Audi A4 1995 ➤

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

Edition 04.2002

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Audi A4 1995 ➤

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

Repair Group

00 - Technical data

40 - Front suspension

42 - Rear suspension

44 - Wheels, Tyres, Wheel alignment

48 - Steering

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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 - Technical data

1.2 - Running gear

Model	Front-wheel drive Four-wheel drive					
	Standard running gear 1BA Heavy-duty running gear 1BP Special-purpose vehicles 1BC		Sports running gear 1BE Sports running gear 1BD (S4)		Heavy-duty running gear 1BB	
	FWD1)	quattro1)	FWD1)	quattro2)	FWD1)	quattro1)
Wheelbase (mm)	2622	2607	2619	2607	2624	2607
Front track width (mm)	1495	1495	1498	1498	1489	1489
Rear track width (mm)	1479	1475	1479	1477	1479	1469
	Heavy-duty running gear 1BT		Sports running gear 1BQ (South Africa)		Sports running gear 1BV (quattro GmbH)	
	FWD1)	quattro1)	FWD1)	quattro1)	FWD2)	quattro2)
Wheelbase (mm)	2623	2607	2620	2607	2618	2607
Front track width (mm)	1493	1493	1497	1497	1499	1500
Rear track width (mm)	1479	1473	1479	1476	1479	1478

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1) Basic tyres 195/65 R15 ET45

2) Basic tyres 225/65 R17 ET45

Track widths differ accordingly when using wheels with other rim offset.

Model	Front-wheel drive Four-wheel drive				
	RS4				
	FWD	quattro1)			
Wheelbase (mm)	-	2607			
Front track width (mm)	-	1498			
Rear track width (mm)	-	1477			

1) Basic tyres 225/65 R17 ET45

Track widths differ accordingly when using wheels with other rim offset.

1.3 - Steering

Model	All
Steering box	Power-assisted steering box
Maximum steering angle	40°
Turning circle dia.	11.1 m

1.4 - Wheels, tyres

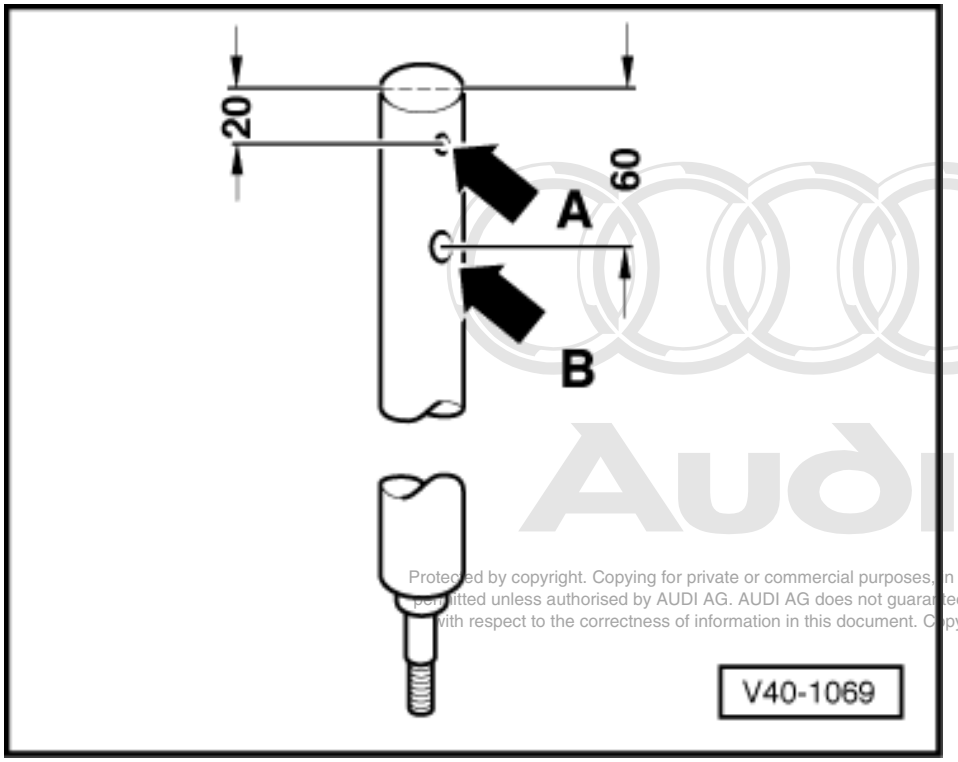
For general information, information on wheel/tyre combinations, winter tyres, snow chains and recommended tyre makes, refer to "Technical Information; Wheel/Tyre reference manual".

2 - Prescribed disposal procedure for oil-filled components

2.1 - Prescribed disposal procedure for oil-filled components

2.2 - Releasing gas from front gas-filled shock absorber and draining

A - Drilling open



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- -> Clamp gas-filled shock absorber vertically in vice with piston rod facing downwards.

Attention:
Wear safety goggles whilst drilling.

- Drill ø 3 mm hole -arrow A- through outer tube of shock absorber.

Note:

Gas escapes whilst doing so.

- Keep drilling until inner tube is penetrated (approx. 25 mm deep).
- Drill second ø 6 mm hole -arrow B- through outer and inner tube of shock absorber.

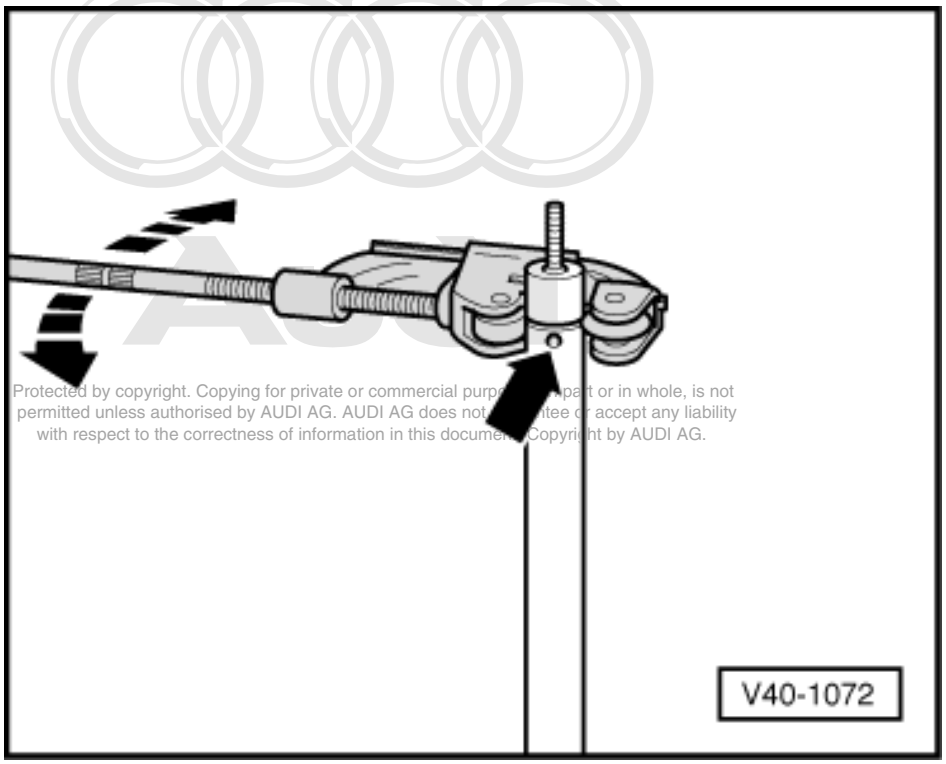
- Hold shock absorber over a drip tray and execute full piston rod stroke several times until no further oil emerges.

B - Opening with pipe cutter

Special tools and workshop equipment required

- Pipe cutter, e.g. Stahlwille Express 150/3

Attention:
Wear safety goggles whilst drilling/sawing.



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- -> Drill ø 3 mm hole -arrow- through outer tube of shock absorber/saw through tube wall.

Note:

Gas escapes whilst drilling/sawing.

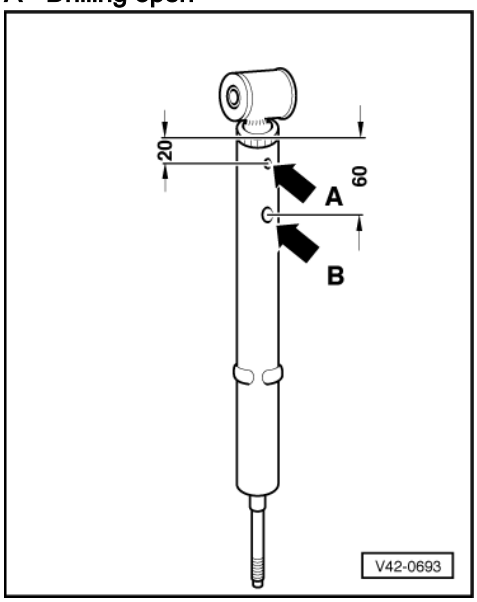
- Apply pipe cutter (e.g. Stahlwille Express 150/3) as shown and cut through outer tube.

- Pull up piston rod; in doing so, hold inner tube with pliers and press tube downwards such that it remains in outer tube on slowly pulling up piston rod.
- Pull piston rod off inner tube.

- Drain shock absorber tube.

2.3 - Releasing gas from rear gas-filled shock absorber and draining

A - Drilling open



- -> Clamp gas-filled shock absorber vertically in vice with piston rod facing downwards.

Attention: Wear safety goggles whilst drilling.

- Drill ø 3 mm hole -arrow A- through outer tube of shock absorber.

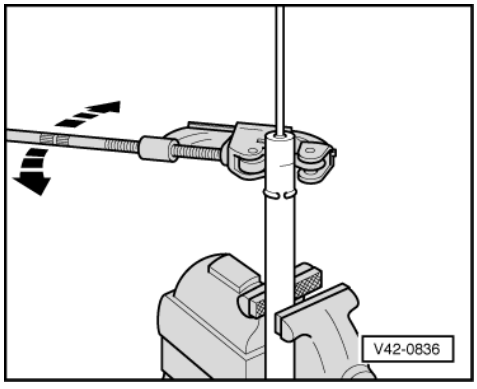
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Note:
Gas escapes whilst doing so.
- Keep drilling until inner tube is penetrated (approx. 25 mm deep).
- Drill second ø 6 mm hole -arrow B- through outer and inner tube of shock absorber.
- Hold shock absorber over a drip tray and execute full piston rod stroke several times until no further oil emerges.

B - Opening with pipe cutter

Special tools and workshop equipment required
- Pipe cutter, e.g. Stahlwille Express 150/3

Attention: Wear safety goggles whilst drilling/sawing.



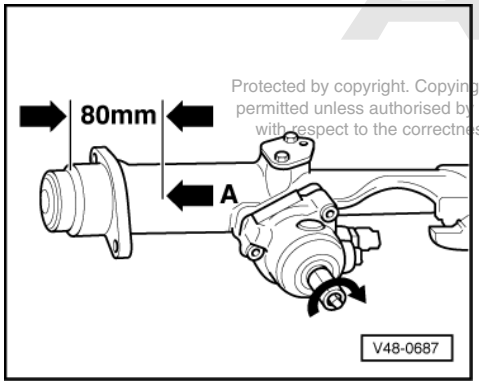
- -> Drill ø 3 mm hole -arrow- through outer tube of shock absorber/saw through tube wall.

Note:

Gas escapes whilst drilling/sawing.

- Apply pipe cutter (e.g. Stahlwille Express 150/3) as shown and cut through outer tube.
- Pull up piston rod; in doing so, hold inner tube with pliers and press tube downwards such that it remains in outer tube on slowly pulling up piston rod.
- Pull piston rod off inner tube.
- Drain shock absorber tube.

2.4 - Draining power-assisted steering box

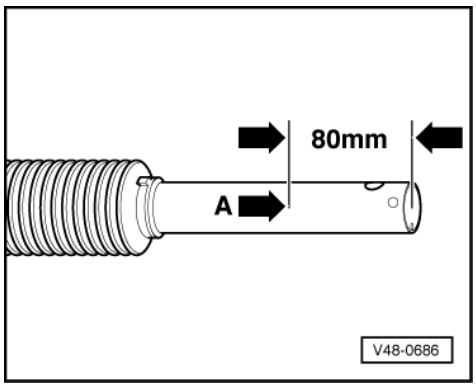


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Note:

When draining steering box, ambient temperature should be at least 20 ° C.

- -> Turn steering pinion as far as it will go in direction of arrow.



- -> Clamp steering box horizontally in vice.
- Place drip tray under steering box.
- Saw off steering box at marked location -arrow A-.
- Hold sawn-off steering box over drip tray and allow hydraulic fluid to drain off. If necessary, turn steering pinion as far as opposite stop.

3 - Checking shock absorbers

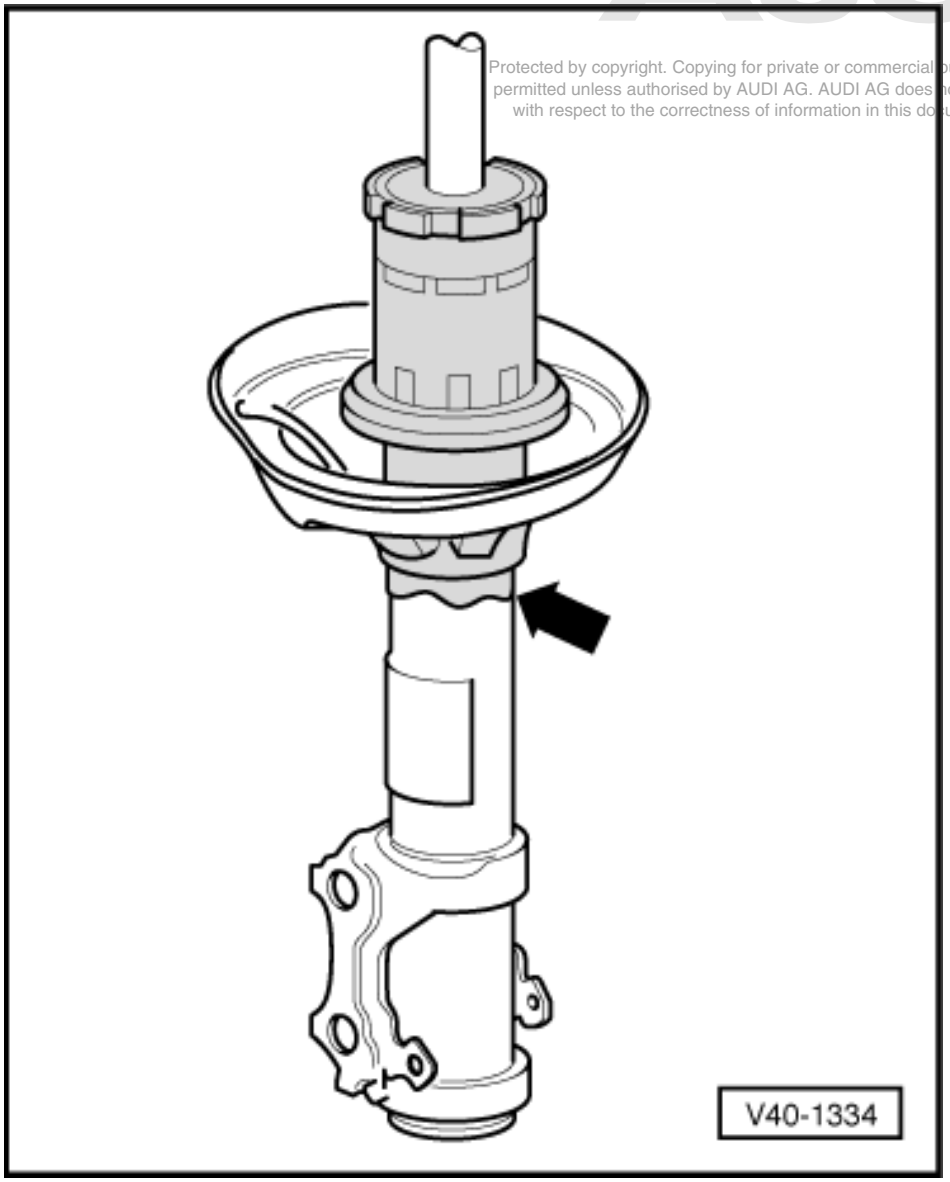
3.1 - Checking shock absorbers

3.2 - Shock absorber leakage

Shock absorbers are often replaced on the basis of complaints about leakage. Test bench and on-the-vehicle studies have revealed that in the majority of cases the complaints received did not justify this action.

The emergence of slight traces of oil ("sweating") at the piston rod seal does not represent grounds for shock absorber replacement. Such oil presence on the shock absorber is acceptable in the following cases:

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- -> Oil emerging is visible (hatched area in illustration), but is dull and matt and possibly also dry and dust-coated
- Emergence of oil is only observed in the range between upper shock absorber seal (piston rod oil seal) and lower spring plate -arrow-

Note:

The emergence of a small quantity of oil is beneficial, as it lubricates the piston rod oil seal and thus extends the service life. This applies to front and rear axle shock absorbers.

3.3 - Shock absorber noise

Shock absorbers are often replaced on the basis of complaints about knocking noises. Test bench and on-the-vehicle studies have revealed that in some 70% of cases the complaints received were not justified and there was no need for replacement.

Proceed as follows in the event of complaints interpreted as being knocking or creaking noise.

- Perform test drive (if at all possible on a dry, uneven surface) together with customer to establish where, when and in what form the noise becomes apparent.

Note:

The shock absorber is hardly ever the cause of the noise.

3.4 - Checking shock absorber following removal

Defective shock absorbers become apparent through loud knocking noises whilst driving, particularly on a poor road surface, on account of the wheel "jumping". A further sign is a severe loss of oil on the outside.

Note:

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

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

- Squeeze shock absorber together.
  - Piston rod must move evenly and smoothly over entire stroke
- Release piston rod.
  - Piston rod returns automatically to initial position if there is sufficient gas pressure in shock absorber

Notes:

- If the above is not the case, the shock absorber need not necessarily be replaced. Provided no major loss of oil has occurred, the mode of operation corresponds to that of a conventional shock absorber.
- The full damping function is retained even without gas pressure, provided there has been no major loss of oil. There may however be a negative effect on noise level.

3.5 - Checking shock absorber on shock tester

A shock tester (shock absorber tester) enables shock absorbers to be checked without removing them. The damping effect can be assessed on the basis of the pointer deflection/printout.

Special tools and workshop equipment required

- Boge shock tester

  Or

- Sachs shock tester V.A.G 1975

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Or

- Maha shock absorber tester VAS 1990

Test requirements:

- Temperature +10 ... +40 ° C
- Driver in vehicle
- Inflation pressure OK
- Vehicle standing centrally aligned and straight on wheel contact plates
- Front wheels straight ahead
- Handbrake not applied; foot brake not pressed

Limit values

The condition of the shock absorber can only be assessed as follows:

- Adequate damping effect

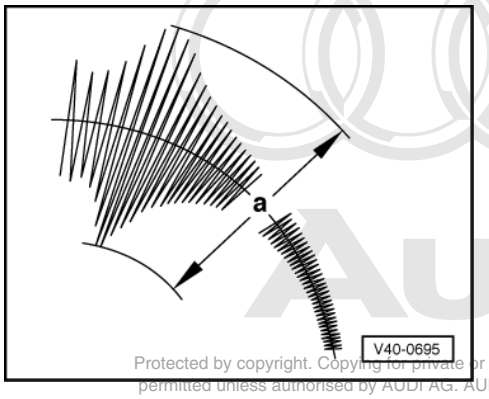
Or

- Inadequate damping effect

Notes:

- Intermediate readings for reduced damping performance are not possible.
- Service life forecasts are not permitted.
- Measured values which include the influence of the spring travel end stops will be biased.

The following values only apply to the above-mentioned test benches. If the stated values are exceeded, less than 50% of shock absorber performance is being obtained and replacement is justified.



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-> Example:

Limit value = 70

- a = Greater than 70: Inadequate damping effect
- a = Less than 70: Adequate damping effect

The shock absorber assembly installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.

Explanatory notes on factory codes (PR numbers) => Page 66

3.6 - Limit values "a" in mm

Notes:

- If reading is higher than limit value "a" (value in table): Inadequate damping effect => Replace shock absorber
- If reading is below limit value "a" (value in table): Adequate damping effect => Shock absorber need not be replaced

Vehicle model	Front axle	Rear axle	Remarks
Audi A4 standard version FWD and 4WD	60	70	
Audi A4 sports version FWD	45	60	
Audi A4 sports version 4WD	45	45	
Audi A4 heavy-duty version FWD and 4WD	60	70	

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40 - Front suspension

1 - Front axle component layout

1.1 - Front axle component layout

1.2 - General

Loadbearing and suspension elements are not to be welded and straightened.

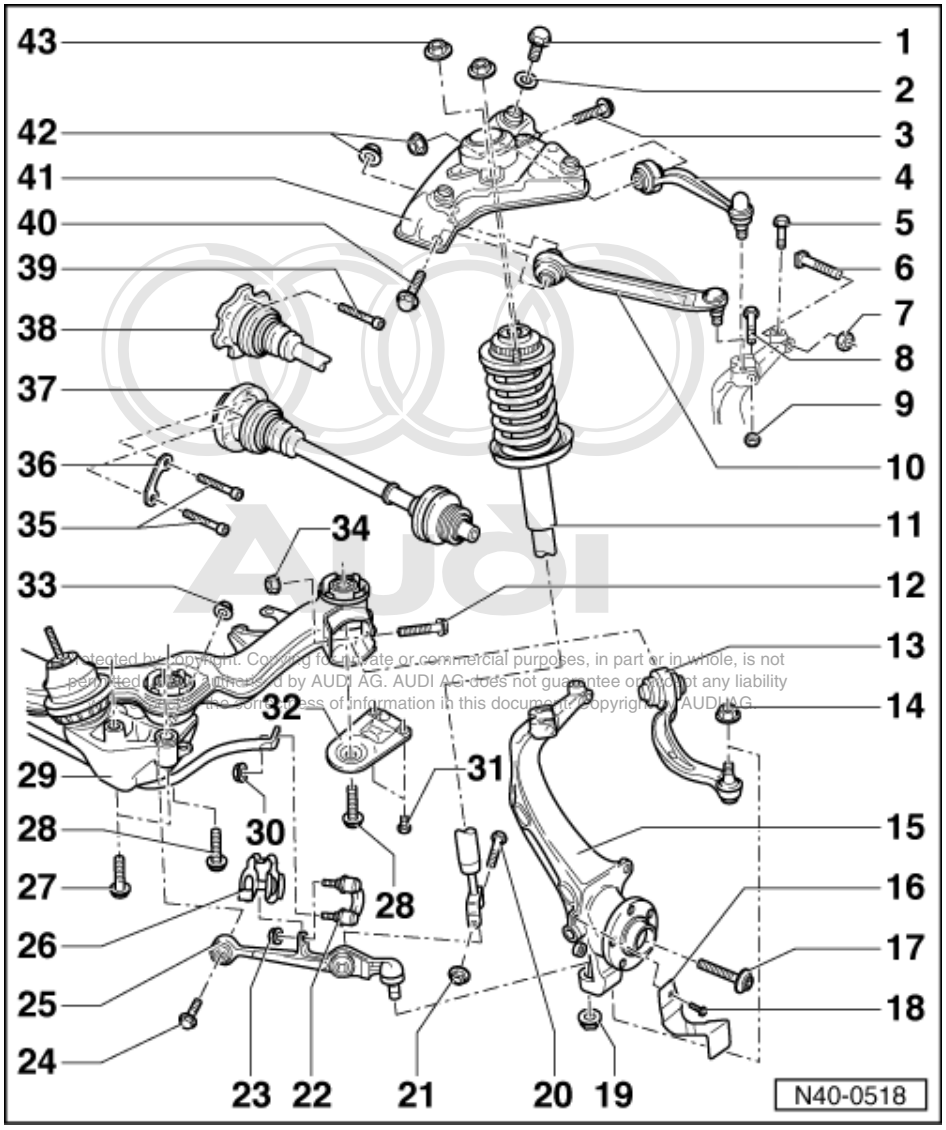
Never move vehicles without drive shaft fitted, as otherwise wheel bearing damage will result. Should it nevertheless become necessary to move the vehicle, always heed the following:

- Fit an outer joint instead of the drive shaft.
- Tighten the outer joint to 50 Nm.

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Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.

1.3 - Layout of components

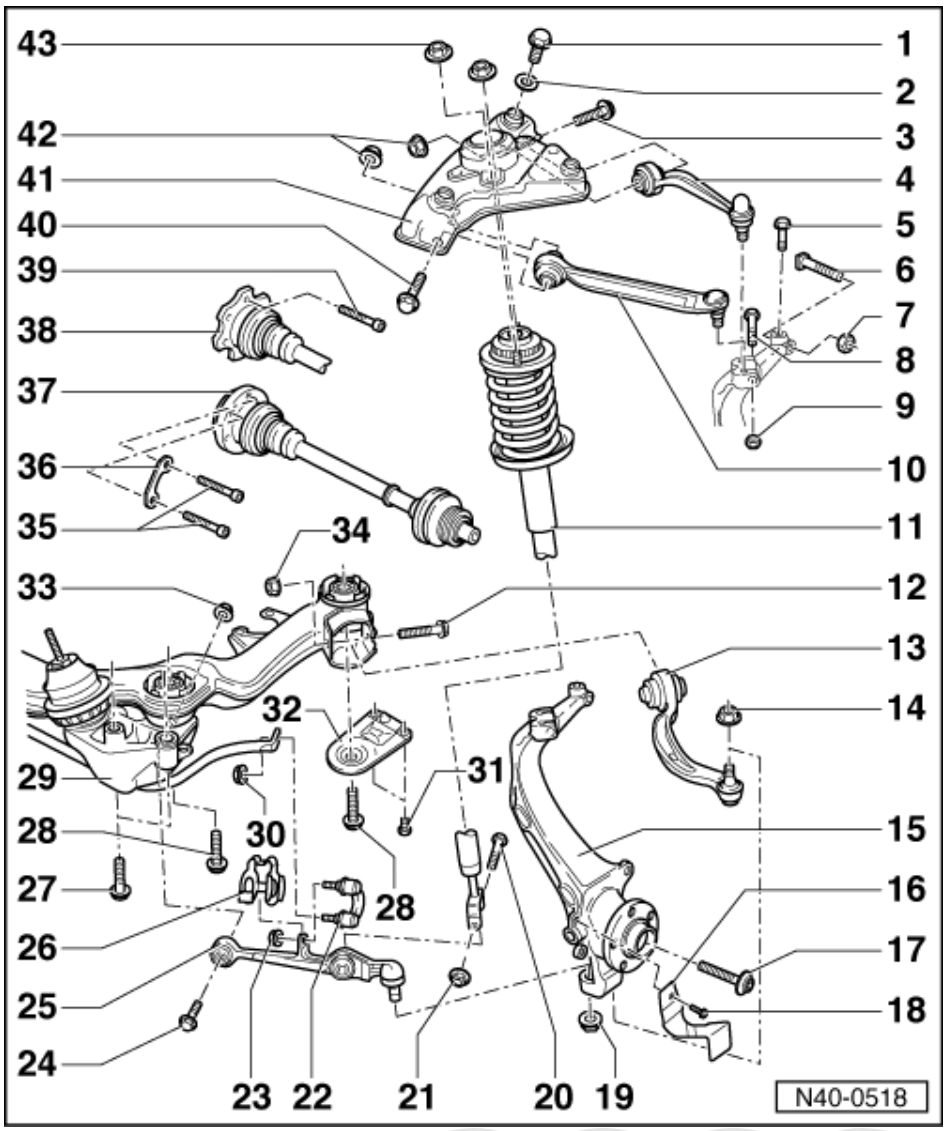


1 Hexagon bolt, 75 Nm
2 Washer
3 Hexagon bolt
- ◆ Note different bolt lengths
- - With steel mounting bracket: M10 x 60
- - With aluminium mounting bracket: M10 x 62
- ◆ Always replace after removing

4 Rear upper link
- ◆ Heed different versions: With and without buffer stop =>Fig. 1 and Fig. 2
- ◆ Replacing bush => Page 100

5 Hexagon bolt, 5 Nm
- ◆ Screw on until contact is made

6 Bolt



7 Self-locking nut, 50 Nm

- Always replace after removing

8 Hexagon bolt M 10 x 100

- If hexagon bolt cannot be removed from wheel bearing housing -Item 85

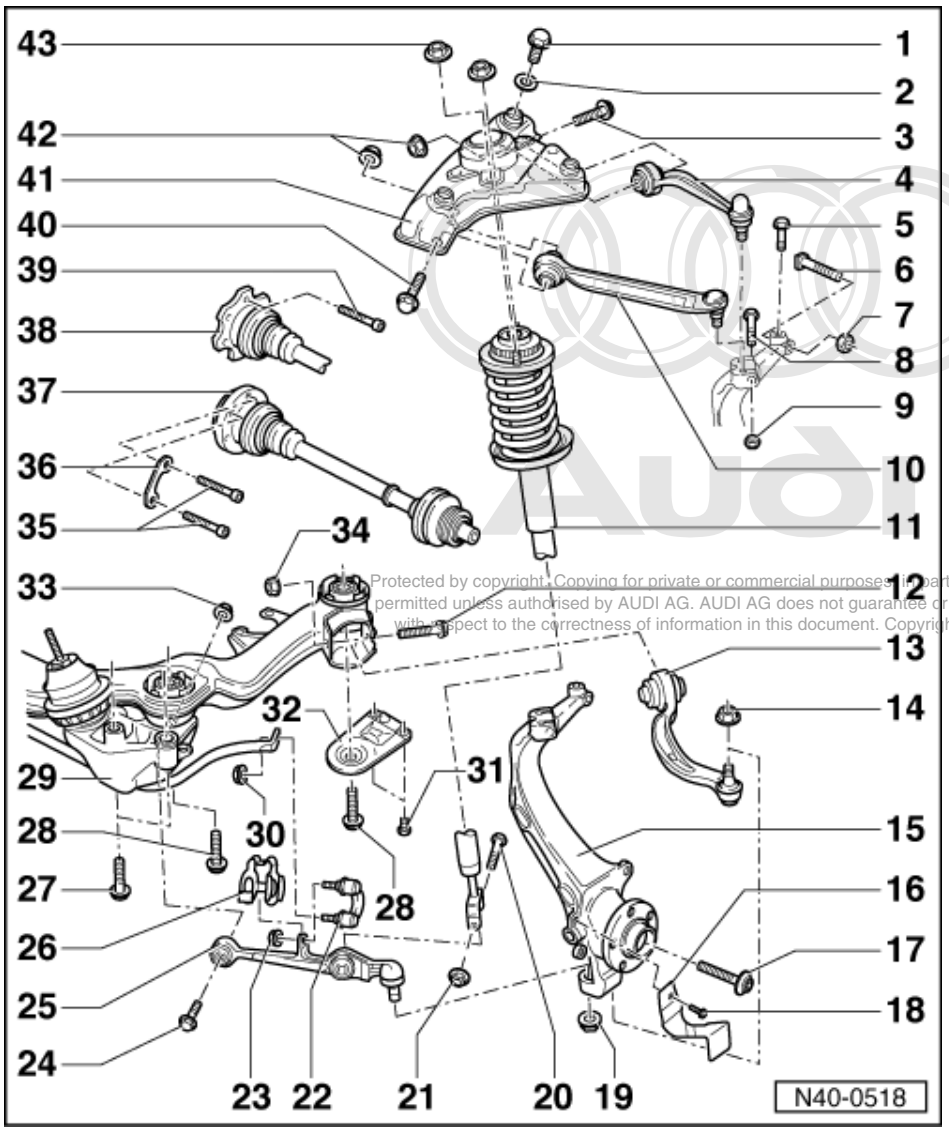
9 Self-locking nut, 40 Nm

- Always replace after removing

10 Front upper link

- Can only be removed together with mounting bracket
- Removing and installing mounting bracket => Page 93
- Replacing bush => Page 93

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11 Suspension strut

- Note different spring/shock absorber versions => Page 66 , vehicle data sticker
- Removing and installing=>Page 59
- Servicing => Page 64

12 Hexagon bolt
M 12 x 1.5 x 120

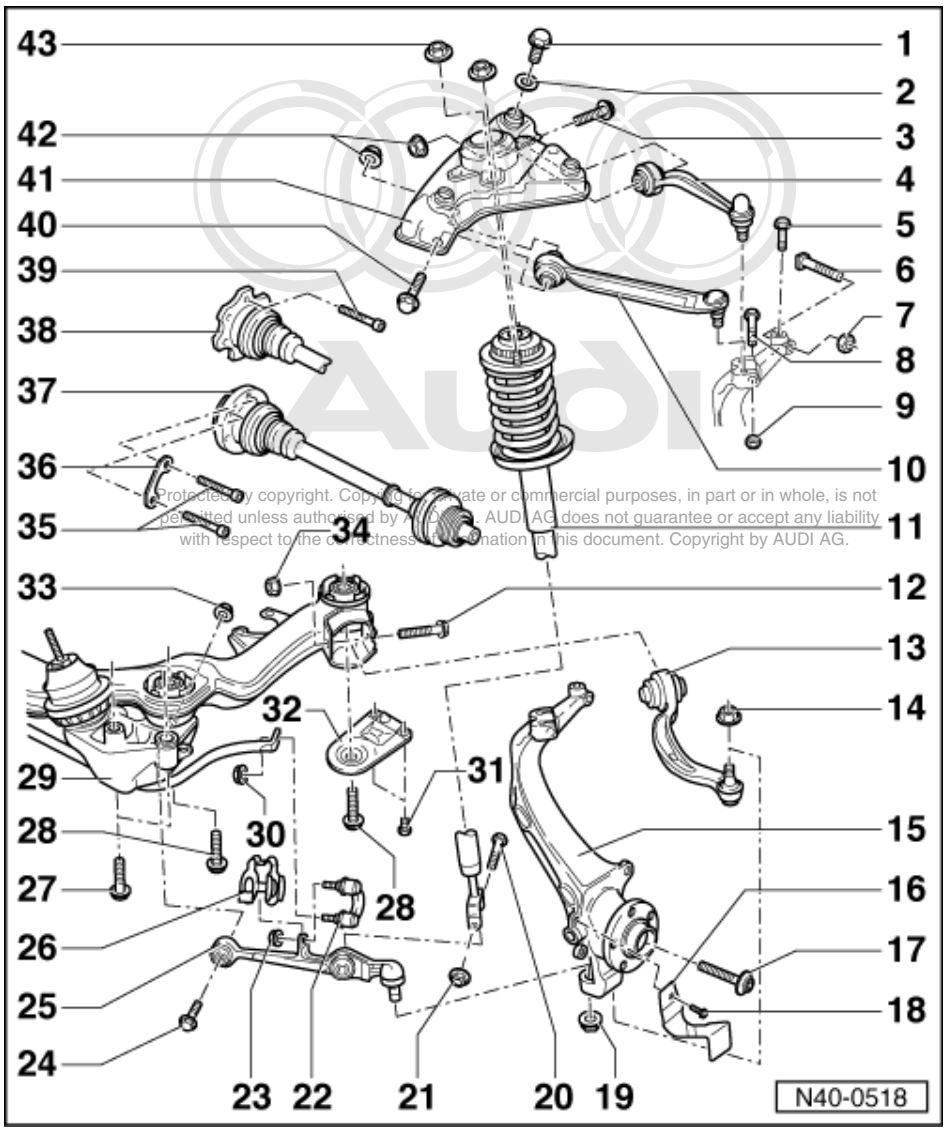
- Always replace after removing

13 Lower guide link

If leaking, hydro-bush must be replaced => Page 117

- Assignment

=> Parts List



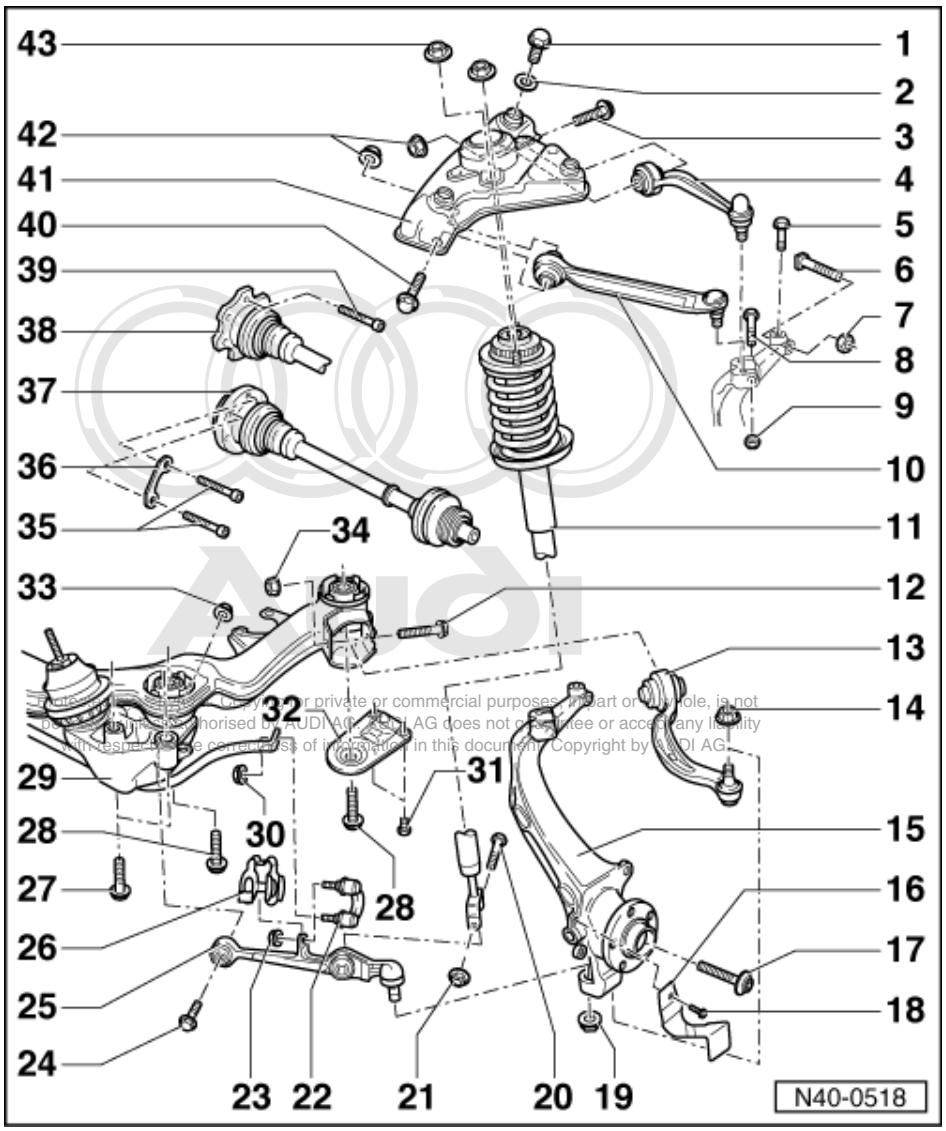
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14 Self-locking nut

- Always replace after removing
- Assignment

=> Parts List

- Flange nut, M12 x 1.5, for wheel bearing housing with no bushing (old version)
  Tightening torque: 100 Nm
- Combi nut, M12 x 1.5, for wheel bearing housing with bushing (new version)
  Tightening torque: 125 Nm
- Vehicles with wheel bearing housings with no bushings and old type track control links -Item 25 - are to be fitted with flange nuts
- On installing wheel bearing housings with bushings, flange nuts are to be replaced with combi nuts



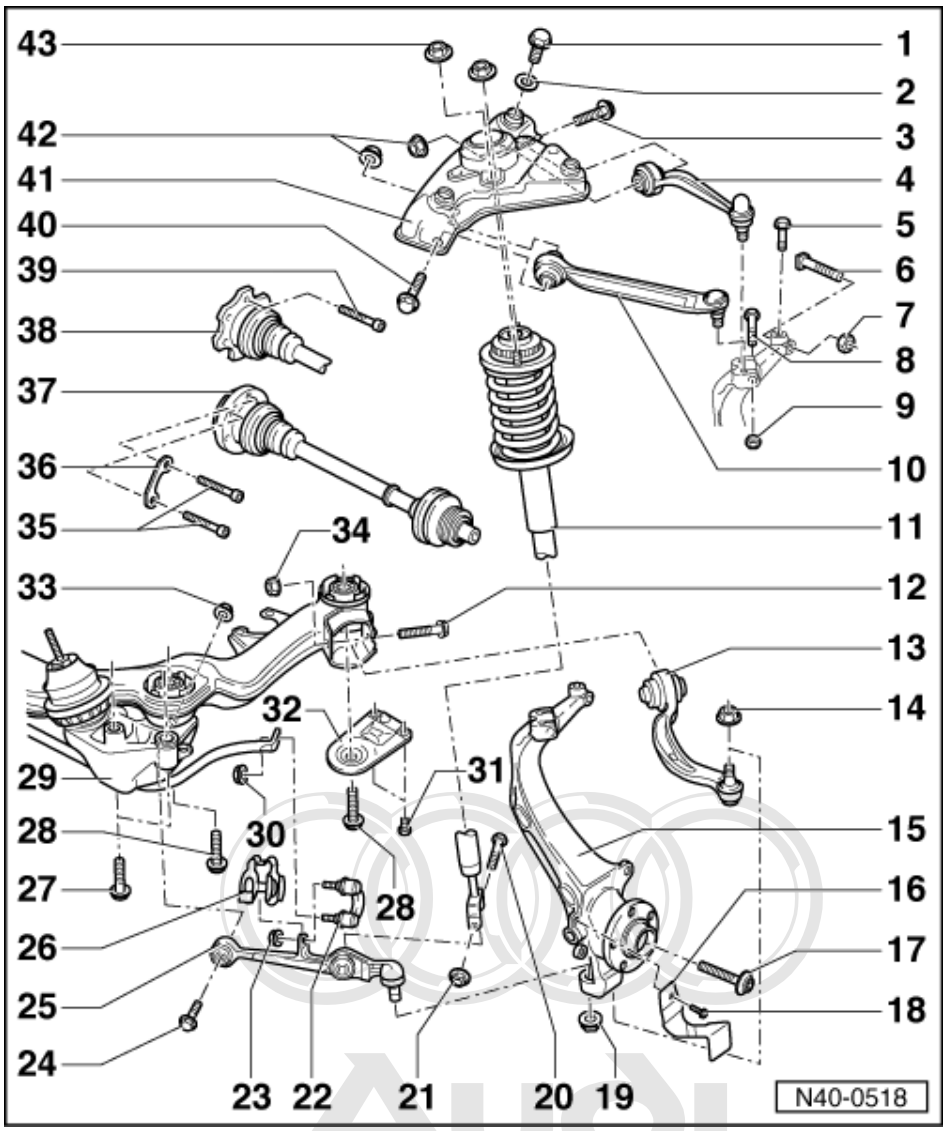
15 Wheel bearing housing/wheel bearing housing with bolted wheel bearing

- Assignment

=> Parts List

- Different wheel bearing housing versions (with and without bushings) => Page 71
- Removing and installing
  => Page 71
- Servicing wheel bearing housing
  => Page 76
- Servicing wheel bearing housing with bolted bearing => Page 85
- For vehicles with headlight range control, heed notes on removal and installation => Page 27

16 Splash plate

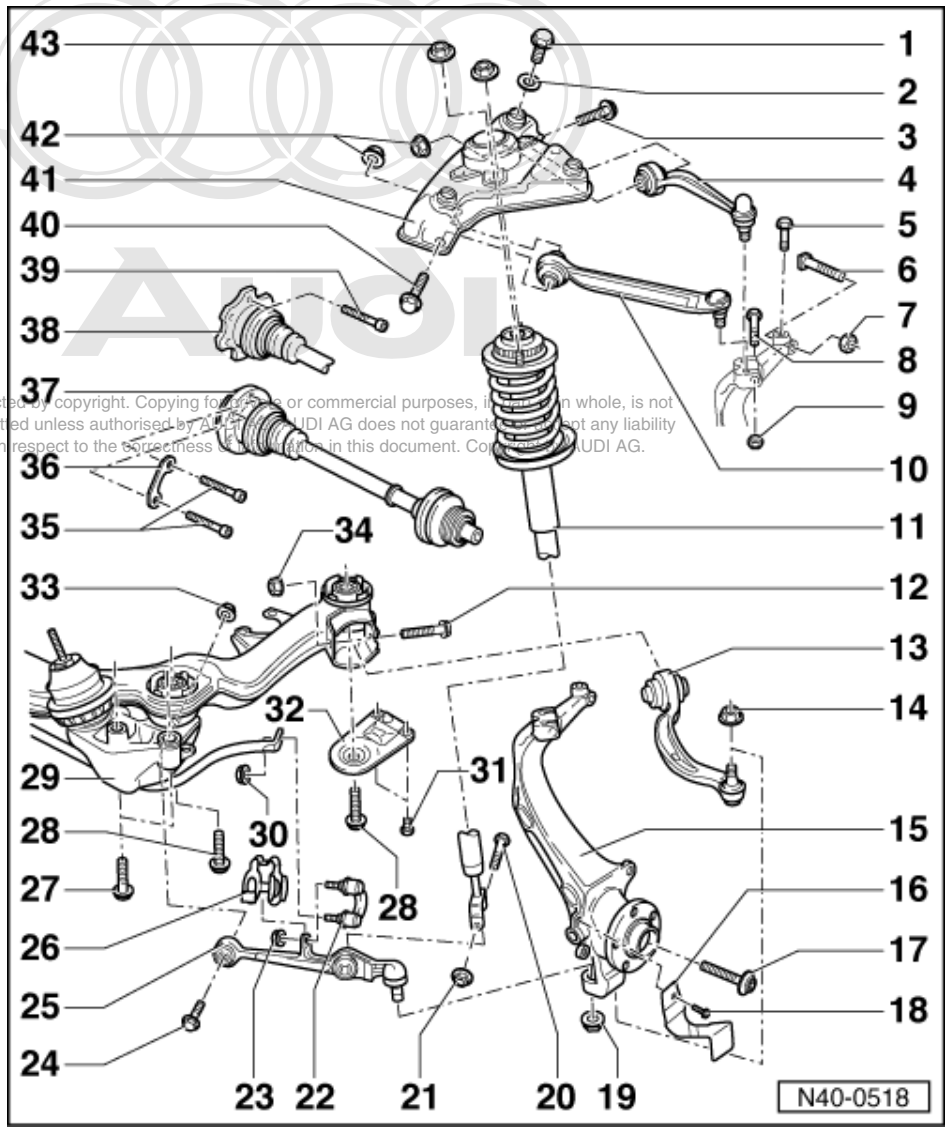


17 Hexagon bolt

- Always replace after removing
  Vehicle must be standing on ground when tightening bolt
  Tightening torques:
  M14 bolt:
- 115 Nm + further 180° turn
  M16 bolt:
- 190 Nm + further 180° turn

18 Hexagon socket-head bolt, 10 Nm

Audi
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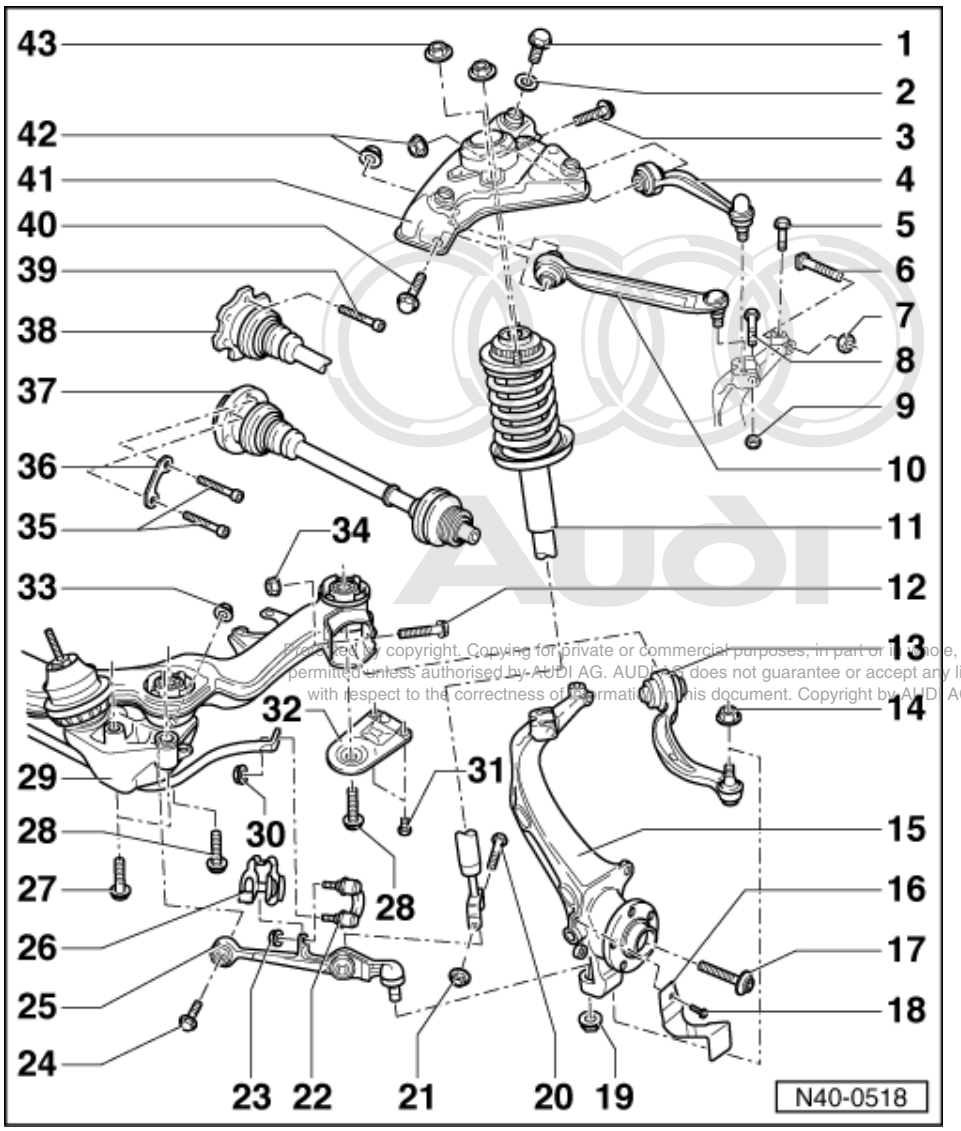
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19 Self-locking nut

- Always replace after removing
- Assignment

=> Parts List

- Flange nut, M12 x 1.5, for wheel bearing housing with no bushing (old version)
  Tightening torque: 100 Nm
- Combi nut, M12 x 1.5, for wheel bearing housing with bushing (new version)
  Tightening torque: 125 Nm
- Vehicles with wheel bearing housings with no bushings and old type track control links -Item 25 - are to be fitted with flange nuts
- On installing wheel bearing housings with bushings, flange nuts are to be replaced with combi nuts



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20 Hexagon bolt M 12 x 1.5 x 85

Note:

On vehicles as of the following chassis numbers, the suspension strut bolted joint was re-positioned, i.e. bolt head faces in direction of travel and nut -Item 21 - is located between track control link and guide link

-Items 25 and 13 -:

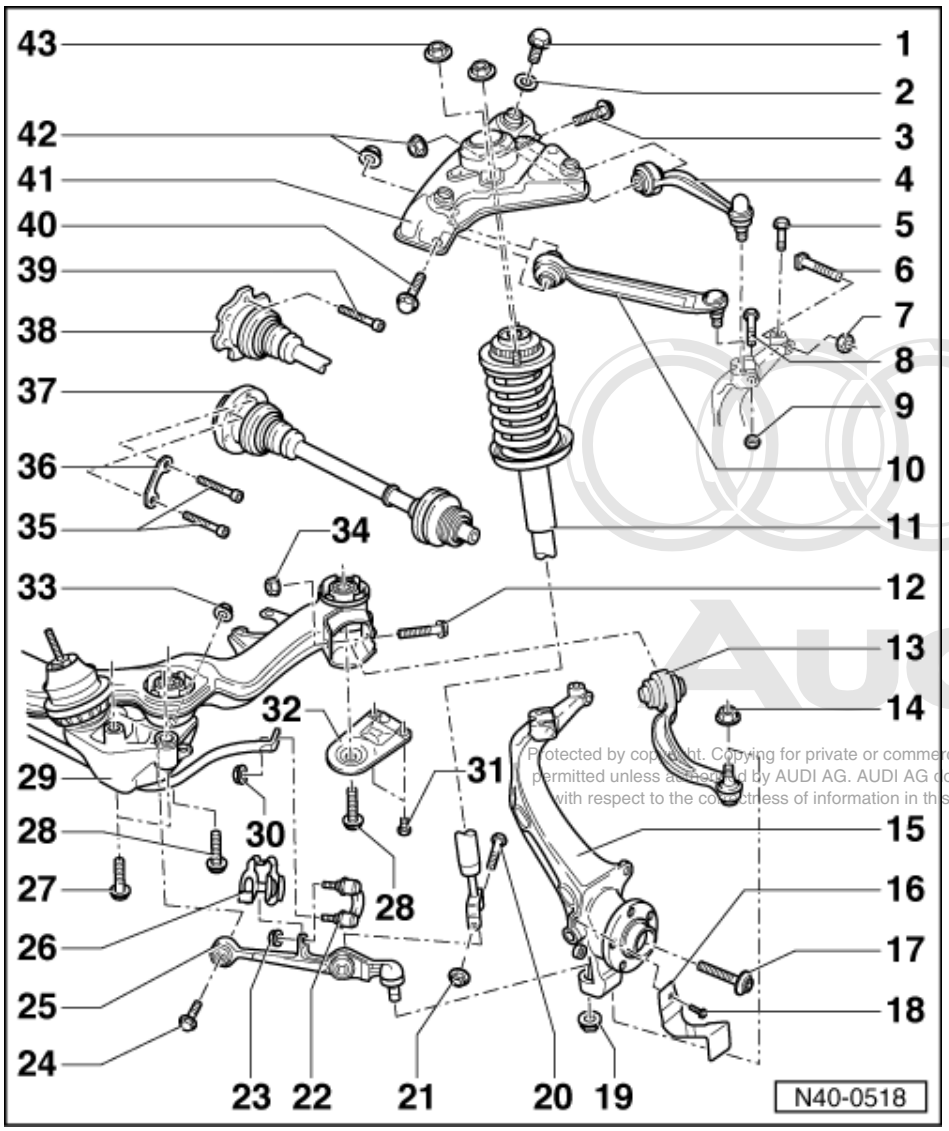
- 8D1A 146 169 (Model Year 2001)
- 8D2A 000 512 (Model Year 2002)
- 8D1N 905 194 (RS4)

21 Self-locking nut, 90 Nm

- Always replace after removing

22 Connecting link

- Note modified connecting links and tightening torques => Page 26
  Arrow on connecting link points in direction of travel



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23 Self-locking hexagon nut

- 40 Nm + further 90° turn
- Always replace after removing
- Underside of nut is ribbed
  Make exclusive use of this special nut as replacement part

24 Hexagon bolt M 12 x 1.5 x 100

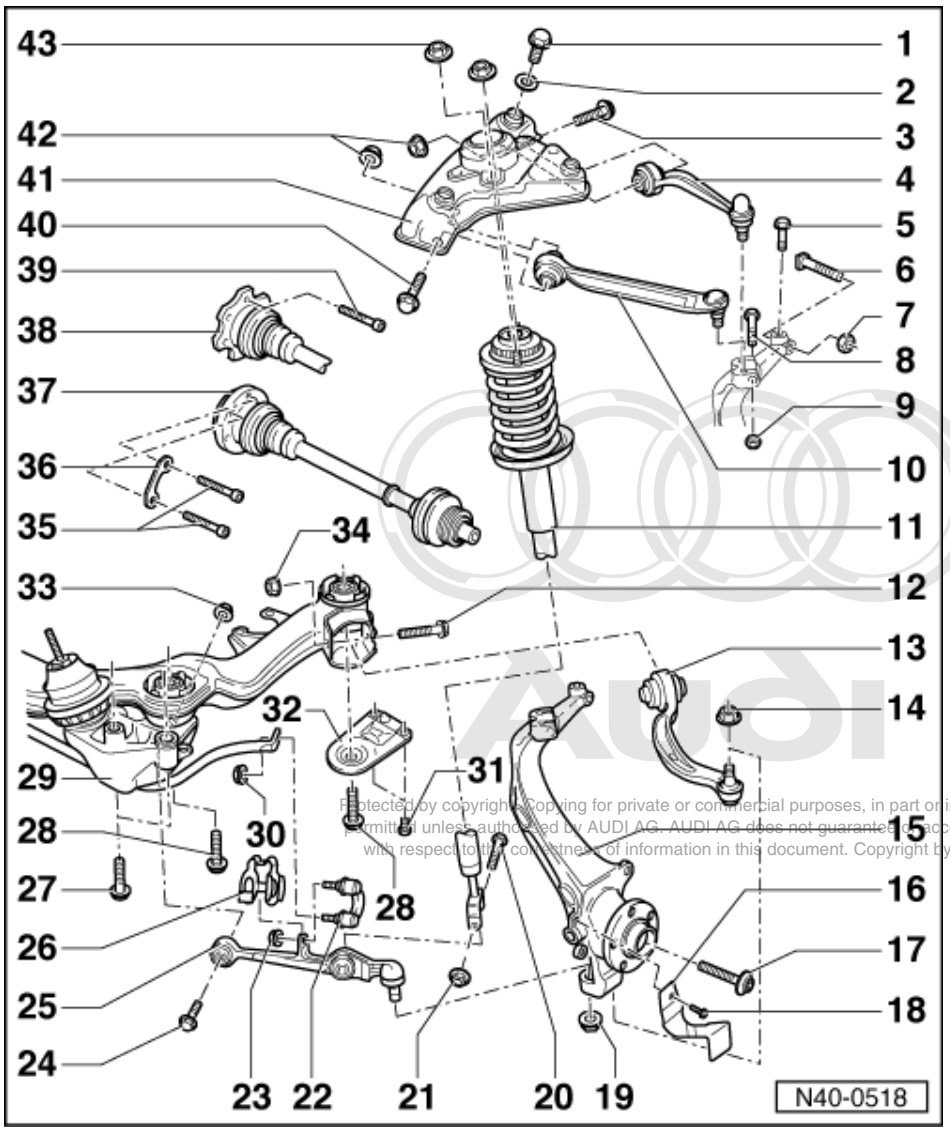
- Always replace after removing

25 Track control link

- Assignment

=> Parts List

- Different track control link versions (for wheel bearing housings with and without bushings)=> Page 111
- Servicing => Page 113
- For vehicles with headlight range control, heed notes on sender removal and installation => Page 27



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26 Clip

- Always replace
- Inserted in track control link

27 Hexagon bolt, 75 Nm

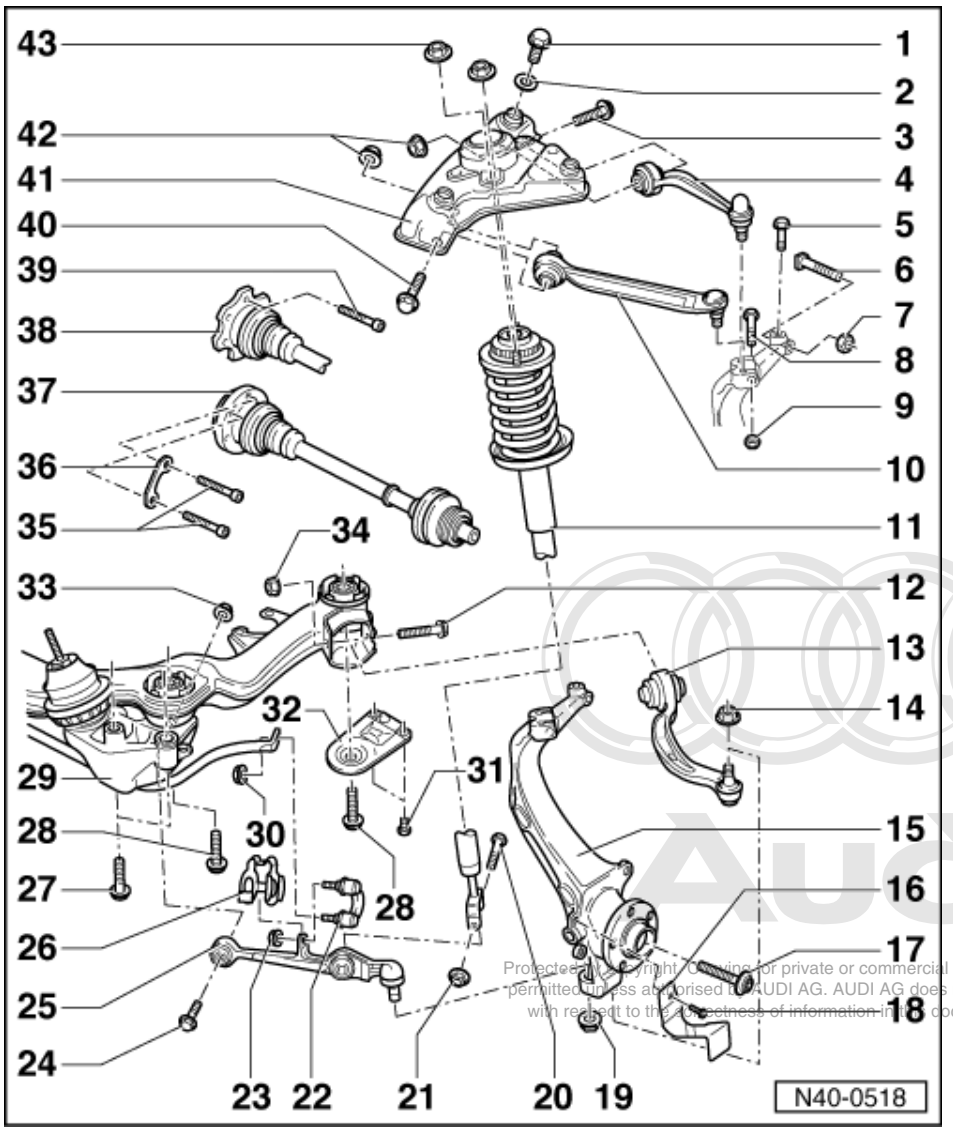
- M10 x 70
- Always replace after removing

28 Hexagon bolt M 12 x 1.5 x 110

- 110 Nm + further 90° turn
- Always replace after removing

29 Subframe

- For vehicles with headlight range control, heed notes on sender removal and installation => Page 27
- Removing and installing => Page 102
- Servicing => Page 107



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30 Self-locking nut, 100 Nm

- Note modified connecting links and tightening torques => Page 26
- Underside of nut is ribbed
- Always replace after removing
  Make exclusive use of this special nut as replacement part

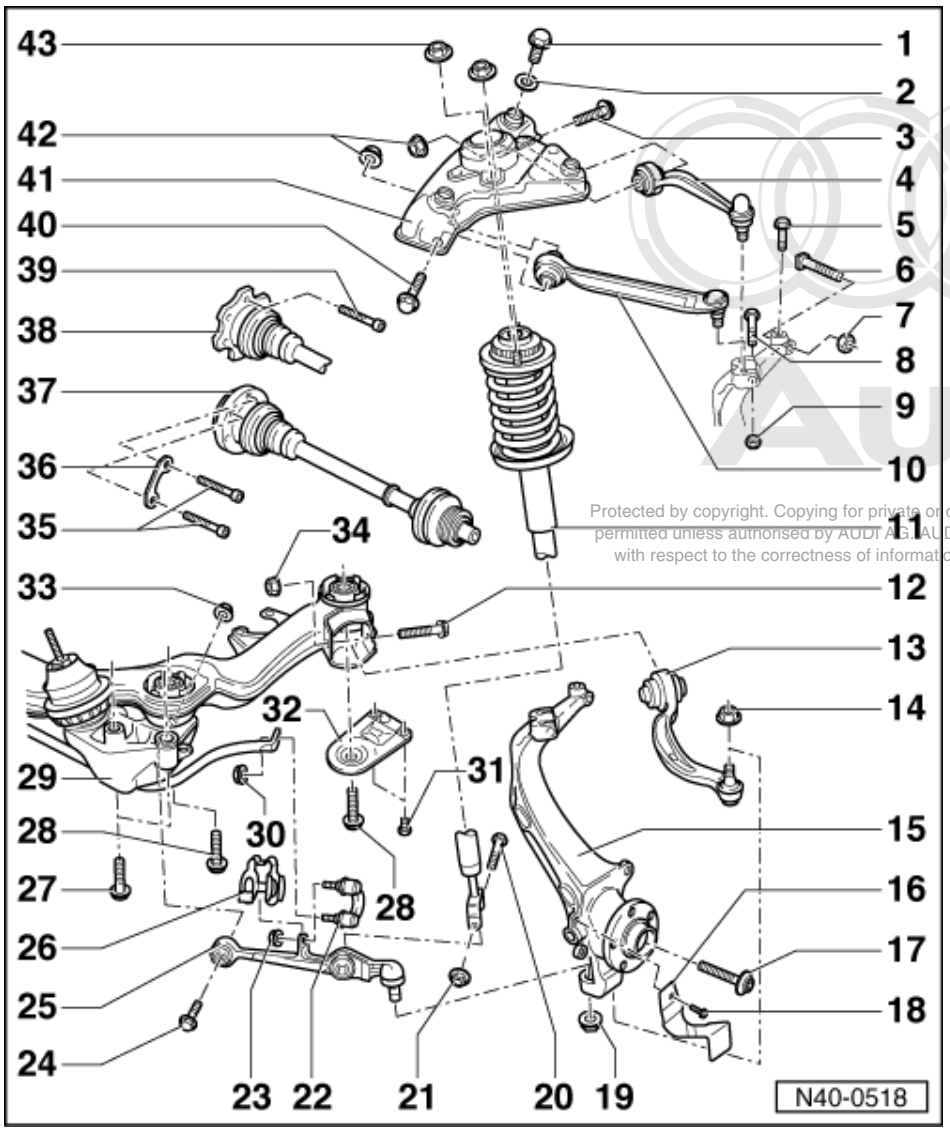
31 Hexagon bolt

- M8 x 25
- Tightening torques:
- Non-ribbed bolt: 30 Nm => Fig. 3
- Ribbed bolt: 75 Nm => Fig. 3

32 Subframe support

33 Self-locking nut

- 80 Nm + further 90° turn
- Always replace after removing



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34 Self-locking nut

- 90 Nm + further 90° turn
- Always replace after removing

35 Multi-point socket head bolt

Tightening torques:
Bolt M8 x 48: 40 Nm
Bolt M10 x 48: 80 Nm

36 Packing plate

37 Drive shaft

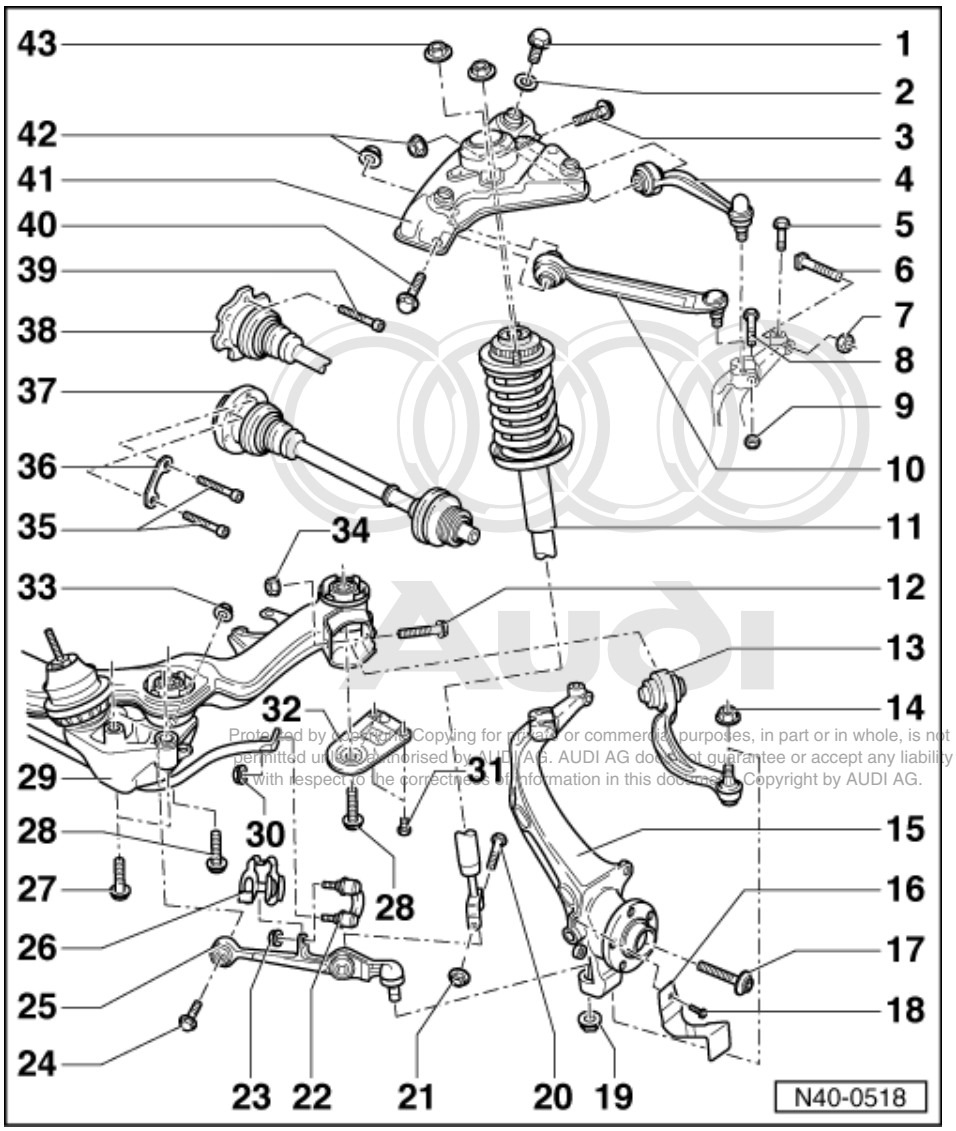
- Removing and installing=>Page 31
- Servicing => Page 32

38 Drive shaft with triple roller joint

- Servicing => Page 44

39 Twelve-point hexagon socket-head bolt, 80 Nm

- For vehicles with triple roller joint
- M10 x 20



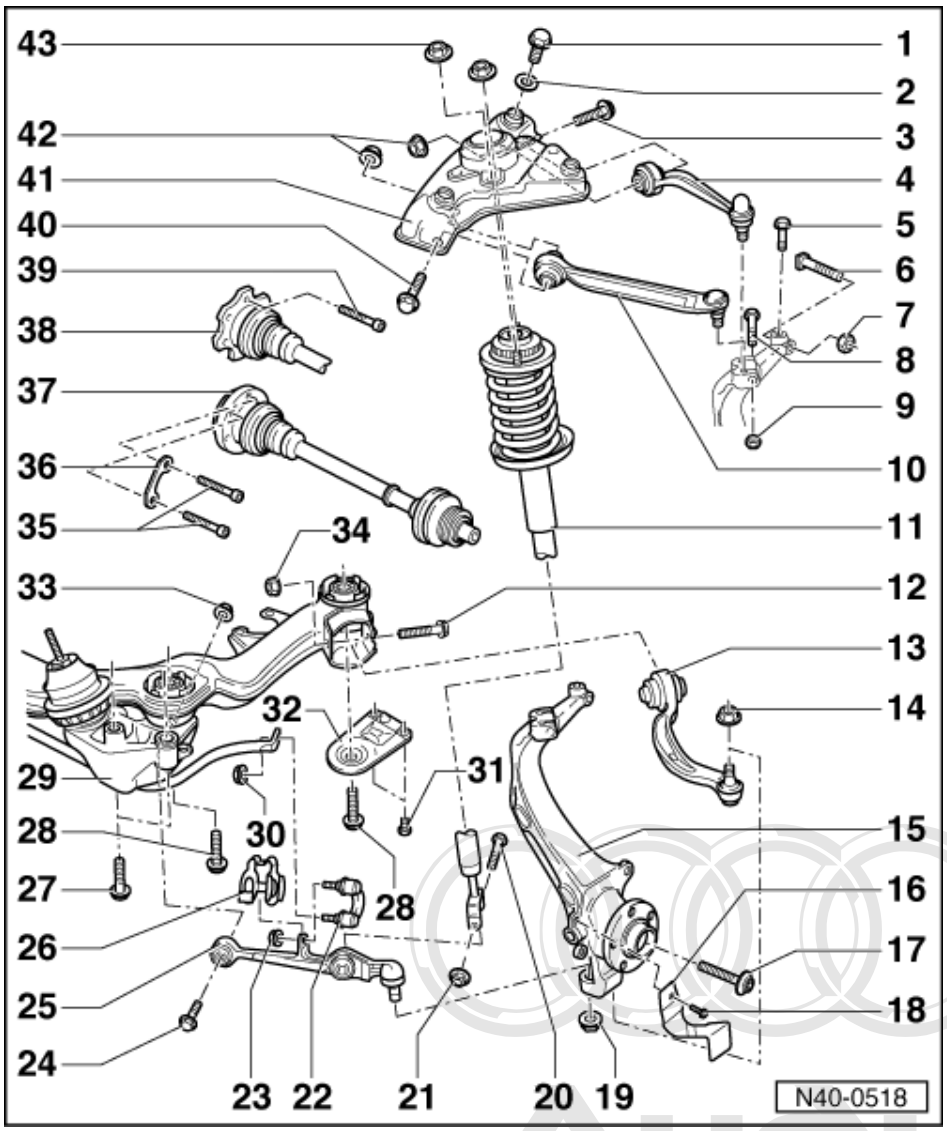
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40 Hexagon bolt

- Note different bolt lengths
- With steel mounting bracket: M10 x 60
- With aluminium mounting bracket: M10 x 62
- Always replace after removing

41 Mounting bracket

- Removing and installing
  => Page 93
- Aluminium mounting brackets were introduced as of MY 98
- Heed correspondingly amended wheel alignment specifications
  =>Pages 231
- Combination of different types (aluminium/steel mounting brackets) is not permitted



42 Self-locking nut

- 50 Nm + further 90° turn
- Always replace after removing

43 Self-locking flange nut, 20 Nm

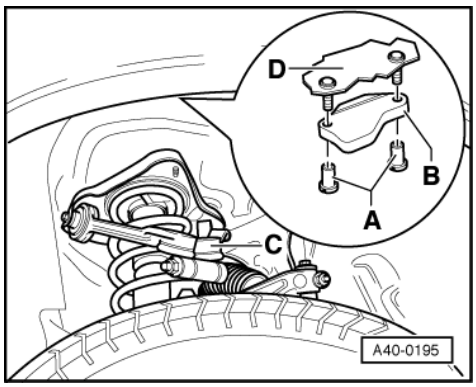
- Always replace after removing

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Stop plates were introduced as end stops as of chassis number -8DTA 321 912- for vehicles with sports and heavy-duty running gear.

Note:

Stop plates are not to be removed.

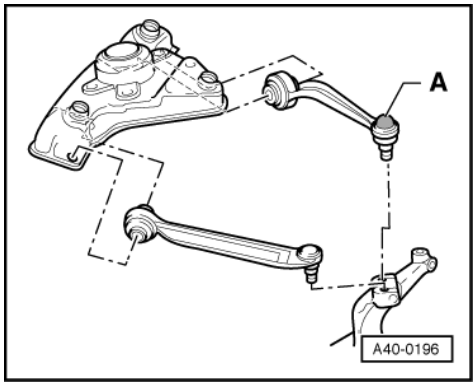


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-> Fig.1 Stop plates

A - Cap
B - Stop plate
C - Rear upper link
D - Body

Buffer stop was introduced as of Model Year '97 at rear upper links.



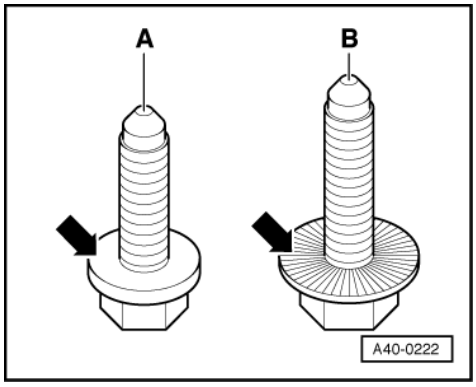
-> Fig.2 Buffer stop

A - Rear upper link with buffer stop

Note:

On replacing rear upper link, make sure vehicles with no stop plates are always fitted with new link.

Attention:
Vehicles with stop plates are still fitted with link with no buffer stop.
Stop plate is not to be removed.



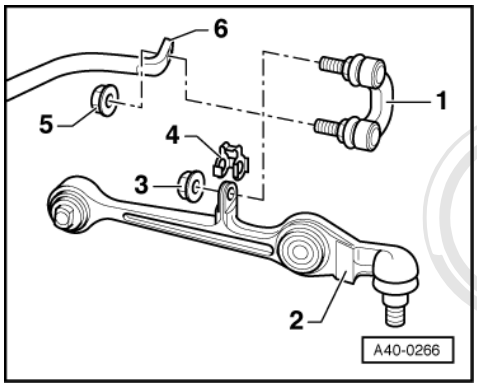
-> Fig.3 Heed different tightening torques

Exclusive use has been made of ribbed bolts since Model Year '98. These bolts may also be used on older models.

- Non-ribbed bolt -A- (arrow)
  Tightening torque: 30 Nm
- Ribbed bolt -B- (arrow)
  Tightening torque: 75 Nm

1.4 - Conversion of connecting link with ball joint to connecting link with rubber bushes as of Model Year '99

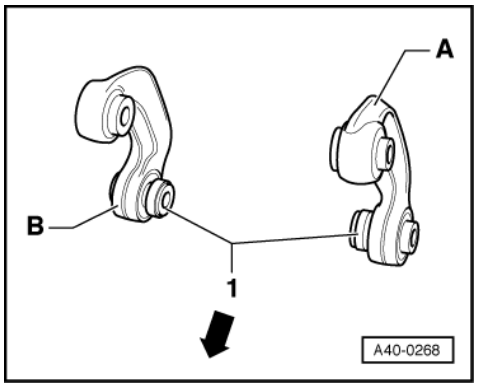
Connecting link with rubber bushes in place of connecting link with ball joint was introduced for Model Year '99.



-> Connecting link with ball joint

1 - Connecting link with ball joint
2 - Track control link
3 - Self-locking hexagon nut, 40 Nm + further 90° turn
4 - Clamp
5 - Self-locking hexagon nut, 100 Nm
6 - Anti-roll bar

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Connecting link with rubber bush

- -> Connecting link -A- for left side of vehicle

Arrow on connecting link points in direction of travel.

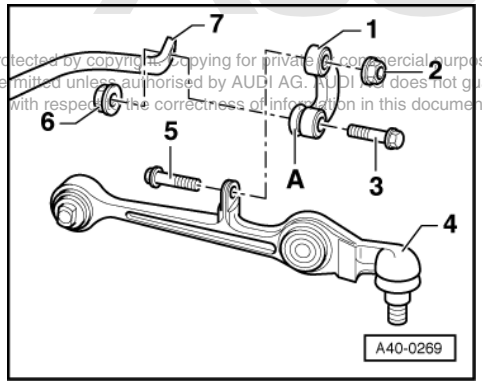
- Permanently installed spacer -1- at connecting link must be fitted at anti-roll bar.
- Connecting link -B- for right side of vehicle

Arrow on connecting link points in direction of travel.

Arrow faces in direction of travel.

Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.

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-> 1 - Connecting link with rubber bush
Rubber bush with pressed-on spacer -Item A- is bolted to anti-roll bar
2 - Self-locking hexagon nut,
40 Nm + further 90° turn
3 - Hexagon bolt
4 - Track control link
5 - Hexagon bolt
6 - Self-locking hexagon nut,
40 Nm + further 90° turn
7 - Anti-roll bar

2 - Vehicle level senders for vehicles with automatic headlight range control

2.1 - Vehicle level senders for vehicles with automatic headlight range control

2.2 - Vehicle level senders at front axle

Vehicles with gas-discharge lamps feature automatic headlight range control as standard.

=> Electrical System; Repair Group 94

The automatic headlight range control function requires information on bump or rebound travel at front and rear axle.

For this purpose, position of lower left link with respect to body is transmitted via a connecting link to front left vehicle level sender -G78-. Sender then transmits electrical signals to headlight range control unit -J431.

Headlight range control unit -J431

=> Electrical System; Repair Group 94; Exploded View of Automatic Headlight Range Control; Removing and installing headlight range control unit -J431 Exploded View of Automatic Headlight Range Control Removing and installing headlight range control unit -J431

The automatic headlight range control reacts to changes in vehicle level. Further details on operation can be found in Self Study Programme No. 192.

The following situations may produce a change in vehicle level:

- Use of trailer
- Different loads (vehicle unladen, partly laden or fully laden)
- Driving style (fast/slow)

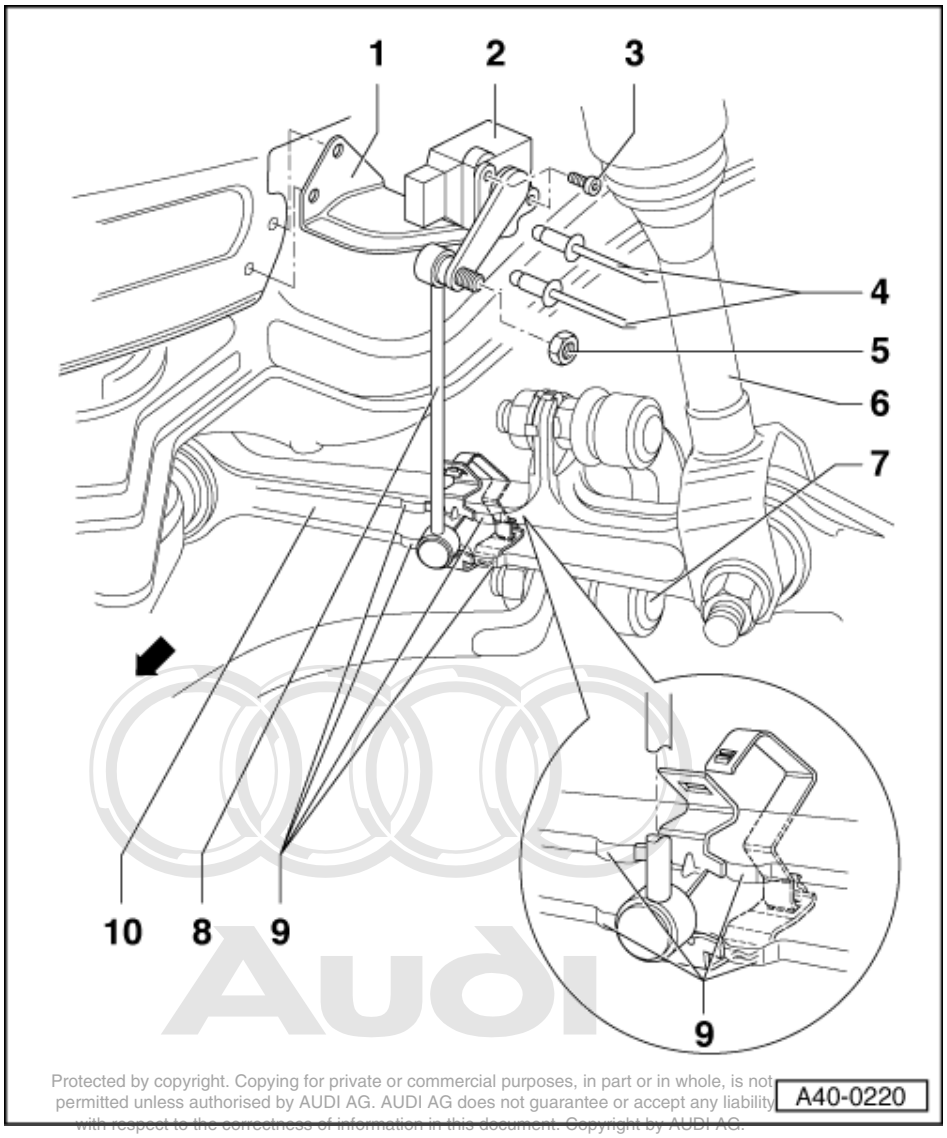
Attention:
Headlight setting

Headlight basic setting is always to be checked:

- Following removal/installation or replacement of track control link
- Following vehicle level sender installation work
- Following replacement of vehicle level sender
- After unfastening clip for connecting link at track control link

Headlight basic setting

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control; Basic setting Self-diagnosis of automatic headlight range control Basic setting



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Arrow faces in direction of travel.

1 Bracket

2 Front left vehicle level sender -G78

- Removing and installing=>Page 30 and

=> Electrical System; Repair Group 94; Exploded View of Automatic Headlight Range Control; Removing and installing front left vehicle level sender -G78 Exploded View of Automatic Headlight Range Control Removing and installing front left vehicle level sender -G78

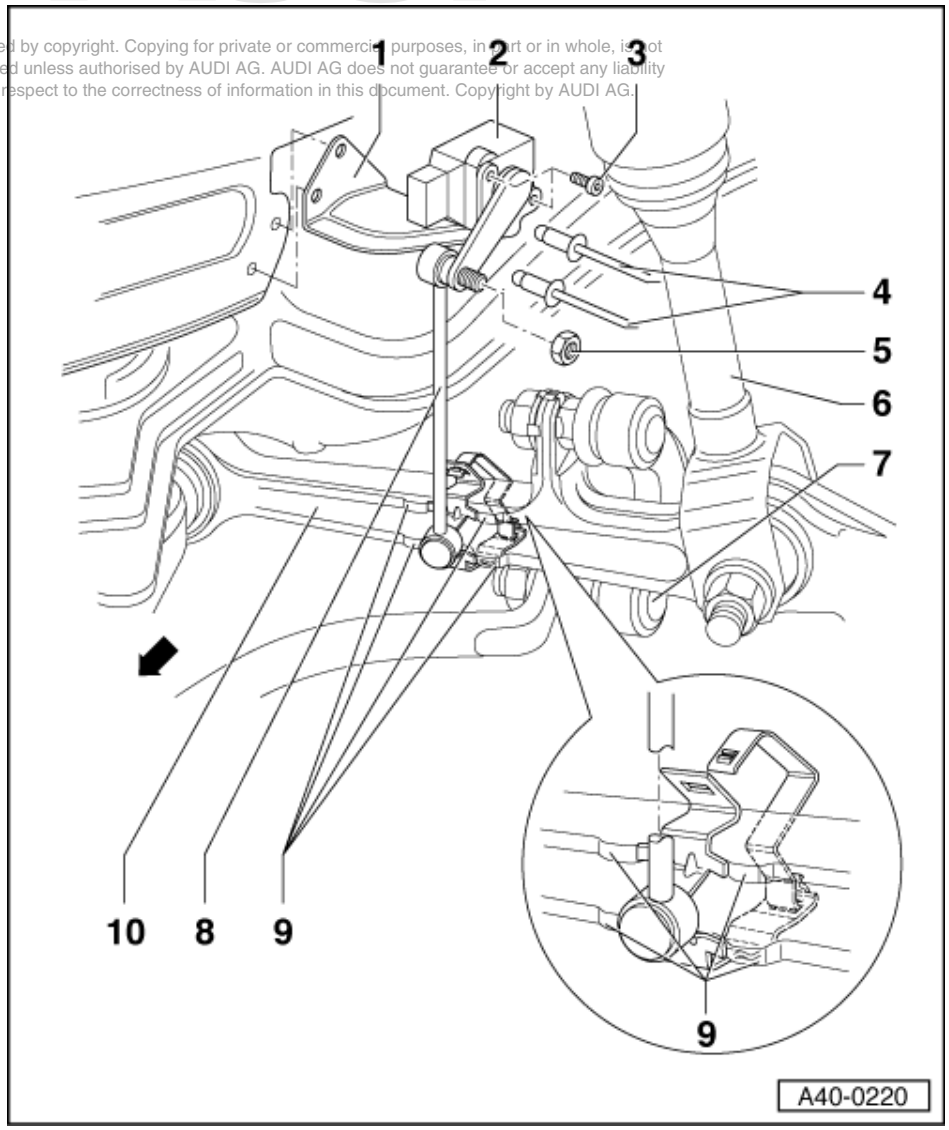
- Checked by self-diagnosis

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control Self-diagnosis of automatic headlight range control

- Perform headlight basic setting following replacement

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control; Basic setting Self-diagnosis of automatic headlight range control Basic setting

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3 Hexagon socket-head bolt, 5Nm

4 Pop rivet (2x steel)

- ø 4.8 mm

5 Hexagon nut, 4 Nm

=> Page 30

6 Shock absorber

7 Connecting link

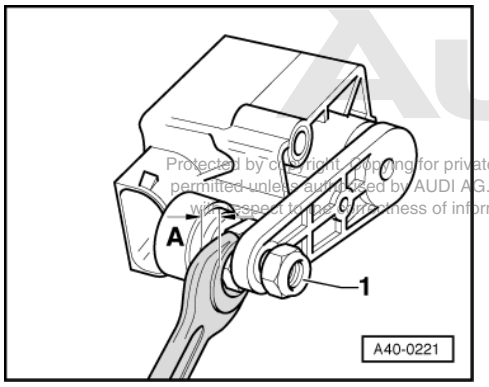
8 Connecting link of front left vehicle level sender -G78

9 Stop
- Position clip between stops
- Fastener of clip must face upwards at track control link and in direction of travel

10 Track control link

Removing and installing

Removal/installation of track control link involves unfastening clip for connecting link of front left vehicle level sender -G78.



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Note:

When attaching connecting link to crank of front left vehicle level sender -G78, use 10 mm open-ended wrench with dimension -A- = 4 mm, so as not to damage seal.

- -> Dimension - A - 4 mm

  1 - Tightening torque: 4 Nm

- Use pliers for attaching clip for connecting link of front left vehicle level sender -G78 to track control link between stops.

On installing headlight range control, ensure correct mutual positioning of crank and connecting link.

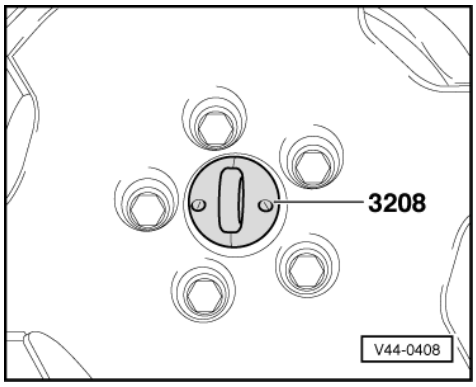
Note:

- Connecting link must be vertical
- Crank must face forwards at bottom

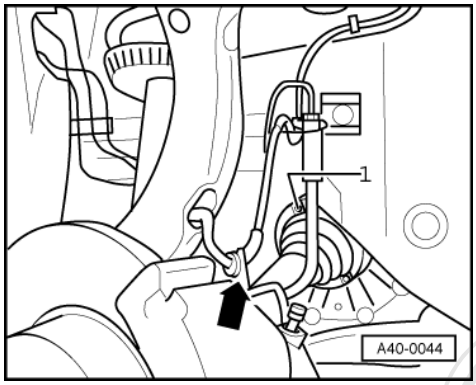
3 - Removing and installing drive shaft

3.1 - Removing and installing drive shaft

3.2 - Removing drive shaft



- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Slacken off hexagon bolt for outer joint of drive shaft by max. 90° (vehicle must be standing on its wheels to avoid danger of accidents).
- Raise vehicle and screw out hexagon bolt for outer joint of drive shaft.
- Remove wheel.

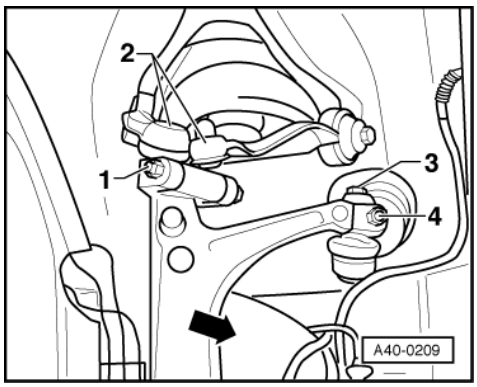


- -> Unscrew drive shaft from flange shaft/gearbox.

  1 - Hexagon socket-head bolts

- Pull wire of ABS speed sensor out of holder at brake caliper -arrow-.
- Pull ABS speed sensor slightly out of wheel bearing housing.

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- -> Unscrew nut -1-, take out hexagon bolt and lift out both links -2-.

If hexagon bolt cannot be removed from wheel bearing housing, bolt and links must be pressed out of wheel bearing housing=>Page 98 .

Slots in wheel bearing housing are never to be widened using a chisel or the like.

Note:

- Do not slacken off bolts -3- and -4- as this would alter setting of front axle.

- Swivel wheel bearing housing aside in direction of arrow.
- Take out drive shaft.

3.3 - Installing drive shaft

- Insert drive shaft at gear shaft and in wheel bearing housing.
- Insert both upper links in wheel bearing housing and tighten new nut to 40 Nm.

  Whilst tightening, press link as far as possible towards wheel bearing housing.

- Bolt drive shaft to gearbox.
  Tightening torques:
  M8 = 40 Nm, M10 = 70 Nm
- Press home ABS speed sensor in wheel bearing housing and insert wire in holder at brake caliper.
- Fit and secure wheel => Page 220 .
- Tighten hexagon bolt for drive shaft. Vehicle must be standing on its wheels when tightening to avoid danger of accidents.
  Tightening torques:
  M14 hexagon bolt, 115 Nm + further 180° turn
  M16 hexagon bolt, 190 Nm + further 180° turn

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4 - Servicing drive shaft with constant velocity joint

4.1 - Servicing drive shaft with constant velocity joint

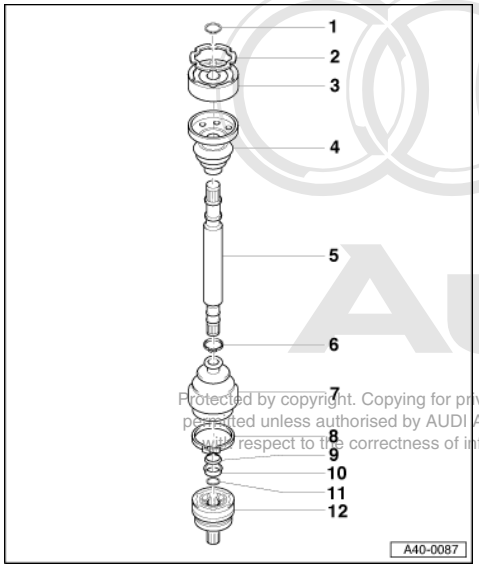
4.2 - Tools

Special tools and workshop equipment required

- 3207 Pressure spindle
- 3340 Pliers
- 40-204 A Tensioner
- VW 161 A Circlip pliers

- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 408 A Press tool
- VW 411 Press tool
- VW 412 Press tool
- VW 522 Support sleeve
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1682 Pliers

4.3 - Exploded view



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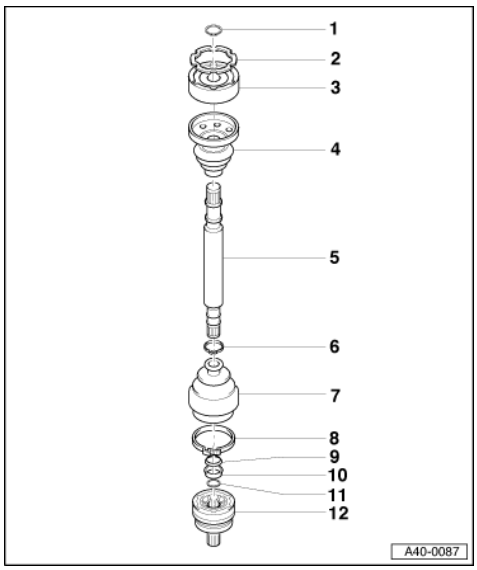
Quantities and type of grease

Re-grease joint if necessary on replacing boot.

Constant velocity joints are filled with high-temperature grease.

=> Parts List

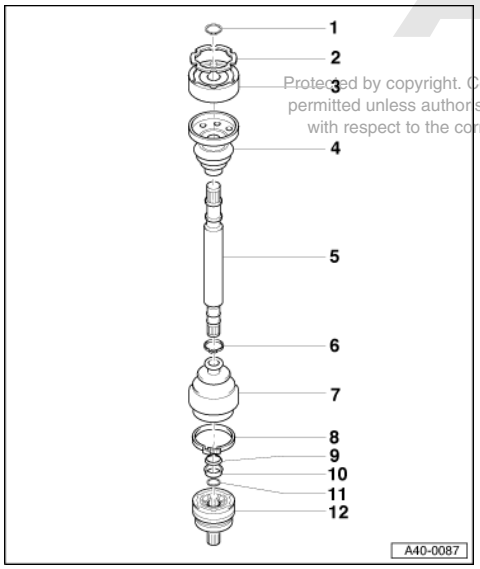
Outer joint	Grease Total quantity	of which in: Joint	Bellows
ø mm	[g]	[g]	[g]
88	90	40	50
98	120	80	40
Inner joint			
ø mm			
100	110	45	65
108	120	35	85



1 Circlip
- Always replace
- Extract and fit using VW 161 a

2 Gasket
- Replace; pull off backing and bond into joint

3 Inner constant velocity joint
- OD depending on engine/gearbox combination 100 or 108 mm
- Replace only as complete assembly
- Pressing off => Fig. 3
- Pressing on => Fig. 4
- Checking => Page 41



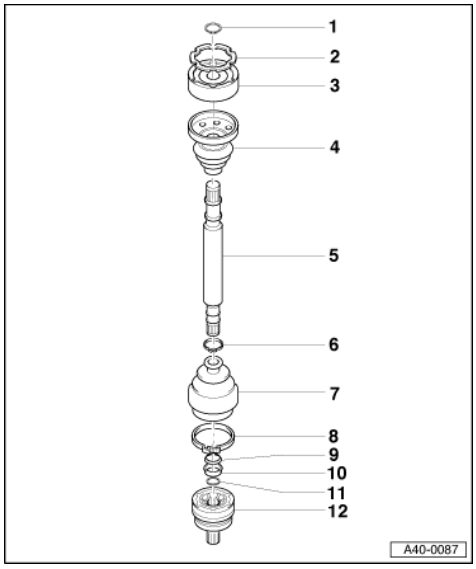
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4 Boot for inner constant velocity joint
- With vent hole
- Check for cracks and abrasion
- Checking inner constant velocity joint if boot damaged => Page 41
- Drive off with mandrel
- Coat sealing surface with D-3 before attaching to constant velocity joint

5 Drive shaft (tubular shaft)

6 Clamp

- Always replace



7 Boot for outer constant velocity joint

- Check for cracks and abrasion
- Checking outer constant velocity joint if boot damaged => Page 39
- Before tensioning clamp, briefly lift boot for pressure equalisation=>Fig. 6
- As of chassis number
  8DTA 279 794, introduction of new boots in outer joint ø88 mm (wheel end) => Fig. 1

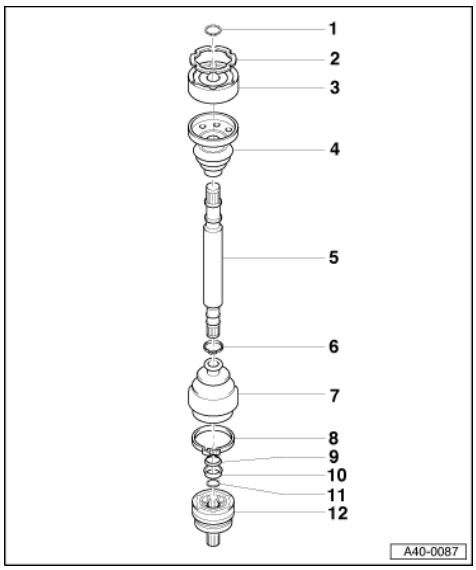
8 Clamp

- Always replace
- Tensioning => Fig. 1 and Fig. 6

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9 Dished washer

- Large ø (concave side) makes contact with thrust ring



- Installation position => Fig. 5

10 Thrust ring

- Installation position => Fig. 5

11 Circlip

- Always replace
- Insert in shaft groove

12 Outer constant velocity joint

- OD depending on engine/gearbox combination 88 or 98 mm

- Replace only as complete assembly
- Removing =>Fig. 2
- Checking => Page 39
- Installing: Drive onto shaft with plastic-headed hammer until circlip engages in annular groove of constant velocity joint

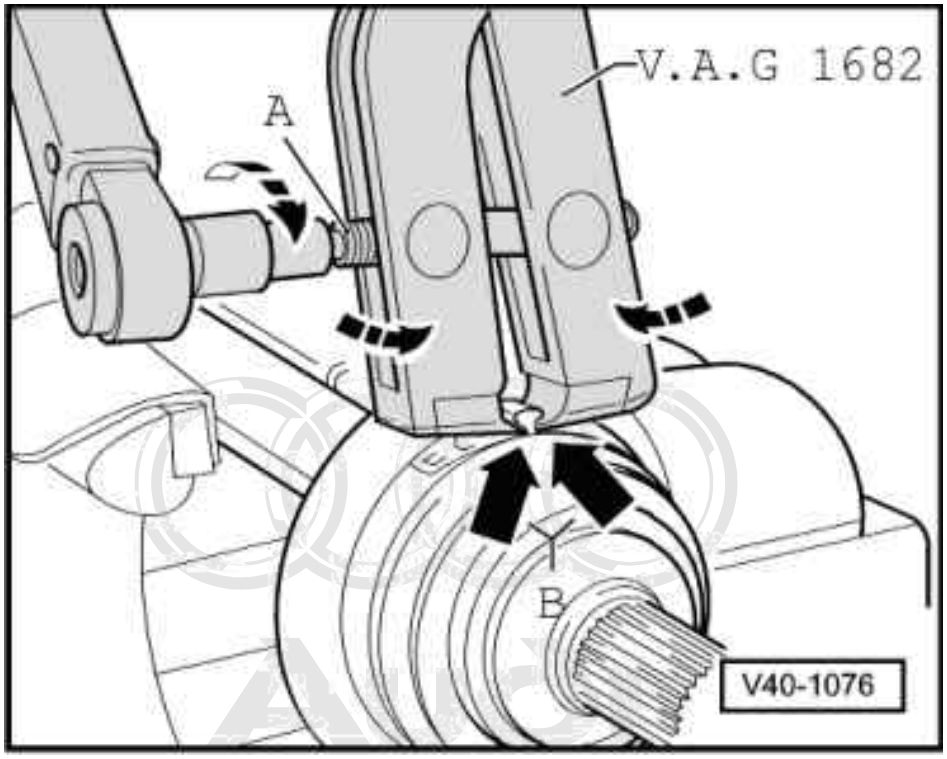
4.4 - Plastic boot

Use is made at the front axle of the Audi A4 of a new plastic boot for the 88 mm outer joint (wheel end).

The difference is that this is a harder material than rubber.

Stainless steel hose clamps are required for fitting the boot on account of the higher pre-tensioning force involved.

Rubber boots are tensioned using pliers V.A.G 1275.



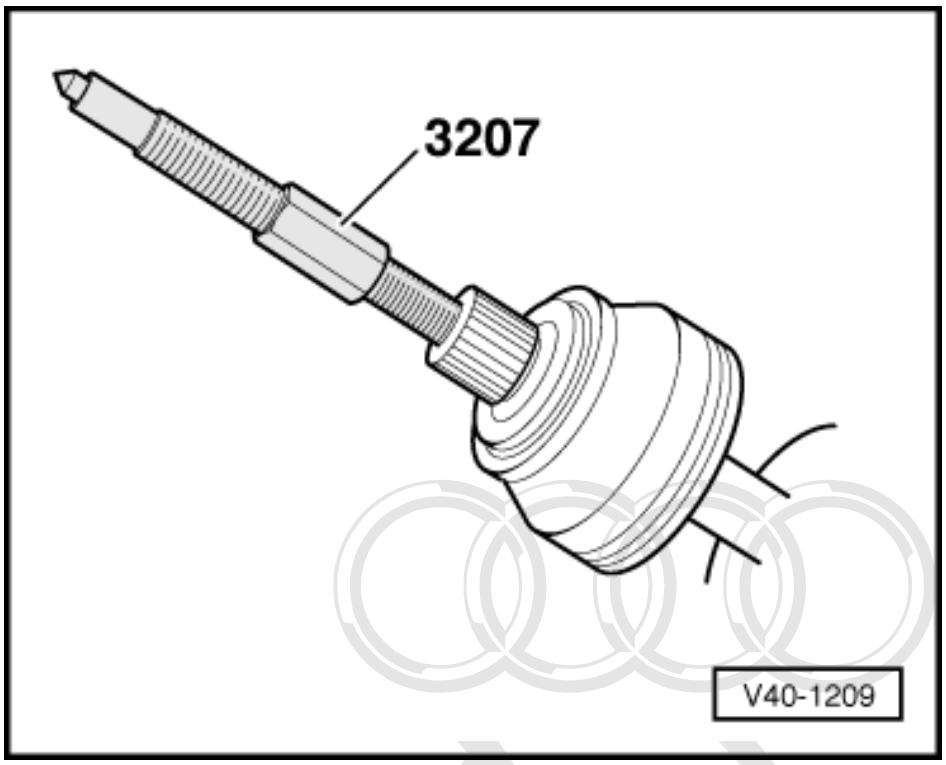
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Instructions for Fig. 1 apply only to stainless steel clamps.

-> Fig.1 Tensioning clamp at outer joint

- Apply pliers V.A.G 1682 as shown. Make sure jaws of pliers make contact with corners (arrows B) of hose clamp.
- Tension hose clamp by turning spindle with torque wrench (take care not to tilt pliers).

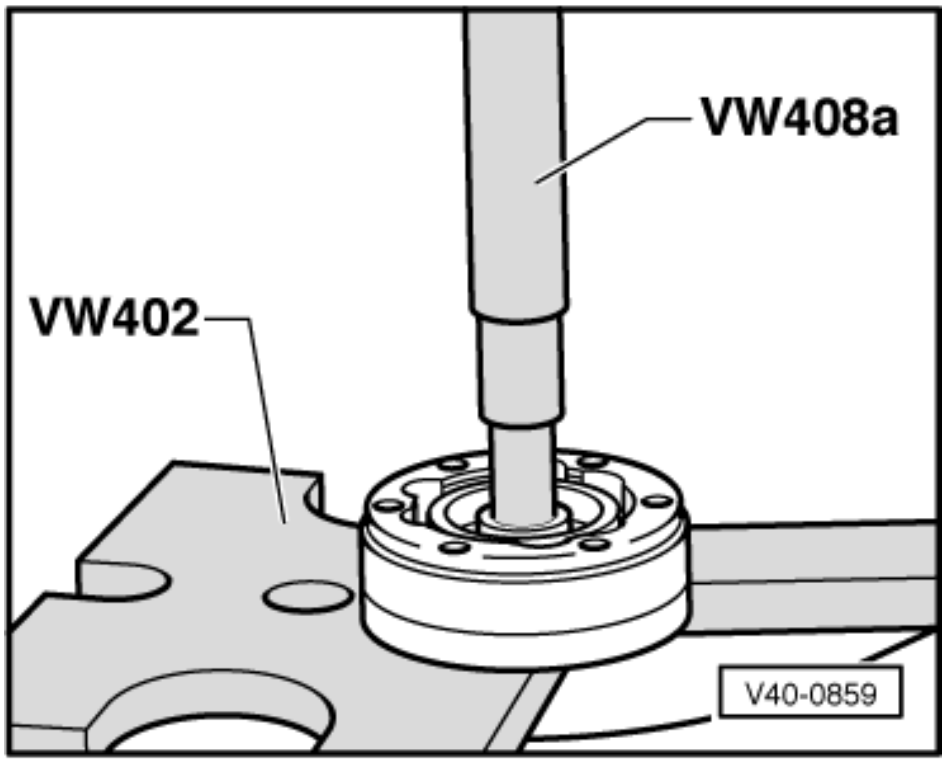
- Tightening torque: 20 Nm
- Use torque wrench with 5...50 Nm adjustment range (e.g. V.A.G 1331).
- Make sure thread of spindle on pliers moves freely. Lubricate with MOS2 grease if necessary.
- If stiff, e.g. due to dirt on thread, required clamp tensioning force will not be attained with specified tightening torque.



-> Fig.2 Pressing off outer constant velocity joint

- Clamp drive shaft with soft jaws in vice.
- Detach hose clamp and push back bellows.
- Screw pressure spindle 3207 with M16/ M14 thread into joint pin until constant velocity joint is pressed off drive shaft.

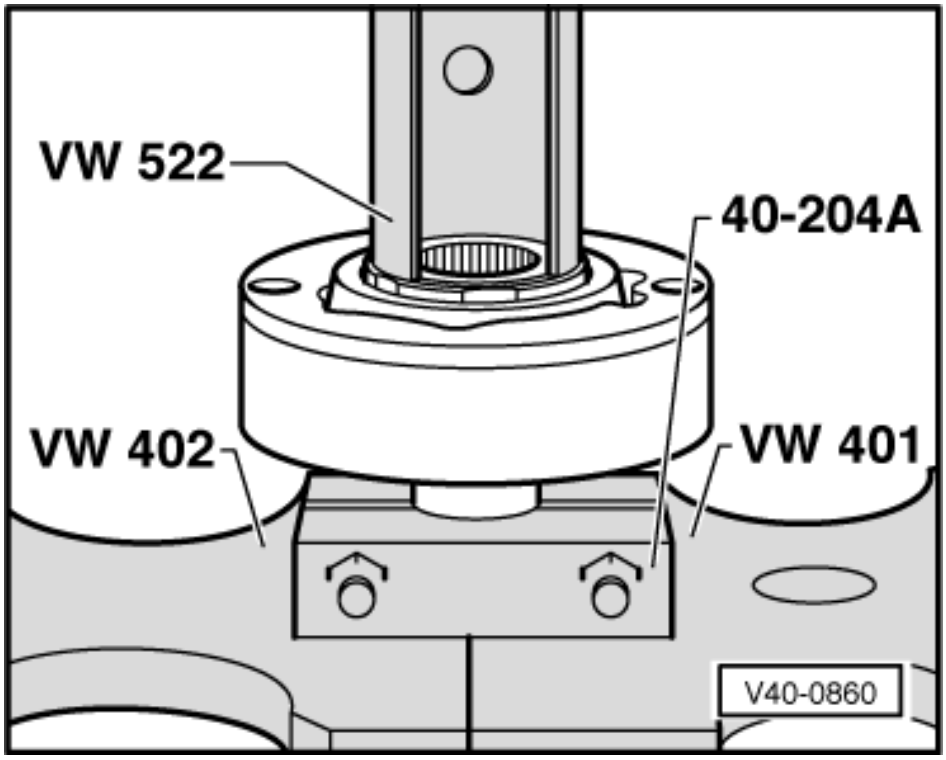
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-> Fig.3 Pressing off inner constant velocity joint

Notes:

- Use mandrel to drive off boot beforehand.
- Support ball hub.

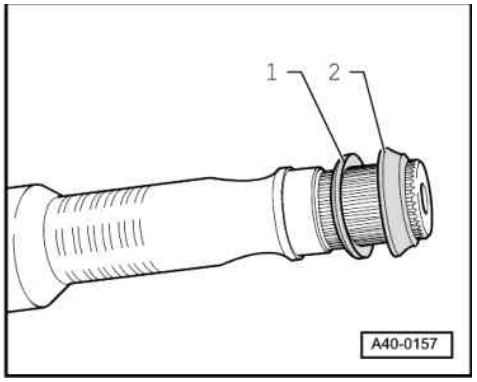


-> Fig.4 Pressing on inner constant velocity joint

- Press on joint as far as it will go.
- Engage circlip.

Note:

Chamfer at ID of ball hub (splines) must face contact collar of drive shaft.

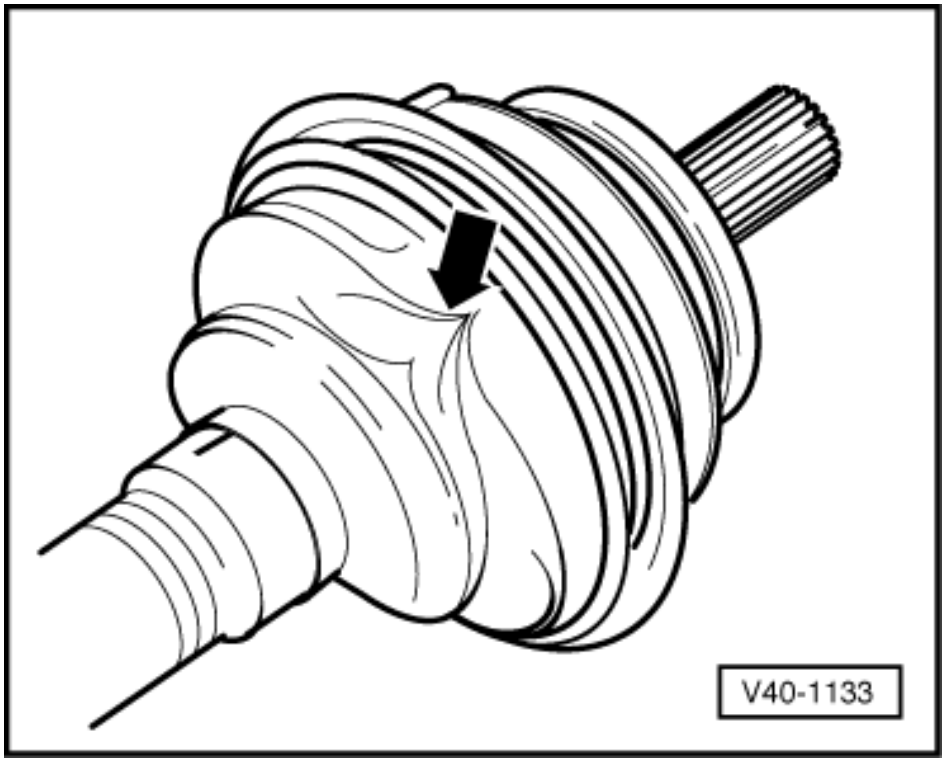


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Fig.5 -> Installation position of spacer ring and dished washer (wheel end)

1 - Dished washer

2 - Spacer ring (plastic)

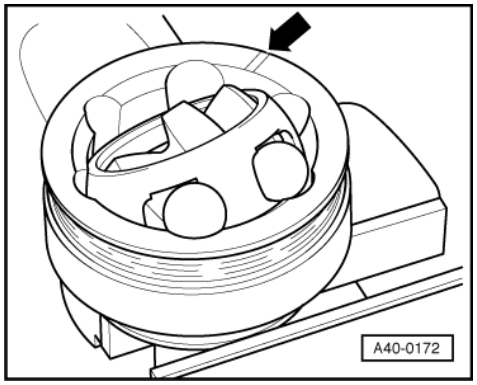


-> Fig.6 Venting boot

Applies only to rubber boots

Boot is often squashed on positioning it on joint housing. This produces a vacuum in the boot, which causes a fold to form whilst driving (arrow). After fitting, boot is therefore to be vented briefly at small diameter to ensure pressure equalisation.

4.5 - Checking outer constant velocity joint



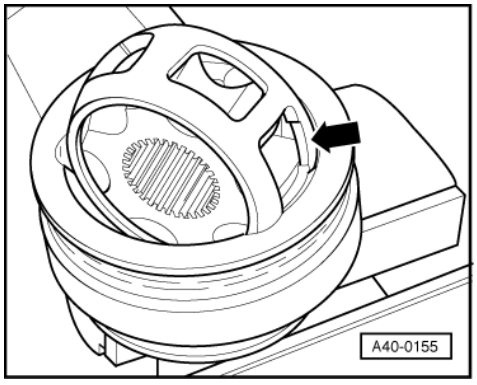
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The joint must be dismantled for replacing grease in the event of severe contamination or if ball contact surfaces are to be checked for wear and damage.

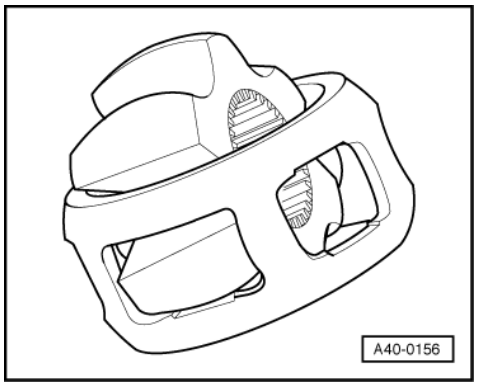
Removing

- -> Use electric scriber or whetstone to mark position of ball hub with respect to ball cage and housing before dismantling (arrow).
- Swivel ball hub and ball cage.

- Consecutively take out balls.



- -> Turn cage until two cage openings (arrow) are in contact with joint housing.
- Lift out cage with hub.



- -> Swivel one hub segment into cage opening.
- Tip hub out of cage.

Note:

The 6 balls for each joint are of one tolerance group. Check stub axle, hub, cage and balls for pitting and signs of seizure. Excessive backlash in joint becomes apparent from load change jolts; joint is then to be replaced. Smooth areas and running marks on balls do not necessitate joint replacement.

Installing

- Insert cage with hub in joint housing.

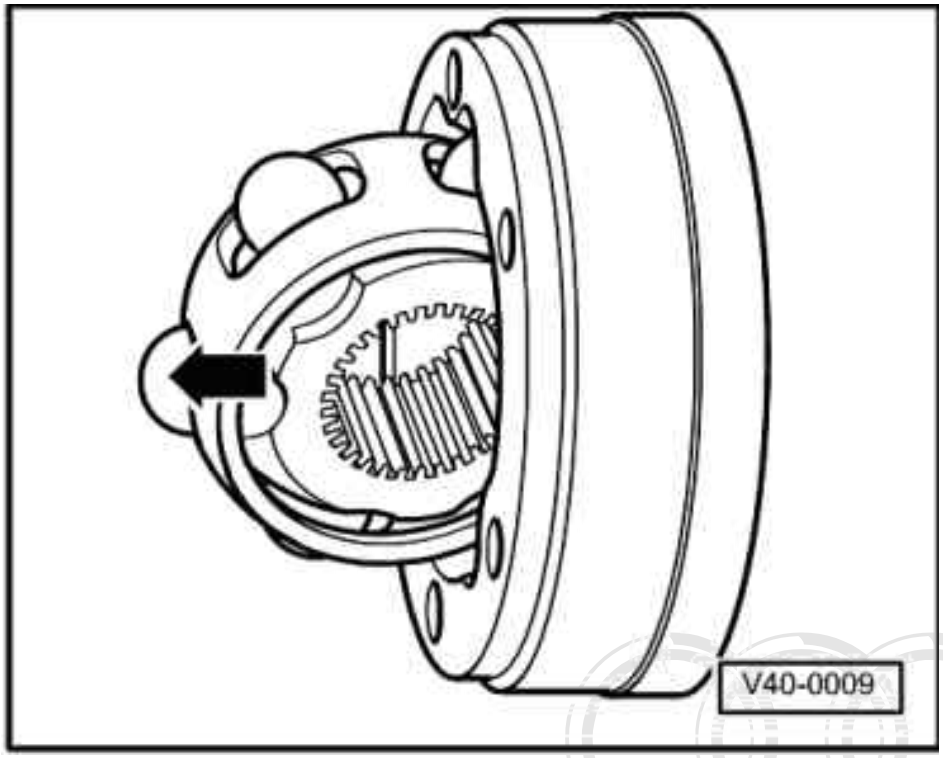
Note:

Cage must be inserted in correct position.

- Consecutively press in opposite balls, taking care to re-establish previous position of ball hub with respect to ball cage and joint housing.
- Press half the total quantity of grease into the joint housing.
- Insert new circlip in shaft.
- Distribute remaining grease in fold.

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4.6 - Checking inner constant velocity joint



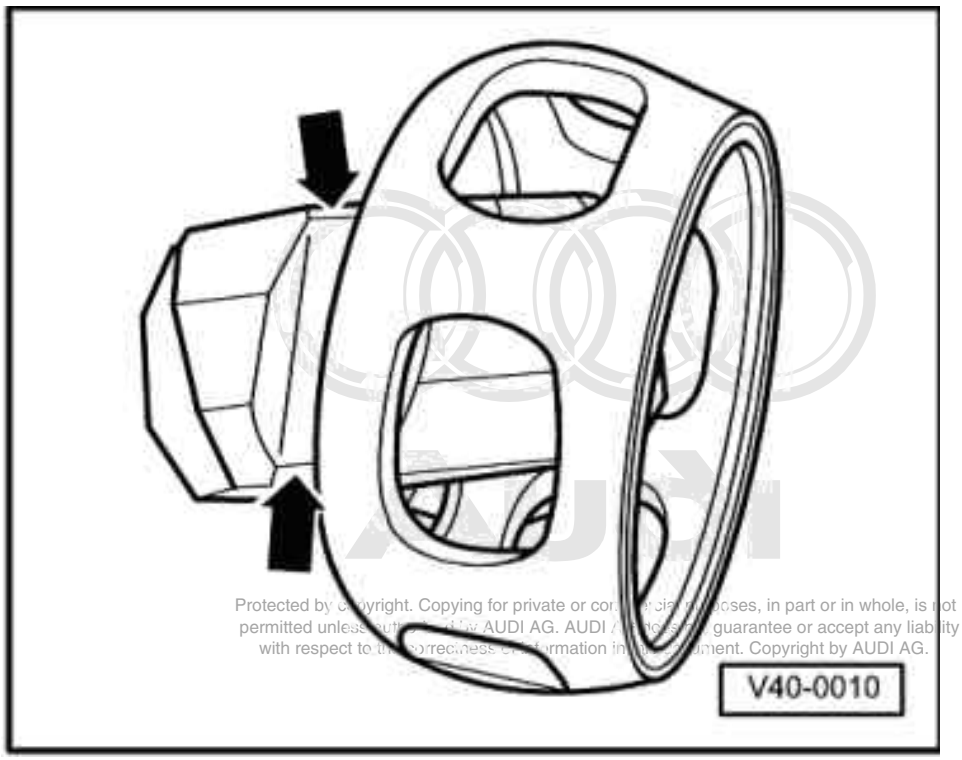
The joint must be dismantled for replacing grease in the event of severe contamination and if contact surfaces and balls are to be checked for wear and damage.

- -> Swivel ball hub and ball cage.
- Press out joint element in direction of arrow.
- Press balls out of cage.

Note:

Ball hub and joint element are paired and should be marked prior to removal. Take care not to alter raceway assignment.

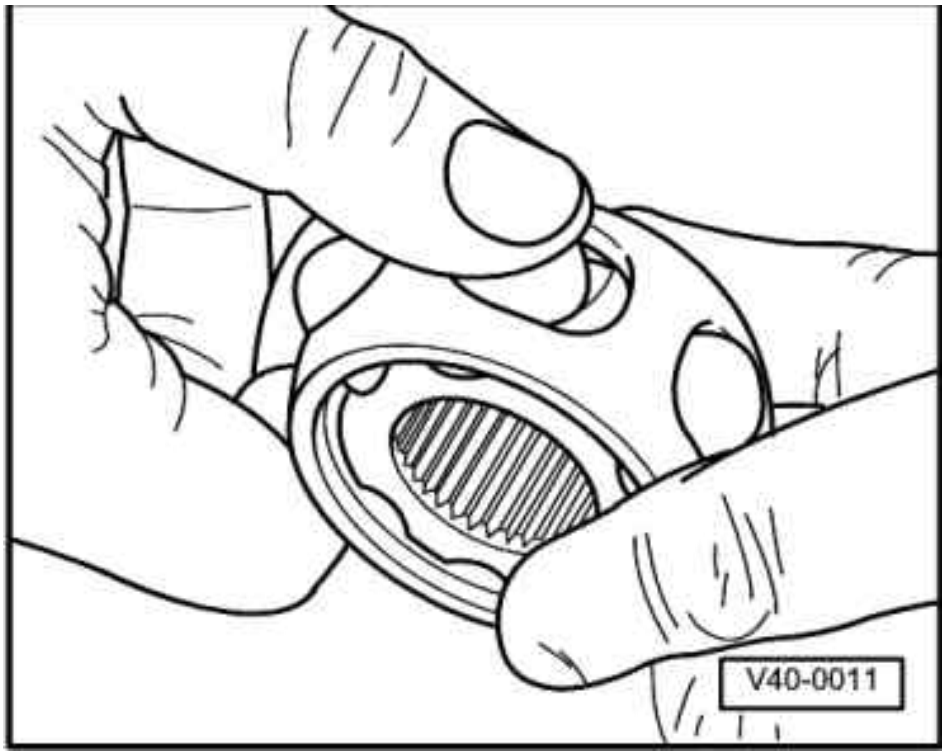
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- -> Tip ball hub out of ball cage via ball raceway (arrows).
- Check joint element, ball hub, ball cage and balls for pitting and signs of seizure.

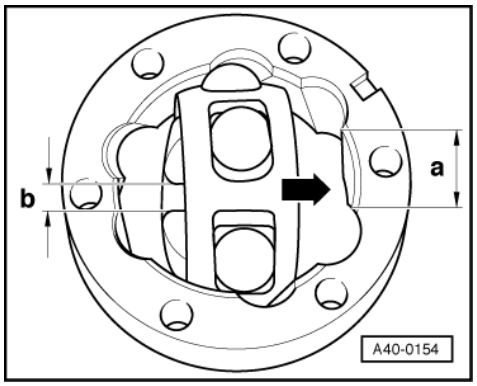
Note:



Excessive backlash in joint becomes apparent from load change jolts. Joint is then to be replaced. Smooth areas and running marks on balls do not necessitate joint replacement.

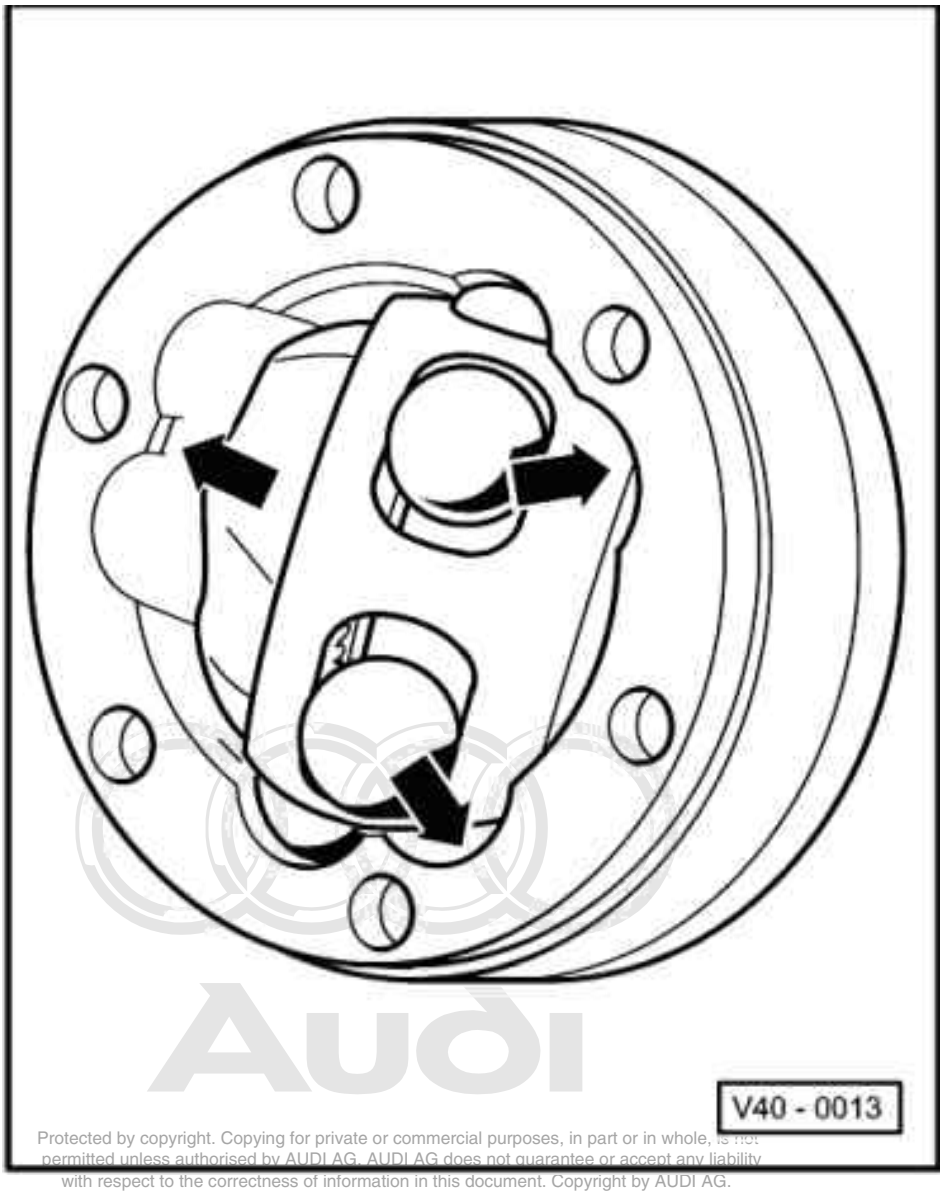
Installing

- -> Insert ball hub in ball cage via the two chamfers. Installation position is arbitrary. Press balls into cage.
- Insert hub with cage and balls in upright position in joint element.



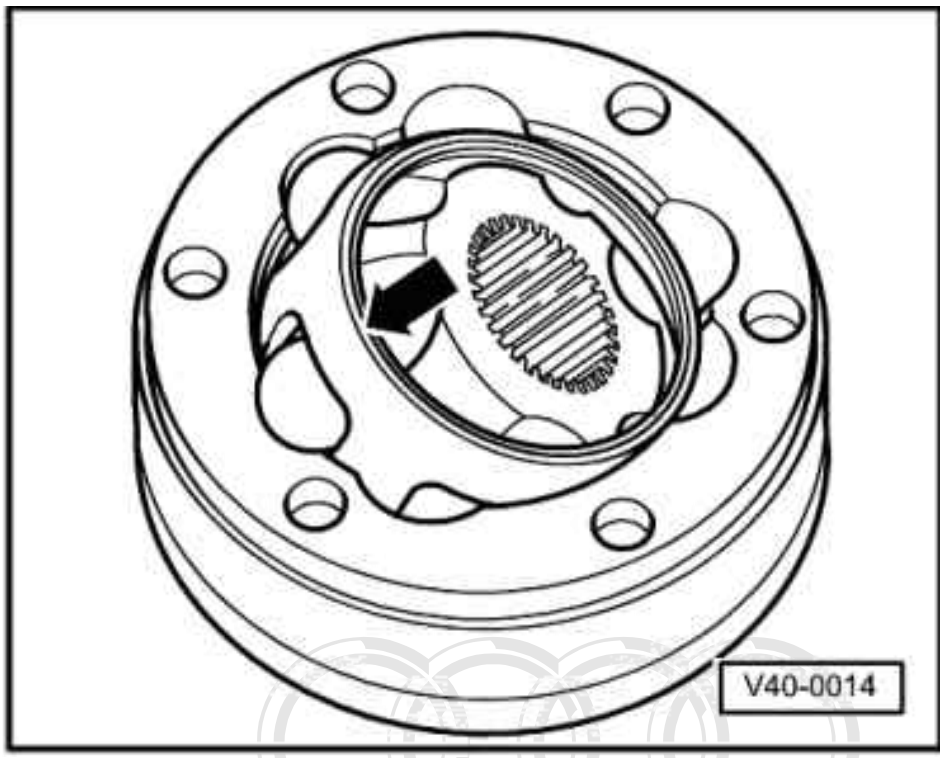
Notes:

- -> On insertion, make sure that broad gap -a- at joint element coincides with narrow gap -b- at hub after swivelling in.



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- -> Swivel in ball hub; to do so swivel hub out of cage (arrows) until the spacing of the balls corresponds to that of the raceways.



- -> Swivel in hub with balls by pressing firmly on cage (arrow).

Checking operation of constant velocity joint

Constant velocity joint has been correctly assembled if ball hub can be pushed back and forth by hand over entire length compensation range.

5 - Servicing drive shaft with triple roller joint

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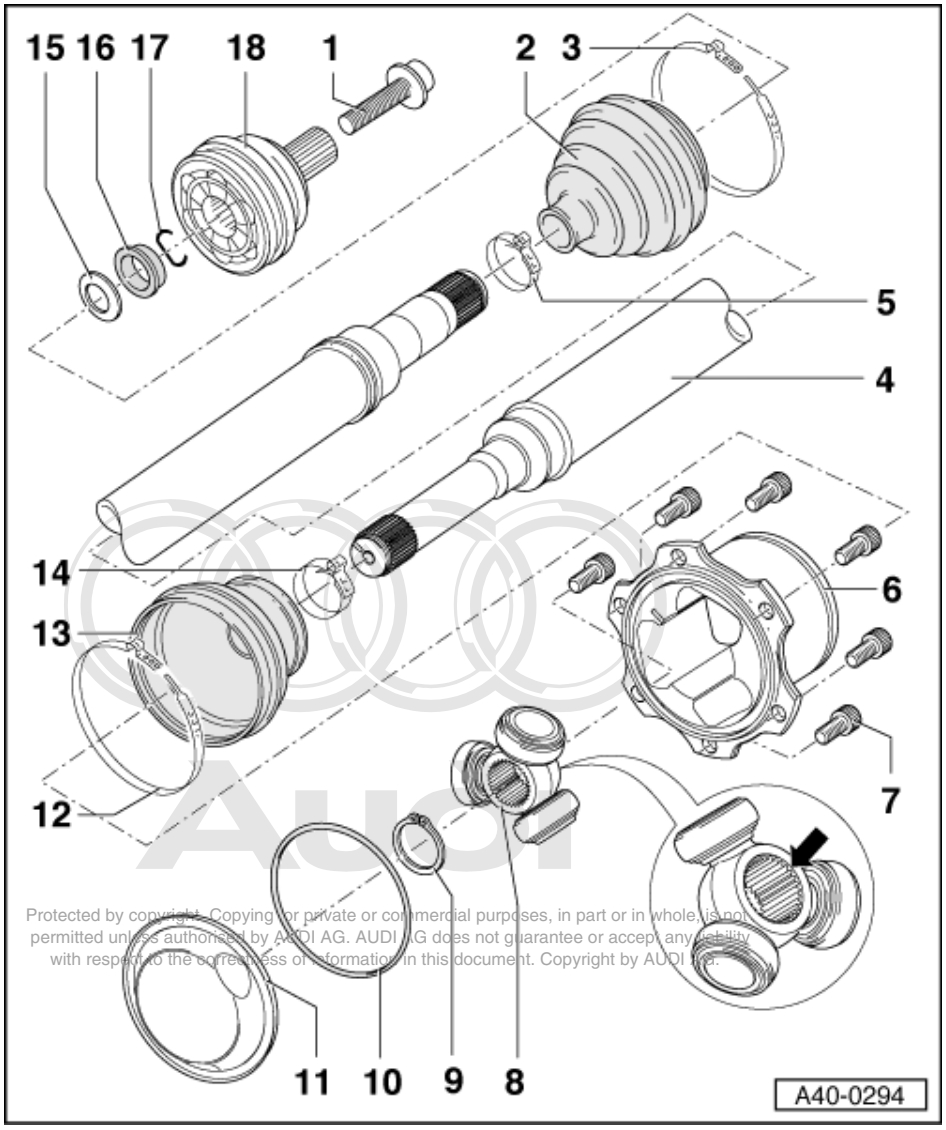
5.1 - Servicing drive shaft with triple roller joint

5.2 - Tools

Special tools and workshop equipment required

- 2050 Thrust pad
- 3110 Tubular section
- 3207 Pressure spindle
- VW 161 A Circlip pliers
- VW 412 Press tool
- VW 416 B Tubular section
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1682 Collet chuck
- Kukko 12-1 Puller

5.3 - Exploded view



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Quantities and type of grease

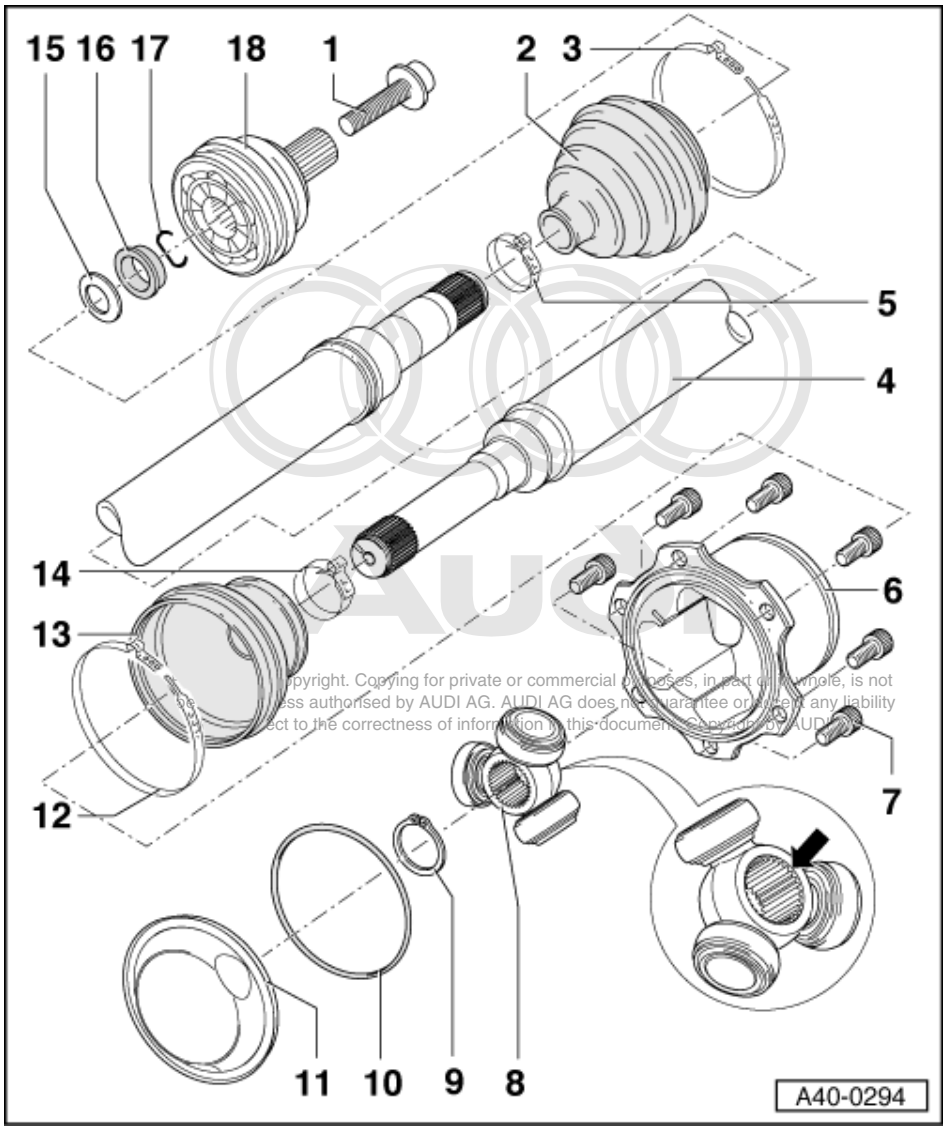
Re-grease joint on replacing boot.

Joints are filled with high-temperature grease.

=> Parts List

Outer joint	Grease Total quantity	of which in: Joint	Bellows
ø mm	[g]	[g]	[g]
88	90	40	50
98	120	80	40
Inner joint			
ø mm			

Grease		of which in:	
Outer joint	Total quantity	Joint	Bellows
130	140	140	-



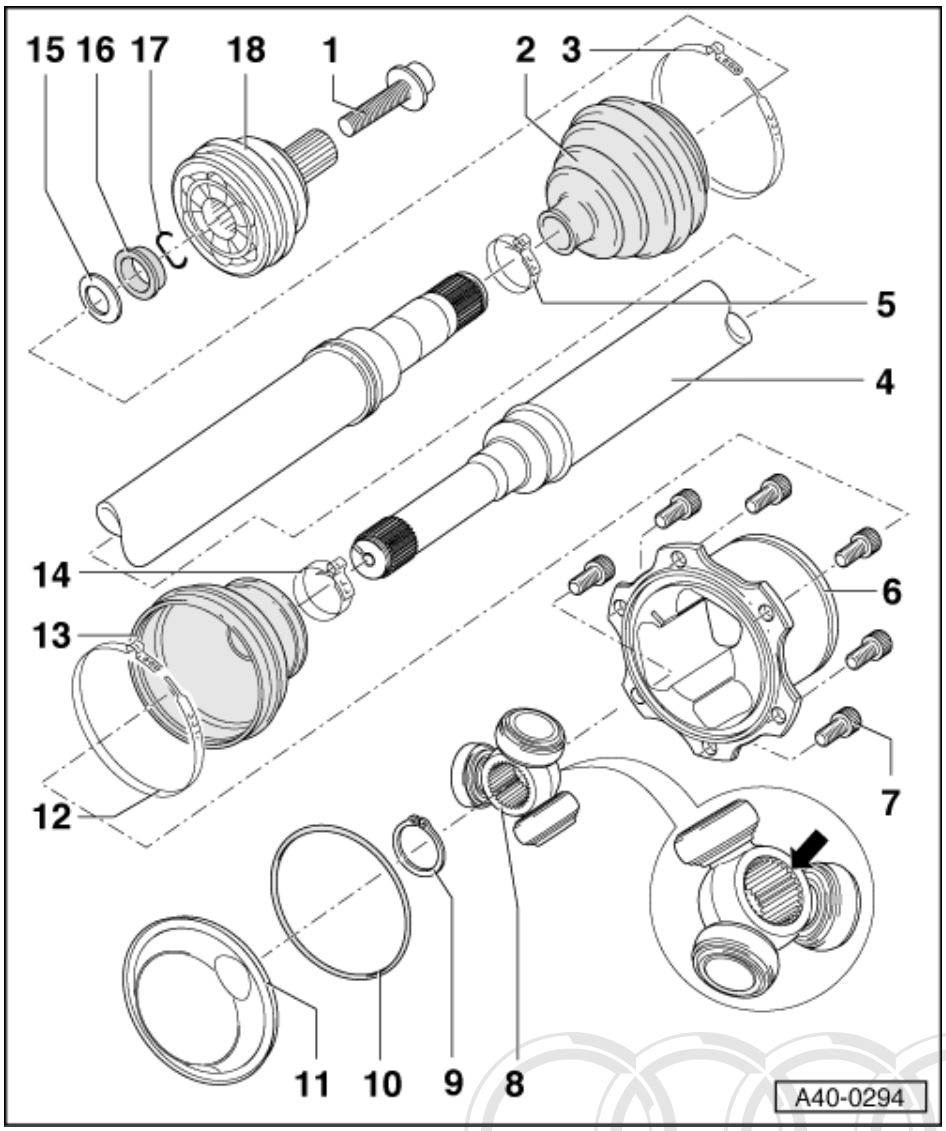
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1 Hexagon bolt

- Always replace after removing
  Tightening torques:
  M16 bolt:
- 190 Nm + further 180° turn
  Heed fitting instructions on removal
  => Page 31
  Heed fitting instructions on installation => Page 32

2 Boot for outer constant velocity joint

- Check for cracks and abrasion
- Before tensioning hose clamps, briefly lift boot for pressure equalisation=>Fig. 3
- Versions: Rubber or Hytrel



3 Clamp
- Different versions for rubber or Hytrel boot
- Replace
- Tensioning => Page 50

4 Drive shaft

5 Clamp
- Replace
- Tensioning => Page 50

6 Joint element

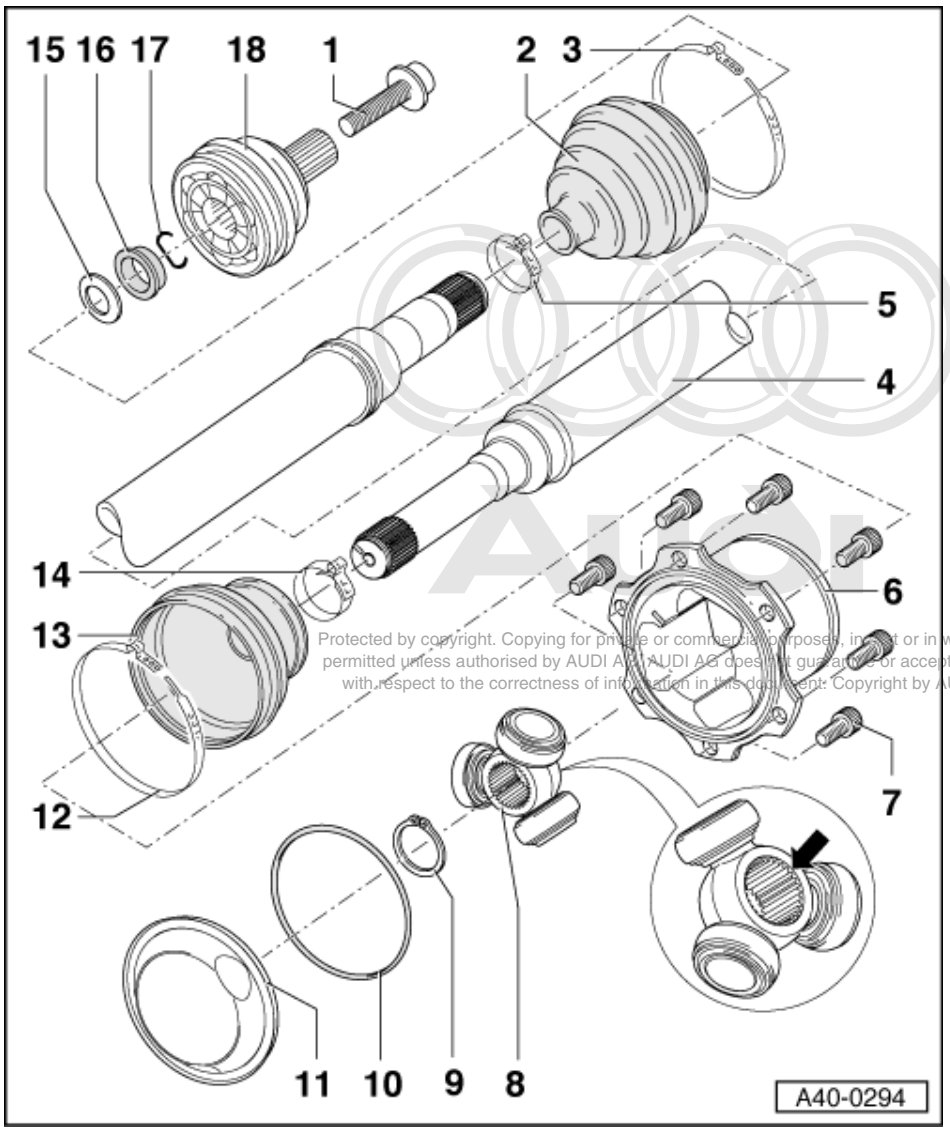
7 Multi-point socket head bolt
- M 10 x 20; 70 Nm

8 Triple roller star

Chamfer -arrow- faces drive shaft splines
- Installation position => Page 54

9 Circlip
- Replace
- Insert in shaft groove

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10 O-ring

Repair set contains new O-ring, which must be fitted

11 Cover

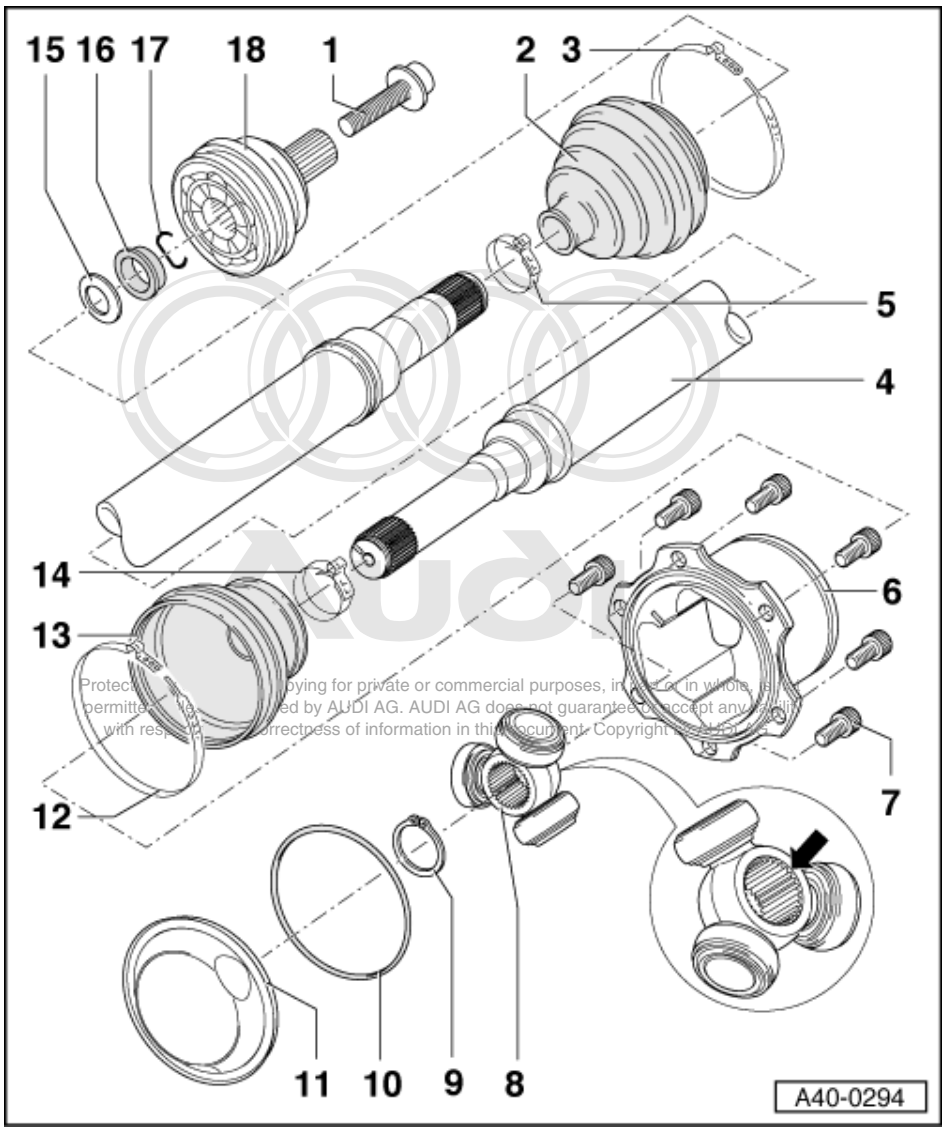
- Always replace
  Destroyed on removal
  Repair set contains modified cover

12 Clamp

- Always replace
- Tensioning => Fig. 1
- Different clamps possible depending on design
  Can also be fitted using pliers 3340

=> Parts List

13 Boot for triple roller joint



14 Clamp

- Always replace
- Tensioning => Fig. 1

15 Dished washer

- Installation position => Fig. 4

16 Spacer ring (plastic)

- Installation position => Fig. 4

17 Circlip

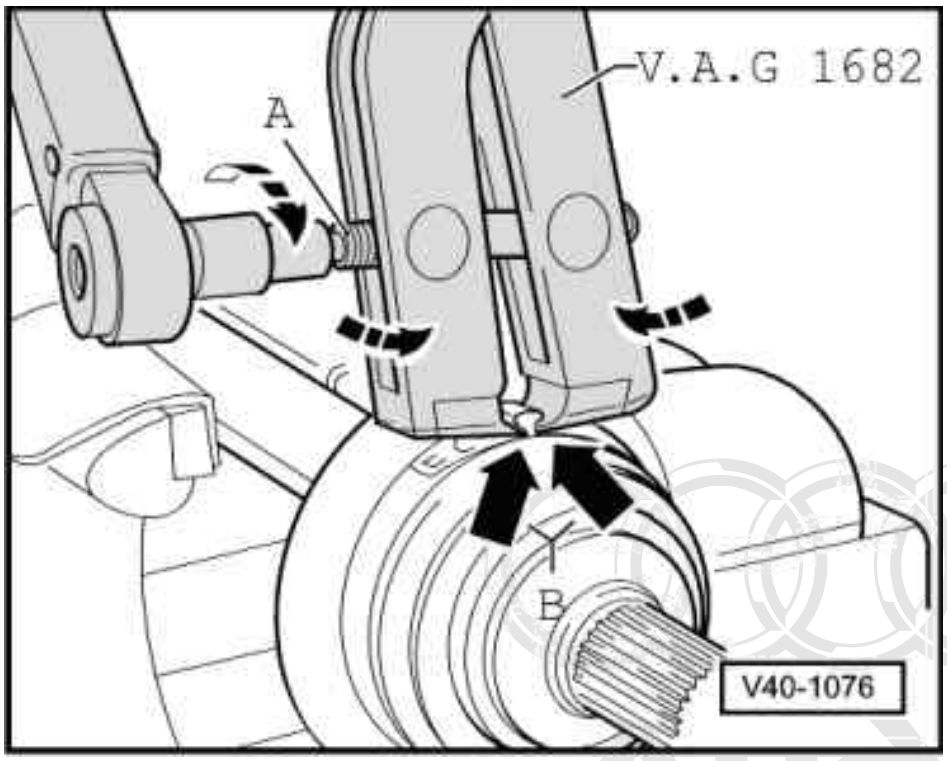
- Always replace
- Insert in annular shaft groove before assembly (not visible with joint fitted)

18 Outer constant velocity joint

- Replace only as complete assembly
- Pressing off =>Fig. 2
- Installing:

- Use plastic-headed hammer to drive joint onto shaft until circlip engages

- Lubricating => Page 45



Instructions for Fig. 1 apply only to stainless steel clamps.

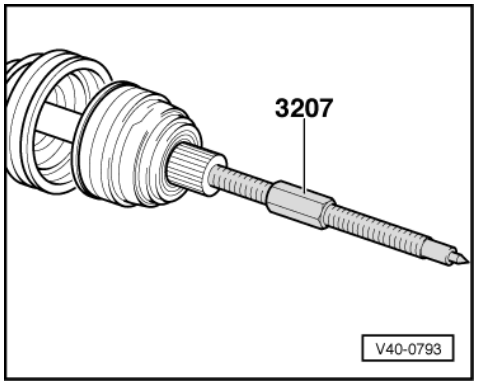
Rubber boots are tensioned using pliers V.A.G 1275.

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-> Fig.1 Tensioning clamp at outer joint

- Apply pliers V.A.G 1682 as shown. Make sure jaws of pliers make contact with corners (arrows B) of hose clamp.
- Tension hose clamp by turning spindle with torque wrench (take care not to tilt pliers).

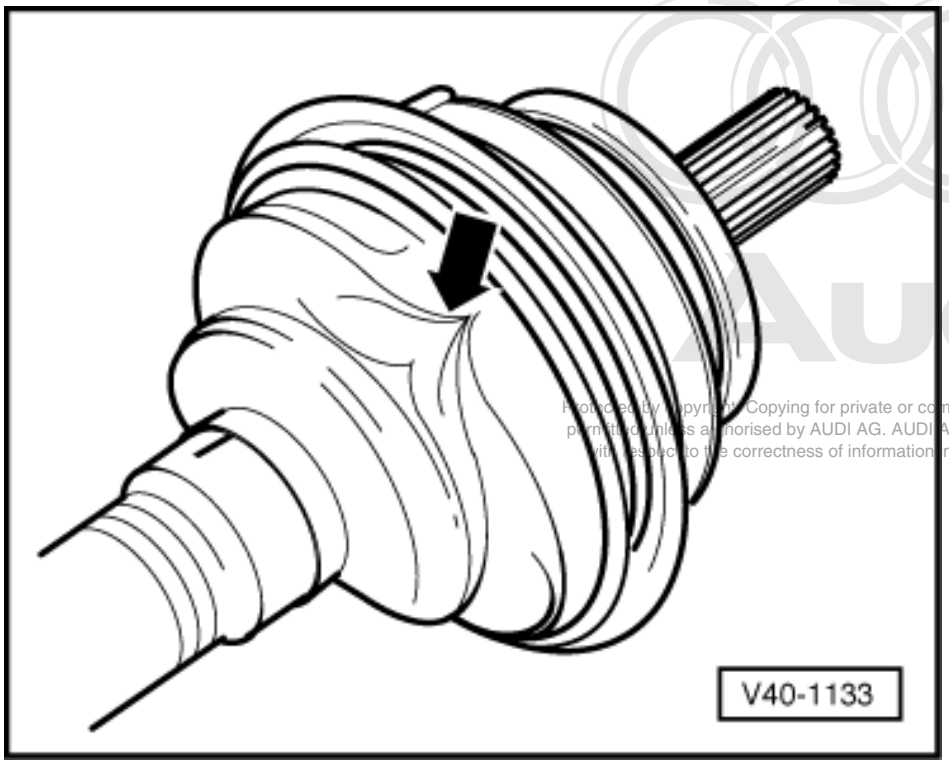
- Tightening torque: 20 Nm
- Use torque wrench with 5...50 Nm adjustment range (e.g. V.A.G 1331).
- Make sure thread of spindle on pliers moves freely. Lubricate with MOS 2 grease if necessary.
- If stiff, e.g. due to dirt on thread, required clamp tensioning force will not be attained with specified tightening torque.



-> Fig.2 Pressing off outer constant velocity joint

- Clamp drive shaft with soft jaws in vice.
- Detach large hose clamp and fold back boot.

- Screw special tool into joint pin until constant velocity joint can be detached.



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-> Fig.3 Venting boot

Applies only to rubber boots

Fitting boot can produce a vacuum in joint.

This vacuum causes a fold to form whilst driving -arrow-.

Attention is therefore to be paid to the following:

- Before tensioning hose clamps, lift boot to ensure pressure equalisation.

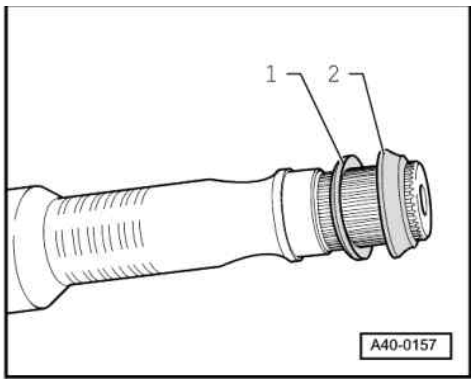
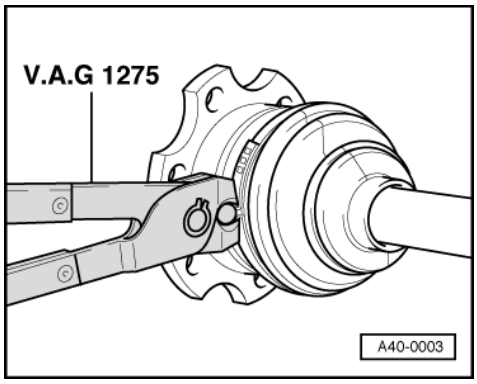


Fig.4 -> Installation position of spacer ring and dished washer (wheel end)

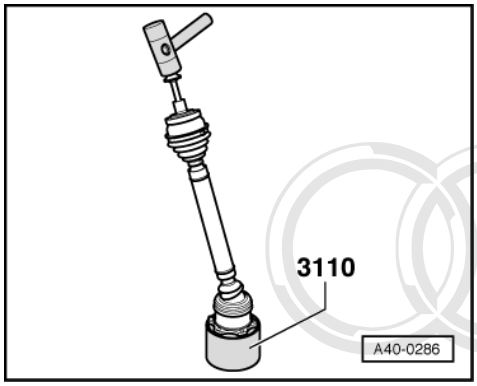
1 - Dished washer
2 - Spacer ring (plastic)



-> Fig.5 Tensioning clamp at inner joint

5.4 - Dismantling and assembling triple roller joint

Dismantling



- Knock out cover.

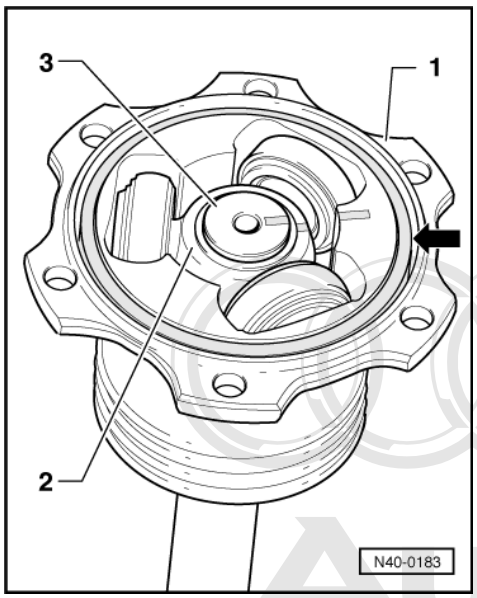
Note:

- Use old bolt for knocking out.
- When doing so, hold shaft at an angle of approx. 20 °.

Use plastic-headed hammer and tubular section 3110.

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- -> Remove any swarf in area of cover.
- Unfasten large clamp.
- Unfasten small clamp at shaft and push back boot.



- -> Mark installation position of components 1. . . . 3.

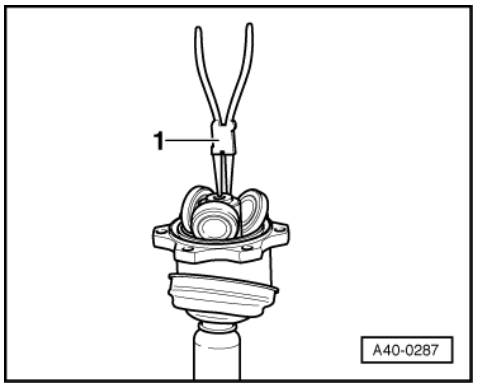
Noise may subsequently be encountered whilst driving if components are not marked and not fitted in their original position on assembly.

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A water-proof felt-tip pen should be used for marking.

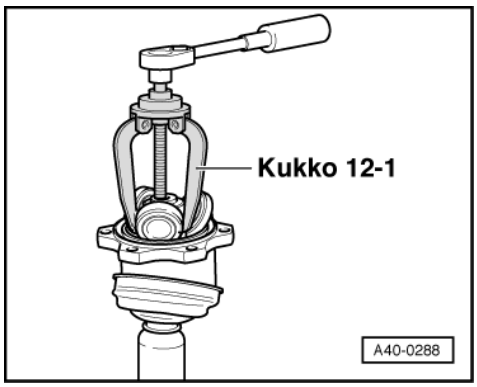
- Take O-ring -arrow- out of groove.

1 - Joint element
2 - Triple roller star
3 - Drive shaft



- -> Remove circlip.

1 - Pliers (commercially available)
If necessary, use circlip pliers VW 161 A.

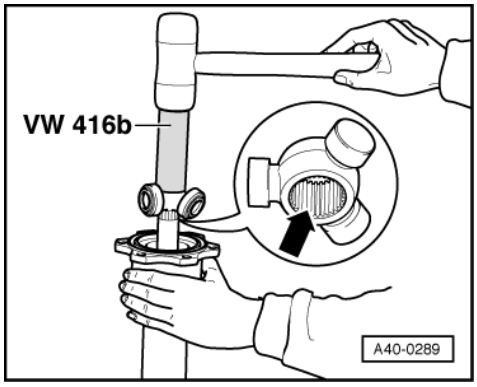


- -> Pull triple roller star off drive shaft.
  Use puller Kukko 12-1 (commercially available).
- Remove grease in sealing ring groove and at shaft splines.
- Check rolling element and raceway for wear.
- Clean shaft and housing.

Assembling

- Slip small clamp for boot onto shaft.
- Slip new boot onto shaft.
- Slip joint element onto shaft.
- Slip boot onto joint element.

Fitting triple roller star



Chamfer -arrow- at star faces shaft and is used as an assembly aid.

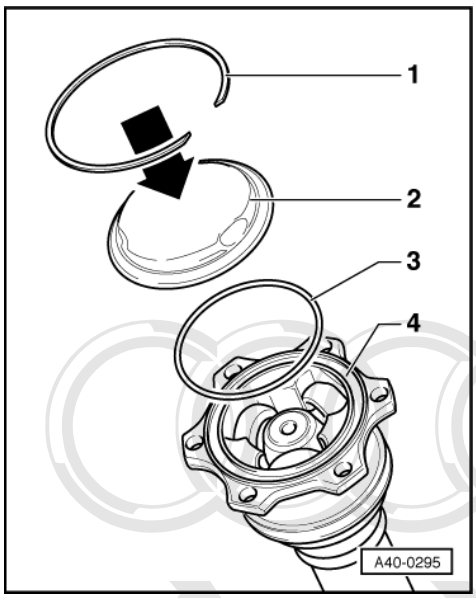
- -> Attach triple roller star to shaft in line with marking and drive home.
- Fit circlip, making sure that it is correctly positioned.
- Press 70 g of high-temperature grease from repair set into triple roller joint.
- Slip joint element over rollers.

Note:

Make sure boot is not twisted when doing so.

- Press 70 g of high-temperature grease from repair set into back of triple roller joint.

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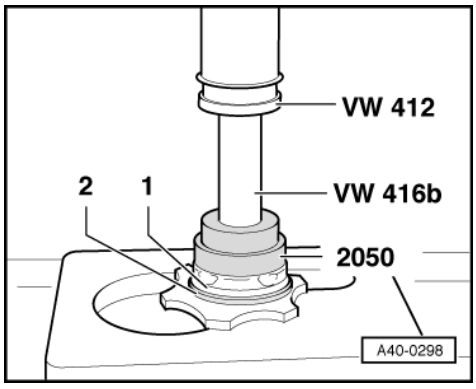
- -> Carefully clean groove for O-ring in triple roller joint -4-.
- Insert O-ring -3- from repair set in groove of triple roller joint -4-.

For ease of illustration, components are shown removed.

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1 - Circlip from repair set
2 - Cover from repair set
3 - O-ring from repair set
4 - Triple roller joint

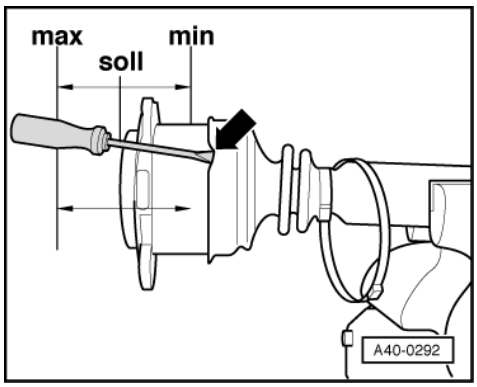
- Insert drive shaft in press.



- -> Press on cover -1- from repair set slightly to permit insertion of circlip from repair set.
- Insert circlip from repair set all round underside of locking edge.

Note:

Make sure circlip is heard to engage.

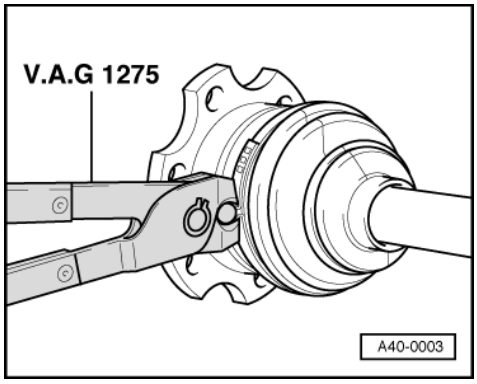


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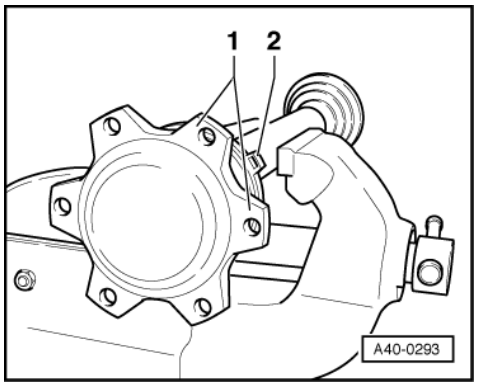
- -> Position joint element in centre. (refer to min. - max. position)

Note:

Whilst positioning joint element in centre, use screwdriver for example to vent boot.

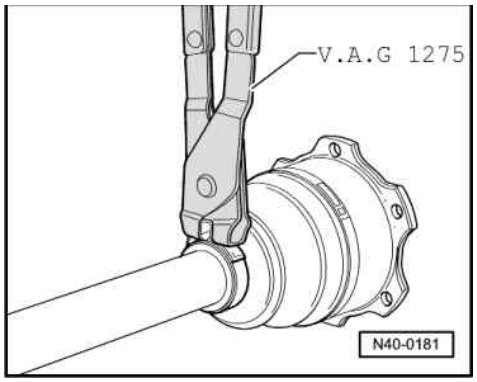


- -> Tension clamp at inner joint.



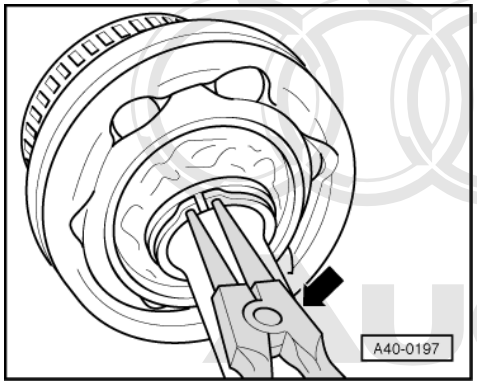
Note:

-> To make it easier to thread in multi-point socket-head bolts when installing drive shaft, lug -2- of clamp must be situated between flanges -1- of joint element.



- -> Tension small clamp using pliers V.A.G 1275.

5.5 - Servicing drive shaft (hollow shaft)

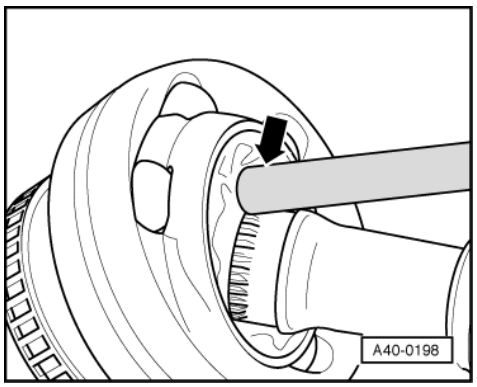


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Drive shaft can be identified from circlip at outer joint => Fig. 6.

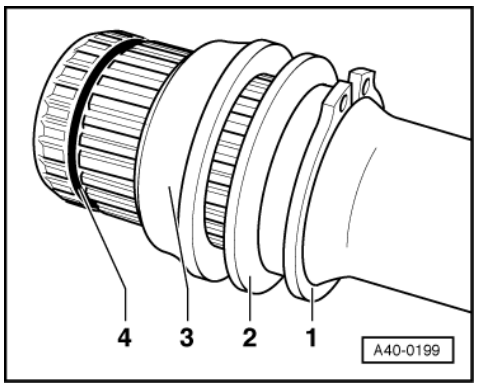
-> Fig.6 Detaching outer joint

- Clamp drive shaft with soft jaws in vice.
- Unfasten hose clamps (large and small) and fold back boot.
- Use circlip pliers -arrow- to unfasten circlip and push back dished washer with spacer.



-> Fig.7 Driving off outer joint

- Apply mandrel (brass or copper) at ball hub -arrow- only.

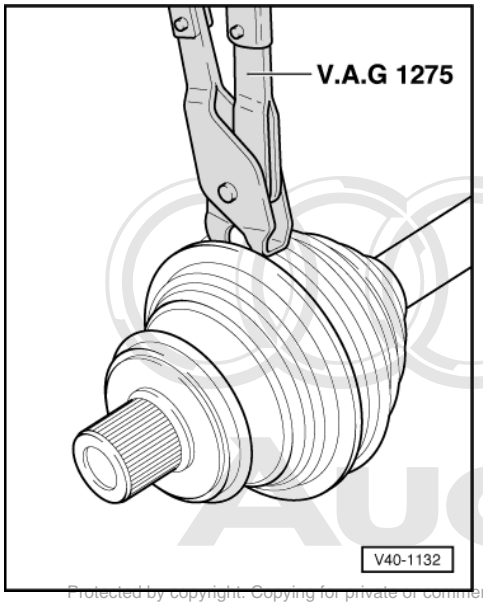


-> Fig.8 Assembly

- When slipping boot onto profile shaft, apply small quantity of grease to bead on profile shaft and carefully fold boot into position.

1- Circlip
2 - Dished washer
3 - Spacer ring (plastic)
4 - Circlip (snap ring)

- Use plastic-headed hammer to drive joint onto shaft until circlip engages.



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-> Fig.9 Tensioning hose clamp

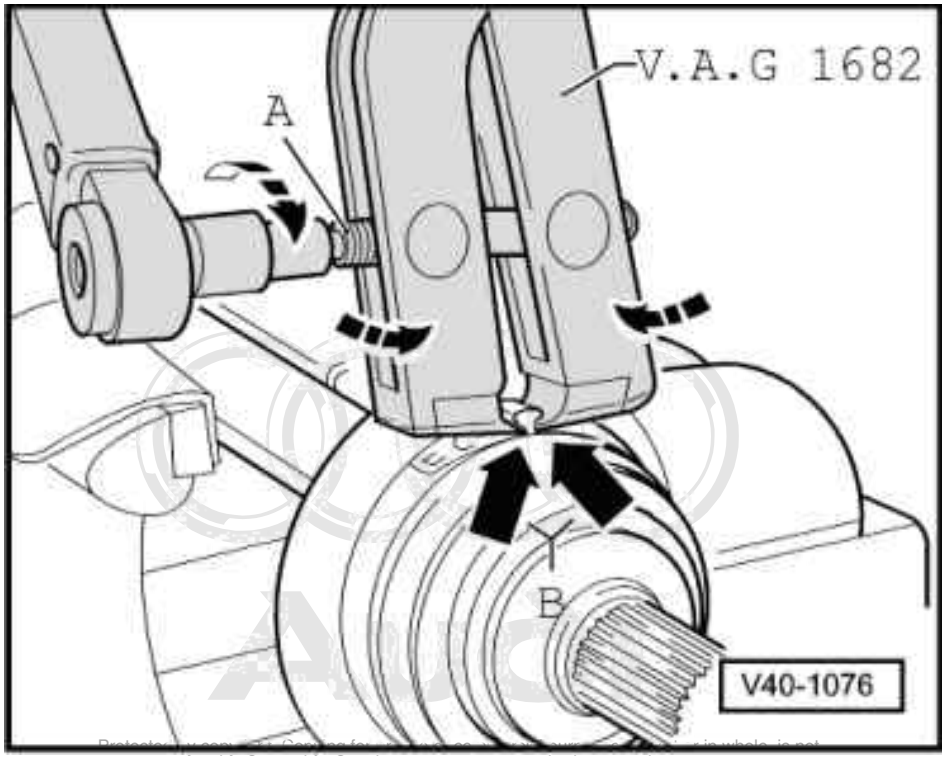
5.6 - Plastic boot

Use is made at the front axle of the Audi A4 of a new plastic boot for the 88 mm outer joint (wheel end).

The difference is that this is a harder material than rubber.

Stainless steel hose clamps are required for fitting the boot on account of the higher pre-tensioning force involved.

Tensioning stainless steel hose clamp



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-> Fig.10 **Tensioning hose clamp at outer joint**

- Apply pliers V.A.G 1682 as shown. Make sure jaws of pliers make contact with corners (arrows B) of hose clamp.
- Tension hose clamp by turning spindle with torque wrench (take care not to tilt pliers).

Notes:

- Hose clamp can only be tensioned using pliers V.A.G 1682.
- Use torque wrench with 5...50 Nm adjustment range (e.g. V.A.G 1331).
- Tightening torque: 25 Nm
- Make sure thread of spindle on pliers moves freely. Lubricate with MOS2 grease if necessary.
- If stiff, e.g. due to dirt on thread, required hose clamp tensioning force will not be attained with specified tightening torque.

6 - Suspension strut

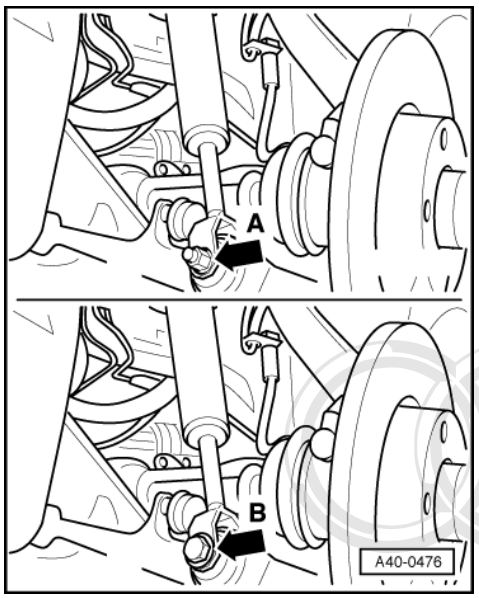
6.1 - Suspension strut

6.2 - Removing and installing suspension strut

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter

- 3287A Ball joint puller



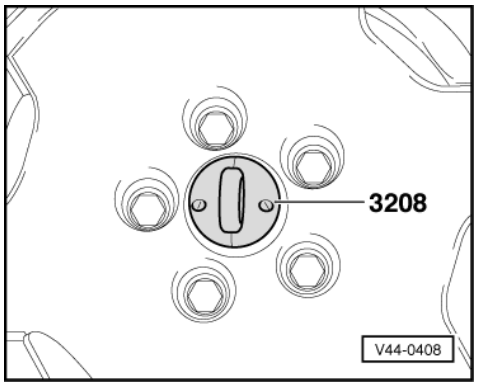
-> Note:

The suspension strut bolted joint was re-positioned on vehicles as of the following chassis numbers, i.e. bolt head -arrow B- points in direction of travel and nut is located between track control link and guide link:

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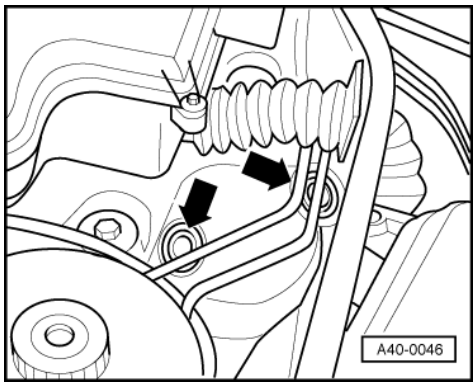
- 8D1A 146 169 (Model Year 2001)
- 8D2A 000 512 (Model Year 2002)
- 8D1N 905 194 (RS4)

I - Old suspension strut/track control link bolted joint -arrow A- (hexagon nut)
II - Re-positioned suspension strut/track control link bolted joint -arrow B- (hexagon bolt)



Removing

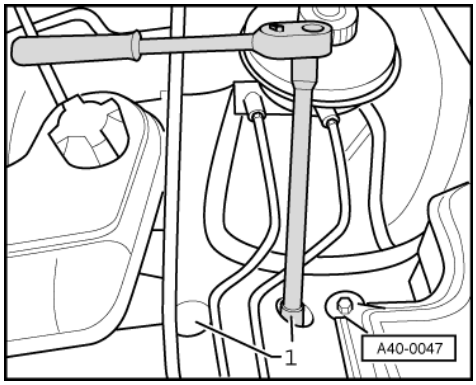
- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Remove wheel.



- -> Take out rubber grommets in plenum chamber -arrows-.

For vehicles with headlight range control, refer to =>Page 27 .

To avoid damaging joints of lower links provide support, e.g. using V.A.G 1383-A (engine and gearbox lifter), to guard against excessive rebound.

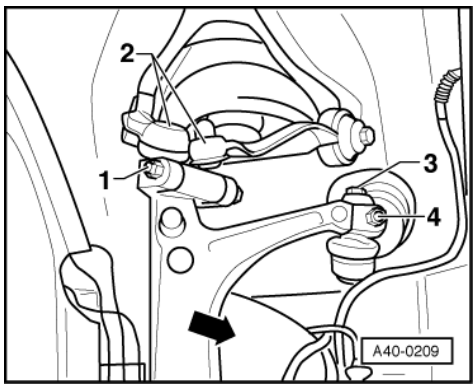


- -> Unscrew suspension strut at body.

  1 - Nuts

- Pull wire of ABS speed sensor out of holder at brake caliper.

  Take care not to damage surface of brake pipes.



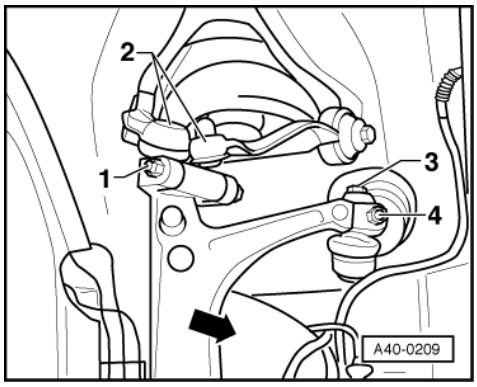
- -> Unscrew nut -1-.
- Take out hexagon bolt and lift out link -2-.

If hexagon bolt cannot be removed from wheel bearing housing, bolt and links must be pressed out of wheel bearing housing=>Page 98 .

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Slots in wheel bearing housing are never to be widened using a chisel or the like.

- Swivel wheel bearing housing aside in direction of arrow.

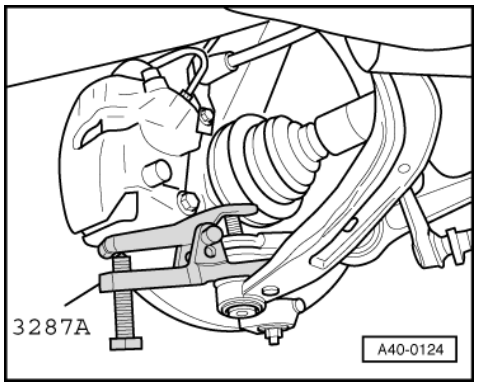


-> Bolts -3- and -4- are never to be slackened off.

Otherwise wheel alignment must be checked.

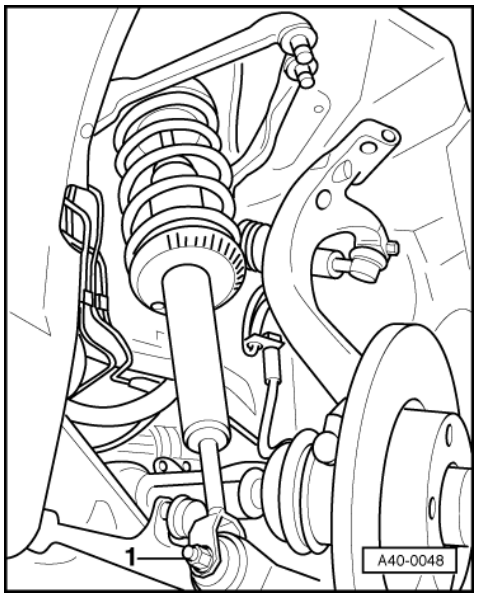
Guide link must be detached from wheel bearing housing to enable suspension strut/track control link hexagon bolt to be screwed out.

If necessary, support joint pin with 4 mm Allen key.



- -> Unscrew nut from joint pin of guide link and press off joint pin.

Take care not to damage boot when doing so.

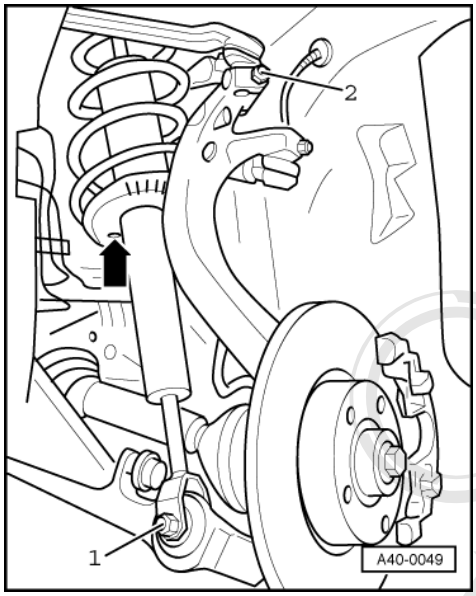


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- -> Unscrew suspension strut/track control link bolt -1-.
- Take out suspension strut downwards.

Notes:

- Take care not to damage boot when taking out suspension strut.
- Servicing suspension strut =>Page 64



Installing

- -> Insert suspension strut such that hole -arrow- in spring plate is facing centre of vehicle.

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Note:

Heed installation position of suspension strut/track control link bolted joint => Page 59 .

- Bolt suspension strut to track control link.

Bonded rubber bushes can only be turned to a limited extent. Suspension strut/track control link bolted joint is therefore only to be tightened when vehicle is standing on ground.

- Hand-tighten new nut for suspension strut/track control link bolted joint.
- Engage upper link in wheel bearing housing, insert new bolt and tighten new nut -2- to 40 Nm.
- Press down upper link as far as possible whilst screwing on.
- Screw on nut at joint pin and tighten to 100 Nm.

  If necessary, support joint pin with 4 mm Allen key.

- Insert ABS wire in holder at brake caliper.
- Screw on new suspension strut/body nuts and tighten to 21 Nm.

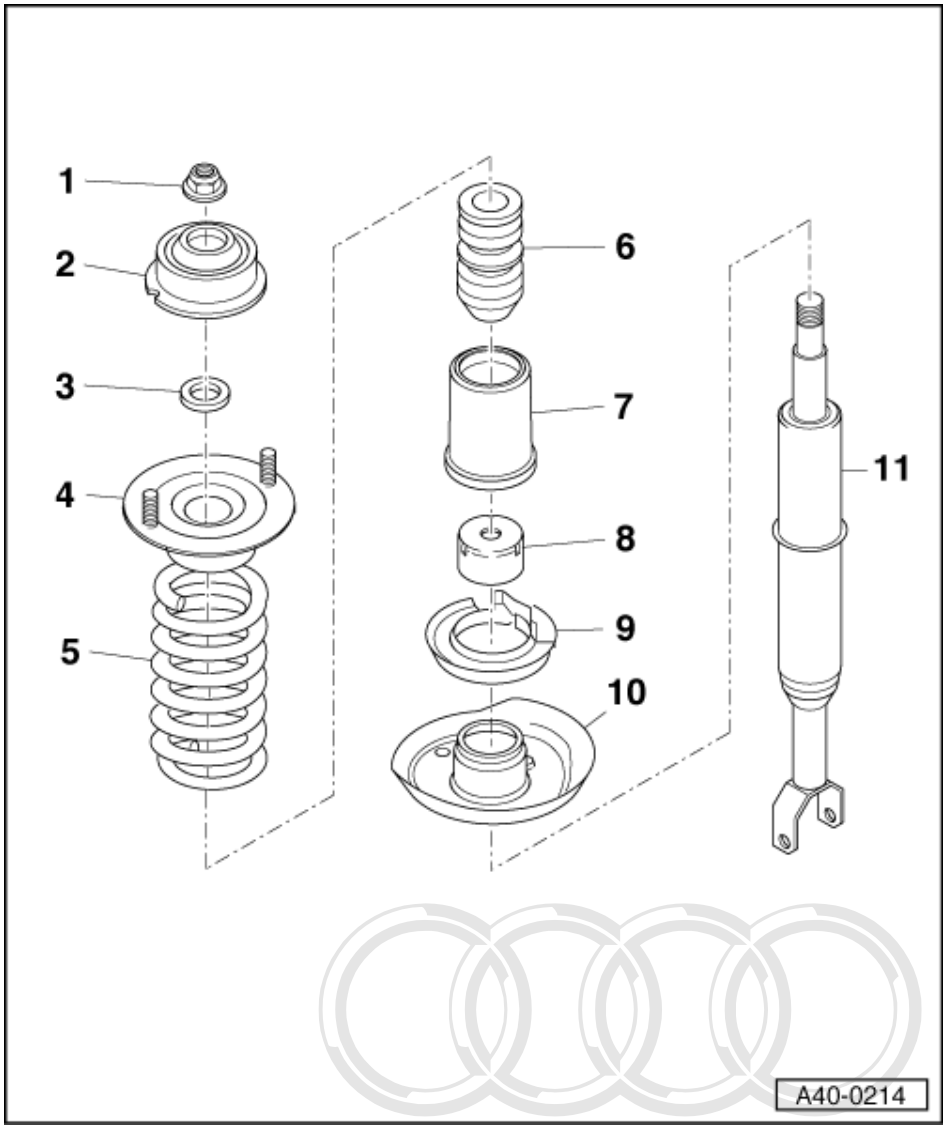
  Take care not to damage surface of brake pipes.

- Insert rubber grommets in plenum chamber.
- If applicable, fit sender for headlight range control => Page 27 .
- Fit and secure wheel => Page 220 .
- Tighten suspension strut/track control link bolted joint to 90 Nm.

6.3 - Servicing suspension strut

Special tools and workshop equipment required

- 3353 Socket attachment, 18 mm
- V.A.G 1332 Torque wrench
- V.A.G 1752/1 Spring tensioner
- V.A.G 1752/2 Suspension strut holder
- V.A.G 1752/7 Spring holder
- V.A.G 1752/8 Suspension strut adjustment gauge



1 Hexagon nut, 50 Nm

- Always replace

2 Suspension strut bush

3 Washer

4 Upper spring plate

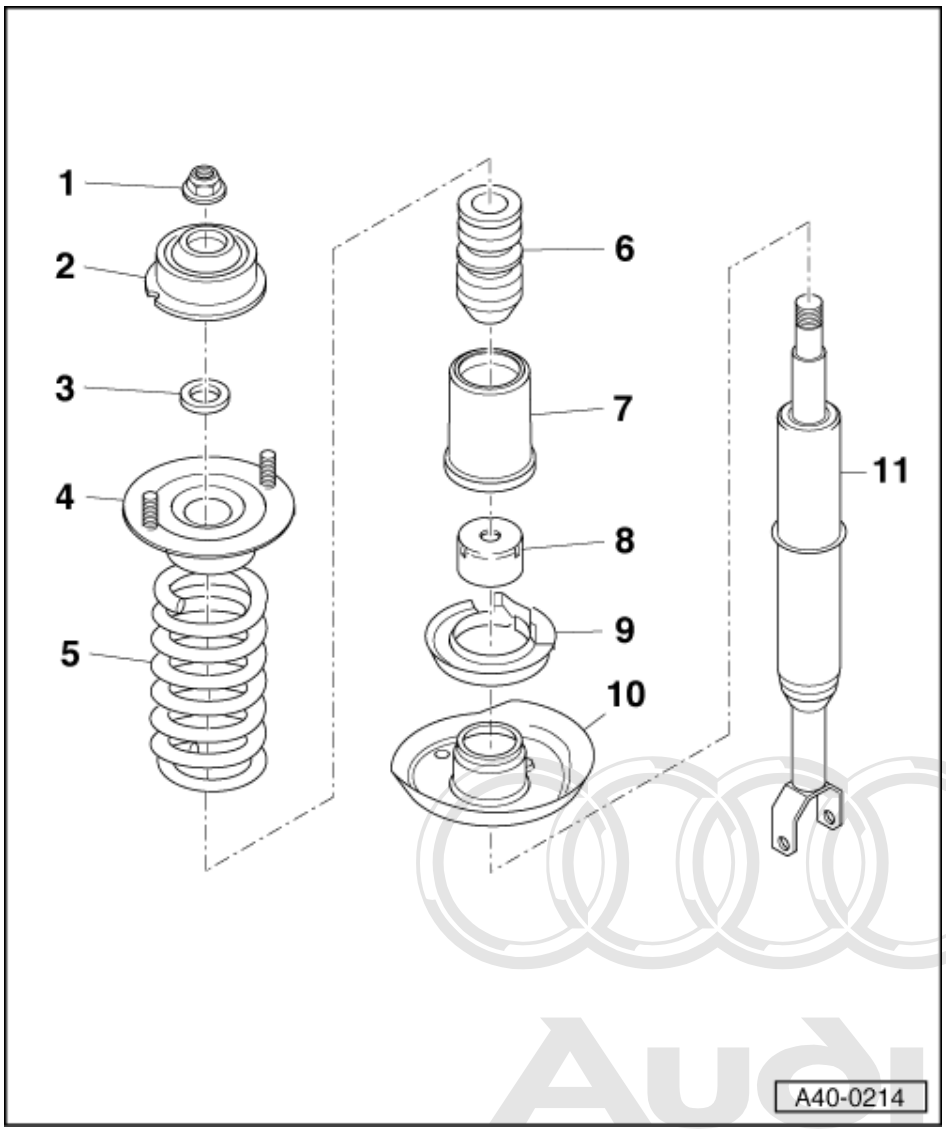
- Installation position => Fig. 8
- Installing => Fig. 7
- Versions: Steel and aluminium
- Combination of different types (aluminium/steel spring plate) is not permitted

5 Coil spring

- Take care not to damage surface of winding
- Heed colour coding

Audi
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- Removing => Figs. 1 , 2 , 3
- Installing => Figs. 6 and 9
- Note different coil spring versions
  => Page 66 , vehicle data sticker



6 Buffer stop

- Insert in upper spring plate
- Assignment

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=> Parts List

7 Protective sleeve

8 Protective cap

9 Seat

- Fixed in position at spring plate by recess in bead

10 Lower spring plate

- Installation position => Fig. 5

11 Shock absorber

- Checking => Page 6
- Replacing => Fig. 4
- Assignment

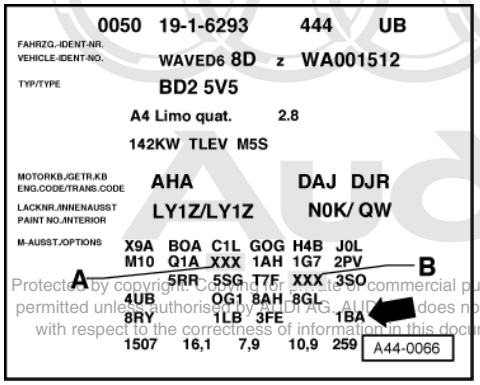
=> Parts List

- Before scrapping defective shock absorbers, always ensure gas release and draining => Page 2

Explanatory notes on factory codes (PR numbers)

PR numbers were introduced at the start of Model Year '98 to facilitate running gear/shock absorber assignment.

The shock absorber assembly installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.



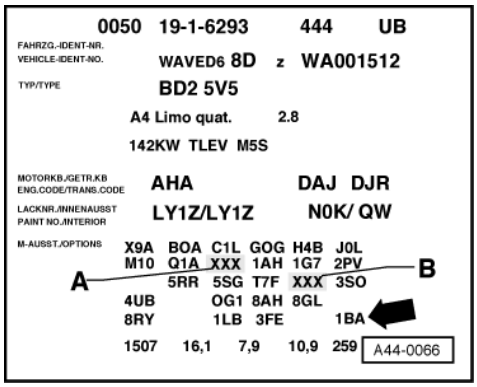
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-> Example of vehicle data sticker

- - A - indicates PR no. for front axle
- - B - indicates PR no. for rear axle

The vehicle data sticker can be found in the spare wheel well and in the Service booklet.

The PR no. can be used to find the correct spring/shock absorber combination in the Parts List.



-> The PR no. for the different running gear versions can be seen from the Fig. - arrow -.

1BA = Standard running gear

1BB = Heavy-duty running gear (approx. 20 mm higher)

1BC = Special-purpose vehicles

1BD =Sports running gear (Audi S4)

RS4 = Sports running gear (RS4)

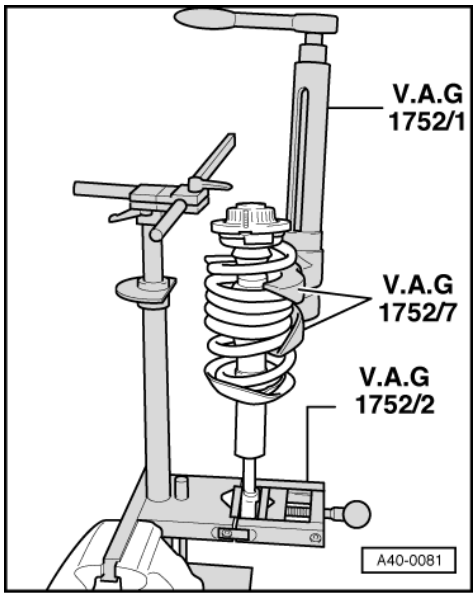
1BE = Sports running gear

1BV = Sports running gear (quattro GmbH)

1BQ = Sports running gear (South Africa)

1BT = Heavy-duty running gear (approx. 7 mm higher)

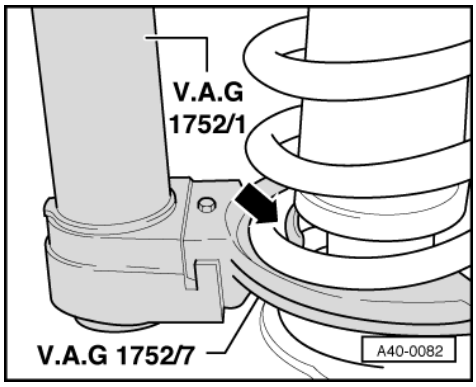
1BP = Heavy-duty running gear (trim position as for 1BA, however with limited bump travel)



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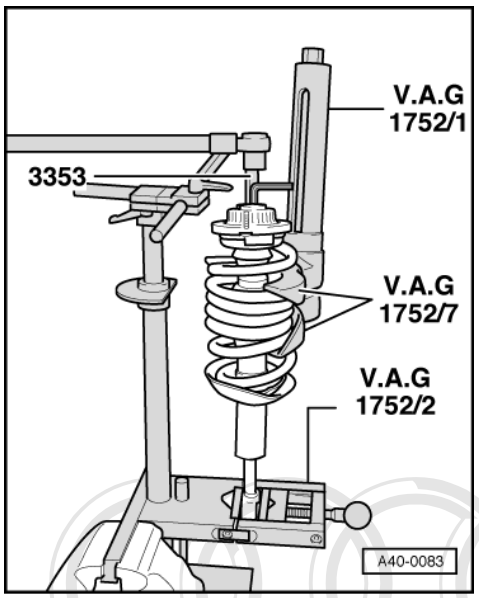
-> Fig.1 Removing coil spring

- Clamp suspension strut holder -V.A.G 1752/2- in vice.



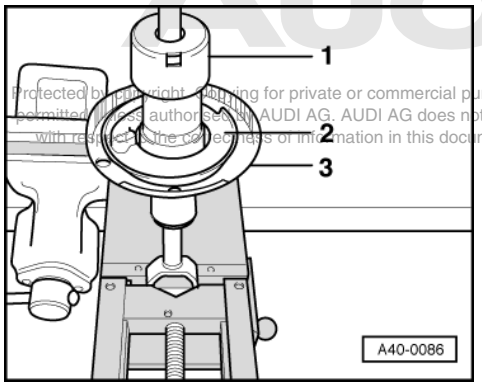
-> Fig.2 Removing coil spring

- Clamp suspension strut at clevis in suspension strut holder.
- Pre-tension coil spring with tensioner -V.A.G 1752/1- until upper spring plate is free.
- Make sure coil spring is correctly positioned in adapter V.A.G 1752/7 -arrow-.



-> Fig.3 Removing coil spring

- Unscrew hexagon nut from piston rod whilst providing support with Allen key.
- Detach components of suspension strut and coil spring with tensioner -V.A.G 1752/1-.

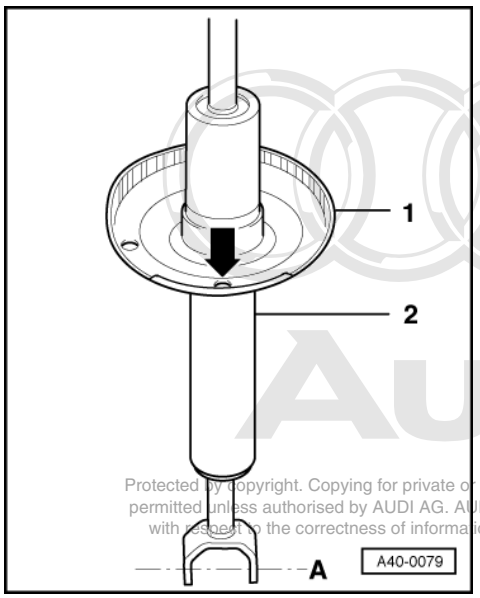


-> Fig.4 Replacing shock absorber

Additional operations are required if shock absorber is to be replaced.

- Detach protective cap -1- and spring seat -2-.
- Loosen spring plate -3- using plastic-headed hammer and detach.

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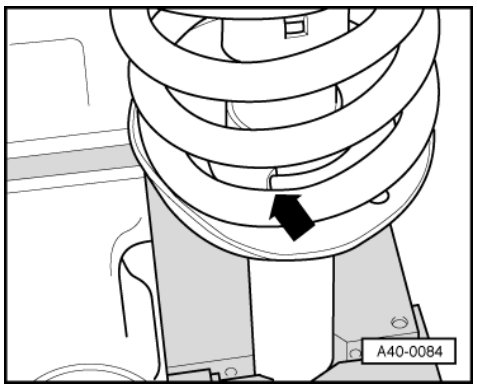
Installing

-> Fig.5 Installation position of lower spring plate

Before inserting coil spring, pay attention to correct installation position of lower spring plate.

Hole -arrow- in spring plate -1- should be offset by 90° with respect to screwing axis -A- of shock absorber -2-.

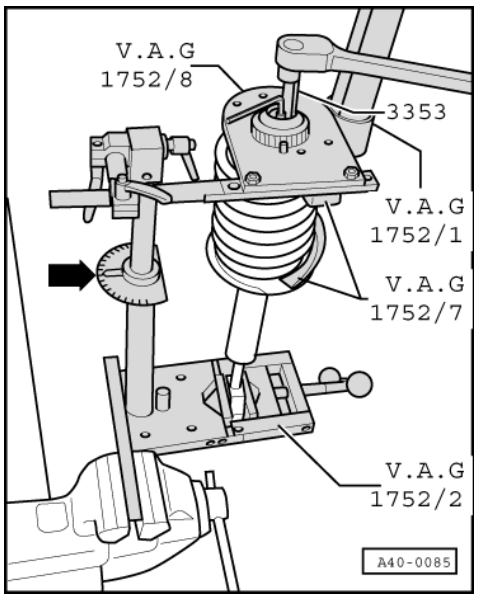
Permissible deviation between spring plate and screwing axis of shock absorber ± 2°



-> Fig.6 Installing coil spring

- Spring seat is fixed in position at spring plate by means of a recess. Fit protective cap and buffer stop.
- Position coil spring with tensioner -V.A.G 1752/1- on spring seat.

  End of spring winding must make contact with stop -arrow-.



-> Fig.7 Installing upper spring plate

- Set angle scale -arrow- of tensioner -1752/2- to 0°.
- Fit upper spring plate, packing plate and shock absorber mount.
- Use adjustment gauge -1752/8- to set upper spring plate to 11°position.

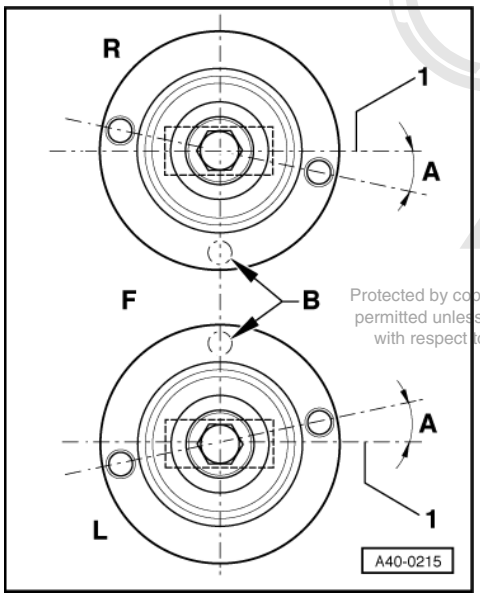
11° setting is marked

"front left"
or
"front right"
on adjustment gauge 1752/8.

Note that 11° setting of spring plates is a mirror image on left and right.

Installation position of upper spring plates => Next page

-> Fig.8 Installation position of upper spring plate



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- Threaded pins in upper spring plate are 11° offset with respect to screwing axis -1- of clevis at shock absorber.

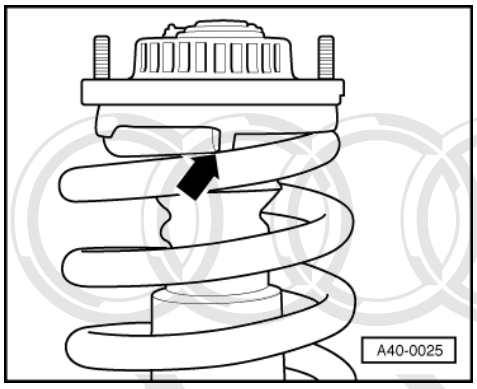
F = Direction of travel

R = Right spring plate

L = Left spring plate

A = 11° ± 2°

- Lower spring plate holes - B - face centre of vehicle.



-> Fig.9 Installing coil spring

- End of spring must make contact with stop of spring support -arrow-.
- Tighten hexagon nut to 50 Nm using 18 mm socket attachment -3353-.
- Slacken off coil spring.
- Detach adjustment gauge -V.A.G 1752/8-.
- Upper and lower spring plates will be in parallel if installation has been performed correctly.

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7 - Wheel bearing housing

7.1 - Wheel bearing housing

7.2 - Removing and installing wheel bearing housing

Special tools and workshop equipment required

- V.A.G 1332 Torque wrench
- 3287A Ball joint puller

Different wheel bearing housing versions with and without bushings

Wheel bearing housings with bushings are being introduced as of Model Year 2002 to provide optimum sealing of lower link bushes (track control link and guide link).

- Assignment => Parts List

- Wheel bearing housings with no bushings (old version) for wheel bearing ø 75 mm and ø 82 mm
- Wheel bearing housings with bushings (new version) for wheel bearing ø 75 mm and ø 82 mm

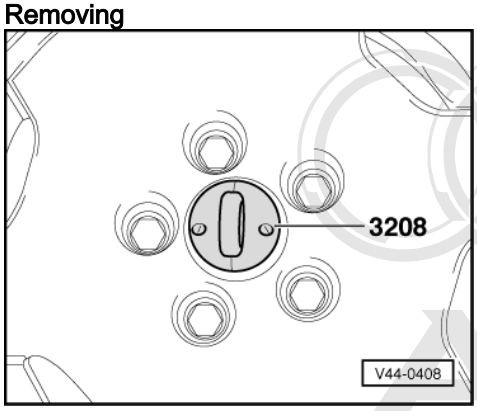
- A combination of wheel bearing housings with and without bushings is permitted.

- When installing wheel bearing housings with bushings, use is also to be made of the corresponding track control links (new type) and track control link/guide link fastening elements.

Flange nuts are to be replaced by combi nuts as fastening elements.
Guide links need not be replaced.

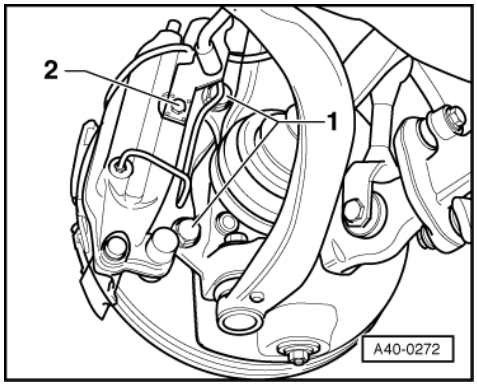
- Conventional flange nuts are to be fitted for vehicles with wheel bearing housings with no bushings and old type track control links.
- Bushings are not intended to be replaced. If damaged, replace wheel bearing housing.

Removing



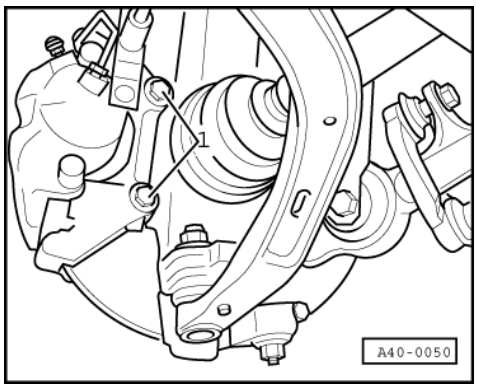
- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Slacken off hexagon bolt for outer joint of drive shaft by max. 90° (vehicle must be standing on its wheels to avoid danger of accidents).
- Raise vehicle and screw out hexagon bolt for outer joint of drive shaft.
- Remove wheel.
- Secure brake disc with wheel bolt.
- Pull wire of ABS speed sensor out of holder at wheel bearing housing/brake caliper.

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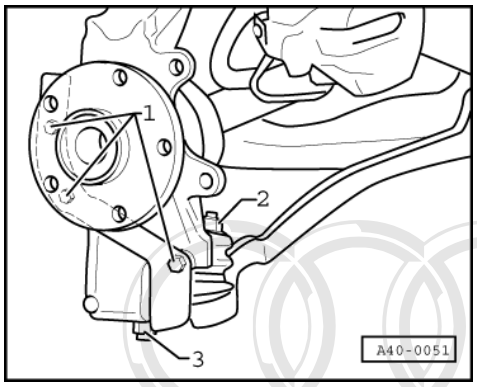
Vehicles with brake caliper HP-2

- -> Screw out hexagon bolt -2- and detach brake pipe holder.
- Unscrew bolts -1- for brake caliper and detach brake caliper.
- Re-attach brake pipe holder. Screw in and tighten hexagon bolt -2-.
- Attach brake caliper to body such that its weight cannot bend or damage brake pipe.

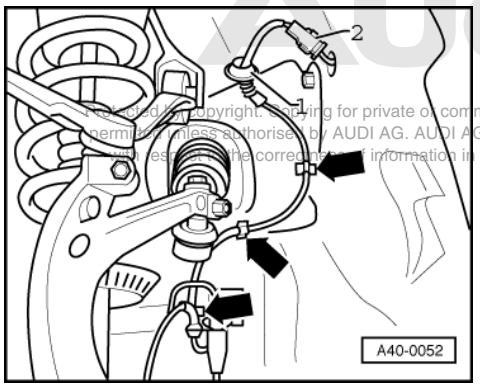


All vehicles (continued)

- -> Unscrew bolts -1- for brake caliper.
- Detach brake caliper and attach to body such that its weight cannot strain or damage brake hose/brake pipe.
- Detach brake disc.



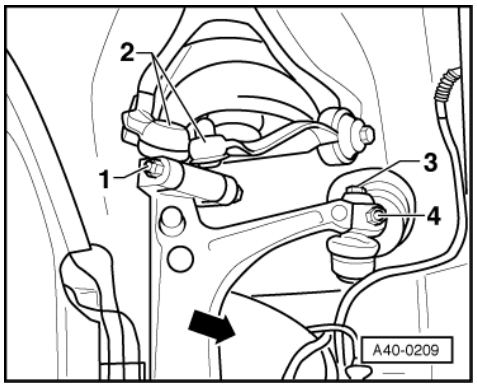
- -> Unscrew bolts -1- for splash plate.
- Pull ABS speed sensor out of wheel bearing housing.
- Unfasten nuts -2- and -3-.



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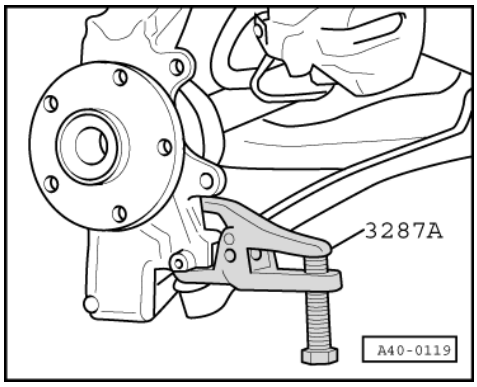
- -> Pull out rubber grommet -1- and unplug connector -2-.
- Pull wire of ABS speed sensor out of holders -arrows-.
- Guide wire through openings in wheel bearing housing and take out.

  Take care not to damage rubber grommet.



- -> Unscrew hexagon bolt -3- and nut -4-.
- Pull out track rod end.
- Unscrew nut from joint pin of guide link.

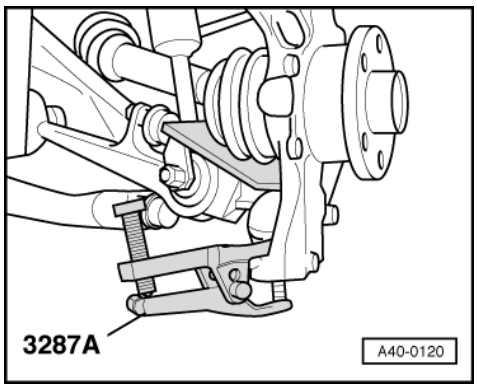
  If necessary, support joint pin with 4 mm Allen key.



- -> Press joint pin of guide link off taper seat.

Notes:

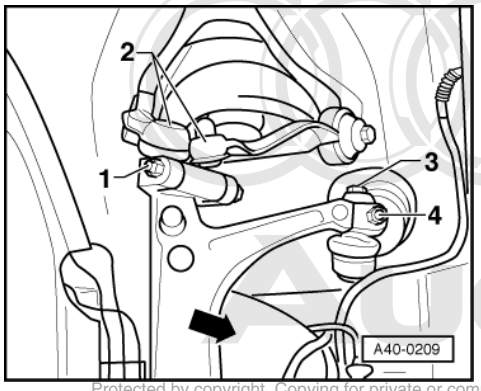
- Take care not to damage boot when doing so.
- Insert leather cloth to prevent boot damage.
- If applicable, pay attention to headlight range control =>Page 27 .



- -> Press joint pin of track control link off taper seat.

Note:

For safety reasons, screw collared nut back on again at joint pin of track control link approx. 4 turns.



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- -> Unscrew nut -1-, take out hexagon bolt and lift out both links -2-.

If hexagon bolt cannot be removed from wheel bearing housing, bolt and links must be pressed out of wheel bearing housing=>Page 98 .

Slots in wheel bearing housing are never to be widened using a chisel or the like.

- Swivel wheel bearing housing aside in direction of arrow and in doing so pull drive shaft journal out of wheel hub.

- Unscrew nut from joint pin of track control link.
- Take out wheel bearing housing.

Installing

- Insert wheel bearing housing.
- Slip outer joint of drive shaft into wheel hub and hand-tighten new hexagon bolt.

Notes:

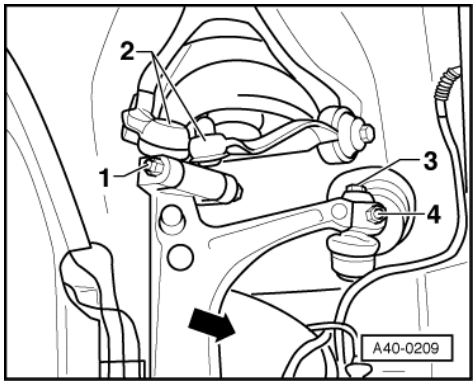
- New type of track control link must be used for wheel bearing housing with bushing.
- If use is made of wheel bearing housing with bushing and new type of track control link, flange nut for attaching track control and guide links is to be replaced by a combi nut.

- Insert joint pin of track control link and guide link in wheel bearing housing.

- Screw on and tighten new self-locking nuts.
  Tightening torques:
  Flange nut: 100 Nm
  Combi nut: 125 Nm

  If necessary, support joint pin with 4 mm Allen key.

- Insert both joint pins of upper links in wheel bearing housing.



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- -> Tighten new self-locking nuts -1- to 40 Nm.
  - Press down upper links as far as possible whilst screwing on.
- Fit track rod.
- Screw on new self-locking nut -4- and tighten to 50 Nm.
- Tighten hexagon bolt -3- to 5 Nm.
- Fit ABS speed sensor.
- On vehicles with headlight range control, fit connecting link of vehicle level sender at track control link => Page 27 .

- Screw on splash plate and tighten to 10 Nm.
- Fit brake disc and screw on brake caliper.

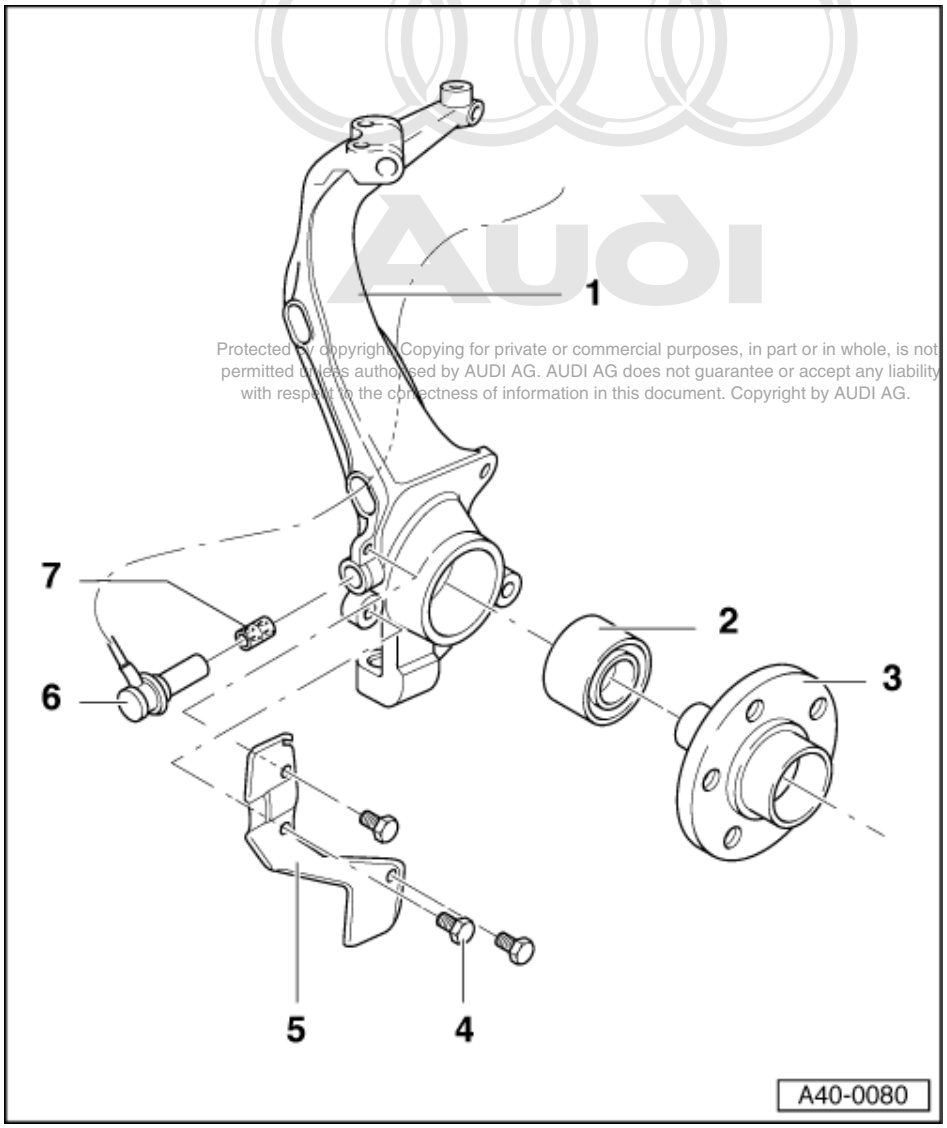
=> Brake System; Repair Group 46

- Fit and secure wheel => Page 220 .
- Tighten hexagon bolt for drive shaft. Vehicle must be standing on its wheels when tightening to avoid danger of accidents.
  Tightening torques:
  M14 hexagon bolt, 115 Nm + further 180° turn
  M16 hexagon bolt, 190 Nm + further 180° turn
- Perform wheel alignment => Page 227 .

7.3 - Servicing wheel bearing housing

Special tools and workshop equipment required

- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 407 Press tool
- VW 412 Press tool
- VW 416 B Tubular section
- VW 432 Thrust pad
- VW 447 i Thrust piece
- VW 519 Tubular section
- 3005 Thrust plate
- 3062 Thrust piece
- 3291/2 from assembly device
- 30-100 Fitting sleeve
- 3345 Tube for wheel bearing
- Kukko 15-17 parting tool (commercially available)

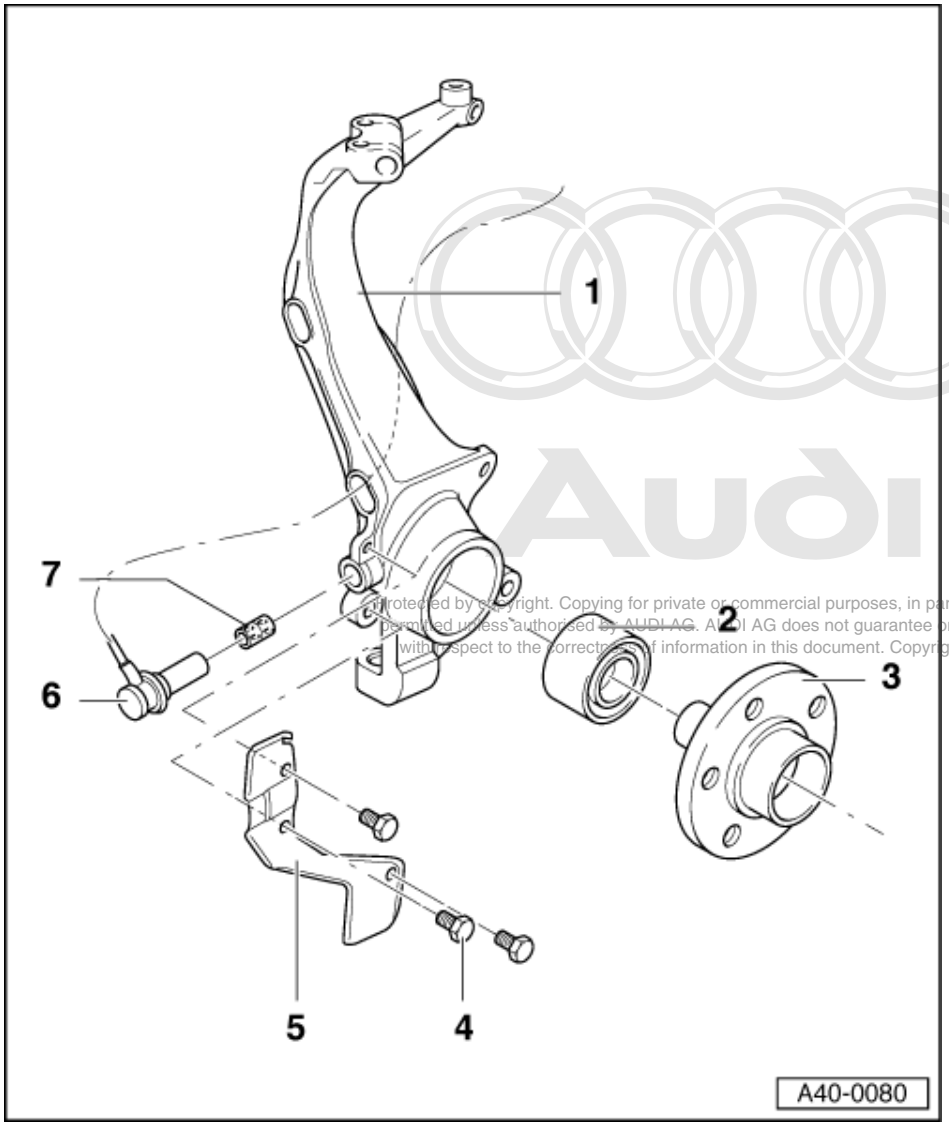


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1 Wheel bearing housing
- Note different running gear versions

=> Parts List
- Do not grease bearing seat in wheel bearing housing before pressing in wheel bearing
- Removing and installing=>Page 71

2 Wheel bearing
- Stepped ID
- Installation position:
- Large ID of wheel bearing faces wheel hub
- Pressing out ø 75 => Fig. 3
- Pressing out ø82 =>Fig. 4
- Pressing off bearing inner race
  => Figs. 5 and 6
- Pressing in ø75=>Fig. 7
- Pressing in ø82 =>Fig. 8



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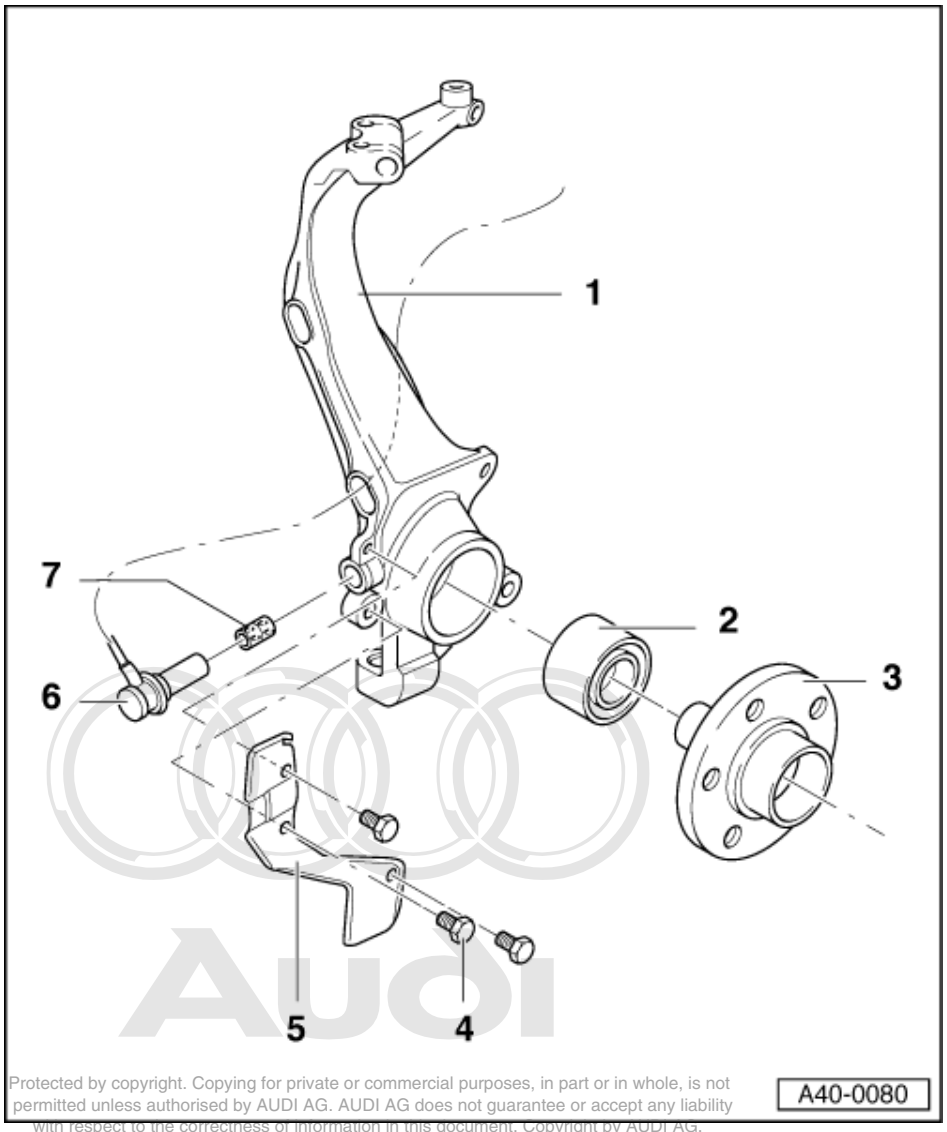
3 Wheel hub
- Stepped design
- Pressing outø75 =>Fig. 1
- Pressing out ø82 =>Fig. 2
- Pressing in ø75 =>Fig. 9
- Pressing in ø82 =>Fig. 10
- Contact surface for wheel hub/brake disc and tapped holes must be free from paint and dirt

4 Hexagon bolt, 10 Nm

5 Splash plate

6 Speed sensor

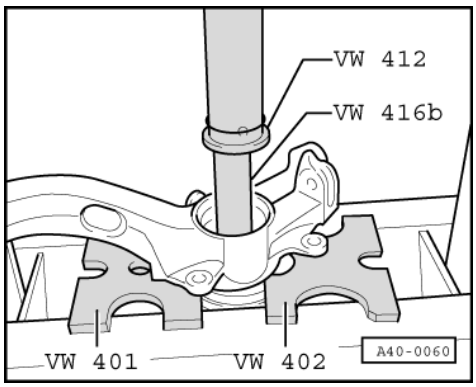
- Pull out to remove
- Fit drive shaft before installing speed sensor
- Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
- Press home in clamping sleeve



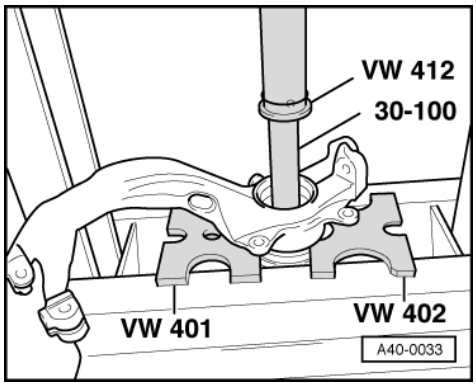
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7 Clamping sleeve

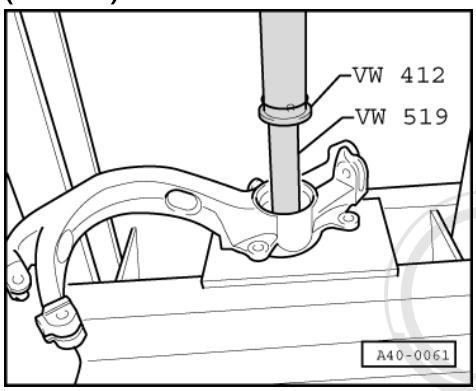
- Always replace
- Left and right identical
- Apply lubricating paste G 000 650 to hole in wheel bearing housing before fitting
- Press home in wheel bearing housing



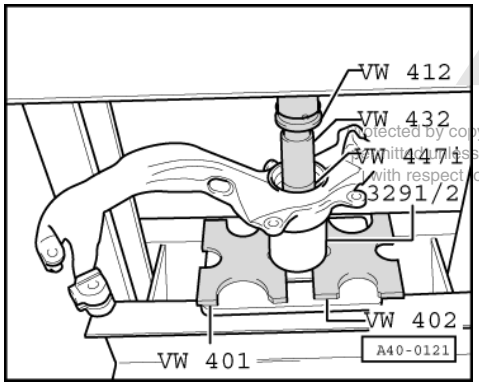
-> Fig.1 Pressing wheel hub out of wheel bearing housing (ø 75 mm)



-> Fig.2 Pressing wheel hub out of wheel bearing housing (ø82 mm)



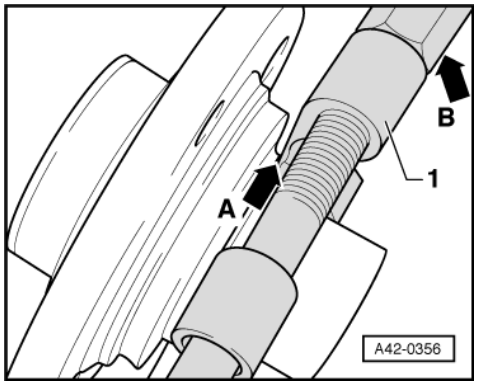
-> Fig.3 Pressing wheel bearing out of wheel bearing housing (ø 75 mm)



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-> Fig.4 Pressing wheel bearing out of wheel bearing housing

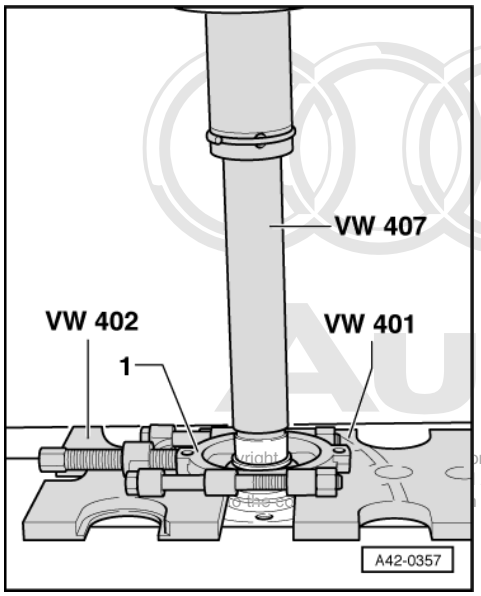
(ø 82 mm)



-> Fig.5 Inserting parting tool

- Insert parting tool -1- in annular groove of bearing inner race -arrow A- and pre-tension with spindle -arrow B-.

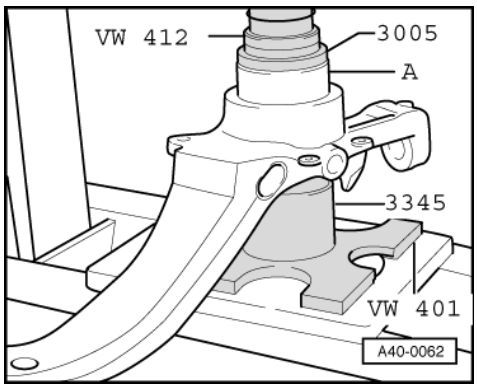
1 - Parting tool, e.g. Kukko 15-17 (commercially available)



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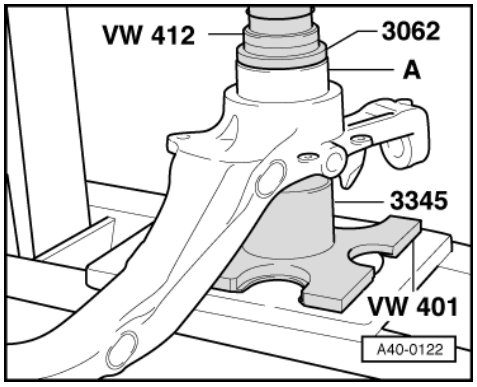
-> Fig.6 Pressing bearing inner race off wheel hub

1 - Parting tool, e.g. Kukko 15-17 (commercially available)



-> Fig.7 Pressing wheel bearing -A- into wheel bearing housing (ø 75 mm)

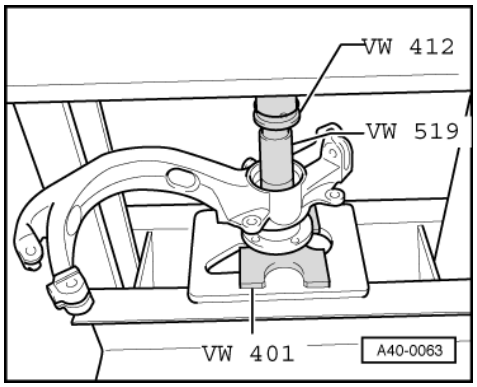
Large ID of wheel bearing faces wheel hub.



-> Fig.8 Pressing wheel bearing -A- into wheel bearing housing (ø 82 mm)

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Large ID of wheel bearing faces wheel hub.



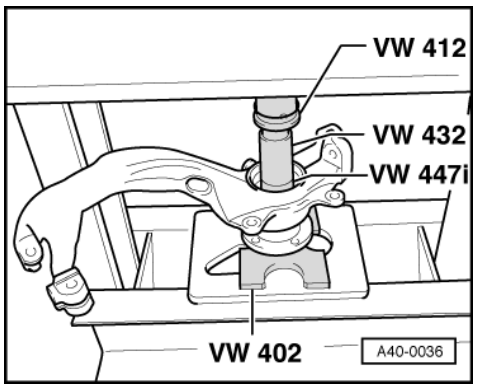
-> Fig.9 Pressing wheel hub into wheel bearing (ø 75 mm)

Make sure wheel hub does not take weight of wheel bearing housing, as otherwise wheel bearing could be damaged.

- When pressing in, thrust pad -VW519- may only rest on bearing inner race.

Wheel bearing housing must be kept as horizontal as possible when pressing in.

Otherwise, wheel hub will tilt in wheel bearing and result in premature bearing damage.



-> Fig.10 Pressing wheel hub into wheel bearing (ø 82 mm)

Make sure wheel hub does not take weight of wheel bearing housing, as otherwise wheel bearing could be damaged.

- When pressing in, thrust pad -VW447i- may only rest on bearing inner race.

Wheel bearing housing must be kept as horizontal as possible when pressing in.

Otherwise, wheel hub will tilt in wheel bearing and result in premature bearing damage.

7.4 - Servicing wheel bearing housing with V.A.G 1459 B

Instead of workshop press V.A.G 1290 A, use can also be made of hydraulic removal and installation tool for wheel bearing and wheel hub V.A.G 1459 B with accessory V.A.G 1459 B /2.

Advantages:

- Wheel bearing housing need not be completely dismantled
- Track rod end is not detached from wheel bearing housing and wheel alignment is thus not necessary

Special tools and workshop equipment required

- V.A.G 1383 A Engine/gearbox lifter with universal gearbox support V.A.G 1359/2
- V.A.G 1389 A/1 Foot-operated pump with high-pressure hose

If hand pump V.A.G 1389/1 is already available in workshop, this can be converted to a foot-operated pump.

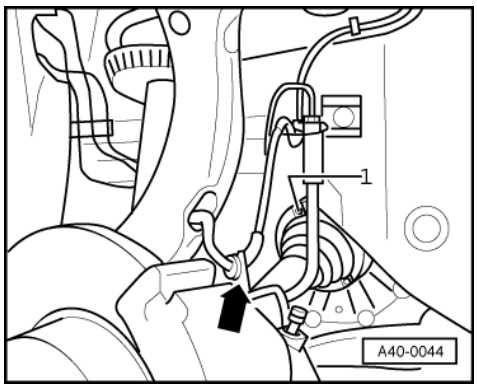
Make use of conversion kit V.A.G 1389/3 for this purpose.

- V.A.G 1459 B Hydraulic removal and installation tool for wheel bearing
  - Hollow plunger cylinder HKZ-15 with thrust pad E-0-204-T, hydraulic
  - Pins E-0-217+218
  - Special nut E-8-214
  - Thrust pad E-5
  - Thrust pad E-14-1
- V.A.G 1459 B/2 Accessory set
  - Parting tool Kukko 17/2
  - Bell E-40
  - Thrust pad E-43
  - Thrust sleeve E-44-1
  - Thrust pad E-45
- Parting tool Kukko 17/3

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Removing

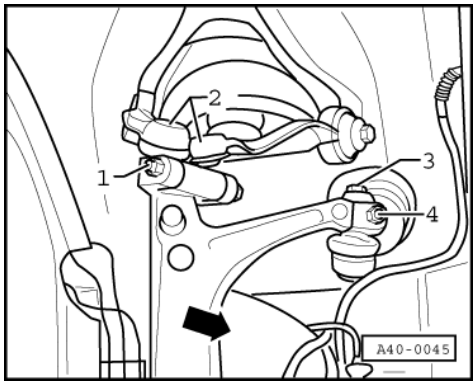
- Slacken off hexagon bolt for drive shaft with vehicle standing on its wheels to avoid danger of accident.
- Remove wheel and raise vehicle.



- -> Unscrew drive shaft from drive flange.

1 - Hexagon socket-head bolt or multi-point socket-head bolt

- Pull wire of ABS speed sensor out of holder at brake caliper -arrow-.
- Pull ABS speed sensor out of wheel bearing housing.
- Detach brake carrier with brake caliper and attach with wire to body.
- Remove brake disc and splash plate.



- -> Unscrew nut -1-, take out hexagon bolt and lift out both links -2-.

Slots in wheel bearing housing are never to be widened using a chisel or the like.

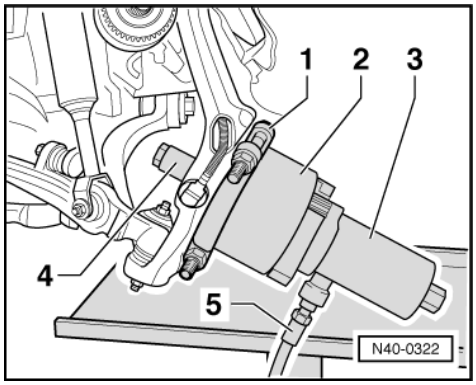
If hexagon bolt cannot be removed from wheel bearing housing, bolt and links -2- must be pressed out of wheel bearing housing => Page 98 .

- Screw out hexagon bolt for drive shaft.
- Swivel out wheel bearing housing.
- Take drive shaft out of wheel bearing housing and tie up.

Note:

Place gearbox lifter V.A.G 1383/A in position (danger of accident caused by falling components on removing wheel hub and wheel bearing).

Removing wheel hub



- -> Insert parting tool -1- between wheel bearing housing and wheel hub and pre-tension.

Installation position: Flat surfaces of edges point towards wheel hub

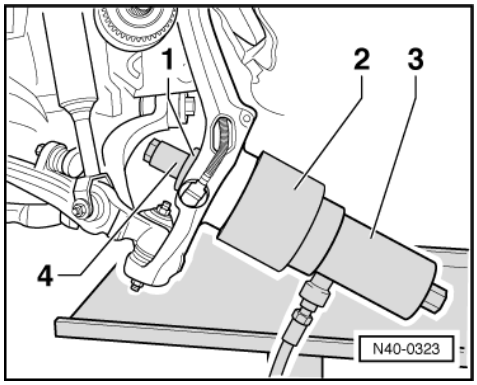
- Fit bell -2-, hollow plunger cylinder -3- with pin and special nut -4-.
- Remove wheel hub whilst holding tool.

1 - Parting tool Kukko 17/2
2 - Bell E-40
3 - Hollow plunger cylinder HKZ-15
4 - Special nut E-8-214 and pin

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5 - High-pressure hose with quick-release coupling

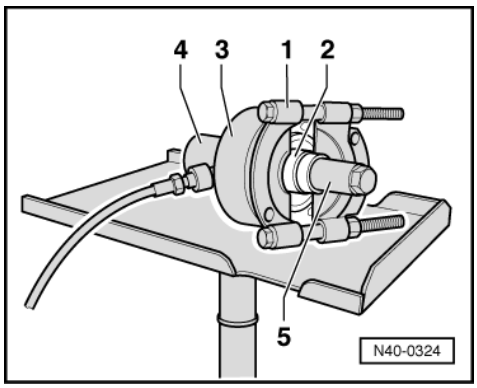
Removing wheel bearing



- -> Fit thrust pad -1- with collar facing bearing, thrust sleeve -2- with the four stepped inner diameters facing wheel bearing housing, hollow plunger cylinder -3- with pin and special nut -4-.
- Remove wheel bearing by way of pump action.

1 - Thrust pad E-5
2 - Thrust sleeve E-44-1
3 - Hollow plunger cylinder HKZ-15
4 - Special nut E-8-214 and pin

Detaching bearing inner race from hub



- -> Fit parting tool -1- behind bearing inner race -2-.

Installation position: Bevel of edges facing bearing inner race

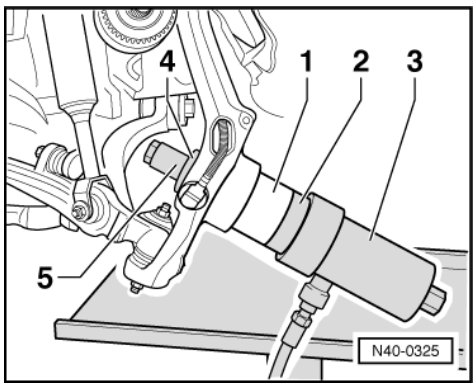
- Fit bell -3- and hollow plunger cylinder -4- with pin, screw on with special nut -5- and detach bearing inner race.

1 - Parting tool Kukko 17/2
2 - Bearing inner race
3 - Bell E-40
4 - Hollow plunger cylinder HKZ-15
5 - Special nut E-8-214 and pin

Pressing in wheel bearing

Installation position: Large ID of wheel bearing facing outwards

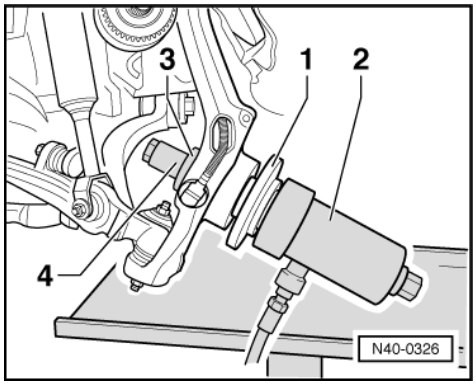
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- -> Place wheel bearing -1-, thrust pad -2- (position collar in bearing) and hollow plunger cylinder -3- with pin in position at wheel bearing housing.
- Fit thrust pad -4- with bevels facing wheel bearing housing and special nut -5- from inside.
- Press in wheel bearing by way of pump action.

1 - Wheel bearing (different versions: ø 75 mm and ø 82 mm)
2 - Thrust pad E-45 for wheel bearing (ø 75 mm) or thrust pad E-14-1 for wheel bearing (ø 82 mm)
3 - Hollow plunger cylinder HKZ-15
4 - Thrust pad E-43
5 - Special nut E-8-214 and pin

Pressing in wheel hub



- -> Place wheel hub -1- and hollow plunger cylinder -2- with pin in position at wheel bearing.
- Fit thrust pad -3- with collar facing special nut -4- from inside.
- Press in wheel hub by way of pump action.

1 - Wheel hub
2 - Hollow plunger cylinder HKZ-15
3 - Thrust pad E-5
4 - Special nut E-8-214 and pin

Perform remaining installation operations in reverse order of removal.

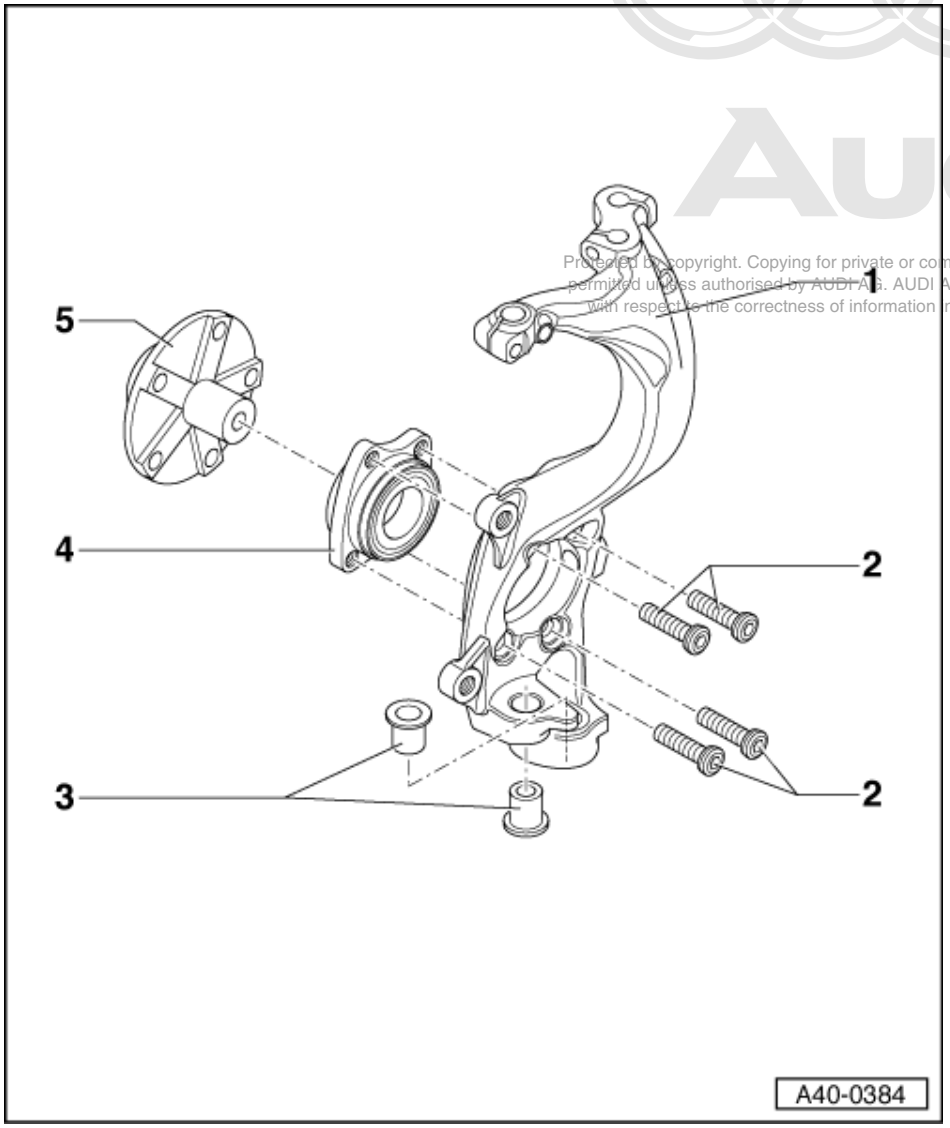
7.5 - Servicing wheel bearing housing with bolted wheel bearing

Special tools and workshop equipment required

- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 407 Press tool
- VW 412 Press tool
- VW 416 B Tubular section
- VW 511 Thrust piece
- VW 519 Tubular section
- V.A.G 1331 Torque wrench

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- V.A.G 1332 Torque wrench
- 30-100 Fitting sleeve
- Kukko 15-17 Parting tool



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1 Wheel bearing housing

- Holes must be free from grease

2 Cap screws

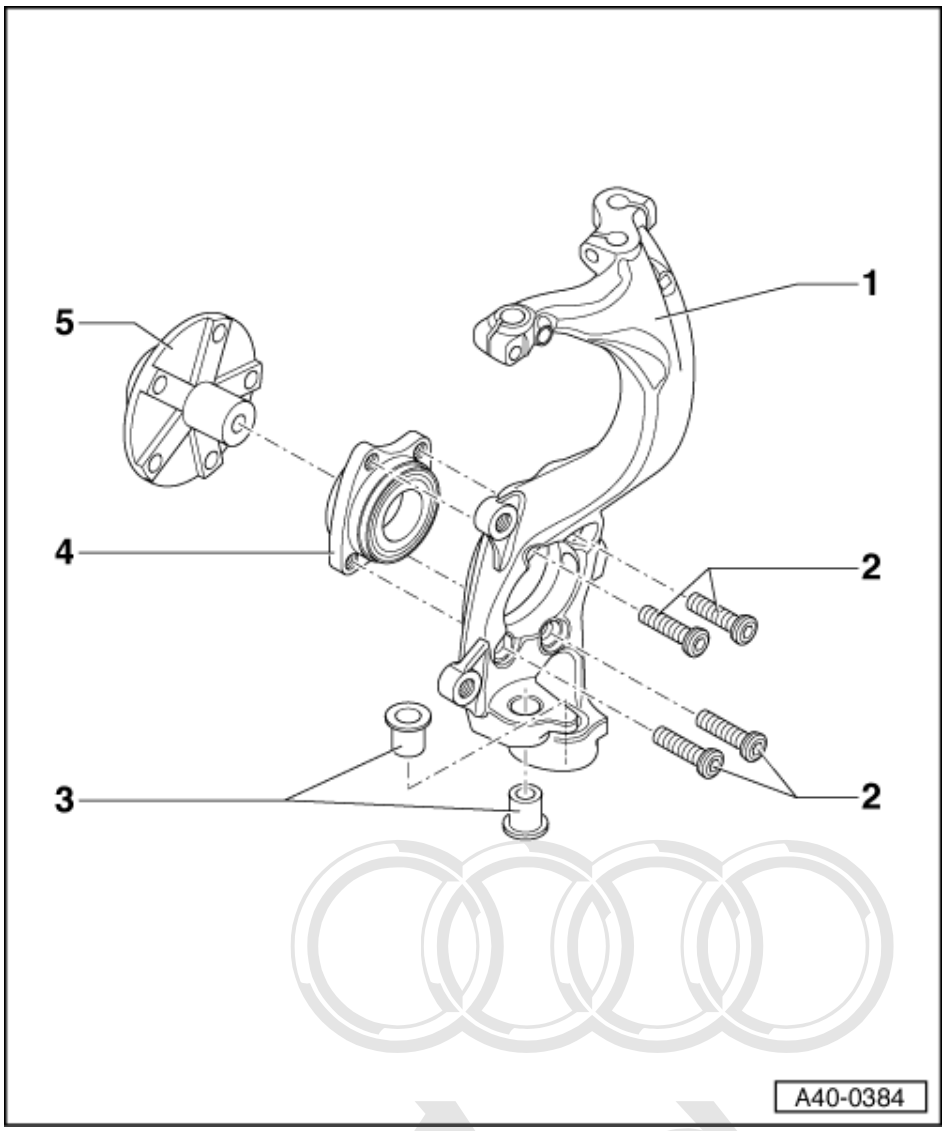
- 80 Nm + further 90° turn

3 Bushings

4 Ball bearing

- Pressing outø75 =>Fig. 1
- Pressing out ø82 =>Fig. 2
- Pressing in ø75 =>Fig. 4
- Pressing in ø82 =>Fig. 5
- Pressing off bearing inner race =>Fig. 3
- Removing and installing => Page 87
- Installation position:

- Large ID of wheel bearing faces wheel hub

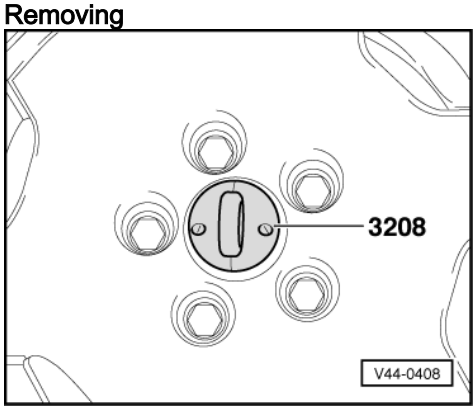


5 Wheel hub

- Pressing out =>Fig. 1 and Fig. 2
- Removing bearing inner race =>Fig. 3
- Stepped design
- Contact surface for wheel hub/brake disc and tapped holes must be free from paint and dirt

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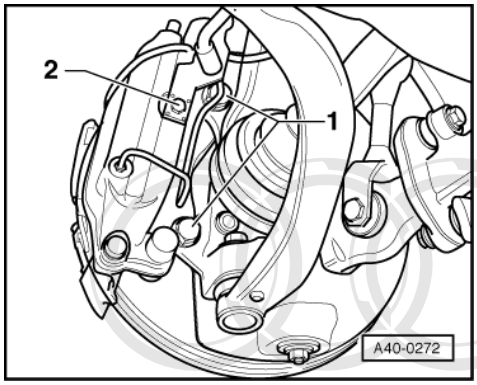
Removing



- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.

- Slacken off hexagon bolt for outer joint of drive shaft by max. 90° (vehicle must be standing on its wheels to avoid danger of accidents).
- Raise vehicle and screw out hexagon bolt for outer joint of drive shaft.
- Remove wheel.
- Secure brake disc with wheel bolt.
- Pull wire of ABS speed sensor out of holder at wheel bearing housing/brake caliper.

Vehicles with brake caliper HP-2

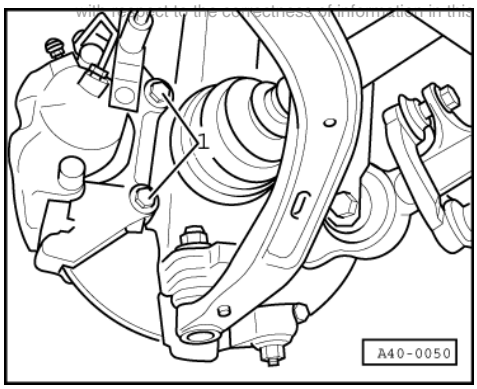


- -> Screw out hexagon bolt -2- and detach brake pipe holder.
- Unscrew bolts -1- for brake caliper and detach brake caliper.
- Re-attach brake pipe holder. Screw in and tighten hexagon bolt -2-.
- Attach brake caliper to body such that its weight cannot bend or damage brake pipe.

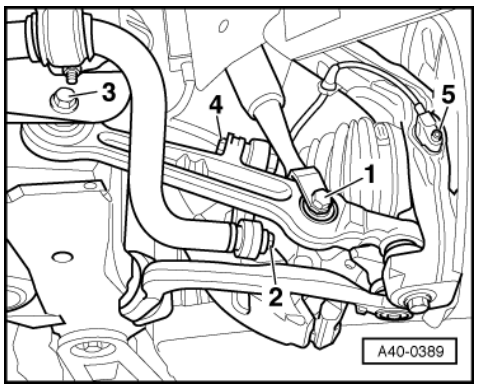
Audi

All vehicles (continued)

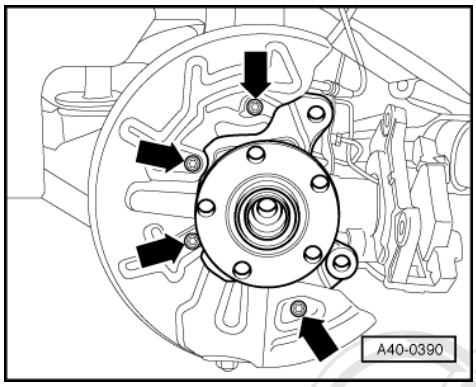
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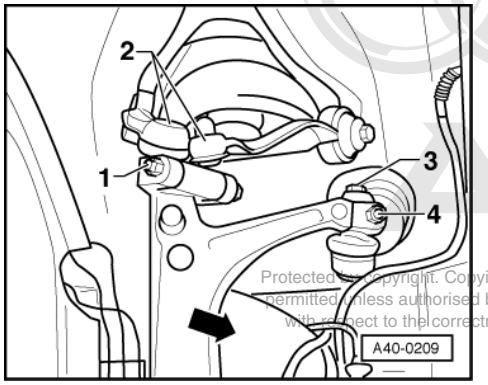
- -> Unscrew bolts -1- for brake caliper.
- Detach brake caliper and attach to body such that its weight cannot strain or damage brake hose/brake pipe.



- -> Unscrew bolt -5- for ABS speed sensor.
- Detach brake disc.



- -> Screw out bolts -arrows-.
- Detach splash plate.



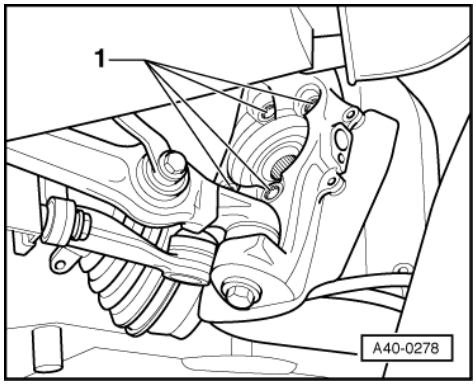
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- -> Unscrew nut -1-, take out hexagon bolt and lift out both links -2-.

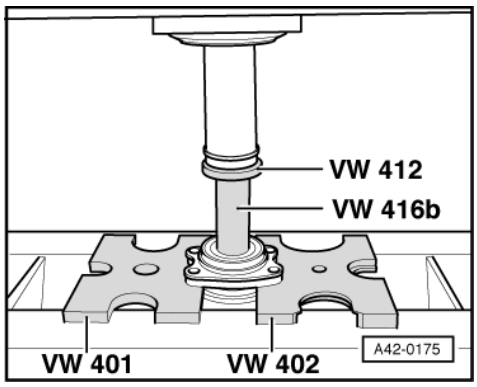
If hexagon bolt cannot be removed from wheel bearing housing, bolt and links -2- must be pressed out of wheel bearing housing => Page 98 .

Slots in wheel bearing housing are never to be widened using a chisel or the like.

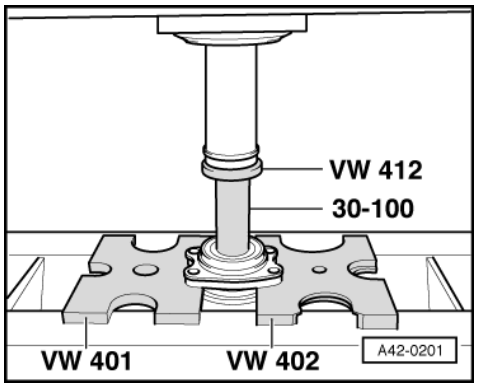
- Swivel wheel bearing housing aside in direction of arrow and in doing so pull drive shaft journal out of wheel hub.
- Use wire, for example, to attach drive shaft to body.



- -> Unscrew cap screws -1-.
- Take out wheel bearing unit.

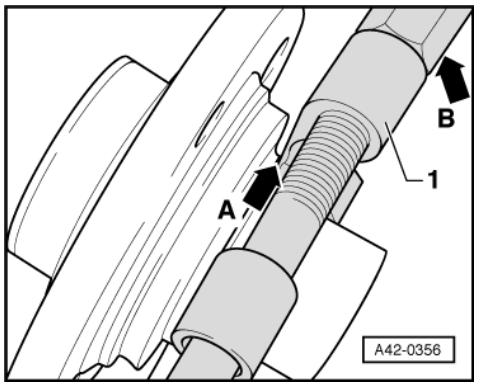


-> Fig.1 Pressing wheel hub out of wheel bearing (ø 75 mm)



-> Fig.2 Pressing wheel hub out of wheel bearing housing (ø82 mm)

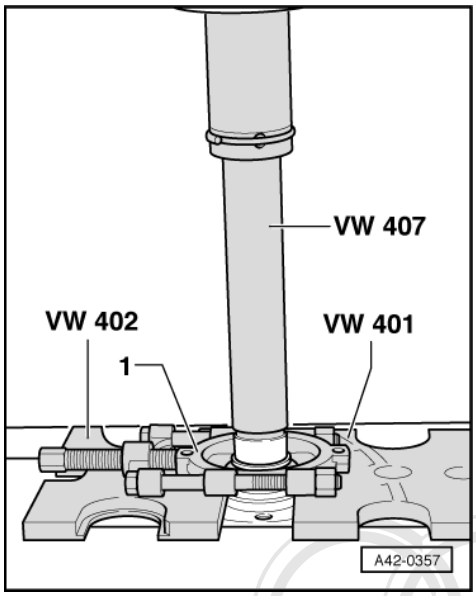
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-> Fig.3 Pressing bearing inner race off wheel hub

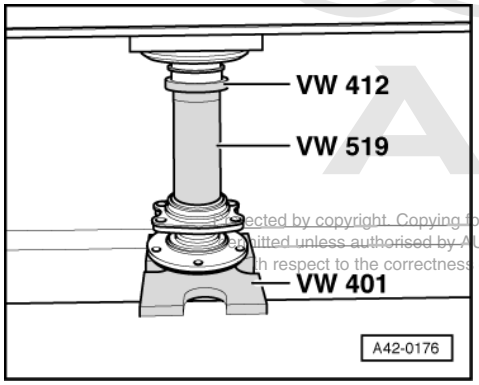
- Insert parting tool -1- in annular groove of bearing inner race -arrow A- and pre-tension with spindle -arrow B-.

1 - Parting tool, e.g. Kukko 15-17 (commercially available)



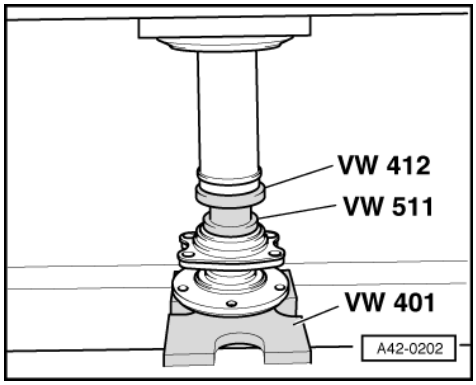
- -> Press bearing inner race off wheel hub.

  1 - Parting tool, e.g. Kukko 15-17 (commercially available)



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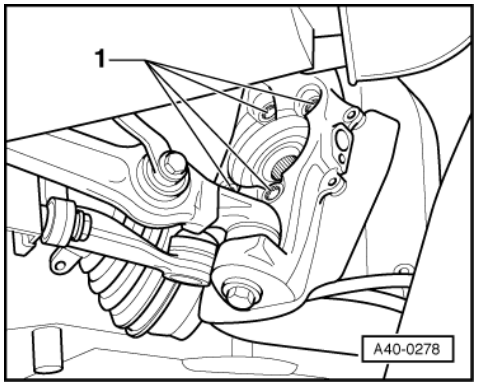
-> Fig.4 Pressing wheel hub into wheel bearing (ø 75 mm)



-> Fig.5 Pressing wheel hub into wheel bearing (ø 82 mm)

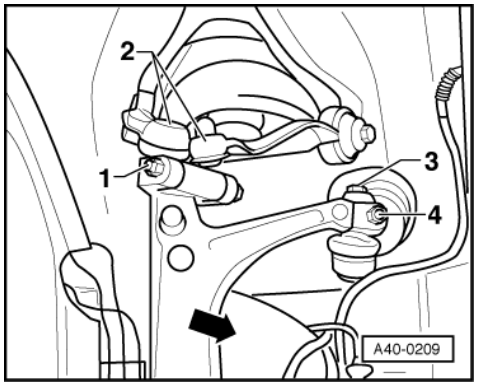
- When pressing in, thrust pad -VW 511- may only rest on bearing inner race.

Installing



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- Insert wheel bearing unit in wheel bearing housing.
- -> Screw in cap screws -1- and tighten to 80 Nm + further 90° turn.
- Slip outer joint of drive shaft into wheel hub and hand-tighten new hexagon bolt.
- Remove any remnants of adhesive on thread of joint pins.
- Insert both joint pins of upper links in wheel bearing housing.



- -> Press down upper links as far as possible whilst screwing on.
- Tighten new self-locking nuts -1- to 40 Nm.
- Fit ABS speed sensor.
- Fit brake disc and screw on brake caliper.

=> Brake System; Repair Group 46

- Screw on outer joint of drive shaft.

Note:

Vehicle must not be in contact with ground when tightening outer joint of drive shaft.

A second mechanic is required for the next operation.

- 1st mechanic: Gets into vehicle and presses foot brake
- 2nd mechanic: Tightens hexagon bolt for drive shaft

M14 hexagon bolt: 115 Nm

M16 hexagon bolt: 190 Nm

- Fit and secure wheel => Page 220 .
- Tighten hexagon bolt for drive shaft. Vehicle must be standing on its wheels when tightening to avoid danger of accidents.
  Give hexagon bolt further 180° turn.
- Perform wheel alignment => Page 227 .

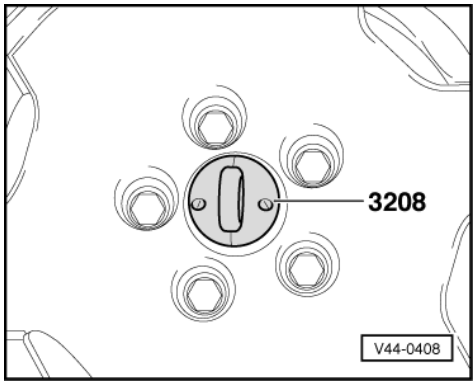
8 - Mounting bracket

8.1 - Mounting bracket

8.2 - Removing and installing mounting bracket

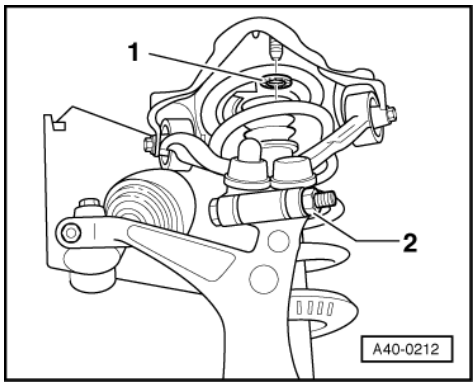
Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter



Removing

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Remove wheel.



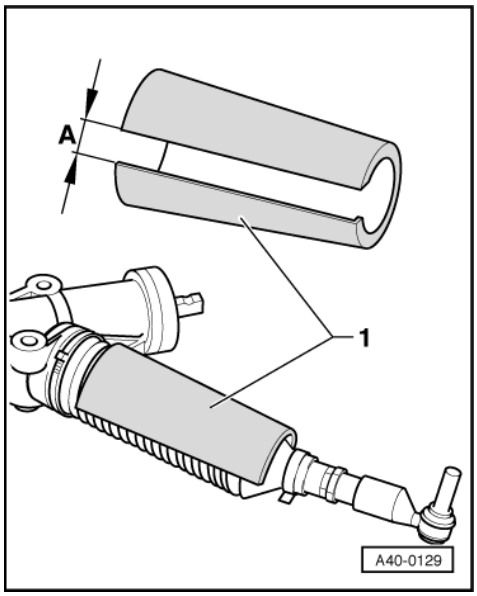
- -> Use pliers to remove clip -1-.

Clip does not have to be re-used.

- Unscrew nut -2-, take out hexagon bolt and lift out both links.

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If hexagon bolt cannot be removed from wheel bearing housing, bolt and links must be pressed out of wheel bearing housing=>Page 98 .



Slots in wheel bearing housing are never to be widened using a chisel or the like.

- -> Protect steering box bellows to prevent damage.

For ease of illustration, steering box has been removed in Fig.

Boot -1- can be ordered under part no. 893 512 137.

- Strip with dimension A = 20 . . . 25 mm has to be cut out of boot -1-.
- Carefully deburr cut surfaces.

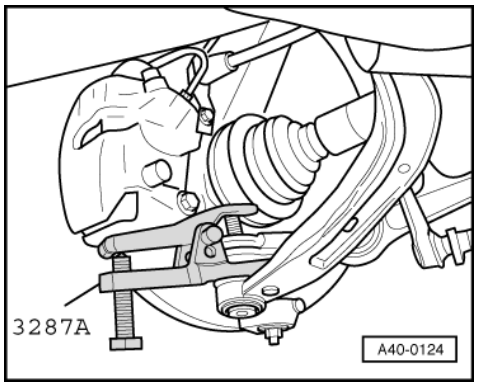
- Slide boot over bellows of steering box.

  Side with open slit should face downwards.

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Guide link must be detached from wheel bearing housing to enable suspension strut/track control link hexagon bolt to be screwed out.

If necessary, support joint pin with 4 mm Allen key.

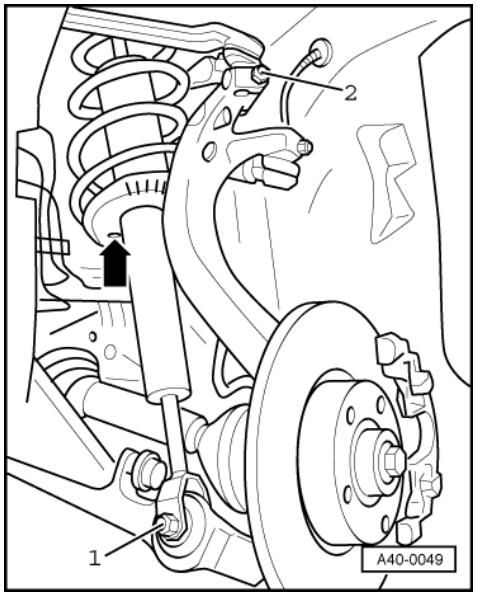


- -> Unscrew nut from joint pin of guide link and press off joint pin.

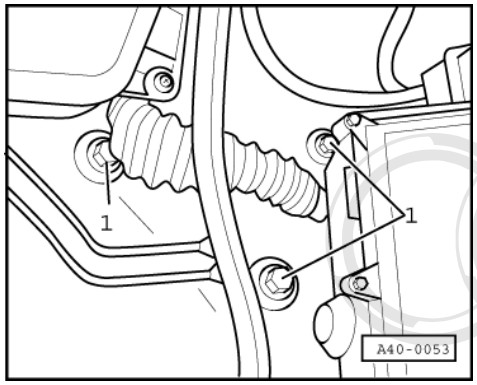
  Take care not to damage boot when doing so.

- Pull wire of ABS speed sensor out of holder at brake caliper.

To avoid damaging joints of lower links provide support, e.g. using V.A.G 1383-A (engine and gearbox lifter), to guard against excessive rebound.



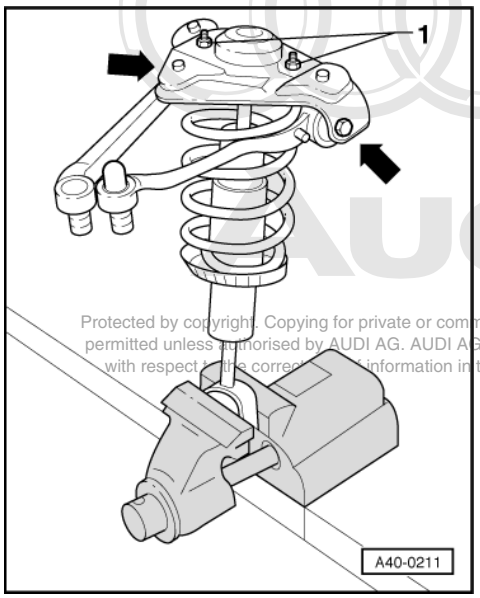
- -> Unscrew suspension strut/track control link hexagon bolt -1-.
- Swivel aside wheel bearing housing.



- -> Unscrew hexagon bolts -1- in plenum chamber.
- Take out suspension strut with mounting bracket.

  Take care not to damage boot when doing so.

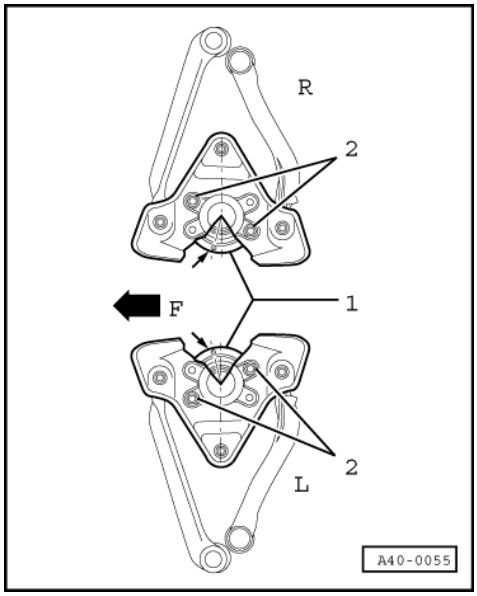
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Unscrewing upper link from mounting bracket

- -> Clamp suspension strut in vice (use soft jaws).
- Unscrew both links -arrows-.
- Unscrew nuts -1- and detach mounting bracket.



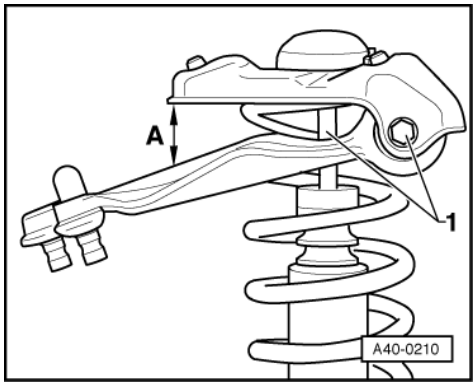
Installing

F = Direction of travel

R = Right mounting bracket

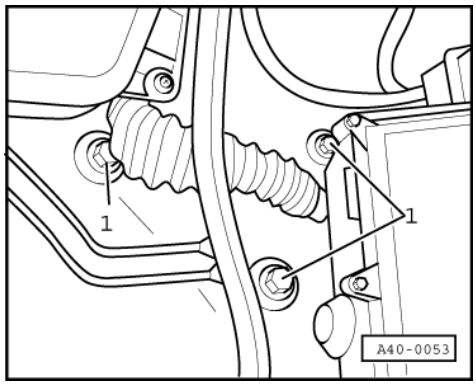
L = Left mounting bracket

- Holes in spring plate -arrows- of suspension strut -1- must face centre of vehicle.
- Tighten hexagon nuts -2- to 20 Nm.



Screwing upper link to mounting bracket

- -> Align upper link (dimension -A- = 47 ±*2 mm).
- Always replace bolts and nuts.
- Tighten hexagon bolts -1- of both links to 50 Nm and then give a further 90°turn.



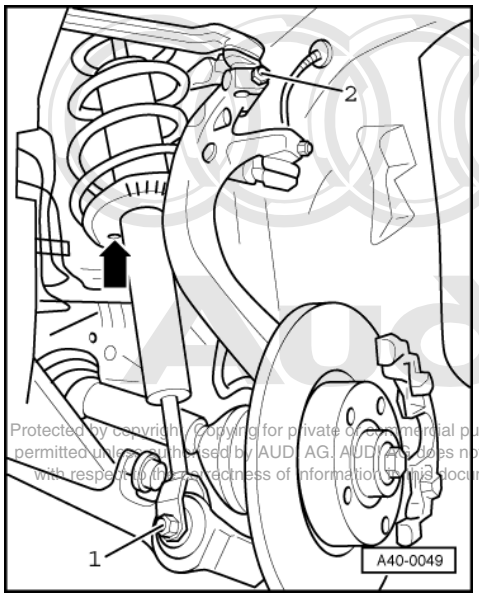
- -> Insert suspension strut with mounting bracket in suspension strut dome. Tighten hexagon bolts -1- to 75 Nm.

Note:

Make sure packing plates are properly attached.

- Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.

Note:



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Heed installation position of suspension strut/track control link bolted joint => Page 59 .

- -> Insert clevis of suspension strut in track control link and hand-tighten nut -1-.
- Remove any remnants of adhesive on thread of joint pin.
- Tighten new nut at joint pin.
  Tightening torques:
  Flange nut: 100 Nm
  Combi nut: 125 Nm
- Insert both upper links and tighten new nut -2- to 40 Nm.

- Press down upper links as far as possible whilst screwing on.
- Insert ABS wire in holder at brake caliper.
- Fit and secure wheel => Page 220 .
- Tighten suspension strut/track control link bolted joint to 90 Nm.
- Perform wheel alignment => Page 227 .

8.3 - Separating upper link connection at wheel bearing housing

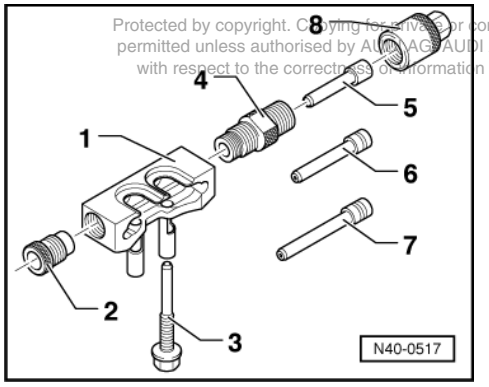
This operation is only necessary if hexagon bolt for connecting upper links to wheel bearing housing cannot be removed.

Special tools and workshop equipment required

- V.A.G 1332 Torque wrench
- VAS 6085 Pressing-out tool

Removing

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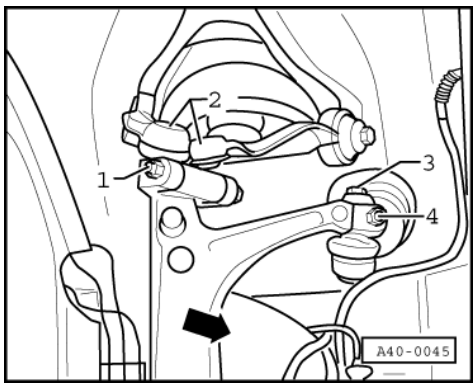
-> Pressing-out tool VAS 6085 components

1 - Basic element
2 - Adapter
3 - Thrust bolt M10 x 1.25 x 95
4 - Threaded sleeve
5 - Press tool (length 78 mm)
6 - Press tool (length 98 mm)
7 - Press tool (length 118 mm)
8 - Nut

Note:

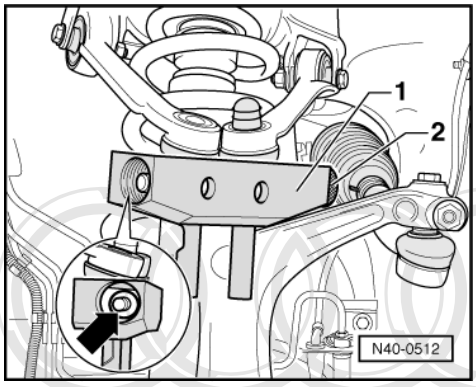
Before starting work, apply polycarbamide grease, part no. G 052 142 A2 to thrust bolt, press tools and nut.

- Remove wheel.
- Pull wire of ABS speed sensor out of holder at brake caliper.



- -> Unscrew nut -1-.

Bolts -3- and -4- are never to be slackened off.



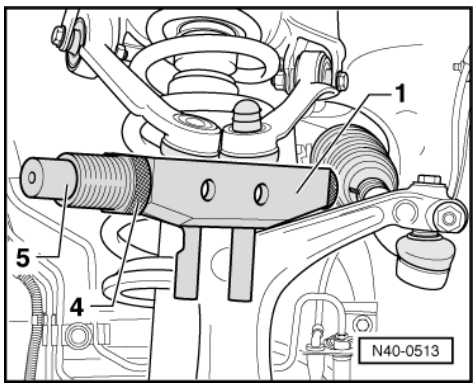
- -> Position basic element -1- on wheel bearing housing. In doing so, recesses engage beneath joints of links.

Note:

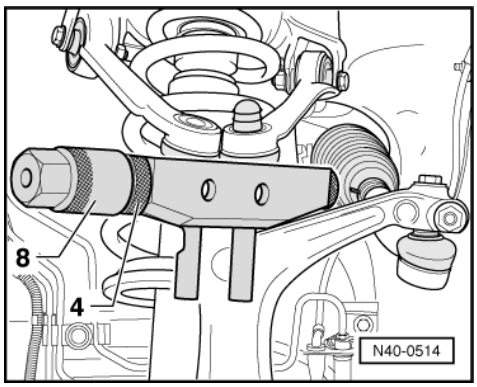
On inserting basic element, pay attention to bellows of links so as to avoid damage.

- Basic element -1- must be inserted such that end of bolt -arrow- is centred in hole in basic element.
- Screw home adapter -2- in basic element -1- to lock basic element.

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- -> Screw home threaded sleeve -4- in basic element -1-.
- Insert press tool -5- in threaded sleeve -4-.

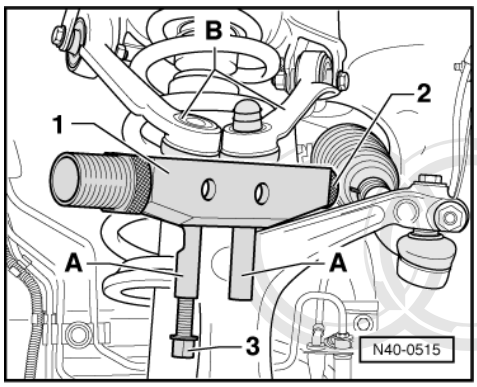


- -> Screw nut -8- onto threaded sleeve -4- and turn as far as it will go, thus pressing out bolt.

Note:

Use can be made of a wrench or an impact screwdriver to turn nut -8-.

- Unscrew nut -8- from threaded sleeve -4-, take out press tool -5- and insert press tool -6- in threaded sleeve -4-.
- Repeat pressing process.
- If bolt can still not be taken out by hand, repeat pressing process with press tool -7-.



- Unscrew nut -8- from threaded sleeve -4-. Take out press tool and bolt.
- -> Screw thrust bolt -3- into one of the guides -A- in each case and press links -B- out of wheel bearing housing.
- Screw thrust bolt -3- out of guide -A- and release adapter -2-.
- Detach basic element -1- from wheel bearing housing.

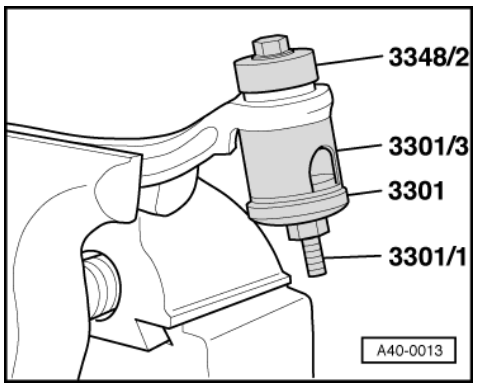
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8.4 - Replacing front and rear upper link bush

Special tools and workshop equipment required

- 3301 Assembly device
- 3301/1 from assembly device
- 3301/3 from assembly device
- 3348/2 from assembly device
- 3348/3 from assembly device

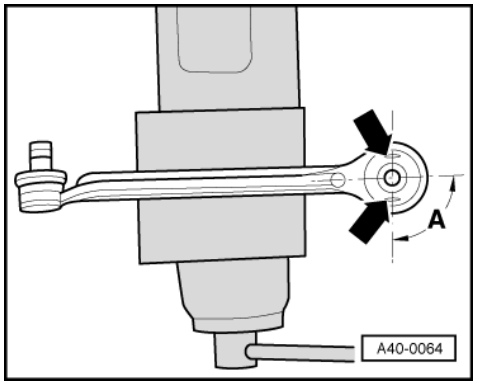
Replacement of upper links or bushes involves removing mounting bracket => Page 93 .



Note:

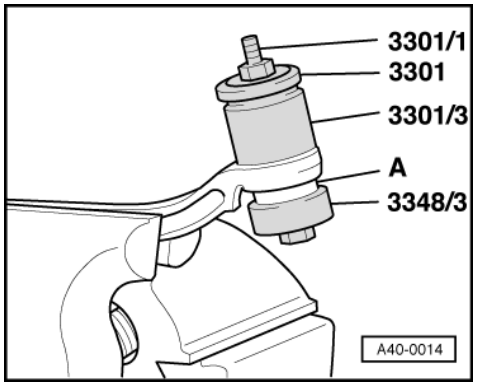
- Use soft jaws for clamping aluminium links.

-> Extracting bush



-> Installation position of bush

A =90° ±5°



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-> Fitting bush

9 - Subframe

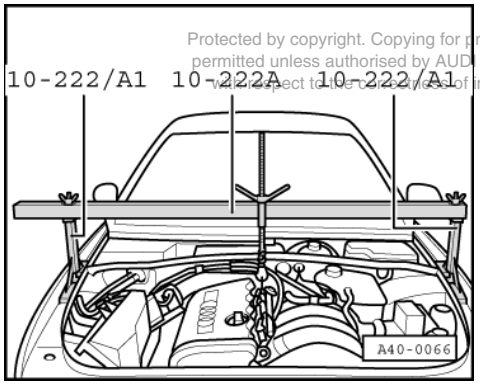
9.1 - Subframe

9.2 - Removing and installing subframe

Special tools and workshop equipment required

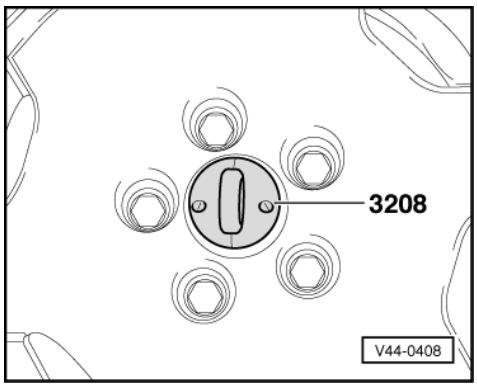
- 10-222 A Support bar
- 10-222 A/1 Frame
- 3393 Test bars
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter

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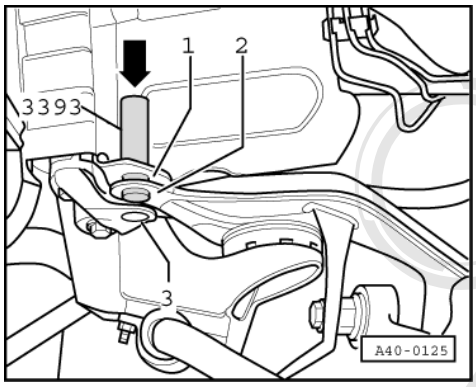


Removing

- -> Support engine with support bar.



- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Remove wheels.
- Remove noise insulation.

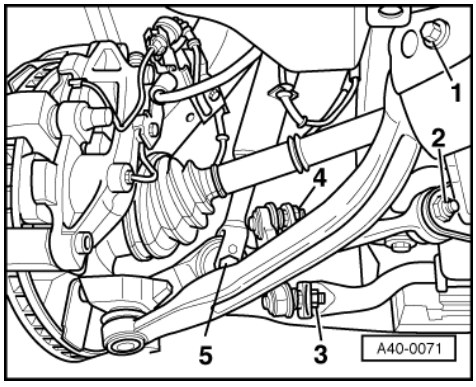


- -> Before unfastening subframe, use test bar 3393 to check whether holes -1- and -2- coincide.

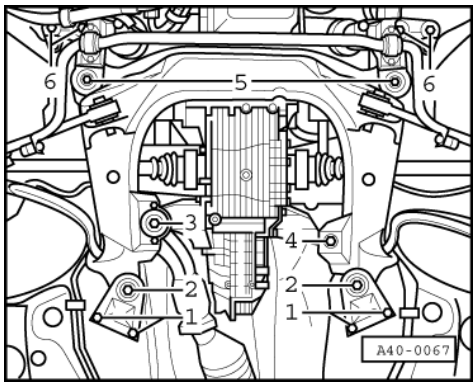
If this is not the case, wheel alignment must be performed after installing subframe.

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To avoid damaging joints of lower links provide support, e.g. using V.A.G 1383-A (engine and gearbox lifter), to guard against excessive rebound.



- -> Unscrew hexagon nuts -3-.
- Slacken off hexagon bolt -1- for attaching guide link to subframe.



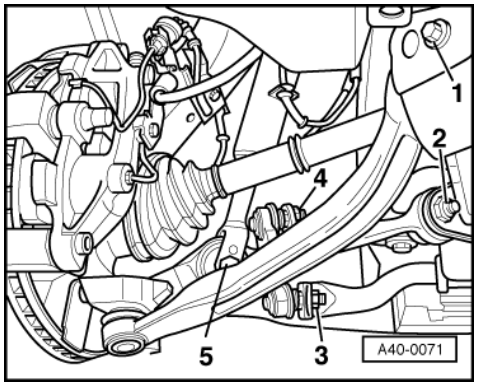
- -> Screw out hexagon bolts -1-.
- Slacken off hexagon bolts -2- and lower subframe at rear.

Note:

To excessive bending of pin-end joints of track control and guide links, they are to be attached to body with wire or the like.

- Pull out hexagon bolts of guide links.

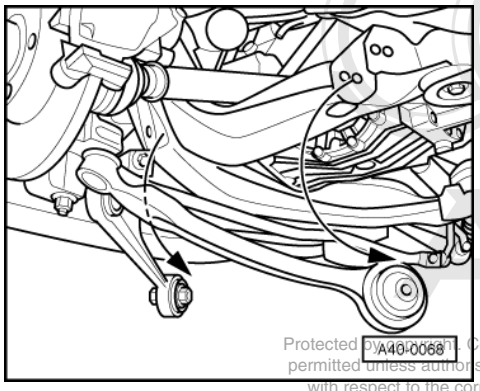
- Pull guide link out of subframe.



- -> Screw out hexagon bolt -5-.

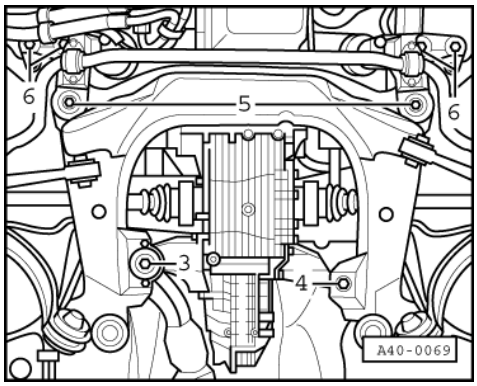
For vehicles with headlight range control, refer to =>Page 27 .

- Unfasten hexagon nut -2- for attaching track control link to subframe and take out hexagon bolt.
- Pull wire of ABS speed sensor out of holder at brake caliper.



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- -> Pull track control link out of subframe.

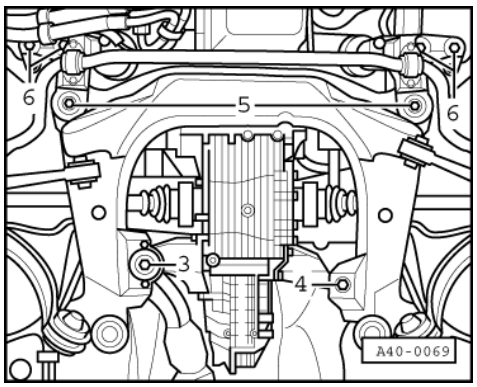


- -> Unscrew hexagon nuts -3- and -4-.
- Unscrew hexagon bolts -5-.
- Slacken off hexagon bolts -6- until subframe can be taken out.

Installing

Note:

Always replace bolts and nuts.

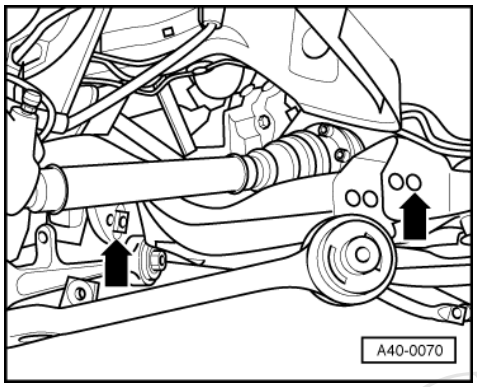


- -> Insert subframe and fit hexagon bolts -5- and -6-.

Note:

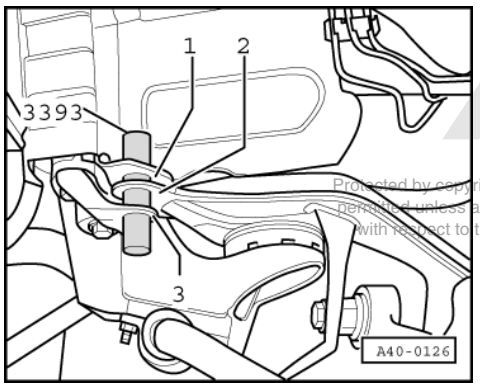
Heed installation position of suspension strut/track control link bolted joint => Page 59 .

- Fit hexagon bolt for suspension strut at track control link.



- -> Insert track control and guide links in subframe.
- Insert bolts in inner holes -arrows-.
- On vehicles with headlight range control, fit connecting link of vehicle level sender at track control link => Page 27 .

Before tightening, subframe must be located with respect to body using test bar 3393.



- -> Hole -1-, hole -2- of subframe and hole -3- of aluminium bracket must be aligned on both sides.

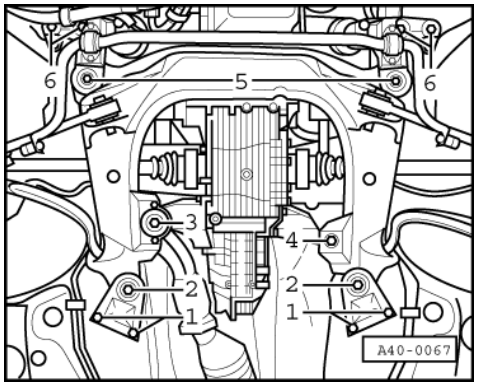
Note:

This locating procedureprovides a substitute for subsequent wheel alignment:

- If only subframe has been removed/installed.

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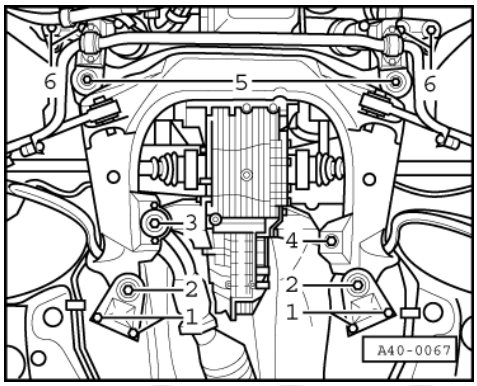
- If holes -1- and -2- coincided prior to repair work.



- -> Fit hexagon bolts -1- and -2-.
- Fit hexagon nuts -3- and -4-.
- Protect hole in body for test bar 3393 against corrosion.

Tightening sequence/tightening torques

Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.



- -> Tighten hexagon bolts -2- and -5- to 110 Nm and give further 90° turn.
- Tighten hexagon bolts -6- to 75 Nm.
- Tighten hexagon bolts -1-.
  Tightening torques:
  Non-ribbed hexagon bolt: 30 Nm
  Ribbed hexagon bolt: 75 Nm
- Tighten hexagon nuts -3- and -4- to 40 Nm.
- Tighten hexagon nuts for track control link to 80 Nm and give further 90° turn.
- Tighten hexagon nuts for guide link to 90 Nm and give further 90° turn.

Pay attention to modified connecting links and tightening torques
=>Page 26 .

- Attach connecting link to anti-roll bar with new ribbed nuts (100 Nm).
- Attach suspension strut to track control link (90 Nm).
- Insert wire of ABS speed sensor in holder at brake caliper.
- Fit and secure wheels => Page 220.

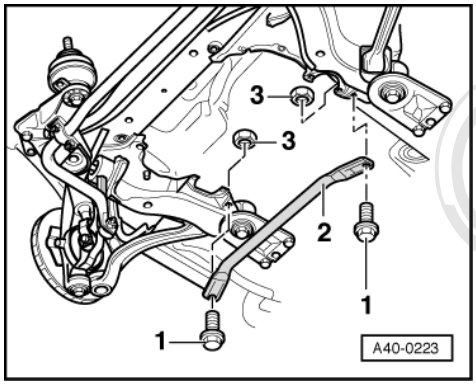
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Notes:

- Wheel alignment is not necessary if subframe was located with respect to body using test bar 3393 prior to removal and assembly (before tightening bolts).
- Wheel alignment must be performed if locating procedure was not employed.

- Perform wheel alignment => Page 227 .

9.3 - Removing and installing lower cross-piece



Various subframes were fitted with a cross-piece as of Model Year `98.

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=> Parts List

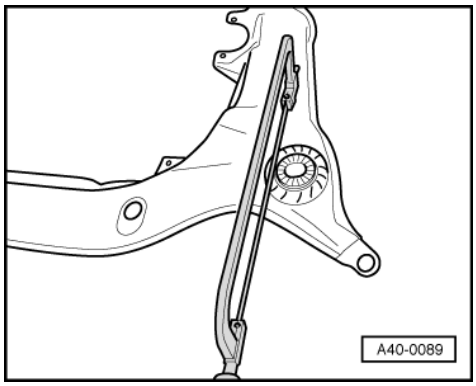
- Tighten hexagon bolts -1- (M10 x 22) to 40 Nm and give further 90° turn.
- Cross-piece - 2 -
- Hexagon nut - 3 -

9.4 - Replacing subframe mounting

Special tools and workshop equipment required

- 3291 Assembly device
- 3351/1 From puller
- 3351/4 From puller
- 3372 Pressing-out tool
- 3372/1 From pressing-out tool
- 3372/2 From pressing-out tool
- 30-205 Thrust plate

Replacement of subframe mountings involves removing subframe
=> Page 102 .

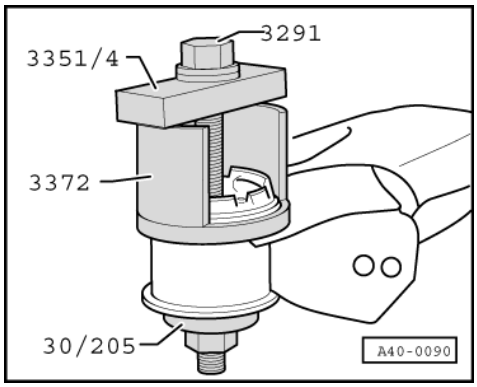


-> Extracting bonded rubber bush

- Saw off/cut off rubber bead at subframe mounting as far as outer mounting bracket.

Note:

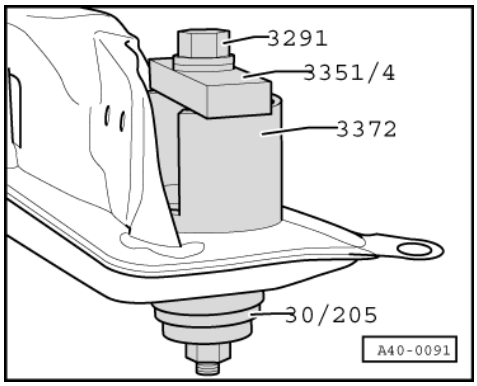
In the event of damage to paint surface at subframe, surface must be protected against corrosion.



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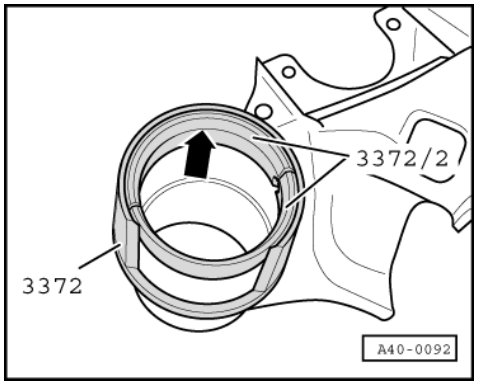
-> Extracting rear bonded rubber bush

Make sure pressing-out tool -3372- is properly positioned and that it cannot tilt.



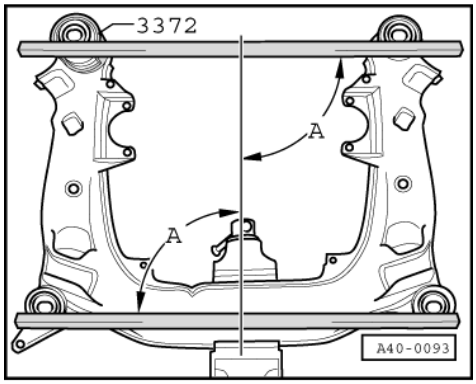
-> Extracting bonded rubber bush

All bonded rubber bushes at subframe are extracted using the same special tool.



-> Preparation for fitting subframe mounting

- Fit pressing-out tool -3372- and insert shell halves -3372/2-.

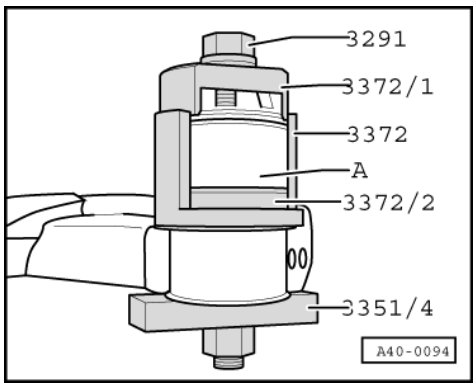


-> Aligning bonded rubber bush

Bonded rubber bushes are to be aligned using a long square tube or rule.

A = 90° ± 5°

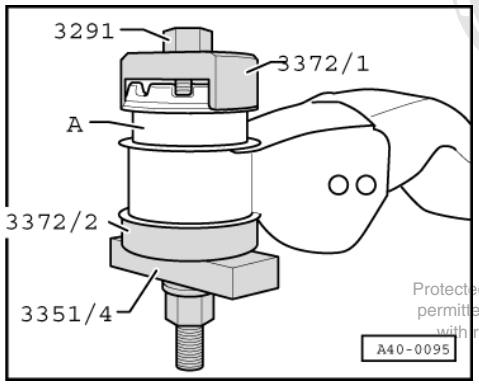
Always use soft jaws when clamping subframe in vice.



-> Fitting rear bonded rubber bush

Use assembly lubricant G 294 421 A1 when pressing in bonded rubber bushes.

- Pull in bush -A- until thrust pad -3372/1- is flush with upper edge of pressing-out tool -3372-.
- Lift off pressing-out tool -3372- and shell halves -3372/2-.

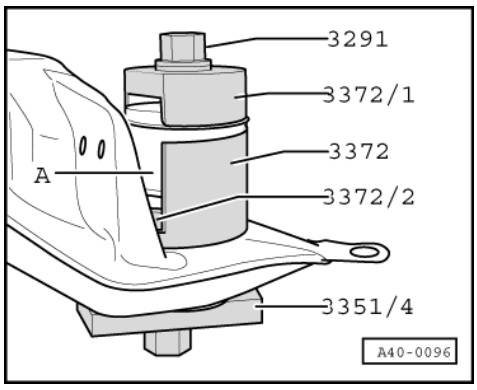


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-> Fitting rear bonded rubber bush

- Insert shell halves -3372/2- between bridge -3351/4- and subframe.
- Press home bush.

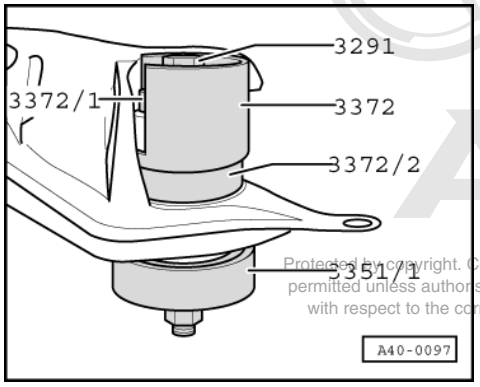
In the event of damage to paint surface at subframe, surface must be protected against corrosion.



-> Fitting front bonded rubber bush

Use assembly lubricant G 294 421 A1 when pressing in bonded rubber bushes.

- Insert shell halves -3372/2- in tube -3372-.
- Pull in bush -A- until thrust pad -3372/1- is flush with upper edge of pressing-out tool -3372-.



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-> Fitting front bonded rubber bush

- Lift pressing-out tool -3372- and take out shell halves -3372/2-.
- Replace bridge -3351/4- with thrust pad -3351/1 and then pull in bush as far as it will go.

In the event of damage to paint surface at subframe, surface must be protected against corrosion.

10 - Track control link

10.1 - Track control link

10.2 - Removing and installing track control link

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter

Different track control link versions for wheel bearing housing with and without bushings

Wheel bearing housings with bushings are being introduced as of Model Year 2002 to provide optimum sealing of lower link bushes (track control link and guide link).

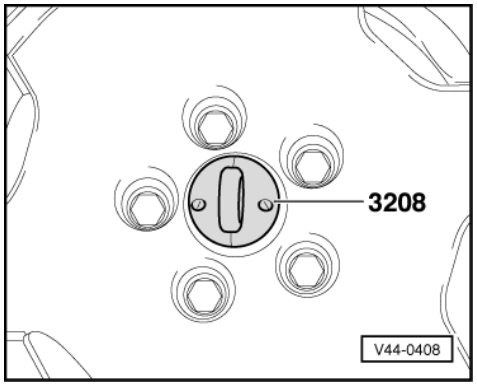
This also involves modifications to track control link and fastening elements for track control and guide links.

- Assignment => Parts List

- Old track control link
- New track control link

- When installing wheel bearing housings with no bushings, old type of track control link and flange nuts for track control and guide links are to be fitted.
- When installing wheel bearing housings with bushings, new type of track control link and combi nuts for track control and guide links are to be fitted.
- If only track control link is renewed, replace old type track control link with old type and new type with new type.
- The following fastening elements are to be used for track control and guide links:

- Old type of track control link => Flange nut
- New type of track control link => Combi nut



Removing

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Remove wheel.

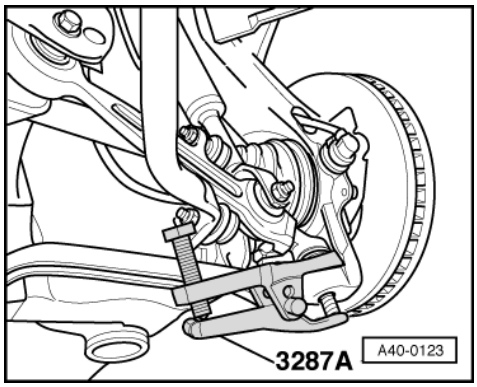
Notes:

- Insert leather cloth to prevent boot damage.

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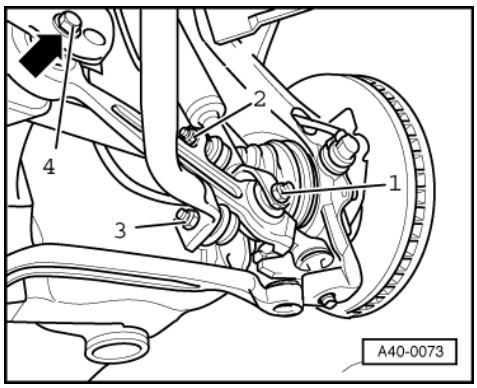
- If applicable, pay attention to headlight range control =>Page 27 .

- Unfasten clip for connecting link of front left vehicle level sender -G78- and detach from track control link =>Page 27 .



- -> Unscrew nut from joint pin of track control link and then press joint pin off taper seat.

  Take care not to damage boot when doing so.

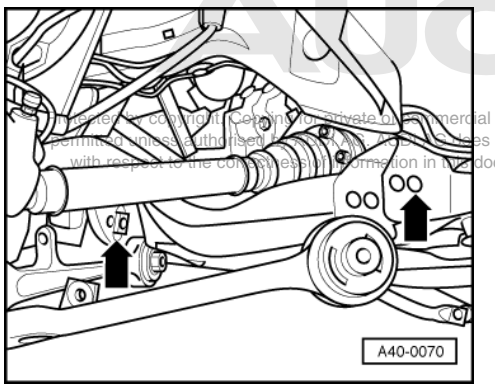


- -> Unscrew hexagon bolt -1-.
- Unscrew ribbed nuts -2- and -3- and take out connecting link.

To avoid damaging joints of upper links provide support, e.g. using V.A.G 1383-A (engine and gearbox lifter), to guard against excessive rebound.

- Unscrew hexagon bolt -4-.
- Take out track control link.

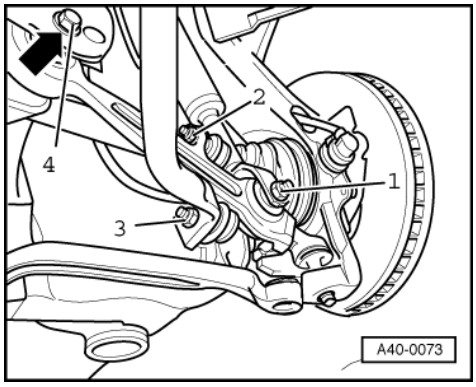
Installing



Audi
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Notes:

- Always replace bolts and nuts.
- -> Only use inner holes -arrow-.
- Remove any remnants of adhesive on thread of joint pin.
- Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.



- -> Insert new hexagon bolt -4- and new hexagon nut and tighten to 80 Nm + 90° further turn.
- Insert old or new type track control link.
- Screw new self-locking nuts to joint pins (guide link/track control link) and tighten.
  Tightening torques:
  Flange nut: 100 Nm
  Combi nut: 125 Nm

Note:

Heed installation position of suspension strut/track control link bolted joint => Page 59 .

- Hand-tighten hexagon nut -1-.
- Fit clip for connecting link of front left vehicle level sender -G78 at track control link =>Page 27 .

Pay attention to modified connecting links and tightening torques =>Page 26 .

Arrow on connecting link points in direction of travel.

- Tighten nut -2- to 40 Nm and give a further 90° turn.
- Tighten nut -3- to 100 Nm.

- Fit and secure wheel => Page 220 .
- Tighten suspension strut/track control link bolted joint to 90 Nm.

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10.3 - Replacing track control link bush

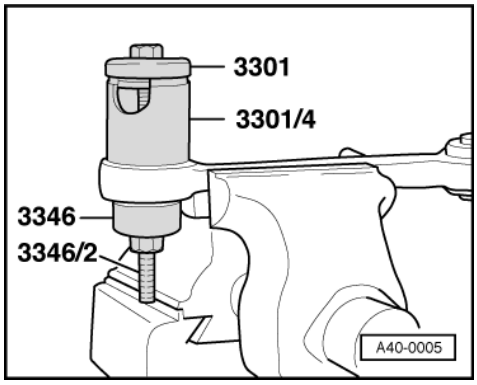
Special tools and workshop equipment required

- 3301 Assembly device
- 3301/4 from assembly device
- 3346 Assembly device
- 3346/2 from assembly device
- 3346/3 from assembly device
- 3350/1 from assembly device

Replacement of track control link bushes involves removing track control link => Page 111 .

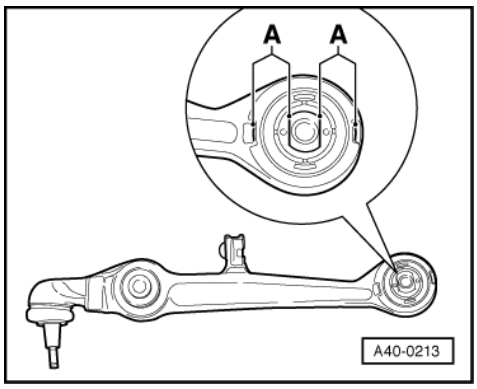
Note:

- Use soft jaws for clamping aluminium links.



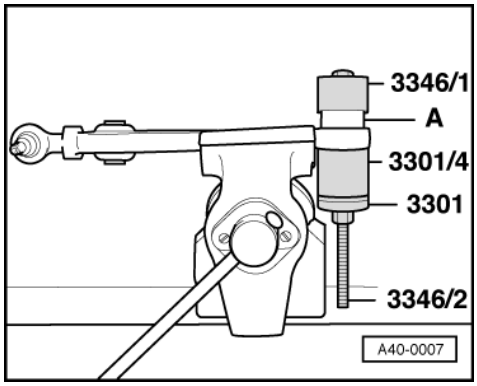
-> Fig.1 Extracting inner bush

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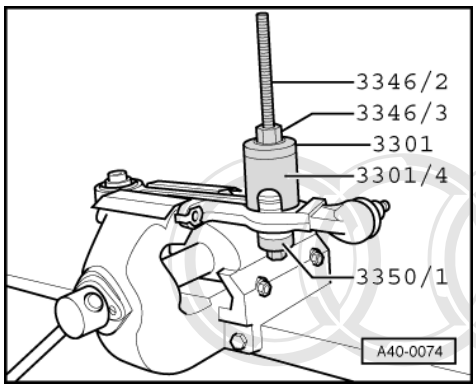
-> Fig.2 Installation position of bush

- Assembly marks on track control link and edge of bush run in parallel.

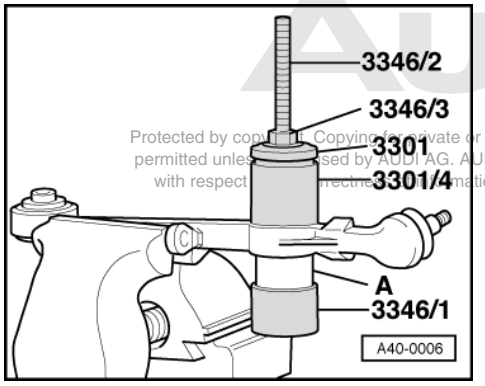


-> Fig.3 Fitting inner bush

- Insert bush -A- in thrust pad -3346/1- in 3.2 mm recess.
- Press home bush.



-> Fig.4 Extracting outer bush



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-> Fig.5 Fitting outer bush

- Insert bush -A- in thrust pad -3346/1- in 8 mm recess.
- Press home bush.

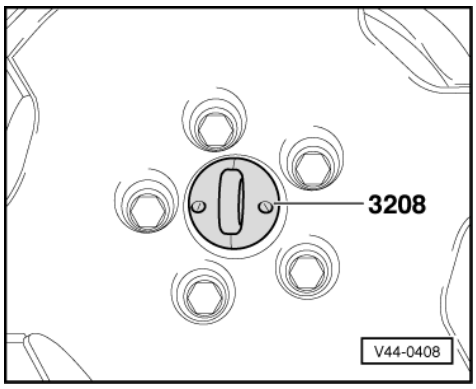
11 - Guide link

11.1 - Guide link

11.2 - Removing and installing guide link

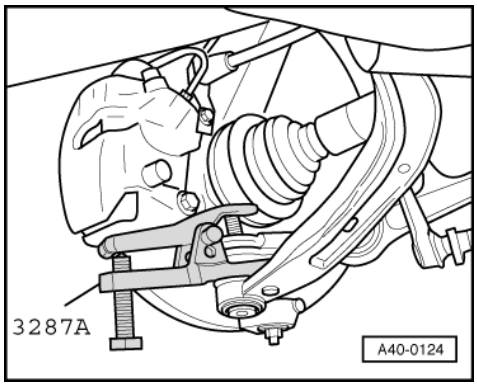
Special tools and workshop equipment required

- V.A.G 1332 Torque wrench
- 3287A Ball joint puller

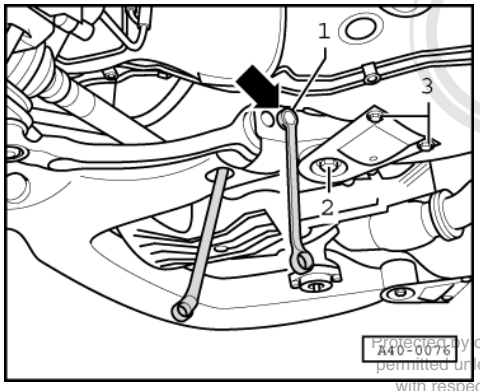


Removing

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.



- Remove wheel.
- -> Unscrew nut from joint pin of guide link and press off joint pin.



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- -> Slacken off hexagon bolt -1-.

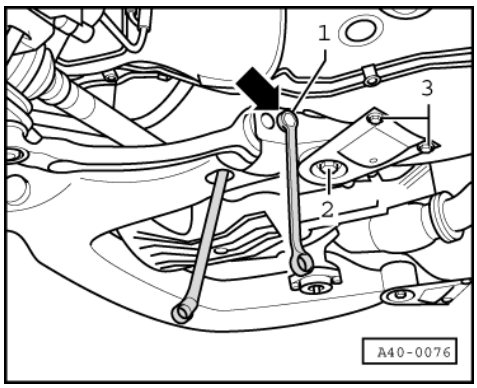
  Take care not to damage surface of brake pipes and underseal.

- Removal of hexagon bolt -1- involves lowering subframe at rear.
- To do so, unscrew hexagon bolts -3- of support plates and subframe bolts -2-.
- Take out guide link.

Installing

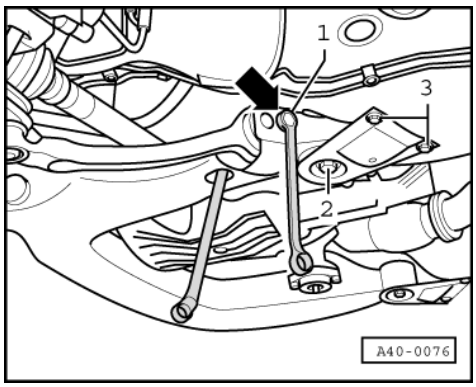
Notes:

- Always replace bolts and nuts.
- Bonded rubber bushes can only be turned to a limited extent. The bolted joints at the suspension links are therefore not to be tightened until the vehicle is standing on the ground.
- Remove any remnants of adhesive on thread of joint pin.



- -> Only use inner holes -arrow-.
- Press guide link inwards whilst tightening.

- Screw on new self-locking nuts at joint pins and tighten.
  Tightening torques:
  Flange nut: 100 Nm
  Combi nut: 125 Nm
- Insert new hexagon bolt -1- and new hexagon nut, tighten to 90 Nm and give further 90° turn.
- Tighten hexagon bolts -3-.
  Tightening torques:
  Non-ribbed hexagon bolt: 30 Nm
  Ribbed hexagon bolt: 75 Nm



- -> Insert new bolts for subframe -2-, tighten to 110 Nm and give further 90° turn.
- Fit and secure wheel => Page 220 .

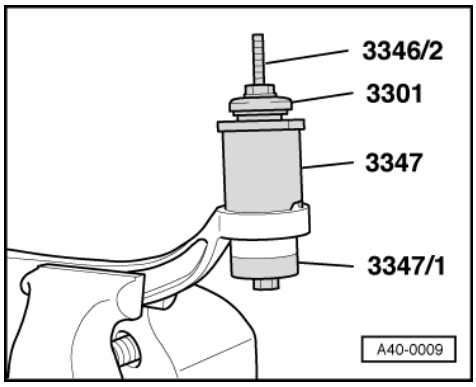
11.3 - Replacing guide link bush

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Special tools and workshop equipment required

- 3301 Assembly device
- 3346 Assembly device
- 3346/2 from assembly device
- 3346/3 from assembly device
- 3347 Assembly device
- 3347/1 from assembly device
- 3347/2 from assembly device

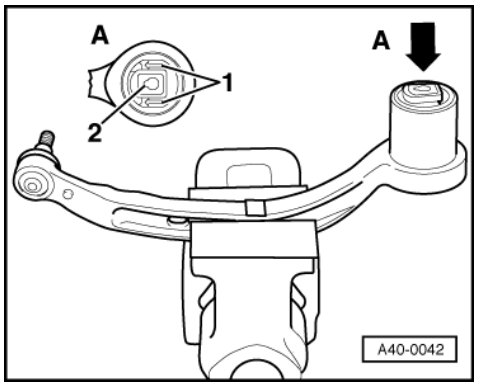
Replacement of guide link bush involves removing guide link
=> Page 115 .



-> Extracting hydro-bush at link

Note:

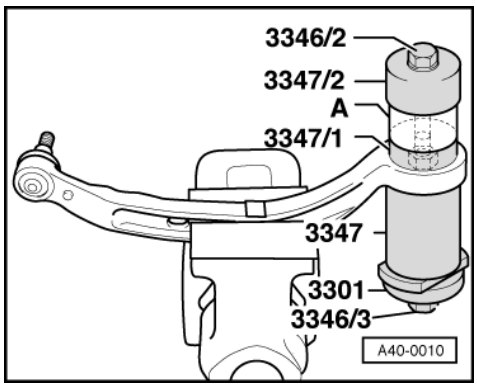
- Use soft jaws for clamping aluminium links.



-> Installation position of hydro-bush

Arrows -1- on hydro-bush/ groove -2- point(s) in direction of joint pin.

Permissible deviation ± 5°



-> Fitting hydro-bush

- Insert hydro-bush -A- in thrust piece -3347/2-.
- Clamp together with sleeve -3347/1-, spindle -3346/2- and hexagon nut.
- Pull in hydro-bush -A- as far as it will go.

12 - Removing and installing anti-roll bar

12.1 - Removing and installing anti-roll bar

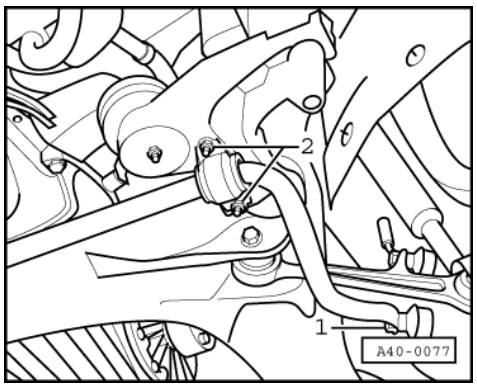
Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

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Removing

- Remove noise insulation.

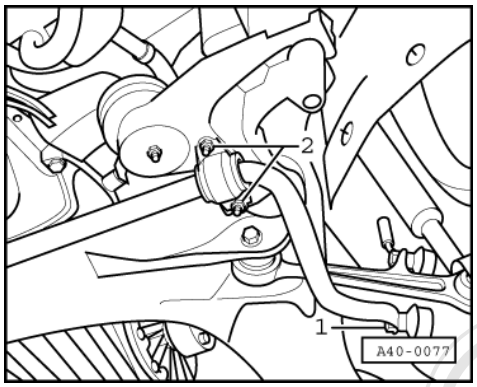


- -> Unfasten nut -1-.
- Take connecting link out of anti-roll bar.
- Unscrew hexagon nuts -2- and detach anti-roll bar.

Installing

Notes:

- Anti-roll bar and mount must be free from grease.
- Arrow on connecting link points in direction of travel.
- If anti-roll bar is replaced, pay attention to running gear version.



-> Tightening torques:

Pay attention to modified connecting links and tightening torques
=>Page 26 .

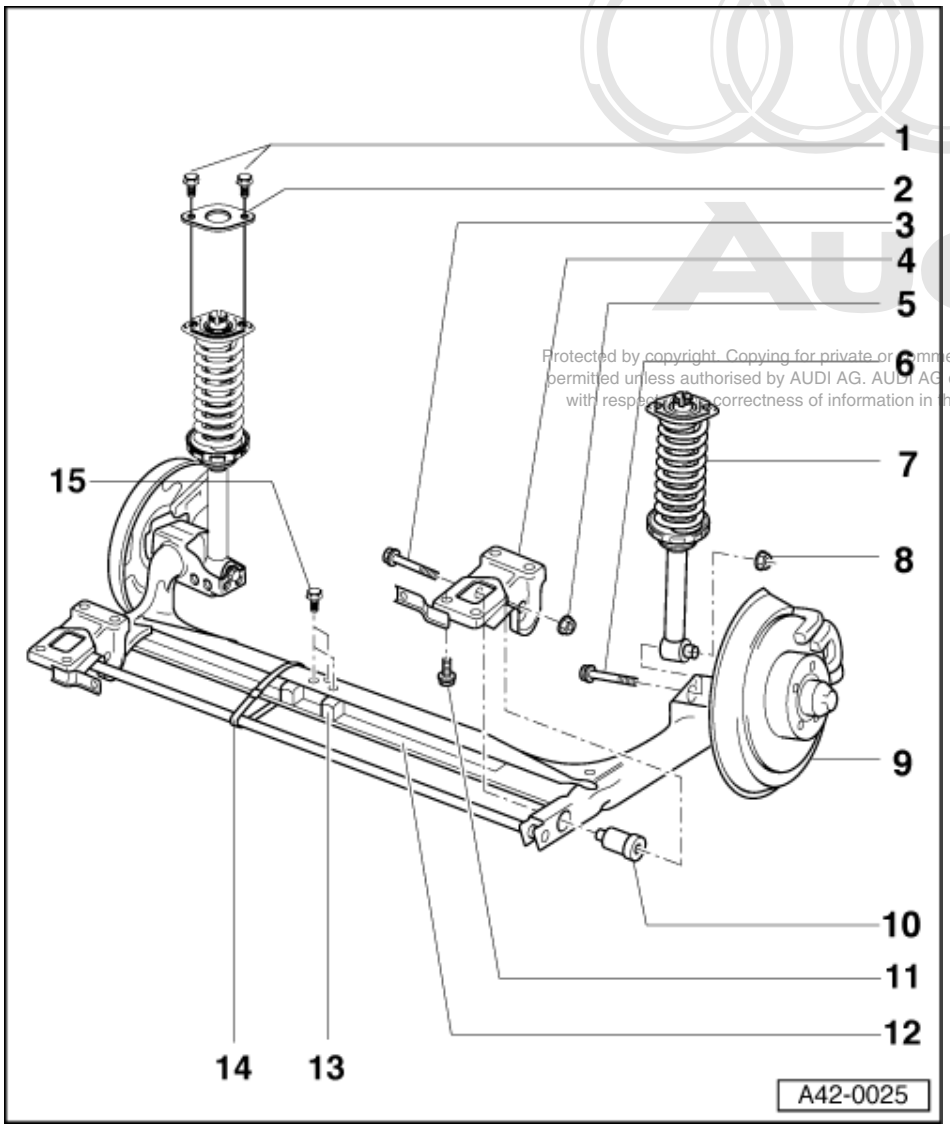
- Attach connecting link to anti-roll bar -1- (tightening torque 100 Nm).
  Always use new ribbed nut.
- Tighten hexagon nuts -2- to 25 Nm.
  Always replace.
- Install noise insulation.

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42 - Rear suspension

1 - Servicing rear axle

1.1 - Servicing rear axle



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1.2 - Servicing rear axle (front-wheel drive vehicles)

1.3 - Layout of rear axle components (front-wheel drive vehicles)

Note:

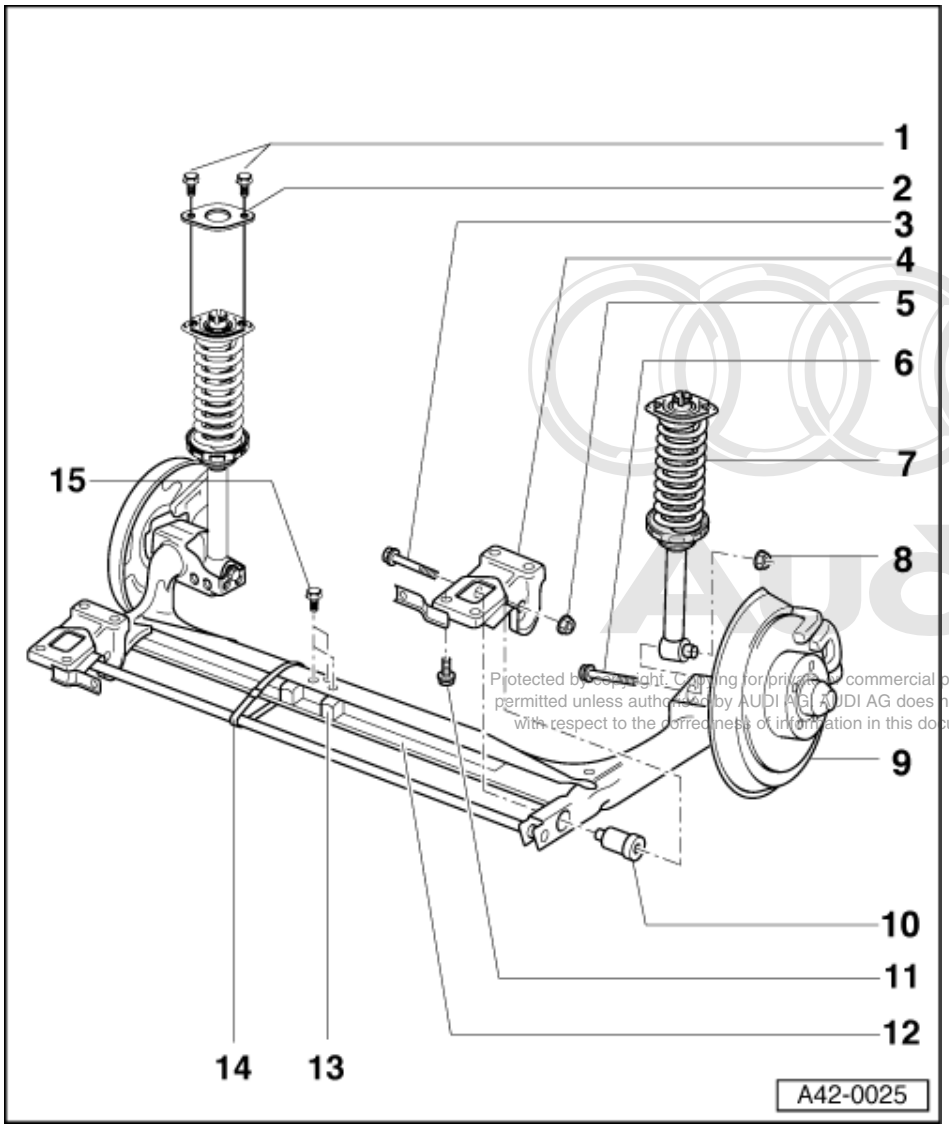
Axle beam is not to be welded and straightened.

- Always replace self-locking nuts.
- Bolted joints are only to be hand-tightened with power tools.

1 Hexagon bolt, 25 Nm

2 Gasket

- Always replace



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3 Hexagon bolt

- Always replace

4 Mounting bracket

- Not to be unfastened for rear axle removal
- Take particular care when fitting bolts

Note:

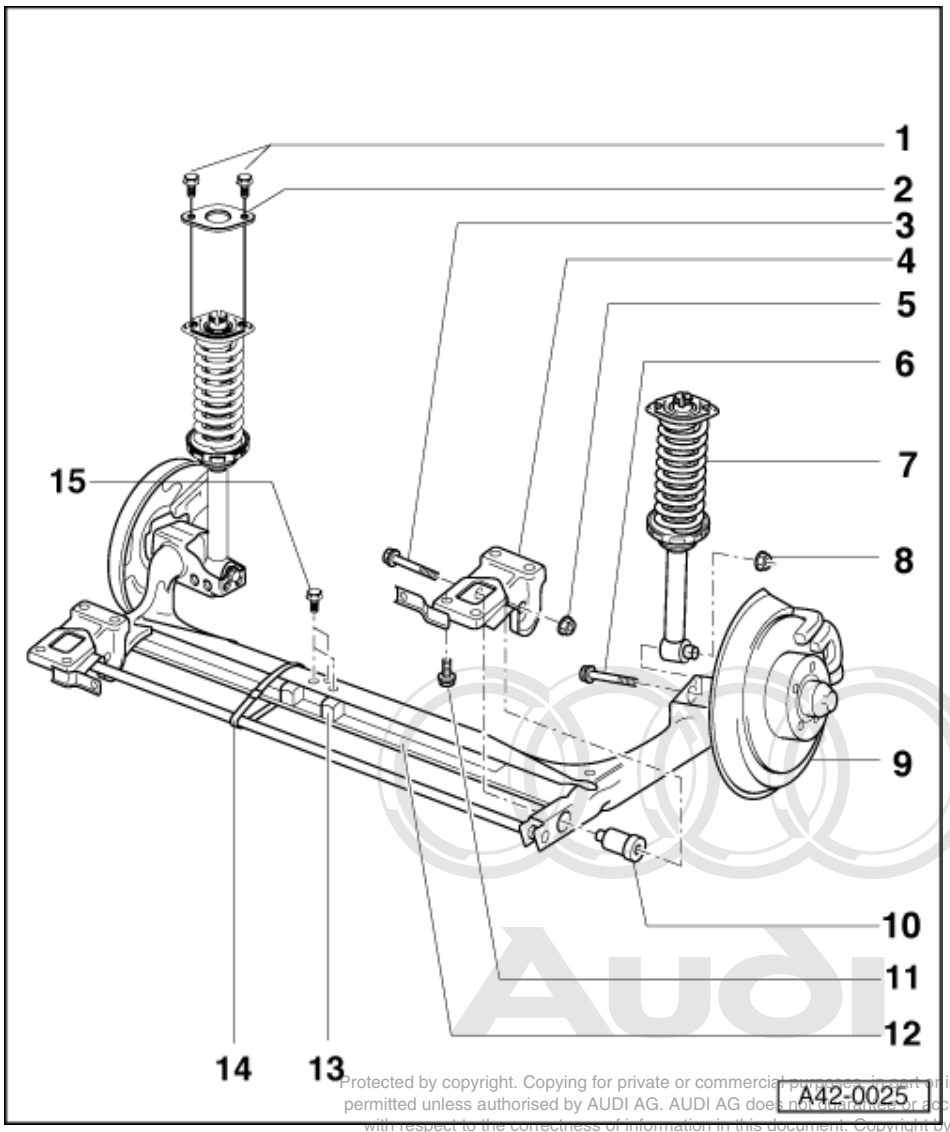
- If mounting bracket removal is absolutely essential, perform rough adjustment on installing rear axle => Fig. 1 .
- On completion of installation work, perform wheel alignment => Page 227 .

5 Hexagon nut

- Always replace
- 80 Nm + further 90° turn

6 Hexagon bolt

- Always replace
- 50 Nm + further 90° turn



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7 Suspension strut

- Note different spring/shock absorber combinations=>Page 124 , vehicle data sticker
- Left and right identical
- Removing and installing=>Page 138
- Servicing => Page 140
- Combination of different versions is not permitted

8 Hexagon nut

- Always replace

9 Outer rear axle, suspension

- Servicing => Page 131

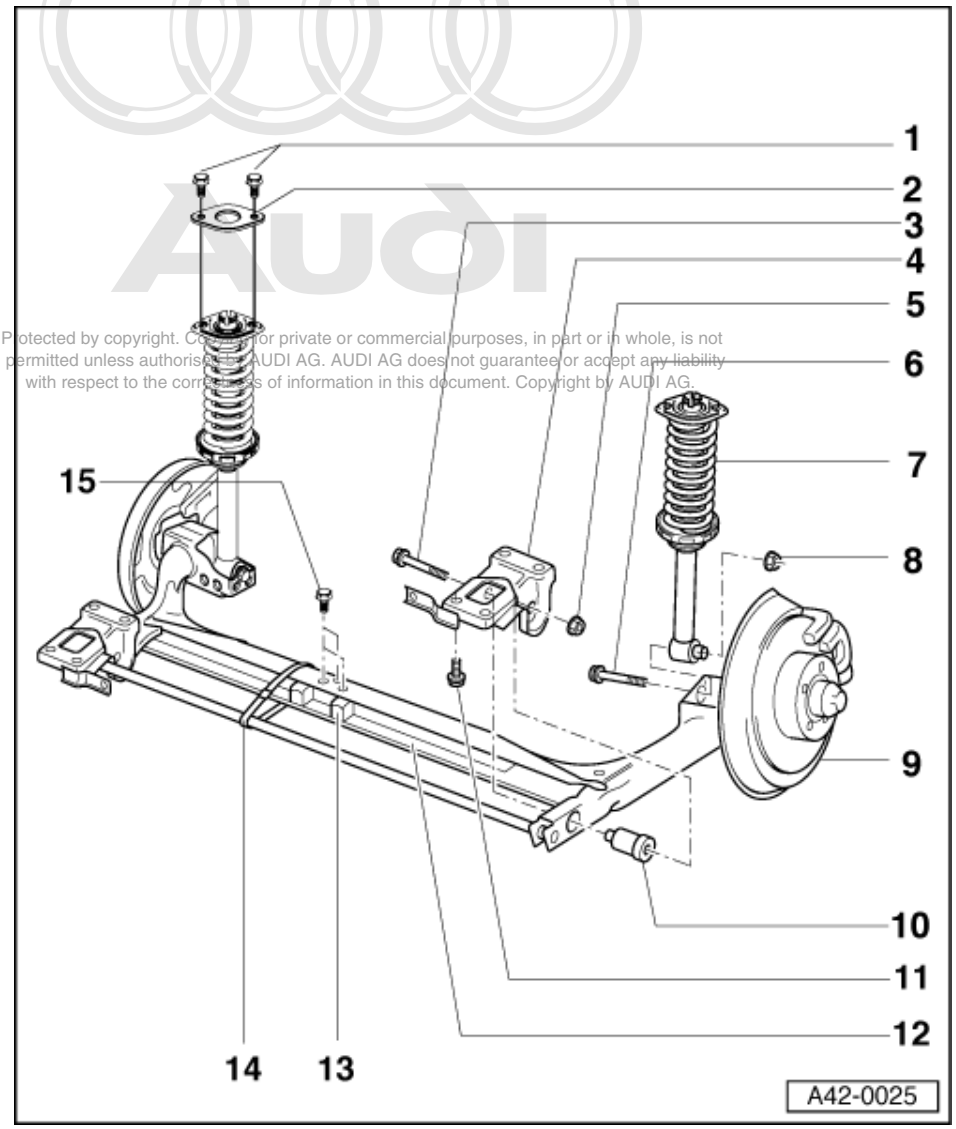
10 Guide bearing

- Pressing out and pressing in =>Page 130

11 Hexagon bolt, 75 Nm

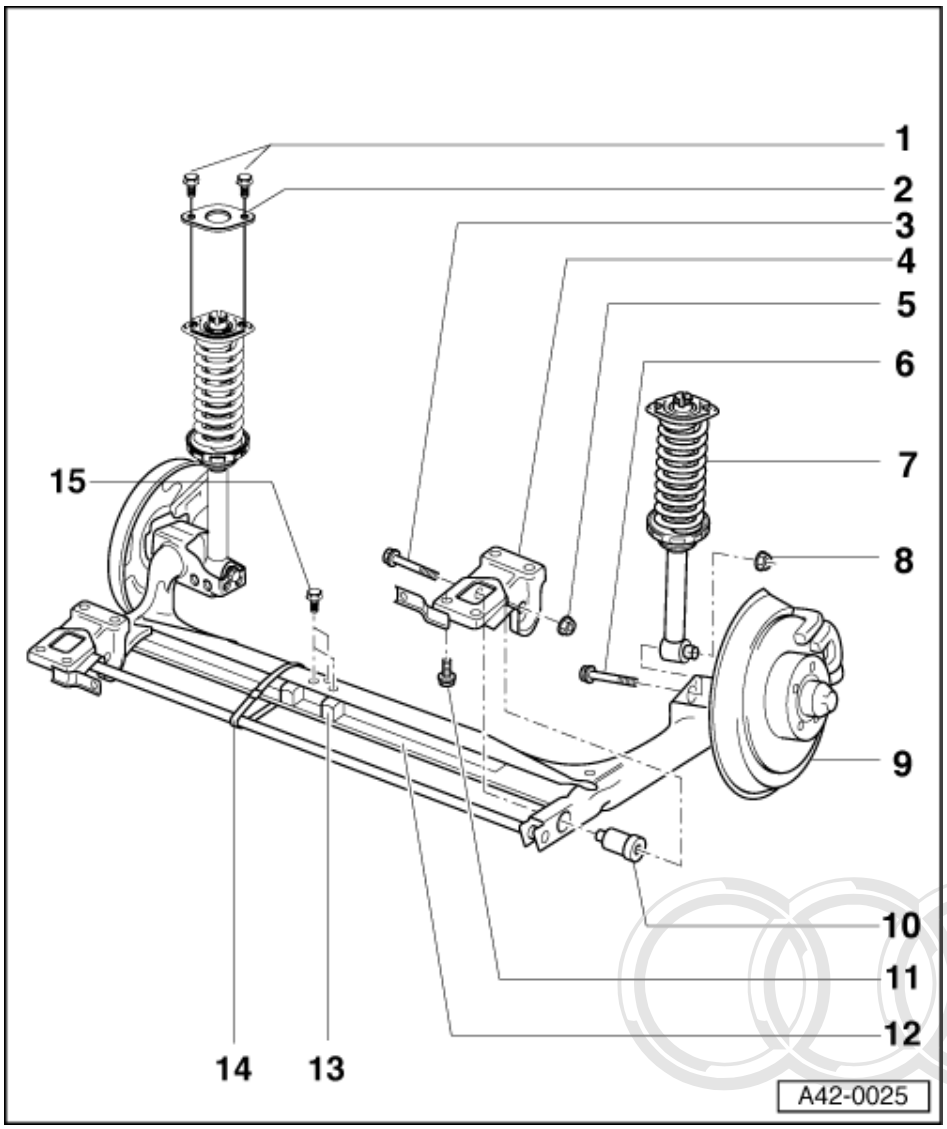
- Always replace

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12 Axle beam

- Removing and installing=>Page 127
- Headlight range control was introduced at the start of MY 98 for vehicles with gas-discharge headlamps
- For vehicles with headlight range control, heed notes on removal and installation => Page 149
- Contact surface for wheel bearing/wheel hub and tapped holes must be free from paint and dirt
- Following installation, perform wheel alignment => Page 227



13 Vibration damper

Note:

A new guide bearing was introduced for the A4 Avant (and Saloon), in combination with which there is no vibration damper at rear axle.

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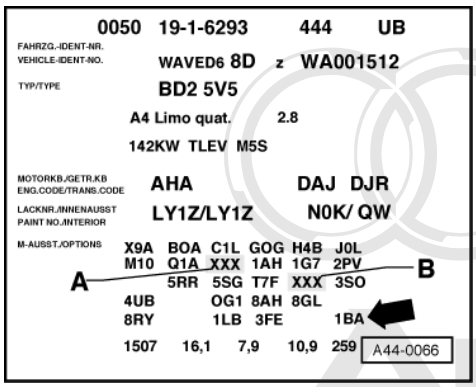
14 Anti-roll bar shackle

- Fitting instructions =>Fig. 2 and Fig. 3

15 Hexagon bolt, 20 Nm

Explanatory notes on factory codes (PR numbers)

At the start of MY 98, PR numbers were introduced to facilitate running gear/spring/shock absorber assignment.



The spring/shock absorber assembly installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.

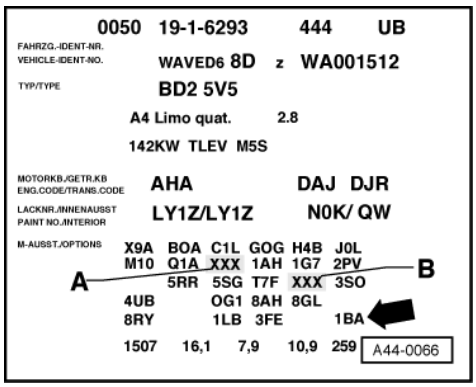
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-> Example of vehicle data sticker

- - A - indicates PR no. for front axle
- - B - indicates PR no. for rear axle

The vehicle data sticker can be found in the spare wheel well and in the Service booklet.

The PR no. can be used to find the correct spring/shock absorber combination in the Parts List.



-> The PR no. for the different running gear versions can be seen from the Fig. - arrow -.

1BA = Standard running gear

1BB = Heavy-duty running gear (approx. 20 mm higher)

1BC = Special-purpose vehicles

1BD =Sports running gear (Audi S4)

RS4 = Sports running gear (RS4)

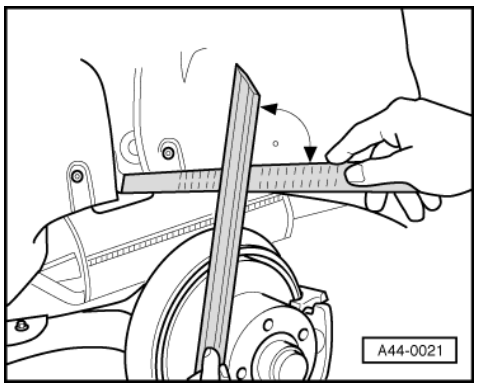
1BE = Sports running gear

1BV = Sports running gear (quattro GmbH)

1BQ = Sports running gear (South Africa)

1BT = Heavy-duty running gear (approx. 7 mm higher)

1BP = Heavy-duty running gear (trim position as for 1BA, however with limited bump travel)

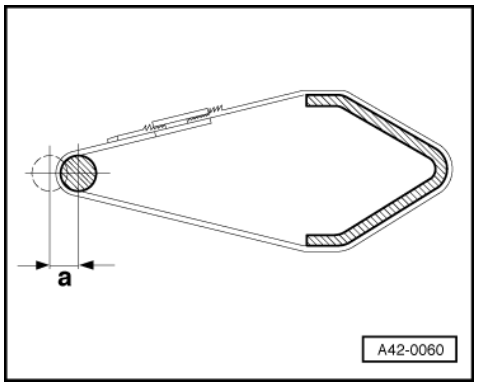


-> Fig.1 Rough adjustment of rear axle

With bolts slackened off, slide rear axle as far as it will go in direction of travel and centre with the aid of two rules.

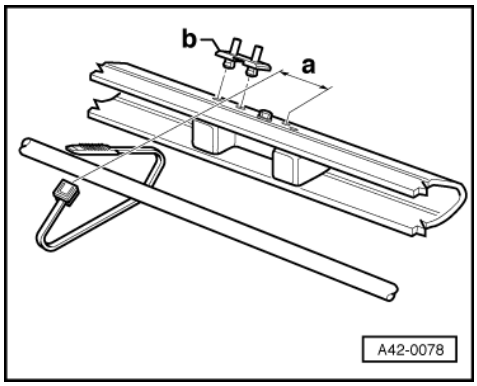
Perform wheel alignment => Page 227 .

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-> Fig.2 Fitting instructions for anti-roll bar shackle

- Press centre of anti-roll bar at axle beam -a- approx. 8 mm.



-> Fig.3 Fitting instructions for anti-roll bar shackle

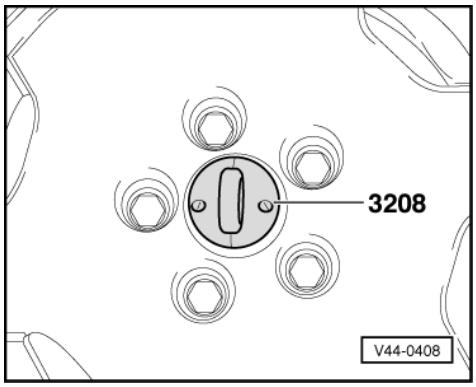
- Place retaining strap around anti-roll bar and secure such that anti-roll bar shackle makes contact with anti-roll bar and axle beam (with fastener facing upwards).
- - Dimension a -100 mm
- Relieve load on anti-roll bar.

Note:
If, when replacing rear axle beam, locating holes -b- for anti-roll bar shackle have already been made in axle beam, use is to be made of these. Dimension -a- can then be ignored.

1.4 - Removing and installing rear axle

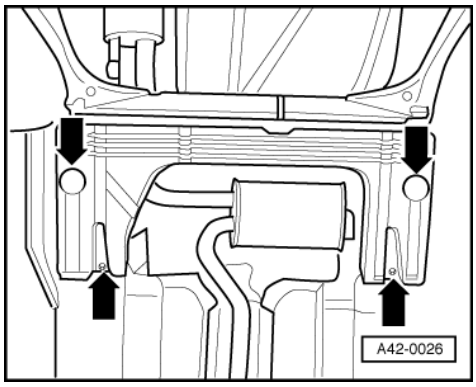
Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter

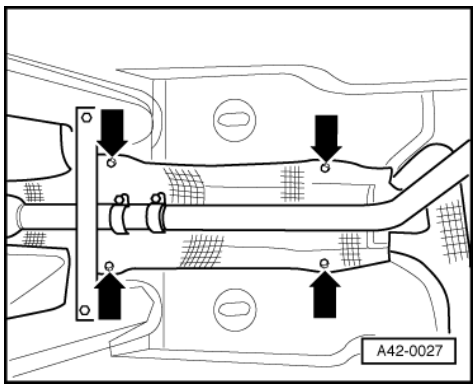


Removing

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Raise vehicle.
- Draw off brake fluid.
- Remove wheels.



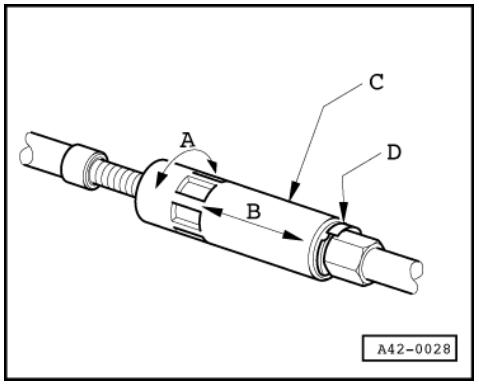
- -> Remove cover -arrows-.



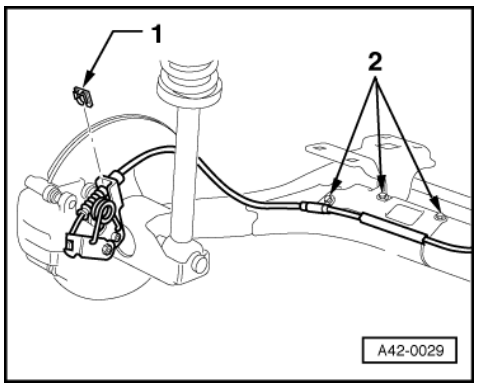
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- -> Unscrew heat shield cover and slide forwards until parking brake cable adjusters are accessible.

  -Arrows- point towards bolted joints.

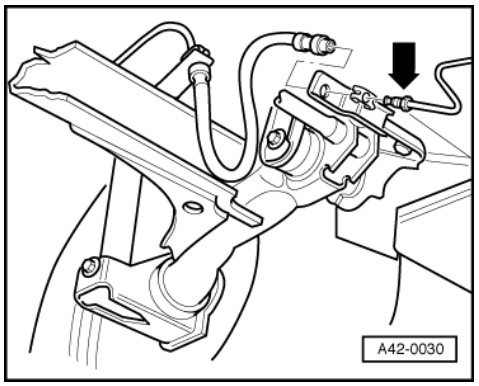


- -> Reset both cable adjusters as follows:
- Remove locking element -D-.
- Screw in adjusting nut -C- as far as it will go.
- Slide adjuster together.



- -> Remove locking plate -1- on left and right, slacken off bolted joint of cable retainers -2- slightly and remove cables from axle.

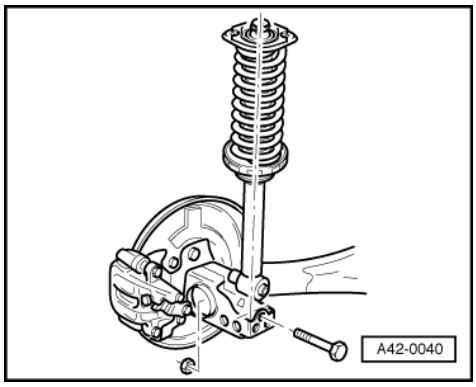
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- -> Unscrew brake pipes -arrow- at rear axle on both sides.
- Remove ABS speed sensor.
- Unclip speed sensor wire from holder.
- On vehicles with headlight range control, detach connecting link of rear left/rear right vehicle level sender -G76/ -G77 at axle beam.

Note:

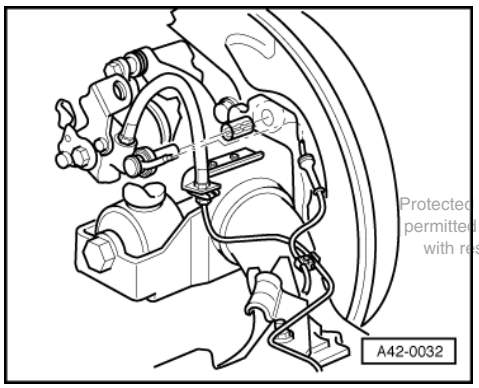
Use engine/gearbox lifter -V.A.G 1383 A when removing and installing axle beam.



- -> Take suspension strut out of axle beam.
- Unscrew bolts at guide bearings on both sides and take out rear axle.

Installing

- Insert axle with guide bearings in mounting brackets and hand-tighten bolted joints.
- Attach suspension struts and in doing so hand-tighten bolted joints of suspension struts at axle beam.
- On vehicles with headlight range control, attach connecting link of rear left/rear right vehicle level sender -G76/ -G77 to axle beam
  => Page 149 .
- Before fitting, apply brake cylinder paste all round speed sensor O-ring.



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- -> Press home ABS speed sensor in wheel bearing housing.
- Secure speed sensor with clip.
- Lay parking brake cables and engage at brake calipers.
- Connect brake pipes.
- Adjust handbrake.

=> Brake System; Repair Group 46; Removing and installing handbrake lever Removing and installing hand-brake lever

- Fit heat shield cover.

Bolted joint for mounting bracket and shock absorber at rear axle must be secured with vehicle standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.

- Tightening torque of guide bearings: 80 Nm + further 90°turn
- Tightening torque of suspension struts at axle beam: 50 Nm + further 90° turn
- Tightening torque of bolted joint for connecting link of rear left/rear right vehicle level sender -G76/ -G77 at axle beam: 10 Nm
- Fit cover.

- Bleed brake system.

=> Brake System; Repair Group 46; Bleeding brake system Bleeding brake system

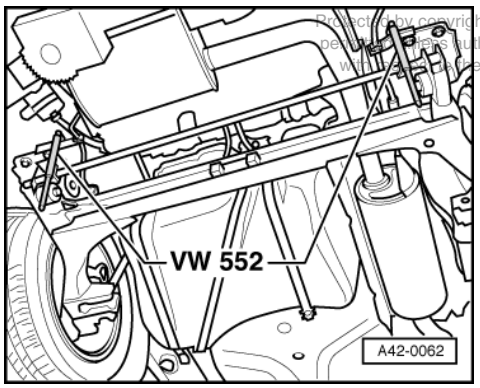
- Fit and secure wheels => Page 220 .
- Perform wheel alignment => Page 227 .

1.5 - Pressing out and pressing in guide bearing

Special tools and workshop equipment required

- 3128/1a from fitting tool
- 3259 Tube
- 3296 Tube
- 3301 Assembly device
- 3346/2 from assembly device
- 3348 Assembly device
- 3351/1 from assembly device
- 3351/4 from assembly device
- VW 552 Spring tensioner
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

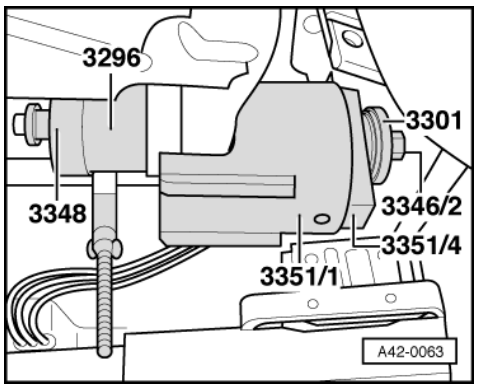
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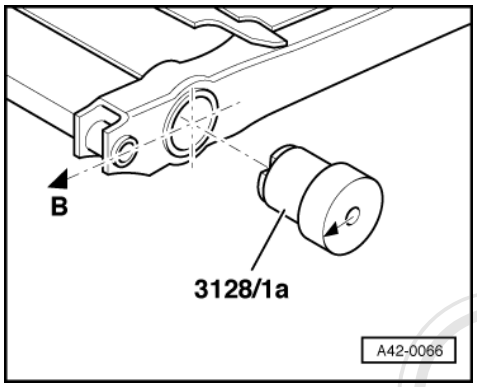
Removing

-> Fig.1 Lowering rear axle

- On vehicles with headlight range control, detach connecting link of rear left/rear right vehicle level sender -G76/ -G77 at axle beam.
- Unfasten guide bearing bolted joint and lower axle.
- Insert spring tensioner -VW 552- such that brake pipes are not subject to strain.



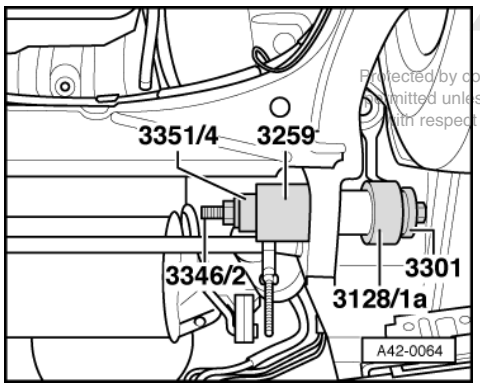
-> Fig.2 Extracting guide bearing



Installing

-> Fig.3 Guide bearing installation direction

- Guide bearing is to be installed in rear axle such that arrow on thrust pad -3128/1a- is pointing in -direction B-.



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-> Fig.4 Fitting guide bearing

Install in reverse order.

Bolted joint for mounting bracket at rear axle must be secured with vehicle standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.

Tightening torque of bolted joint for connecting link of rear left/rear right vehicle level sender -G76/ -G77 at axle beam: 10 Nm

Tightening torques => Page 120

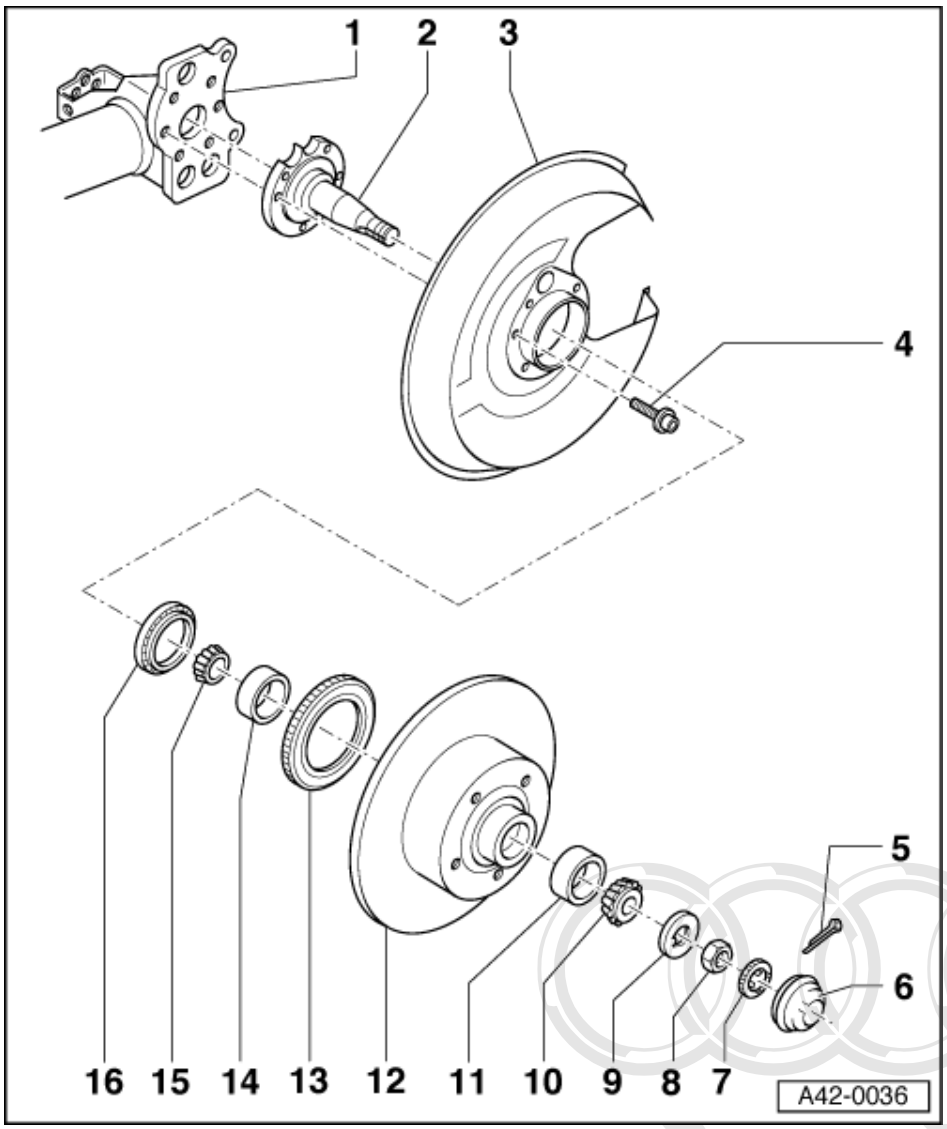
2 - Servicing suspension (front-wheel drive)

2.1 - Servicing suspension (front-wheel drive)

Special tools and workshop equipment required

- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 407 Press tool

- VW 412 Press tool
- 2050 Thrust pad
- 30-506 Pressing-in tool
- 32-119 Tube
- T10019 Thrust pad



Remove wheel and brake caliper before working on suspension.

=> Brake System; Repair Group 46

Secure brake caliper with wire so as not to strain brake hose.

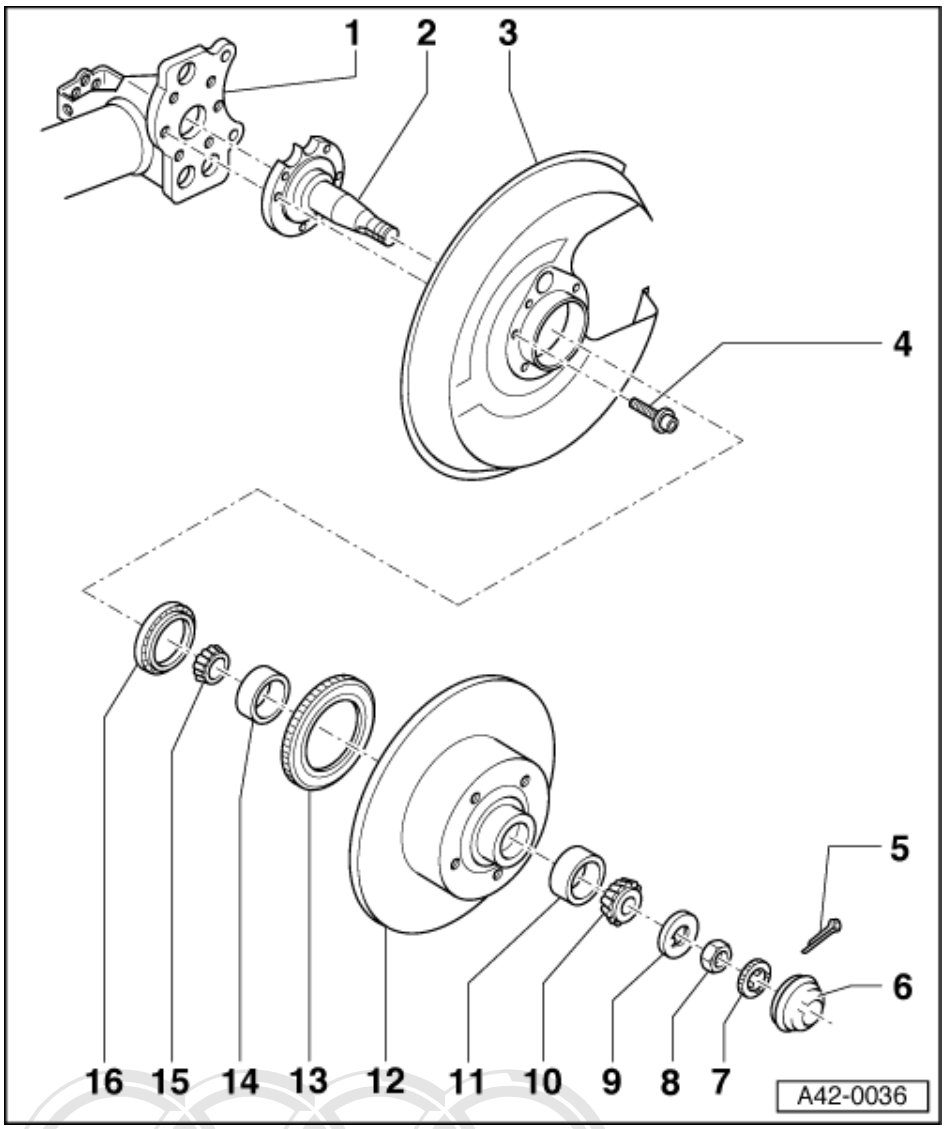
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Notes:

- Loadbearing and suspension elements are not to be welded and straightened.
- Only re-install clean bearings; bearings are not to be rinsed out.
- Take care when adjusting wheel bearing clearance.

1 Axle beam

- Resting surface for stub axle must be clean



2 **Stub axle**
- Assignment

=> Parts List

3 **Splash plate**

4 **Combi bolt, 30 Nm**

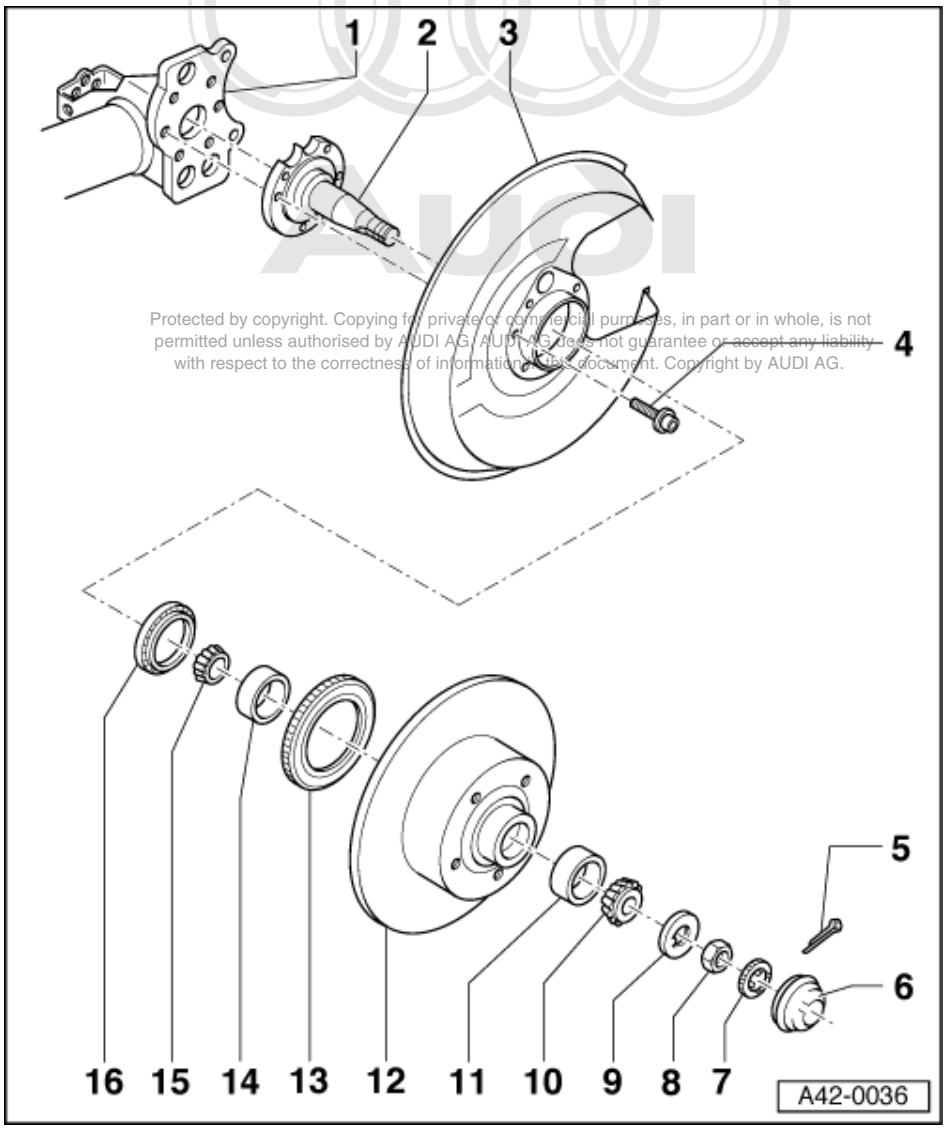
5 **Split pin**
- Always replace

6 **Grease cap**
- Always replace
- Pressing off => Fig. 1
- Driving in => Fig. 2

7 **Slotted ring**
- Attach to hexagon nut

8 **Hexagon nut**
- Adjusting wheel bearing clearance
  => Fig. 3

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9 Thrust washer

10 Outer wheel bearing

- Do not rinse out for re-use

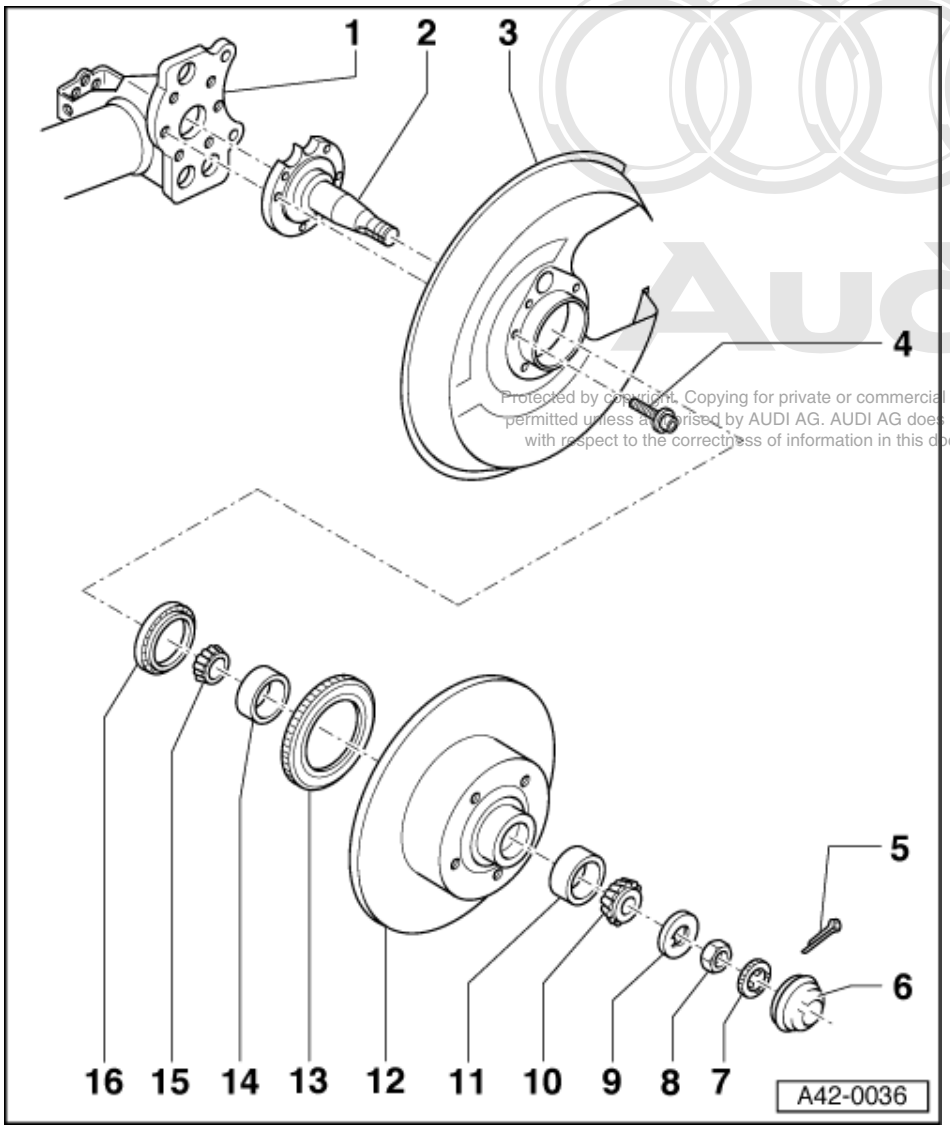
11 Outer wheel bearing outer race

- Drive out outer race with copper mandrel
- Pressing in => Fig. 4
- Apply small quantity of wheel bearing grease to wheel bearing seat before pressing in bearing shell

12 Wheel hub

13 Rotor

- Drive off evenly with copper mandrel through tapped holes in wheel hub
- Pressing in => Fig. 5



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14 Inner wheel bearing outer race

- Drive out outer race with copper mandrel
- Apply small quantity of wheel bearing grease to wheel bearing seat before pressing in bearing shell

15 Inner wheel bearing

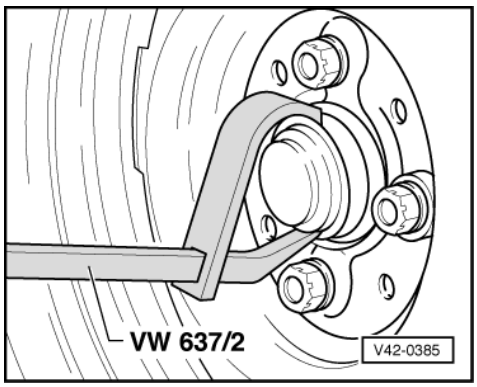
- Do not rinse out for re-use

16 Sealing ring

- Always replace
- Assignment

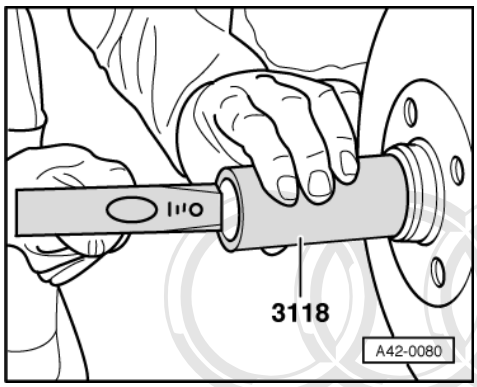
=> Parts List

- Pressing in => Fig. 6
- Fill space between sealing lips with multi-purpose grease



-> Fig.1 Pressing off grease cap

Detach grease cap from its seat by tapping gently on claw.

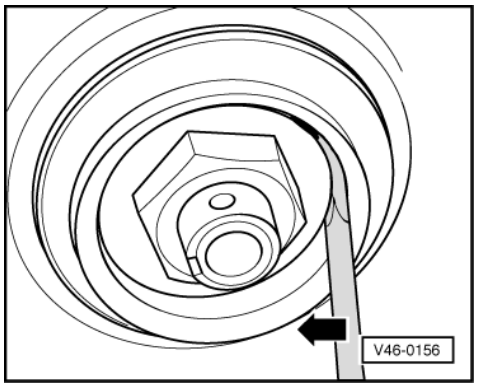


-> Fig.2 Driving in grease cap

Notes:

- Always replace damaged (dented) grease caps.
- Damaged (dented) grease caps allow ingress of moisture. Use is therefore always to be made of the special tool shown.

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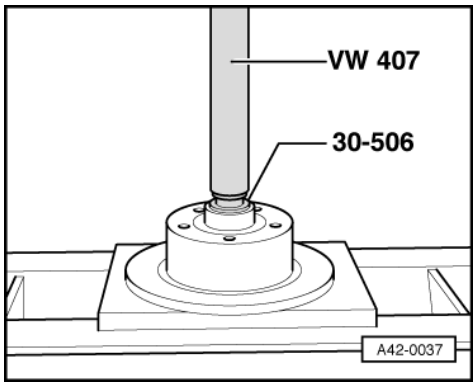


-> Fig.3 Adjusting wheel bearing clearance

Note:

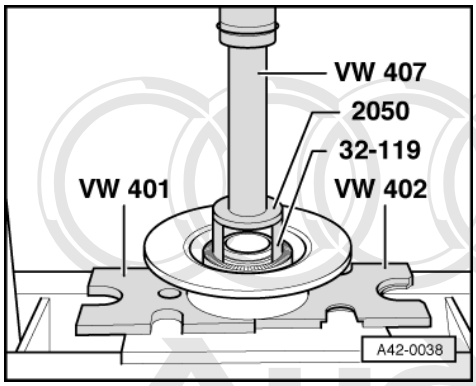
It must be possible to move thrust washer by applying finger pressure to a screwdriver without levering action.

- Secure with slotted ring and new split pin.



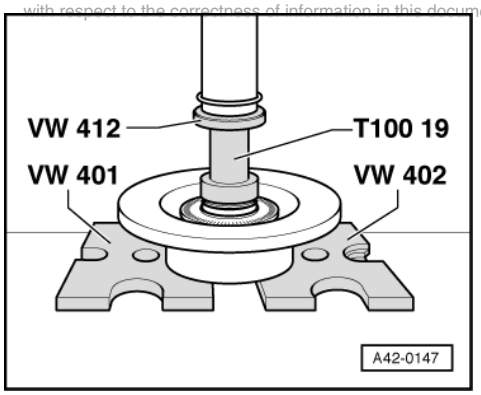
-> Fig.4 Pressing in outer race for outer wheel bearing

- Apply small quantity of wheel bearing grease to wheel bearing seat before pressing in bearing shell.



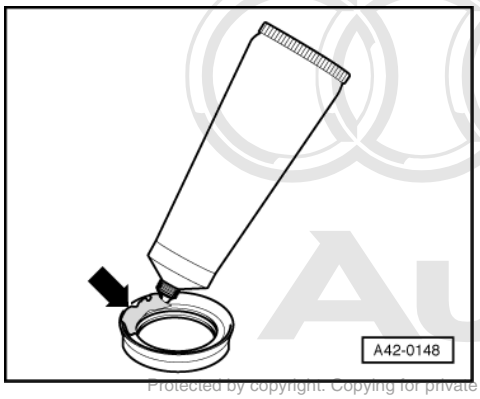
-> Fig.5 Pressing in rotor

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-> Fig.6 Pressing in outer race for inner wheel bearing

- Apply small quantity of wheel bearing grease to wheel bearing seat before pressing in bearing shell.



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As of Model Year `98, modified stub axles were introduced in conjunction with dust lips at sealing rings.

=> Parts List

-> Fig.7 Filling channel -arrow- with grease

For ease of illustration, seal is shown removed.

3 - Suspension strut

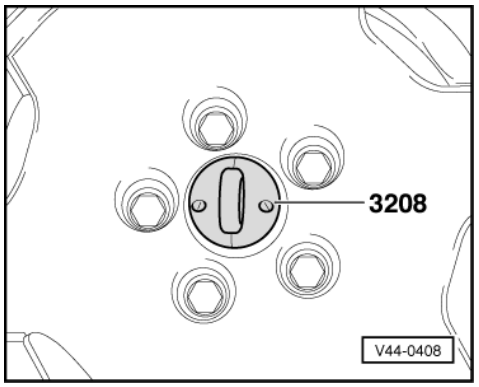
3.1 - Suspension strut

3.2 - Removing and installing suspension strut

Special tools and workshop equipment required

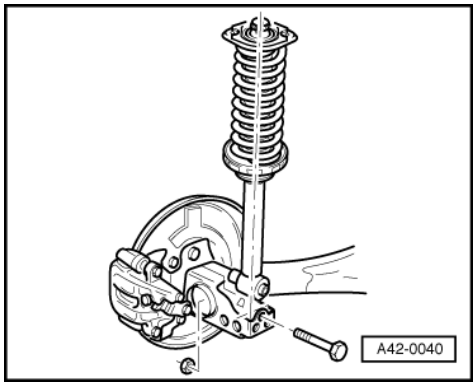
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- 3208 Suction grip

Removing



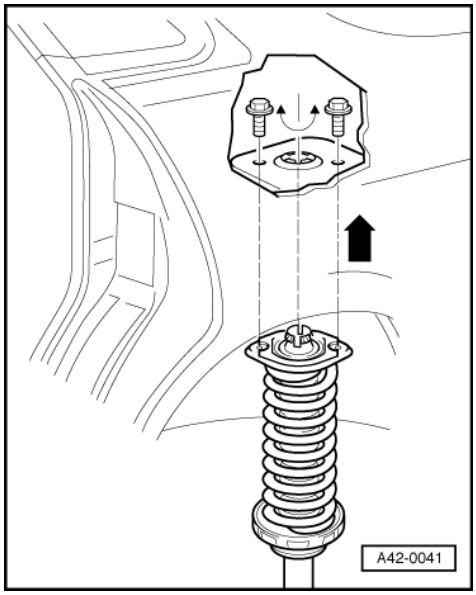
- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Raise vehicle.

- Remove wheels.



- -> Unscrew suspension strut from axle beam.
- Detach side backrest trim/backrest.

=> General Body Repairs, Interior; Repair Group 72; Rear seat Rear seat



- -> Unscrew suspension strut from body.

Note:

In addition to bolted joint, there are four retainer tabs for engaging suspension strut in position on body.

- Turn suspension strut until retainer tabs are located over recesses. Pull suspension strut downwards out of mount.

Installing

Install in reverse order.

Replace seal on upper spring plate. Thoroughly clean sealing surfaces.

Use new hexagon bolt and hexagon nut for attaching suspension strut to axle beam.

Note:

On installation, make sure retainer tabs are properly engaged.

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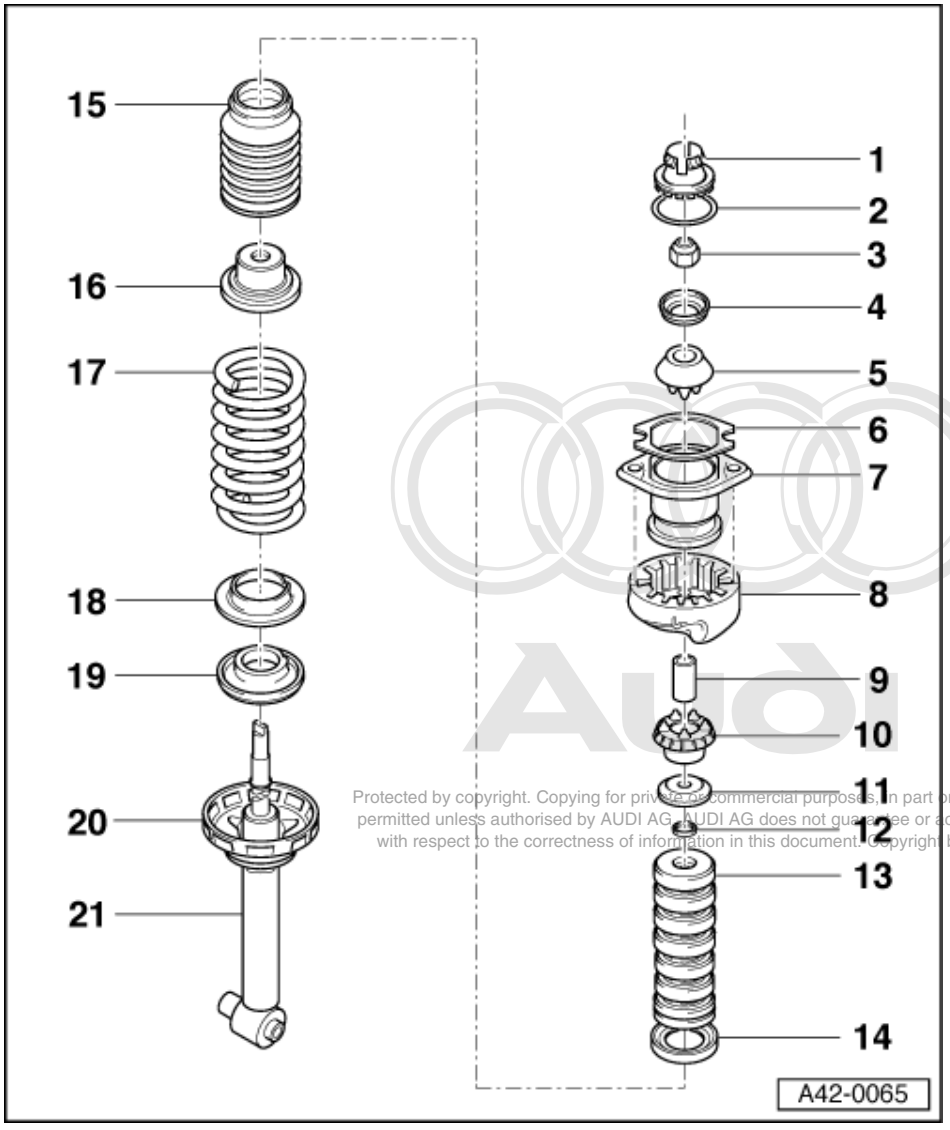
- Fit and secure wheels => Page 220 .

Bolted joint for shock absorber at rear axle must be secured with vehicle standing on its wheels. Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.
Tightening torques => Page 120

3.3 - Servicing suspension strut

Special tools and workshop equipment required

- 3079 Counterhold
- 3118 Thrust pad
- 3379 Socket attachment
- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 412 Press tool
- V.A.G 1331 Torque wrench
- V.A.G 1752/1 Spring tensioner
- V.A.G 1752/2 Suspension strut holder
- V.A.G 1752/3 Spring holder
- V.A.G 1752/8 Suspension strut adjustment gauge



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1 Cap
2 O-ring
- Coat with silicone grease G 000 405 A2

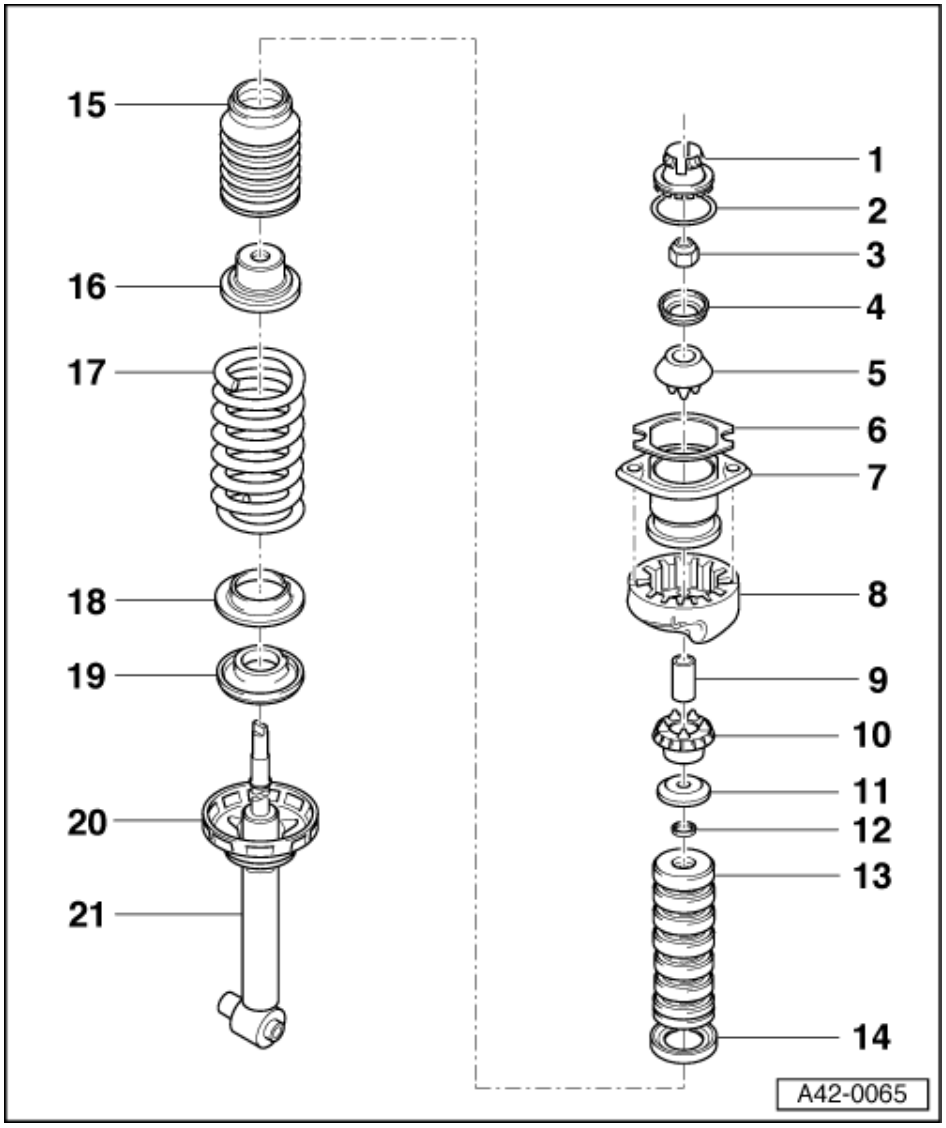
3 Lock nut, 25 Nm
- Always replace

4 Dished washer
5 Bearing ring
- Pay attention to correct installation position

6 Seal (foam)
- Always replace

7 Upper spring plate
8 Spring support
9 Spacer
10 Bearing ring
- Pay attention to correct installation position

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11 Lower washer
- Assignment

=> Parts List

12 Ring

- Different versions

=> Parts List

13 Additional spring

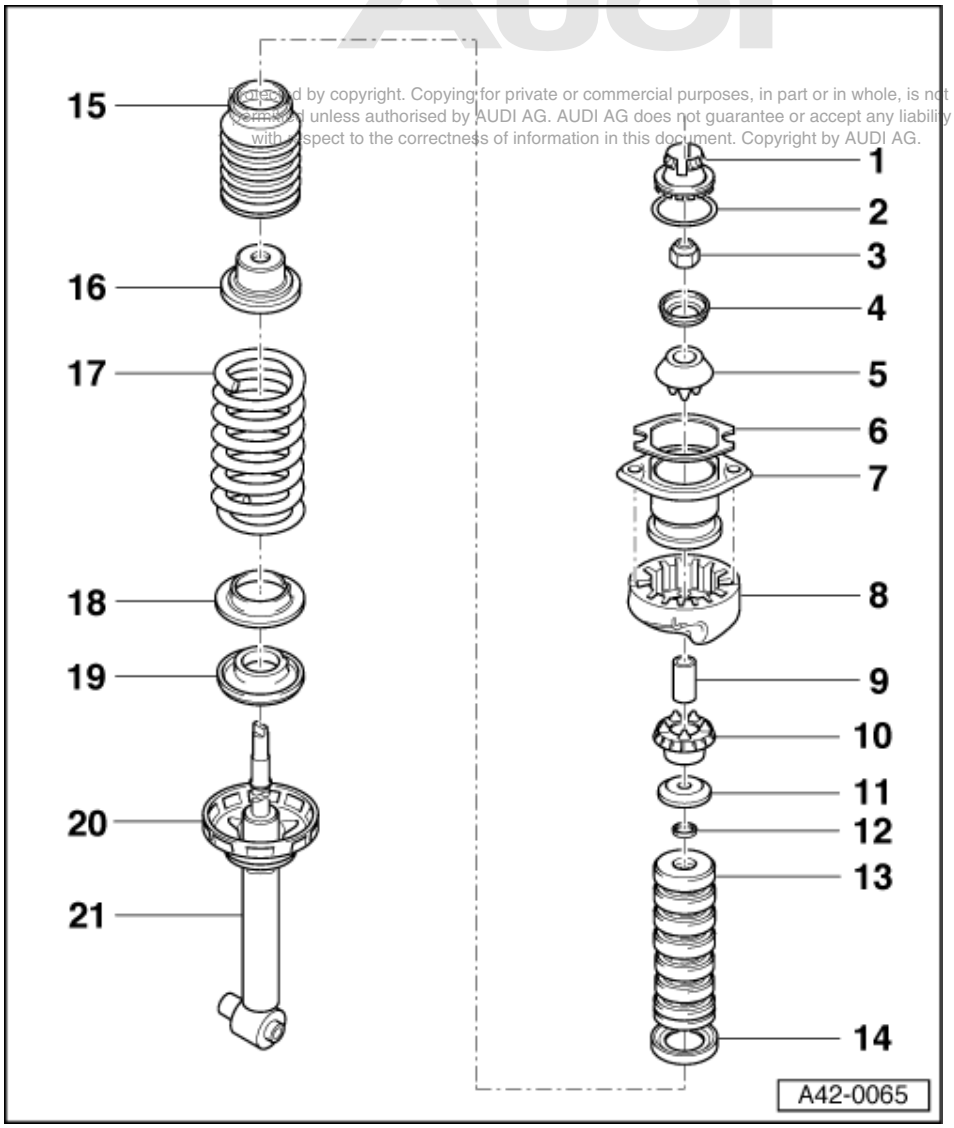
14 Bellows support ring

15 Bellows

16 Protective cap

- Different versions

=> Parts List



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17 Spring

- Note different coil spring versions
  => Page 148 , vehicle data sticker
- Replace only as a pair
- Fit with colour code facing downwards

18 Packing ring

19 Spring seat

20 Lower spring plate

21 Gas-filled shock absorber

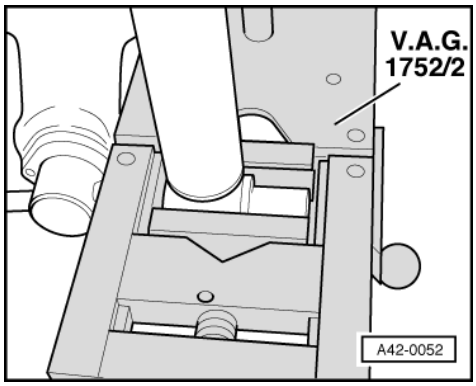
- Checking => Page 6
- Assignment

=> Parts List

- Can be replaced separately
- Replacement part supplied with pressed-on lower spring plate
- Before scrapping defective shock absorbers, always ensure gas release and draining => Page 4

Dismantling and assembling suspension strut

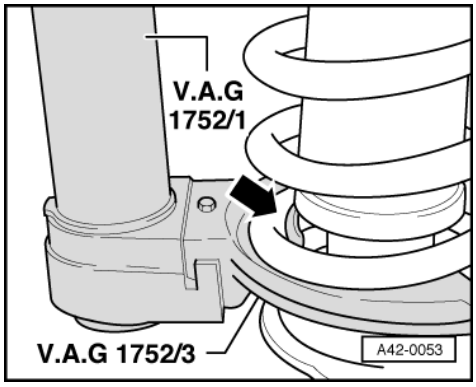
Dismantling



Note:

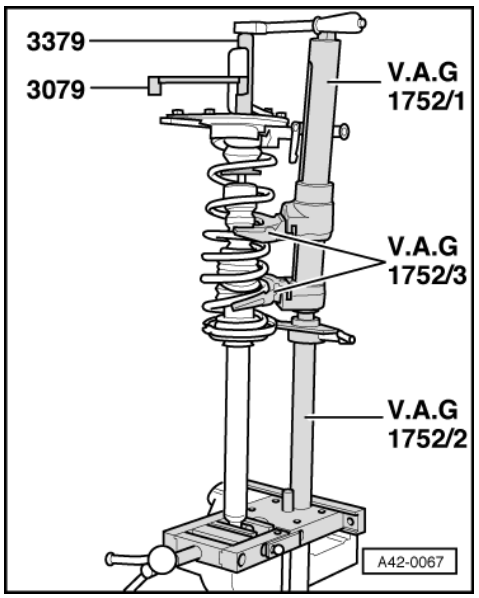
Pay attention to differences in component design between "standard, sports and heavy-duty running gear".

- Clamp suspension strut holder -V.A.G 1752/2- in vice.
- -> Insert suspension strut in suspension strut holder V.A.G 1752/2.
- Use screwdriver to prise out cap => Page 141 , -Item 1 -.

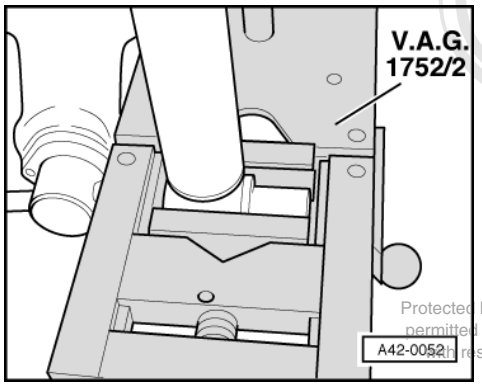


- -> Position coil spring with tensioner -V.A.G 1752/1- on spring seat.
- Pay attention to correct positioning of coil spring in adapter V.A.G 1752/3.

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- -> Pre-tension coil spring with tensioner -V.A.G 1752/1- until upper spring plate is free.
- Unscrew hexagon nut from piston rod whilst providing support with Allen key.
- Detach appropriate components.



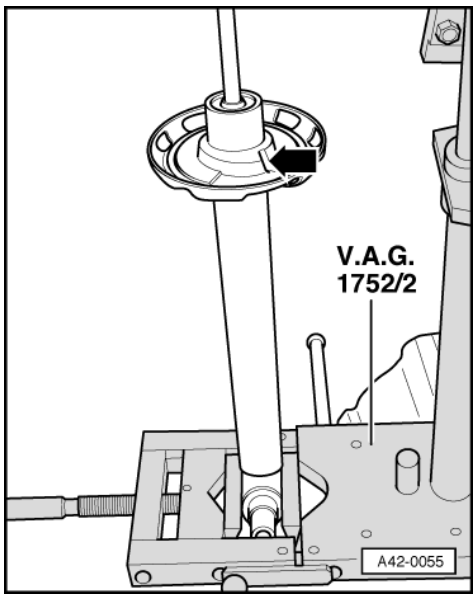
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Assembling

Note:

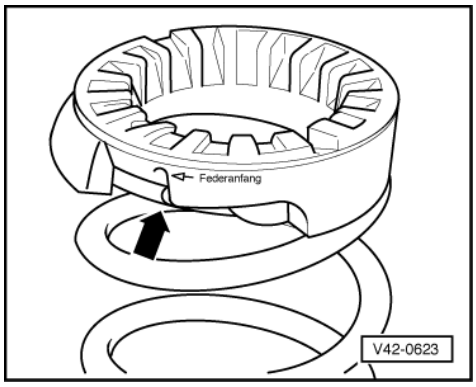
Left and right suspension strut are identical.

- -> Clamp shock absorber in suspension strut holder -V.A.G 1752/2-.



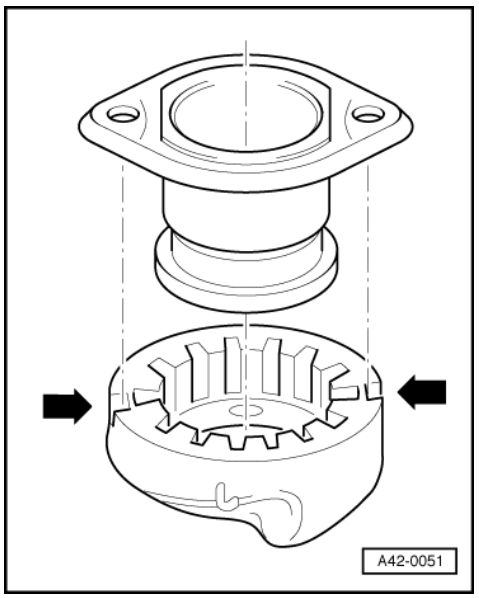
- -> Roughly align spring seat and packing ring as shown in direction of shock absorber eye.
- Fit pre-tensioned coil spring. End of spring winding must make contact with packing ring stop provided.
- Insert protective cap, bellows, bellows support ring, additional spring, ring, lower washer, bearing ring and spacer.

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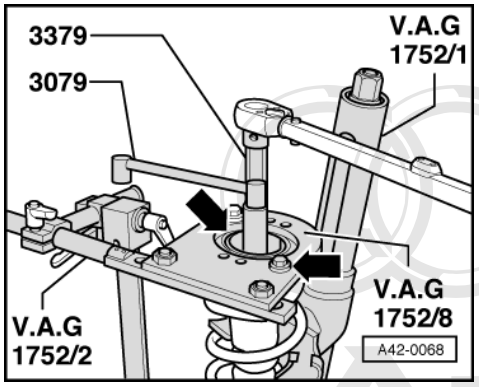
- -> Fit spring support.

  End of spring winding must make contact with stop -arrow-.



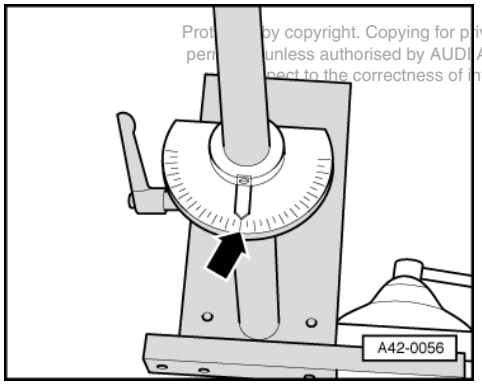
- -> Fit upper spring plate.
- Stamped nuts of spring plate must be positioned in recesses of spring support -arrows-.

- Fit bearing ring, dished washer and new lock nut.
- Attach adjustment gauge V.A.G 1752/8 to suspension strut holder V.A.G 1752/2.

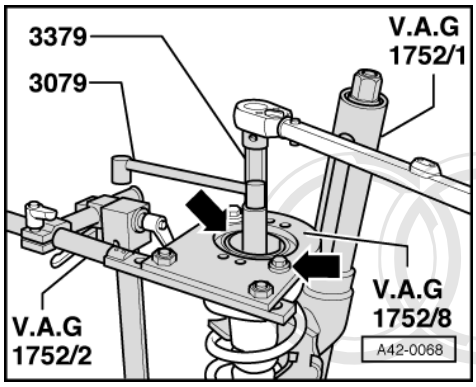


- -> Position adjustment gauge V.A.G 1752/8 on upper spring plate and secure with hexagon bolts.
- Lock upper locking levers of suspension strut holder V.A.G 1752/2.

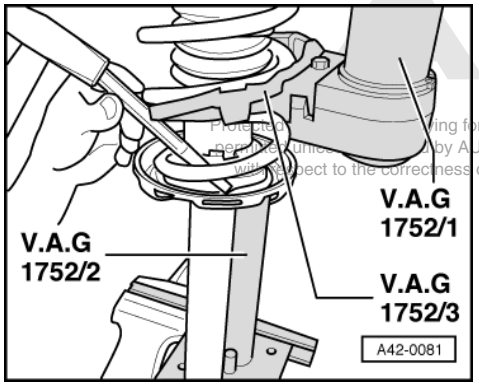
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- -> Release lower locking levers and turn upper spring plates until reading on scale of suspension strut holder -V.A.G 1752/2- is 0°.
- Make sure spring ends are in contact with stops of spring support and spring seat.
- Lock levers.



- -> Tighten lock nut with socket attachment 3379 and counterhold 3079 to 25 Nm.

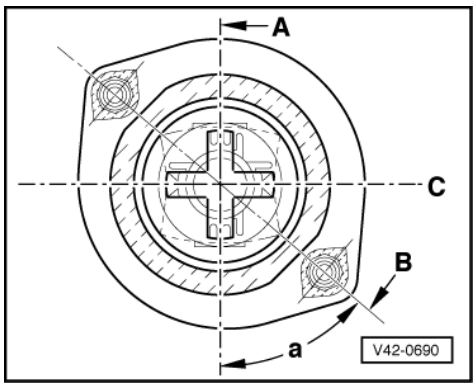


- -> Turn spring seat => Page 142 , -Item 18 until stop is at end of spring.

Note:

In doing so, take care not to damage surface of spring.

- Carefully slacken off coil spring, paying attention to correct positioning of coil spring and top and bottom spring plates.
- As soon as tensioner V.A.G 1752/1 is free, stop slackening off and detach tensioner.
- Detach adjustment gauge -1752/8-.
- Take suspension strut out of suspension strut holder V.A.G 1752/2.

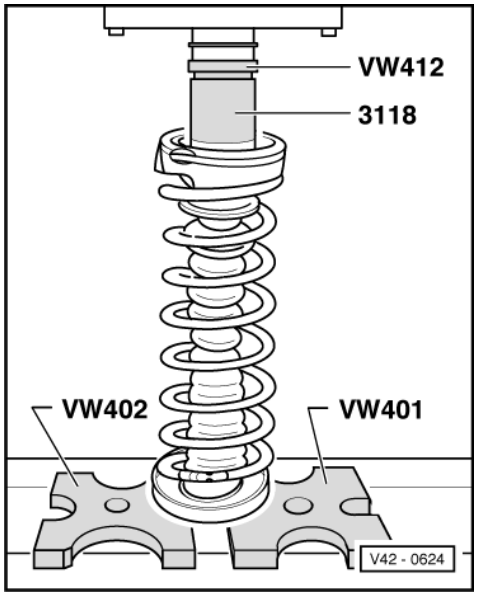


- -> Axis -C- of cap offset by 90° with respect to axis -A- of shock absorber eye; position cap on upper spring plate.

Note:

Coat O-ring with silicone grease G 000 405 A2 before fitting cap.

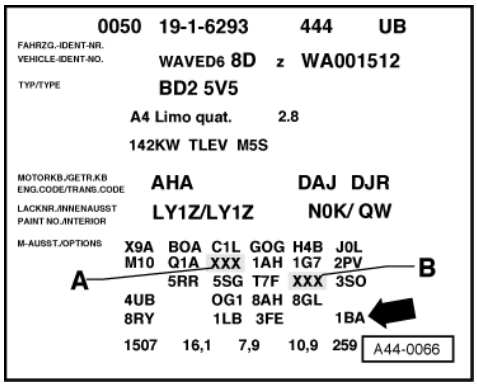
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- -> Use special tools shown to press in cap.

Explanatory notes on factory codes (PR numbers)

PR numbers are used to facilitate running gear/spring/shock absorber assignment.



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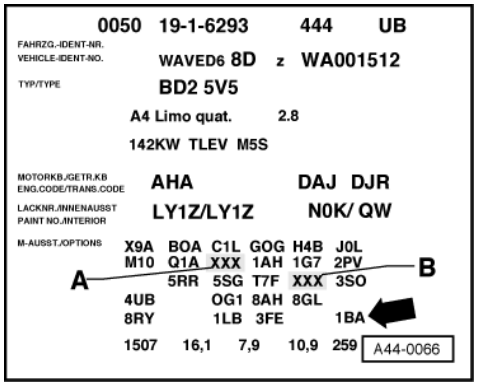
The spring/shock absorber assembly installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.

-> Example of vehicle data sticker

- - A - indicates PR no. for front axle
- - B - indicates PR no. for rear axle

The vehicle data sticker can be found in the spare wheel well and in the Service booklet.

The PR no. can be used to find the correct spring/shock absorber combination in the Parts List.



-> The PR no. for the different running gear versions can be seen from the Fig. - arrow -.

1BA = Standard running gear

1BB = Heavy-duty running gear (approx. 20 mm higher)

1BC = Special-purpose vehicles

1BD =Sports running gear (Audi S4)

RS4 = Sports running gear (RS4)

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1BE = Sports running gear

1BV = Sports running gear (quattro GmbH)

1BQ = Sports running gear (South Africa)

1BT = Heavy-duty running gear (approx. 7 mm higher)

1BP = Heavy-duty running gear (trim position as for 1BA, however with limited bump travel)

4 - Vehicle level senders for vehicles with automatic headlight range control

4.1 - Vehicle level senders for vehicles with automatic headlight range control

4.2 - Vehicle level senders at rear axle

Vehicles with gas-discharge lamps feature automatic headlight range control as standard.

=> Electrical System; Repair Group 94

The automatic headlight range control function requires information on bump or rebound travel at front and rear axle.

For this purpose, position of rear axle (front-wheel drive) or left link (four-wheel drive) with respect to body is transmitted by way of a connecting link to rear left/rear right vehicle level sender -G76/ -G77. Sender then transmits electrical signals to headlight range control unit -J431.

Headlight range control unit -J431

=> Electrical System; Repair Group 94; Exploded View of Automatic Headlight Range Control; Removing and installing headlight range control unit -J431 Exploded View of Automatic Headlight Range Control Removing and installing headlight range control unit -J431

The automatic headlight range control reacts to changes in vehicle level. Further details on operation can be found in Self Study Programme No. 192.

The following situations may produce a change in vehicle level:

- Use of trailer
- Different loads (vehicle unladen, partly laden or fully laden)
- Driving style (fast/slow)

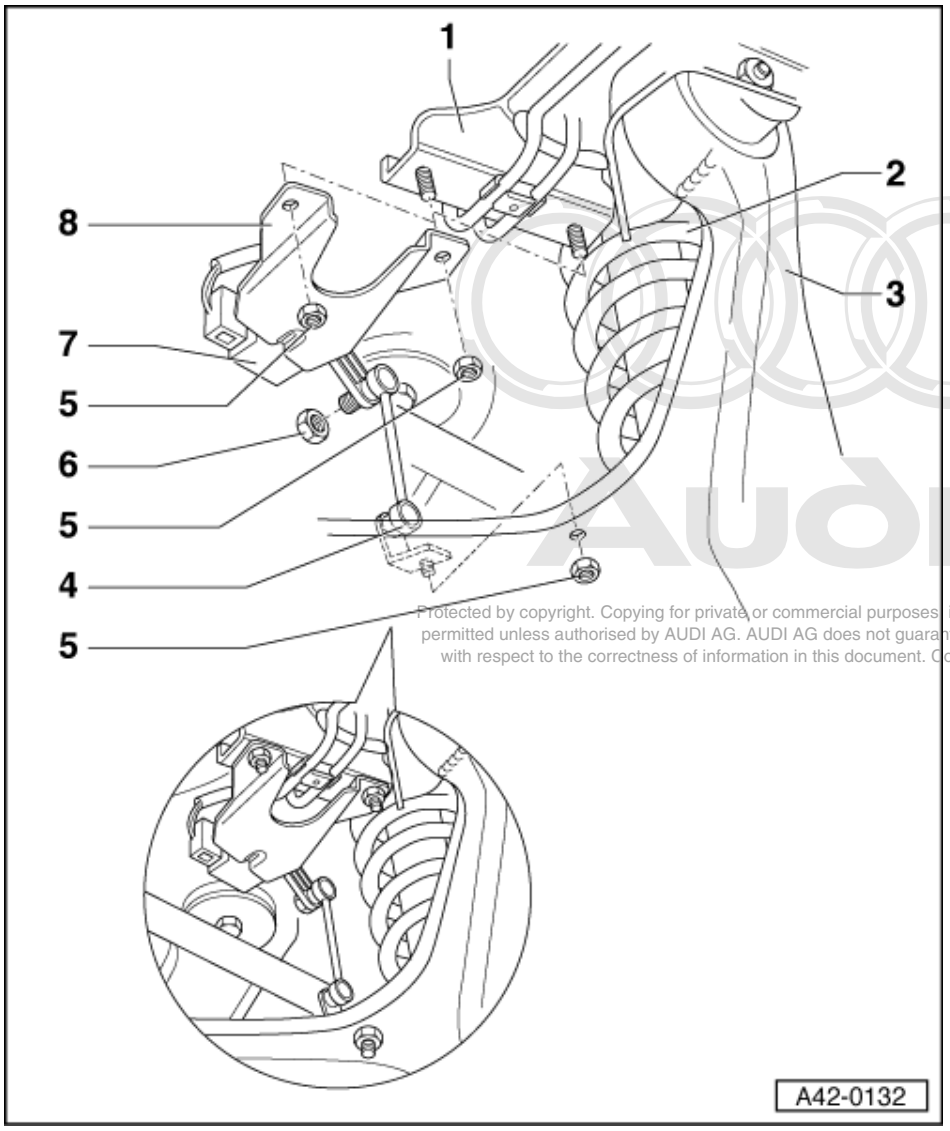
Attention: Headlight setting

Headlight basic setting is always to be checked:

- Following vehicle level sender installation work
- Following replacement of vehicle level sender
- Following removal/installation or replacement of rear axle on vehicles with front-wheel drive
- Following removal/installation or replacement of left link on vehicles with four-wheel drive

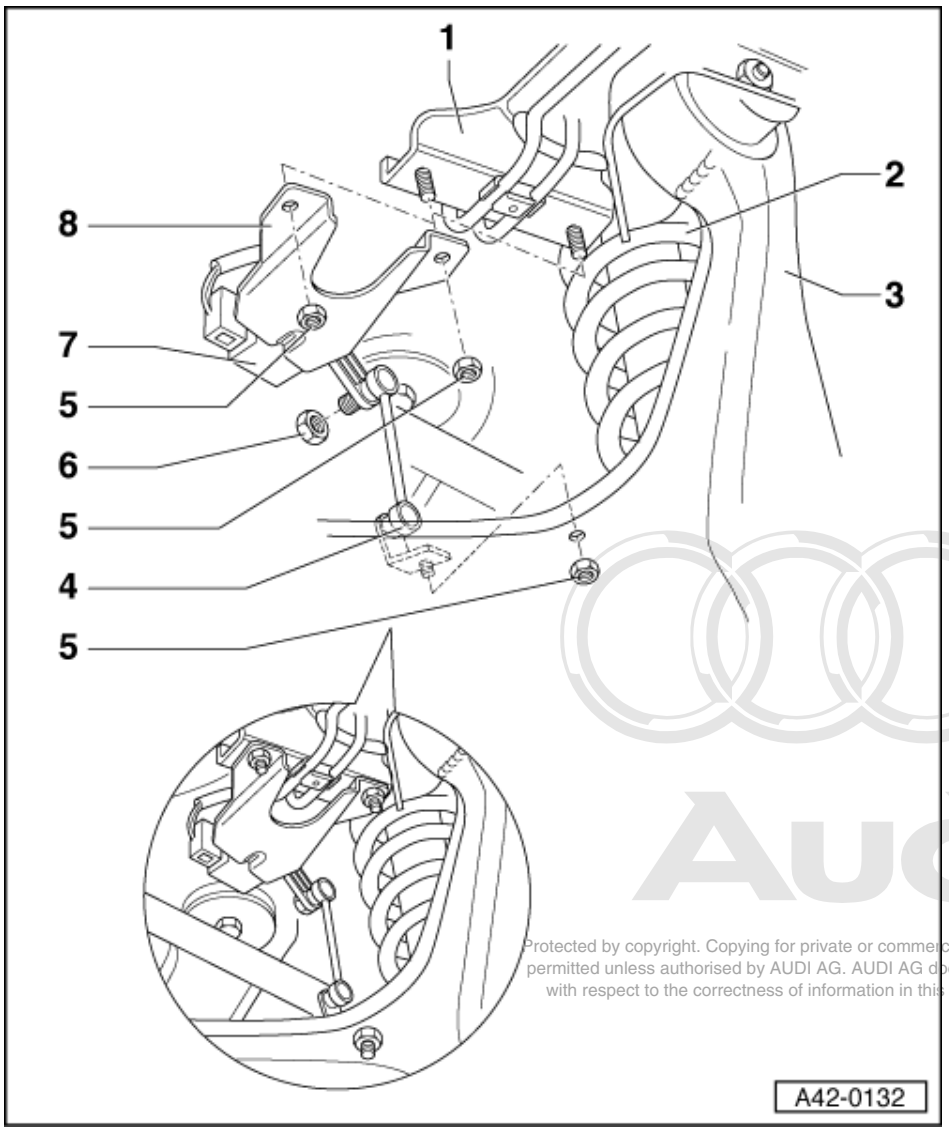
Headlight basic setting

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control; Basic setting Self-diagnosis of automatic headlight range control Basic setting



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1 Rear subframe
2 Suspension strut
3 Lower link
4 Connecting link of rear left/rear right vehicle level sender -G76/ -G77-
5 Self-locking nut, 10 Nm
6 Hexagon nut, 4 Nm
=> Page 152



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7 Rear left/rear right vehicle level sender -G76/ -G77-

- Removing and installing => Page 152 and

=> Electrical System; Repair Group 94; Exploded View of Automatic Headlight Range Control; Removing and installing rear left vehicle level sender -G76 Exploded View of Automatic Headlight Range Control Removing and installing rear left vehicle level sender -G76

- Checked by self-diagnosis

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control Self-diagnosis of automatic headlight range control

- Perform headlight basic setting following replacement

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control; Basic setting Self-diagnosis of automatic headlight range control Basic setting

8 Bracket

Replacing vehicle level sender in vehicle

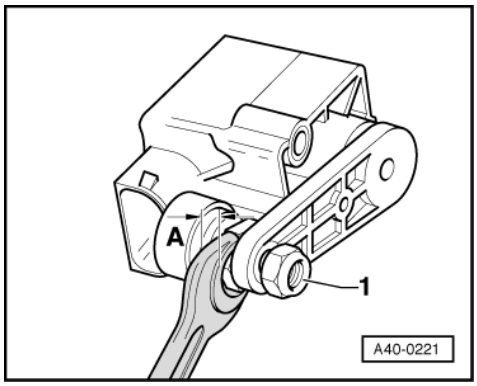
Removing

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

Notes:

- Removal and installation of rear axle or lower link involves unfastening connecting link of rear left/rear right vehicle level sender -G76/ -G77 at lower link.

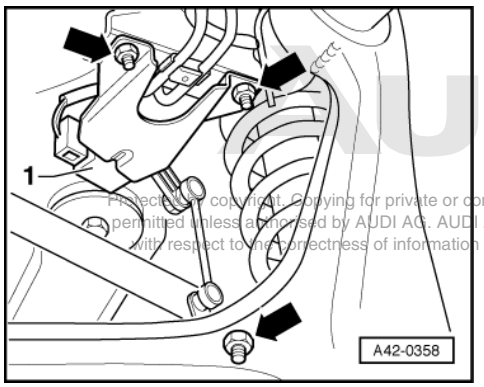


- -> For attaching connecting link to crank of rear left/rear right vehicle level sender -G76/ -G77, use 10 mm open-ended wrench with dimension -A- = 4 mm so as not to damage seal.

- Dimension -A- = 4 mm

1 - Tightening torque: 4 Nm

- Remove wheel.



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- -> Unscrew nuts -arrows-.
- Remove vehicle level sender -1-.

Installing

Install in reverse order.

Tightening torque of nuts -arrows- => Page 149

On installing headlight range control, ensure correct mutual positioning of crank and connecting link.

Note:

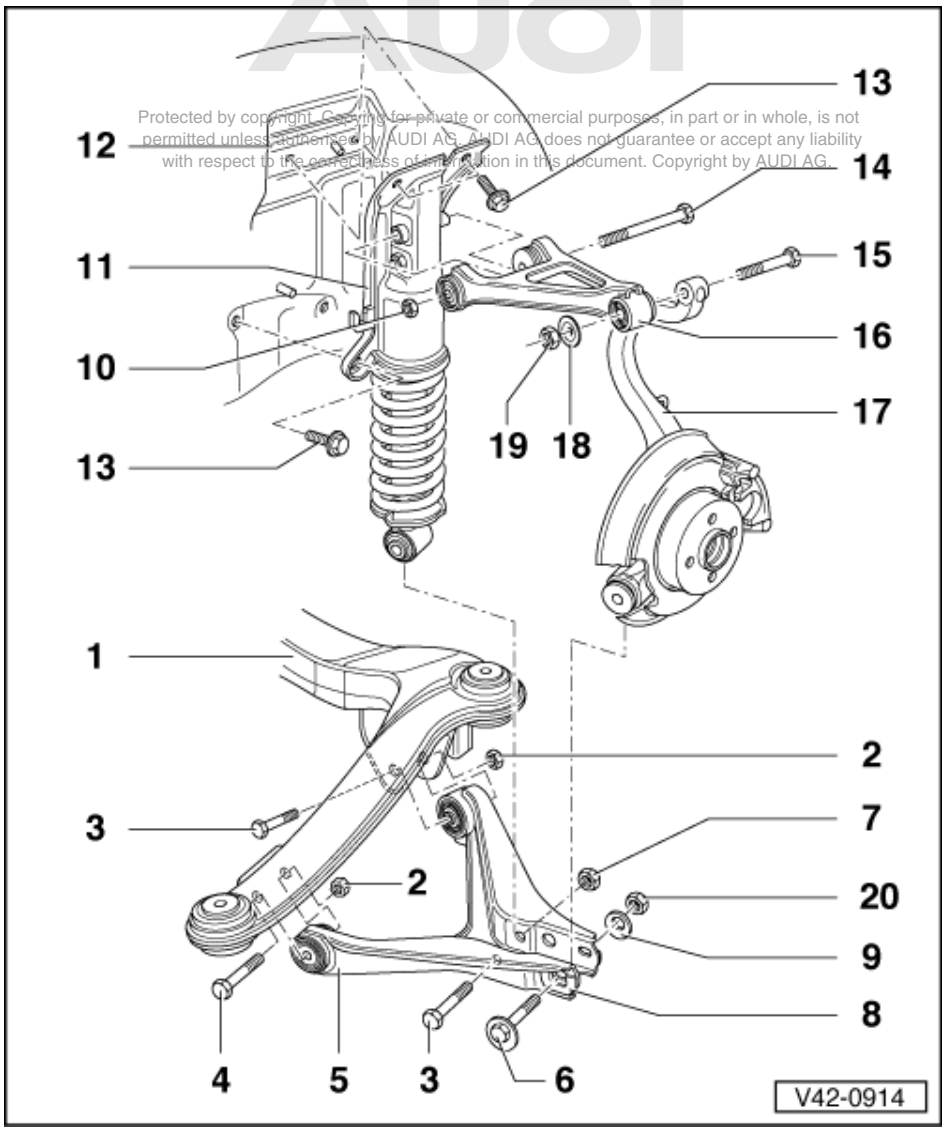
- Connecting link must be vertical
- Crank must face outwards at bottom

- Perform headlight basic setting following replacement.

=> Electrical System; Repair Group 01; Self-diagnosis of automatic headlight range control; Basic setting Self-diagnosis of automatic headlight range control Basic setting

5 - Servicing rear axle

5.1 - Servicing rear axle



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5.2 - Servicing rear axle (four-wheel drive vehicles)

5.3 - Layout of rear axle components (four-wheel drive vehicles)

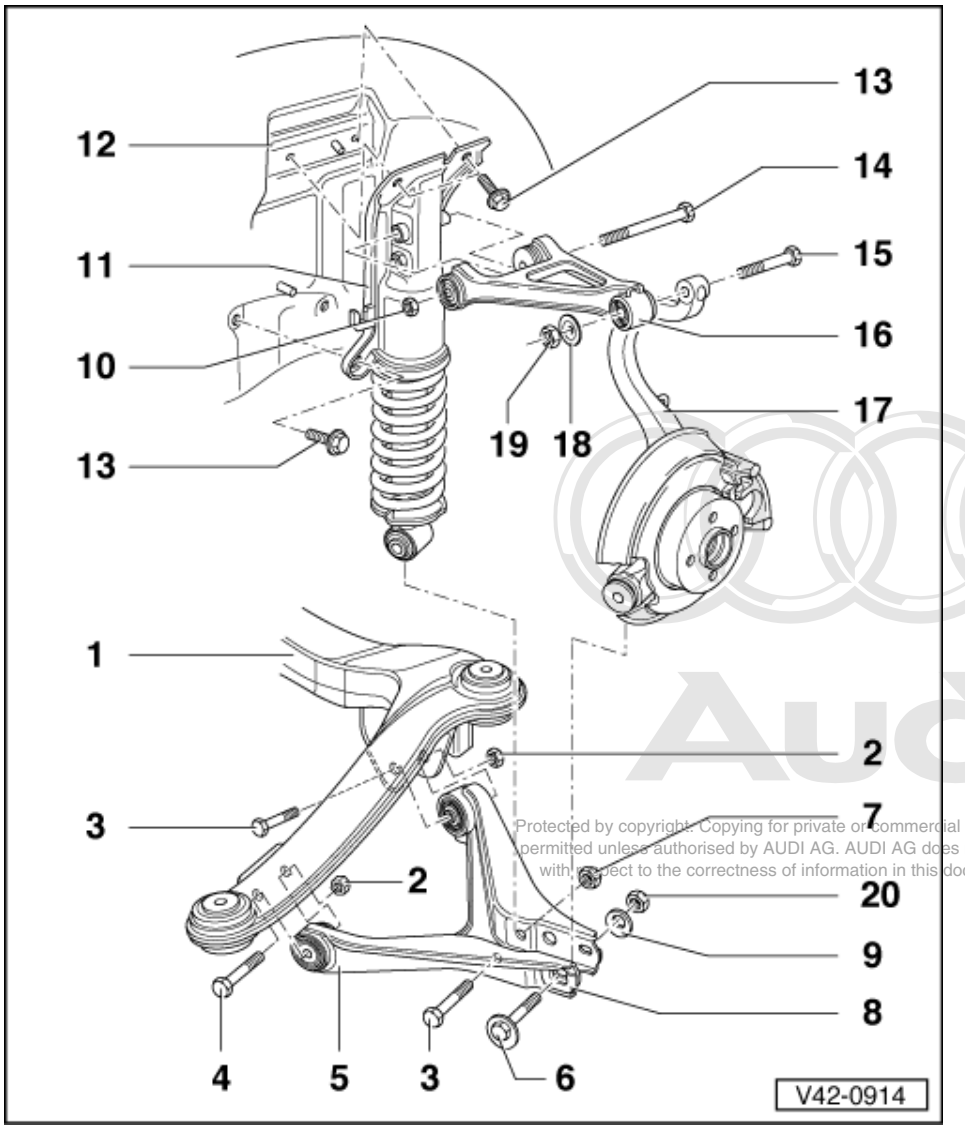
Note:

Axle components are not to be welded and straightened.

- Always replace self-locking nuts.
- Bolted joints are only to be hand-tightened with power tools.

1 Rear subframe

- Adjusting camber and toe after replacing subframe => Page 227
- Servicing => Page 162
- For vehicles with headlight range control, heed notes on removal and installation => Page 149



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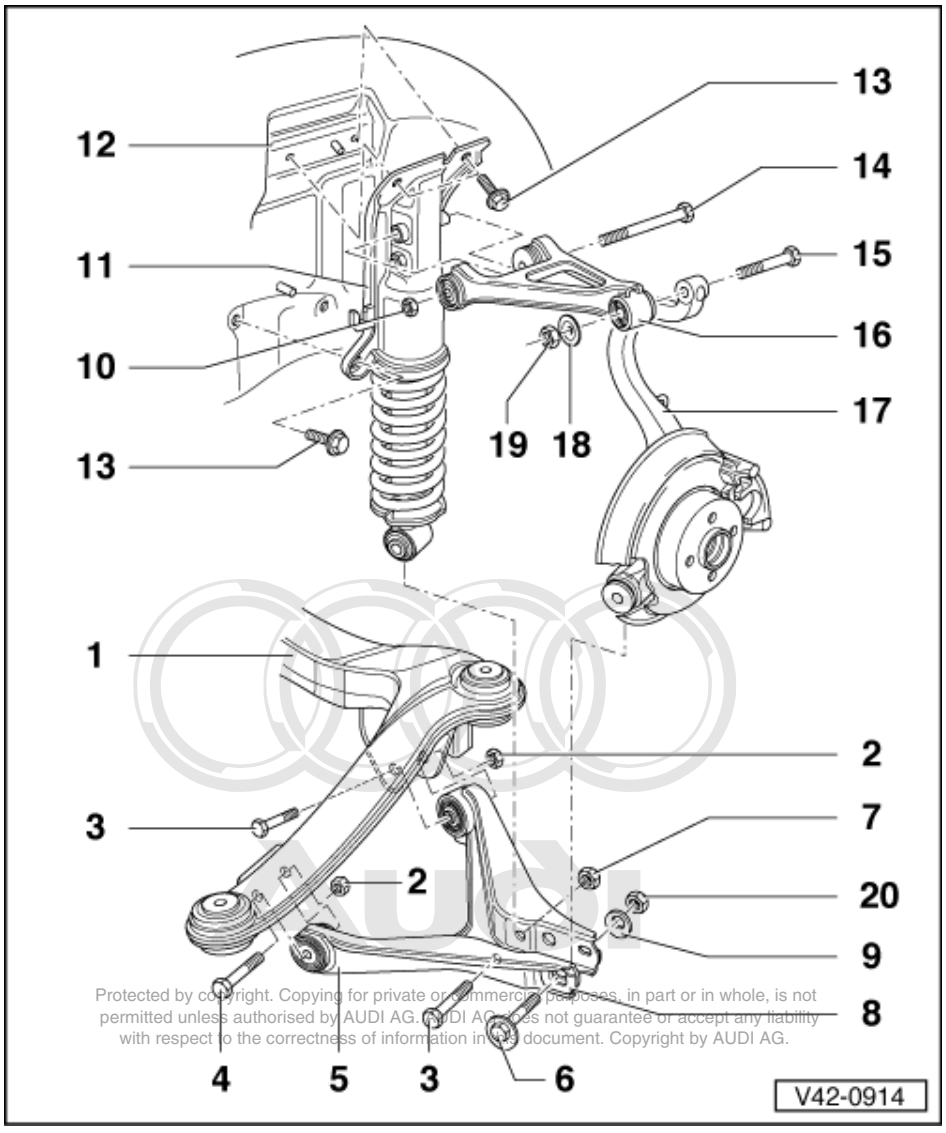
2 Self-locking nut

- Always replace
- 70 Nm + further 90° turn
- Vehicle must be standing on its wheels when tightening

3 **Hexagon bolt**
- Always replace

4 **Hexagon bolt**
- Always replace

5 **Lower link**
- For vehicles with headlight range control, heed notes on removal and installation => Page 149
- Removing and installing
  =>Page 186
- Servicing => Page 189



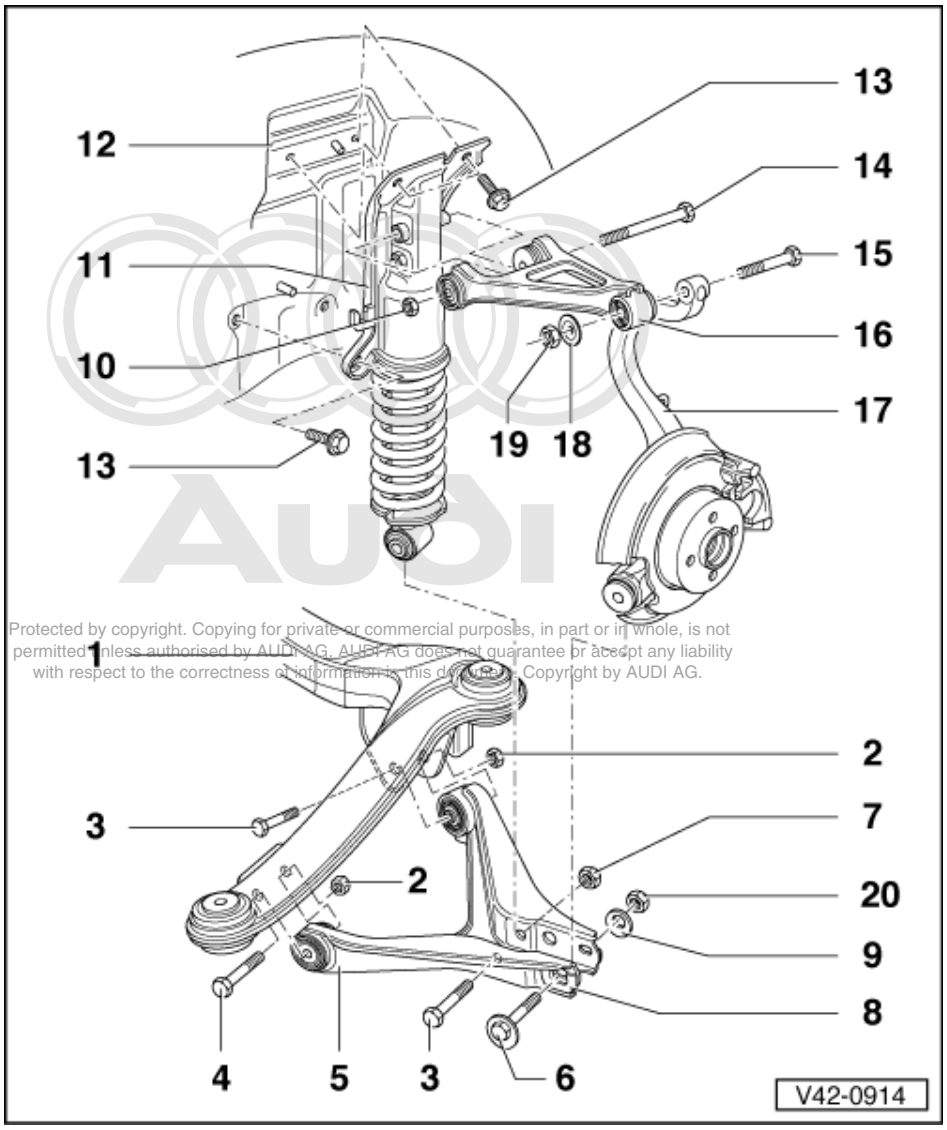
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6 **Eccentric bolt**
- Adjusting camber => Page 237
- Never turn more than 90° to left or right out of centre position (min. - max. adjustment)

7 **Self-locking nut**
- Always replace
- 70 Nm + further 90° turn
- Vehicle must be standing on its wheels when tightening

8 **Support bracket for adjusting camber**
- Welded to link on both sides
- Pay attention to correct positioning of eccentric bolt and washer

9 **Eccentric washer**



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10 Self-locking nut

- Always replace
- 50 Nm + further 90° turn
- Hold upper link in horizontal position when tightening nut
- Vehicle must be standing on its wheels when tightening

11 Suspension strut

- Removing and installing=>Page 171
- Servicing => Page 173

12 Wheel housing

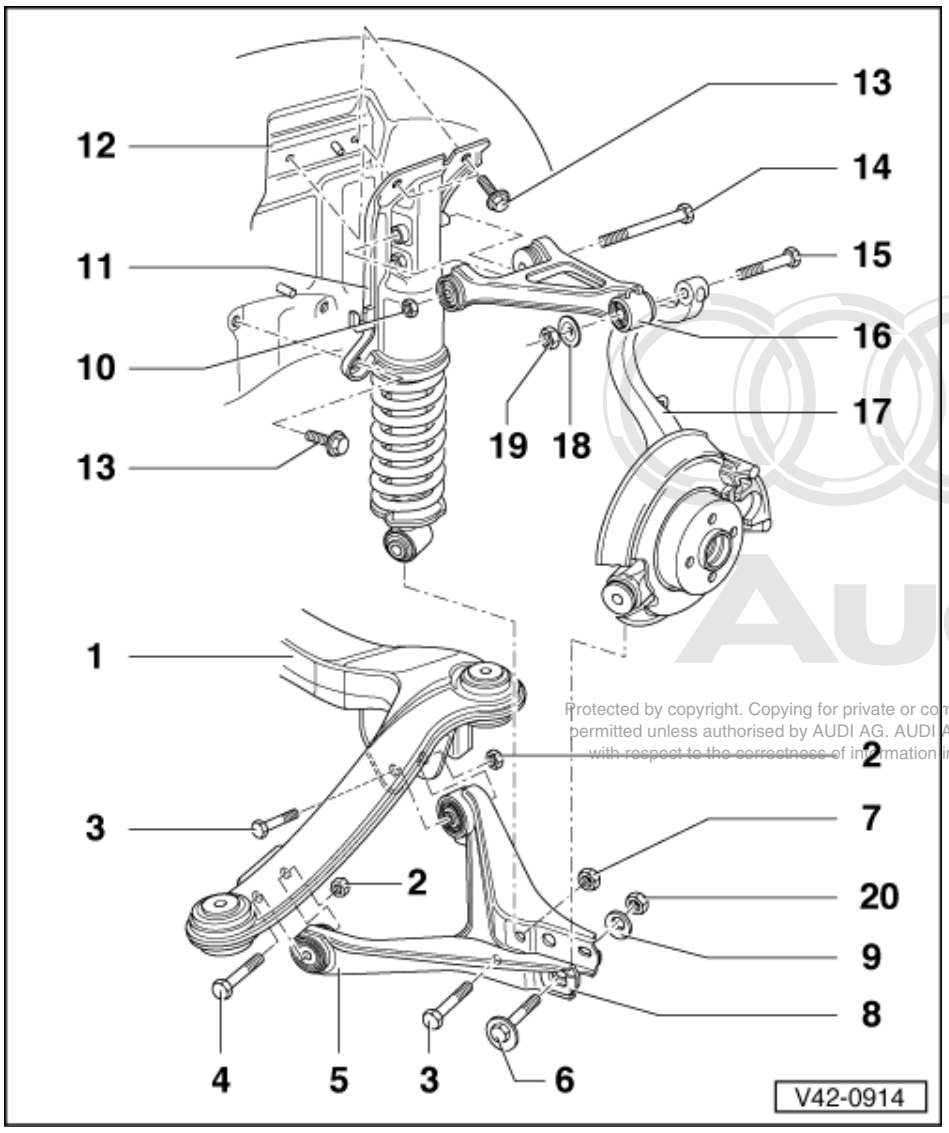
13 Hexagon combi bolt, 55 Nm

14 Hexagon bolt

- Always replace

15 Hexagon bolt

- Always replace



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16 Upper link

- Removing and installing=>Page 171
- Servicing => Page 183

17 Wheel bearing housing

18 Washer

- Always replace

19 Self-locking nut

- Always replace
- 50 Nm + further 90° turn

20 Self-locking nut, 95 Nm

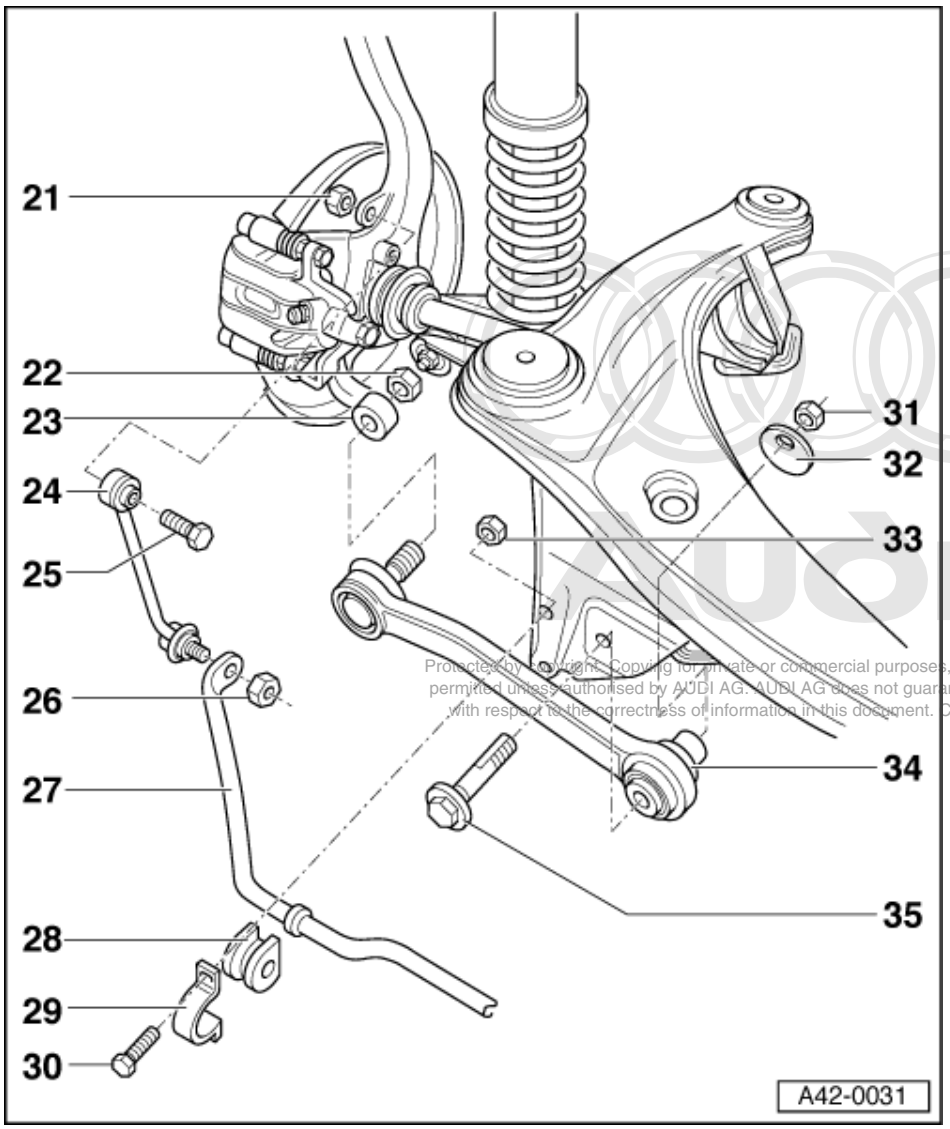
- Always replace

21 Self-locking nut

- Always replace

22 Self-locking nut, 50 Nm

- Always replace
- Vehicle must be standing on its wheels when tightening



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23 Wheel bearing housing

- Removing and installing
  => Page 210
- Servicing => Page 214

24 Connecting link

- For anti-roll bar

25 Hexagon bolt, 50 Nm

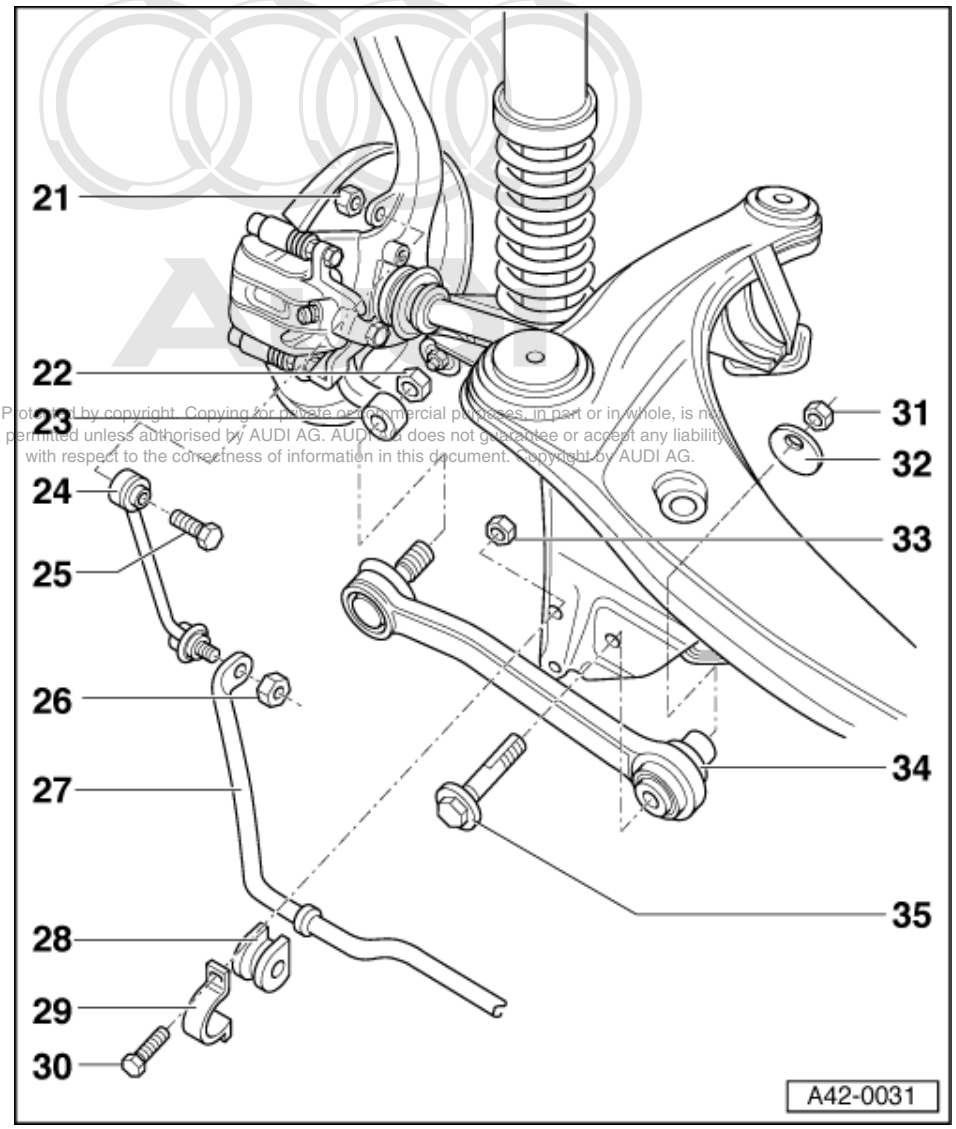
26 Self-locking nut, 40 Nm

- Always replace

27 Anti-roll bar

- Note different running gear versions => Page 160 , vehicle data sticker
- Explanation of code on data sticker:

- 1BA = Standard running gear



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28 Mount

- Note different running gear versions => Page 160 , vehicle data sticker
- Explanation of code on data sticker:

- 1BA = Standard running gear

29 Clamp

30 Hexagon bolt, 25 Nm

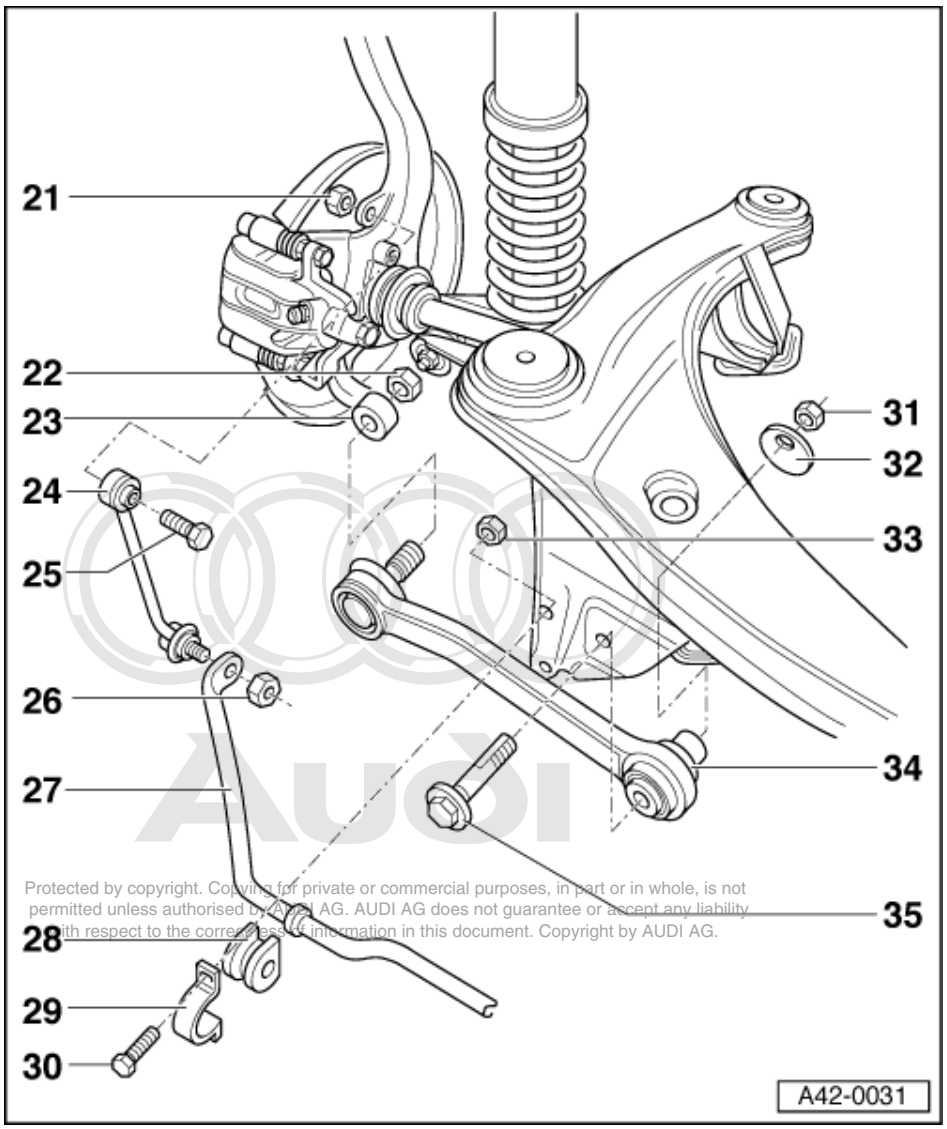
31 Self-locking nut, 90 Nm

- Always replace
- Vehicle must be standing on its wheels when tightening nut

32 Eccentric washer

33 Self-locking hexagon nut

- Always replace



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34 Track rod

- Performing wheel alignment after removal and installation of track rod => Page 227

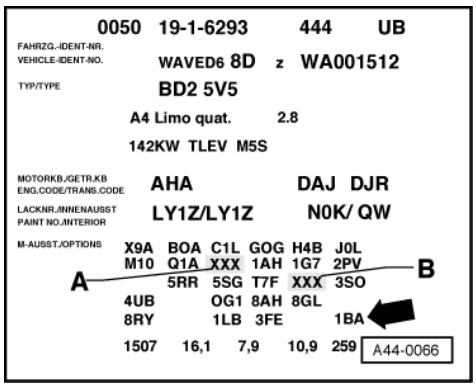
35 Eccentric bolt for adjusting toe

- Adjusting toe => Page 238
- Never turn more than 90° to left or right out of centre position (min. - max. adjustment)

Explanatory notes on factory codes (PR numbers)

At the start of MY 98, PR numbers were introduced to facilitate running gear/spring/shock absorber assignment.

The spring/shock absorber assembly installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.

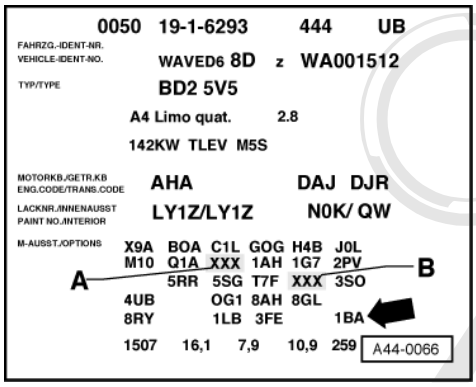


-> Example of vehicle data sticker

- - A - indicates PR no. for front axle
- - B - indicates PR no. for rear axle
- - Arrow - indicates PR no. for running gear versions

The vehicle data sticker can be found in the spare wheel well and in the Service booklet.

The PR no. can be used to find the correct spring/shock absorber combination in the Parts List.



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-> The PR no. for the different running gear versions can be seen from the Fig. -arrow-.

1BA = Standard running gear

1BB = Heavy-duty running gear (approx. 20 mm higher)

1BC = Special-purpose vehicles

1BD =Sports running gear (Audi S4)

RS4 = Sports running gear (RS4)

1BE = Sports running gear

1BV = Sports running gear (quattro GmbH)

1BQ = Sports running gear (South Africa)

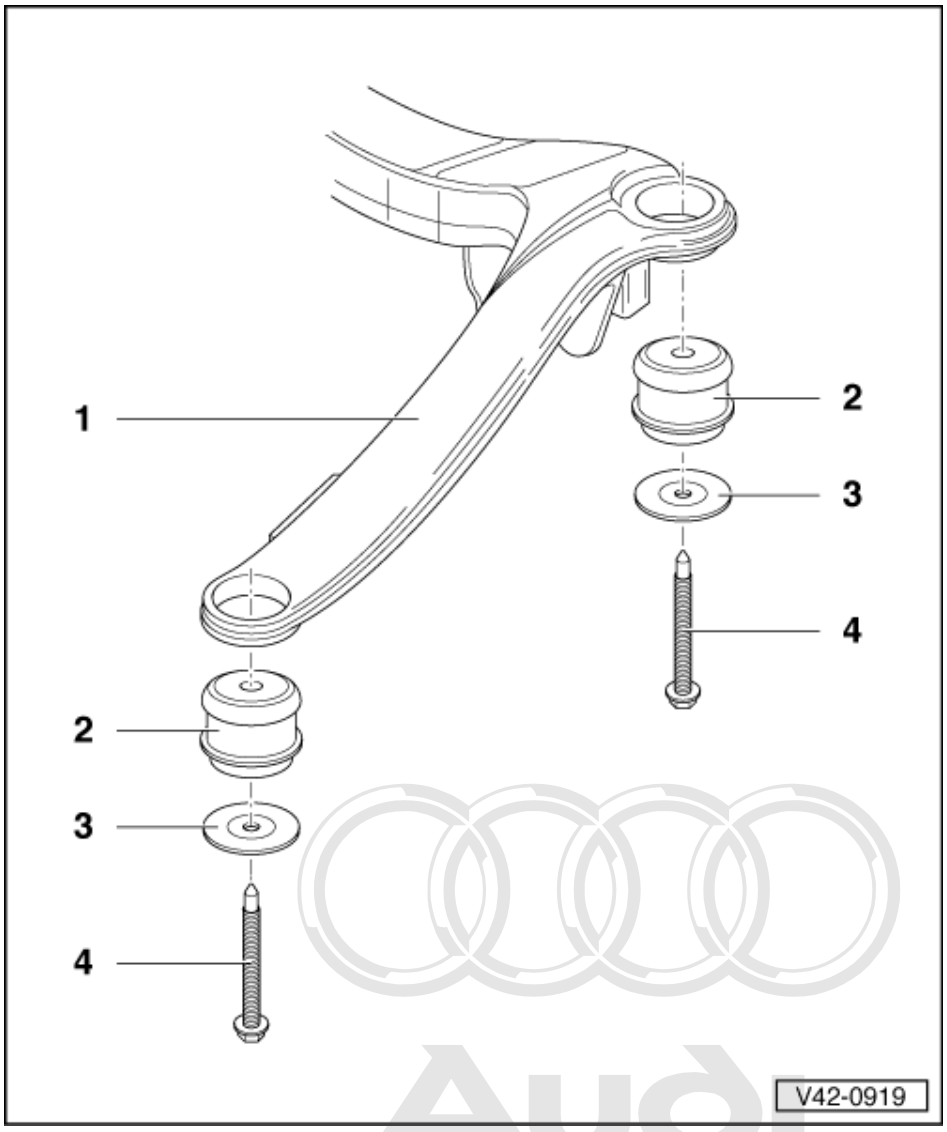
1BT = Heavy-duty running gear (approx. 7 mm higher)

1BP = Heavy-duty running gear (trim position as for 1BA, however with limited bump travel)

5.4 - Servicing subframe

Special tools and workshop equipment required

- 3392 Assembly device
- 3392/1 from assembly device
- 3392/2 from assembly device
- 3392/3 from assembly device
- 3392/4 from assembly device
- 3392/5 from assembly device



Notes:

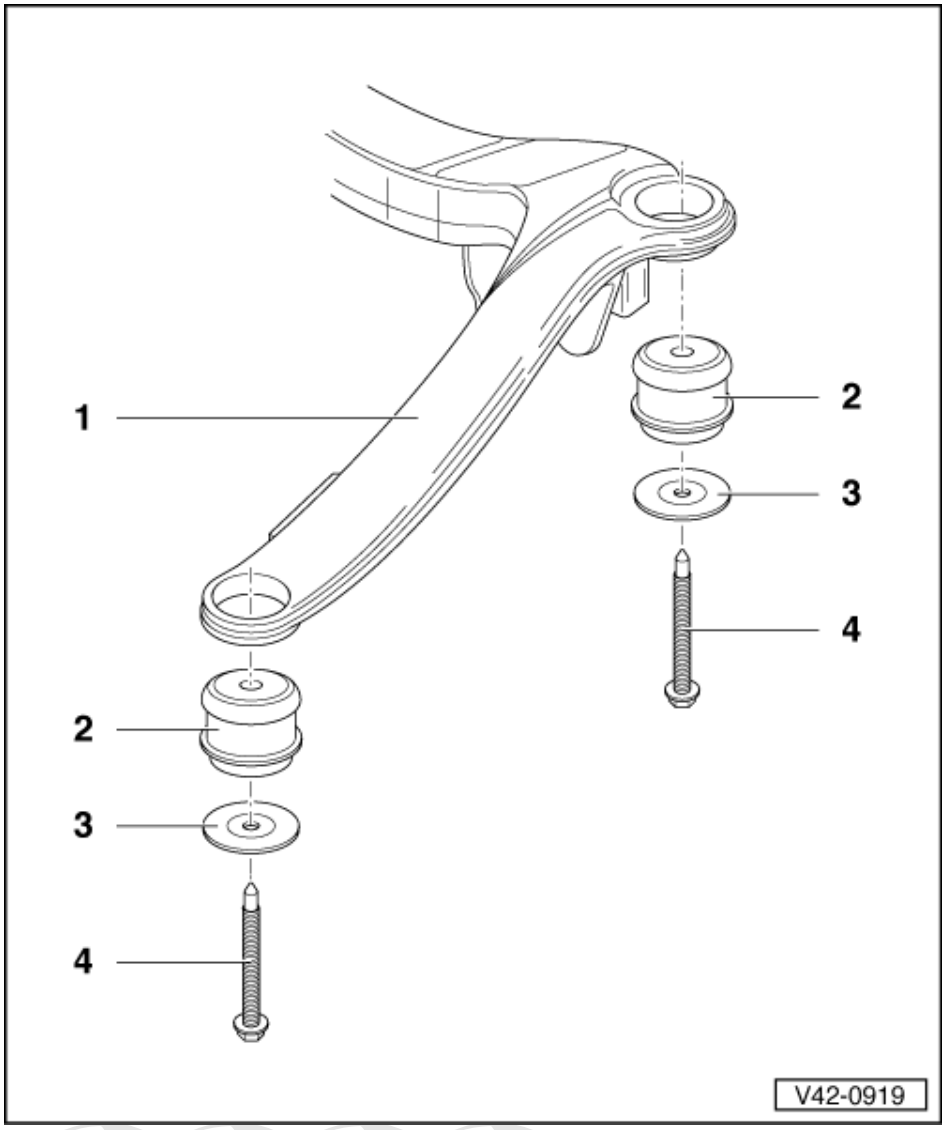
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- Loadbearing and suspension elements are not to be welded and straightened.
- Bolted joints are only to be hand-tightened with power tools.

1 Subframe

- Tightening sequence => -Item 4 -
- 1. Rear right
- 2. Rear left
- 3. Front right
- 4. Front left

- Performing wheel alignment after removal and installation of subframe => Page 227



2 Bonded rubber bush

- Extracting front bush =>Fig. 1
- Fitting front bush => Fig. 2
- Extracting rear bush=>Fig. 3
- Fitting rear bush => Fig. 4
- Installation position => Fig. 5

Note:

Apply assembly lubricant G 294 421 A1 before fitting

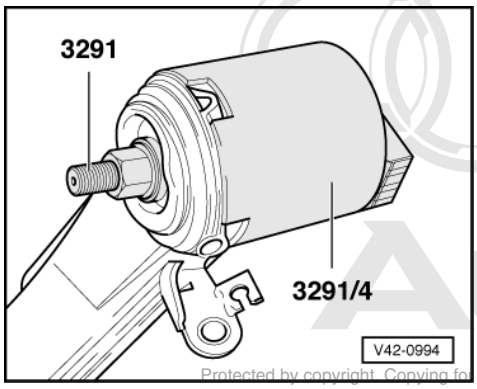
3 Packing plate

- Always replace
- Ribbed side faces upwards

4 Hexagon combi bolt

- Always replace
- 110 Nm + further 90° turn

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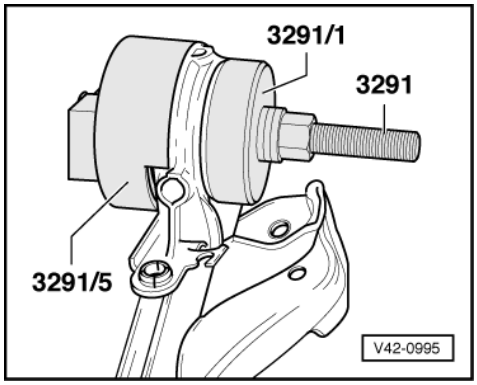
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-> Fig.1 Extracting front bonded rubber bush from subframe

- Apply tube 3291/4 (heed recesses) with threaded stem 3291 to subframe at right angles.
- Position the two brass washers with annular grooves next to one another on threaded stem 3291. Attach packing plate and screw on hexagon nut. Extract bonded rubber bush by turning hexagon nut.

Note:

Insert hexagon head of threaded stem 3291 in recess of tube 3291/4. Grease annular grooves of brass washers and threaded stem.



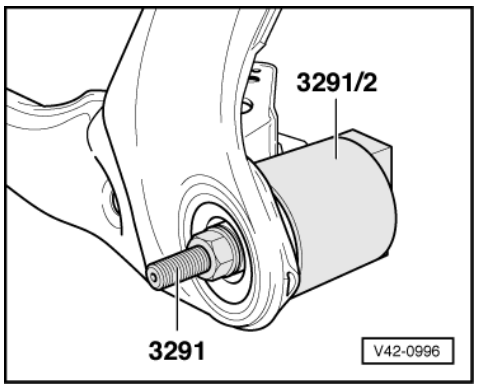
-> Fig.2 Fitting front bonded rubber bush in subframe

Use lubricant G 294 421 A1, for example, when pressing in bonded rubber bushes.

- Position thrust pad 3291/1 on bonded rubber bush and insert with tube 3291/5 (heed recesses) and threaded stem 3291 in subframe hole at right angles.
- Position the two brass washers with annular grooves facing one another on threaded stem 3291.
- Attach packing plate and screw on hexagon nut.
- Draw in bonded rubber bush as far as it will go by turning hexagon nut; whilst doing so, hold thrust pad 3291/1 and bonded rubber bush by hand to prevent turning.

Note:

Insert hexagon head of threaded stem 3291 in recess of tube 3291/5. Grease annular grooves of brass washers and threaded stem.

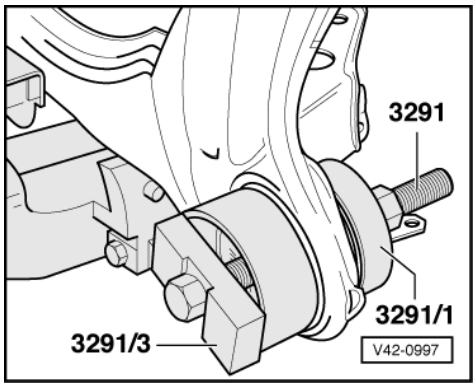


-> Fig.3 Extracting rear bonded rubber bush from subframe

- Apply tube 3291/2 with threaded stem 3291 at right angles to subframe. Position the two brass washers with annular grooves next to one another on threaded stem 3291. Attach packing plates and screw on hexagon nut. Extract bonded rubber bush by turning hexagon nut.

Note:

Insert hexagon nut of threaded stem 3291 in recess of tube 3291/2. Grease annular grooves of brass washers and threaded stem.



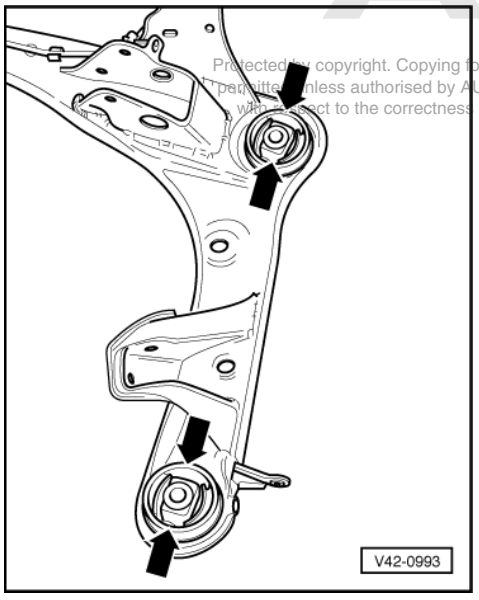
-> Fig.4 Fitting rear bonded rubber bush in subframe

Use lubricant G 294 421 A1, for example, when pressing in bonded rubber bushes.

- Position thrust pad 3291/1 on bonded rubber bush and insert with tube 3291/3 and threaded stem 3291 in subframe hole at right angles.
- Position the two brass washers with annular grooves next to one another on threaded stem 3291.
- Attach packing plate and screw on hexagon nut.
- Draw in bonded rubber bush as far as it will go by turning hexagon nut; whilst doing so, hold thrust pad 3291/1 and bonded rubber bush by hand to prevent turning.

Note:

Insert hexagon head of threaded stem 3291 in recess of tube 3291/3. Grease annular grooves of brass washers 3291/1 and threaded stem.



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-> Fig.5 Installation position of bonded rubber bushes in rear subframe

Note:

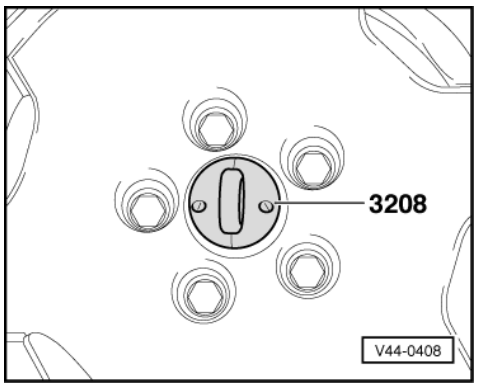
Kidney-shaped recesses (arrows) must be facing in direction of vehicle longitudinal axis. Deviations of max. 10° to left or right are permissible.

5.5 - Removing and installing rear axle

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1383 A Engine/gearbox lifter
- V.A.G 1752/1 Spring tensioner
- V.A.G 1752/3 Spring holder

Removing



- Remove rear centre console.

=> General Body Repairs; Repair Group 70; Shelves/Trim, Removing and installing rear centre console Shelves/Trim, Removing and installing rear centre console

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Unscrew both rear wheels.

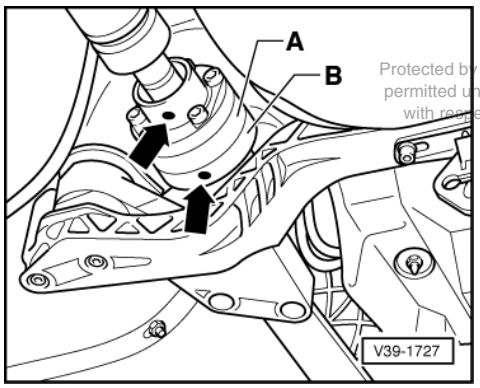
- Separate exhaust system at clamp and remove rear section of exhaust system.

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

Note:

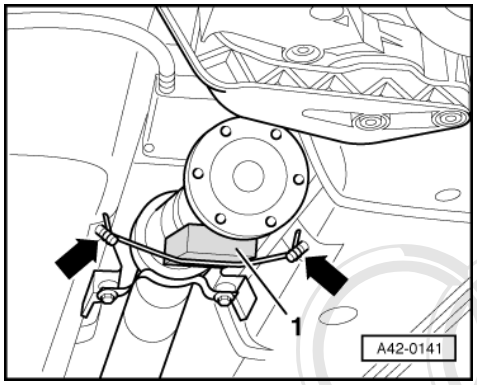
To avoid damage, decoupling element in front exhaust pipe is never to be kinked by more than 10 °.

- Remove rear heat shield for propshaft.
- If necessary, tie exhaust pipe with catalytic converter to propshaft centre bearing.



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- -> Check for factory mark (coloured dot -arrows-) at propshaft and at flange/propshaft at rear final drive. If there is no coloured dot, make coloured mark to identify position of propshaft flange -A- with respect to rear final drive -B-.



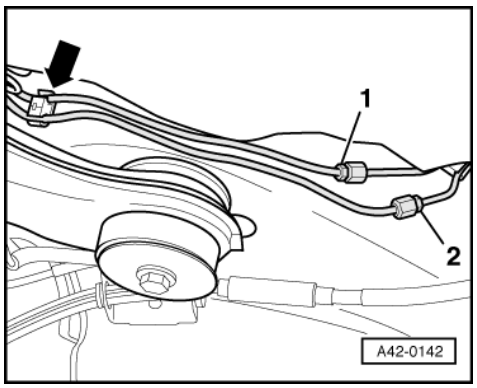
- Slacken off bolts of propshaft flange.
- -> Tie propshaft with wire to underside of vehicle -arrows-. Place wooden block -1- beneath propshaft.
- Remove handbrake cables.

=> Brake System; Repair Group 46; Removing and installing handbrake cables Removing and installing handbrake cables

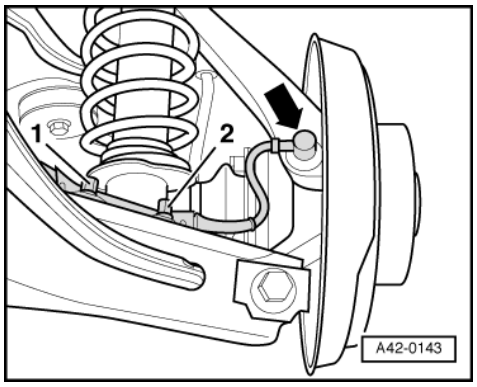
Note:

If same rear axle is to be re-installed, only disengage handbrake cables at handbrake lever, on underside of vehicle and at fuel tank. In this case, handbrake cables at rear axle and brake calipers are to be left engaged.

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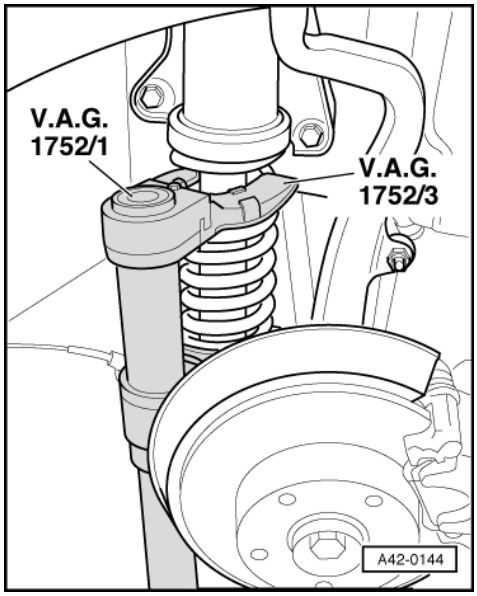


- -> Disconnect brake pipes at joints -1- and -2- on underside of vehicle at rear left.
- Unclip brake pipes from holder -arrow- on underside of vehicle.



- -> Unscrew -1- and -2- holders of wires to rear right and rear left speed sensors -G44 and -G46 at lower link.
- Pull rear right and rear left speed sensors -G44 and -G46 -arrow- out of wheel bearing housing.

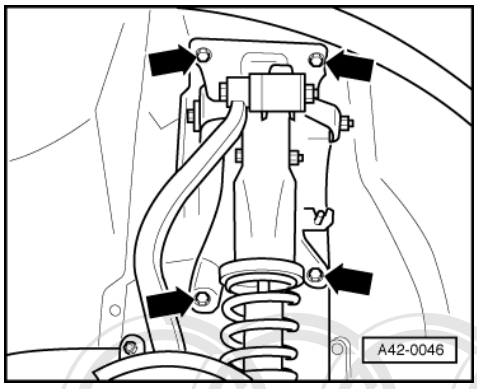
- Disengage wires to speed sensors at front of subframe.



- -> Apply spring tensioner V.A.G 1752/1 with spring holder V.A.G 1752/3 (with pads) at second and second last winding of coil spring.
- Pre-tension coil spring.

Notes:

- If applicable, pay attention to headlight range control =>Page 149 .
- Removal and installation of rear axle or lower link involves unfastening connecting link of rear left/rear right vehicle level sender -G76/ -G77 at lower link.



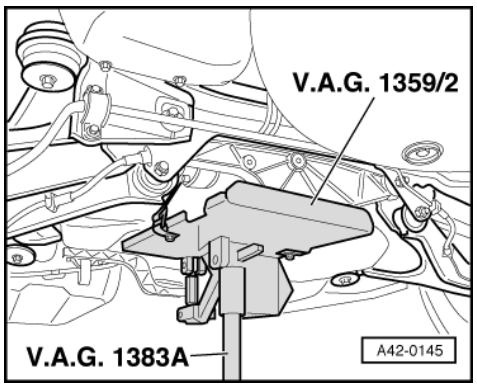
- -> Slacken off bolts -arrows- at adapter with coil spring still tensioned.
- Swivel top of suspension strut outwards and slacken off coil spring.

Notes:

- Take care not to damage edge of wheel housing.
- Unscrew opposite suspension strut from wheel housing in same manner.

- Unscrew bracket for exhaust system from final drive.

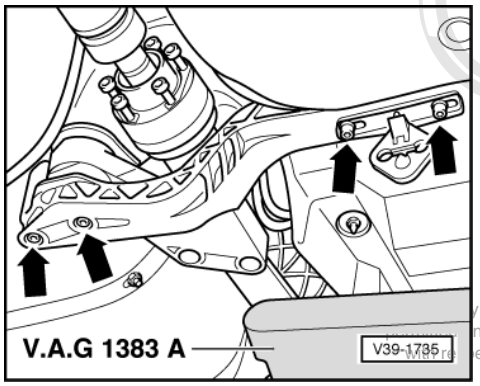
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- -> Support final drive with engine/gearbox lifter V.A.G 1383 A.
- Secure final drive with strap.

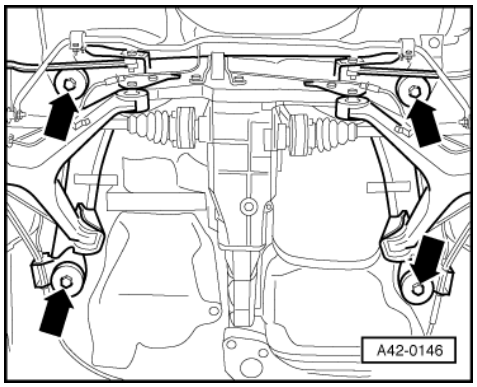
Note:

Take care not to damage fuel tank.



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- -> Screw out bolts -arrows- at front cross member for rear final drive.



- -> Slacken off 4 bolts -arrows- of subframe.
- Slowly lower subframe with final drive.

Note:

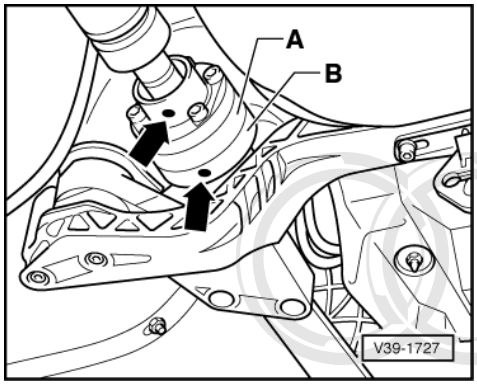
Take care not to damage edge of wheel housing.

Installing

Install in reverse order, paying attention to the following:

Remove any paint remnants, adhesive remnants and or/corrosion in thread/splines.

Notes:



- -> To prevent imbalance, flanges of propshaft -A- and rear final drive -B- must be fitted such that coloured marks are aligned -arrows-.
- Replace seal between propshaft and input flange (remove backing and bond seal to flange shaft). Bonding surface must be free from grease.
- Replace propshaft bolts (self-locking).

- Bleed brake system.

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=> Brake System; Repair Group 46; Bleeding brake system Bleeding brake system

- Adjust handbrake.

=> Brake System; Repair Group 46; Removing and installing handbrake lever Removing and installing handbrake lever

- Perform stress-free alignment of exhaust system.

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Replace the 4 subframe bolts and corresponding washers.
- Pay attention to installation position of washers: Ribbed side faces upwards
- Attach connecting link of rear left/rear right vehicle level sender -G76/ -G77 to lower link =>Page 149 .
- Fit and secure wheels => Page 220 .
- Perform wheel alignment => Page 227 .

Tightening torques

Component	Nm
Subframe to body	110 + 90°1)2)
Adapter for suspension strut to body	55
Propshaft to final drive (input flange) M8	55
Front cross member for rear final drive to body M10	40
Front cross member for rear final drive with exhaust system bracket to body M8	20
Drive shaft to rear final drive M10	80
Connecting link of rear left/rear right vehicle level sender -G76/ -G77 to lower link	103)

1) Replace bolt

2) 90°corresponds to quarter turn

3) Replace nut

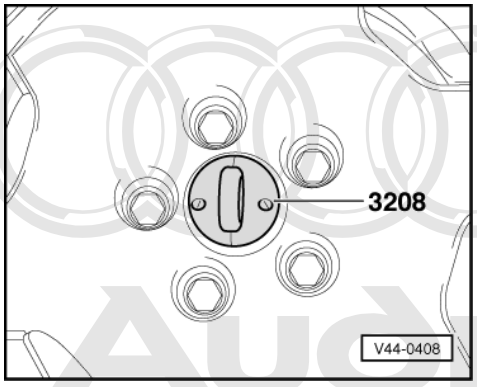
6 - Suspension strut and upper link

6.1 - Suspension strut and upper link

6.2 - Removing and installing suspension strut and upper link

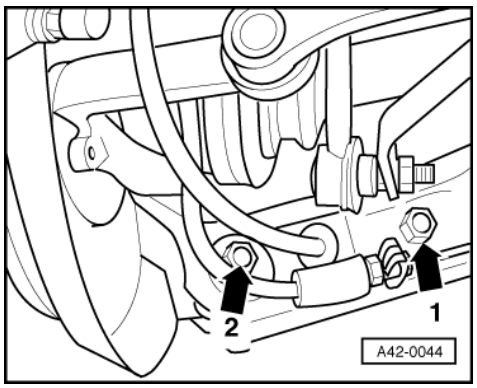
Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

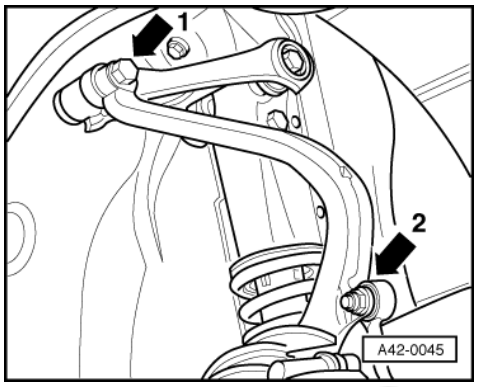


- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Slacken off wheel bolts.
- Raise vehicle.
- Remove wheels.

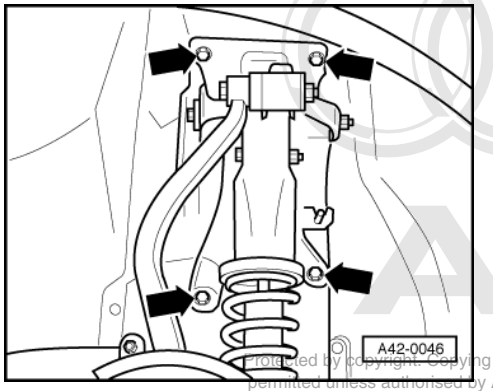
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- -> Remove lower link/suspension strut bolted joint -arrow 1-.



- -> Remove wheel bearing housing/upper link bolted joint -arrow 1-.



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- -> Unscrew (arrows) adapter bolts, press down wheel bearing housing and take out suspension strut with link.
- Remove shock absorber/upper link bolted joint and detach link.

Installing

Install in reverse order.

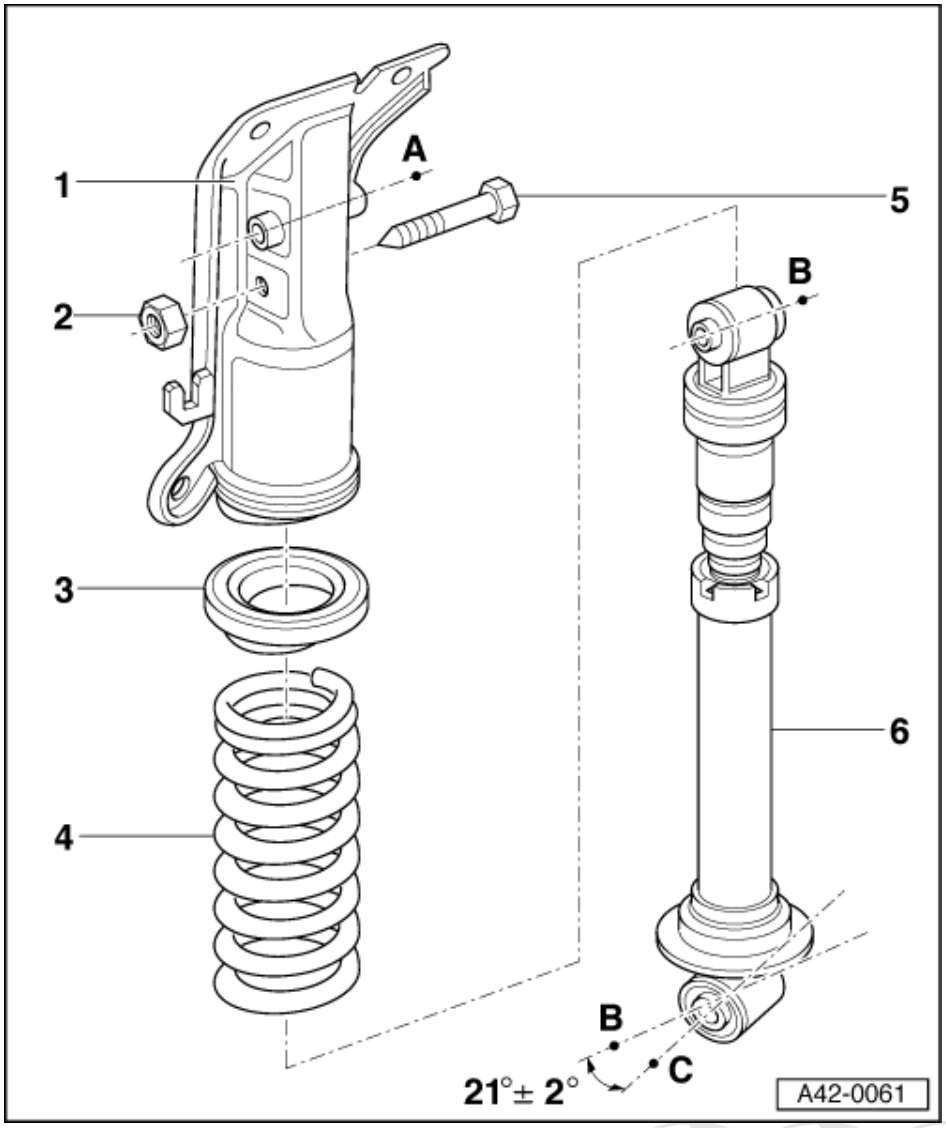
For bolts and washers to be replaced as well as tightening torques, refer to => Page 154 .

- Fit and secure wheels => Page 220 .
- Perform wheel alignment => Page 227 .

Wheel bearing housing/upper link and shock absorber/lower link bolted joints must be secured with vehicle standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.

6.3 - Servicing suspension strut



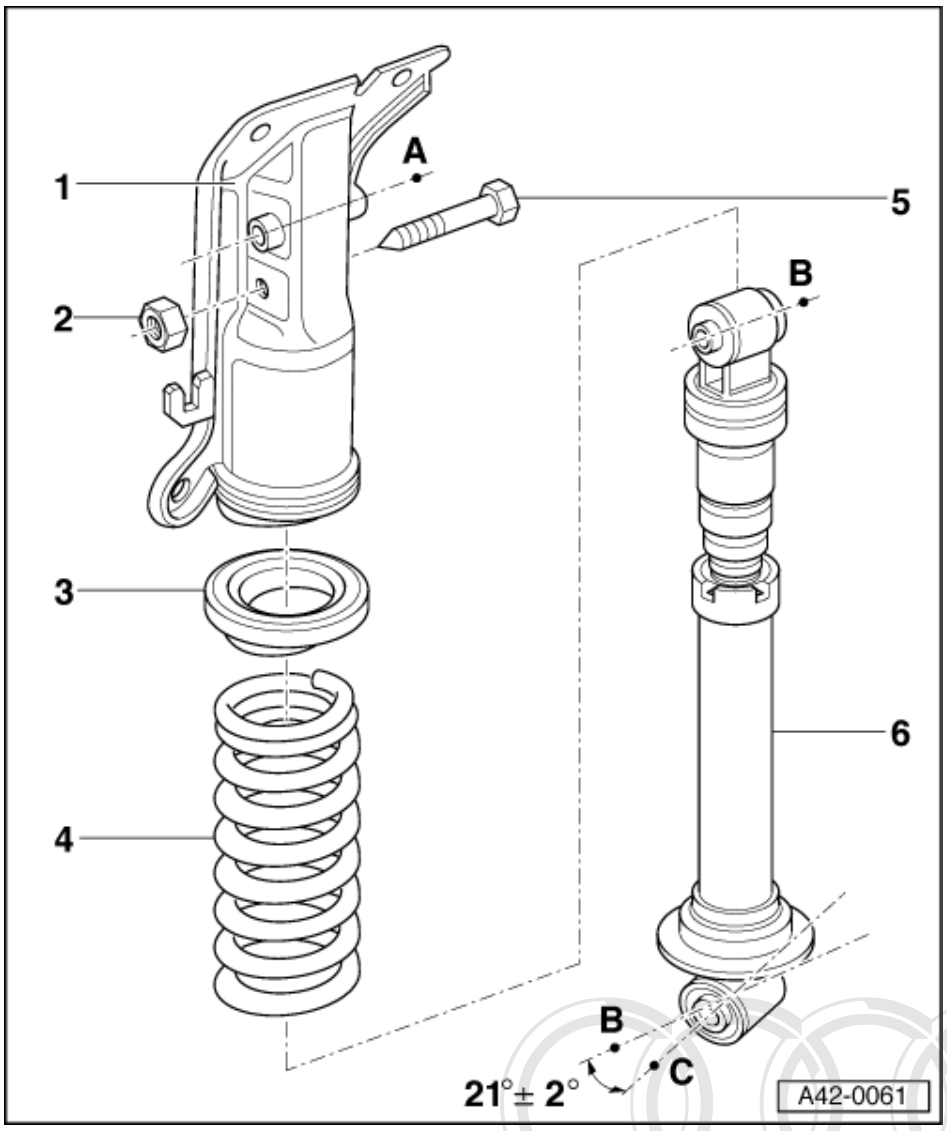
Dismantling and assembling suspension strut => Page 175

1 **Adapter**
- Different version on left and right

2 **Self-locking nut**
- Always replace
- 70 Nm + further 90° turn

3 **Damping ring**
- Attach to coil spring such that stop makes contact with end of spring

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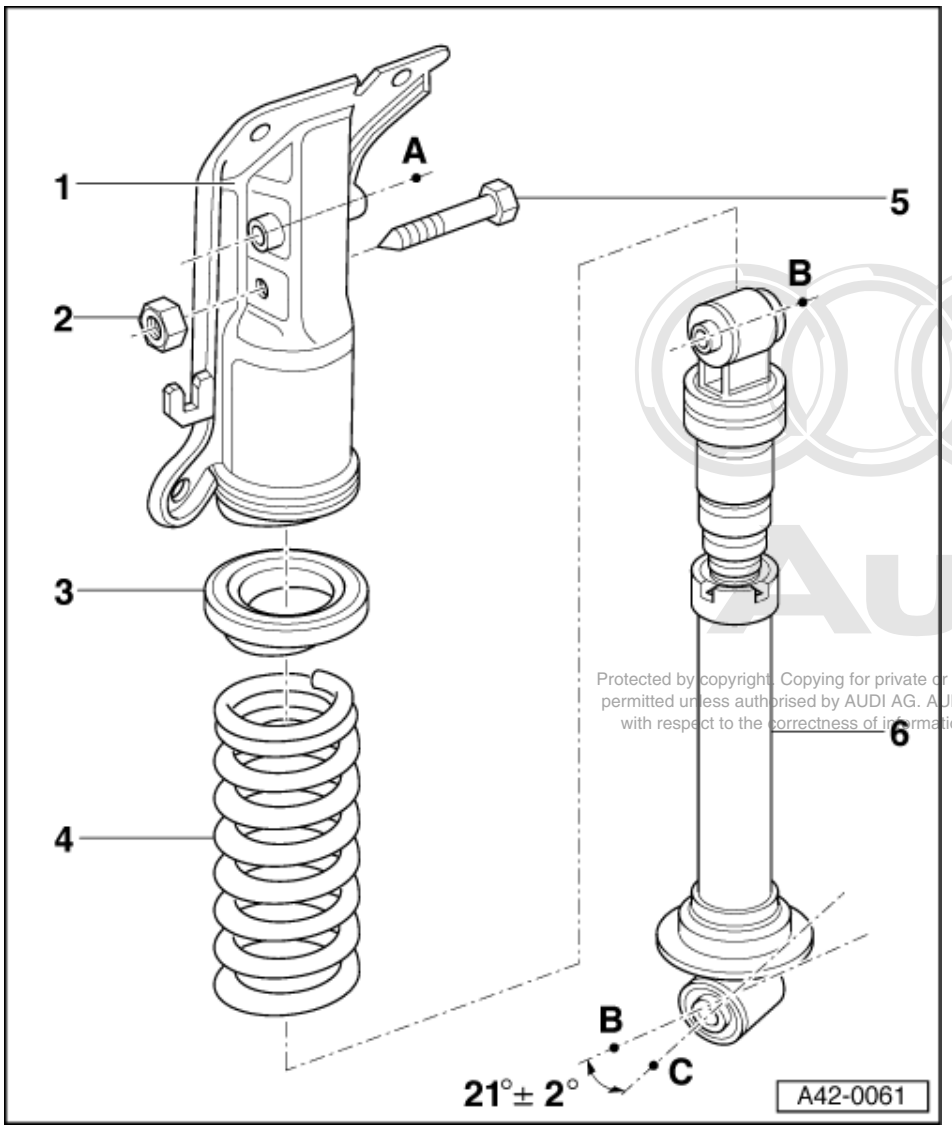
4 Coil spring

- Always replace on both sides
- Note different coil spring versions
  => Page 148 , vehicle data sticker
- Attach to shock absorber and turn such that end of winding makes contact with stop of lower spring plate
- Installation position: Coloured mark on spring points downwards towards spring plate
- If suspension strut has been fitted correctly, lower end of spring faces rear on left and front on right

5 Hexagon bolt

- Always replace

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6 Gas-filled shock absorber

- Checking => Page 6
- Assignment

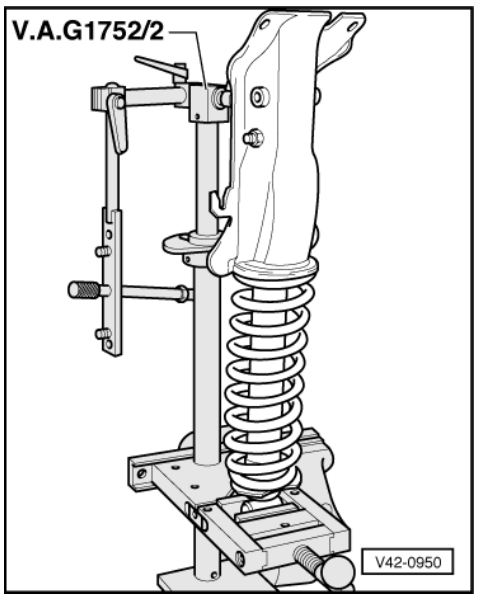
=> Parts List

- Replacement part supplied with pressed-on lower spring plate
- Before scrapping defective shock absorbers, always ensure gas release and draining => Page 4
- Pay attention to the following on assembly: Axis -B- to axis -A-, -Item - 1 , 0° and axis -B- to axis -C- 21° ± 2°

Dismantling and assembling suspension strut

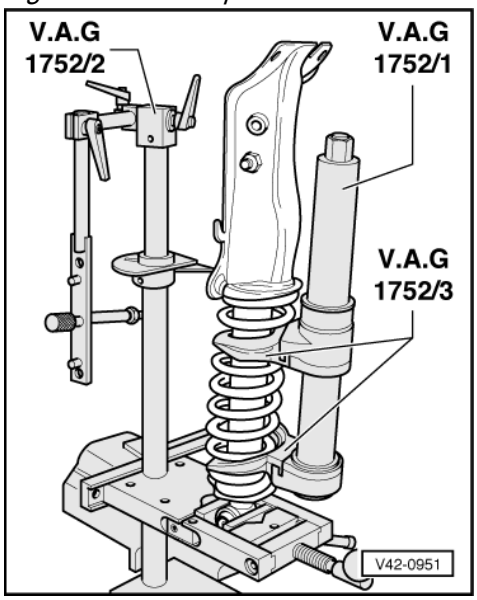
Special tools and workshop equipment required

- V.A.G 1332 Torque wrench
- V.A.G 1752/1 Spring tensioner
- V.A.G 1752/2 Suspension strut holder
- V.A.G 1752/3 Spring holder

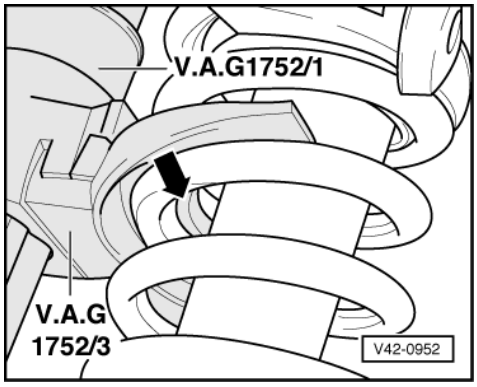


- Remove suspension strut => Page 171 .
- -> Insert suspension strut in spring tensioner V.A.G 1752.

Note:
Fig. shows left suspension strut.

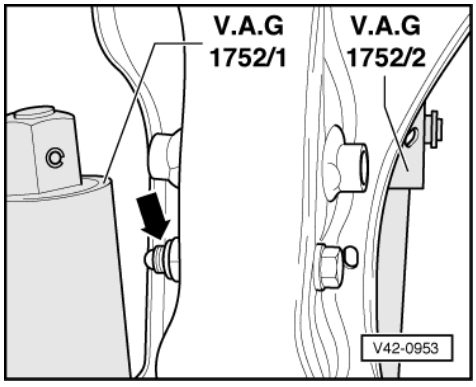


- -> Insert V.A.G 1752/1 in coil spring.

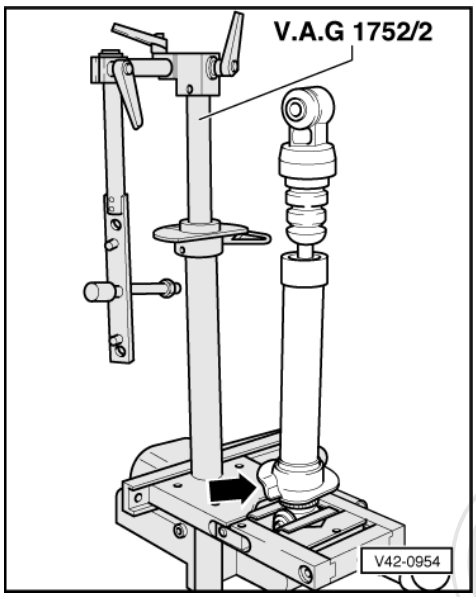


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- -> Make sure coil spring is correctly positioned in adapter -V.A.G 1752/3 -arrow-.
- Pre-tension coil spring with tensioner -V.A.G 1752/1- until upper shock absorber mount is free.



- -> Unscrew nut -arrow- and take out bolt.
- Detach adapter and damping ring.
- Detach pre-tensioned spring with tensioner V.A.G 1752/1.
- Take defective shock absorber out of spring tensioner V.A.G 1752 and treat accordingly prior to scrapping => Page 4 .

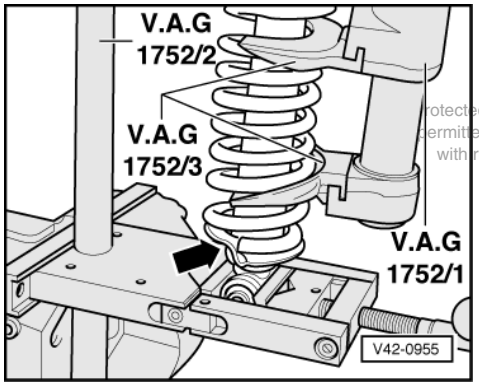


Assembling

- -> Clamp new shock absorber in spring tensioner V.A.G 1752 as shown.

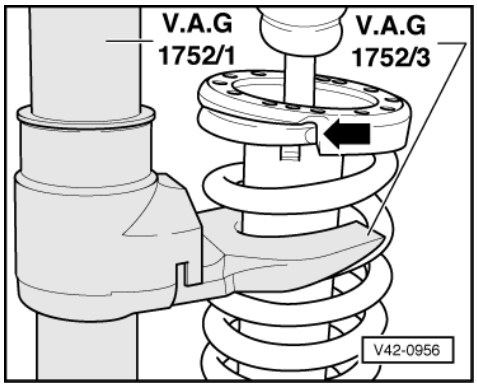
Note:

Pay attention to position of shoulder at lower spring plate -arrow-.

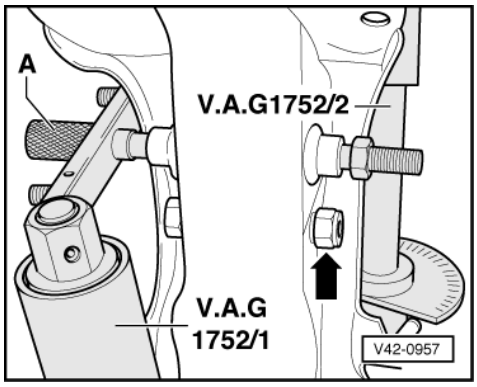


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- -> Pre-tension new coil spring with tensioner V.A.G 1752/1.
- Position pre-tensioned coil spring on shock absorber such that coloured marking on coil spring faces downwards towards spring plate and end of winding makes contact with stop of spring plate -arrow-.



- -> Fit damping ring such that end of spring winding makes contact with stop of damping ring -arrow-.

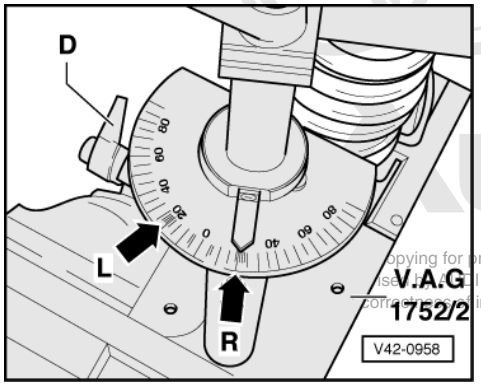


- Fit adapter.
- -> Insert bolt in adapter and loosely screw on nut -arrow-.

Note:

Nut faces in direction of travel.

- Insert locating pin -A- in adapter and secure loosely with nut.

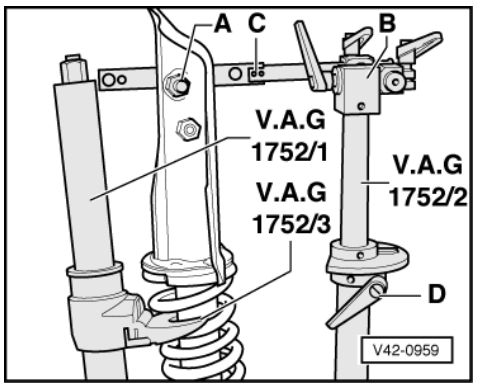


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- -> Turn adapter accordingly until pointer on scale of spring tensioner V.A.G 1752 indicates 21° ± 2° (locking bolt -D- loose) and ...
  - L = Left suspension strut
  - R = Right suspension strut

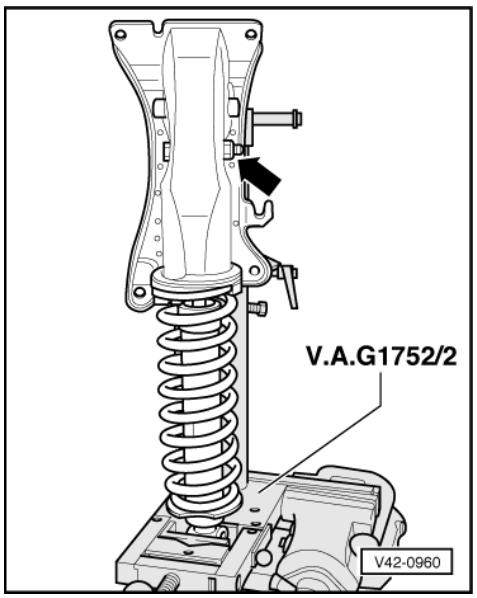
Note:

Fig. shows position of scale on assembling right suspension strut.



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- -> ... move lever arm -C- with locating pin -A- into horizontal position with respect to height adjuster -B-.
- Tighten locking bolt -D-.
- Slacken off coil spring and remove tensioner V.A.G 1752/1.
- Remove locating pin -A- from adapter at suspension strut.



- -> Tighten nut -arrow- to 70 Nm and then give a further 90° turn.
- Take suspension strut out of spring tensioner V.A.G 1752.

Note:

Fig. shows right suspension strut.

7 - Servicing upper link

7.1 - Servicing upper link

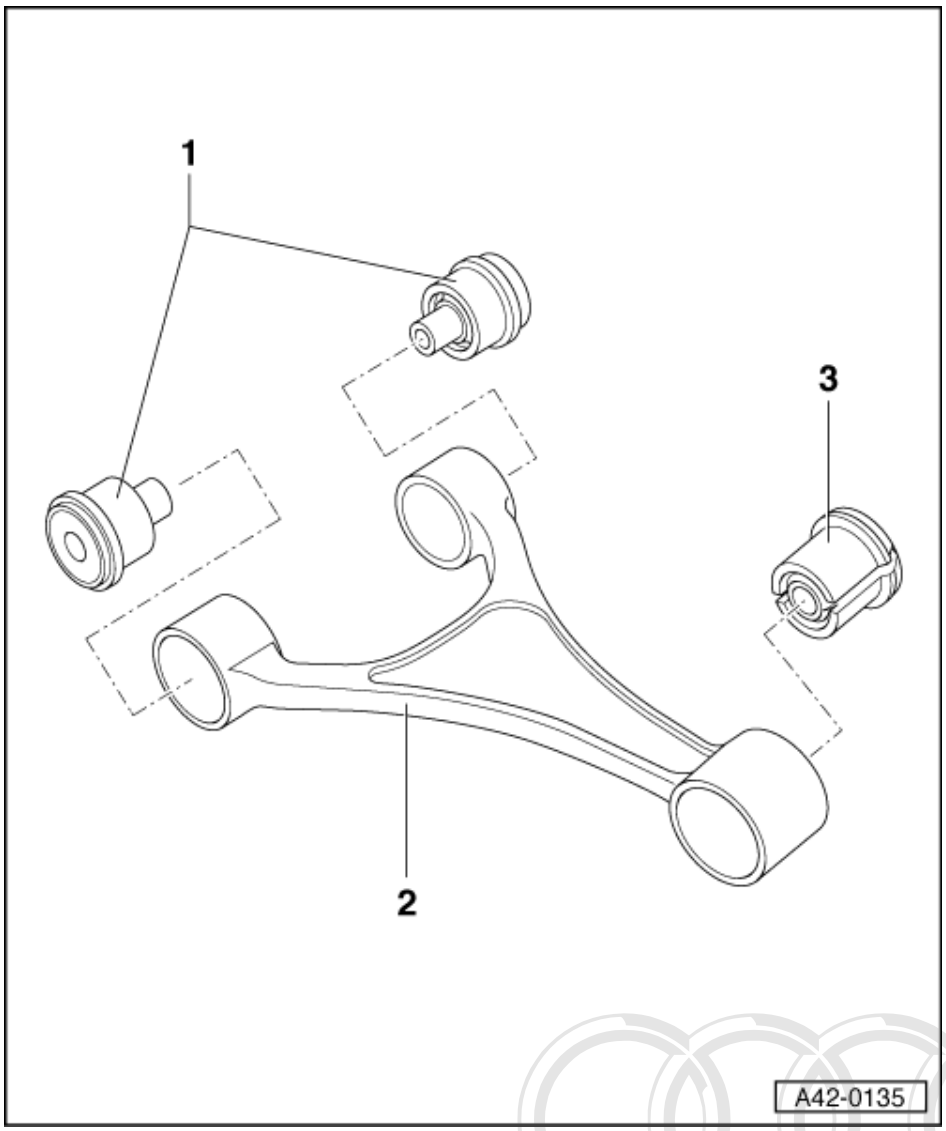
7.2 - Servicing forged upper link

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Special tools and workshop equipment required

- 3062 Thrust piece
- 3140 A Gripping wedges
- 3288/2 from assembly device
- 3292 Assembly device
- 3292/2 from assembly device
- 3292/4 from assembly device
- 3350 Assembly device
- 3350/2 from assembly device
- 10-203 Fitting tool
- 41-501 Drift sleeve
- VW 401 Pressure plate
- VW 412 Press tool

- VW 456 A/1 from bearing plate mount
- VW 457/1 from support rails
- VW 457/2 from support rails



1 Bonded rubber bush

- Pressing out => Fig. 1 and 2
- Pressing in => Fig. 4

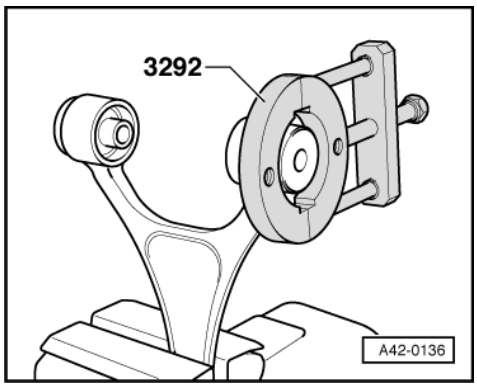
2 Link

- Replacement part is supplied with fitted bonded rubber bush
- Left and right identical

3 Bonded rubber bush

- Pressing out => Fig. 3
- Pressing in => Fig. 5
- No specified installation position for bush with slot in outer jacket

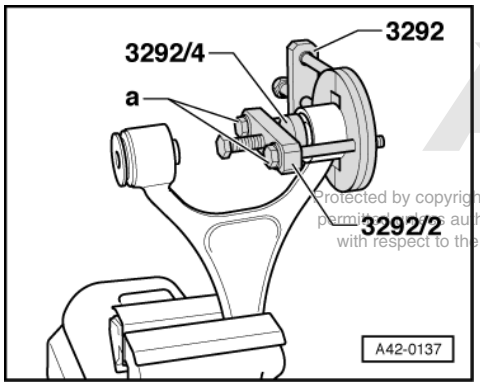
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-> Fig.1 Inserting assembly device in link

Take care not to damage surface of brake pipes.

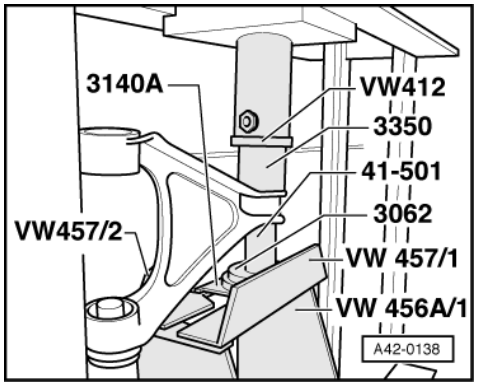
- Insert assembly device -3292- such that radii of both special tool jaws are positioned between bush and eye of link.
- Screw in threaded stem as far as it will go such that bonded rubber bush is pressed slightly off eye of link.



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-> Fig.2 Inserting thrust pad in link and pressing bonded rubber bush out of link

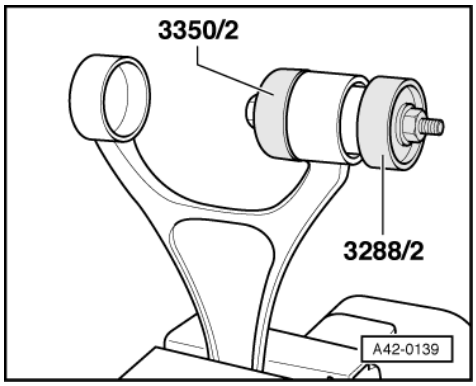
- Use hexagon bolts -a- (M10 x 80) to attach cross piece -3292/2- to assembly device -3292-.
- Align cross piece with thrust pad -3292/4-.
- Screw spindle into cross piece until bonded rubber bush is pressed out.



-> Fig.3 Pressing bonded rubber bush out of link

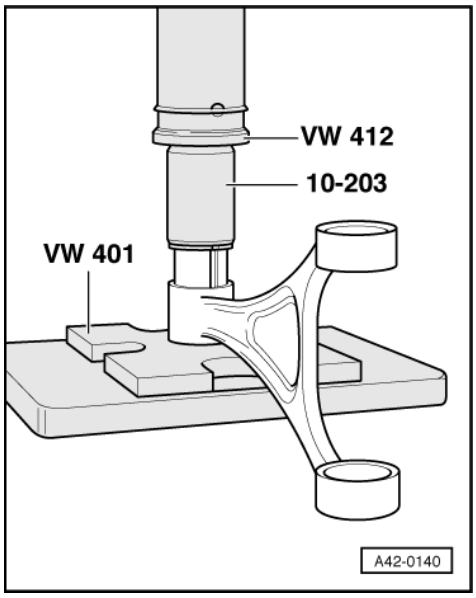
Note:

Take care to ensure exact positioning of drift sleeve -41-501-.



-> Fig.4 Fitting bonded rubber bush in link

- Position bonded rubber bush at right angles on link.
- Use hexagon bolt to screw on thrust pads -3288/2- and -3350/2- as shown and insert bush as far as it will go in eye of link.



-> Fig.5 Pressing bonded rubber bush into link

- Press home bush.

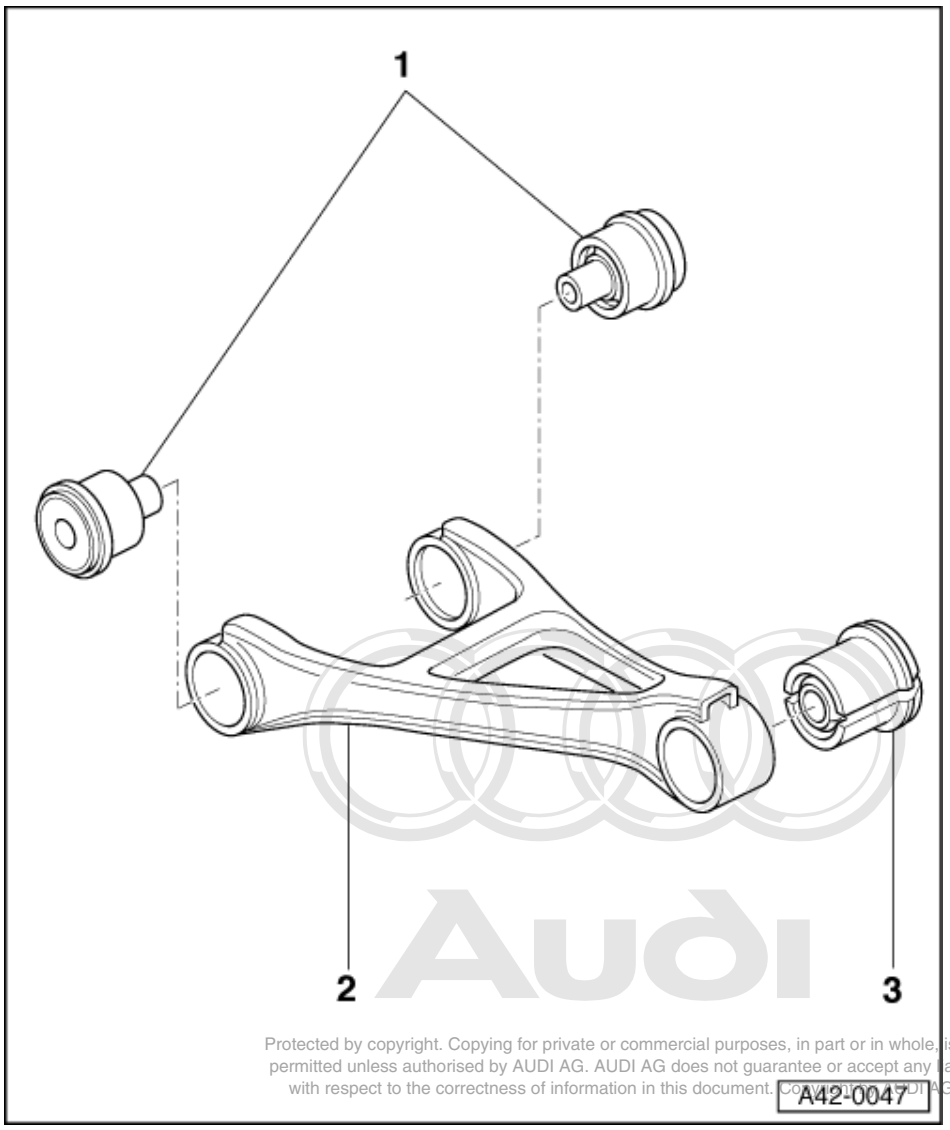
7.3 - Servicing sheet steel upper link

Special tools and workshop equipment required

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- 3062 Thrust piece
- 3111/11 from pressing-out and pressing-in tool
- 3140 A Gripping wedges

- 3288/2 from assembly device
- 3296 Tube
- 41-501 Drift sleeve
- VW 412 Press tool
- VW 415 A Tubular section
- VW 416 B Tubular section
- VW 456 A/1 from bearing plate mount
- VW 457/1 from support rails
- VW 457/2 from support rails
- VW 516 Tubular section



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1 Bonded rubber bush

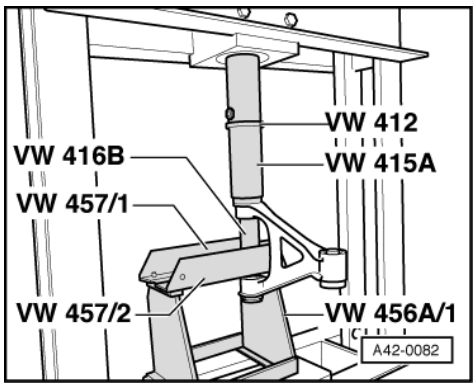
- Pressing out => Fig. 6
- Pressing in => Fig. 8

2 Upper link

- Replacement part is supplied with fitted bonded rubber bush
- Left and right identical

3 Bonded rubber bush

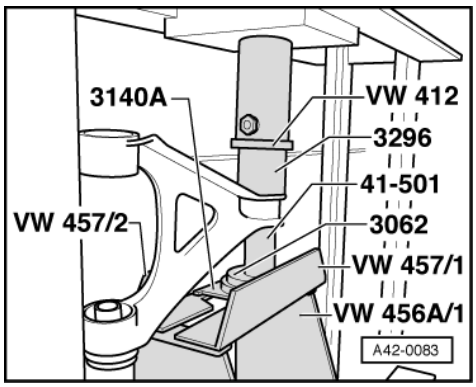
- Pressing out => Fig. 7
- Pressing in => Fig. 9
- No specified installation position for bush with slot in outer jacket



-> Fig.6 Pressing bonded rubber bush out of link

- Should tubular section -VW 416B- tilt on pressing out, release and re-apply.

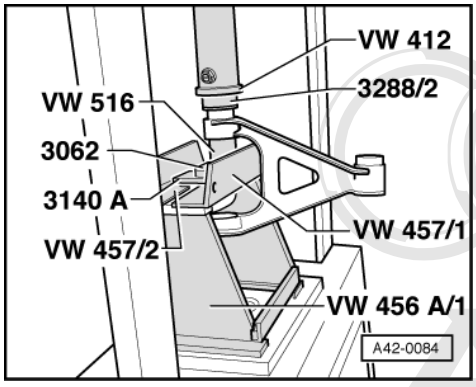
  Take care not to damage surface of link.



-> Fig.7 Pressing bonded rubber bush out of link

Note:

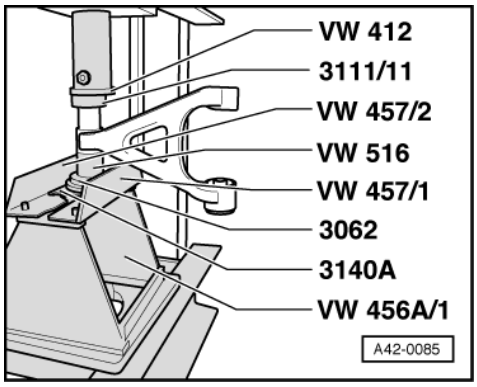
Take care to ensure exact positioning of drift sleeve -41-501-.



-> Fig.8 Pressing bonded rubber bush into link

- Position bonded rubber bush at right angles on link.
- Press home bush.

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-> Fig.9 Pressing bonded rubber bush into link

- Press home bush.

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8 - Lower link

8.1 - Lower link

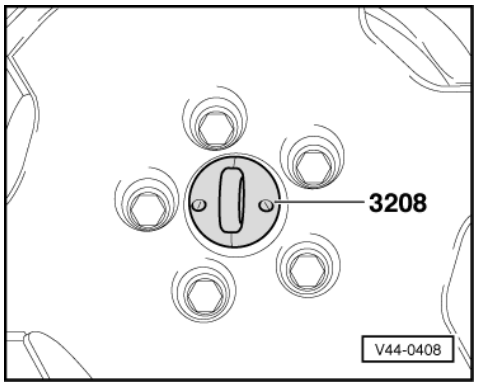
8.2 - Removing and installing lower link

Special tools and workshop equipment required

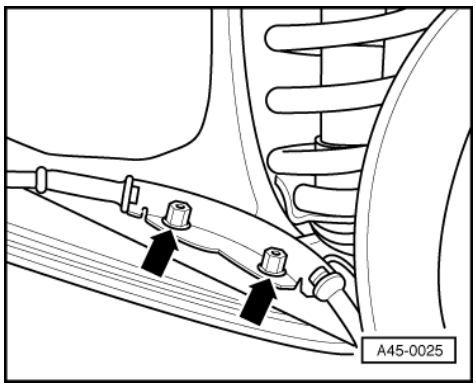
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- 3208 Suction grip

Removing

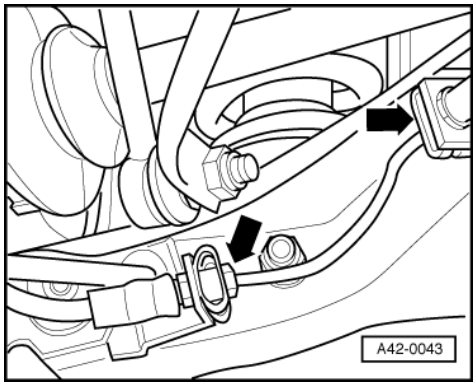
- Vehicle standing on its wheels over lifting platform



- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.
- Slacken off wheel bolts.
- Raise vehicle.
- Remove wheels.



- -> Unscrew speed sensor holder -arrows-.

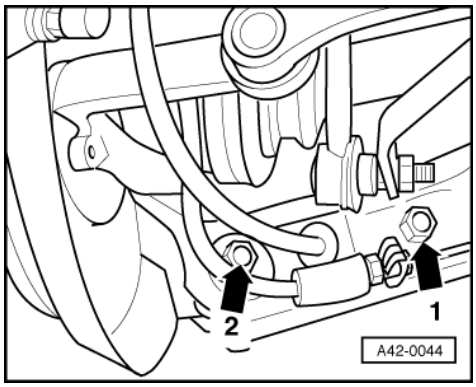


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- Draw off brake fluid from reservoir.
- -> Unscrew brake pipe at locations marked with -arrows- in Fig.

Notes:

- If applicable, pay attention to headlight range control =>Page 149 .



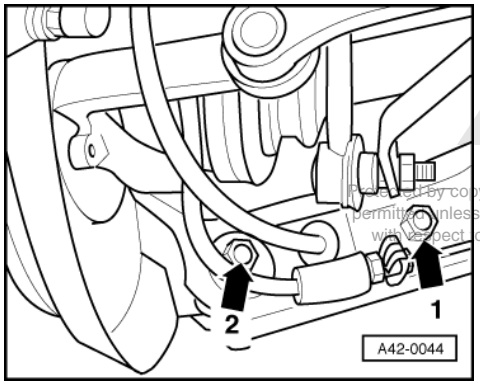
- Removal and installation of rear axle or lower link involves unfastening connecting link of rear left/rear right vehicle level sender -G76/ -G77 at lower link.

- -> Remove lower link/suspension strut bolted joint -arrow 1-.
- Remove parking brake cable from link.

=> Brake System; Repair Group 46; Removing and installing handbrake cables Removing and installing handbrake cables

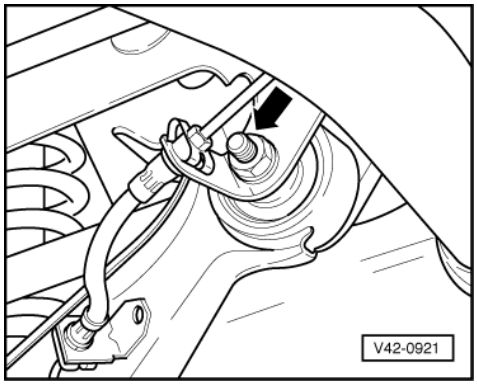
Note:

Do not pull on handbrake cable as this would alter handbrake setting.



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- -> Remove wheel bearing housing/lower link eccentric bolt -arrow 2-.



- -> Remove both subframe/lower link bolts -arrow-.

In the interests of clarity Fig. only shows one bolt.

- Take out link.

Installing

Install in reverse order.

For bolts and nuts to be replaced as well as tightening torques, refer to => Page 154 .

Tightening torques for brake pipe bolted joint

=> Brake System; Repair Group 47; Brake Pipes; Tightening torques Brake Pipes Tightening torques

- Bleed brake system.

=> Brake System; Repair Group 47; Bleeding brake system Bleeding brake system

- Pre-tighten bolted joint for wheel bearing housing/lower link and shock absorber/lower link to 20 Nm.

Wheel bearing housing/lower link and shock absorber/lower link bolted joints must be secured with vehicle standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.

- Attach connecting link of rear left/rear right vehicle level sender -G76/ -G77 to lower link => Page 149 .
- Fit and secure wheels => Page 220 .
- Slacken off wheel bearing housing/lower link and shock absorber/lower link bolted joints.
- Bounce vehicle several times.

- Tighten bolted joint for wheel bearing housing/lower link and shock absorber/lower link to prescribed torque.
- Check setting of handbrake and adjust handbrake if necessary.

=> Brake System; Repair Group 46; Removing and installing handbrake lever; Adjusting handbrake Removing and installing handbrake lever Adjusting handbrake

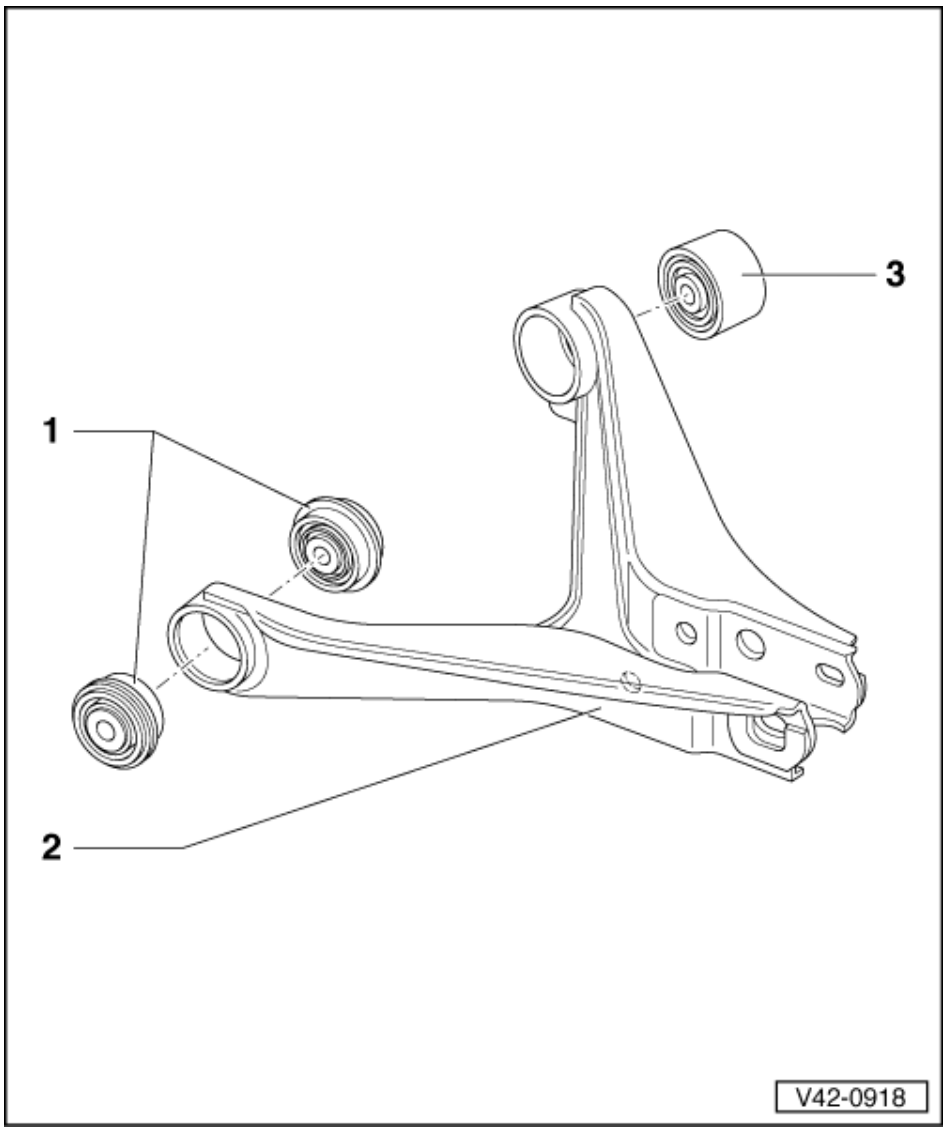
- Perform wheel alignment => Page 227 .

8.3 - Servicing lower link

Special tools and workshop equipment required

- 2010 Tubular section
- 3111/8 from pressing-out and pressing-in tool
- 3206 Thrust piece
- 3259 Tube
- 3293 Assembly device
- 3293/4 from assembly device
- 3301 Assembly device
- 3301/1 from assembly device
- 3349 Puller
- VW 401 Pressure plate
- VW 412 Press tool
- Kukko 15-0 Parting tool
- Kukko 18-0 Puller

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1 Rear bonded rubber bush

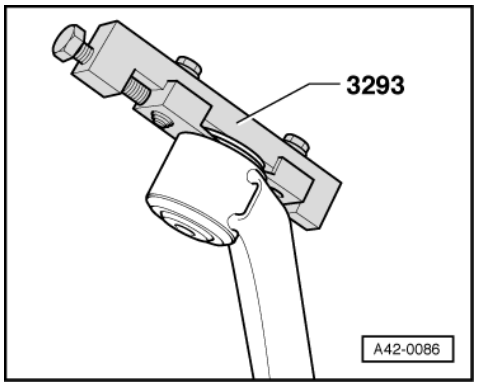
- Replacing => Figs. 1 to 4
- Always replace both halves of bush

2 Lower link

- Replacement part is supplied with fitted bonded rubber bushes

3 Front bonded rubber bush

- Replacing => Fig. 5



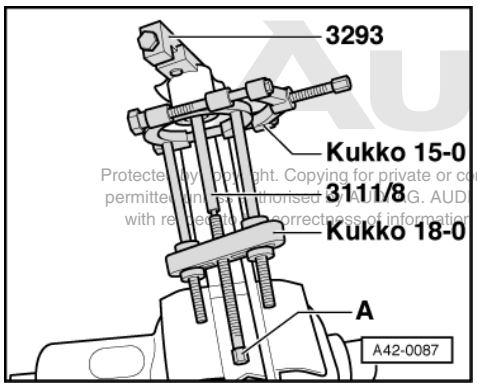
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-> Fig.1 Inserting assembly device in link

Notes:

- Before inserting special tool, the two collars of the bonded rubber bushes must be beaded slightly.
- Take extreme care when inserting special tool.

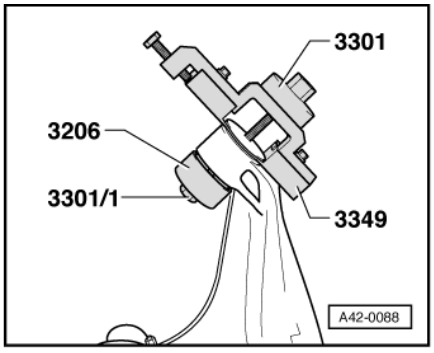
- Insert assembly device -3293- such that radii of both special tool jaws are positioned between bush and eye of link.
- Then screw in threaded stem as far as it will go such that bonded rubber bush is pressed slightly off eye of link.



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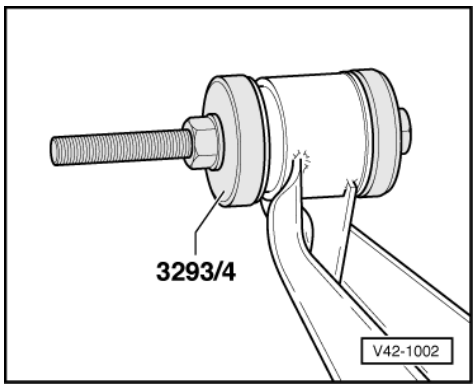
-> Fig.2 Inserting puller in link

- Insert commercially available parting tool -Kukko 15-0- in link.
- Insert mandrel -3111/8- in hole of bonded rubber bush.
- Screw puller Kukko 18-0 into parting tool -Kukko 15-0-. In doing so, centrally align puller.
- Then screw in threaded stem -A- until bonded rubber bush is pulled out.



-> Fig.3 Pulling second half of bonded rubber bush out of link

- Insert puller -3349- in link.
- Then press out second half of bush by screwing in stem -3301/1-.

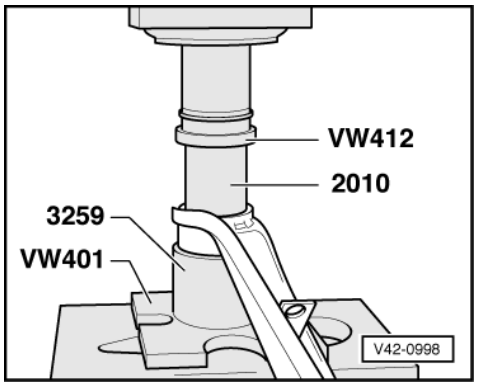


-> Fig.4 Fitting bonded rubber bush in link

- Insert both halves of bonded rubber bush with thrust pads -3293/4- and threaded stem at right angles in link.

Threaded stem is part of assembly device -3293-.

- Pull in bonded rubber bush as far as it will go by tightening threaded stem.



-> Fig.5 Pressing bonded rubber bush out of lower link/pressing in

Note:

When pressing out, make sure bonded rubber bush does not rest on end face of pressure plate -3259-.

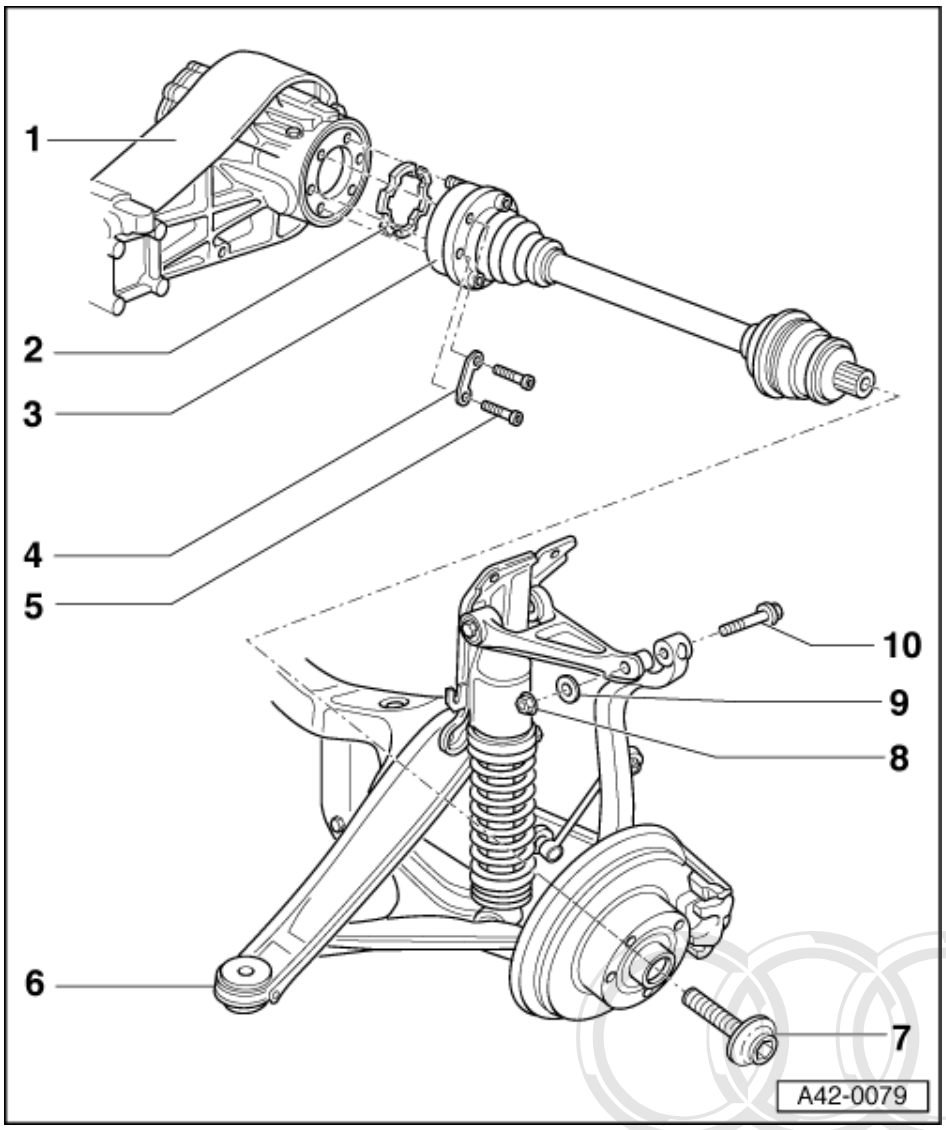
Collar of tube -3259- faces pressure plate -VW 401-.

- Press in bush such that it is flush.

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9 - Rear drive shaft

9.1 - Rear drive shaft



9.2 - Removing and installing drive shaft

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- 3208 Suction grip

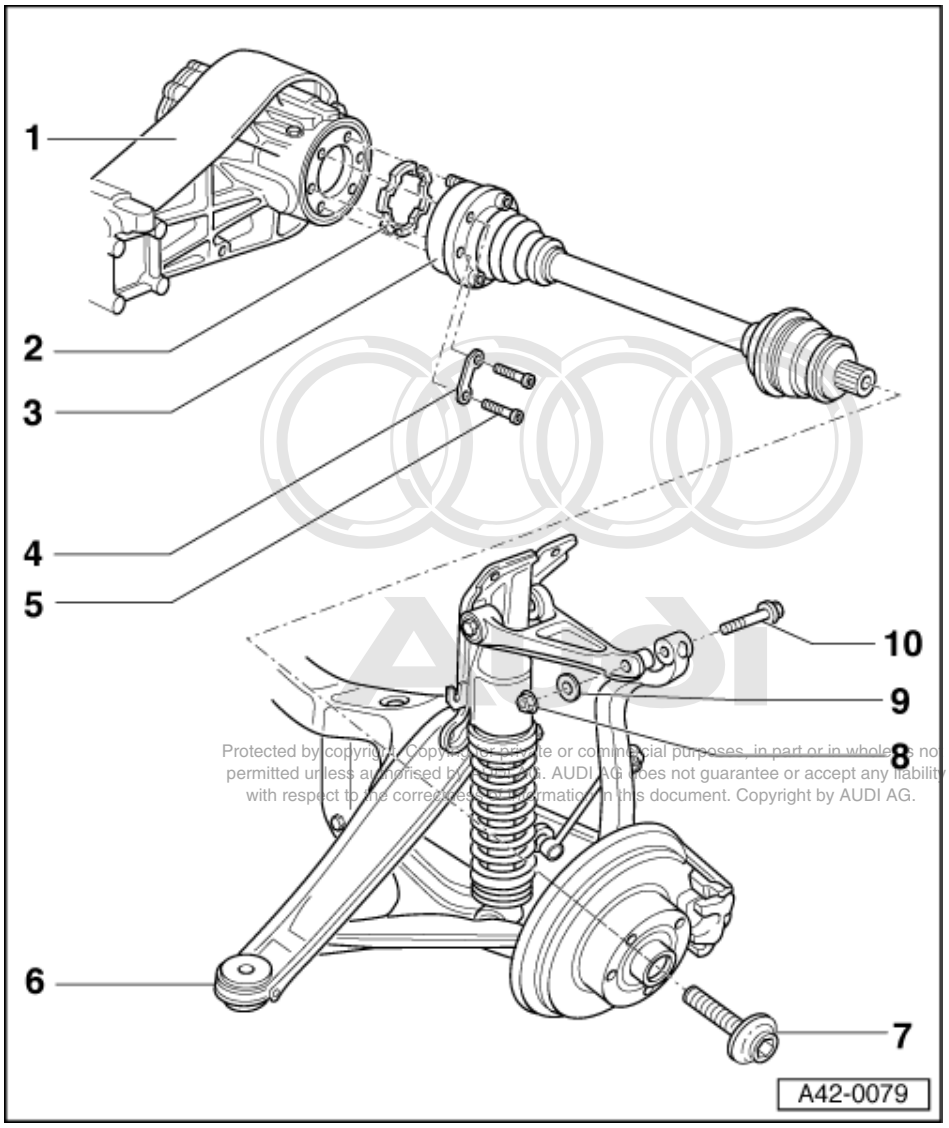
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1 **Differential**

2 **Gasket**
- Replace; pull off backing and bond into joint

3 **Drive shaft**
- Servicing => Page 197

4 **Packing plate**



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5 Multi-point socket head bolt

- Assignment

=> Parts List

- Tightening torques:
  M8 bolt: 40 Nm
  M10 bolt: 70 Nm

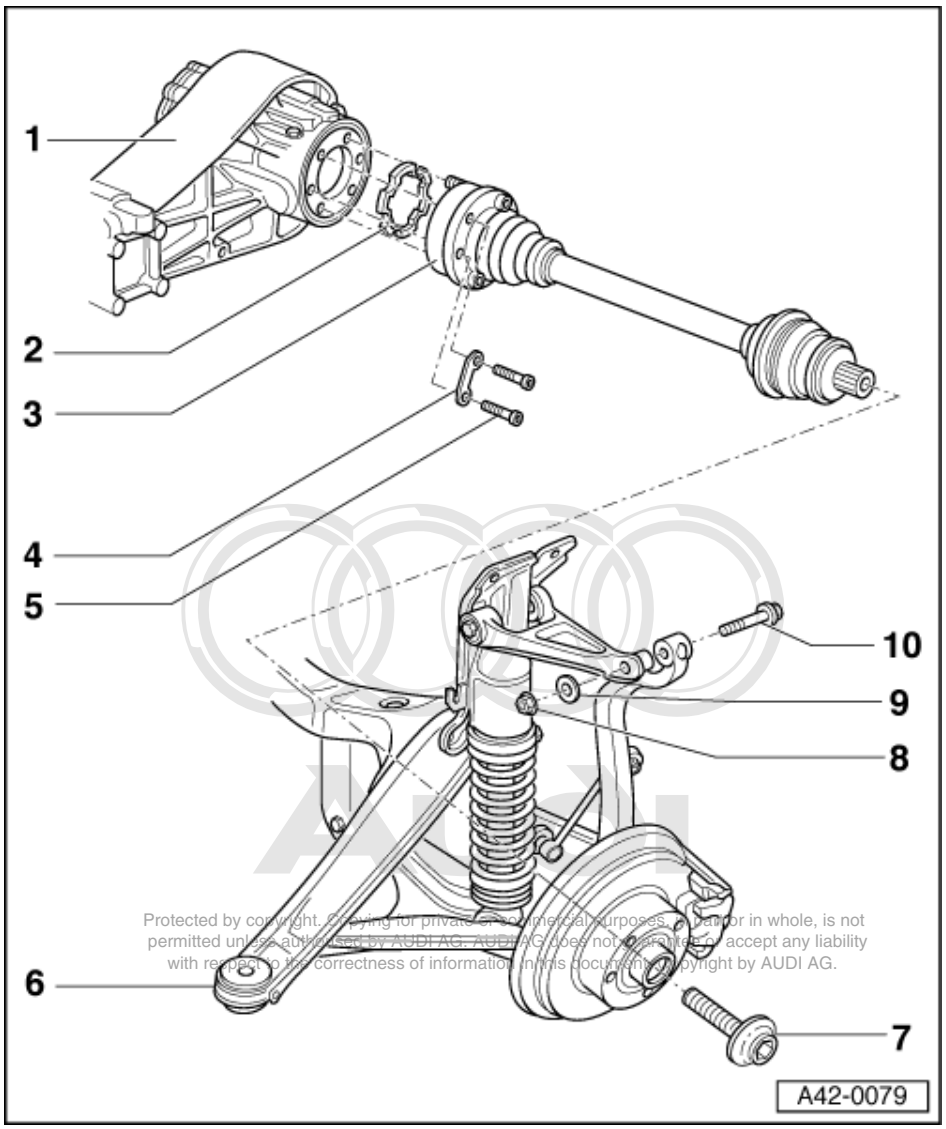
6 Subframe

7 Hexagon socket-head collared bolt

- Always replace
- Switched from hexagon head to hexagon socket; combination is permitted
  Vehicle must be standing on ground when tightening bolt
  Tightening torque:
  M14 bolt:
- 115 Nm + further 180° turn

8 Self-locking nut

- Always replace
- 70 Nm + further 90° turn



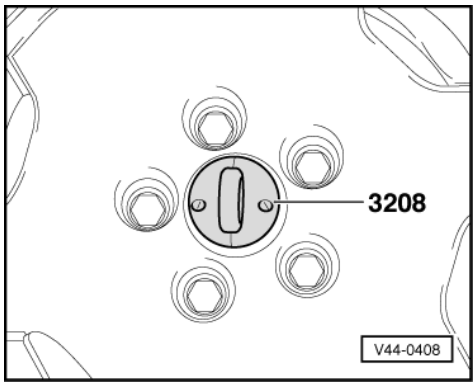
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9 Washer

- Always replace

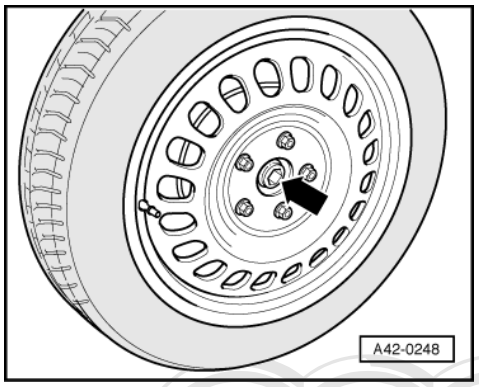
10 Hexagon bolt

- Always replace



Removing drive shaft

- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.



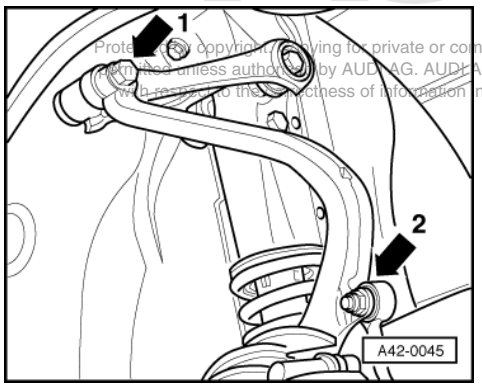
- -> Slacken off collared bolt -arrow- by 90° only so as not to damage wheel bearing.

Attention:
Vehicle must be standing on its wheels when slackening off and tightening collared bolt.
-Danger of accident-

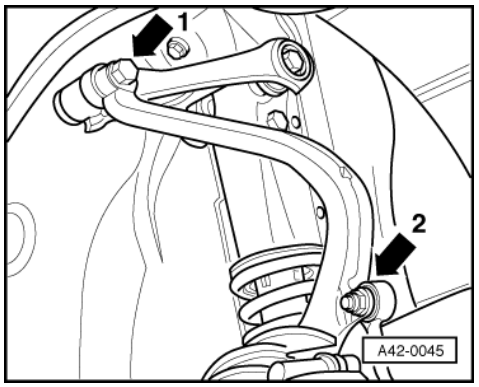
- Remove wheel.
- Hand-tighten all 5 wheel bolts again.

- Firmly apply handbrake.

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- Screw out collared bolt -arrow-.
- Pull ABS speed sensor out of axle support slightly.
- Unscrew drive shaft from flange shaft/differential.
- -> Slacken off connecting link/wheel bearing housing bolted joint -arrow 2-.



- -> Unscrew upper link/wheel bearing housing bolted joint -arrow 1-.

Removing left drive shaft:

- Remove rear and centre exhaust system silencers.

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

All vehicles (continued)

- Lower drive shaft on inside of final drive and pull out of wheel bearing housing.

Installing drive shaft

Install in reverse order.

Bolted joints with bonded rubber bushes must be tightened when vehicle is standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.

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- Pre-tighten bolted joints with bonded rubber bushes to 20 Nm.
- Screw in new collared bolt and tighten to prescribed torque without additional turn.
- Fit and secure wheel => Page 220 .
- Slacken off bolted joints with bonded rubber bushes again.
- Set vehicle down on its wheels.
- Bounce vehicle several times.
- Tighten bolted joints with bonded rubber bushes to prescribed torque.

- Give collared bolt prescribed further turn.

Tightening torques

Component	Nm
Connecting link to wheel bearing housing	50 1)
Upper link to wheel bearing housing	70 + 90°2)
Collared bolt for drive shaft	115 + 180°3)
Drive shaft to flange shaft/differential - M8 bolt	40
Drive shaft to flange shaft/differential - M10 bolt	70

1) Replace nut

2) Replace bolt and nut

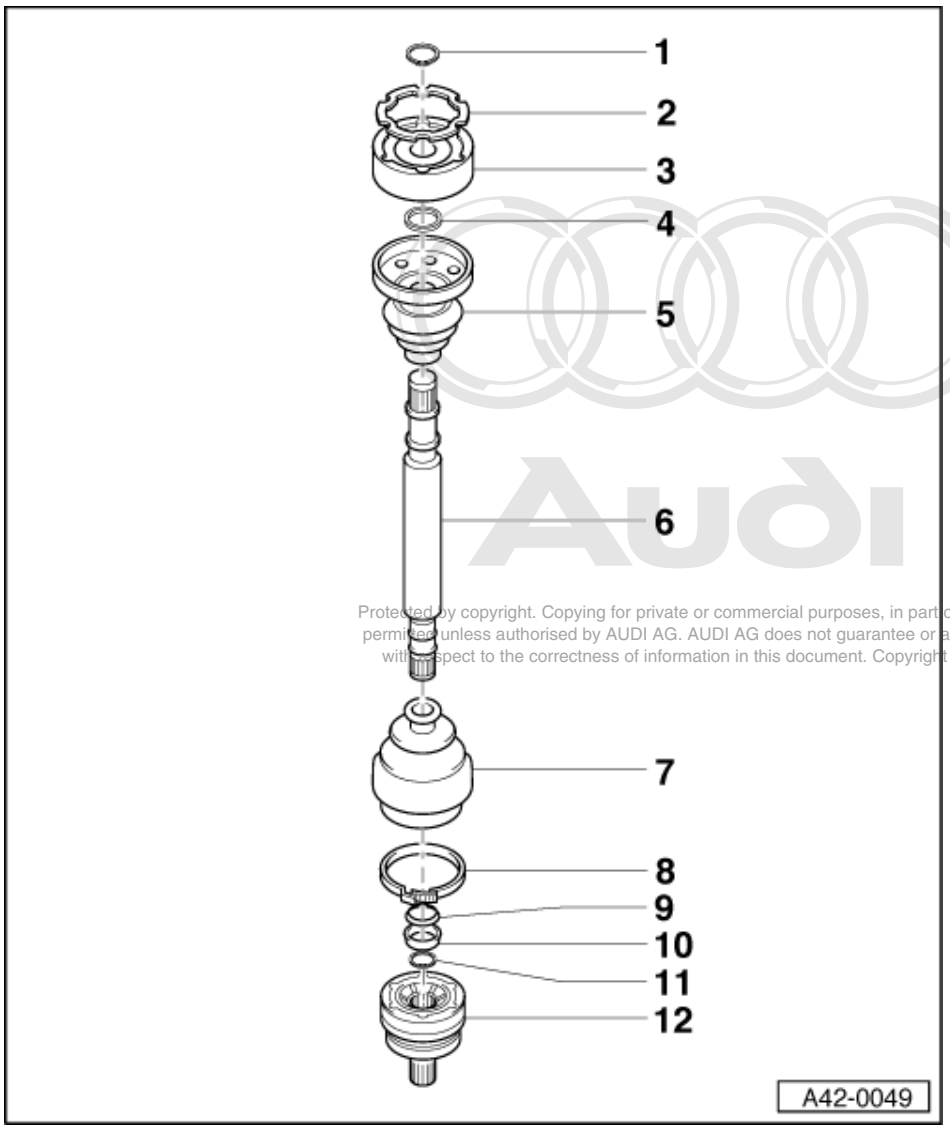
3) Replace bolt

9.3 - Servicing drive shaft

Special tools and workshop equipment required

- 3207 Pressure spindle
- 40-204 A Tensioner
- VW 161 A Circlip pliers
- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 411 Press tool
- VW 412 Press tool
- VW 522 Support sleeve

- V.A.G 1275 Hose clamp pliers



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Quantities and type of grease

Constant velocity joints are filled with high-temperature grease.

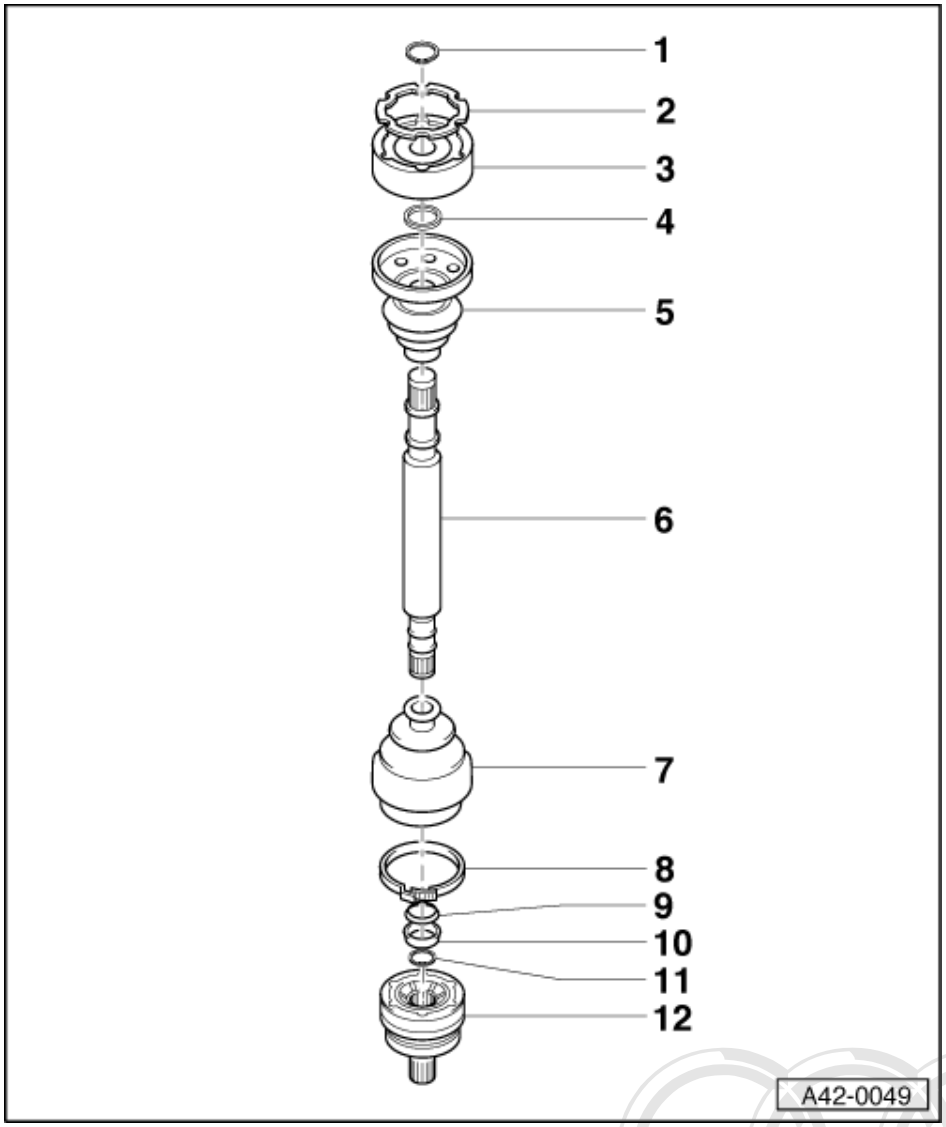
=> Parts List

Outer joint	Grease Total quantity	of which in: Joint	Bellows
ø mm	[g]	[g]	[g]
89	90	40	50
Inner joint			
ø mm			
100	80	30	50

Re-grease joint if necessary on replacing boot.

1 **Circlip**
- Always replace

- Removing and fitting with circlip pliers VW 161 A => Fig. 4



2 Gasket

- Replace; pull off backing and bond into joint

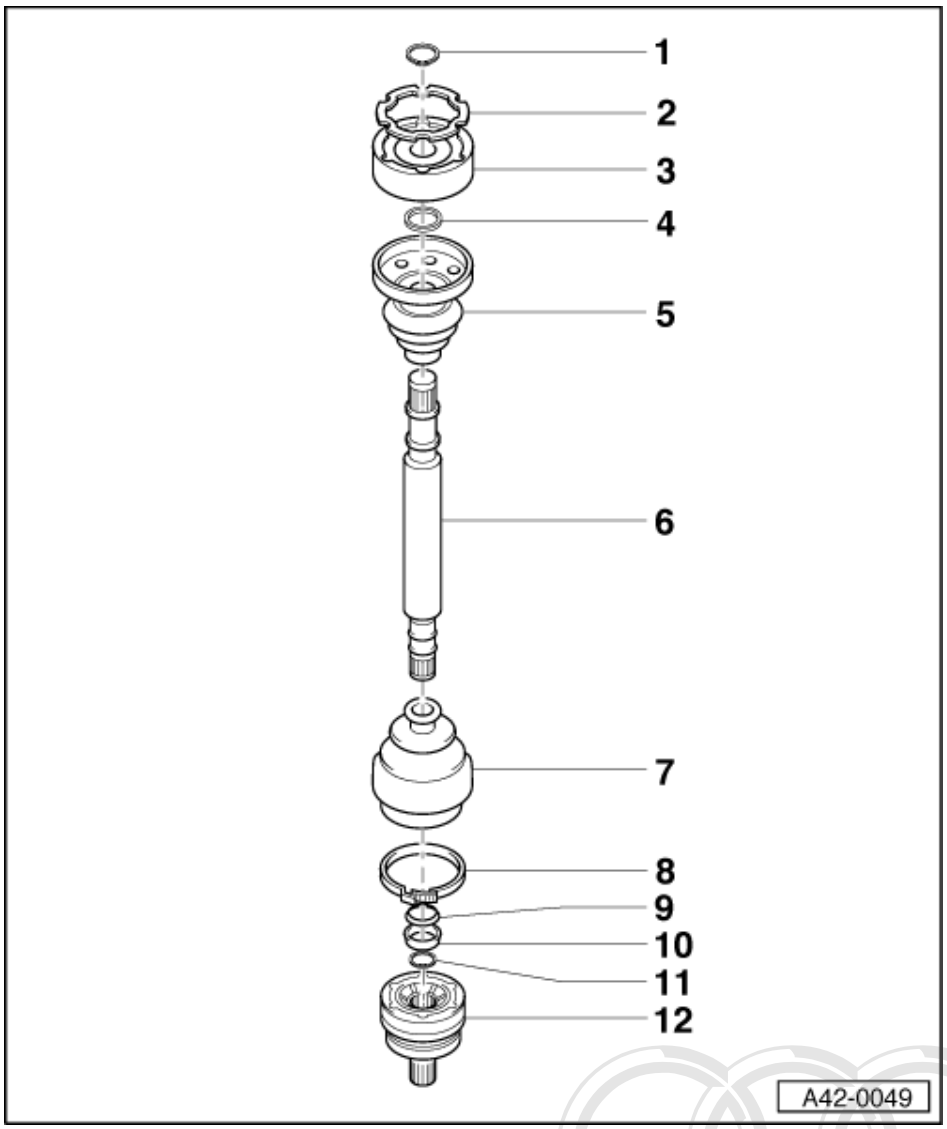
3 Inner constant velocity joint

- OD: 100 mm
- Replace only as complete assembly
- Pressing off => Fig. 2
- Pressing on => Fig. 3
- Lubricating => Page 198
- Checking => Page 207

4 Dished washer

- Installation position => Fig. 6

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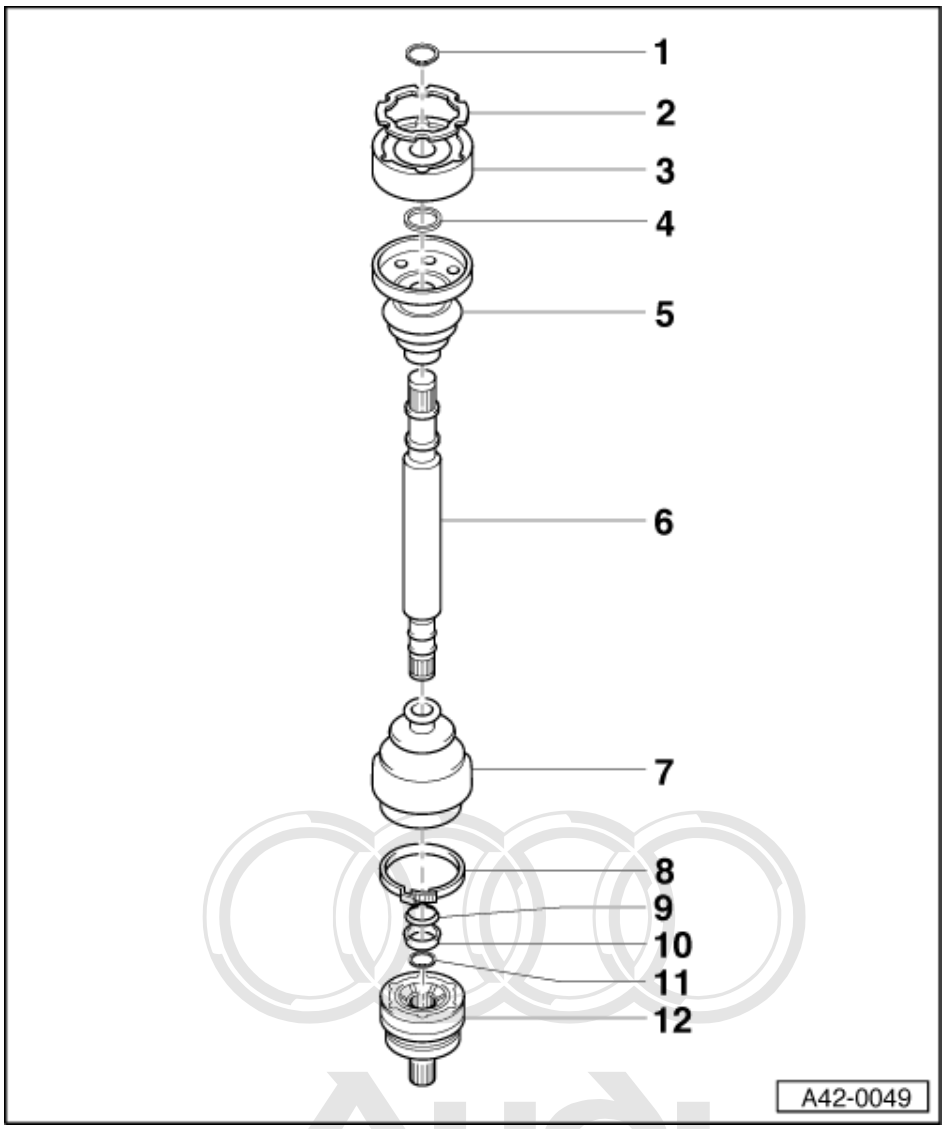
5 Boot for inner constant velocity joint

- Check for cracks and abrasion
- Drive off with mandrel
- Checking inner constant velocity joint if boot damaged => Page 207
- Coat sealing surface with D 454 300 A2 before attaching to constant velocity joint
- Before fitting, align screw holes of inner constant velocity joint and inner boot
- On assembly, boot/drive shaft sealing surfaces must be free from grease

6 Drive shaft

- Same length on left and right

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7 Boot for outer constant velocity joint

- Check for cracks and abrasion and replace if necesssary
- Checking outer constant velocity joint if boot damaged => Page 205
- On assembly, boot/drive shaft/joint sealing surfaces must be free from grease

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8 Clamp

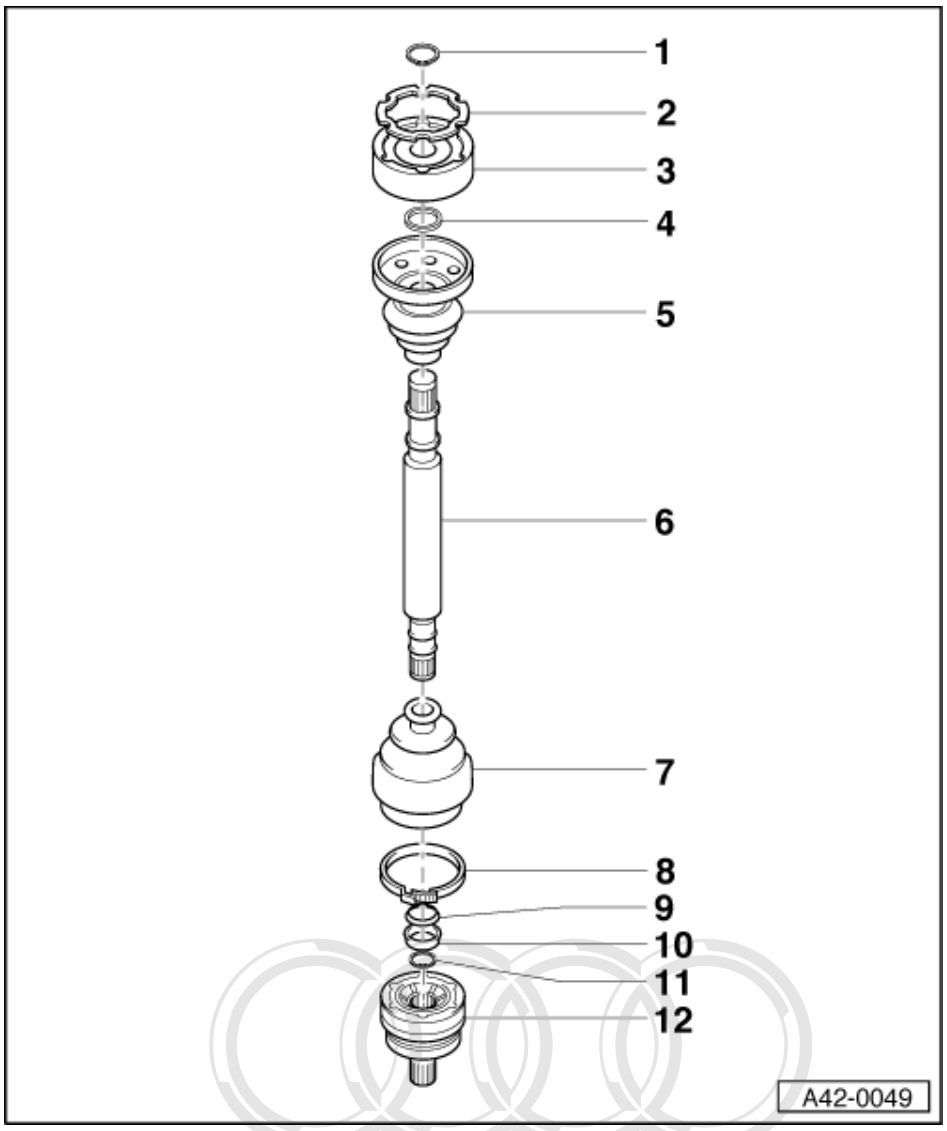
- Replace
- Tensioning => Fig. 1

9 Dished washer

- Large ø (concave side) makes contact with thrust ring
- Installation position => Fig. 5

10 Spacer ring (plastic)

- Installation position => Fig. 5



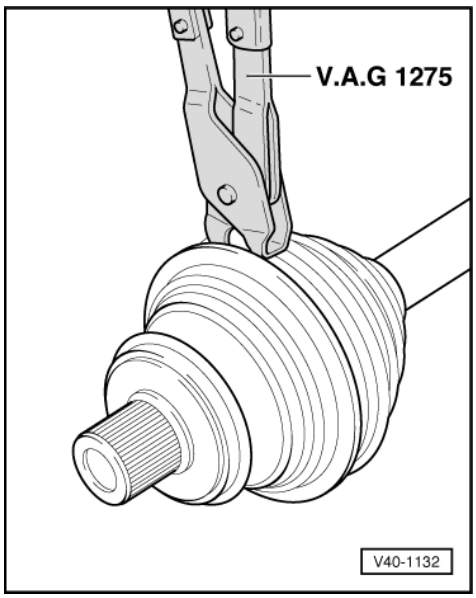
11 Circlip

- Replace
- Insert in shaft groove

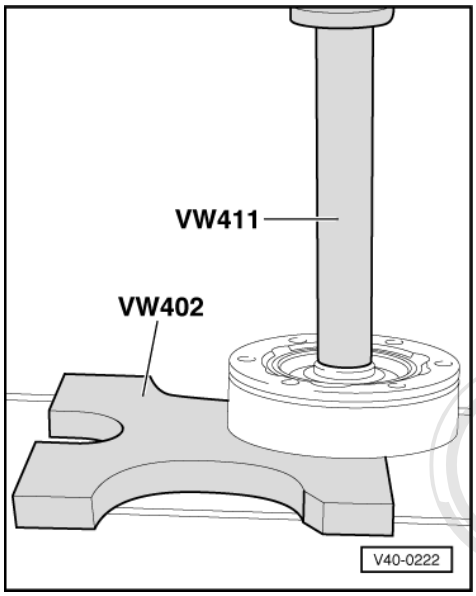
12 Outer constant velocity joint

- OD: 89 mm
- Replace only as complete assembly
- Pressing off =>Fig. 7
- Checking => Page 205
- Installing: Drive onto shaft with plastic-headed hammer until circlip engages in annular groove of constant velocity joint
- Lubricating => Page 198

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-> Fig.1 Tensioning hose clamp or clamp

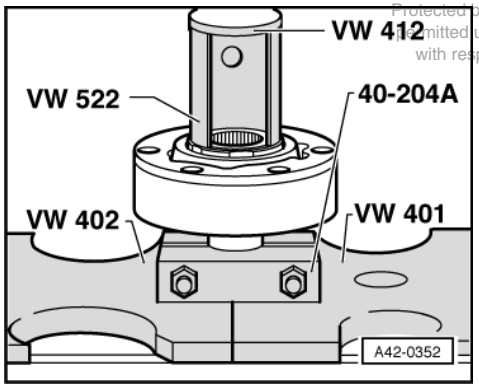


-> Fig.2 Pressing off inner constant velocity joint

Notes:

- Use mandrel to drive off boot beforehand.
- Support ball hub.

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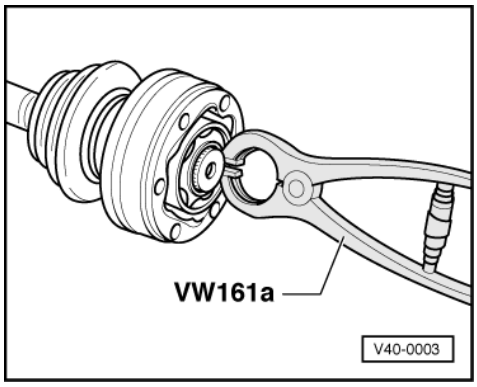


-> Fig.3 Pressing on inner constant velocity joint

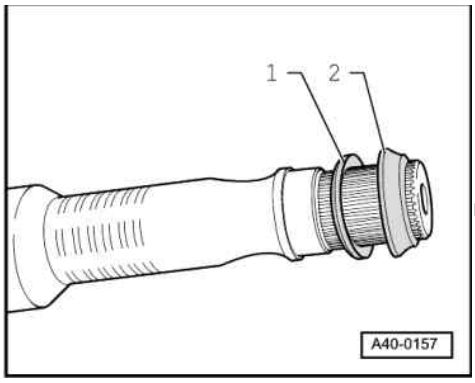
Note:

Chamfer at ID of ball hub (splines) must face contact collar of drive shaft.

- Press on joint as far as it will go.
- Engage circlip.



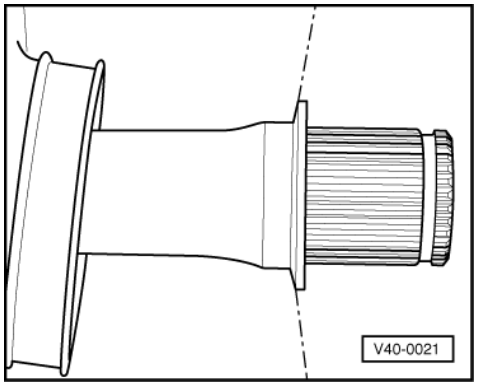
-> Fig.4 Removing/fitting circlip



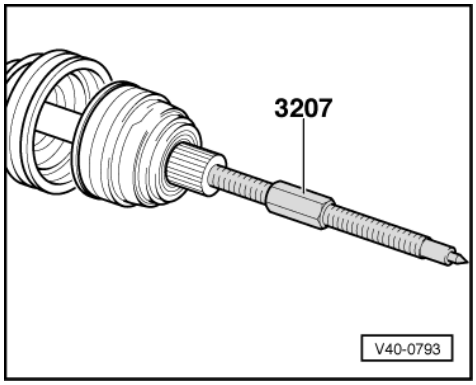
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Fig.5 -> Installation position of spacer ring and dished washer (wheel end)

1 - Dished washer
2 - Spacer ring (plastic)



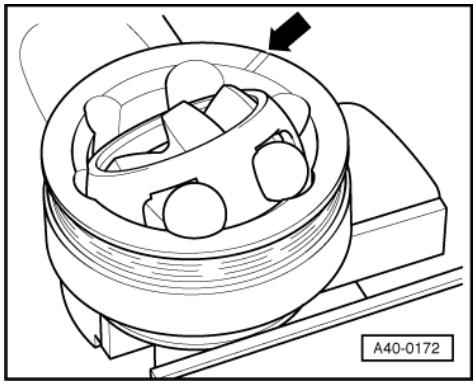
-> Fig.6 Fitting dished washer in correct position



-> Fig.7 Pressing off outer constant velocity joint

- Clamp drive shaft with soft jaws in vice.
- Detach clamp and push back bellows.
- Screw pressure spindle -3207- with M14 thread into joint pin until constant velocity joint is pressed off drive shaft.

9.4 - Checking outer constant velocity joint

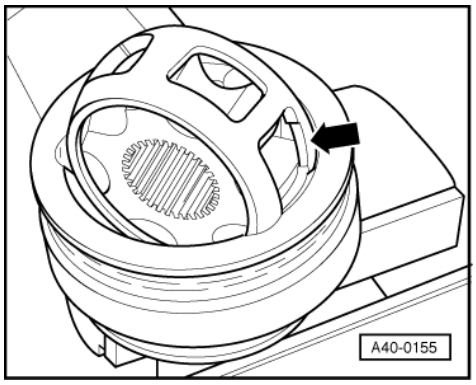


The joint must be dismantled for replacing grease in the event of severe contamination or if ball contact surfaces are to be checked for wear and damage.

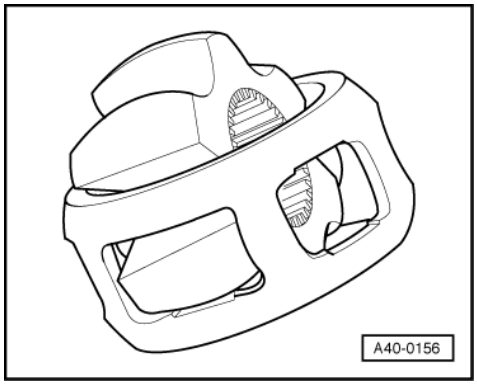
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Removing

- -> Use electric scriber or whetstone to mark position of ball hub with respect to ball cage and housing before dismantling (arrow).
- Swivel ball hub and ball cage.
- Consecutively take out balls.



- -> Turn cage until two cage openings (arrow) are in contact with joint housing.
- Lift out cage with hub.



- -> Swivel one hub segment into cage opening.
- Tip hub out of cage.

Note:

The 6 balls for each joint are of one tolerance group. Check stub axle, hub, cage and balls for pitting and signs of seizure. Excessive backlash in joint becomes apparent from load change jolts; joint is then to be replaced. Smooth areas and running marks on balls do not necessitate joint replacement.

Installing

- Insert cage with hub in joint housing.

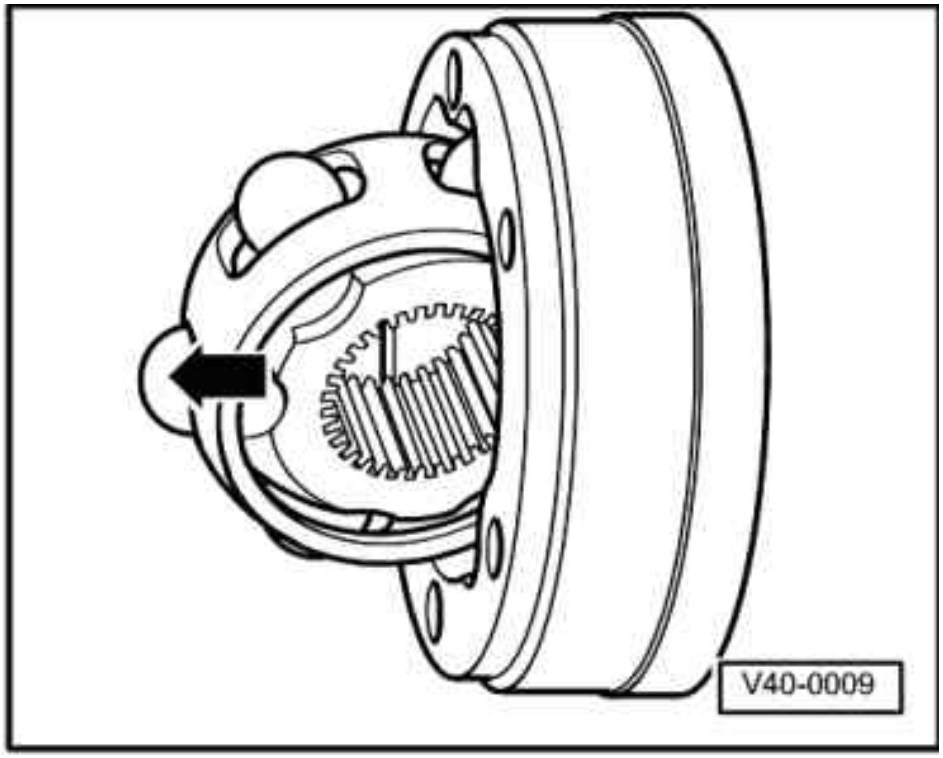
Note:

Cage must be inserted in correct position.

- Consecutively press in opposite balls, taking care to re-establish previous position of ball hub with respect to ball cage and joint housing.
- Press half the total quantity of grease into the joint housing.
- Insert new circlip in shaft.
- Distribute remaining grease in fold.

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9.5 - Checking inner constant velocity joint



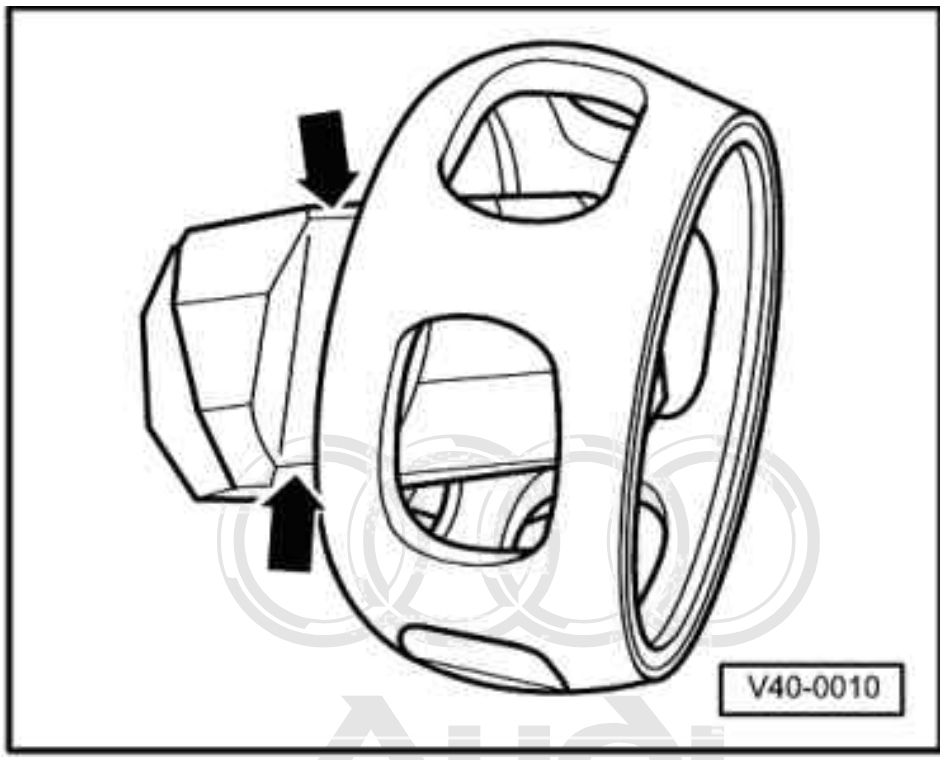
The joint must be dismantled for replacing grease in the event of severe contamination and if contact surfaces and balls are to be checked for wear and damage.

- -> Swivel ball hub and ball cage.
- Press out joint element in direction of arrow.
- Press balls out of cage.

Note:

Ball hub and joint element are paired and should be marked prior to removal. Take care not to alter raceway assignment.

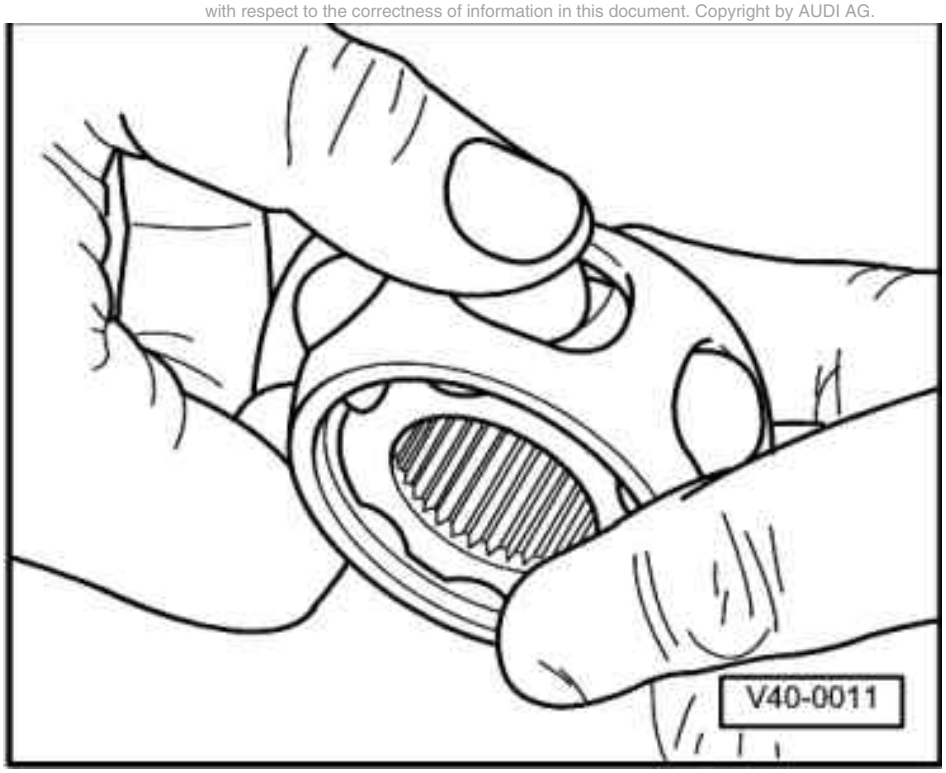
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- -> Tip ball hub out of ball cage via ball raceway (arrows).
- Check joint element, ball hub, ball cage and balls for pitting and signs of seizure.

Note:

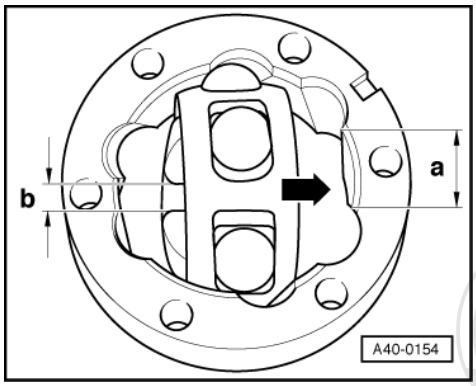
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Excessive backlash in joint becomes apparent from load change jolts. Joint is then to be replaced. Smooth areas and running marks on balls do not necessitate joint replacement.

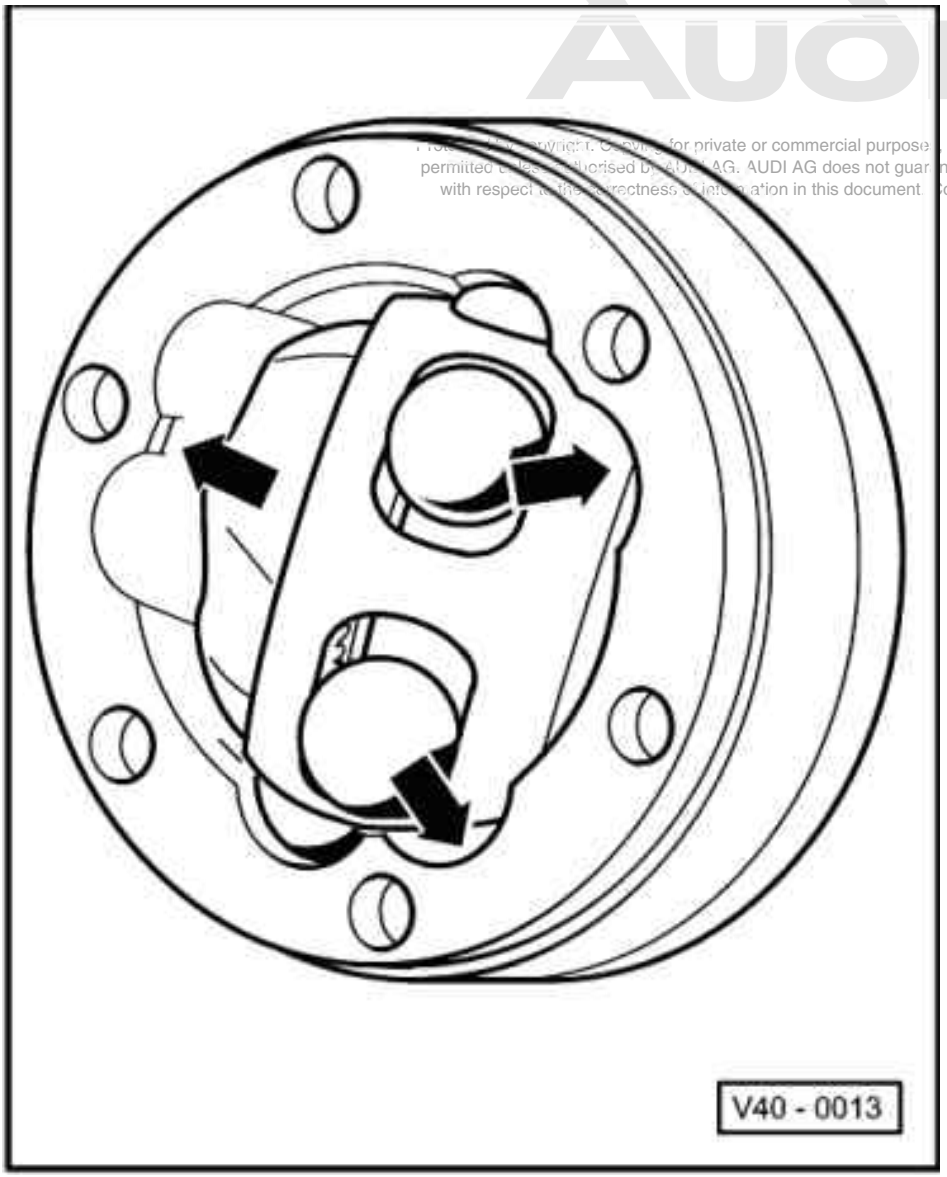
Installing

- -> Insert ball hub in ball cage via the two chamfers. Installation position is arbitrary. Press balls into cage.
- Insert hub with cage and balls in upright position in joint element.



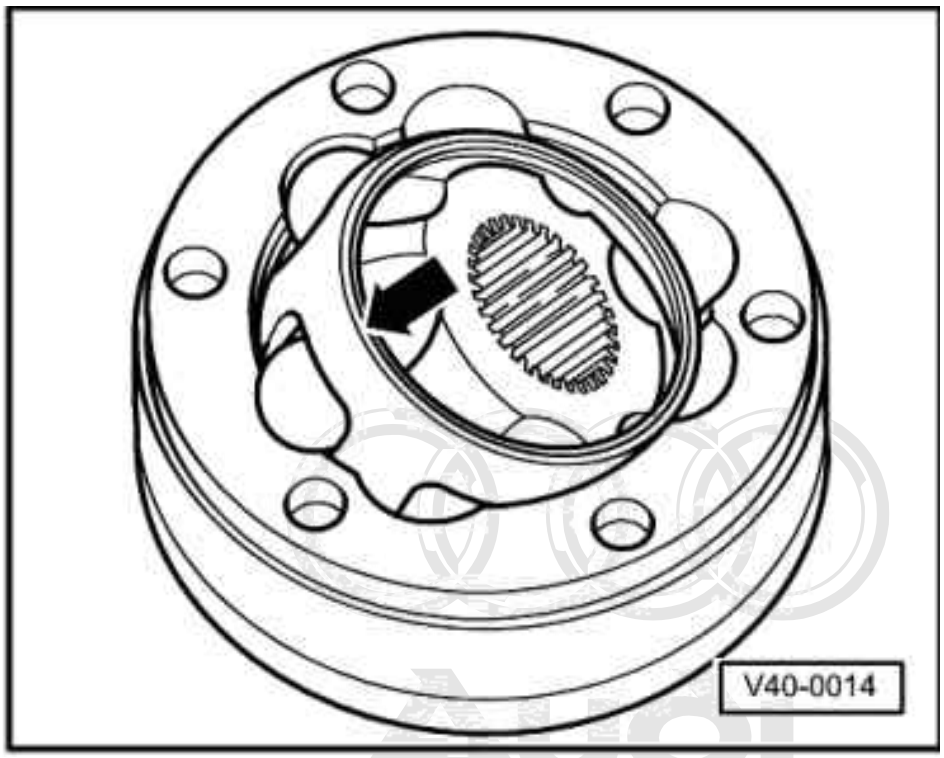
Notes:

- -> On insertion, make sure that broad gap -a- at joint element coincides with narrow gap -b- at hub after swivelling in.



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- -> Swivel in ball hub; to do so swivel hub out of cage (arrows) until the spacing of the balls corresponds to that of the raceways.



- -> Swivel in hub with balls by pressing firmly on cage (arrow).

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Checking operation of constant velocity joint

Constant velocity joint has been correctly assembled if ball hub can be pushed back and forth by hand over entire length compensation range.

10 - Wheel bearing housing (four-wheel drive)

10.1 - Wheel bearing housing (four-wheel drive)

10.2 - Removing and installing wheel bearing housing

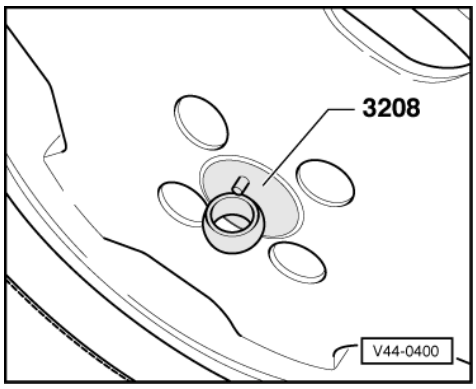
Special tools and workshop equipment required

- 3287 Pressing-out tool

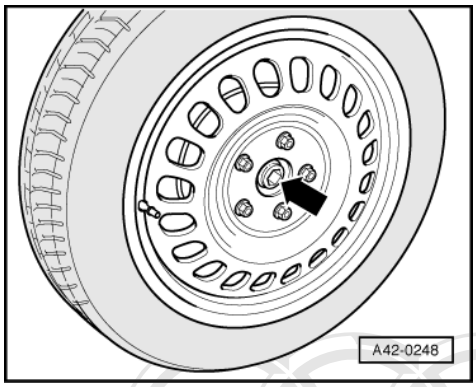
Or

- 3287A Ball joint puller
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

Removing



- Vehicle standing on its wheels over lifting platform
- -> Detach wheel trim. In the case of light alloy wheels, use puller from vehicle tool kit or suction grip -3208- to remove trim cap.

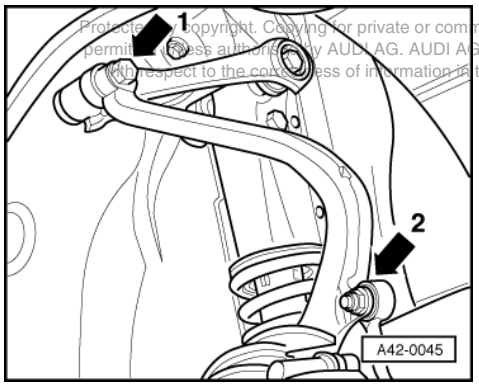


- -> Slacken off collared bolt -arrow- by 90° only so as not to damage wheel bearing.

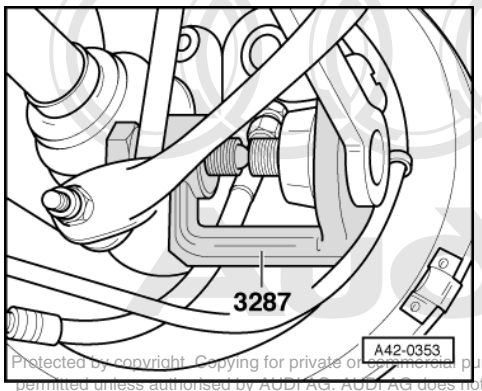
Attention:
Vehicle must be standing on its wheels when slackening off and tightening collared bolt.
-Danger of accident-

- Remove wheel.
- Hand-tighten all 5 wheel bolts again.
- Firmly apply handbrake.
- Screw out collared bolt -arrow-.

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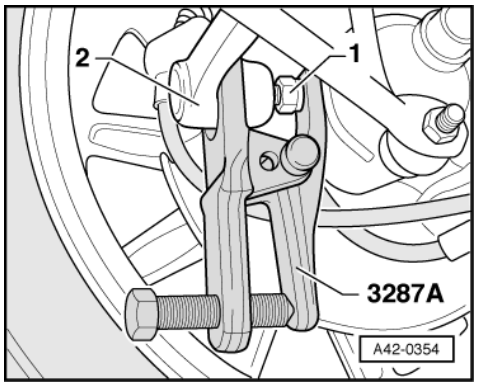
- Pull ABS speed sensor out of wheel bearing housing.
- -> Screw out bolt -arrow 2- for connecting link.



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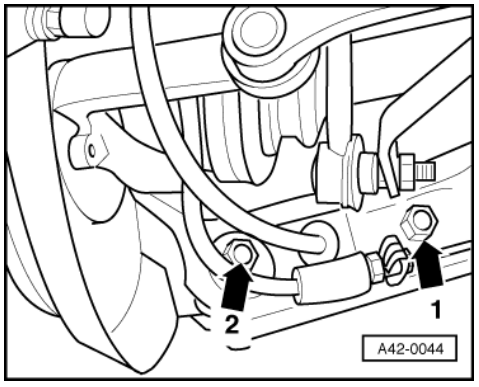
- Unscrew nut of bolted track rod/steering arm joint of wheel bearing housing.
- -> Use pressing-out tool -3287- to press track rod off steering arm of wheel bearing housing.
- Detach pressing-out tool -3287-.

Instead of pressing-out tool -3287-, use can also be made of ball joint puller -3287A-.

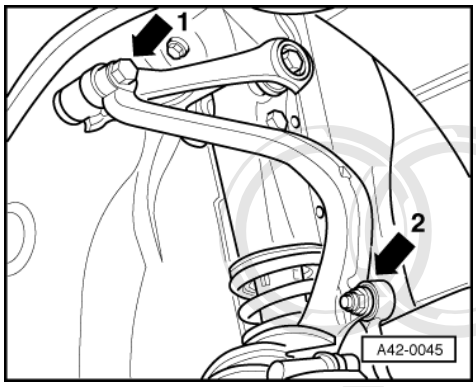


- -> Unscrew nut -1- from pin of track rod -2- until it is flush with thread of pin.
- Apply ball joint puller -3287A- and press track rod off steering arm of wheel bearing housing.
- Detach ball joint puller -3287A-.
- Unscrew nut from pin of track rod.
- Detach track rod from steering arm of wheel bearing housing.

- Unscrew bolts from brake caliper housing.



- Detach brake caliper and attach to body such that its weight cannot bend or damage brake hose/brake pipe.
- Detach brake disc.
- -> Mark installation position of eccentric washer for bolt -arrow 2-.
- Screw out bolt -arrow 2-.



- -> Remove wheel bearing housing/upper link bolted joint -arrow 1-.
- Detach wheel bearing housing from drive shaft.

Installing

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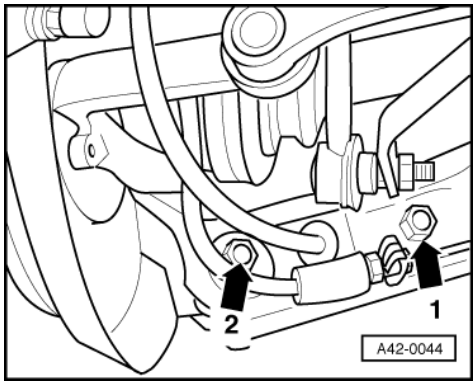
Install in reverse order.

For bolts and nuts to be replaced as well as tightening torques, refer to => Page 193 .

- Attach wheel bearing housing to drive shaft.
- Pre-tighten bolted joint for wheel bearing housing/lower link and shock absorber/lower link to 20 Nm.

Wheel bearing housing/upper link bolted joint must be secured with vehicle standing on its wheels.

Otherwise, bonded rubber bush would be subject to torsion and its service life shortened.



- -> Fit bolt -arrow 2- with eccentric washer in line with mark and secure.
- Install brake caliper housing.

=> Brake System; Repair Group 46; Rear Brake C38; Servicing brake caliper Rear Brake C38 Servicing brake caliper

=> Brake System; Repair Group 46; Rear Brake C43; Servicing brake caliper Rear Brake C43 Servicing brake caliper

- Attach track rod to steering arm of wheel bearing housing.

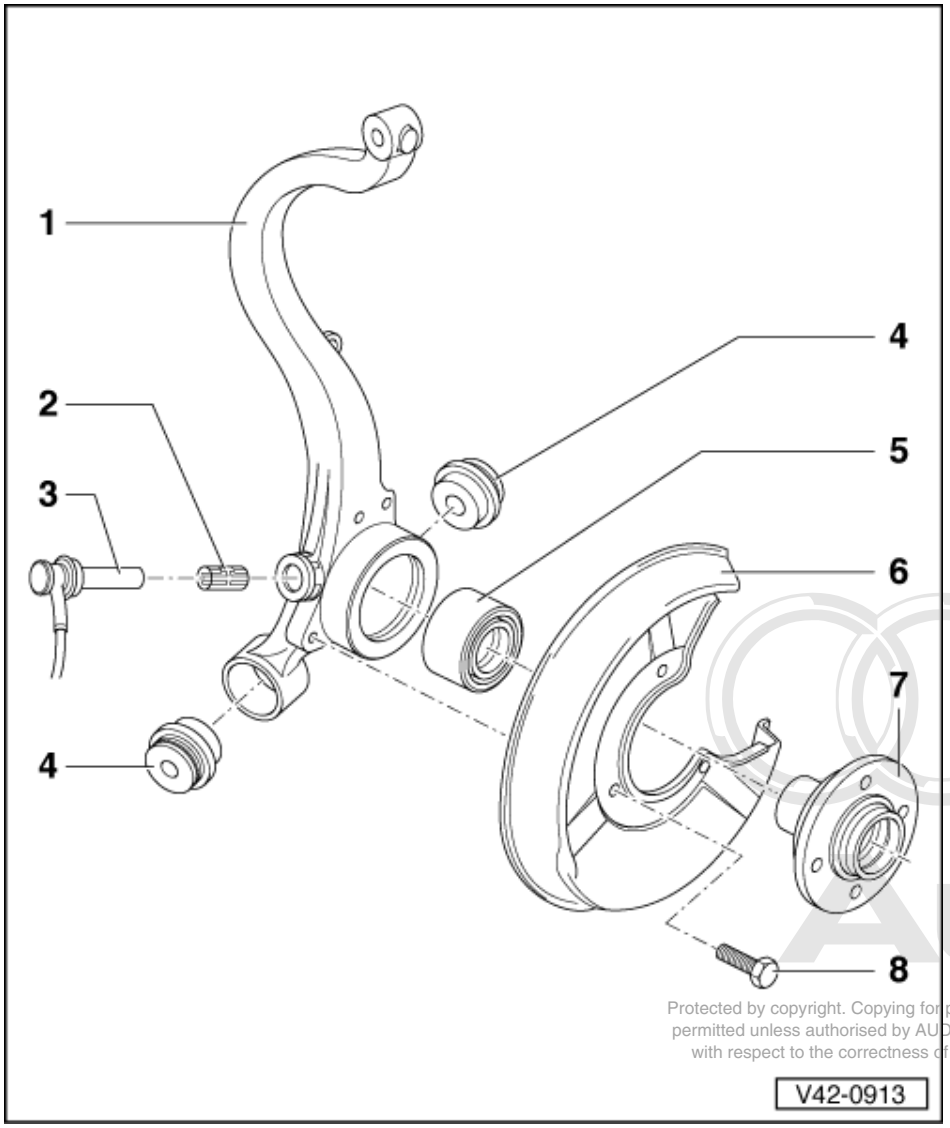
- Fit connecting link.
- Screw in new collared bolt and tighten to prescribed torque without additional turn => Page 194 , Item 7 .
- Fit and secure wheel => Page 220 .
- Set vehicle down on its wheels.
- Unfasten wheel bearing housing/upper link bolted joint.
- Bounce vehicle several times.
- Tighten wheel bearing housing/upper link bolted joint to prescribed torque.
- Secure collared bolt with prescribed additional turn => Page 194 , Item 7 .

- Perform wheel alignment => Page 227 .

10.3 - Servicing wheel bearing housing

Special tools and workshop equipment required

- 30-505 Insertion mandrel
- 3005 Thrust plate
- 3259 Tube
- 3292 Assembly device
- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 407 Press tool
- VW 412 Press tool
- VW 416 B Tubular section
- VW 519 Tubular section
- V.A.G 1331 Torque wrench
- Kukko 15-17 parting tool (commercially available)



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1 Wheel bearing housing

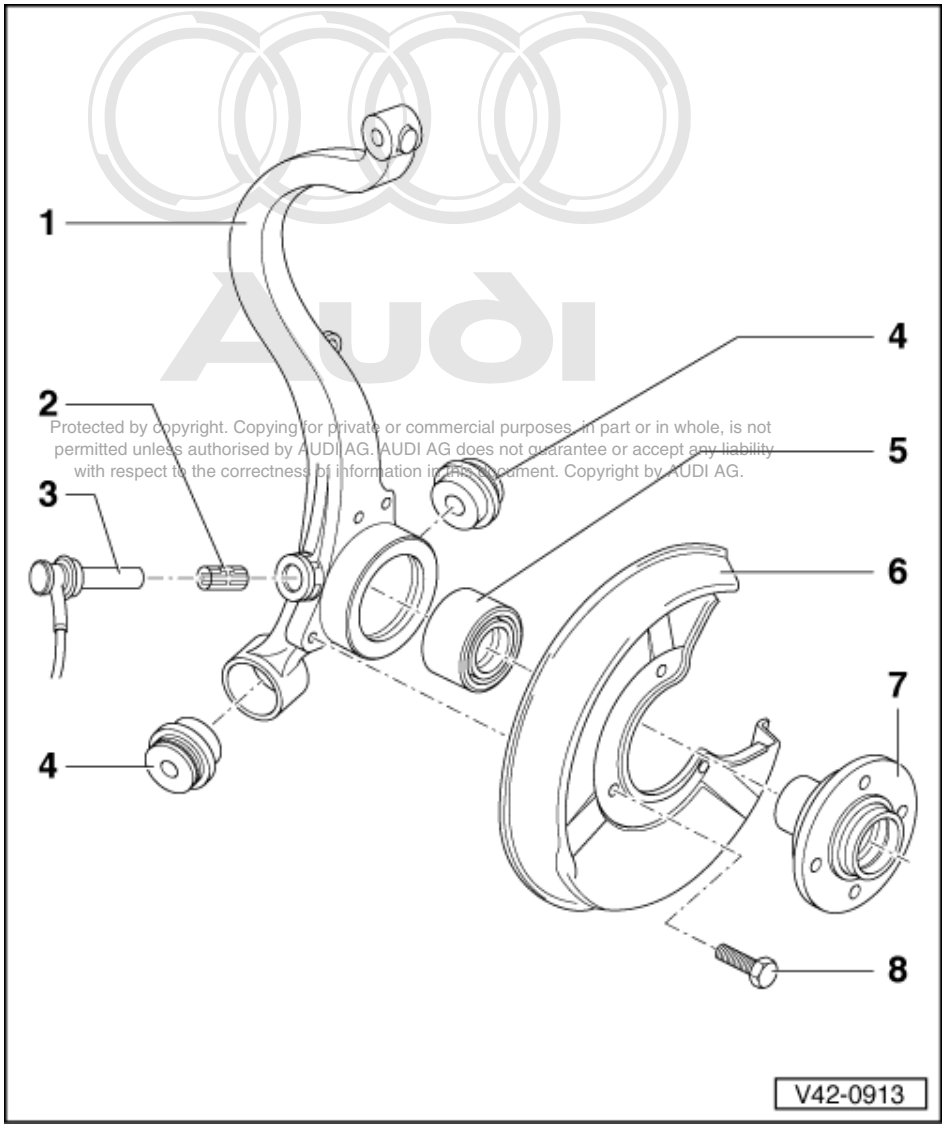
- Removing and installing
  => Page 210
- Do not grease bearing seat in wheel bearing housing before pressing in wheel bearing

2 Clamping sleeve

- Always replace
- Left and right identical
- Grease all round with lubricating paste G 000 650 before inserting in wheel bearing housing
- Press home in wheel bearing housing

3 Speed sensor

- Pull out to remove
- Fit drive shaft before installing speed sensor
- Clean inner surface of hole before inserting speed sensor
- Press home in clamping sleeve



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4 Bonded rubber bush

- Replacing =>Figs. 1 and 3
- Always replace both halves of bush

5 Wheel bearing

- Stepped design
- Installation position:

- Large ID of wheel bearing faces wheel hub

- Pressing out => Fig. 4
- Pressing in => Fig. 5

6 Splash plate

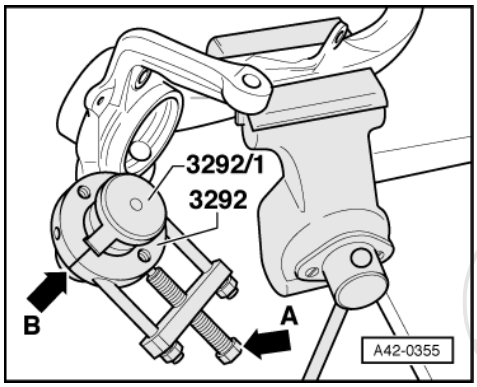
- Bolt to wheel bearing housing

7 Wheel hub

- Pressing out => Fig. 6

- Pressing in => Fig. 7
- Removing bearing inner race =>Figs. 8 and 9

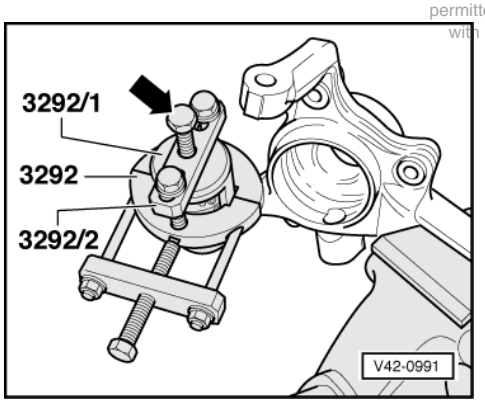
8 Hexagon bolt, 10 Nm



-> Fig.1 Inserting assembly device in wheel bearing housing

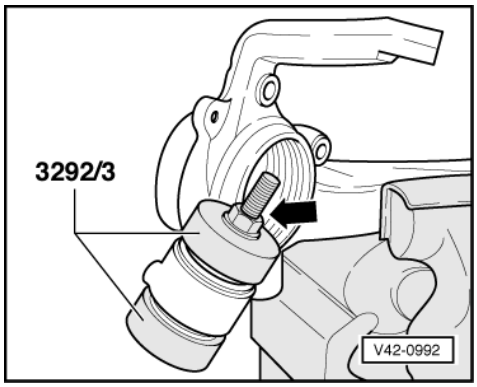
- Position support 3292/1 on bonded rubber bush.
- Fit assembly device 3292 over support 3292/1 such that it makes contact.
- Tighten threaded stem -arrow A- as far as it will go such that both jaws of assembly device 3292 are located -arrow B- in annular groove between bonded rubber bush and wheel bearing housing.

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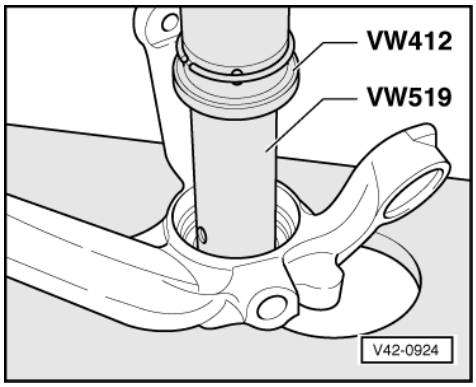
-> Fig.2 Screwing cross piece to assembly device

- Align cross piece 3292/2 and bring fully into contact with support 3292/1 by tightening the two hexagon bolts.
- Screw in spindle of cross piece 3292/2 -arrow- until bush is extracted.



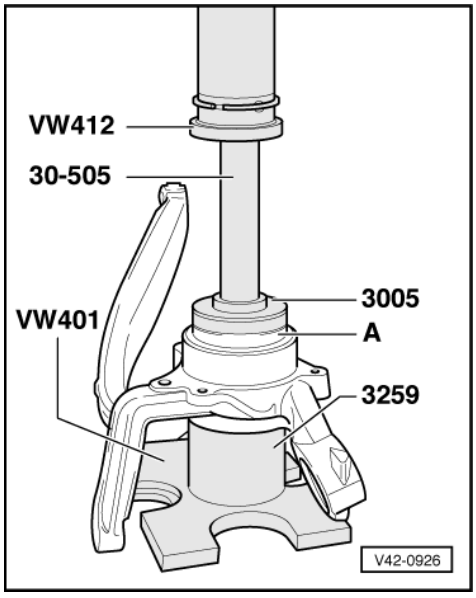
-> Fig.3 Fitting bonded rubber bush

- Insert bonded rubber bush in hole in wheel bearing housing such that both sides are at right angles.
- Attach one thrust pad 3293/3 to each bush and screw in threaded stem -arrow- as far as it will go.



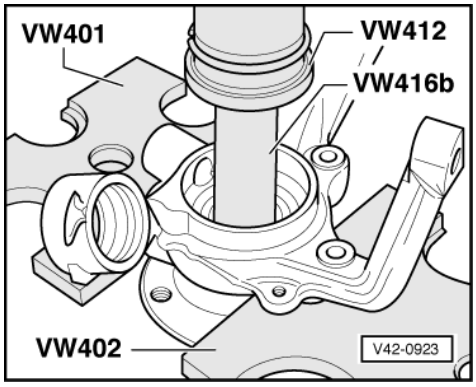
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-> Fig.4 Pressing wheel bearing out of wheel bearing housing

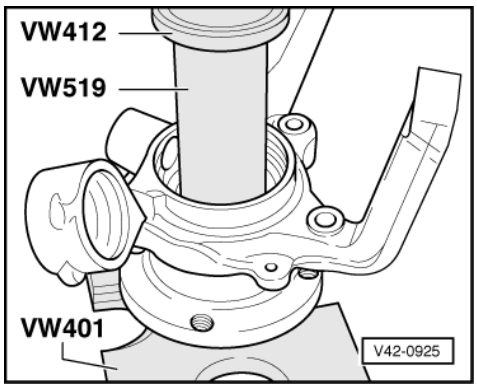


-> Fig.5 Pressing wheel bearing -A- into wheel bearing housing

- If necessary, remove corrosion and dirt from wheel bearing housing hole.
- Large ID of wheel bearing faces wheel hub.
- Press home.



-> Fig.6 Pressing wheel hub out of wheel bearing housing

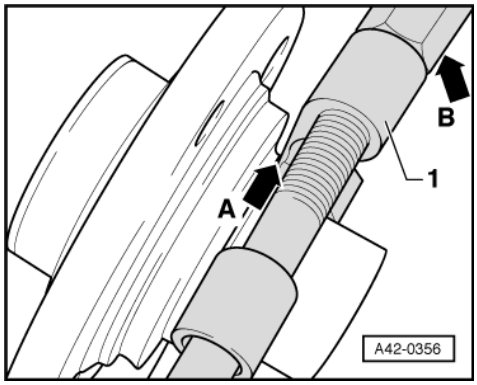


-> Fig.7 Pressing in wheel hub

- Press home.

Note:

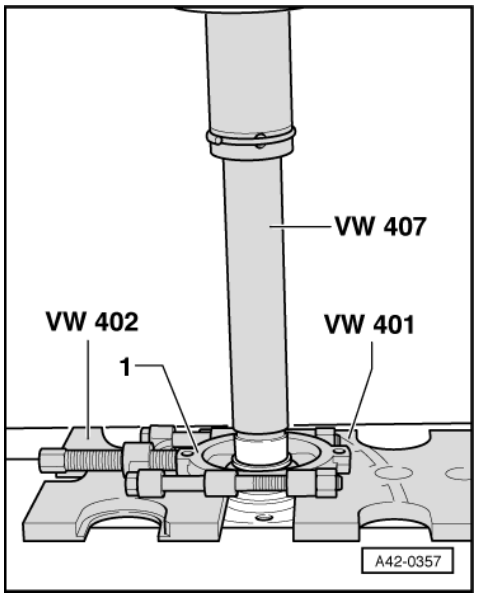
When pressing in, tubular section VW 519 may only rest on bearing inner race.



-> Fig.8 Inserting parting tool

- Insert parting tool -1- in annular groove of bearing inner race -arrow A- and pre-tension with spindle - arrow B-.

1 - Parting tool, e.g. Kukko 15-17 (commercially available)



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-> Fig.9 Pulling bearing inner race off wheel hub

1 - Parting tool, e.g. Kukko 15-17 (commercially available)

10.4 - Servicing wheel bearing housing with V.A.G 1459 B

Instead of workshop press V.A.G 1290 A, use can also be made of hydraulic removal and installation tool for wheel bearing and wheel hub V.A.G 1459 B with accessory V.A.G 1459 B /2.

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Advantages:

- Wheel bearing housing need not be completely dismantled
- Track rod and lower link are not detached from wheel bearing housing and wheel alignment is thus not necessary

44 - Wheels, Tyres, Wheel alignment

1 - Wheels and tyres

1.1 - Wheels and tyres

The valid wheel/tyre combinations can be found in

=> Technical Information; Wheel/Tyre Reference Manual

General

To ensure vehicle safety, tyres are not to be renewed individually, but rather at least on an axle basis.

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The tyres with the deeper tread should always be fitted to the front wheels.

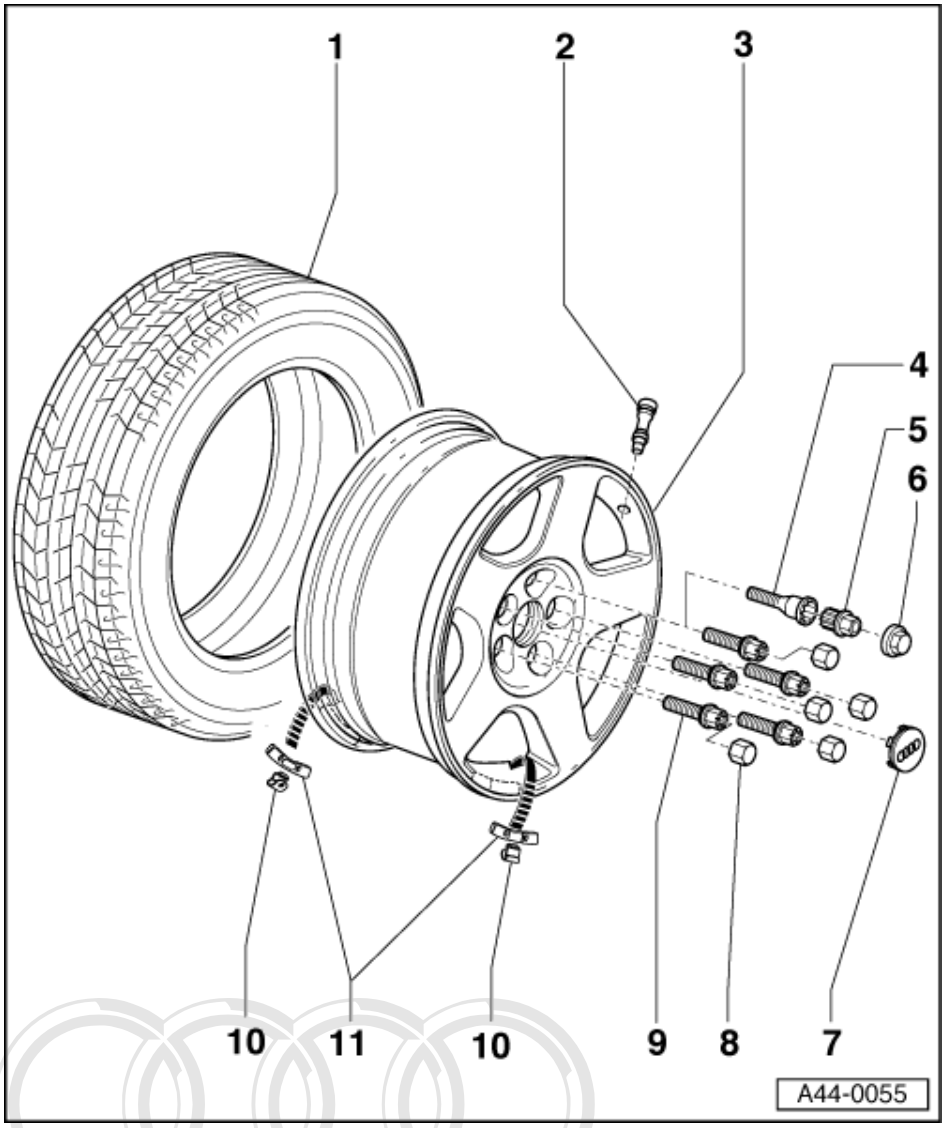
It is advisable to use tyres of the same make, design and tread type on all wheels.

Always replace rubber valve when renewing disc wheel or tyre.

Tyres are to be fitted with DOT mark facing outside of wheel; applies to left side of vehicle only in the case of tyres with directional tread pattern.

A wheel/tyre combination for the right side of the vehicle is to be fitted as spare wheel in the case of tyres with directional tread pattern.

1.2 - Exploded view



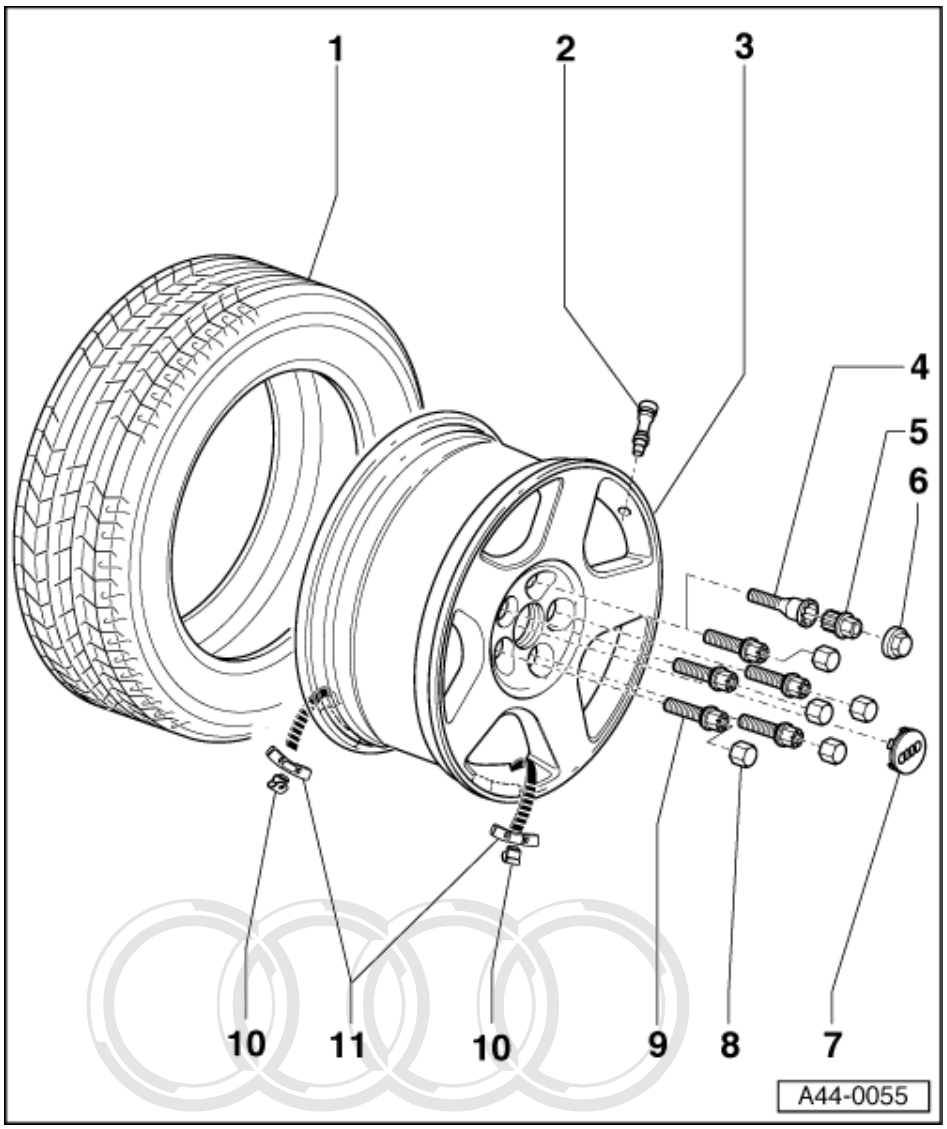
1 Tyre

2 Valve
- Always replace
- Only fit valve as per Parts List

3 Wheel
- Assignment

=> Parts List
- "Steel" disc wheel (not illustrated)
- "Aluminium" disc wheel (shown in Fig.)
  - May differ from illustration due to design changes
- Remove carefully to stop rust/dirt dropping between brake disc and wheel hub; if necessary blow out rust/dirt with compressed air
- Heed fitting instructions when changing/fitting wheels, Page => 225

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4 Wheel bolt/lockable wheel bolt, 120 Nm

- Anti-theft wheel bolt => Fig. 1
- M14 x 1.5 x 27.5 mm
- Heed fitting instructions when changing/fitting wheels, Page => 225

5 Adapter for anti-theft wheel bolt

6 Cap

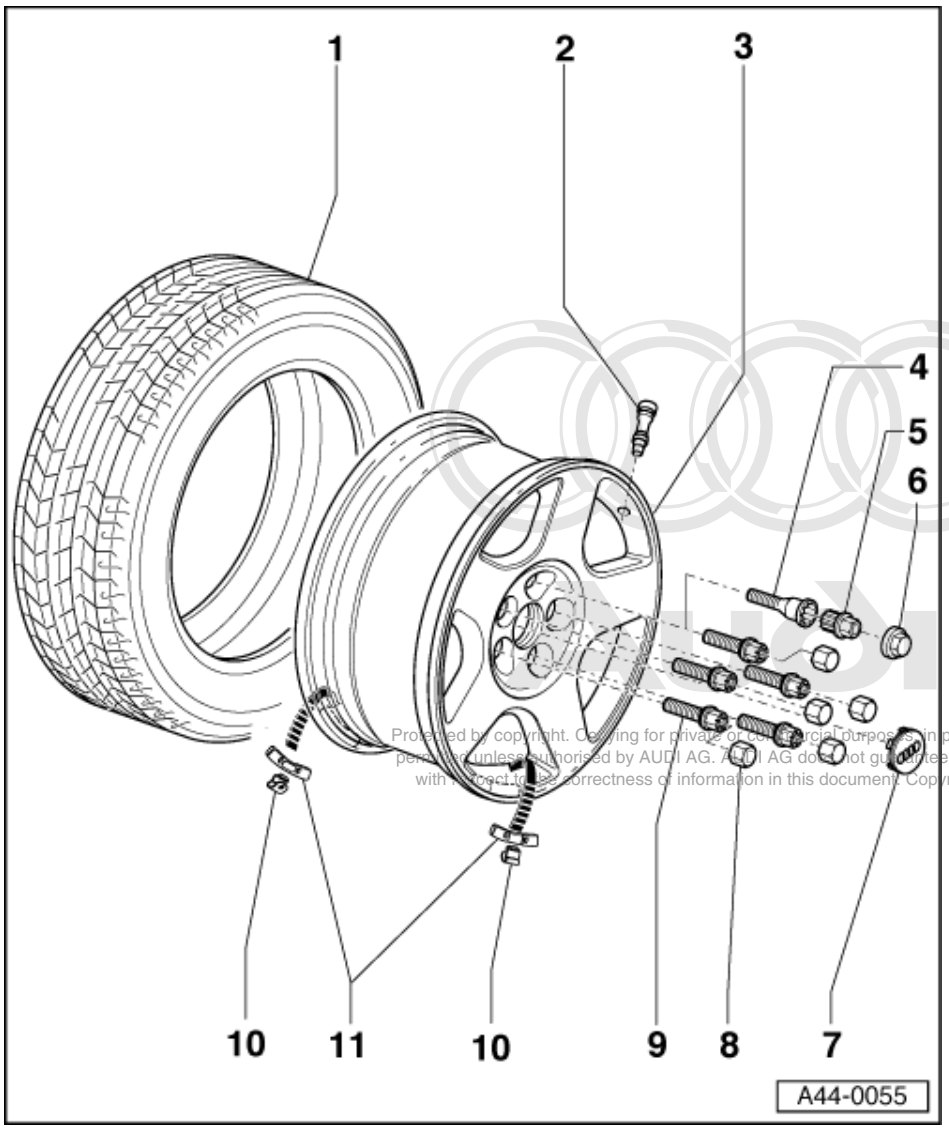
- For lockable wheel bolt => Item 4

7 Cap

8 Cap

- For wheel bolt => Item 9

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9 Wheel bolt

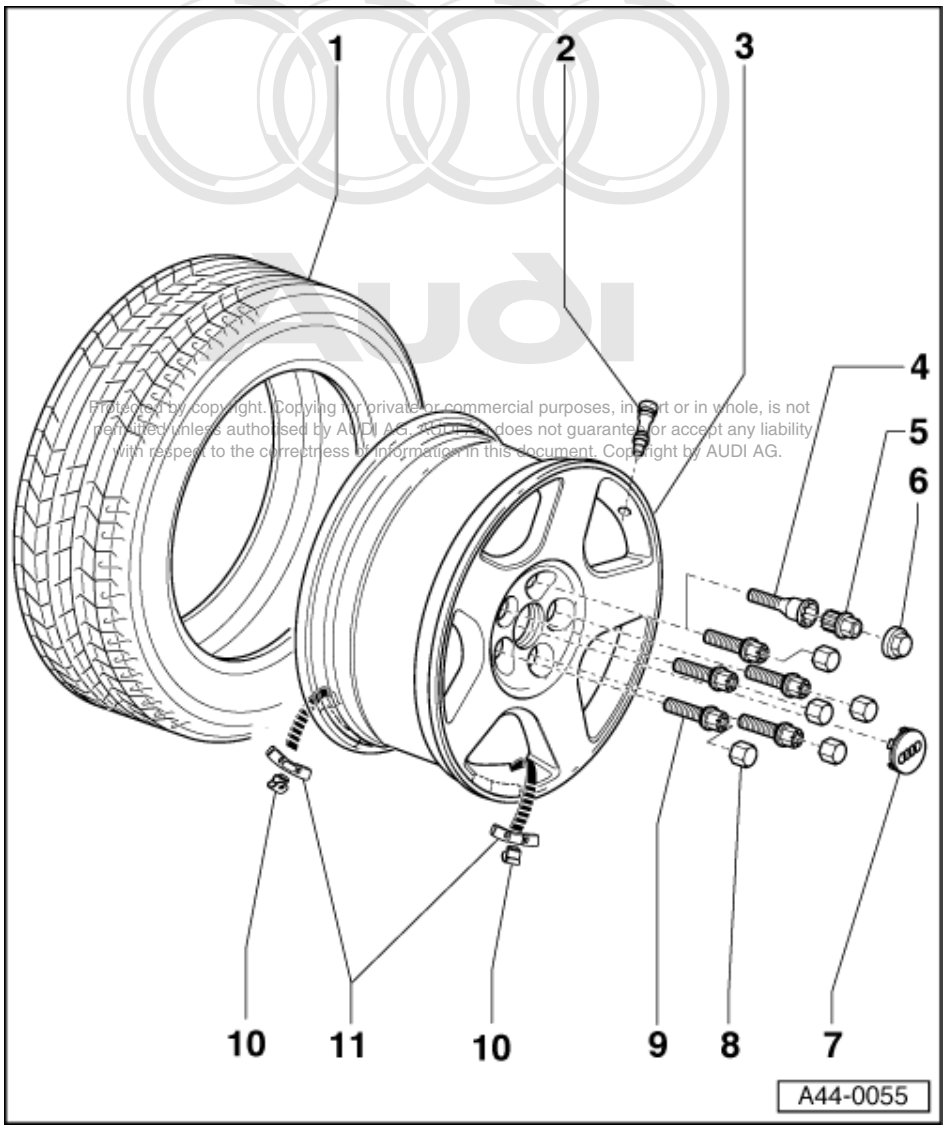
- ◆ Tightening torques:
- \- All vehicles except RS4: 120 Nm
- \- RS4: 140 Nm
- ◆ Assignment

=> Parts List

- ◆ Only one-piece wheel bolts are permitted; also applies to RS4 => Fig. 2

10 Retaining spring for balancing weights

- ◆ Not for adhesive weights



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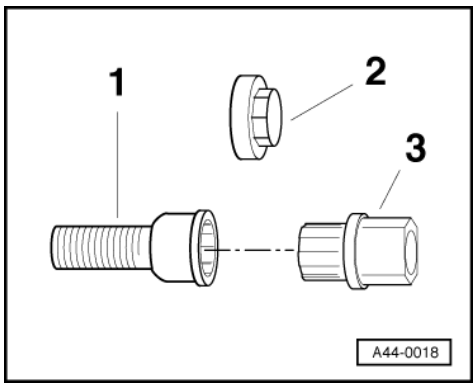
11 Balancing weights

Version with retaining spring

- Assignment

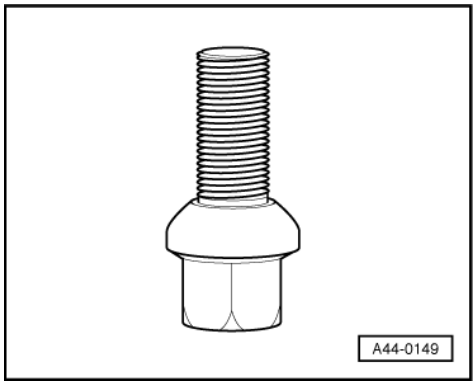
=> Parts List

- Max. 60 g per rim flange permitted
  Self-adhesive version
- Max. 60 g per rim flange permitted
- Remove dirt and grease from adhesion point on disc wheel
- Pull off backing
- Bond on balancing weights at envisaged locations



-> Fig.1 Anti-theft wheel bolt

- 1 - Anti-theft wheel bolt
- 2 - Cap
- 3 - Adapter for wheel bolt



-> Fig.2 Wheel bolt designs

One-piece wheel bolt

Assignment => Parts List

1.3 - Balancing wheels on vehicle

=> Wheel/tyre reference manual

1.4 - Wheel change/wheel fitting instructions

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Special tools and workshop equipment required

- T40004 Master set for wheel bolts
- 3208 Suction grip

- V.A.G 1332 Torque wrench

Notes:

- Only raise vehicle at jacking points provided.
- Do not use screwdriver to prise off trim caps on vehicles with light alloy wheels; always make use of special tool provided (puller from vehicle tool kit or suction grip 3208).
- To slacken off wheel bolts, use socket attachments of correct size. Worn socket attachments are not to be re-used.

- Do not use impact screwdrivers for slackening off anti-theft wheel bolts (lockable wheel bolts).
- Take care to keep wheel bolts clean.

Attention:
Firm fit of wheel bolts and wheels can only be guaranteed by adhering to the tests/instructions indicated below.

The work relating to the following tests/instructions must be performed with wheel (rim) removed.

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- Check that contact surfaces at brake disc/brake drum and wheel (rim) are free from corrosion and dirt. If necessary, remove oil, grease and corrosion.
- Check whether centring hole of wheel (rim) and centring element of wheel hub are free from corrosion and dirt.
  Remove any oil, grease and corrosion and re-establish corrosion protection around centring element by applying wax spray D 322 000 A2.

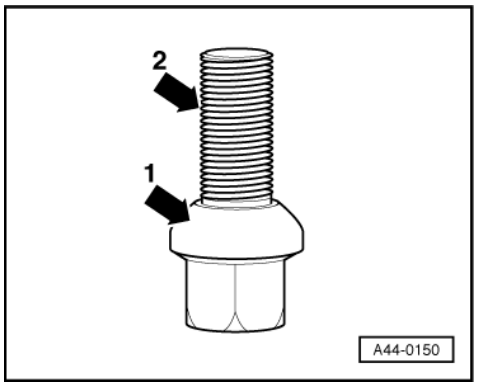
Note:

Wax spray must not be allowed to come into contact with brake system components.

- Any rust/dirt which drops between brake disc and wheel hub on removal is to be blown out using compressed air.

Attention:
Wear safety goggles when working with compressed air.

- Collars of wheels (rims) and wheel bolts must be free from dirt and corrosion.
- Use clean lint-free cloth to remove any dirt from collars of wheels (rims).
- Check that wheel bolts and wheel hub threads are clean.
- Use brass brush, for example, to remove any dirt from wheel bolts in area of collar and thread.
  Severely corroded and/or damaged wheel bolts are to be replaced.



All vehicles except RS4

- If slightly corroded wheel bolts are re-used, they are to be cleaned in the area of the collar and thread and the contact surfaces greased as follows with Optimol TA paste, part no. G 052 109 A2.

-> One-piece wheel bolt

- Apply thin coat of grease to thread area -2- and collar -1-.

Note:

Exclusive use is to be made of Optimol TA paste, part no. G 052 109 A2. Paste must not be allowed to come into contact with brake system components.

RS4 only

- Slightly corroded wheel bolts on RS4 are not to be cleaned and greased. They are always to be replaced.
- RS4 wheel bolts are always to be screwed in "without lubrication".

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All vehicles (continued)

- Check that wheel bolts can be screwed in easily by hand without the need for tools. It must be easy to screw in the full thread length of the wheel bolts when fitting the wheel.
- Make sure brake disc hole is aligned with hub thread. Wheel bolt thread must not make contact with brake disc hole.

Fitting wheels

- Position wheel on wheel hub and secure by hand with two opposing wheel bolts.
- Screw in remaining wheel bolts by hand. They must be easy to screw in. Pay attention to exact centring.
- Relieve load on wheel if necessary by lifting slightly and tighten two wheel bolts slightly by hand.
- Screw in all wheel bolts evenly by hand.

- Tighten wheel bolts diagonally to approx. 50 Nm using nut wrench, for example.
- Lower vehicle onto ground and diagonally finish-tighten all wheel bolts to prescribed torque.

Tightening torques

- All vehicles except RS4: 120 Nm
- RS4: 140 Nm

2 - Wheel alignment

2.1 - Wheel alignment

2.2 - General

Wheel alignment is always to be performed with equipment released for use by AUDI.

Wheel alignment always includes both front and rear axle.

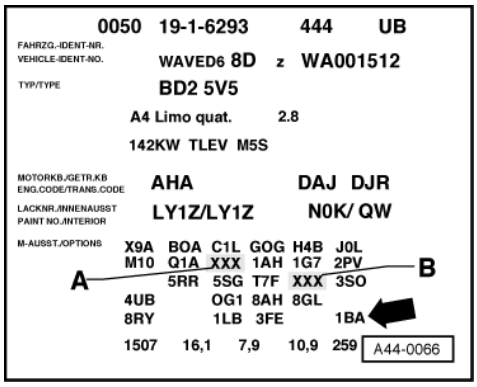
Proper vehicle performance is otherwise not guaranteed.

Notes:

- It is not appropriate to carry out wheel alignment before the vehicle has been driven for between 1000 and 2000 km, as the coil springs must be allowed to fully settle.
- Always attempt to come as close as possible to the respective specifications when performing adjustment work.

2.3 - Test requirements

Explanatory notes on factory codes (PR numbers)



-> Example of vehicle data sticker

At the start of MY 98, PR numbers were introduced to facilitate running gear/spring/shock absorber assignment.

- - A - indicates PR no. for front axle
- - B - indicates PR no. for rear axle

The running gear version installed in the vehicle can be seen from the corresponding PR number on the vehicle data sticker.

- - Arrow - indicates PR no. for running gear versions

In this example, the vehicle is fitted with standard running gear 1BA -arrow-.

The vehicle data sticker can be found in the spare wheel well at the rear of the vehicle and in the Service booklet.

1BA = Standard running gear

1BB = Heavy-duty running gear (approx. 20 mm higher)

1BC = Special-purpose vehicles

1BD =Sports running gear (Audi S4)

RS4 = Sports running gear (RS4)

1BE = Sports running gear

1BV = Sports running gear (quattro GmbH)

1BQ = Sports running gear (South Africa)

1BT = Heavy-duty running gear (approx. 7 mm higher)

1BP = Heavy-duty running gear (trim position as for 1BA, however with limited bump travel)

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Vehicles with special running gear -1BC- have the same wheel alignment specifications as the standard running gear -1BA-.

- Sensors properly attached and adjusted; heed manufacturer's operating instructions

- Tread depth on one axle must not differ by more than 2 mm
- Specified tyre inflation pressure
- When performing wheel alignment, make sure neither sliding base nor turntable is on end stop
- Vehicle kerb weight 1)

1) Kerb weight refers to weight of vehicle ready for operation (fuel tank and windscreen/headlight washer system fluid reservoir full, spare wheel, vehicle tool kit, jack) without driver.

Spare wheel, vehicle tool kit and jack must be in their specified positions.

- Vehicle properly aligned, bounced several times and allowed to settle
- Check suspension, steering and steering linkage for impermissible play and damage and service if necessary
- Perform wheel runout compensation
  The permissible wheel runout may already cause the toe-in tolerance to be exceeded. The toe-in can then not be set correctly without performing wheel runout compensation.

Wheel alignment must be performed:

In the event of running problems
Following accident damage
If axle components have been removed
If one-sided tyre wear is found

Audi

Front axle component	Alignment required		Adjustment of toe constant "S" required		Rear axle component	Alignment required	
	Yes	No	Yes	No		Yes	No
Rear upper link		X		X	Shock absorber		X
Front upper link	X		X				
Lower guide link		X		X	Coil spring		X
Suspension strut		X		X			
Track control link		X		X	Upper link 1)	X	
Mounting bracket	X		X		Lower link 1)	X	
Wheel bearing housing	X		X		Wheel bearing housing1)	X	
Track rod	X		X		Track rod1)	X	
Steering box	X		X		Rear subframe1)	X	
Subframe	X		X		Entire torsion beam axle (FWD)	X	
Anti-roll bar		X			Anti-roll bar1)		X

1) Four-wheel drive vehicles only

2.4 - Wheel alignment specifications (front-wheel drive vehicles)

Applicable to all engines

Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	- 25' ±25'	- 40' ±25'	- 15' ±25' (1BB) - 30' ±25' (1BT)
Max. perm. difference between the two sides	30'	30'	30'

Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'	+ 10' ±5'
Toe constant per wheel (setting)	+ 12' ±2'	+ 12' ±2'	+ 12' ±2'
Toe constant per wheel (check value)	+ 12' ±7'	+ 12' ±7'	+ 12' ±7'
Toe-out on turns at 20 degrees 1)	- 1° 20'*±30'	- 1° 20'*±30'	- 1° 20'*±30'

1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

Rear axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	- 1°30'*±20'	- 1°30'*±20'	- 1°30'*±20'
Max. perm. difference between the two sides	30'	30'	30'
Overall toe	+ 20' +15'/-10'	+ 28' +15'/-10'	+ 14' +15'/-10'
Max. perm. mis-alignment with respect to longitudinal axis of vehicle	±15'	±15'	±15'

2.5 - Wheel alignment specifications (four-wheel drive vehicles)

Applicable to all engines

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Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	- 25' ±25'	- 40' ±25'	- 15' ±25' (1BB) - 30' ±25' (1BT)
Max. perm. difference between the two sides	30'	30'	30'
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'	+ 10' ±5'
Toe constant per wheel (setting)	+ 12' ±2'	+ 12' ±2'	+ 12' ±2'
Toe constant per wheel (check value)	+ 12' ±7'	+ 12' ±7'	+ 12' ±7'
Toe-out on turns at 20 degrees 1)	- 1° 20'*±30'	- 1° 20'*±30'	- 1° 20'*±30'

1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

Rear axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	-40'*±30'	- 40'*±30'	-40'*±30'
Max. perm. difference between the two sides	30'	30'	30'
Overall toe	16' ±10'	16' ±10'	16' ±10'
Max. perm. mis-alignment with respect to longitudinal axis of vehicle	±10'	±10'	±10'

1) Vehicles with heavy-duty running gear = 1BT only

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

Applicable to all engines

Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	- 35' ±25'	- 50' ±25'	- 20' ±25' (1BB) - 30' ±25' (1BT)
Max. perm. difference between the two sides	30'	30'	30'
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'	+ 10' ±5'
Toe constant per wheel (setting)	+ 9' ±2'	+ 9' ±2'	+ 9' ±2'
Toe constant per wheel (check value)	+ 9' ±7'	+ 9' ±7'	+ 9' ±7'
Toe-out on turns at 20 degrees 1)	- 1° 20'*±30'	- 1° 20'*±30'	- 1° 20'*±30'

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1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

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

Applicable to all engines

Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Camber	- 35' ±25'	- 50' ±25'	- 20' ±25' (1BB) - 30' ±25' (1BT)

Front axle	Standard running gear (1BA, 1BC) Heavy-duty running gear (1BP)	Sports running gear (1BE)	Heavy-duty running gear (1BB, 1BT)
Max. perm. difference between the two sides	30'	30'	30'
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'	+ 10' ±5'
Toe constant per wheel (setting)	+ 9' ±2'	+ 9' ±2'	+ 9' ±2'
Toe constant per wheel (check value)	+ 9' ±7'	+ 9' ±7'	+ 9' ±7'
Toe-out on turns at 20 degrees 1)	- 1° 20'*±30'	- 1° 20'*±30'	- 1° 20'*±30'

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1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

2.8 - Wheel alignment specifications (sports running gear 1BD, RS4)

Front axle	Sports running gear 1BD	Sports running gear RS4
Camber	- 50' ±25'	- 1° 10'*±25'
Max. perm. difference between the two sides	30'	30'
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'
Toe constant per wheel (setting)	+ 7' ±2'	+ 7' ±2'
Toe constant per wheel (check value)	+ 7' ±7'	+ 7' ±7'
Toe-out on turns at 20 degrees 1)	1° 20'*±30'	1° 20'*±30'

1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

Rear axle	Sports running gear 1BD	Sports running gear RS4
Camber	- 55'*±15'	- 1° 10'*±15'
Max. perm. difference between the two sides	30'	30'
Overall toe	16' ±10'	16' ±10'
Max. perm. mis-alignment with respect to longitudinal axis of vehicle	±10'	±10'

2.9 - Wheel alignment specifications (sports running gear 1BV, 1BQ)

Front axle	Sports running gear 1BV quattro GmbH	Sports running gear 1BQ South Africa
Camber	- 1°*±25'	- 45'*±25'
Max. perm. difference between the two sides	30'	30'
Toe per wheel (kerb weight setting)	+ 10' ±2'	+ 10' ±2'
Toe per wheel(kerb weight check value)	+ 10' ±5'	+ 10' ±5'

Front axle	Sports running gear 1BV quattro GmbH	Sports running gear 1BQ South Africa
Toe constant per wheel (setting)	+ 9' ±2'	+ 9' ±2'
Toe constant per wheel (check value)	+ 9' ±7'	+ 9' ±7'
Toe-out on turns at 20 degrees 1)	1° 20'*±30'	1° 20'*±30'

1) Toe-out on turns at kerb weight 1° 20'*±30' with 20° steering angle at inside wheel

Rear axle	Sports running gear 1BV quattro GmbH	Sports running gear 1BQ South Africa
Camber/front-wheel drive	**- 1° 50'*±20' 2)**	- 1° 30'*±20' 2)
Camber/four-wheel drive	- 55'*±15' 3)	- 40'*± 30' 3)
Max. perm. difference between the two sides	30'	30'
Overall toe	35' +15'/-10' 2) 16' ±10' 3)	25' +15'/-10' 2) 16' ±10' 3)
Max. perm. mis-alignment with respect to longitudinal axis of vehicle	±15' 2) ±10' 3)	±15'2) ±10'3)

Additional data for vehicles with front and four-wheel drive:

Additional data are only intended to speed up diagnosis after an accident.

Table => Page 1

2.10 - Preparation for measurement

Special tools and workshop equipment required

- V.A.G 1813 Wheel alignment computer
- V.A.G 1869/2 Brake pedal depressor
- V.A.G 1907 Screw for steering centring
- V.A.G 1925 Spacer gauge
- V.A.G 1925/3 Adapter
- V.A.G 1925/4 Adapter

Use of adapter V.A.G 1925/3 or V.A.G 1925/4 depends on design of lifting platform.

- V.A.G 1925/6 Adapter set

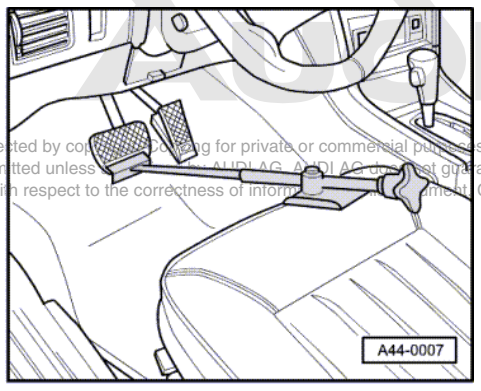
Wheel runout compensation

Compensation must be provided for lateral runout of rims. Otherwise measurement result will be biased.

The toe-in cannot be set correctly without performing wheel runout compensation.

- Perform wheel runout compensation.

  Heed appropriate instructions of wheel alignment equipment manufacturer when doing so.



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- -> Insert brake pedal depressor V.A.G 1869/2.

Crash vehicles

Screw for steering centring V.A.G 1907 must be inserted when performing wheel alignment on such vehicles.

Otherwise centre position of rack is not guaranteed.

Screw for steering centring V.A.G 1907 is only to be hand-tightened.

2.11 - Assignment of adapters to running gear for alignment

Adapter	Standard running gear (1BA)	Heavy-duty running gear (1BB)	Special-purpose vehicles (1BC)	Sports running gear Audi S4 (1BD)	Sports running gear (1BE)
V.A.G 1925	X	X	X	X	X
V.A.G 1925/4	X	X	X	X	X
V.A.G 1925/6		X		X	X
V.A.G 1925/3 1)	X	X	X	X	X

1) Only required on certain lifting platforms. V.A.G 1925/3 replaces V.A.G 1925/4.

Adapter	Heavy-duty running gear (1BP)	Heavy-duty running gear (1BT)	Sports running gear (1BV) quattro GmbH	RS4	Sports running gear (1BQ) South Africa
V.A.G 1925	X	X	X	X	X
V.A.G 1925/4	X	X	X	X	X
V.A.G 1925/6	X	X	X	X	X
V.A.G 1925/3 1)	X	X	X	X	X

1) Only required on certain lifting platforms. V.A.G 1925/3 replaces V.A.G 1925/4.

2.12 - Sequence of wheel alignment operations

Notes:

- Wheel alignment is only to be performed at vehicle kerb weight
  => Page 228 .

Exception: Toe-in curve adjustment as per alignment program instructions

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- Establish which running gear version is fitted in vehicle. Appropriate information is provided on vehicle data sticker => Page 228 .

Always keep to the following sequence:

- Check and if necessary balance out camber at front axle => Page 235 .
- Check and if necessary adjust camber at rear axle => Page 237 (front-wheel drive vehicles).
- Check and if necessary adjust camber at rear axle =>Page 237 (four-wheel drive vehicles).
- If necessary, check profile of toe-in curve at front axle.

The tables on Page 240 describe the situations where it is necessary to adjust the toe-in curve/toe constant "S".

- Check and if necessary adjust toe at front axle at kerb weight
=> Page 241 .

6 - If settings have been altered at front axle, perform zero position compensation for steering angle sender -G85.

=> Running Gear Self-diagnosis for ABS, ESP; Repair Group 01; ESP, Electronic Stability Program Bosch 5.3; Zero position compensation for steering angle sender -G85 ESP, Electronic Stability Program Bosch 5.3 Zero position compensation for steering angle sender -G85

2.13 - Vehicle pull and crash vehicles

Vehicle pull

This may be due to rack in steering box not being positioned exactly in the centre when driving in a straight line.

This is enough to result in slight hydraulic steering assistance to left or right and cause vehicle to pull.

Always check centre position of rack when performing wheel alignment on a vehicle subject to "Pulling to one side or at an angle".

Rack in steering box must be positioned exactly in centre when adjusting toe/toe constant.

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Crash vehicles

Steering centring must be performed on such vehicles before checking or adjusting toe or toe constant "S".

Checking centre position of rack

- Perform steering centring as instructed by wheel alignment computer.
- Screw for steering centring V.A.G 1907 must be inserted to centre rack => Page 245 , Fig. 1 .
- Check whether steering wheel is as close as possible to being horizontal on steering column with wheels facing straight ahead.
- If necessary, re-position steering wheel accordingly.

Otherwise centre position of rack is not guaranteed.

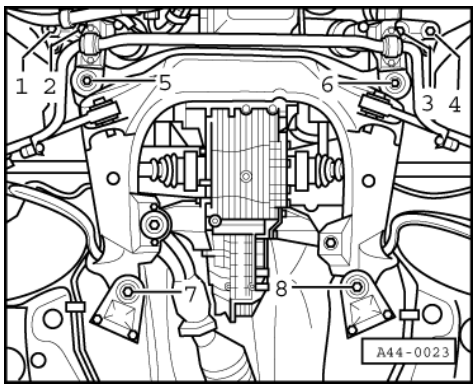
If steering wheel is re-positioned on such vehicles, zero position compensation must be performed for steering angle sender -G85.

=> Running Gear Self-diagnosis for ABS, ESP; Repair Group 01; ESP, Electronic Stability Program Bosch 5.3; Zero position compensation for steering angle sender -G85 ESP, Electronic Stability Program Bosch 5.3 Zero position compensation for steering angle sender -G85

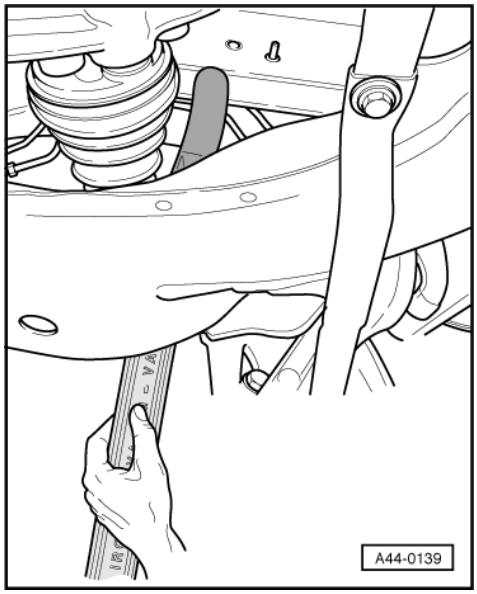
2.14 - Checking and if necessary balancing out camber at front axle

Camber cannot be adjusted.

It can be evenly balanced out within the specified/tolerance range by moving the subframe.



- Remove noise insulation.
- -> Slacken off hexagon bolts -1-, -2-, -3-, -4-, -5-, -6-, -7- and -8-.



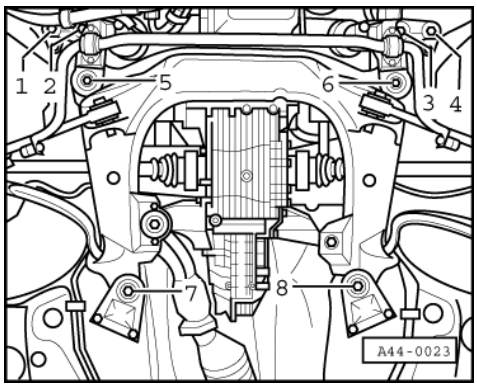
- -> Use plastic-coated tyre iron to move subframe to appropriate position.

Apply pressure in centre of subframe between subframe and longitudinal member of body.

If no plastic-coated tyre iron is available, wrap adhesive tape around a conventional tyre iron.

Attention: Take care not to damage any components.

Wheel alignment specifications => Page 229



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- -> Screw in new hexagon bolts -7- and -8-, tighten to 110 Nm and give further 90° turn.
- Screw in new hexagon bolts -5- and -6-, tighten to 110 Nm and give further 90° turn.
- Screw in new hexagon bolts -1-, -2-, -3- and -4- and tighten to 75 Nm.
- Install noise insulation.

=> General Body Repairs, Exterior; Repair Group 50; Front Body; Noise insulation - Exploded view Front Body Noise insulation - Exploded view

Note:

All wheel alignment settings must be checked each time camber is corrected.

2.15 - Checking rear axle camber (front-wheel drive vehicles)

Wheel alignment specifications => Page 229

On front-wheel drive vehicles, camber can be checked but not adjusted.

If measured values are outside permitted tolerance, check axle beam for damage and replace if necessary.

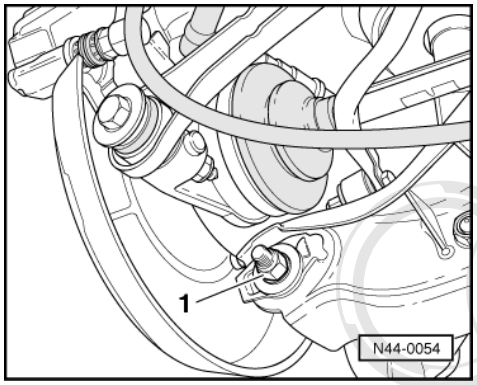
2.16 - Adjusting rear axle camber (four-wheel drive vehicles)

Wheel alignment specifications => Page 230

- Unfasten hexagon nut -1-.

Note:

- Maximum adjustment range is 90° to left or right from centre position.



- -> Adjust camber by turning eccentric bolt.
- Tighten nut, re-check camber value and correct if necessary.

2.17 - Balancing out rear axle toe (front-wheel drive vehicles)

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Overall rear axle toe value cannot be adjusted.

The individual toe values can be balanced out by moving the rear axle.

- Slacken off bolts at mounting brackets.
- Balance out individual toe values by moving axle beam in elongated holes of mounting brackets.

If overall toe value is outside permitted tolerance or if individual toe values cannot be balanced out, axle beam must be checked for damage and replaced if necessary.

If applicable, body is also to be checked in area of rear axle mounting points/aligned and serviced.

=> Body Repairs Workshop Manual

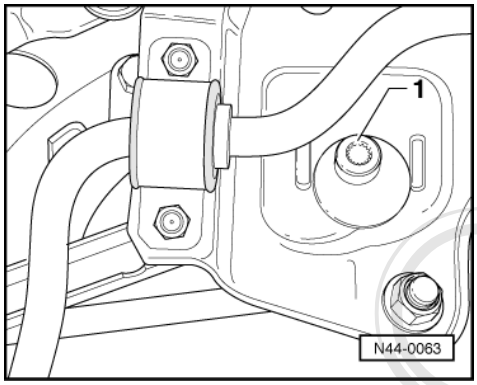
2.18 - Adjusting rear axle toe (four-wheel drive vehicles)

Wheel alignment specifications => Page 230

- Unfasten hexagon nut -1-.

Notes:

- Maximum adjustment range is 90° to left or right from centre position.
- Altering individual toe values automatically changes geometric drive axis as well.



- -> Adjust individual toe values accordingly by turning eccentric bolt.
- Tighten nut, re-check camber value and correct if necessary.

2.19 - Adjusting front axle toe-in curve

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Explanatory notes:

Bump or rebound alters the toe as a function of the bump and rebound travel. The resultant toe values are referred to as the toe-in curve.

The change in toe constant "S" is set with the vehicle raised by way of vertical adjustment of the track rod end, Page => 240 .

The wheel alignment computer determines the toe constant "S" by way of one measured value in the initial position and one when raised. In doing so, the actual values are compared to the specifications and displayed on the monitor.

Different adapters are required for raising depending on running gear => Page 234 .

Note:

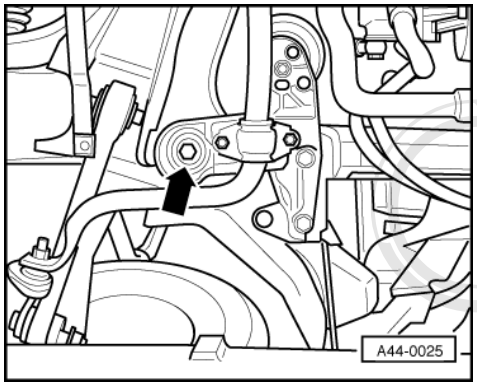
Incorrect adjustment of the toe constant will result in inaccurate steering on braking/accelerating or driving over an uneven surface.

2.20 - Moving vehicle to initial position for wheel alignment

Running gear 1BA, 1BB, 1BC, 1BT, 1BP

Note:

On account of different wheel alignment platforms, it may be necessary to raise front axle of vehicle for insertion of spacer gauge -V.A.G 1925-. Bounce vehicle after lowering it.

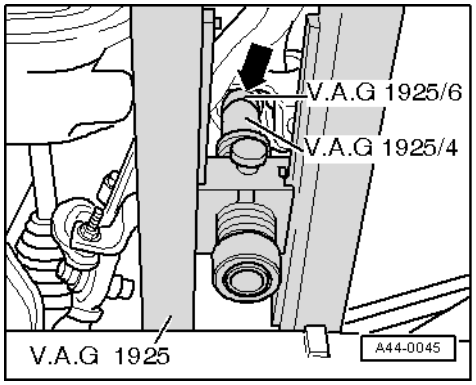


- -> Insert spacer gauge -V.A.G 1925- with adapters - V.A.G 1925/3 or V.A.G 1925/4- and screw out the two threaded stems
- . . . until they just make contact with the front bolts -arrow- of the subframe.

  This must not cause the vehicle to be raised.

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Vehicle is now in initial position.



Vehicle with sports running gear 1BD, 1BE, 1BQ, 1BV, RS4

- -> Position axle lift at front jacking points and raise vehicle.
- Position adapter - V.A.G 1925/6- on adapter - V.A.G 1925/3 or V.A.G 1925/4- of spacer gauge.
- Lower vehicle onto adapters -arrow-.

Vehicle is now in initial position.

All running gear versions

In this position, program in wheel alignment computer checks whether toe-in value for each wheel is as specified. If necessary, toe-in is to be corrected by altering length of track rod.

Adjusting front axle toe in initial position => Page 241

Wheel alignment specifications => Page 229

If correction is necessary, this is indicated by wheel alignment program.

2.21 - Raising vehicle with running gear 1BA, 1BB, 1BC, 1BD, 1BE, 1BP, 1BQ, 1BT, 1BV, RS4

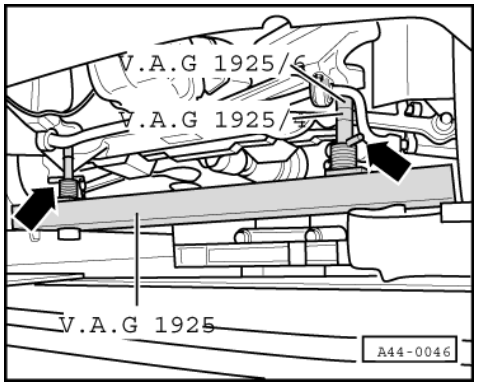
When performing the next operation, it must be ensured that the wheels remain in contact with the turntables whilst raising the vehicle.

Should contact be lost, the turntables are not to be moved, as this would bias the measurement result.

- Position axle lift at front jacking points and raise vehicle.

Note:

Vehicle is raised by 60 mm.



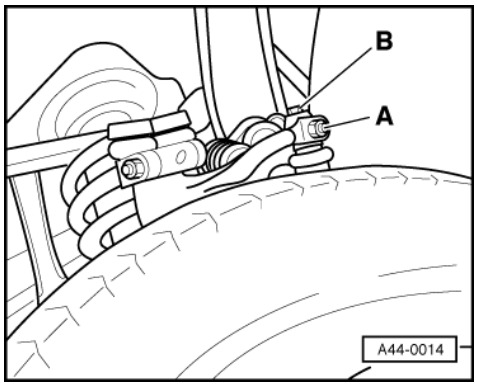
- -> Extend cylinders in threaded stems and fix in position with locking pins.

  Make sure locking pins -arrows- are correctly positioned.

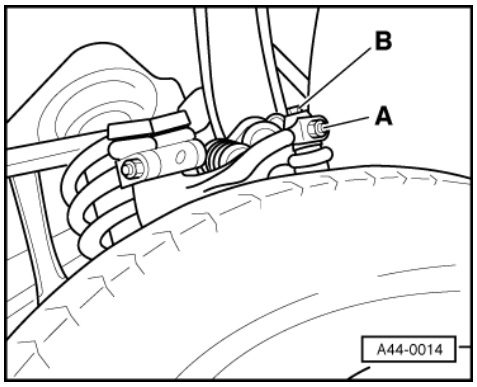
- Lower vehicle onto spacer gauge V.A.G 1925.

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2.22 - Adjusting toe constant "S"



- -> Unfasten hexagon nut -A-.
- Screw out bolt -B- approx. 4 mm.
- Press down track rod joint as far as it will go.



- -> Screw in bolt -B- until exact specification is attained.
- Tighten hexagon nut -A- to 50 Nm and check value.
- Tighten bolt -B- to 7 Nm.
- Lower vehicle back into initial position.
- Screw down threaded stem.
- Bounce vehicles with standard running gear several times.

Checking toe constant following adjustment

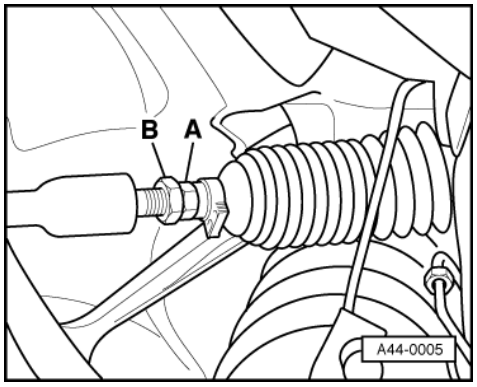
The wheel alignment equipment now re-checks the toe constant.

Setting is OK if measured values in re-check are within tolerance for check value.

If measured values are not within tolerance for check value, re-adjustment must be performed in raised position.

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2.23 - Adjusting front axle toe



- Unfasten lock nut -B-.
- -> Adjust toe in each case at left and right wheel with hexagon -A-.

Make sure bellows are not twisted after turning track rods

as twisted bellows soon become worn.

- Tighten lock nut -B- to 40 Nm and check toe-in value again.

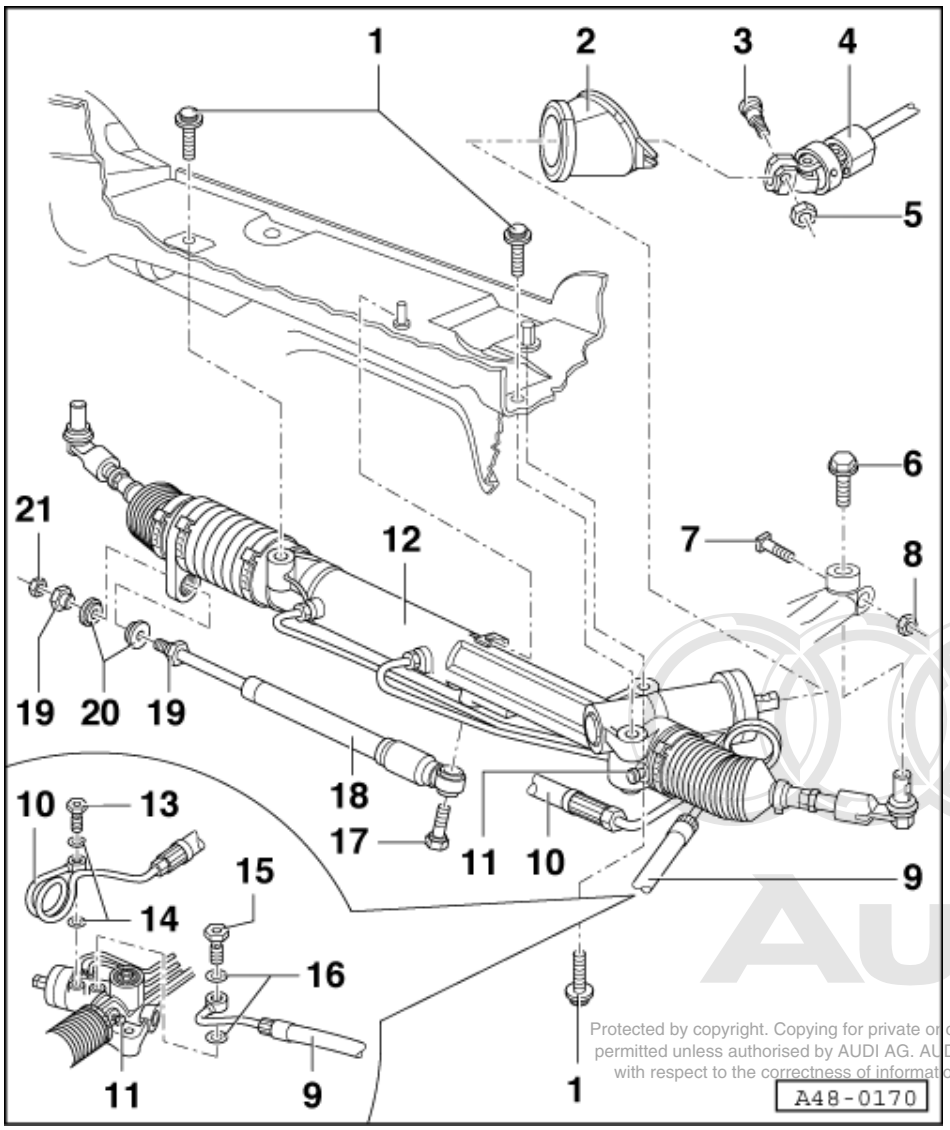
Value set may deviate slightly after tightening lock nut -B-.

Setting is however correct if measured toe value is within tolerance.

48 - Steering

1 - Steering box (left-hand drive)

1.1 - Steering box (left-hand drive)



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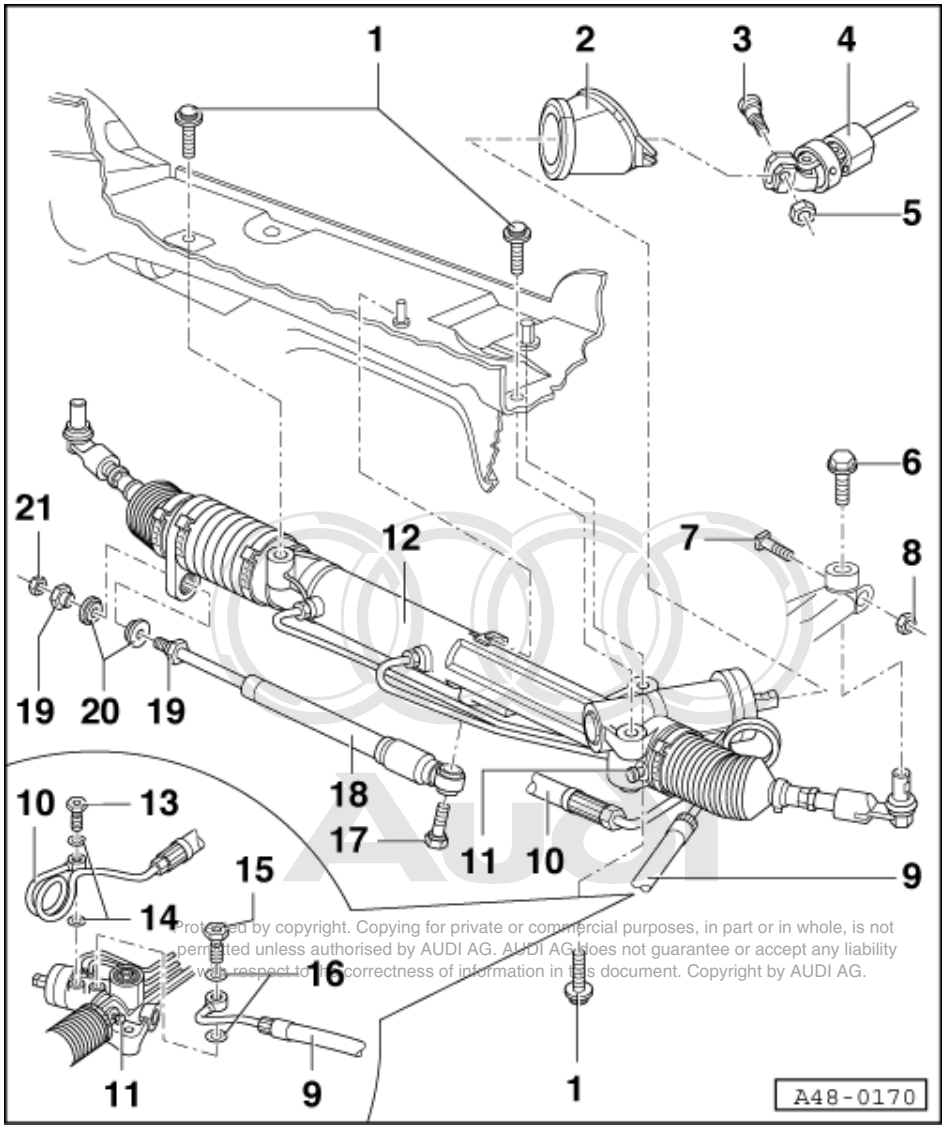
1.2 - Exploded view

1 **Hexagon bolt, 68 Nm**
2 **Boot**
- Check for cracks and abrasion

3 **Eccentric bolt**
- Torx T50
- Turn clockwise to slacken off
- Turn anti-clockwise to tension

4 **Steering column**
5 **Self-locking hexagon nut, 30 Nm**

- Always replace



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6 Combi bolt, 7 Nm
- For adjusting toe-in curve

7 Bolt

8 Self-locking nut, 50 Nm
- Always replace

9 Return hose

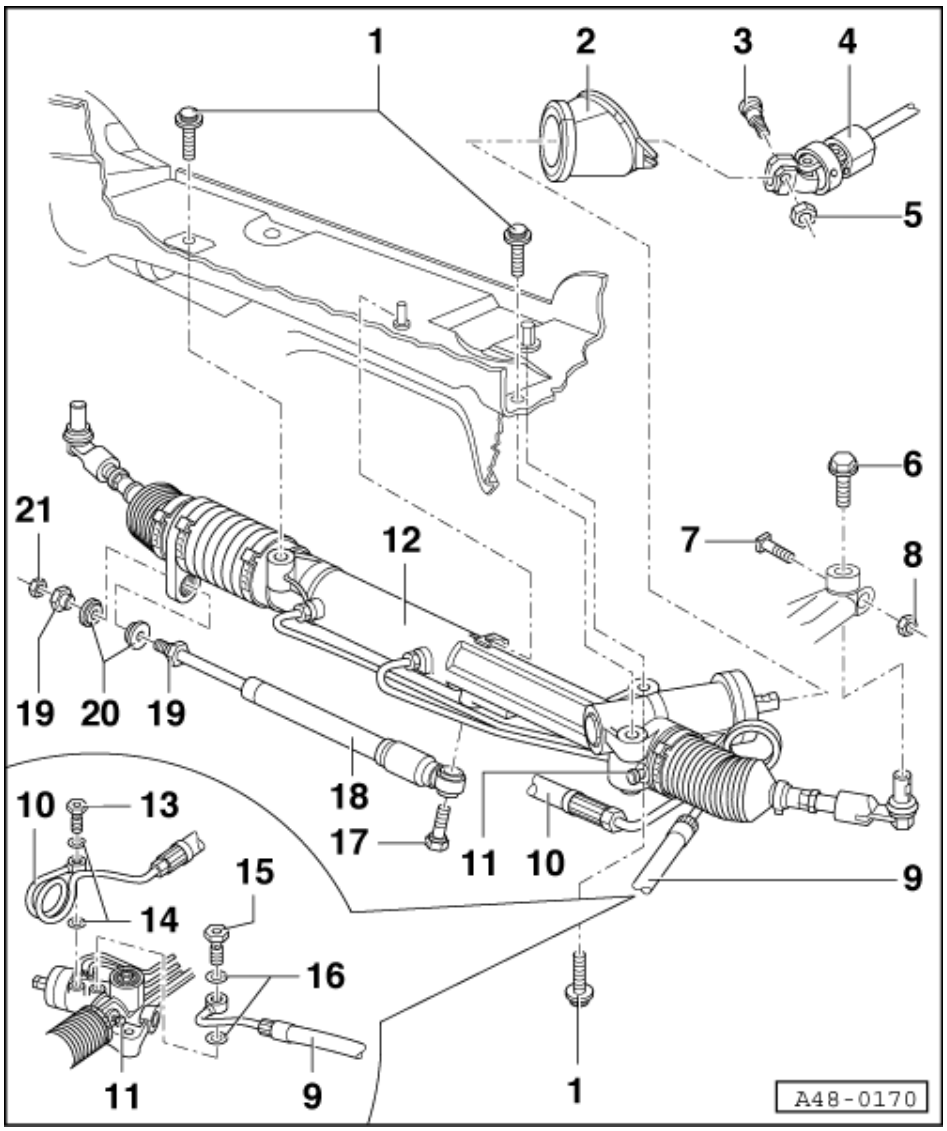
10 Expansion hose

11 Cheese-head bolt, 13 Nm
- Screw plug of steering centring
  => Fig. 1

12 Power-assisted steering box with track rods

13 Banjo bolt, 40 Nm
- With integrated non-return valve

14 Sealing ring, 14 *20
- Always replace



15 Banjo bolt, 50 Nm

16 Sealing ring, 16 *22

- Always replace

17 Hexagon bolt, 35 Nm

18 Steering damper

- Only for:

- 6-cyl. models
- As of MY` 98 all 4-cyl. models as of 132 kW

19 Bushing

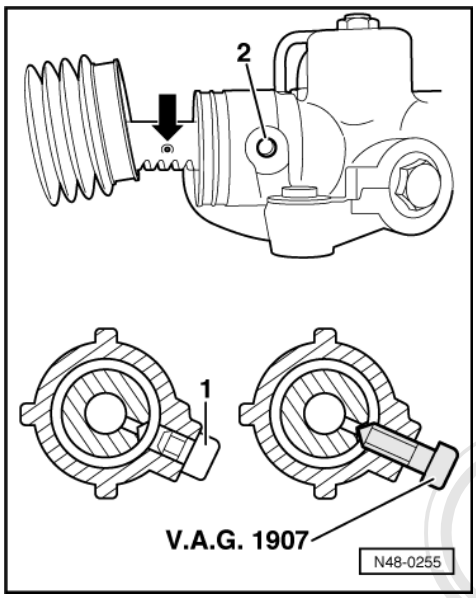
20 Rubber bush

- Two-piece

21 Hexagon nut, 10 Nm

- Provide support at hexagon of steering damper piston rod when slackening off and tightening

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-> Fig.1 Screw plug of steering centring

1 - Screw plug of steering centring, 13 Nm
2 - Tapped hole in steering box

Audi

1.3 - Removing and installing power-assisted steering box (left-hand drive)

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Special tools and workshop equipment required

- 3094 Hose clamps up to ø 25 mm
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1907 Screw for steering centring

Removing

- Take out plenum chamber cover.
- Remove battery.

=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

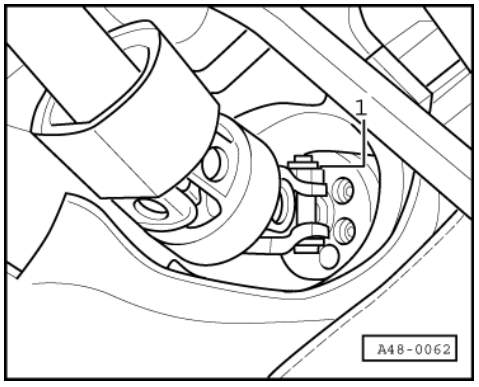
- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

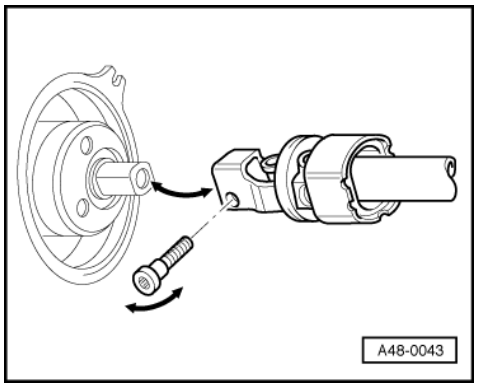
Attention:
Move steering wheel to centre position and do not turn it whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.

- Move steering wheel to centre position.
- Pull out ignition key with steering wheel in centre position.
- Move steering wheel slightly to engage steering lock.

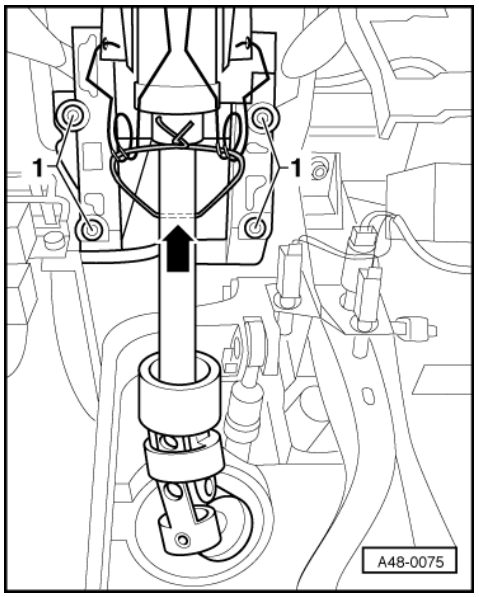
Uncontrolled turning of steering wheel with steering box removed could strain and damage coil connector of airbag system.



- -> Unscrew nut -1- at universal joint.
- Slacken off eccentric by turning tensioning bolt (Torx T50) clockwise and take out bolt.



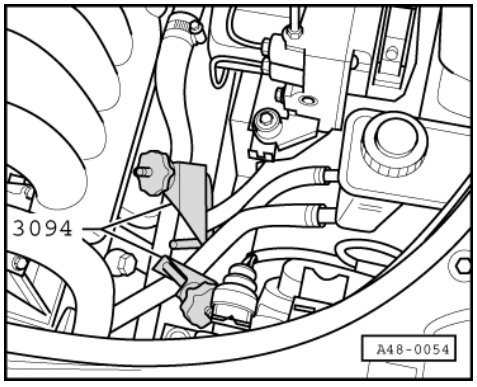
- -> Swivel aside universal joint.
- Pull out bulkhead collar to inside.



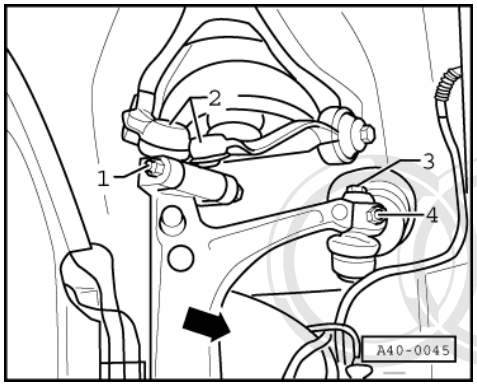
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- -> Before detaching from steering box pinion, secure steering column with wire as shown.

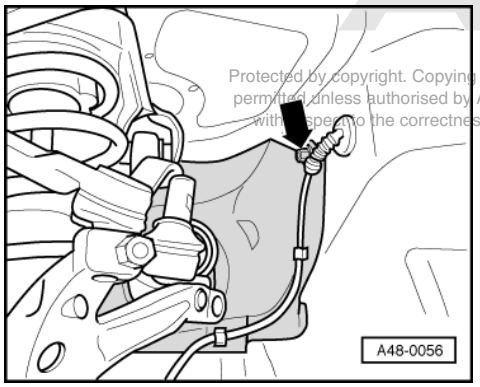
Attention:
- **Mesh section between top and bottom part of steering column is never to be separated.**
- **Do not turn steering wheel whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.**



- -> Pinch off suction and return pipe with hose clamps -3094-.

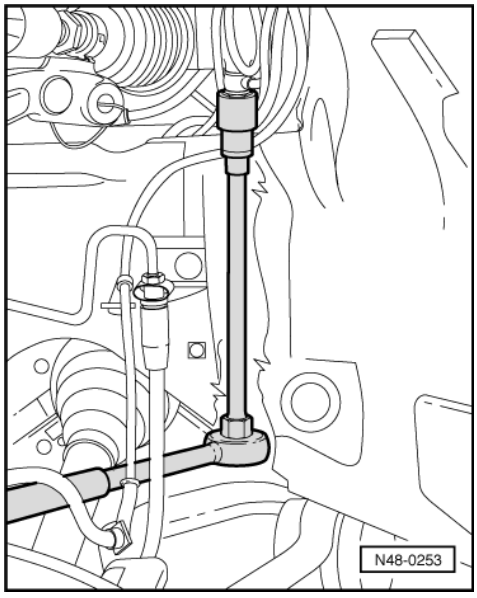


- Unscrew front wheels.
- -> Screw out hexagon bolt -3- and bolt -4-.
- Pull out track rod.

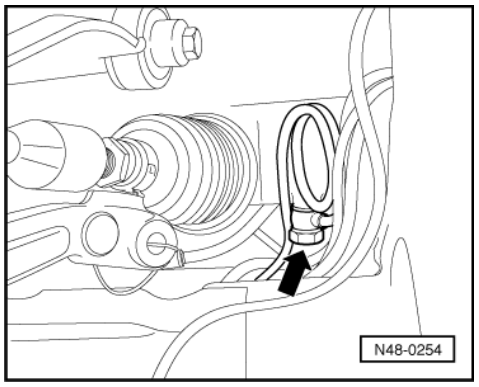


- -> Unscrew plastic nut -arrow-.
- Prise out clips and take out cover.

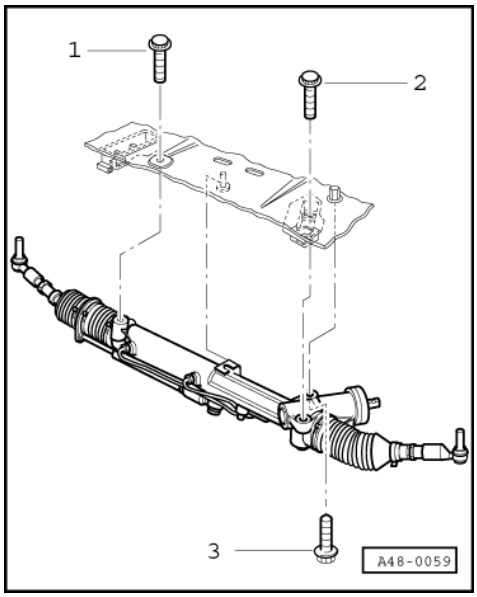
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- Place drip tray in position to collect hydraulic fluid.
- -> Unscrew banjo bolt for return hose (22 mm) from steering box.



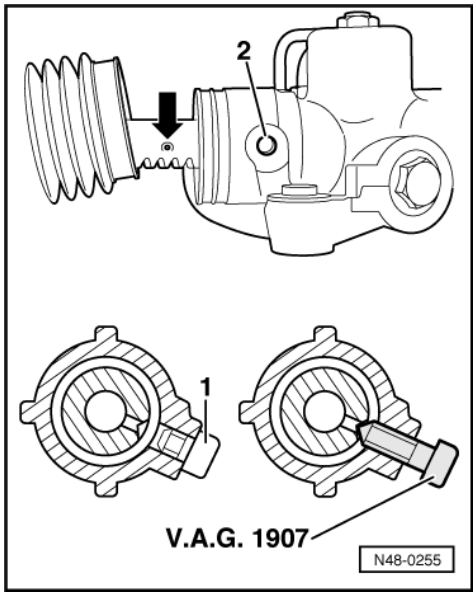
- -> Unscrew banjo bolt for pressure hose (19 mm) from steering box.



- -> Screw out bolts -1-, -2- and -3-.

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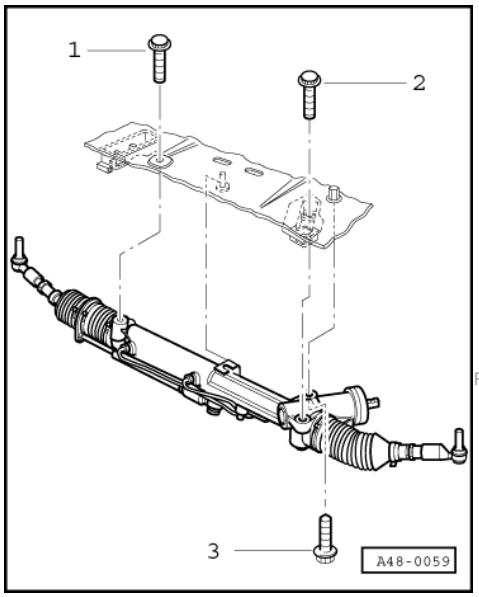
- Take out steering box through left wheel housing (requires second mechanic).



Installing

-> Centre steering box removed with -V.A.G 1907-.

- To do so, screw out hexagon socket-head bolt -1- at steering box.
- Move rack until centring on rack -arrow- is aligned with tapped hole -2-.
- Hand-tighten V.A.G 1907.
- Apply lubricant G 052 745 A3 to steering box in area of bulkhead collar seat.



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- -> Position steering box at plenum chamber (requires 2nd mechanic).

Make sure threads and contact surfaces of bolts are free from oil/grease.

- Fit but do not tighten bolts -1- and -2-.
- Screw in bolt -3- and tighten to 68 Nm.
- Then tighten bolts -1- and -2- to 68 Nm.

Notes:

- Always use new seals for banjo bolts.

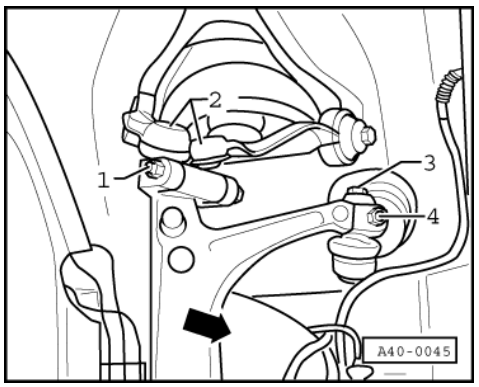
- Pressure and return hose must not make mutual contact or come into contact with other parts.

- Screw on return hose and tighten banjo bolt -22 mm- to 50 Nm.
- Screw on pressure hose and tighten banjo bolt -19 mm- to 40 Nm.
- Re-insert bulkhead collar.

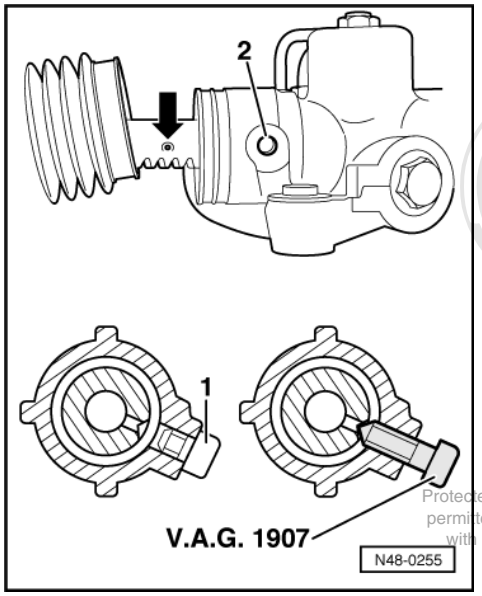
Notes:

- Replace seal if damaged.
- Make sure seal is properly positioned.

- Release steering lock.
- Move steering wheel to centre position and then attach universal joint to steering pinion.
- Insert tensioning bolt (Torx T50) and pre-tension in anti-clockwise direction. Use new nut.
- Remove assembly lock from steering column.



- Insert track rod as far as it will go in steering arm.
- -> Fit screw connection -4- and tighten new nut to 45 Nm.
- Insert bolt -3- and tighten to 7 Nm.



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- -> Then screw tool -V.A.G 1907 out of steering box.

1 - Hexagon socket-head bolt
2 - Tapped hole in steering box

- Secure steering box with hexagon socket-head bolt -1- (tightening torque 13 Nm).
- Tighten hexagon nut of tensioning bolt (steering column/steering pinion) to30 Nm.
- Install driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Fit wheel housing trim.
- Remove hose clamps -3094- on completion of steering box assembly.
- Install battery and plenum chamber cover.

=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

- Fit and secure wheels => Page 220 .

- Check hydraulic fluid level => Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .
- Perform wheel alignment => Page 227 .

1.4 - Removing and installing power-assisted steering box (RS4)

Special tools and workshop equipment required

- 3094 Hose clamps up to ø 25 mm
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1907 Screw for steering centring

Removing

- Take out plenum chamber cover.
- Remove right water deflector.
- Remove battery.

=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

Attention:
Move steering wheel to centre position and do not turn it whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.

- Move steering wheel to centre position.
- Pull out ignition key with steering wheel in centre position.
- Move steering wheel slightly to engage steering lock.

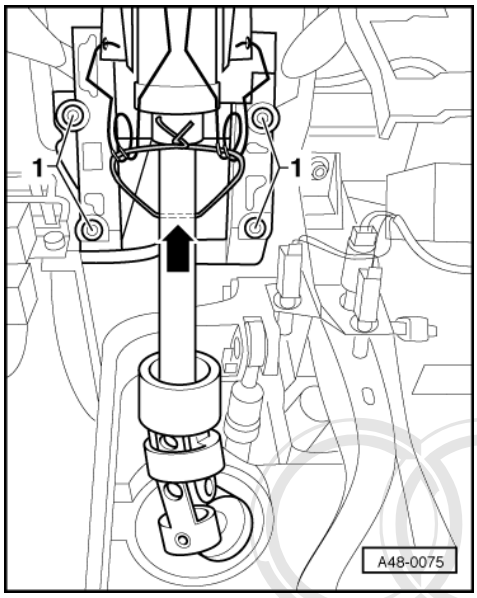
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Uncontrolled turning of steering wheel with steering box removed could strain and damage coil connector of airbag system.

An assembly lock is required to prevent top and bottom parts of steering column being pulled apart when pulling off steering box.

Mesh section will become separated if top and bottom parts of steering column are pulled too far apart or excessively telescoped.

Rattling noise may subsequently be encountered if mesh section is no longer in its original installation position.



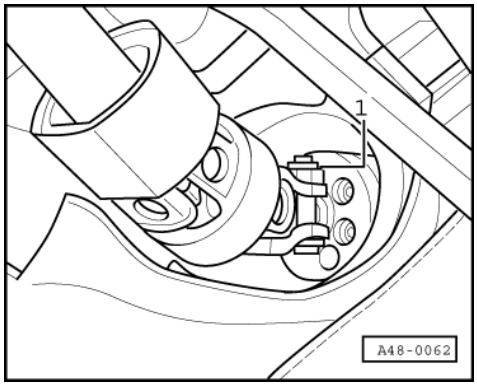
Securing steering column prior to removal

- -> Pull wire/cable tie through hole in bottom part of steering column -arrow- and spring.
- Wire/cable tie can also be pulled through spring and universal joint.

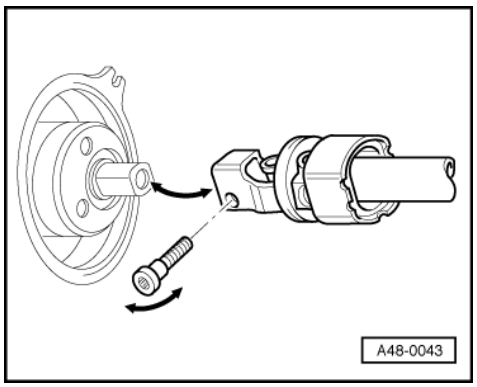
Steering column can also be secured with a transport lock => Page 349 .

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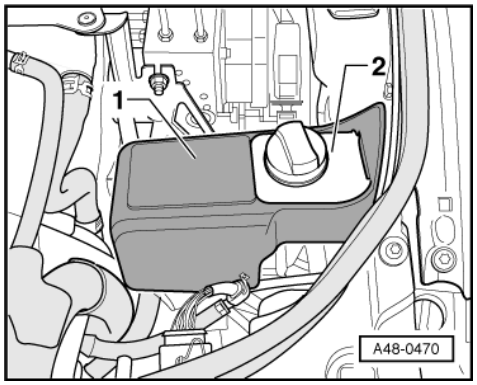
Attention:
- **Mesh section between top and bottom part of steering column is never to be separated.**
- **Do not turn steering wheel whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.**



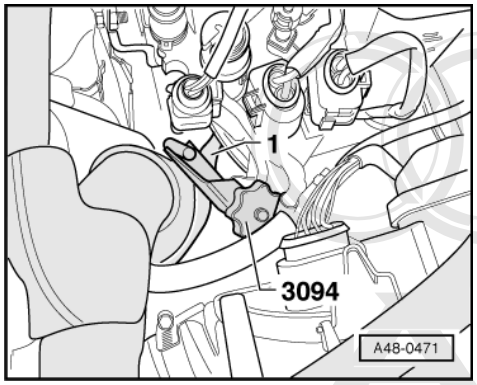
- -> Unscrew nut -1- at universal joint.
- Slacken off eccentric by turning tensioning bolt (Torx T50) clockwise and take out bolt.



- -> Swivel aside universal joint.
- Pull out bulkhead collar to inside.
- Remove noise insulation.

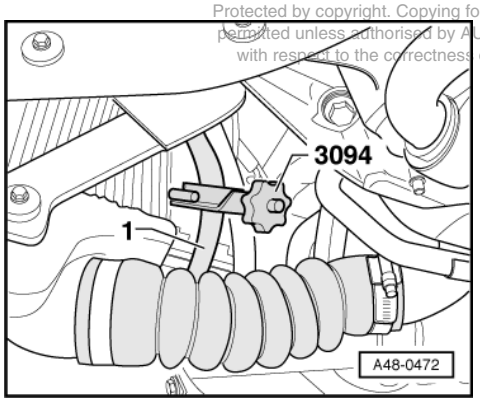


- -> Remove cover -1- of reservoir -2-.

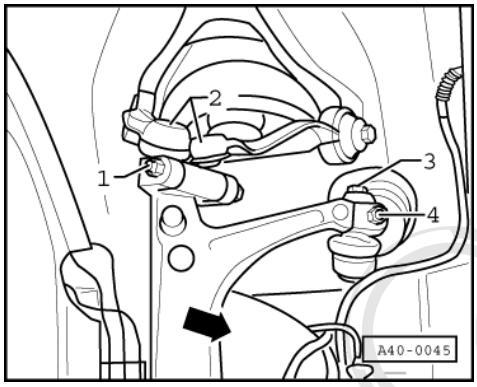


- -> Pinch off suction hose -1- immediately downstream of reservoir with hose clamp -3094-.

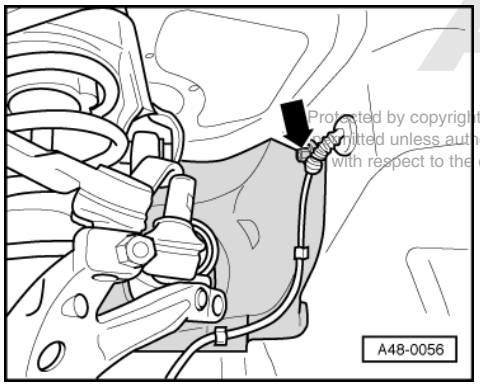
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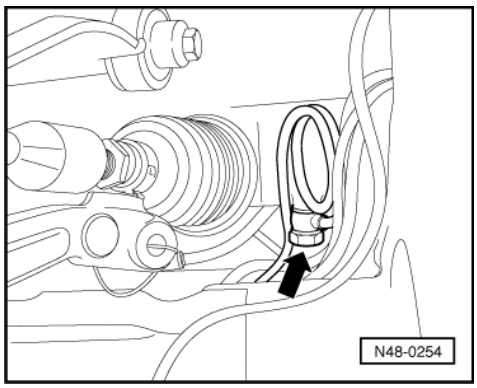
- -> Pinch off return pipe -1- with hose clamp -3094-.



- Unscrew front wheels.
- -> Screw out hexagon bolt -3- and bolt -4-.
- Pull out track rod.

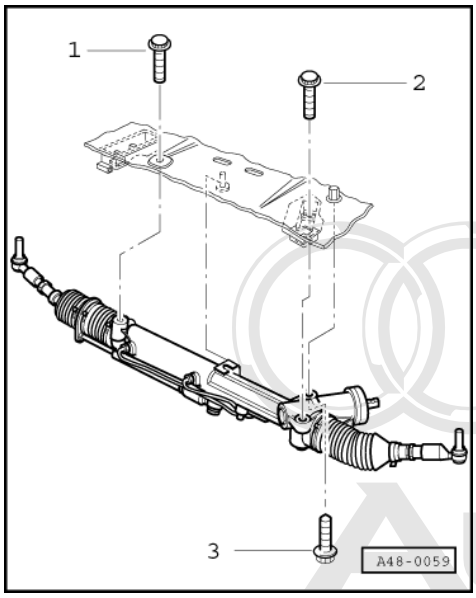


- -> Unscrew speed nut -arrow-.
- Prise out clips and take out cover.
- Place drip tray in position to collect hydraulic fluid.



- -> Unscrew banjo bolt for pressure hose (19 mm) from steering box.

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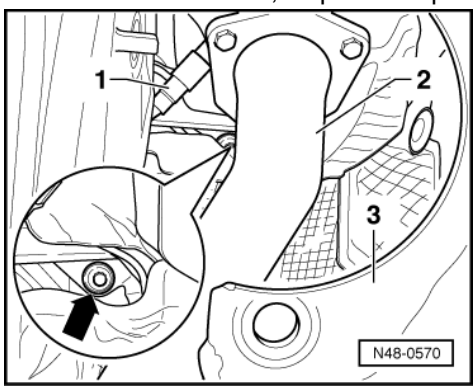
- -> Screw out bolts -1- and -2-.

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Left gearbox support must be removed before bolt -3- can be screwed out.

- Remove left gearbox support assembly.

=> Manual Gearbox; Repair Group 34; Removing and installing gearbox Removing and installing gearbox
=> Automatic Gearbox; Repair Group 37; Removing and installing gearbox Removing and installing gearbox

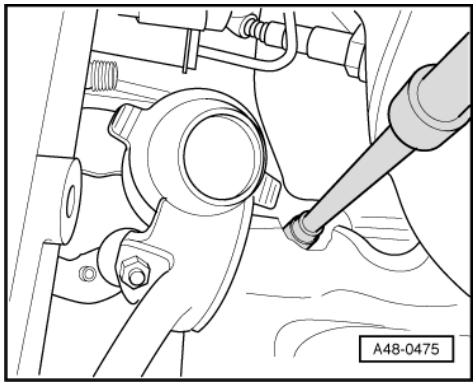


- -> Screw out bolt -arrow- for attaching steering box.
  (corresponds to Item 3 in Fig. A48-0059)

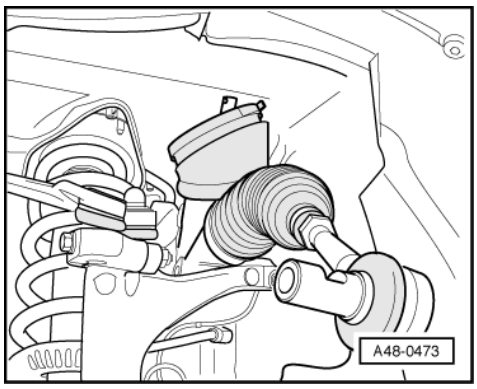
Note:

Bolt -arrow- is only accessible through recess in shield between Lambda probe -1- and front exhaust pipe -2-.

3 - Subframe

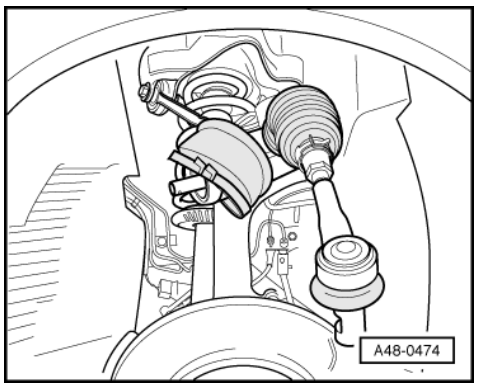


- Apply tool as shown to screw out bolt.

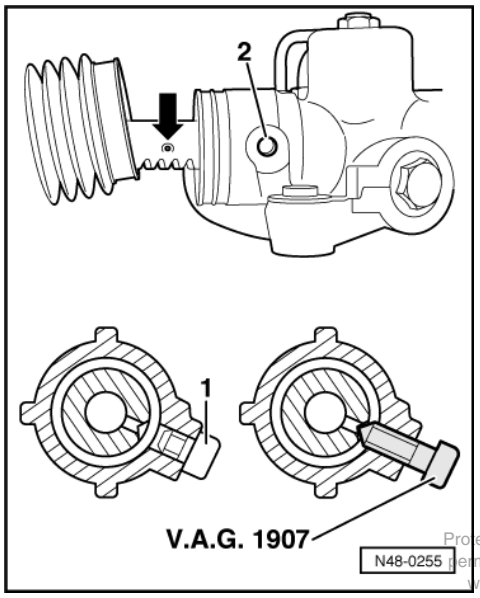


The following operations require two mechanics

- -> Guide steering box as far as possible to left over wheel bearing housing and give 90° anti-clockwise turn.



- -> Then guide steering box as far as possible to left again and give a further 90° anti-clockwise turn.
- Take out steering box.

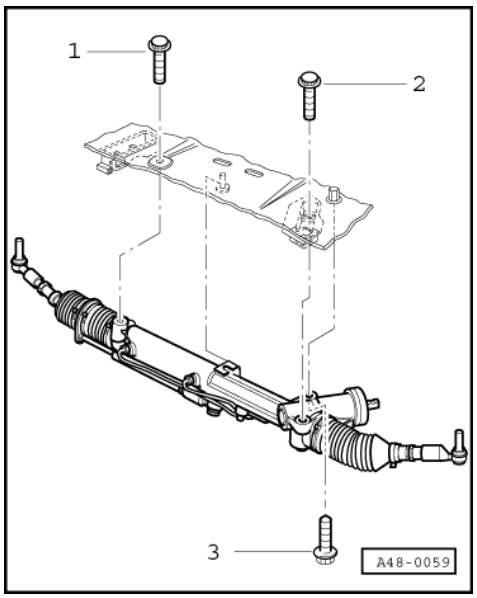


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Installing

-> Centre steering box removed with -V.A.G 1907-.

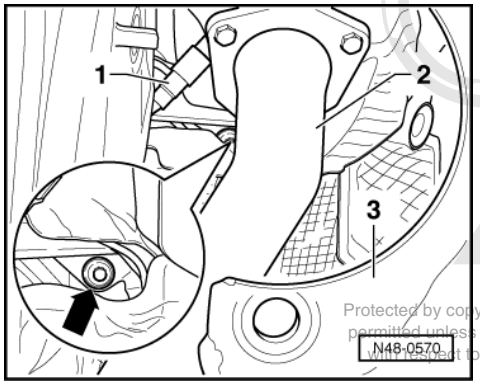
- To do so, screw out hexagon socket-head bolt -1- at steering box.
- Move rack until centring on rack -arrow- is aligned with tapped hole -2-.
- Hand-tighten screw for steering centring -V.A.G 1907-.
- Apply lubricant G 052 745 A3 to steering box in area of bulkhead collar seat.



- -> Position steering box at plenum chamber (requires 2nd mechanic).

Make sure threads and contact surfaces of bolts are free from oil/grease.

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



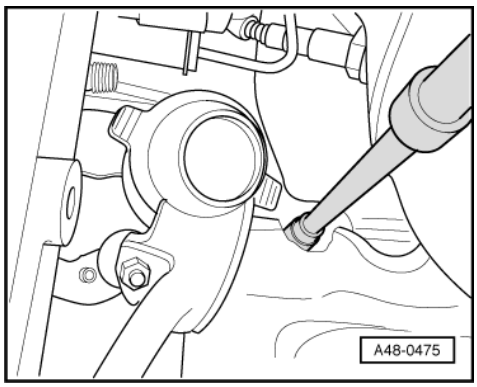
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- -> Screw in bolt -arrow- and tighten to 68 Nm.
  (corresponds to Item 3 in Fig. A48-0059)

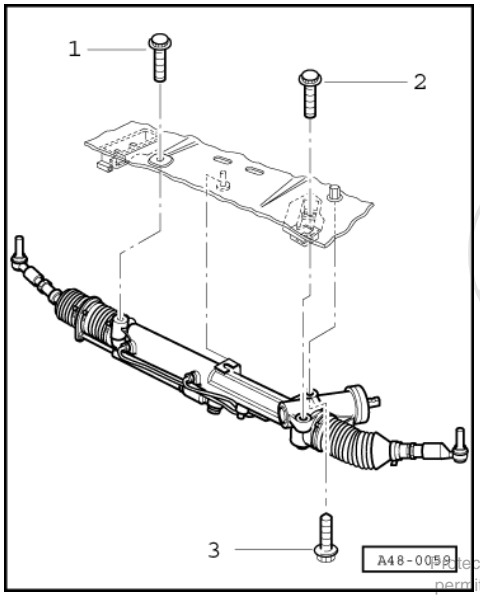
Note:

Bolt -arrow- is only accessible through recess in shield between Lambda probe -1- and front exhaust pipe -2-.

3 - Subframe



- -> Apply tool as shown to screw in and tighten bolt.



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- -> Then tighten bolts -1- and -2- to 68 Nm.
- Install left gearbox support assembly.

=> Manual Gearbox; Repair Group 34; Removing and installing gearbox Removing and installing gearbox

=> Automatic Gearbox; Repair Group 37; Removing and installing gearbox Removing and installing gearbox

Notes:

- Always use new seals for banjo bolts.
- Pressure and return hose must not make mutual contact or come into contact with other parts.

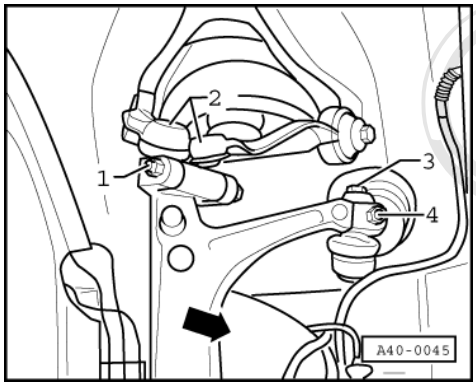
- Screw on return hose and tighten banjo bolt -22 mm- to 50 Nm.
- Screw on pressure hose and tighten banjo bolt -19 mm- to 40 Nm.
- Re-insert bulkhead collar.

Notes:

- Replace bulkhead collar if damaged.
- Make sure bulkhead collar is properly positioned.

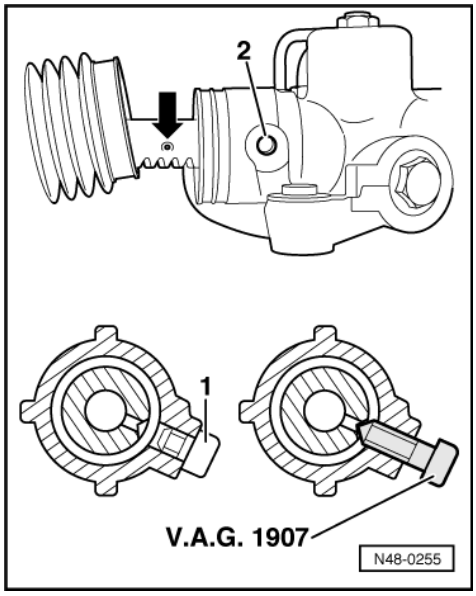
- Release steering lock.
- Move steering wheel to centre position and then attach universal joint to steering pinion.
- Insert tensioning bolt (Torx T50) and pre-tension in anti-clockwise direction. Use new nut.

- Tighten hexagon nut of tensioning bolt (steering column/steering pinion) to30 Nm.



- Remove assembly lock from steering column.
- Insert track rod as far as it will go in steering arm.
- -> Fit screw connection -4- and tighten new nut to 45 Nm.
- Insert bolt -3- and tighten to 7 Nm.

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- -> Then screw tool -V.A.G 1907 out of steering box.

1 - Hexagon socket-head bolt
2 - Tapped hole in steering box

- Secure steering box with hexagon socket-head bolt -1- (tightening torque 13 Nm).
- Install noise insulation.
- Install driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Fit wheel housing trim.
- Remove hose clamps -3094- on completion of steering box assembly.
- Install battery.

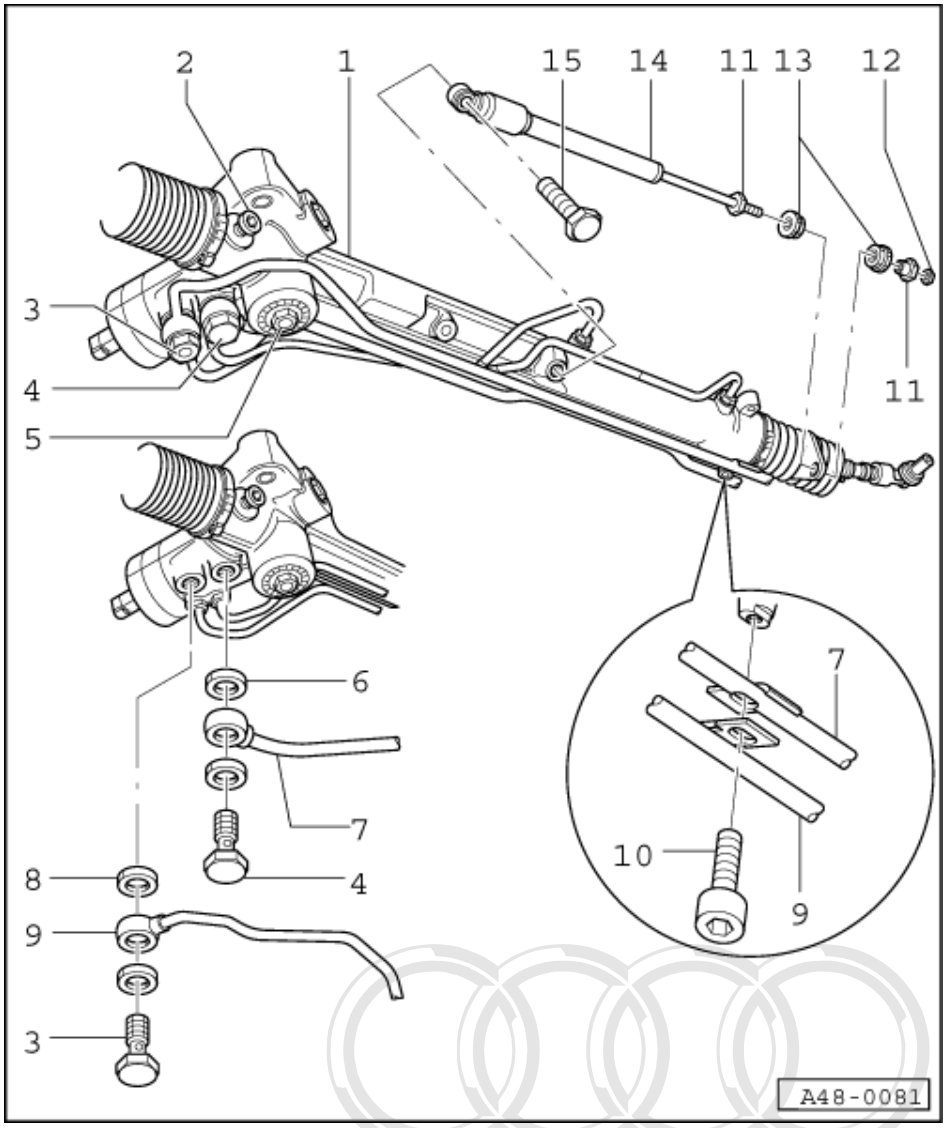
=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

- Install right water deflector.
- Install plenum chamber cover.
- Install cover of hydraulic fluid reservoir.

- Fit and secure wheels => Page 220 .
- Check hydraulic fluid level => Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .
- Perform wheel alignment => Page 227 .

2 - Steering box (right-hand drive)

2.1 - Steering box (right-hand drive)



2.2 - Exploded view

1 **Power-assisted steering box**
2 **Cheese-head bolt, 13 Nm**
- Screw plug of steering centring => Fig. 245

3 **Banjo bolt, 40 Nm**
- With integrated non-return valve

4 **Banjo bolt, 50 Nm**

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5 Adjusting screw

6 Sealing ring, 16 *22

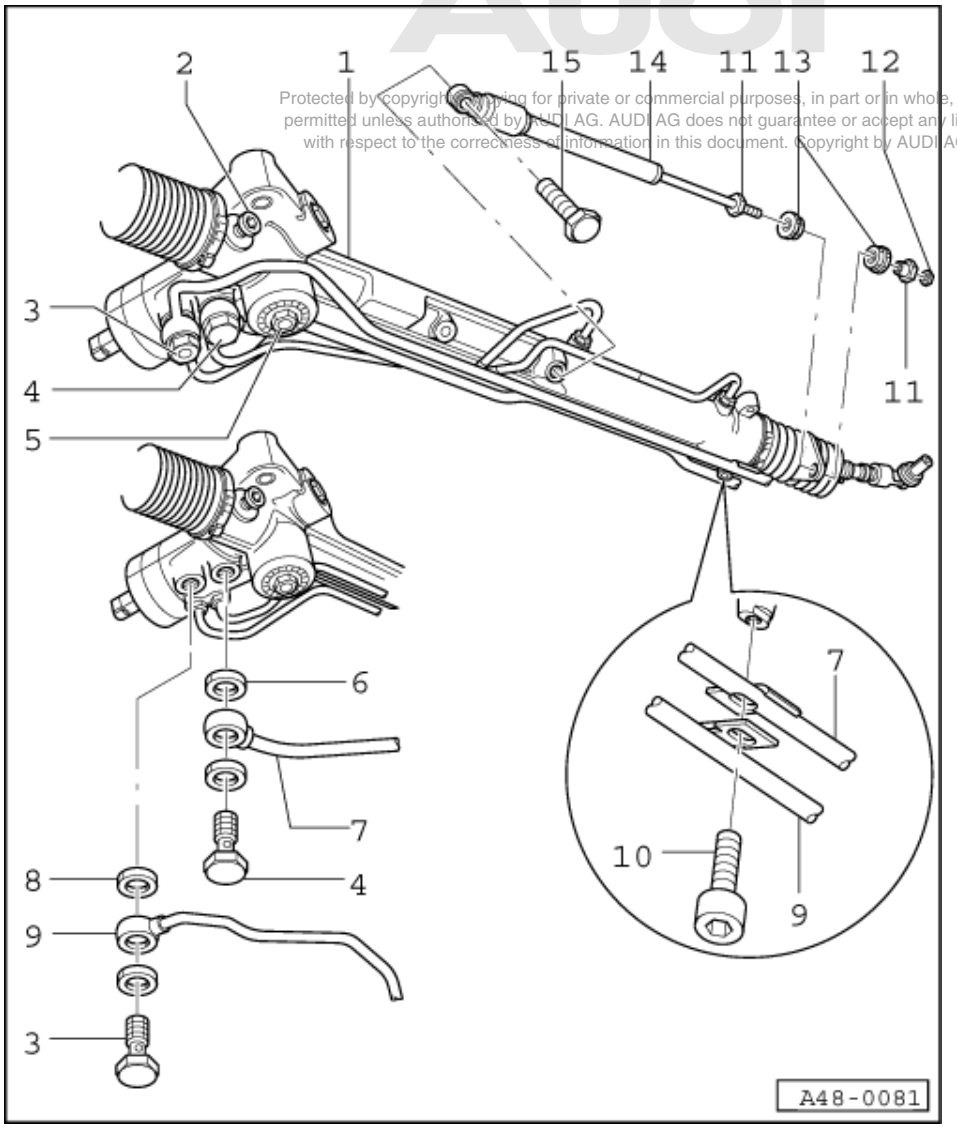
- Always replace

7 Return hose

8 Sealing ring, 14 *20

- Always replace

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9 Expansion hose

10 Hexagon socket-head bolt, 20 Nm

- For attaching return hose/pressure hose to steering box

11 Bushing

12 Hexagon nut, 10 Nm

- Provide support at hexagon of steering damper piston rod when slackening off and tightening

13 Rubber bush

- Two-piece

14 Steering damper

- Only for:

- 6-cyl. models
- As of MY` 98 all 4-cyl. models as of 132 kW

15 Hexagon bolt, 35 Nm

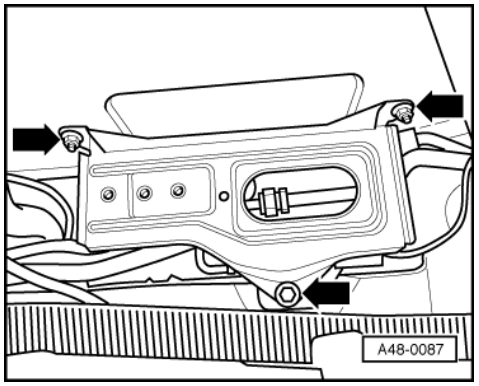
2.3 - Removing and installing power-assisted steering box (right-hand drive)

Special tools and workshop equipment required

- 3094 Hose clamps up to ø 25 mm
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1907 Screw for steering centring

Removing

- Take out plenum chamber cover.



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- Remove battery.

=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

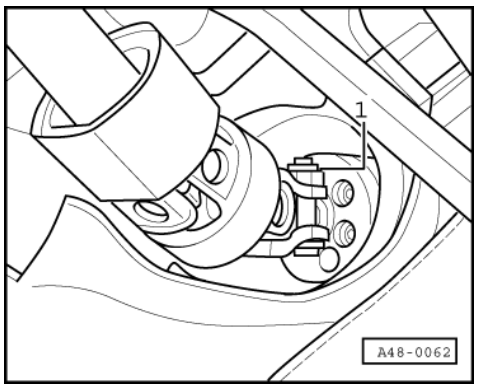
- -> Unscrew battery bracket -arrows-.
- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

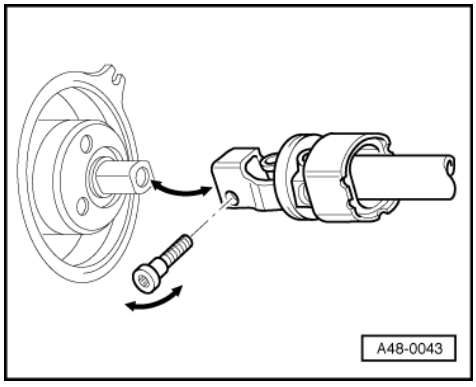
Attention:
Move steering wheel to centre position and do not turn it whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.

- Move steering wheel to centre position.
- Pull out ignition key with steering wheel in centre position.
- Move steering wheel slightly to engage steering lock.

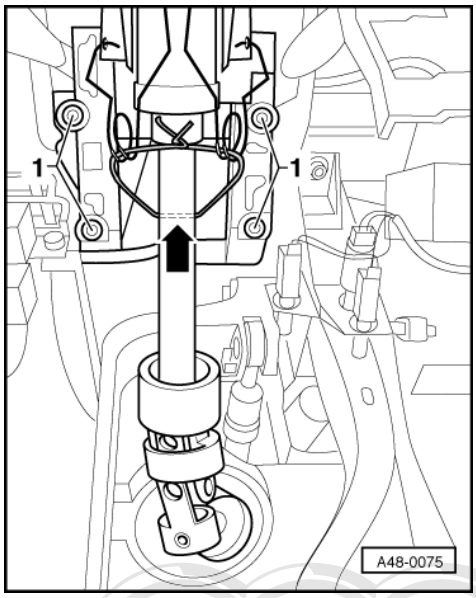
Uncontrolled turning of steering wheel with steering box removed could strain and damage coil connector of airbag system.



- -> Unscrew nut -1- at universal joint.
- Slacken off eccentric by turning tensioning bolt (Torx T50) clockwise and take out bolt.



- -> Swivel aside universal joint.
- Pull out bulkhead collar to inside.



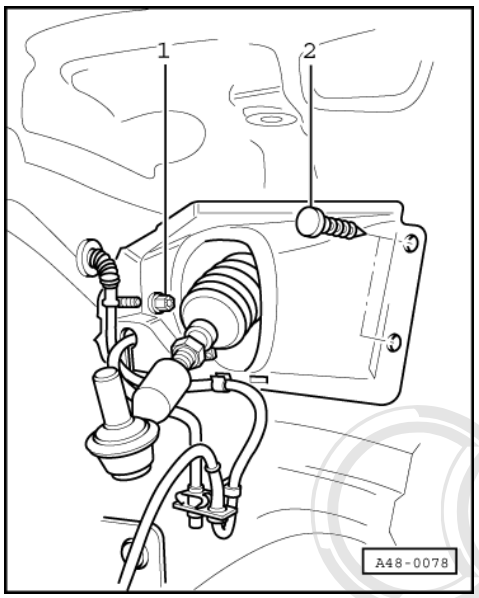
- -> Before detaching from steering box pinion, secure steering column with wire as shown.

Attention:
- **Mesh section between top and bottom part of steering column is never to be separated.**
- **Do not turn steering wheel whilst performing repair work, as otherwise coil connector of airbag unit could be damaged.**

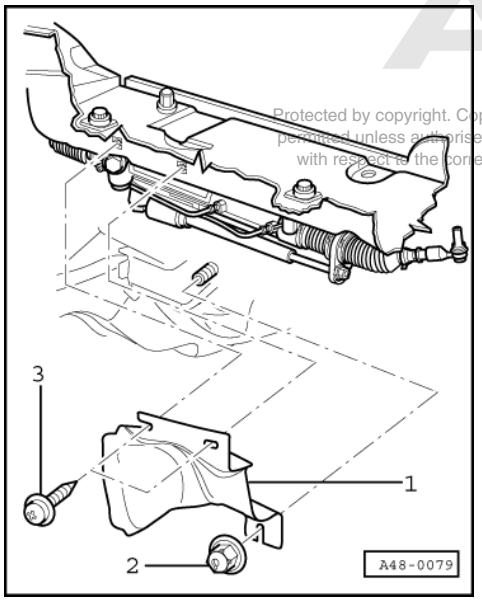
- Remove wheel bearing housing and mounting bracket with suspension strut => Page 93 .

When removing wheel bearing housing, take care not to damage track rod bellows (shield bellows if necessary).

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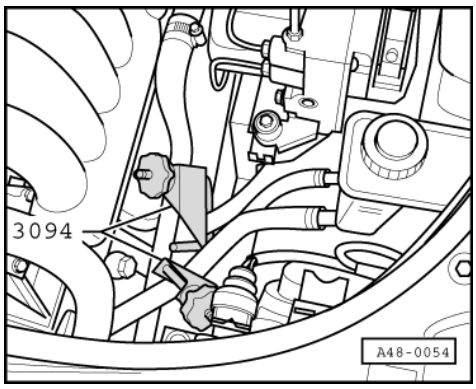


- -> Unscrew nut -1-.
- Prise out clips -2-.
- Take out cover.

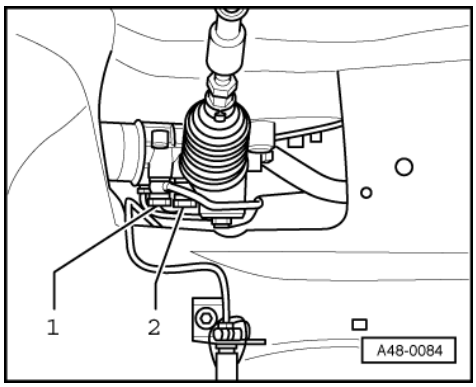


- Remove air cleaner housing and air pipe for air-mass meter.
- Take out bottom part of air cleaner box.
- Unscrew nut -2- and self-tapping screws -3-.
- -> Take out shield -1-.

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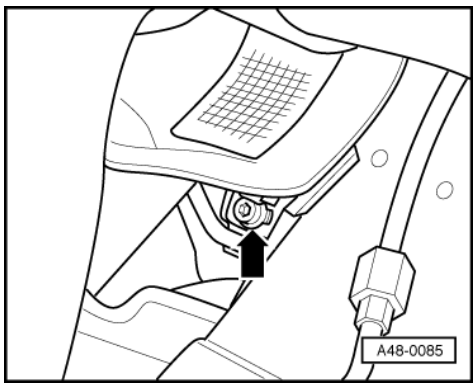


- Remove cover from reservoir.
- -> Pinch off suction and return pipe with hose clamps -3094-.

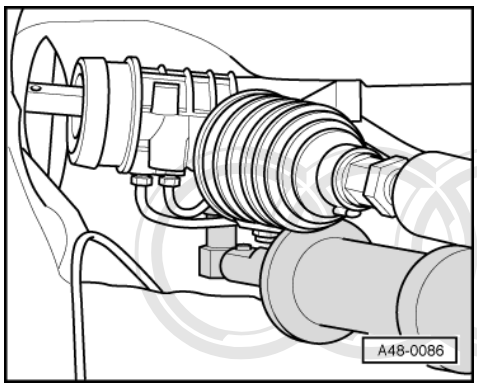


- Place drip tray in position to collect hydraulic fluid.
- -> Unscrew expansion hose -1- and return hose -2- from steering box.

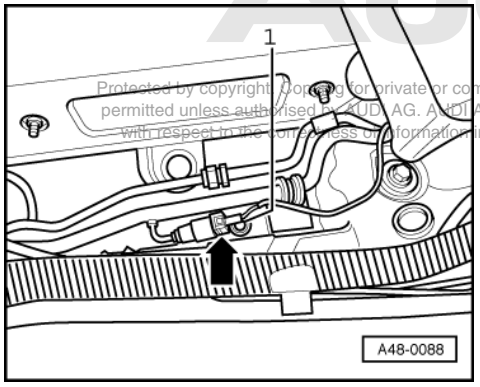
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- -> Unfasten holder -arrow- for hoses at steering box.
  => Page 261 , Item 10

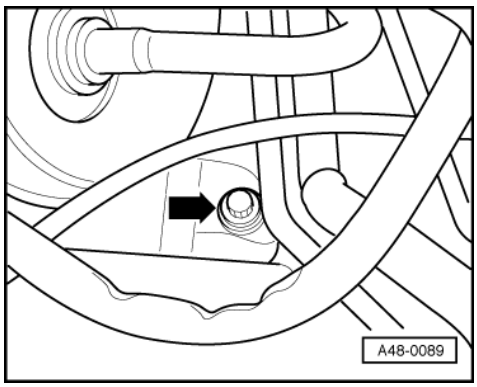


- -> Screw out right steering box bolt.



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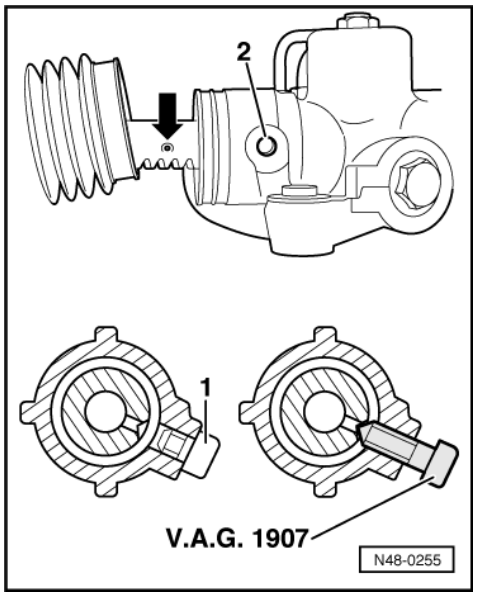
- -> On vehicles with air conditioner, unplug connector -arrow-.
- Unscrew multi-point socket-head bolt -1- for attaching steering box.



- -> Unscrew bolt -arrow- for attaching steering box.

  Bolt is located on side of servo unit.

- Pull out steering box to right (2nd mechanic required).

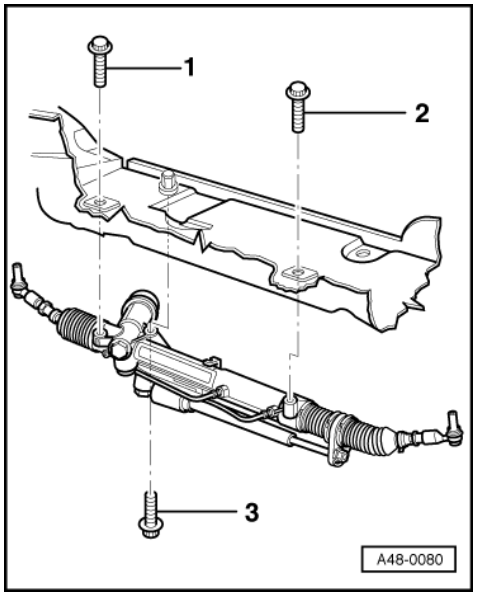


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Installing

-> Centre steering box removed with -V.A.G 1907-.

- To do so, screw out hexagon socket-head bolt -1- at steering box.
- Move rack until centring on rack -arrow- is aligned with tapped hole -2-.
- Hand-tighten V.A.G 1907.
- Apply lubricant G 052 745 A3 to steering box in area of bulkhead collar seat.

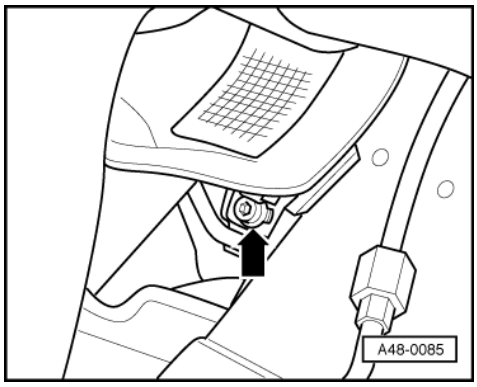


- -> Position steering box at plenum chamber (requires 2nd mechanic).

Make sure threads and contact surfaces of bolts are free from oil/grease.

To ensure compliance with wheel alignment values, repair set for South Africa contains 3 additional shims 8D0422211 (thickness 2 mm) for fitting between steering box and body (at all 3 bolted joints).

- Fit but do not tighten bolts -1- and -2-.
- Screw in bolt -3- and tighten to 68 Nm.
- Then tighten bolts -1- and -2- to 68 Nm.

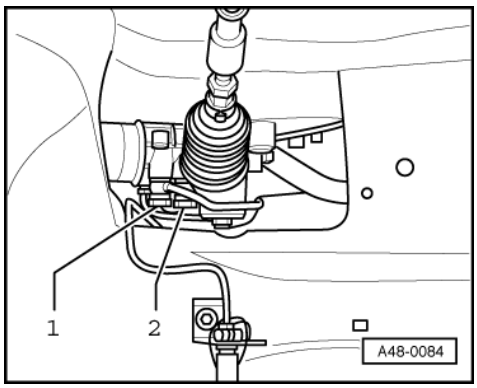


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- -> Position holder for hoses at steering box.
  => Page 261 , Item 10

Notes:

- Always use new seals for banjo bolts.
- Pressure and return hose must not make mutual contact or come into contact with other parts.



- -> Screw on return hose and tighten banjo bolt -22 mm- to 50 Nm.
- Screw on pressure hose and tighten banjo bolt -19 mm- to 40 Nm.
- Secure holder for hoses at steering box.

  Tightening torque 20 Nm

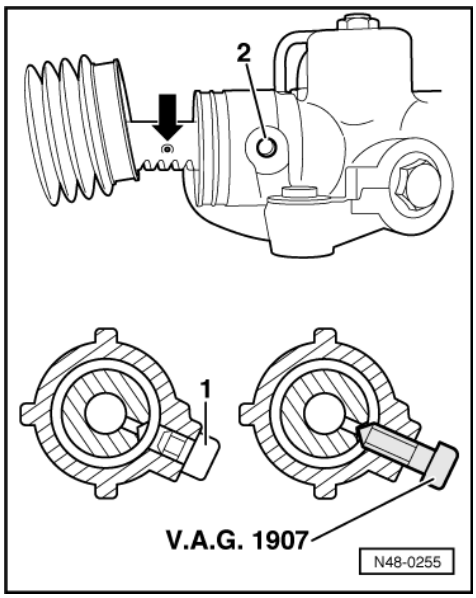
- Re-insert bulkhead collar.

Notes:

- Replace seal if damaged.
- Make sure seal is properly positioned.

- Release steering lock.
- Move steering wheel to centre position and then attach universal joint to steering pinion.

- Insert tensioning bolt (Torx T50) and pre-tension in anti-clockwise direction. Use new nut.
- Remove assembly lock from steering column.



- -> Then screw tool -V.A.G 1907 out of steering box.

1 - Hexagon socket-head bolt
2 - Tapped hole in steering box

- Secure steering box with hexagon socket-head bolt -1- (tightening torque 13 Nm).
- Tighten hexagon nut of tensioning bolt (steering column/steering pinion) to30 Nm.
- Install driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Remove hose clamps -3094- on completion of steering box assembly.
- Fit wheel housing trim.
- Fit mounting bracket with suspension strut and wheel bearing housing => Page 71 .

- Fit heat shield.
- Fit cover of reservoir.
- Fit bottom part of air cleaner box.
- Fit air cleaner housing and air pipe for air-mass meter.
- Install battery bracket, battery and plenum chamber cover.

=> Electrical System; Repair Group 27; Battery; Removing and installing battery Battery Removing and installing battery

- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .
- Perform wheel alignment => Page 227 .

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3 - Removing and installing track rods

3.1 - Removing and installing track rods

Special tools and workshop equipment required

- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

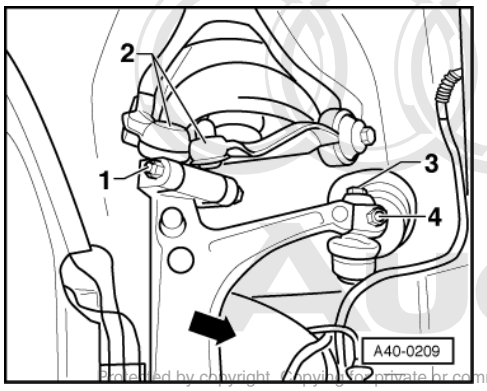
- V.A.G 1923 Open-ended wrench socket

Left and right track rods are identical.

They can be removed and installed without taking out steering box.

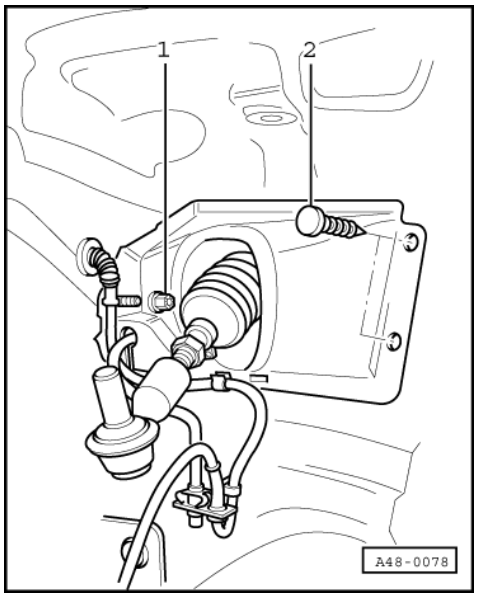
Removing

- Unscrew front wheel.

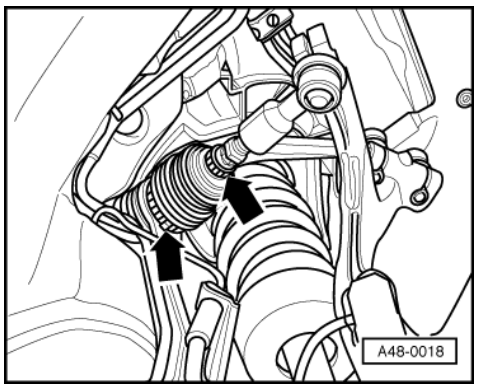


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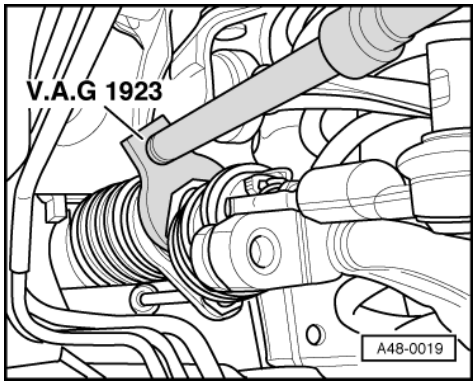
- -> Slacken off bolts -3- and -4- and pull out track rod end downwards.



- -> Unscrew plastic nut -1-.
- Prise out clips -2-.
- Take out cover for track rod.



- -> Unfasten clamps at bellows.
- Pull bellows as far outwards as possible.

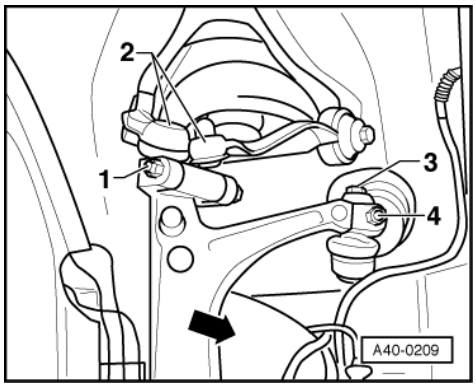


- -> Unscrew track rod with V.A.G 1923.

Installing

Install in reverse order, paying attention to the following:

- Depending on extent of damage, replace bellows and/or track rod.
- Tighten track rod to 100 Nm.
- On installing bellows, make sure that:
  - Smaller diameter snaps into position in groove at track rod.
  - Bellows are not twisted.

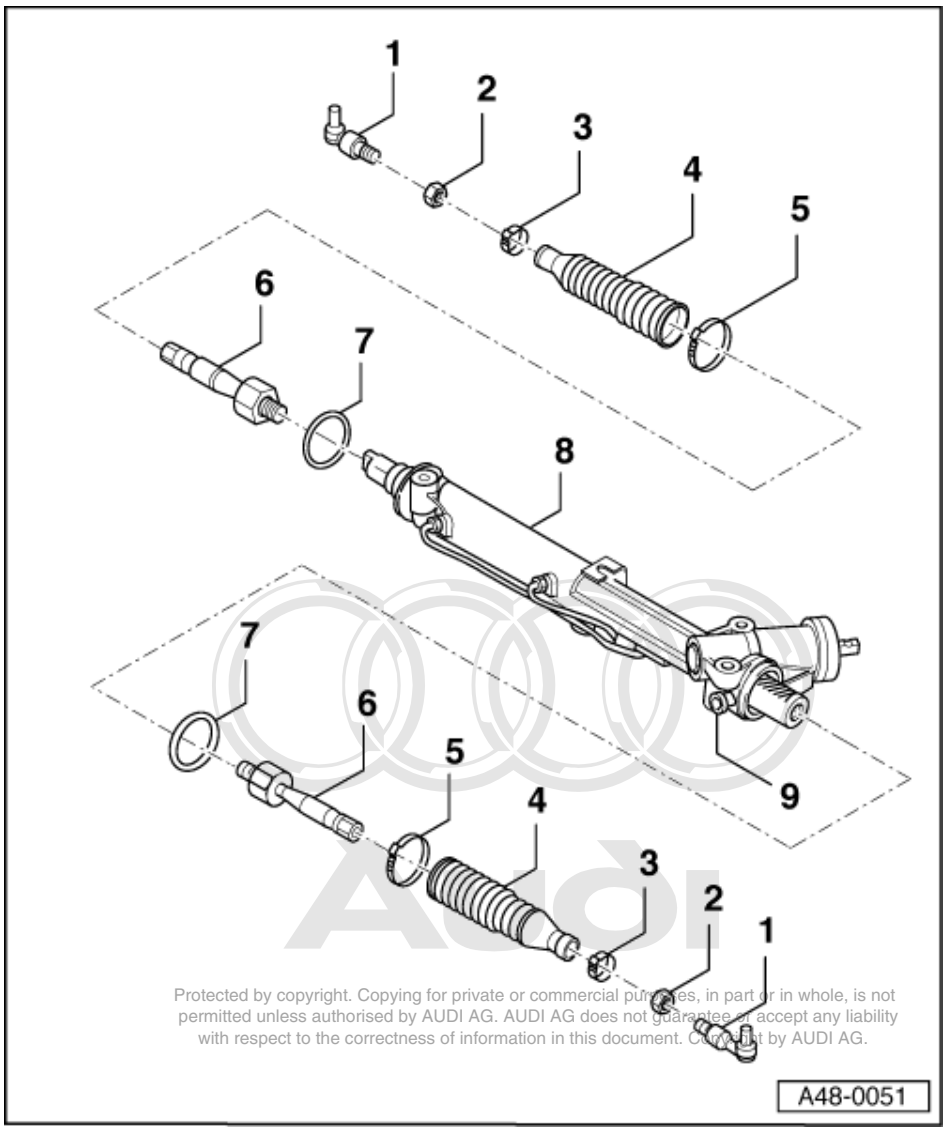


- Replace clamp.
- -> Fit screw connection -4- and tighten new nut to 45 Nm.
- Insert bolt -3- and tighten to 7 Nm.
- Fit and secure wheel => Page 220 .
- Perform wheel alignment => Page 227 .

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4 - Dismantling and assembling power-assisted steering box

4.1 - Dismantling and assembling power-assisted steering box



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4.2 - Steering box with no steering damper (4-cyl. engines)

Special tools and workshop equipment required

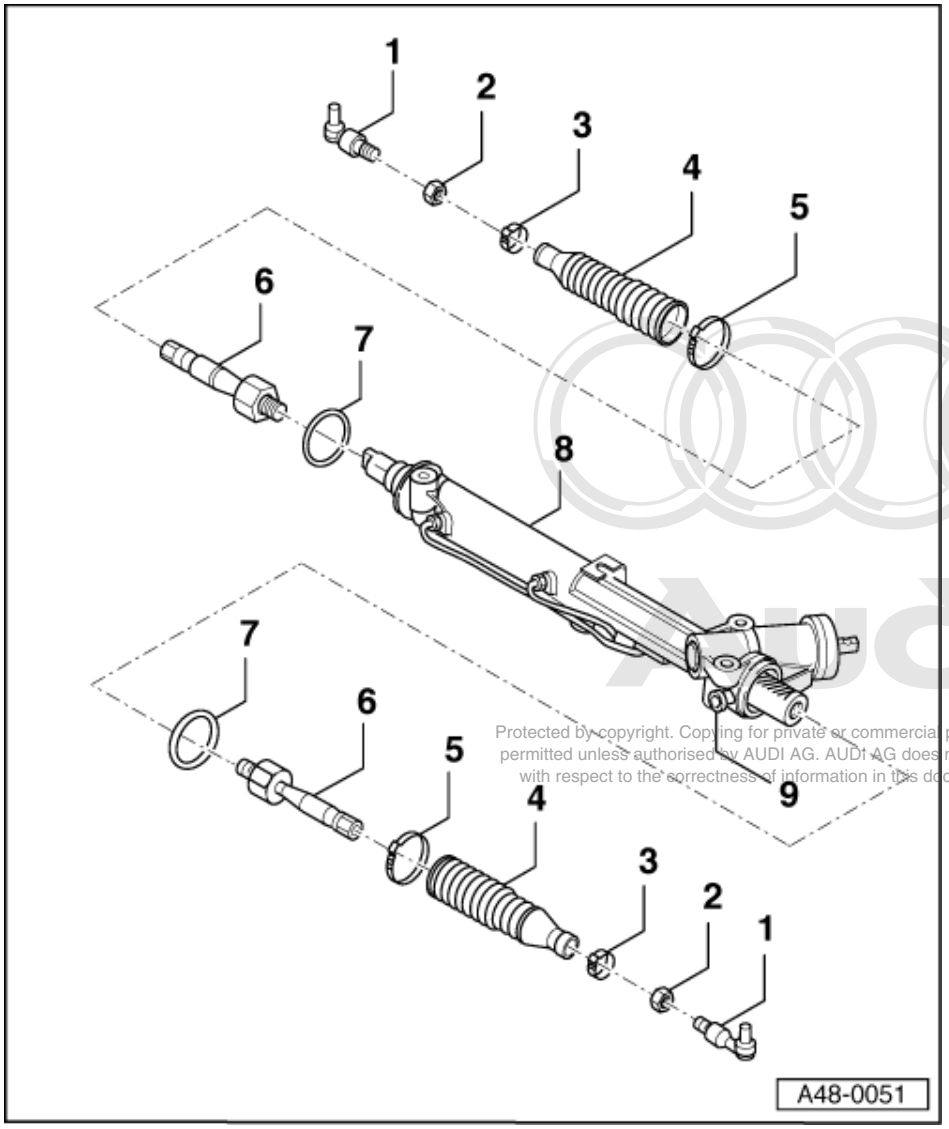
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

This exploded view applies to both LHD and RHD vehicles.

Notes:

- Replace self-locking nuts and bolts.
- Steering components are not to be welded and straightened.
- For greasing rack, make exclusive use of steering box grease, part no. AOF 063 000 04.

- Hydraulic fluid: Part no. G 002 000



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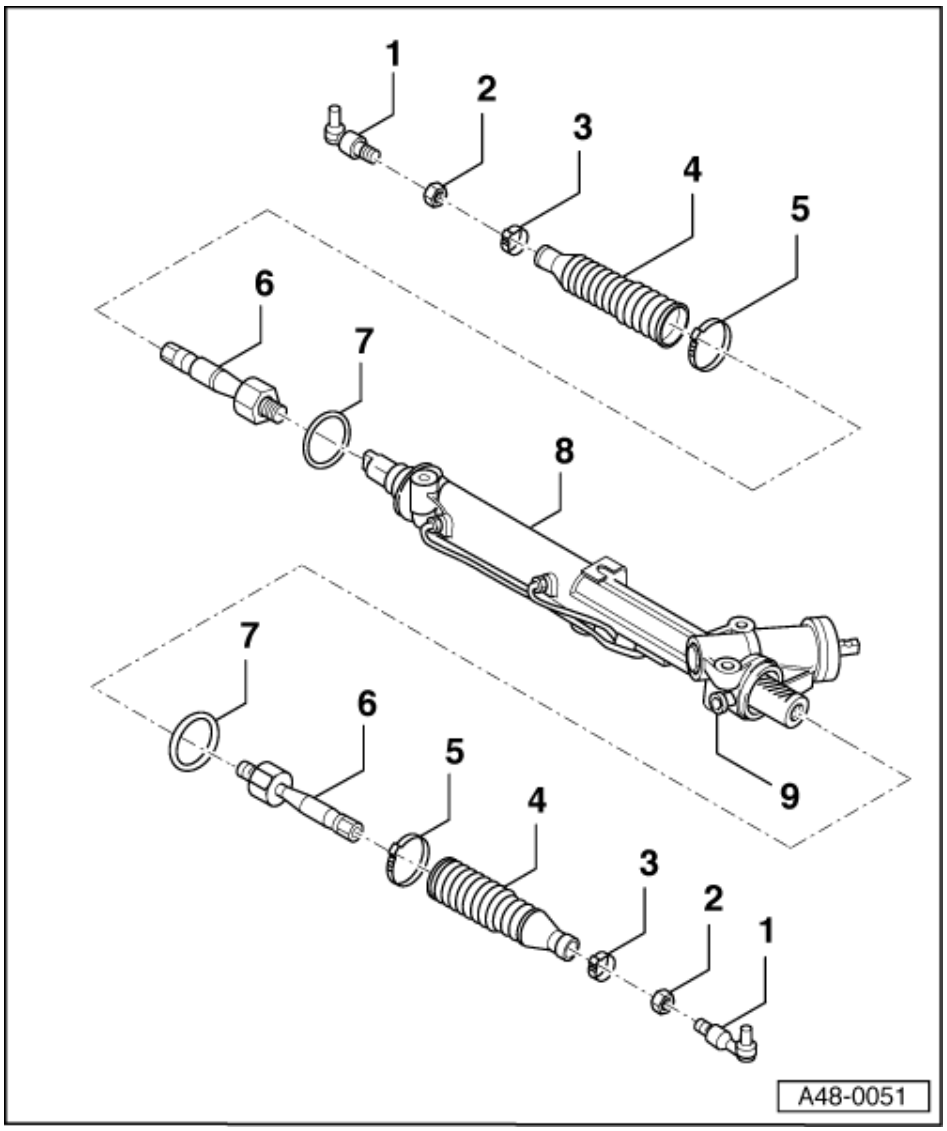
1 **Track rod end**
- Check dust caps for damage and correct positioning

2 **Lock nut, 40 Nm**

3 **Clamp**
- Always replace

4 **Bellows**
- Check for damage
- Can be replaced with steering box in position
- Must not be twisted after adjusting toe
- Removing track rods to replace bellows => Page 269

5 **Clamp**
- Tension using V.A.G 1275
- Always replace



6 Track rod, 100 Nm

- Removing and installing=>Page 269
- Lubricate joint with steering box grease A0F 063 000 04

7 O-ring

- Always replace

8 Power-assisted steering box

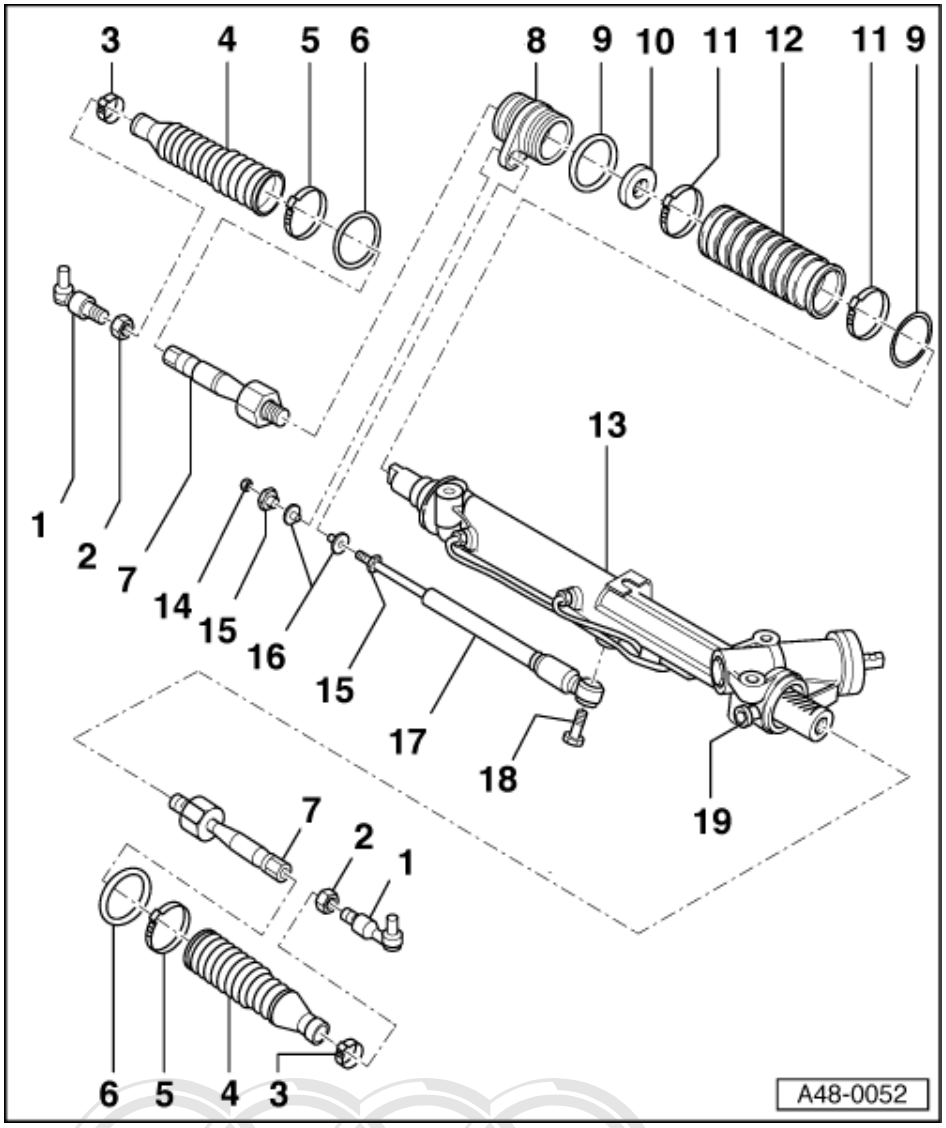
- Lubricate rack with steering box grease A0F 063 000 04

9 Cheese-head bolt, 13 Nm

- Screw plug of steering centring

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4.3 - Steering box with steering damper (6-cyl. engines)



Special tools and workshop equipment required

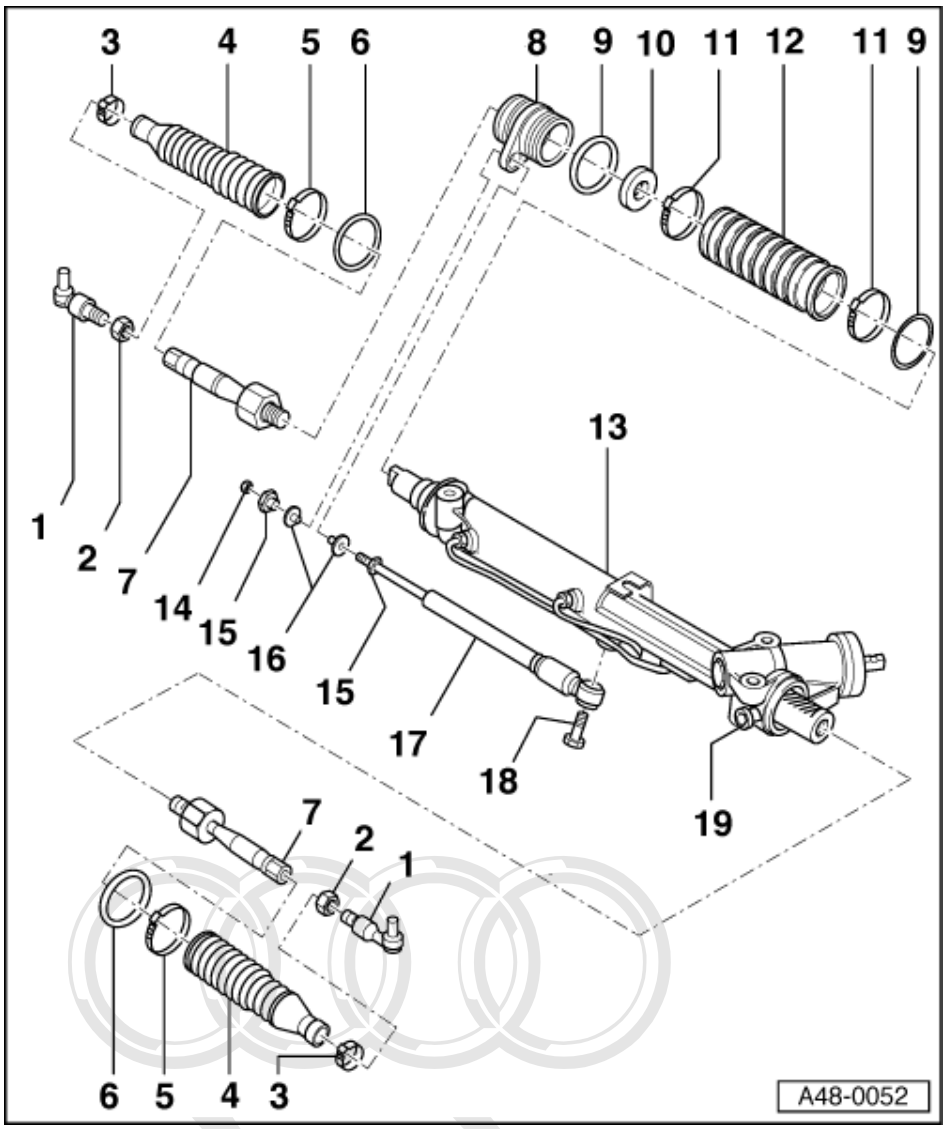
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

This exploded view applies to both LHD and RHD vehicles.

Notes:

- Replace self-locking nuts and bolts.
- Steering components are not to be welded and straightened.
- For greasing rack, make exclusive use of steering box grease, part no. AOF 063 000 04.
- Hydraulic fluid: Part no. G 002 000

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1 **Track rod end**
- Check dust caps for damage and correct positioning

2 **Lock nut, 40 Nm**

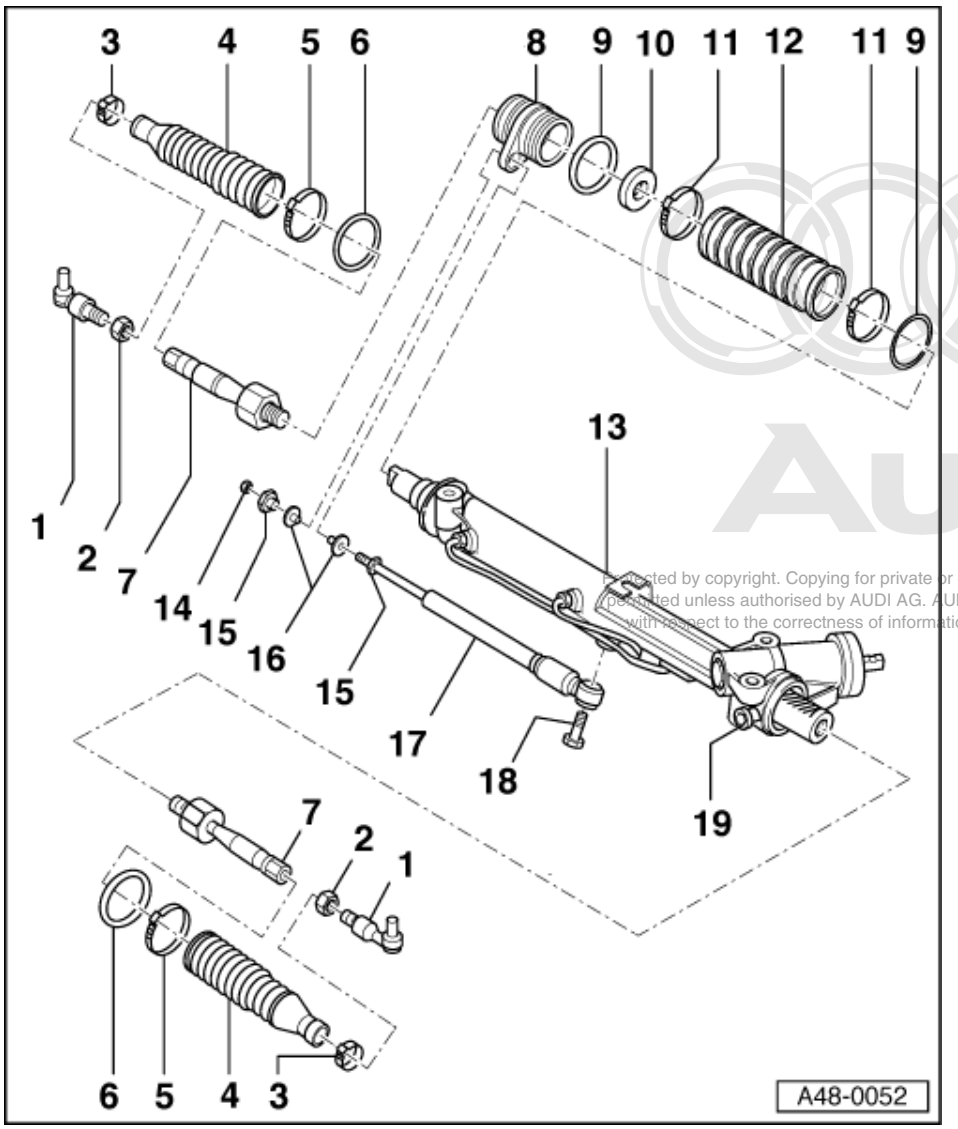
3 **Clamp**
- Always replace

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4 **Bellows**
- Check for damage
- Can be replaced with steering box in position
- Must not be twisted after adjusting toe
- Removing track rods to replace bellows => Page 269

5 **Clamp**
- Tension using V.A.G 1275
- Always replace

6 **O-ring**
- Always replace



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7 Track rod, 100 Nm

- Removing and installing=>Page 269
- Lubricate joint with steering box grease A0F 063 000 04

8 Holder for steering damper

9 O-ring

- Always replace

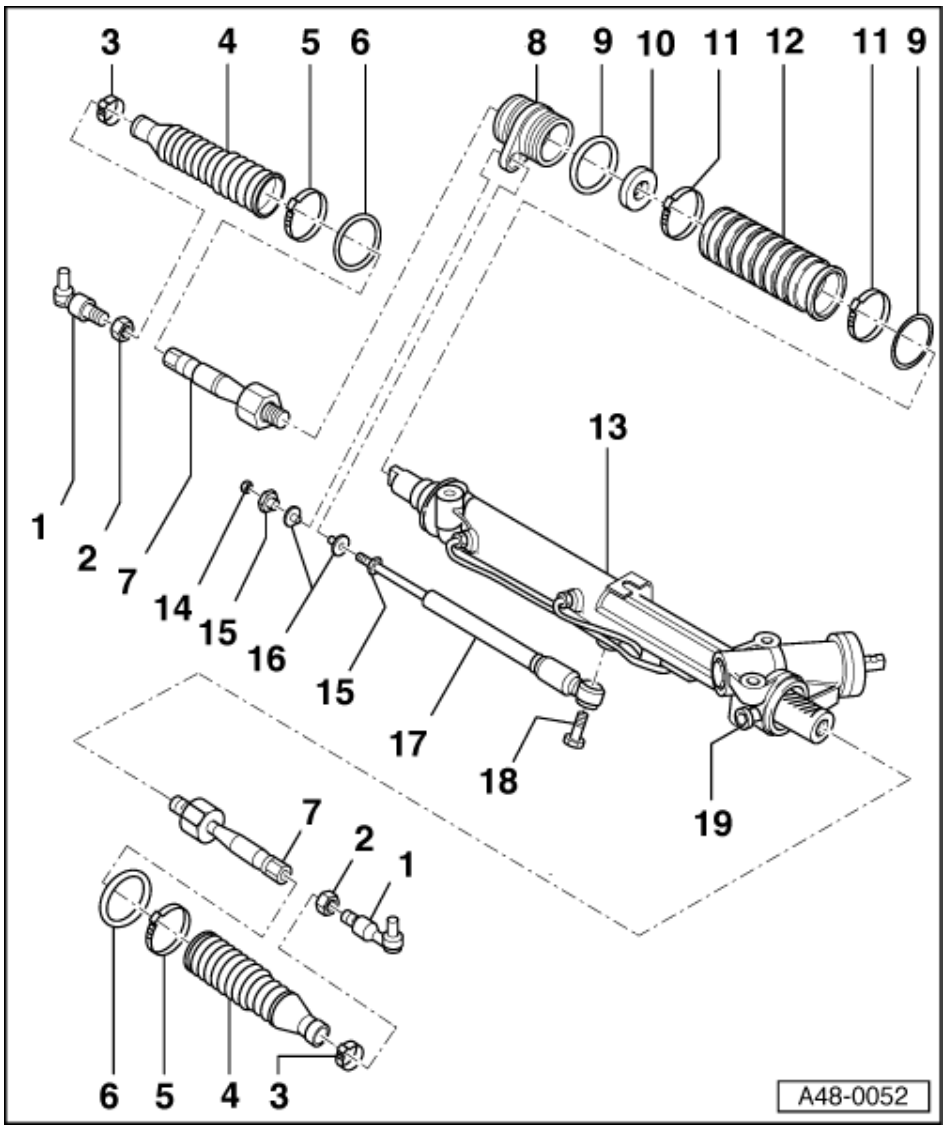
10 Dished washer

11 Clamp

- Tension using V.A.G 1275
- Always replace

12 Bellows

- Check for damage
- Can be replaced with steering box in position
- Replacement involves removing track rods -Item 7 - and holder for steering damper -Item 8 -



13 Power-assisted steering box

- Lubricate rack with steering box grease A0F 063 000 04

14 Hexagon nut, 10 Nm

- Provide support at hexagon of steering damper piston rod when slackening off and tightening

15 Bushing

16 Rubber bush

- Two-piece

17 Steering damper

18 Hexagon bolt, 35 Nm

19 Cheese-head bolt, 13 Nm

- Screw plug of steering centring

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5 - Checking fluid level, bleeding steering system, leak test

5.1 - Checking fluid level, bleeding steering system, leak test

5.2 - Checking power-assisted steering fluid level

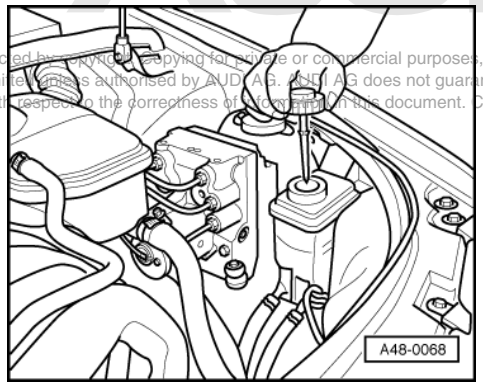
- With engine stopped, move front wheels to straight ahead position.

Cold fluid:

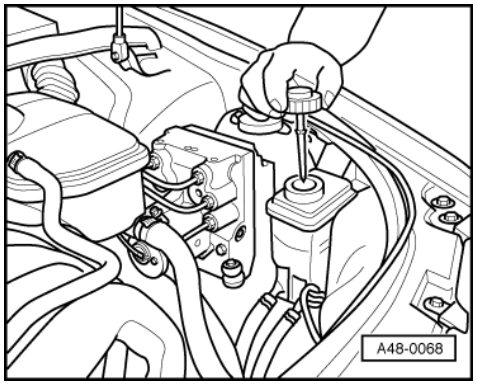
- Unscrew cap.
- Wipe over dipstick with a clean cloth.
- Screw in cap hand-tight and screw off again.

Fluid level is only valid if cap was previously screwed in.

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- -> Check fluid level: It must be around MIN mark (up to 2 mm above/below mark).



Warm fluid (as of approx. 50 °C):

- -> Check fluid level: Fluid level must be between MIN and MAX marks.

Notes:

- Fluid must be drawn off if level is above that stated.
- Check hydraulic system for leaks if level is below that stated. It is not then sufficient to merely top up fluid.
- Hydraulic fluid drained off is not to be re-used.

5.3 - Bleeding steering system following conversion work

On completion of steering-system conversion work, system is to be bled in different ways depending on extent of conversion work.

After replacement of entire steering system or steering box:

- Check hydraulic fluid level and top up fluid if necessary.
- Raise vehicle such that front wheels are free.
- Briefly start engine (max. 2 s).

Pump must not draw in air; steering wheel must not be turned.

Waiting time between individual engine starts approx. 30 s.

- Check hydraulic fluid level and top up fluid if necessary.
- Keep repeating this procedure until fluid level remains constant.
- Turn steering wheel 10 * from lock to lock with engine switched off.
- Check hydraulic fluid level and top up fluid if necessary.

- Start engine.
- Turn steering wheel 10 * from lock to lock.
- Check hydraulic fluid level and top up fluid if necessary.

Any air remaining in steering system escapes automatically whilst driving after approx. 10 . . . 20 km.

On conversion of steering system component other than steering box (pump, tubing, etc.):

- Check hydraulic fluid level and top up fluid if necessary.
- Briefly start engine (max. 2 s).

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Pump must not draw in air; steering wheel must not be turned.

Waiting time between individual engine starts approx. 30 s.

- Check hydraulic fluid level and top up fluid if necessary.
- Keep repeating this procedure until fluid level remains constant.

- Start engine and let it run for 2 - 3 minutes; do not turn steering wheel.

Any air remaining in steering system escapes automatically whilst driving after approx. 10 . . . 20 km.

5.4 - Checking steering system for leaks

Note:

Steering system must be checked for leaks following assembly work and in the event of a lack of hydraulic fluid in the reservoir.

- Start engine.
- Turn steering wheel from lock to lock and hold briefly in each position.

  This builds up maximum pressure.

To avoid pump damage, steering wheel must not be held on full lock for more than 10 seconds during this test.

Check the following components for leaks in this position:

- Steering pinion sealing ring at valve housing of steering box

- All pipe connections
- Rack sealing rings

  This test can only be performed with bellows pushed back.
  - Unfasten hose clamp of bellows.
  - Push back bellows.

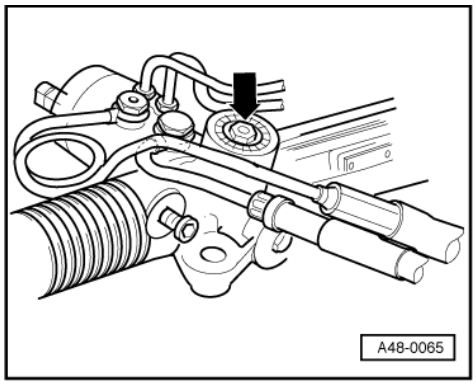
  Steering box must be replaced if fluid is visible in steering box housing and/or in bellows.

6 - Adjusting power-assisted steering box

6.1 - Adjusting power-assisted steering box

Two mechanics are required for adjustment, which is to be performed with engine switched off.

- Raise vehicle on lifting platform.
- Wheels in straight ahead position.
- Turning steering wheel back and forth (roughly 30°about centre axis) produces a rattling noise in the event of excessive steering play.



- -> Have second mechanic carefully screw in adjusting screw (arrow) until rattling noise disappears inside vehicle.
- Perform test drive.
- After manoeuvring/cornering, make sure steering returns automatically and smoothly to straight ahead position. Correct setting if necessary.

7 - Exploded view: Vane pump, reservoir, hydraulic pipes

7.1 - Exploded view: Vane pump, reservoir, hydraulic pipes

7.2 - Exploded view for vehicles with 4-cyl. engines

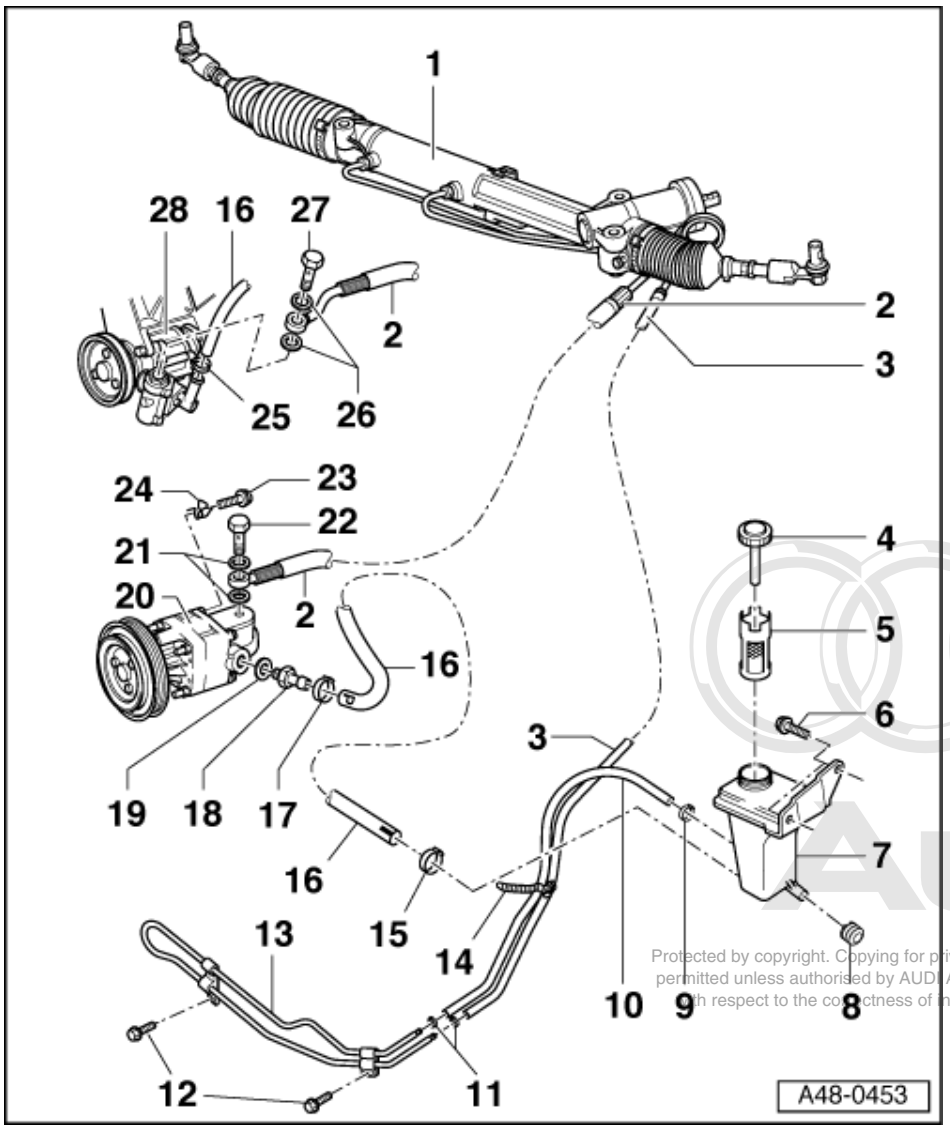
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Vane pump servicing work is not envisaged. In the event of complaints, perform pressure test and leak test to establish the cause. Replace vane pump if fault is found.

Notes:

- Always check steering system for leaks in the event of a lack of fluid in the reservoir.
- If a leak is found in the area of the pipe connections, start by checking pipes/pipe connections for leaks, retighten if necessary and wipe dry.
- Replacement pumps have no fluid fill. Prior to installation they are therefore to be filled with hydraulic fluid G 002 000 and cranked by hand to avoid the possibility of noise whilst driving or pump damage.
- Type: Hydraulic fluid G 002 000

- Quantity of fluid in system: 0.7 ... 0.9 l



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1 **Power-assisted steering box**
Left-hand drive vehicles:
- Exploded view => Page 242
- Removing and installing => Page 245

Right-hand drive vehicles:
- Exploded view => Page 260
- Removing and installing=>Page 262

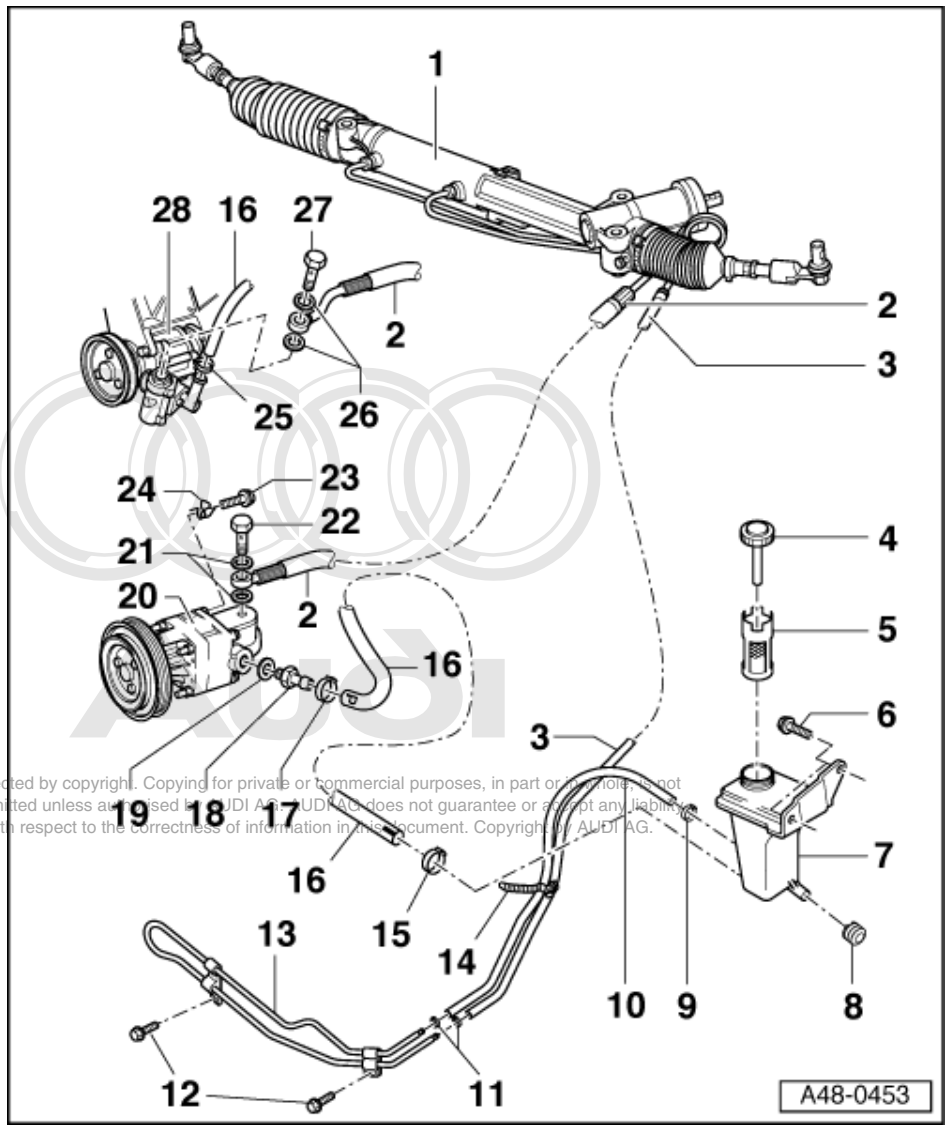
2 **Pressure pipe**

3 **Return hose**

4 **Cap with dipstick**
- Checking fluid level =>Page 279

5 **Strainer**
- Integrated into reservoir

6 **Hexagon bolt, 9 Nm**



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7 Reservoir

- Fresh fill with hydraulic fluid, part no. G 002 000, quantity 0.7 l

8 Rubber bush

9 Clamp

- Tension using V.A.G 1275
- Always replace

10 Return hose

Between reservoir and cooling pipe

- Not for 4-cyl. TDI with no towing hitch

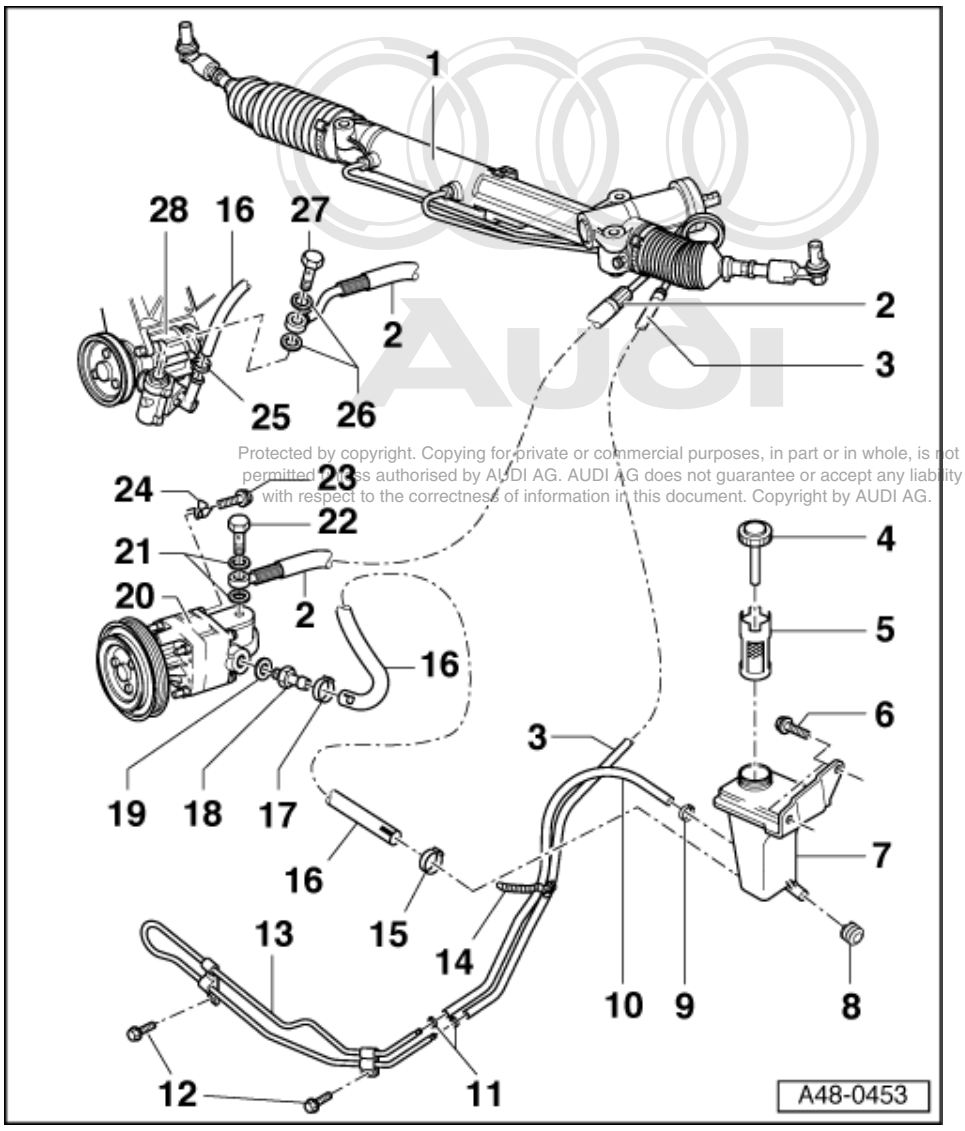
11 Clamp

- Tension using V.A.G 1275
- Always replace

12 Hexagon bolt, 10 Nm

13 Cooling pipe

- Not for 4-cyl. TDI with no towing hitch



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14 Cable tie

15 Clamp

- Tension using V.A.G 1275
- Always replace

16 Suction hose

- Installation position => Page 301 , Figs. 1 and 2

17 Clamp

- Tension using V.A.G 1275
- Always replace

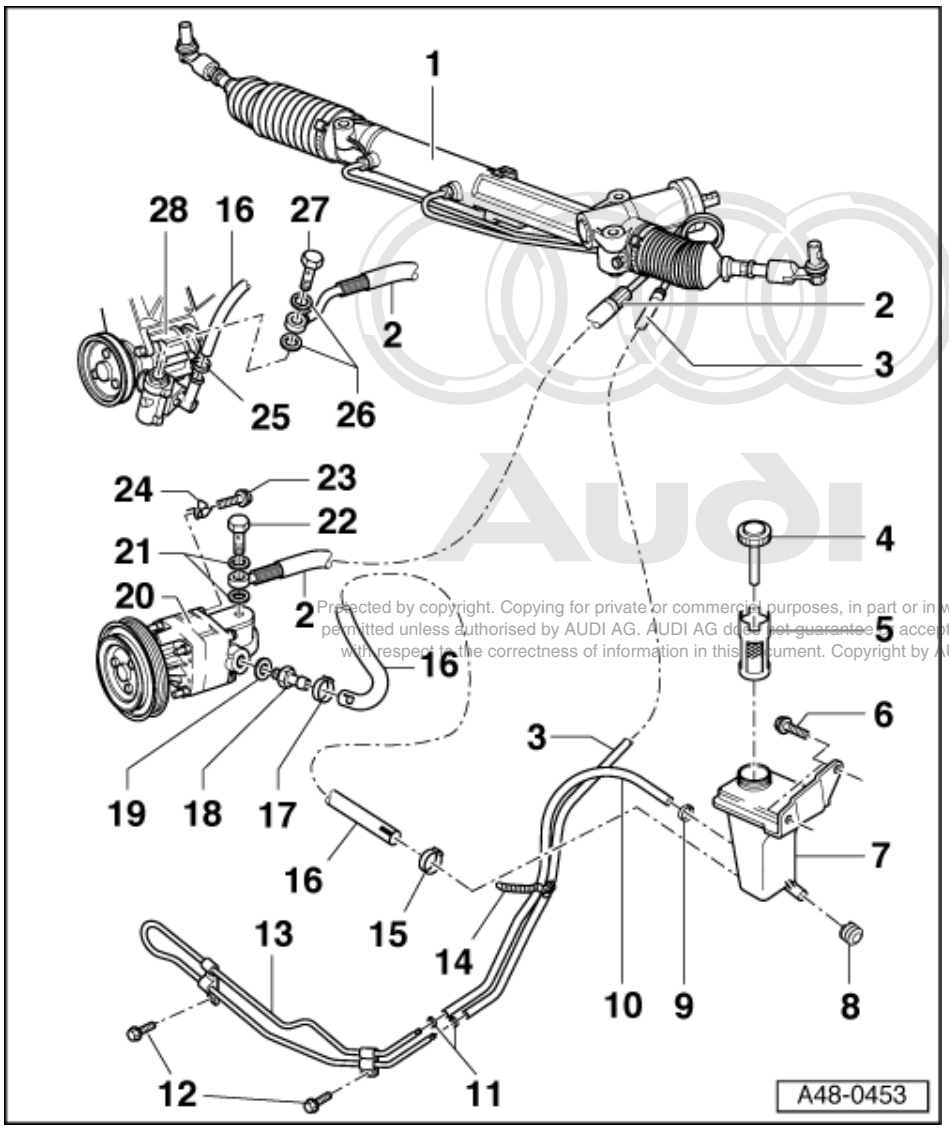
18 Threaded connection, 50 Nm

19 Sealing ring, 18 x 24

- Always replace

20 Vane pump

- This vane pump was fitted up to Model Year '97 on all 4-cyl. engines
- Checking delivery pressure
  => Page 302
- Fill with fluid before installing =>Note, Page 281



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21 Sealing rings, 16 x 22

- Always replace

22 Banjo bolt, 50 Nm

23 Hexagon bolt, 18 Nm

24 Fastening bracket

25 Clamp

- Tension using V.A.G 1275
- Always replace

26 Sealing rings, 16 x 22

- Always replace

27 Banjo bolt, 50 Nm

28 Vane pump

- Fill with fluid before installing =>Note, Page 281
- This vane pump was fitted as of Model Year '98 on all 4-cyl. engines

7.3 - Exploded view for vehicles with 6-cyl. engines except 5-valve turbo (bi-turbo)

Vane pump servicing work is not envisaged. In the event of complaints, perform pressure test and leak test to establish the cause. Replace vane pump if fault is found.

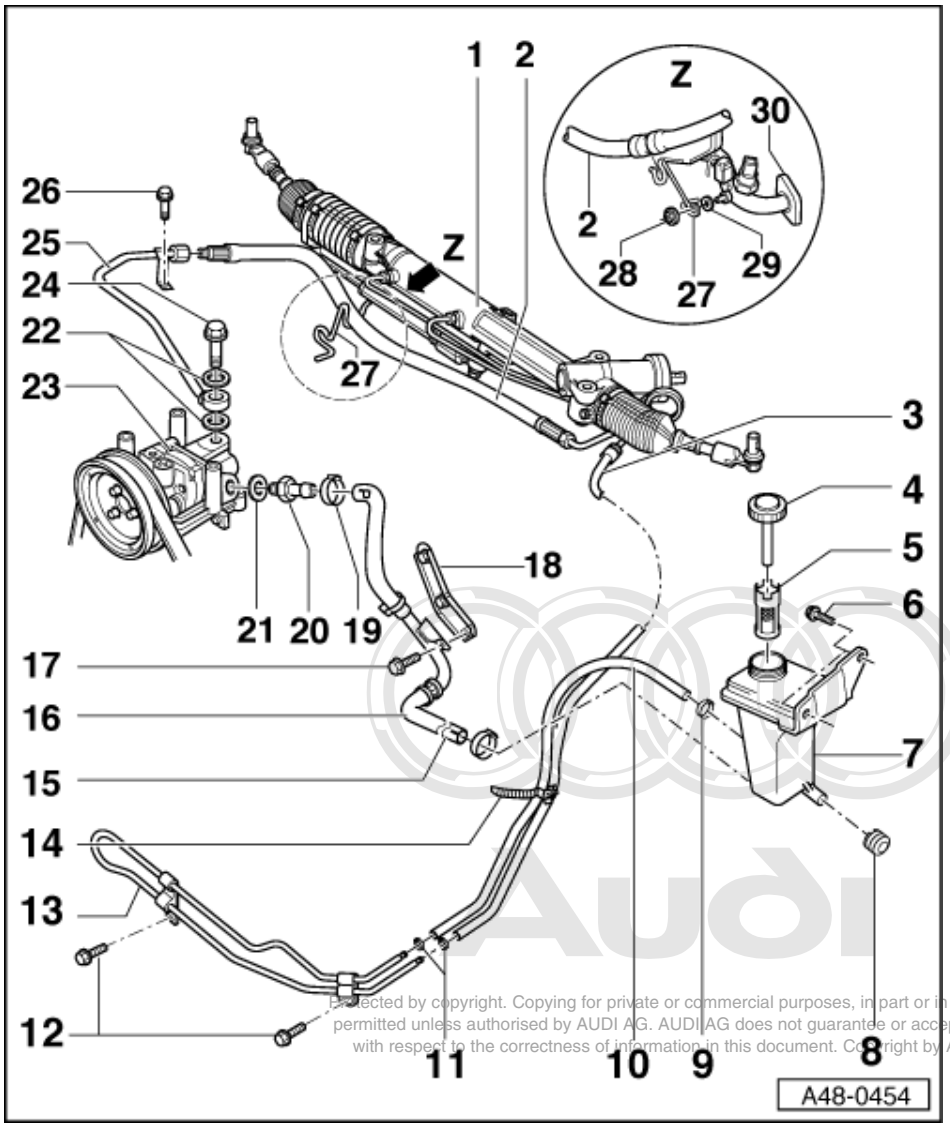
Notes:

- Always check steering system for leaks in the event of a lack of fluid in the reservoir.
- If a leak is found in the area of the pipe connections, start by checking pipes/pipe connections for leaks, re-tighten if necessary and wipe dry.
- Replacement pumps have no fluid fill. Prior to installation they are therefore to be filled with hydraulic fluid G 002 000 and cranked by hand to avoid the possibility of noise whilst driving or pump damage.
- Type: Hydraulic fluid G 002 000
- Quantity of fluid in system: 0.7 ... 0.9 l

6-cyl. 2-valve petrol engine => Page 287

6-cyl. 5-valve petrol engine => Page 290

6-cyl. TDI engine => Page 294



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6-cyl. 2-valve petrol engine

1 Power-assisted steering box
- Left-hand drive vehicles:
- Exploded view => Page 242
- Removing and installing => Page 245
- Right-hand drive vehicles:
- Exploded view => Page 260
- Removing and installing=>Page 262

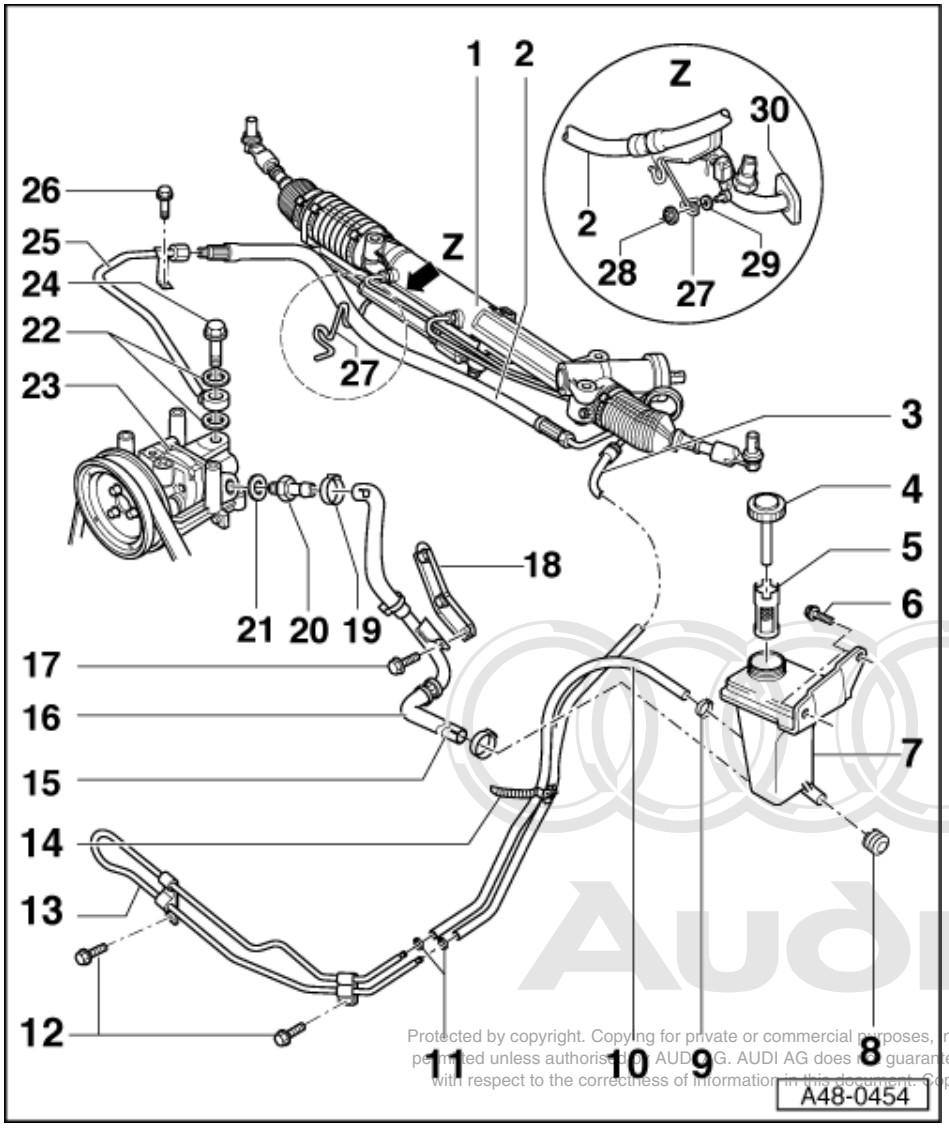
2 Pressure hose

3 Return hose

4 Cap with dipstick
- Checking fluid level =>Page 279

5 Strainer
- Integrated into reservoir

6 Hexagon bolt, 9 Nm



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7 Reservoir
- Fresh fill with hydraulic fluid, part no. G 002 000, quantity 0.7 l

8 Rubber bush

9 Clamp
- Tension using V.A.G 1275
- Always replace

10 Return hose

Between reservoir and cooling pipe

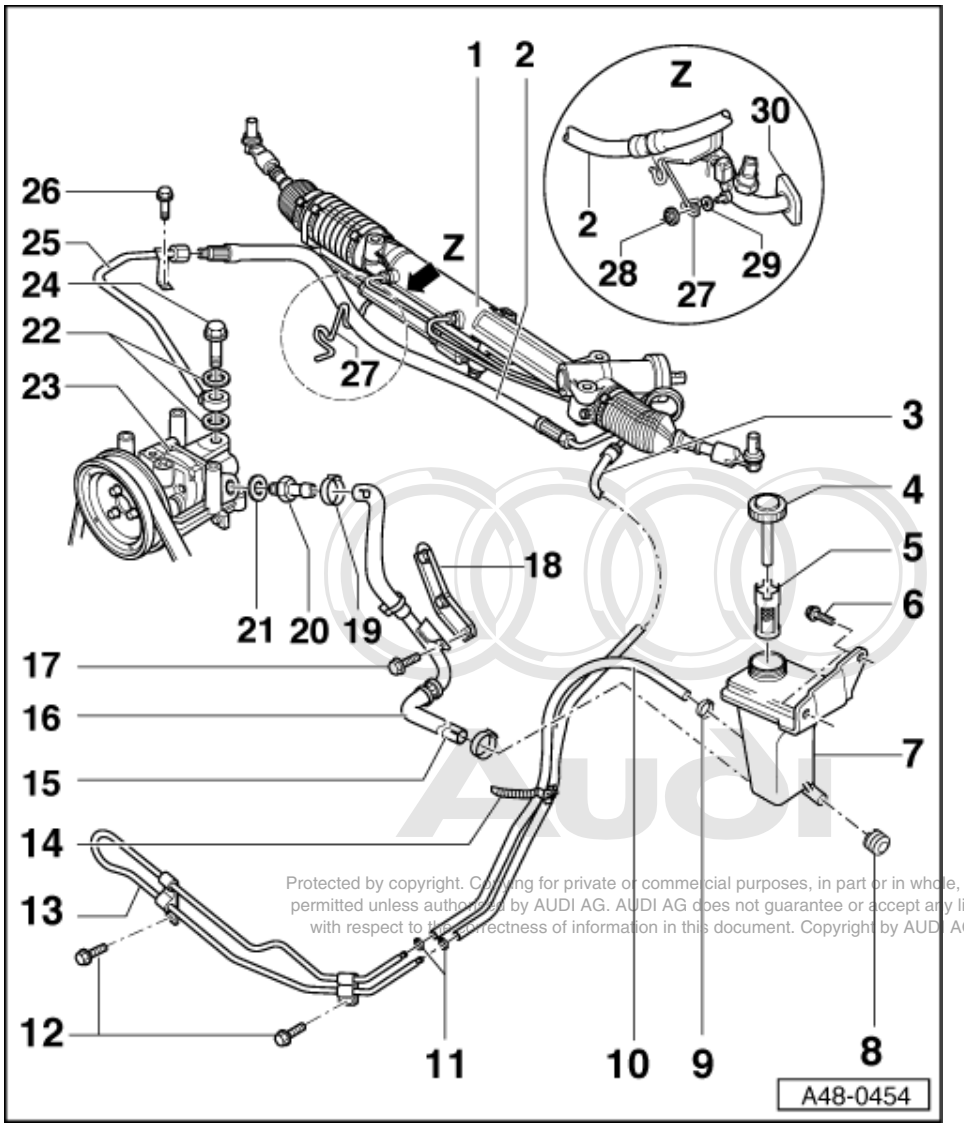
11 Clamp

- Tension using V.A.G 1275
- Always replace

12 Hexagon bolt, 10 Nm

13 Cooling pipe

14 Cable tie



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15 Clamp

- Tension using V.A.G 1275
- Always replace

16 Suction hose

- Installation position => Page 301 , Fig. 2

17 Hexagon bolt, 8 Nm

18 Bracket

- Bolted to cylinder head

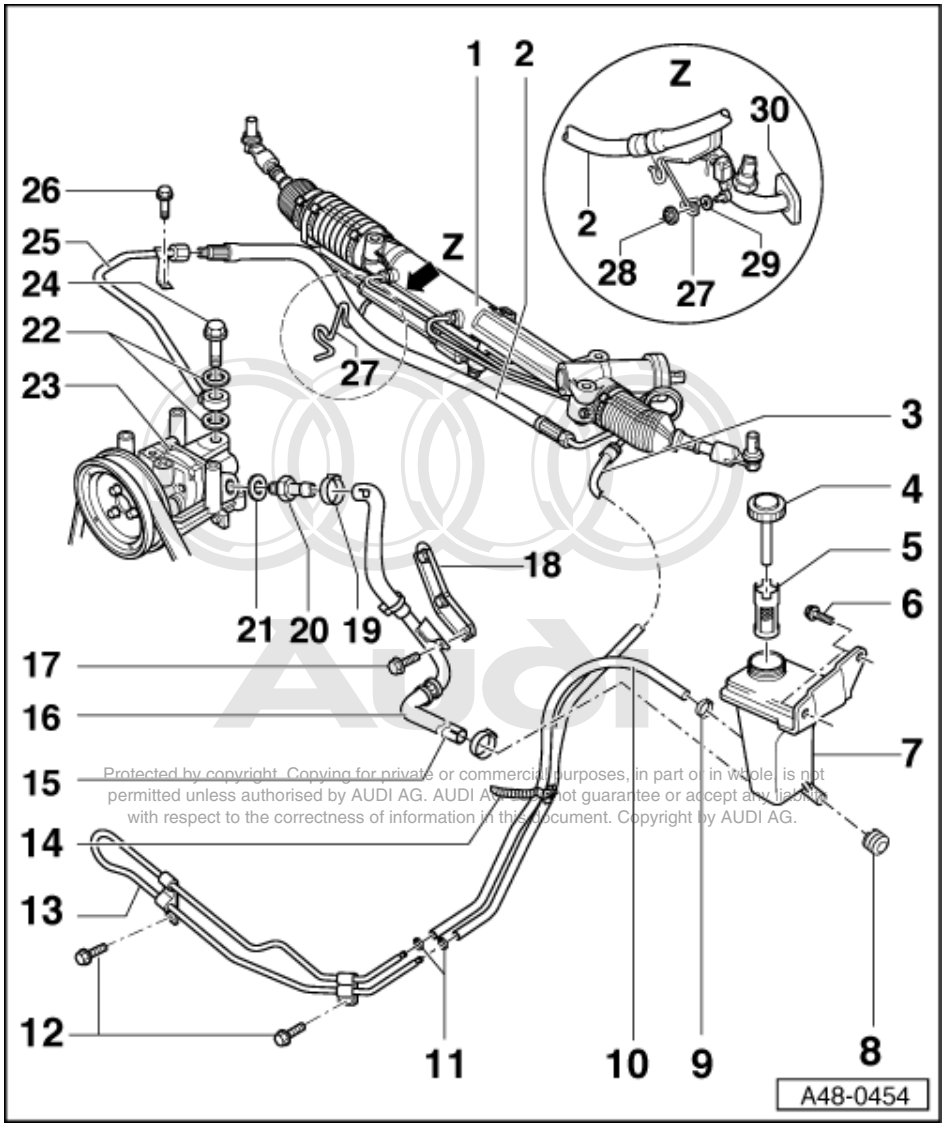
19 Clamp

- Tension using V.A.G 1275
- Always replace

20 Threaded connection, 50 Nm

21 Sealing ring, 18 x 24
- Always replace

22 Sealing rings, 16 x 22
- Always replace



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23 Vane pump
- Checking delivery pressure
  => Page 302
- Fill with fluid before installing =>Note, Page 286

24 Banjo bolt, 50 Nm

25 Pressure pipe
- Tighten bolted joint of pressure pipe/pressure hose -Item 2 - to 40 Nm
- Screw to pressure hose; to do so, provide support at hexagon of pressure hose
- Screwed to intake manifold with hexagon bolt -item 26-

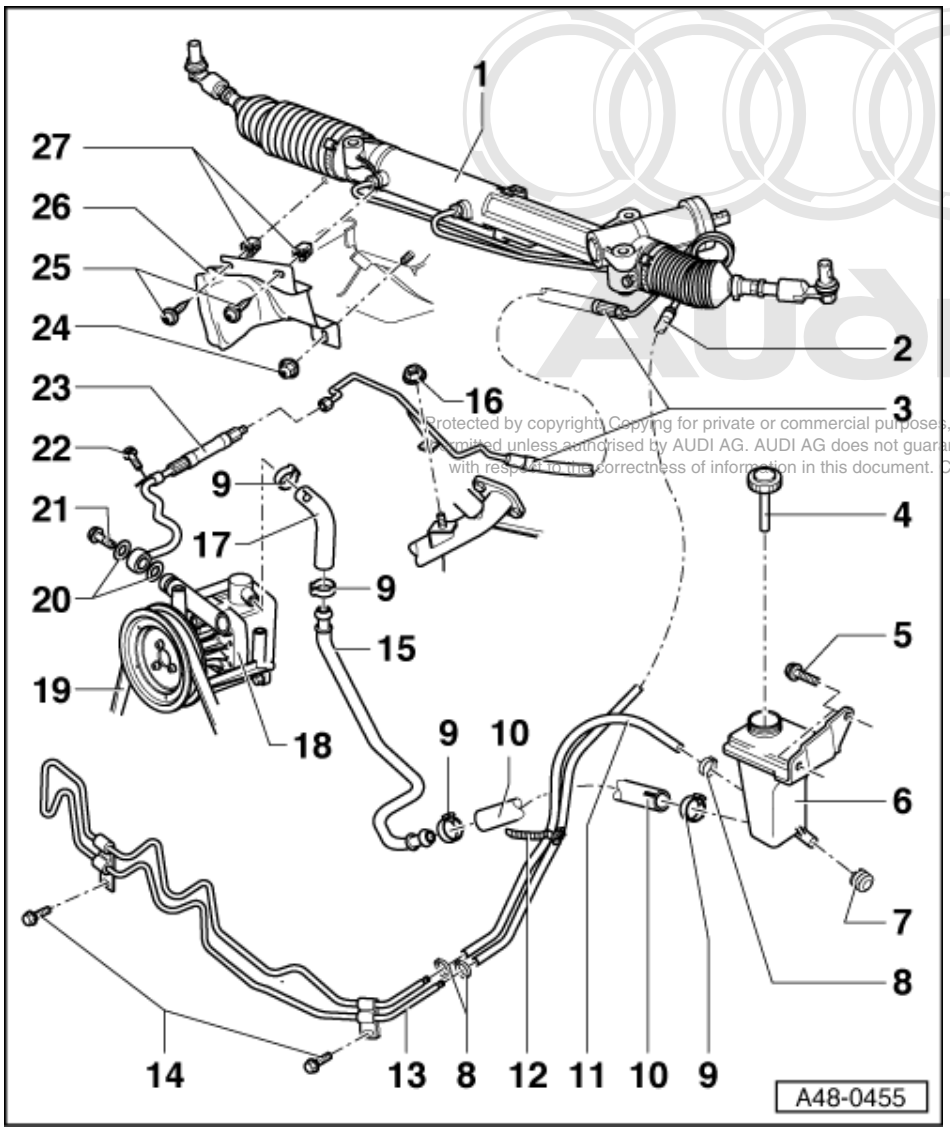
26 Hexagon bolt, 8 Nm

27 Bracket

28 Hexagon nut, 20 Nm

29 Washer

30 Coolant pipe



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6-cyl. 5-valve petrol engine

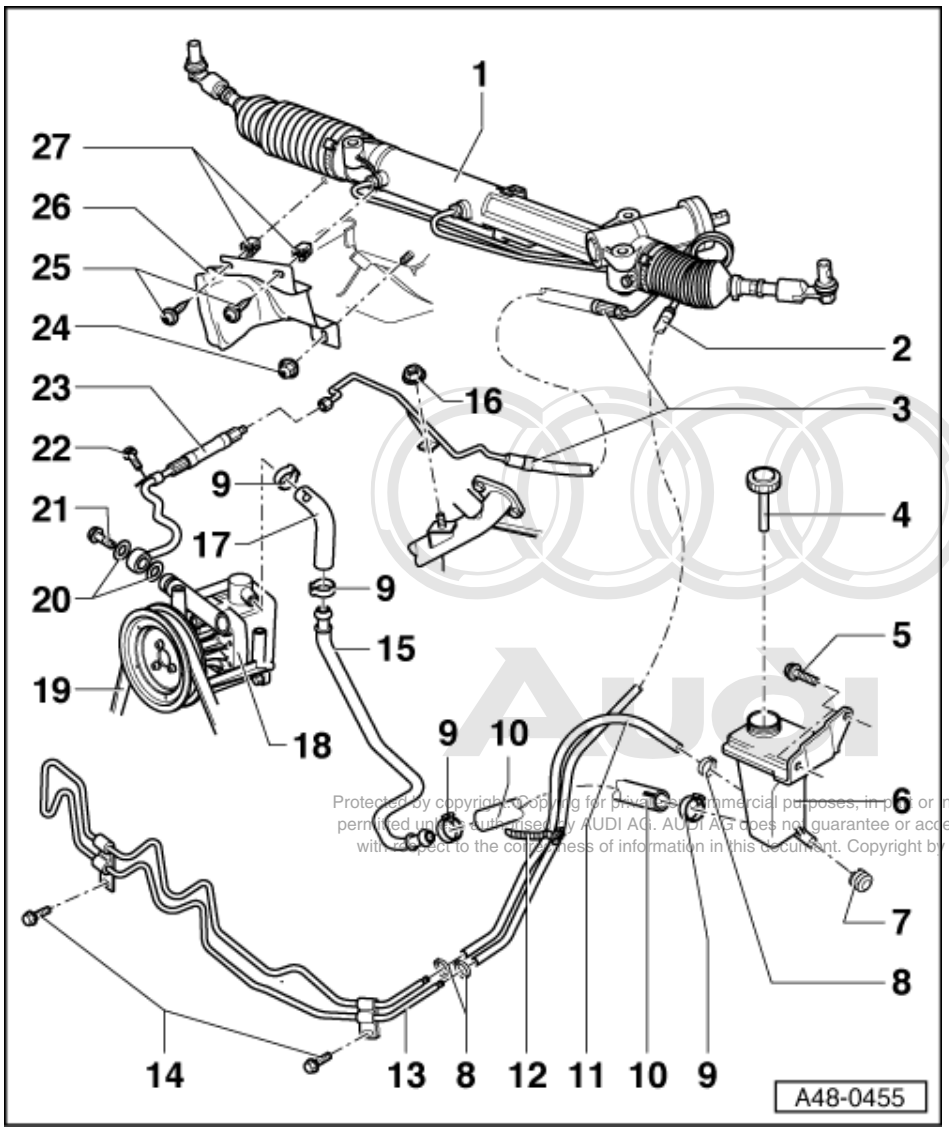
1 **Power-assisted steering box**
Left-hand drive vehicles:
- Exploded view => Page 242
- Removing and installing => Page 245

Right-hand drive vehicles:
- Exploded view => Page 260
- Removing and installing=>Page 262

2 **Return hose**

3 **Expansion hose**
- Tighten bolted joint to expansion hose -Item 23 - to 40 Nm; to do so, provide support at hexagon of expansion hose -Item 23 -

4 **Cap with dipstick**
- Checking fluid level =>Page 279



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5 Hexagon bolt, 9 Nm

6 Reservoir

- Fresh fill with hydraulic fluid, part no. G 002 000, quantity 0.7 l

7 Rubber bush

8 Clamp

- Tension using V.A.G 1275
- Always replace

9 Clamp

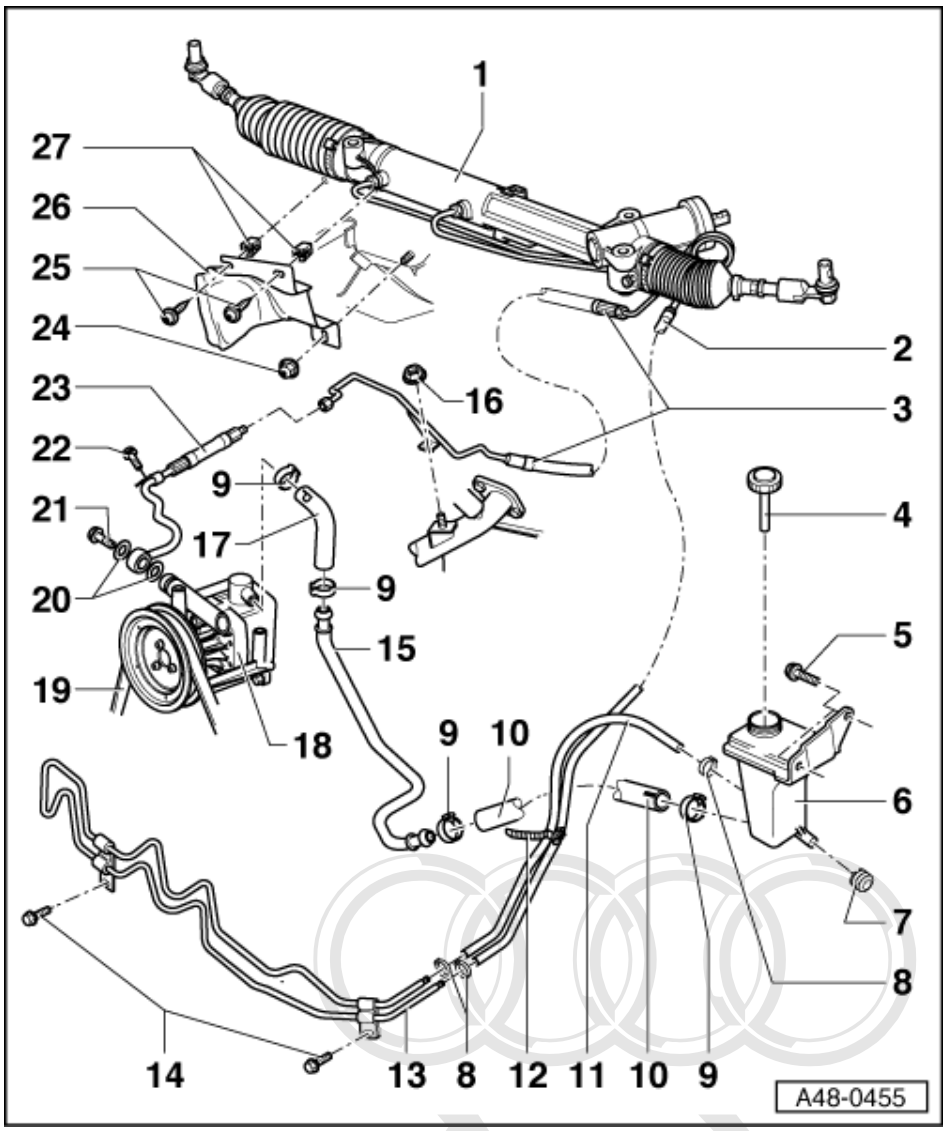
- Tension using V.A.G 1275
- Always replace

10 Suction hose

- Installation position => Page 301 , Fig. 2
- Marks must be aligned

11 Return hose

Between reservoir and cooling pipe



12 Cable tie

13 Cooling pipe

14 Torx bolts (T 30)

- 9 Nm

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15 Pipe

- Mark must be aligned with suction hose mark

16 Hexagon nut, 20 Nm

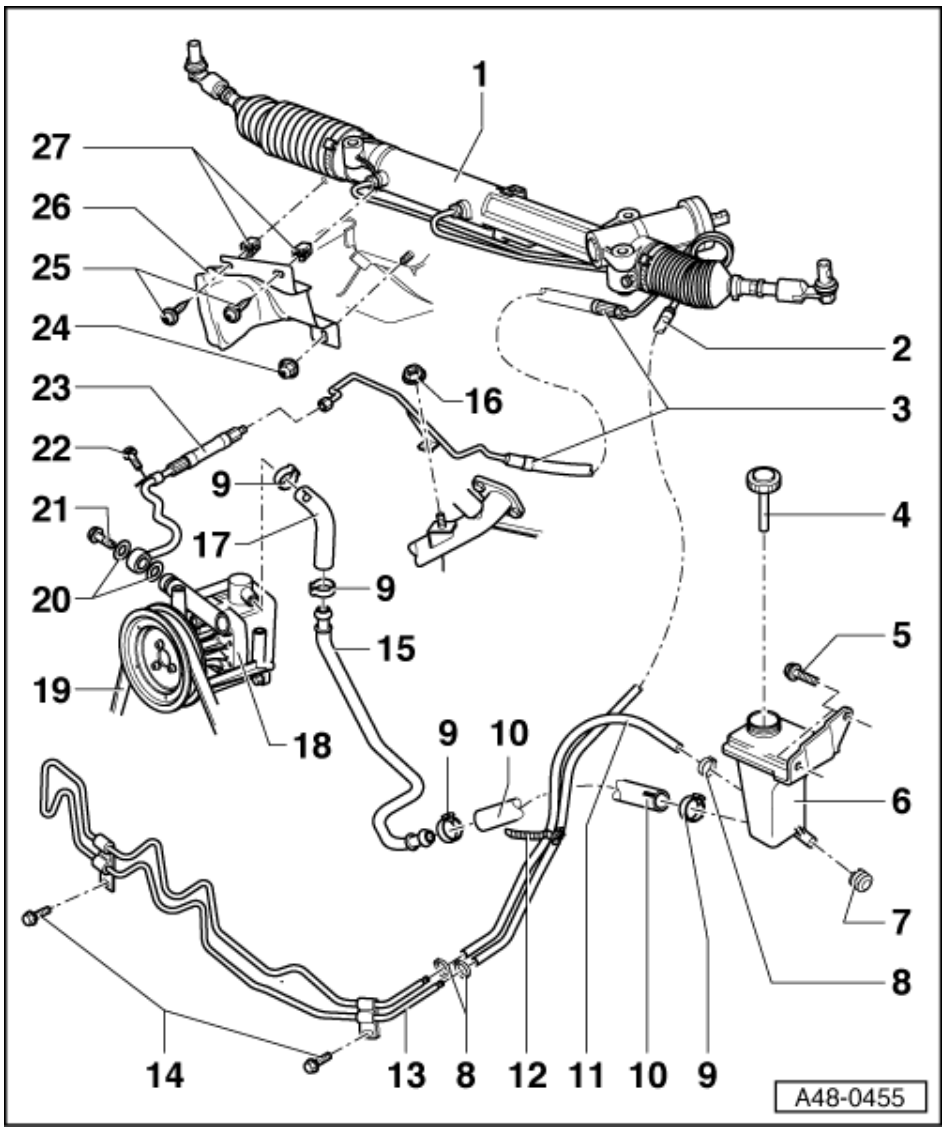
- For attaching expansion hose to coolant pipe

17 Suction hose

- Mark -P- faces pump

18 Vane pump

- Checking delivery pressure
  => Page 302
- Fill with fluid before installing =>Note, Page 286



19 Ribbed belt

- Mark direction before removing

20 Sealing ring, 16 *22

- Always replace

21 Banjo bolt, 50 Nm

22 Hexagon bolt, 6 Nm

23 Expansion hose

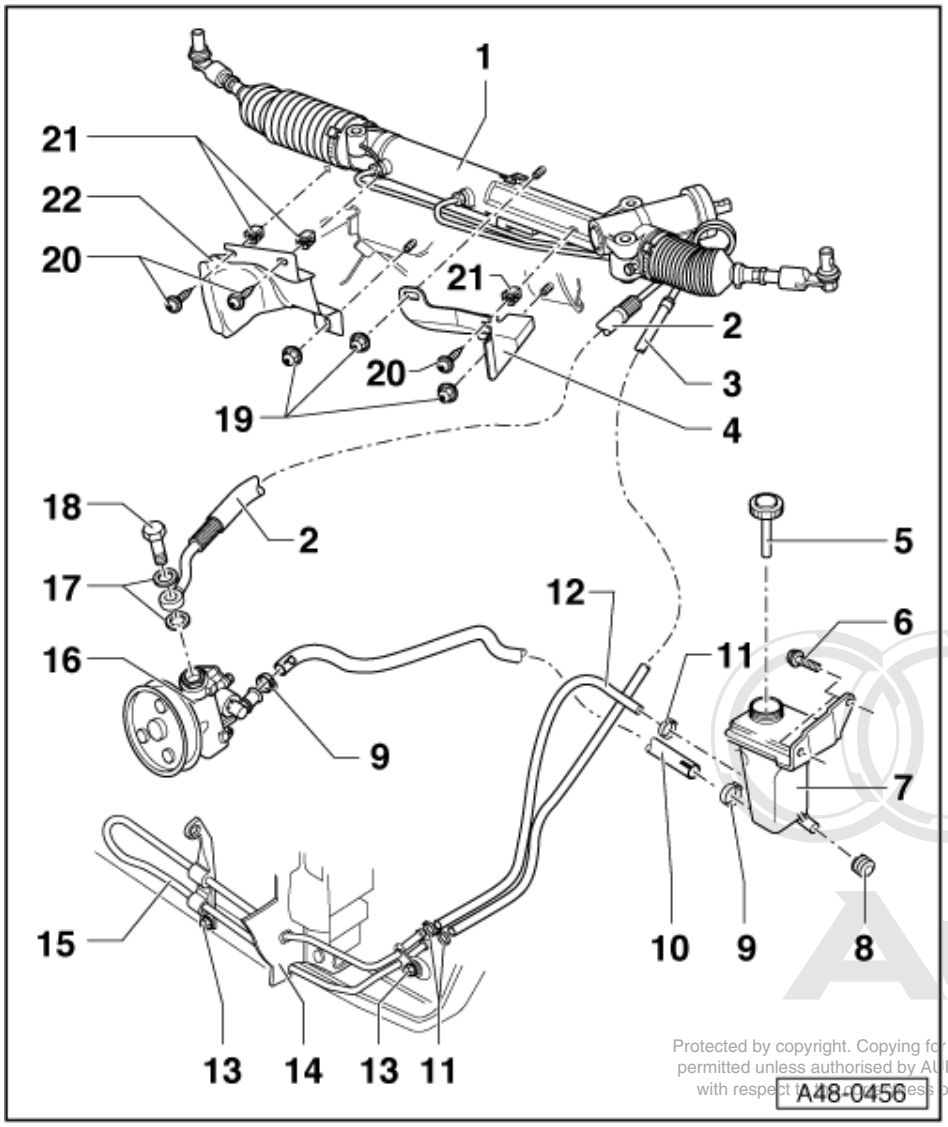
24 Speed nut

25 Combi bolt

26 Shield

27 Expanding nut

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6-cyl. TDI engine

1 **Power-assisted steering box**
Left-hand drive vehicles:
- Exploded view => Page 242
- Removing and installing => Page 245

Right-hand drive vehicles:
- Exploded view => Page 260
- Removing and installing=>Page 262

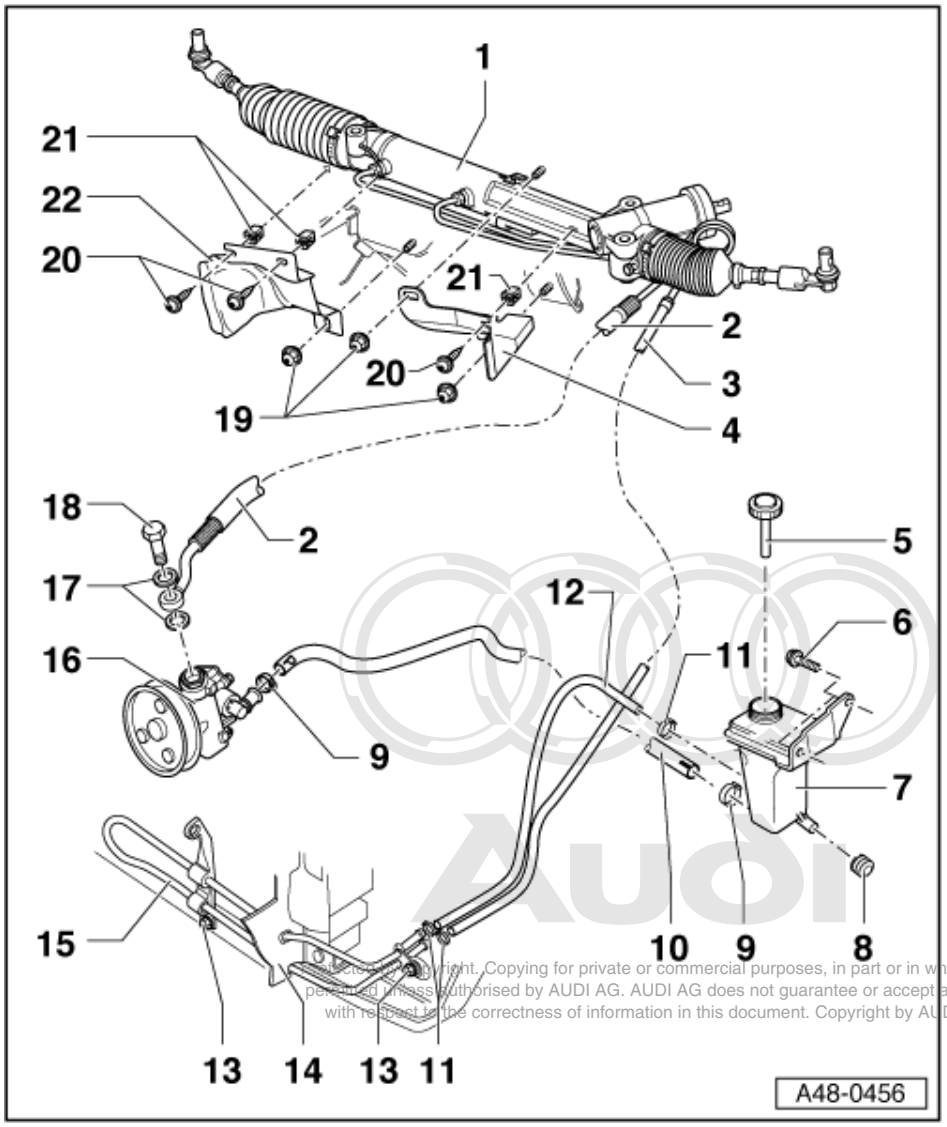
2 **Pressure hose**

3 **Return hose**

4 **Shield**

5 **Cap with dipstick**
- Checking fluid level =>Page 279

6 **Hexagon bolt, 9 Nm**



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7 Reservoir

- Fresh fill with hydraulic fluid, part no. G 002 000, quantity 0.7 l

8 Rubber bush

9 Clamp

- Tension using V.A.G 1275
- Always replace

10 Suction hose

- Installation position => Page 301 , Figs. 1 and 2

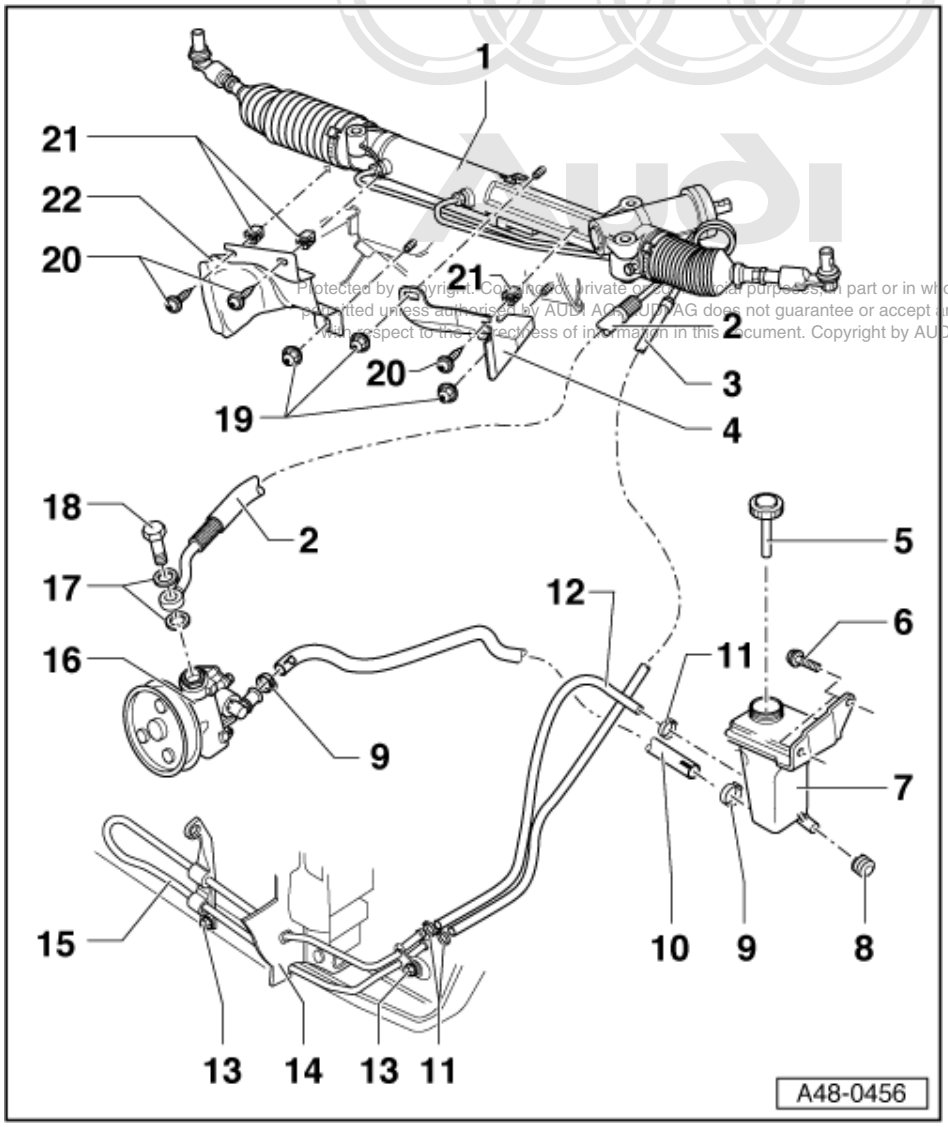
11 Clamp

- Tension using V.A.G 1275
- Always replace

12 Return hose

Between reservoir and cooling pipe

13 Hexagon bolt, 9 Nm



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14 Cover

15 Cooling pipe

16 Vane pump

- Checking delivery pressure
  => Page 302
- Fill with fluid before installing =>Note, Page 286

17 Sealing ring, 16 *22

- Always replace

18 Banjo bolt, 50 Nm

19 Hexagon nut, 1.3 Nm

20 Cross-head bolt, 2 Nm

21 Expanding nut

- Replace

22 Shield

7.4 - Exploded view for vehicles with 6-cyl. 5-valve turbo engine (bi-turbo)

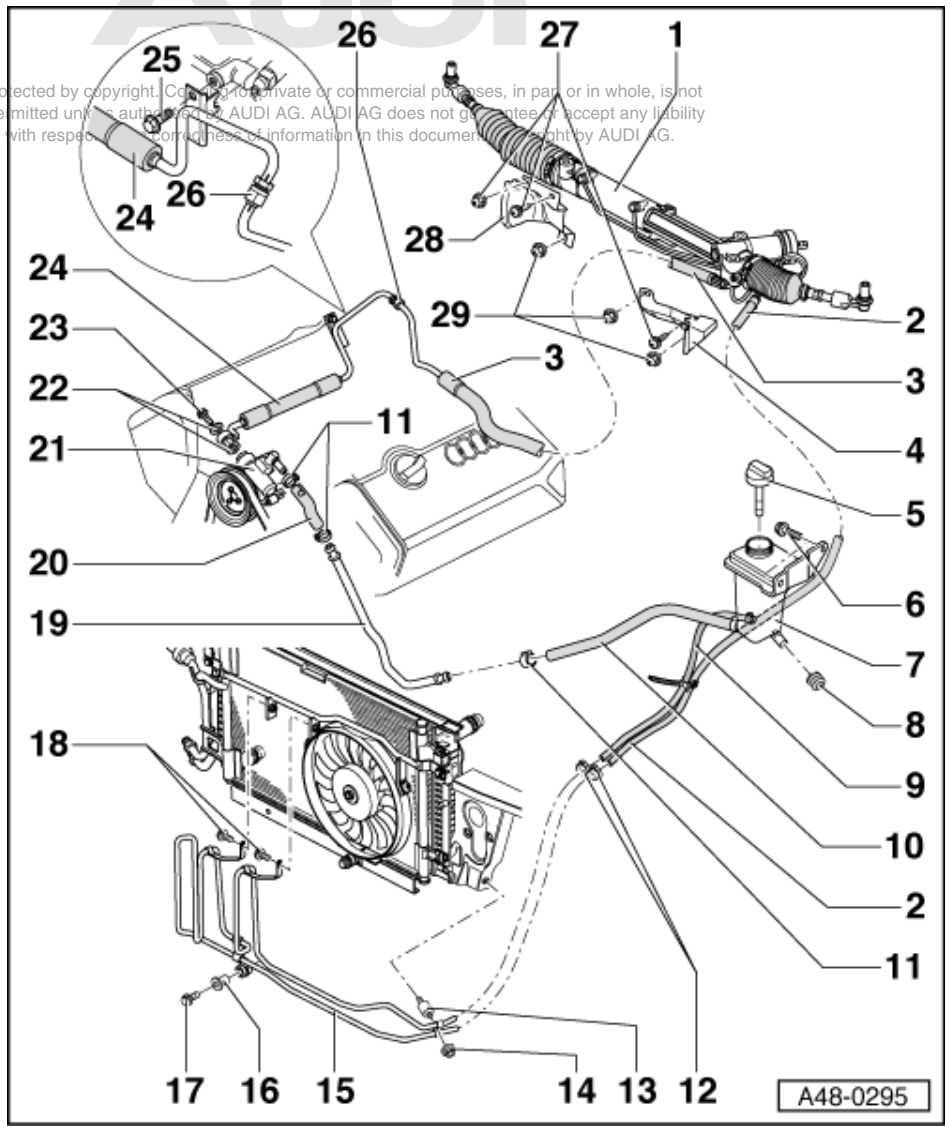
General

Vane pump servicing work is not envisaged. In the event of complaints, perform pressure test and leak test to establish the cause. Replace vane pump if fault is found.

With the exception of extension of the hydraulic pipes from left to right at the steering box, the fluid circuit of RHD vehicles corresponds to that of the LHD version.

- Always check steering system for leaks in the event of a lack of fluid in the reservoir.
- If a leak is found in the area of the pipe connections, start by checking pipes/pipe connections for leaks, re-tighten if necessary and wipe dry.
- Replacement pumps have no fluid fill. Prior to installation they are therefore to be filled with hydraulic fluid G 002 000 and cranked by hand to avoid the possibility of noise whilst driving or pump damage.
- Type: Hydraulic fluid G 002 000

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1 Power-assisted steering box

Left-hand drive vehicles:

- Exploded view => Page 242
- Removing and installing => Page 245

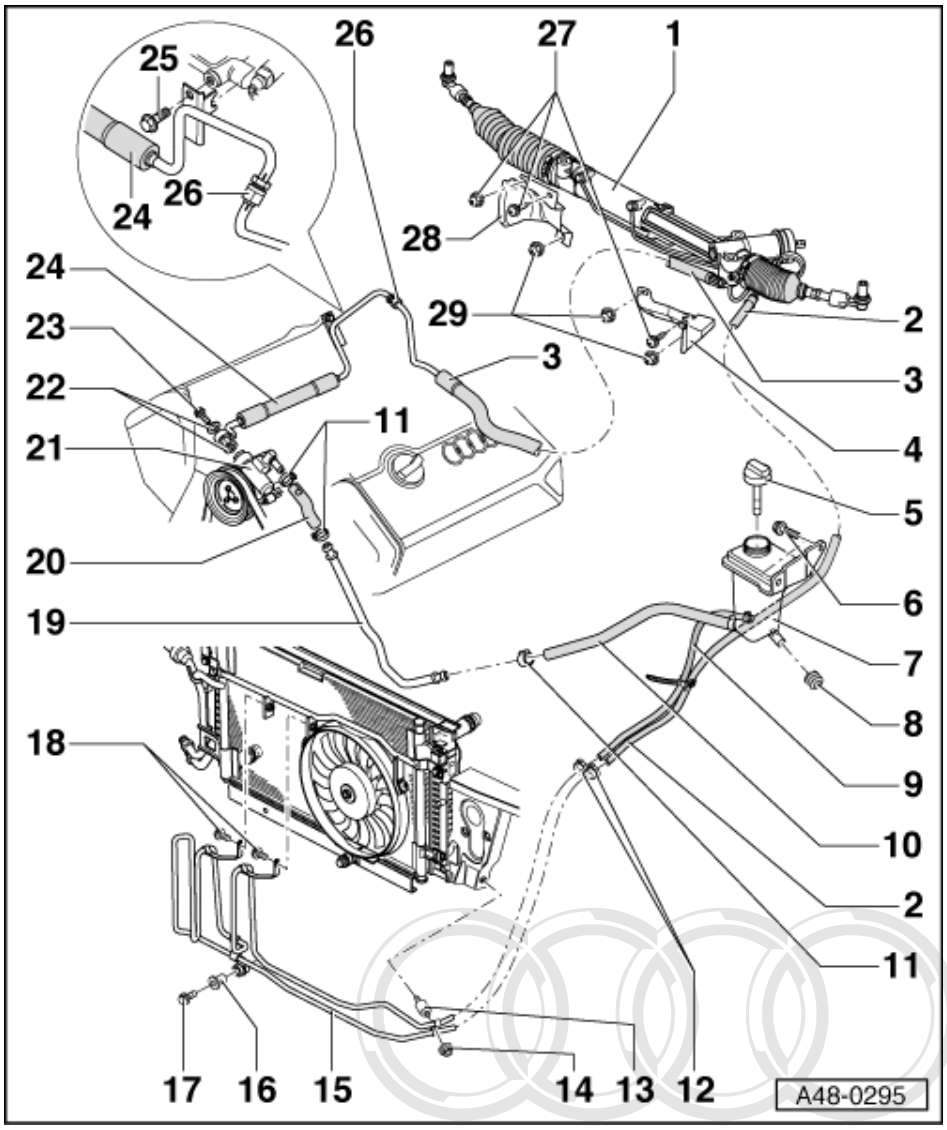
Right-hand drive vehicles:

- Exploded view => Page 260
- Removing and installing=>Page 262

2 Return hose
3 Expansion hose
- Section with pipe leading to steering box

4 Shield
5 Cap with dipstick
- Checking fluid level =>Page 279

6 Hexagon bolt, 9 Nm



7 Reservoir
- Fresh fill with hydraulic fluid, part no. G 002 000, quantity 0.7 l

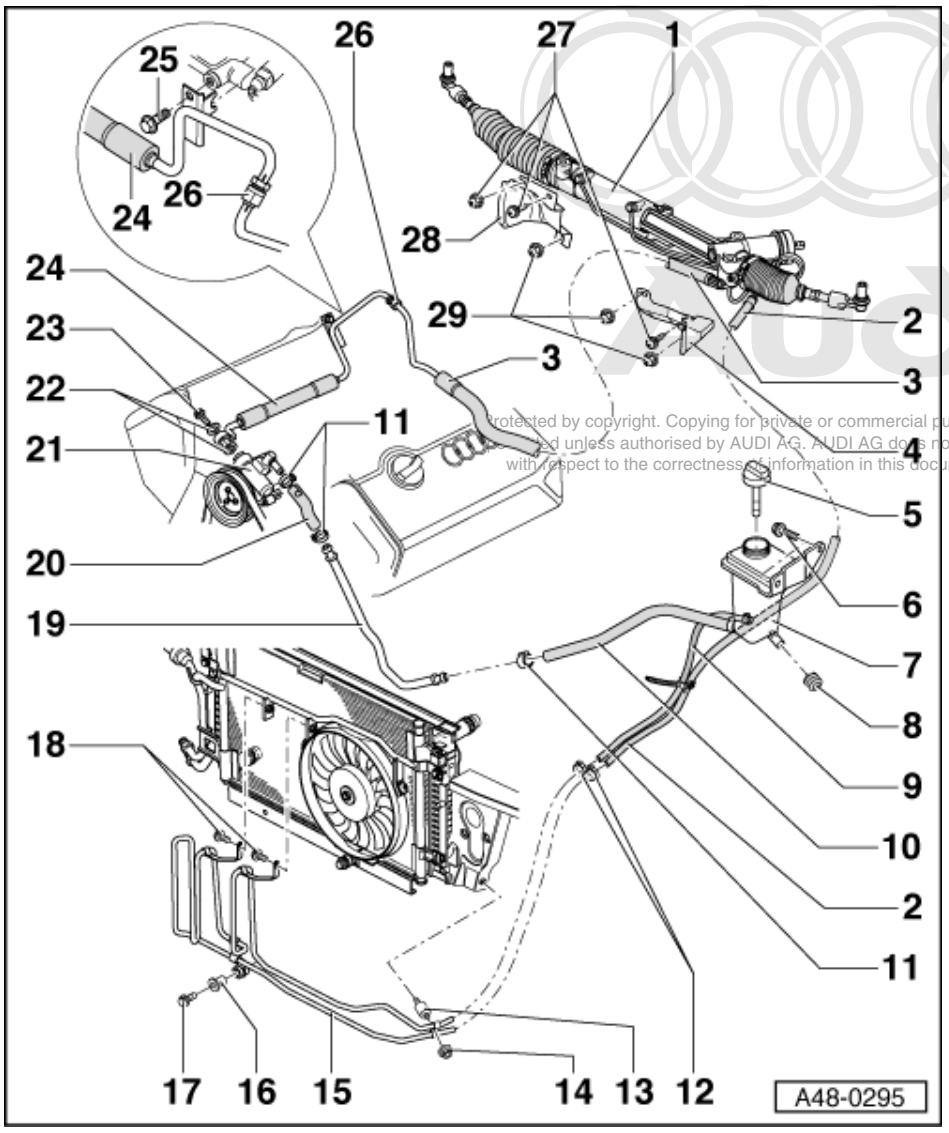
8 Rubber bush
9 Return hose
Between fluid reservoir and cooling pipe
10 Suction hose
- Installation position => Page 301, Fig. 2
- Marks must be aligned

11 Clamp
- Tension using V.A.G 1275
- Always replace

12 Clamp
- Tension using V.A.G 1275
- Always replace

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13 Rubber buffer



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14 Hexagon nut, 9 Nm
- M6

15 Cooling pipe

16 Sleeve

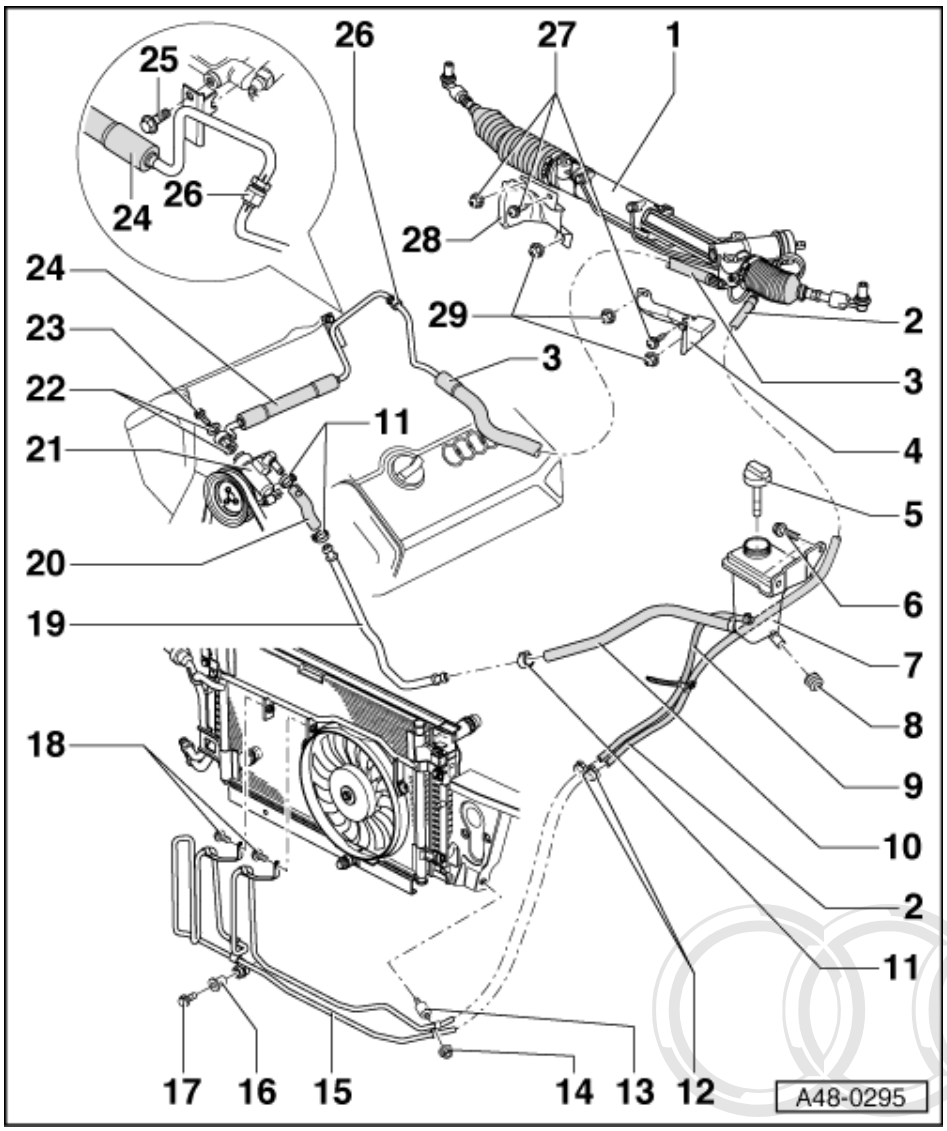
17 Combi bolt, 9 Nm

18 Torx bolts (T 25)
- 5 Nm
- M5 x 12

19 Pipe
- Mark must be aligned with suction hose mark

20 Suction hose
- Mark -P- must be aligned with parting line at pump

21 Vane pump
- Fill with fluid before installing
  =>Notes, Page 297
- Checking delivery pressure
  => Page 309



22 Sealing ring, 16 *22

- Always replace

23 Banjo bolt, 50 Nm

- M16 x 1.5

24 Expansion hose

- Section with pipe leading to steering box

25 Hexagon bolt, 7.5 Nm

- M8 x 15

26 Union nut

- Tighten to 40 Nm whilst providing support at hexagon
- Marks must be aligned

27 Self-tapping combi bolt

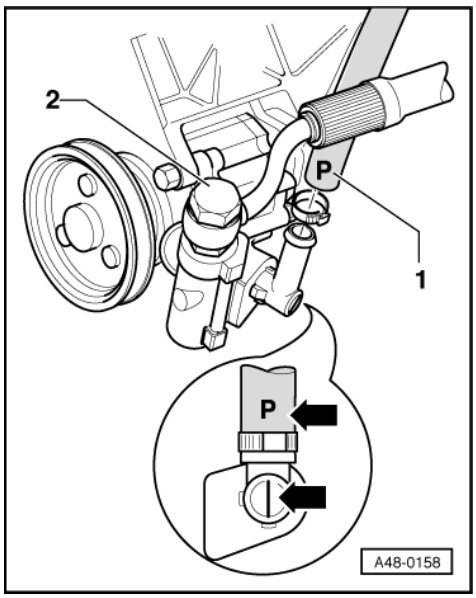
- 2 Nm

28 Shield

29 Speed nut

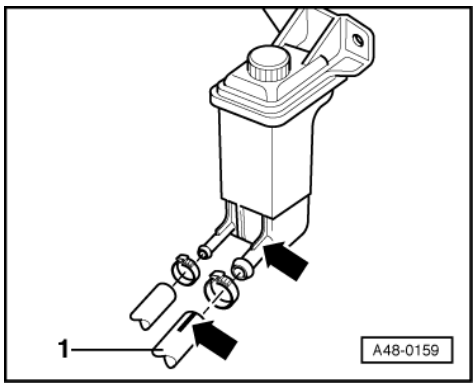
- 1.3 Nm

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-> Fig.1 Installation position of suction hose at vane pump on 4-cyl. and V6 TDI engines

- Mark -P- at suction hose must be aligned with seam at pump.



-> Fig.2 Installation position of suction hose at reservoir for all engines

- Mark at suction hose -1- must be aligned with seam at reservoir.

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8 - Checking delivery pressure of vane pump

8.1 - Checking delivery pressure of vane pump

8.2 - General information

The following information does not apply to the 6-cyl. 5-valve turbo engine (bi-turbo).

Notes:

Pay attention to the following to avoid damaging pump:

- Cut-off valve of pressure gauge must not remain closed for more than 10 seconds during this test.
- Start engine without pressing accelerator and allow it to idle.
- Take pump pressure reading at idling speed immediately after starting (have second mechanic take reading if necessary).
- Maximum pressure displayed is definitive, as pressure decreases in the course of the test.

Vehicles with 4-cyl. engines => Page 302

Vehicles with 6-cyl. engines except 5-valve turbo (bi-turbo)=>Page 304

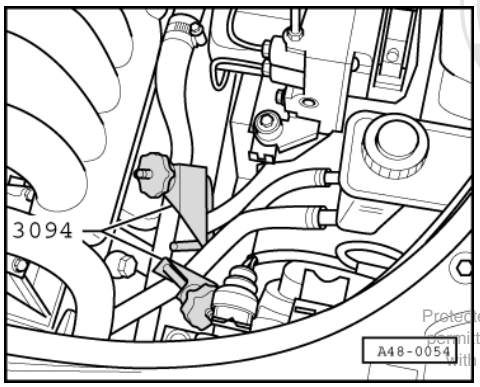
Vehicles with 6-cyl. 5-valve turbo engine (bi-turbo) => Page 309

8.3 - Vehicles with 4-cyl. engines

Pay attention to information on => Page 302 .

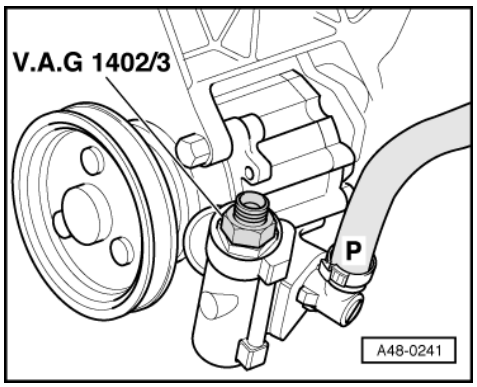
Special tools and workshop equipment required

- 3094 Hose clamps
- V.A.G 1402 Power steering tester
- V.A.G 1402/3 Adapter
- V.A.G 1402/6 Hose from adapter set

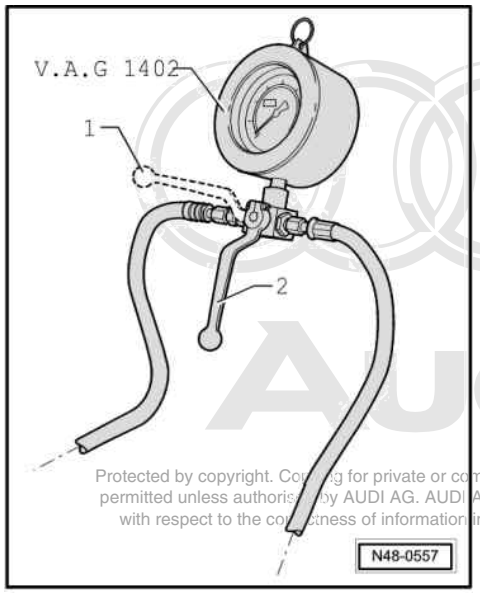


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- -> Pinch off suction and return hose with hose clamps -3094-.
- Place drip tray in position.
- Unscrew pressure pipe from vane pump.



- -> Screw adapter -V.A.G 1402/3- into vane pump in place of banjo bolt.
- Screw hose of pressure gauge -V.A.G 1402- to adapter -V.A.G 1402/3-.
- Use corresponding adapters to connect hose from adapter set -V.A.G 1402/6- to pressure gauge -V.A.G 1402- and to pressure pipe.
- Detach hose clamps -3094-.



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-> Make sure lever on pressure gauge is in position -2-.

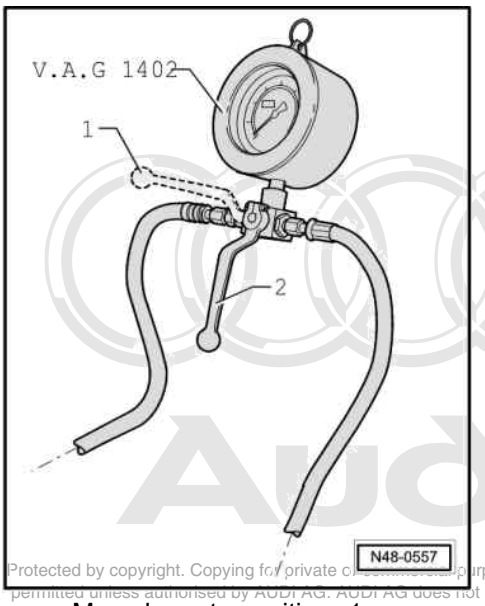
- Start engine and, if necessary, top up fluid level in reservoir.
- Turn steering wheel roughly 10 times from lock to lock.
- Then check delivery pressure.
- With engine idling, close cut-off valve -position 1- (max. 10 seconds) and take pressure reading.

Pump pressure specification (gauge pressure)

Engine	Pump	Pump pressure (bar)
4-cyl. petrol engines	8D0 145 156 K 8D0 145 156 L	110 ... 120 103 ... 107
4-cyl diesel engines	8D0 145 156 T 8D0 145 156 Q	110 ... 120 110 ... 115

If readout does not match specification, replace vane pump

=> Page 312 .



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- => Move lever to position -1-.
- Switch off engine.
- Remove pressure gauge.
- Connect pressure pipe with banjo bolt to vane pump => Page 285 , Item 22 or Item 27 .
- Check hydraulic fluid level =>Page 279 .
- Check steering system for leaks =>Page 280 .
- Bleed steering system =>Page 280 .

8.4 - Vehicles with 6-cyl. engines except 5-valve turbo (bi-turbo)

Special tools and workshop equipment required

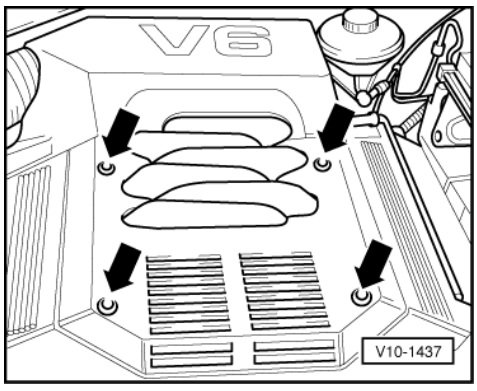
- 3094 Hose clamps
- V.A.G 1402 Power steering tester
- V.A.G 1402/2 Adapter
- V.A.G 1402/3 Adapter
- V.A.G 1402/6 Hose from adapter set

Pay attention to information on => Page 302 .

Vehicles with 6-cyl. 2-valve petrol engine => Page 305

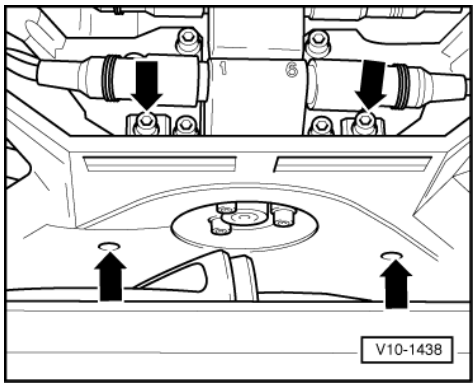
Vehicles with 6-cyl. 5-valve petrol engine => Page 306

Vehicles with 6-cyl. diesel engine (TDI) => Page 307

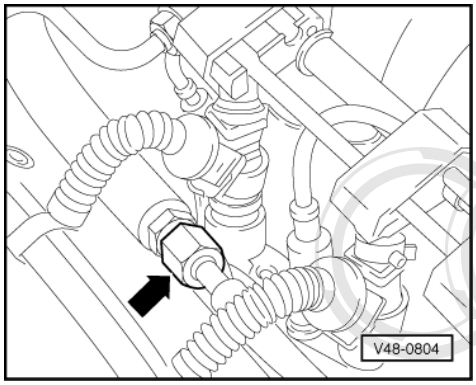


Vehicles with 6-cyl. 2-valve petrol engine

- -> Unclip and detach top engine cover -arrows-.

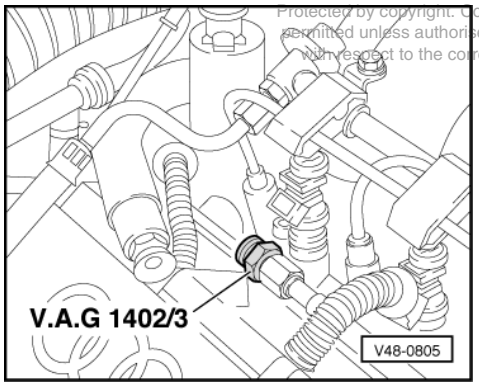


- -> Unscrew ribbed belt cover -arrows-.

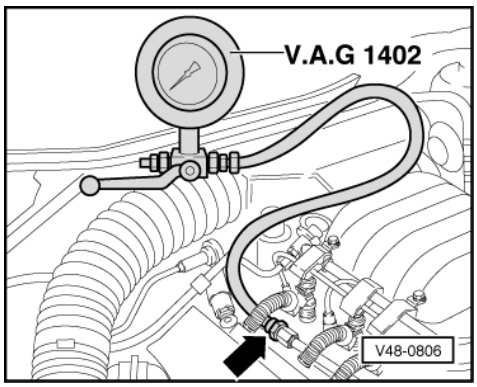


- Pinch off suction hose with hose clamp -3094-.
- -> Press spring clip for connector and unplug connector from injector.
- Place drip tray in position.
- Unscrew -arrow- pressure pipe from pressure hose; to do so, provide support at hexagon of pressure hose.

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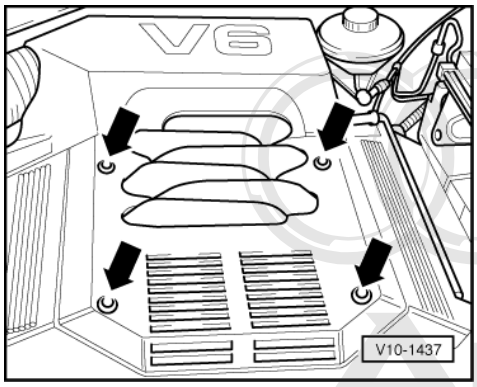


- -> Screw adapter V.A.G 1402/3 into pressure pipe in place of pressure hose.



- -> Screw -arrow- hose of pressure gauge -V.A.G 1402- to adapter -V.A.G 1402/3-.
- Use corresponding adapters to connect hose from adapter set -V.A.G 1402/6- to pressure gauge -V.A.G 1402- and to pressure pipe.
- Attach injector connector to injector.
- Detach hose clamp -3094- from suction hose.

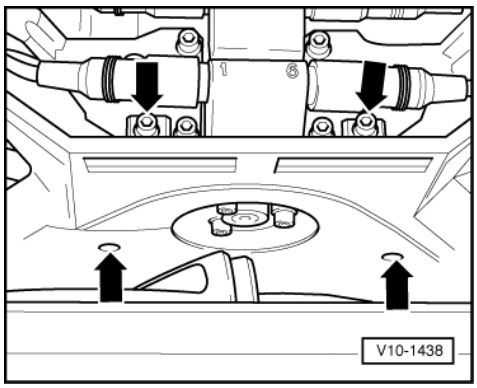
Continuation of delivery pressure test => Page 308



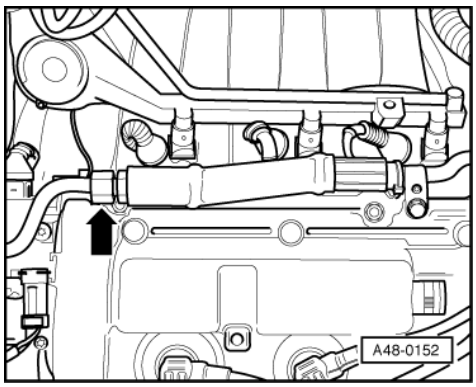
Vehicles with 6-cyl. 5-valve petrol engine

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- -> Unclip and detach top engine cover -arrows-.



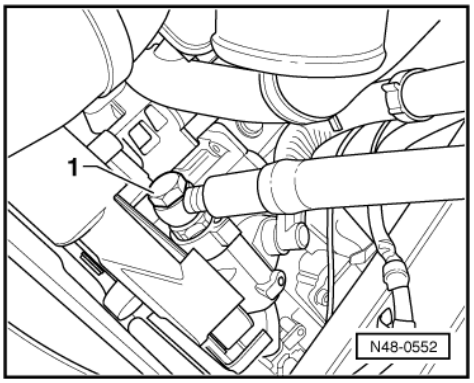
- -> Unscrew ribbed belt cover -arrows-.
- Pinch off suction hose with hose clamp -3094-.
- Press spring clip for connector and unplug connector from injector.
- Place drip tray in position.



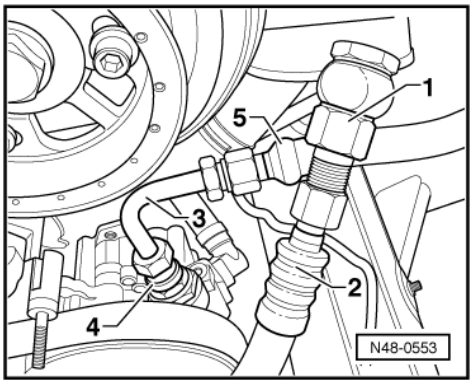
- -> Unscrew (arrow) pipe from expansion hose; to do so, provide support at hexagon of expansion hose.
- Screw hose of pressure gauge -V.A.G 1402- to expansion hose.
- Use corresponding adapters to connect hose from adapter set -V.A.G 1402/6- to pressure gauge -V.A.G 1402- and to pressure pipe.
- Attach injector connector to injector.
- Detach hose clamp -3094- from suction hose.

Continuation of delivery pressure test => Page 308

Vehicles with 6-cyl. diesel engine (TDI)



- Remove noise insulation for engine.
- Pinch off suction hose with hose clamp -3094-.
- Place drip tray in position.
- -> Screw out banjo bolt -1-.



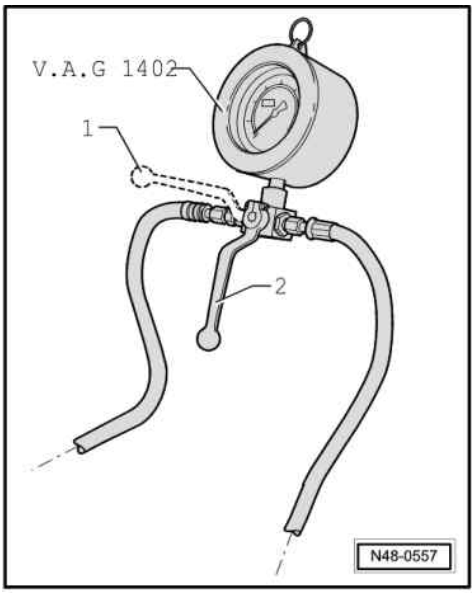
- -> Fit V.A.G adapters as shown.

1 - V.A.G 1402/2
2 - V.A.G 1402/6
3 - V.A.G 1402/5
4 - V.A.G 1402/4

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5 - Pressure hose to pressure gauge V.A.G 1402

- Insert four sealing rings between adapter V.A.G 1402/2 and banjo bolt.
- Detach hose clamp -3094- from suction hose.



All vehicles with 6-cyl. engines except bi-turbo (continued)

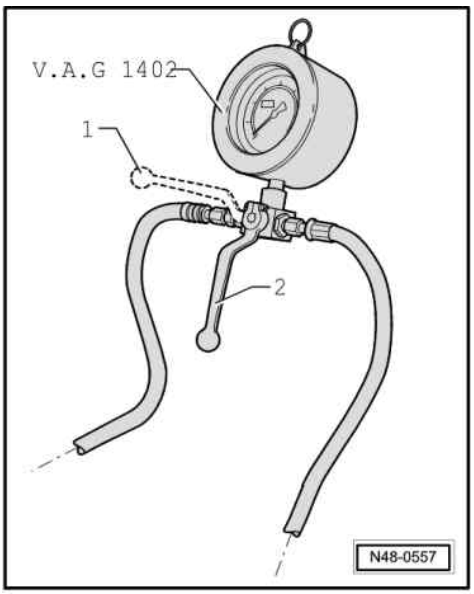
-> Make sure lever on pressure gauge is in position -2-.

- Start engine and, if necessary, top up fluid level in reservoir.
- Turn steering wheel roughly 10 times from lock to lock.
- Then check delivery pressure.
- With engine idling, close cut-off valve -position 1- (max. 10 seconds) and take pressure reading.

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Pump pressure specification (gauge pressure)

Engine	Pump	Pump pressure (bar)
6-cyl. 2-valve petrol engine	8D0 145 156 8D0 145 155 M	110 ... 120 110 ... 120
6-cyl. 5-valve petrol engine	8D0 145 156 F	110 ... 120
6-cyl diesel engines (TDI)	8D0 145 177 D	120 ... 127



If readout does not match specification, replace vane pump.

6-cyl. 2-valve petrol engine => Page 318
6-cyl. 5-valve petrol engine => Page 324
6-cyl. diesel engine (TDI) => Page 337
-> Move lever to position -1-.
Switch off engine.
Remove pressure gauge.
Connect pressure pipe/expansion hose.
6-cyl. 2-valve petrol engine => Page 289 , Item 25
6-cyl. 5-valve petrol engine => Page 290 , Item 3
6-cyl. diesel engine (TDI) => Page 294 , Item 2

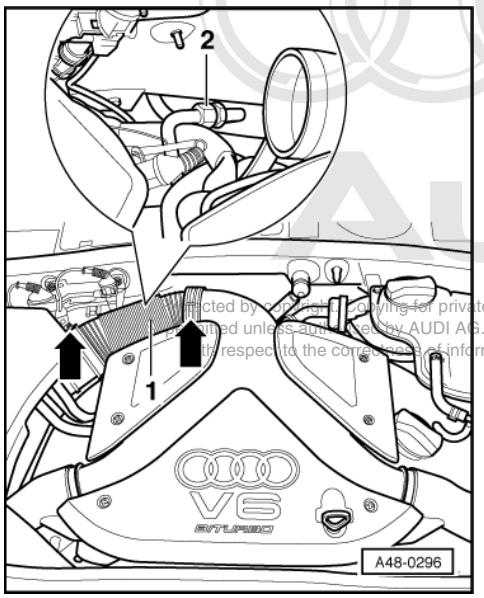
- Check hydraulic fluid level =>Page 279 .
- Check steering system for leaks =>Page 280 .
- Bleed steering system =>Page 280 .

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8.5 - Vehicles with 6-cyl. 5-valve turbo petrol engine (bi-turbo)

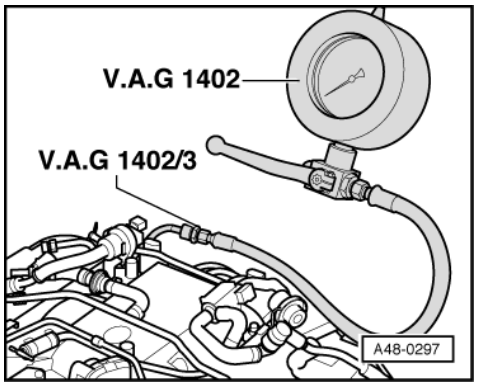
Special tools and workshop equipment required

- V.A.G 1402 Power steering tester
- V.A.G 1402/3 Adapter
- V.A.G 1402/6 Hose from adapter set
- V.A.G 1921 Hose clamp pliers

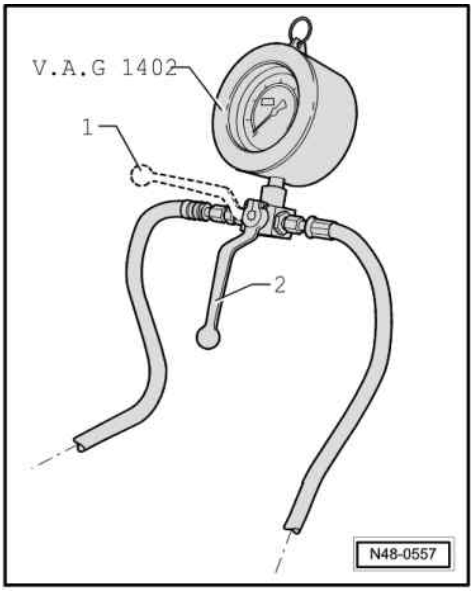


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- -> Unfasten hose clamps -arrows- and take out intake hose -1-.
- Place drip tray in position.
- Unscrew union nut -2- whilst providing support at hexagon of pressure pipe.
- Use dummy plug to seal off pipe to steering box.



- -> Screw adapter -V.A.G 1402/3- into expansion hose with pipe leading to vane pump.
- Screw hose of pressure gauge -V.A.G 1402- to adapter -V.A.G 1402/3-.

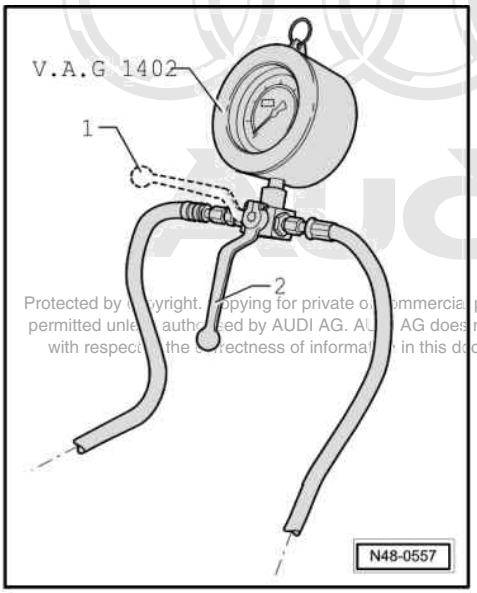


- -> Close cut-off valve of pressure gauge (lever in -position 1-).
- Re-install intake hose.
- Top up fluid in reservoir if necessary.

Checking pressure:

Pay attention to the following to avoid damaging pump:

- Engine must not run for more than 10 seconds when performing this test.
- Start engine without pressing accelerator and allow it to idle.
- Take pump pressure reading at idling speed immediately after starting (have second mechanic take reading).
- Maximum pressure displayed is definitive, as pressure decreases in the course of the test.



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- Then check delivery pressure.

Attention:
Do not open cut-off valve on pressure gauge when checking delivery pressure (lever in position -1-).

- Start engine (max. 10 seconds) and take pressure reading at idle (2nd mechanic required).

Pump pressure specification (gauge pressure)

Engine	Pump	Pump pressure (bar)
6-cyl. 5-valve turbo petrol engine (bi-turbo)	8D0 145 156 N	120 ... 127

If readout does not match specification, replace vane pump

=> Page 330 .

- Switch off engine.
- Remove intake hose again.
- Remove pressure gauge.
- Remove dummy plug from pipe to steering box.
- Connect expansion hoses with union nut =>Page 300 , Item 26 .
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

9 - Removing and installing vane pump

9.1 - Removing and installing vane pump

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9.2 - General information

Vane pump servicing work is not envisaged. In the event of complaints, perform pressure test and leak test to establish the cause. Replace vane pump if fault is found.

- Always check steering system for leaks in the event of a lack of fluid in the reservoir.
- If a leak is found in the area of the pipe connections, start by checking pipes/pipe connections for leaks, re-tighten if necessary and wipe dry.
- Replacement pumps have no fluid fill. Prior to installation they are therefore to be filled with hydraulic fluid G 002 000 and cranked by hand to avoid the possibility of noise whilst driving or pump damage.

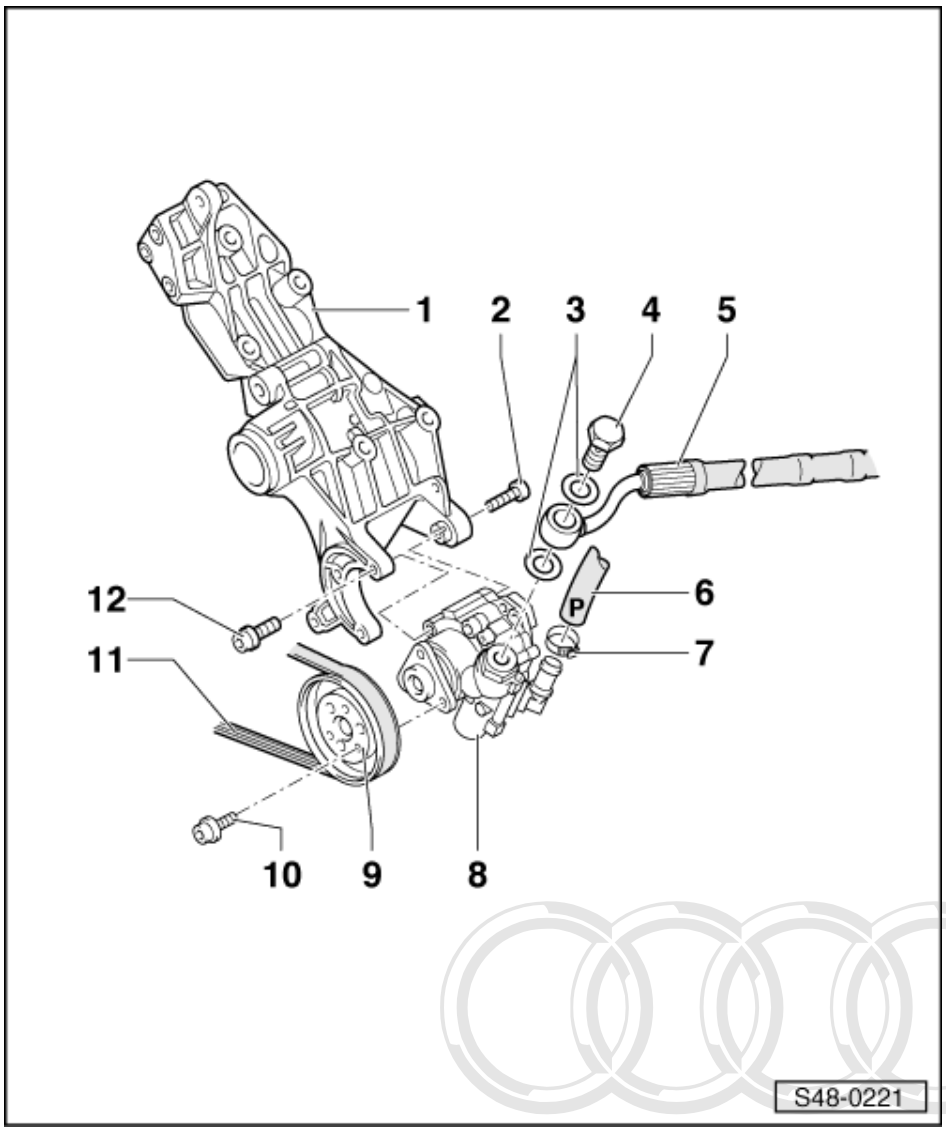
- Checking hydraulic fluid level =>Page 279
- Bleeding steering system =>Page 280
- Checking steering system for leaks =>Page 280

9.3 - Removing and installing vane pump (vehicles with 4-cyl. engines)

- Pay attention to general information => Page 312 .

Special tools and workshop equipment required

- 3094 Hose clamps
- 3204 Mandrel
- 3369 Front end service positioner
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1590 Gripping wrench



Exploded view

Notes:

- Replace sealing rings.
- Do not re-use hydraulic fluid drained off.
- Hydraulic fluid: Part no. G 002 000

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1 Vane pump bracket
- Assignment

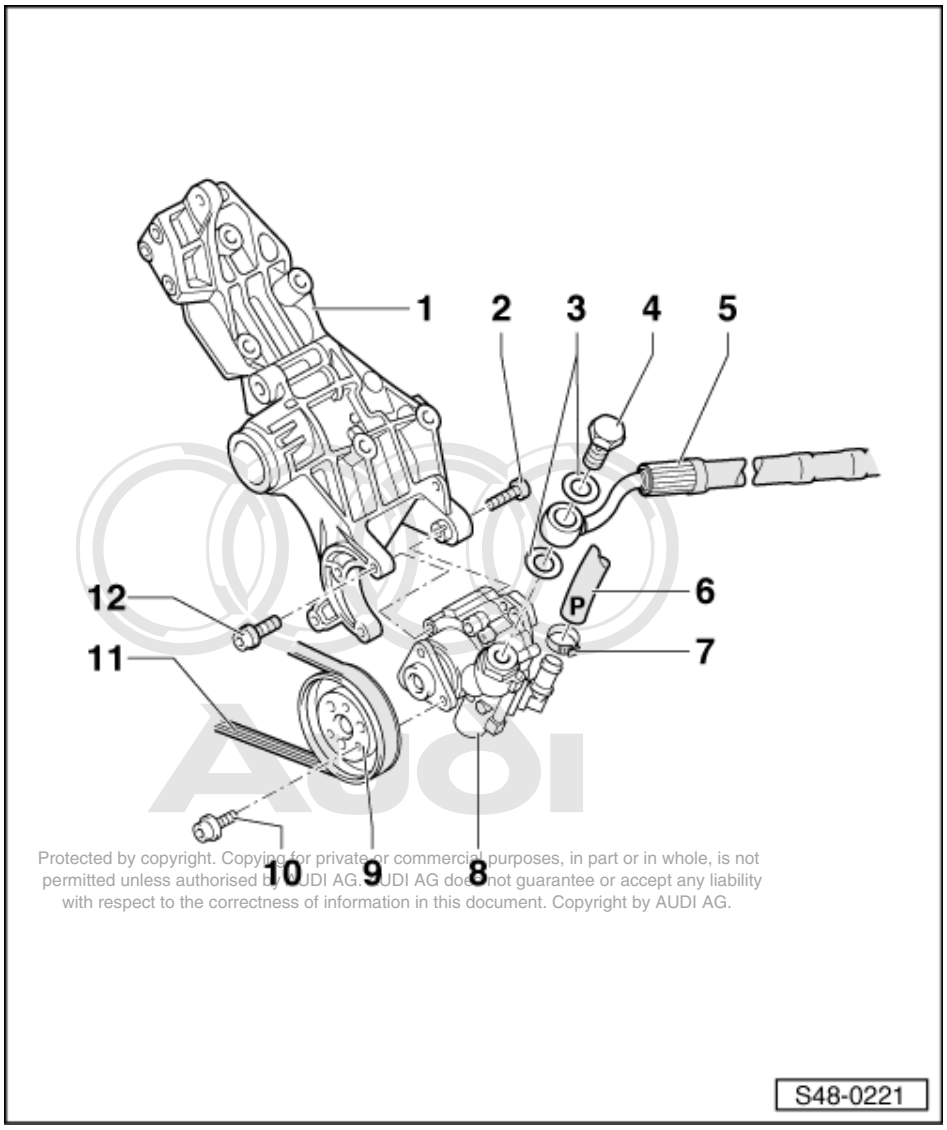
=> Parts List

2 Hexagon socket-head bolt, 20Nm
- For attaching vane pump to bracket

3 Sealing rings
- Diameter 16 x 22
- Always replace

4 Banjo bolt, 50 Nm

5 Pressure pipe



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6 Suction hose

- Mark -P- must be aligned with seam at pump

7 Clamp

- Tension using V.A.G 1275
- Always replace

8 Vane pump

- Fill with fluid before installing =>Note, Page 281
- Removing and installing
  => Page 312
- Checking delivery pressure
  => Page 302

9 Pulley

- Provide support with gripping wrench V.A.G 1590 when slackening off and tightening

10 Hexagon socket-head bolt, 25Nm

11 Ribbed belt

12 Hexagon socket-head bolt, 20Nm

Removing

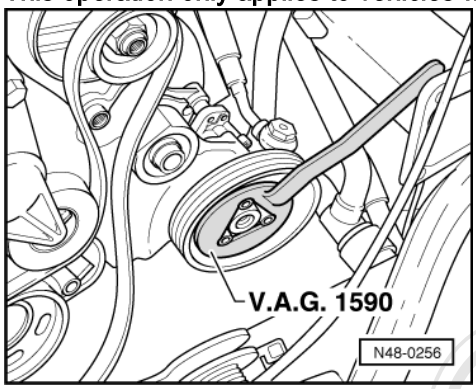
- Remove bumper.

=> General Body Repairs, Exterior; Repair Group 63; Front Bumper Front Bumper
- Move lock carrier to service position.

=> General Body Repairs, Exterior; Repair Group 50; Front Body Front Body
- Remove noise insulation.
- Remove ribbed belt.

=> Engine, Mechanics; Repair Group 13; Dismantling and assembling engine Dismantling and assembling engine

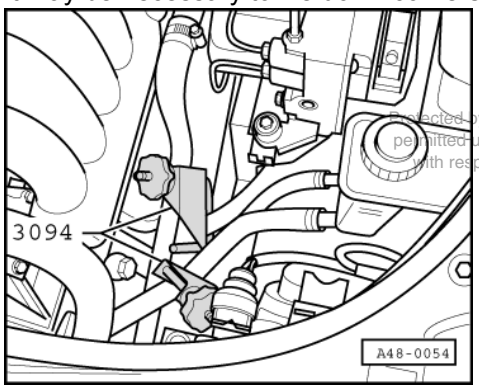
This operation only applies to vehicles with 4-cyl. petrol engines



- Unscrew V-belt pulley of coolant pump.

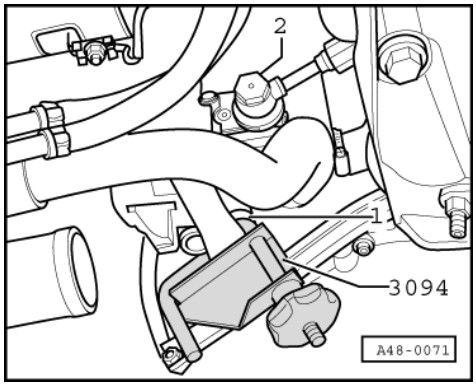
=> 4-cyl. Engine, Mechanics; Repair Group 19; Removing and installing cooling system components Removing and installing cooling system components
- Detach V-belt.
- -> Unscrew vane pump pulley.

It may be necessary to file down corners of gripping wrench -V.A.G 1590-.



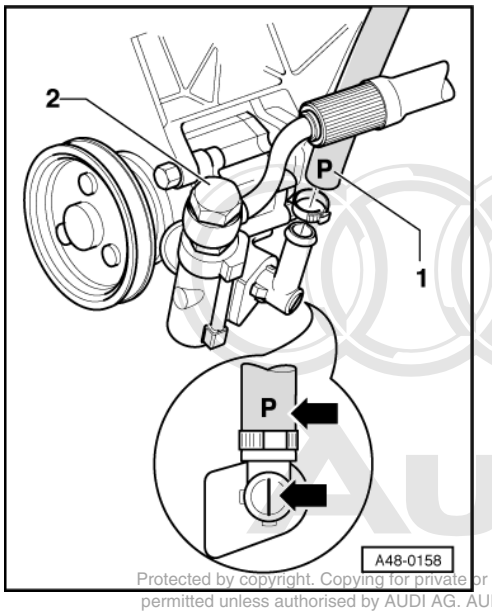
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All vehicles with 4-cyl. engines (continued)
- -> Pinch off suction and return pipe with hose clamps -3094-.
- Place drip tray in position.



This operation only applies to vehicles up to MY '97

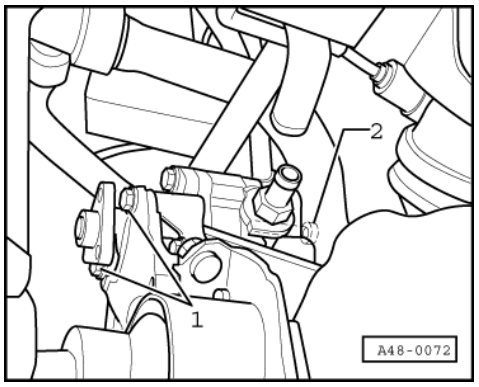
- -> Detach hose clamp -1- from suction pipe.
- Detach suction pipe, press out of retainer and lay aside.
- Unscrew pressure hose -2- (22 mm).
  - Seal off pressure pipe with a plastic bag or the like.



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This operation only applies to vehicles as of MY '97 with new vane pump

- -> Detach hose clamp from suction pipe -1-.
- Detach and lay aside suction pipe.
- Unscrew expansion hose -2-.
  - Seal off pressure pipe with a plastic bag or the like.



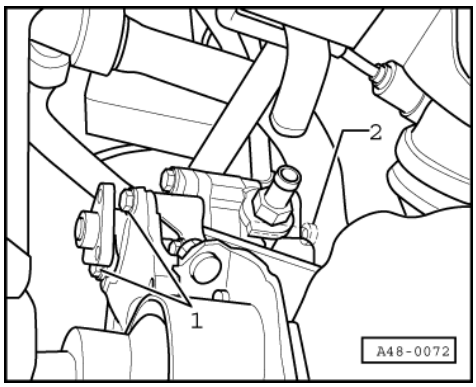
All vehicles with 4-cyl. engines (continued)

- -> Unscrew hexagon bolts -1- and hexagon socket-head bolt -2-.
- Take out pump.

Installing

- Fill vane pump with hydraulic fluid.

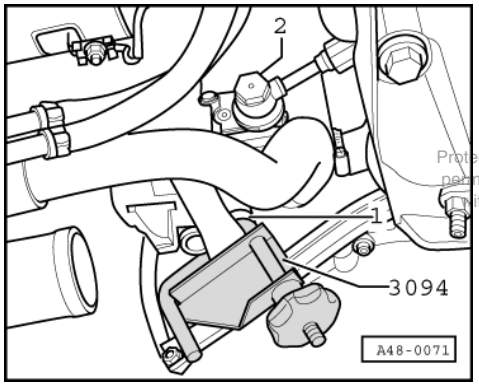
  Pour in fluid at pump suction connection.



- Turn hub by hand until fluid emerges from delivery end.

◆ Clean areas in engine compartment contaminated with fluid.

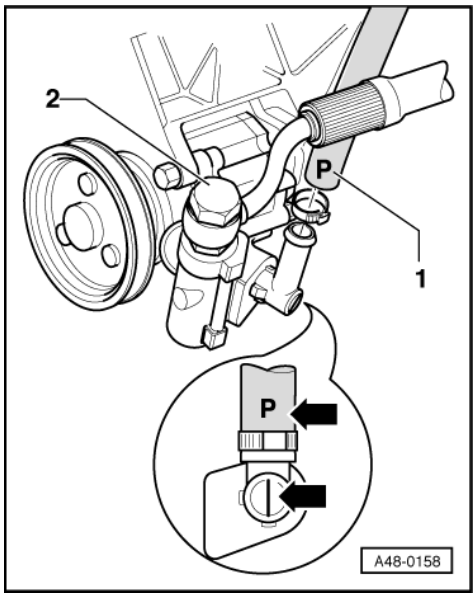
- Install vane pump.
- -> Tighten bolts -1- and -2- to 20 Nm.



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This operation only applies to vehicles up to MY '97

- Fit new sealing rings on banjo bolt.
- -> Tighten banjo bolt for pressure hose -2- to 50 Nm.
- Fit suction pipe.

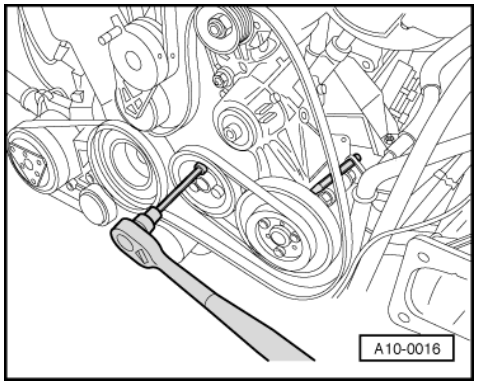


This operation only applies to vehicles as of MY '97 with new vane pump

- Fit new sealing rings on banjo bolt.
- -> Tighten banjo bolt for pressure hose -2- to 50 Nm.
- Fit suction hose -1-.
- Mark -P- at suction hose must be aligned with seam at pump.

All vehicles with 4-cyl. engines (continued)

- Detach hose clamps -3094-.



- -> Tighten hexagon socket-head bolts of pulleys for coolant/vane pump to 25 Nm.
- Fit impeller at viscous fan coupling (10 Nm).

- Fit ribbed belt.

=> Engine, Mechanics; Repair Group 13; Dismantling and assembling engine Dismantling and assembling engine

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When installing belt, make sure it is properly seated in pulleys.

- Attach lock carrier.

=> General Body Repairs, Exterior; Repair Group 50; Front Body; Lock carrier service position Front Body Lock carrier service position

- Fit bumper.

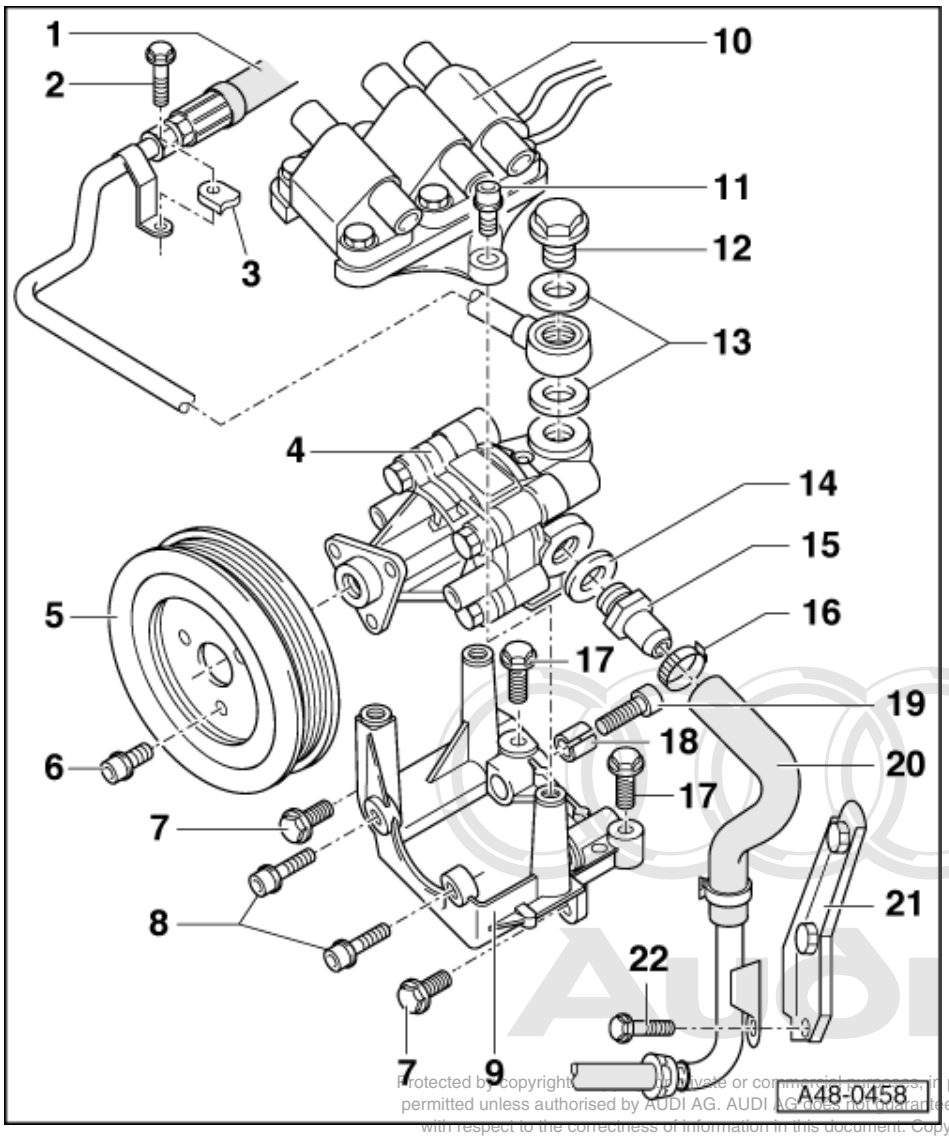
- Install noise insulation.
- Fill with hydraulic fluid G 002 000.
- Start engine and check belt running.
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

9.4 - Removing and installing vane pump (vehicles with 6-cyl. 2-valve petrol engine)

- Pay attention to general information => Page 312 .

Special tools and workshop equipment required

- 3094 Hose clamps
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1590 Gripping wrench



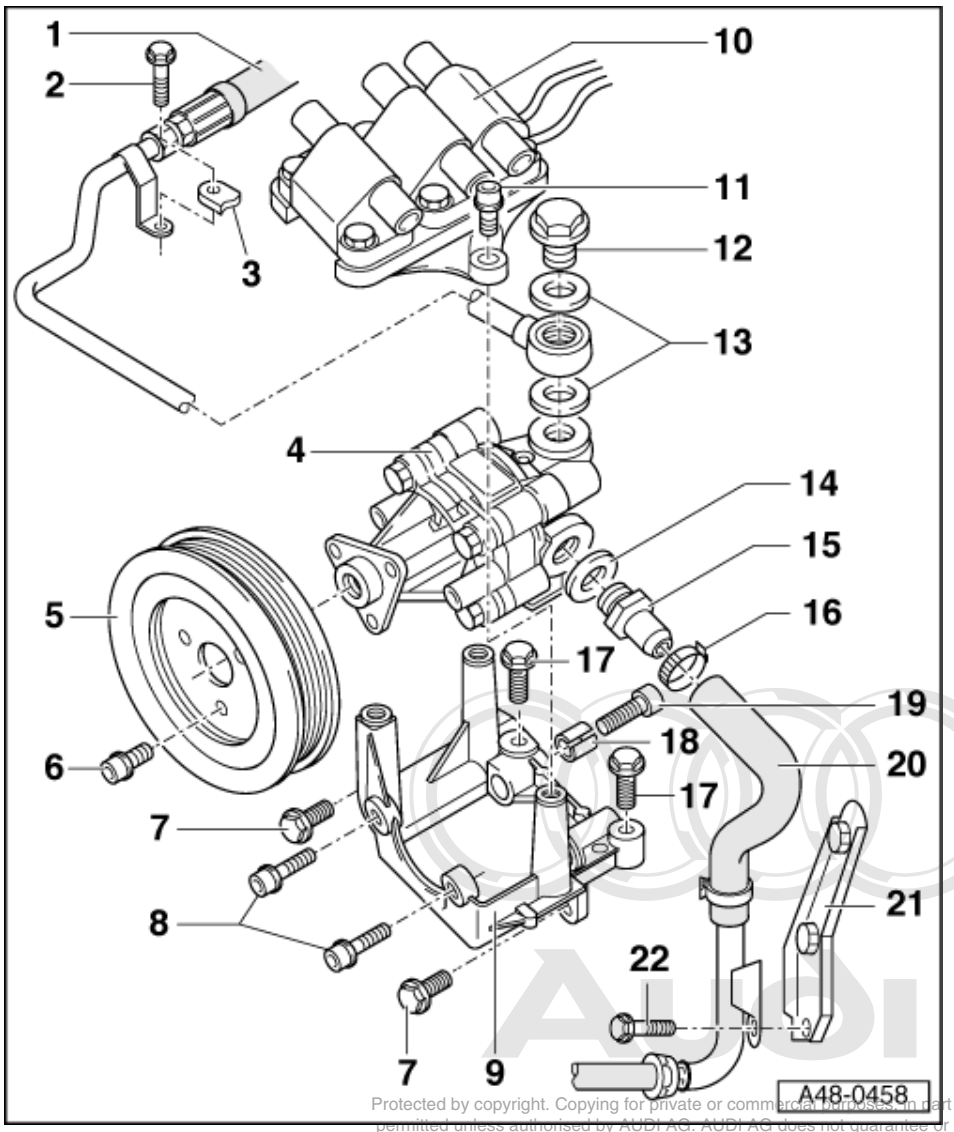
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Exploded view

Notes:

- Replace sealing rings.
- Do not re-use hydraulic fluid drained off.
- Hydraulic fluid: Part no. G 002 000

1 **Pressure pipe with hose**
2 **Hexagon bolt, 8 Nm**
3 **Hole at intake manifold**
4 Vane pump
- Fill with fluid before installing =>Note, Page 286
- Removing and installing
  => Page 318
- Checking delivery pressure
  => Page 302



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5 Pulley
- Provide support with gripping wrench V.A.G 1590 when slackening off and tightening

6 Hexagon socket-head bolt, 25Nm
- If necessary, provide support with V.A.G 1590 when slackening off and tightening

7 Hexagon bolt, 25 Nm

8 Hexagon socket-head bolt, 25Nm

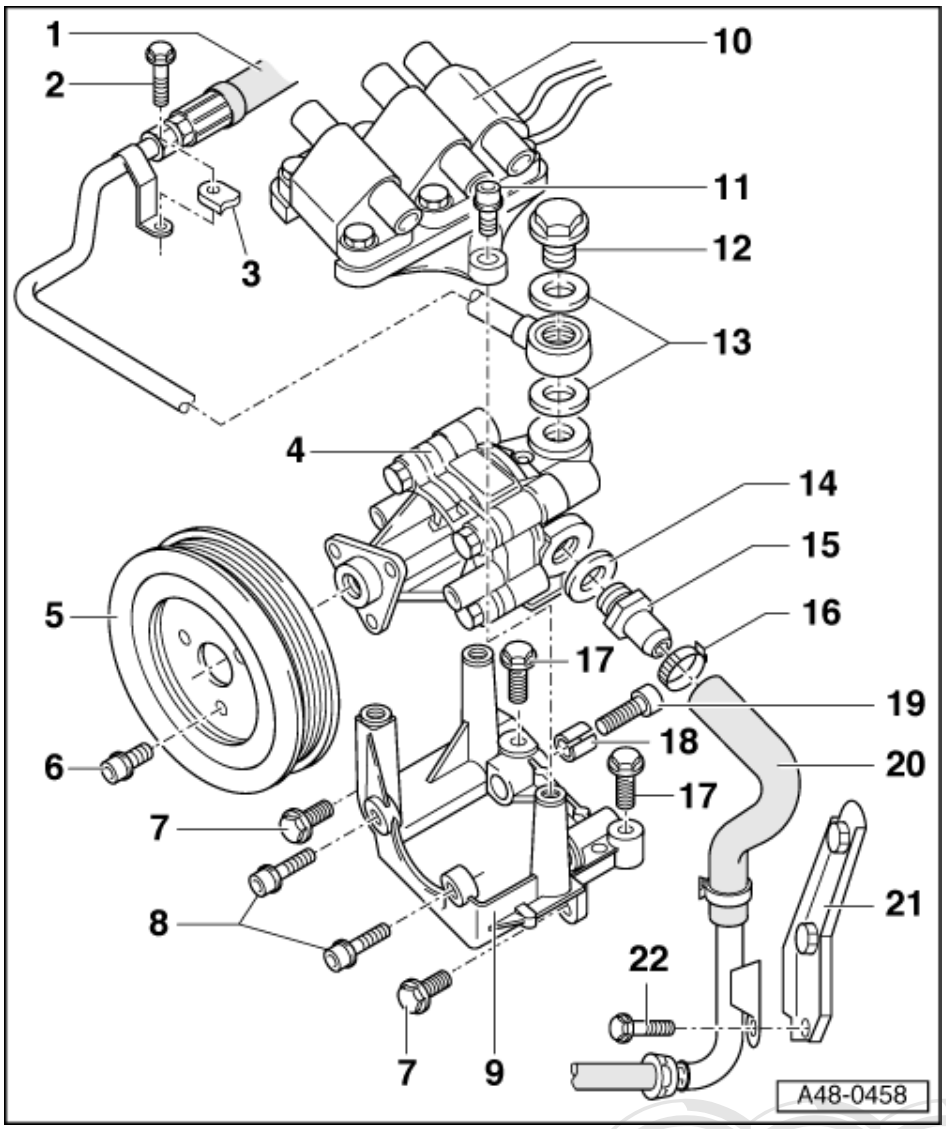
9 Bracket

10 Ignition coils with holder

11 Hexagon socket-head bolt, 25Nm

12 Banjo bolt, 40 Nm

13 Sealing rings, 16 x 22
- Always replace



14 Sealing rings, 18 x 24
- Always replace

15 Threaded connection, 50 Nm

16 Clamp
- Tension using V.A.G 1275
- Always replace

17 Hexagon bolt, 25 Nm

18 Slotted bushing

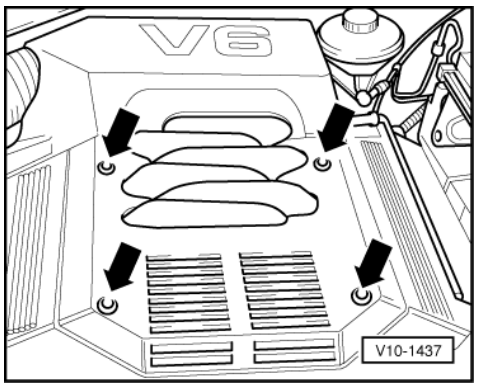
19 Hexagon socket-head bolt, 25Nm

20 Suction pipe with hose

21 Bracket

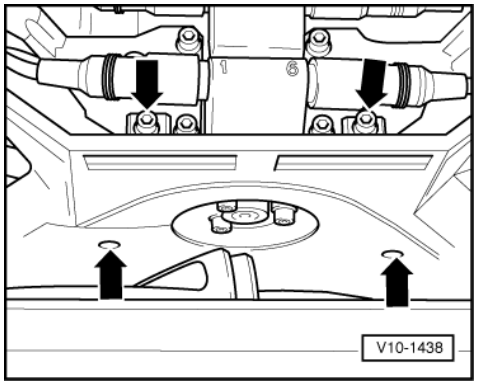
22 Hexagon bolt, 8 Nm

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Removing

- -> Unclip and detach top engine cover -arrows-.



- -> Remove ribbed belt cover -arrows-.
- Remove ribbed belt.

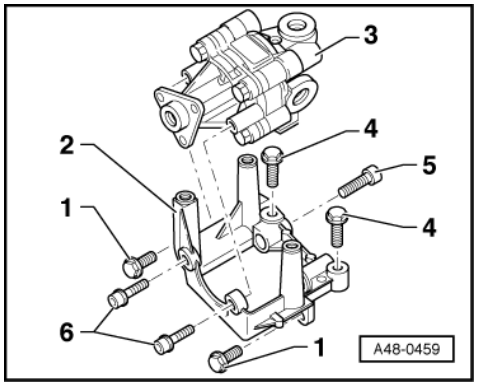
=> 6-cyl. Engine (2-valve), Mechanics; Repair Group 13; Dismantling and assembling engine Dismantling and assembling engine

- Pull ignition cables out of ignition coils.

=> MPFI Injection and Ignition System; Repair Group 28; Checking ignition system; Removing and installing ignition components Checking ignition system Removing and installing ignition components

- Remove ignition coils with holder.
- Unscrew pulley of vane pump whilst providing support with gripping wrench if necessary.

- Place drip tray in position.
- Use hose clamp -3094- to pinch off suction pipe with hose.
- Detach pressure and suction pipe from vane pump.
  - Seal off pressure pipe with a plastic bag or the like.



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- -> Screw out bolts -1- and -4- and remove bracket -2- with vane pump -3-.
- Screw out bolts -5- and -6- and take vane pump out of bracket.

In the interests of clarity, removal of bracket and vane pump is shown without surrounding components.

Installing

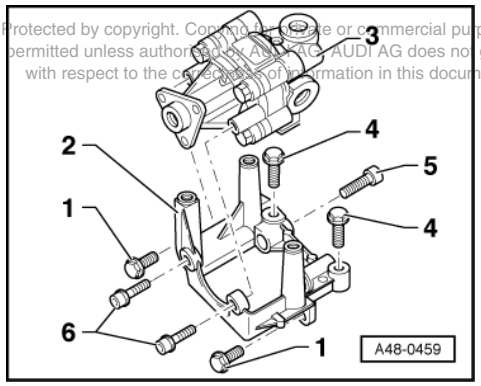
- Fill vane pump with hydraulic fluid.

  Pour in fluid at pump suction connection.

- Turn hub by hand until fluid emerges from delivery end.

- ◆ Clean areas in engine compartment contaminated with fluid.

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- -> Insert vane pump -3- in bracket -2-.
- Screw in and tighten bolts -5- and -6-.
- Position bracket with vane pump on cylinder block.
- Screw in and tighten bolts -1- and -4-.
- Position suction pipe with hose on vane pump and fit new clamp.
- Mark -P- at suction hose must be aligned with seam at pump.
- Fit new sealing rings on banjo bolt.
- Tighten banjo bolt for pressure hose.
- Detach hose clamps -3094-.

- Install ignition coils with holder.
- Attach ignition cables to ignition coils.

=> MPFI Injection and Ignition System; Repair Group 28; Checking ignition system; Removing and installing ignition components Checking ignition system Removing and installing ignition components

- Install vane pump pulley.
- Fit ribbed belt.

=> 6-cyl. Engine (2-valve), Mechanics; Repair Group 13; Dismantling and assembling engine Dismantling and assembling engine

When installing belt, make sure it is properly seated in pulleys.

- Fit cover for ribbed belt.
- Fit top engine cover.
- Fill with hydraulic fluid G 002 000.
- Start engine and check belt running.
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

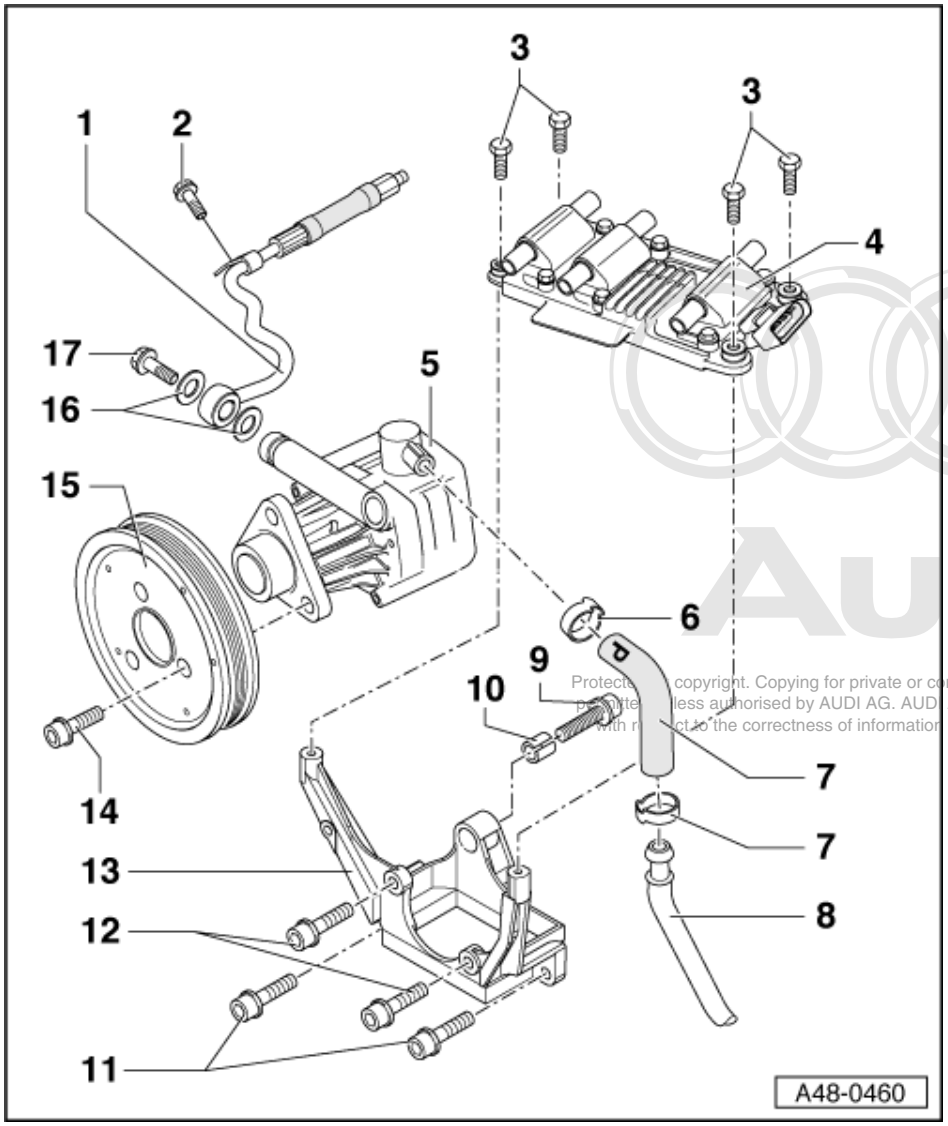
Tightening torques => Page 319

9.5 - Removing and installing vane pump (vehicles with 6-cyl. 5-valve petrol engine except bi-turbo)

- Pay attention to general information => Page 312 .

Special tools and workshop equipment required

- 3094 Hose clamps
- 3212 Pin wrench
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench



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Exploded view

Notes:

- Replace sealing rings.
- Do not re-use hydraulic fluid drained off.

- Hydraulic fluid: Part no. G 002 000

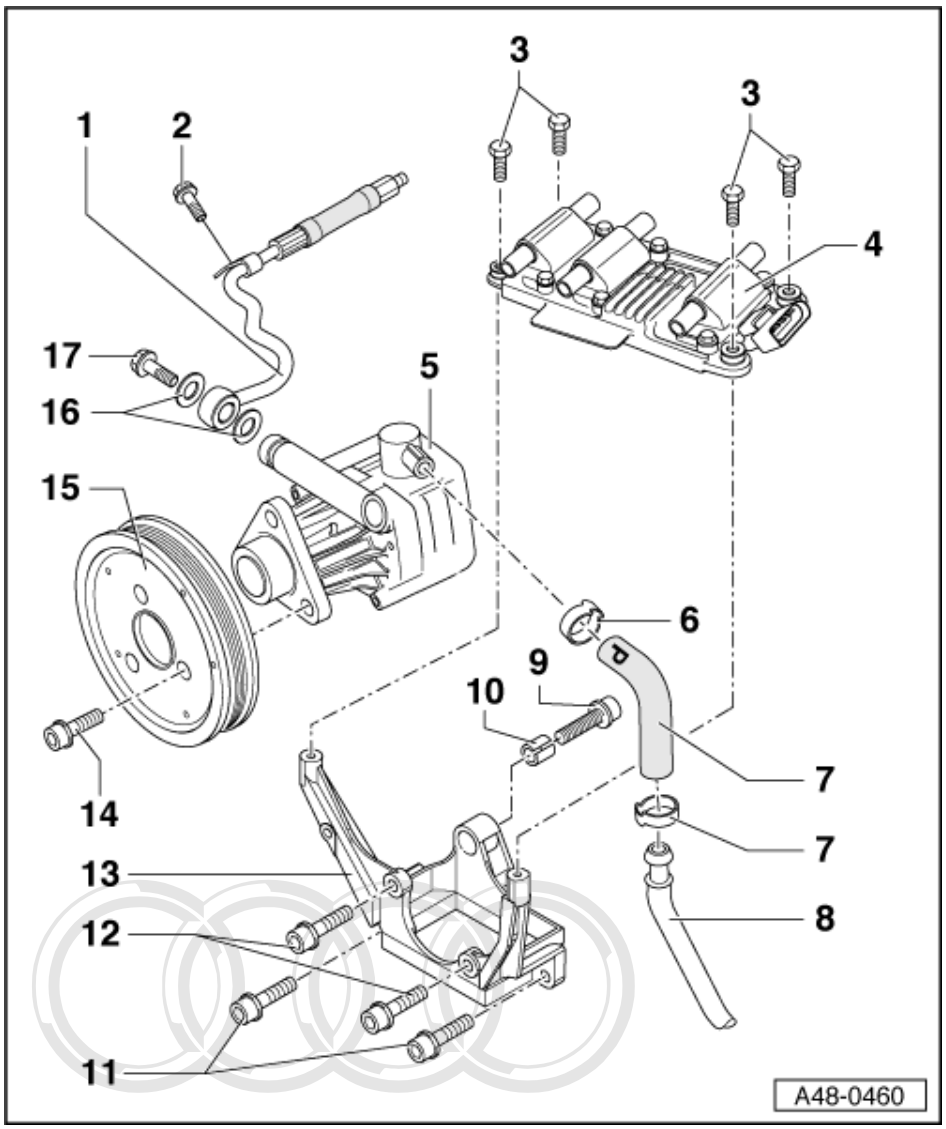
1 Expansion hose
- Section with pipe leading to steering box

2 Hexagon bolt, 6 Nm

3 Hexagon bolt, 10 Nm

4 Ignition coils with holder

5 Vane pump
- Fill with fluid before installing =>Note, Page 286
- Checking delivery pressure
  => Page 302
- Removing and installing
  => Page 324



6 Clamp
- Always replace
- Tension using V.A.G 1275

7 Suction hose
- Mark -P- must be aligned with seam at pump

8 Pipe for suction hose

9 Hexagon socket-head bolt, 22 Nm
- Attachment of vane pump to bracket at rear

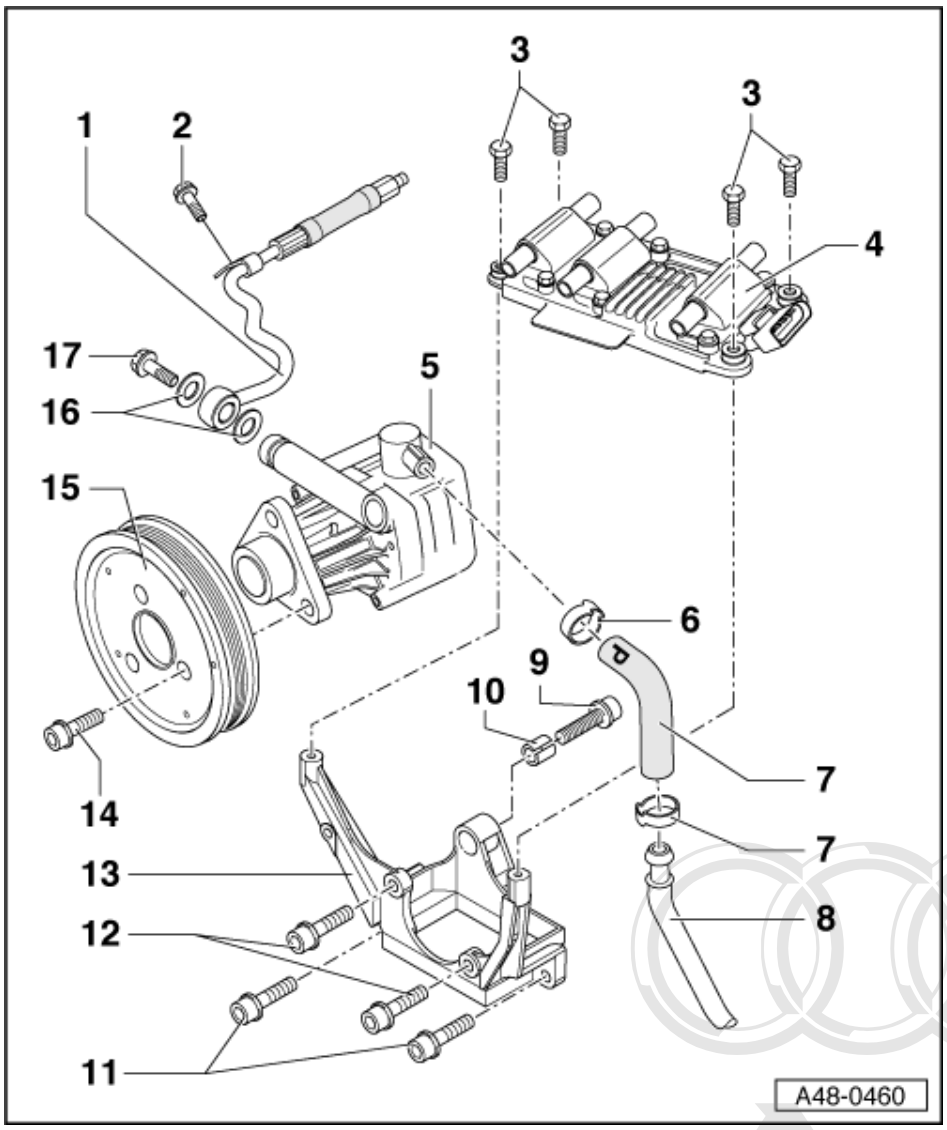
10 Slotted bushing

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- For tolerance compensation

11 Hexagon socket-head bolt, 22 Nm

- For attaching vane pump bracket to crankcase



12 Hexagon socket-head bolt, 22 Nm

- Attachment of vane pump to bracket at front

13 Vane pump bracket

14 Hexagon socket-head bolt, 22 Nm

- When slackening off and tightening, provide support with pin wrench -3212-

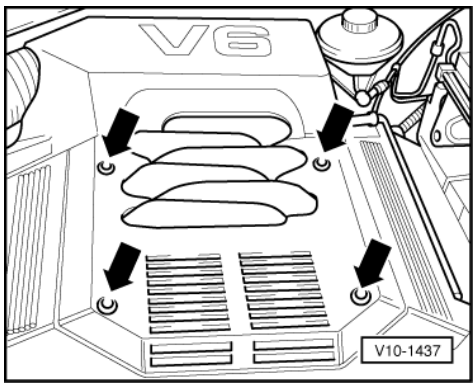
15 Pulley

16 Sealing ring

- Always replace

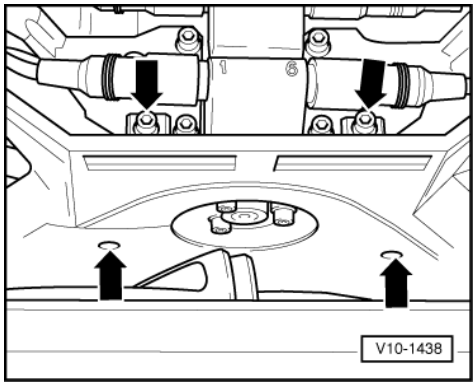
17 Banjo bolt, 50 Nm

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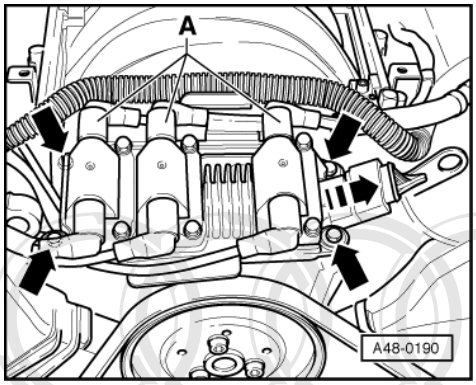


Removing

- -> Unclip and detach top engine cover -arrows-.



- -> Remove ribbed belt cover -arrows-.

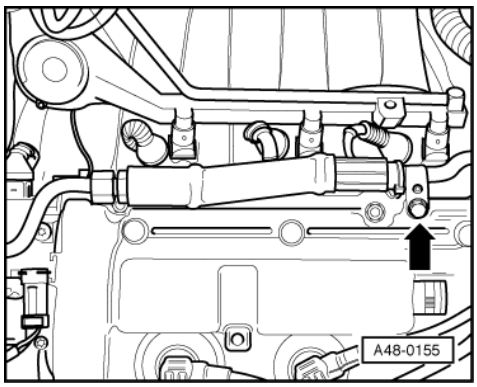


- -> Unplug 5-pin connector at ignition coils in direction of arrow.
- Unplug the three rear connectors -A- from the ignition coils.
- Screw out the four bolts -arrows-.
- Swivel ignition coil holder to rear.
- Remove ribbed belt.

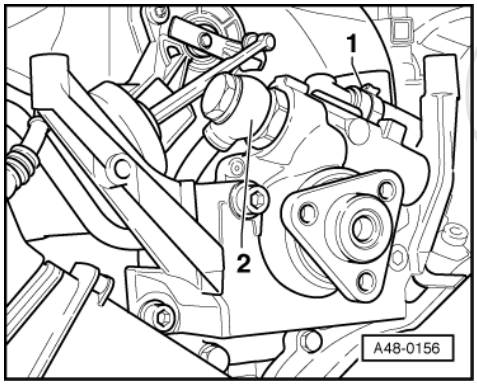
=> 6-cyl. Engine (5-valve), Mechanics; Repair Group 13; Servicing belt drive Servicing belt drive

- Unscrew pulley of vane pump whilst providing support with gripping wrench if necessary.

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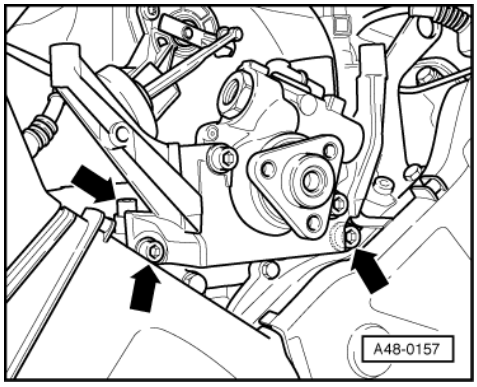


- Place drip tray in position.
- -> Screw out hexagon bolt -arrow- for pressure pipe.
- Pinch off suction hose with hose clamp -3094- immediately downstream of vane pump.



- -> Screw out banjo bolt -2-.
- Lay aside pressure pipe.
  - Seal off pressure pipe with a plastic bag or the like.
- Unfasten clamp -1- and detach suction hose from vane pump.

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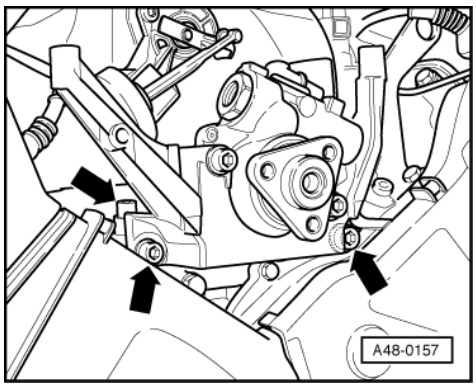


- -> Screw out bolts -arrows-.
- Take out vane pump with bracket.
- Screw vane pump bolts out of bracket and take out vane pump.

Installing

- Fill vane pump with hydraulic fluid.

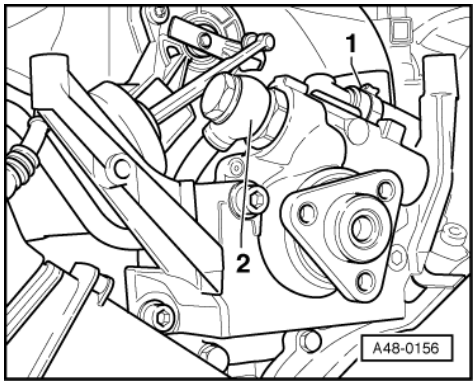
  Pour in fluid at pump suction connection.



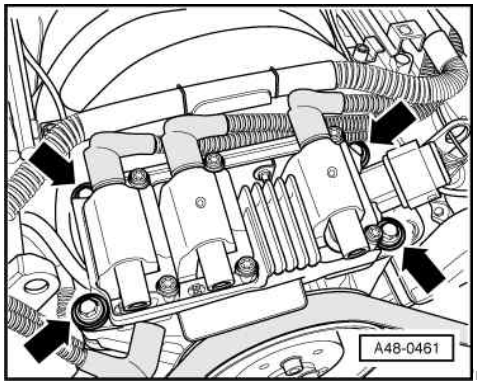
- Turn hub by hand until fluid emerges from delivery end.

◆ Clean areas in engine compartment contaminated with fluid.

- -> Insert vane pump in bracket and tighten bolts -arrows-.
  - Tighten front bolts first and then rear bolt.
- Attach suction hose and fit clamp -1-.
- Mark -P- at suction hose must be aligned with seam at pump.
- Fit new sealing rings on banjo bolt.



- -> Position pressure pipe -2- on vane pump and tighten banjo bolt.
- Detach hose clamps -3094-.
- Install vane pump pulley.
- Position ignition coils on vane pump bracket.



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- -> Fit and tighten bolts -arrows-.
- 5-pin connector is to be attached to ignition coils.
- Attach ignition cables to ignition coils.

=> Motronic Injection and Ignition System (6-cyl.); Repair Group 28; Checking ignition system; Removing and installing ignition components Checking ignition system Removing and installing ignition components

- Fit ribbed belt.

=> 6-cyl. Engine (5-valve), Mechanics; Repair Group 13; Servicing belt drive Servicing belt drive

When installing belt, make sure it is properly seated in pulleys.

- Fit cover for ribbed belt.
- Fit top engine cover.
- Fill with hydraulic fluid G 002 000.
- Start engine and check belt running.
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

Tightening torques => Page 324

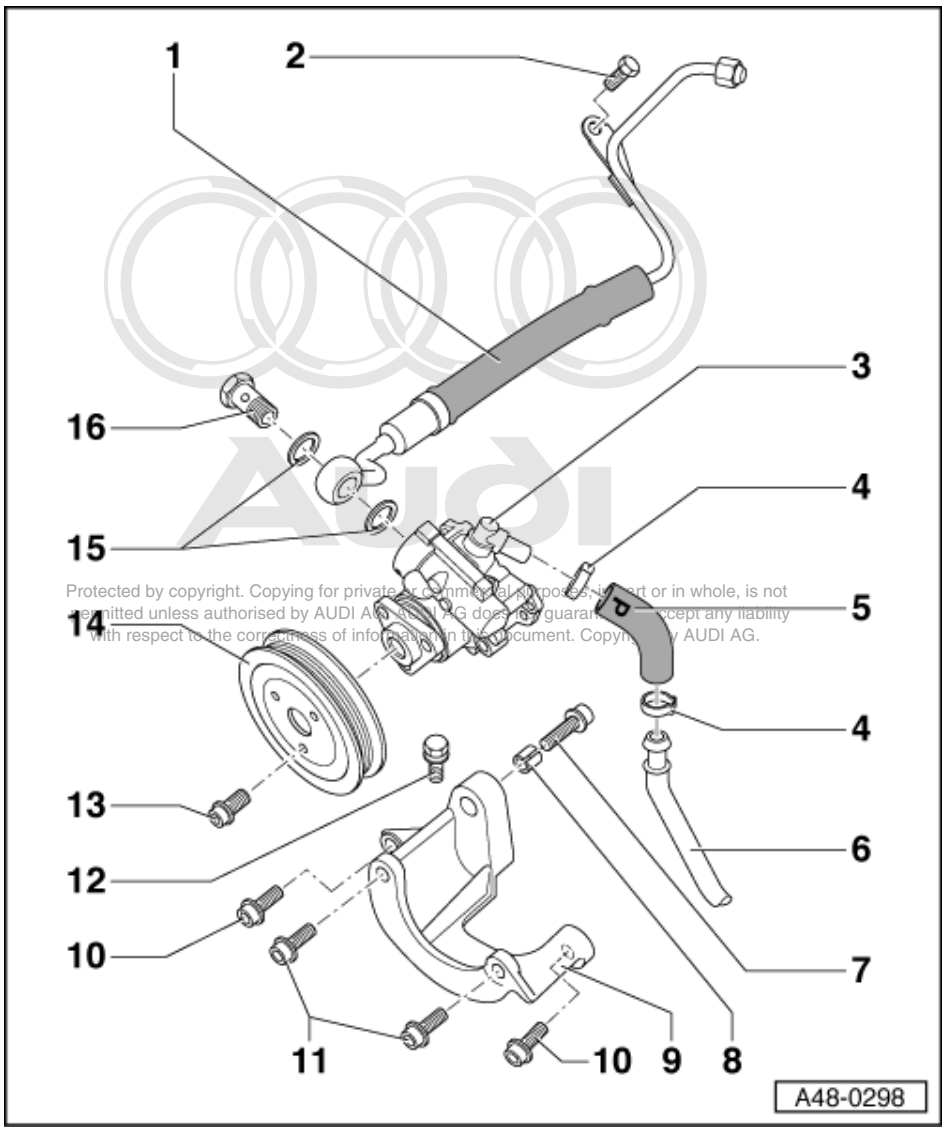
9.6 - Removing and installing vane pump (vehicles with 6-cyl. 5-valve turbo petrol engine - bi-turbo)

- Pay attention to general information => Page 312 .

Special tools and workshop equipment required

- 3094 Hose clamps
- 3212 Pin wrench
- V.A.G 1275 Hose clamp pliers
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

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Exploded view

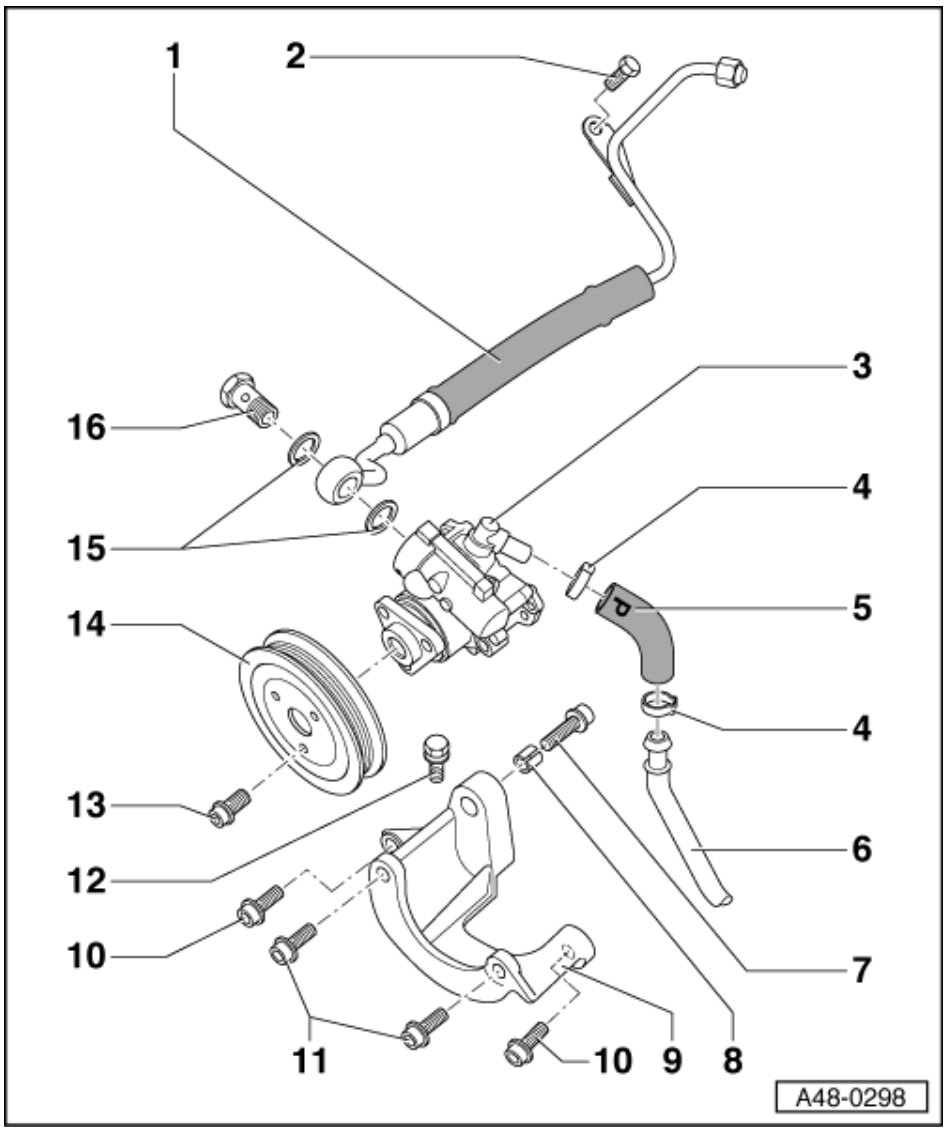
Notes:

- Replace sealing rings.
- Do not re-use hydraulic fluid drained off.
- Hydraulic fluid: Part no. G 002 000

1 Expansion hose
- Section with pipe leading to steering box

2 Hexagon bolt, 7.5 Nm
- M8 x 15

3 Vane pump
- Fill with fluid before installing
  =>Notes, Page 297
- Checking delivery pressure
  => Page 309
- Removing and installing
  => Page 330



4 Clamp
- Always replace
- Tension using V.A.G 1275

5 Suction hose
- Mark -P- must be aligned with parting line at pump

6 Pipe

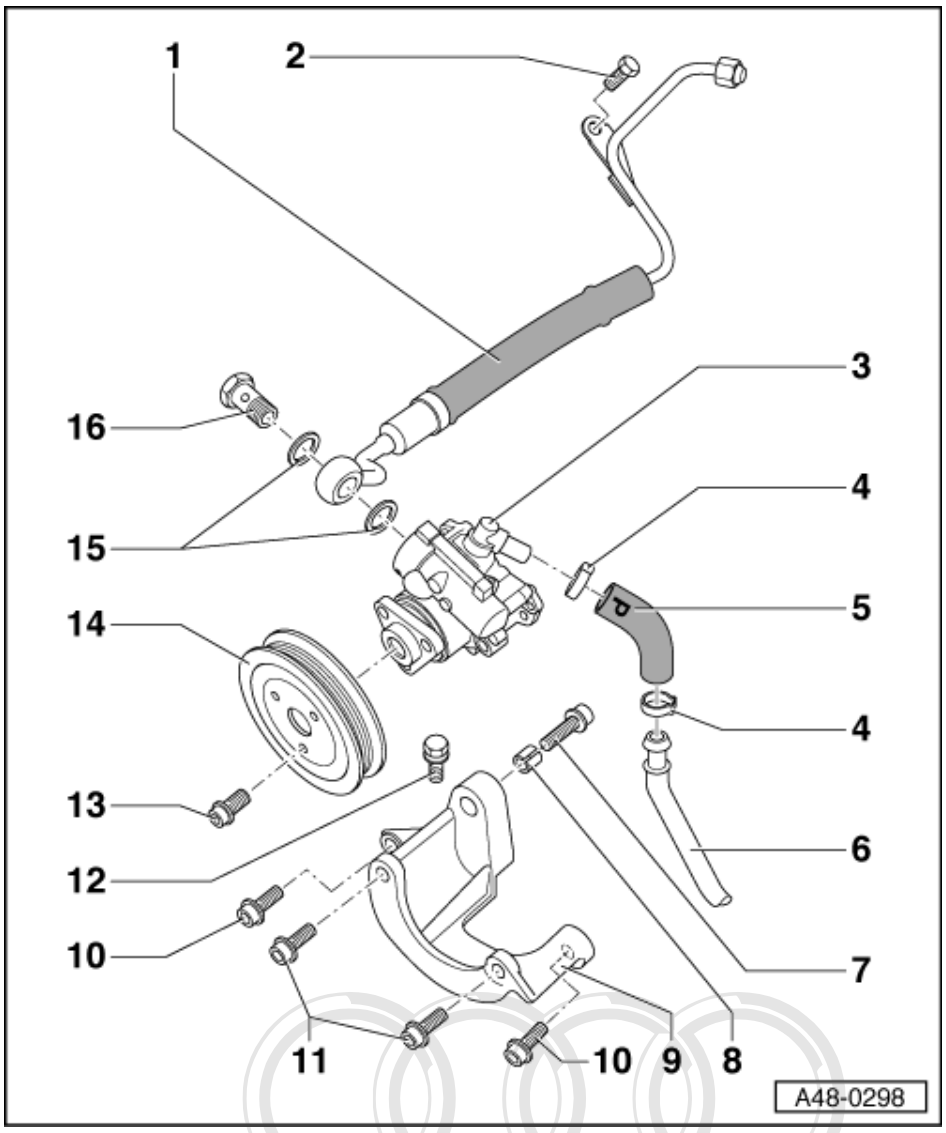
7 Hexagon socket-head bolt, 22 Nm
- Attachment of vane pump to bracket at rear

8 Slotted bushing
- For tolerance compensation

9 Vane pump bracket

10 Hexagon socket-head bolt, 22 Nm
- For attaching vane pump bracket to crankcase

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11 Hexagon socket-head bolt, 22 Nm

- Attachment of vane pump to bracket at front

12 Hexagon bolt, 22 Nm

- For attaching vane pump bracket to crankcase

13 Hexagon socket-head bolt, 22 Nm

- When slackening off and tightening, provide support with pin wrench -3212-

14 Pulley

15 Sealing ring

- Always replace

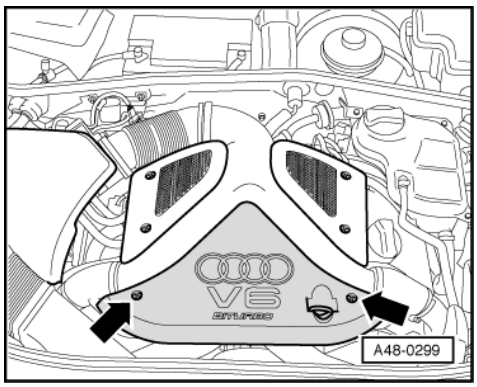
16 Banjo bolt, 50 Nm

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Removing

- Remove bumper.

=> General Body Repairs, Exterior; Repair Group 63; Front Bumper Front Bumper

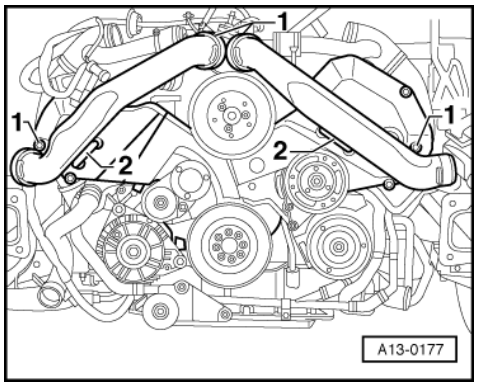


- Move lock carrier to service position.

=> General Body Repairs, Exterior; Repair Group 50; Front Body Front Body

- -> Unfasten bolted joints -arrows- and detach front cover.
- Remove viscous fan.

=> 6-cyl. Engine (5-valve Turbo), Mechanics; Repair Group 19; Removing and installing cooling system components Removing and installing cooling system components



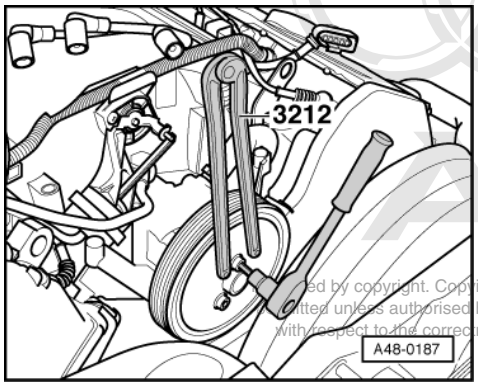
- Remove ribbed belt for vane pump.

=> 6-cyl. Engine (5-valve Turbo), Mechanics; Repair Group 13; Removing and installing ribbed belt Removing and installing ribbed belt

- -> Remove pressure pipes -1-.

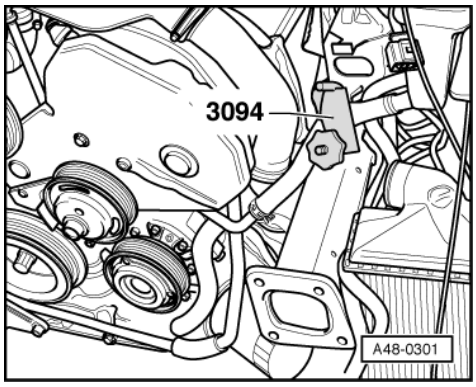
Note:

Pay attention to retainers -2-.

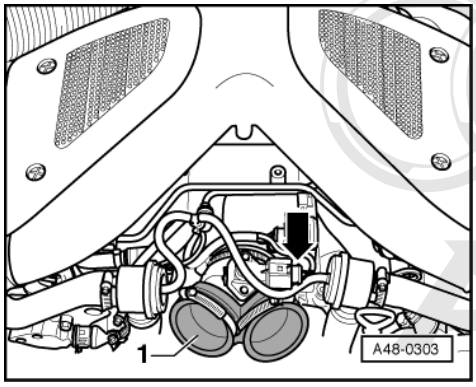


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- -> Unscrew pulley of vane pump whilst providing support with pin wrench -3212-.

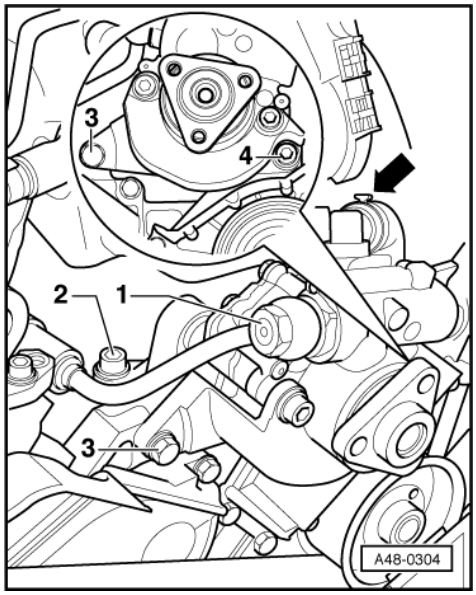


- -> Use hose clamp -3094- to pinch off suction pipe.



- -> Unplug connector at charge pressure sender -G31 -arrow-.
- Detach rubber elbow -1-.

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- -> Unfasten clamp -arrow- and detach suction hose from pump.
- Unscrew pressure pipe -1-.
- Unscrew vane pump bracket, items -2, 3 and 4-.
- Take out bracket with pump.
- Then unscrew vane pump from bracket.

Installing

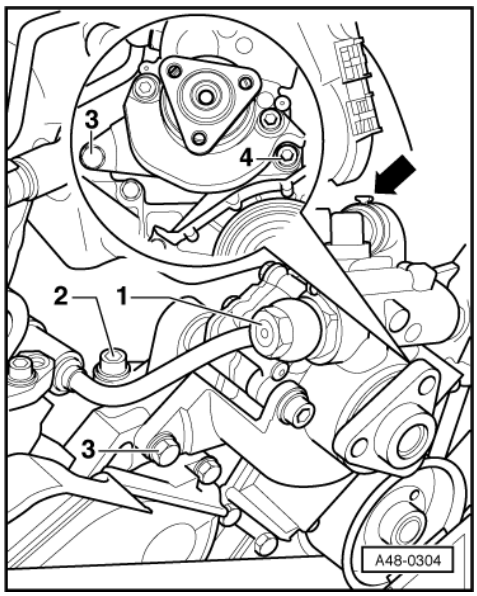
- Fill vane pump with hydraulic fluid.

  Pour in fluid at pump suction connection.

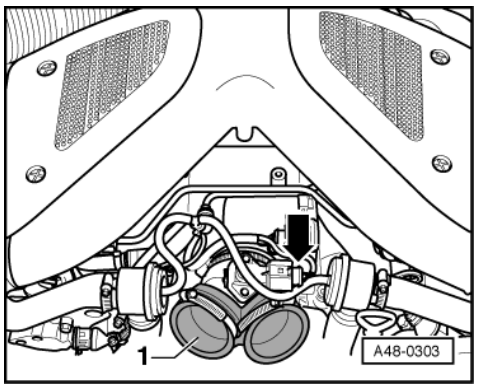
- Turn hub by hand until fluid emerges from delivery end.

◆ Clean areas in engine compartment contaminated with fluid.

- Screw pump to bracket.
- Tighten the two front bolts first, then the one at the rear (22 Nm).

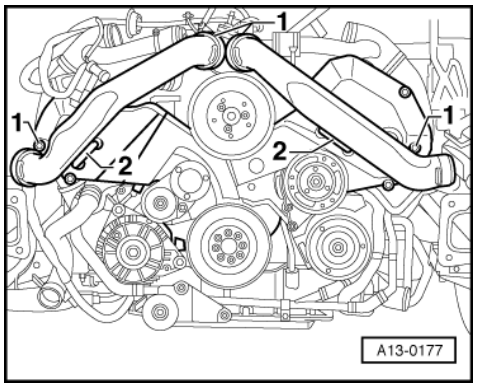


- -> Insert pump with bracket.
- Fit new sealing rings on banjo bolt.
- Tighten banjo bolt for pressure pipe -1- to 50 Nm.
- Fit suction hose; mark -P- must be aligned with parting line at pump.
- Detach hose clamps -3094-.



- -> Fit rubber elbow -1-.
- Plug in connector at charge pressure sender -G31- arrow-.
- Tighten hexagon socket-head bolts of pulleys for vane pump to 22 Nm.

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- -> Fit pressure pipes -1-.

Note:

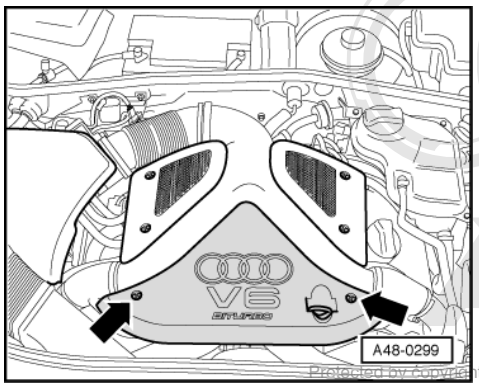
Pay attention to retainers -2-.

- Fit ribbed belt for vane pump.

=> 6-cyl. Engine (5-valve Turbo), Mechanics; Repair Group 13; Removing and installing ribbed belt Removing and installing ribbed belt

- Fit viscous fan.

=> 6-cyl. Engine (5-valve Turbo), Mechanics; Repair Group 19; Removing and installing cooling system components Removing and installing cooling system components



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- -> Install front cover.
- Attach lock carrier.

=> General Body Repairs, Exterior; Repair Group 50; Front Body; Lock carrier service position Front Body Lock carrier service position

- Fit bumper.

- Fill with hydraulic fluid G 002 000.
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

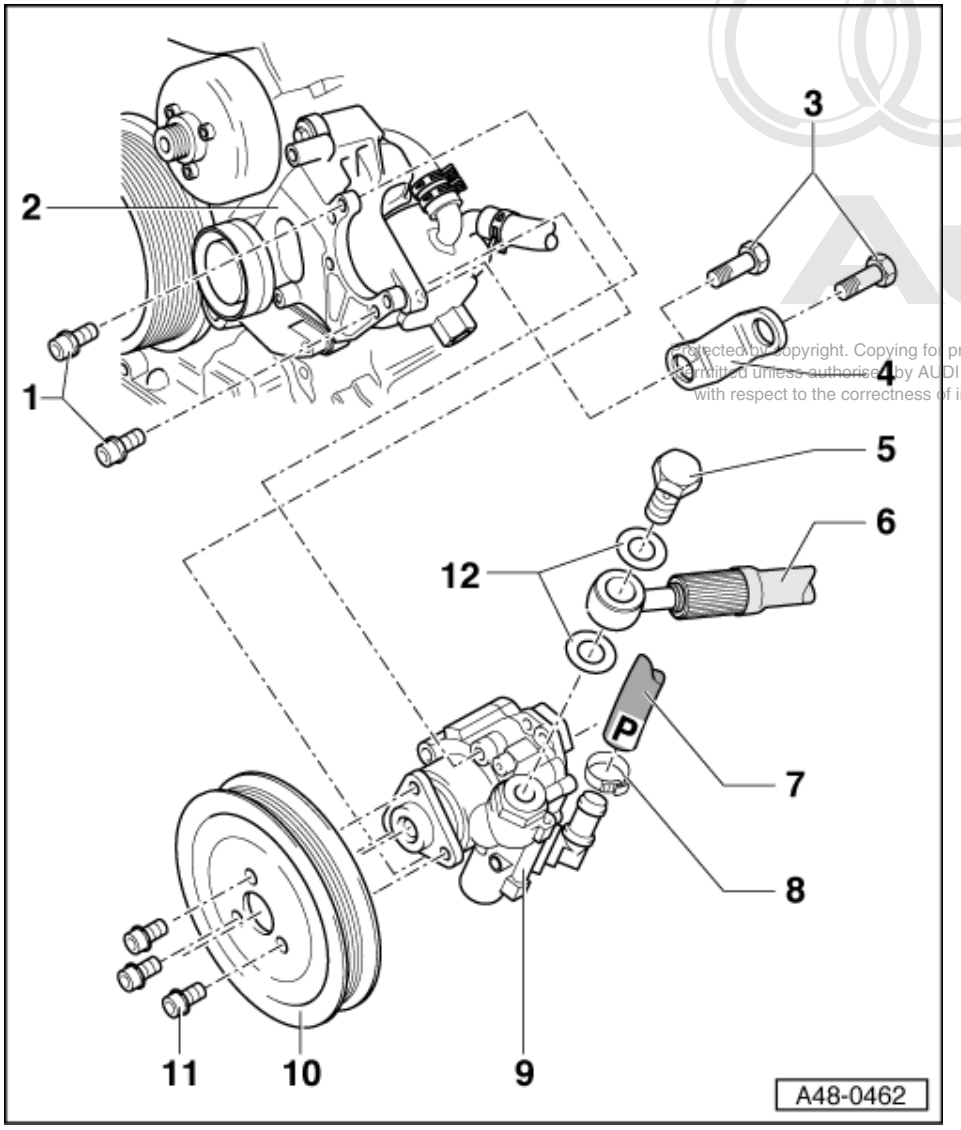
Tightening torques => Page 331

9.7 - Removing and installing vane pump (vehicles with 6-cyl. TDI engine)

- Pay attention to general information => Page 312 .

Special tools and workshop equipment required

- 3094 Hose clamps
- 3212 Pin wrench
- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench
- V.A.G 1590 Gripping wrench



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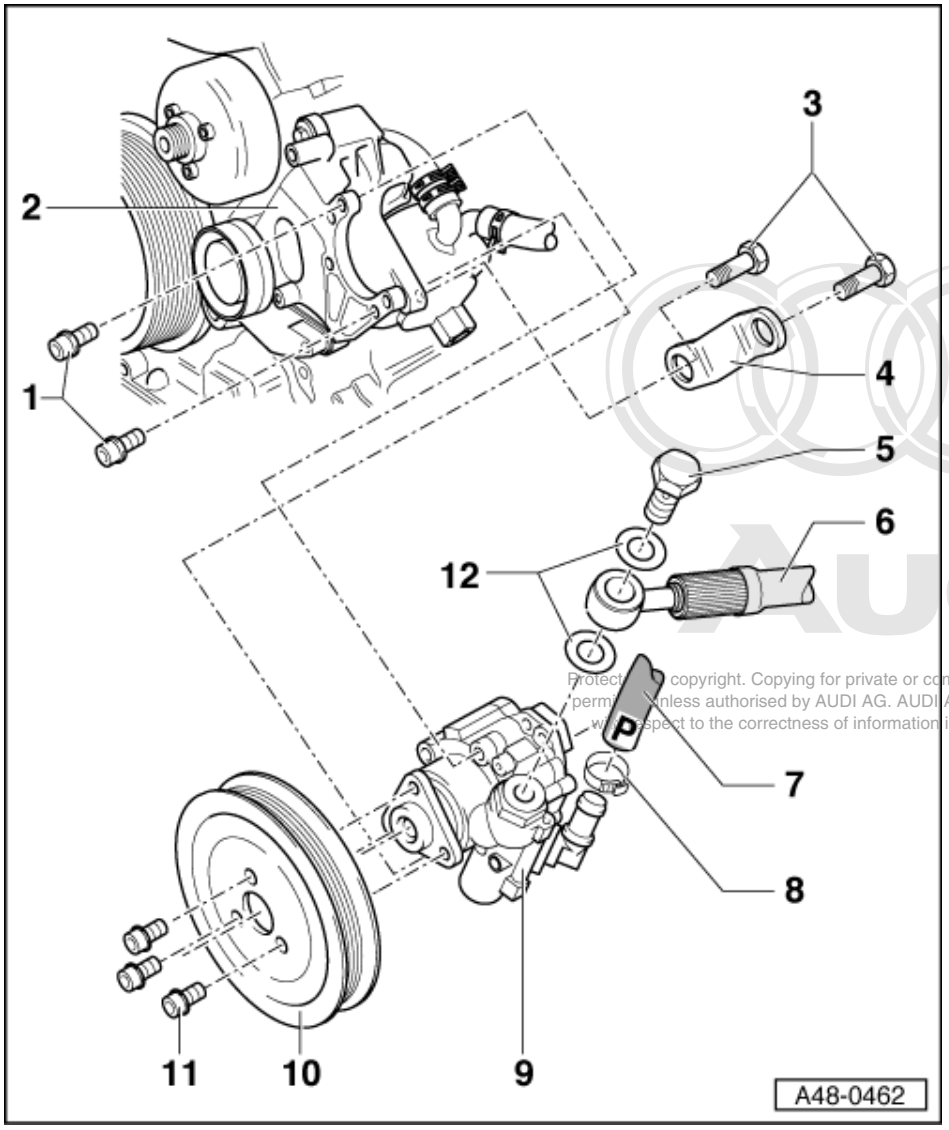
Exploded view

Notes:

- Replace sealing rings.
- Do not re-use hydraulic fluid drained off.
- Hydraulic fluid: Part no. G 002 000

1 Combi bolt, 22 Nm
2 Bracket
3 Hexagon bolt, 22 Nm
4 Retaining plate
5 Banjo bolt, 47 Nm
6 Expansion hose

- Vane pump - steering box
- Note installation position; danger of abrasion



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7 Suction hose

- Vane pump - fluid reservoir
- Note installation position; danger of abrasion
- Mark -P- must be aligned with seam at pump

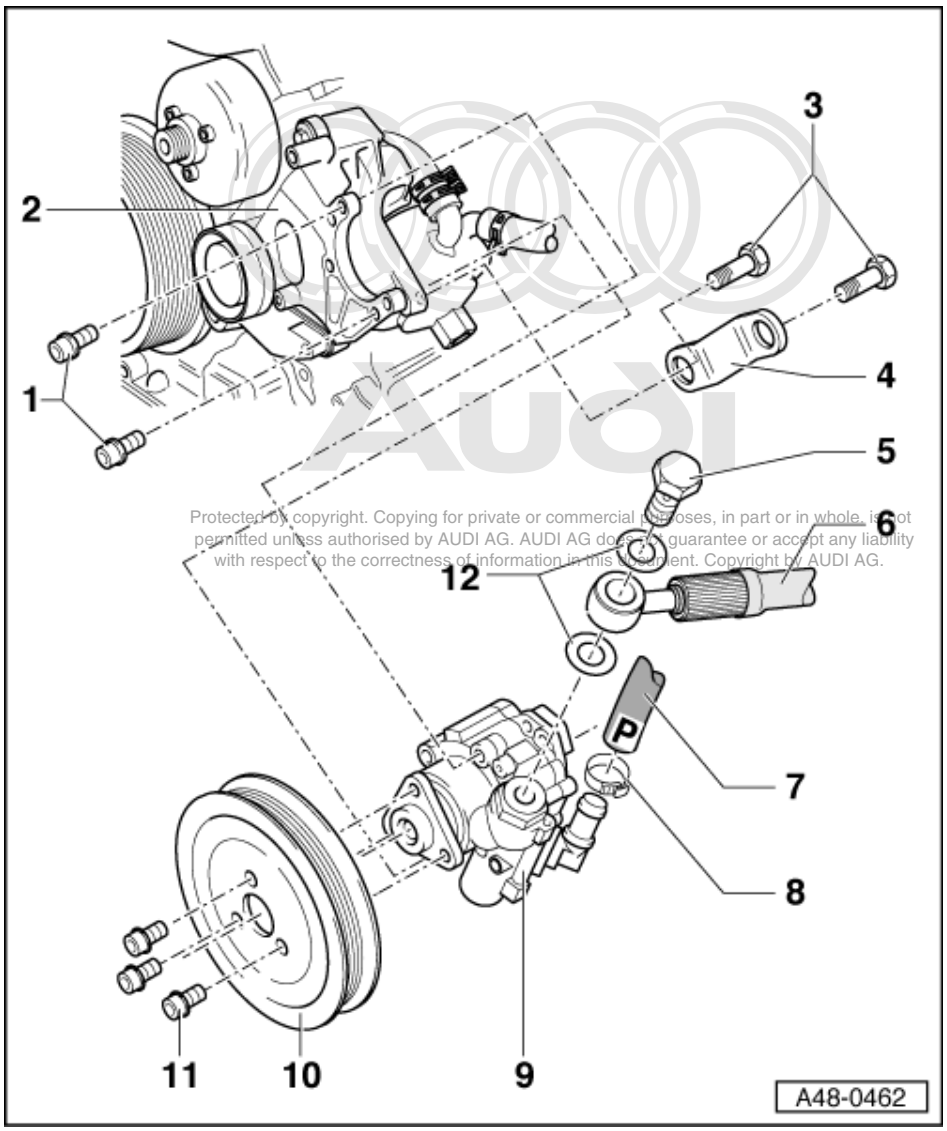
8 Clamp

- Tension using V.A.G 1275
- Always replace

9 Vane pump

- Fill with fluid before installing =>Note, Page 286
- Removing and installing
  => Page 337
- Checking delivery pressure
  => Page 302

10 Pulley



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11 Hexagon socket-head bolt, 22 Nm

- When slackening off and tightening, provide support with pin wrench -3212-

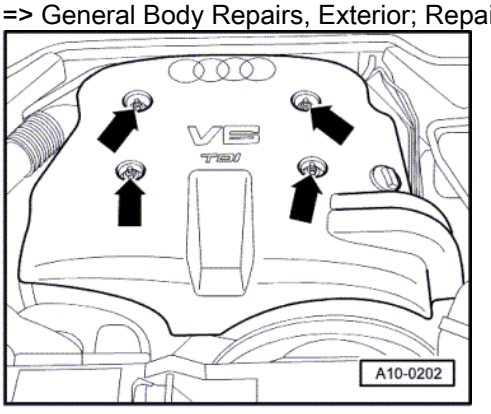
12 Sealing rings

- Always replace

Removing

- Remove bumper.

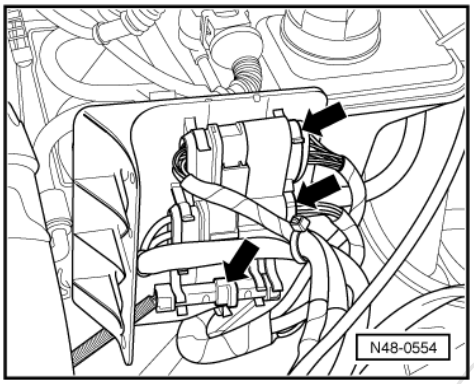
=> General Body Repairs, Exterior; Repair Group 63; Front Bumper Front Bumper



- Move lock carrier to service position.

=> General Body Repairs, Exterior; Repair Group 50; Front Body Front Body

- Remove noise insulation.
- -> Unscrew engine cover -arrows-.



Vehicles with air conditioner

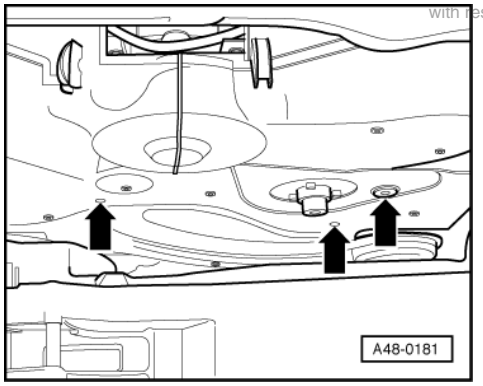
- -> Unclip connectors -arrows- from holder.
- Unclip holder.

All vehicles (continued)

- Remove viscous fan.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 19; Removing and installing cooling system components; Removing and installing viscous fan Removing and installing cooling system components Removing and installing viscous fan

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- -> Remove ribbed belt cover -arrows-.

Note:

Pay attention to spacer sleeves for ribbed belt cover.

Vehicles with air conditioner

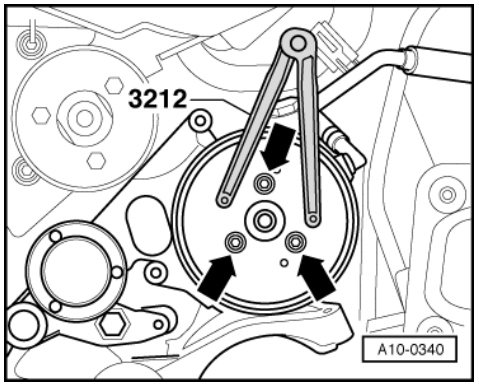
- Remove ribbed belt for air conditioner compressor.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 13; Dismantling and assembling engine: Ribbed belt drive for air conditioner Dismantling and assembling engine: Ribbed belt drive for air conditioner

All vehicles (continued)

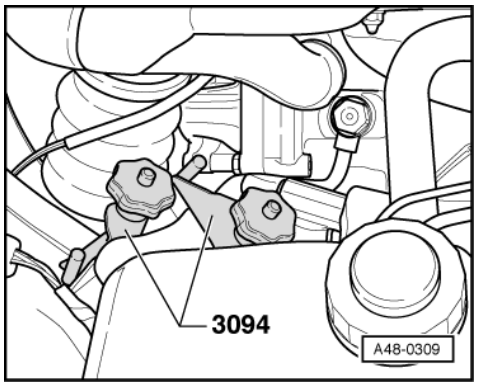
- Remove ribbed belt for vane pump.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 13; Dismantling and assembling engine: Ribbed belt drive for vane pump, alternator and viscous fan Dismantling and assembling engine: Ribbed belt drive for vane pump, alternator and viscous fan

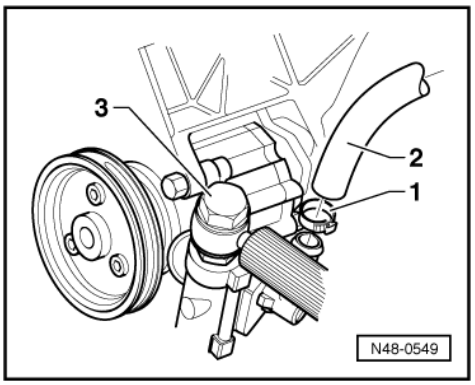


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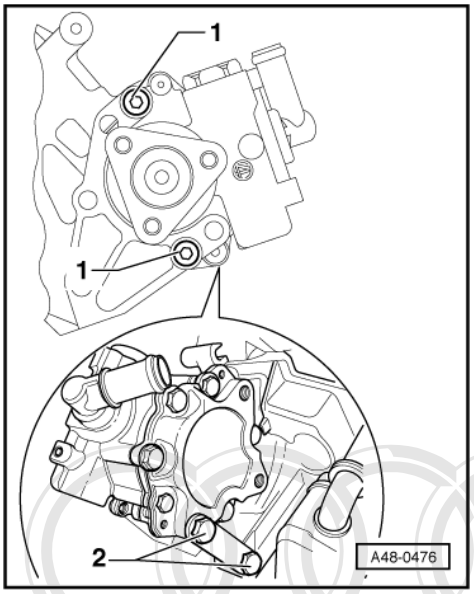
- -> Unscrew vane pump pulley -arrows- using pin wrench -3212- to provide support.



- -> Pinch off suction and return pipe with hose clamp -3094-.
- Place drip tray under vehicle.



- -> Screw out banjo bolt -3-.
- Unfasten clamp -1- and detach suction hose -2-.
  - Seal off pressure pipe with a plastic bag or the like.

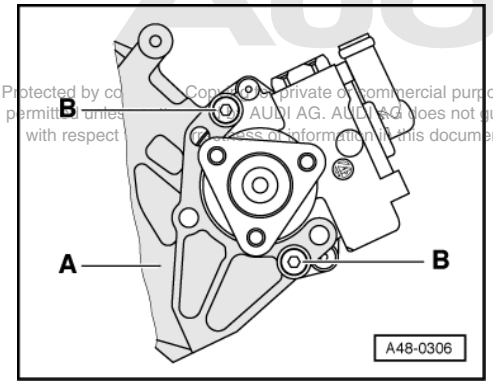


- -> Unscrew hexagon bolts -1- and -2-.
- Take out pump.

Installing

- Fill vane pump with hydraulic fluid.

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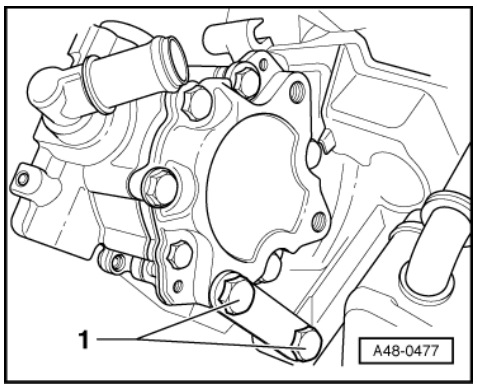


Pour in fluid at pump suction connection.

- Turn hub by hand until fluid emerges from delivery end.

◆ Clean areas in engine compartment contaminated with fluid.

- -> Insert vane pump in bracket -A- and tighten bolts -B-.



- -> Then tighten hexagon bolts -1- on back of vane pump.
- Attach suction hose and fit clamp.
- Mark -P- at suction hose must be aligned with seam at pump.
- Fit new sealing rings on banjo bolt.

- Position pressure pipe on vane pump and tighten banjo bolt.
- Detach hose clamps -3094-.
- Install vane pump pulley.
- Fit ribbed belt for vane pump.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 13; Dismantling and assembling engine: Ribbed belt drive for vane pump, alternator and viscous fan Dismantling and assembling engine: Ribbed belt drive for vane pump, alternator and viscous fan

When installing belt, make sure it is properly seated in pulleys.

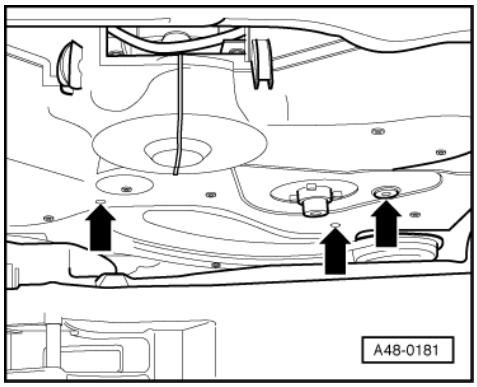
Vehicles with air conditioner

- Fit ribbed belt for air conditioner compressor.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 13; Dismantling and assembling engine: Ribbed belt drive for air conditioner Dismantling and assembling engine: Ribbed belt drive for air conditioner

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When installing belt, make sure it is properly seated in pulleys.



All vehicles (continued)

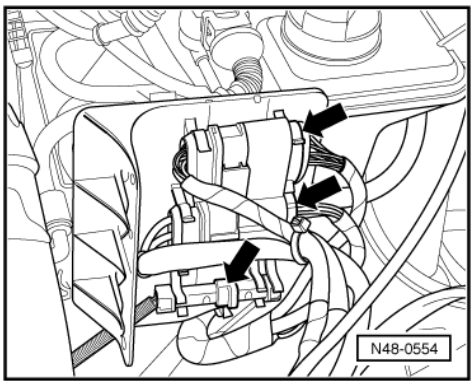
- Start engine and check belt running.
- -> Fit cover for ribbed belt.
- Fit viscous fan.

=> 6-cyl. Diesel Direct Injection Engine (TDI), Mechanics; Repair Group 19; Removing and installing cooling system components; Removing and installing viscous fan Removing and installing cooling system components Removing and installing viscous fan

- Attach lock carrier.

=> General Body Repairs, Exterior; Repair Group 50; Front Body; Lock carrier service position Front Body Lock carrier service position

- Fit bumper.



Vehicles with air conditioner

- Clip in holder.
- -> Clip connectors -arrows- into holder.

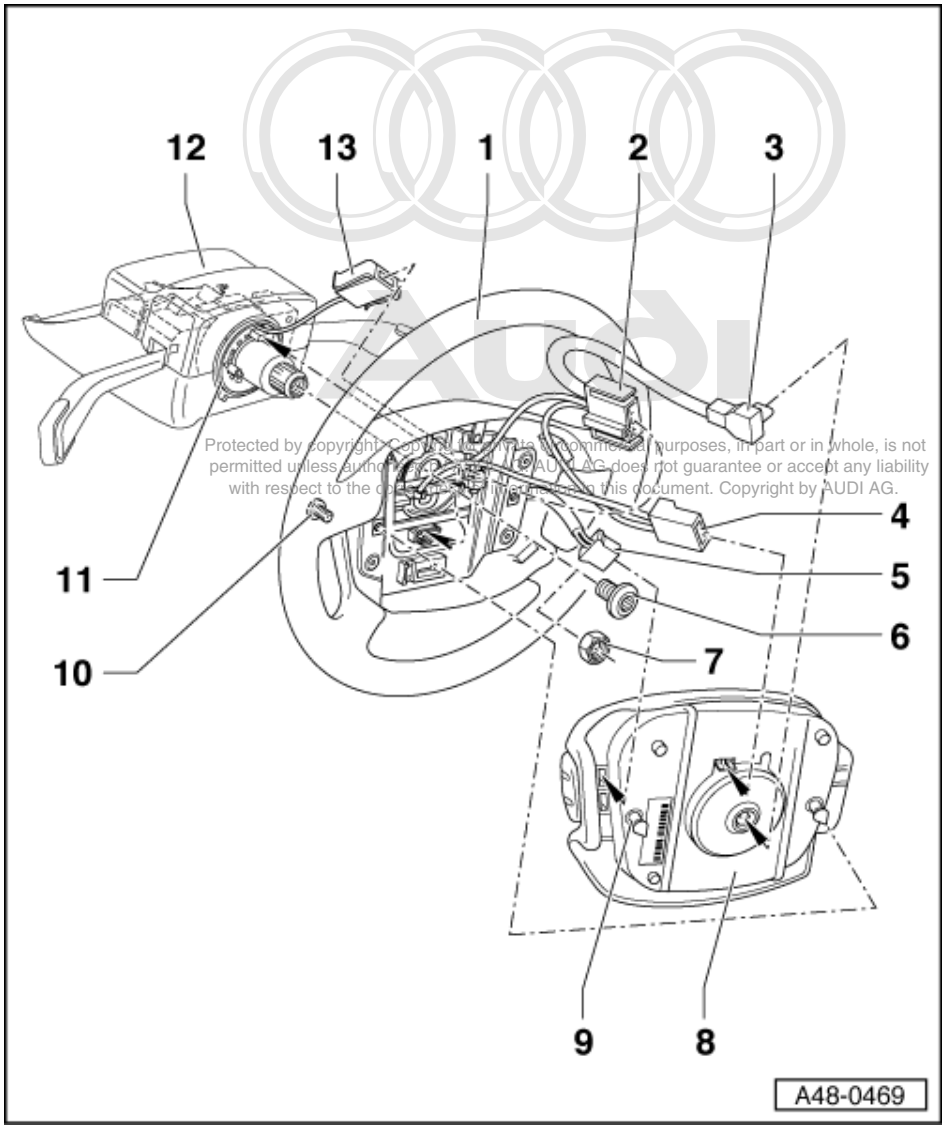
All vehicles (continued)

- Fit top engine cover.
- Install noise insulation.
- Fill with hydraulic fluid G 002 000.
- Check hydraulic fluid level =>Page 279 .
- Bleed steering system =>Page 280 .
- Check steering system for leaks =>Page 280 .

Tightening torques => Page 338

10 - Airbag steering wheel

10.1 - Airbag steering wheel



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10.2 - Exploded view: Airbag steering wheel

1 Steering wheel
- Removing and installing
  => Page 348
- Different versions
- Assignment

=> Parts List

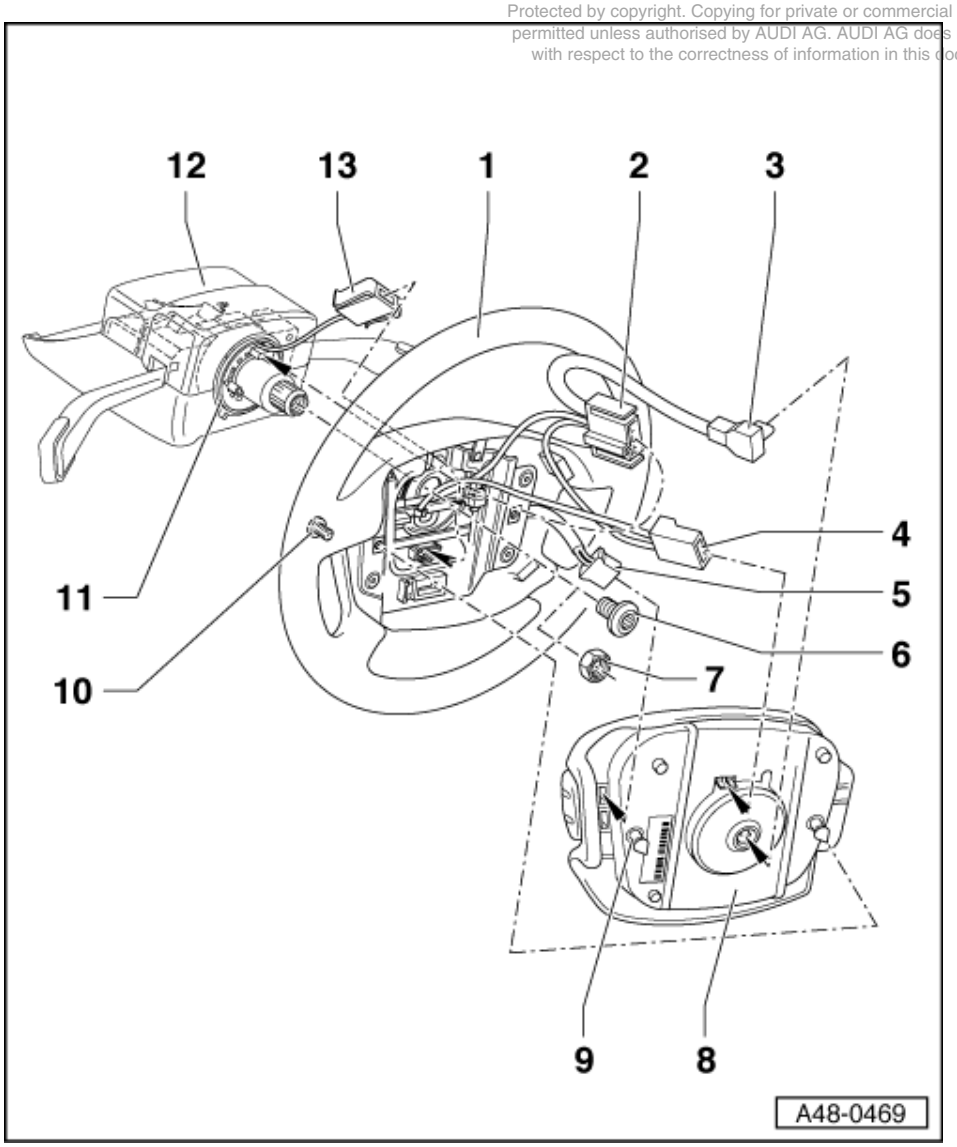
2 Plug for coil connector

3 Connector for airbag unit

4 Electrostatic discharge connector
- Vehicles up to MY 98 only
- New earth via bolted joint => Item 10

5 Plug for multi-function connector

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6 Multi-point socket-head bolt, 60 Nm
- MY 98 onwards
- Always to be replaced

7 Steering wheel nut, 42 Nm
- Up to MY 98
- Always to be replaced

8 Airbag unit

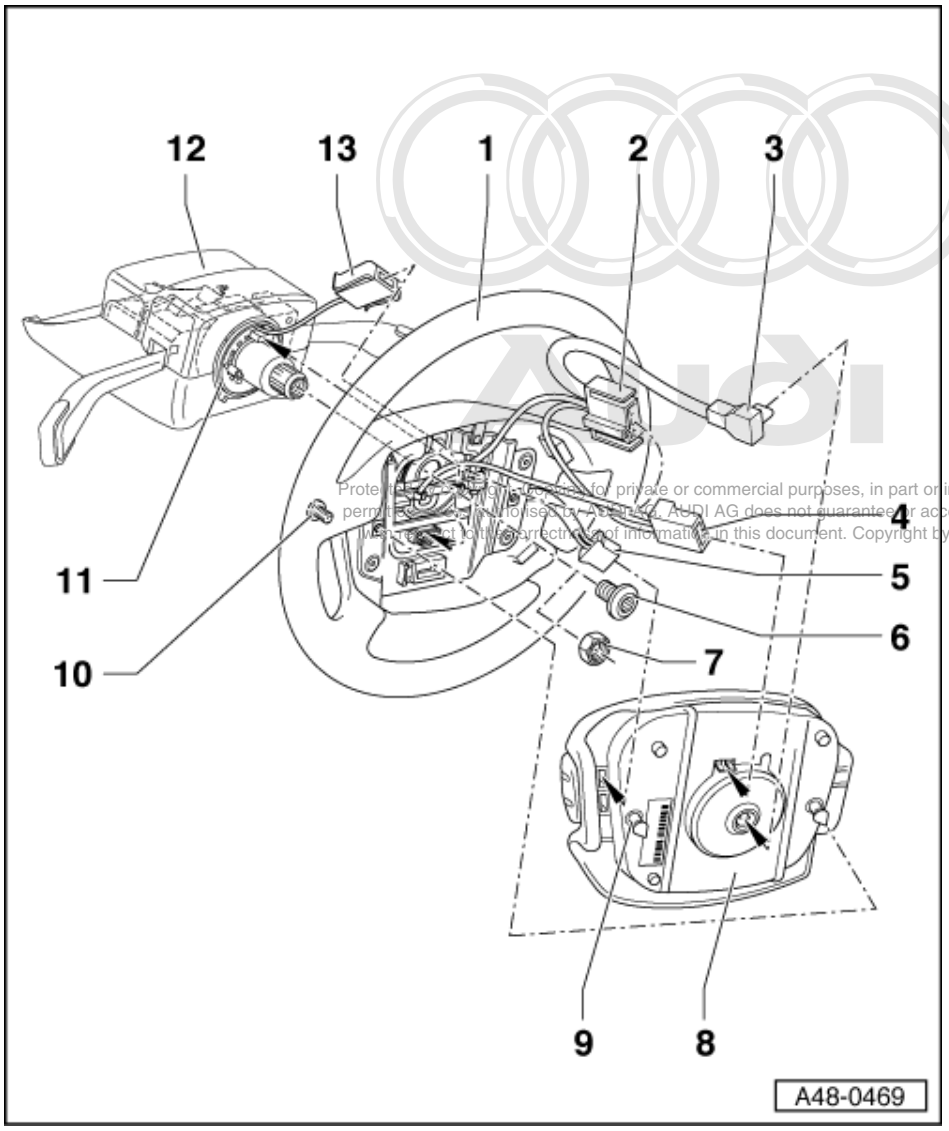
- Heed safety precautions

=> General Body Repairs, Interior; Repair Group 69; Airbag safety instructions Airbag safety instructions

- Removing and installing

=> General Body Repairs; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

9 Tab



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10 Bolt

- As of MY 98, tabs were replaced by hexagon socket-head bolts (Fig.)
- Screwing out bolts

=> General Body Repairs; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

11 Coil connector with slip ring

- Removing and installing

=> General Body Repairs; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

12 Trim for steering column switch

- Removing and installing

=> General Body Repairs; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

13 Connector for steering wheel heating

- Thread into steering wheel
- All multi-function steering wheels feature heating

10.3 - Exploded view: Sports steering wheel

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

10.4 - Removing and installing airbag steering wheel

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Removal/installation of sports steering wheel is similar to airbag steering wheel.

Removing airbag steering wheel

- Move wheels to straight ahead position.
- Remove airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Unscrew nut (up to MY 98) or screw out multi-point socket-head bolt (as of MY 98).

Installing airbag steering wheel

Pay particular attention to the following on installation:

Make sure wheels are facing straight ahead before fitting steering wheel.

- Fit steering wheel and tighten nut/bolt.

Tightening torques

Component	Nm
Nut for steering wheel (up to MY '98)	42 Nm1)
Bolt (as of MY 98)	55 Nm2)

1) Always replace nut

2) Always replace bolt

11 - Mechanically adjustable steering column with column tube

11.1 - Mechanically adjustable steering column with column tube

11.2 - Transport lock

New replacement steering columns feature a transportation safeguard.

This must be removed after installing steering column in vehicle.

If old steering column is to be removed and re-installed, an assembly lock is required to stop upper and lower part of steering column being pulled apart on detaching from steering box. Cable tie or wire, for example, is to be used as assembly lock.

Mesh section will become separated if top and bottom parts of steering column are pulled too far apart or excessively telescoped.

Rattling noise may subsequently be encountered if mesh section is no longer in its original installation position.

11.3 - Removing and installing steering column

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench
- V.A.G 1332 Torque wrench

Removing

Replacement steering columns are only available as complete assemblies. Servicing is not possible.

Steering lock housing can be transferred.

Attention:
Prerequisites for steering wheel removal:
Heed safety precautions for working on airbags.=>General Body Repairs, Interior; Repair Group 69; Airbag safety instructions
- **Unscrew earth strap from battery.**
- **Wheels must be facing straight ahead.**

Non-compliance with the above can result in subsequent airbag system failure.

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- Remove driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Remove airbag steering wheel => Page 348 .
- Remove coil connector with slip ring.

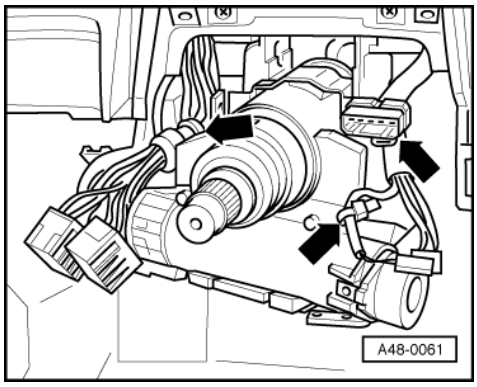
=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Remove steering column switch.

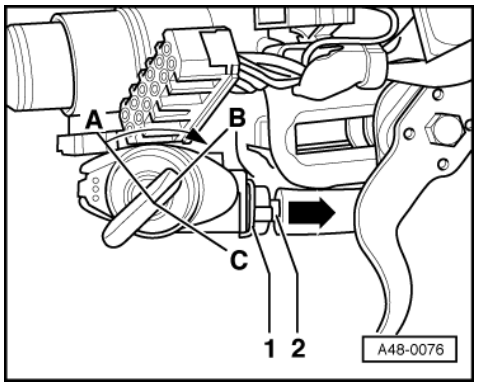
=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



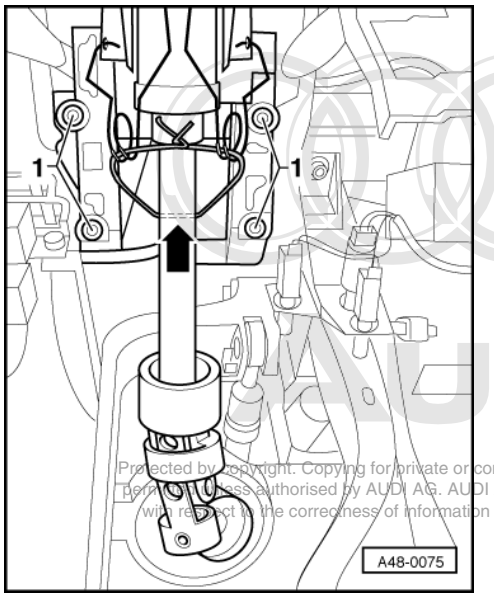
- -> Unfasten cable ties at steering column and unplug connectors.



Locking cable must be disengaged on vehicles with automatic gearbox:

- Move selector lever to position "P".
- -> Turn ignition key to position -"B" ignition on-.
- Lift interlock lever -1- slightly and pull locking cable -2- out of ignition lock housing.

Securing steering column prior to removal



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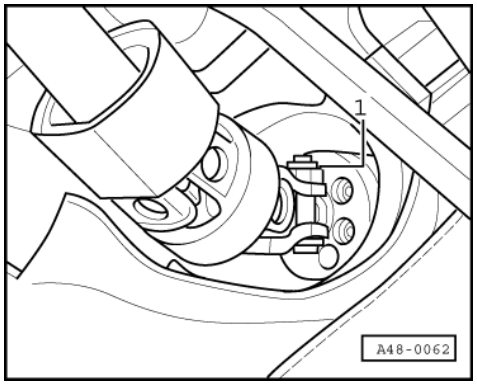
An assembly lock is required to prevent top and bottom parts of steering column being pulled apart when pulling off steering box.

Mesh section will become separated if top and bottom parts of steering column are pulled too far apart or excessively telescoped.

Rattling noise may subsequently be encountered if mesh section is no longer in its original installation position.

- -> Pull wire through hole in bottom part of steering column -arrow- and spring.

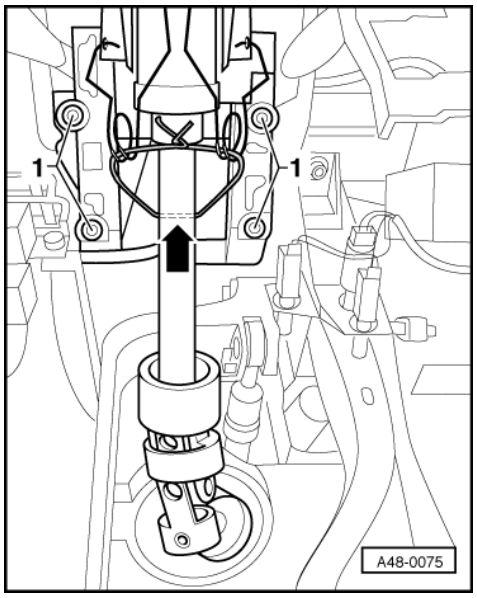
Steering column can also be secured with a transport lock => Installing, Page 352 .



Removing (continued)

- -> Unscrew nut -1- at universal joint.
- Slacken off bolt (Torx T50) in clockwise direction and take out.
- Detach universal joint from steering box.

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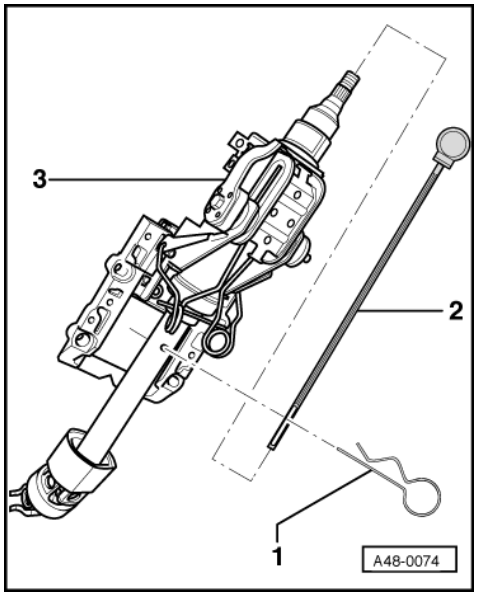


- -> Unscrew hexagon socket-head bolts -1- of steering column and take out steering column.
- Remove lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

- Remove steering lock housing => Page 355 .

- Check steering column for damage => Page 355 .



Installing

New replacement steering columns feature a transportation safeguard.

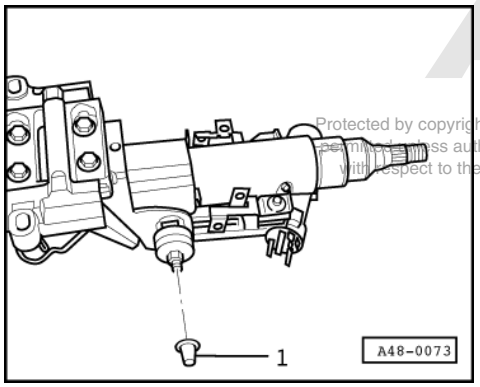
This must be removed after installing steering column in vehicle.

1 - Locking clip
2 - Plastic rod
3 - Steering column

It is advisable to keep these components as they can be used on steering column removal.

- Install steering lock housing => Page 355 .
- Install lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

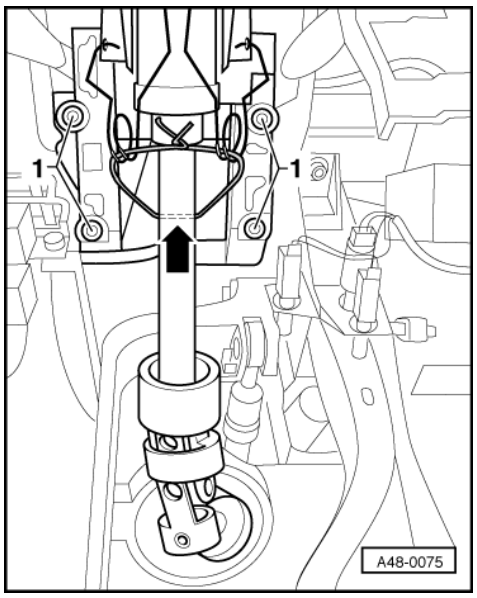


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- -> On inserting steering column, make sure cap -1- has been attached.

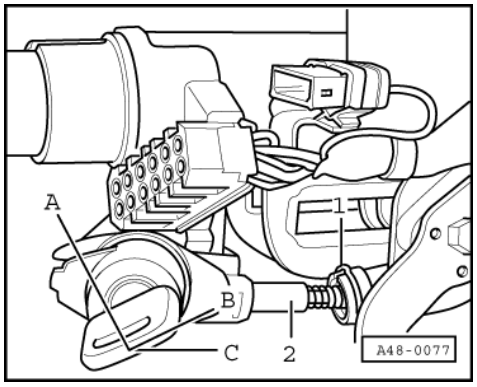
Note:

If cap has not been fitted, it must always be installed. Otherwise, wiring could be abraded.



- -> Locate steering column at cross member with 4 hexagon socket-head bolts -1-.
- Attach universal joint to pinion of steering box.
- Insert clamping bolt (Torx T50) through bottom part and pre-tension by turning anti-clockwise.
- Fit hexagon nut in position and tighten to 30 Nm.

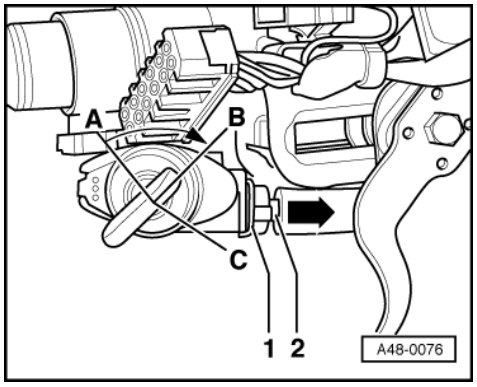
Attention:
Mesh section between top and bottom part of steering column is never to be separated on installation.



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Engage locking cable on vehicles with automatic gearbox.

- -> To engage locking cable, turn ignition key to position -"B" ignition on-.
- Move selector lever to position "P".
- Insert locking cable -2- in ignition lock housing. In doing so, make sure interlock lever -1- engages.



Checking operation of locking cable:

Vehicles with automatic gearbox only

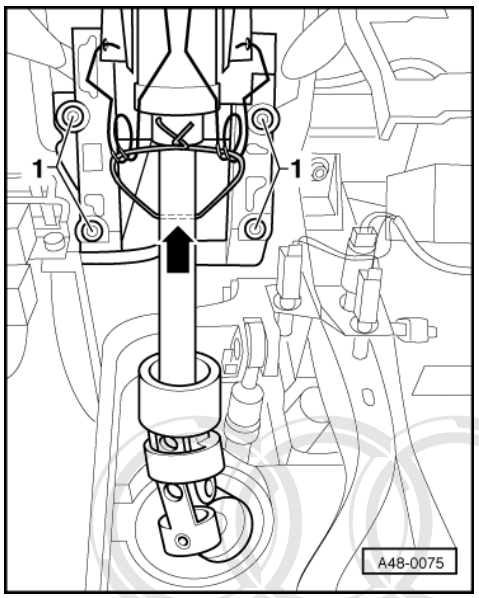
-> Turn ignition key to position -"B" ignition on-.

- It must be possible to shift selector lever smoothly out of position "P".
- It should only be possible to remove ignition key in selector lever position "P".

Move selector lever to position "P".

- Ignition lock must function smoothly.
- With ignition key in position -"A" Ignition off- it must not be possible to shift selector lever out of position "P". Ignition key can be removed.
- Basic setting and routing of locking cable

=> Automatic Gearbox; Repair Group 37; Servicing shift mechanism Servicing shift mechanism



Installing (continued)

- -> Remove wire/transport lock between top and bottom part of steering column.
- Fit necessary cable ties at steering column.
- Fit steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

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- Fit coil connector with slip ring.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Attach connectors.
- Fit trim for steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

- Align steering column such that trim joints are even.
- Tighten hexagon socket-head bolts -1- of steering column to 22.5 Nm.
- Install driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Install airbag steering wheel => Page 348 .
- Install driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

Attention:
Make sure there is no-one in the vehicle when connecting battery.

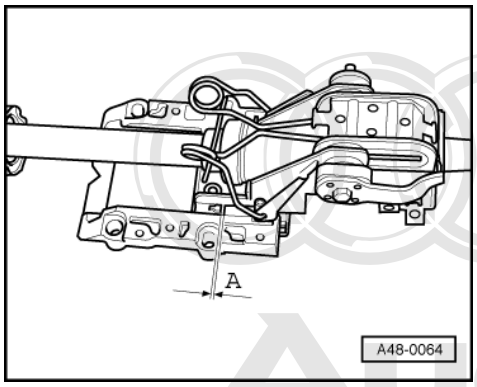
11.4 - Checking steering column for damage

Visual inspection

- Check whether steering column components reveal signs of damage.

Checking operation

- Check whether steering column can be turned without catching or stiffness.
- Check whether axial position and height of steering column can be adjusted.



- -> Check gap -dimension A- between slide and mounting bracket.
  Dimension A: max. 0.5 mm or less
- If dimension -A- is greater than0.5 mm, steering column is damaged and must be replaced.

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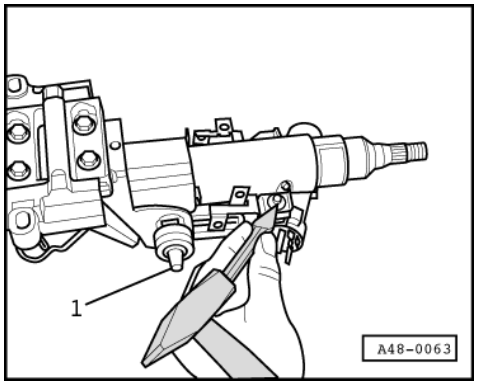
11.5 - Removing and installing steering lock housing

Removing

Attention:
Wheels must be in straightahead position before removing steering wheel.
Heed safety precautions for working on airbags.=>General Body Repairs, Interior; Repair Group 69; Airbag safety instructions
Non-compliance with the above can result in subsequent airbag system failure.

- Remove steering column => Page 349 .
- Remove lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock



-> Fig.1 Chiseling out shear bolts

1 - Cap

- Make sure cap -1- has been fitted so as to prevent wiring abrasion.
- Detach steering lock housing.

Note:

Steeringcolumn must be clamped in a vice as shown for chiseling out shear bolts.

Mounting bracket of steering column will be damaged if work is performed with steering column installed.

Securing bracket of steering column is not to be clamped in vice as this could damage plastic moulding.

Installing

- Install steering lock housing.
- Screw in new shear bolts.
- Tighten shear bolts until head shears off.
  Shear-off moment of new bolts ≥ 20 Nm
- Install lock cylinder.

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=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

- Install steering column => Page 349 .

12 - Mechanically adjustable steering column with no column tube

12.1 - Mechanically adjustable steering column with no column tube

12.2 - Removing and installing steering column

Special tools and workshop equipment required

- V.A.G 1331 Torque wrench

- V.A.G 1332 Torque wrench

Removing

Replacement steering columns are only available as complete assemblies. Servicing is not possible.

Steering lock housing can be transferred.

Attention:
Wheels must be in straightahead position before removing steering wheel.
Heed safety precautions for working on airbags.=>General Body Repairs, Interior; Repair Group 69; Airbag safety instructions
Non-compliance with the above can result in subsequent airbag system failure.

- Remove driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Remove airbag steering wheel => Page 348.
- Remove coil connector with slip ring.

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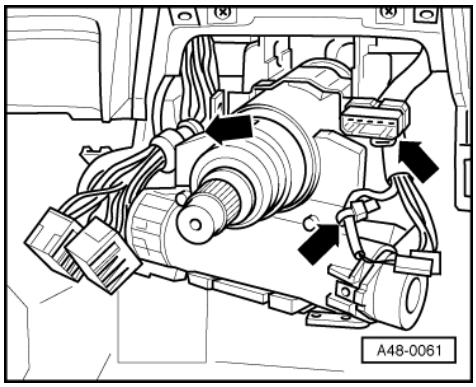
=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Remove steering column switch.

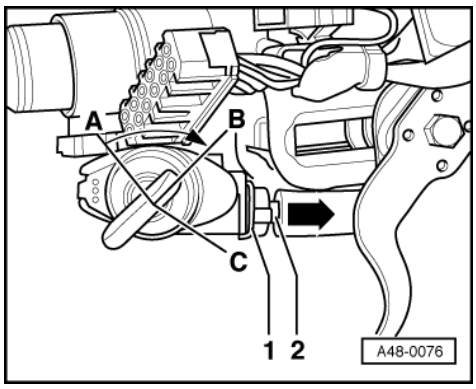
=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

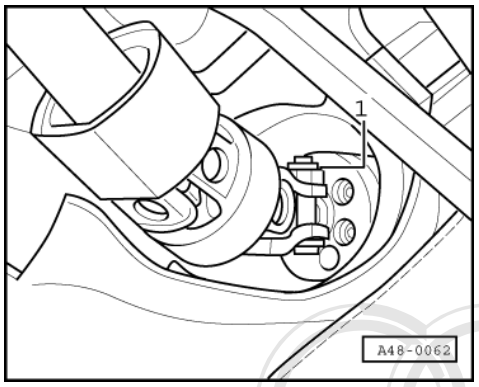


- -> Unfasten cable ties at steering column and unplug connectors.

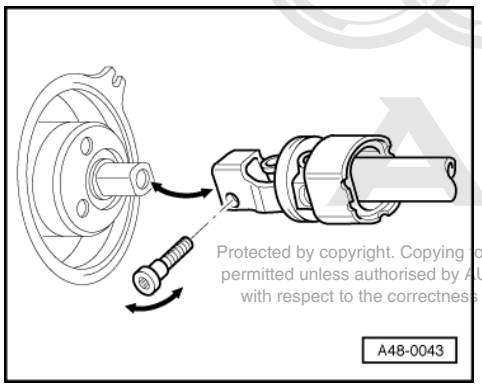


Locking cable must be disengaged on vehicles with automatic gearbox:

- Move selector lever to position "P".
- -> Turn ignition key to position -"B" ignition on-.
- Lift interlock lever -1- slightly and pull locking cable -2- out of ignition lock housing.

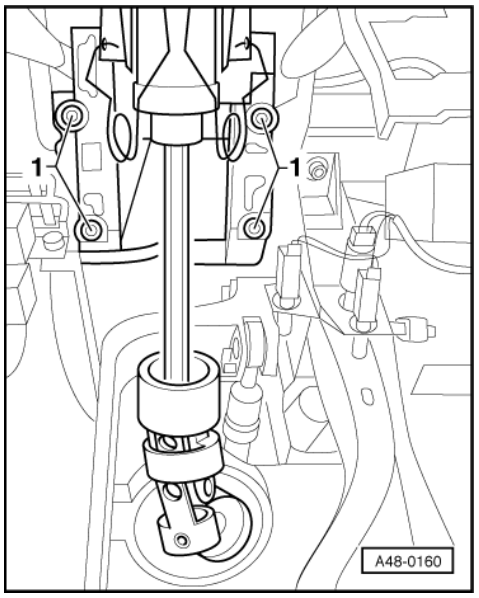


- -> Unscrew nut -1- at universal joint.
- Slacken off eccentric by turning tensioning bolt (Torx T50) clockwise and take out bolt.



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- Release steering column adjuster.
- -> Swivel aside universal joint.

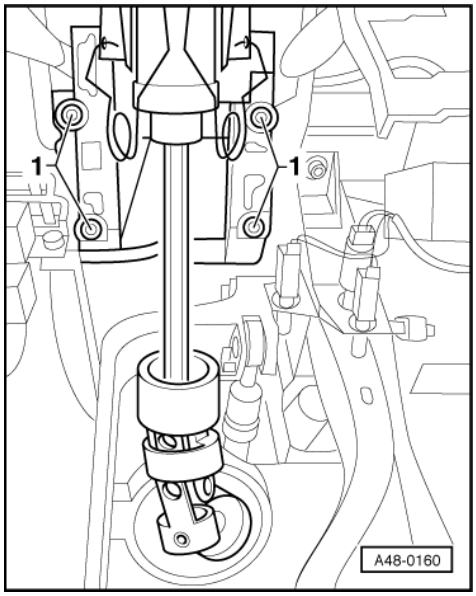


- Unscrew hexagon socket head bolts-1- of steering column and take out steering column.

- Remove lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

- Remove steering lock housing => Page 362 .
- Check steering column for damage => Page 361 .



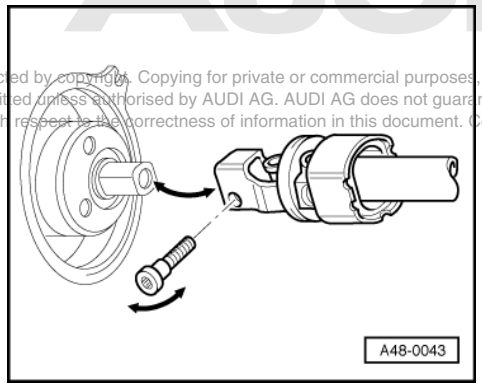
Installing

- Install steering lock housing => Page 362 .
- Install lock cylinder.

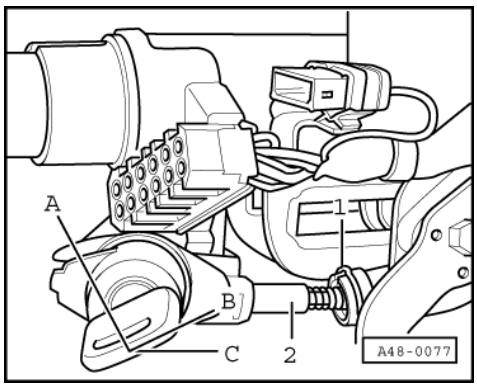
=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

- -> Locate steering column at cross member with 4 hexagon socket-head bolts -1-.
- Release steering column adjuster.

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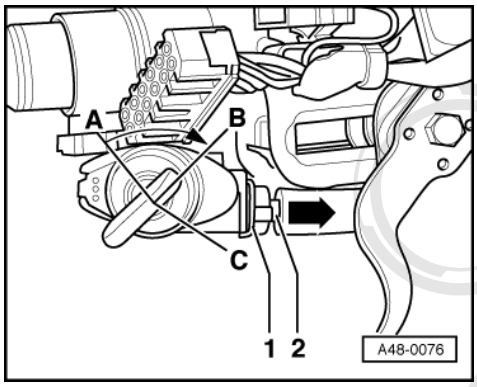


- -> Attach universal joint to pinion of steering box.
- Insert clamping bolt (Torx T50) through bottom part and pre-tension by turning anti-clockwise.
- Fit hexagon nut in position and tighten to 30 Nm.



Engage locking cable on vehicles with automatic gearbox.

- -> To engage locking cable, turn ignition key to position -"B" ignition on-.
- Move selector lever to position "P".
- Insert locking cable -2- in ignition lock housing. In doing so, make sure interlock lever -1- engages.



Checking operation of locking cable:

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-> Turn ignition key to position -"B" ignition on-.

- It must be possible to shift selector lever smoothly out of position "P".
- It should only be possible to remove ignition key in selector lever position "P".

Move selector lever to position "P".

- Ignition lock must function smoothly.
- With ignition key in position -"A" Ignition off- it must not be possible to shift selector lever out of position "P". Ignition key can be removed.
- Basic setting and routing of locking cable

=> Automatic Gearbox; Repair Group 37; Servicing shift mechanism Servicing shift mechanism

- Fit necessary cable ties at steering column.
- Fit steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

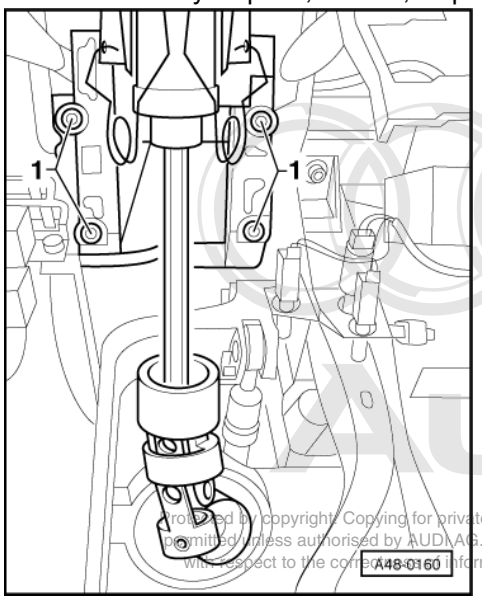
Installing (continued)

- Fit coil connector with slip ring.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Attach connectors.
- Fit trim for steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel



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- Align steering column such that trim joints are even.
- -> Tighten hexagon socket-head bolts -1- of steering column to 22.5 Nm.
- Install driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Install airbag steering wheel => Page 348 .

- Install driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

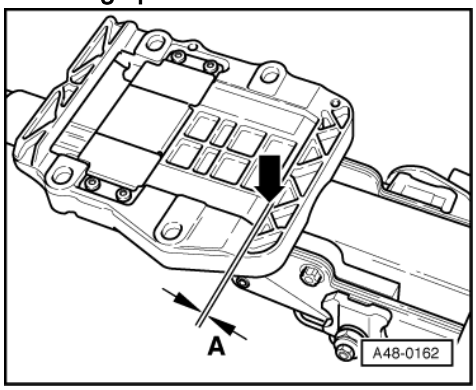
Attention: Make sure there is no-one in the vehicle when connecting battery.

12.3 - Checking steering column for damage

Visual inspection

- Check whether steering column components reveal signs of damage.

Checking operation



- Check whether steering column can be turned without catching or stiffness.
- Check whether axial position and height of steering column can be adjusted.
- -> Check for gap -dimension A- between slide and mounting bracket.
- If dimension -A- is greater than0.5 mm, steering column is damaged and must be replaced.

12.4 - Removing and installing steering lock housing

Removing

Attention:
Wheels must be in straightahead position before removing steering wheel.
Heed safety precautions for working on airbags.=>General Body Repairs, Interior; Repair Group 69; Airbag safety instructions
Non-compliance with the above can result in subsequent airbag system failure.

- Remove driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Remove airbag steering wheel => Page 348 .
- Remove coil connector with slip ring.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

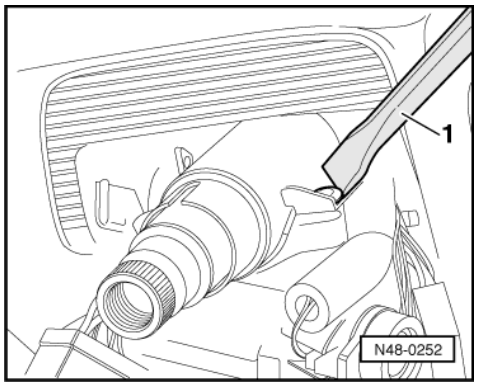
- Remove steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

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- On vehicles with automatic gearbox, disengage locking cable =>Page 350 .
- Remove lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock



- -> Drill out shear bolts -1- or chisel out with appropriate tool.
- Detach steering lock housing.

Installing

- Install steering lock housing.
- Screw in new shear bolts.
- Tighten shear bolts until head shears off.
  Shear-off moment of new bolts ≥ 20 Nm
- On vehicles with automatic gearbox, engage locking cable =>Page 360 .

- Check operation of locking cable =>Page 360 .

- Install lock cylinder.

=> Electrical System; Repair Group 94; Servicing ignition/starter switch and lock cylinder; Removing and installing lock cylinder for steering/starting lock Servicing ignition/starter switch and lock cylinder Removing and installing lock cylinder for steering/starting lock

- Fit steering column switch.

=> General Body Repairs, Interior; Repair Group 70; Dash Panel Dash Panel

- Fit coil connector with slip ring.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

- Install airbag steering wheel => Page 348 .
- Install driver's airbag unit.

=> General Body Repairs, Interior; Repair Group 69; Servicing driver's airbag Servicing driver's airbag

Attention:
Make sure there is no-one in the vehicle when connecting battery.

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