46-4 Foot Controls, Brake Pedal

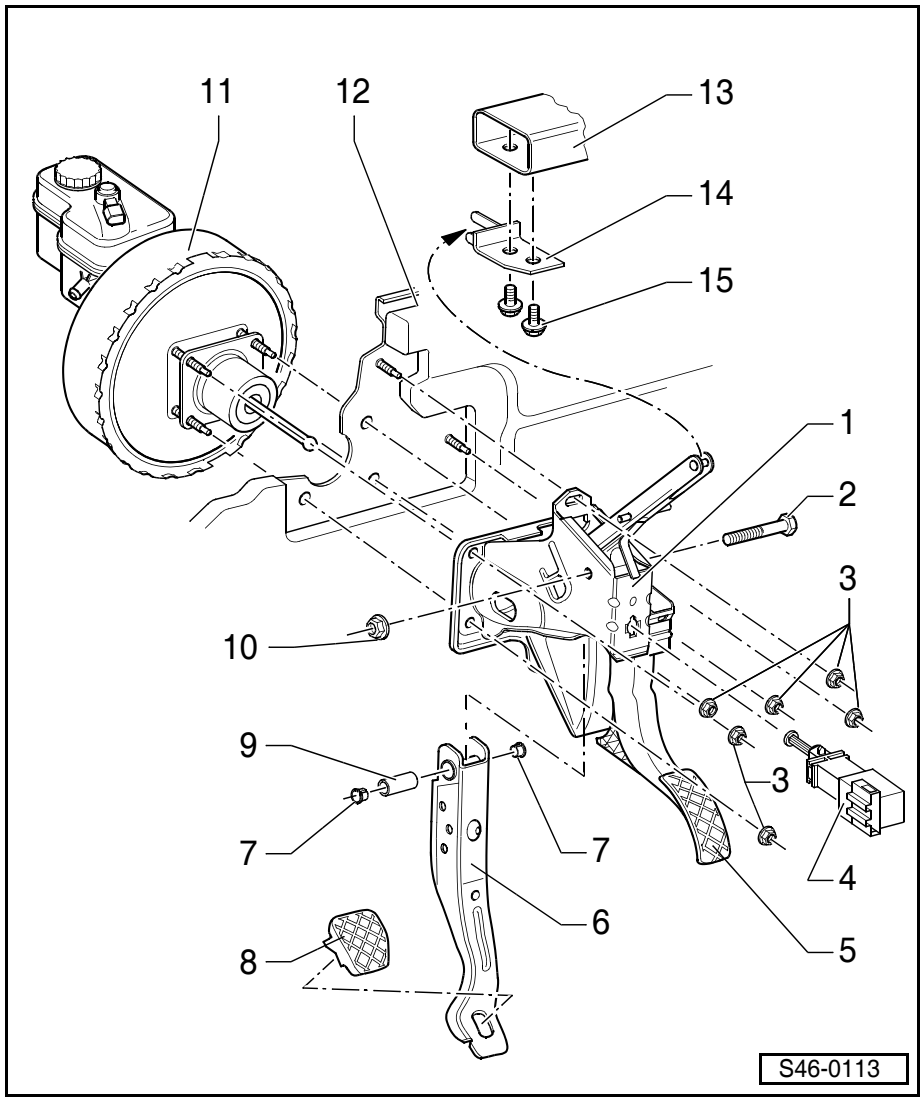
Summary of Components of Foot Controls, Brake Pedal

Caution!

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

Note

- *Replace self-locking nuts each time they are removed.*
- *Grease all bearing points and contact surface of the brake light switch tappet before assembly with polycarbamide grease -G 052 142 A2-.*



1 - Bracket
- ❑ for foot controls
- ❑ Crash strut cannot be removed, as it is welded to bracket
- ❑ removing and installing ⇒ 46-4 page 3

2 - Hexagonal screw

3 - Self-locking hexagon nut, 28 Nm
- ❑ replace after each removal
- ❑ 4 pieces for securing the brake servo unit to the bracket
- ❑ 2 pieces for securing the bracket to the assembly plate

4 - Brake light switch
- ❑ assignment ⇒ Spare part catalogue
- ❑ before assembling the brake light switch clip brake pedal to the pressure rod of the brake servo unit
- ❑ Setting, removing and installing the brake light switch ⇒ Chap. 45-16
- ❑ Inspecting function of the brake light ⇒ Chap. 45-16

5 - Accelerator pedal with sender -G79- and -G185-
- ❑ removing and installing ⇒ Engine, Mechanics; Rep. Gr. 20

6 - Brake pedal
- ❑ removing and installing ⇒ 46-4 page 4

7 - Bushing

8 - Cap

9 - Bearing bolt

10 - Self-locking hexagon nut, 25 Nm
- ❑ replace after each removal

11 - Brake servo unit
- ❑ removing and installing ⇒ Chapter 47-2
- ❑ assignment ⇒ Spare part catalogue

12 - Front wall

13 - Module carrier

14 - Bracket

❑ for crash strut

15 - Self-locking hexagon screw, 10 Nm

❑ replace after each removal

Separating the brake pedal from the brake servo unit and clipping onto brake servo unit

Special tools, test and measuring equipment and auxiliary items required

♦ Release tool -T30021- or -T10006 A-

Separating the brake pedal from the brake servo unit

– Remove the cover with storage area ⇒ Body Work; Rep. Gr. 70.

– Removing the brake light switch ⇒ Chap. 45-16.

Note

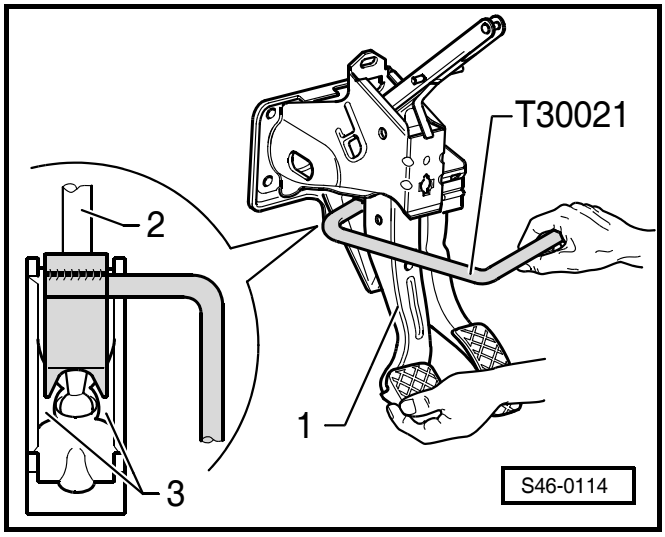
Fig. shows the separation of the brake pedal from the brake servo unit with the foot controls removed for clarity.

– Press brake pedal -1- towards the brake servo unit and hold in position.

– Insert release tool -T30021- or -T10006 A- and pull towards the driver's seat while counterholding the brake pedal. (At this moment the pedal must not move backwards.)

This causes the retaining lugs -3- of the support to be pressed off the spherical head of the push rod -2-.

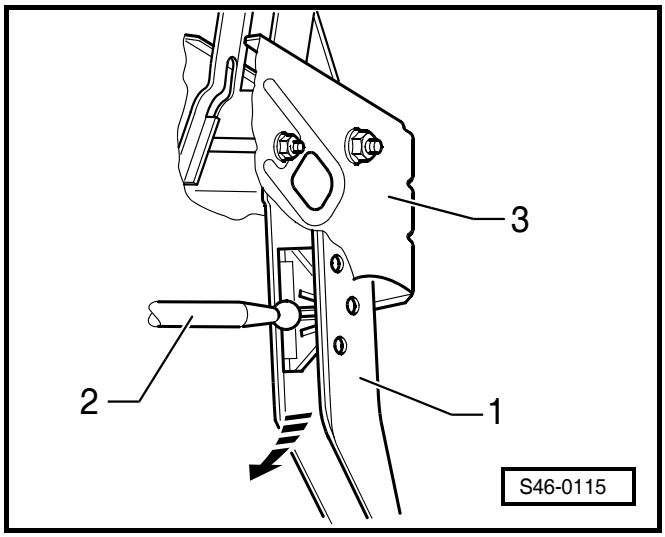
– Pull the release tool and brake pedal jointly towards the driver's seat. (This causes the brake pedal to be drawn off the ball knob of the pressure rod).



Clipping the brake pedal onto the brake servo unit

– Hold the ball knob of the pressure rod -2- before the support and press the brake pedal -1- towards the brake servo unit so that the ball knob is heard to catch.

3 - Bracket



– Setting and installing the brake light switch ⇒ Chap. 45-16.

– Install the cover with storage area ⇒ Body Work; Rep. Gr. 70.

– Check operation of the brake lights.

Removing and installing the foot controls

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3-, -V.A.G 1551/3A-, -V.A.G 1551/3B-, -V.A.G 1551/3C-, -VAS 5051/5A- or -VAS 5051/6A-
- Release tool -T30021- or -T10006 A-

Removing

Note

Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.

– Disconnect battery ⇒ Electrical System; Rep. Gr. 27.

– Remove the cover with storage area ⇒ Body Work; Rep. Gr. 70.

Vehicles without air conditioning

– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 80.

Vehicles with air conditioning

– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 87.

Vehicles with Convenience system central control unit -J393-

– Remove the convenience system central control unit -J393- ⇒ Body Work; Rep. Gr. 70.

Continued for all vehicles

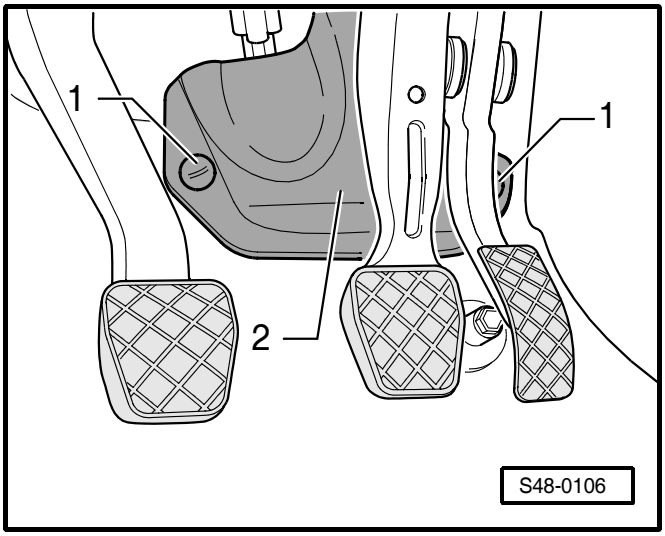
– Unscrew plastic nuts -1-.

– Remove cover -2-.

– Removing brake light switch ⇒ Chap. 45-16.

– Pull out plug of accelerator pedal position sender -G79-.

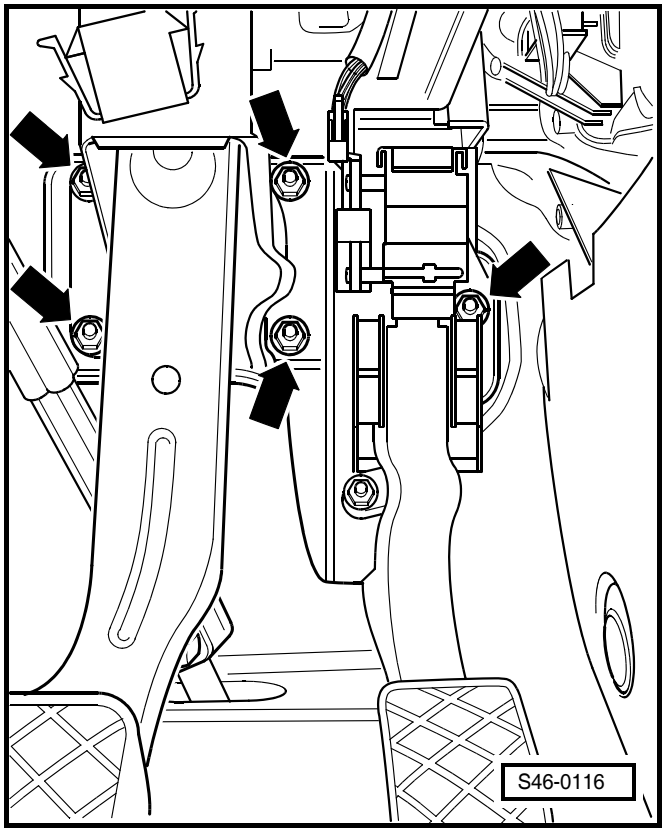
– Separating the brake pedal from the brake servo unit ⇒ 46-4 page 2.



– Unscrew the hexagon nuts for securing the foot controls -arrows-.

  The top hexagon nut for securing the foot controls is not visible in the figure. It is located at the bulkhead behind the crash strut.

– Remove foot controls.



Installing

Installation is carried out in the reverse order.

– Setting and installing the brake light switch ⇒ Chap. 45-16.
– Connect battery ⇒ Electrical System; Rep. Gr. 27.
– Perform automatic test sequence ⇒ Chapter 45-5 either using the vehicle system tester -V.A.G 1552- or the vehicle system test ⇒ Chapter 45-4 using the vehicle diagnosis, measurement and information system -VAS 5051-.

Tightening torque:

Foot controls on brake servo unit and on assembly plate ♦ Use new nuts!	28 Nm

Removing and installing brake pedal

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3-, -V.A.G 1551/3A-, -V.A.G 1551/3B-, -V.A.G 1551/3C-, -VAS 5051/5A- or -VAS 5051/6A-
- Release tool -T30021- or -T10006 A-
- Internal extractor (10.0…14.0 mm) -Kukko 21/02-
- Polycarbamide grease -G 052142 A2-

Removing

Note

Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.

– Disconnect battery ⇒ Electrical System; Rep. Gr. 27.
– Remove the cover with storage area ⇒ Body Work; Rep. Gr. 70.

Vehicles without air conditioning

– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 80.

Vehicles with air conditioning

– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 87.

Vehicles with Convenience system central control unit -J393-

– Remove the convenience system central control unit -J393- ⇒ Body Work; Rep. Gr. 70.

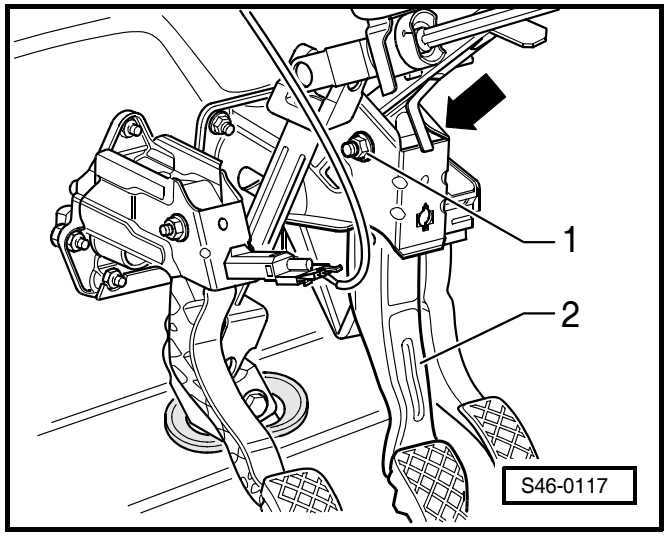
Continued for all vehicles

– Removing brake light switch ⇒ Chap. 45-16.

– Pull out plug of accelerator pedal position sender -G79-.

– Separating the brake pedal from the brake servo unit ⇒ 46-4 page 2.

– Unscrew hexagon nut -1-.



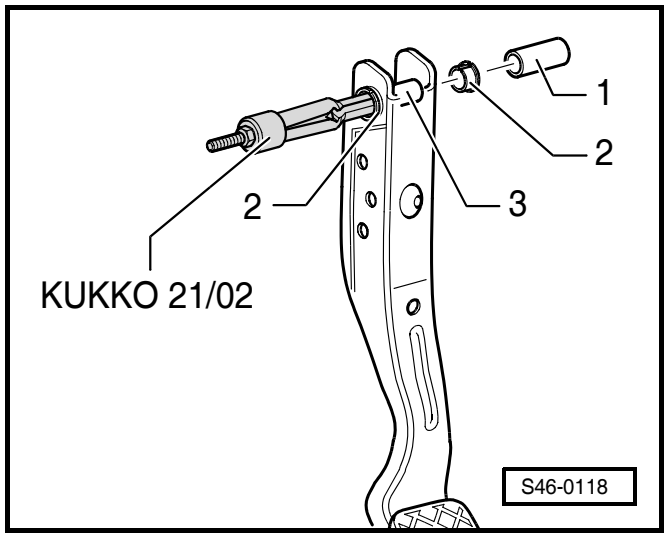
Note

In the Fig. hexagon screw for bearing bolt is covered by the bracket.

– Remove hexagon screw for bearing bolt -arrow-.

– Remove brake pedal -2-.

– Pull bearing bolt -1- out of the casing tube -3- of the brake pedal.



Note

Replace all removed bushings.

– Insert and tension interior extractor -Kukko 21/2- on the bushing -2-.

– Pull out bushing by hand from the casing tube.

Installing

Installation is carried out in the reverse order.

Note

Do not tilt bushings when installing.

– Insert new bushings in the brake pedal if they were removed.

  Press in bushings up to stop.

– Grease bearing points of the brake pedal (bearing bolts and bushings) with polycarbamide grease -G 052 142 A2-.

– Setting and installing the brake light switch ⇒ Chap. 45-16.

– Connect battery ⇒ Electrical System; Rep. Gr. 27.

– Perform automatic test sequence ⇒ Chapter 45-5 either using the vehicle system tester -V.A.G 1552- or the vehicle system test ⇒ Chapter 45-4 using the vehicle diagnosis, measurement and information system -VAS 5051-.

Tightening torque:

Brake pedal to bracket ◆ Use new nut!	25 Nm

47 – Brake, Brake Hydraulics

47-1 Repairing the brake caliper

Summary of Components of Brake Caliper FS-III

Note

- *When repairing install complete repair set.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease -G 052 150 A2-.*

1 - Dust cap

2 - Vent valve, 10 Nm
- ❑ before screwing in thinly coat thread with lithium grease -G 052 150 A2-

3 - Bushing
- ❑ insert in brake caliper housing

4 - Guide bolts, 28 Nm

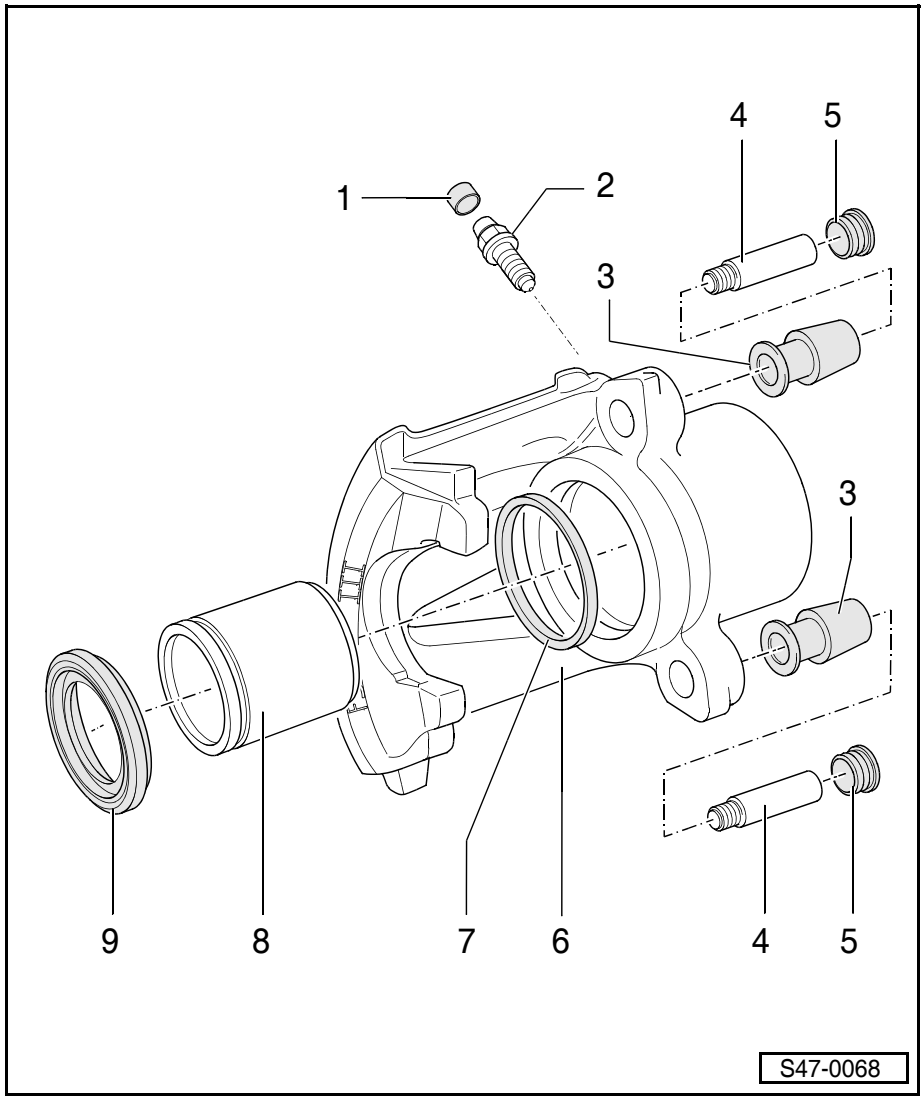
5 - Caps
- ❑ insert in bushing

6 - Brake caliper housing

7 - Seal
- ❑ removing and installing ⇒ 47-1 page 2

8 - Piston
- ❑ removing and installing ⇒ 47-1 page 2

9 - Protective cap
- ❑ removing and installing ⇒ 47-1 page 2
- ❑ when inserting piston do not damage



Removing and installing piston of brake caliper FS-III

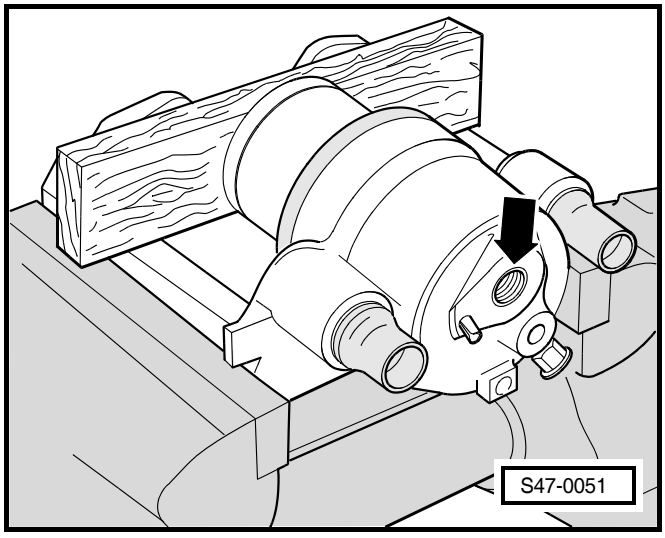
Special tools, test and measuring equipment and auxiliary items required

- Piston jig -MP 9-403-
- Disassembly wedge -3409-
- Lithium grease -G 052 150 A2-

Removing

– Insert wooden plate in the channel to avoid damaging the piston when it is ejected. ►

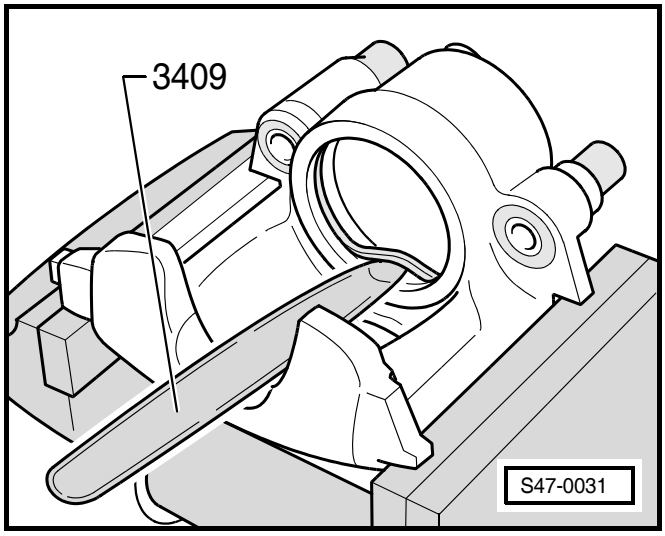
– Press out piston from the brake caliper housing with compressed air -arrow-.



Note

When removing the gasket ring make sure the cylinder surface is not damaged.

– Remove gasket ring with disassembly wedge -3409-. ►



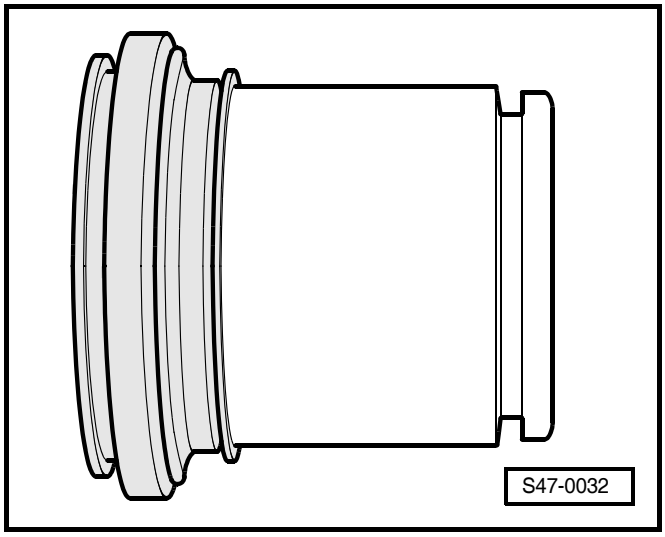
Installing

– Clean the piston and gasket ring surfaces with alcohol and subsequently dry.

– Before installing the piston and gasket ring in the brake caliper housing thinly coat with lithium grease -G 052 150 A2-.

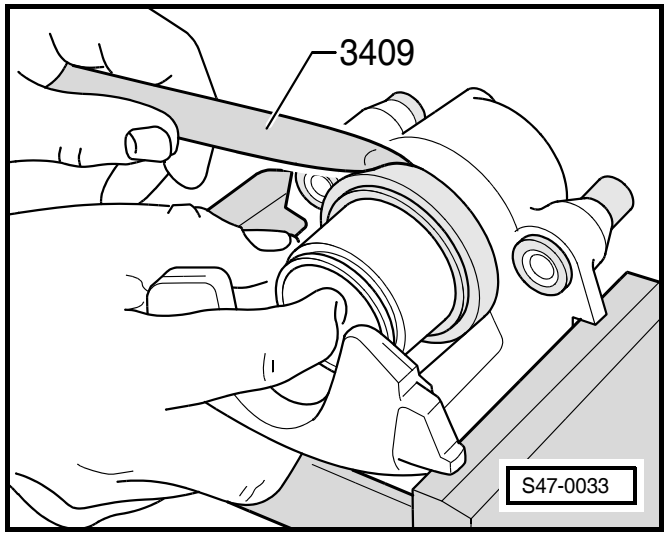
– Insert new gasket ring in the groove of the brake caliper housing.

– Position the new protective cap with the outer sealing lip on the piston. ►



– Insert inner sealing lip of the protective cap with disassembly wedge -3409- in the groove of the cylinder. ►

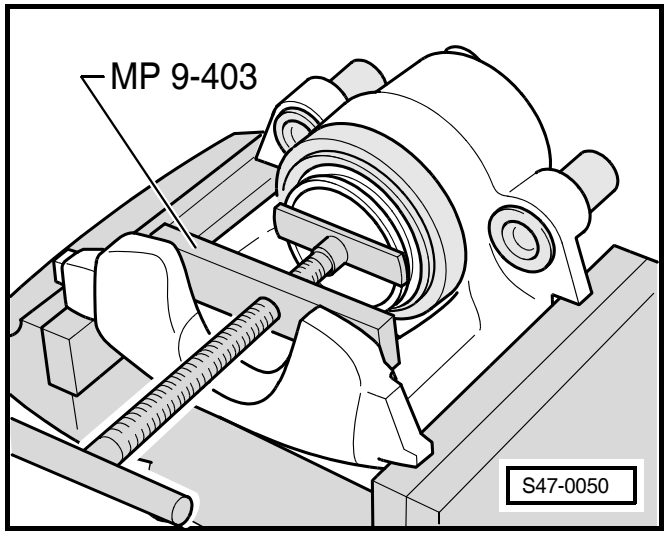
  To do so hold the piston in front of the brake caliper housing.



– Press the piston in the brake caliper housing with the piston jig -MP 9-403-. ►

Note

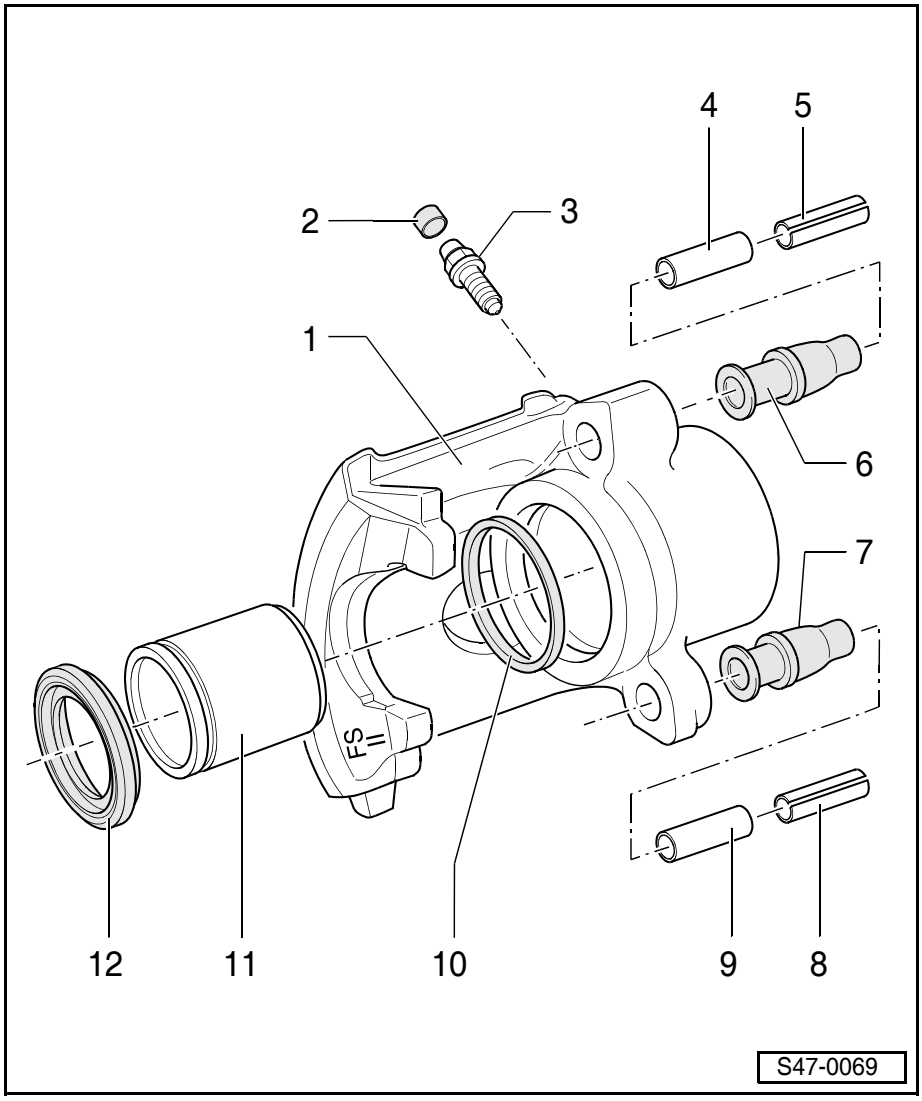
The outer sealing lip of the protective cap will fall in the piston groove.



Summary of Components of Brake Caliper FS-II

Note

- *When repairing install complete repair set.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease -G 052 150 A2-.*



1 - Brake caliper housing

2 - Dust cap

3 - Vent valve, 10 Nm
- ❑ before screwing in thinly coat thread with lithium grease -G 052 150 A2-

4 - Top distance sleeve
- ❑ insert with Lithium grease -G 052 150 A2-

5 - Top bushing
- ❑ slotted
- ❑ insert with Lithium grease -G 052 150 A2-

6 - Top bush
- ❑ insert with Lithium grease -G 052 150 A2-

7 - Bottom bush
- ❑ insert with Lithium grease -G 052 150 A2-

8 - Bottom bushing
- ❑ slotted
- ❑ insert with Lithium grease -G 052 150 A2-

9 - Bottom distance sleeve
- ❑ insert with Lithium grease -G 052 150 A2-

10 - Seal
- ❑ removing and installing ⇒ 47-1 page 2

11 - Piston
- ❑ removing and installing ⇒ 47-1 page 2

12 - Protective cap
- ❑ removing and installing ⇒ 47-1 page 2
- ❑ when inserting piston do not damage

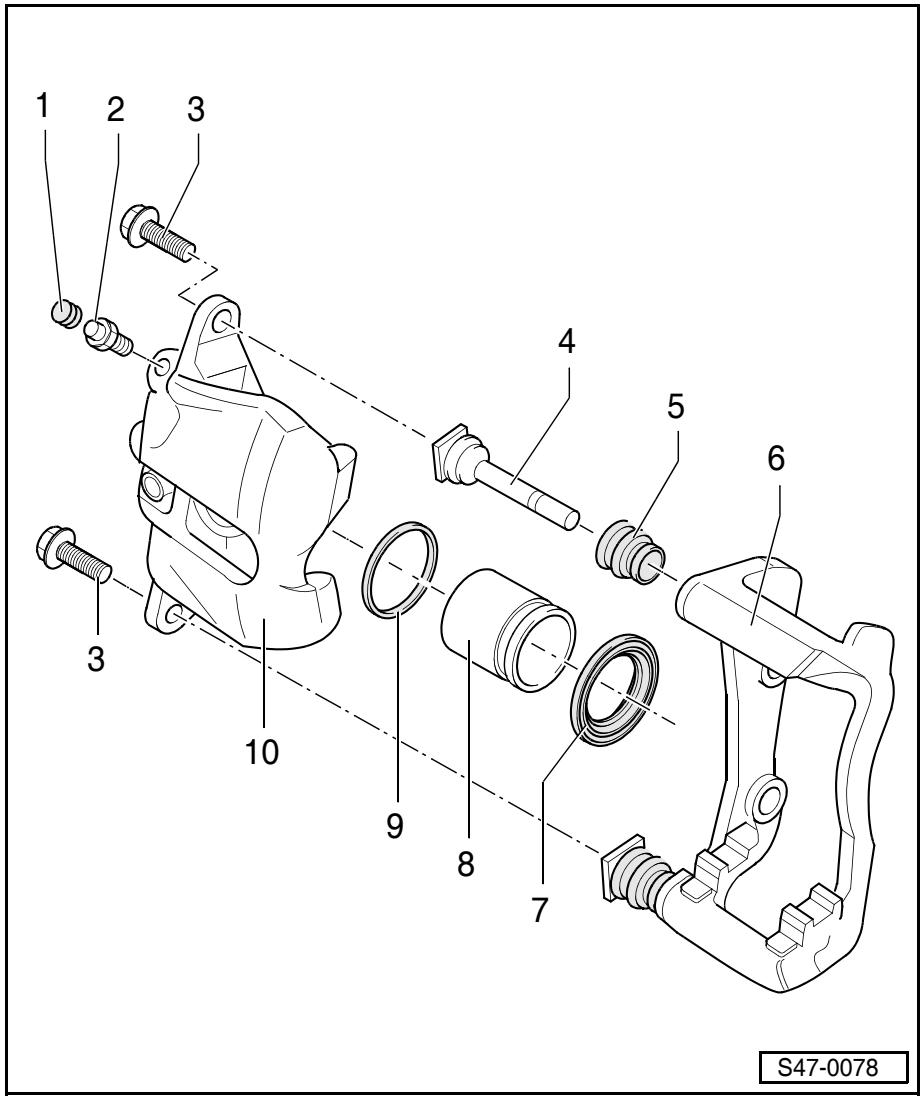
Removing and installing piston of brake caliper FS-II

Removing and installing the piston occurs in the same way as for the piston of the brake caliper of the FS-III brake ⇒ 47-1 page 2.

Summary of components of brake caliper C54-II

Note

- *When repairing install complete repair set.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease -G 052 150 A2-.*



1 - Dust cap

2 - Vent valve, 10 Nm
- ❑ before screwing in thinly coat thread with lithium grease -G 052 150 A2-

3 - Hexagon collar bolt, 30 Nm
- ❑ replace each time removed

4 - Guide bolts

5 - Protective cap
- ❑ insert into slot of the brake carrier and of guide pin; grease slot first of all, use grease packing of repair kit

6 - Brake carrier with guide bolt and protective cap
- ❑ is supplied as replacement part assembled with guide pin and protective caps as well as adequate quantity of grease on guide pins
- ❑ if there is any damage to the protective caps or guide bolts fit a repair set; use the enclosed grease packing to lubricate the guide bolts

7 - Protective cap
- ❑ removing and installing ⇒ 47-1 page 2
- ❑ when inserting piston do not damage

8 - Piston
- ❑ removing and installing ⇒ 47-1 page 2

9 - Seal
- ❑ removing and installing ⇒ 47-1 page 2

10 - Brake caliper housing

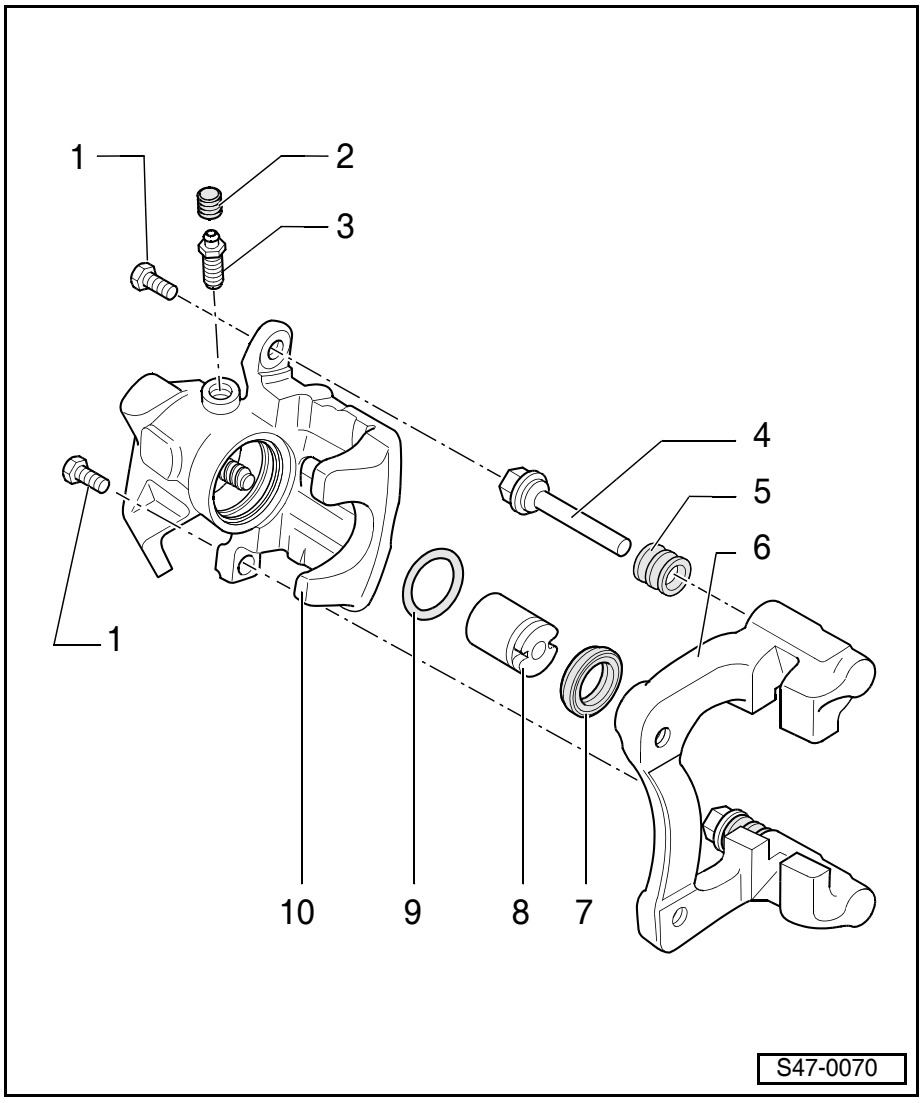
Removing and installing piston of brake caliper C54-II

Removing and installing the piston occurs in the same way as for the piston of the brake caliper of the FS-III brake ⇒ 47-1 page 2.

Summary of components of rear brake caliper

Note

- *When repairing always install complete repair set.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *In the event of repair it is absolutely necessary to pre-bleed the brake calipers before installing them in the vehicle (without brake pads) ⇒ 47-1 page 8.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease -G 052 150 A2-.*



1 - Self-locking hexagon screw, 35 Nm
- ❑ replace each time removed
- ❑ counterhold at guide bolt when releasing and tigtening

2 - Dust cap

3 - Vent valve, 10 Nm
- ❑ before screwing in thinly coat thread with lithium grease -G 052 150 A2-

4 - Guide bolts
- ❑ grease before fitting protective cap ⇒ item 5
- ❑ to grease use the grease supplied with the repair set

5 - Protective cap
- ❑ pull onto brake carrier and guide bolt

6 - Brake carrier with guide bolt and protective cap
- ❑ must be assembled with sufficient grease on the guide bolts, supplied as a spare part
- ❑ if there is any damage to the protective caps or guide bolts fit a repair set; use the enclosed grease packing to lubricate the guide bolts

7 - Protective cap
- ❑ removing and installing ⇒ 47-1 page 7
- ❑ when inserting piston do not damage

8 - Piston with automatic adjusting device
- ❑ removing and installing ⇒ 47-1 page 7

9 - Seal
- ❑ removing and installing ⇒ 47-1 page 7

10 - Brake caliper housing with lever for hand-brake cable
- ❑ replace brake caliper housing if the lever for the hand-brake cable is not tight
- ❑ after repair pre-bleed brake caliper housing ⇒ 47-1 page 8

Removing and installing the rear brake caliper piston

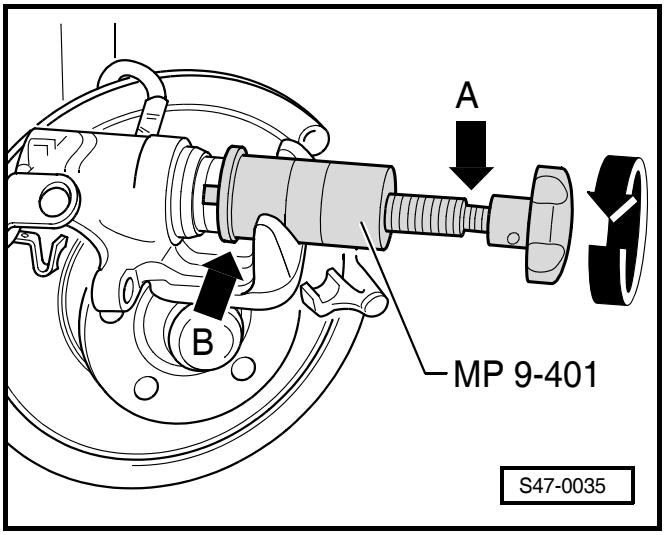
Special tools, test and measuring equipment and auxiliary items required

- Resetting and turning out tool -MP 9-401-
- Disassembly wedge -3409-
- Bleeding bottle (commercially available)
- Lithium grease -G 052 150 A2-
- Brake fluid ⇒ Chap. 00-3

Removing

– Insert resetting and turning out tool -MP 9-401 -. ►

Collar -arrow B- must be located before the piston.



Note

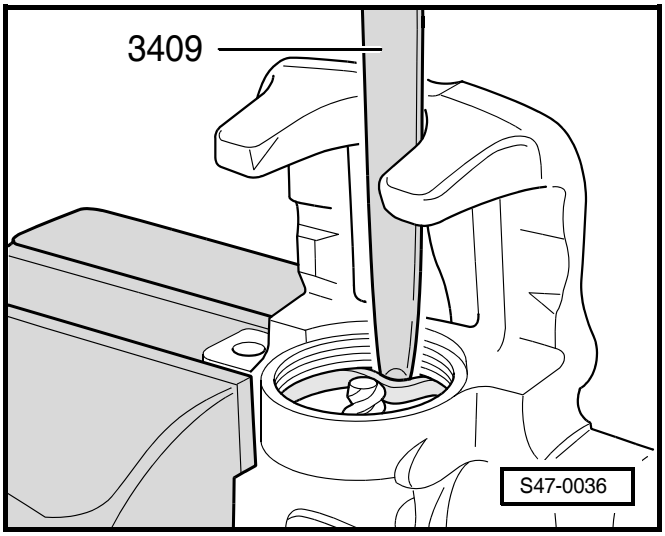
If there is a resistance in the piston position open-end wrench waf 13 on the provided wrench surfaces -arrow A-.

– Release the piston from the brake caliper housing by turning the knurled wheel to the left.

Note

When removing the gasket ring make sure the cylinder surface is not damaged.

– Remove gasket ring with disassembly wedge -3409-. ►



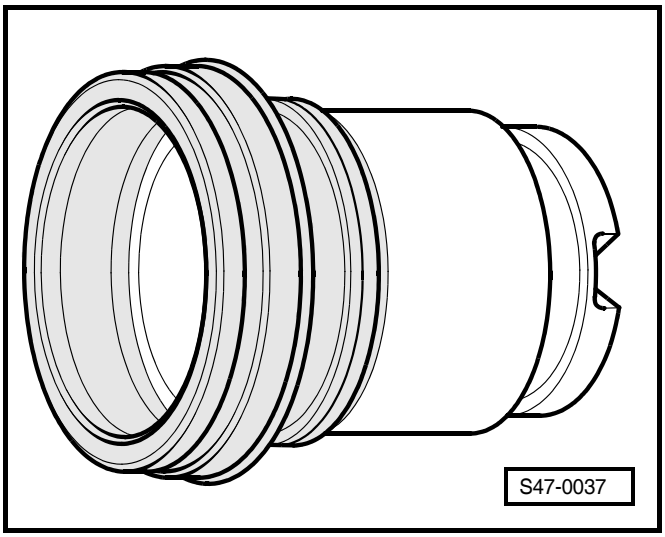
Installing

– Clean the piston and gasket ring surfaces with alcohol and subsequently dry.

– Before installing the piston and gasket ring in the brake caliper housing thinly coat with lithium grease -G 052 150 A2-.

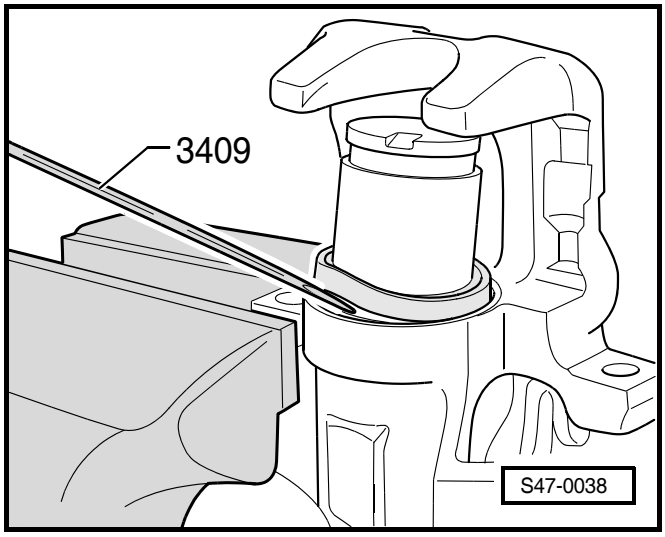
– Insert new gasket ring in the brake caliper housing.

– Position the new protective cap with the outer sealing lip on the piston. ►



– Insert inner sealing lip with disassembly wedge -3409 - in the groove of the cylinder.

  To do so hold the piston in front of the brake caliper housing.



– Insert resetting and turning out tool -MP 9-401 -.

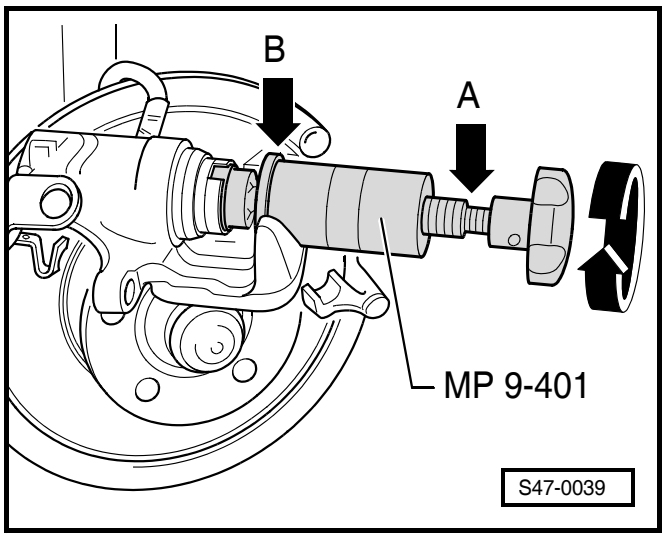
  The collar -arrow B- must rest on the brake caliper.

Note

- *If there is a resistance in the piston position open-end wrench waf 13 on the provided wrench surfaces -arrow A-.*
- *When adjusting the piston with a piston jig or by actuating the foot brake the automatic adjustment in the brake caliper is destroyed.*

– Screw in piston by turning the knurled wheel to the right.

– Insert brake pads.



Pre-bleeding the brake caliper

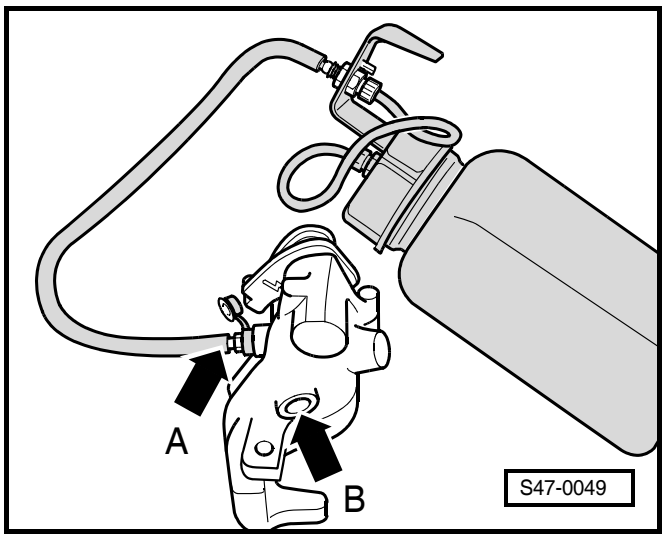
Note

Set up brake caliper for pre-bleeding.

– Open vent valve -arrow A-.

– Using a commercially available ventilation reservoir fill brake fluid until bubble-free brake fluid drips out of the threaded bore (brake hose connection) -arrow B-.

– Close vent valve.

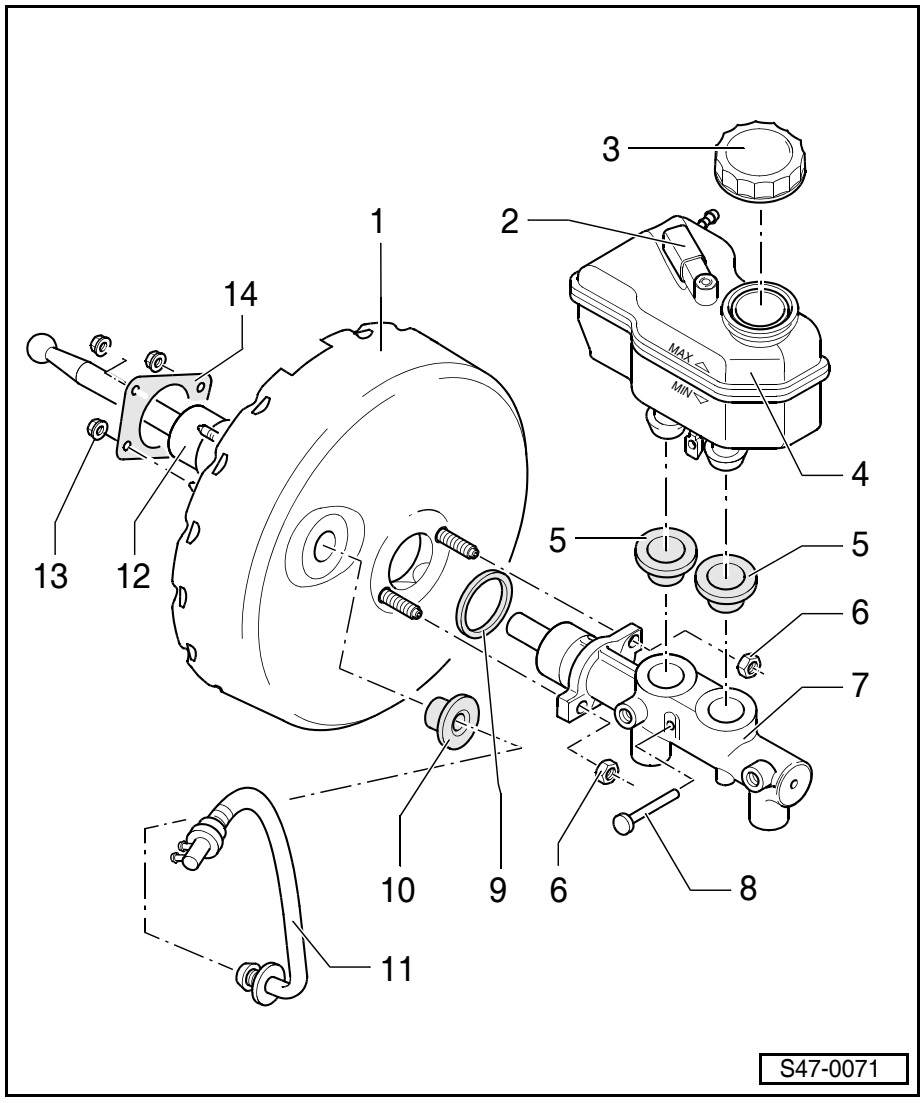


47-2 Brake Servo Unit, Master Brake Cylinder

Summary of Components of Brake Servo Unit, Master Brake Cylinder

Note

The complete master brake cylinder and brake servo unit can be replaced independently of one another.



1 - Brake servo unit

- ❑ removing and installing ⇒ 47-2 page 5
- ❑ assignment ⇒ Spare part catalogue
- ❑ on petrol engines the required negative pressure is drawn from the induction pipe
- ❑ Diesel engines are fitted with a vacuum pump or tandem pump for fuel and negative pressure supply

Functional test:

- – With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).
- – Now hold the brake pedal in brake position using a medium foot pressure and start the engine. If the brake servo unit operates perfectly the brake pedal must yield noticeably under your foot (servo boost takes effect).

- ❑ if there are faults replace completely
- ❑ disconnect from brake pedal or clip onto brake pedal ⇒ Chap. 46-4
- ❑ Non-return valve in vacuum hose of the vacuum pump ⇒ 47-2 page 7
- ❑ Non-return valve in the vacuum hose of the tandem pump for fuel and vacuum supply ⇒ 47-2 page 8

Functional test:

- – It must be possible to blow through the valve in the direction of the arrow.
- – Against the direction of the arrow the valve must be closed.

2 - Brake fluid level warning contact -F34-

- ❑ cannot be removed or repaired

3 - Cap

4 - Brake fluid reservoir

- ❑ removing:
- – Drain brake fluid.
- – Press out retaining pin from the lateral catches of the brake fluid reservoir and master brake cylinder.
- – Pull brake fluid reservoir upwards out of the sealing plugs.
- ❑ Installing:

Installation is carried out in the reverse order.

– Fill up with new brake fluid.
– On vehicles without ABS or with ABS BOSCH 5.7 or ABS, ABS/TCS BOSCH 8.0 bleed brake system ⇒ Chapter 47-4.
– On vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 perform basic setting:
♦ using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13
♦ using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.
– On vehicles with ABS//TCS/ESP BOSCH 8.0 perform basic setting:
♦ using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14.
♦ using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

5 - Sealing plugs
❑ moisten with brake fluid and press in brake fluid reservoir

6 - Self-locking nut, 20 Nm
❑ replace after each installation

7 - Master brake cylinder
❑ cannot be repaired, replace completely in the event of faults
❑ Tightness test ⇒ 47-2 page 2
❑ removing and installing ⇒ 47-2 page 3
❑ assignment ⇒ Spare part catalogue

8 - Retaining pin
❑ to secure brake fluid reservoir at brake master cylinder

9 - Gasket ring
❑ replace after disassembling the master brake cylinder

10 - Sealing plugs

11 - Vacuum hose
❑ insert with brake servo unit

12 - Cap
❑ check for firm seating

13 - Self-locking nut, 28 Nm
❑ replace after each removal

14 - Gasket
❑ for brake servo unit

Checking the master brake cylinder for tightness

Special tools, test and measuring equipment and auxiliary items required

♦ Brake-power regulator or brake system tester, e.g. -V.A.G 1310- or -V.A.G 1310 A-
♦ Lithium grease -G 052 150 A2-

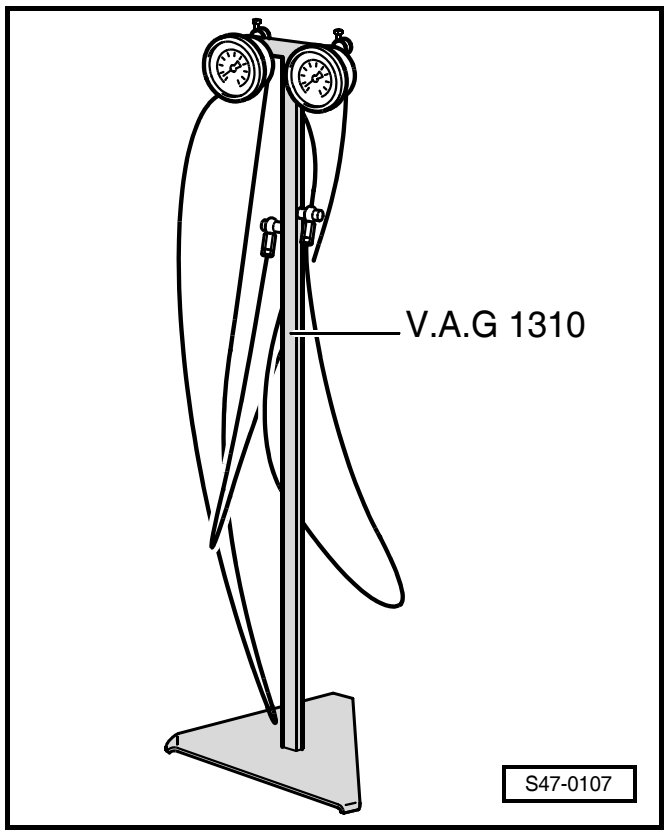
Inspection requirement

• Function and tightness of the brake system (hydraulic control unit or load-dependent brake-power regulator, brake lines, brake hoses, brake calipers and wheel-brake cylinder) O.K.

Test

– Release the vent valve on one of the front brake calipers.

– Connect the pressure gauge of the tester -V.A.G 1310 - or -V.A.G 1310 A- and bleed.
– Push down brake pedal until the pressure gauge on the tester indicates 5 MPa (50 bar).
– Throughout the test which lasts 45 seconds the pressure loss must not exceed 0.4 MPa (4 bar).
– If the pressure loss exceeds 0.4 MPa (4 bar) replace the master brake cylinder.



Tightening torque:

Vent valve in brake caliper	10 Nm

Removing and installing the master brake cylinder

Special tools, test and measuring equipment and auxiliary items required

- Hose clamp -MP 7-602-
- Removal and installation pliers, e.g. -VAS 5024-
- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3, 3A, 3B oder 3C-, -VAS 5051/5A- or -VAS 5051/6A-
- Brake filling and bleeding device, e.g. -ROMESS S15-
- Extraction bottle (commercially available)
- Repair kit SP.-No. 1H0 698 311 A
- Brake fluid ⇒ Chapter 00-3

Note

- *The master brake cylinder must not be repaired.*
- *assignment ⇒ Spare part catalogue*

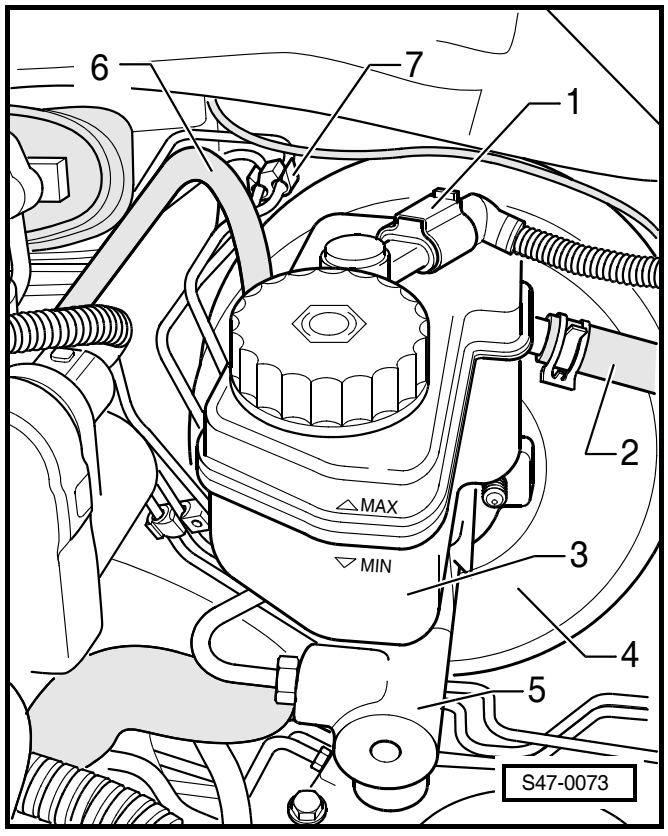
Removing

– Remove engine cover ⇒ Engine, Mechanics; Rep. Gr. 10.
– Remove air filter ⇒ Engine, Fuel Injection; Rep. Gr. 24 (fuel engines) or ⇒ Rep. Gr. 23 (diesel engines).

Note

Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.

– Remove battery and battery tray ⇒ Electrical System; Rep. Gr. 27.
– Lay sufficient non-fluffing cloths around the engine and gearbox.
– Disconnect plug -1- from the brake fluid level warning contact -F34-.
– Unclip vacuum hose -6- from the brake fluid reservoir.



– After opening the breather screws on the front axle brake calipers pump off brake fluid by repeatedly pressing the brake pedal.
– Clamp off the running-on line of the clutch master cylinder -2- with hose clamp -MP 7-602-.
– Open spring strap clamps of the running-on line of the clutch master cylinder using assembly pliers or -VAS 5024-.
– Disconnect the running-on line of the clutch master cylinder -2- from the brake fluid reservoir -3- and tie up.
– Unclip the brake lines from the holder -7-.
– Unscrew the brake lines from the tandem master brake cylinder -5- and shut off.
– Shut-off the connections of the brake lines on the master brake cylinder with screw plugs from the repair kit SP No. 1 H0 698 311 A.
– Release the nuts of the master brake cylinder.
– Carefully pull off the master brake cylinder -5- from the brake servo unit -4-.

Installing

Note

- *Install new gasket ring between the master brake cylinder and the brake servo unit.*
- *When installing the master brake cylinder with the brake servo unit pay attention to the correct positioning of the pressure rod in the master brake cylinder.*
- *Only fill up with new brake fluid.*

Installation is carried out in the reverse order.

– Fill up with new brake fluid.
– Install battery and battery tray ⇒ Electrical System; Rep. Gr. 27.
– Connect battery ⇒ Electrical System; Rep. Gr. 27.

Vehicles without or with ABS BOSCH 5.7 or ABS, ABS/TCS BOSCH 8.0

– Bleed brake system ⇒ Chapter 47-4.

Vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

Vehicles with ABS//TCS/ESP BOSCH 8.0

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

Continued for all vehicles

– Bleed clutch ⇒ gearbox; Rep. Gr. 30.

– Install air filter ⇒ Engine, Fuel Injection; Rep. Gr. 24 (fuel engines) or ⇒ Rep. Gr. 23 (diesel engines).

– Installing engine cover ⇒ Engine, Mechanics; Rep. Gr. 10.

– Perform automatic test sequence ⇒ Chapter 45-5 either using the vehicle system tester -V.A.G 1552- or the vehicle system test ⇒ Chapter 45-4 using the vehicle diagnosis system, measurement and information system -VAS 5051-.

Tightening torques:

Master brake cylinder to brake servo unit ♦ Use new nuts!	20 Nm
Brake line to master brake cylinder	14 Nm

Removing and installing brake servo unit

Special tools, test and measuring equipment and auxiliary items required

- Hose clamp -MP 7-602-
- Release tool -T30021- or -T10006 A-
- Removal and installation pliers, e.g. -VAS 5024-
- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3, 3A, 3B oder 3C-, -VAS 5051/5A- or -VAS 5051/6A-
- Brake filling and bleeding device. -ROMESS S15-
- Extraction bottle (commercially available)
- Repair kit SP.-No. 1H0 698 311 A
- Brake fluid ⇒ Chapter 00-3

Removing

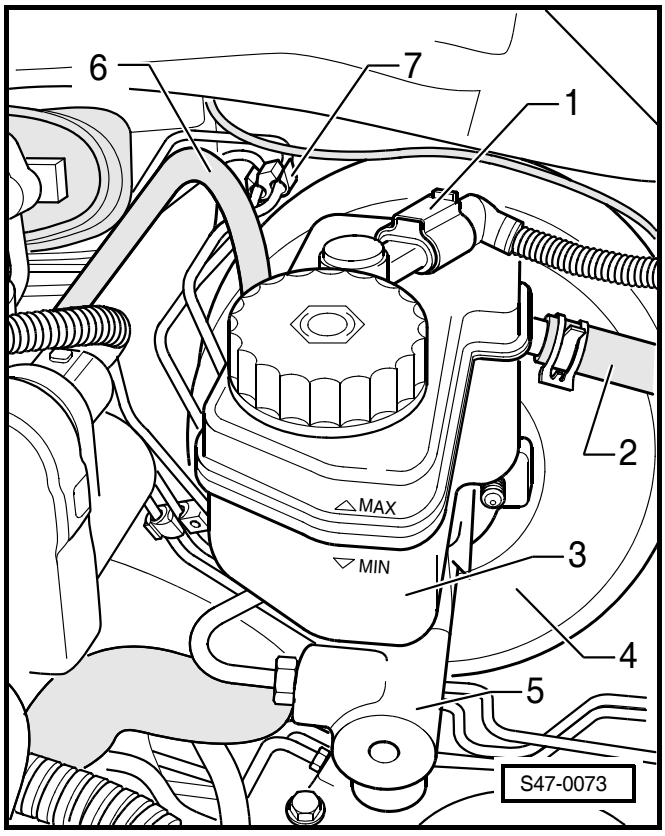
– Remove engine cover ⇒ Engine, Mechanics; Rep. Gr. 10.

– Remove air filter ⇒ Engine, Fuel Injection; Rep. Gr. 24 (fuel engines) or ⇒ Rep. Gr. 23 (diesel engines).

Note

Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.

– Remove battery and battery tray ⇒ Electrical System; Rep. Gr. 27.
– Lay sufficient non-fluffing cloths around the engine and gearbox.
– Disconnect plug -1- from the brake fluid level warning contact -F34-.
– Unclip vacuum hose -6- from the brake fluid reservoir.
– After opening the breather screws on the front axle brake calipers pump off brake fluid by repeatedly pressing the brake pedal.
– Clamp off the running-on line of the clutch master cylinder -2- with hose clamp -MP 7-602-.
– Open spring strap clamps of the running-on line of the clutch master cylinder using assembly pliers or -VAS 5024-.
– Disconnect the running-on line of the clutch master cylinder -2- from the brake fluid reservoir -3- and tie up.
– Unclip the brake lines from the holder -7-.
– Unscrew the brake lines from the tandem master brake cylinder -5- and shut off.
– Shut-off the connections of the brake lines on the master brake cylinder with screw plugs from the repair kit SP No. 1 H0 698 311 A.



Vehicles without air conditioning

– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 80.

Vehicles with air conditioning

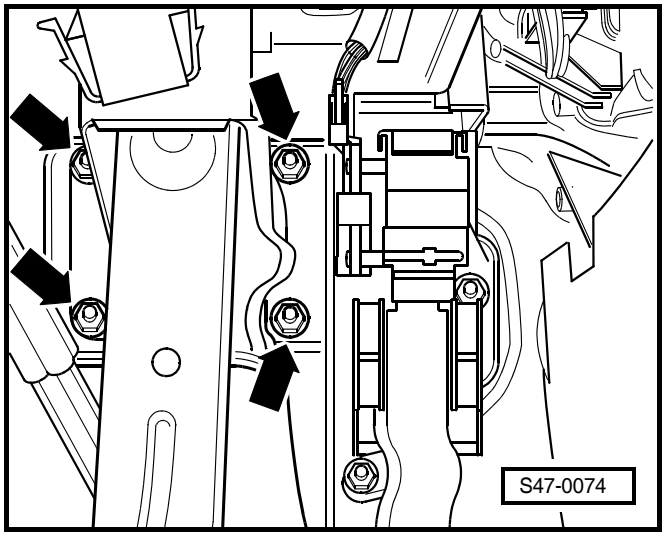
– Removing the left footwell vent ⇒ Heating, Air Conditioning; Rep. Gr. 87.

Vehicles with Convenience system central control unit -J393-

– Remove the convenience system central control unit - J393- ⇒ Body Work; Rep. Gr. 70.

Continued for all vehicles

– Removing brake light switch ⇒ Chap. 45-16.
– Removing brake pedal from brake servo unit ⇒ Chapter 46-4.
– Unscrew the nuts for brake servo unit -arrows-.
– Guide the brake servo unit with master brake cylinder towards the front and remove.

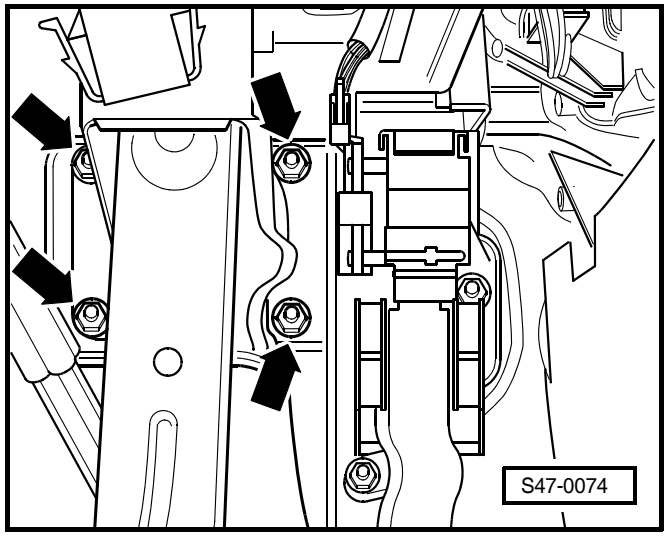


Installing

Installation is carried out in the reverse order.

– Clipping the brake pedal onto the brake servo unit ⇒ Chap. 46-4.
– Setting and installing the brake light switch ⇒ Chap. 45-16.

– Fill up with new brake fluid.
– Install battery and battery tray ⇒ Electrical System; Rep. Gr. 27.
– Connect battery ⇒ Electrical System; Rep. Gr. 27.
– Removing brake light switch ⇒ Chap. 45-16.
– Removing brake pedal from brake servo unit ⇒ Chapter 46-4.
– Unscrew the nuts for brake servo unit -arrows-.
– Guide the brake servo unit with master brake cylinder towards the front and remove.



Vehicles without or with ABS BOSCH 5.7 or ABS, ABS/TCS BOSCH 8.0

– Bleed brake system ⇒ Chapter 47-4.

Vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

Vehicles with ABS//TCS/ESP BOSCH 8.0

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

Continued for all vehicles

– Bleed clutch ⇒ gearbox; Rep. Gr. 30.
– Install air filter ⇒ Engine, Fuel Injection; Rep. Gr. 24 (fuel engines) or ⇒ Rep. Gr. 23 (diesel engines).
– Installing engine cover ⇒ Engine, Mechanics; Rep. Gr. 10.
– Perform automatic test sequence ⇒ Chapter 45-5 either using the vehicle system tester -V.A.G 1552- or the vehicle system test ⇒ Chapter 45-4 using the vehicle diagnosis system, measurement and information system -VAS 5051-.

Tightening torques:

Brake servo unit to foot controls ♦ Use new nuts!	20 Nm
Brake line to master brake cylinder	14 Nm

Removing and installing the vacuum pump for the brake servo unit

Vehicles with 1.9 ltr./47 kW SDI engine

The vacuum supply of the brake servo unit occurs via a vacuum pump on vehicles with a suction diesel engine ⇒ 1.9/47 SDI Engine, Mechanics; Rep. Gr. 15.

Removing and installing tandem pump for fuel and vacuum supply

For vehicles with TDI PD Turbocharger engines

The vacuum supply of the brake servo unit occurs via a tandem pump on vehicles with a turbo-diesel engine ⇒ TDI Engine, Mechanics; Rep. Gr. 20.

47-3 Brake-power regulator, brake-pressure reducer

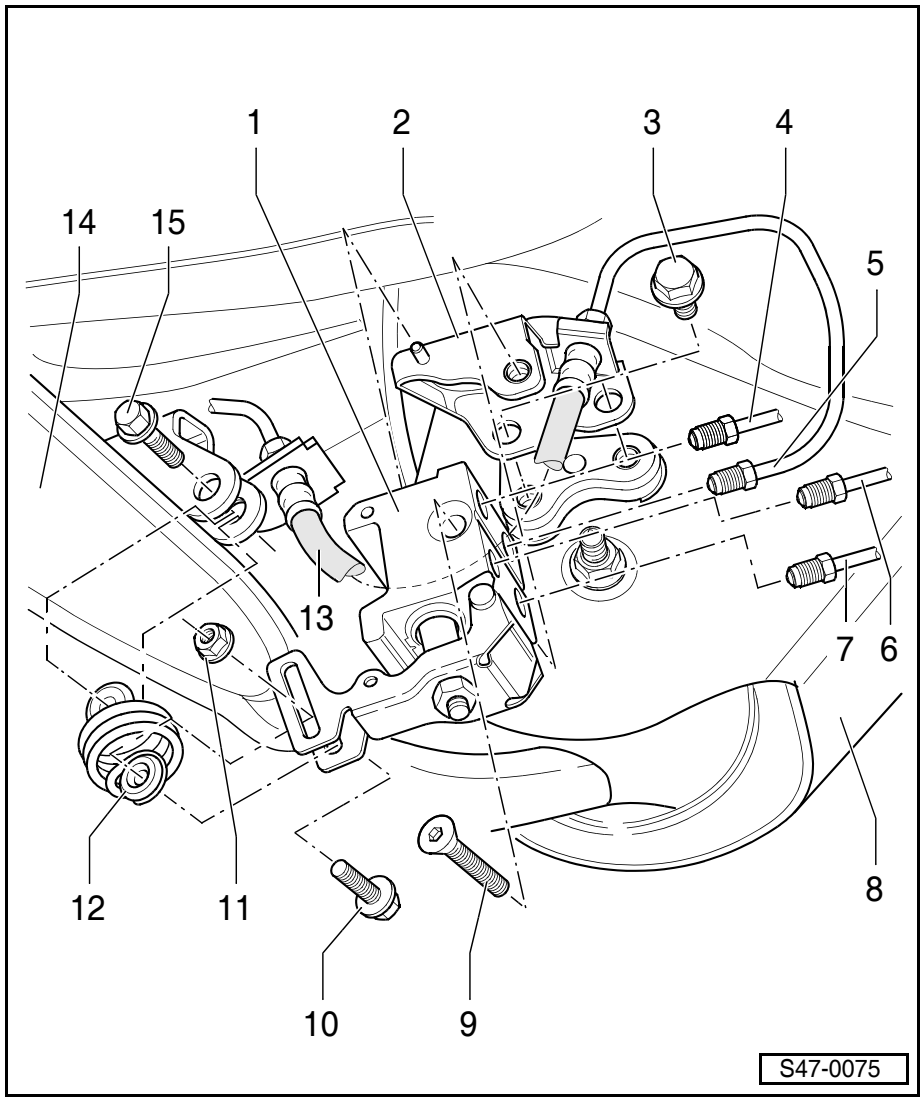
Summary of Components of Brake-Power Regulator

Note

- *After removing the brake lines close connection bores on the brake-power regulator with screw plugs.*
- *Only remove the screw plugs from the connection bores when the brake lines are installed.*

WARNING!

Pay attention to the correct channel assignment of the brake lines. Interchanging the brake lines will result in dangerous brake control actions.



1 - Brake-power regulator
- ❑ load dependent
- ❑ assignment ⇒ Spare part catalogue
- ❑ testing and adjusting ⇒ 47-3 page 2
- ❑ Adjusting values ⇒ Chap. 00-3

2 - Bracket
- ❑ for brake-power regulator

3 - Hexagon screw, 20 Nm

4 - Brake line with pipe screw
- ❑ Brake-power regulator - rear right brake hose
- ❑ Tightening torque of the pipe screws: 14 Nm

5 - Brake line with pipe screw
- ❑ Brake-power regulator - rear left brake hose
- ❑ Tightening torque of the pipe screws: 14 Nm

6 - Brake line with pipe screw
- ❑ Master brake cylinder - brake-power regulator
- ❑ Tightening torque of the pipe screws: 14 Nm

7 - Brake line with pipe screw
- ❑ Master brake cylinder - brake-power regulator
- ❑ Tightening torque of the pipe screws: 14 Nm

8 - Bracket
- ❑ for rear axle

9 - Oval-head countersunk screw, 20 Nm

10 - Hexagonal screw

11 - Hexagonal nut, 20 Nm

12 - Tension spring

13 - Rear left brake hose

14 - Rear axle

15 - Hexagon screw, 16 Nm

Inspecting and adjusting the brake-power regulator

Special tools, test and measuring equipment and auxiliary items required

- Brake-power regulator or brake system tester, e. g. -V.A.G 1310- or -V.A.G 1310 A-
- Brake filling and bleeding device. -ROMESS S15-

Fitting location of the brake-power regulator

The brake-power regulator is secured to a bracket assigned to the mount for rear axle and is controlled by the rear axle movement via a spring.

Check for proper operation

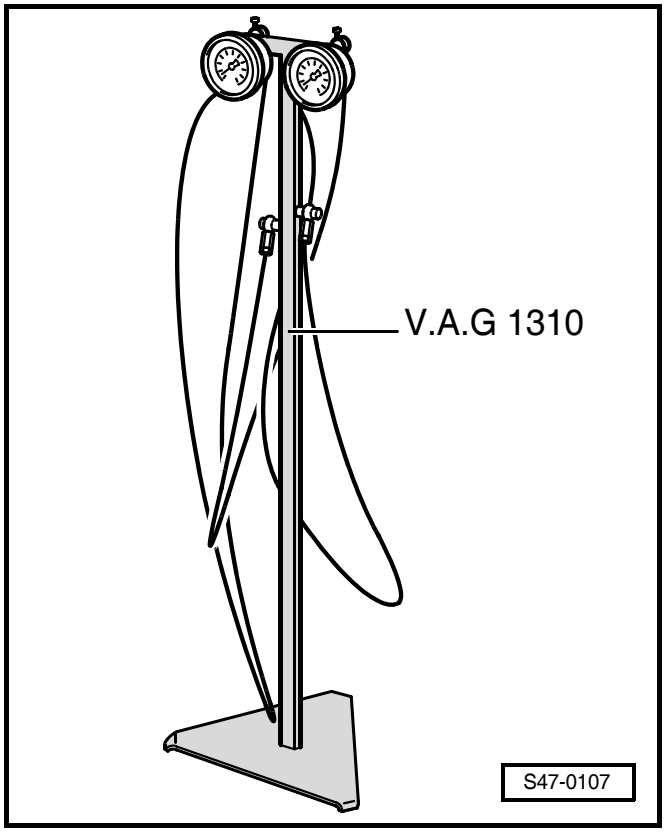
– Forcefully apply the brake pedal and release quickly (vehicle is standing on its wheels). While doing so the lever of the brake-power regulator must move.

Pressure test and adjustment

Note

- *The brake-power regulator is adjusted on a vehicle ready for driving.*
- *Vehicle ready for driving: Weight of the vehicle with full fuel tank and full water reservoir for windscreen wiper/washer and headlamp cleaning system, spare wheel, tool kit, jack and driver (75 kg). The spare wheel, tool kit, jack and driver must be located in the position prescribed by the vehicle manufacturer.*

– Raise vehicle and connect pressure gauge of the tester to the brake caliper (front left wheel) and connect to the wheel-brake cylinder (rear right wheel).



– Bleed both pressure gauges.
– Lower vehicle and repeatedly depress vehicle and allow to settle on the rear axle.
– Press brake pedal and measure pressures.
– Compare measured pressure values to the specified adjusting values ⇒ Chap. 00-3.
– If necessary adjust brake-power regulator ⇒ 47-3 page 2.

Adjusting brake-power regulator

Test pressure on rear axle too high:

– Release tension spring on brake-power regulator.

Test pressure on rear axle too low:

– Tighten tension spring on brake-power regulator.

Note

Adjust without load on the brake pedal, observe the following sequence:

– Read off values.
– Relieve brake pedal.
– Adjust tension spring on brake-power regulator.
– Again load brake pedal.
– Read-off values and if necessary correct adjustment.
– Remove pressure gauge.
– Bleed brake system ⇒ Chapter 47-4.

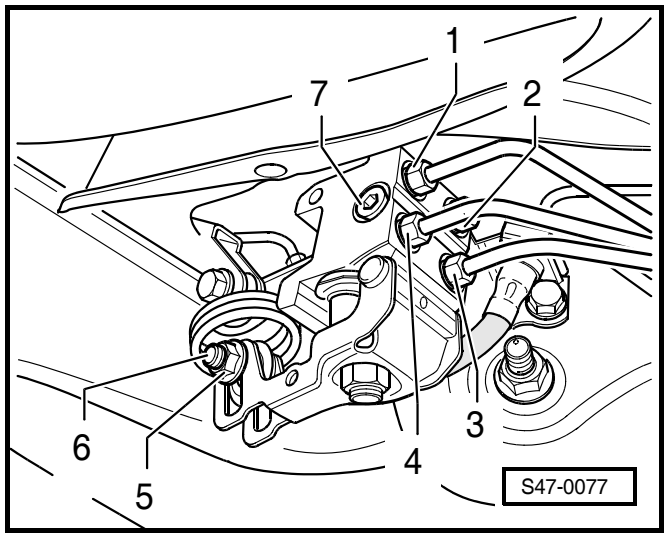
Removing and installing brake-power regulator

Special tools, test and measuring equipment and auxiliary items required

- Brake-power regulator or brake system tester, e. g. -V.A.G 1310- or -V.A.G 1310 A-
- Brake pedal arrester, e.g. -V.A.G 1238 B- or brake pedal load device, e.g. -V.A.G 1869/2-
- Brake filling and bleeding device. -ROMESS S15-
- Oil catch pan
- Repair kit SP.-No. 1H0 698 311 A
- Brake fluid ⇒ Chapter 00-3

Removing

– Press brake pedal and arrest with brake pedal arrester.
– Position the oil catch pan under the brake-power regulator to collect escaping brake fluid.
– Mark brake lines.
– Unscrew brake lines -1-, -2-, -3- and -4- on the brake-power regulator. ►
– Shut-off brake lines to prevent brake fluid from running out and soiling.
– Shut-off the connections of the brake lines on the brake-power regulator with screw plugs from repair kit SP No. 1 H0 698 311 A.
– Unscrew hexagon nut -5- and remove hexagon screw -6-.
– Release oval-head countersunk screw -7-.
– Remove brake-power regulator.



Installing

WARNING!

Pay attention to the correct channel assignment of the brake lines. Interchanging the brake lines will result in dangerous brake control actions.

Installation is carried out in the reverse order.

– Bleed brake system ⇒ Chapter 47-4.
– Adjusting brake-power regulator ⇒ 47-3 page 2.

Tightening torques:

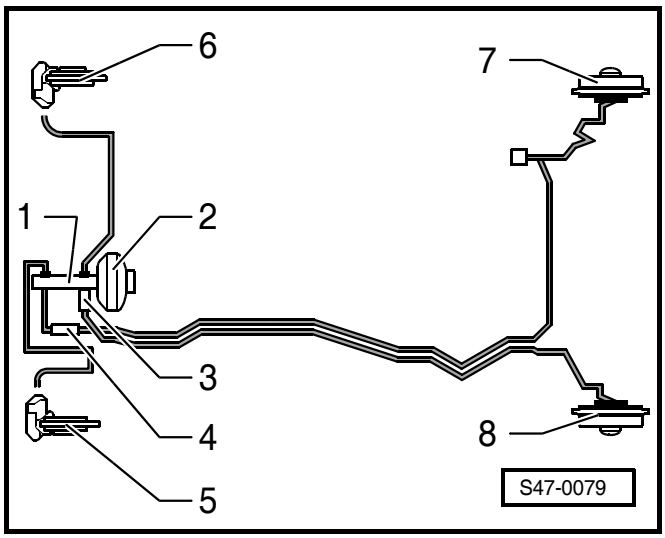
Brake-power regulator to bracket	20 Nm
Brake-power regulator to tension spring	20 Nm
Brake line to brake-power regulator	14 Nm

Inspecting the brake-pressure reducer

Brake-pressure reducers are fitted on vehicles without ABS and without load-dependent brake-power regulator, Assignment ⇒ Spare part catalogue.

Fitting location

A brake-pressure reducer is fitted on each brake circuit. ►



The brake-pressure reducer -3- is screwed directly into the master brake cylinder -1-, the other brake pressure reducer -4- is connected to the master brake cylinder by means of a short brake line.

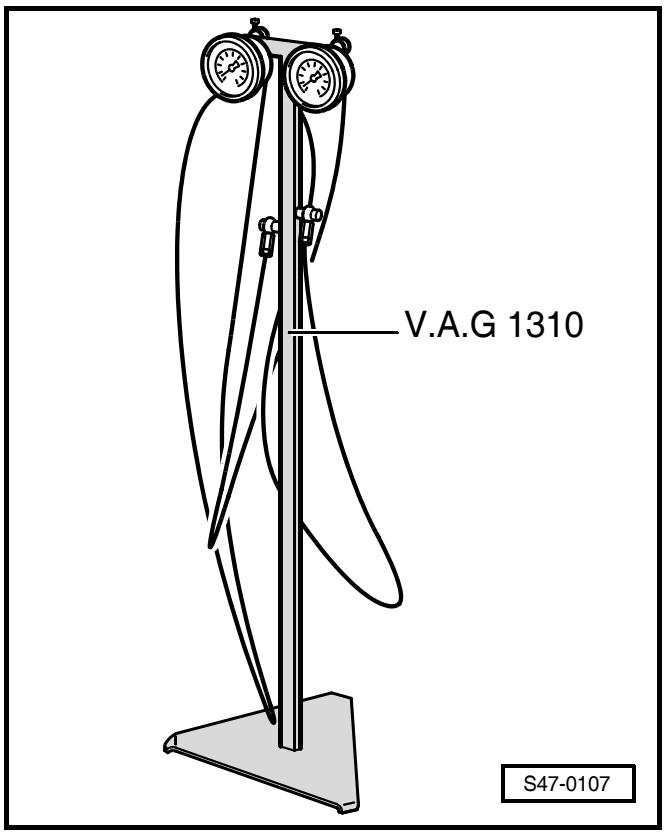
2 - Brake servo unit
5 - Front left disc brake
6 - Front right disc brake
7 - Rear right drum brake
8 - Rear left drum brake

Pressure test

Special tools, test and measuring equipment and auxiliary items required

- Brake-power regulator or brake system tester, e. g. -V.A.G 1310- or -V.A.G 1310 A-
- Brake filling and bleeding device. -ROMESS S15-

– Raise vehicle and connect pressure gauge of the tester to the front left brake caliper and connect to the rear right wheel-brake cylinder. Because of the diagonal brake circuits after the pressure test proceed in the same way for the 2nd brake circuit (front right brake caliper and rear left wheel brake cylinder). ►



– Bleed both pressure gauges.

– Press brake pedal and measure pressures.

– Compare measured pressure values to the specified values ⇒ Chap. 00-3.

At a given pressure of 10 MPa (100 bar) the pressure reducer must be closed.

A drop in pressure of maximum 1MPa (10 bar) 3 minutes is allowed.

If the test pressures are not reached, inspect the brake system for leaks.

If the brake system is tight and the test pressures are exceeded, replace the brake pressure reducer. The brake pressure reducer must not be repaired.

– Remove pressure gauge.

– Bleed brake system ⇒ Chapter 47-4.

Removing and installing the brake-pressure reducer

Special tools, test and measuring equipment and auxiliary items required

- Brake-power regulator or brake system tester, e. g. -V.A.G 1310- or -V.A.G 1310 A-
- Brake pedal arrester, e.g. -V.A.G 1238 B- or brake pedal load -V.A.G 1869/2-
- Brake filling and bleeding device, e. g. -ROMESS S15-
- Bleeding bottle (commercially available)
- Brake fluid ⇒ Chap. 00-3

Removing

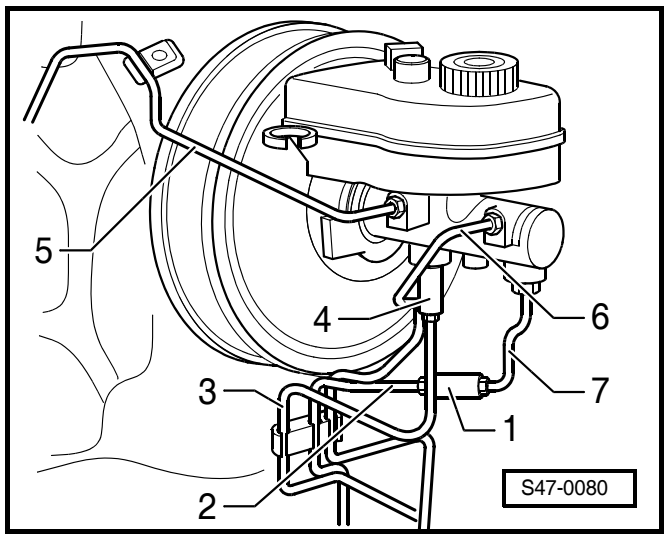
– Insert the bleeder hose of the bleeding bottle on the vent valve of the left and right brake caliper.

– After opening the breather screws on the front axle brake calipers pump off brake fluid by repeatedly pressing the brake pedal.

– Shut the vent valve once the brake fluid flowed out.

– Disconnect the bleeder hose from the vent valve.

– Removing the brake-pressure reducer.



1 - Brake-pressure reducer for front left wheel/rear right wheel brake circuit.
2 - Brake line from the brake-pressure reducer to the rear right wheel-brake cylinder
3 - Brake line from the brake-pressure reducer to the rear left wheel-brake cylinder
4 - Brake-pressure reducer for front right wheel/rear left wheel brake circuit.
5 - Brake line from the master brake cylinder to the front right brake caliper
6 - Brake line from the master brake cylinder to the front left brake caliper
7 - Brake line from the master brake cylinder to the brake pressure reducer

Installing

Installation is carried out in the reverse order.

– Bleed brake system ⇒ Chapter 47-4.

– Perform pressure test ⇒ 47-3 page 4.

Tightening torques

Brake-pressure reducer to master brake cylinder	14 Nm
Brake line to brake-pressure reducer (tube or hose connection)	14 Nm
Brake lines to master brake cylinder	14 Nm

47-4 Bleeding Brake System

Bleeding Brake System - vehicles without and with ABS, ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 or ABS, ABS/TCS or ABS/ASR/ESP BOSCH 8.0

Note

- *On vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP the EDL function is integrated in the TCS function.*
- *The procedure for bleeding air from the brake system is described with the brake filling and bleeding appliance -ROMESS S15-.*

Vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 or ABS/TCS/ESP BOSCH 8.0

If one chamber of the brake fluid reservoir has run completely dry, e.g. leakage in the brake system, the hydraulic unit must be bled via the function „basic setting“ either using the vehicle system tester -V.A.G 1552- or using the vehicle diagnosis, measurement and information system -VAS 5051-.

Continued for vehicles with ABS systems BOSCH 5.7 or BOSCH 8.0

WARNING!

On vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 or ABS/TCS/ESP BOSCH 8.0 a filling pressure of at least 0.2 MPa (2 bar) must be maintained when filling with brake fluid using brake filling and bleeding device -ROMESS S15-.

If the filling pressure of 0.2 MPa (2 bar) is not reached, proper bleeding of the hydraulic unit is no longer assured.

Distinction between ABS, ABS/EDL/TCS and ABS/EDL/TCS/ESP BOSCH 5.7 as well as ABS, ABS/TCS and ABS/TCS/ESP BOSCH 8.0

⇒ Chapter 45-2

Note

- *Perform basic setting on vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 either using the vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13 or using the vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.*
- *Perform basic setting on vehicles with ABS/TCS/ESP BOSCH 8.0 either using the vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14 or using the vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.*
- *Bleeding brake system on vehicles with ABS BOSCH 5.7 or ABS, ABS/TCS BOSCH 8.0, as for vehicles without ABS.*

- *Bleeding brake system on vehicles without ABS BOSCH 5.7 or ABS, ABS/TCS BOSCH 8.0, as for vehicles without ABS. DUring bleeding move the rear wheel-brake lever of the brake-power regulator.*
- *Only use new brake fluid ⇒ Chap. 00-3.*

WARNING!

- ***Brake fluid is hygroscopic, i.e. it retains humidity from the ambient air, and must therefore always be stored in airtight containers.***
- ***Brake fluid must never come into contact with fluids containing mineral oils (oil, petrol, cleaning agent). Mineral oils damage the plugs and boots of the brake system.***
- ***Drained (used) brake fluid must never be used again.***
- ***Observe the disposal instructions!***
- ***Brake fluid is toxic, avoid skin contact.***
- ***Because of its caustic effect brake fluid must not come into contact with paint.***
- ***Rinse any brake fluid spills with a lot of water.***
- ***Dispose of brake fluid in compliance with the applicable environmental regulations.***

Bleeding the brake system of air using the brake filling and bleeding device, e. g. -ROMESS S15-

Special tools, test and measuring equipment and auxiliary items required

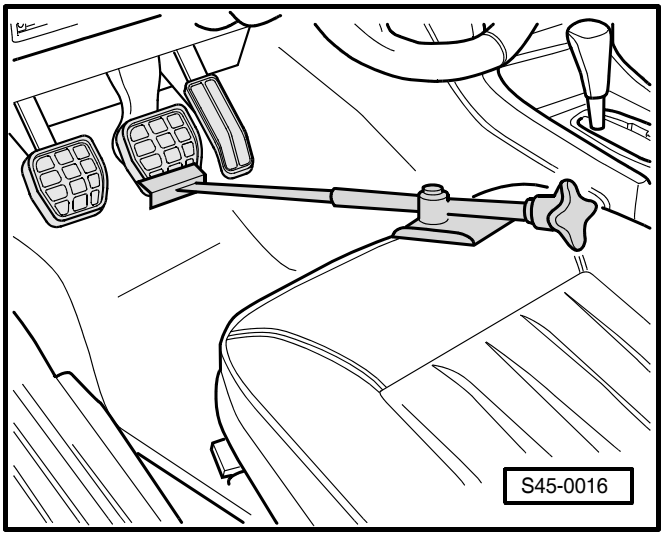
- Brake pedal arrester, e.g. -V.A.G 1238 B- or brake pedal load device, e.g. -V.A.G 1869/2-
- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3A-, -V.A.G 1551/3B-, -V.A.G 1551/3C-, -VAS 5051/5A- or -VAS 5051/6A -
- Brake filling and bleeding device. -ROMESS S15-
- Bleeding bottle (commercially available)
- Brake fluid ⇒ Chapter 00-3

Note

- *Bleeding of the brake system on vehicles with ABS is undertaken as for vehicles without ABS.*
- *For vehicles without ABS and with brake-power regulator move the rear wheel-brake lever of the regulator during bleeding.*

– Connect up the brake filling and bleeding device but do not switch it on.

– Press brake pedal and arrest with brake pedal arrester. ►



– Remove dust caps from the vent valves of the brake calipers/wheel-brake cylinder.

– Open the bleed valves in the prescribed sequence with the hose of the bleeding bottle fitted, switch on the brake filling and bleeding device and bleed both the wheel-brake cylinder and the brake calipers

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 relevant vent valve and fit dust cap.

– Disconnect the brake filling and bleeding device.

– Separate connection from brake fluid reservoir and remove brake pedal arrester.

Note

- *After bleeding perform a test drive. While doing so perform at least one ABS adjustment!*
- *After bleeding or replacing the ABS, EDL/TCS control unit BOSCH 5.7 or the ABS, ABS/TCS control unit BOSCH 8.0 perform a final control diagnosis:*

  either using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-12

  using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

– Perform test drive with ABS adjustment.

Vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7

Note

The bleeding of the brake system on vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 occurs via the basic setting.

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

– Perform test drive with at least one ABS adjustment.

Vehicles with ABS//TCS/ESP BOSCH 8.0

Note

The bleeding of the brake system on vehicles with ABS/TCS/ESP BOSCH 8.0 occurs via the basic setting.

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

– Perform test drive with at least one ABS adjustment.

Bleeding the brake system of air without using the brake filling and bleeding device

Special tools, test and measuring equipment and auxiliary items required

- Brake pedal arrester, e.g. -V.A.G 1238 B- or brake pedal load device, e.g. -V.A.G 1869/2-
- Vehicle system tester -V.A.G 1552- or vehicle diagnosis, measurement and information system -VAS 5051-
- Diagnostic cable -V.A.G 1551/3A-, -V.A.G 1551/3B-, -V.A.G 1551/3C-, -VAS 5051/5A- or -VAS 5051/6A -
- Bleeding bottle (commercially available)
- Brake fluid ⇒ Chapter 00-3

Note

- *Bleeding of the brake system on vehicles with ABS is undertaken as for vehicles without ABS.*
- *For vehicles without ABS and with brake-power regulator move the rear wheel-brake lever of the regulator during bleeding.*
- *Always check the brake fluid level in the brake fluid reservoir while bleeding the sustem of air and top up the brake fluid to the „MAX“ marking if necessary.*

– Build up pressure in the brake system by pumping the brake pedal.

– Open the vent valve with the hose of the bleeding bottle fitted.

– Close the vent valve while the pedal is pressed down.

– Repeat this procedure until no more air escapes.

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 relevant vent valve and fit dust cap.

Note

After bleeding perform a test drive. While doing so perform at least one ABS adjustment!

– Perform test drive with ABS adjustment.

Vehicles with ABS/EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7

Note

The bleeding of the brake system on vehicles with ABS/ EDL/TCS or ABS/EDL/TCS/ESP BOSCH 5.7 occurs via the basic setting.

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-13.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

– Perform test drive with at least one ABS adjustment.

Vehicles with ABS//TCS/ESP BOSCH 8.0

Note

The bleeding of the brake system on vehicles with ABS/ TCS/ESP BOSCH 8.0 occurs via the basic setting.

– Perform basic setting:

- using vehicle system tester -V.A.G 1552- ⇒ Chapter 45-14.
- using vehicle diagnosis, measurement and information system -VAS 5051- ⇒ Chapter 45-4.

– Perform test drive with at least one ABS adjustment.

Changing the brake fluid

⇒ Inspection and Maintenance

48 – Steering

48-1 Steering column

Summary of components

Note

- *Do not carry out repair work on the steering column.*
- *Replace the self-locking nuts and screws.*
- *Welding and straightening of the steering components is not allowed.*
- *Steering columns are supplied as a spare part with ignition lock housing but without lock cylinder and ignition starter switch. The lock cylinder and ignition starter switch must be removed from the removed steering column or be obtained as a spare part.*
- *After an accident and if the steering column is damaged replace steering components ⇒ item 1 in 48-1 page 1 i.e. 2, 6 and 7.*

1 - Steering column
- ❑ adjustable
- ❑ Assignment ⇒ Spare part catalogue
- ❑ inspecting for damage ⇒ Chap. 48-2
- ❑ removing and installing ⇒ Chap. 48-3

2 - Steering column
- ❑ rigid
- ❑ Assignment ⇒ Spare part catalogue
- ❑ inspecting for damage ⇒ Chap. 48-2
- ❑ removing and installing ⇒ Chap. 48-3

3 - Hexagon screw, 23 Nm

4 - Hexagon bolt, 20 Nm + torque a further 90° ($^1/_4$ turn)
- ❑ replace after each removal

5 - Steering gear

6 - Bushing
- ❑ replace if damaged
- ❑ removing and installing ⇒ Chap. 48-3

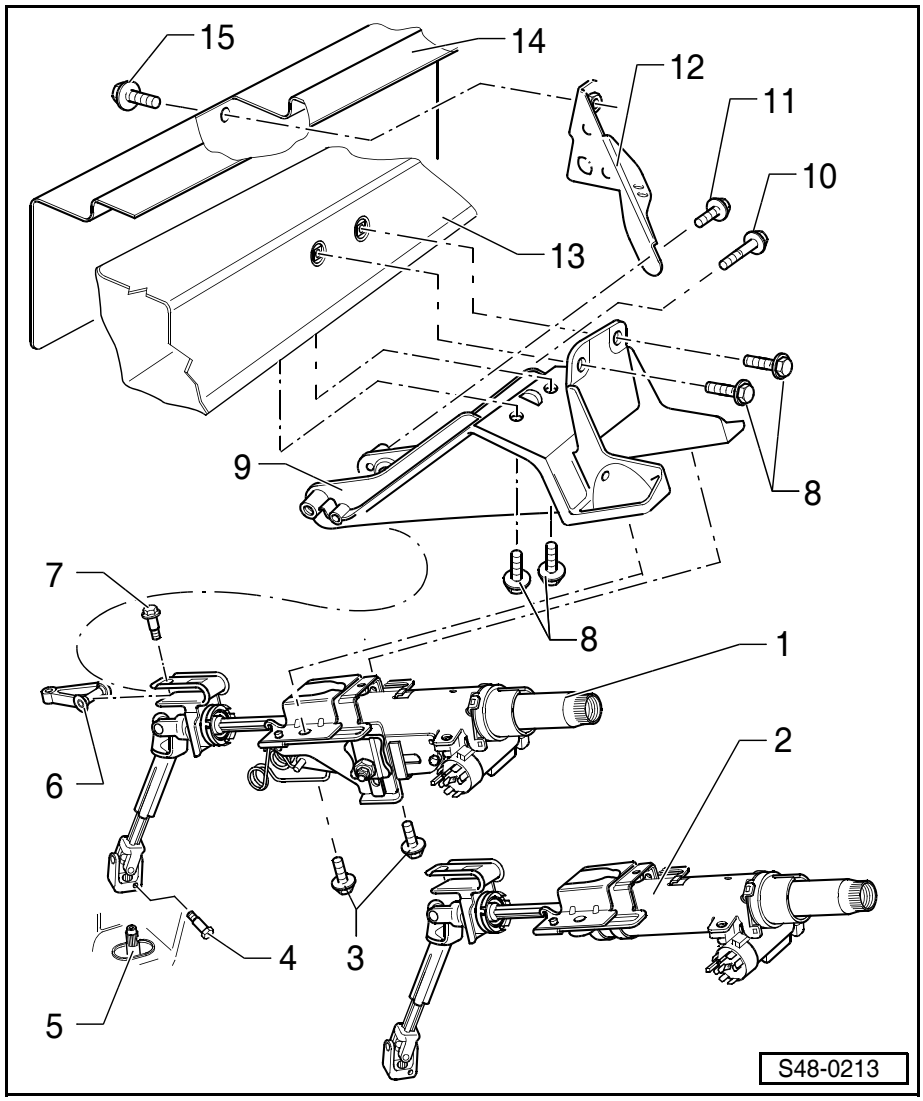
7 - Hexagon screw, 7 Nm

8 - Hexagon screw, 23 Nm
- ❑ Observe the mounting sequence ⇒ Chap. 48-5

9 - Bracket
- ❑ removing and installing ⇒ Chap. 48-5

10 - Hexagon screw, 19 Nm

11 - Hexagon screw, 23 Nm
- ❑ replace after each removal



12 - Frequency link

❑ removing and installing ⇒ Chap. 48-5

13 - Module carrier

14 - Front wall

15 - Combination screw, 25 Nm

48-2 Inspecting steering column

Special tools, test and measuring equipment and auxiliary items required

♦ Caliper gauge (commercially available)

Optical inspection

– Inspecting parts of the steering column for damage.

– If any damage is visible, replace steering column completely.

Functional test

Inspection requirement:

• Universal joint of steering column pulled off steering gear.

– Check whether the steering column turns freely without jerking.

Vehicles with an adjustable steering column

– Check whether the length and height of the steering column can be adjusted.

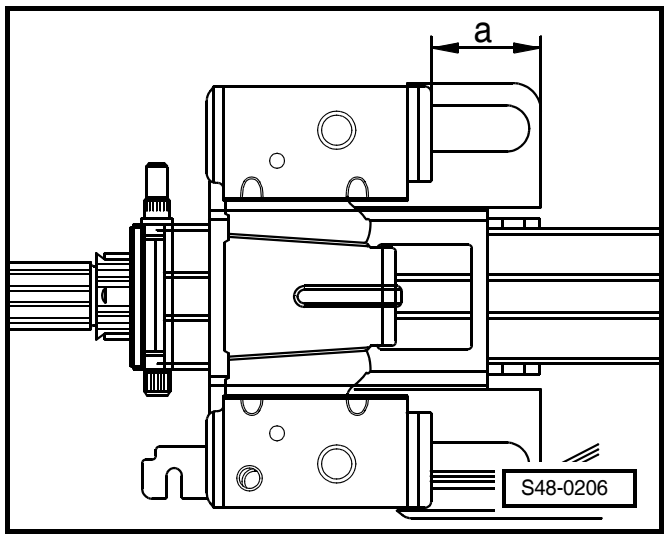
Continued for all vehicles

In the event of an accident so-called deformation elements may shift on the steering column.

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

If there is any damage remove the steering column until dimension -a- can be checked.

– Inspect dimension -a- with a sliding caliper.



Dimension -a-: minimum 37 mm

If a fault is found during one of these inspections or if dimension -a- is not reached, the steering column must be replaced.

– If this is the case replace the steering column completely.

48-3 Removing and installing steering column

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552-
- Diagnostic cable -V.A.G 1551/3-, - V.A.G 1551/3A-, -V.A.G 1551/3B- or - V.A.G 1551/3C-
- Adhesive tape (commercially available)

Note

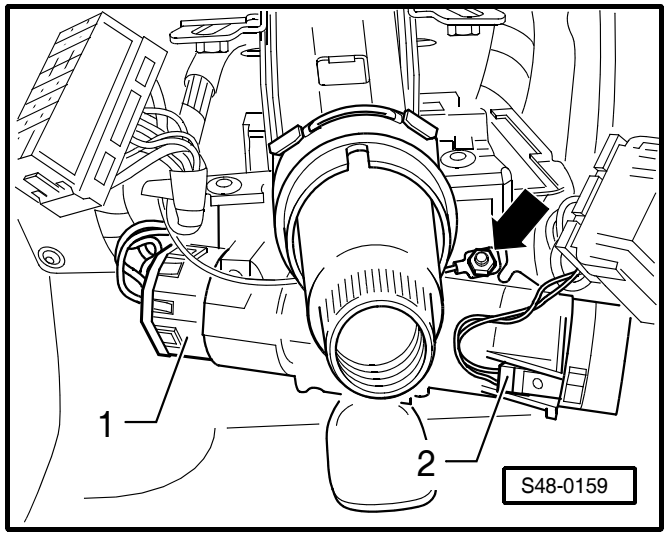
- *New steering columns supplied as spare parts are secured for transport. This transport security must be removed once the steering column has been installed.*
- *Steering columns are supplied as a spare part with ignition lock housing but without lock cylinder and ignition starter switch. The lock cylinder and ignition starter switch must be removed from the removed steering column or be obtained and installed as a spare part.*
- *Do not carry out repair work on the steering column.*
- *Always replace the self-locking nuts and screws.*
- *Welding and straightening on axle body and axle studs not allowed.*
- *Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.*
- *Connect battery ⇒ Electrical System; Rep. Gr. 27.*

Removing the steering column

– Remove the storage area on the driver's side ⇒ Body Work; Rep. Gr. 70.

– Removing steering-column control ⇒ Electrical System; Rep. Gr. 94.

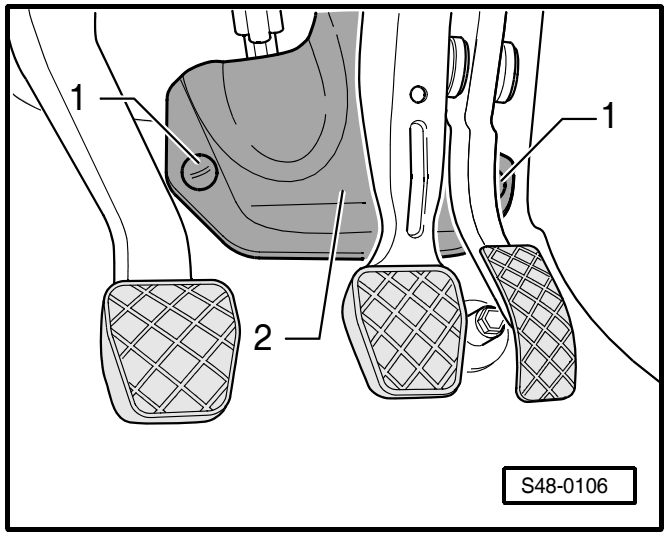
– Unplug connector for the ignition starter switch -1- and the connector for the immobilizer -2- reading coil. ►



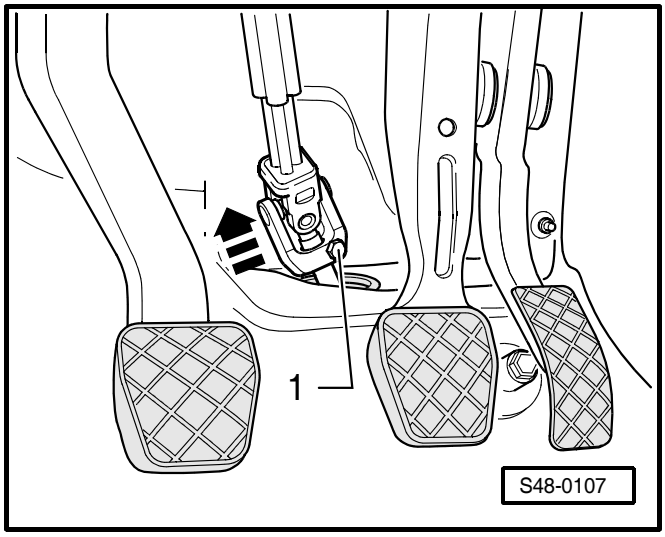
– Unbolt earth strap -arrow-.

– Unscrew plastic nuts -1-. ►

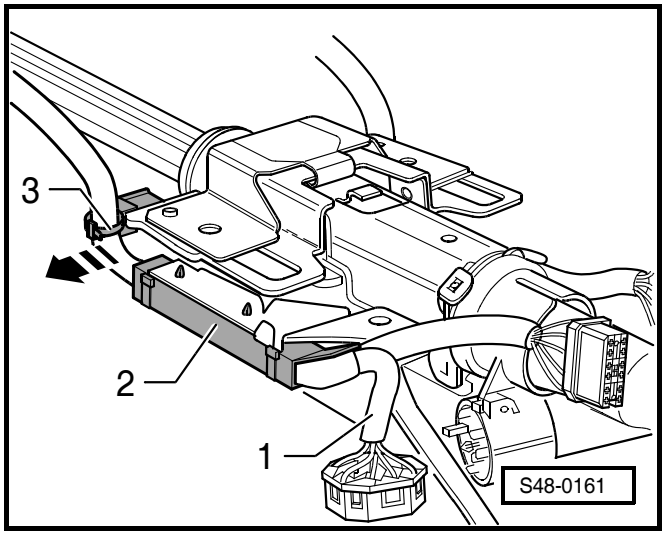
– Remove cover -2-.



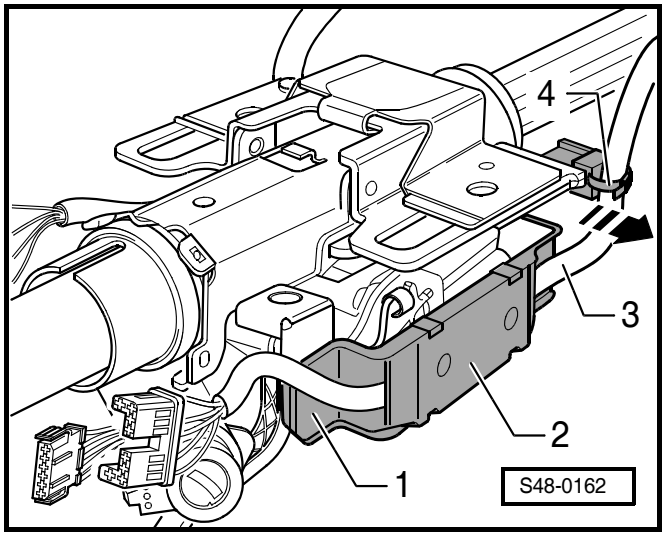
– Unscrew bolt -1-.
– Remove universal joint in the direction of the arrow from the input shaft of the steering gear.



– Unclip cable guide -2- on the steering column and remove wiring loom -1-.
– Remove cable strap -3- from the steering column in the direction of the arrow.



– Open the cover -2- of the cable guide -1- and remove wiring loom -3-.
– Remove cable strap -4- from the steering column in the direction of the arrow.



Note

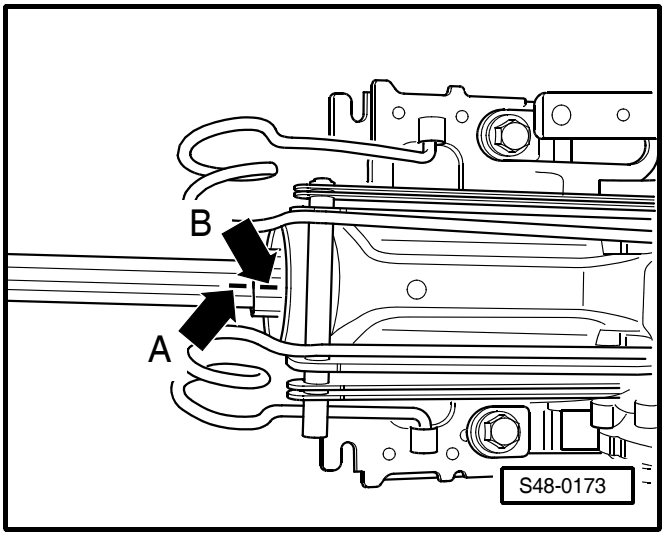
- *For reasons of clarity the work steps in the following figures are shown on a removed steering column, i.e. without background.*
- *Before removing the steering column mark the position of the top and bottom part relatively to each other and secure the steering column against separation.*
- *On vehicles fitted with a rigid steering column there is no colour coding and safe positioning of the top and bottom part of the steering column.*

If the top and bottom part of the steering column are separated the pairing of the clover-leaf profile is no longer guaranteed. Moreover, this could result in the greased area becoming soiled.

– Mark the top and bottom part of the steering column relatively to each other on the bottom side with a colour marker.

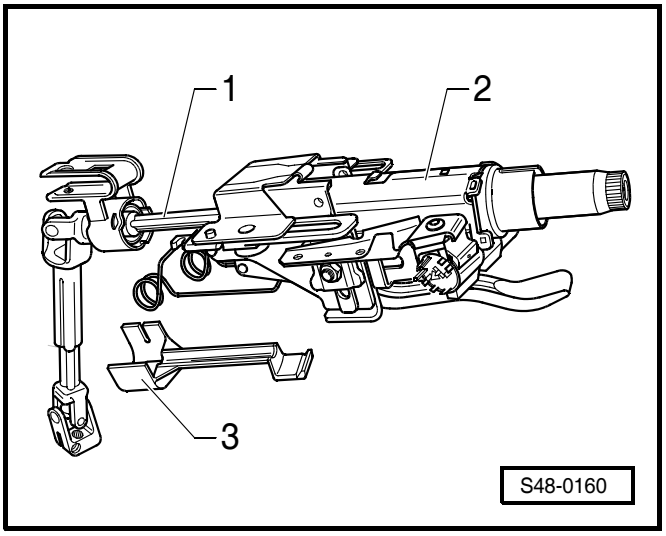
  Arrow A - Marking on bottom part of the steering column

  Arrow B - Marking on top part of the steering column



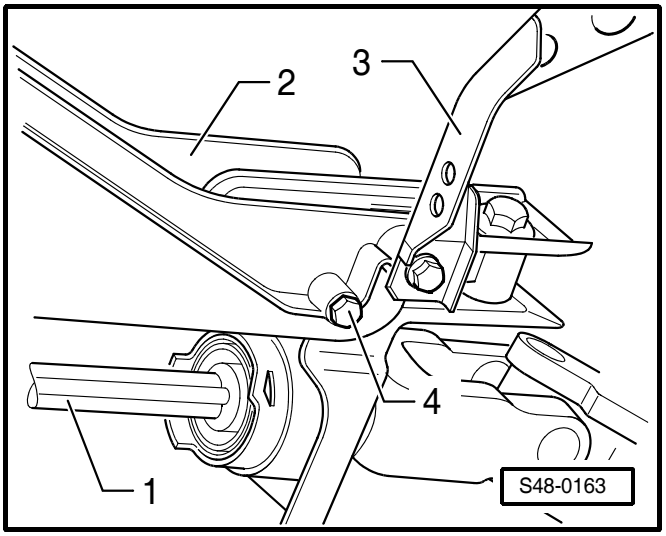
– Secure the bottom part -1- and top part -2- of the steering column against separation.

  To do so use the transport security -3- of a replacement steering column or attach the top and bottom part of the steering column with wire.



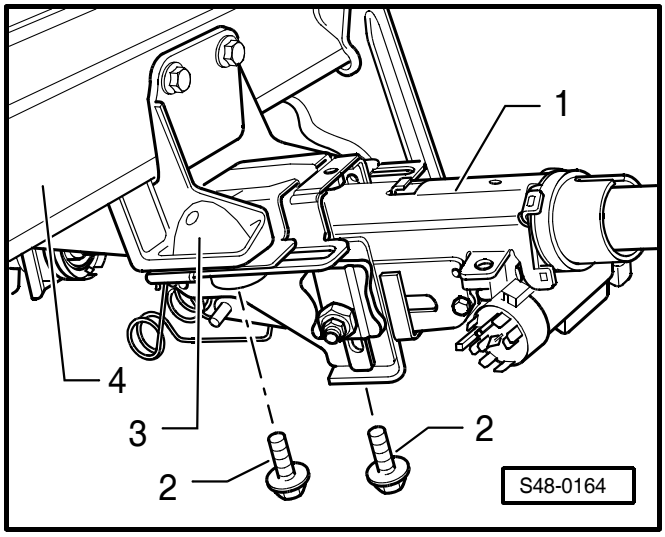
– Unscrew bolt -4-.

1 - Steering column
2 - Bracket
3 - Frequency link



– Unscrew bolts -2-.
– Remove steering column -1-.

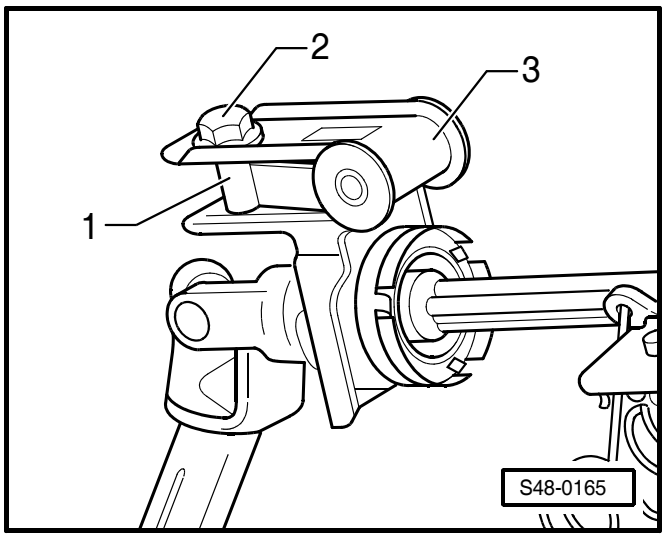
3 - Bracket
4 - Module carrier



Note

- *If the old steering column -3- is installed again do not remove the bushing -1-.*
- *Only remove the bushing -1- in the event of damage or if a spare part steering column is used.*

– Unscrew bolt -2-.
– Remove the bushing -1- from the steering column fork -3-.



Note

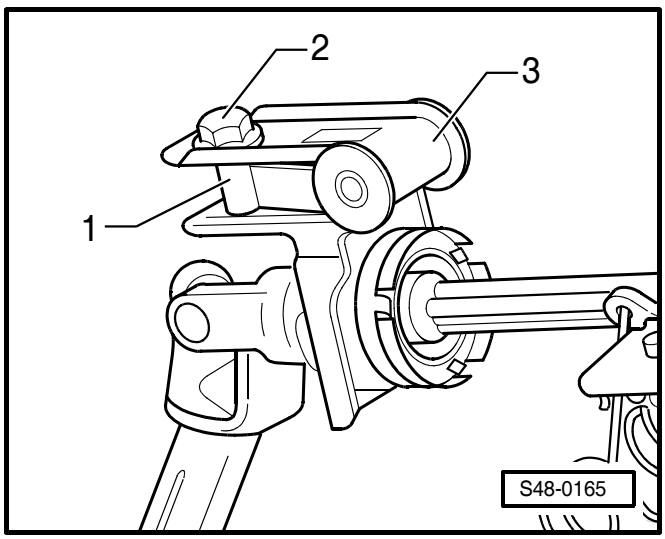
- *Steering columns are supplied as a spare part with ignition lock housing but without lock cylinder and ignition starter switch.*
- *If the lock cylinder and ignition starter switch of the removed steering column are O.K., they must be fitted in the new steering column.*
- *Removing lock cylinder and ignition starter switch ⇒ Electrical System; Rep. Gr. 94.*

Installing the steering column

Note

- *The installation of the steering column is described for an adjustable steering column. When installing a rigid steering column one does not need to remove the securing mechanism of the top and bottom part of the steering column.*
- *When installing the old steering column again do not replace the bushing.*
- *Only replace the bushing if damaged.*
- *If a spare part steering column is fitted, a new bushing and a new screw must first be fitted in the steering column fork before installing the steering column.*

– Insert the new bushing -1- in the steering column fork -3-.
– Insert and tighten new new screw -2-.

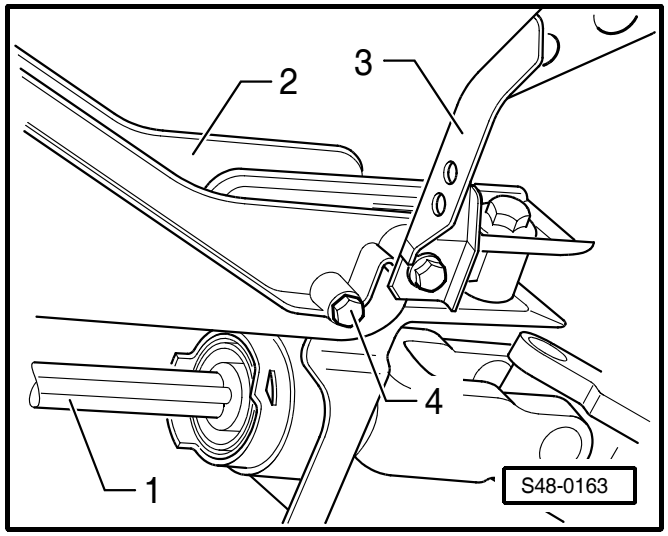


– Installing the lock cylinder and ignition starter switch in the ignition lock housing ⇒ Electrical System; Rep. Gr. 94.

– Insert the steering column with bushing -1- in the bracket -2-.

– Screw in screw -4- from the right and initially tighten to 5 Nm (do not fully tighten the screw yet).

3 - Frequency link



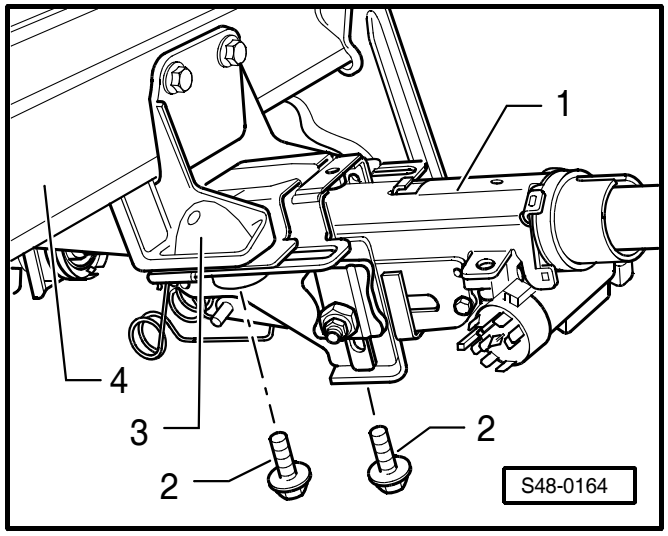
– Swivel the steering column -1- on the bracket -3- and align and match the fixing holes of the steering column and bracket.

Note

Carefully screw the screws in the bracket without tilting.

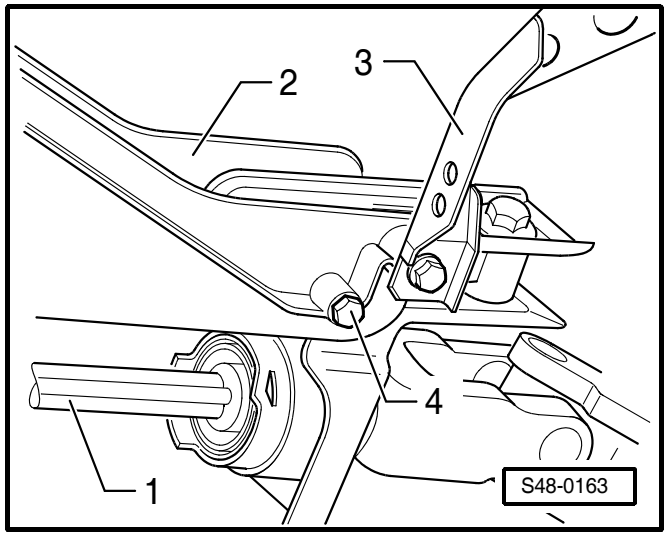
– Insert and tighten screws -2-.

4 - Module carrier



– Tighten the screw -4- to the specified tightening torque.

1 - Steering column
2 - Bracket
3 - Frequency link



– Remove transport security -3- or wire security.

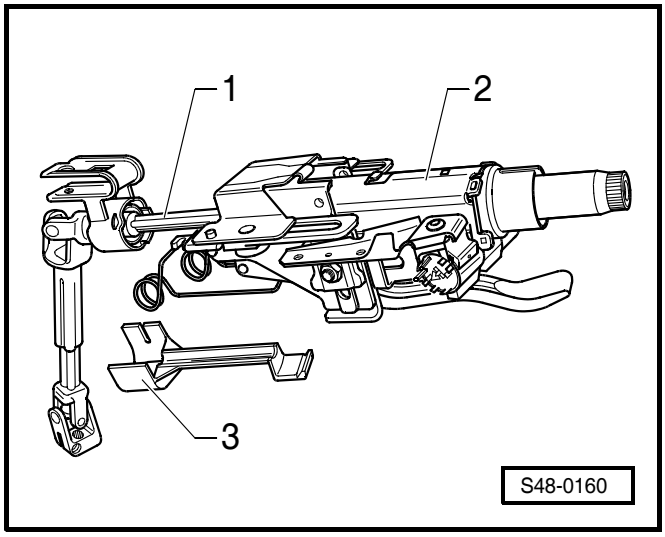
1 - Bottom part of the steering column
2 - Top part of the steering column

Further installation occurs in reverse order.

– Performing automatic test sequence ⇒ Chapter 45-4.

If faults are stored in the fault memory:

– Eliminating fault ⇒ Chapter 48-25.
– Erasing fault memory ⇒ Chapter 48-25.



Tightening torques:

Bushing on the steering column fork	7 Nm
Bushing on bracket	20 Nm
Steering column on bracket	23 Nm
Universal joint on input shaft ♦ Use new screw!	20 Nm + 90°

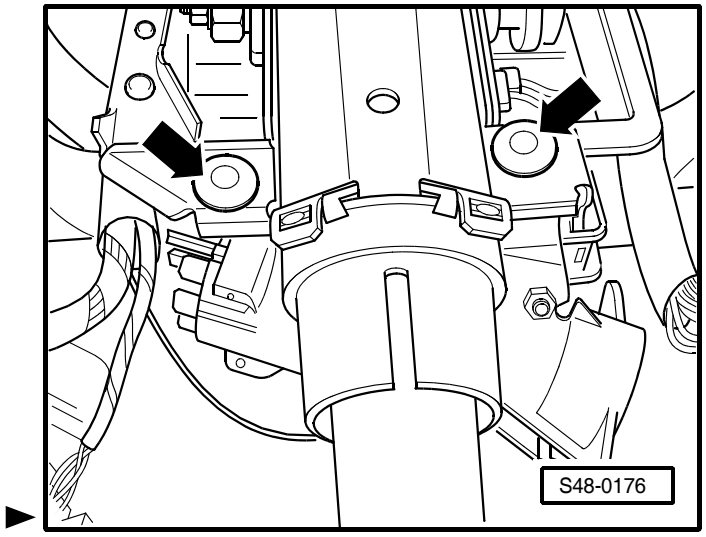
48-4 Removing and installing ignition lock housing

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552-
- Diagnostic cable -V.A.G 1551/3-

Note

- *Before disconnecting the battery determine the code of radio sets fitted with anti-theft coding.*
- *When the battery is reconnected perform the following operations depending on the vehicle equipment: Encode the radio, re-set the clock, initialise the power windows ⇒ Inspection and Maintenance.*



Removing ignition lock housing

– Removing trim panel ⇒ Body Work; Rep. Gr. 70.

– Removing steering-column control ⇒ Electrical System; Rep. Gr. 94.

– Removing lock cylinder and ignition starter switch ⇒ Electrical System; Rep. Gr. 94.

– Remove pull-off screws -arrows-.

– Remove the ignition lock housing.

Installing ignition lock housing

– Insert the ignition lock housing and tighten new pull-off screws.

– Tighten pull-off screws until the head shears off.

– Installing lock cylinder and ignition starter switch ⇒ Electrical System; Rep. Gr. 94.

Further installation occurs in reverse order.

– Performing automatic test sequence ⇒ Chap. 45-4.

If entries from the fault memory are shown:

– Eliminating fault ⇒ Chap. 48-25.

– Erasing fault memory ⇒ Chap. 48-25.

48-5 Frequency link, bracket

Removing and installing frequency link

Special tools, test and measuring equipment and auxiliary items required

- Torque wrench (4...20 Nm), e.g. -V.A.G 1410-
- Torque wrench (5...50 Nm), e.g. -V.A.G 1331-

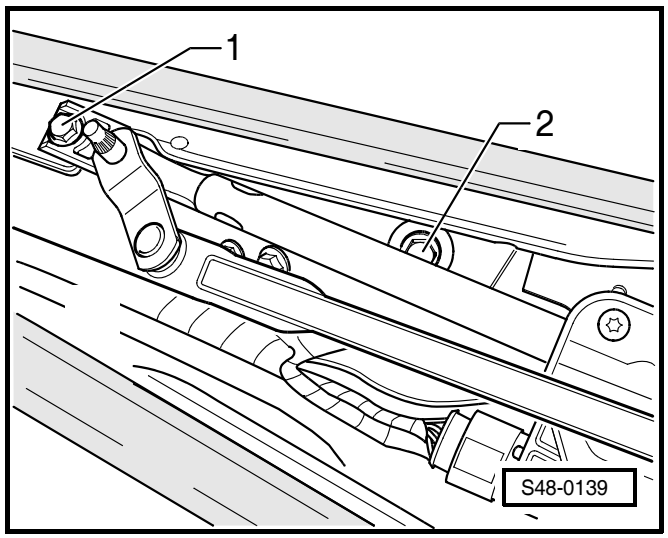
Removing

– Removing scuttle ⇒ Body Work; Rep. Gr. 66.

Note

The wiper arms must be in end position.

– Release hexagon screw -1-.

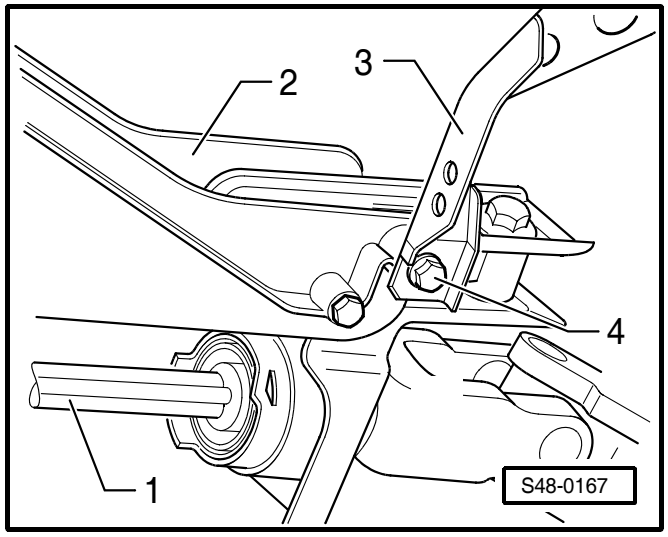


– Press wiper system towards the bulkhead.

– Unscrew combination screws -2-.

– Remove the cover with storage area ⇒ Body Work; Rep. Gr. 70.

– Unscrew hexagon screw -4-.



1 - Steering column
2 - Bracket
3 - Frequency link

– Remove frequency link.

Installing

The installation occurs in reverse order.

Tightening torques:

Frequency link on bulkhead	25 Nm
Frequency link on bracket	23 Nm
Wiper linkage on body	5 Nm

Removing and installing bracket

Special tools, test and measuring equipment and auxiliary items required

- Torque wrench (5...50 Nm), e.g. -V.A.G 1331-

Removing

– Removing the dash panel ⇒ Body Work; Rep. Gr. 70.

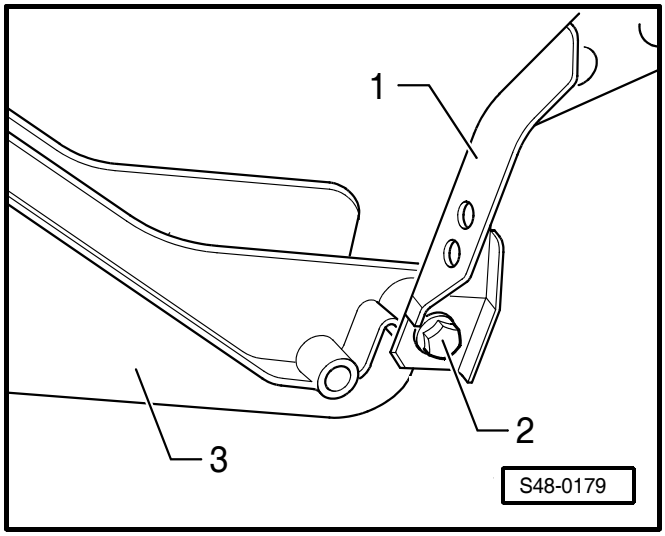
– Removing steering column ⇒ Chap. 48-3.

Note

For reasons of clarity the surrounding components are not shown in the following figures.

– Remove frequency link -1- from the bracket -3-.

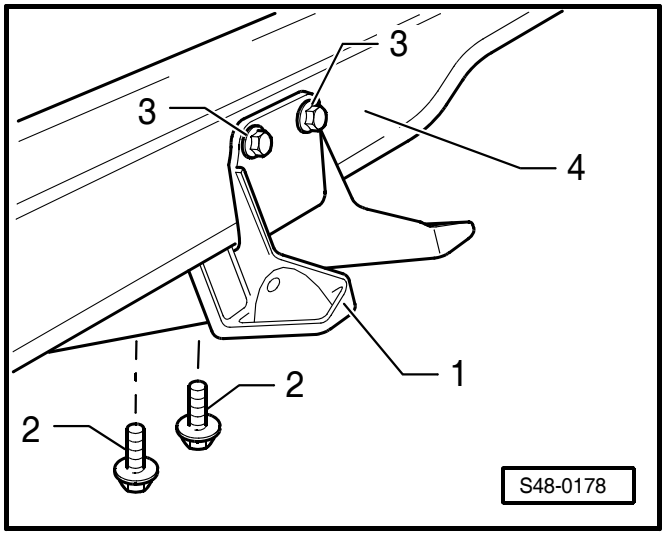
– Unscrew hexagon screw -2-.



– Unscrew hexagon screw -3-.

– Unscrew hexagon screw -2- and remove bracket -1-.

4 - Module carrier



Installing

Note

- *Hexagon screws -2- and -3- are identical and are tightened to the same torque.*
- *When installing the bracket -1- observe the mounting sequence of the hexagon screws -2- and -3-.*

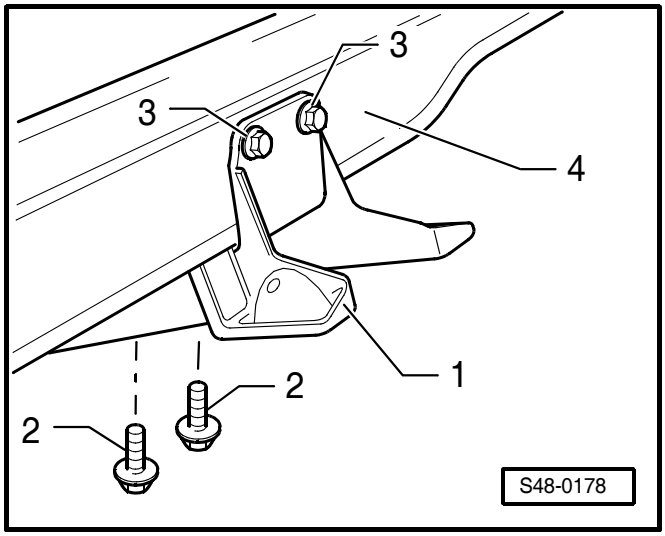
– Position the bracket -1- on the module carrier -4-.

– Screw in hexagon screws -2- and initially tighten to 5 Nm (do not fully tighten the screws yet).

– Insert and tighten hexagon screws -3-.

– Tighten the hexagon screws -2- to the specified tightening torque.

Further installation occurs in reverse order.



Tightening torques:

Bracket on module carrier	23 Nm
Frequency link on bracket	23 Nm

48-6 Steering without servo unit (mechanical steering)

Summary of components

Note

- *If the front axle is damaged as a result of an accident certain steering components must be replaced ⇒ Chapter 48-9.*
- *Repairs to the steering gear are not provided for, if there is a complaint about the steering gear it must be replaced.*
- *Replace the self-locking nuts and screws.*
- *Welding and straightening of the steering components is not allowed.*
- *Only use steering gear grease to grease the gear rack ⇒ Chapter 00-2.*

1 - Universal joint
- ❑ of steering column

2 - Tighten hexagon screw 20 Nm + 90°
- ❑ replace after each removal

3 - Tighten self-locking hexagon nut 20 Nm + 90°
- ❑ replace after each removal

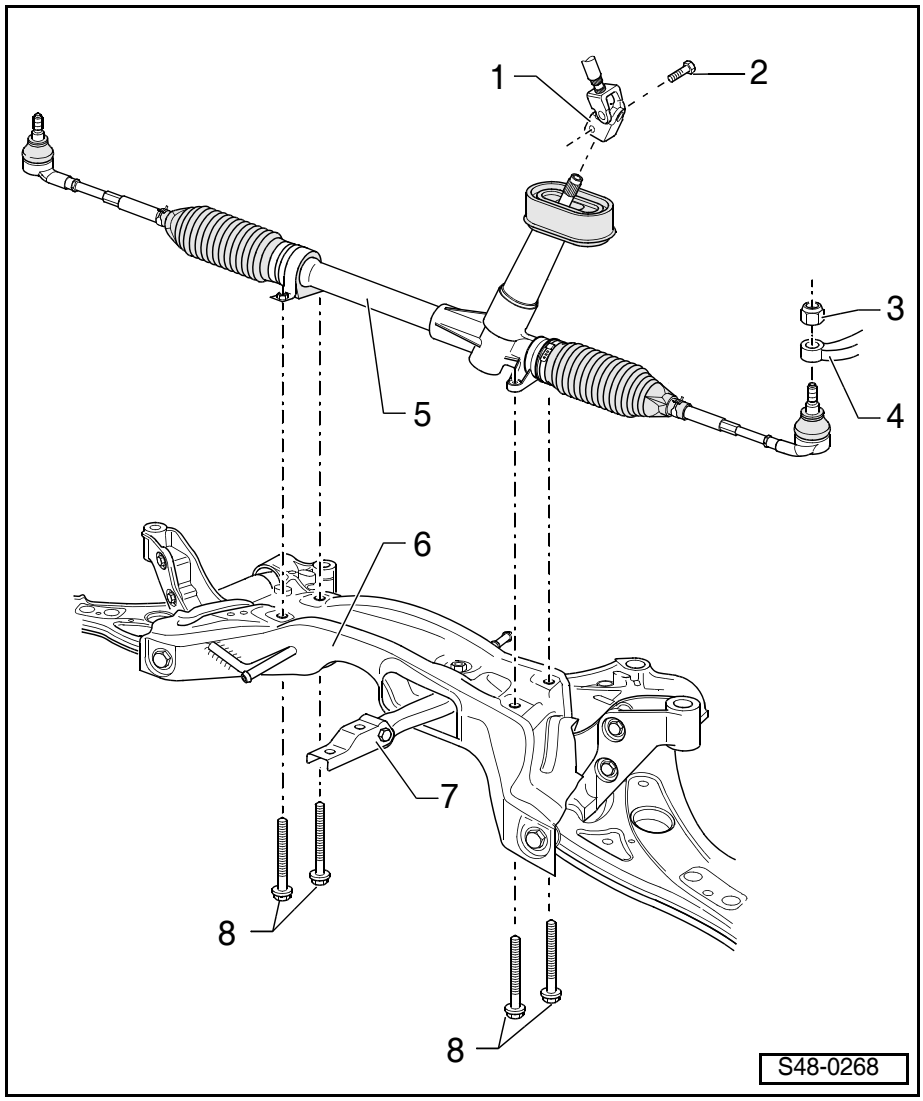
4 - Steering-knuckle arm of the wheel-bearing housing

5 - Steering gear

6 - Assembly carrier
- ❑ with impression as shown in the figure, only if the front exhaust pipe is fitted below the engine-gearbox assembly carrier
- ❑ without impression, not shown in the figure, only if the front exhaust pipe is fitted above the engine-gearbox assembly carrier

7 - Hinged bracket
- ❑ The shape of the hinged bracket depends on the gearbox

8 - Tighten hexagon screw 50 Nm + 90°
- ❑ replace after each removal



48-7 Removing and installing mechanical steering gear

Special tools, test and measuring equipment and auxiliary items required

- Torque wrench (5...50 Nm), e.g. -V.A.G 1331-
- Torque wrench (40...200 Nm), e.g. -V.A.G 1332-
- Gearbox jack with adapter, e.g. -V.A.G 1383 A- with -V.A.G 1359/2-
- Fixing device -T10096-
- Extractor -Matra V176-
- Wooden insert 490 x 270 x 50 mm for adapter -V.A.G 1359/2-

Note

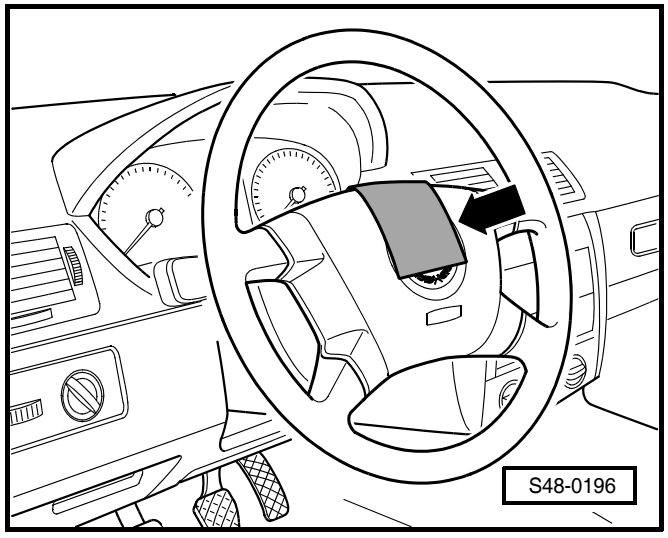
Apart from replacing the bellows, track rod ends and track rods no other repairs may be carried out on the steering gear.

Removing steering gear

Caution!

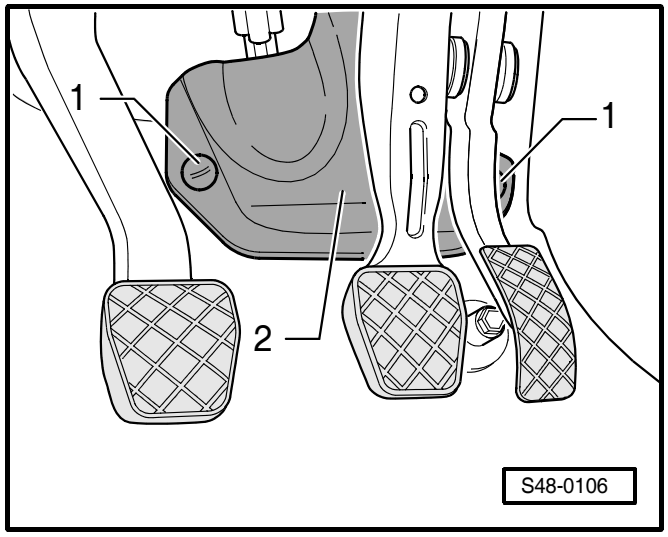
Bring the steering wheel in centre position (wheels straight ahead) and make sure they do not turn during repairs as this could damage the coil spring of the airbag unit.

– Secure the steering wheel with the wheels in straight ahead position with adhesive tape -arrow- against unintended turning.

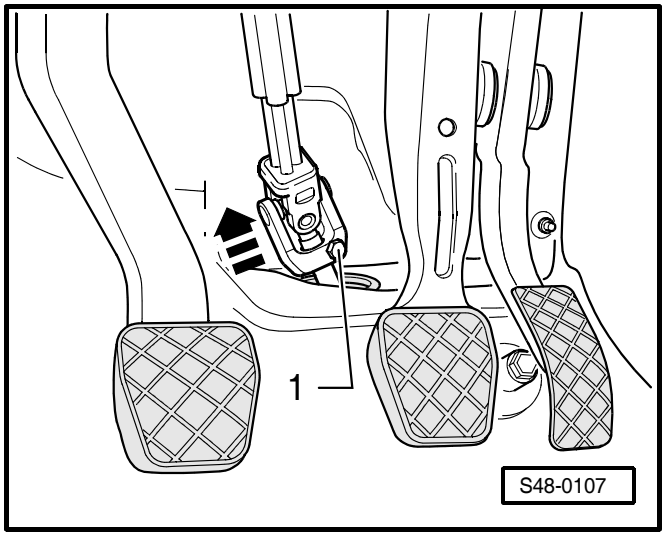


– Unscrew plastic nuts -1-.

– Remove cover -2-.



– Remove hexagon screw -1-.
– Remove universal joint in the direction of the arrow from the input shaft of the steering gear.
– Raise vehicle.

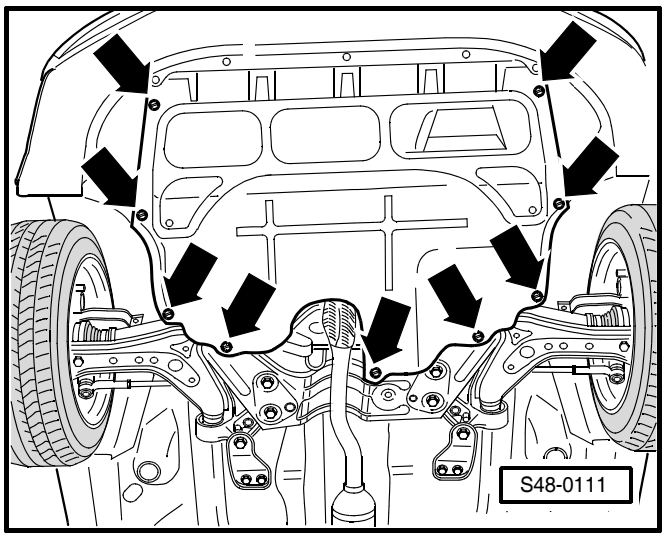


– Remove noise insulation panel -arrows-.

Note

The figure shows the noise insulation panel on models with 1.4 ltr./74 kW engines. Other engine variants may have noise insulation panel versions that differ slightly from the figure.

– Remove front wheels.

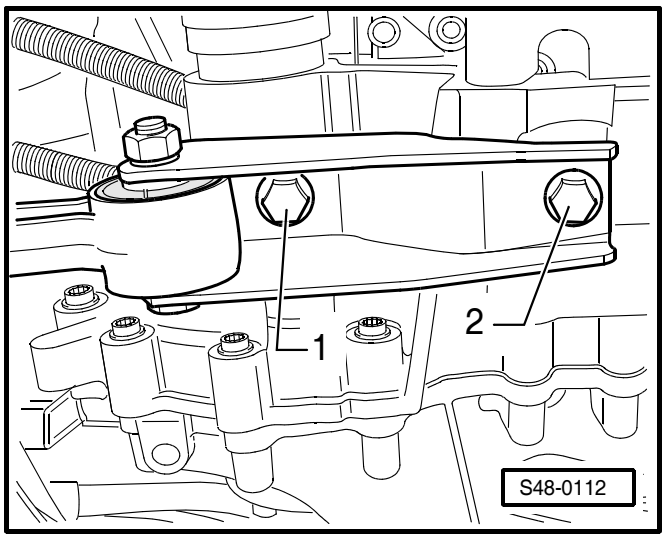


Vehicles with exhaust pipe under the assembly carrier

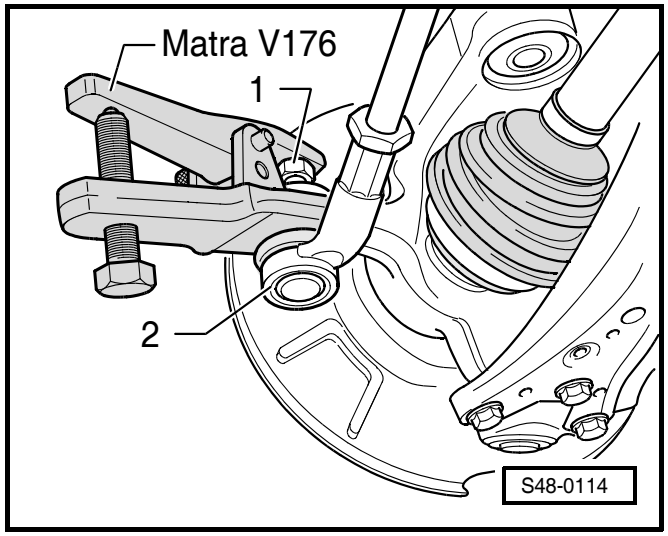
– Removing front exhaust pipe with catalyst ⇒ Engine - Mechanics; Rep. Gr. 26.

Continued for all vehicles

– Unscrew hexagon screw -1- and -2- from the pendulum support.



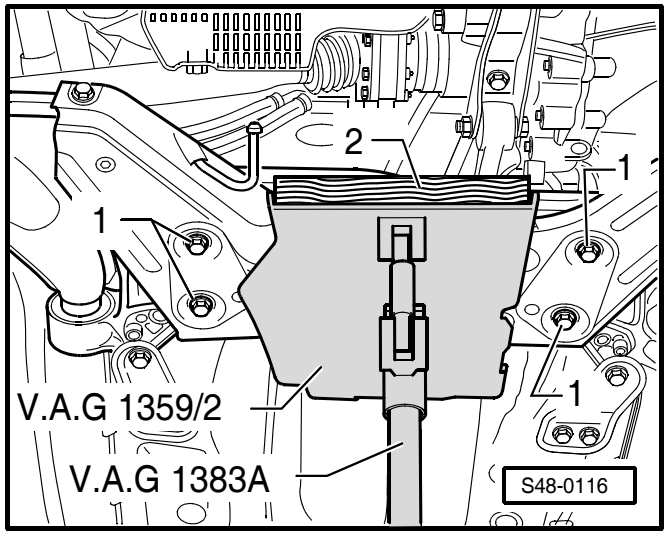
– Screw up hexagon nut of the track rod end -1- sufficiently so that the extractor -Matra V176- is supported on the hexagon nut.
– Use extractor -Matra V176- to press track rod/track rod end -2- on both sides off the steering arm.
– Unscrew hexagon nut on both sides from the track rod end.
– Pull track rod end on both sides out of steering arm.



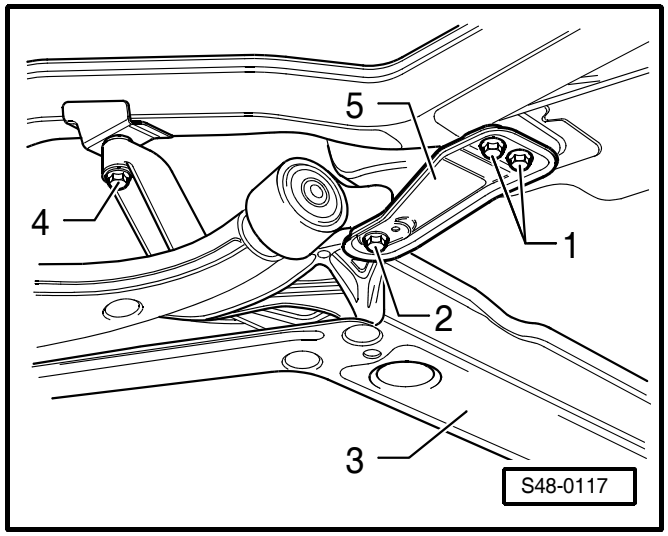
– Insert wooden insert (490 x 270 x 50 mm) -2- in the adapter.
– Position gearbox jack with adapter and support assembly carrier.
– Release hexagon screws -1- for steering gear.

Note

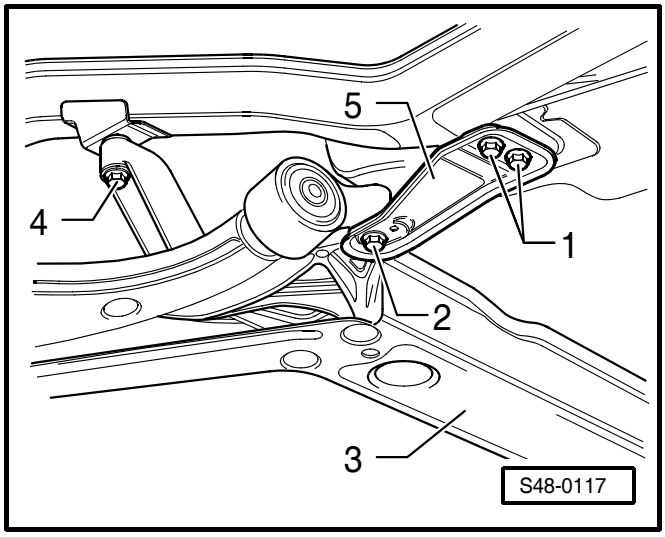
- *Observe the recommended sequence for the following steps.*
- *The fixing bolts for -T10096- must only be tightened to maximum 20 Nm as otherwise the fixing bolt thread becomes damaged.*



– Unscrew left screw -4- for assembly carrier -3- and screw in a fixing bolt of -T10096- to 20 Nm.
– Unscrew right screw -4- for assembly carrier (not shown in figure) and screw in a fixing bolt of -T10096- to 20 Nm.
– Release hexagon screws -1- on both sides.
– Unscrew the left screw -2- and remove support -5-.
– Screw in fixing bolts of -T10096- to 20 Nm.
– Unscrew the right screw -2- and remove support -5-.
– Screw in fixing bolts of -T10096- to 20 Nm.



The fixing of the assembly carrier is completed once all 4 screws (Pos. -2- and -4-) are consecutively replaced with the fixing bolts.



Note

When pulling off the steering gear make sure the serration of the input shaft of the steering gear is not tilted or stuck relatively to the drive shaft of the steering column.

– Slowly lower assembly carrier with gearbox jack and adapter, e.g. -V.A.G 1383 A- with -V.A.G 1359/2-.

– Remove steering gear towards the rear.

Installing steering gear

Caution!

After installing the steering gear check the position of the steering wheel after performing a test drive. If the steering wheel is not straight peform a chassis alignment.

Note

- *Coat the seal on the steering gear with lubricant before installing the steering gear, e.g. lubricating soap.*
- *Make sure all sealing surfaces are clean.*
- *After positioning the steering gear on the drive shaft of the steering column make sure the seal on the steering gear is not bent on the assembly plate and correctly seals the footwell opening. Otherwise this could cause water penetration and/or noise.*
- *Before fitting the steering gear check the centre position of the gear rack ⇒ Chap. 48-8.*
- *Before positioning the universal joint of the steering column on the input shaft of the steering gear, first make sure the vehicle is on the ground and all wheels are pointing straight ahead.*

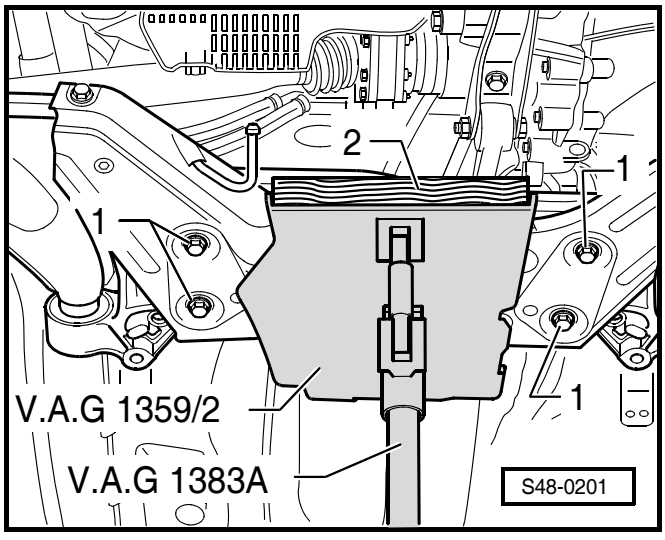
– Check the centre position of the gear rack of the steering gear, if necessary adjust ⇒ Chap. 48-8.

– Place the steering gear from the rear onto the lowered assembly carrier and tighten new hexagon screws -1- by hand.

– Check correct fit of the seal on the steering gear valve housing.

– Slowly raise the assembly carrier with gearbox jack and adapter, and while doing so insert the input shaft of the steering gear in the opening in the vehicle floor.

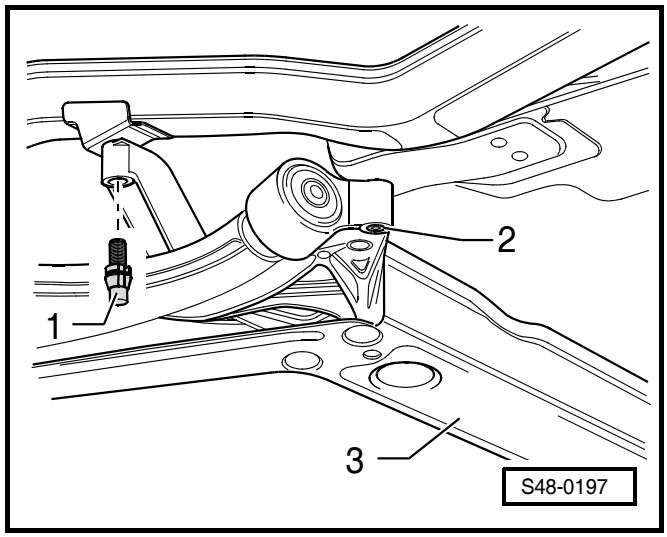
2 - Wooden insert (490 x 270 x 50 mm)



Note

- *Observe the recommended sequence for the following steps.*
- *Unscrew the fixing bolts of -T10096- one at a time. Subsequently, replace it with a new bolt tightened to the recommended torque and further rotation.*

– Unscrew fixing bolt -1- of -T10096- from the left and screw in new bolt to the recommended tightening torque. ►

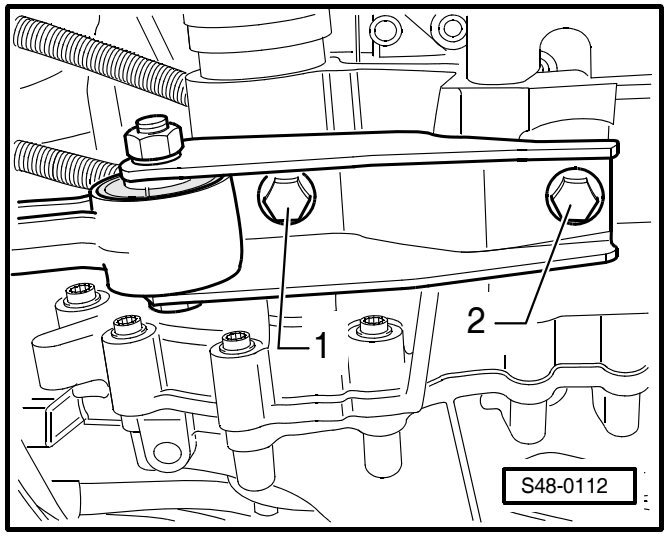


3 - Engine-gearbox assembly carrier

– Unscrew fixing bolt -1- of -T10096- from the right (shown in figure) and screw in new bolt to the recommended tightening torque.
– Unscrew fixing bolt -2- of -T10096- from the left.
– Install left support.
– Tighten new bolts for the rear left support by hand.
– Tighten new bolts for left console and support to the recommended tightening torque.
– Tighten the rear left support bolts to the recommended tightening torque.
– Unscrew right fixing bolts -2- of -T10096- (shown in figure).
– Install right support.
– Tighten new bolts for the rear right support by hand.
– Tighten new bolts for right console and support to the recommended tightening torque.
– Tighten the rear right support bolts to the recommended tightening torque.
– Remove gearbox jack with adapter.
– Tighten hexagon screws for fixing the steering gear to the assembly carrier to the recommended tightening torque.
– Insert track rod end/track rod into steering arm and tighten new hexagon nut ⇒ Chap. 48-16.

  If the joint stub rotates when tightening, counterhold with hexagon socket wrench (SW6).

– Mount pendulum support on the gearbox and tighten new hexagon screws -1- and -2-. ►



Vehicles with exhaust pipe under the assembly carrier

– Installing front exhaust pipe with catalyst ⇒ Engine - Mechanics; Rep. Gr. 26.

Continued for all vehicles

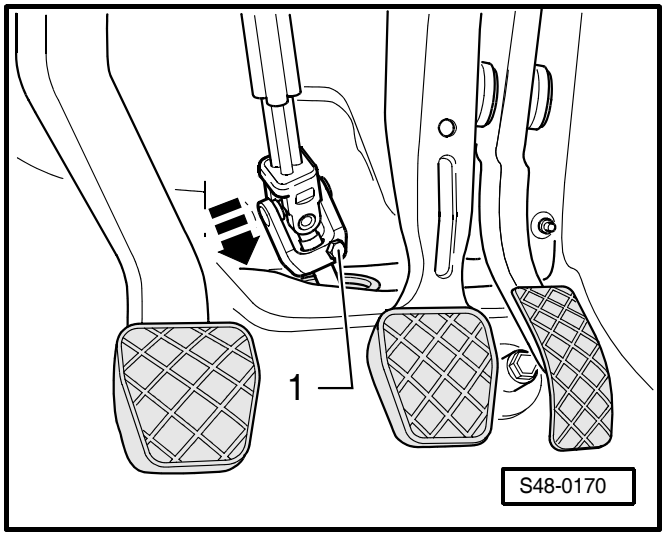
– Fit front wheels.
– Install noise insulation panel.

– Lower vehicle.

– Slide the universal joint of the steering column in the direction of the arrow onto the input shaft of the steering and tighten with a new hexagon screw -1-. ►

– Fit cover for universal joint.

– Perform a test drive.



Caution!

If after the test drive and with the front wheels pointing straight ahead the steering wheel is off straight, perform a chassis alignment.

– Carrying out chassis alignment ⇒ Chap. 44-2.

Tightening torques:

Steering gear to assembly carrier ♦ Use new screws!	50 Nm + 90°
Assembly carrier to body ♦ Use new screws!	70 Nm + 90°
Support to body ♦ Use new screws!	20 Nm + 90°
Pendulum support to gearbox ♦ Use new screws!	30 Nm + 90°
Track rod end/track rod to steering arm ♦ Use new nuts!	20 Nm + 90°
Universal joint to steering gear ♦ Use new screw!	20 Nm + 90°
Wheel bolts	120 Nm

48-8 Inspecting and adjusting mechanical steering gear

Check the centre position of the gear rack of the steering gear, if necessary adjust

Special tools, test and measuring equipment and auxiliary items required

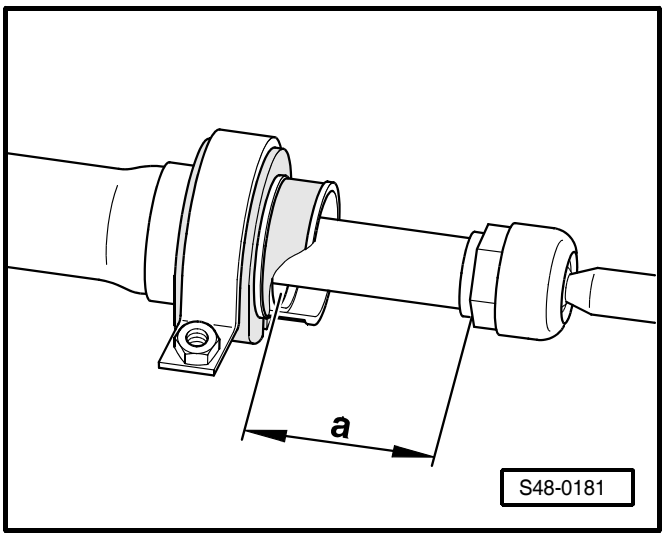
- Caliper gauge (commercially available)

Note

- *Before installing the steering gear place the gear rack in centre position.*
- *The gear rack of spare part steering gears is already in centre position.*
- *Dimension -a- must be equal on both the right and left side if the steering gear. If the dimension on the two sides is not the same, distance -a- must be corrected.*

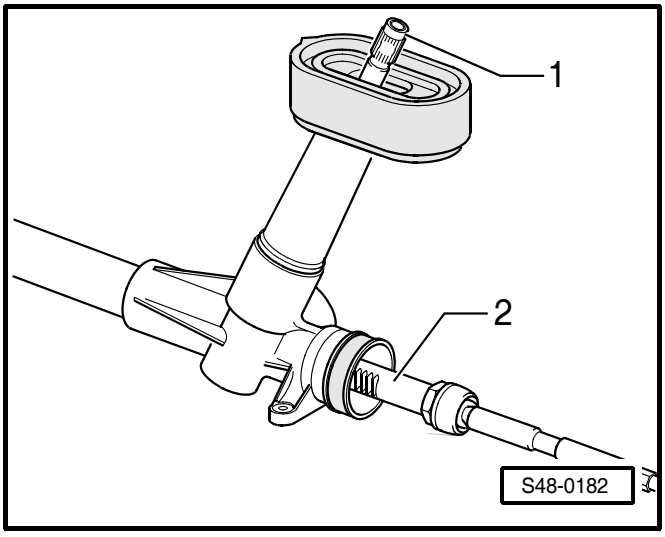
– Check dimension -a-, if necessary adjust. ►

-a- = 68.5 mm



– Adjusting dimension -a- by turning the input shaft -1- of the steering gear. ►

2 - Gear rack



Adjusting the steering gear (adjusting the pressure plate clearance)

Note

2 mechanics are required for this adjustment.

Inspection requirement:

- Put the wheels in straight ahead position.

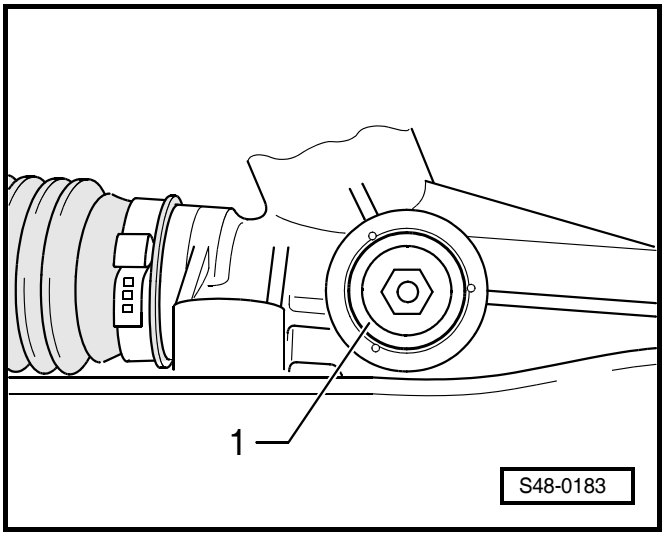
– Raise vehicle.

– Move the steering wheel alternately approx. 30°. on the centre axle.

If the steering clearance is too great rattling noises will be audible inside the vehicle.

– While moving the steering wheel have the 2nd mechanic carefully screw in the ajusting screw -1- until no more rattling noises can be heard inside the vehicle. ►

– Perform a test drive.

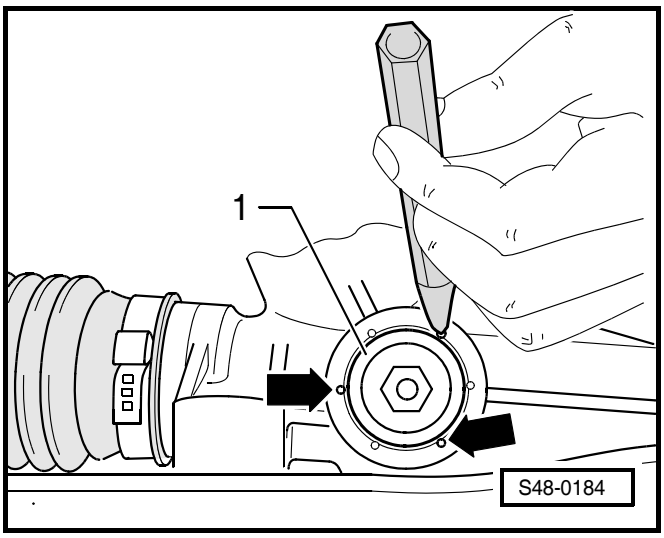


Caution!

The steering must automatically return to straight ahead position after a manoeuvre or cornering without sticking, correct if necessary.

– Secure adjusting screw -1- against turning.

  To this end apply 3 centre punch marks -arrows- uniformly distributed on the collar of the steering gear housing.



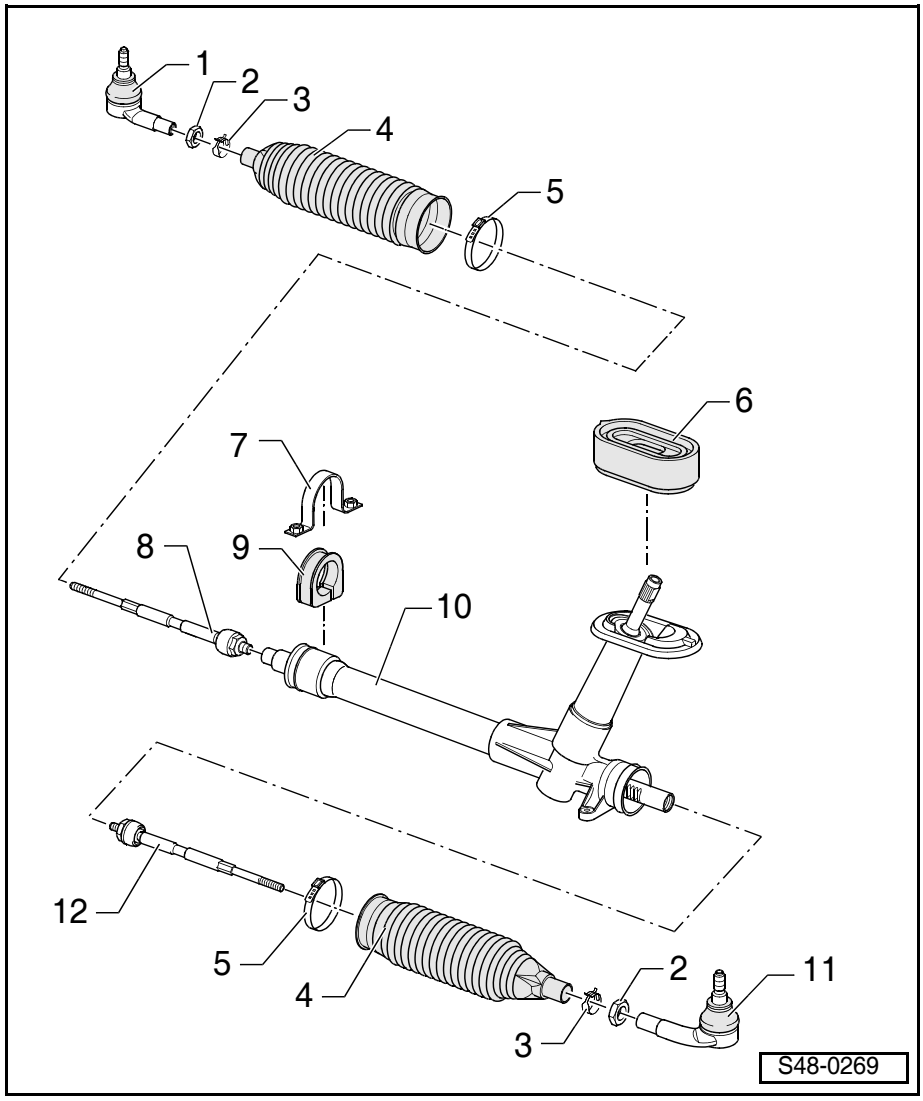
48-9 Disassembling and assembling the steering gear

Special tools, test and measuring equipment and auxiliary items required

- Hose strap pliers, e.g. -V.A.G 1275-
- Removal and installation pliers, e.g. -VAS 5024-
- Steering gear grease ⇒ Chapter 00-2

Note

- *Always replace all steering components (except pos. 6) after an accident or in the event of damage to the front axle.*
- *Do not carry out repair work on the steering gear ⇒ item 10 in 48-9 page 2. If there are any complaints about the steering gear ⇒ item 10 in 48-9 page 2 replace it.*
- *Welding and straightening of the steering components is not allowed.*
- *Always use original clamping collars and circlips.*
- *Only use steering gear grease to grease the gear rack ⇒ Chapter 00-2.*



1 - Right track rod end
- ❑ inspect ⇒ Chapter 48-10
- ❑ removing and installing ⇒ Chapter 48-10
- ❑ before installing, remove grease on tapered stud

2 - Lock nut, 50 Nm

3 - Spring strap clip
- ❑ use assembly pliers, e.g. -VAS 5024- for removing and installing

4 - Boot
- ❑ can only be replaced with the steering gear removed
- ❑ before removing boot detach the track-rod end ⇒ Chapter 48-10
- ❑ must not be twisted after setting the wheel toe
- ❑ inspect for wear and damage (cuts, splits)

5 - Warm-type clamp
- ❑ replace after each removal
- ❑ removing: open with cutting pliers
- ❑ tensioning ⇒ Chapter 48-10

6 - Gasket
- ❑ pay attention to installation instructions for installing ⇒ Chapter 48-7

7 - Clamp
- ❑ replace if thread of stamp nut damaged

8 - Right track rod
- ❑ tightening torque on steering rack: 80 Nm
- ❑ removing and installing ⇒ Chapter 48-10

- ❑ track rod and track rod end are supplied as replacement part pre-set
- ❑ lock nut for track rod/track rod end on replacement parts tightened initially only to 10 Nm. After installing replacement track rod/track rod end tighten lock nut fully to 50 Nm
- ❑ Setting wheel toe ⇒ Chap. 44-2.

9 - Rubber insert

Fitting position:

- ♦ larger bore must point outwards
- ♦ replace if damaged or worn

10 - Steering gear

- ❑ do not repair
- ❑ removing and installing ⇒ Chapter 48-7
- ❑ setting ⇒ Chapter 48-8
- ❑ inspecting centre position ⇒ Chapter 48-8

11 - Left track rod end

- ❑ inspect ⇒ Chapter 48-10
- ❑ removing and installing ⇒ Chapter 48-10
- ❑ before installing, remove grease on tapered stud

12 - Left track rod

- ❑ tightening torque on steering rack: 80 Nm
- ❑ removing and installing ⇒ Chapter 48-10
- ❑ track rod and track rod end are supplied as replacement part pre-set
- ❑ lock nut for track rod/track rod end on replacement parts tightened initially only to 10 Nm. After installing replacement track rod/track rod end tighten lock nut fully to 50 Nm
- ❑ Setting wheel toe ⇒ Chap. 44-2.

48-10 Track rod ends, track rods

Play, correct attachment and joint boots

⇒ Chap. 48-16

Removing and installing track rod ends

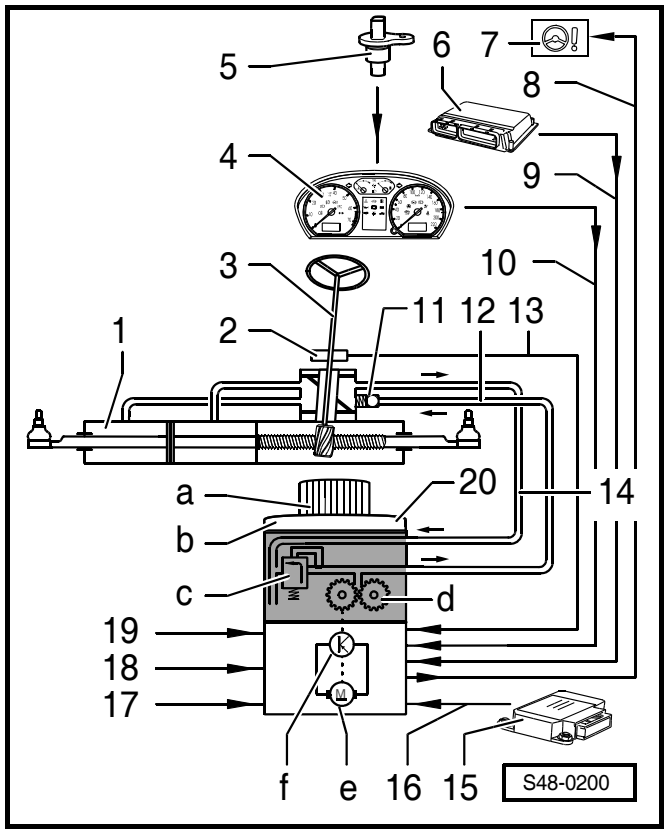
⇒ Chap. 48-16

Removing and installing track rods

⇒ Chap. 48-16

48-11 Power-assisted steering

Structure and function



The EPHS (Electrically Powered Hydraulic Steering) is a power-assisted steering system which uses its own electric motor to drive the pump.

1 - Power-steering gear
2 - Sensor for power steering -G250-
3 - Steering column
4 - Control unit in dash panel insert -J285-
5 - Sender for speedometer -G22-
6 - Engine control unit
7 - Servotronic warning light -K92- in dash panel insert
8 - Signal for servotronic warning light -K92- through databus
9 - Signal for engine speed via data BUS
10 - Signal for driving speed via data BUS
11 - Hollow screw with non-return valve
12 - Pressure line
13 - Signal for steering angle speed
14 - Return-flow line
15 - Airbag control unit -J234-
16 - Crash signal over the databus
17 - Terminal +30
18 - Terminal + 15
19 - Earth
20 - Engine pump aggregate - consisting of:

a - Screwed lid
b - Reservoir for hydraulic oil
c - Pressure limiting valve
d - Gear pump
e - Electric motor
f - Power-assisted steering control unit -J500-

The steering hydraulics pump -V119- includes the gear pump -d- and the electric motor -e-.

This steering uses a gear pump integrated in the engine pump aggregate instead of the servo pump (vane pump) traditionally used in power-assisted steering systems.

This gear pump -d- is not driven directly via the vehicle's combustion engine but by an electric motor -e- integrated in the engine pump aggregate.

Signals for steering angle speed -13-, for vehicle speed -10- and engine speed -9- are sent to the control unit -f-. This control unit controls the speed of the electric motor -e- on the gear pump and thus also the supplied quantity or volume of hydraulic oil.

Re-engaging protection

The electrohydraulic power-assisted steering has a re-engaging protection after faults, failure or crash.

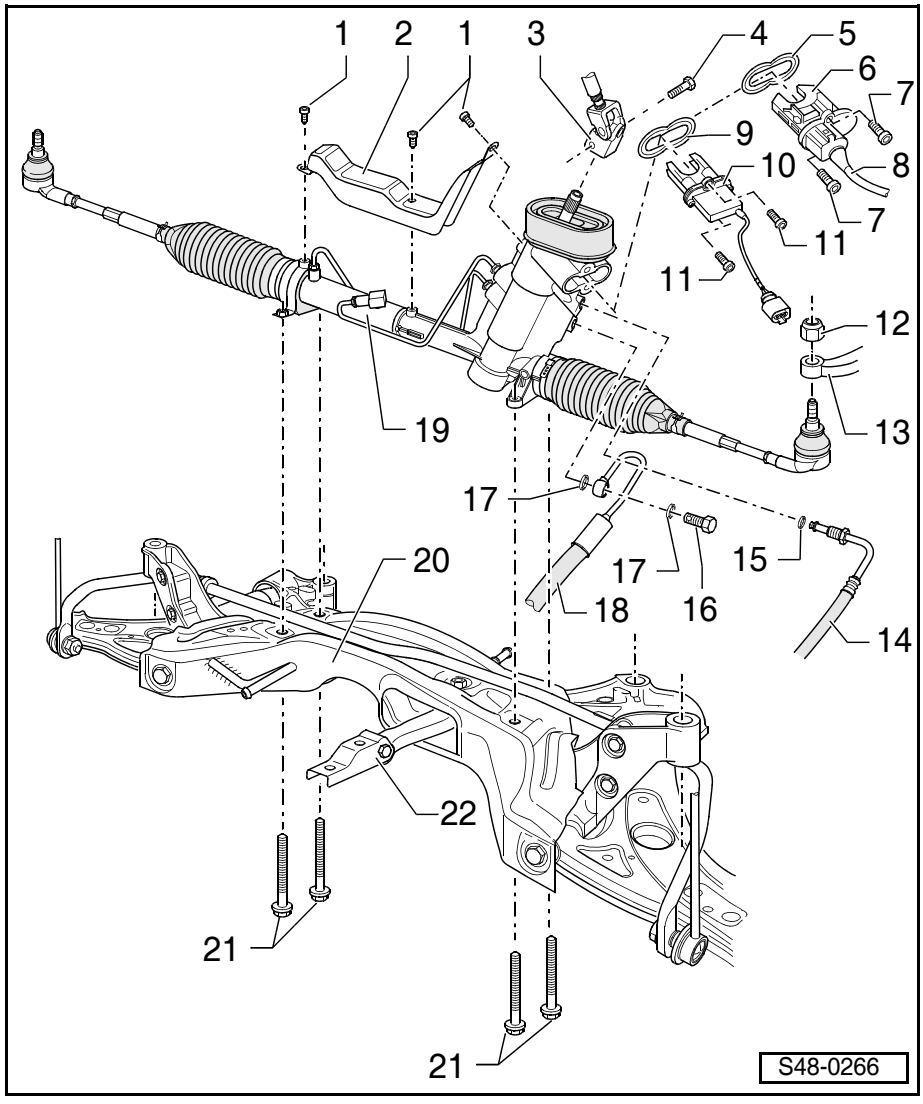
After a crash or after the display of the crash signal on the vehicle system tester -V.A.G 1552- or at the vehicle diagnostic, measuring and information system -VAS 5051- the vehicle memory must be erased to de-activate the re-engaging protection.

The re-engaging protection can be neutralised by switching off the ignition and switching it on again. If necessary wait 15 minutes to allow the engine pump aggregate to cool down after overheating. If after this waiting period the re-engaging protection cannot be neutralised by switching the engine on again, the fault must be found in the vehicle electric system or e.g. in the engine pump aggregate. In these instances perform the self-diagnosis and if necessary replace the engine pump aggregate.

Summary of components of power-assisted steering (TRW)

Note

- *If the front axle is damaged as a result of an accident certain steering components must be replaced ⇒ Chapter 48-15.*
- *Repairs on the power-steering gear are not foreseen. In the event of failure determine the cause with the pressure and tightness test as well as by performing self-diagnosis.*
- *If there is a fault on the power-steering gear, replace the steering gear, unless the fault is in the power-steering sensor.*
- *Replace the self-locking nuts and screws.*
- *Welding and straightening of the steering components is not allowed.*
- *Only use steering gear grease to grease the gear rack ⇒ Chapter 00-2.*
- *Oil types: Hydraulic oil ⇒ Chapter 00-2.*
- *Oil volume in the system ⇒ Chapter 00-2*



1 - Self-tapping screw, 6 Nm

2 - Heat shield
- ❑ assignment ⇒ Spare part catalogue

3 - Steering column universal joint

4 - Screw, 20 Nm + torque a further 90° ($^1/_4$ turn)
- ❑ replace after each removal

5 - Gasket
- ❑ for power-assisted steering sensor -G250- with adapter cable ⇒ item 6
- ❑ replace after each removal
- ❑ assignment ⇒ Spare part catalogue

6 - Sensor for power steering -G250-
- ❑ with adapter cable ⇒ item 8
- ❑ removing and installing ⇒ Chapter 48-13
- ❑ assignment ⇒ Spare part catalogue

7 - Screw, 6 Nm
- ❑ for power-assisted steering sensor -G250- with adapter cable ⇒ item 6
- ❑ assignment ⇒ Spare part catalogue

8 - Adapter cable
- ❑ assignment ⇒ Spare part catalogue

9 - Gasket
- ❑ for power-assisted steering sensor -G250- with fixed connecting line ⇒ item 10
- ❑ replace after each removal
- ❑ assignment ⇒ Spare part catalogue

10 - Sensor for power steering -G250-
- ❑ with fixed connecting line
- ❑ removing and installing ⇒ Chapter 48-13
- ❑ assignment ⇒ Spare part catalogue

11 - Screw, 6 Nm
- ❑ for power-assisted steering sensor -G250- with fixed connecting line ⇒ item 10
- ❑ assignment ⇒ Spare part catalogue

12 - Nut, self-locking, 20 Nm and torque a further 90° ($^1/_4$ turn)
- ❑ replace after each removal

13 - Steering-knuckle arm (of the wheel-bearing housing)

14 - Return-flow line
- ❑ Pipe screw M16x1.5
- ❑ power-assisted steering gear - engine pump aggregate
- ❑ Torque for pipe screw on the power-assisted steering gear: 30 Nm

15 - O-ring
- ❑ replace after each removal

16 - Hollow screw, 35 Nm
- ❑ replace after each removal
- ❑ with non-return valve
- ❑ M14x1.5

17 - Gasket ring
- ❑ replace after each removal

18 - Pressure line
- ❑ power-assisted steering gear - engine pump aggregate
- ❑ Pay attention to installation position relative to subframe ⇒ 48-11 page 6
- ❑ Torque for pipe screw on the engine pump aggregate: 30 Nm

19 - Power-steering gear
- ❑ removing and installing ⇒ Chapter 48-12

20 - Assembly carrier
- ❑ with impression (as shown in Figure), only if the front exhaust pipe is fitted below the engine-gearbox assembly carrier
- ❑ with impression (not shown), only if the front exhaust pipe is fitted below the engine-gearbox assembly carrier

21 - Screw, 50 Nm + torque a further 90° ($^1/_4$ turn)
- ❑ replace after each removal

22 - Hinged bracket
- ❑ The shape of the hinged bracket depends on the gearbox