

Audi A8 1994 ➤

Brake System

Edition 08.1999

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Audi A8 1994 ➤

Brake System

Repair Group

- 00 - Technical data
- 45 - Anti-locking brake system
- 46 - Brakes, Brake mechanics
- 47 - Brakes, Brake hydraulics



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

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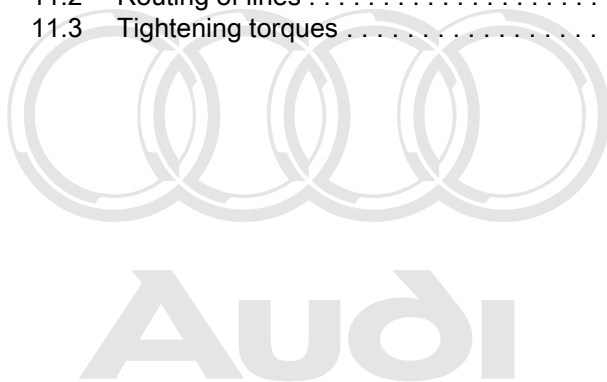
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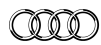


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00 - Technical data

1 - Technical data

1.1 - Technical data

1.2 - Brakes

Vehicles with front and rear disc brakes

Brake System		
Diagonal dual-circuit brake system with ABS with EDL, EBD and optional ESP		
Brake master cylinder	øin mm	23.81
Brake servo, vacuum from intake manifold or vacuum pump	øin inches	7"/ 8" tandem LHD and RHD
Boost factor		i =4.5 / 5.2 / 7.0

Front brakes

Brake calipers		FN 3 (15"/ 16")	HP 2 (15"/ 16")	Brembo (17")	FN 2 (18")
Brake disc, ventilated	øin mm	288 or 312	314 or 323	345	360
Brake disc, thickness	mm	25	30	30	30
Brake caliper, piston	øin mm	57	42.8	40.0 / 46.0	42.0 / 42.0
Pad thickness including backplate	mm	19	17	17	17

Rear brakes

Lucas brake calipers		C 38	C 43 (16")	C 43 (16"/ 17")
Brake disc	øin mm	245	269	269/ 280
Brake disc, thickness	mm	10	22	20/ 22
Brake caliper, piston	øin mm	38.1/ 36.0	42.8/ 40.8	42.8/ 40.8
Pad thickness including backplate	mm	17	17	17



2 - Brake test

2.1 - Brake test

2.2 - General information

The wheels are driven by the test stand.

Throughout the test the gearbox should be in neutral for manual gearboxes or in position "N" for automatic gearboxes.

Follow the instructions provided by the test stand manufacturer when performing the test.

2.3 - Vehicles with front-wheel drive

Brake test on a 1-axle roller type test stand

We recommend the use of a test stand with roller speed limiter and a maximum test speed of 6 km/h.

Failure to meet these requirements could result in braking intervention by the EDL system.

In this case the engine and the ignition should be switched off for the test. If necessary, run the engine briefly to ensure that enough vacuum pressure is built up for the brake test.

2.4 - Vehicles with four-wheel drive (Torsen differential)

Brake test on a 1-axle test stand for 4WD vehicles

The test stand drives the two wheels on an axle in opposite directions so that no drive is transferred to the other axle.

We recommend the use of a test stand with roller speed limiter and a maximum test speed of 6 km/h.

Failure to meet these requirements could result in braking intervention by the EDL system.

In this case the engine and the ignition should be switched off for the test. If necessary, run the engine briefly to ensure that enough vacuum pressure is built up for the brake test.

If no 4WD test stand is available then the brake test can also be carried out on a conventional test stand, provided the above requirements are met.

3 - Contact corrosion

3.1 - Contact corrosion

Contact corrosion can occur if non approved fasteners are used on the vehicle (bolts, nuts, washers etc.).

For this reason, all the fastening components have been subjected to special surface treatment (Dachromet). These components can be identified by their greenish surface finish.

In addition, all rubber and plastic parts and all adhesives are made of non-electrically conductive materials.
If you are not sure whether used parts can be refitted, always fit new parts.

Please note the following:

Always use genuine parts.

These have been tested and are compatible with aluminium.

Accessories must be approved by AUDI AG.

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



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45 - Anti-locking brake system

1 - Anti-lock brake system (ABS) and electronic stability program (ESP)

1.1 - Anti-lock brake system (ABS) and electronic stability program (ESP)

1.2 - General notes

Important

The anti-lock brake system (ABS) and electronic stability program (ESP) are completely maintenance-free. Testing, removing, installing and repair work may only be performed by qualified personnel. Failure to observe the points described in this Workshop Manual may result in damage to the system and could make the vehicle unsafe.

- ◆ Before carrying out repair work, determine the cause of the problem with the aid of the self-diagnosis.

=> Running Gear Self-Diagnosis; Repair group 01

- ◆ Only use genuine parts in their original packaging.
- ◆ Do not remove replacement parts from their wrapping until you are ready to install them.
- ◆ Only use lint-free cloths.
- ◆ Thoroughly clean all unions and the adjacent areas before undoing them, but do not use aggressive cleaning agents such as brake cleaner, petrol, thinners or similar.
- ◆ Absolute cleanliness is required when working on the anti lock brake system, and it is not permitted to use any products which contain mineral oil, such as oil, grease etc.
- ◆ Ensure that no brake fluid enters plug connectors.
- ◆ Bleed the brake system after repairs that involve opening the brake system (e.g.: with V.A.G 1869) => Page 161.
- ◆ Observe the relevant safety precautions and information when handling brake fluid.
- ◆ Place removed parts on a clean surface and cover.
- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately. (Use plugs, repair set H0 698 311 A)
- ◆ When the system is open do not work with compressed air and do not move the vehicle.
- ◆ When carrying out spray painting work, the electronic control unit may be exposed for short periods to a maximum temperature of 95°C and for longer periods (about 2 hours) to a maximum temperature of 85°C.
- ◆ Before carrying out welding work with electric welding equipment

=> General Notes; General Body Assembly; Safety precautions

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1.3 - Road test

- ◆ Certain faults are only detected by the self-diagnosis when the vehicle is moving. The system can be tested by carrying out a test drive. Maintain a speed above 60 km/h for a period of 30 seconds. Observe the traffic conditions and perform a braking controlled by the ABS. The control can be felt by a pulsing sensation at the brake pedal.

Important

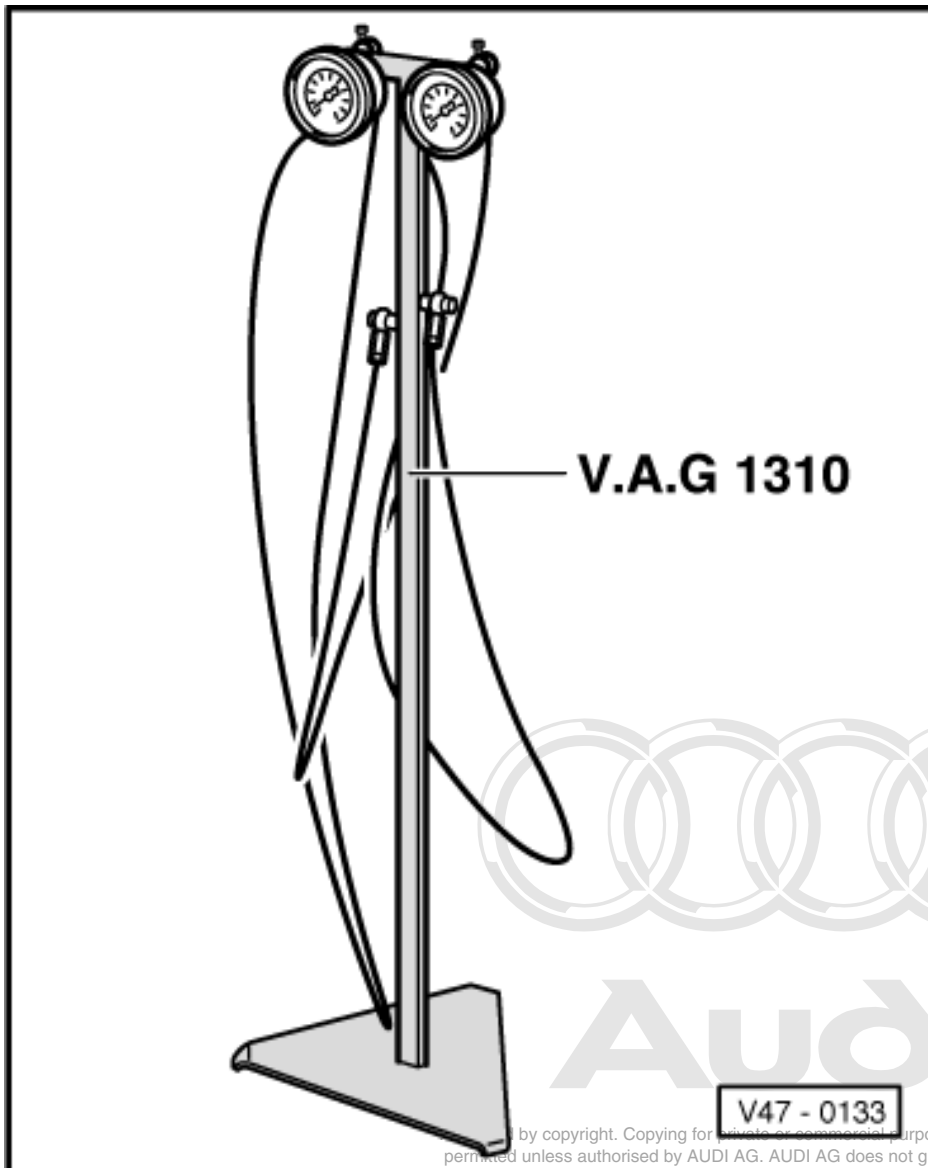
If the vehicle is driven after a fault has been detected there is danger of an accident. The function of the brake system will be impaired. As the brake pressure is no longer controlled by the electronic brake force distribution the rear wheels tend to break excessively. Due to this the rear of the vehicle may break away unexpectedly. If test and measuring instruments are required during a test drive, these must always be secured to the rear seat and operated by a second person from this position. If test equipment is operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.

1.4 - High- and low pressure test

Before you begin:

Make sure that the brake system (brake master cylinder, brake hoses, brake pipes and brake calipers) works properly and is free of leaks.

High pressure test:



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- Remove bleeder screw at one of the front brake calipers. Connect pressure gauge V.A.G 1310 or V.A.G 1310A and bleed.
- Insert brake pedal depressor between brake pedal and driver's seat. Apply pressure to brake pedal until the gauge indicates a pressure of 50 bar. The pressure must not drop by more than 4 bar during the test period of 45 seconds. Replace hydraulic unit if drop in pressure exceeds the above figure.

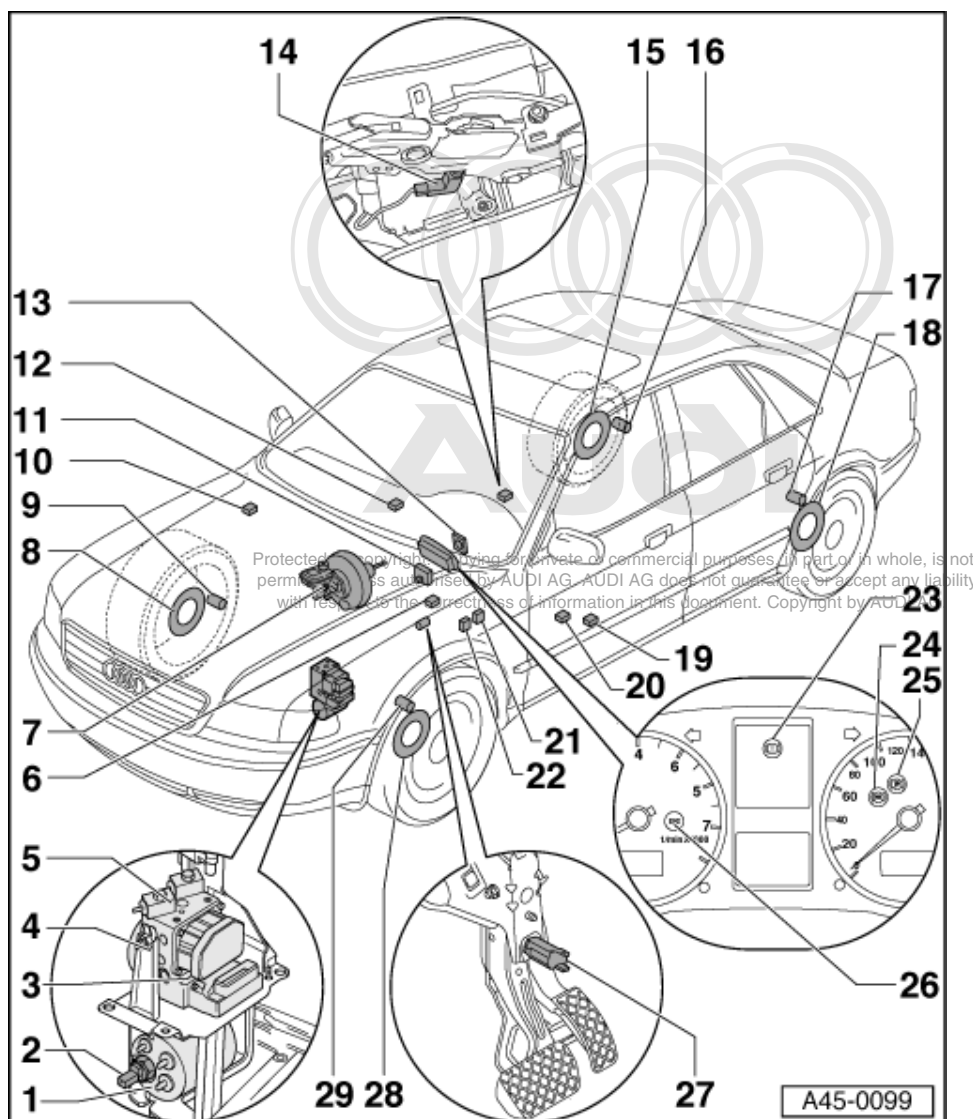
Low pressure test:

- Move the brake pedal depressor back until the pressure gauge indicates a pressure of 6 bar.
- The pressure must not drop by more than 1 bar during the test duration of 3 minutes.

Replace hydraulic unit if drop in pressure exceeds the above figure.

2 - Component overview for ABS/ESP system

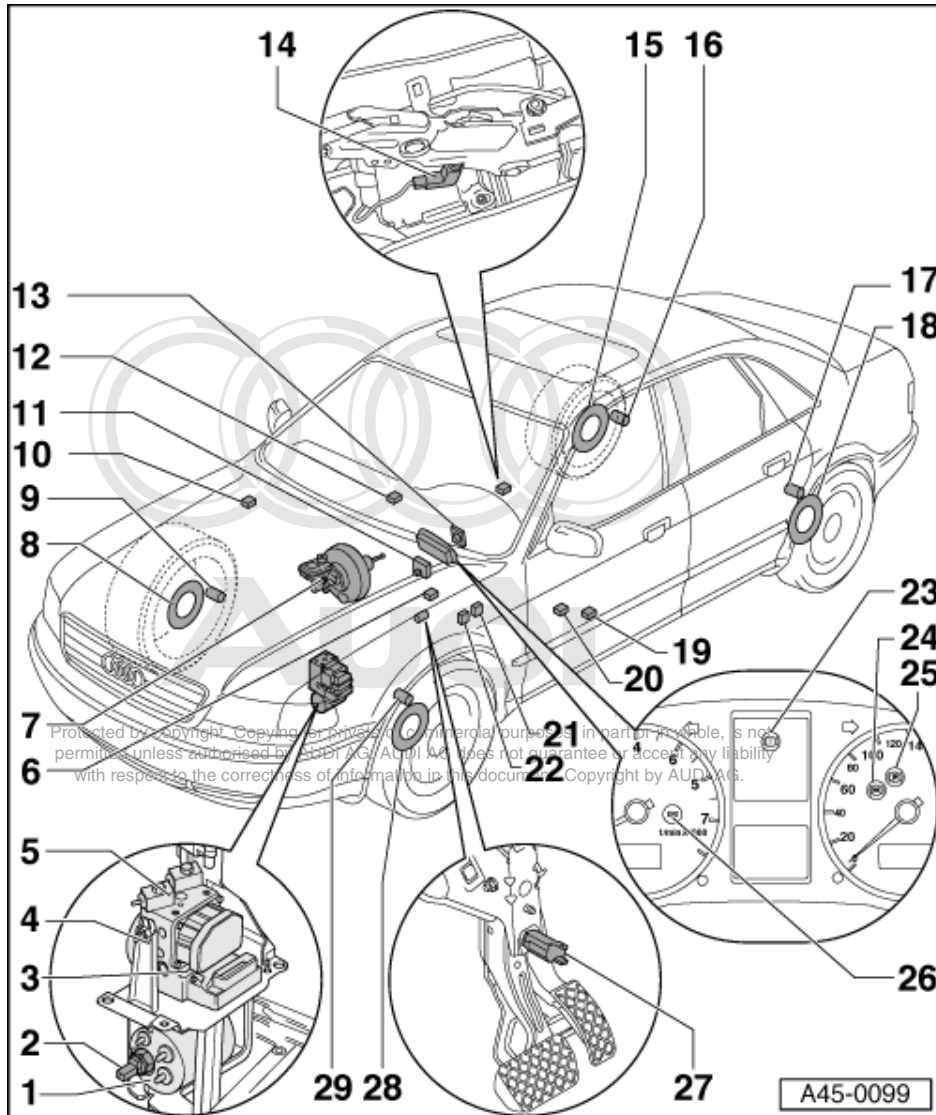
2.1 - Component overview for ABS/ESP system



- 1 ESP hydraulic pump -V156 (with ESP)
- 2 Brake pressure sender -G201 in ESP pump (with ESP)
- 3 Return pump relay -J105 for Bosch 5.3
- 4 Solenoid valve relay -J106 for Bosch 5.3
- 5 Hydraulic control unit -N55 with control unit -J104

- 6 Control unit -J104 for Bosch 5.0
 - ♦ Fitting location: in dash panel insert
- 7 Warning contact for brake fluid level F34
- 8 Rotor for speed sensor, front right
 - ♦ Checking => Page 45

=> Running Gear, FWD; Repair group 40

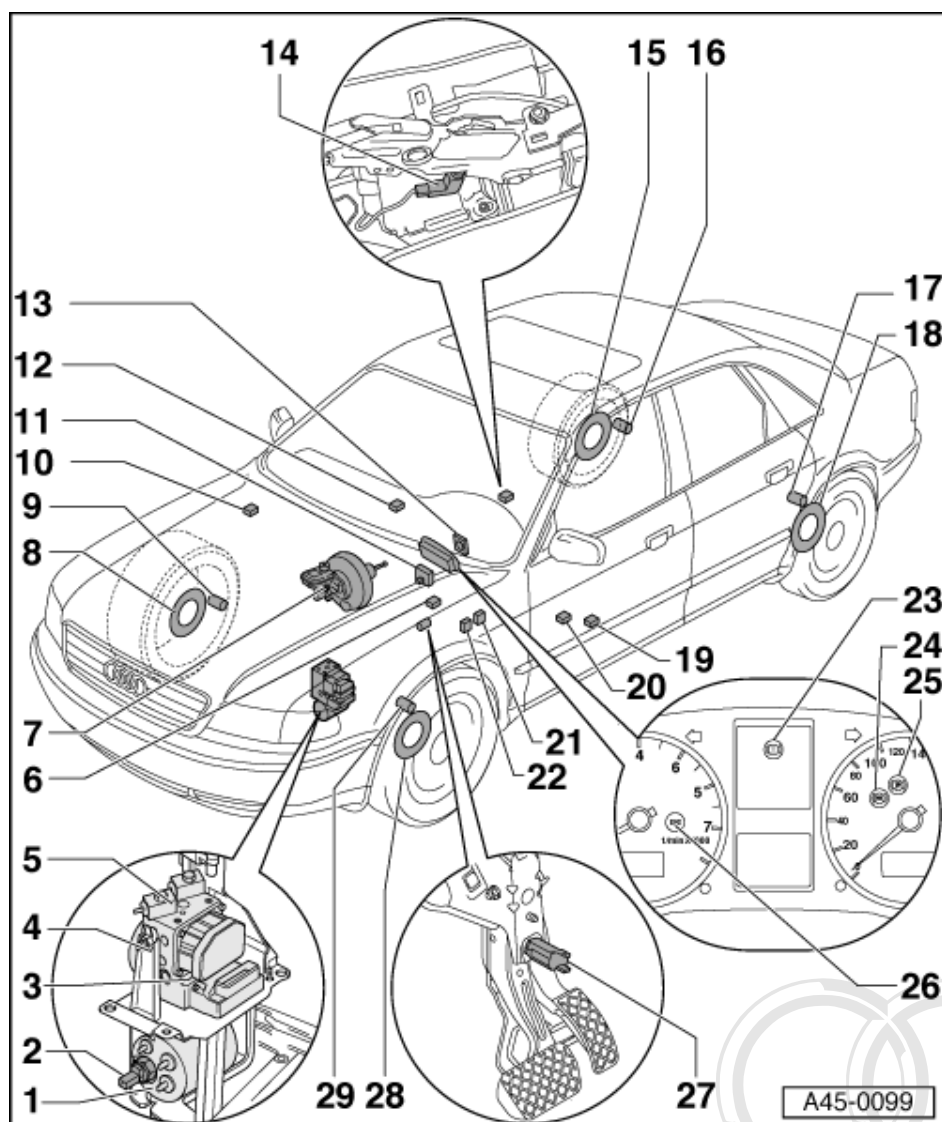


- 9 Front right speed sensor -G45
 - ♦ Removing and installing=>Page 45
- 10 Control unit J104 (with ESP)
 - ♦ Fitting location: in dash panel insert
- 11 Steering angle sender G85 for ESP
 - ♦ Fitting location: Installed on the steering column
 - ♦ Removing and installing

=> Running Gear, FWD; Repair group 48

- 12 Switch for TCS/ESP E132
 - ♦ Fitting location: on the centre console
- 13 Steering angle sender G85
 - ♦ In a housing together with the airbag coil spring

♦ Removing and installing=>Page 38



14 Handbrake warning switch F9

- ♦ Fitting location: on the handbrake lever assembly

15 Rotor for rear right speed sensor

- ♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42

16 Rear right speed sensor -G44

- ♦ Removing and installing=>Page 48

17 Rear left speed sensor -G46

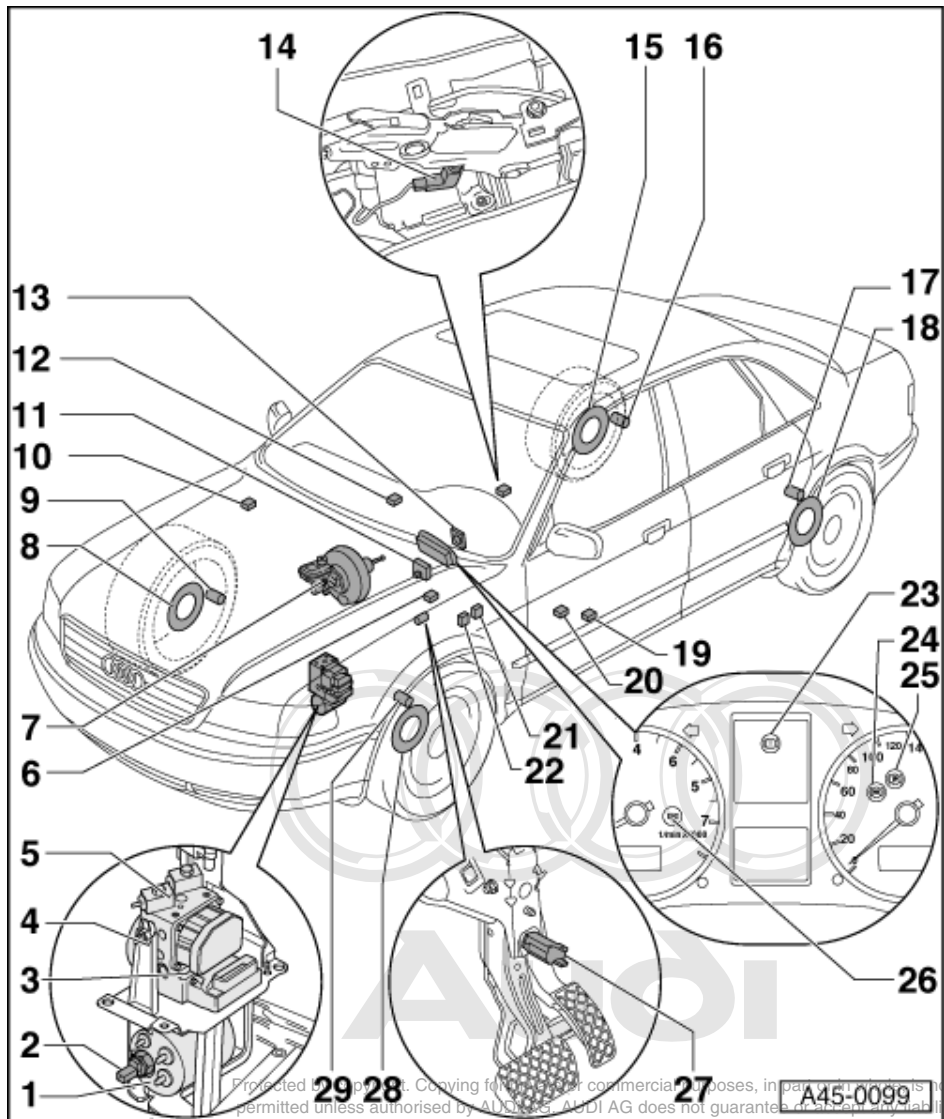
- ♦ Removing and installing=>Page 48

18 Rotor for rear left speed sensor

- ♦ Checking => Page 49
- ♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42

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19 Lateral acceleration sender G200

- ♦ New design in a housing together with G202
- ♦ Removing and installing=>Page 41

20 Yaw rate sender G202

- ♦ Removing and installing=>Page 41

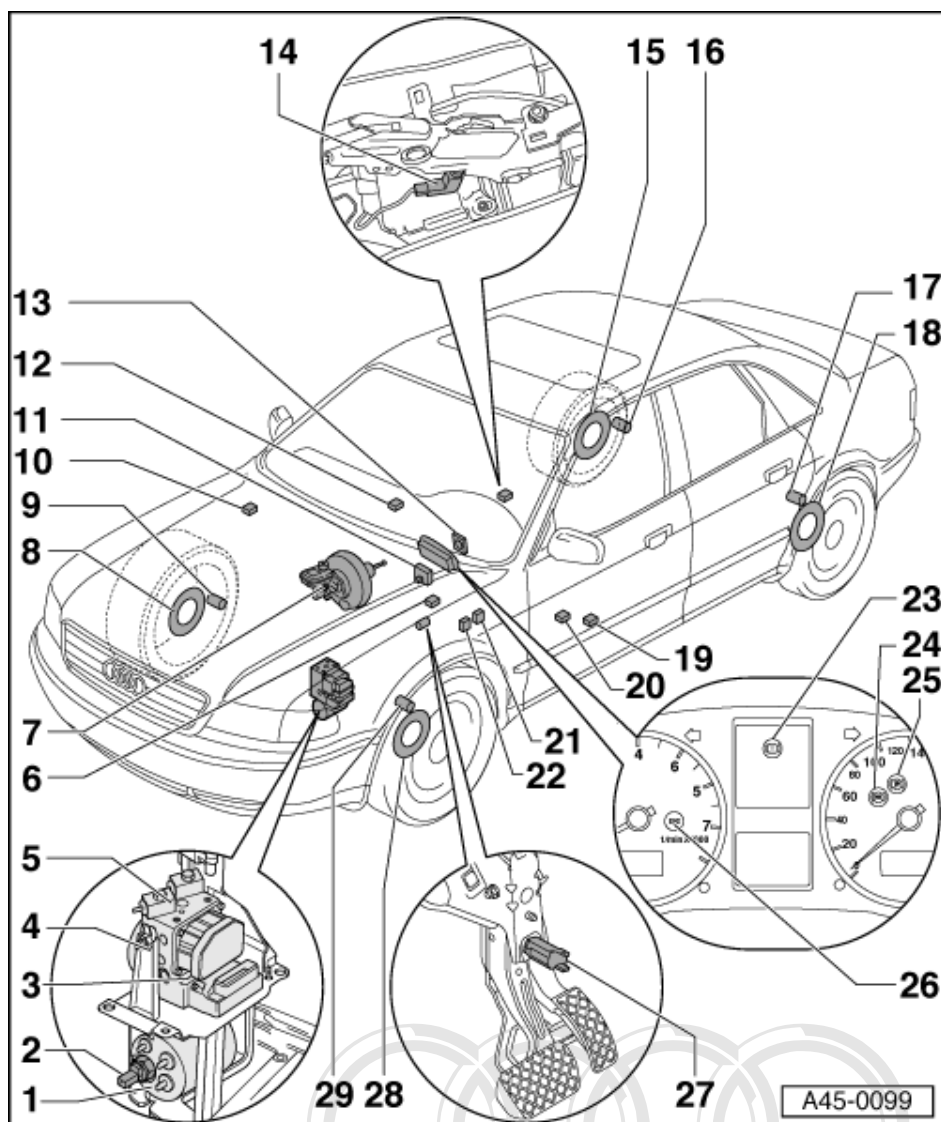
21 Return pump relay J105 for Bosch 5.3 only

- ♦ Fitting location: on fuse box

22 Solenoid relay -J106 for Bosch 5.3

23 Brake warning symbol -K118

- ♦ Fitting location: in the dash panel insert in the driver information system



24 ABS warning lamp -K47

- ♦ Fitting location: in dash panel insert

25 Handbrake warning lamp -K14

- ♦ Fitting location: in dash panel insert

26 TCS/ESP warning lamp -K86

- ♦ Fitting location: in dash panel insert

27 Brake light switch -F

- Removing and installing the brake light switch =>Page 38

28 Rotor for front left speed sensor

- ♦ Checking => Page 45
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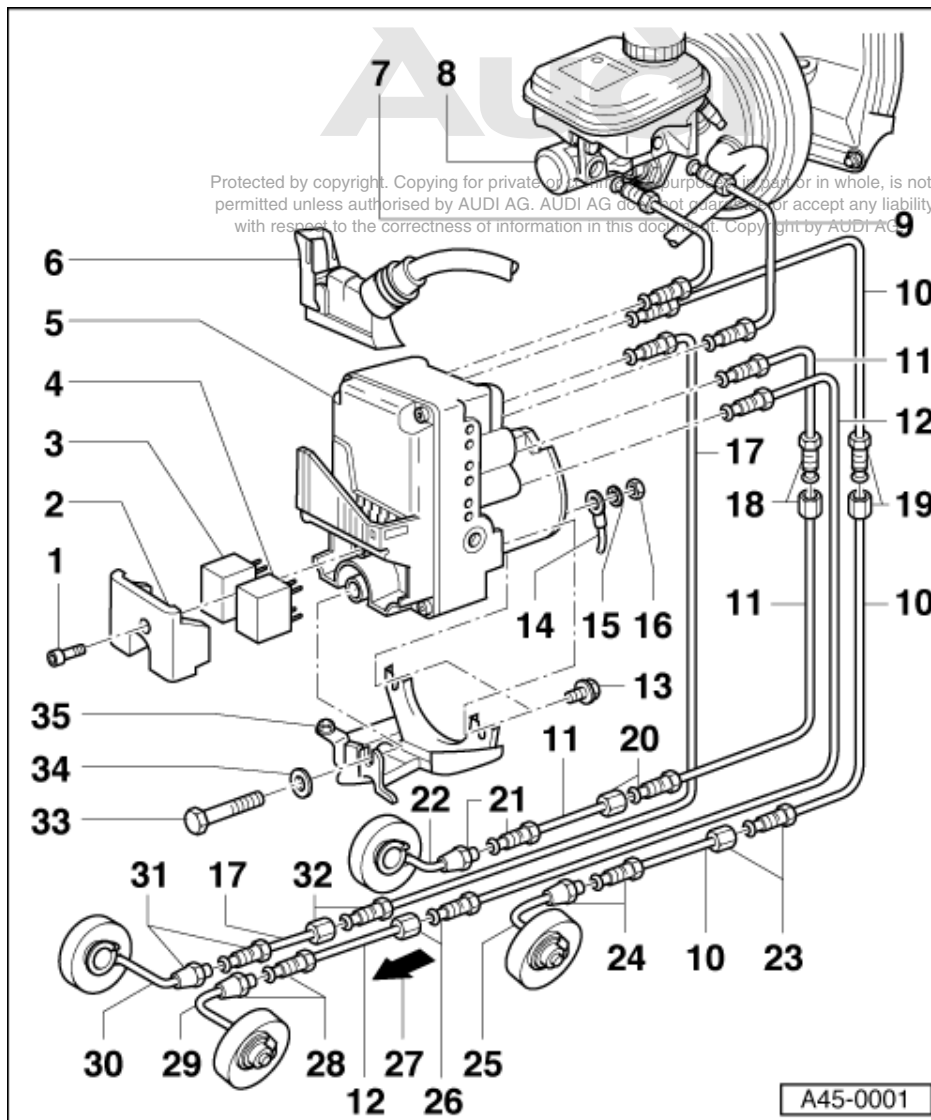
=> Running Gear, FWD; Repair group 40

29 Front left speed sensor -G47

- ♦ Removing and installing=>Page 45

3 - Anti-lock brake system (ABS) Bosch 5.0

3.1 - Anti-lock brake system (ABS) Bosch 5.0



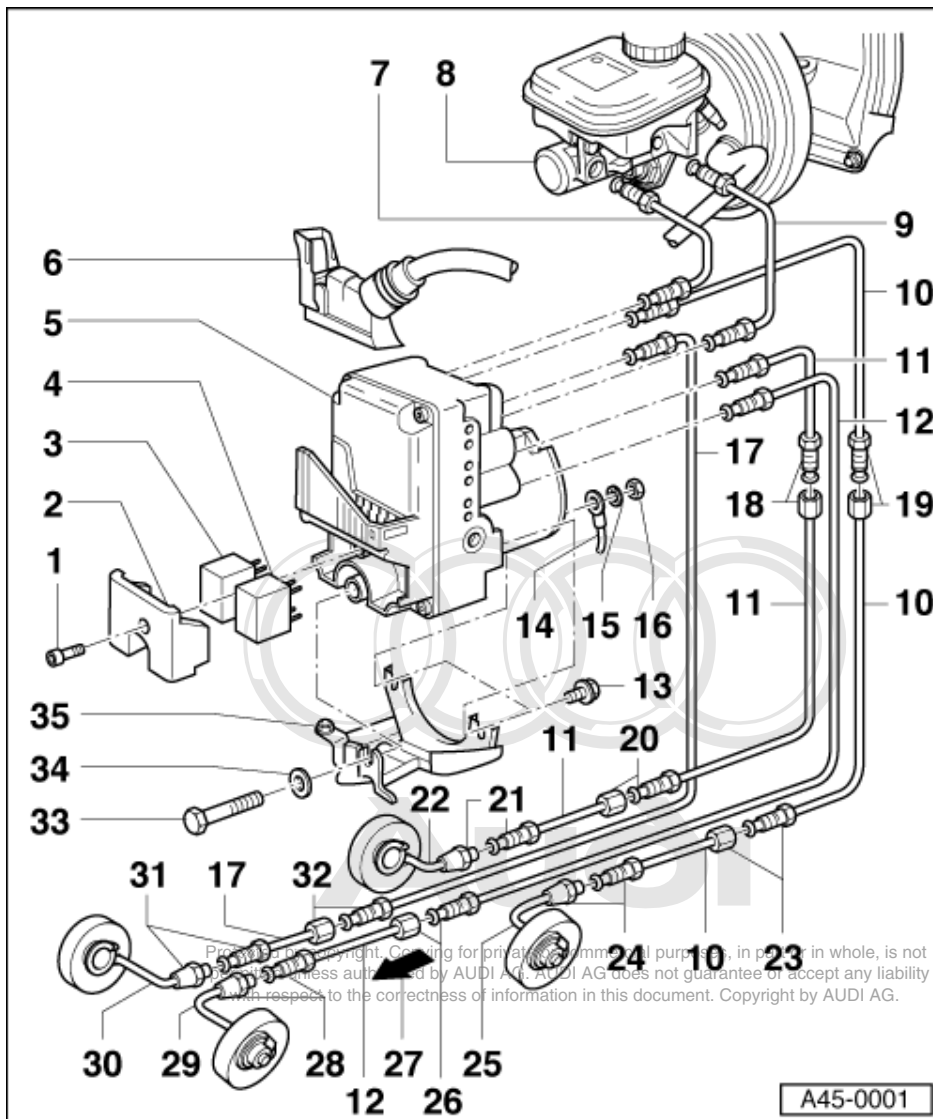
3.2 - Hydraulic unit and brake pipes

The tightening torque for the brake lines is 15 Nm.

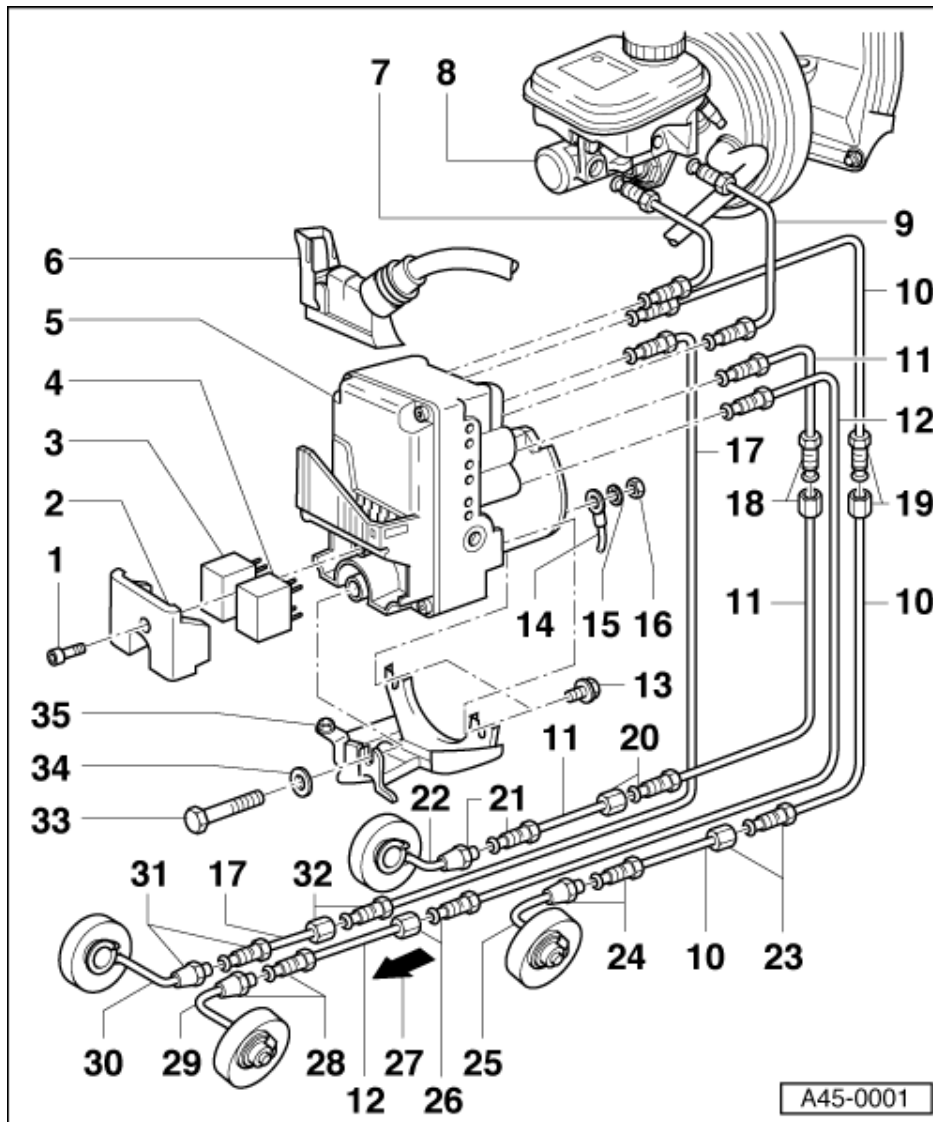
- 1 Bolt, 5 Nm
- 2 Cover
- 3 Relay for solenoid valves
- 4 Relay for return pump
- 5 Hydraulic unit for ABS 5.0
 - ♦ Different designs => Fig. 1 and Fig. 2
 - ♦ No repair work may be carried out on the hydraulic unit, with the exception of replacing both relays .
Never unfasten bolted joints



- ◆ Replacement hydraulic units are supplied pre-bled



- ◆ Removing and installing the hydraulic unit
 - Disconnect earthing strap from battery.
 - Remove front half of front right wheel housing liner.
 - Unscrew the brake pipes and seal the connections immediately with dummy plugs.
 - Screw a new hydraulic unit into the bracket - **35** -.
 - The brake pipes should be connected in accordance with the designations on the hydraulic unit.
- ◆ Hydraulic unit/pipe connections/rear => Fig. **1** and Fig. **2**
 - Bleed brake system => Page **161**
 - Perform final control diagnosis => Running Gear Self-Diagnosis, Repair group 00



6 Connector, ABS wiring harness

- ◆ Release and detach
- ◆ The connector is part of the ABS wiring harness. Different designs are component-specifically encoded.

7 Brake pipe

- ◆ Brake master cylinder/floating piston circuit to hydraulic unit
- ◆ Different designs => Fig. 1 and Fig. 2

8 Brake master cylinder with servo unit

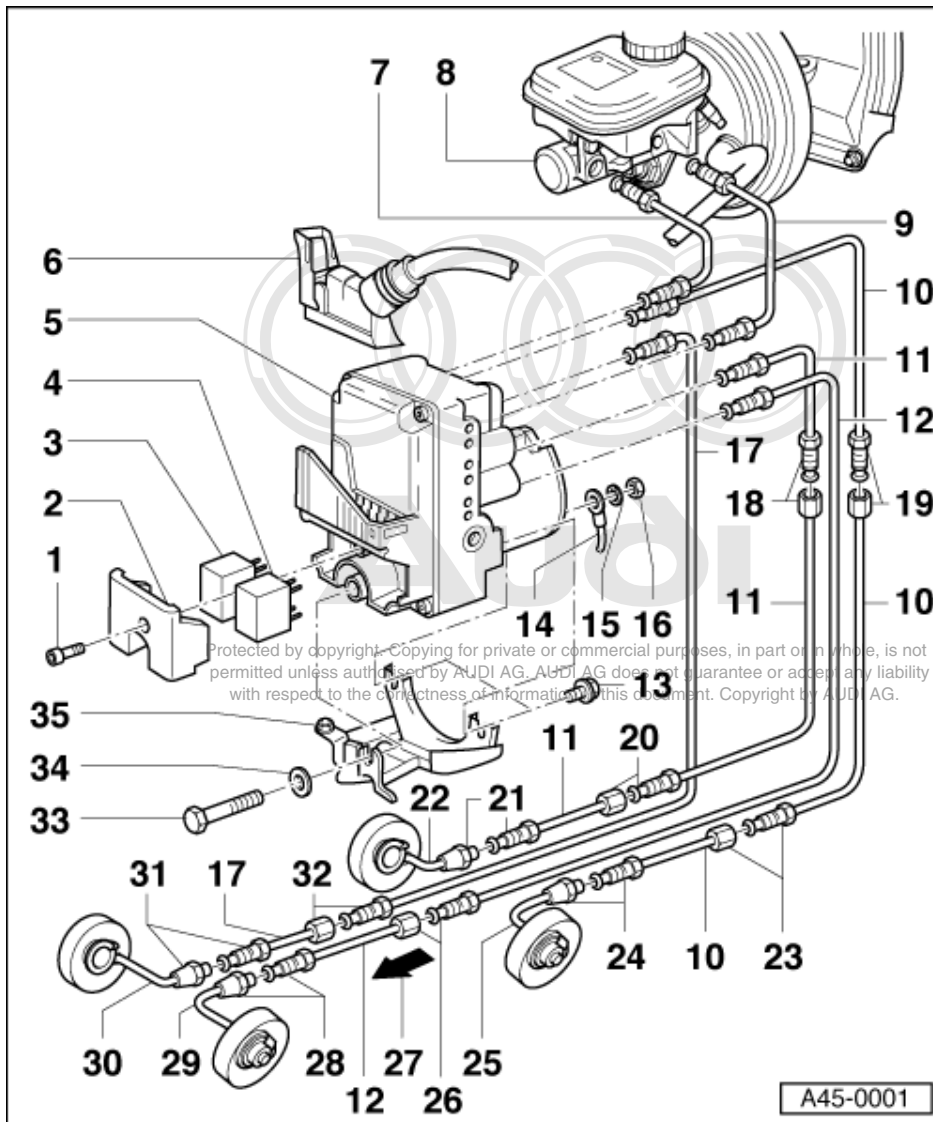
9 Brake pipe

- ◆ Brake master cylinder/push rod piston circuit to hydraulic unit
- ◆ Different designs => Fig. 1 and Fig. 2

10 Brake pipe

- ◆ Hydraulic unit to rear left brake caliper

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**11 Brake pipe**

- ♦ Hydraulic unit to rear right brake caliper

12 Brake pipe

- ♦ Hydraulic unit to front left brake caliper

13 Combi bolt, 10 Nm**14 Earth wire**

- ♦ Ensure good contact

15 Toothed lock washer**16 Hexagon nut, 10 Nm****17 Brake pipe**

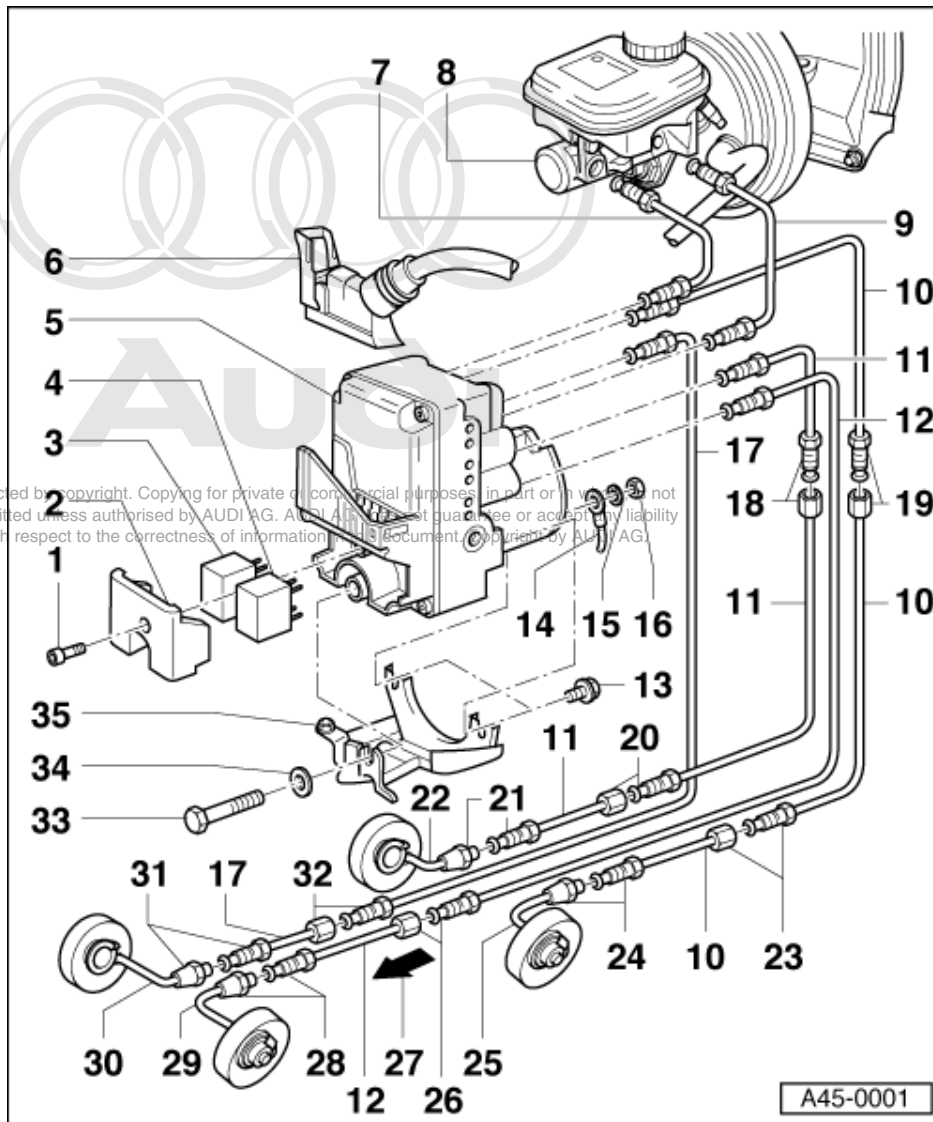
- ♦ Hydraulic unit to front right brake caliper

18 Joint/brake pipe to rear right brake caliper

- ♦ Position: Wheel housing - side member, front left => Fig. 3

19 Joint/brake pipe to rear left brake caliper

- ♦ Position: Wheel housing - side member, front left => Fig. 3



20 Joint/brake pipe to rear right brake caliper right

- ◆ Position: Wheel housing - side member, rear left => Fig. 4

21 Joint/brake pipe/brake hose

- ◆ Rear right

22 Brake hose, rear right

23 Joint/brake pipe to rear left brake caliper

- ◆ Position: Wheel housing - side member, rear left => Fig. 4

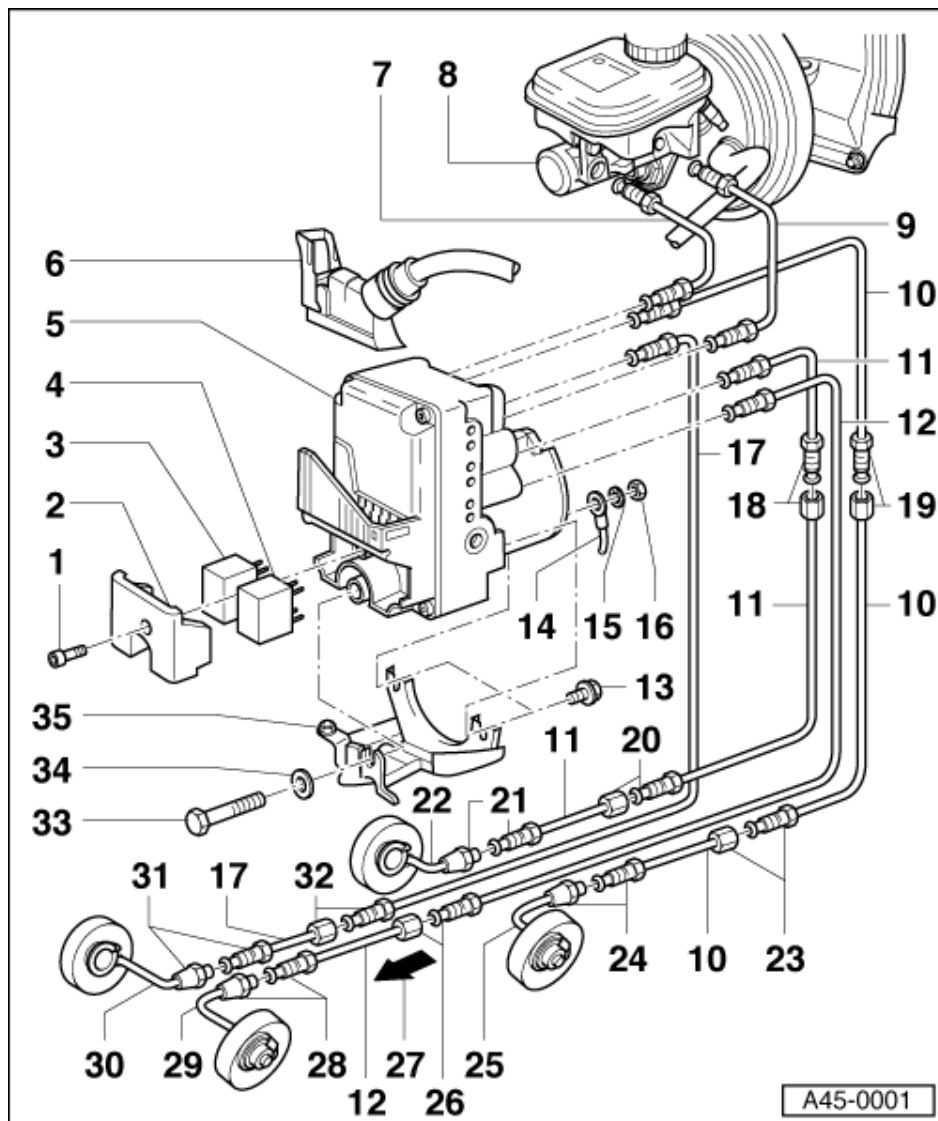
24 Joint/brake pipe/brake hose

- ◆ Rear left

25 Brake hose, rear left

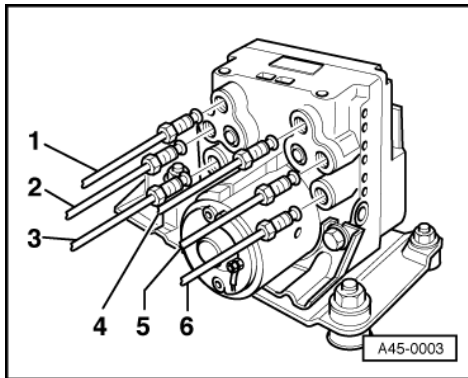
26 Joint/brake pipe to front left brake caliper

- ◆ Position: Wheel housing - side member, front left => Fig. 3



- 27 Direction of travel
 28 Joint/brake pipe/brake hose
 ♦ Front left
 29 Brake hose, front left
 30 Brake hose, front right
 31 Joint/brake pipe/brake hose
 ♦ Front right
 32 Joint/brake pipe to front right brake caliper
 ♦ Position: Wheel housing - side member, front right => Fig. 5
 33 Hexagon bolt, 15 Nm
 34 Washer
 35 Bracket for hydraulic unit
 ♦ Insert hydraulic unit and secure.
 ♦ Removing and installing bracket => Page 19

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-> Fig.1 Brake pipe connections to hydraulic unit, ABS 5.0

Applies to the following vehicles:

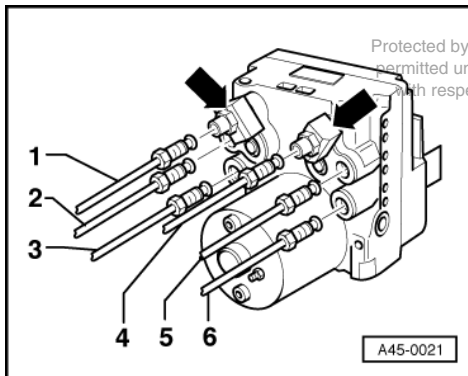
FWD with ABS/EDL
 FWD with ABS/EDL/TCS
 4WD with ABS/EDL

- 1 - Hydraulic unit - brake master cylinder (push rod piston circuit)
- 2 - Hydraulic unit - rear right brake caliper
- 3 - Hydraulic unit - front left brake caliper
- 4 - Hydraulic unit - brake master cylinder (floating piston circuit)
- 5 - Hydraulic unit - rear left brake caliper
- 6 - Hydraulic unit - front right brake caliper

Note:

The pressure dampers are not fitted to vehicles with 4WD and EDL suction control (05.95 onwards) => Fig. 2
EDL suction control minimises control noises.

The working range of the pressure limiting valve in the hydraulic unit is raised from 90 ±25 bar to 170 ±25 bar.



-> Fig.2 Brake pipe connections at hydraulic unit, ABS 5.0

For models with 4WD and ABS/EDL- pressure control (up to 05 95):

Two pressure dampers are screwed into the hydraulic unit -arrows- on vehicles with 4WD and EDL pressure control.

The dampers are designed to smooth pressure peaks in the brake pipes and reduce control noises.

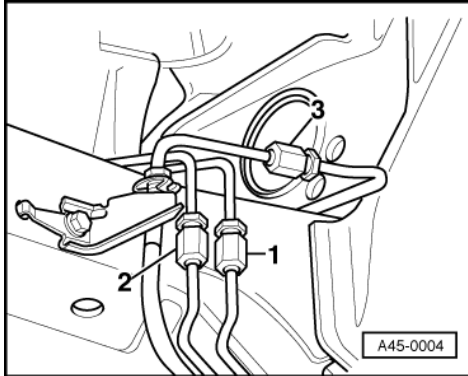
Counterhold at the hexagon of the pressure dampers when unfastening the brake pipes.



- 1 - Hydraulic unit - brake master cylinder (push rod piston circuit)
- 2 - Hydraulic unit - rear right brake caliper
- 3 - Hydraulic unit - front left brake caliper
- 4 - Hydraulic unit - brake master cylinder (floating piston circuit)
- 5 - Hydraulic unit - rear left brake caliper
- 6 - Hydraulic unit - front right brake caliper

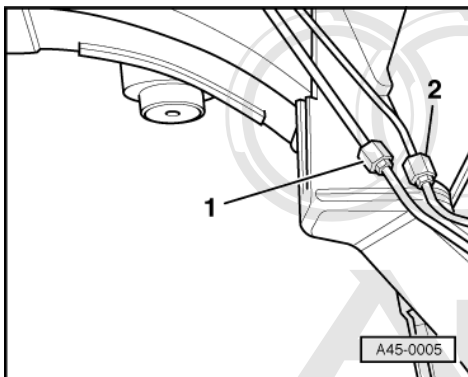
Note:

The operating range of the pressure limiting valve in the hydraulic unit is 90 ± 25 bar.



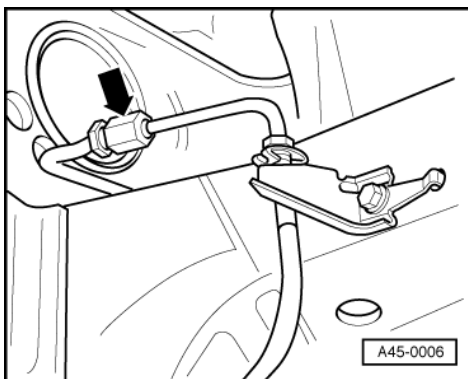
-> Fig. 3 Joints in the brake pipes

- 1 - Hydraulic unit - rear right brake caliper
- 2 - Hydraulic unit - rear left brake caliper
- 3 - Hydraulic unit - front left brake caliper



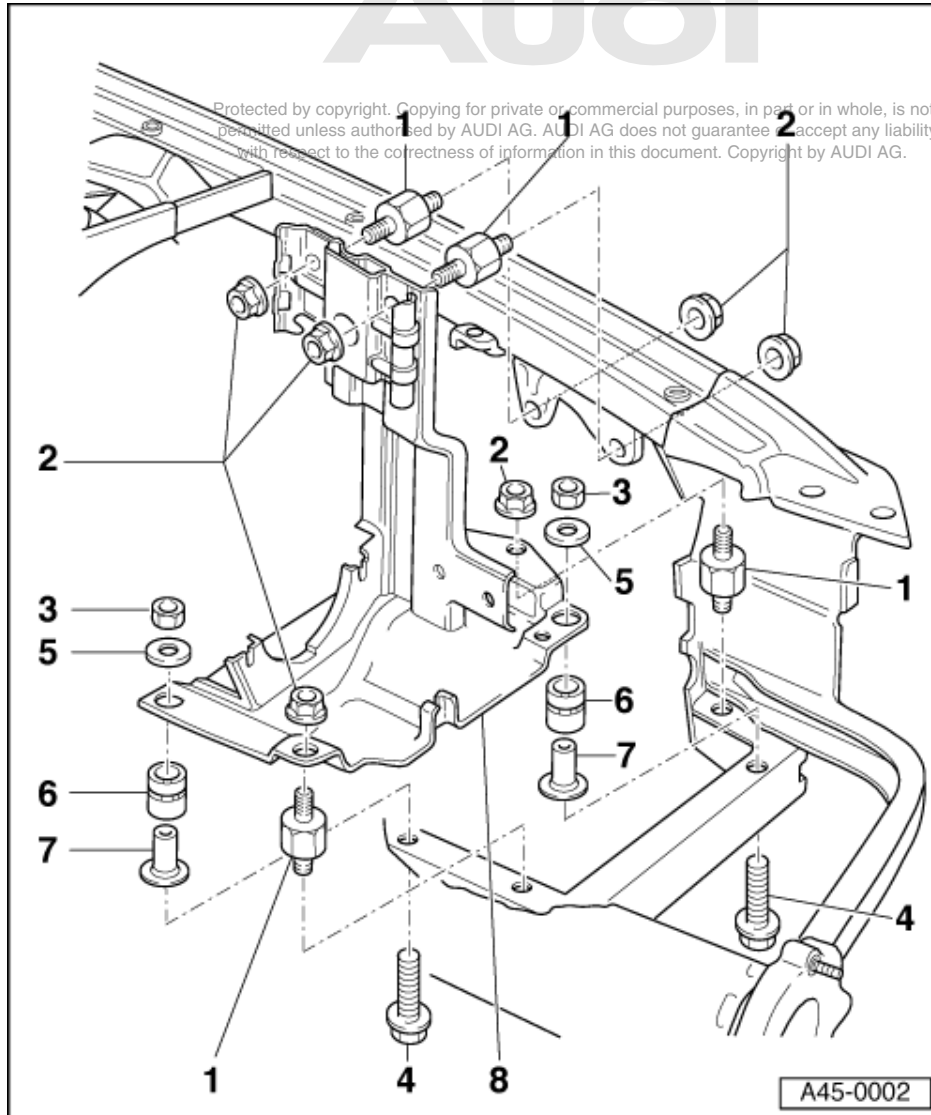
-> Fig. 4 Joints in the brake pipes

- 1 - Hydraulic unit - rear right brake caliper
- 2 - Hydraulic unit - rear left brake caliper



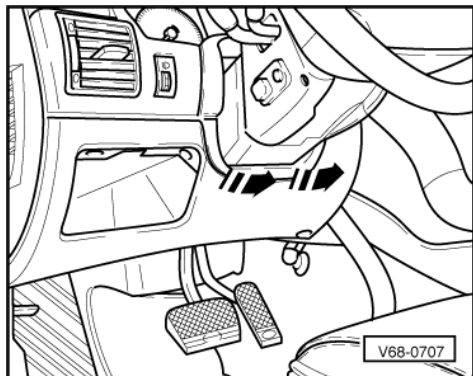
-> Fig.5 Joint in the brake pipe: hydraulic unit - front right brake caliper

3.3 - Removing and installing bracket for hydraulic unit



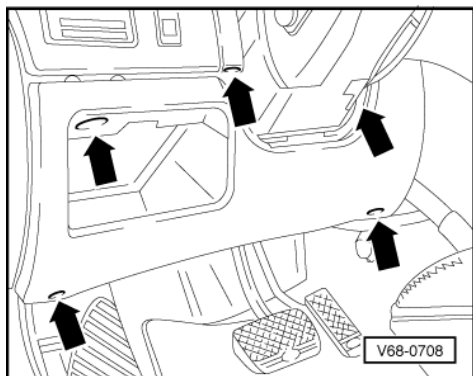
- 1 Bonded rubber bush
- 2 Collar nut, 10 Nm
- 3 Self-locking nut, 10 Nm
 - ♦ Always replace
- 4 Combi bolt
- 5 Washer
- 6 Buffer
- 7 Bush
- 8 Bracket

3.4 - Removing and installing control unit -J104 (LHD)

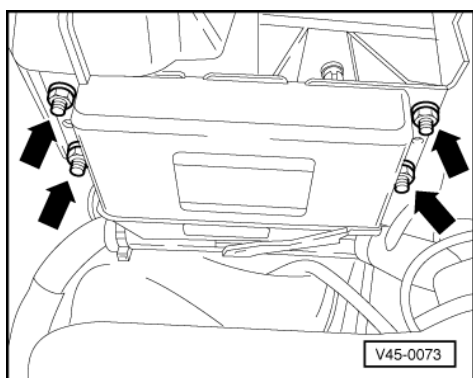


Removing

- Disconnect battery.
- => Electrical System; Repair group 27; Battery Battery
- -> Lever off lower surround, see arrows.



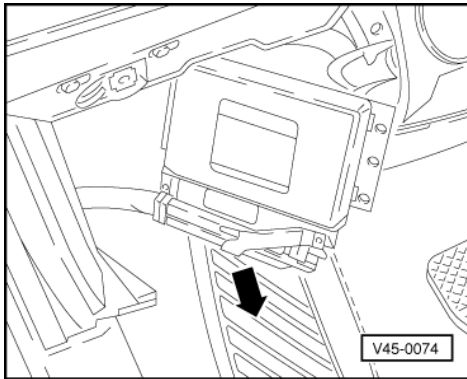
- -> Unscrew cover, see arrows



- -> Remove control unit -J104- for ABS/EDL or TCS.



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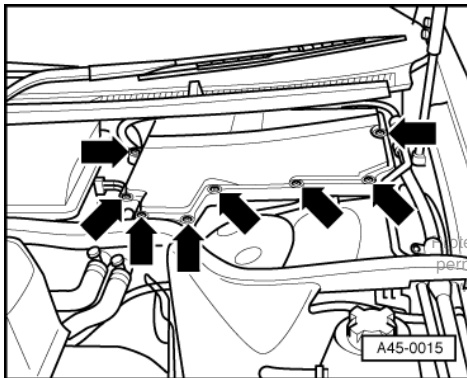


- -> Pull connector off control unit.

Installing

Install in reverse order.

3.5 - Removing and installing control unit for ABS/EDL or TCS (RHD)

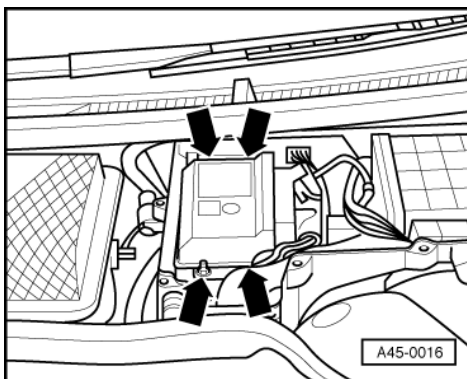


Removing

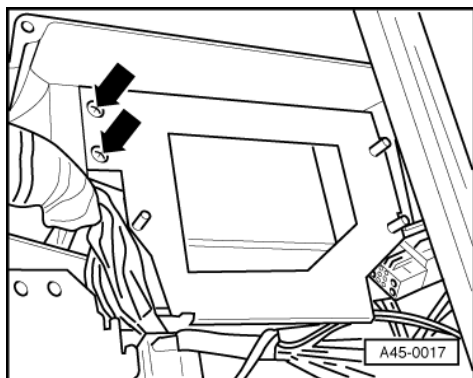
- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

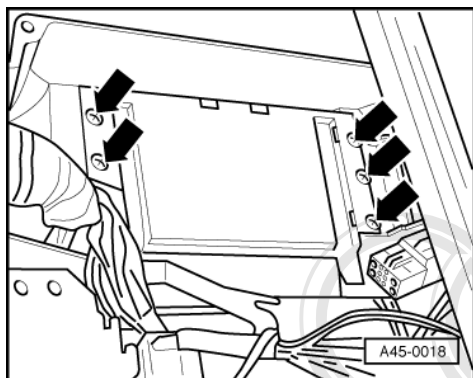
- -> Unscrew cap from central electrics box in plenum chamber



- -> Remove gearbox control unit -J217



- -> Remove retainer for gearbox control unit -J217
- Unscrew the cross head bolts and pull the retainer out of its mounting towards the front of the vehicle.
- The fuse mounting attached to the retainer must not be damaged.



- -> Remove control unit -J104 for ABS/EDL or TCS.

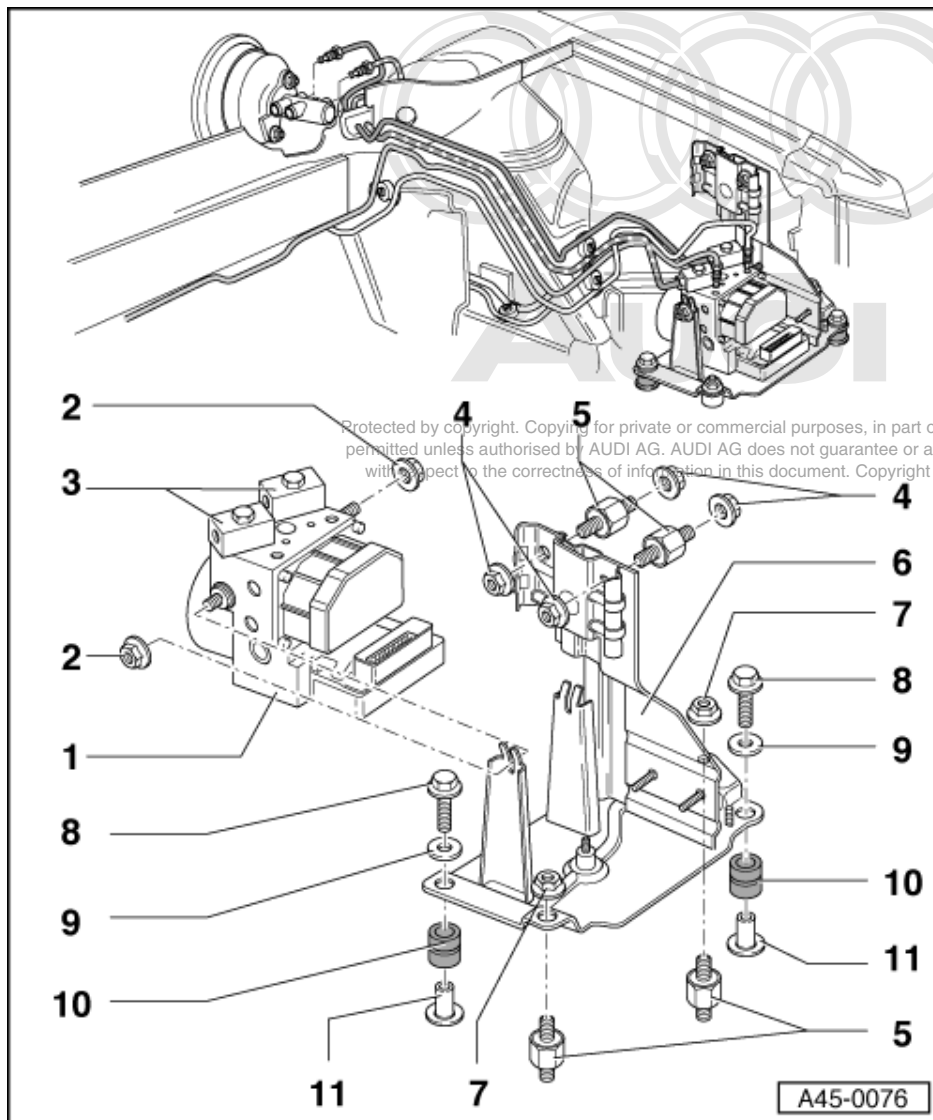
Installing

Install in reverse order.

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4 - Anti-lock brake system (ABS) Bosch 5.3

4.1 - Anti-lock brake system (ABS) Bosch 5.3



4.2 - Assembly overview: Hydraulic control unit

The tightening torque of the brake lines is 15 Nm.

1 Hydraulic control unit

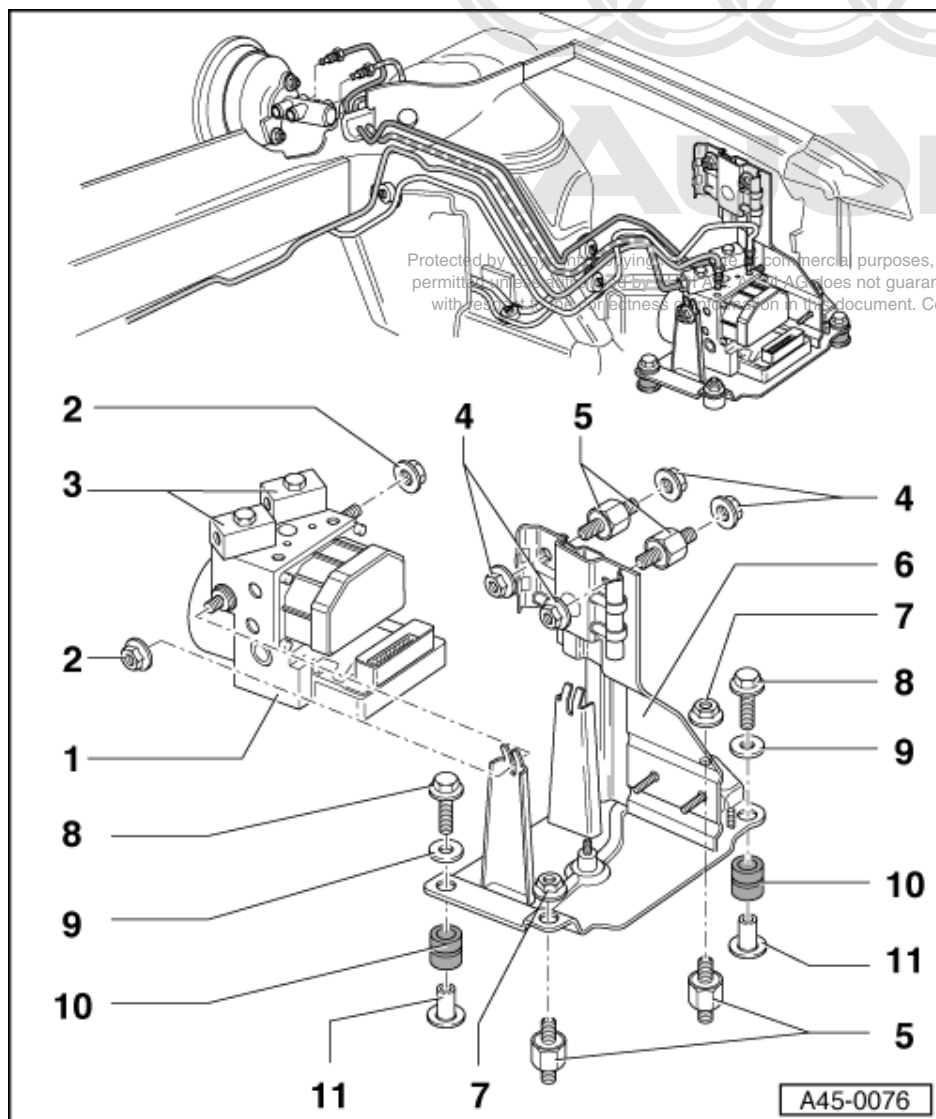
- ♦ Brake pipe connections
=>Fig. 2 and 3
- ♦ Removing and installing
=>Page 26.

2 Collar nut, 12 Nm

3 Suction dampers

- ♦ To be discontinued gradually (will be incorporated in the hydraulic control unit)

- ♦ Aligning => Fig. 1

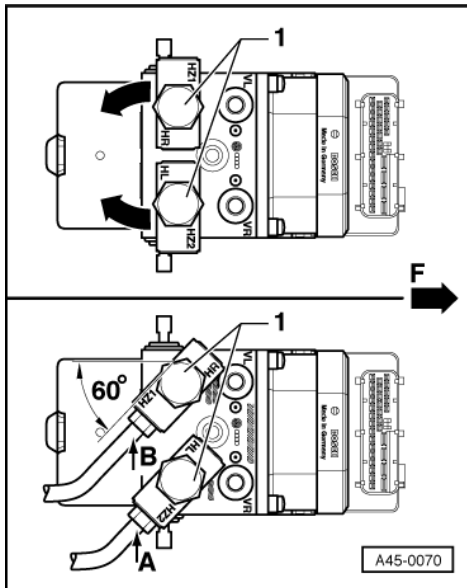


- 4 Collar nut, 10 Nm
- 5 Bonded rubber bush
- 6 Bracket
- 7 Collar nut, 10 Nm
- 8 Combi bolt, 10 Nm
- 9 Washer
- 10 Buffer
- 11 Bush

Installed up to March 1997:

Notes:

- ♦ Brake fluid can escape when releasing and rotating the suction dampers
- ♦ Protect the engine compartment against escaping brake fluid.



→ Fig.1 Aligning the suction dampers

F = Direction of travel

- Loosen the bolts -1- by approx. 1/2a turn.

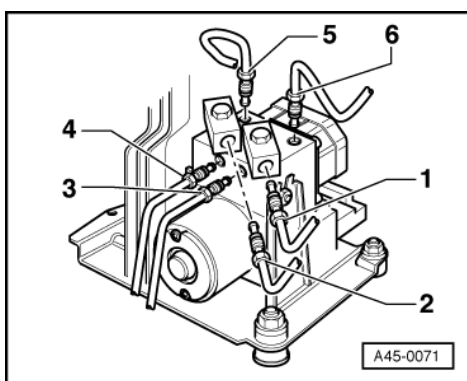
After slackening the bolts 1/2 a turn, the sealing rings still make contact with the sealing surfaces. This prevents dirt from entering when rotating the suction dampers.

- Rotate the suction dampers in the direction of the arrow until they are at an angle of approx. 60°- to the hydraulic control unit.
- Connect and tighten brake pipes -A and B-.

Counterhold on the side surfaces of the suction dampers during tightening.

- Tighten bolts -1- to 25 Nm.
- Bleeding brake system => Page 161

Installed up to March 1997:

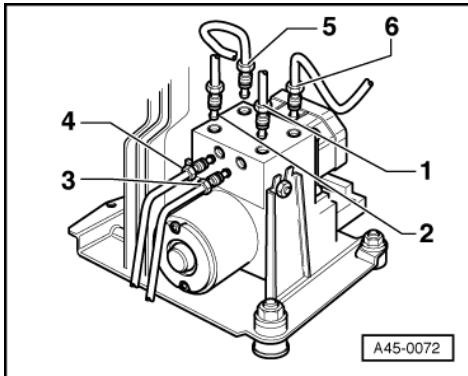


→ Fig.2 Brake pipe connections at hydraulic control unit, ABS 5.3 with suction dampers

- 1 - Brake master cylinder (floating piston circuit)
- 2 - Brake master cylinder (pushrod piston circuit)
- 3 - Rear left brake caliper
- 4 - Rear right brake caliper
- 5 - Front left brake caliper

6 - Front right brake caliper

Installed from April 1997:



-> Fig.3 Brake pipe connections at hydraulic control unit, ABS 5.3 with integrated suction dampers

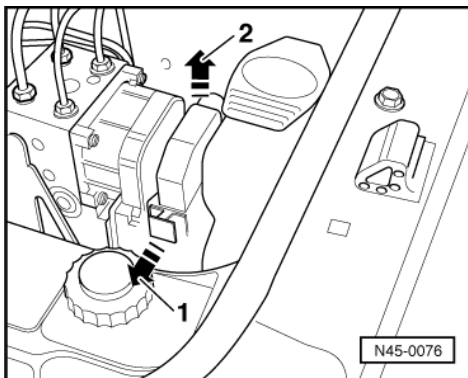
- 1 - Brake master cylinder (floating piston circuit)
- 2 - Brake master cylinder (pushrod piston circuit)
- 3 - Rear left brake caliper
- 4 - Rear right brake caliper
- 5 - Front left brake caliper
- 6 - Front right brake caliper

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4.3 - Removing and installing hydraulic control unit

Special tools and workshop equipment required

Plug repair set, Part no. 1H0 698 311A
Brake pedal depressor, e.g. from V.A.G 1813



Removing

- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

- -> Release connector from control unit (arrow -1-) and unplug it (arrow -2-).
- Connect bleeder bottle to bleeder screw on front left brake caliper and open the bleeder screw.

- Insert brake pedal depressor between brake pedal and driver's seat. Depress the brake pedal by at least 60 mm.

This will prevent the brake fluid reservoir from running dry.

The brake pedal depressor must remain in position until all the brake pipes have been reconnected to the hydraulic unit.

- Close front left bleeder screw.
- ◆ Protect the engine compartment against escaping brake fluid.
- Unscrew brake pipe connections on hydraulic unit.
- Seal brake pipes and threaded holes with plugs from repair set Part No. 1H0 698 311 A.
- Remove hexagon nuts on hydraulic control unit bracket.
- Remove hydraulic control unit.

Important
Brake pipes must not be bent.

Installing

Install in reverse order.

- Bleeding brake system => Page 161
- Perform final control diagnosis.

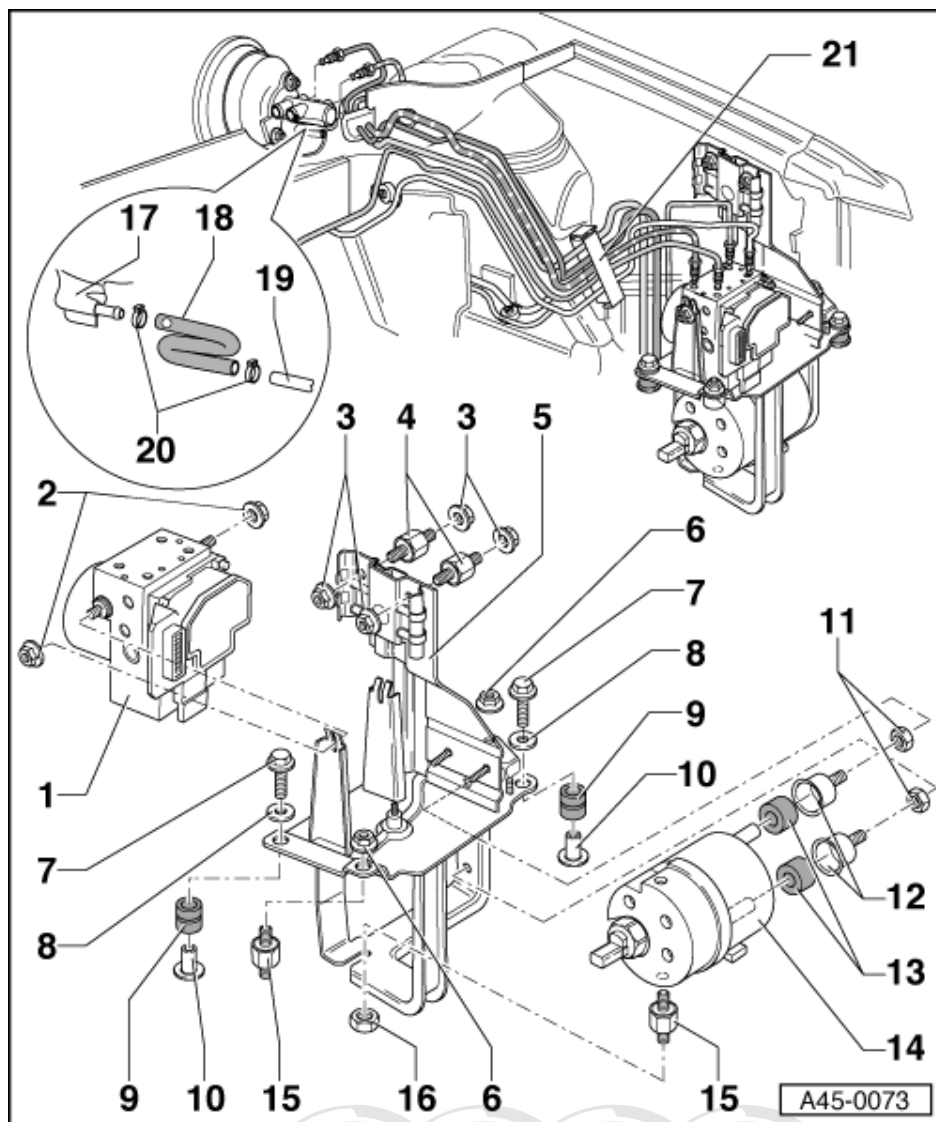
=> Running Gear Self-Diagnosis; Repair group 00



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5 - Electronic stability program (ESP) Bosch 5.3

5.1 - Electronic stability program (ESP) Bosch 5.3



5.2 - Assembly overview: Hydraulic control unit with ESP hydraulic pump

The tightening torque of the brake lines is 15 Nm.

1 Hydraulic control unit

- ♦ Brake pipe connections
=>Page 32
- ♦ Removing and installing
=>Page 33.

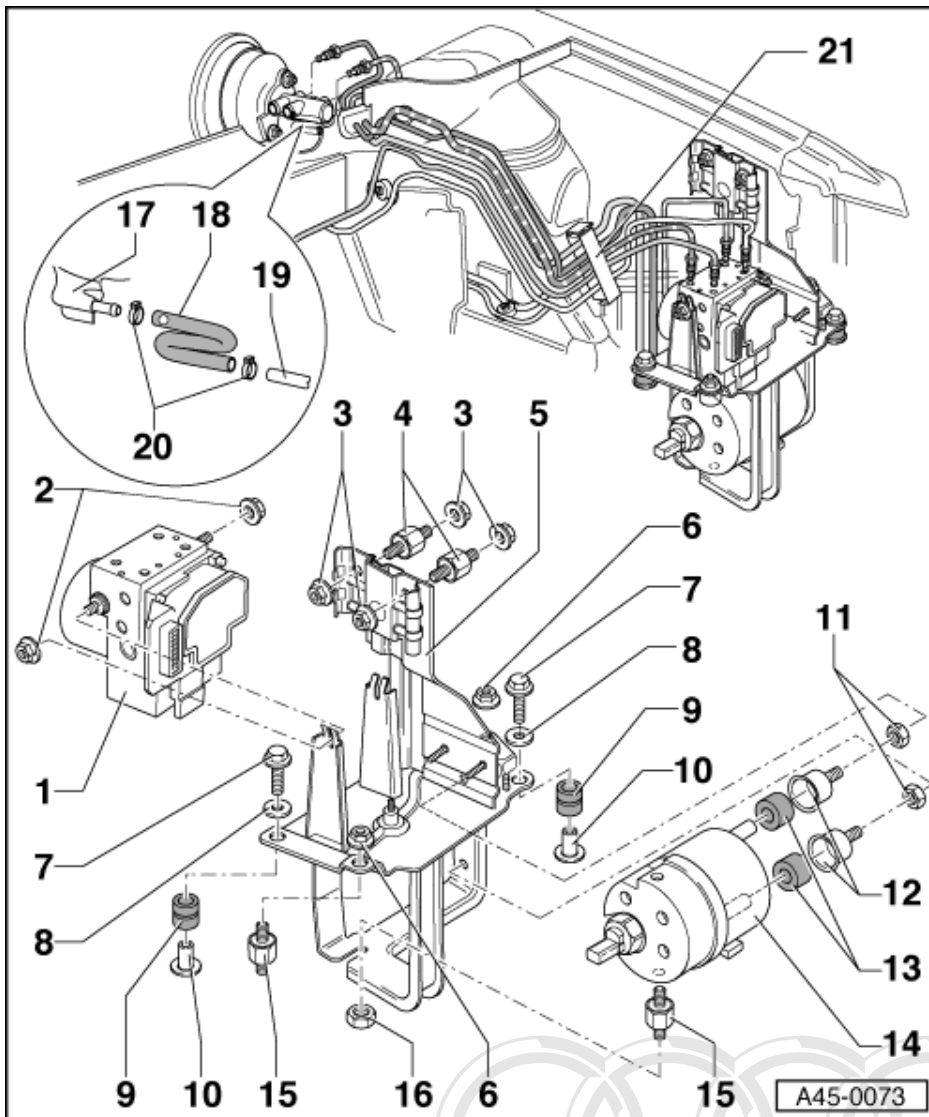
2 Collar nut, 12 Nm

3 Collar nut, 10 Nm

4 Bonded rubber bush, 2 Nm

5 Bracket

6 Collar nut, 10 Nm



7 Combi bolt, 10 Nm

8 Washer

9 Buffer

10 Bush

11 Hexagon nut, 10 Nm

12 Bush

13 Buffer

14 ESP hydraulic pump

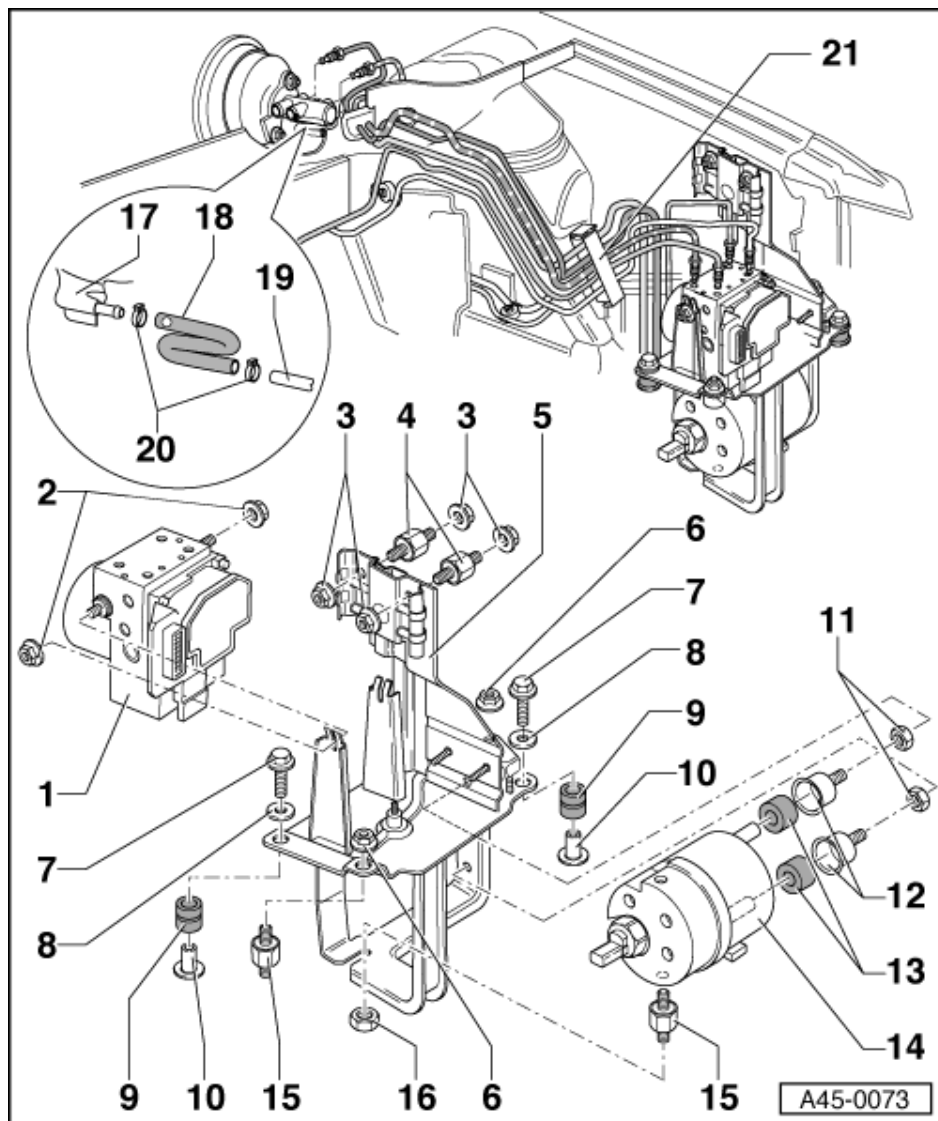
♦ Also referred to as the charging pump

♦ Removing and installing
 =>Page 33.

15 Bonded rubber bush, 2 Nm

16 Hexagon nut, 10 Nm

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17 Brake fluid reservoir

18 Suction hose

- ◆ Connect with white colour marking towards the reservoir.

19 Suction pipe

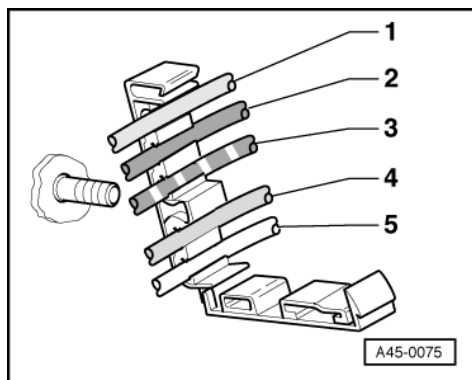
- ◆ Leads to ESP hydraulic pump

20 Hose clamp

21 Brake pipe holder

- ◆ Arrangement of brake pipes =>Fig. 1

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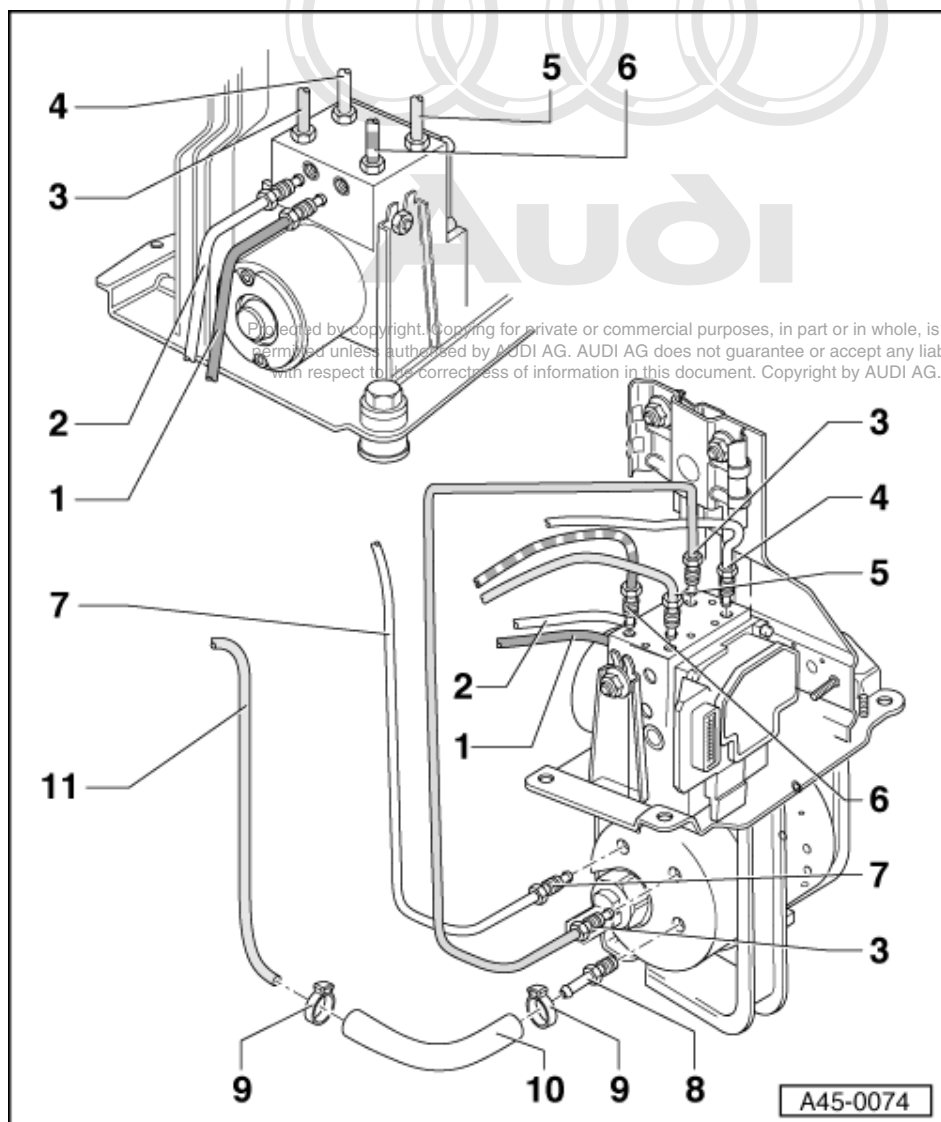
-> Fig.1 Arrangement of the brake pipes in the holder

- 1 - Suction pipe, ESP hydraulic pump to brake fluid reservoir
- 2 - From ESP hydraulic pump to brake master cylinder (pushrod piston circuit)
- 3 - From hydraulic control unit to brake master cylinder (floating piston circuit)
- 4 - From hydraulic control unit to front right brake caliper
- 5 - From hydraulic control unit to front left brake caliper



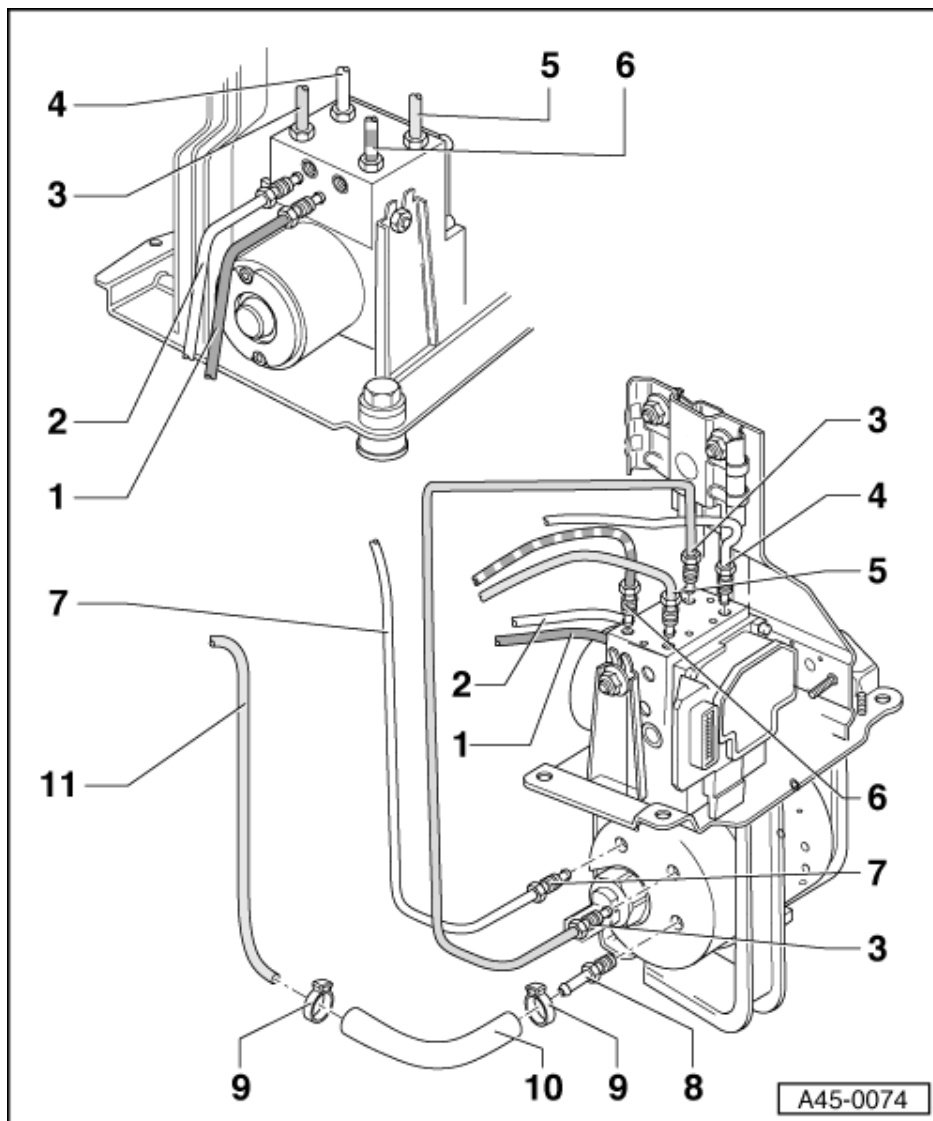
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5.3 - Brake pipe connections: Hydraulic control unit with ESP hydraulic pump



The tightening torque of the brake lines is 15 Nm.

- 1 To rear left brake caliper
- 2 To rear right brake caliper
- 3 From hydraulic control unit to ESP hydraulic pump
- 4 To front left brake caliper
- 5 To front right brake caliper



- 6 To brake master cylinder (floating piston circuit)
- 7 From ESP hydraulic pump to brake master cylinder (pushrod piston circuit)
- 8 Pipe union, 12 Nm
- 9 Hose clamp
- 10 Suction hose
- 11 Suction pipe from ESP hydraulic pump to brake fluid reservoir

5.4 - Removing and installing hydraulic control unit

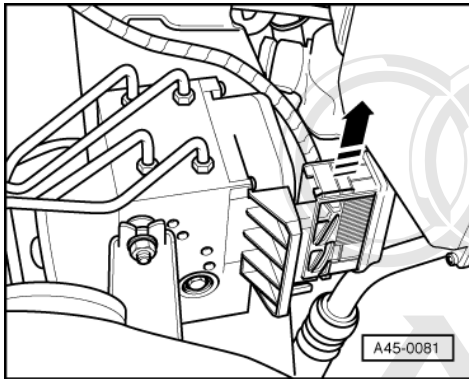
Special tools and workshop equipment required

Plug repair set, Part no. 1H0 698 311A

Brake pedal depressor, e.g. from V.A.G 1813

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Removing



- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

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Disconnect the connector from the control unit.

- -> Pull the connector housing upwards until the connector can be taken off.
- Connect bleeder bottle to bleeder screw on front left brake caliper and open the bleeder screw.
- Insert brake pedal depressor between brake pedal and driver's seat. Depress the brake pedal by at least 60 mm.

This will prevent the brake fluid reservoir from running dry.

The brake pedal depressor must remain in position until all the brake pipes have been reconnected.

- Close front left bleeder screw.
- ♦ Protect the engine compartment against escaping brake fluid.
- Unscrew brake pipe connections on hydraulic unit.
- Seal brake pipes and threaded holes with plugs from repair set Part No. 1H0 698 311 A.
- Remove hexagon nuts on hydraulic control unit bracket.
- Remove hydraulic control unit.

Important Brake pipes must not be bent.
--

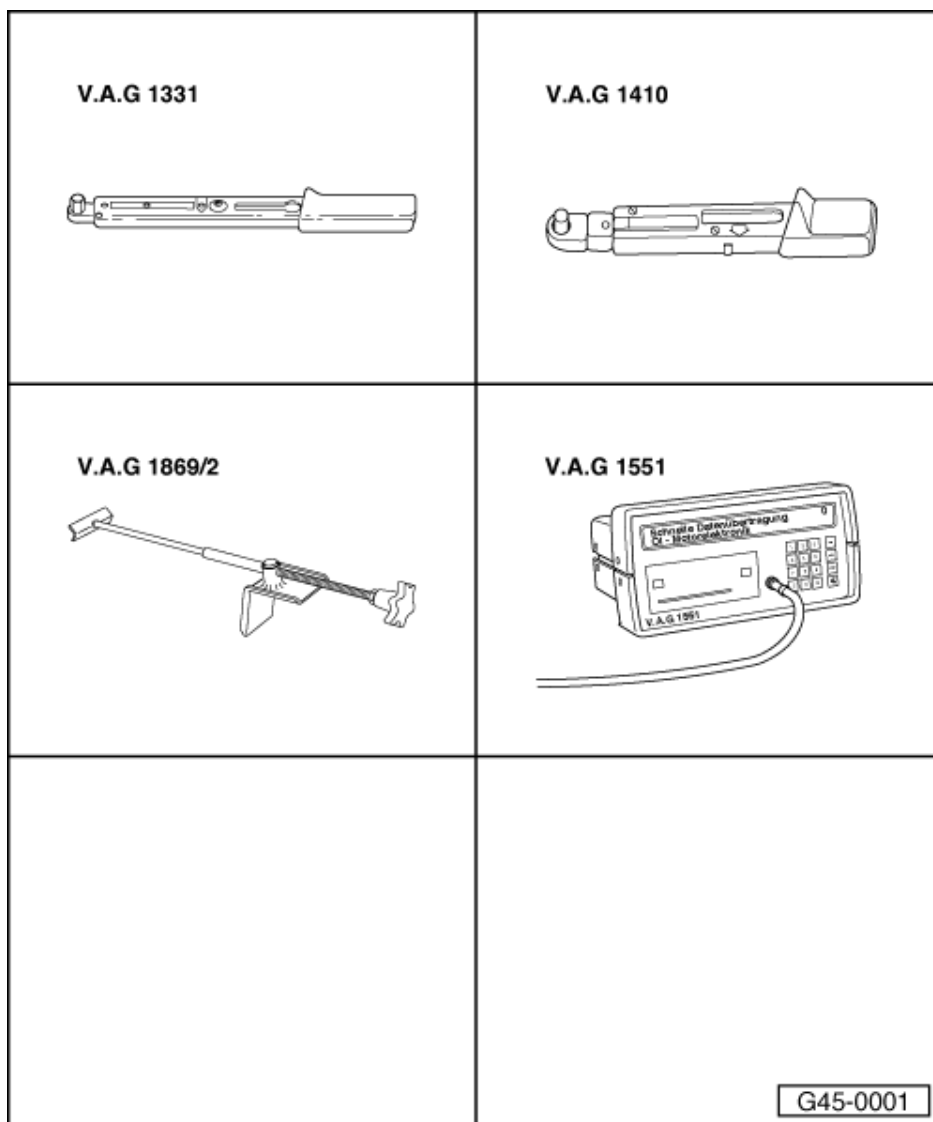
Installing

Install in reverse order.

- Bleeding brake system => Page 161
- Perform final control diagnosis.

=> Running Gear Self-Diagnosis; Repair group 00

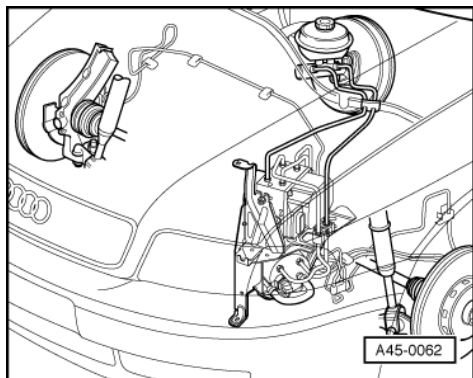
5.5 - Removing and installing ESP (electronic stability program) hydraulic pump



Special tools and workshop equipment required

- ◆ V.A.G 1331 Torque wrench
- ◆ V.A.G 1410 Torque wrench
- ◆ V.A.G 1869/2 Brake pedal depressor
- ◆ V.A.G 1551 or V.A.G 1552

Plug repair set, Part no. 1H0 698 311A



-> Fitting location

The ESP hydraulic pump is located in the engine compartment on the left beneath the hydraulic control unit.

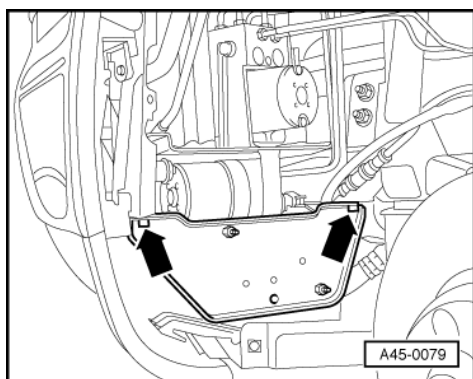
Removing

- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

Important
Brake pipes must not be bent.

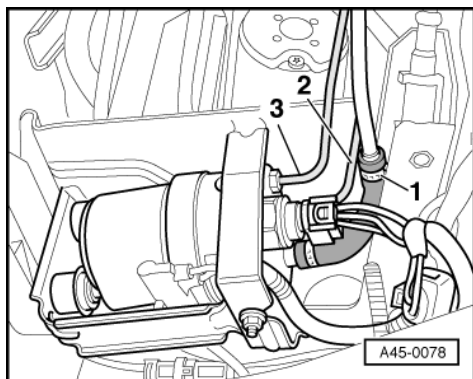
- Raise vehicle.



- Remove front left wheel.
- Remove front half of front left wheel housing liner.
- -> Unscrew the retainer for the fan resistors.

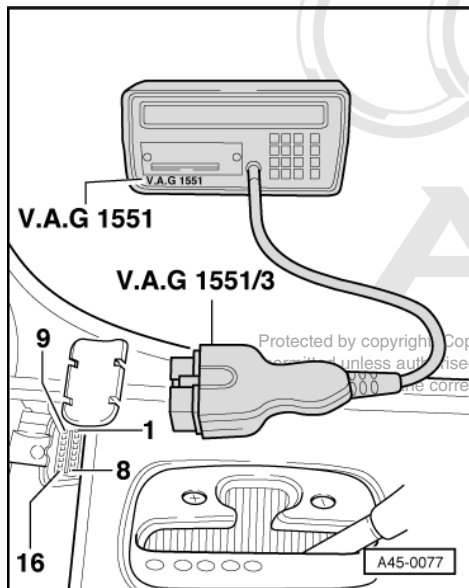
Note:

- ♦ Protect the engine compartment against escaping brake fluid.

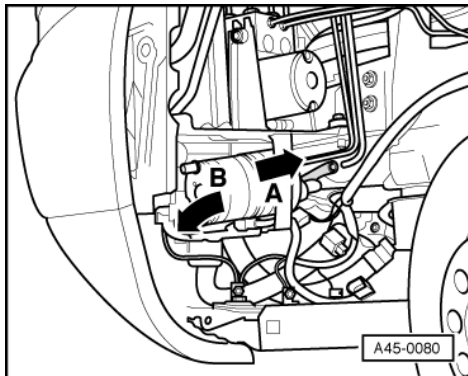


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- -> Release hose clamp of suction hose -1- and detach.
- Unbolt brake pipes -2- and -3-.
- Seal brake pipes and threaded holes with plugs from repair set Part No. 1H0 698 311 A.



- -> Disconnect connector -1- and separate plug connection -2-.
- Open the cable ties -arrows-.
- Unscrew hexagon nut -3-.



- -> Slide the hydraulic pump out of the rear buffers in the direction of arrow -A-.
- Unscrew the lower bonded rubber bush from the pump.
- Take out the pump in the direction of arrow -B-.

Installing

Install in reverse order.

- Bleeding brake system => Page 161
- Perform final control diagnosis.

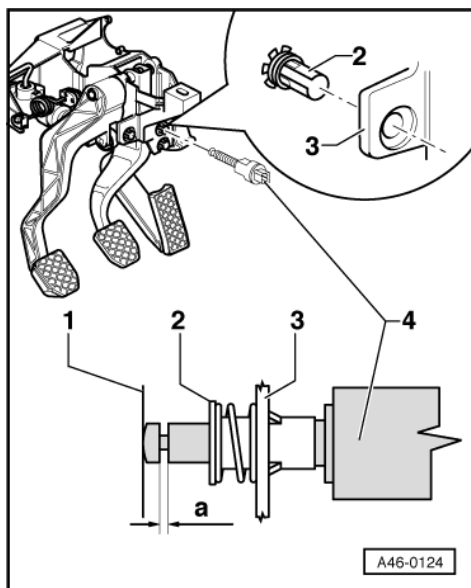
=> Running Gear Self-Diagnosis; Repair group 00

6 - Removing and installing components of the ABS/ESP system

6.1 - Removing and installing components of the ABS/ESP system

6.2 - Removing and installing brake light switch (F)

With spring clip for mounting brake light switch.



- 1 - Brake pedal stop surface
- 2 - Spring clip
- 3 - Pedal bracket
- 4 - Brake light switch -F-
- a - Dimension: max. 1.2 mm - min. 0.5 mm

Note:

The switch must only be fitted once to ensure that it is sufficiently tight.

- Press spring clip -2- into the pedal bracket, against the direction of travel.
- Guide switch -4- into the installed spring clip -2- and press or screw it up to stop.

This must not place the brake pedal under any pre-tension.

- Check dimension -a- with feeler gauge and, if necessary, turn brake light switch to dimension -a-.

6.3 - Removing and installing steering angle sensor -G85

- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

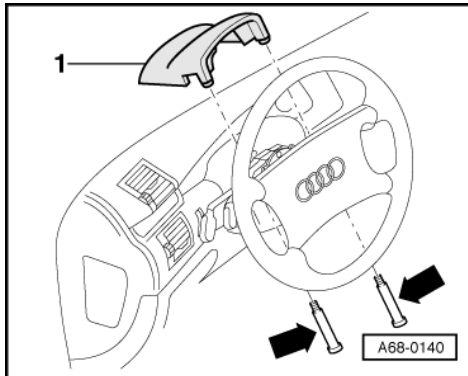
- Remove the driver's side airbag unit.

=> General Body Assembly, Interior; Repair group 69; Servicing airbag on driver's side Servicing airbag on driver's side

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- Remove airbag unit and steering wheel

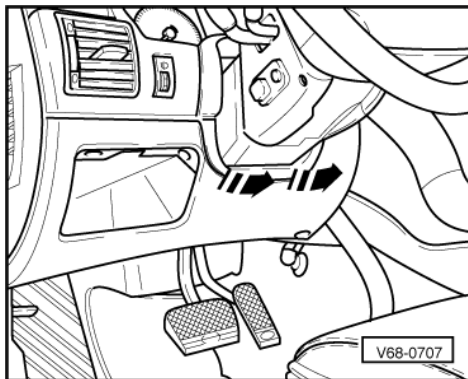
=> Running Gear, FWD and 4WD; Repair group 48; Airbag, Steering wheel, Steering column; Removing and installing driver's airbag unit Airbag, Steering wheel, Steering column Removing and installing driver's airbag unit



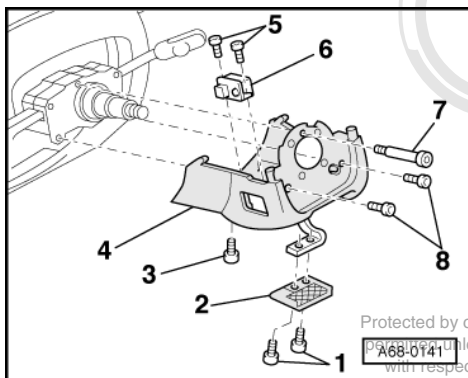
- Wheels set to straight-ahead position.

Remove the trim on the steering column switch.

- -> Remove screws -arrows- and detach trim -1-.



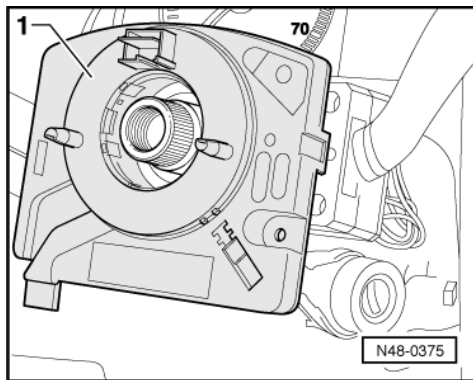
- -> Pull off lower surround in direction of arrow.



- -> Remove screws -1- and detach grip -2- for steering column adjustment.
- Remove screws -7- and -8- and detach lower trim for steering column switch -4-.
- If applicable, detach connector from switch -6- or unscrew switch.

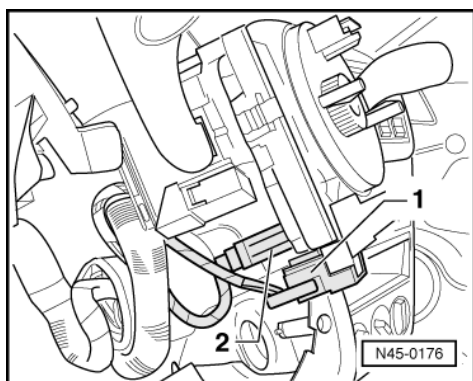
Note:

Fig. shows trim for steering column switch ▶ 06.97.

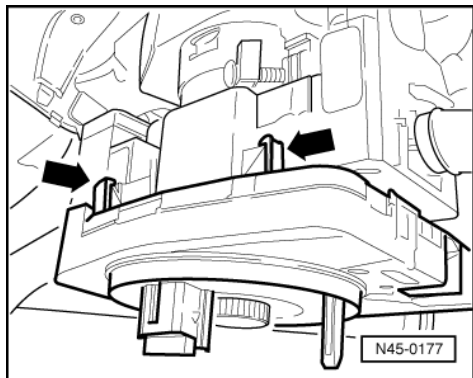


-> The steering angle sensor -G85 is installed in housing -1- together with coil spring

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- -> Remove connectors -1- and -2-.

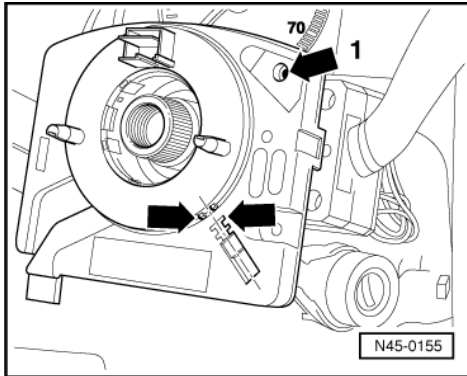


- -> Carefully lift hooks -arrows- and disconnect steering angle sensor.

Installing

The steering angle sensor -G85 must be in centre position before installing.

- Mount steering angle sensor until lugs engage.
- Remove transport protection.



- -> A yellow dot must be visible in the hole -arrow 1-.
- Furthermore, the markings -arrows- must align.

Make sure that centre position is adhered to.

The remaining installation steps are carried out in the reverse sequence.

- Carry out basic setting of steering angle sensor -G85.

=> Running Gear Self-Diagnosis for ESP; Repair group 01; Perform self-diagnosis Perform self-diagnosis

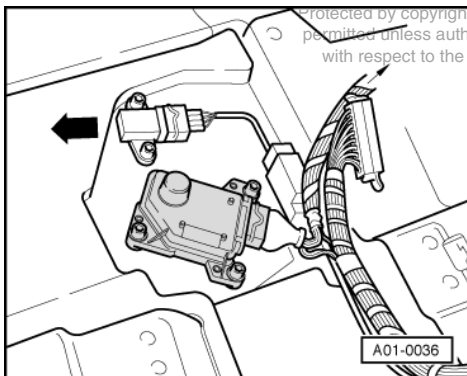
- Disconnect battery.

=> Electrical System; Repair group 27; Battery Battery

6.4 - Removing and installing lateral acceleration sender -G200 and yaw rate sender -G202

Removing

- Switch off ignition.

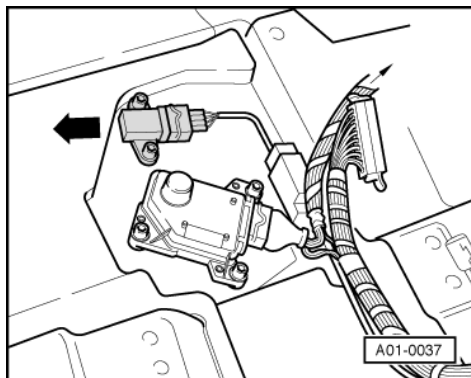


- Remove the driver's seat

=> General Body Assembly, Interior; Repair group 72; Front seats Front seats

-> Yaw rate sender-G202 is located underneath the driver's seat.

Tightening torque for bolts 5 Nm.



-> Lateral acceleration sender -G200

Is located underneath the driver's seat.

Caution.

Lateral acceleration sensor is sensitive to impact.

If the sensor has been dropped by mistake it may not work properly and must not be installed into the vehicle. Do not use the sensor again.

Tightening torque for bolts 2 Nm.

Installing

The remaining installation steps are carried out in the reverse sequence.

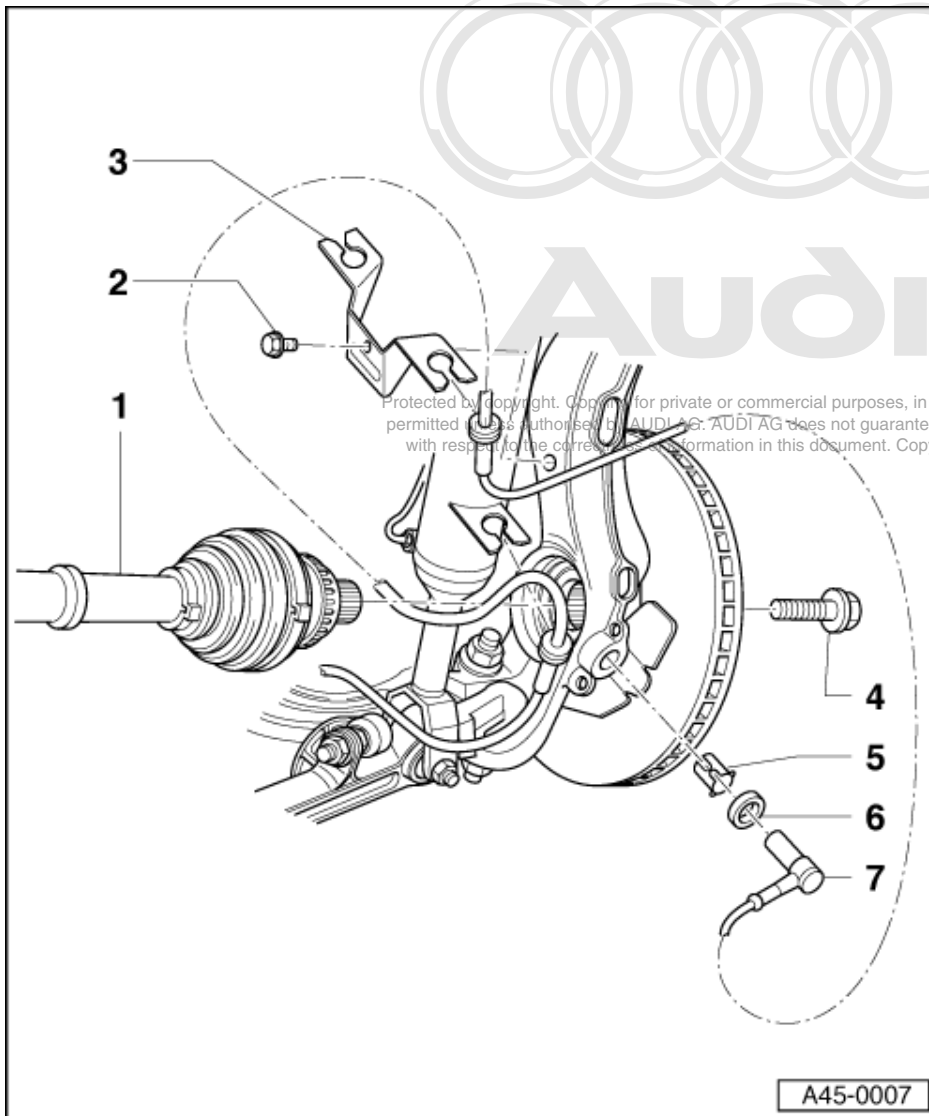
- Install the driver's seat

=> General Body Assembly, Interior: **Repair group 72: Front seats Front seats**

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7 - Removing and installing components of the ABS/ESP system on the front axle

7.1 - Removing and installing components of the ABS/ESP system on the front axle



1 Drive shaft with rotor

- ♦ Inspect rotor for signs of dirt and damage => Page 45
- ♦ Replace outer CV joint if the rotor is damaged.

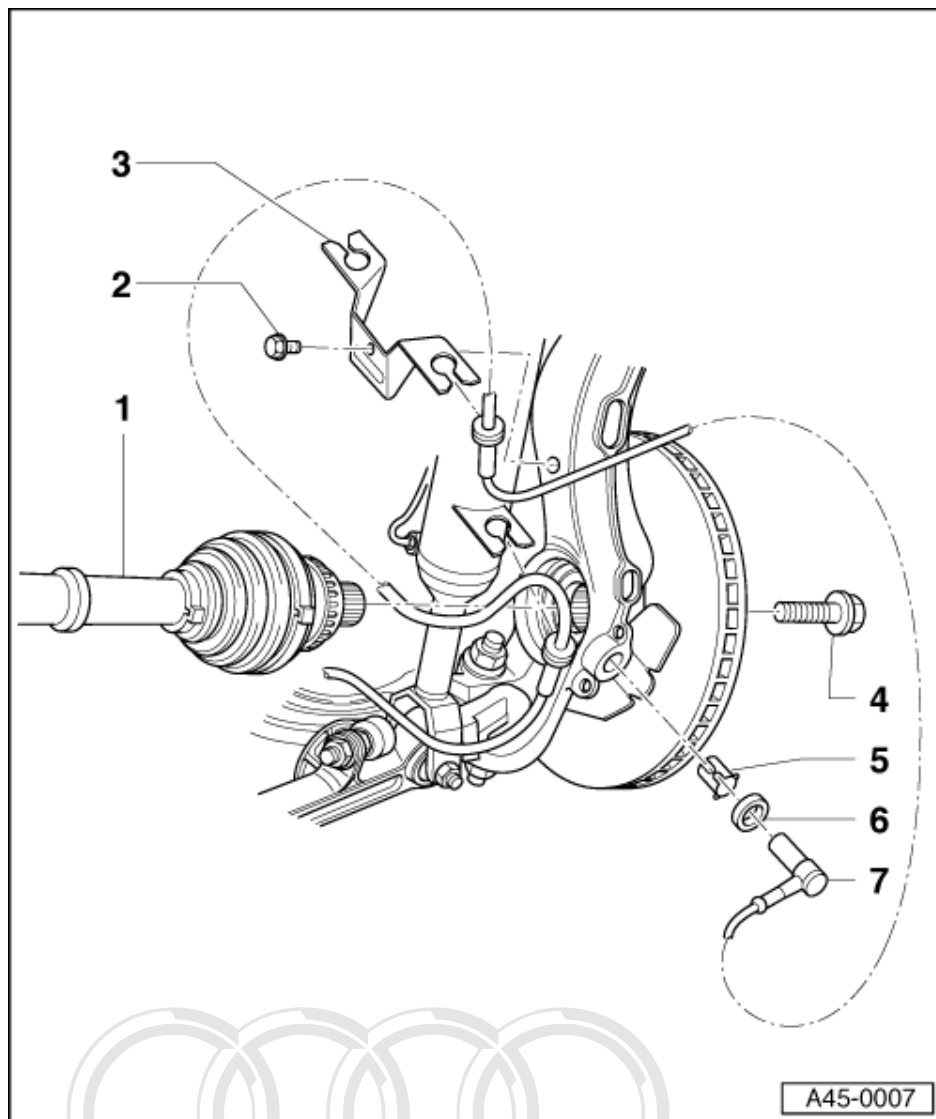
=> Running Gear, FWD and 4WD; Repair group 40; Removing and installing drive shaft Removing and installing drive shaft

- ♦ Outer CV joint is supplied as replacement part with rotor

2 Combi bolt, 10 Nm

3 Bracket

- ♦ Insert speed sensor wiring with grommet into retainer.



4 Collar bolt

5 Clamping sleeve

- ◆ Always replace
- ◆ Grease the hole in the wheel bearing housing with lubricating paste G 000 650 before inserting
- ◆ Press home in wheel bearing housing

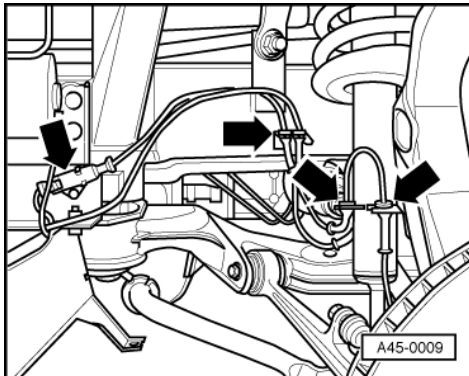
6 Sealing collar

7 Speed sensor

- ◆ Replacing => Page 45 .

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7.2 - Removing and installing speed sensor

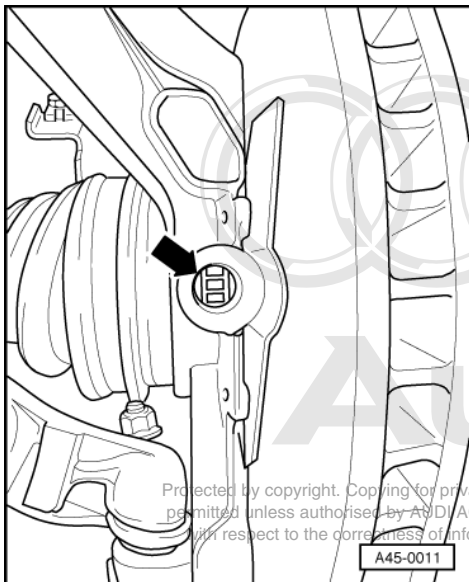


- Switch off ignition.
- Raise vehicle.
- Remove wheel.
- Remove front half of wheel housing liner.
- -> Detach connector of speed sensor wiring.
- Unclip speed sensor wiring from retainers.
- Pull ABS speed sensor from wheel bearing housing.

Installing

- Renew clamping sleeve (=> Page 45-55 -item 5-).
- Before inserting the speed sensor, fit the sealing collar and coat the speed sensor all around with lubricating paste G 000 650.
- Press the ABS speed sensor home by hand.
- Connect speed sensor wiring and fasten grommets in retainers.
- Fit wheels and tighten to 120 Nm.

7.3 - Checking rotor

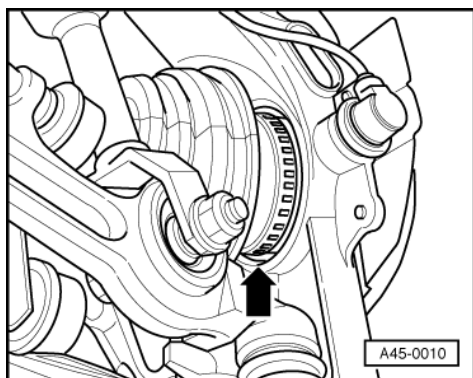


- Raise vehicle.
- Remove wheel.
- Pull speed sensor out of wheel bearing housing.
- Inspect rotor for signs of dirt and damage -arrow-.



Notes:

- ♦ If the rotor is damaged or dirty remove the drive shaft. In the event of damage, replace outer CV joint together with rotor.



- -> To clean the rotor, undo the collar bolt on the drive shaft and slide the drive shaft inwards.

Important

The vehicle must be standing on its wheels when slackening off and tightening the collared bolt
-risk of accident-

Always use a new collar bolt.

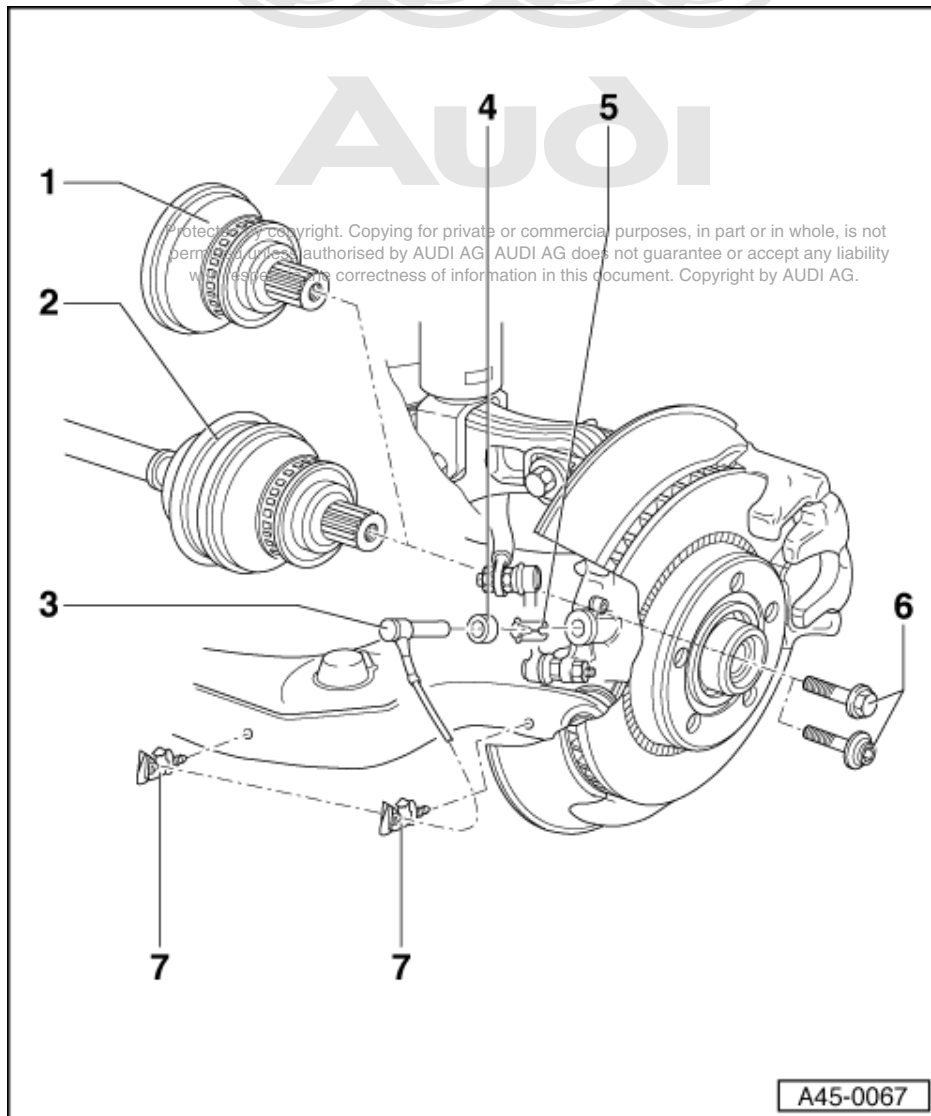
- Tighten the collar bolt to 190 Nm and then turn it a further 180°.



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8 - Removing and installing components of the ABS/ESP system on the rear axle

8.1 - Removing and installing components of the ABS/ESP system on the rear axle



1 Stub axle with rotor (FWD)

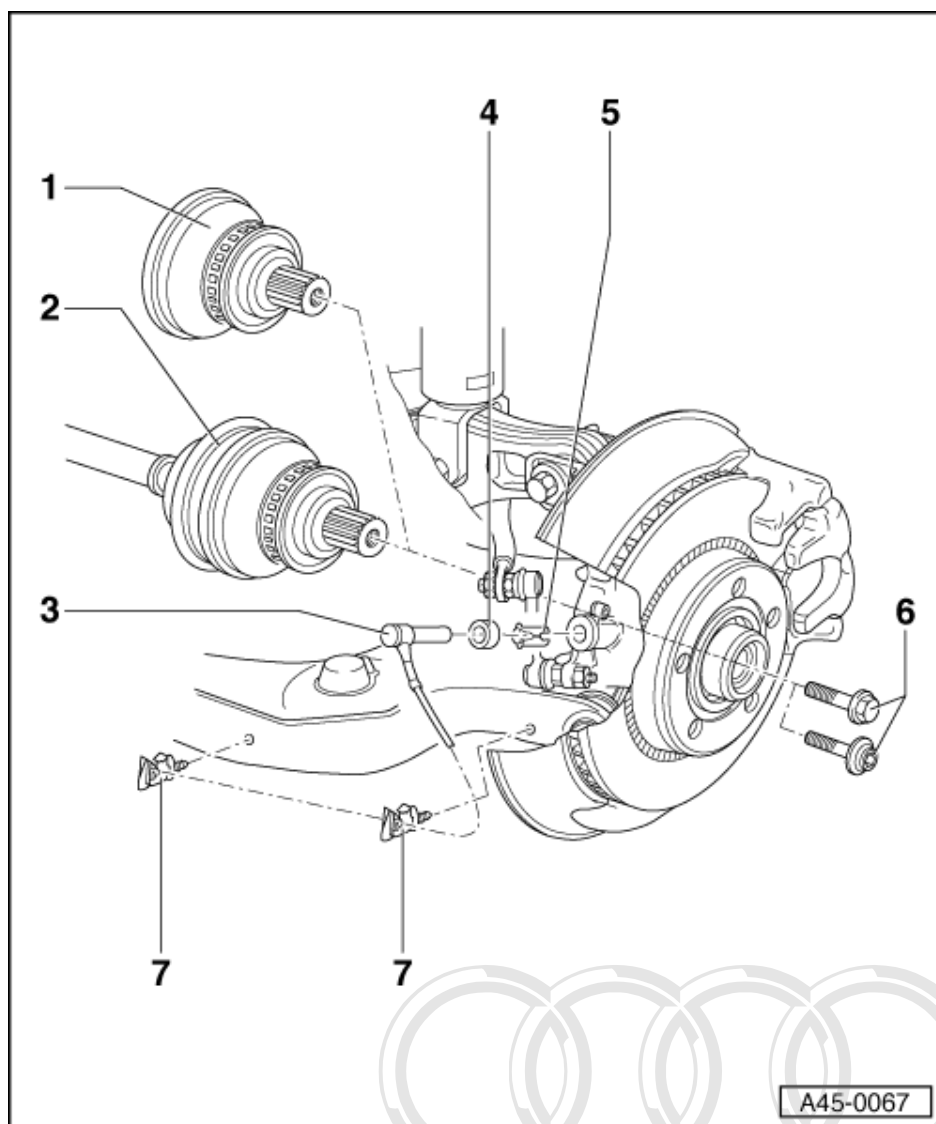
- ◆ Inspect rotor for signs of dirt and damage => Page 49
- ◆ The stub axle is supplied with rotor as a replacement part

2 Drive shaft with rotor (4WD)

- ◆ Inspect rotor for signs of dirt and damage => Page 49
- ◆ Replace outer CV joint with rotor if rotor is damaged.

=> Running Gear, FWD and 4WD; Repair group 42; Removing and installing drive shaft Removing and installing drive shaft

- ◆ Outer CV joint is supplied as a replacement part with the rotor.



3 Speed sensor

- ♦ Removing and installing
=> Page 48

4 Sealing collar

5 Clamping sleeve

- ♦ Always replace
- ♦ Grease the hole in the wheel bearing housing with lubricating paste G 000 650 before inserting
- ♦ Press home in wheel bearing housing

6 Collar bolt

7 Clip

- ♦ Release connector of wheel speed sensor cable and detach. Unclip speed sensor wiring

8.2 - Removing and installing speed sensor

- Switch off ignition.
- Raise vehicle.
- Remove wheel.
- Detach connector of speed sensor wiring.
- Unclip speed sensor wiring from retainers.
- Pull ABS speed sensor from wheel bearing housing.

Installing

- Renew clamping sleeve (=> Page 48 -Item 5 -).
- Before inserting the speed sensor, fit the sealing collar and coat the speed sensor all around with lubricating paste G 000 650.
- Press the ABS speed sensor home by hand.
- Connect speed sensor wiring and press into retainers.
- Fit wheels and tighten to 120 Nm.

8.3 - Checking rotor

- Raise vehicle.
- Remove wheel.
- Pull speed sensor out of wheel bearing housing.
- Inspect rotor for signs of damage or dirt.

Notes:

- ♦ If the rotor is damaged or dirty remove the stub axle/drive shaft. In the event of damage, replace outer CV joint together with rotor.



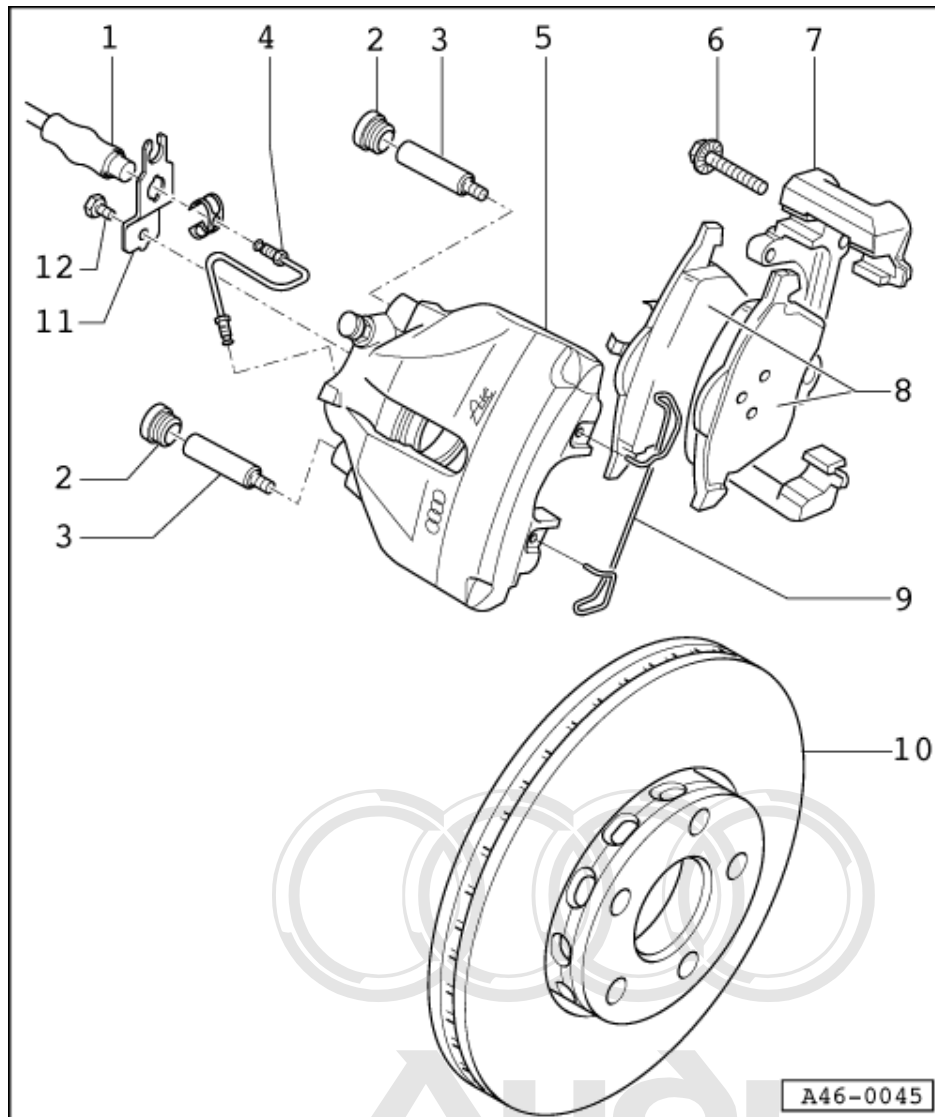
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46 - Brakes, Brake mechanics

1 - Front brake FN-3

1.1 - Front brake FN-3



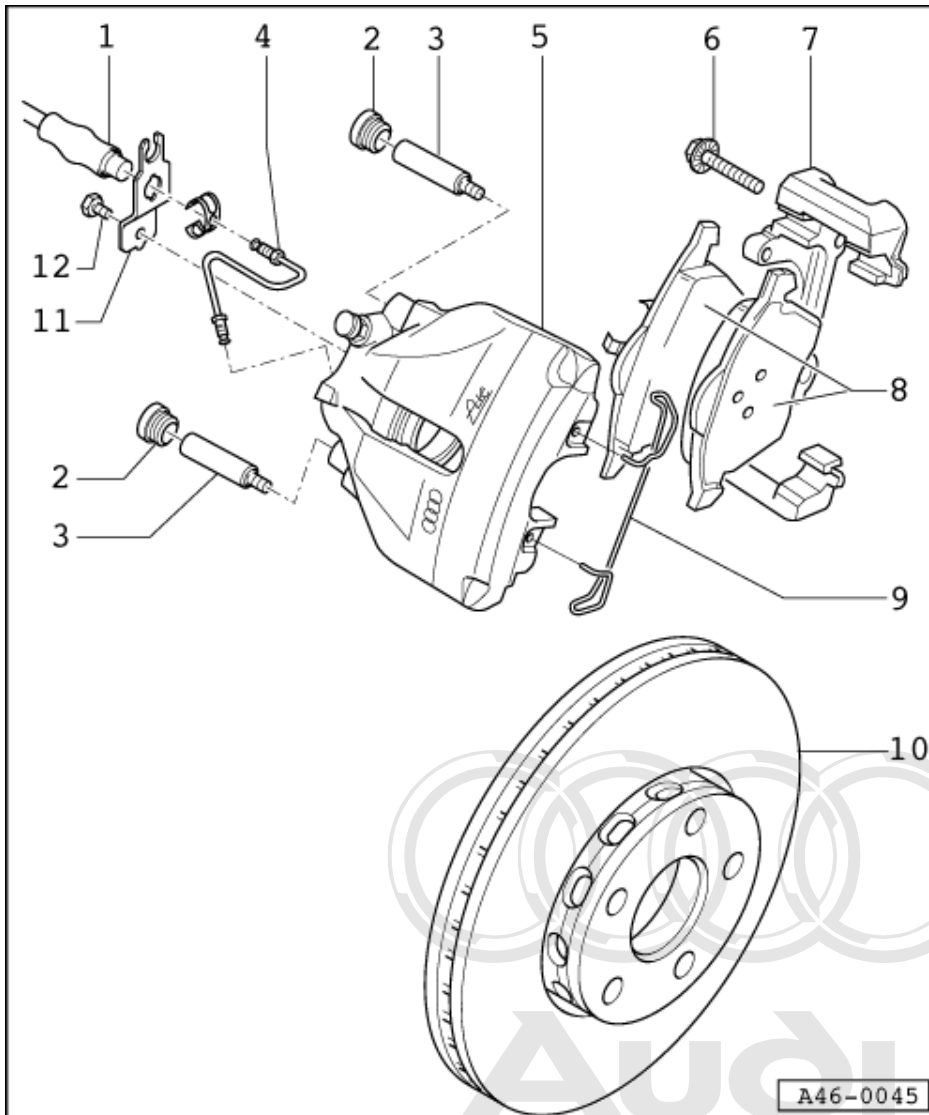
1.2 - Servicing front brakes

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Notes:

- ♦ Always install the complete repair kit.
- ♦ After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in the normal operating position.
- ♦ To draw off brake fluid from the reservoir, use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.
- ♦ Check that the brake caliper moves freely by moving it from side to side.

- ♦ Wheel bolt tightening torque: 120 Nm.



1 Brake hose

- ♦ Do not disconnect brake hose when changing brake pads

2 Trim cap

- ♦ Remove

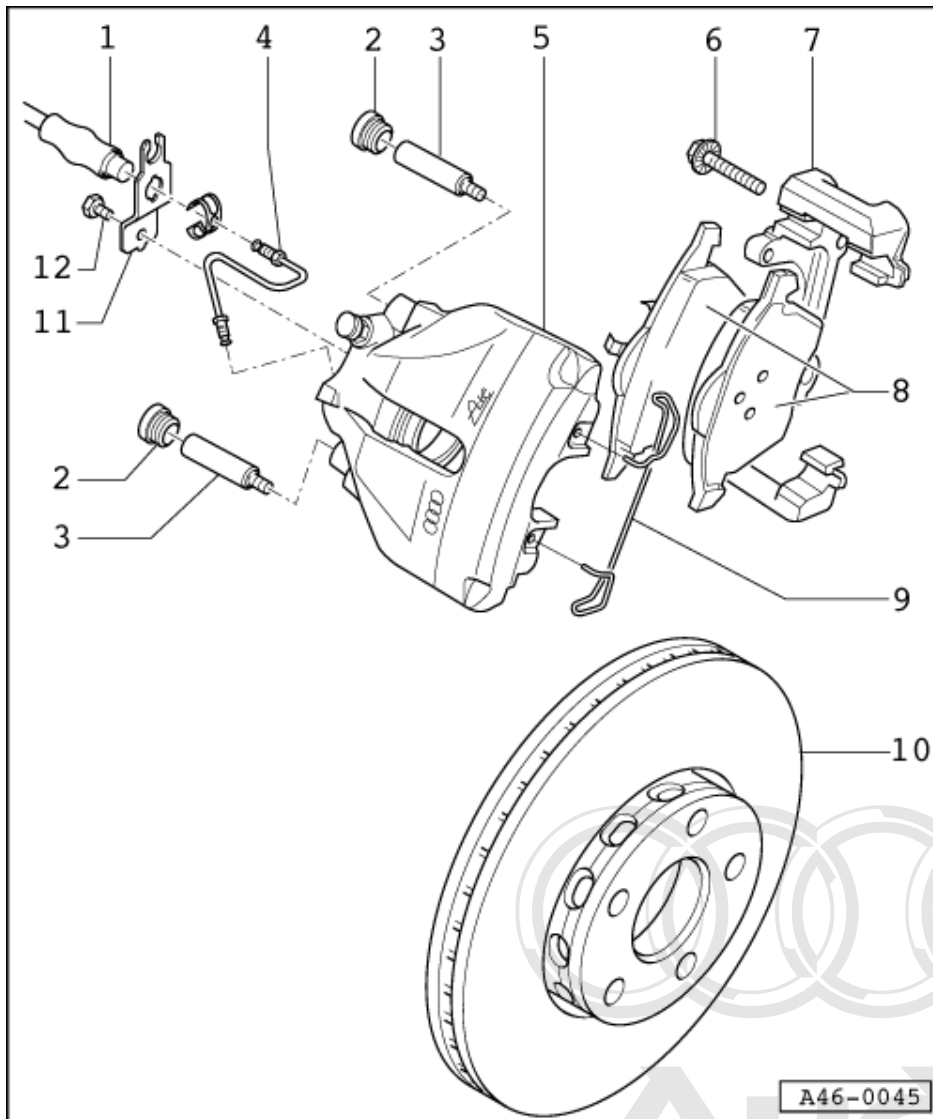
3 Guide pin, 25 Nm

4 Brake pipe, 15 Nm

- ♦ Screw into brake caliper housing
- ♦ Screw into brake hose, counterholding at hexagon on brake hose.
- ♦ Ensure that lugs are properly seated in retainer grooves.

5 Brake caliper housing

=> Brake System; Repair group 00; Technical data Technical data



6 Ribbed bolt, 120 Nm

- ♦ Clean ribbing if reusing

7 Brake carrier

- ♦ Bolt to wheel bearing housing

8 Brake pads

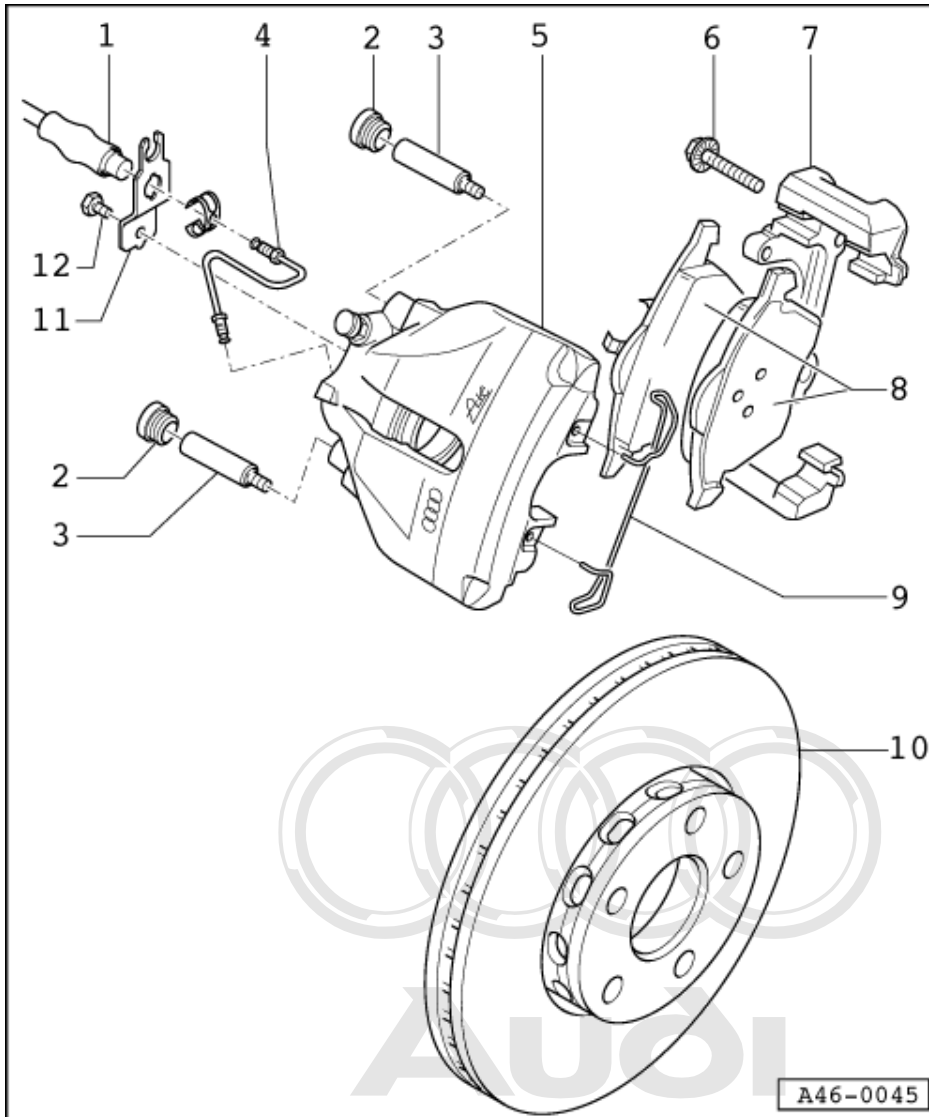
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Note:

The inner pad (with expansion spring) has an arrow. The arrow should point in the direction of rotation of the brake disc when travelling forwards. If installed incorrectly this may cause noise problems.

- ♦ The outer brake pads are provided with an adhesive sheet on the backing plate of the pad. Remove the protective sheet before inserting pads.
- ♦ Always replace all components on an axle
- ♦ Removing and installing
=> Page 55

=> Brake System; Repair group 00; Technical data Technical data



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Note:

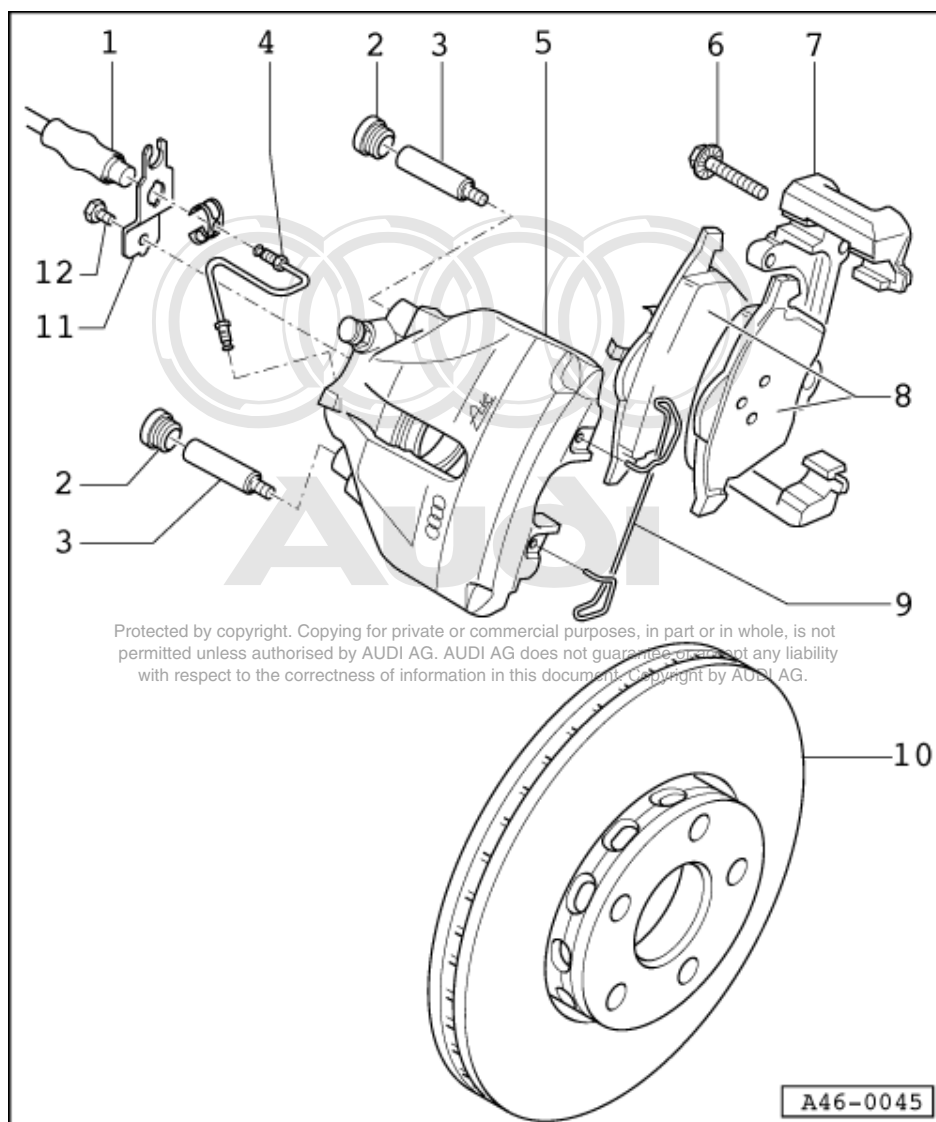
Always clean the brake calipers (no grease) before inserting new brake pads. At the same time, make sure that all adhesive sheet residue on the contact surfaces of the outer brake pad is removed.

9 Retaining spring

- ♦ Insert in both holes in brake caliper housing

Note:

After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.



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10 Brake disc

- ◆ Always replace all components on an axle
- ◆ Remove brake caliper prior to removing
- ◆ Always replace all components on an axle
- ◆ Pads are different, piston side pad with retaining spring

=> Brake System; Repair group 00; Technical data Technical data

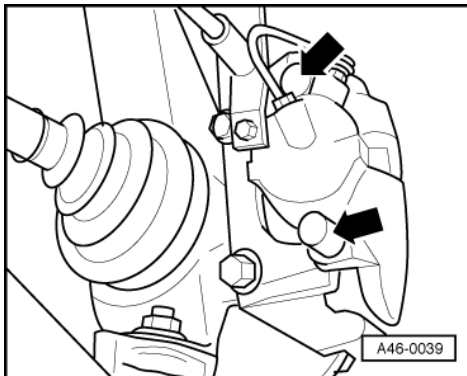
11 Bracket

- ◆ Bolt to brake caliper housing

12 Hexagon bolt, 10 Nm

1.3 - Removing and installing brake pads

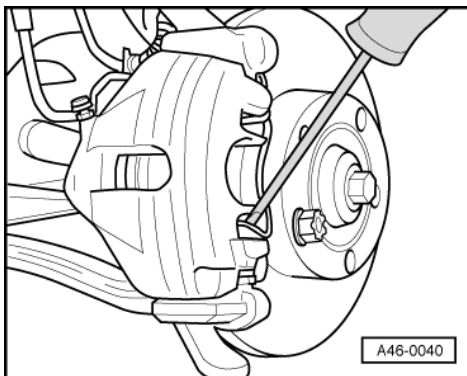
Removing



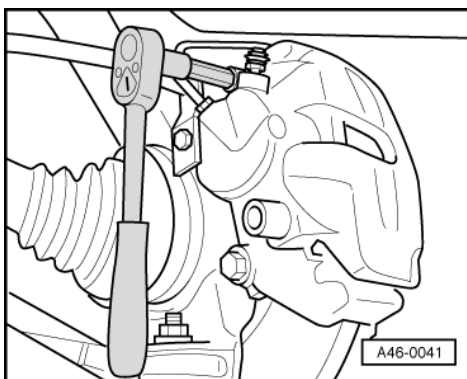
Note:

Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

- -> Remove protective caps.



- -> Lever off brake pad retaining spring from brake caliper housing with a screwdriver and remove.

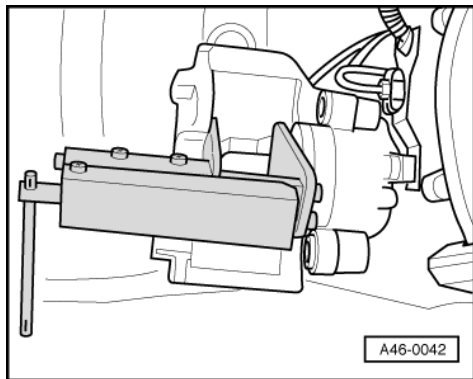


- -> Unscrew both guide pins and remove from brake caliper.
- Remove brake caliper housing and lay to one side so that the weight of the brake caliper does not stress or damage the brake hose.
- Take brake pads out of brake caliper housing or from brake carrier.

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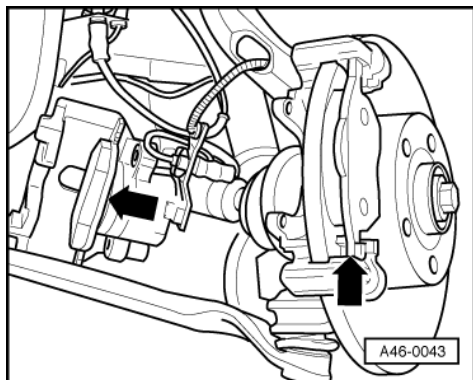
Installing



Note:

Before inserting new brake pads, press piston back into the cylinder with resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

- -> Press back piston.



- -> Install brake pad with retaining spring into brake caliper housing (piston).

Note:

The inner pad (with expansion spring) has an arrow. The arrow should point in the direction of rotation of the brake disc when travelling forwards. If installed incorrectly this may cause noise problems.

- Detach protective sheet on backing plate of outer brake pad.
- Fit outer brake pad onto brake carrier.
- Secure brake caliper housing to brake carrier with both guide pins to 25 Nm.
- Fit both protective caps.
- Insert retaining spring into brake caliper housing.

Note:

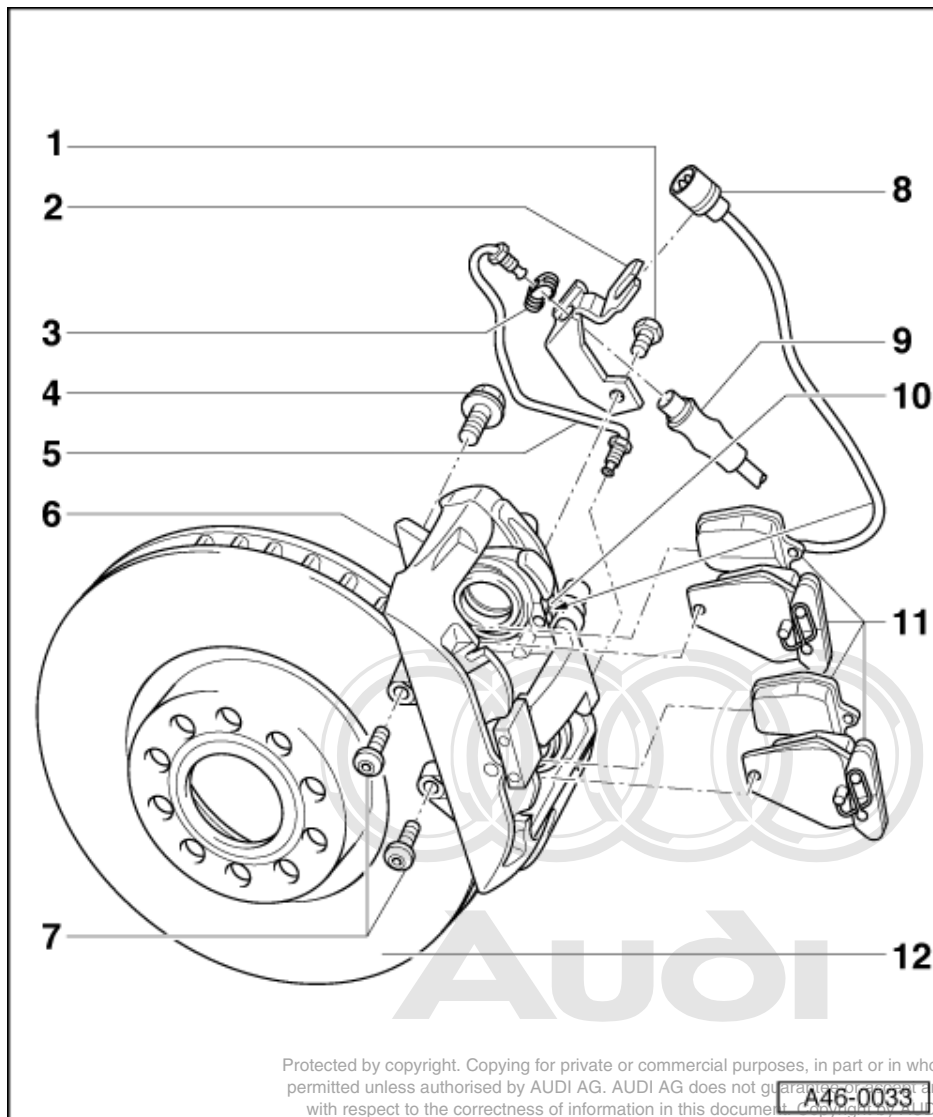
After replacing the brake pads, depress pedal firmly several times with the vehicle stationary, so that the brake pads are properly seated in their normal operating position.

- Check brake fluid level and top up if necessary.

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2 - Front brake HP-2 double-piston brake/steel

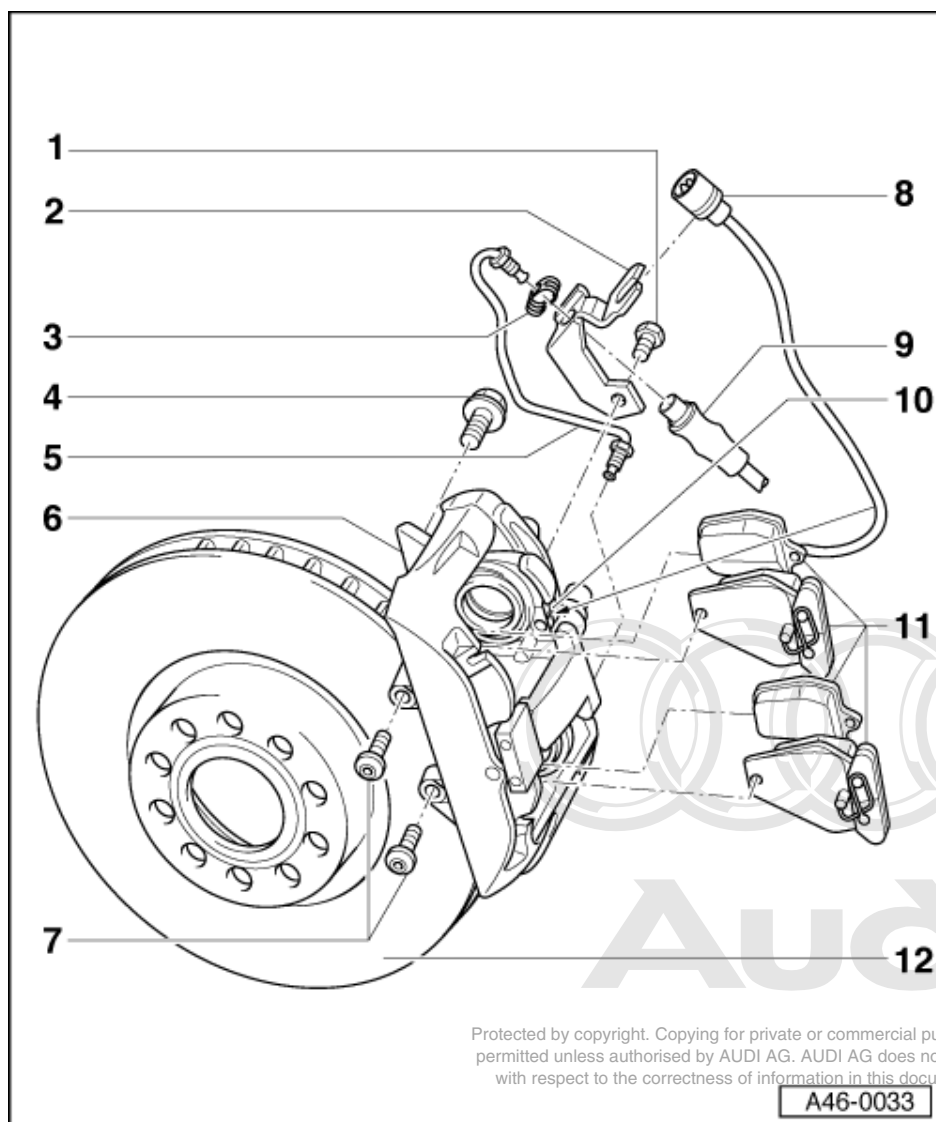
2.1 - Front brake HP-2 double-piston brake/steel



2.2 - Servicing front brakes

Notes:

- ◆ Always install the complete repair kit.
- ◆ After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in the normal operating position.
- ◆ To draw off brake fluid from the reservoir, use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.

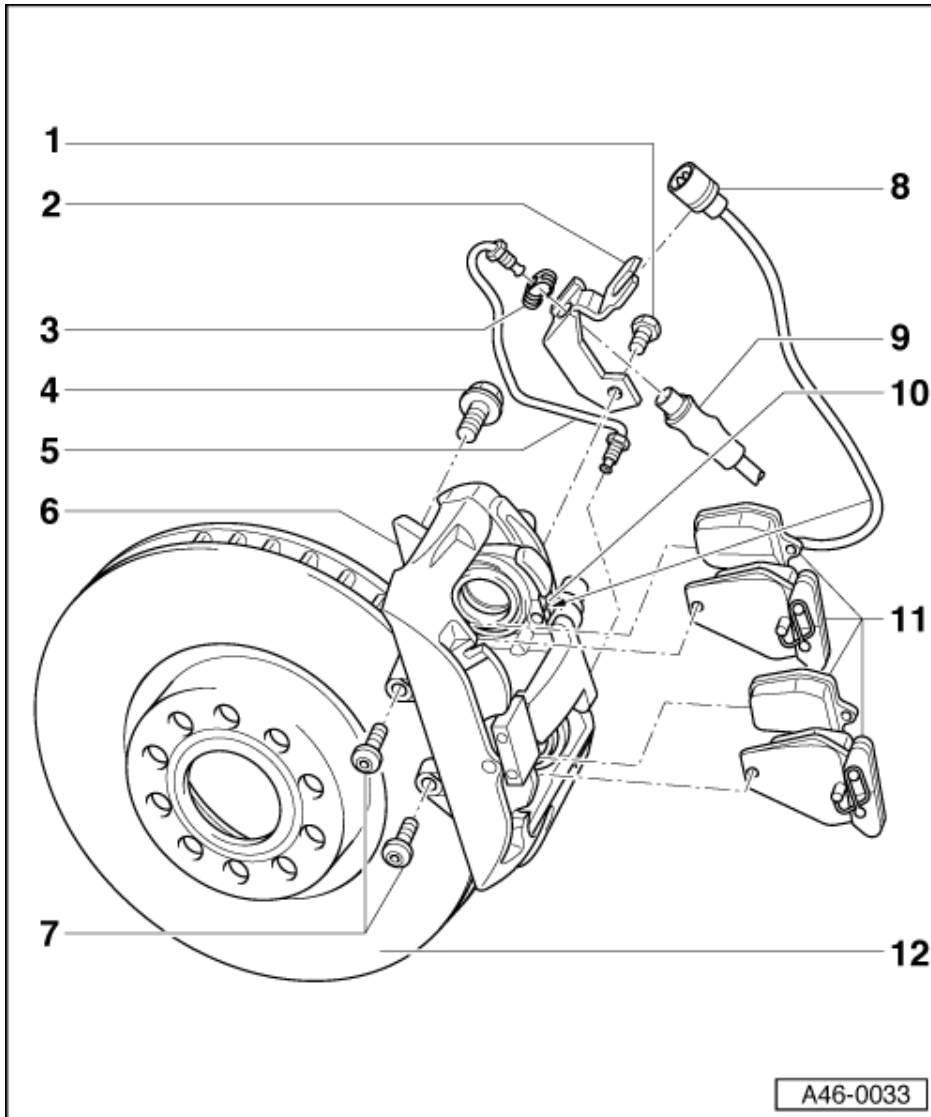


- ♦ The tightening torque of the brake pipes is 15 Nm.

1 Hexagon bolt, 25 Nm

2 Bracket

- ♦ Bolt to brake caliper housing
- ♦ Insert connector for brake pad wear indicator

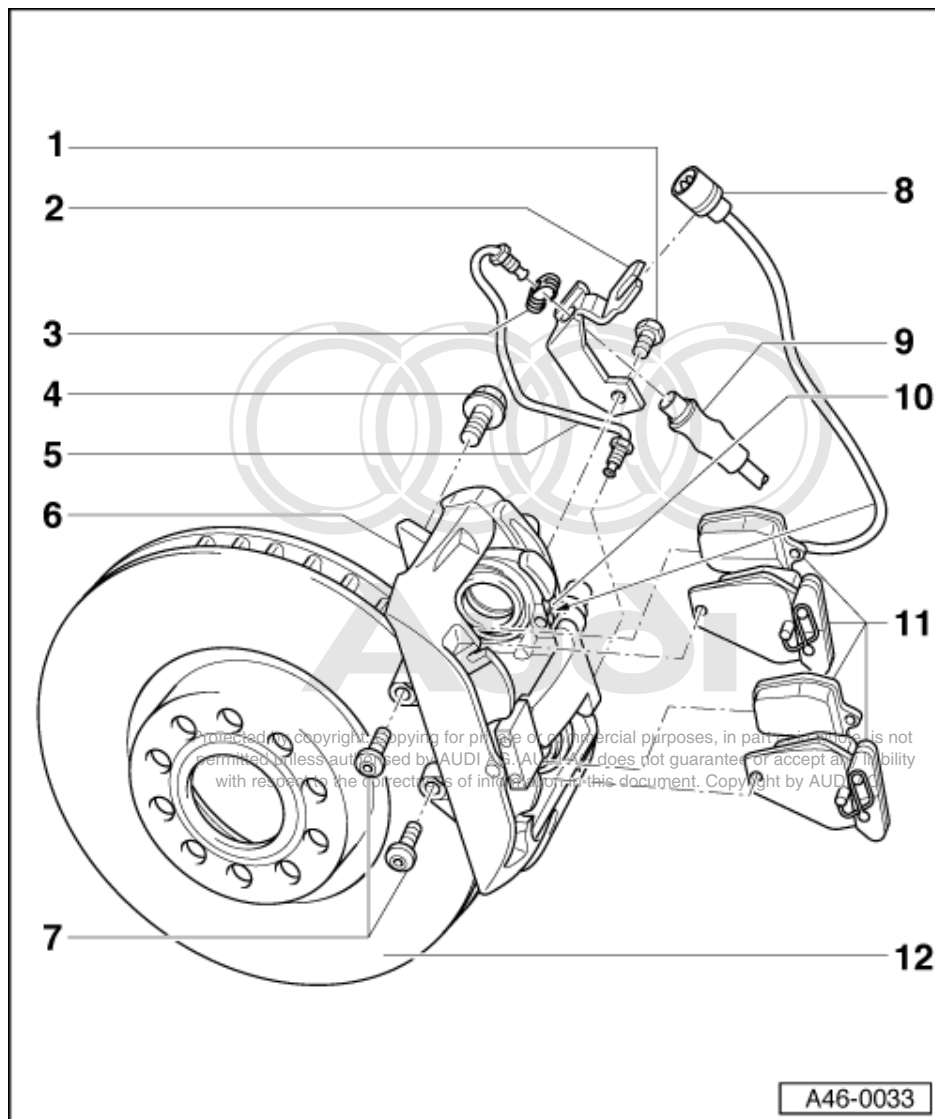


- 3 Retaining spring**
- 4 Ribbed bolt, 200 Nm**
 - ♦ Clean ribbing if reusing
- 5 Brake pipe, 15 Nm**
- 6 Brake caliper with mass damper**
 - ♦ If assembly work is required, do not leave caliper hanging from brake hose but secure it to bodywork with wire
 - ♦ With the exception of "Replacing brake pads"=> Page **128** , no further repairs may be performed on the brake calipers.

=> Brake System; Repair group 00; Technical data Technical data

Audi

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7 Torx bolts, 25 Nm

- ◆ Always replace
- ◆ Remove and insert using commercially available Torx socket (e.g. Hazet T40)
- ◆ Included in brake pad repair set

8 Connector

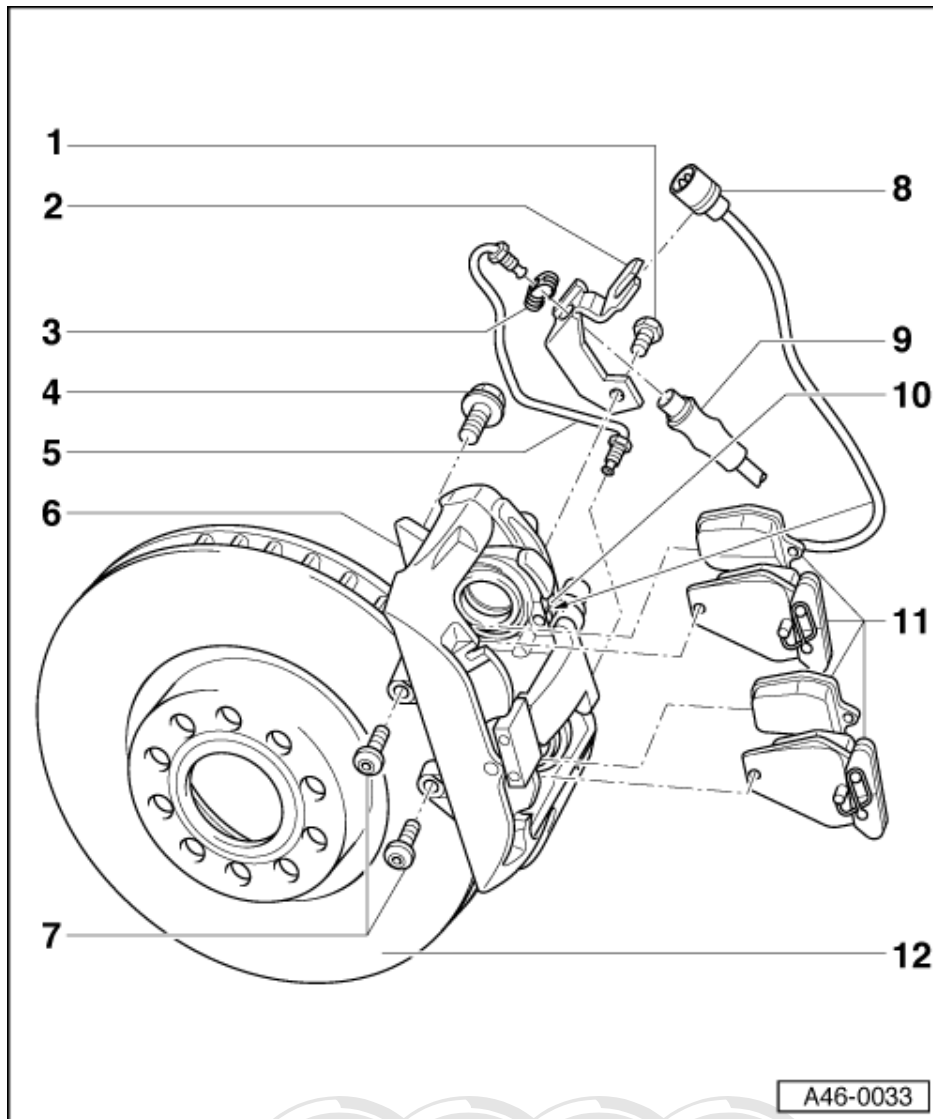
- ◆ Take out of bracket at brake caliper on brake pad replacement

9 Brake hose

- ◆ Do not unscrew to replace brake pads

10 Cable holder

- ◆ Insert cable for brake pad wear indicator into cable holder



11 Brake pads

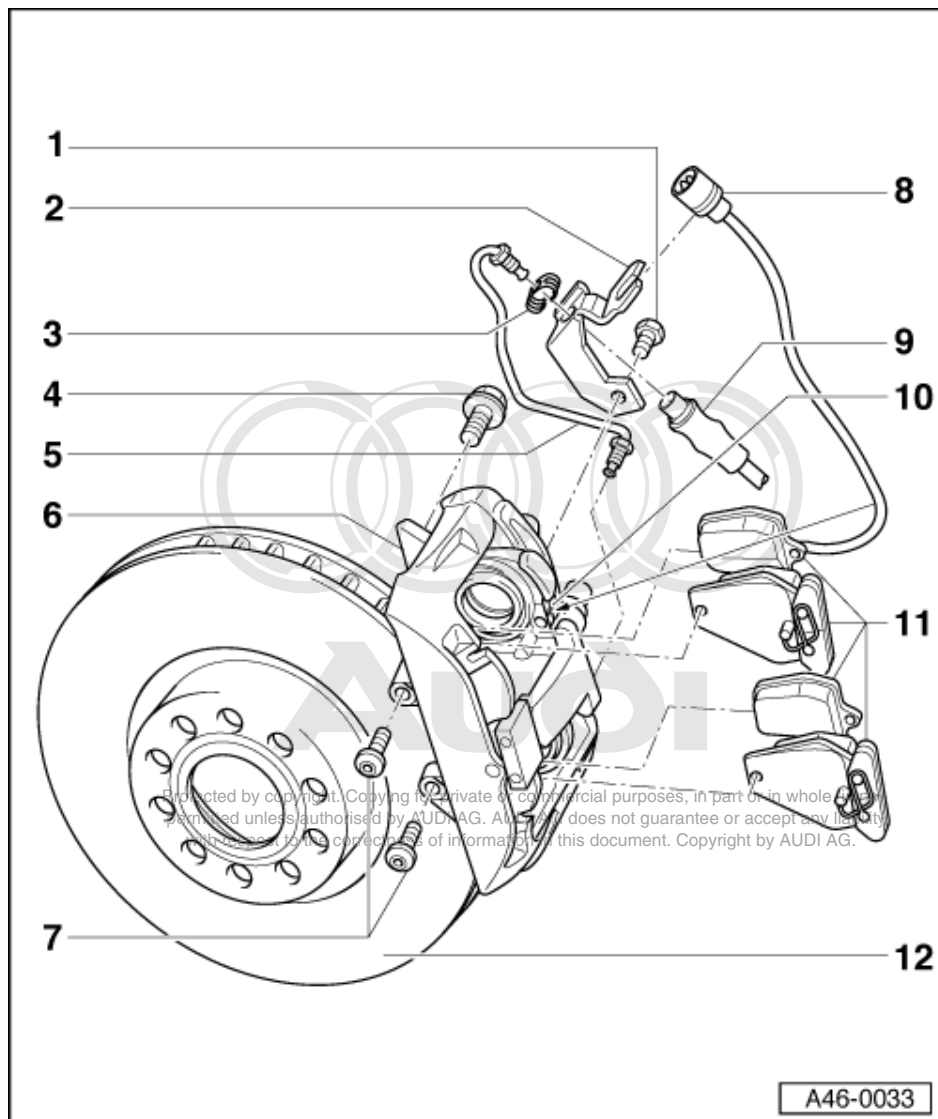
- ◆ With mass damper and anti-squeal spring
- ◆ Always replace all components on an axle
- ◆ Different designs on left and right
- ◆ Removing and installing
=> Page 64
- ◆ With wear indicator
- Once the wear limit is reached (limit: 3 mm), warning light in dash panel insert comes on.
- ◆ The outer brake pads are provided with an adhesive sheet on the backing plate of the pad. Remove the protective sheet before inserting pads.

=> Brake System; Repair group 00; Technical data Technical data

Note:

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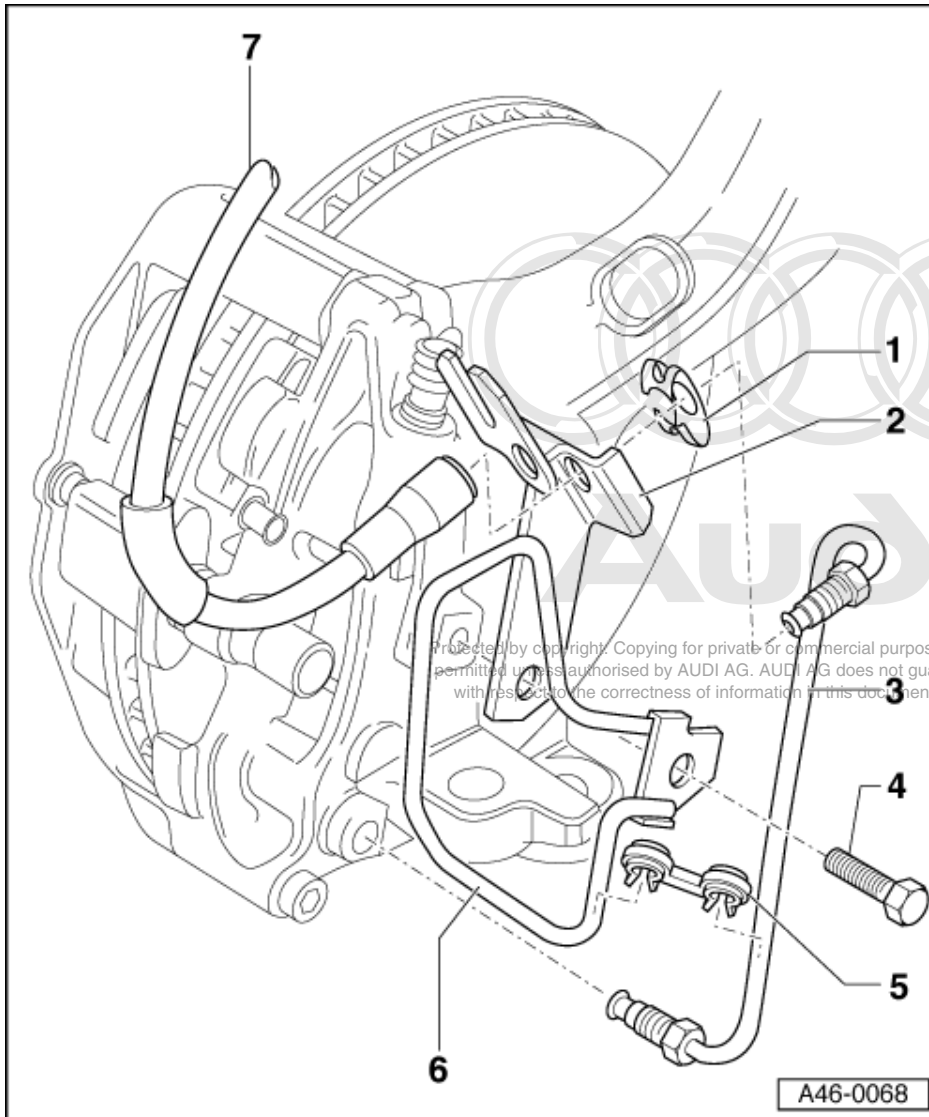
The brake pads are marked with an arrow. The arrow should point in the direction of rotation of the brake disc when travelling forwards. If installed incorrectly this may cause noise problems.



12 Brake disc

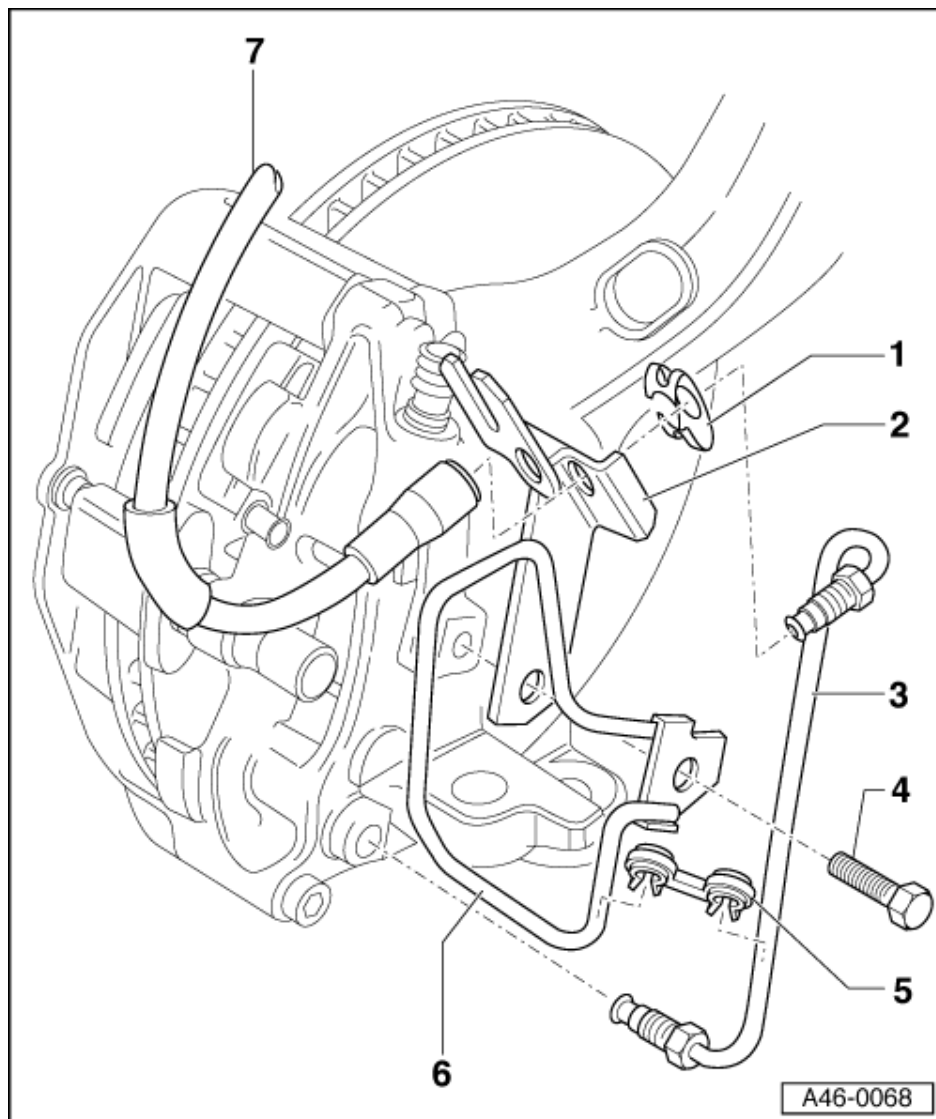
- ◆ Always replace all components on an axle
- ◆ Ensure adequate wear reserve
- ◆ Remove brake caliper prior to removing

=> Brake System; Repair group 00; Technical data Technical data



Following the introduction of the combination of sports running gear and 8J x 18 wheels, an additional retainer has been fitted to the caliper housing on the front brakes on all vehicles. If retrofit 8J x 18 wheels are to be fitted but there is no retainer on the brake caliper housing, fit one in accordance with the illustration.

- 1 Retaining spring**
- 2 Bracket**
 - ♦ Bolt to brake caliper housing
 - ♦ Insert connector for brake pad wear indicator
- 3 Brake pipe, 15 Nm**
- 4 Hexagon bolt, 25 Nm**
 - ♦ Do not tighten until the retainer - **6** - has been fixed in place with the aid of the spacer - **5** -



- 5 Spacer**
 - ♦ Fixes the installation position of the retainer and the brake pipe
- 6 Retainer**
 - ♦ Bolt to brake caliper housing
 - ♦ Note the markings: L = left side, R = right side
- 7 Brake hose**
 - ♦ Do not unscrew to replace brake pads

2.3 - Removing and installing brake pads

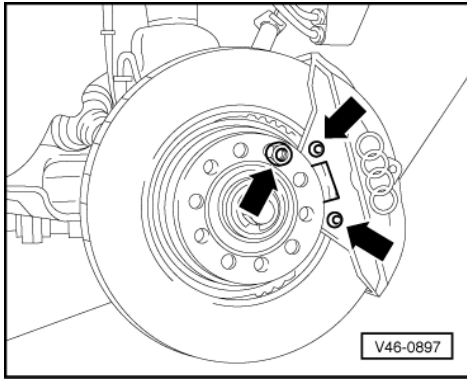
Removing

Note:

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Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

- Raise vehicle.
- Remove wheels.

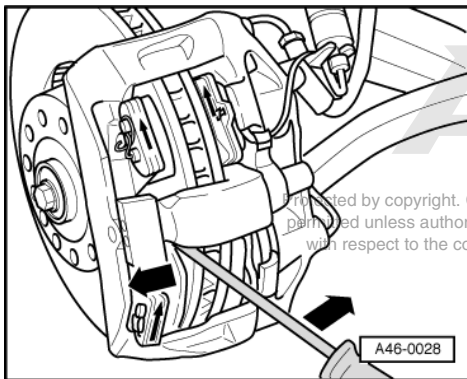


- -> Secure brake disc with a wheel bolt.
- Unscrew both Torx bolts for the outer brake pads.

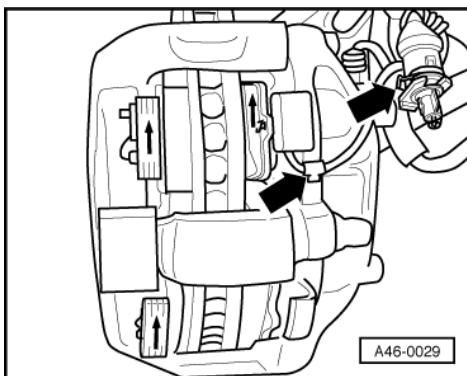
Note:

Before pressing back the piston, extract brake fluid from the brake fluid reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

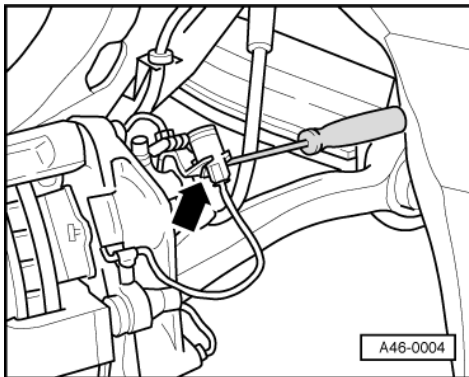
Important
 Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



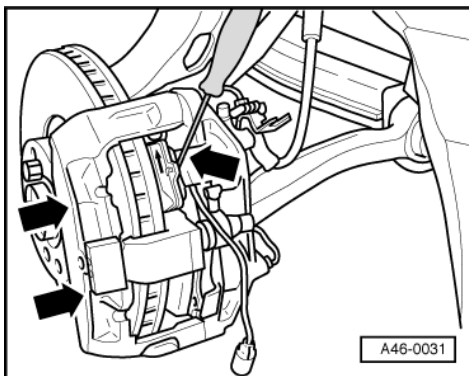
- -> Press piston back into brake caliper housing.
- For this purpose, insert sliding caliper with screwdriver as shown and press firmly outwards.
- First remove outer brake pad; for this purpose, use screwdriver to press brake pads off brake caliper.



- -> Detach connector; to do so, press spring and disconnect plug.
- Pull cable for brake pad wear indicator out of bracket at brake caliper.



- -> Use screwdriver to carefully lift tab slightly on bottom part of plug, then turn through 90° anti-clockwise or clockwise and remove from bracket.



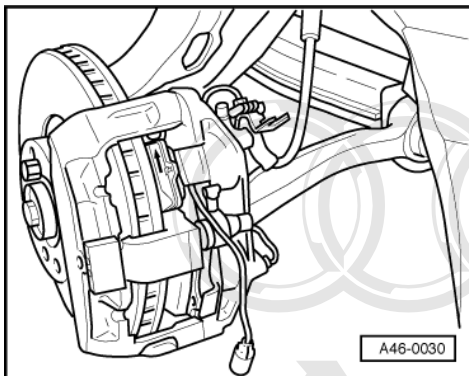
- -> Firmly press floating caliper in direction of arrow as far as it will go.
- Use screwdriver to carefully press brake pads out of piston and remove from brake caliper housing.

Note:

Thoroughly clean brake caliper housing before installing new brake pads.

In particular, watch for residual adhesive sheet from the outer brake pads.

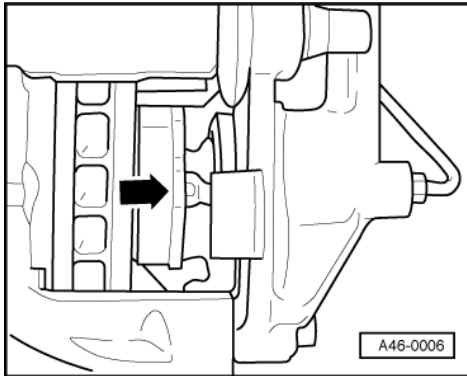
Installing



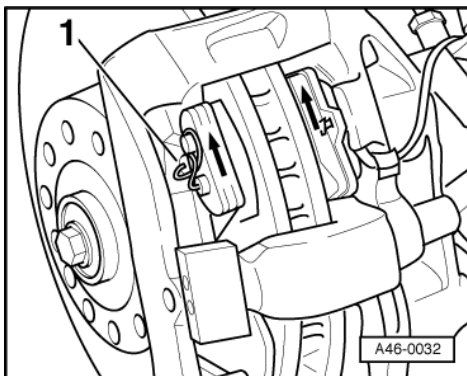
- -> Insert brake pad with wire for wear indicator into upper piston.

Note:

Take care not to damage protective caps when inserting brake pads. is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Insert lower brake pad in piston.
- Clip cable for brake pad wear indicator into bracket at brake caliper.
- Insert bottom part of plug of brake pad wear indicator in bracket at brake caliper.



- -> Press floating caliper outwards as far as it will go.
- Pull protective sheet off backplates of outer brake pads.

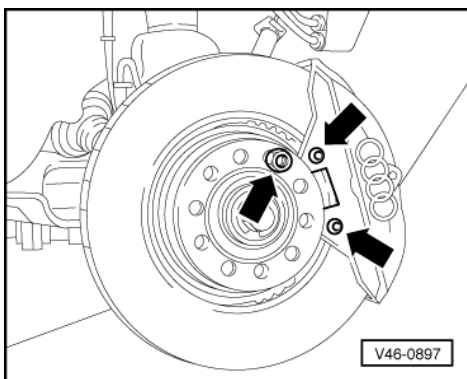
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Notes:

- ◆ The arrows on the brake pads point in the direction of travel or in the direction of rotation of the brake disc when travelling forwards.
- ◆ The springs -1- must latch into the cut-out on the brake caliper.

Notes:

- ◆ The repair kit includes four self locking Torx bolts which must be installed in all cases.
- ◆ Each time after replacing the brake pads, depress the brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.



- -> Screw the Torx bolts from the repair set into the floating caliper and fix the brake pads in position.

- ◆ Tightening torque: 25 Nm.



- Unscrew wheel bolt from wheel hub.

Note:

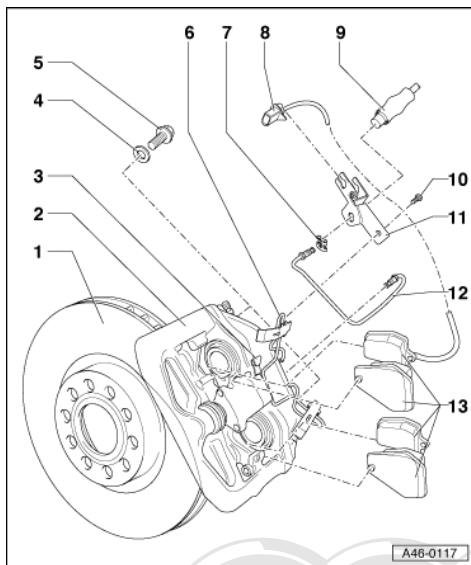
When fitting the wheels, ensure that the rim flange does not contact the brake caliper.

This could otherwise press the brake pads out of their guides.

- Fit wheels and tighten to 120 Nm.
- Check brake fluid level and top up if necessary.

3 - Front brake HP-2 double-piston brake/aluminium

3.1 - Front brake HP-2 double-piston brake/aluminium

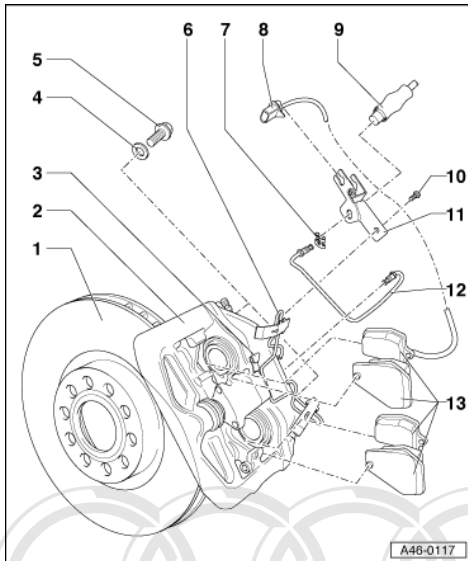


3.2 - Servicing front brakes

Notes:

- ♦ Always install the complete repair kit.
- ♦ After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in the normal operating position.
- ♦ To draw off brake fluid from the reservoir, use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.

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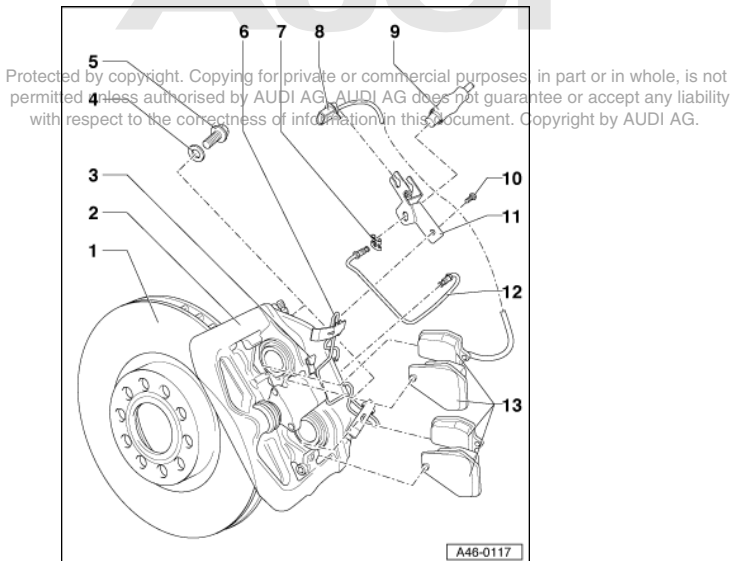


- ♦ The tightening torque of the brake pipes is 15 Nm.

1 Brake disc

- ♦ Always replace all components on an axle
- ♦ Ensure adequate wear reserve
- ♦ Remove brake caliper prior to removing

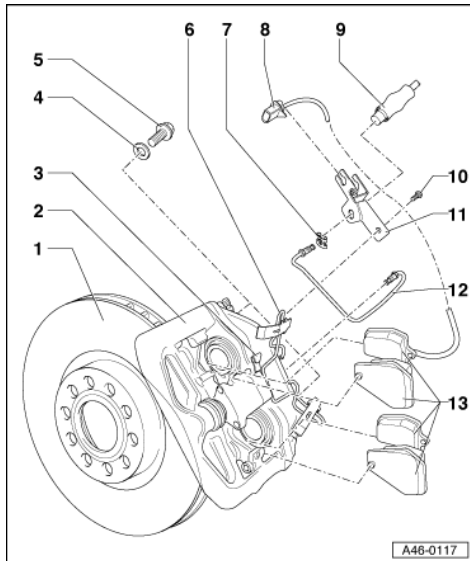
=> Brake System; Repair group 00; Technical data Technical data



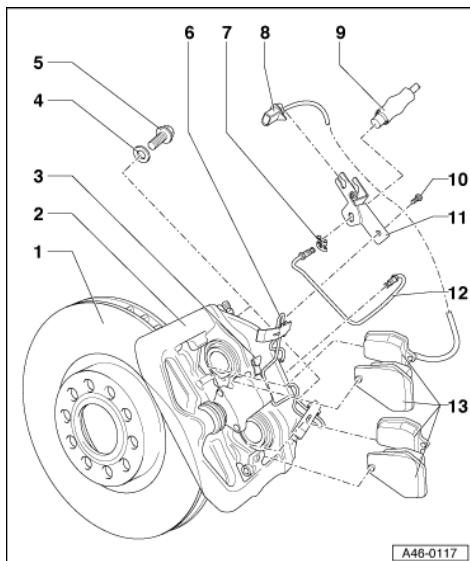
2 Brake caliper

- ♦ If assembly work is required, do not leave caliper hanging from brake hose but secure it to bodywork with wire
- ♦ With the exception of "Replacing brake pads"=> Page 134 , no further repairs may be performed on the brake calipers.

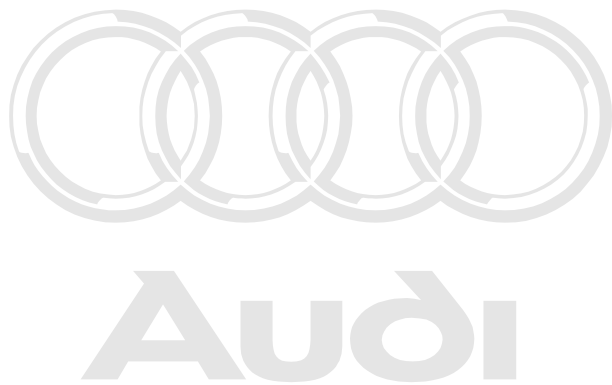
=> Brake System; Repair group 00; Technical data Technical data



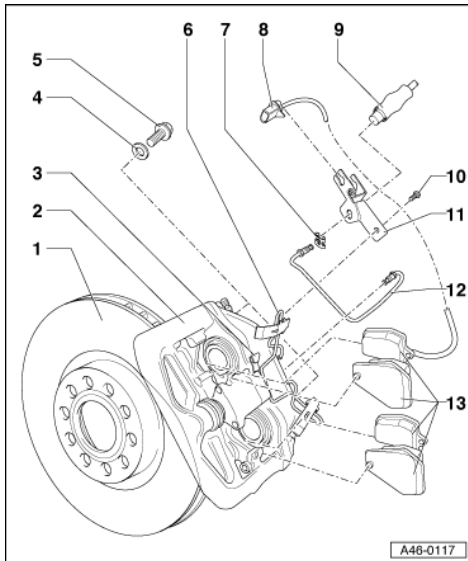
- 3 Holder for wear indicator cable**
 - ◆ Insert cable for brake pad wear indicator into cable holder
- 4 Ribbed washer**
- 5 Ribbed bolt, 190 Nm**
 - ◆ Clean ribbing if reusing
- 6 Tension spring**
 - ◆ Swivel aside.
 - ◆ Disassembly not possible
- 7 Retaining spring**



- 8 Connector**
 - ◆ Only on models with wear indicator
- 9 Brake hose**
 - ◆ Do not unscrew to replace brake pads
- 10 Hexagon bolt, 25 Nm**
- 11 Bracket**
 - ◆ Bolt to brake caliper housing
 - ◆ Insert connector for brake pad wear indicator



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12 Brake pipe, 15 Nm

13 Brake pads

- ◆ Always replace all components on an axle
- ◆ Different designs on left and right
- ◆ Removing and installing=> Page **71**
- ◆ With wear indicator
- Once the wear limit is reached (limit: 3 mm), warning light in dash panel insert comes on.
- ◆ The outer brake pads are provided with an adhesive sheet on the backing plate of the pad. Remove the protective sheet before inserting pads.

=> Brake System; Repair group 00; Technical data Technical data

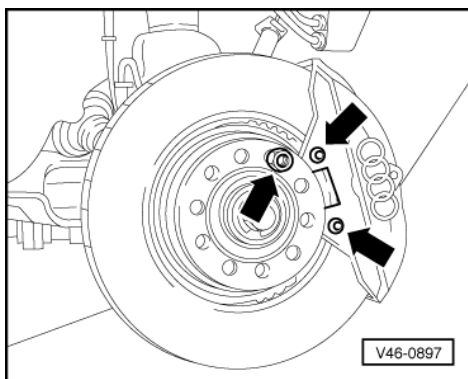
3.3 - Removing and installing brake pads

Removing

Note:

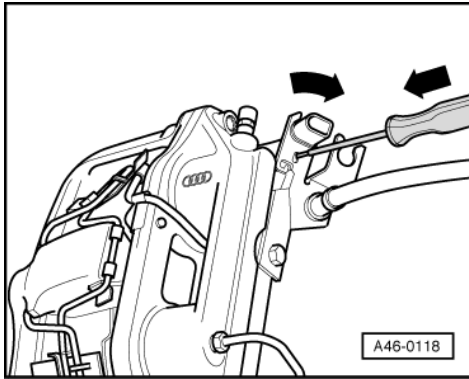
Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

- Raise vehicle.
- Remove wheels.

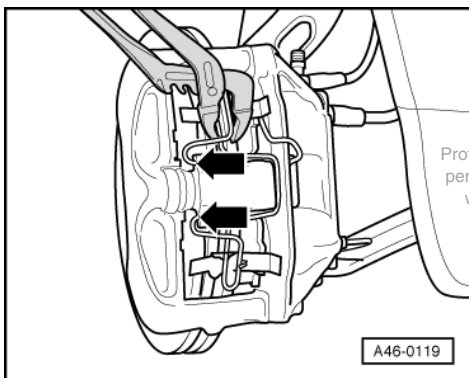


- -> Secure brake disc with a wheel bolt.

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- Disconnect brake wear indicator connector
- Release the connector from the holder using a screwdriver, turning connector by 90° at the same time.
- Pull connector out upwards and unhook the cable.



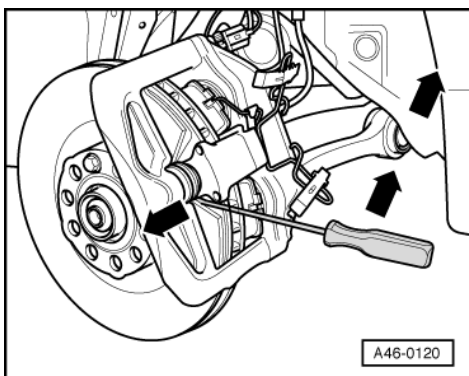
- Push the upper and lower spring tensioners out of the catches using a pair of pliers (see arrows).
- Swivel the springs aside.

Note:

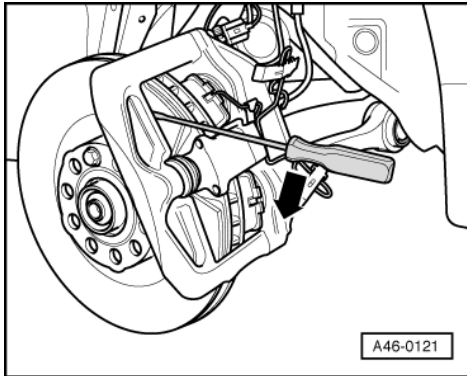
Before pressing back the piston, extract brake fluid from the brake fluid reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

Important

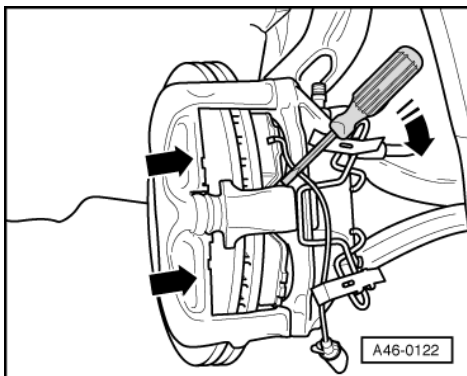
Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



- -> Press piston back into brake caliper housing.
- For this purpose, insert sliding caliper with screwdriver as shown and press firmly outwards.



- First remove the outer brake pads by pushing them off the brake caliper using a screwdriver



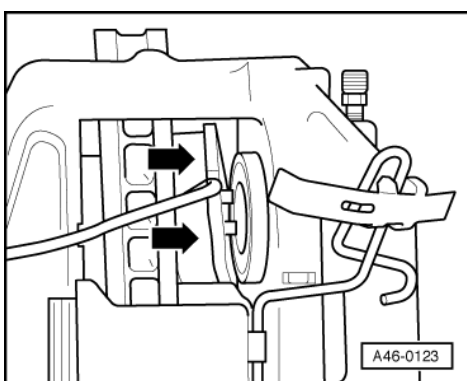
- -> Firmly press floating caliper in direction of arrow as far as it will go.
- Carefully push the brake pads out of the piston and remove from brake caliper housing.

Note:

Thoroughly clean brake caliper housing before installing new brake pads.

In particular, watch for residual adhesive sheet from the outer brake pads.

Installing

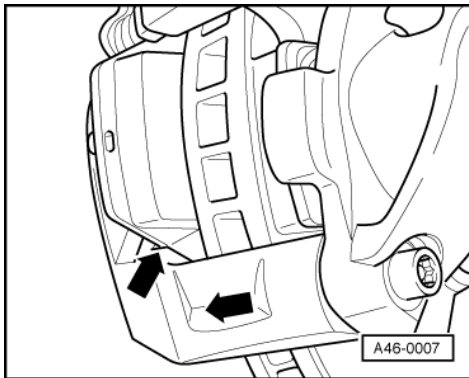


- -> Insert lower and upper brake pads into piston.

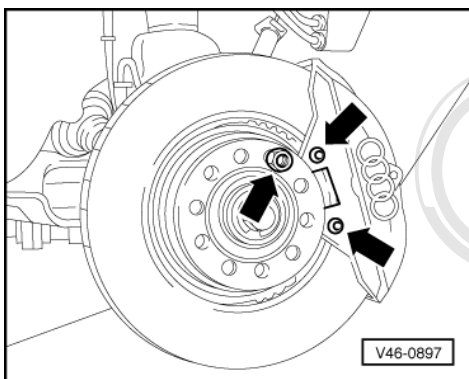
Note:

- ◆ Ensure that the lugs in the backplates are in position in the brake pistons.
- ◆ Take care not to damage protective caps when inserting brake pads.

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- -> Press floating caliper outwards as far as it will go.
- Pull protective sheet off backplates of outer brake pads.



- -> Ensure that the lugs in the backplates are in position in the floating calipers.

Note:

- ♦ Each time after replacing the brake pads, depress the brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.

- Unscrew wheel bolt from wheel hub.

Note:

When fitting the wheels, ensure that the rim flange does not contact the brake caliper.

This could otherwise press the brake pads out of their guides.

- Fit wheels and tighten to 120 Nm.
- Check brake fluid level and top up if necessary.

4 - Front brake, Brembo brake caliper

4.1 - Front brake, Brembo brake caliper

4.2 - Servicing front brakes

Notes:

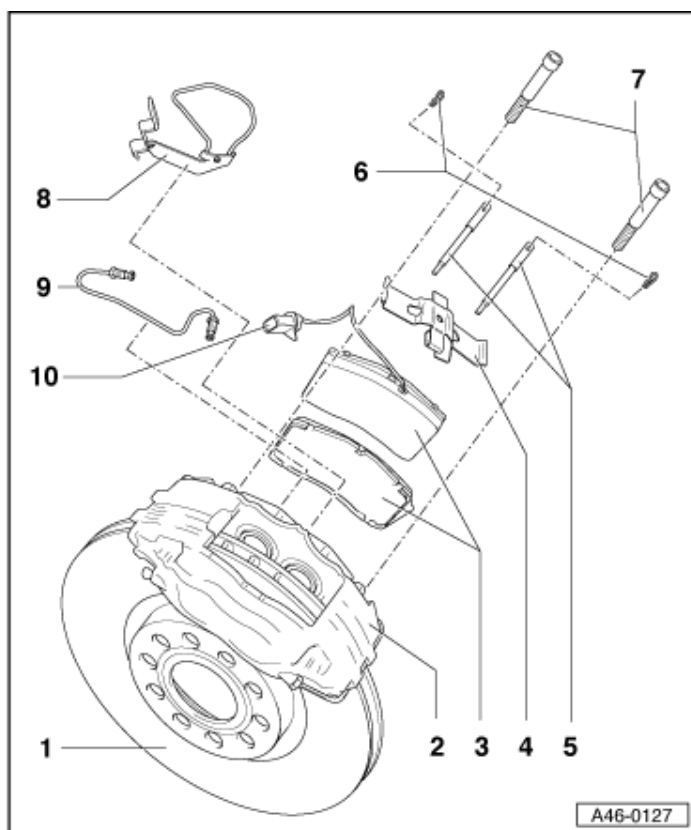
- ♦ Always install the complete repair kit.

-
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- A46-0127**

=> Brake System; Repair group 00; Technical data Technical data

- ◆ If assembly work is required, do not leave caliper hanging from brake hose but secure it to bodywork with wire
- ◆ With the exception of "Replacing brake pads"=> Page 139 , no further repairs may be performed on the brake calipers.

=> Brake System; Repair group 00; Technical data Technical data



3 Brake pads

- ◆ Always replace all components on an axle
- ◆ Different designs on left and right
- ◆ Removing and installing
=> Page **77**
- ◆ With wear indicator

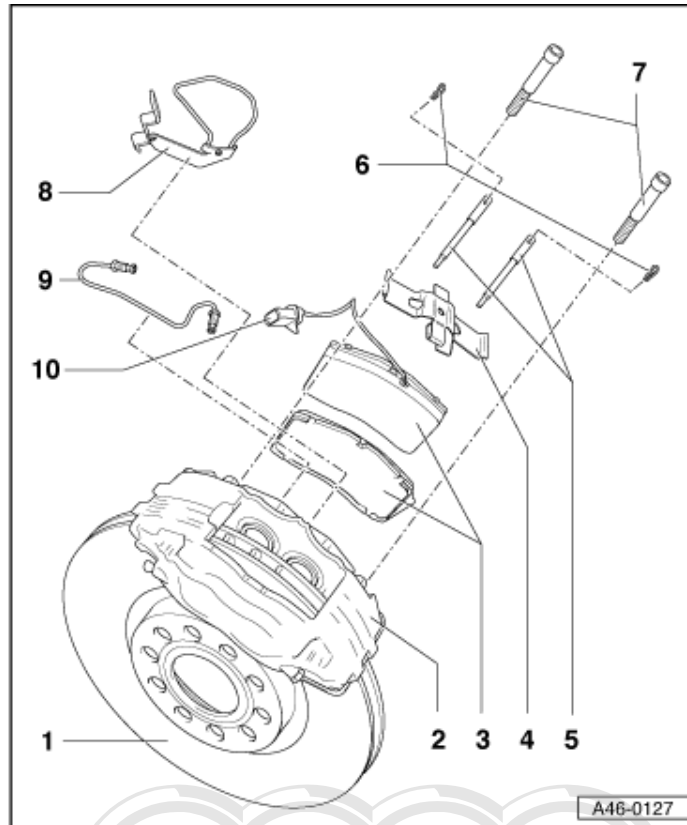
=> Brake System; Repair group 00; Technical data Technical data

4 Pad retaining spring

5 Retaining pins



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- 6 Locking elements**
- 7 Cheese head bolts, 110 Nm**
 - ♦ Always replace
- 8 Bracket**
 - ♦ Bolt to brake caliper housing
 - ♦ Insert connector for brake pad wear indicator
- 9 Brake pipe, 15 Nm**
- 10 Plug connector for brake pad wear indicator**
 - ♦ Insert cable for brake pad wear indicator into cable holder

4.3 - Removing and installing brake pads

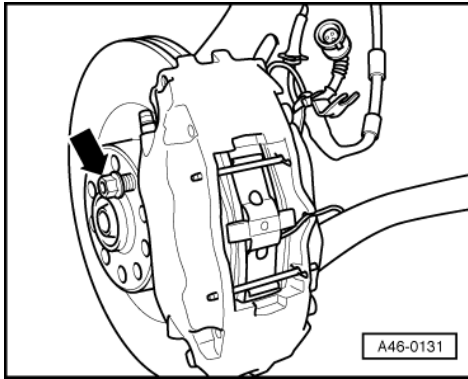
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Removing

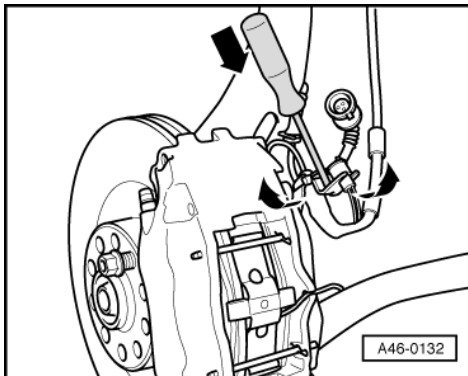
Note:

Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

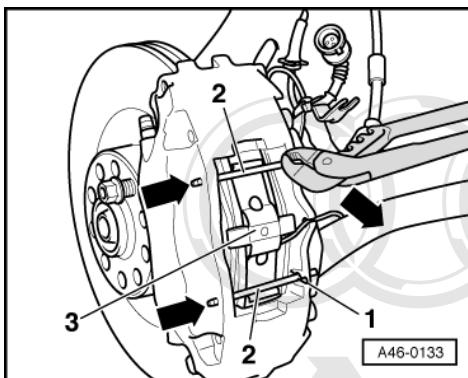
- Raise vehicle.
- Remove wheels.



- -> Secure brake disc with a wheel bolt.



- Disconnect brake wear indicator connector
- Release the connector from the holder using a screwdriver, turning connector by 90° at the same time.
- Pull connector out upwards and unhook the cable.



- Pull out the retainers -1-.
- Slide out the locking bolts -2- inwards => see arrow
- Take out the tension spring -3-.

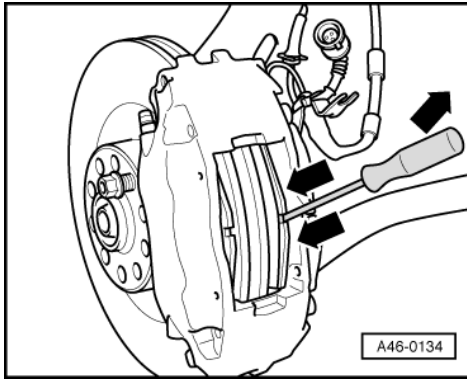
Note:

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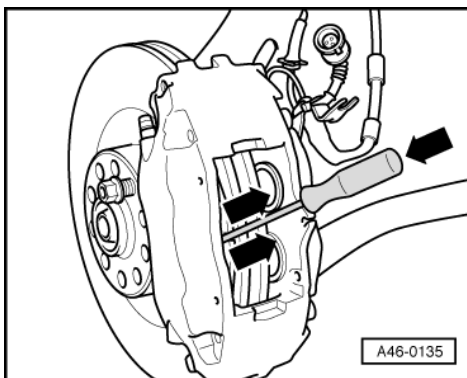
Before pressing back the piston, extract brake fluid from the brake fluid reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

Important

Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



- -> Press piston back into brake caliper housing.
- To do so, insert piston with screwdriver as shown and press firmly inwards.
- Carefully take out the inner pad.



- -> Press piston back into brake caliper housing.
- To do so, insert piston with screwdriver as shown and press firmly outwards.
- Carefully take out the outer pad.

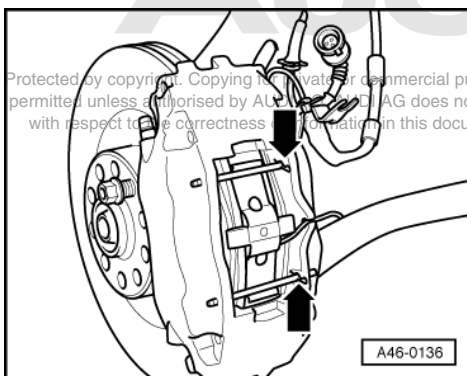
Note:

Thoroughly clean brake caliper housing before installing new brake pads.

Installing

Note:

- ♦ Take care not to damage protective caps when inserting brake pads.



- -> Carefully insert the brake pads.
- Insert the locking bolt with the tension spring
- Engage the plug connector for the brake pad wear indicator in the holder and connect it.

Note:

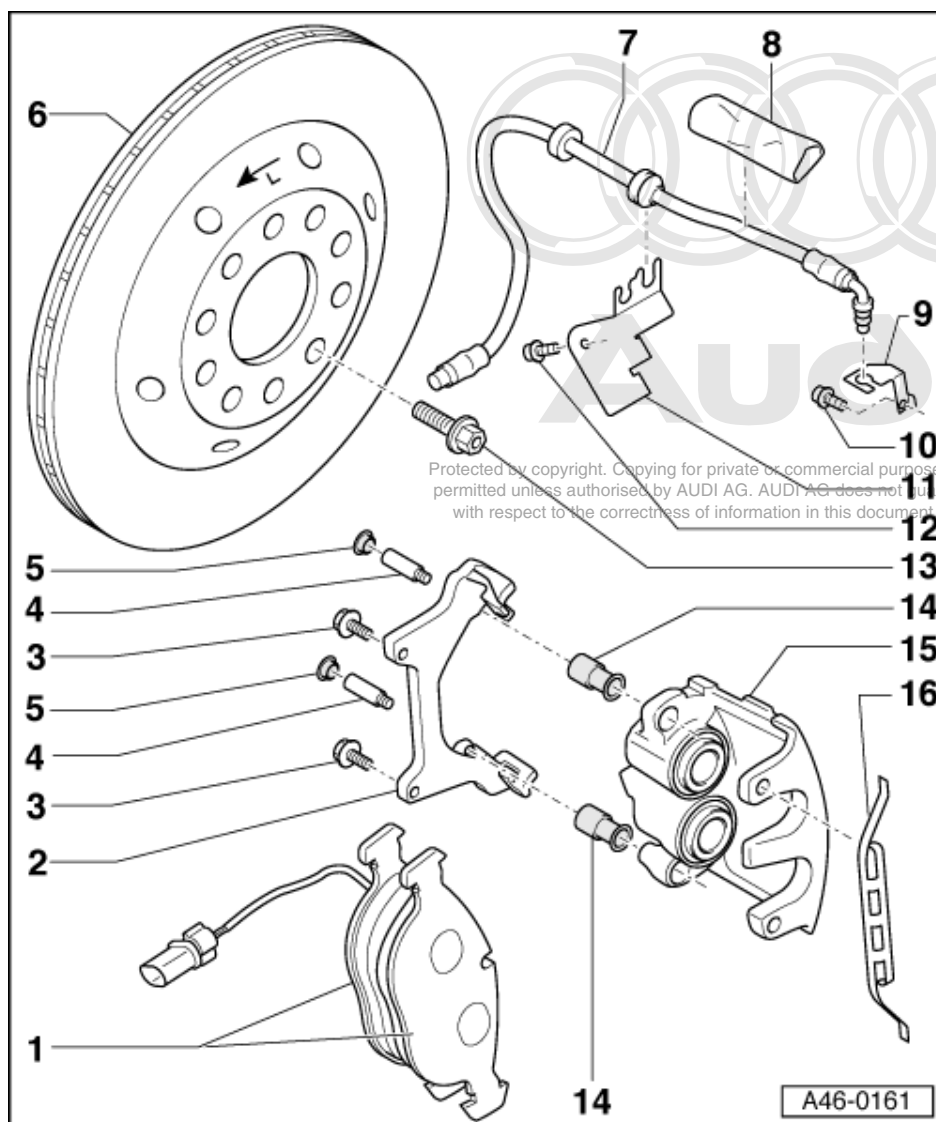
- ♦ Make sure the tension spring is correctly positioned.
- Insert both retainers => see arrow
- Unscrew wheel bolt from wheel hub.

Note:

- ♦ When fitting the wheels, ensure that the rim flange does not contact the brake caliper.
- ♦ This could otherwise press the brake pads out of their guides.
- ♦ Each time after replacing the brake pads, depress the brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
- Fit wheels and tighten to 120 Nm.
- Check brake fluid level and top up if necessary.

5 - Front brake FN-2

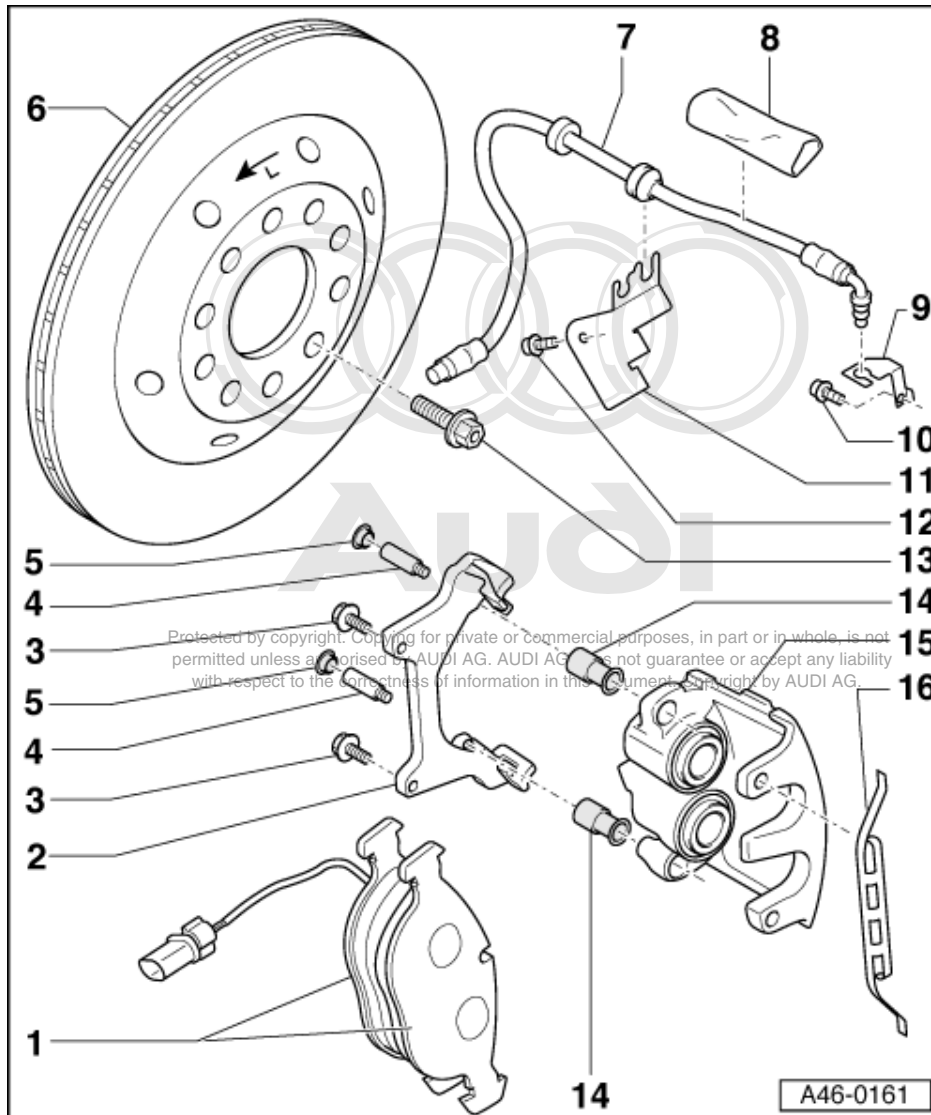
5.1 - Front brake FN-2



5.2 - Servicing front brakes

Notes:

- ◆ Always install the complete repair kit.
- ◆ After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in the normal operating position.
- ◆ To draw off brake fluid from the reservoir, use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



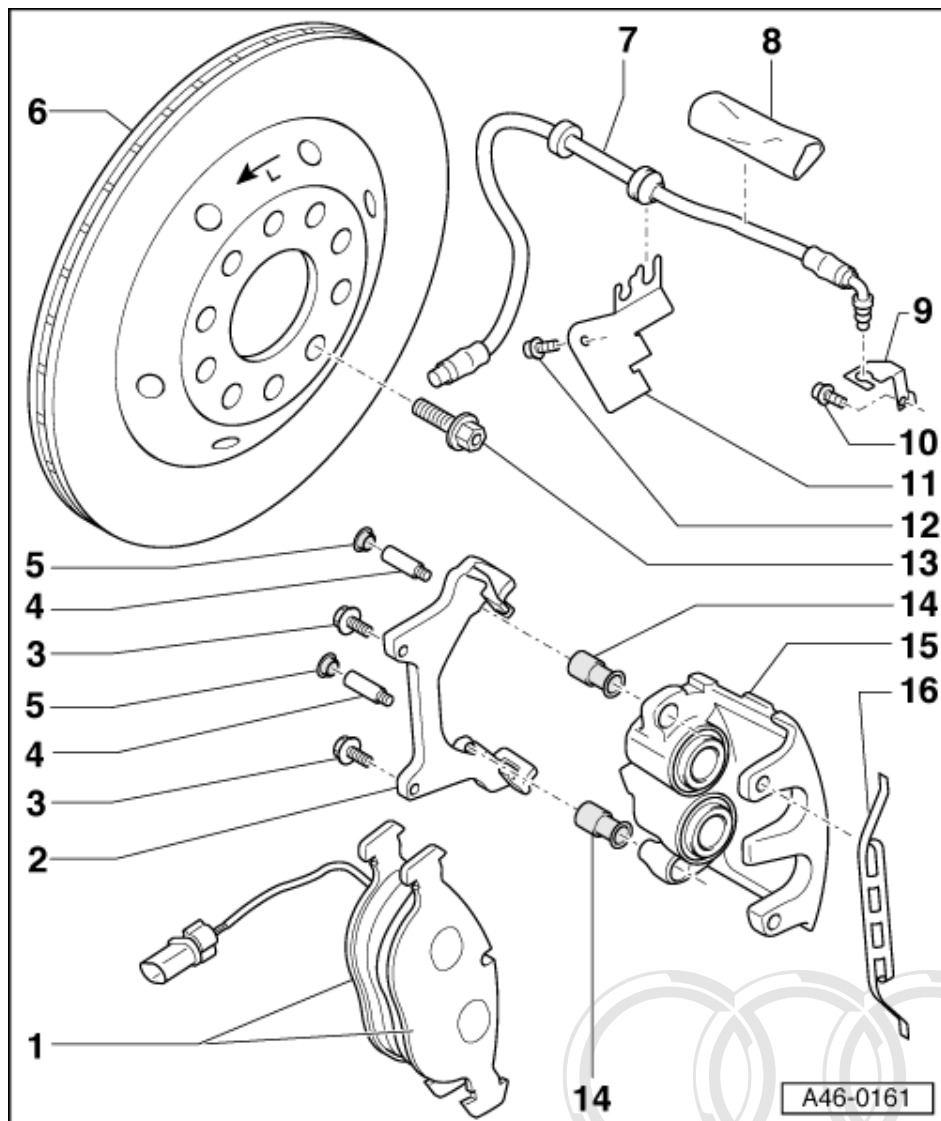
- ◆ The tightening torque of the brake pipes is 15 Nm.
- ◆ Check that the brake caliper moves freely by moving it from side to side.

1 Brake pads

Note:

The inner pad (with expansion spring) has a cable for wear indicator.

- ◆ The outer brake pads are provided with an adhesive sheet on the backing plate of the pad. Remove the protective sheet before inserting pads.



- ♦ Different versions => Parts List
- ♦ Always replace all components on an axle
- ♦ Removing and installing=> Page 55

Note:

Always clean the brake calipers (no grease) before inserting new brake pads. At the same time, make sure that all adhesive sheet residue on the contact surfaces of the outer brake pad is removed.

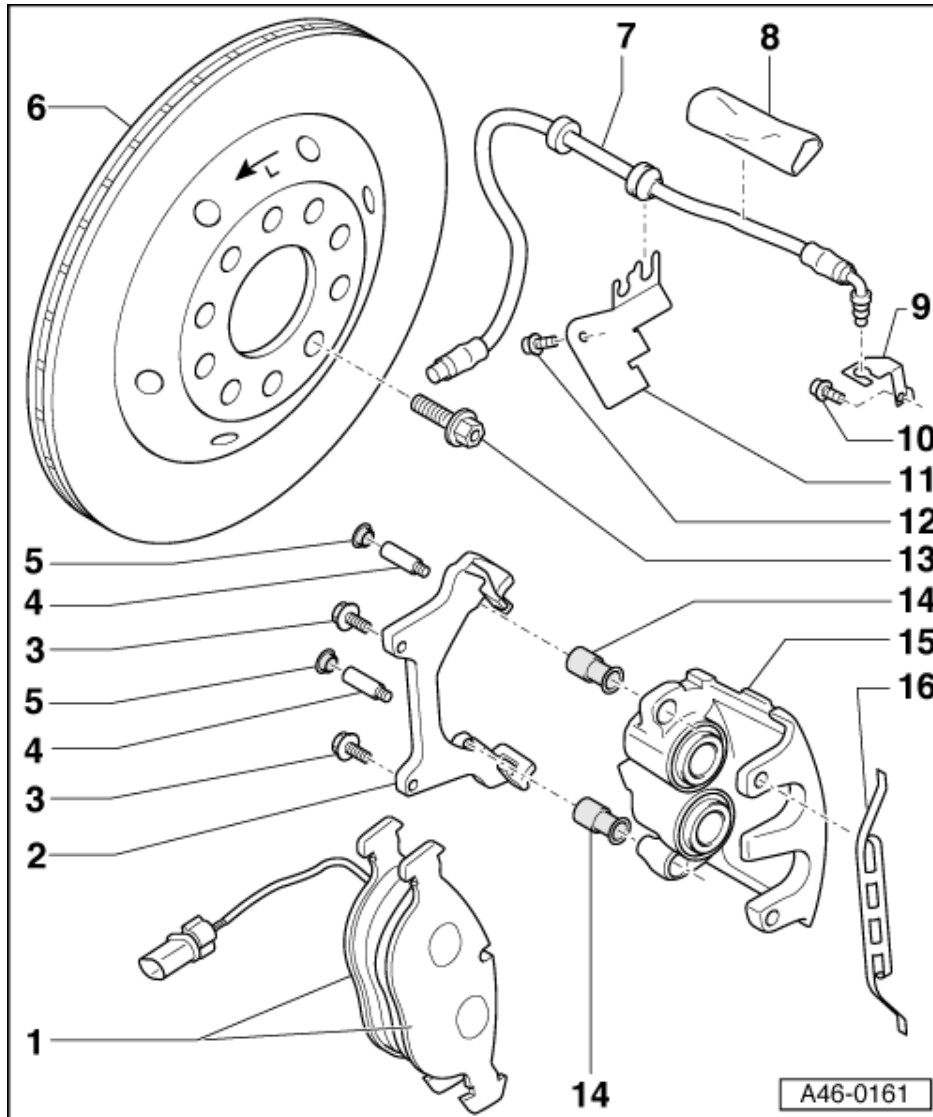
2 Brake carrier

- ♦ Bolt to wheel bearing housing

3 Ribbed bolt, 190 Nm

- ♦ Clean ribbing if reusing

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4 Guide pin, 25 Nm

5 Trim cap

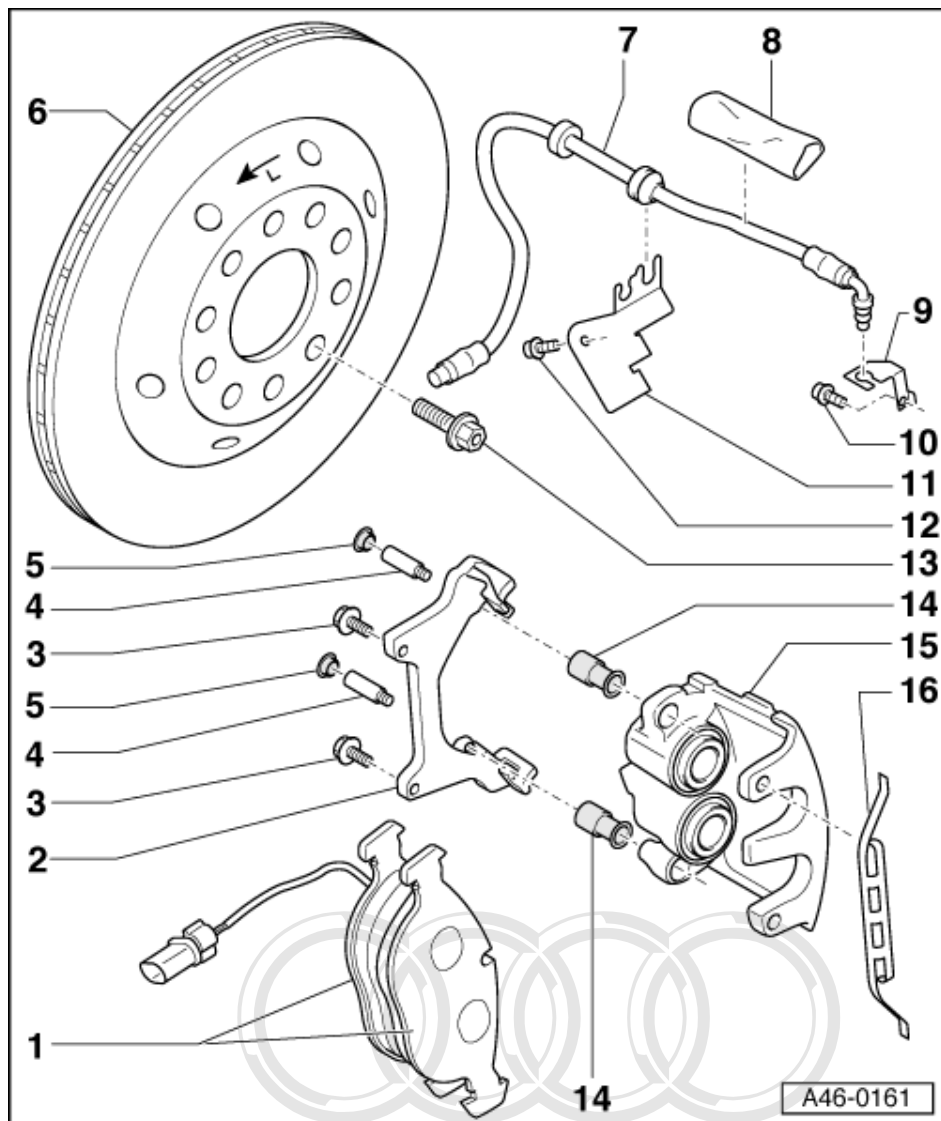
- ◆ Remove
- ◆ Attach cable for wear indicator

6 Brake disc

- ◆ Always replace all components on an axle
- ◆ Remove brake caliper prior to removing
- ◆ Different designs on left and right
- ◆ The arrow on the brake disc points in the running direction
- ◆ Lubricate contact surfaces between brake disc and wheel hub with polyurea grease G 052 142 A2.

=> Brake System; Repair group 00; Technical data Technical data

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7 Brake pipe, 15 Nm

- ◆ Screw into brake caliper housing
- ◆ Screw into brake hose, counterholding at hexagon on brake hose.
- ◆ Hose must be attached without twisting
- ◆ Ensure that lugs are properly seated in retainer grooves.

8 Brake pipe heat shield

- ◆ Push over brake pipe

9 Bracket

- ◆ Bolt to brake caliper housing

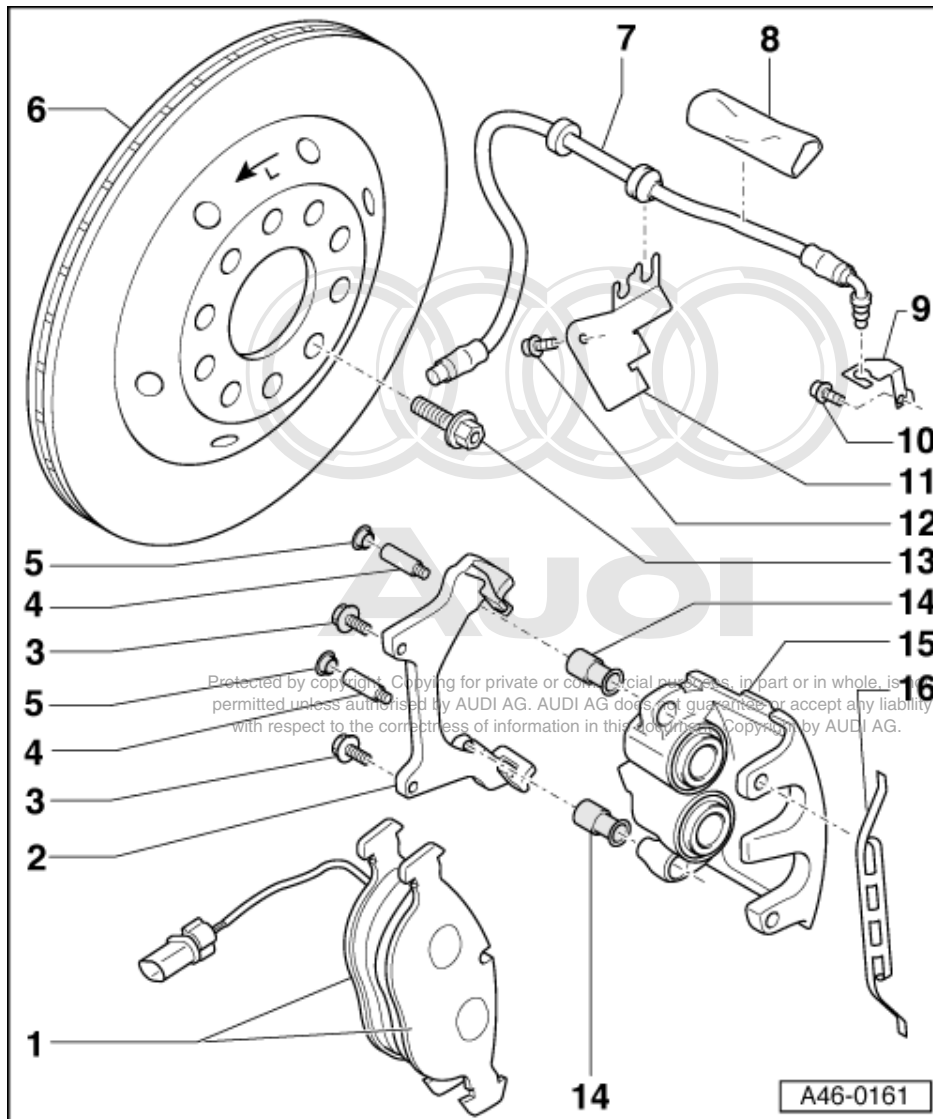
10 Hexagon bolt

- ◆ Tightening torque 8 Nm

11 Bracket

- ◆ Attach brake pipe
- ◆ Bolt to wheel bearing housing

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12 Hexagon bolt

- ♦ Tightening torque 8 Nm

13 Wheel bolts

- ♦ Tightening torque 140 Nm

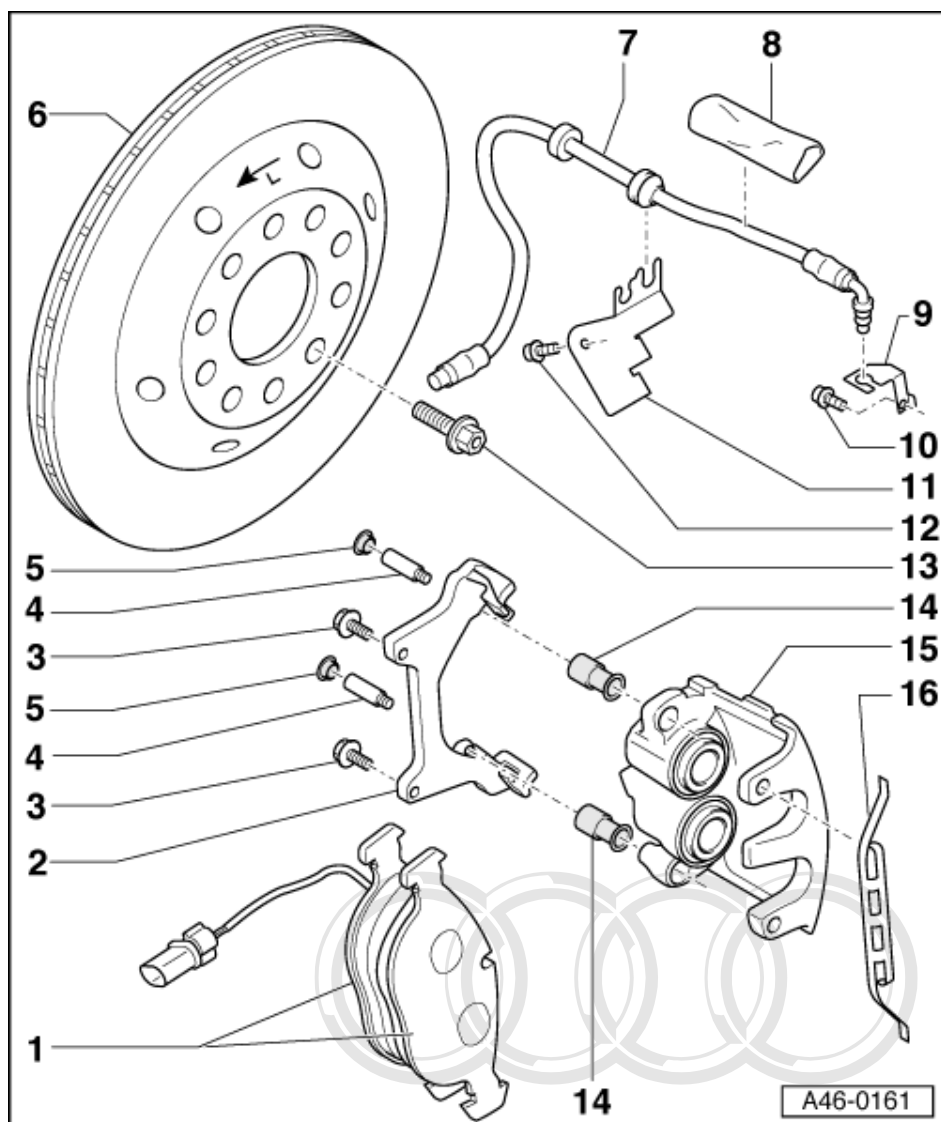
14 Bush

- ♦ Insert into brake caliper housing

15 Brake caliper housing

- ♦ If assembly work is required, do not leave caliper hanging from brake hose but secure it to bodywork with wire
- ♦ With the exception of "Replacing brake pads" => Page 134, no further repairs may be performed on the brake calipers.
- ♦ Hose must be attached without twisting

=> Brake System; Repair group 00; Technical data Technical data



16 Retaining spring

- ◆ Insert in both holes in brake caliper housing
- ◆ For removing and installing retaining spring, apply hand pressure in direction of arrow (stamped on spring) and remove.

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5.3 - Removing and installing brake pads

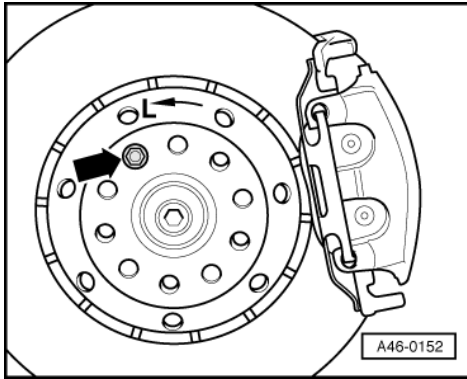
Removing

Note:

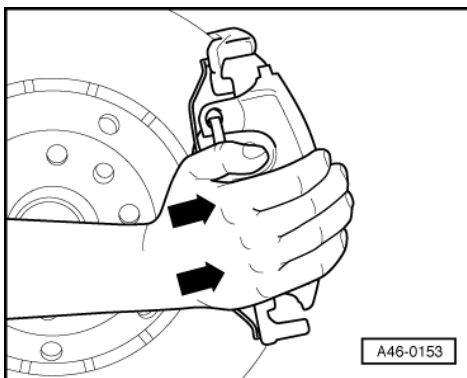
Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

When installing the brake discs, note the direction of rotation -arrow on the brake disc- and fitting location -left or right-

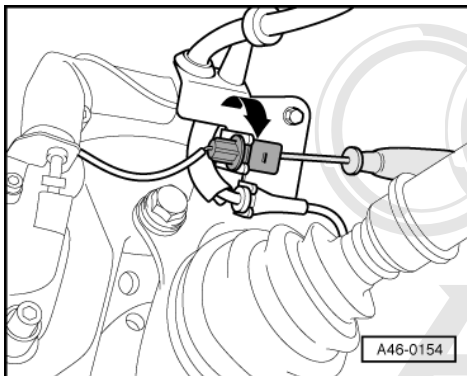
- Raise vehicle.
- Remove wheels.



- -> Secure brake disc with a wheel bolt, see -arrow-.
- The arrow on the brake disc must point in the running direction.
- L-stands for left

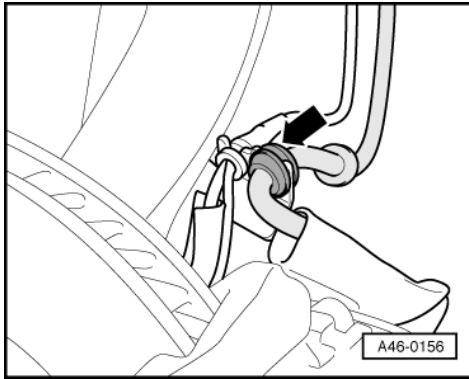


- -> Press retaining spring in direction of arrow (with ball of hand) and remove the spring from the brake caliper sideways.

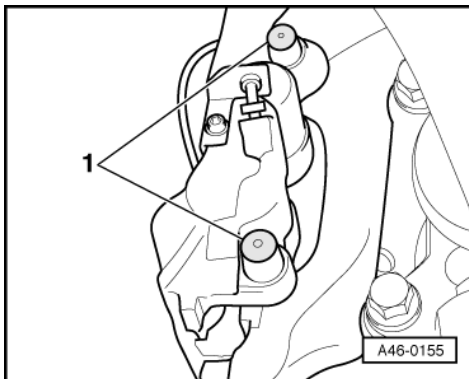


- Disconnect brake wear indicator connector
- Release the connector from the holder using a screwdriver, turning connector by 90° at the same time.
- Pull connector out upwards and unhook the cable.

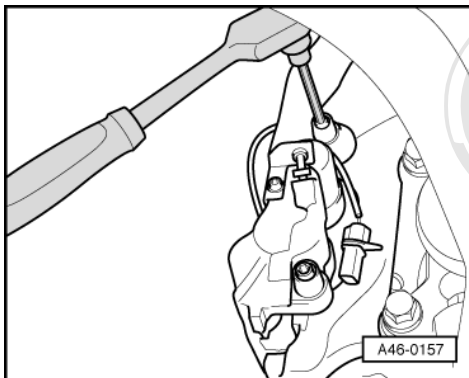
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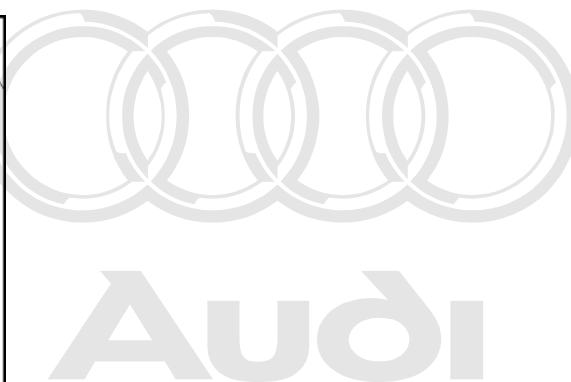
- -> Detach brake pipe from bracket



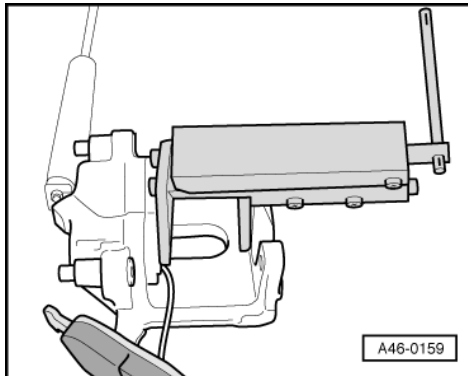
- -> Remove trim cap -1-.



- -> Unscrew both guide pins and remove from brake caliper.
- Remove brake caliper housing and lay to one side so that the weight of the brake caliper does not stress or damage the brake hose.
- Take brake pads out of brake caliper housing or from brake carrier.



Only use methylated spirits to clean the brake caliper housing.



Installing

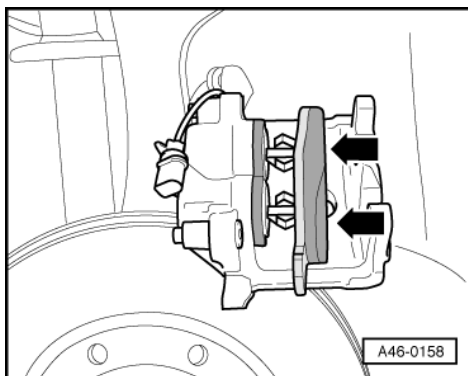
- -> Press back piston.

Note:

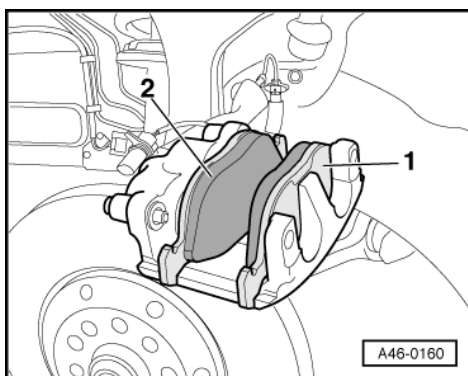
Before inserting new brake pads, press piston back into the cylinder with resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

Important

Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



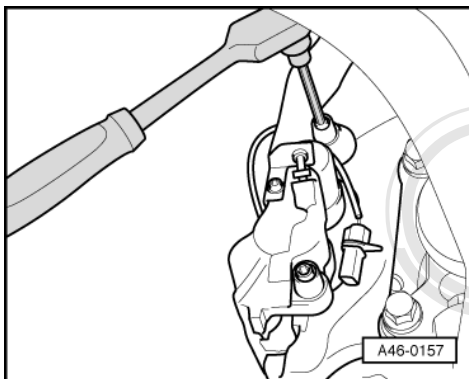
- -> Insert brake pad with retaining spring and wear indicator into brake caliper housing (piston).



- -> Fit outer brake pad -1- onto brake caliper.



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- Secure brake caliper housing to brake carrier with both guide pins to 25 Nm.
 - Ensure that the brake hose is installed without twisting.
 - Fit both protective caps.
 - Insert retaining spring into brake caliper housing.
 - Attach brake pipe
 - Plug in connector for wear indicator and engage pipe in dust cap and trim cap.
 - Fit wheels
- Tightening torque 140 Nm

Notes:

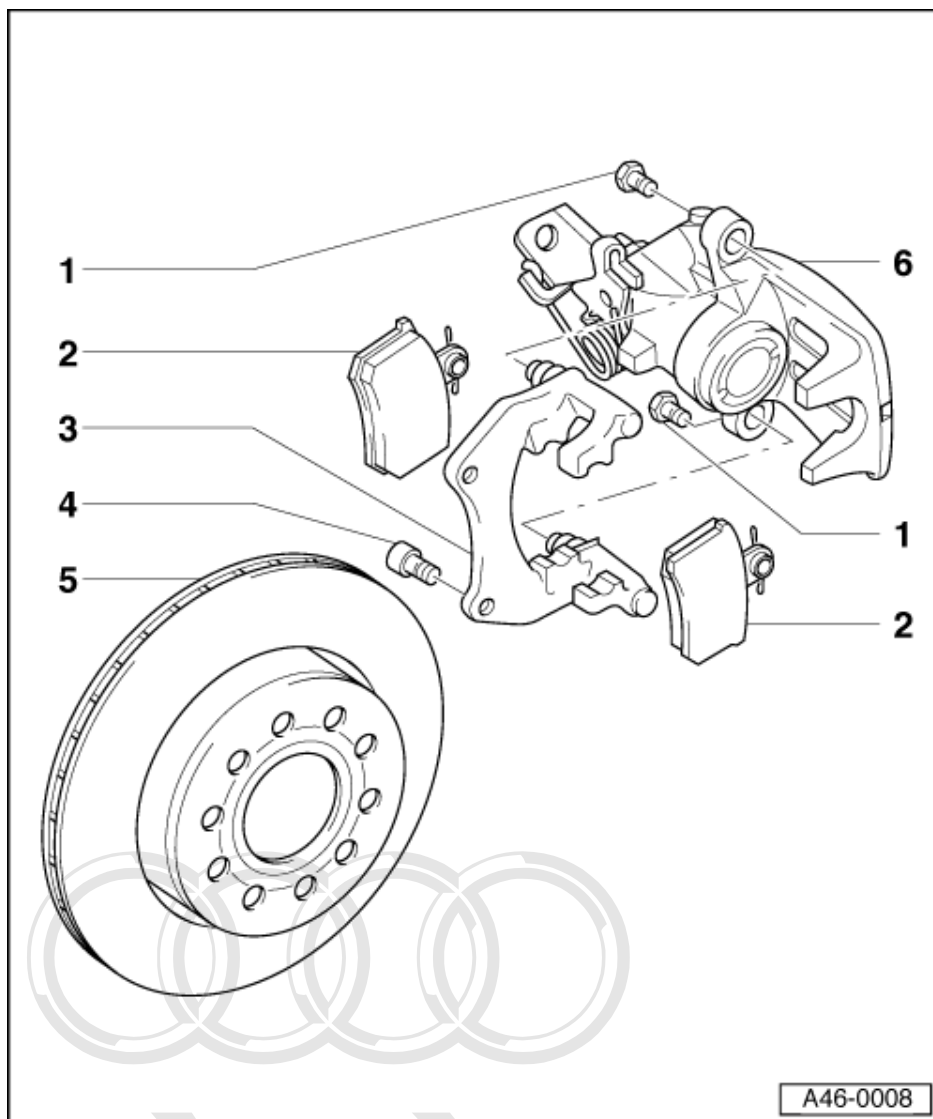
- ◆ After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.

After replacing the brake pads, depress pedal firmly several times with the vehicle stationary, so that the brake pads are properly seated in their normal operating position.

- Check brake fluid level and top up if necessary.

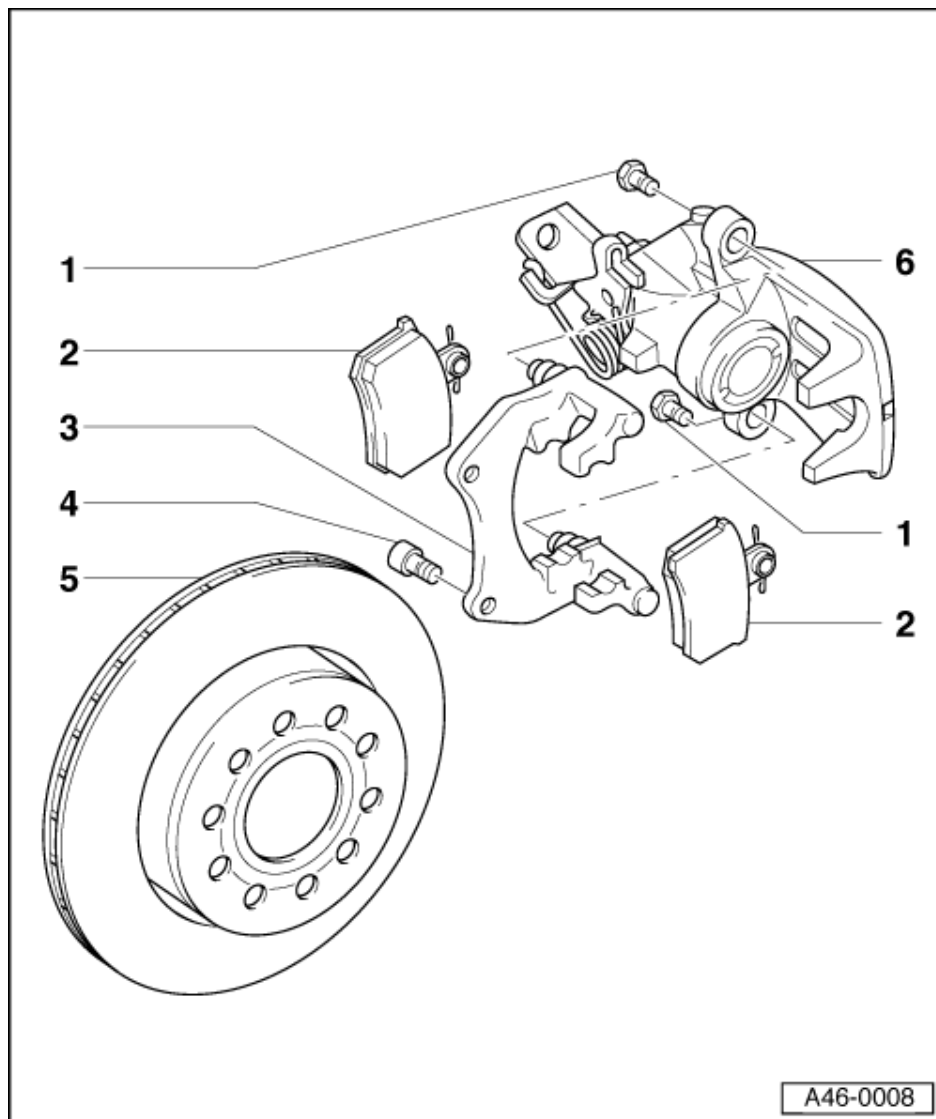
6 - Servicing rear brakes

6.1 - Servicing rear brakes



Notes:

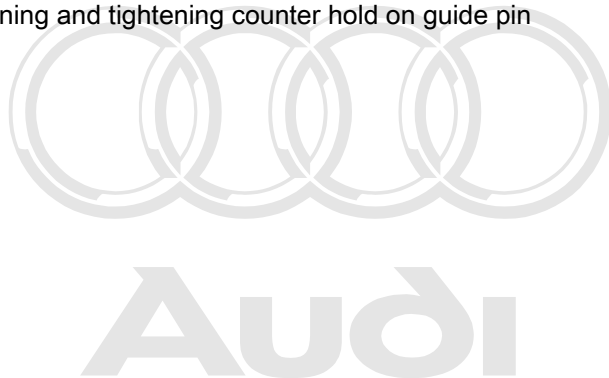
- ◆ Always install the complete repair kit.
- ◆ After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in the normal operating position.
- ◆ To draw off brake fluid from the reservoir, use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



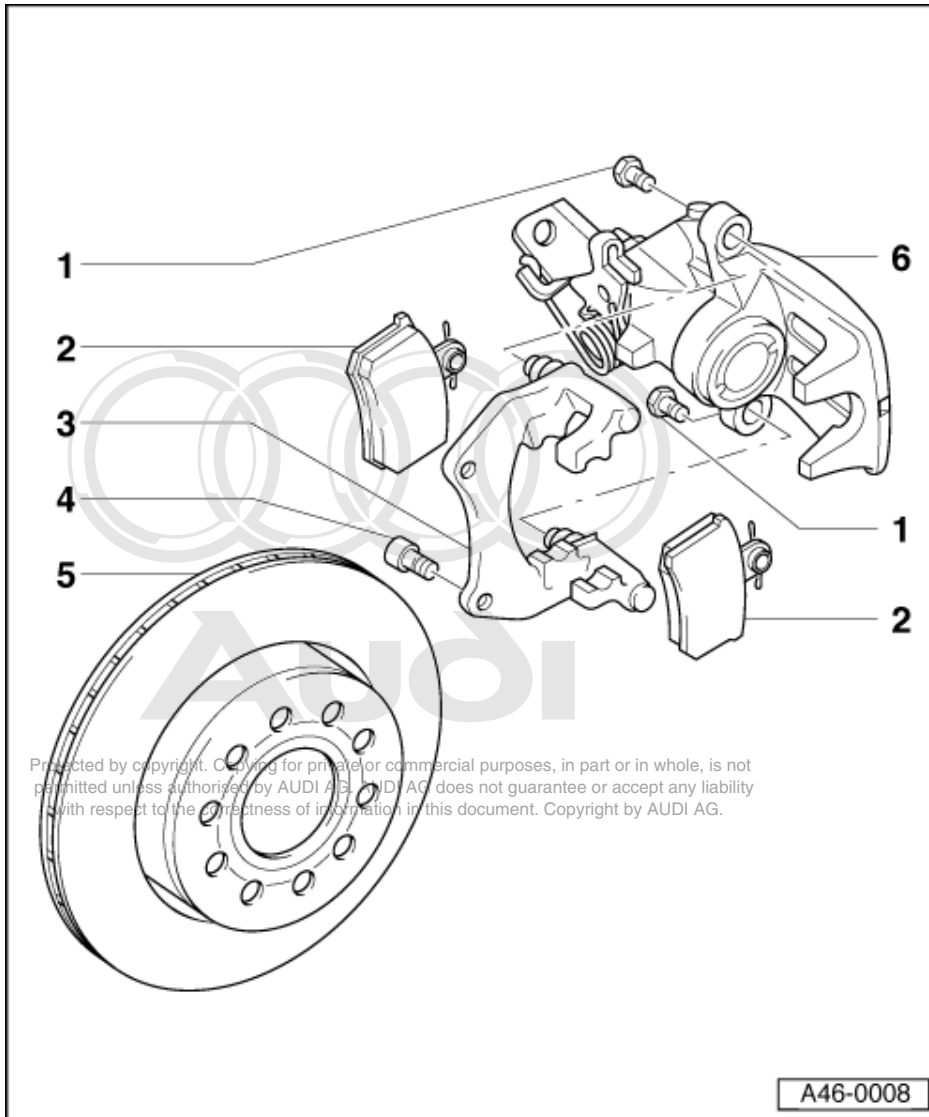
- ♦ Brakes can be checked on any commercially available brake test stand, provided that the driving speed of the two driving rollers of the test stand is not more than 5.5 km/h.
- ♦ The tightening torque of the brake pipes is 15 Nm.

1 Hexagon bolt, self-locking, 35 Nm

- ♦ Always replace
- ♦ When loosening and tightening counter hold on guide pin



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2 Brake pads

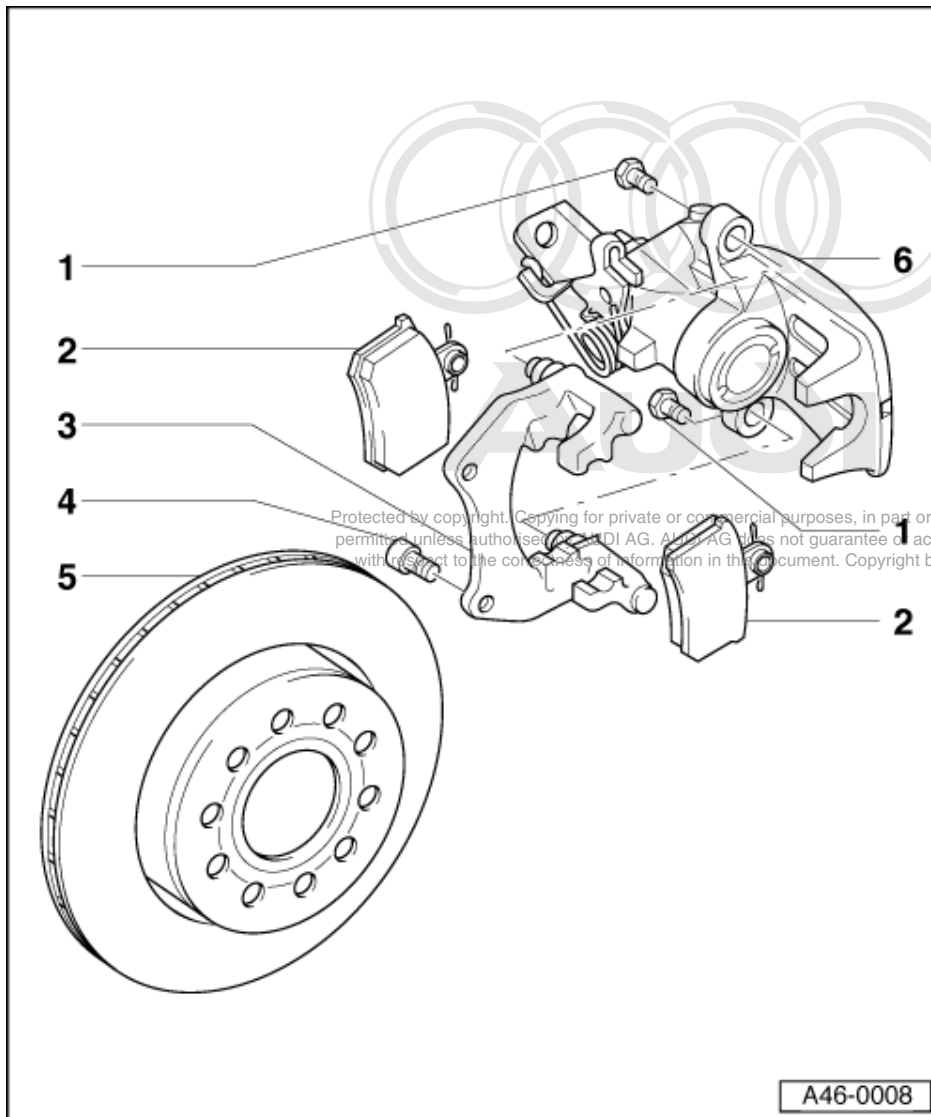
- ◆ Always replace all components of an axle
- ◆ Removing and installing
=> Page 95
- ◆ Checking thickness:

=> Maintenance Manual

=> Brake System; Repair group 00; Technical data Technical data

3 Brake carrier with guide pin and protective cap

- ◆ Supplied as replacement part assembled with sufficient quantities of grease on guide pins
- ◆ If protective caps or guide pins are damaged, install repair kit. Use grease sachet supplied to lubricate guide pins.



4 Cheese head bolts

- ♦ Vehicles with steel wheel bearing housing only, 60 Nm

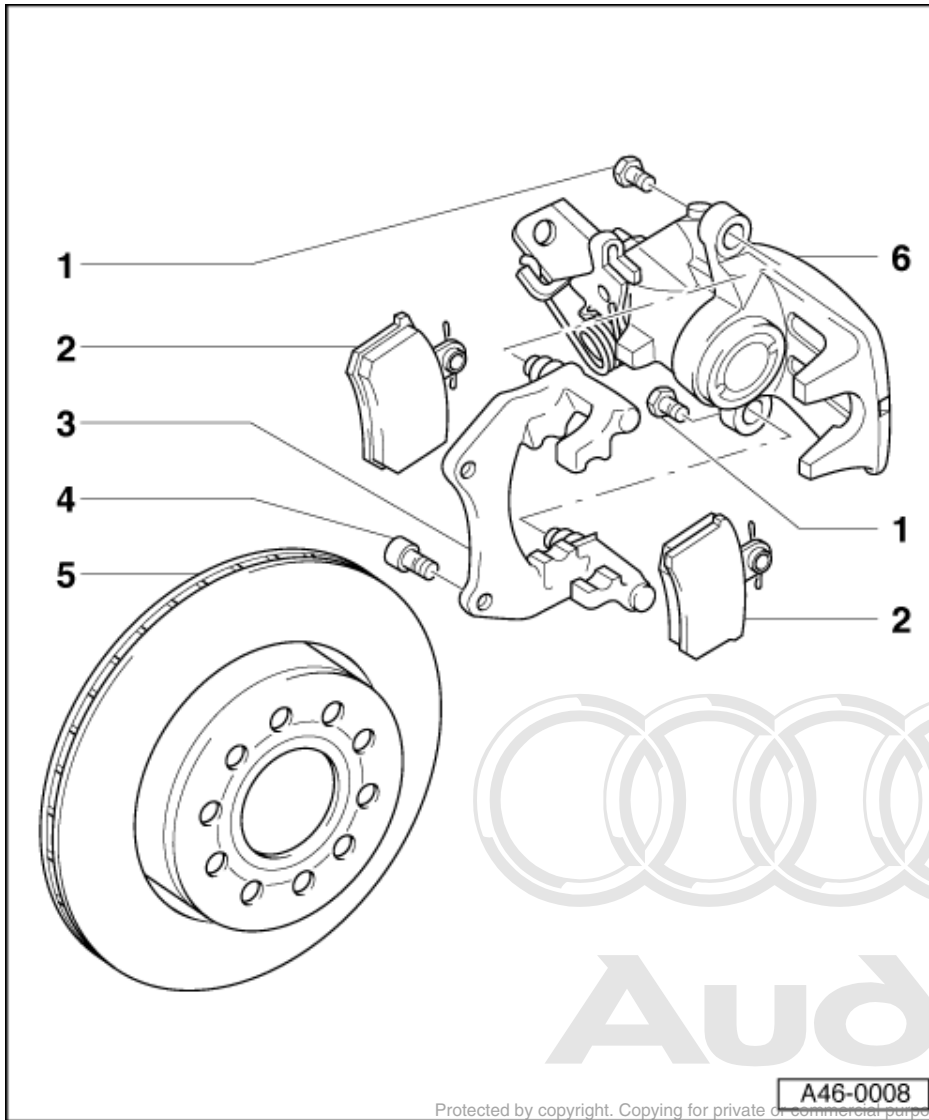
4 - Cheese head bolts

- ♦ Vehicles with aluminium wheel bearing housing only, 70 Nm and turn further 90°

5 Brake disc

- ♦ Always replace all components of an axle
- ♦ Remove brake caliper prior to removing
- ♦ Always dress evenly, on both sides, starting from thickness when new
- ♦ Ensure adequate wear reserve

=> Brake System; Repair group 00; Technical data Technical data



A46-0008

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6 Brake caliper housing

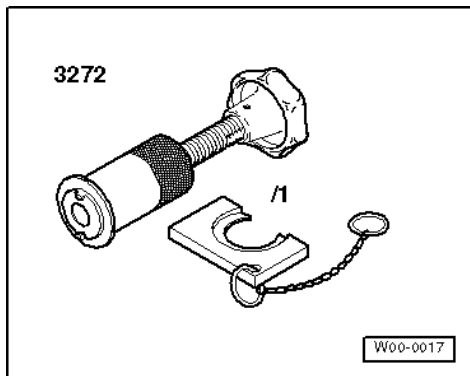
- ◆ Unscrew from brake carrier to replace brake pads
- ◆ Do not disconnect brake hose when changing brake pads
- ◆ Servicing brake caliper => Page 154
- ◆ Tighten brake hose on brake caliper housing to 45 Nm.
- ◆ Hose must be attached without twisting.

=> Brake System; Repair group 00; Technical data Technical data

6.2 - Removing and installing brake pads

Special tools and workshop equipment required

- ◆ 3272 Resetting and removing tool

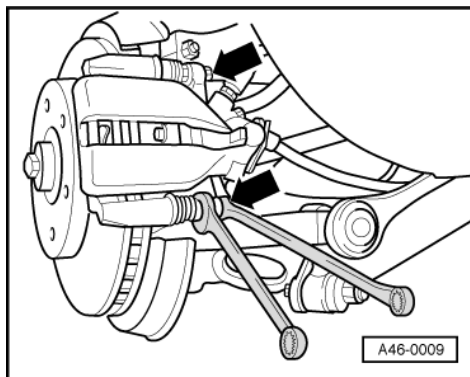


Removing

Note:

Mark brake pads to be reused on removal. Reinstall in their original position to prevent uneven braking!

- Raise vehicle.
- Remove wheels.



- -> Remove bolts from brake caliper housing, counterholding on guide pins.
- Remove brake pads.

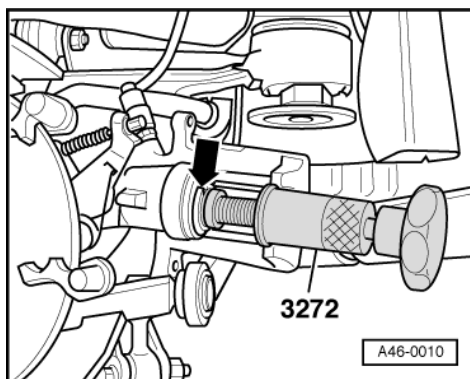
Note:

Before inserting new brake pads, press piston back into the cylinder with resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

Important

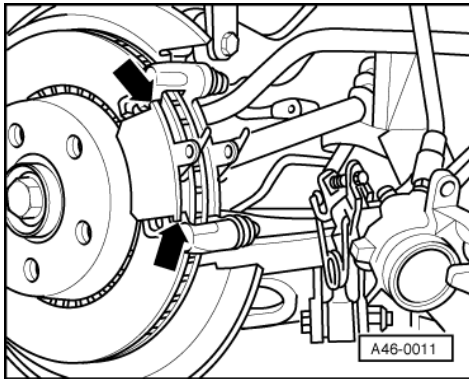
Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.

Installing



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- Screw in piston by turning special tool -3272- clockwise.



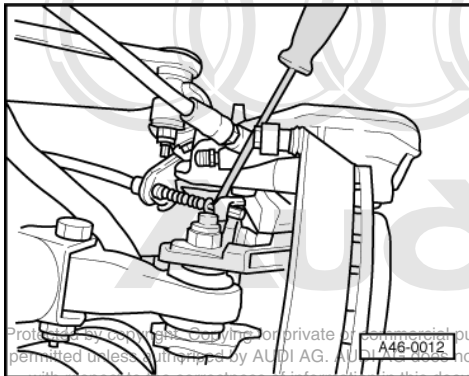
- -> Insert brake pads.
- Secure brake caliper housing with new self-locking bolts.
- Tighten bolts on brake caliper housing, 35 Nm.

Notes:

- ◆ The repair kit includes four self locking hexagon bolts which must be installed in all cases.
 - ◆ Each time after replacing the brake pads, depress the brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
 - ◆ Always perform basic setting of rear brakes whenever brake pads have been replaced =>Page 97
- Fit wheels and tighten to 120 Nm.
 - Check brake fluid level and top up if necessary.

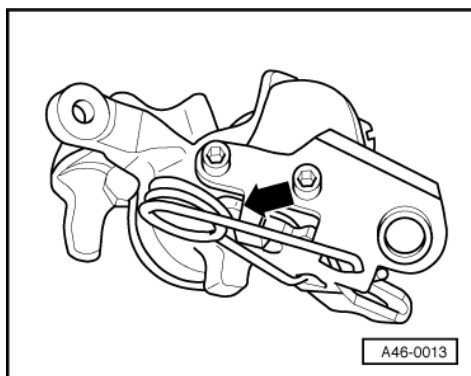
6.3 - Basic setting of rear wheel brake

Handbrake cable must not be pretensioned when performing basic setting (release handbrake).



To test:

- -> Use screwdriver to alternately press levers for handbrake cable against ...

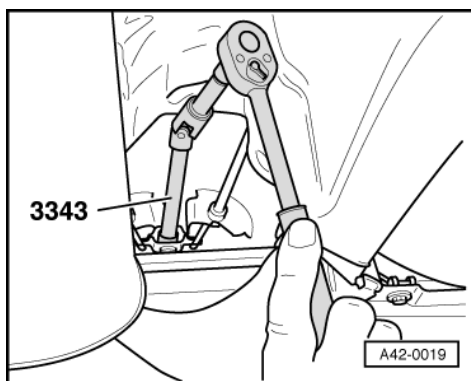


- -> ... stop (see arrow).

If lever of opposite brake caliper is pulled off stop, then handbrake cable is excessively pretensioned.

Note:

For ease of illustration, stop is shown with brake caliper removed.



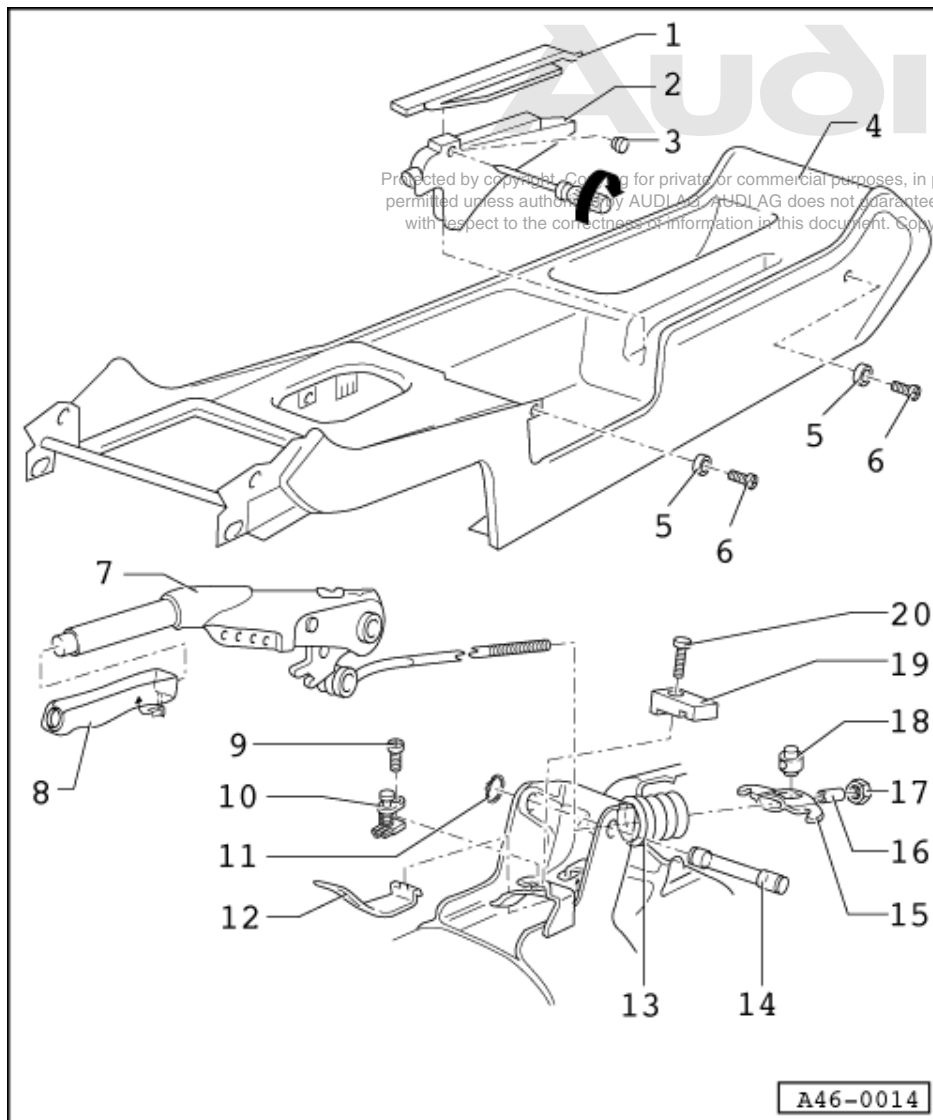
- -> Loosen off the adjusting nut for the handbrake cable using special tool -3343- until both levers make contact with the stop of the brake caliper.



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7 - Handbrake lever - Exploded view

7.1 - Handbrake lever - Exploded view

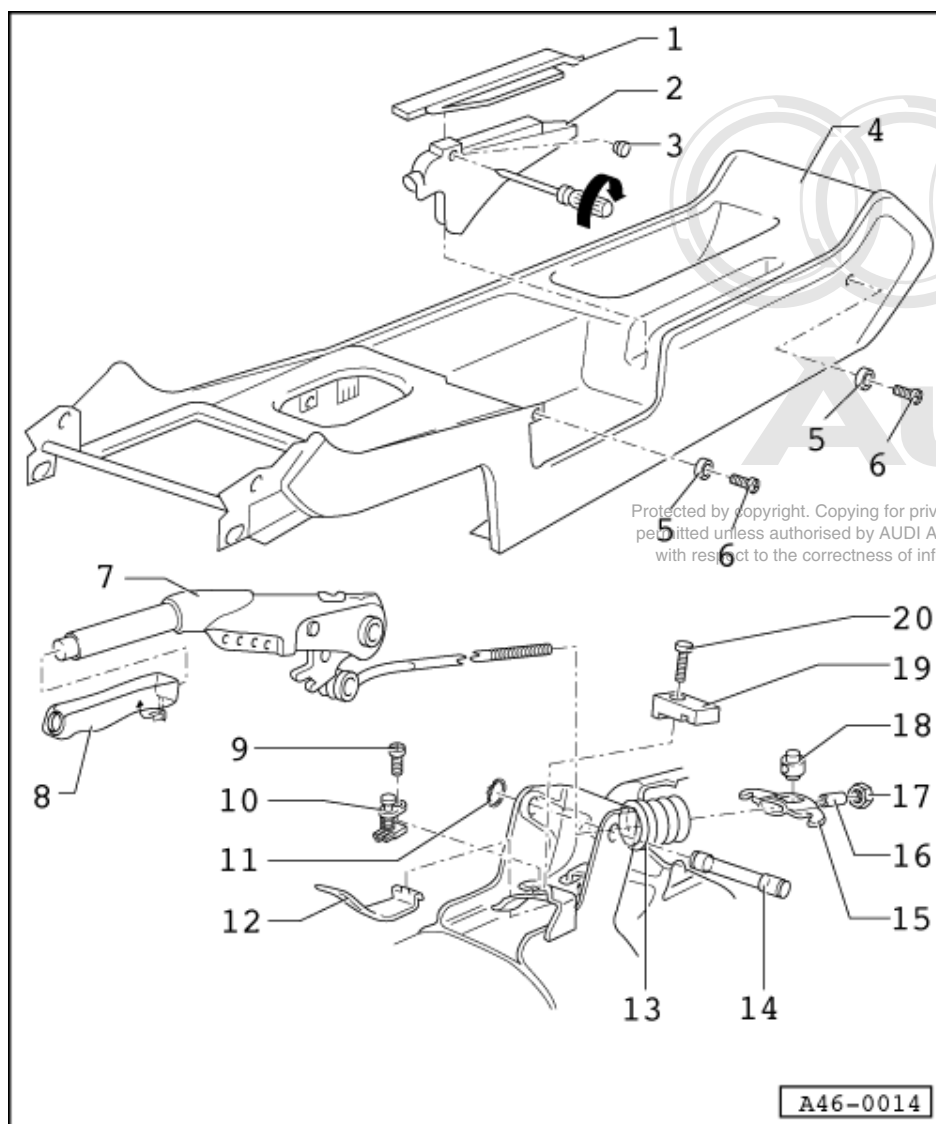


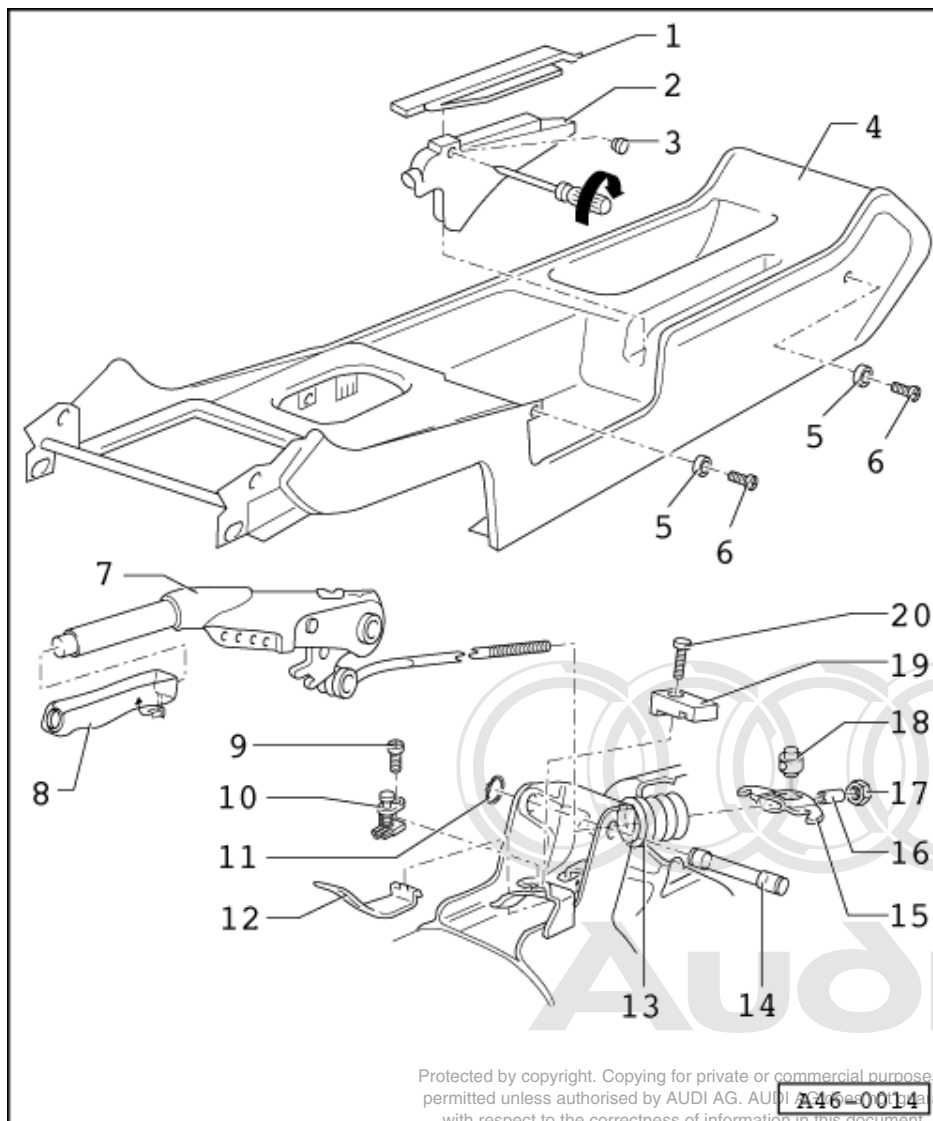
Notes:

- ◆ On RHD vehicles, the handbrake lever is fitted flush with the right side of the centre console (flush with left side on LHD vehicles).
- ◆ Grease all bearing points prior to assembly with lubricating paste, part no. G 000 150.

The following applies to both LHD and RHD vehicles.

- 1 Handbrake lever cover
- 2 Handbrake lever trim
- 3 Cap





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8 Grip

- ◆ Push onto handbrake lever
- ◆ Press home tab after assembly
- ◆ To dismantle, carefully press out tab with screwdriver

9 Self-tapping screw

10 Switch for handbrake warning light

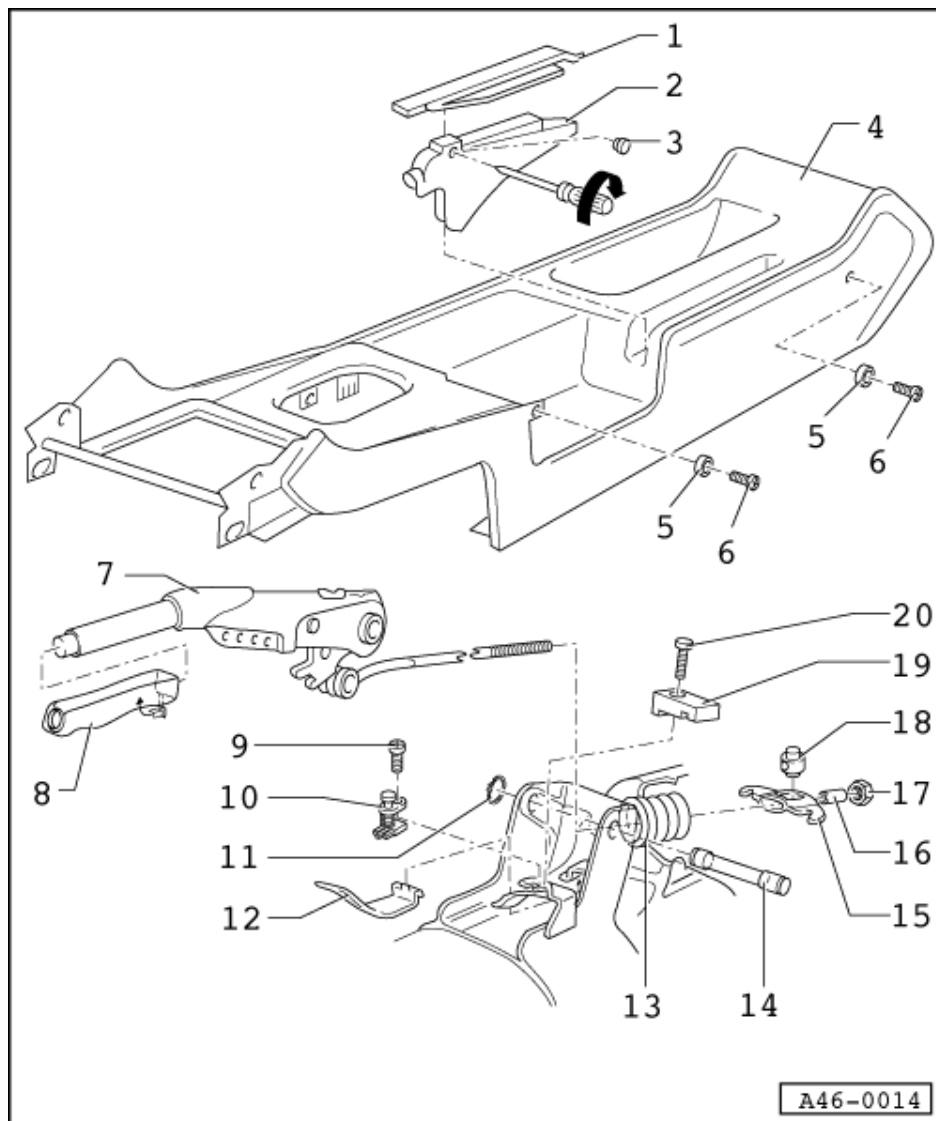
11 Circlip

- ◆ Ensure correct positioning

12 Spring

13 Bellows

- ◆ Ensure correct positioning



- 14 Pivot pin**
 - ◆ For supporting handbrake lever
- 15 Compensator**
- 16 Socket**
- 17 Adjusting nut**
 - ◆ Adjusting handbrake => Page **103**
- 18 Pivot pin**
- 19 Clamp**
- 20 Cheese-head bolt, 5 Nm**



7.2 - Removing and installing handbrake lever

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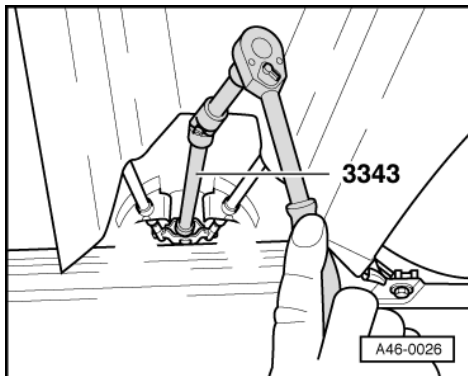
Removing

- Remove rear exhaust on quattro vehicles.

=> 6-cylinder Engine, Mechanical Components; Repair group 26

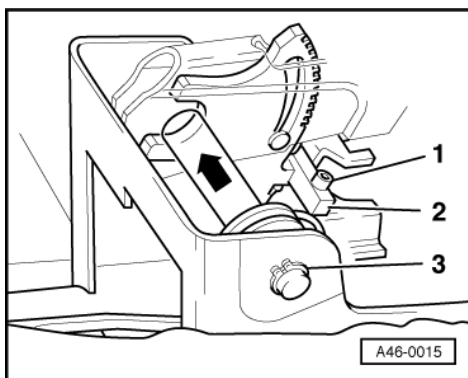
=> 8-cylinder Engine, Mechanical Components; Repair group 26

- Removing centre heat-insulation panels.



- -> Unscrew adjusting nut from connecting rod.
- Detach compensator.
- Detach bellows.
- Removing centre console.

=> General Body Repairs; Repair group 70; Removing and installing centre console and handbrake lever trim
 Removing and installing centre console and handbrake lever trim



- Unscrew cheese head bolt -1- and take off clamp -2-.
- -> Disengage circlip -3- from pivot pin.
- Press out pivot pin in direction of arrow.
- Push handbrake lever slightly to rear and take out.

Pay special attention to the following on installation:

- Insert circlip carefully.
- With the handbrake in the release position, secure the locking segment together with the clamp to the support bracket without lateral application of force.
- Insert bellows carefully.
- Ensure stress-free installation of exhaust system.
- Adjusting handbrake => Page **103**

7.3 - Adjusting handbrake

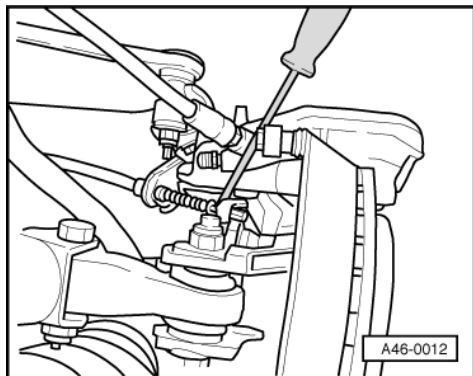
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Notes:

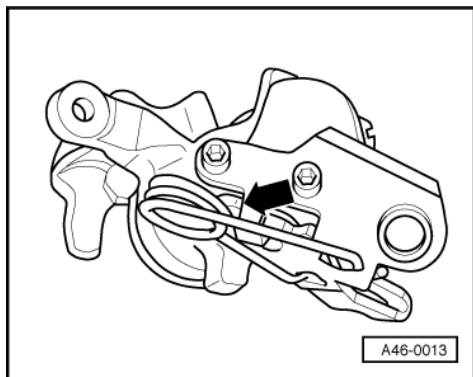
- ◆ The rear brakes are self-adjusting, so it is unnecessary to adjust the handbrake. Adjustment is only necessary if the handbrake cables, brake calipers, brake pads and brake discs are renewed.
- ◆ The foot brake system must have been bled and must be functioning properly.

- ♦ The handbrake must be adjusted after installing the centre console and the handbrake trim.

Checking basic setting:



- -> Use screwdriver to alternately press levers for handbrake cable against ...



- -> ... stop (see arrow).

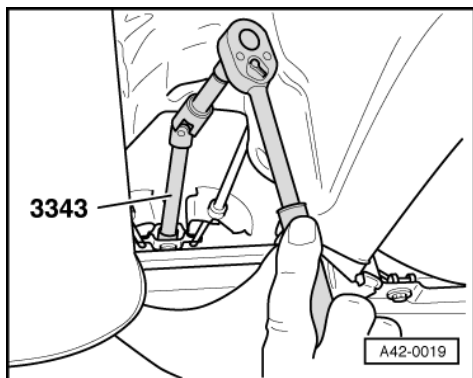
If lever of opposite brake caliper is pulled off stop, then handbrake cable is excessively pretensioned.

Note:

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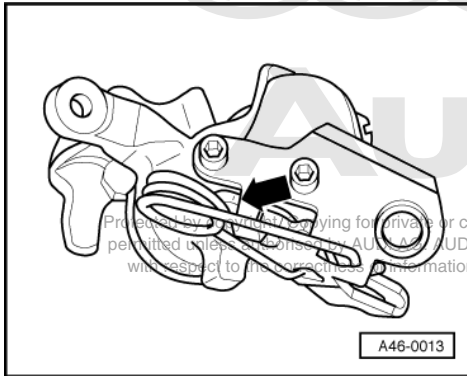
For ease of illustration, stop is shown with brake caliper removed.

Adjusting:



- Depress brake pedal firmly at least 1*.
- Handbrake lever in release position.
- -> Loosen the adjusting nut for the handbrake cable using special tool -3343- until both levers make contact with the stop of the brake caliper.

- Tighten nut on connecting rod until both levers at brake calipers clearly move (two mechanics required).



- Apply the handbrake firmly 3*.
- -> Set adjusting nut on connecting rod such that one lever at one brake caliper just lifts off stop.
- Re-check basic setting => Page 104

Note:

For ease of illustration, stop is shown with brake caliper removed.

7.4 - Removing and installing handbrake cables

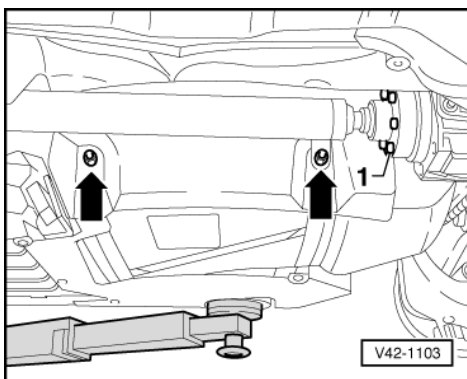
Removing

- Remove both rear wheels.
- Release handbrake.
- Remove rear exhaust on quattro vehicles.

=> 6-cylinder Engine, Mechanical Components; Repair group 26

=> 8-cylinder Engine, Mechanical Components; Repair group 26

- Remove centre heat-insulation panels.



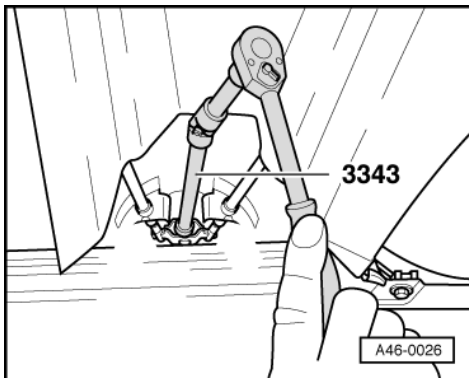
Note:

Mark the position at which the propshaft is bolted to the rear differential.

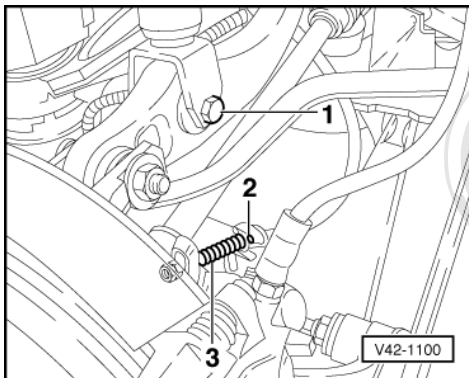
- -> Unscrew the bolts attaching the propshaft to the rear differential -1-.



- Remove the heat insulation panel in the propshaft tunnel -arrow-.



- -> Loosen the adjusting nut for the handbrake cable using special tool -3343-.
- Take the handbrake cables off the compensating bar.
- Pull out the retaining springs -arrow- from the handbrake cables.

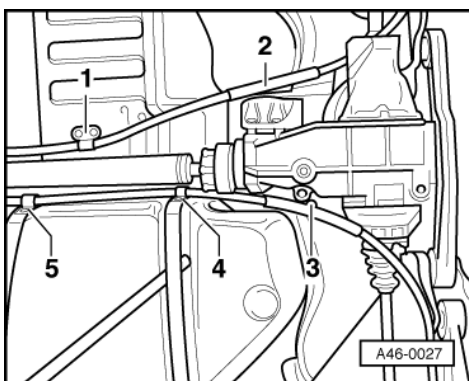


- -> Unhook the handbrake cable -3- from the brake caliper.
- Press out the spring clip -2- and pull out the handbrake cable to the rear.

Notes:

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- ♦ On FWD vehicles the open end of the spring clip -2- should point towards the brake.
- ♦ Do not loosen bolt -1-.



- -> Release retainer -1- and pull the handbrake cable out to the rear through the guide -2-.
- Release attachments -4- and -5- far enough to allow the handbrake cable to be taken out.
- Pull the handbrake cable out to the rear through the guide -3-.

Pay special attention to the following on installation:

- Propshaft to rear differential, 55 Nm.

Remove any residue of microencapsulated adhesive from the internal threads of the rear differential.

- Install and align the exhaust system.

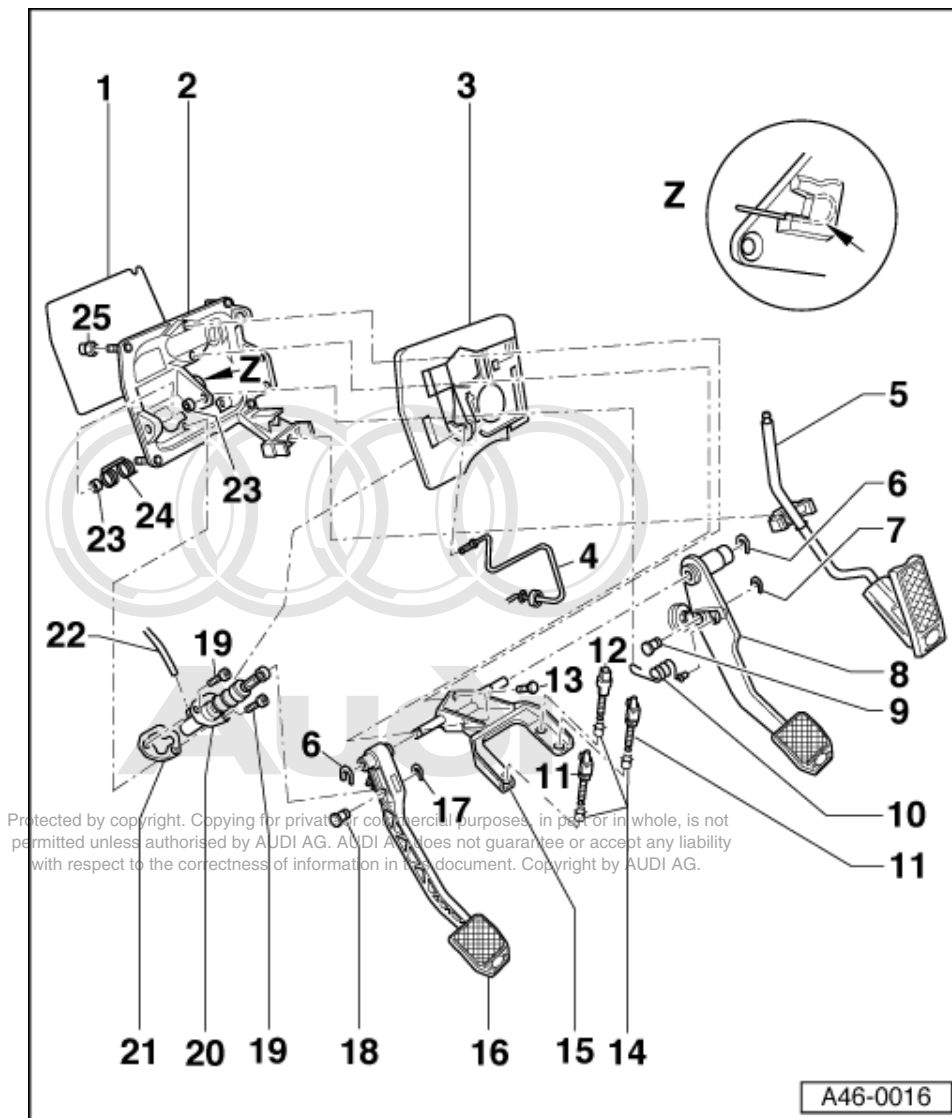
=> 6-cylinder Engine, Mechanical Components; Repair group 26

=> 8-cylinder Engine, Mechanical Components; Repair group 26

- Adjusting handbrake=> Page 103

8 - Assembly overview of pedal cluster, LHD

8.1 - Assembly overview of pedal cluster, LHD



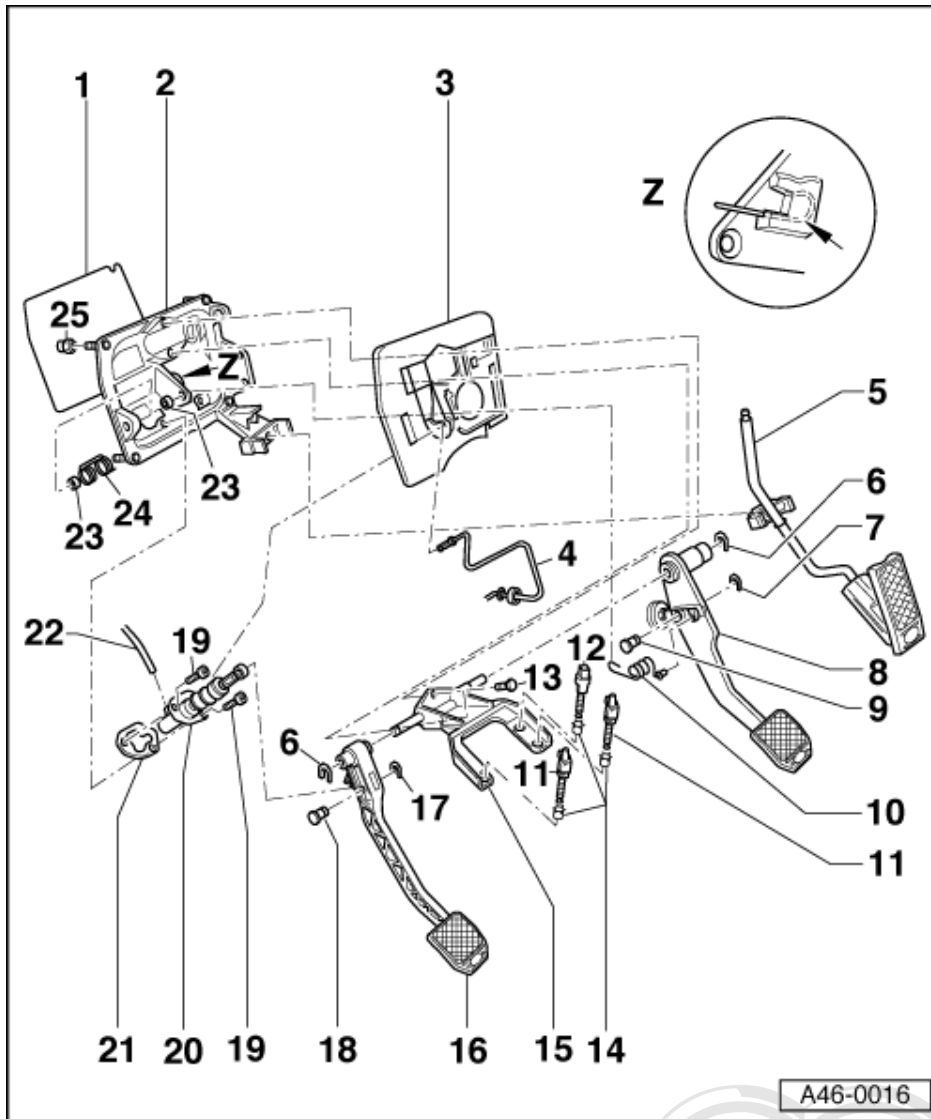
- 1 Butyl cord**
 - ♦ Always replace
 - ♦ For sealing between pedal bracket and bulkhead
- 2 Pedal bracket**
 - ♦ Removing and installing
=>Page 114.
- 3 Insulation**
 - ♦ Inserted in pedal bracket



4 Pipe for clutch master cylinder, 15 Nm

5 Accelerator

- ◆ Clip into pedal bracket
- ◆ Replacement part supplied with moulded mounting bush which cannot be replaced
- ◆ Removing and installing
=>Page 116.



6 Retainer

- ◆ Always replace
- ◆ Attach to shaft of mounting bracket

7 Retainer

- ◆ Always replace
- ◆ Fit onto pin

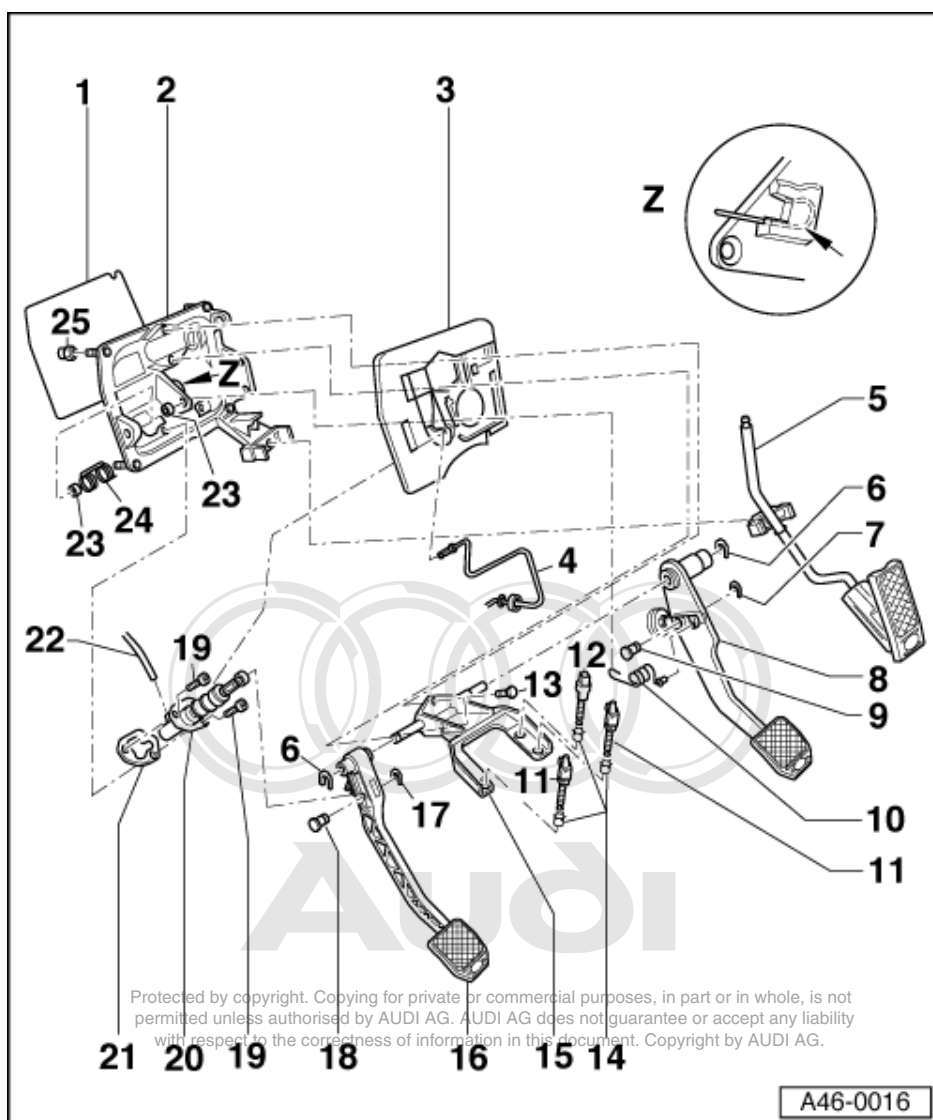
8 Brake pedal

- ◆ Push onto shaft of mounting bracket
- ◆ Loosen pedal bracket before removing
- ◆ Replacement part supplied with moulded mounting bush which cannot be replaced
- ◆ Removing and installing
=>Page 112.

9 Pin

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- ♦ Insert in clevis and brake pedal



10 Torsion spring

- ♦ Press home in pedal bracket

11 Vent valve for cruise control system

12 Brake light switch

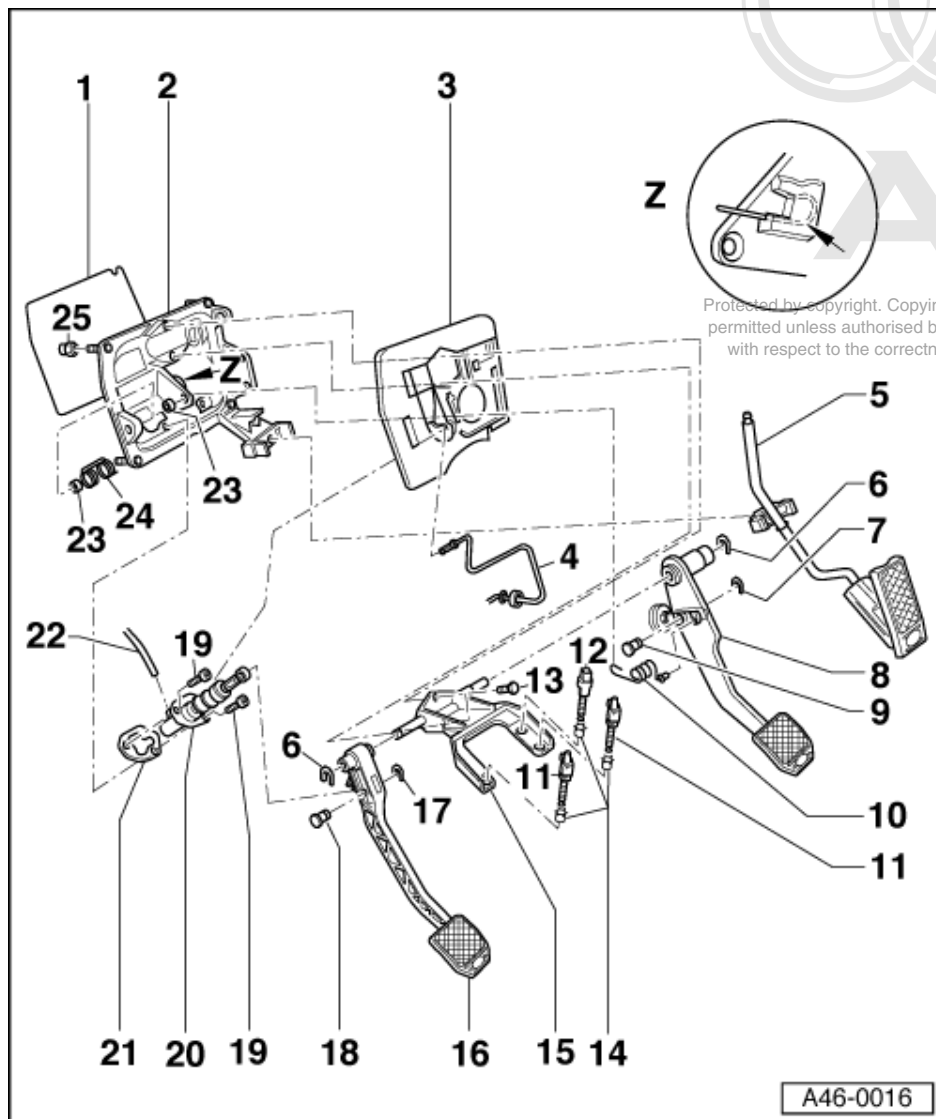
13 Hexagon bolt, 20 Nm

14 Clip

- ♦ Always replace
- ♦ Insert in mounting bracket

15 Bracket

- ♦ Removing and installing
 =>Page 112.



16 Clutch pedal

- ◆ Located in position by clutch master cylinder adjustment
- ◆ Push onto shaft of mounting bracket
- ◆ Removal and installation can take place without taking out the pedal bracket => Page 112

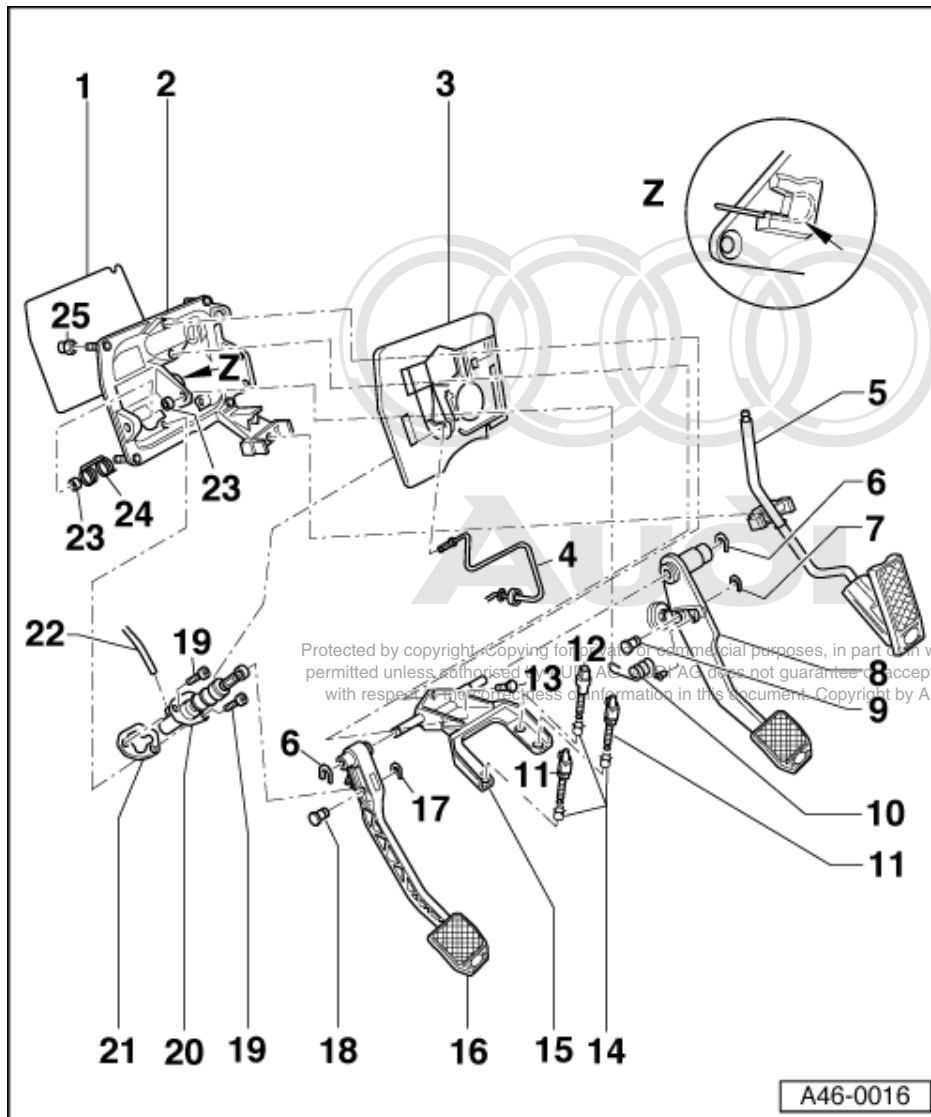
17 Retainer

- ◆ Always replace
- ◆ Fit onto pin

18 Pin

- ◆ Insert in clutch pedal and master cylinder

19 Cheese head bolts, 20 Nm



20 Master cylinder

- ♦ Replace in the event of leakage
- ♦ To remove detach mounting bracket => Page 112
- ♦ Adjusting => Fig. 1

21 Seal

- ♦ Insert between mounting bracket and master cylinder

22 Supply hose

- ♦ Attach to master cylinder

23 Bush

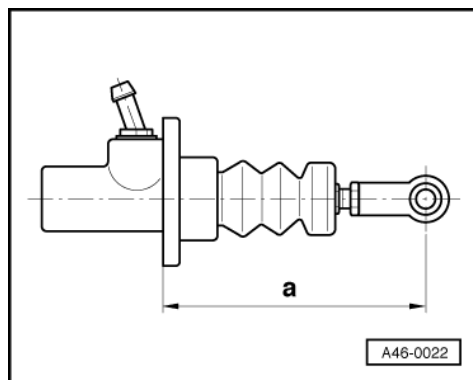
- ♦ Replace if damaged

24 Torsion spring

- ♦ Do not grease
- ♦ To remove unscrew the mounting bracket

25 Hexagon nut, 20 Nm

- ♦ Always replace



-> Fig.1 Adjusting clutch master cylinder

$a = 114.5 \text{ mm} \pm 0.5 \text{ mm}$

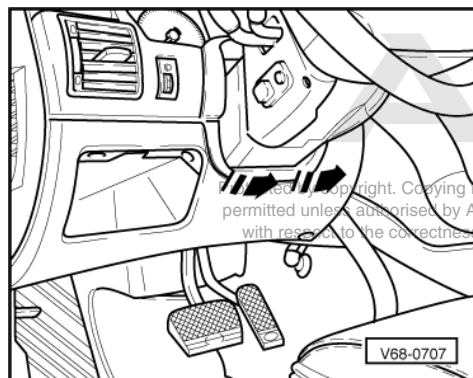
- Turn plastic mounting lug to adjust.

Notes:

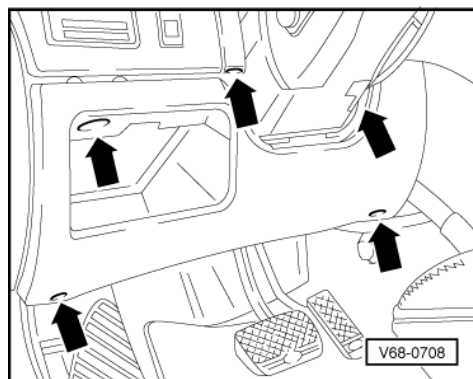
- ♦ When measuring, plastic mounting lug must be at right angles to contact surface of clutch master cylinder.
- ♦ If clutch pedal does not reset automatically with plastic mounting lug correctly set, this may be due to:
 - Air in hydraulic system
 - Pedal not moving freely in mount.

8.2 - Removing and installing pedal cluster, LHD

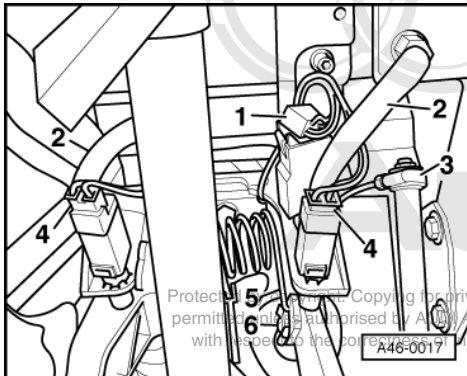
Remove mounting bracket



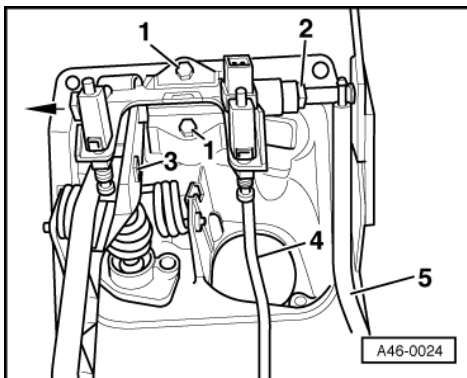
- -> Lever off surround underneath steering column, see arrows.



- -> Unscrew cover, see arrows
- Remove the lower insulation panel.



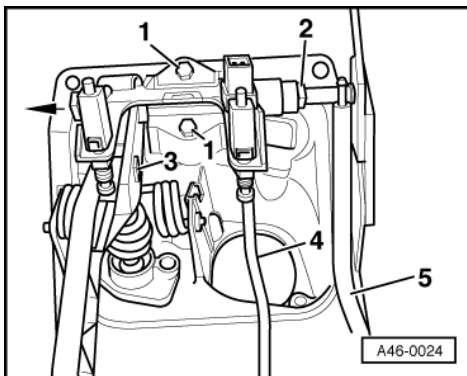
- -> Unhook the cable -3- from the accelerator pedal.
- Unclip the connector -4- for the CCS from the clutch and brake pedal.
- Unclip the CCS vacuum hose -2- from the clutch and brake pedal.
- Unclip connector -1- from the brake light switch.
- Release the hose clamp securing the wiring loom.
- Unhook the return spring -5- at the brake pedal.
- Unhook the push rod -6- of the brake master cylinder.



Note:

The illustration shows the removal procedure with the pedal bracket removed in order to simplify the illustration.

- -> Take out the securing clip -2- for the brake pedal.

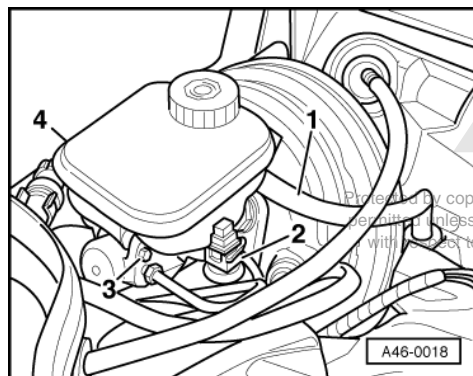


- -> Disengage the securing clip -3- from the clutch master cylinder and take out the pin.
- Unscrew hexagon bolts -1-.
- Pull out the mounting bracket in the direction of the arrow, and at the same time take the brake pedal -4- off the shaft.

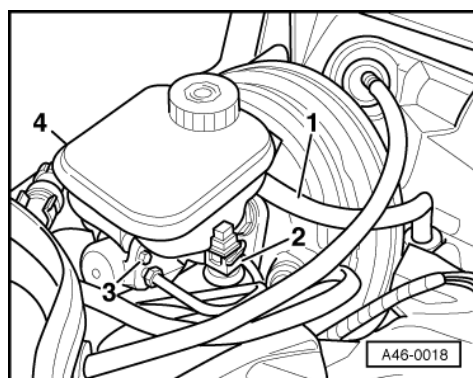
- Unclip the accelerator pedal -5- => Page **116**

Remove the pedal bracket:

- ♦ For removal of the pedal bracket, first remove the mounting bracket => Page **112**
- Fit bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw.



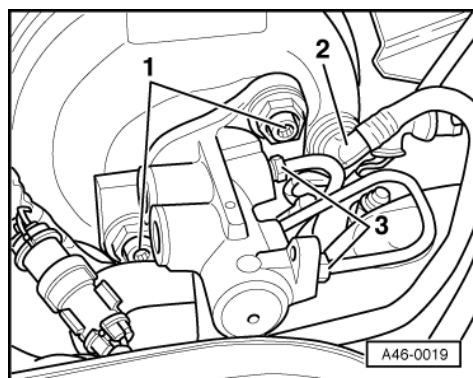
- Depress the brake pedal in order to pump out as much brake fluid as possible.
- Close front left bleeder screw.
- -> Unscrew the bolt -3- attaching the brake fluid reservoir.



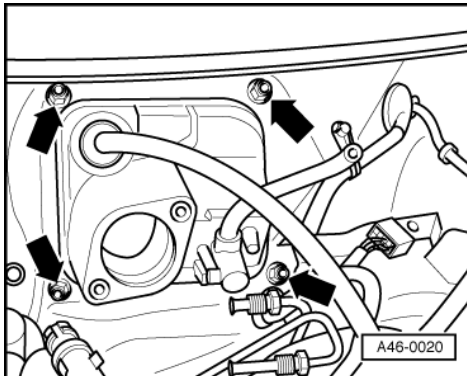
- -> Unplug the connector of the sender for the float warning indicator -2-.
- Disconnect the feed hose -1- for the clutch master cylinder.

Notes:

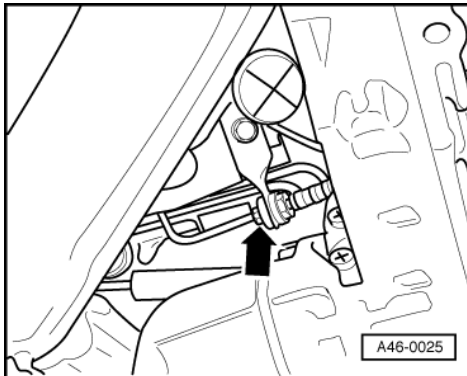
- ♦ Protect the plenum chamber against any escaping brake fluid.
- ♦ The underside of the brake fluid reservoir clips into the brake master cylinder.
- To remove reservoir, press down locking lug and at the same time pull brake fluid reservoir out of sealing plugs.
- Remove brake fluid reservoir.



- -> Unscrew the brake pipes -3- and close them off with dummy plugs.
- Disconnect vacuum hose -2-.
- Unscrew the bolts attaching the brake servo unit -1- (Torx T45).
- Remove brake servo with brake master cylinder.



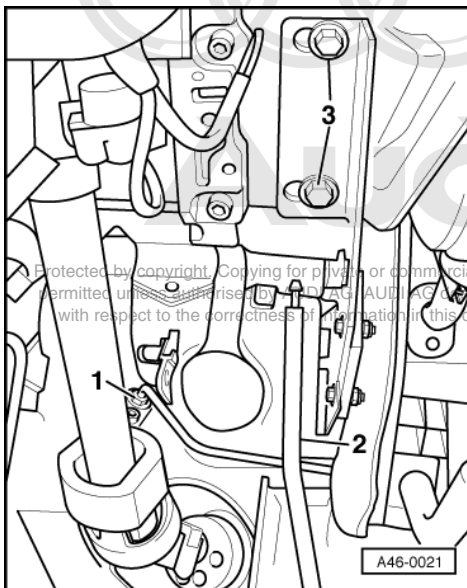
- -> Press the accelerator cable out of the pedal bracket from the inside.
- Unscrew the retaining nuts -arrows- for the pedal bracket.



- -> Separate the clutch pipe -arrow-.

Note:

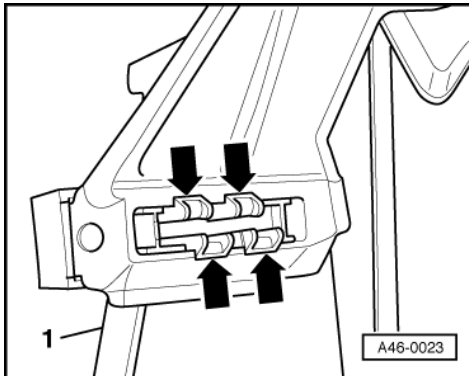
The pipe is attached to a bracket in the area of the steering gear.



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- -> Detach clutch pipe -1- at the master cylinder.
- Unclip the accelerator pedal -2- => Page **116**
- Unscrew bolt -3-.



- -> To remove accelerator pedal, press catches in direction of arrow and at the same time press out accelerator pedal.
- Take out the insulation panel

Note:

- ♦ The pedal bracket is installed into the body with a butyl cord which should be renewed every time it is removed and installed.
- ♦ Separate the pedal bracket from the body with light blows of a rubber mallet.

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Pay special attention to the following on installation:

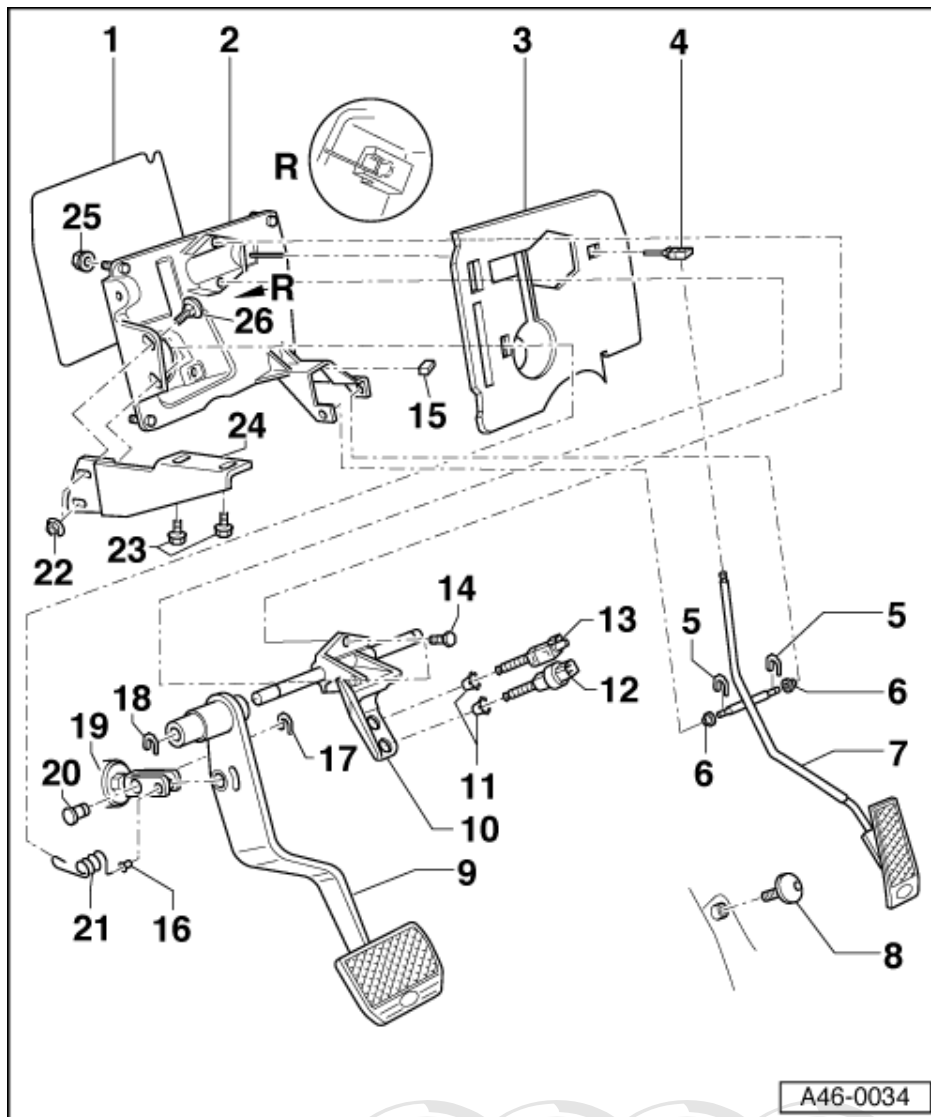
- Once the new butyl cord is in place, insert the pedal bracket immediately and tighten it down.
- Bleed brake system => Page **161** and clutch.

=> 5-speed Manual Gearbox 012, FWD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

=> 5-speed Manual Gearbox 01A, 4WD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

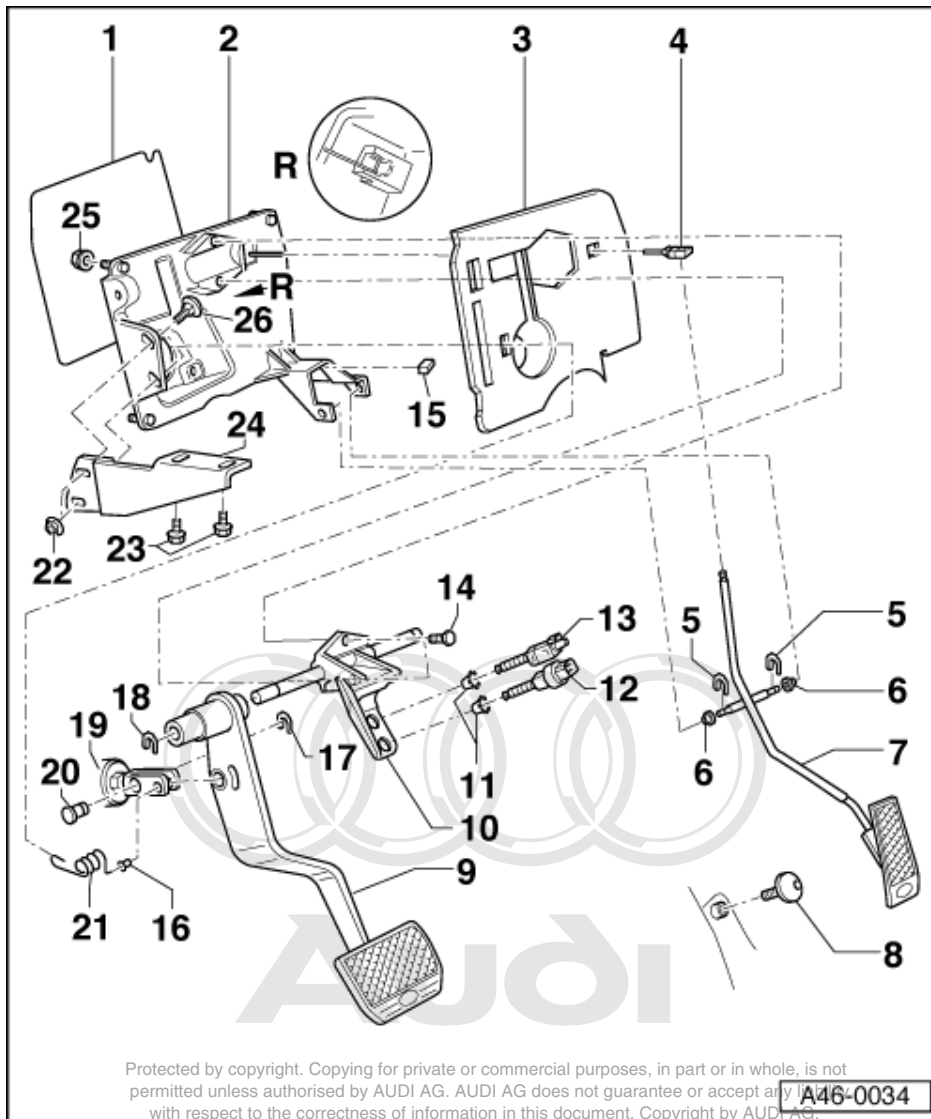
9 - Assembly overview of pedal cluster, RHD

9.1 - Assembly overview of pedal cluster, RHD



- 1 **Butyl cord**
 - ♦ Always replace
 - ♦ For sealing between pedal bracket and bulkhead
- 2 **Pedal bracket**
 - ♦ Removing and installing
=>Page 120.
- 3 **Insulation**
 - ♦ Inserted in pedal bracket
- 4 **Accelerator cable**
 - ♦ Hook into accelerator pedal
- 5 **Retainer**
 - ♦ Always replace
 - ♦ Fit onto accelerator pedal shaft
- 6 **Bush**

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7 Accelerator

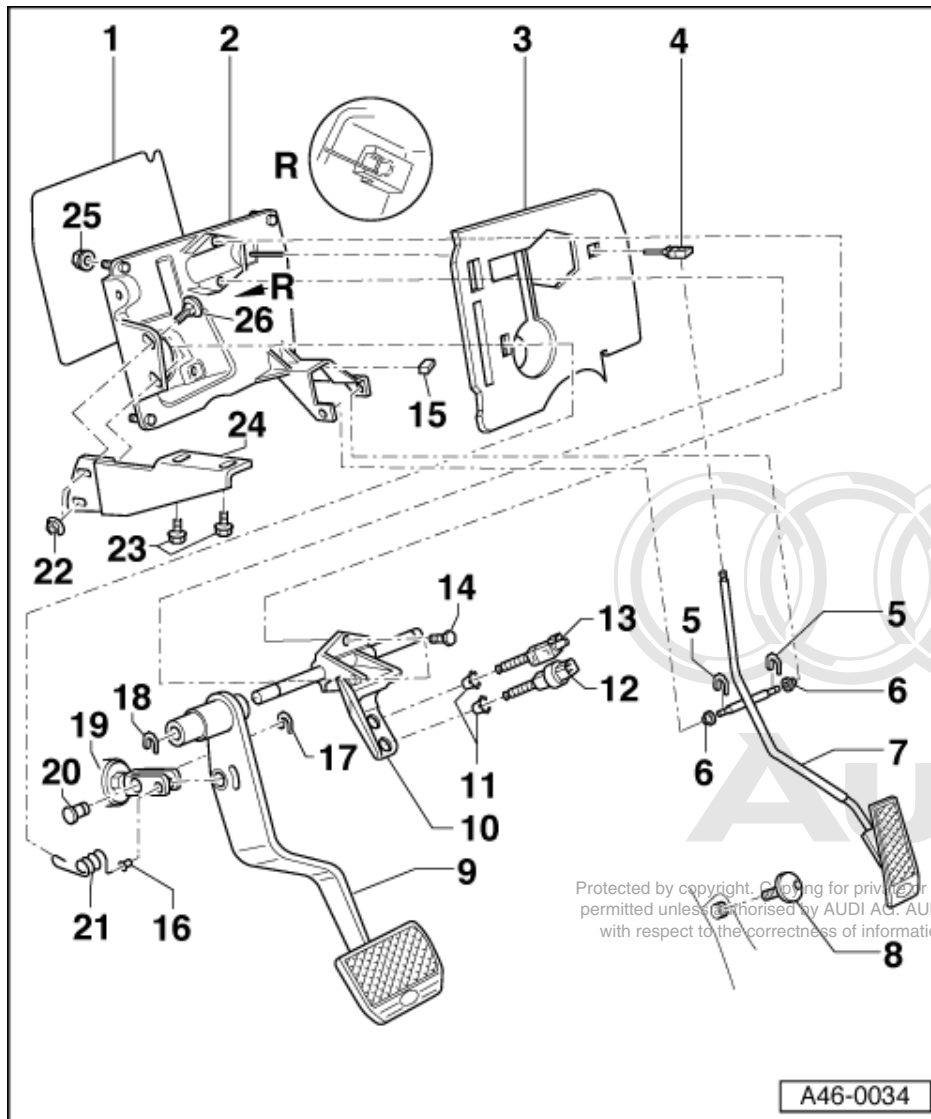
8 Accelerator pedal stop

9 Brake pedal

- ◆ Push onto shaft of mounting bracket
- ◆ Loosen pedal bracket before removing
- ◆ Replacement part supplied with moulded mounting bush which cannot be replaced
- ◆ Removing and installing
=>Page 112.

10 Bracket

- ◆ Removing and installing
=>Page 112.



11 Clip

- ♦ Always replace
- ♦ Insert in mounting bracket

12 Brake light switch

13 Vent valve for cruise control system

14 Hexagon bolt, 20 Nm

15 Beading

16 Socket

17 Retainer

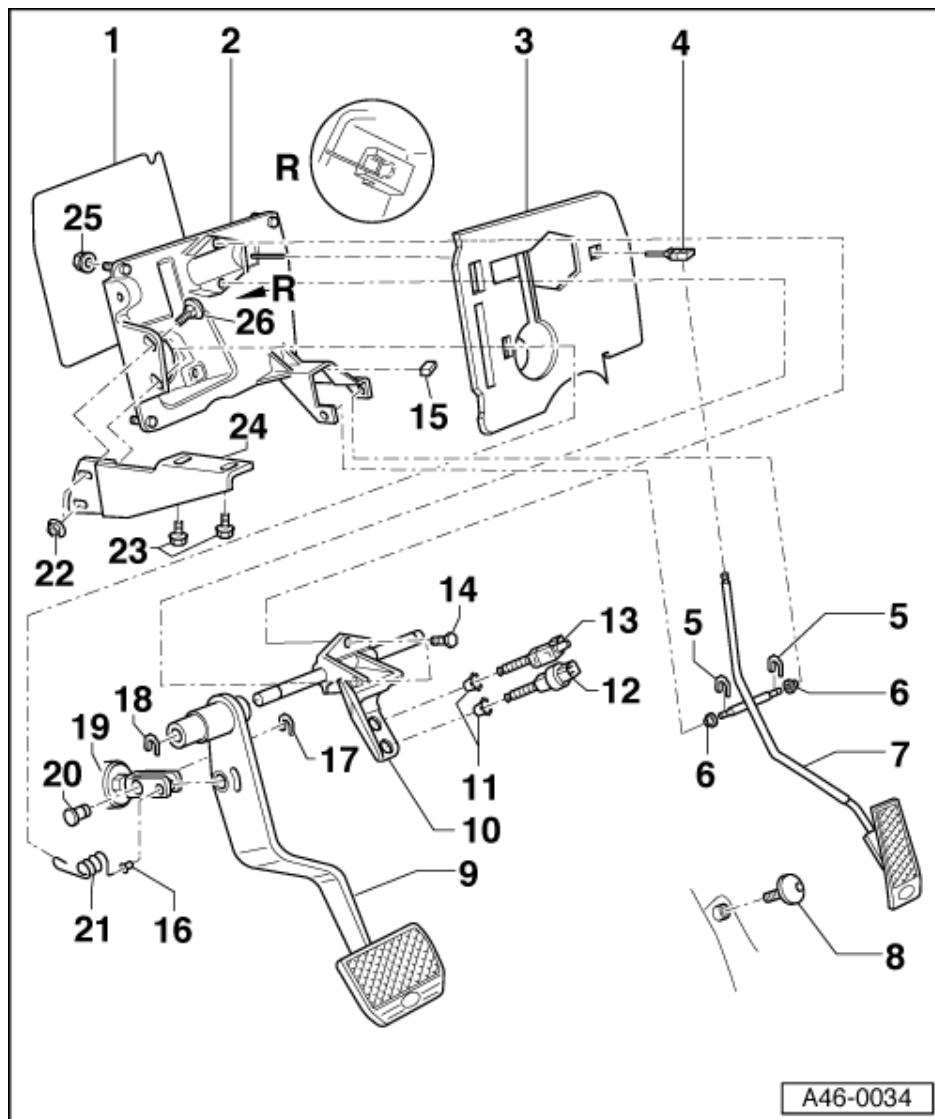
- ♦ Always replace
- ♦ Fit onto pin

18 Retainer

- ♦ Always replace
- ♦ Fit onto shaft of mounting bracket

19 Brake servo

- ♦ Removing and installing
 =>Page **175**.



20 Pin

- ◆ Insert in clevis and brake pedal

21 Torsion spring

- ◆ Press home in pedal bracket => Detail R

22 Hexagon nut, 10 Nm

23 Combi bolt, 22 Nm

- ◆ Bolted into assembly carrier

24 Support

- ◆ Tighten free of stress

25 Hexagon nut, 20 Nm

- ◆ Always replace

26 Flat-head bolt

9.2 - Removing and installing pedal cluster, RHD

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- Remove the support on the left of the pedal bracket.
- To remove the accelerator pedal, pull the retaining clips off the shaft. Then remove the bearing bushes, followed by the accelerator pedal.

- Unhook the accelerator cable in the engine compartment
- => AAH 6-cylinder Engine, Mechanical Components; Repair group 20
- => AAH 8-cylinder Engine, Mechanical Components; Repair group 20



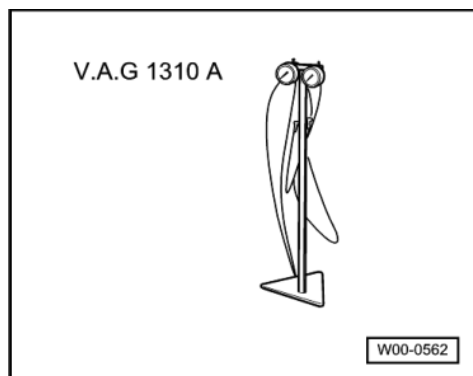
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47 - Brakes, Brake hydraulics

1 - Pressurised leak test

1.1 - Pressurised leak test

Special tools and workshop equipment required



- ♦ V.A.G 1310 A Braking-system tester

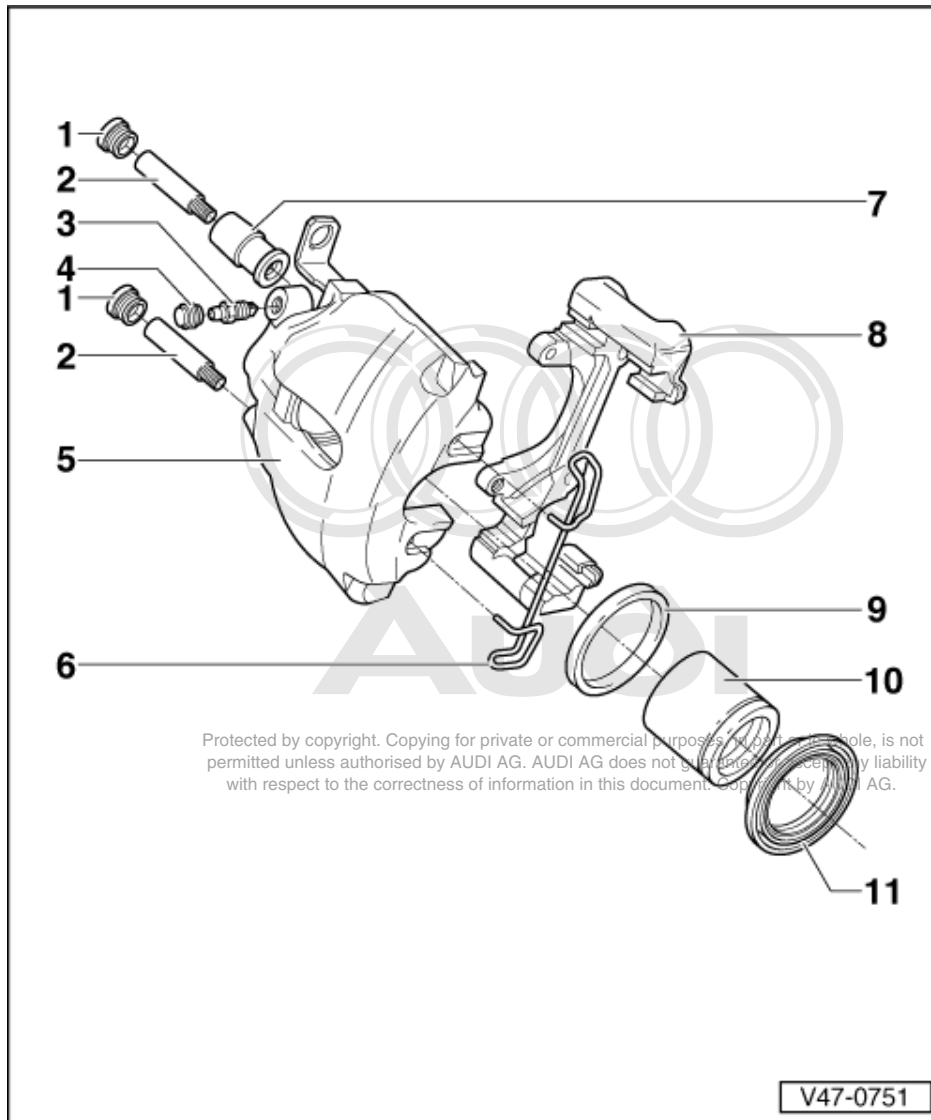
Before you begin:

Make sure that the brake system (hydraulic unit, brake hoses, brake pipes and brake calipers) functions properly and is free of leaks.

- Remove bleeder screw at one of the front brake calipers. Connect pressure gauge -V.A.G 1310- or V.A.G 1310A and bleed.
- Insert brake pedal depressor between brake pedal and driver's seat. Apply pressure to brake pedal until the gauge indicates a pressure of 50 bar. The pressure must not drop by more than 4 bar during the test period of 45 seconds. Replace brake master cylinder if drop in pressure exceeds the above figure.

2 - Brake caliper FN-3

2.1 - Brake caliper FN-3



2.2 - Servicing brake caliper

Notes:

- ◆ Install complete repair set when servicing.
- ◆ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.

1 Caps

- ◆ Insert into bearing bush

2 Guide pin, 25 Nm

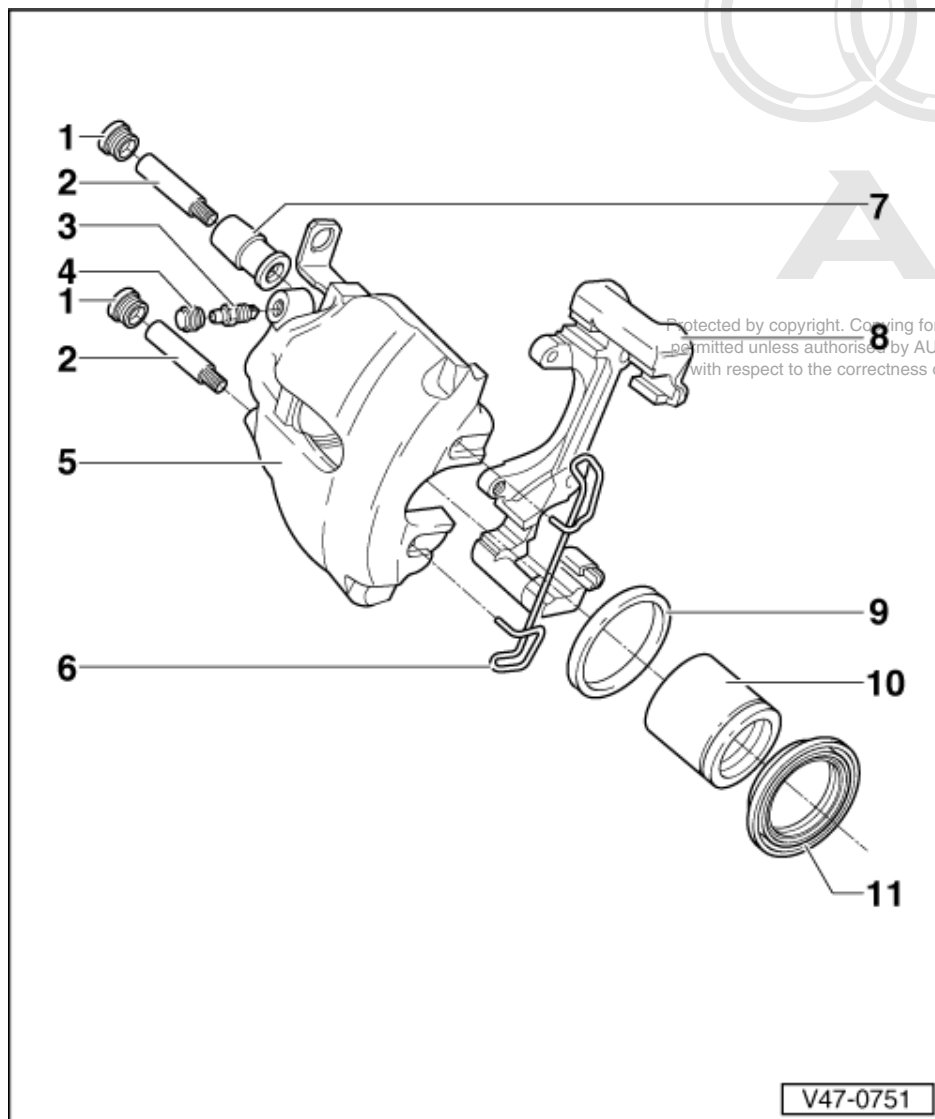
3 Vent valve

- ◆ Apply thin coat of assembly paste G 052 150 A2 to thread before screwing in

4 Protective cap

- ◆ Attach to bleed valve

5 Brake caliper housing



6 Retaining spring

- ◆ Insert both ends into the holes in the brake caliper housing

7 Bush

- ◆ Insert into brake caliper housing

8 Brake carrier

- ◆ Bolt to brake caliper housing

9 Sealing ring

10 Piston

- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting
- ◆ Piston diameter

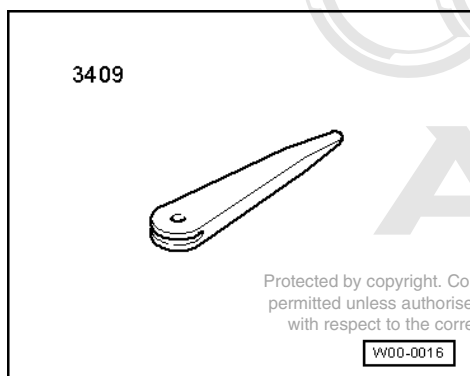
=> Brake System; Repair group 00; Technical data Technical data

11 Protective cap

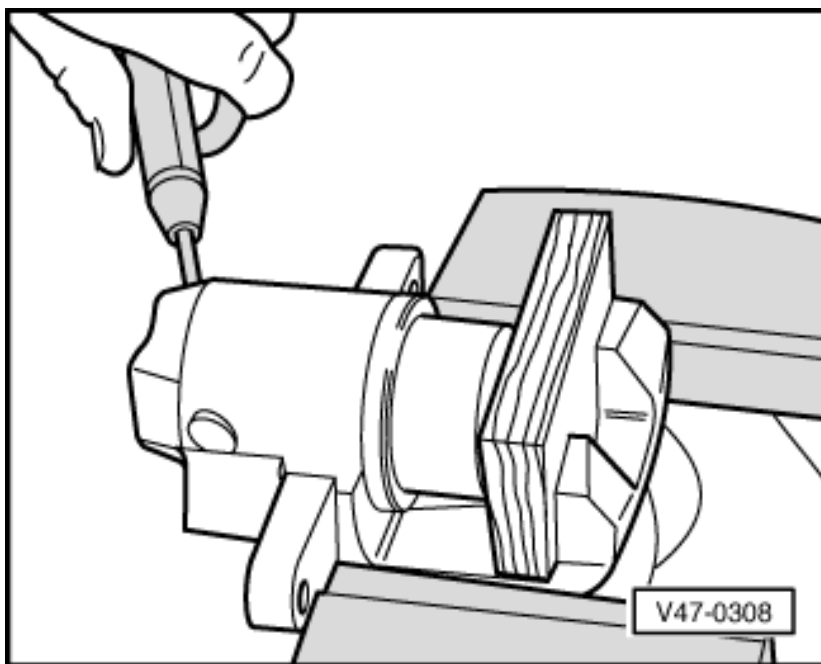
- ◆ Do not damage when inserting piston

2.3 - Removing and installing piston for front brake caliper

Special tools and workshop equipment required



- ◆ 3409 Assembly wedge
- ◆ Piston resetting tool
- ◆ Assembly paste G 052 150 A2

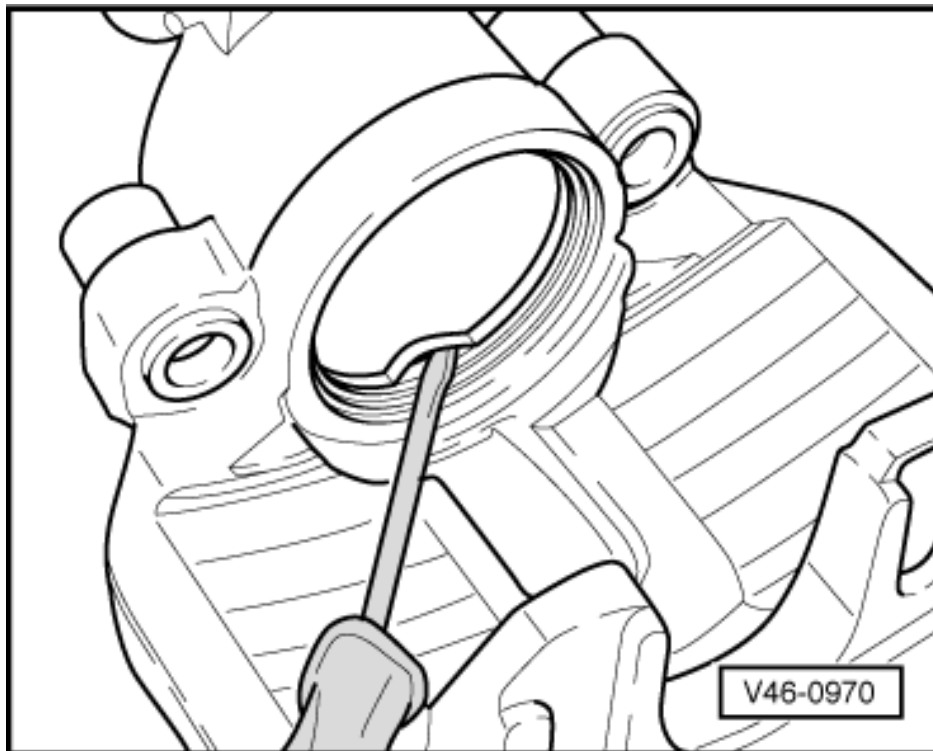


Removing

- -> Force piston out of brake caliper housing using compressed air.

Note:

Place a piece of wood in the recess to prevent damaging the piston.

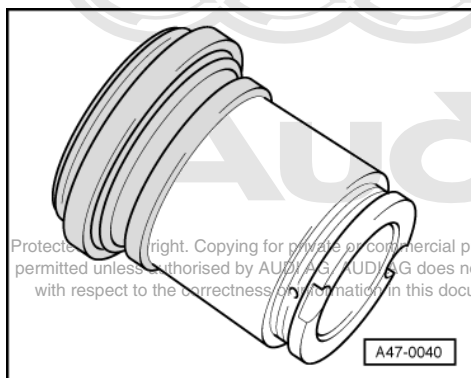


- -> Remove sealing ring.
- For this purpose, use removal wedge 3409.

Note:

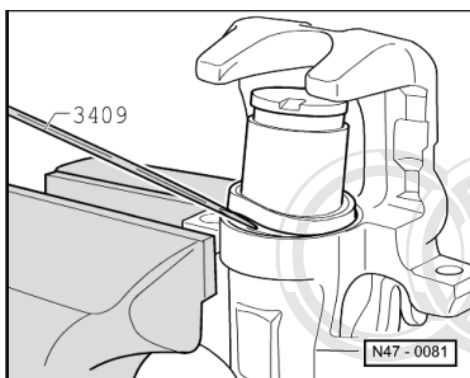
Ensure that the surface of the cylinder is not damaged during removal.

Installing



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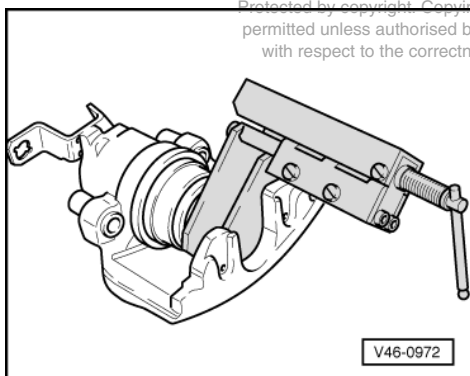
- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.
- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
- -> Place protective cap with the outer sealing lip on the piston.



- -> Using removal wedge 3409, insert the inner sealing lip into the groove on the cylinder.

Note:

At the same time, hold piston in front of brake caliper housing.



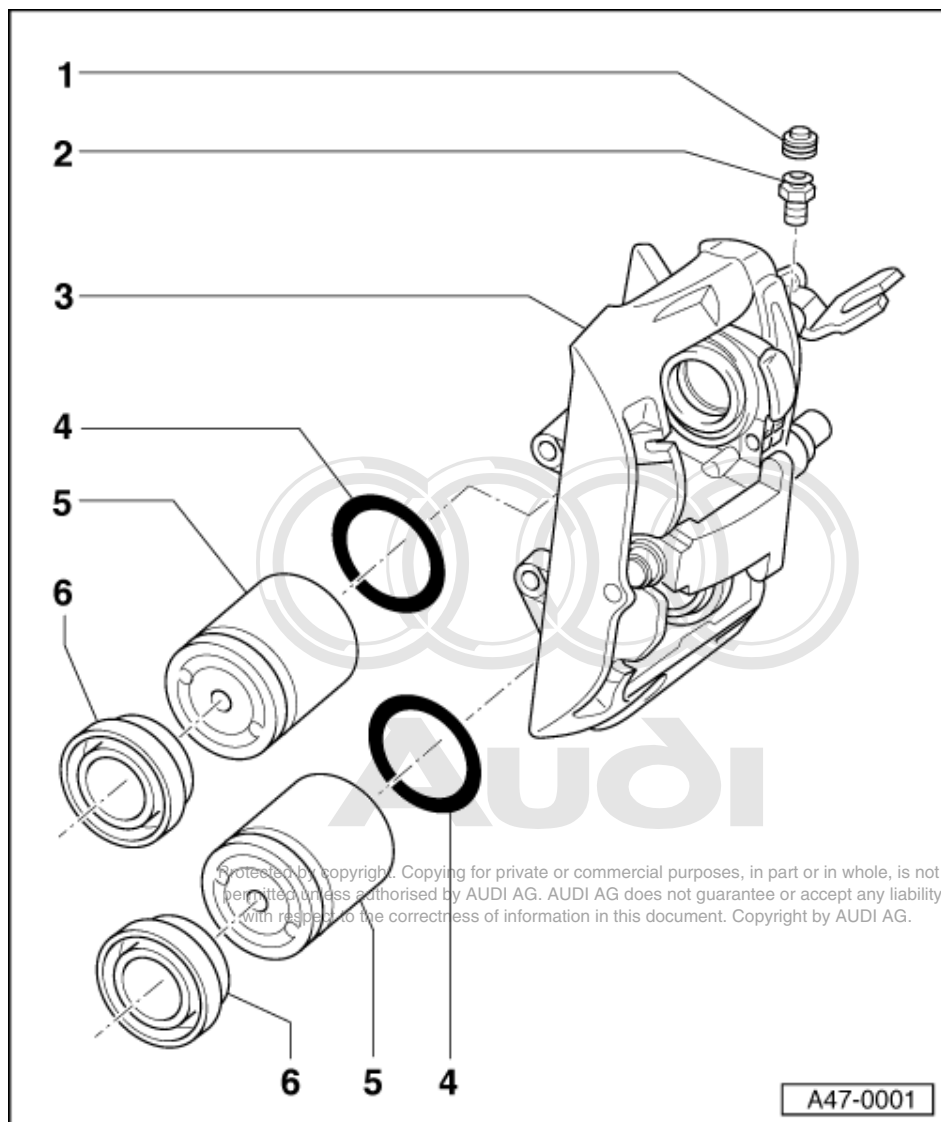
- -> Press the piston into the brake caliper housing using a piston resetting tool.

Note:

The outer sealing lip of the protective cap will then locate in the groove on the piston.

3 - Brake caliper HP-2 double-piston brake caliper/steel

3.1 - Brake caliper HP-2 double-piston brake caliper/steel



3.2 - Servicing brake caliper

Notes:

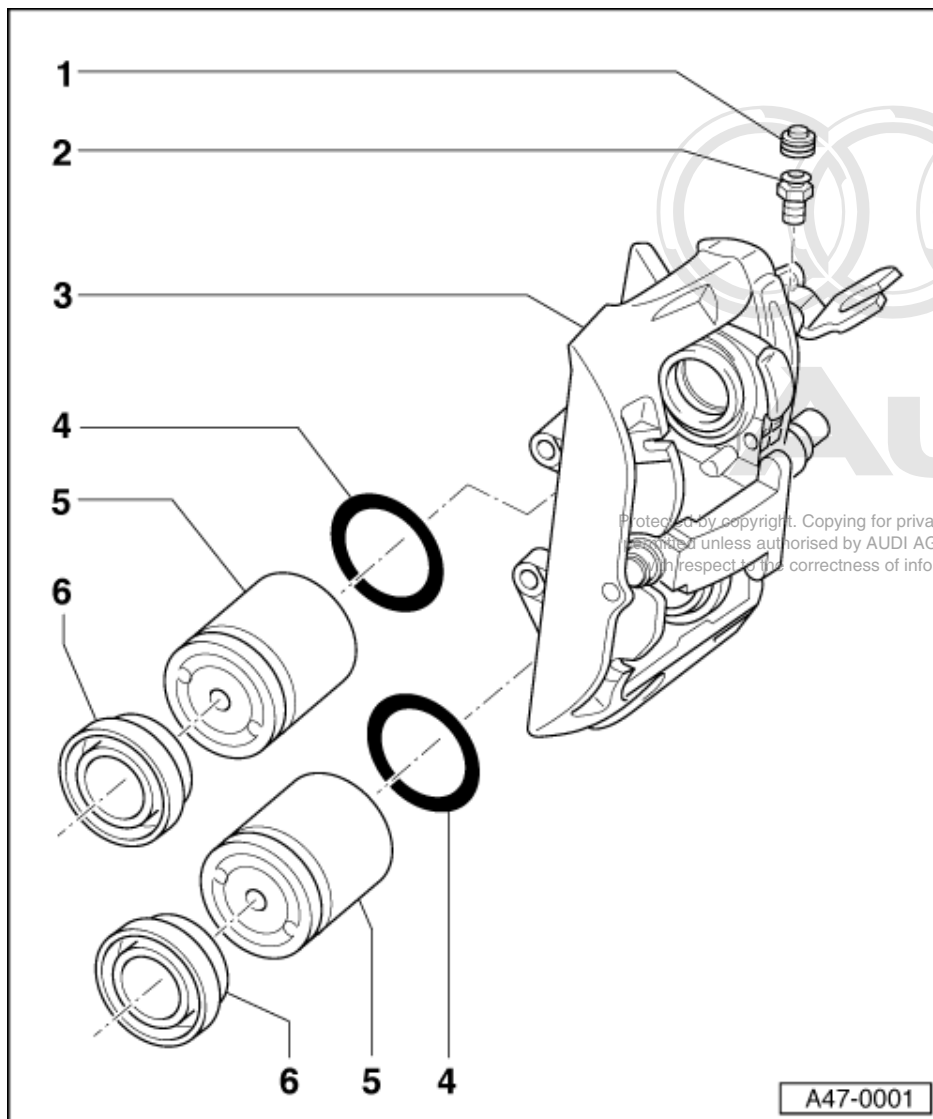
- ♦ Install complete repair set when servicing.
- ♦ New brake calipers are filled with brake fluid and are pre-bled.
- ♦ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.

1 Protective cap

- ♦ Attach to bleed valve

2 Vent valve

- ♦ Apply thin coat of assembly paste G 052 150 A2 to thread before screwing in



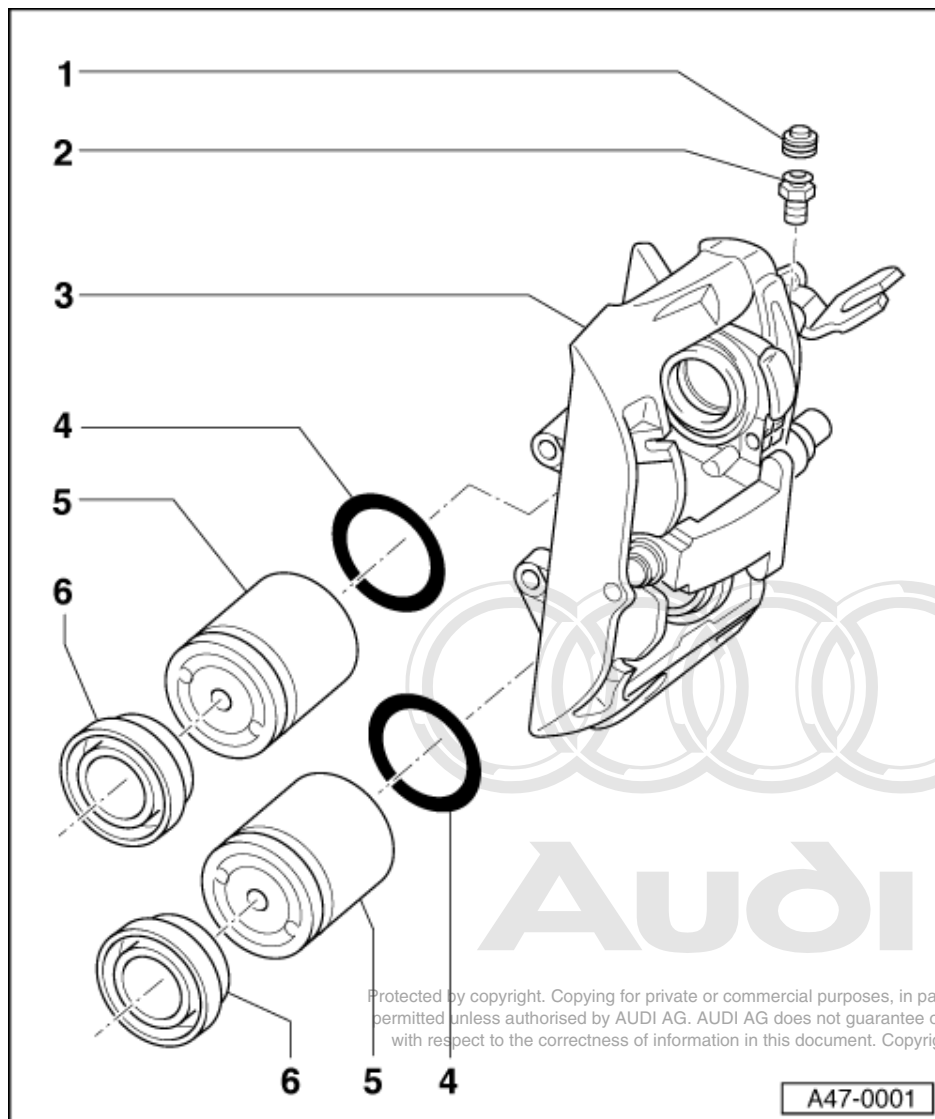
3 Brake caliper housing

Important

Do not separate the two halves of the housing (internally serrated screws). Replace brake caliper if protective cap for guide pins is damaged.

4 Seals

- ◆ Use wedge -3409- to remove =>Fig. 2
- ◆ Insert carefully by hand



5 Piston

- ◆ Piston diameter

=> Brake System; Repair group 00; Technical data Technical data

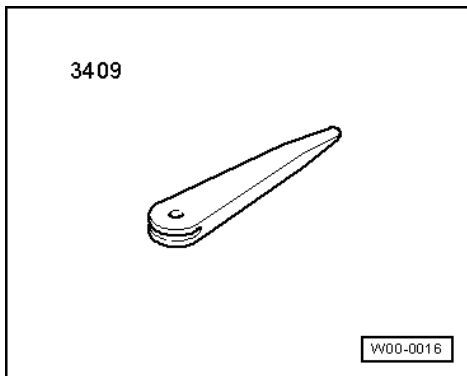
- ◆ Use compressed air to press out of brake caliper housing => Fig. 1
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting
- ◆ Installing => Fig. 3, 4, and 5

6 Protective caps

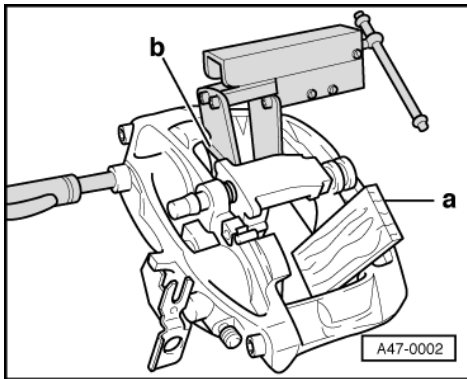
- ◆ Do not damage when inserting piston
- ◆ Fit onto piston with outer sealing lip => Fig. 3
- ◆ Insert with inner sealing lip in groove in brake caliper housing => Fig. 4

3.3 - Removing and installing piston for front brake caliper

Special tools and workshop equipment required



- ◆ 3409 Assembly wedge
- ◆ Piston resetting tool
- ◆ Assembly paste G 052 150 A2

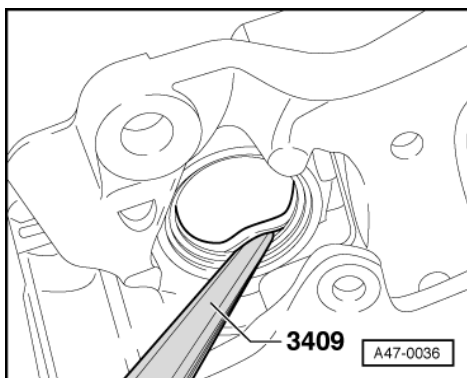


-> Fig.1 Using compressed air to press pistons individually out of brake caliper housing

Note:

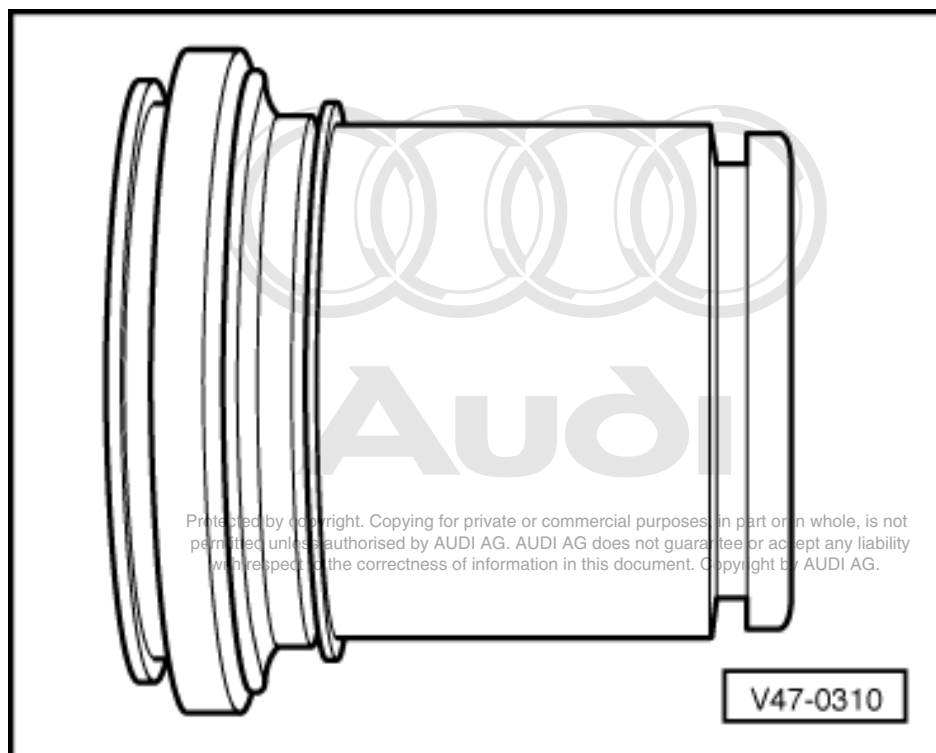
Insert brake pad -b- into the piston. Position wooden block -a- in recess to avoid piston damage.

Only one piston can be pressed out at a time, when doing so, hold other piston in position in brake caliper housing using piston resetting tool.

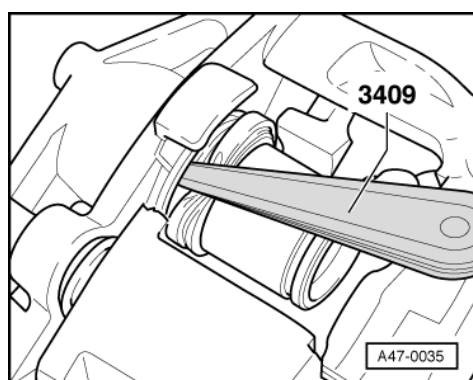


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-> Fig.2 Using wedge -3409- to remove sealing rings



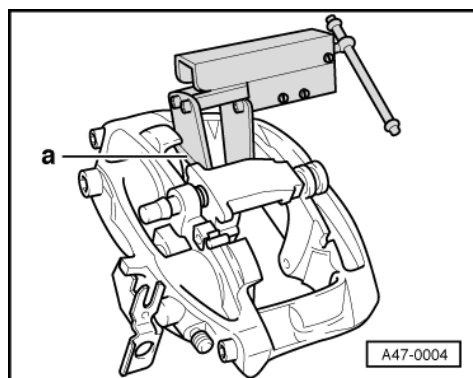
-> Fig.3 Attaching outer sealing lip of protective cap to piston.



-> Fig.4 Inserting inner sealing lip of protective cap with wedge -3409-

Note:

At the same time, hold piston in front of brake caliper housing.



-> Fig. 5 Press the piston into the brake calliper housing using a piston resetting tool.

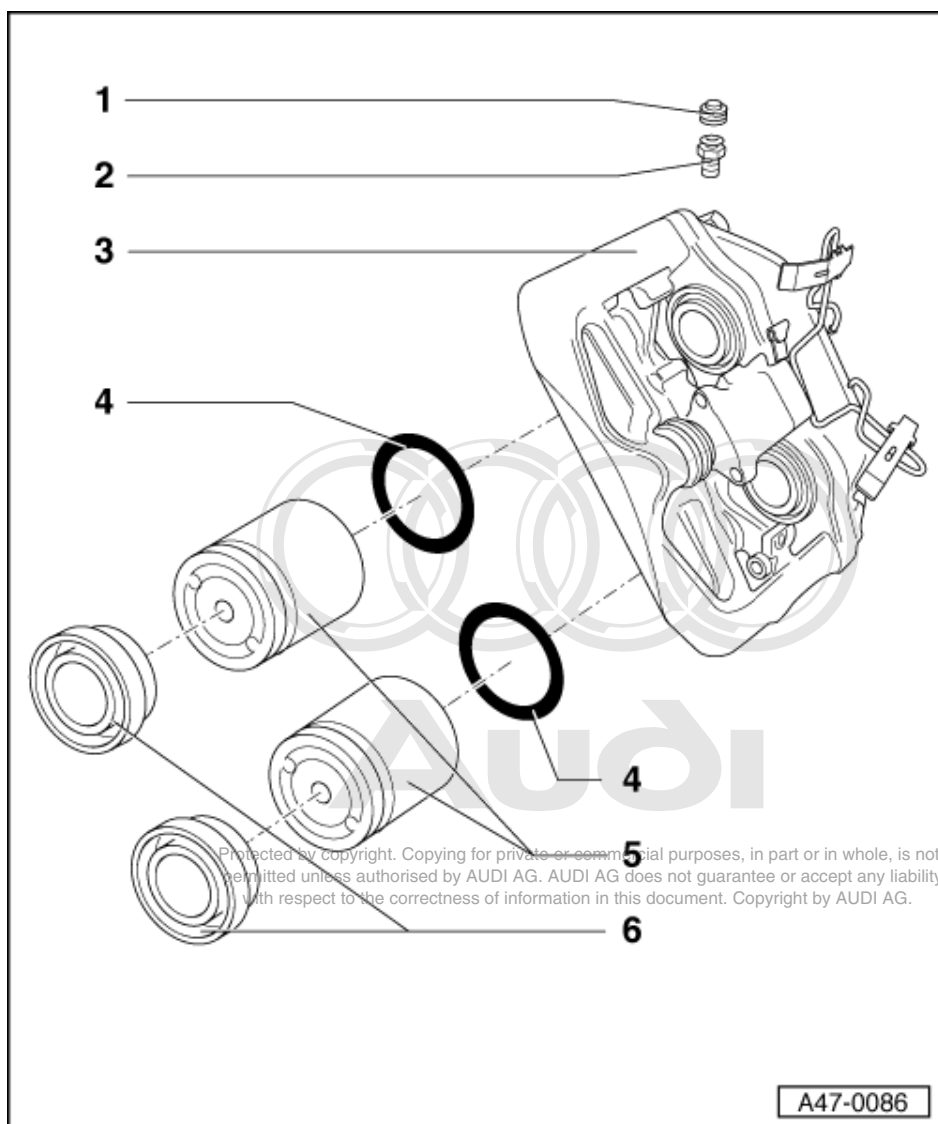
Note:

Insert piston by hand into the bore and then insert brake pad -a- into the piston before pressing into brake caliper housing.

The outer sealing lip of the protective cap will then locate in the groove on the piston.

4 - Brake caliper HP-2 brake caliper/aluminium

4.1 - Brake caliper HP-2 brake caliper/aluminium



4.2 - Servicing brake caliper

Notes:

- ♦ Install complete repair set when servicing.
- ♦ New brake calipers are filled with brake fluid and are pre-bled.
- ♦ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing rings.

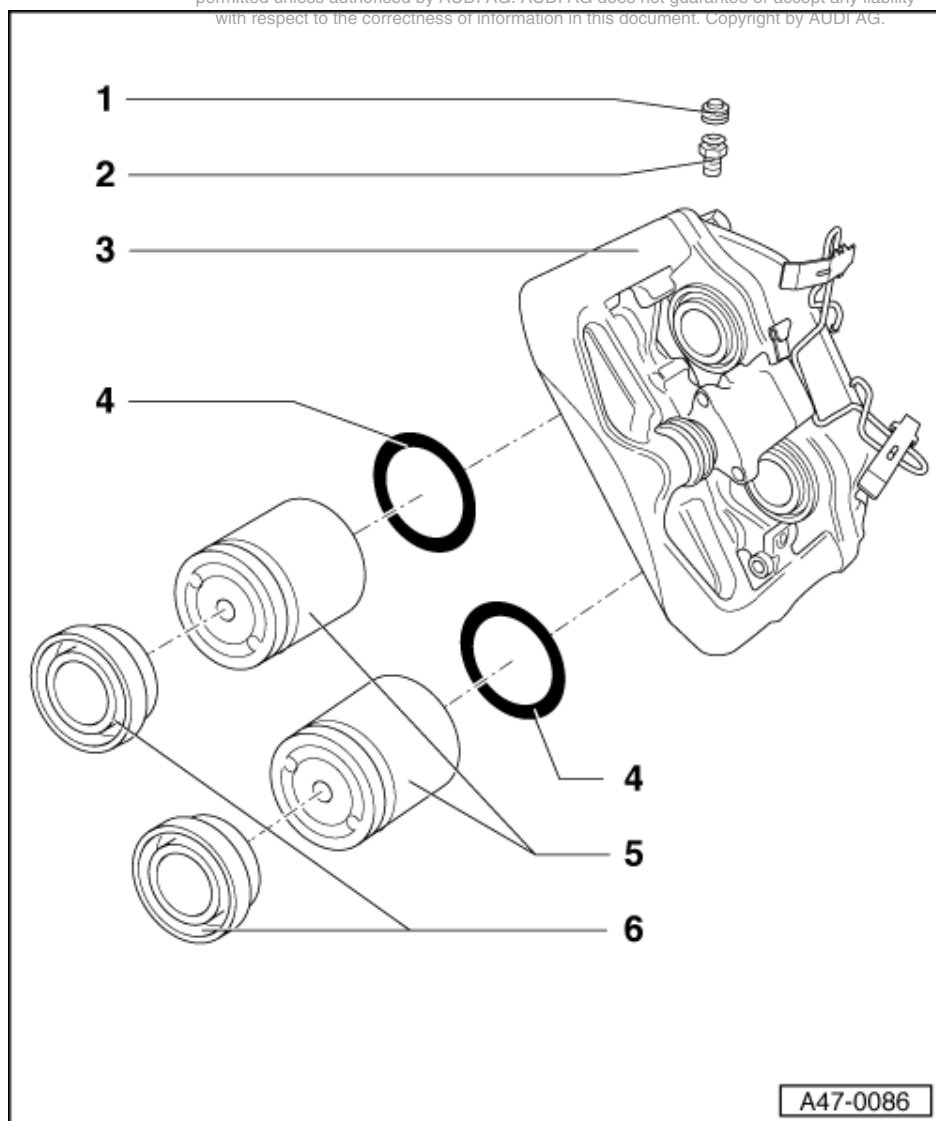
1 Protective cap

- ♦ Attach to bleed valve

2 Vent valve

- ♦ Apply thin coat of assembly paste G 052 150 A2 to thread before screwing in

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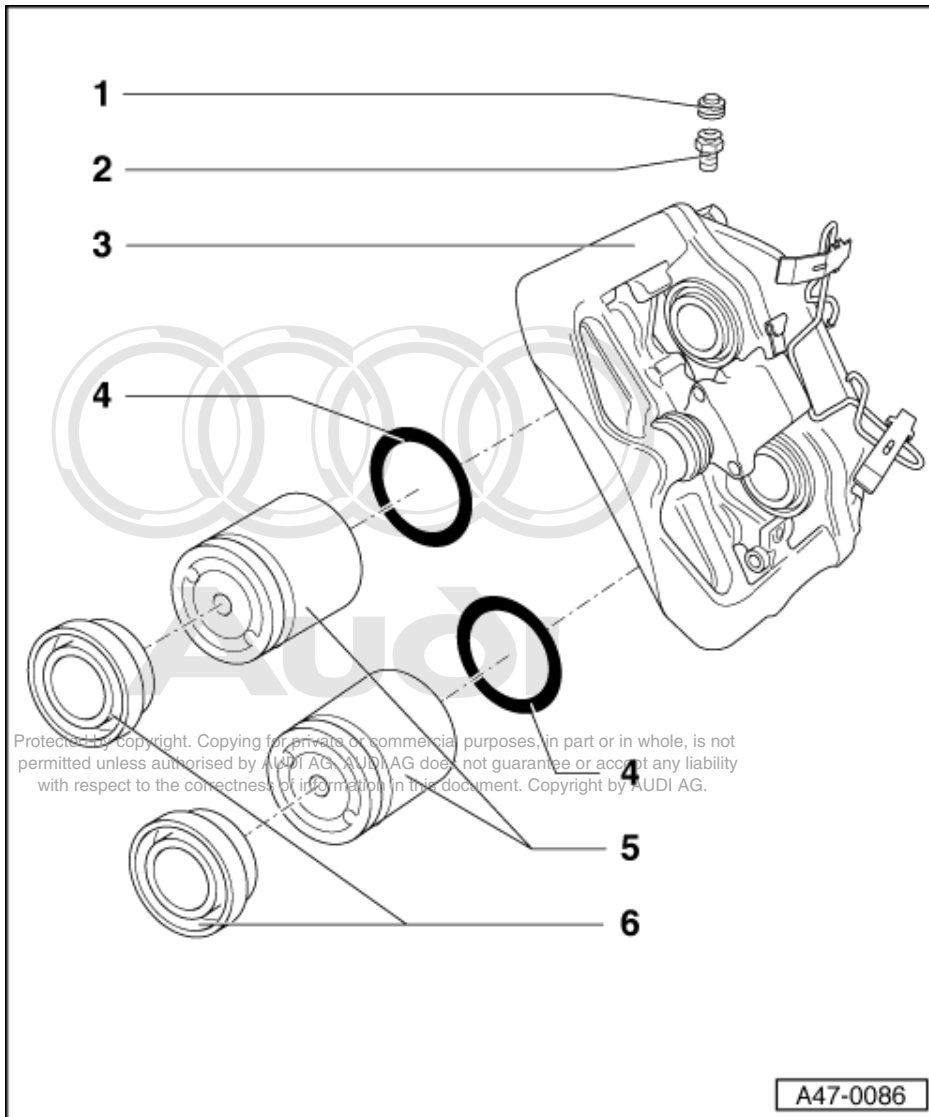
3 Brake caliper housing

Important

Do not separate the two halves of the housing (internally serrated screws). Replace brake caliper if protective cap for guide pins is damaged.

4 Seals

- ◆ Use wedge -3409- to remove => Fig. 2
- ◆ Insert carefully by hand



5 Piston

- ◆ Piston diameter

=> Brake System; Repair group 00; Technical data Technical data

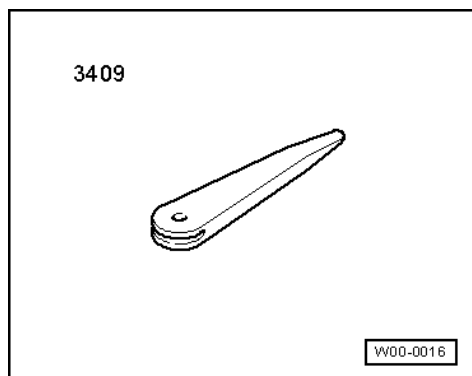
- ◆ Use compressed air to press out of brake caliper housing => Fig. 1
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting
- ◆ Installing => Fig. 3, 4, and 5

6 Protective caps

- ◆ Do not damage when inserting piston
- ◆ Fit onto piston with outer sealing lip => Fig. 3
- ◆ Insert with inner sealing lip in groove in brake caliper housing => Fig. 4

4.3 - Removing and installing piston for front brake caliper

Special tools and workshop equipment required

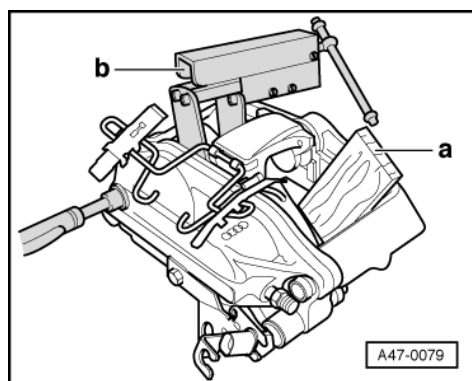


- ♦ 3409 Assembly wedge
- ♦ Piston resetting tool
- ♦ Assembly paste G 052 150 A2



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Removing

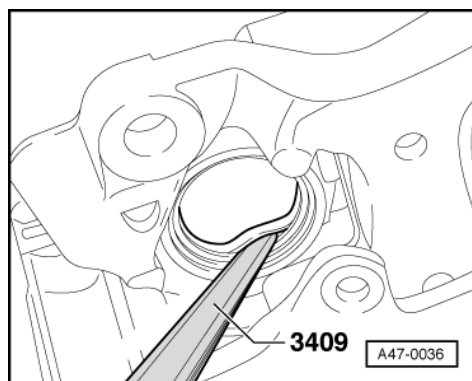


-> Fig.1 Using compressed air to press pistons individually out of brake caliper housing

Note:

Insert brake pad -b- into the piston. Position wooden block -a- in recess to avoid piston damage.

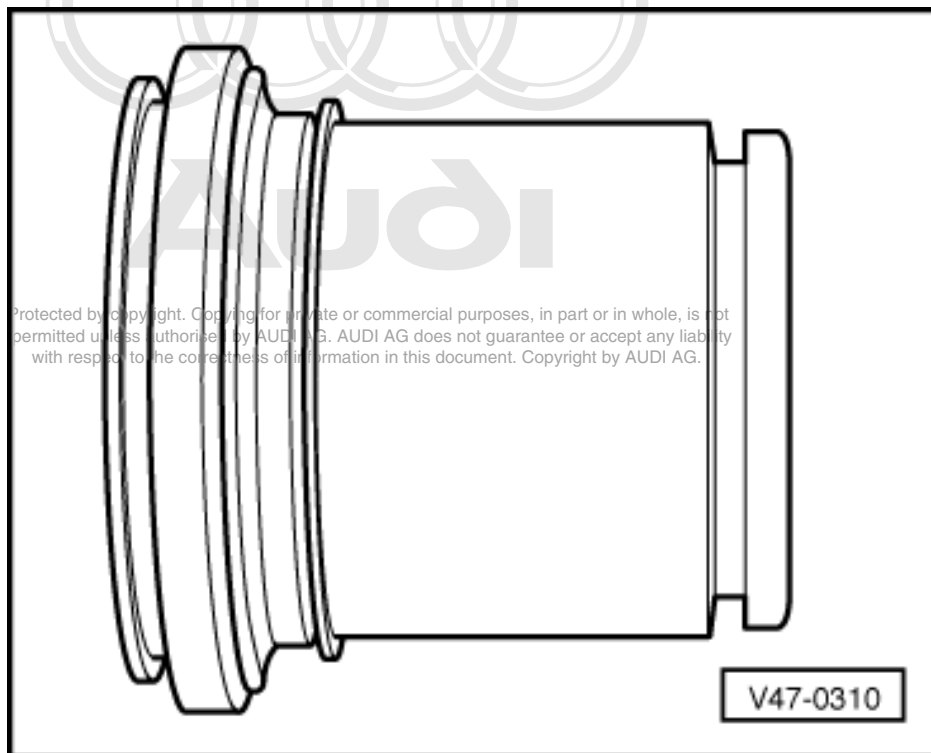
Only one piston can be pressed out at a time, when doing so, hold other piston in position in brake caliper housing using piston resetting tool.



-> Fig.2 Using wedge -3409- to remove sealing rings

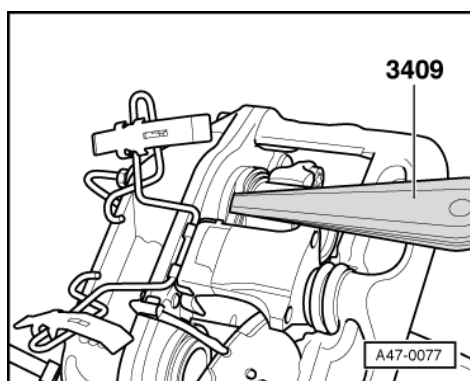
Ensure that the surface of the cylinder is not damaged during removal.

Installing



- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.

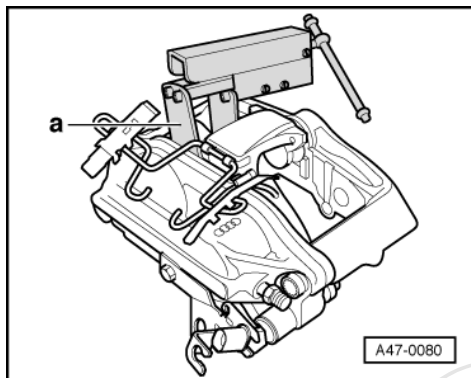
-> Fig.3 Attaching outer sealing lip of protective cap to piston.



-> Fig.4 Inserting inner sealing lip of protective cap with wedge -3409-

Note:

At the same time, hold piston in front of brake caliper housing.



-> Fig. 5 Press the piston into the brake calliper housing using a piston resetting tool.

Note:

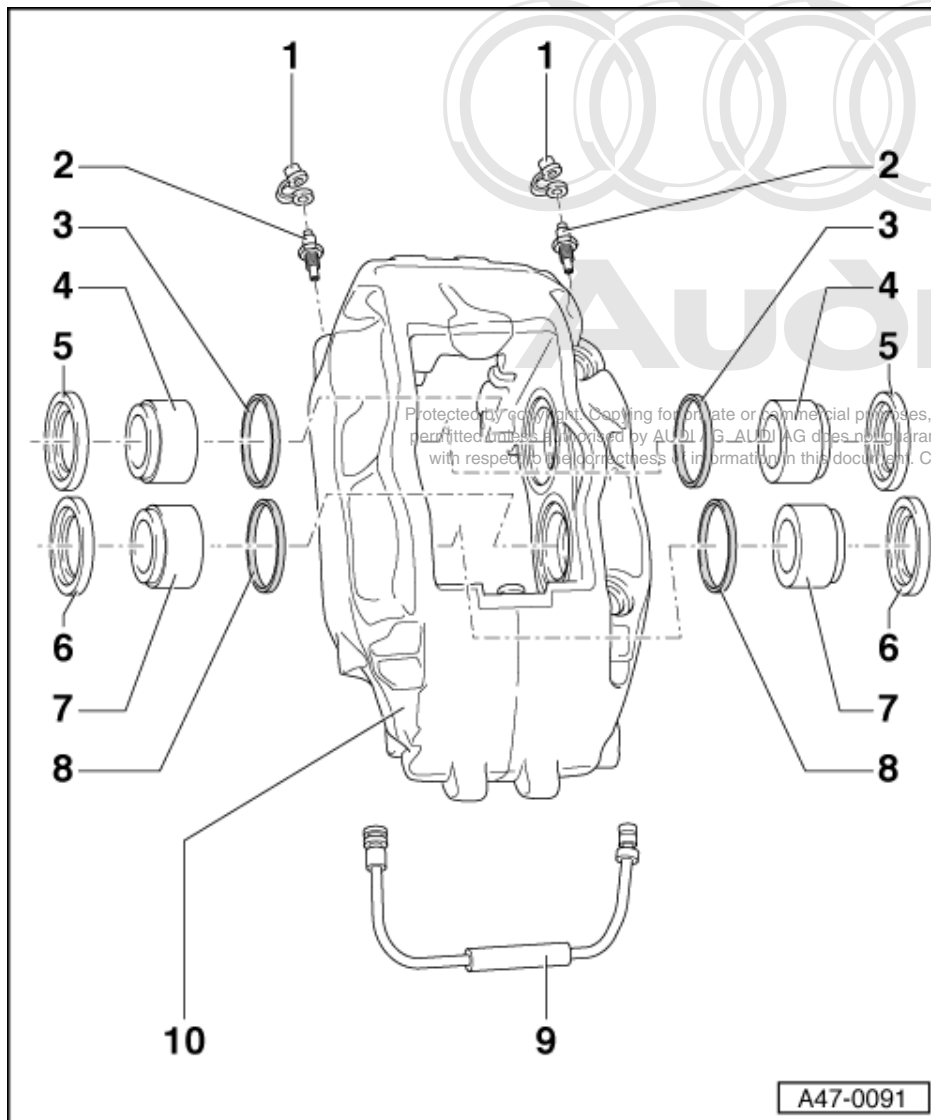
Insert piston by hand into the bore and then insert brake pad -a- into the piston before pressing into brake caliper housing.

The outer sealing lip of the protective cap will then locate in the groove on the piston.

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5 - Brembo brake caliper

5.1 - Brembo brake caliper



5.2 - Servicing brake caliper

Notes:

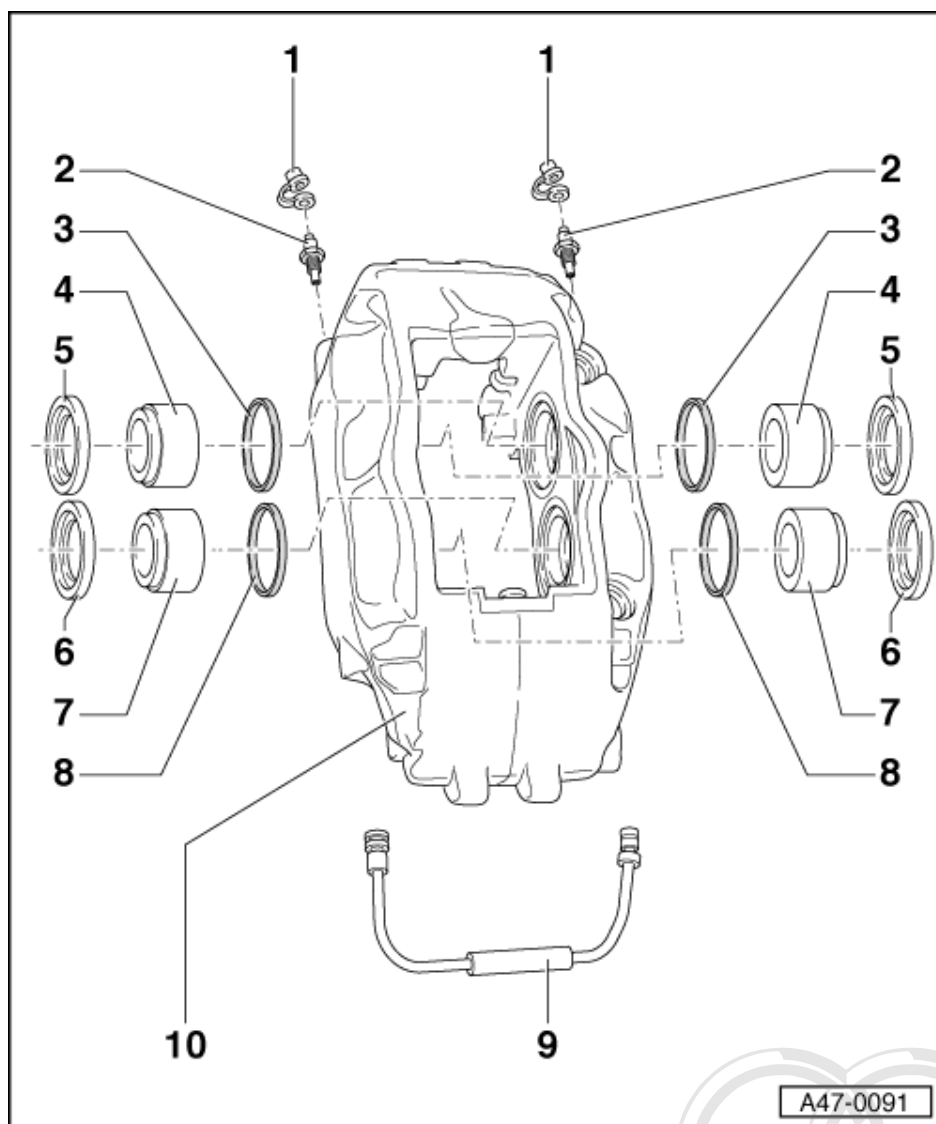
- ◆ Install complete repair set when servicing.
- ◆ New brake calipers are filled with brake fluid and are pre-bled.
- ◆ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.

1 Protective cap

- ◆ Attach to bleed valve

2 Vent valve

- ◆ Apply thin coat of assembly paste G 052 150 A2 to thread before screwing in



3 Seals

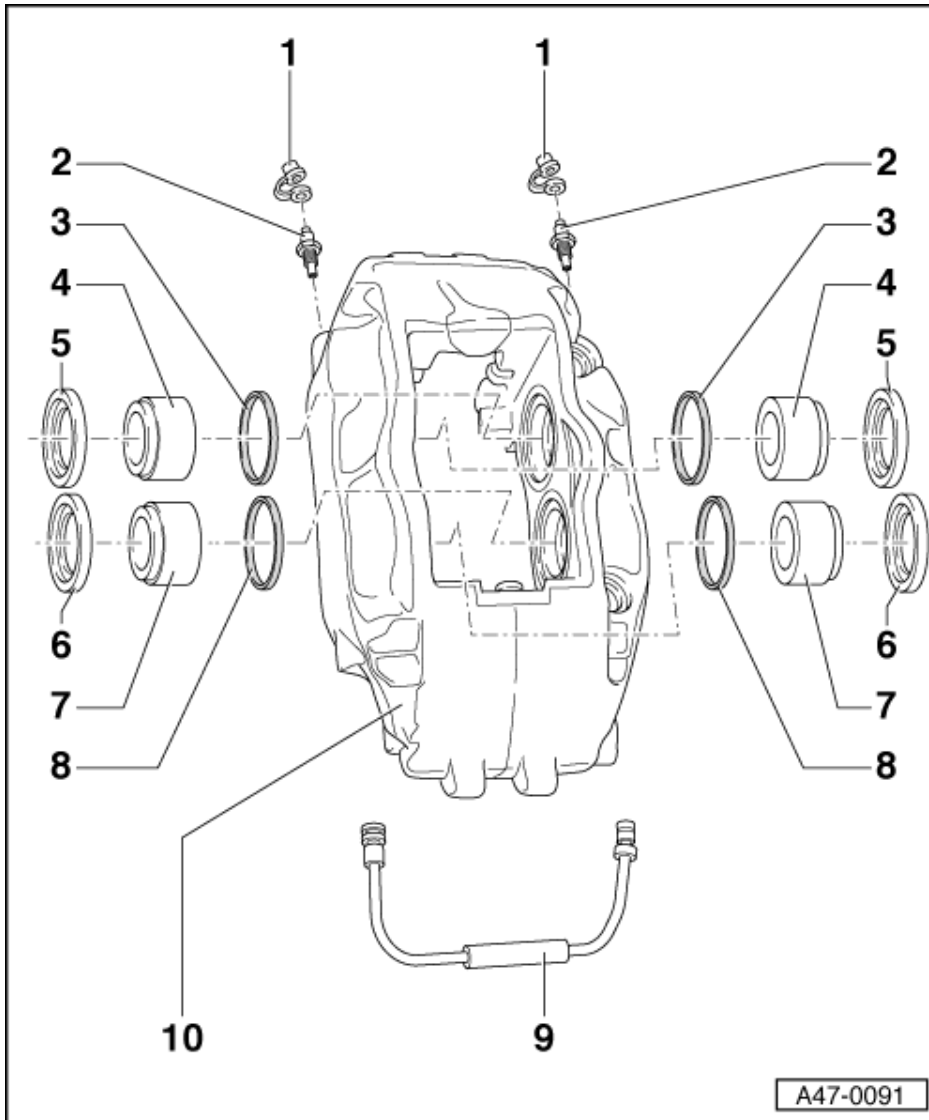
- ◆ Use wedge -3409- to remove => Fig. 2 and 3
- ◆ Insert carefully by hand => Fig. 5

4 Piston

- ◆ Use compressed air to press out of brake caliper housing => Fig. 1
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting
- ◆ Installing => Fig. 5 , and 6
- ◆ Piston diameter

=> Brake System; Repair group 00; Technical data Technical data

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5 Protective caps

- ◆ Do not damage when inserting piston
- ◆ Fit onto piston with outer sealing lip => Fig. 4
- ◆ Insert with inner sealing lip in groove in brake caliper housing => Fig. 3

6 Seals

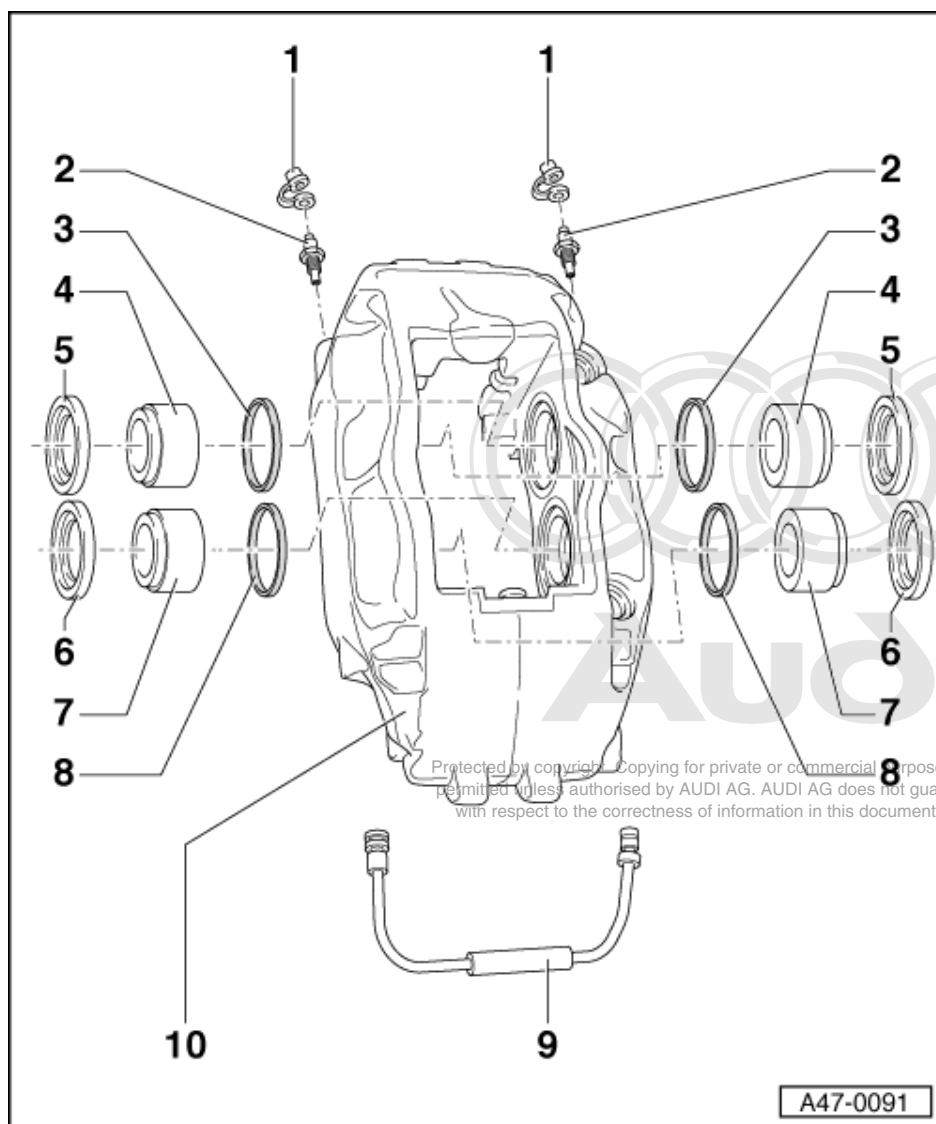
- ◆ Use wedge -3409- to remove => Fig. 2 and 3
- ◆ Insert carefully by hand => Fig. 5

7 Piston

- ◆ Use compressed air to press out of brake caliper housing => Fig. 1
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting
- ◆ Installing => Fig. 5, and 6
- ◆ Piston diameter

=> Brake System; Repair group 00; Technical data Technical data

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8 Protective caps

- ◆ Do not damage when inserting piston
- ◆ Fit onto piston with outer sealing lip => Fig. 4
- ◆ Insert with inner sealing lip in groove in brake caliper housing => Fig. 3

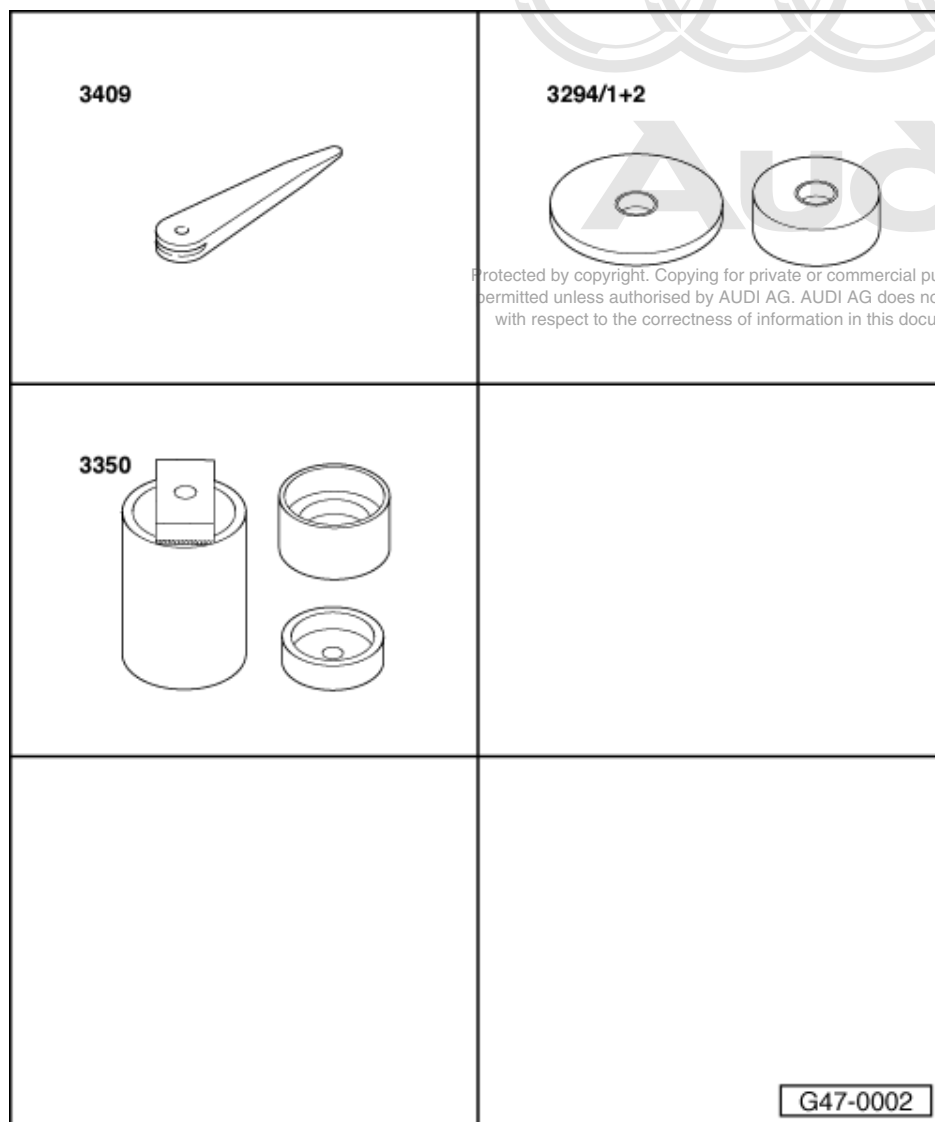
9 Brake pipe

10 Brake caliper housing

Important

Do not separate the two halves of the housing (internally serrated screws). Replace brake caliper if protective cap for guide pins is damaged.

5.3 - Removing and installing piston for front brake caliper



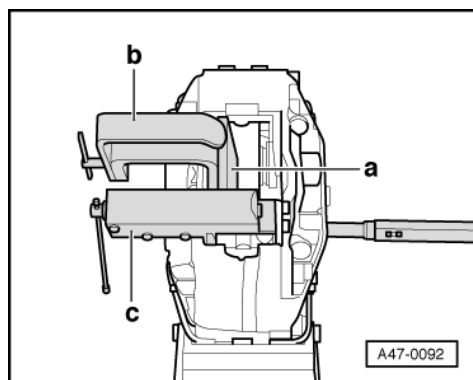
Special tools and workshop equipment required

- ♦ 3409 Assembly wedge
- ♦ Thrust piece 3294/1
- ♦ Thrust piece 3350/2

Proprietary

- ♦ Piston resetting tool
- ♦ Assembly paste G 052 150 A2

Removing

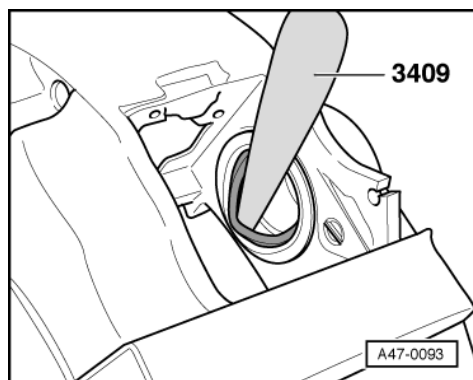


-> Fig.1 Using compressed air to press pistons individually out of brake caliper housing

Note:

Insert piston resetting tools -b- and -c- into the piston. Position wooden block -a- in recess to avoid piston damage.

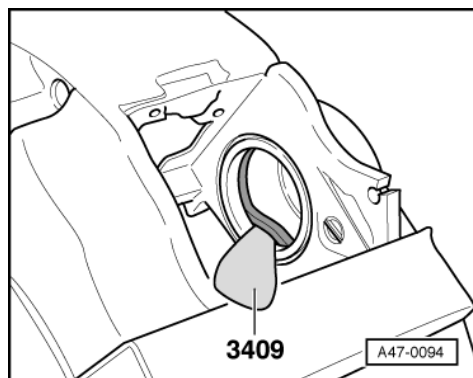
Only one piston can be pressed out at a time. For this purpose, hold other piston in position in brake caliper housing using piston resetting tool.



-> Fig.2 Use wedge -3409- to remove outer sealing rings

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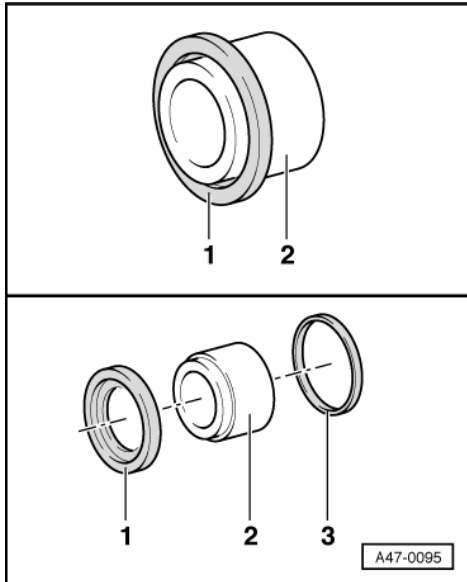
Ensure that the surface of the brake caliper is not damaged during removal.



-> Fig.3 Use wedge -3409- to remove inner sealing rings

Ensure that the surface of the brake caliper is not damaged during removal.

Installing

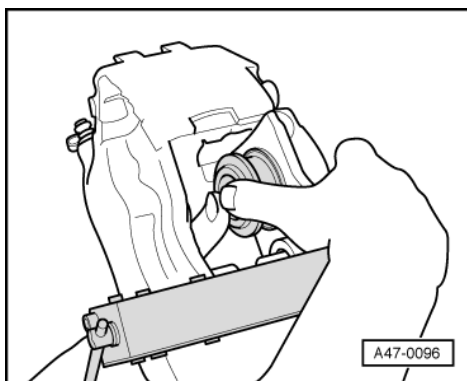


- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.

-> Fig.4 Attaching outer sealing lip of protective cap to piston.

- -1- Place protective cap on piston
- -2- Piston
- -3- Insert sealing ring in brake caliper

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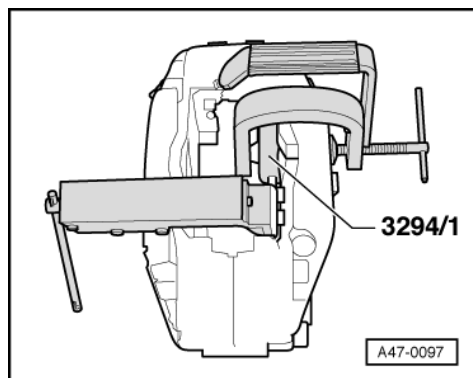


-> Fig.5 Inserting inner sealing lip of protective cap with wedge -3409-

Note:

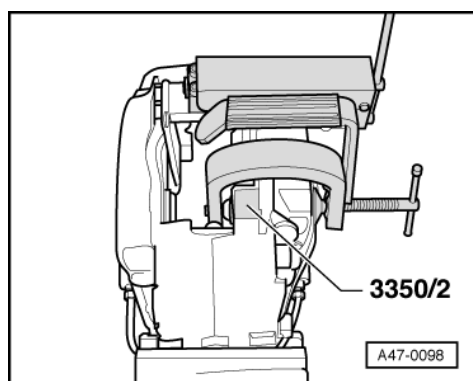
Insert the piston by hand into the bore.

- Press the brake piston by hand over the inner seal



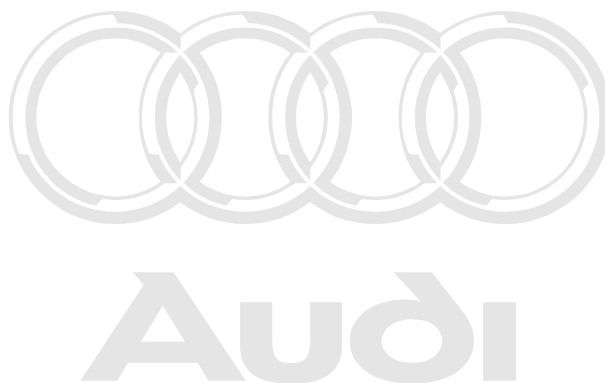
-> Fig.6 Fitting the protective cap

- Using a piston resetting tool and special tool 3294/1, press the protective cap 44 mm into the brake caliper housing.



-> Fig. 7 Press the piston into the brake calliper housing using a piston resetting tool.

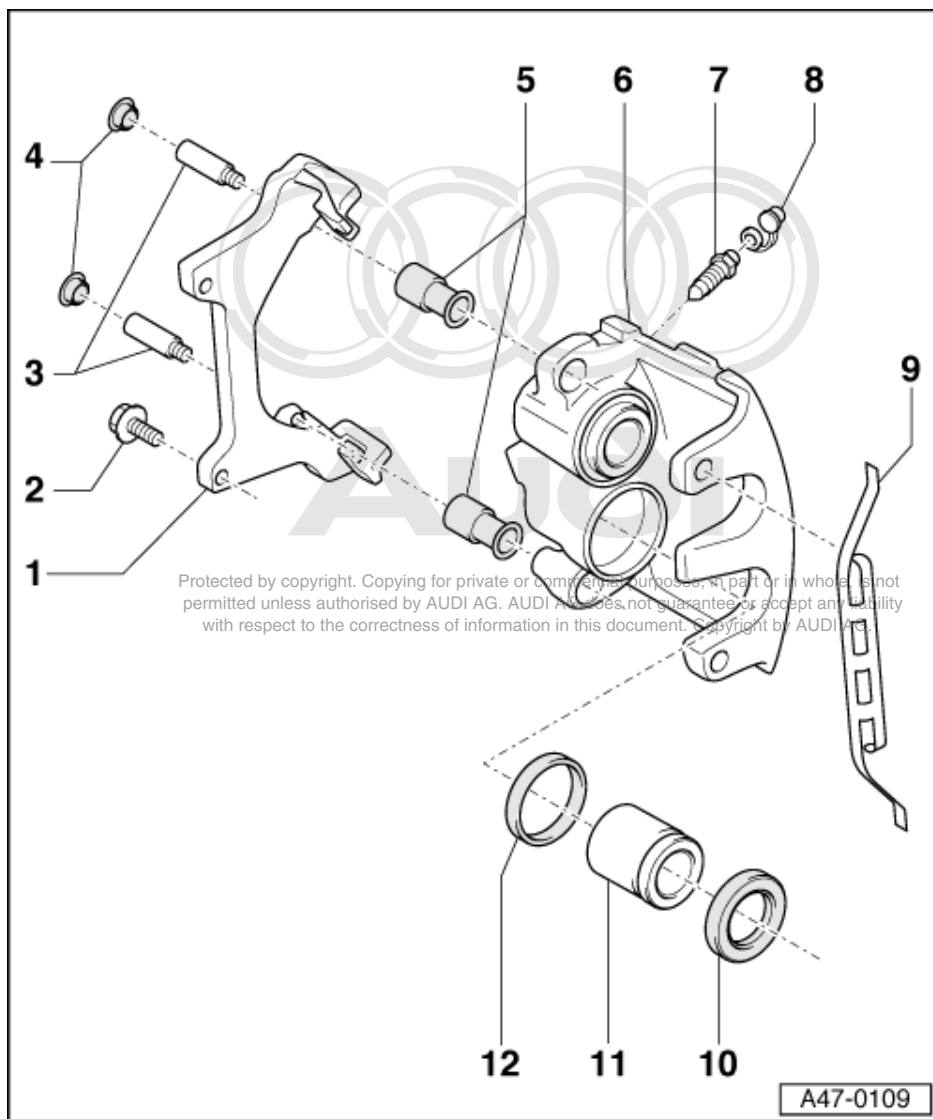
- Using a piston resetting tool and special tool 3350/2, press the protective cap 40 mm into the brake caliper housing.



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6 - Brake caliper FN-2

6.1 - Brake caliper FN-2



6.2 - Servicing brake caliper

Notes:

- ♦ Install complete repair set when servicing.
- ♦ New brake calipers are filled with brake fluid and are pre-bled.
- ♦ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.

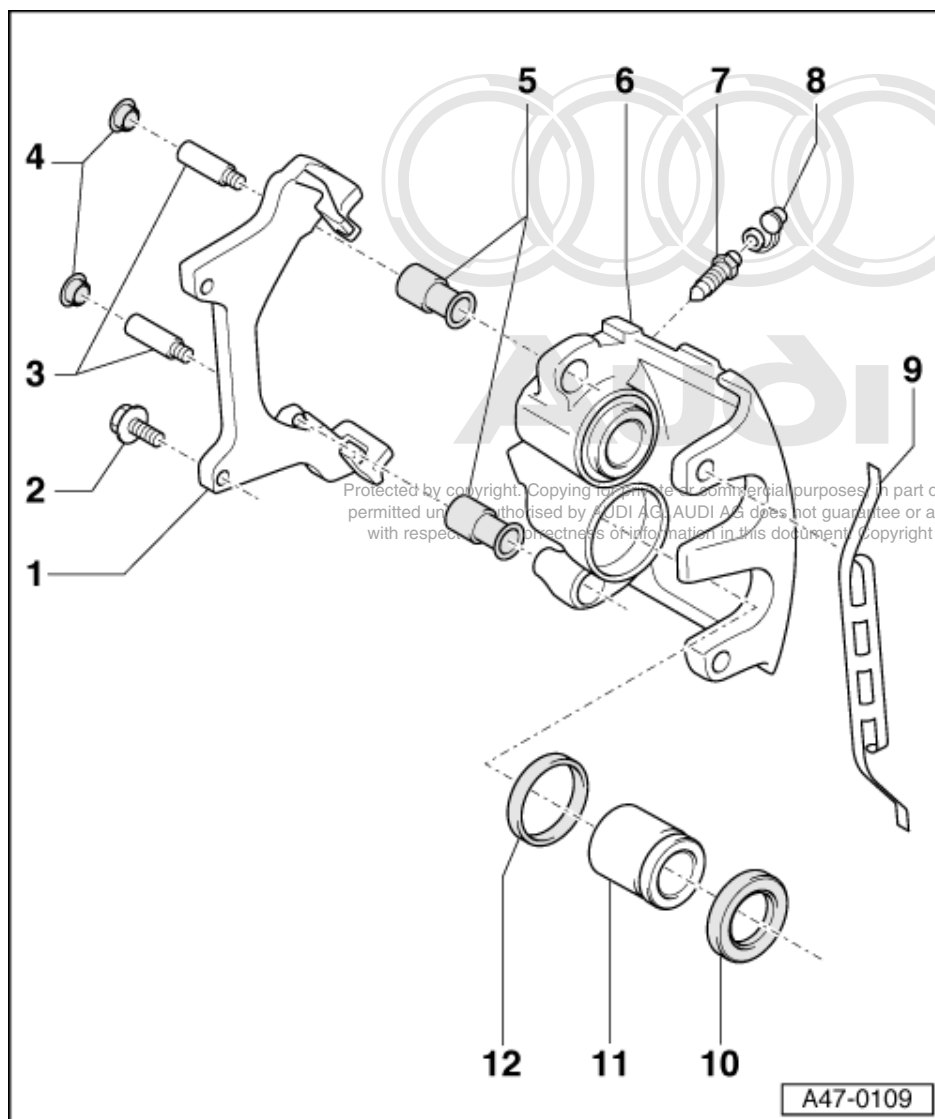
1 Brake carrier

- ♦ Bolt to brake caliper housing

2 Ribbed bolt, 190 Nm

- ♦ Clean ribbing if reusing

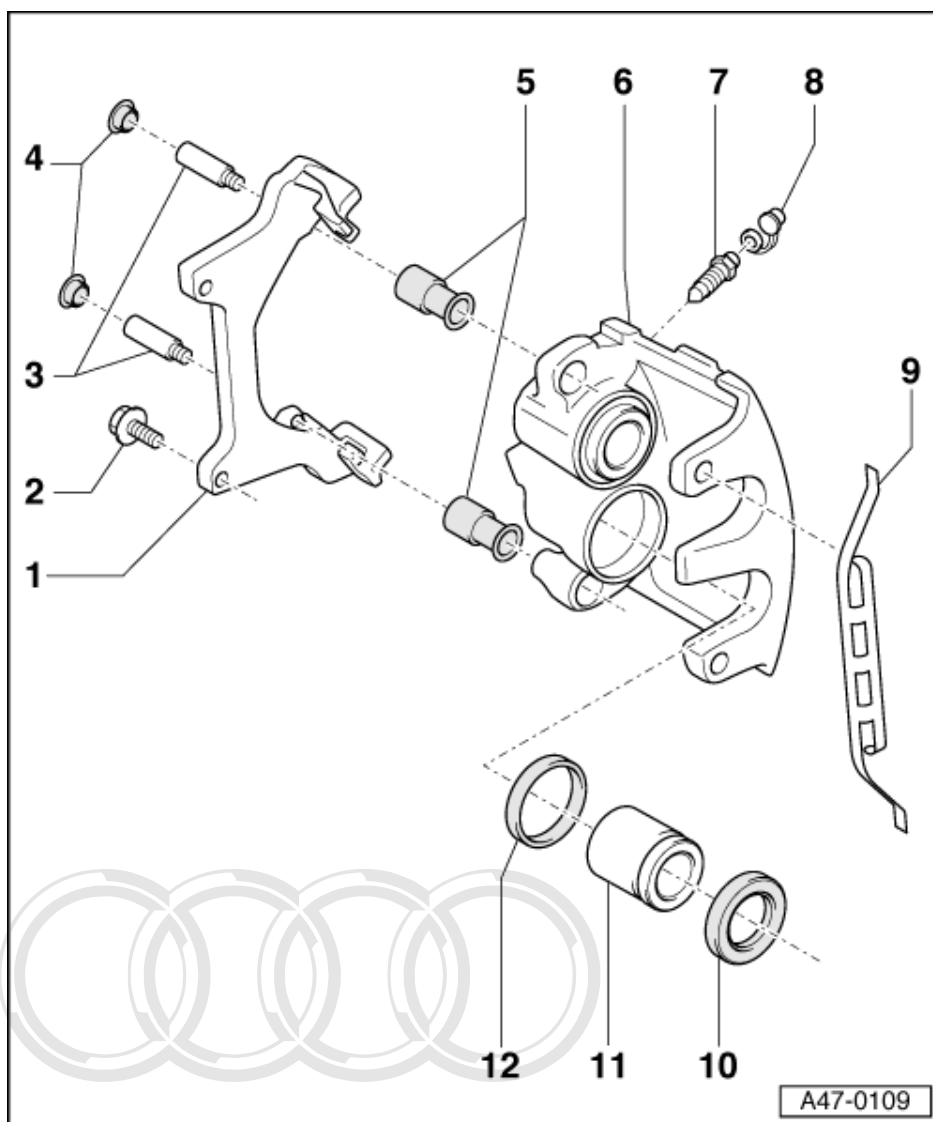
3 Guide pin, 25 Nm



- 4 Caps**
 - ♦ Insert into bearing bush
- 5 Bush**
 - ♦ Insert into brake caliper housing
- 6 Brake caliper housing**
- 7 Vent valve**
 - ♦ Apply thin coat of assembly paste G 052 150 A2 to thread before screwing in
- 8 Protective cap**
 - ♦ Attach to bleed valve
- 9 Retaining spring**
 - ♦ Insert both ends into the holes in the brake caliper housing

Notes:

After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.



10 Sealing ring

11 Piston

- ♦ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting

=> Brake System: Repair group 00: Technical data Technical data

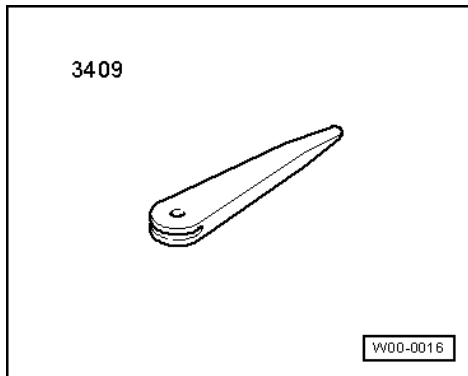
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12 Protective cap

- ♦ Do not damage when inserting piston



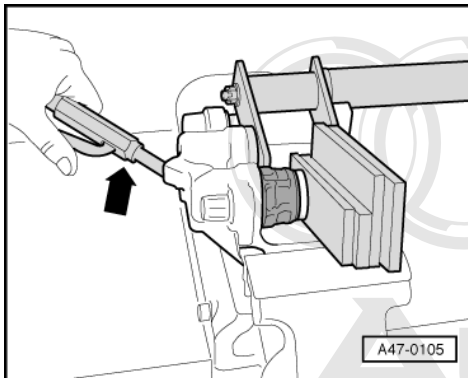
6.3 - Removing and installing piston for front brake caliper



Special tools and workshop equipment required

- ♦ 3409 Assembly wedge
- ♦ Piston resetting tool

Removing

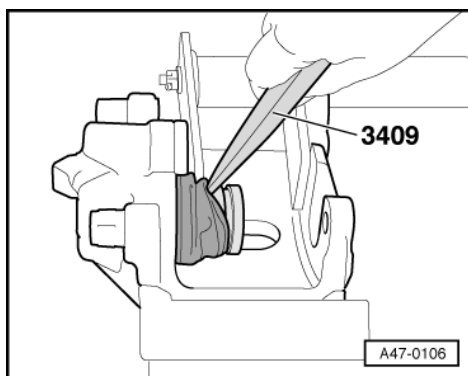


- -> Press piston out of brake caliper housing using compressed air.

Note:

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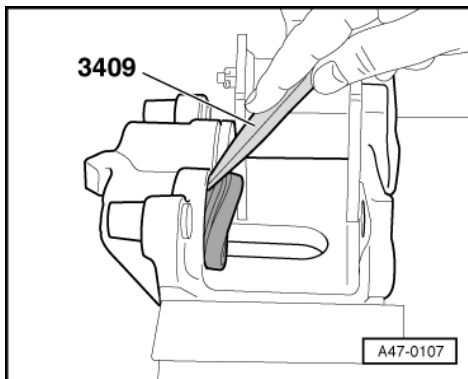
Place a piece of wood in the recess to prevent damaging the piston.



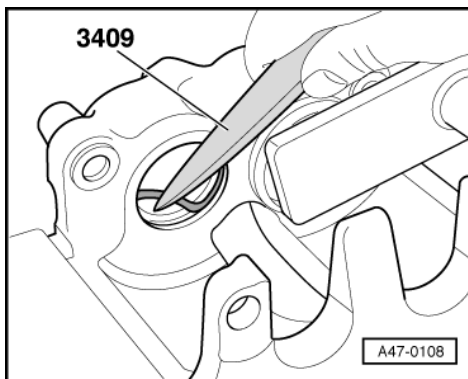
- -> Remove protective cap from piston groove.
- For this purpose, use removal wedge 3409.
- Remove piston.

Note:

Ensure that the surface of the cylinder is not damaged during removal.



- -> Remove protective cap.
- For this purpose, use removal wedge 3409.

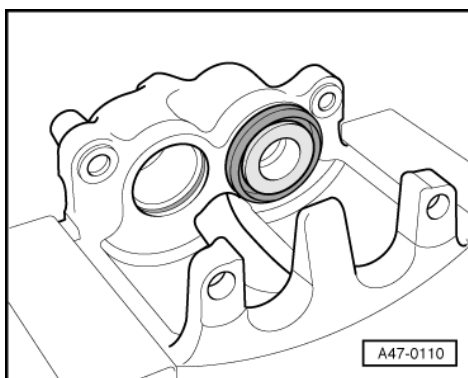


- -> Remove sealing ring.
- For this purpose, use removal wedge 3409.

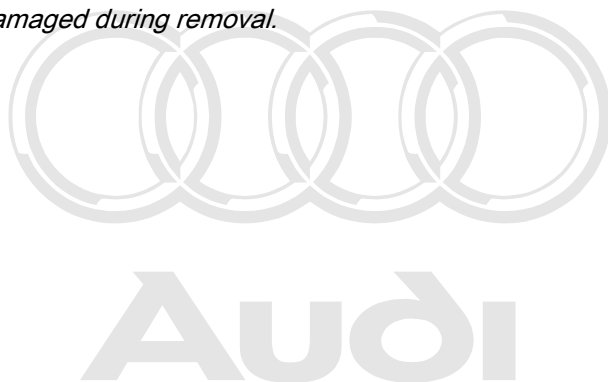
Note:

Ensure that the surface of the cylinder is not damaged during removal.

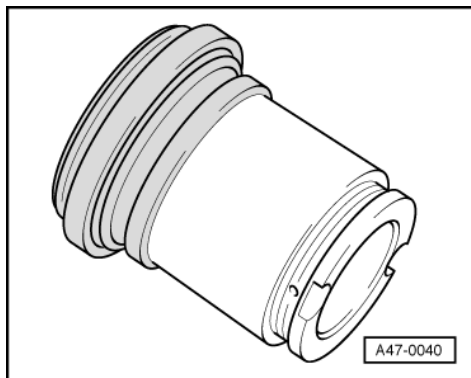
Installing



- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.
- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
- -> Insert inner sealing ring.

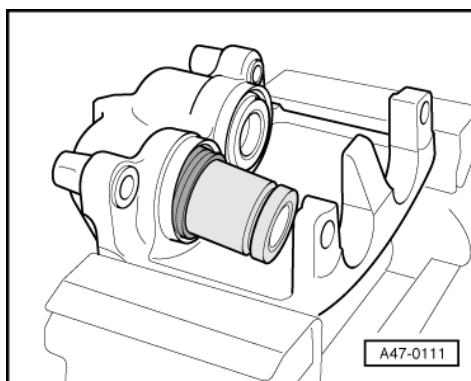


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- -> Place protective cap with the outer sealing lip on the piston.
- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.

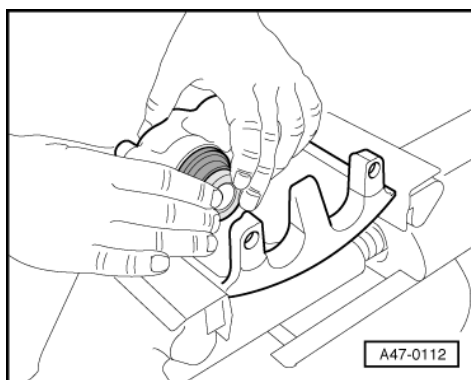
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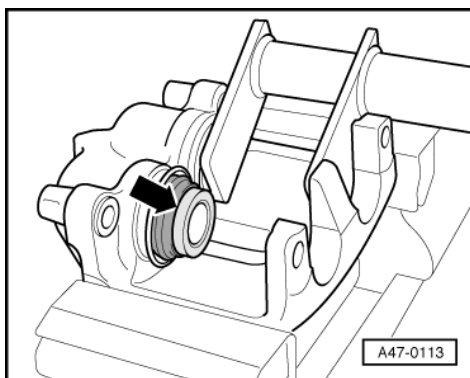
- -> Using removal wedge 3409, insert the inner sealing lip into the groove on the cylinder.

Note:

At the same time, hold piston in front of brake caliper housing.



- -> Press the piston into the brake caliper housing by hand.



- -> Press piston into brake caliper housing.

Note:

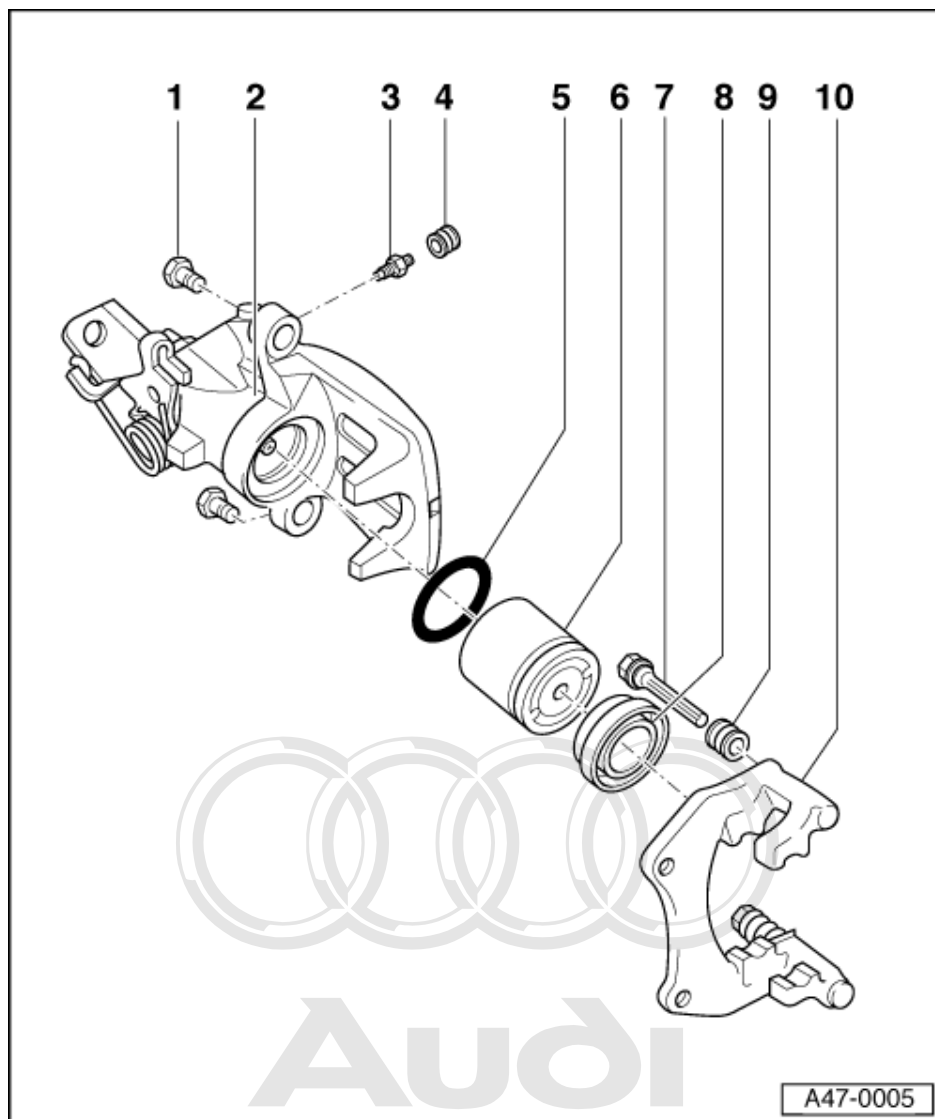
The outer sealing lip of the protective cap will then locate in the groove on the piston.



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7 - Servicing rear brake caliper

7.1 - Servicing rear brake caliper



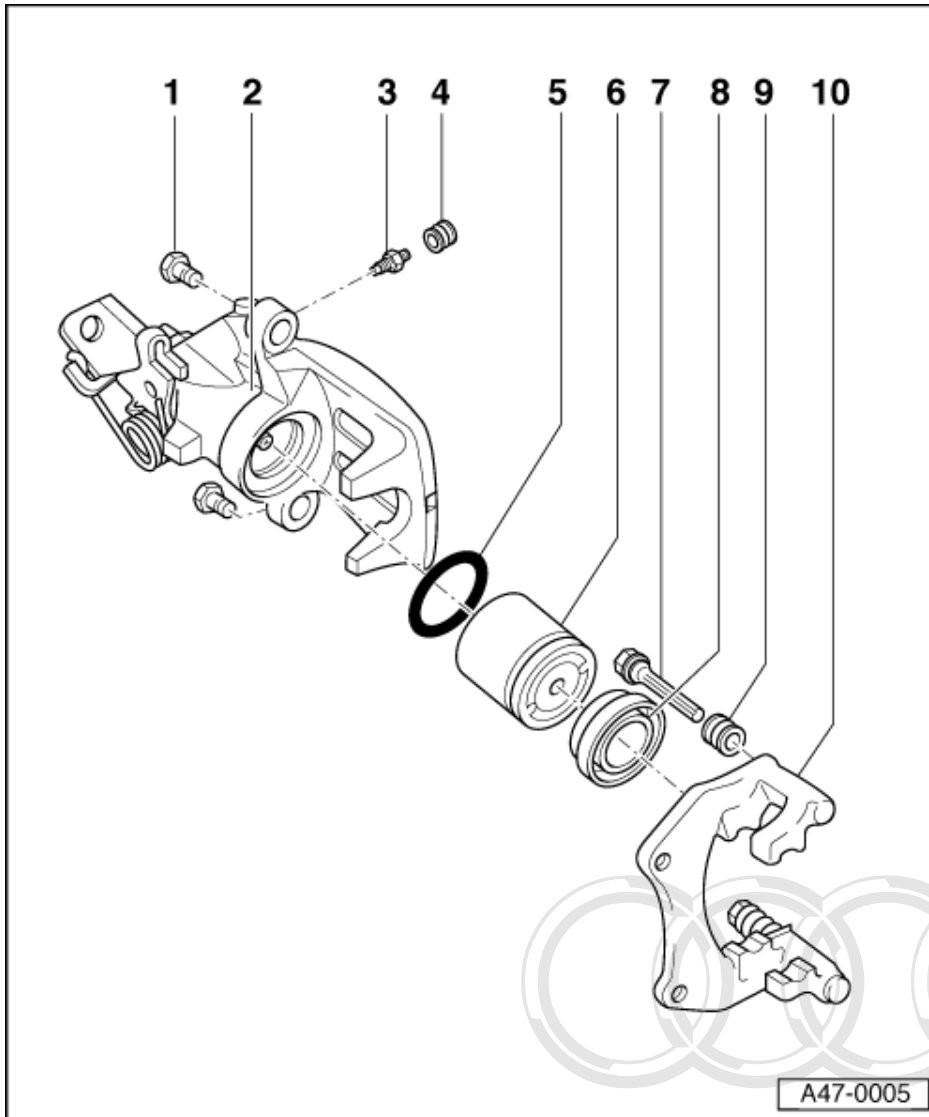
Notes:

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- ♦ Install complete repair set when servicing.
- ♦ New brake calipers are filled with brake fluid and are pre-bled.
- ♦ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.

1 Self-locking bolts, 35 Nm

- ♦ Always replace
- ♦ When loosening and tightening counter hold on guide pin



2 Brake caliper housing with lever for handbrake cable

- ♦ Renew the brake caliper housing if there is a leak at the lever for the handbrake cable
- ♦ After servicing, pre-bleed brake caliper housing => Fig. 6

3 Vent valve

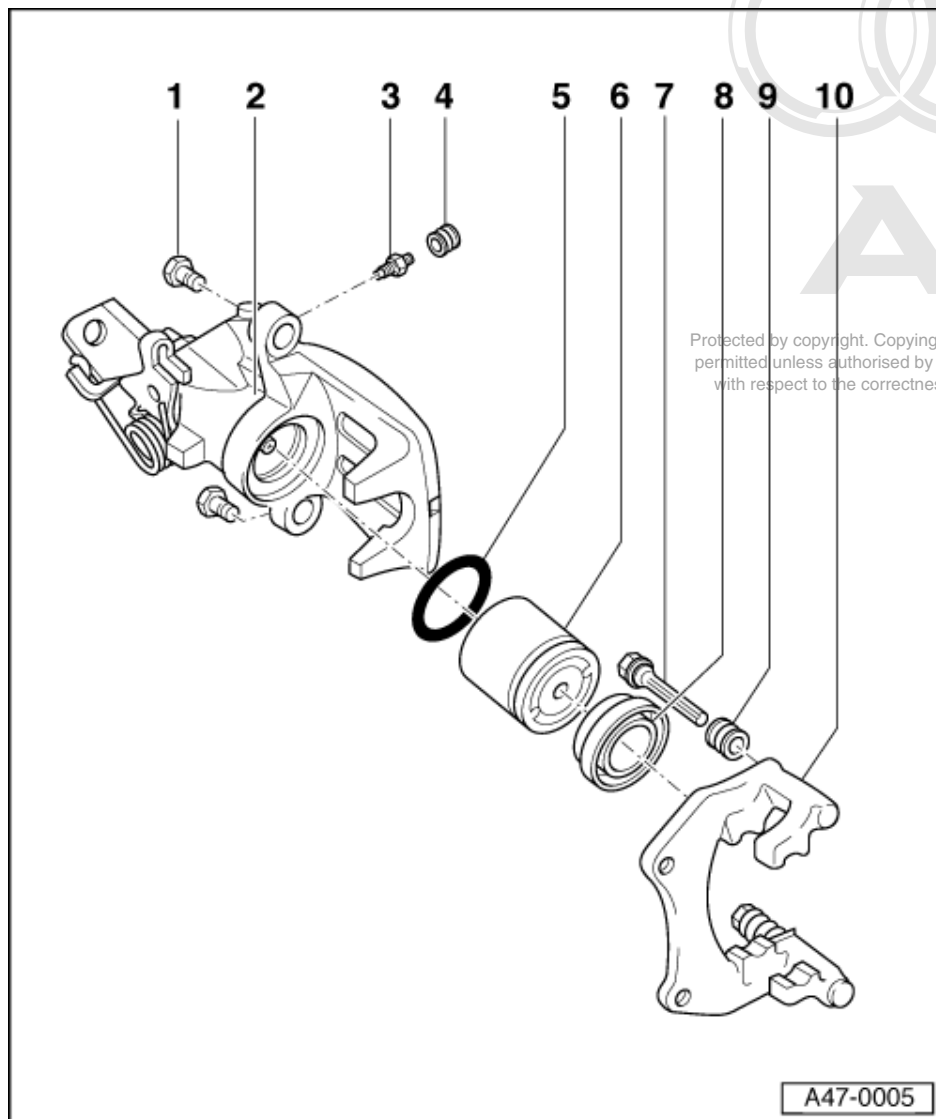
4 Dust cap

- ♦ Fit onto bleed valve

5 Sealing ring

- ♦ Note different versions
- ♦ Use wedge -3409- to remove => Fig. 3

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6 Piston with automatic adjustment

- ◆ Unscrewing from brake caliper housing => Fig. 1
- ◆ Screwing into brake caliper housing => Fig. 5
- ◆ Piston diameter

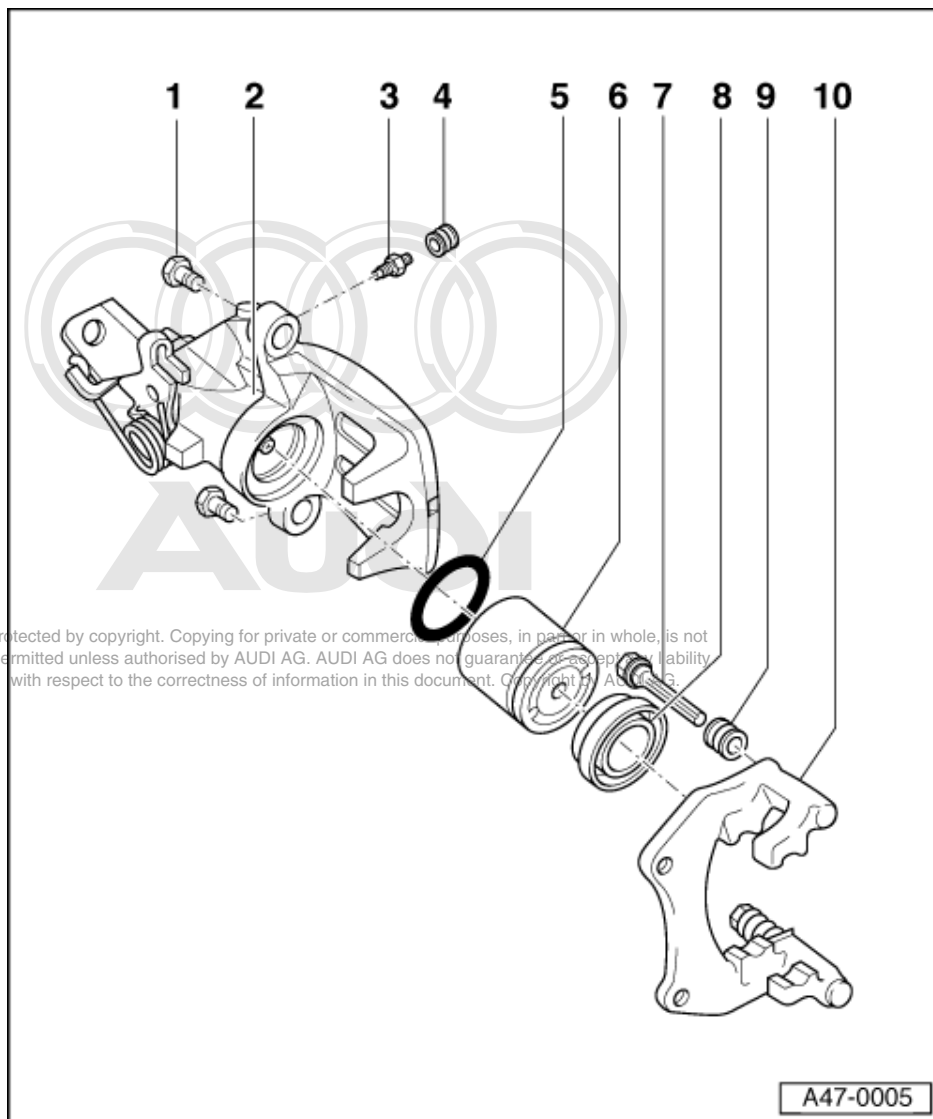
=> Brake System; Repair group 00; Technical data Technical data

7 Guide pin

- ◆ Grease before installing protective cap

8 Protective cap

- ◆ Fit onto piston with outer sealing lip => Fig. 2
- ◆ Insert with inner sealing lip in groove in brake caliper housing => Fig. 4



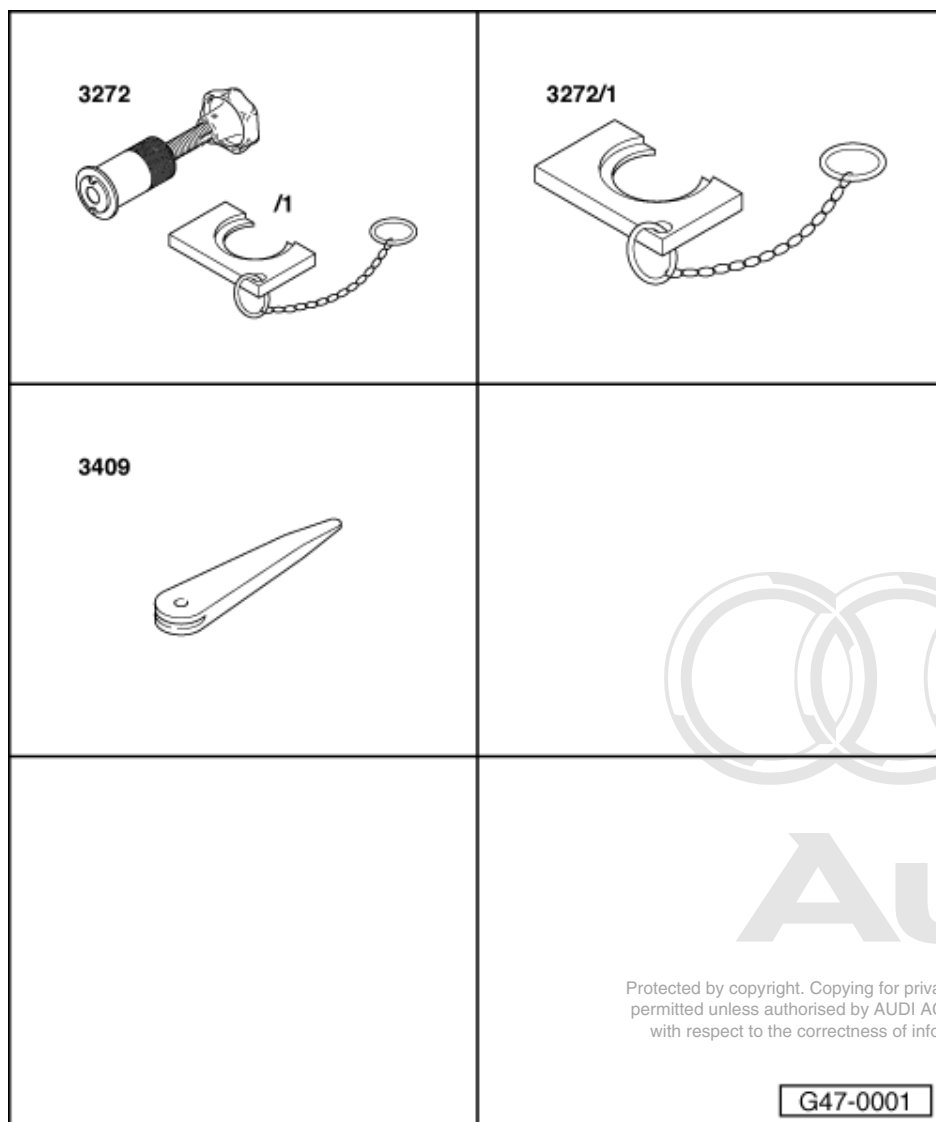
9 Protective cap

- ♦ Fit onto brake carrier and guide pin

10 Brake carrier with guide pin and protective cap

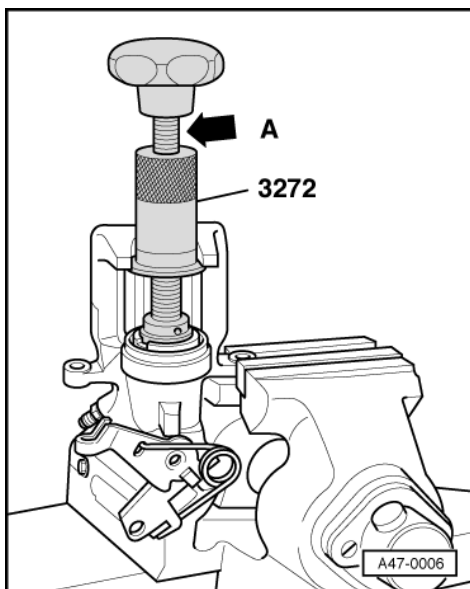
- ♦ Supplied as replacement part assembled with sufficient quantities of grease on guide pins
- ♦ If protective caps or guide pins are damaged, install repair kit. Use grease sachet supplied to lubricate the guide pins.

7.2 - Removing and installing rear brake caliper piston

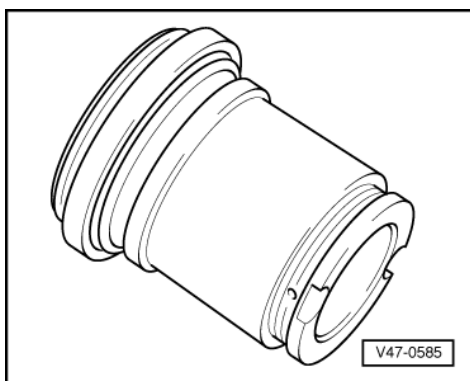


Special tools and workshop equipment required

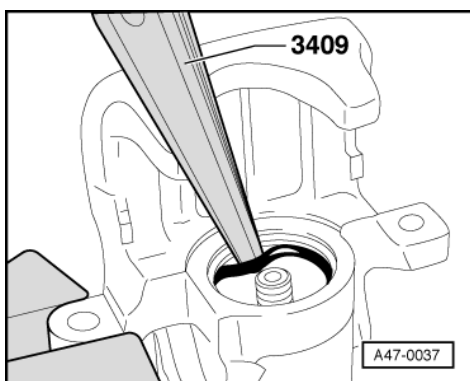
- ♦ 3272 Resetting and removing tool
- ♦ 3272/1 Connection to the resetting and removal tool
- ♦ 3409 Assembly wedge



-> Fig.1 Unscrewing piston from brake caliper housing

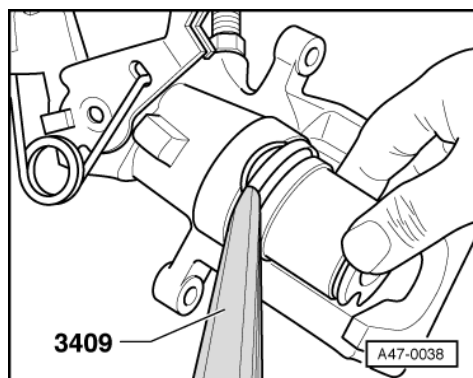


-> Fig.2 Attaching outer sealing lip of protective cap to piston.



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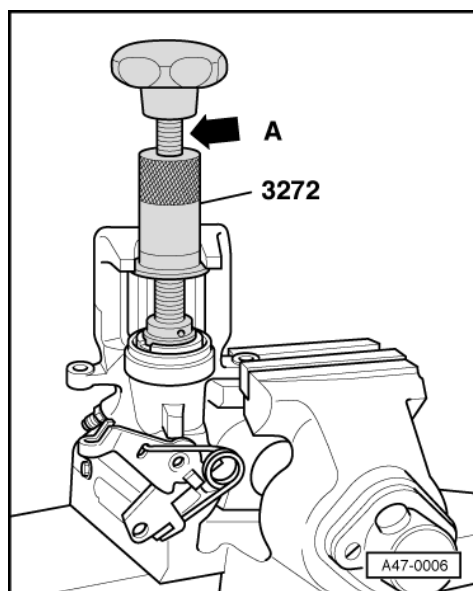
-> Fig.3 Using wedge -3409- to remove sealing ring



-> Fig.4 Inserting inner sealing lip of protective cap with wedge -3409-

Note:

At the same time, hold piston in front of brake caliper housing.

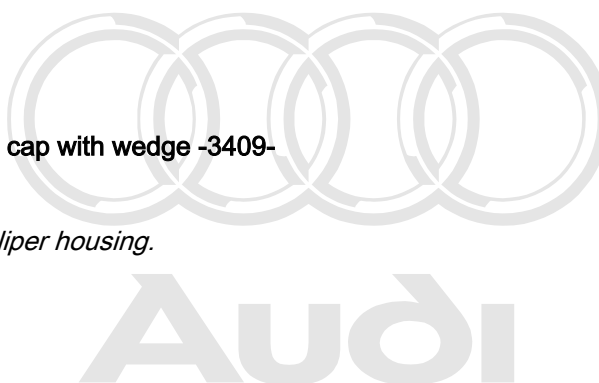
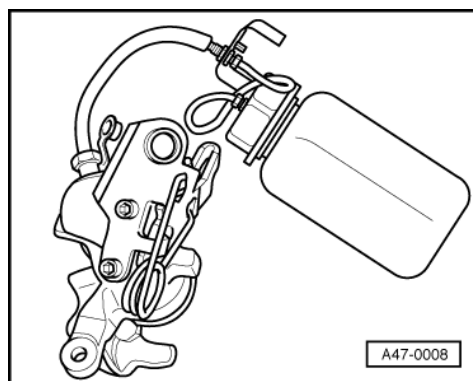


-> Fig. 5 Screwing piston up to stop into brake caliper housing

Press firmly onto piston while screwing it in.

Note:

The outer sealing lip of the protective cap will then locate in the groove on the piston.



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➔ Fig.6 Pre-bleeding brake caliper

- Open bleed valve and using a standard bleeder bottle, fill with brake fluid until bubble-free brake fluid flows from the threaded hole (brake hose connection). Close bleed valve.

Note:

Position brake caliper as illustrated for pre-bleeding.

8 - Bleeding brake system

8.1 - Bleeding brake system

Important

- ◆ Do not under any circumstances allow brake fluid to come into contact with liquids which contain mineral oils (e.g. oil, petrol, cleaning agents). Mineral oils damage the plugs and seals in the brake system.
- ◆ Brake fluid is poisonous and must on no account be siphoned by mouth through a hose. Because of its caustic properties it must also not come into contact with paintwork.
- ◆ Brake fluid is hygroscopic, i.e. it absorbs moisture from the surrounding atmosphere. It is thus always to be kept in containers with an air-tight seal.
- ◆ Always observe the relevant environmental regulations for disposal.

Notes:

- ◆ Only use fresh brake fluid as per US Standard FMVSS 116 DOT 4.
- ◆ Genuine VW/Audi brake fluid complies with this specification.
- ◆ Use plenty of water to flush away any brake fluid spillage.
- ◆ When the system is open do not work with compressed air and do not move the vehicle.
- ◆ During the concluding road test, ensure that an ABS-controlled brake application is carried out at least once (can be felt from the pulsing of the brake pedal).
 - Please refer also to the section on road testing on Page 4 .

Bleeding brake system with brake filling and bleeding unit V.A.G 1869

- Connect V.A.G 1869.
- Open bleeder screws in the specified order and bleed brake calipers.

Bleeding sequence

- 1 - Rear right brake caliper
 - 2 - Rear left brake caliper
 - 3 - Front right brake caliper
 - 4 - Front left brake caliper
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- Bleed the calipers until clear, bubble-free brake fluid emerges.
 - Close bleed screw.

8.2 - Bleeding sequence for vehicles with Electronic Stability Program (ESP)

Please note:

A pressure of at least 2 bar is required for bleeding the ESP hydraulic unit. Therefore always check the pressure setting on the bleeding device.



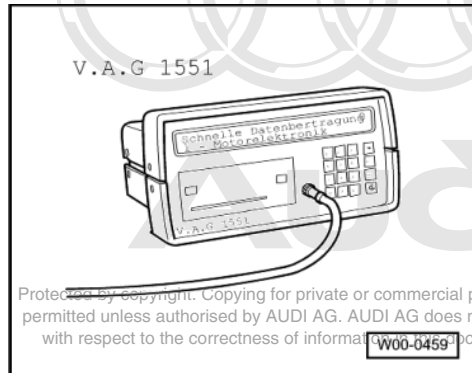
First, all of the brake calipers are bled using the conventional method, but in a different sequence.

Afterwards the ESP hydraulic pump needs to be bled. This is done using the fault reader.

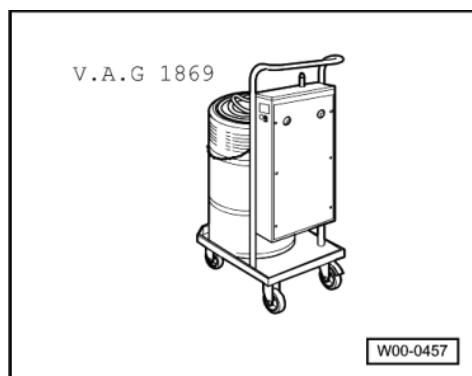
The fault reader is used to actuate the hydraulic pump for 10 s.

This actuation must only be carried out a maximum of 3 times in succession (approx. 30 sec.). Then the pump must be left to cool for at least 5 minutes.

Special tools and workshop equipment required



- ♦ V.A.G 1551 or V.A.G 1552

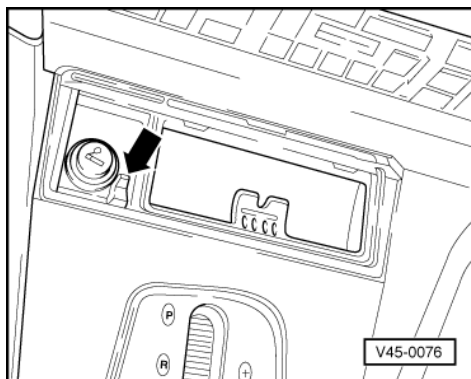


- ♦ V.A.G 1869 bleeding appliance.

Bleeding sequence

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

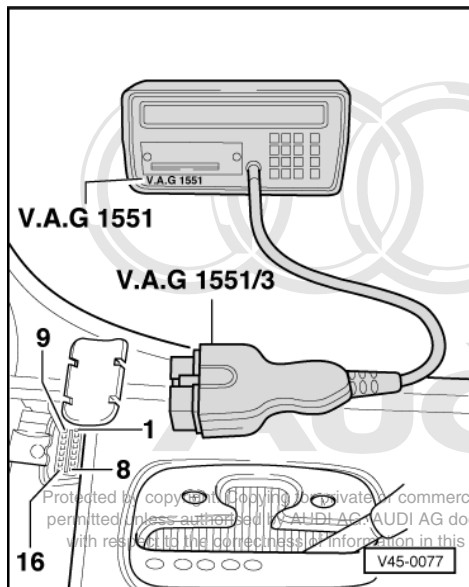
- Bleed the calipers until clear, bubble-free brake fluid emerges.
- Close bleed screw.



Connecting fault reader V.A.G 1551 and selecting address word

The vehicle systems tester V.A.G 1552 can also be used instead of fault reader V.A.G 1551. However, with vehicle systems tester V.A.G 1552 there is no option to print out information.

- -> Unlatch the ash tray and remove it from the centre console.



- Remove the cover for the diagnostic connector.
- -> With the ignition off, connect fault reader to diagnostic connector using wire V.A.G 1551/3.

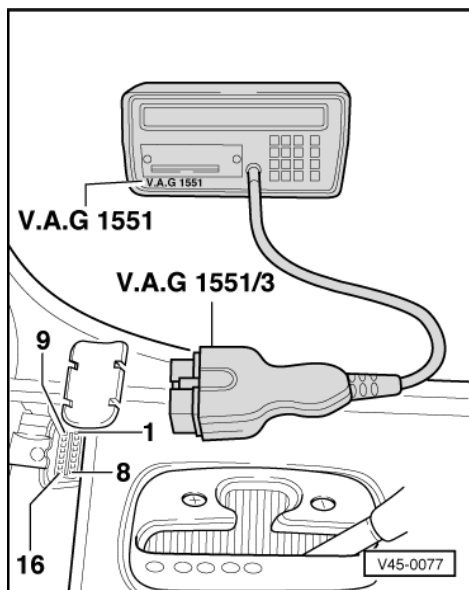
-> Indicated on display:

V.A.G

1) Displayed alternately

Notes:

- ♦ Check the connections of the diagnostic connector if there is no display on the screen.





=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations

- ♦ The PRINT key is used to switch on the printer. When the printer is on the warning lamp in the print key illuminates.
- ♦ Depending on the program, additional operating information can be printed out by pressing the HELP key of V.A.G 1551.
- Switch the ignition on.
- Switch on the printer by pressing the Print key on the fault reader.
- Press key -1- for "Rapid data transfer" operating mode.

-> Indicated on display:

Rapid data transfer	HELP
Enter address word XX	

- Press keys 0 and 3 for the address word "Brake electronics".

-> Indicated on display:

Rapid data transfer	Q
03 Brake electronics	

- Confirm input with Q key.

-> Display after address word 03 has been entered:

Rapid data transfer	
Tester sends address word 03	

Note:

If there is a fault in the communications build-up between the fault reader V.A.G 1551 and the control unit:

=> Running Gear Self-Diagnosis; Repair group 01; Basic Notes on Self-Diagnosis; Connecting fault reader V.A.G 1551 and selecting address word Basic Notes on Self-Diagnosis Connecting fault reader V.A.G 1551 and selecting address word

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 4 to select function "Basic setting".

-> Indicated on display:

Rapid data transfer	Q
04 Basic setting	

- Confirm input with Q key.

-> Indicated on display:

Basic setting	Q
Enter display group number XXX	

Open the bleeder screw on the front left brake caliper.

- Press the keys 0, 0 and 2 and confirm the entry by pressing Q.

-> Indicated on display:

System in basic setting	2
Bleeding system	

The ESP hydraulic pump -V156- is now actuated for 10 seconds.



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This actuation must only be carried out a maximum of 3 times in succession (approx. 30 sec.). Then the pump must be left to cool for at least 5 minutes.

To cancel the actuation press the ➔ key. The program then returns to its initial settings.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Bleed the calipers until clear, bubble-free brake fluid emerges.
- Close bleed screw.
- Press keys 0 and 6 for the function "End output".

-> Indicated on display:

Rapid data transfer	Q
06 - End output	

- Confirm input with Q key.

-> Indicated on display:

Rapid data transfer	HELP
Enter address word XX	

- Switch ignition off.
- Disconnect fault reader.
- Switch off V.A.G 1869.
- Check the brake fluid level in the reservoir and correct as necessary.

8.3 - Changing brake fluid (every 2 years)

Important

- ◆ Do not under any circumstances allow brake fluid to come into contact with liquids which contain mineral oils (e.g. oil, petrol, cleaning agents). Mineral oils damage the plugs and seals in the brake system.
- ◆ Brake fluid is poisonous and must on no account be siphoned by mouth through a hose. Because of its caustic properties it must also not come into contact with paintwork.
- ◆ Brake fluid is hygroscopic, i.e. it absorbs moisture from the surrounding atmosphere. It is thus always to be kept in containers with an air-tight seal.
- ◆ Always observe the relevant environmental regulations for disposal.

Notes:

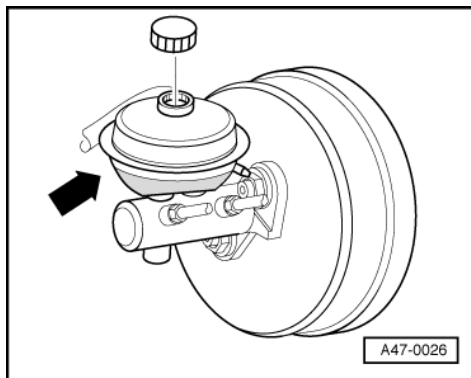
- ◆ Only use fresh brake fluid as per US Standard FMVSS 116 DOT 4.
- ◆ Genuine VW/Audi brake fluid complies with this specification.
- ◆ Use plenty of water to flush away any brake fluid spillage.
- ◆ When the system is open do not work with compressed air and do not move the vehicle.
- ◆ During the concluding road test, ensure that an ABS-controlled brake application is carried out at least once (can be felt from the pulsing of the brake pedal).

Changing brake fluid with brake filling and bleeding appliance V.A.G 1869

- Open the brake fluid reservoir.

Note:

The brake fluid reservoir must be kept adequately filled to ensure that no air can enter the brake system from the reservoir.



- -> With the engine running and the bleeder screw on the rear right brake caliper open, use the brake pedal to pump brake fluid out of the reservoir until the level goes down as far as the opening for the hydraulic clutch connector hose.
- Collect the used brake fluid in a suitable container. Close bleed screw.
- Connect V.A.G 1869.
- On vehicles with a manual gearbox attach the bleeder hose of the collector to the bleeder screw on the clutch slave cylinder.
- Open the bleeder screw on the clutch slave cylinder and allow about 100 cm³ of brake fluid to drain out.
- Close bleed screw.

The following steps apply to the four brake calipers.

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

- Fit bleeder hose leading to brake fluid collector onto bleeder screw.
- Open bleeder screw and allow about 250 cm³ of brake fluid to drain out.

Pumping in new brake fluid flushes the used brake fluid out of the system.

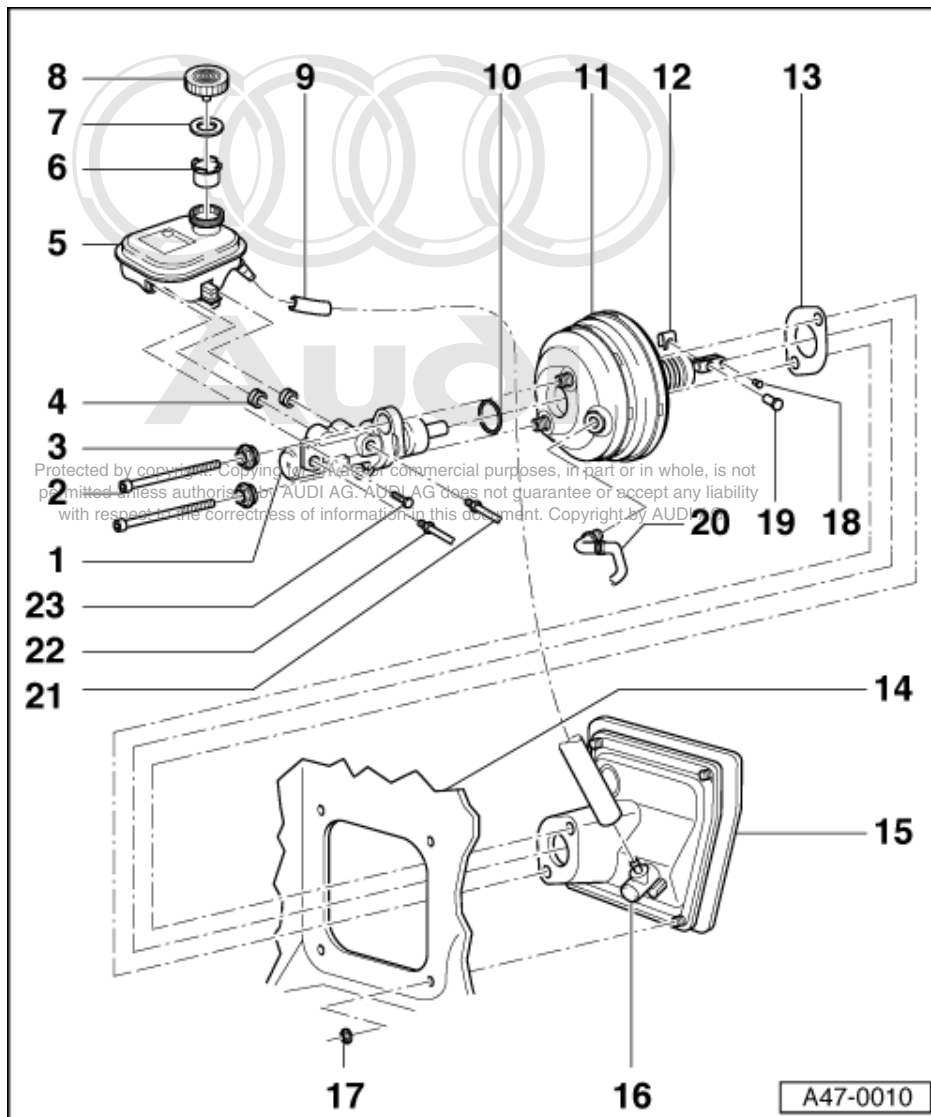
- Close bleed screw.
- Disconnect hose from brake fluid reservoir.
- Check pedal pressure and brake pedal free play. Free play: max. 1/3 of pedal travel



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9 - Assembly overview: Servo unit/tandem brake master cylinder

9.1 - Assembly overview: Servo unit/tandem brake master cylinder



Note:

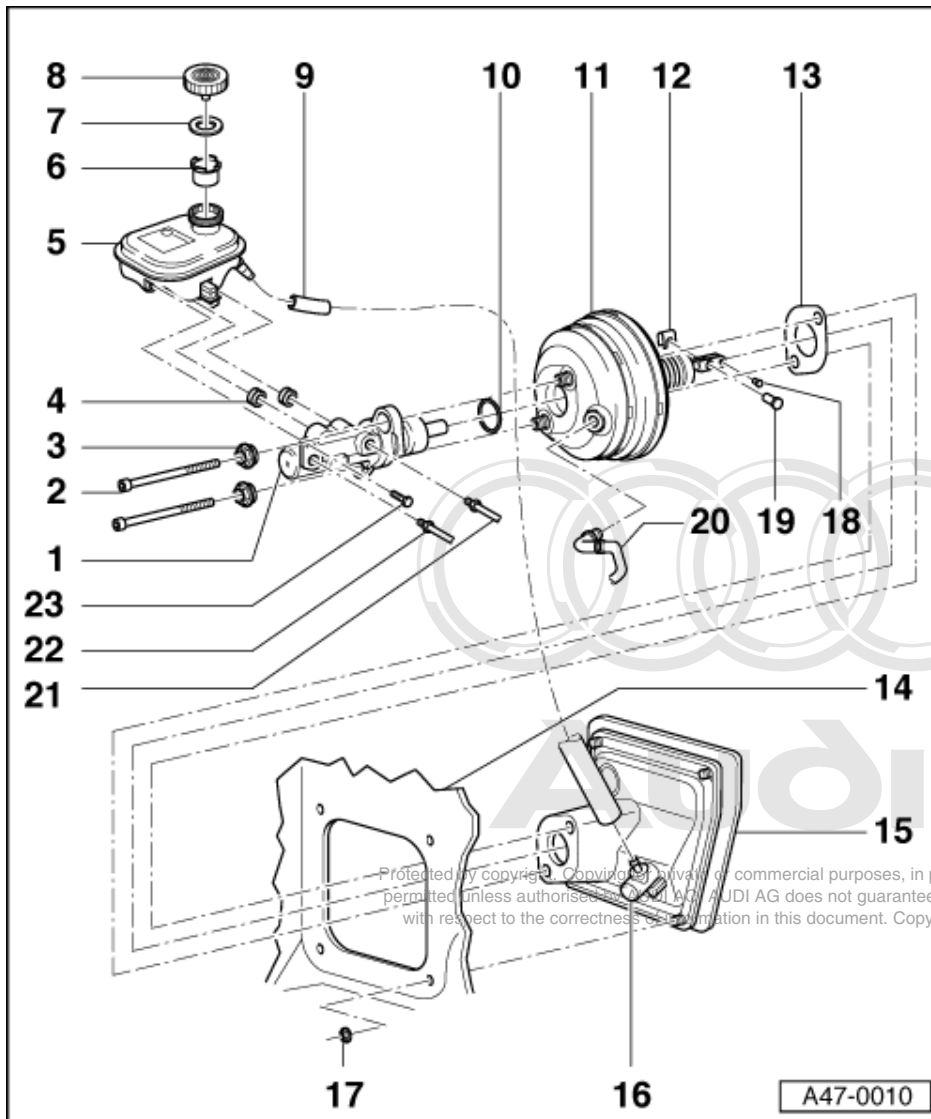
- ◆ Brake master cylinders can no longer be dismantled, i.e. no provision is made for servicing.
- ◆ Use only fresh brake fluid. Refer to information on brake fluid reservoir.

Assignment of brake pipe connections:

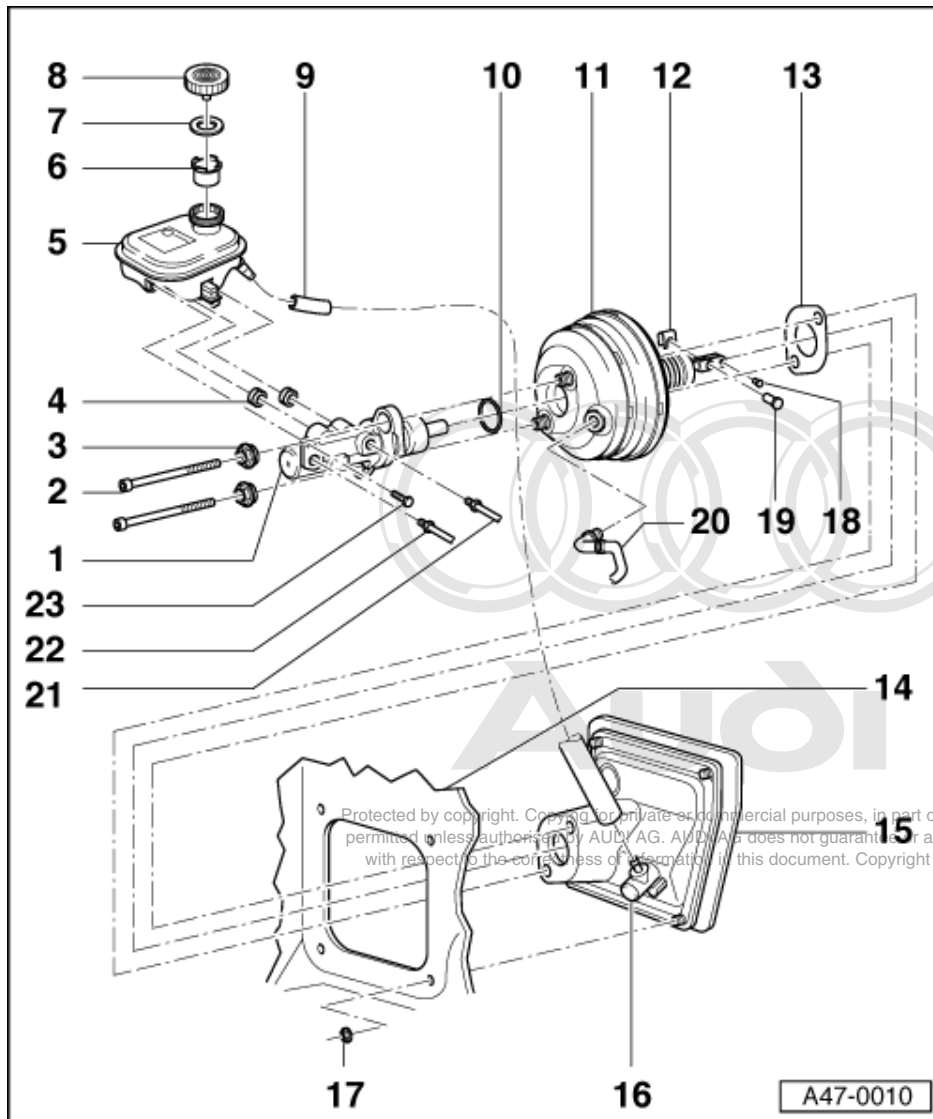
- ◆ ABS 5.0 => Page 11
- ◆ ABS 5.3 => Page 23
- ◆ ABS 5.3 with ESP => Page 28

1 Brake master cylinder, \varnothing 25.4mm

- ◆ Cannot be repaired. If faulty, renew complete.
- ◆ Removing and installing
=>Page 174 .

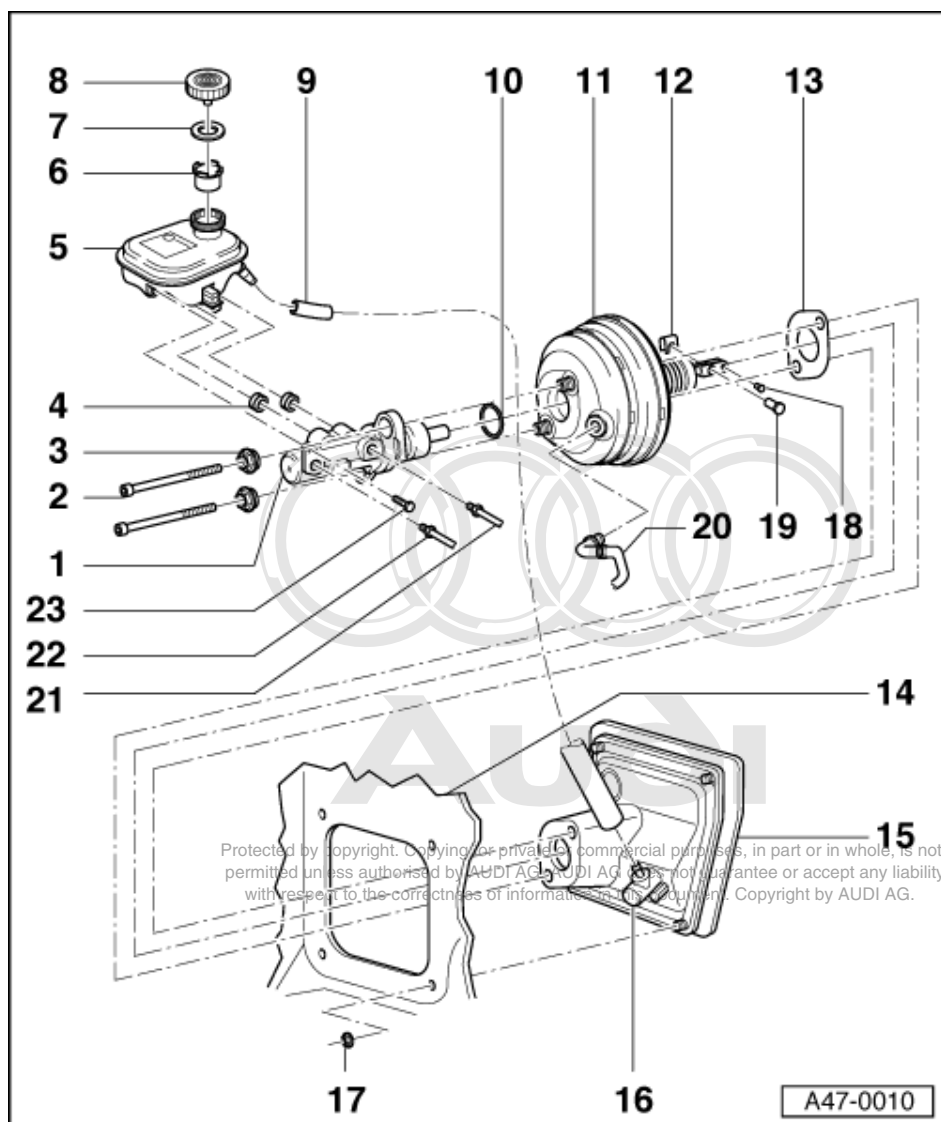


- 2 Bolt, Torx socket T45, 25 Nm
- 3 Flanged nut, 50 Nm
- ♦ Always replace
- 4 Sealing plug
- ♦ Moisten with brake fluid and insert into brake master cylinder
 - ♦ Press brake fluid reservoir into sealing plugs

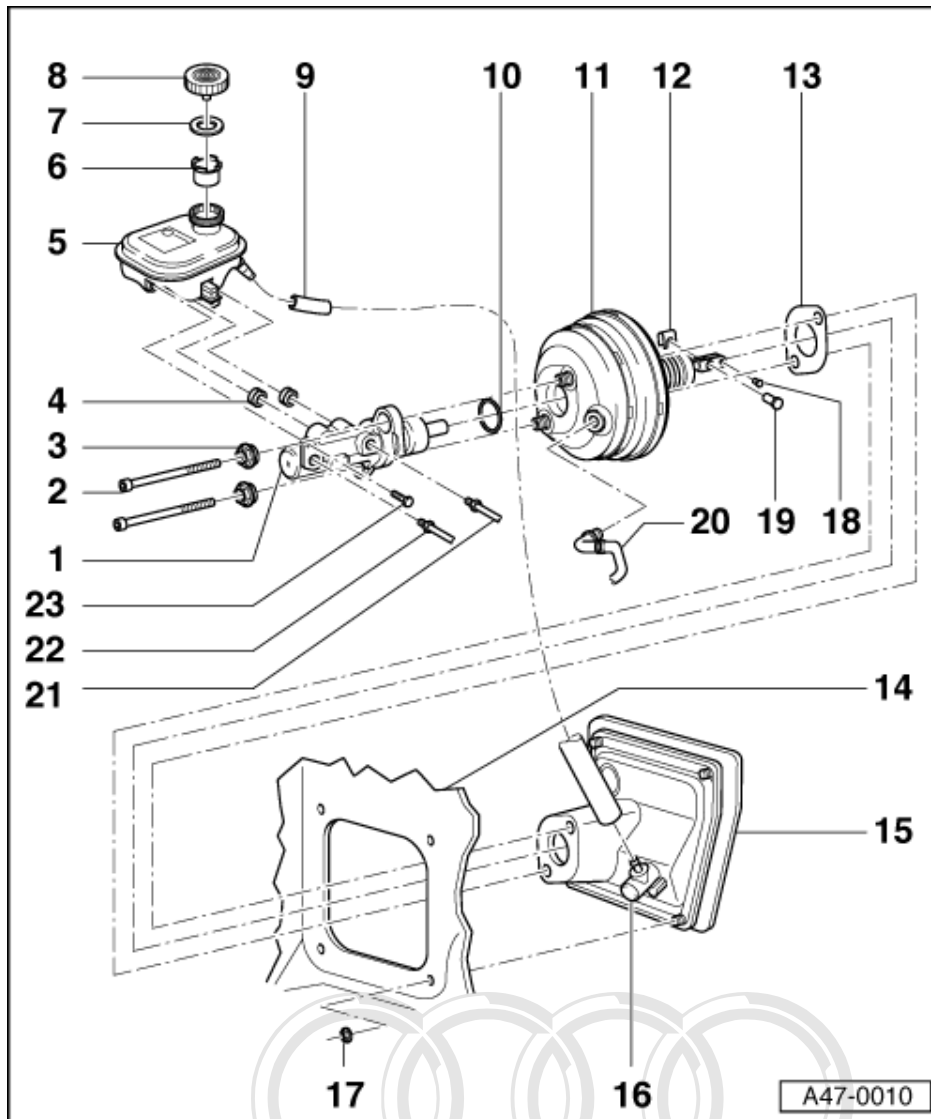


5 Brake fluid reservoir with float warning indicator

- ◆ Functional test
 - With the ignition switched on, remove the cap and press with your hand on the strainer that is visible. Warning lamp in instrument cluster lights and acoustic alarm sounds.
- ◆ Removing and installing
 - =>Page 174.
- ◆ Connection for hydraulic coupling is located on side
- ◆ On vehicles equipped with ESP there is an additional connection for the suction hose => Page 30
- ◆ Refer to label on reservoir before topping up brake fluid



- 6 Strainer**
 - ◆ Securely clipped into the container
- 7 Sealing ring**
- 8 Cap**
- 9 Supply hose**
 - ◆ From brake fluid reservoir to clutch master cylinder
- 10 Sealing ring**
 - ◆ Insert into groove at brake master cylinder
 - ◆ Replace after removing brake master cylinder



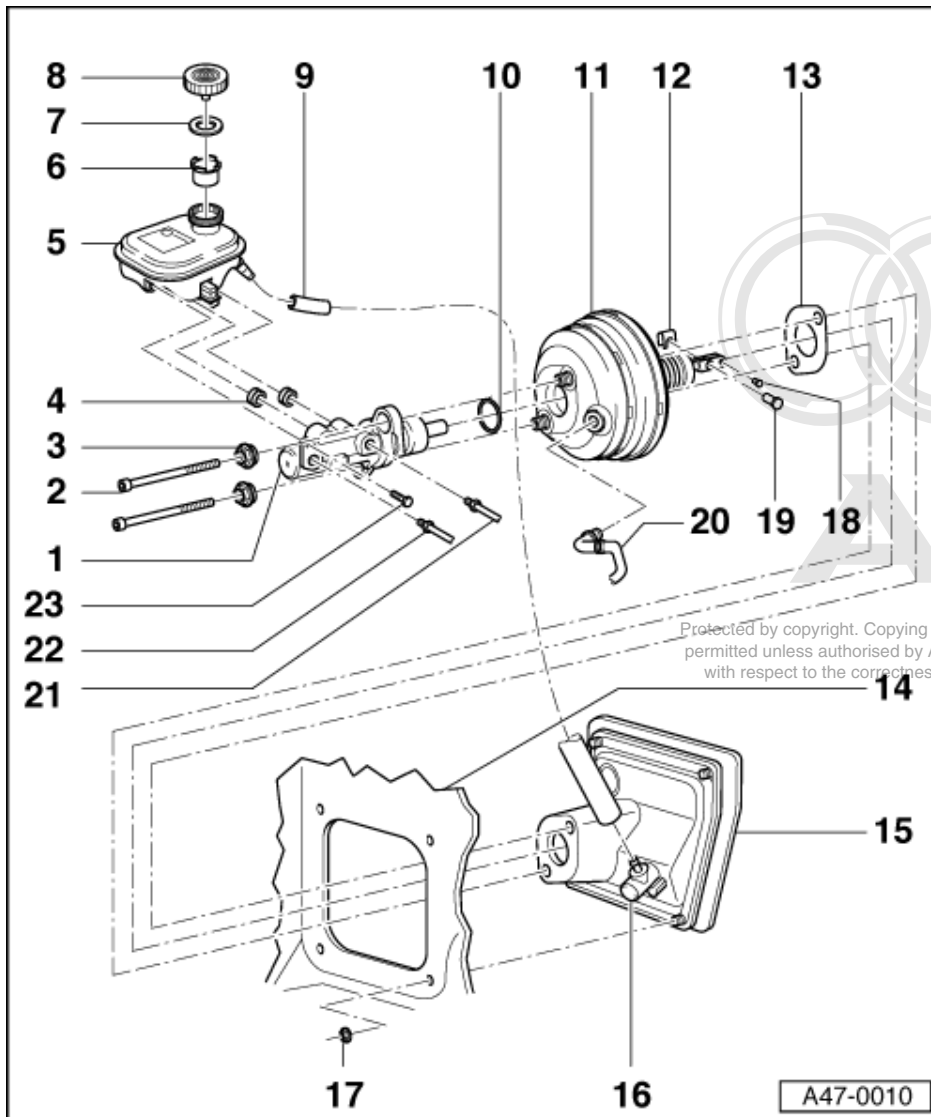
11 Brake servo

- ◆ Removing and installing
=>Page 175.
- ◆ Adjust clevis =>Page 1.
- ◆ Functional test
 - With the engine switched off, firmly depress the brake pedal several times (this reduces the vacuum present in the servo unit).
 - Now depress brake pedal with moderate force, hold and start engine. If the servo unit is working properly, the pedal will be felt to give slightly when pressed (servo assistance becomes effective).
- ◆ If faulty renew complete.

12 Retainer

- ◆ Fit onto pin

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13 Seal

- ♦ Brake servo is supplied with bonded gasket
- ♦ Replace only if damaged

14 Bulkhead

15 Pedal bracket

- ♦ Removing and installing
=>Page 114 .

16 Master cylinder

- ♦ Replace in the event of leakage
- ♦ Adjusting => Fig. 112
- ♦ To remove detach mounting bracket => Page 112

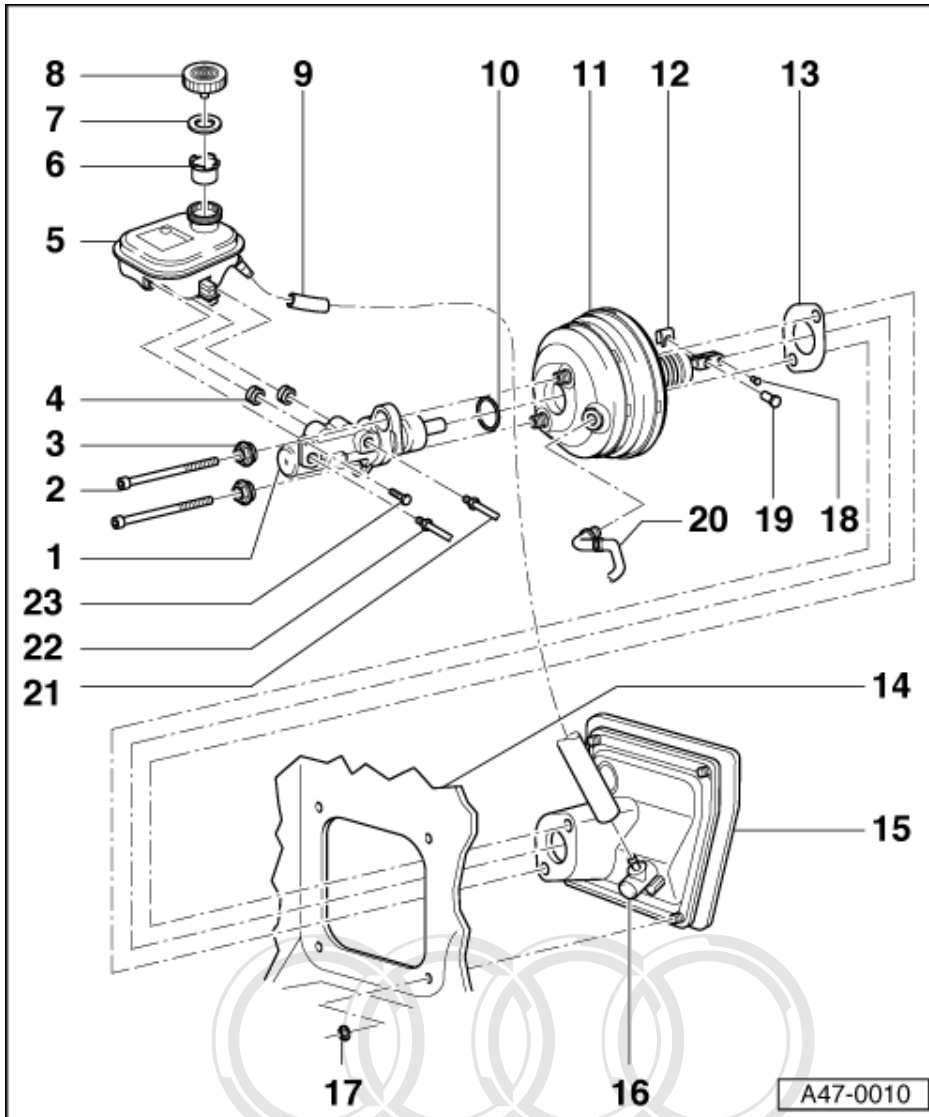
17 Hexagon nut, 25 Nm

- ♦ Always replace

18 Grommet

19 Pin

- ♦ Insert in clevis and brake pedal



20 Vacuum hose

- Insert into brake servo unit
- ♦ On petrol engines the required vacuum is taken from the intake manifold.

21 Brake pipe, 15 Nm

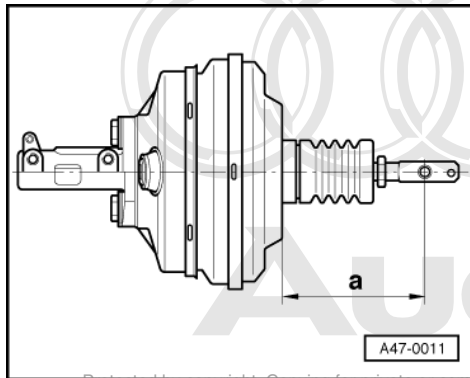
- ♦ Brake master cylinder/push rod piston circuit to hydraulic unit

22 Brake pipe, 15 Nm

- ♦ Brake master cylinder/floating piston circuit to hydraulic unit

23 Hexagon bolt

- ♦ Screw home
- ♦ Unscrew to remove brake fluid reservoir



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-> Fig.1 Adjusting clevis

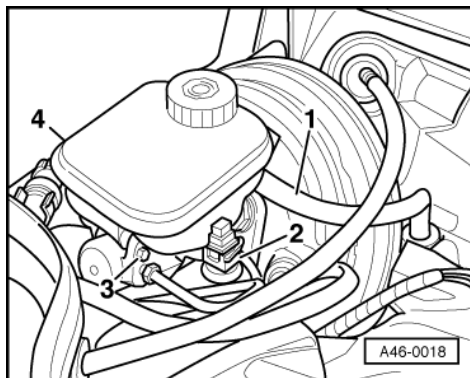
$a = 135\text{mm} \pm 0.5\text{mm}$

Notes:

- ♦ When measuring, the clevis should be aligned at right angles to the surface of the brake servo unit.
- ♦ Dimension -a- applies to both LHD and RHD vehicles.

9.2 - Removing and installing brake master cylinder

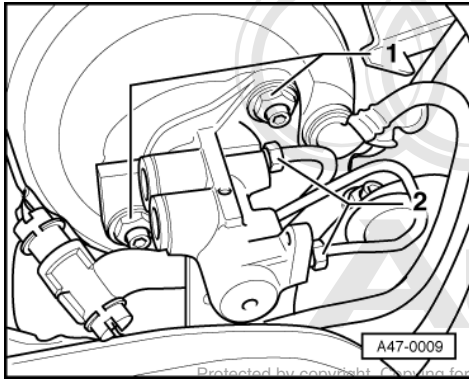
- Fit bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw.
- Depress the brake pedal in order to pump out as much brake fluid as possible.
- Close front left bleeder screw.
- Remove plenum chamber cover.



- -> Unscrew the bolt -3- attaching the brake fluid reservoir.
- Unplug the connector of the sender for the float warning indicator -2-.
- Disconnect the feed hose -1- for the clutch master cylinder.
- On vehicles with ESP detach the suction hose => Page 30

Notes:

- ♦ Protect the plenum chamber against any escaping brake fluid.
- ♦ The underside of the brake fluid reservoir clips into the brake master cylinder.
- To remove reservoir, press down locking lug and at the same time pull brake fluid reservoir out of sealing plugs.
- Remove brake fluid reservoir.



- -> Unscrew the brake pipes -2- and close them off with dummy plugs.
- Unscrew the nuts attaching the brake master cylinder -1-.
- Carefully remove brake master cylinder from brake servo unit.

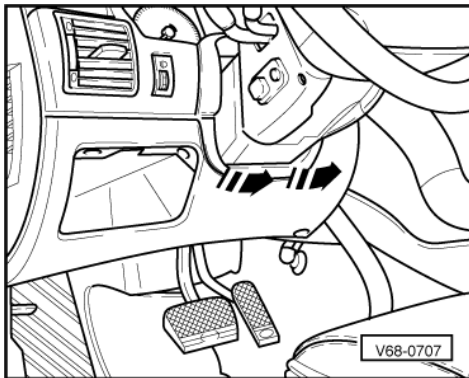
Pay special attention to the following on installation:

- ♦ Before installing the brake master cylinder, clean any residual brake fluid off the plenum chamber.
 - ♦ When assembling brake master cylinder with brake servo unit, make sure push rod is properly positioned in brake master cylinder.
- Bleed brake system => Page **161** and clutch.

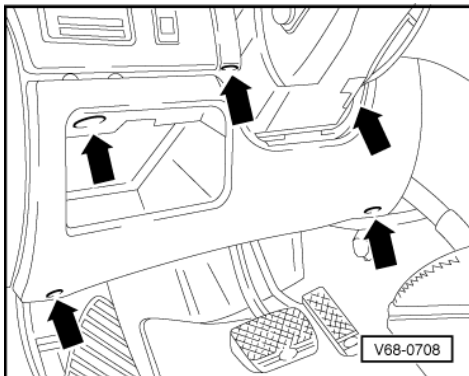
=> 5-speed Manual Gearbox 012, FWD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

=> 5-speed Manual Gearbox 01A, 4WD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

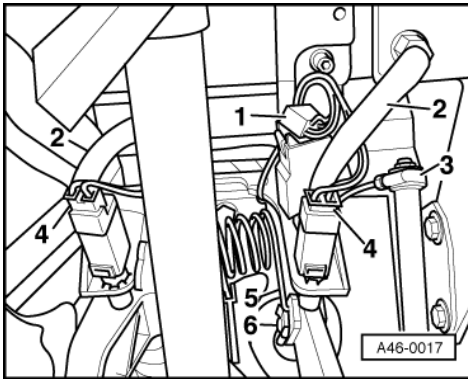
9.3 - Removing and installing brake servo



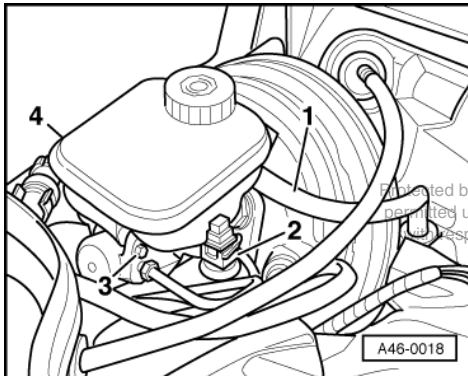
- -> Lever off surround underneath steering column, see arrows.



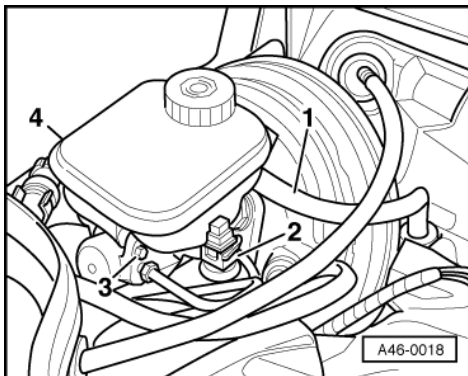
- -> Unscrew cover, see arrows
- Remove the lower insulation panel.



- -> Unhook the push rod -6- of the brake master cylinder.
- Fit bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw.
- Depress the brake pedal in order to pump out as much brake fluid as possible.
- Close front left bleeder screw.
- Remove plenum chamber cover.



- -> Unscrew the bolt -3- attaching the brake fluid reservoir.
- Unplug the connector of the sender for the float warning indicator -2-.

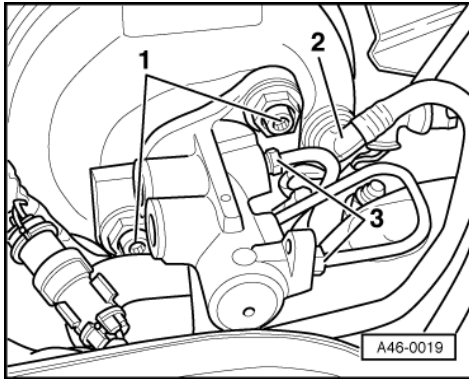


- -> Detach feed hose -1- for clutch master cylinder.
- On vehicles with ESP detach the suction hose => Page 30

Notes:

- ♦ Protect the plenum chamber against any escaping brake fluid.
- ♦ The underside of the brake fluid reservoir engages into the brake master cylinder.
- To remove reservoir, press down locking lug and at the same time pull brake fluid reservoir out of sealing plugs.

- Remove brake fluid reservoir.



- -> Unscrew the brake pipes -3- and close them off with dummy plugs.
- Disconnect vacuum hose 2.
- Unscrew the bolts attaching the brake servo unit -1- (Torx T45).
- Remove brake servo with brake master cylinder.

Pay special attention to the following on installation:

- ◆ Before installing brake master cylinder, clean any residual brake fluid off plenum chamber.
- Bleed brake system => Page 161 and clutch.

=> 5-speed Manual Gearbox 012, FWD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

=> 5-speed Manual Gearbox 01A, 4WD; Repair group 30; Servicing clutch mechanism Servicing clutch mechanism

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10 - Electric vacuum pump

10.1 - Electric vacuum pump

10.2 - Description and function

The electric vacuum pump is only installed in vehicles with automatic gearbox. It is switched on by the engine control unit, depending upon the intake manifold pressure.

The vacuum pump has self-diagnosis capability. Recognised faults are stored in the engine control unit.

The function of the electric vacuum pump must only be checked via self-diagnosis with the engine stopped.

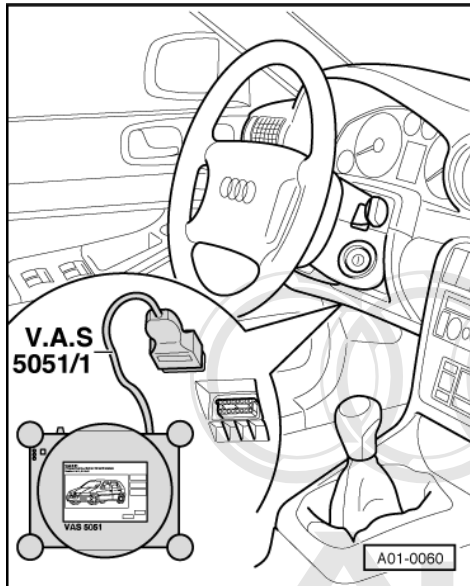
10.3 - Connecting vehicle diagnostic, testing and information system VAS 5051 or Connect fault reader V.A.G 1551

Test requirements:

- Battery voltage at least 11 V
- Earth connections on engine and gearbox OK.
- Engine off



- Automatic gearbox in position "P" or "N"

Procedure

- -> Connect vehicle diagnostic, testing and information system VAS 5051 with diagnostic cable VAS 5051/1 with the ignition switched off. Alternatively, connect fault reader V.A.G 1551 with diagnostic cable V.A.G 1551/3A.

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Notes:

- ♦ The following describes self-diagnosis using the fault reader V.A.G 1551 only.
- ♦ When using the vehicle diagnostic, testing and information system VAS 5051, follow the procedures described in equipment operating instructions.

-> Indicated on display:

V.A.G

- 1) Appears alternately

Note:

If the display remains blank:

=> Fault Reader Operating Instructions

- Switch the ignition on.
- Switch on the fault reader printer with the print key. The indicator lamp in the key must illuminate.
- Press key 1 for "Rapid data transfer".

-> Indicated on display

Rapid data transfer HELP
Enter address word XX

Note:

Address word 00 is used to start the automatic test sequence i.e. interrogation of fault memories in all vehicle systems with self-diagnosis capability in vehicle with rapid data transfer.

- Enter "01" for address word "Engine electronics" and confirm entry with Q key.

-> The fault reader V.A.G 1551 display will show the control unit identification, for example:

3B0907552A	2.7l	V6/5V	G
0002	□		
Coding 05002	WSC 12345		

Note:

The control unit identification can be printed out by pressing the PRINT key on fault reader V.A.G 1551.

Control unit identification (example)

- 3B0907552 A	Part-No.; assignment => Parts List
- 2.7l	Engine capacity
- V6/5V	Design of engine (V-engine, 6-cyl- inder, 5-valve)
- "G" or no display	Vehicle with or without cruise con- trol
- 0002	Control unit software version
- Code 05002	Control unit code
- WSC 12345	Workshop Code of V.A.G 1551 with which encoding was last performed

10.4 - Selecting functions

Diagnostic communication established. Control unit version is checked and ➔ key is pressed.

-> Indicated on display:
(Function selection, e.g. 02 - interrogate fault memory)

Rapid data transfer	HELP
Select function XX	

For self-diagnosis of the vacuum pump, the following functions are available in the engine control unit:

- | |
|-----------------------------------|
| 02 - Interrogating fault memory |
| 03 - Final control diagnosis |
| 04 - Starting basic setting |
| 08 - Reading measured value block |

10.5 - Basic setting (perform short trip)

- Press the ➔key until the following display appears:
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-> Indicated on display (function selection):

Vehicle system test	HELP
Select function XX	

- Press keys 0 and 4 for "Basic setting" and confirm the entry with the Q key.

-> Indicated on display (function selection):

Basic setting
Enter display group number XXX

- Press keys 0,0 and 8 for "Perform short trip UP 28" and confirm the entry with the Q key.

-> Indicated on display (function selection):



System in basic setting 8 off (4 on)
□
not actuated Pump off XXX mbar test off

- Press 4
- Firmly apply the brake pedal several times in succession (venting the brake servo) until the test is activated.

-> Indicated on display (function selection):

System in basic setting 8 on (8 off)
□
actuated/not actuated Pump on XXX mbar
test on

- The brake pedal must not be pressed once the test has been activated, as the pump is switched off when the brake pedal is actuated.

The pump evacuates the brake servo. The diagnosis of the brake servo system runs in parallel in the control unit. The system passes the test if the pressure in the brake servo reaches the shut-off threshold within the time limit set by the diagnostic function: (max 20 sec)

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-> Indicated on display (function selection):

System in basic setting 8 on (8 off)
□
not actuated Pump off XXX mbar system OK

- Press 8
- Remove the diagnostic cable from the diagnostic connection

Or:

-> Indicated on display (function selection):

System in basic setting 8
not actuated Pump off XXX mbar system not
OK

If after the test the system is not OK, read out the fault memory and rectify the fault (ignition OFF).

- Afterwards perform the short trip again.

10.6 - Performing final control diagnosis

- Connect the fault reader and select the engine electronics function => Page 177 .
- Press ➔key.

-> Indicated on display (function selection):

Vehicle system test HELP
Select function XX

- Press keys 0 and 3 for "Final control diagnosis" and confirm the entry with the Q key.
- Press the ➔key until the following text appears:

-> Indicated on display (function selection):

Final control diagnosis
Actuating vacuum pump for brake system

- Confirm the entry with the Q key.

The electric vacuum pump should now run for approx. 10 sec.

- Remove the diagnostic cable from the diagnostic connection

10.7 - Reading measured value block

- Connect the fault reader and select the engine electronics function => Page 177 .
- Press =>key.

-> Indicated on display (function selection):

Vehicle system test	HELP
Select function XX	

- Press keys 0 and 8 for "Read measured value block" function.
- Confirm input with Q key.

-> Indicated on display:

Read measured value block	Help
Enter display group number	XXX

- Press keys 0, 0 and 8.
- Confirm input with Q key.

Display group 008

Reading measured value block	8=>	◀ Indicated on display
not actuated Pump off XXX mbar	Test off	
actuated Pump on	Test on	
<div style="display: flex; justify-content: space-between;"> <div> <p style="margin: 0;">Test</p> <ul style="list-style-type: none"> - Test (short trip) off - Test (short trip) on <p style="margin: 0;">Vacuum</p> <ul style="list-style-type: none"> - Measured vacuum in brake servo <p style="margin: 0;">Vacuum pump</p> <ul style="list-style-type: none"> - Pump off - Pump on <p style="margin: 0;">Brake pedal:</p> <ul style="list-style-type: none"> - Brake pedal not actuated - Brake pedal actuated </div> <div style="margin-top: 20px;"> <p style="margin: 0;">- Indicated for vented brake servo: approx. 960, and for evacuated brake servo: approx. 450, dependent upon ambient pressure.</p> <p style="margin: 0;">If the pump does not run when "Pump on" is displayed, perform fault finding according to current flow diagram.</p> <p style="margin: 0;">- Check brake light switch in the event of deviation.</p> </div> </div>		

10.8 - Fault table

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Fault code		Fault readout	Fault remedy
SAE	V.A.G		
P1427	17835	Actuating vacuum pump for brake system Short to positive	- Locate and eliminate open circuit in wiring or short circuit. => Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
P1428	17836	Actuating vacuum pump for brake system Short to earth	
P1429	17837	Actuating vacuum pump for brake system Open circuit	



P1479	17887	Brake vacuum system Mechanical fault	- Perform final control diagnosis in engine control unit to ascertain whether the vacuum pump runs/is actuated Check hoses to pump and from pump to brake servo Perform short trip in engine control unit (basic setting; display group 8 with ignition on and selector lever in "P" or "N" position)
-------	-------	---	---

Fault code		Fault readout	Fault remedy
SAE	V.A.G		
P1912	18320	Brake servo pressure sensor - G294 Open circuit / short to positive	- Locate and eliminate open circuit in wiring or short circuit. => Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
P1913	18321	Brake servo pressure sensor - G294 Short to earth	
P1914	18322	Brake servo pressure sensor - G294 Implausible signal	

11 - Brake lines and brake pipes

11.1 - Brake lines and brake pipes

11.2 - Routing of lines

The brake lines and brake pipes are supplied as replacement parts ready for installation.

The brake lines and brake pipes should be attached at the original attachment points during installation.

11.3 - Tightening torques

FS-3 brake caliper	45 Nm
Brake hose to brake caliper (banjo union with banjo bolt)	
HP- 2 brake caliper	12 Nm
Brake pipe to brake caliper	
Brembo brake caliper	12 Nm
Brake pipe to brake caliper	
Vent valve to brake caliper	10 Nm
Brake pipes to hydraulic control unit	15 Nm
Brake pipes to brake hoses	15 Nm
Hydraulic unit to retainer, ABS 5.0	15 Nm
Hydraulic unit to retainer, ABS 5.3	12 Nm
ABS sensors to wheel bearing housing	10 Nm
Brake plates to wheel bearing housing	10 Nm
Rear brake caliper	45 Nm
Brake hose to brake caliper (banjo union with banjo bolt)	