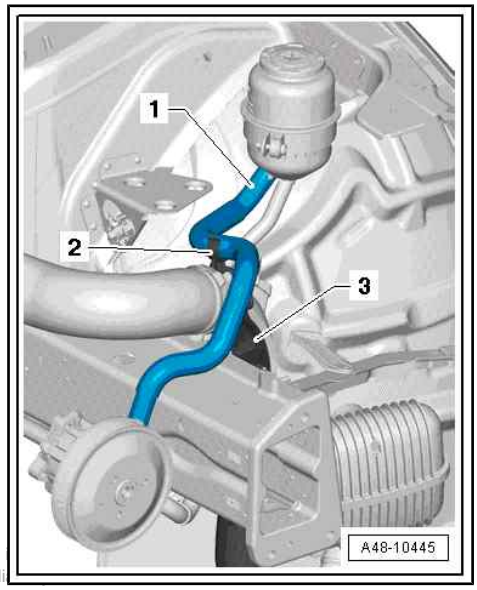
Clip for securing return hose to longitudinal member

– Attach return hose -1- to longitudinal member (left-side) using clip -2-.



Suction hose in clip of pressure pipe

– Insert suction hose -1- in clip -2- of pressure pipe -3-.

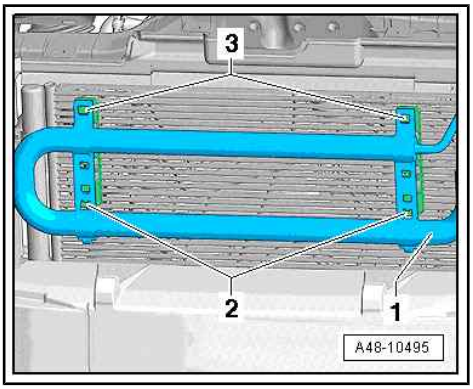


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Hydraulic fluid cooler to condenser

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

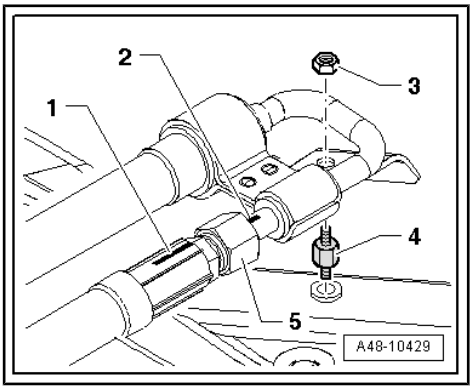
Hoses to hydraulic fluid cooler ⇒ page 623



Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

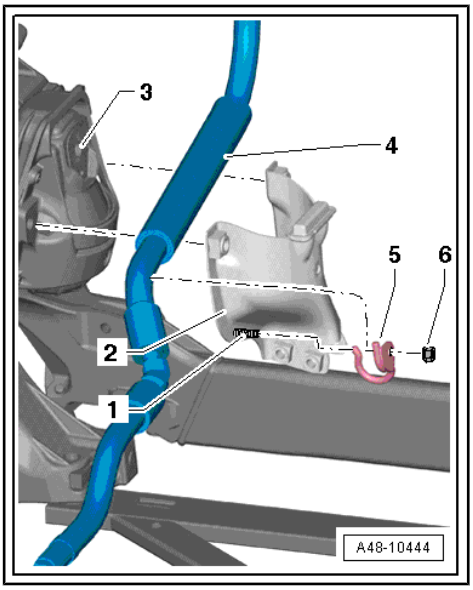
– Note correct position of line when connecting. Markings -1- and -2- must be aligned.



Pressure line to engine mounting

– Route pressure line -4- between connecting element -2- and engine mounting -3-.

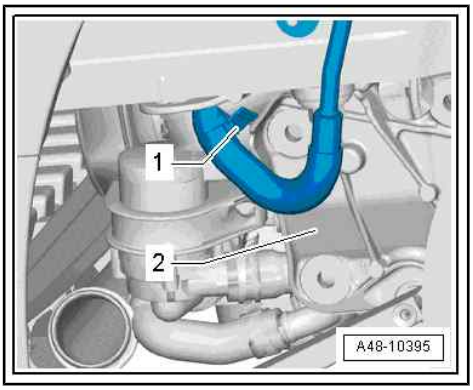
– Screw retainer -5- to stud -1- with nut -6-.



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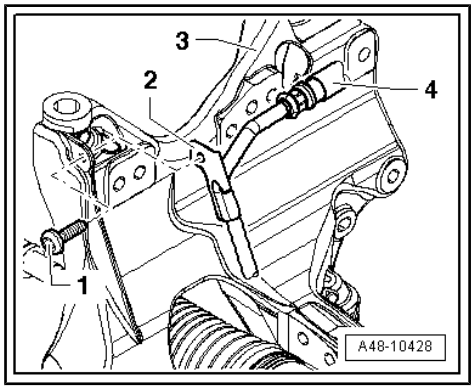
Retainer for securing return line to subframe

– Secure retainer -1- of return line to front left of subframe -2-.



Return line to subframe

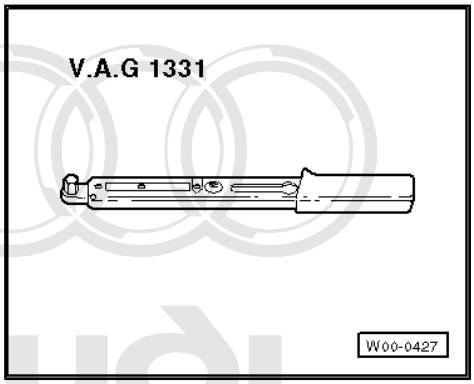
– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.



7.4 Checking delivery pressure of power steering pump (vehicles with 4-cylinder diesel engine, vehicles with and without dynamic steering)

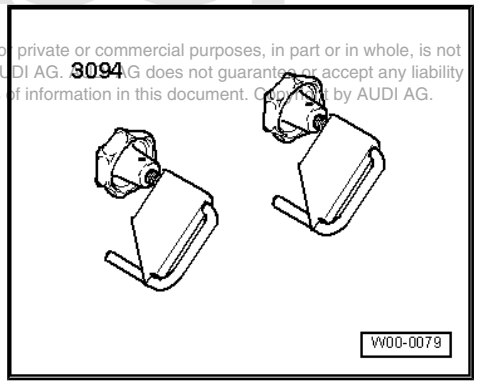
Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-

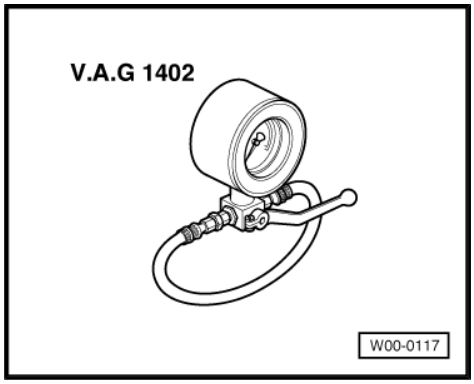


♦ Hose clamps up to 25 mm ∅ -3094-

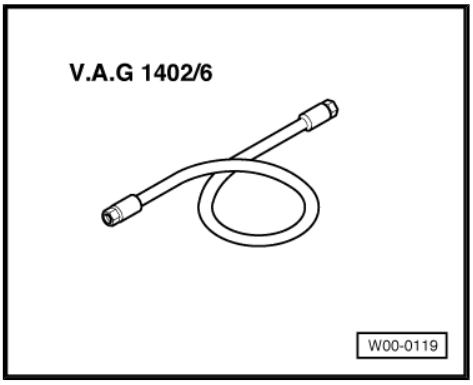
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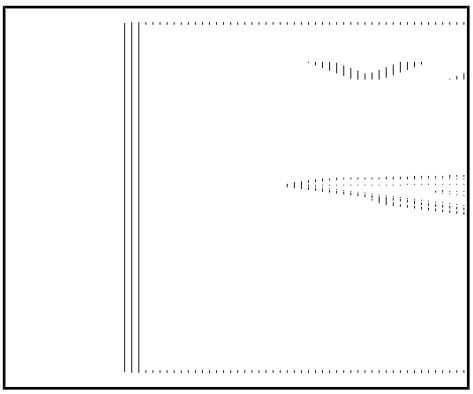
♦ Power steering tester -V.A.G 1402-



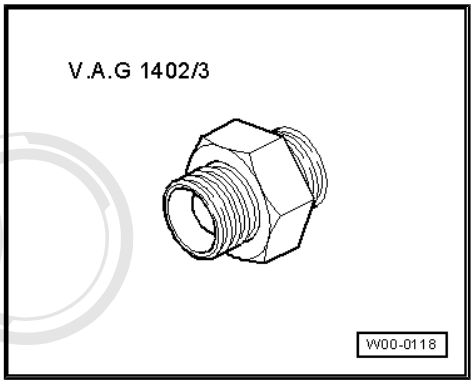
- Adapter set -V.A.G 1402/6-



- Drip tray for workshop hoist -VAS 6208-



- Adapter -V.A.G 1402/3- is required for vehicles with connecting point in pressure line ⇒ Item 13 (page 432)



- Adapter set -V.A.G 1402/17- is required for vehicles without connecting point in pressure line ⇒ Item 13 (page 432)

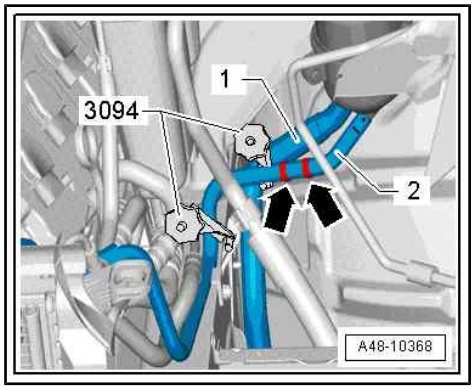
Test requirements:

- V-belt and V-belt tension OK.
- No leaks in system
- Hoses and pipes not kinked or constricted

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Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

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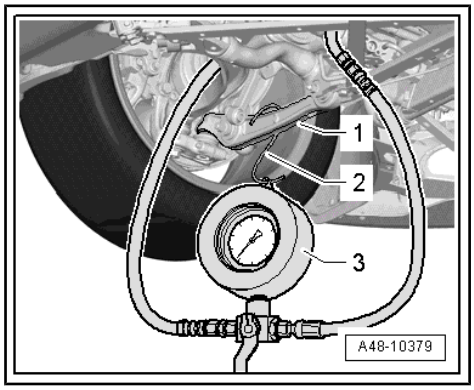
Vehicles with connecting point in pressure line

⇒ Item 13 (page 432)

– Remove noise insulation ⇒ Rep. gr. 66 .

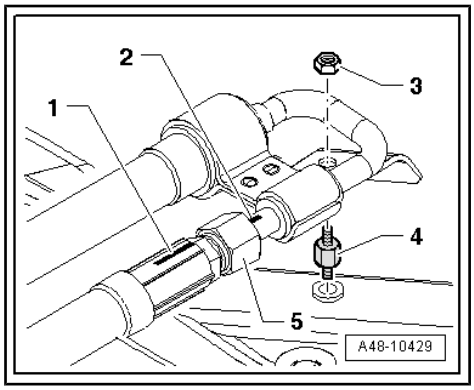
– Attach tester -3- by a hook -2- to track control link -1-.

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.



– Slacken union nut -5-. Counterhold at hexagon flats.

– Remove nut -3-.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

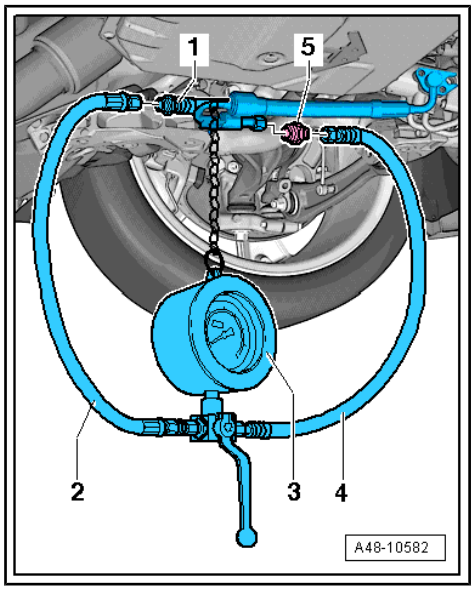
2 - Hose from adapter set -V.A.G 1402/6-

3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

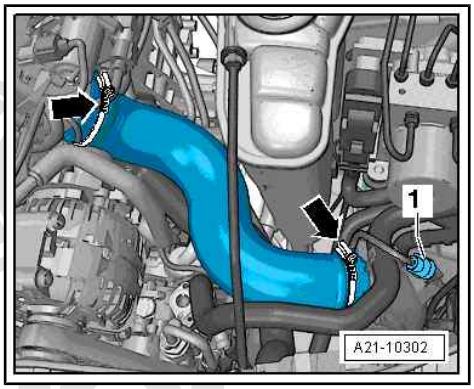
5 - Adapter -V.A.G 1402/3-

– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.

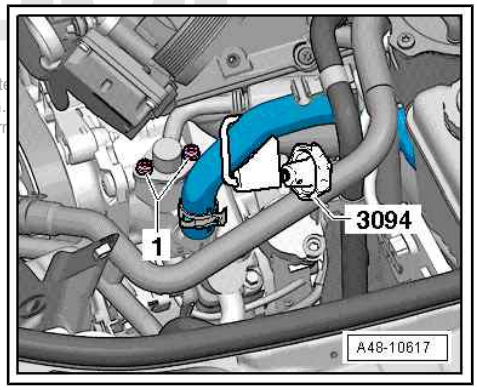


Vehicles without connecting point ⇒ Item 13 (page 432)

– Release hose clips -arrows- and remove air hose.



– Remove bolts -1- and pull pressure line out of power steering pump.



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– Connect power steering tester -V.A.G 1402- as shown.

1 - Power steering pump

2 - Adapter -V.A.G 1402/17-1- [11] with angle piece -V.A.G 1402/17-3-

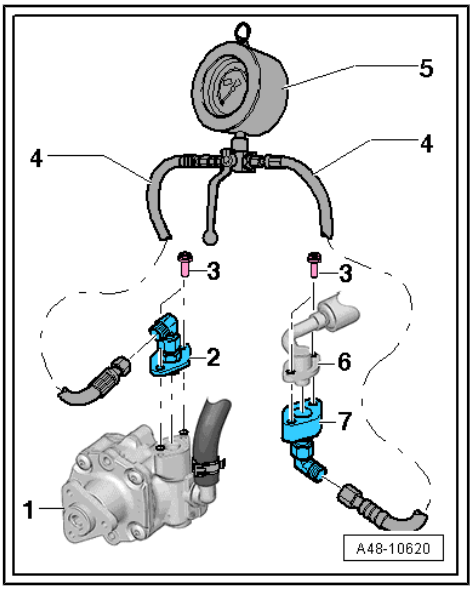
3 - Bolt for securing pressure line ⇒ Item 20 (page 432)

4 - Hose from adapter set -V.A.G 1402/6-

5 - Power steering tester -V.A.G 1402-

6 - Pressure line

7 - Adapter -V.A.G 1402/17-2- with angle piece -V.A.G 1402/17-3-

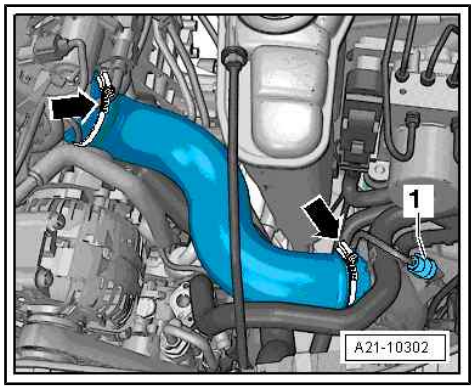


11) If the seal on adapter -V.A.G 1402/17-1- is damaged or leaking, it must be replaced with a new seal ⇒ Item 9 (page 431) ⇒ Electronic parts catalogue .

Note

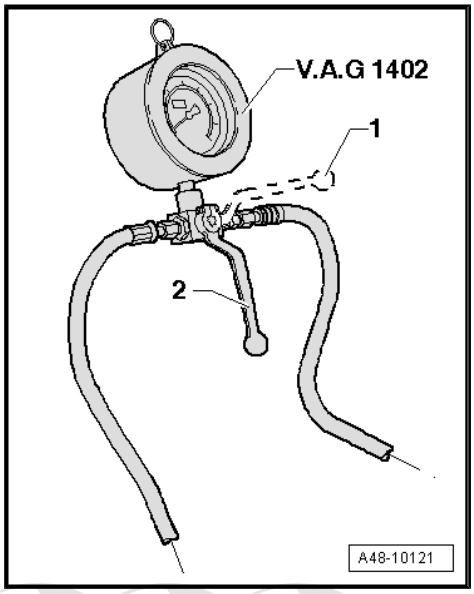
- *Position angle piece -V.A.G 1402/17-3- on adapter -V.A.G 1402/17-1- so that hose of adapter set -V.A.G 1402/6- does not come into contact with pulley or poly V-belt.*
- *Tighten union nuts on angle pieces -V.A.G 1402/17-3- and on hoses of adapter set -V.A.G 1402/6- hand-tight using an open-end spanner.*

– Install air intake hose -arrows-.



All vehicles (continued):

– Make sure lever on pressure gauge is at position -2-.
– Remove hose clamps -3094- .
– Start engine but do not press accelerator.
– Turn steering wheel approx. 10 times from lock to lock.
– Switch off engine and top up hydraulic fluid in reservoir if necessary.



Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.
– Start engine.

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– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.

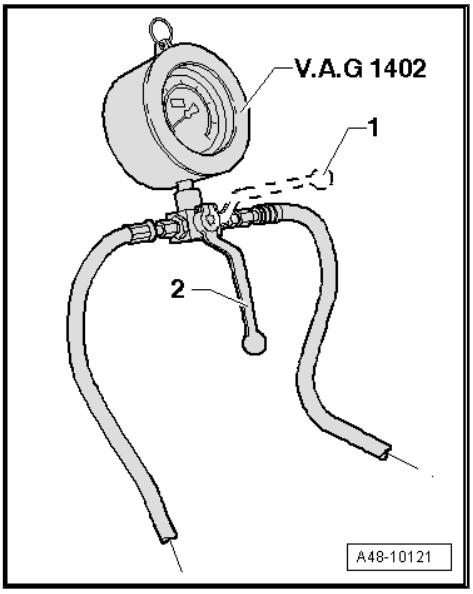
Specification for delivery pressure (vehicles with and without dynamic steering): 110…130 bar

Renew power steering pump if specification is not attained
⇒ „7.5 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)“, page 441 or
⇒ „7.6 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)“, page 448 .

– Switch off engine.

– Remove power steering tester -V.A.G 1402- .

Tightening torques
⇒ „7.1 Exploded view (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)“, page 427



– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- must be aligned.

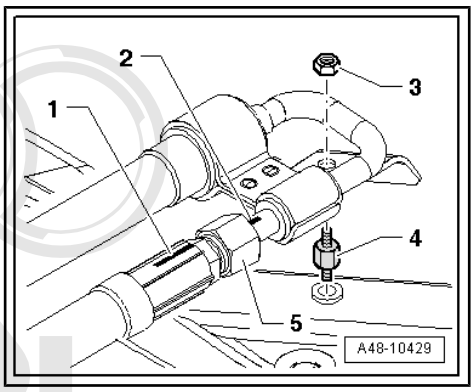
– Tighten union nut -1-. Counterhold at hexagon flats.

– Tighten nut -3- and, if necessary, rubber mounting -4-.

– Bleed steering system ⇒ page 425 .

– Check hydraulic fluid level ⇒ page 424 .

– Check all opened lines for leaks ⇒ page 426 .



7.5 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)

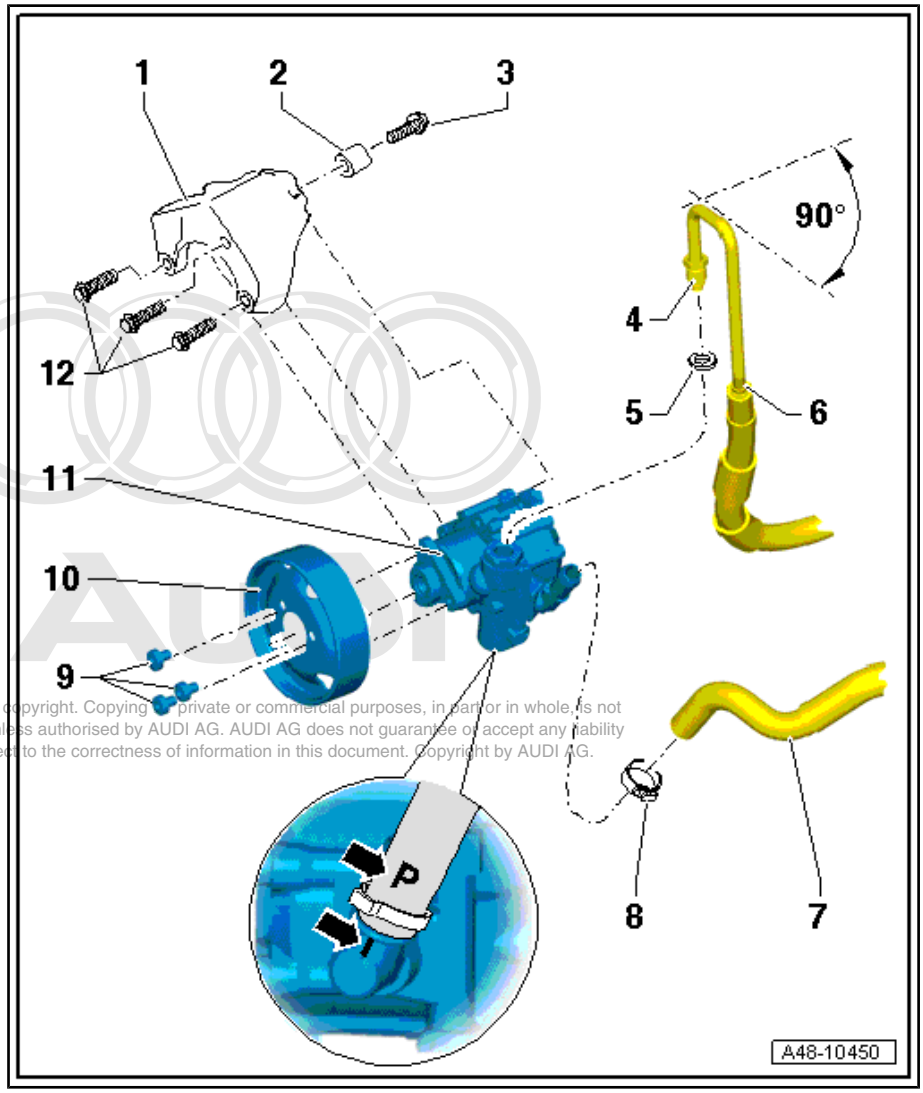
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Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles with dynamic steering)
⇒ page 442 .

Exploded view of power steering pump (vehicles with dynamic steering)

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Union nut

- ❑ 38 Nm

5 - Seal

- ❑ Always renew if removed

6 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 90°

7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

9 - Bolt

- ❑ 22 Nm

10 - Belt pulley

11 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 436
- ❑ Removing and installing ⇒ page 442
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

12 - Bolt

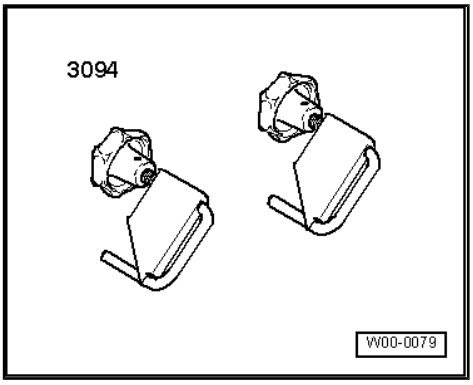
- ❑ 25 Nm

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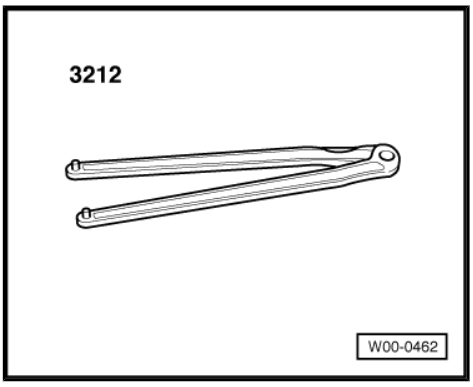
Removing

Special tools and workshop equipment required

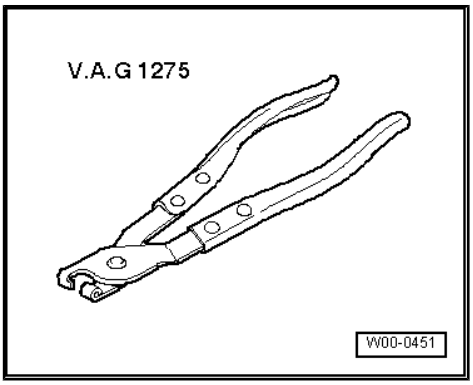
- Hose clamps up to 25 mm ∅ -3094-



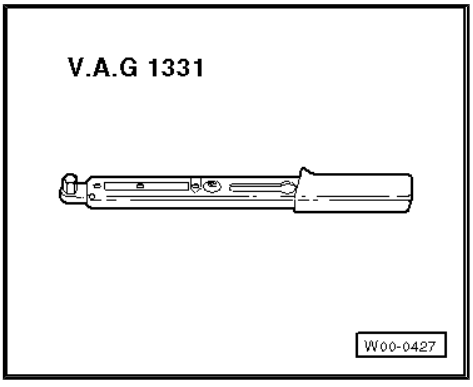
- Pin wrench -3212-



- Hose clip pliers -V.A.G 1275-

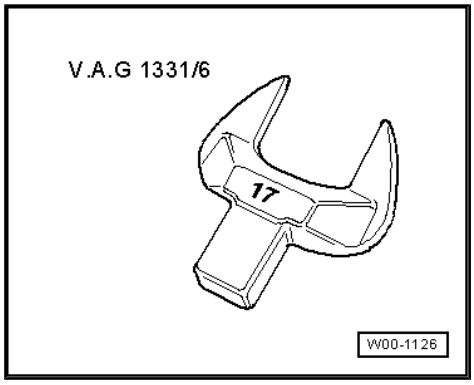


- Torque wrench -V.A.G 1331-

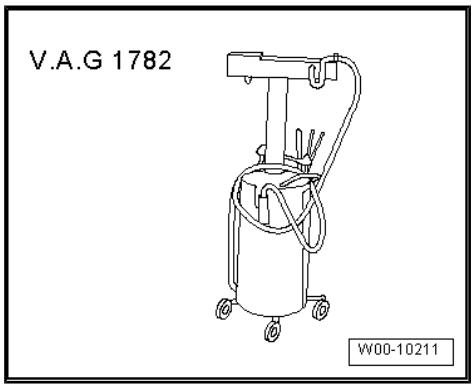


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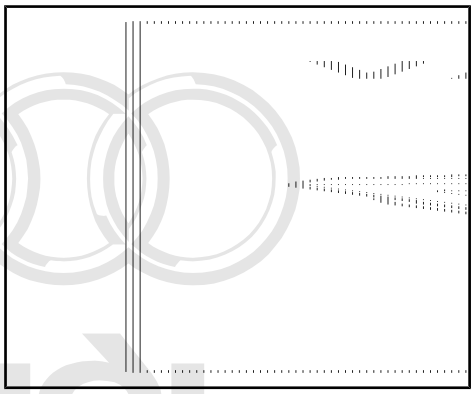
- Tool insert (17 mm) -V.A.G 1331/6-



- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



- Engine bung set -VAS 6122-

General notes

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There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

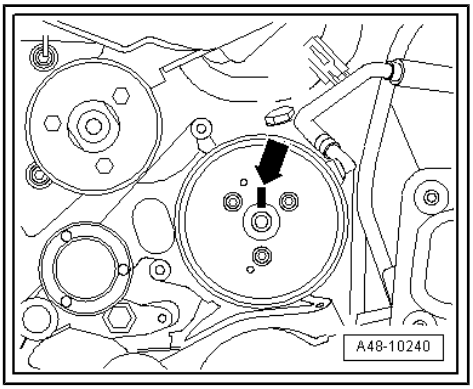
- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel.

– Move lock carrier to service position ⇒ Rep. gr. 50 .

– Mark position of pulley relative to hub -arrow-.

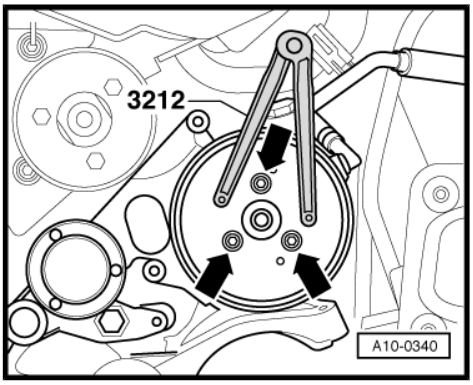


Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

– First slacken (but do not remove) bolts for pulley (only 2 of the 3 bolts are accessible). If necessary, counterhold with pin wrench -3212- .

– Slacken off poly V-belt (but do not remove yet) and hold tensioning roller with tool. At the same time rotate the power steering pump pulley so that the third bolt can be slackened.



Note

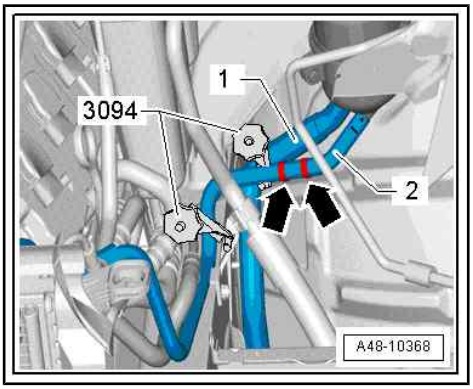
Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Remove poly V-belt only from power steering pump pulley ⇒ Rep. gr. 13 .

– Now remove slackened bolts and detach belt pulley.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



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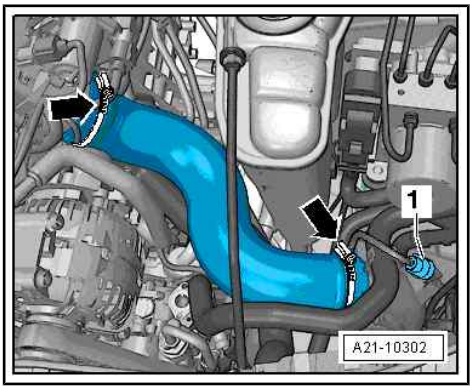
Caution

- ***Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.***
- ***The non-return valve is located in the return hose -2- between the hose clips -arrows-.***

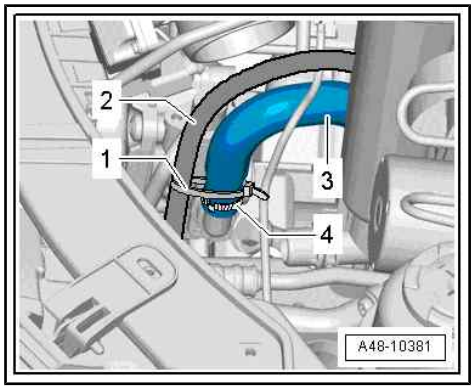
– Release hose clips -arrows- and remove air hose.

– Remove noise insulation ⇒ Rep. gr. 66 .

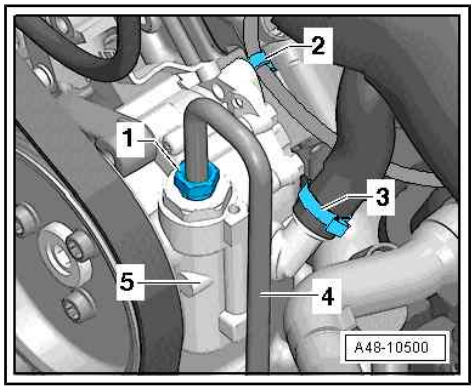
– Place drip tray underneath power steering pump.



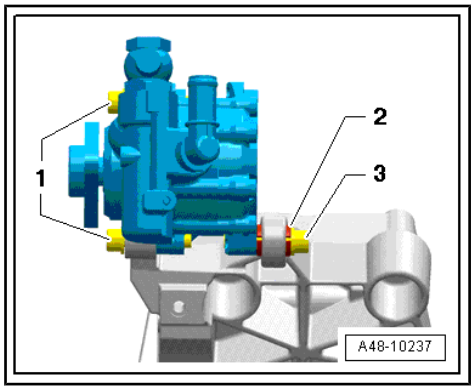
– If fitted, carefully cut through cable tie -1- for wiring harness -2-.
– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.
– Place several cloths beneath power steering pump and pressure line.



– Unscrew union nut -1- and pull pressure line out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.



– Remove bolts -1- (3x) and bolt -3-.
– To install power steering pump, drive back sleeve -2- for bolt -3- slightly at bracket.
– Take out power steering pump.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 441

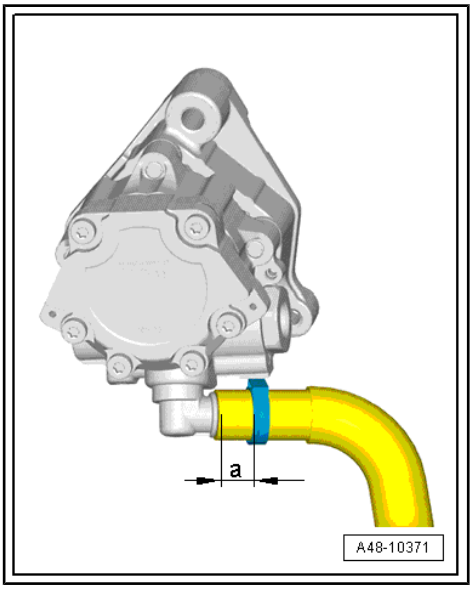
Note

- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

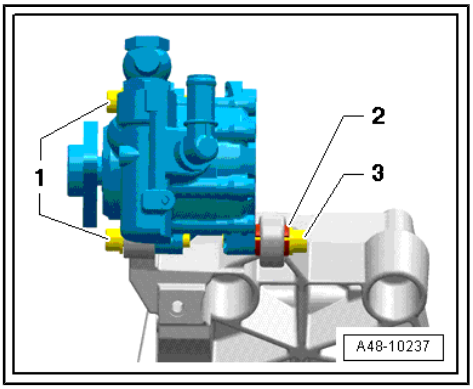
– Note correct position of suction hose on power steering pump.

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– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.
– Turn hub by hand until fluid comes out at pump outlet.

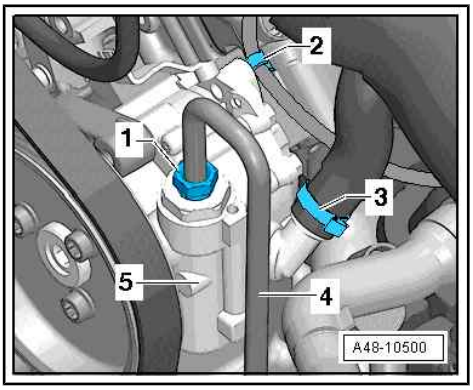


– Fit power steering pump into bracket.
• Sleeve -2- has been driven back slightly.
– First screw in front bolts -1- (3x) loosely.
– Then screw in rear bolt -3- loosely.
– First tighten bolts -1- and then bolt -2-.

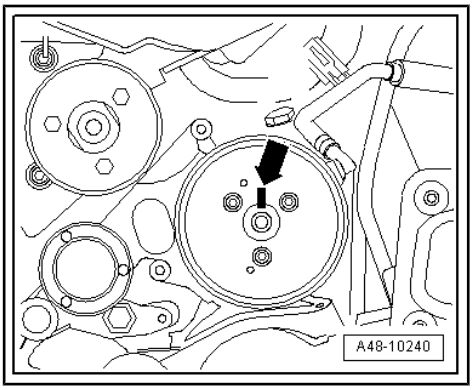


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– Press pressure line into power steering pump as far as stop. Then tighten union nut -1-.
– Push suction hose onto connection and attach a new hose clip -3-.
– Clean off fluid in engine compartment where necessary.



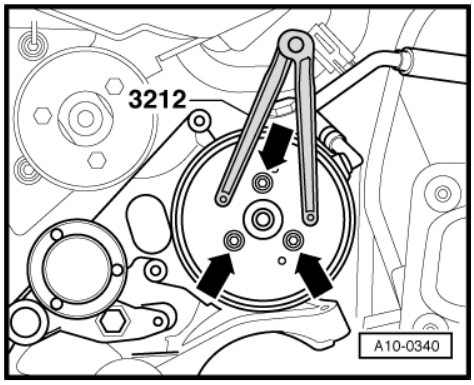
– Align marking on pulley -arrow- (made previously) with marking on hub.



– Tighten bolts -arrows- for belt pulley.

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .
– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .

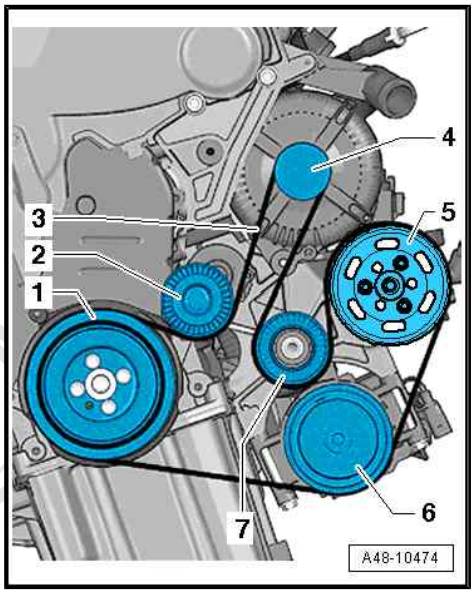


Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Vibration damper
2 - Tensioner for poly V-belt
3 - Poly V-belt
4 - Alternator
5 - Power steering pump pulley
6 - Air conditioner compressor
7 - Idler roller

– Start engine and check that belt runs properly.



7.6 Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)

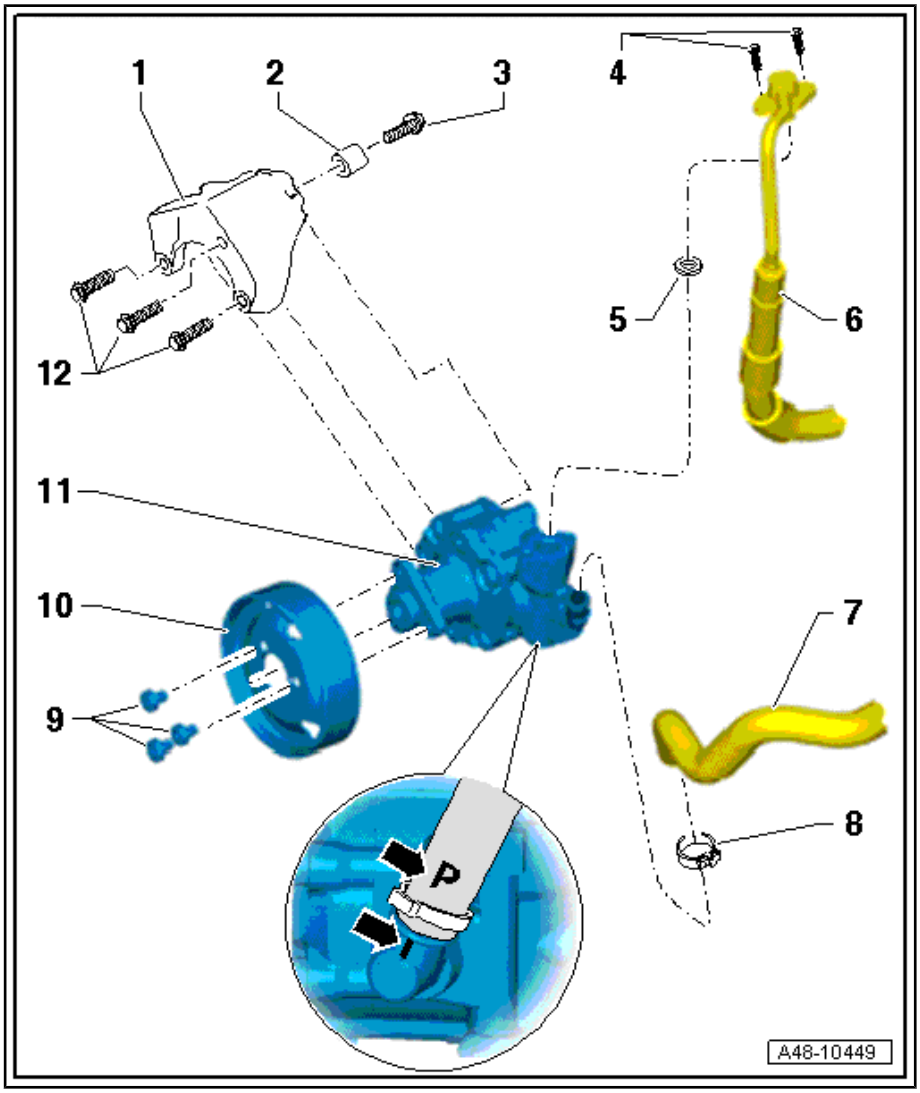
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Removing and installing power steering pump (vehicles with 4-cylinder diesel engine, vehicles without dynamic steering)
⇒ page 449 .

Exploded view of power steering pump (vehicles without dynamic steering)

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Bolt

- ❑ 9 Nm

5 - Seal

- ❑ Always renew if removed

6 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

9 - Bolt

- ❑ 22 Nm

10 - Belt pulley

11 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 436
- ❑ Removing and installing ⇒ page 449
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

12 - Bolt

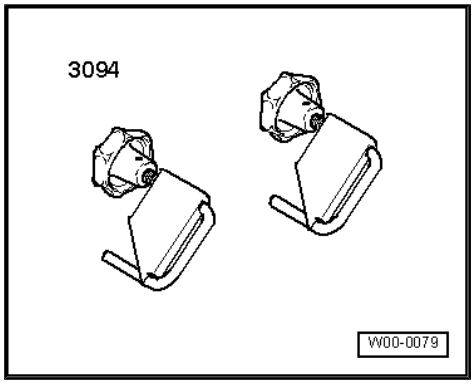
- ❑ 25 Nm

Removing

Special tools and workshop equipment required

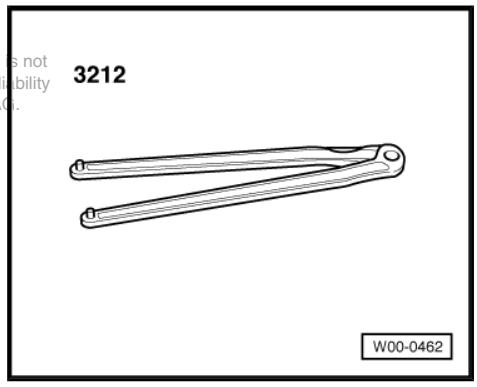
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- Hose clamps up to 25 mm ∅ -3094-

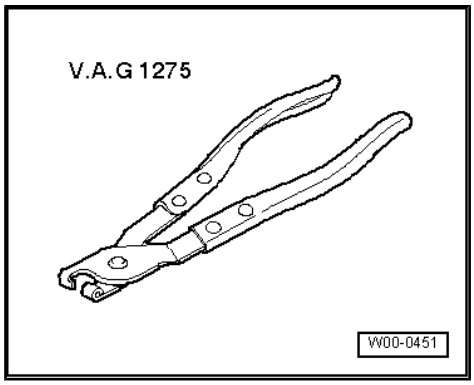


- Pin wrench -3212-

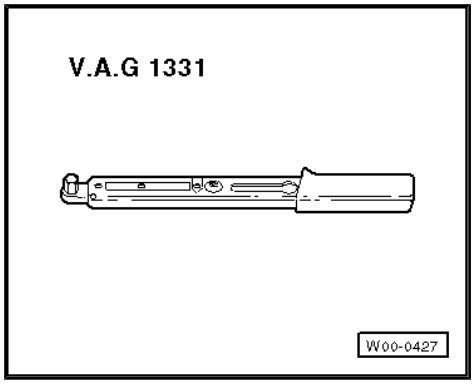
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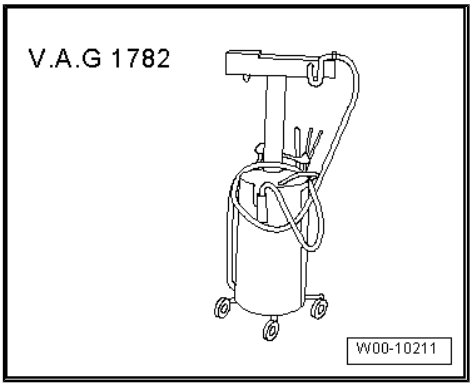
- Hose clip pliers -V.A.G 1275-



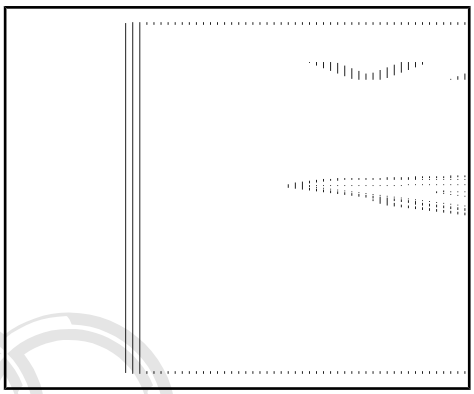
- Torque wrench -V.A.G 1331-



- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



- Engine bung set -VAS 6122-

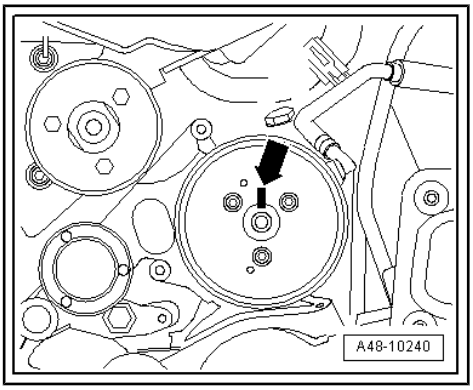
General notes

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

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– Raise vehicle on lifting platform.
– Lift off engine cover panel.
– Move lock carrier to service position ⇒ Rep. gr. 50 .
– Mark position of pulley relative to hub -arrow-.

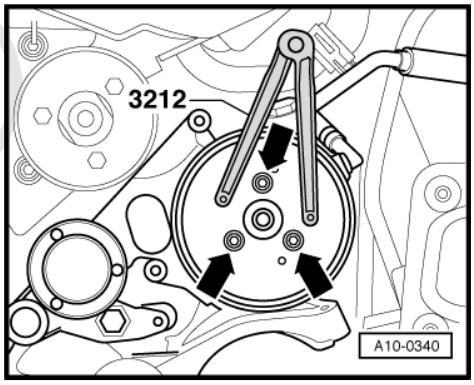


Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

– First slacken (but do not remove) bolts for pulley (only 2 of the 3 bolts are accessible). If necessary, counterhold with pin wrench -3212- .

– Slacken off poly V-belt (but do not remove yet) and hold tensioning roller with tool. At the same time rotate the power steering pump pulley so that the third bolt can be slackened.



Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

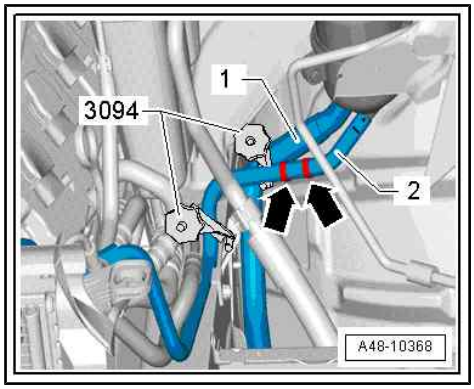
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– Remove poly V-belt only from power steering pump pulley ⇒ Rep. gr. 13 .

– Now remove slackened bolts and detach belt pulley.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



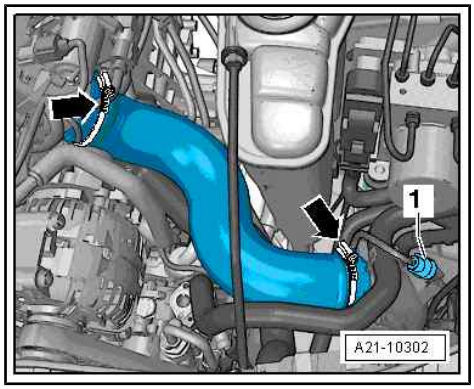
Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

– Release hose clips -arrows- and remove air hose.

– Remove noise insulation ⇒ Rep. gr. 66 .

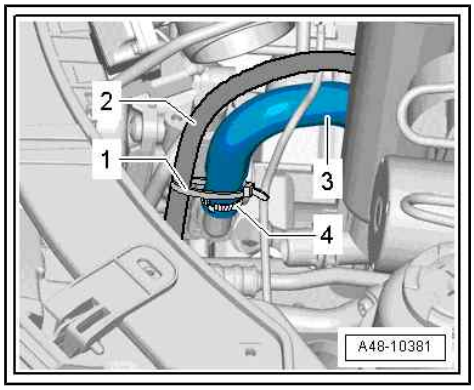
– Place drip tray underneath power steering pump.



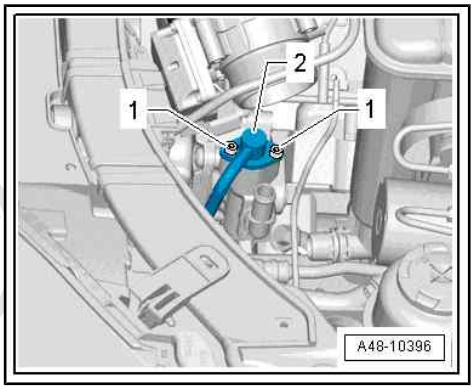
– If fitted, carefully cut through cable tie -1- for wiring harness -2-.

– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.

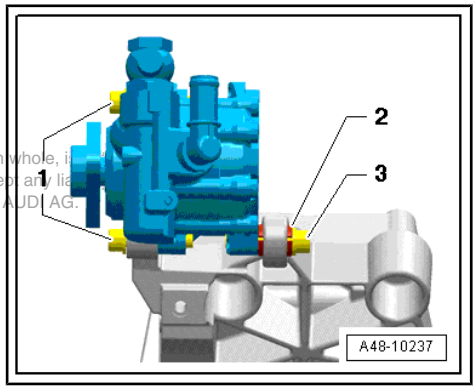
– Place several cloths beneath power steering pump and pressure line.



– Remove bolts -1- and pull pressure line -2- out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.



– Remove bolts -1- (3x) and bolt -3-.
– To install power steering pump, drive back sleeve -2- for bolt -3- slightly at bracket.
– Take out power steering pump.



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Installing

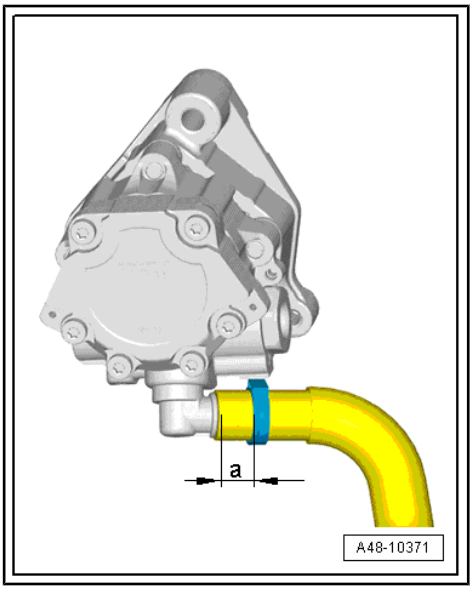
Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 448

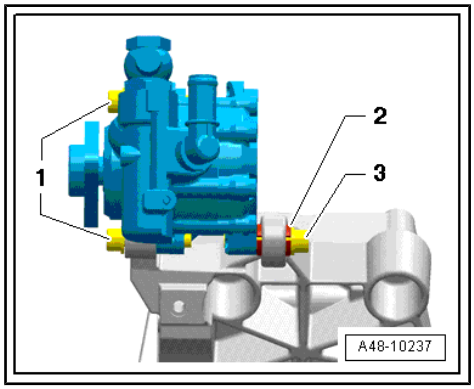
Note

- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

– Note correct position of suction hose on power steering pump.
– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.
– Turn hub by hand until fluid comes out at pump outlet.

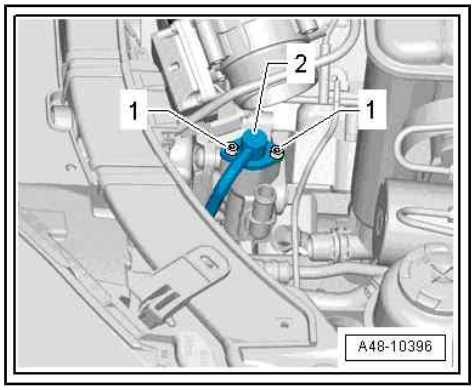


– Fit power steering pump into bracket.
• Sleeve -2- has been driven back slightly.
– First screw in front bolts -1- (3x) loosely.
– Then screw in rear bolt -3- loosely.
– First tighten bolts -1- and then bolt -2-.

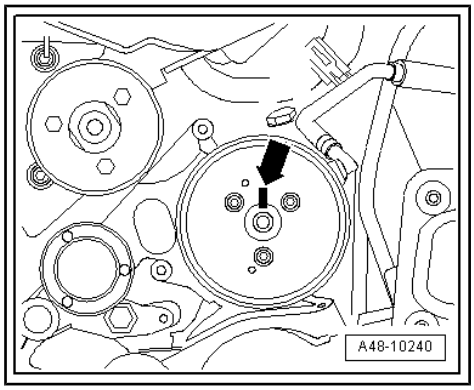


– When installing, insert pressure line -2- fully into power steering pump.
– Tighten pressure line -2- with bolts -1-.
– Clean off fluid in engine compartment where necessary.

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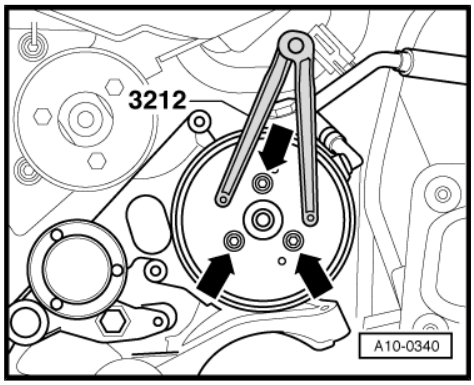
– Align marking on pulley -arrow- (made previously) with marking on hub.



– Tighten bolts -arrows- for belt pulley.

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .
– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .

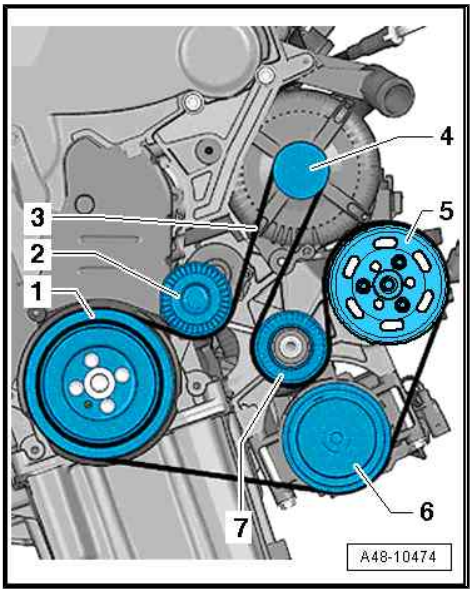


Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Vibration damper
2 - Tensioner for poly V-belt
3 - Poly V-belt
4 - Alternator
5 - Power steering pump pulley
6 - Air conditioner compressor
7 - Idler roller

– Start engine and check that belt runs properly.



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8 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 4-cylinder TFSI engine)

⇒ „8.1 Exploded view (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)“, page 456

⇒ „8.2 Exploded view (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)“, page 459

⇒ „8.3 Exploded view of pipes and hoses (vehicles with 4-cylinder TFSI engine, vehicles with and without dynamic steering)“, page 462

⇒ „8.4 Checking delivery pressure of power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with and without dynamic steering)“, page 465

⇒ „8.5 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)“, page 470

⇒ „8.6 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)“, page 478

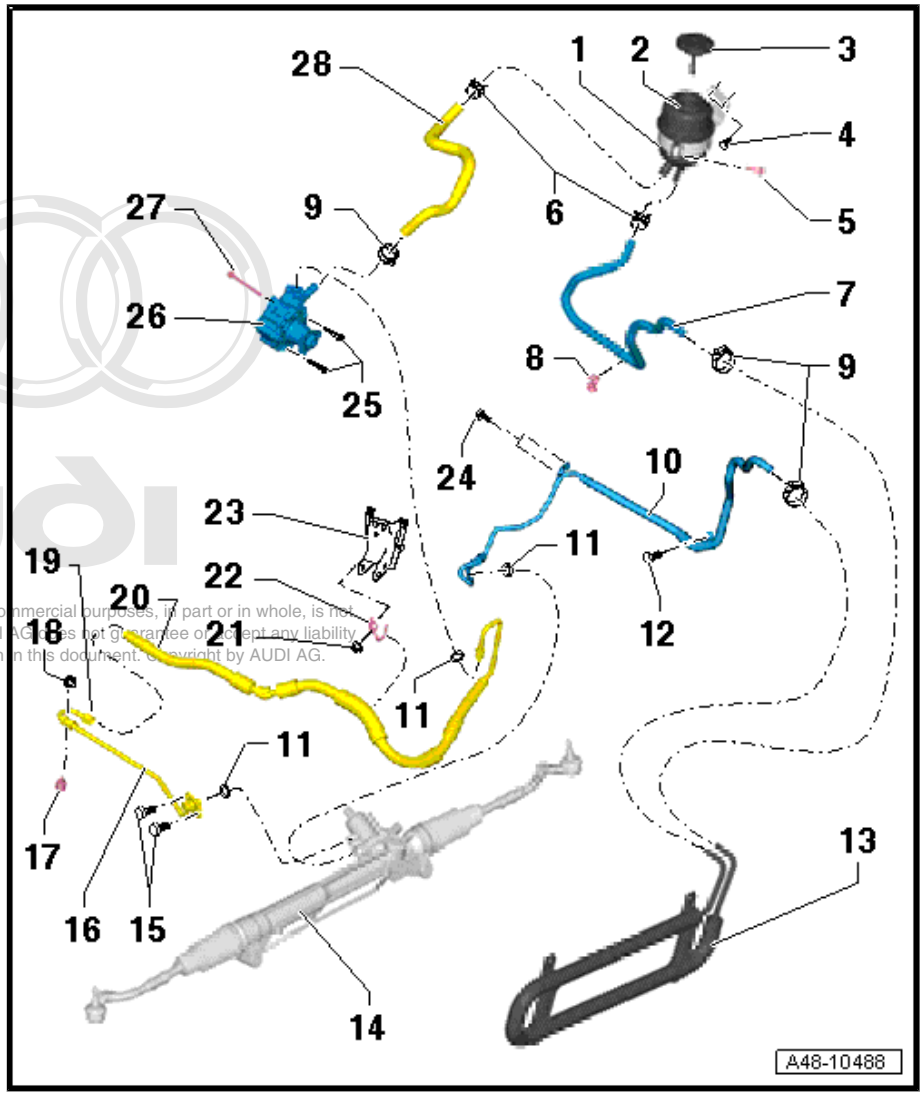
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8.1 Exploded view (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 462

2 - Reservoir

- ❑ Note correct installation position ⇒ page 462
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Return hose

- ❑ From hydraulic fluid cooler to reservoir
- ❑ Securing to longitudinal member ⇒ page 462
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

8 - Clip

9 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

10 - Return line

- ❑ From power steering box to hydraulic fluid cooler

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 462
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

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- ❑ Installation position at line connection ⇒ page 623

11 - Seal

- ❑ Always renew if removed

12 - Bolt

- ❑ 9 Nm

13 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 462
- ❑ Removing and installing ⇒ page 618

14 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

15 - Bolt

- ❑ 20 Nm

16 - Pressure line

- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 462
- ❑ Installation position of line connection ⇒ page 462

17 - Rubber mounting

- ❑ 6 Nm

18 - Nut

- ❑ 6 Nm

19 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 462

20 - Pressure line

- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Tightening torque of union nut: 38 Nm
- ❑ Securing to engine mounting ⇒ page 462
- ❑ Installation position of line connection ⇒ page 623

21 - Nut

- ❑ 9 Nm

22 - Retainer

23 - Connector

- ❑ For engine mounting

24 - Bolt

- ❑ 9 Nm

25 - Bolt

- ❑ 25 Nm

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26 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 465
- ❑ Removing and installing ⇒ page 470

27 - Bolt

- ❑ 25 Nm

28 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 470

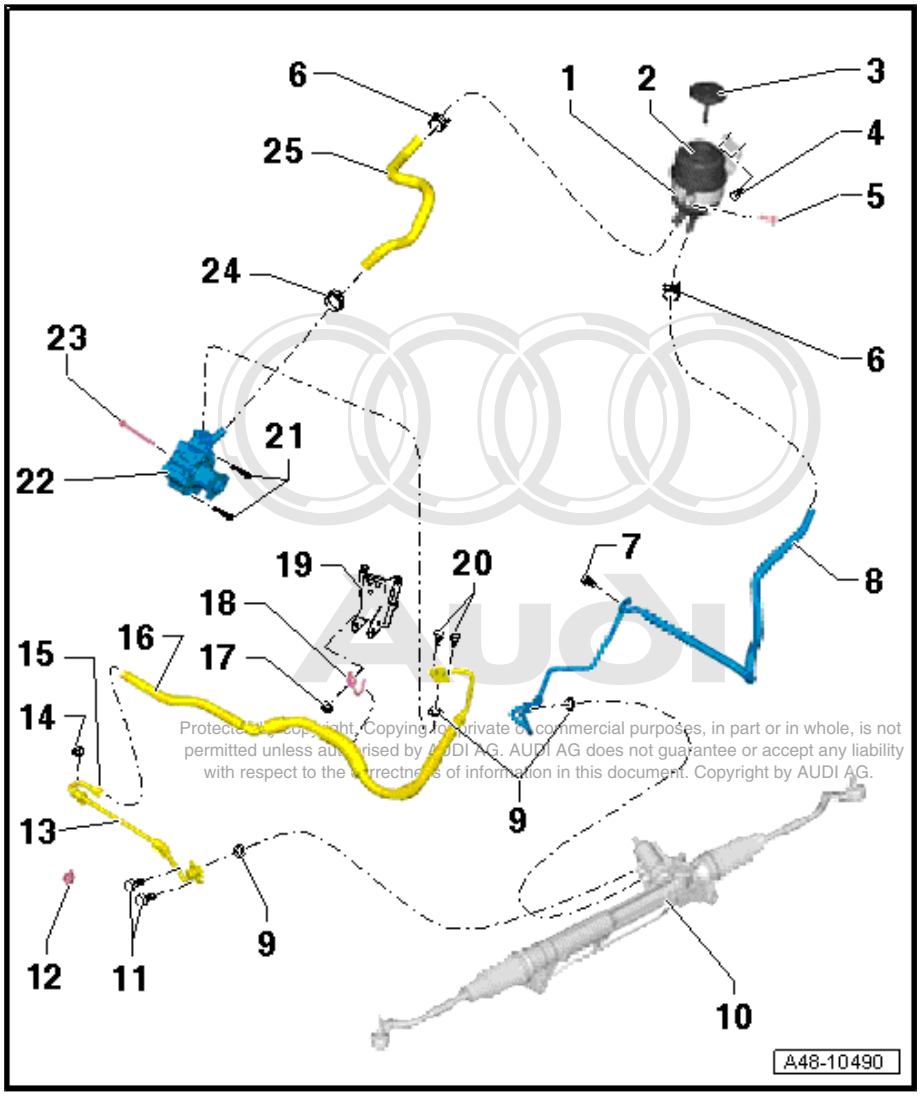
8.2 Exploded view (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 462

2 - Reservoir

- ❑ Note correct installation position ⇒ page 462
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Bolt

- ❑ 9 Nm

8 - Return line

- ❑ From power steering box to reservoir

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 462
- ❑ Note correct position on reservoir ⇒ page 623

9 - Seal

- ❑ Always renew if removed

10 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

11 - Bolt

- ❑ 20 Nm

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12 - Rubber mounting

- ❑ 6 Nm

13 - Pressure line

- ❑ From power steering pump to power steering box; different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue
- ❑ Securing to cross brace ⇒ page 462
- ❑ Installation position of line connection ⇒ page 462

Caution

Fully insert pressure line when installing.

14 - Nut

- ❑ 6 Nm

15 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 462
- ❑ Union nut not fitted on pressure line without connecting point

16 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Securing to engine mounting ⇒ page 462
- ❑ Installation position of line connection ⇒ page 462

17 - Nut

- ❑ 9 Nm

18 - Retainer

19 - Connector

- ❑ For engine mounting

20 - Bolt

- ❑ 9 Nm

21 - Bolt

- ❑ 25 Nm

22 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 465
- ❑ Removing and installing ⇒ page 478

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23 - Bolt

- ❑ 25 Nm

24 - Hose clip

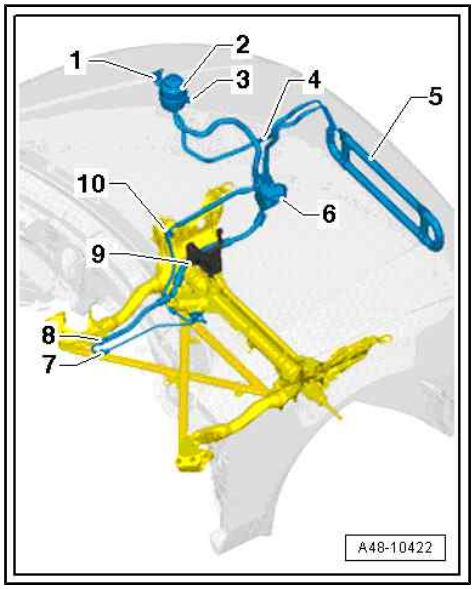
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

25 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623

❑ Note correct position on power steering pump ⇒ page 478

8.3 Exploded view of pipes and hoses (vehicles with 4-cylinder TFSI engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 462

2 - Reservoir in bracket ⇒ page 463

3 - Bolt in bracket ⇒ page 463

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4 - Clip for securing return hose to longitudinal member ⇒ page 463 and clip for securing suction hose to pressure pipe ⇒ page 463

5 - Hydraulic fluid cooler to condenser ⇒ page 464

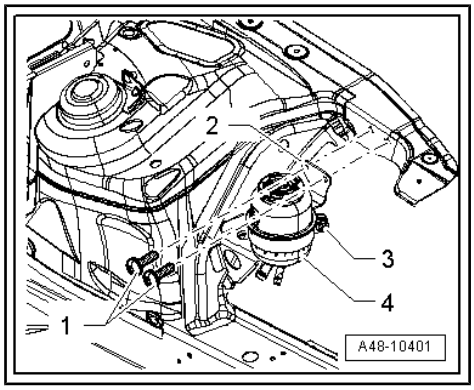
6 - Power steering pump in bracket ⇒ „8.5 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)“, page 470 or ⇒ „8.6 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)“, page 478

7 - Pressure line to cross brace ⇒ page 464

8 - Installation position of pressure line connection ⇒ page 464

9 - Pressure line to engine mounting ⇒ page 464

10 - Return line to subframe ⇒ page 465 , return line bracket to longitudinal member ⇒ page 464



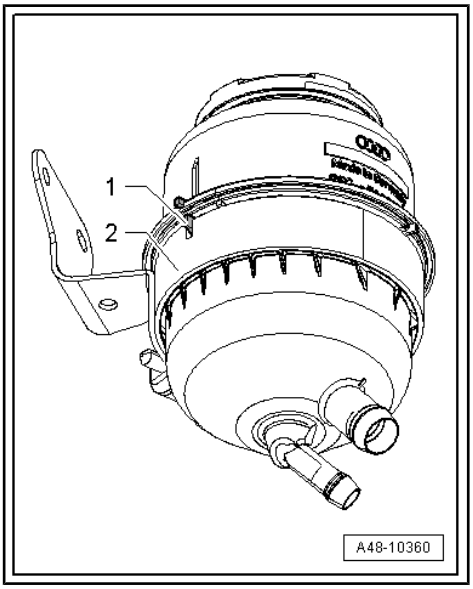
Bracket for reservoir to body

– Secure bracket -2- to body with bolts -1-.

– Secure reservoir -4- in bracket -2- with bolt -3-.

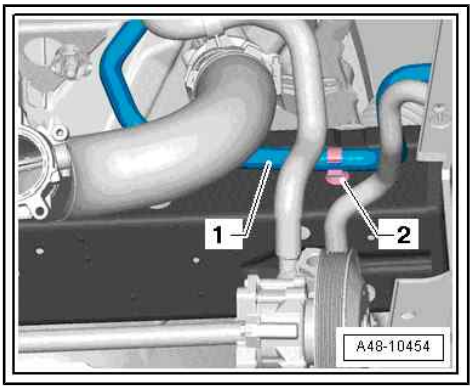
Reservoir in bracket

– Fit reservoir (insert lug -1- into recess in bracket -2-).



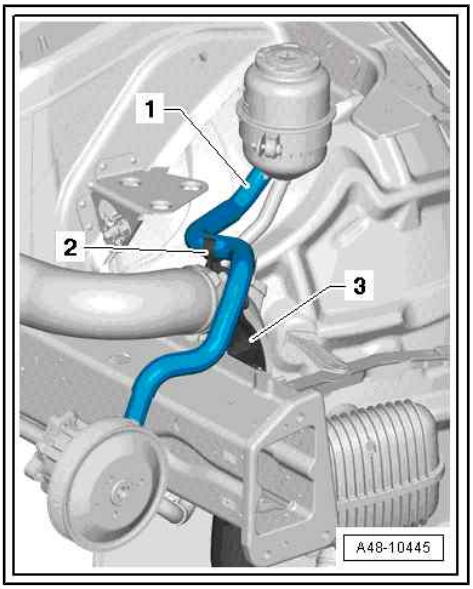
Clip for securing return hose to longitudinal member

– Attach return hose -1- to longitudinal member (left-side) using clip -2-.



Suction hose in clip of pressure pipe

– Insert suction hose -1- in clip -2- of pressure pipe -3-.

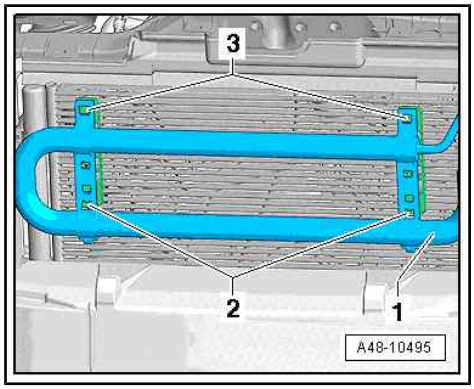


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Hydraulic fluid cooler to condenser

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

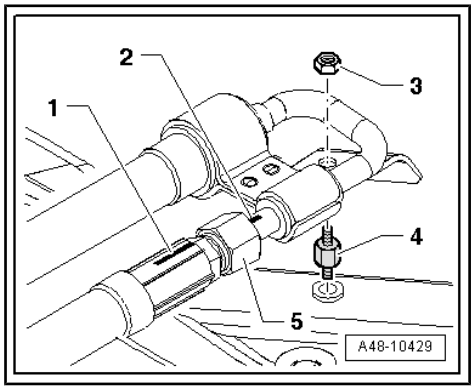
Hoses to hydraulic fluid cooler ⇒ page 623



Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

– Note correct position of line when connecting. Markings -1- and -2- must be aligned.

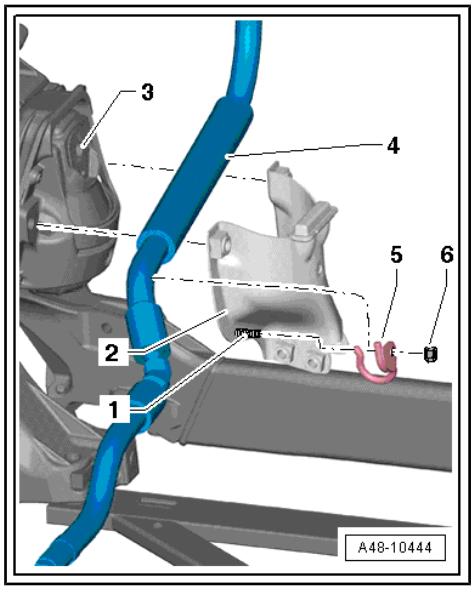


Pressure line to engine mounting

– Route pressure line -4- between connecting element -2- and engine mounting -3-.

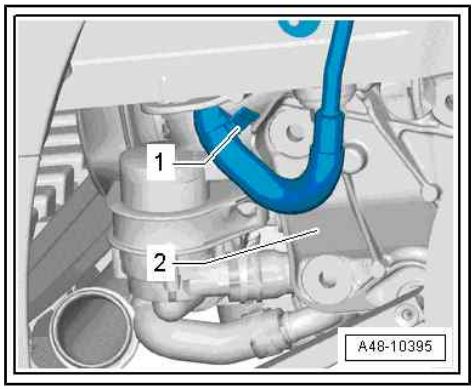
– Screw retainer -5- to stud -1- with nut -6-.

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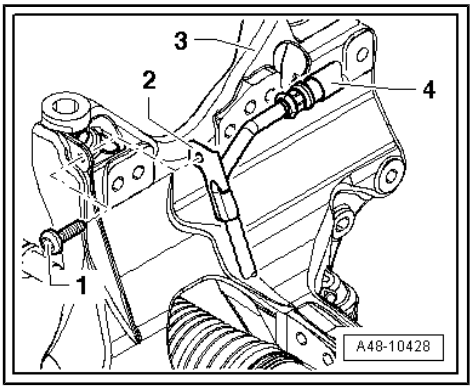
Retainer for securing return line to subframe

– Secure retainer -1- of return line to front left of subframe -2-.



Return line to subframe

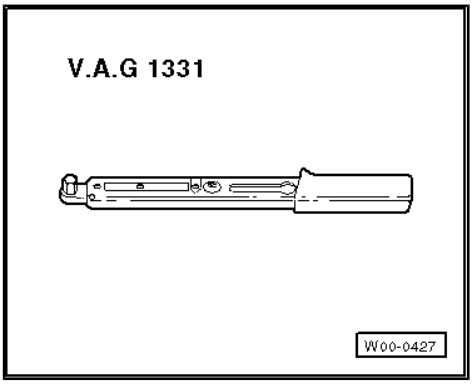
– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.



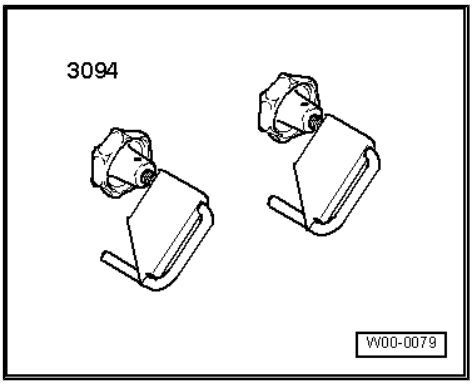
8.4 Checking delivery pressure of power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with and without dynamic steering)

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1331-

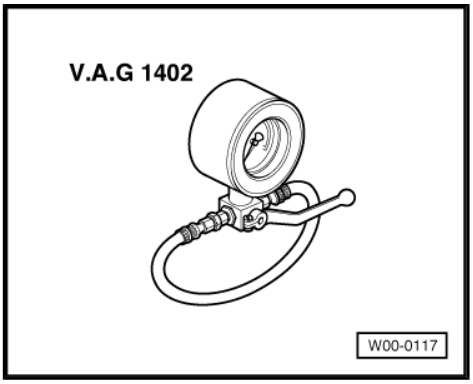


♦ Hose clamps up to 25 mm ∅ -3094-

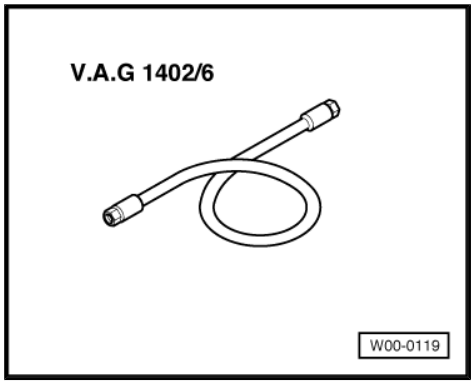


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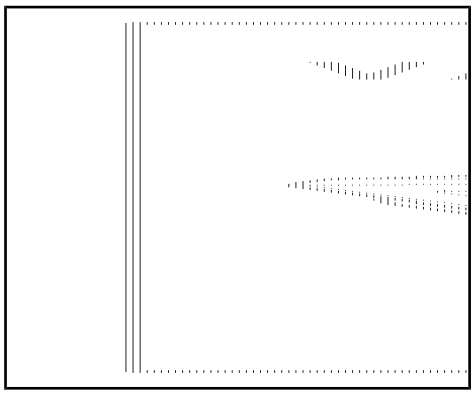
♦ Power steering tester -V.A.G 1402-



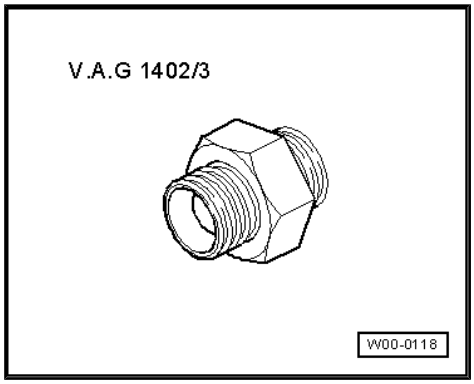
- Adapter set -V.A.G 1402/6-



- Drip tray for workshop hoist -VAS 6208-



- Adapter -V.A.G 1402/3- is required for vehicles with connecting point in pressure line ⇒ Item 13 (page 461)



- Adapter set -V.A.G 1402/18- is required for vehicles without connecting point in pressure line ⇒ Item 13 (page 461)

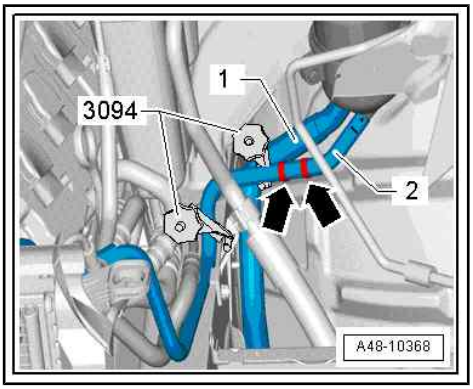
Test requirements:

- V-belt and V-belt tension OK.
- No leaks in system
- Hoses and pipes not kinked or constricted

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Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

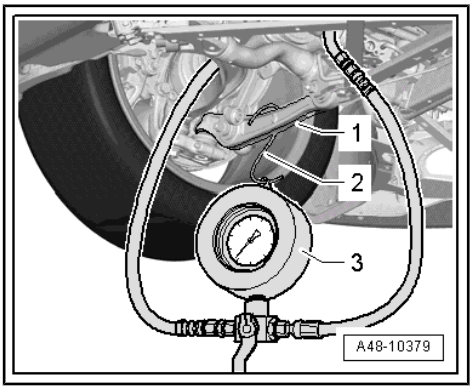
Vehicles with connecting point in pressure line

⇒ Item 13 (page 461)

– Remove noise insulation ⇒ Rep. gr. 66 .

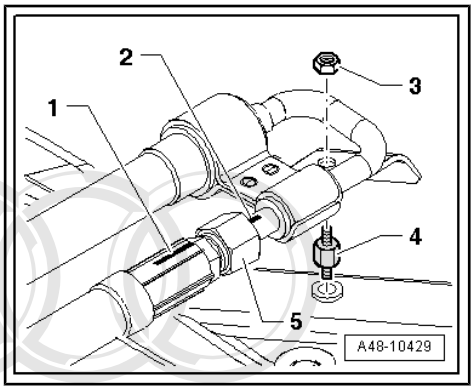
– Attach tester -3- by a hook -2- to track control link -1-.

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.



– Slacken union nut -5-. Counterhold at hexagon flats.

– Remove nut -3-.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

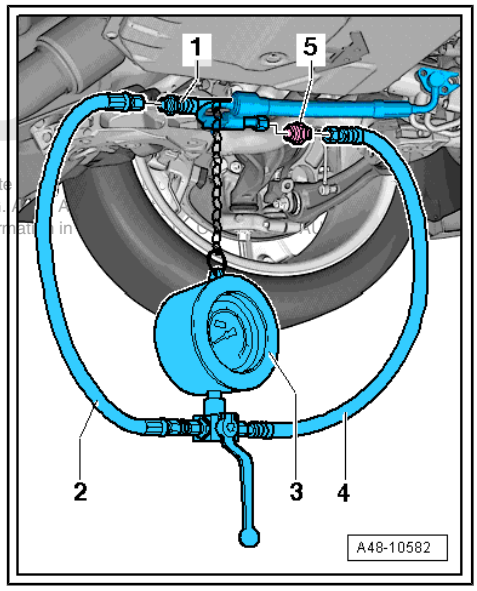
2 - Hose from adapter set -V.A.G 1402/6-

3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

5 - Adapter -V.A.G 1402/3-

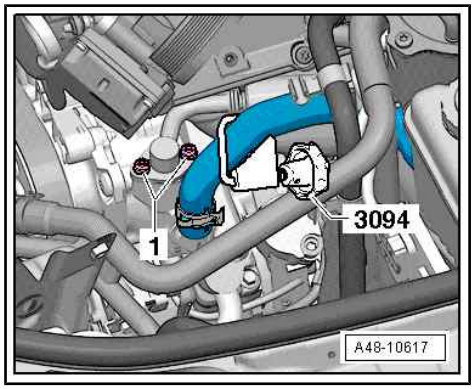
– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.



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Vehicles without connecting point ⇒ Item 13 (page 461)

– Remove bolts -1- and pull pressure line out of power steering pump.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Power steering pump

2 - Adapter -V.A.G 1402/18-1- [12] with angle piece -V.A.G 1402/17-3-

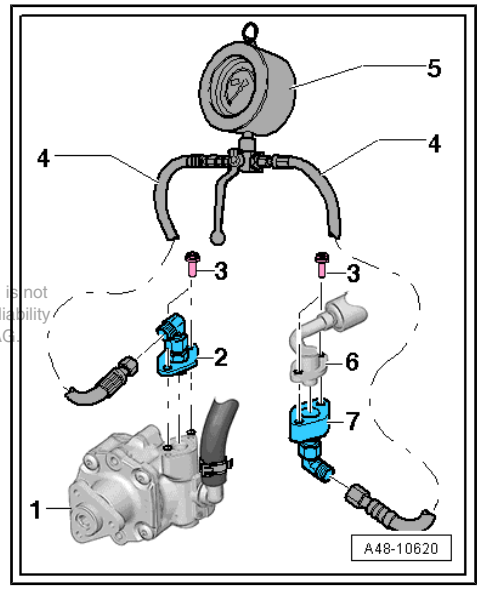
3 - Bolt for securing pressure line ⇒ Item 20 (page 432)

4 - Hose from adapter set -V.A.G 1402/6-

5 - Power steering tester -V.A.G 1402-

6 - Pressure line

7 - Adapter -V.A.G 1402/18-2- with angle piece -V.A.G 1402/17-3-



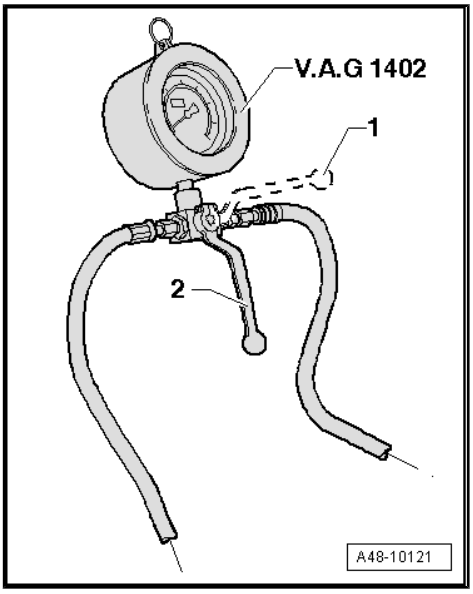
12) If the seal on adapter -V.A.G 1402/18-1- is damaged or leaking, it must be replaced with a new seal ⇒ Item 9 (page 431) ⇒ Electronic parts catalogue .

Note

- *Position angle piece -V.A.G 1402/17-3- on adapter -V.A.G 1402/18-1- so that hose of adapter set -V.A.G 1402/6- does not come into contact with pulley or poly V-belt.*
- *Tighten union nuts on angle pieces -V.A.G 1402/17-3- and on hoses of adapter set -V.A.G 1402/6- hand-tight using an open-end spanner.*

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All vehicles (continued):

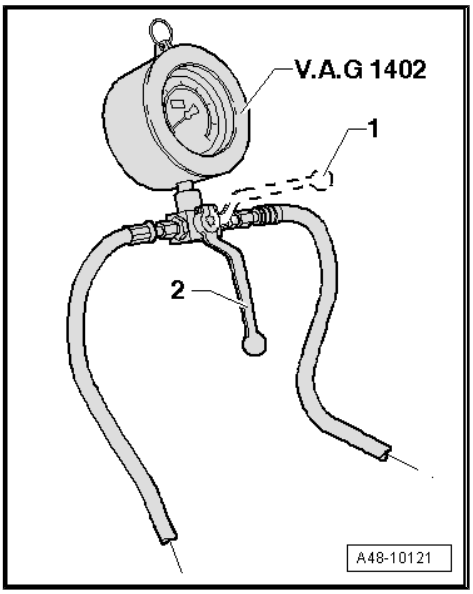


– Make sure lever on pressure gauge is at position -2-.
– Remove hose clamps -3094- .
– Start engine but do not press accelerator.
– Turn steering wheel approx. 10 times from lock to lock.
– Switch off engine and top up hydraulic fluid in reservoir if necessary.

Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.
– Start engine.



– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.

Specification for delivery pressure (vehicles with and without dynamic steering): 110…130 bar

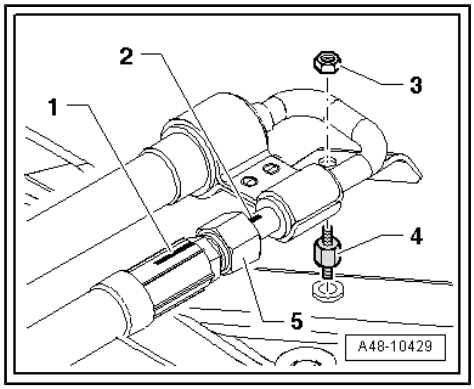
Renew power steering pump if specification is not attained
⇒ „8.5 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)“, page 470 or
⇒ „8.6 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)“, page 478 .

– Switch off engine.
– Remove power steering tester -V.A.G 1402- .

Tightening torques
⇒ „8.1 Exploded view (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)“, page 456

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– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- must be aligned.
– Tighten union nut -1-. Counterhold at hexagon flats.
– Tighten nut -3- and, if necessary, rubber mounting -4-.
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .



8.5 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)

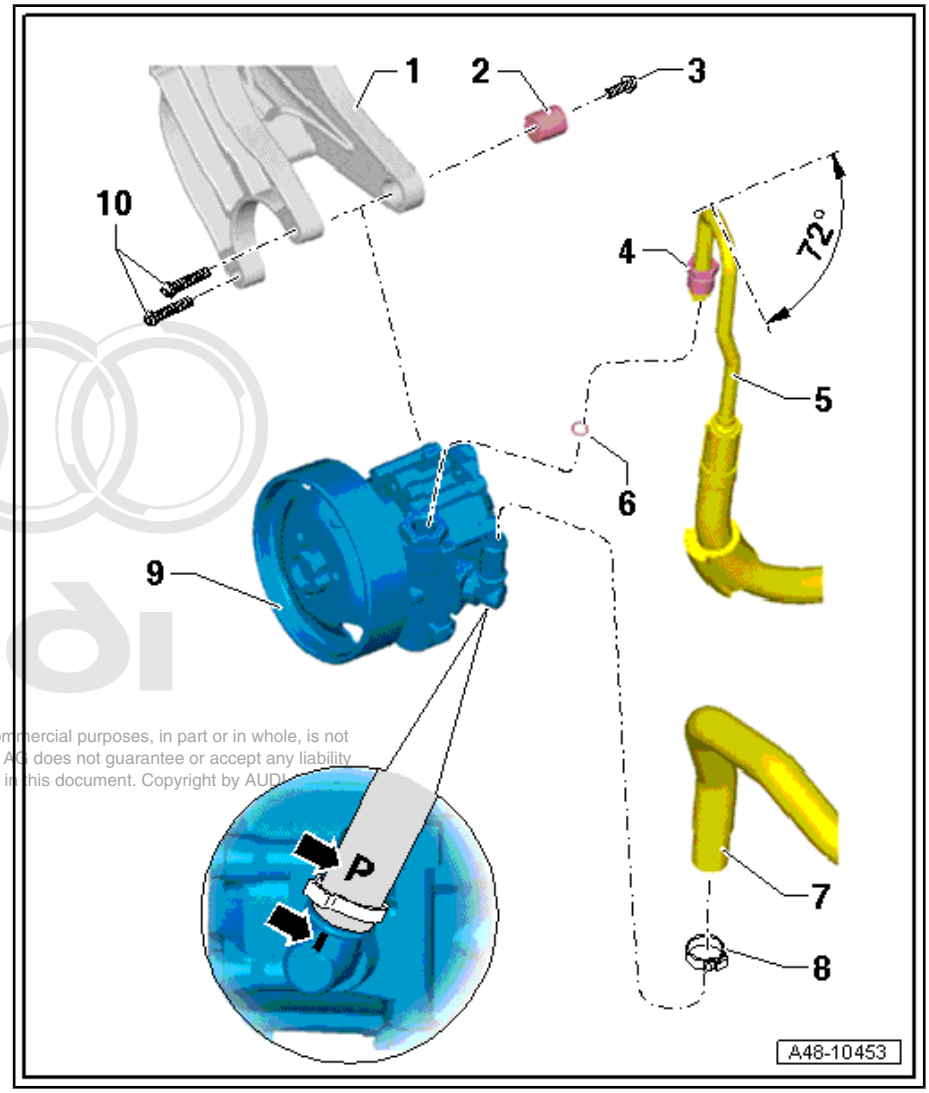
Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles with dynamic steering)
⇒ page 471 .

Exploded view of power steering pump (vehicles with dynamic steering)

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Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Union nut

- ❑ 38 Nm

5 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 72°.

6 - Seal

- ❑ Always renew if removed

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7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

9 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 465
- ❑ Removing and installing ⇒ page 471
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

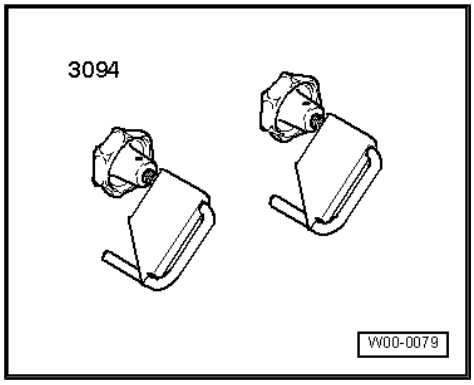
10 - Bolt

- ❑ 25 Nm

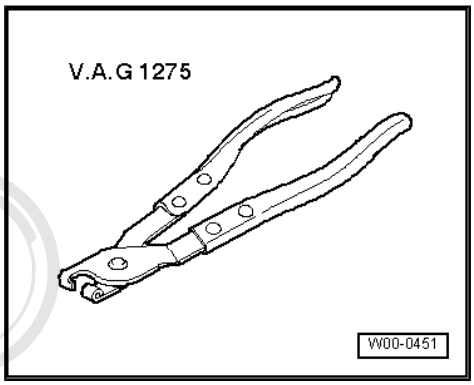
Removing

Special tools and workshop equipment required

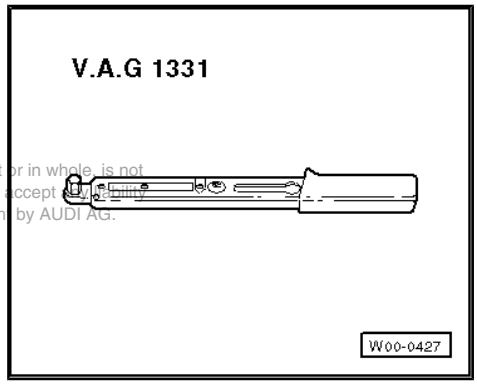
- Hose clamps up to 25 mm ∅ -3094-



- Hose clip pliers -V.A.G 1275-

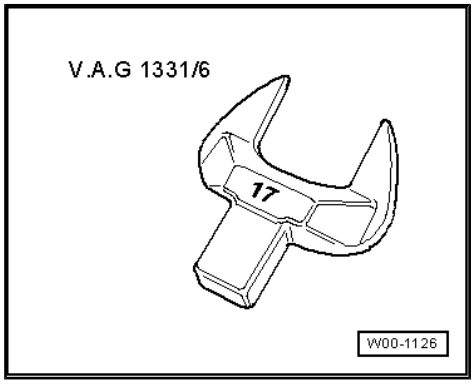


- Torque wrench -V.A.G 1331-

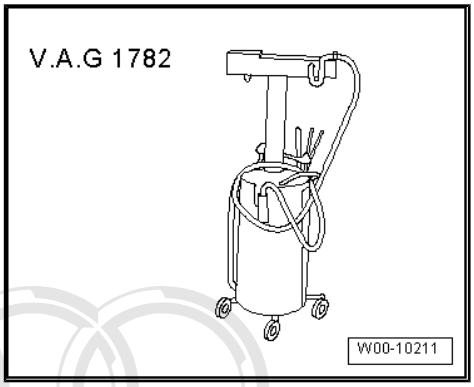


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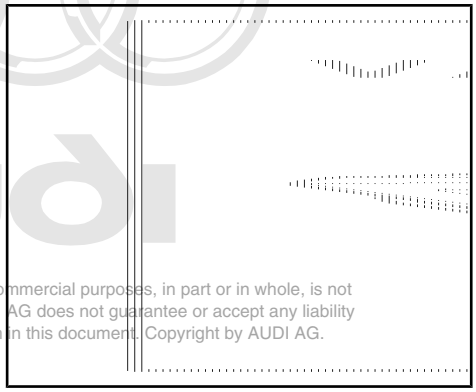
- Tool insert (17 mm) -V.A.G 1331/6-



- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



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- Engine bung set -VAS 6122-

General notes

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel.

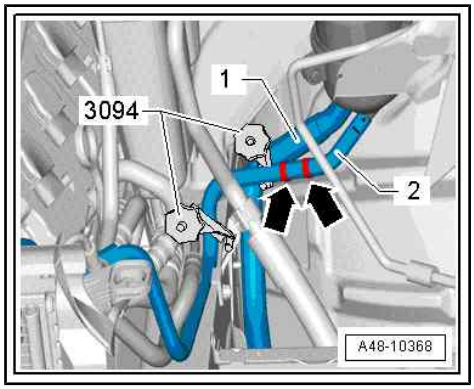
Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Remove poly V-belt only from power steering pump pulley ⇒ Rep. gr. 13 .

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



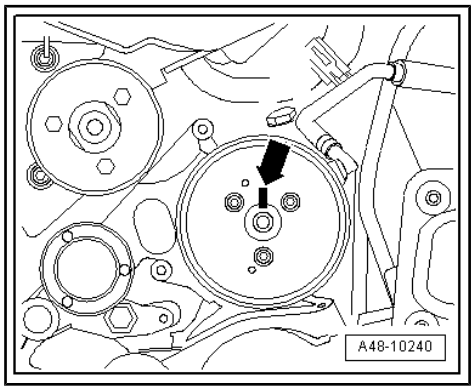
Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

– Remove noise insulation ⇒ Rep. gr. 66 .

– Place drip tray underneath power steering pump.

– Mark position of pulley relative to hub -arrow-.



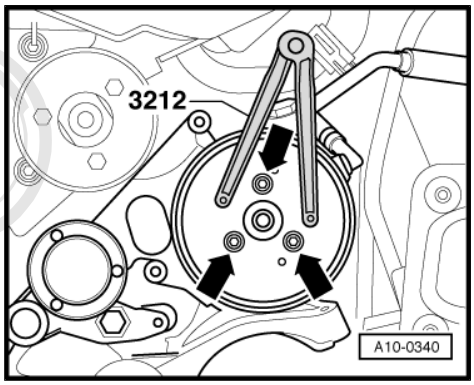
Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

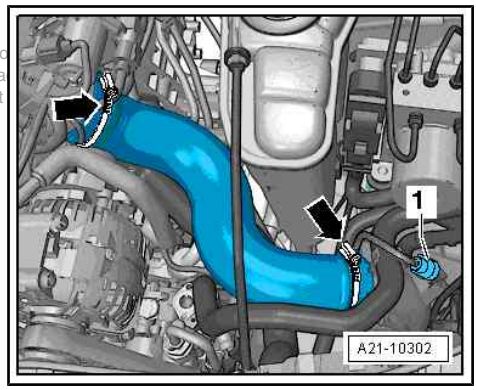
– First slacken (but do not remove) bolts for pulley (only 2 of the 3 bolts are accessible). If necessary, counterhold with pin wrench -3212- .

– Rotate the power steering pump pulley so that the third bolt can be slackened.

– Remove bolts and detach pulley.



– Release hose clips -arrows- and remove air hose.

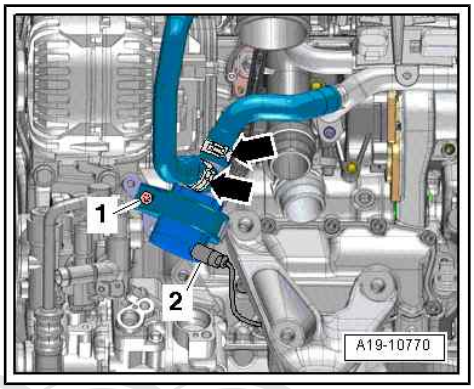


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Vehicles for hot countries

– Unplug electrical connector -2-.

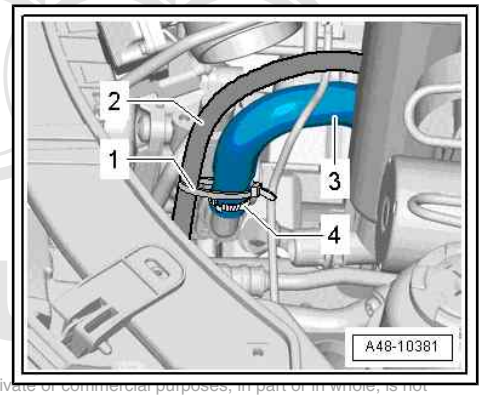
– Remove bolt -1- and move continued coolant circulation pump -V51- to one side.



– If fitted, carefully cut through cable tie -1- for wiring harness -2-.

– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.

– Place several cloths beneath power steering pump and pressure line.

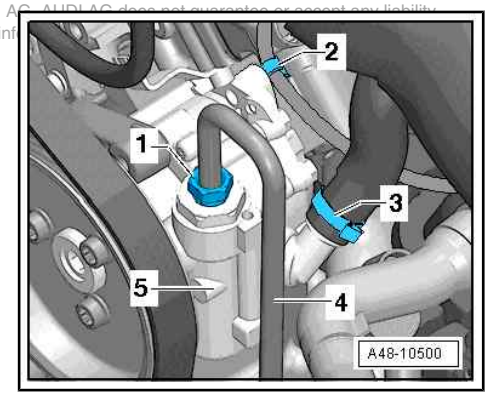


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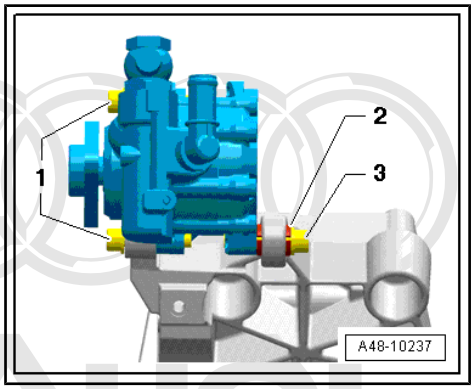
– Unscrew union nut -1- and pull pressure line out of power steering pump.

– Release connector -2- and unplug.

– Seal off connections of power steering pump and lines with clean plugs.



– Remove the two bolts -1- securing the power steering pump from the front.



Note

The illustration shows the power steering pump without the pulley.

– To install power steering pump, drive back sleeve -2- for bolt -3- slightly at bracket.

– Take out power steering pump.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 470

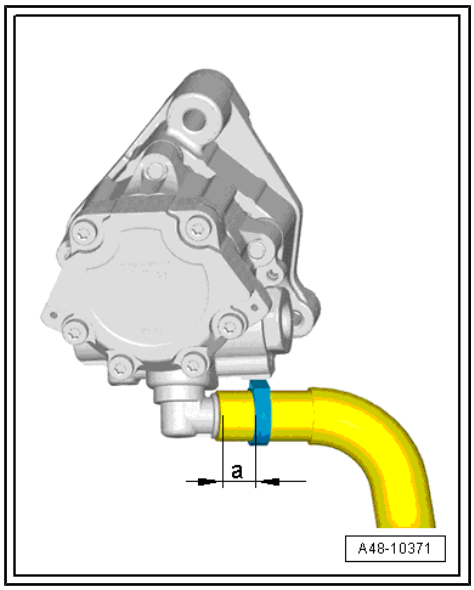
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Note

- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

– Note correct position of suction hose on power steering pump.

– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



– Turn hub by hand until fluid comes out at pump outlet.

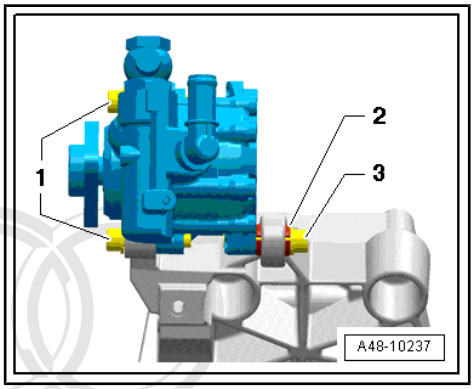
– Fit power steering pump into bracket.

• Sleeve -2- has been driven back slightly.

– First screw in front bolts -1- (3x) loosely.

– Then screw in rear bolt -3- loosely.

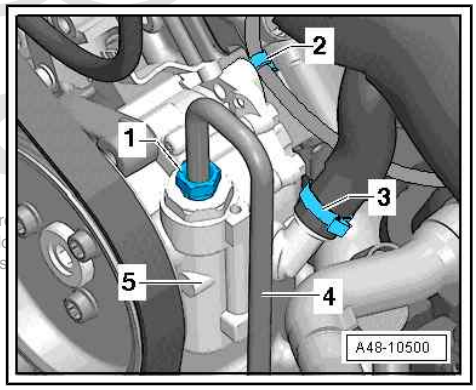
– First tighten bolts -1- and then bolt -2-.



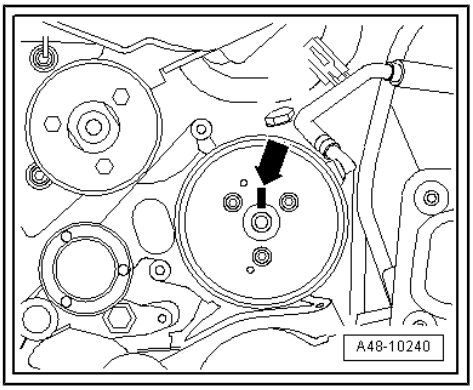
– Press pressure line into power steering pump as far as stop. Then tighten union nut -1-.

– Push suction hose onto connection and attach a new hose clip -3-.

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– Align marking on pulley -arrow- (made previously) with marking on hub.



– Tighten bolts -arrows- for belt pulley.

– Clean off fluid in engine compartment where necessary.

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

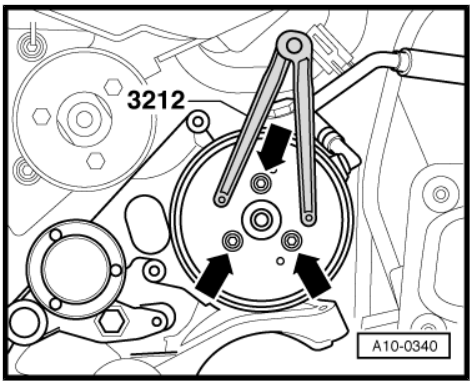
– Check hydraulic fluid level ⇒ page 424 .

– Bleed steering system ⇒ page 425 .

– Check steering system for leaks ⇒ page 426 .

– Fit noise insulation ⇒ Rep. gr. 66 .

– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .

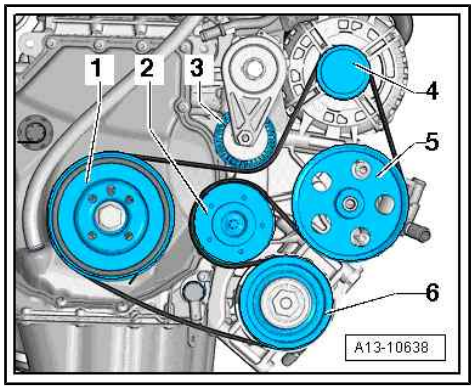


Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Vibration damper
2 - Idler roller
3 - Tensioner for poly V-belt
4 - Alternator
5 - Power steering pump pulley
6 - Air conditioner compressor

– Start engine and check that belt runs properly.



8.6 Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)

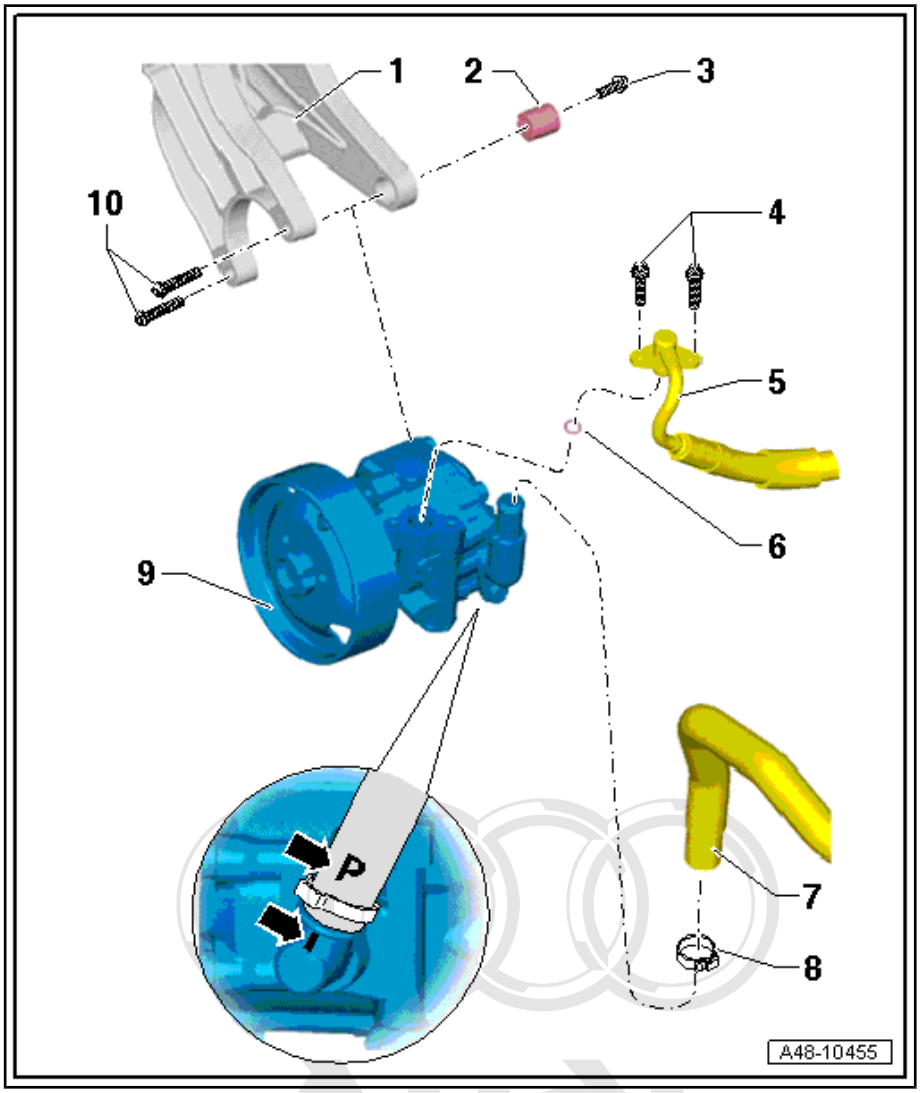
Removing and installing power steering pump (vehicles with 4-cylinder TFSI engine, vehicles without dynamic steering)
⇒ page 479 .

Exploded view of power steering pump (vehicles without dynamic steering)

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*

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1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Bolt

- ❑ 9 Nm

5 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

6 - Seal

- ❑ Always renew if removed

7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

9 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 465
- ❑ Removing and installing ⇒ page 479
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

10 - Bolt

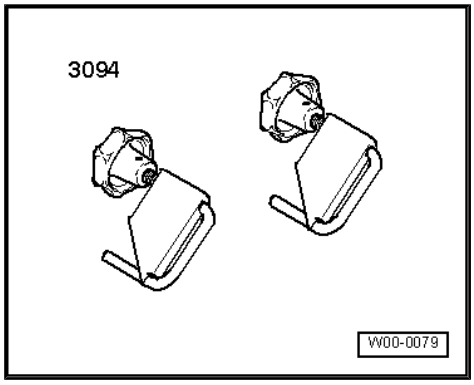
- ❑ 25 Nm

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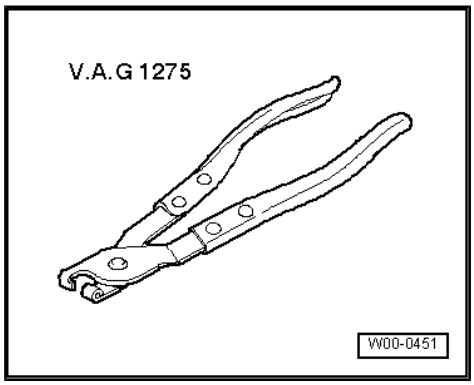
Removing

Special tools and workshop equipment required

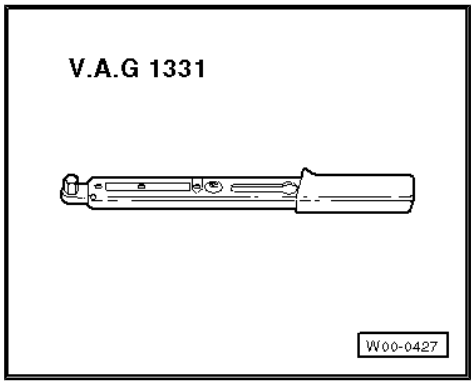
- Hose clamps up to 25 mm ∅ -3094-



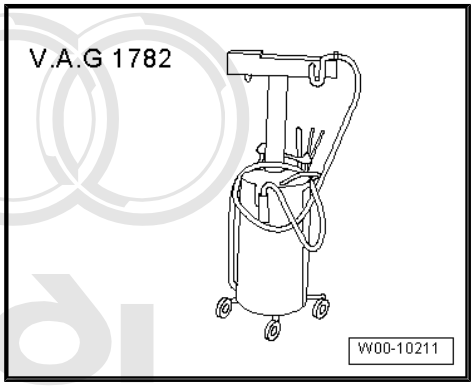
- Hose clip pliers -V.A.G 1275-



- Torque wrench -V.A.G 1331-

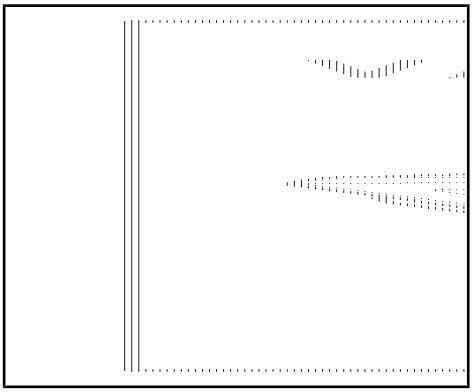


- Used oil collection and extraction unit -V.A.G 1782-



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♦ Drip tray for workshop hoist -VAS 6208-



♦ Engine bung set -VAS 6122-

General notes

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

♦ Check steering system for leaks if fluid level is low in reservoir.

♦ If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.

♦ The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

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– Raise vehicle on lifting platform.

– Lift off engine cover panel.

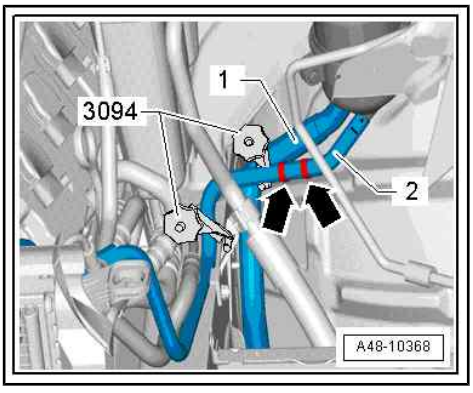
Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Remove poly V-belt only from power steering pump pulley ⇒ Rep. gr. 13 .

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



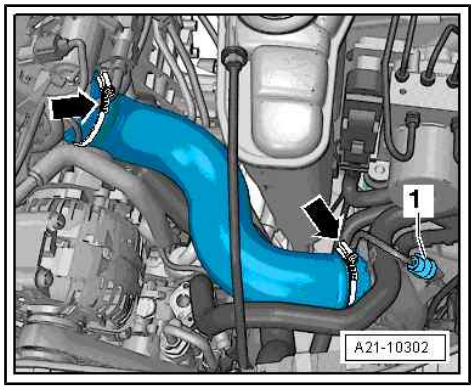
Caution

- ***Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.***
- ***The non-return valve is located in the return hose -2- between the hose clips -arrows-.***

– Remove noise insulation ⇒ Rep. gr. 66 .

– Place drip tray underneath power steering pump.

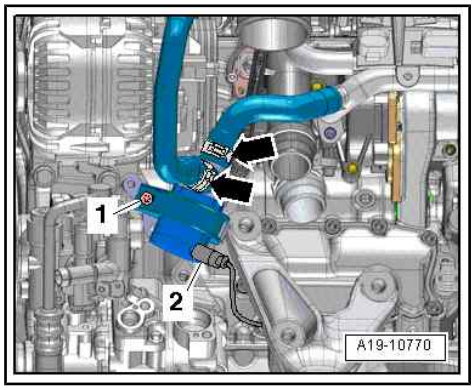
– Release hose clips -arrows- and remove air hose.



Vehicles for hot countries

– Unplug electrical connector -2-.

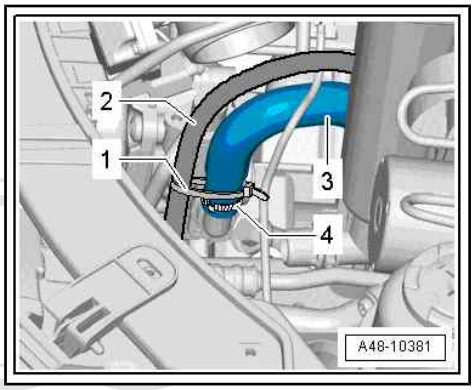
– Remove bolt -1- and move continued coolant circulation pump -V51- to one side.



– If fitted, carefully cut through cable tie -1- for wiring harness -2-.

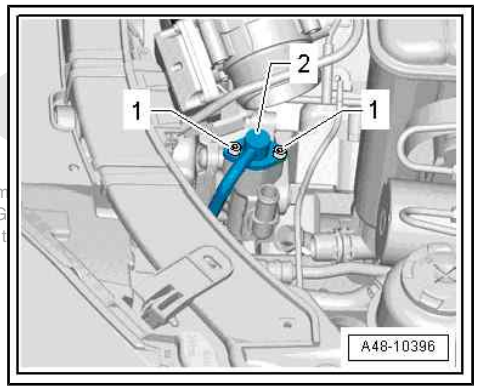
– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.

– Place several cloths beneath power steering pump and pressure line.



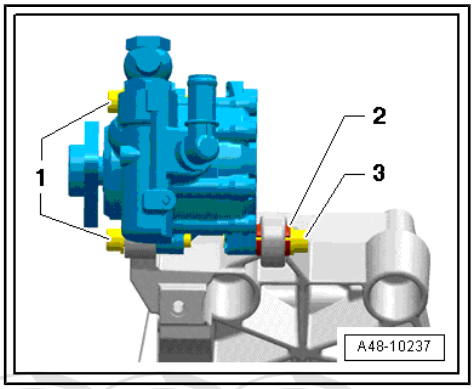
– Remove bolts -1- and pull pressure line -2- out of power steering pump.

– Seal off connections of power steering pump and lines with clean plugs.



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– Remove the two bolts -1- securing the power steering pump through the pulley from the front.



Note

The illustration shows the power steering pump without the pulley.

– To install power steering pump, drive back sleeve -2- for bolt -3- slightly at bracket.

– Take out power steering pump.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 448

Note

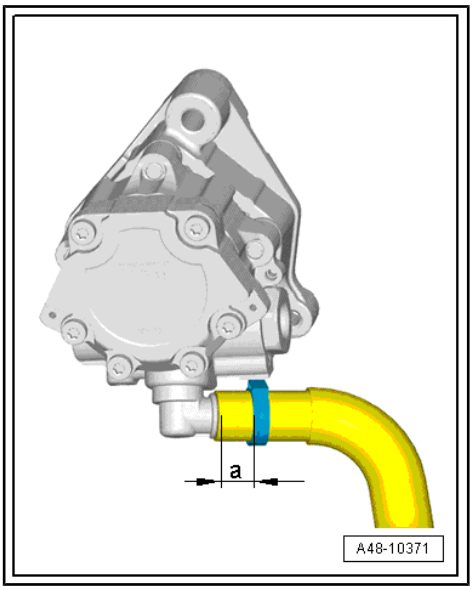
- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

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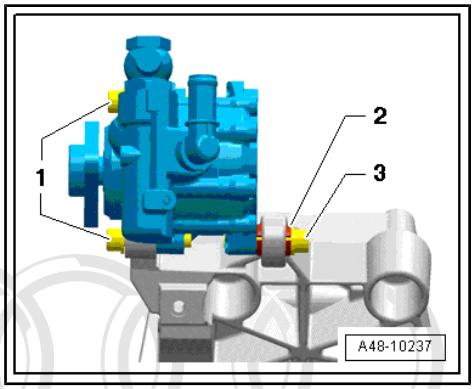
– Note correct position of suction hose on power steering pump.

– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.

– Turn hub by hand until fluid comes out at pump outlet.



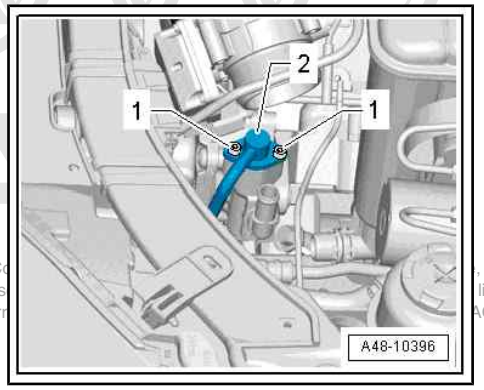
– Fit power steering pump into bracket.
• Sleeve -2- has been driven back slightly.
– First screw in front bolts -1- (3x) loosely.
– Then screw in rear bolt -3- loosely.
– First tighten bolts -1- and then bolt -2-.



– Insert pressure line -2- into power steering pump as far as stop and tighten bolts -1-.
– Clean off fluid in engine compartment where necessary.

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .
– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



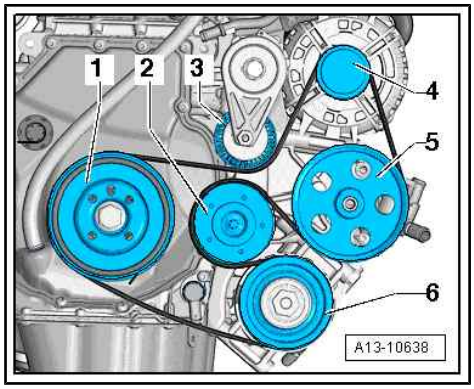
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Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Vibration damper
2 - Idler roller
3 - Tensioner for poly V-belt
4 - Alternator
5 - Power steering pump pulley
6 - Air conditioner compressor

– Start engine and check that belt runs properly.



9 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 6-cylinder diesel engine)

⇒ „9.1 Exploded view (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)“, page 485

⇒ „9.2 Exploded view (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)“, page 488 .

⇒ „9.3 Exploded view of pipes and hoses (vehicles with 6-cylinder diesel engine, vehicles with and without dynamic steering)“, page 491

⇒ „9.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder diesel engine, vehicles with and without dynamic steering)“, page 494 .

⇒ „9.5 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)“, page 499

⇒ „9.6 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)“, page 509 .

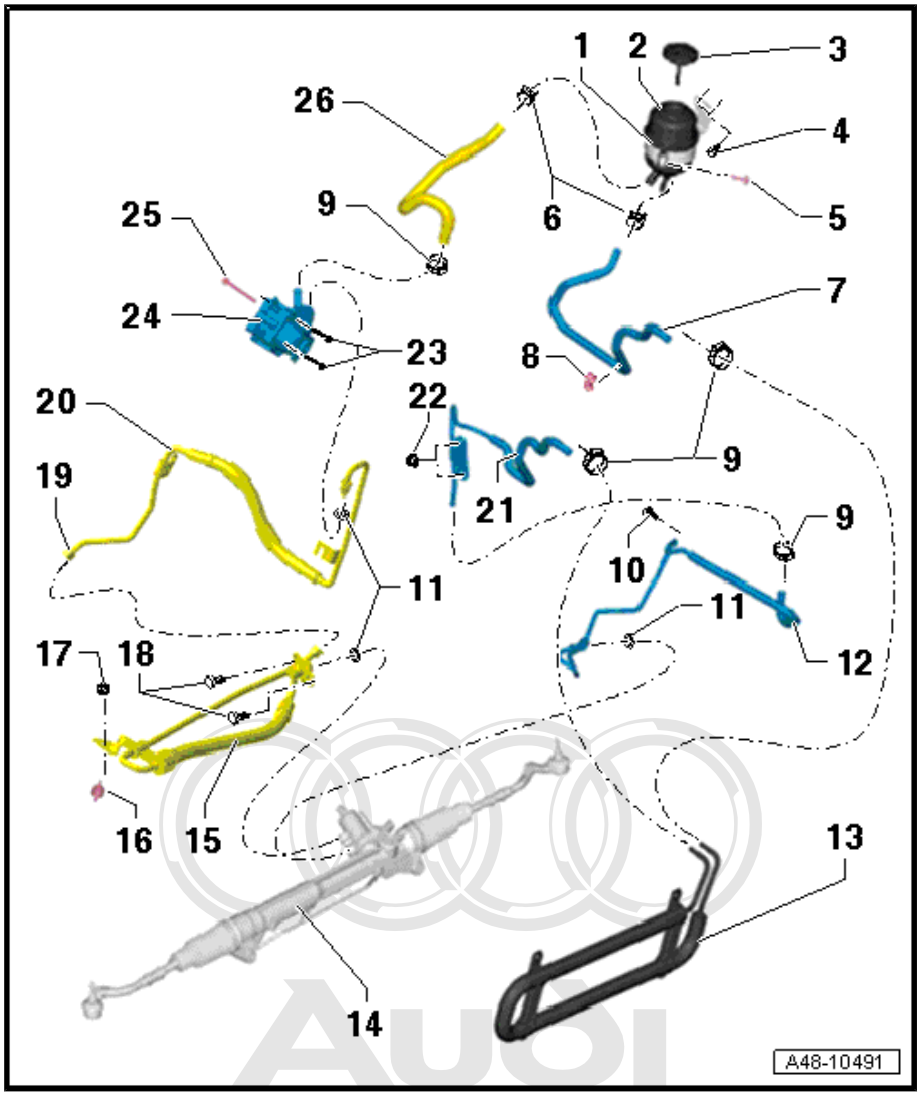
9.1 Exploded view (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap
- ❑ Securing to body ⇒ page 491

2 - Reservoir
- ❑ Note correct installation position ⇒ page 491
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick
- ❑ Checking fluid level ⇒ page 424

4 - Bolt
- ❑ 9 Nm

5 - Bolt
- ❑ 9 Nm

6 - Spring-type clip
- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Return hose
- ❑ From hydraulic fluid cooler to reservoir
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

8 - Clip

9 - Hose clip
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

10 - Bolt
- ❑ 9 Nm

11 - Seal
- ❑ Always renew if removed

12 - Return line
- ❑ From power steering box to hydraulic fluid cooler

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Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 491
- ❑ Installation position at line connection ⇒ page 623

13 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 491
- ❑ Removing and installing ⇒ page 618

14 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

15 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

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- ❑ Securing to cross brace ⇒ page 491
- ❑ Installation position of line connection ⇒ page 491

16 - Rubber mounting

- ❑ 6 Nm

17 - Nut

- ❑ 6 Nm

18 - Bolt

- ❑ 20 Nm

19 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 491

20 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Securing to subframe ⇒ page 491
- ❑ Attachment to A/C compressor ⇒ page 491
- ❑ Installation position of line connection ⇒ page 491

21 - Return line

- ❑ From power steering box to hydraulic fluid cooler

Caution

Fully insert return line when installing.

- ❑ Securing to longitudinal member ⇒ page 491
- ❑ Securing to subframe ⇒ page 491

- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623
- ❑ Installation position at line connection ⇒ page 623

22 - Nut

- ❑ 9 Nm

23 - Bolt

- ❑ 25 Nm

24 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 494
- ❑ Removing and installing ⇒ page 499

25 - Bolt

- ❑ 25 Nm

26 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 499

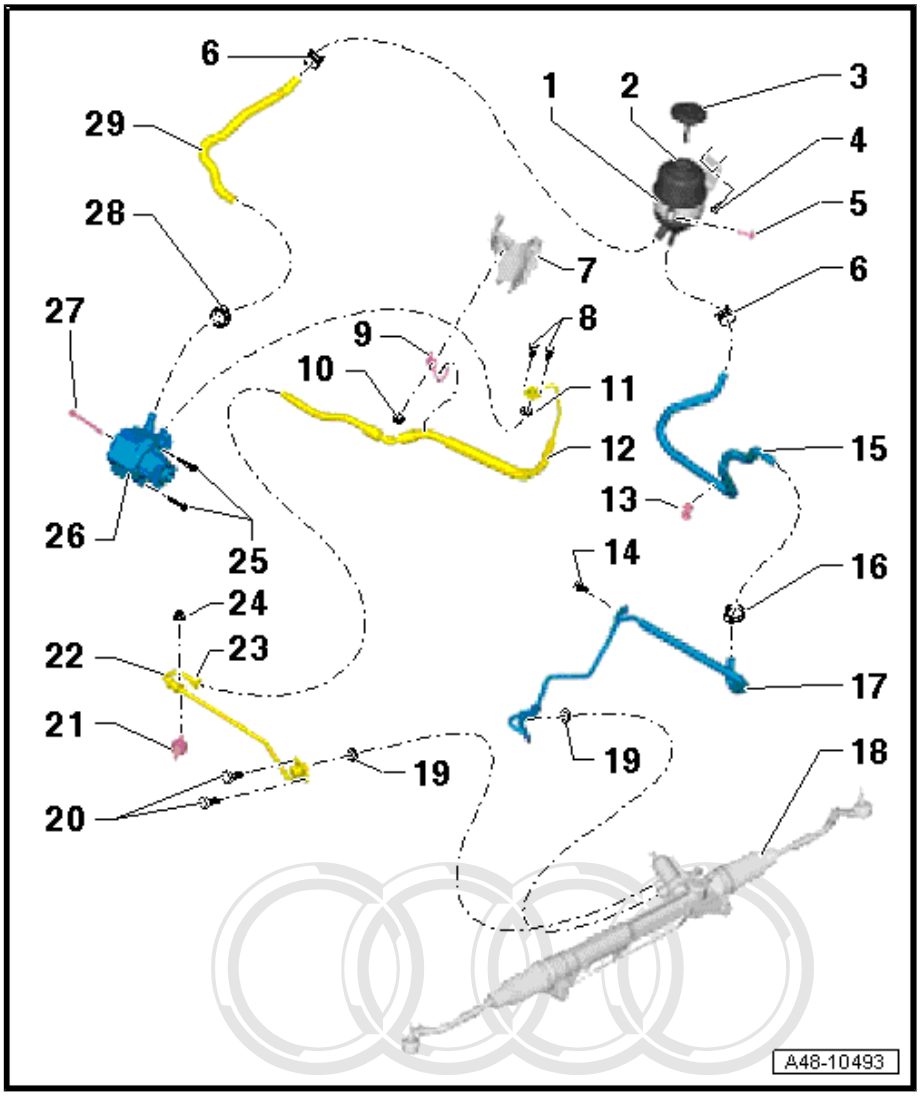
9.2 Exploded view (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap
- ❑ Securing to body ⇒ page 491

2 - Reservoir
- ❑ Note correct installation position ⇒ page 491
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick
- ❑ Checking fluid level ⇒ page 424

4 - Bolt
- ❑ 9 Nm

5 - Bolt
- ❑ 9 Nm

6 - Spring-type clip
- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Connector
- ❑ For engine mounting

8 - Bolt
- ❑ 9 Nm

9 - Retainer

10 - Nut
- ❑ 9 Nm

11 - Seal
- ❑ Always renew if removed

12 - Pressure line
- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 491
- ❑ Installation position of line connection ⇒ page 491

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13 - Clip

14 - Bolt

- ❑ 9 Nm

15 - Return hose

- ❑ From hydraulic fluid cooler to reservoir
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

16 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

17 - Return line

- ❑ From power steering box to reservoir

Caution
Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 491

18 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

19 - Seal

- ❑ Always renew if removed

20 - Bolt

- ❑ 20 Nm

21 - Rubber mounting

- ❑ 9 Nm

22 - Pressure line

- ❑ From power steering pump to power steering box; different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue
- ❑ Securing to cross brace ⇒ page 491
- ❑ Installation position of line connection ⇒ page 491

Caution
Fully insert pressure line when installing.

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23 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 491
- ❑ Union nut not fitted on pressure line without connecting point

24 - Nut

- ❑ 6 Nm

25 - Bolt

- ❑ 25 Nm

26 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing

- ❑ Checking delivery pressure ⇒ page 494
- ❑ Removing and installing ⇒ page 509

27 - Bolt

- ❑ 25 Nm

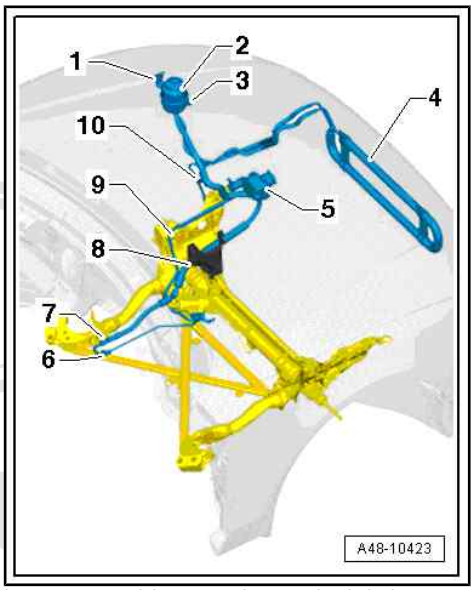
28 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

29 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 509

9.3 Exploded view of pipes and hoses (vehicles with 6-cylinder diesel engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 491

2 - Reservoir in bracket ⇒ page 492

3 - Bolt in bracket ⇒ page 491

4 - Hydraulic fluid cooler to condenser ⇒ page 492

5 - Power steering pump to bracket
⇒ „9.5 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)“, page 499 or
⇒ „9.6 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)“, page 509

6 - Pressure line to cross brace ⇒ page 493

7 - Installation position of pressure line connection
⇒ page 493

8 - Pressure line to engine mounting ⇒ page 493

9 - Return line to subframe ⇒ page 493

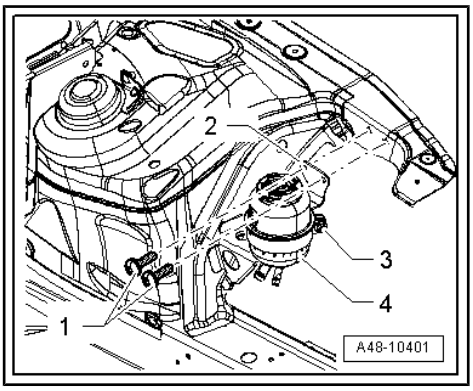
10 - Retainers securing return lines to subframe ⇒ page 493 and longitudinal member ⇒ page 492

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Bracket for reservoir to body

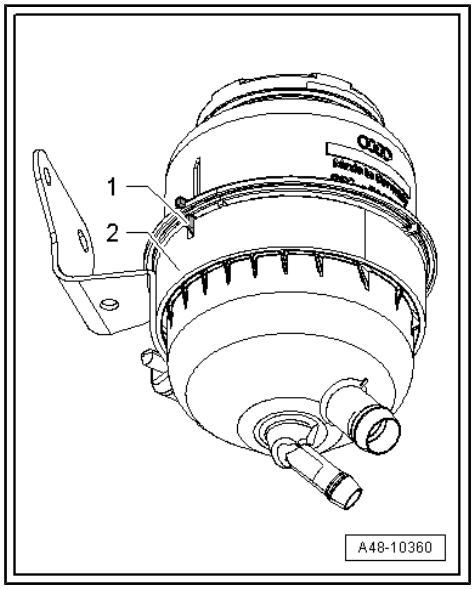
– Secure bracket -2- to body with bolts -1-.

– Secure reservoir -4- in bracket -2- with bolt -3-.



Reservoir in bracket

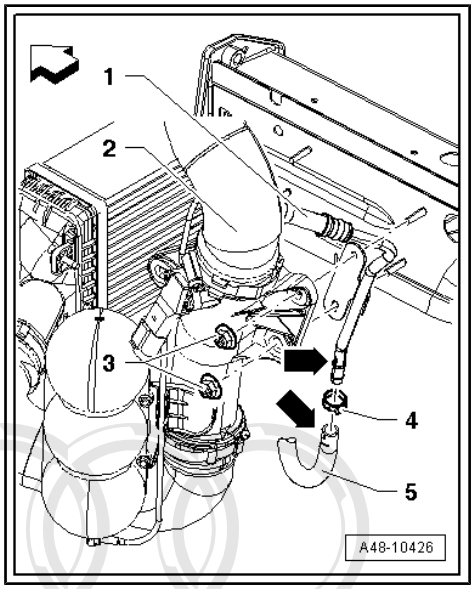
– Fit reservoir (insert lug -1- into recess in bracket -2-).



Retainers securing lines to longitudinal member

– Secure return line -1- with pressure pipe -2- and nuts -3- to longitudinal member (left-side).

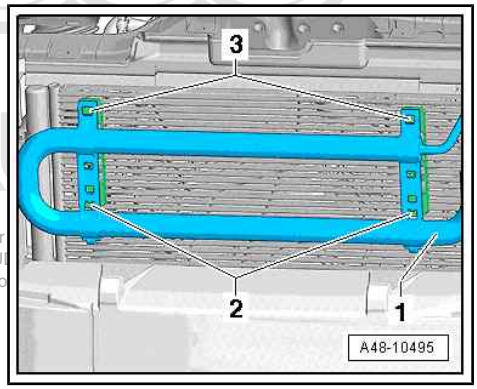
– Secure return hose -5- to return line -1- with hose clip -4-. Note correct position -arrows- ⇒ page 623 .



Hydraulic fluid cooler to condenser

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

Hoses to hydraulic fluid cooler ⇒ page 623

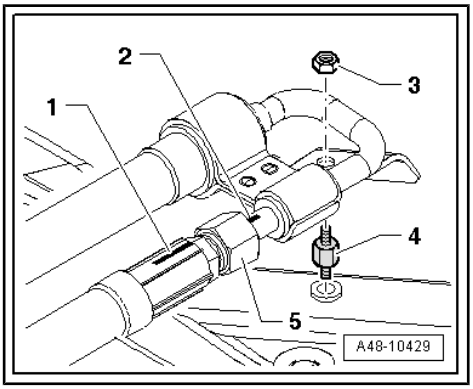


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Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

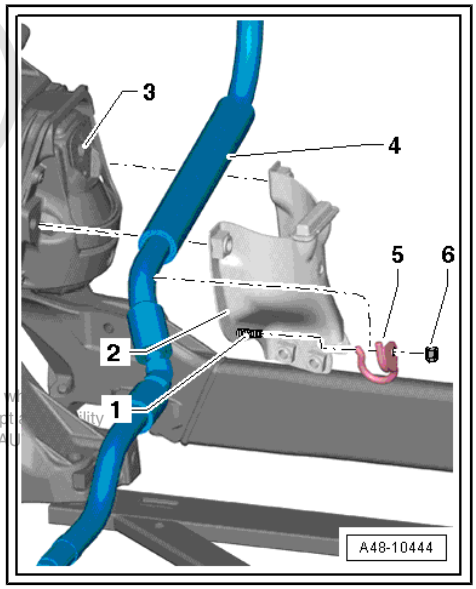
– Note correct position of line when connecting. Markings -1- and -2- must be aligned.



Pressure line to engine mounting

– Route pressure line -4- between connecting element -2- and engine mounting -3-.

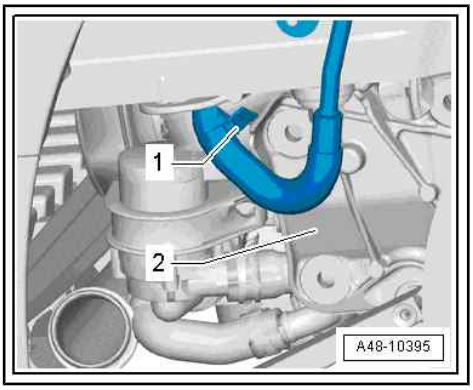
– Screw retainer -5- to stud -1- with nut -6-.



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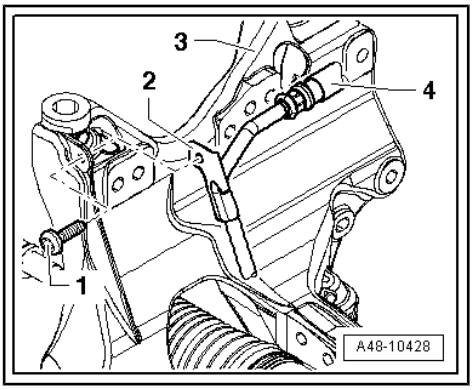
Retainer for securing return line to subframe

– Secure retainer -1- of return line to front left of subframe -2-.



Pressure line and return line to subframe

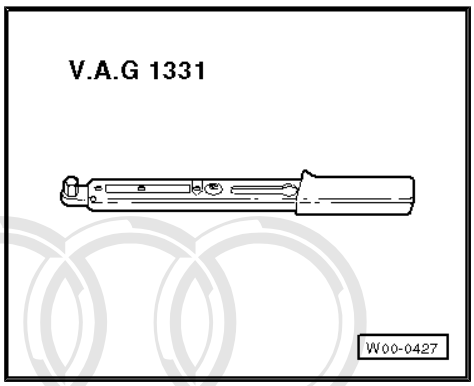
– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.



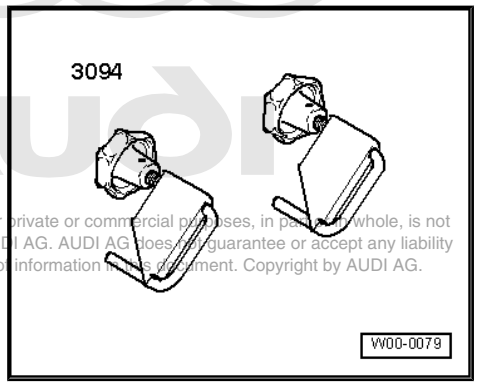
9.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder diesel engine, vehicles with and without dynamic steering)

Special tools and workshop equipment required

- Torque wrench -V.A.G 1331-

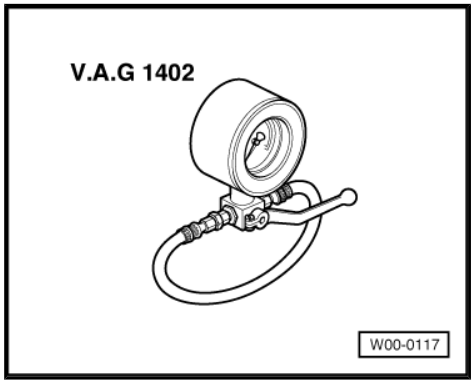


- Hose clamps up to 25 mm ∅ -3094-

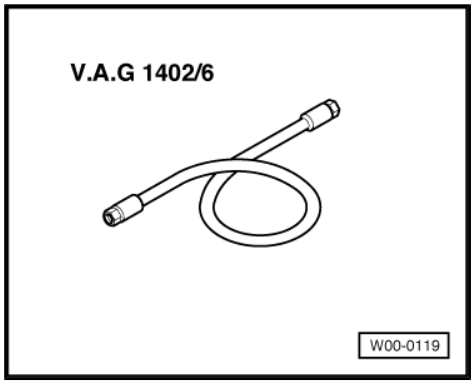


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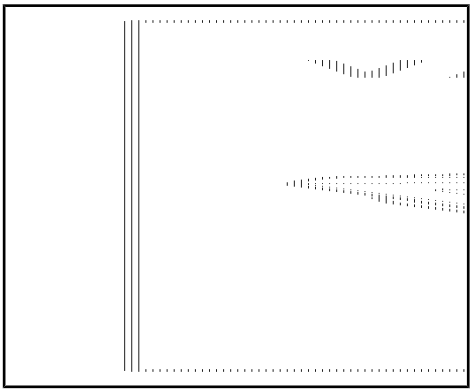
- Power steering tester -V.A.G 1402-



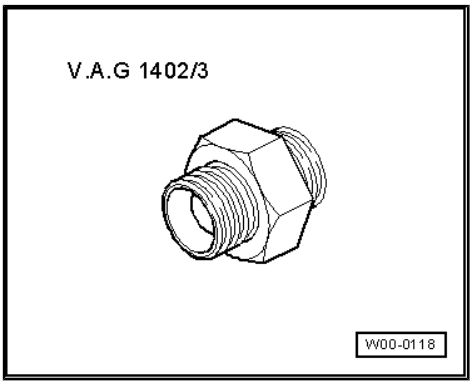
- Adapter set -V.A.G 1402/6-



♦ Drip tray for workshop hoist -VAS 6208-



♦ Adapter -V.A.G 1402/3- is required for vehicles with connecting point in pressure line ⇒ Item 22 (page 490)



♦ Adapter set -V.A.G 1402/17- is required for vehicles without connecting point in pressure line ⇒ Item 22 (page 490)

Test requirements:

- V-belt and V-belt tension OK.
- No leaks in system
- Hoses and pipes not kinked or constricted

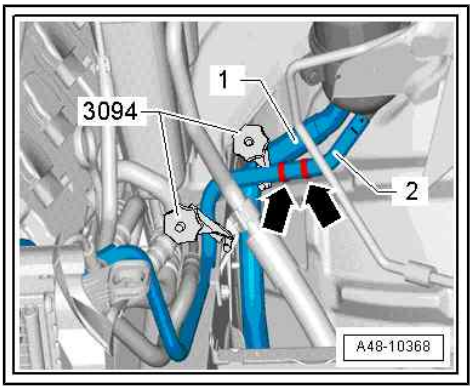
Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

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Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

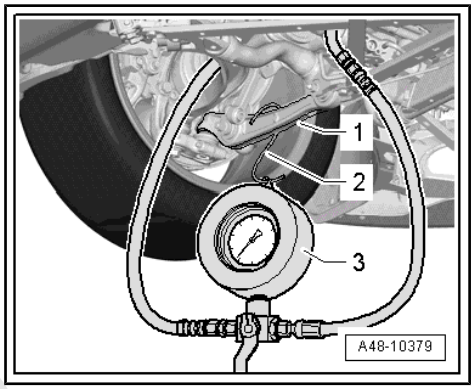


Vehicles with connecting point in pressure line
⇒ Item 22 (page 490)

– Remove noise insulation ⇒ Rep. gr. 66 .

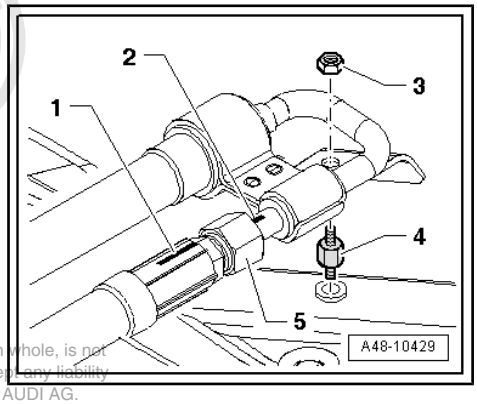
– Attach tester -3- by a hook -2- to track control link -1-.

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.



– Slacken union nut -5-. Counterhold at hexagon flats.

– Remove nut -3-.



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– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

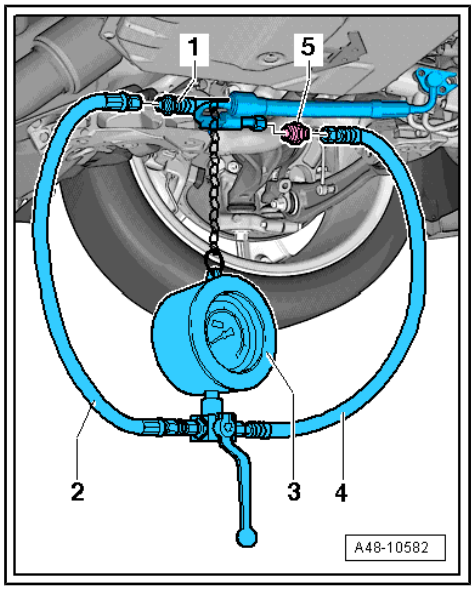
2 - Hose from adapter set -V.A.G 1402/6-

3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

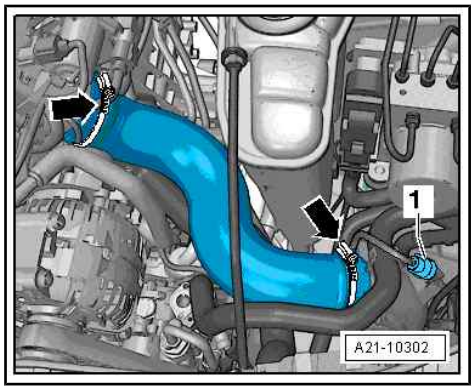
5 - Adapter -V.A.G 1402/3-

– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.

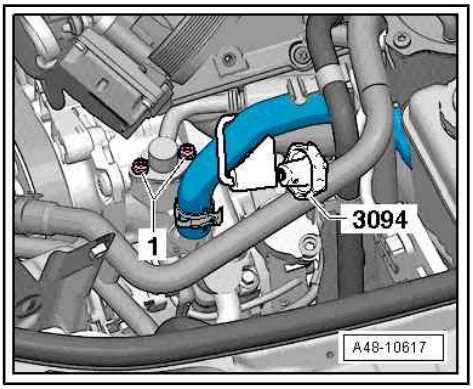


Vehicles without connecting point ⇒ Item 22 (page 490)

– Release hose clips -arrows- and remove air hose.

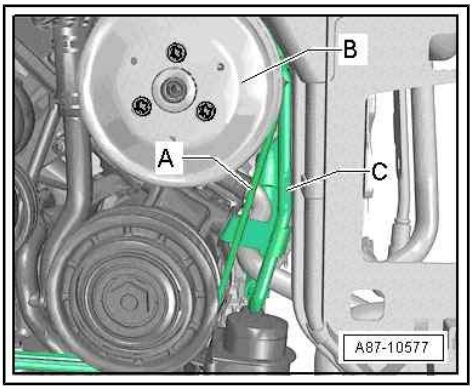


– Remove bolts -1- and pull pressure line out of power steering pump.



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– If pressure line -C- is also secured to A/C compressor by bracket, remove bolt (top) securing A/C compressor (front).



– Connect power steering tester -V.A.G 1402- as shown.

1 - Power steering pump

2 - Adapter -V.A.G 1402/17-1- [13] with angle piece -V.A.G 1402/17-3-

3 - Bolt for securing pressure line ⇒ Item 8 (page 489)

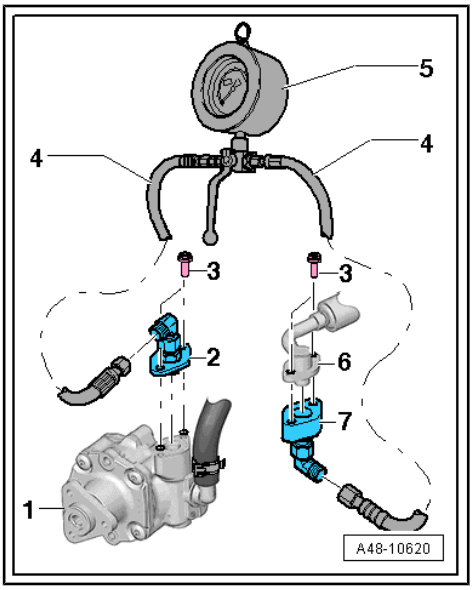
4 - Hose from adapter set -V.A.G 1402/6-

5 - Power steering tester -V.A.G 1402-

6 - Pressure line

7 - Adapter -V.A.G 1402/17-2- with angle piece -V.A.G 1402/17-3-

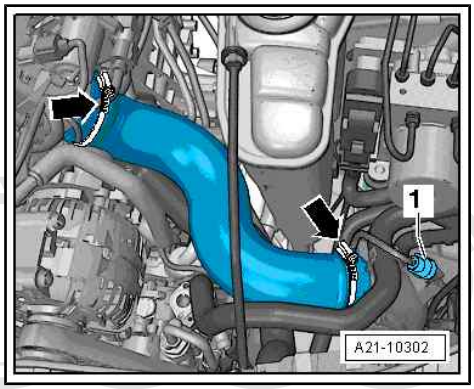
13) If the seal on adapter -V.A.G 1402/17-1- is damaged or leaking, it must be replaced with a new seal ⇒ Item 11 (page 489) ⇒ Electronic parts catalogue .



Note

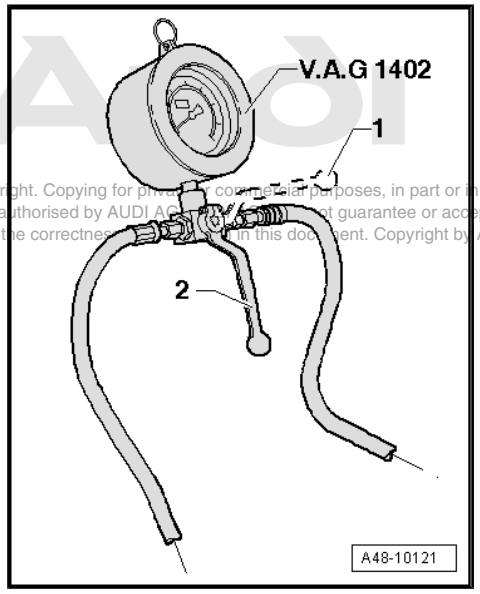
- *Position angle piece -V.A.G 1402/17-3- on adapter -V.A.G 1402/17-1- so that hose of adapter set -V.A.G 1402/6- does not come into contact with pulley or poly V-belt.*
- *Tighten union nuts on angle pieces -V.A.G 1402/17-3- and on hoses of adapter set -V.A.G 1402/6- hand-tight using an open-end spanner.*

– Install air intake hose -arrows-.



All vehicles (continued):

– Make sure lever on pressure gauge is at position -2-.
– Remove hose clamps -3094- .
– Start engine but do not press accelerator.
– Turn steering wheel approx. 10 times from lock to lock.
– Switch off engine and top up hydraulic fluid in reservoir if necessary.



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Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.
– Start engine.

– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.

Specification for delivery pressure (vehicles without dynamic steering): 115…132 bar

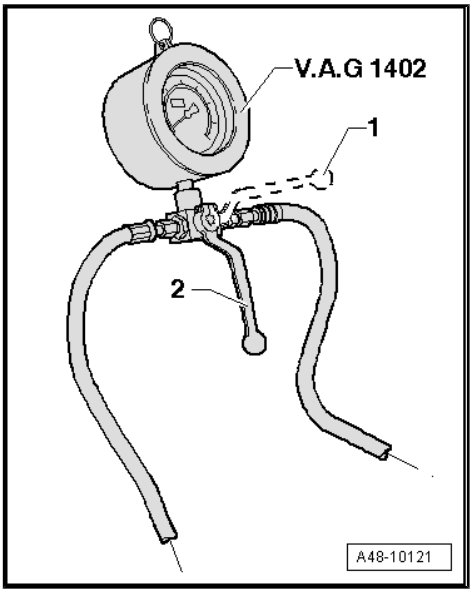
Specification for delivery pressure (vehicles with dynamic steering): 117…131 bar

Renew power steering pump if specification is not attained
⇒ „9.5 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)“, page 499 or
⇒ „9.6 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)“, page 509 .

– Switch off engine.

– Remove power steering tester -V.A.G 1402- .

Tightening torques ⇒ page 488



– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- must be aligned.

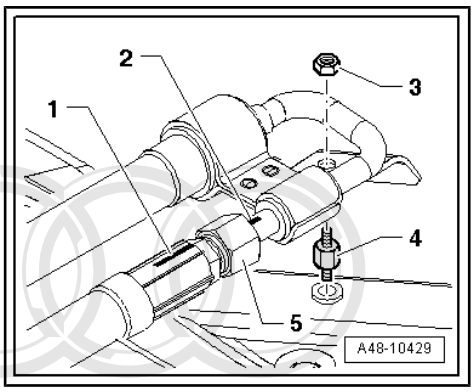
– Tighten union nut -1-. Counterhold at hexagon flats.

– Tighten nut -3- and, if necessary, rubber mounting -4-.

– Bleed steering system ⇒ page 425 .

– Check hydraulic fluid level ⇒ page 424 .

– Check all opened lines for leaks ⇒ page 426 .



9.5 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles with dynamic steering)

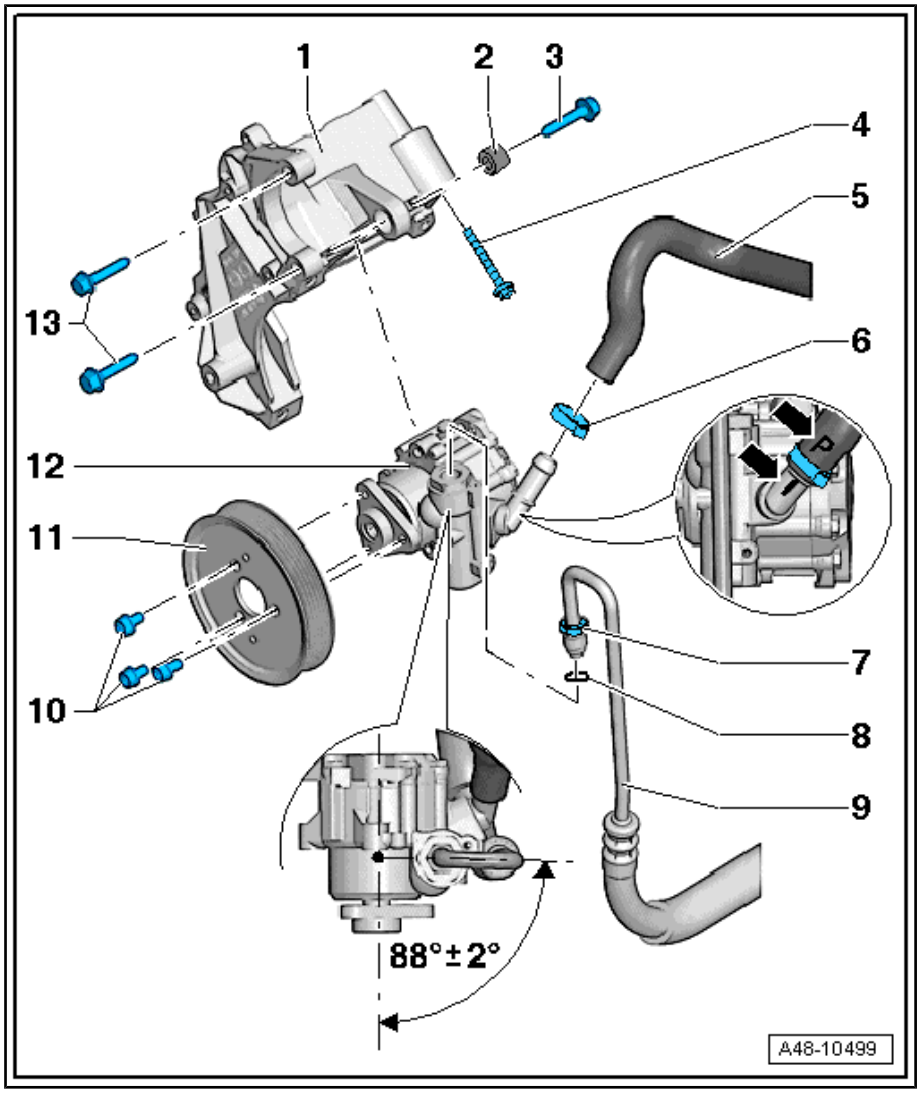
Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)
⇒ page 501 .

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Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Bolt

- ❑ Tightening torque ⇒ Rep. gr. 13

5 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

6 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

7 - Union nut

- ❑ 38 Nm

8 - Seal

- ❑ Always renew if removed

9 - Pressure line

Caution

Fully insert pressure line when installing.

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 88°.
- ❑ Also secured to A/C compressor, depending on version

10 - Bolt

- ❑ 25 Nm

11 - Belt pulley

- ❑ Different versions with and without holes for counterholding with pin wrench -3212-
- ❑ Use pin wrench -3212- or counterhold tool -T10172- with adapter -T10172/5- to counterhold, depending on version

12 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 494
- ❑ Removing and installing ⇒ page 501
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

13 - Bolt

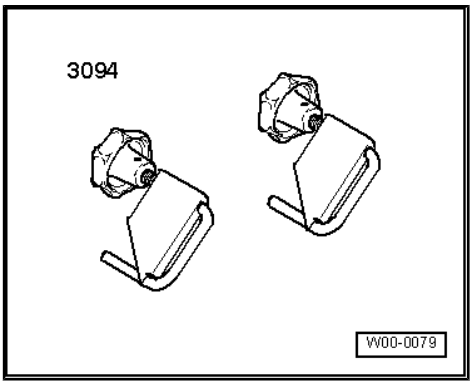
- ❑ 25 Nm

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Removing

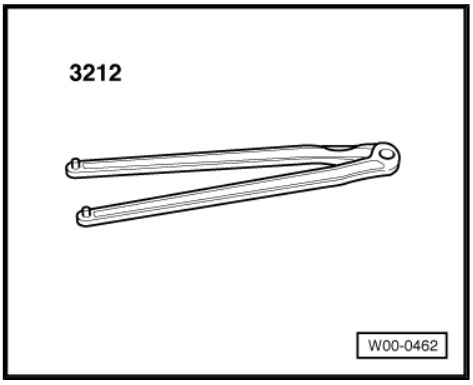
Special tools and workshop equipment required

- Hose clamps up to 25 mm ∅ -3094-

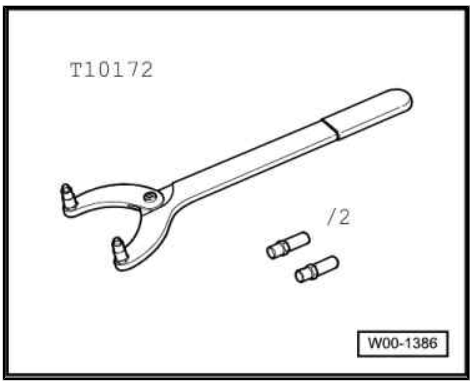


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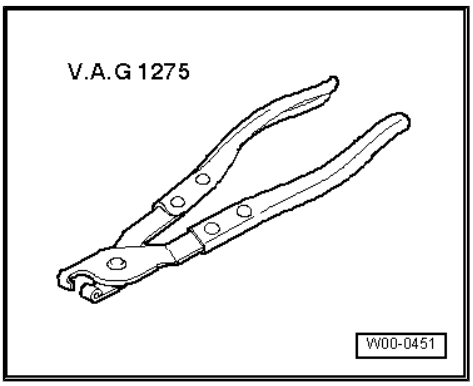
- Pin wrench -3212-



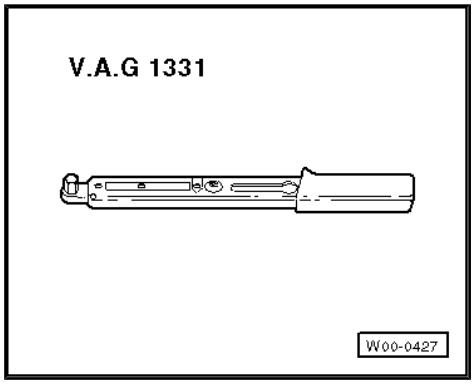
- or counterhold tool -T10172- with adapter -T10172/5-



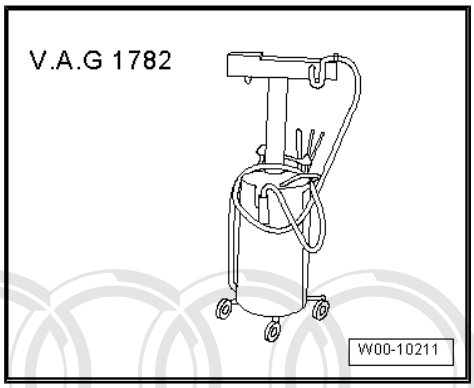
- Hose clip pliers -V.A.G 1275-



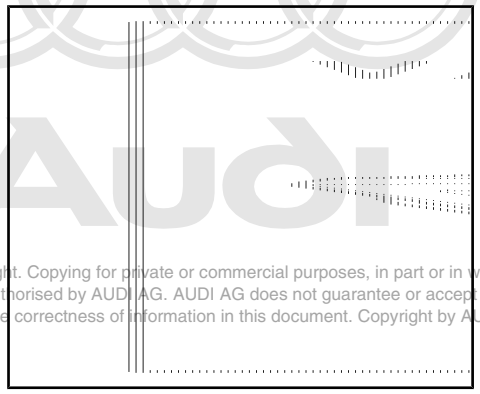
- Torque wrench -V.A.G 1331-



- Used oil collection and extraction unit -V.A.G 1782-

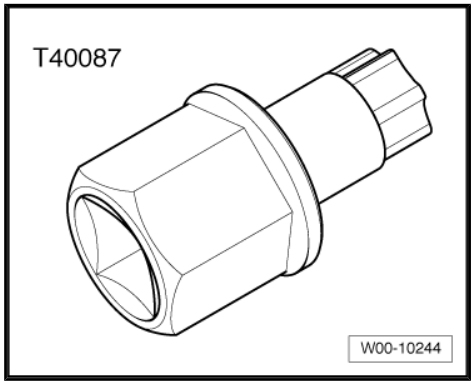


- Drip tray for workshop hoist -VAS 6208-



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- Torx T 60 socket -T40087-



- Engine bung set -VAS 6122-

General notes

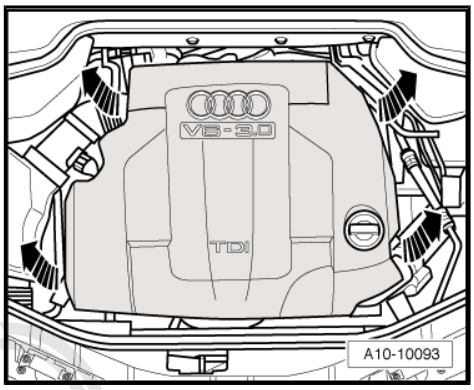
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- ♦ Check steering system for leaks if fluid level is low in reservoir.
- ♦ If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- ♦ The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

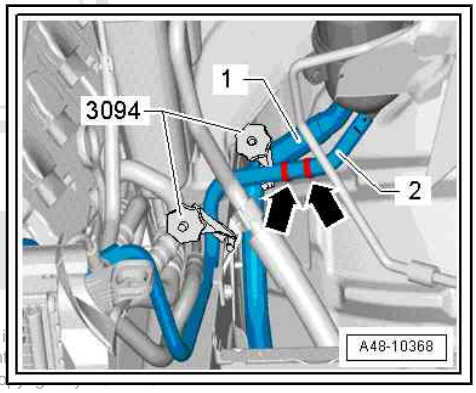
– Raise vehicle on lifting platform.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Carefully pull engine cover panel off 4 mounting studs (one at a time) -arrows-.



– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

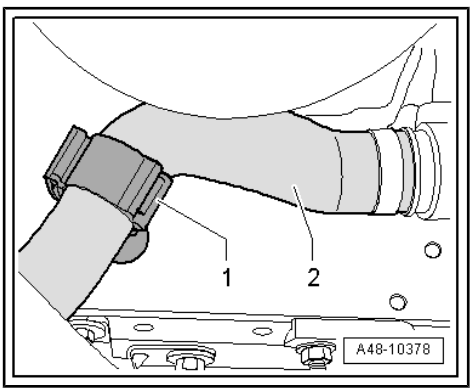
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

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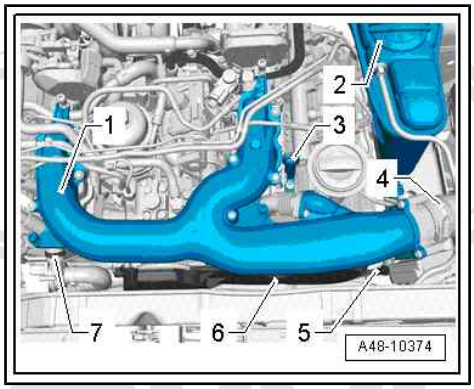
– Remove noise insulation ⇒ Rep. gr. 66 .

– Drain coolant ⇒ Rep. gr. 19 .

– Unfasten clamp -1- on longitudinal member (left-side) and take out coolant hose -2-.



– Remove intake manifold (top section) -1-. To do so, detach air hose -4-, remove fastening ring -3-, detach hose clip -7- and take off coolant hose.
– Remove expansion tank -2-, pull out oil dipstick -5- and remove toothed belt cover -6-.

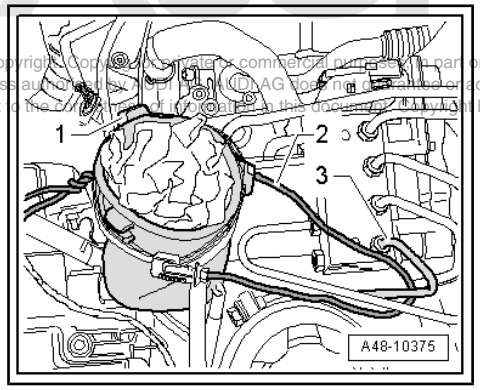


– Tie up air hose -1- to brake line -3- with a wire -2-.

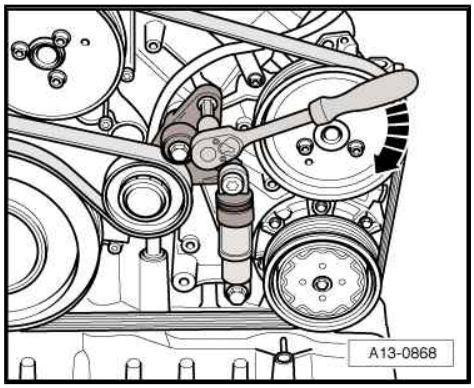
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Note

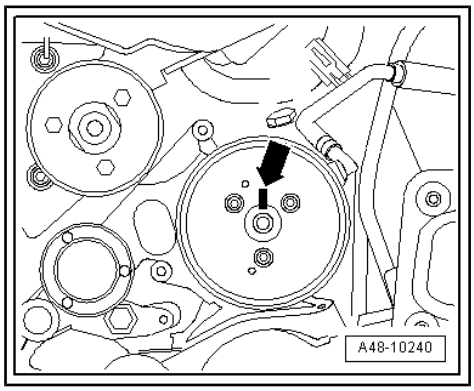
Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.



– Swivel tensioner in direction of -arrow- to slacken poly V-belt. Use Torx T 60 socket -T40087- .
– Remove poly V-belt only from power steering pump pulley.



– Mark position of pulley relative to hub -arrow-.



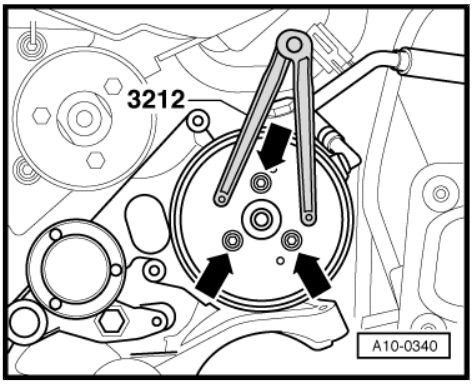
Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

Applies to pulley with holes for counterholding:

– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.

– Take off power steering pump pulley.

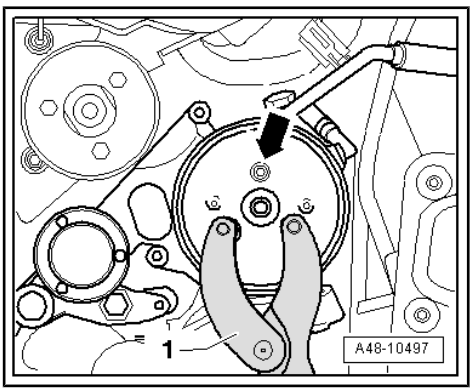


Applies to pulley without holes for counterholding:

– First slacken (but do not remove) bolts -arrow- for pulley. If necessary, use counterhold tool -T10172- with adapter -T10172/5- -1-.

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– Now remove slackened bolts and detach pulley from power steering pump.



Applies to all versions:

– Place drip tray underneath power steering pump.

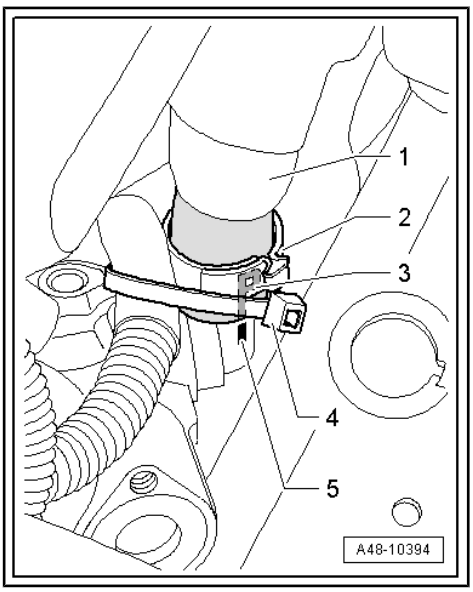
– Cut through cable tie -4-.

Note

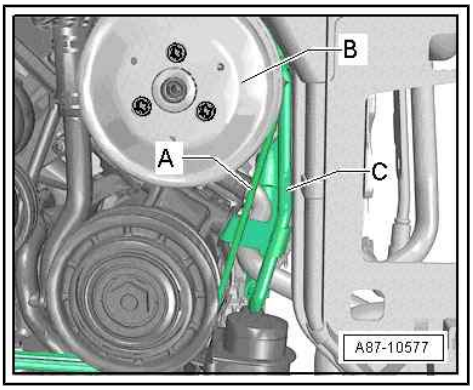
The power steering pump has been removed in the illustration.

– Remove hose clip -2- and pull off suction hose -1-.

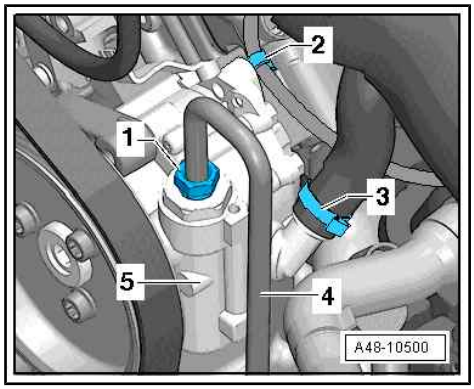
– Place several cloths beneath power steering pump and pressure line.



– If pressure line -C- is also secured to A/C compressor by bracket, remove bolt (top) securing A/C compressor (front).



– Unscrew union nut -1- and pull pressure line out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.



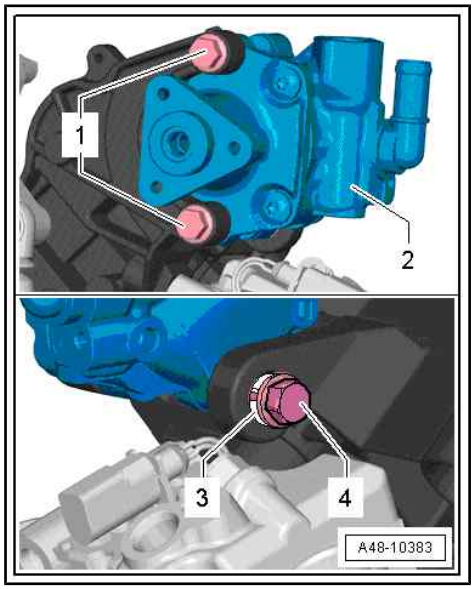
– Remove bolts -1- and -4- and detach power steering pump -2-.
– To install power steering pump -2- drive back sleeve -3- for bolt -4- slightly at bracket.

Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

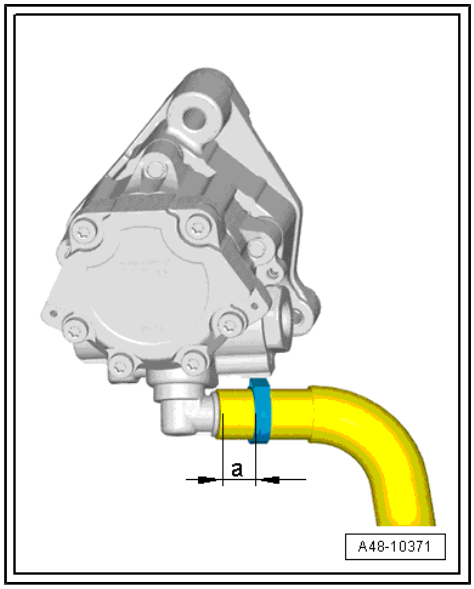
- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*



Tightening torques ⇒ page 499

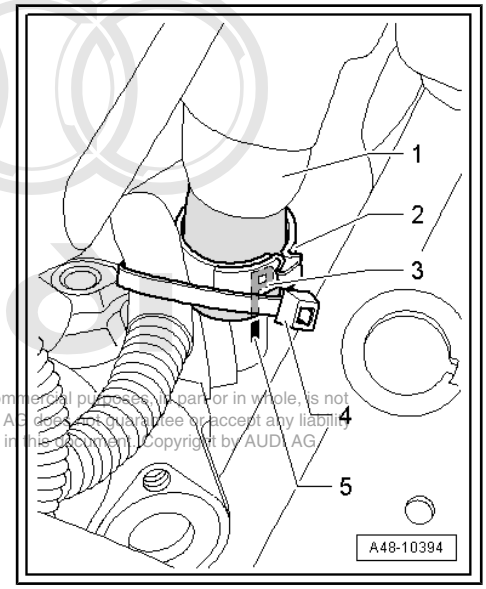
Tightening torques ⇒ Rep. gr. 87

– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



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– Before installing power steering pump, fit suction hose -1- and position marking „P“ -3- opposite marking -5- on power steering pump.
– Secure suction hose -1- with new hose clip -2-.
– Secure wiring harness to connection with new cable tie -4-.



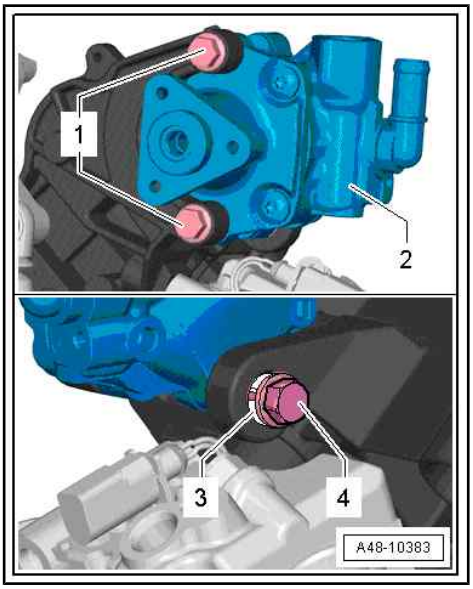
Note

Due to restricted space, the hose clip -2- cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump has been installed.

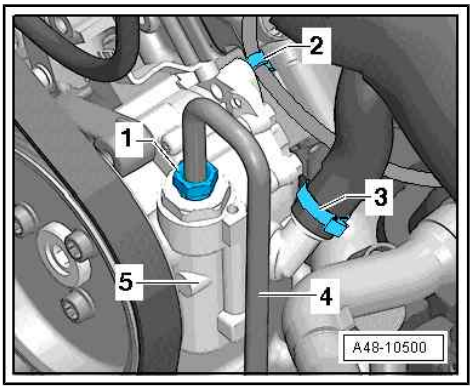
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– Turn hub by hand until fluid comes out at pump outlet.

– Bring power steering pump -2- into position.
• Sleeve -3- has been driven back slightly.
– First screw in front bolts -1- loosely.
– Then screw in rear bolt -4- loosely.
– Tighten bolts -1- and -4-.



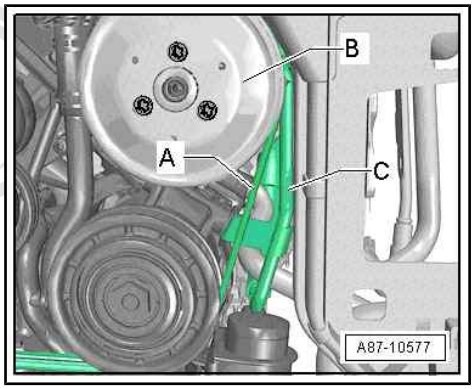
– Press pressure line into power steering pump as far as stop. Then tighten union nut -1-.



Note

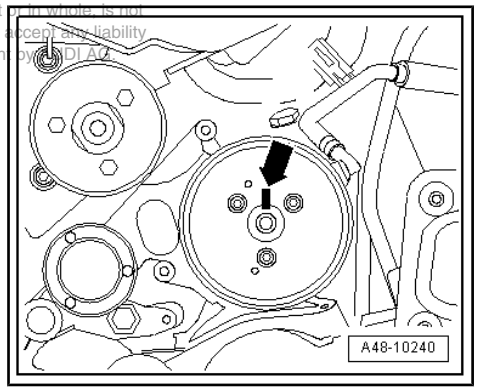
When fitting the pressure line -4-, make sure the angle between the pipe connection and the shaft of the power steering pump is approx. 88°.

– If pressure line -C- is also secured to A/C compressor by bracket, tighten bolt (top) securing A/C compressor (front).
– Clean off fluid in engine compartment where necessary.

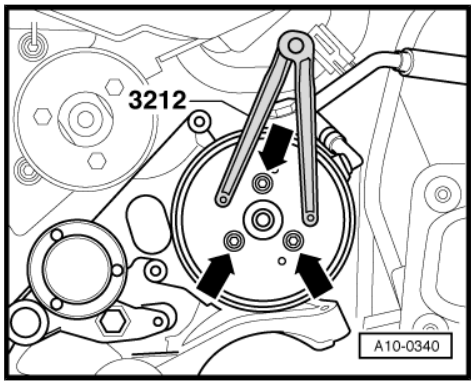


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– Align marking on pulley -arrow- (made previously) with marking on hub.

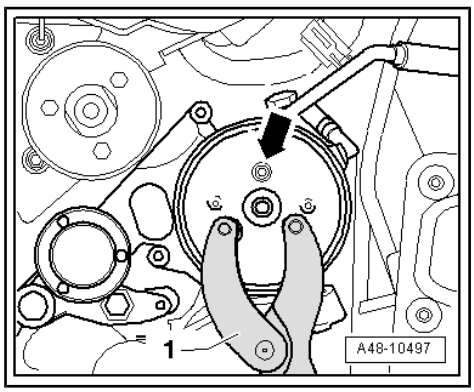


– Tighten bolts -arrows- for pulley (with holes for counterholding) ⇒ Rep. gr. 13 .



– Tighten bolts -arrow- for pulley (without holes for counterholding).

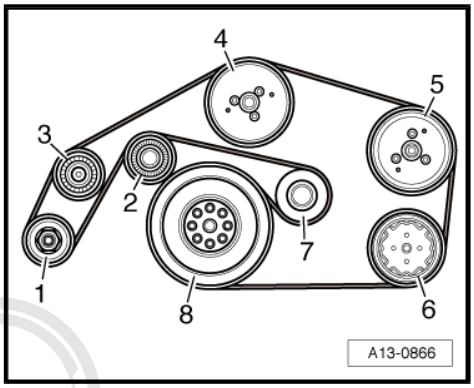
1 - Counterhold tool -T10172/5-



Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Fill up and bleed cooling system ⇒ Rep. gr. 19 .
– Install intake manifold (top section) ⇒ Rep. gr. 23 .
– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .

– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Idler roller
4 - Coolant pump
5 - Power steering pump
6 - Air conditioner compressor
7 - Tensioner for poly V-belt
8 - Crankshaft

9.6 Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)

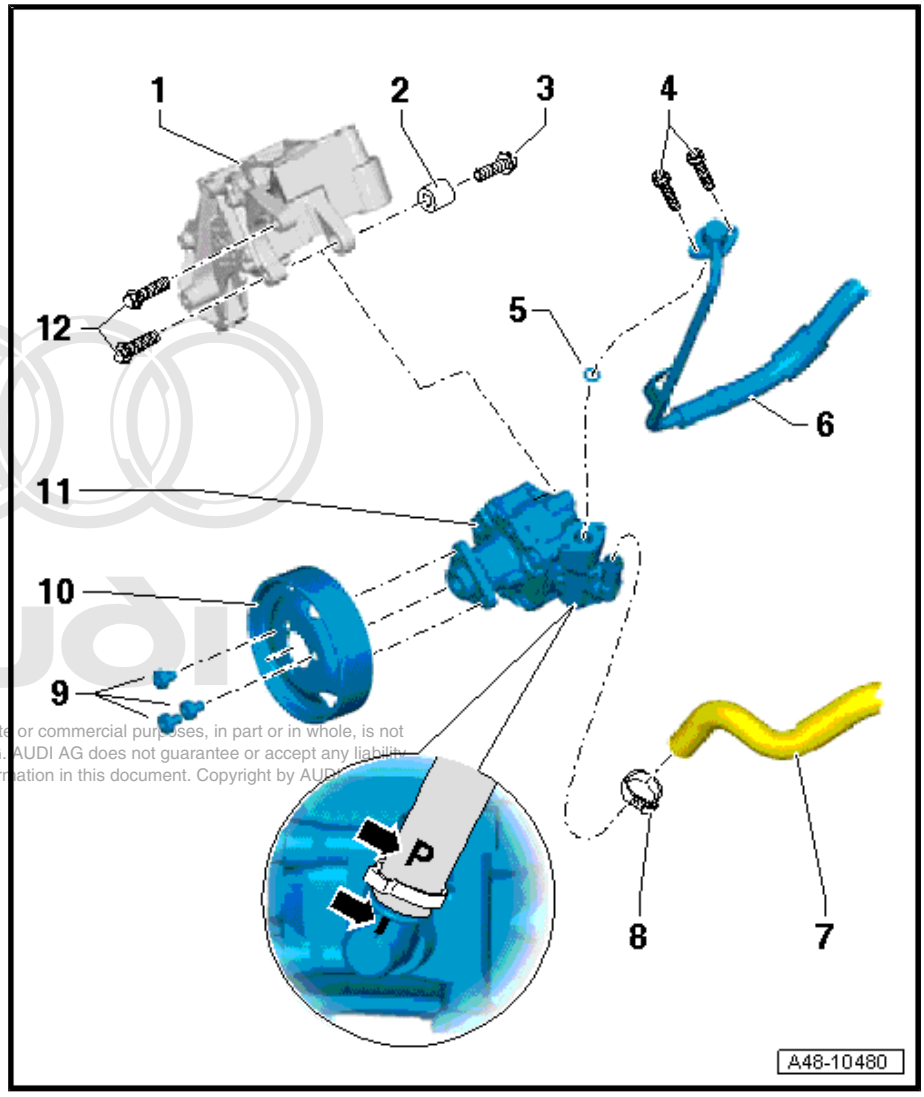
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Removing and installing power steering pump (vehicles with 6-cylinder diesel engine, vehicles without dynamic steering)
⇒ page 510 .

Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 25 Nm

4 - Bolt

- ❑ 9 Nm

5 - Seal

- ❑ Always renew if removed

6 - Pressure line

> **Caution**
> ***Fully insert pressure line when installing.***

- ❑ Also secured to A/C compressor, depending on version

7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

9 - Bolt

- ❑ 22 Nm

10 - Belt pulley

11 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 494
- ❑ Removing and installing ⇒ page 510
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

12 - Bolt

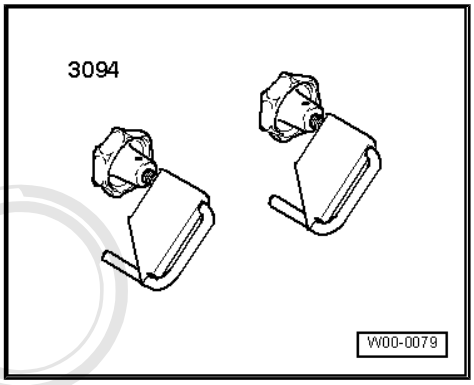
- ❑ 25 Nm

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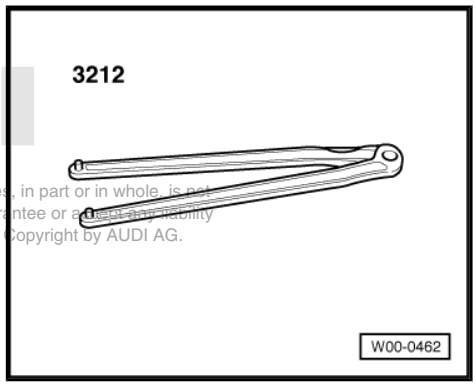
Removing

Special tools and workshop equipment required

- Hose clamps up to 25 mm ∅ -3094-

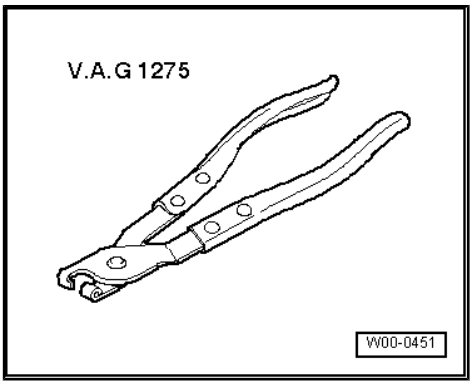


- Pin wrench -3212-

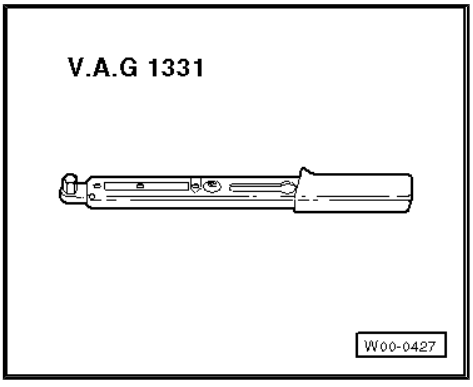


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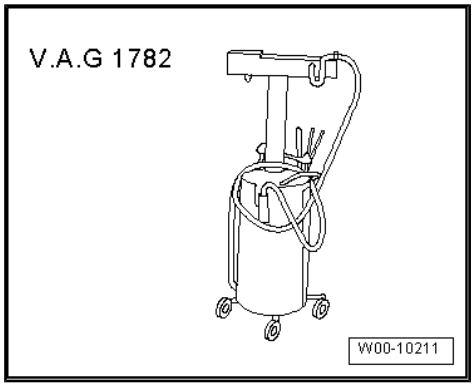
- Hose clip pliers -V.A.G 1275-



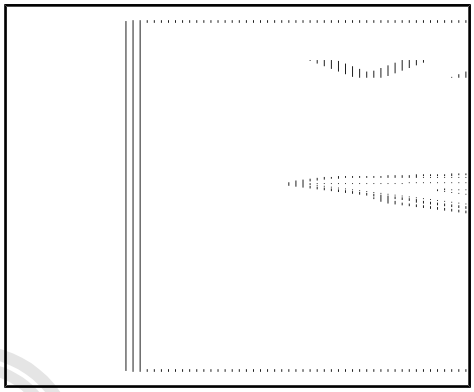
- Torque wrench -V.A.G 1331-



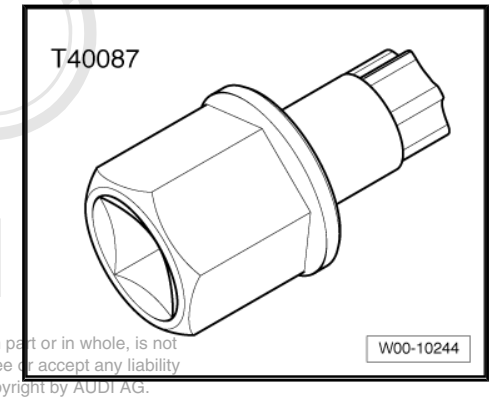
- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



- Torx T 60 socket -T40087-



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- Engine bung set -VAS 6122-

General notes

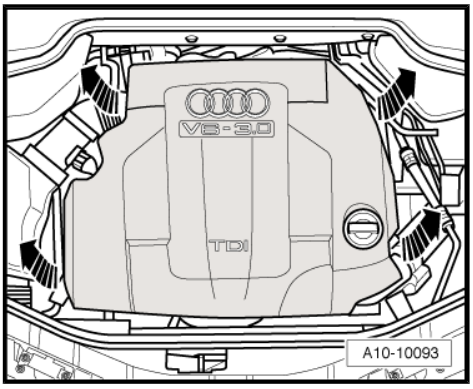
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

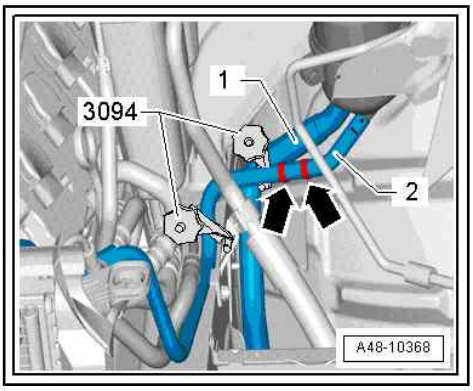
– Carefully pull engine cover panel off 4 mounting studs (one at a time) -arrows-.



– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

Caution

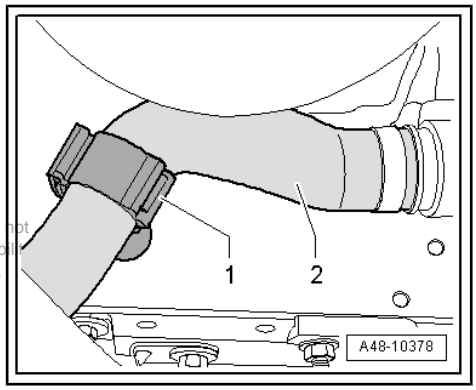
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*



– Remove noise insulation ⇒ Rep. gr. 66 .

– Drain coolant ⇒ Rep. gr. 19 .

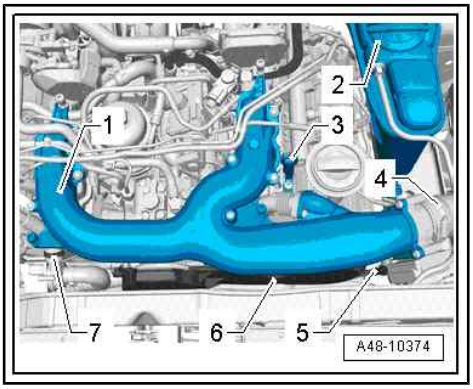
– Unfasten clamp -1- on longitudinal member (left-side) and take out coolant hose -2-.



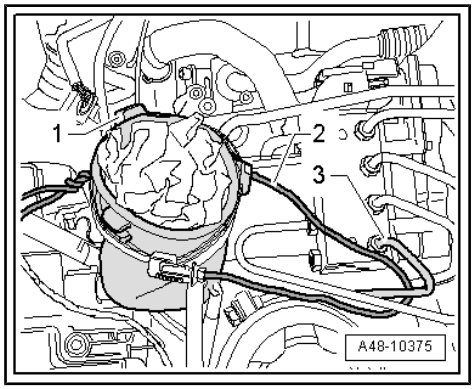
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– Remove intake manifold (top section) -1-. To do so, detach air hose -4-, remove fastening ring -3-, detach hose clip -7- and take off coolant hose.

– Remove expansion tank -2-, pull out oil dipstick -5- and remove toothed belt cover -6-.



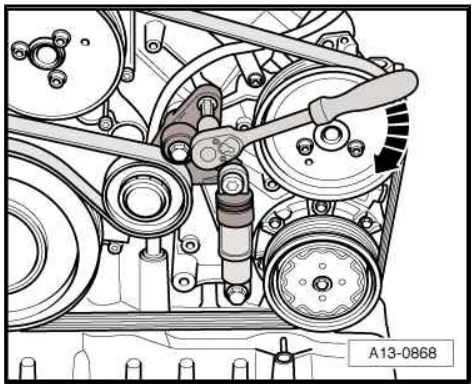
– Tie up air hose -1- to brake line -3- with a wire -2-.



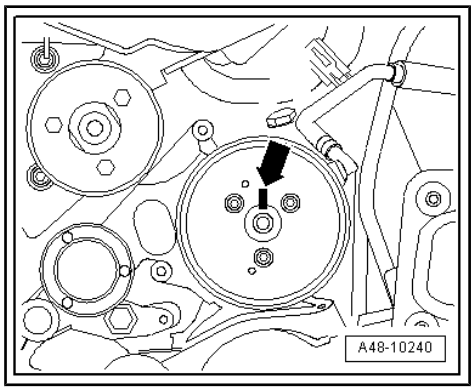
Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Swivel tensioner in direction of -arrow- to slacken poly V-belt. Use Torx T 60 socket -T40087- .
– Remove poly V-belt only from power steering pump pulley.



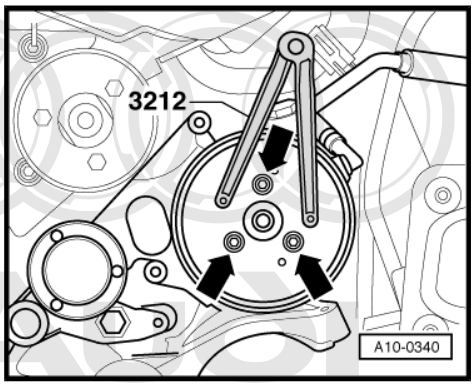
– Mark position of pulley relative to hub -arrow-.



Note

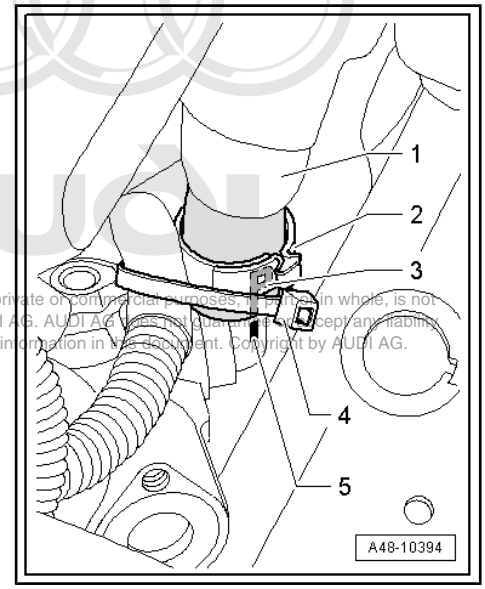
- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.
– Take off power steering pump pulley.
– Place drip tray underneath power steering pump.



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– Cut through cable tie -4-.



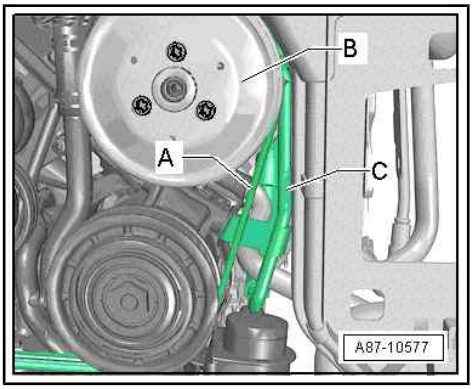
Note

The power steering pump has been removed in the illustration.

– Remove hose clip -2- and pull off suction hose -1-.

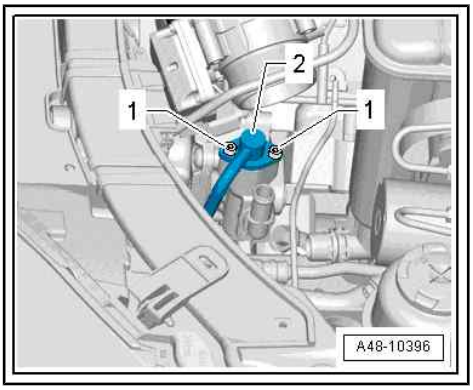
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– If pressure line -C- is also secured to A/C compressor by bracket, remove bolt (top) securing A/C compressor (front).

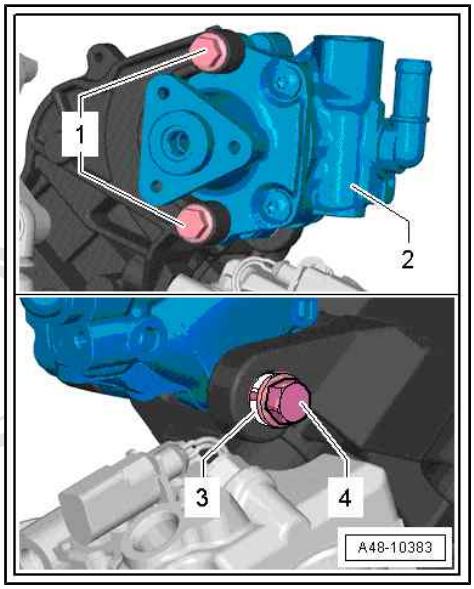


– Remove bolts -1- and pull pressure line -2- out of power steering pump.

– Seal off connections of power steering pump and lines with clean plugs.



– Remove bolts -1- and -4- and detach power steering pump -2-.
– To install power steering pump -2- drive back sleeve -3- for bolt -4- slightly at bracket.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Note

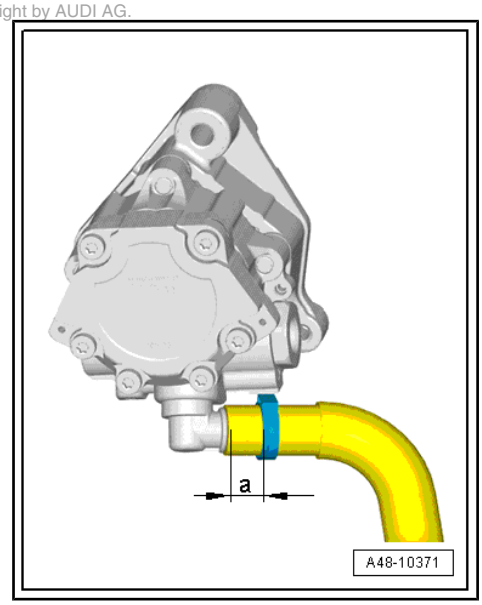
- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

Tightening torques ⇒ page 509

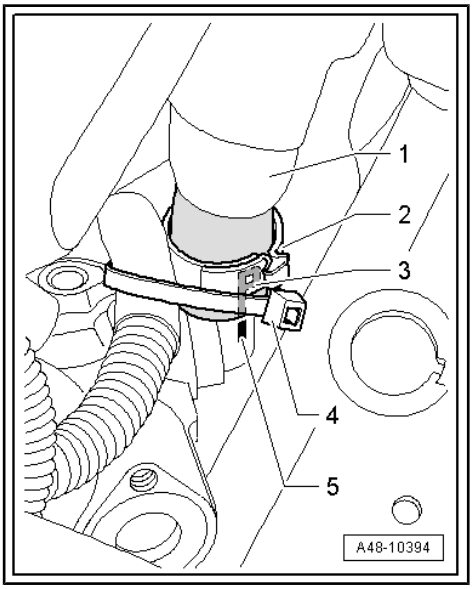
Tightening torques ⇒ Rep. gr. 87

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– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



– Before installing power steering pump, fit suction hose -1- and position marking „P“ -3- opposite marking -5- on power steering pump.
– Secure suction hose -1- with new hose clip -2-.
– Secure wiring harness to connection with new cable tie -4-.

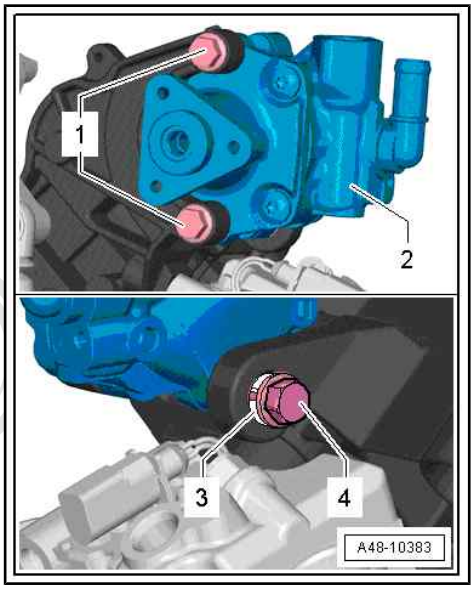


Note

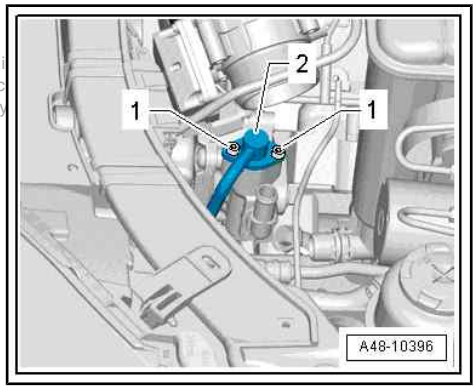
Due to restricted space, the hose clip -2- cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump has been installed.

– Turn hub by hand until fluid comes out at pump outlet.

– Bring power steering pump -2- into position.
• Sleeve -3- has been driven back slightly.
– First screw in front bolts -1- loosely.
– Then screw in rear bolt -4- loosely.
– Tighten bolts -1- and -4-.

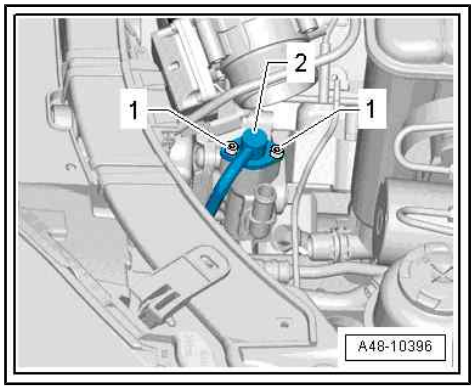


– Insert pressure line -2- into power steering pump and screw in bolts -1- only loosely.

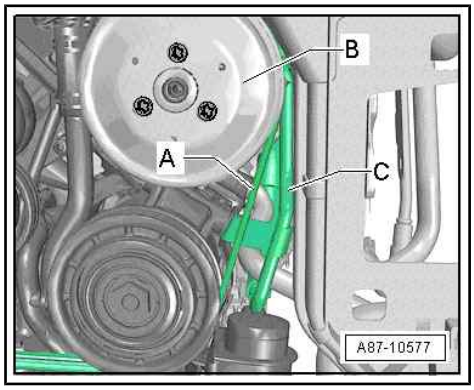


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– Press pressure line -2- as far as it will go into power steering pump. Then tighten bolts -1-.

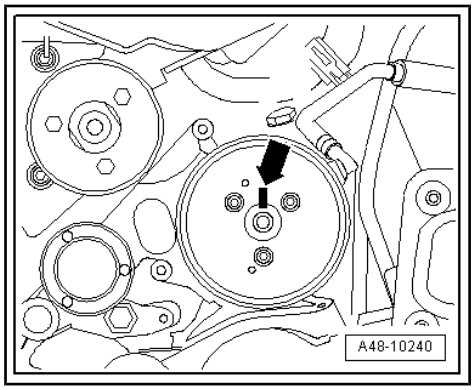


– If pressure line -C- is also secured to A/C compressor by bracket, tighten bolt (top) securing A/C compressor (front).
– Clean off fluid in engine compartment where necessary.



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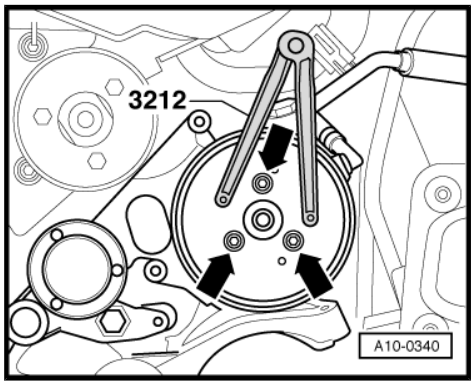
– Align marking on pulley -arrow- (made previously) with marking on hub.



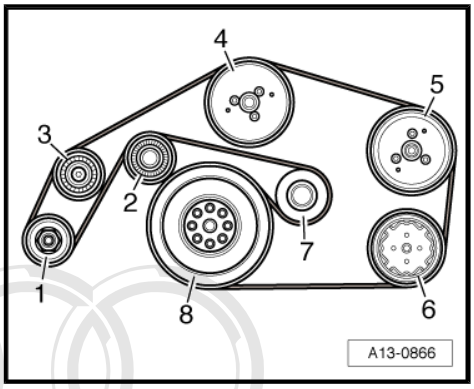
– Tighten bolts -arrows- for belt pulley ⇒ Rep. gr. 13 .

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Fill up and bleed cooling system ⇒ Rep. gr. 19 .
– Install intake manifold (top section) ⇒ Rep. gr. 23 .
– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .



– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Idler roller
4 - Coolant pump
5 - Power steering pump
6 - Air conditioner compressor
7 - Tensioner for poly V-belt
8 - Crankshaft

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10 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 6-cylinder FSI engine)

⇒ „10.1 Exploded view (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)“, page 520

⇒ „10.2 Exploded view (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)“, page 523 .

⇒ „10.3 Exploded view of pipes and hoses (vehicles with 6-cylinder FSI engine, vehicles with and without dynamic steering)“, page 526

⇒ „10.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder FSI engine, vehicles with and without dynamic steering)“, page 528 .

⇒ „10.5 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)“, page 534

⇒ „10.6 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)“, page 545 .

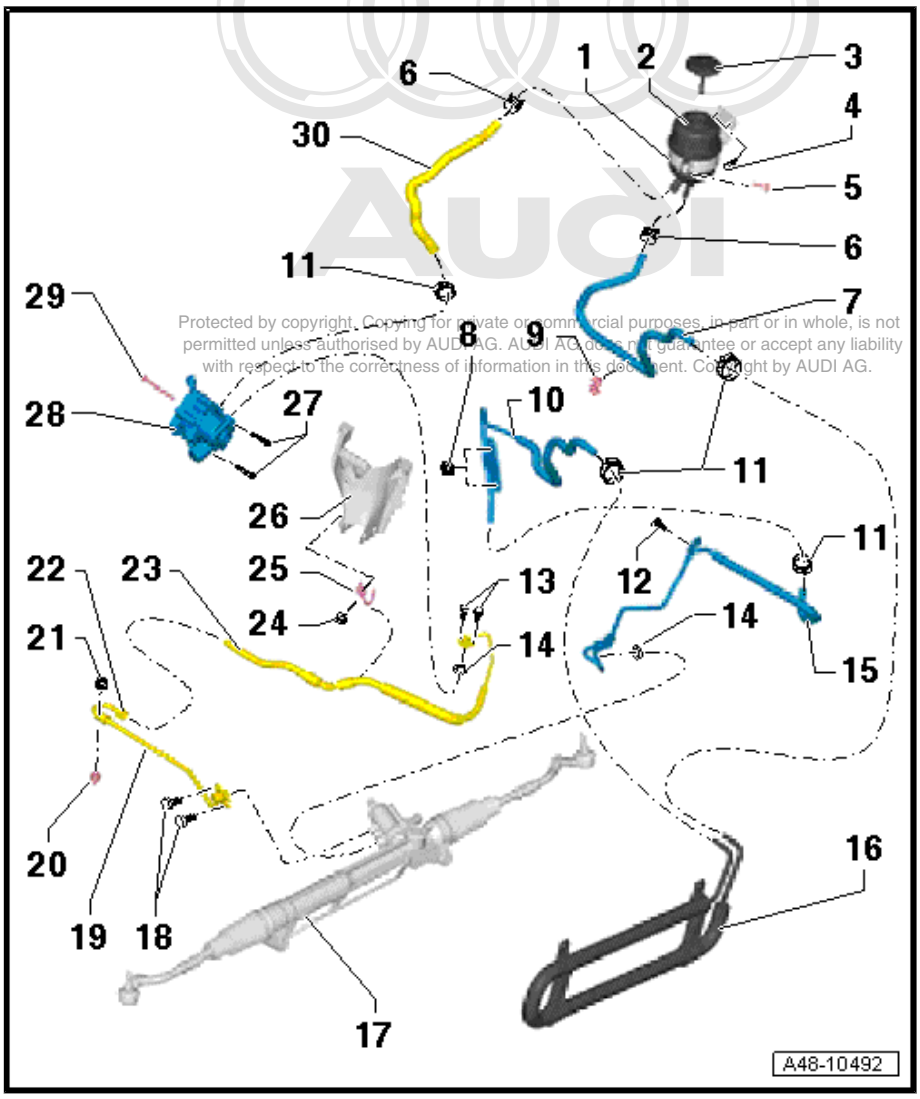
10.1 Exploded view (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)

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There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



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1 - Securing strap
- ❑ Securing to body ⇒ page 526

2 - Reservoir
- ❑ Note correct installation position ⇒ page 526
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick
- ❑ Checking fluid level ⇒ page 424

4 - Bolt
- ❑ 9 Nm

5 - Bolt
- ❑ 9 Nm

6 - Spring-type clip
- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Return hose
- ❑ From hydraulic fluid cooler to reservoir
- ❑ Securing to longitudinal member ⇒ page 526
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

8 - Nut
- ❑ 6 Nm

9 - Clip

10 - Return line
- ❑ From power steering box to hydraulic fluid cooler
- ❑ Securing to subframe ⇒ page 526
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

11 - Hose clip
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

12 - Bolt

- ❑ 9 Nm

13 - Bolt

- ❑ 9 Nm

14 - Seal

- ❑ Always renew if removed

15 - Return line

- ❑ From power steering box to hydraulic fluid cooler

Caution
Fully insert return line when installing.

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- ❑ Securing to subframe ⇒ page 526
- ❑ Installation position at line connection ⇒ page 623

16 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 526
- ❑ Removing and installing ⇒ page 618

17 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

18 - Bolt

- ❑ 20 Nm

19 - Pressure line

- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 526
- ❑ Installation position of line connection ⇒ page 526

20 - Rubber mounting

- ❑ 6 Nm

21 - Nut

- ❑ 6 Nm

22 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 526

23 - Pressure line

- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 526
- ❑ Installation position of line connection ⇒ page 526

24 - Nut

- ❑ 9 Nm

25 - Retainer

26 - Connector

- ❑ For engine mounting

27 - Bolt

- ❑ 20 Nm

28 - Steering hydraulics pump -V119-

- ❑ With regulating valve for power steering pump -(V119)-
- ❑ Pump and regulating valve are combined as one component and renewed together
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 528
- ❑ Removing and installing ⇒ page 534

29 - Bolt

- ❑ 20 Nm

30 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 545

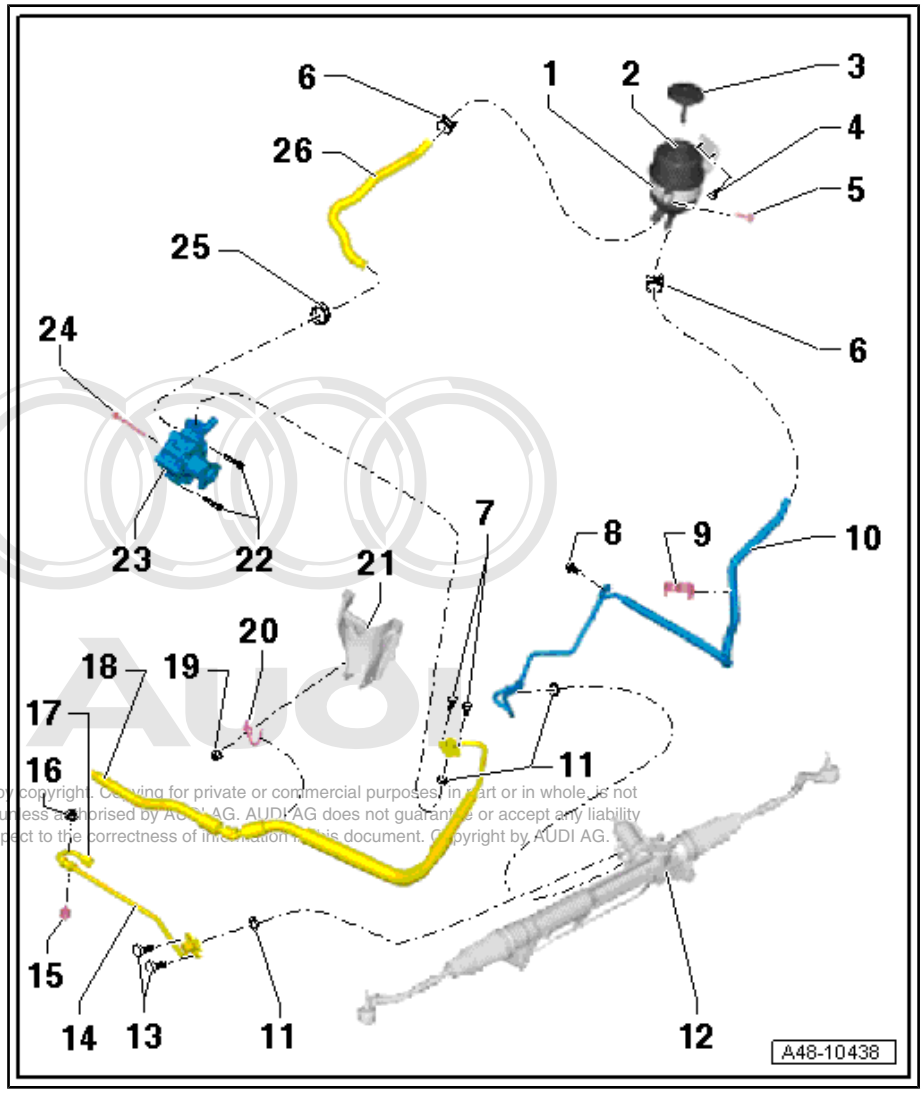
10.2 Exploded view (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 526

2 - Reservoir

- ❑ Note correct installation position ⇒ page 526
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Bolt

- ❑ 9 Nm

8 - Bolt

- ❑ 9 Nm

9 - Retainer

- ❑ For securing suction hose to longitudinal member ⇒ page 526

10 - Return line

- ❑ From power steering box to reservoir

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 526
- ❑ Note correct position on reservoir ⇒ page 623

11 - Seal

- ❑ Always renew if removed

12 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue

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- ❑ Removing and installing ⇒ page 402

13 - Bolt

- ❑ 20 Nm

14 - Pressure line

- ❑ From power steering pump to power steering box; different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue
- ❑ Securing to cross brace ⇒ page 526
- ❑ Installation position of line connection ⇒ page 526

Caution

Fully insert pressure line when installing.

15 - Rubber mounting

- ❑ 6 Nm

16 - Nut

- ❑ 6 Nm

17 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 526
- ❑ Union nut not fitted on pressure line without connecting point

18 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

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- ❑ Securing to cross brace ⇒ page 526
- ❑ Installation position of line connection ⇒ page 526

19 - Nut

- ❑ 9 Nm

20 - Retainer

21 - Connector

- ❑ For engine mounting

22 - Bolt

- ❑ 20 Nm

23 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 528
- ❑ Removing and installing ⇒ page 545

24 - Bolt

- ❑ 20 Nm

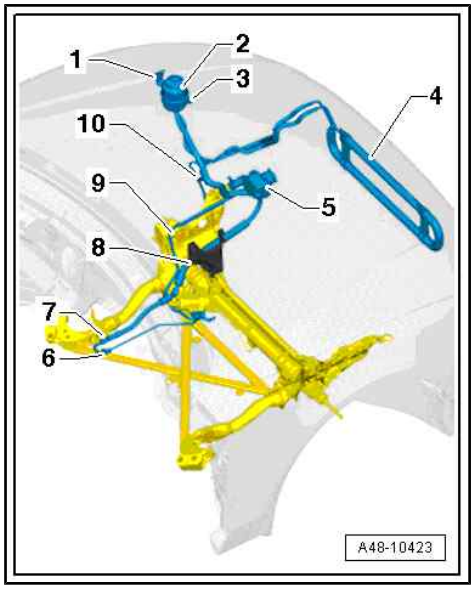
25 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

26 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 545

10.3 Exploded view of pipes and hoses (vehicles with 6-cylinder FSI engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 526

2 - Reservoir in bracket ⇒ page 527

3 - Bolt in bracket ⇒ page 526

4 - Hydraulic fluid cooler to condenser ⇒ page 527

5 - Power steering pump to bracket
⇒ „10.5 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)“, page 534 or
⇒ „10.6 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)“, page 545

6 - Pressure line to cross brace ⇒ page 527

7 - Installation position of pressure line connection
⇒ page 527

8 - Pressure line to engine mounting ⇒ page 528

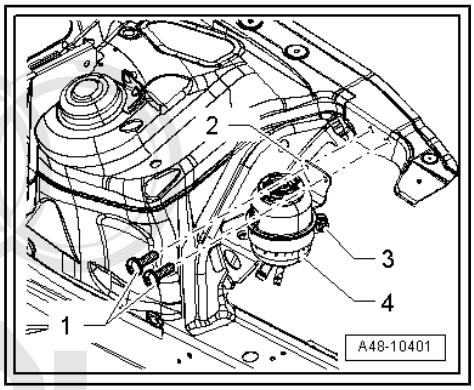
9 - Return line to subframe ⇒ page 528

10 - Retainer for securing return line to longitudinal member
⇒ page 528

Bracket for reservoir to body

– Secure bracket -2- to body with bolts -1-.

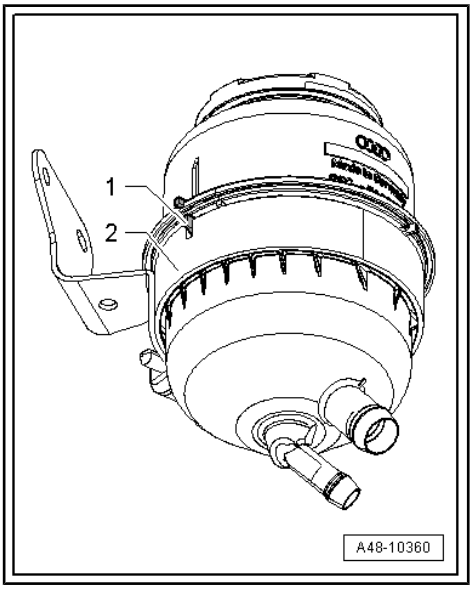
– Secure reservoir -4- in bracket -2- with bolt -3-.



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Reservoir in bracket

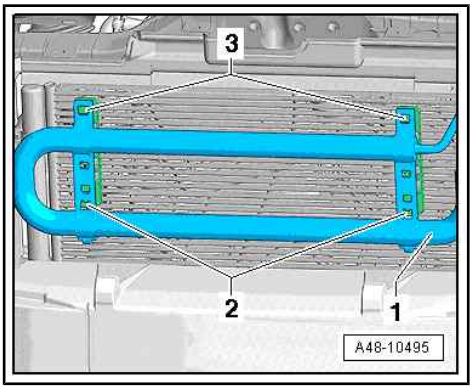
– Fit reservoir (insert lug -1- into recess in bracket -2-).



Hydraulic fluid cooler to condenser

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

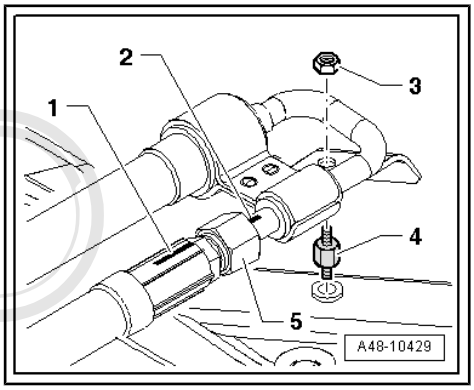
Hoses to hydraulic fluid cooler ⇒ page 623



Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

– Note correct position of line when connecting. Markings -1- and -2- must be aligned.

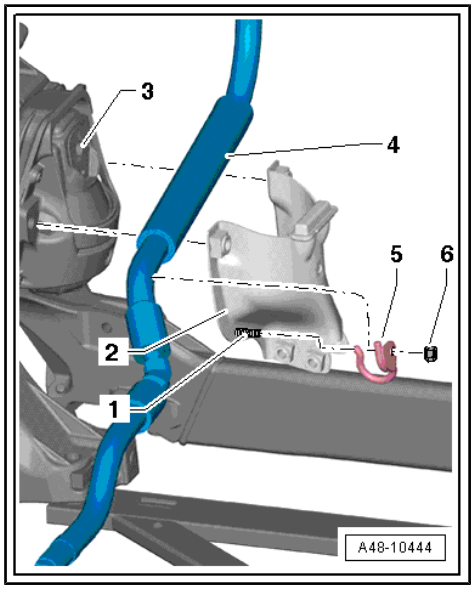


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Pressure line to engine mounting

– Route pressure line -4- between connecting element -2- and engine mounting -3-.

– Screw retainer -5- to stud -1- with nut -6-.



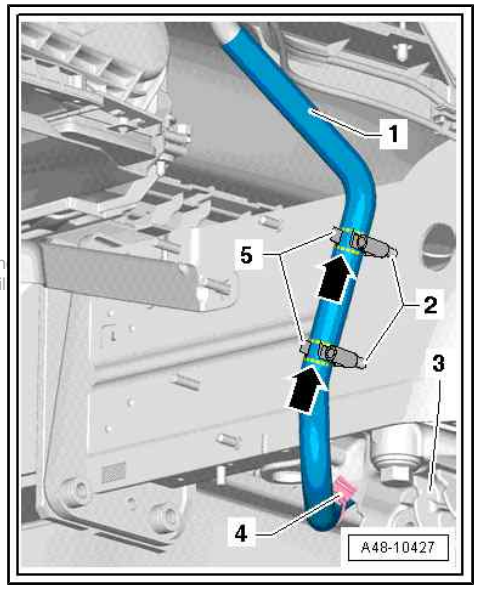
Retainer for securing return line to subframe

– Fit clips -5- of return line -1- onto studs -2- on longitudinal member.

– Insert return line -1- with colour markings -arrows- into clips -5-.

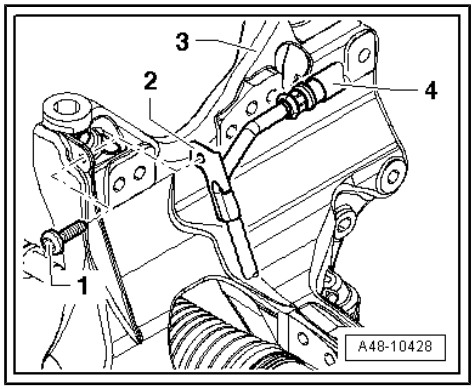
– Secure retainer -4- of return line -1- to front left of subframe -3-.

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Return line to subframe

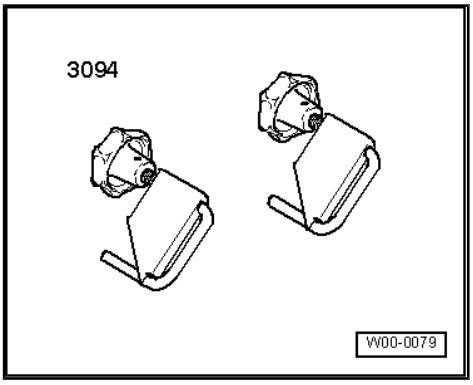
– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.



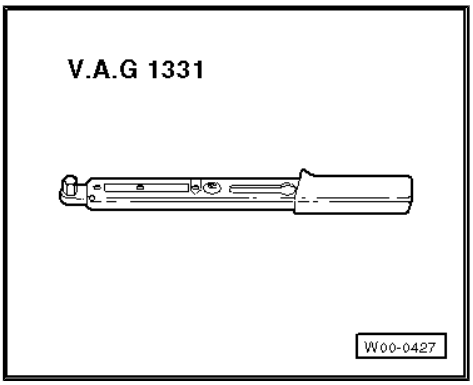
10.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder FSI engine, vehicles with and without dynamic steering)

Special tools and workshop equipment required

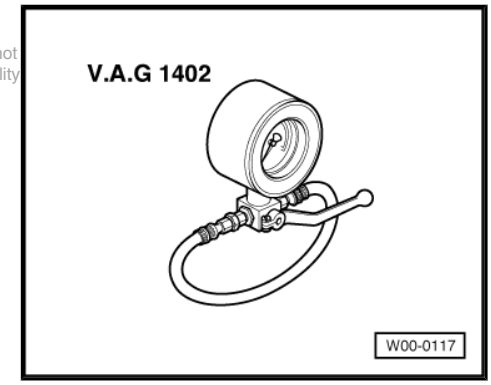
- Hose clamps up to 25 mm ∅ -3094-



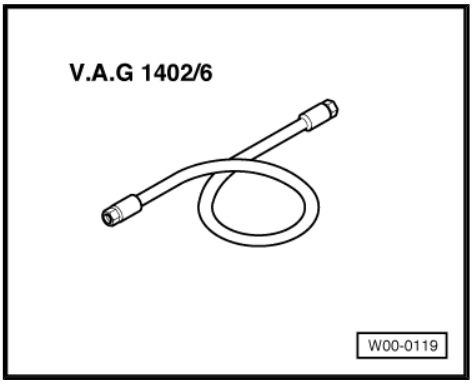
- Torque wrench -V.A.G 1331-



- Power steering tester -V.A.G 1402-

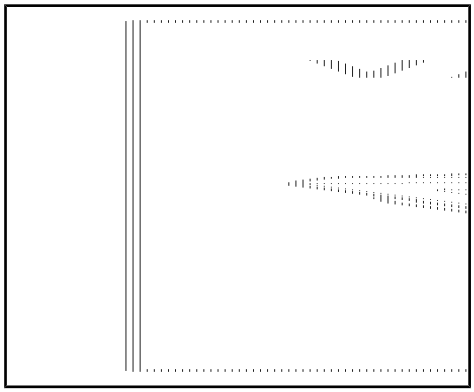


- Adapter set -V.A.G 1402/6-

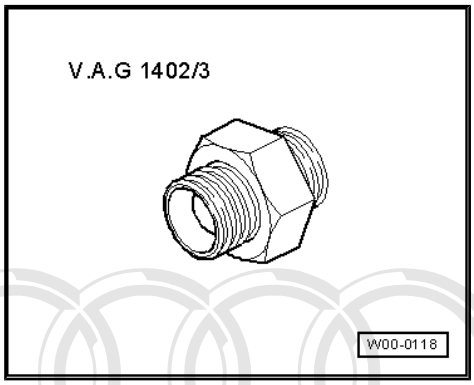


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♦ Drip tray for workshop hoist -VAS 6208-



♦ Adapter -V.A.G 1402/3- is required for vehicles with connecting point in pressure line ⇒ Item 14 (page 525)



♦ Adapter set -V.A.G 1402/17- is required for vehicles without connecting point in pressure line ⇒ Item 14 (page 525)

Test requirements:

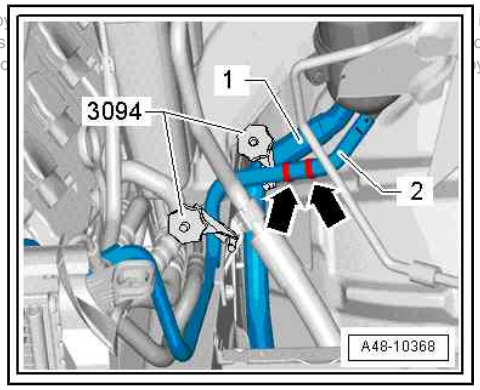
- V-belt and V-belt tension OK.
- No leaks in system
- Hoses and pipes not kinked or constricted

Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*



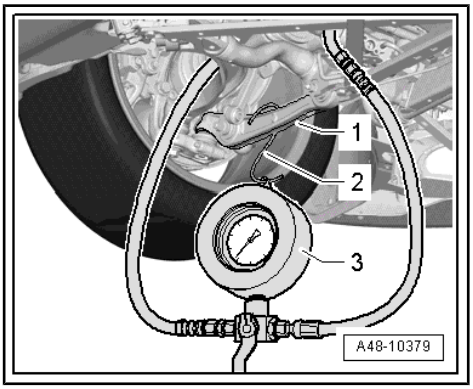
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Vehicles with connecting point in pressure line
⇒ Item 14 (page 525)

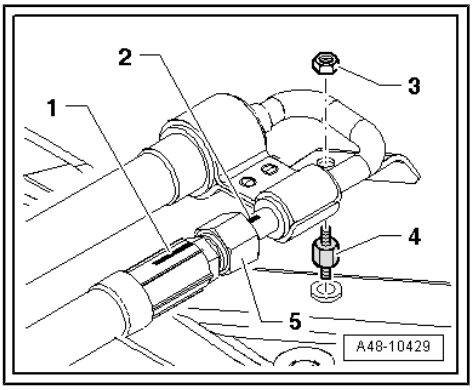
– Remove noise insulation ⇒ Rep. gr. 66 .

– Attach tester -3- by a hook -2- to track control link -1-.

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.



– Slacken union nut -5-. Counterhold at hexagon flats.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

2 - Hose from adapter set -V.A.G 1402/6-

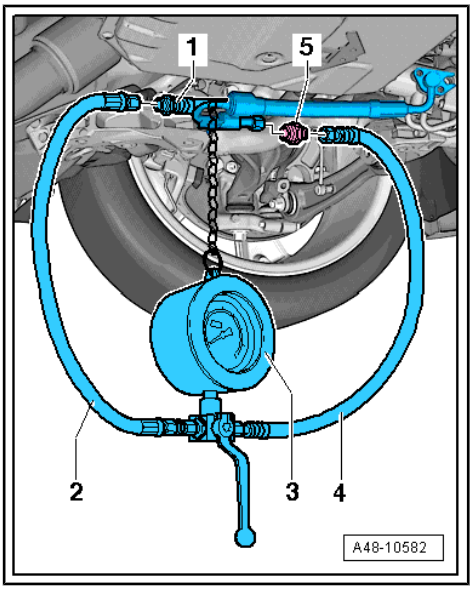
3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

5 - Adapter -V.A.G 1402/3-

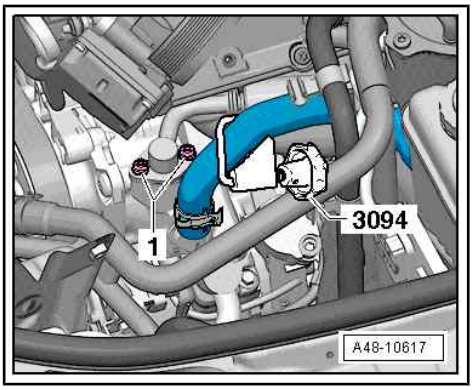
– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.

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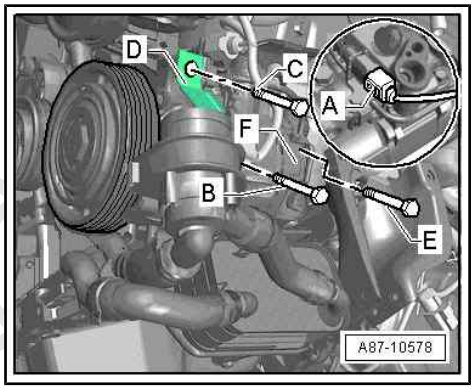


Vehicles without connecting point ⇒ Item 22 (page 490)

– Remove bolts -1- and pull pressure line out of power steering pump.



– If pressure line is also secured to A/C compressor, remove bolt -C- for bracket -D- from A/C compressor.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Power steering pump

2 - Adapter -V.A.G 1402/17-1- [14] with angle piece -V.A.G 1402/17-3-

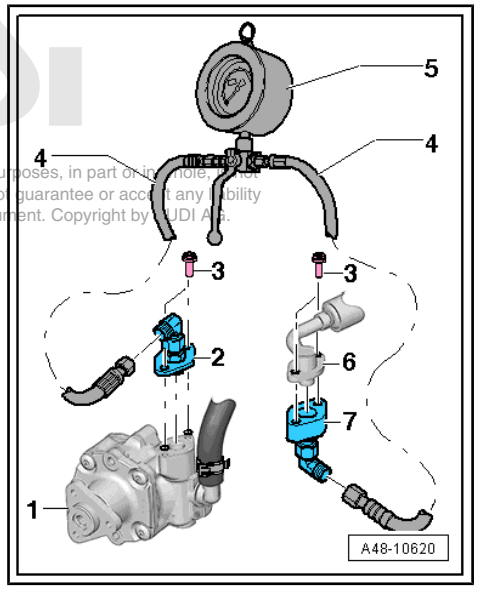
3 - Bolt for securing pressure line ⇒ Item 8 (page 489)

4 - Hose from adapter set -V.A.G 1402/6-

5 - Power steering tester -V.A.G 1402-

6 - Pressure line

7 - Adapter -V.A.G 1402/17-2- with angle piece -V.A.G 1402/17-3-



14) If the seal on adapter -V.A.G 1402/17-1- is damaged or leaking, it must be replaced with a new seal ⇒ Item 11 (page 489) ⇒ Electronic parts catalogue .

Note

- *Position angle piece -V.A.G 1402/17-3- on adapter -V.A.G 1402/17-1- so that hose of adapter set -V.A.G 1402/6- does not come into contact with pulley or poly V-belt.*
- *Tighten union nuts on angle pieces -V.A.G 1402/17-3- and on hoses of adapter set -V.A.G 1402/6- hand-tight using an open-end spanner.*

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All vehicles (continued):

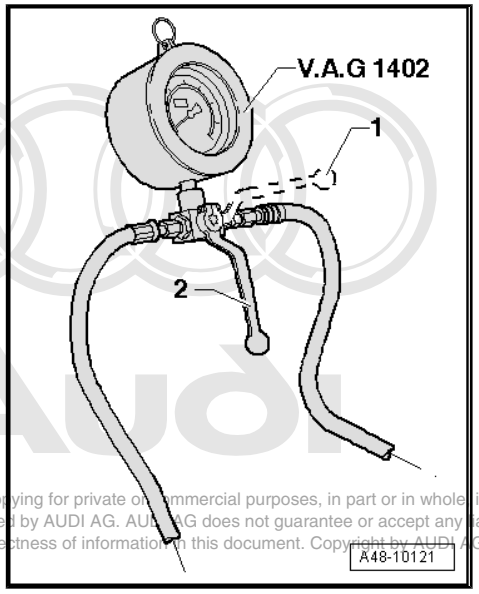
– Make sure lever on pressure gauge is at position -2-.

– Remove hose clamps -3094- .

– Start engine but do not press accelerator.

– Turn steering wheel approx. 10 times from lock to lock.

– Switch off engine and top up hydraulic fluid in reservoir if necessary.



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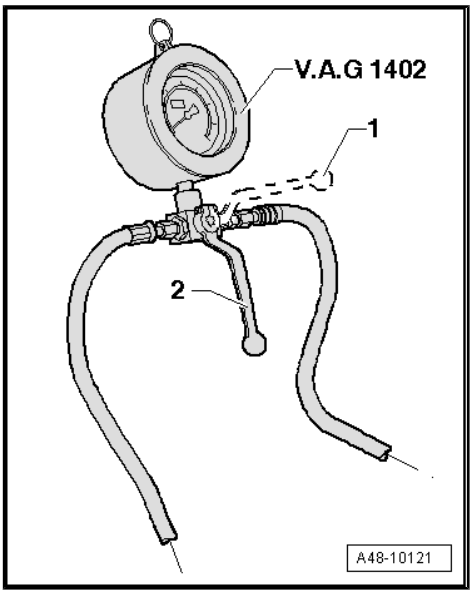
Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.

– Start engine.

– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.



Specification for delivery pressure (vehicles without dynamic steering): 115…132 bar

Specification for delivery pressure (vehicles with dynamic steering): 114…131 bar

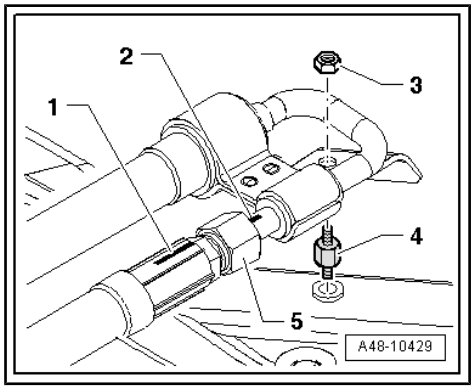
Renew power steering pump if specification is not attained
⇒ „10.5 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)“, page 534 or
⇒ „10.6 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)“, page 545 .

– Switch off engine.

– Remove power steering tester -V.A.G 1402- .

Tightening torques ⇒ page 523

– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- must be aligned.
– Tighten union nut -1-. Counterhold at hexagon flats.
– Tighten nut -3- and, if necessary, rubber mounting -4-.
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .



10.5 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles with dynamic steering)

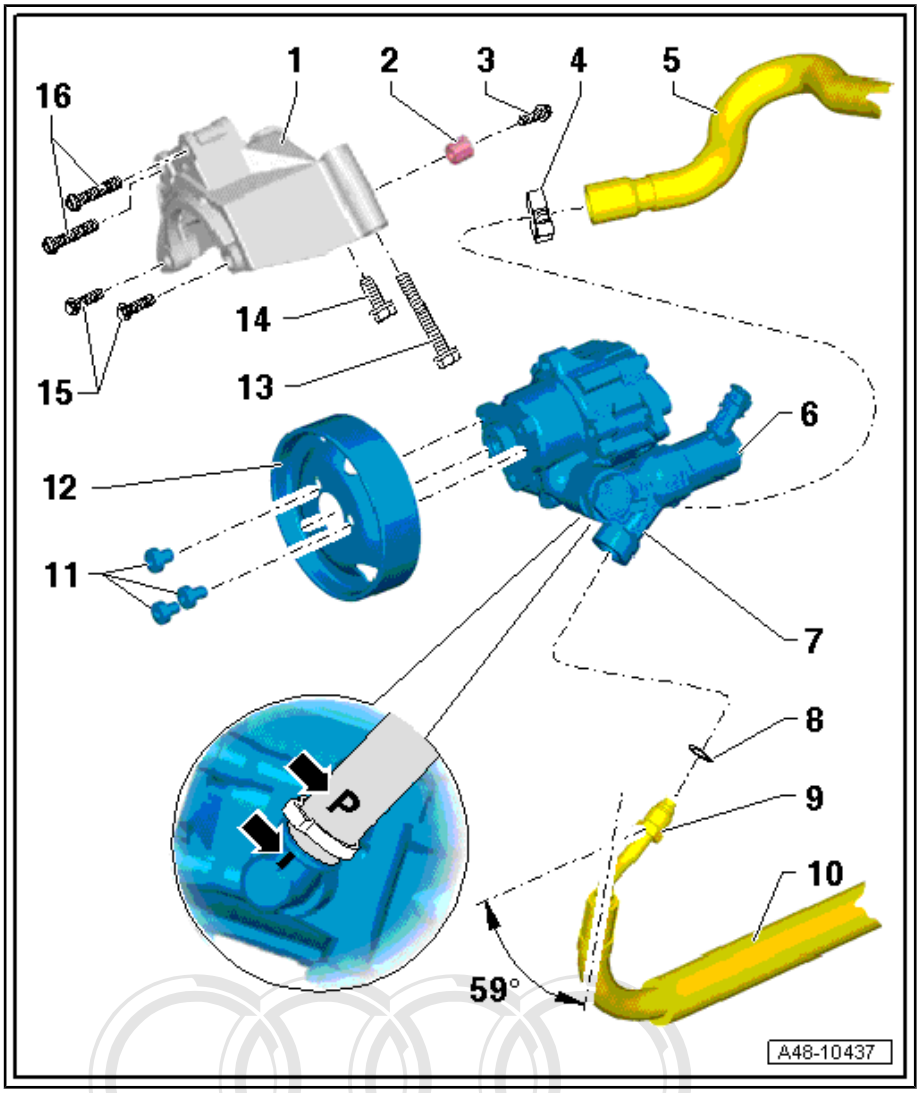
Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)
⇒ page 536 .

Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*

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1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 20 Nm

4 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

5 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

6 - Regulating valve for power steering pump -(V119)-

- ❑ Power steering pump and regulating valve are combined as one component and can only be renewed together

7 - Steering hydraulics pump -V119-

- ❑ With regulating valve for power steering pump -(V119)-
- ❑ Power steering pump and regulating valve ⇒ Item 6 (page 535) are combined as one component and can only be renewed together
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 528
- ❑ Removing and installing ⇒ page 536
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

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8 - Seal

- ❑ Always renew if removed

9 - Union nut

- ❑ 38 Nm

10 - Pressure line

> **Caution**
> ***Fully insert pressure line when installing.***

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 59°.
- ❑ Also secured to A/C compressor, depending on version

11 - Bolt

- ❑ 22 Nm

12 - Belt pulley

13 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

14 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

15 - Bolt

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- ❑ 20 Nm
- ❑ For securing power steering pump to bracket

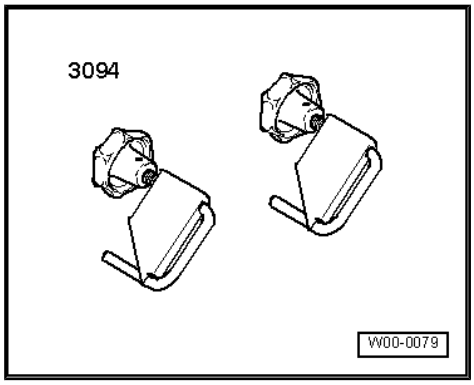
16 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine

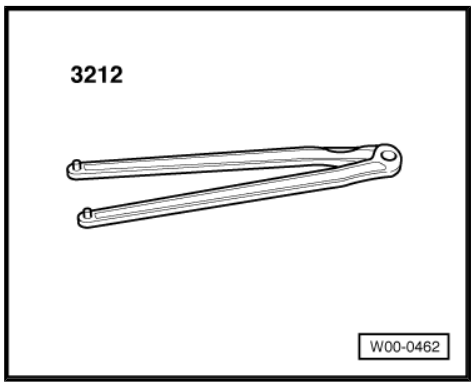
Removing

Special tools and workshop equipment required

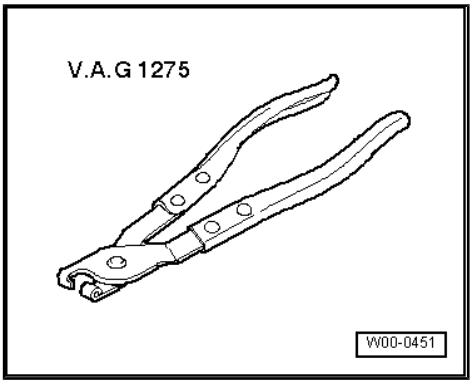
♦ Hose clamps up to 25 mm ∅ -3094-



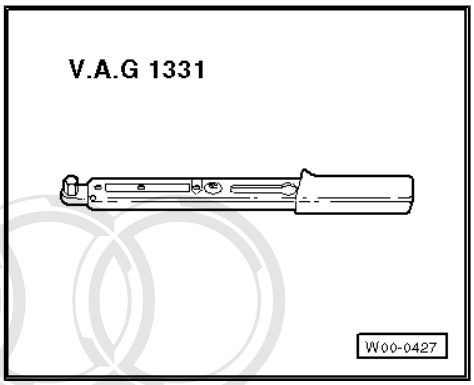
♦ Pin wrench -3212-



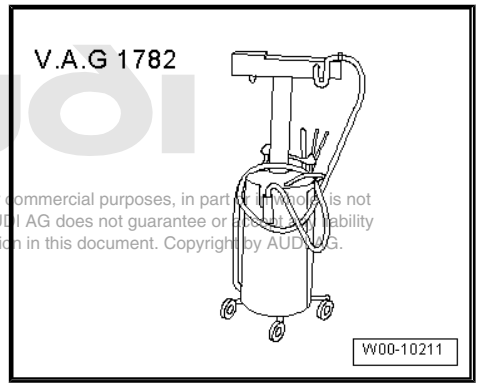
- Hose clip pliers -V.A.G 1275-



- Torque wrench -V.A.G 1331-

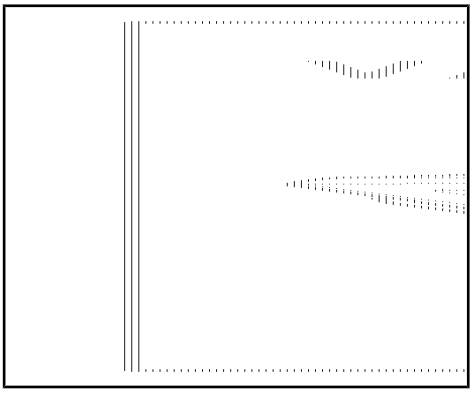


- Used oil collection and extraction unit -V.A.G 1782-



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- Drip tray for workshop hoist -VAS 6208-



- Engine bung set -VAS 6122-

General notes

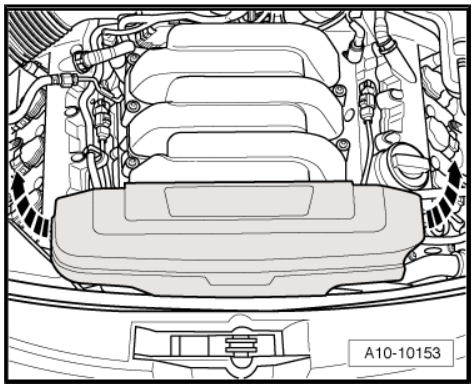
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- ♦ Check steering system for leaks if fluid level is low in reservoir.
- ♦ If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- ♦ The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel -arrows-.

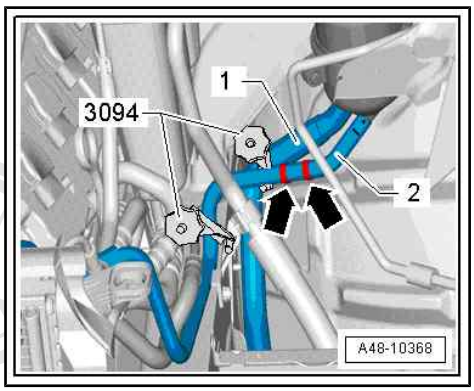
– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .



– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

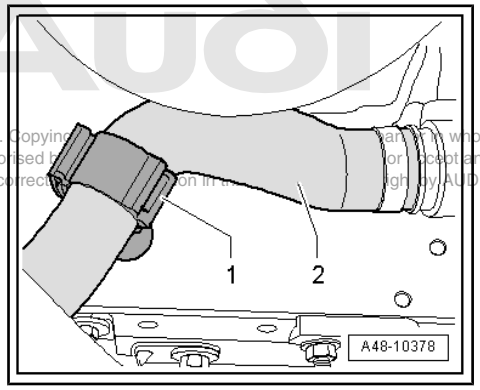
Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*



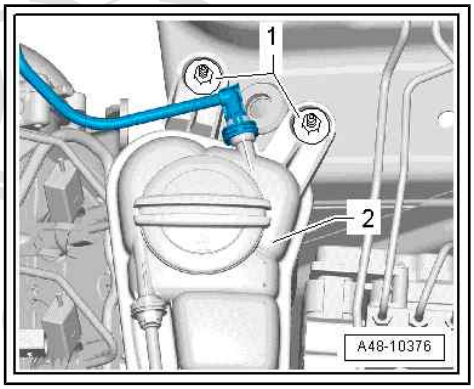
– Remove noise insulation ⇒ Rep. gr. 66 .

– Unfasten clamp -1- on longitudinal member (left-side) and take out coolant hose -2-.



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– Remove nuts -1- and detach coolant expansion tank -2- with hoses connected.
– Release and unplug connector at coolant expansion tank -2-.

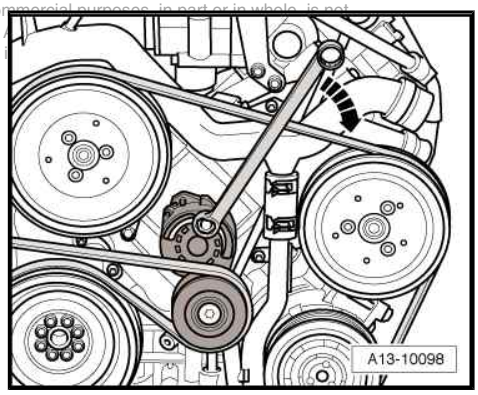


Note

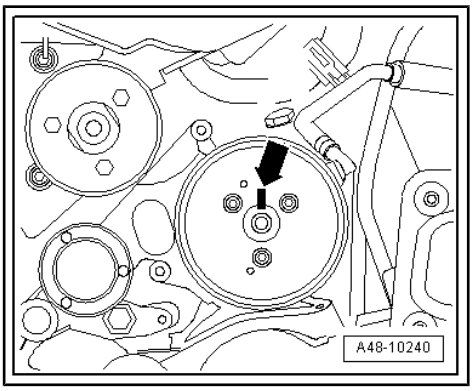
Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

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– Swivel tensioner in direction of -arrow- to slacken poly V-belt.
– Remove poly V-belt only from power steering pump pulley.
– Release tensioner and remove tool.



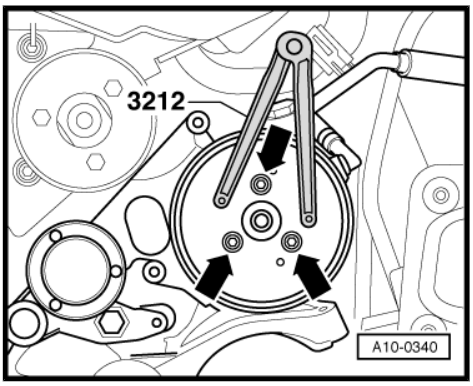
– Mark position of pulley relative to hub -arrow-.



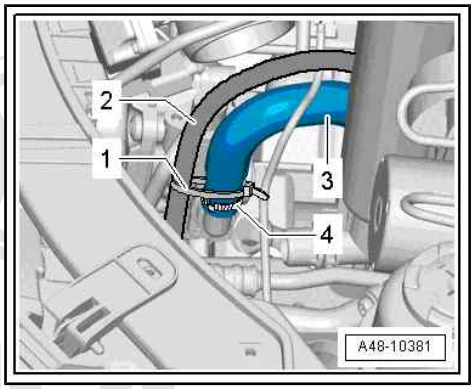
Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.
– Take off power steering pump pulley.
– Place drip tray underneath power steering pump.

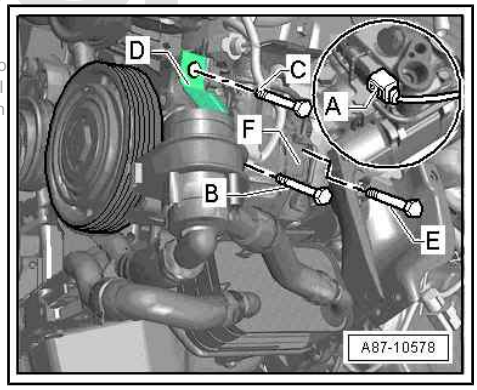


– Carefully cut through cable tie -1- for wiring harness -2-.
– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.

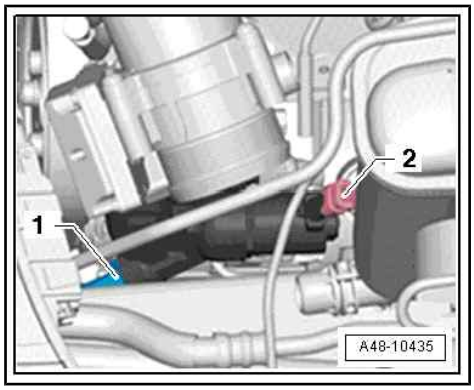


– If pressure line is also secured to A/C compressor, remove bolt -C- for bracket -D- from A/C compressor.

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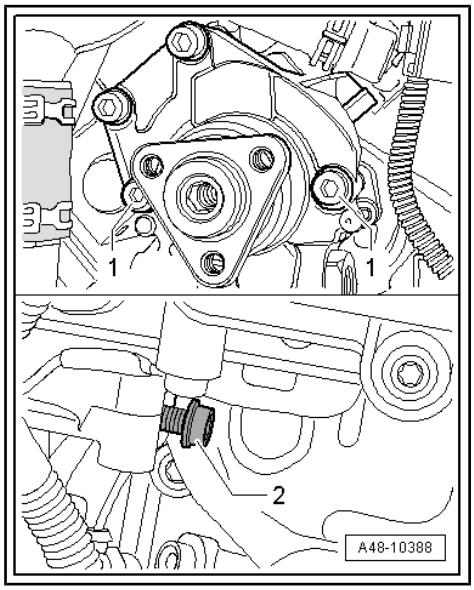
– Unscrew union nut -1- and pull pressure line out of power steering pump.
– Release connector -2- and unplug.
– Seal off connections of power steering pump and lines with clean plugs.



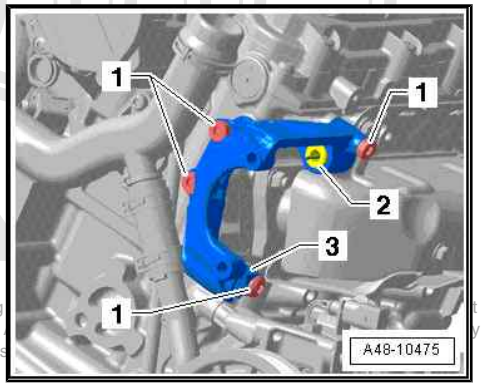
– Unbolt power steering pump from bracket. To do so, remove front bolts -1- and rear bolt -2-.

Note

Bolt -2- is concealed inside the bracket and has already been unscrewed in the illustration.

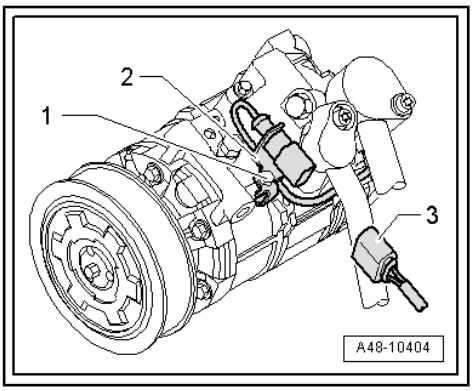


– Remove bolts -1- from bracket -3-.

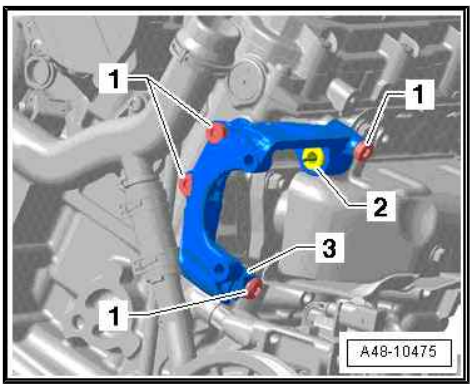


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– Release connector -3- and unplug.
– Remove bolt -1- and detach bracket -2-.



– Remove bracket -3-.
– To install power steering pump, drive back sleeve -2- slightly at bracket.
– Take out power steering pump.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 534

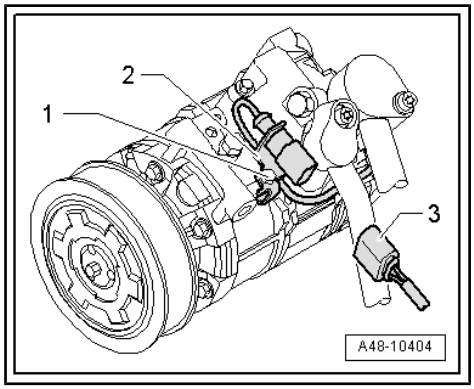
Tightening torques ⇒ Rep. gr. 87

Note

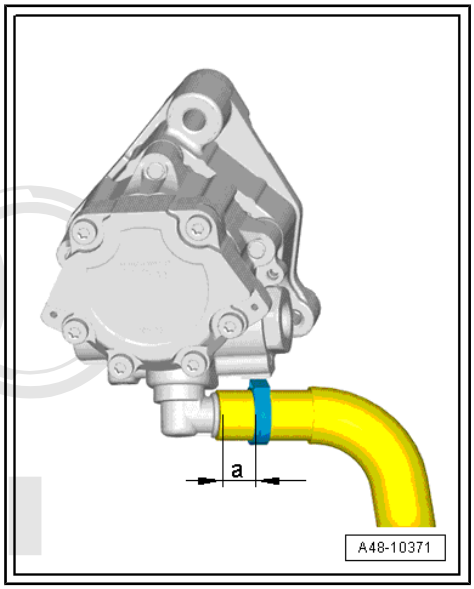
- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

– Insert power steering pump with bracket.

– Fit bracket -2- and tighten bolt -1- ⇒ Rep. gr. 87 .
– Plug in connector -3-.

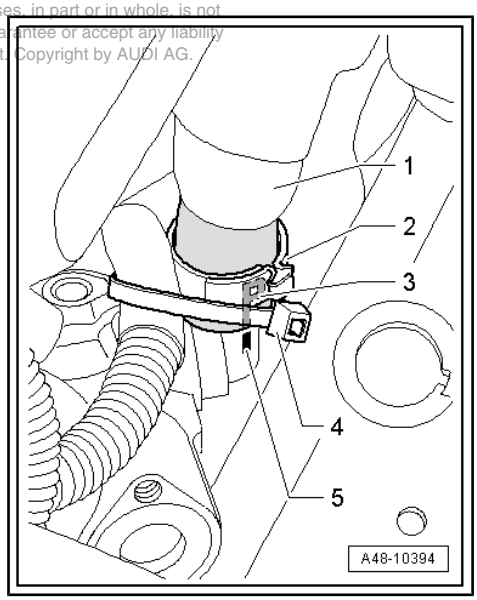


– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



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– Before installing power steering pump, fit suction hose -1- and position marking „P“ -3- opposite marking -5- on power steering pump.
– Secure suction hose -1- with new hose clip -2-.
– Secure wiring harness to connection with new cable tie -4-.



Note

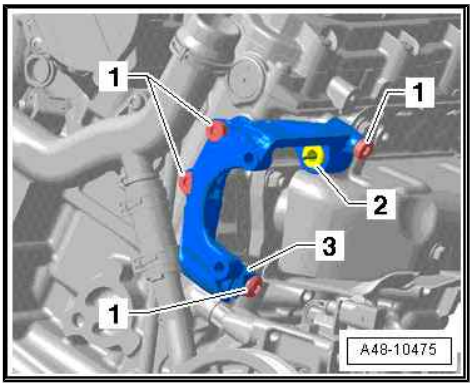
Due to restricted space, the hose clip -2- cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump has been installed.

– Attach bracket -3- and tighten bolts -1-.

• Sleeve -2- has been driven back slightly.

– Turn hub by hand until fluid comes out at pump outlet.

– Fit power steering pump into bracket.

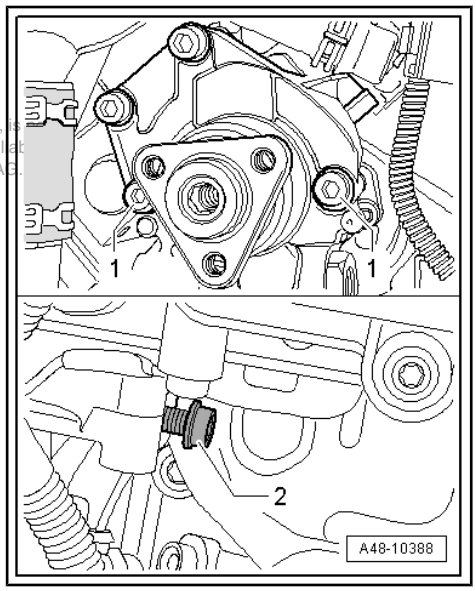


– First screw in front bolts -1- loosely.

– Then screw in rear bolt -2- loosely.

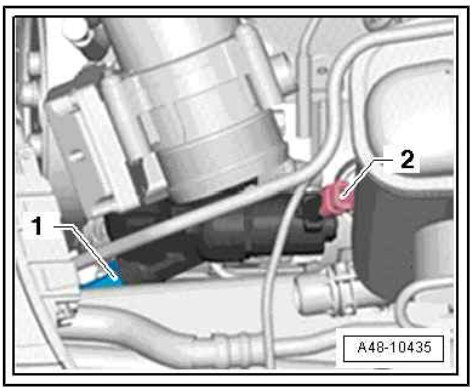
– Tighten bolts -1- and -2-.

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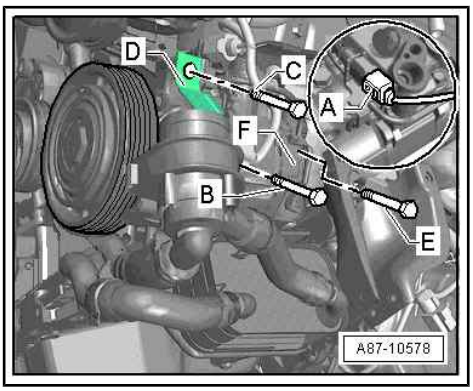
– Press pressure line into power steering pump as far as stop. Then tighten union nut -1-.

– Plug in connector -2-.

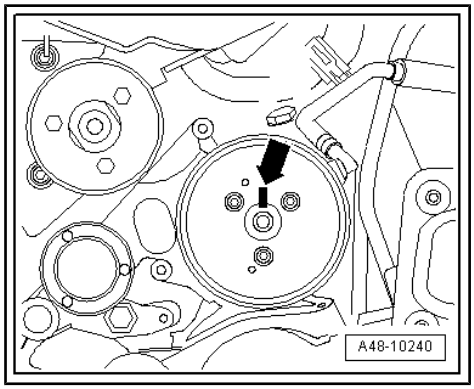


– If pressure line is also secured to A/C compressor, tighten bolt -C- for bracket -D- on A/C compressor.

– Clean off fluid in engine compartment where necessary.



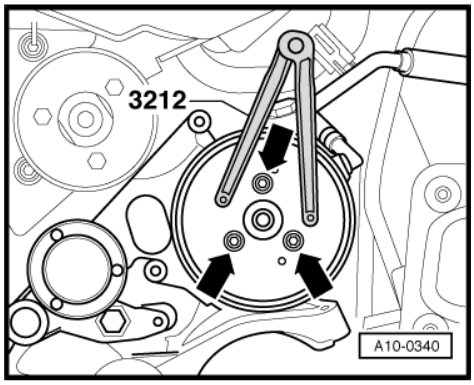
– Align marking on pulley -arrow- (made previously) with marking on hub.



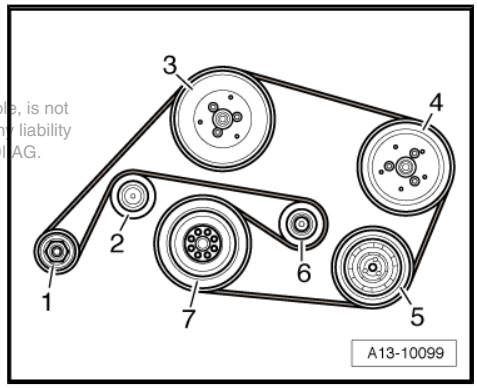
– Tighten bolts -arrows- for belt pulley ⇒ Rep. gr. 13 .

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .



– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

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Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Coolant pump
4 - Power steering pump
5 - Air conditioner compressor
6 - Tensioning roller
7 - Crankshaft

10.6 Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)

Removing and installing power steering pump (vehicles with 6-cylinder FSI engine, vehicles without dynamic steering)
⇒ page 546 .

Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*

1 - Bracket

2 - Sleeve
- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt
- ❑ 20 Nm

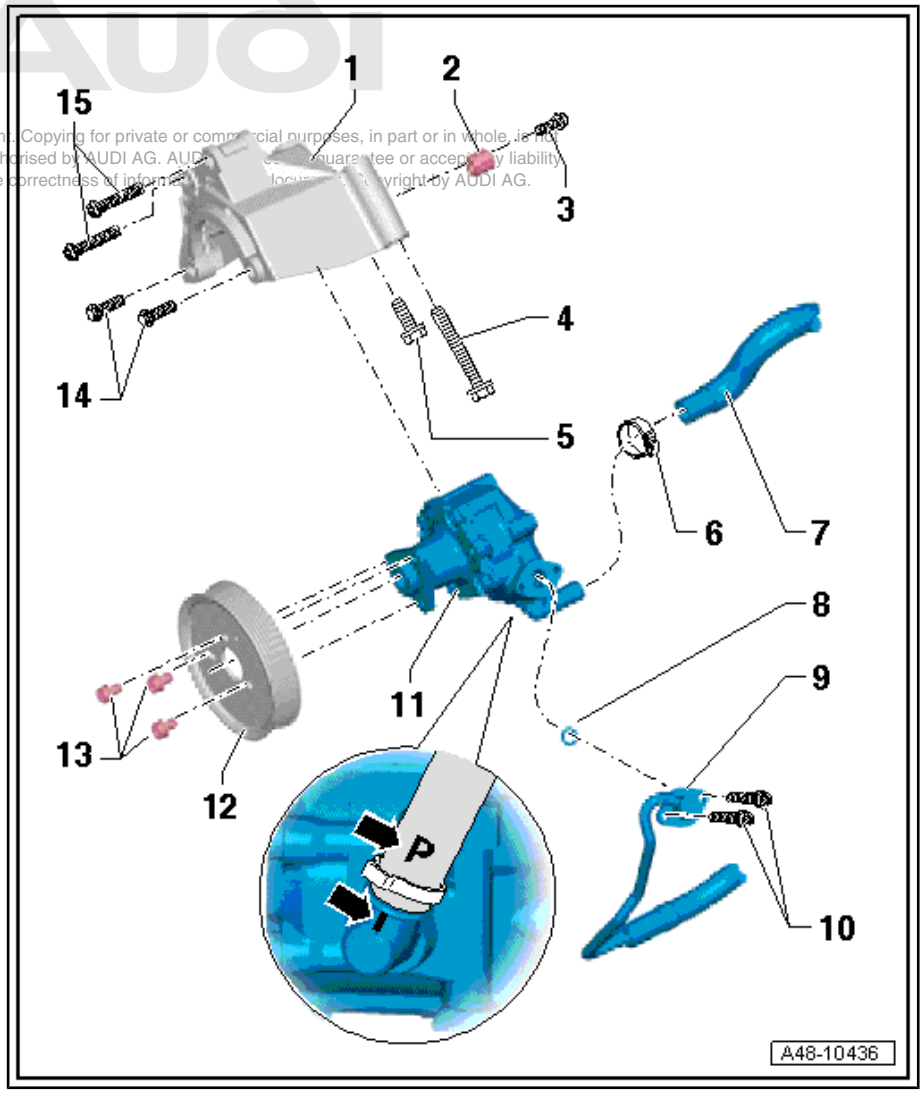
4 - Bolt
- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

5 - Bolt
- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

6 - Hose clip
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

7 - Suction hose
- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Seal
- ❑ Always renew if removed



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9 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Also secured to A/C compressor, depending on version

10 - Bolt

- ❑ 9 Nm

11 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 528
- ❑ Removing and installing ⇒ page 546
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

12 - Belt pulley

13 - Bolt

- ❑ 22 Nm

14 - Bolt

- ❑ 20 Nm
- ❑ For securing power steering pump to bracket

15 - Bolt

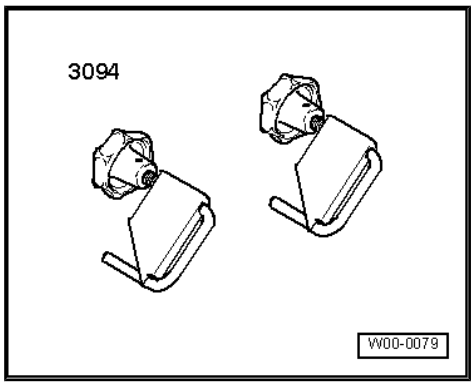
- ❑ 20 Nm
- ❑ For securing bracket to engine

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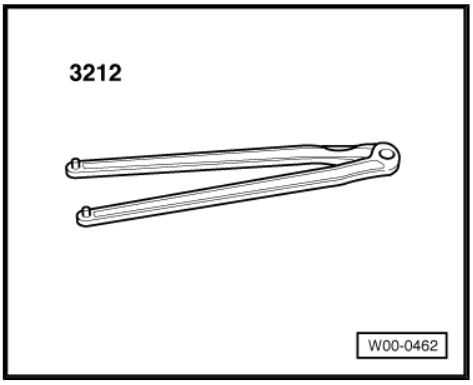
Removing

Special tools and workshop equipment required

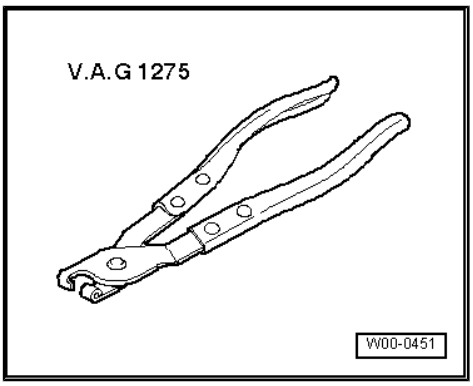
♦ Hose clamps up to 25 mm ∅ -3094-



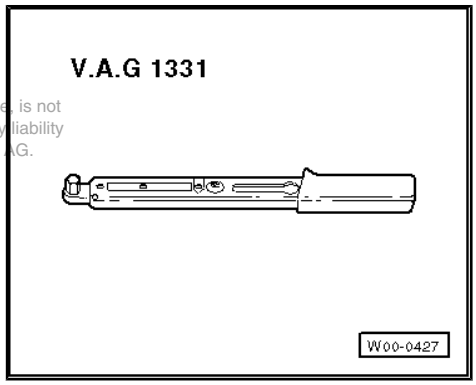
- Pin wrench -3212-



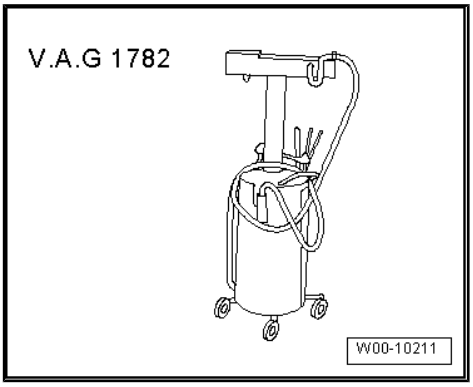
- Hose clip pliers -V.A.G 1275-



- Torque wrench -V.A.G 1331-

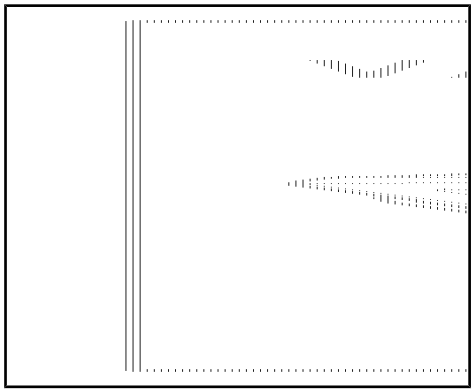


- Used oil collection and extraction unit -V.A.G 1782-



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♦ Drip tray for workshop hoist -VAS 6208-



♦ Engine bung set -VAS 6122-

General notes

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

♦ Check steering system for leaks if fluid level is low in reservoir.

♦ If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.

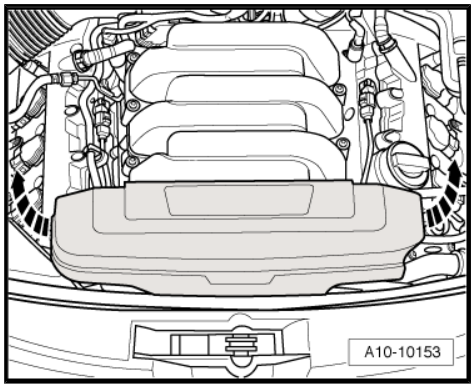
♦ The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel -arrows-.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

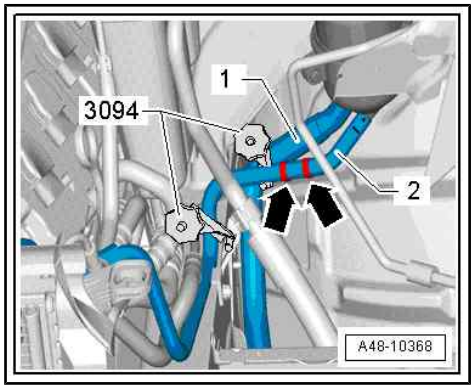
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– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

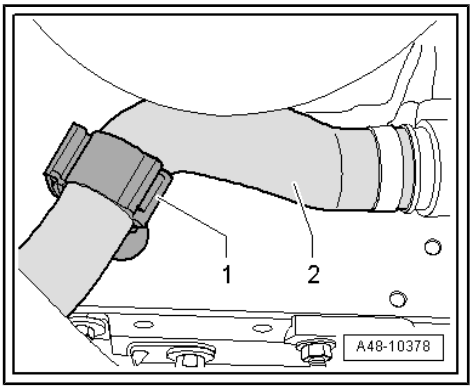
Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

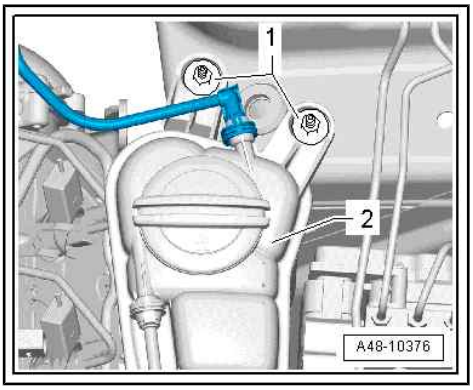


– Remove noise insulation ⇒ Rep. gr. 66 .

– Unfasten clamp -1- on longitudinal member (left-side) and take out coolant hose -2-.



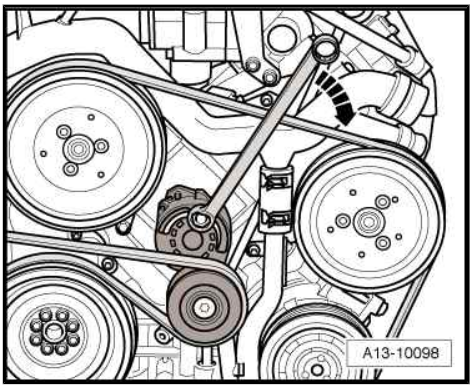
– Remove nuts -1- and detach coolant expansion tank -2- with hoses connected.
– Release and unplug connector at coolant expansion tank -2-.



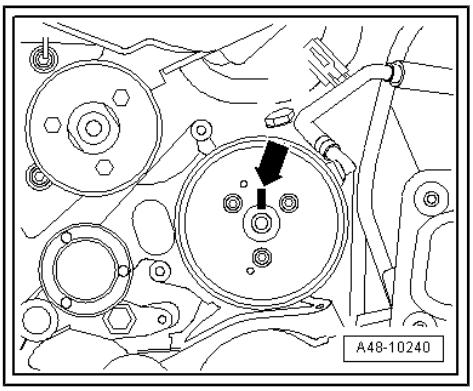
Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Swivel tensioner in direction of -arrow- to slacken poly V-belt.
– Remove poly V-belt only from power steering pump pulley.
– Release tensioner and remove tool.



– Mark position of pulley relative to hub -arrow-.

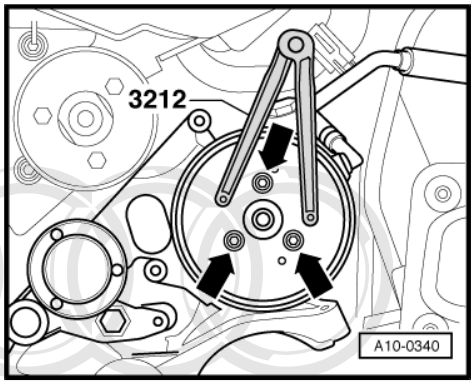


Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

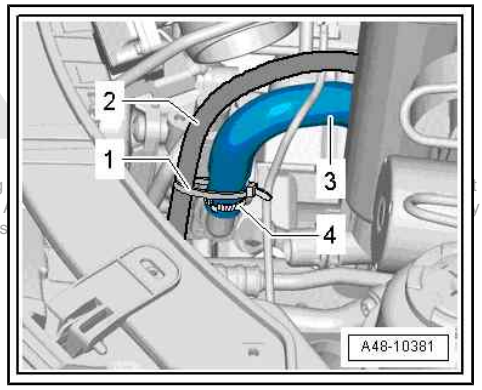
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– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.
– Take off power steering pump pulley.
– Place drip tray underneath power steering pump.

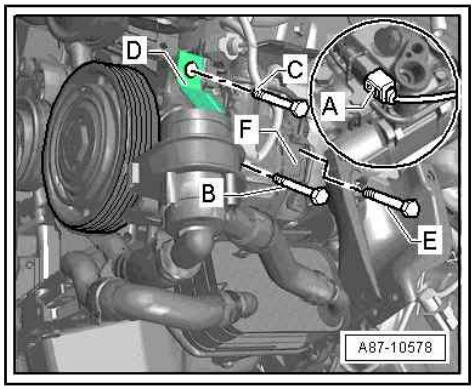


– Carefully cut through cable tie -1- for wiring harness -2-.
– Detach hose clip -4- from suction hose -3-. Pull off suction hose -3-.

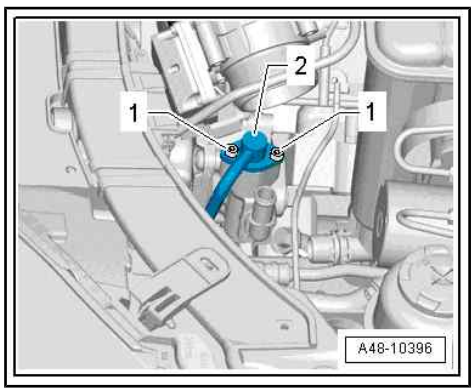
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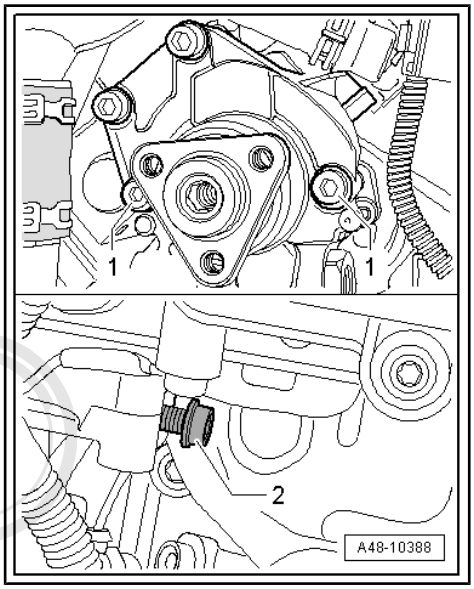
– If pressure line is also secured to A/C compressor, remove bolt -C- for bracket -D- from A/C compressor.



– Remove bolts -1- and pull pressure line -2- out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.



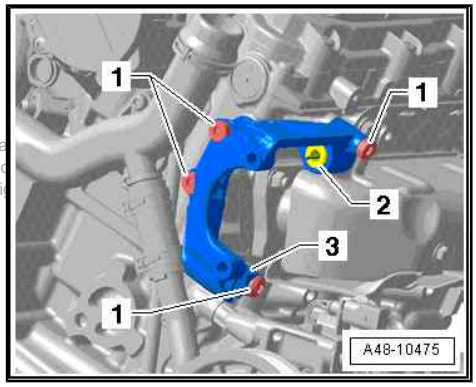
– Unbolt power steering pump from bracket. To do so, remove front bolts -1- and rear bolt -2-.



Note

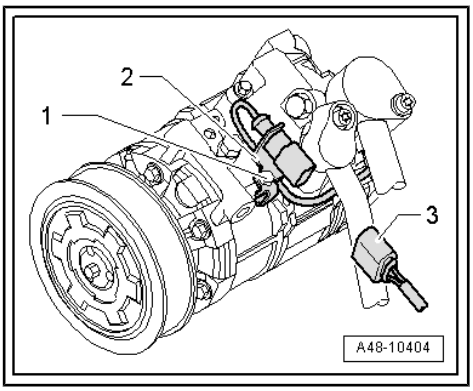
Bolt -2- is concealed inside the bracket and has already been unscrewed in the illustration.

– Remove bolts -1- from bracket -3-.



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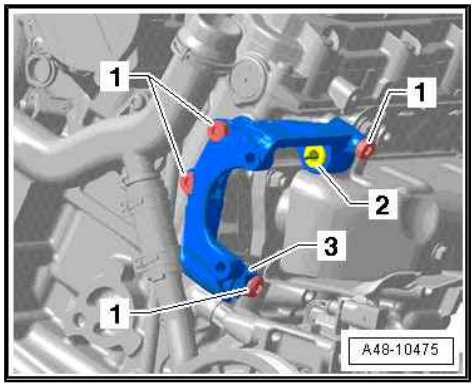
– Release connector -3- and unplug.
– Remove bolt -1- and detach bracket -2-.



– Remove bracket -3-.

– To install power steering pump, drive back sleeve -2- slightly at bracket.

– Take out power steering pump.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 545

Tightening torques ⇒ Rep. gr. 87

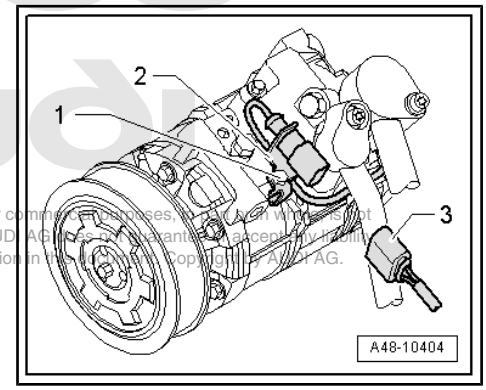
Note

- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*

– Insert power steering pump with bracket.

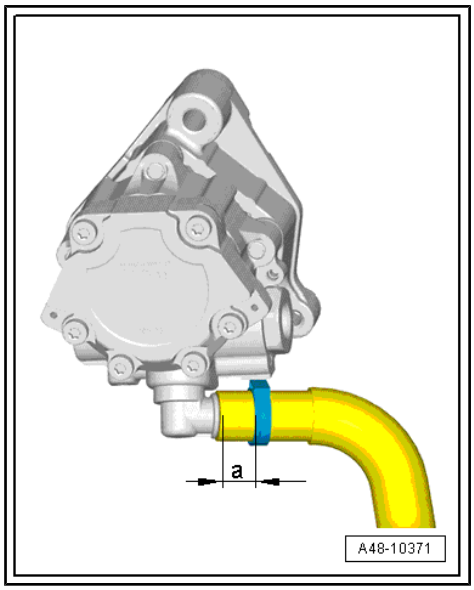
– Fit bracket -2- and tighten bolt -1- ⇒ Rep. gr. 87 .

– Plug in connector -3-.

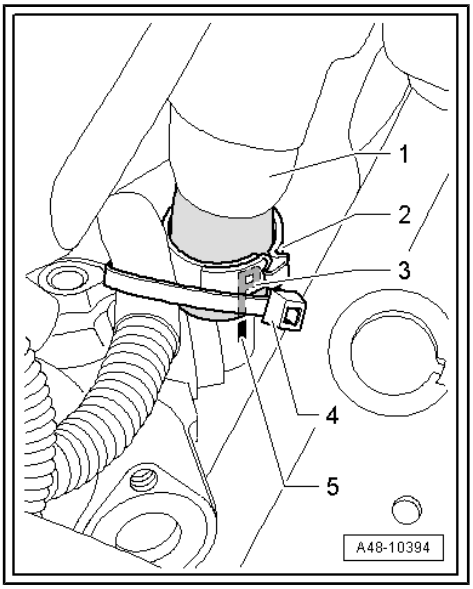


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– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



– Before installing power steering pump, fit suction hose -1- and position marking „P“ -3- opposite marking -5- on power steering pump.
– Secure suction hose -1- with new hose clip -2-.
– Secure wiring harness to connection with new cable tie -4-.

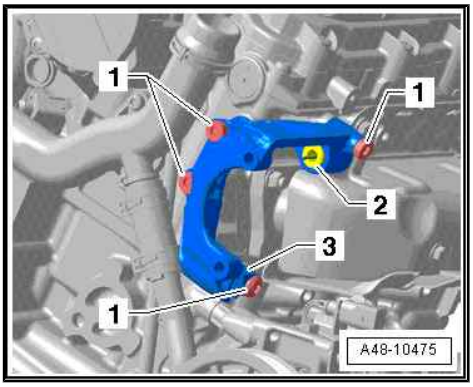


Note

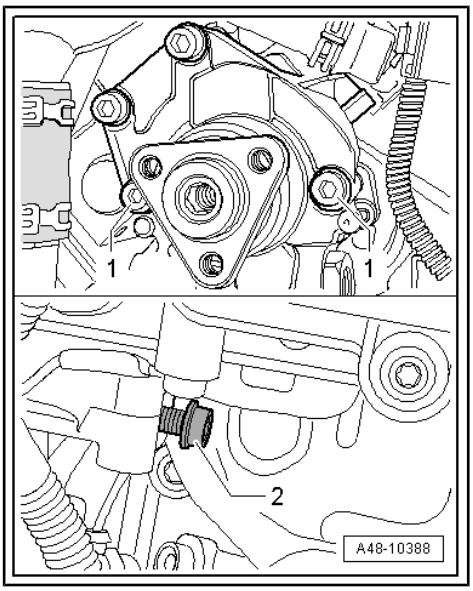
Due to restricted space, the hose clip -2- cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump has been installed.

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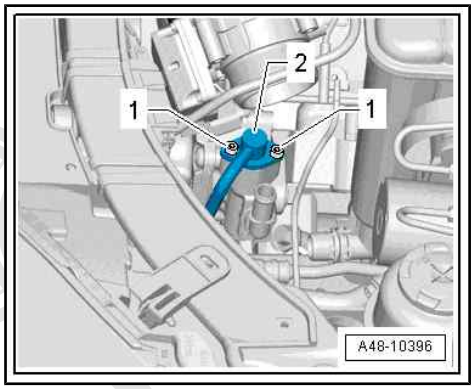
– Attach bracket -3- and tighten bolts -1-.
• Sleeve -2- has been driven back slightly.
– Turn hub by hand until fluid comes out at pump outlet.
– Fit power steering pump into bracket.



– First screw in front bolts -1- loosely.
– Then screw in rear bolt -2- loosely.
– Tighten bolts -1- and -2-.

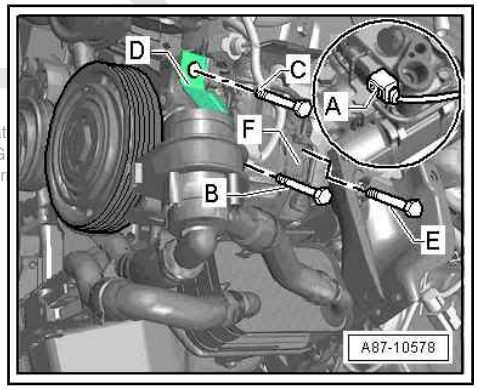


– Press pressure line -2- as far as it will go into power steering pump. Then tighten bolts -1-.

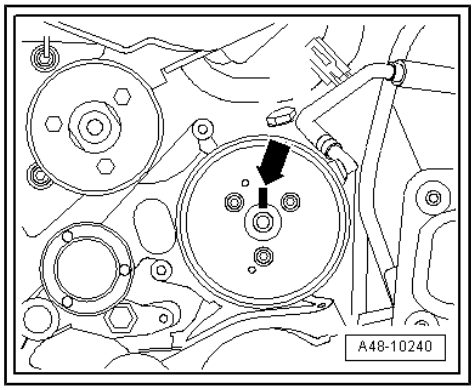


– If pressure line is also secured to A/C compressor, tighten bolt -C- for bracket -D- on A/C compressor.
– Clean off fluid in engine compartment where necessary.

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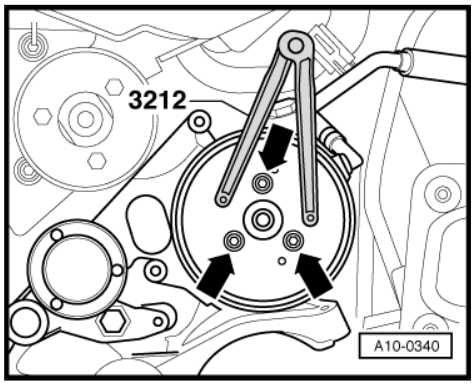
– Align marking on pulley -arrow- (made previously) with marking on hub.



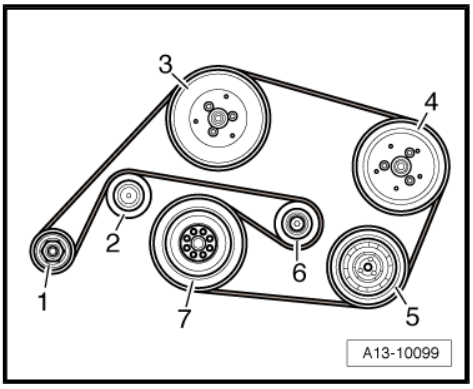
– Tighten bolts -arrows- for belt pulley ⇒ Rep. gr. 13 .

Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .



– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Coolant pump
4 - Power steering pump
5 - Air conditioner compressor
6 - Tensioning roller
7 - Crankshaft

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11 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 6-cylinder TFSI engine)

⇒ „11.1 Exploded view (vehicles with 6-cylinder TFSI engine, vehicles with dynamic steering)“, page 556

⇒ „11.2 Exploded view (vehicles with 6-cylinder TFSI engine, vehicles without dynamic steering)“, page 559

⇒ „11.3 Exploded view of pipes and hoses (vehicles with 6-cylinder TFSI engine, vehicles with and without dynamic steering)“, page 562

⇒ „11.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder TFSI engine, vehicles with and without dynamic steering)“, page 565

⇒ „11.5 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles with dynamic steering)“, page 570

⇒ „11.6 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles without dynamic steering)“, page 581

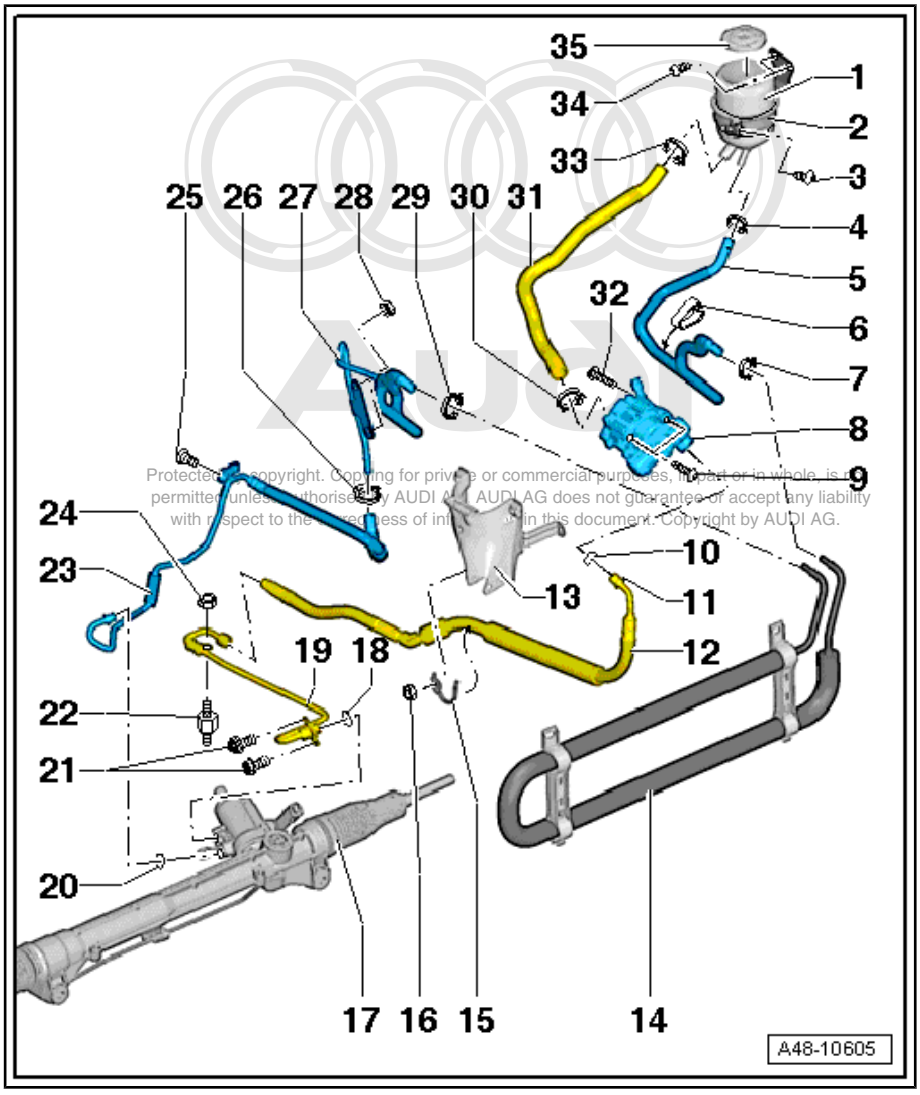
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11.1 Exploded view (vehicles with 6-cylinder TFSI engine, vehicles with dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Reservoir

- ❑ Note correct installation position ⇒ page 562
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

2 - Securing strap

- ❑ Securing to body ⇒ page 562

3 - Bolt

- ❑ 9 Nm

4 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

5 - Return hose

- ❑ From hydraulic fluid cooler to reservoir
- ❑ Securing to longitudinal member ⇒ page 562
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

6 - Clip

7 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

8 - Steering hydraulics pump - V119-

- ❑ With regulating valve for power steering pump -(V119)-
- ❑ Pump and regulating valve are combined as one component and renewed together
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 565
- ❑ Removing and installing ⇒ page 570

9 - Bolt

- ❑ 20 Nm

10 - Seal

- ❑ Always renew if removed

11 - Union screw

- ❑ 38 Nm
- ❑ Installation position of line connection ⇒ page 562
- ❑ Installation position of line connection on power steering pump ⇒ page 570

12 - Pressure line

- ❑ From power steering pump to power steering box

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Securing to engine mounting ⇒ page 562
- ❑ Installation position of line connection ⇒ page 562

13 - Connector

- ❑ For engine mounting

14 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 562
- ❑ Removing and installing ⇒ page 618

15 - Retainer

16 - Nut

- ❑ 9 Nm

17 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

18 - Seal

- ❑ Always renew if removed

19 - Pressure line

- ❑ From power steering pump to power steering box

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Securing to cross brace ⇒ page 562
- ❑ Installation position of line connection ⇒ page 562

20 - Seal

- ❑ Always renew if removed

21 - Bolt

- ❑ 20 Nm

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22 - Rubber mounting

- ❑ 6 Nm

23 - Return line

- ❑ From power steering box to hydraulic fluid cooler
- ❑ Securing to subframe ⇒ page 562
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

24 - Nut

- ❑ 6 Nm

25 - Bolt

- ❑ 9 Nm

26 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

27 - Return line

- ❑ From power steering box to hydraulic fluid cooler

> **Caution**
> *Fully insert return line when installing.*

- ❑ Securing to subframe ⇒ page 562
- ❑ Installation position at line connection ⇒ page 623

28 - Nut

- ❑ 9 Nm

29 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

30 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

31 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 570

32 - Bolt

- ❑ 20 Nm

33 - Spring-type clip

- ❑ Use hose clip pliers -V.A.G 1921- for removal and installation

34 - Bolt

- ❑ 9 Nm

35 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

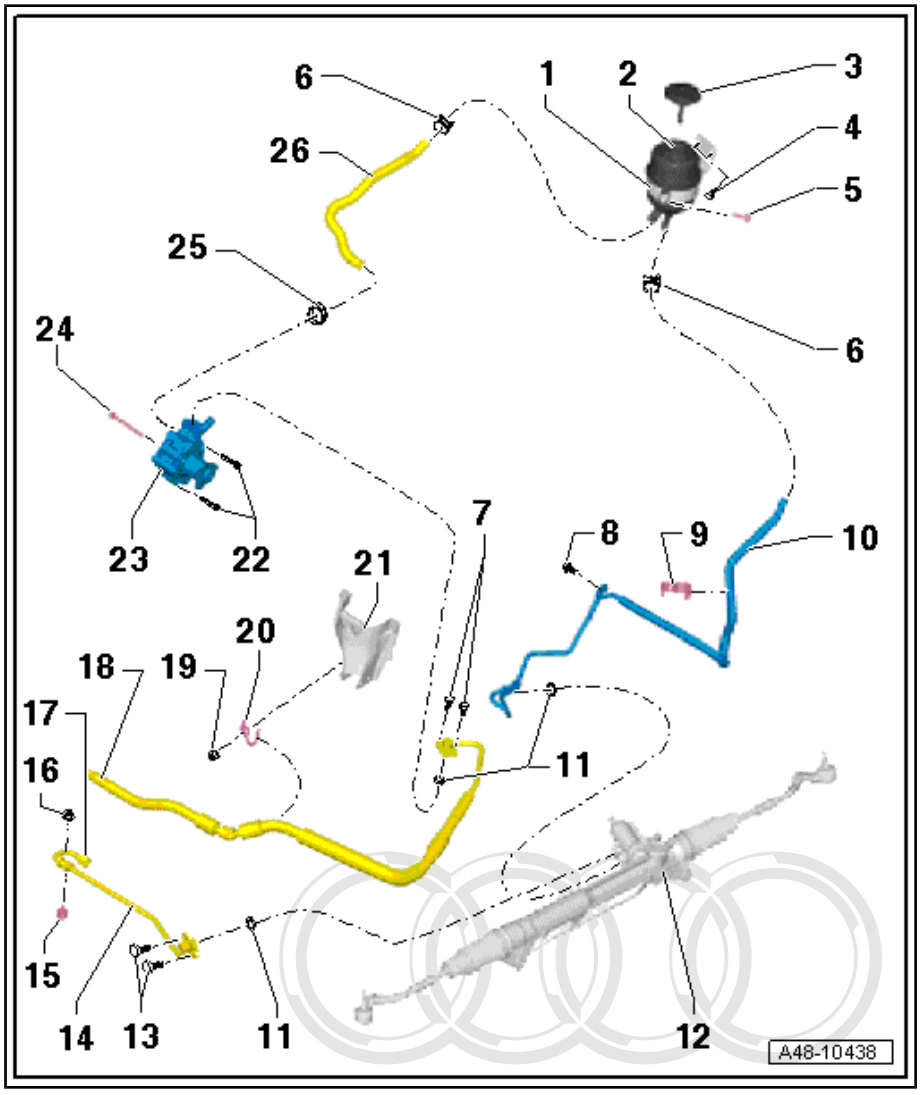
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11.2 Exploded view (vehicles with 6-cylinder TFSI engine, vehicles without dynamic steering)

There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 562

2 - Reservoir

- ❑ Note correct installation position ⇒ page 562
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Bolt

- ❑ 9 Nm

8 - Bolt

- ❑ 9 Nm

9 - Retainer

- ❑ For securing suction hose to longitudinal member ⇒ page 562

10 - Return line

- ❑ From power steering box to reservoir

Caution

Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 562
- ❑ Note correct position on reservoir ⇒ page 623

11 - Seal

- ❑ Always renew if removed

12 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue

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- ❑ Removing and installing ⇒ page 402

13 - Bolt

- ❑ 20 Nm

14 - Pressure line

- ❑ From power steering pump to power steering box; different versions, with or without connecting point; refer to ⇒ Electronic parts catalogue
- ❑ Securing to cross brace ⇒ page 562
- ❑ Installation position of line connection ⇒ page 562

Caution

Fully insert pressure line when installing.

15 - Rubber mounting

- ❑ 6 Nm

16 - Nut

- ❑ 6 Nm

17 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 562
- ❑ Union nut not fitted on pressure line without connecting point

18 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 562
- ❑ Installation position of line connection ⇒ page 562

19 - Nut

- ❑ 9 Nm

20 - Retainer

21 - Connector

- ❑ For engine mounting

22 - Bolt

- ❑ 20 Nm

23 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 565
- ❑ Removing and installing ⇒ page 581

24 - Bolt

- ❑ 20 Nm

25 - Hose clip

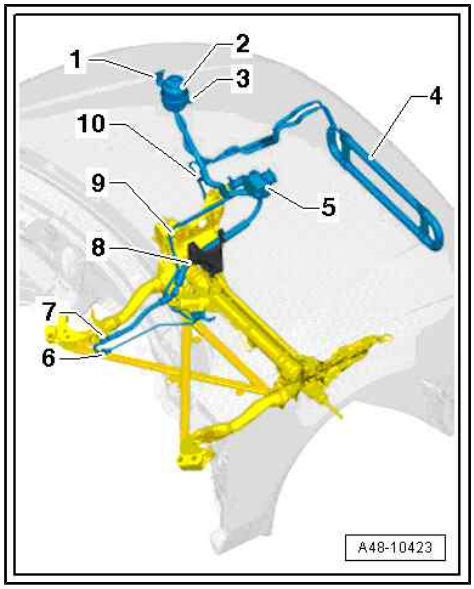
- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

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26 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 581

11.3 Exploded view of pipes and hoses (vehicles with 6-cylinder TFSI engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 562

2 - Reservoir in bracket ⇒ page 563

3 - Bolt in bracket ⇒ page 562

4 - Hydraulic fluid cooler to condenser ⇒ page 563

5 - Power steering pump in bracket with regulating valve for power steering pump -(V119)- ⇒ page 570 or without regulating valve for power steering pump -(V119)- ⇒ page 581

6 - Pressure line to cross brace ⇒ page 563

7 - Installation position of pressure line connection ⇒ page 563

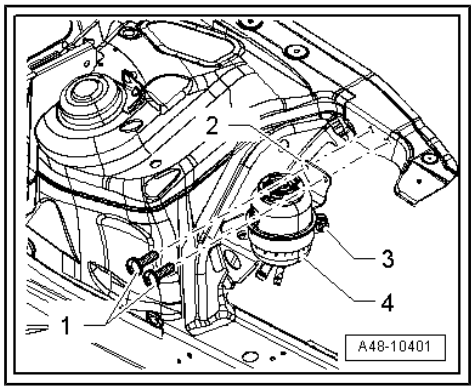
8 - Pressure line to engine mounting ⇒ page 564

9 - Return line to subframe ⇒ page 565

10 - Retainers securing return line to longitudinal member ⇒ page 564 or ⇒ page 564

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Bracket for reservoir to body

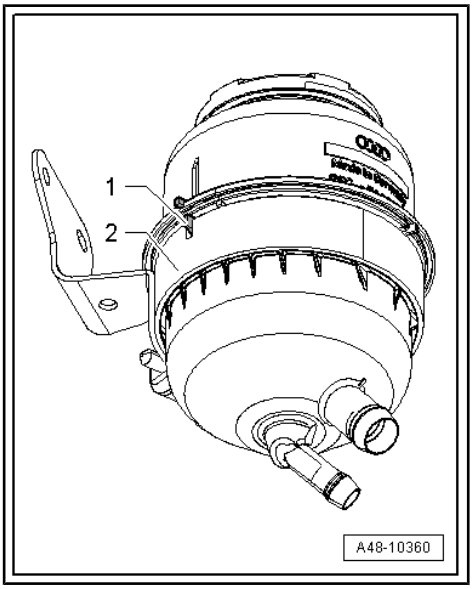


– Secure bracket -2- to body with bolts -1-.

– Secure reservoir -4- in bracket -2- with bolt -3-.

Reservoir in bracket

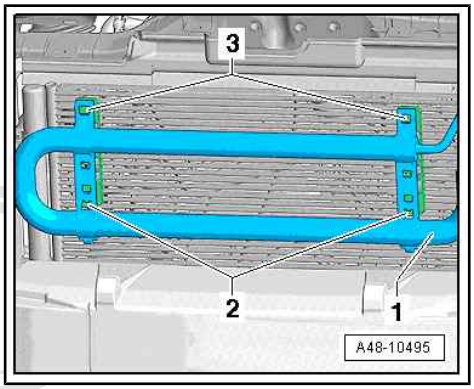
– Fit reservoir (insert lug -1- into recess in bracket -2-).



Hydraulic fluid cooler to condenser

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

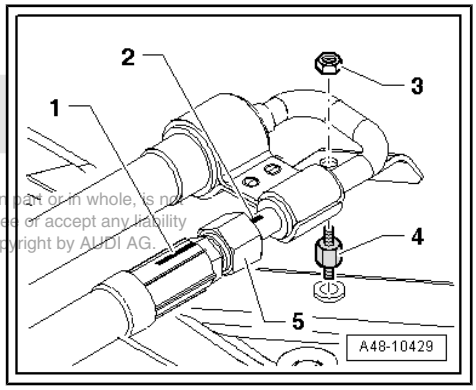
Hoses to hydraulic fluid cooler ⇒ page 623



Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

– Note correct position of line when connecting. Markings -1- and -2- must be aligned.

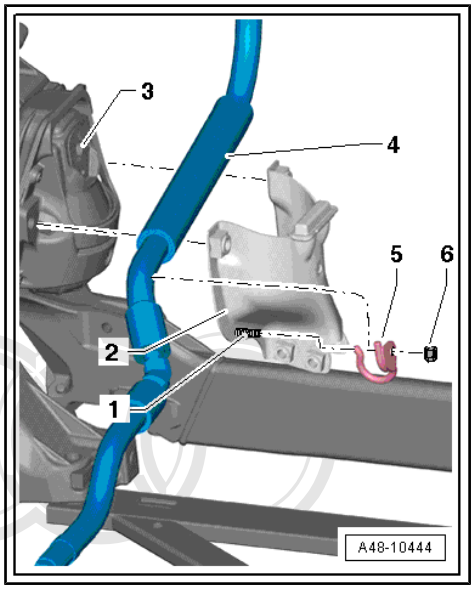


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Pressure line to engine mounting

– Route pressure line -4- between connecting element -2- and engine mounting -3-.

– Screw retainer -5- to stud -1- with nut -6-.



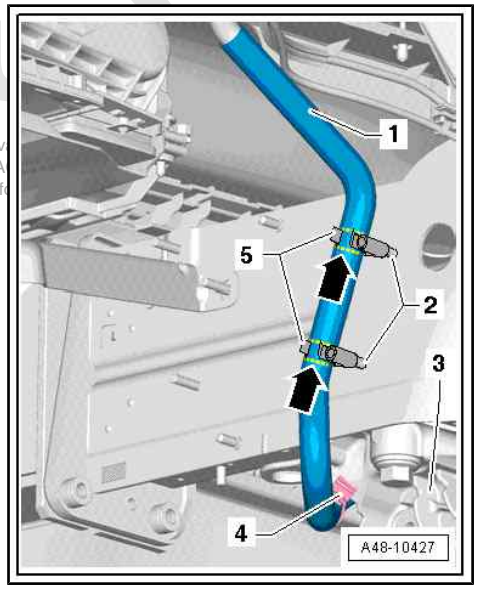
Retainers securing return line to longitudinal member (vehicles without dynamic steering)

– Fit clips -5- of return line -1- onto studs -2- on longitudinal member.

– Insert return line -1- with colour markings -arrows- into clips -5-.

– Secure retainer -4- of return line -1- to front left of subframe -3-.

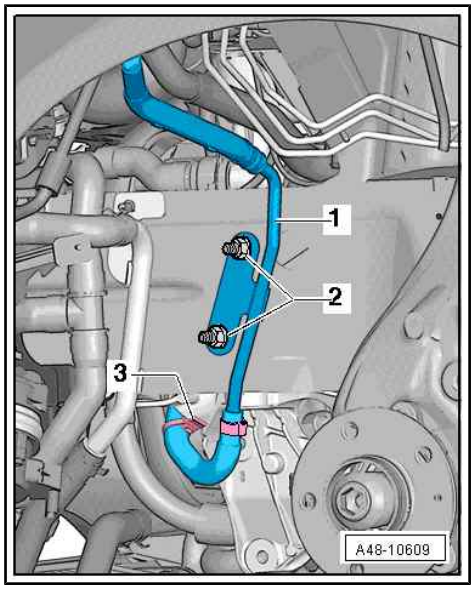
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Retainers securing return line to longitudinal member (vehicles with dynamic steering)

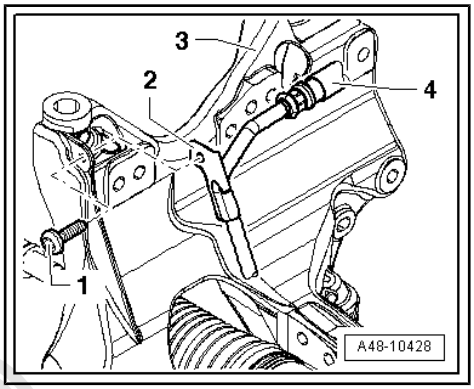
– Fit retaining plate of return line -1- onto studs of longitudinal member and tighten nuts -2-.

– Secure retainer -3- of return line -1- to front left of subframe.



Return line to subframe

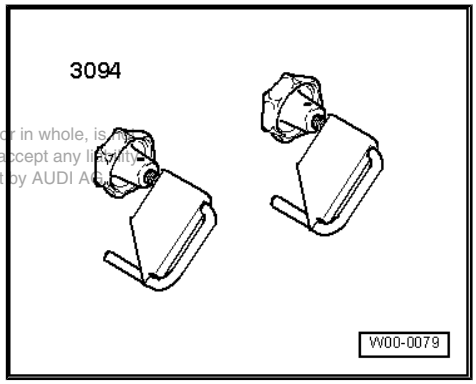
– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.



11.4 Checking delivery pressure of power steering pump (vehicles with 6-cylinder TFSI engine, vehicles with and without dynamic steering)

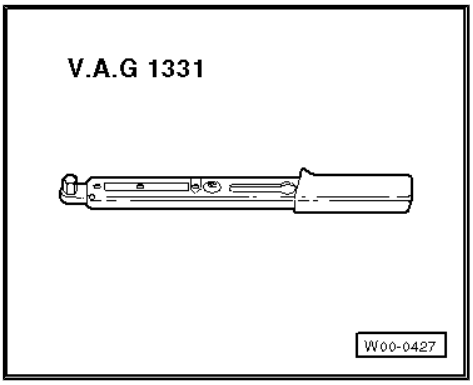
Special tools and workshop equipment required

♦ Hose clamps up to 25 mm ∅ -3094-

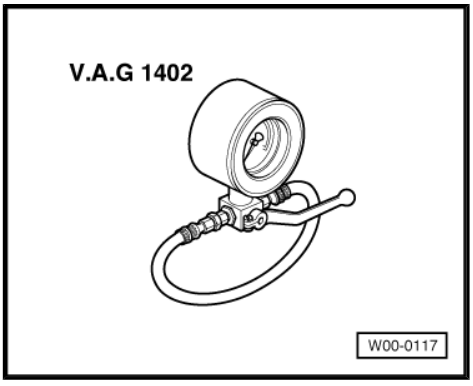


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♦ Torque wrench -V.A.G 1331-



♦ Power steering tester -V.A.G 1402-

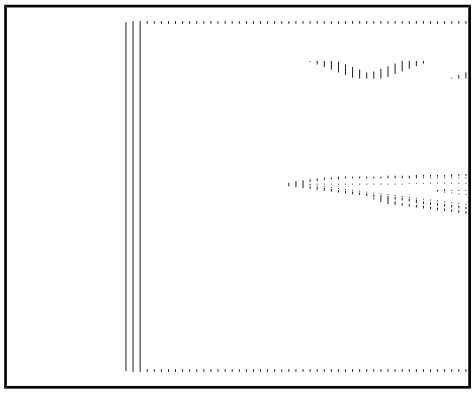


- Adapter set -V.A.G 1402/6-

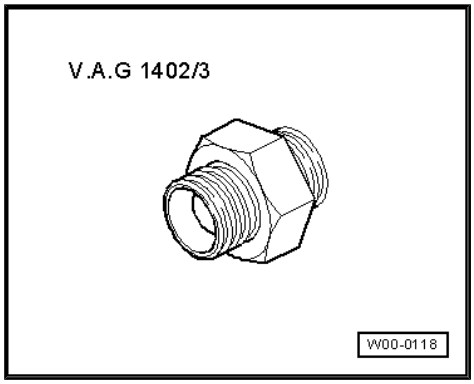


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- Drip tray for workshop hoist -VAS 6208-



- Adapter -V.A.G 1402/3- is required for vehicles with connecting point in pressure line ⇒ Item 14 (page 561)



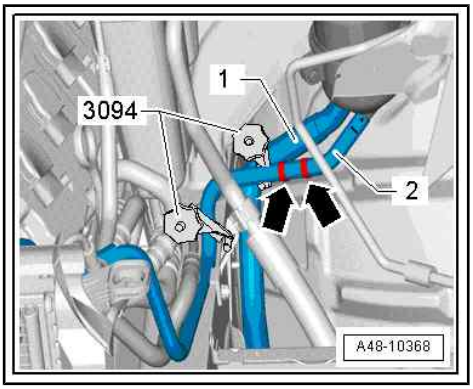
- Adapter set -V.A.G 1402/17- is required for vehicles without connecting point in pressure line ⇒ Item 14 (page 561)

Test requirements:

- V-belt and V-belt tension OK.
- No leaks in system
- Hoses and pipes not kinked or constricted

Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

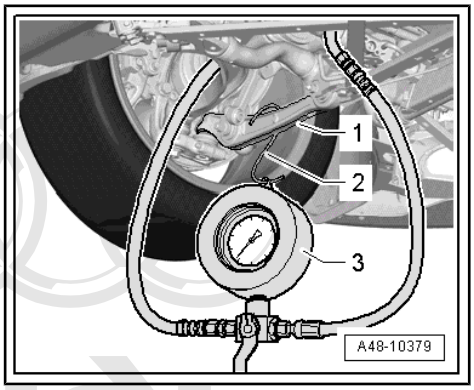
Vehicles with connecting point in pressure line

⇒ Item 14 (page 561)

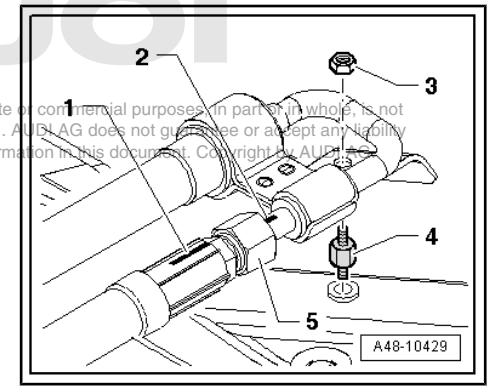
– Remove noise insulation ⇒ Rep. gr. 66 .

– Attach tester -3- by a hook -2- to track control link -1-.

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.



– Slacken union nut -5-. Counterhold at hexagon flats.



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– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

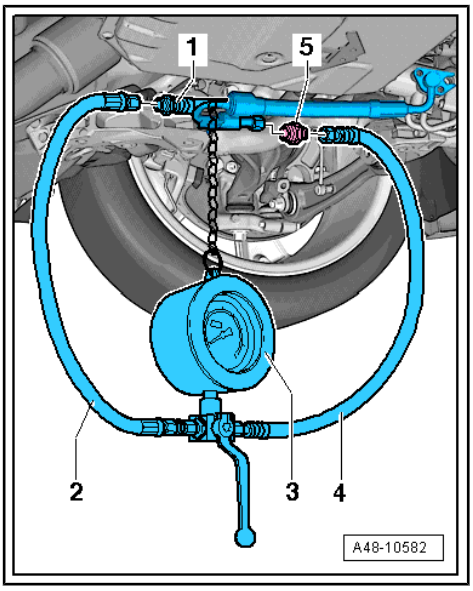
2 - Hose from adapter set -V.A.G 1402/6-

3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

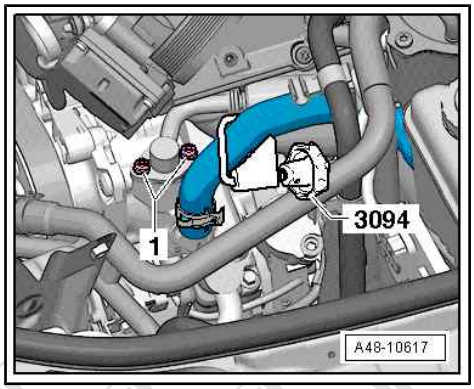
5 - Adapter -V.A.G 1402/3-

– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.

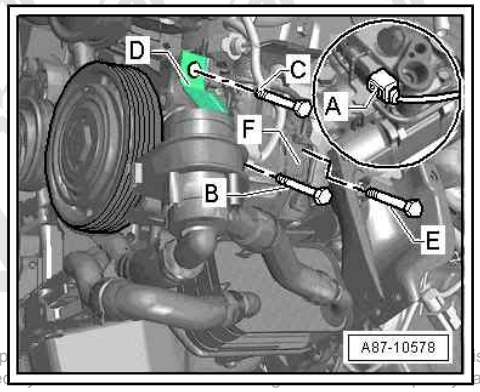


Vehicles without connecting point ⇒ Item 22 (page 490)

– Remove bolts -1- and pull pressure line out of power steering pump.

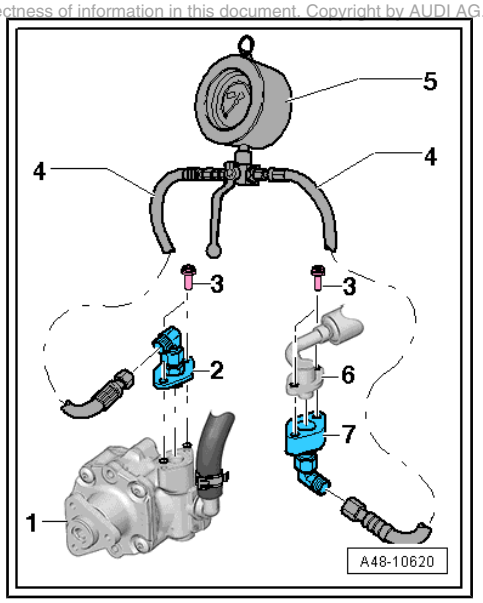


– If pressure line is also secured to A/C compressor, remove bolt -C- for bracket -D- from A/C compressor.



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– Connect power steering tester -V.A.G 1402- as shown.



1 - Power steering pump

2 - Adapter -V.A.G 1402/17-1- [15] with angle piece -V.A.G 1402/17-3-

3 - Bolt for securing pressure line ⇒ Item 8 (page 489)

4 - Hose from adapter set -V.A.G 1402/6-

5 - Power steering tester -V.A.G 1402-

6 - Pressure line

7 - Adapter -V.A.G 1402/17-2- with angle piece -V.A.G 1402/17-3-

15) If the seal on adapter -V.A.G 1402/17-1- is damaged or leaking, it must be replaced with a new seal ⇒ Item 11 (page 489) ⇒ Electronic parts catalogue .

Note

- *Position angle piece -V.A.G 1402/17-3- on adapter -V.A.G 1402/17-1- so that hose of adapter set -V.A.G 1402/6- does not come into contact with pulley or poly V-belt.*
- *Tighten union nuts on angle pieces -V.A.G 1402/17-3- and on hoses of adapter set -V.A.G 1402/6- hand-tight using an open-end spanner.*

All vehicles (continued):

– Make sure lever on pressure gauge is at position -2-.

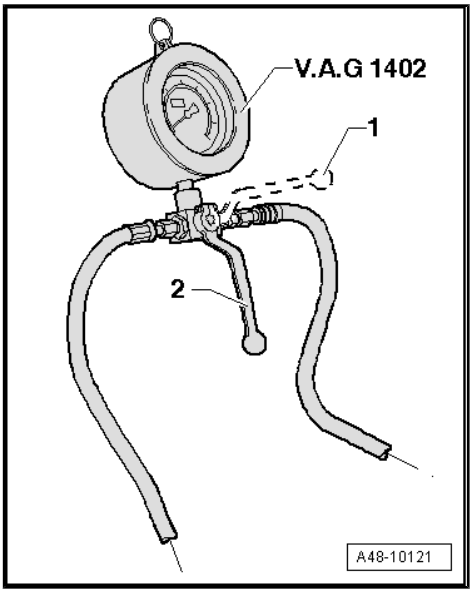
– Lower vehicle.

– Remove hose clamps -3094- .

– Start engine but do not press accelerator.

– Turn steering wheel approx. 10 times from lock to lock.

– Switch off engine and top up hydraulic fluid in reservoir if necessary.



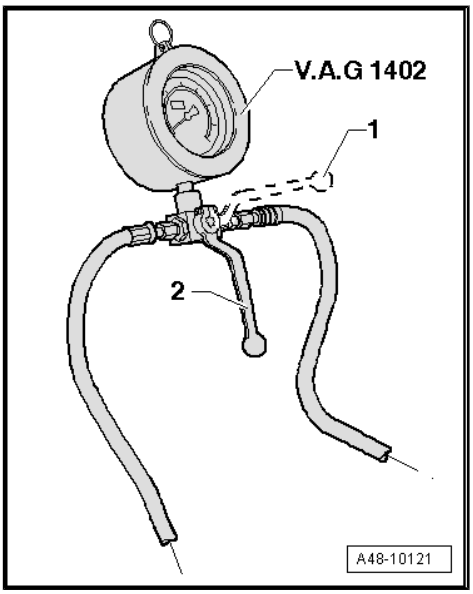
Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.

– Start engine.

– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.



Specification for delivery pressure (vehicles without dynamic steering): 115…132 bar

Specification for delivery pressure (vehicles with dynamic steering): 114…131 bar

Renew power steering pump if specification is not attained
⇒ „11.5 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles with dynamic steering)“, page 570 or
⇒ „11.6 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles without dynamic steering)“, page 581 .

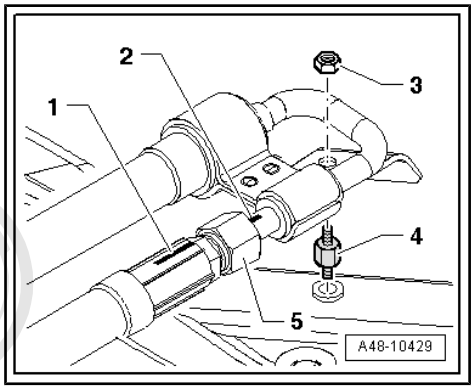
– Switch off engine.

– Remove power steering tester -V.A.G 1402- .

Tightening torques ⇒ page 556 , ⇒ page 559

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– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- must be aligned.
– Tighten union nut -1-. Counterhold at hexagon flats.
– Tighten nut -3- and, if necessary, rubber mounting -4-.
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .



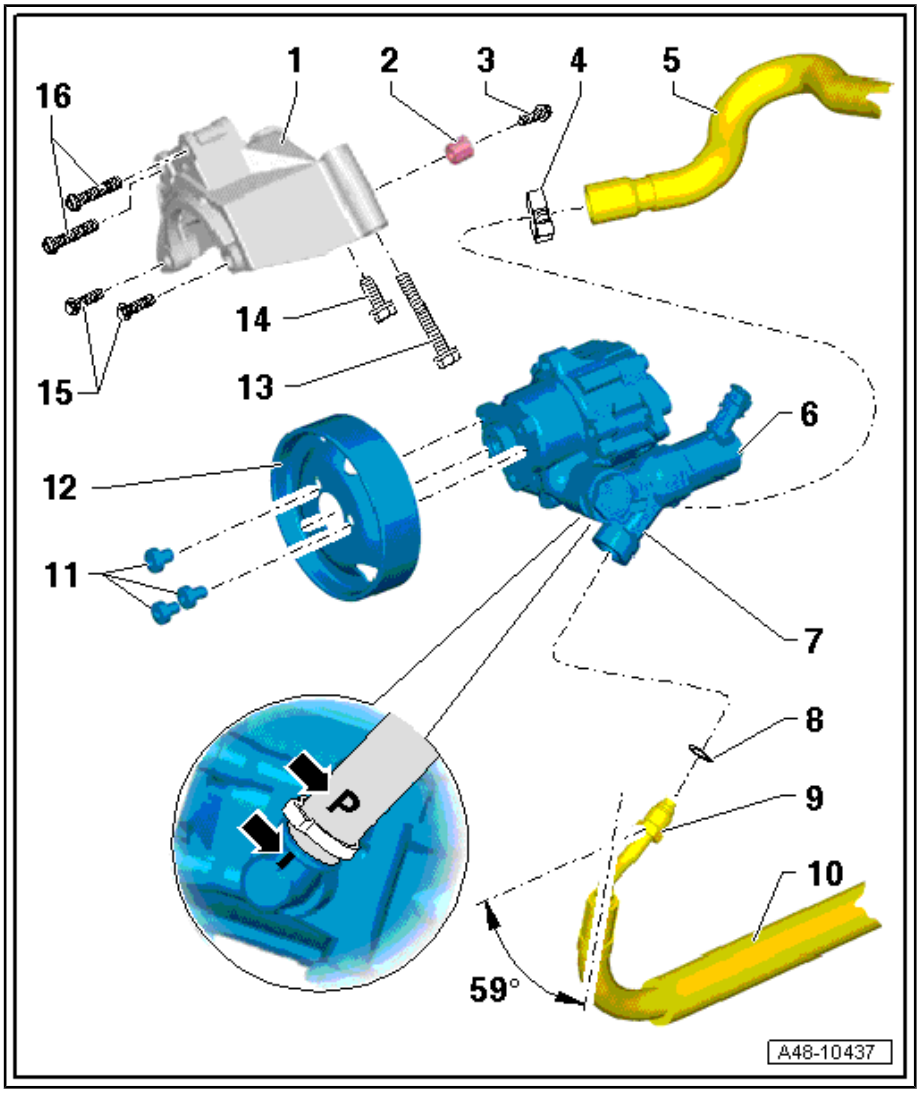
11.5 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles with dynamic steering)

Exploded view of power steering pump

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Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 20 Nm

4 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

5 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

6 - Regulating valve for power steering pump -(V119)-

- ❑ Power steering pump and regulating valve are combined as one component and can only be renewed together

7 - Steering hydraulics pump -V119-

- ❑ With regulating valve for power steering pump -(V119)-
- ❑ Power steering pump and regulating valve ⇒ Item 6 (page 571) are combined as one component and can only be renewed together
- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 565
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

8 - Seal

- ❑ Always renew if removed

9 - Union nut

- ❑ 38 Nm
- ❑ 36 Nm (this tightening torque only applies when using slotted ring spanner insert, 17 mm -V.A.G 1331/10-)

10 - Pressure line

Caution

Fully insert pressure line when installing.

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- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 59°.

11 - Bolt

- ❑ 22 Nm

12 - Belt pulley

13 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

14 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

15 - Bolt

- ❑ 20 Nm
- ❑ For securing power steering pump to bracket

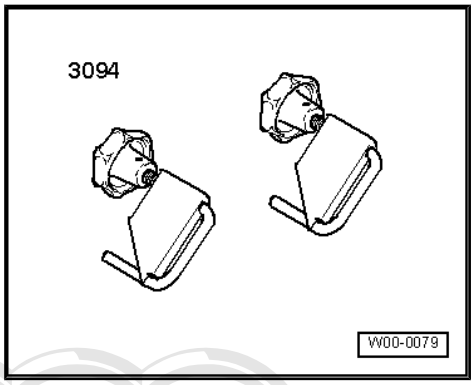
16 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine

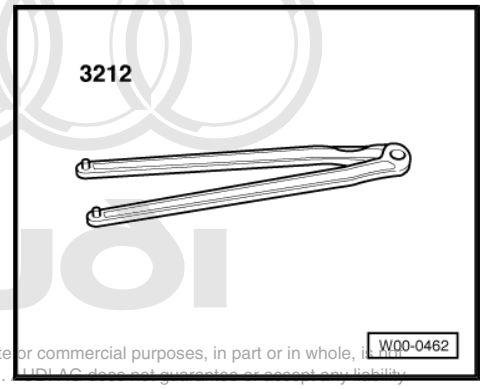
Removing

Special tools and workshop equipment required

- ♦ Hose clamps up to 25 mm ∅ -3094-

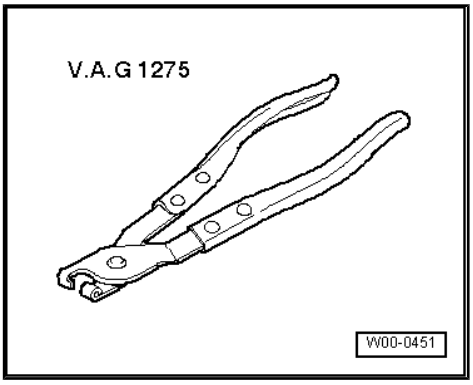


- ♦ Pin wrench -3212-

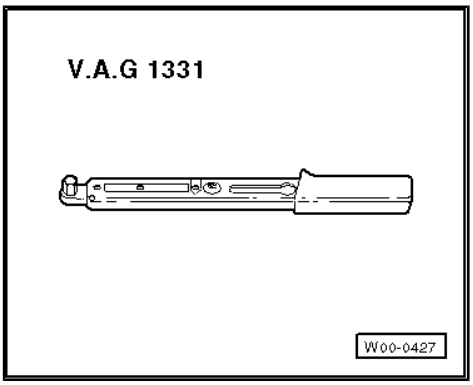


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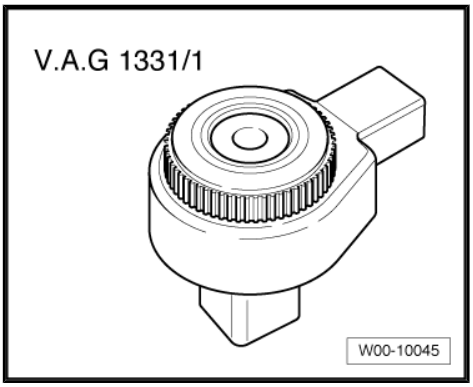
- Hose clip pliers -V.A.G 1275-



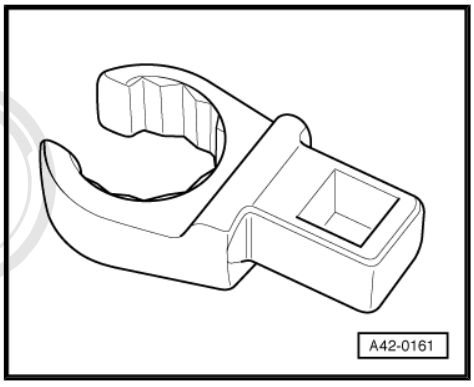
- Torque wrench -V.A.G 1331-



- Ratchet -V.A.G 1331/1-

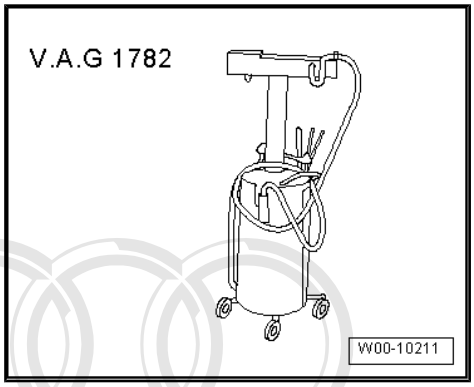


- Slotted ring spanner insert, 17 mm -V.A.G 1331/10-

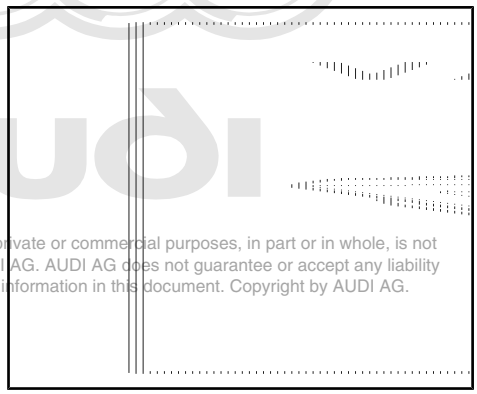


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- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



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- Engine bung set -VAS 6122-

General notes

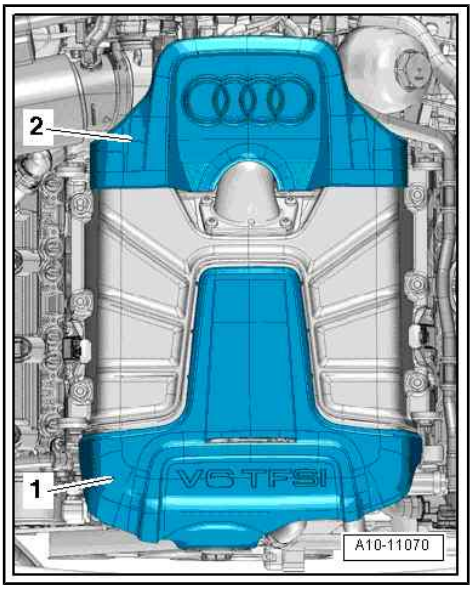
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Always check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel -1-.

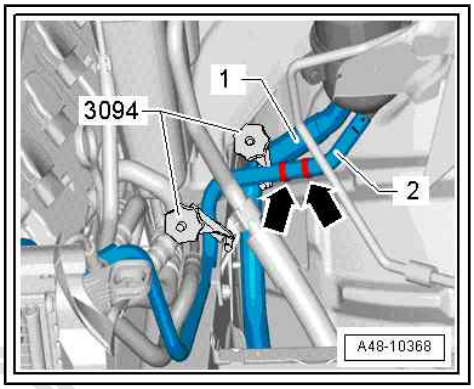
– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .



– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

Caution

- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

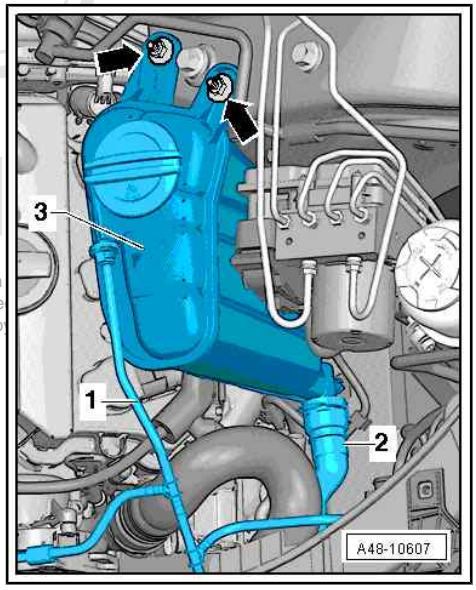


– Remove noise insulation ⇒ Rep. gr. 66 .

– Drain coolant ⇒ Rep. gr. 19 .

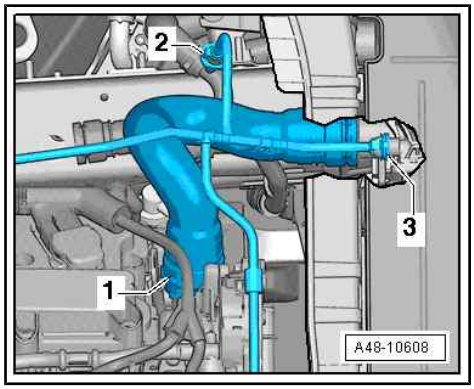
– Detach coolant lines -1- and -2- from coolant expansion tank. Remove nuts -arrows- and lift coolant expansion tank -3- out of retainer.

– Release and unplug connector (bottom) at coolant expansion tank -3-. Move coolant expansion tank -3- to one side.

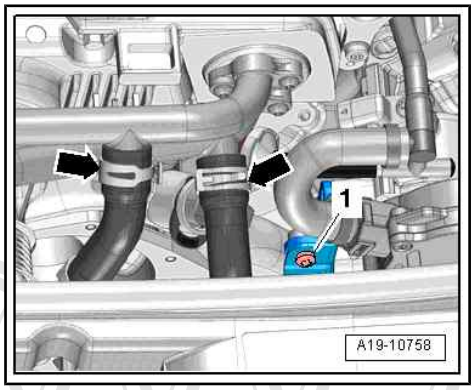


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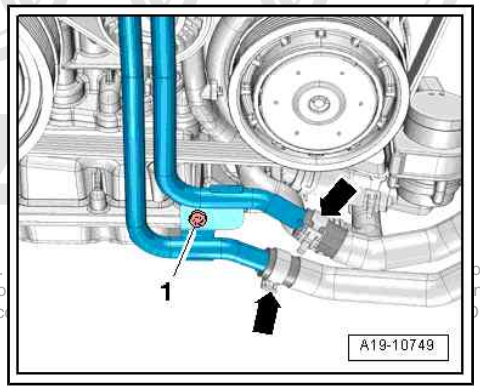
– Detach coolant hoses -1- and -2- from coolant pipe and swivel aside.
– Detach coolant line -3- from radiator and swivel aside.



– Remove bolt -1- for coolant pipes (top).
• -Arrows- can be disregarded.



– Remove bolt -1- for coolant pipes (bottom).
• -Arrows- can be disregarded.

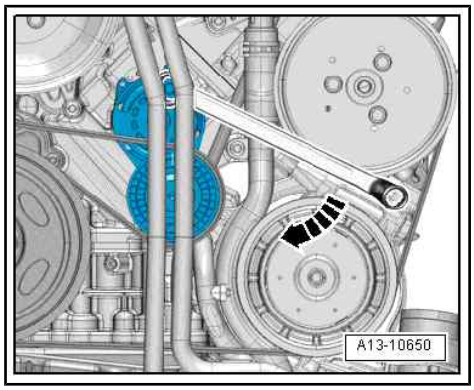


Note

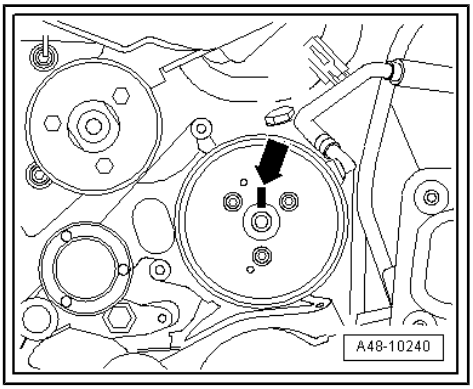
Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

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– Slacken off poly V-belt and detach belt from power steering pump pulley.
– Swivel tensioner in direction of -arrow- to slacken poly V-belt.
– Remove poly V-belt only from power steering pump pulley.
– Release tensioner and remove tool.



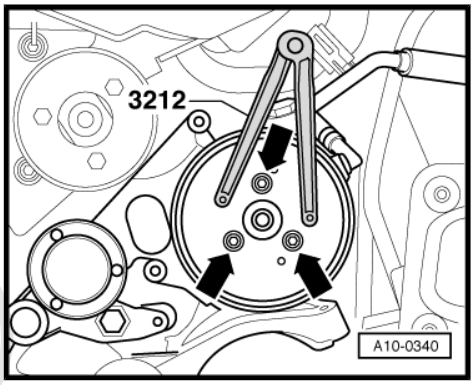
– Mark position of pulley relative to hub -arrow-.



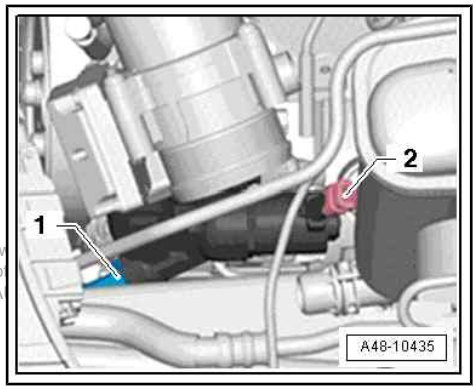
Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.
– Take off power steering pump pulley.
– Place drip tray underneath power steering pump.

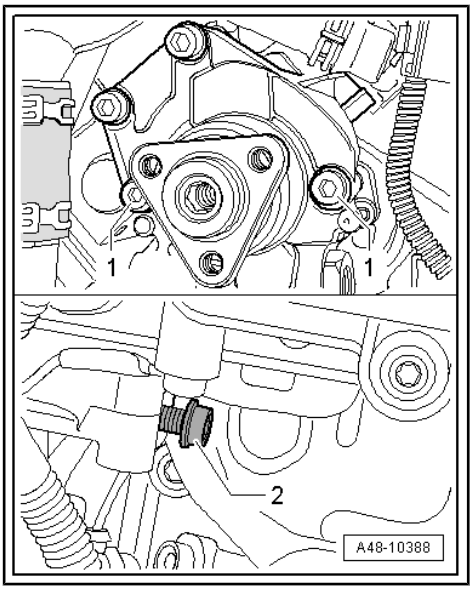


– Release connector -2- and unplug.
– Unscrew union nut -1- and pull pressure line out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.



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– Unbolt power steering pump from bracket. To do so, remove front bolts -1- and rear bolt -2-.

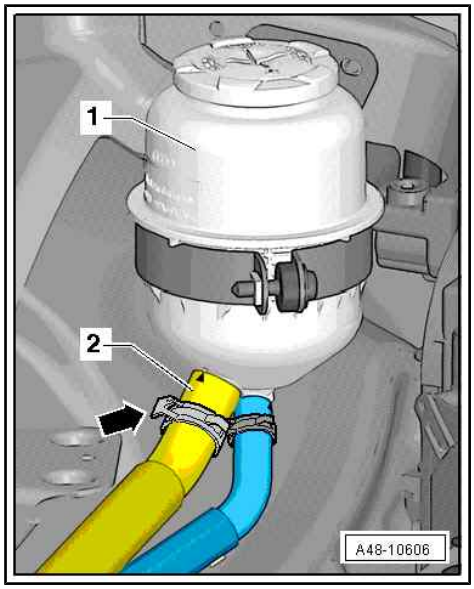


Note

Bolt -2- is concealed inside the bracket and has already been unscrewed in the illustration.

– Release spring-type hose clip -arrow- for suction hose -2- at reservoir -1- and detach suction hose -2- from reservoir.

– Take power steering pump with suction hose out of bracket.



Installing

Installation is carried out in the reverse sequence. Note the following points:

Tightening torques ⇒ page 570

Installation position of hoses
⇒ „14.1 Installation position of hoses on fluid reservoir, hydraulic fluid cooler and return line“, page 623

Note

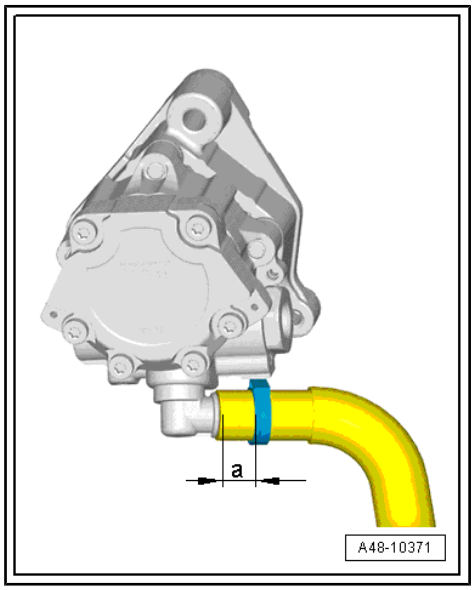
- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*
- *Due to restricted space, the hose clip cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump is installed, and so this must be done while the pump is still removed.*

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– Before installing power steering pump, fit suction hose ⇒ Item 5 (page 571) and align marking „P“ with seam on pump.

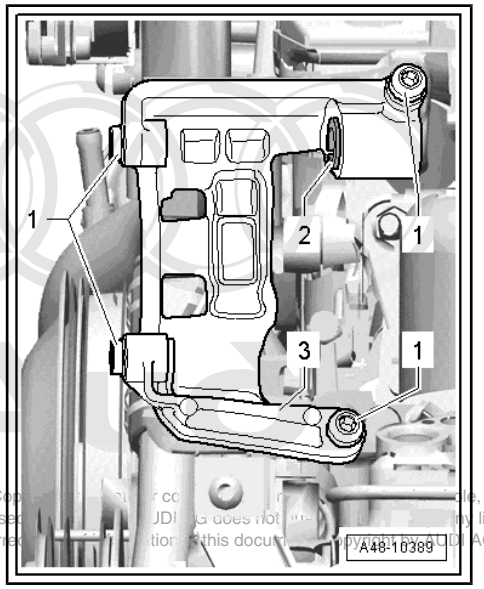
– Secure suction hose with new hose clip.

– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



– Fit power steering pump with suction hose into bracket -3-.

• Sleeve -2- has been driven back slightly.

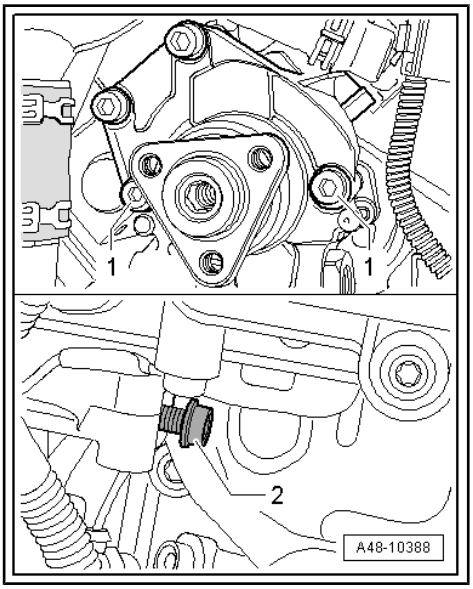


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– First screw in front bolts -1- loosely.

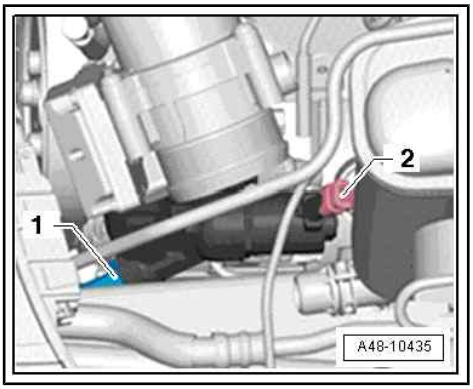
– Then screw in rear bolt -2- loosely.

– Tighten bolts -1- and -2-.



– Press pressure line into power steering pump as far as stop. Then screw on union nut -1-.

– Plug in connector -2-.



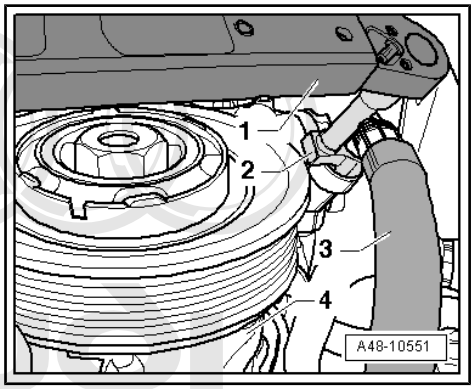
– Use slotted ring spanner insert, 17 mm -V.A.G 1331/10- to tighten union nut, as shown in illustration.

1 - Torque wrench -V.A.G 1331- with extension

2 - Slotted ring spanner insert, 17 mm -V.A.G 1331/10-

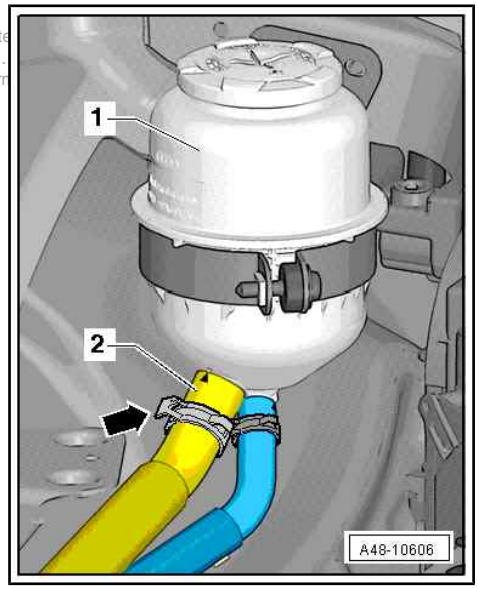
3 - Pressure line with union nut

4 - Air conditioner compressor



– Route suction hose -2- through engine compartment so that it is free of kinks and tension, and secure hose to fluid reservoir.

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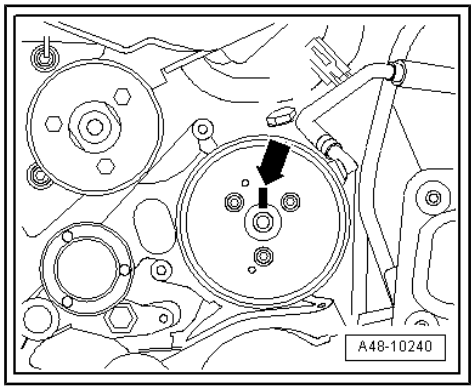


Note

Make sure that the suction hose is not kinked or twisted.

– Clean off fluid in engine compartment where necessary.

– Align marking on pulley -arrow- (made previously) with marking on hub.



– Tighten bolts -arrows- for belt pulley ⇒ Rep. gr. 13 .

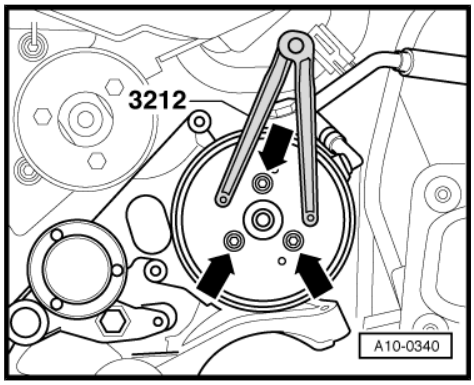
Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .

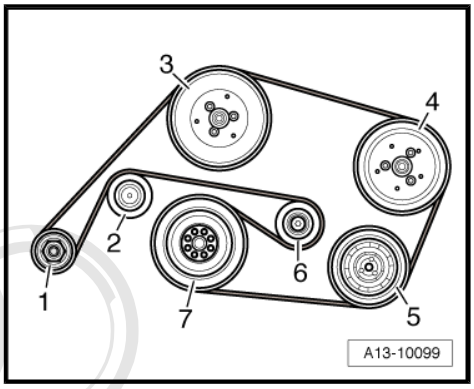
– Bleed steering system ⇒ page 425 .

– Check steering system for leaks ⇒ page 426 .

– Fit noise insulation ⇒ Rep. gr. 66 .



– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Coolant pump
4 - Power steering pump
5 - Air conditioner compressor
6 - Tensioning roller
7 - Crankshaft

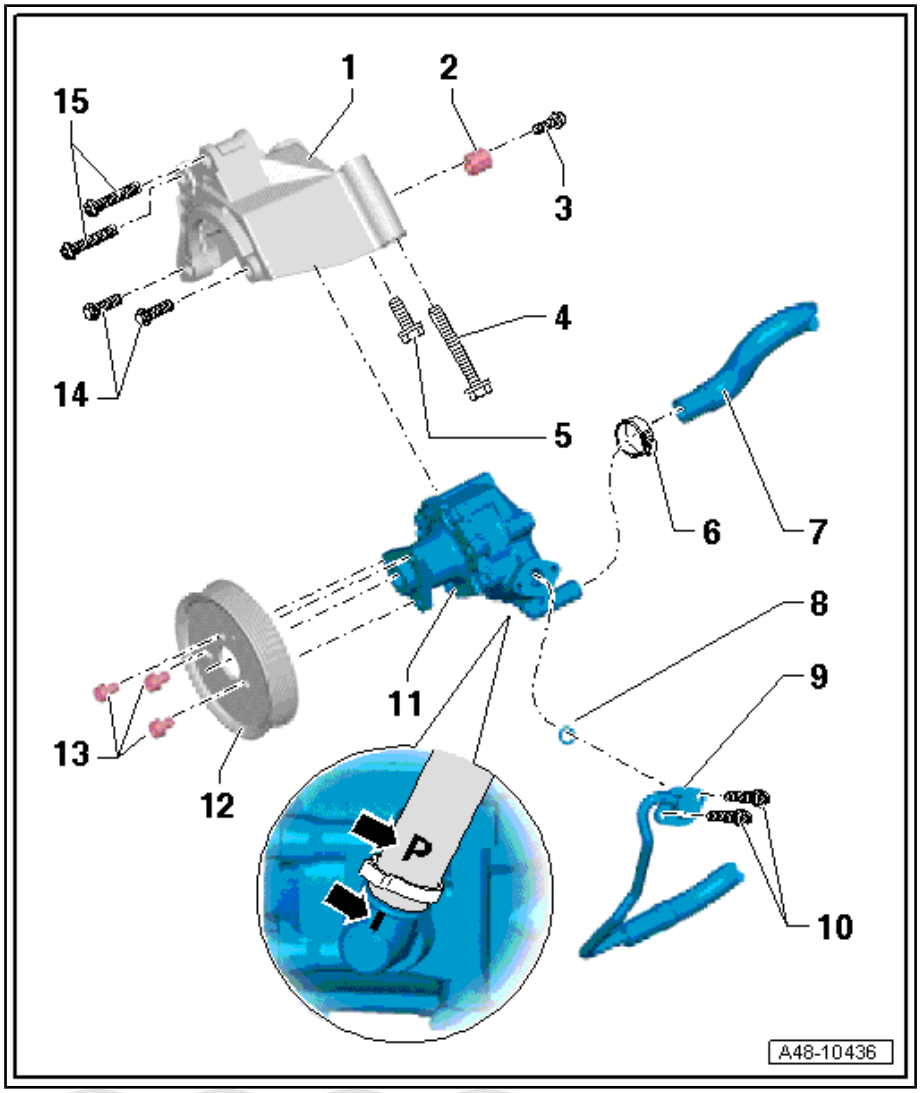
11.6 Removing and installing power steering pump (vehicles with 6-cylinder TFSI engine, vehicles without dynamic steering)

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Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*



1 - Bracket

2 - Sleeve

- ❑ Sleeve must be driven back slightly to install power steering pump

3 - Bolt

- ❑ 20 Nm

4 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

5 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine
- ❑ Note different lengths of bolts

6 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

7 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Seal

- ❑ Always renew if removed

9 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

10 - Bolt

- ❑ 9 Nm

11 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 565
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

12 - Belt pulley

13 - Bolt

- ❑ 22 Nm

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14 - Bolt

- ❑ 20 Nm
- ❑ For securing power steering pump to bracket

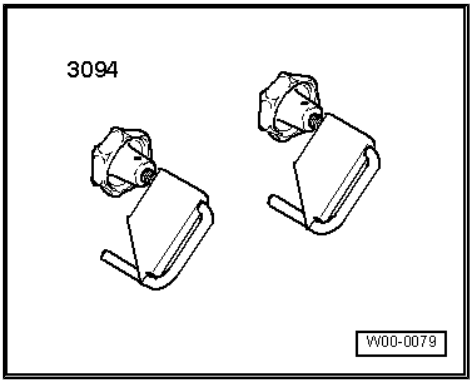
15 - Bolt

- ❑ 20 Nm
- ❑ For securing bracket to engine

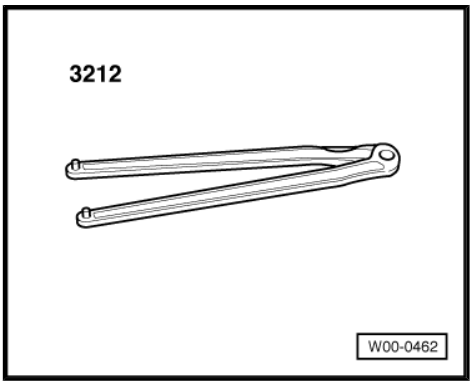
Removing

Special tools and workshop equipment required

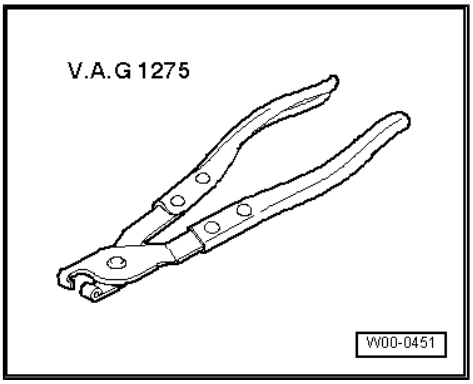
- ♦ Hose clamps up to 25 mm ∅ -3094-



- ♦ Pin wrench -3212-

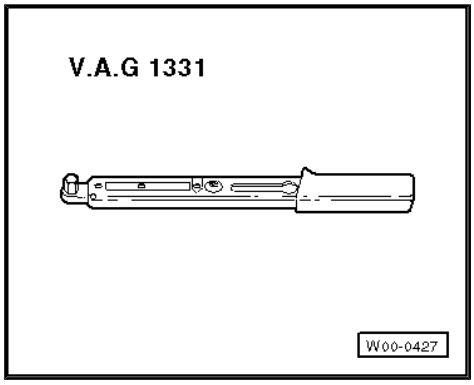


- ♦ Hose clip pliers -V.A.G 1275-

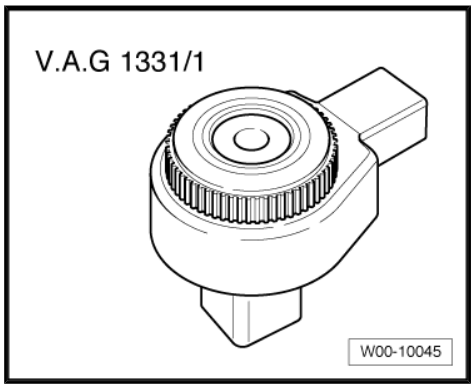


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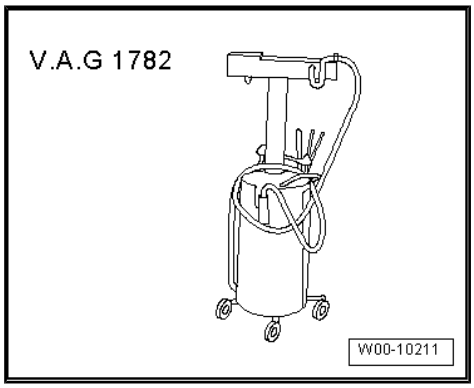
- Torque wrench -V.A.G 1331-



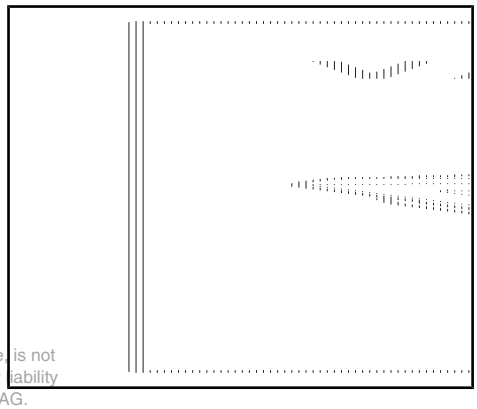
- Ratchet -V.A.G 1331/1-



- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



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- Engine bung set -VAS 6122-

General notes

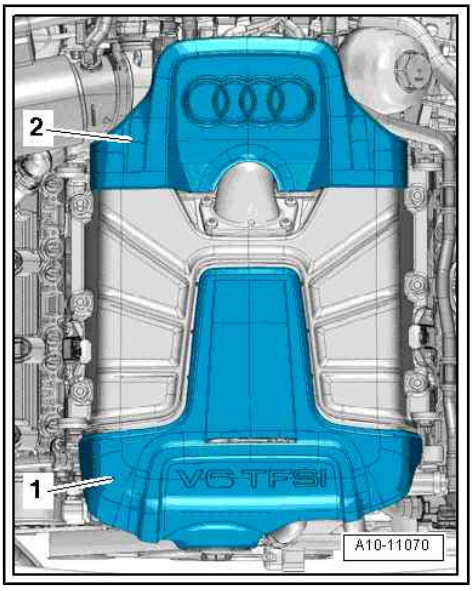
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- ♦ Check steering system for leaks if fluid level is low in reservoir.
- ♦ If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- ♦ The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.

– Raise vehicle on lifting platform.

– Lift off engine cover panel -1-.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

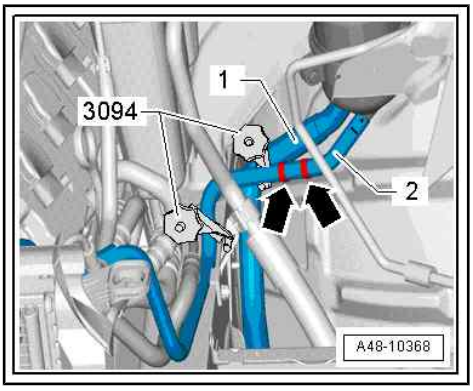


– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .

Caution

- ***Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.***
- ***The non-return valve is located in the return hose -2- between the hose clips -arrows-.***

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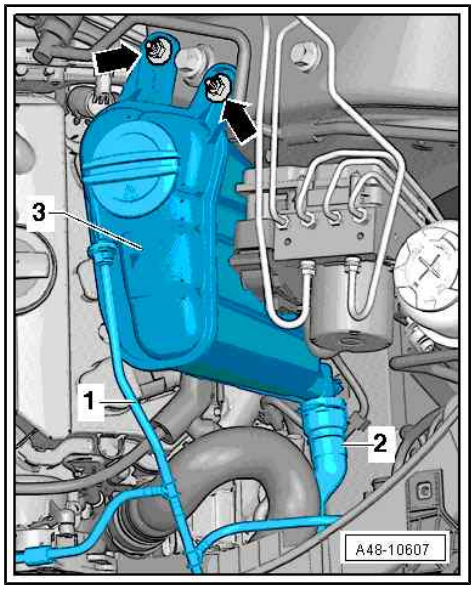


– Remove noise insulation ⇒ Rep. gr. 66 .

– Drain coolant ⇒ Rep. gr. 19 .

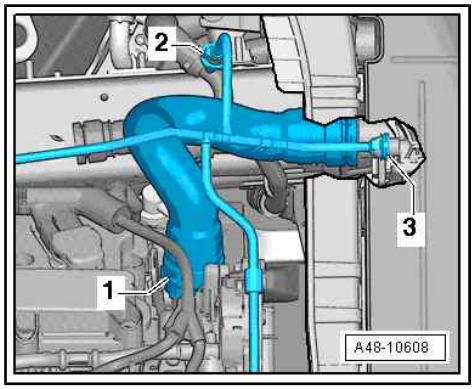
– Detach coolant lines -1- and -2- from coolant expansion tank. Remove nuts -arrows- and lift coolant expansion tank -3- out of retainer.

– Release and unplug connector (bottom) at coolant expansion tank -3-. Move coolant expansion tank -3- to one side.



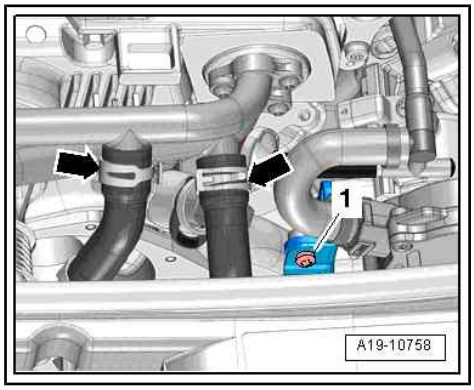
– Detach coolant hoses -1- and -2- from coolant pipe and swivel aside.

– Detach coolant line -3- from radiator and swivel aside.



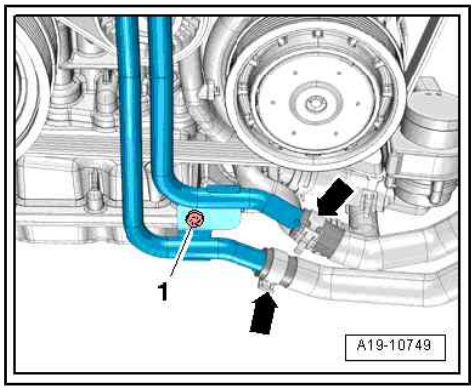
– Remove bolt -1- for coolant pipes (top).

• -Arrows- can be disregarded.



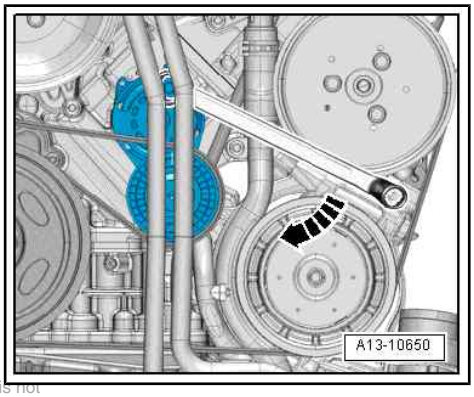
– Remove bolt -1- for coolant pipes (bottom).

• -Arrows- can be disregarded.



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– Slacken off poly V-belt and detach belt from power steering pump pulley.



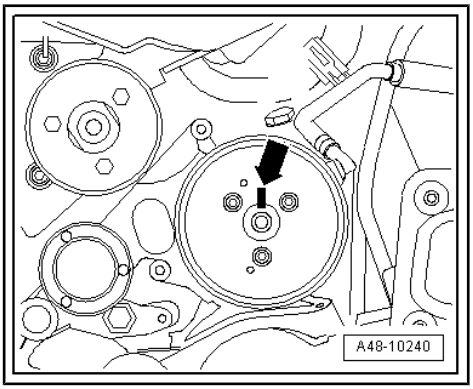
Note

Before removing poly V-belt, mark direction of rotation. A used belt can break if it runs in the opposite direction. Ensure that the belt is properly seated in the pulleys when installing.

– Swivel tensioner in direction of -arrow- to slacken poly V-belt.
– Remove poly V-belt only from power steering pump pulley.
– Release tensioner and remove tool.

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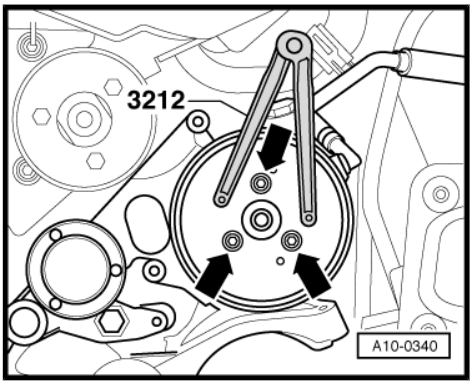
– Mark position of pulley relative to hub -arrow-.



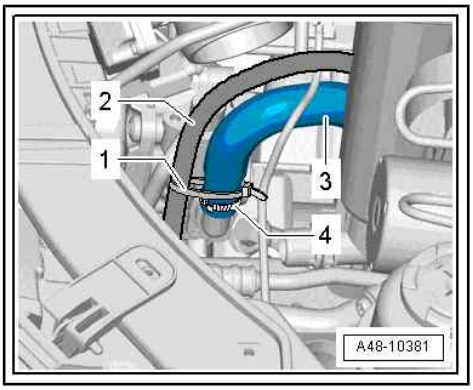
Note

- *If the power steering pump is being renewed, transfer the marking on the hub from the old pump to the new pump.*
- *Due to limited space, it is not possible to see the positions of the holes in the pulley relative to the holes in the hub during installation.*

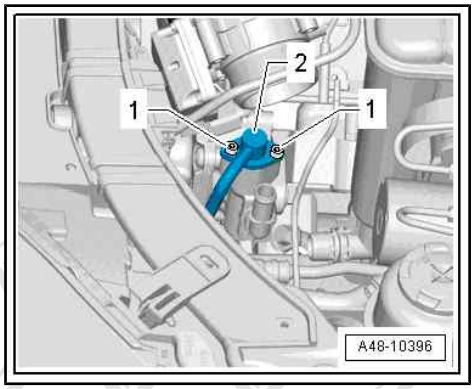
– Remove bolts -arrows-. Use pin wrench -3212- to counterhold pulley.
– Take off power steering pump pulley.
– Place drip tray underneath power steering pump.



– If fitted, carefully cut through cable tie -1- for wiring harness -2-.



– Remove bolts -1- and pull pressure line -2- out of power steering pump.
– Seal off connections of power steering pump and lines with clean plugs.

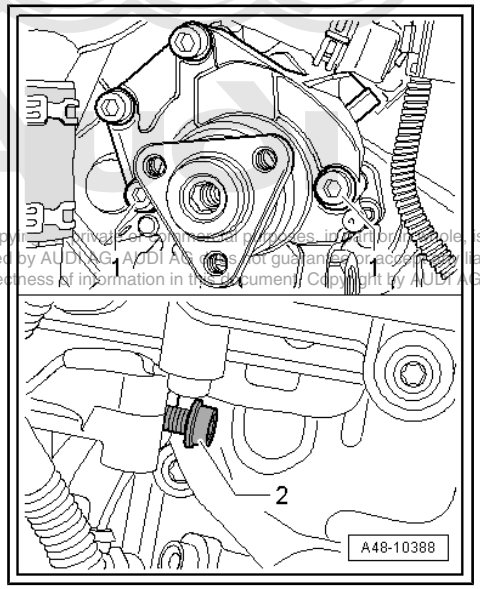


– Unbolt power steering pump from bracket. To do so, remove front bolts -1- and rear bolt -2-.

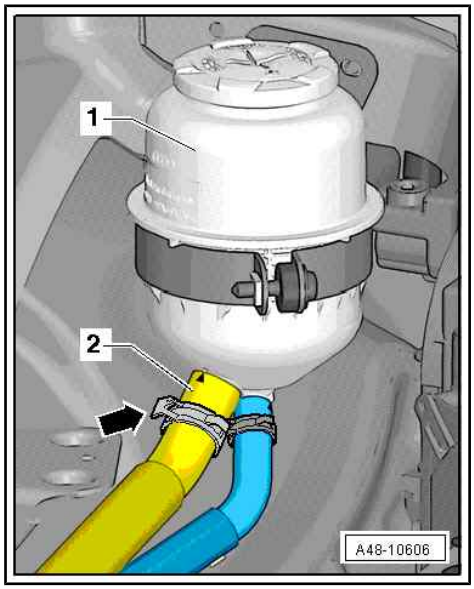
Note

Bolt -2- is concealed inside the bracket and has already been unscrewed in the illustration.

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– Release spring-type hose clip -arrow- for suction hose -2- at reservoir -1- and detach suction hose -2- from reservoir.
– Take power steering pump with suction hose out of bracket.



Installing

Installation is carried out in the reverse sequence. Note the following points:

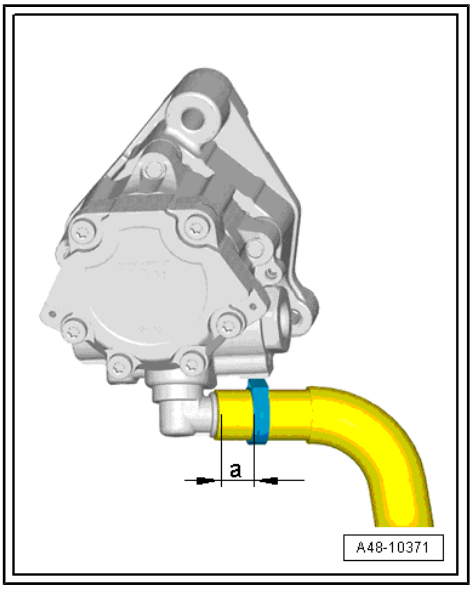
Tightening torques ⇒ page 581

Installation position of hoses
⇒ „14.1 Installation position of hoses on fluid reservoir, hydraulic fluid cooler and return line“, page 623

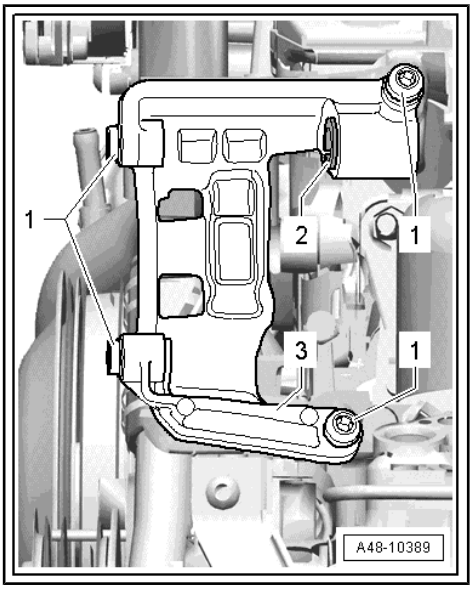
Note

- *Renew gaskets and seals.*
- *Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.*
- *Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .*
- *Due to restricted space, the hose clip cannot be tightened with the hose clip pliers -V.A.G 1275- after the power steering pump is installed, and so this must be done while the pump is still removed.*

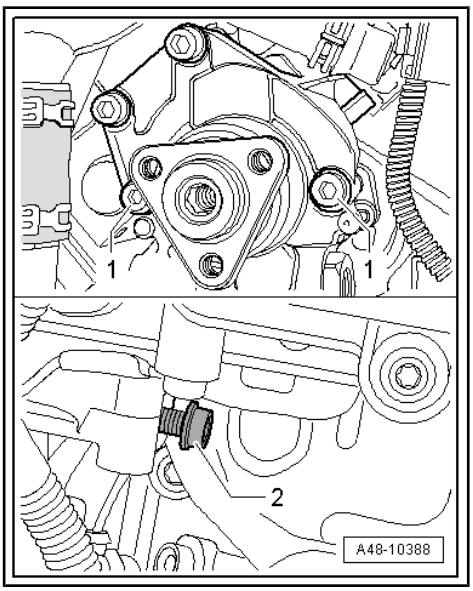
– Before installing power steering pump, fit suction hose ⇒ Item 7 (page 582) and align marking „P“ with seam on pump.
– Secure suction hose with new hose clip.
– Note installation dimensions of hose clip. Dimension -a- should be 4 mm.



– Fit power steering pump with suction hose into bracket -3-.
• Sleeve -2- has been driven back slightly.

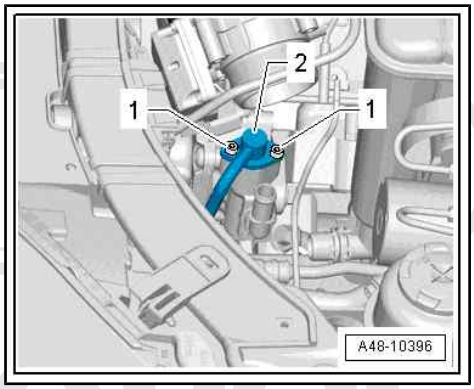


– First screw in front bolts -1- loosely.
– Then screw in rear bolt -2- loosely.
– Tighten bolts -1- and -2-.



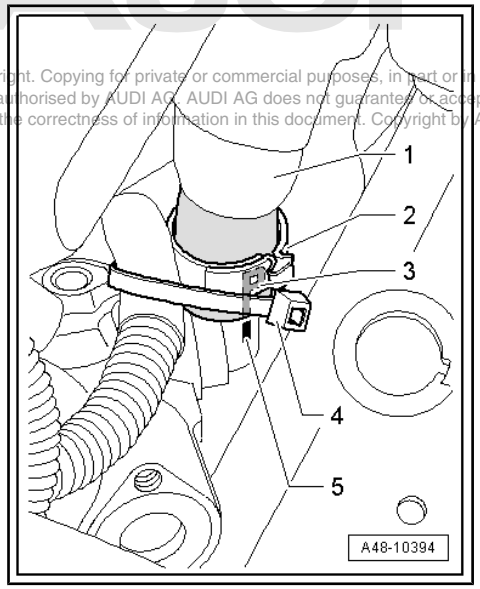
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– Press pressure line -2- as far as it will go into power steering pump. Then tighten bolts -1-.

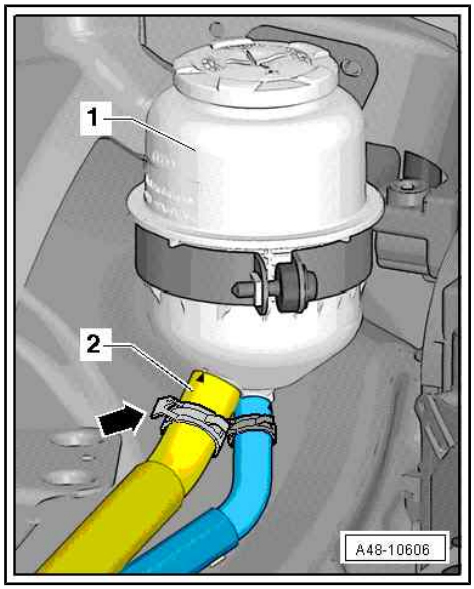


– If fitted, attach wiring harness with new cable tie -4- to connection.

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– Route suction hose -2- through engine compartment so that it is free of kinks and tension, and secure hose to fluid reservoir.

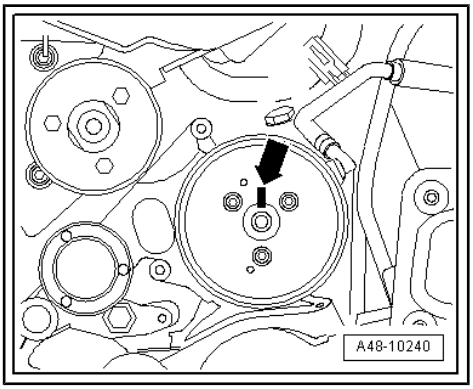


Note

Make sure that the suction hose is not kinked or twisted.

– Clean off fluid in engine compartment where necessary.

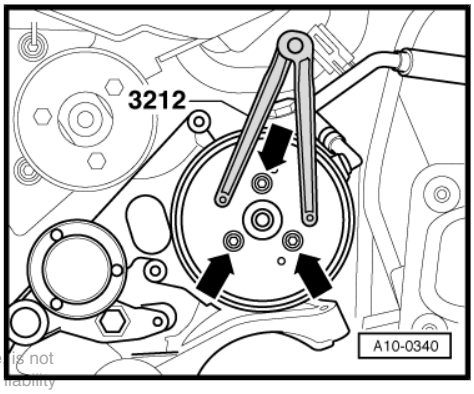
– Align marking on pulley -arrow- (made previously) with marking on hub.



– Tighten bolts -arrows- for belt pulley ⇒ Rep. gr. 13 .

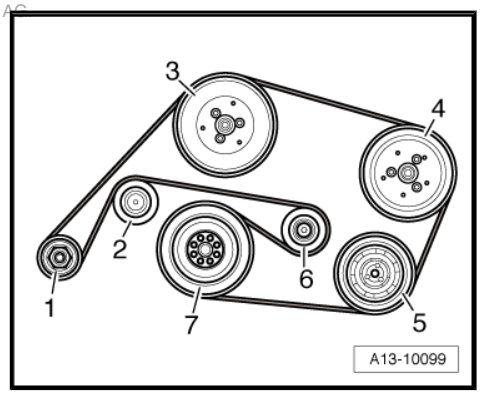
Install poly V-belt for power steering pump ⇒ Rep. gr. 13 .

– Check hydraulic fluid level ⇒ page 424 .
– Bleed steering system ⇒ page 425 .
– Check steering system for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .



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– Install poly-V-belt and make sure that belt runs straight ⇒ Rep. gr. 13 .



Note

Ensure that the belt is properly seated in the pulleys when installing.

1 - Alternator
2 - Idler roller
3 - Coolant pump
4 - Power steering pump
5 - Air conditioner compressor
6 - Tensioning roller
7 - Crankshaft

12 Power steering pump, hydraulic pipes and hoses, fluid reservoir (vehicles with 8-cylinder FSI engine)

⇒ „12.1 Exploded view (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)“, page 592

⇒ „12.2 Exploded view (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)“, page 595 .

⇒ „12.3 Exploded view of pipes and hoses (vehicles with 8-cylinder FSI engine, vehicles with and without dynamic steering)“, page 598

⇒ „12.4 Checking delivery pressure of power steering pump (vehicles with 8-cylinder FSI engine, vehicles with and without dynamic steering)“, page 601 .

⇒ „12.5 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)“, page 605

⇒ „12.6 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)“, page 611 .

12.1 Exploded view (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)

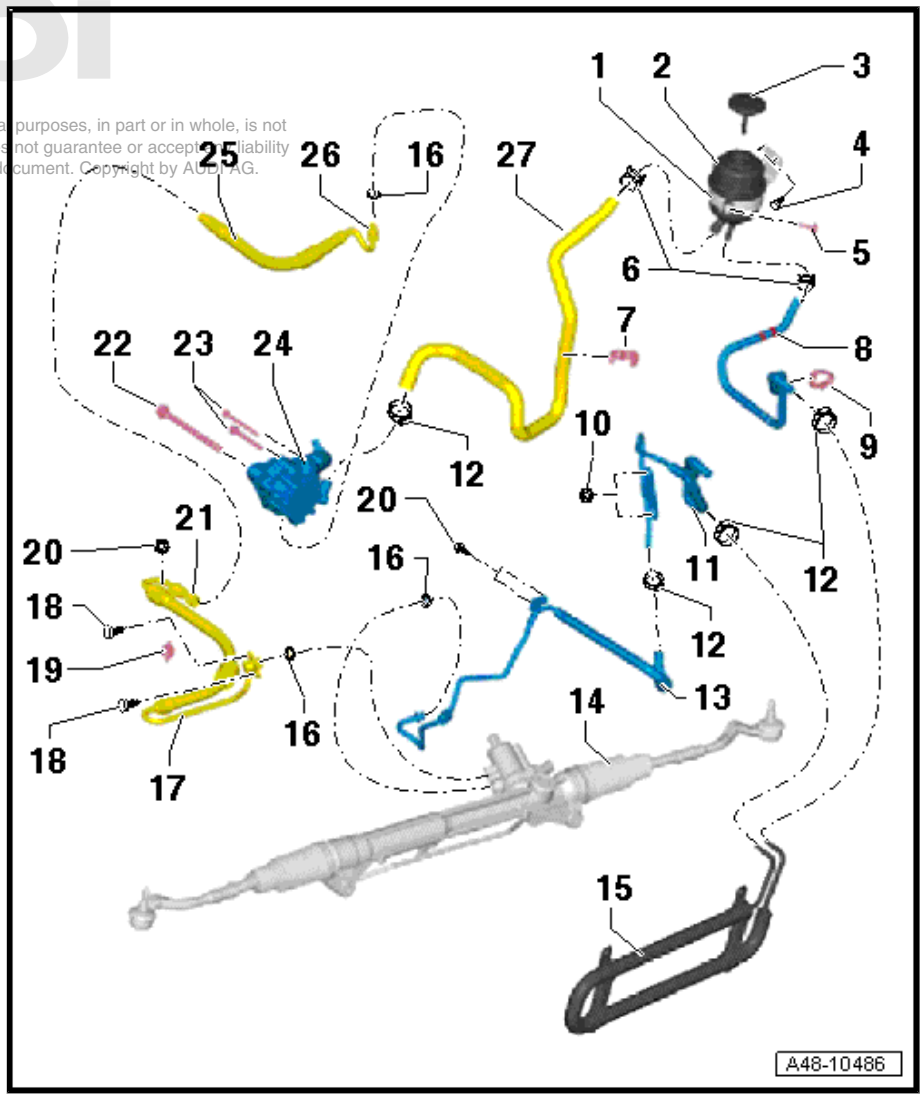
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

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Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*

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1 - Securing strap
- ❑ Securing to body ⇒ page 598

2 - Reservoir
- ❑ Note correct installation position ⇒ page 598
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick
- ❑ Checking fluid level ⇒ page 424

4 - Bolt
- ❑ 9 Nm

5 - Bolt
- ❑ 9 Nm

6 - Spring-type clip
- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Retainer
- ❑ For securing suction hose to longitudinal member ⇒ page 598

8 - Return hose
- ❑ From hydraulic fluid cooler to reservoir
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

9 - Clip
- ❑ For securing return hose to longitudinal member ⇒ page 598

10 - Nut
- ❑ 9 Nm

11 - Return line
- ❑ From power steering box to hydraulic fluid cooler
- ❑ Securing to longitudinal member ⇒ page 598
- ❑ Securing to subframe ⇒ page 598
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623
- ❑ Installation position at line connection ⇒ page 623

12 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

13 - Return line

- ❑ From power steering box to hydraulic fluid cooler

> **Caution**
> *Fully insert return line when installing.*

- ❑ Securing to subframe ⇒ page 598
- ❑ Installation position at line connection ⇒ page 623

14 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

15 - Hydraulic fluid cooler

- ❑ Clipped onto condenser ⇒ page 598
- ❑ Removing and installing ⇒ page 618

16 - Seal

- ❑ Always renew if removed

17 - Pressure line

- ❑ From power steering pump to power steering box

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Securing to cross brace ⇒ page 598
- ❑ Installation position of line connection ⇒ page 598

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18 - Bolt

- ❑ 20 Nm

19 - Rubber mounting

- ❑ 6 Nm

20 - Nut

- ❑ 6 Nm

21 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 598

22 - Bolt

- ❑ Tightening torque for vehicles with manual gearbox ⇒ Rep. gr. 34
- ❑ Tightening torque for vehicles with automatic gearbox ⇒ Rep. gr. 37
- ❑ Securing bolt: gearbox/ engine/ power steering pump

23 - Bolt

- ❑ 25 Nm

24 - Steering hydraulics pump -V119-

- ❑ With regulating valve for power steering pump -(V119)-
- ❑ Pump and regulating valve are combined as one component and renewed together
- ❑ For correct version refer to ⇒ Electronic parts catalogue

- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 601
- ❑ Removing and installing ⇒ page 605

25 - Pressure line

- ❑ From power steering pump to power steering box

Caution

Fully insert pressure line when installing.

- ❑ Securing to subframe ⇒ page 598
- ❑ Attachment to A/C compressor ⇒ page 598
- ❑ Installation position of line connection ⇒ page 598
- ❑ Installation position on power steering pump ⇒ page 605

26 - Union nut

- ❑ 38 Nm
- ❑ Installation position on power steering pump ⇒ page 605

27 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 605

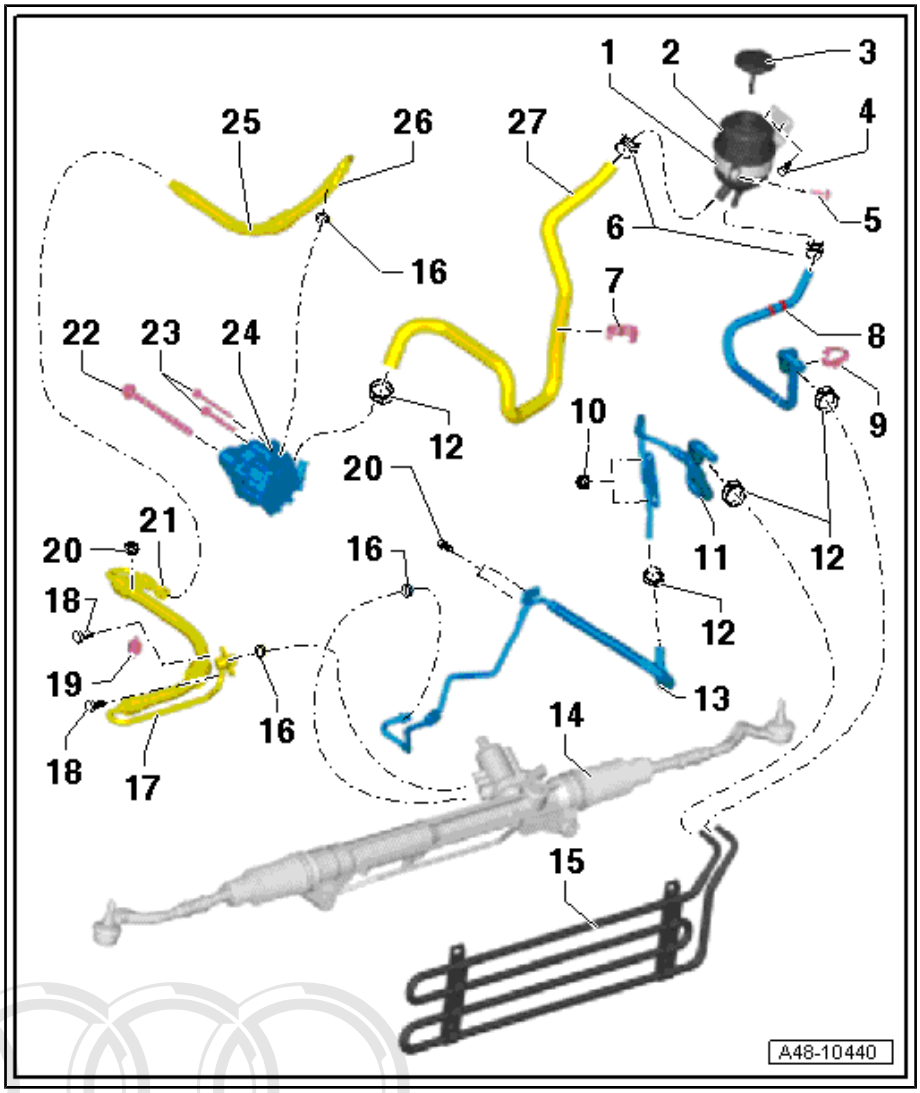
12.2 Exploded view (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)

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There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

Note

- *Check steering system for leaks if fluid level is low in reservoir.*
- *If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.*
- *The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.*



1 - Securing strap

- ❑ Securing to body ⇒ page 598

2 - Reservoir

- ❑ Note correct installation position ⇒ page 598
- ❑ Installation position of hoses at fluid reservoir ⇒ page 623

3 - Cap with dipstick

- ❑ Checking fluid level ⇒ page 424

4 - Bolt

- ❑ 9 Nm

5 - Bolt

- ❑ 9 Nm

6 - Spring-type clip

- ❑ Use hose clip pliers - V.A.G 1921- for removal and installation

7 - Retainer

- ❑ For securing suction hose to longitudinal member ⇒ page 598

8 - Return hose

- ❑ From hydraulic fluid cooler to reservoir
- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623

9 - Clip

- ❑ For securing return hose to longitudinal member ⇒ page 598

10 - Nut

- ❑ 9 Nm

11 - Return line

- ❑ From power steering box to hydraulic fluid cooler
- ❑ Securing to longitudinal member ⇒ page 598
- ❑ Securing to subframe ⇒ page 598
- ❑ Note correct position on hydraulic fluid cooler ⇒ page 623
- ❑ Installation position at line connection ⇒ page 623

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12 - Hose clip

- ❑ Tighten using hose clip pliers -V.A.G 1275-
- ❑ Always renew if removed

13 - Return line

- ❑ From power steering box to hydraulic fluid cooler

Caution
Fully insert return line when installing.

- ❑ Securing to subframe ⇒ page 598
- ❑ Installation position at line connection ⇒ page 623

14 - Power steering box

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Removing and installing ⇒ page 402

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15 - Hydraulic fluid cooler

- ❑ Clipped onto condenser - S5 ⇒ page 598
- ❑ Clipped onto condenser - RS 5 ⇒ page 598
- ❑ Removing and installing ⇒ page 618

16 - Seal

- ❑ Always renew if removed

17 - Pressure line

- ❑ From power steering pump to power steering box

Caution
Fully insert pressure line when installing.

- ❑ Securing to cross brace ⇒ page 598
- ❑ Installation position of line connection ⇒ page 598

18 - Bolt

- ❑ 20 Nm

19 - Rubber mounting

- ❑ 6 Nm

20 - Nut

- ❑ 6 Nm

21 - Union nut

- ❑ 40 Nm
- ❑ Installation position of line connection ⇒ page 598

22 - Bolt

- ❑ Tightening torque for vehicles with manual gearbox ⇒ Rep. gr. 34
- ❑ Tightening torque for vehicles with automatic gearbox ⇒ Rep. gr. 37
- ❑ Securing bolt: gearbox/ engine/ power steering pump

23 - Bolt

- ❑ 25 Nm

24 - Power steering pump

- ❑ For correct version refer to ⇒ Electronic parts catalogue
- ❑ Fill with hydraulic fluid before installing

- ❑ Removing and installing ⇒ page 611
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

25 - Pressure line

- ❑ From power steering pump to power steering box

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Securing to subframe ⇒ page 598
- ❑ Attachment to A/C compressor ⇒ page 598
- ❑ Installation position of line connection ⇒ page 598
- ❑ Installation position on power steering pump ⇒ page 611

26 - Union nut

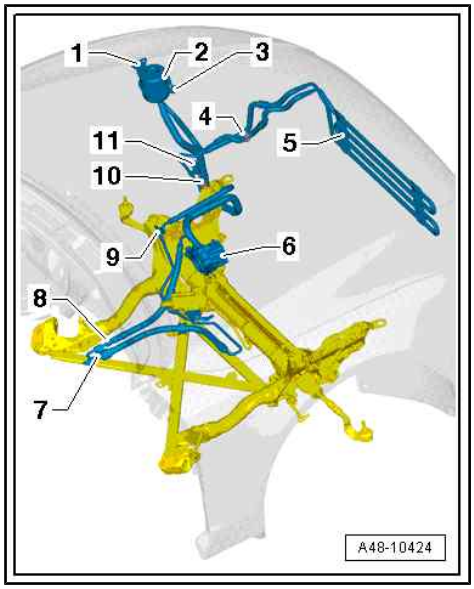
- ❑ 38 Nm
- ❑ Installation position on power steering pump ⇒ page 611

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27 - Suction hose

- ❑ Note correct position on reservoir ⇒ page 623
- ❑ Note correct position on power steering pump ⇒ page 611

12.3 Exploded view of pipes and hoses (vehicles with 8-cylinder FSI engine, vehicles with and without dynamic steering)



Exploded view of mounting parts for pipes and hoses

1 - Bracket for reservoir to body ⇒ page 599

2 - Reservoir in bracket ⇒ page 599

3 - Bolt in bracket ⇒ page 599

4 - Retainer for securing return hose to longitudinal member ⇒ page 599

5 - Hydraulic fluid cooler to condenser ⇒ page 600

6 - Power steering pump to engine/gearbox ⇒ „12.5 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)“, page 605 or ⇒ „12.6 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)“, page 611

7 - Pressure line to cross brace ⇒ page 600

8 - Installation position of pressure line connection ⇒ page 600

9 - Return line to subframe ⇒ page 601

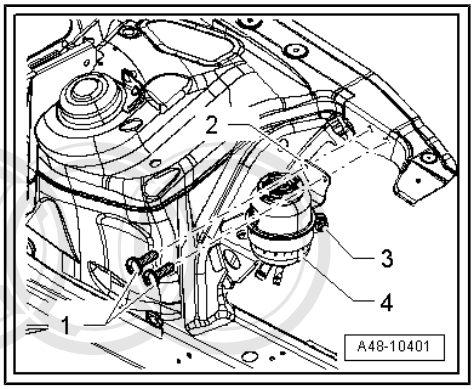
10 - Retainers securing return line to subframe ⇒ page 600

11 - Retainer for securing return line to longitudinal member ⇒ page 599

Bracket for reservoir to body

– Secure bracket -2- to body with bolts -1-.

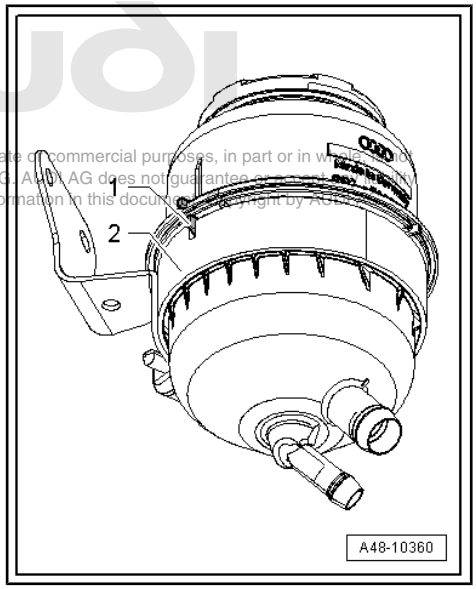
– Secure reservoir -4- in bracket -2- with bolt -3-.



Reservoir in bracket

– Fit reservoir (insert lug -1- into recess in bracket -2-).

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Retainers securing lines to longitudinal member

– Secure return line -1- to longitudinal member (left-side) using retainer -3-. To do so, fit return line -1- with marking -arrow A- into retainer -3-.

– Fit suction hose -4- into retainer -6-. Clip retainer -6- into bracket -5-.

– Secure return line -2- to longitudinal member (left-side) using nuts -7- and bracket -5-.

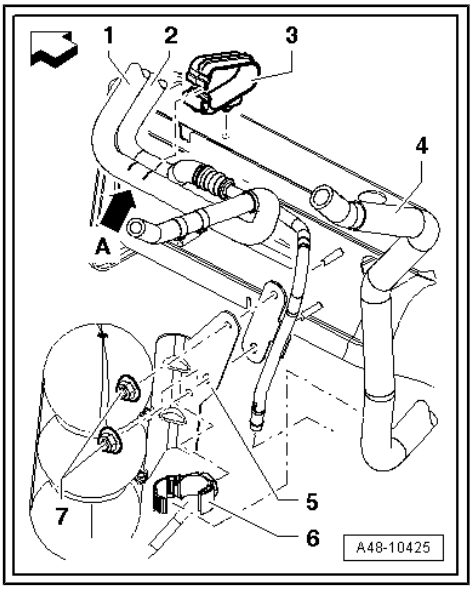
1 - Return line from hydraulic fluid cooler to reservoir

2 - Return line from power steering box to hydraulic fluid cooler

-Arrow- points in direction of travel.

Installation position of return line -2- ⇒ page 623 .

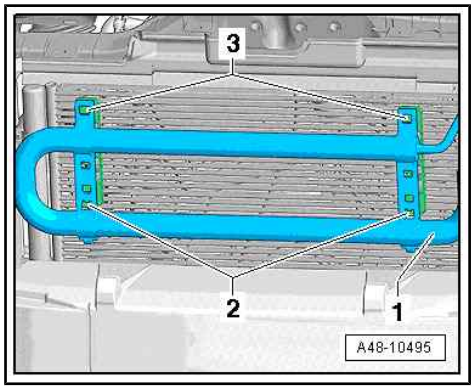
Installation position of return line -1- and suction hose -4- on reservoir ⇒ page 623 .



Hydraulic fluid cooler to condenser - S5

– Position hydraulic fluid cooler -1- on retainers -2- and then engage in retainers -3-.

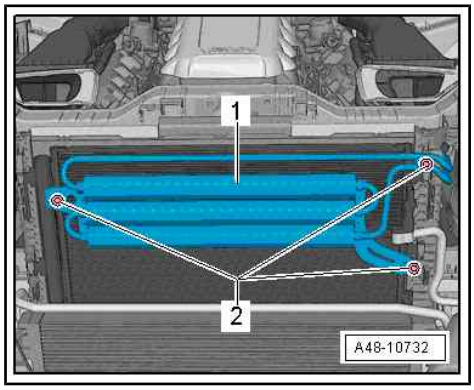
Hoses to hydraulic fluid cooler ⇒ page 623



Hydraulic fluid cooler to condenser - RS 5

– Fit hydraulic fluid cooler -1- on retainers and then tighten bolts -2- to 9 Nm.

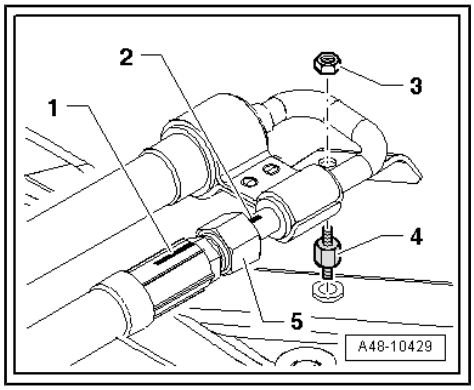
Hoses to hydraulic fluid cooler ⇒ page 623



Pressure line to cross brace

– Bolt pressure line with nut -3- and rubber mounting -4- onto cross brace.

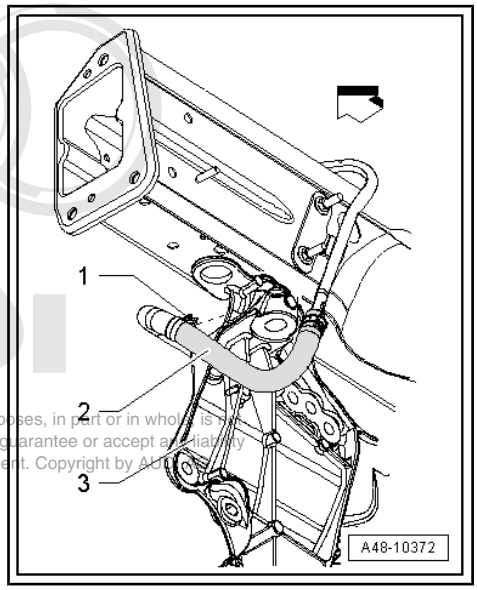
– Note correct position of line when connecting. Markings -1- and -2- must be aligned.



Retainer for securing return line to subframe

– Secure retainer -1- of return line -2- to front left of subframe -3-.

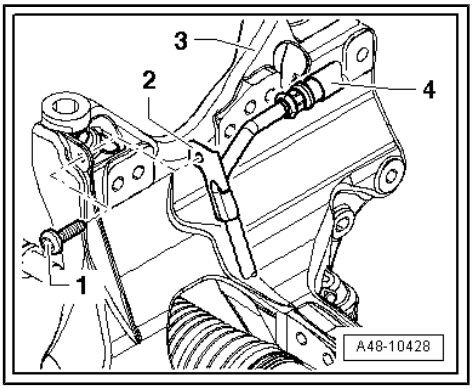
-Arrow- points in direction of travel.



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Return line to subframe

– Attach return line -4- with bracket -2- and bolt -1- to subframe -3-.

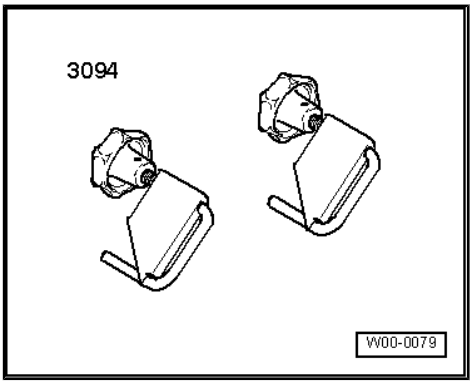


12.4 Checking delivery pressure of power steering pump (vehicles with 8-cylinder FSI engine, vehicles with and without dynamic steering)

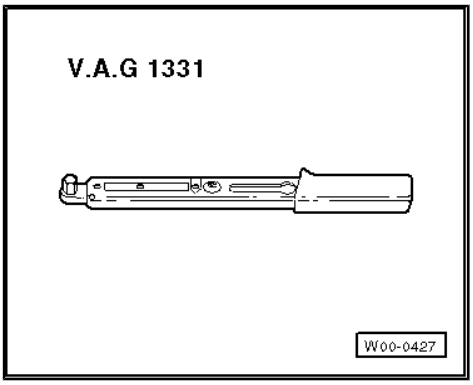
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Special tools and workshop equipment required

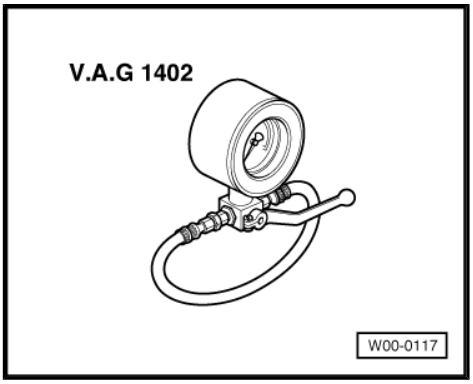
♦ Hose clamps up to 25 mm ∅ -3094-



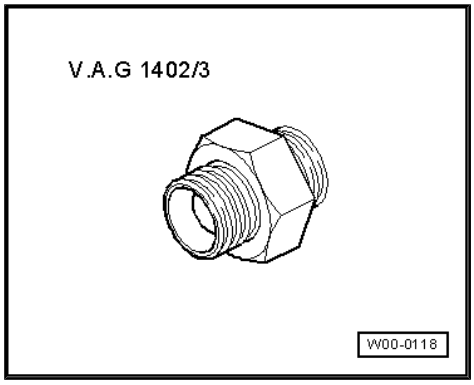
♦ Torque wrench -V.A.G 1331-



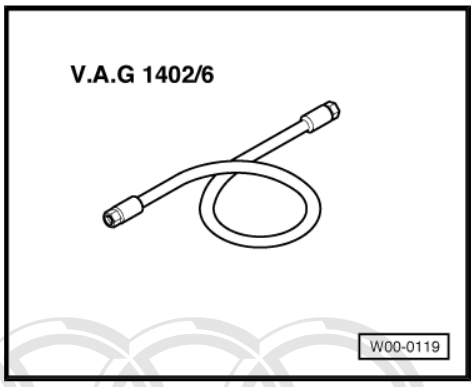
♦ Power steering tester -V.A.G 1402-



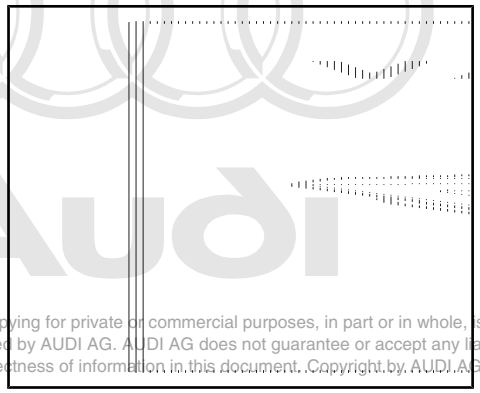
- Adapter -V.A.G 1402/3-



- Adapter set -V.A.G 1402/6-



- Drip tray for workshop hoist -VAS 6208-



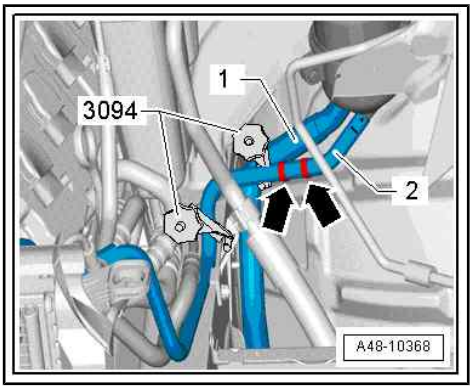
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Test requirements:

- No leaks in system
- Hoses and pipes not kinked or constricted

Checking

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

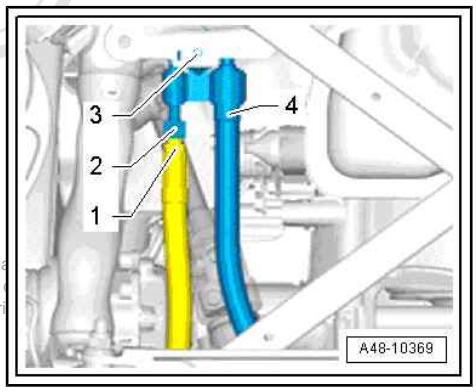
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

– Remove noise insulation ⇒ Rep. gr. 66 .

– Place drip tray for workshop hoist -VAS 6208- underneath to collect hydraulic fluid.

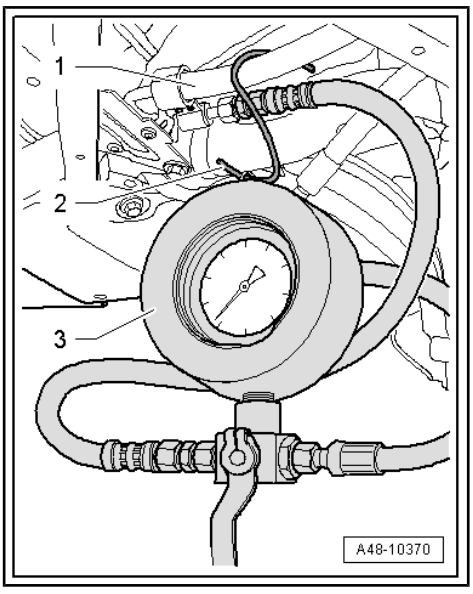
– Detach pressure line -4- from cross brace. To do so, remove bolt -3-.

– Slacken union nut -2-. Counterhold at hexagon flats -1-.



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– Suspend tester -3- from pressure pipe -1- using hook -2-.



– Connect power steering tester -V.A.G 1402- as shown.

1 - Pressure line with connecting point

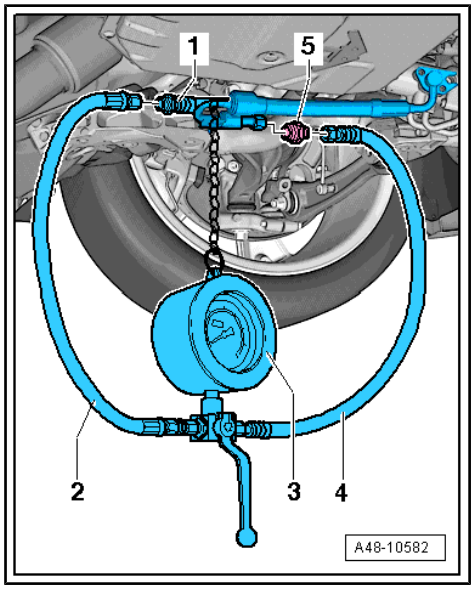
2 - Hose from adapter set -V.A.G 1402/6-

3 - Pressure gauge -V.A.G 1402-

4 - Hose from adapter set -V.A.G 1402/6-

5 - Adapter -V.A.G 1402/3-

– Screw hoses from power steering tester -V.A.G 1402- onto open lines of pressure hose at connecting point, as shown in illustration.



– Make sure lever on pressure gauge is at position -2-.

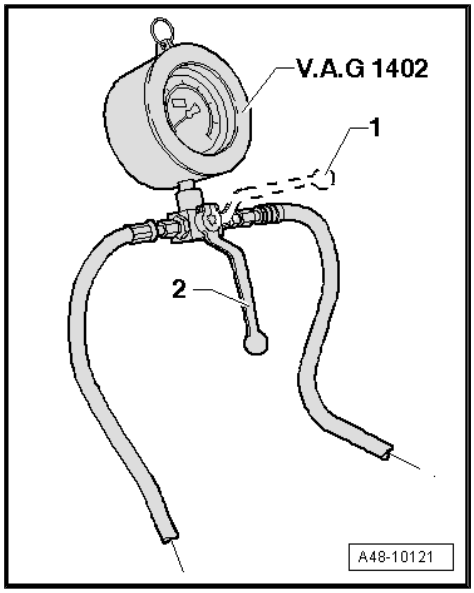
– Lower vehicle.

– Remove hose clamps -3094- .

– Start engine but do not press accelerator.

– Turn steering wheel approx. 10 times from lock to lock.

– Switch off engine and top up hydraulic fluid in reservoir if necessary.



Note

- *To avoid damaging the power steering pump, please note the following points:*
- *Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.*
- *Start engine without pressing accelerator and leave it running at idling speed.*
- *Take pump pressure reading at idling speed immediately after starting engine (have second mechanic take reading).*
- *The pressure will drop during the test; the highest pressure reading is therefore the required test value.*

– Then check delivery pressure.

– Start engine.

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– With engine idling, close cut-off valve (position -1-) and read off pressure (lever must face away from pressure hose). Do not perform measurement for longer than 10 seconds.

Specification for delivery pressure (vehicles without dynamic steering): 113…130 bar

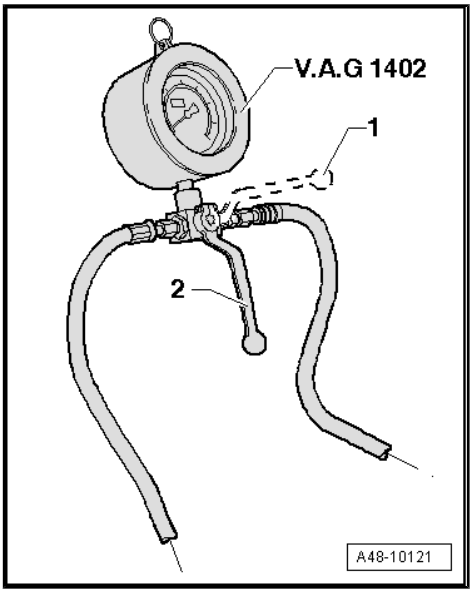
Specification for delivery pressure (vehicles with dynamic steering): 117…131 bar

Renew power steering pump if specification is not attained
⇒ „12.5 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)“, page 605 or
⇒ „12.6 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)“, page 611 .

– Switch off engine.

– Remove power steering tester -V.A.G 1402- .

Tightening torques ⇒ page 595



– Note correct positions of pipes when connecting pipe union. Markings -1- and -2- on top side of pipe must be aligned.

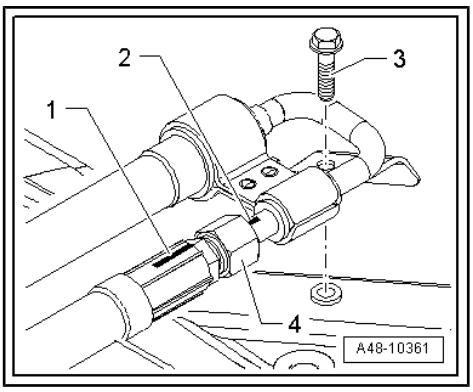
– Secure pressure line -4- to cross brace with bolt -3-.

– Check hydraulic fluid level ⇒ page 424 .

– Bleed steering system ⇒ page 425 .

– Check all opened lines for leaks ⇒ page 426 .

– Fit noise insulation ⇒ Rep. gr. 66 .



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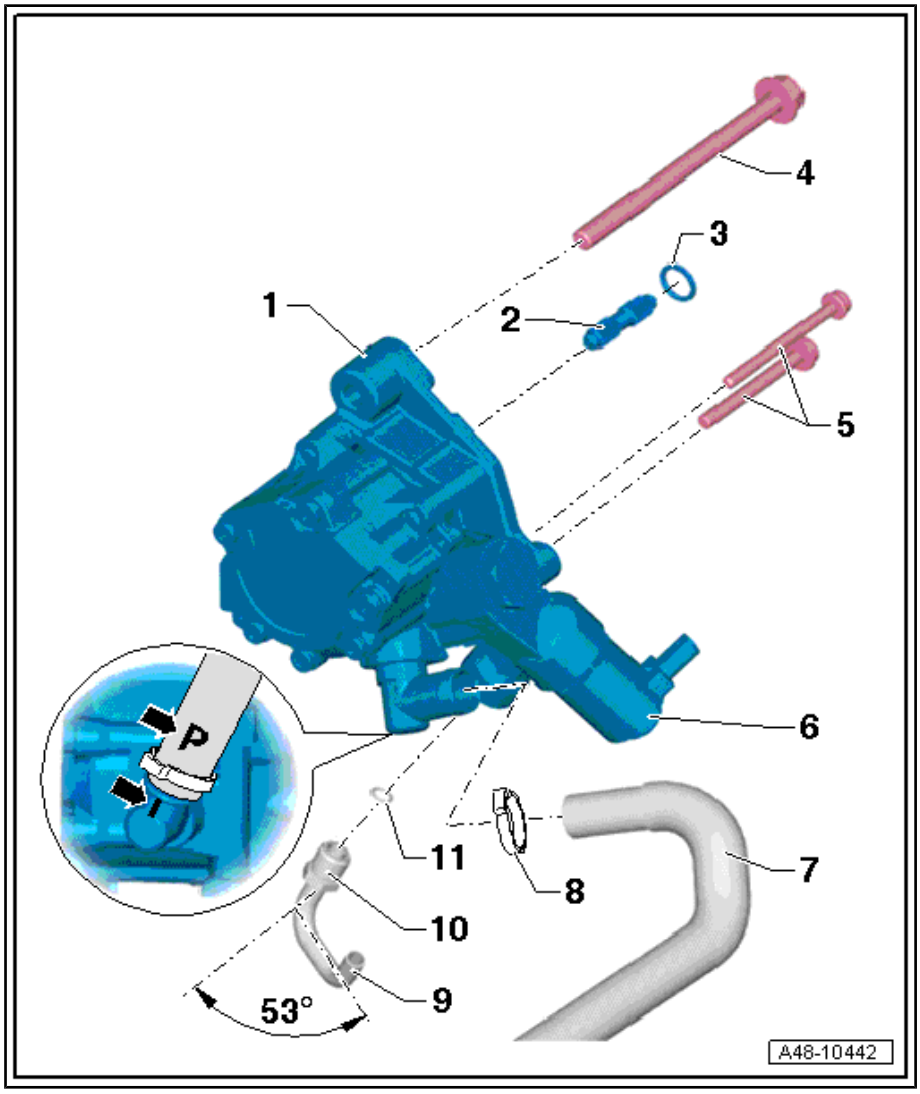
12.5 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)

Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles with dynamic steering)
⇒ page 607 .

Exploded view of power steering pump

Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*
- *When installing new power steering pump, always renew oil seal and O-ring for pump ⇒ Rep. gr. 15 .*
- *Use only specified type of grease ⇒ Electronic parts catalogue for lubrication.*



1 - Steering hydraulics pump - V119-

- With regulating valve for power steering pump -(V119)-
- Power steering pump and regulating valve ⇒ Item 6 (page 606) are combined as one component and can only be renewed together
- Fill with hydraulic fluid before installing
- Checking delivery pressure ⇒ page 601
- Removing and installing ⇒ page 607
- When re-installing, grease splines of power steering pump.
- Bleeding steering system ⇒ page 425
- Checking hydraulic fluid level ⇒ page 424
- Checking steering system for leaks ⇒ page 426

2 - Drive shaft

- Grease splines of drive shaft and power steering pump all round. For correct version refer to ⇒ Electronic parts catalogue
- Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .

3 - Seal

- Renewing ⇒ Rep. gr. 15
- Grease when refitting.

4 - Bolt

- Tightening torque for vehicles with manual gearbox ⇒ Rep. gr. 34
- Tightening torque for vehicles with automatic gearbox ⇒ Rep. gr. 37
- Securing bolt: gearbox/ engine/ power steering pump

5 - Bolt

- 25 Nm

6 - Regulating valve for power steering pump -(V119)-

- Power steering pump and regulating valve are combined as one component and can only be renewed together

7 - Suction hose

- Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

8 - Hose clip

- Tighten using hose clip pliers -V.A.G 1275- .
- Always renew if removed

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9 - Pressure line

> **Caution**
> *Fully insert pressure line when installing.*

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 53°.

10 - Union nut

- ❑ 38 Nm

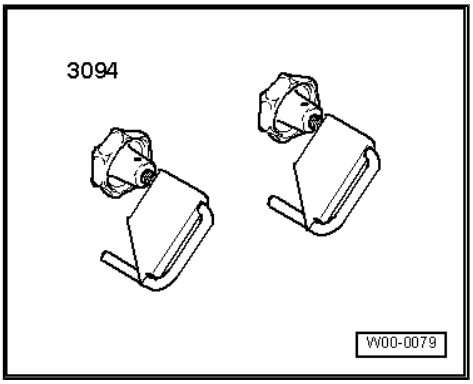
11 - Seal

- ❑ Always renew if removed

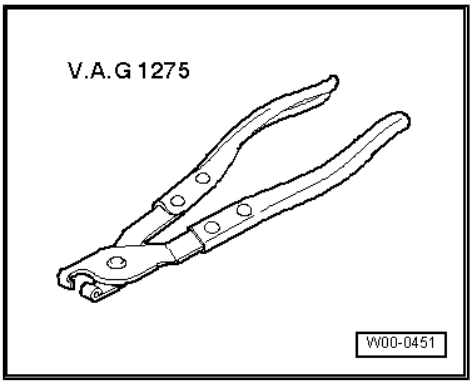
Removing

Special tools and workshop equipment required

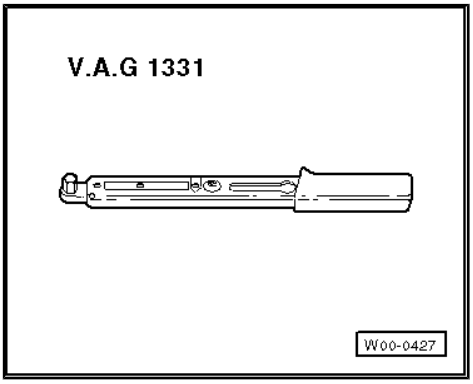
- ♦ Hose clamps up to 25 mm ∅ -3094-



- ♦ Hose clip pliers -V.A.G 1275-

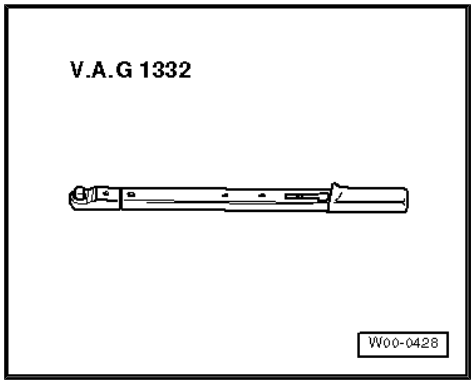


- ♦ Torque wrench -V.A.G 1331-

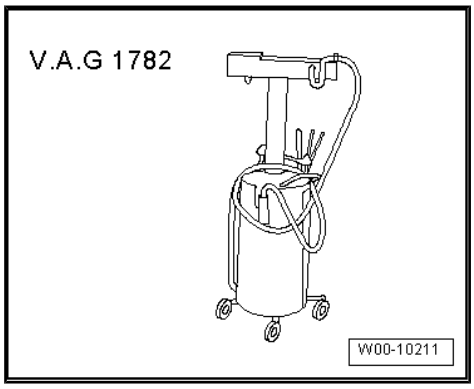


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- Torque wrench -V.A.G 1332-

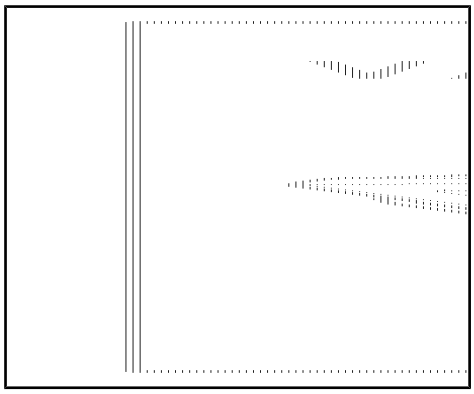


- Used oil collection and extraction unit -V.A.G 1782-



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- Drip tray for workshop hoist -VAS 6208-



General notes

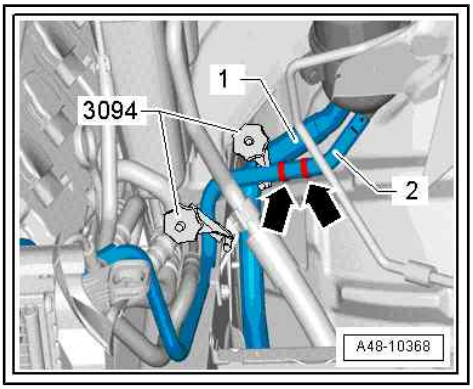
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.
- Renew oil seal and O-ring for power steering pump prior to installation.

– Raise vehicle on lifting platform.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

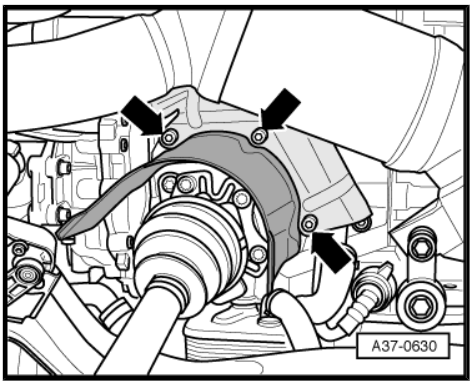
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

– Remove noise insulation ⇒ Rep. gr. 66 .

– Lower subframe ⇒ Rep. gr. 10 .

– Remove heat shield for drive shaft (left-side) -arrows-.

– Place drip tray underneath.



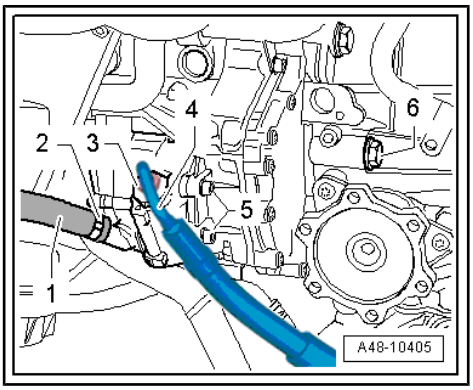
– Remove hose clip -2- from suction hose -1- and pull suction hose -1- off power steering pump.

– Release and unplug connector (not shown in illustration) from regulating valve.

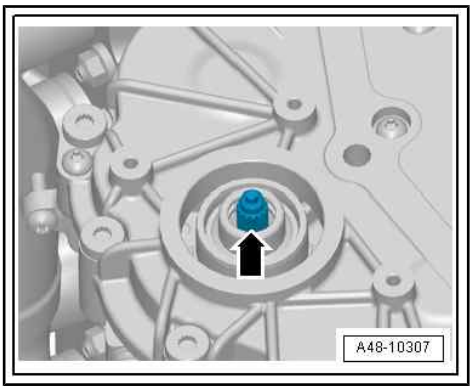
– Unscrew union nut -3- and pull pressure line -4- off power steering pump.

– Remove bolts -5- and bolt -6-.

– Detach power steering pump with drive shaft.

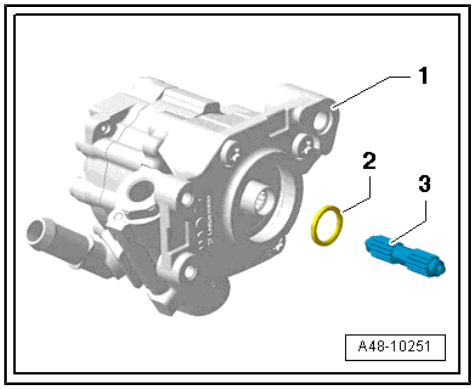


– If necessary, pull drive shaft -arrow- for power steering pump out of engine by hand.

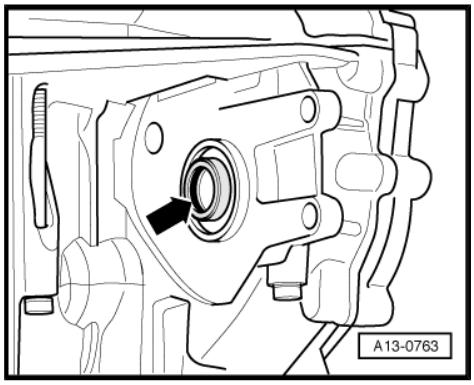


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– If power steering pump -1- is renewed, seal -2- and drive shaft -3- must also be renewed.



– Renew oil seal and O-ring for power steering pump -arrow- ⇒ Rep. gr. 15 .



Installing

Installation is carried out in the reverse sequence. Note the following points:

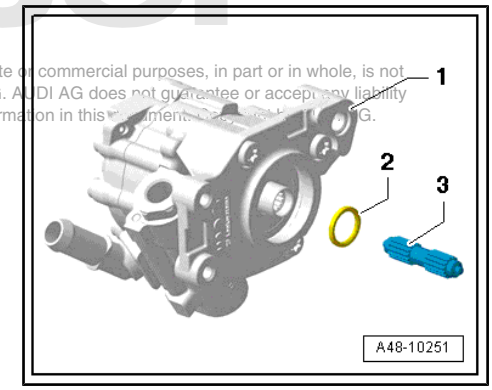
- Renew gaskets and seals.
- Clean off fluid in engine compartment where necessary.
- Always renew O rings for drive shaft and power steering pump.
- Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.
- Grease splines of drive shaft and power steering pump all round. Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .
- Hose connections and suction hose must be free of oil and grease before fitting.
- Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .

Tightening torques ⇒ page 611

– Grease splines of power steering pump -1- and drive shaft -3- all round ⇒ Electronic parts catalogue .

– Renew seal -2-.

– Fit components of power steering pump as illustrated and install pump on engine.



1 - Power steering pump

2 - Seal

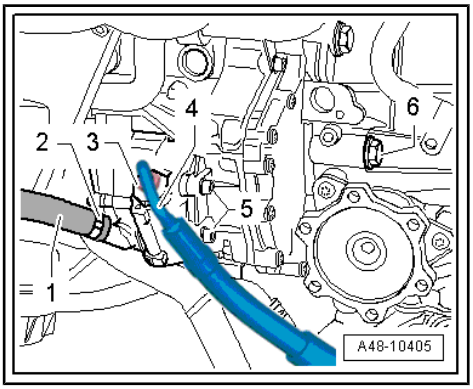
3 - Grease drive shaft, splines of drive shaft and power steering pump all round. Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .

Note correct position of suction hose on power steering pump ⇒ Item 9 (page 606) .

– Turn hub by hand until fluid comes out at pump outlet.

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– Tighten bolts -5- and -6-.
– Connect suction hose -1- to power steering pump and secure with new hose clip -2-.
– Bolt pressure line -4- onto power steering pump ⇒ Item 9 (page 606) .
– Install subframe ⇒ Rep. gr. 10 .
– Tighten subframe bolts to torque but not to extra angle (only tighten bolts fully after checking wheel alignment).



WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

– Fill up with hydraulic fluid .
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

WARNING

Tighten subframe bolts to final setting after checking wheel alignment.

12.6 Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)

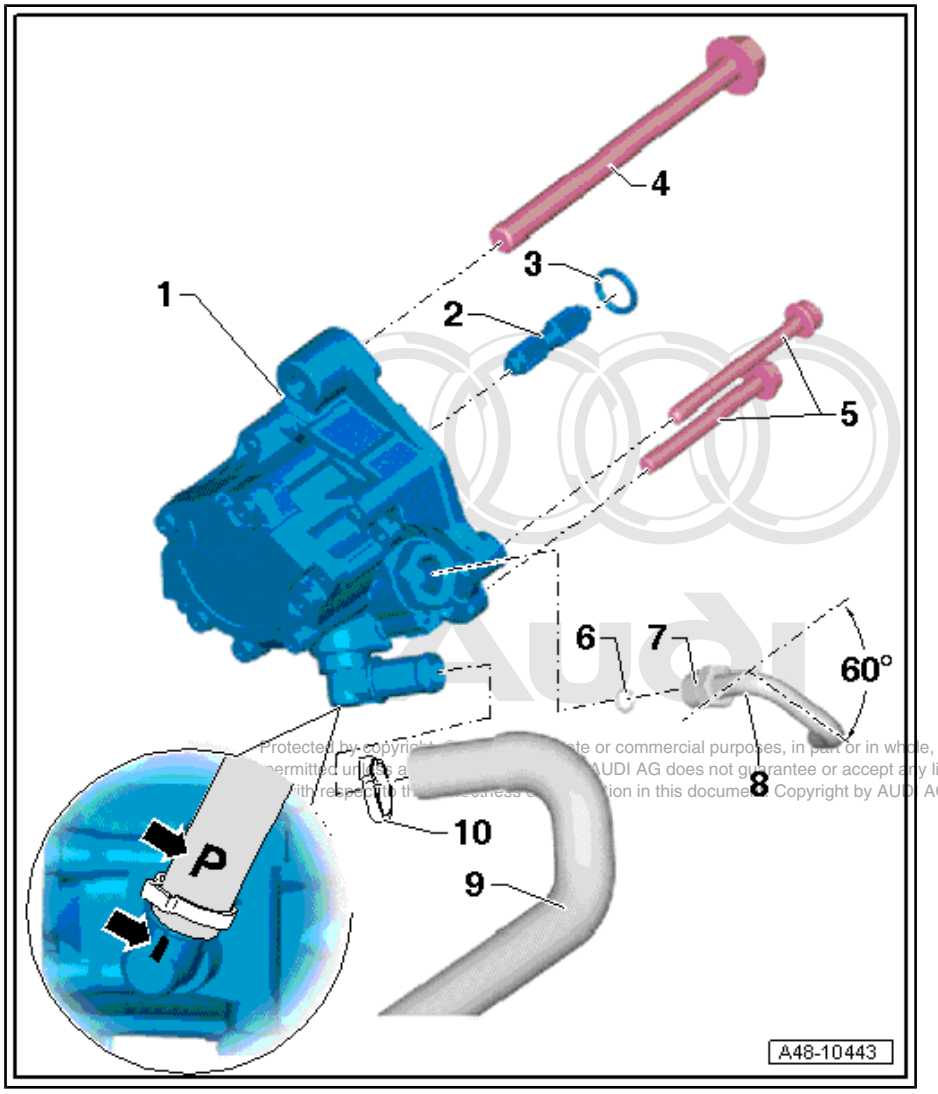
Removing and installing power steering pump (vehicles with 8-cylinder FSI engine, vehicles without dynamic steering)
⇒ page 613 .

Exploded view of power steering pump

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Note

- *Renew seals.*
- *Do not re-use hydraulic fluid which has been drained off.*
- *Use only hydraulic fluid .*
- *When installing new power steering pump, always renew oil seal and O-ring for pump ⇒ Rep. gr. 15 .*
- *Use only specified type of grease ⇒ Electronic parts catalogue for lubrication.*



1 - Power steering pump

- ❑ Fill with hydraulic fluid before installing
- ❑ Checking delivery pressure ⇒ page 601
- ❑ Removing and installing ⇒ page 613
- ❑ When re-installing, grease splines of power steering pump.
- ❑ Bleeding steering system ⇒ page 425
- ❑ Checking hydraulic fluid level ⇒ page 424
- ❑ Checking steering system for leaks ⇒ page 426

2 - Drive shaft

- ❑ Grease splines of drive shaft and power steering pump all round. For correct version refer to ⇒ Electronic parts catalogue
- ❑ Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .

3 - Seal

- ❑ Renewing ⇒ Rep. gr. 15
- ❑ Grease when refitting.

4 - Bolt

- ❑ Tightening torque for vehicles with manual gearbox ⇒ Rep. gr. 34
- ❑ Tightening torque for vehicles with automatic gearbox ⇒ Rep. gr. 37
- ❑ Securing bolt: gearbox/ engine/ power steering pump

5 - Bolt

- ❑ 25 Nm

6 - Seal

- ❑ Always renew if removed

7 - Union nut

- ❑ 38 Nm

8 - Pressure line

Caution

Fully insert pressure line when installing.

- ❑ Note correct position: Angle between pipe connection and shaft of power steering pump is approx. 60°.

9 - Suction hose

- ❑ Marking „P“ -arrow- on suction hose must be in line with seam -arrow- on power steering pump

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10 - Hose clip

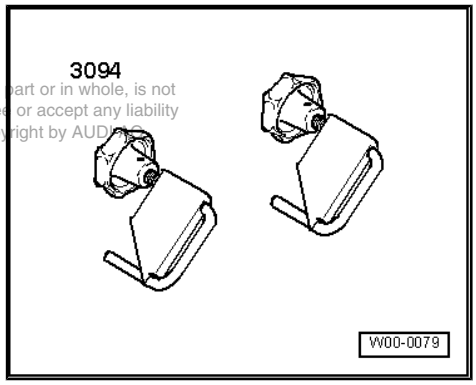
- ❑ Tighten using hose clip pliers -V.A.G 1275- .
- ❑ Always renew if removed

Removing

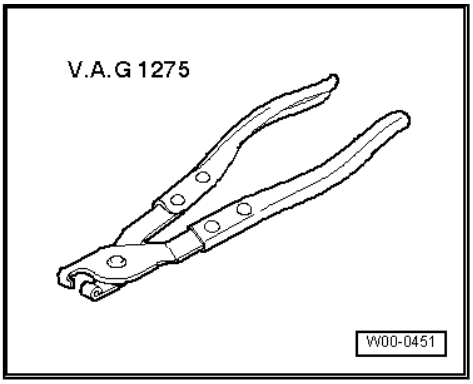
Special tools and workshop equipment required

♦ Hose clamps up to 25 mm ∅ -3094-

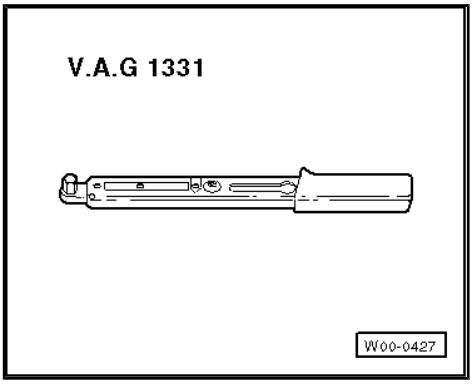
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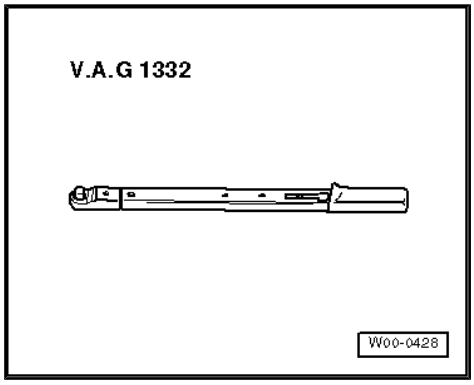
♦ Hose clip pliers -V.A.G 1275-



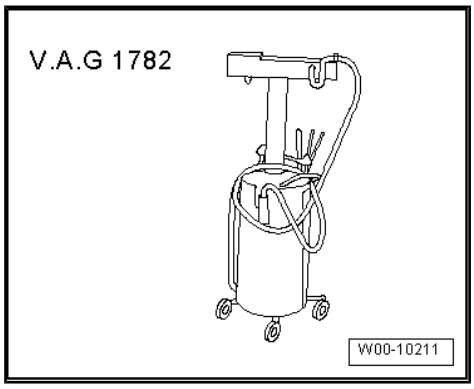
♦ Torque wrench -V.A.G 1331-



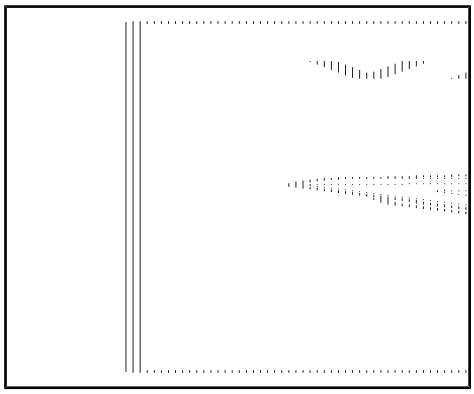
- Torque wrench -V.A.G 1332-



- Used oil collection and extraction unit -V.A.G 1782-



- Drip tray for workshop hoist -VAS 6208-



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General notes

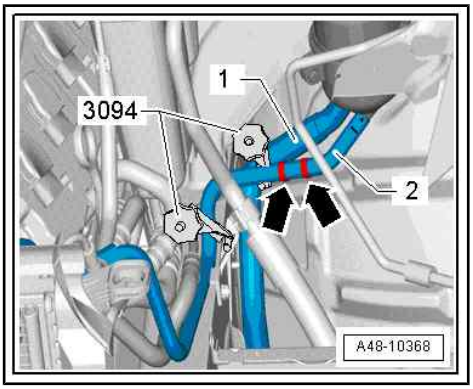
There is no provision for repairing the power steering pump. If problems are reported, trace the fault by means of a pressure test and a leakage test. Renew the power steering pump if there is a fault.

- Check steering system for leaks if fluid level is low in reservoir.
- If leakage is visible at the pipe connections first tighten connections and wipe dry, then check for leaks again.
- The power steering pump is supplied without fluid filling. Prior to installation, the pump must therefore always be filled with hydraulic fluid and turned by hand. Otherwise, there is a possibility of pump damage or noise while driving.
- Renew oil seal and O-ring for power steering pump prior to installation.

– Raise vehicle on lifting platform.

– Extract hydraulic fluid from reservoir with used oil collection and extraction unit -V.A.G 1782- .

– Clamp off suction hose -1- and return hose -2- using hose clamps -3094- .



Caution

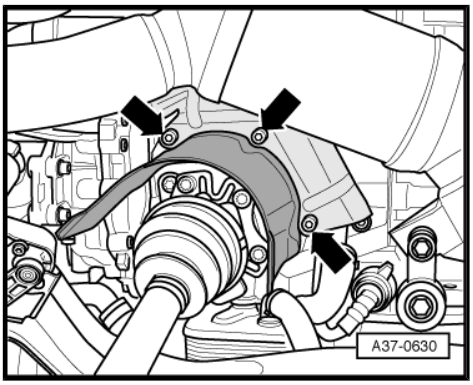
- *Hose clamps up to ∅ 25 mm -3094- must not be applied at any point near the non-return valve in the return hose -2-. The non-return valve will otherwise be damaged.*
- *The non-return valve is located in the return hose -2- between the hose clips -arrows-.*

– Remove noise insulation ⇒ Rep. gr. 66 .

– Lower subframe ⇒ Rep. gr. 10 .

– Remove heat shield for drive shaft (left-side) -arrows-.

– Place drip tray underneath.

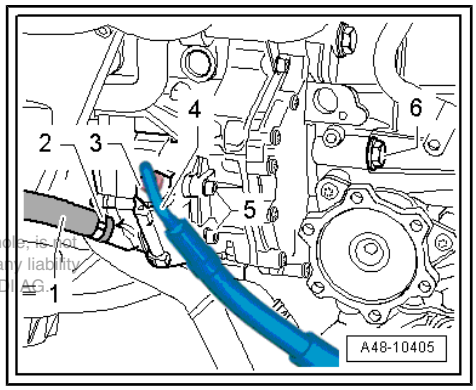


– Remove hose clip -2- from suction hose -1- and pull suction hose -1- off power steering pump.

– Unscrew union nut -3- and pull pressure line -4- off power steering pump.

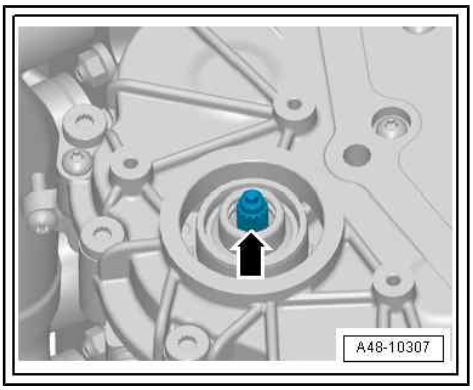
– Remove bolts -5- and bolt -6-.

– Detach power steering pump with drive shaft.

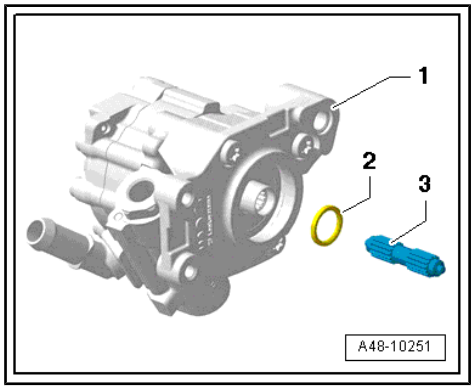


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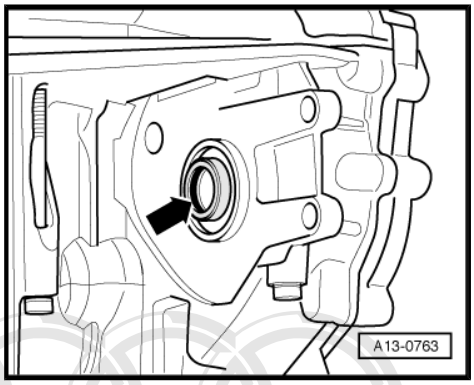
– If necessary, pull drive shaft -arrow- for power steering pump out of engine by hand.



– If power steering pump -1- is renewed, seal -2- and drive shaft -3- must also be renewed.



– Renew oil seal and O-ring for power steering pump -arrow- ⇒ Rep. gr. 15 .



Installing

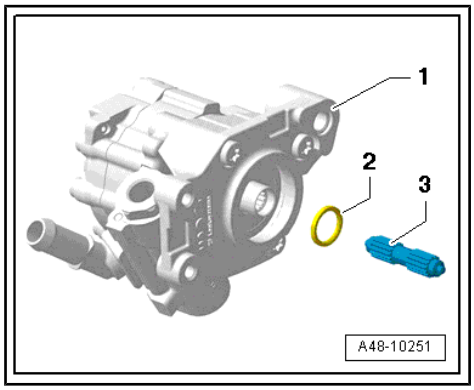
Installation is carried out in the reverse sequence. Note the following points:

- Renew gaskets and seals.
- Clean off fluid in engine compartment where necessary.
- Always renew O rings for drive shaft and power steering pump.
- Grease splines of drive shaft and power steering pump all round. For correct version refer to ⇒ Electronic parts catalogue . Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .
- Before fitting a new power steering pump, put in hydraulic fluid at the inlet and turn pump by hand until fluid flows out at the pressure outlet.
- Hose connections and suction hose must be free of oil and grease before fitting.
- Secure all hose connections with new hose clips ⇒ Electronic parts catalogue .

Tightening torques ⇒ page 611

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– Grease splines of power steering pump -1- and drive shaft -3- all round ⇒ Electronic parts catalogue .
– Renew seal -2-.
– Fit components of power steering pump as illustrated and install pump on engine.



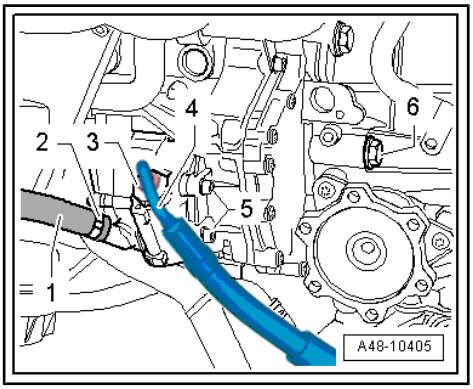
1 - Power steering pump

2 - Seal

3 - Grease drive shaft, splines of drive shaft and power steering pump all round. For correct version refer to ⇒ Electronic parts catalogue . Apply grease to hole at pump end and either to hole or to end of shaft at engine end. For correct type of grease refer to ⇒ Electronic parts catalogue .

Note correct position of suction hose on power steering pump ⇒ Item 9 (page 612) .

– Turn hub by hand until fluid comes out at pump outlet.



– Tighten bolts -5- and -6-.
– Connect suction hose -1- to power steering pump and secure with new hose clip -2-.
– Bolt pressure line -4- onto power steering pump ⇒ Item 8 (page 612) .
– Install subframe ⇒ Rep. gr. 10 .
– Tighten subframe bolts to torque but not to extra angle (only tighten bolts fully after checking wheel alignment).

WARNING

All bolts and nuts must be fully tightened according to specifications before the vehicle is driven on public roads.

– Fill up with hydraulic fluid .
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .
– Fit noise insulation ⇒ Rep. gr. 66 .
– Check and adjust wheel alignment as required, see chart ⇒ page 310 .

WARNING

Tighten subframe bolts to final setting after checking wheel alignment.

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13 Removing and installing hydraulic fluid cooler

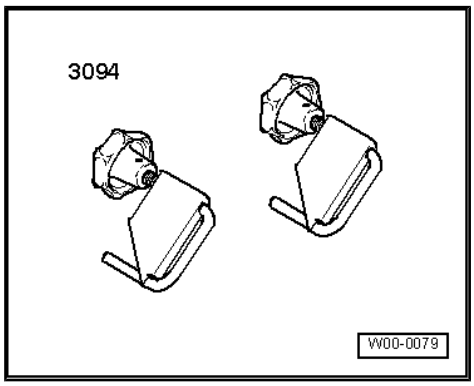
⇒ „13.1 Removing and installing hydraulic fluid cooler (vehicles with dynamic steering and vehicles with 8-cylinder FSI engine)“, page 618

⇒ „13.2 Removing and installing hydraulic fluid cooler (RS 5 vehicles)“, page 620

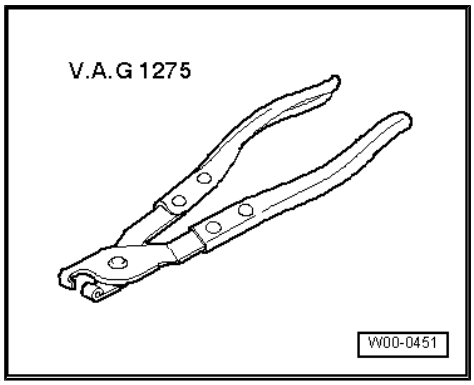
13.1 Removing and installing hydraulic fluid cooler (vehicles with dynamic steering and vehicles with 8-cylinder FSI engine)

Special tools and workshop equipment required

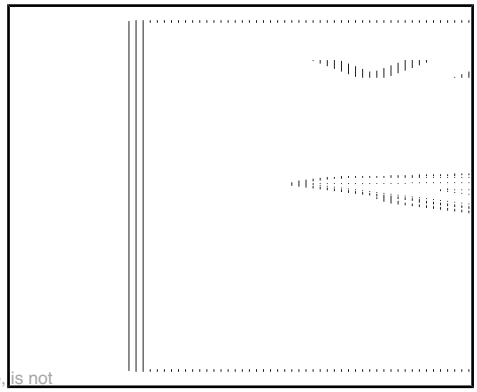
- Hose clamps up to 25 mm ∅ -3094-



- Hose clip pliers -V.A.G 1275-



- Drip tray for workshop hoist -VAS 6208-

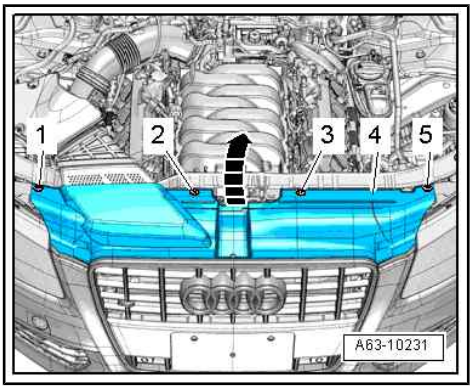


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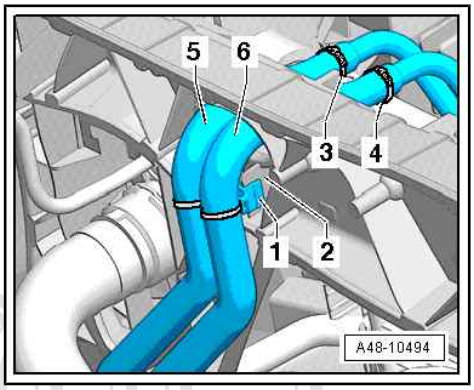
Removing

– Remove bolts -1, 2, 3, 5- to detach cover -4- for lock carrier (front) ⇒ Rep. gr. 50 .

– Lift cover -4- for lock carrier -arrow- and unhook at radiator grille ⇒ Rep. gr. 50 .

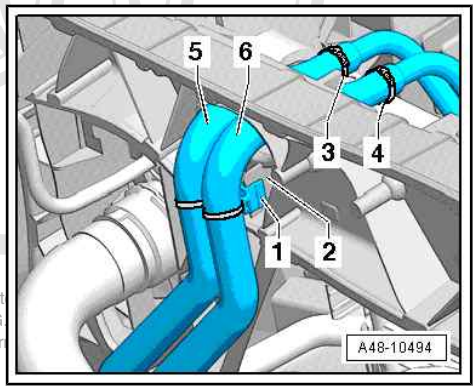


– Clamp off hydraulic lines -5- and -6- with hose clamps up to ∅ 25 mm -3094- .



– Remove hose clips -3- and -4-.

– Disconnect hydraulic lines -5- and -6- from hydraulic fluid cooler.

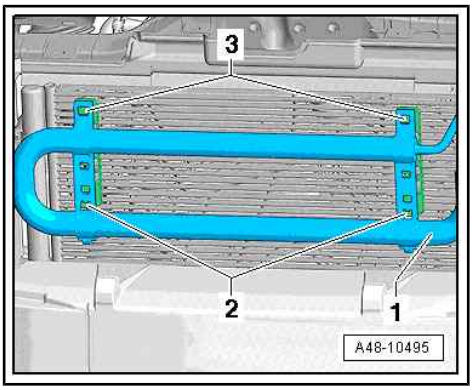


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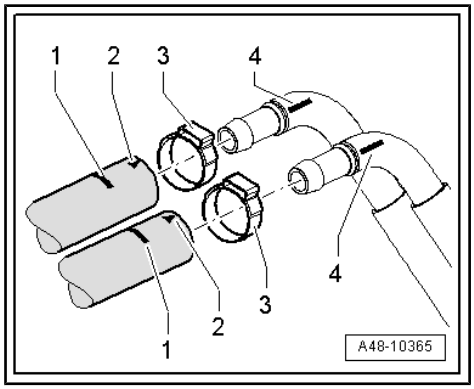
– Release retainers -3-, tilt top section of hydraulic fluid cooler -1- forwards slightly and lift cooler out of brackets -2- at air conditioner condenser.

Installing

Installation is carried out in the reverse sequence. Note the following points:



– Markings -2- on hoses should face the top (»12 o'clock« position).



Caution

- *Hold pipes -4- when attaching hoses -1-.*

– Fill up with hydraulic fluid .
– Clean off any fluid spills.
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .
– Install lock carrier cover (front) ⇒ Rep. gr. 63 .

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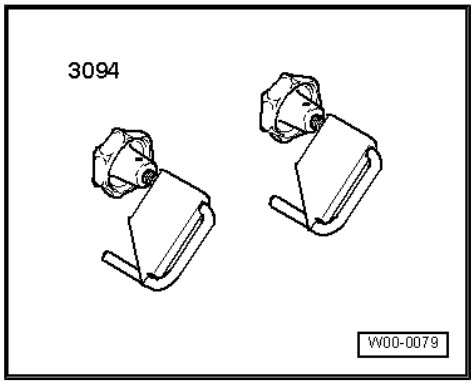
Note

Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .

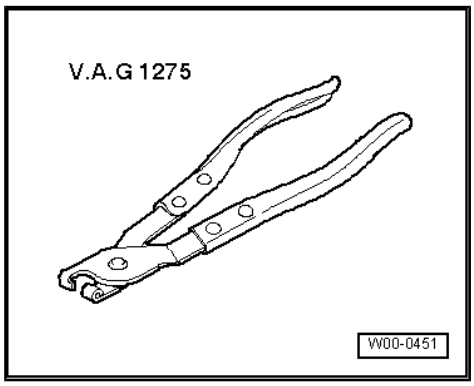
13.2 Removing and installing hydraulic fluid cooler (RS 5 vehicles)

Special tools and workshop equipment required

♦ Hose clamps up to 25 mm ∅ -3094-



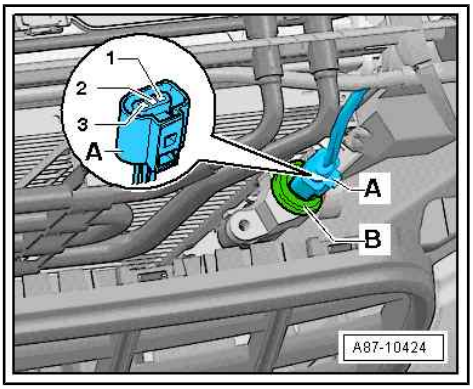
♦ Hose clip pliers -V.A.G 1275-



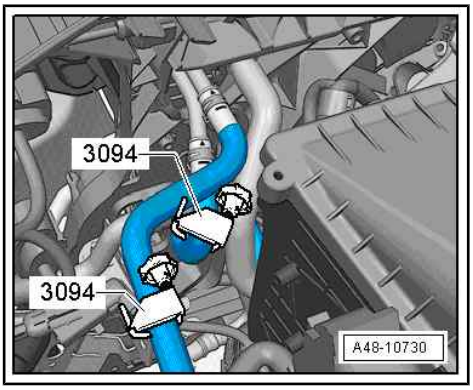
Removing

– Switch off ignition.
– Remove front bumper cover ⇒ Rep. gr. 63 .

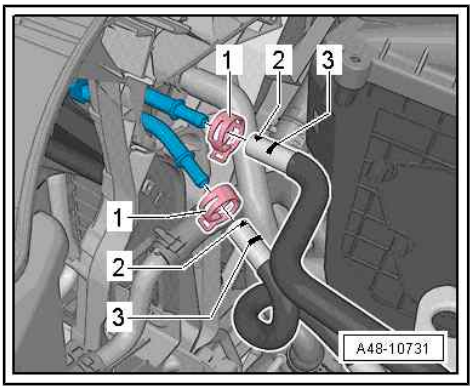
– Unplug electrical connector -A- from refrigerant pressure and temperature sender -G395- -B- and move clear wiring.



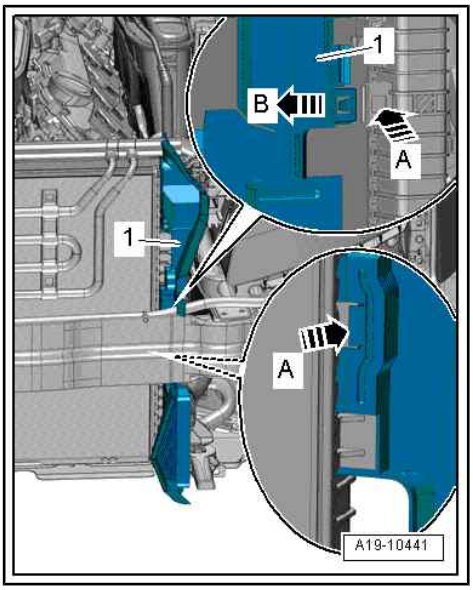
– Clamp off hydraulic hoses at a suitable point using hose clamps up to ∅ 25 mm -3094- .



– Remove hose clips -1-.
– Disconnect hydraulic lines from hydraulic fluid cooler.

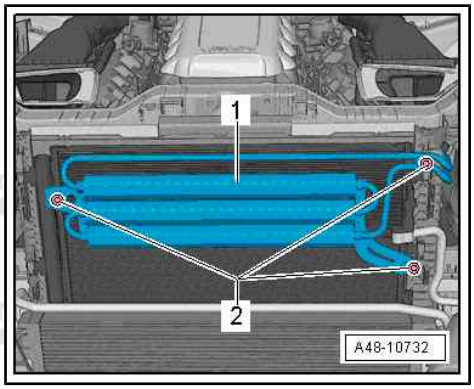


– Release retaining tabs -arrows A- and detach air duct -1- (left-side) -arrow B-.



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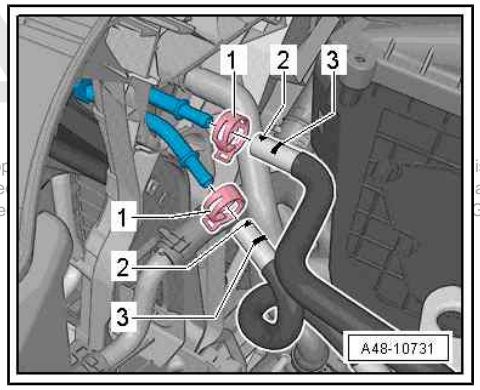
– Remove bolts -2- and detach hydraulic fluid cooler -1- from front of vehicle.



Installing

Installation is carried out in the reverse sequence. Note the following ⇒ page 600 .

– Markings -2- on hoses should face the top (»12 o'clock« position).



Caution

- *Hold pipes when attaching hoses.*

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G.

– Fill up with hydraulic fluid .
– Clean off any fluid spills.
– Bleed steering system ⇒ page 425 .
– Check hydraulic fluid level ⇒ page 424 .
– Check all opened lines for leaks ⇒ page 426 .
– Install front bumper cover ⇒ Rep. gr. 63 .

Note

Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .

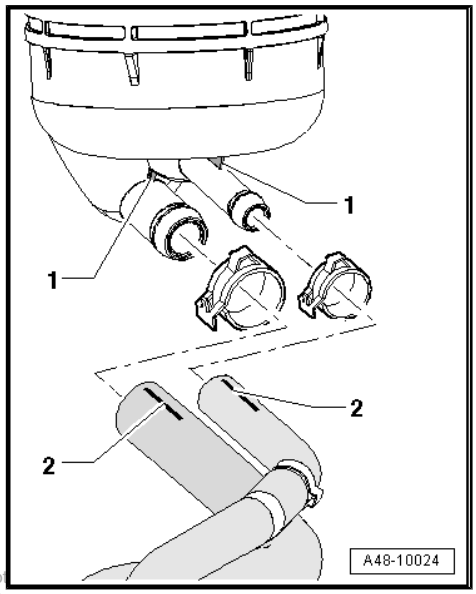
14 Installation position of hoses

⇒ „14.1 Installation position of hoses on fluid reservoir, hydraulic fluid cooler and return line“, page 623

14.1 Installation position of hoses on fluid reservoir, hydraulic fluid cooler and return line

Installation position of hoses on fluid reservoir (all engines)

– Markings -2- on hoses must be aligned with webs -1- on reservoir.

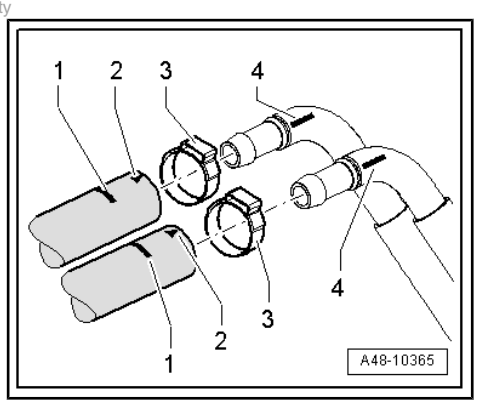


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Installation position of hoses on hydraulic fluid cooler (all engines)

– Markings -2- on hoses must be aligned with markings -4- on hydraulic fluid cooler.

> **Caution**
>
> • *Hold pipes when attaching hoses.*



– Secure hose clips -3- at markings -1-.

Installation position of return line (all engines)

– Marking -3- on hose -5- must be opposite marking -2- on pipe -1-.

– Secure hose clip (not shown in illustration) at marking -4-.

