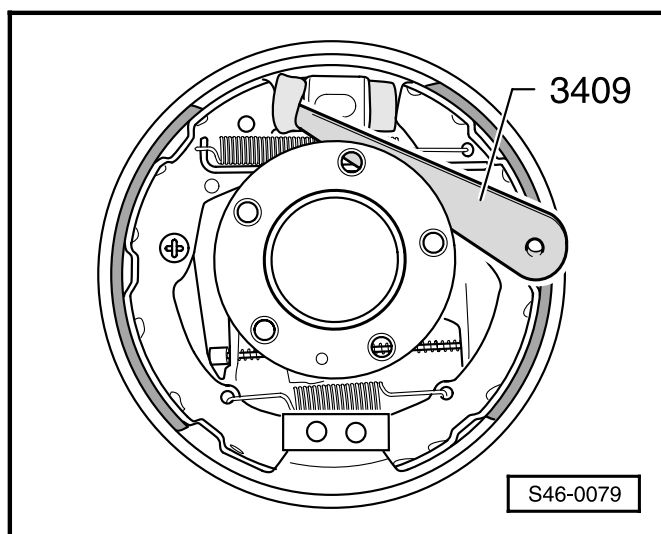


12 - Tension spring**13 - Bottom restoring spring**

- ◆ Grease contact points with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste)

14 - Top restoring spring**15 - Brake shoe with lever for handbrake**

- ◆ Removing and installing
⇒ page 46-10
- ◆ Adjusting handbrake ⇒ page 46-12

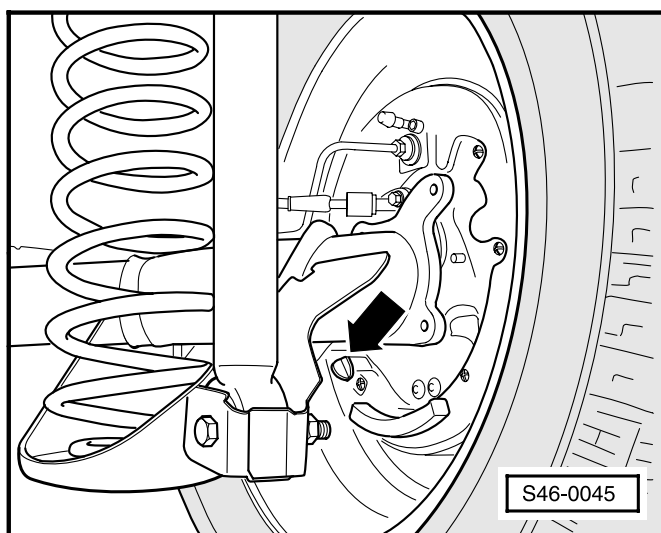


◀ **Fig. 1 Inspecting wheel brake cylinder for leaks**

- Lift off dust seal.

Use plastic wedge 3409 for this step.
- If brake fluid is present in dust seal, replace wheel brake cylinder.

When lifting off dust seal, ensure that the seal is not damaged.



◀ **Fig. 2 Inspecting thickness of brake linings through hole in brake carrier**

- Unclip cap from brake carrier -arrow-.
- Inspect thickness of brake linings through inspection hole in brake carrier.
Minimum thickness without supporting shoe (wear limit) 2.5 mm.

Note:

Check to determine whether linings are smeared by brake fluid or grease.

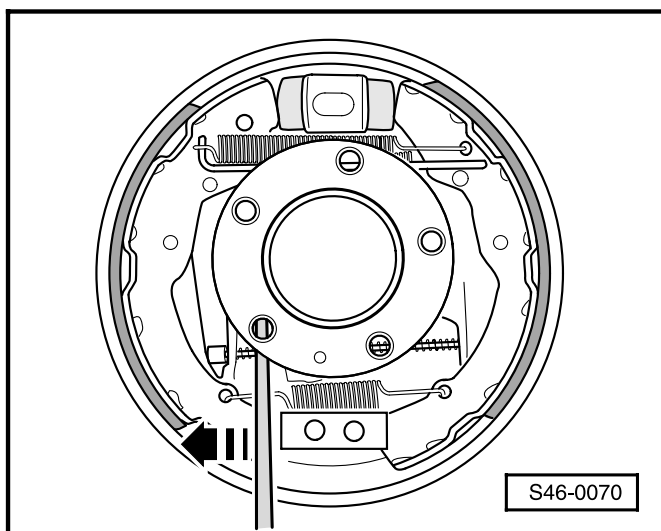
Removing and installing brake shoes

Special tools, testers and aids required

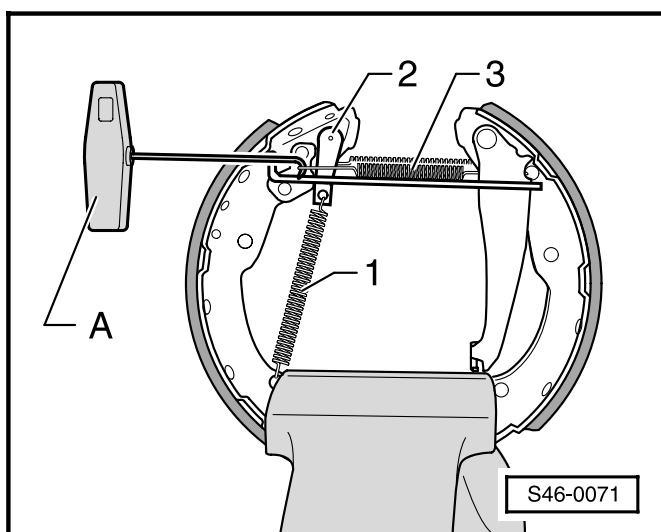
- ◆ Hook (commercially available)
- ◆ Solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste)

Removing

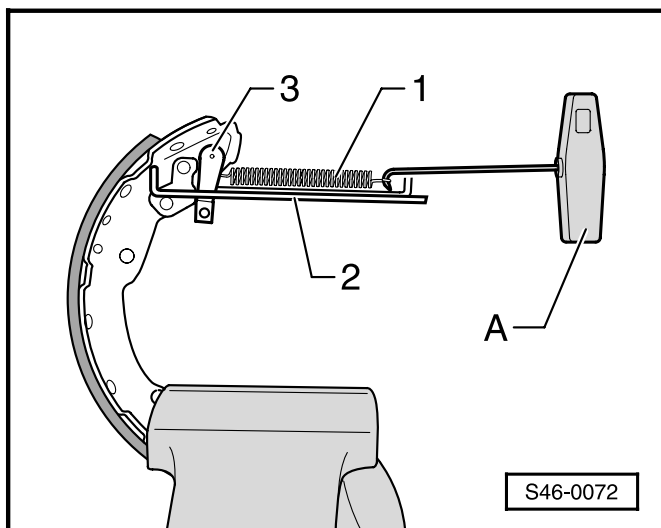
- Take off wheels.
- Remove brake drum ⇒ page 46-6, Removing and installing rear brakes.
- Remove spring retainer together with compression springs.
- ◀ - Use a screwdriver to lever the brake shoes down in direction of arrow behind the supporting plate.

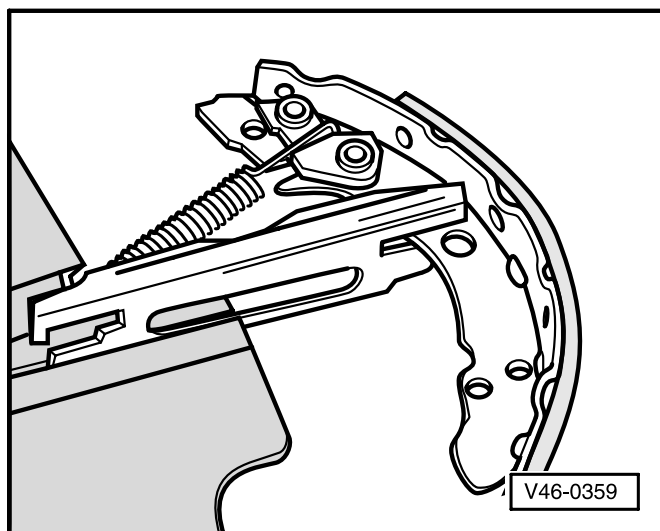


- Place brake shoes down on the supporting plate.
- Detach restoring spring at bottom.
- Detach handbrake cable.
- Guide the brake shoes out between the wheel hub and the brake carrier.
- Clamp brake shoe in a vice.
- ◀ - Remove tension spring -1- for wedge -2-.
- Use hook -A- to release top restoring spring -3-.



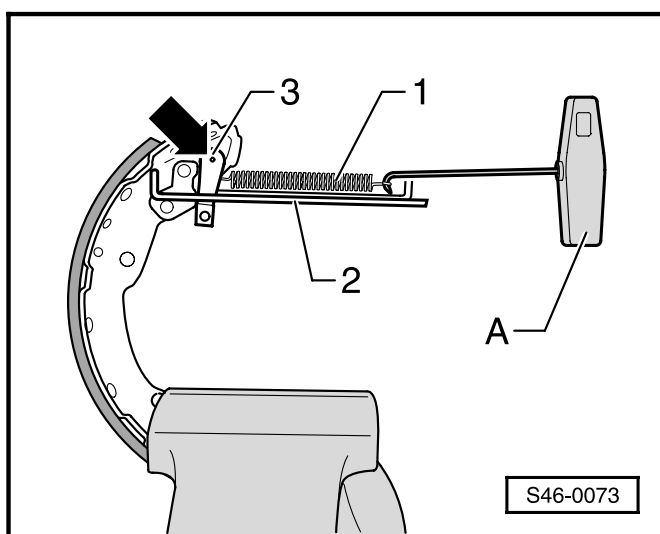
- ◀ - Use hook -A- to release contact spring -1-.
- Take the pull rod -2- and the wedge -3- off the brake shoe.





Installing

- ◀ - Attach contact spring at the brake shoe and place brake shoe onto the pull rod.
- Grease contact point of pull rod with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste).

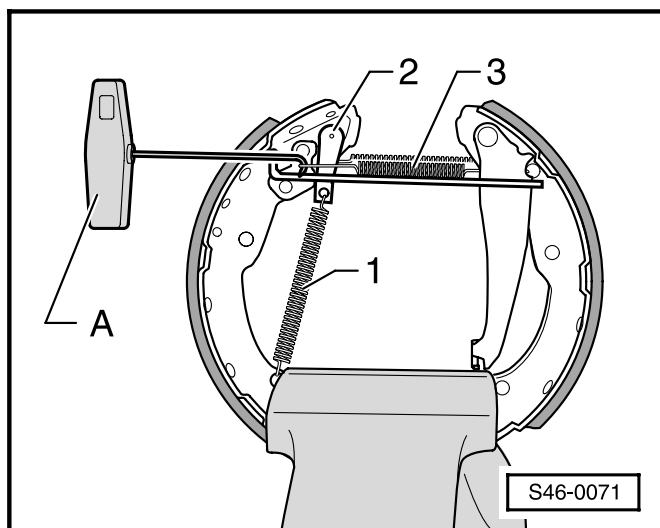


- ◀ - Use hook -A- to attach contact spring -1- in the pull rod -2-.
- Insert the wedge -3- at the same time.

Installation position:

Raised face -arrow- should remain visible when installed.

- Insert brake shoe with brake lever into pull rod.
- Grease contact point of pull rod with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste).



- ◀ - Use hook -A- to attach top restoring spring -3-.
- Attach tension spring -1- for wedge -2-.
- Guide the brake shoes in between the wheel hub and the brake carrier.
- Place brake shoes onto the piston of the wheel brake cylinder.
- Attach handbrake cable at the brake lever.
- Insert bottom restoring spring and lever brake shoe behind the bottom support.
- Grease contact points of bottom restoring spring at the brake shoes with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste).

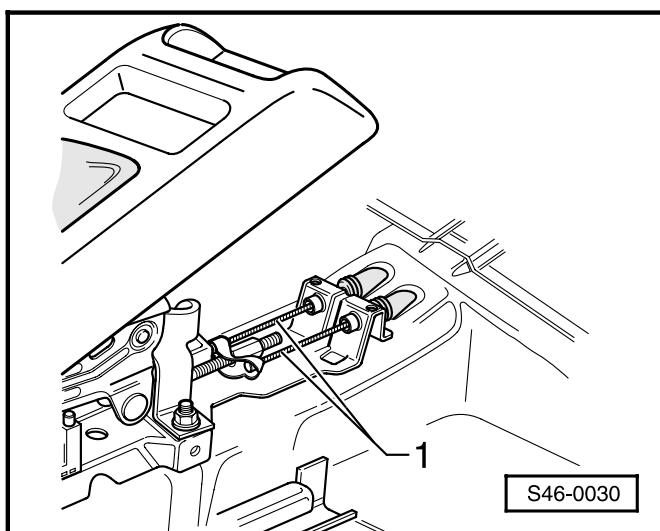
- Insert compression spring with spring retainer.
- Install brake drum.
- Depress brake pedal firmly once.
- Adjust handbrake.
- Fit on wheels.

Adjusting handbrake (drum brakes)

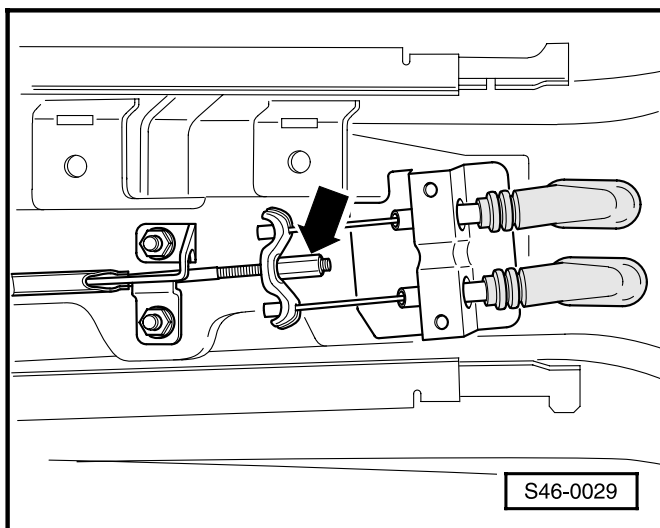
The automatic slack adjuster of the rear wheel brakes makes it unnecessary to re-set the handbrake. Re-setting should only be performed after replacing the handbrake cables, the brake carrier or after fitting new brake linings/brake shoes.

Note:

Always replace the self-locking slack adjuster nut.



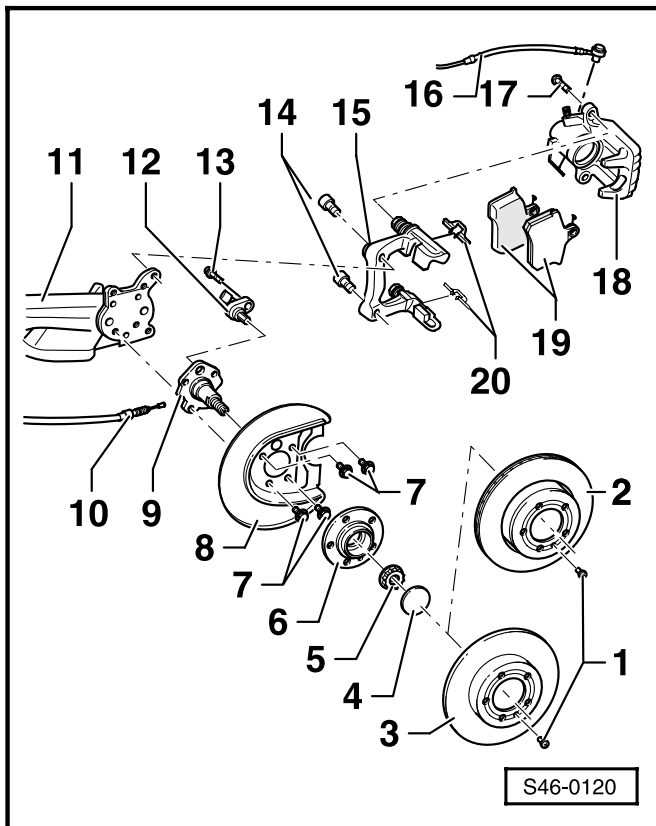
- Release handbrake.
- Remove ashtray in centre console.
- Take out cross-head screws.
- ◀ - Raise centre console at rear, or remove if necessary
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- 1 - Handbrake cables
- Depress brake pedal firmly once.
- Apply handbrake lever to 4th detent.



- ◀ - Tighten slack adjuster nut -arrow- sufficiently until it is difficult to turn both wheels by hand.
- Release handbrake and check whether both wheels rotate freely; turn back slack adjuster nut slightly, if necessary.

Servicing rear brake - front-wheel drive/disc brake

Removing and installing rear brake



- ◆ Use a bleeder bottle which comes into contact only with brake fluid for extracting brake fluid from the brake fluid reservoir. Brake fluid is toxic and must on no account be extracted by sucking out through a hose with your mouth!
- ◆ Insert the brake pedal depresser, e.g. V.A.G 1869/2, before removing a brake cylinder or separating a brake hose from the brake cylinder.
- ◆ Do not re-use brake fluid which was in the system.
- ◆ Tightening torque of wheel bolts: 120 Nm

1 - Cross-head screw, 4 Nm

2 - Brake disc, internally ventilated

- ◆ Diameter 256 mm
- ◆ Thickness 22 mm
- ◆ Wear limit 20 mm
- ◆ If worn, replace on both sides of axle

3 - Brake disc

- ◆ Diameter 232 mm
- ◆ Thickness 9 mm
- ◆ Wear limit 7 mm
- ◆ If worn, replace on both sides of axle

4 - Cap

- ◆ Pressing off ⇒ page 42-29
- ◆ Knocking in ⇒ page 42-31

5 - Twelve-point nut, self-locking

- ◆ Replace each time removed
- ◆ Tightening ⇒ page 42-74

6 - Wheel hub with wheel bearing and pulse rotor

- ◆ Fitted only to models with ABS
- ◆ Replace each time removed
- ◆ Always replace complete
- ◆ Pressing out and in ⇒ page 42-28

7 - Hexagon, 60 Nm

- ◆ With dished washer

8 - Splash guard

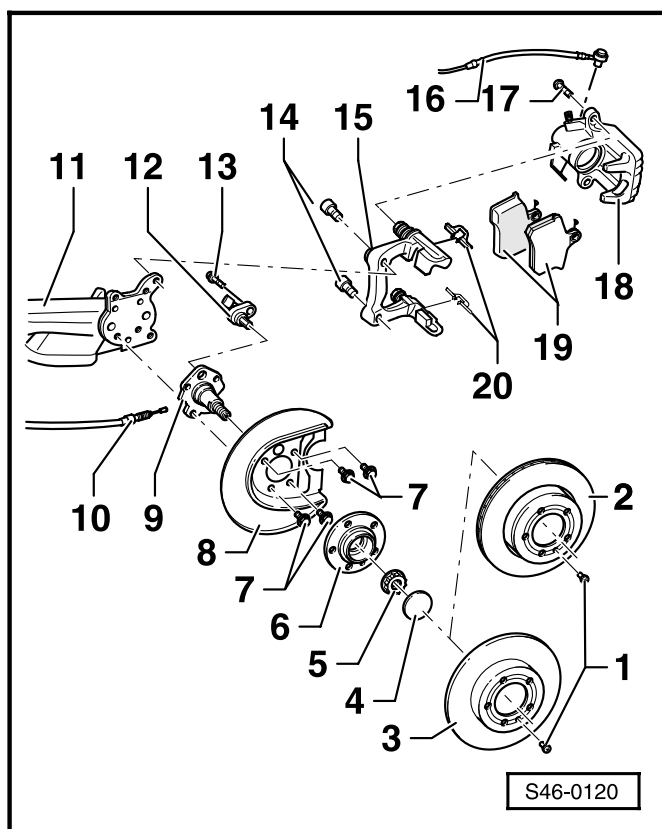
9 - Axle stub

Special tools, testers and aids required

- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Brake pedal depresser, e.g. V.A.G 1238/B
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste)

Notes:

- ◆ After replacing the brake pads, depress brake pedal firmly several times when vehicle stationary so that the brake pads are properly seated according to their position in operation.

**10 - Handbrake cable**

- ◆ Adjusting handbrake
⇒ page 46-17
- ◆ Removing and installing
⇒ page 46-17.3

11 - Axle beam**12 - ABS wheel speed sensor**

- ◆ Clean inner surface of hole and coat with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste) before inserting the sensor

13 - Hexagon socket bolt, 8 Nm**14 - Hexagon socket bolt, 65 Nm****15 - Brake carrier with guide pins and protective caps**

- ◆ Is supplied as replacement part, assembled, with adequate quantity of grease on guide pins
- ◆ If damage exists at the protective caps or the guide pins, install repair kit. Use enclosed grease packing for greasing the guide pins.

16 - Brake hose with banjo union and banjo bolt

- ◆ Must not be disassembled; always replace complete
- ◆ Tightening torque of banjo bolt: 35 Nm
- ◆ Do not detach brake hose for replacing brake pad

17 - Hexagon bolt, self-locking, 35 Nm

- ◆ Always replace

18 - Brake caliper

- ◆ Do not detach brake hose for replacing brake pad
- ◆ Removing:
 - Remove brake pads -item 19- ⇒ page 46-15
 - Insert brake pedal depresser
 - Detach brake hose -item 16- from brake caliper
- ◆ Installing:
 - Install brake pads -item 19- ⇒ page 46-15
 - Attach brake hose -item 16- to brake caliper
 - Remove brake pedal depresser
 - Bleed brake system ⇒ page 47-18
- ◆ Servicing ⇒ page 47-11
- ◆ After servicing or replacement, it is first of all necessary to adjust the handbrake cable

Do not operate the footbrake before this!

- ◆ Adjusting handbrake ⇒ page 46-17

19 - Brake pads

- ◆ Thickness 17 mm including supporting plate
- ◆ Wear limit: 7.5 mm including supporting plate
- ◆ Inspecting thickness:

⇒ Inspection and Maintenance

- ◆ Always replace on both sides of axle
- ◆ Removing and installing
⇒ page 46-15

20 - Brake pad retaining spring

- ◆ Install new spring if pad replaced

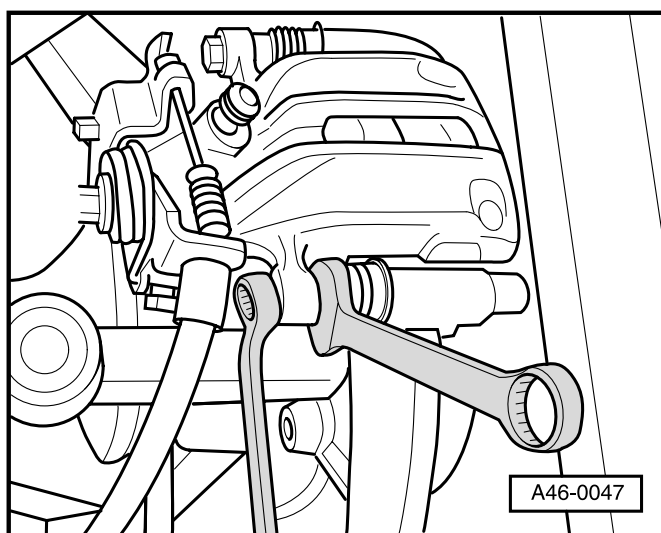
Removing and installing brake pads

Special tools, testers and aids required

- ◆ Bleeder bottle (commercially available)
- ◆ Resetting and removal tool MP 9-401
- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Brake fluid ⇒ page 00-8

Notes:

- ◆ *Mark brake pads which are to be re-used, when removing. Install again at the same point otherwise braking action will be uneven.*
- ◆ *Do not disconnect brake hose for changing pads.*



Removing

- Take off wheels.
- Detach handbrake cable at brake caliper ⇒ page 46-17.3.
- ◀ - Unscrew bolts attaching brake caliper housing; counterhold at guide pin for this step.
- Take off brake caliper housing and attach with wire so that the weight of the brake caliper is not pulling on the brake hose, and cannot damage it.
- Remove brake pads and pad retaining springs.

Note:

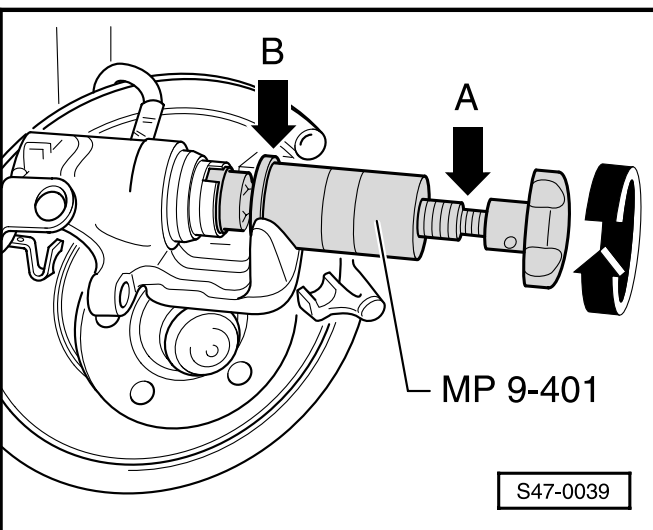
Use only methylated spirits for cleaning the brake caliper housing.

- Clean brake caliper housing, in particular the area for bonding the brake pad. It must be free of adhesive residues and grease.

Installing

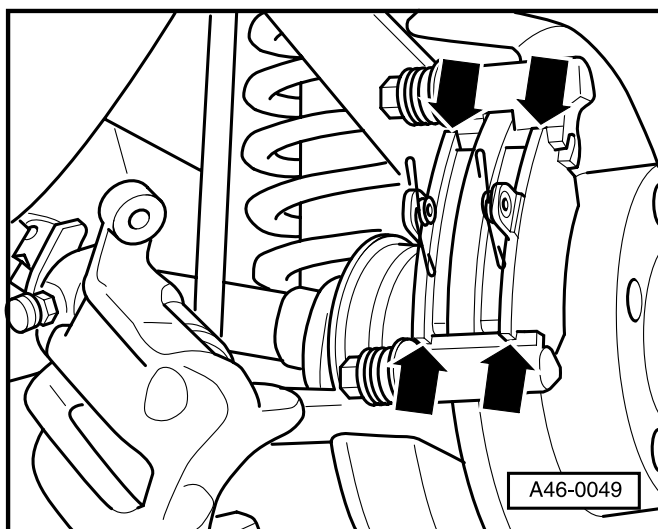
Notes:

Before inserting new brake pads, use resetting and removal tool MP 9-401 to press piston into the cylinder. Before pressing back, extract brake fluid from the brake fluid reservoir with a bleeder bottle otherwise - if brake fluid has been topped up in the meantime - it may flow out and cause damage.

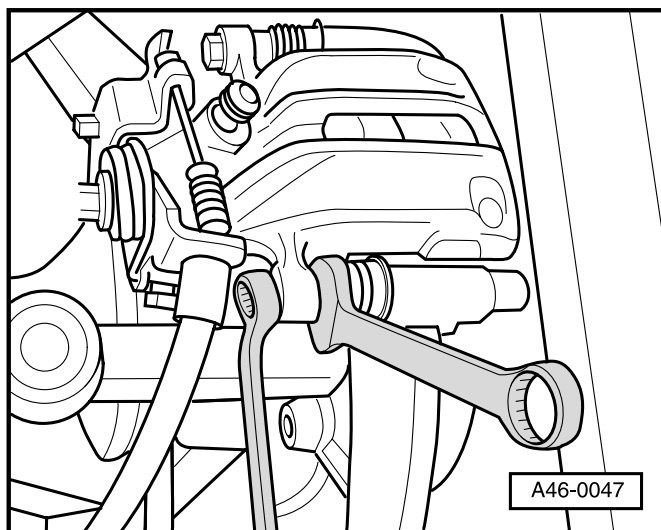
**Warning!**

Brake fluid is toxic and must on no account be sucked out with your mouth through a hose.

- ◀ ♦ Insert special tool MP 9-401 so that the collar (arrow B) of the tool is resting against the brake caliper.
- ♦ If piston is stiff, an open-end wrench waf 13 can be positioned at the wrench faces (arrow A) provided for this purpose.
- ♦ If the position of the piston is altered with a piston resetting device, the automatic adjuster in the brake caliper is destroyed.



- Screw in piston by turning knurled wheel of special tool MP 9-401 to the right.
- ◀ - Insert new pad retaining springs -arrows- and brake pads into the brake carrier.
- Remove protective sheet from the supporting plate of brake pad.

**Note:**

The repair kit contains four self-locking hexagon bolts which must always be installed.

- ◀ - Attach brake caliper housing with new self-locking bolts.

Counterhold at guide pin when tightening.

Tightening torque: 35 Nm.

- Attach handbrake cable to brake caliper
⇒ page 46-17.3.
- Adjust handbrake ⇒ page 46-17.
- Fit on wheels.

Notes:

Each time after replacing the brake pads, depress brake pedal firmly several times when vehicle is stationary so that the brake pads are properly seated to match their operating position.

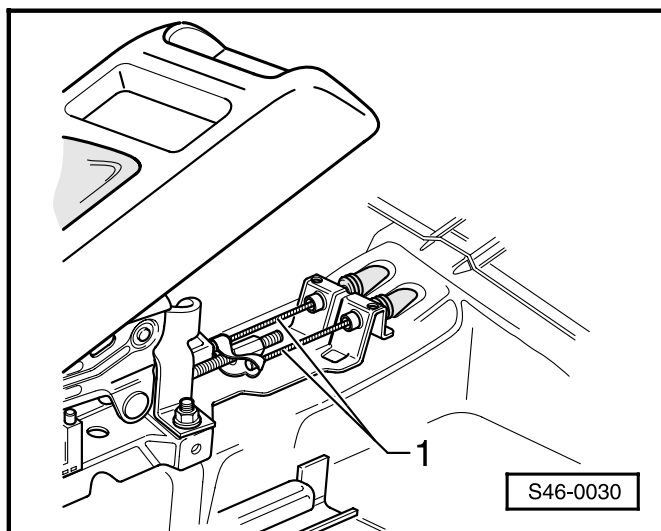
After replacing brake pads, check brake fluid level and top up brake fluid if necessary.

Adjusting handbrake (disc brakes)

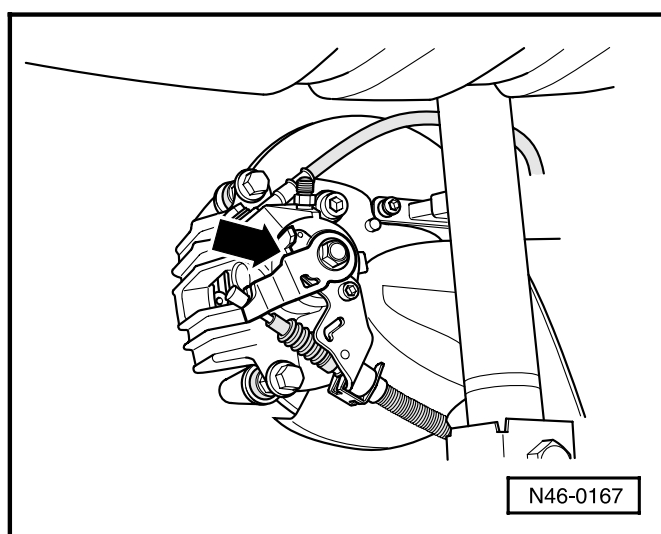
The automatic slack adjuster of the rear wheel brakes makes it unnecessary to re-set the handbrake. Re-setting should only be performed if the handbrake cables, brake calipers and brake discs are replaced.

Notes:

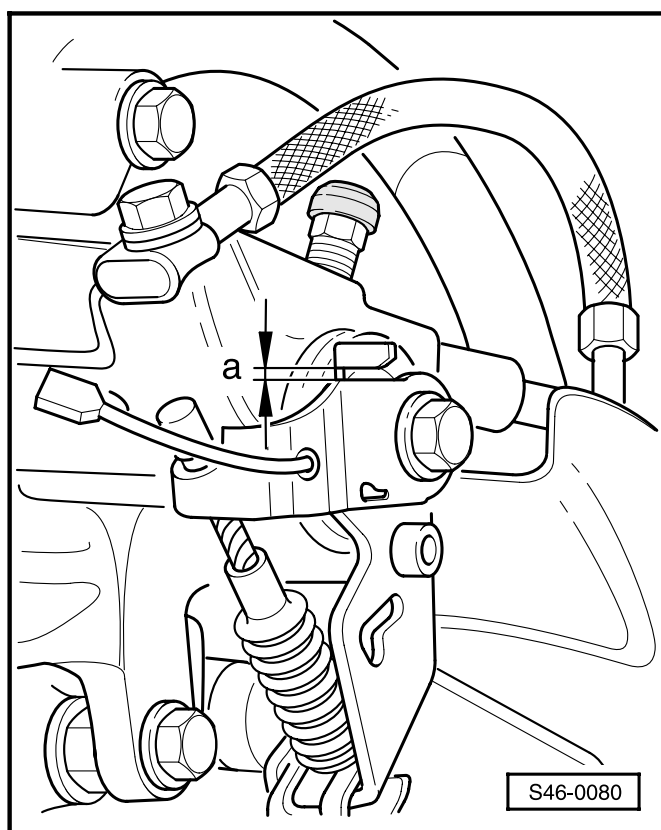
- ◆ *The footbrake must be bled and be in proper operating condition.*
- ◆ *Always replace self-locking slack adjuster nut.*
- Release handbrake.
- Remove ashtray in centre console.



- Take out cross-head screws.
- ◀ - Raise centre console at rear or remove, if necessary
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- 1 - Handbrake cables
- Depress footbrake firmly once.



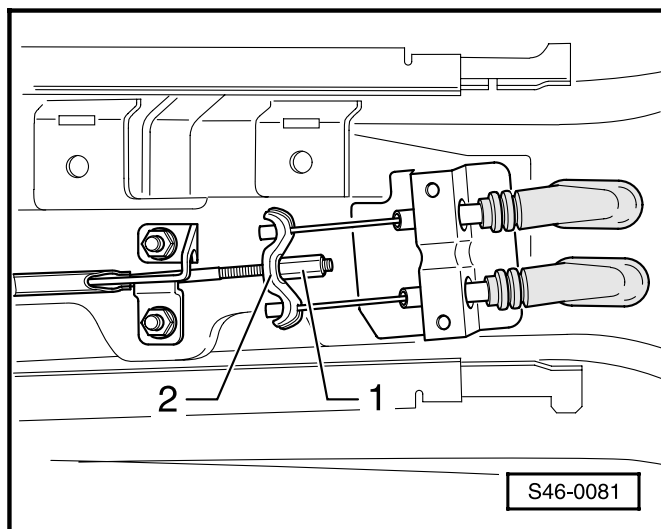
- ◀ - Handbrake lever in off position. Tighten slack adjuster nut sufficiently until the levers (arrow) at the brake calipers lift off from the stops.



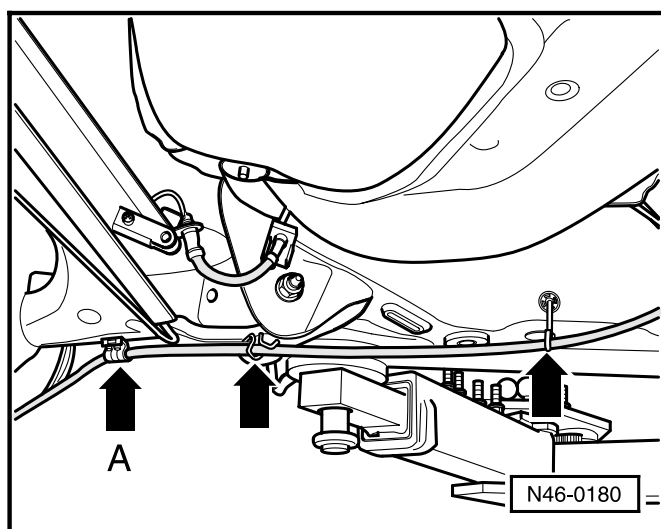
- ◀ - Use a feeler gauge to check clearance between lever and stop at left and right brake caliper.
- The distance -a- between lever and stop at the left and right brake calipers must in total be at least 1 mm; it must not be less or more than 3 mm.
- Tighten handbrake firmly and release again 3x. This ensures that the components are properly positioned and settled.
 - With handbrake lever in off position, check whether both wheels rotate freely; turn back slack adjuster nut slightly, if necessary.

Removing and installing handbrake cable (FWD models/drum brakes)

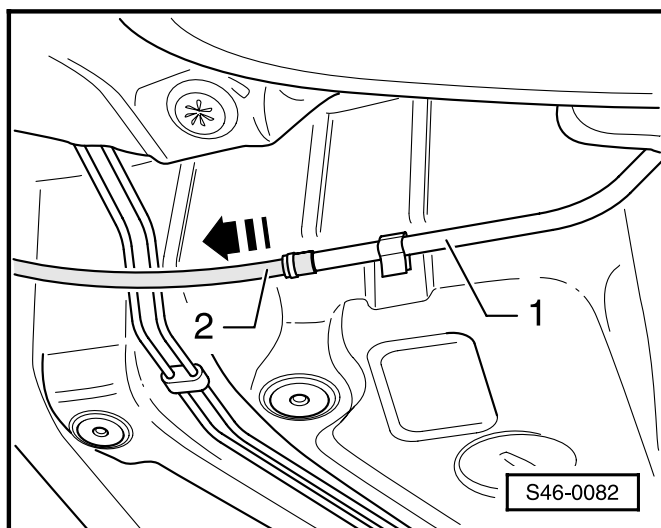
Removing



- Remove rear centre console.
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- Release handbrake.
- ◀ - Slacken adjusting nut -1- sufficiently until it is possible to take the handbrake cable out of the compensating bar -2-.
- Raise vehicle.
- Take off wheel.
- Remove brake drum.



- Release handbrake cable from the brake lever at the brake shoe.
- ◀ - Take handbrake cable out of the clip at the rear axle beam -arrow A- and release it from the fixtures -arrows-.



- ◀ - Pull handbrake cable -2- out of the guide tube -1- in direction of arrow.

Installing

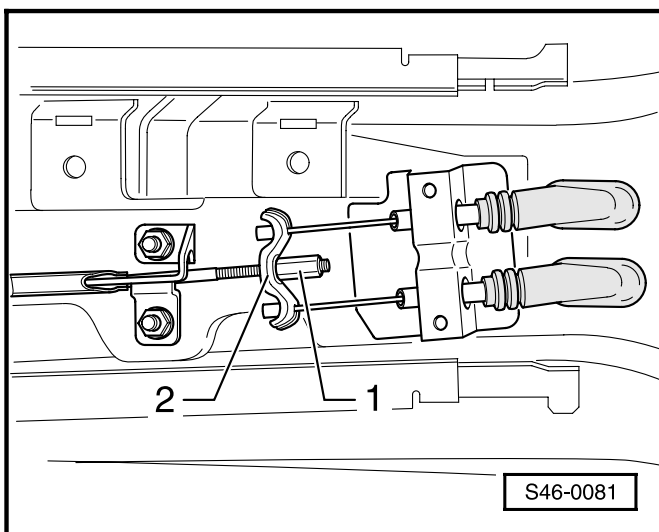
Installation is carried out in the reverse order.

Notes:

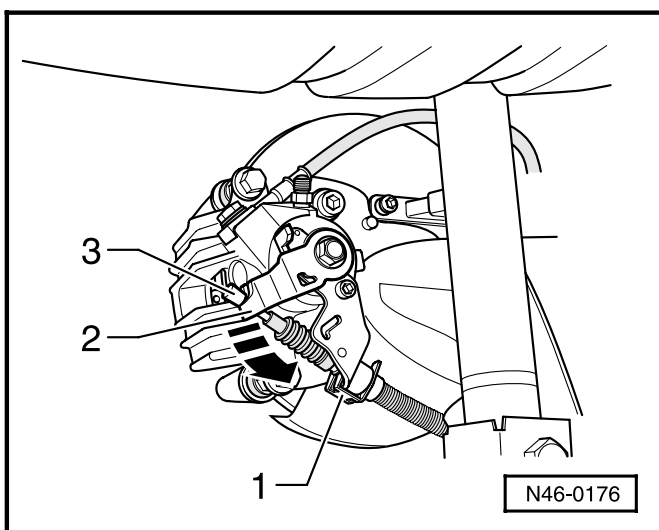
- ♦ Pay attention to installation position when installing handbrake cables ⇒ page 46-18.
- ♦ Before adjusting the handbrake, pretension handbrake cable with the adjusting nut at the compensating arm.
- ♦ Adjusting handbrake ⇒ page 46-12.

Removing and installing hand-brake cable (FWD models/disc brakes)

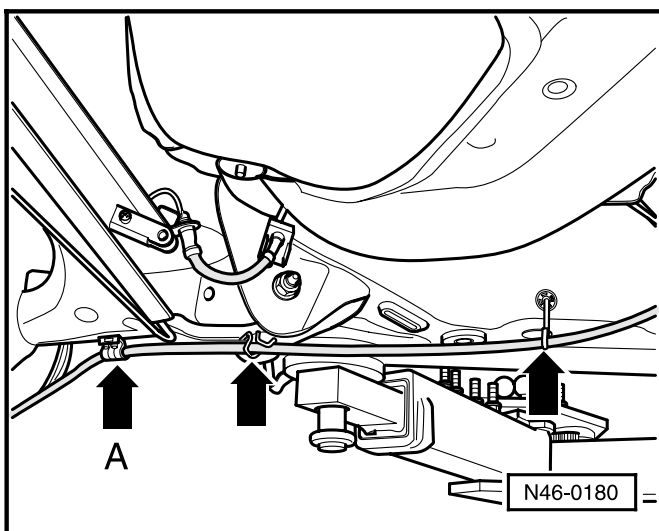
Removing



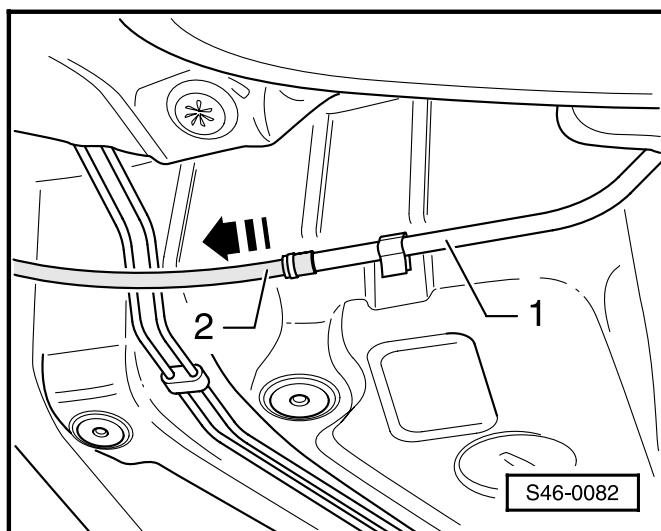
- Remove rear centre console.
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- Release handbrake.
- ◀ - Slacken adjusting nut -1- sufficiently until it is possible to take the handbrake cable out of the compensating bar -2-.
- Raise vehicle.



- ◀ - Use a screwdriver to lever out clip -1- and pull down and off.
- Press brake lever -2- in direction of arrow and detach handbrake cable -3-.



- ◀ - Take handbrake cable out of the clip at the rear axle beam -arrow A- and release it from the fixtures -arrows-.



- ◀ - Pull handbrake cable -2- out of the guide tube
-1- in direction of arrow.

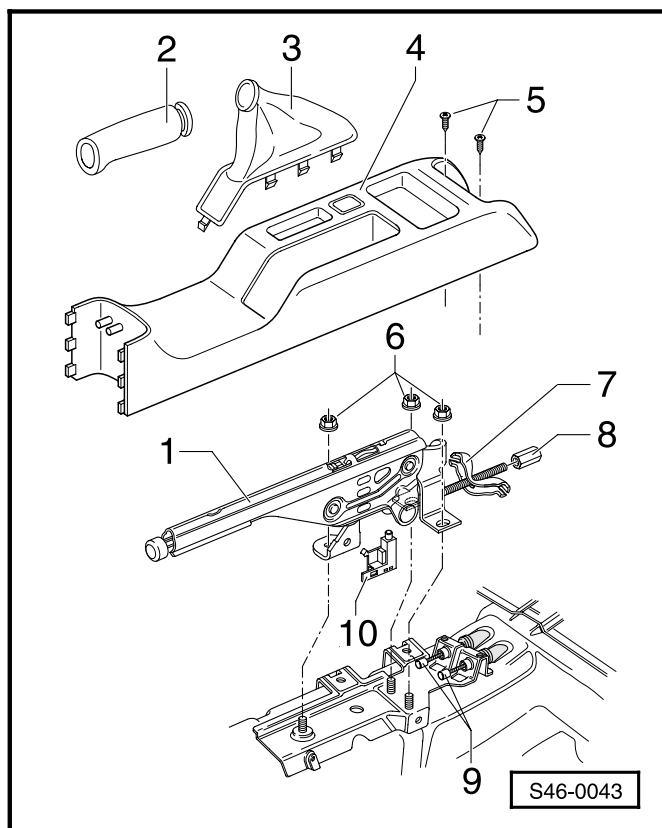
Installing

Installation is carried out in the reverse order.

Notes:

- ♦ Pay attention to installation position when installing the handbrake cables ⇒ page 46-18.
- ♦ Before adjusting the handbrake, pretension handbrake cable with the adjusting nut at the compensating bar.
- ♦ Adjusting handbrake cable ⇒ page 46-17.

Summary of components of handbrake lever



1 - Handbrake lever

- ◆ Take out centre console before removing

⇒ Body Fitting Work; Repair Group 68; Interior Equipment

2 - Handle

- ◆ Pull off to the front; to do this, use screwdriver to first of all press down catch below handle

3 - Trim cover for handbrake lever

- ◆ Removing:

⇒ Body Fitting Work; Repair Group 68; Interior Equipment

4 - Centre console

- ◆ Removing:

⇒ Body Fitting Work; Repair Group 68; Interior Equipment

5 - Cross-head screw, 1.4 Nm

6 - Hexagon nut, 25 Nm

7 - Compensating bar

8 - Slack adjuster nut, self-locking

- ◆ Replace each time removed
- ◆ Adjusting handbrake:
 - Models with drum brakes
⇒ page 46-12
 - Models with disc brakes
⇒ page 46-17

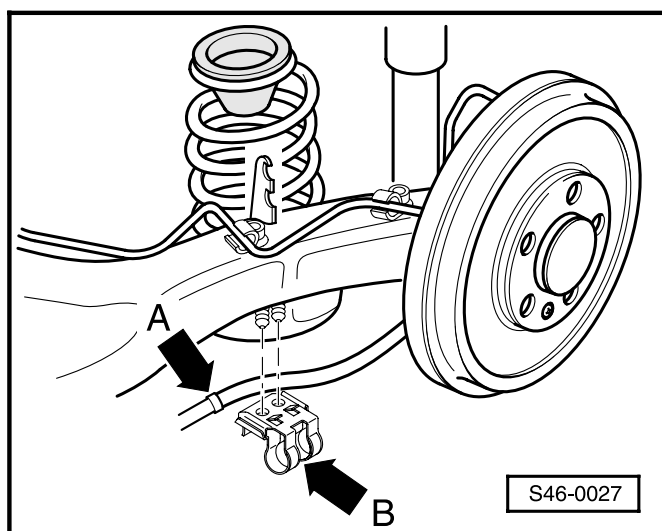
9 - Handbrake cable

- ◆ Installation position of handbrake cables ⇒ Fig. 1
- ◆ Removing and installing (drum brakes)
⇒ page 46-17.2
- ◆ Removing and installing (disc brakes)
⇒ page 46-17.3
- ◆ Different versions for rear drum and disc brakes

⇒ Parts List

10 - Handbrake indicator switch

- ◆ Clipped in place
- ◆ Replace if faulty



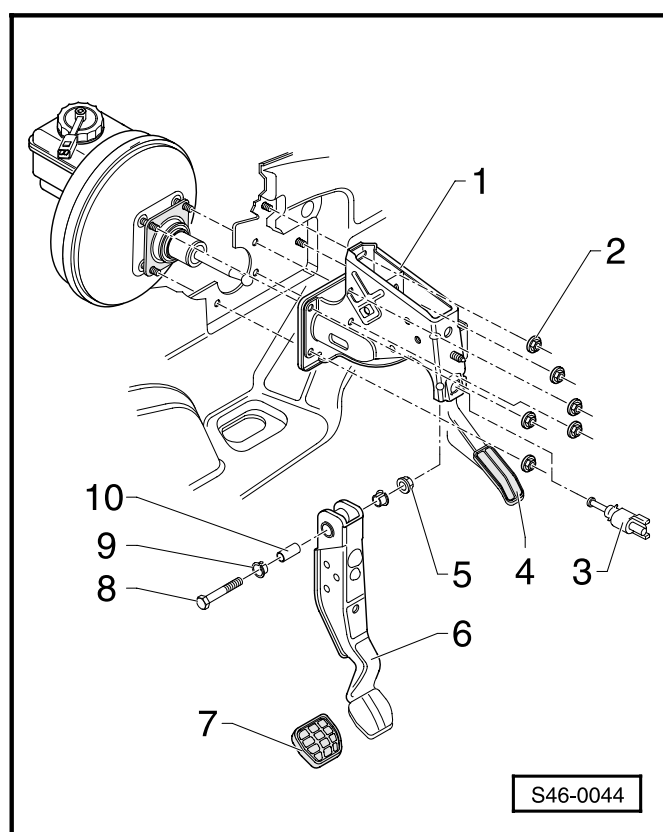
◀ Fig. 1 Installation position of handbrake cables

Note:

The installation position of handbrake cables is identical on models fitted with drum or disc brakes (illustration shows version with drum brakes).

- The handbrake cables are attached to the axle beam with clips.
- The clamping ring -arrow A- at the handbrake cable must be positioned in the middle of the clip -arrow B-.

Summary of components: foot lever system, the brake pedal



Take note!

The travel distance of the brake pedal must not be shortened by use of additional floor coverings.

Comments:

- ◆ Grease the bearing and the contact surfaces with MoS₂ grease (Molykote grease)
 - ◆ Replace self-locking nuts
 - ◆ When using mechanical gas actuation detach the gas actuation system from the accelerator pedal before removing the bearing support.
- ⇒ Engine-mechanics, Rep. Gr. 20; repairing the gas actuation system

1 - Bearing support

- ◆ Removing and installing
⇒ Page 46-22

2 - Hexagonal nut, self-locking, 28 Nm

- ◆ Replace
- ◆ 4 pieces for fixing the bearing support to the brake booster
- ◆ 2 pieces for fixing the bearing support to the assembly plate

3 - Brake light switch

- ◆ The brake pedal should be clipped onto the push rod of the brake booster before mounting the brake light switch
⇒ Page 46-21
- ◆ Removing and installing
⇒ Page 45-69
- ◆ Allocation ⇒ spare parts catalogue

4 - The accelerator pedal

- ◆ Removing and installing
⇒ Engine-mechanics, Rep. Gr. 20

5 - Hexagonal nut, self-locking, 25 Nm

6 - The brake pedal

- ◆ Disconnect from the brake booster
⇒ Page 46-20
- ◆ Removing and installing
⇒ Page 46-22

7 - Cap

8 - Hexagonal nut

9 - Bearing bush

10 - Bearing bolts

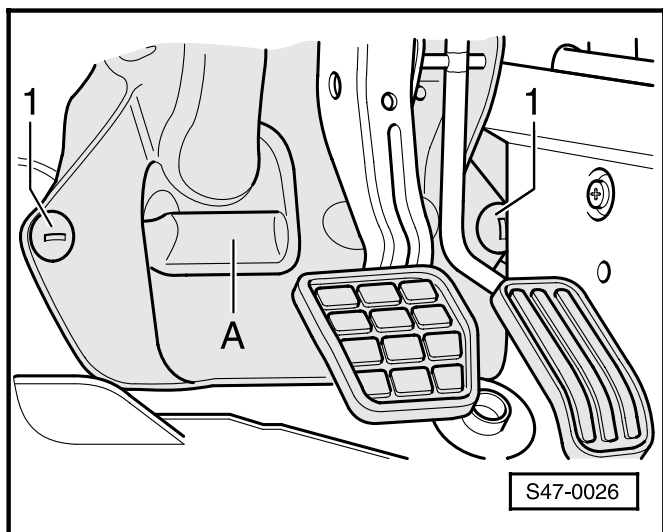
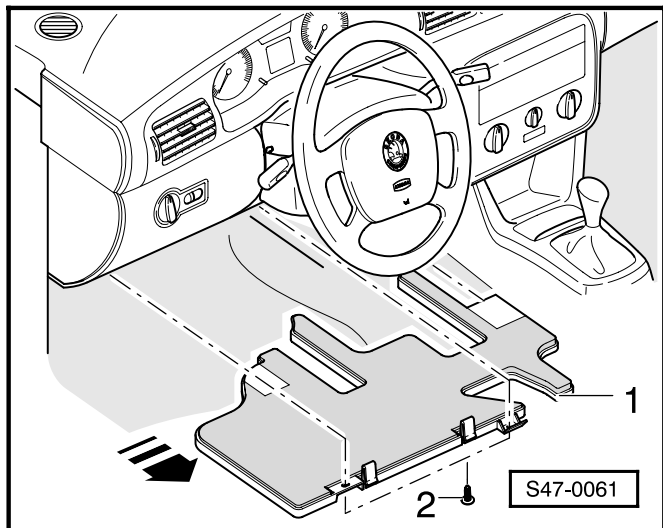
Separating brake pedal from brake servo unit, clipping together

Special tools, testers and aids required

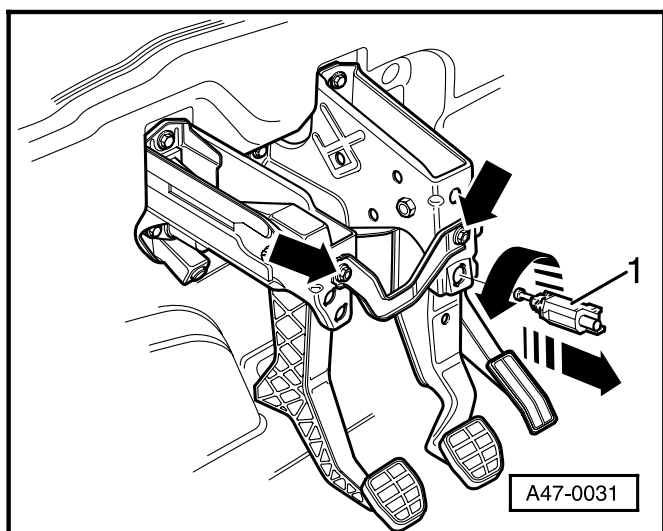
- ◆ Release tool T30021

Separating brake pedal from brake servo unit

- ◀ - Take out screws -2-.
- Pull footwell panel -1- out of fixtures.



- ◀ - Remove screws -1-.
- Remove cover -A-.



- ◀ - On models with manual gearbox, remove connecting plate between clutch and brake pedal -arrows-.
- Remove brake light switch -1-
⇒ page 45-69.

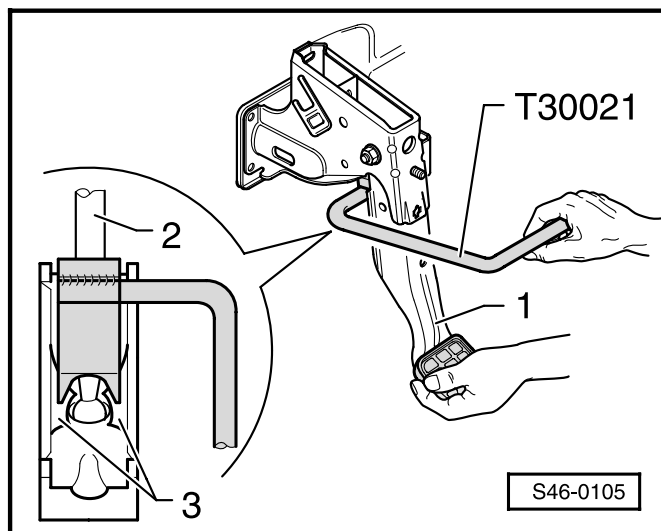
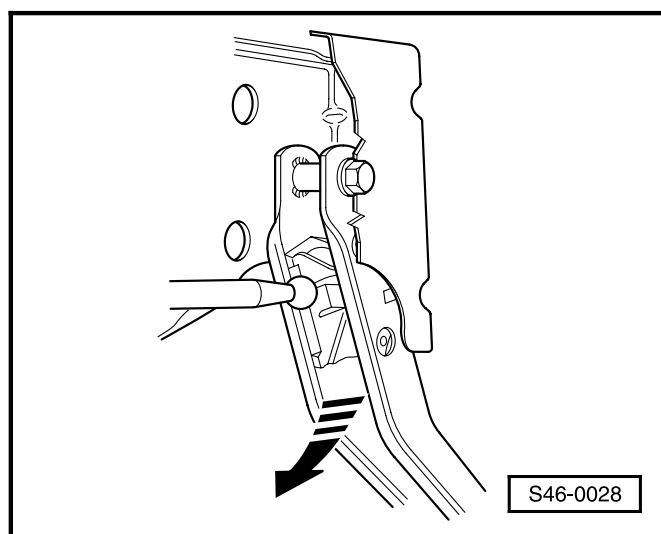
**Note:**

Illustration shows how to separate brake pedal from brake servo unit with pedal assembly removed, to simplify illustration.

- ◀ - Press brake pedal toward brake servo unit and hold tight.
 - 1 - Brake pedal
 - 2 - Pushrod
 - 3 - Retaining lugs
- Insert release tool T30021 and pull toward driver seat; counterhold at brake pedal for this step (pedal must not move back at this moment).
When this is done, the retaining lugs -3- of the mount are pressed off at the ball head of the pushrod -2-.
- Pull release tool T30021 and brake pedal together toward driver seat (the brake pedal is pulled off at the ball head of the pushrod when this is done).

**Clipping brake pedal to brake servo unit**

- ◀ - Hold ball head of pushrod in front of the mount and depress brake pedal toward brake servo unit so that the ball head is heard to engage properly.

Further installation is carried out in the reverse order.

- Install brake light switch and set
⇒ page 45-69.

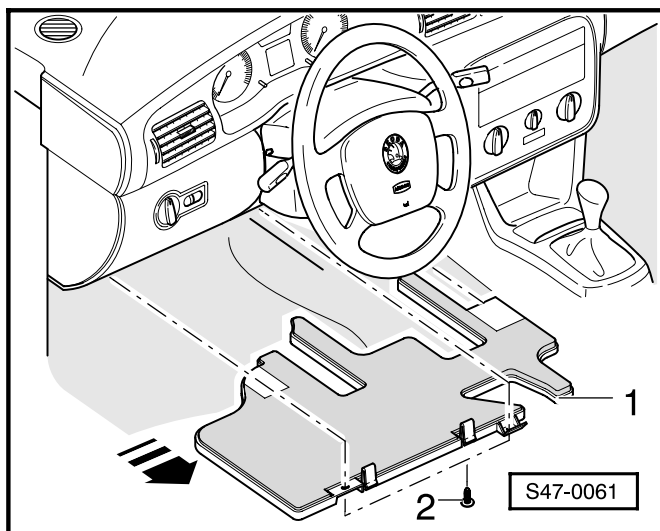
Removing and installing brake pedal

Special tools, testers and aids required

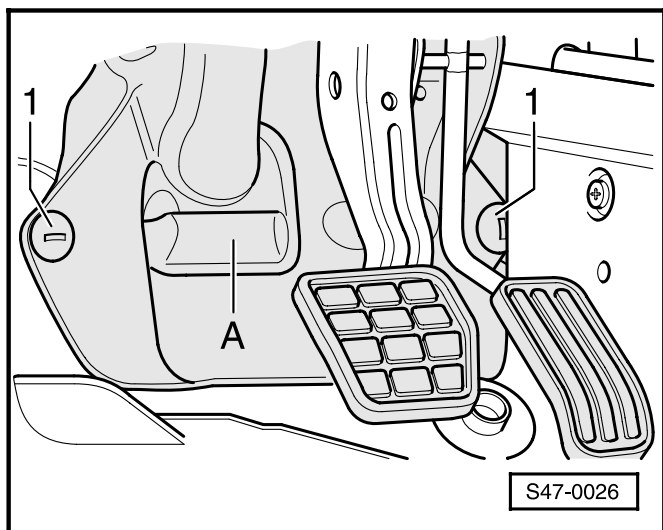
- ◆ Release tool T30021
- ◆ MoS₂ grease (Molykote grease)

Removing

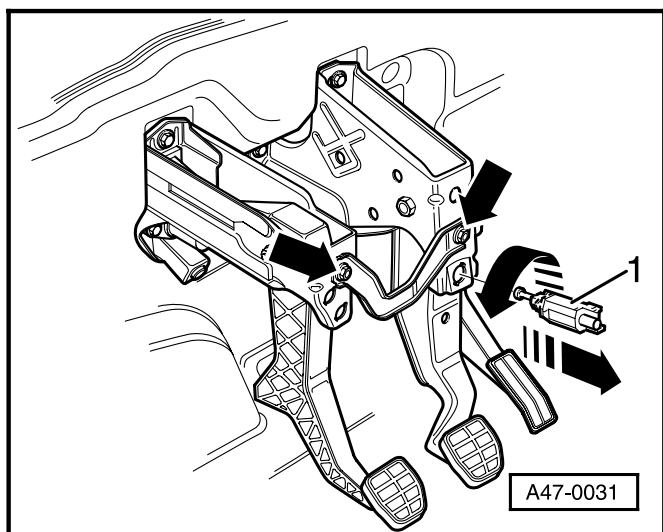
- ◀ - Take out screws -2-.
- Pull footwell panel -1- out of fixtures.

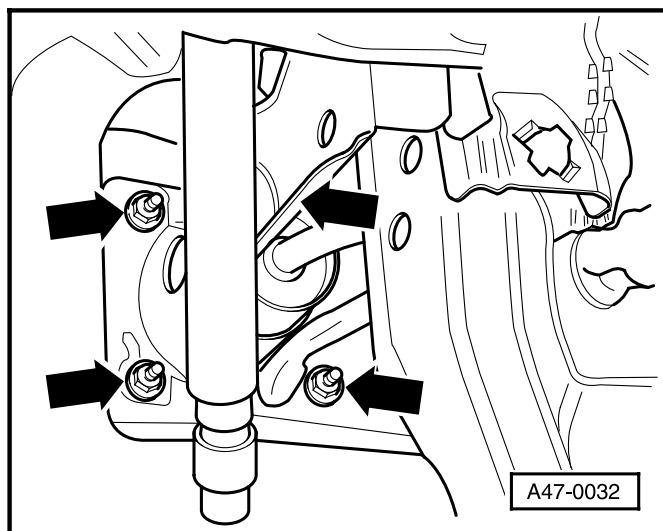


- ◀ - Remove screws -1-.
- Remove cover -A-.



- ◀ - On models with manual gearbox, remove connecting plate between clutch and brake pedal -arrows-.
- Remove brake light switch -1- ⇒ page 45-69.
- Detach accelerator cable.
- On models fitted with accelerator pedal position sender, detach plug connection below dash panel.
- Separate brake pedal from brake servo unit ⇒ page 46-20.





- ◀ - Remove hexagon nuts for attaching pedal assembly -arrows- (top right hexagon nut not visible in illustration).
- Take out pedal assembly.
- Remove bolted connection of bearing bracket - brake pedal.
- Remove brake pedal.

Installing

Note:

Grease all bearing and contact surfaces with MoS₂ grease.

Installation is carried out in the reverse order.

- Install brake light switch and set
⇒ page 45-69.

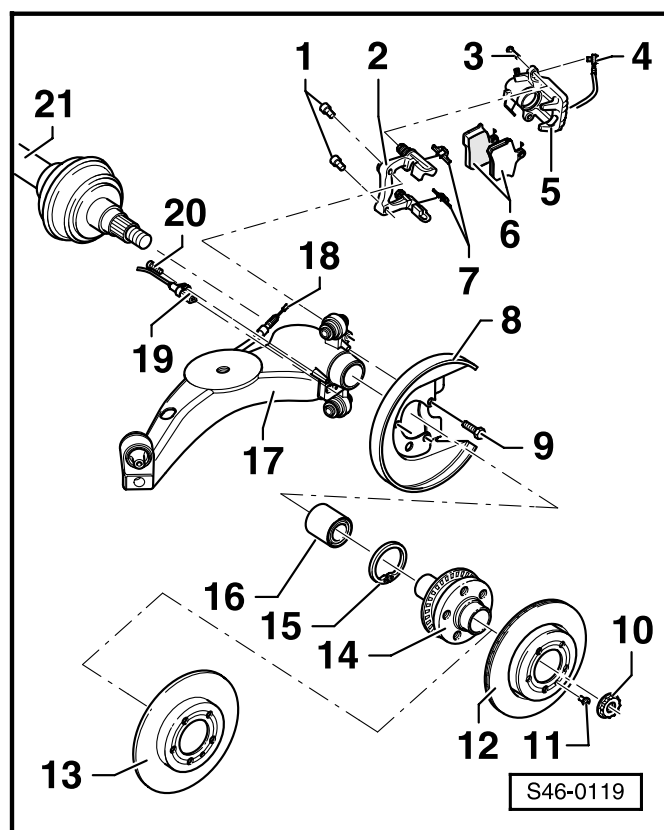
Tightening torques:

Brake pedal to bearing bracket 28 Nm
Fit new nut and bolt!

Brake servo unit to bearing bracket 28 Nm
Fit new nuts!

Servicing rear brake - 4x4/disc brake

Removing and installing rear brake



Notes:

- ◆ After replacing the brake pads, depress brake pedal firmly several times when vehicle stationary so that the brake pads are properly seated according to their position in operation.
- ◆ Use a bleeder bottle which comes into contact only with brake fluid for extracting brake fluid from the brake fluid reservoir. Brake fluid is toxic and must on no account be extracted by sucking out through a hose with your mouth!
- ◆ Insert the brake pedal depressor, e.g. V.A.G 1238/B, before removing a brake cylinder or separating a brake hose from the brake cylinder.
- ◆ Do not re-use brake fluid which was in the system.
- ◆ Tightening torque of wheel bolts: 120 Nm

1 - Hexagon socket bolt, 65 Nm

2 - Brake carrier with guide pins and protective caps

- ◆ Is supplied as replacement part, assembled, with adequate quantity of grease on guide pins
- ◆ If damage exists at the protective caps or the guide pins, install repair kit. Use enclosed grease packing for greasing the guide pins.

3 - Hexagon bolt, self-locking, 35 Nm

- ◆ Always replace

4 - Brake hose with banjo union and banjo bolt

- ◆ Must not be disassembled; always replace complete
- ◆ Tightening torque of banjo bolt: 35 Nm
- ◆ Do not detach brake hose for replacing brake pad

Special tools, testers and aids required

- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Brake pedal depressor, e.g. V.A.G 1238/B
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste)

5 - Brake caliper

- ◆ Do not detach brake hose for replacing brake pad
 - ◆ Removing:
 - Remove brake pads -item 6- ⇒ page 46-25
 - Insert brake pedal depresser
 - Detach brake hose -item 4- from brake caliper
 - ◆ Installing:
 - Install brake pads -item 6- ⇒ page 46-26
 - Attach brake hose -item 4- to brake caliper
 - Remove brake pedal depresser
 - Bleed brake system ⇒ page 47-18
 - ◆ Servicing ⇒ page 47-11
 - ◆ After servicing or replacement, it is first of all necessary to adjust the handbrake cable
- Do not operate the footbrake before this!**
- ◆ Adjusting handbrake ⇒ page 46-29

6 - Brake pads

- ◆ Thickness 17 mm including supporting plate
- ◆ Wear limit: 7.5 mm including supporting plate
- ◆ Inspecting thickness:
⇒ Inspection and Maintenance
 - ◆ Always replace on both sides of axle
 - ◆ Removing and installing
⇒ page 46-26

7 - Brake pad retaining spring

- ◆ Install new spring if pad replaced

8 - Splash guard**9 - Hexagon, 10 Nm****10 - Twelve-point nut, self-locking**

- ◆ Replace each time removed
- ◆ Tightening ⇒ page 42-74

11 - Cross-head screw, 4 Nm**12 - Brake disc, internally ventilated**

- ◆ Diameter 256 mm
- ◆ Thickness 22 mm
- ◆ Wear limit 20 mm
- ◆ If worn, replace on both sides of axle

13 - Brake disc

- ◆ Diameter 232 mm
- ◆ Thickness 9 mm
- ◆ Wear limit 7 mm
- ◆ If worn, replace on both sides of axle

14 - Wheel hub with pulse rotor

- ◆ Removing and inserting
⇒ page 42-44

15 - Circlip

- ◆ Replace each time removed

16 - Wheel bearing

- ◆ Replace each time removed
- ◆ Removing and inserting
⇒ page 42-44

17 - Semi-trailing arm**18 - Handbrake cable**

- ◆ Adjusting handbrake ⇒ page 46-29
- ◆ Removing and installing
⇒ page 46-31

19 - ABS wheel speed sensor

- ◆ Clean inner surface of hole and coat with solid lubricating paste G 000 650 (e.g. Wolfrakote Top Paste) before inserting the sensor

20 - Hexagon socket bolt, 8 Nm**21 - Drive shaft**

- ◆ Removing and installing
⇒ page 42-72

Removing and installing brake pads

Special tools, testers and aids required

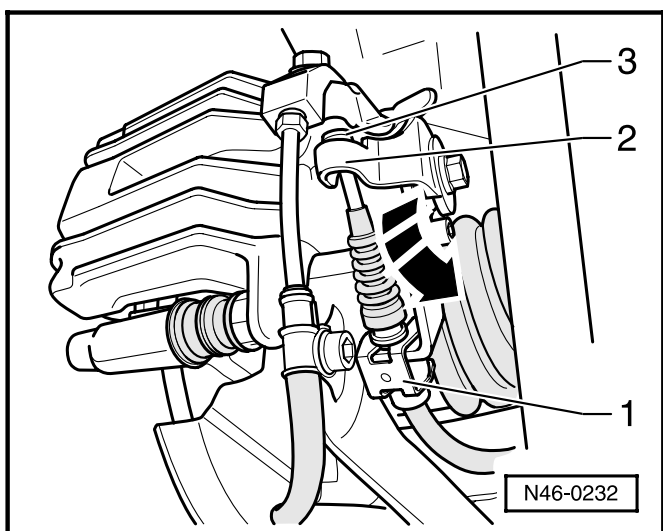
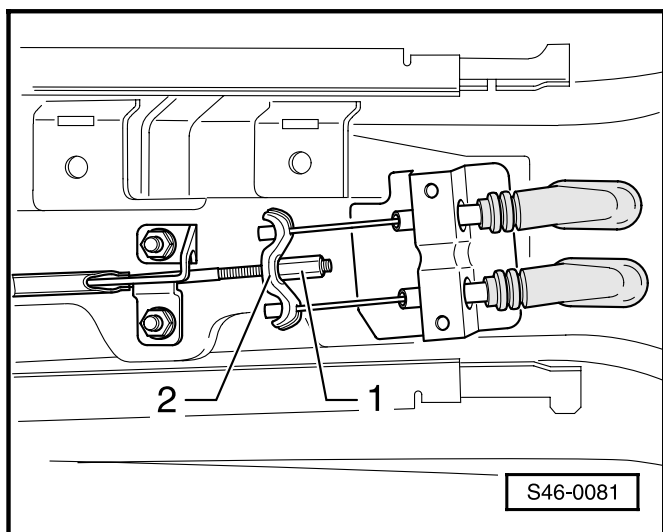
- ◆ Resetting and skimming tool MP 9-401
- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8

Notes:

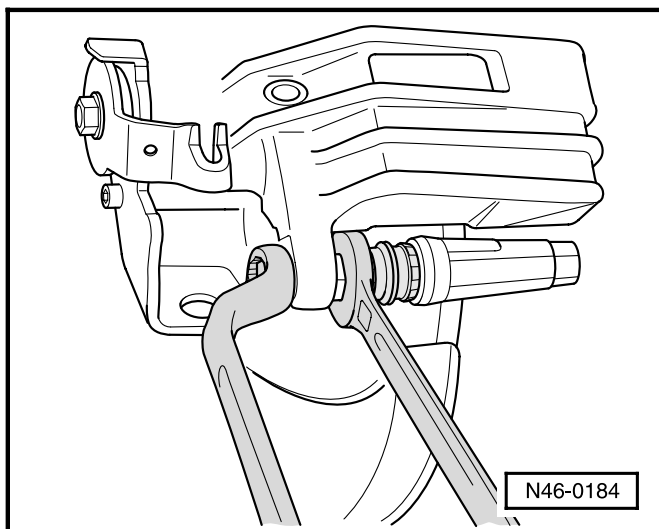
- ◆ *Mark brake pads which are to be re-used, when removing. Re-install at the same point otherwise braking action will be uneven!*
- ◆ *Do not disconnect brake line for replacing brake pads.*

Removing

- Remove rear centre console.
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- Release handbrake.
- ◀ - Slacken adjusting nut -1- sufficiently until it is possible to take the handbrake cable out of the compensating bar -2-.
- Raise vehicle.
- Take off wheels.



- ◀ - Use a screwdriver to lever out clip -1- and pull down and off.
- Press brake lever -2- in direction of arrow and detach handbrake cable -3-.

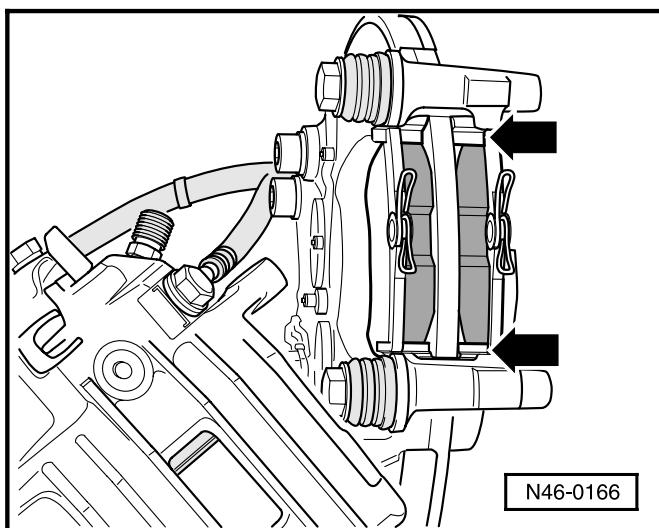


- ◀ - Unscrew bolts attaching brake caliper housing; counterhold at guide pin for this step.

Note:

The brake line and the surrounding area are not shown in the figure in order to simplify the illustration.

- Take off brake caliper housing and attach with wire so that the weight of the brake caliper is not pulling on the brake line or can damage it.



- ◀ - Remove brake pads and pad retaining springs -arrows-.

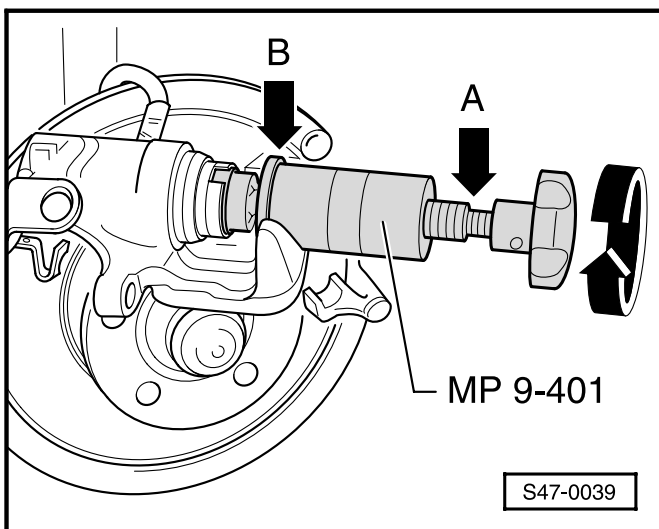
Note:

Use only methylated spirits for cleaning the brake caliper housing.

- Clean brake caliper housing, particularly the bonded surface for the brake pad. It must be free of adhesive residues and grease.

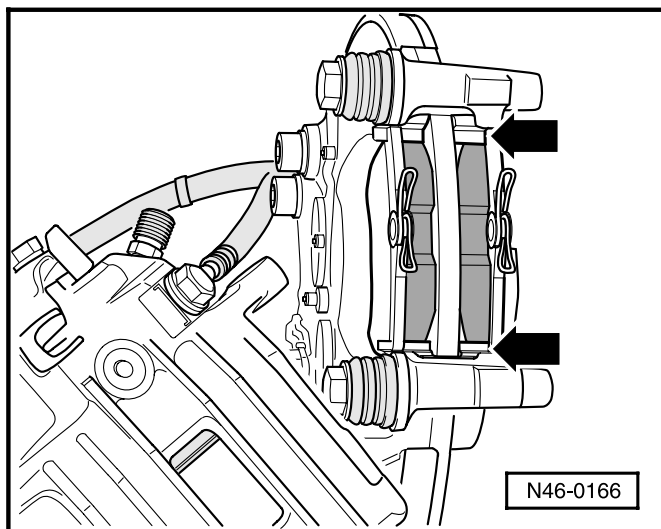
Installing**Notes:**

Before inserting new brake pads, press piston into the cylinder with resetting and skimming tool MP 9-401. Before pushing back, extract brake fluid from the reservoir with the bleeder bottle otherwise - if brake fluid has been replenished in-between - brake fluid may flow out and cause damage.

**Warning!**

Brake fluid is poisonous and must on no account be sucked out through a hose with your mouth.

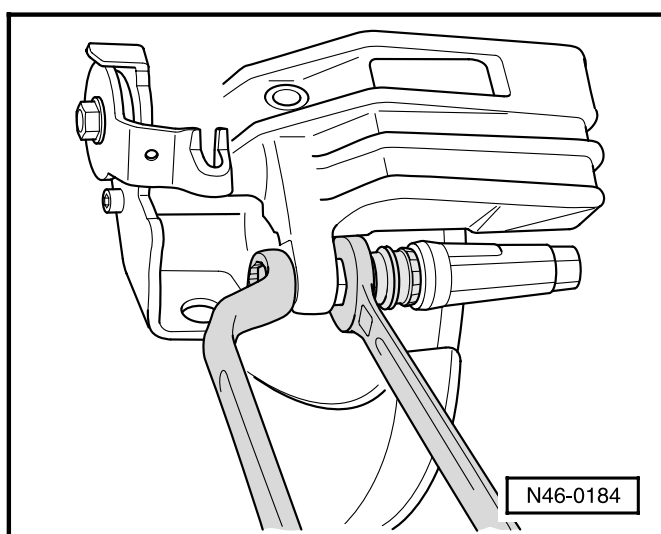
- ◆ Insert special tool MP 9-401 so that the collar (arrow B) of the tool is resting against the brake caliper.
- ◆ If piston is stiff, an open-end wrench size 13 can be positioned against the flats (arrow A) provided for this purpose.
- ◆ When the piston is moved with a piston resetting device, the automatic adjuster in the brake caliper is destroyed.



- Screw in piston by turning to the right at the knurled wheel of the special tool MP 9-401.
- ◀ - Insert new pad retaining springs and brake pads -arrows- into the brake carrier.
- Pull protective sheeting of the supporting plate of the brake pad.

Note:

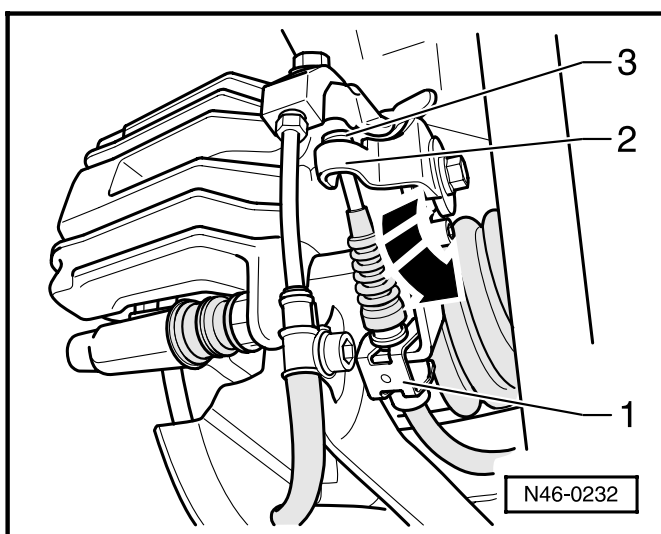
The repair kit contains four self-locking hexagon bolts which must always be installed.



- ◀ - Attach brake caliper housing with new self-locking bolts.

Counterhold at guide pin when tightening.

Tightening torque: 35 Nm.



- ◀ - Press brake lever -2- in direction of arrow and attach handbrake cable -3-.
- Install clip -1-.
- Adjust handbrake ⇒ page 46-29.
- Fit on wheels.
- Lower vehicle.

Notes:

- ◆ *Each time after replacing the brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads adopt their position corresponding to the normal operating state.*
- ◆ *Inspect the brake fluid level each time after replacing the brake pads.*

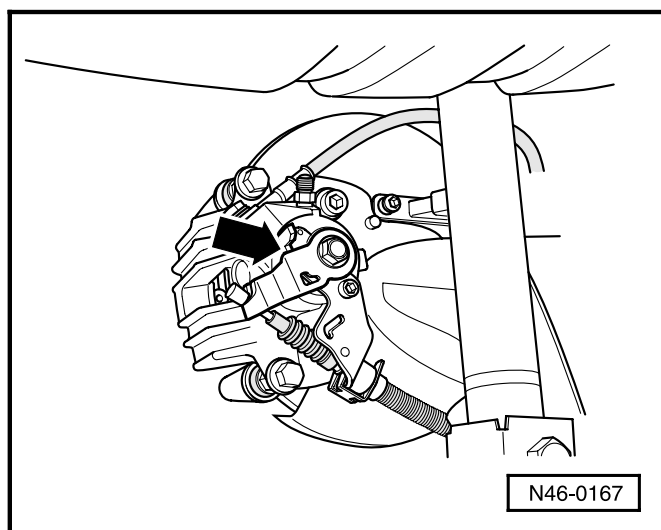
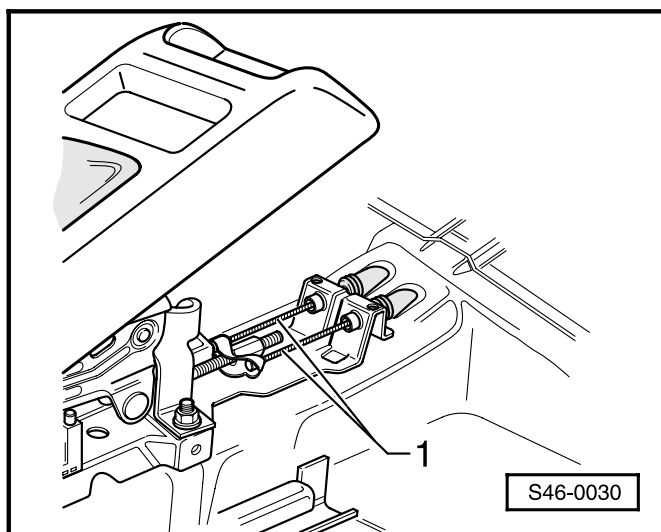
Adjusting handbrake

It is not normally necessary to adjust the handbrake because of the automatic slack adjuster of the rear brakes. A re-setting is only necessary if the handbrake cables, the brake calipers and the brake discs are replaced.

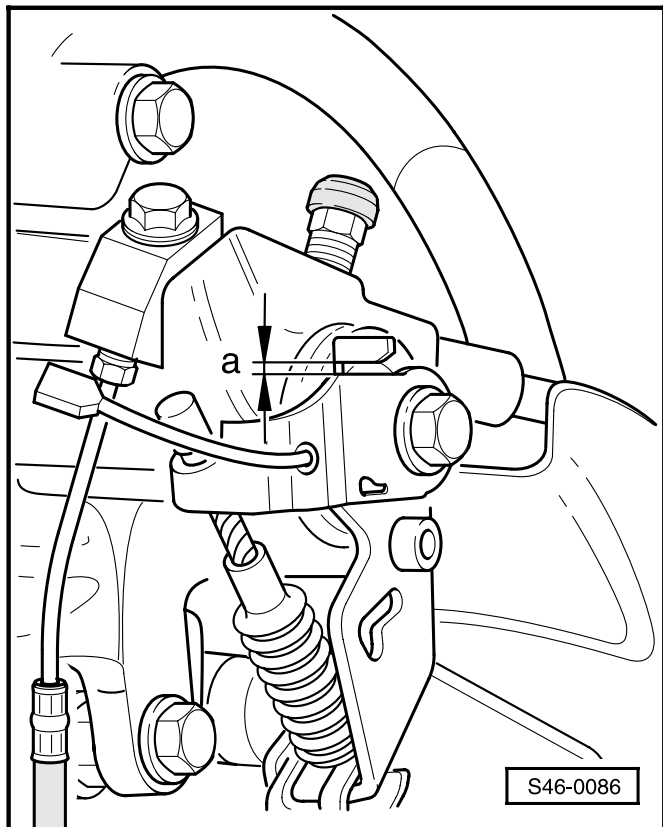
Notes:

- ◆ The footbrake must be bled and be operating properly.
- ◆ Always replace self-locking adjusting nut.

- Release handbrake.
- Remove ashtray in centre console.
- Take out cross-head screws.
- ◀ - Raise rear centre console; remove if necessary.
- ⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- 1 - Handbrake cables
- Depress footbrake once firmly.



- ◀ - Handbrake lever in off position. Tighten adjusting nut sufficiently until the levers (arrow) lift off from the stops at the brake calipers.



- ◀ - Inspect clearance between lever and stop at the left and right brake caliper with the feeler gauge.

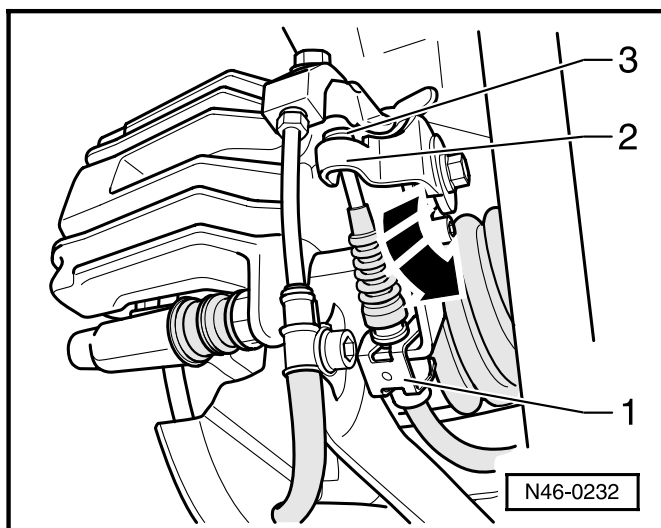
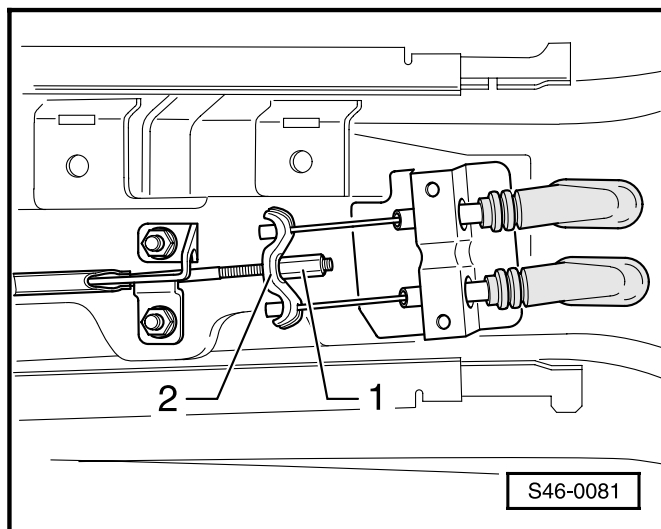
The clearance -a- between lever and stop must in total be at least 1 mm at the left and right brake caliper, but must not be more or less than 3 mm in total.

- Apply handbrake 3x firmly and release again. This ensures that the components are properly positioned and settled.
- With the handbrake lever in the off position, check whether both wheels rotate freely; turn back adjusting nut slightly, if necessary.

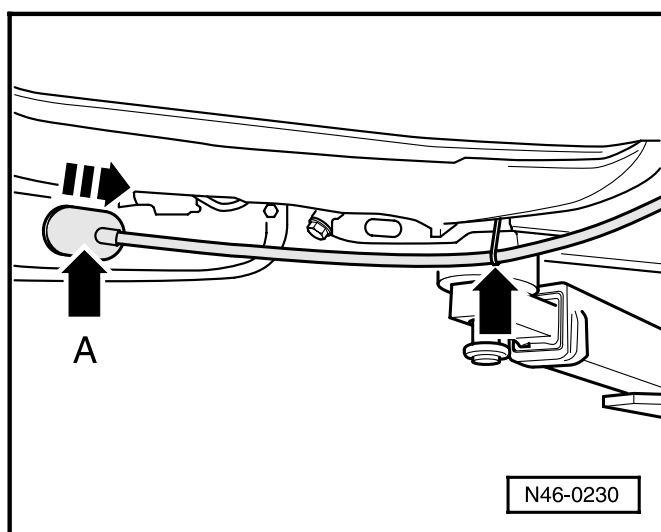
Removing and installing hand-brake cable, 4x4 models/disc brakes

Removing

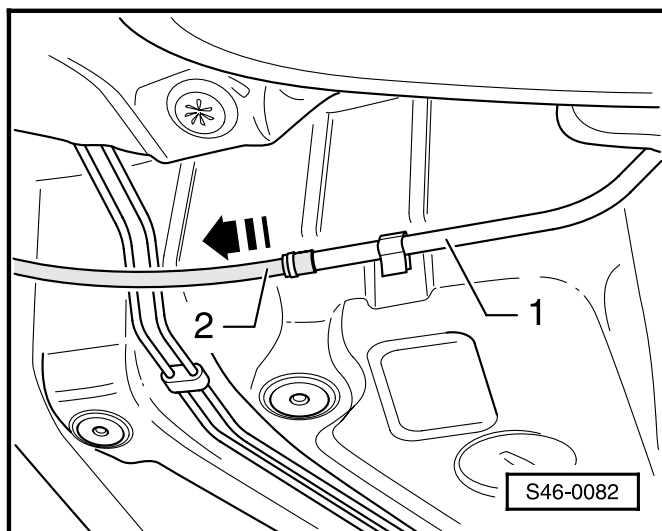
- Remove rear centre console.
⇒ Body Fitting Work; Repair Group 68; Interior Equipment
- Release handbrake.
- ◀ - Slacken adjusting nut -1- sufficiently until it is possible to take the handbrake cable out of the compensating bar -2-.
- Raise vehicle.



- ◀ - Use a screwdriver to lever out clip -1- and pull down and off.
- Press brake lever -2- in direction of arrow and detach handbrake cable -3-.



- ◀ - Remove rubber grommet -arrow A- from the trailing arm.
- Take handbrake cable out of fixture -arrow- and pull it out of trailing arm in direction of arrow.



- ◀ - Pull handbrake cable -2- out of guide tube
-1- in direction of arrow.

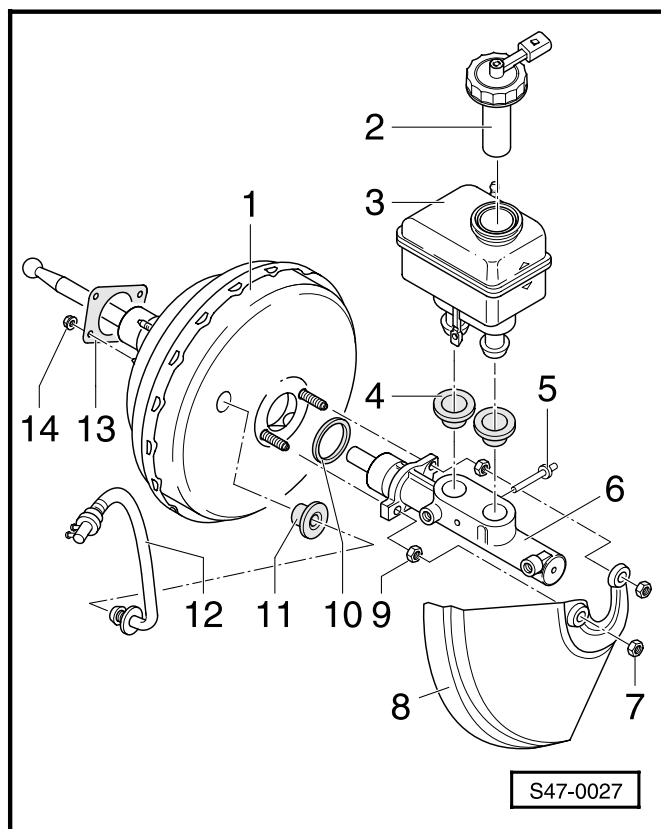
Installing

Installation is carried out in the reverse order.

Notes:

- ♦ Before adjusting the handbrake, pretension handbrake cable with the adjusting nut at the compensating arm.
- ♦ Adjusting handbrake ⇒ page 46-29.

Assembly overview: brake servo unit/brake master cylinder for models without ABS and for models with ABS, ABS/EDL Mark 20



Note:

Complete brake master cylinders and brake servo units can be replaced separately from each other.

1 - Brake servo unit without mechanical brake assist

- ◆ all models without ABS
- ◆ RHD models with ABS, ABS/EDL
- ◆ LHD models with ABS, ABS/EDL up to and including Model Year 2001

- Brake servo unit with mechanical brake assist

- ◆ LHD models with ABS, ABS/EDL from Model Year 2002
- ◆ mechanical brake assist integrated in brake servo unit
- ◆ brake assist is recognisable only from the part number of the brake servo unit assignment ⇒ Parts List
- ◆ brake assist cannot be serviced; if complaints exist, replace complete brake servo unit ⇒ page 47-4.1

- Continued for all brake servo units

- ◆ operational check ⇒ page 47-4
- ◆ removing and installing ⇒ page 47-4.1
- ◆ if fault exists, replace complete
- ◆ separating from brake pedal ⇒ page 46-20
- ◆ on petrol engines, vacuum required is drawn from intake manifold
- ◆ on diesel engines, vacuum pump fitted to produce vacuum
- ◆ non-return valve (in vacuum hose of vacuum pump) ⇒ page 47-7

Operational check

- It must be possible to blow through valve in direction of arrow.
- The valve must be leaktight in opposite direction of arrow.

2 - Cap

- ◆ with integrated brake fluid level warning contact -F34-

3 - Brake fluid reservoir

- ◆ locked into retaining pin with side catches

4 - Sealing plug

- ◆ moisten with brake fluid and press in reservoir

5 - Retaining pin

- ◆ insert through brake master cylinder

6 - Brake master cylinder

- ◆ on models with ABS/EDL/ESP two brake pressure senders (G201 and G214) are installed additionally ⇒ page 47-28
- ◆ must not be serviced; if fault exists, replace complete
- ◆ leak test ⇒ page 47-24

7 - Self-locking hexagon nut, 20 Nm

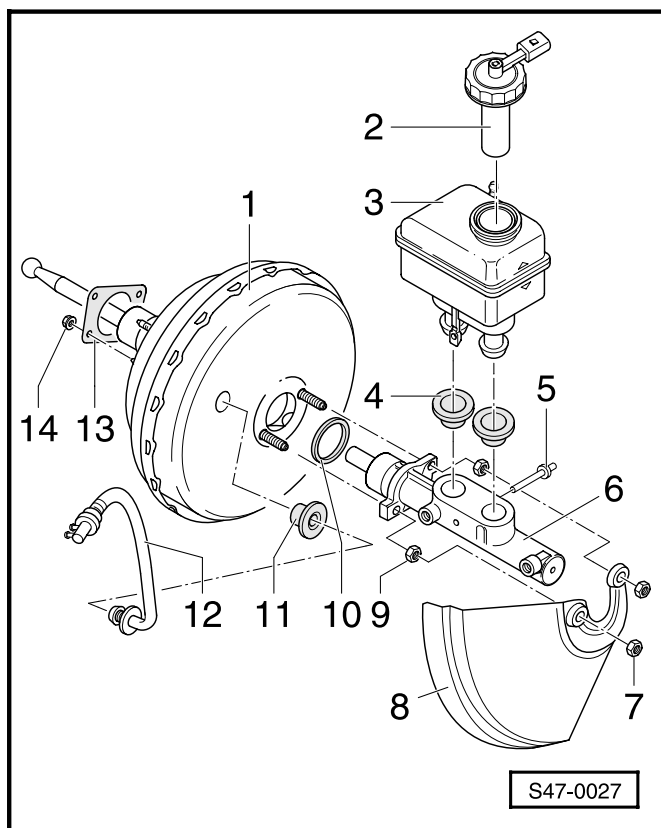
- ◆ only on models with 74 kW, 92 kW and 110 kW engine

8 - Heat shield

- ◆ only on models with 74 kW, 92 kW and 110 kW engine

9 - Self-locking hexagon nut, 20 Nm

- ◆ replace

**10 - Seal**

- ♦ replace

11 - Sealing plug**12 - Vacuum hose**

- ♦ with non-return valve

13 - Gasket

- ♦ for brake servo unit
- ♦ install between brake servo unit and bulkhead

14 - Self-locking hexagon nut, 25 Nm

- ♦ replace

Removing and installing brake master cylinder

Special tools, testers and aids required

- ♦ Hose clamp MP 7-602
- ♦ Extraction bottle (commercially available)
- ♦ Brake fluid ⇒ page 00-8
- ♦ Repair kit Part No. 1H0 698 311 A

Notes:

- ♦ *Before disconnecting the battery, determine the code of radio sets fitted with anti-theft coding.*
- ♦ *When re-connecting the battery, check the vehicle equipment:*
 - encode radio,
 - re-set clock,
 - initialise power windows.

⇒ Inspection and Maintenance

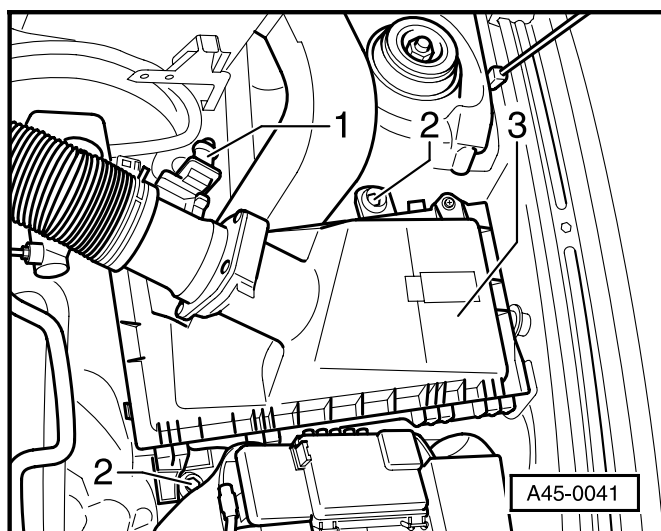
Removing

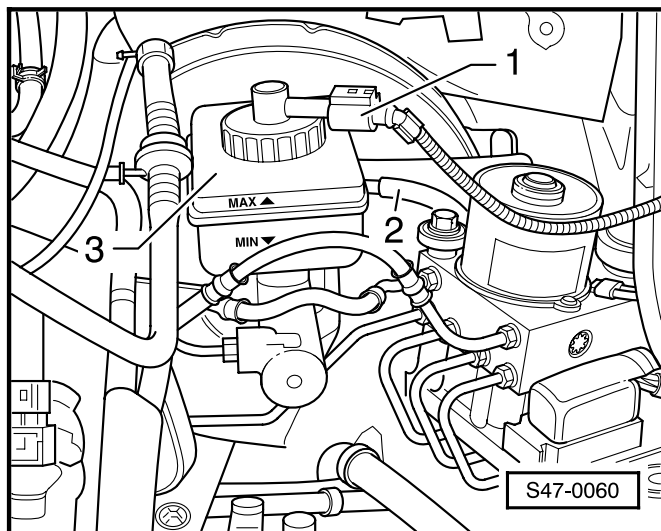
- Disconnect battery.

Note:

The following 2 steps do not apply to the 1.6 l/ 55 kW engine:

- ◀ - Unplug connector -1- of air mass meter from air guide pipe of air filter.
- Take out the screws -2- at the air filter -3- and place this down to the side.
- On diesel engines, remove relay carrier above brake servo unit.





- ◀ - Unplug connector -1- from brake fluid level warning contact -F34-.
- Extract as much brake fluid as possible from the brake fluid reservoir with extraction equipment or extraction bottle.
- Use special tool MP 7-602 to pinch off feed line of clutch master cylinder -2-.
- Detach feed line of clutch master cylinder -2- from brake fluid reservoir -3- and place up.
- Detach brake lines from tandem brake master cylinder, seal brake lines with plugs from repair kit Part No. 1H0 698 311 A.
- On 74 kW, 92 kW and 110 kW engines, unbolt heat shield.
- Unbolt tandem brake master cylinder from brake servo unit.

Installing

Installation is carried out in the reverse order.

- Replace the seal between brake master cylinder and brake servo unit.
- When fitting together brake master cylinder and brake servo unit, ensure the pushrod is correctly located in the brake master cylinder.
- After installing, pour in only fresh brake fluid.
- Connect battery ⇒ page 47-2.
- Bleed brake system ⇒ page 47-18.

- Bleed clutch (manual gearbox).
⇒ Manual Gearbox; Repair Group 30; Servicing clutch mechanism
⇒ Inspection and Maintenance
- On models with EDL, initiate basic setting
⇒ page 45-36.
- Interrogate fault memory ⇒ page 45-12.
- Erase fault memory ⇒ page 45-21.

Testing brake servo unit

Brake servo unit without brake assist

Operational check

- With engine switched off, depress brake pedal firmly several times (this reduces the pressure in the brake servo unit).
- Now, hold the brake pedal in the braking position with moderate foot force and start engine.

If the brake servo unit is operating properly, the brake pedal will now be felt to yield under your foot (servo assistance is active).

- If a problem exists, replace brake servo unit.

Brake servo unit with mechanical brake assist

Operational check of brake servo unit

⇒ Brake servo unit without brake assist, page 47-4.

Operational check of brake assist

- With engine running (full vacuum assistance must be assured), depress brake pedal firmly. When this is done, a “clicking” must be audible (brake assist is activated).

If no “clicking” can be heard, there is a fault in the brake assist and the brake servo unit must be replaced complete.

When the brake pedal is then released, a considerably reduced force from the brake pedal acts on the foot than is the case when braking.

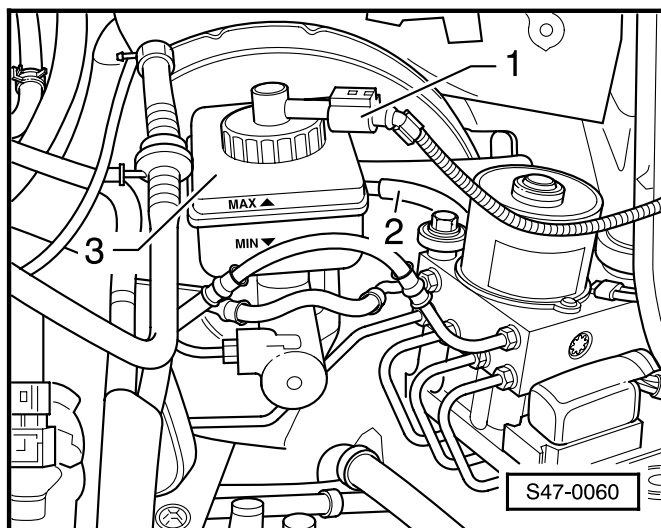
Removing and installing brake servo unit

Special tools, testers and aids required

- ◆ Hose clamp MP 7-602
- ◆ Brake pedal depresser, e.g. V.A.G 1238/B
- ◆ Vehicle system tester V.A.G 1552
- ◆ Diagnostic cable V.A.G 1551/3, 3A, 3B or 3C
- ◆ Release tool T30021
- ◆ Extraction bottle (commercially available)
- ◆ Repair kit Part No. 1H0 698 311 A
- ◆ Brake fluid ⇒ page 00-8

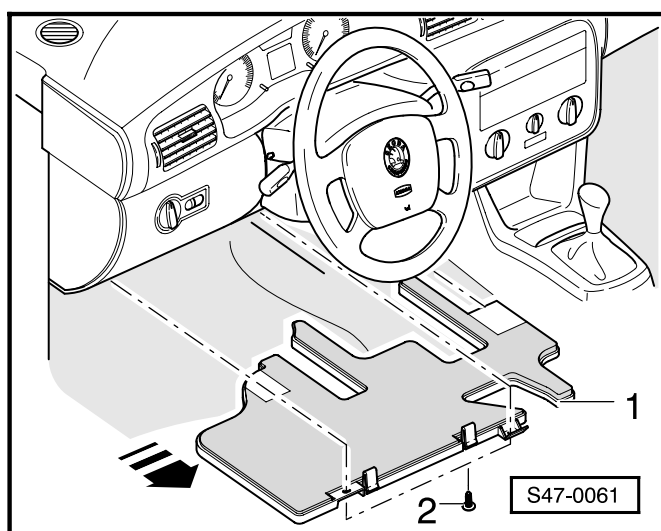
Notes:

- ◆ *Before disconnecting the battery, determine the code of radio sets fitted with anti-theft coding.*
 - ◆ *When re-connecting the battery, check the vehicle equipment:*
 - *encode radio,*
 - *re-set clock,*
 - *initialise power windows.*
- ⇒ Inspection and Maintenance

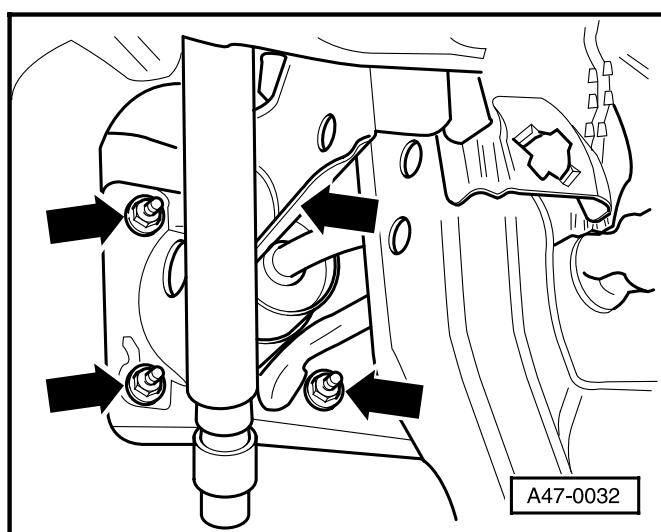


Removing

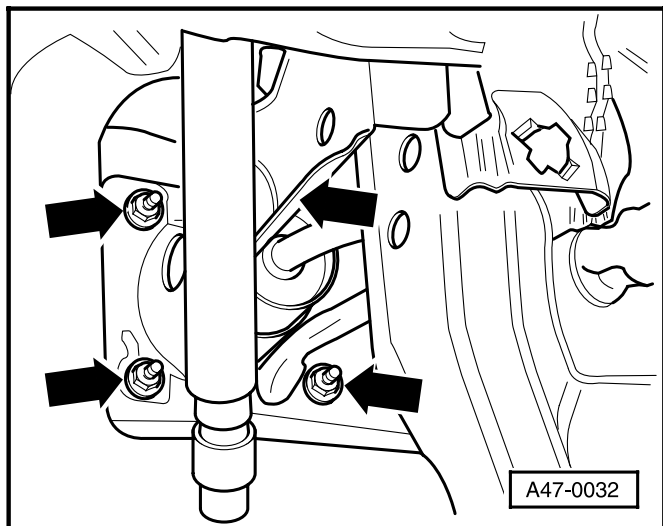
- Remove hydraulic control unit ⇒ page 45-52.
- ◀ - Unplug connector -1- from brake fluid level warning contact -F34-.
- Use hose clamp MP 7-602 to pinch off feed line of clutch master cylinder -2-.
- Detach feed line of clutch master cylinder -2- from brake fluid reservoir -3- and place up.
- Detach vacuum hose from brake servo unit.



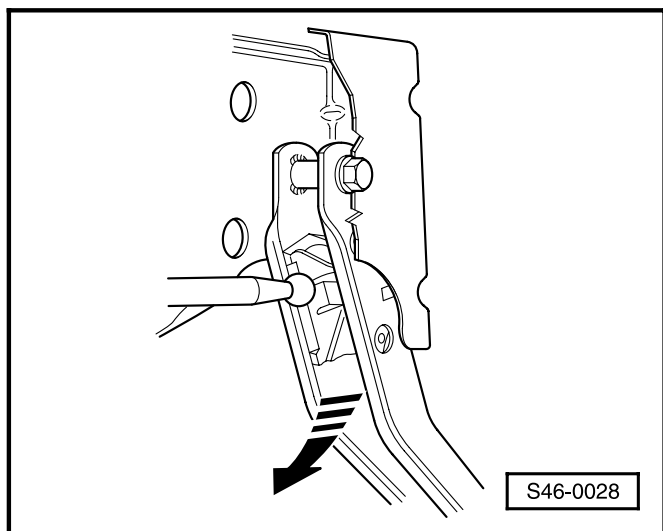
- ◀ - Remove screws -2-.
- Pull footwell panel -1- out of the fixture.



- Separate brake pedal from brake servo unit ⇒ page 46-20.
- ◀ - Unscrew hexagon nuts for brake servo unit -arrows-.
- Top right nut not visible in illustration.
- Guide brake servo unit and brake master cylinder out to the front and remove.

**Installing**

- ◀ - Install brake servo unit and brake master cylinder and tighten new hexagon nuts to final torque of 28 Nm -arrows-.



- ◀ - Clip brake pedal to brake servo unit ⇒ page 46-20.
- Install brake light switch and set ⇒ page 45-69.

The remaining installation is carried out in the reverse order.

- Pour in fresh brake fluid ⇒ page 00-8.
- Connect battery ⇒ page 47-2.
- Bleed brake system ⇒ page 47-18.
- Bleed clutch (manual gearbox).
⇒ Manual Gearbox; Repair Group 30; Servicing clutch mechanism
⇒ Inspection and Maintenance
- On models fitted with EDL, initiate basic setting ⇒ page 45-36.
- Interrogate fault memory ⇒ page 45-12.
- Erase fault memory ⇒ page 45-21.

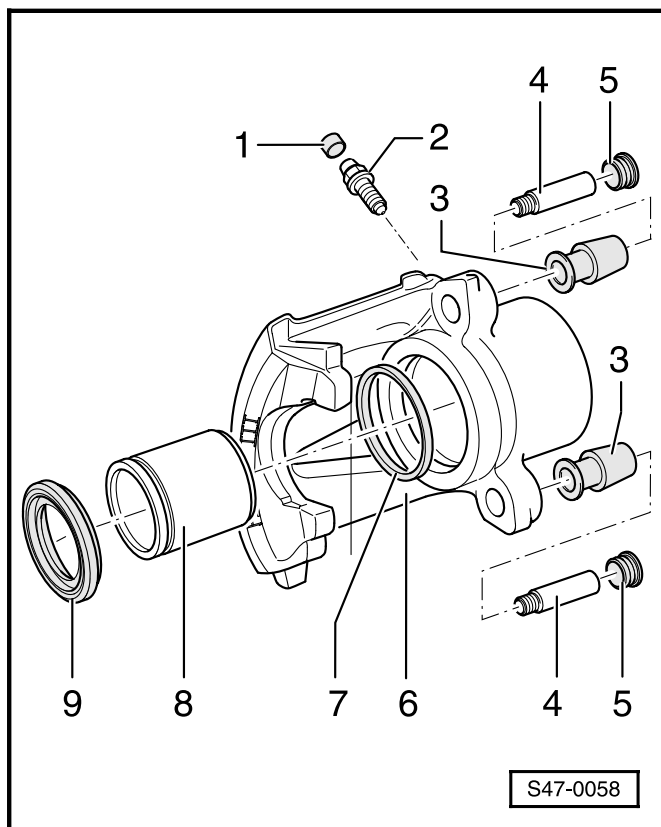
Removing and installing vacuum pump for brake servo unit

Models with diesel engine

- ⇒ Engine, Mechanical Components; Repair Group 15; Removing and installing cylinder head

Servicing front brake caliper, brake caliper FS-III

Summary of components of brake caliper FS-III



Notes:

- ♦ Always install complete repair kit when carrying out repairs.
- ♦ New brake calipers are filled with brake fluid and pre-bled.
- ♦ Apply a thin coat of brake fluid or assembly paste to brake cylinder, piston and seal.

1 - Dust cap

2 - Bleeder valve, 10 Nm

- ♦ Before inserting, apply a thin coat of brake fluid or assembly paste to thread

3 - Bearing bush

- ♦ Insert into brake caliper housing

4 - Guide pin, 28 Nm

5 - Cap

- ♦ Insert into bearing bush

6 - Brake caliper housing

7 - Seal

- ♦ Removing and installing ⇒ from page 47-9

8 - Piston

- ♦ Removing and installing ⇒ from page 47-9
- ♦ First of all, apply a thin coat of assembly paste or brake fluid to piston

9 - Protective cap

- ♦ Do not damage when inserting piston

Special tools, testers and aids required

- ♦ Piston resetting device MP 9-403
- ♦ Plastic wedge 3409
- ♦ Brake fluid ⇒ page 00-8
- ♦ Assembly paste G 052 150 A2

Removing and installing piston for front brake caliper

Special tools, testers and aids required

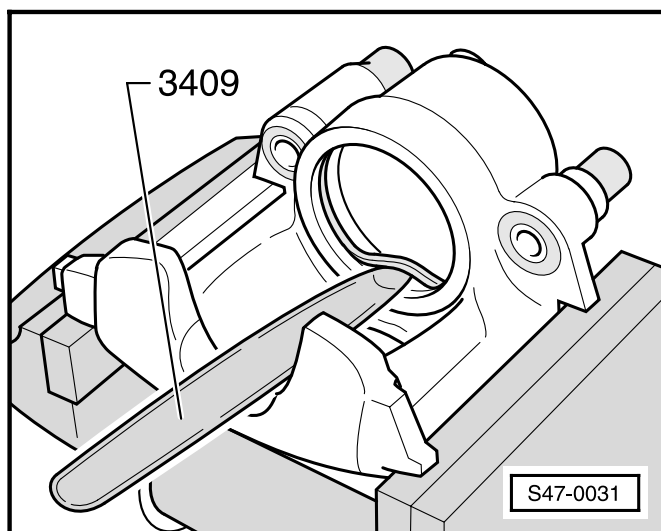
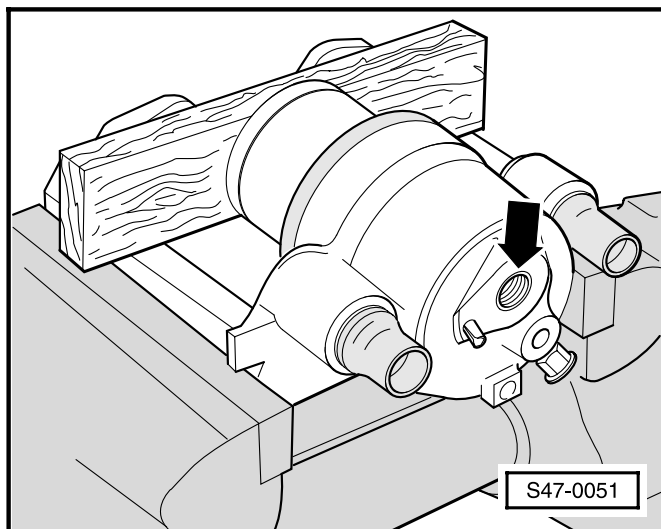
- ◆ Piston resetting device MP 9-403
- ◆ Plastic wedge 3409
- ◆ Brake fluid ⇒ page 00-8
- ◆ Assembly paste G 052 150 A2

Removing

- ◀ - Use compressed air to press piston out of the brake caliper housing -arrow-.

Note:

Place a wooden block in the recess so that the piston is not damaged.

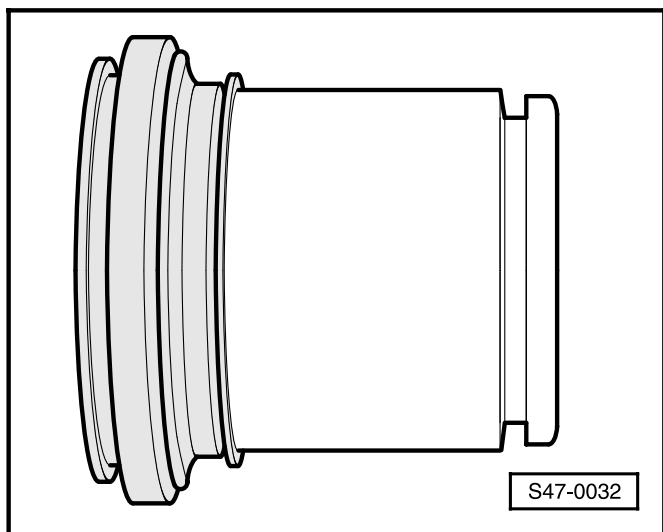


- ◀ - Remove seal.

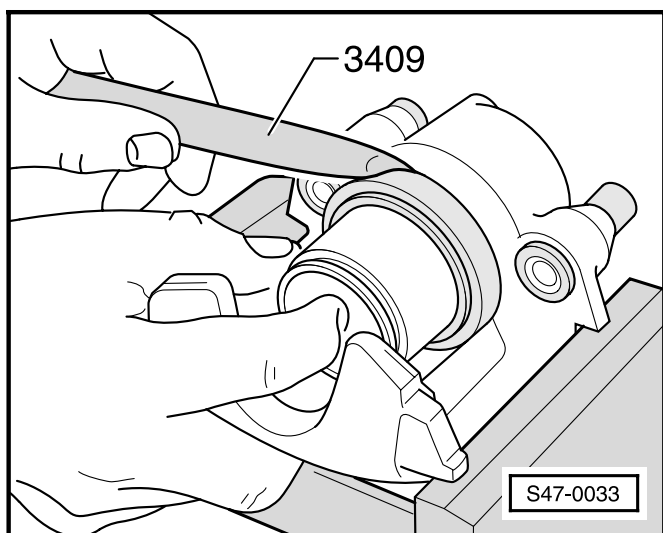
Use plastic wedge 3409 for this step.

Note:

When removing, ensure that the surface of the cylinder is not damaged.

Installing

- Clean surfaces of piston and seal with methylated spirits and then dry.
- Apply a thin coat of brake fluid or assembly paste G 052 150 A2 to the piston and seal before inserting into brake caliper housing.
- Insert new seal into the groove of the brake caliper.
- ◀ - Fit new protective cap with the outer sealing lip onto the piston.

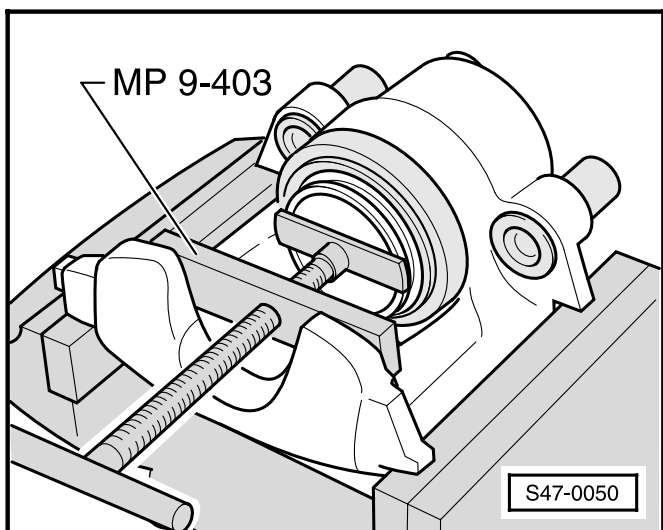


- ◀ - Use a plastic wedge to insert inner sealing lip of the protective cap into the groove of the cylinder.

Use plastic wedge 3409 for this step.

Note:

Hold piston in front of brake caliper housing for this step.



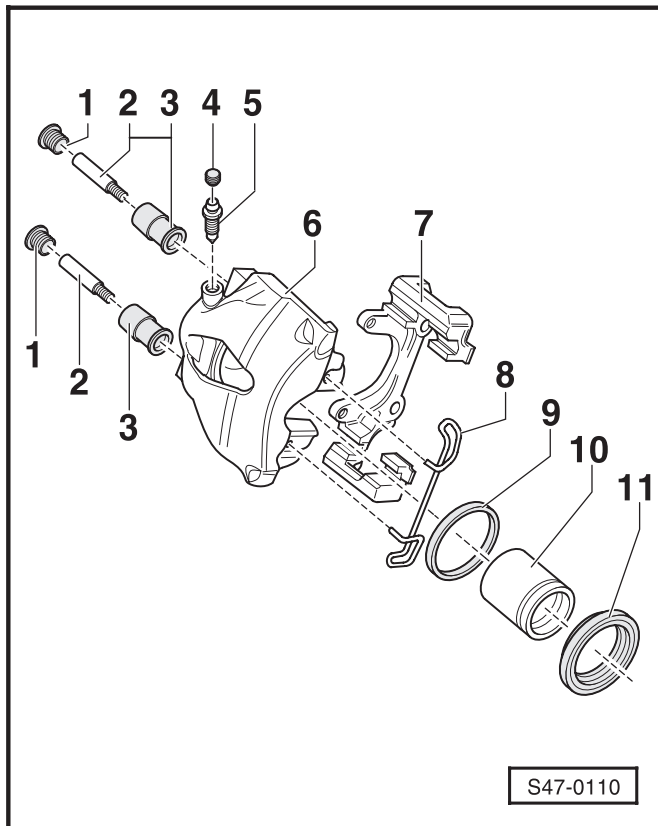
- ◀ - Use piston resetting device MP 9-403 to press piston into brake caliper housing.

Note:

The outer sealing lip of the protective cap jumps into the groove on the piston when this is done.

Repairing the front brake calliper, brake calliper FN-3

Summary of Components of Brake Caliper FN-3



Special tools, testers and aids required

- ◆ Piston jig MP 9-403
- ◆ Plastic wedge 3409
- ◆ Brake fluid ⇒ page 00-8
- ◆ Assembly paste G 052 150 A2

Notes:

- ◆ Install the complete repair set when undertaking repairs.
- ◆ New brake calipers are filled with brake fluid and are pre-bled.
- ◆ Thinly coat brake cylinder, piston and gasket ring with brake fluid or assembly paste

1 - Cap

- ◆ insert into bushing

2 - Guide bolts, 28 Nm

3 - Bushing

- ◆ insert into brake caliper housing

4 - Dust cap

5 - Bleeder screw, 10 Nm

- ◆ thinly coat thread with brake fluid or assembly paste before screwing in

6 - Brake caliper

7 - Brake carrier

- ◆ screwed to the brake caliper

8 - Pad retaining spring

- ◆ insert with both ends in the bores of the brake caliper.

9 - Gasket ring

- ◆ removing and installing
⇒ page 47-10.2

10 - Piston

- ◆ removing and installing
⇒ page 47-10.2
- ◆ thinly coat piston with brake fluid or assembly paste before fitting
- ◆ piston diameter: 54 mm

11 - Protective cap

- ◆ do not damage when inserting the piston
- ◆ pull with the outer sealing lip onto the piston
- ◆ insert with the inner sealing lip into the groove of the brake caliper ⇒ page 47-10.3

Removing and installing piston for front brake calliper

Special tools, testers and aids required

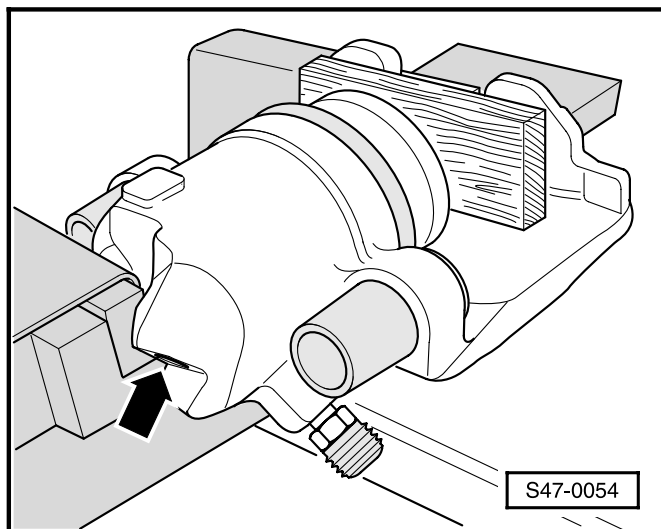
- ◆ Piston resetting device MP 9-403
- ◆ Plastic wedge 3409
- ◆ Brake fluid ⇒ page 00-8
- ◆ Brake cylinder paste, e.g. G 052 150 A2

Removing

- ◀ - Use compressed air to press piston out of brake calliper housing -arrow-.

Note:

Insert wooden block into the shaft so that the piston is not damaged.

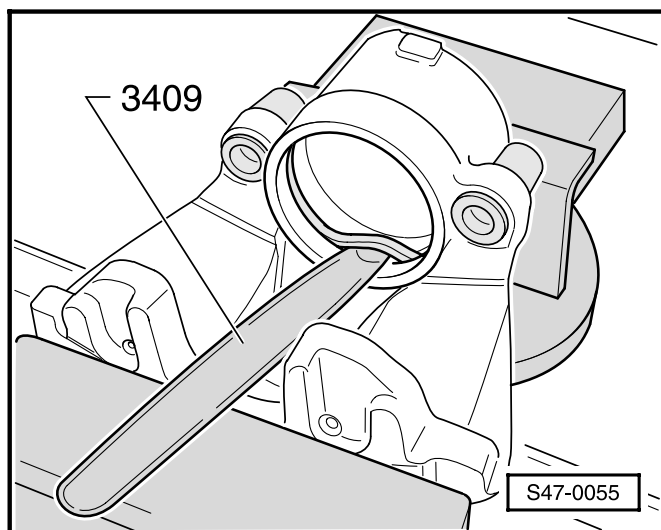


- ◀ - Remove seal.

Use plastic wedge 3409 for this step.

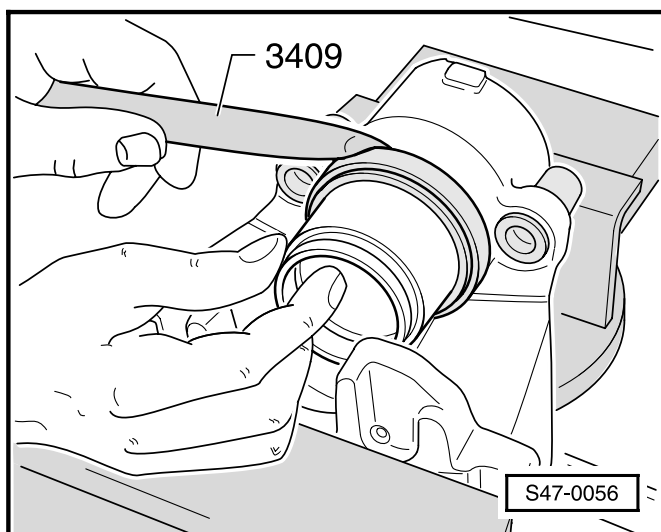
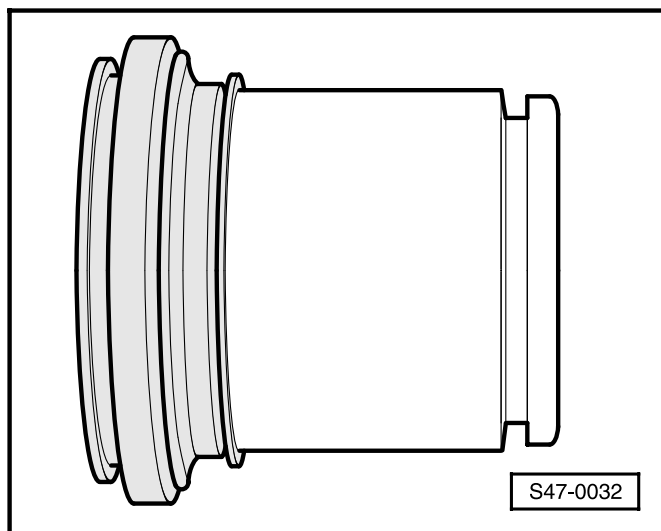
Note:

When removing, ensure that the surface of the cylinder is not damaged.



Installing

- Clean the surface on the piston and seal with spirit and dry.
- Before inserting the piston and seal into the brake cylinder, apply a thin coat of brake fluid or brake cylinder paste, e.g. G 052 150 A2, to all the parts.
- Insert new seal into the groove of the brake calliper.
- ◀ - Fit new protective cap with outer sealing lip onto the piston.

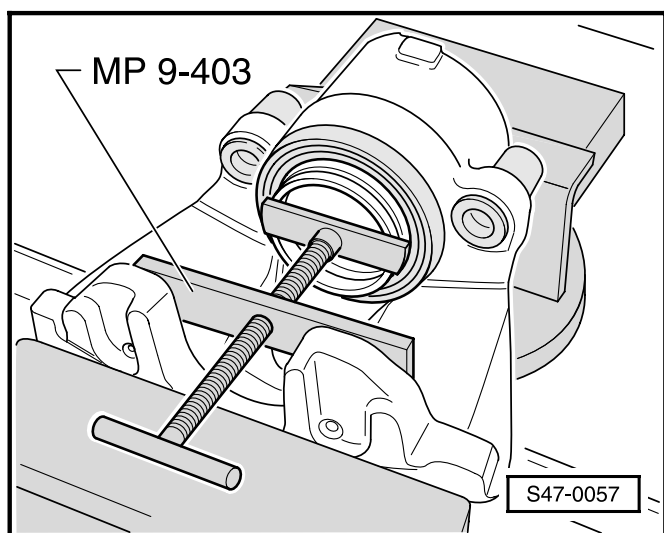


- ◀ - Use a plastic wedge to insert inner sealing lip of the protective cap into the groove of the cylinder.

Use plastic wedge 3409 for this step.

Note:

Hold piston in front of brake calliper housing for this step.



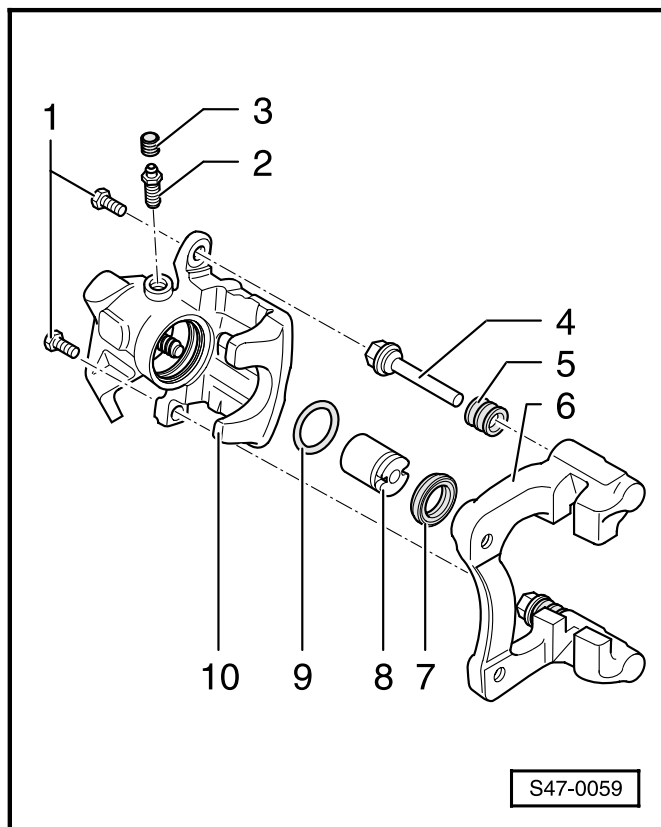
- ◀ - Use piston resetting device MP 9-403 to press piston into brake calliper housing.

Note:

The outer sealing lip of the protective cap jumps into the groove on the piston when this is done.

Servicing rear brake calipers

Summary of components of brake caliper



Special tools, testers and aids required

- ◆ Resetting and removal tool MP 9-401
- ◆ Plastic wedge 3409
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Assembly paste G 052 150 A2

Notes:

- ◆ *When carrying out repairs, always install the complete repair kit.*
- ◆ *New brake calipers are filled with brake fluid and pre-bled.*
- ◆ *When carrying out repairs, it is essential to pre-bleed the brake calipers accordingly before installing them in the vehicle (without brake pads) ⇒ page 47-14.*
- ◆ *Apply a thin coat of brake fluid or assembly paste to brake cylinder, piston and seal.*

1 - Self-locking hexagon bolt, 35 Nm

- ◆ Replace
- ◆ Counterhold at guide pin when slackening and tightening

2 - Bleeder valve, 10 Nm

- ◆ Before screwing in, apply a thin coat of brake fluid or assembly paste G 052 150 A2 to the thread

3 - Dust cap

4 - Guide pin

- ◆ Grease before fitting on protective cap

5 - Protective cap

- ◆ Fit onto brake carrier and guide pin

6 - Brake carrier with guide pins and protective cap

- ◆ Is supplied as a replacement part assembled with adequate quantity of grease on the guide pins
- ◆ If the protective caps or guide pins are damaged, install repair kit; use enclosed grease packing for greasing the guide pins

7 - Protective cap

- ◆ Fit with outer sealing lip onto the piston
- ◆ Insert with inner sealing lip into the groove of the brake caliper housing ⇒ page 47-13

8 - Piston with automatic slack device

- ◆ Removing and installing ⇒ from page 47-12
- ◆ Apply a thin coat of brake fluid or assembly paste G 052 150 A2 to piston before installing

9 - Seal

- ◆ Use plastic wedge for removing ⇒ page 47-12

10 - Brake caliper housing with lever for handbrake cable

- ◆ If leaks exist at lever for handbrake cable, replace brake caliper housing
- ◆ After servicing, pre-bleed brake caliper housing ⇒ page 47-14

Removing and installing piston for rear brake caliper

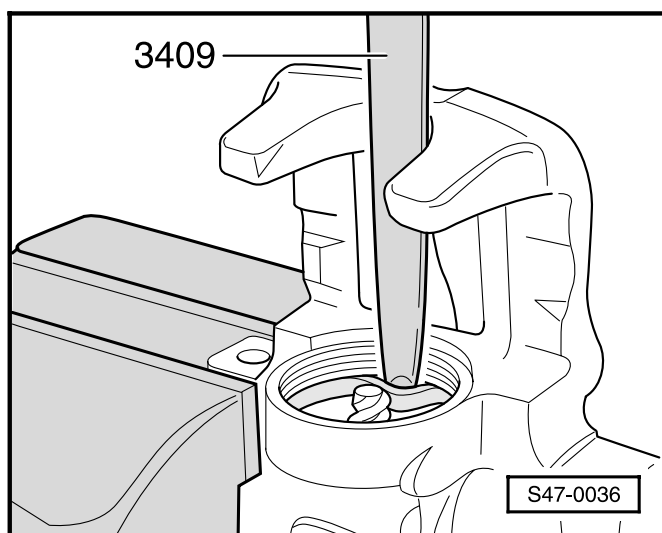
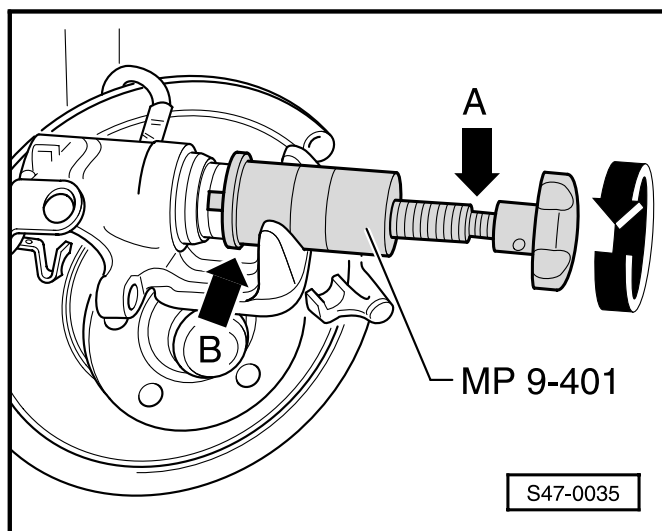
Special tools, testers and aids required

- ◆ Resetting and removal tool MP 9-401
- ◆ Plastic wedge 3409
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Assembly paste G 052 150 A2

Removing

Notes:

- ◆ Insert special tool MP 9-401 so that the collar (arrow B) is positioned in front of the piston.
- ◆ If piston is stiff, an open-end wrench waf 13 can be positioned at the wrench faces provided for this purpose (arrow A).
- Remove piston from the brake caliper housing by turning the knurled wheel to the left.

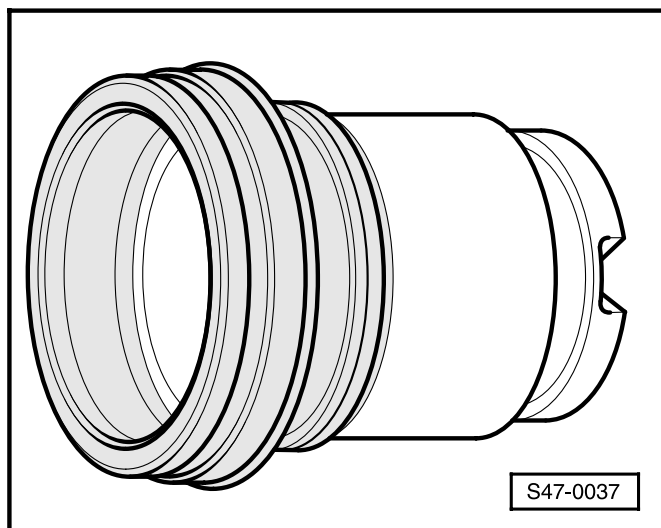


- ◀ - Take out seal.

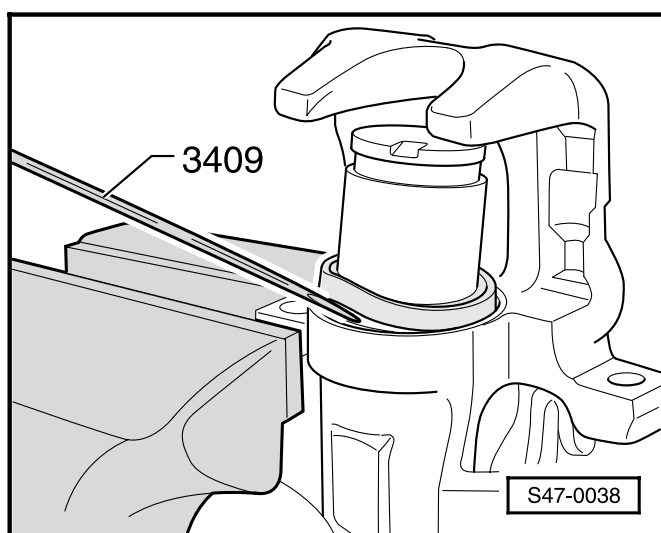
Use plastic wedge 3409 for this step.

Note:

When removing, ensure that the surface of the cylinder is not damaged.

**Installing**

- Clean surfaces of piston and seal with methylated spirits and then dry.
- Apply a thin coat of brake fluid or assembly paste G 052 150 A2 to piston and seal before inserting into the brake caliper housing.
- ◀ - Fit protective cap with outer sealing lip onto the piston.

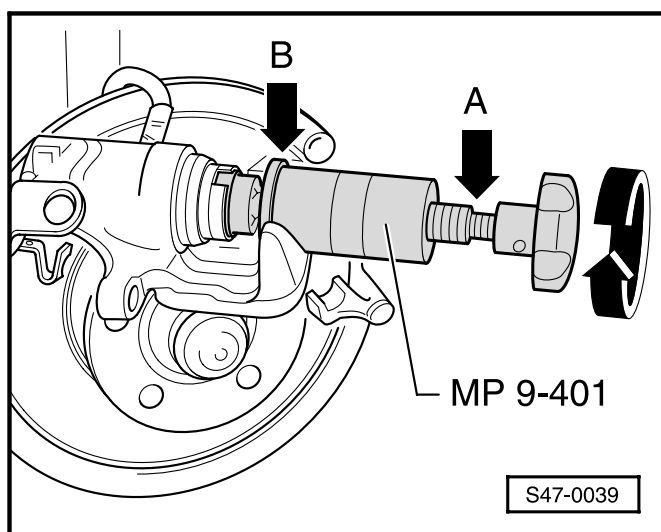


- ◀ - Insert inner sealing lip into the groove of the cylinder with a plastic wedge.

Use plastic wedge 3409 for this step.

Note:

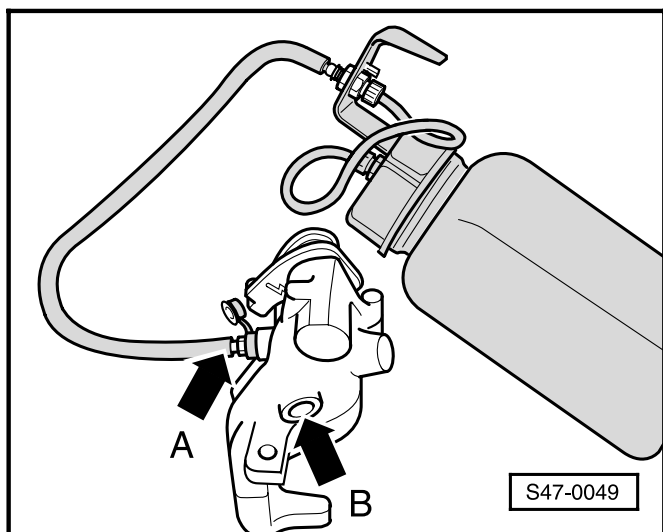
Hold piston in front of brake caliper housing for this step.

**Notes:**

- ◀ ♦ Insert special tool MP 9-401 so that the collar (arrow B) of the tool is resting against brake caliper.
- ♦ If piston is stiff, an open-end wrench waf 13 can be positioned at the wrench faces provided for this purpose (arrow A).
- ♦ If the position of the piston is altered with a piston resetting device or by depressing the footbrake, the automatic slack adjuster in the brake caliper is destroyed.
- Insert piston by turning knurled wheel to the right.
- Insert brake pads.

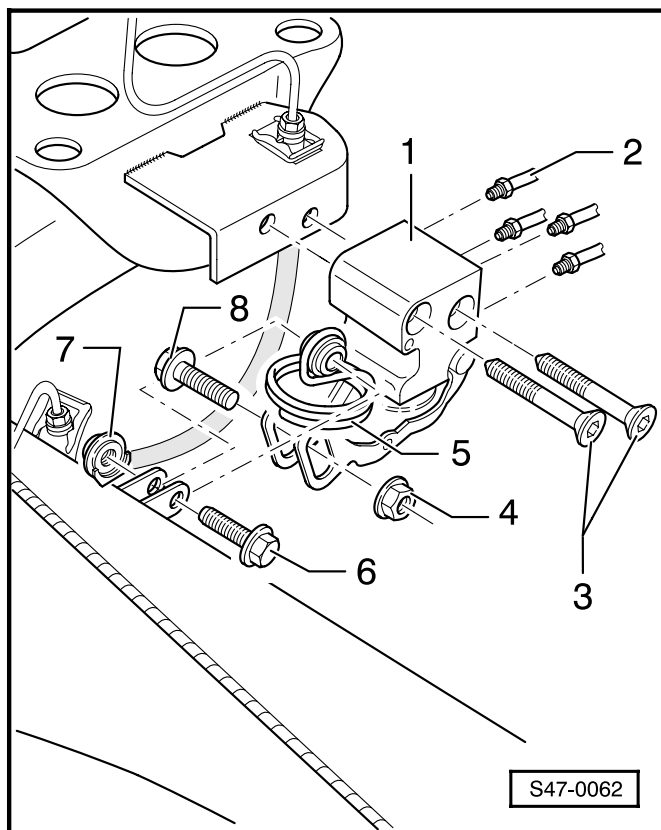
Pre-bleeding brake caliper**Note:**

Position brake caliper upright for pre-bleeding.



- ◀ - Open bleeder bottle -arrow A-.
- Use a commercially available bleeder vessel to pour in brake fluid long enough until brake fluid flows out of the threaded hole (brake hose connection) -arrow B- free of bubbles.
- Close bleeder screw.

Summary of components of brake pressure regulator



1 - Load-dependent brake pressure regulator

- ♦ Testing and setting ⇒ from page 47-16

2 - Brake line with screw union

- ♦ Tightening torque of screw union 14 Nm

3 - Recessed machine screw, 21 Nm

4 - Hexagon nut, self-locking, 21 Nm

- ♦ Replace each time removed

5 - Tensile spring

6 - Hexagon bolt, 16 Nm

7 - Push-in nut

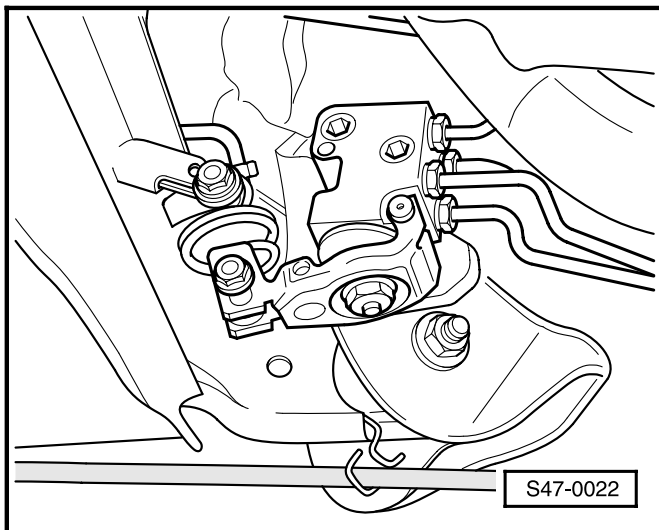
8 - Hexagon bolt

- ♦ Replace each time removed

Testing and setting brake pressure regulator

Special tools, testers and aids required

- ◆ Tester for brake pressure regulator and brake systems, e.g. V.A.G 1310 or V.A.G 1310 A



◀ The brake pressure regulator is attached to a bracket positioned at the bearing bracket for the rear axle, and is controlled by means of a spring in line with the movement of the rear axle.

Inspecting operation

Fully depress brake pedal firmly and release quickly (vehicle standing on its wheels). When this is done, the lever of the brake pressure regulator must move.

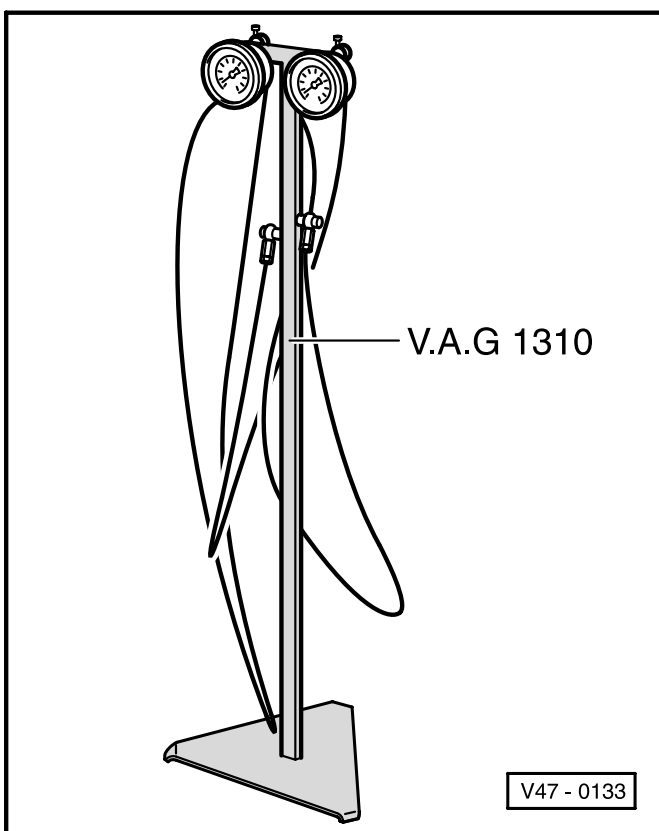
Testing pressure and setting

Note:

The brake pressure regulator is set when the vehicle is at its unladen weight.

Unladen weight refers to:

Weight of unladen vehicle (fuel tank empty or not more than 5 litres, no driver, with spare wheel, vehicle tool kit, vehicle jack).



- ◀ - Raise vehicle and connect pressure gauge to brake caliper (left front wheel) and to wheel brake cylinder (right rear wheel).
- Bleed both pressure gauges.
- Lower vehicle and bounce several times at the rear wheels.
- Apply pressure to brake pedal and measure pressures.
- Compare pressure readings obtained with the specified settings ⇒ page 47-17.
- Set brake pressure regulator, if necessary ⇒ page 47-17.

Setting of load-dependent brake pressure regulator

Model / Version		bar	MPa		bar	MPa
Rear drum brakes	Front wheels	70	7	Front wheels	100	10
	Rear wheels	41 ... 47	4.1 ... 4.7	Rear wheels	54 ... 60	5.4 ... 6.0

Setting brake pressure regulator

Test pressure at rear wheels too high:

- Slacken tensile spring at brake pressure regulator.

Test pressure at rear wheels too low:

- Tension tensile spring at brake pressure regulator.

Note:

Do not carry out setting with load applied to brake pedal; pay attention to the following sequence:

- Read off pressures.
- Take load of brake pedal.
- Set tensile spring at brake pressure regulator.
- Once again apply pressure to brake pedal.
- Read off pressures and correct setting, if necessary.
- Detach pressure gauges.
- Bleed brake system ⇒ from page 47-18.

Bleeding brake system, models with and without ABS or ABS/EDL Mark 20 and Mark 60

Notes:

- ◆ *Use only fresh brake fluid complying with the Standard ⇒ page 00-8.*
- ◆ *When system is open, do not work with compressed air and do not move vehicle.*

Special tools, testers and aids required

- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Brake pedal depressor, e.g. V.A.G 1238/B
- ◆ Vehicle system tester V.A.G 1552 (only for models fitted with ABS/EDL)

Warning!

- ◆ *Brake fluid is hygroscopic, in other words it absorbs moisture from the surrounding air and should therefore always be stored in airtight sealed containers.*
- ◆ *On no account allow brake fluid to come into contact with fluids containing mineral oil (oil, petroleum, cleaning products). Mineral oils damage the plugs and seals of the brake system.*
- ◆ *Do not re-use brake fluid which has been extracted (which was in the system).*
- ◆ *Pay attention to disposal regulations!*
- ◆ *Brake fluid is poisonous, avoid contact with skin.*
- ◆ *Do not allow brake fluid to come into contact with the paintwork because of its caustic effect.*
- ◆ *If brake fluid spills, flush with plenty of water.*
- ◆ *Disposal of brake fluid in accordance with the applicable environmental regulations.*

Vehicles not fitted with ABS or ABS/EDL

- Connect the brake filling and bleeding appliance.

Bleeding sequence ⇒ page 47-20

- After fitting on hose of bleeder bottle, leave bleeder screws opened until brake fluid flows out free of bubbles.

Vehicles fitted with Mark 20 or Mark 60

- Connect the brake filling and bleeding appliance.
- Insert brake pedal depresser.

If a chamber of the brake fluid reservoir has been run completely empty (e.g. because of a leak in the brake system), it is then necessary to first of all pre-bleed the brake system.

Bleeding sequence for vehicles fitted with Mark 20 ⇒ page 47-20

Bleeding sequence for vehicles fitted with Mark 60 ⇒ page 47-23

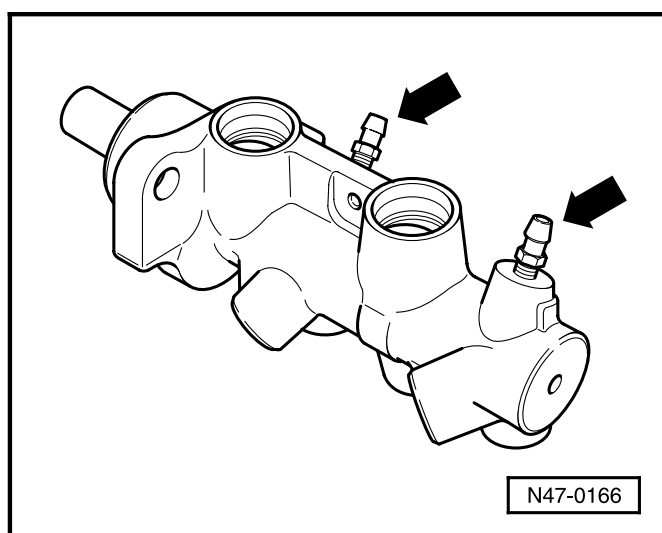
After this, it is then necessary to bleed the hydraulic unit with the function "Basic setting" and the vehicle system tester V.A.G 1552.

Special note for RHD models

- ◀ If a chamber of the brake fluid reservoir has been run completely empty (e.g. because of a leak in the brake system), or after replacing the hydraulic unit, it is then necessary to bleed the system at the bleeder screws -arrows- after carrying out the basic setting of the brake master cylinders.

Continued for models fitted with Mark 60

After bleeding the brake system, it is necessary to carry out the zero adjustment or brake pressure sender 1 -G201- ⇒ page 45-194.



Continued for all models

When replenishing brake fluid with a brake filling and bleeding appliance, e.g. ROMESS S15, it is important to ensure that the filling pressure of 1 bar (0.1 MPa) is not exceeded.

For this reason, the brake fluid pressure must be reduced accordingly to 0.1 MPa (1 bar) at the brake filling and bleeding appliance. Operating Instructions of ROMESS S15.

If the filling pressure of 0.1 MPa (1 bar) is exceeded, proper bleeding of the hydraulic unit is not assured.

- On vehicles fitted with Mark 20, initiate basic setting ⇒ page 45-36.
- On vehicles fitted with Mark 60, initiate basic setting ⇒ page 45-194.

After bleeding is completed, conduct a road test. This must include at least one ABS control cycle!

Bleeding brake system with brake filling and bleeding appliance, e.g. ROMESS S15, on models fitted with Mark 20

Special tools, testers and aids required

- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Vehicle system tester V.A.G 1552 (only for models fitted with ABS/EDL)
- ◆ Brake fluid ⇒ page 00-8

It is not permitted to open the bleeder screws at the hydraulic unit on vehicles fitted with ABS, ABS/EDL!

- Connect brake filling and bleeding appliance.
- Remove dust caps at the bleeder screws of the brake calipers/wheel brake cylinders.
- Open bleeder screws in the specified order and bleed brake calipers and wheel brake cylinders.

Bleeding sequence

- 1- Rear right wheel brake cylinder/brake caliper
 - 2 - Rear left wheel brake cylinder/brake caliper
 - 3 - Front right brake caliper
 - 4 - Front left brake caliper
- After bleeding, close the appropriate bleeder screw and fit on protective cap.

Vehicles fitted with ABS or ABS/EDL

A road test of these vehicles must be carried out after bleeding the brake system. At least one ABS control cycle must be activated during the road test!

Note:

When bleeding the rear wheel brake on vehicles fitted with a brake force regulator, move the lever of the regulator.

Changing brake fluid ⇒ Inspection and Maintenance**Bleeding brake system without brake filling and bleeding appliance****Special tools, testers and aids required**

- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8

It is not permitted to open the bleeder screws at the hydraulic unit on vehicles fitted with ABS, ABS/EDL.

Note:

During the bleeding operation, always check brake fluid level in the reservoir; top up brake fluid to the "MAX" marking if necessary.

- After fitting on hose to bleeder bottle, open bleeder screw.
- Pump brake fluid through brake system by pumping the brake pedal.

- With brake pedal depressed, close bleeder screws.
- Perform pumping operation with brake pedal at least 10x for each wheel brake and repeat operation as often as necessary until no further air flows out.

Bleeding sequence for vehicles fitted with Mark 20

- 1 - Rear right wheel brake cylinder/brake caliper
- 2 - Rear left wheel brake cylinder/brake caliper
- 3 - Front right brake caliper
- 4 - Front left brake caliper

Bleeding operation for vehicles fitted with Mark 60

- 1 - Front left brake caliper
- 2 - Front right brake caliper
- 3 - Rear left brake caliper
- 4 - Rear right brake caliper

Vehicles fitted with ABS or ABS/EDL

A road test of these vehicles must be carried out after bleeding the brake system. At least one ABS control cycle must be activated during the road test!

Note:

When bleeding the rear wheel brake on vehicles fitted with a brake force regulator, move the lever of the regulator.

Changing brake fluid ⇒ Inspection and Maintenance

Bleeding brake system with brake filling and bleeding appliance, e.g. ROMESS S15, vehicles fitted with ABS Mark 60

Special tools, testers and aids required

- ◆ Brake filling and bleeding appliance, e.g. ROMESS S15
- ◆ Brake pedal depresser, e.g. V.A.G 1238/B
- Connect the brake filling and bleeding appliance.
- Insert brake pedal depresser.
- Open bleeder screws in the specified sequence and bleed brake calipers and wheel brake cylinders.

Bleeding sequence

- 1 - Front left brake caliper
 - 2 - Front right brake caliper
 - 3 - Rear left brake caliper
 - 4 - Rear right brake caliper
- After fitting hose onto bleeder bottle, leave bleeder screws open long enough until brake fluid flows out free of bubbles.

After completing bleeding, it is necessary to carry out a road test. At least one ABS control cycle must be activated during the road test!

Pre-bleeding the brake system if a chamber of the brake fluid reservoir has been run completely empty (e.g. because of a leak in the brake system).

Bleeding sequence

- 1 - Bleed front left and front right brake calipers at the same time
 - 2 - Bleed rear left and rear right brake calipers at the same time
- After fitting hose onto bleeder bottle, leave bleeder screws open long enough until brake fluid flows out free of bubbles.

Testing brake master cylinder for leaks

Special tools, testers and aids required

- ◆ Tester for brake pressure regulator and brake systems, e.g. V.A.G 1310 or V.A.G 1310 A
- ◆ Brake fluid ⇒ page 00-8
- ◆ Assembly paste G 052 150 A2

Test requirement

- Brake system operating properly and free of leaks

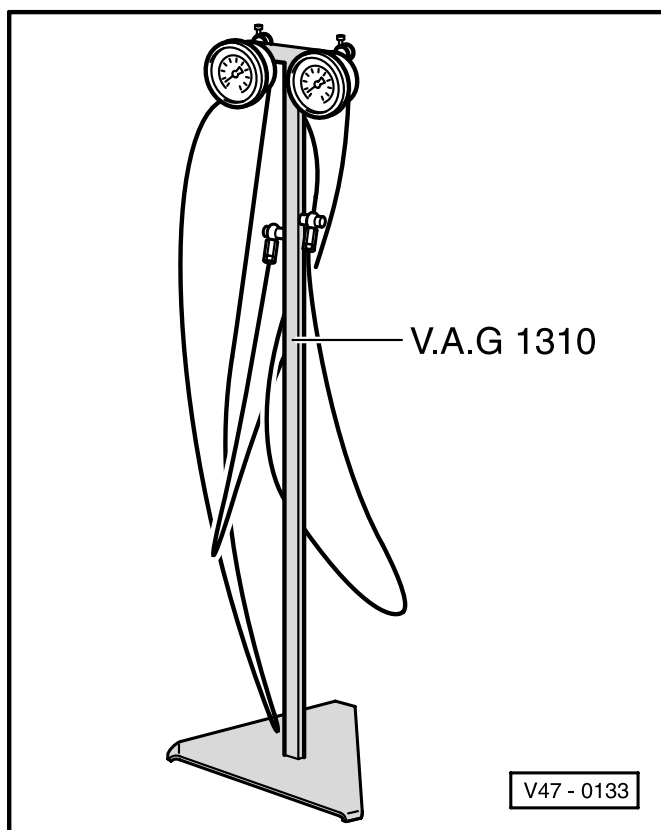
The brake system includes:

- ◆ Hydraulic control unit or load-dependent brake pressure regulator, as appropriate
- ◆ Brake lines, brake hoses and their connections
- ◆ Brake calipers and wheel brake cylinders

Testing

- Remove bleeder screw at one of the front brake calipers.
- ◀ - Connect pressure gauge of tester V.A.G 1310 or V.A.G 1310 A and bleed.
- Apply load to brake pedal until pressure gauge at tester indicates a pressure of 5 MPa (50 bar).
- Duration of test: 45 seconds.
- The pressure drop during the duration of the test must not be more than 0.40 MPa (4 bar).

If the pressure drop is more than 0.40 MPa (4 bar), replace brake master cylinder
⇒ page 47-2.

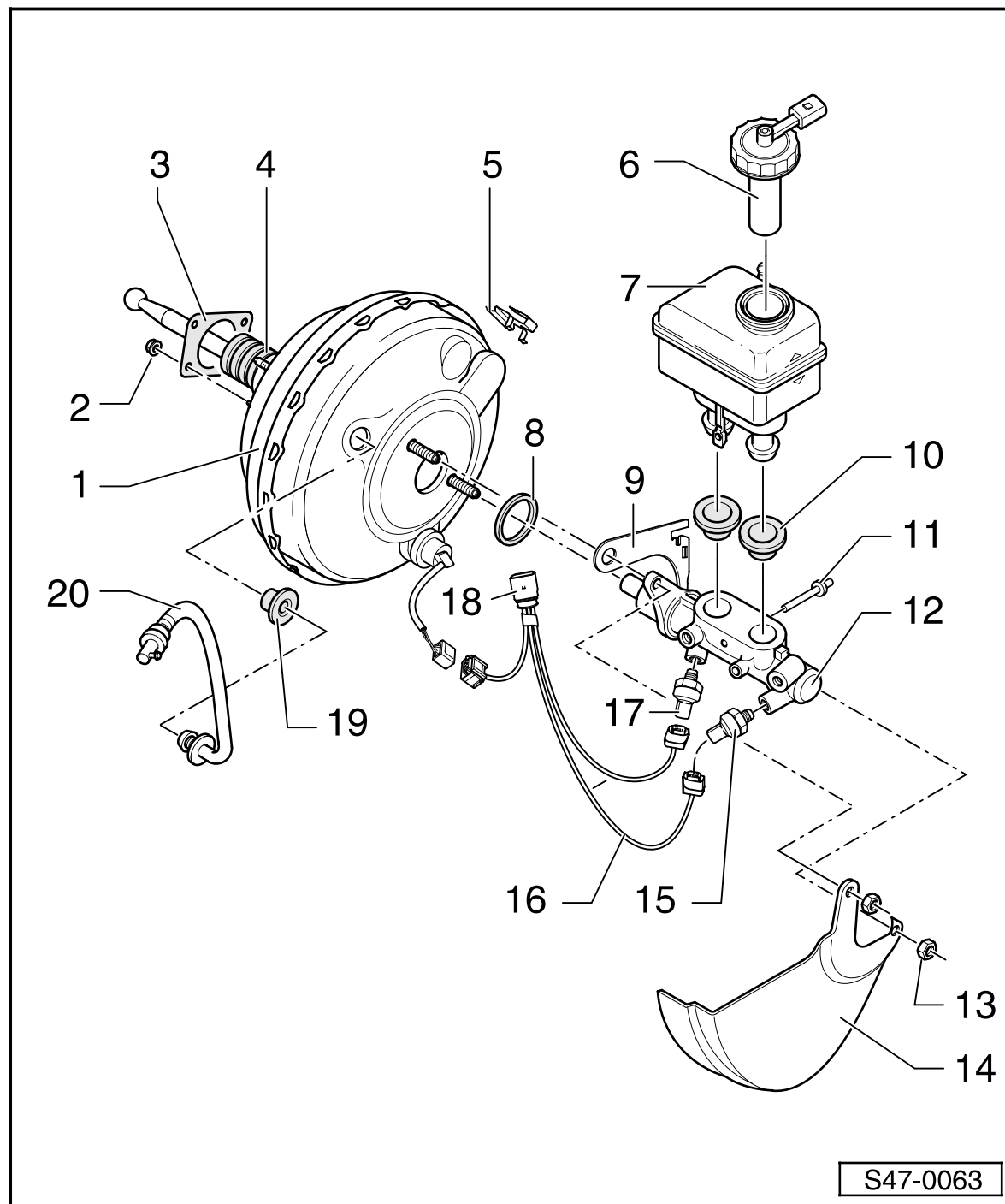


- After replacing the brake master cylinder, repeat test.
- Detach pressure gauge of tester V.A.G 1310 or V.A.G 1310 A from brake caliper.
- Apply a thin coat of brake fluid or assembly paste G 052 150 A2 to thread of bleeder valve.
- Screw bleeder valve into brake caliper and tighten fully.

Tightening torque: 10 Nm

- Bleed brake system ⇒ from page 47-18.

Assembly overview: brake servo unit/brake master cylinder for vehicles fitted with ABS/EDL/ESP Mark 20



S47-0063

Note:

Complete brake master cylinders and brake servo units can be replaced separately from each other.

1 - Brake servo unit

- ◆ operational check ⇒ page 47-4
- ◆ removing and installing ⇒ page 47-32
- ◆ if fault exists, replace complete
- ◆ separating from brake pedal ⇒ page 46-20
- ◆ assignment ⇒ Parts List

- ◆ On petrol engines, vacuum required is drawn from intake manifold.
- ◆ On diesel engines, a vacuum pump is fitted for producing vacuum.
- ◆ check valve (in vacuum hose of vacuum pump)

Operational check

- It must be possible to blow through the valve in direction of arrow.
- The valve must be leaktight in opposite direction of arrow.

2 - Self-locking hexagon nut, 28 Nm

- ◆ replace

3 - Gasket

- ◆ for brake servo unit
- ◆ installed between brake servo unit and bulkhead

4 - Boot

- ◆ ensure correctly installed, risk of suction noises

5 - Fixture

- ◆ is attached to the edge of the brake servo unit
- ◆ is designed for mounting the connector -item 18-

6 - Cap

- ◆ with integrated brake fluid level warning contact -F34-

7 - Brake fluid reservoir

- ◆ locked into retaining pin with side catches

8 - Seal

- ◆ replace

9 - Retaining plate

- ◆ for fixing wiring loom -item 16- in place

10 - Sealing plug

- ◆ moisten with brake fluid and press in reservoir

11 - Retaining pin

- ◆ insert through brake master cylinder

12 - Brake master cylinder

- ◆ must not be serviced, if fault exists, replace complete
- ◆ leak test ⇒ page 47-24

13 - Self-locking hexagon nut, 20 Nm

- ◆ replace

14 - Heat shield

- ◆ only on models with 74 kW, 92 kW and 110 kW engine

15 - Brake pressure sender -1- -G201-

- ◆ in floating piston circuit
- ◆ removing and installing ⇒ page 47-28

16 - Wiring loom**17 - Brake pressure sender -2- -G214-**

- ◆ in pushrod piston circuit
- ◆ removing and installing ⇒ page 47-28

18 - Connector

- ◆ connection of dash panel/engine compartment wiring loom

19 - Sealing plug**20 - Vacuum hose**

- ◆ with non-return valve
- ◆ insert into brake servo unit

Removing and installing brake pressure sensor -1- -G201- and brake pressure sensor -2- -G214-

Special tools, testers and aids required

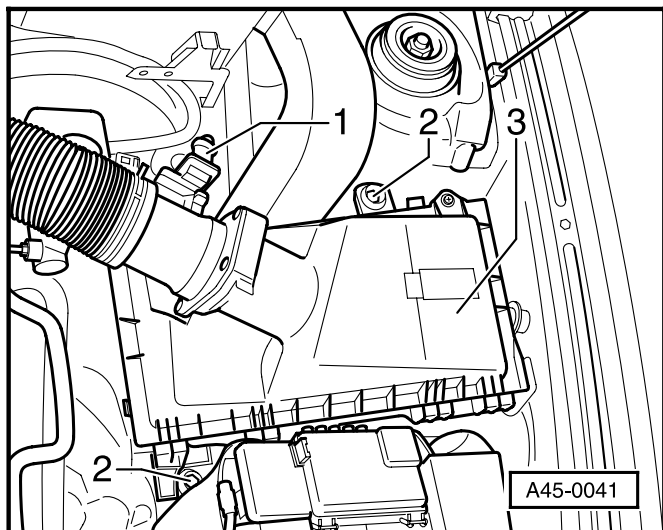
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Torque wrench 5...50 Nm, e.g. V.A.G 1331
- ◆ Open ring wrench waf 27, e.g. Stahlwille 737/ 10-10 waf 27, Code No. 9154 00709

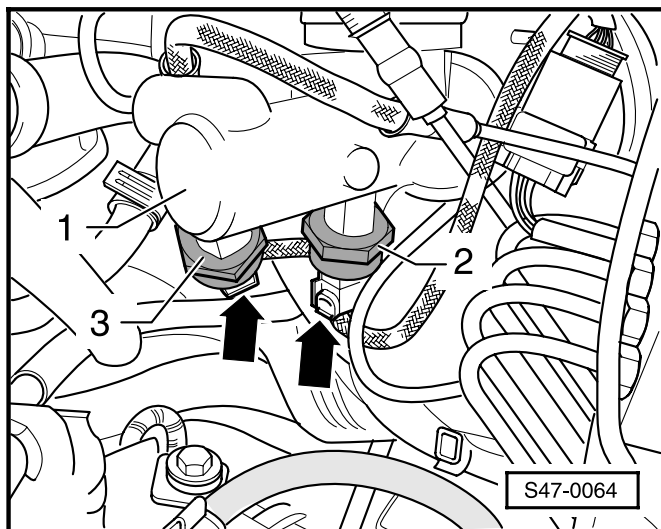
Notes:

- ◆ *It is prohibited to carry out any repairs to the screened cables of the ABS system.*
 - ◆ *Before disconnecting the battery, determine the code of a radio set fitted with anti-theft coding.*
 - ◆ *When re-connecting the battery, check the vehicle equipment:*
 - *Encode the radio,*
 - *set the clock,*
 - *initialise the power windows.*
- ⇒ Inspection and Maintenance

Removing

- Disconnect battery.
- ◀ - Unplug the connector -1- of the air mass meter from the air guide tube of the air filter.
- Unscrew the bolts -2- at the air filter -3- and place the filter to the side.
- On diesel engines, remove relay carrier above the brake servo unit.
- Lay out adequate non-woven cloths in the area of the plenum chamber, of the engine and gearbox.
- Extract as much brake fluid as possible with a bleeder bottle or extraction equipment from the brake fluid reservoir.





- Fit hose of bleeder bottle onto the bleeder screw of the left front brake caliper and open bleeder screw.
 - Operate the brake pedal at least 15 times so that the brake master cylinder is pumped dry.
 - Depress the brake pedal and close the front left bleeder screw.
 - ◀ - Unplug the connector -arrow- of the brake pressure sensor which is to be removed.
- 1 - Brake master cylinder
 2 - Brake pressure sensor -2- -G214- in pushrod piston circuit
 3 - Brake pressure sensor -1- -G202- in float piston circuit
- Unbolt brake pressure sensor -1- -G202- or brake pressure sensor -2- -G214-, respectively.

Installing

Installation is carried out in the reverse order.

- Connect up battery ⇒ page 47-28.
- After installing, pour in only fresh brake fluid.
- Bleed brake system ⇒ page 47-18.
- Bleed clutch (manual gearbox)
 ⇒ 5-Speed Manual Gearbox 02J; Repair Group 30; Servicing clutch mechanism
- Carry out basic setting of brake pressure sensor -G201- and -G214- ⇒ page 45-124.
- Interrogate fault memory ⇒ page 45-101.
- Erase fault memory ⇒ page 45-113.

Tightening torques:

Brake pressure sensor -1-	25 Nm
Brake pressure sensor -2-	25 Nm

Removing and installing brake master cylinder

Special tools, testers and aids required

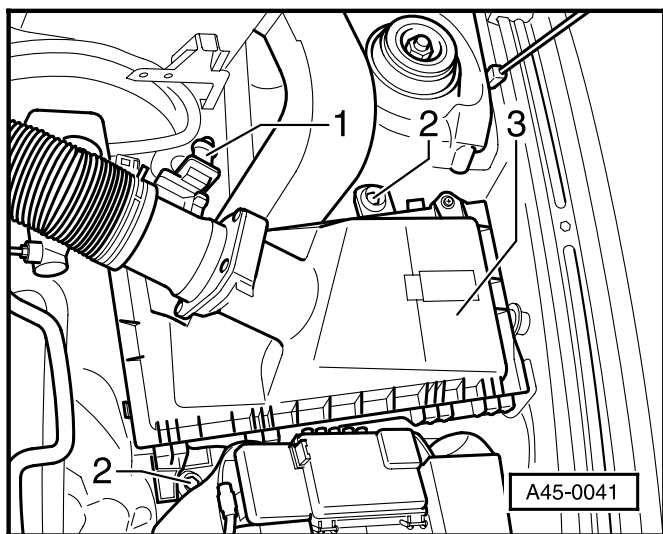
- ◆ Hose clamp MP 7-602
- ◆ Bleeder bottle (commercially available)
- ◆ Brake fluid ⇒ page 00-8
- ◆ Repair kit Part No. 1H0 698 311 A

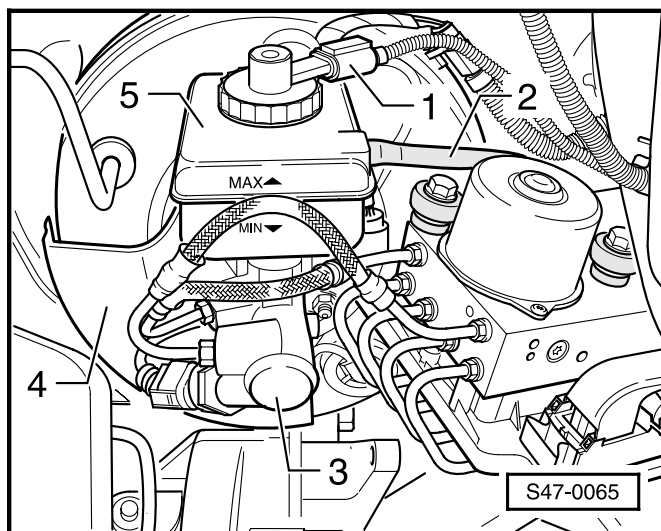
Notes:

- ◆ *Before disconnecting the battery, determine the code of a radio set fitted with anti-theft coding.*
 - ◆ *When re-connecting the battery, check the vehicle equipment:*
 - *Encode the radio,*
 - *set the clock,*
 - *initialise the power windows.*
- ⇒ Inspection and Maintenance

Removing

- Disconnect battery.
- ◀ - Unplug the connector -1- of the air mass meter from the air guide tube of the air filter.
- Unscrew the bolts -2- at the air filter -3- and place the filter to the side.
- On diesel engines, remove relay carrier above the brake servo unit.
- Lay out adequate non-woven cloths in the area of the plenum chamber, of the engine and gearbox.



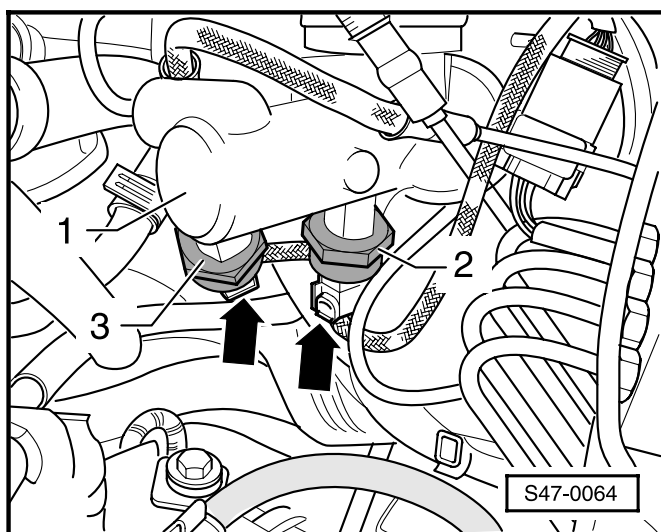


◀ - Unplug connector -1- of the brake fluid level warning contact -F34-.

- Extract as much brake fluid as possible with a bleeder bottle or extraction equipment from the brake fluid reservoir -5-.
- Pinch off feed line of clutch master cylinder -2- with special tool MP 7-602.
- Detach feed line of clutch master cylinder -2- from brake fluid reservoir -5- and place up.

3 - Brake master cylinder

4 - Heat shield



◀ - Unplug the connectors -arrows- of the brake pressure sensors -2- and -3-.

- Unscrew nuts of brake master cylinder -1-.
- Take off heat shield, if fitted.
- Carefully take brake master cylinder -1- off the brake servo unit.

Installing

Installation is carried out in the reverse order.

- Replace the seal between brake master cylinder and brake servo unit.
- When fitting together the brake master cylinder and the brake servo unit, ensure the pushrod in the brake master cylinder is correctly located.
- After installing, pour in only fresh brake fluid.
- Re-connect battery ⇒ page 47-30.
- Bleed brake system ⇒ page 47-18.
- Bleed clutch (manual gearbox).
⇒ 5-Speed Manual Gearbox 02J; Repair Group 30; Servicing clutch mechanism
⇒ Inspection and Maintenance

- Initiate basic setting ⇒ page 45-124.
- Interrogate fault memory ⇒ page 45-101.
- Erase fault memory ⇒ page 45-113.

Tightening torques:

Brake master cylinder to brake servo unit	20 Nm
--	-------

Testing brake servo unit

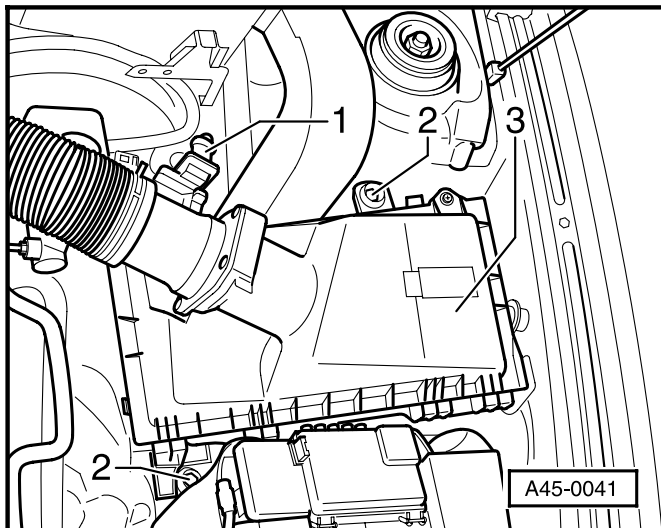
⇒ page 47-4

Removing and installing brake servo unit**Special tools, testers and aids required**

- ◆ Hose clamp MP 7-602
- ◆ Brake pedal depresser, e.g. V.A.G 1238/B
- ◆ Vehicle system tester V.A.G 1552
- ◆ Diagnostic cable V.A.G 1551/3, 3A, 3B or 3C
- ◆ Release tool T30021
- ◆ Extraction bottle (commercially available)
- ◆ Repair kit Part No. 1H0 698 311 A
- ◆ Brake fluid ⇒ page 00-8

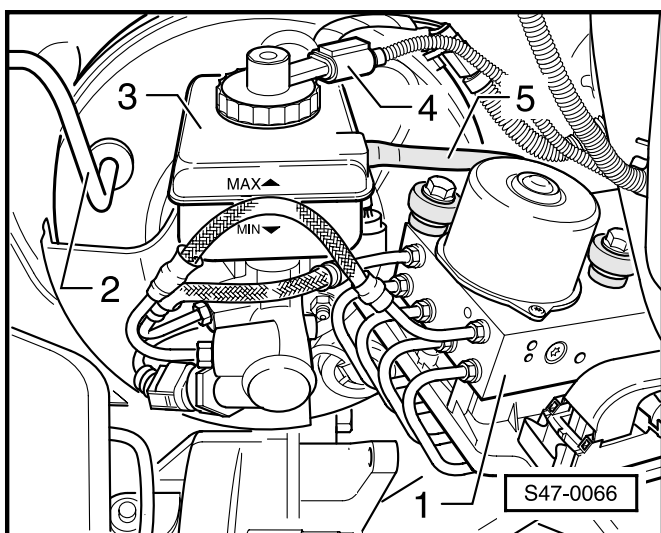
Notes:

- ◆ *Before disconnecting the battery, determine the code of radio sets fitted with anti-theft coding.*
 - ◆ *When re-connecting the battery, check the vehicle equipment:*
 - *encode radio,*
 - *re-set clock,*
 - *initialise power windows.*
- ⇒ Inspection and Maintenance

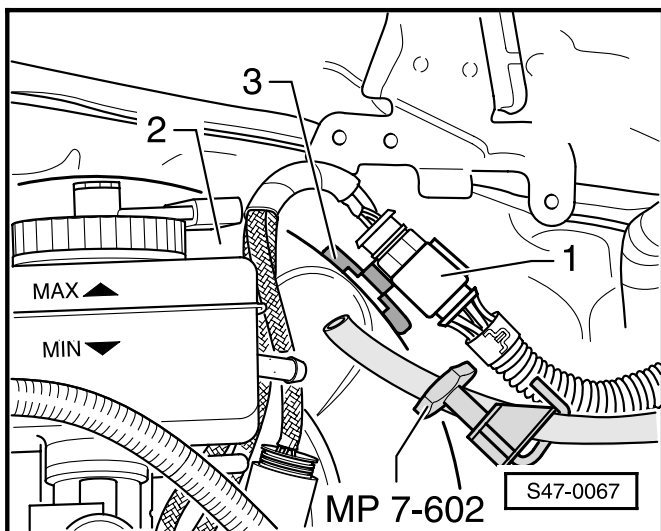


Removing

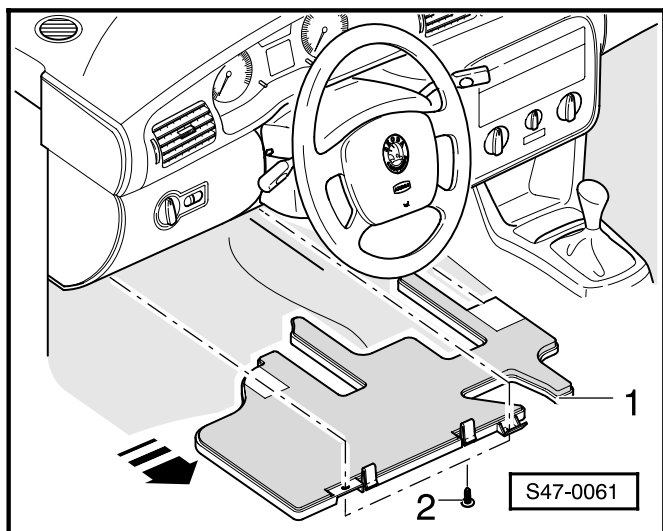
- Disconnect battery.
- ◀ - Unplug the connector -1- of the air mass meter from the air guide tube of the air filter.
- Unscrew the bolts -2- at the air filter -3- and place the filter to the side.
- On diesel engines, remove relay carrier above the brake servo unit.



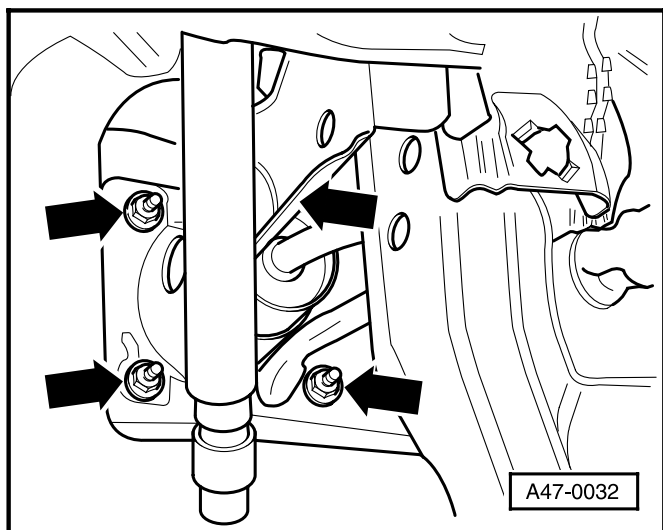
- Lay out adequate non-woven cloths in the area of the plenum chamber, of the engine and gearbox.
- Remove hydraulic control unit -1- ⇒ page 45-158.
- ◀ - Unplug connector -4- from brake fluid warning contact -F34-.
- Pinch off feed line of clutch master cylinder -5- with hose clamp MP 7-602.
- Detach feed line of clutch master cylinder -5- from brake fluid reservoir -3- and place up.
- Detach vacuum hose -2- from brake servo unit.



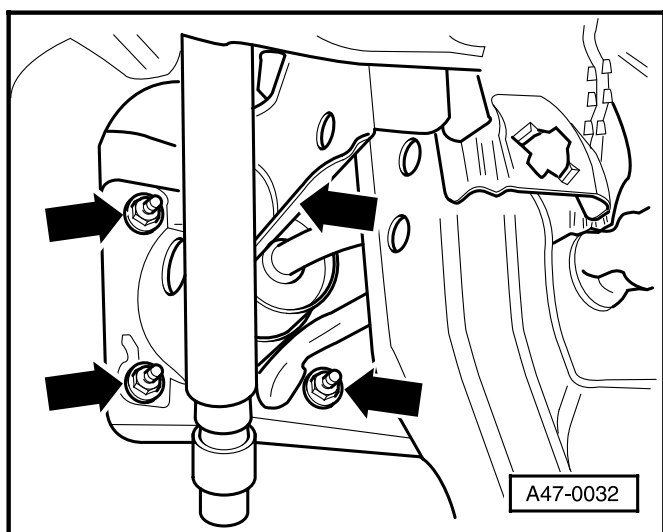
- ◀ - Press plug connection -1- off the fixture -3-.
- Push the plug connection -1- toward the bulkhead for this step.
- 2 - Brake servo unit
- Separate plug connection -1-.



- ◀ - Remove screws -2-.
- Pull footwell panel -1- out of the fixtures.

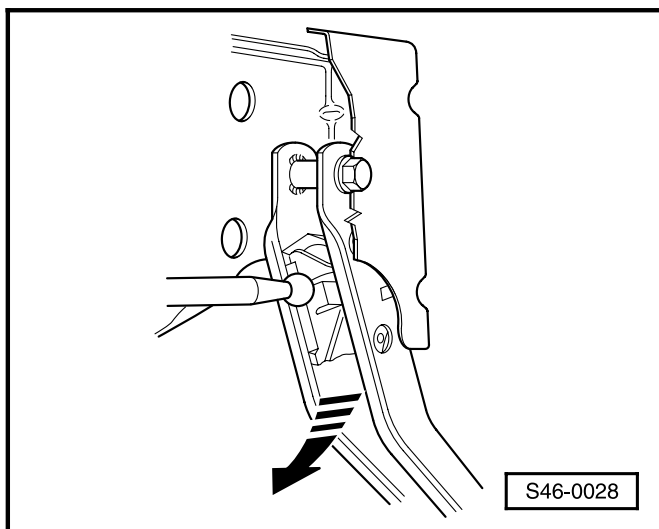


- Separate brake pedal from brake servo unit
⇒ page 46-20.
 - ◀ - Unscrew hexagon nuts of brake servo units -arrows-.
- Top right nut not visible in illustration.
- Feed out brake servo unit together with brake master cylinder to the front and remove.



Installing

- ◀ - Install brake servo unit together with brake master cylinder and tighten the new hexagon nuts -arrows-.



◀ - Clip brake pedal to brake servo unit ⇒ page 46-20.

- Install brake light switch and set ⇒ page 46-69.

The remaining installation is carried out in the reverse order.

- Pour in only fresh brake fluid ⇒ page 00-8.
- Re-connect battery ⇒ page 47-32.
- Bleed brake system ⇒ page 47-18.
- Bleed clutch (manual gearbox).
⇒ 5-Speed Manual Gearbox 02J; Repair Group 30; Servicing clutch mechanism
⇒ Inspection and Maintenance
- Carry out basic setting ⇒ page 45-124.
- Interrogate fault memory ⇒ page 45-101.
- Erase fault memory ⇒ page 45-113.

Tightening torques:

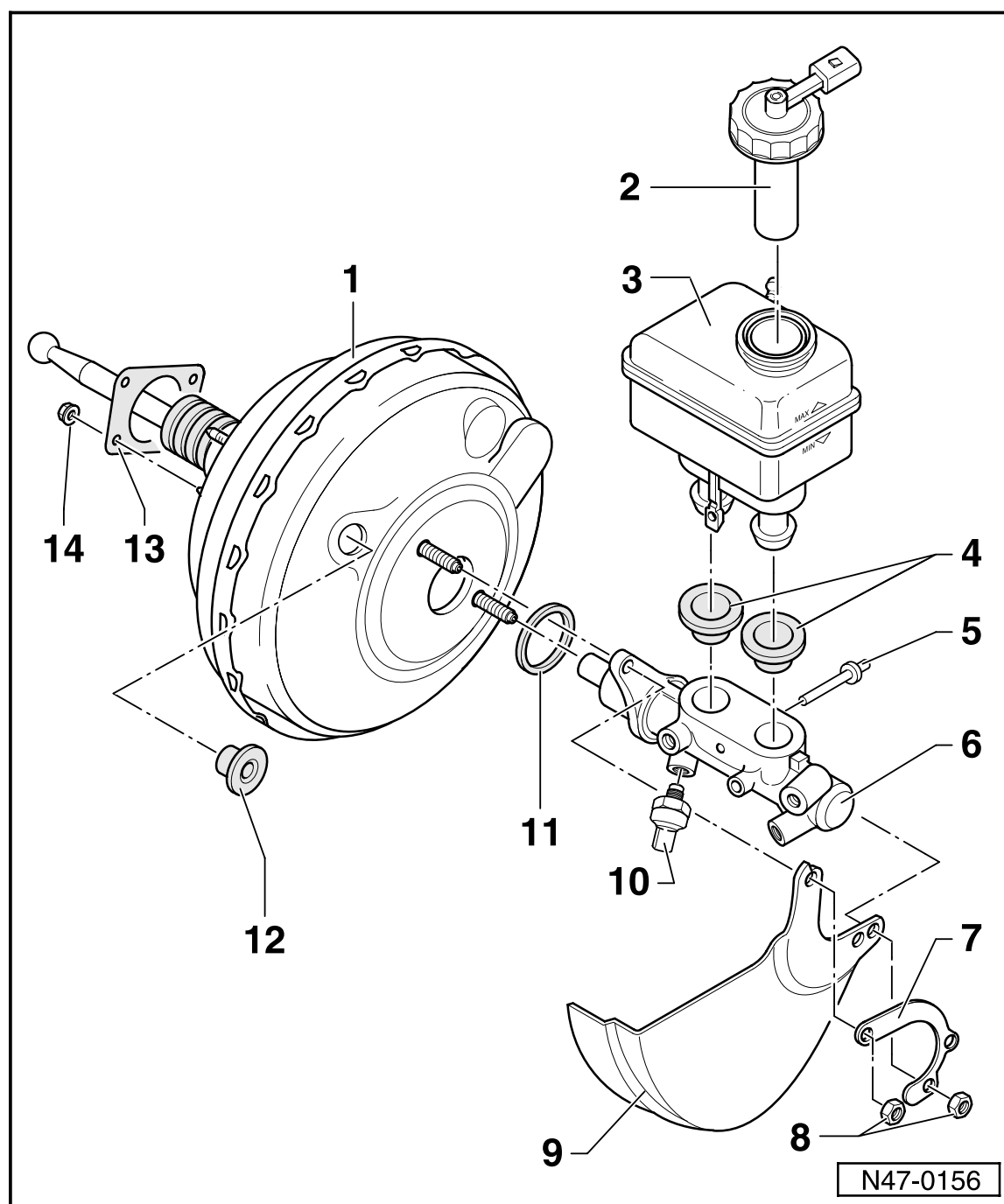
Brake servo unit to pedal assembly 28 Nm

Removing and installing vacuum pump for brake servo unit

Models fitted with diesel engine

- ⇒ Engine, Mechanical Components; Repair Group 15; Removing and installing cylinder head

Assembly overview: brake servo unit/brake master cylinder for models without ABS and for models with ABS/EDL/TCS/ESP Mark 60



Note:

Complete brake master cylinders and brake servo units can be replaced separately from each other.

1 - Brake servo unit without mechanical brake assist

- ◆ RHD models with ABS/EDL/TCS/ESP Mark 60
- ◆ LHD models with ABS/EDL/TCS/ESP Mark 60 up to and including Model Year 2001

- Brake servo unit with mechanical brake assist

- ◆ LHD models with ABS/EDL/TCS/ESP Mark 60 from Model Year 2002
- ◆ mechanical brake assist integrated in brake servo unit
- ◆ brake assist is recognisable only from the part number of the brake servo unit
- ◆ brake assist cannot be serviced; if complaints exist, replace complete brake servo unit ⇒ page 47-32

- Continued for all brake servo units

- ◆ operational check ⇒ page 47-4
- ◆ removing and installing ⇒ page 47-32
- ◆ if fault exists, replace complete
- ◆ separating from brake pedal ⇒ page 46-20
- ◆ on petrol engines, vacuum required is drawn from intake manifold
- ◆ on diesel engines, vacuum pump fitted to produce vacuum
- ◆ on models with automatic gearbox and in combination with EU4 engines, the electric vacuum pump for brakes -V192- is installed additionally
- ◆ operational check of -V192- ⇒ page 47-38
- ◆ removing and installing vacuum pump for brake -V192- ⇒ page 47-39
- ◆ non-return valve (in vacuum hose of vacuum pump)

Operational check

- It must be possible to blow through valve in direction of arrow.
- The valve must be leaktight in opposite direction of arrow.

2 - Cap

- ◆ with integrated brake fluid level warning contact -F34-

3 - Brake fluid reservoir, LHD models

- ◆ locked into retaining pin with side catches

4 - Sealing plug

- ◆ moisten with brake fluid and press in reservoir

5 - Retaining pin

- ◆ insert through brake master cylinder

6 - Brake master cylinder

- ◆ must not be serviced; if fault exists, replace complete

7 - Retaining plate

- ◆ is designed to fix wiring loom in place

8 - Self-locking hexagon nut, 20 Nm

- ◆ always replace

9 - Heat shield

- ◆ only on models with 74 kW, 92 kW, 110 kW and 132 kW engine

10 - Brake pressure sender -1- -G201-

- ◆ removing and installing ⇒ page 47-28

11 - Seal

- ◆ always replace

12 - Sealing plug

- ◆ connection for vacuum hose
- ◆ insert into brake servo unit

13 - Gasket

- ◆ for brake servo unit
- ◆ installed between brake servo unit and bulkhead
- ◆ always replace

14 - Self-locking hexagon nut, 20 Nm

- ◆ always replace

Removing and installing brake pressure sender -1- -G201-

With introduction of the hydraulic control unit Mark 60 the brake master cylinder has only one brake pressure sender.

Removing and installing ⇒ page 47-30

Removing and installing brake master cylinder

⇒ page 47-30

Testing brake servo unit

⇒ page 47-4

Removing and installing brake servo unit

⇒ page 47-32

Removing and installing brake vacuum pump -V192-

No provision is made for repairing the brake vacuum pump -V192-. If a fault exists, the brake vacuum pump -V192- should be replaced.

The brake vacuum pump -V192- is installed at the bottom left of the subframe.

Removing

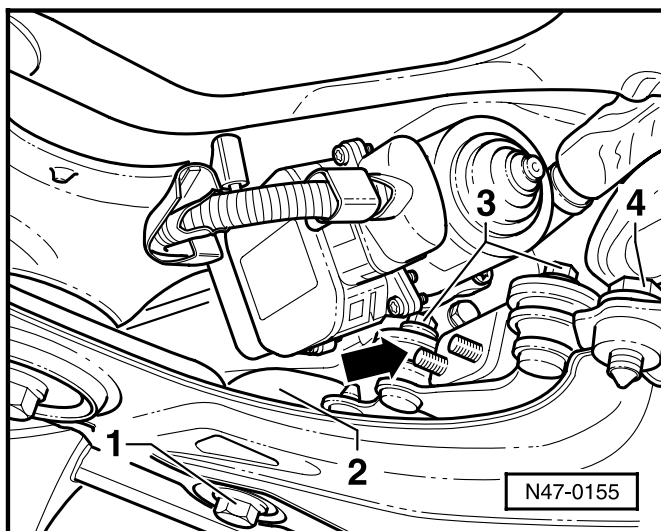
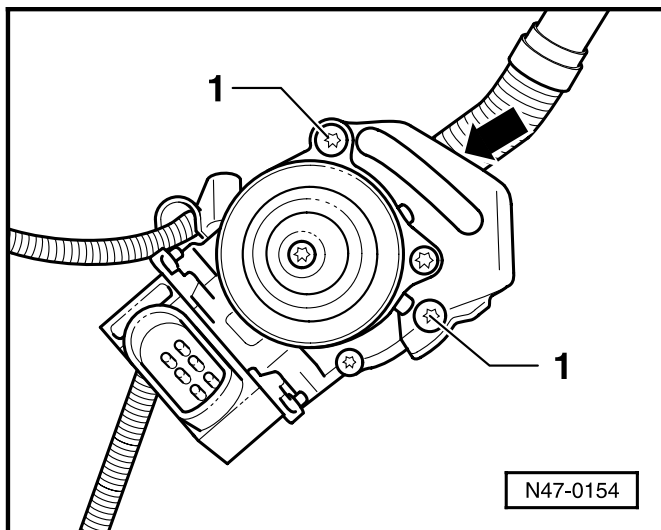
- ◀ - Unscrew bolts -1- at bracket of brake vacuum pump -V192-.
- Detach vacuum hose -arrow- from brake vacuum pump -V192-.
- Take out brake vacuum pump -V192-.
- Unlock plug connection and separate from the vacuum pump.
- ◀ Bracket -arrow- for brake vacuum pump -V192-.
- Unscrew lock nut -2- from bolt -1-.
- Unscrew bolt -4-.
- Take out bracket.
- Unscrew bolts -3- for disassembling the bracket -arrow- further.

Installing

Installation is carried out in the reverse order.

Tightening torques

Nut -2- to bracket	20 Nm
Bolts -3- to bracket	8 Nm
Bolt -4- to bracket	20 Nm
Internal Torx bolt for brake vacuum pump -V192- to bracket	8 Nm



Testing brake vacuum pump -V192-

When the engine is started, the brake vacuum pump -V192- must run for a short time.

Procedure

- Drive vehicle onto a lift platform and switch off engine.
- Start engine.
- A second person must check the operation of the brake vacuum pump -V192- by feeling with his hand.

If the brake vacuum pump -V192- does not run:

- Read out fault memory of engine control unit.
⇒ Engine, Fuel Injection and Ignition System;
Repair Group 01

Steering column and steering wheel with airbag

Inspecting steering column for damage

Special tools, testers and aids required

- ◆ Locking drift T10060

Visual inspection

- Inspect steering column components for damage.
- If damage is present, replace complete steering column.

Inspection requirement

- Universal joint of steering column detached from steering gear

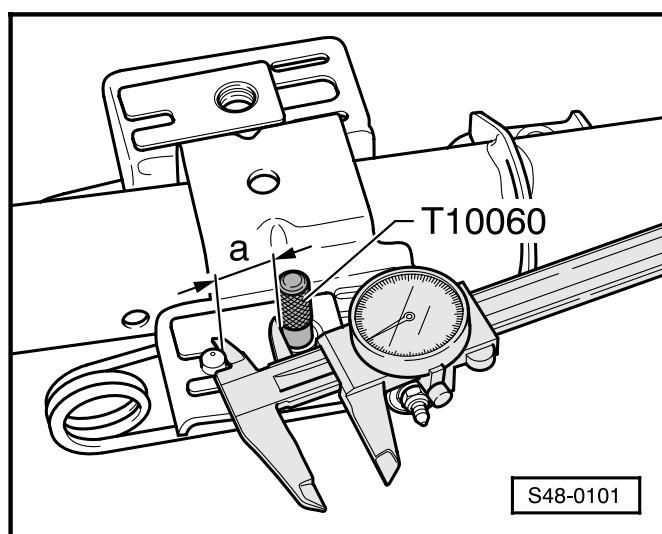
Operational check

- Check whether steering column can be turned freely and without catching.
- Check whether the steering column can be adjusted forward/back and for height.

If an accident has occurred, so-called deformation elements at the steering column may have been shifted out of place.

They are located at the two top bolted connections of the steering column.

If such damage is suspected, remove the steering column sufficiently until dimension -a- can be checked.



- ◀ Insert locking drift T10060.
- Use slide gauge to check dimension -a-.

Dimension -a-: not more than 23 mm

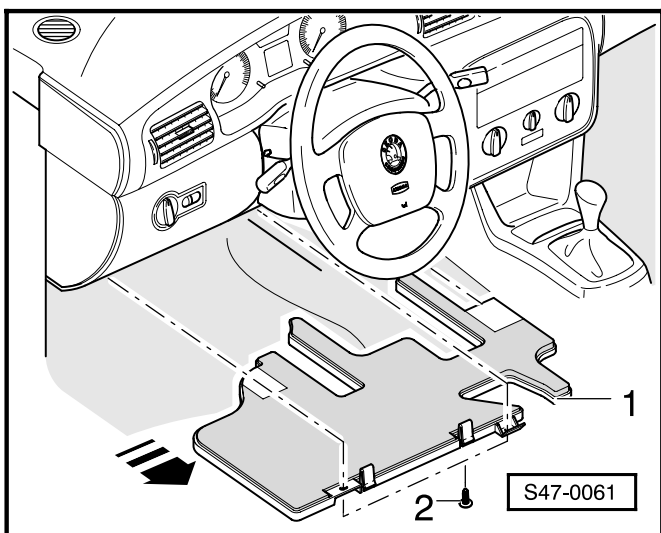
If any defect is found during any of these inspections, the steering column is damaged.

- In this case, replace complete steering column.

Removing and installing steering column

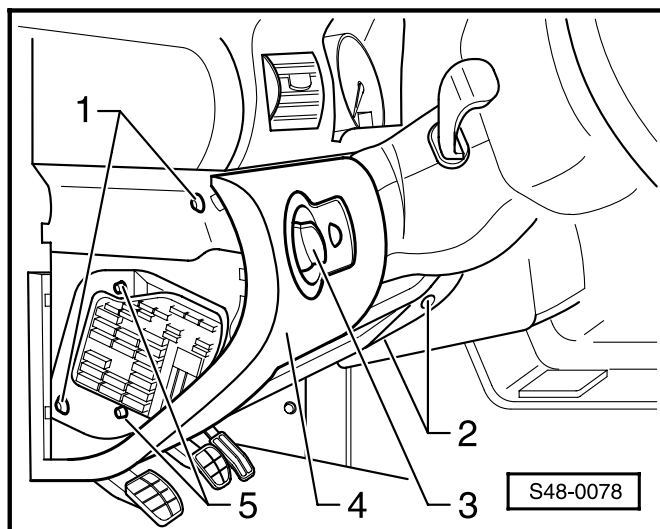
Notes:

- ◆ New steering columns which are supplied as a replacement part, are provided with a transport protection. Remove this transport protection after installing the steering column.
- ◆ The steering column is supplied as a replacement part only complete with ignition lock housing and without lock cylinder and also ignition/starter switch.
- ◆ The existing ignition lock housing can be used.
- ◆ Removing and installing ignition lock housing ⇒ page 48-6, Fig. S48-0094.
- ◆ For new steering columns which are supplied as replacement parts, fit the existing lock cylinder and ignition/starter switch from the old steering column or procure as replacement part and install.
- ⇒ Electrical System; Repair Group 94; Servicing lock cylinder and ignition/starter switch
- ◆ No provision is made for repairing the steering column.
- ◆ Always replace self-locking nuts and bolts.
- ◆ It is not permitted to carry out any welding and straightening work on steering components.
- ◆ Before disconnecting the battery, determine the coding of radio sets fitted with anti-theft code.
- ◆ When the battery is re-connected, check the vehicle equipment:
 - encode radio,
 - re-set clock,
 - initialise power windows.
- ⇒ Inspection and Maintenance

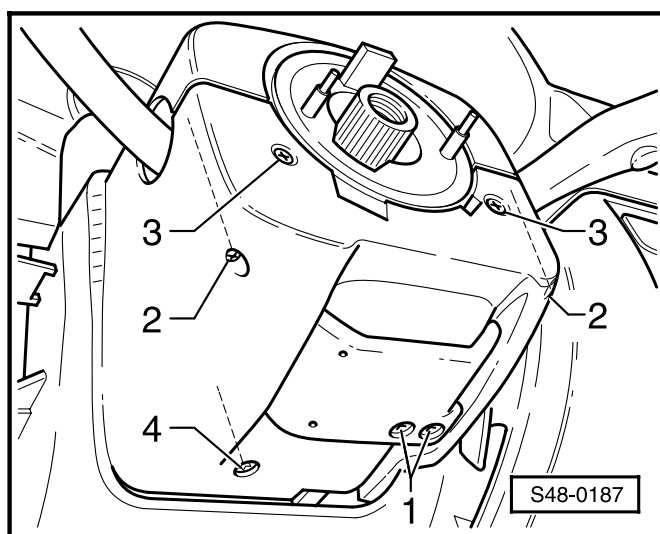


Removing

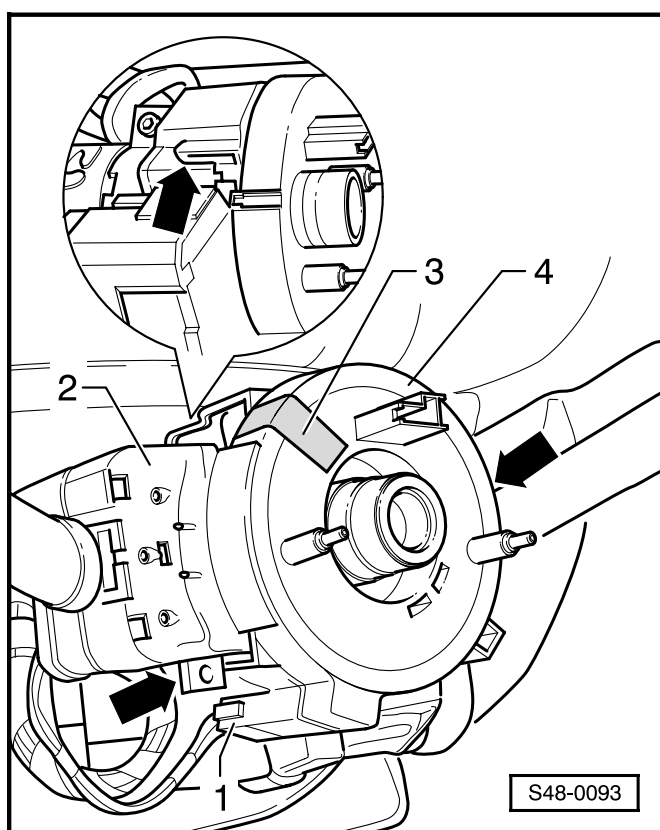
- Disconnect battery.
- Move wheels into straightahead position.
- ◀ - Remove screws -2-.
- Pull footwell trim panel -1- out of the fixtures.
- Remove airbag on driver side.
- ⇒ Body Fitting Work; Repair Group 69; Airbag System
- Remove steering wheel.
- ⇒ Body Fitting Work; Repair Group 69; Airbag System



- Unclip cover of fuse carrier.
- ◀ Remove light switch -3-.
⇒ Electrical System; Repair Group 96; Removing and installing light switch
- Take out screws -5- for fuse carrier.
- Remove Torx screws -1-.
- Remove cross-head screws -2-.

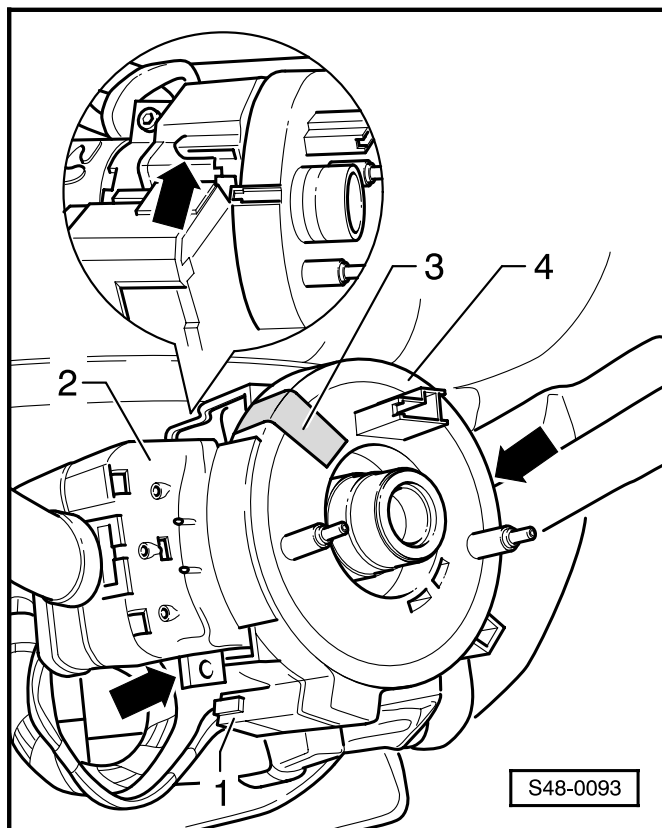


- Take out bottom part of dash panel on left -4-.
- ◀ Remove screws -1-, -2-, -3- and -4-.
- Take off steering column adjustment handle as well as top and bottom parts of steering column trim.



- ◀ The illustration shows the coil spring contact -4- on a vehicle not fitted with the electronic stability programme (ESP).
- Tape over coil spring -4- with adhesive tape -3- to prevent it being turned unintentionally.
- Unplug connector -1-.
- Carefully separate all the plug connections of the steering column switch.

Arrows - locking hook of coil spring -4-

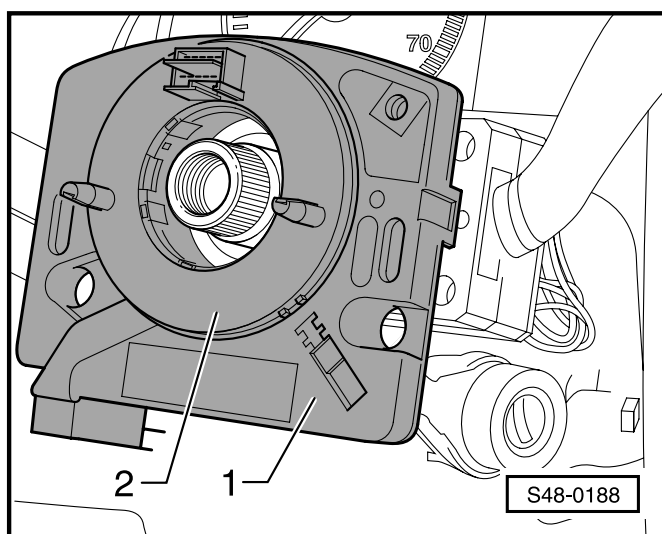
**Notes:**

- ◆ The next operation only requires to be carried out if the coil spring or the steering column switch is replaced.
- ◆ The coil spring must only be removed and installed when the steering wheel is in the middle position (wheels in straightahead position).
- ◆ The coil spring supplied as a replacement part is secured in the middle position by a cable strap.

- ◀ - Release locking hook -arrows- and pull coil spring -4- off the steering column switch -2-.

Note:

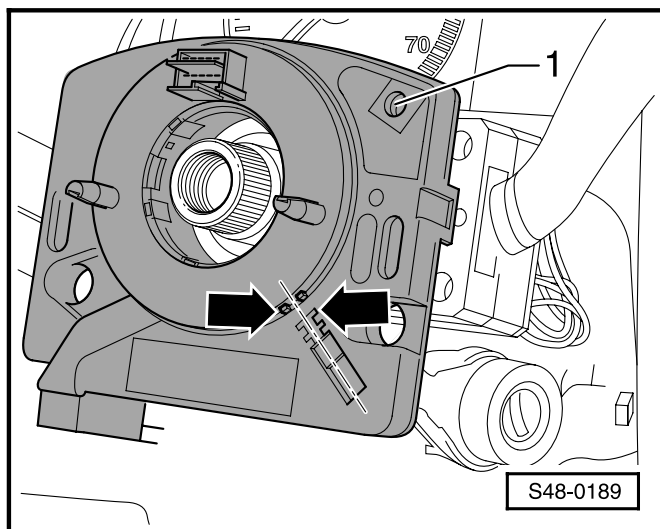
If the coil spring remains on the steering column switch, ensure that the coil spring is not turned out of the middle position when the steering column switch is placed down.

**Models fitted with ESP**

- ◀ Models fitted with ESP are additionally equipped with the steering angle sensor -G85-. It is installed in the housing -1- together with coil spring -2-.

You can find a description of the basic principles, design and operation of the ESP in Self Study Programme No. 28.

- **Check to ensure the front wheels are in the straightahead position.**
- If necessary, fit on steering wheel and move front wheels into straightahead position.
- Pull off steering wheel.

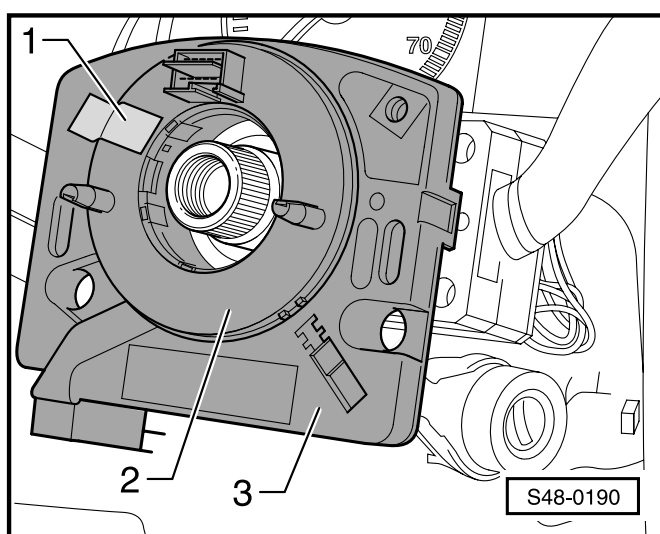
**Note:**

The next two operations only require to be carried out when subsequently re-installing the same housing with the coil spring.

- Position the steering angle sensor in the middle position:

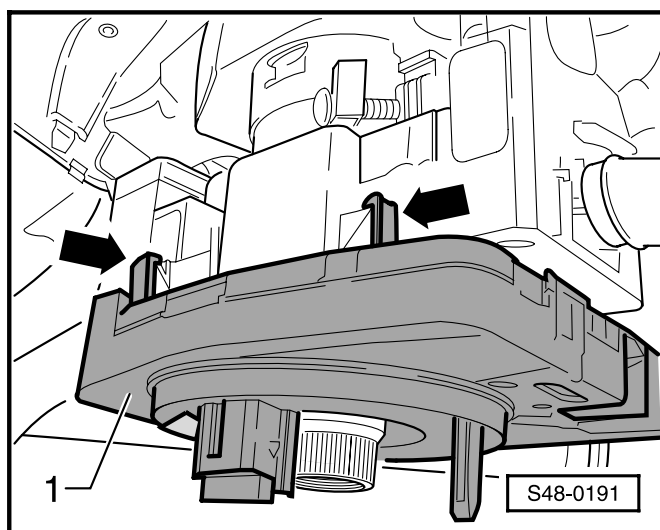
A yellow dot must be visible in the window -1-.

The markings -arrows- must be aligned.

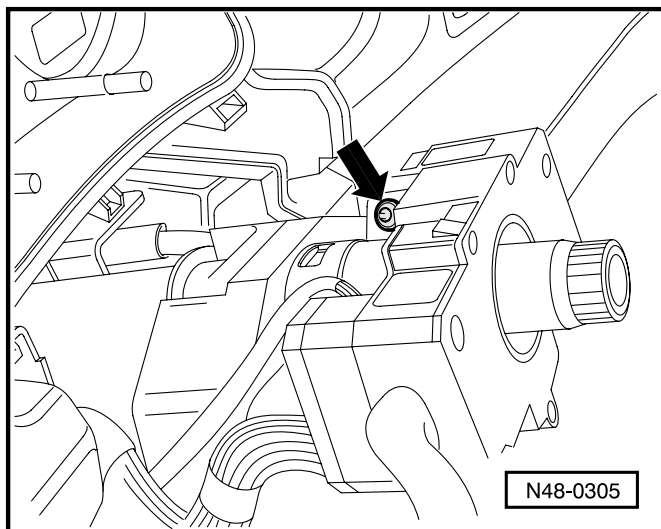


- Tape over coil spring -2- with adhesive tape -1- to prevent it turning unintentionally.

3 - Housing

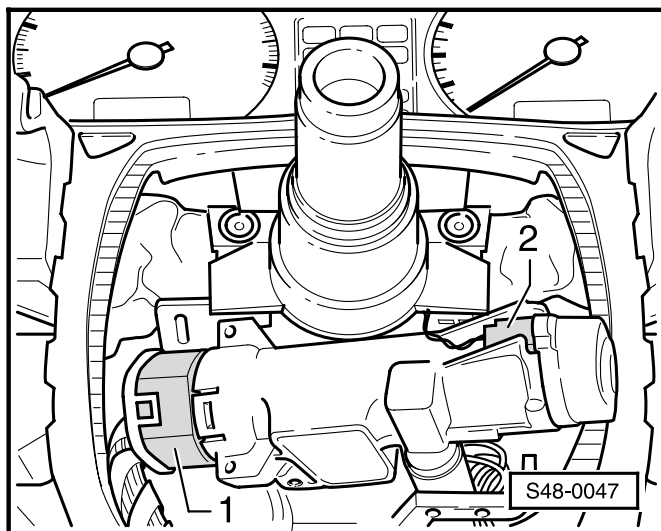


- Unplug connector from housing -1-.
- Carefully release locking hook -arrows- and pull off housing -1- together with steering angle sensor -G85- and coil spring.

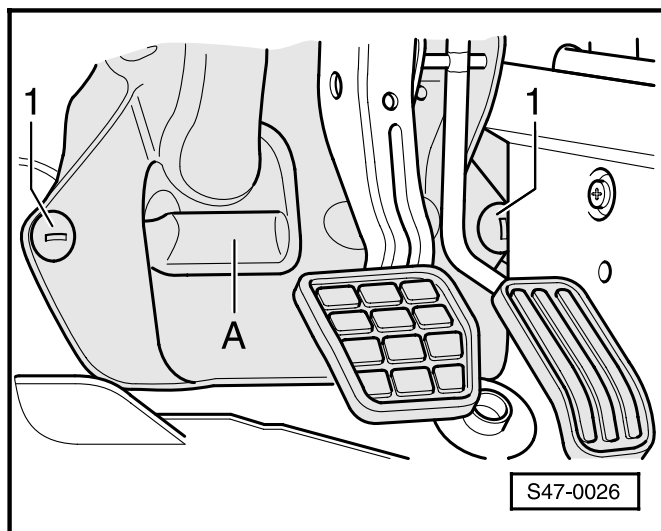


The remaining procedure now applies again to all models.

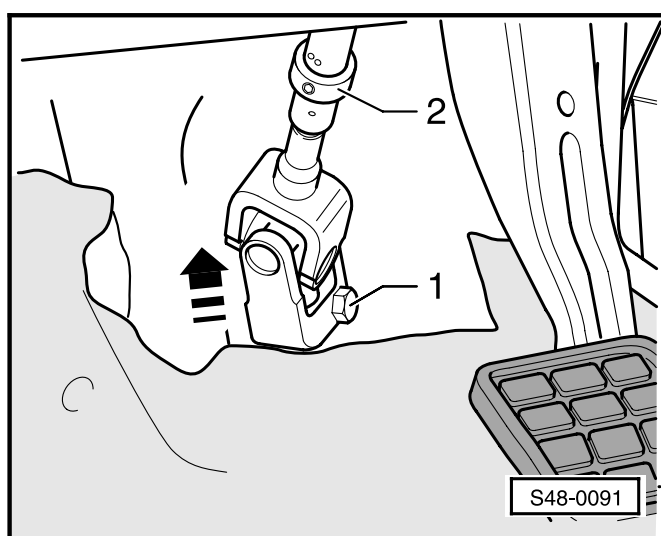
- ◀ - Slacken screw -arrow- of steering column switch until the steering column switch can be easily moved.
- Take off steering column.



- ◀ - Unplug connectors -1- and -2-.



- ◀ - Unscrew plastic nut -1- and remove cover -A-.



- ◀ - Unscrew hexagon bolt -1-.

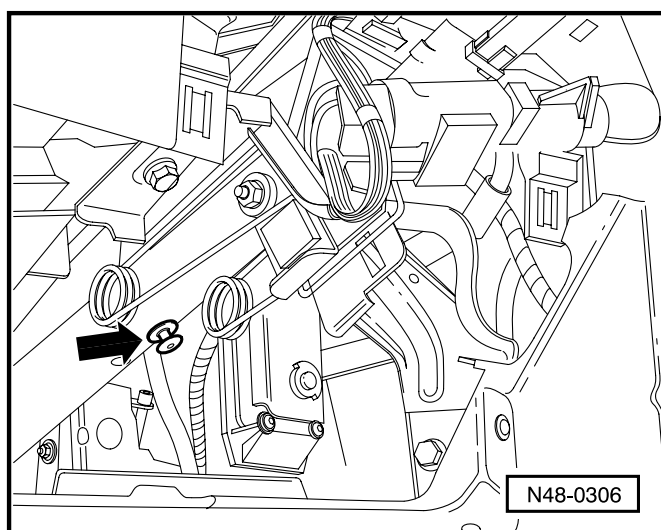
02.97 ➤ a clamp ring is fitted.

- Slacken hexagon socket screw of clamp ring -2- sufficiently until it is possible to pull the universal joint off the steering gear pinion.
- Pull universal joint off the steering gear pinion -arrow-.

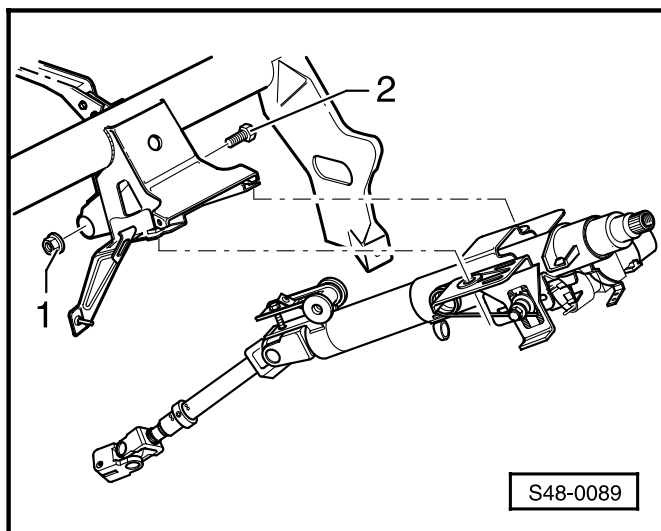
Notes:

- ◆ An assembly lock is required when pulling the steering column off the steering gear so that the top and bottom parts are not pulled apart.
- ◆ If the top and bottom parts of the steering column are pulled too far apart or pushed into each other, the splines will be separated. This can result in clattering noises in subsequent operation if the splines are no longer in their original installed position.

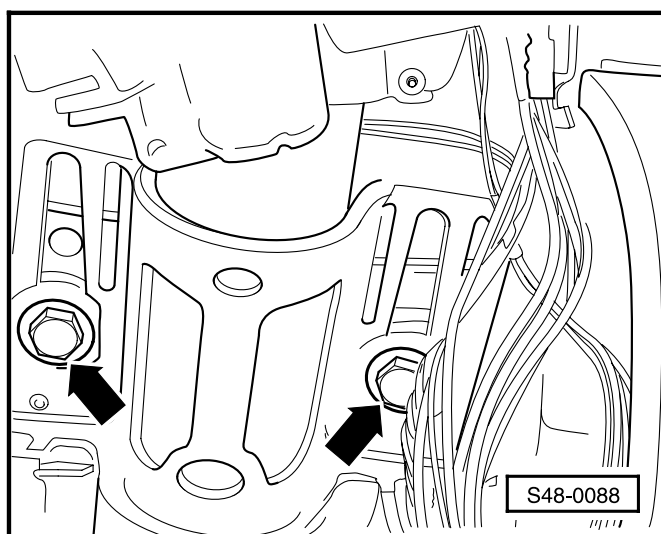
- Secure steering column before removing.
- Push or pull the steering column sufficiently far together or apart until the hole is visible.



- ◀ - Insert, for example, a clip into the hole -arrow-.



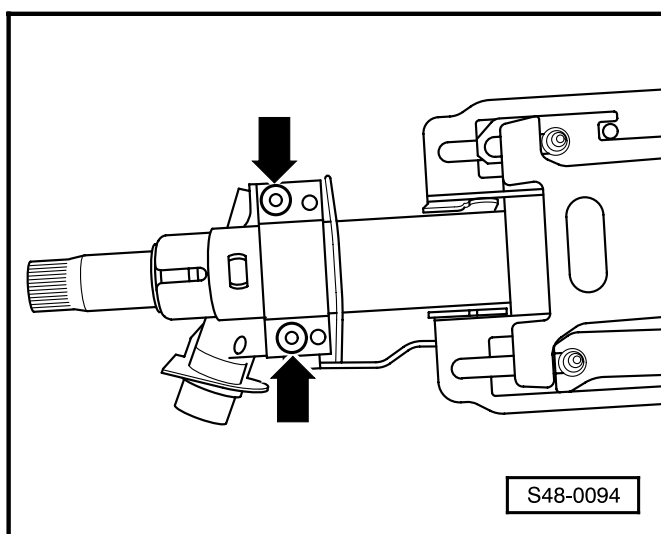
- ◀ - Unscrew self-locking hexagon nut -1- at the central tube and pull out hexagon bolt -2-.



- ◀ - Remove hexagon bolts -arrows-.
- Take out steering column.

Notes:

- ♦ *New steering columns are generally supplied as a replacement part without the ignition lock housing.*
- ♦ *Ignition lock housings are supplied separately as replacement parts.*



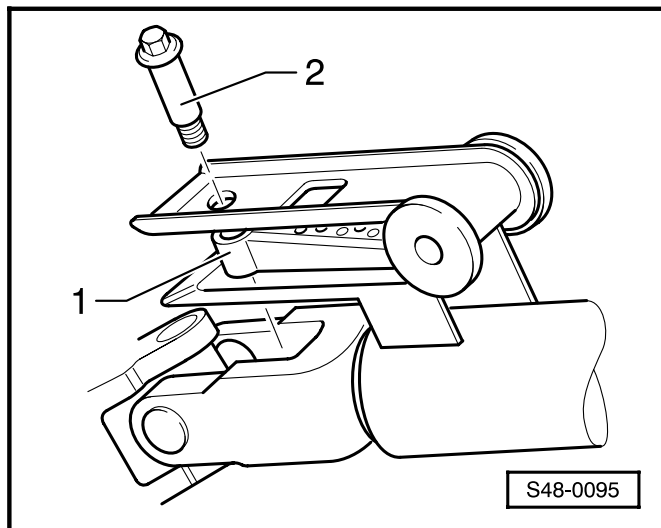
Replacing ignition lock housing

- ◀ - Remove shear bolts -arrows-.
- Take off ignition lock housing.
- Attach ignition lock housing to the steering column.
- Tighten shear bolts -arrows- until the head shears off.

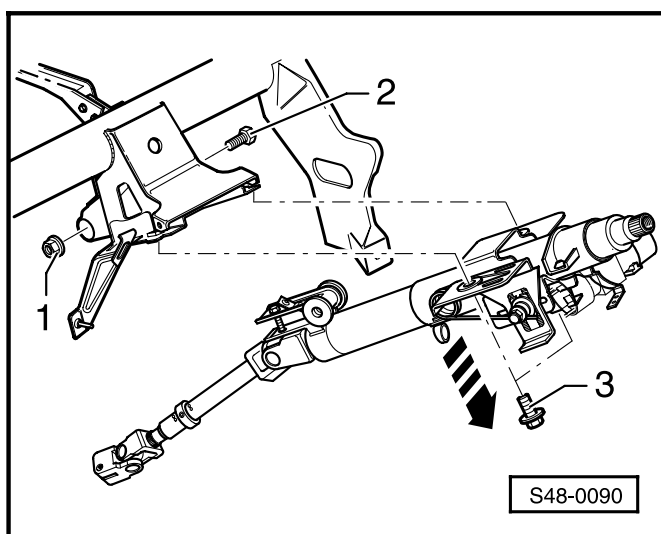
Installing

Notes:

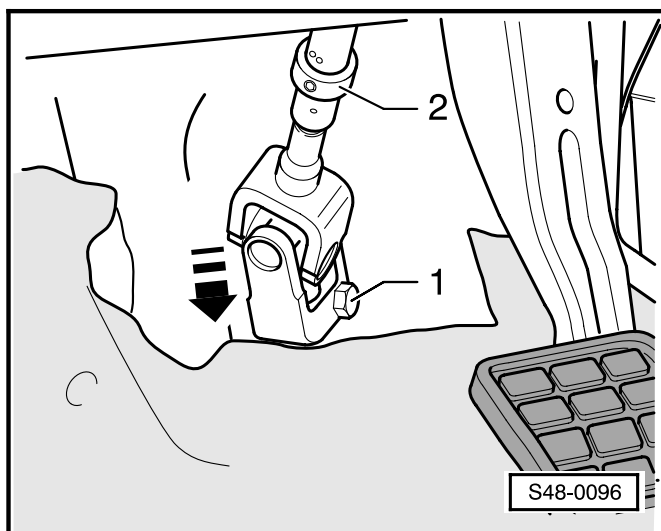
- ◆ New steering columns supplied as replacement parts are protected by a transportation lock.
- ◆ Remove the transportation lock after installing the steering column.
- ◆ Before installing new steering columns supplied as replacement parts, fit on a new bearing bush and shear bolt.
- ◆ The shear bolts and bearing bush must be replaced each time the bearing bush is removed.



- ◀ - Insert new bearing bush -1- and install shear bolt -2-.



- ◀ - Tighten shear bolt -2- until the head shears off.
- Fit steering column onto central tube.
- Screw in hexagon bolt -3- but do not tighten fully at this stage.
- Insert new hexagon bolt -2-.
- Screw on new self-locking hexagon nut -1- and tighten to 10 Nm.
- Tighten hexagon bolt -3- fully to 22 Nm.
- Pull out transportation lock -arrow-.



- ◀ - Push universal joint onto the steering pinion and tighten with new hexagon bolt -1-.

A clamping ring is installed as of 02.97 ➤.

- Tighten hexagon socket bolt of the clamping ring -2- to 17 Nm.
- Install cover of universal joint.
- Plug in connector for ignition/starter lock and immobiliser.

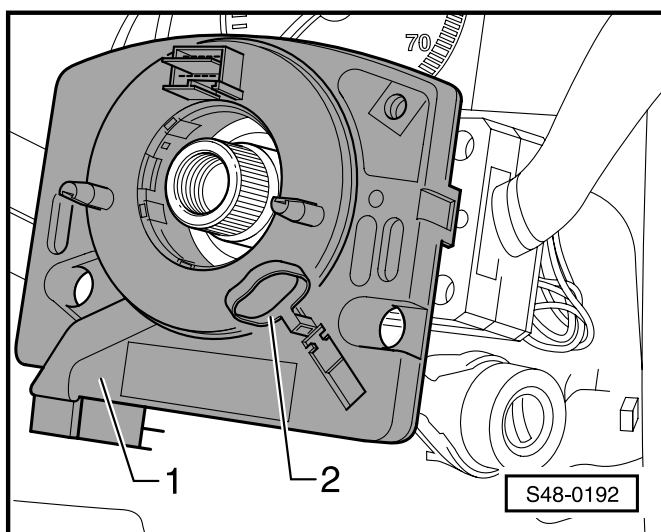
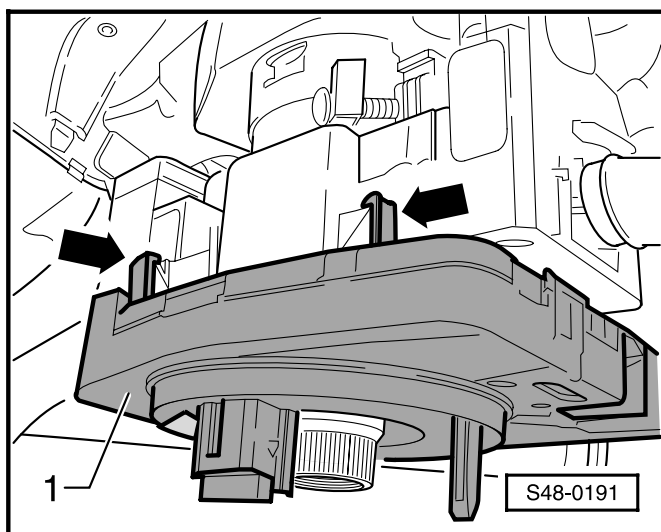
- Push steering column switch onto steering column.

Models not fitted with ESP

- Push coil spring onto the steering column and lock with the steering column switch.

Models fitted with ESP

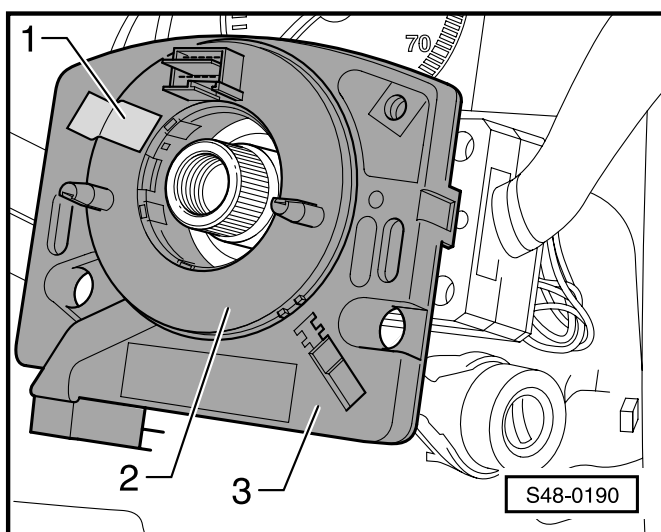
- ◀ - Push housing -1- together with steering angle sensor -G85- and coil spring onto the steering column and lock with steering column switch -arrows-.
- Plug in connector at housing -1-.



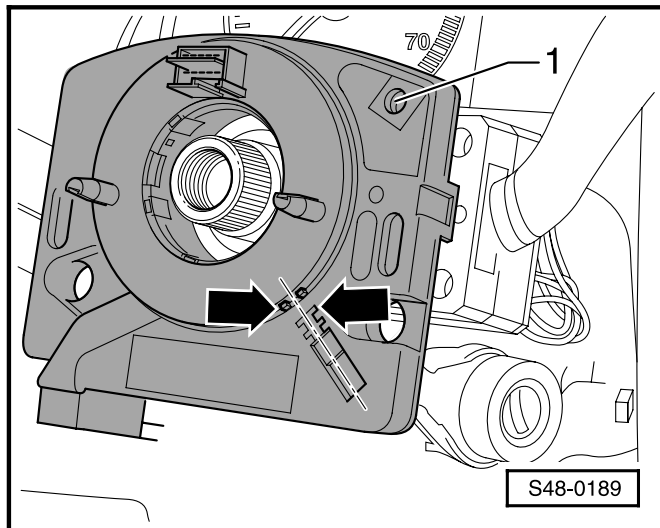
Note:

Do not turn the coil spring after removing the transportation lock or the adhesive tape, respectively; it is only permissible to move the steering angle sensor -G85- into the middle position.

- ◀ - Remove transportation lock -2- after installing a new housing -1-.



- ◀ - Remove adhesive tape -1- after installing an existing housing -3-.
- 2 - Coil spring



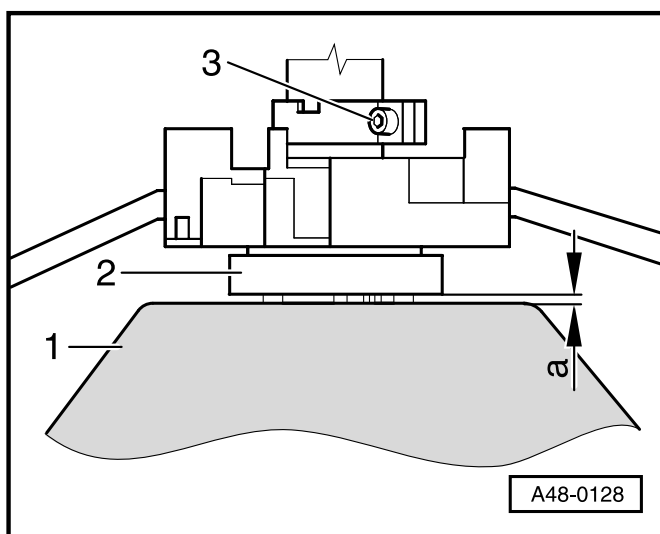
- ◀ - Move the steering angle sensor -G85- into the middle position.

A yellow dot must be visible in the window -1-.

The markings -arrows- must be aligned.

Check to ensure that these two requirements are met.

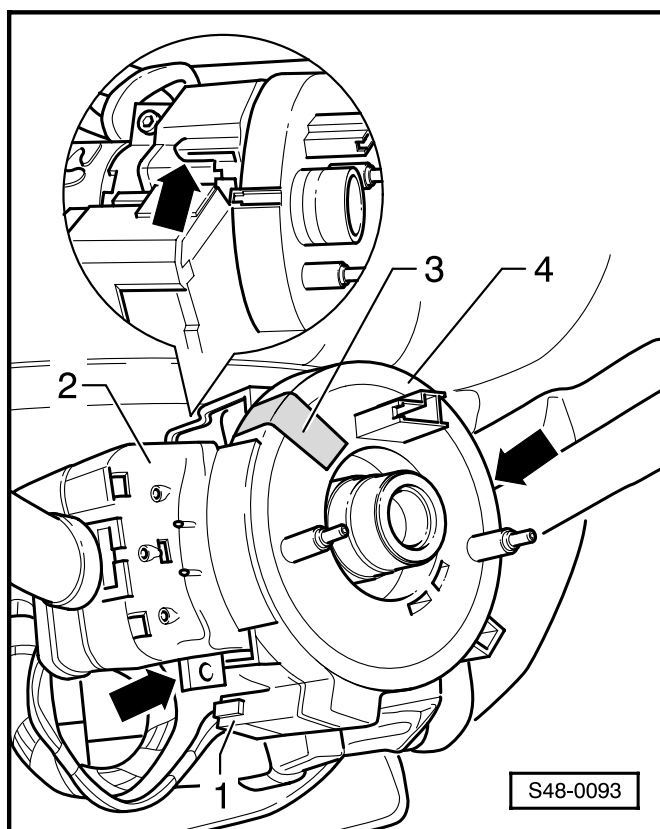
The remaining procedure now applies again to all models.



- Fit steering wheel onto the steering column and screw in existing internally serrated bolt and tighten.

Notes:

- ◀ ♦ Fig. shows steering column switch with coil spring -2- and steering wheel -1- on a vehicle not fitted with ESP.
- ♦ On vehicles fitted with ESP the size „a“ between the coil spring integrated in the housing and the steering wheel, is likewise 3 mm.
- Align steering column switch horizontally and set size -a-; after this, tighten clamping screw -3-.



- Take off steering wheel again.
- ◀ - Plug in connector -1-.
- Fit together plug connections at steering column switch.

Note:

Do not turn coil spring out of the middle position after pulling off the adhesive tape -3-.

- Carefully pull off adhesive tape -3-.
- Install trim for steering column switch.
- ⇒ Body Fitting Work; Repair Group 70; Dash Panel

- Install bottom part of dash panel on left.
⇒ Body Fitting Work; Repair Group 70; Dash Panel
- Install footwell trim on driver side.
⇒ Body Fitting Work; Repair Group 68; Storage Compartment, Covers and Trim
- Install steering wheel.
⇒ Body Fitting Work; Repair Group 69; Airbag System
- Install airbag on driver side.
⇒ Body Fitting Work; Repair Group 69; Airbag System

Warning!

Ensure that no person is present inside the vehicle when the battery is re-connected.

- Re-connect battery ⇒ page 48-2.

Models not fitted with ESP:

- Interrogate fault memory ⇒ page 45-12.
- Erase fault memory ⇒ page 45-21.

Models fitted with ESP:

- Carry out basic setting of steering angle sensor -G85- ⇒ page 45-124.
- Interrogate fault memory ⇒ page 45-101.
- Erase fault memory ⇒ page 45-113.

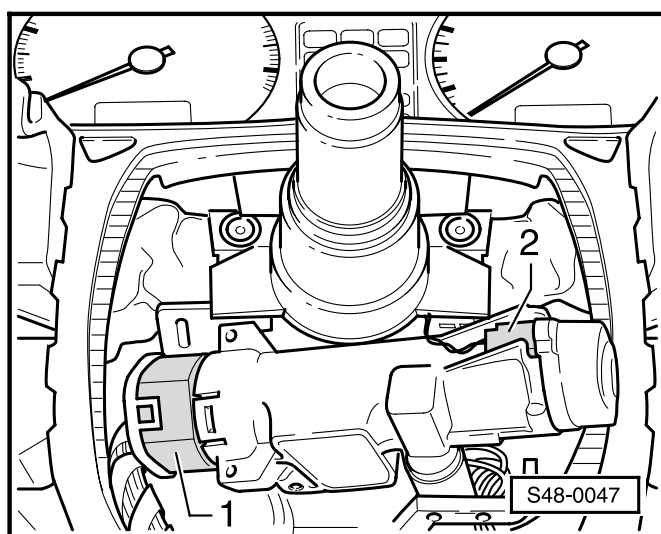
Removing and installing ignition lock housing with steering column fitted on

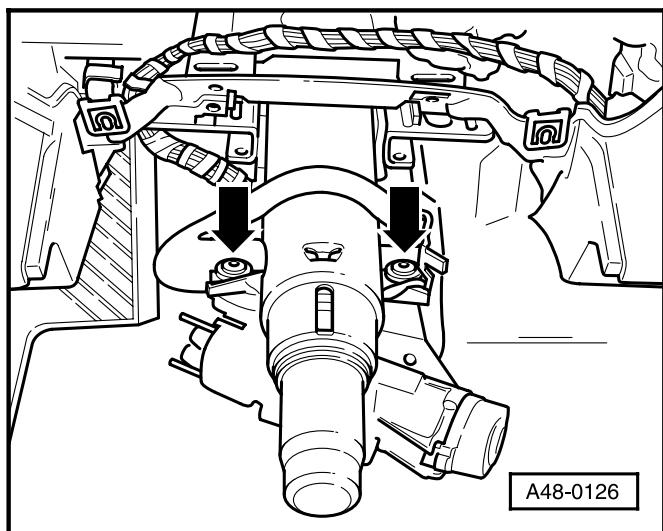
Notes:

- ◆ Before disconnecting the battery, determine the code of the radio set fitted with anti-theft coding.
 - ◆ When the battery is re-connected, please check the vehicle equipment:
 - Enter radio code
 - Re-set clock
 - Initialise power windows.
- ⇒ Inspection and Maintenance

Removing

- Remove steering wheel.
⇒ Body Fitting Work; Repair Group 69; Airbag System
- Remove bottom part of dash panel on left.
⇒ Body Fitting Work; Repair Group 70; Dash Panel
- Remove trim of steering column switch.
⇒ Body Fitting Work; Repair Group 70; Dash Panel
- Remove ignition/starter switch.
⇒ Electrical System; Repair Group 94; Servicing lock cylinder and ignition/starter switch
- Remove steering column switch.
⇒ Electrical System; Repair Group 94; Servicing steering column switch
- Remove dash panel insert.
⇒ Electrical System; Repair Group 90; Dash Panel Insert
- ◀ - Unplug connector -1- for ignition/starter lock and connector -2- for immobiliser.





- ◀ - Remove shear bolts -arrows- and take out ignition lock housing.

Installing

- Insert ignition lock housing and tighten with new shear bolts.
- Tighten shear bolts until the head shears off.
- Install ignition/starter switch.
⇒ Electrical System; Repair Group 94; Servicing lock cylinder and ignition/starter switch
- Install dash panel insert.
⇒ Electrical System; Repair Group 90; Dash Panel Insert
- Plug in connectors for ignition/starter lock and immobiliser.
- Align steering column switch to steering wheel and tighten fully ⇒ page 48-8.
- Install trim for steering column switch and bottom part of dash panel on left.
⇒ Body Fitting Work; Repair Group 70; Dash Panel
- Install steering wheel and airbag on driver side.
⇒ Body Fitting Work; Repair Group 69; Airbag System

Warning!

Ensure that no person is present inside the vehicle when the battery is re-connected.

- Re-connect battery ⇒ page 48-8.3.

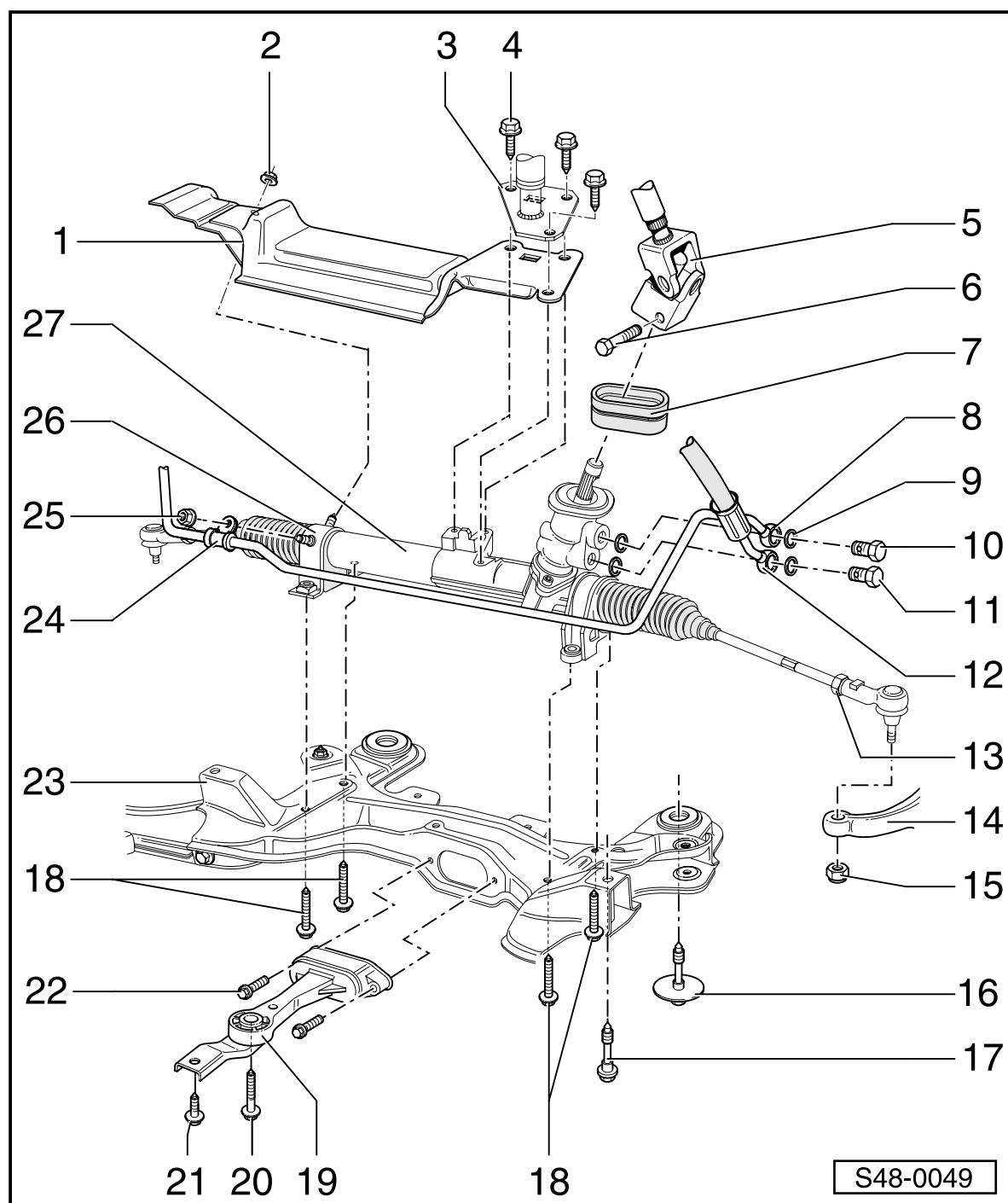
Models not fitted with ESP

- Interrogate fault memory ⇒ page 45-12.
- Erase fault memory ⇒ page 45-21.

Models fitted with ESP

- Carry out basic setting of steering angle sensor -G85- ⇒ page 45-124.
- Interrogate fault memory ⇒ page 45-101.
- Erase fault memory ⇒ page 45-113.

Summary of components of power-assisted steering gear



Notes:

- ◆ It is necessary to replace various components of the steering system following an accident or damage to the front suspension ⇒ page 48-19.
- ◆ No provision is made for repairing the steering gear. In the event of complaints or problems, replace the steering gear.
- ◆ Replace self-locking nuts and bolts.
- ◆ It is not permitted to carry out any welding and straightening work on steering components.
- ◆ Use only steering gear grease AOF 063 000 04 for greasing the steering rack (quantity 23 ... 27 g).

- ◆ Oil grade: central hydraulic fluid G 002 000
- ◆ Quantity of hydraulic fluid in system: 0.7 ... 0.9 ltr.

1 - Heat shield

- ◆ Centre with bearing bracket on power steering gear

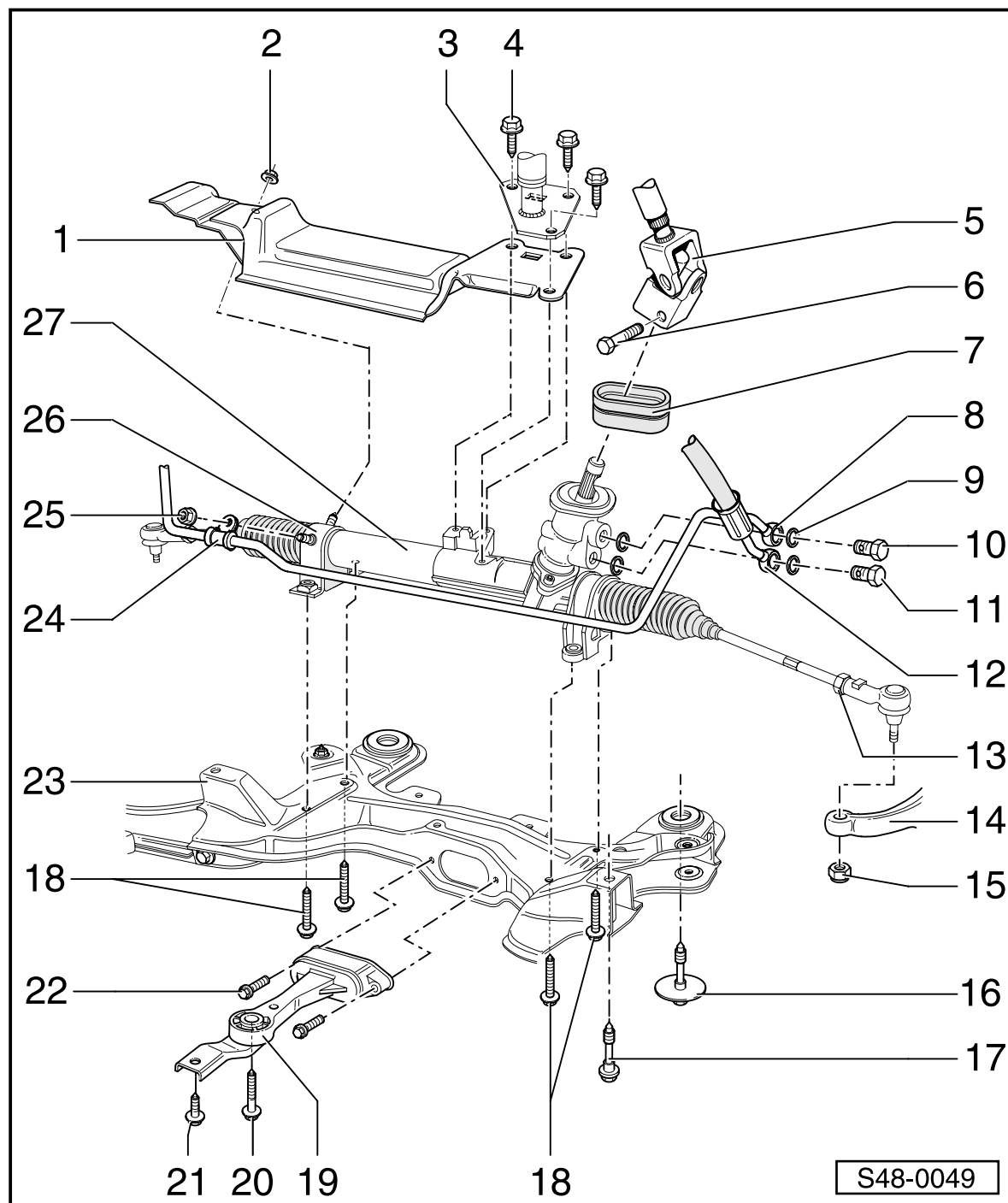
2 - Hexagon nut, 20 Nm

3 - Bearing bracket

- ◆ Only on gearbox 02K

4 - Hexagon bolt, 25 Nm

5 - Universal joint of steering column



6 - Hexagon bolt, 30 Nm

- ◆ Replace each time removed

7 - Sealing collar

- ◆ Pay attention to installation instructions ⇒ page 48-16

8 - Return-flow line

- ◆ Power steering gear - reservoir for central hydraulic fluid
- ◆ Clearance to power steering gear must be 10 mm

9 - Seals

- ◆ Replace each time removed

10 - Banjo bolt, 45 Nm

- ◆ M16 x 1.5

11 - Banjo bolt, 45 Nm

- ◆ M14 x 1.5

12 - Pressure line (flexible hose)

- ◆ Hydraulic pump - power steering gear

13 - Lock nut, 50 Nm

14 - Steering arm of wheel bearing housing

15 - Hexagon nut, self-locking, 45 Nm

- ◆ Replace each time removed

16 - Bolt + washer, 100 Nm and torque a further 90°

- ◆ Replace each time removed

17 - Bolt + washer, 100 Nm and torque a further 90°

- ◆ Replace each time removed

18 - Hexagon bolt, 20 Nm and torque a further 90°

- ◆ Replace each time removed

19 - Pendulum support**20 - Hexagon bolt, 40 Nm and torque a further 90°**

- ◆ Replace each time removed

21 - Hexagon bolt, 40 Nm and torque a further 90°

- ◆ Replace each time removed

22 - Hexagon bolt, 20 Nm and torque a further 90°

- ◆ Replace each time removed

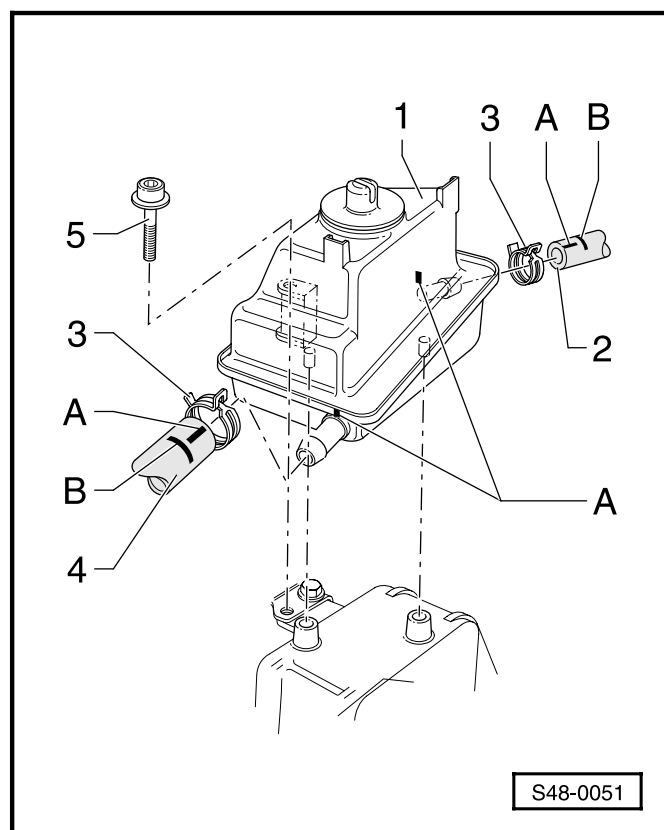
23 - Subframe**24 - Retaining clip****25 - Hexagon nut, 20 Nm****26 - Clip with rubber insert**

Installation position:

- ◆ Arrow on clip points in direction of travel
- ◆ If thread of welded nut is damaged, replace

27 - Power steering gear

- ◆ Setting ⇒ page 48-25
- ◆ Removing and installing ⇒ page 48-12

Removing and installing hydraulic fluid reservoir

- ◆ Central hydraulic fluid
TL 52 146
N 052 146 00
e.g. PENTOSIN CHF 11 S (G 002 000)

1 - Reservoir with cap and dipstick

- ◆ Tighten cap to 2 Nm
- ◆ Inspect hydraulic fluid level, top up if necessary ⇒ page 48-26

2 - Return-flow line

- ◆ Longitudinal markings -A- must be aligned
- ◆ Install spring strap clip max. up to transverse marking -B- on hose

3 - Spring strap clip

- ◆ Use special tool, e.g. Matra V/131, for opening and closing
- ◆ Tensioning eyes must be facing up

4 - Suction line

- ◆ Longitudinal markings -A- must be aligned
- ◆ Install spring strap clip max. up to transverse marking -B- on hose

5 - Bolt + washer, 10 Nm**Special tools, testers and aids required**

- ◆ Pliers for spring strap clips, e.g. Matra V/131

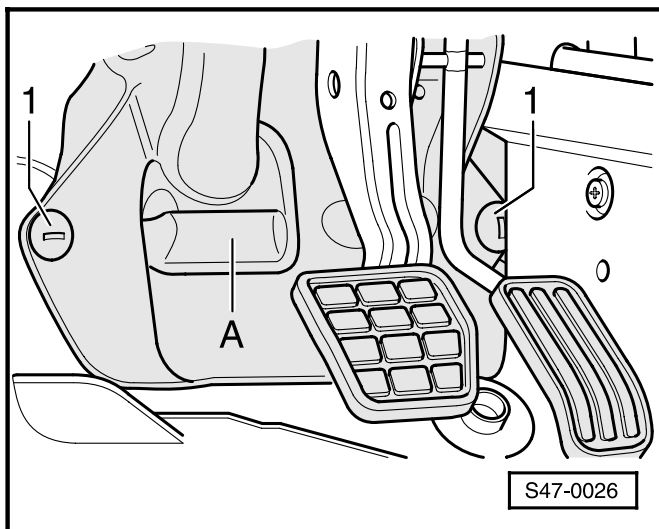
Removing and installing PAS gear

Special tools, testers and aids required

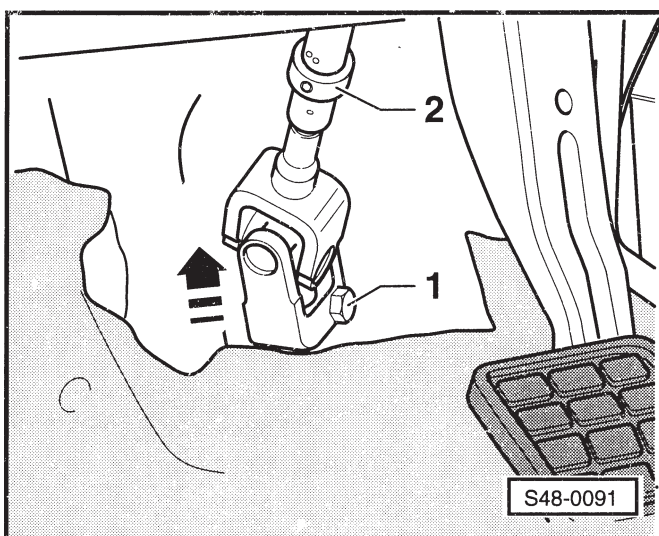
- ◆ Hose clamp MP 7-602
- ◆ Pliers for spring strap clip, e.g. Matra V/131
- ◆ Puller, Matra V 176
- ◆ Gearbox jack with adapter, e.g. V.A.G 1383 A with V.A.G 1359/2
- ◆ Sealing plug for hydraulic fluid reservoir (commercially available)
- ◆ Plastic screw plugs for pipe connections at PAS gear (commercially available)
- ◆ Central hydraulic fluid
TL 52 146
N 052 146 00
e.g. PENTOSIN CHF 11 S (G 002 000)

Notes:

- ◆ *No provision is made for repairs except replacing the boots and the track rods.*
- ◆ *Scrupulous cleanliness is required when carrying out work on the power-assisted steering.*
- ◆ *Thoroughly clean connection points and the surrounding area before disconnecting.*
- ◆ *Place removed parts down on a clean surface and cover over if repairs are not carried out immediately.*
- ◆ *Do not use any fluffing cloth.*
- ◆ *Do not remove replacement parts from their wrapping until just before installing.*
- ◆ *Use only genuine, wrapped parts.*
- ◆ *Do not re-use drained hydraulic fluid.*
- ◆ *Replace seals.*
- ◆ *Disposal ⇒ page 48-24.*

**Removing**

- ◀ - Unscrew plastic nuts -1- and remove cover -A-.



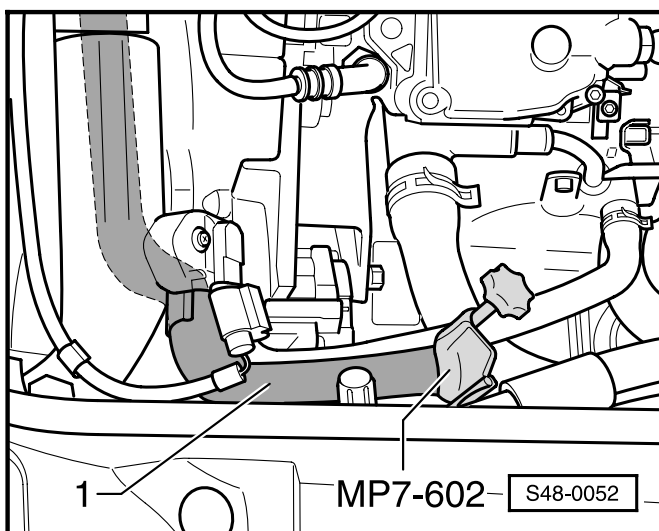
- ◀ - Unscrew hexagon bolts -1-.

Important!

Move the steering wheel into middle position (wheels straightahead) and do not turn during the repair work otherwise the contact spring of the airbag unit may be damaged.

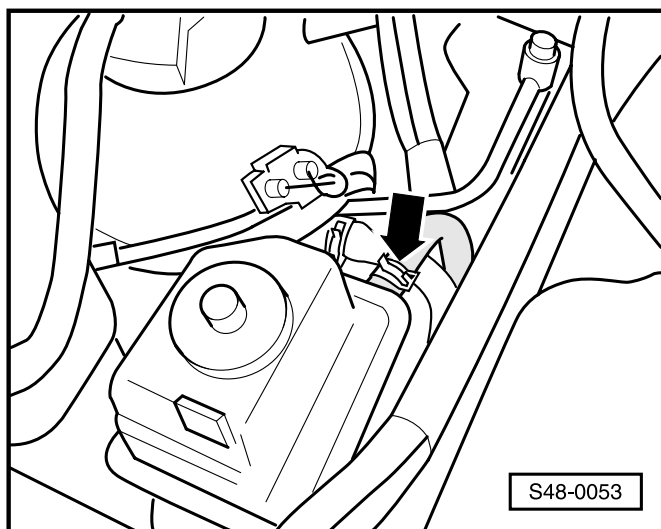
02.97 ► a clamping ring is fitted.

- Slacken hexagon socket screw of the clamping ring -2- sufficiently until the universal joint can be pulled off the steering gear pinion.
- Pull universal joint off steering gear pinion -arrow-.

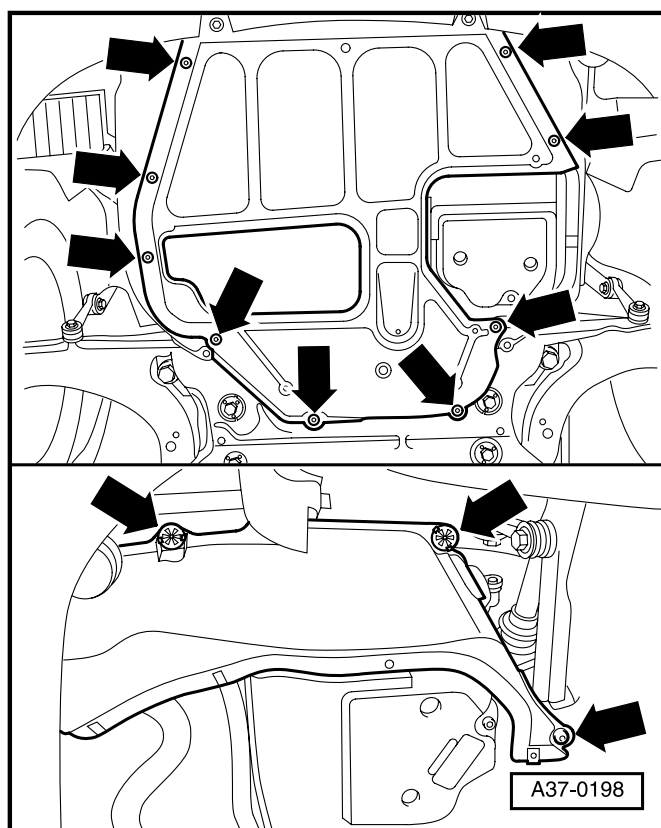


- ◀ - Use special tool -MP 7-602- to pinch off suction line -1- (reservoir for hydraulic fluid/ hydraulic pump) close to hydraulic pump.

Illustration shows routing of line and pinching off line on 1.9-ltr./66 kW TDI engine. Routing of suction line on other engine differs. Suction line should be pinched off, however, close to hydraulic pump.

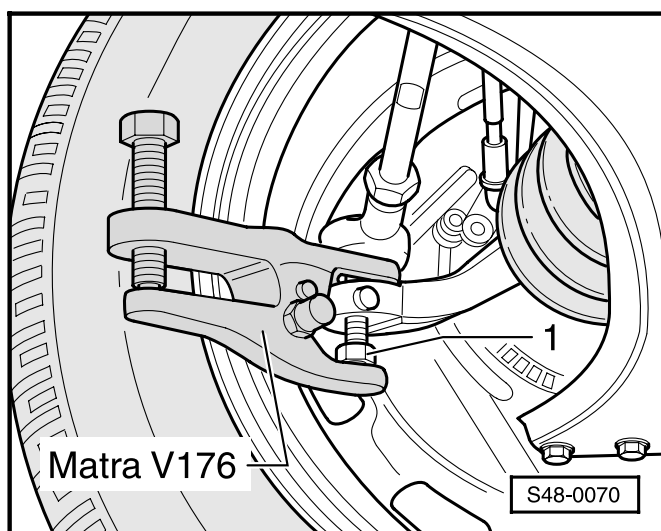


- ◀ - Use special tool, e.g. Matra V/131, to open spring strap clip -arrow-.
- Detach return-flow pipe from hydraulic fluid reservoir and allow hydraulic fluid to flow into a suitable vessel.
- Use a sealing plug to seal off return-flow opening at the hydraulic fluid reservoir.



- ◀ - Remove noise insulation panelling in the middle and also on left and right -arrows-.

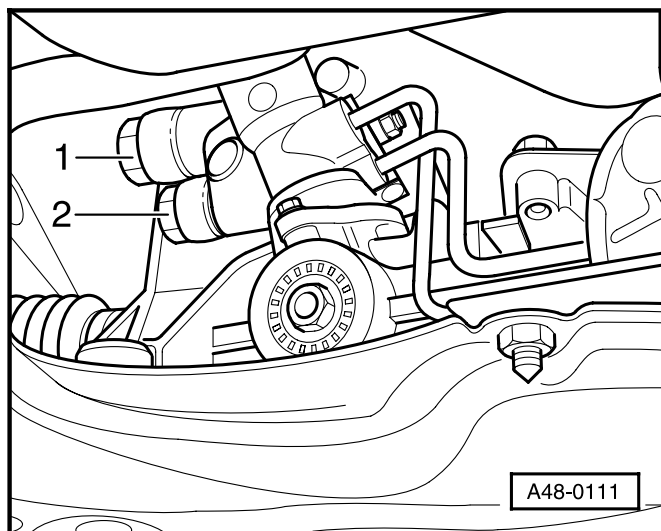
Fig. shows the noise insulation panel on models with 1.9-ltr./66 kW TDI and 1.9-ltr./50 kW SDI engines. The noise insulation panel on other engine versions may differ from that shown in the illustration.



- ◀ - Use puller Matra V176 to press track rods off the pitman arm.

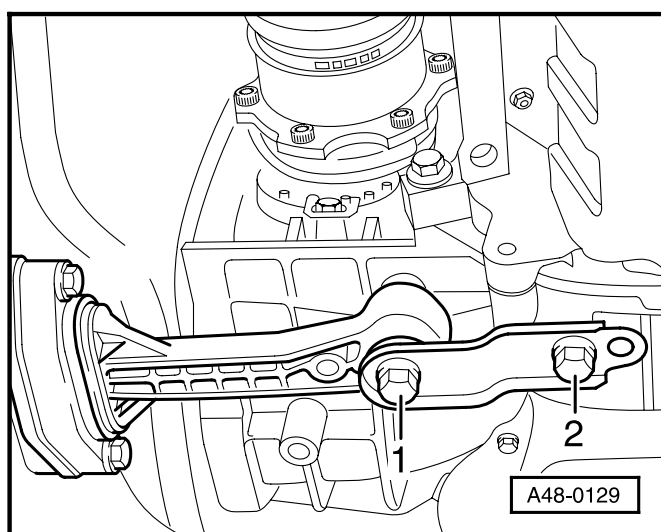
Note:

Screw down hexagon nut -1- sufficiently so that the track rod puller cannot damage the thread.

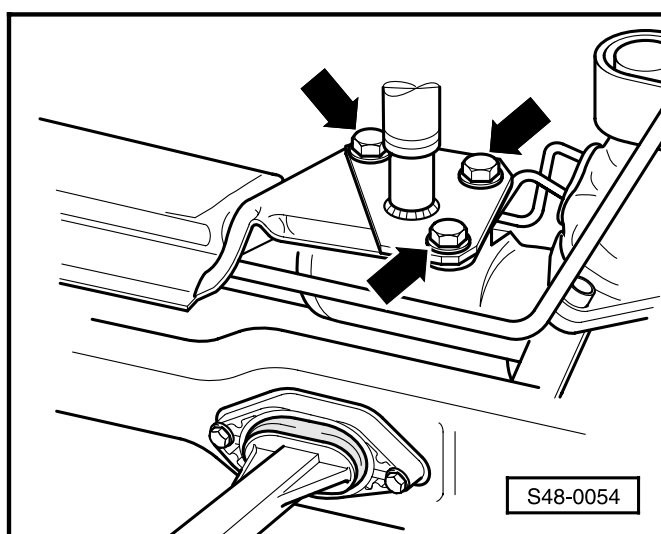


- Place a drip tray below for collecting the hydraulic fluid which flows out.
- ◀ - Detach pressure pipe -2- (expansion hose) of PAS gear and seal with a plastic bag and adhesive tape.
- Seal threaded opening for pressure pipe connection -2- at the PAS gear (e.g. with plastic screw plug).

The return-flow pipe -1- can only be disconnected from the PAS gear once the subframe has been lowered.



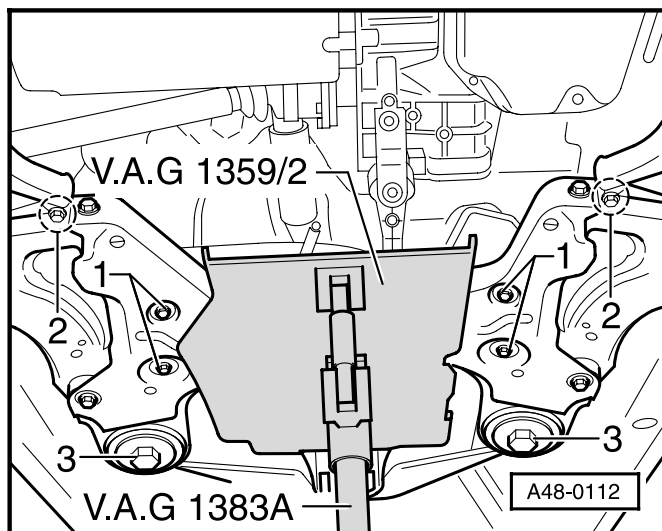
- ◀ - Detach pendulum support at the gearbox side by unscrewing hexagon bolts -1- and -2-.



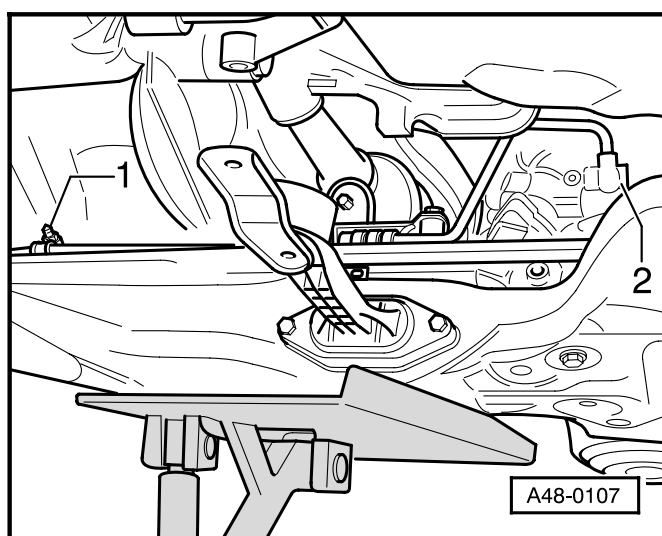
- ◀ - Unscrew bolts for bearing bracket -arrows-.

Note:

Only for gearbox 02K.



- ◀ - Position gearbox lift with attachment, e.g. V.A.G 1383 A with V.A.G 1359/2.
- Slacken bolts -1- for power steering gear.
- Take out bolts -2- and -3- of subframe.
- Lower subframe.



- ◀ - Disconnect return-flow line from clip -1- and rotary slide valve housing -2-.
- Seal return-flow line with plastic bag and adhesive tape.
- Seal threaded hole for connection of return-flow line at rotary slide valve housing -2- (e.g. with plastic screw plug).
- Remove bolts attaching power steering gear and take out power steering gear to the rear.

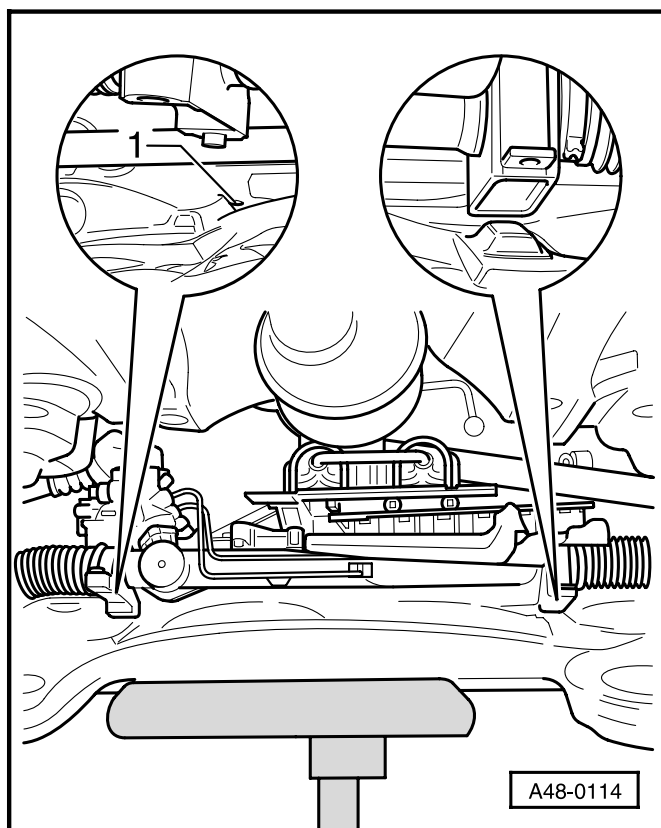
Installing

Warning!

The vehicle alignment must be checked after installing the power steering gear.

Notes:

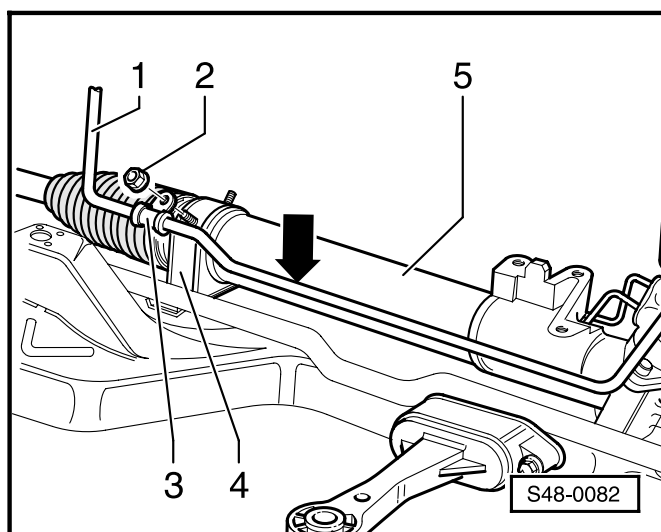
- ◆ When tightening the lines, ensure that the lines cannot touch or chafe against any other part.
- ◆ Use new seals for the hose/line connections.
- ◆ Before installing steering gear, coat sealing collar on steering gear with a lubricant, e.g. lubricating soap.
- ◆ After positioning steering gear against drive shaft, ensure that the sealing collar on the steering gear is resting against the assembly plate without any creases and the opening to the footwell is correctly sealed. Otherwise risk of water leaking in and/or noises.



- ◆ Ensure that the sealing surfaces are clean.
- ◆ Specified tightening torques ⇒ from page 48-9.
- ◆ Before installing power steering gear, check middle position of steering rack ⇒ page 48-23.

- Check middle position of power steering gear, set if necessary ⇒ page 48-23.

- ◀ - Insert power steering gear with guide sleeve -1- into the subframe and tighten new bolts by hand.



- ◀ - Attach return-flow line -1- with retaining clip -3- and hexagon nut -2- at the clip with rubber insert -4-.

Note:

Maintain a clearance of 10 mm between return-flow line -1- and power steering gear -5- (arrow).

- Attach return-flow line with new seals tight to rotary slide valve housing.
- Ensure sealing collar on steering gear pinion is correctly fitted.
- Raise subframe and at the same time insert the steering gear pinion into the opening on the floor of the vehicle.
- Tighten subframe at first with old bolts and to specified torque.

Note:

The old bolts for attaching the subframe should be replaced with new bolts as part of the check of the vehicle alignment.

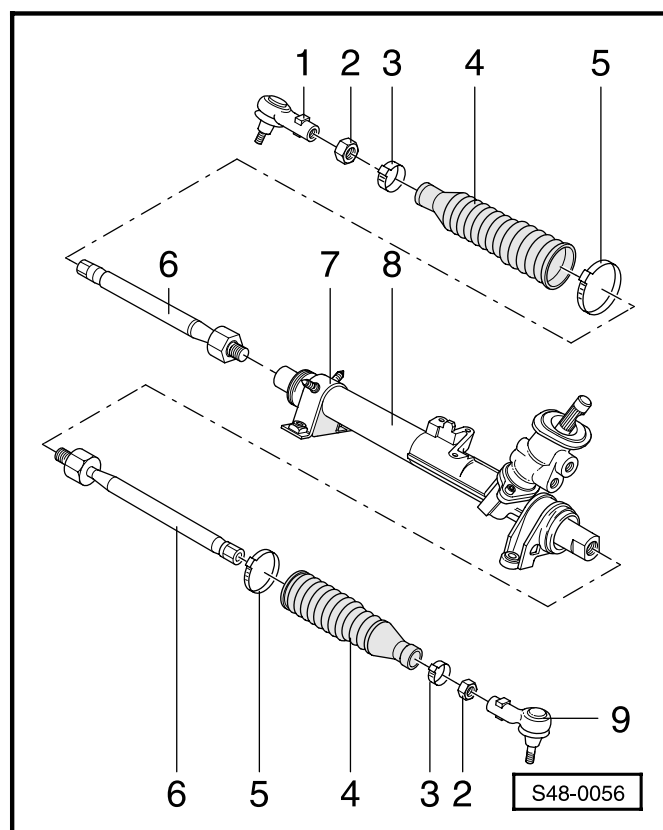
- Tighten bolts for power steering gear to subframe.

- Attach pressure line with new seals tight to rotary slide valve housing.
- Bolt on pendulum support and fixture for exhaust system.
- Bolt on bearing bracket for shift linkage (only gearbox 02K).
- Insert track rods into steering arm and bolt tight. If the joint stud also rotates when tightening, counter-hold with hexagon socket wrench (waf 6 mm).
- Install return-flow line at hydraulic fluid reservoir.
- Take hose clip off the suction line.
- Push universal joint onto the steering pinion and tighten fully with new hexagon bolt to 30 Nm.

02.97 ► clamp ring is fitted.

- Tighten hexagon socket screw of clamp ring to 17 Nm.
- Install cover for universal joint.
- Pour in hydraulic fluid ⇒ page 48-26.
- Fit on noise insulation.
- Perform check of vehicle alignment ⇒ page 44-1.
- As part of the check of vehicle alignment, replace old bolts attaching subframe with new bolts and tighten fully to the specified torque.

Servicing power steering gear (ZF)



Notes:

- ◆ Following an accident and damage to the front axle, the steering components items 1 to 9 must always be replaced.
- ◆ No provision is made for servicing the power steering gear. If complaints are received, determine the cause by conducting a pressure test and leaktightness test. If a fault exists, replace the power steering gear.
- ◆ It is not permitted to carry out any welding or straightening work on steering components.
- ◆ Always replace self-locking nuts and bolts.
- ◆ Use only genuine clamp-type clips.
- ◆ Use only steering gear grease AOF 063 000 04 for greasing the steering rack (quantity 23 ... 27 g).

1 - Right track rod end

- ◆ Pressing off from steering arm
⇒ page 48-14
- ◆ Inspecting ⇒ page 48-21
- ◆ Removing and installing ⇒ page 48-21
- ◆ Pay attention to installation position
- ◆ Modified from vehicle ident No. TMBZZZ1U12W2074066 ⇒ page 48-23.1

2 - Lock nut, 50 Nm

3 - Clamp-type clip

- ◆ Replace
- ◆ Open with cutting pliers for removing
- ◆ Tensioning ⇒ page 48-23

4 - Boot

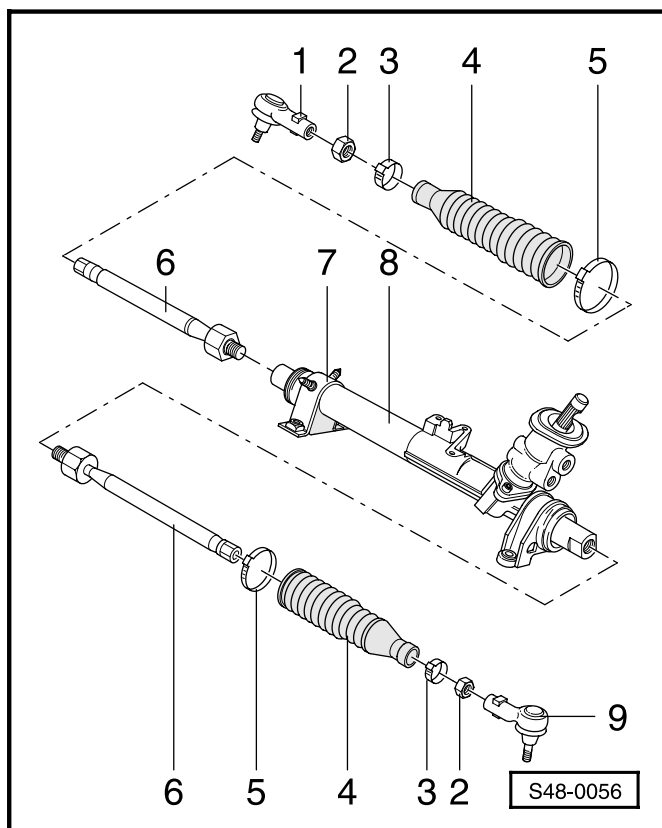
- ◆ Boot can only be replaced with power steering gear removed
- ◆ Before taking off boot, detach track rod end ⇒ page 48-21
- ◆ Inspect for wear (splits, slits), inspect whether sealing surfaces and sealing lips clean and undamaged

5 - Clamp-type clip

- ◆ Replace
- ◆ Open with cutting pliers for removing
- ◆ Tensioning ⇒ page 48-23

Special tools, testers and aids required

- ◆ Puller, Kukko V/176
- ◆ Torque wrench, e.g. V.A.G 1332
- ◆ Open-end wrench insert, e.g. V.A.G 1332/5
- ◆ Caliper gauge
- ◆ Clamping pliers for hose straps, e.g. V.A.G 1275
- ◆ Gearbox grease
TL 733
NO 52733 00
e.g. DEA ORNA F6 EPO (AOF 063 000 04)



6 - Track rod

- ◆ Tightening torque to steering rack: 75 Nm
- ◆ Left and right track rods can be adjusted
- ◆ Removing and installing
⇒ page 48-22
- ◆ Modified from vehicle ident No. TMBZZZ1U12W2074066 ⇒ page 48-23.1

7 - Clip with rubber insert

8 - Power steering gear

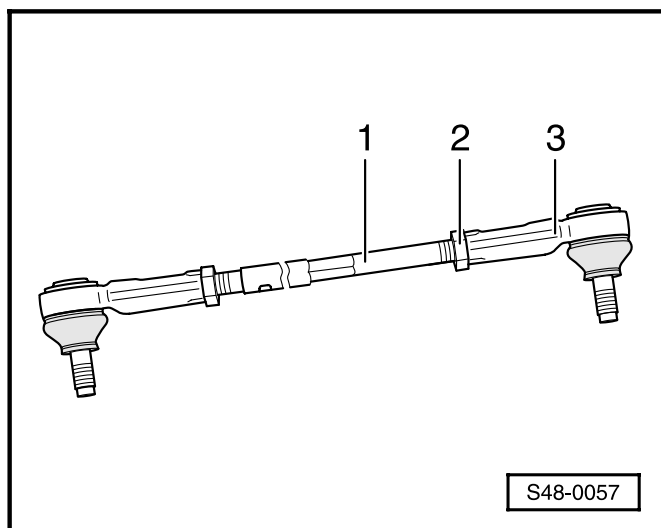
- ◆ No provision for servicing
- ◆ Removing and installing
⇒ page 48-12
- ◆ Setting ⇒ page 48-25
- ◆ Inspecting middle position ⇒ page 48-23

9 - Left track rod end

- ◆ Pressing off from steering arm
⇒ page 48-14
- ◆ Inspecting ⇒ page 48-20
- ◆ Removing and installing
⇒ page 48-21
- ◆ Pay attention to fitting location
- ◆ Modified from vehicle ident No. TMBZZZ1U12W2074066 ⇒ page 48-23.1

Inspecting play, attachment and sealing boots of track rod ends

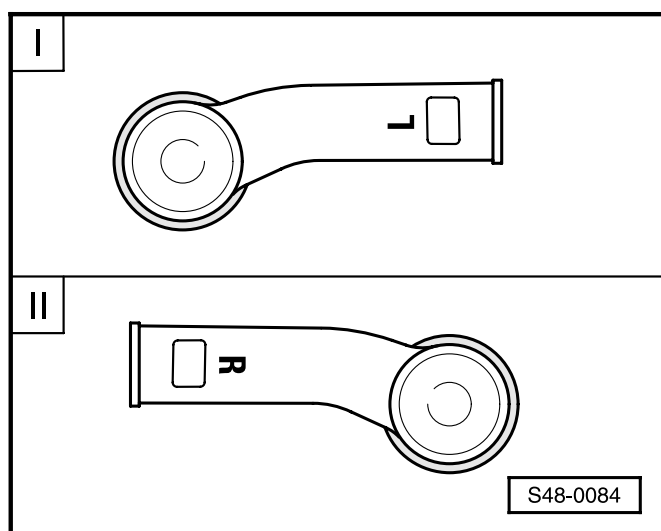
- With vehicle raised (wheels clear of ground), inspect play by moving track rods and wheels.
Specified play: no play
- Inspect attachment.
- Inspect sealing boots for damage and correct installation.



Removing and installing track rod ends

Removing

- Press track rod off steering arm
⇒ page 48-14.
- ◀ - Slacken hexagon nut -2- and turn track rod end -3- off the track rod -1-.



Installing

Notes:

- ♦ From vehicle ident No.
TMBZZZ1U12W2074066 modified track rod ends and track rods ⇒ page 48-23.1.
- ♦ It is not permitted to install mixed (old and modified) track rod ends or track rods
⇒ page 48-23.3.
- ♦ Install track rod ends at the correct side.
- ◀ ♦ When installing, pay attention to marking on track rod end
I - Left track rod end - L
II - Right track rod end - R
- ♦ Pay attention to new marking on modified track rod ends ⇒ page 48-23.1.

- Turn track rod end onto the track rod as far as the stop and align so that the stud of the track rod end is in the installed position.
- Tighten lock nut to 50 Nm.
- Insert track rod into steering arm and tighten self-locking hexagon nut to 45 Nm. If the joint stud also turns when tightening, counter-hold with a hexagon socket wrench (waf 6 mm).
- Check toe-in of front wheels and position of steering wheel, and align if necessary.

Removing and installing track rods

Note:

The track rods can only be removed and installed with the power steering gear removed.

Removing

- Clean outside of power steering gear in the area of boot.

- Open clip and push back boot.

- ◀ - Turn track rod off the steering rack. Use torque wrench with open-end wrench insert waf 34, e.g. V.A.G 1332 with V.A.G 1332/5, for this step. An open-end wrench (waf 21) must be used for counter-holding when slackening.

Installing

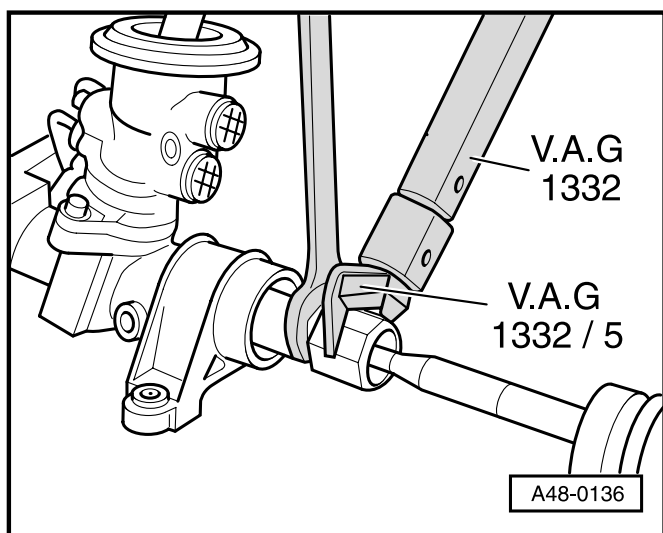
Notes:

- ♦ From vehicle ident No.
TMBZZZ1U12W2074066 modified track rod ends and track rods ⇒ page 48-23.1.
- ♦ It is not permitted to install mixed (old and modified) track rod ends or track rods ⇒ page 48-23.2.
- ♦ If it is necessary to replace a track rod, always replace both track rods ⇒ page 48-23.2.
- Turn track rod onto steering rack and tighten to 75 Nm. Use torque wrench with open-end wrench insert waf 34, e.g. V.A.G 1332 with V.A.G 1332/5, for this step. An open-end wrench (waf 21) must be used for counter-holding when slackening.

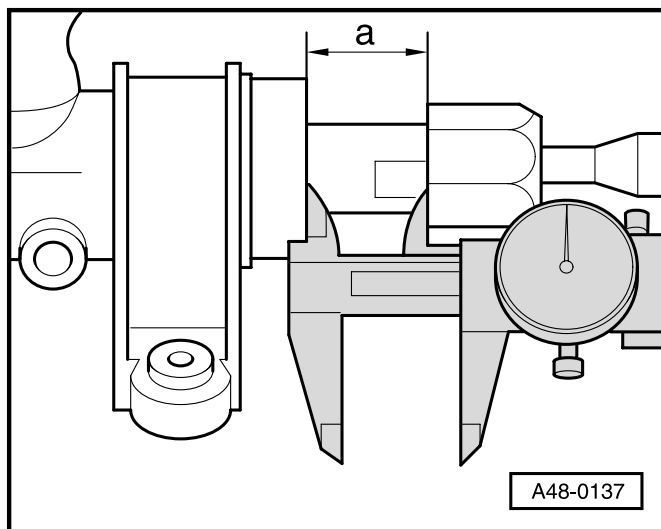
Note:

Turn track rod so that the stud of the track rod end is in the installed position.

- Inspect middle position of power steering gear ⇒ page 48-23.
- Install boot ⇒ page 48-23.



Inspecting middle position of steering rack of power steering gear, adjusting if necessary

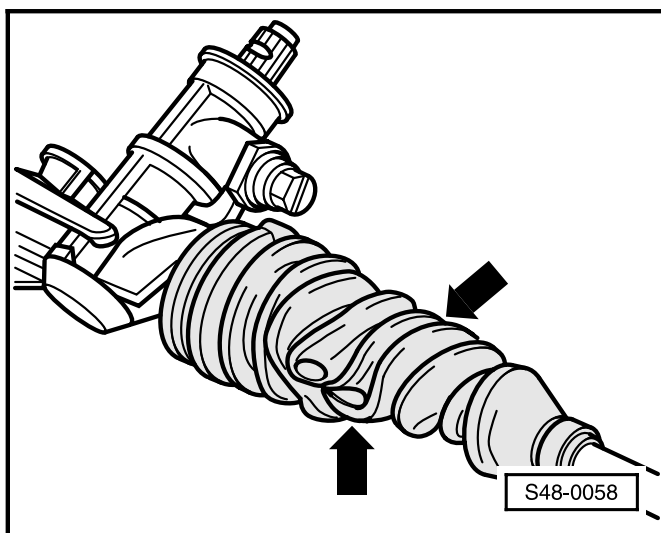


Notes:

- ◆ Move the steering rack into the middle position before installing the power steering gear.
- ◆ The dimension -a- must be identical on the right and left sides of the power steering gear. If the dimension is not identical on both sides, set distance -a- to correct dimension.

◀ - Check dimension -a- and set if necessary.

$a = 30.5 \text{ mm}$

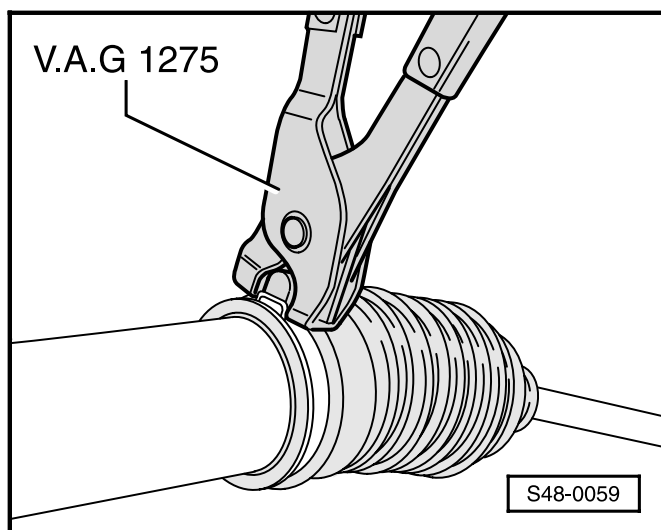


Installing boot

- Inspect boot for wear (splits, slits) and ensure sealing surfaces of boot are clean.

Note:

◀ The boot must on no account be installed twisted (illustration shows negative example).



◀ - Use hose strap pliers, e.g. V.A.G 1275 to tension clip.

Modified track rod ends

The production process for the track rod ends has been optimised. There is no change in this case to the exterior shape and the length of the threaded shank.

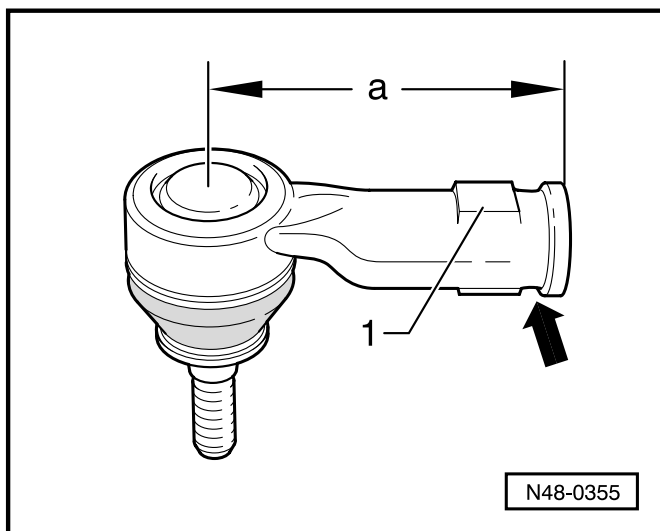
The track rods have been matched to the modified track rod ends $\Rightarrow$ page 48-23.2.

Introduction from:

Vehicle ident No. TMBZZZ1U12W2074066

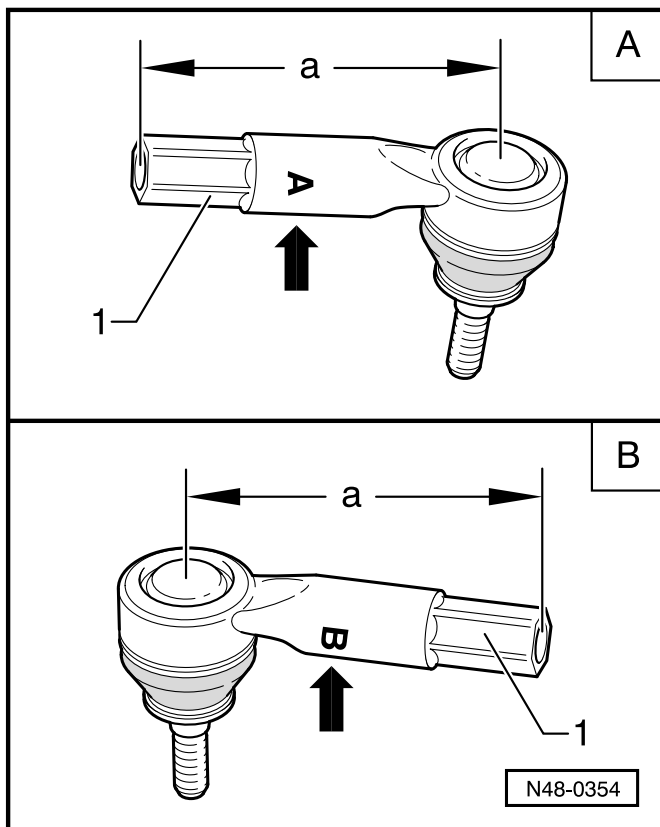
Recognition features of previous track rod ends

- 1 - Wrench face on shank, with marking „R“ or „L“
- Width across flats 22 mm
- Dimension -a- = 74 -1 mm
- The shank -arrow- is round.



Warning!

These track rod ends must not be attached to track rods which have a length -a- = 318.9 mm $\Rightarrow$ page 48-23.2.



Recognition features of modified track rod ends

A -Right track rod end

- 1 - Hexagon on threaded shank, width across flats 19 mm
- Dimension -a- = 94 ± 0.5 mm
- Marking „A“ for right-hand

B -Left track rod end

- 1 - Hexagon on threaded shank, width across flats 19 mm
- Dimension -a- = 94 ± 0.5 mm
- Marking „B“ for left-hand

Warning!

These track rod ends must not be attached to track rods which have a length -a- = 343.1 mm $\Rightarrow$ page 48-23.2.

Modified track rods

The track rods have been matched to the modified track rod ends.

The track rods have been shortened compared to the previous version.

Introduction from:

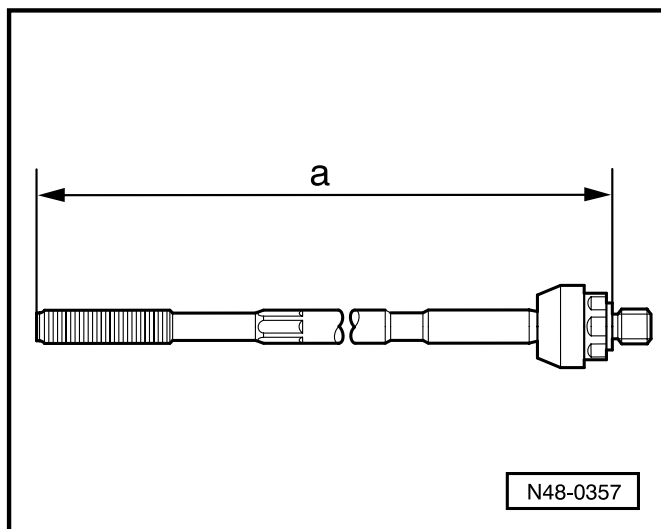
Vehicle ident No. TMBZZZ1U12W2074066

◀ Recognition feature of previous track rod

Dimension -a- = 343.1 mm

Recognition feature of modified track rod

Dimension -a- = 318.9 mm



Warning!

It is not permitted to install the track rods mixed (previous and modified versions).

Both track rods should always be replaced at the same time.

In addition, the modified track rods must not be fitted with the previous track rod ends.

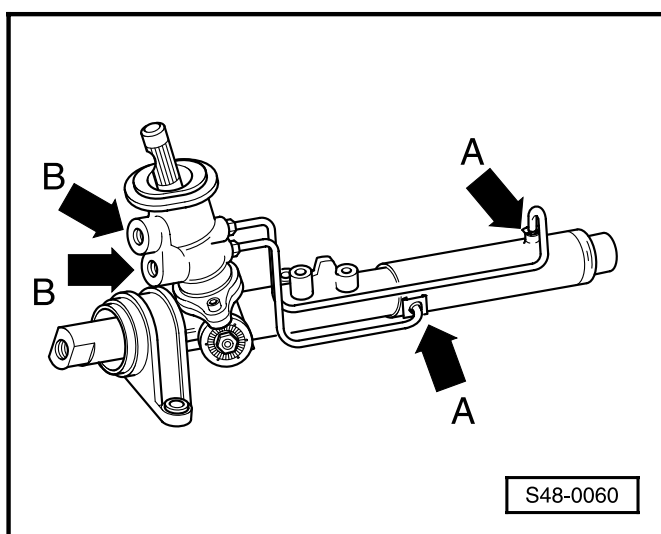
Disposing of PAS gear

Special tools, testers and aids required

- ◆ Hydraulic fluid vessel

Notes:

- ◆ *The oils used in the PAS gears do not contain any harmful substances. These oils can be disposed of together with old oil from engines and gearboxes.*
- ◆ *Dispose of old oils in conformity with the relevant environmental protection regulations.*
- ◆ *Old oils (the term old oils refers to used engine and gearbox oils incl. ATF and also mineral hydraulic oils), which are suitable for processing, must on no account be mixed with brake fluid, antifreeze agent, synthetic resin or nitro thinner, chemicals etc.*
- ◆ *After „emptying“, the old parts should be allowed to drip adequately.*
- ◆ *When disposing of old parts, pay attention to legal provisions as slight residual quantities of hydraulic fluid remain in the PAS gear.*

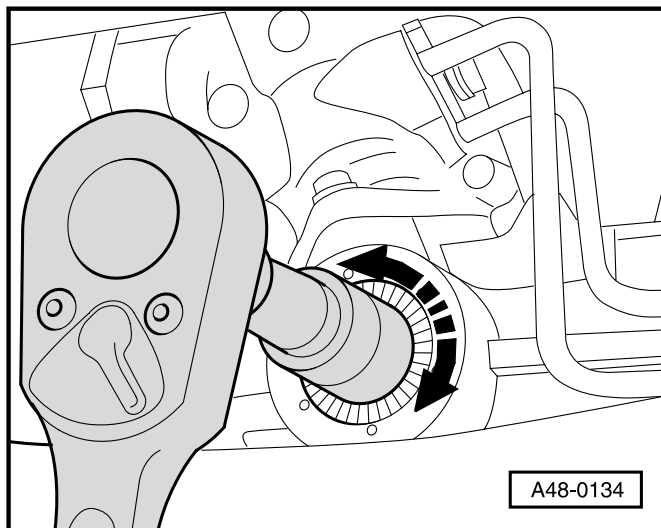


- ◀ - Detach pipes -arrows A- from the PAS gear by pulling off the clips. The clips must not be re-used.
- Hold PAS gear over a collecting vessel and turn steering pinion several times from full lock to full lock until no further hydraulic fluid flows out of the holes. Holes -arrows B- must not be sealed.
- Dispose of PAS gear.

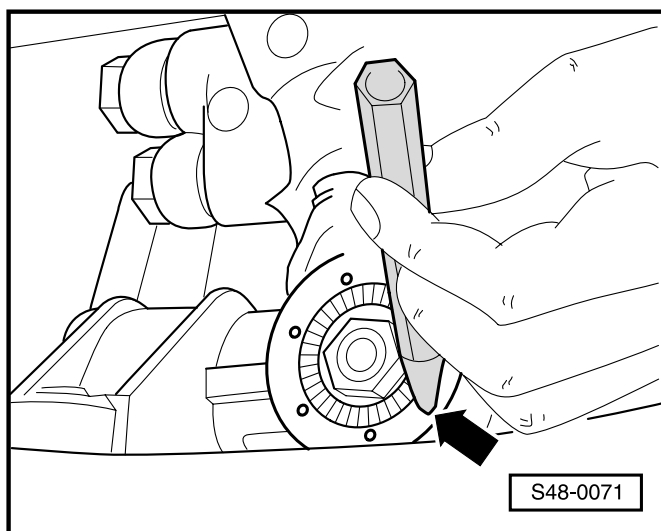
Setting PAS gear (ZF)

Note:

Two mechanics are required for setting the steering gear. The setting should be carried out with the engine switched off.



- Raise vehicle with lift platform.
- Wheels in straightahead position.
- A rattling noise can be heard when the steering wheel is moved alternately around the centre axis (about 30°) if steering play is excessive.
- ◀ - The second mechanic turns the adjusting screw (arrow) carefully into the cover to the point at which the rattling noise is no longer heard in the interior.



- Carry out a road test and check to ensure that the steering moves back by itself into the straightahead position, without sticking, after a parking manoeuvre or cornering. Correct setting if necessary.
- ◀ - Secure adjusting nut against turning by striking with a chisel in the collar of the steering gear housing.

Inspecting hydraulic fluid level of power-assisted steering, replenishing if necessary

Special tools, testers and aids required

- ◆ Central hydraulic fluid
TL 52 146
N 052 146 00
e.g. PENTOSIN CHF 11S (G 002 000)

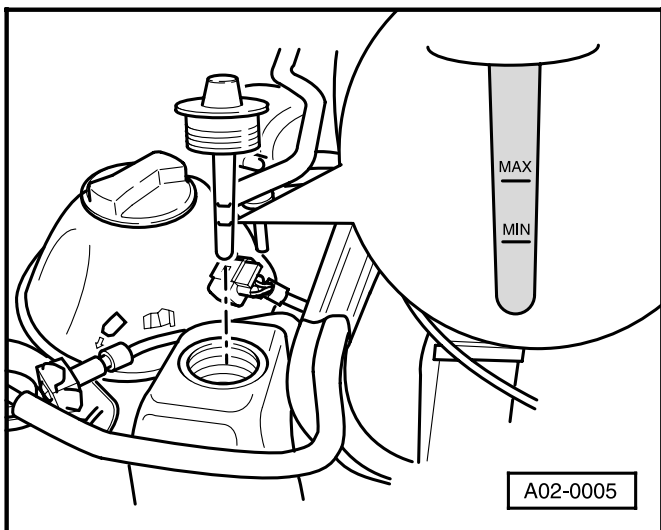
Notes:

- ◆ *Delivery Inspection:*
Oil level at „MAX“ marking
⇒ Inspection and Maintenance
- ◆ *Inspection Service:*
Oil level between „MIN“ and „MAX“ markings
⇒ Inspection and Maintenance

Hydraulic fluid when cold:

- Do not run engine, and move front wheels into straightahead position.
- Unscrew cap.
- Wipe off dipstick with a clean cloth.
- Screw in cap by hand and remove again.

Only the oil level indicated when the cap has first of all been fully inserted, is correct.



- ◀ - Inspect oil level: The oil level must be within the range of the „MIN“ marking (up to 2 mm above or the lower marking).

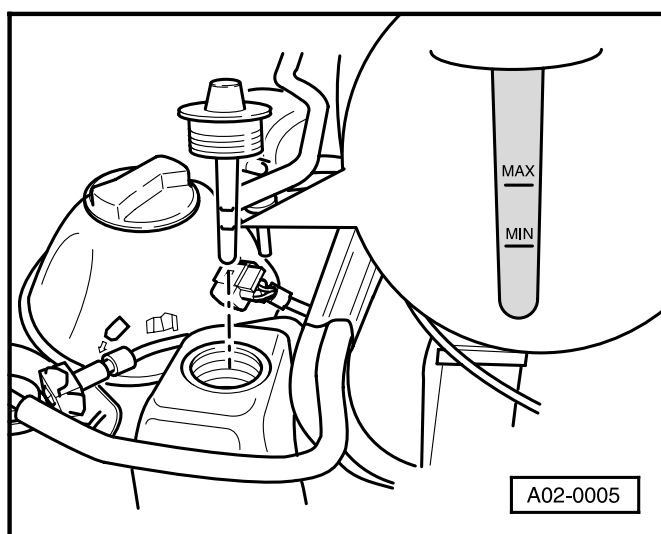
Notes:

- ◆ *If the oil level is above the range indicated, oil must be extracted.*
- ◆ *If the oil level is below the range indicated, the hydraulic system must be inspected for leaks ⇒ page 48-30. It is not sufficient merely to replenish the oil.*
- Screw in cap and tighten to 2 Nm.

**Hydraulic fluid at operating temperature
(from about 50 °C):**

- Engine idling, front wheels at straightahead position, run for about 2 minutes.
- Unscrew cap.
- Wipe off dipstick with a clean rag.
- Screw in cap by hand and remove again.

The hydraulic fluid level which applies is that for a cap which has previously been fully inserted.



- ◀ - Check fluid level: The fluid level should be between the MIN and MAX markings.

Notes:

- ◆ If the fluid level is above the stated range, fluid should be extracted.
- ◆ If the fluid level is below the stated range, it is then necessary to inspect the hydraulic system for leaks ⇒ page 48-30. It is not sufficient simply to top up the hydraulic fluid.
- Screw in cap and tighten to 2 Nm.

Draining, filling and bleeding PAS system

Special tools, testers and aids required

- ♦ Central hydraulic fluid
TL 52 146
N 052 146 00
e.g. PENTOSIN CHF 11S (G 002 000)

Draining

- Do not run engine and raise vehicle sufficiently until the front wheels are clear.
- Place basin below for collecting hydraulic fluid.
- Open hydraulic system at suction and return sides and allow hydraulic fluid to flow out.
- Force out remaining quantity of hydraulic fluid by turning the steering several times from full lock to full lock.
- Lower vehicle and re-connect hydraulic pipes.

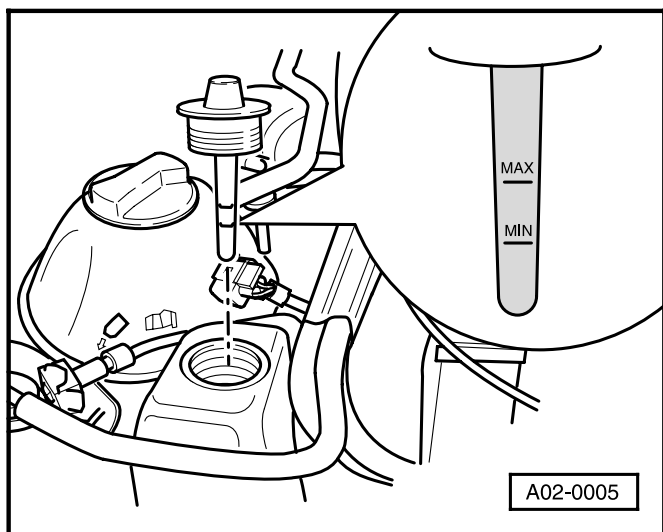
Notes:

- ♦ Do not re-use drained hydraulic fluid.
- ♦ Dispose of hydraulic fluid in accordance with the applicable environmental protection regulations.

Filling and bleeding

Notes:

- ♦ A drained hydraulic system should only be filled when engine is cold.
- ♦ Central hydraulic fluid G 002 000.
- ♦ Quantity of hydraulic fluid in system: 0.7 ... 0.9 ltr.
- Refilling a hydraulic system ⇒ page 48-26.
- ◀ - If the hydraulic system is drained, fill up hydraulic fluid reservoir sufficiently until „MAX“ marking on dipstick is reached.



- Raise vehicle sufficiently until the front wheels are clear. Move front wheels into straightahead position.
- With engine switched off, turn steering wheel 10 x from full lock to full lock.
- Check hydraulic fluid level and top up if necessary ⇒ page 48-26.
- Lower vehicle.
- Start engine and run for about 5 seconds. Hydraulic pump draws in hydraulic fluid.
- Switch off engine.
- Check hydraulic fluid level and top up if necessary ⇒ page 48-26.
- Start engine.
- Turn steering wheel 10 x from full lock to full lock.
- When doing this, have a second mechanic observe hydraulic fluid level in the reservoir and top up if necessary so that no air can be drawn in. If no air bubbles in the reservoir flow out of the return-flow pipe, the hydraulic system is bled. If air bubbles repeatedly occur, it is then necessary to repeat the bleeding operation.
- Switch off engine.
- Inspect hydraulic fluid level and top up if necessary ⇒ page 48-26.

Any air which remains in the steering system escapes by itself after driving about 10...20 km.

Inspecting PAS system for leaks

Notes:

- ◆ *If metal swarf is found in the hydraulic fluid and/or in the reservoir, the reservoir, suction and pressure pipe should be carefully flushed out and replaced, if necessary.*
- ◆ *The PAS system has to be inspected for leaks after carrying out removal and installation work and if there is a loss of hydraulic fluid in the reservoir.*

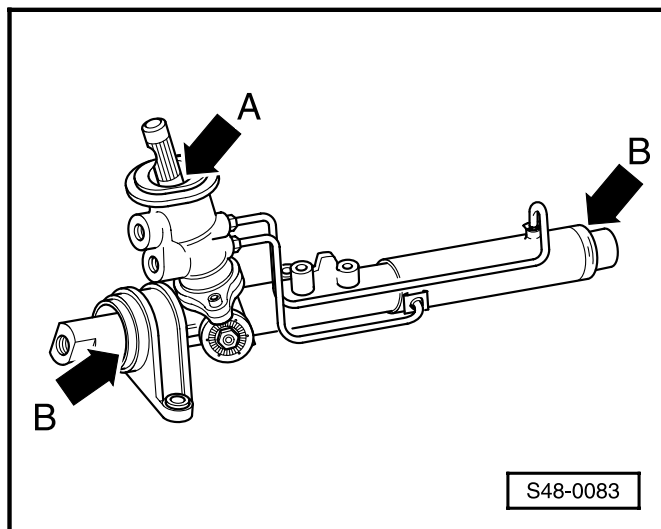
- Start engine.
- Turn steering wheel alternately to full lock and hold tight for a short time.

This builds up the maximum possible pressure.

- Inspect all hose and pipe connections for tight fit and leaks.
- If leaks are present, retighten hose or pipe connection to the specified maximum tightening torques or replace seal or pipe.
- Inspect hoses and pipes for leaks. If leaks are present, replace the relevant hose or pipe.
- Inspect hydraulic pump for leaks. If leaks are present, replace hydraulic pump.
- Inspect hydraulic fluid reservoir for leaks. If leaks are present, replace reservoir.
- Inspect hydraulic fluid level and top up if necessary ⇒ page 48-26.

Note:

If a loss of hydraulic fluid in the reservoir occurs repeatedly and an intensive inspection has been carried out several times of the hoses and pipes and also their connections, the hydraulic pump and the reservoir, the PAS gear should be removed and inspected.



- Remove power steering gear
⇒ page 48-12.
- ◀ - Inspect seal for steering pinion at valve housing of power steering gear -arrow A- for leaks.
- Open clip of boot and push back boot.
- Inspect steering rack seals -arrows B- for leaks.

If hydraulic fluid is visible in the steering gear housing and/or in the boots, the power steering gear must be replaced.

- Install power steering gear ⇒ page 48-12.

Note:

If there is no further hydraulic fluid in the reservoir, the hydraulic pump may possibly have run „dry“ and have been damaged.

- Replace hydraulic pump ⇒ page 48-37, Removing and installing hydraulic pump

Noises from power steering system

A closed hydraulic system will always produce operating noises.

Hissing noises always occur when the steering wheel is turned slowly when the car is stationary and the engine running, or if the steering is turned to full left or right lock (must only be done for a short time!).

The increased pump noise at full lock of the steering (when parking) is system-related and is technically unavoidable.

If noises occur which differ from the usual, and technically unavoidable operating noises, carry out the following measures:

- Inspect hydraulic fluid level in reservoir
⇒ page 48-26.
- Test delivery pressure of hydraulic pump
⇒ page 48-36.

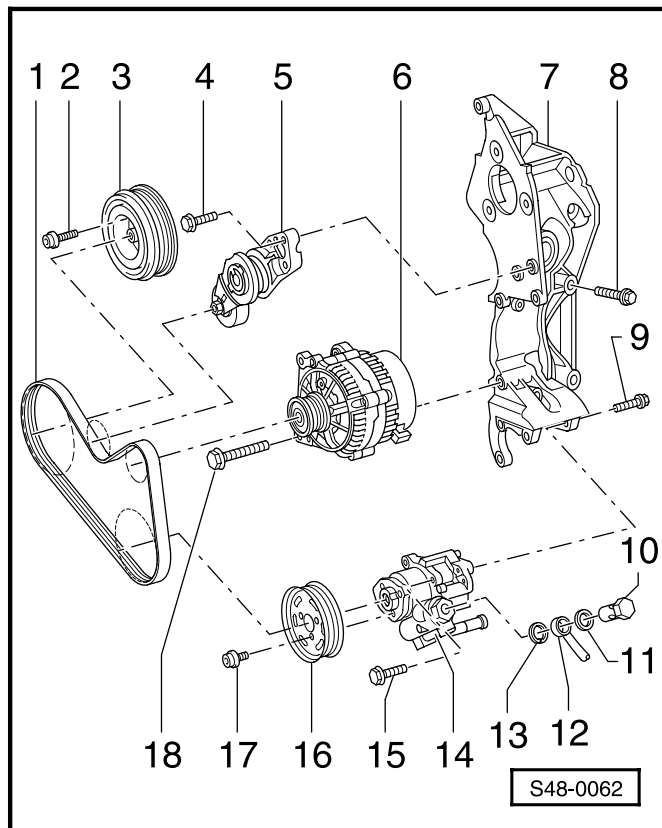
- Inspect connections for leaks (air in the system).
- Check tension of V-belt.
- Check routing of the suction and delivery pipes (pipes pinched or touching other vehicle parts).
- Inspect the steering gear attachment at the subframe.
- Inspect the bolt connection of the hydraulic pump to bracket/engine.
- Inspect bolt connection of belt pulley.

Note:

In order to determine whether the noises originate from the PAS system, it is recommended to take off the V-belt of the hydraulic pump and to run the engine without the hydraulic pump.

Assembly overview: hydraulic pump

Assembly overview for horizontal and vertical hydraulic pump



Note:

The illustration shows a version with horizontal hydraulic pump.

The same tightening torques apply for the bolts for attaching the hydraulic pump of the vertical version and for the banjo bolt for connecting the pressure to the hydraulic pump.

1 - Ribbed V-belt

- ◆ Before removing, mark direction of running
- ◆ Assignment ⇒ Parts List
- ◆ Removing and installing

⇒ Engine, Mechanical Components; Repair Group 13; Disassembling and assembling engine

2 - Hexagon socket bolt, 10 Nm + torque a further 90°

3 - Vibration damper

- ◆ With belt pulley for ribbed V-belt

4 - Hexagon bolt, 25 Nm

5 - Tensioning element

6 - Alternator

7 - Bracket

- ◆ Fig. shows bracket for models without air conditioning
- ◆ Install free of stress ⇒ item 8

8 - Hexagon bolt, 45 Nm

- ◆ For attaching bracket -item 7- to engine block
- ◆ Installing

⇒ Engine, Mechanical Components; Repair Group 13; Disassembling and assembling engine

9 - Hexagon bolt, 25 Nm

10 - Banjo bolt, 38 Nm

11 - Seal

- ◆ Replace

12 - Pressure line (flexible hose)

13 - Seal

- ◆ Replace

14 - Hydraulic pump

- ◆ For power-assisted steering
- ◆ Testing delivery pressure ⇒ page 48-35
- ◆ Fill with hydraulic oil before installing ⇒ page 48-37
- ◆ Removing and installing ⇒ page 48-37, Notes

15 - Hexagon bolt, 25 Nm

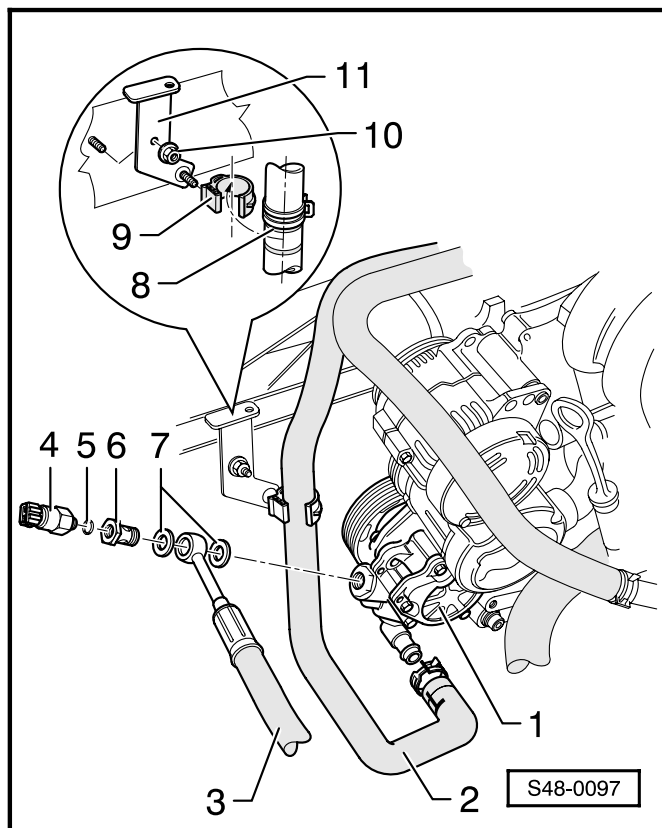
16 - Belt pulley

- ◆ For hydraulic pump
- Models with 1.4-ltr./44 kW engine:
- ◆ Before removing, mark front of belt pulley. Belt pulley must not be installed with the front on the hydraulic pump.

17 - Hexagon socket bolt, 25 Nm

18 - Hexagon bolt, 25 Nm

Power steering pressure switch



Note:

The pressure switch integrated in the hydraulic pump is used for stabilising the idling speed of the engine during steering actions when the vehicle is stationary.

1 - Hydraulic pump

2 - Suction line

3 - Pressure line

4 - Pressure switch, 15 Nm

- ◆ Switches at 4.0 MPa (40 bar)
- ◆ Testing signal

⇒ Simos Fuel Injection and Ignition System;
Repair Group 24; Testing additional signals

5 - Seal

- ◆ Replace

6 - Banjo bolt, 38 Nm

7 - Seal

- ◆ Replace

8 - Coloured marking on suction line

- ◆ White or yellow all round; must be positioned within holder (item 9)

9 - Holder

10 - Hexagon nut

11 - Bracket

Testing delivery pressure of hydraulic pump

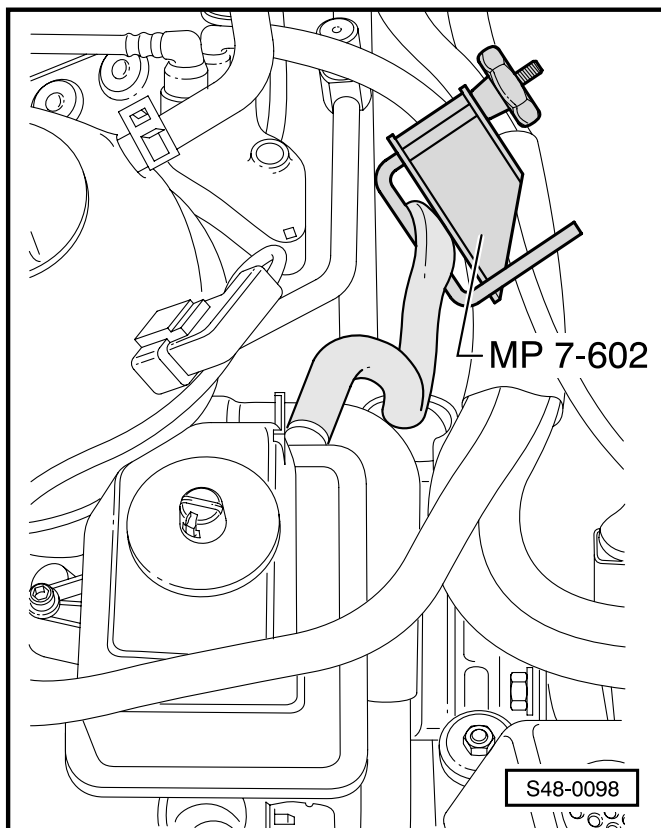
Models with low-mounted or high-mounted hydraulic pump

Special tools, testers and aids required

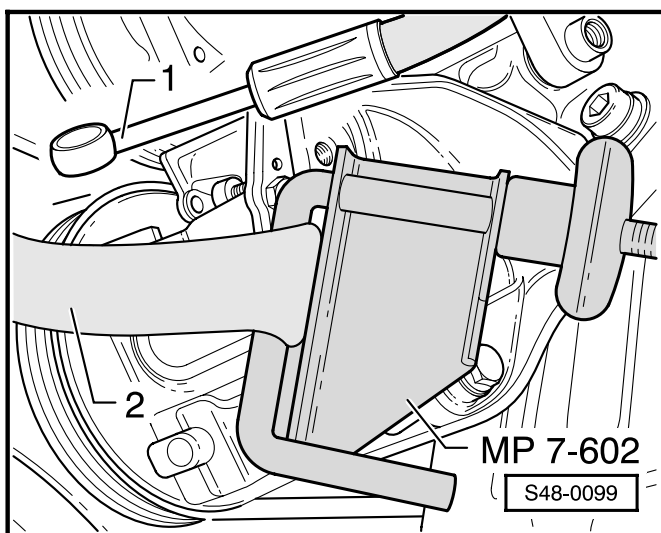
- ◆ Tester for power steering, e.g. V.A.G 1402
- ◆ Adapter, e.g. V.A.G 1402/1 A
- ◆ Adapter, e.g. V.A.G 1402/2
- ◆ Adapter, e.g. V.A.G 1402/3
- ◆ Hose from adapter set, e.g. V.A.G 1402/6
- ◆ Hose clamp MP 7-602

Notes:

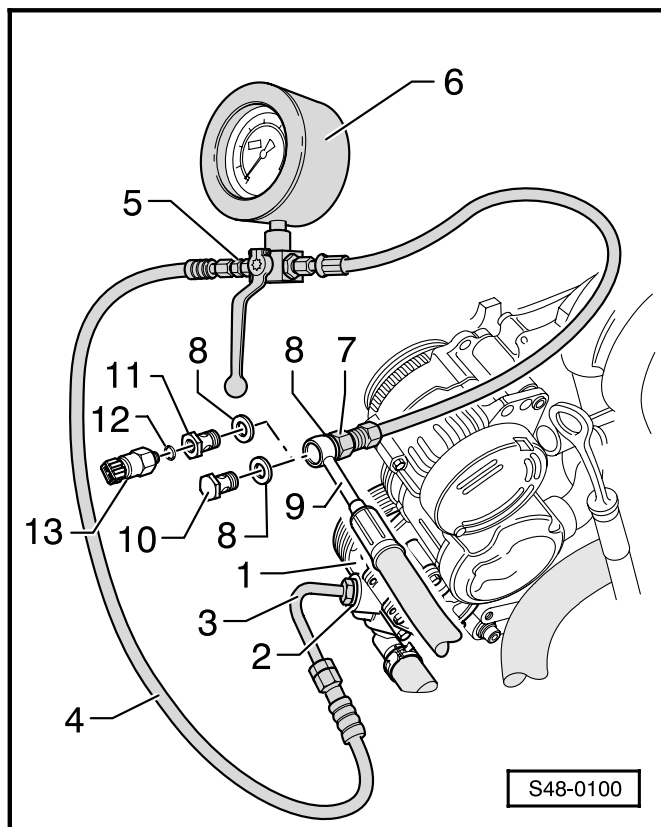
- ◆ *If hydraulic fluid in reservoir is below minimum level, always inspect power steering system for leaks ⇒ page 48-30.*
- ◆ *If leaks exist at power steering gear, first of all inspect the lines and line connections for leaks, re-tighten, if necessary, and wipe dry.*
- ◆ *Inspecting seal at steering pinion and steering rack seal ⇒ page 48-30. If leaks exist at seal or at steering rack seal, replace power steering gear.*
- ◆ *Disposing of power steering gear ⇒ page 48-24.*

**Models with low-mounted hydraulic pump**

- ◀ - Pinch off return-flow line with hose clamp MP 7-602.
- Remove noise insulation in middle.
- Place drip tray for hydraulic fluid which flows out, below hydraulic pump.



- ◀ - Pinch off suction line -1- with hose clamp MP 7-602.
- On models with pressure switch, unplug connector of pressure switch.
- Detach pressure line -2- at hydraulic pump.

**Note:**

The surrounding area is not shown in the figure in order to simplify the illustration.

- ◀ - Connect tester for power-assisted steering, e.g. V.A.G 1402.

1 - Hydraulic pump**2 - Seal**

- ♦ Replace each time removed

3 - Adapter, e.g. V.A.G 1402/1 A**4 - Hose from adapter set, e.g. V.A.G 1402/6****5 - Adapter, e.g. V.A.G 1402/3****6 - Tester for power-assisted steering, e.g. V.A.G 1402****7 - Adapter, e.g. V.A.G 1402/2****8 - Seal**

- ♦ Replace each time removed

9 - Pressure line with ring union**10 - Banjo bolt**

- ♦ For hydraulic pump without pressure switch

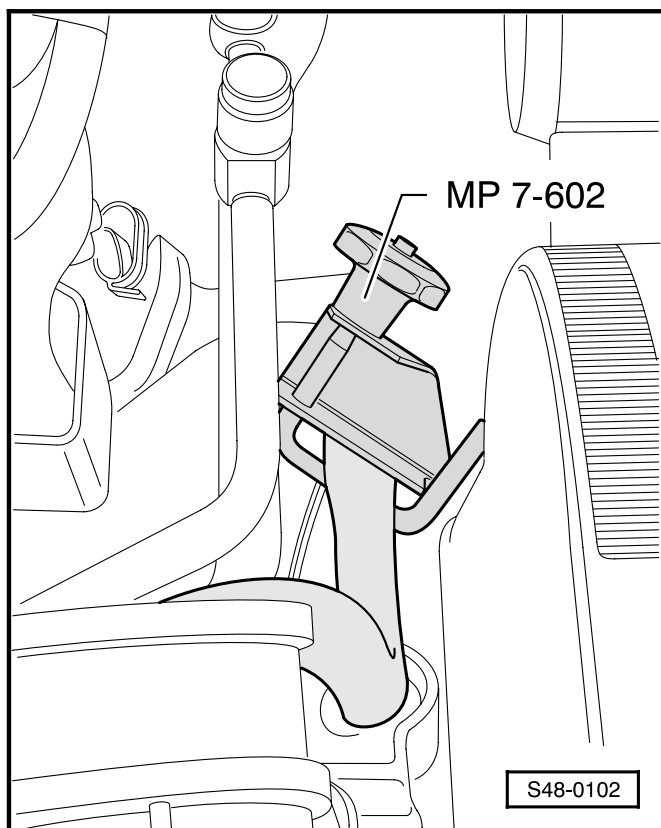
11 - Banjo bolt

- ♦ For hydraulic pump with pressure switch

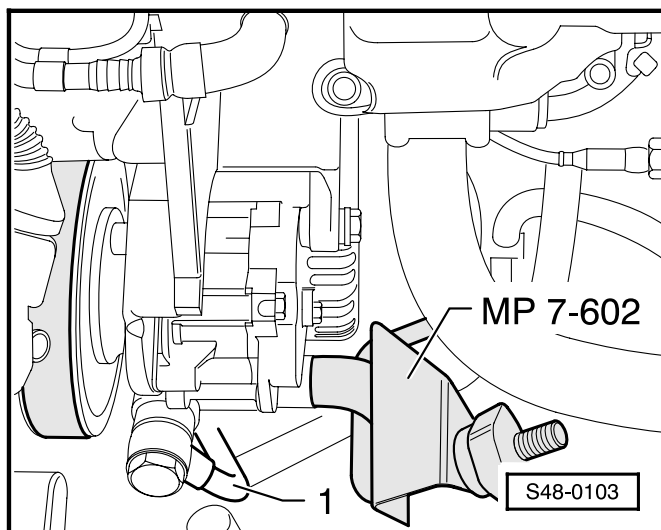
12 - Seal

- ♦ For hydraulic pump with pressure switch
- ♦ Replace each time removed

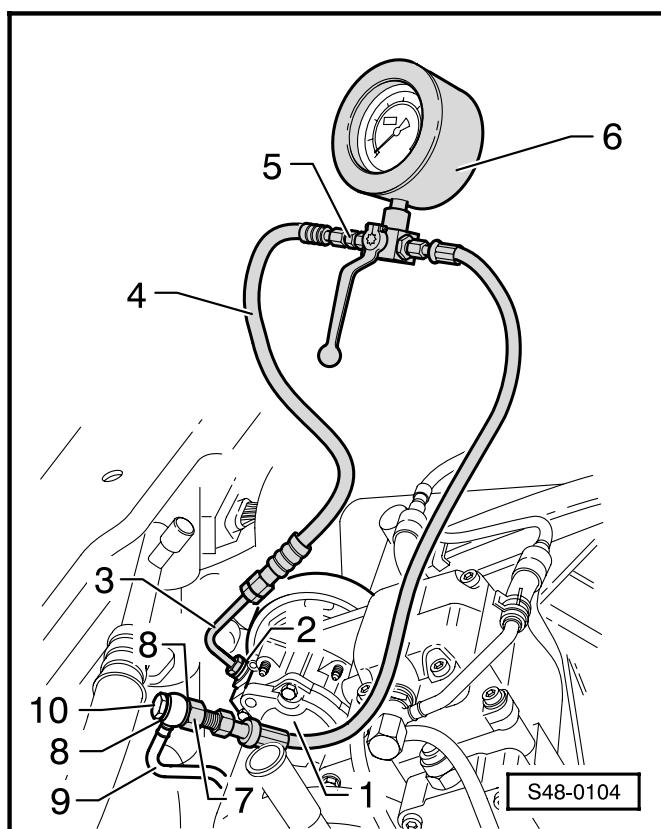
13 - Pressure switch

**Models with high-mounted hydraulic pump**

- Remove engine trim panel, as appropriate.
- ◀ - Pinch off return-flow line with hose clamp MP 7-602.



- ◀ - Pinch off suction line with hose clamp MP 7-602.
- Place drip tray for hydraulic fluid which flows out below hydraulic pump.
- Detach pressure line -1- at hydraulic pump.

**Note:**

The surrounding components are not shown in the figure in order to simplify the illustration.

- ◀ - Connect power steering tester, e.g. V.A.G 1402.

1 - Hydraulic pump

2 - Seal

- ◆ Replace each time removed

3 - Adapter, e.g. V.A.G 1402/1 A

4 - Hose from adapter set, e.g. V.A.G 1402/6

5 - Adapter, e.g. V.A.G 1402/3

6 - Power steering tester, e.g. V.A.G 1402

7 - Adapter, e.g. V.A.G 1402/2

8 - Seal

- ◆ Replace each time removed

9 - Pressure line with banjo union

10 - Banjo bolt

Test requirements:

- V-belt in correct condition and correctly tensioned
- No leak in system
- Hoses/lines not kinked or caught in-between

Testing:

- Take hose clamps MP 7-602 off the suction and return-flow lines.
- Open shut-off valve at pressure gauge.
- Start engine and, if necessary, top up hydraulic fluid level in reservoir.
- Turn steering wheel 10x from lock to lock.
- Test delivery pressure.
- When engine is idling, close shut-off valve (not longer than 5 seconds), read off pressure at full steering lock and compare with specified pressure in the table below.

Engine	Rated pressure of hydraulic pump		Specified pressure	
	MPa	bar	MPa	bar
Petrol engines	9.0	90	8.5 ... 9.5	85 ... 95
Diesel engines	9.0	90	8.5 ... 9.5	85 ... 95

Notes:

If the pressure is lower or higher than the specified pressure, replace hydraulic pump.

Removing and installing high-mounted hydraulic pump ⇒ page 48-37.1

Removing and installing low-mounted hydraulic pump ⇒ page 48-41.

Disposing of hydraulic pump ⇒ page 48-45

- Switch off engine.
- Pinch off suction line and return-flow line with hose clamps MP 7-602.
- Disconnect power steering tester, e.g. V.A.G 1402.

Removing and installing hydraulic pump

Notes:

- ◆ *No provision is made for repairing the hydraulic pump. If a complaint exists, carry out the pressure and leaktightness test in order to determine the cause. If a fault exists, replace the hydraulic pump.*
- ◆ *Pumps supplied as replacement parts are not filled with oil. For this reason, it is essential to fill the pump with hydraulic oil G 002 000 and to rotate it by hand before it is installed; if this is not done, noise problems may occur when driving or the pump may be damaged.*
- ◆ *Grade of oil: central hydraulic oil G 002 000*
- ◆ *Quantity of oil in system: 0.7 ... 0.9 ltr.*
- ◆ *Do not remove replacement parts from their wrapping until just before installing.*
- ◆ *Use only genuine wrapped parts.*
- ◆ *Do not re-use drained hydraulic oil.*
- ◆ *Always replace seals.*
- ◆ *Before removing the ribbed V-belt, mark the direction of running. If a used belt is fitted on again to run in the opposite direction, it may be destroyed. When installing the belt, ensure it is correctly located in the belt pulleys.*
- ◆ *Disposal ⇒ page 48-45.*
- ◆ *Version and attachment of hydraulic pump as well as bracket may differ from the illustration depending on engine version and whether vehicle is equipped with air conditioning or not.*

Vehicles fitted with 1.4-ltr./44 kW engine:

- ◆ *Mark installation position of belt pulley before removing.*

If the belt pulley of the hydraulic pump is installed in the opposite direction, this will result in an offset to the other belt pulleys. The ribbed V-belt will be damaged as a result of this offset running.

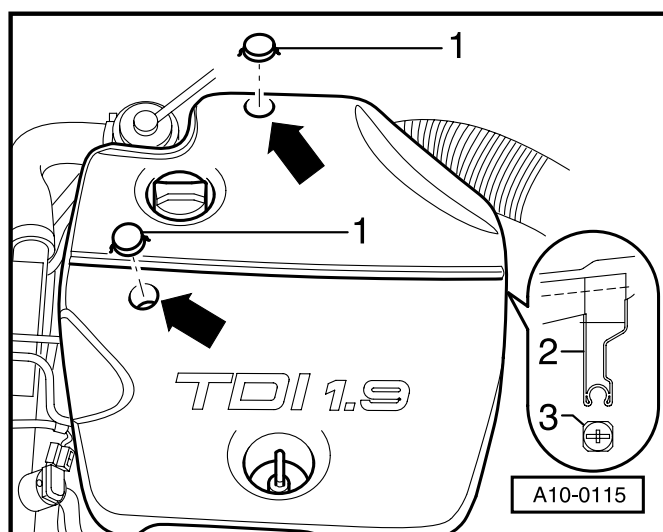
Models with high-mounted hydraulic pump

Special tools, testers and aids required

- ◆ Hose clamp MP 7-602
- ◆ Pliers for spring strap clip, e.g. Matra V/131
- ◆ Central hydraulic fluid
 - TL 52 146
 - N 052 146 00
 - e.g. PENTOSIN CHF 11 S (G 002 000)

Removing

Illustration shows engine trim panel of the 1.9-ltr./66 kW (TDI) engine. Other engine versions have a trim panel which differs from the illustration.



◀ - Remove engine trim pane.

1 - Plug

2 - Clip

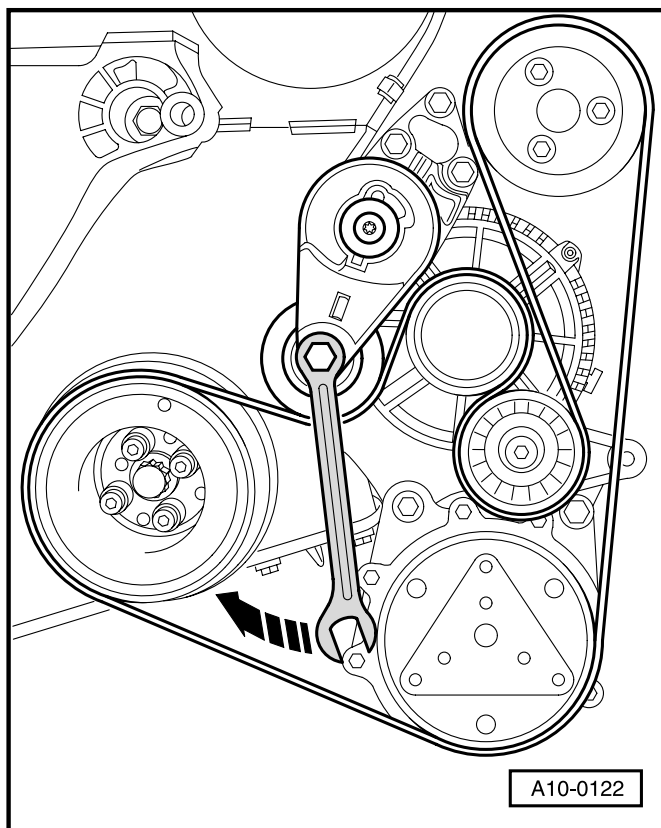
3 - Pin

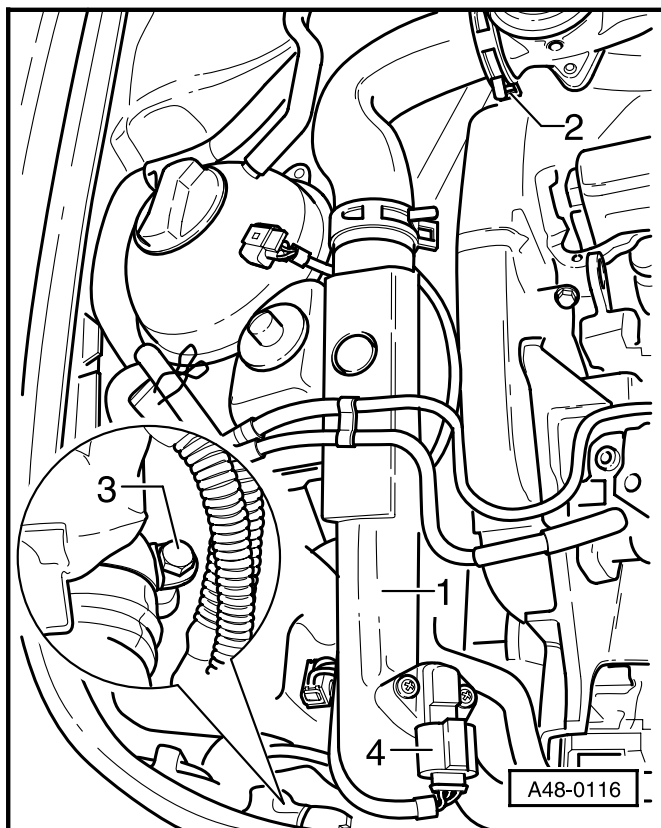
Illustration shows ribbed V-belt version on models with air conditioning. Different routing of ribbed V-belt on models without air conditioning.

Note:

Before removing the ribbed V-belt, mark the direction of running. If a used belt is fitted on again to run in the opposite direction, it may be destroyed. When installing the belt, ensure it is correctly located in the belt pulleys.

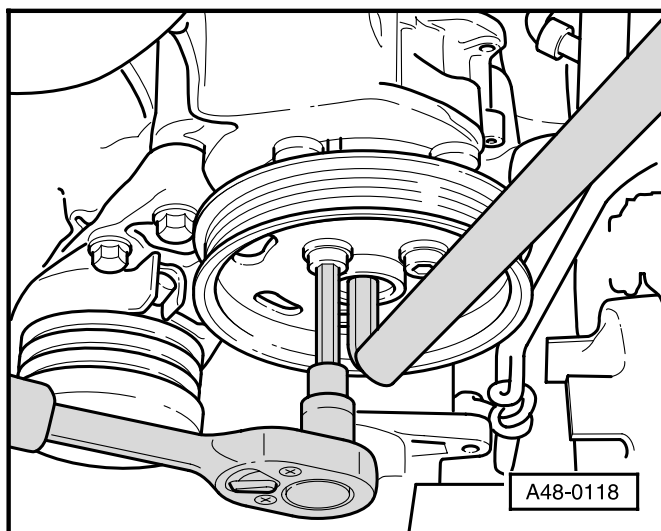
- ◀ - Position flat ring wrench waf 16 against hexagon of tensioning pulley.
- Swivel tensioning pulley in direction of arrow in order to slacken the ribbed V-belt.
- Take off ribbed V-belt.





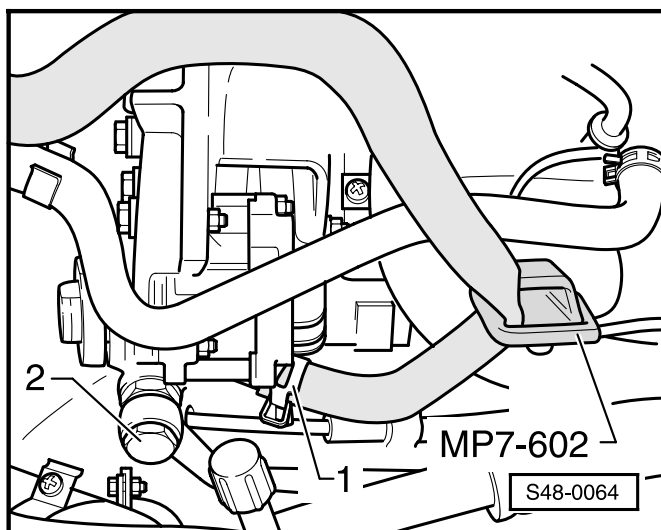
The illustration shows the routing of the intake manifold on the 1.9-ltr./66 kW TDI engine. The steps described below should only be carried out on this engine version.

- ◀ - Use special tool, e.g. Matra V/131, to open spring strap clip -2-.
- Open screw-type clamp -3-.
- Unplug connector -4-.
- Remove intake manifold -1-.



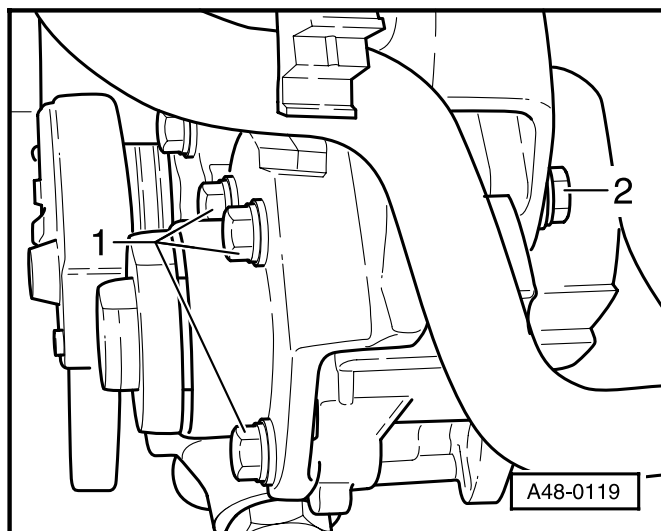
Valid for all engine versions with and without air conditioning.

- ◀ - Unbolt belt pulley; counter-hold with hexagon socket wrench (size 9 mm).



Valid for all models with air conditioning and hydraulic pump positioned at top.

- ◀ - Use special tool MP 7-602 to pinch off suction pipe of hydraulic fluid reservoir/hydraulic pump.
- Use special tool, e.g. Matra V/131, to open spring strap clip -1- and detach suction pipe from the hydraulic pump.
- Detach pressure pipe (flexible hose) -2-.

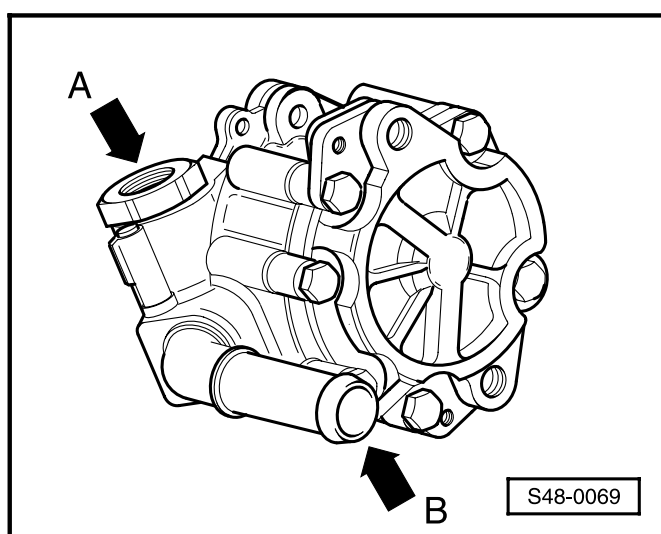


- ◀ - Unscrew bolts -1- and -2-.
- Take hydraulic pump out of bracket.

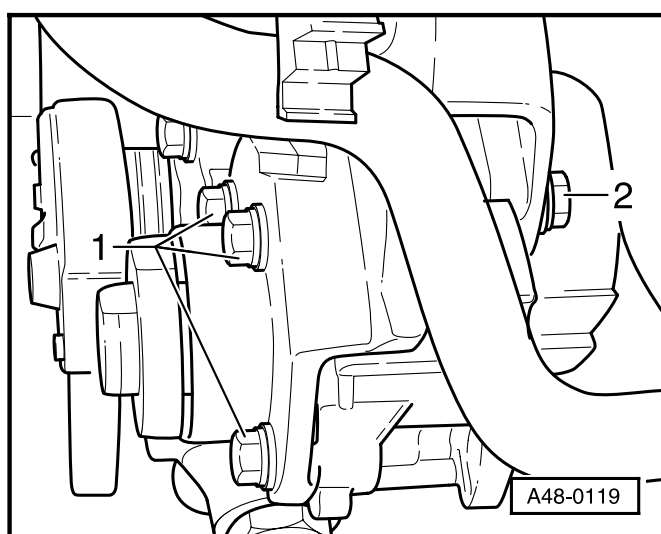
Installing

Notes:

- ♦ Hydraulic pumps supplied through the Parts Sector are not filled with hydraulic fluid. For this reason, it is essential to fill pump with hydraulic fluid G 002 000 before installing and to rotate it by hand otherwise noises may occur in operation or the pump may be damaged.
- ♦ Contact surfaces and threads on both sides of hydraulic pump must be free of paint.
- ♦ Do not re-use drained hydraulic fluid.
- ♦ Replace seals.

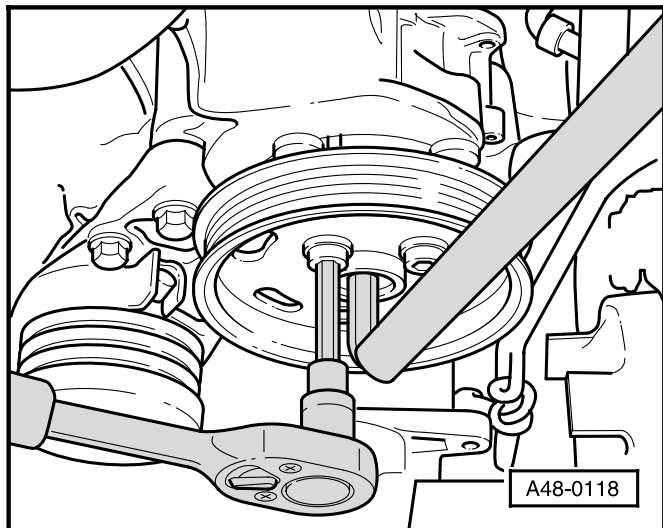


- ◀ - Fill hydraulic pump with hydraulic fluid through the suction connection -arrow B-.
- Rotate hub of hydraulic pump by hand until hydraulic fluid flows out of the pressure connection -arrow A-.



- ◀ - Insert hydraulic pump into bracket and insert bolts -1- and -2-.

Tightening torque: 25 Nm



- ◀ - Fit belt pulley onto hydraulic pump with hexagon socket bolt, counter-hold with hexagon socket wrench (size 9 mm).

Tightening torque: 25 Nm

- Install ribbed V-belt.
- ⇒ Engine, Mechanical Components; Repair Group 13; Disassembling and assembling engine

Note:

When installing ribbed V-belt, ensure it is correctly located in the belt pulleys.

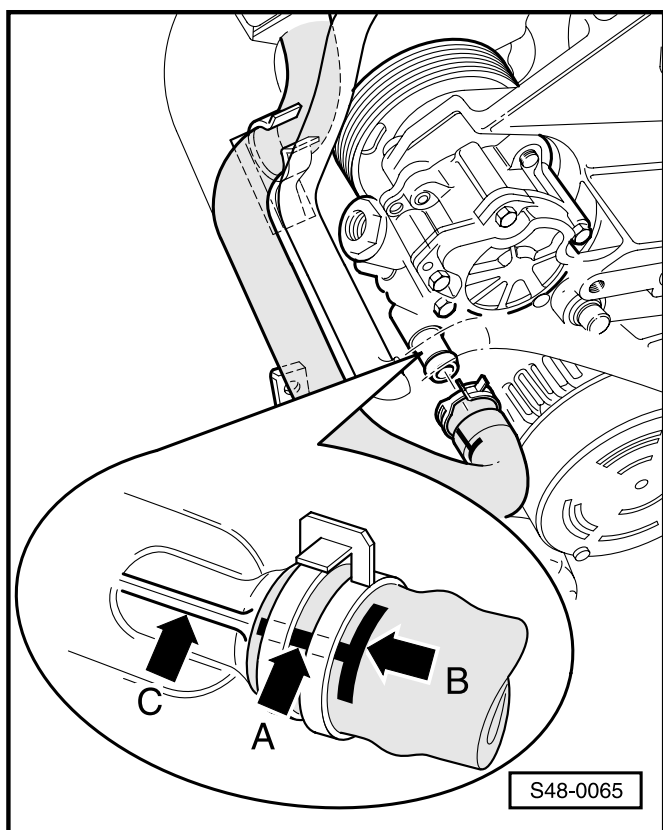
- Engine 1.9-ltr./66 kW TDI: install intake manifold.

Note:

Use new seals for connection of pressure line.

- Install pressure line (flexible hose).

Tightening torque of banjo bolt: 38 Nm



- ◀ - Install spring strap clamp and suction line as shown in illustration.

- Longitudinal marking -A- on suction line must be aligned with the shaped seam -C- on the hydraulic pump.
- Install spring strap clamp up to not more than the transverse marking -B-.
- Take hose clamp MP 7-602 off the suction line.
- Replenish hydraulic fluid and bleed power-assisted steering system, if necessary
⇒ page 48-28.
- Inspect line connections for leaks
⇒ page 48-30.
- Install engine trim panel.

Models with low-mounted hydraulic pump

- ◆ Hose clamp MP 7-602
- ◆ Pliers for spring strap clip, e.g. Matra V/131
- ◆ Central hydraulic fluid
TL 52 146
N 052 146 00
e.g. PENTOSIN CHF 11 S (G 002 000)

Removing

Note:

Before removing the ribbed V-belt, mark the direction of running. When installing the belt, ensure it is correctly located in the belt pulleys.

- ◀ - Use open-end wrench to swivel tensioning pulley in direction of arrow.
- Take off ribbed V-belt.

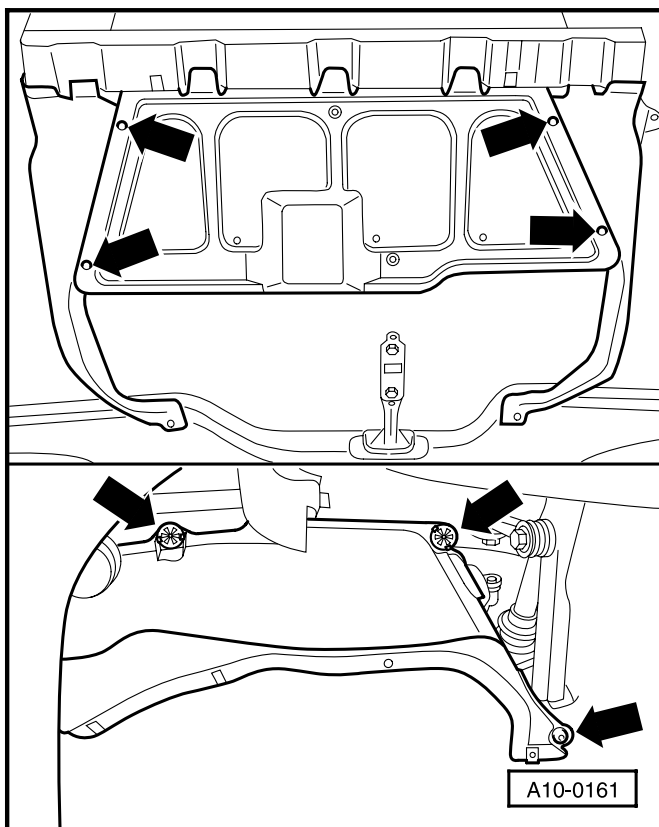
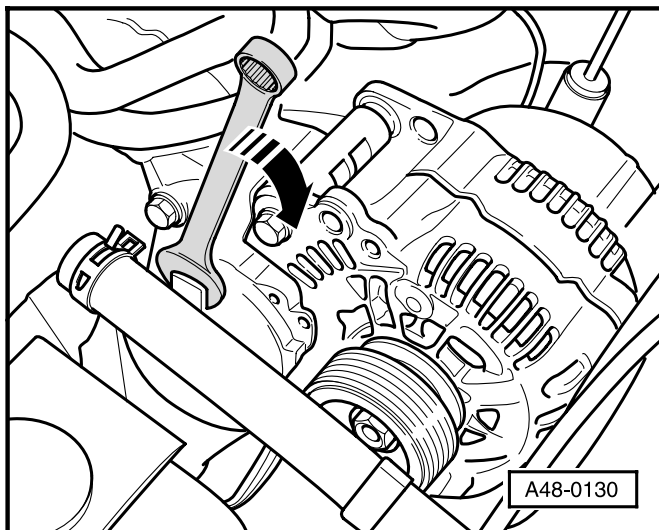


Illustration shows noise insulation in middle and on left on models with petrol engines.

- ◀ - Remove noise insulation in middle -arrows- and on right.

Applies to all petrol engines not fitted with air conditioning.

Vehicles fitted with 1.4-ltr./44 kW engine:

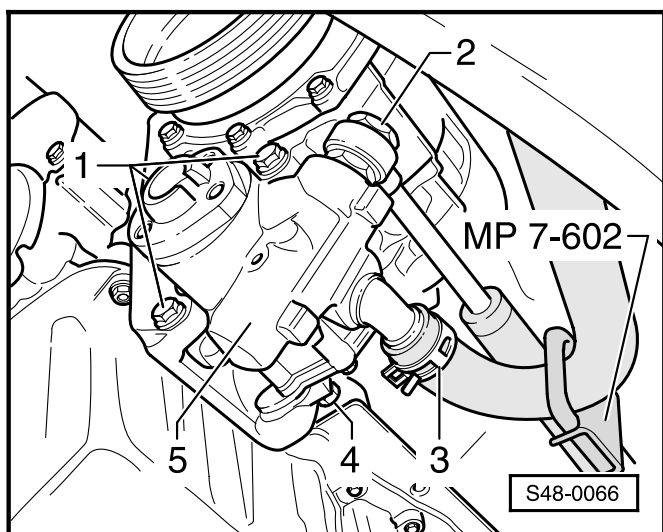
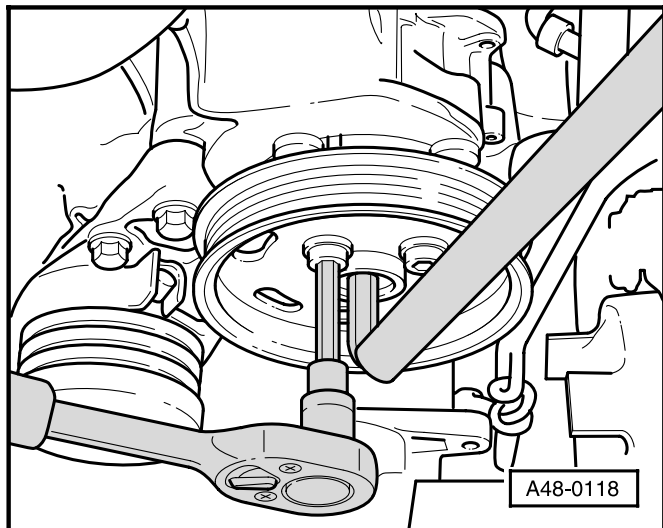
- Mark installation position of belt pulley before removing.

Note:

If the belt pulley of the hydraulic pump is installed in the opposite direction, this will result in an offset to the other belt pulleys. The ribbed V-belt will be damaged as a result of this offset running.

Continued for all models

- ◀ - Unbolt belt pulley; counter-hold with hexagon socket wrench (waf 9 mm).



- ◀ - Pinch off inlet line of hydraulic oil/hydraulic pump reservoir with special tool MP 7-602.
- Open spring strap clip -3- with special tool, e.g. Matra V/131, and detach inlet line from hydraulic pump.

Vehicles without pressure switch (ill.)

- Unscrew banjo bolt -2- and take off pressure line (flexible hose).

Vehicles with pressure switch (not ill.)

- Unplug connector from pressure switch.
- Unscrew pressure switch and take off pressure line (flexible hose).

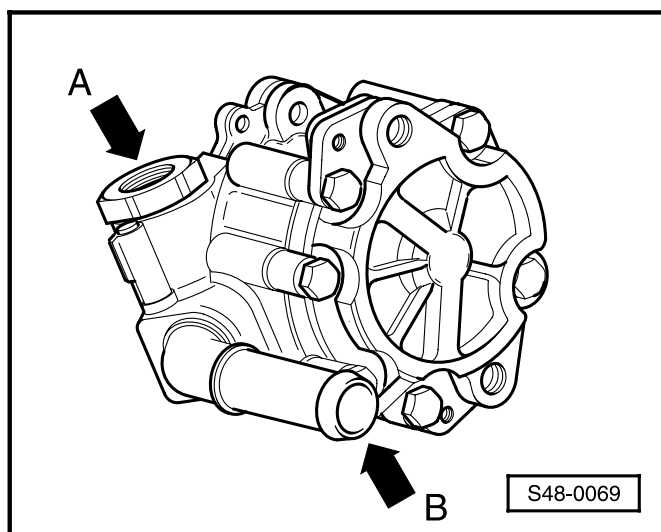
Continued for all models

- Unscrew bolts -1- and -4-.
- Take hydraulic pump -5- out of bracket.

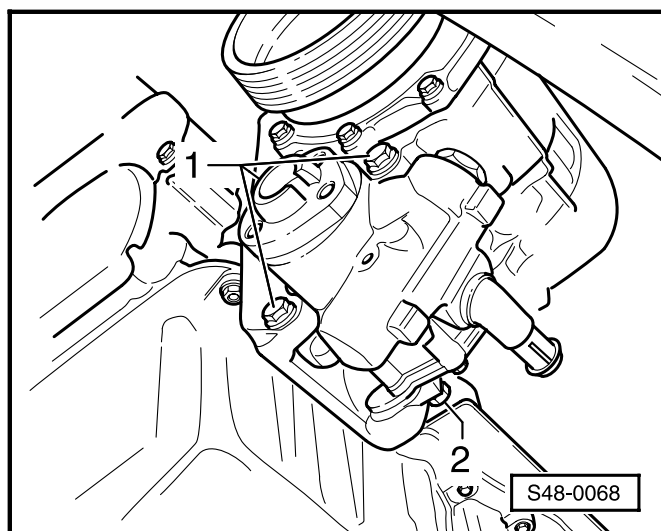
Installing

Notes:

- ♦ *Hydraulic pumps supplied through the Parts Sector are not filled with hydraulic fluid. For this reason, it is essential to fill pump with hydraulic fluid G 002 000 before installing and to rotate it by hand otherwise noises may occur in operation or the pump may be damaged.*
- ♦ *Contact surfaces and threads on both sides of hydraulic pump must be free of paint.*
- ♦ *Do not re-use drained hydraulic fluid.*
- ♦ *Replace seals.*

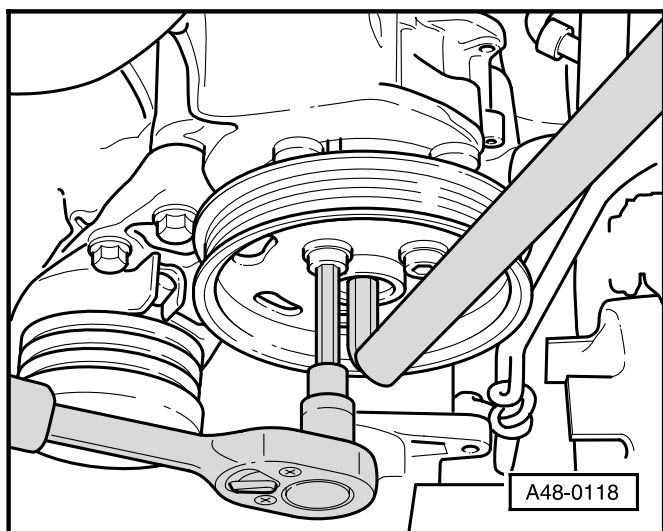


- ◀ - Fill hydraulic pump with hydraulic fluid through the suction connection -arrow B-.
- Rotate hub of hydraulic pump by hand until hydraulic fluid flows out of the pressure connection -arrow A-.



- ◀ - Insert hydraulic pump into bracket and insert bolts -1- and -2-.

Tightening torque: 25 Nm



Models with 1.4 l/44 kW engine:

- ◀ Attach belt pulley with the hexagon socket bolts to the hydraulic pump according to the marking made; use Allen key (waf 9 mm) to counter-hold.

Tightening torque: 25 Nm

Note:

If the belt pulley of the hydraulic pump is fitted on the wrong way round, this will result in an offset to the other belt pulleys. This offset will result in the ribbed V-belt being damaged.

Continued for all models

- Attach belt pulley to hydraulic pump with hexagon socket bolts; use Allen key (waf 9 mm) for counter-holding.

Tightening torque: 25 Nm

- Install ribbed V-belt.
- ⇒ Engine, Mechanical Components; Repair Group 13; Disassembling and assembling engine

Notes:

- ♦ When installing the ribbed V-belt, ensure it is correctly located in the belt pulleys.
- ♦ Use new seals for the connection of the pressure line.

- Install pressure line (flexible hose).

Tightening torque of banjo bolt and of pressure switch: 38 Nm

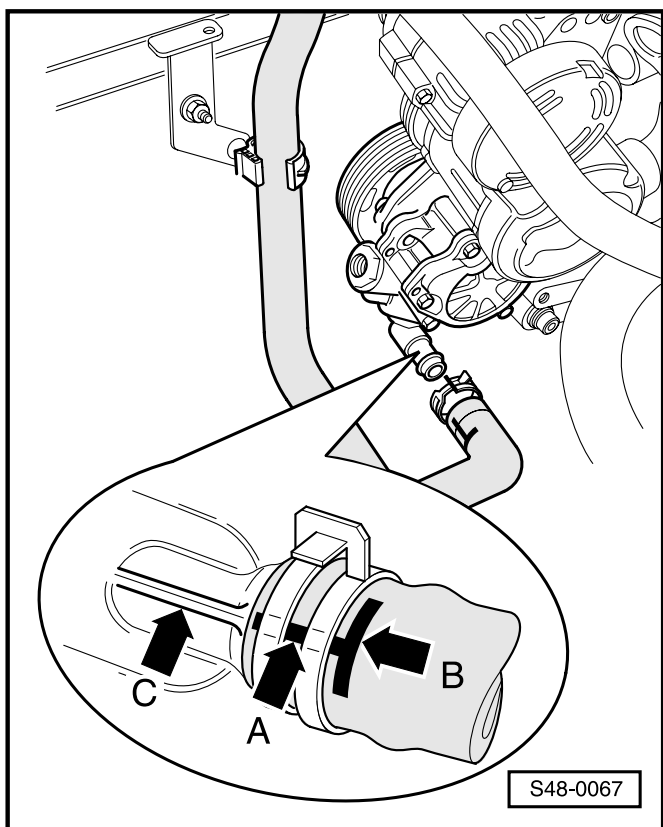
- ◀ Install spring collar clamp and suction line as shown.

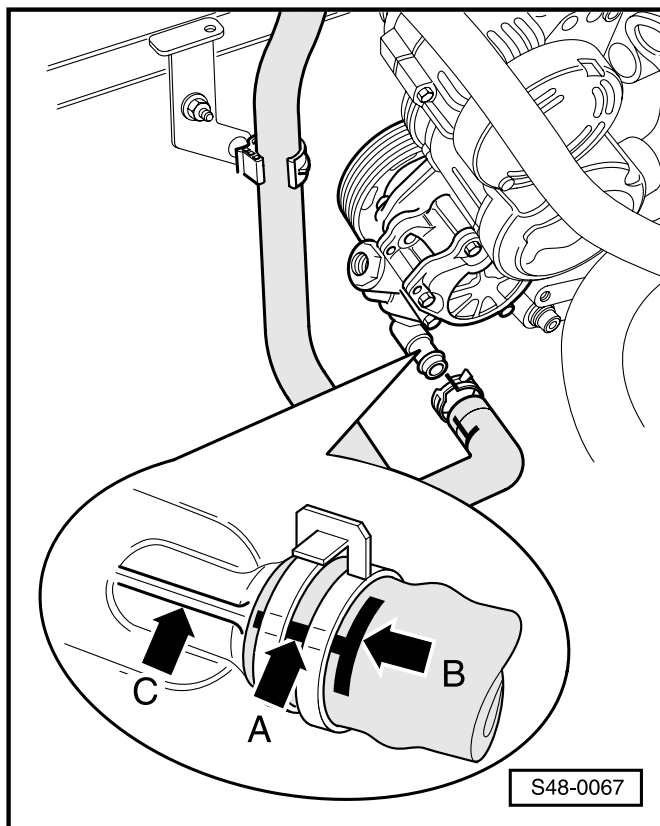
- Lengthwise marking -A- on the suction line must be aligned with the shaped seam -C- on the hydraulic pump.

- Install spring collar clamp up to not more than cross marking -B-.

- Take hose clamp MP 7-602 off the suction line.

- Replenish hydraulic oil and bleed power steering system, if necessary ⇒ page 48-28.





- ◀ - Install spring strap clamp and intake line, as shown in Fig.
- Longitudinal marking -A- on intake line must be aligned with the raised seam -C- on the hydraulic pump.
- Install spring strap clamp so that it is not beyond the cross marking -B-.
- Take hose clamp MP 7-602 off the intake line.
- Replenish hydraulic oil and bleed power steering system, if necessary ⇒ page 48-28.
- Inspect line connections for leaks ⇒ page 48-30.
- Install middle and right noise insulation panels.

- Inspect line connections for leaks ⇒ page 48-30.
- Install noise insulation panel in middle and on right.

Disposing of hydraulic pump

Special tools, testers and aids required

- ◆ Vessel for collecting hydraulic oil

Notes:

- ◆ *The oils used in hydraulic pumps do not contain any harmful substances. Such oils can be disposed of together with old oil from engines and gearboxes.*
- ◆ *Dispose of old oils in accordance with applicable environmental protection regulations.*
- ◆ *Old oils (the term old oils refer to used engine and gearbox oils incl. ATF as well as mineral hydraulic oils) which are suitable for reprocessing, must on no account be mixed with brake fluid, antifreeze agent, synthetic resin or nitro-thinners, chemicals etc.*
- ◆ *After "emptying", the old parts must be allowed to drain adequately by dripping.*
- ◆ *When disposing of old parts, pay attention to the legal regulations as slight quantities of hydraulic oil still remain in the hydraulic pump.*

- Remove hydraulic pump.

- ◆ Models with top-mounted hydraulic pump ⇒ page 48-37.1
- ◆ Models with bottom-mounted hydraulic pump ⇒ page 48-41

- ◀ - Hold hydraulic pump above collecting vessel and allow hydraulic oil to flow out by turning or rotating pump several times.

Line connections -arrows A and B- must not be sealed.

- Dispose of hydraulic pump.

