

Audi A2 2001 ➤

Brake System

Edition 04.2002



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Repair GroupsList of Workshop Manual Repair Groups

Audi A2 2001 ➤

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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00 - Technical data

1 - Technical data

1.1 - Technical data

1.2 - Brakes

Brake system	
Diagonally split dual-circuit brake system, anti-lock brake system (ABS), with electronic brake pressure distribution (EBPD), electronic differential lock (EDL) and traction control system (TCS). Electronic stability programme, ESP (ABS with EDL, EBD and optional ESP)	

Brake master cylinder	øin mm	22.2	22.2
Brake servo, vacuum from intake manifold or vacuum pump	øin inches	LHD models 9"	RHD 8"
Boost factor		i =4.5	i =4.5

Front brakes

Brake caliper		FS 1- Alu-13"	FS 3 14"
Production-relevant-No. (Pr. No.)		1ZB	1LY
Brake disc	øin mm	239	256
Brake disc, thickness	mm	15 ventilated	22 ventilated
Brake disc, wear limit	mm	13	20
Brake caliper, piston	øin mm	48	54
Pad thickness including backplate	mm	17	17
Wear limit including backplate	mm	7	7

Rear brakes

Brake drum		Aluminium brake drum	Steel brake drum	C34
Production-relevant No. (Pr. No.)	øin mm	1KR	1KB	1KD
Brake drum / brake disc	øin mm	180	200	232
Brake disc, thickness	øin mm	-	-	9
Brake drum / brake disc, wear limit	øin mm	181.5	201.5	230
Brake piston diameter	øin mm	15.87	17.46	34
Brake pad thickness	mm	5	5	-
Brake pad, width	mm	30	40	-



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 on manual gearboxes or in position "N" on automatic gearboxes.

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

2.3 - Vehicles with front-wheel drive

Perform the brake test on a 1-axle roller type test stand.

The test speed must not exceed 6 km/h, as otherwise the time delay in setting the rollers in motion could cause the brake control systems to intervene (EDS control).

The Audi-approved test stands meet these criteria.

Note:

The brake control systems are inoperative when the ignition is switched off.

3 - General information on aluminium body

3.1 - General information on aluminium body

3.2 - 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.

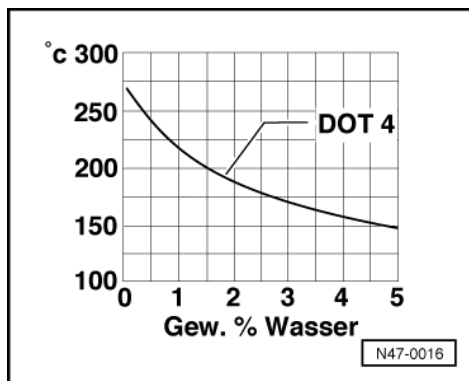
4 - Brake fluid

4.1 - Brake fluid

4.2 - General information

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Brake fluid is hygroscopic, i.e. it absorbs water and moisture from the surrounding atmosphere.



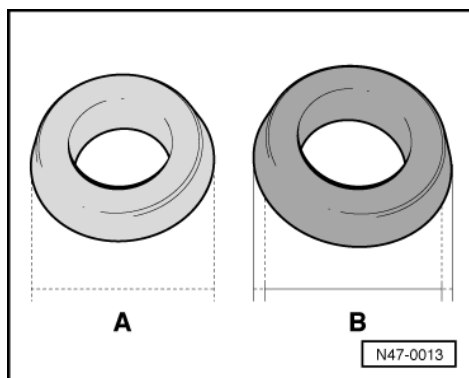
-> As the water content increases, the boiling point falls, i.e., in the event of the brake fluid overheating, vapour bubbles are formed which may lead to brake failure.

Brake fluid becomes discoloured (darkens) over time. Dark-coloured brake fluid does not necessarily indicate poor quality. Discoloration is due to chemical reactions, and may occur after a short time (a few weeks) particularly in the case of vehicles with ABS.

Important

Mineral oil, petrol and cleaning agents cause damage to rubber components of the brake system (sleeves, sealing rings).

Even tiny amounts contacting a sealing ring or a sleeve will affect these components and may adversely affect the functioning of the brake. The consequences of a contaminated brake system only become apparent after months, but can cause considerable costs, particularly for vehicles with ABS.





-> A = sleeve - original size

B = sleeve - swollen due to contact with mineral oil

Conclusions from the above points:

Always keep brake fluid containers well sealed. This is the only way to rule out the penetration of oil, dirt, cleaning agents and atmospheric humidity.

Keep brake fluid containers well away from oils, fluids (incl. hydraulic fluid) and cleaning agents to exclude the possibility of these becoming mixed or even the brake system being filled with the wrong fluid.



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45 - Anti-locking brake system

1 - Anti-lock brake system (ABS) ITT Mark 20 IE

1.1 - Anti-lock brake system (ABS) ITT Mark 20 IE

1.2 - General information on this ABS system

Important

The anti-lock brake system is basically 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 on the anti-lock brake system, determine the cause of the problem with the aid of the self-diagnosis.
- ◆ Switch off the ignition before removing and installing components. If the vehicle is equipped with a coded radio, obtain the security code before disconnecting the earthing strap of the battery.
- ◆ New hydraulic control units must be encoded upon installation.

=> Running Gear Self-diagnosis for ESP, Steering; Repair group 01; Performing self-diagnosis; Encoding control unit Performing self-diagnosis Encoding control unit

- ◆ Bleed the brake system after repairs that involve opening the brake system (e.g.: with V.A.G 1869) => Page 165.
- ◆ Observe the relevant safety precautions and information when handling brake fluid.
- ◆ 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 connectors.
- ◆ 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.
- ◆ Place removed parts on a clean surface and cover.

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- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately. (Use sealing plugs, repair kit H0 698 311 A)
- ◆ When the system is open do not work with compressed air and do not move the vehicle.
- ◆ Only use lint-free cloths.
- ◆ Only use genuine parts in their original packaging.
- ◆ Do not remove replacement parts from their wrapping until you are ready to install them.
- ◆ 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).

=> Running Gear Self-diagnosis for ESP, Steering; Repair group 01; Self-diagnosis; Safety measures and basic notes on self-diagnosis Self-diagnosis Safety measures and basic notes on self-diagnosis

- ◆ 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

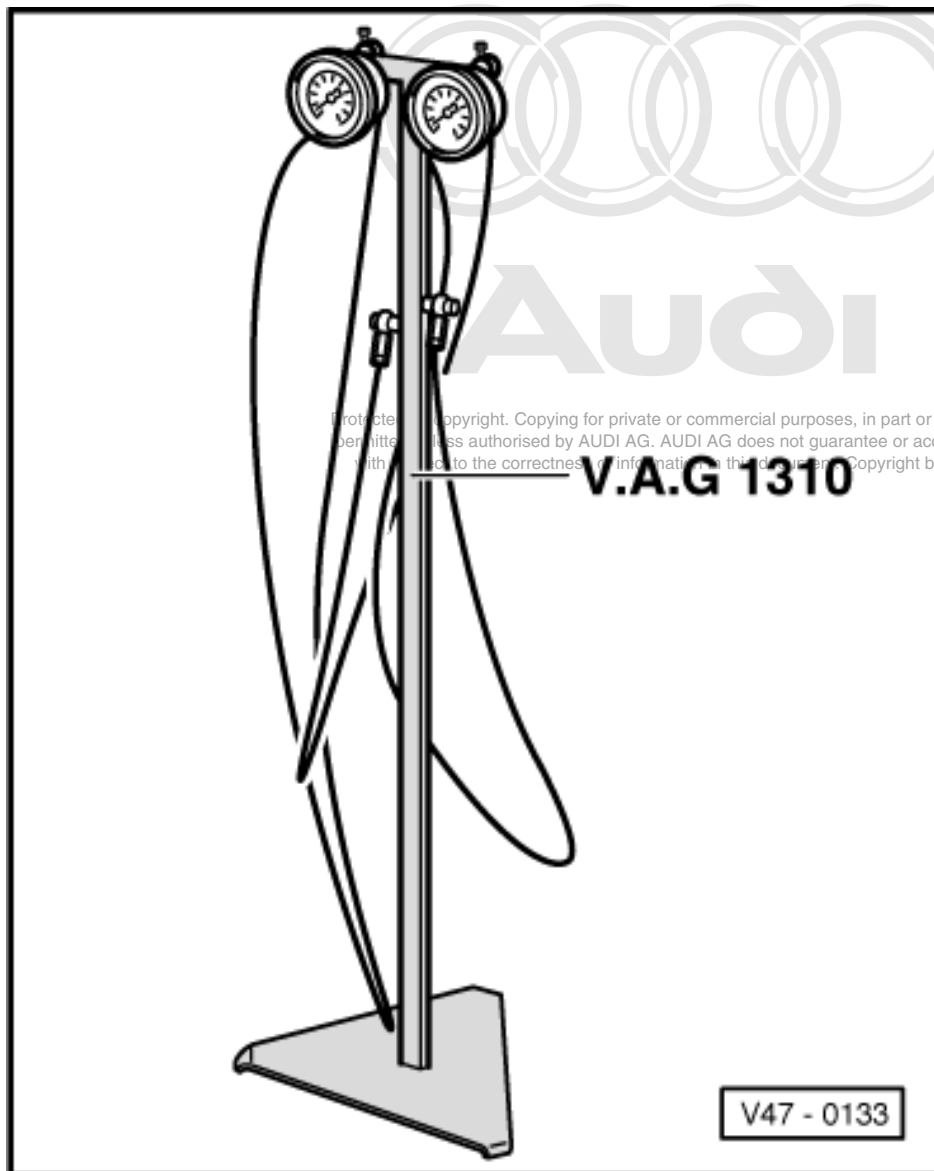


1.3 - High- and low pressure test

Before you begin:

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

High pressure test:



- 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.

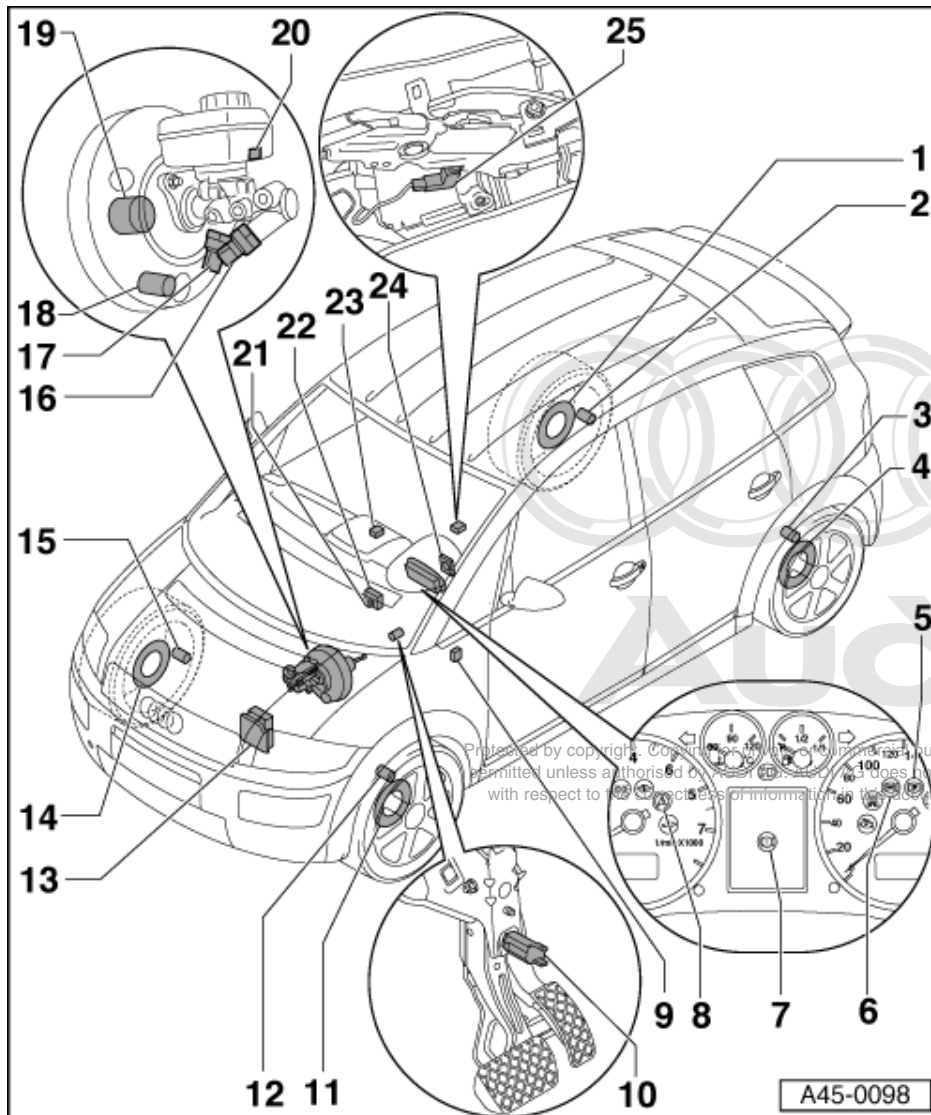
Low pressure test:

- 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, ABS/ESP Mark 20

2.1 - Component overview, ABS/ESP Mark 20



- 1 Rotor for speed sensor, rear right**
♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42;

- 2 Rear right speed sensor -G44**
♦ Removing and installing=>Page 40

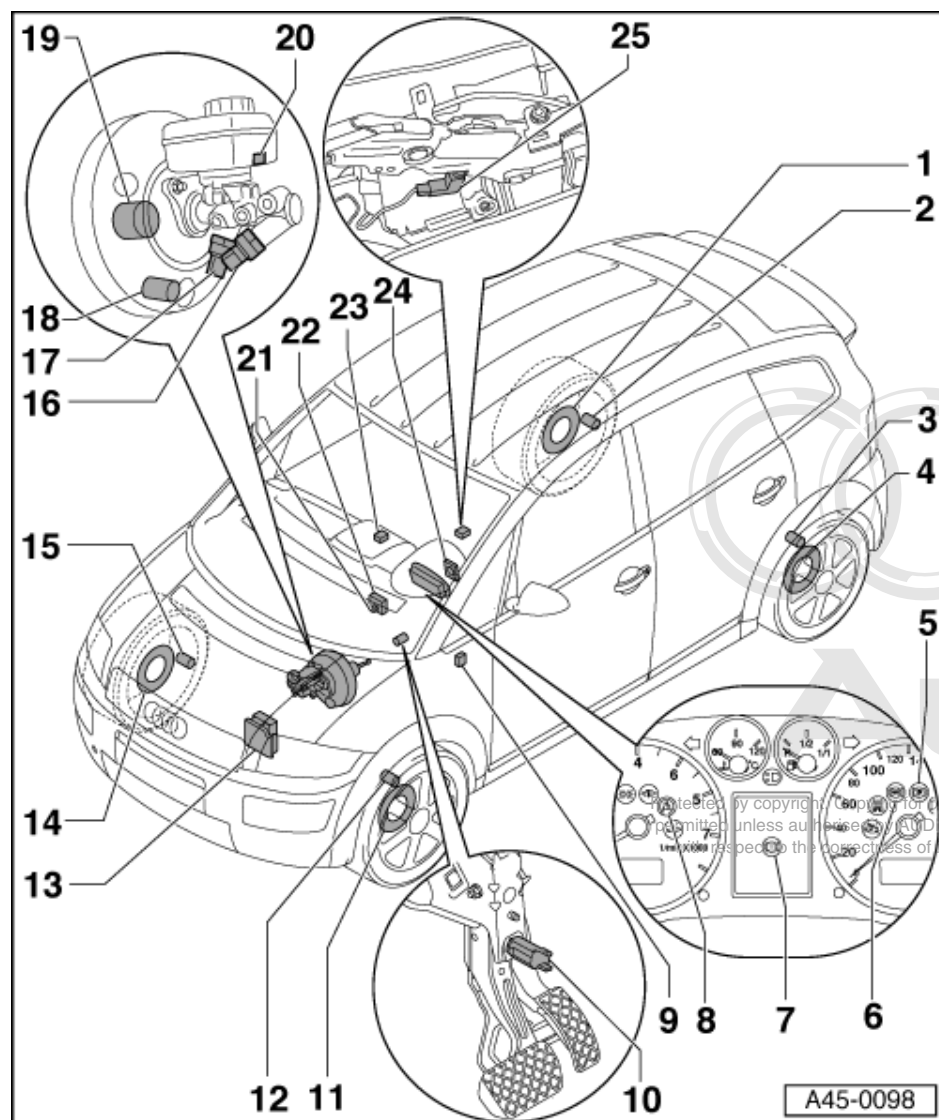
- 3 Rear left speed sensor -G46**
♦ Removing and installing=>Page 40

- 4 Rotor for speed sensor, rear left**
♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42;

5 Handbrake warning lamp -K14

- ♦ Fitting location: in dash panel insert



6 ABS warning lamp -K47

- ♦ Fitting location: in dash panel insert

7 Brake warning symbol -K118

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

8 TCS/ESP warning lamp -K86

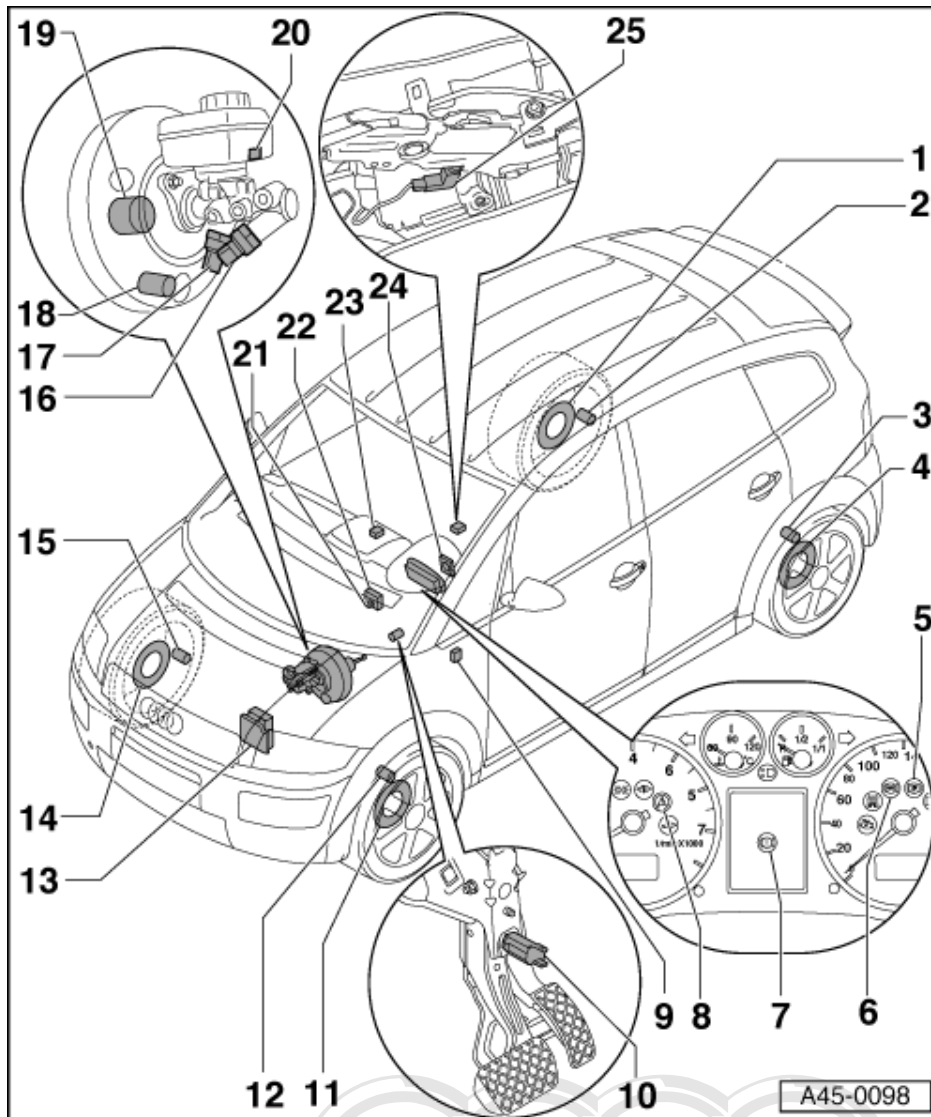
- ♦ Fitting location: in dash panel insert

9 Relay J508 for brake light suppression

- ♦ Fitting location: on fuse box

10 Brake light switch -F

- ♦ The brake light switch is open in the rest position;
- Removing and installing the brake light switch =>Page 17
- Adjusting => Page 17



11 Rotor for speed sensor, front left

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

=> Running Gear, FWD; Repair group 40;

12 Front left speed sensor -G47

- ♦ Removing and installing=>Page 34

13 Hydraulic control unit -N55 with control unit -J104

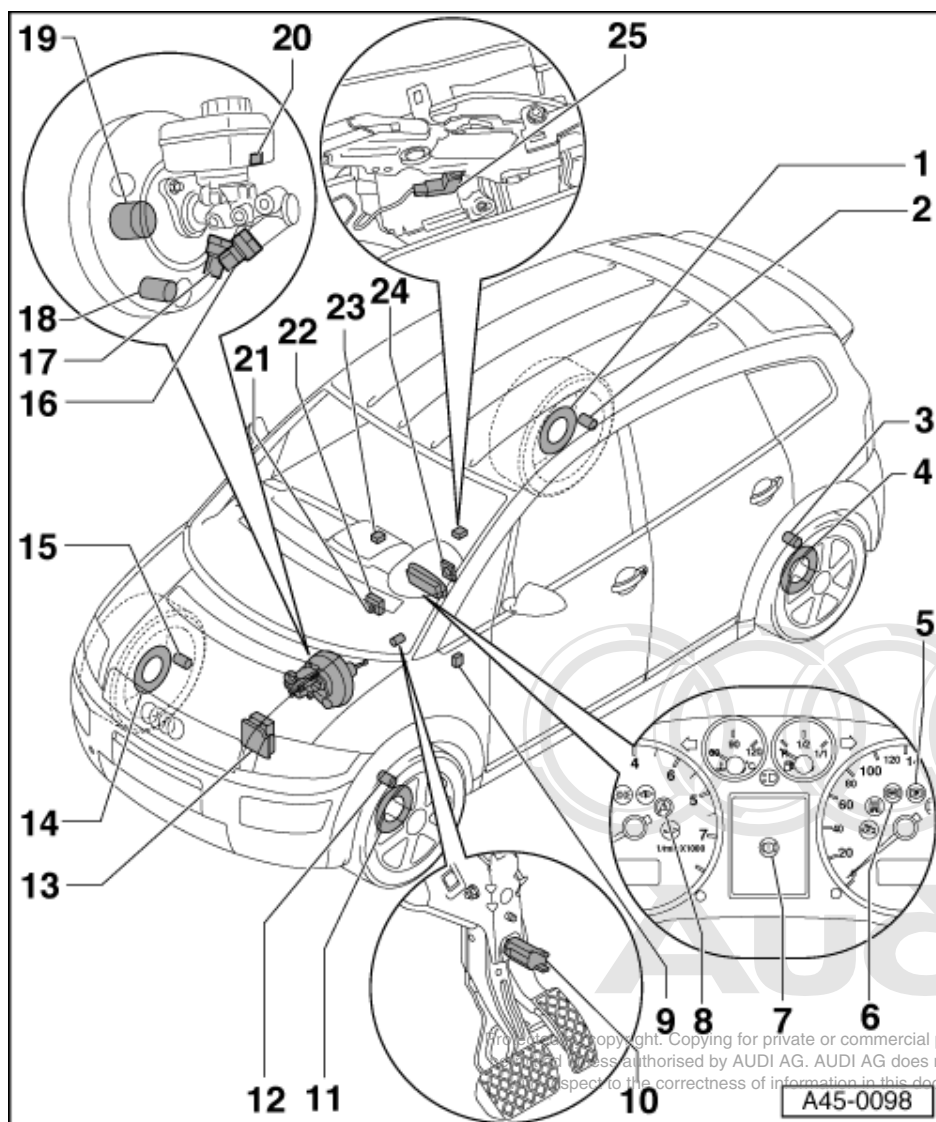
- ♦ The hydraulic pump -V64, the hydraulic unit -N55 and the control unit -J104 form the hydraulic control unit.
- ♦ Removing and installing=>Page 28

14 Rotor for speed sensor, front right

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

=> Running Gear, FWD; Repair group 40;

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15 Front right speed sensor -G45

- ♦ Removing and installing=>Page 34

16 Sender -G201 for brake pressure -1-

- ♦ Removing and installing=>Page 16

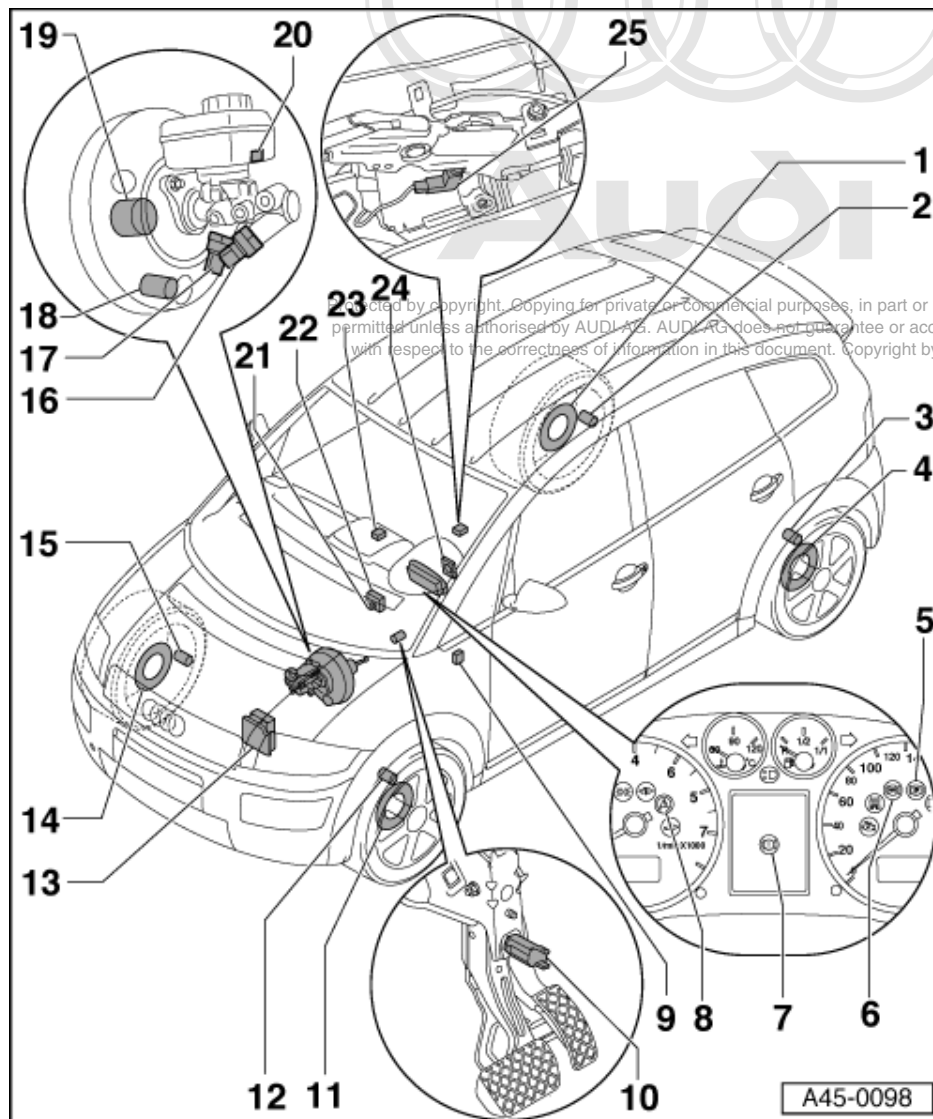
17 Sender -G214 for brake pressure -2-

- ♦ Removing and installing=>Page 16

18 Switch F83 for brake recognition

19 Solenoid N247 for brake pressure

20 Warning contact for brake fluid level F34



21 Lateral acceleration sender G200

- ♦ Removing and installing=>Page 11

22 Yaw rate sender G202

- ♦ Removing and installing=>Page 11

23 Switch for TCS/ESP E256

- ♦ Fitting location: on the centre console

24 Steering angle sender G85

- ♦ Removing and installing=>Page 14

25 Handbrake warning switch F9

- ♦ Fitting location: on the handbrake lever assembly

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

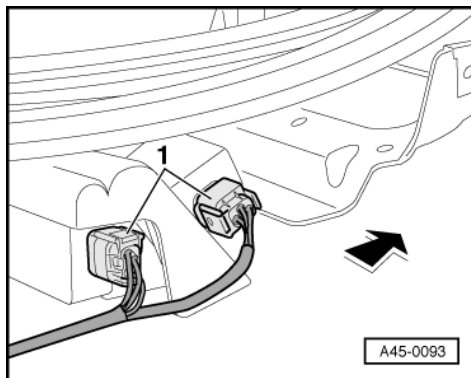
The removal and installation of the yaw rate and lateral acceleration senders is identical except for the actual replacement of the senders.

Removing

- Note radio code on vehicles with coded radio; if necessary request it.

- Removing driver's storage compartment.

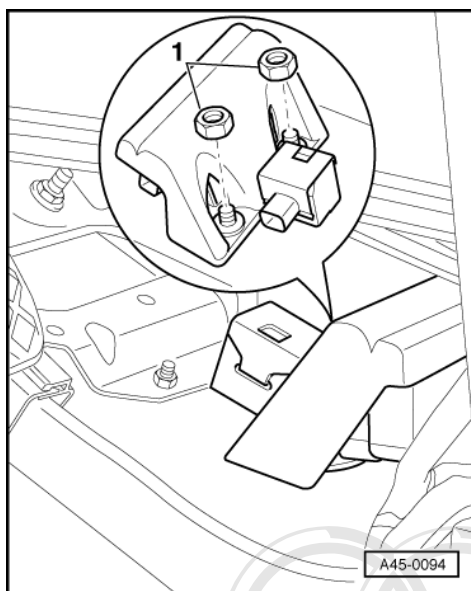
=> General Body Assembly, Interior; Repair group 68; Shelves/trim covers Shelves/trim covers



Fitting location: In front tunnel area

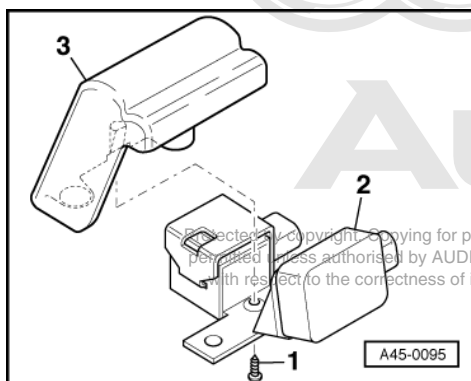
- -> Unplug connector -1- from sensors.

The -arrow- in the illustration points in direction of travel.

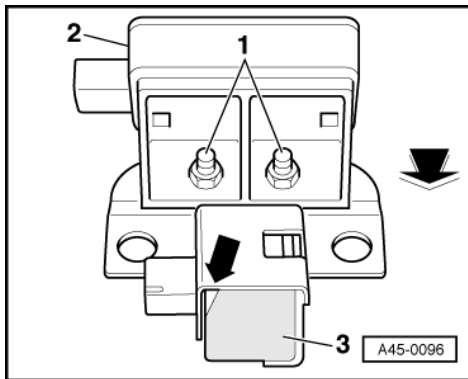


- -> Unscrew hexagon nuts -1- and remove sensors.

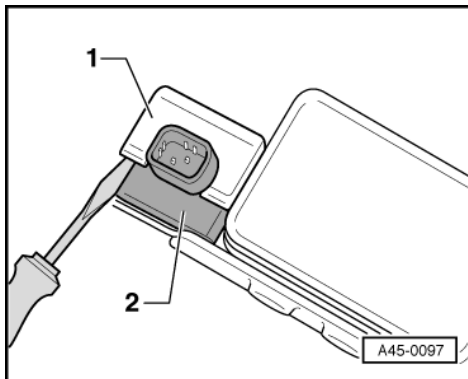
Removal of yaw rate sender



- Remove cross-head screw -1- with cover -3- from sender -2-.

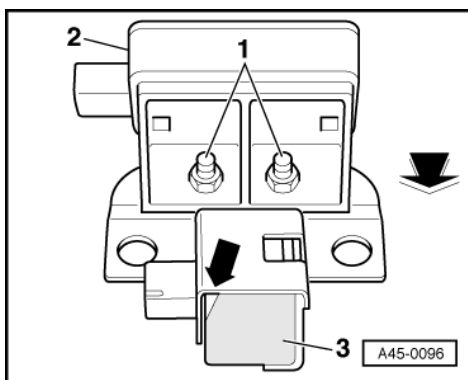


- -> Unscrew nuts -1- from yaw rate sender -2-.
- Remove yaw rate sender.



Removal of lateral acceleration sender

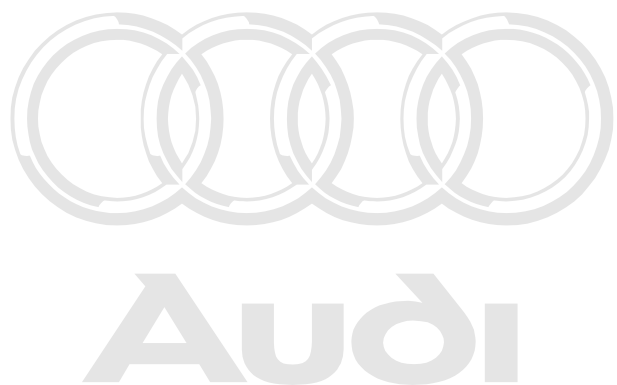
- -> With a screwdriver lever off retainer -1- from lateral acceleration sender. -2-.
- Remove lateral acceleration sender.



Installing

Installation of yaw rate sender

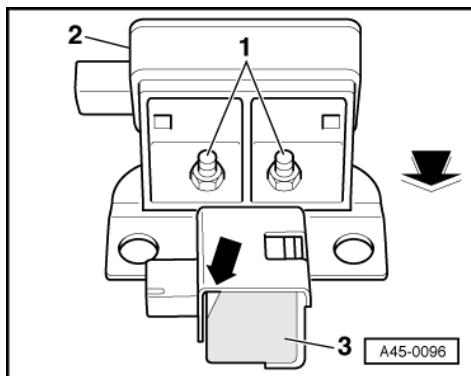
- Install yaw rate sender and align straight ahead.
- -> Fasten nuts -1- at yaw rate sender (bracket) -2-.



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Installation of lateral acceleration sender

- Install lateral acceleration sender in retainer.



- -> Installation position: The slanted side -arrow- of lateral acceleration sender -3- must face to the right in the direction of travel.

The -arrow- in the illustration points in direction of travel.

- Push retainer over lateral acceleration sender until it engages.

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

- Enter radio code.

Tightening torque:

Yaw rate sender to bracket

9 Nm

Yaw rate sender and lateral acceleration sender 7 Nm
with retainer to tunnel (body)

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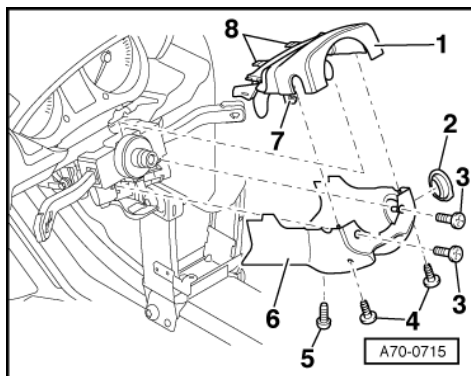
2.3 - Removing and installing steering angle sensor -G85

- Remove airbag unit and steering wheel

=> Running Gear, Front-wheel Drive; 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.

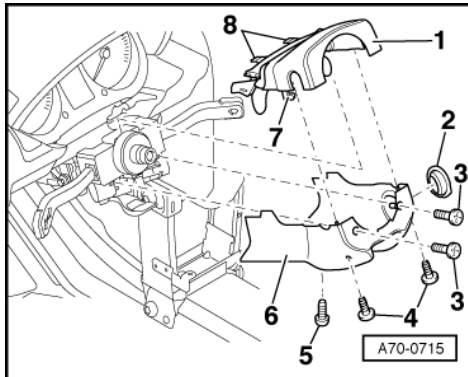
Removing trims at steering column switch.



Driver airbag unit and steering wheel removed.

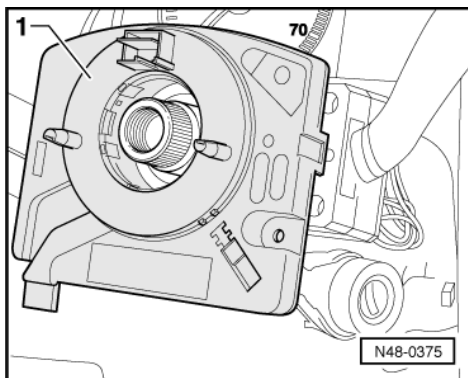
- Pull steering column out and tilt downwards as far as possible.
- -> Unscrew bolt -4- (2x).
- Tightening torque 0.6 Nm.
- Remove upper steering column switch trim -1- upwards and unclip at clips -8- rearwards.

When installing, insert upper shell hooks -7- into lower shell, swivel downwards and screw in place.

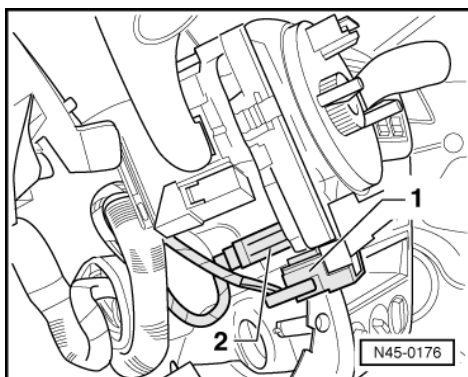


- -> Unscrew bolt -3- (2x).
- Tightening torque 4.5 Nm.
- Remove hexagon socket head bolt -5-.
- Tightening torque 5 Nm.
- Open steering wheel adjustment release lever.
- Remove lower trim for steering column switch -6-.

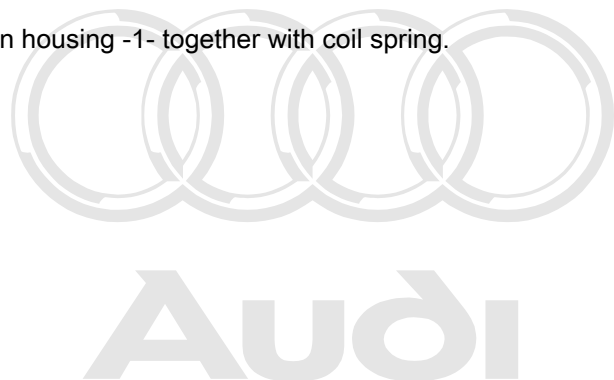
2 - Ignition/start lock grommet



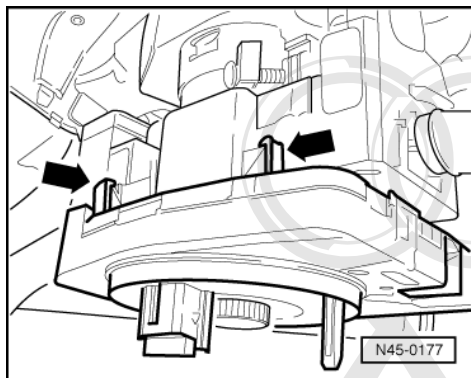
-> The steering angle sensor -G85 is installed in housing -1- together with coil spring.



- -> Detach connectors -1- and -2-.



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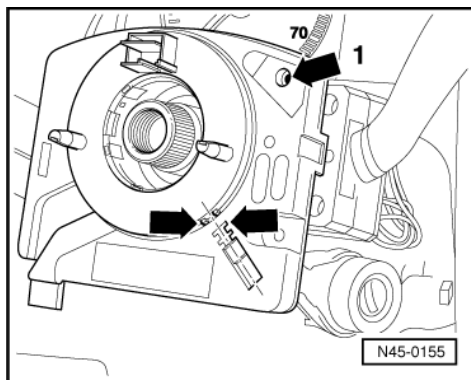
- -> Carefully lift hooks -arrows- and disconnect steering angle sensor.

Installing

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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:

- Install airbag unit and steering wheel

=> Running Gear, Front-wheel Drive; 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.

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

2.4 - Removing and installing brake pressure sender from brake master cylinder.

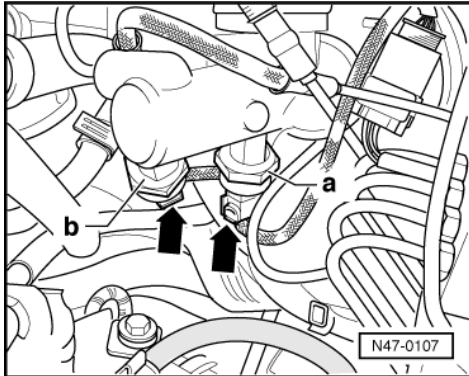
Additionally required information

- ♦ VAS 5051 vehicle diagnostic, testing and information system

Removing

- Note radio code on vehicles with coded radio; if necessary request it.
- Disconnect and remove battery.
- Lay out plenty of lint-free cloths in the area of the engine and gearbox.

- Draw off as much brake fluid as possible from brake fluid reservoir using an extraction bottle.
- Fit bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw.
- Operate the brake pedal at least 15 times so that the brake master cylinder is emptied.
- Close front left bleeder screw.



- -> Unplug connector -arrow- on the relevant brake pressure sender to be removed.

- a - Sender for brake pressure in pushrod piston circuit
- b - Sender for brake pressure in floating piston circuit

- Remove sender for brake pressure.

Installing

- Install in reverse order.

Tightening torque:	
Sender for brake pressure	35 Nm

- Bleed brake system => Page 165
- Initiate basic setting.
- Perform basic setting in "Guided fault-finding" using VAS 5051.

2.5 - Adjusting brake light switch

Removing and installing

Remove brake light switch to adjust.

- Unplug connector from brake light switch.
- Remove brake light switch by turning through 90° clockwise.
- Pull brake light switch plunger fully out.
- Press brake pedal down as far as possible by hand.
- Guide brake light switch through assembly opening and re-install by turning 90°-anti-clockwise.
- Release brake pedal.
- Plug in connector for brake light switch.
- Operate brake pedal.

=> Brake lights light up.

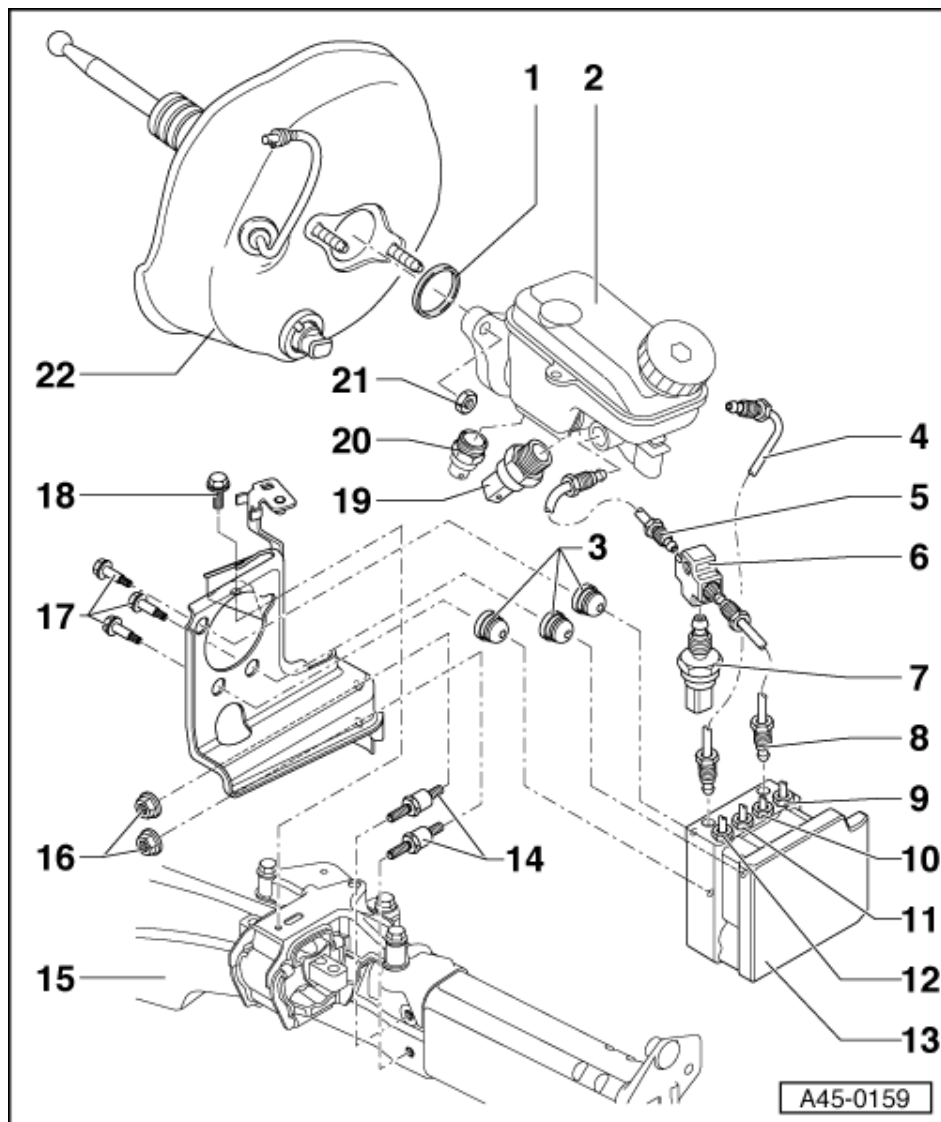
- Take foot off brake pedal.

=> Brake lights must not light up.

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3 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 3 litre

3.1 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 3 litre



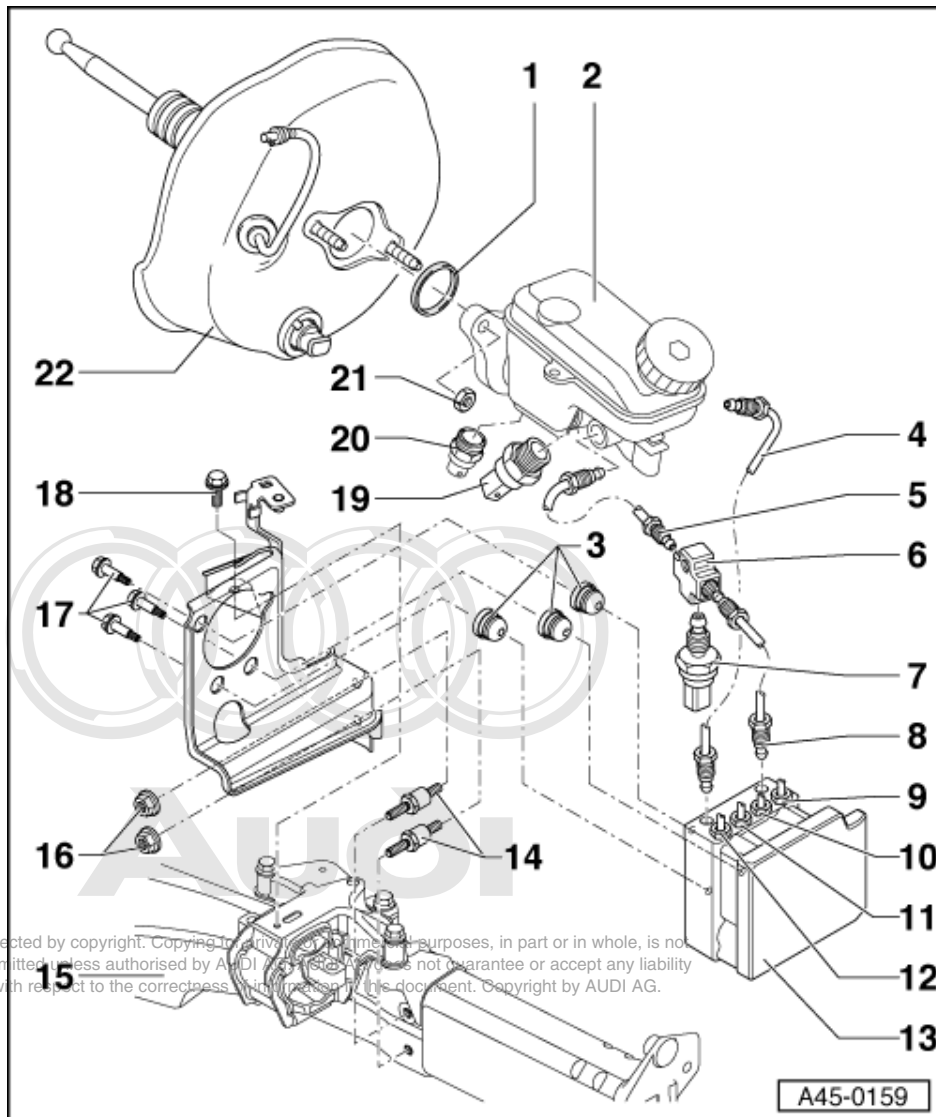
3.2 - ABS/EDL/TCS/ESP Mark 20 IE

Note:

The complete brake master cylinder and brake servo can be replaced separately from each other.

- 1 **Sealing ring**
 - ♦ Replace
- 2 **Brake master cylinder**
 - ♦ Cannot be repaired. If faulty, renew complete.
- 3 **Rubber mount**

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4 Brake line

- ◆ Brake master cylinder/push rod piston circuit to hydraulic unit
- ◆ Tightening torque: 12 Nm

5 Brake line

- ◆ Brake master cylinder/floating piston circuit to hydraulic unit
- ◆ Tightening torque: 12 Nm

6 Manifold

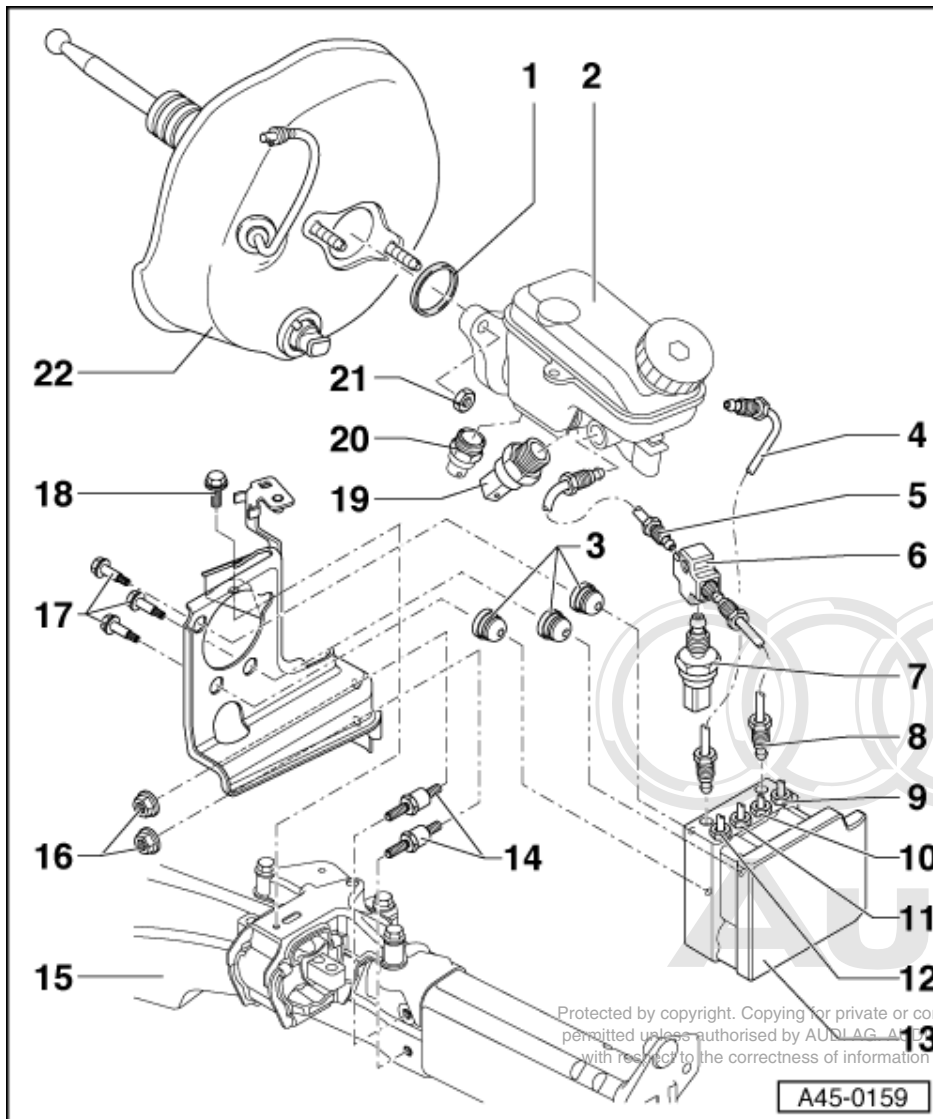
7 Sender for start/stop signal
 Tightening torque 12 Nm

8 Brake line

- ◆ Brake master cylinder/floating piston circuit to hydraulic unit
- ◆ Tightening torque: 12 Nm

9 Brake line connection

- ◆ Hydraulic unit to front left brake caliper
- ◆ Tightening torque: 12 Nm



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A45-0159

10 Brake line connection

- ◆ Hydraulic unit to wheel cylinder/rear right brake caliper
- ◆ Tightening torque: 12 Nm

11 Brake line connection

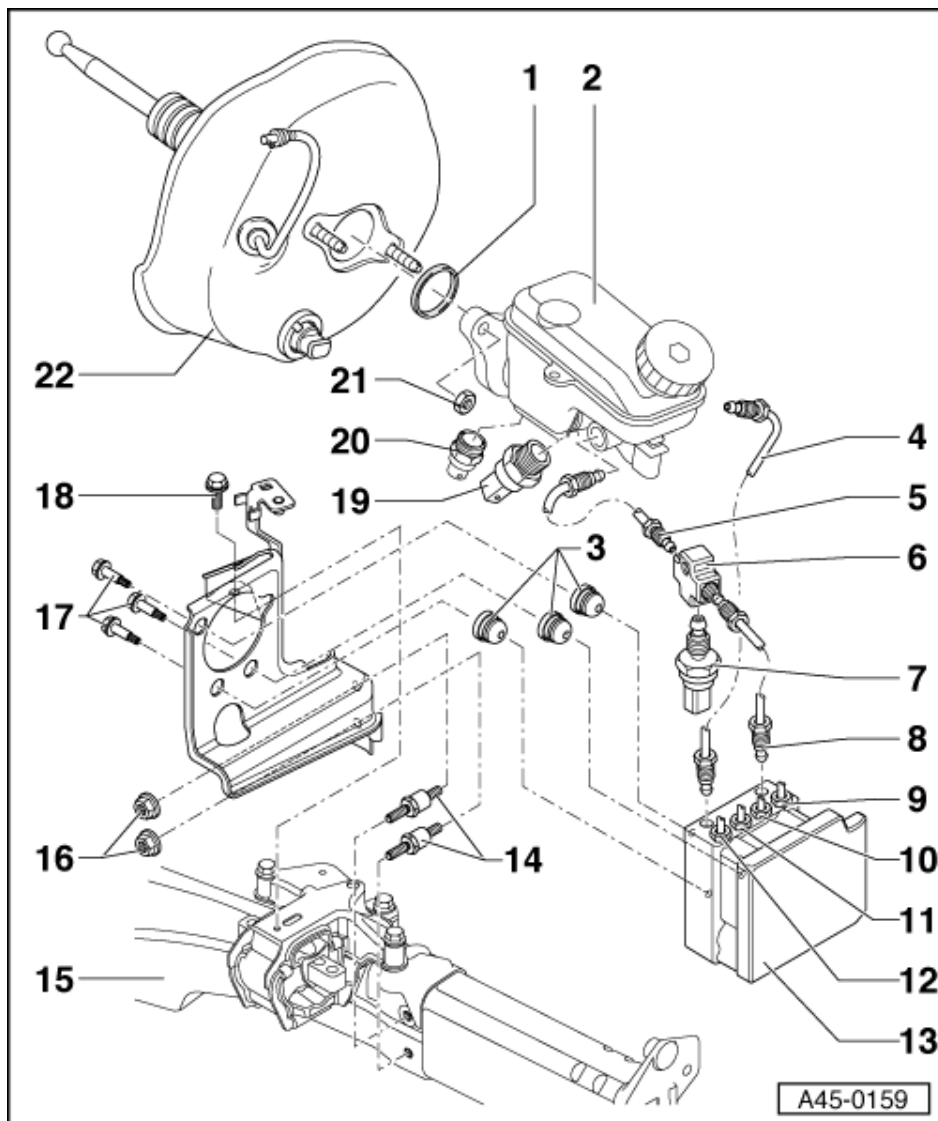
- ◆ Hydraulic unit to wheel cylinder/rear left brake caliper

12 Brake line connection

- ◆ Hydraulic unit to front right brake caliper
- ◆ Tightening torque: 12 Nm

13 ABS hydraulic unit with control unit

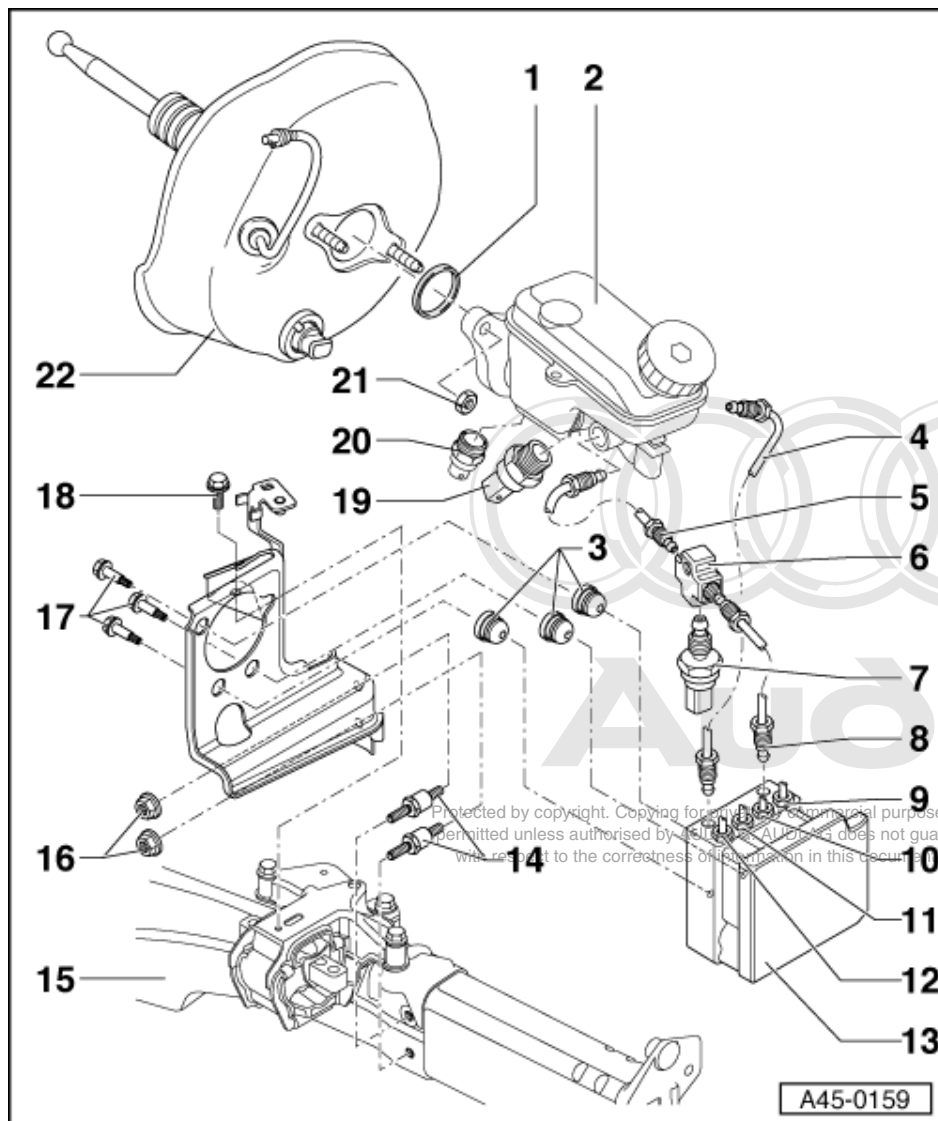
- ◆ Do not unplug control unit connector before self-diagnosis.
- ◆ Tightening torque: 12 Nm
- ◆ Removing and installing=>Page 28



- 14 Double bolt
- 15 Longitudinal member with assembly mounting
- 16 Hexagon bolt, 25 Nm
- 17 Fitted bolt, 8 Nm
- 18 Hexagon bolt, 10 Nm
- 19 Brake pressure sender -G201
 - ♦ Removing and installing=>Page 16
- 20 Brake pressure sender -G214
 - ♦ Removing and installing=>Page 16
- 21 Self-locking nut, 25 Nm



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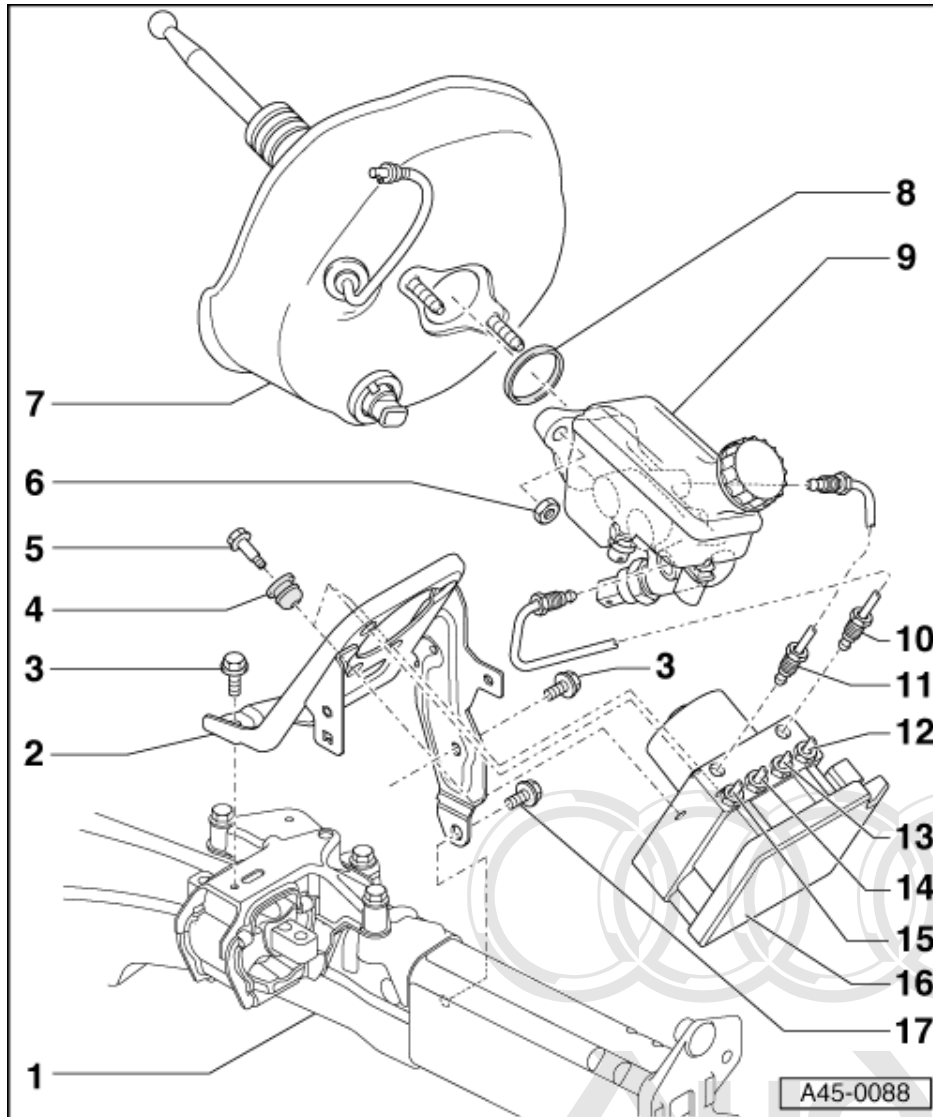


22 Brake servo

- ◆ The vacuum required is taken from the intake manifold.
- ◆ 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.
- ◆ Detach from brake pedal
=>Page 137 .
- ◆ Removing and installing => Page 173

4 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 1.4 petrol engine and 1.4 TDI engine

4.1 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 1.4 petrol engine and 1.4 TDI engine



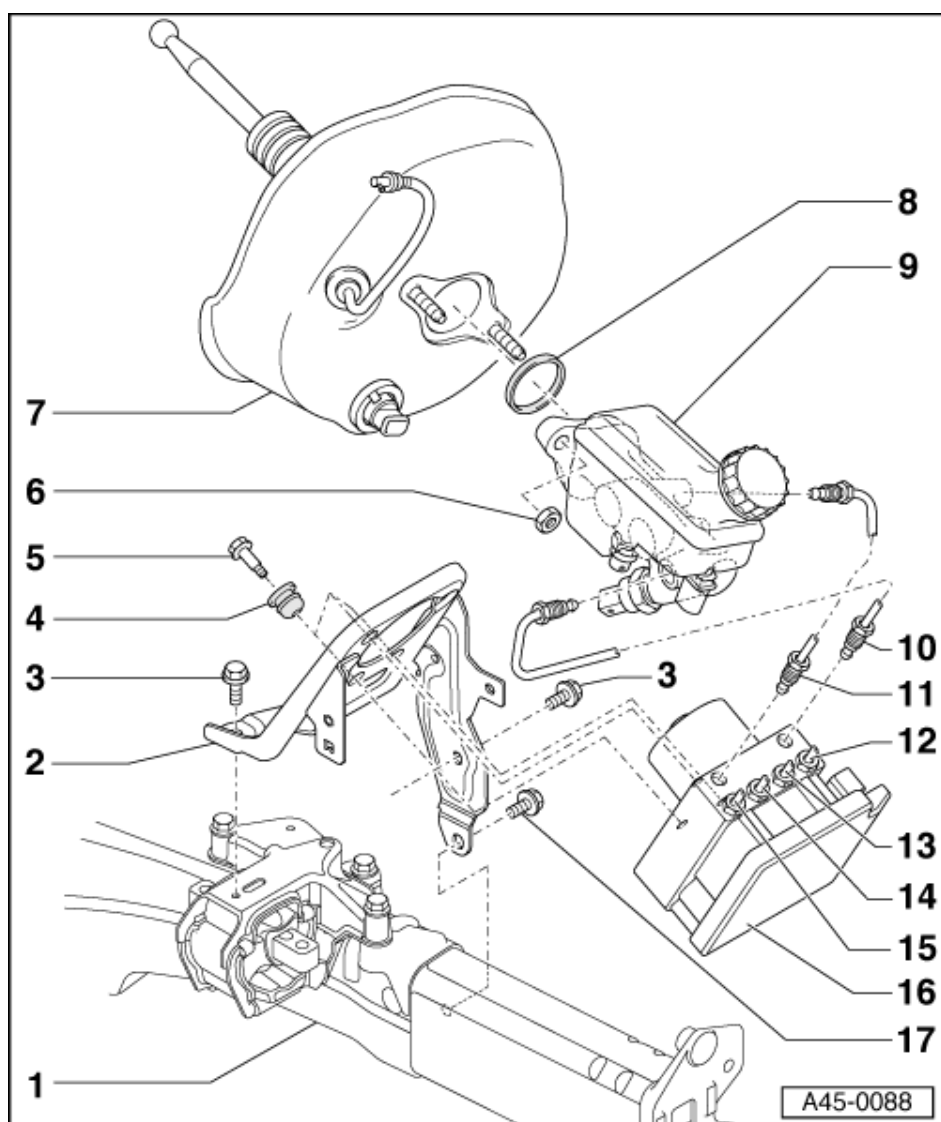
4.2 - ABS/EDL/TCS/ESP Mark 20 IE

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Note:

The complete brake master cylinder and brake servo can be replaced separately from each other.

- 1 Longitudinal member with assembly mounting
- 2 Bracket
- 3 Hexagon bolt, 25 Nm
- 4 Rubber mount
- 5 Fitted bolt, 8 Nm
- 6 Self-locking nut, 25 Nm



7 Brake servo

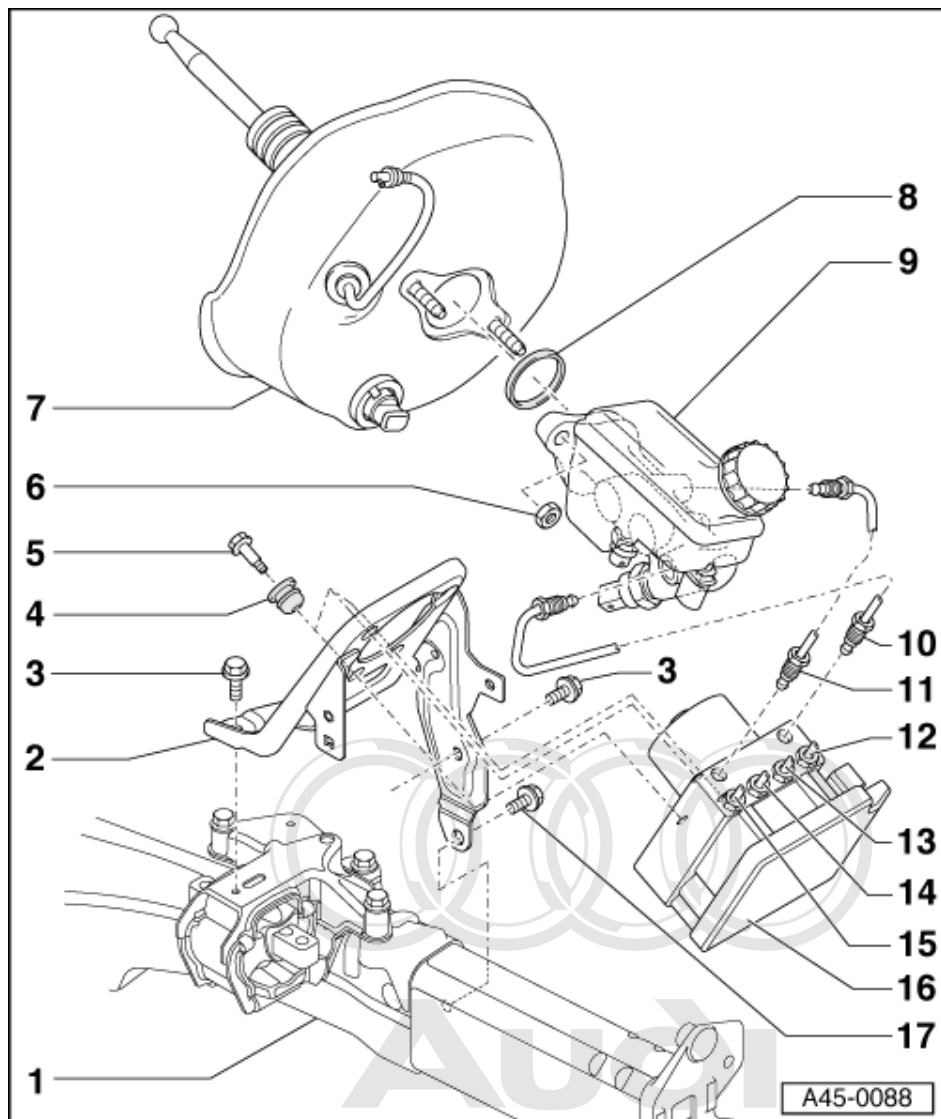
- ◆ The required vacuum is taken from the intake manifold.
- ◆ Functional test
 - With the engine switched off, firmly depress the brake pedal several times (this reduces the vacuum present in the servo unit).
 - Now depress brake pedal with moderate force, hold and start engine. If the servo unit is working properly, the pedal will be felt to give slightly when pressed (servo assistance becomes effective).
- ◆ If faulty renew complete.
- ◆ Detach from brake pedal
=>Page 137 .
- ◆ Removing and installing => Page 173



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- A45-0088



12 Brake line connection

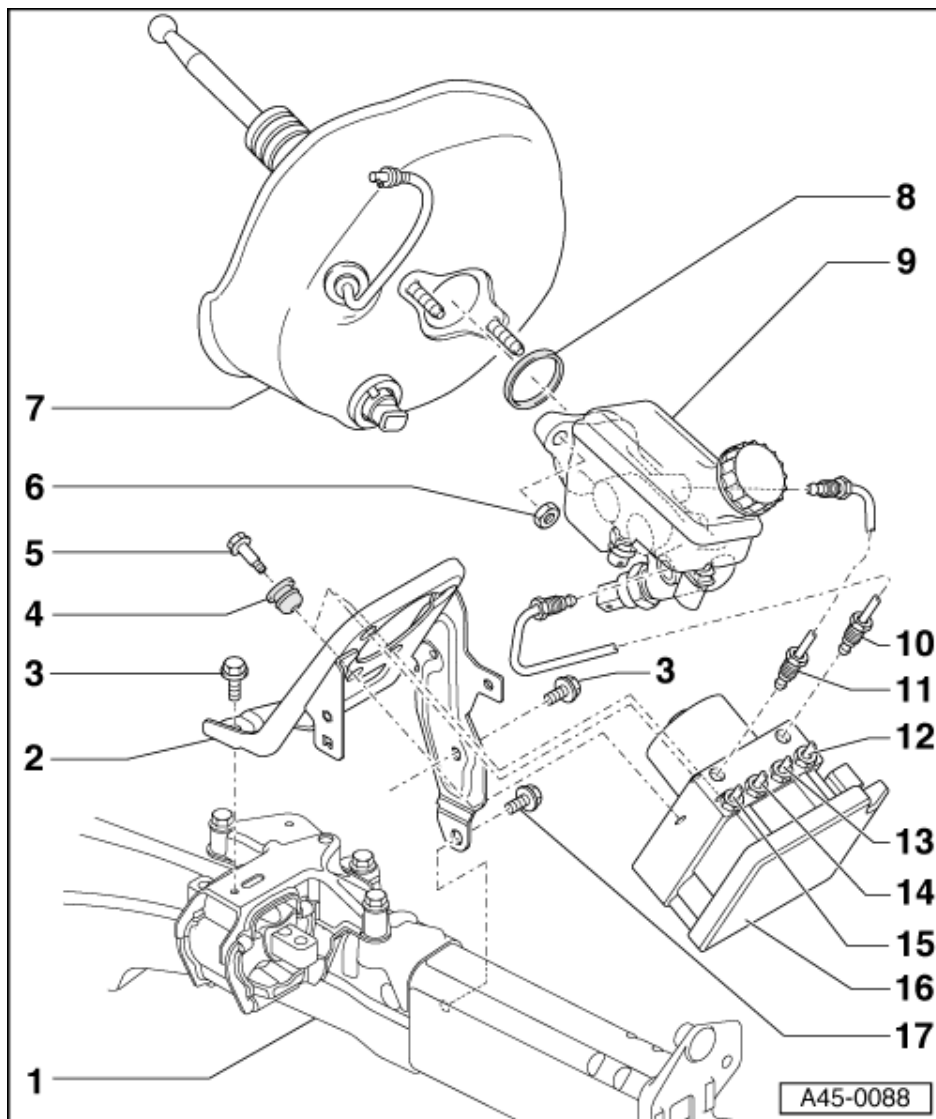
- ♦ Hydraulic unit to front left brake caliper
- ♦ Tightening torque: 12 Nm

13 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear right brake caliper
- ♦ Tightening torque: 12 Nm

14 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear left brake caliper
- ♦ Tightening torque: 12 Nm



15 Brake line connection

- ◆ Hydraulic unit to front right brake caliper
- ◆ Tightening torque: 12 Nm

16 ABS hydraulic unit with control unit

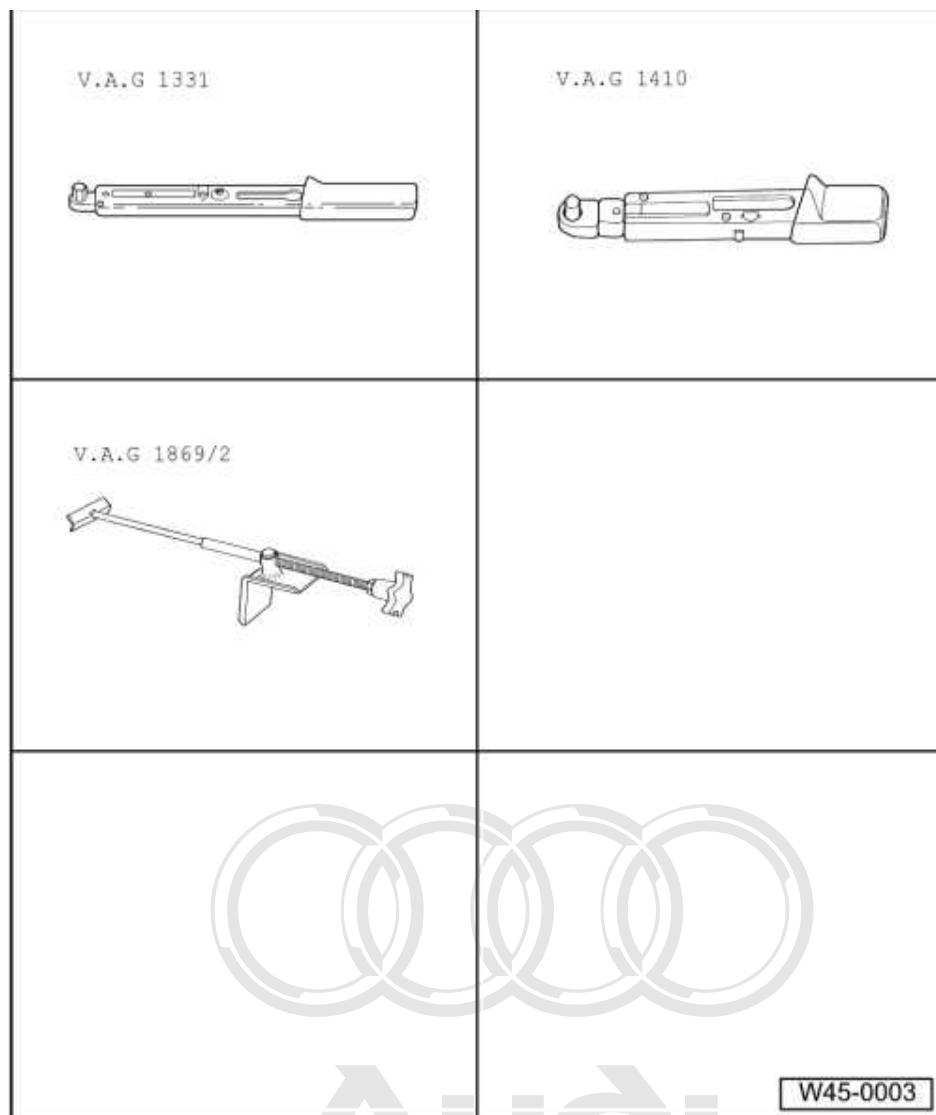
- ◆ Do not unplug connector for control unit before self-diagnosis.
- ◆ Removing and installing=>Page 28

17 Hexagon bolt, 25 Nm

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4.3 - Removing and installing control unit and hydraulic unit



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

Additionally required information

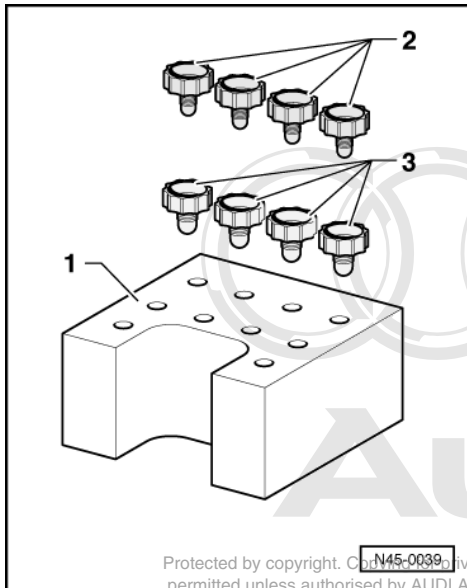
- ♦ Workshop Manual Audi A2 2001 ä Running Gear, Self-diagnosis for ESP; Steering

Fitting location:

The control unit is bolted to the hydraulic unit and is located at the left of the engine compartment.

Note:

The brake lines in the vicinity of the hydraulic unit must not be bent.



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-> Sealing plug, repair kit

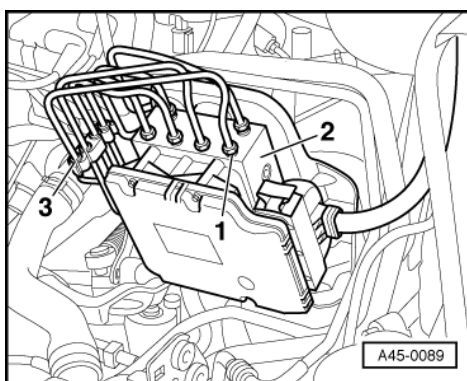
After detaching the control unit from the hydraulic unit, the transport protection for valve domes must always be fitted onto the hydraulic unit.

No warranty can be accepted for hydraulic units without transport protection for valve domes.

- 1 - Transport protection for valve domes (foam)
- 2 - Sealing plug, M10
- 3 - Sealing plug, M12

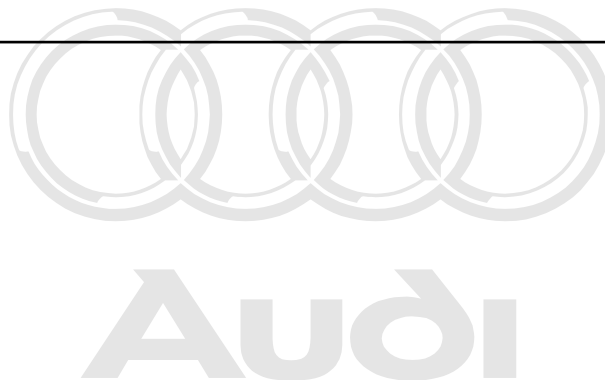
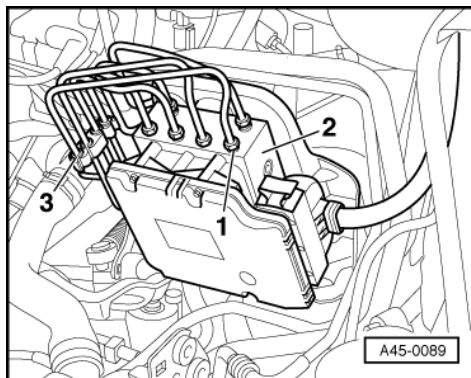
Removing

- Note radio code on vehicles with coded radio; if necessary request it.
- Disconnect battery.
- Fit brake pedal depressor V.A.G 1869/2
- Depress brake pedal using brake pedal depressor.



- -> Open bracket -3- and unclip brake line.
- Lay out plenty of lint-free cloths under the control unit and the hydraulic unit.

Note:
 The brake lines in the vicinity of the hydraulic unit must not be bent.



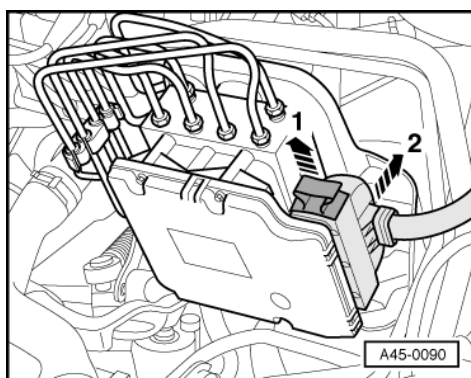
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Note:

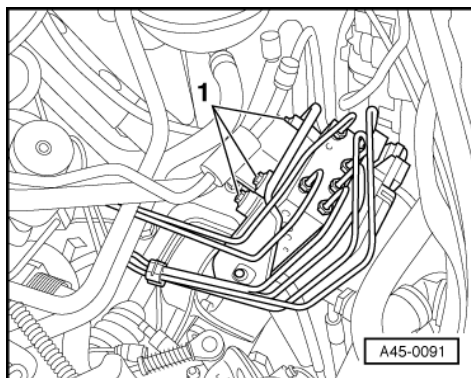
Fuel system is pressurised. Place a lint-free cloth around the connection point before opening the system. Then release pressure by carefully loosening the connection.

- -> Disconnect brake lines from hydraulic unit -1- and seal brake lines and threaded holes with plugs from repair kit, Part No. 1H0 698 311 A.

Ensure that no brake fluid spills onto the contacts.

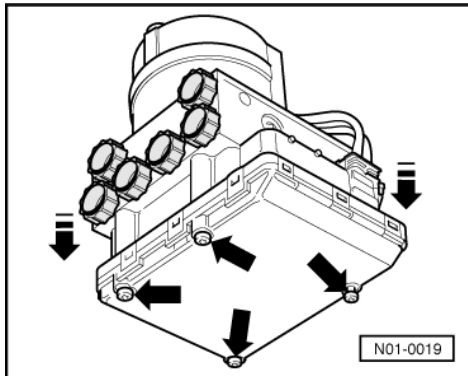


- -> Release connector from control unit (arrow -1-) and unplug it (arrow -2-).

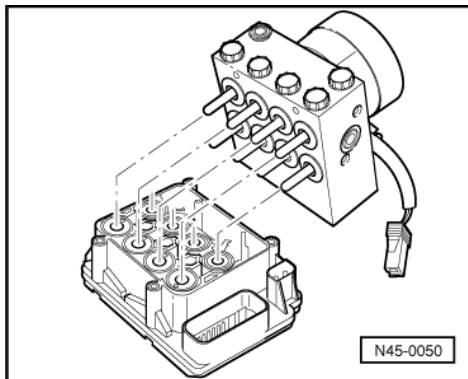


- -> Remove bolts from bracket for hydraulic unit -1-.
- Carefully remove hydraulic unit with control unit.

Detaching control unit from hydraulic unit



- Unplug hydraulic pump motor connector from control unit.
- -> Remove 5 external Torx bolts -arrows- from control unit and detach control unit.



-> When detaching the control unit, ensure that the valve domes of the hydraulic unit are not misaligned by the control unit solenoids.

Cover control unit solenoids with a lint-free cloth.

After separating the control unit from the hydraulic unit, use the transportation protection for the valve domes.

Installing

- ◆ Only remove sealing plugs on the new hydraulic unit when the relevant brake line is being fitted.
- ◆ If the sealing plugs are removed too early, brake fluid can escape, it can then no longer be guaranteed that the unit is sufficiently filled or adequately bled.

When attaching the control unit to the hydraulic unit, ensure that the valve domes of the hydraulic unit are not misaligned by the control unit solenoids.

- Attach the control unit to hydraulic unit using new bolts. Observe tightening torque, max 4 Nm.

Do not fully tighten bolts. Connection of the various brake lines to the hydraulic unit is facilitated thereby.

- The remaining installation steps are carried out in the reverse sequence.
- Bleeding brake system => Page 165
- Enter radio code.
- Encode the control unit

=> Running Gear Self-diagnosis for ESP, Steering; Repair group 01; Performing self-diagnosis; Encoding control unit Performing self-diagnosis Encoding control unit

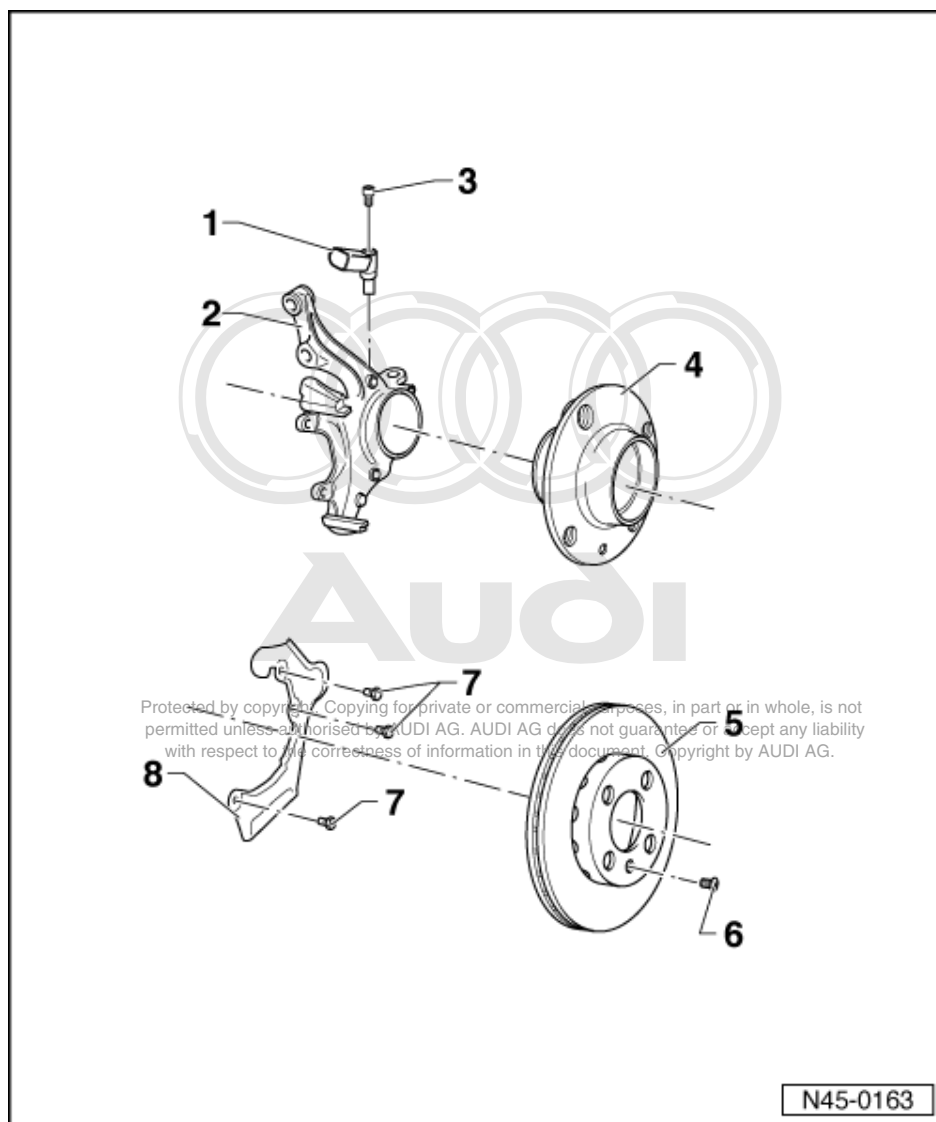
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Tightening torques:

Control unit to hydraulic unit	max. 4 Nm
Hexagon bolt for hydraulic unit to bracket	8 Nm
Brake lines to ABS assembly:	
M 10 x 1 thread	12 Nm
M 12 x 1 thread	12 Nm

5 - Removing and installing components of ABS system on front and rear axle

5.1 - Removing and installing components of ABS system on front and rear axle



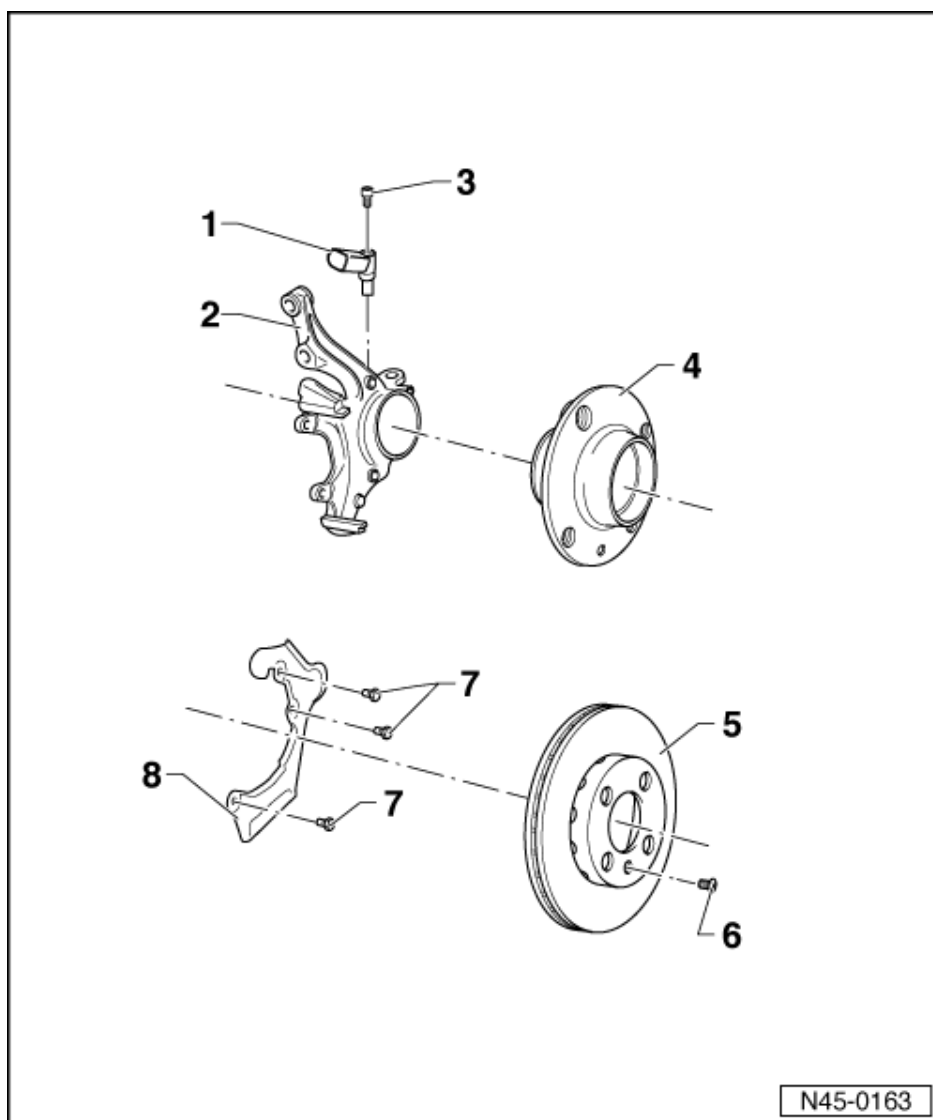
5.2 - Removing and installing components of ABS system on front axle

1 ABS speed sensor

- ◆ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.

2 Wheel bearing housing**3 Hexagon socket head bolt,**

10 Nm



4 Wheel hub with wheel bearing

- ♦ The ABS sensor ring is installed in the wheel hub
- ♦ Removing and installing

=> Running Gear, FWD; Repair group 40; Servicing front suspension Servicing front suspension

5 Internally ventilated brake disc

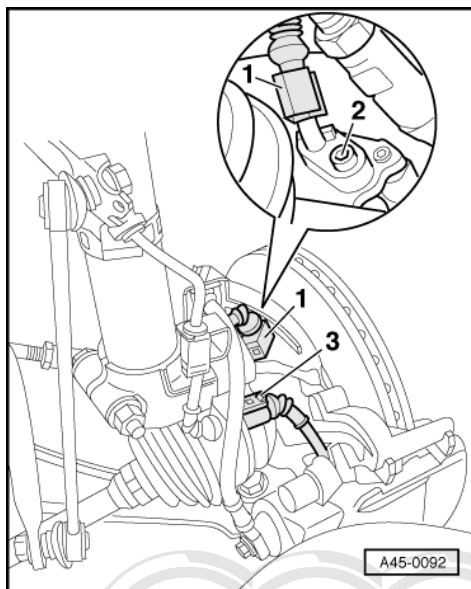
6 Cross-head screw, 4 Nm

7 Hexagon bolt, 10 Nm

8 Cover plate

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5.3 - Removing and installing speed sensor on front axle



Removing

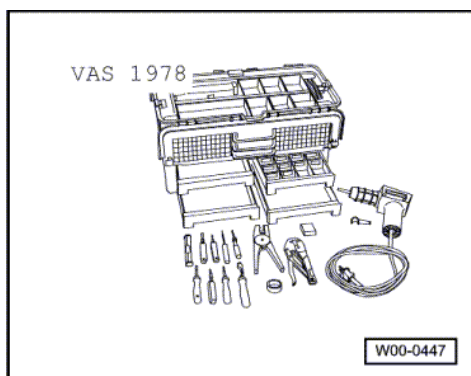
- Raise vehicle.
- -> Remove connector -1- from speed sensor line and speed sensor.
- Unscrew bolt -2- from wheel bearing housing.
- Remove ABS speed sensor from wheel bearing housing.

Installing

- Before inserting sensor, clean inside of hole and coat everywhere with solid lubricant paste G 000 650.
- Insert speed sensor into hole of wheel bearing housing and tighten bolt to 8 Nm.
- Connect the speed sensor to the speed sensor wire.
- Turn steering to full left lock and full right lock and check clearance of speed sensor wire.

Removing and installing front speed sensor wiring

Special tools and workshop equipment required

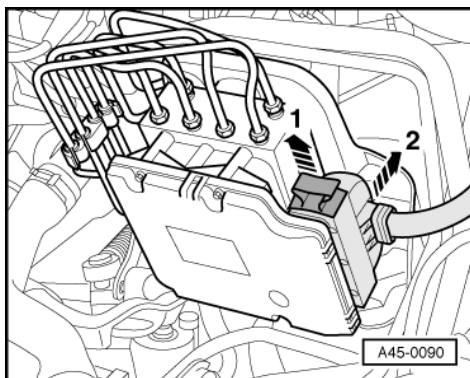


- ♦ VAS 1978 wiring harness repair kit

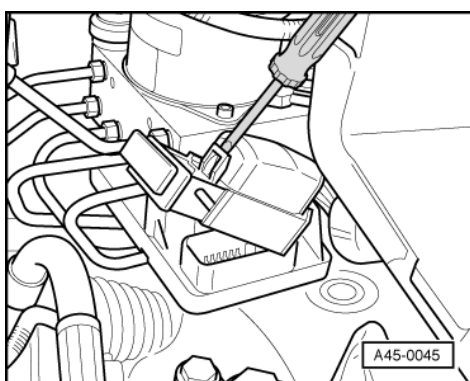
Removing

- Observe or obtain radio code on vehicles with coded radio.

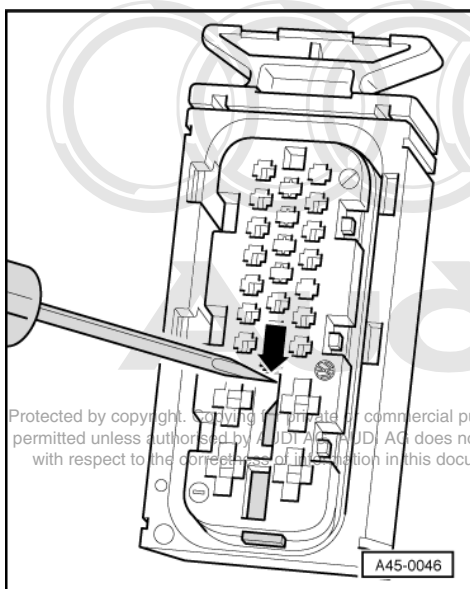
- Disconnect battery.



- -> Release connector from control unit (arrow -1-) and unplug it (arrow -2-).

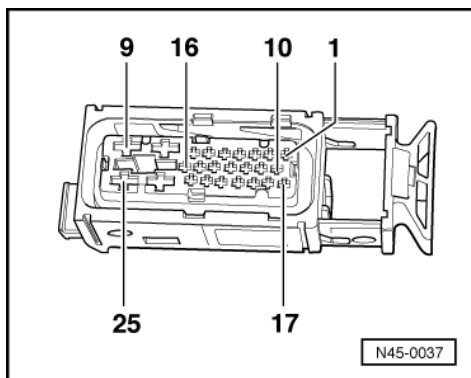


- -> Loosen cap on multi-pin connector with a screwdriver and remove.



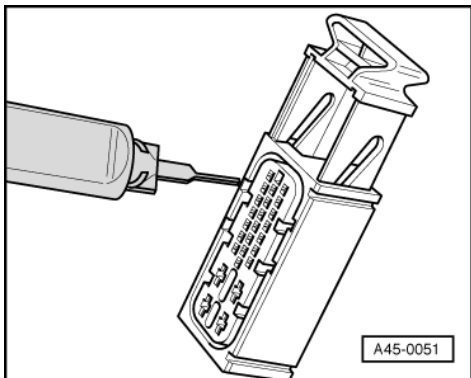
- -> Release secondary catch (violet) in direction of arrow using a small screwdriver.

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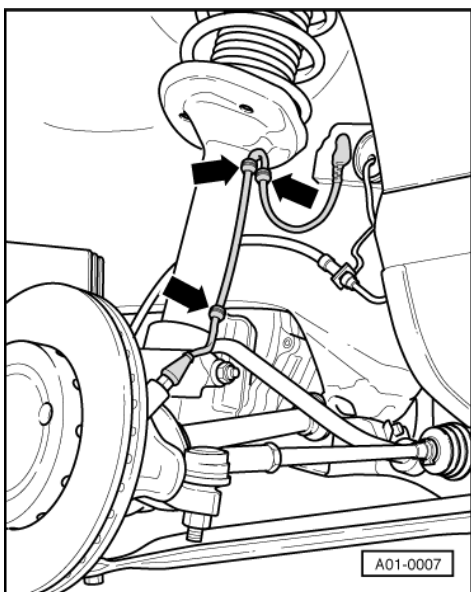


-> Contact assignment of connector T25, wiring harness/control unit -J104

Contact	Wiring to component...
19 + 20	Front right speed sensor -G45
1 + 2	Front left speed sensor -G47

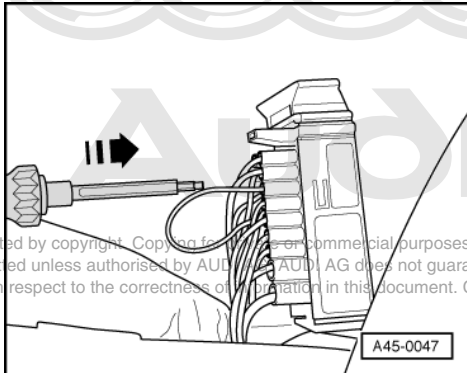


- -> Remove the relevant contacts using a suitable extractor from wiring harness repair kit VAS 1978.
- Unplug connector from speed sensor wire and speed sensor.
- Remove defective wiring for wheel speed sensor and install new wheel speed sensor wire.
- Connect the speed sensor to the speed sensor wire.



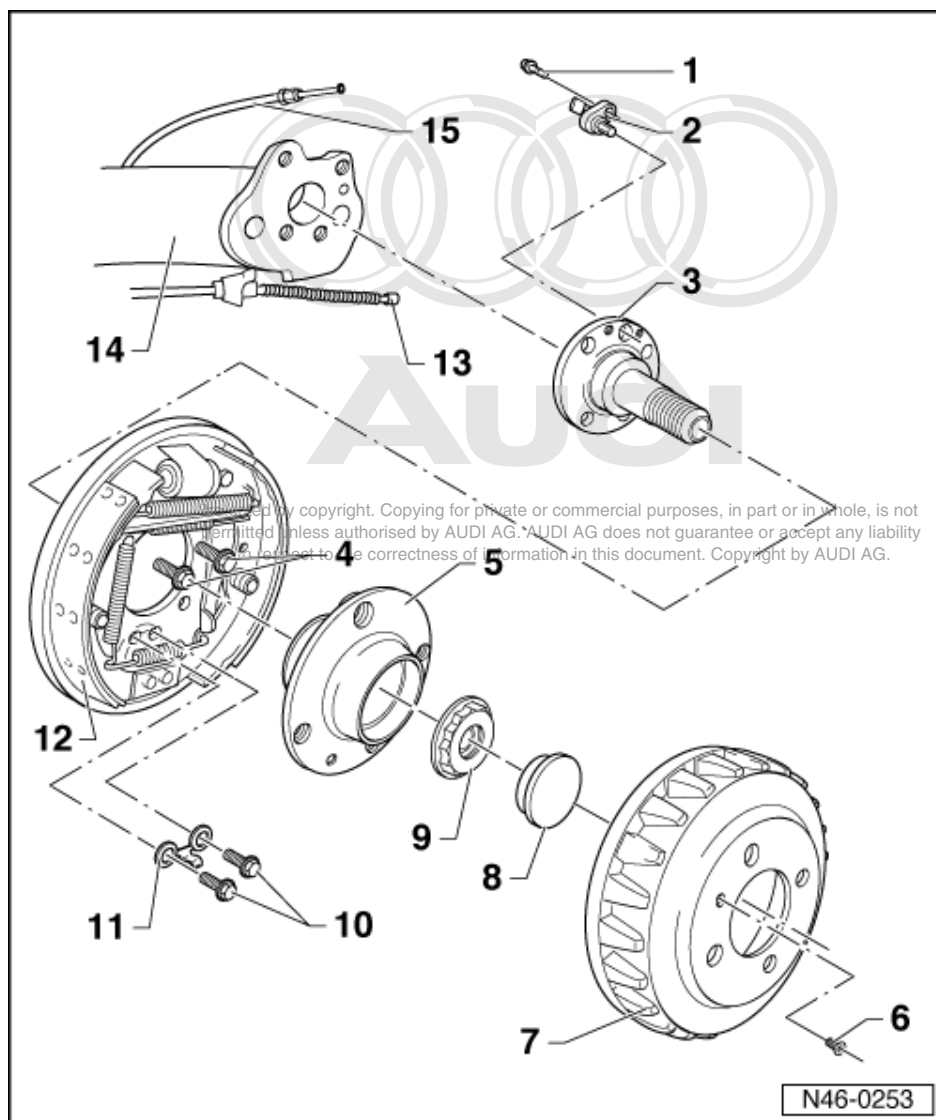
- -> Clip in speed sensor wire -arrow-.

When installing the wheel speed sensor wire, ensure it is not twisted in the wheel housing.



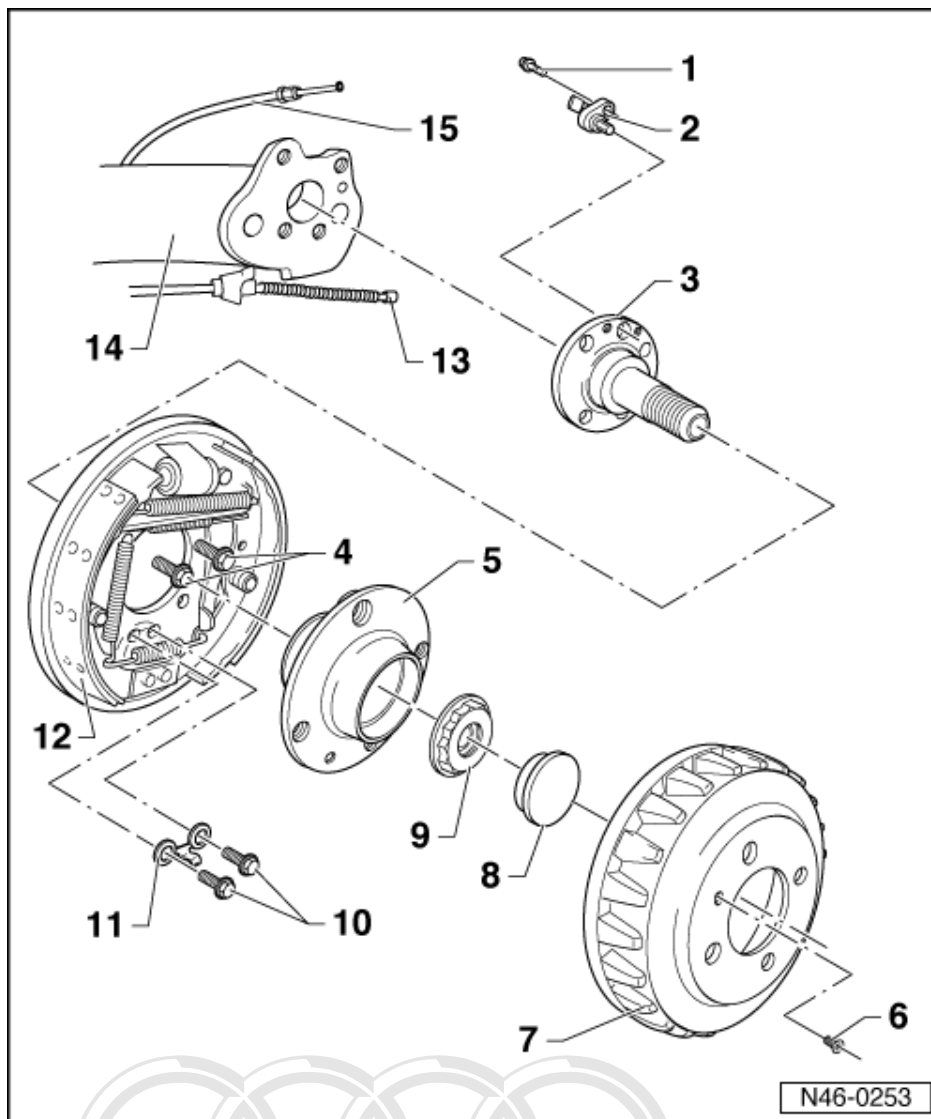
- -> Insert the contact into the connector housing.
- Push in the individual wiring seals to the stop using an installing tool from VAS 1978.
- Secure the contacts with the secondary catch, and fit cap of multi-pin connector.

5.4 - Removing and installing components of ABS system on rear axle, drum brake



- 1 Hexagon socket head bolt,
8 Nm
- 2 ABS speed sensor
 - ♦ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.
- 3 Stub axle
- 4 Hexagon bolt, 60 Nm
 - ♦ With dished washer
- 5 Wheel hub with wheel bearing
 - ♦ The ABS sensor ring is installed in the wheel hub
 - ♦ Removing and installing

=> Running Gear, FWD; Repair group 42; Servicing rear suspension Servicing rear suspension

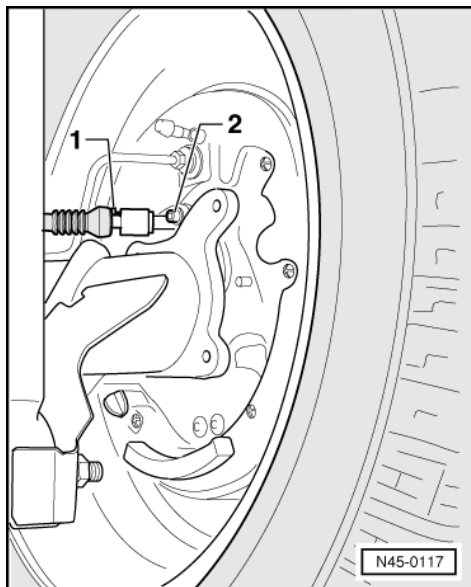


- 6 Cross-head screw, 4 Nm
 7 Brake drum
 8 Cap
 9 Double hexagon nut, self-locking, 175 Nm
 ♦ Renew each time after removing
 10 Hexagon bolt, 60 Nm
 ♦ With dished washer
 11 Bracket
 ♦ For handbrake cable
 12 Brake carrier with brake shoes
 13 Handbrake cable
 ♦ Adjusting handbrake=>Page 108
 14 Axle beam
 15 Brake pipe

5.5 - Removing and installing speed sensor on rear axle

Removing

- Raise vehicle.



- -> Remove connector -1- from speed sensor line and speed sensor.
- Unscrew bolt -2- from stub axle.
- Remove ABS speed sensor from stub axle.

Installing

- Before inserting sensor, clean inside of hole and coat everywhere with solid lubricant paste G 000 650.
- Insert speed sensor into hole on stub axle and tighten bolt to 8 Nm.
- Connect the speed sensor to the speed sensor wire.

Checking rotor on rear axle, removing and installing if necessary

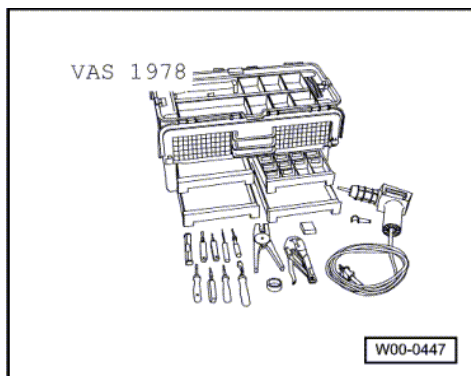
- Raise vehicle.
- Remove wheel.
- Remove brake drum.
- Remove speed sensor from wheel bearing housing.
- Inspect rotor for signs of damage or dirt.
- If the rotor is damaged, remove and replace the wheel hub with rotor.

=> Running Gear, FWD; Repair group 42; Servicing rear suspension Servicing rear suspension

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Removing and installing rear speed sensor wiring

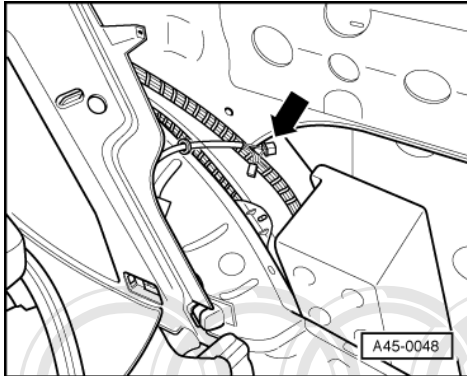
Special tools and workshop equipment required



- ♦ VAS 1978 wiring harness repair kit

Removing

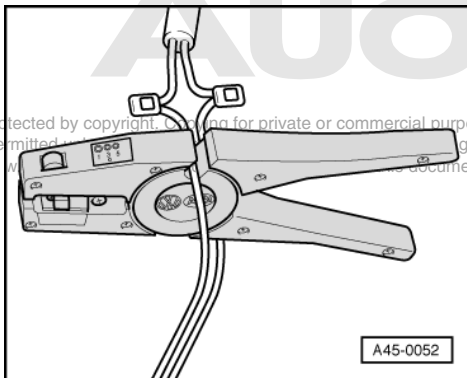
- Observe or obtain radio code on vehicles with coded radio.
- Disconnect battery.



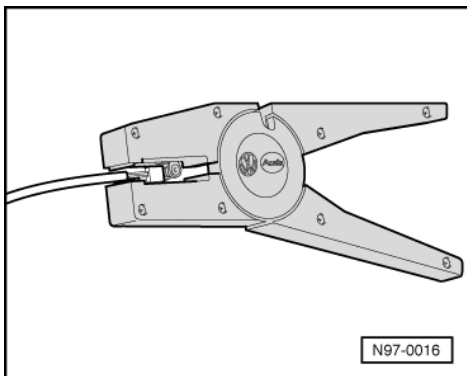
- Unplug connector from speed sensor wire and speed sensor.
- Remove rear side trim => Booklet: General Body Assembly, Interior

=> Repair group 70; Trims/Insulation; Removing and installing rear side trim.

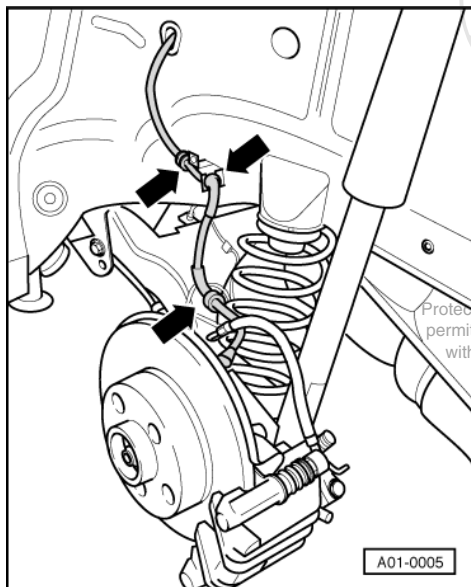
- -> Detach insulation -arrow- from the welded joint.



- -> Disconnect speed sensor wire upstream of welded joint using stripping pliers from VAS 1978 and remove defective length of wire.



- -> Use stripping pliers to strip end of wire over a length of 15 mm and fold stripped wire in half.



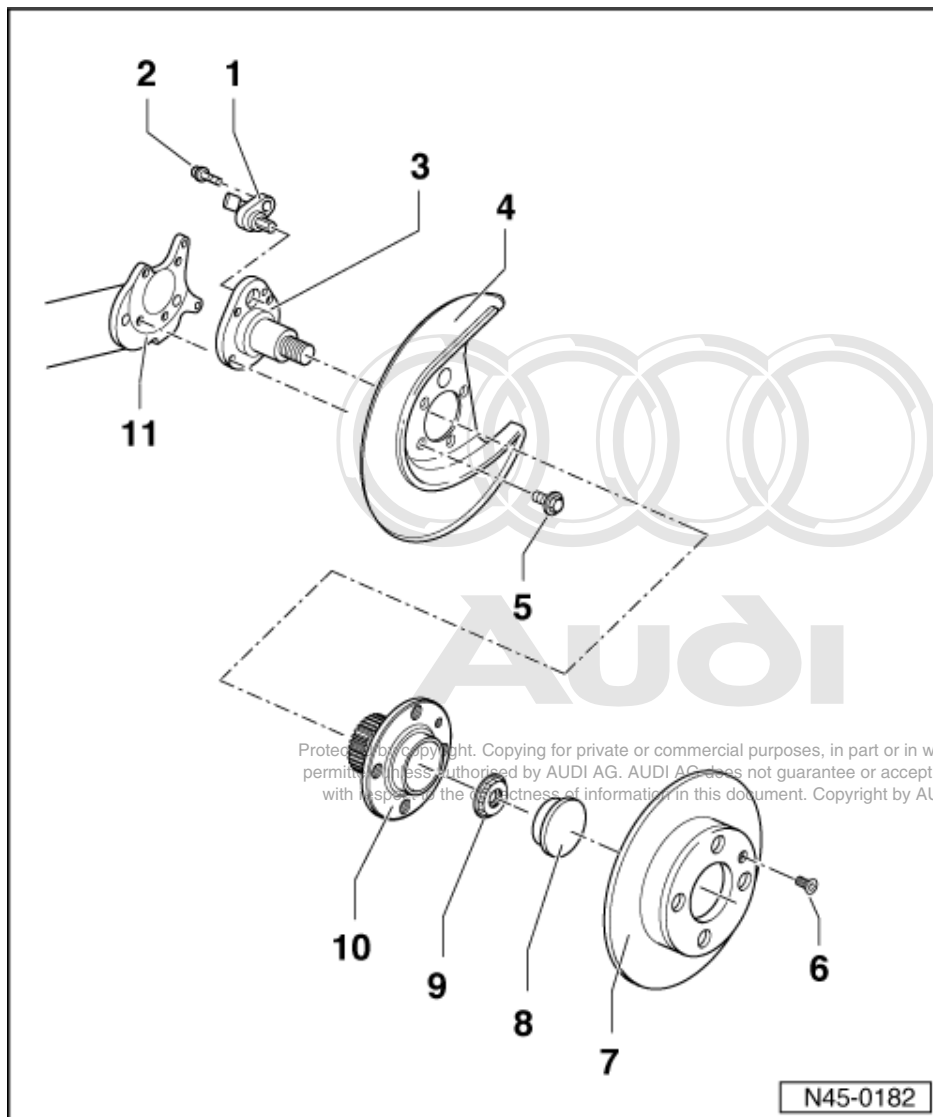
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- Insert new speed sensor wire
- -> Clip in speed sensor wire -arrow-.

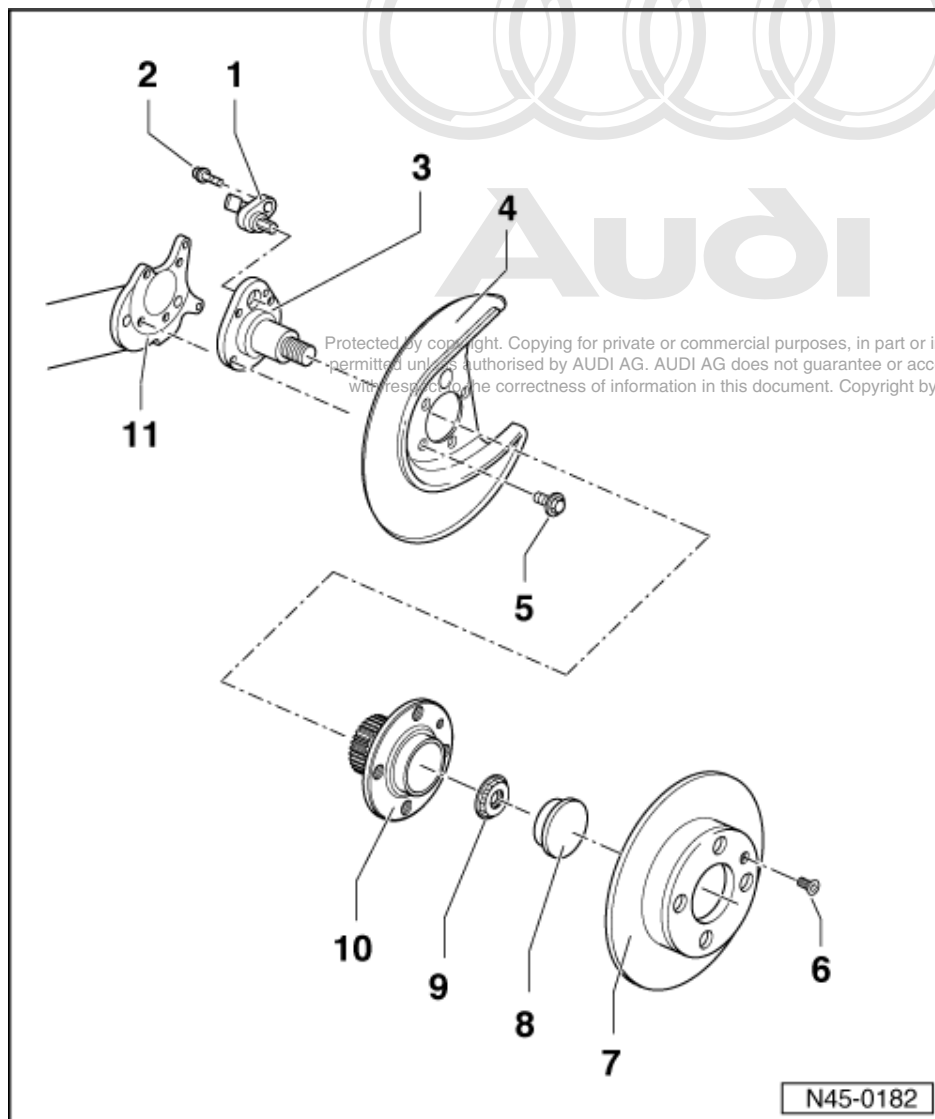
When installing the wheel speed sensor wire, ensure it is not twisted in the wheel housing.

- Connect wiring to wheel speed sensor.
- If present, detach two-pin connector at new speed sensor wire using stripping pliers.
- Use stripping pliers to strip end of wire over a length of 15 mm and fold stripped wire in half.
- Connect the speed sensor wire using a suitable crimp connector from wiring harness repair kit VAS 1978.

5.6 - Removing and installing components of ABS system on rear axle, disk brakes



- 1 **ABS speed sensor**
 - ♦ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.
- 2 **Hexagon socket-head bolt**
8 Nm
- 3 **Stub axle**
- 4 **Cover plate**
- 5 **Hexagon bolt, 60 Nm**
 - ♦ With dished washer
- 6 **Cross-head screw, 4 Nm**



7 Brake disc

- ◆ Thickness 9 mm
- ◆ Wear limit 7 mm
- ◆ When worn, always renew both sides
- ◆ Installation sequence for run-in brake disc
 - Brake caliper
 - Brake pads
 - Brake carrier

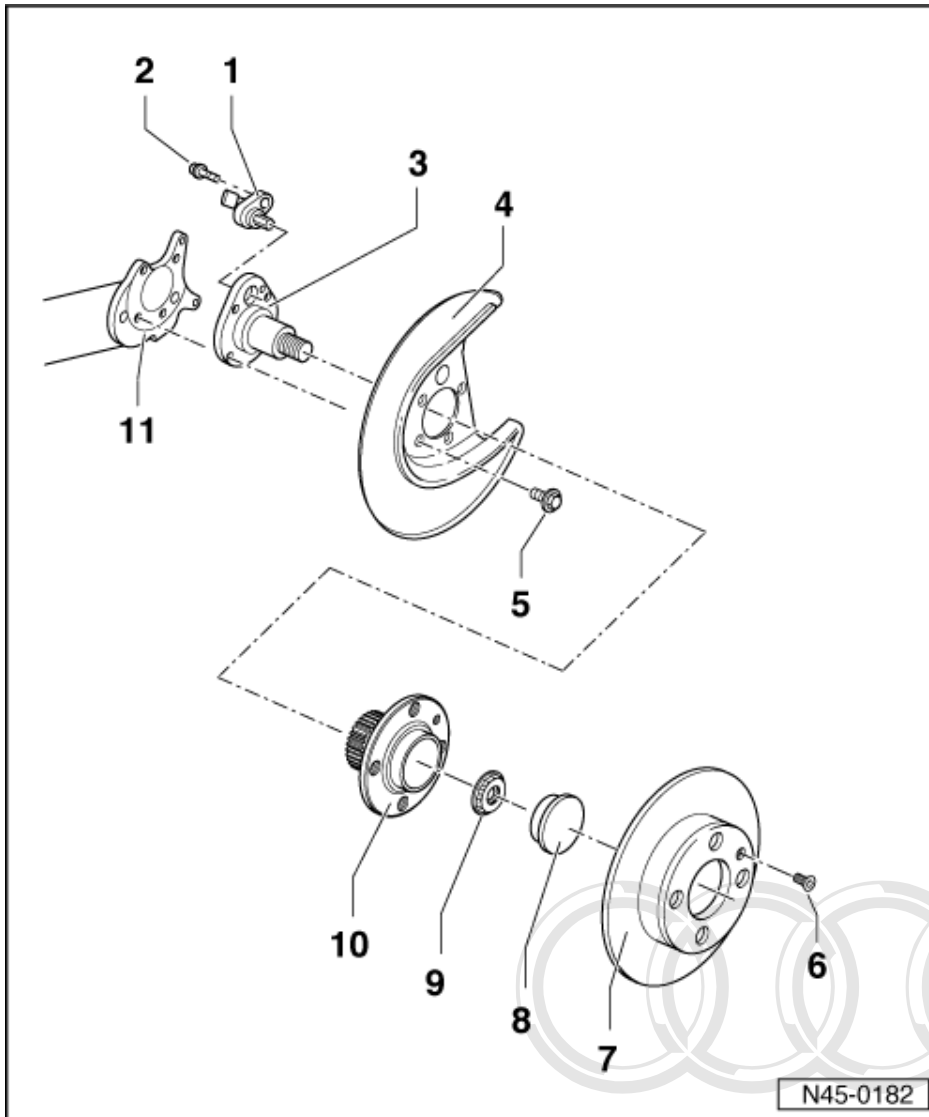
8 Cap

- ◆ Removing and installing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes

9 Double hexagon nut, self-locking, 175 Nm

- ◆ Renew each time after removing



10 Wheel hub with wheel bearing and rotor

- ◆ Replace only as complete unit
- ◆ Removing and installing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes

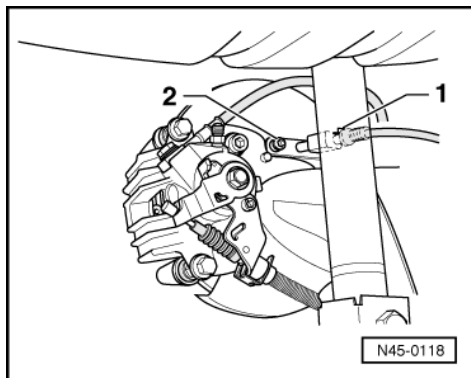
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11 Axle beam

Removing and installing speed sensor on rear axle

Removing

- Raise vehicle.



- -> Remove connector -1- from speed sensor line and speed sensor.
- Unscrew bolt -2- from stub axle.
- Remove ABS speed sensor from stub axle.

Installing

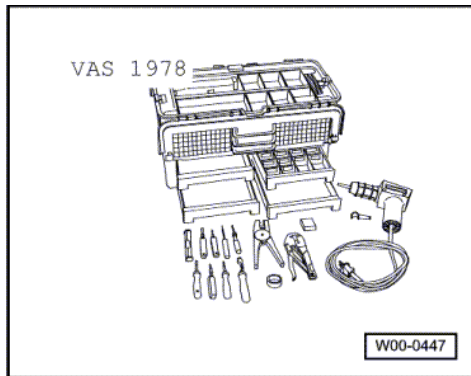
- Before inserting sensor, clean inside of hole and coat everywhere with solid lubricant paste G 000 650.
- Insert speed sensor into hole on stub axle and tighten bolt to 8 Nm.
- Connect the speed sensor to the speed sensor wire.

Checking rotor on rear axle, removing and installing if necessary

- Raise vehicle.
- Remove wheel.
- Remove the bolt for the ABS speed sensor from the stub axle.
- Remove ABS speed sensor from stub axle.
- Inspect rotor for signs of damage or dirt.
- If the rotor is damaged, remove and replace the wheel hub with rotor.

=> Running Gear, FWD; Repair group 42; Servicing wheel bearing Servicing wheel bearing

Removing and installing rear speed sensor wiring

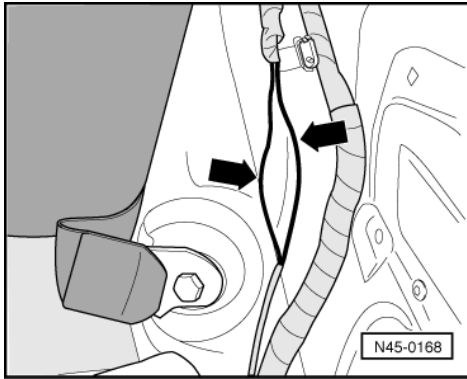


Special tools and workshop equipment required

- ♦ VAS 1978 wiring harness repair kit

Removing

- Observe or obtain radio code on vehicles with coded radio.
- Disconnect battery.
- Remove wheel housing liner.
- Unplug connector from speed sensor wire and speed sensor.
- Remove rear side trim

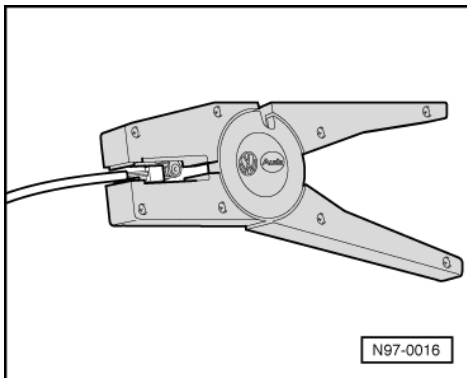


=> General Body Assembly, Interior; Repair group 70; Pillars and side trims; Removing and installing rear side trim. Pillars and side trims Removing and installing rear side trim.

- Remove rear storage compartment.

=> General Body Assembly, Interior; Repair group 70; Pillars and side trims; Removing and installing rear storage compartment. Pillars and side trims Removing and installing rear storage compartment.

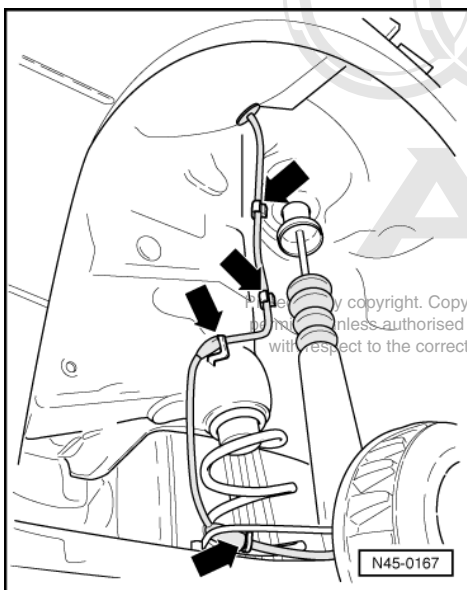
- -> Disconnect speed sensor wire -arrows- using stripping pliers from VAS 1978 and remove defective length of wire.



- -> Use stripping pliers to strip end of wire over a length of 15 mm and fold stripped wire in half.

Installing

- Insert new speed sensor wire
- Connect the speed sensor to the speed sensor wire.





- -> Clip in speed sensor wire -arrow-.

When installing the speed sensor wire, make sure it is not twisted in the wheel housing.

- If present, detach two-pin connector at new speed sensor wire using stripping pliers.
- Use stripping pliers to strip end of wire over a length of 15 mm and fold stripped wire in half.
- Connect the speed sensor wire using a suitable crimp connector from wiring harness repair kit VAS 1978.

- Install rear storage compartment.

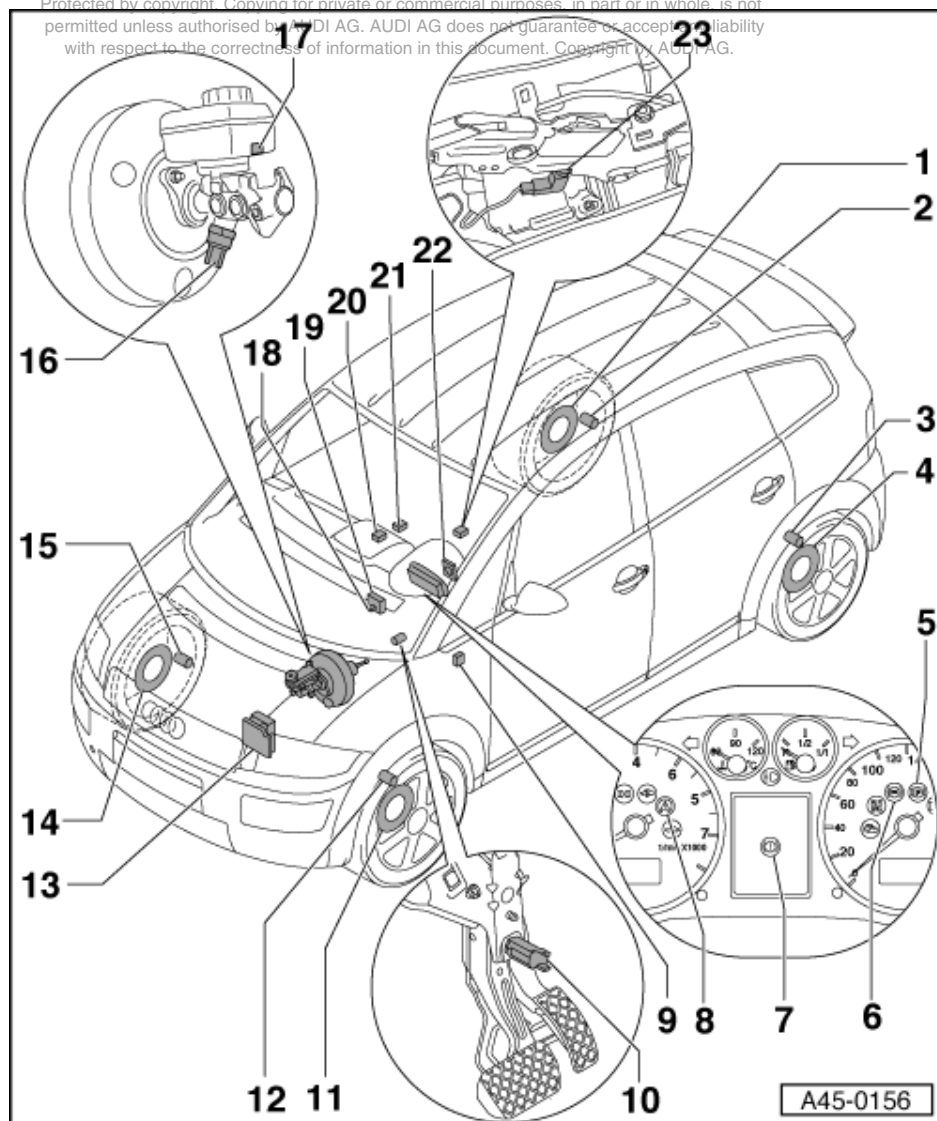
=> General Body Assembly, Interior; Repair group 70; Pillars and side trims; Removing and installing rear storage compartment. Pillars and side trims Removing and installing rear storage compartment.

- Install rear side trim.
- Install the wheel housing liner.

6 - Component overview, ABS/ESP Mark 60

6.1 - Component overview, ABS/ESP Mark 60

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- 1 Rotor for speed sensor, rear right
 - ♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42;

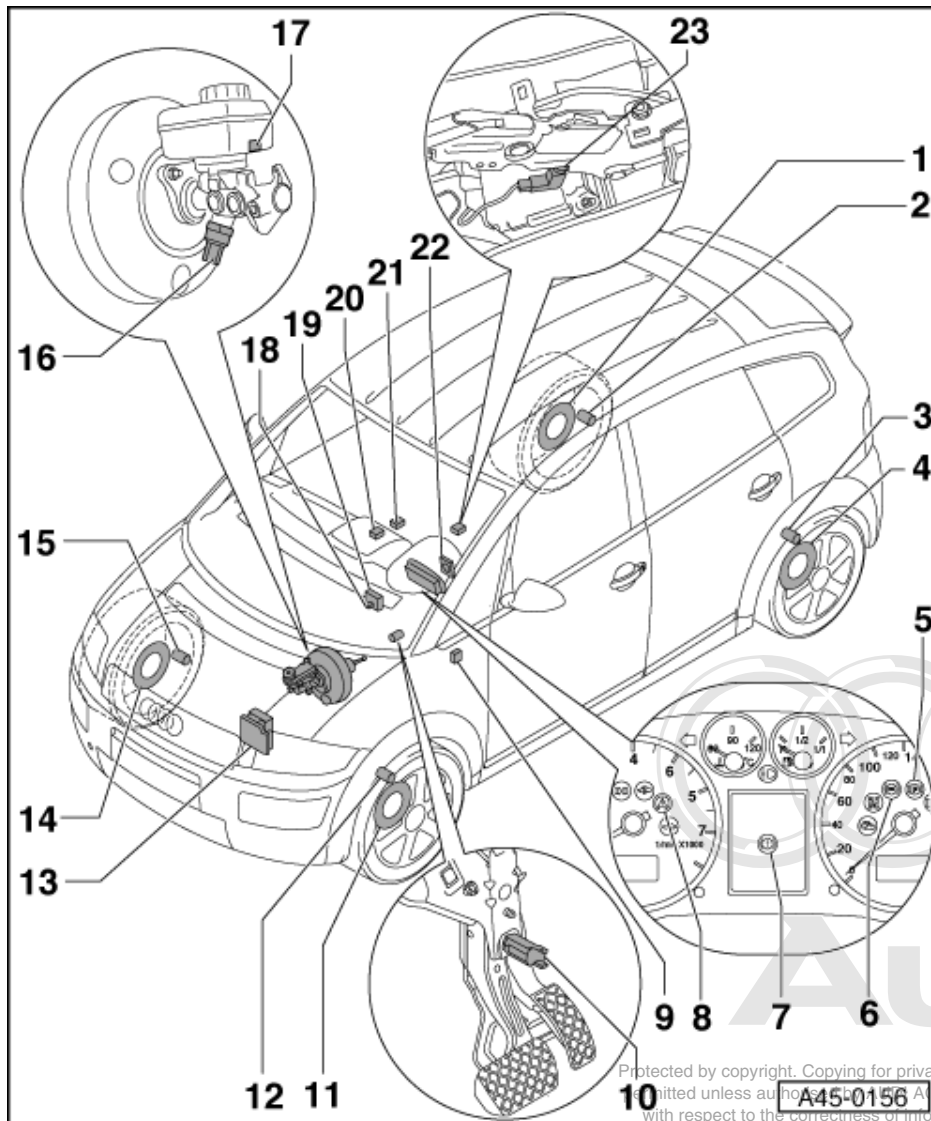
- 2 Rear right speed sensor -G44
 - ♦ Removing and installing=>Page 40

- 3 Rear left speed sensor -G46
 - ♦ Removing and installing=>Page 40

- 4 Rotor for speed sensor, rear left
 - ♦ Rotor is welded to wheel hub. Removing and installing

=> Running Gear, FWD; Repair group 42;

- 5 Handbrake warning lamp -K14
 - ♦ Fitting location: in dash panel insert



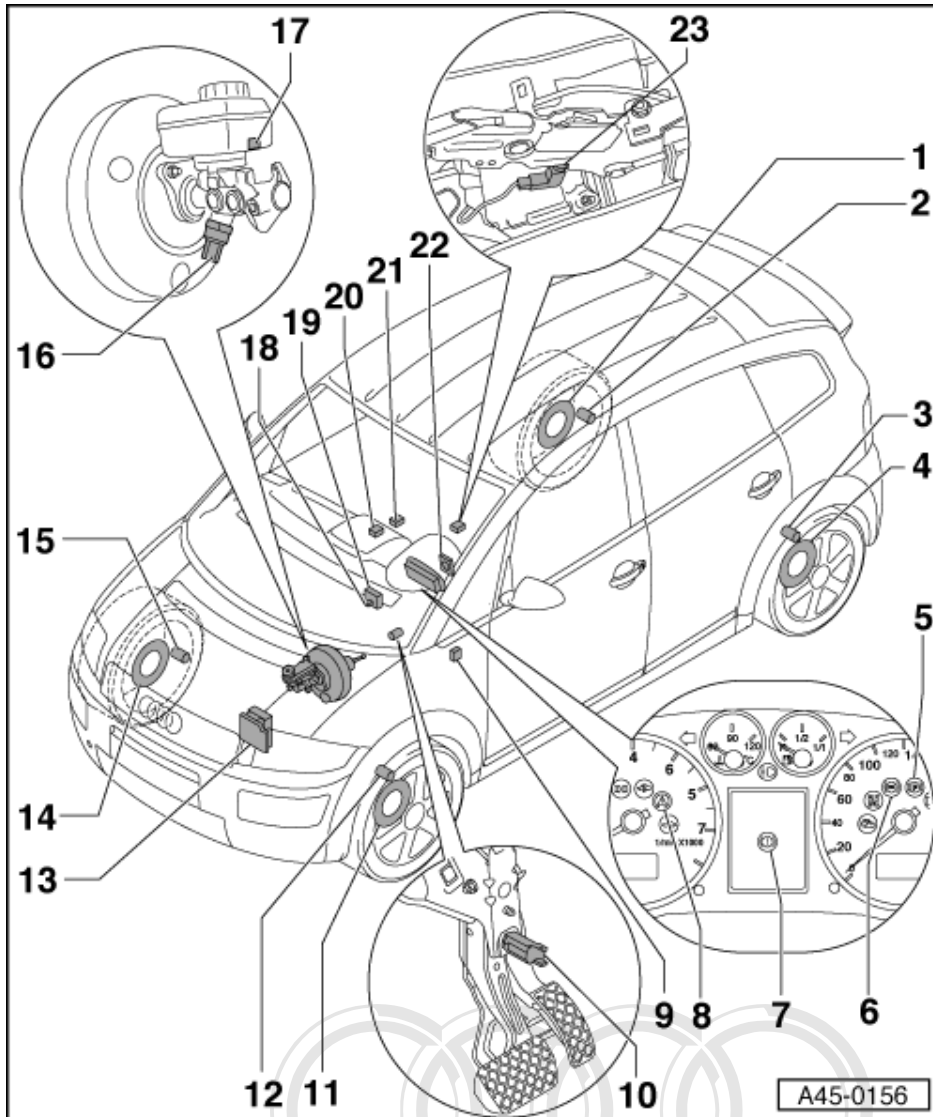
- 6 ABS warning lamp -K47
 - ♦ Fitting location: in dash panel insert
- 7 Brake warning symbol -K118
 - ♦ Fitting location: in the dash panel insert in the driver information system
- 8 TCS/ESP warning lamp -K86
 - ♦ Fitting location: in dash panel insert

9 Relay J508 for brake light suppression

- ♦ Fitting location: on fuse box

10 Brake light switch -F

- ♦ The brake light switch is open in the rest position;
- Removing and installing the brake light switch =>Page 60



11 Rotor for speed sensor, front left

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

=> Running Gear, FWD; Repair group 40;

12 Front left speed sensor -G47

- ♦ Removing and installing=>Page 34

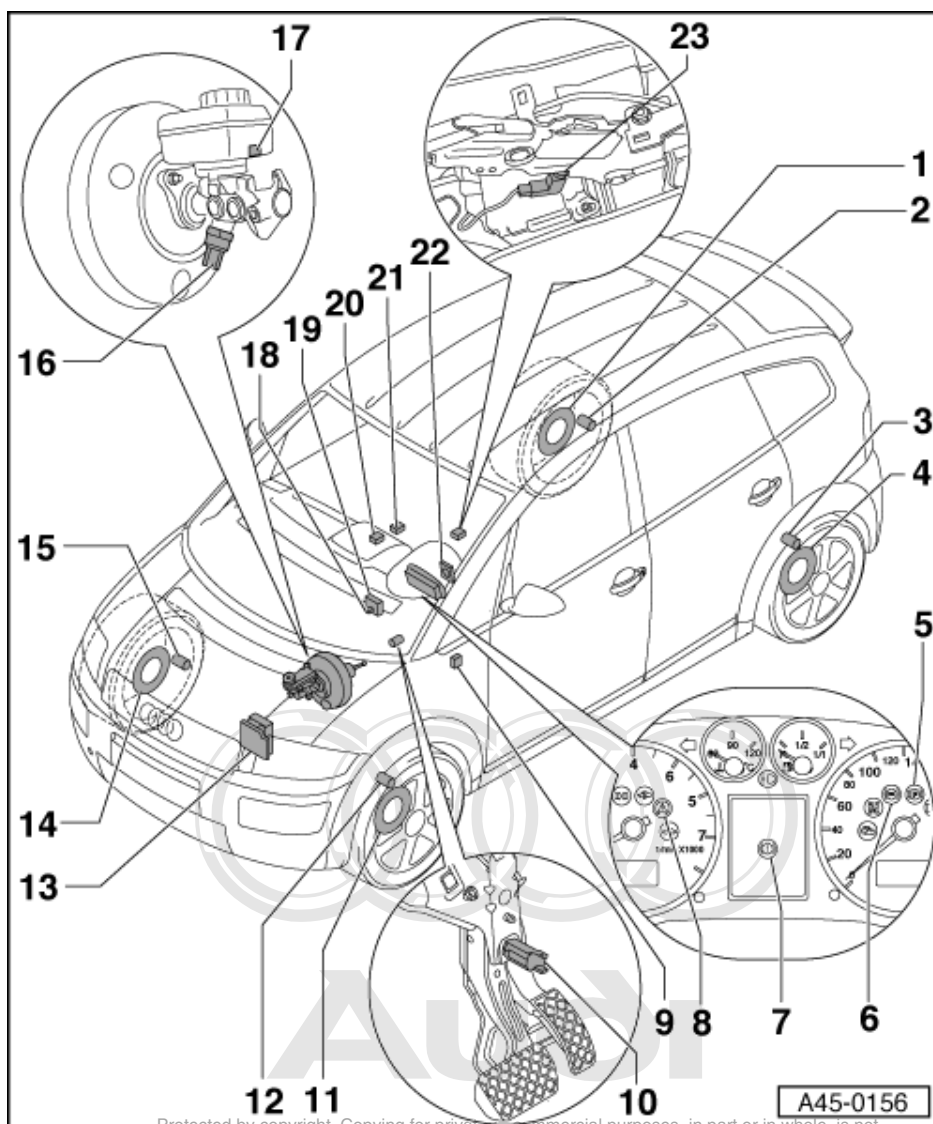
13 Hydraulic control unit -N55 with control unit -J104

- ♦ The hydraulic pump -V64, the hydraulic unit -N55 and the control unit -J104 form the hydraulic control unit.
- ♦ Removing and installing=>Page 74

14 Rotor for speed sensor, front right

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

=> Running Gear, FWD; Repair group 40;



15 Front right speed sensor -G45

- ♦ Removing and installing=>Page 34

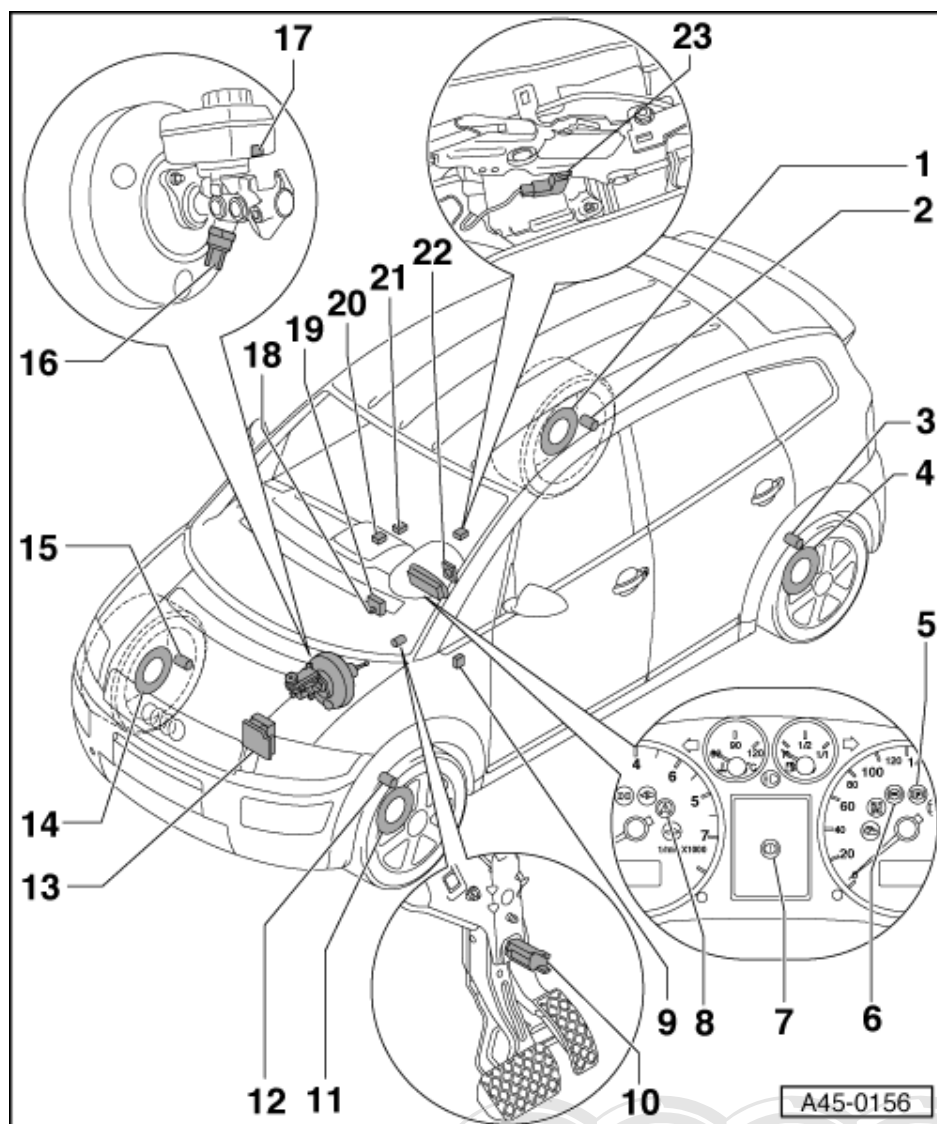
16 Sender G201 for brake pressure -1-

- ♦ Removing and installing=>Page 59

17 Warning contact for brake fluid level F34

18 Lateral acceleration sender -G200

- ♦ Removing and installing=>Page 53
- ♦ Integrated in the ESP sensor unit -G419 from approx. 09.01 => Fig. 1



19 Yaw rate sender G202

- ♦ Removing and installing=>Page 53
- ♦ Integrated in the ESP sensor unit -G419 from approx. 09.01 => Fig. 1

20 Switch for TCS/ESP E256

- ♦ Fitting location: on the centre console

21 Switch for TCS/ESP E256

- ♦ From approx. 09.01 => Fig. 1
- ♦ Removing and installing=>Page 56

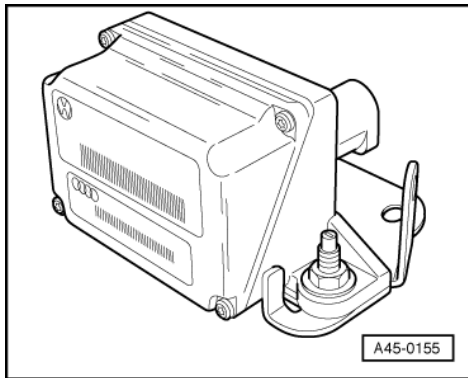
22 Steering angle sender G85

- ♦ Removing and installing=>Page 57

23 Handbrake warning switch F9

- ♦ Fitting location: on the handbrake lever assembly

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→ Fig.1 ESP sensor unit -G419 from approx. 09.01

The ESP sensor unit comprises the following senders:

- ◆ Lateral acceleration sender -G200
- ◆ Yaw rate sender -G202

7 - Removing and installing components of the ABS/ESP system, ITT Mark 60

7.1 - Removing and installing components of the ABS/ESP system, ITT Mark 60

Note:

The ESP road test serves to check the plausibility of the signals from sender -1- for brake pressure -G201, sender -2- for brake pressure -G214 as well as the sender for lateral acceleration -G200 and the sender for yaw rate -G202. The latter three senders are integrated in the ESP sensor unit from approx. 09.01.

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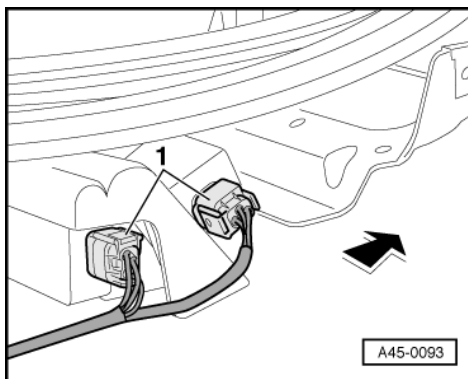
7.2 - Removing and installing lateral acceleration sender -G200 and yaw rate sender -G202 up to approx. 08.01

The removal and installation of the yaw rate and lateral acceleration senders is identical except for the actual replacement of the senders.

Removing

- Note radio code on vehicles with coded radio; if necessary request it.
- Removing driver's storage compartment.

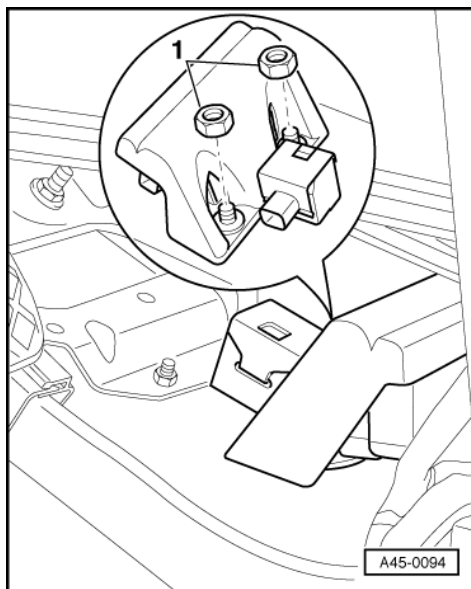
=> General Body Assembly, Interior; Repair group 68; Shelves/trim covers Shelves/trim covers



Fitting location: In front tunnel area

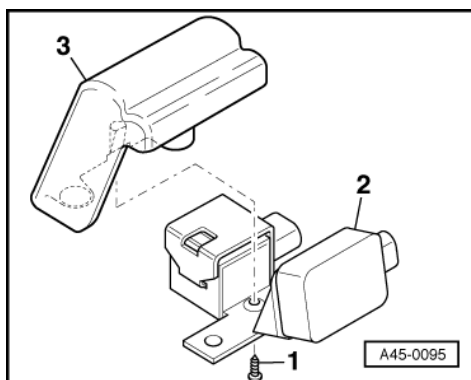
- -> Unplug connector -1- from sensors.

The -arrow- in the illustration points in direction of travel.

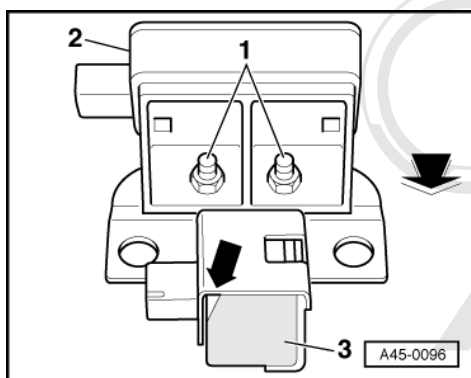


- -> Unscrew hexagon nuts -1- and remove sensors.

Removal of yaw rate sender



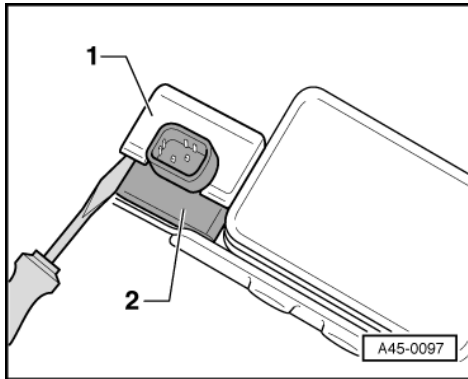
- -> Remove cross-head screw -1- with cover -3- from sender -2-.



- -> Unscrew nuts -1- from yaw rate sender -2-.

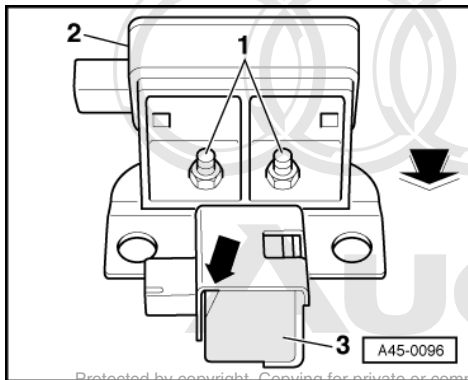
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- Remove yaw rate sender.



Removal of lateral acceleration sender

- -> With a screwdriver lever off holder -1- from lateral acceleration sender. -2-.
- Remove lateral acceleration sender.



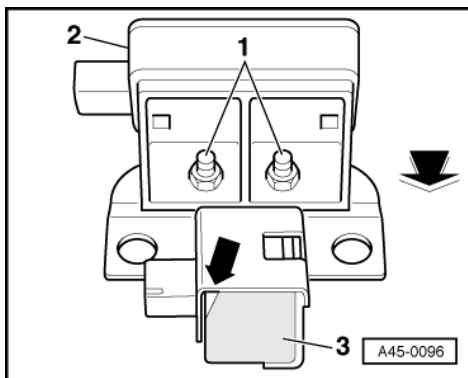
Installing

Installation of yaw rate sender

- Install yaw rate sender and align straight ahead.
- -> Fasten nuts -1- at yaw rate sender (bracket) -2-.

Installation of lateral acceleration sender

- Insert lateral acceleration sender in holder.



- -> Installation position: The slanted side -arrow- of lateral acceleration sender -3- must face to the right in the direction of travel.

The -arrow- in the illustration points in direction of travel.

- Push holder over lateral acceleration sender until it engages.

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

- Enter radio code.

Tightening torque:

Yaw rate sender to bracket 9 Nm

Yaw rate sender and lateral acceleration sender 7 Nm
with retainer to tunnel (body)

7.3 - Removing and installing ESP sensor unit -G419

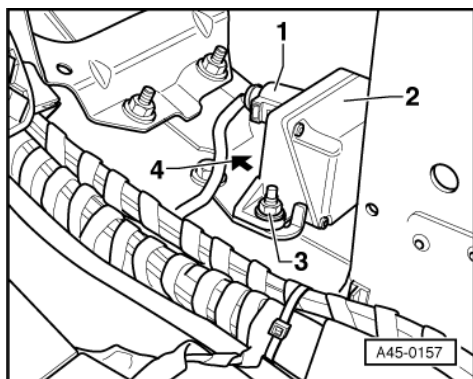
Removing

- Note radio code on vehicles with coded radio; if necessary request it.
- Removing driver's storage compartment.

=> General Body Assembly, Interior; Repair group 68; Shelves/trim covers Shelves/trim covers

Fitting location: In front tunnel area

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- -> Unscrew bolts -3-.
- Remove ESP sensor unit -2- upwards out of the bracket.
- Detach connector -1-.

Notes:

- ♦ The ESP sensor unit is sensitive to impact.
- ♦ If the ESP sensor unit has been dropped, it may not work properly. The sensor unit must no longer be used.

Installing

Installation is carried out in the reverse order; note the following:

- Initiate basic setting for the senders of the ESP sensor unit.

=> Running Gear Self-diagnosis; Repair group 01

- Carry out ESP road test.

=> Running Gear Self-diagnosis; Repair group 01

Tightening torque

Component	Nm
ESP sensor unit to bracket	20

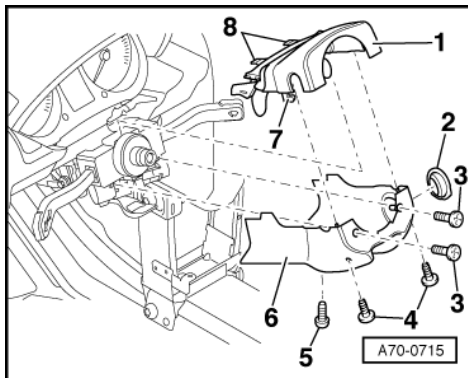
7.4 - Removing and installing steering angle sensor -G85

- Remove airbag unit and steering wheel

=> Running Gear, Front-wheel Drive; 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.

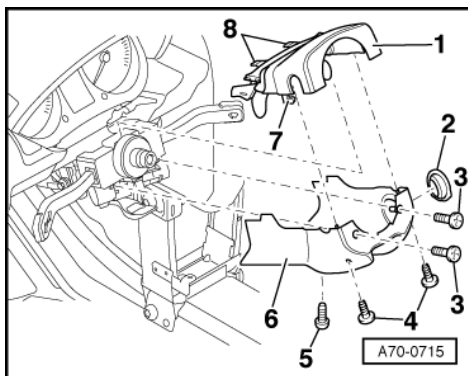
Removing trims at steering column switch



Driver airbag unit and steering wheel removed.

- Pull steering column out and tilt downwards as far as possible.
- -> Unscrew bolt -4- (2x).
- Tightening torque 0.6 Nm.
- Remove upper steering column switch trim -1- upwards and unclip at clips -8- rearwards.

When installing, insert upper shell hooks -7- into lower shell, swivel downwards and screw in place.

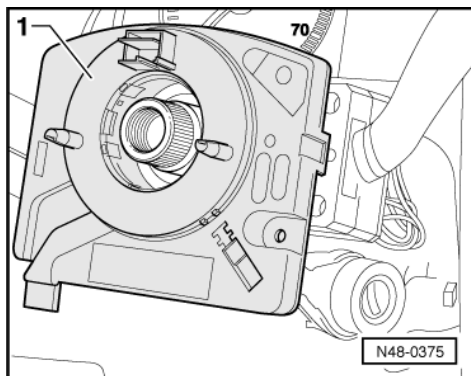


- -> Unscrew bolt -3- (2x).
- Tightening torque 4.5 Nm.
- Remove hexagon socket head bolt -5-.
- Tightening torque 5 Nm.
- Open steering wheel adjustment release lever.

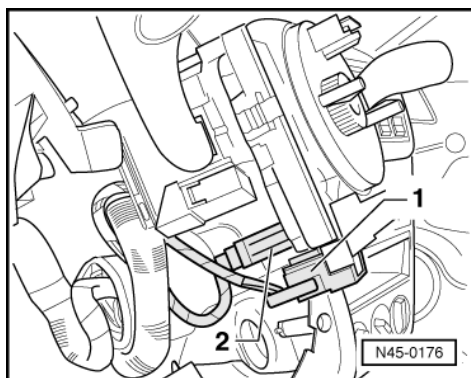
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- Remove lower trim for steering column switch -6-.

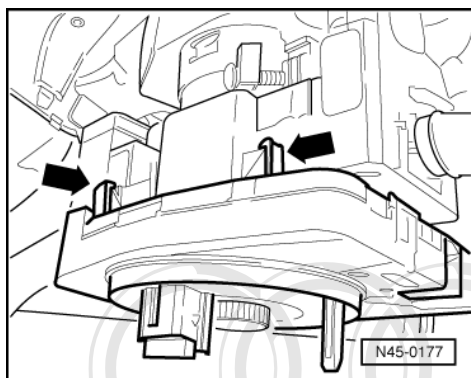
2 - Ignition/start lock grommet



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



- -> Detach connectors -1- and -2-.



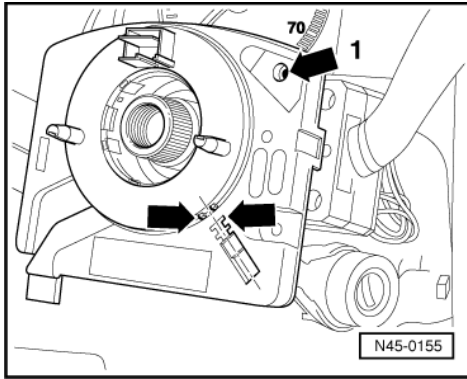
- -> Carefully lift hooks -arrows- and disconnect steering angle sensor.

Installing

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

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

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- -> 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:

- Install airbag unit and steering wheel

=> Running Gear, Front-wheel Drive; 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.

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

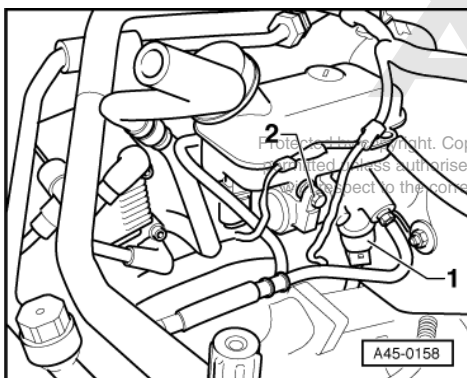
7.5 - Removing and installing brake pressure sender -G201- from brake master cylinder

Additionally required information

- ♦ VAS 5051 vehicle diagnostic, testing and information system

Removing

- Note radio code on vehicles with coded radio; if necessary ask for it.
- Disconnect and remove battery.
- Lay out plenty of lint-free cloths in the area of the engine and gearbox.
- Draw off as much brake fluid as possible from brake fluid reservoir using an extraction bottle.
- Fit bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw.
- Operate the brake pedal at least 15 times so that the brake master cylinder is emptied.
- Close front left bleeder screw.



- -> Unplug connector -arrow- on the relevant brake pressure sender to be removed.



a - Sender for brake pressure in pushrod piston circuit

- Remove sender for brake pressure.

Installing

- Install in reverse order.

Tightening torque:

Sender for brake pressure

35 Nm

- Bleed brake system => Page 165
- Initiate basic setting
- Perform basic setting in "Guided fault-finding" using VAS 5051.

7.6 - Adjusting brake light switch

Removing and installing

Remove brake light switch to adjust.

- Disconnect plug from brake light switch.
- Remove brake light switch by turning through 90°-clockwise.
- Pull brake light switch plunger fully out.
- Press brake pedal down as far as possible by hand.
- Guide brake light switch through assembly opening and re-install by turning 90°-anti-clockwise.
- Release brake pedal.
- Connect plug for brake light switch.
- Operate the brake pedal.

=>Brake lights light up.

- Take foot off brake pedal.

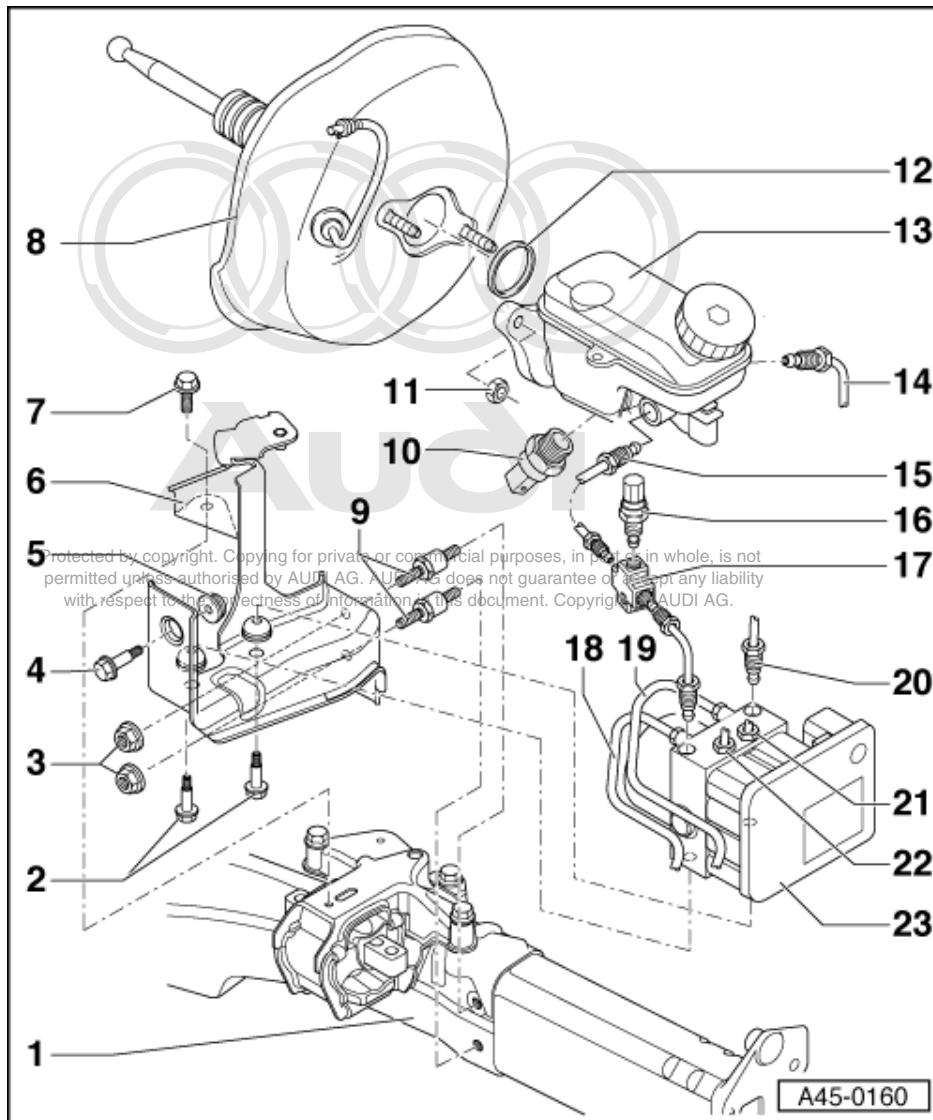
=>Brake lights must not light up.



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8 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 3 litre

8.1 - Hydraulic unit, brake servo/brake master cylinder - assembly overview - 3 litre



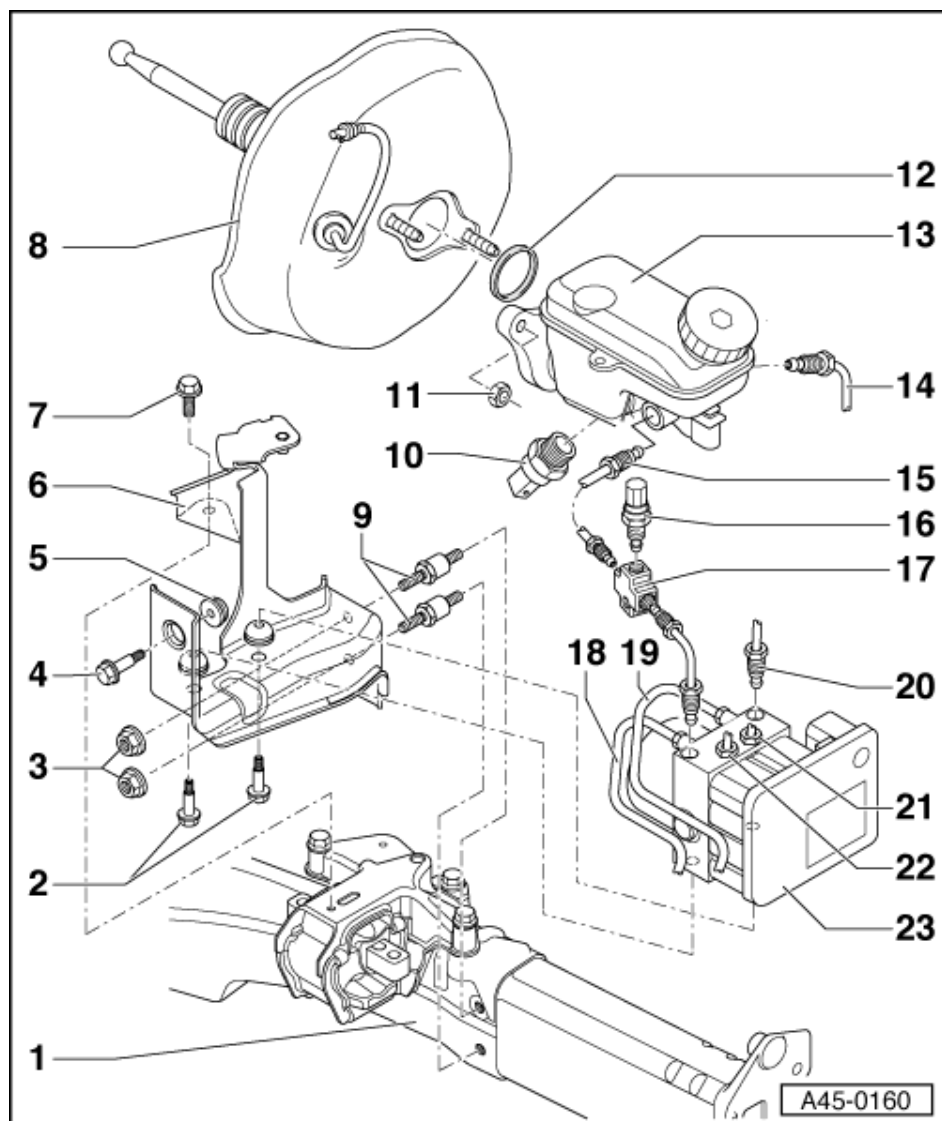
8.2 - ABS/EDL/TCS/ESP Mark 60 IE

Note:

The complete brake master cylinder and brake servo can be replaced separately from each other.

The bolted connections between the brake master cylinder and ABS control unit are tightened to 25 Nm.

- 1 Longitudinal member with assembly mounting
- 2 Fitted bolt, 8 Nm
- 3 Hexagon bolt, 25 Nm
- 4 Fitted bolt, 8 Nm
- 5 Rubber mount



6 Bracket

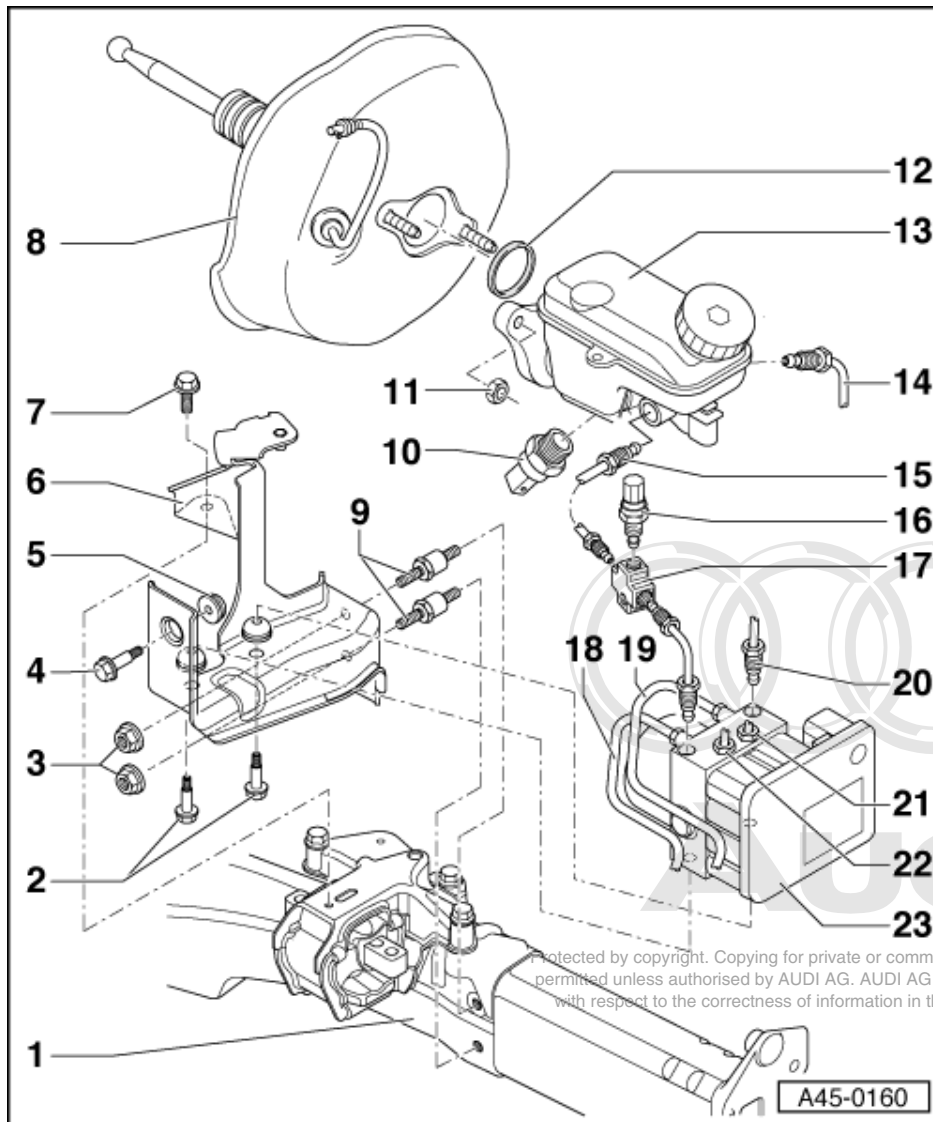
7 Hexagon bolt, 10 Nm

8 Brake servo

- ◆ The required vacuum is taken from the intake manifold.
- ◆ 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.
- ◆ Detach from brake pedal
=>Page 137 .
- ◆ Removing and installing => Page 173



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9 Double bolt

10 Sender -G201 for brake pressure -1-

- ♦ Removing and installing=>Page 59

11 Self-locking nut, 25 Nm

12 Sealing ring

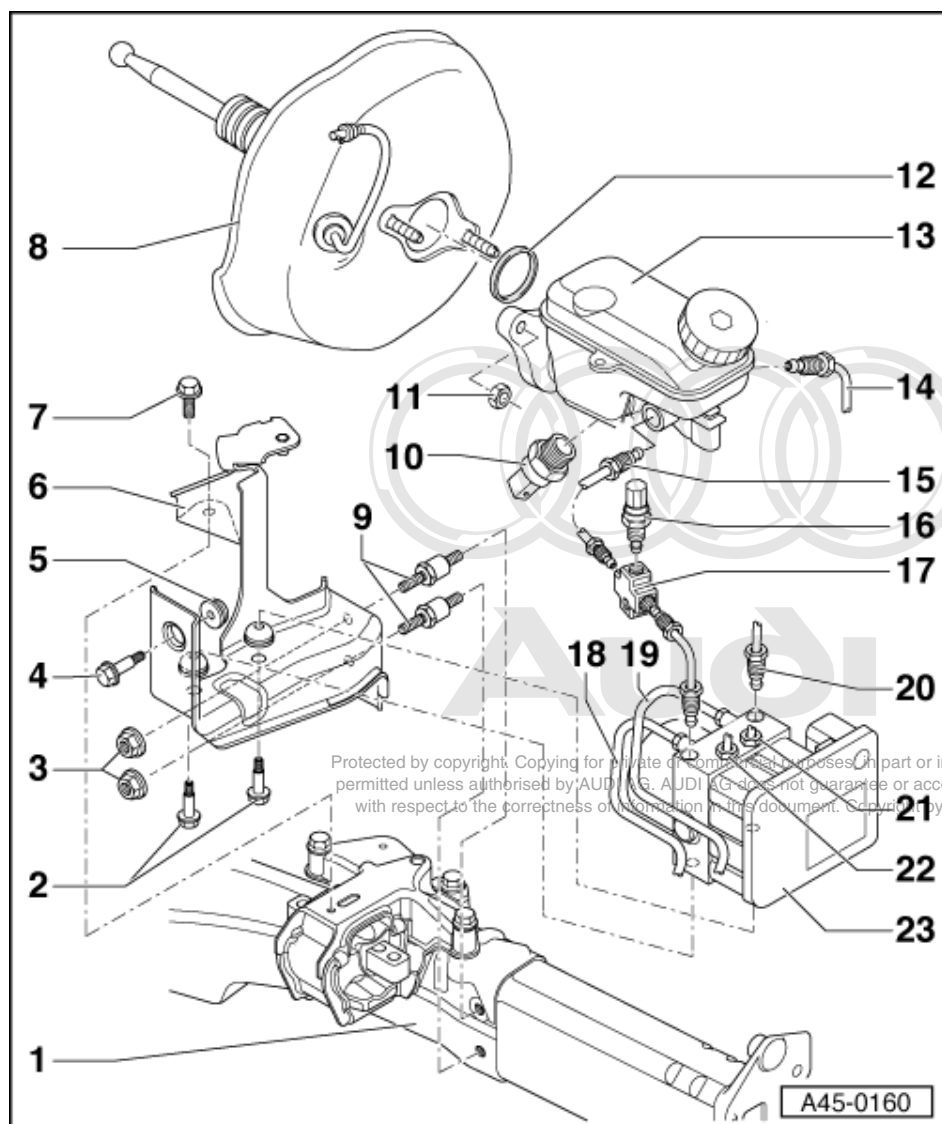
- ♦ Replace

13 Brake master cylinder

- ♦ Cannot be repaired. If faulty, renew complete.
- ♦ Removing and installing=>Page 28

14 Brake line

- ♦ Brake master cylinder/push rod piston circuit to hydraulic unit
- ♦ Tightening torque: 25 Nm



15 Brake line

- ♦ Brake master cylinder/floating piston circuit to hydraulic unit
- ♦ Tightening torque: 25 Nm

16 Sender for start/stop signal, tightening torque 12 Nm

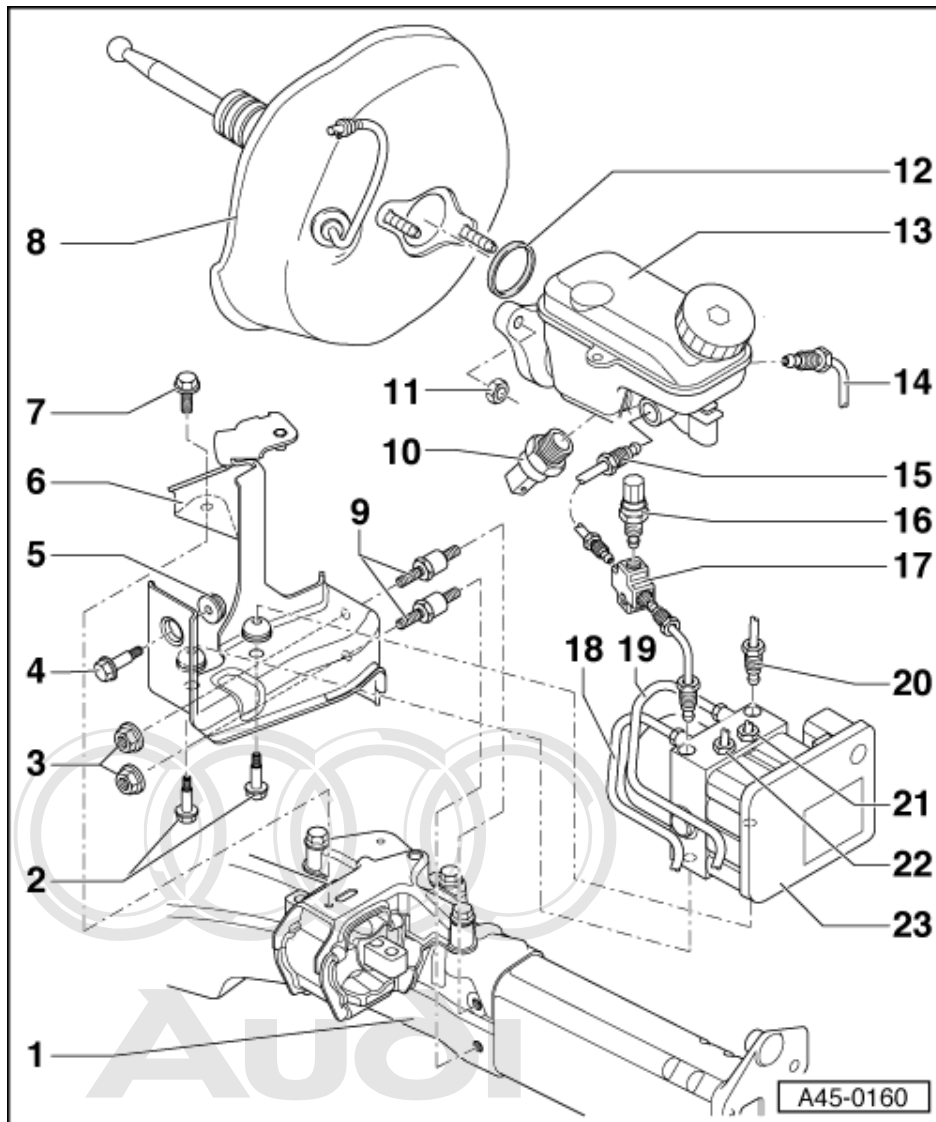
17 Manifold

18 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear left brake caliper
- ♦ Tightening torque: 12 Nm

19 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear right brake caliper
- ♦ Tightening torque: 12 Nm



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20 Brake line

- ◆ Brake master cylinder/push rod piston circuit to hydraulic unit
- ◆ Tightening torque: 12 Nm

21 Brake line connection

- ◆ Hydraulic unit to front left brake caliper
- ◆ Tightening torque: 12 Nm

22 Brake line connection

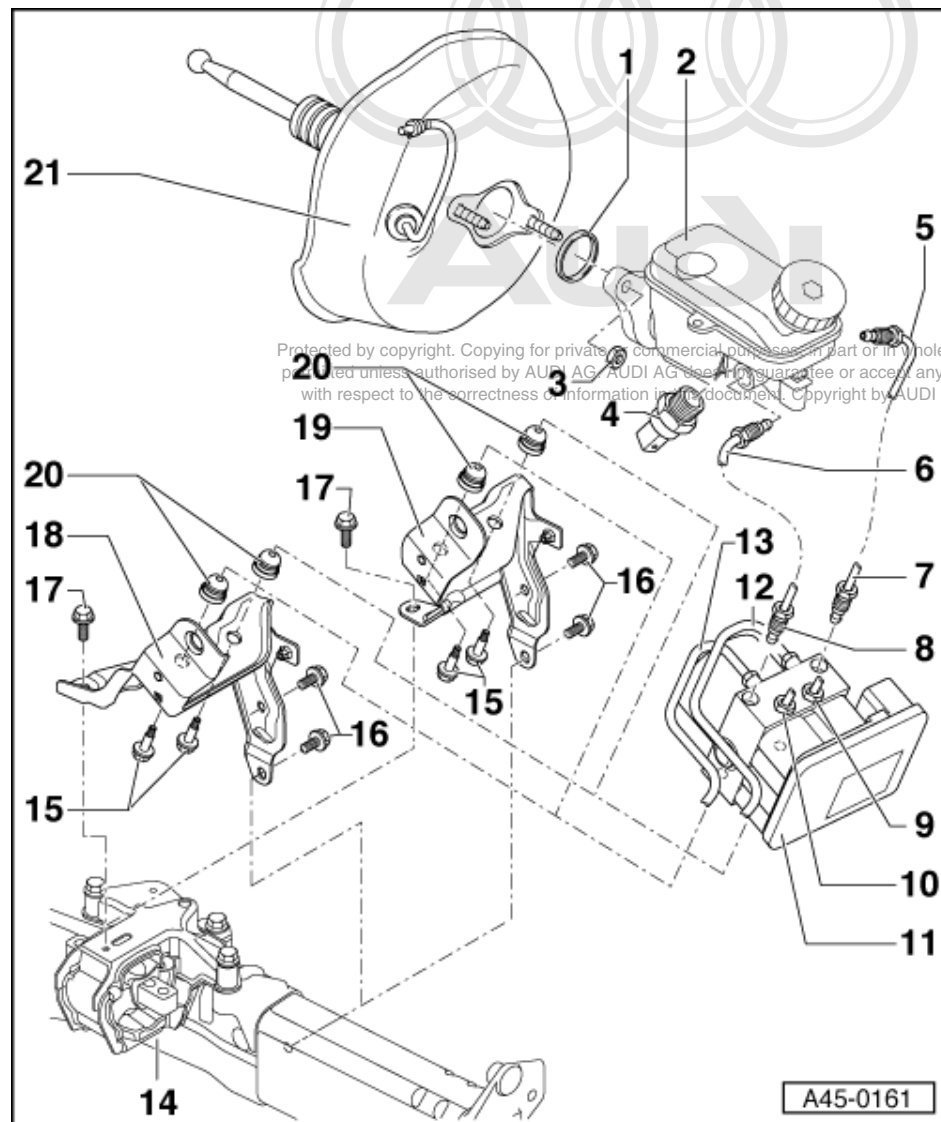
- ◆ Hydraulic unit to front right brake caliper
- ◆ Tightening torque: 12 Nm

23 ABS hydraulic unit with control unit

- ◆ Do not unplug connector for control unit before self-diagnosis.
- ◆ Tightening torque: 12 Nm
- ◆ Removing and installing=>Page 71

9 - Hydraulic unit, brake servo/brake master cylinder - 1.4 petrol engine and 1.4 TDI engine

9.1 - Hydraulic unit, brake servo/brake master cylinder - 1.4 petrol engine and 1.4 TDI engine



9.2 - ABS/EDL/TCS/ESP Mark 60 IE

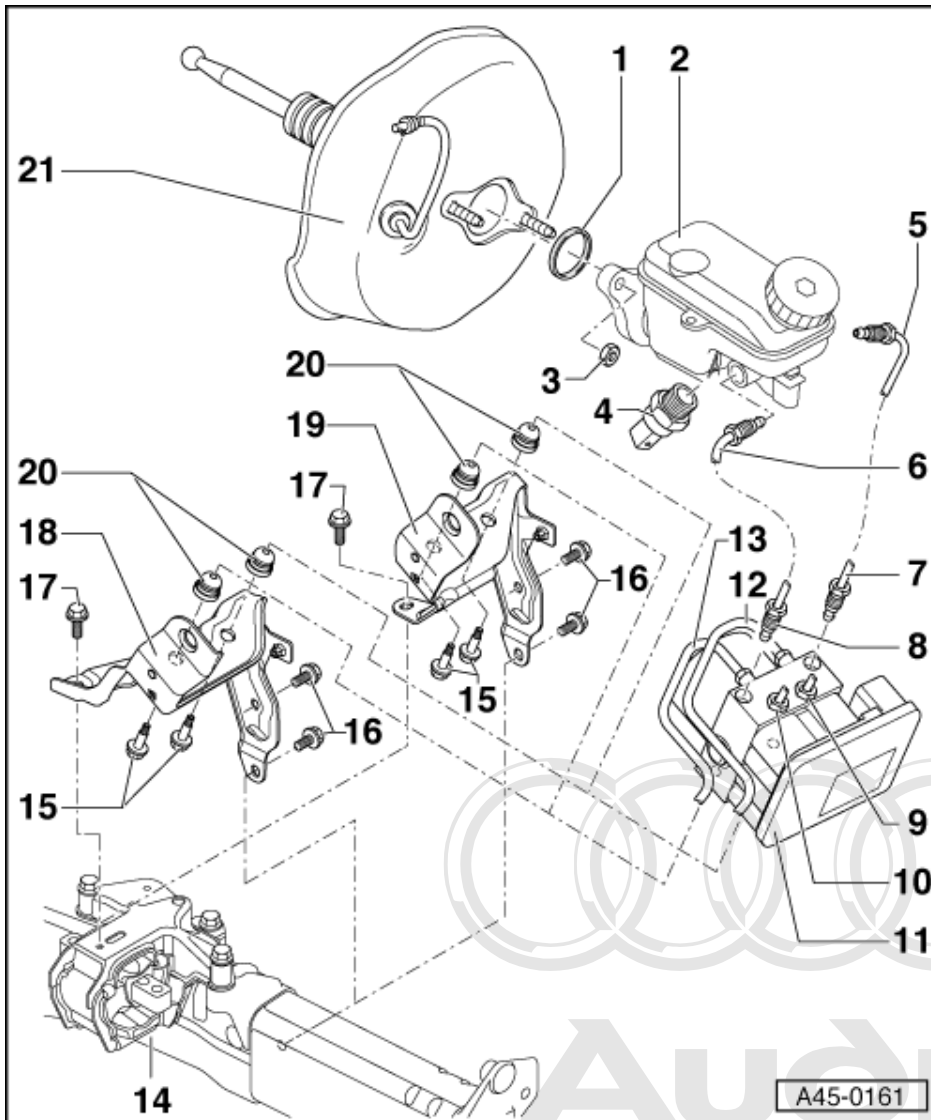
Note:

The complete brake master cylinder and brake servo can be replaced separately from each other.

The bolted connections between the brake master cylinder and ABS control unit are tightened to 25 Nm.

- 1 **Sealing ring**
 - ♦ Replace
- 2 **Brake master cylinder**
 - ♦ Cannot be repaired. If faulty, renew complete.

♦ Removing and installing=>Page 28



3 Self-locking nut, 25 Nm

4 Sender -G201 for brake pressure -1-

♦ Removing and installing=>Page 59

5 Brake line

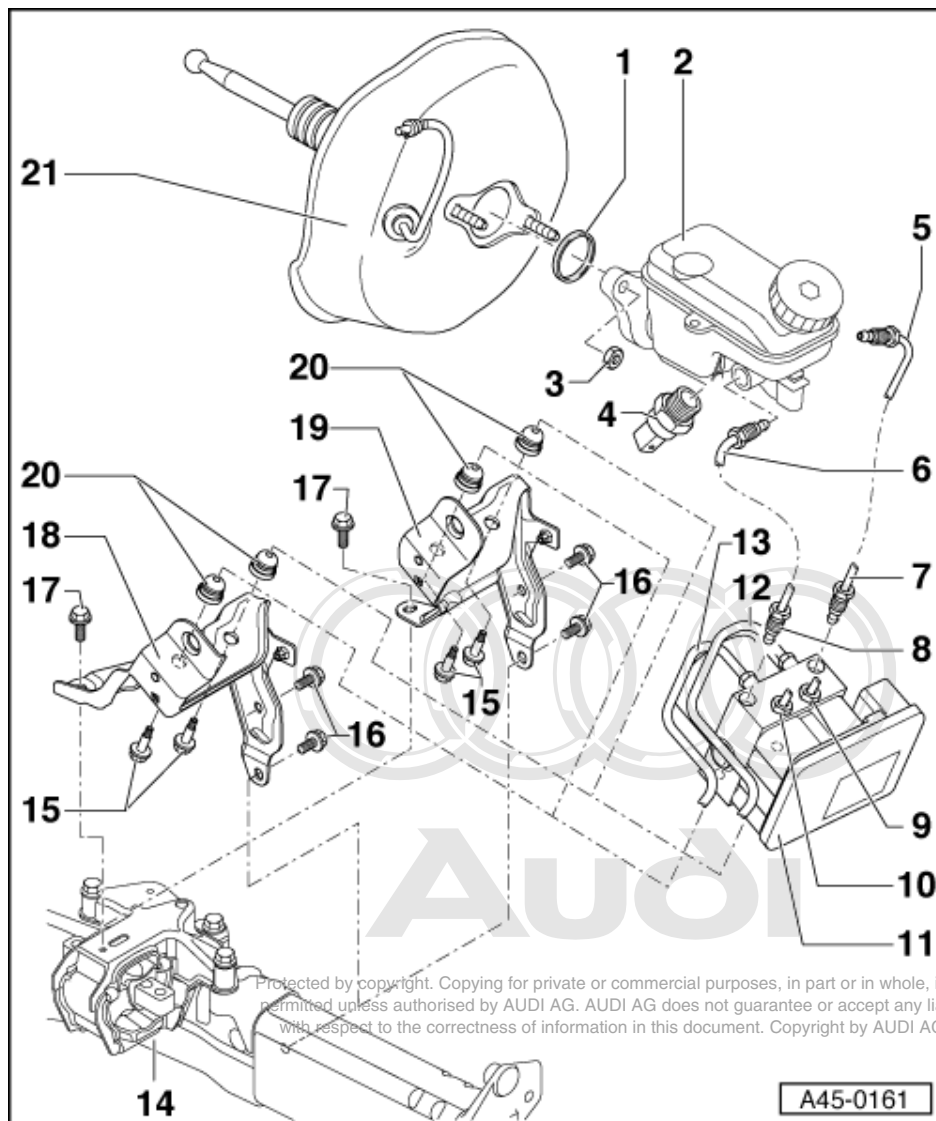
- ♦ Brake master cylinder/push rod piston circuit to hydraulic unit
- ♦ Tightening torque: 25 Nm

6 Brake line

- ♦ Brake master cylinder/floating piston circuit to hydraulic unit
- ♦ Tightening torque: 25 Nm

7 Brake line

- ♦ Brake master cylinder/push rod piston circuit to hydraulic unit
- ♦ Tightening torque: 25 Nm



8 Brake line

- ◆ Brake master cylinder/floating piston circuit to hydraulic unit
- ◆ Tightening torque: 25 Nm

9 Brake line connection

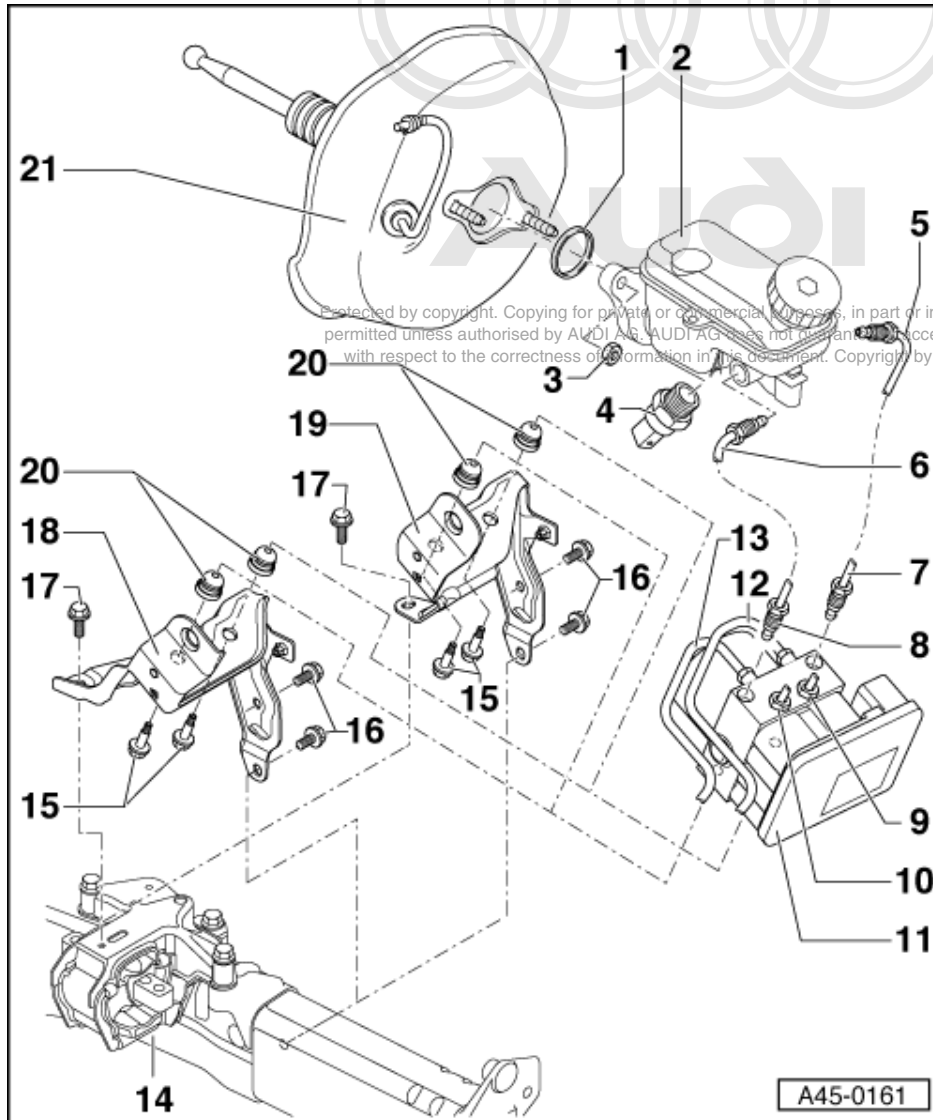
- ◆ Hydraulic unit to front left brake caliper
- ◆ Tightening torque: 12 Nm

10 Brake line connection

- ◆ Hydraulic unit to front right brake caliper
- ◆ Tightening torque: 12 Nm

11 ABS hydraulic unit with control unit

- ◆ Do not unplug connector for control unit before self-diagnosis.
- ◆ Removing and installing=>Page 71



12 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear right brake caliper
- ♦ Tightening torque: 12 Nm

13 Brake line connection

- ♦ Hydraulic unit to wheel cylinder/rear left brake caliper
- ♦ Tightening torque: 12 Nm

14 Longitudinal member with assembly mounting

15 Fitted bolt, 8 Nm

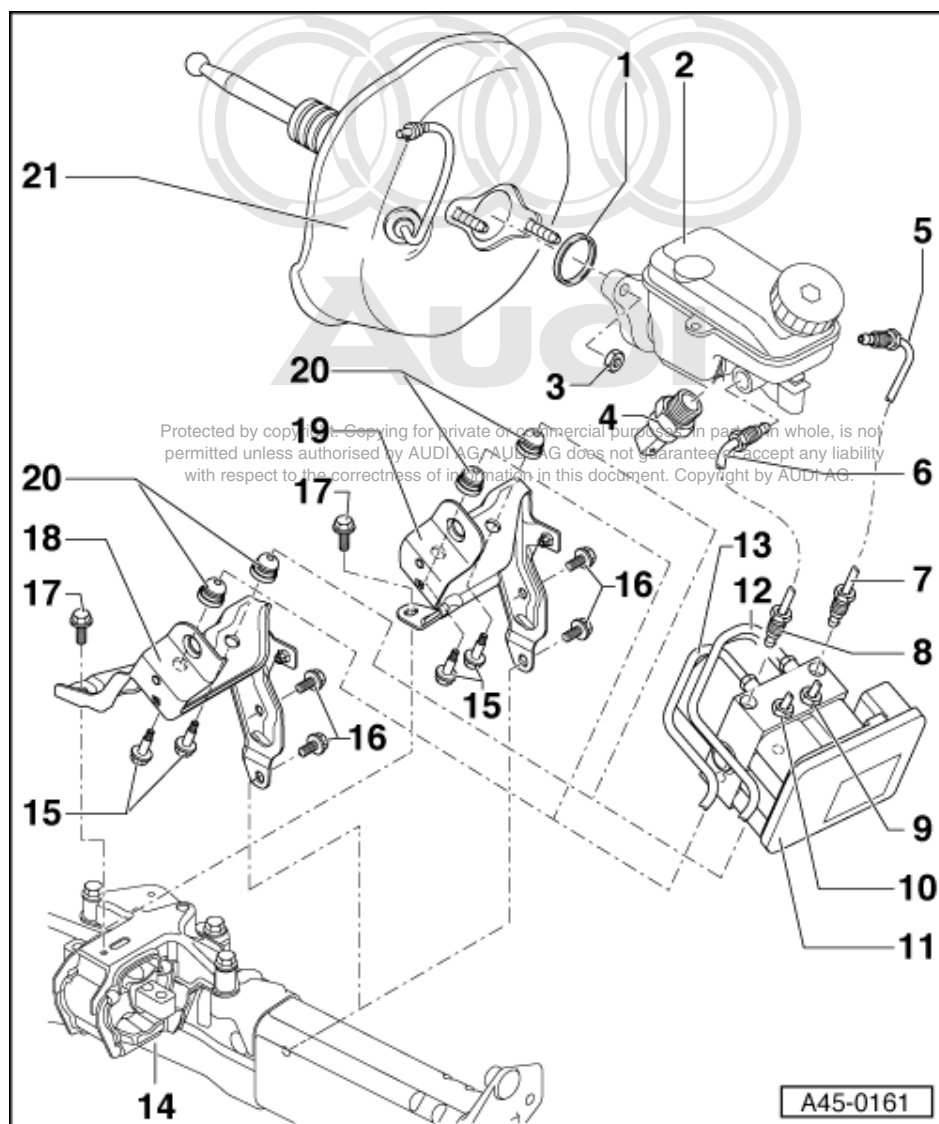
16 Hexagon bolt, 25 Nm

17 Hexagon bolt, 25 Nm

18 Bracket for 1.4 petrol engines

19 Bracket for 1.4 TDI engines

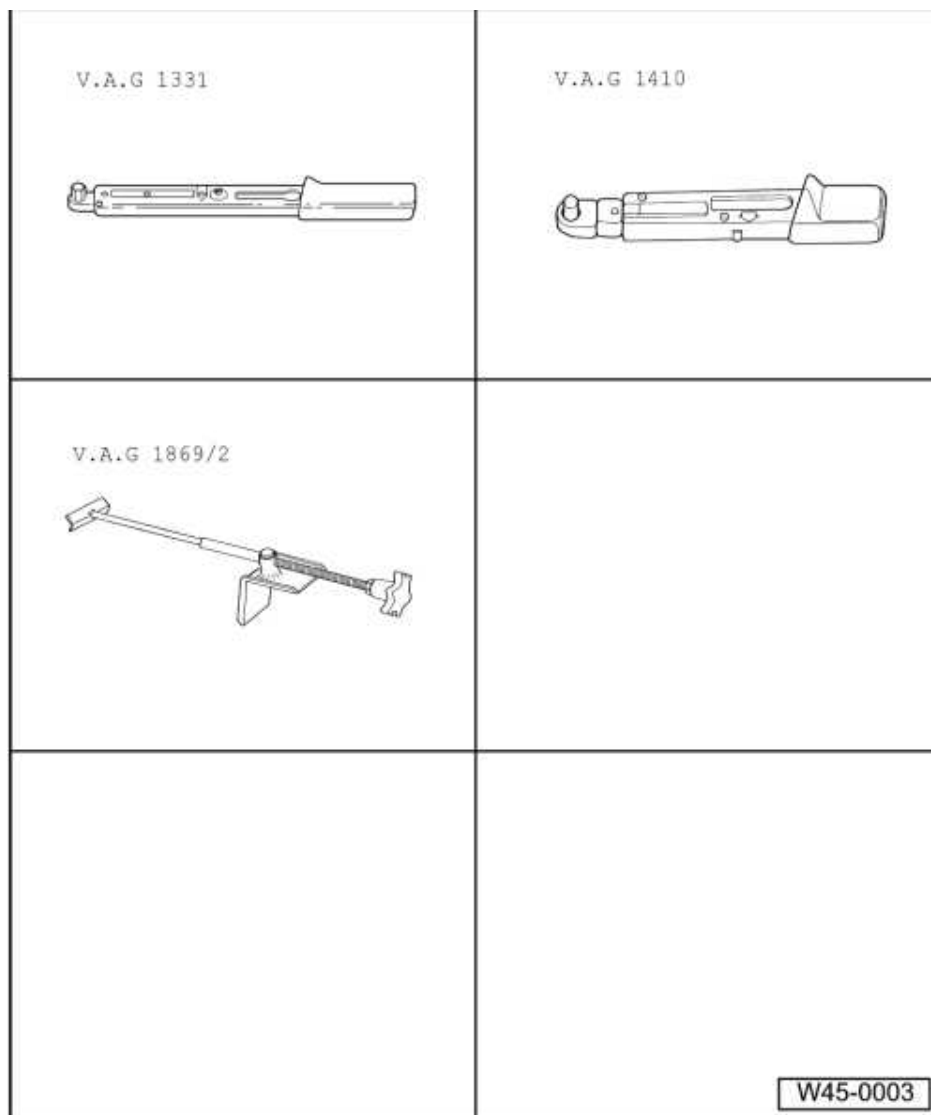
20 Rubber mount



21 Brake servo

- ◆ The required vacuum is taken from the intake manifold.
- ◆ 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.
- ◆ Detach from brake pedal
=>Page 137 .
- ◆ Removing and installing => Page 173

9.3 - Removing and installing control unit and hydraulic unit



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

Additionally required information

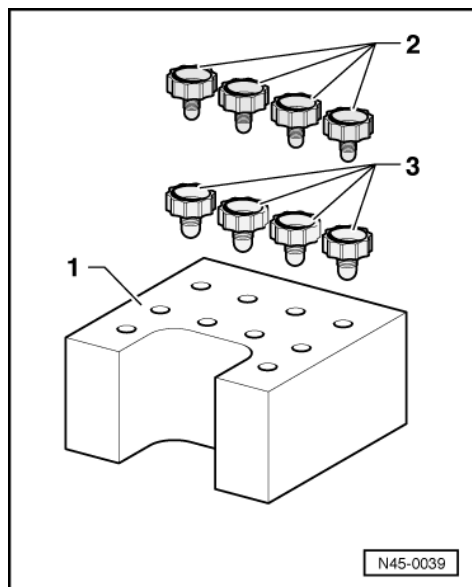
- ◆ Workshop Manual Audi A2 2000 ä Running Gear, Self-diagnosis for ESP; Steering

Fitting location:

The control unit is bolted to the hydraulic unit and is located at the left of the engine compartment.

Note:
 The brake lines in the vicinity of the hydraulic unit must not be bent.

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-> Sealing plug, repair kit

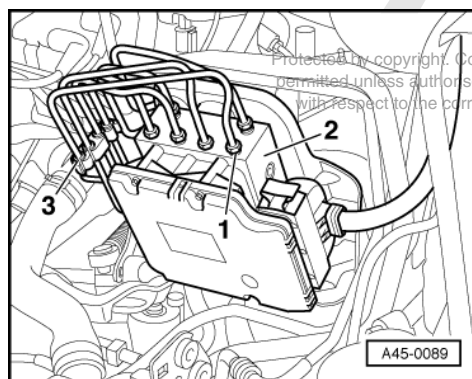
After detaching the control unit from the hydraulic unit, the transport protection for valve domes must always be fitted onto the hydraulic unit.

No warranty can be accepted for hydraulic units without transport protection for valve domes.

- 1 - Transport protection for valve domes (foam)
- 2 - Sealing plug, M10
- 3 - Sealing plug, M12

Removing

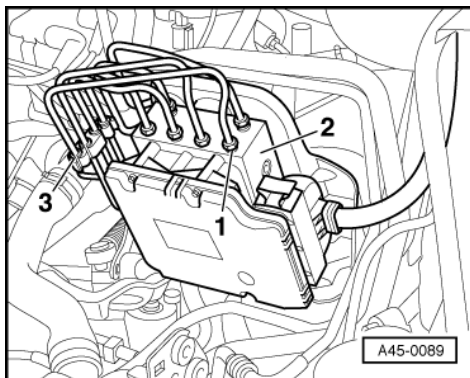
- Note radio code on vehicles with coded radio; if necessary ask for it.
- Disconnect battery.
- Fit brake pedal depressor V.A.G 1869/2
- Depress brake pedal using brake pedal depressor.



- -> Open bracket -3- and unclip brake line.
- Lay out plenty of lint-free cloths under the control unit and the hydraulic unit.

Note:

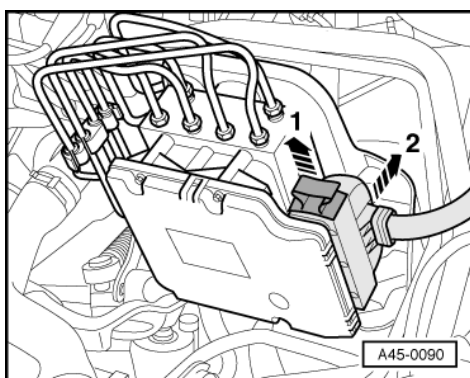
The brake lines in the vicinity of the hydraulic unit must not be bent.



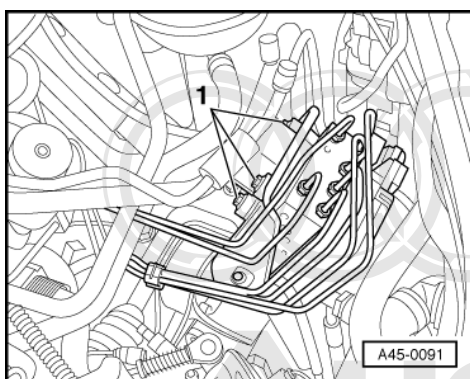
Note:
 Fuel system is pressurised. Place a lint-free cloth around the connection point before opening the system. Then release pressure by carefully loosening the connection.

- -> Disconnect the brake lines from hydraulic unit -1- and seal brake lines and threaded holes with plugs from repair kit, Part No. 1H0 698 311 A.

Ensure that no brake fluid spills onto the contacts.



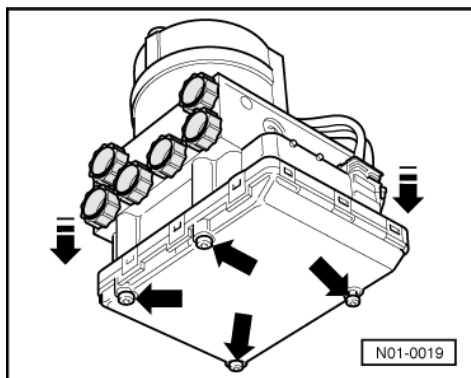
- -> Release connector from control unit (arrow -1-) and unplug it (arrow -2-).



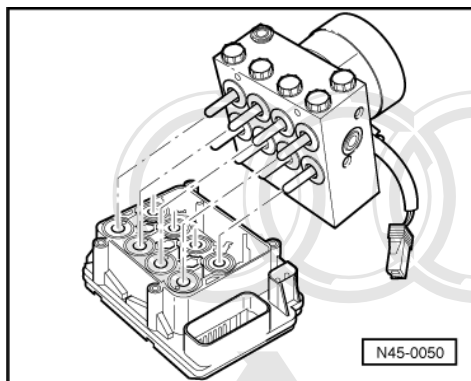
- -> Remove bolts from bracket for hydraulic unit -1-.
- Carefully remove hydraulic unit with control unit.

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Detaching control unit from hydraulic unit



- Unplug hydraulic pump motor connector from control unit.
- -> Remove E 5 external Torx bolts -arrows- from control unit and remove control unit.



-> When detaching the control unit, ensure that the valve domes of the hydraulic unit are not misaligned by the control unit solenoids.

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Cover control unit solenoids with a lint free cloth.

After separating the control unit from the hydraulic unit, use the transportation protection for the valve domes.

Installing

- ♦ Only remove sealing plugs on the new hydraulic unit when the relevant brake line is being fitted.
- ♦ If the sealing plugs are removed too early, brake fluid can escape, it can then no longer be guaranteed that the unit is sufficiently filled or adequately bled.

When attaching the control unit to the hydraulic unit, ensure that the valve domes of the hydraulic unit are not misaligned by the control unit solenoids.

- Attach the control unit to hydraulic unit using new bolts. Observe tightening torque, max 4 Nm.

Do not fully tighten bolts. Connection of the various brake lines to the hydraulic unit is facilitated thereby.

- The remaining installation steps are carried out in the reverse sequence.
- Bleed brake system => Page 165
- Enter radio code.
- Encode the control unit.

=> Running Gear Self-diagnosis for ESP, Steering; Repair group 01; Performing self-diagnosis; Encoding control unit Performing self-diagnosis Encoding control unit

Tightening torque:	
Control unit to hydraulic unit	max. 4 Nm
Hexagon bolt for hydraulic unit to bracket	8 Nm
Brake lines to ABS assembly:	
M 10 x 1 thread	12 Nm
M 12 x 1 thread	12 Nm



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46 - Brakes, Brake mechanics

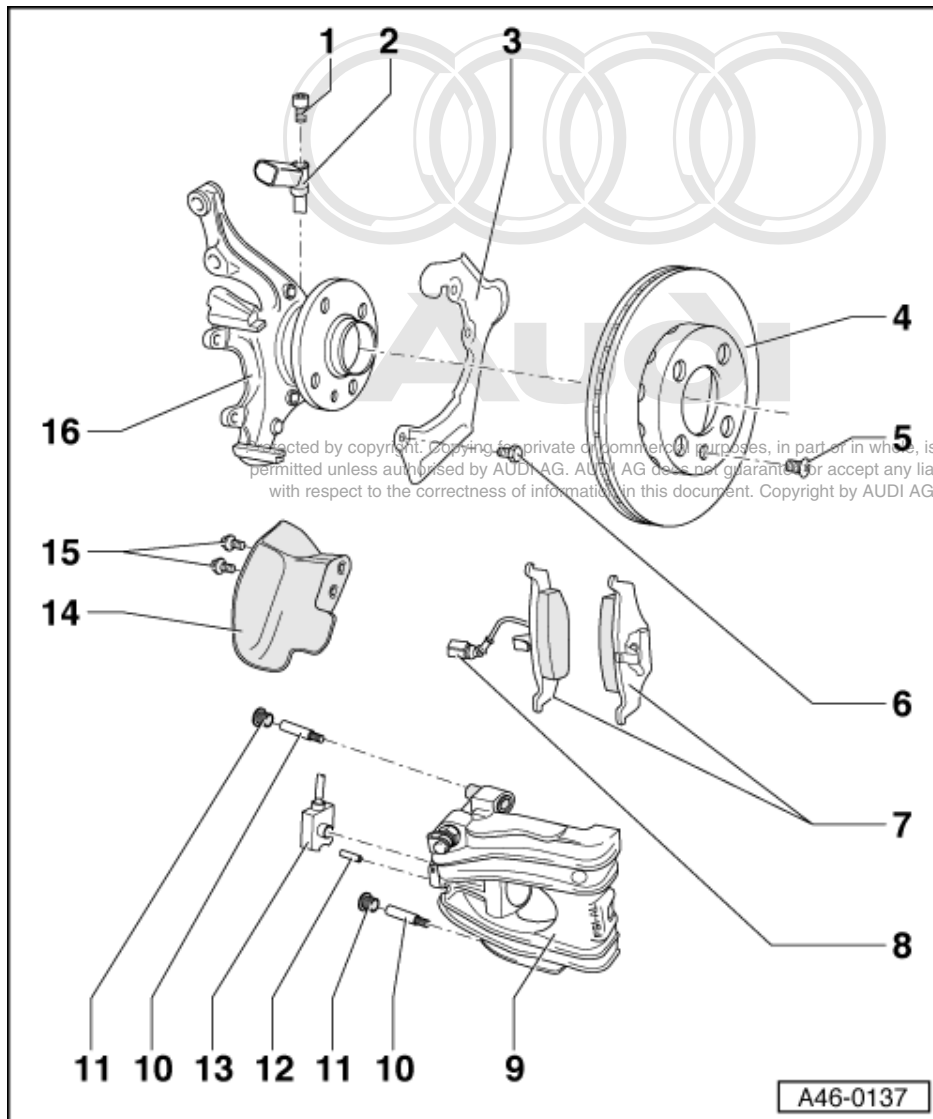
1 - Servicing front brakes

1.1 - Servicing front brakes

V.A.G 1331 	V.A.G 1410 
V.A.G 1869/2 	Protected by copyright. Copying for private or commercial purposes, in part or in whole, 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.
	W45-0003

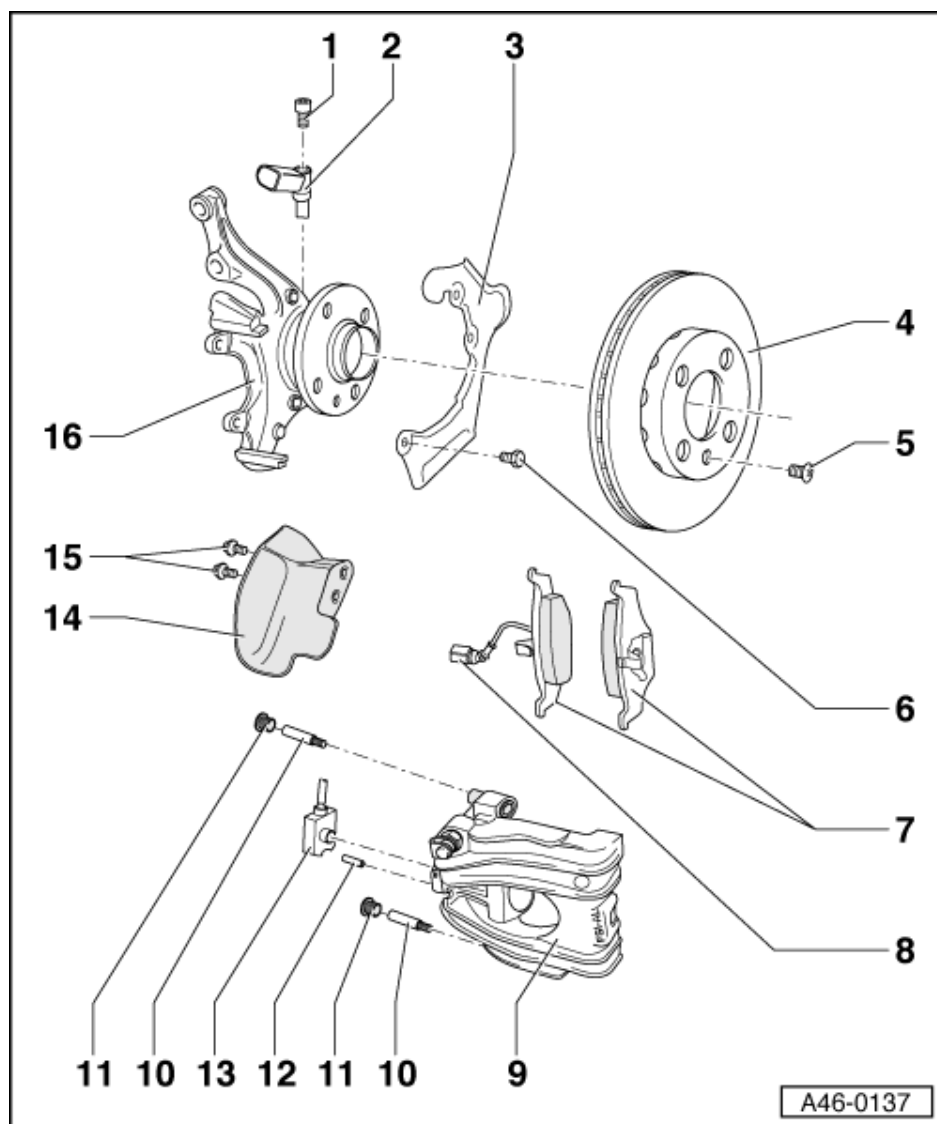
1.2 - Servicing front-wheel brake, brake caliper FS I - AL

- ♦ V.A.G 1331 Torque wrench
- ♦ V.A.G 1410 Torque wrench
- ♦ V.A.G 1869/2 Brake pedal depressor



- ♦ 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.
- ♦ Brake pedal depressor VAG 1869/2 must be fitted before removing a brake caliper or disconnecting a brake hose from the brake caliper.

**1 Hexagon socket head bolt,
10 Nm**



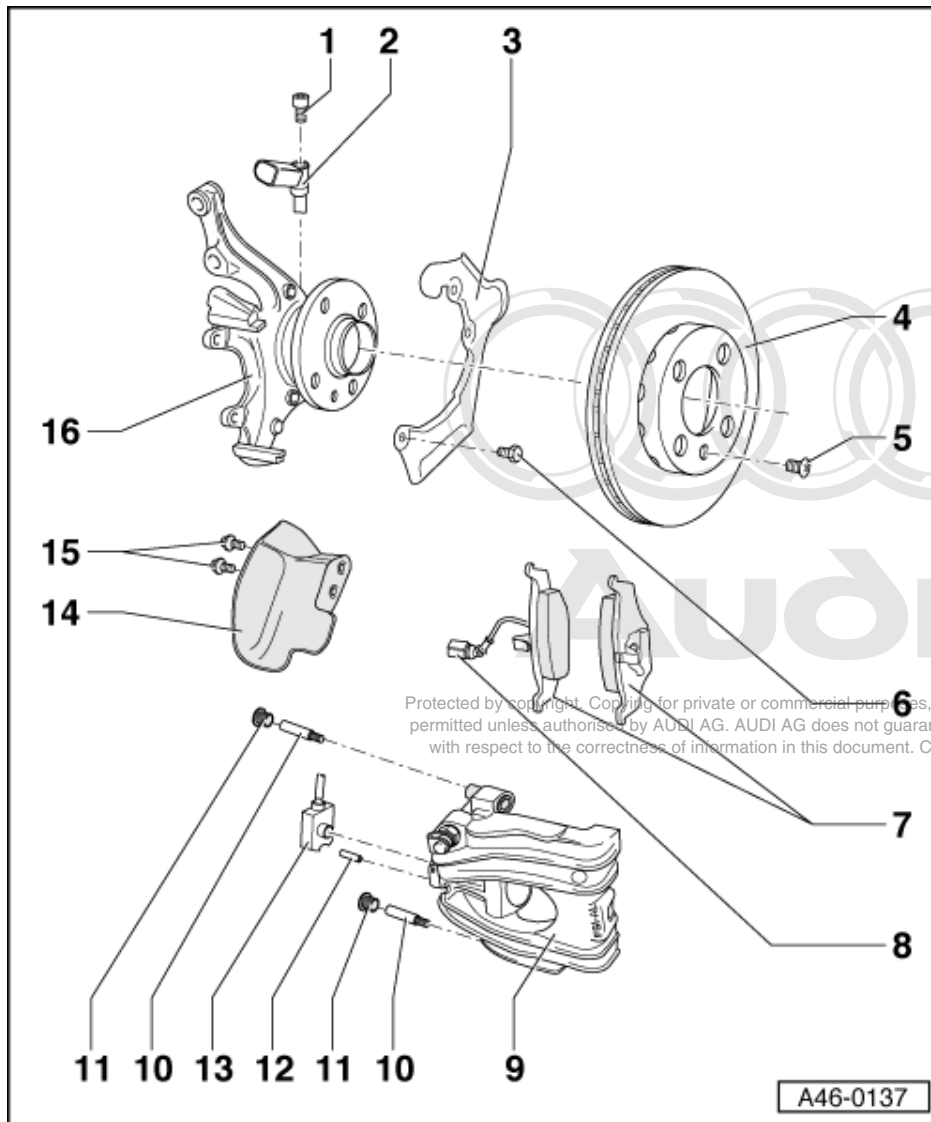
2 ABS speed sensor

- ◆ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.

3 Cover plate

4 Brake disc, internally ventilated

- ◆ Internally ventilated brake disc: $\varnothing 239.00$ mm
- ◆ When worn always renew both sides.
- ◆ Do not force brake discs off wheel hub; if necessary, use rust remover otherwise brake discs will be damaged.



5 Cross-head screw, 4 Nm

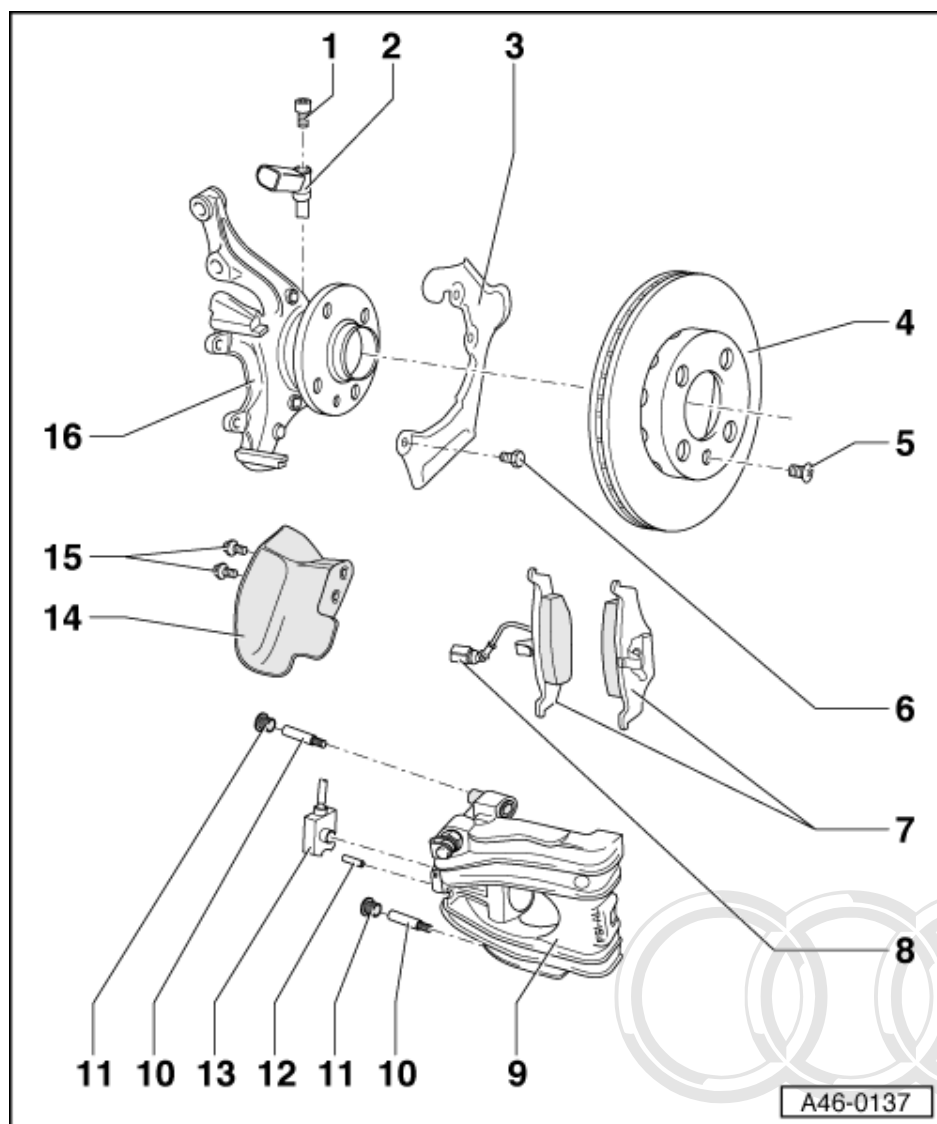
6 Hexagon bolt, 10 Nm

7 Brake pads

- ♦ With wear indicator
- Once the wear limit is reached (limit: 2 to 3 mm), the warning light in the dash panel insert comes on.
- ♦ With riveted retaining spring
- ♦ Thickness 14 mm, brake pad with largest frictional area fitted to the outside
- ♦ Wear limit: 7 mm including backplate
- ♦ Check thickness

=> Maintenance manual; Description of operations; Front and rear brake pads: check thickness

- ♦ Before fitting the pads, clean the pad guide surfaces and apply a coat of lithium grease G 052 142 A2.



- ◆ Always replace all components on an axle
- ◆ Removing and installing
=>Page 83.
- ◆ Allocation

=> Replacement Parts Catalogue

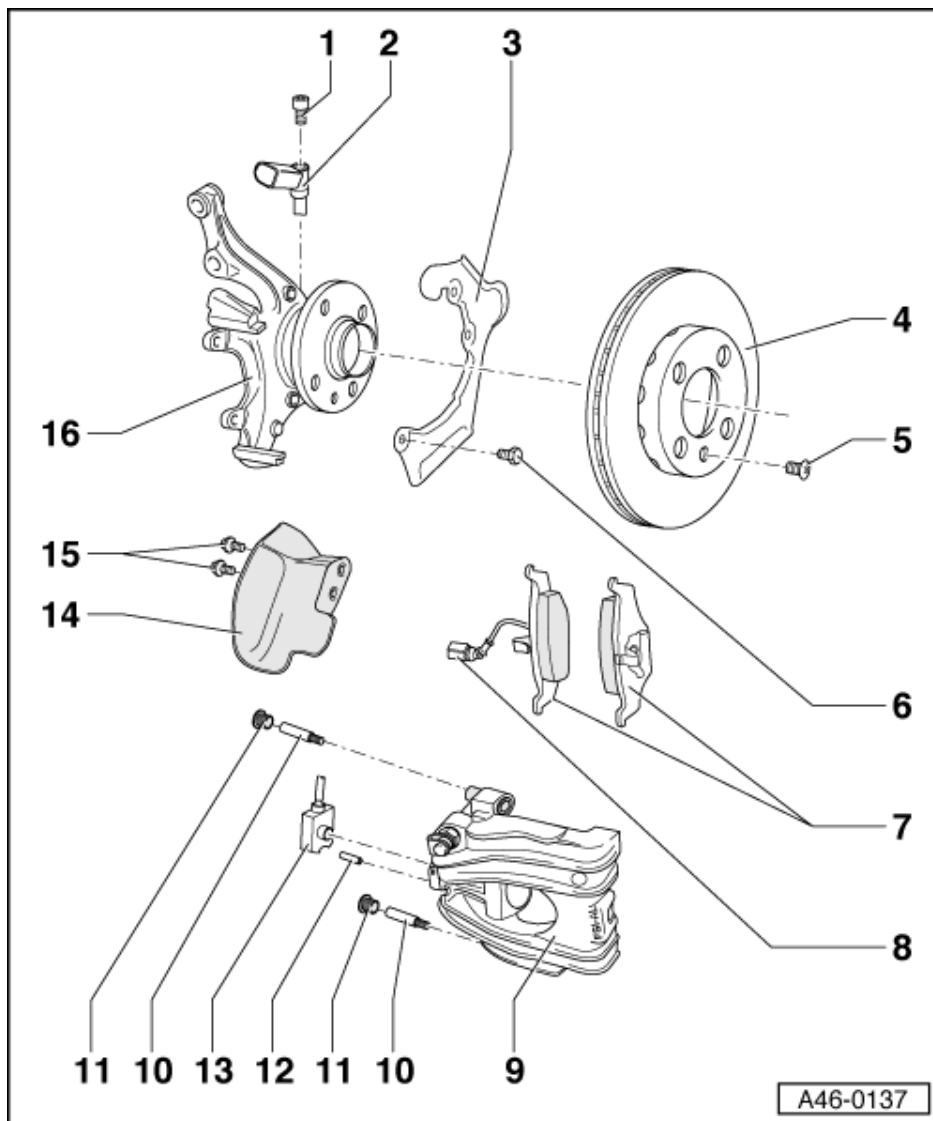
8 Connector

- ◆ Unplug connector when replacing pads
- ◆ Insert cable for wear indicator in dust cap

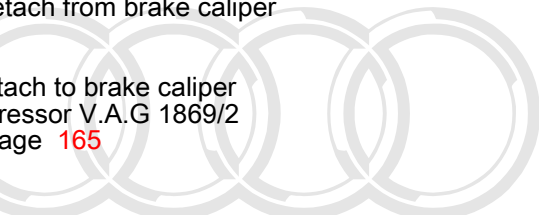
9 FS | AL brake caliper

- ◆ Do not disconnect brake hose when changing brake pads
- ◆ Insert cable for wear indicator in dust cap

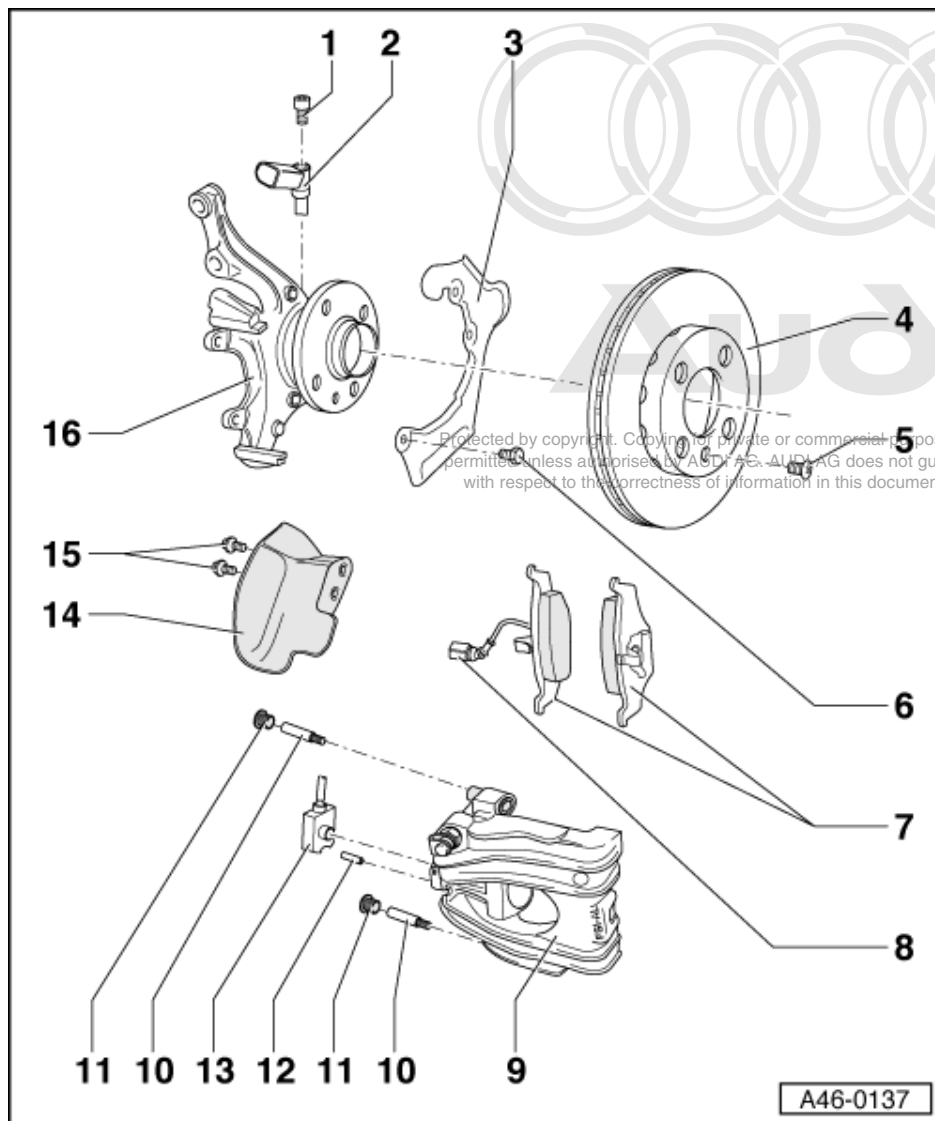
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- ◆ Removal:
 - Attach hose of bleeder bottle on bleeder screw
 - Open bleeder screw
 - Fit brake pedal depressor V.A.G 1869/2
 - Brake pads -Item **83**
 - Brake hose -Item **13** - Detach from brake caliper
- ◆ Installation:
 - Brake pads -Item **83**
 - Brake hose -Item **13** - Attach to brake caliper
 - Remove brake pedal depressor V.A.G 1869/2
 - Bleed brake system => Page **165**
- ◆ Repairing => Page **150**


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10 Guide pin, 28 Nm

11 Trim cap

- ◆ Remove

12 Locking device

13 Brake hose with banjo union with banjo bolt

- ◆ With copper sealing washers (bronze coloured)
Tightening torque, 45 Nm
- ◆ With galvanised sealing washers (silver coloured)
Tightening torque, 35 Nm

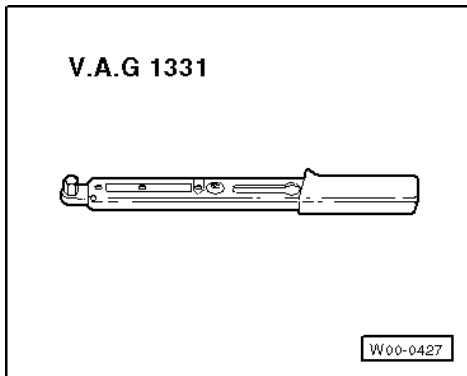
14 Air duct

- ◆ For cooling the brake system

15 Hexagon bolt, 10 Nm

16 Wheel bearing housing

1.3 - Removing and installing brake pads

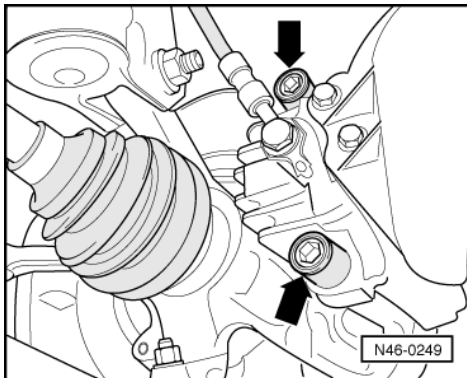


Special tools and workshop equipment required

- ♦ V.A.G 1331 Torque wrench
- ♦ Piston resetting tool

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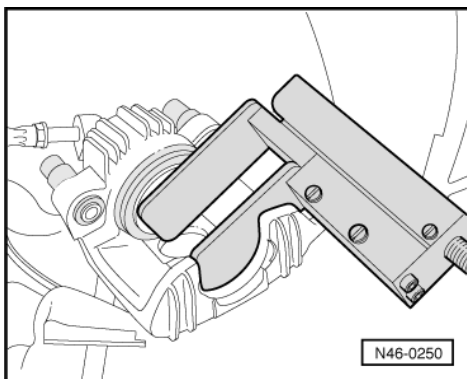
Removing



- Remove protective caps.
- -> Unscrew both guide pins -arrows- from brake caliper and remove.
- Detach brake calliper housing and secure with wire such that the weight of the brake caliper does not stress or damage the brake hose.
- Remove brake pads from brake caliper housing.

Only use methyalted spirits to clean the brake caliper housing.

Installing

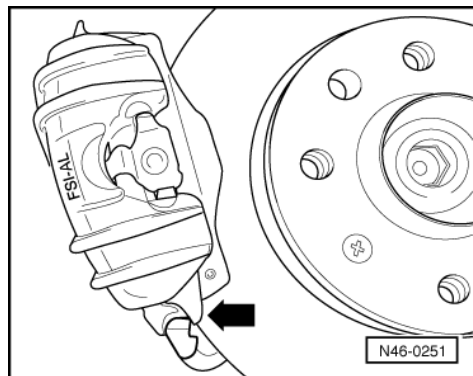




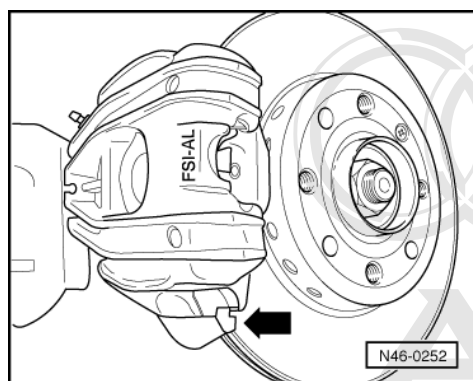
Before inserting new brake pads, press piston back into the cylinder with resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise brake fluid which was used to top up the brake fluid reservoir, may escape and cause damage.

- -> Press back piston.
- Insert brake pads into brake caliper housing and piston.

Brake pads with largest frictional area are fitted to the outside, also inside left pad with wear indicator.



- -> Fit bottom of brake caliper housing on pin first -arrow-.
- Install brake caliper housing with brake pads to wheel bearing housing.

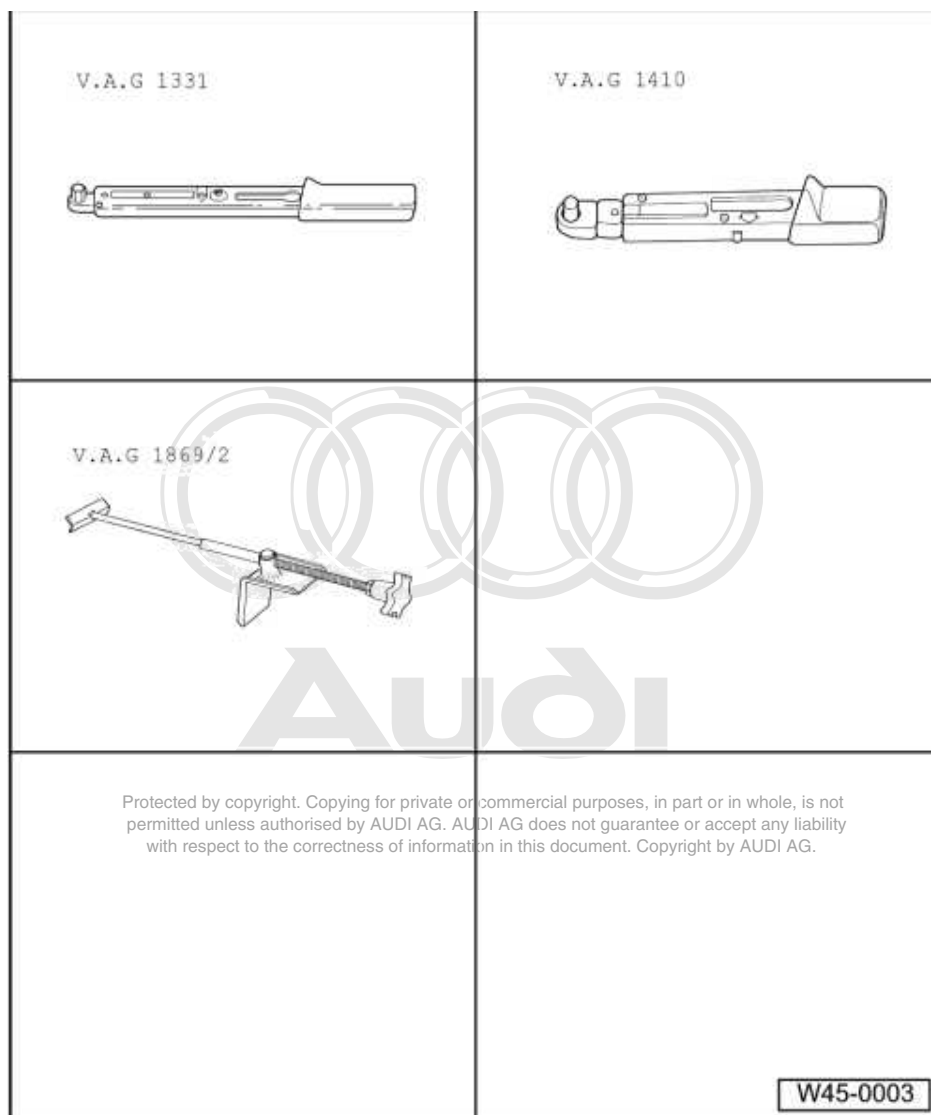


Pin - arrow- of brake caliper housing must be behind guide of wheel bearing housing.

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- **Secure brake caliper housing to brake carrier with both guide pins to 28 Nm.**
 - ♦ 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.
 - ♦ After changing brake pads check brake fluid level.

2 - Servicing front brakes

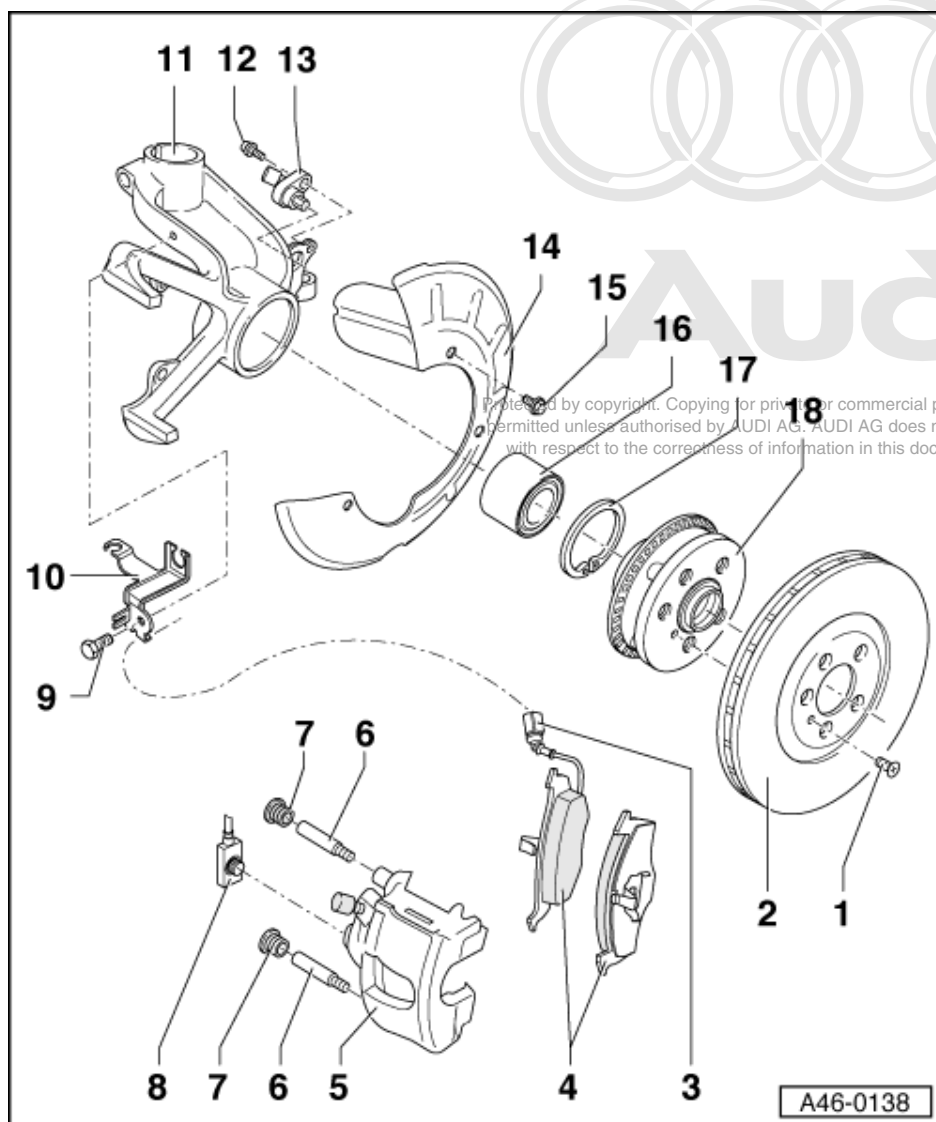
2.1 - Servicing front brakes



2.2 - Servicing front-wheel brake, brake caliper FS III

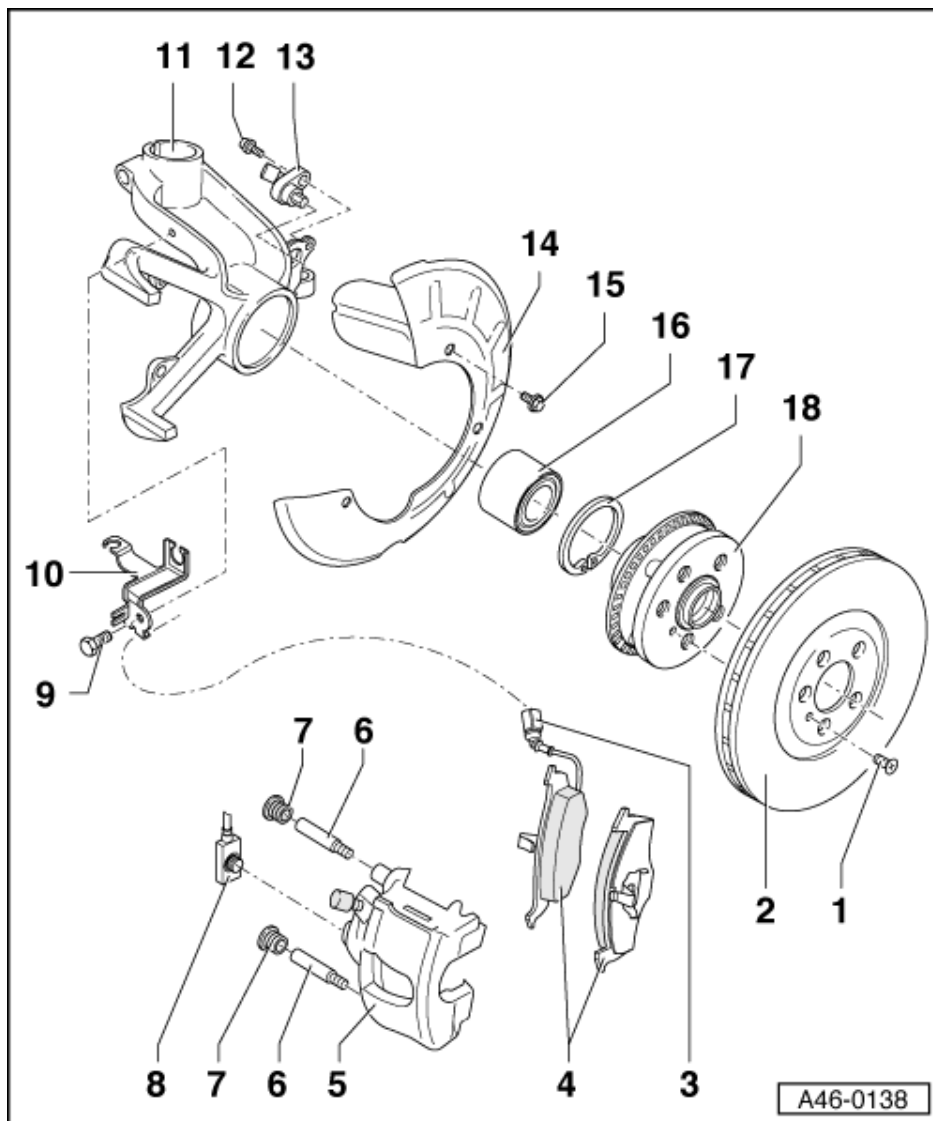
Special tools and workshop equipment required

- ♦ V.A.G 1331 Torque wrench
- ♦ V.A.G 1410 Torque wrench
- ♦ V.A.G 1869/2 Brake pedal depressor



- ♦ 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.
- ♦ Brake pedal depressor VAG 1869/2 must be fitted before removing a brake caliper or disconnecting a brake hose from the brake caliper.

1 Cross-head screw, 4 Nm



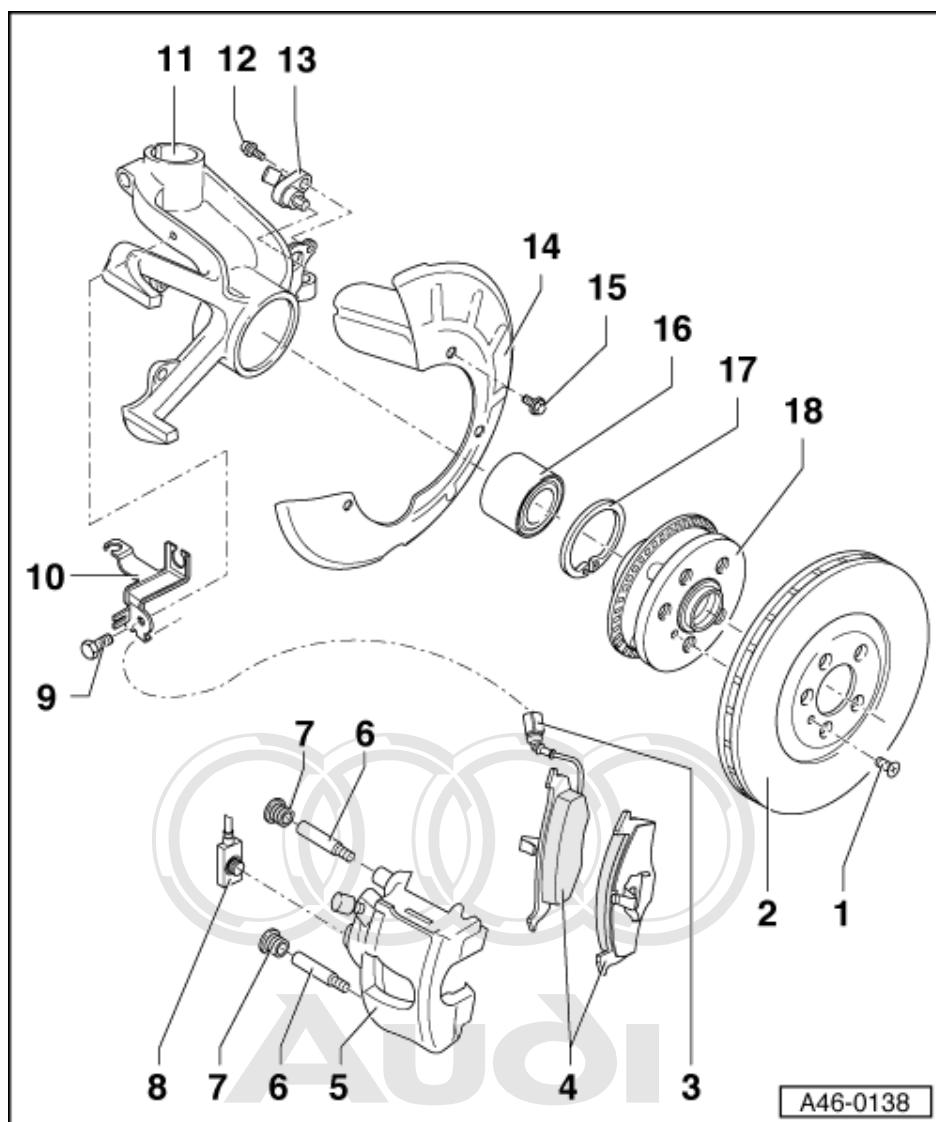
2 Brake disc

- ♦ Always replace all components on an axle
- ♦ Remove brake caliper prior to removing
- ♦ Do not force brake discs off wheel hub; if necessary, use rust remover otherwise brake discs will be damaged.

3 Connector

- ♦ Remove from holder -Item 10 - when replacing the pads

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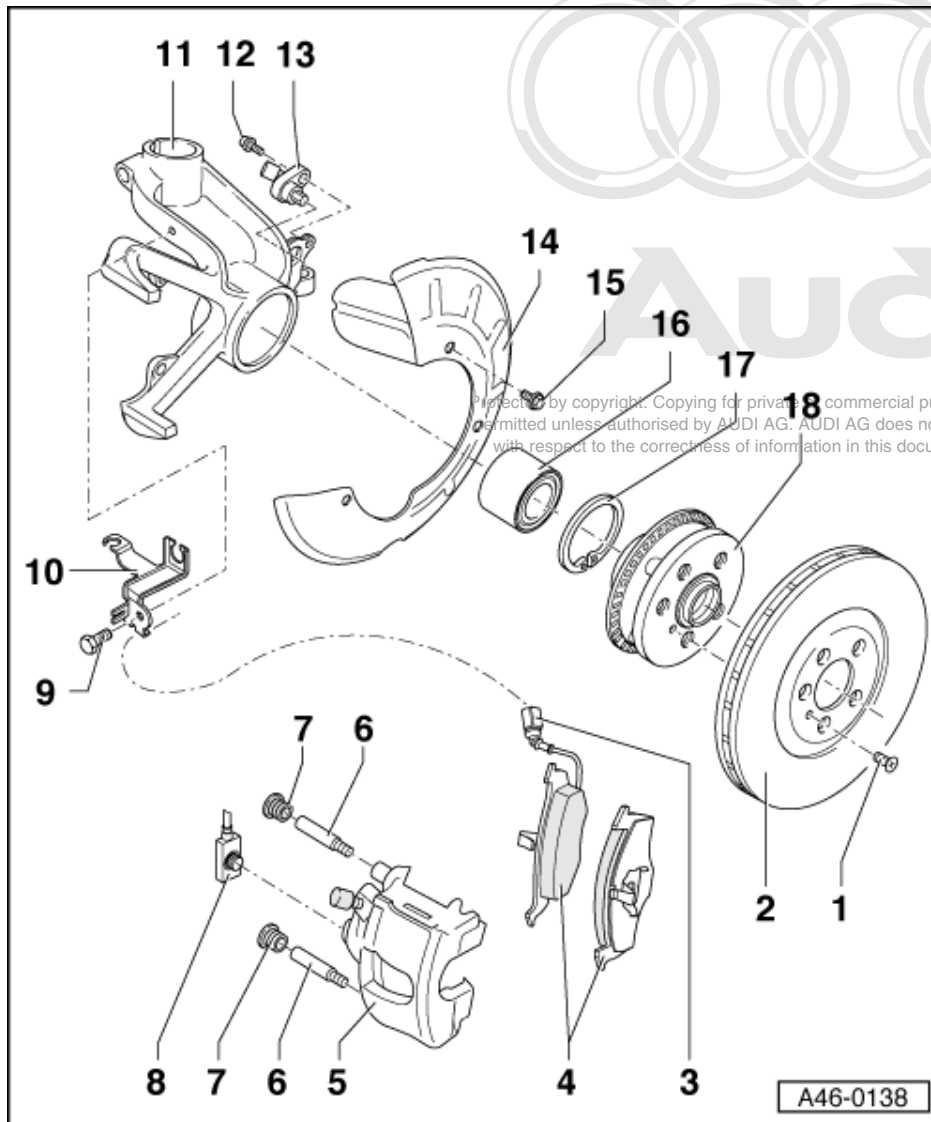


4 Brake pads

- ◆ Thickness 14 mm
- ◆ Check thickness

=> Maintenance Manual; Description of operations; Front and rear brake pads: check thickness

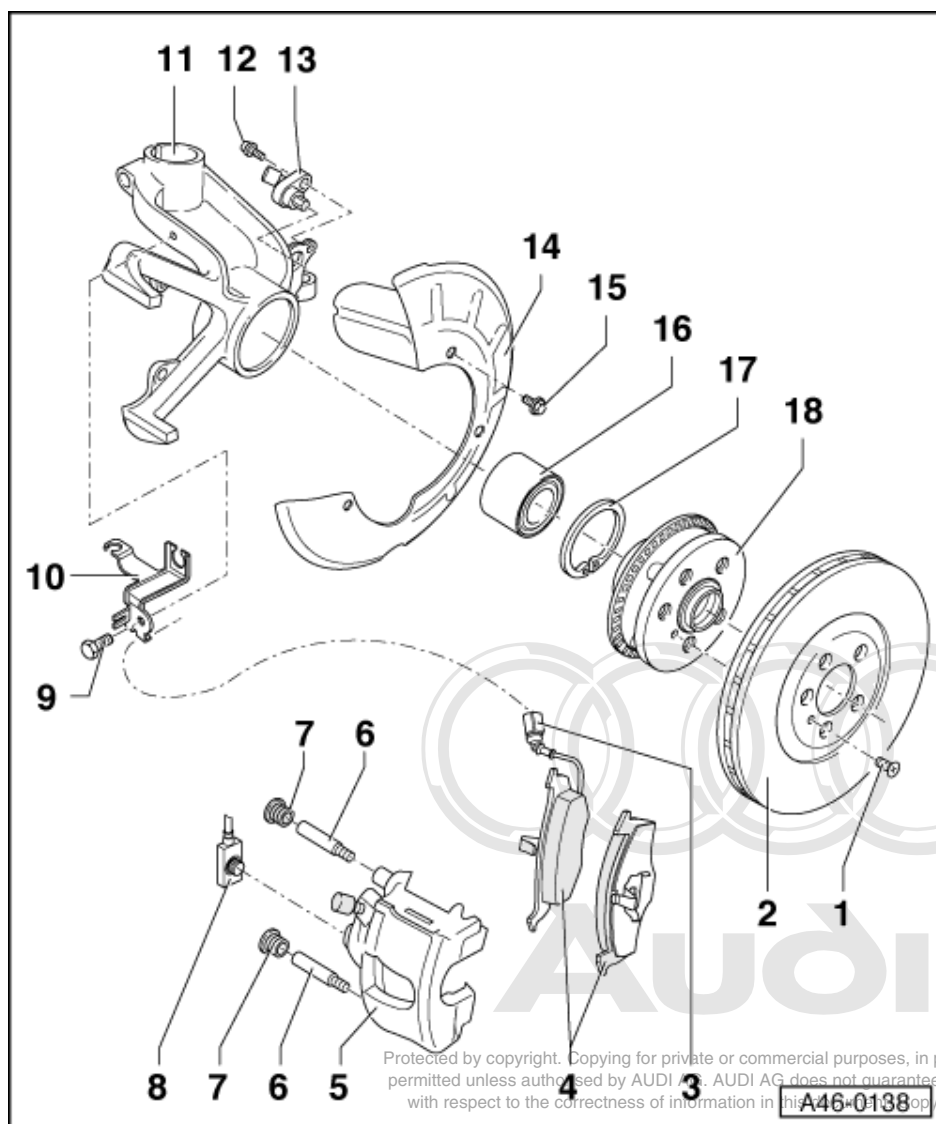
- ◆ Always replace all components on an axle
- ◆ Removing and installing
=>Page 83.
- ◆ Wear limit: 7 mm including backplate
- ◆ Before fitting the pads, clean the pad guide surfaces and apply a coat of lithium grease G 052 142 A2.



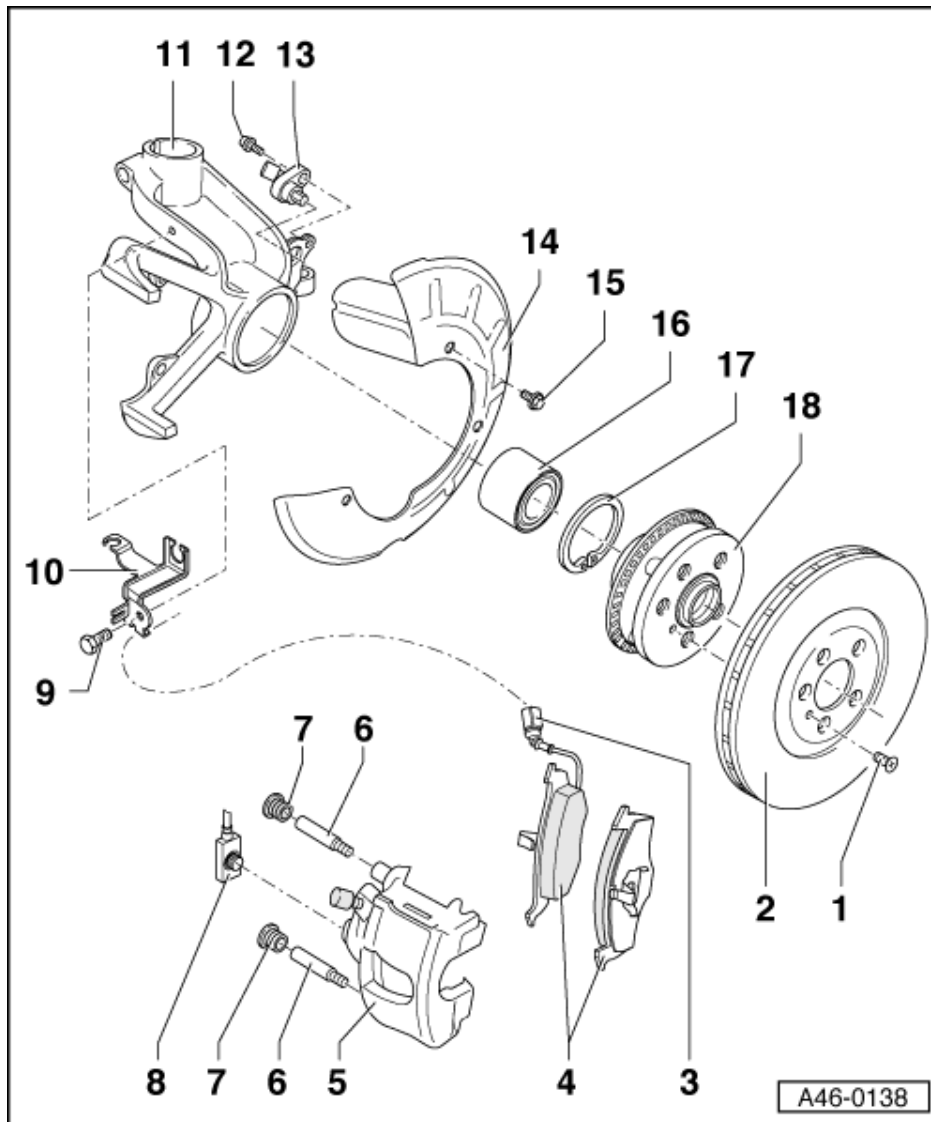
5 Brake caliper

- ◆ Do not disconnect brake hose when changing brake pads
- ◆ Removal:
 - Brake pads -Item **92**
 - Fit brake pedal depressor V.A.G 1869/2
 - Brake hose -Item **8** - Detach from brake caliper
- ◆ Installation:
 - Brake pads -Item **83**
 - Brake hose -Item **8** - Attach to brake caliper
 - Remove brake pedal depressor V.A.G 1869/2.
 - Bleed brake system => Page **165**
- ◆ Repairing => Page **155**

6 Guide pin, 28 Nm



- 7 Trim cap
 - ♦ Remove
- 8 Brake hose with banjo union with banjo bolt, 35 Nm
- 9 Hexagon bolt, 10 Nm
- 10 Bracket
- 11 Wheel bearing housing
- 12 Hexagon socket-head bolt
8 Nm
- 13 ABS speed sensor
 - ♦ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.
- 14 Cover plate
- 15 Hexagon bolt, 10 Nm



16 Wheel bearing

- ◆ Renew each time after removing
- ◆ Pressing out and in

=> Running Gear, FWD; Repair group 40; Servicing front suspension; - Servicing wheel bearing Servicing front suspension - Servicing wheel bearing

17 Circlip

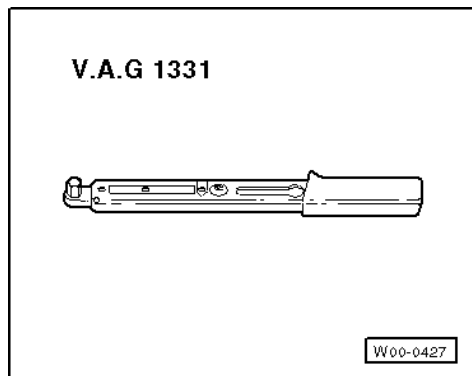
18 Wheel hub with rotor

- ◆ Pressing out and in

=> Running Gear, FWD; Repair group 40; Servicing front suspension; - Servicing wheel bearing Servicing front suspension - Servicing wheel bearing

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2.3 - Removing and installing brake pads

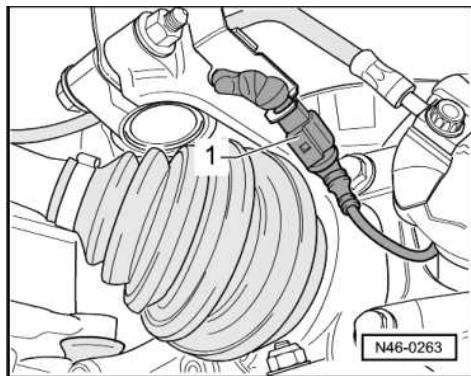


Special tools and workshop equipment required

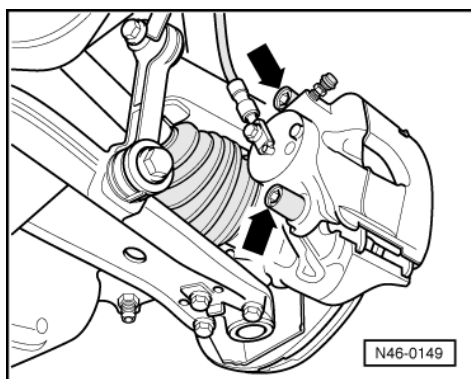
- ♦ V.A.G 1331 Torque wrench
- ♦ Piston resetting tool

Removing

- Remove protective caps.



- -> On vehicles equipped with brake pad wear indicators disconnect connector -1-.



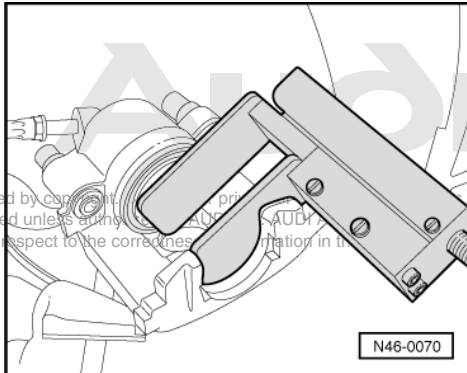
- -> Unscrew both guide pins -arrows- from brake caliper and remove.
- Detach brake caliper housing and secure with wire such that the weight of the brake caliper does not stress or damage the brake hose or brake hose bracket.
- Remove brake pad from brake caliper housing.



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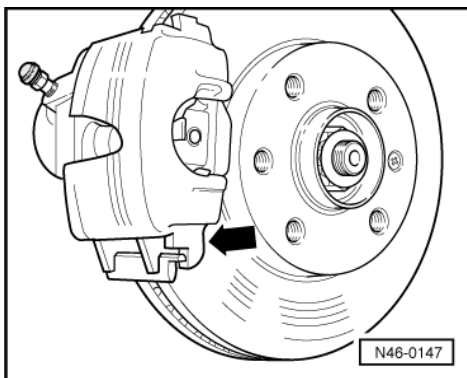
Only use methyated spirits to clean the brake caliper housing.

Installing



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.
- Insert brake pads into brake caliper housing and piston.



- -> Fit bottom of brake caliper housing first -arrow-.
- Install brake caliper housing with brake pads to wheel bearing housing.

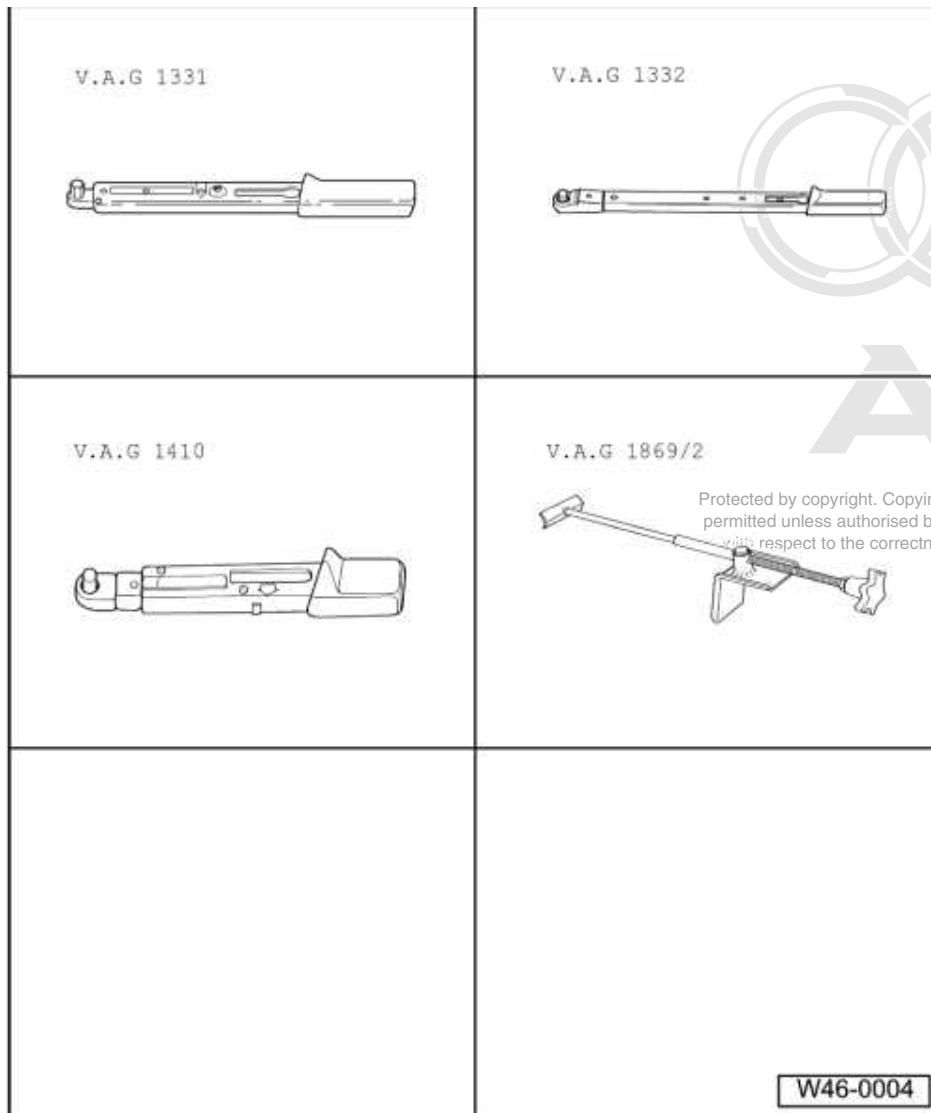
Pin - arrow- of brake caliper housing must be behind guide of wheel bearing housing.

- Secure brake caliper housing to brake carrier with both guide pins to 28 Nm.
- Insert brake pad wear indicator plug in bracket at suspension strut.
- ◆ 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.
- ◆ After changing brake pads check brake fluid level.



3 - Servicing rear wheel brake, drum brake

3.1 - Servicing rear wheel brake, drum brake

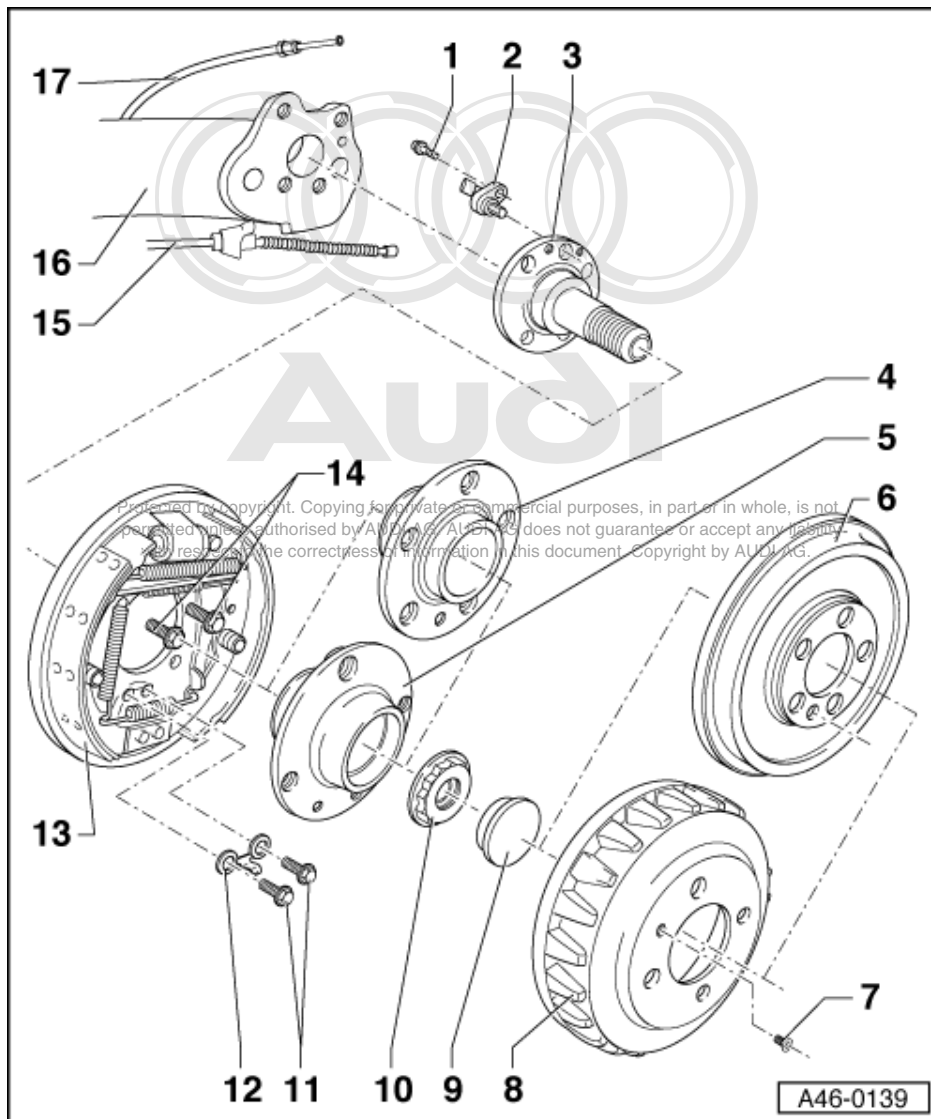


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Special tools and workshop equipment required

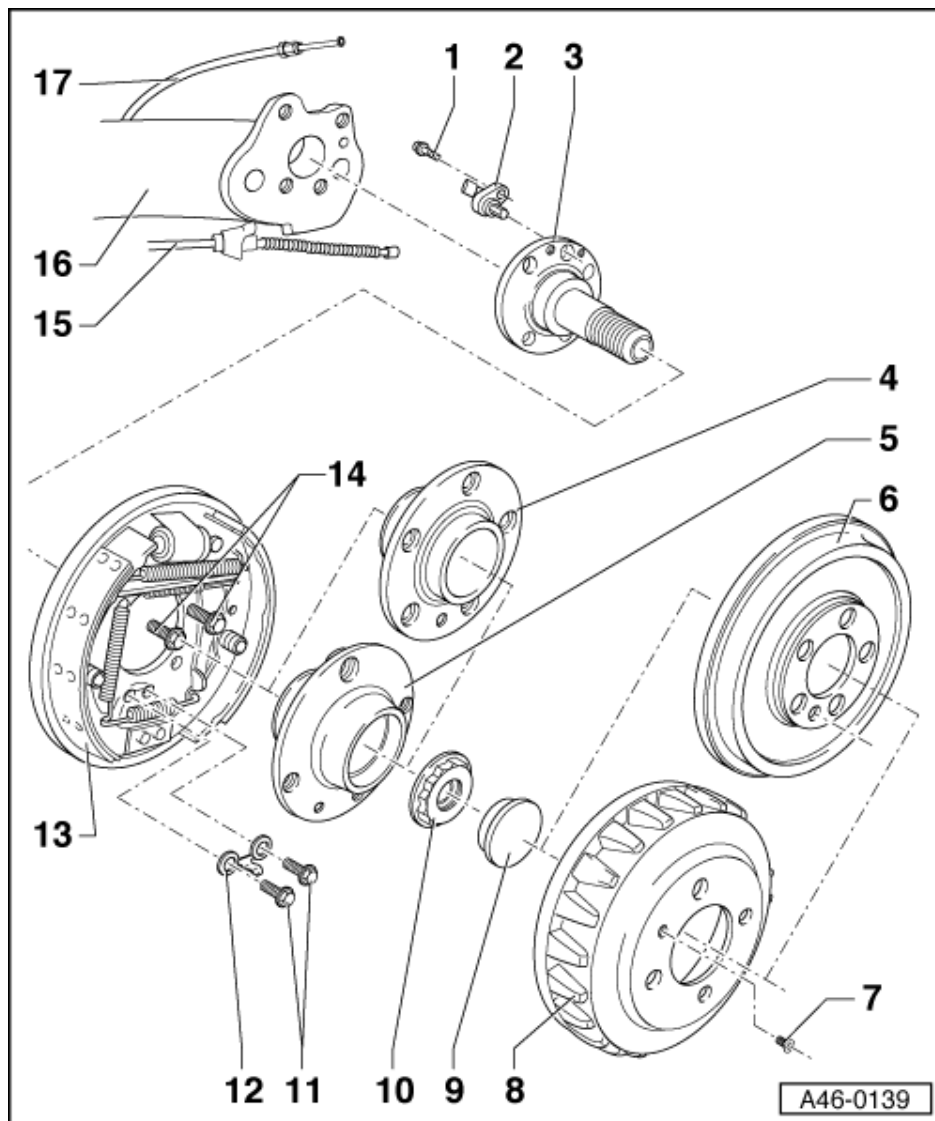
- ♦ V.A.G 1331 Torque wrench
- ♦ V.A.G 1332 Torque wrench
- ♦ V.A.G 1410 Torque wrench
- ♦ V.A.G 1869/2 Brake pedal depressor

3.2 - Removing and installing rear brake



- ◆ After replacing wheel brake cylinder, brake carrier and brake shoes, depress brake pedal once firmly with vehicle stationary so that the brake shoes are correctly 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.
- ◆ Brake pedal depressor VAG 1869/2 must be fitted before detaching a brake line from the wheel brake cylinder.

**1 Hexagon socket head bolt,
8 Nm**



2 ABS speed sensor

- ◆ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.

3 Stub axle

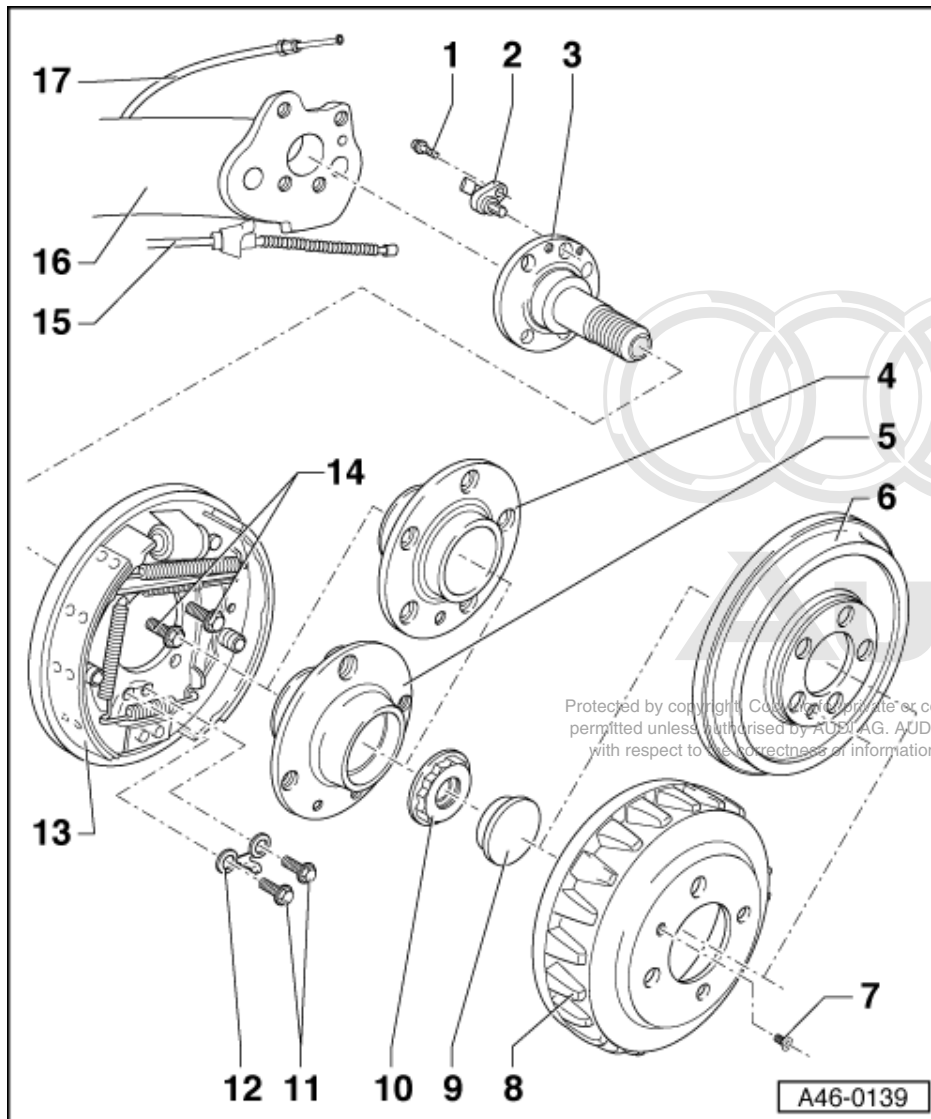
4 Wheel hub with wheel bearing

- ◆ (5- hole) see =>Parts Catalogue
- ◆ Renew each time after removing
- ◆ Replace only as complete unit
- ◆ Removing and installing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/ wheel hub unit, vehicles with drum brakes Servicing wheel bearings Removing and installing wheel bearing/ wheel hub unit, vehicles with drum brakes



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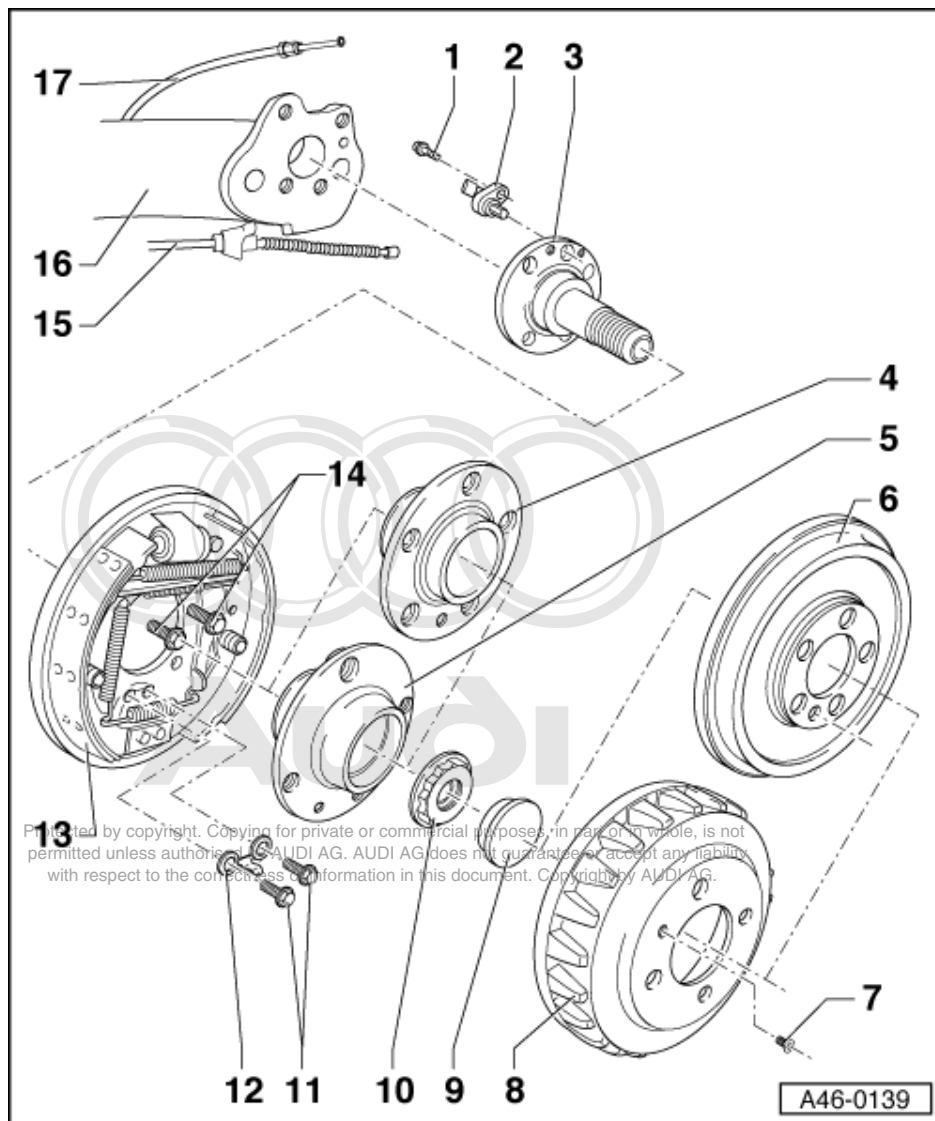
5 Wheel hub with wheel bearing

- ◆ (4- hole) see =>Parts Catalogue
- ◆ The ABS sensor ring is installed in the wheel hub
- ◆ Removing and installing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit

6 Brake drum

- ◆ (5- hole) see =>Parts Catalogue
- ◆ Brake drum diameter, 200 mm
- ◆ Wear limit 201.5 mm
- ◆ Clean carefully, check for wear, damage, dimensional accuracy, damaged wheel bolt threads and perfect brake contact surface



7 Countersunk screw, 4 Nm

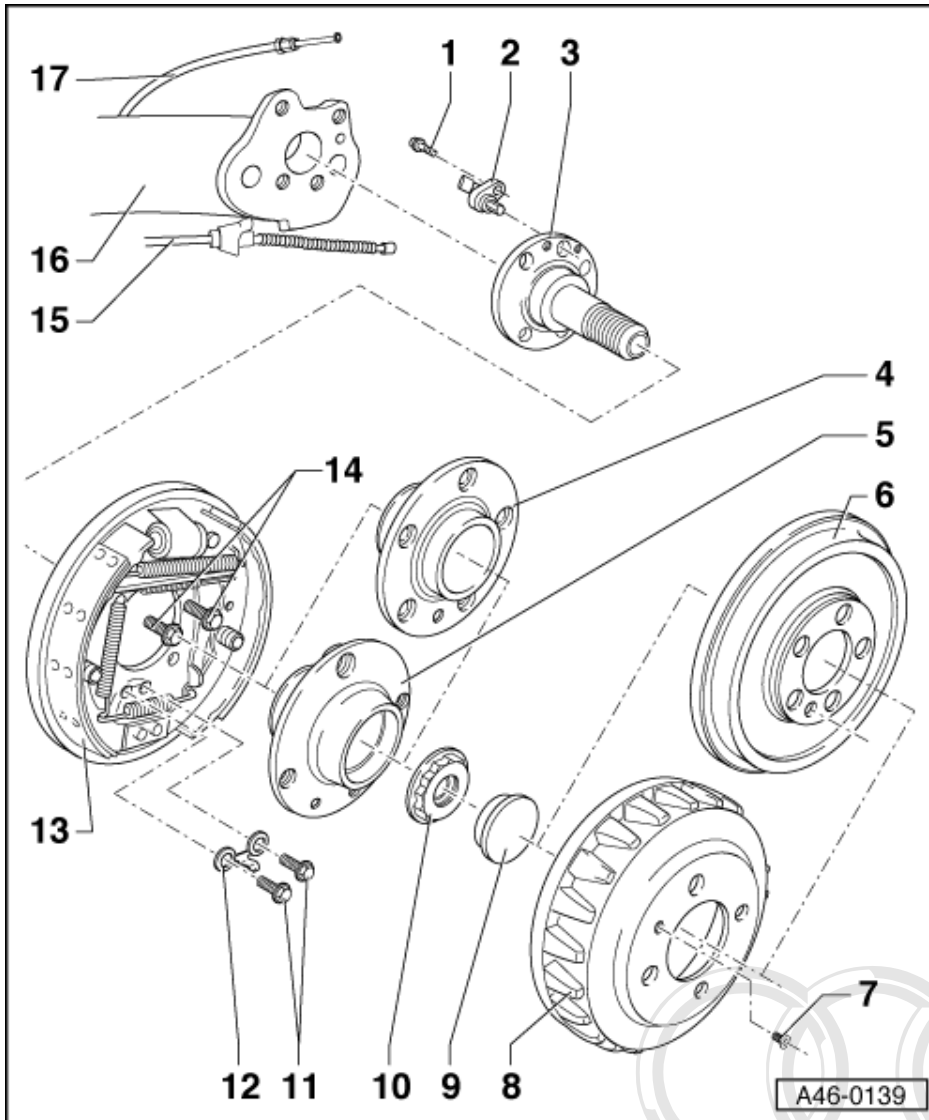
8 Brake drum

- ◆ (4- hole) see =>Parts Catalogue
- ◆ Brake drum diameter, 180 mm
- ◆ Wear limit 181.5 mm
- ◆ Reset before removing brake drum => Page **102**
- ◆ Clean carefully, check for wear, damage, dimensional accuracy, threads in the wheel hub and perfect brake contact surface
- ◆ Check runout

9 Cap

- ◆ Removing and installing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit



10 Double hexagon nut, self-locking, 175 Nm

- ◆ Renew each time after removing

11 Hexagon bolt, 60 Nm

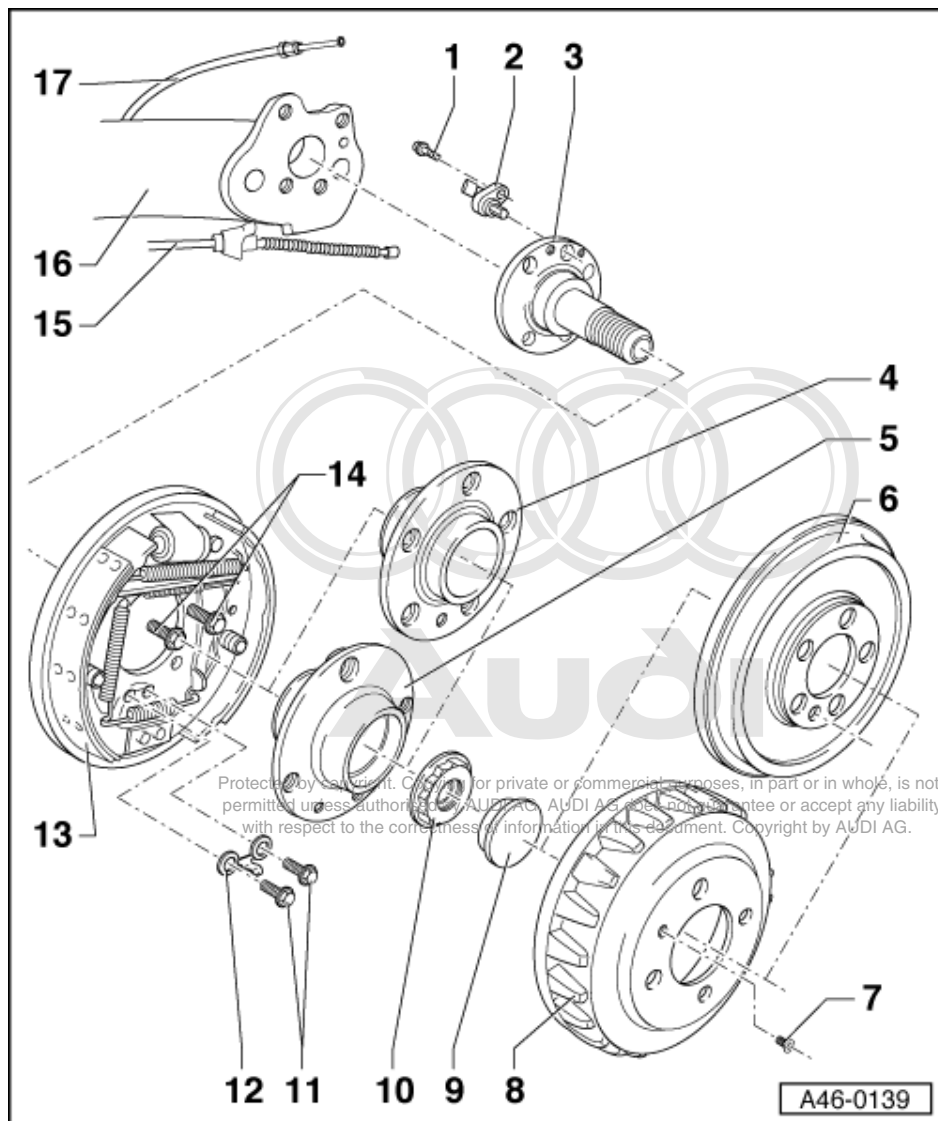
- ◆ Renew each time after removing
- ◆ With dished washer

12 Retainer for handbrake cable

13 Brake carrier with brake shoes

- ◆ Reset brake before removing brake drum => Page 102
- ◆ Removal:
 - Attach hose of bleeder bottle on bleeder screw
 - Open bleeder screw
 - Fit brake pedal depressor V.A.G 1869/2
 - Reset brake => Page 102 .

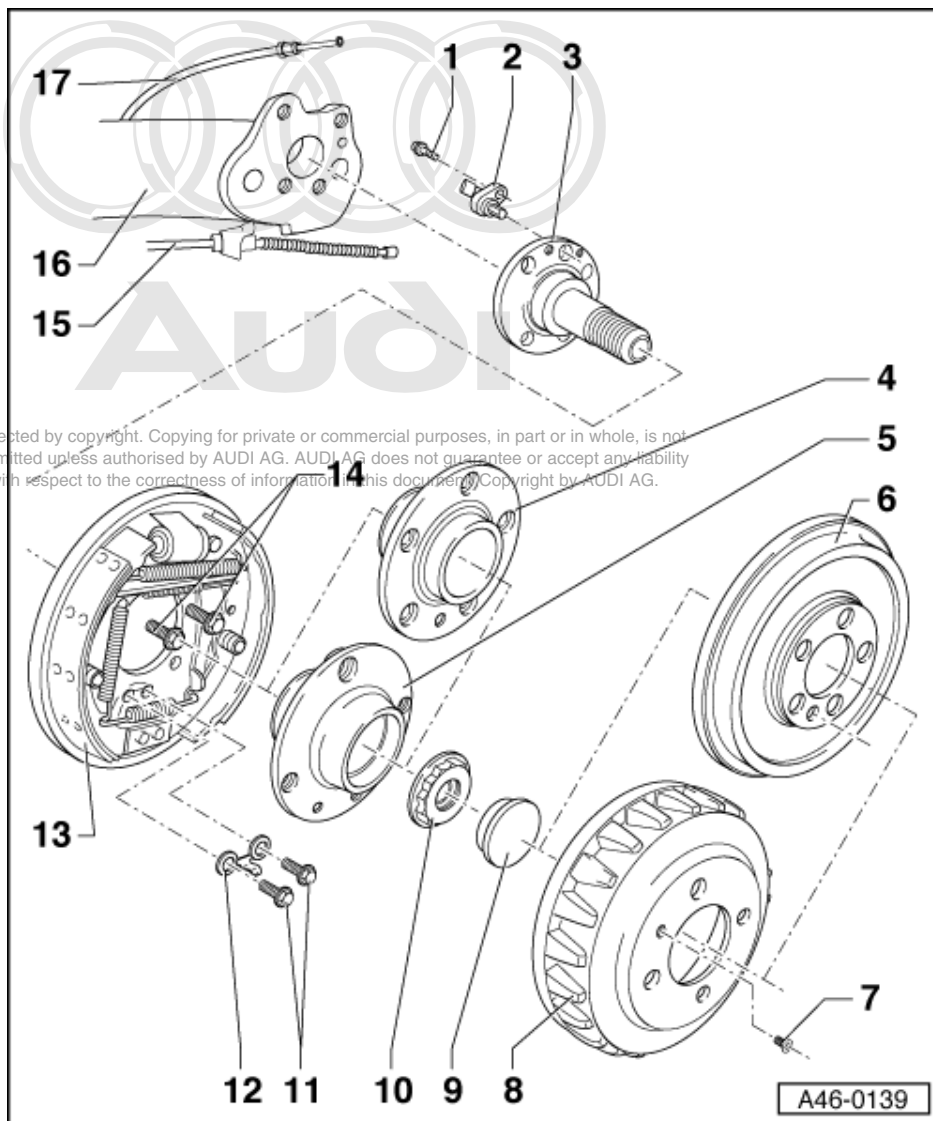
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- Remove brake drum
- Removing wheel hub with wheel bearing

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit

- Remove brake pipe -Item **17** -
- Remove brake carrier
- ◆ Installation:
- Install brake carrier
- Attach brake pipe -Item **17** -
- Install wheel hub with wheel bearing
- Remove brake pedal depressor V.A.G 1869/2.
- Install brake drum
- Bleed brake system => Page **165**
- ◆ Repairing => Page **103**



14 Hexagon bolt, 60 Nm

- ♦ Renew each time after removing
- ♦ With dished washer

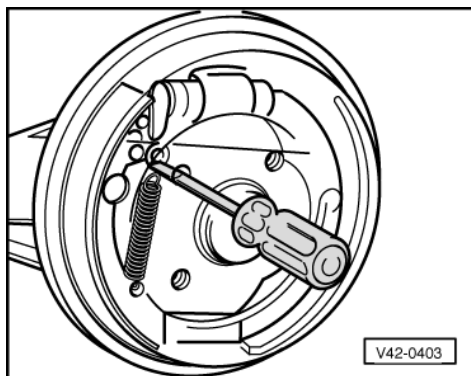
15 Handbrake cable

- ♦ Adjusting handbrake=>Page 108

16 Axle beam

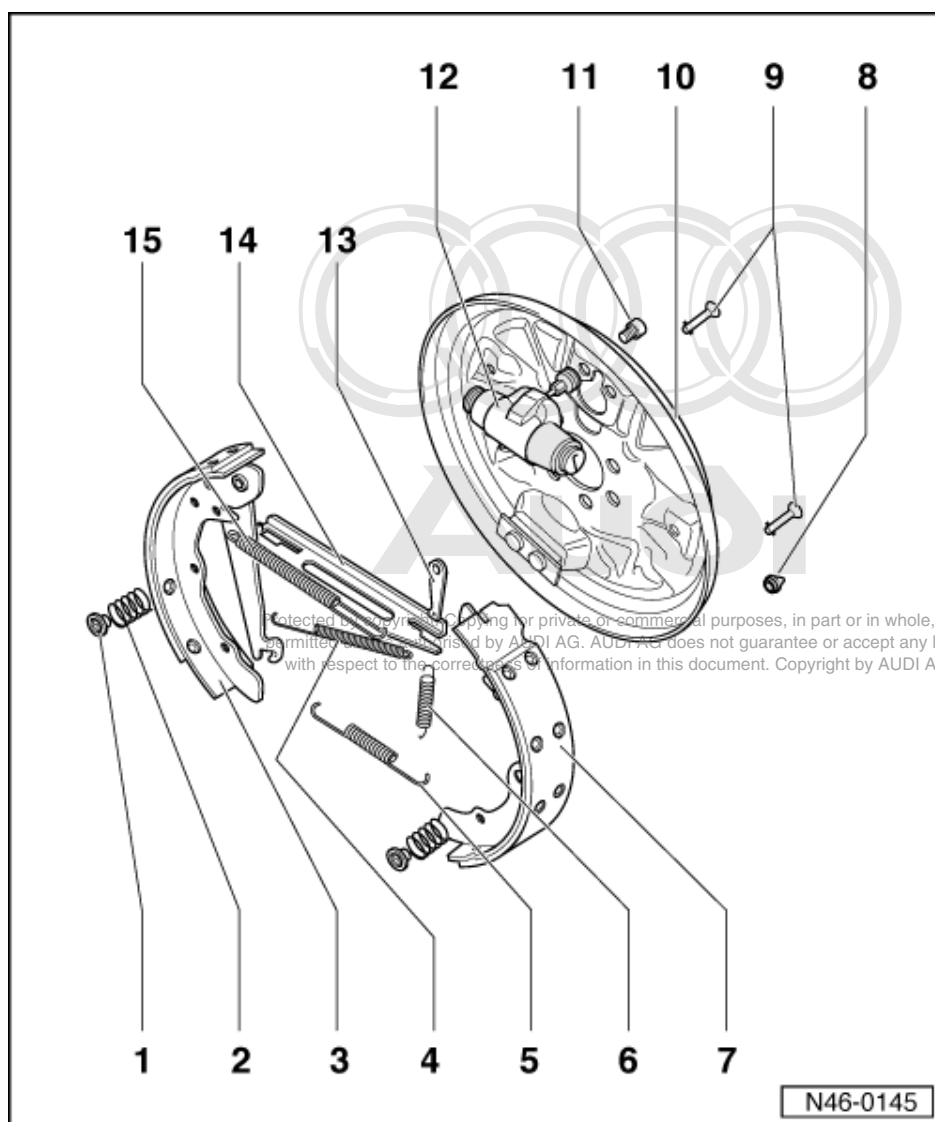
17 Brake pipe

3.3 - Resetting brake



- -> Insert screwdriver through wheel-bolt threaded hole in wheel hub/brake drum to push the wedge upwards.

3.4 - Servicing rear brakes



After performing work on rear brake:

- ♦ Release handbrake.
- ♦ Firmly press brake pedal once.

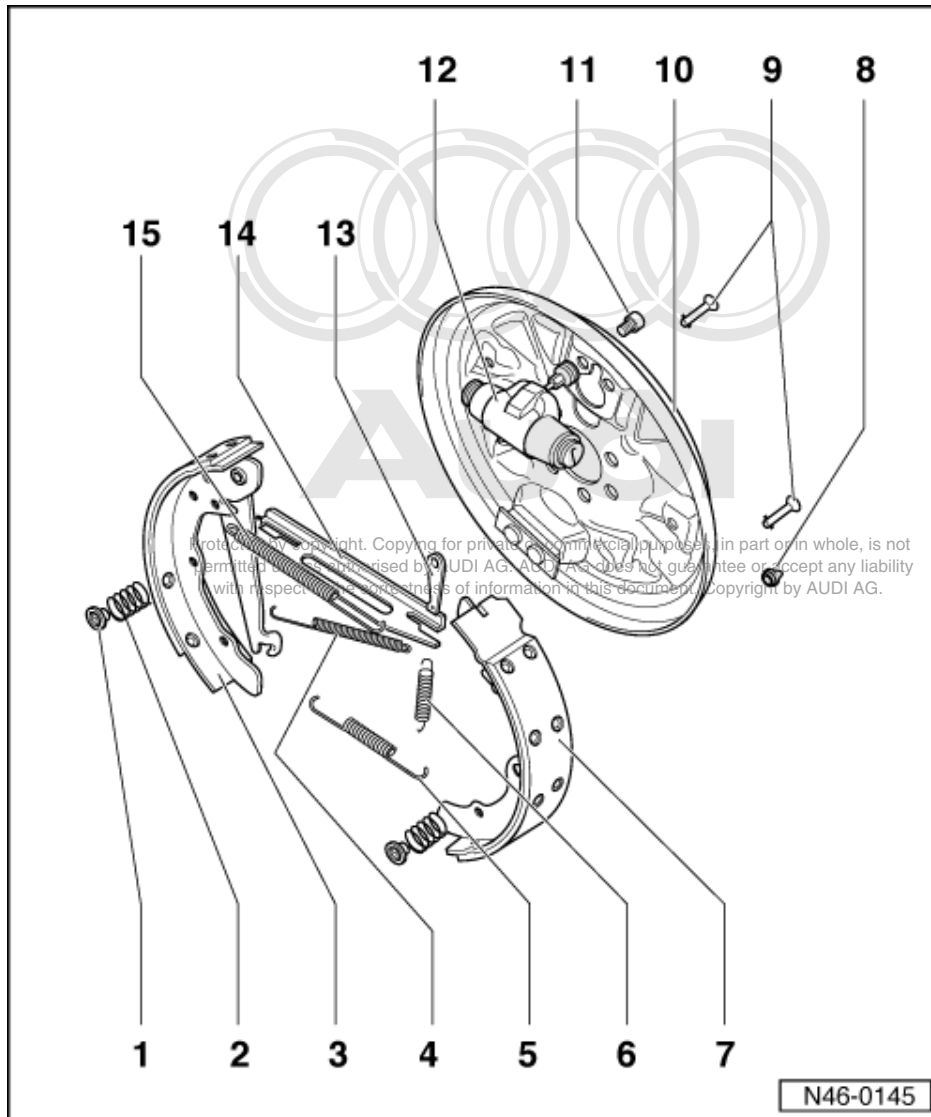
1 Spring plate

- ♦ To remove, press against compression spring and turn through 90°

2 Spring

3 Brake shoe with lever for handbrake

- ♦ Note different versions =>Parts catalogue
- ♦ removing and installing
=>Page 106 .
- ♦ Adjusting handbrake=>Page 108



4 Upper return spring,

- ♦ Release using special tool 3438

5 Lower return spring

- ♦ Grease contact points with lubricating paste, part- no. G 000 650

6 Tension spring

7 Brake shoes

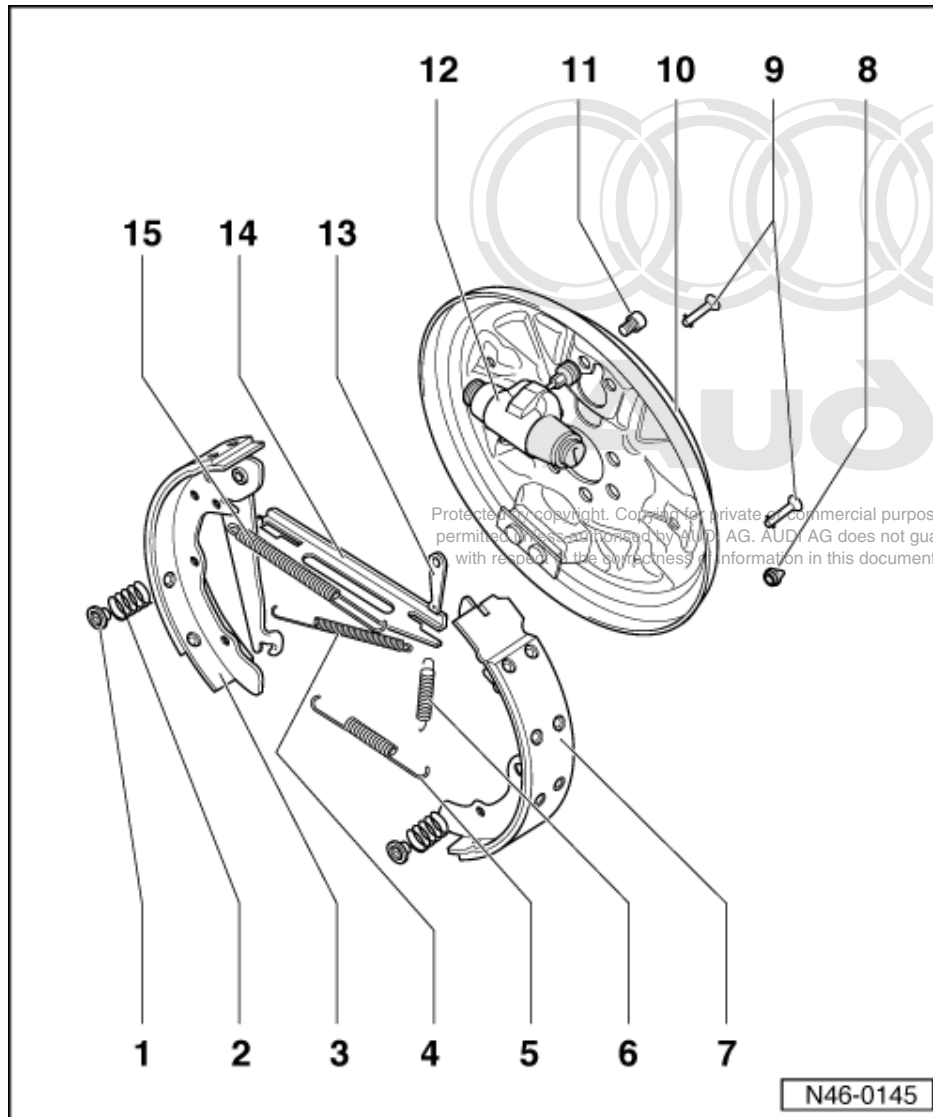
- ♦ Note different versions =>Parts Catalogue
- ♦ Removing and installing
=>Page 106 .



- ♦ Minimum pad thickness 2.5 mm
- ♦ Check thickness

=> Maintenance manual; Description of operations; Front and rear brake pads: check thickness

Brake pads are also available without brake shoes



8 Cap

- ♦ Remove to check brake pad thickness

9 Spring pin

10 Brake carrier

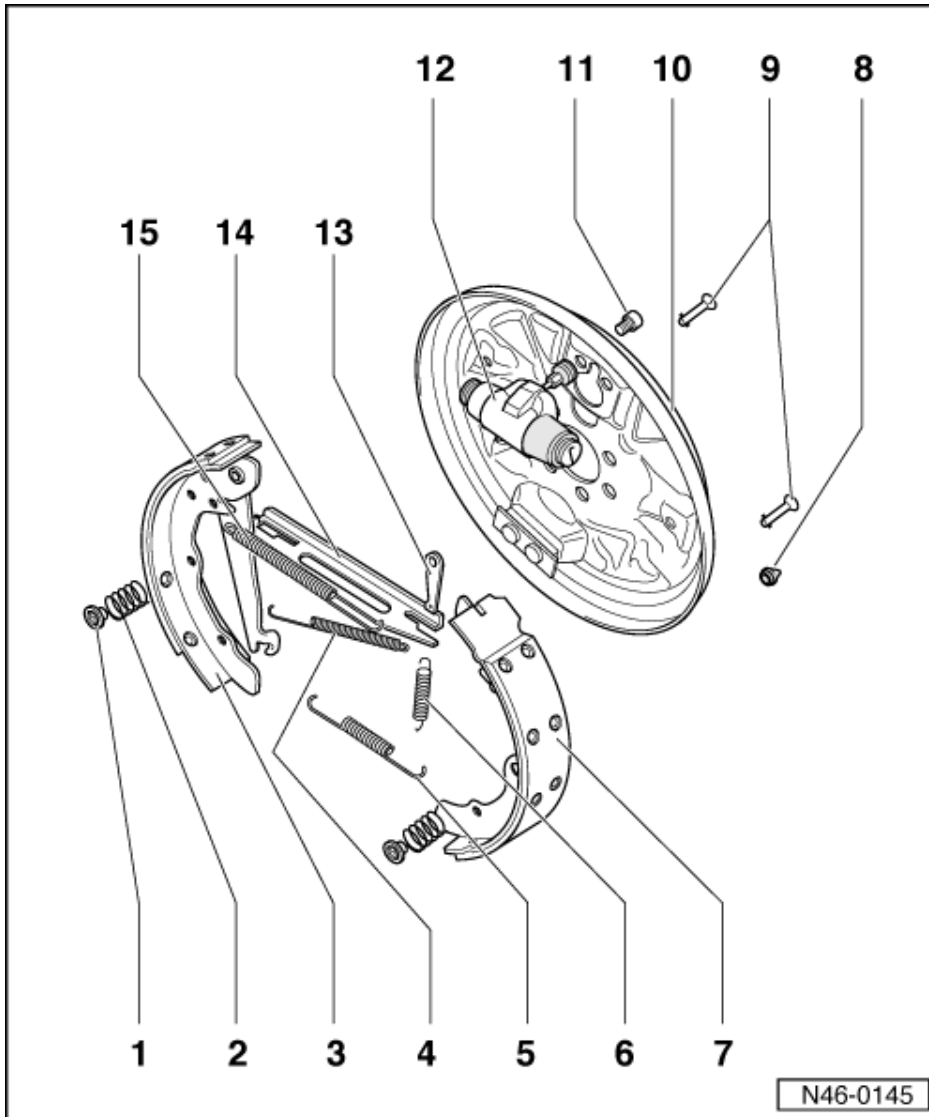
11 Hexagon socket-head bolt
8 Nm

12 Wheel-brake cylinder

- ♦ Leak test
=> Fig. 1

13 Wedge

- ♦ Push upwards through threaded wheel-bolt hole to install the brake drum=>Page 102 .

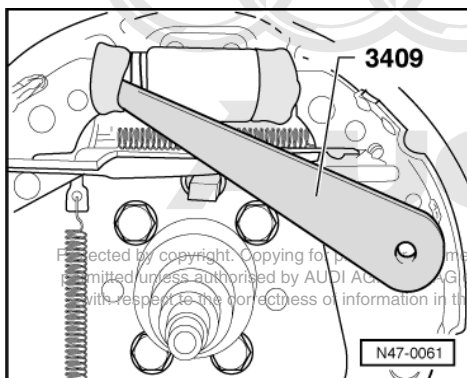


14 Push rod

- ♦ Note different versions =>Parts Catalogue
- ♦ Before fitting the pads, clean the pad guide surfaces and apply a coat of lithium grease G 052 142 A2.

15 Locating spring

- ♦ Release using special tool 3409



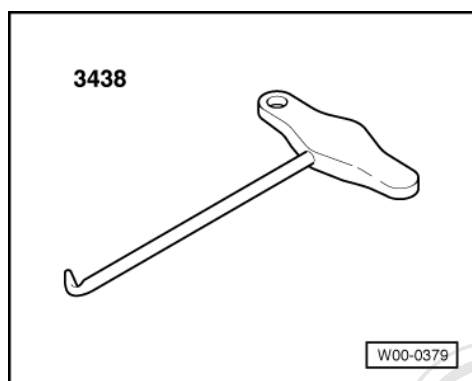
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-> Fig.1 Checking wheel-brake cylinder for leaks

- Lift off dust sleeve
- Replace wheel-brake cylinder if brake fluid is found in dust sleeve.

Take care not to damage dust sleeve when lifting off.

3.5 - Removing and installing brake shoes



Special tools and workshop equipment required

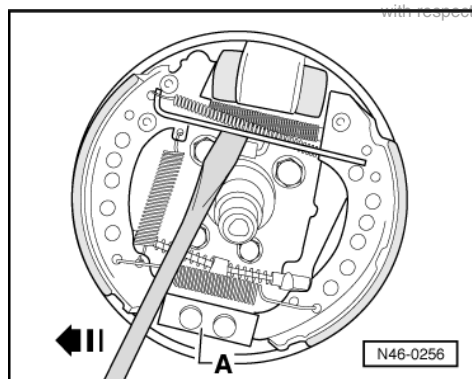
- ♦ Hook 3438

Removing

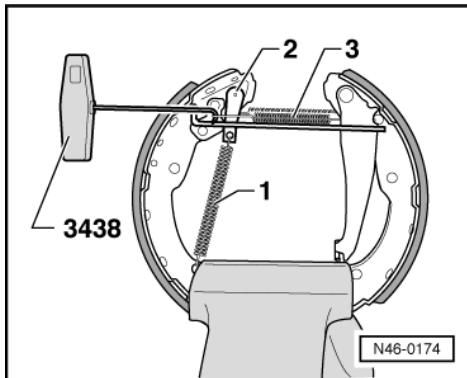
- Remove brake drum => Removing and installing rear brake, 95.
- Remove wheel hub with wheel bearing.

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit

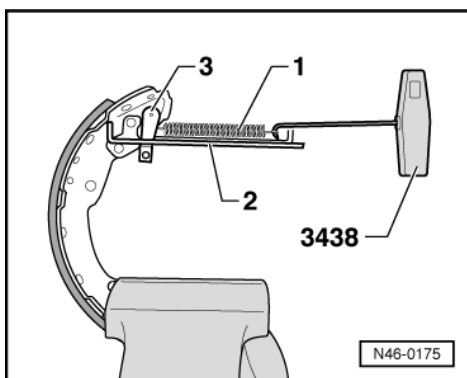
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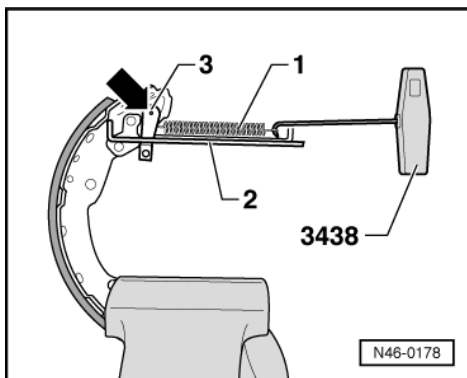
- Remove spring plate with spring.
- -> Lever out the brake shoes behind the lower support plate -A- in direction of arrow.
- Set the brake shoes aside on the lower support plate.
- Disengage lower return spring.
- Detach brake shoes.
- Disengage handbrake cable.
- Clamp brake shoes in vice.



- -> Remove tension spring -1- for wedge -2-.
- Remove upper return spring -3- using special tool 3438.



- -> Release locating spring -1- using special tool 3438.
- Remove the push rod -2- and the wedge -3- from the brake shoe.



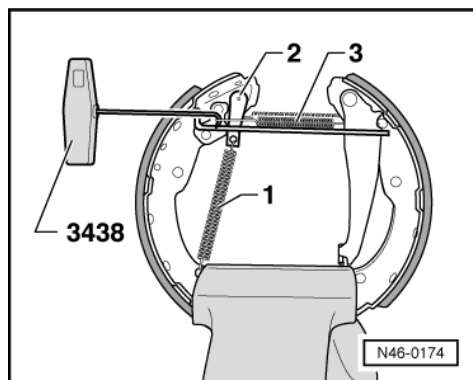
Installing

- -> Engage locating spring -1- in the push rod -2- using special tool 3438.
- Insert the wedge -3- at the same time.

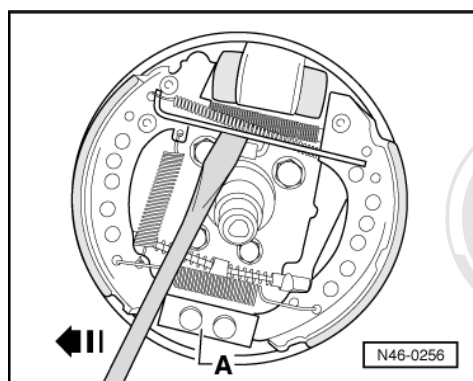
Installation position:

The raised area -arrow- must remain visible when installed.

- Insert brake shoe with brake lever in push rod.



- -> Engage return spring -3- using special tool 3438.
- Engage tension spring -1- for wedge -2-.
- Position brake shoes on pistons of wheel-brake cylinder.
- Engage handbrake cable at brake lever.



- -> Engage lower return spring and lift brake shoes onto lower support -A-.
- Engage tension spring for wedge.
- Insert compression spring with spring plate.
- Install wheel hub with wheel bearing.

=> Running gear, FWD; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit

- Install brake drum.
- Firmly press brake pedal once.
- Adjusting handbrake =>Page 108 .

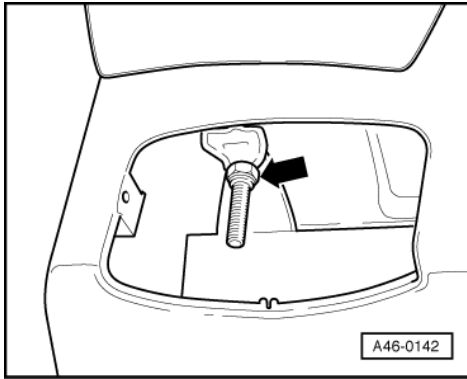
3.6 - Adjusting handbrake

The handbrake must be adjusted after charging/adjusting the service brake system. The service brake system must be fully functional.

The handbrake cables must not be under tension.

Resetting is only required after replacing the handbrake cables, the brake carrier or brake pads.

- Release handbrake.
- Remove the rear storage compartment.
- Firmly press brake pedal several times.
- Pull handbrake lever 4 notches.



- -> Tighten adjusting nut -arrow- until both wheels are difficult to turn by hand.
- Release handbrake and check, whether both wheels can spin freely. If necessary, screw back adjusting nut slightly.

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It is unnecessary to adjust the handbrake after readjustment owing to the automatic adjustment of the rear brake.

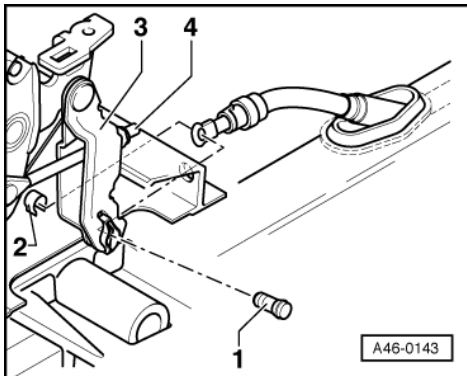
4 - Removing and installing handbrake cable (drum brake)

4.1 - Removing and installing handbrake cable (drum brake)

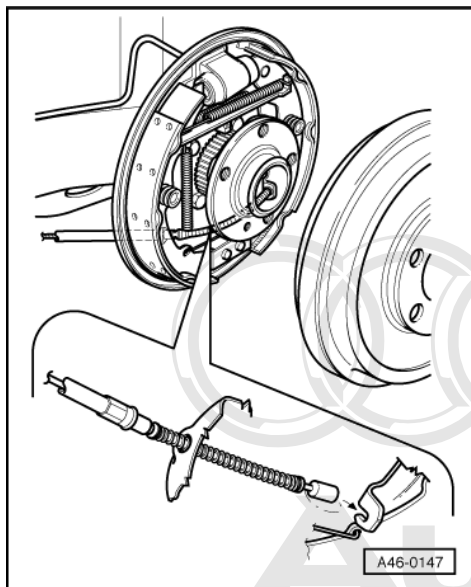
Removing

- Remove centre console,

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console Storage compartments, covers and trims Removing and installing centre console

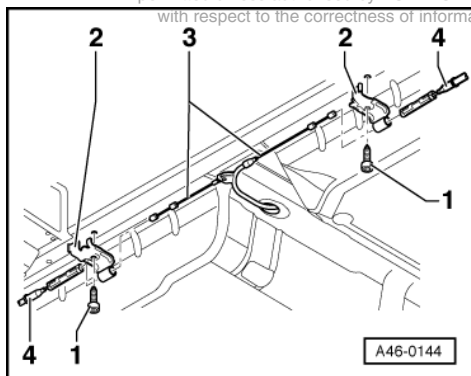


- Release handbrake.
- -> Loosen the adjusting nut -4-.
- Pull the retainer -2- out of the pin -1-.
- Pull the pin -1- out of the lever arm -3-.
- Raise vehicle.
- Remove wheel.

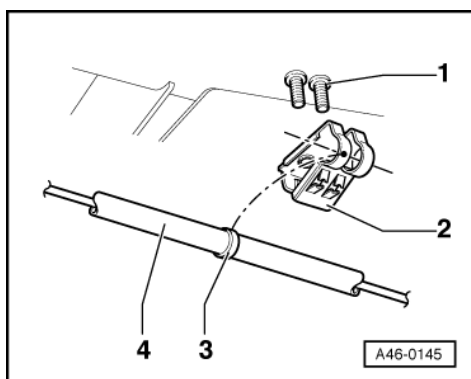


- -> Remove brake drum.
- Disengage handbrake cable.

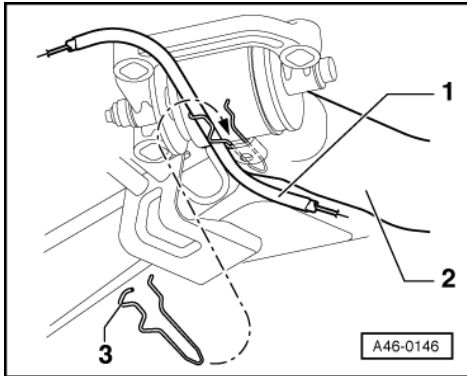
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- -> Remove support bracket -2-
- Separate cables -3- and -4-



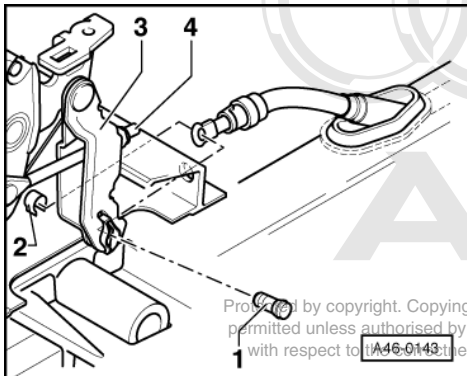
- -> Release clip -2- and detach cable.



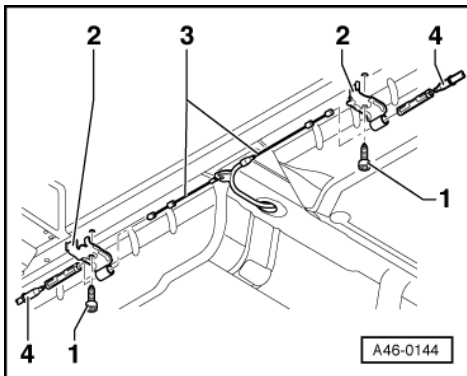
- -> Detach the cable -1- from the handbrake cable bracket -3-

Installing

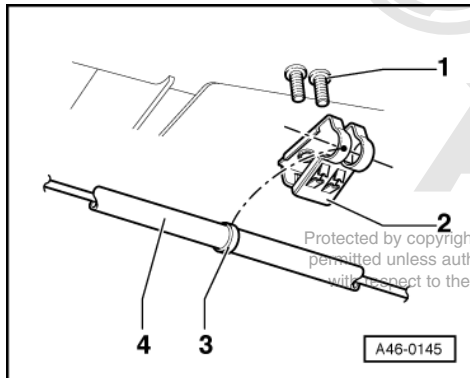
- Push in handbrake cable with guide tube.
- Engage handbrake cable at brake lever.



- Install brake drum.
- -> Install pin -1- with lever arm -3- and secure



- -> Engage cable in support bracket and install
 Tightening torque 10 Nm



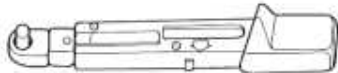
- -> Locating ring -3- at handbrake cable must be positioned in centre of fastening clip -2-
- Engage handbrake cable in bracket at axle beam.
- Install centre console,

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console. Storage compartments, covers and trims Removing and installing centre console.

- Adjusting handbrake =>Page 108 .

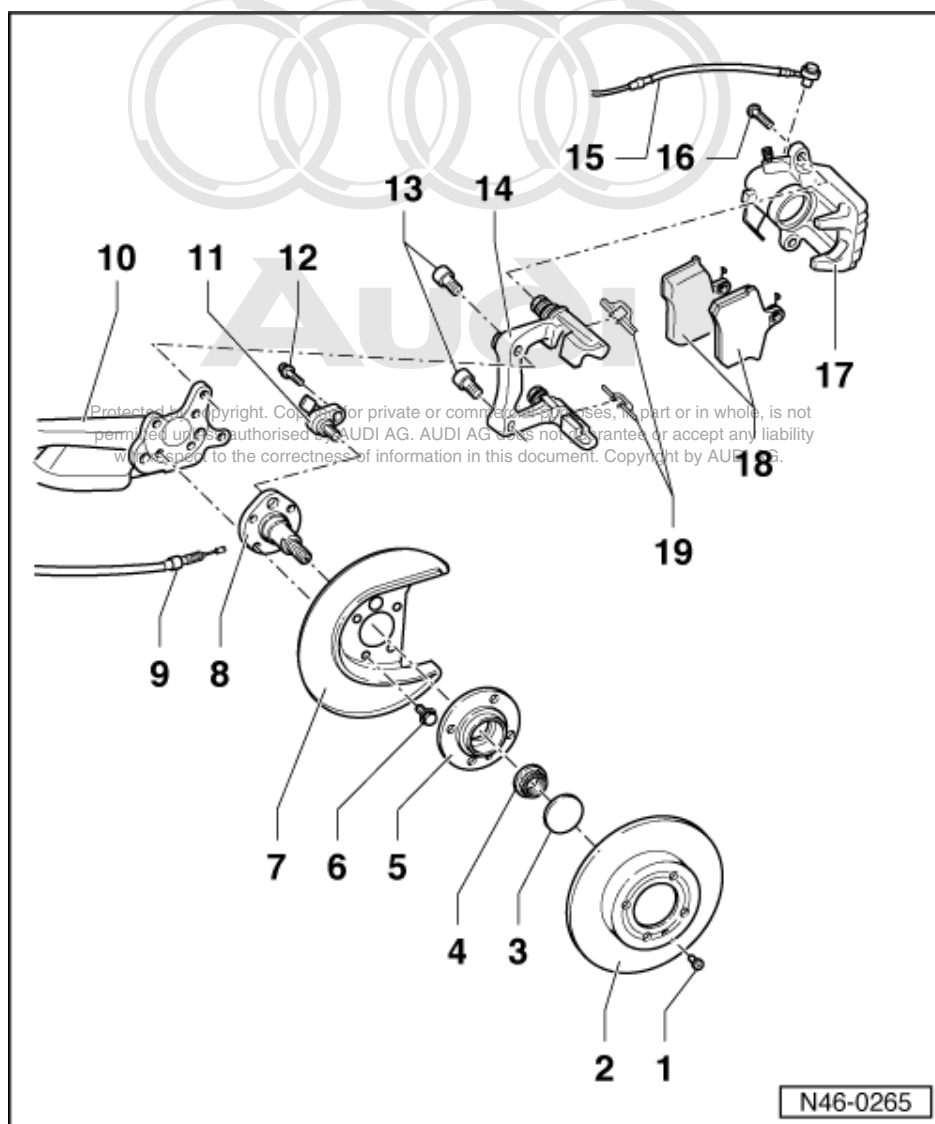
5 - Servicing rear wheel brake (disc brake)

5.1 - Servicing rear wheel brake (disc brake)

V.A.G 1331 	V.A.G 1332 
V.A.G 1410 	V.A.G 1869/2 
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Special tools and workshop equipment required

- ◆ V.A.G 1331 Torque wrench
- ◆ V.A.G 1332 Torque wrench
- ◆ V.A.G 1410 Torque wrench
- ◆ V.A.G 1869/2 Brake pedal depressor



Notes:

- ♦ 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.
- ♦ Brake pedal depressor VAG 1869/2 must be fitted before removing a brake caliper or disconnecting a brake hose from the brake caliper.

1 Cross-head screw, 4 Nm



- ◆ Thickness 9 mm
- ◆ Wear limit 7 mm
- ◆ When worn, always renew both sides

3 Cap

- ◆ Removing and installing

=> Running gear, Axles, Steering; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes

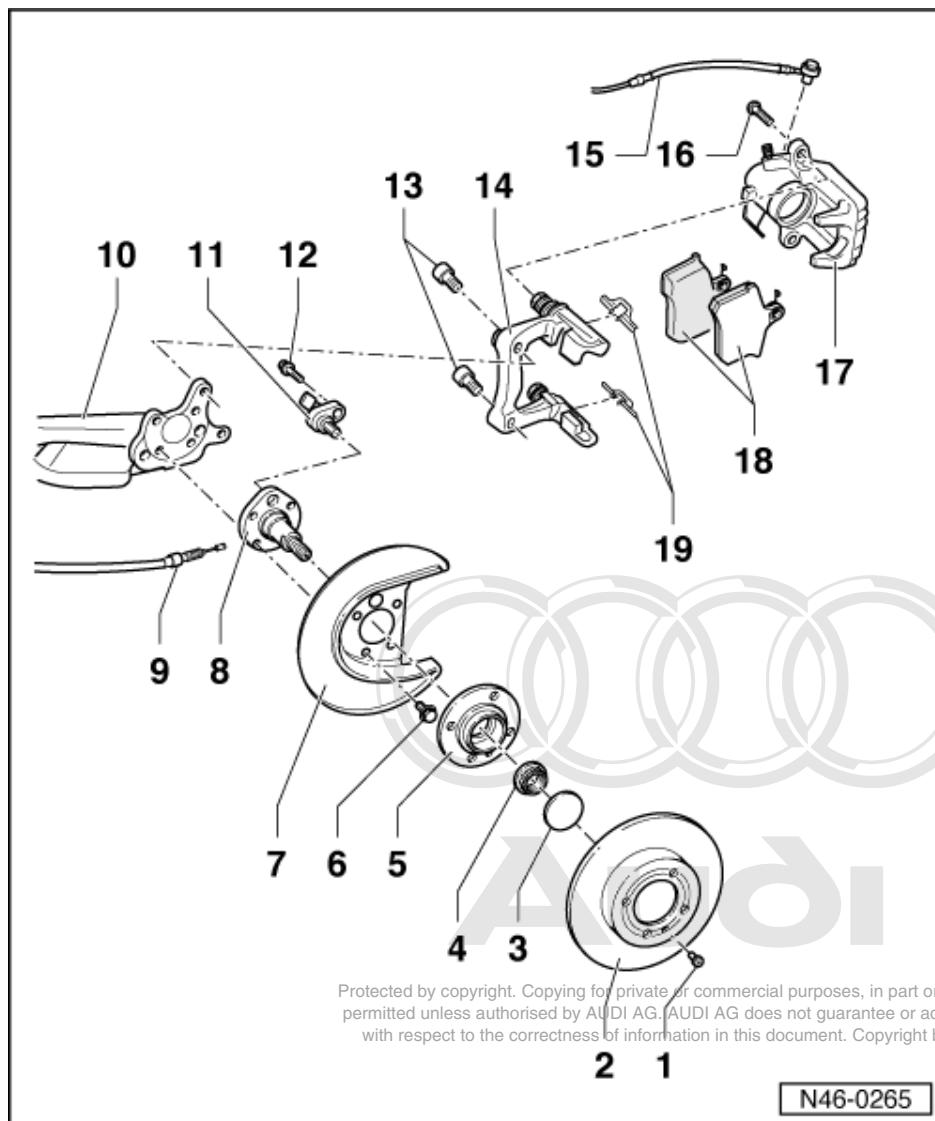
4 Double hexagon nut, self-locking, 175 Nm

- ◆ Renew each time after removing

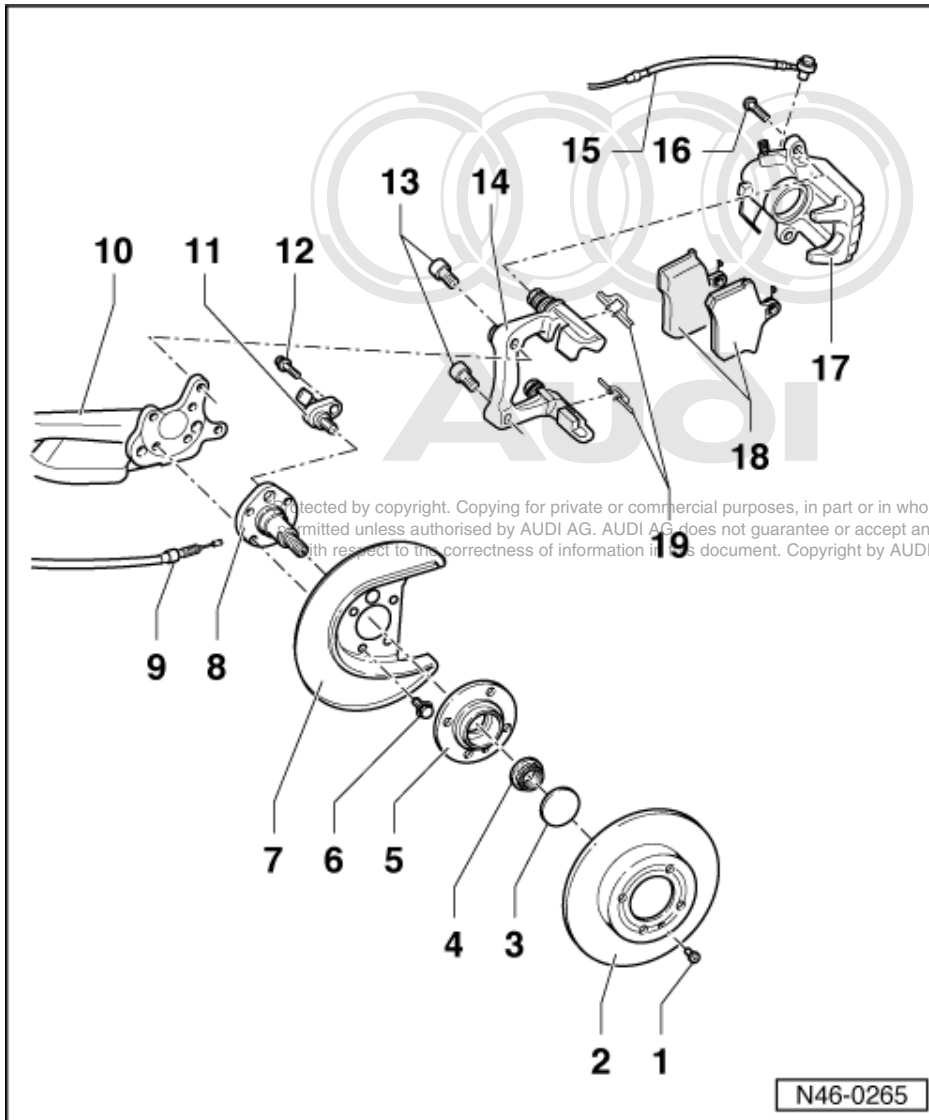
5 Wheel hub with wheel bearing and rotor

- ◆ Replace only as complete unit
- ◆ Removing and installing

=> Running gear, Axles, Steering; Repair group 42; Servicing wheel bearings; Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes Servicing wheel bearings Removing and installing wheel bearing/wheel hub unit, vehicles with disc brakes



- 6 Hexagon bolt, 60 Nm
♦ With dished washer
- 7 Cover plate
- 8 Stub axle
- 9 Handbrake cable
♦ Adjusting handbrake
=>Page 122 .
- 10 Axle beam
- 11 ABS speed sensor
♦ Before inserting sensor, clean fitting hole inner surface and coat with lubricating paste G 000 650.
- 12 Hexagon socket-head bolt
8 Nm
- 13 Hexagon socket head bolt,
65 Nm



14 Brake carrier with guide pin and protective cap

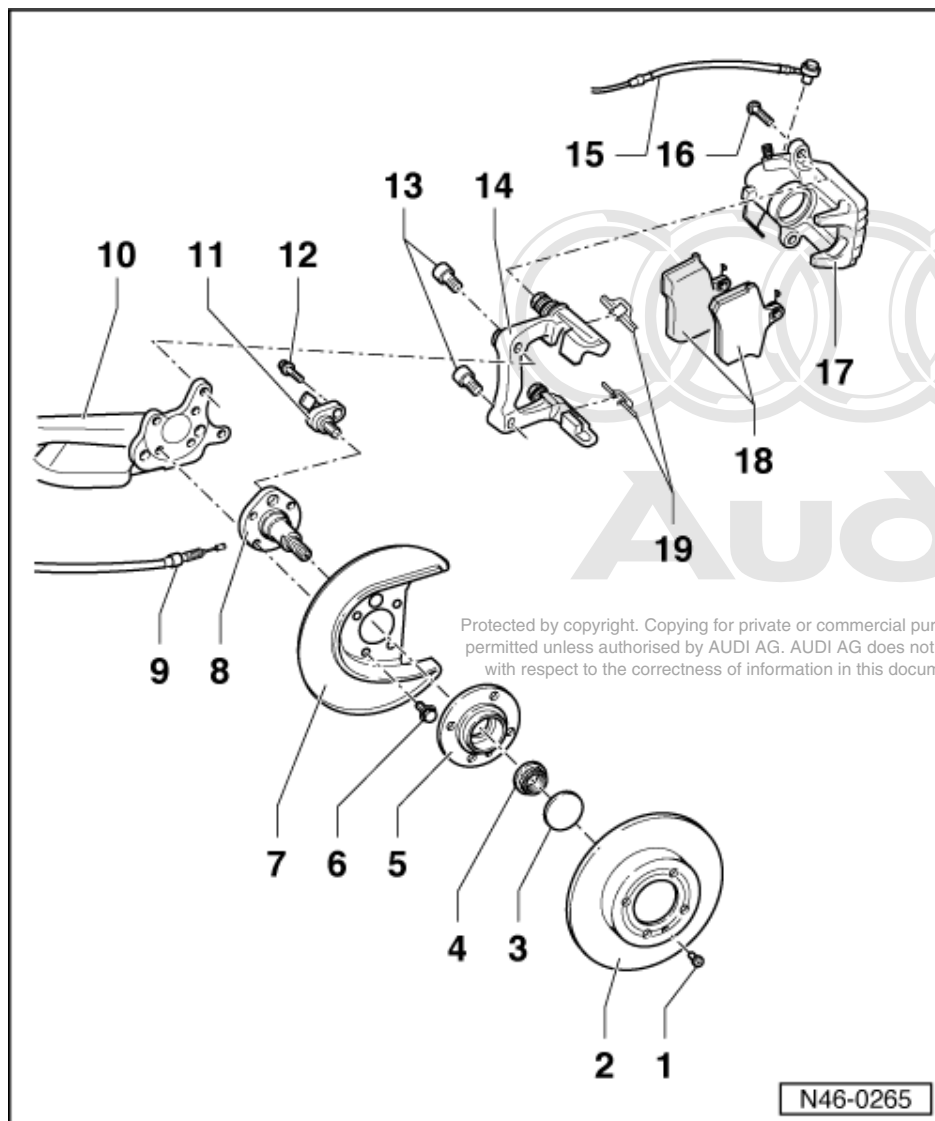
- ♦ Supplied as replacement part assembled with sufficient quantities of grease on guide pins
- ♦ If protective caps or guide pins are damaged, install repair kit. Use grease sachet supplied to lubricate guide pins.

15 Brake hose/brake pipe

- ♦ With banjo bolt and sealing rings
- ♦ Tightening torque of banjo bolt to brake caliper 35 Nm
- ♦ Do not disconnect brake hose when changing brake pads

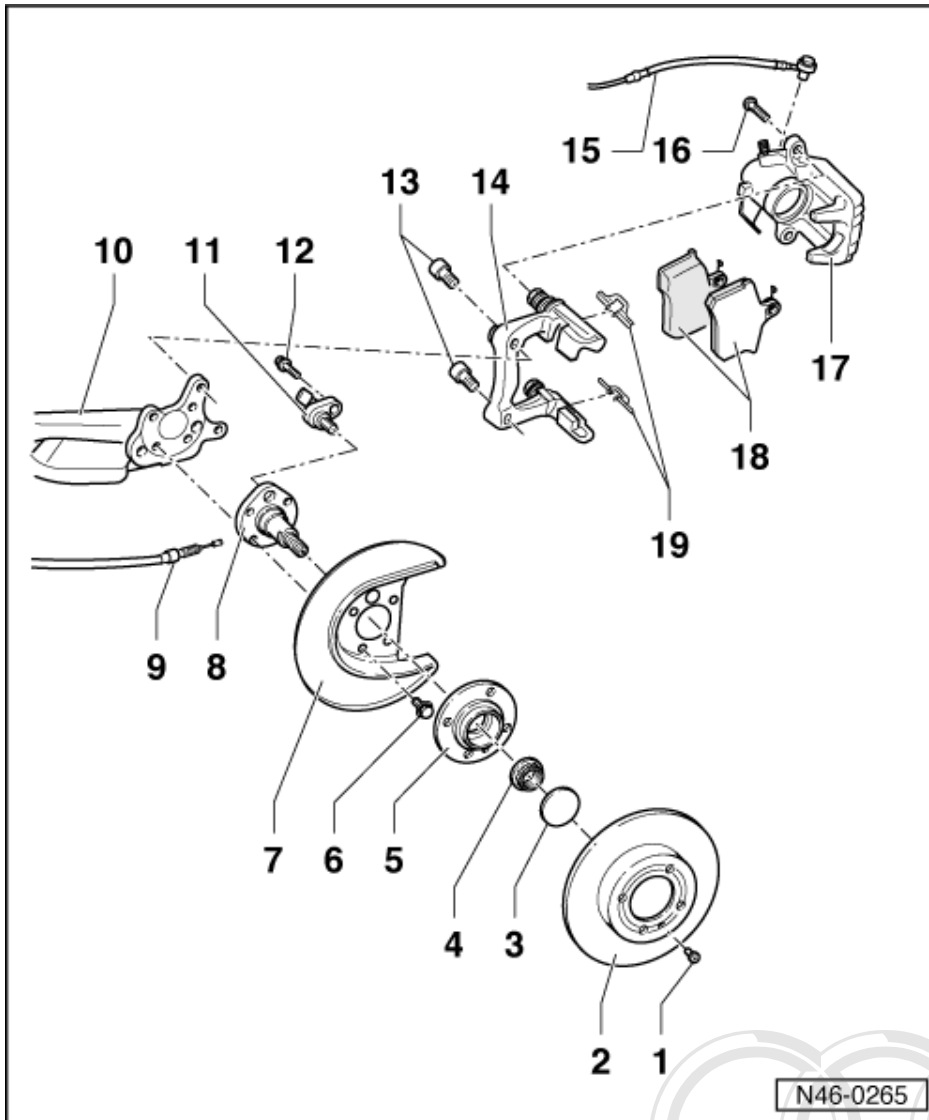
16 Hexagon bolt, Self-locking, 35 Nm

- ♦ Replace



17 Brake caliper

- ◆ Do not disconnect brake hose when changing brake pads
- ◆ Removal:
 - Brake pads -Item 120
 - Fit brake pedal depressor V.A.G 1869/2
 - Brake hose -Item 15 - Detach from brake caliper
- ◆ Installation:
 - Brake pads -Item 121
 - Brake hose -Item 15 - Attach to brake caliper
 - Remove brake pedal depressor V.A.G 1869/2.
 - Bleed brake system => Page 165
- ◆ Repairing => Page 159
- ◆ The handbrake cable must be adjusted following repair or replacement.
- ◆ Adjusting handbrake =>Page 122



18 Brake pads

- ♦ Thickness 12 mm
- ♦ Checking thickness:

=> Maintenance manual; Description of operations; Front and rear brake pads: check thickness

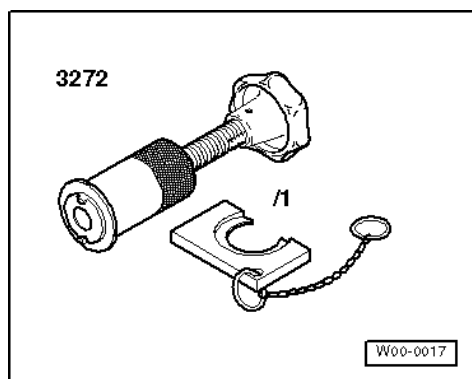
- ♦ Always replace all components on an axle
- ♦ Removing and installing
=>Page 120.
- ♦ Wear limit: 7.5 mm including backplate
- ♦ Before fitting the pads, clean the pad guide surfaces and apply a coat of lithium grease G 052 142 A2.

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19 Pad retaining spring

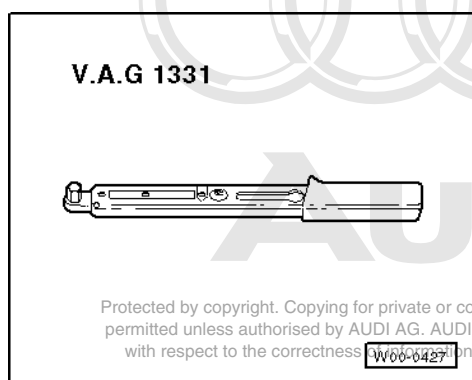
- ♦ Always replace when changing pads

5.2 - Removing and installing brake pads

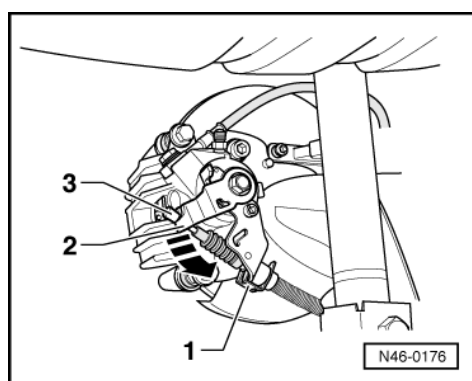


Special tools and workshop equipment required

- ♦ 3272 Resetting and removing tool



- ♦ V.A.G 1331 Torque wrench

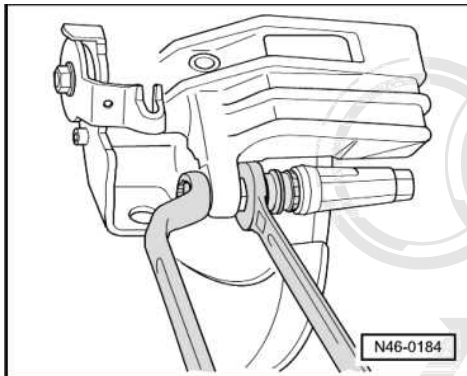


Note:

Mark brake pads when removing if they are to be reused. Reinstall in their original position to prevent uneven braking.

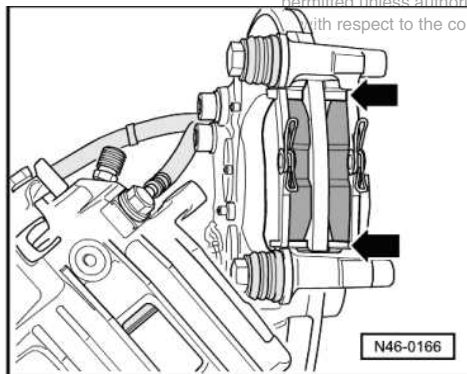
Removing

- Remove wheels.
- -> Detach c lip -1-.
- Push the handbrake lever -2- in direction of arrow and detach handbrake cable -3-.



- -> Remove bolts from brake caliper housing, counterholding on guide pins.
- Detach brake caliper housing and secure with wire such that the weight of the brake calliper does not stress or damage the brake hose.

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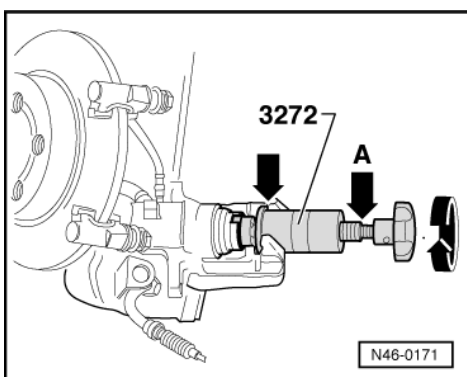


- -> Remove brake pads and pad retaining springs -arrows-.
- Clean brake caliper housing, in particular the bonding surface (at piston and brake caliper). It must be free of adhesive residues and grease.

Only use methylated spirits to clean the brake caliper housing.

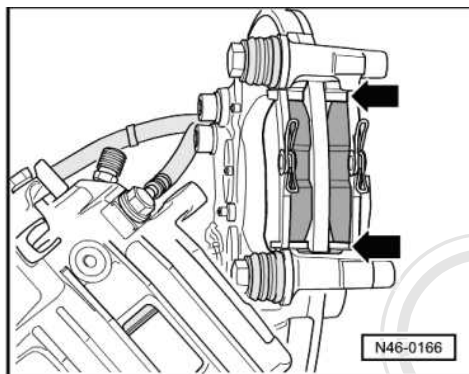
Installing

Before pressing the piston back, draw off brake fluid from the reservoir. For extracting use a bleeder bottle or a plastic bottle which is only used for brake fluid. Brake fluid is poisonous and must on no account be siphoned by mouth through a hose.



- -> Screw piston by turning knurled wheel of special tool 3272 clockwise, do not damage protective cap.
- ◆ Fit special tool 3272 so that the collar (arrow) of the tool is seated against the brake caliper.
- ◆ If piston is difficult to move, use a 13 mm AF open jaw spanner on the flats (arrow A) provided for this purpose.

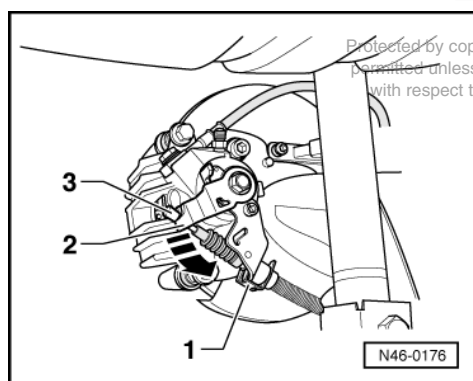
- ♦ If the piston is pushed back with a piston resetting tool the automatic adjustment in the brake caliper will be destroyed.



- -> Insert the brake pad retaining springs -arrows- and pads into the brake carrier.
- Pull protective foil off outer brake pad backplate.
- Secure brake caliper housing with new self-locking bolts.

Note:

- ♦ The repair kit includes four self-locking hexagon bolts which must be installed in all cases.



- -> Push the handbrake lever -2- in direction of arrow and attach handbrake cable -3-.
- Install clip -1-.
- Adjusting handbrake =>Page 122 .
- Fit wheels.

Notes:

- ♦ 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.
- ♦ After changing brake pads check brake fluid level.

5.3 - Adjusting handbrake

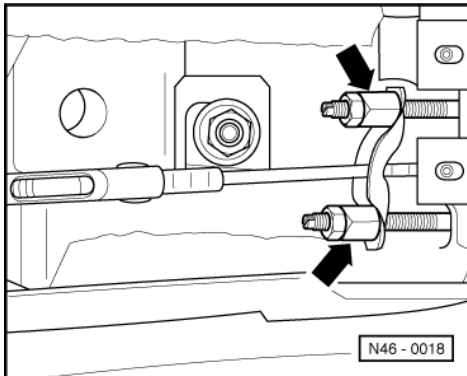
Note:

Adjustment is only necessary after replacing handbrake cables and brake calipers.

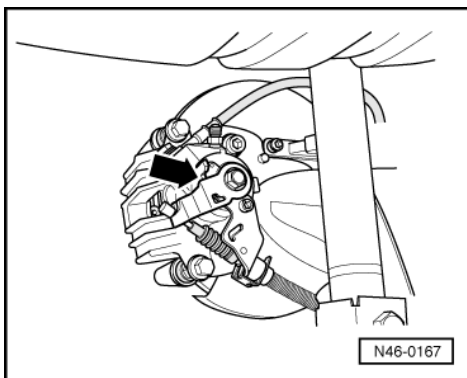
- Remove centre console.

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console. Storage compartments, covers and trims Removing and installing centre console.

- Firmly press brake pedal once.



- -> Handbrake lever in rest position. Tighten adjusting nuts -arrows- until levers on brake calipers lift away from stops.



- -> A gap of max. 1.5 mm from stop (arrow) is permissible on each side but should be set the same on both sides.
- Apply handbrake firmly 3 times and then release it again.
- Check whether both wheels can spin freely. If necessary, screw back adjusting nuts slightly.
- Secure the adjusting nuts with counternuts.
- Install centre console,

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console. Storage compartments, covers and trims Removing and installing centre console.

Note:

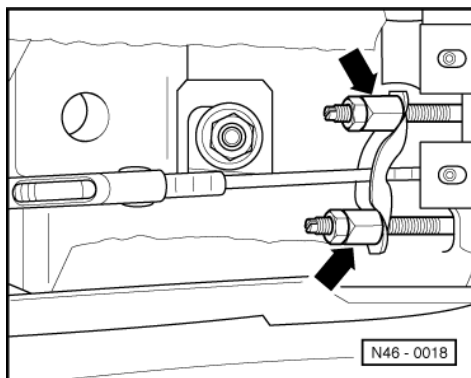
It is unnecessary to adjust the handbrake after readjustment owing to the automatic adjustment of the rear brakes.

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6 - Removing and installing handbrake cable (disc brake)

6.1 - Removing and installing handbrake cable (disc brake)

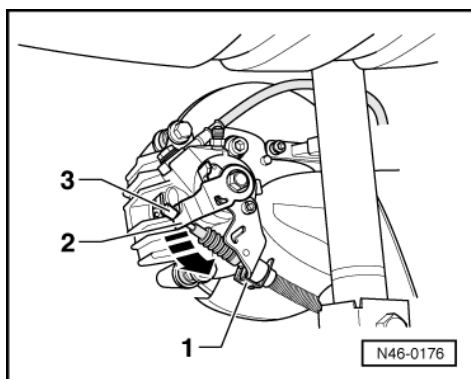
Removing



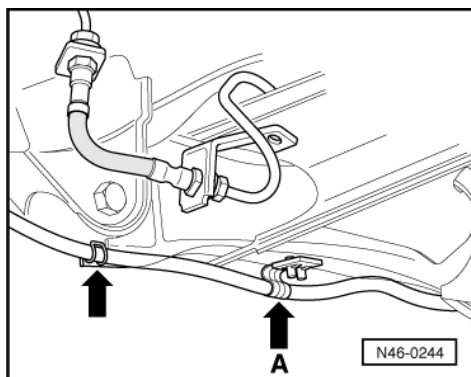
- Remove centre console.

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console Storage compartments, covers and trims Removing and installing centre console

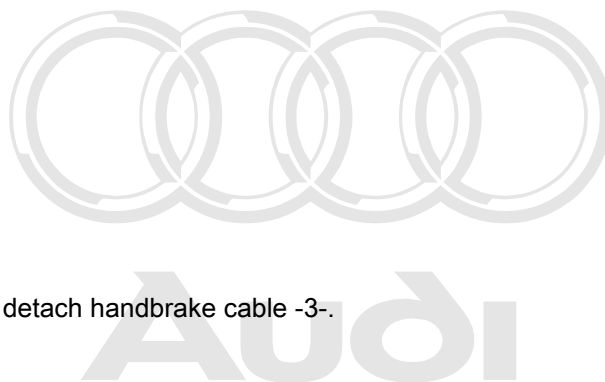
- Release handbrake.
- -> Unscrew the relevant adjusting nut -arrow-, so that the handbrake cable can be pulled out of the compensating bar.
- Raise vehicle.
- Remove wheel.



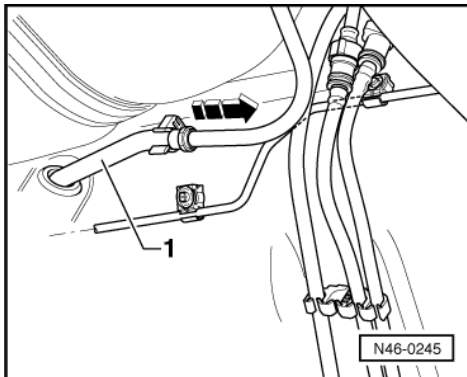
- -> Detach clip -1-.
- Push the handbrake lever -2- in direction of arrow and detach handbrake cable -3-.



- -> Unclip handbrake cable from bracket on rear axle beam -arrow A- and out of bracket -arrow-.

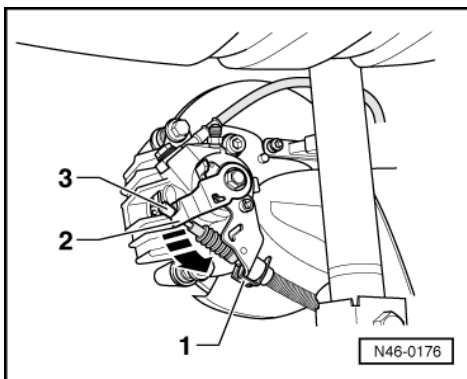


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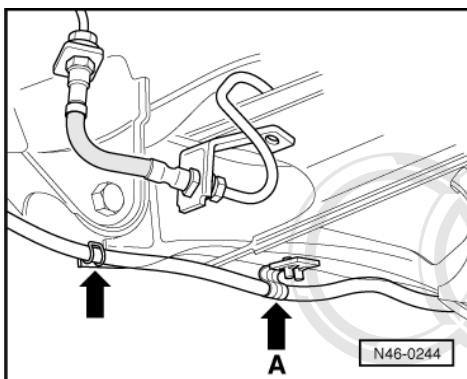


- -> Pull the handbrake cable out of the guide tube -1- in direction of arrow.

Installing

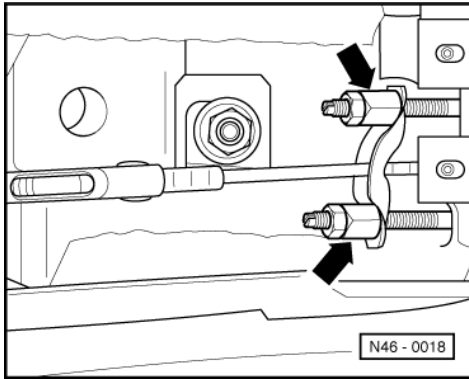


- Push handbrake cable into guide tube.
- -> Push the handbrake lever -2- in direction of arrow and attach handbrake cable -3-.
- Install clip -1-.



- -> Clip the handbrake cable in the bracket at the rear axle beam -arrow A-.
- The clamp ring on the handbrake cable must be positioned in the centre of the clip.
- Engage handbrake cable in bracket -arrow-.
- Push the handbrake cable into the compensating bar.

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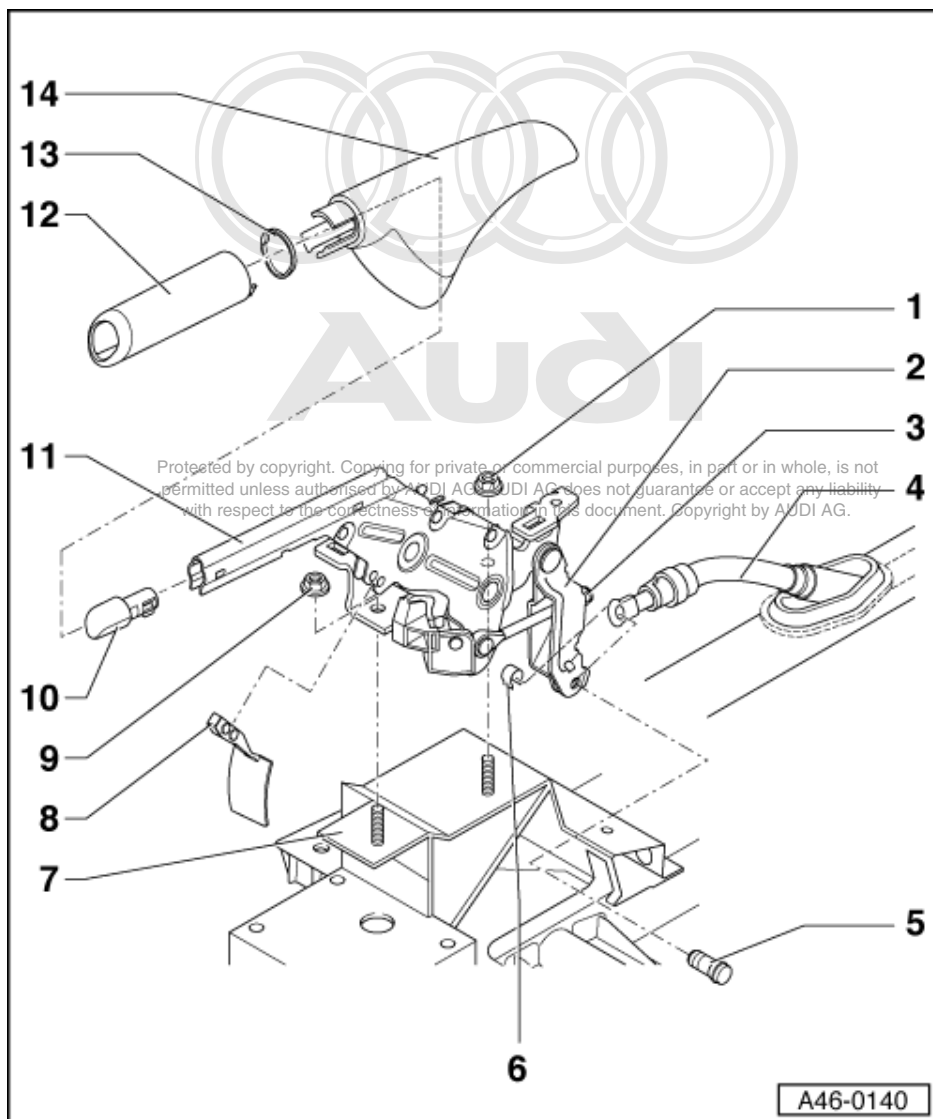
- -> Pretension the handbrake cable using the relevant adjusting nut -arrows-.
- Adjusting handbrake =>Page **122** .
- Install centre console,

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console Storage compartments, covers and trims Removing and installing centre console

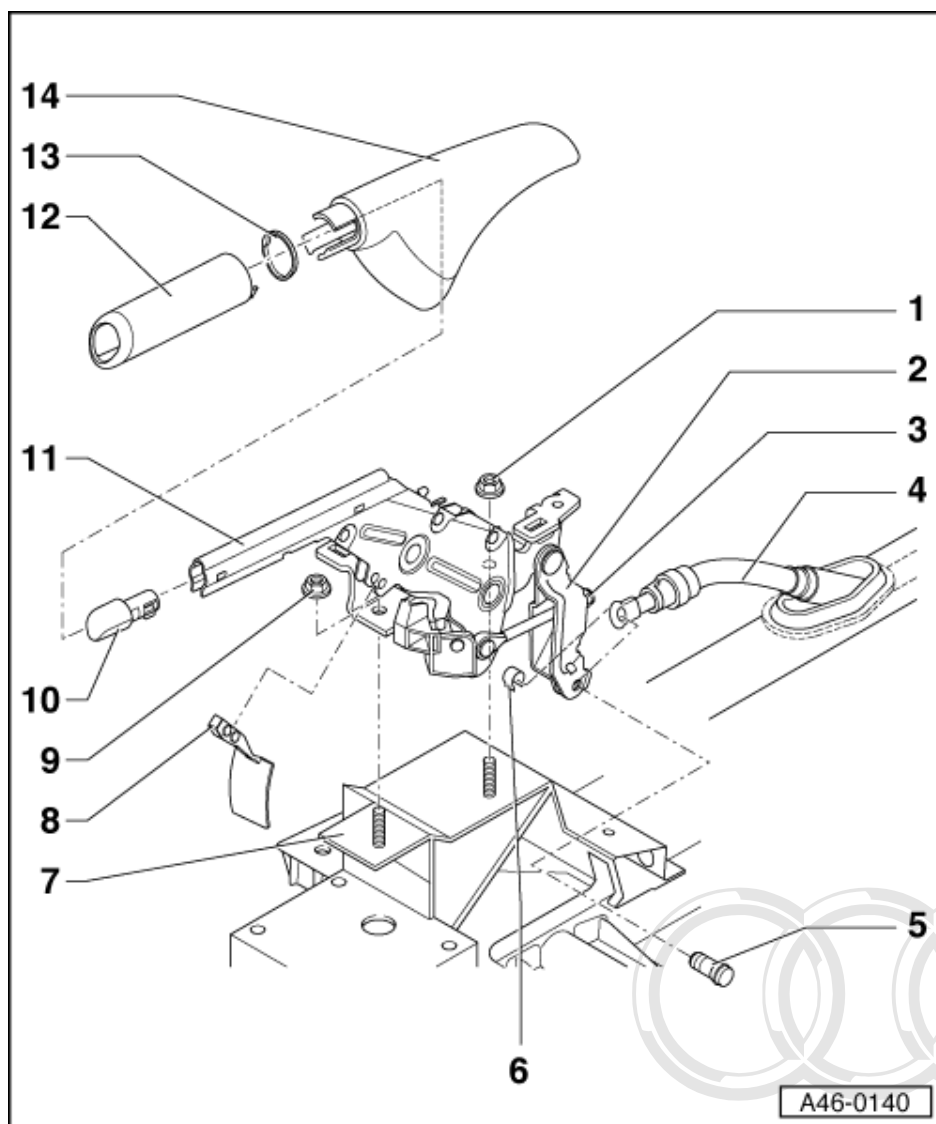
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7 - Handbrake lever - Exploded view

7.1 - Handbrake lever - Exploded view



- 1 Hexagon nut, 25 Nm
- 2 Lever arm
- 3 Adjusting nut
 - ♦ Adjusting hand brake:
 - Vehicles with drum brakes => Page 108
 - Vehicles with (disc brakes) => Page 122
- 4 Handbrake cable
 - ♦ Removing and installing (drum brakes) =>Page 109
 - Vehicles with (disc brakes) => Page 124
- 5 Pin
- 6 Retainer
- 7 Handbrake mounting bracket
- 8 Trim cover



9 Hexagon nut, 25 Nm

10 Button

11 Handbrake lever

- ♦ To remove and install handbrake lever, remove centre console.

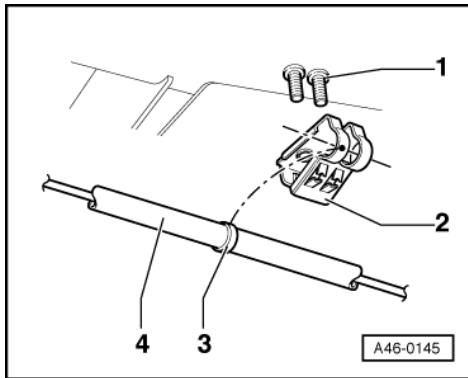
=> General Body Assembly, Interior; Repair group 68: Storage compartments, covers and trims; Removing and installing centre console.

12 Grip

- ♦ Detach forwards, first push down retaining lug below the handle using a small screwdriver.

13 Decorative ring

14 Trim



→ Fig.1 Installation position of handbrake cables

- The handbrake cables are attached to the axle beam with clips.
- Locating ring -3- at handbrake cable must be positioned in centre of fastening clip -2-

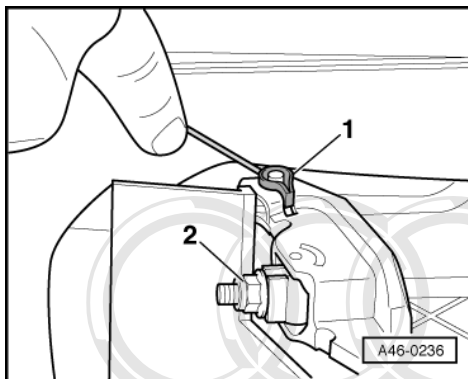
7.2 - Removing and installing handbrake lever

Spare parts, special tools and workshop equipment required

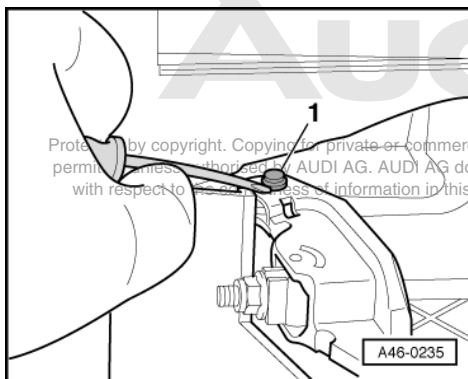
Removing

- Remove centre console.

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console. Storage compartments, covers and trims Removing and installing centre console.

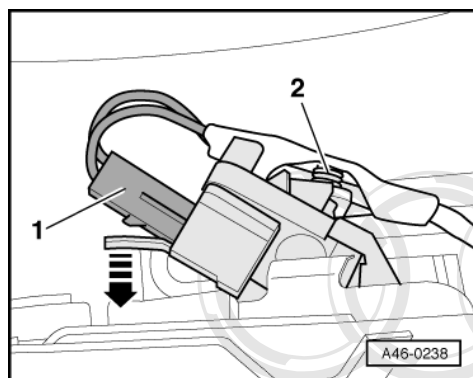


- Loosen the hexagon nut -2- until the handbrake is slackened.
- Pull the retainer -2- out of the pin -1-

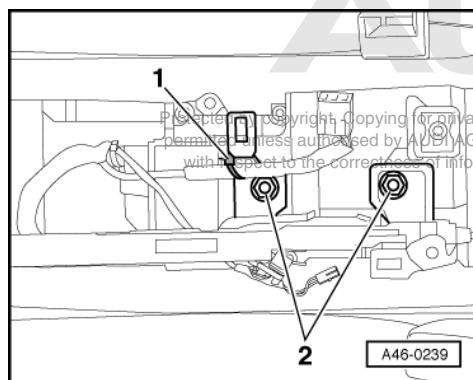


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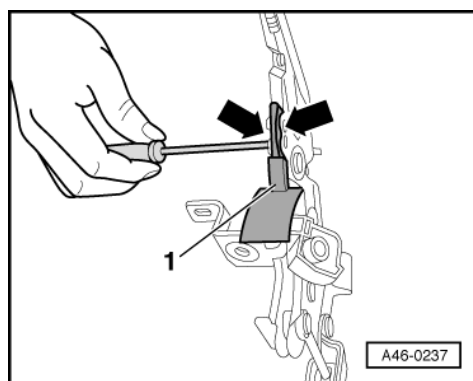
- Pull the pin -1- out of the lever arm -3-



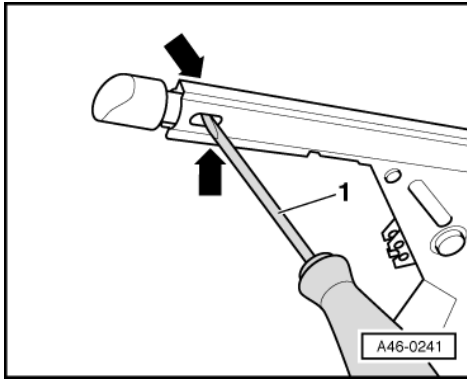
- -> Release and unplug connector -1-.
- Pull out clip with cable guide.



- -> Detach cable tie -1-.
- Unscrew hexagon bolts -2-.

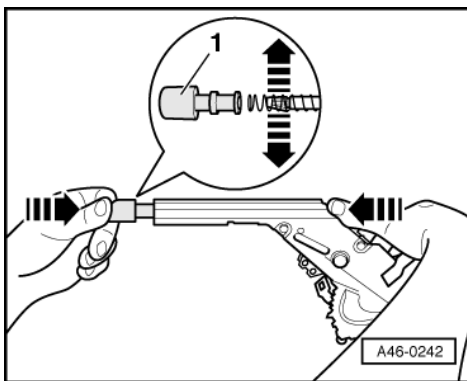


- -> Press handbrake lever cover -1- together in direction of arrow and remove.



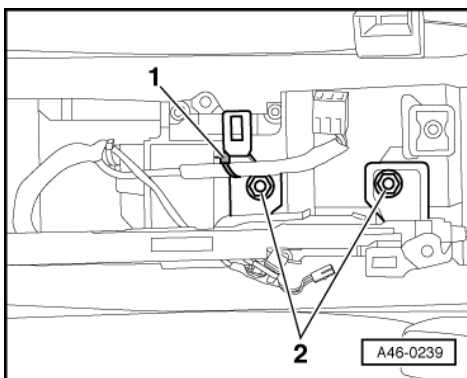
- -> Press in direction of arrow with screwdriver -1- and pull out operating button.

Installing



Install operating button in new handbrake lever.

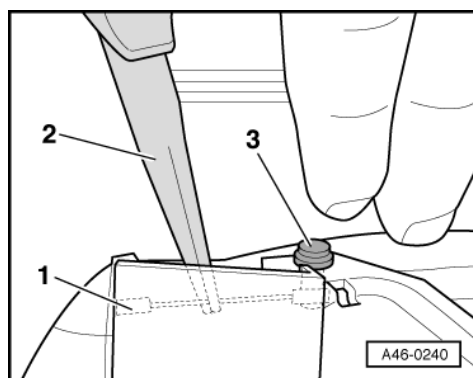
- -> Insert operating knob -1- in direction of arrow, counterhold push rod until the expanding clips engage.



- -> Screw in hexagon bolts -2-.
- Tightening torque 23 Nm.
- Fasten wiring for handbrake switch using cable tie.



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- -> Insert handbrake cable -1- using pointed pliers and install pin -3-.
- Fit retainer clip.
- Remove centre console.

=> General Body Assembly, Interior; Repair group 68; Storage compartments, covers and trims; Removing and installing centre console. Storage compartments, covers and trims Removing and installing centre console.

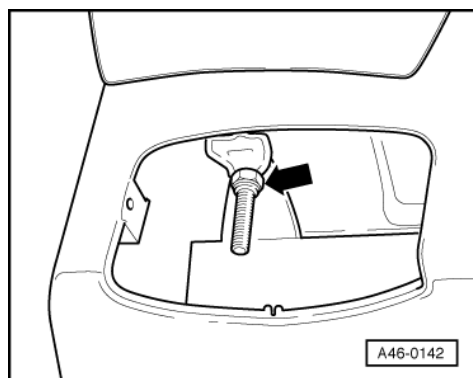
7.3 - Adjusting handbrake

The handbrake must be adjusted after charging/adjusting the service brakes. The service brake system must be fully functional.

The handbrake cables must not be under tension.

Resetting is only required after replacing the handbrake cables, the brake carrier or brake pads.

- Release handbrake.
- Firmly press brake pedal several times.
- Pull handbrake lever 4 notches.



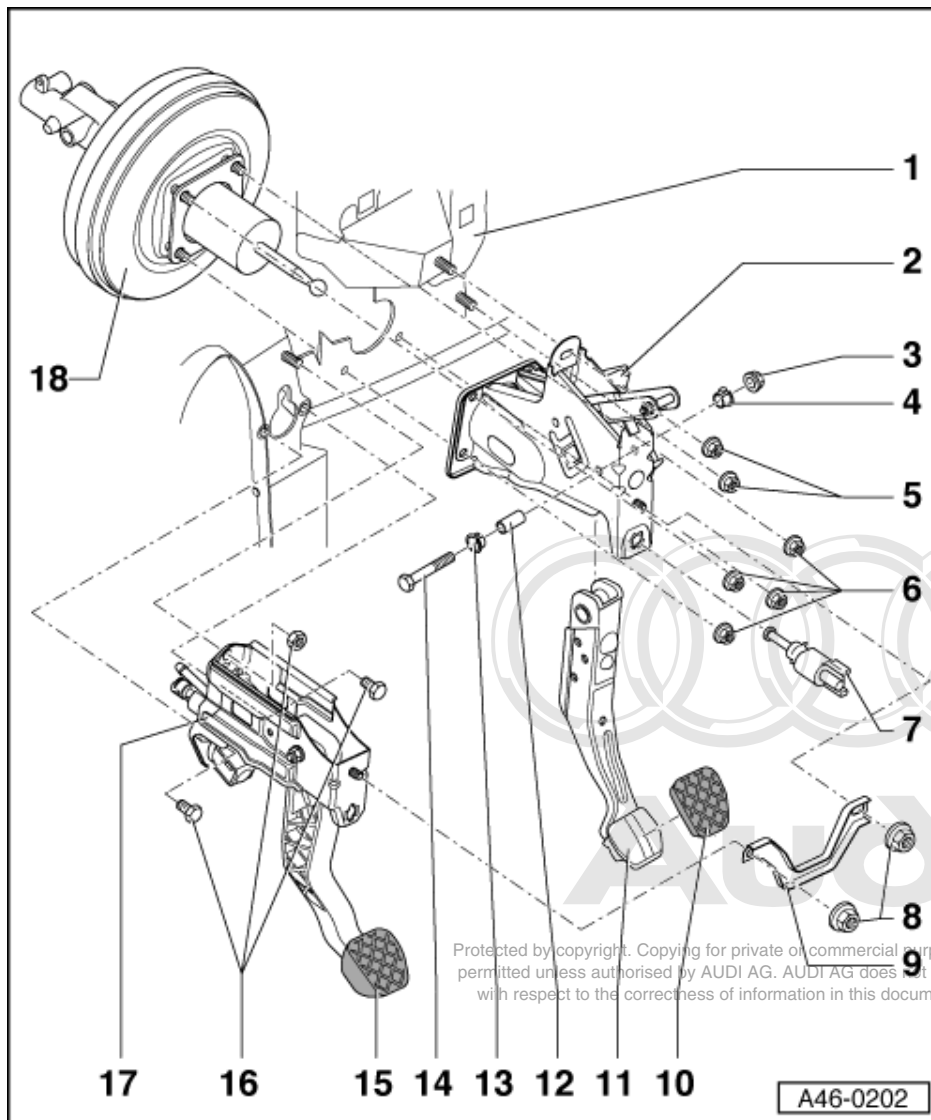
- -> Tighten adjusting nut -arrow- until both wheels are difficult to turn by hand.
- Release handbrake and check, whether both wheels can spin freely. If necessary, screw back adjusting nut slightly.

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It is unnecessary to adjust the handbrake after readjustment owing to the automatic adjustment of the rear brakes.

8 - Removing and installing brake pedal/brake servo

8.1 - Removing and installing brake pedal/brake servo

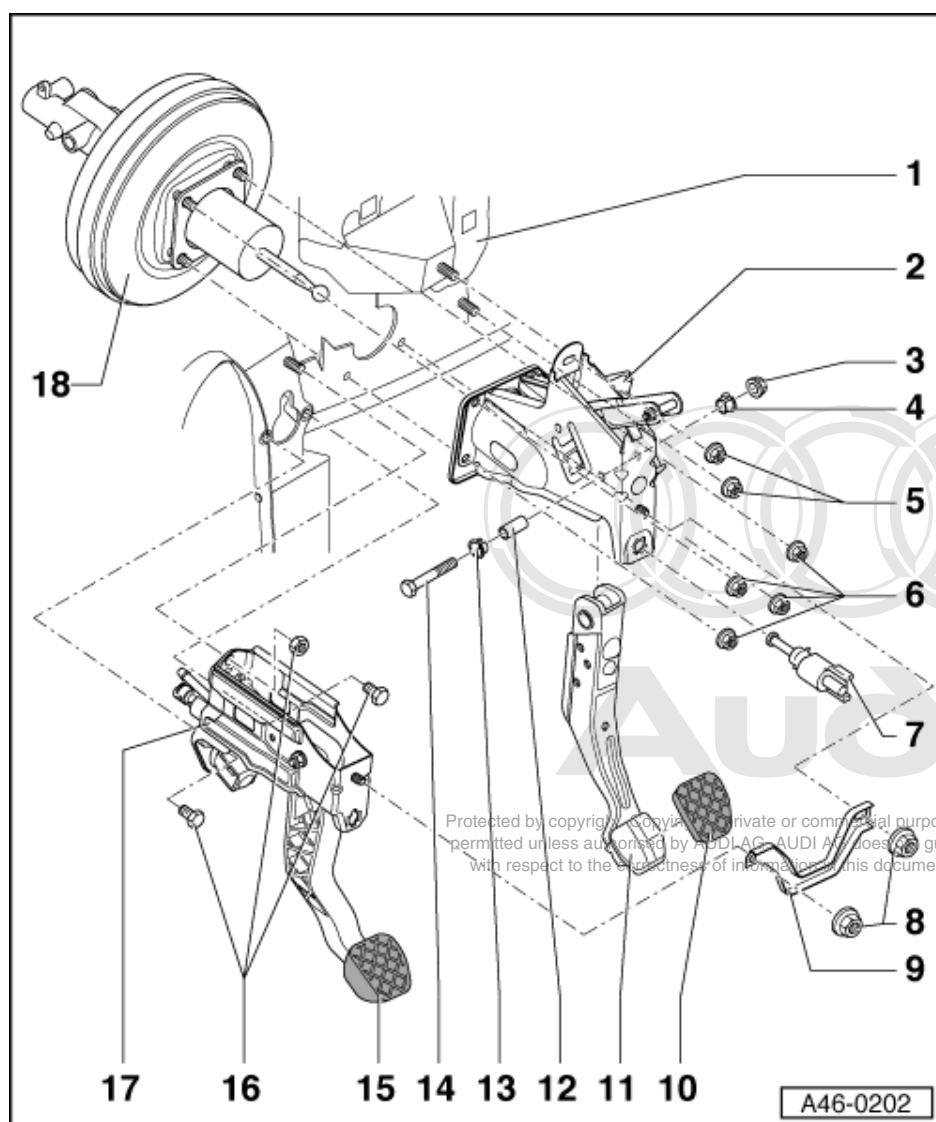


8.2 - LHD vehicles

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

Lubricate all bearings with grease, Part No. G 000 602 prior to assembly.

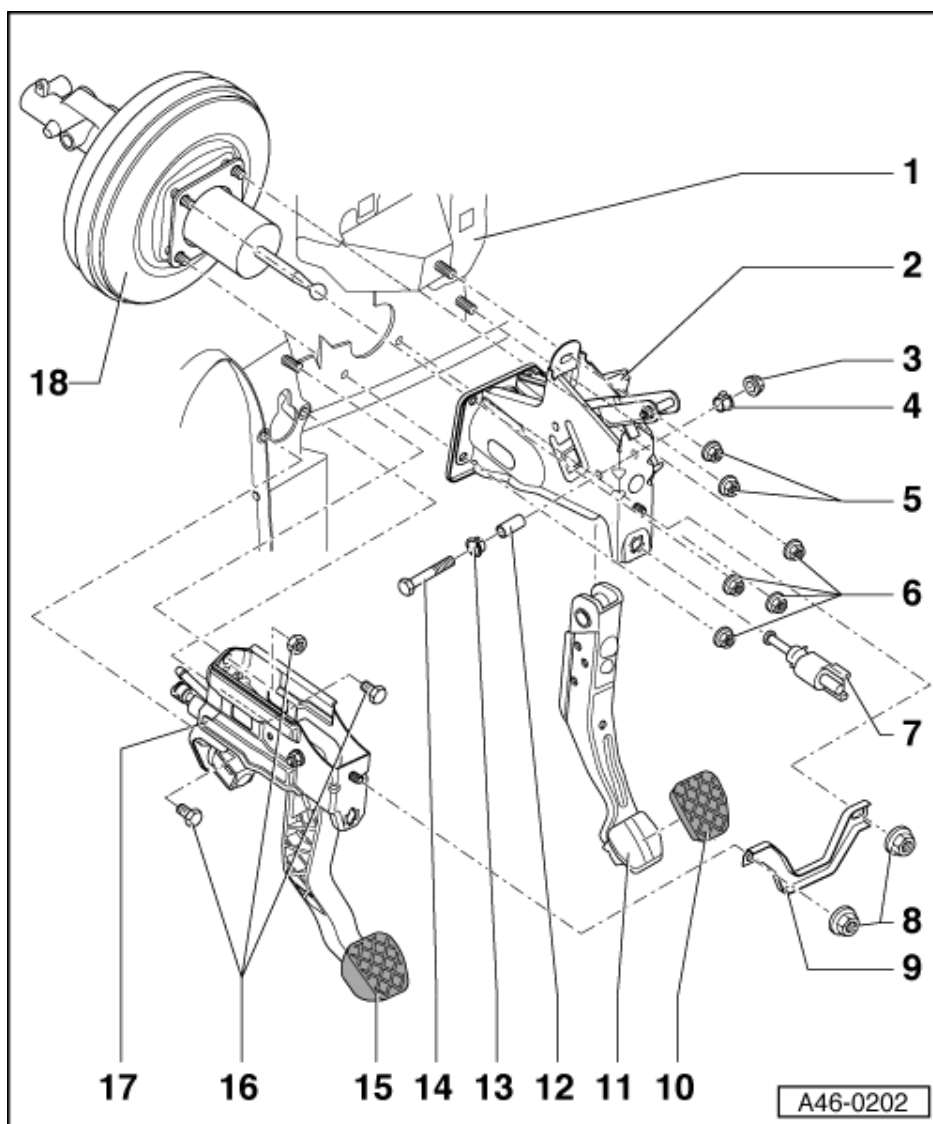
- 1 Bulkhead
- 2 Mounting bracket for pedal cluster
- 3 Hexagon nut, 25 Nm
- 4 Bush for brake pedal
- 5 Self-locking hexagon nut, 20 Nm
 - ♦ 2 off
- 6 Self-locking hexagon nut, 28 Nm



7 Brake light switch

- ◆ Before installing brake light switch, clip brake pedal to brake servo push rod
- ◆ Before installing pull plunger out completely
- ◆ Press brake pedal down as far as possible by hand.
- ◆ Guide switch through mounting hole and install by turning 90° anti-clockwise
- ◆ Release brake pedal
- ◆ Plug in connector for brake pedal
- ◆ Adjusting, removing and installing brake light switch => Page 17
- ◆ Check function of brake lights

8 Hexagon nut, 30 Nm



9 Connector plate

10 Cap

11 Brake pedal

- ♦ Detach brake pedal from brake servo =>Page 137
- ♦ Removing and installing=>Page 138

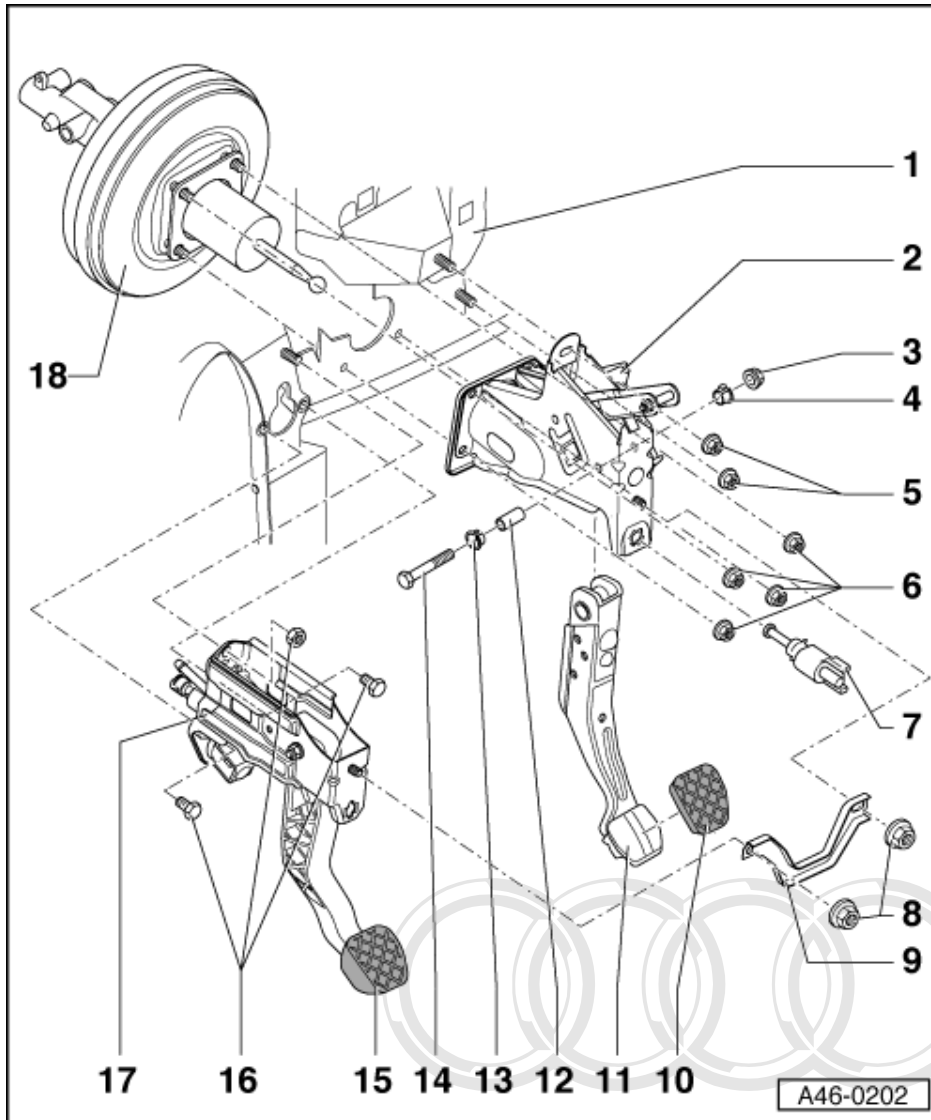
12 Bush

- ♦ For supporting the casing tube

13 Bush for brake pedal

14 Hexagon bolt

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15 Clutch pedal

16 Hexagon bolts / hexagon nuts, 20 Nm

- ♦ 3 off, for attaching pedal cluster for clutch

17 Mounting bracket for clutch pedal

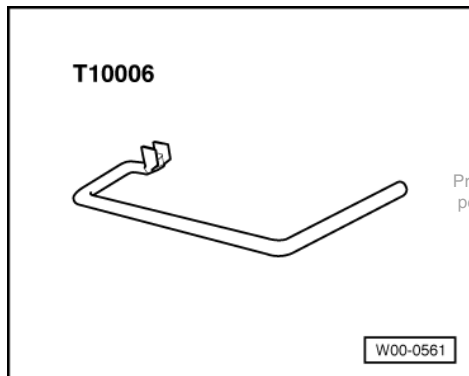
18 Brake servo

- ♦ Detach brake pedal from brake servo => Page 137
- ♦ Removing and installing => Page 173

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8.3 - Detaching brake pedal from brake servo

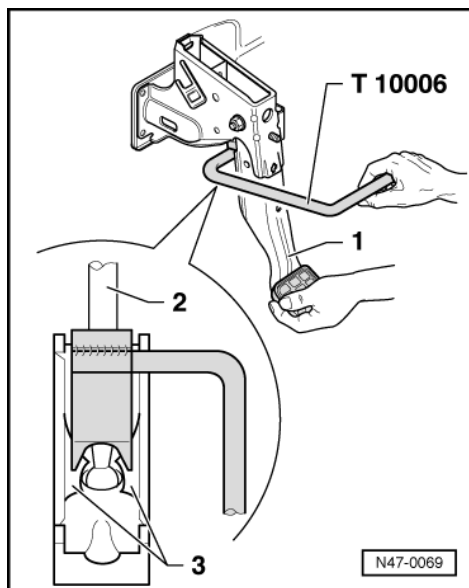
Special tools and workshop equipment required



- ♦ T 10006 Release tool

Additionally required information

- ♦ Workshop Manual Audi A2 2001 ä Running Gear, Self-diagnosis for ESP
- Remove cover under driver's storage compartment.
- Adjusting, removing and installing brake light switch => Page 17



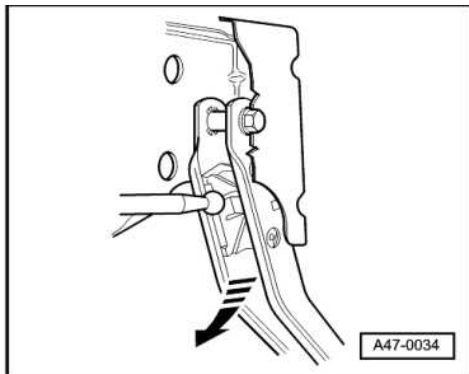
- -> Push brake pedal in direction of brake servo and hold in this position.
 - 1 - Brake pedal
 - 2 - Push rod
 - 3 - Retaining lugs
- Fit special tool T 10006 and pull in direction of the driver's seat, counterhold at the brake pedal (brake pedal must not move backwards during this operation). The retaining lugs -3- of the mount are pressed off from the ball head of the push rod -2-.

Note:

For ease of illustration, the Fig. shows detachment of the brake pedal from the brake servo with pedal cluster removed.



- Pull special tool T 10006 and brake pedal together in direction of driver's seat. (The brake pedal is pulled off the ball head of the push rod thereby).



Clipping brake pedal to brake servo

- -> Hold push rod ball head in front of mounting and push brake pedal in direction of brake servo, so that the ball head audibly engages.

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

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- Adjusting, removing and installing brake light switch => Page 17

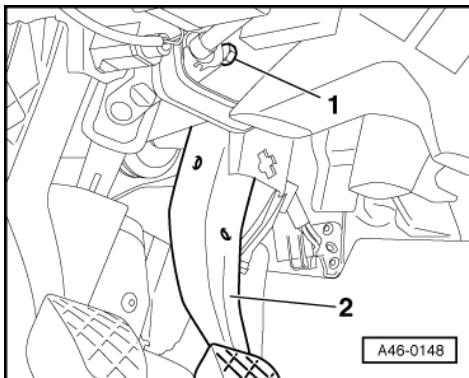
8.4 - Removing and installing brake pedal

Removing

- Removing driver's storage compartment.

=> General Body Assembly, Interior; Repair group 68

- Adjusting, removing and installing brake light switch => Page 17



- Detach brake pedal from brake servo => Page 137 .
- -> Unscrew hexagon bolt -1- for brake pedal pivot pin and remove together with bushes.
- Carefully pull out the hexagon bolt.
- Remove brake pedal -2-

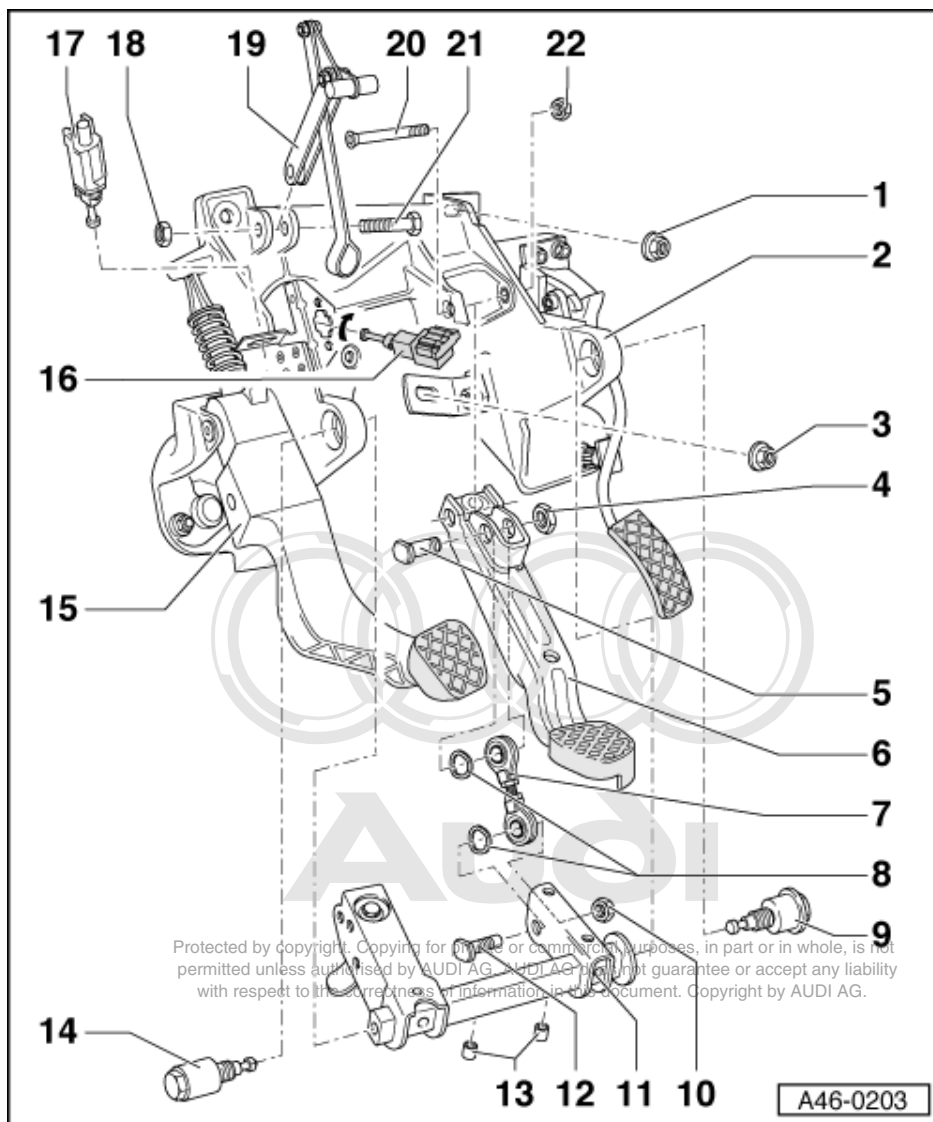
Installing

Installation is in reverse order.

- Adjusting, removing and installing brake light switch => Page 17

9 - Removing and installing brake pedal/brake servo

9.1 - Removing and installing brake pedal/brake servo



9.2 - RHD vehicles

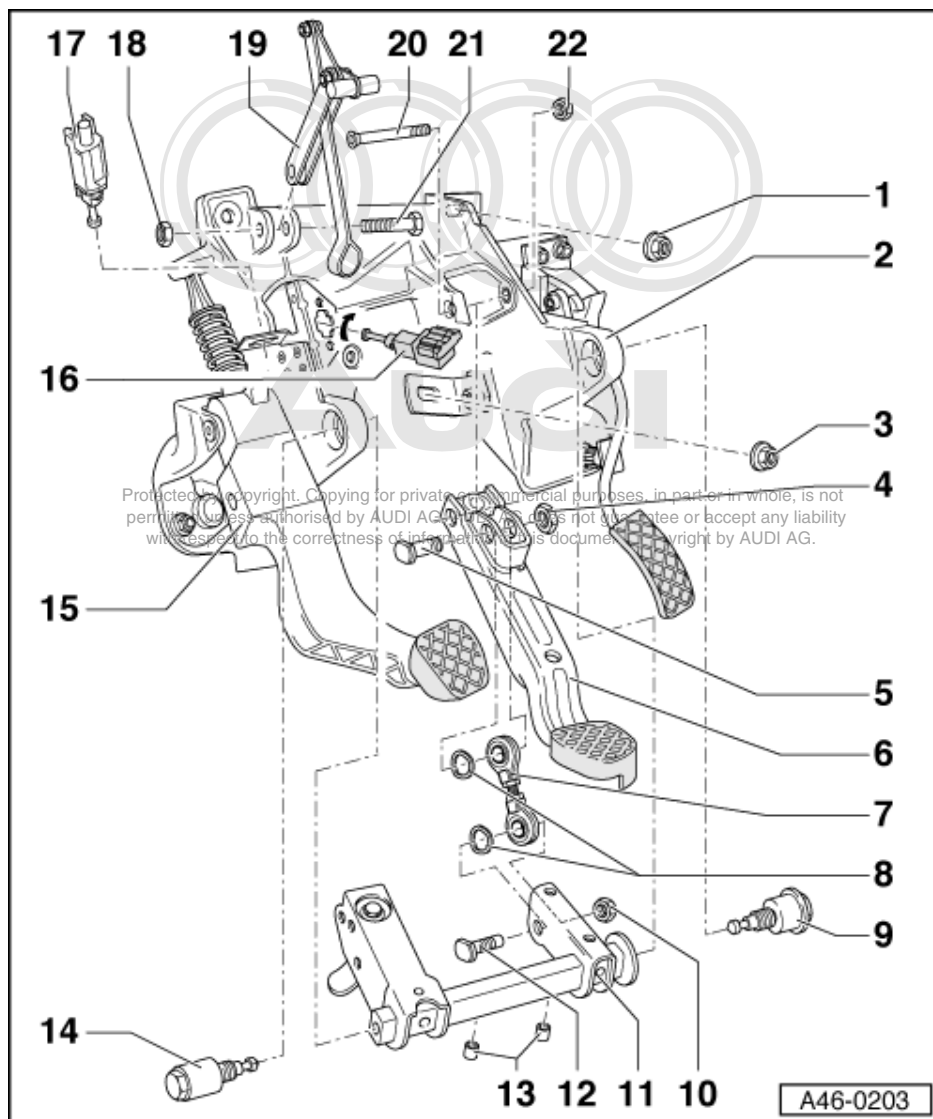
Important

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

Lubricate all bearings with grease, Part No. G 000 602 prior to assembly.

- 1 Hexagon nut, 28 Nm
- 2 Mounting bracket for pedal cluster
- 3 Hexagon nut, 28 Nm
- 4 Hexagon nut, 25 Nm
 - ◆ Coat with locking compound D 197 300 A1
 - ◆ Always replace
- 5 Bolt for connecting link

- ♦ Always replace



6 Brake pedal

- ♦ Detach brake pedal from brake servo =>Page 137
- ♦ Removing and installing=>Page 138

7 Connecting link

- ♦ Adjusting the connecting linkage =>Fig. 1
- ♦ Mounting =>Fig. 2

8 Spring washers

9 Bearing screw, 95 Nm

10 Hexagon nut, 25 Nm

- ♦ Always replace

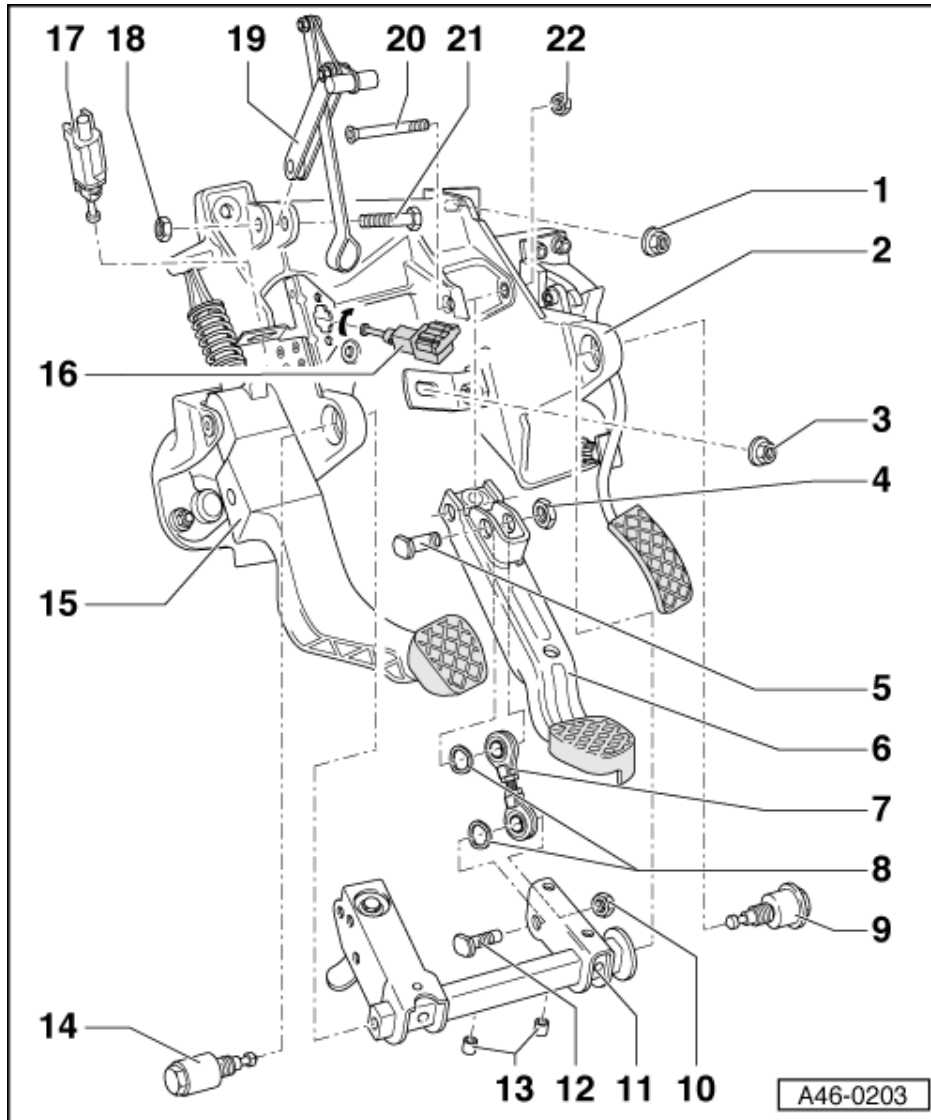
11 Intermediate shaft

12 Bolt for connecting link

- ♦ Always replace

13 Securing bolts, 7 Nm

14 Bearing screw, 95 Nm

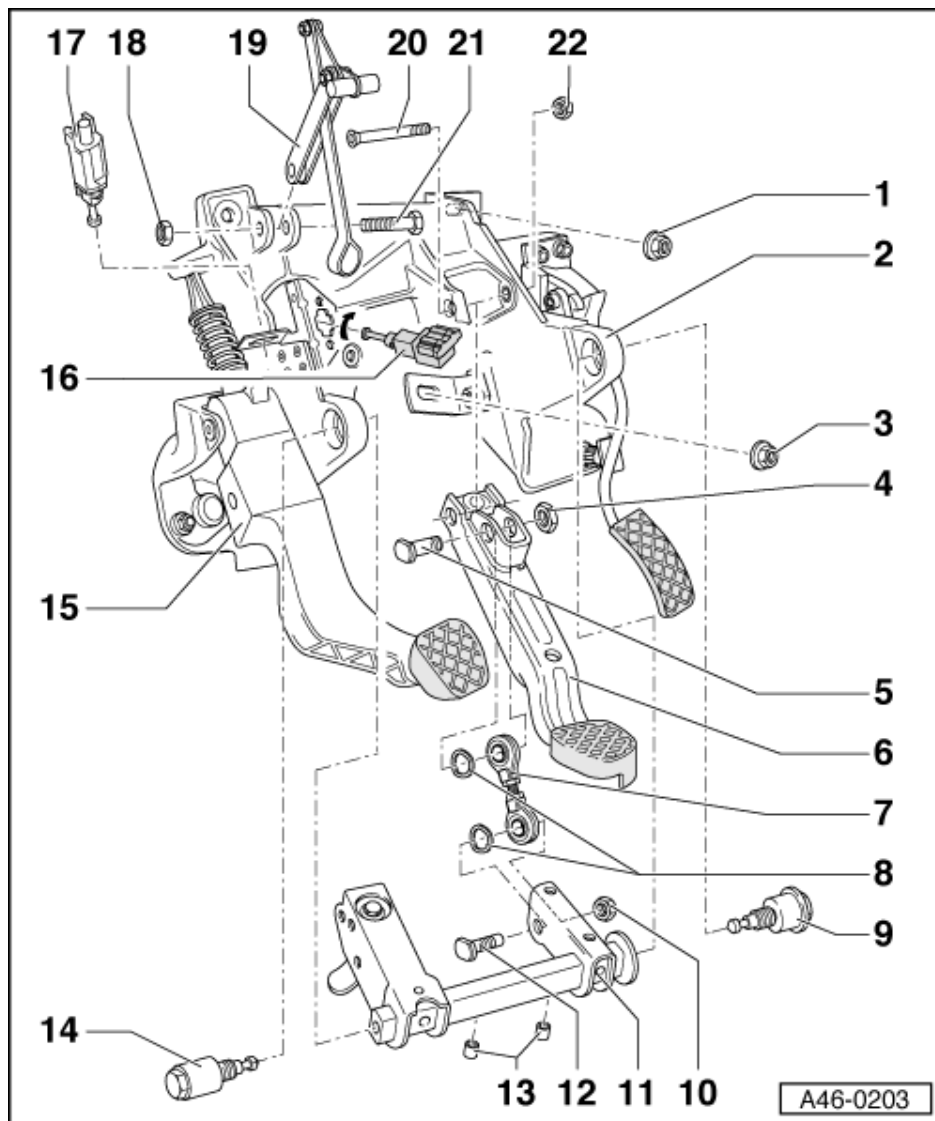


15 Clutch pedal

16 Brake light switch

- ◆ Before installing brake light switch, clip brake pedal to brake servo push rod
- ◆ Before installing pull plunger out completely
- ◆ Press brake pedal down as far as possible by hand.
- ◆ Guide switch through mounting hole and install by turning 90° anti-clockwise
- ◆ Release brake pedal
- ◆ Plug in connector for brake pedal
- ◆ Adjusting, removing and installing brake light switch => Page 17
- ◆ Check function of brake lights

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- 17 Switch
- 18 Hexagon nut, 30 Nm
- 19 Crash kinematics
- 20 Torx socket head bolt
- 21 Hexagon bolt
- 22 Hexagon nut, 25 Nm

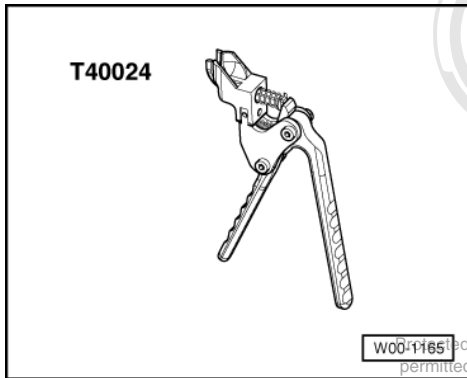
9.3 - Removing and installing brake pedal

Special tools and workshop equipment required

- ♦ Workshop Manual, General Body Assembly



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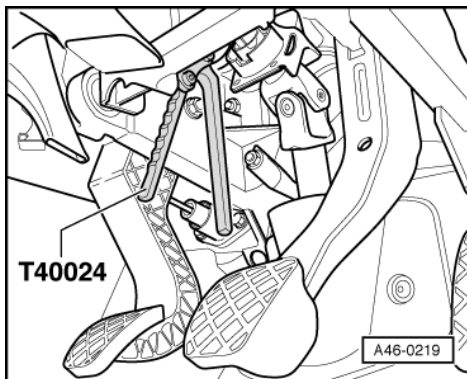
- ◆ Release tool T40024

Removing

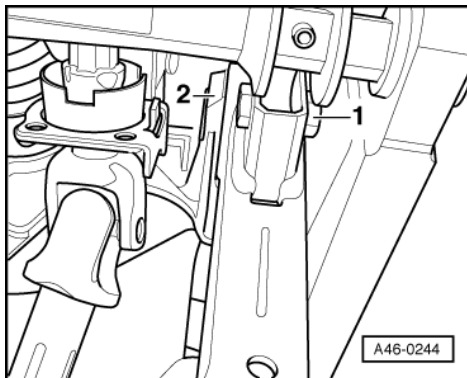
- Remove storage compartment, driver's side.

=> General Body Assembly; Repair group 68

- Remove cover under driver's storage compartment.
- Adjusting, removing and installing brake light switch => Page 17



- -> Detach the brake pedal from the brake servo using release tool T40024.



- -> Detach bolted connection -1- for brake pedal to connecting link
- Detach bolted connection -2- for brake pedal to connecting link
- Remove brake pedal

Installing

Installation is in reverse order.

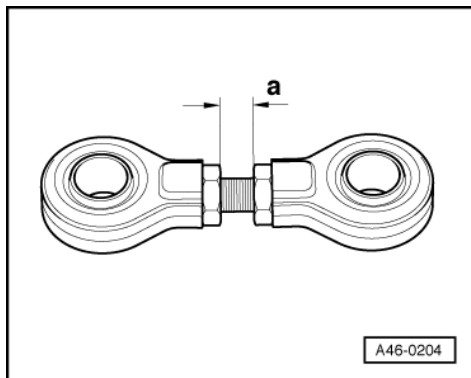


Fig.1 Adjusting connecting linkage

- The threads, dimension -a-, between the counter-nuts must not exceed 8.5 mm.
Tightening torque 16 Nm

Note:

- ♦ The push rod joints must not be twisted with respect to one another.

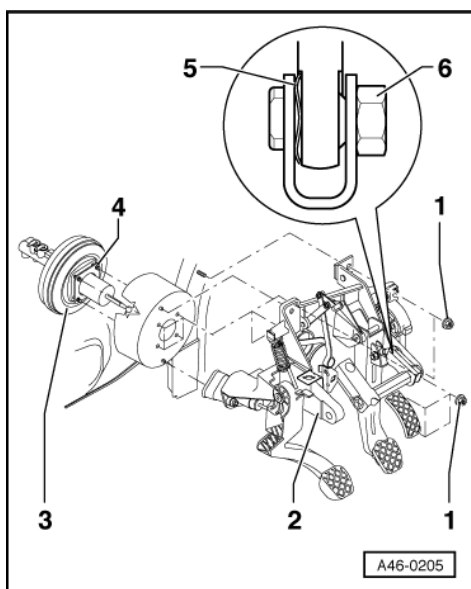


Fig.2 Attaching the connecting rod to the operating lever

- The spring washers, Item -5-, must be fitted between the push rod joint and the operating lever as illustrated in magnified view.

Note:

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- ♦ Hexagon nut prior to assembly, apply locking compound on bolts.
- Install hexagon nuts -6-, tightening torque 25 Nm.

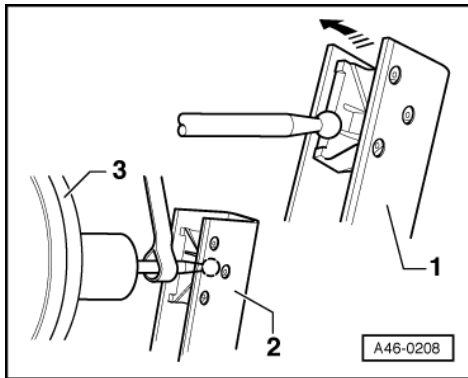


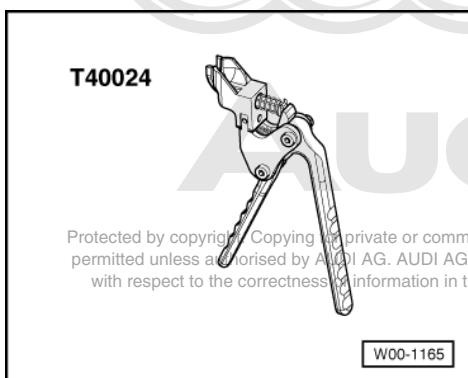
Fig.3 Clipping brake pedal to brake servo

- -> Hold push rod ball head in front of mounting and push brake pedal in direction of brake servo, so that the ball head audibly engages.
- Item -1- Brake pedal
- Item -3- Brake servo
- Adjusting, removing and installing brake light switch => Page 17

9.4 - Removing and installing mounting bracket

Removing

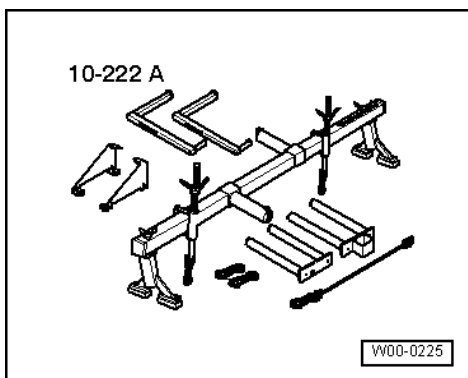
Special tools and workshop equipment required



Workshop Manual, General Body Assembly

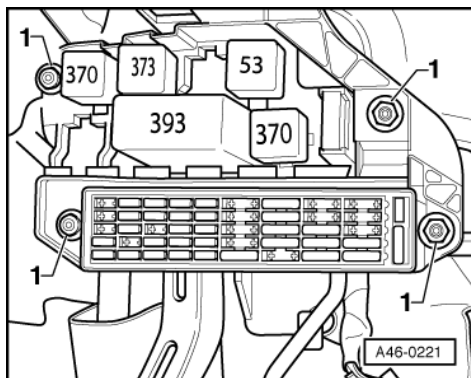
Workshop Manual, Running Gear, FWD

Release tool T40024



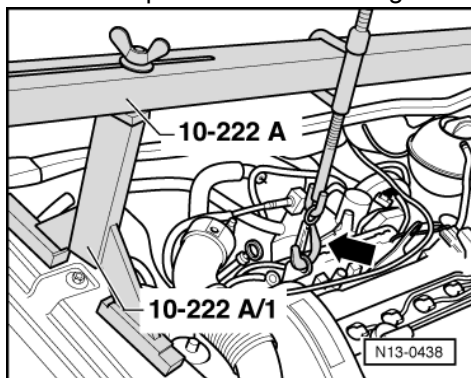
Support bar 10-222A with legs 10-222A/1

- Remove storage compartment, driver's side.
- Remove steering column trim
- Remove air duct



- Remove lower right tunnel trim
- Detach foot rest with bracket
- Remove carpet in footwell
- -> Unscrew hexagon bolts -1-.
- Remove relay carrier and fuse holder

Additional operations for ensuring sufficient clearance



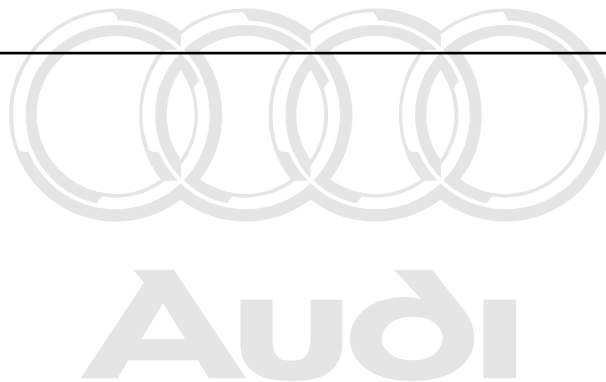
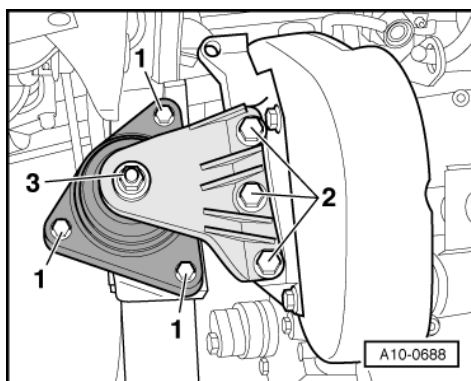
- Remove steering column.

=> Running Gear, FWD; Repair group 48

- Remove steering wheel

=> General Body Assembly, Interior; Repair group 69

- Remove engine cowl
- -> Fit support bar 10-222A with legs 10-222A/1 as shown.
- Pre-tension engine slightly in order to remove console.

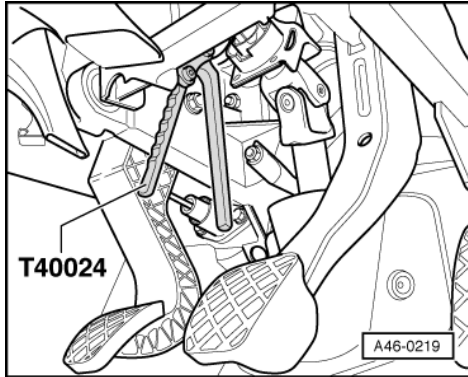


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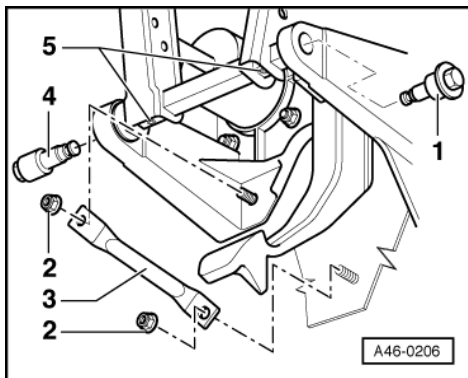
- -> Unbolt engine mount -2- from engine

Note:

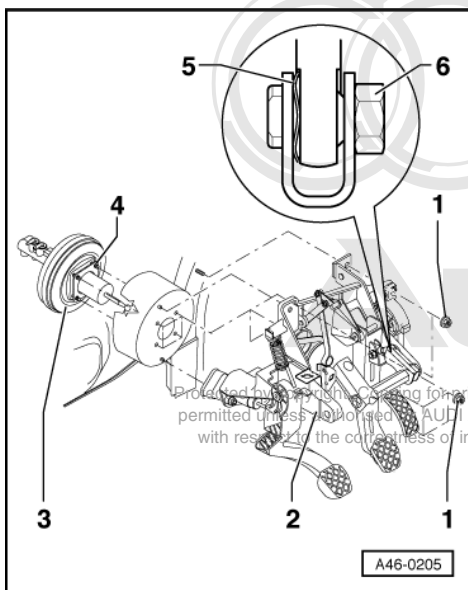
- ♦ The central bolt -3- must not be loosened.
- ♦ For tightening torques, refer to the Workshop Manual, Engine - Mechanical Components



- -> Separate the brake pedal from the brake servo using release tool T40024.
- Detach brake lines from brake master cylinder and detach brake servo from bulkhead => Page 133
- Remove clutch supply hose and pressure line.



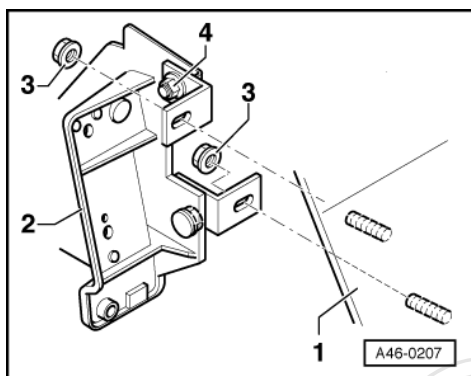
- -> Item -3- support
- Detach Item -2-.



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- -> Item -1- hexagon bolts, tightening torque 28 Nm. 2x at top, 4x at bottom
- Item -2- pedal cluster
- Detach Item -6-.

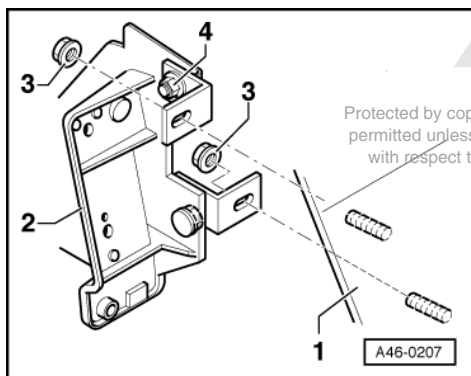


- -> Detach Item -4- and remove upper lever of crash kinematics

Installing

Installation is in reverse order.

- Adjusting, removing and installing brake light switch => Page 17

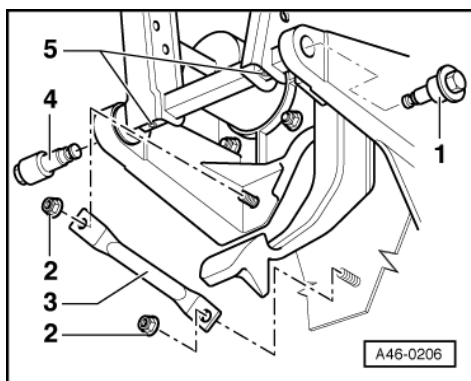


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- -> Install hexagon nuts -3-, tightening torque 28 Nm.

Tightening sequence:

- Tighten Item 4 slightly (movable bracket)
- Tighten Item 3 to 28 Nm
- Tighten Item 4 to 28 Nm



- -> Item -3- fit support
 - Item -2- tightening torque, 28 Nm
 - Install bearing screws -1- and -4-
Tightening torque 95 Nm.
 - Install securing bolts -5-, tightening torque 7 Nm.
-
- Adjusting, removing and installing brake light switch => Page 17
 - Clipping brake pedal to brake servo => Fig. 3

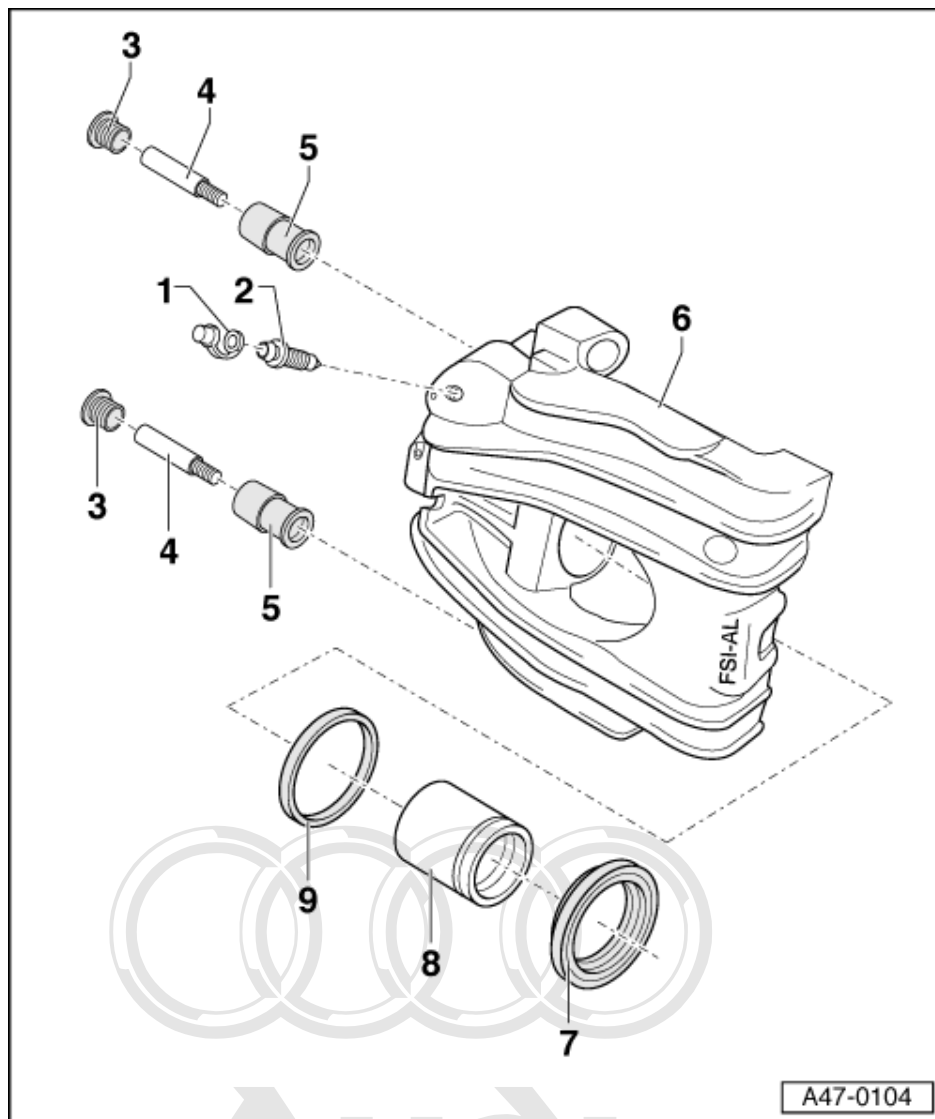


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47 - Brakes, Brake hydraulics

1 - Servicing front brake caliper, brake caliper FS I - AL

1.1 - Servicing front brake caliper, brake caliper FS I - AL



- ♦ 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 **Dust cap**
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- ♦ Insert cable for wear indicator in dust cap.

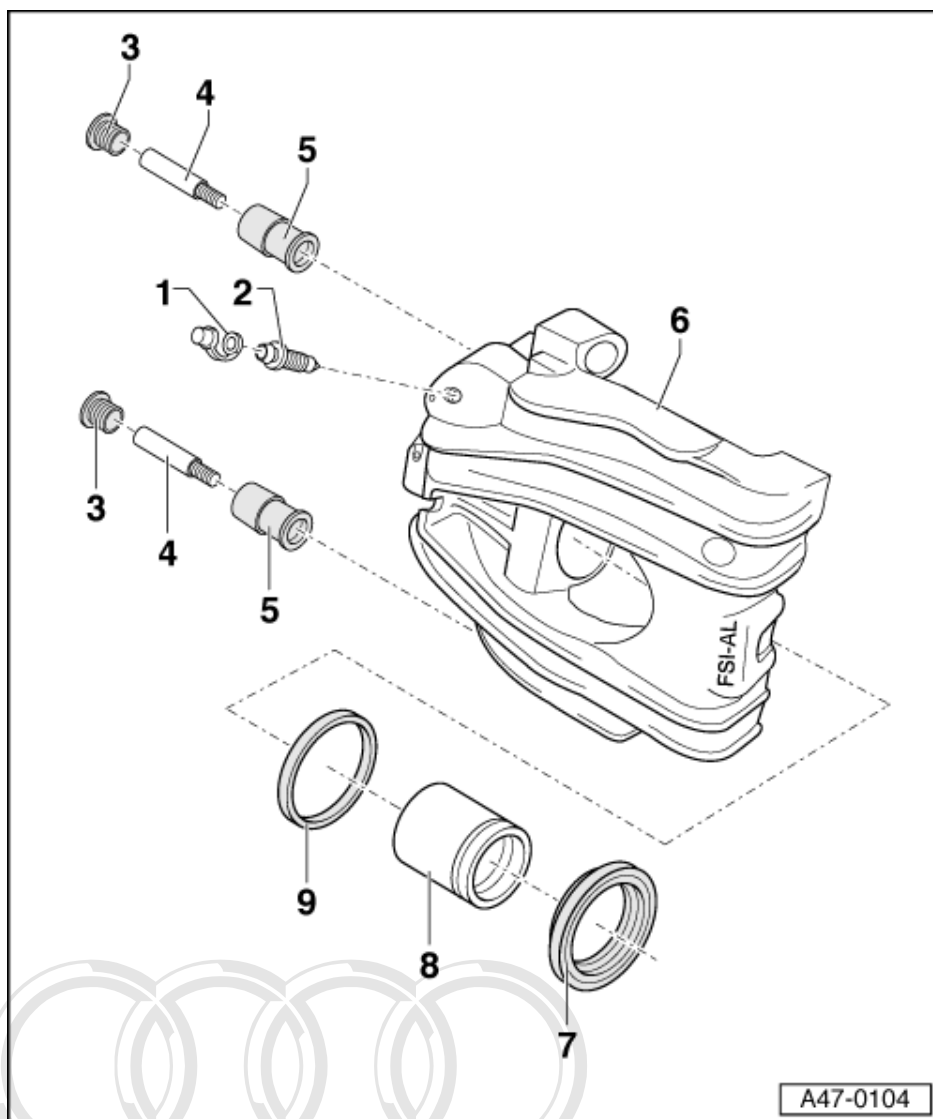
2 **Bleed valve, 10 Nm**

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

3 **Caps**

- ♦ Insert into bearing bush

4 **Guide pin, 28 Nm**



5 Bush

- ◆ Insert into brake caliper housing

6 FS I - AL brake caliper

7 Protective cap

- ◆ Removing and installing
=>Page 152 .

8 Piston

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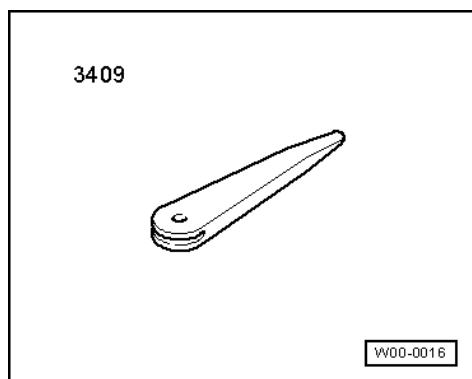
- ◆ Removing and installing
=>Page 152 .

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

9 Sealing ring

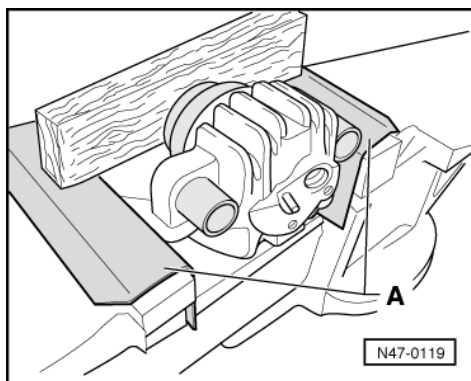
- ◆ Removing and installing
=>Page 152 .

1.2 - Removing and installing piston for front brake caliper



Special tools and workshop equipment required

- ♦ Assembly tool for protective cap T100146/ 3
- ♦ Piston resetting tool

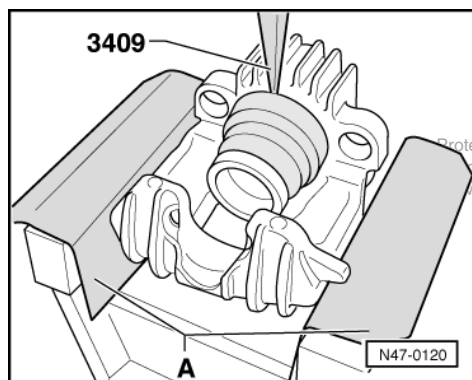


Removing

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

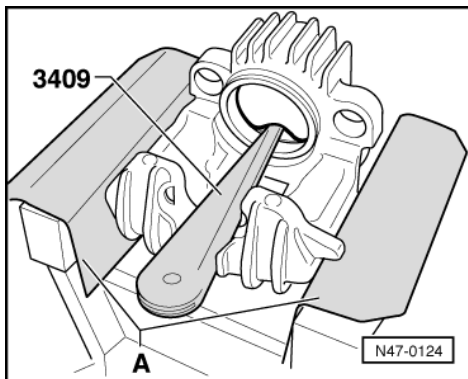
Place a piece of wood in the recess to prevent damaging the piston.

A - Soft jaws



- -> Lever protective cap from brake caliper using assembly wedge 3409.

A - Soft jaws



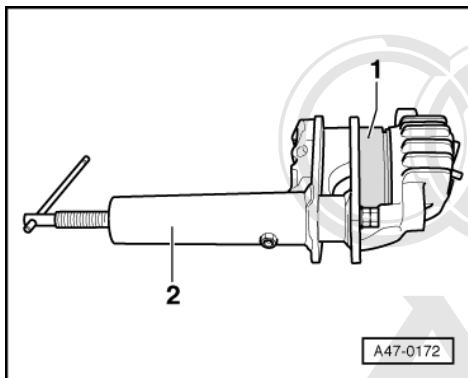
- -> Remove sealing ring using assembly wedge 3409.

A - Soft jaws

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

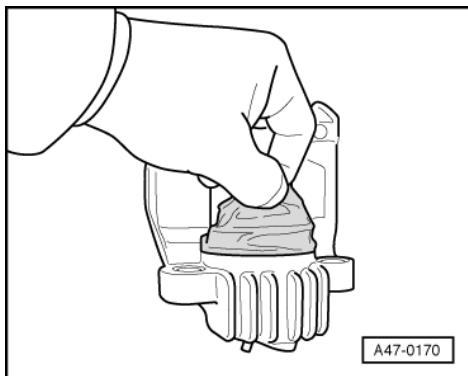
Installing

- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.
- Insert the inner sealing ring into the brake caliper housing.

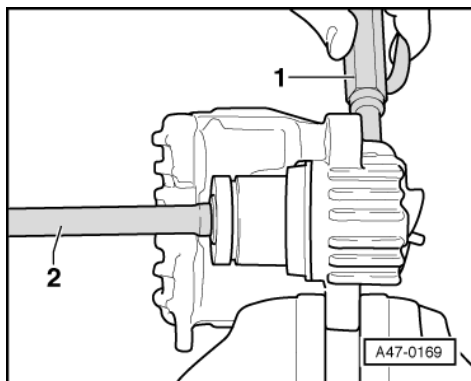


- -> Press in protective cap using special tools -1- and -2-.
- Item -1- Press tool from assembly kit T100146
- Item -2- Piston resetting tool
- Press protective cap onto brake caliper housing so that it is seated all round at brake caliper housing.

Use soft jaws



- -> It must not be possible to pull off the protective cap from the brake caliper housing by hand.

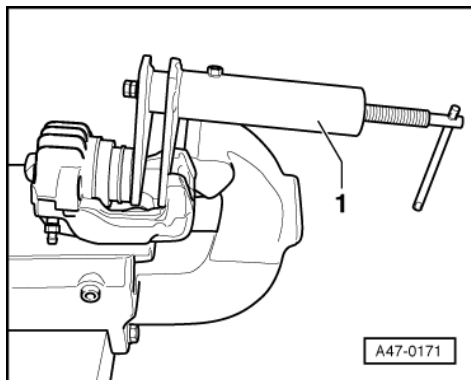


- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
 - -> Fit brake piston in commercially available extension and ratchet and press lightly onto the protective cap.
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Keep piston straight, in order to avoid damaging the sealing collar.

- Install the protective cap with compressed air (max. 3 bar). The protective cap is pressed over the brake piston.

Use soft jaws



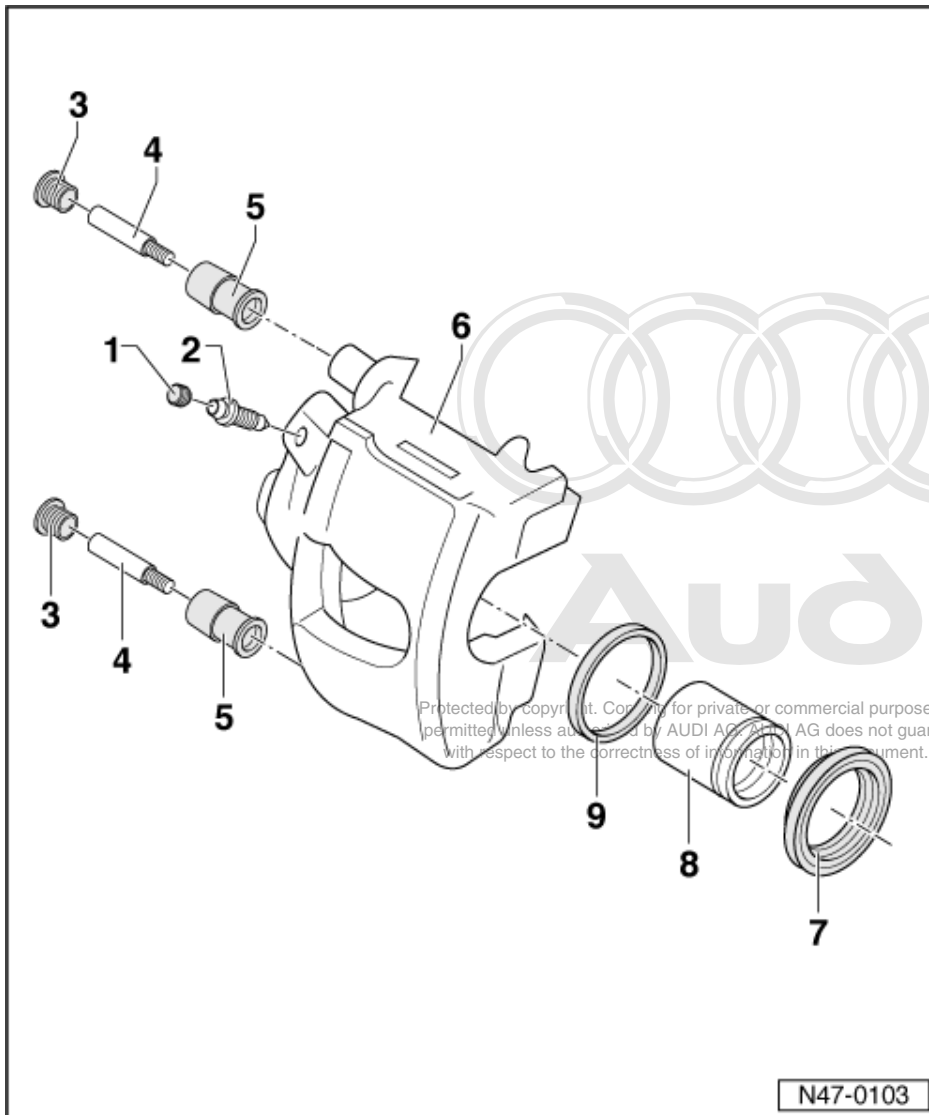
- -> Press the piston into the brake caliper housing using a piston resetting tool.

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

Use soft jaws

2 - Servicing front brake caliper, brake caliper FS III

2.1 - Servicing front brake caliper, brake caliper FS III



- ♦ 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 Dust cap

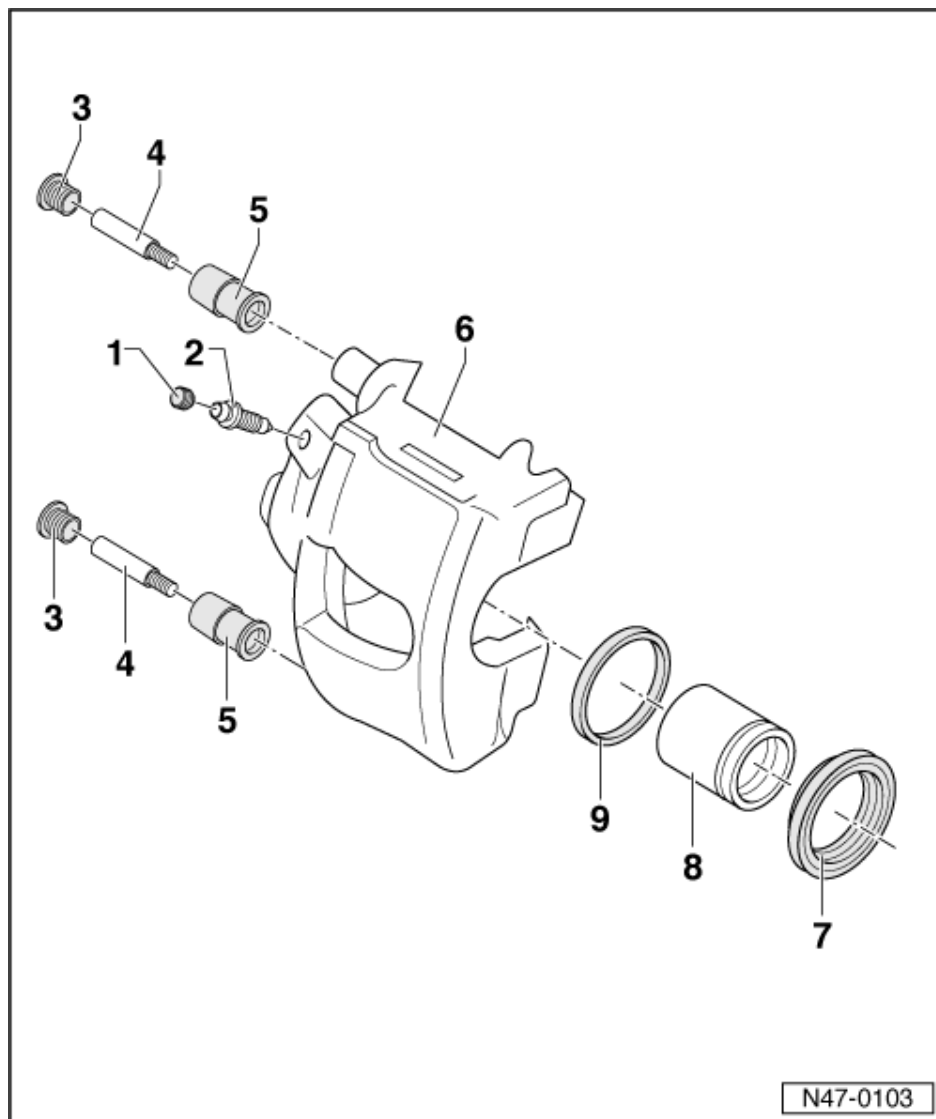
2 Vent valve

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

3 Caps

- ♦ Insert into bearing bush

4 Guide pin, 30 Nm



5 Bush

- ◆ Insert into brake caliper housing

6 Brake caliper housing

7 Protective cap

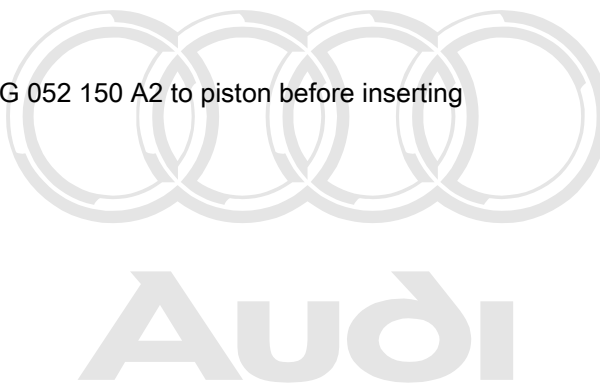
- ◆ Do not damage when inserting piston

8 Piston

- ◆ Removing and installing
=>Page 152 .
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting

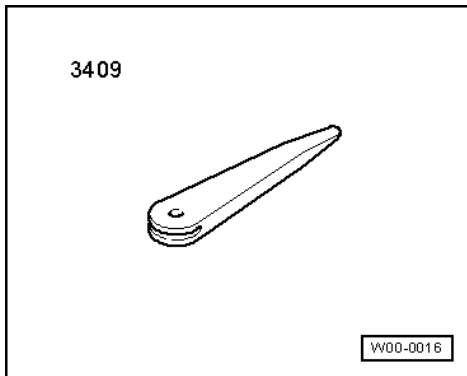
9 Sealing ring

- ◆ Removing and installing
=>Page 152 .



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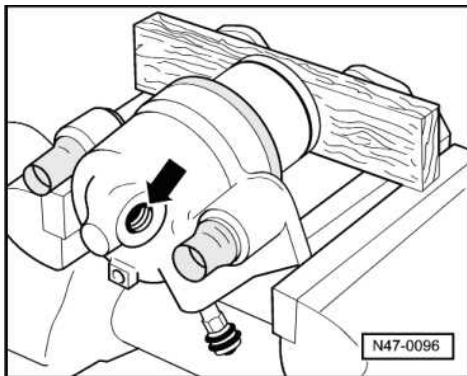
2.2 - Removing and installing piston for front brake caliper



Special tools and workshop equipment required

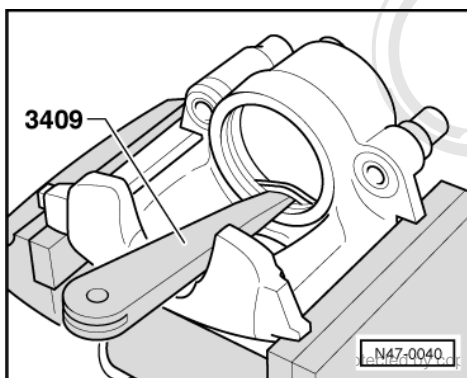
- ♦ 3409 Assembly wedge
- ♦ Piston resetting tool

Removing



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

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



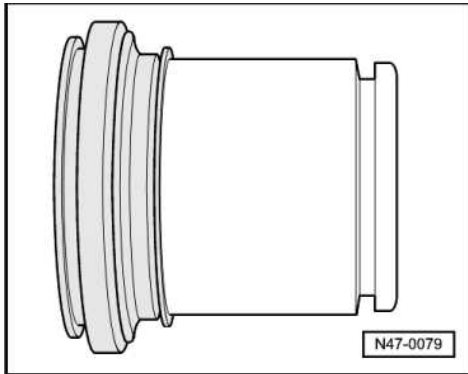
- -> Remove sealing ring using assembly wedge 3409.

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

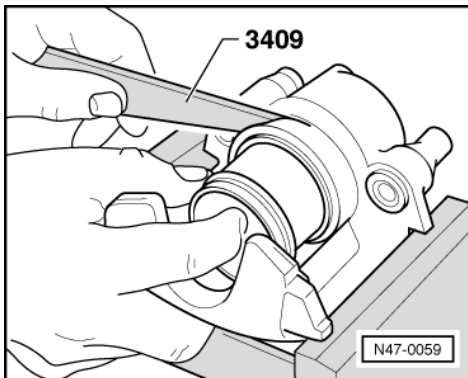
Installing

- 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.

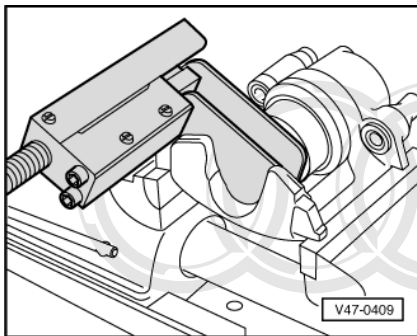


- Insert the O-ring into the brake caliper housing
- -> Place protective cap with the outer sealing lip on the piston.



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

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



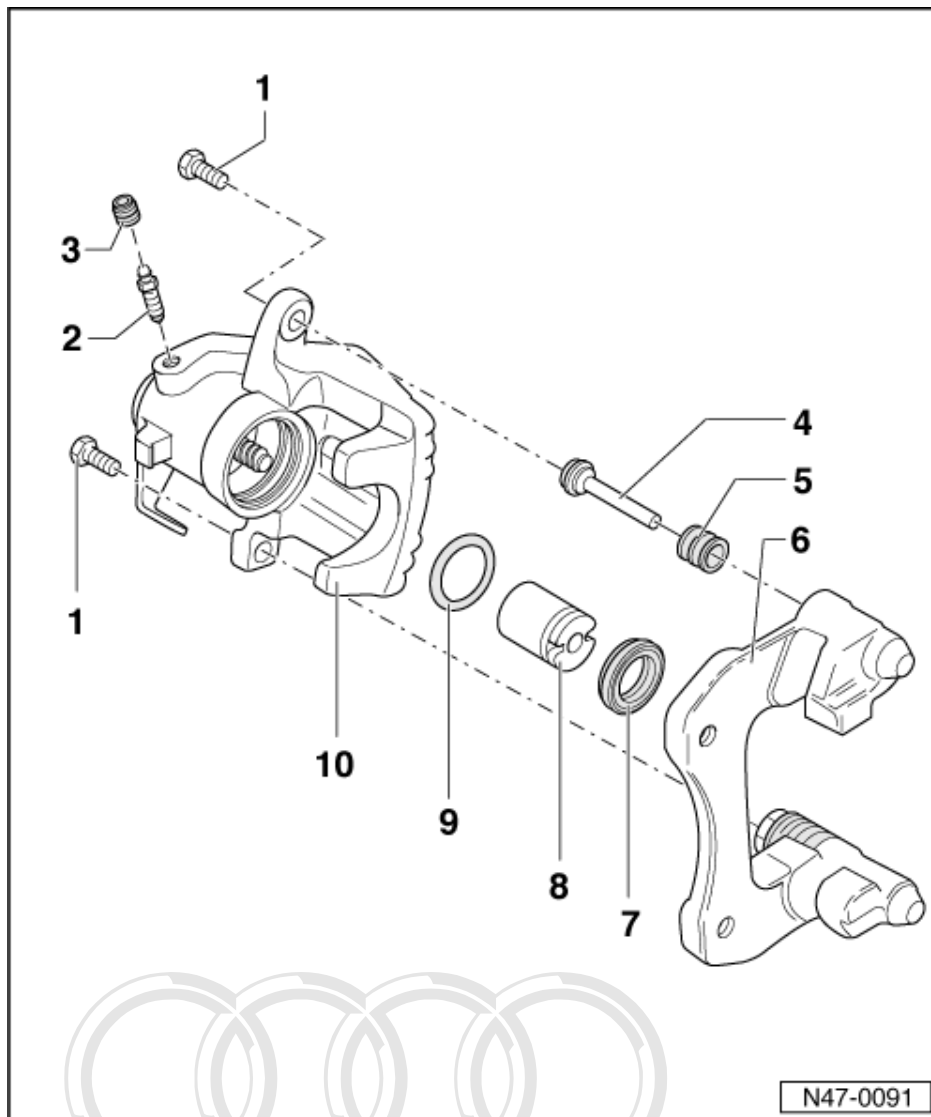
- -> Press the piston into the brake caliper housing using a piston resetting tool.

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

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3 - Servicing rear brake caliper, brake caliper C 34

3.1 - Servicing rear brake caliper, brake caliper C 34



Notes:

- ◆ When carrying out repairs install all parts supplied in repair kit.
- ◆ 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.
- ◆ When carrying out repairs, it is essential to pre-bleed the brake calipers (without brake pads) before installing in the vehicle => Page 164

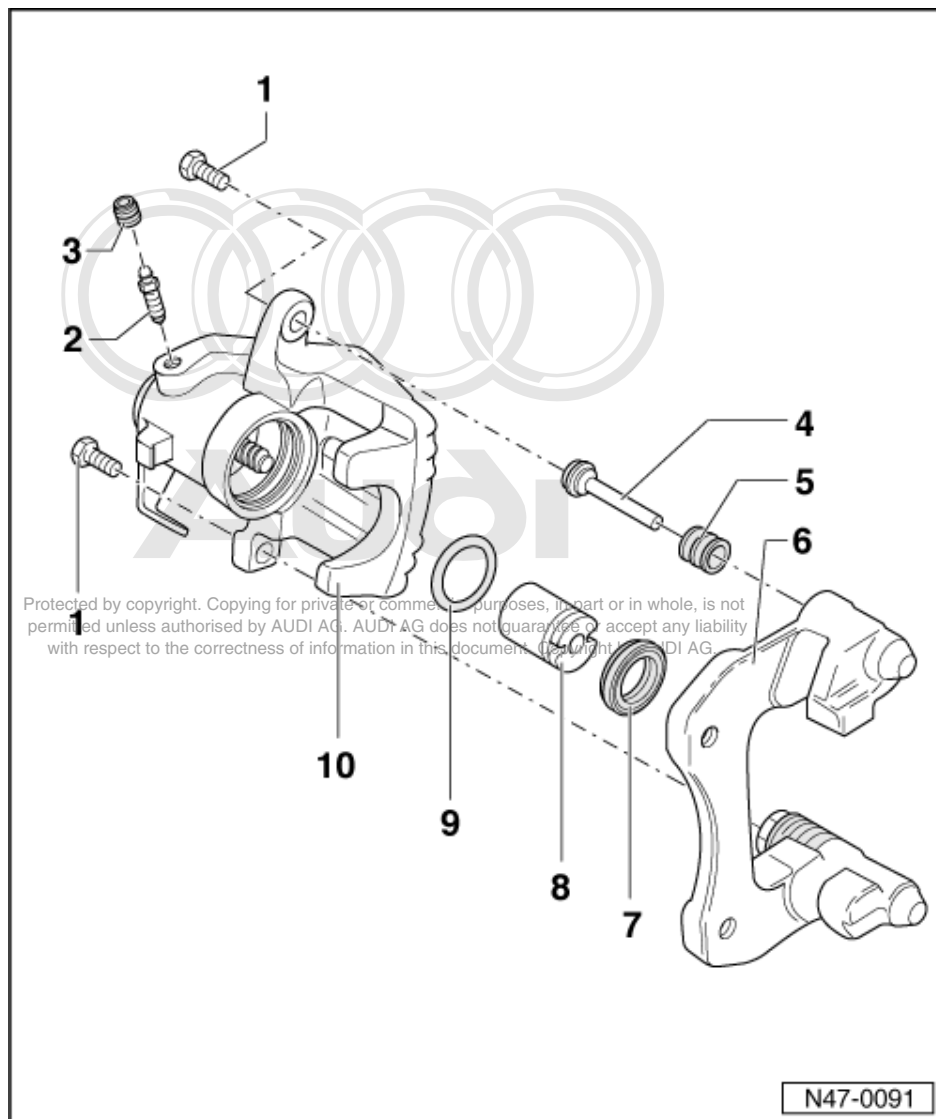
1 Hexagon bolt, Self-locking, 35 Nm

◆ Replace

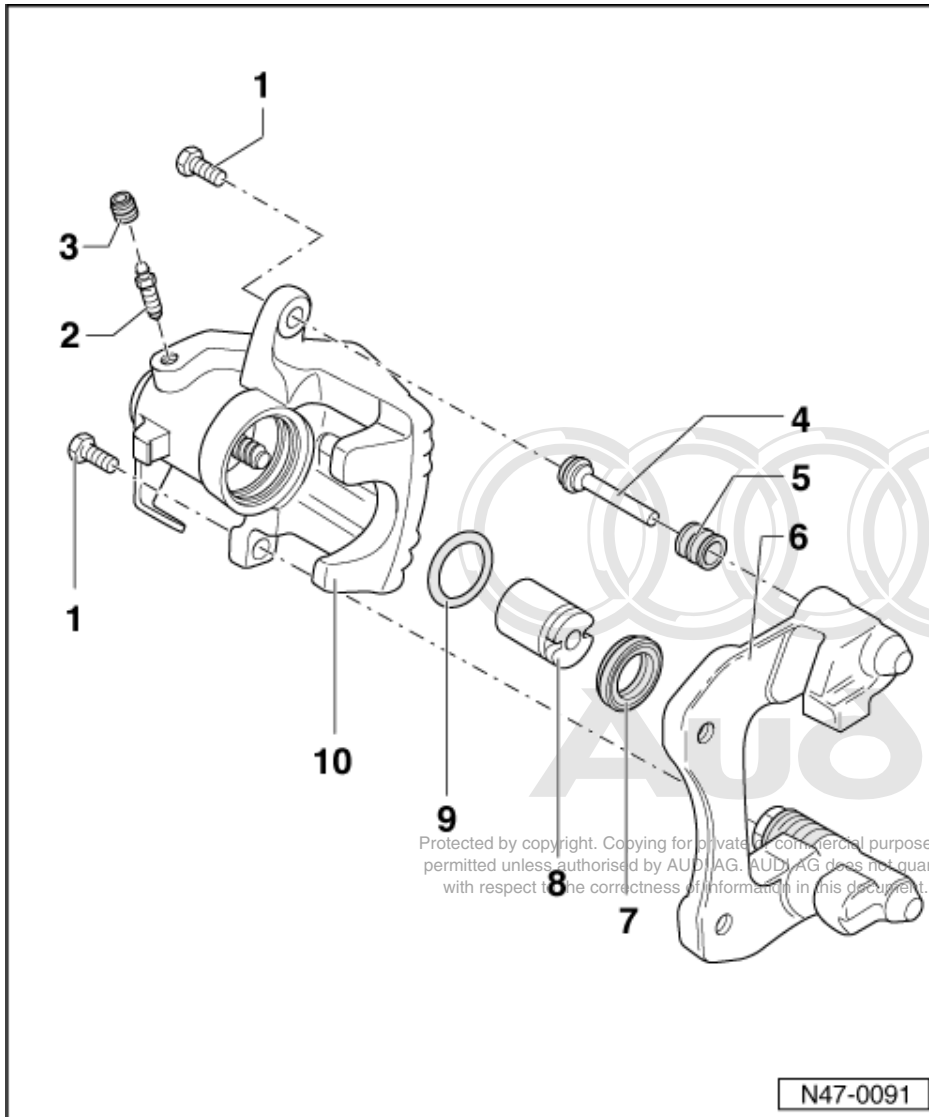
◆ When loosening and tightening counter hold on guide pin

2 Vent valve

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



- 3 Dust cap
- 4 Guide pin
 - ◆ Grease before installing protective cap
- 5 Protective cap
 - ◆ Pull onto brake carrier and guide pin
- 6 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 Protective cap

- ◆ Pull outer sealing lip onto piston

8 Piston with automatic adjustment

- ◆ Removing and installing
=>Page 162 .
- ◆ Apply thin coat of assembly paste G 052 150 A2 to piston before inserting

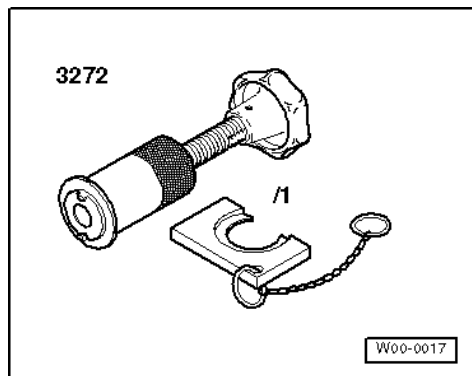
9 Sealing ring

- ◆ Removing and installing
=>Page 162 .

10 Brake caliper housing with lever for handbrake cable

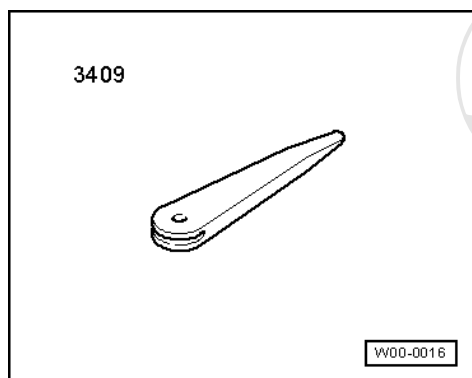
- ◆ Renew the brake caliper housing if there is a leak at the lever for the handbrake cable
- ◆ After servicing pre-bleed brake caliper housing => Page 164

3.2 - Removing and installing rear brake caliper piston



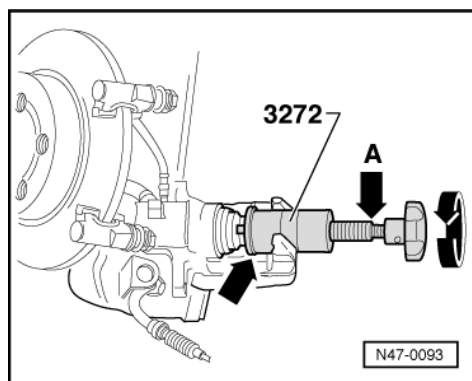
Special tools and workshop equipment required

- ♦ 3272 Resetting and removing tool



- ♦ 3409 Assembly wedge
- ♦ Bleeder bottle

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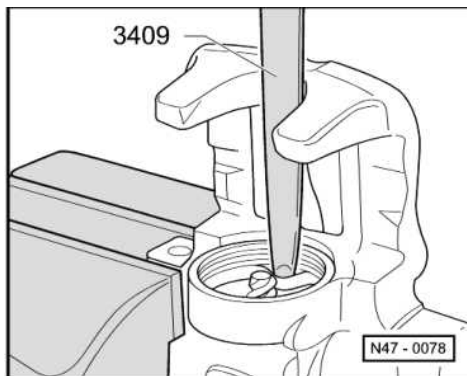


Removing

- -> Extract piston from brake caliper housing by turning the knurled wheel anti clockwise.

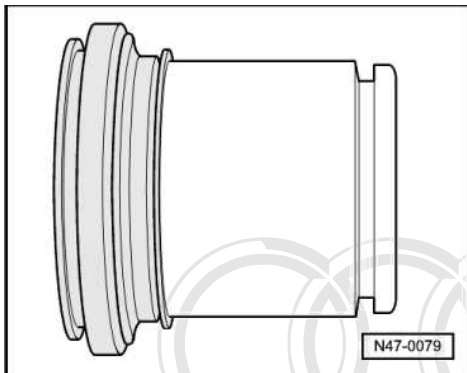
Notes:

- ♦ Fit special tool 3272 so that the collar (arrow) is located in front of the piston.
- ♦ If piston is difficult to move, use a 13 mm AF open jaw spanner on the flats (arrow A) provided for this purpose.

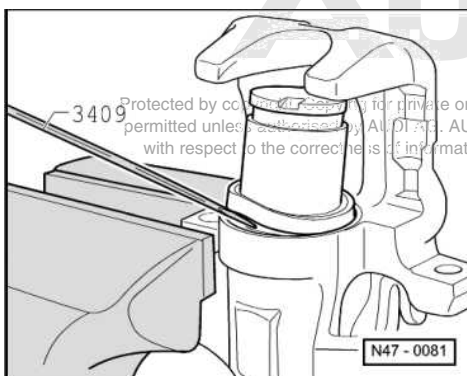


- -> Remove sealing ring using assembly wedge 3409.

Installing



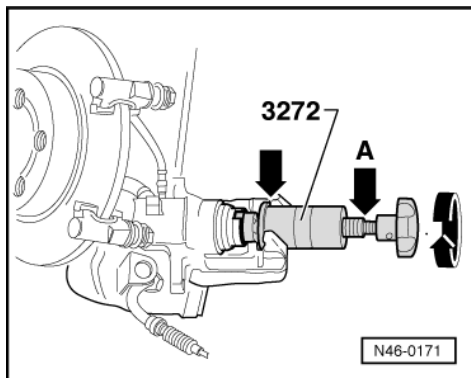
- The surface of the piston and sealing ring should be cleaned using only methylated spirits and then dried.
- Thinly coat piston and sealing ring with assembly paste G 052 150 A2 before inserting.
- -> Place protective cap with the outer sealing lip on the piston.



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

Note:

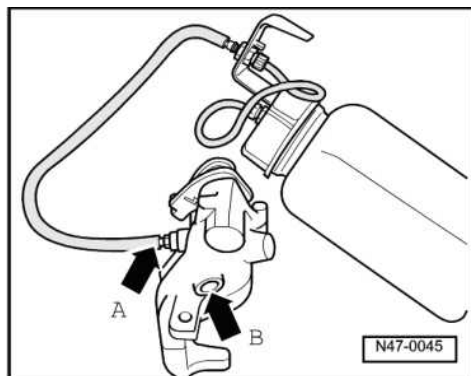
At the same time, hold piston in front of brake caliper housing.



- -> Screw piston into housing by turning knurled wheel clockwise.

Notes:

- ♦ Fit special tool 3272 so that the collar (arrow) of the tool is seated against the brake caliper.
 - ♦ If piston is difficult to move, use a 13 mm AF open jaw spanner on the flats (arrow A) provided for this purpose.
 - ♦ If the piston is pushed back with a piston resetting tool or by operating the foot brake the automatic adjustment in the brake caliper is destroyed.
- Fit brake pads.



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Pre-bleeding brake caliper

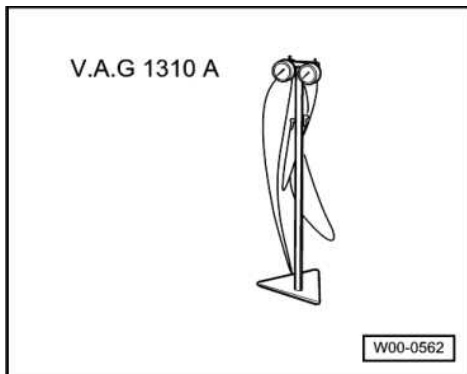
- -> Open bleed valve -arrow A- and, using a standard bleeder bottle, fill with brake fluid until bubble-free brake fluid flows from the threaded hole (brake hose connection) -arrow B-. Close bleed valve.

Note:

Position brake caliper as illustrated for pre-bleeding.

3.3 - Pressurised leak test

Special tools and workshop equipment required



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

Test requirements:

Brake system (hydraulic unit, brake hoses, brake lines and brake calipers) working properly and free of leaks.

- Remove bleeder screw at one of the front brake calipers. Connect pressure gauge of V.A.G 1310 A and bleed system.
- 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.

4 - Bleeding brake system

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4.1 - Bleeding brake system

Bleeding of the brake system is described using brake filling and bleeding unit V.A.G 1869.

Special feature of vehicles with ABS/EDL

If a chamber of the brake fluid reservoir is completely empty (e.g. in the event of leakage in the brake system) the hydraulic unit must be bled via the "Basic setting" function and the fault reader V.A.G 1551.

Important: For vehicles with ABS/EDL
 When filling up brake fluid with a filling and bleeding unit, e.g. V.A.G

For this reason, the brake fluid pressure must be reduced to 1 bar on filler and bleeder unit V.A.G 1869. => Operating instructions for V.A.G 1869

If the filling pressure of 1 bar is exceeded, it may not be possible to bleed the hydraulic unit properly.

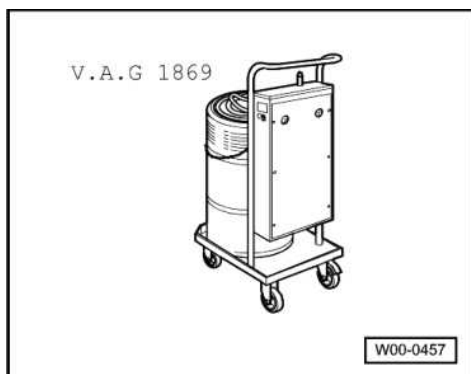
Initiating basic setting => Page 167

- ♦ Bleeding of the brake system on vehicles with ABS is performed in the same manner as for vehicles with a conventional braking system
- ♦ Only use fresh brake fluid with Part No. B 000 700 A. (please specify the container index in place of the point).
- ♦ Brake fluid is poisonous. On account of its corrosive effect it must also never be allowed to come into contact with paint.
- ♦ 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.



- ♦ Use plenty of water to rinse away any brake fluid spillage.

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



Special tools and workshop equipment required

- ♦ V.A.G 1869 Brake filling and bleeding unit
- ♦ V.A.G 1869 Brake filling and bleeding unit

Bleeding of the brake system on vehicles with ABS is performed in the same manner as for vehicles with a conventional braking system

- Connect brake filling and bleeding unit V.A.G 1869.
- Open bleeder screws in prescribed sequence and bleed brake calipers and wheel brake cylinders.

Bleeding sequence

1 - Wheel brake cylinder/brake caliper rear right

2 - Wheel brake cylinder/brake caliper rear left

3 - Front right brake caliper

4 - Front left brake caliper

Vehicles with ABS or ABS/EDL

A road test must be performed for these vehicles following bleeding. The ABS must be activated at least once during the test.

4.3 - Bleeding brake system without brake filling and bleeding unit

- Build up pressure in braking system by pumping pedal
- Open bleeder screw with hose of bleeder bottle attached.
- Close bleeder screws with pedal depressed.
- Repeat procedure until no further air emerges.

Bleeding sequence => Page 166

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Brake fluid change

=> Maintenance Manual

4.4 - Initiating basic setting

Special tools and workshop equipment required



- ♦ -> V.A.G 1869 Brake filling and bleeding unit

Function 04 "Initiate basic setting" fulfils several tasks:

- ♦ Display group number 001 is only required for the bleeding of the hydraulic unit. =>Page **167** .

Basic setting is only necessary if at least one chamber of the brake fluid reservoir is completely empty (e.g. in the event of leakage in the brake system).

Display group number 01: Bleeding the hydraulic unit.

When filling up brake fluid with a filling and bleeding unit, e.g. V.A.G 1869, make sure that the filling pressure of 1 bar is not exceeded.

If the filling pressure exceeds 1 bar a hydraulically controlled changeover valve, which is required for the EDL function, prevents unrestricted flushing of the EDL-related parts of the hydraulic unit. If this is the case, it may not be possible to bleed the system properly.

For this reason the brake fluid pressure must be reduced to 1 bar on filler and bleeder units VW 1238/1 and V.A.G 1869.

=> Operating instructions VW 1238/1, V.A.G 1869

Filling and bleeding unit V.A.G 1238/B is not suitable for bleeding brake system for "Initiate basic setting" function.

If only filler and bleeder unit V.A.G 1238/B is available then switch unit on and off to ensure that there is always sufficient brake fluid in the reservoir.

- Connect filler and bleeder unit, e.g. V.A.G 1869.
- Connect fault reader V.A.G 1551 and select "Brake electronics" with address word 03.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

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

-> Indicated on display:

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Rapid data transfer Q
04 - Basic setting

- Confirm input with Q key.

Note:

During the next test steps the ABS warning lamp flashes 4 times per second.

-> Indicated on display:

Default setting HELP
Enter display group number XXX

- Press keys 0, 0 and 1.
- Confirm input with Q key.

The following test cycle must be repeated 8 times according to the prescribed sequence in the basic setting mode on V.A.G 1551.

-> Indicated on display:

System in basic setting 1
Press and hold brake pedal...

- Operate pedal with substantial foot pressure and hold.

Notes:

- ♦ Pedal moves down
- ♦ Hydraulic pump runs
- ♦ Pedal comes back

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-> Indicated on display:

System in basic setting 1
Release pedal; FR+FL Bleeder screw ON

- Press key 3.

-> Indicated on display:

System in basic setting 2
wait...

- Wait 10 seconds.

-> Indicated on display:

System in basic setting 2
Press pedal 10x; Bleeder screw CLOSED

- Press key 3.

-> If all eight cycles have been completed, the following display appears:

System in basic setting 17
Part bleeding ended ...

- Press =>key.

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- 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.

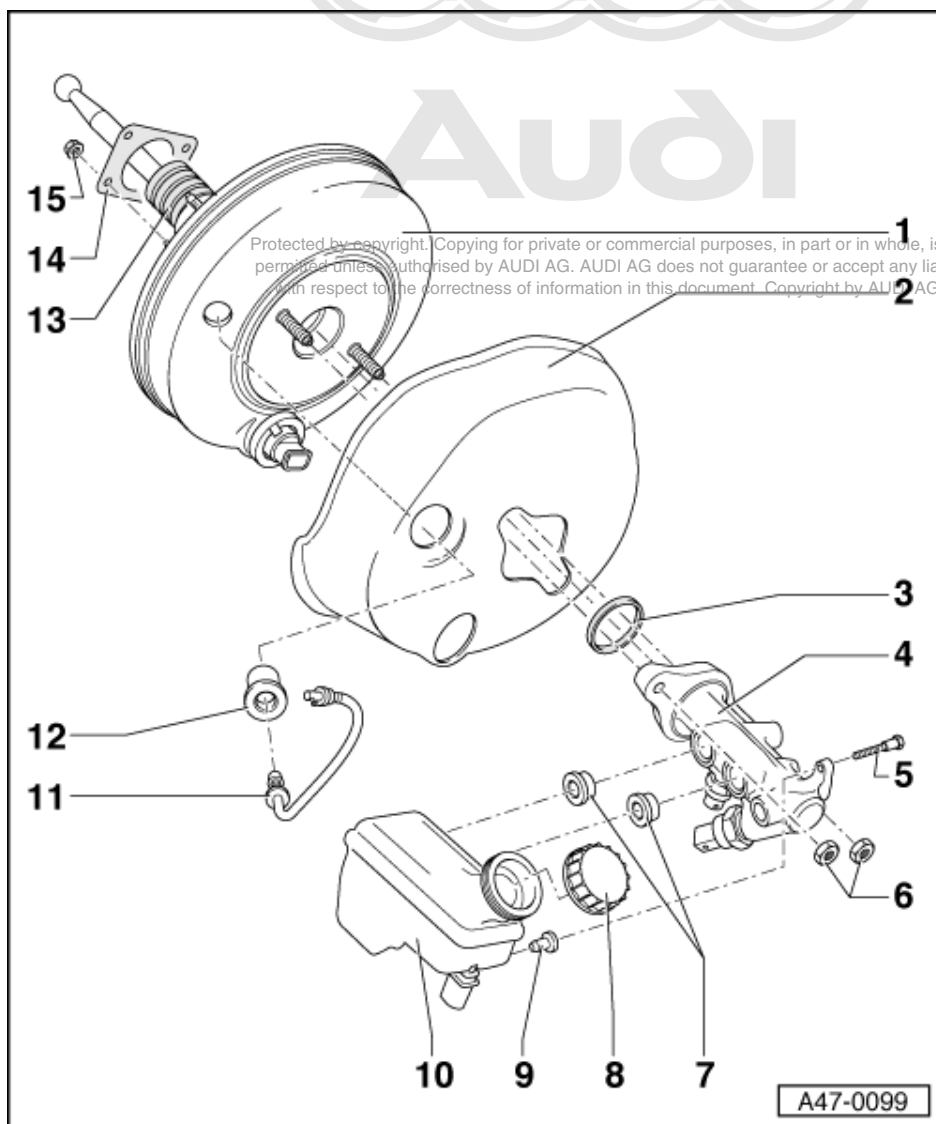
-> Indicated on display:

Rapid data transfer HELP
 Enter address word XX

- Press Ckey.
- Switch ignition off.
- Disconnect fault reader.
- The brake system must subsequently be bled => Page 165 .

5 - Assembly overview: Servo unit/brake master cylinder

5.1 - Assembly overview: Servo unit/brake master cylinder

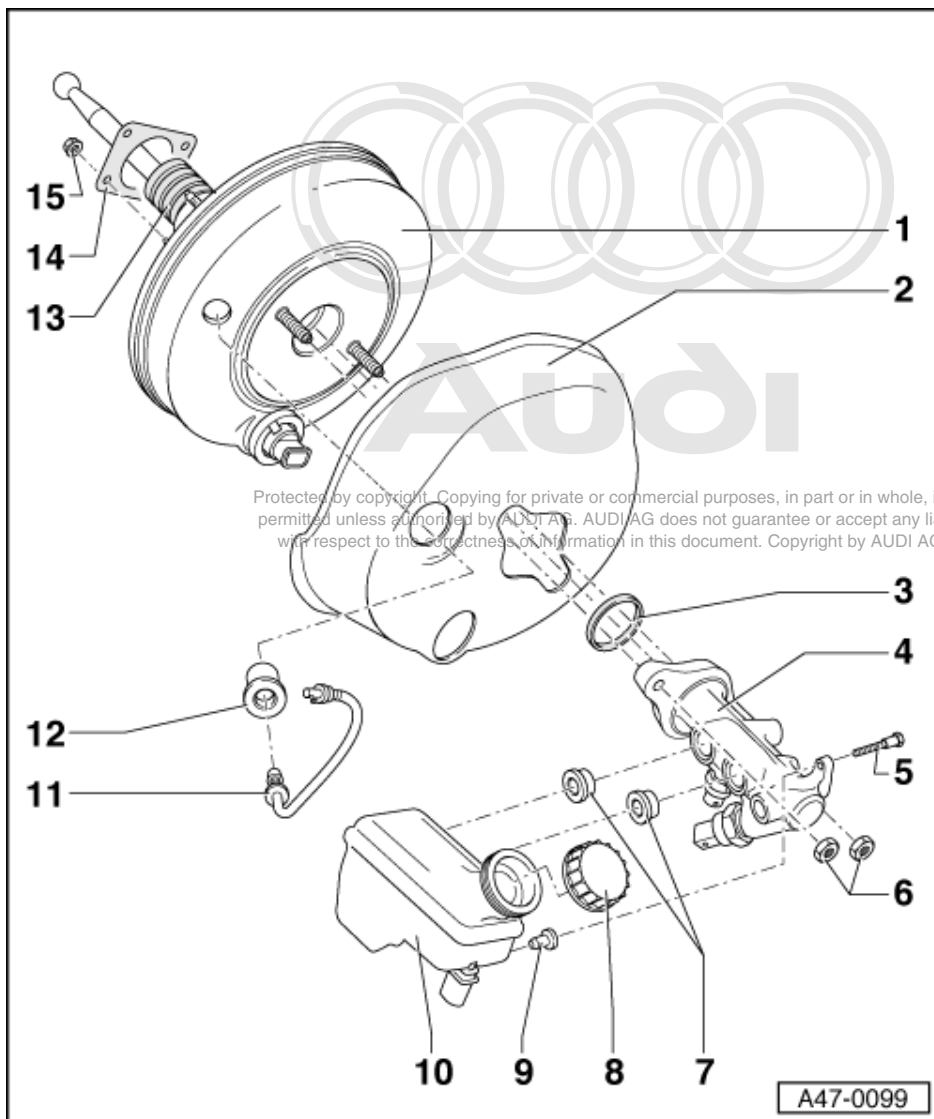


Note:

The complete brake master cylinder and brake servo can be replaced separately from each other.

1 Brake servo

- ◆ With cable connector for solenoid
- ◆ The required vacuum is taken from the intake manifold.
- ◆ Functional test
 - With the engine switched off, firmly depress the brake pedal several times (this reduces the vacuum present in the servo unit).

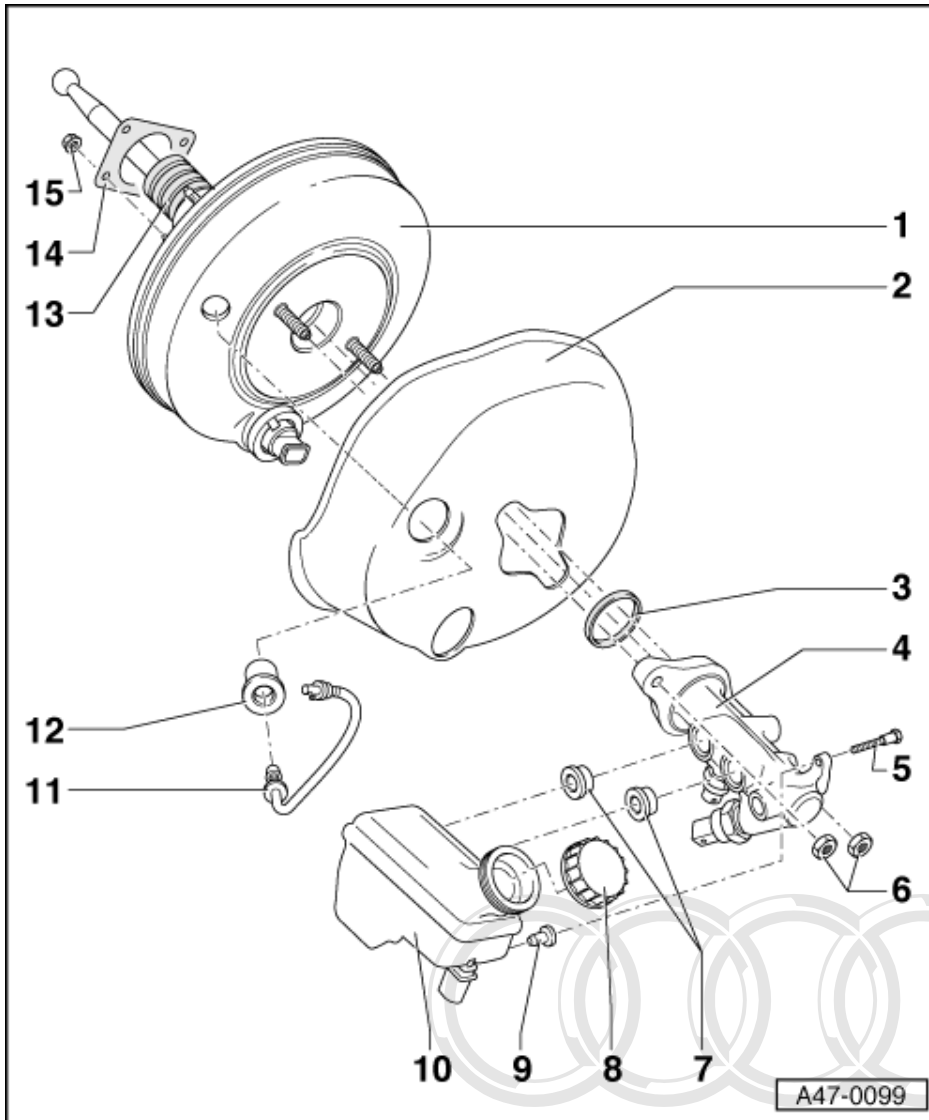


- Now depress brake pedal with moderate force, hold and start engine. If the servo unit is working properly, the pedal will be felt to give slightly when pressed (servo assistance becomes effective).
- ◆ If faulty renew complete.
- ◆ Detach from brake pedal
=>Page **137**.
- ◆ Removing and installing => Page **173**

2 Insulating shell for brake servo

3 Sealing ring

- ◆ Replace



4 Brake master cylinder

- ♦ Cannot be repaired. If faulty, replace complete.
- ♦ With sender G201 and sender G214 for brake pressure
- ♦ Tightening torque 25 Nm
- ♦ Removing and installing => Page 172

5 Longer hexagon bolt 10 Nm

- ♦ Insert through brake master cylinder

6 Self-locking hexagon nut, 25 Nm

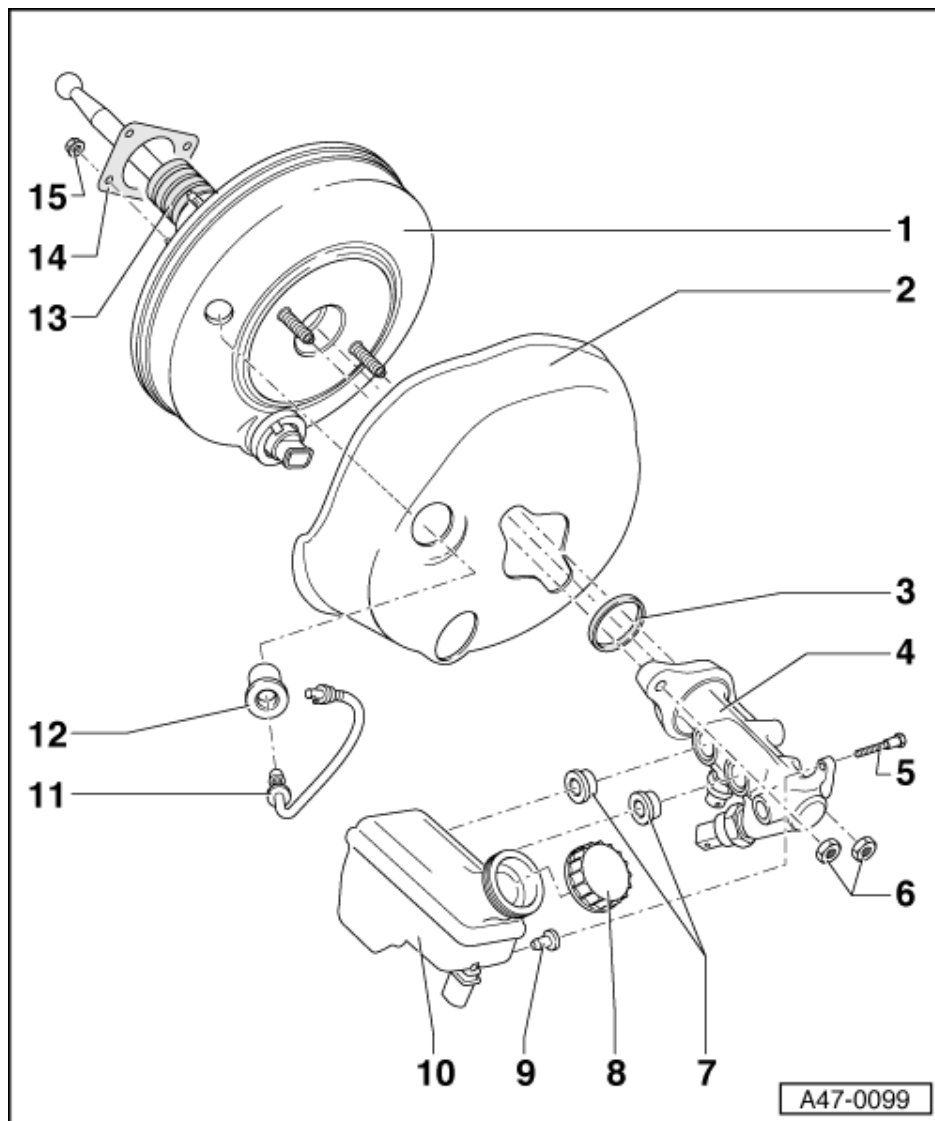
7 Sealing plug

- ♦ Moisten with brake fluid and press in reservoir

8 Cap

9 Rubber insert

- ♦ Serves as thread insert



10 Brake fluid reservoir

- ♦ Clipped onto brake master cylinder

11 Vacuum hose

- Insert into brake servo unit

12 Sealing plug

13 Bellows

- ♦ Ensure correct seating, danger of suction noises

14 Seal

- ♦ For brake servo

15 Self-locking hexagon nut, 25 Nm

6 - Removing and installing brake master cylinder

6.1 - Removing and installing brake master cylinder

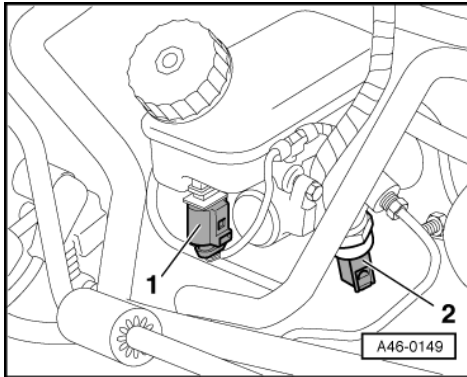
Additionally required information

- ♦ Workshop Manual Audi A2 2001 à Running Gear Self-diagnosis for ESP

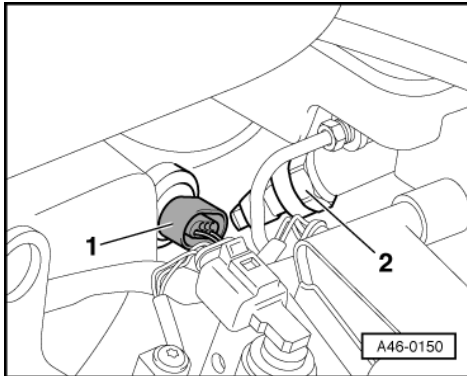
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Removing

- Note radio code on vehicles with coded radio; if necessary ask for it.
- Disconnect battery.



- Lay out plenty of lint-free cloths in the area of the plenum chamber, engine and gearbox.
- Draw off as much brake fluid as possible from brake fluid reservoir using an extraction bottle.
- -> Detach connector -1- from for brake fluid level switch.
- Disconnect the brake pressure sender -2-



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- -> Disconnect the brake pressure sender -2-
- Disconnect brake lines from brake master cylinder and seal brake lines with sealing plugs from repair kit, Part No. 1H0 698 311 A.
- Unscrew nuts from brake master cylinder.
- Carefully remove brake master cylinder from brake servo unit.

Installing

- Install in reverse order.

The following points should be especially be noted when installing:

- When fitting together the brake master cylinder and brake servo unit, ensure that the push rod is correctly located in the brake master cylinder.
- Bleed the brake system after installation => Page 165 .

7 - Removing and installing brake servo

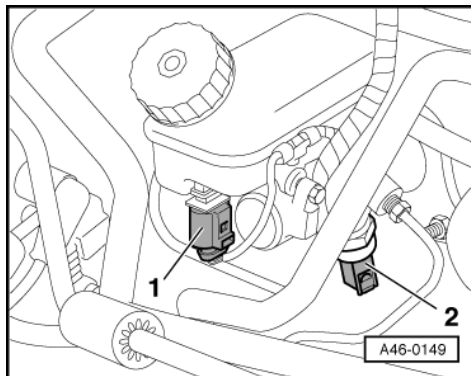
7.1 - Removing and installing brake servo

Additionally required information

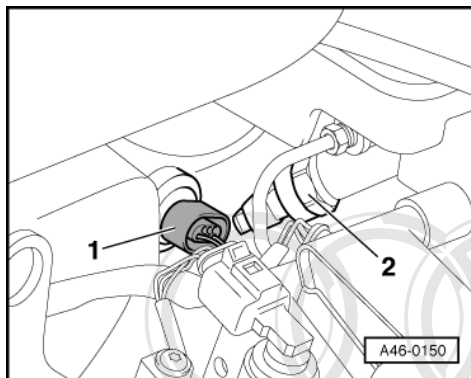
- ♦ Workshop Manual Audi A2 2001 ä Running Gear, Self-diagnosis for ESP

Removing

- Note radio code on vehicles with coded radio; if necessary request it.
- Disconnect battery.
- Remove coolant system expansion tank and lay to one side, do not open coolant system.

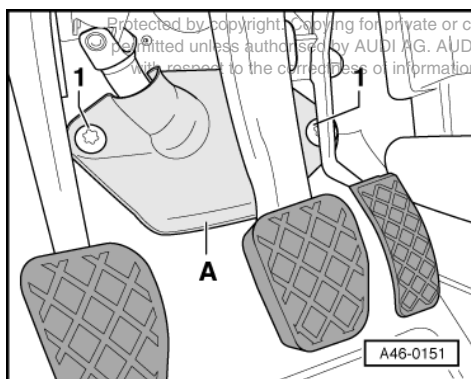


- Detach vacuum hose from brake servo.
- -> Disconnect the brake pressure sender -2-
- Unplug connector for brake fluid reservoir -1-.

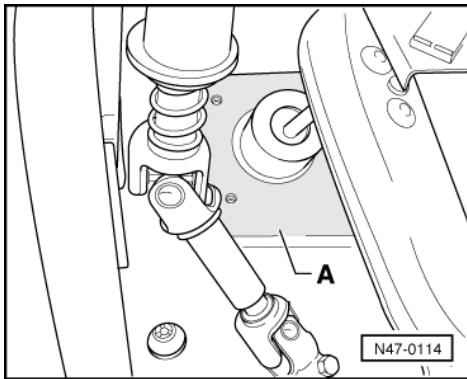


- -> Disconnect the brake pressure sender -2-
- Unplug wire connector for solenoid -1-.
- Protect the engine compartment against escaping brake fluid using plenty of cloths.
- Unscrew lines to brake master cylinder.
- Removing driver's storage compartment.

=> General Body Assembly, Interior; Repair group 68



- -> Remove bolts -1-.
- Remove cover -A-.



- -> Fold the cover -A- downwards.
- Adjusting, removing and installing brake light switch => Page 17
- Detach brake pedal from brake servo =>Page 137 .
- Unscrew servo unit.
- Thread out brake servo with brake master cylinder to front and remove.

Installing

Installation is in reverse order.

- Adjusting, removing and installing brake light switch => Page 17
- Bleed the brake system after installation => Page 165 .

8 - Brake lines and brake pipes

8.1 - Brake lines and brake pipes

8.2 - 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.

8.3 - Tightening torques

FS-I Alu brake caliper	45 Nm
Brake hose to brake caliper (banjo union with banjo bolt)	
FS-III brake caliper	35 Nm
Brake hose to brake caliper (banjo union with banjo bolt)	
Rear brake calipers	35 Nm
Brake hose/brake pipe	
Banjo bolt and sealing rings	
Vent valve to brake caliper	10 Nm
Brake lines to hydraulic unit, Mark 20	12 Nm



Brake pipes to brake hoses, Mark 20	12 Nm
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Brake pipes between hydraulic unit and brake master cylinder, Mark 60	24 Nm
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Brake lines to brake hoses, Mark 60	12 Nm
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Hydraulic unit to bracket	8 Nm
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ABS sensors to wheel bearing housing	10 Nm
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Brake plates to wheel bearing housing	10 Nm
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Wheel brake cylinder to rear brake carrier	8 Nm
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Audi

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