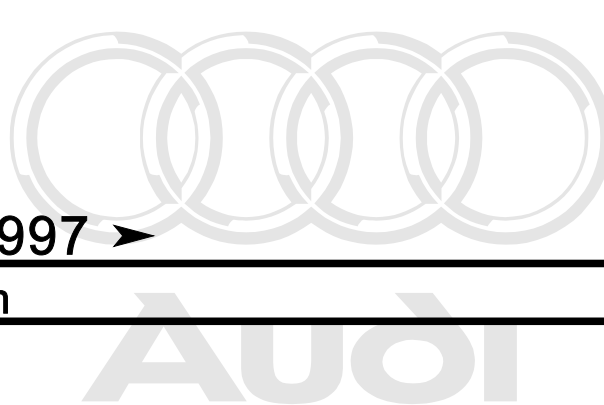


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Audi A3 1997 ➤

Brake system

Edition 09.2001

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Audi A3 1997 ➤

Brake system

Repair Group

00 - Technical data

45 - Anti-locking brake system

46 - Brakes, Brake mechanics

47 - Brakes, Brake hydraulics

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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Brake system - Edition 09.2001



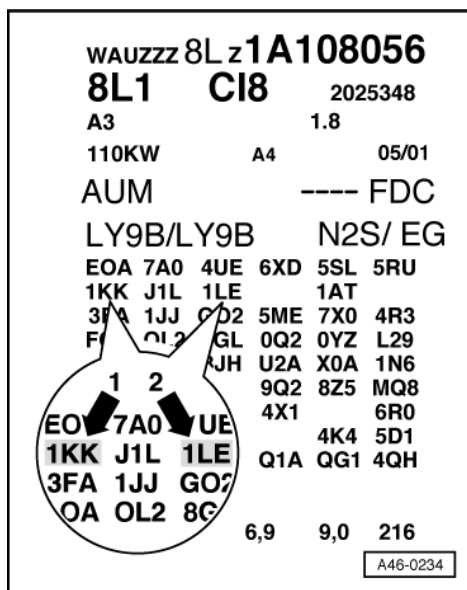
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00 - Technical data

1 - Technical data

1.1 - Technical data

1.2 - PR No./brake assignment



-> The brakes with which the vehicle is fitted can be seen from the corresponding PR number on the vehicle data sticker.

- ◆ Arrow 1 - Rear brake
- ◆ Arrow 2 - Front brake

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

The PR No. indicates the correct brake caliper/brake disc/brake pad combination.

=> Parts List

Engine version	PR No.	Front brake
1.6 l - 74, 75 kW	1LQ	FS 3 (14")
1.8 l - 92 kW	1LS	FS 3 (15")
1.9 l - 66 kW		
1.9 l - 74 kW		
1.9 l - 81 kW		
1.8 l - 110 kW	1LE	FN 3 (15")
1.8 l - 132 kW		
1.9 l - 96 kW		
1.8 l - 154 kW	1LT	FN 3 (16")
1.8 l - 165 kW		

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Engine version	PR No.	Rear brake
FWD		
1.6 l - 74, 75 kW 1.8 l - 92 kW 1.8 l - 110 kW 1.8 l - 132 kW 1.9 l - 66 kW 1.9 l - 74 kW 1.9 l - 81 kW 1.9 l - 96 kW	1KK	C 38
4WD		
1.8 l - 110 kW 1.8 l - 132 kW 1.9 l - 96 kW	1KE	C 41 HR
1.8 l - 154 kW 1.8 l - 165 kW	1KF	C 38

1.3 - Brakes

Brake system		
Dual-circuit diagonally split braking system, anti-locking brake system (ABS) with electronic brake-pressure distribution (EBPD) Certain equipment versions/model years additionally feature electronic differential lock (EDL), traction control system (TCS) and electronic stability program (ESP)		
Brake master cylinder	ømm	23.81
Brake servo	øin inches	LHD: 10 RHD: 7 / 8 tandem
	Operation	Pneumatic
Boost factor	i =	5

Front brake					
Brake caliper		PR No. 1LQ, 1LS		PR No. 1LE, 1LT	
Front brake caliper		FS 3		FN 3	
Piston		54		54	
Brake disc		PR No. 1LQ	PR No. 1LS	PR No. 1LE	PR No. 1LT
Front brake disc	ømm	256	280	288	312
Brake disc thickness, ventilated	mm	22	25	25	25
Brake-disc wear limit	mm	20	23	23	23
Brake pad					
As-new pad thickness (without backplate)	mm	14	14	14	14
Pad wear limit (without backplate)	mm	2	2	2	2

Rear brake				
Brake caliper		PR No. 1KK	PR No. 1KE	PR No. 1KF
Rear brake caliper		C 38	C 41 HR	C 38
Piston	ømm	38	41	38
Brake disc				

Rear brake				
Rear brake disc	ømm	232	239	256
Brake disc thickness, non-ventilated	mm	9	9	-
Brake disc thickness, ventilated	mm	-	-	22
Brake-disc wear limit	mm	7	7	20
Brake pad				
As-new pad thickness (without backplate)	mm	12	12	12
Pad wear limit (without backplate)	mm	2	2	2

2 - Brake test

2.1 - Brake test

2.2 - General

The wheels are driven by the dynamometer.

For test purposes, select idle on vehicles with manual gearbox and position N on vehicles with automatic gearbox.

Heed instructions of dynamometer manufacturer when performing test.

2.3 - Front-wheel drive vehicles

Brake test on single-axle roller dynamometer

We recommend use of a brake dynamometer with controlled roller speed and a max. test speed of 6 km/h.

Failure to comply with the above specifications can lead to brake application (EDL control).

In such cases switch off engine and ignition for test purposes. Run engine briefly if necessary to build up sufficient vacuum for brake test.

2.4 - Four-wheel drive vehicles (Haldex coupling)

Brake test on single-axle dynamometer for four-wheel drive vehicles

The dynamometer drives the wheels of one axle in opposite directions to avoid the other axle being driven.

We recommend use of a brake dynamometer with controlled roller speed and a max. test speed of 6 km/h.

Failure to comply with the above specifications can lead to brake application (EDL control).

In such cases switch off engine and ignition for test purposes. Run engine briefly if necessary to build up sufficient vacuum for brake test.

If no four-wheel drive dynamometer is available, testing can also be performed using a conventional dynamometer.



- Drive vehicle forwards onto rollers.
- Switch off engine and wait 2 seconds.
- Perform brake test at front.
- Start engine and let it run for approx. 5 s to build up sufficient vacuum in brake servo.
- Drive vehicle forwards until rear wheels are positioned on rollers.
- Switch off engine and wait 2 seconds.
- Perform brake test at rear.

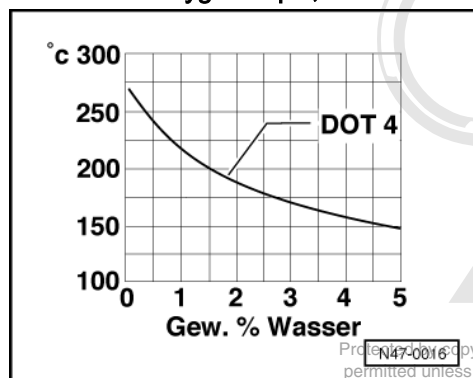
Engine must not run and ignition must not be switched on during test, as otherwise rear axle would be driven by Haldex coupling.

3 - Brake fluid

3.1 - Brake fluid

3.2 - General

Brake fluid is hygroscopic, i.e. it has a tendency to absorb water and moisture from the atmosphere



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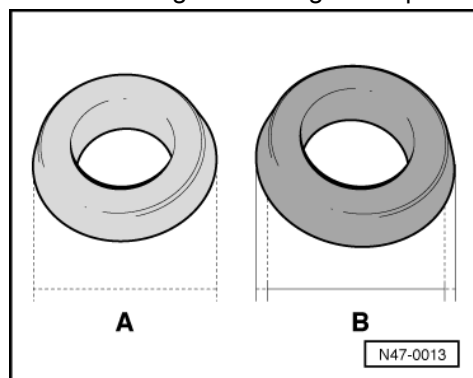
-> The boiling point decreases with increasing water content, i.e. a considerable rise in brake fluid temperature can lead to formation of vapour bubbles and brake failure.

The colour of the brake fluid becomes darker over the course of time. A dark brake fluid colour is not an indication of its condition. The change in colour is caused by chemical reactions and may occur within a short period (several weeks), particularly in the case of vehicles fitted with ABS.

Attention:

Rubber parts of brake system (sleeves, sealing rings) are not compatible with mineral oil, petrol and cleaning agents.

Even minute quantities coming into contact with a sealing ring or sleeve will affect the components and could impair brake operation. The consequences of a contaminated brake system only become apparent months later but then give rise to great expense, particularly in the case of vehicles fitted with ABS.



-> A = Sleeve - original size

B = Sleeve - swollen due to contact with mineral oil

Consequences of the above-mentioned points:

Always keep brake fluid containers properly sealed. This is the only way of preventing the ingress of oil, dirt, cleaning agent or moisture.

Brake fluid containers should be kept completely separate from oils (including hydraulic fluid) and cleaning agents to prevent any mixture of fluids or even filling of the brake system with an incorrect fluid.



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45 - Anti-locking brake system

1 - General information on anti-locking brake system

1.1 - General information on anti-locking brake system

1.2 - Notes on ABS repair work

Attention:

The anti-locking brake system is basically maintenance-free.

Testing, assembly and servicing work are only to be performed by qualified personnel.

Failure to comply with the information described in the Workshop Manual can result in system damage and make the vehicle unsafe to drive.

- ♦ Before performing servicing work on anti-locking brake system, use self-diagnosis to establish cause of damage.
- ♦ Always switch off ignition before unplugging connector at hydraulic control unit.
- ♦ If a new hydraulic control unit is fitted, it must be encoded.

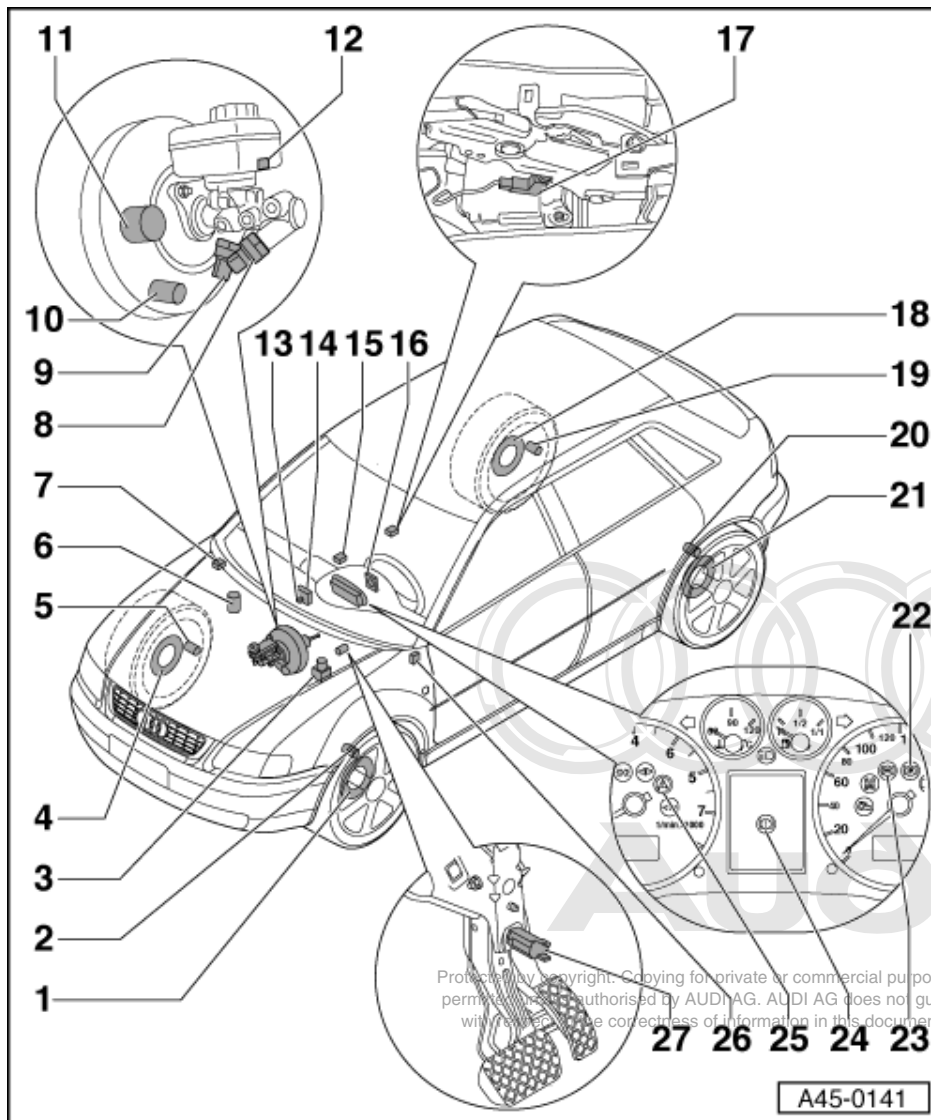
=> Running Gear, Self-diagnosis; Repair Group 01

- ♦ Bleed brake system after performing work involving opening of brake system. **ABS/ESP Mark 20 =>Page 167**. Use is to be made for this purpose of e.g. brake filling and bleeding appliance V.A.G 1869 A or VAS 5234.
- ♦ Observe appropriate safety precautions and instructions regarding handling of brake fluid.
- ♦ Absolute cleanliness is to be ensured when working on anti-locking brake system. Do not use products containing mineral oil, such as oils and greases.
- ♦ Make sure brake fluid does not enter connectors.
- ♦ Carefully clean all joints and adjacent areas before disconnecting. Do not use aggressive cleaning agents, such as brake cleaner, petrol, thinners or the like.
- ♦ Place parts removed on a clean surface and cover them over.
- ♦ Carefully cover or seal opened components if repairs are not to be performed immediately (use sealing plugs from repair set, part no. 1H0 698 311 A).
- ♦ Do not work with compressed air and do not move vehicle when system is open.
- ♦ Do not use fluffy cloths.
- ♦ Only use genuine wrapped parts.
- ♦ Do not remove replacement parts from wrapping until immediately prior to installation.
- ♦ Make sure that at least one ABS-controlled braking operation (with noticeable pulsing of brake pedal) is carried out during the concluding test drive.
- ♦ When performing painting work, electronic control unit may be exposed to temperatures of max. 95 °C for brief periods and max. 85 °C for longer periods (approx. 2 hours).
- ♦ Before performing electric welding work, refer to

=> General Information; Body Repairs; Safety Precautions

2 - ABS/ESP ITT Mark 20

2.1 - ABS/ESP ITT Mark 20



2.2 - Exploded view of components

1 Rotor for front left speed sensor

- ◆ Rotor is welded to wheel hub
- ◆ Checking =>Page 32
- ◆ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

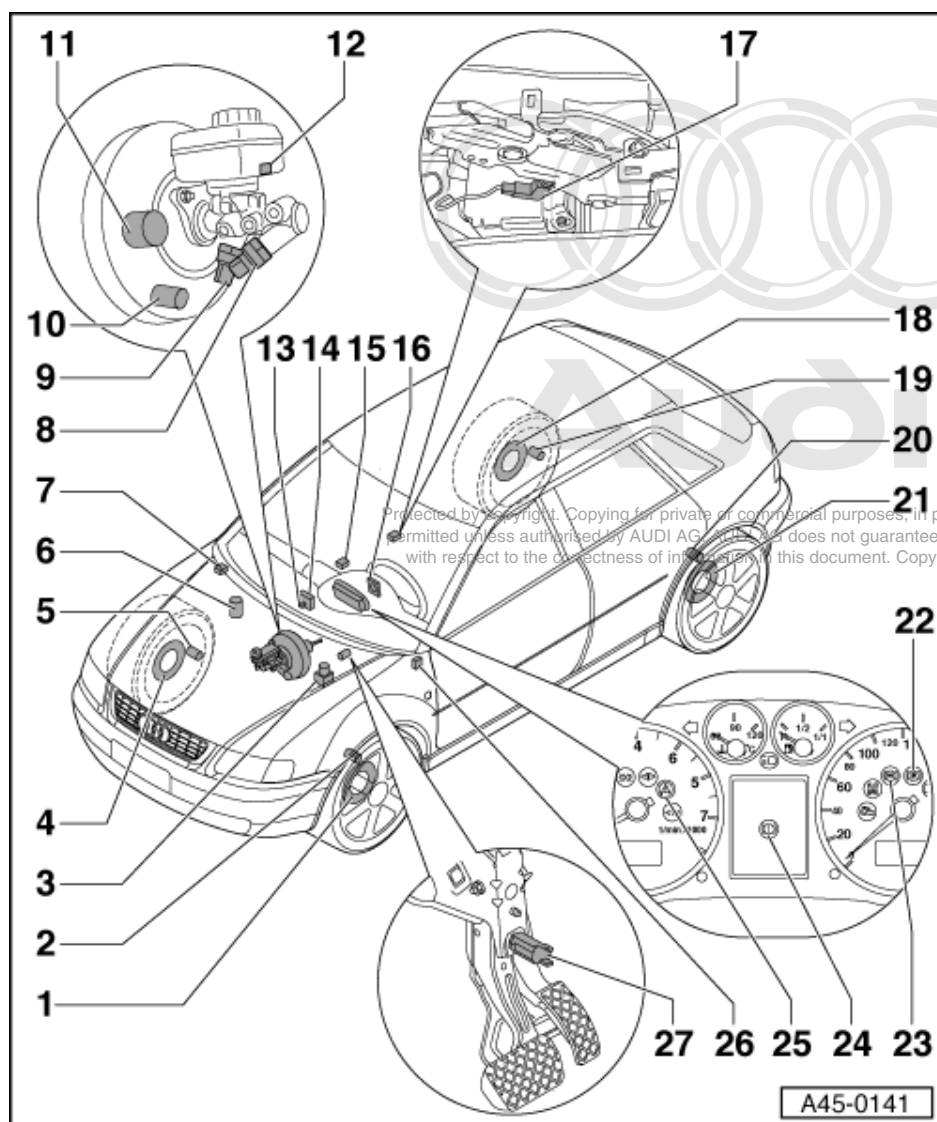
2 Front left speed sensor -G47

- ◆ Removing and installing=>Page 32

3 ABS hydraulic unit -N55 with ABS/EDL control unit -J104

- ◆ Hydraulic control unit consists of ABS hydraulic pump -V64, ABS hydraulic unit -N55 and ABS with EDL control unit -J104
- ◆ Distinguishing features of hydraulic unit => Fig. 1

♦ Removing and installing=>Page 24



4 Rotor for front right speed sensor

- ♦ Rotor is welded to wheel hub
- ♦ Checking =>Page 32
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

5 Front right speed sensor -G45

- ♦ Removing and installing=>Page 32

6 Vacuum pump for brake -V192

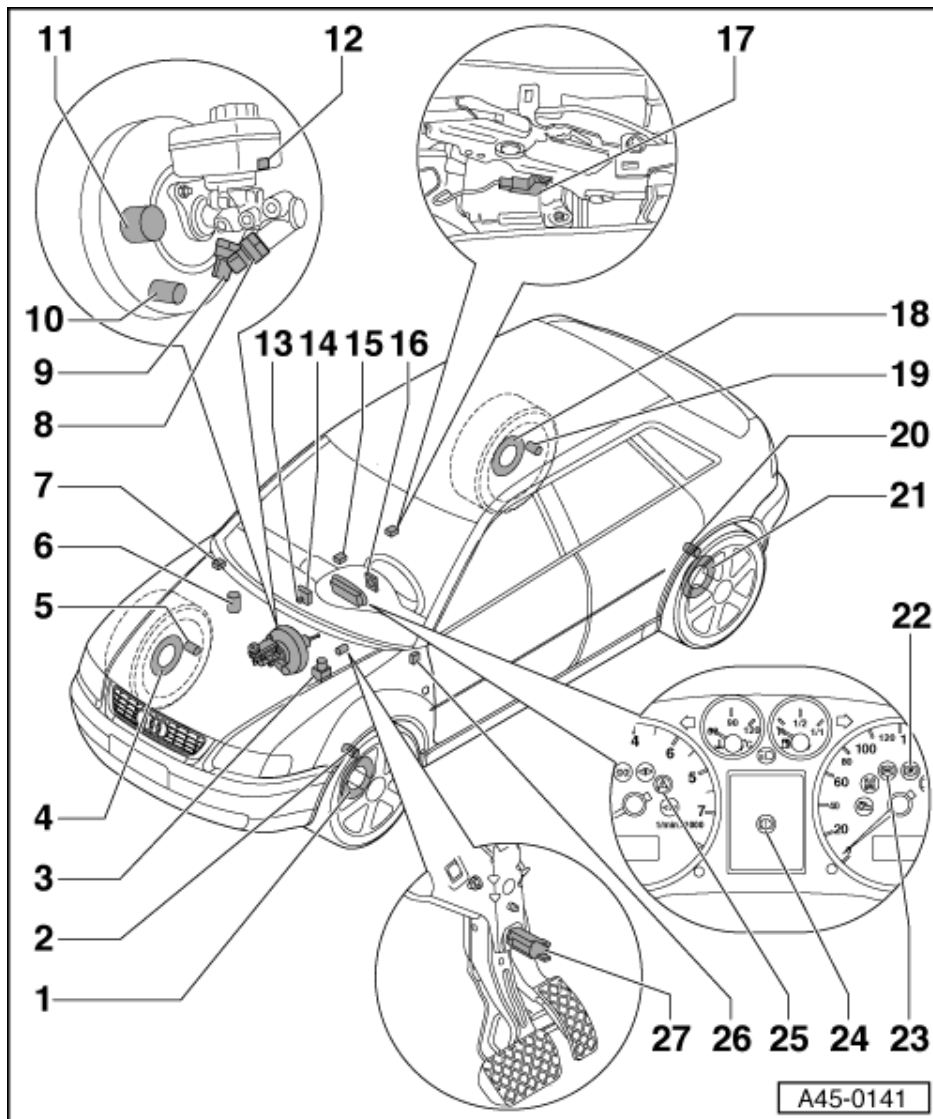
- ♦ For petrol engines with automatic gearbox (depending on year)
- ♦ Assignment

=> Parts List

7 Longitudinal acceleration sender -G251

- ♦ Vehicles with ESP and 4WD only
- ♦ Fitting location: At A-pillar on passenger side

♦ Removing and installing=>Page 17



8 Brake pressure sender 1 -G201

- ♦ Vehicles with ESP only
- ♦ Removing and installing=>Page 20

9 Brake pressure sender -2- -G214

- ♦ Vehicles with ESP only
- ♦ Removing and installing=>Page 20

10 Brake detection switch, ESP -F83

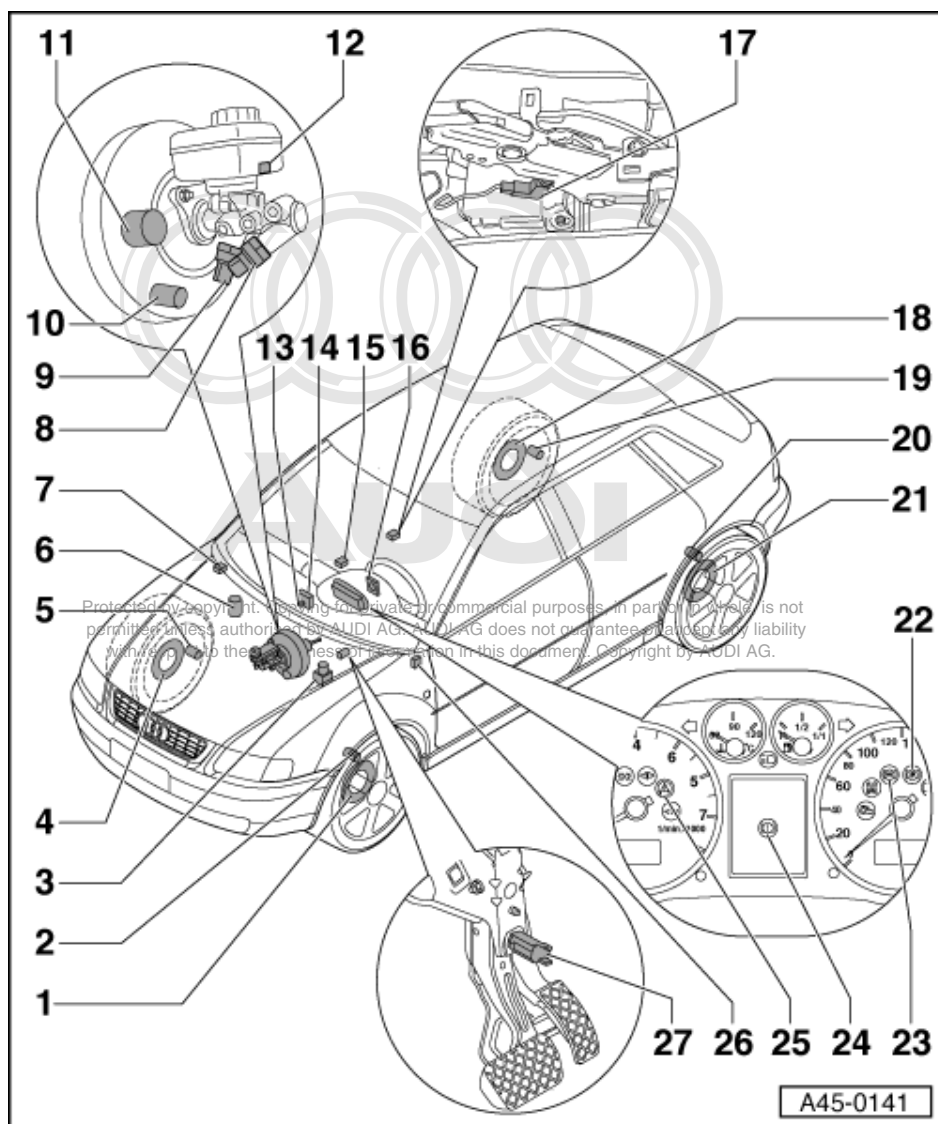
- ♦ Vehicles with ESP only
- ♦ Brake servo assembly must be replaced if switch is defective

11 Brake pressure solenoid valve, in brake servo -N247

- ♦ Vehicles with ESP only
- ♦ Brake servo assembly must be replaced if solenoid is defective

12 Brake fluid level warning contact -F34

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13 Lateral acceleration sender -G200

- ♦ Vehicles with ESP only
- ♦ Removing and installing=>Page 15

14 Yaw rate sender -G202

- ♦ Vehicles with ESP only
- ♦ Removing and installing=>Page 15

15 Traction control system switch -E132

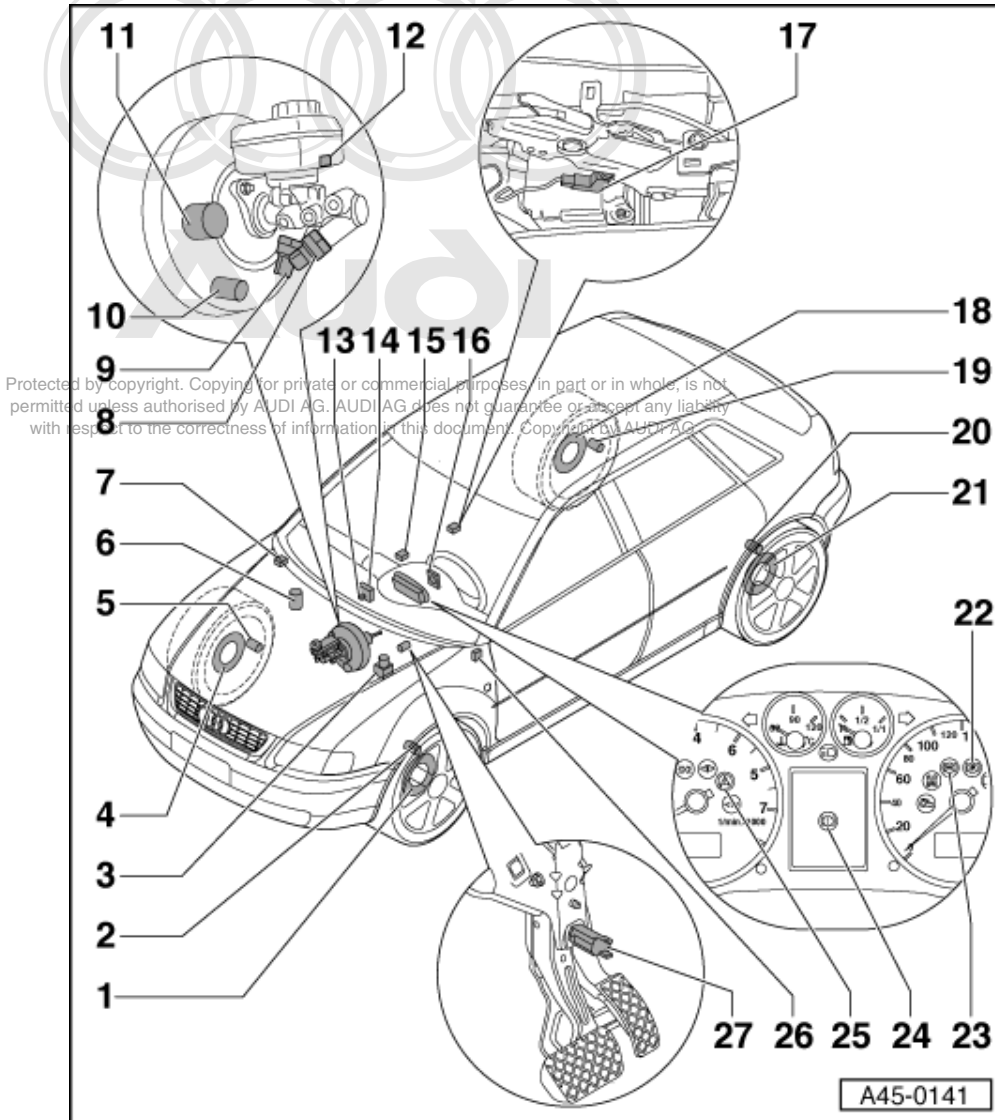
- ♦ Fitting location: In centre console

16 Steering angle sender -G85

- ♦ Vehicles with ESP only
- ♦ Removing and installing=>Page 18

17 Handbrake warning switch -F9

- ♦ Fitting location: At handbrake lever



18 Rotor for rear right speed sensor

- ◆ Rotor is welded to wheel hub
- ◆ Checking => Page 47
- ◆ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

19 Rear right speed sensor -G44

- ◆ Removing and installing=>Page 46

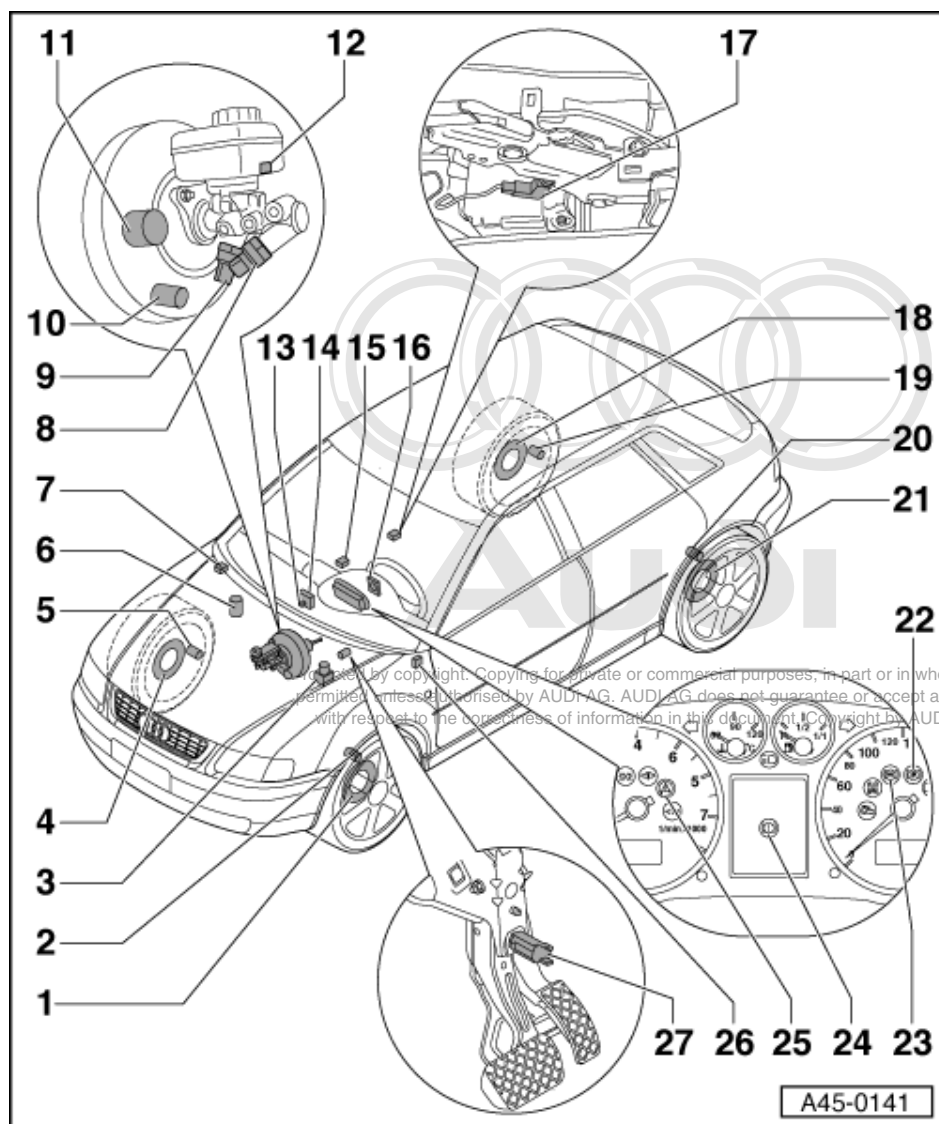
20 Rear left speed sensor -G46

- ◆ Removing and installing=>Page 46

21 Rotor for rear left speed sensor

- ◆ Rotor is welded to wheel hub
- ◆ Checking => Page 47
- ◆ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42



22 Handbrake warning lamp -K14

- ♦ Fitting location: In dash panel insert

23 ABS warning lamp -K47

- ♦ Fitting location: In dash panel insert

24 Brake system warning lamp -K118

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

25 Traction control system warning lamp -K86

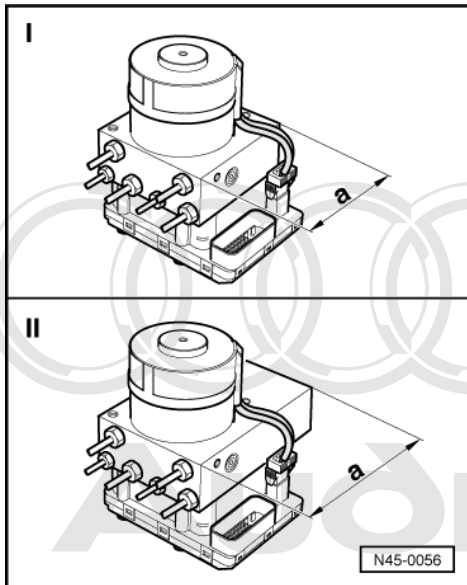
- ♦ Fitting location: In dash panel insert

26 Brake lights deactivation relay -J508

- ♦ Vehicles with ESP only
- ♦ Fitting location: In 13-position relay carrier behind driver's storage compartment

27 Brake light switch -F

- ♦ Removing and installing=>Page 14



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➤ **Fig. 1 Distinguishing features of hydraulic unit**

- I - Hydraulic unit for vehicles with ABS only
 - Dimension a = 100 mm
 - 8 valve domes
- II - Hydraulic unit for vehicles with ABS and additional functions (EDL, TCS, ESP)
 - Dimension a = 130 mm
 - 10 valve domes

Note:

The valve domes become visible on separating control unit from hydraulic unit => Page 28.

3 - Removing and installing ABS/ESP ITT Mark 20 system components

3.1 - Removing and installing ABS/ESP ITT Mark 20 system components

3.2 - Removing and installing brake light switch (square housing)

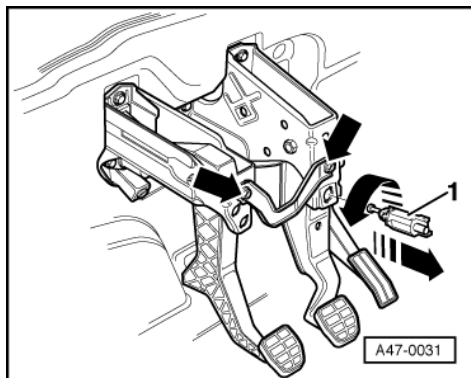
Note:

Switch is only to be fitted once so as to ensure a firm fit.

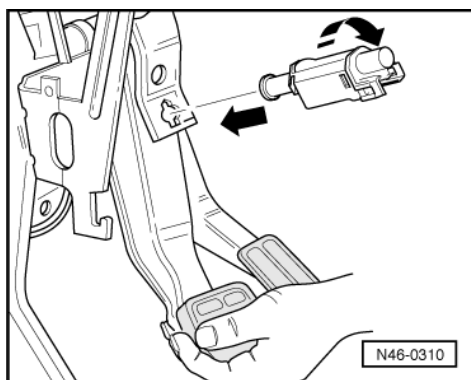
Removing

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- Unplug connector.
- -> Turn brake light switch -1- anti-clockwise through 90° and remove.



Installing

Install in reverse order, paying attention to the following:

- Pull out plunger of brake light switch as far as it will go.
- Press down brake pedal as far as possible by hand.
- -> Insert switch in assembly opening and secure by turning clockwise through 90° -arrows-.
- Release brake pedal.
- Check operation of brake lights both with brake pedal pressed and at rest.

3.3 - Removing and installing brake light switch (round housing)

Note:

Switch is only to be fitted once so as to ensure a firm fit.

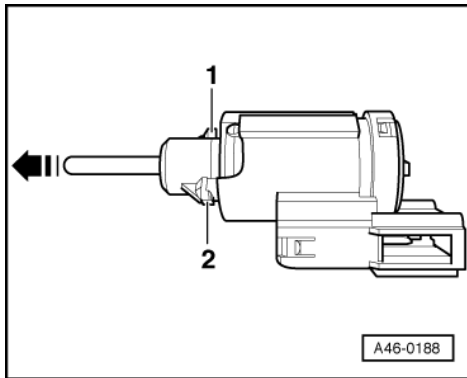
Removing

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Unplug connector.
- Turn brake light switch anti-clockwise through 45° and remove.

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Installing

Install in reverse order, paying attention to the following:

- -> Pull out plunger of brake light switch as far as it will go -arrow-.
- Insert retainer tabs -1- and -2- of switch in recesses provided in assembly opening and secure by turning clockwise through 45°.

Notes:

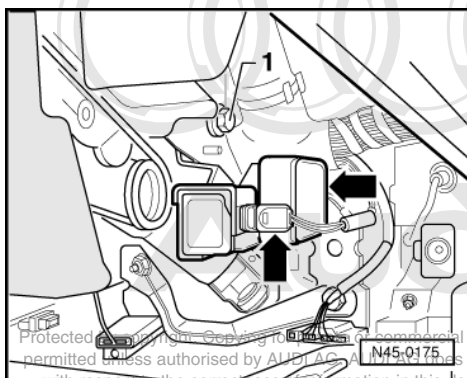
- ◆ When installing, brake pedal is not to be pressed.
- ◆ Plunger is adjusted automatically on inserting brake switch.
- Check operation of brake lights both with brake pedal pressed and at rest.

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

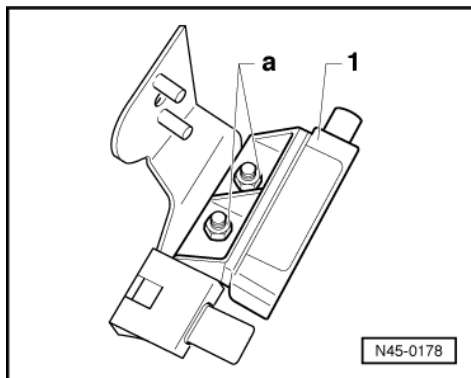
Sequence of operations

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Unplug connectors -arrows- at senders -G200/-G202.
- Screw out bolt -1- and detach holder for senders -G200/-G202.

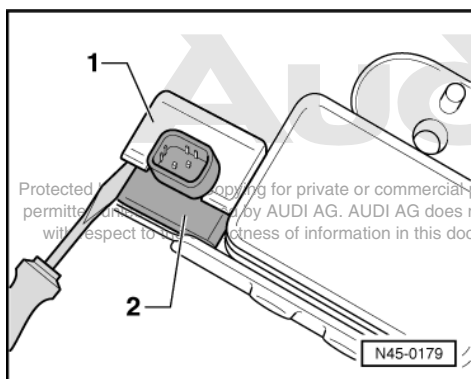


Removing and installing yaw rate sender -G202

- -> Unscrew nuts -a- and detach yaw rate sender -G202 -Item 1-.
- When fitting, insert yaw rate sender -G202 in holder, align and screw on.

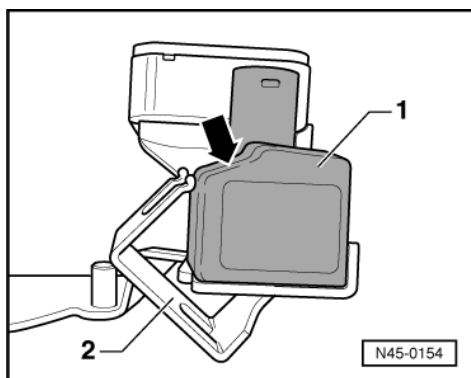
Notes:

- ♦ Yaw rate sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.



Removing and installing lateral acceleration sender -G200

- -> Use screwdriver to prise off mount -1- and detach lateral acceleration sender -G200 -Item 2-.



- -> When fitting, insert lateral acceleration sender -G200 -Item 1- in holder.
- Installation position: Sloping side -arrow- of lateral acceleration sender -G200 must face mount -2-.
- Slide mount over lateral acceleration sender -G200 until it is heard to engage.

Notes:

- ♦ Lateral acceleration sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.

Installing

Perform further installation in reverse order, paying attention to the following:

- Start basic setting for lateral acceleration sender -G200/yaw rate sender -G202.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torques

Component	Nm
Yaw rate sender to holder	9
Holder for sender to steering column mounting bracket	20

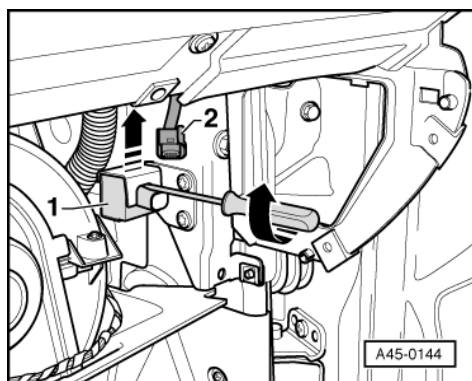
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3.5 - Removing and installing longitudinal acceleration sender -G251

Removing

- Remove glove box.

=> General Body Repairs, Interior; Repair Group 68; Storage Compartments/Covers and Trim Panels; Removing and installing glove box Storage Compartments/Covers and Trim Panels Removing and installing glove box



- -> Unplug connector -2-.
- Use screwdriver to prise off mount -arrows- and take out longitudinal acceleration sender -G251 -Item 1-.

Notes:

- ♦ Longitudinal acceleration sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.

Installing

Install in reverse order, paying attention to the following:

- Start basic setting for longitudinal acceleration sender -G251.

=> Running Gear, Self-diagnosis; Repair Group 01

3.6 - Removing and installing steering angle sender -G85

Note:

Coil connector with slip ring is integrated into housing of steering angle sender -G85.

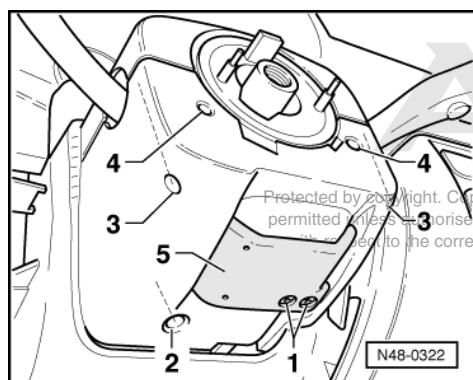
Removing

- Move wheels to straight ahead position.
- Remove airbag unit and steering wheel.

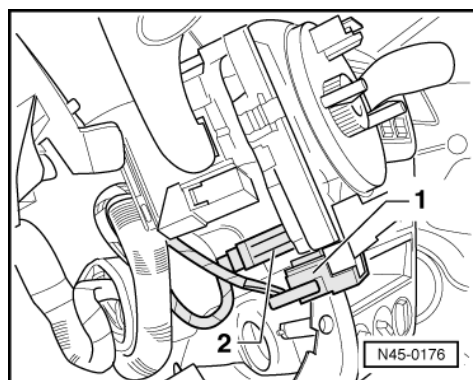
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 48; Steering column and steering wheel with airbag Steering column and steering wheel with airbag

- Remove driver's storage compartment.

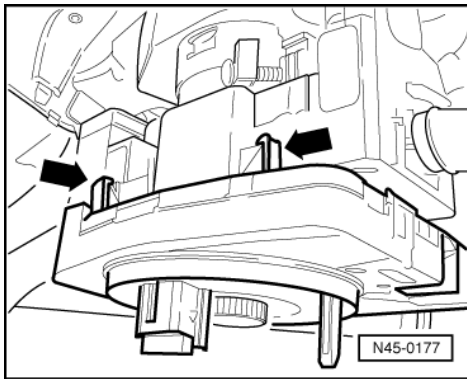
=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Screw out bolts -1- and detach handle for steering column adjustment -5-.
- Screw out bolts -2...4-.
- Detach upper and lower steering column trim sections.



- -> Unplug connectors -1- and -2-.

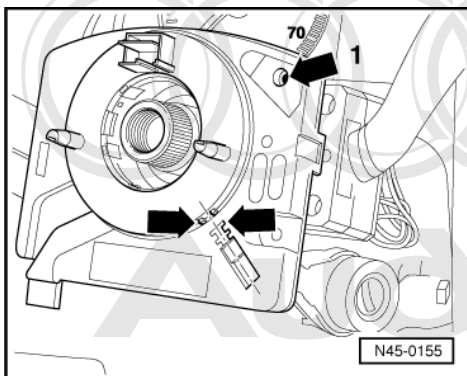


- -> Carefully release upper fasteners -arrows-.
- Carefully release lower fasteners and detach housing of coil connector with slip ring and steering angle sender from steering column switch.

Installing

Install in reverse order, paying attention to the following:

- Slide housing of coil connector with slip ring and steering angle sender onto steering column switch until all fasteners are heard to engage.
- Break off transportation protection to remove.



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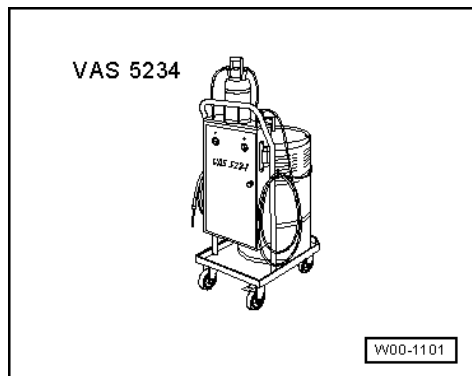
- **> Move steering angle sender to centre position.**
- **Yellow dot must be visible in hole -arrow 1- and the two marks -arrows- must be aligned**
- Install airbag unit and steering wheel.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 48; Steering column and steering wheel with airbag Steering column and steering wheel with airbag

- Start basic setting for steering angle sender -G85.

=> Running Gear, Self-diagnosis; Repair Group 01

3.7 - Removing and installing brake pressure sender

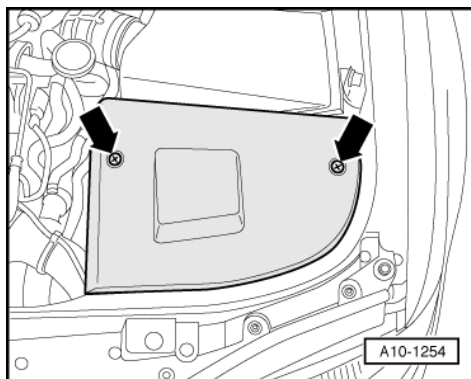


Special tools and workshop equipment required

- ♦ Brake filling and bleeding appliance VAS 5234

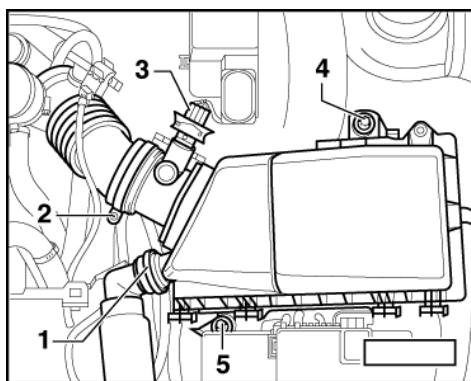
Or

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



Removing

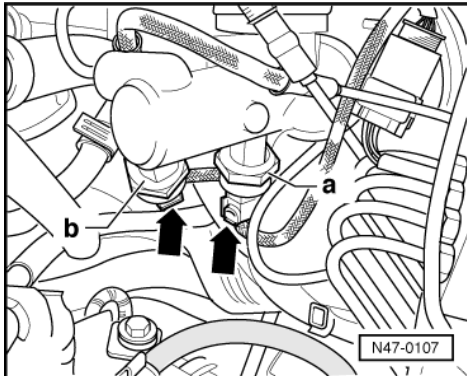
- -> If fitted, remove front left cover -arrows-.



- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.

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- As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.
- Use brake filling and bleeding appliance VAS 5234 or extractor V.A.G 1869/4 to draw off as much brake fluid as possible from brake fluid reservoir.



- -> Unplug connectors at sender to be removed -arrows-.
- a - Brake pressure sender -1- -G201 in primary piston circuit
 - b - Brake pressure sender -2- -G214 in secondary piston circuit
- Remove brake pressure sender.

Installing

Install in reverse order, paying attention to the following:

- Bleed brake system => Page 160 .
- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- Start basic setting for brake pressure senders.

=> Running Gear, Self-diagnosis; Repair Group 01

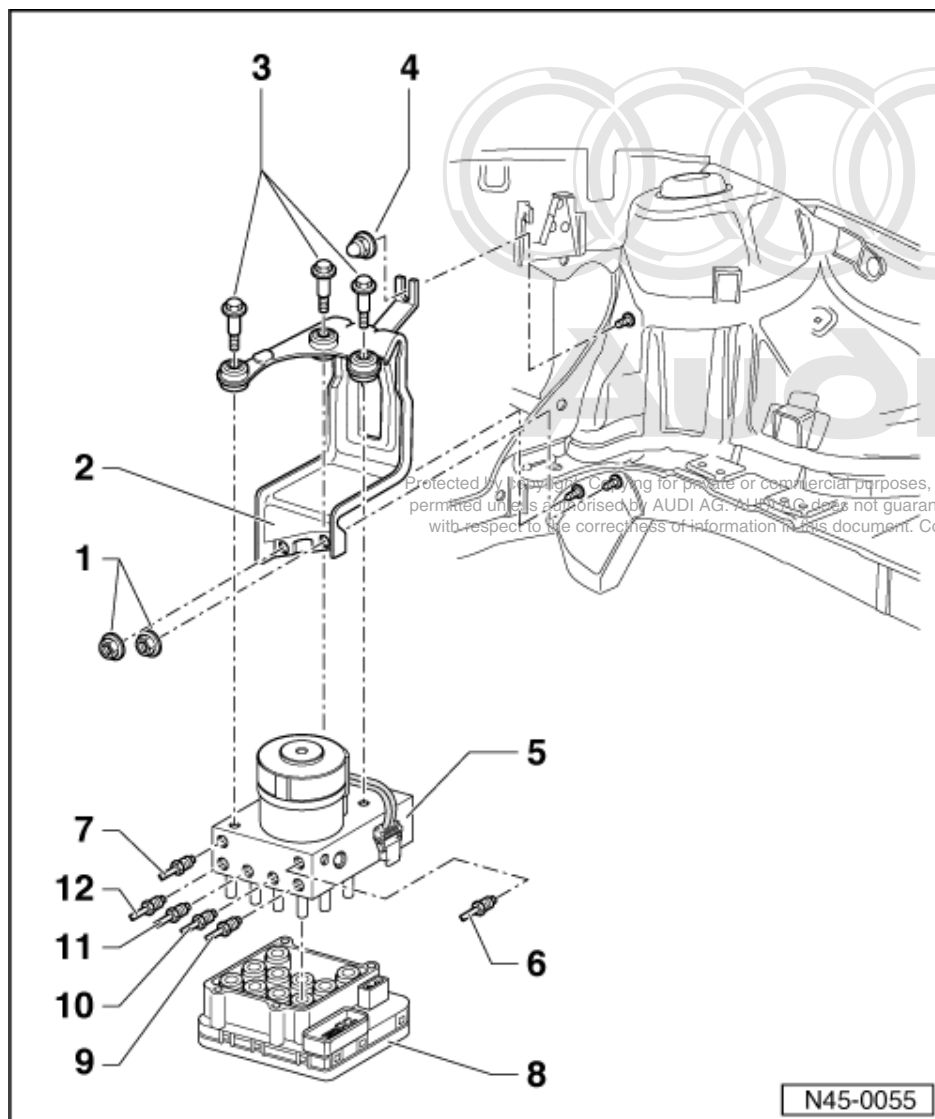
Tightening torques

Component	Nm
Brake pressure sender to brake master cylinder	14
Air cleaner housing	10

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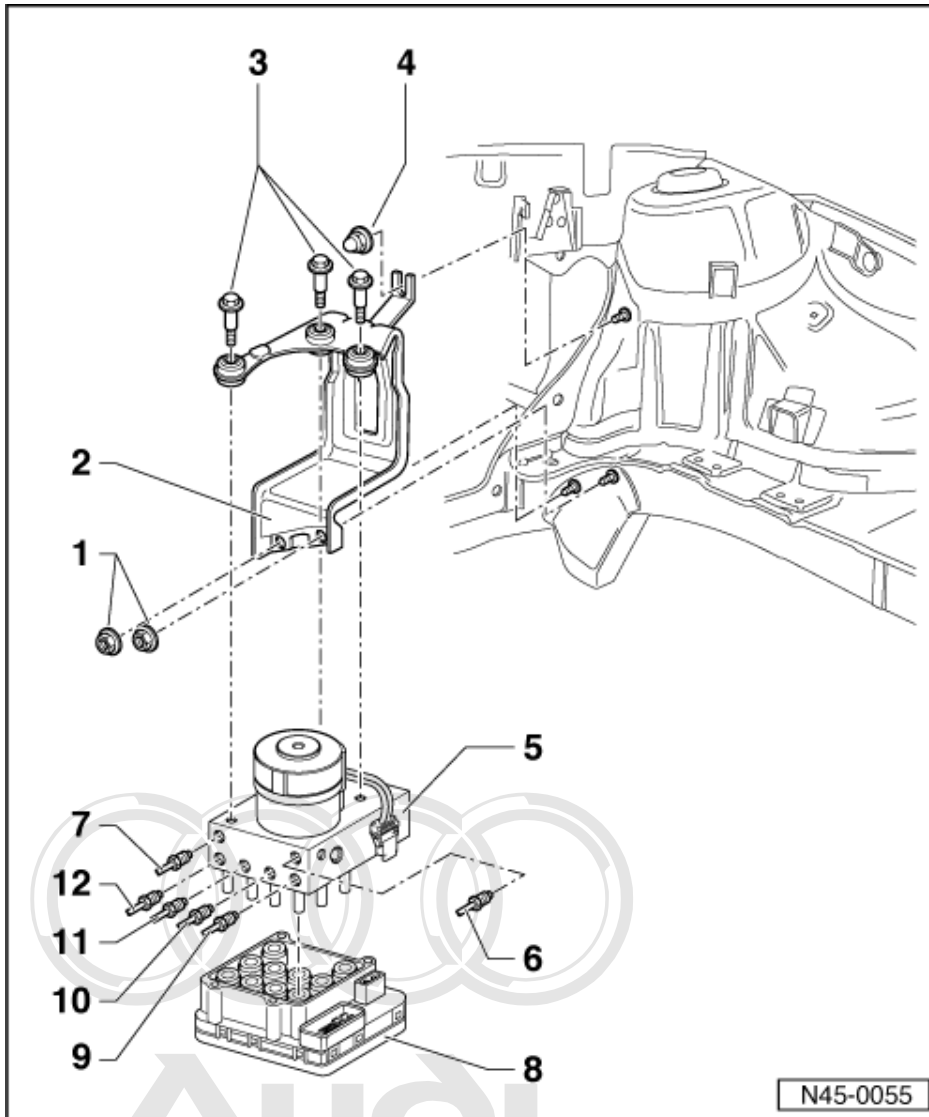
4 - ABS/ESP ITT Mark 20 control unit and hydraulic unit

4.1 - ABS/ESP ITT Mark 20 control unit and hydraulic unit



4.2 - Exploded view

- 1 Nut, 20 Nm
 - ♦ Self-locking
 - ♦ Always replace after removing
- 2 Bracket
- 3 Set bolt, 8 Nm
- 4 Cap nut, 20 Nm
- 5 ABS hydraulic unit -N55
 - ♦ Fitting location: On left of engine compartment
 - ♦ Connecting brake pipes => Fig. 1
- 6 Brake pipe
 - ♦ Brake master cylinder/secondary piston circuit to hydraulic unit



7 Brake pipe

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

8 ABS with EDL control unit - J104
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- ♦ Fitting location: On left of engine compartment
- ♦ Control unit is bolted to hydraulic unit

9 Brake pipe

- ♦ Hydraulic unit to front left brake caliper

10 Brake pipe

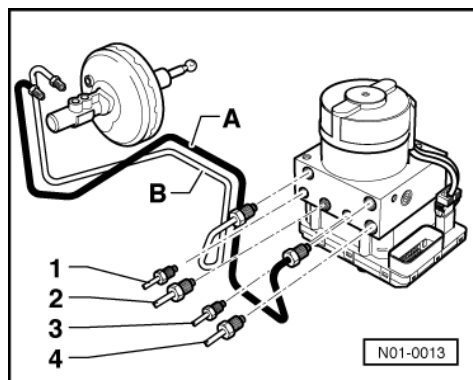
- ♦ Hydraulic unit to rear right brake caliper

11 Brake pipe

- ♦ Hydraulic unit to rear left brake caliper

12 Brake pipe

- ♦ Hydraulic unit to front right brake caliper



-> Fig.1 Connecting brake pipes to hydraulic unit

- A - Secondary piston circuit
- B - Primary piston circuit
- 1 - To front right brake caliper
- 2 - To rear left brake caliper
- 3 - To rear right brake caliper
- 4 - To front left brake caliper

Attention:
Interchanging connections will result in ESP system malfunction.

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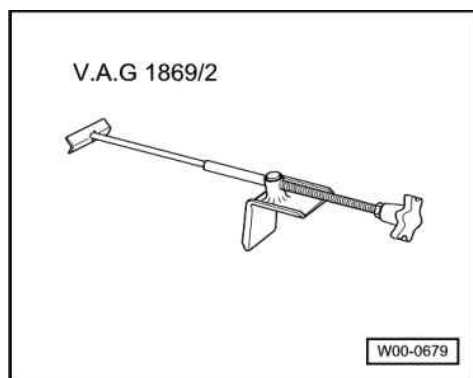
- Perform final control diagnosis after attaching brake pipes to hydraulic unit.

=> Running Gear, Self-diagnosis; Repair Group 01

Note:

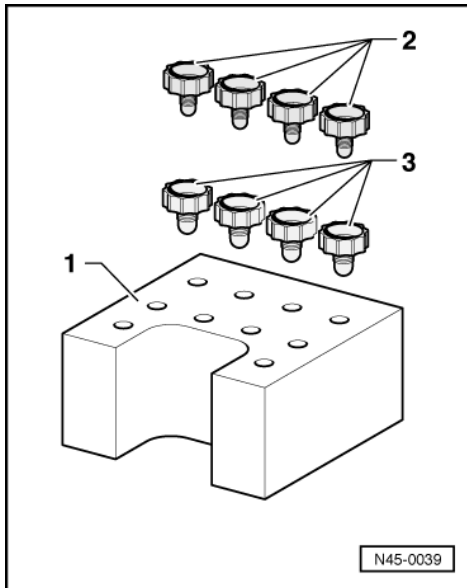
Final control diagnosis can be used to establish whether pipe connections have been interchanged.

4.3 - Removing and installing control unit and hydraulic unit



Special tools and workshop equipment required

- ♦ Brake pedal depressor V.A.G 1869/2



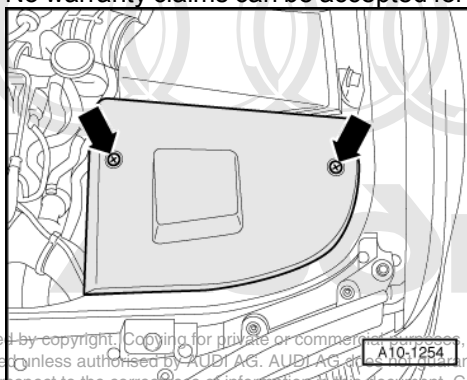
♦ Repair set, Part no.

=> Parts List

- 1 - Transportation protection for valve domes (foam)
- 2 - Sealing plug M10 for brake pipes and tapped holes
- 3 - Sealing plug M12 for brake pipes and tapped holes

After separating control unit from hydraulic unit, always attach transportation protection for valve domes to hydraulic unit.

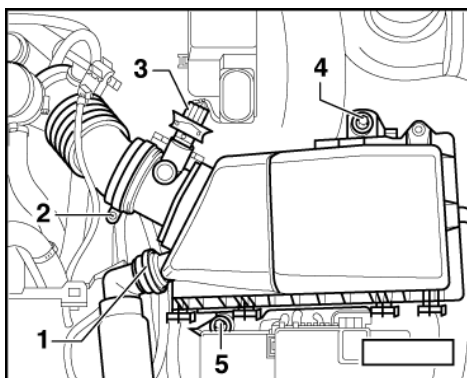
No warranty claims can be accepted for hydraulic units not fitted with transportation protection for valve domes.



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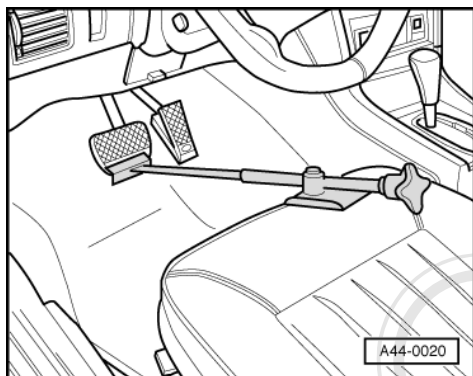
Removing

- -> If fitted, remove front left cover -arrows-.





- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.



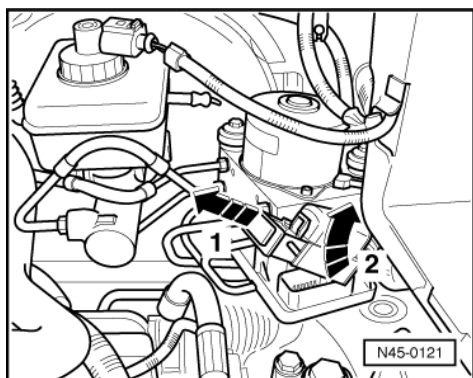
- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.
- Connect hose of bleeder bottle to bleed screw of front left and rear left brake caliper and open bleed screws.

Note:

This dissipates pressure in hydraulic unit.

- Close front left and rear left bleed screws.
- Leave brake pedal depressor V.A.G 1869/2 in position.

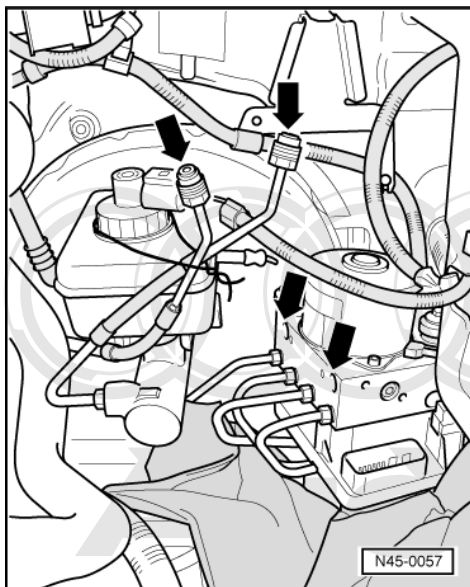
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- -> Release -arrow 1- connector at control unit and unplug -arrow 2-.

Notes:

- ♦ Make sure brake fluid does not ingress into connector housing of control unit as this could result in contact corrosion and thus system failure.
- ♦ Use compressed air to carefully clean dirty connector housing.



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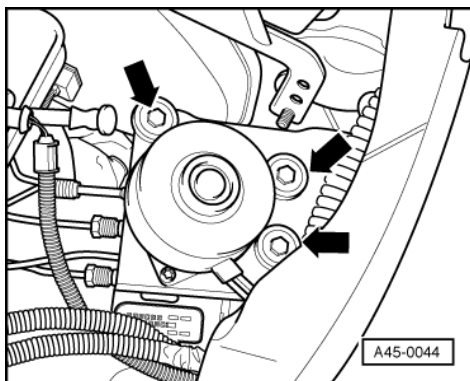
As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath control unit and hydraulic unit.

- Mark brake pipes.
- -> Unscrew brake pipes from hydraulic unit to brake master cylinder -arrows- and tie in place.
- Unscrew the remaining brake pipes from the hydraulic unit.

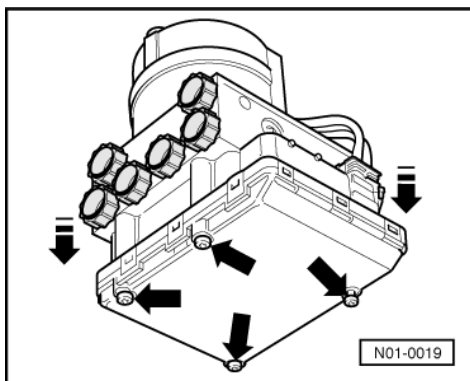
Attention:

Take care not to bend brake pipes in the vicinity of the hydraulic unit.

- Seal brake pipes and tapped holes with sealing plugs from repair set.

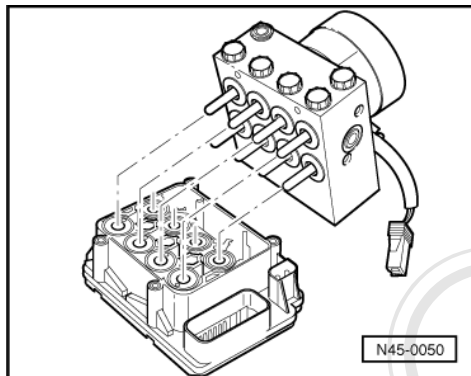


- -> Screw out bolts at bracket for hydraulic unit -arrows- and detach hydraulic unit with control unit.



Unscrewing control unit from hydraulic unit

- Unplug connector for hydraulic pump at control unit.
- -> Screw out TORX bolts -arrows- of control unit and detach control unit.



- -> When detaching control unit, make sure valve domes of hydraulic unit do not catch on control unit solenoids.
- Cover control unit solenoids with a lint-free cloth.
- Protect components against moisture.
- After disconnecting control unit and hydraulic unit, fit transportation protection for valve domes from repair set.

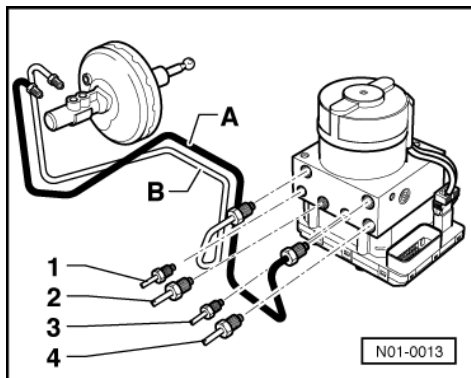
Installing

Install in reverse order, paying attention to the following:

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Notes:

- ♦ Do not remove sealing plugs from new hydraulic unit until appropriate brake pipe is to be fitted.
- ♦ If sealing plugs are removed from hydraulic unit sooner, brake fluid may escape and it may no longer be possible to fill and bleed the unit properly.
- When assembling control unit and hydraulic unit, make sure valve domes of hydraulic unit do not catch on control unit solenoids.



- -> Connect pipes as marked.

- A - Secondary piston circuit
- B - Primary piston circuit
- 1 - To front right brake caliper
- 2 - To rear left brake caliper
- 3 - To rear right brake caliper
- 4 - To front left brake caliper

- Attach connector to hydraulic pump.

- Screw ABS unit to bracket.

Note:

Do not fully tighten bolts to facilitate attachment of individual brake pipes to hydraulic unit.

- Finish tightening hydraulic unit after screwing on brake pipes.
- Bleed brake system => Page 160 .
- If a new control unit is fitted, it must be encoded.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform final control diagnosis after attaching brake pipes to hydraulic unit.

=> Running Gear, Self-diagnosis; Repair Group 01

Note:

Final control diagnosis can be used to establish whether pipe connections have been interchanged.

Tightening torques

Component	Nm
Control unit to hydraulic unit	4 1)
Hydraulic unit to bracket	8
Brake pipes to hydraulic unit	14 2)
Air cleaner housing	10

- 1) Replace bolts
- 2) For M10 and M12 connections

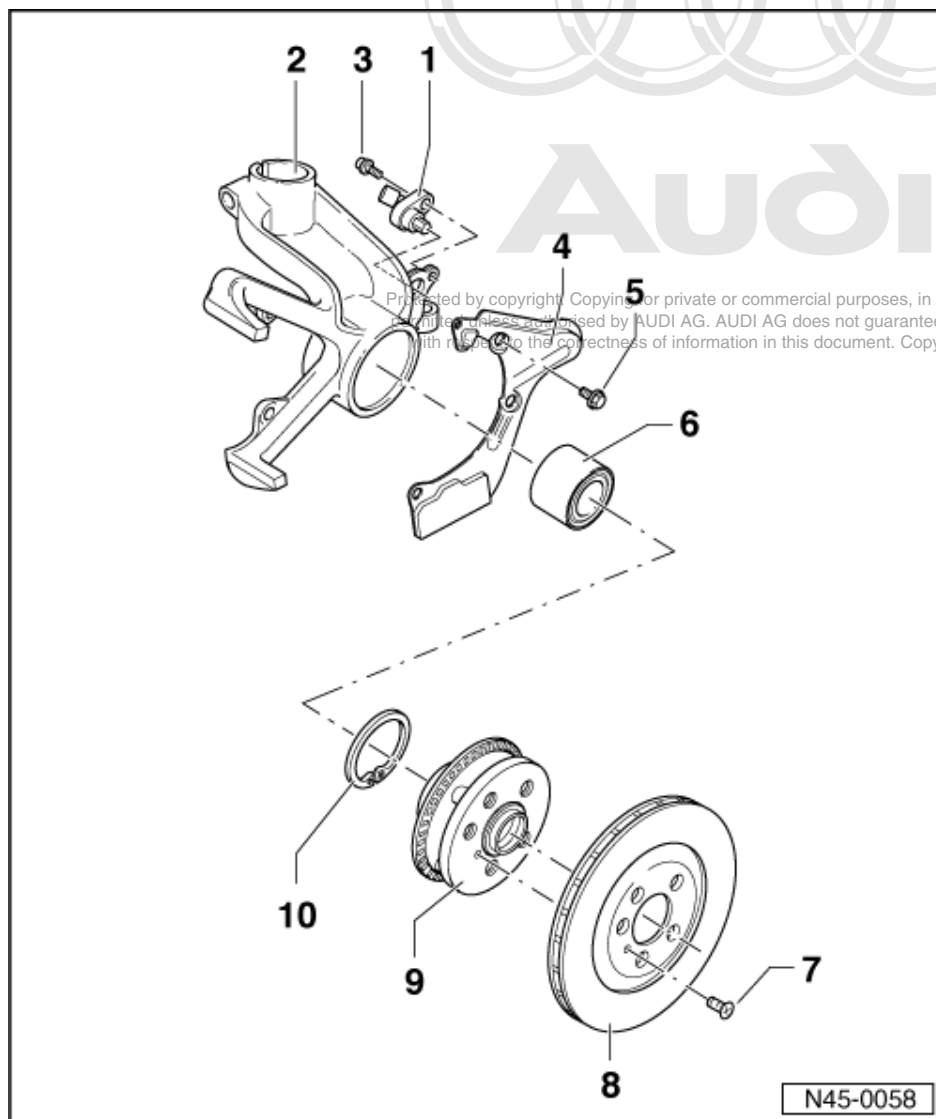


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5 - ABS/ESP ITT Mark 20 system components at front wheels

5.1 - ABS/ESP ITT Mark 20 system components at front wheels



5.2 - Exploded view

1 Speed sensor

- ♦ Removing and installing => Page 32
- ♦ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
- ♦ Replacing speed sensor wire => Page 33

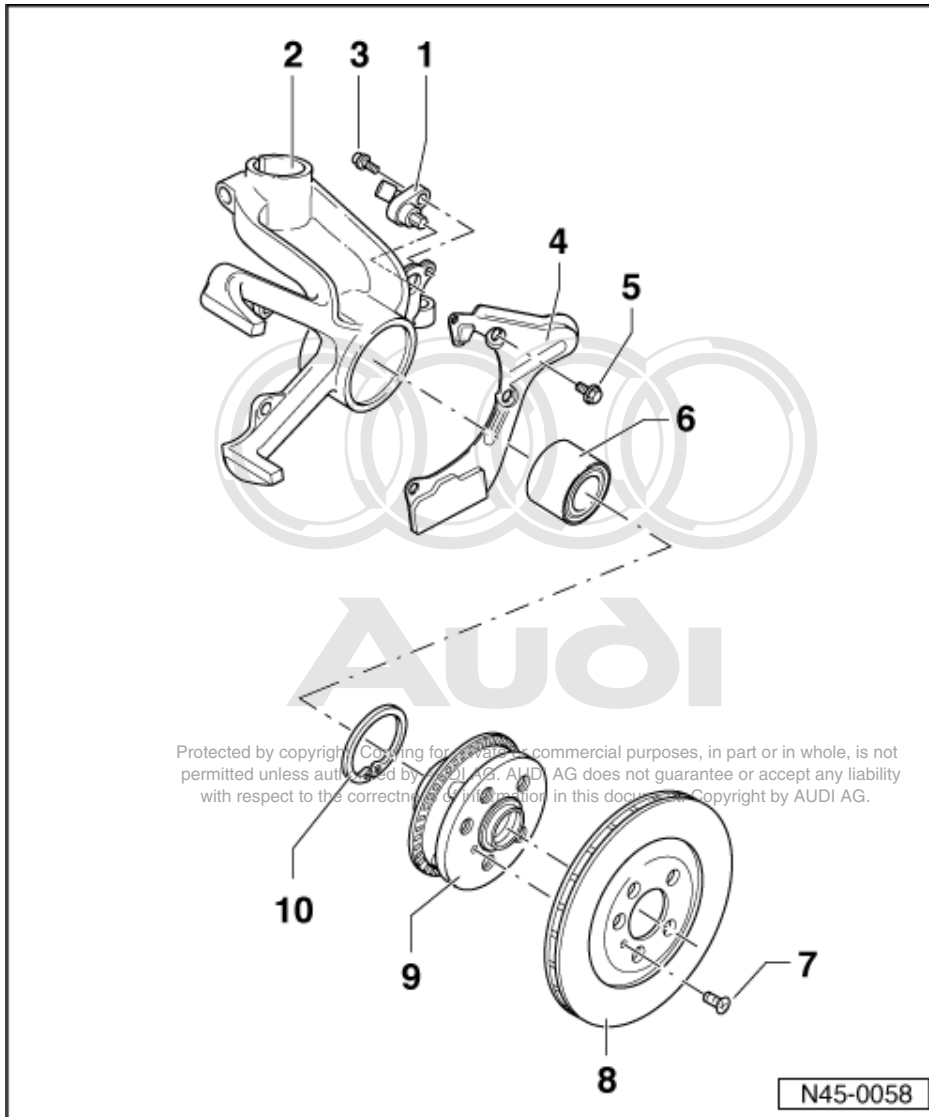
2 Wheel bearing housing

3 Hexagon socket-head bolt - 8Nm

4 Splash plate

5 Bolt

- ♦ Tightening torque => Page 105



6 Wheel bearing

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

7 Cross-head bolt

- ♦ Tightening torque => Page 102

8 Brake disc

- ♦ Assignment => Page 1 onwards

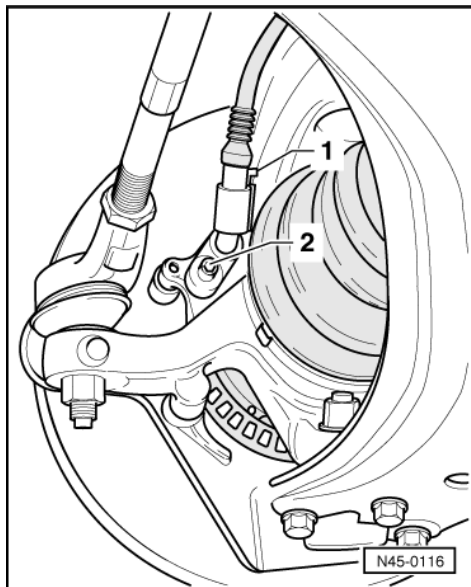
9 Wheel hub with rotor

- ♦ Checking rotor => Page 32
- ♦ Replace only as complete assembly

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

10 Circlip

5.3 - Removing and installing speed sensor



Removing

- -> Release connector -1- at speed sensor and unplug.
- Screw out bolt -2-.
- Pull speed sensor out of wheel bearing housing.

Installing

Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.
- Turn steering to left and right lock and check freedom of movement of speed sensor wire.

Tightening torque

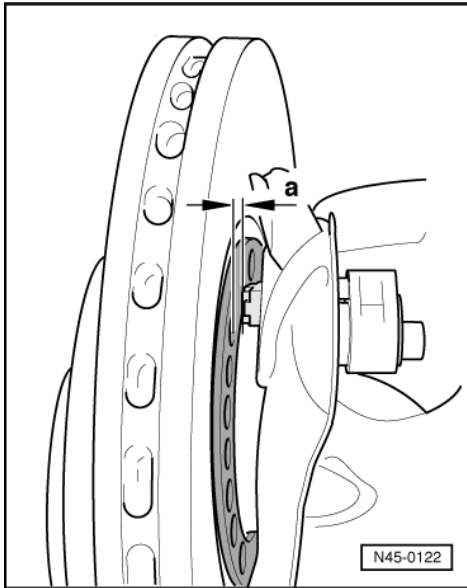
Component	Nm
Speed sensor to wheel bearing housing	8

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5.4 - Checking rotor

- Unscrew wheel.
- Check rotor for dirt and damage by turning brake disc.
- If rotor is damaged, replace wheel hub with rotor.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing



Checking lateral runout of rotor

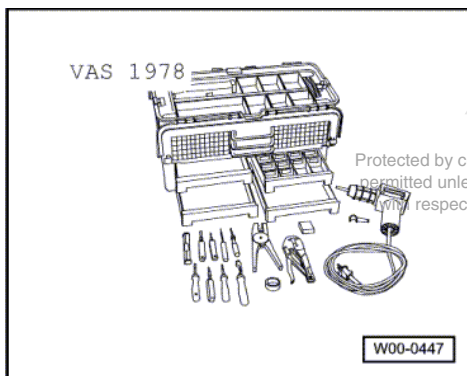
- -> Turn wheel hub and check evenness of gap -a- between rotor and speed sensor.
- Dimension a = 0.3 mm
- In the event of excessive lateral runout, replace wheel hub with rotor.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

5.5 - Replacing speed sensor wire

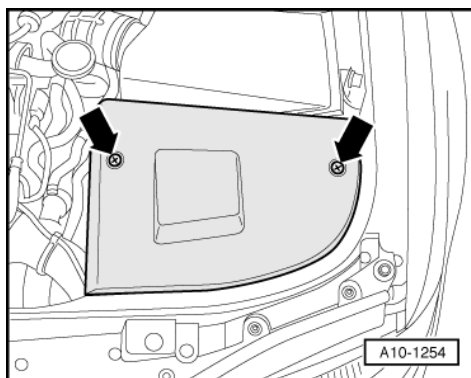
Note:

Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.



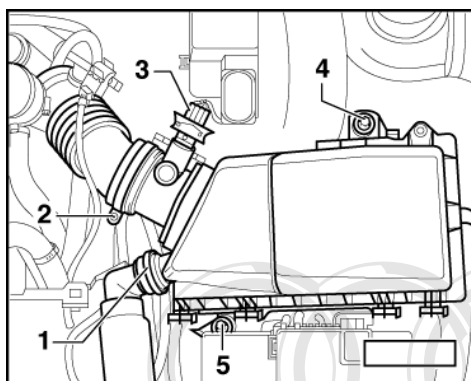
Special tools and workshop equipment required

- ◆ Wiring harness repair set VAS 1978

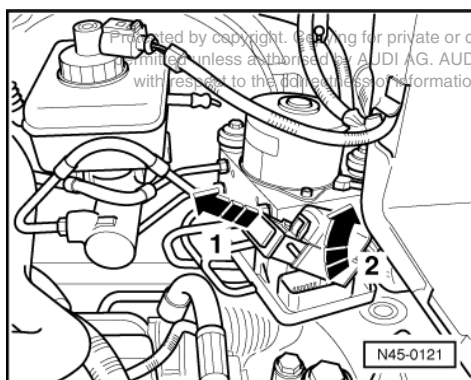


Removing

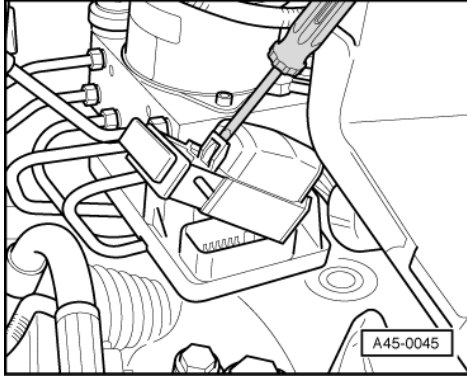
- -> If fitted, remove front left cover -arrows-.



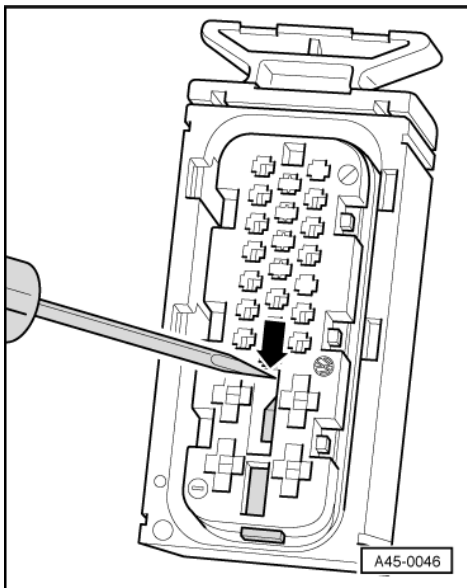
- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.



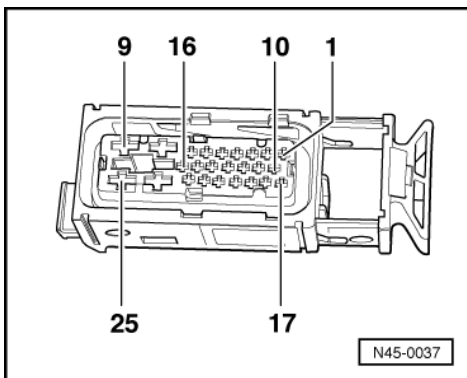
- -> Release -arrow 1- connector at control unit and unplug -arrow 2-.



- -> Release cap on multi-pin connector with a screwdriver and detach.



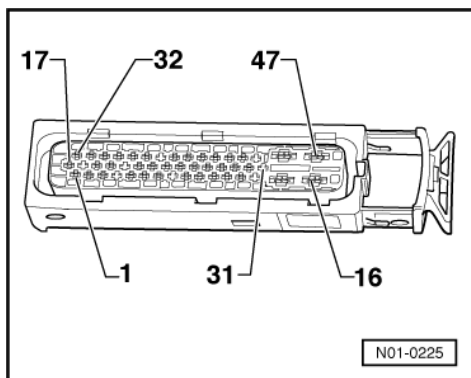
- -> Release secondary catch (violet) with a small screwdriver by pressing in direction of arrow.



-> Contact assignment of 25-pin connector at control unit -J104

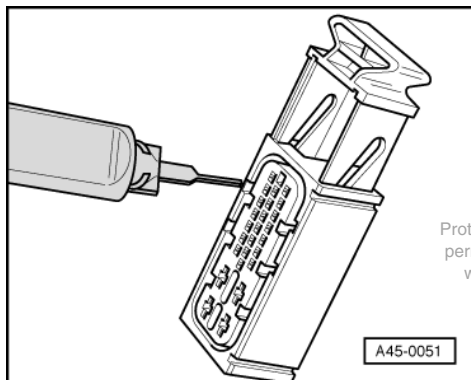
=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

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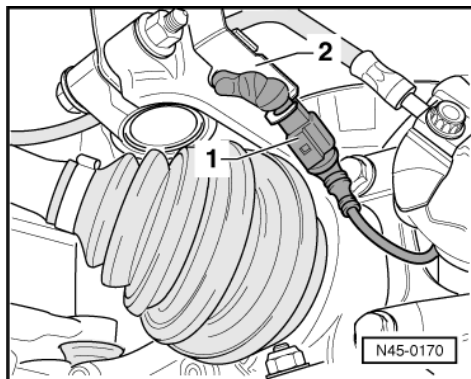
-> Contact assignment of 47-pin connector at control unit -J104

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

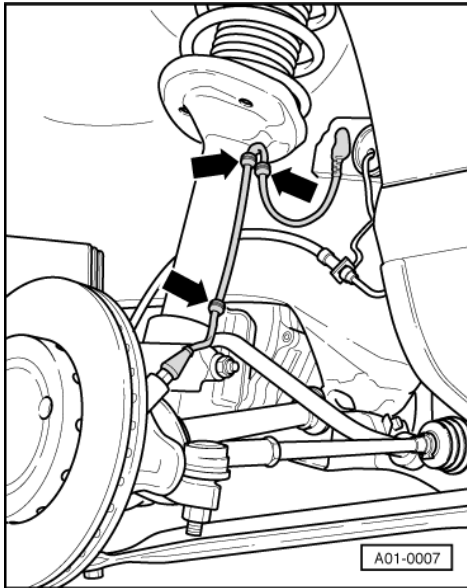


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- -> Push out relevant contacts using suitable ejector tool from wiring harness repair set VAS 1978.



- -> Unplug connector -1- of brake pad wear indicator at left brake.
- Unclip wire from holder -2-.
- Release connector at speed sensor and unplug.
- Remove defective speed sensor wire.



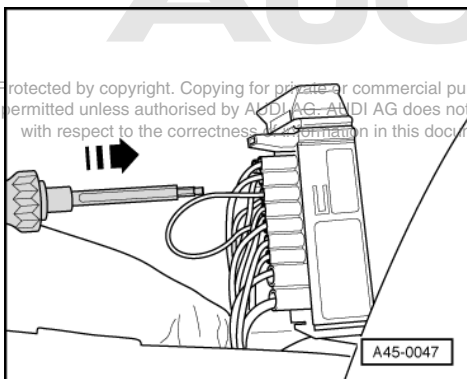
Installing

Install in reverse order, paying attention to the following:

- Fit new speed sensor wire.
- -> Clip in speed sensor wire -arrows-.

Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.



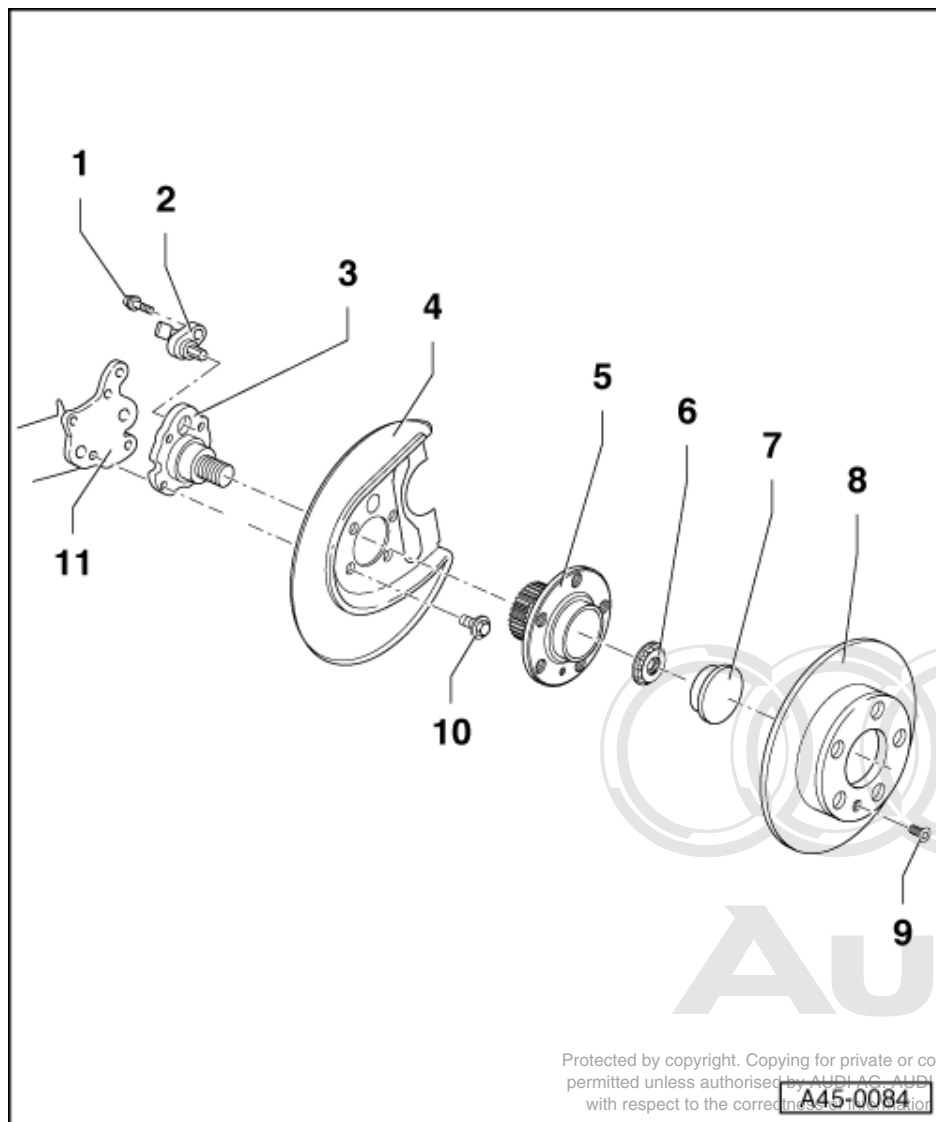
- Insert contact into connector housing.
- -> Use VAS 1978 insertion tool to slide home individual wire seal.
- Secure contacts with secondary catch and attach cap to multi-pin connector.

Tightening torque

Component	Nm
Air cleaner housing	10

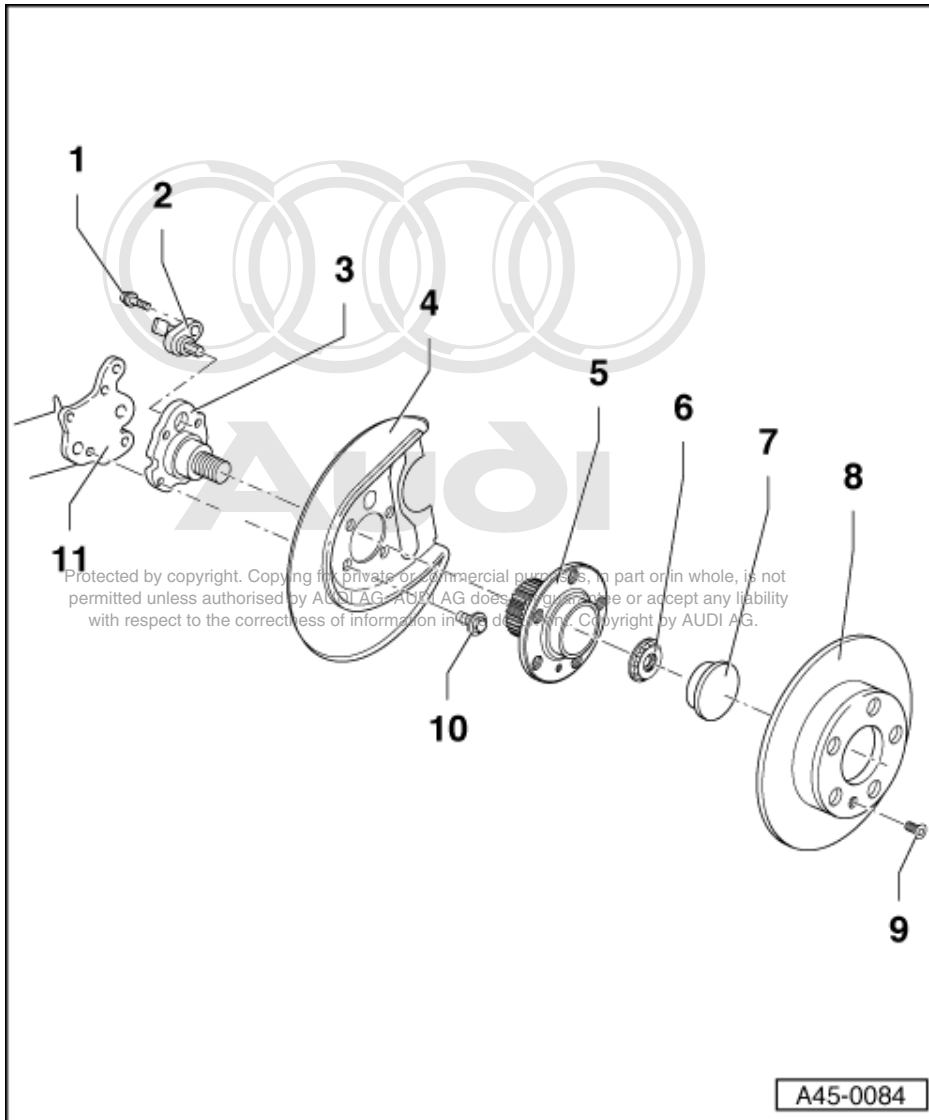
6 - ABS/ESP ITT Mark 20 system components at rear wheels for front-wheel drive vehicles

6.1 - ABS/ESP ITT Mark 20 system components at rear wheels for front-wheel drive vehicles



6.2 - Exploded view

- 1 Hexagon socket-head bolt -8 Nm
- 2 Speed sensor
 - ◆ Removing and installing=>Page 40
 - ◆ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
 - ◆ Replacing speed sensor wire
=> Page 41
- 3 Stub axle
- 4 Splash plate



5 Wheel hub with wheel bearing and rotor

- ♦ Checking rotor => Page 40
- ♦ Replace only as complete assembly
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

6 Twelve-point nut

- ♦ Tightening torque

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

7 Grease cap

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

8 Brake disc

- ♦ Assignment => Page 1 onwards

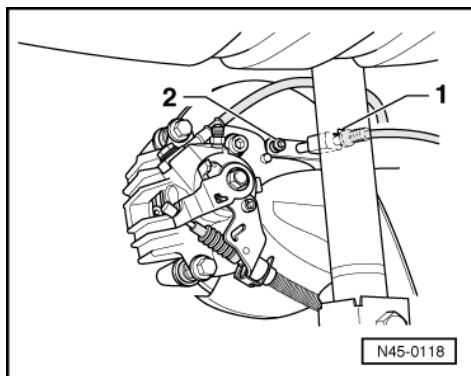
9 Cross-head bolt

- ♦ Tightening torque => Page 113

10 Bolt, 60 Nm

11 Axle beam

6.3 - Removing and installing speed sensor



Removing

- -> Release connector -1- at speed sensor and unplug.
- Screw out bolt -2-.
- Pull speed sensor out of stub axle.

Installing

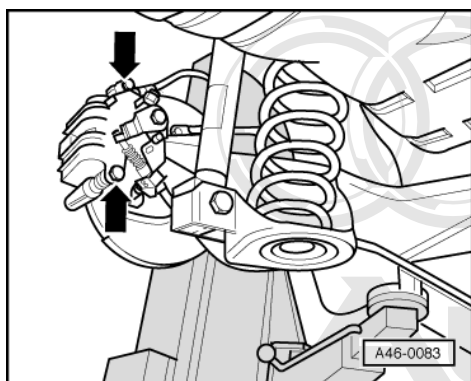
Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.

Tightening torque

Component	Nm
Speed sensor to stub axle	8

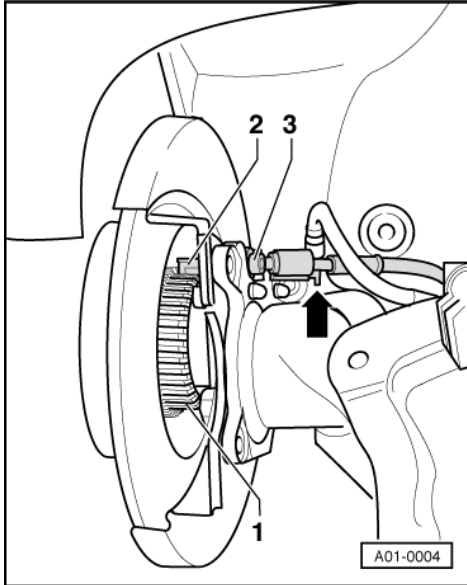
6.4 - Checking rotor



- Remove wheel.
 - -> Unscrew brake caliper housing -arrows- and tie up with piece of wire.
- 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.

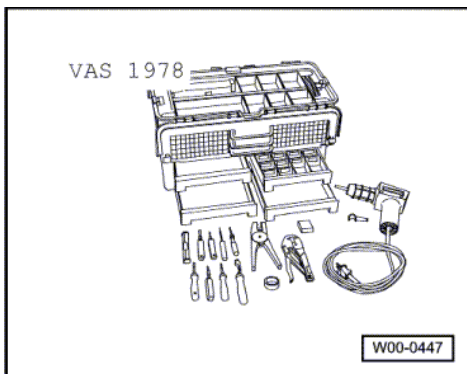
Note:

Brake hose/pipe is never to be twisted or kinked.



- -> Check rotor -1- for dirt and damage by turning brake disc.
 - In the event of rotor damage or excessive wheel bearing clearance, replace wheel hub with rotor.
- => Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42
- Install brake caliper housing => Page 117 .

6.5 - Replacing speed sensor wire

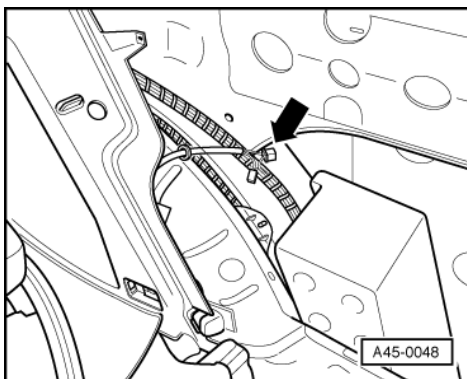


Note:

Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.

Special tools and workshop equipment required

- ◆ Wiring harness repair set VAS 1978



Removing

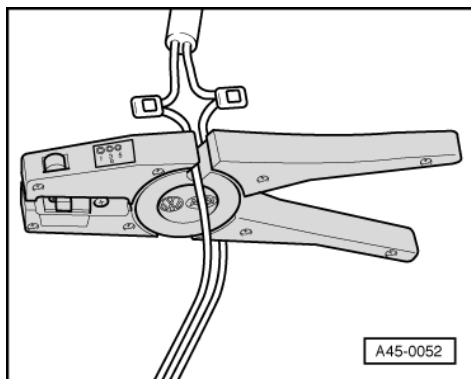
- Remove wheel housing liner.

=> General Body Repairs, Exterior; Repair Group 66

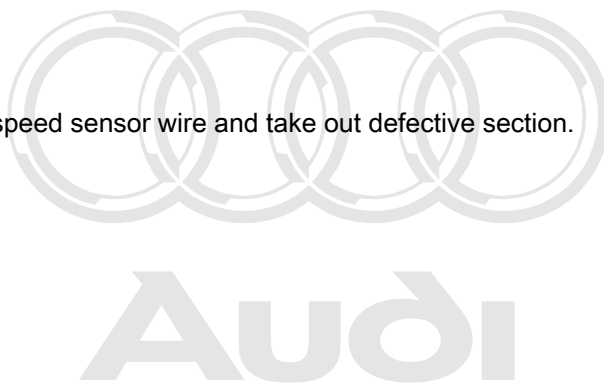
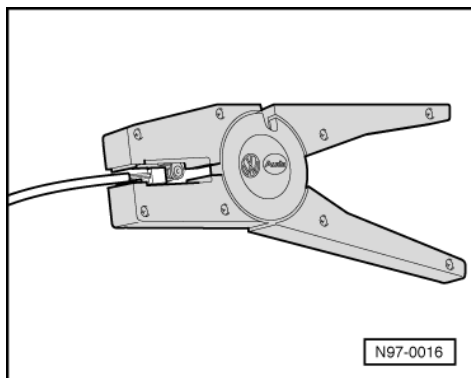
- Release connector at speed sensor and unplug.
- Remove inner side trim/rear wheel housing trim.

=> General Body Repairs, Interior; Repair Group 70

- -> Pull insulating grommet -arrow- off wiring.



- -> Use stripping pliers VAS 1978/3 to sever speed sensor wire and take out defective section.

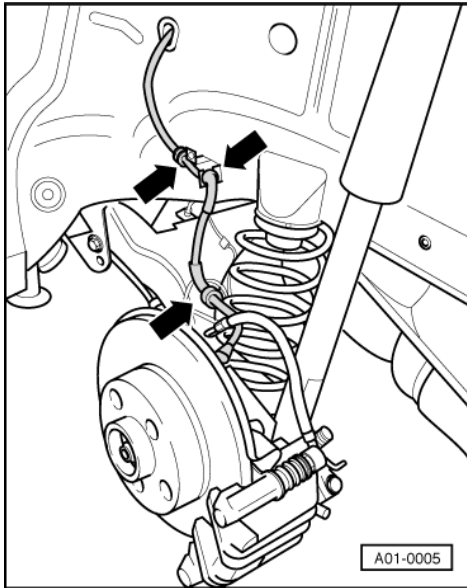


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Installing

Install in reverse order, paying attention to the following:

- -> Strip 15 mm of insulation off end of wire with stripping pliers VAS 1978/3 and bend back bare part of wire over half its length.
- Fit new speed sensor wire.



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

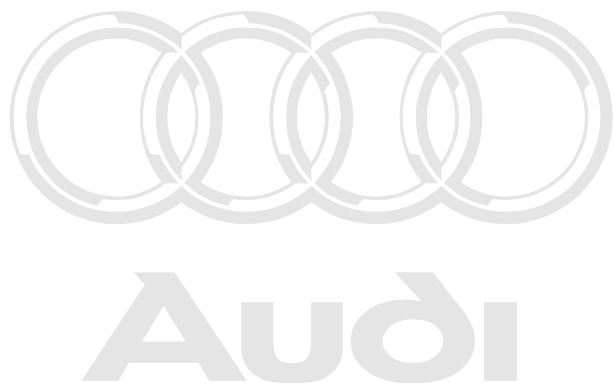
Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.

- If fitted, use stripping pliers to cut off twin connector at new speed sensor wire.
- Strip 15 mm of insulation off end of wire and bend back bare part of wire over half its length.
- Use suitable crimp connector from wiring harness repair set VAS 1978 to connect speed sensor wire.

Note:

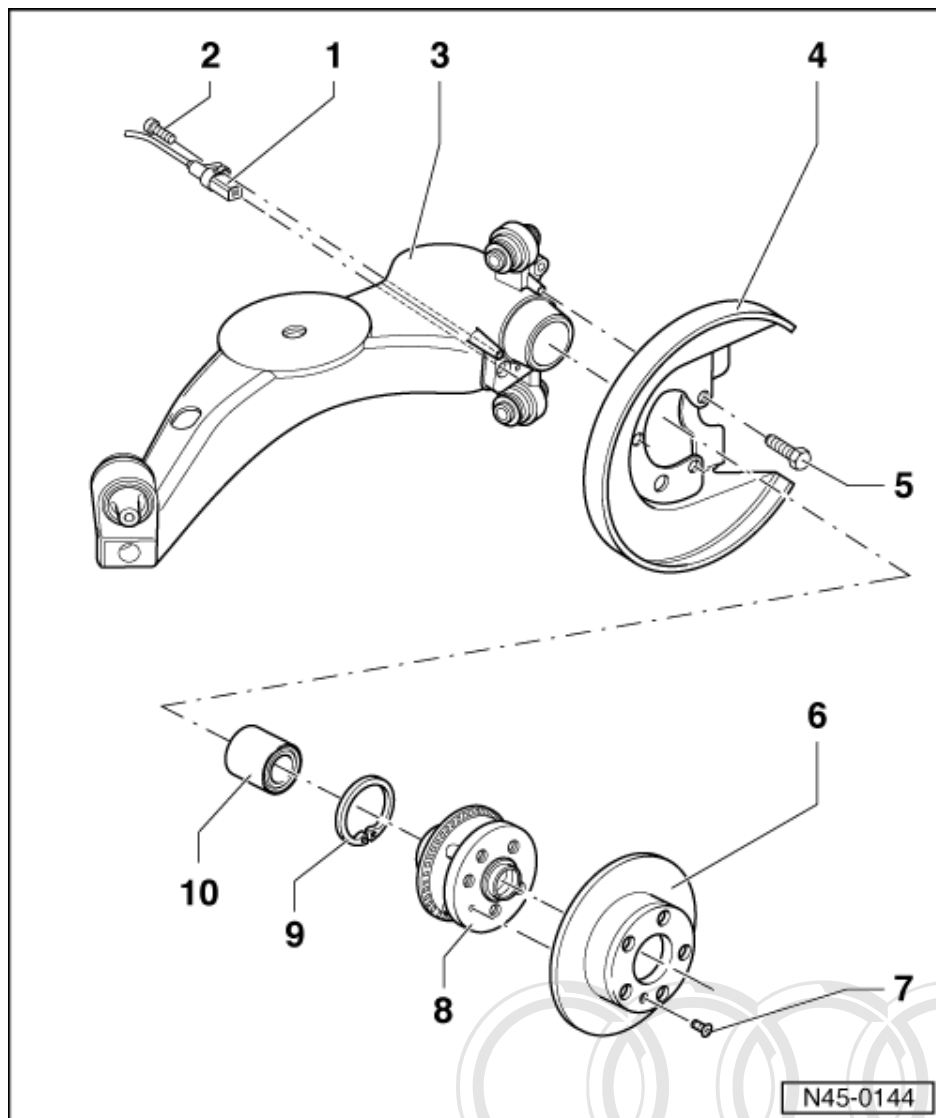
The instructions supplied with the wiring harness repair set VAS 1978 do not normally permit repairs to the ABS system wiring. This does however only apply to the screened wiring in the system.



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7 - ABS/ESP ITT Mark 20 system components at rear wheels for four-wheel drive vehicles

7.1 - ABS/ESP ITT Mark 20 system components at rear wheels for four-wheel drive vehicles



7.2 - Exploded view

1 Speed sensor

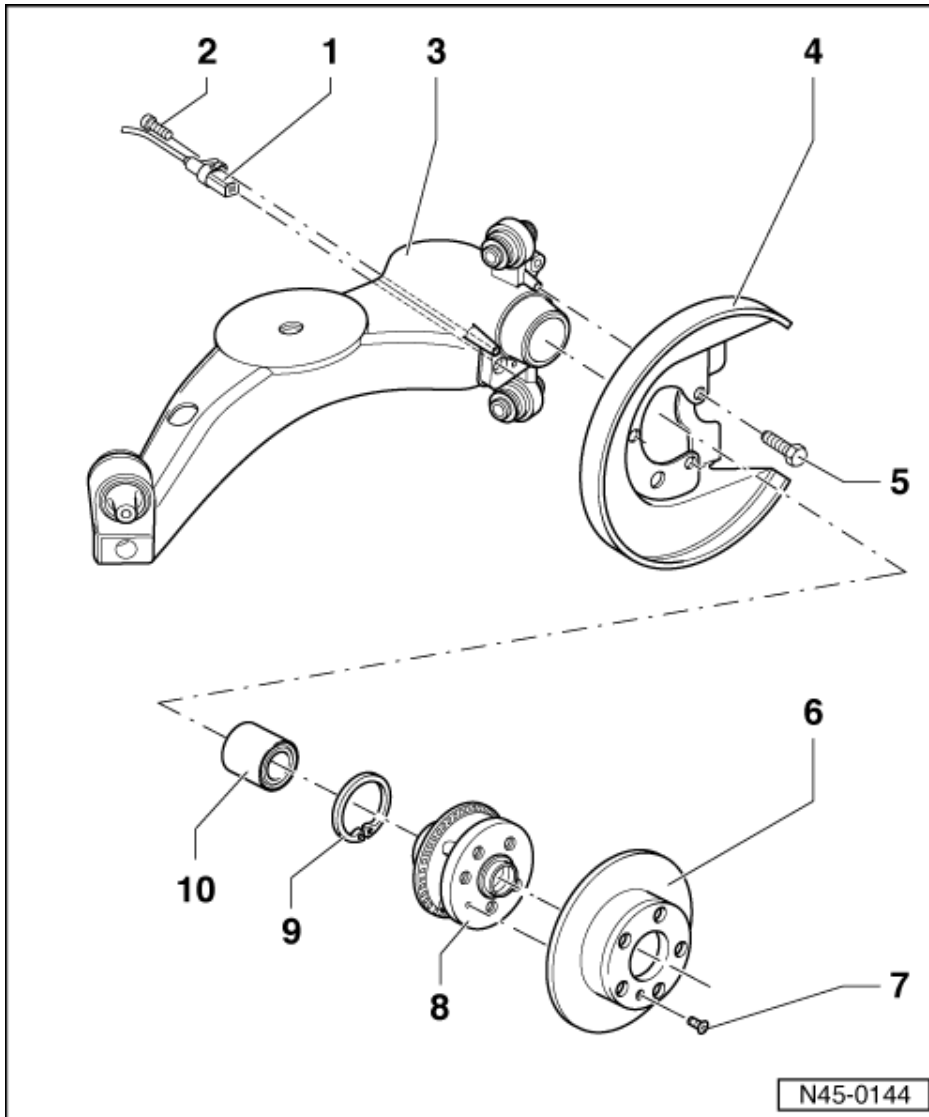
- ◆ Removing and installing=>Page 46
- ◆ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
- ◆ Replacing speed sensor wire
=> Page 47

2 Hexagon socket-head bolt -8 Nm

3 Trailing arm

4 Splash plate

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5 Bolt, 10 Nm

6 Brake disc

7 Cross-head bolt

- ♦ Tightening torque => Page 124

8 Wheel hub with rotor

- ♦ Checking rotor => Page 47
- ♦ Replace only as complete assembly
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

9 Circlip

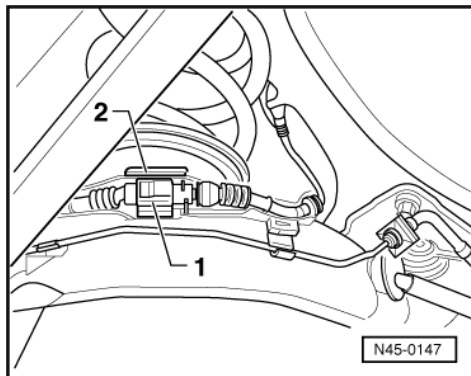
10 Wheel bearing

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

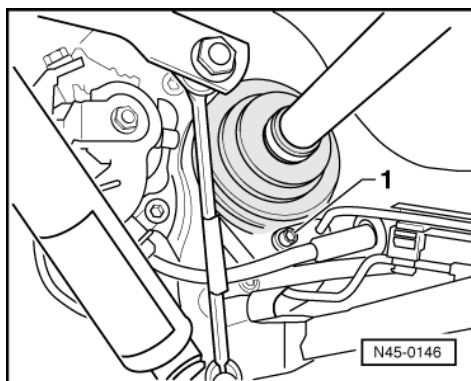
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7.3 - Removing and installing speed sensor



Removing

- -> Open cover -2- over speed sensor connector.
- Unplug connector -1-.



- -> Screw out bolt -1-.
- Pull speed sensor out of trailing arm.

Installing

Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.

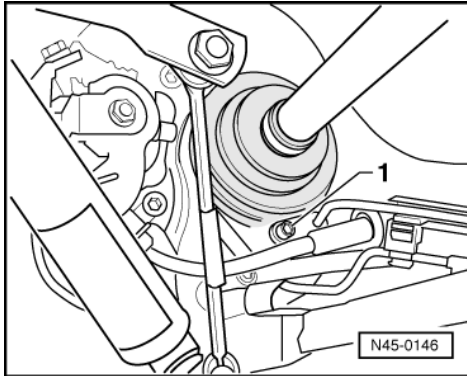
Tightening torque

Component	Nm
Speed sensor to trailing arm	8



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7.4 - Checking rotor



- -> Screw out bolt -1-.
- Pull speed sensor out of trailing arm.
- Unscrew wheel.
- Check rotor for dirt and damage by turning brake disc.
- If rotor is damaged, replace wheel hub with rotor.

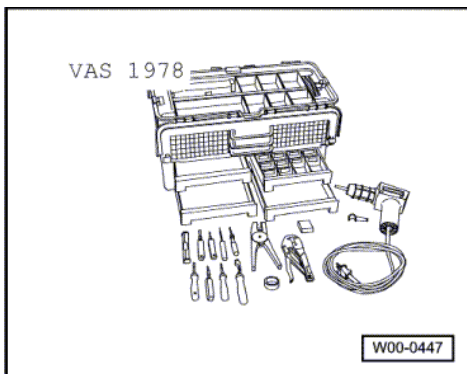
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

- Fit speed sensor => Page 46 .

7.5 - Replacing speed sensor wire

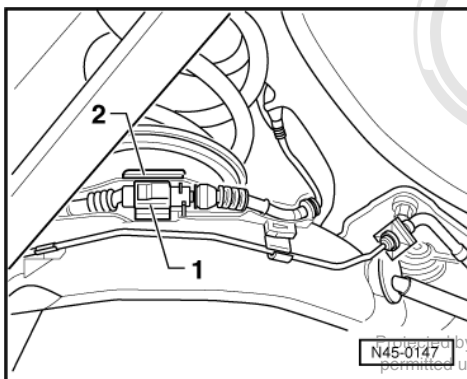
Note:

Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.



Special tools and workshop equipment required

- ♦ Wiring harness repair set VAS 1978

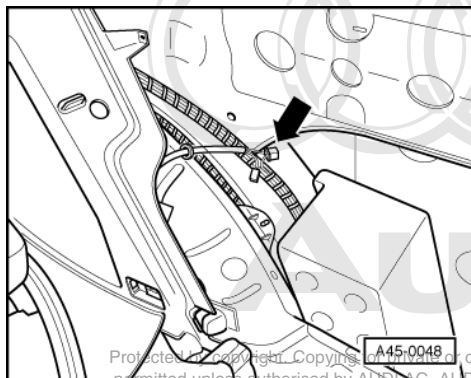


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Removing

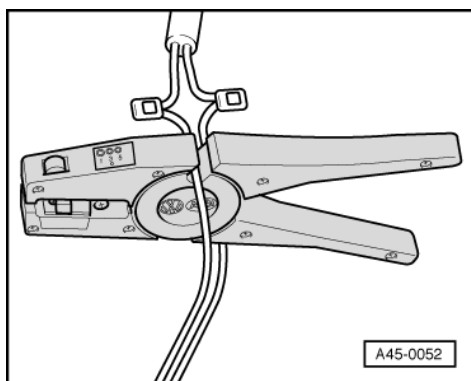
- -> Open cover -2- over speed sensor connector.
- Unplug connector -1-.



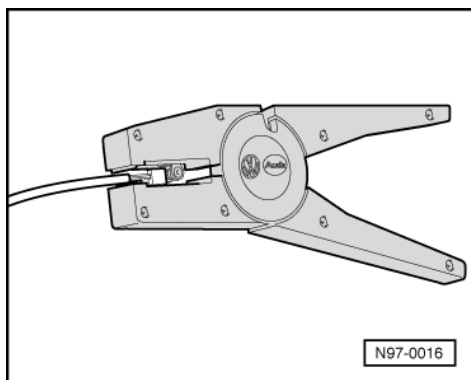
- Remove inner side trim/rear wheel housing trim.

=> General Body Repairs, Interior; Repair Group 70

- -> Pull insulating grommet -arrow- off wiring.



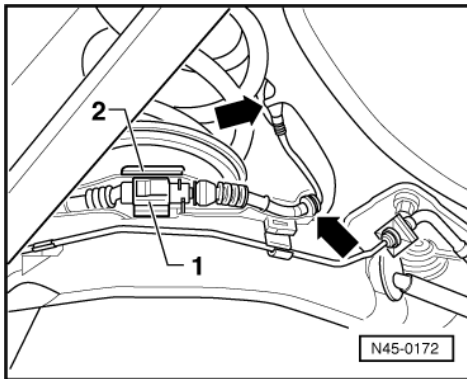
- -> Use stripping pliers VAS 1978/3 to sever speed sensor wire and take out defective section.



Installing

Install in reverse order, paying attention to the following:

- -> Strip 15 mm of insulation off end of wire with stripping pliers VAS 1978/3 and bend back bare part of wire over half its length.



- Fit new speed sensor wire.
- -> Clip in speed sensor wire -arrows-.

Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.

- Plug in connector -1- and close cover -2-.
- If fitted, use stripping pliers to cut off twin connector at new speed sensor wire.
- Strip 15 mm of insulation off end of wire and bend back bare part of wire over half its length.
- Use suitable crimp connector from wiring harness repair set VAS 1978 to connect speed sensor wire.

Note:

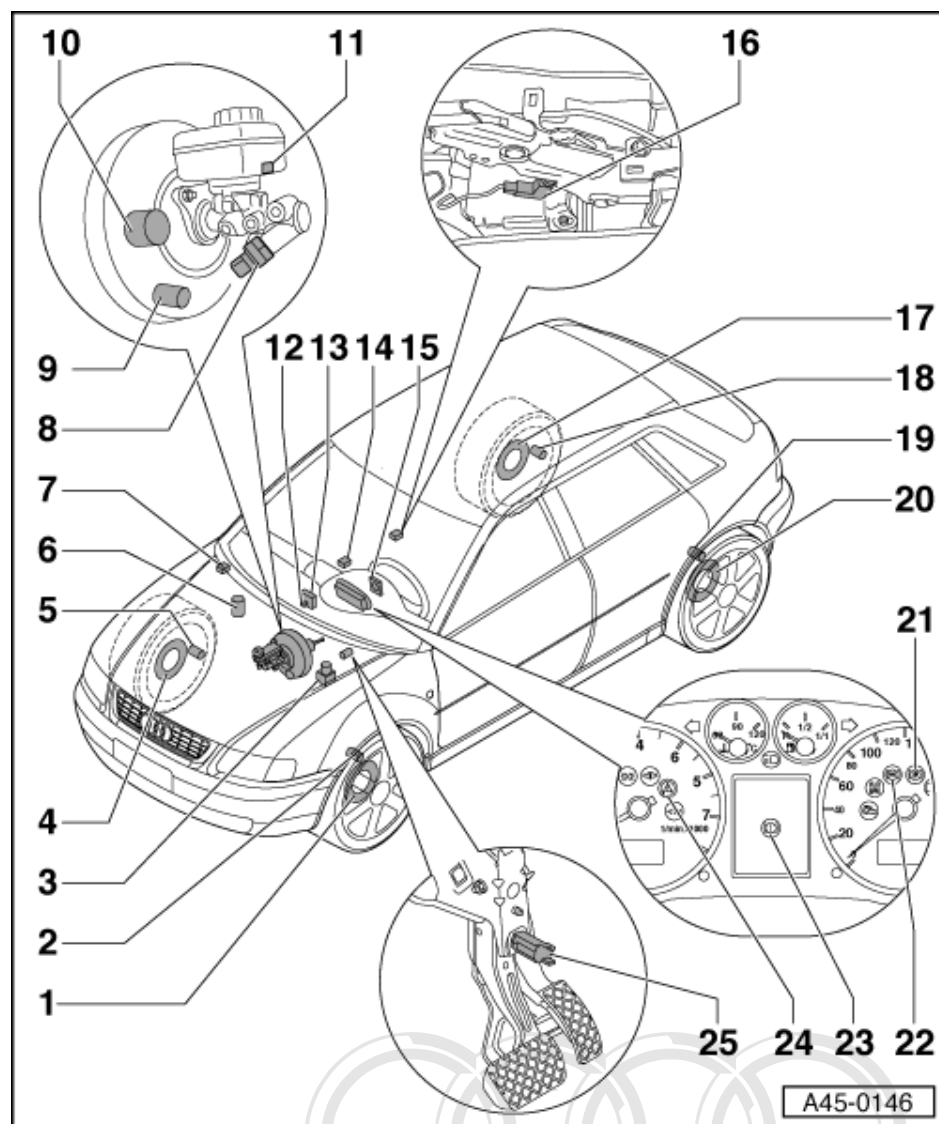
The instructions supplied with the wiring harness repair set VAS 1978 do not normally permit repairs to the ABS system wiring. This does however only apply to the screened wiring in the system.



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8 - ABS/ESP ITT Mark 60

8.1 - ABS/ESP ITT Mark 60



8.2 - Exploded view of components

1 Rotor for front left speed sensor

- ♦ Rotor is welded to wheel hub
- ♦ Checking =>Page 75
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

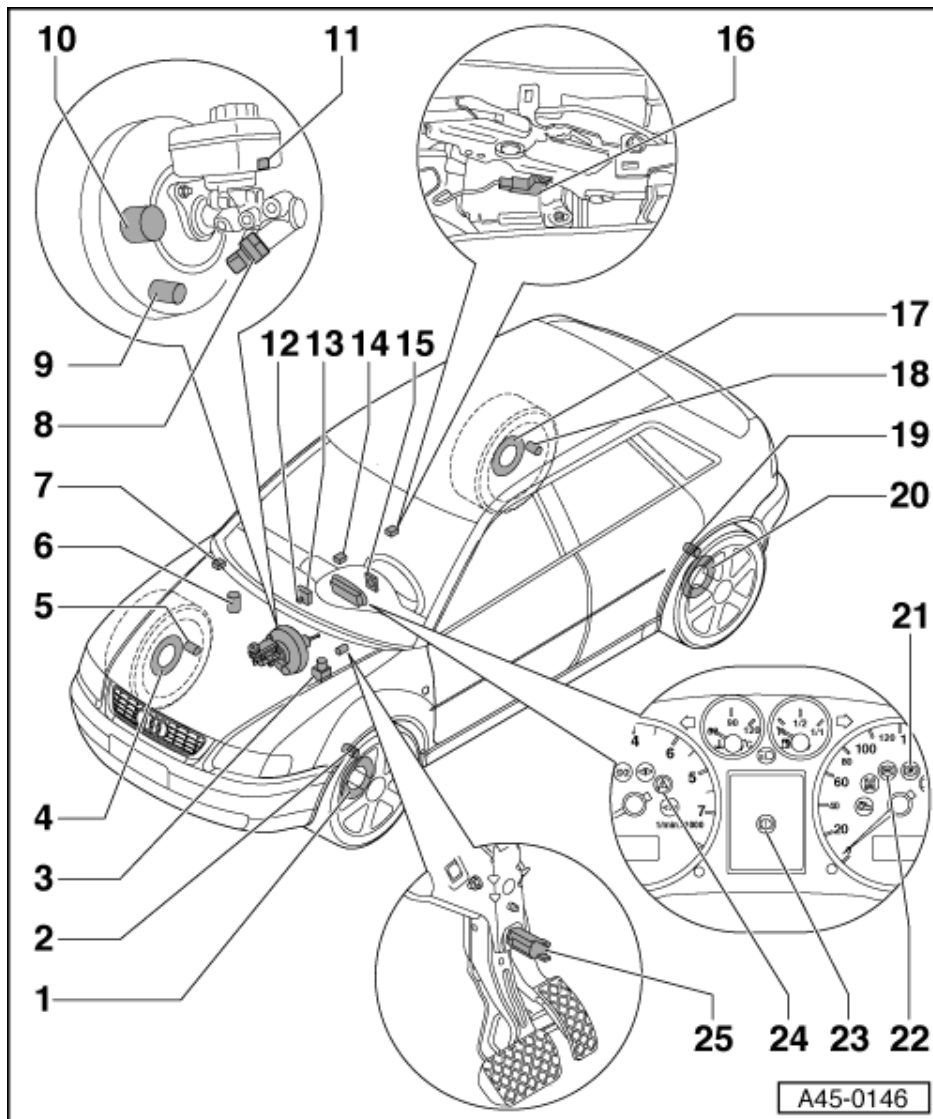
2 Front left speed sensor - G47

- ♦ Removing and installing
- => Page 75

3 ABS hydraulic unit -N55 with ABS/EDL control unit -J104

- ♦ Hydraulic control unit consists of ABS hydraulic pump -V64, ABS hydraulic unit -N55 and ABS with EDL control unit -J104
- ♦ Removing and installing

=> Page 69



4 Rotor for front right speed sensor

- ◆ Rotor is welded to wheel hub
- ◆ Checking =>Page 75
- ◆ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

5 Front right speed sensor -G45

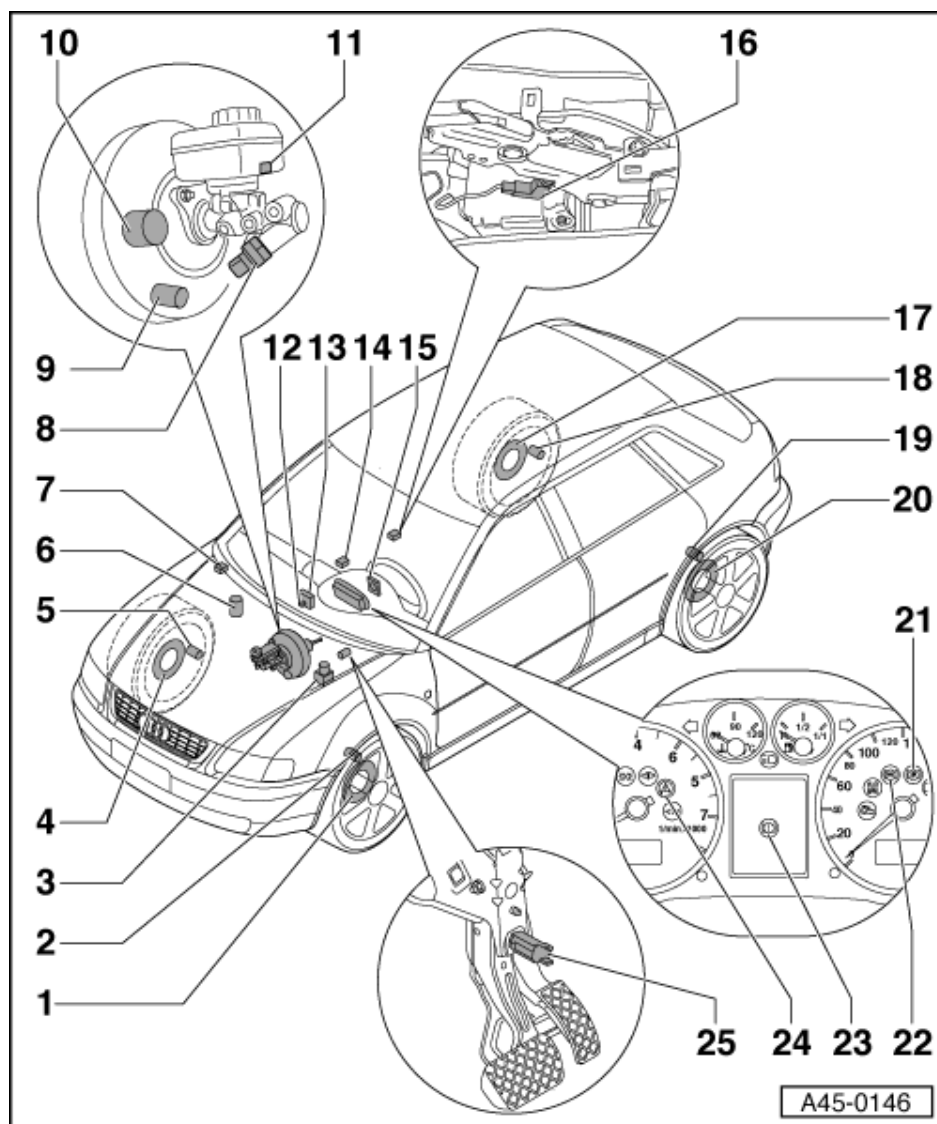
- ◆ Removing and installing
- => Page 75

6 Vacuum pump for brake servo

- ◆ For petrol engines with automatic gearbox
- ◆ Assignment

=> Parts List

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**7 Longitudinal acceleration sender
-G251**

- ♦ 4WD vehicles only
- ♦ Fitting location: At A-pillar on passenger side
- ♦ Removing and installing=>Page 60
- ♦ As of approx. 09.01 integrated into ESP sensor unit => Fig. 1
- ♦ Removing and installing ESP sensor unit => Page 60

8 Brake pressure sender 1 -G201

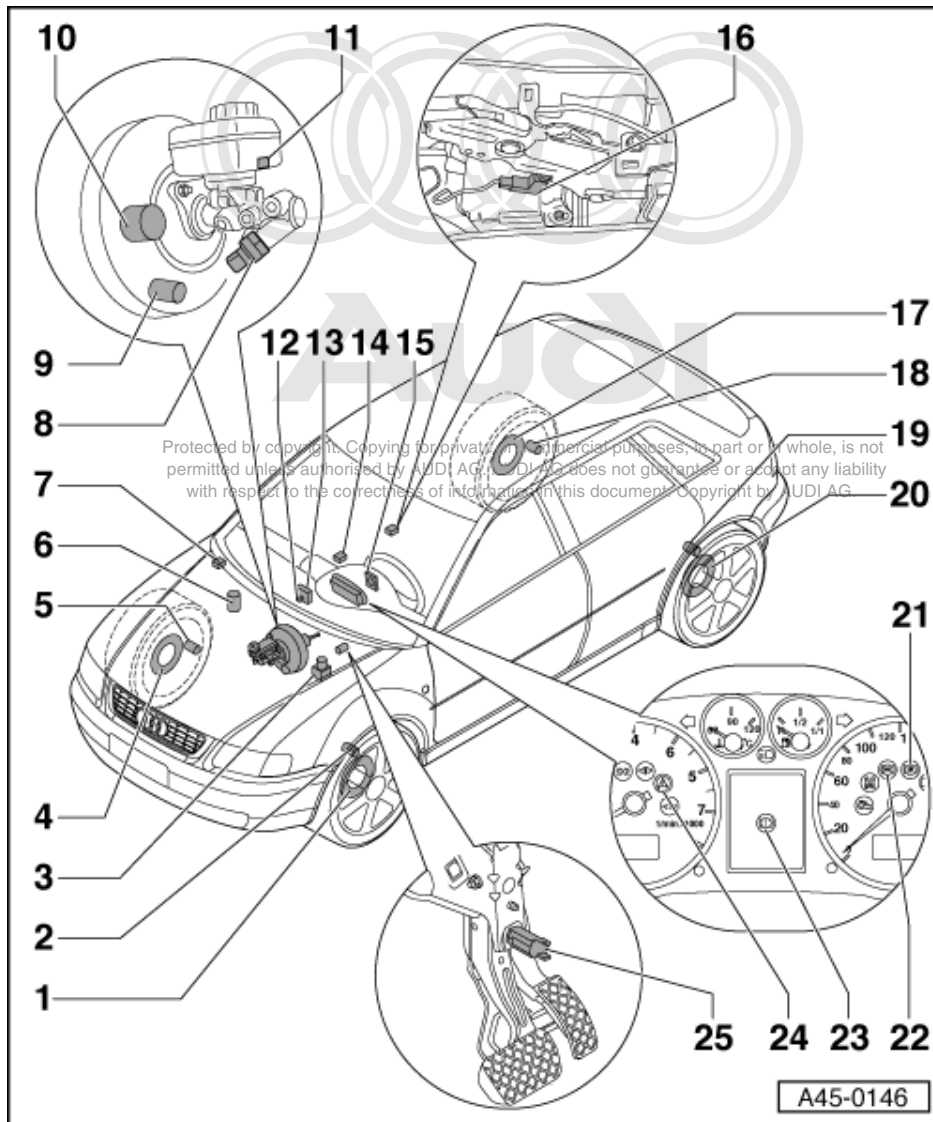
- ♦ Removing and installing=>Page 63

9 Brake detection switch, ESP -F83

- ♦ Brake servo assembly must be replaced if switch is defective



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10 Brake pressure solenoid valve, in brake servo -N247

- ♦ Brake servo assembly must be replaced if solenoid is defective

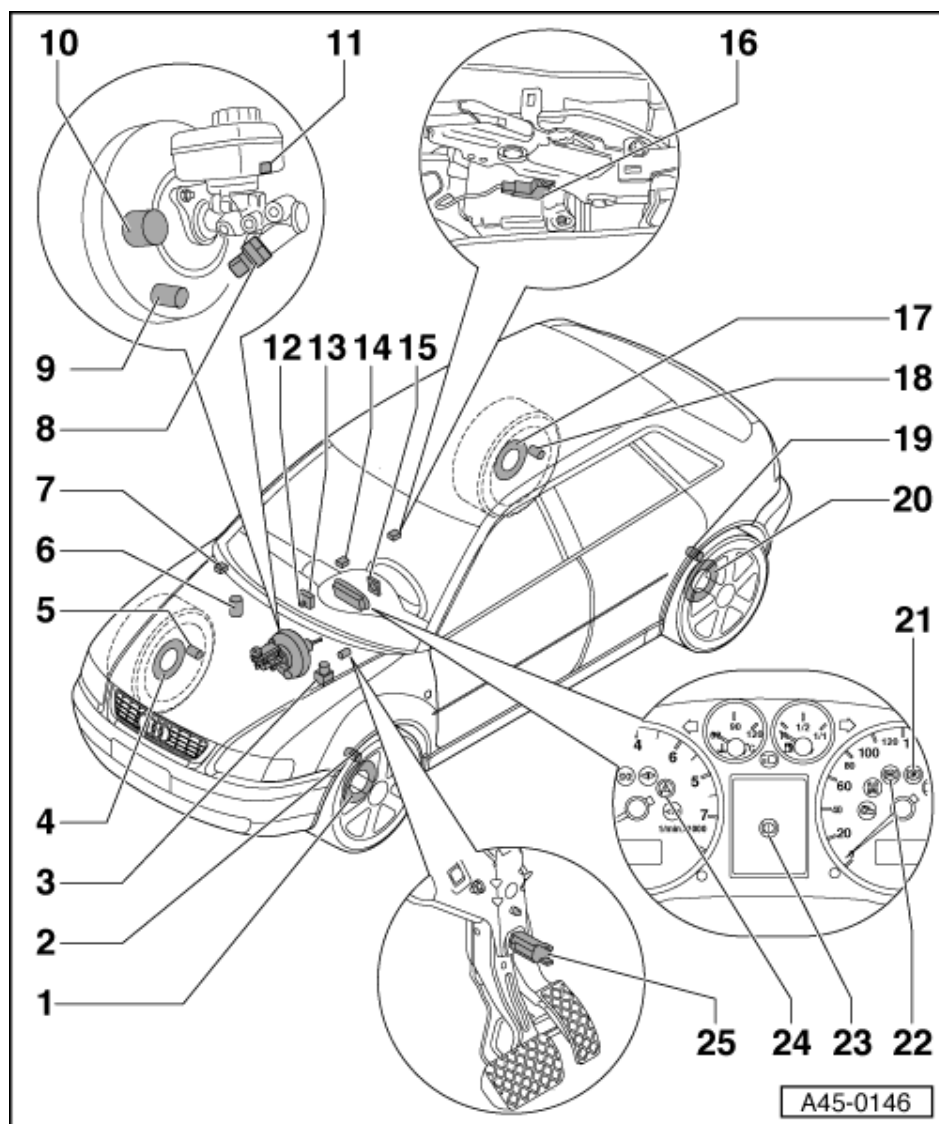
11 Brake fluid level warning contact -F34

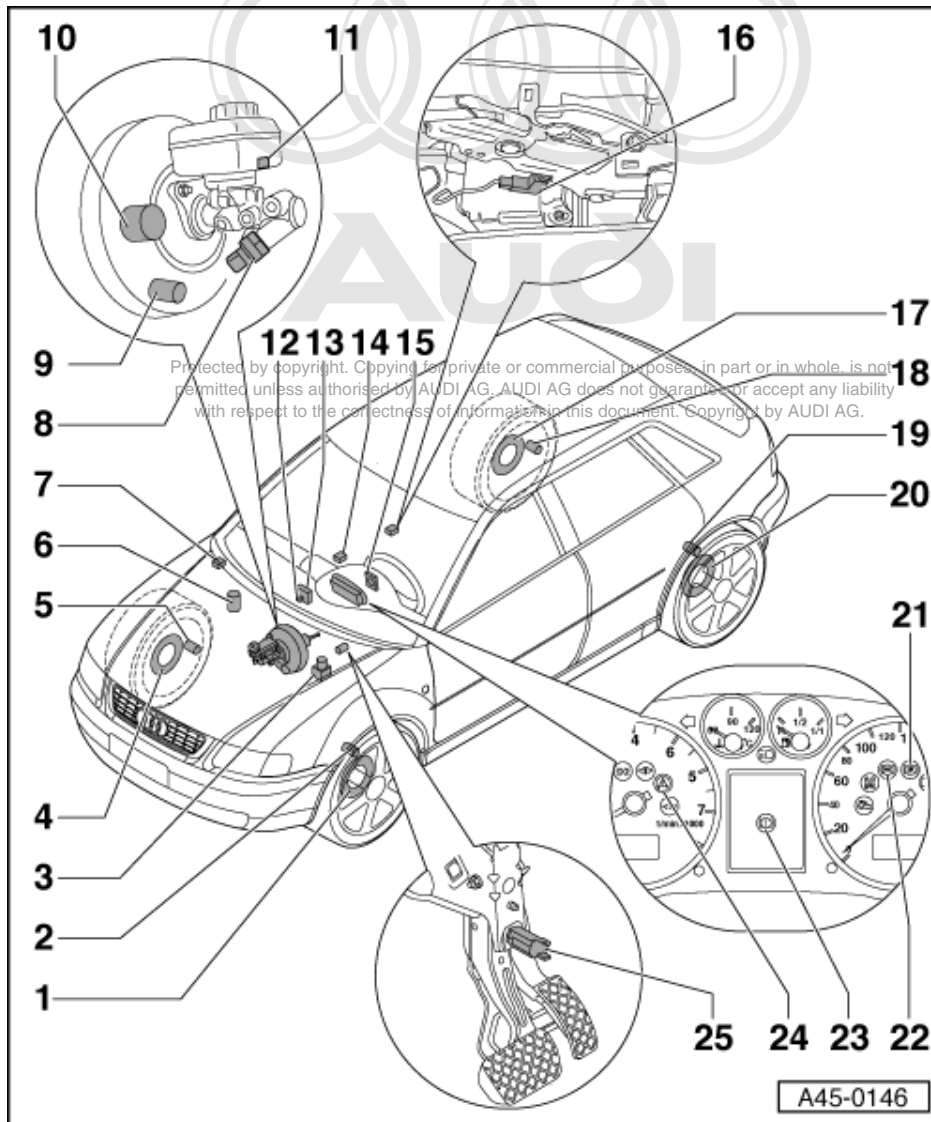
12 Lateral acceleration sender -G200

- ♦ Removing and installing=>Page 58
- ♦ As of approx. 09.01 integrated into ESP sensor unit => Fig. 1
- ♦ Removing and installing ESP sensor unit => Page 60

13 Yaw rate sender -G202

- ♦ Removing and installing=>Page 58
- ♦ As of approx. 09.01 integrated into ESP sensor unit => Fig. 1
- ♦ Removing and installing ESP sensor unit => Page 60





18 Rear right speed sensor -G44

- ♦ Removing and installing
 => Page 89

19 Rear left speed sensor -G46

- ♦ Removing and installing
 => Page 89

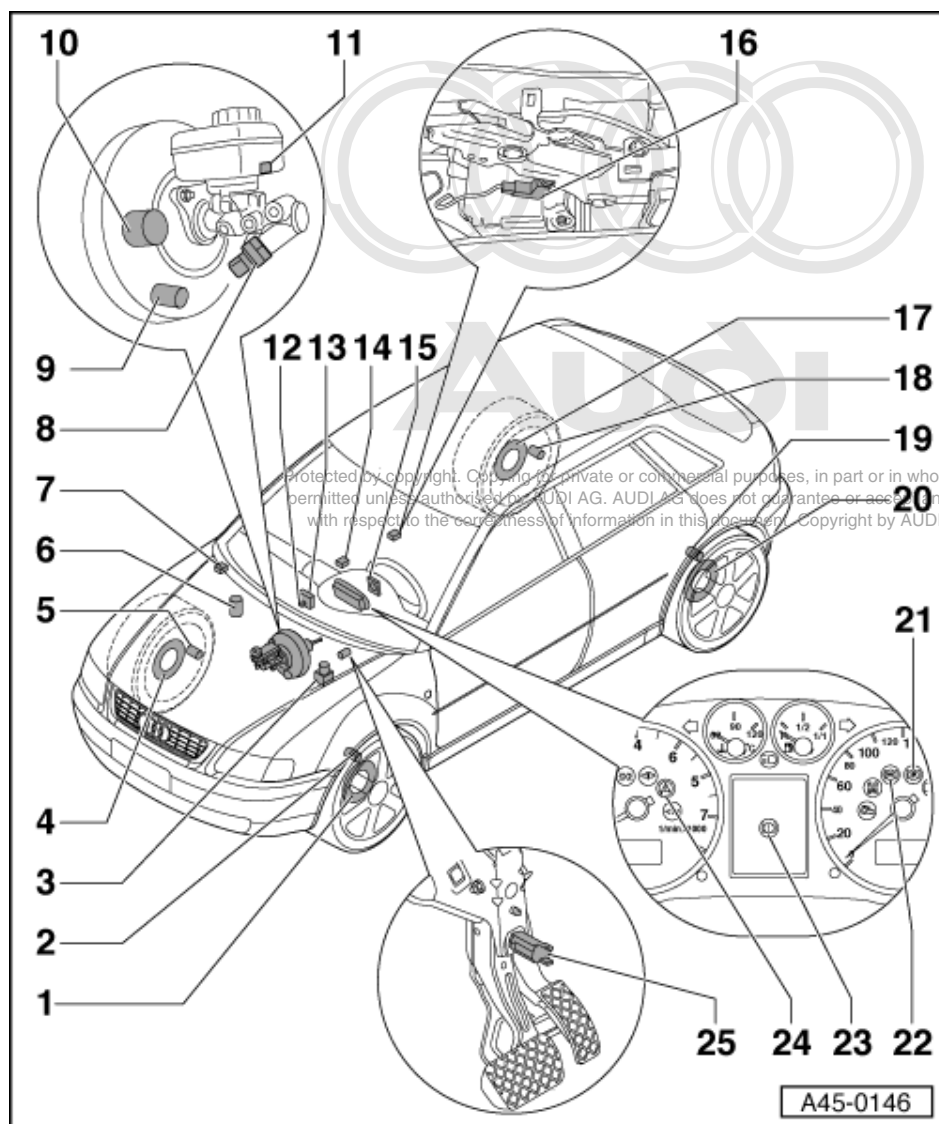
20 Rotor for rear left speed sensor

- ♦ Rotor is welded to wheel hub
- ♦ Checking => Page 90
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

21 Handbrake warning lamp -K14

- ♦ Fitting location: In dash panel insert



22 ABS warning lamp -K47

- ♦ Fitting location: In dash panel insert

23 Brake system warning lamp -K118

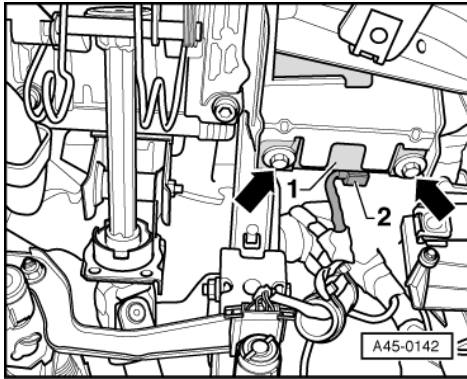
- ♦ Fitting location: In dash panel insert in driver information system

24 Traction control system warning lamp -K86

- ♦ Fitting location: In dash panel insert

25 Brake light switch -F

- ♦ Removing and installing=>Page 57



→ Fig.1 ESP sensor unit as of approx. 09.01

The following senders are integrated into the ESP sensor unit -1-:

- ◆ Lateral acceleration sender -G200
- ◆ Yaw rate sender -G202
- ◆ Longitudinal acceleration sender -G251 (four-wheel drive vehicles only)

9 - Removing and installing ABS/ESP ITT Mark 60 system components

9.1 - Removing and installing ABS/ESP ITT Mark 60 system components

Note:

The ESP drive test is designed to check the plausibility of the following signals: Brake pressure sender -1- - G201, lateral acceleration sender -G200, yaw rate sender -G202 and longitudinal acceleration sender -G251 (4WD vehicles only). On vehicles as of approx. 09.01, the last three senders listed are integrated into the ESP sensor unit.

9.2 - Removing and installing brake light switch

Note:

Switch is only to be fitted once so as to ensure a firm fit.

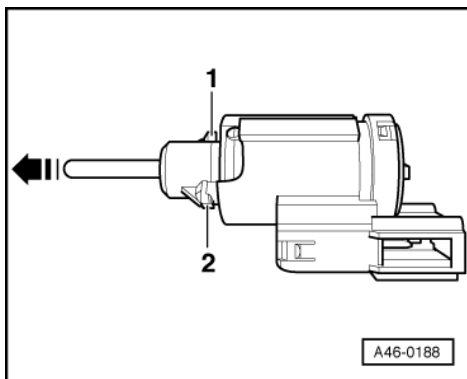
Removing

- Remove driver's storage compartment.

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=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Unplug connector.
- Turn brake light switch anti-clockwise through 45° and remove.



Installing

Install in reverse order, paying attention to the following:

- -> Pull out plunger of brake light switch as far as it will go -arrow-.
- Insert retainer tabs -1- and -2- of switch in recesses provided in assembly opening and secure by turning clockwise through 45°.

Notes:

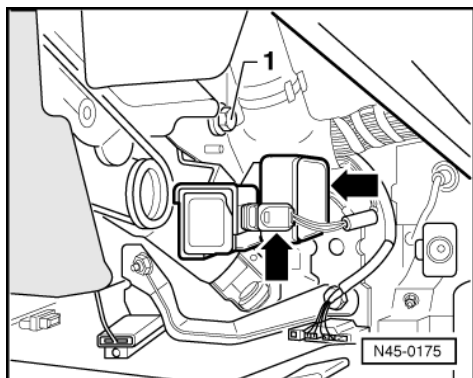
- ♦ When installing, brake pedal is not to be pressed.
- ♦ Plunger is adjusted automatically on inserting brake switch.
- Check operation of brake lights both with brake pedal pressed and at rest.

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

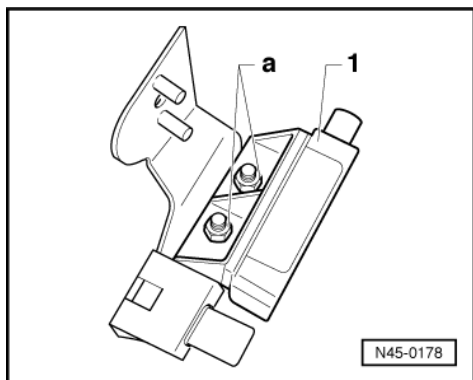
Sequence of operations

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Unplug connectors -arrows- at senders -G200/-G202.
- Screw out bolt -1- and detach holder for senders -G200/-G202.



Removing and installing yaw rate sender -G202

- -> Unscrew nuts -a- and detach yaw rate sender -G202 -Item 1-.

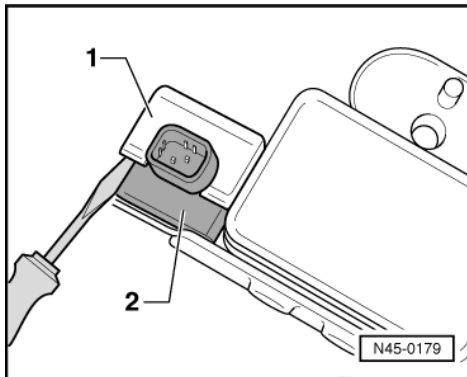


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- When fitting, insert yaw rate sender -G202 in holder, align and screw on.

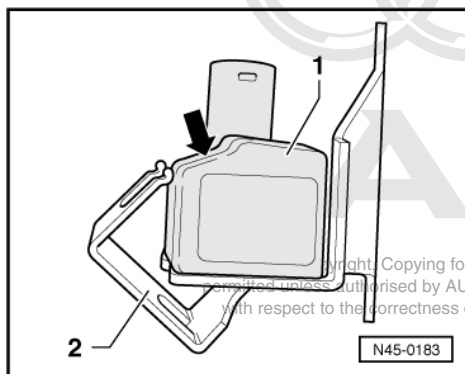
Notes:

- ♦ Yaw rate sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.



Removing and installing lateral acceleration sender -G200

- -> Use screwdriver to prise off mount -1- and detach lateral acceleration sender -G200 -Item 2-.



- -> When fitting, insert lateral acceleration sender -G200 -Item 1- in holder.
- Installation position: Sloping side -arrow- of lateral acceleration sender -G200 must face mount -2-
- Slide mount over lateral acceleration sender -G200 until it is heard to engage.

Notes:

- ♦ Lateral acceleration sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.

Installing

Perform further installation in reverse order, paying attention to the following:

- Start basic setting for lateral acceleration sender -G200/yaw rate sender -G202.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torques

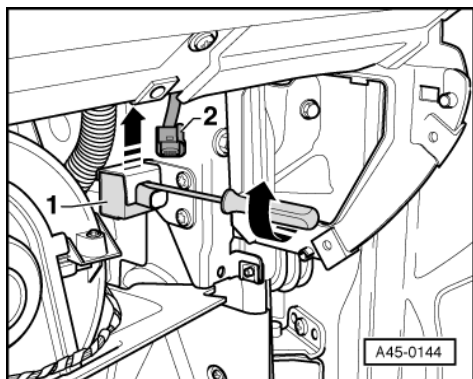
Component	Nm
Yaw rate sender to holder	9
Holder for sender to steering column mounting bracket	20

9.4 - Removing and installing longitudinal acceleration sender -G251 up to approx. 08.01

Removing

- Remove glove box.

=> General Body Repairs, Interior; Repair Group 68; Storage Compartments/Covers and Trim Panels; Removing and installing glove box Storage Compartments/Covers and Trim Panels Removing and installing glove box



- -> Unplug connector -2-.
- Use screwdriver to prise off mount -arrows- and take out longitudinal acceleration sender -G251 -Item 1-.

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Notes:

- ♦ Longitudinal acceleration sender is sensitive to severe vibration.
- ♦ Proper operation is no longer guaranteed if sender has been dropped onto ground and sender is then no longer to be used.

Installing

Install in reverse order, paying attention to the following:

- Start basic setting for longitudinal acceleration sender -G251.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform ESP drive test.

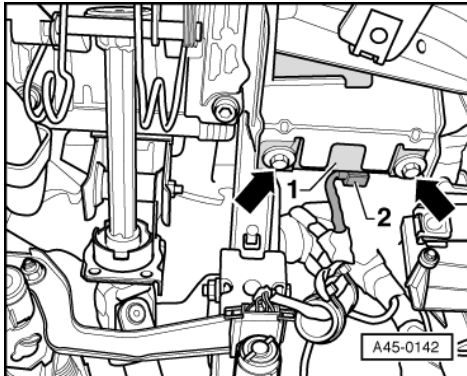
=> Running Gear, Self-diagnosis; Repair Group 01

9.5 - Removing and installing ESP sensor unit

Removing

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Screw out bolts -arrows-.
- Detach ESP sensor unit -1- to front from holder.
- Unplug connector -2-.

Notes:

- ◆ The ESP sensor unit is sensitive to severe vibration.
- ◆ Proper operation is no longer guaranteed if ESP sensor unit has been dropped onto ground and sensor unit is then no longer to be used.

Installing

Install in reverse order, paying attention to the following:

- Start basic setting for senders of ESP sensor unit.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torque

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Component	Nm
ESP sensor unit to holder	20

9.6 - Removing and installing steering angle sender -G85

Note:

Coil connector with slip ring is integrated into housing of steering angle sender -G85.

Removing

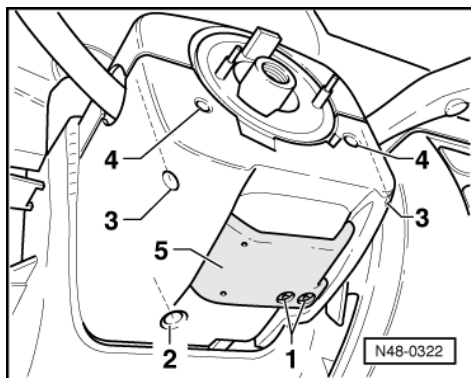
- Move wheels to straight ahead position.
- Remove airbag unit and steering wheel.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 48; Steering column and steering wheel with airbag Steering column and steering wheel with airbag

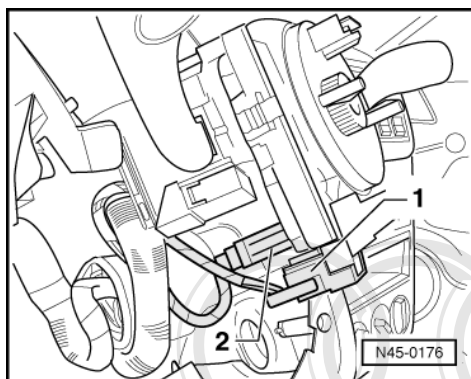
- Remove driver's storage compartment.



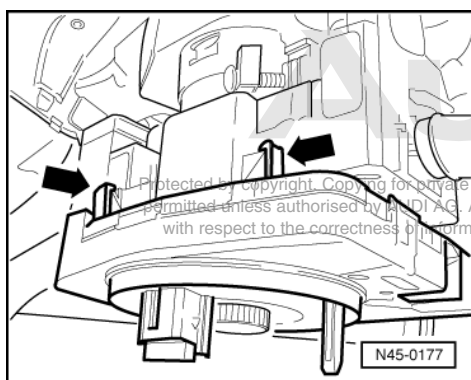
=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Screw out bolts -1- and detach handle for steering column adjustment -5-.
- Screw out bolts -2...4-.
- Detach upper and lower steering column trim sections.



- -> Unplug connectors -1- and -2-.



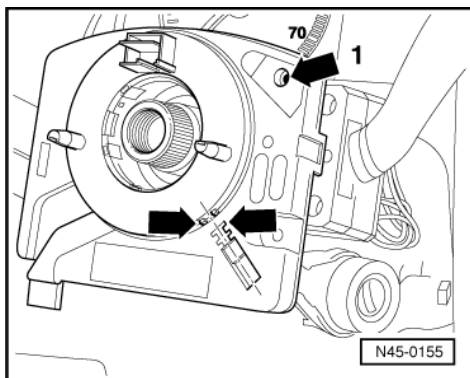
- -> Carefully release upper fasteners -arrows-.
- Carefully release lower fasteners and detach housing of coil connector with slip ring and steering angle sender from steering column switch.

Installing

Install in reverse order, paying attention to the following:

- Slide housing of coil connector with slip ring and steering angle sender onto steering column switch until all fasteners are heard to engage.

- Break off transportation protection to remove.



- ➔ Move steering angle sender to centre position.
- Yellow dot must be visible in hole -arrow 1- and the two marks -arrows- must be aligned
- Install airbag unit and steering wheel.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 48; Steering column and steering wheel with airbag Steering column and steering wheel with airbag

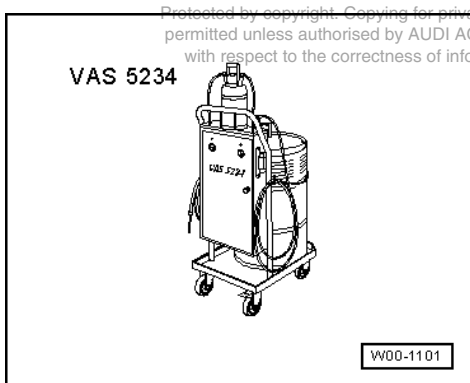
- Start basic setting for steering angle sender -G85.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

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

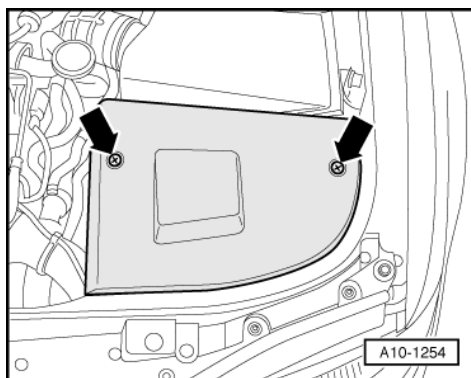


Special tools and workshop equipment required

- ◆ Brake filling and bleeding appliance VAS 5234

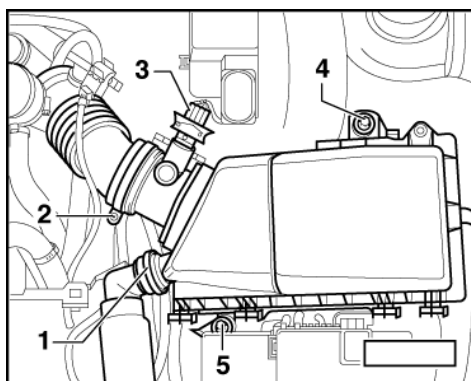
Or

- ◆ Brake filling and bleeding appliance V.A.G 1869 A

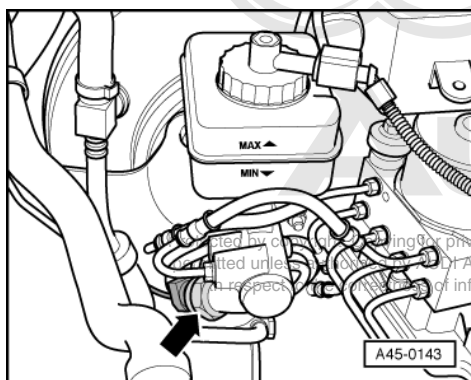


Removing

- -> If fitted, remove front left cover -arrows-.



- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.
- As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.
- Use brake filling and bleeding appliance VAS 5234 or extractor V.A.G 1869/4 to draw off as much brake fluid as possible from brake fluid reservoir.



- -> Unplug connector -arrow-.
- Remove brake pressure sender.

Installing

Install in reverse order, paying attention to the following:

- Bleed brake system => Page **167** .
- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- Start basic setting for brake pressure sender -1- -G201.

=> Running Gear, Self-diagnosis; Repair Group 01

- Perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torques

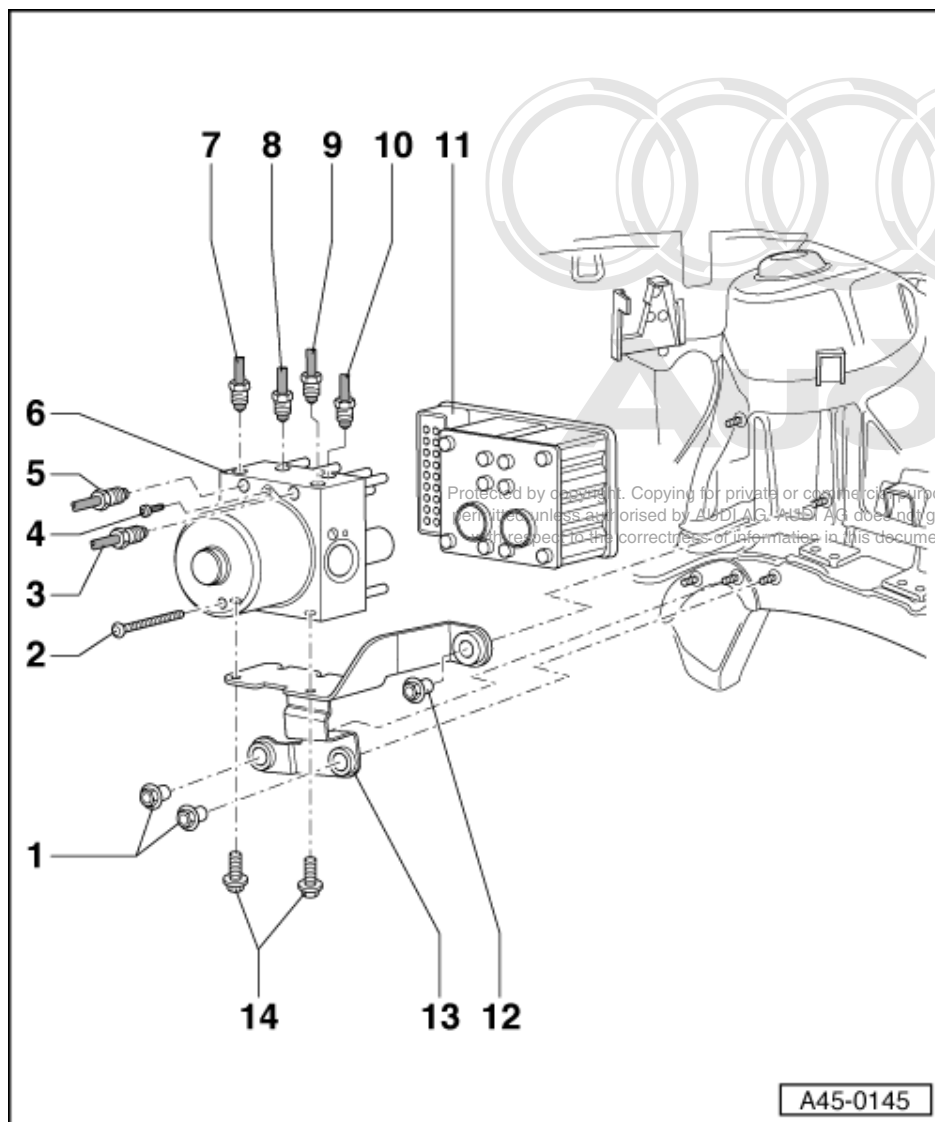
Component	Nm
Brake pressure sender to brake master cylinder	14
Air cleaner housing	10



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10 - ABS/ESP ITT Mark 60 control unit and hydraulic unit

10.1 - ABS/ESP ITT Mark 60 control unit and hydraulic unit



10.2 - Exploded view

Attention:
 Interchanging brake pipe connections will result in ESP system malfunction.

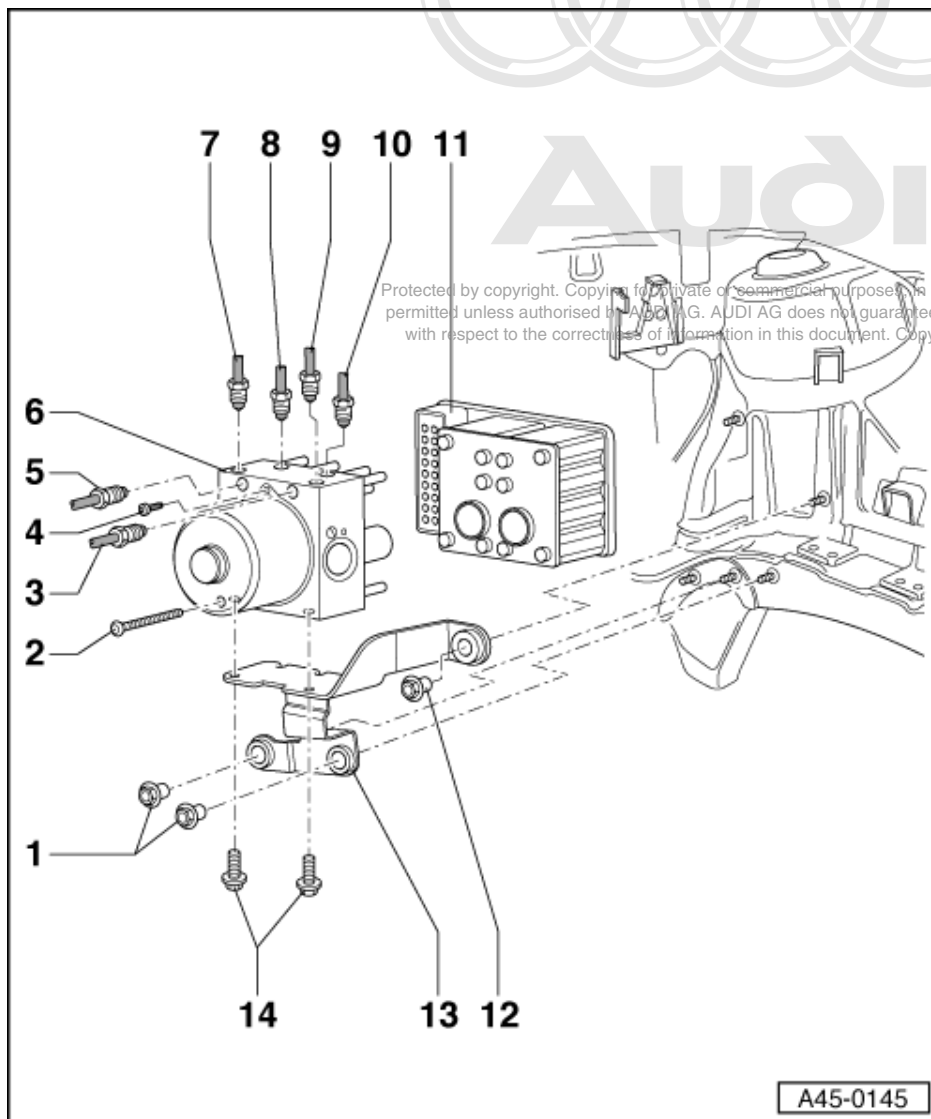
- Perform final control diagnosis after attaching brake pipes to hydraulic unit.

=> Running Gear, Self-diagnosis; Repair Group 01

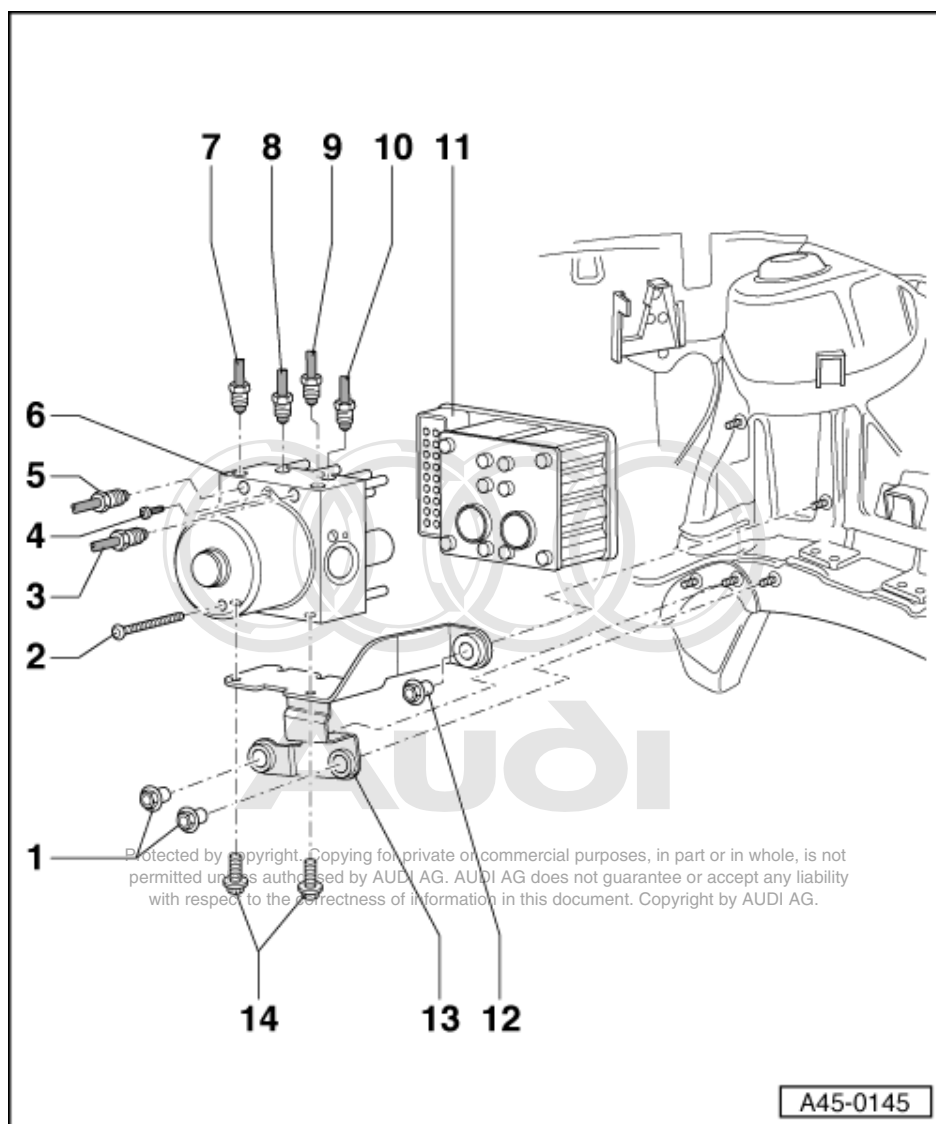
Note:

Final control diagnosis can be used to establish whether pipe connections have been interchanged.

1 Cap nut, 20 Nm



- 2 TORX socket-head bolt, 4 Nm
- 3 Brake pipe
 - ♦ Hydraulic unit to rear left brake caliper
- 4 TORX socket-head bolt, 4 Nm
- 5 Brake pipe
 - ♦ Hydraulic unit to rear right brake caliper
- 6 ABS hydraulic unit -N55
 - ♦ Fitting location: On left of engine compartment
- 7 Brake pipe
 - ♦ Brake master cylinder/primary piston circuit to hydraulic unit
- 8 Brake pipe
 - ♦ Hydraulic unit to front left brake caliper
- 9 Brake pipe
 - ♦ Hydraulic unit to front right brake caliper



10 Brake pipe

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

11 ABS with EDL control unit -J104

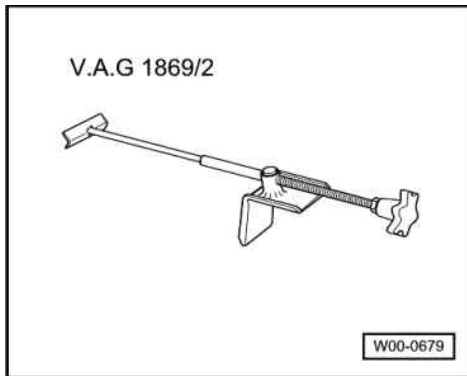
- ♦ Fitting location: On left of engine compartment
- ♦ Control unit is bolted to hydraulic unit

12 Cap nut, 20 Nm

13 Bracket

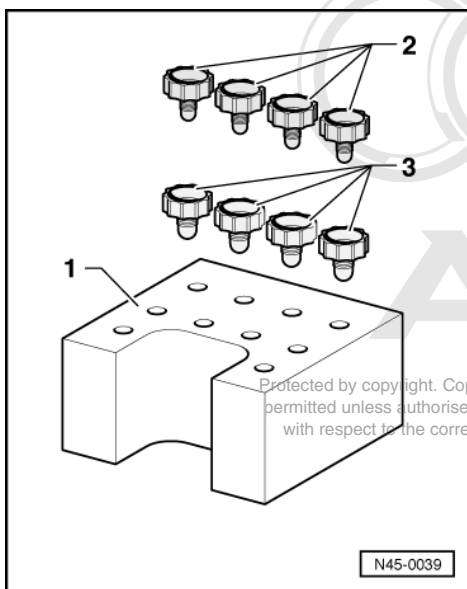
14 Bolt, 8 Nm

10.3 - Removing and installing control unit and hydraulic unit



Special tools and workshop equipment required

- ◆ Brake pedal depressor V.A.G 1869/2



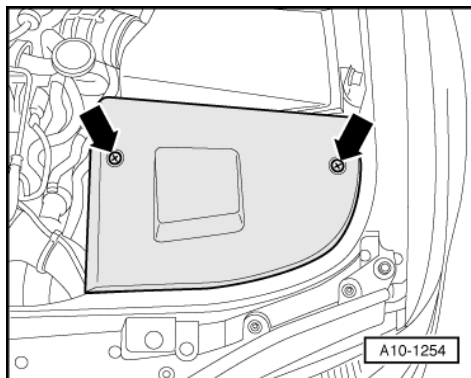
- ◆ Repair set, Part no.

=> Parts List

- 1 - Transportation protection for valve domes (foam)
- 2 - Sealing plug M10 for brake pipes and tapped holes
- 3 - Sealing plug M12 for brake pipes and tapped holes

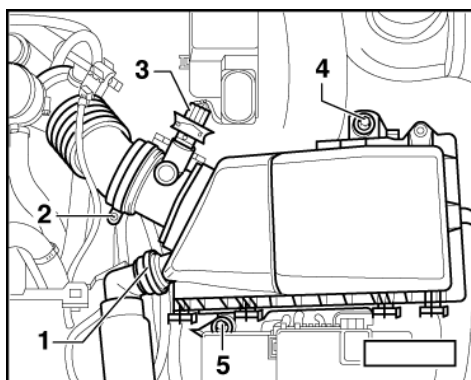
After separating control unit from hydraulic unit, always attach transportation protection for valve domes to hydraulic unit.

No warranty claims can be accepted for hydraulic units not fitted with transportation protection for valve domes.

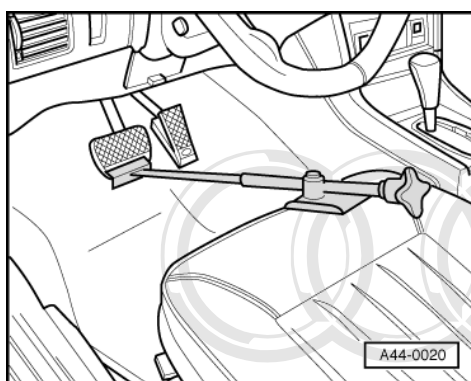


Removing

- -> If fitted, remove front left cover -arrows-.



- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.



- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.
- Connect hose of bleeder bottle to bleed screw of front left and rear left brake caliper and open bleed screws.

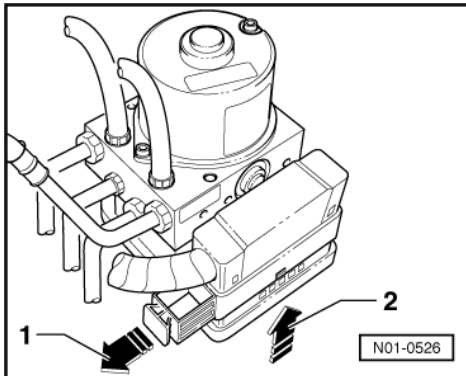
Note:

This dissipates pressure in hydraulic unit.

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- Close front left and rear left bleed screws.

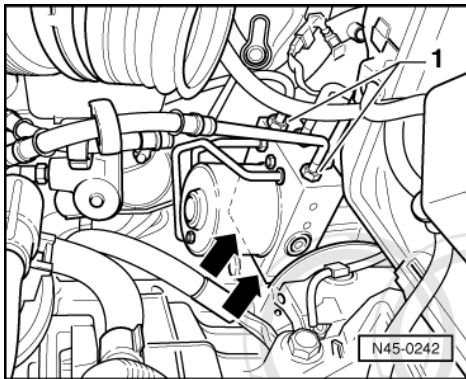
- Leave brake pedal depressor V.A.G 1869/2 in position.



- -> Release -arrow 1- connector at control unit and unplug -arrow 2-.

Notes:

- ♦ Make sure brake fluid does not ingress into connector housing of control unit as this could result in contact corrosion and thus system failure.
- ♦ Use compressed air to carefully clean dirty connector housing.

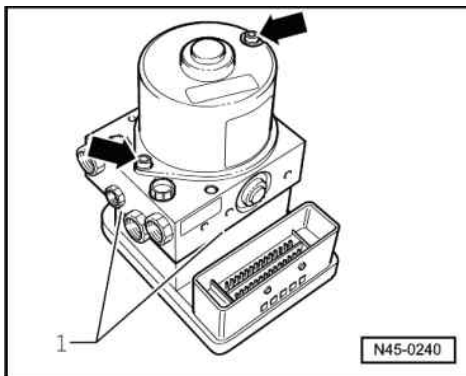


- As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath control unit and hydraulic unit.
- Mark brake pipes.
- -> Unscrew brake pipes from hydraulic unit -1- to brake master cylinder and tie in place.
- Unscrew the remaining brake pipes from the hydraulic unit.

Attention:

Take care not to bend brake pipes in the vicinity of the hydraulic unit.

- Seal brake pipes and tapped holes with sealing plugs from repair set.
- Screw out bolts at bracket for hydraulic unit -arrows- and detach hydraulic unit with control unit.



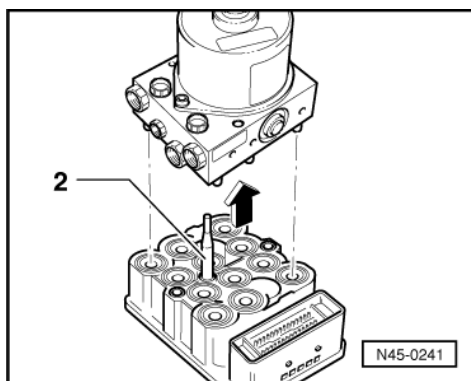
Unscrewing control unit from hydraulic unit

- Set down hydraulic unit on a clean flat surface with control unit facing downwards.
- -> Screw out Torx socket-head bolts -arrows-.

Attention:

Hydraulic pump is not to be separated from hydraulic unit.

- Carefully lift hydraulic unit with hydraulic pump off control unit at seam -1-.



- -> When detaching control unit, make sure valve domes of hydraulic unit do not catch on control unit solenoids.
- Cover control unit solenoids with a lint-free cloth.
- Protect components against moisture.
- After disconnecting control unit and hydraulic unit, fit transportation protection for valve domes from repair set.

Note:

Dome -2- supplied as replacement part for control unit can only be clipped in once and then no longer detached.

Installing

Install in reverse order, paying attention to the following:

Notes:

- ♦ Do not remove sealing plugs from new hydraulic unit until appropriate brake pipe is to be fitted.
- ♦ If sealing plugs are removed from hydraulic unit sooner, brake fluid may escape and it may no longer be possible to fill and bleed the unit properly.
- When assembling control unit and hydraulic unit, make sure valve domes of hydraulic unit do not catch on control unit solenoids.
- Connect pipes in line with markings => Page 66 .
- Screw ABS unit to bracket.

Note:

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Do not fully tighten bolts to facilitate attachment of individual brake pipes to hydraulic unit.

- Finish tightening hydraulic unit after screwing on brake pipes.
 - Bleed brake system => Page 167 .
 - If a new control unit is fitted, it must be encoded.
- => Running Gear, Self-diagnosis; Repair Group 01
- Perform final control diagnosis after attaching brake pipes to hydraulic unit.

=> Running Gear, Self-diagnosis; Repair Group 01

Note:

Final control diagnosis can be used to establish whether pipe connections have been interchanged.

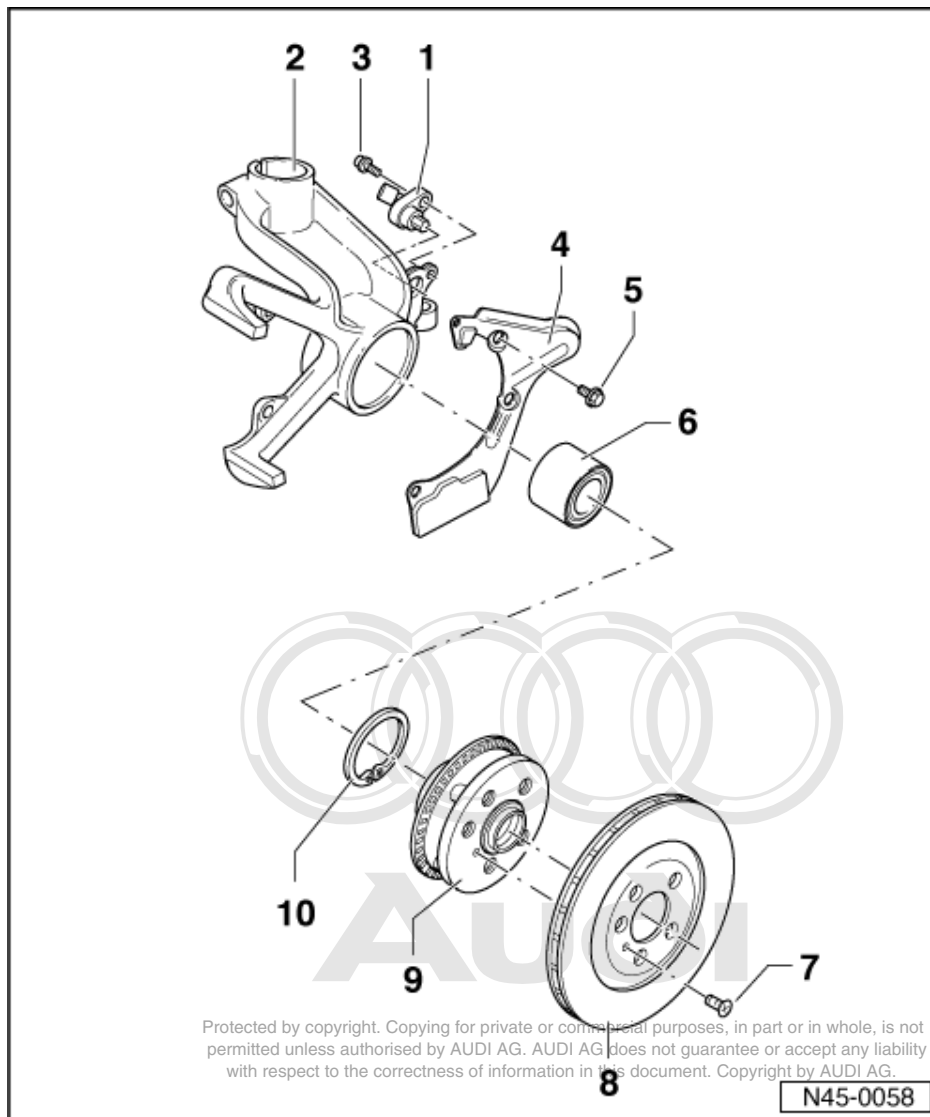
Tightening torques

Component	Nm
Control unit to hydraulic unit	4 1)
Hydraulic unit to bracket	8
Brake pipes to hydraulic unit	14 2)
Air cleaner housing	10

- 1) Replace bolts
- 2) For M10 and M12 connections

11 - ABS/ESP ITT Mark 60 system components at front wheels

11.1 - ABS/ESP ITT Mark 60 system components at front wheels



11.2 - Exploded view

1 Speed sensor

- ♦ Removing and installing => Page 75
- ♦ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
- ♦ Replacing speed sensor wire => Page 76

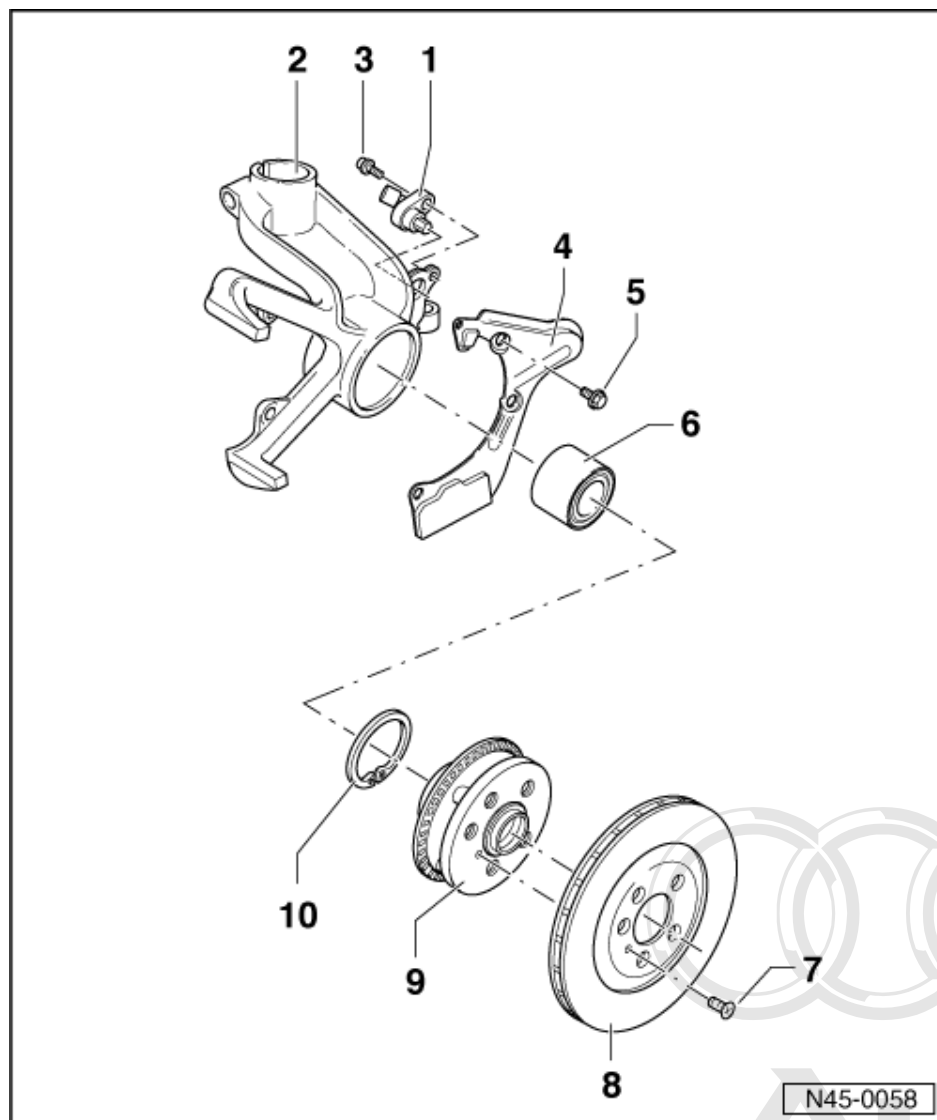
2 Wheel bearing housing

3 Hexagon socket-head bolt -8 Nm

4 Splash plate

5 Bolt

- ♦ Tightening torque => Page 105



6 Wheel bearing

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing

7 Cross-head bolt

- ♦ Tightening torque => Page 102

8 Brake disc

- ♦ Assignment => Page 1 onwards

9 Wheel hub with rotor

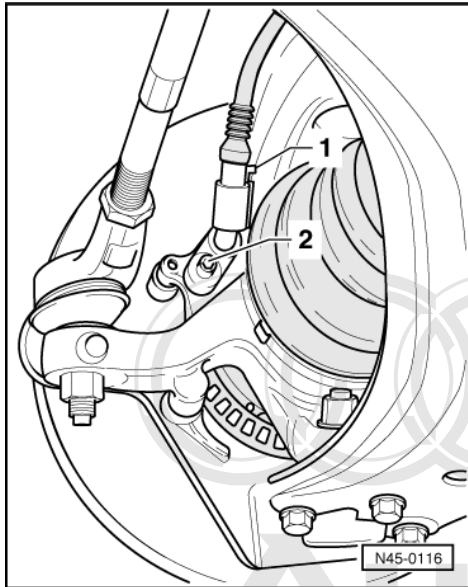
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- ♦ Checking rotor => Page 75
- ♦ Replace only as complete assembly

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

10 Circlip

11.3 - Removing and installing speed sensor



Removing

- -> Release connector 1- at speed sensor and unplug.
- Screw out bolt 2-
- Pull speed sensor out of wheel bearing housing.

Installing

Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.
- Turn steering to left and right lock and check freedom of movement of speed sensor wire.

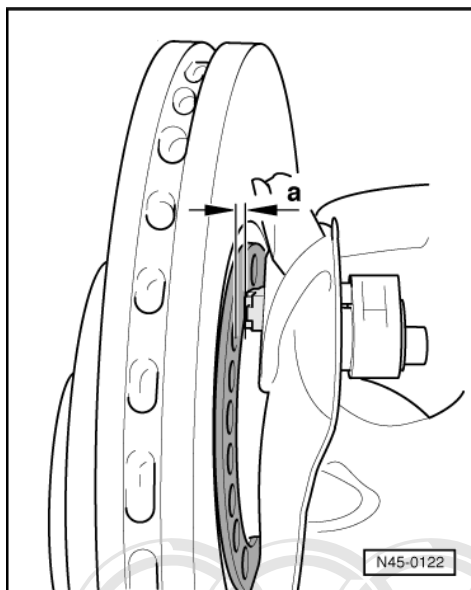
Tightening torque

Component	Nm
Speed sensor to wheel bearing housing	8

11.4 - Checking rotor

- Unscrew wheel.
- Check rotor for dirt and damage by turning brake disc.
- If rotor is damaged, replace wheel hub with rotor.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing



Checking lateral runout of rotor

- -> Turn wheel hub and check evenness of gap -a- between rotor and speed sensor.
- Dimension a = 0.3 mm
- In the event of excessive lateral runout, replace wheel hub with rotor.

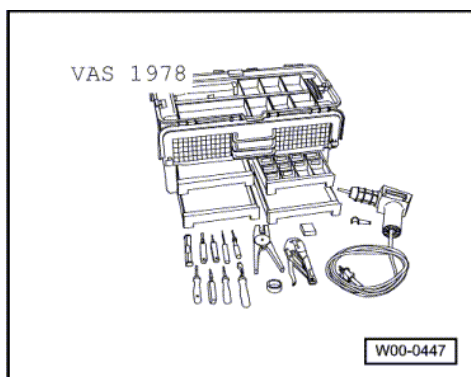
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

11.5 - Replacing speed sensor wire

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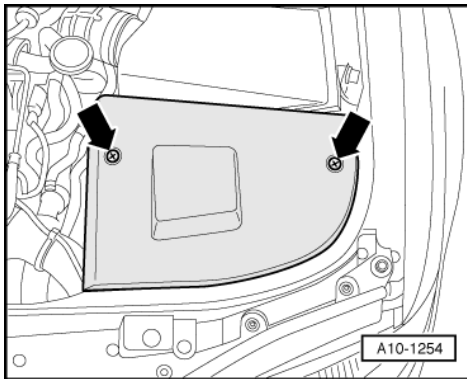
Note:

Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.



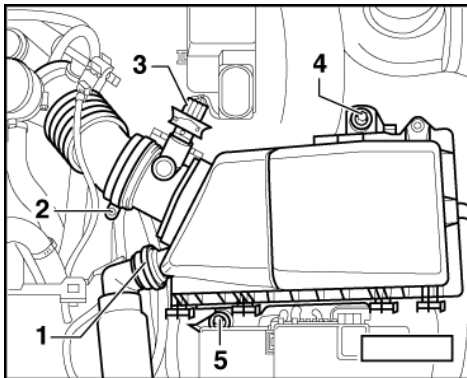
Special tools and workshop equipment required

- ♦ Wiring harness repair set VAS 1978

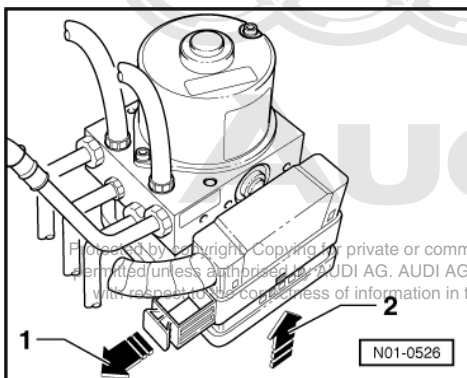


Removing

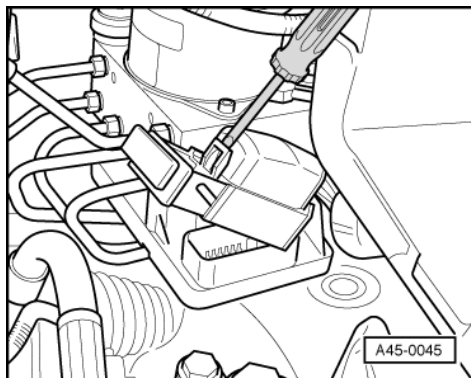
- -> If fitted, remove front left cover -arrows-.



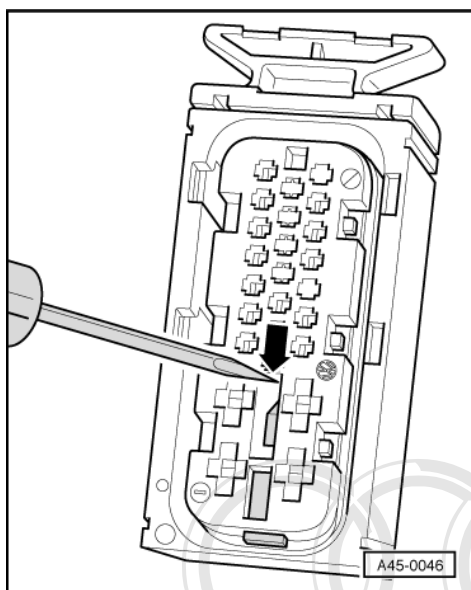
- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Take out air cleaner housing.



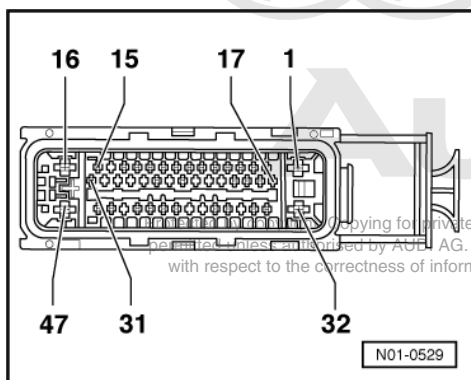
- -> Release -arrow 1- connector at control unit and unplug -arrow 2-.



- -> Release cap on multi-pin connector with a screwdriver and detach.

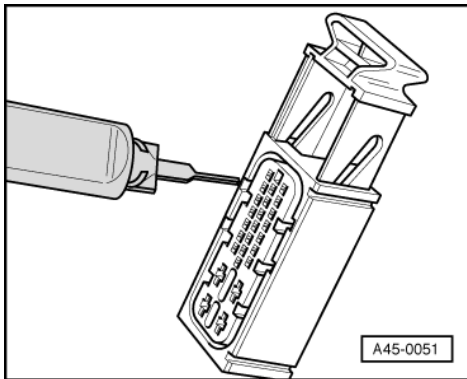


- -> Release secondary catch (violet) with a small screwdriver by pressing in direction of arrow.

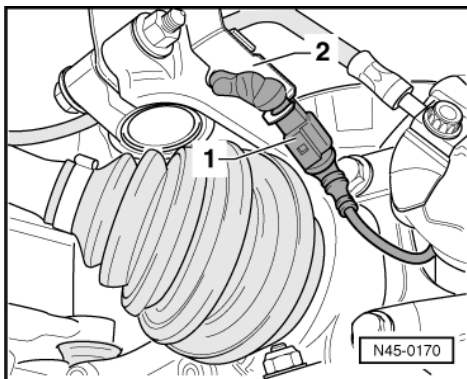


-> Contact assignment of 47-pin connector at control unit -J104

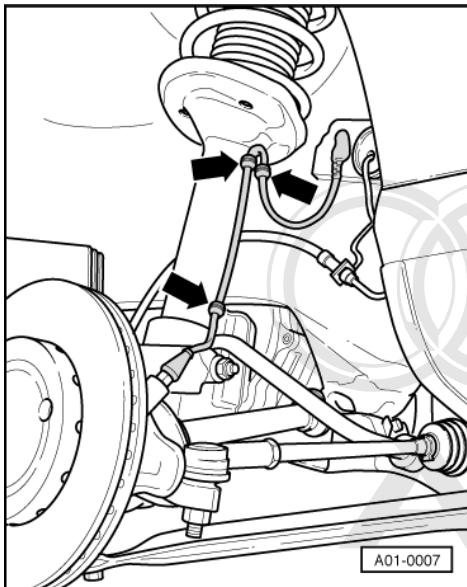
=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder



- -> Push out relevant contacts using suitable ejector tool from wiring harness repair set VAS 1978.



- -> Unplug connector -1- of brake pad wear indicator at left brake.
- Unclip wire from holder -2-.
- Release connector at speed sensor and unplug.
- Remove defective speed sensor wire.



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Installing

Install in reverse order, paying attention to the following:

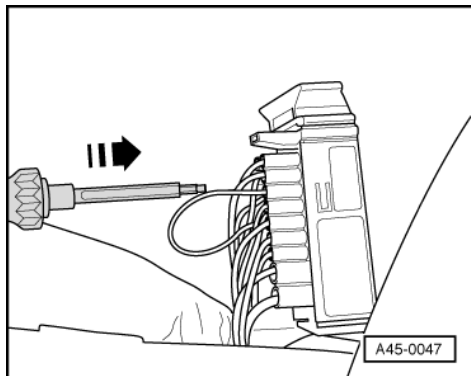
- Fit new speed sensor wire.



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

Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.



- Insert contact into connector housing.
- -> Use VAS 1978 insertion tool to slide home individual wire seal.
- Secure contacts with secondary catch and attach cap to multi-pin connector.

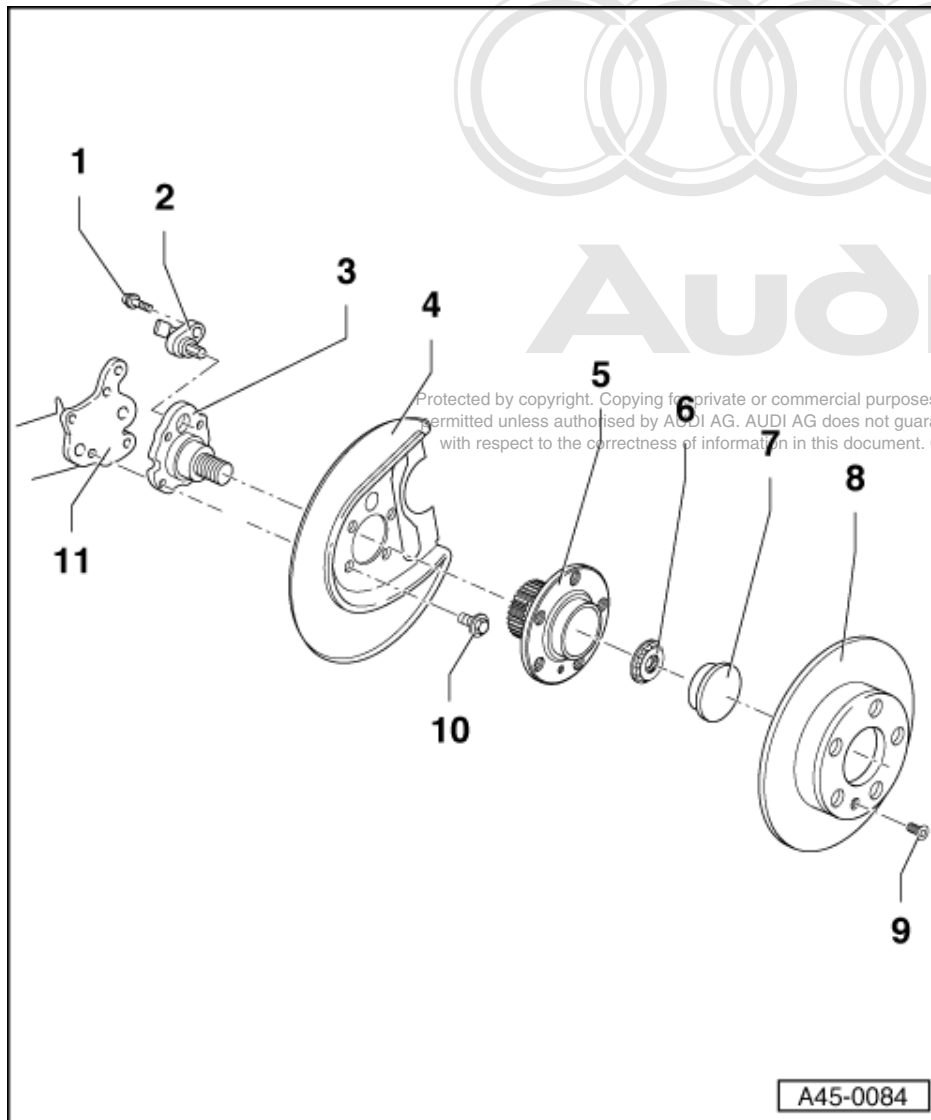
Tightening torque

Component	Nm
Air cleaner housing	10

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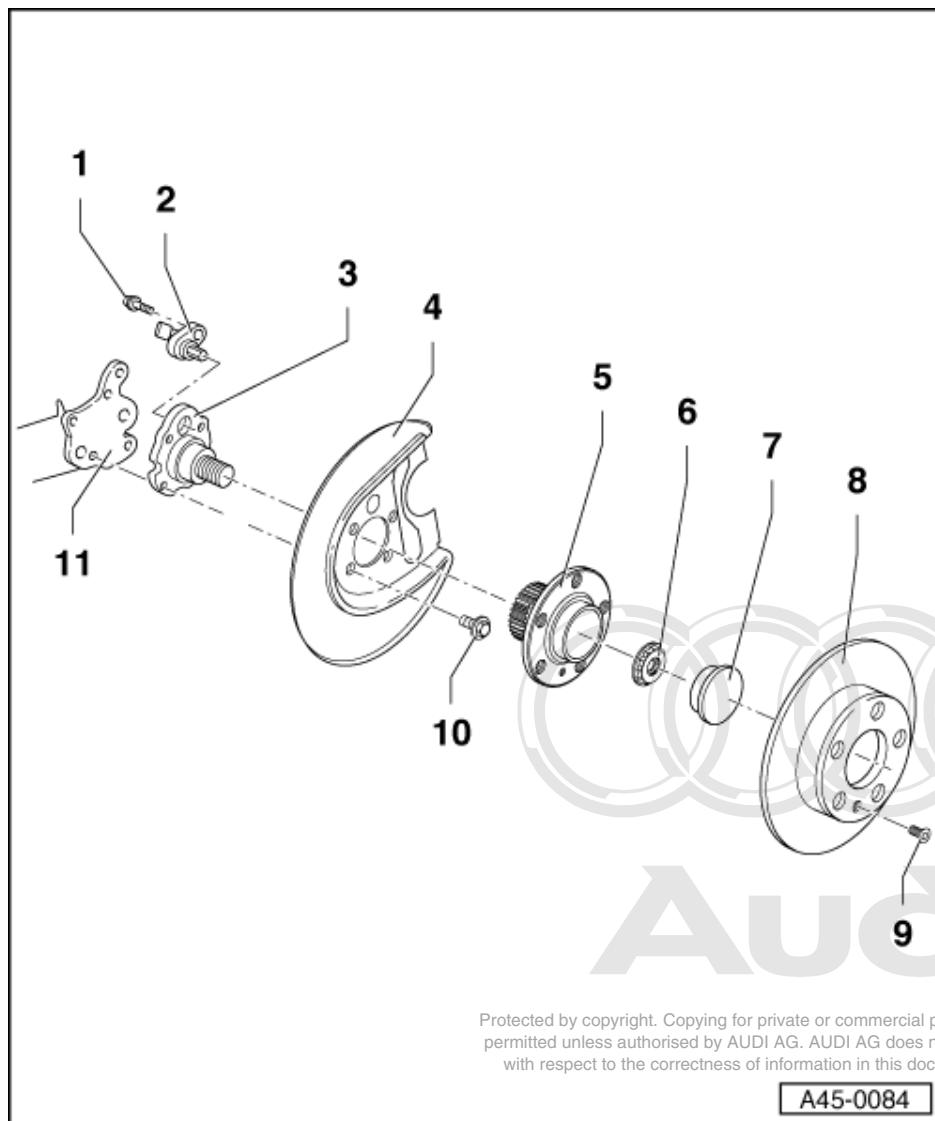
12 - ABS/ESP ITT Mark 60 system components at rear wheels for front-wheel drive vehicles

12.1 - ABS/ESP ITT Mark 60 system components at rear wheels for front-wheel drive vehicles



12.2 - Exploded view

- 1 Hexagon socket-head bolt -8 Nm
- 2 Speed sensor
 - ♦ Removing and installing
=> Page 83
 - ♦ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
 - ♦ Replacing speed sensor wire
=> Page 84
- 3 Stub axle
- 4 Splash plate



5 Wheel hub with wheel bearing and rotor

- ♦ Checking rotor => Page 83
- ♦ Replace only as complete assembly
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

6 Twelve-point nut

- ♦ Tightening torque

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

7 Grease cap

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

8 Brake disc

- ♦ Assignment => Page 1 onwards

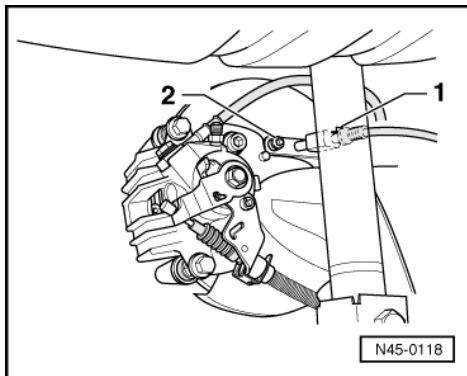
9 Cross-head bolt

- ♦ Tightening torque => Page 113

10 Bolt, 60 Nm

11 Axle beam

12.3 - Removing and installing speed sensor



Removing

- -> Release connector -1- at speed sensor and unplug.
- Screw out bolt -2-.
- Pull speed sensor out of stub axle.

Installing

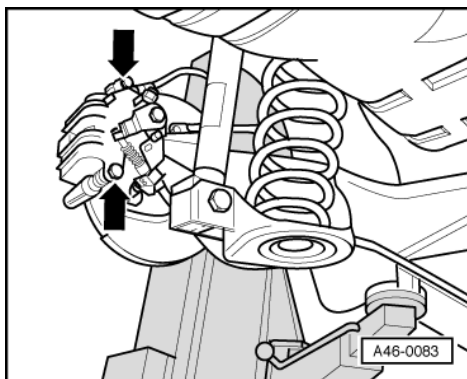
Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.

Tightening torque

Component	Nm
Speed sensor to stub axle	8

12.4 - Checking rotor

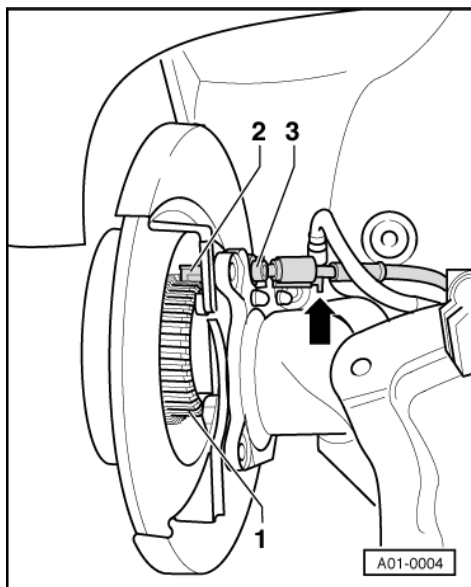


- Remove wheel.
- -> Unscrew brake caliper housing -arrows- and tie up with piece of wire.

Note:

Brake hose/pipe is never to be twisted or kinked.

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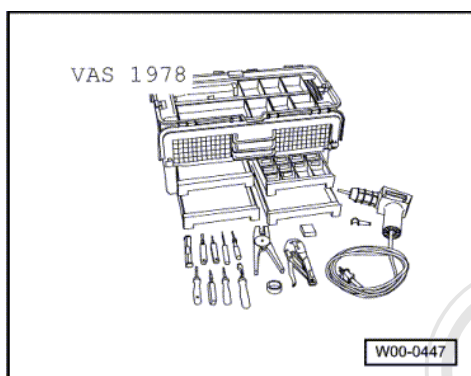


- -> Check rotor -1- for dirt and damage by turning brake disc.
- In the event of rotor damage or excessive wheel bearing clearance, replace wheel hub with rotor.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

- Install brake caliper housing => Page **117**.

12.5 - Replacing speed sensor wire

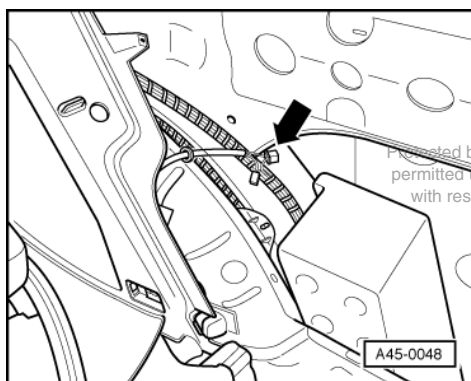


Note:

Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.

Special tools and workshop equipment required

- ♦ Wiring harness repair set VAS 1978



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Removing

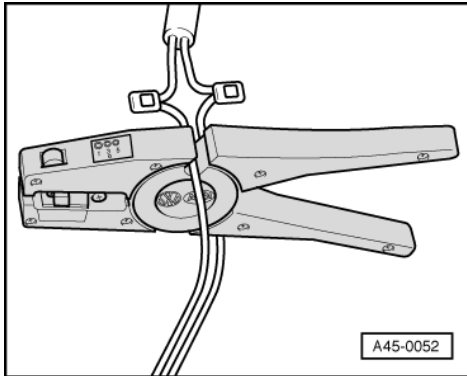
- Remove wheel housing liner.

=> General Body Repairs, Exterior; Repair Group 66

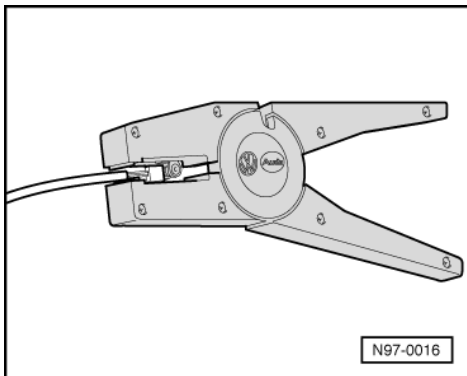
- Release connector at speed sensor and unplug.
- Remove inner side trim/rear wheel housing trim.

=> General Body Repairs, Interior; Repair Group 70

- -> Pull insulating grommet -arrow- off wiring.



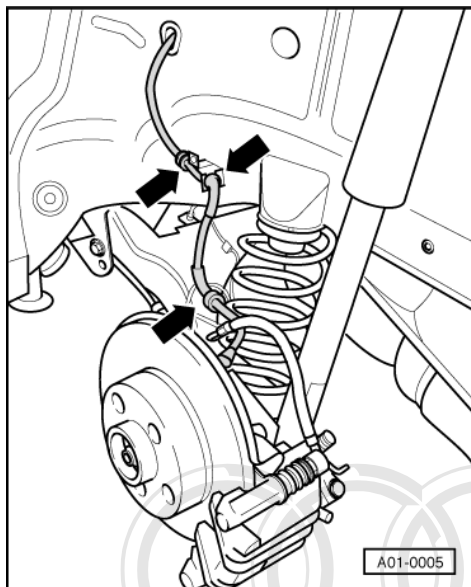
- -> Use stripping pliers VAS 1978/3 to sever speed sensor wire and take out defective section.



Installing

Install in reverse order, paying attention to the following:

- -> Strip 15 mm of insulation off end of wire with stripping pliers VAS 1978/3 and bend back bare part of wire over half its length.
- Fit new speed sensor wire.



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

Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.

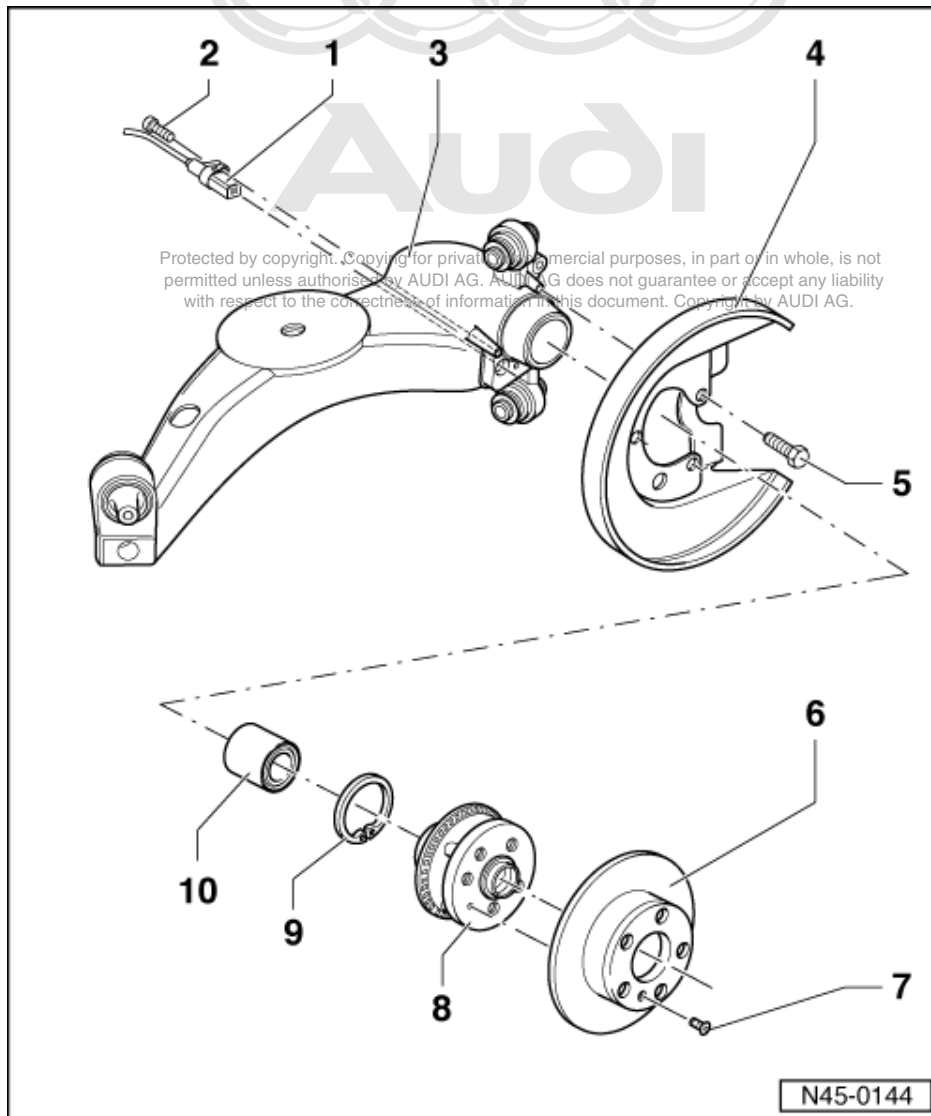
- If fitted, use stripping pliers to cut off twin connector at new speed sensor wire.
- Strip 15 mm of insulation off end of wire and bend back bare part of wire over half its length.
- Use suitable crimp connector from wiring harness repair set VAS 1978 to connect speed sensor wire.

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The instructions supplied with the wiring harness repair set VAS 1978 do not normally permit repairs to the ABS system wiring. This does however only apply to the screened wiring in the system.

13 - ABS/ESP ITT Mark 60 system components at rear wheels for four-wheel drive vehicles

13.1 - ABS/ESP ITT Mark 60 system components at rear wheels for four-wheel drive vehicles



13.2 - Exploded view

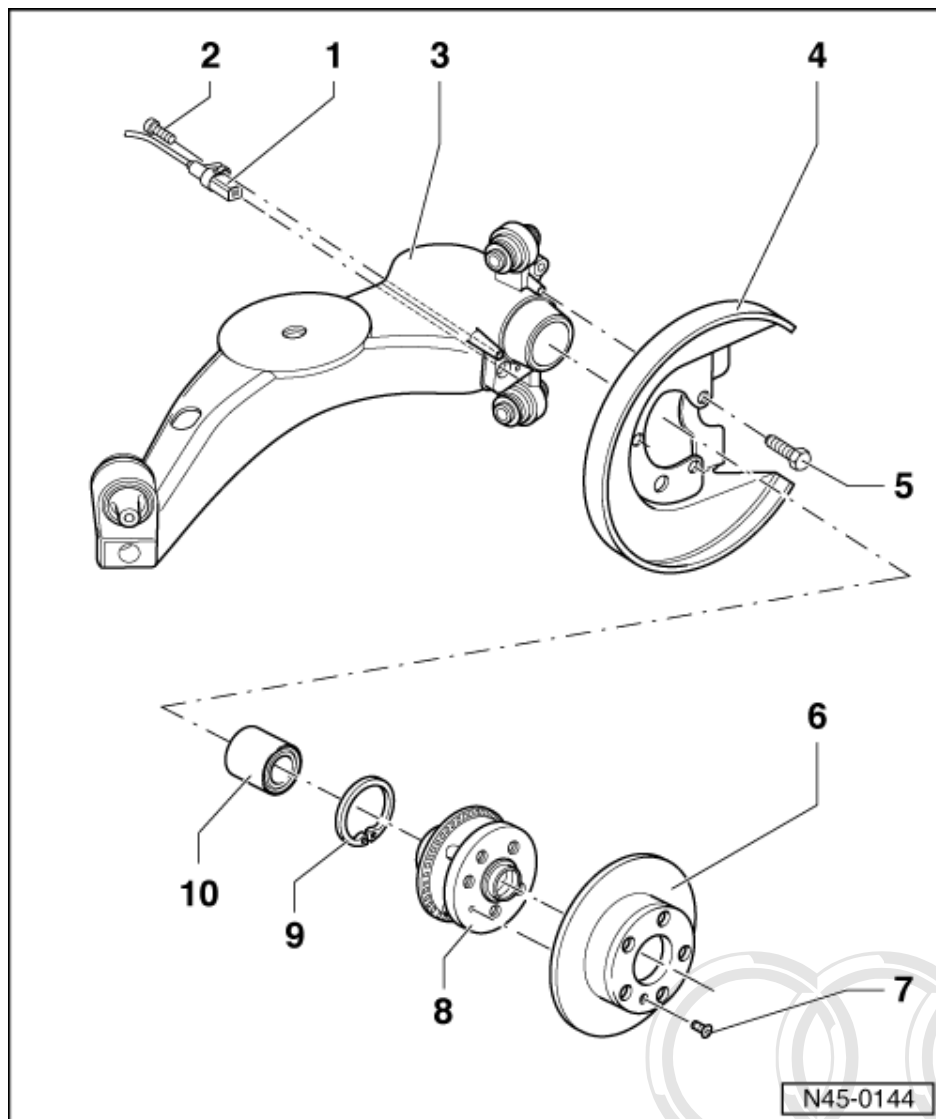
1 Speed sensor

- ♦ Removing and installing
=> Page 89
- ♦ Before fitting sensor, clean inner surface of hole and coat with lubricating paste G 000 650
- ♦ Replacing speed sensor wire
=> Page 90

2 Hexagon socket-head bolt -8 Nm

3 Trailing arm

4 Splash plate



5 Bolt, 10 Nm

6 Brake disc

7 Cross-head bolt

- ♦ Tightening torque => Page 124

8 Wheel hub with rotor

- ♦ Checking rotor => Page 90
- ♦ Replace only as complete assembly
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

9 Circlip

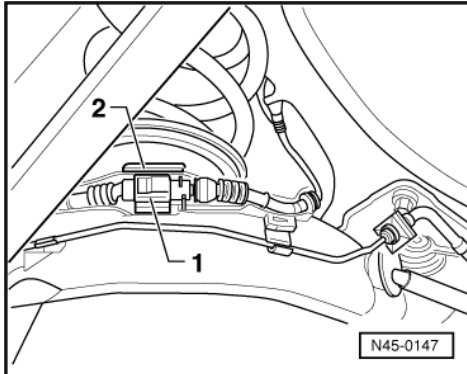
10 Wheel bearing

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

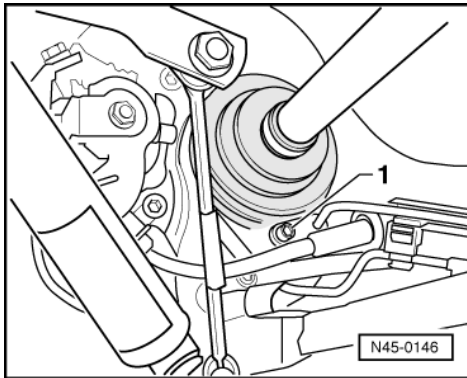
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13.3 - Removing and installing speed sensor



Removing

- -> Open cover -2- over speed sensor connector.
- Unplug connector -1-.



- -> Screw out bolt -1-.
- Pull speed sensor out of trailing arm.

Installing

Install in reverse order, paying attention to the following:

- Before fitting speed sensor, clean inner surface of hole and coat speed sensor all round with lubricating paste G 000 650.

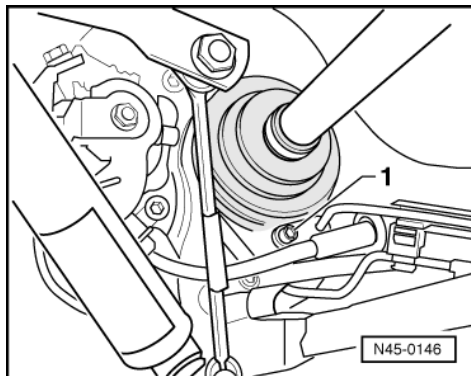
Tightening torque

Component	Nm
Speed sensor to trailing arm	8



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13.4 - Checking rotor



- -> Screw out bolt -1-.
- Pull speed sensor out of trailing arm.
- Unscrew wheel.
- Check rotor for dirt and damage by turning brake disc.
- If rotor is damaged, replace wheel hub with rotor.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

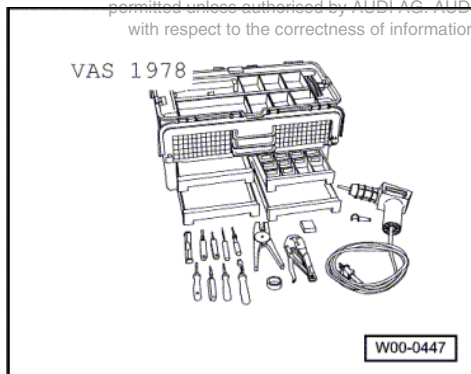
- Fit speed sensor => Page 89 .

13.5 - Replacing speed sensor wire

Note:

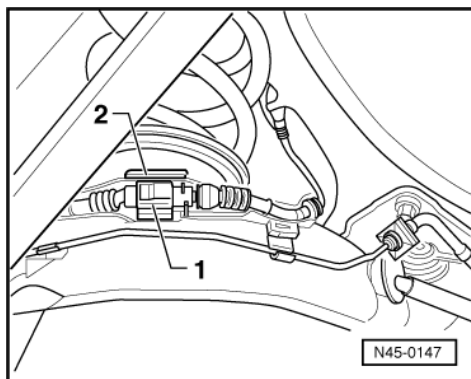
Exclusive use is to be made for wiring harness and connector repairs of repair set VAS 1978.

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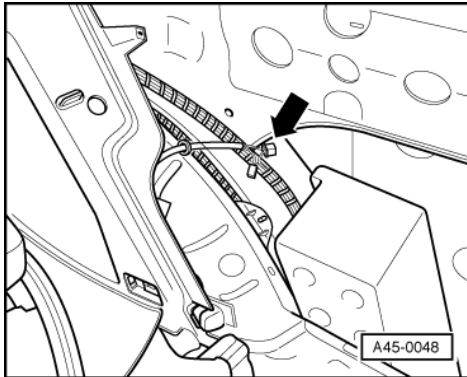
Special tools and workshop equipment required

- ♦ Wiring harness repair set VAS 1978



Removing

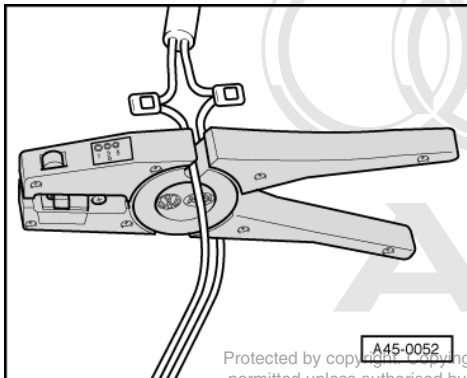
- -> Open cover -2- over speed sensor connector.
- Unplug connector -1-.



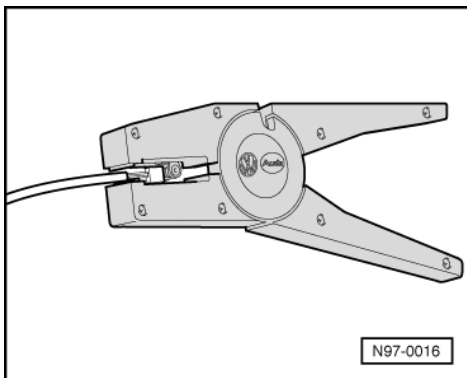
- Remove inner side trim/rear wheel housing trim.

=> General Body Repairs, Interior; Repair Group 70

- -> Pull insulating grommet -arrow- off wiring.



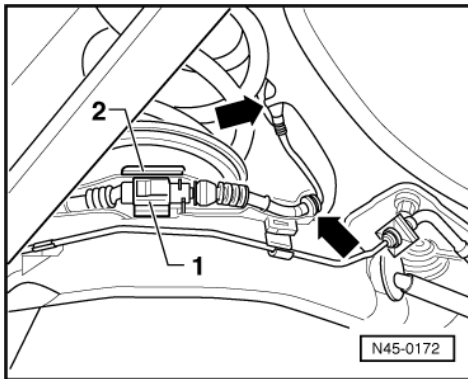
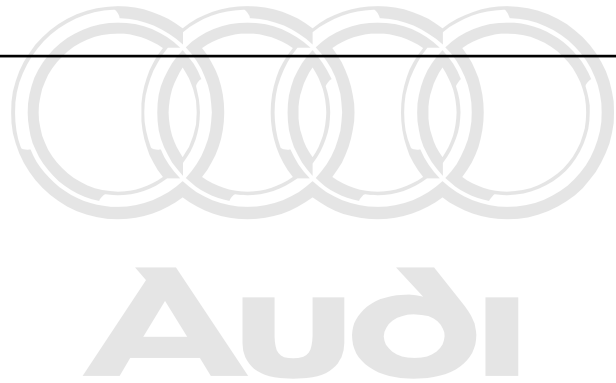
- -> Use stripping pliers VAS 1978/3 to sever speed sensor wire and take out defective section.



Installing

Install in reverse order, paying attention to the following:

- -> Strip 15 mm of insulation off end of wire with stripping pliers VAS 1978/3 and bend back bare part of wire over half its length.



- Fit new speed sensor wire.
- -> Clip in speed sensor wire -arrows-.

Note:

Take care to avoid twisting in wheel housing when fitting speed sensor wire.

- Plug in connector -1- and close cover -2-.
- If fitted, use stripping pliers to cut off twin connector at new speed sensor wire.
- Strip 15 mm of insulation off end of wire and bend back bare part of wire over half its length.
- Use suitable crimp connector from wiring harness repair set VAS 1978 to connect speed sensor wire.

Note:

The instructions supplied with the wiring harness repair set VAS 1978 do not normally permit repairs to the ABS system wiring. This does however only apply to the screened wiring in the system.

46 - Brakes, Brake mechanics

1 - Servicing front brake

1.1 - Servicing front brake

General

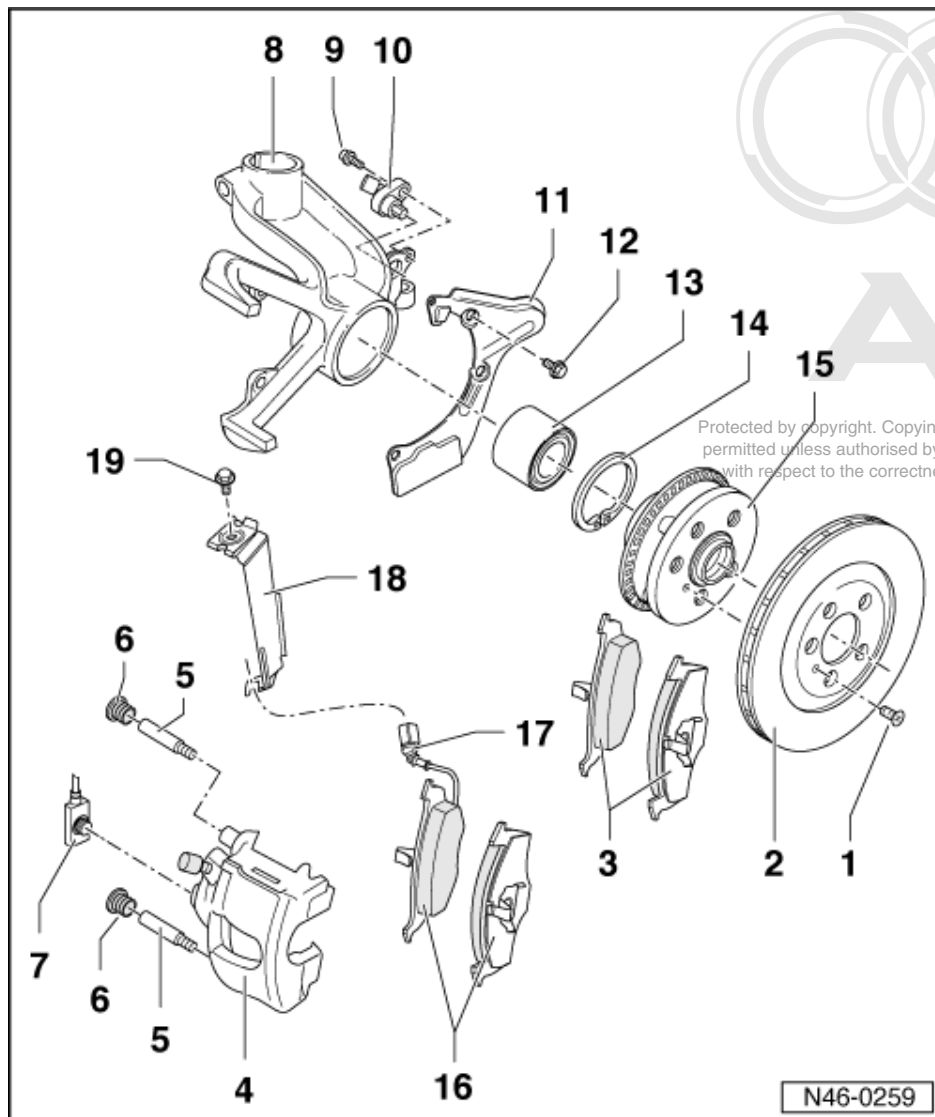
- ♦ Use brake filling and bleeding appliance VAS 5234 or extractor V.A.G 1869/4 to draw off brake fluid from brake fluid reservoir.
- ♦ Before removing brake caliper or disconnecting brake hose from brake caliper, insert brake pedal depressor V.A.G 1869/2 to stop brake fluid reservoir running empty.

Attention:
After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.



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1.2 - Exploded view of front brake FS 3

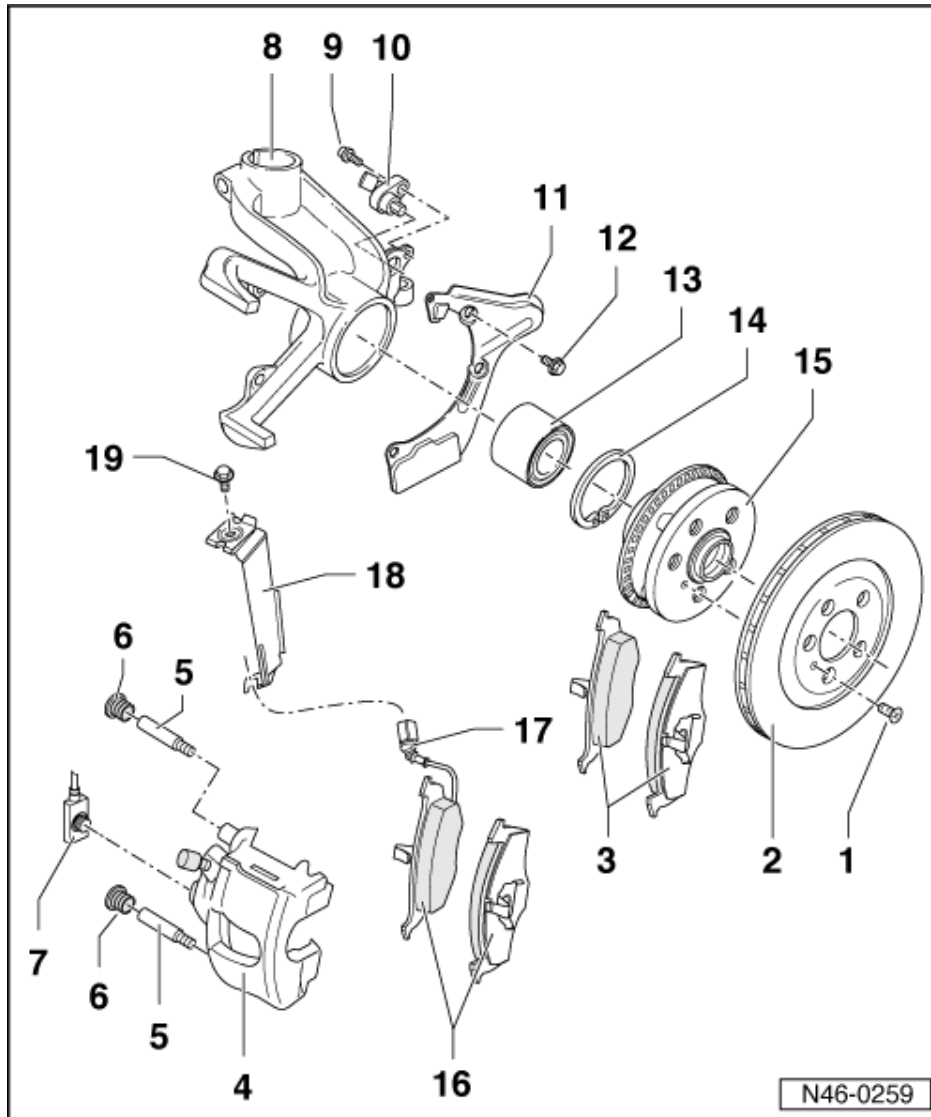


General information => Page **93**

1 Cross-head bolt, 4 Nm

2 Brake disc

- ◆ Assignment, dimensions, wear limit => Page **1** onwards
- ◆ Removal involves unscrewing brake caliper
- ◆ Do not force brake discs off wheel hub; use rust remover if necessary to avoid damaging brake discs
- ◆ Always replace on an axle basis



3 Brake pad

- ♦ Pad thickness, wear limit=>Page 00-4
- ♦ Different versions

=> Parts List

- ♦ Checking pad thickness

=> Maintenance

- ♦ Removing and installing=>Page 98
- ♦ Heed installation position => Fig. 1
- ♦ Always replace on an axle basis

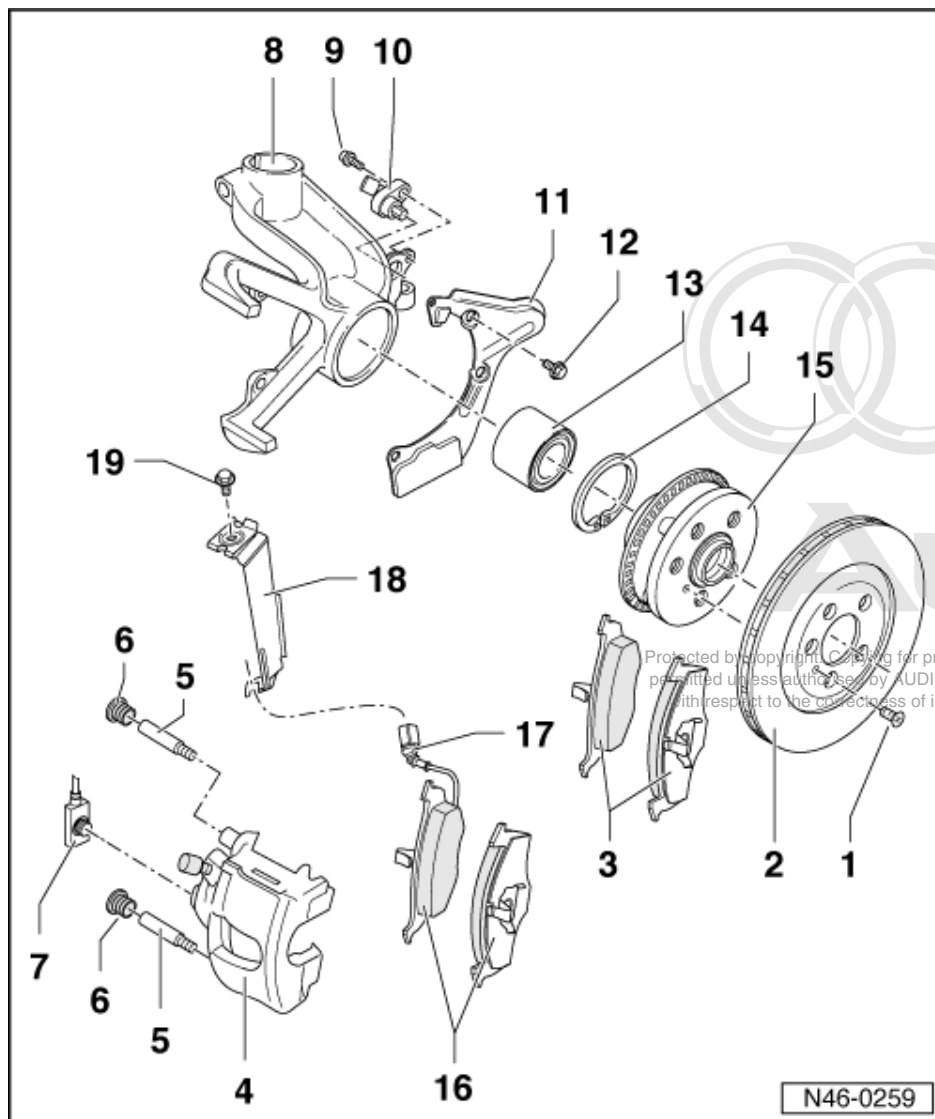
4 Brake caliper

- ♦ Piston diameter => Page 00-4
- ♦ Removing and installing=>Page 101
- ♦ Servicing => Page 149

5 Guide pin, 28 Nm

6 Cap

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7 Brake hose with banjo union and banjo bolt, 35 Nm

- ♦ Locating pin => Fig. 2

8 Wheel bearing housing

9 Hexagon socket-head bolt

- ♦ Tightening torque => Page 30

10 Speed sensor

- ♦ Removing and installing=>Page 32

11 Splash plate

12 Bolt, 10 Nm

13 Wheel bearing

- ♦ Removing and installing

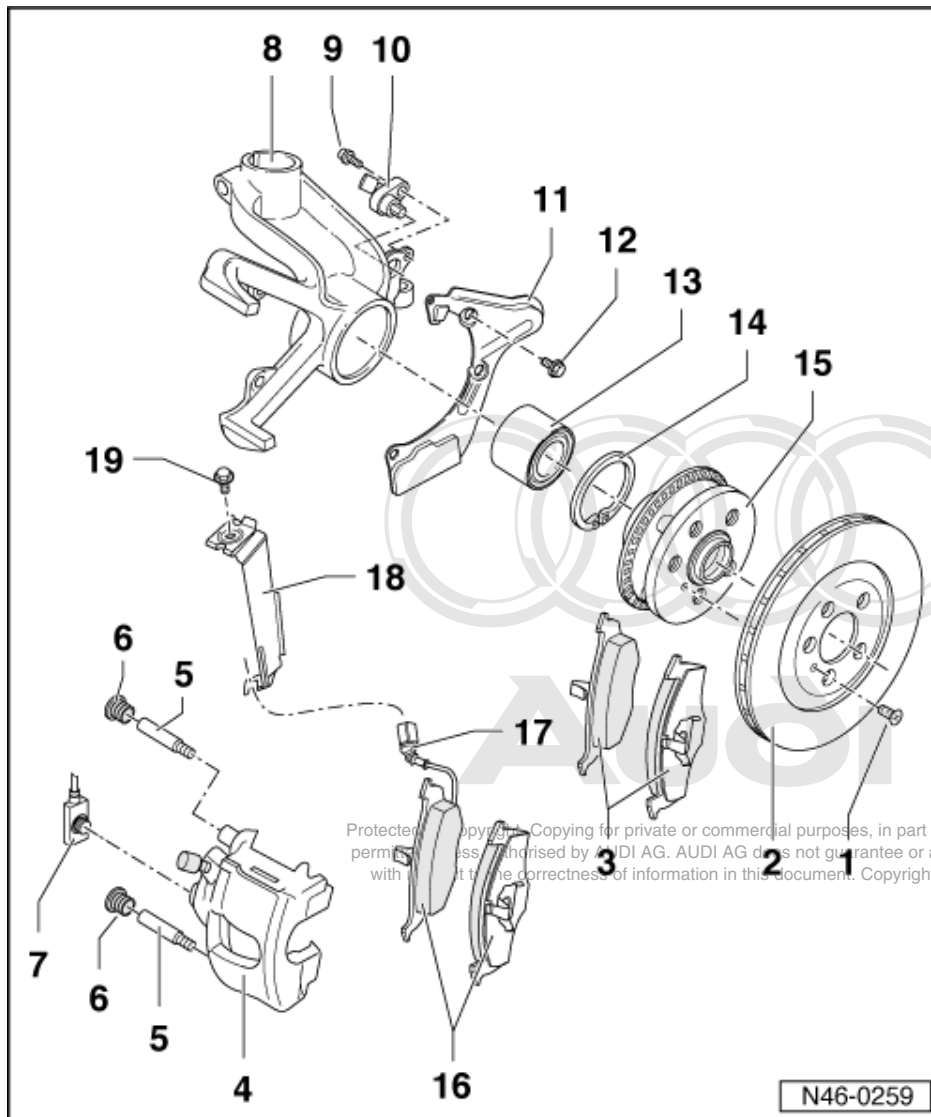
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

14 Circlip

15 Wheel hub with rotor

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing



16 Brake pad

- ♦ With wear indicator (left side only)
- Warning lamp in dash panel insert lights on reaching wear limit
- ♦ Pad thickness, wear limit=>Page 00-4
- ♦ Different versions

=> Parts List

- ♦ Checking pad thickness

=> Maintenance

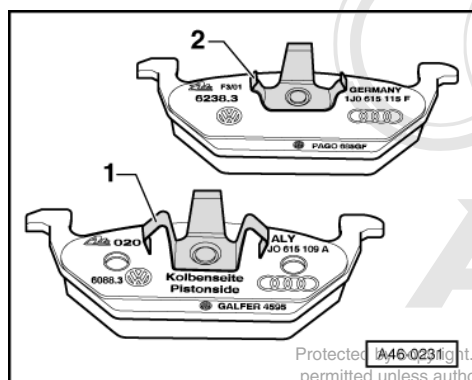
- ♦ Removing and installing=>Page 98
- ♦ Heed installation position => Fig. 1
- ♦ Always replace on an axle basis

17 Connector

- ♦ Take out of holder -item 18 - on replacing pad

18 Holder

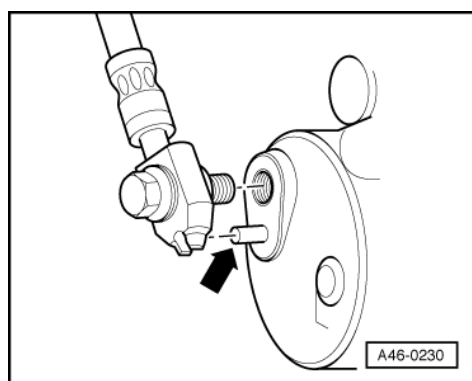
19 Self-tapping screw



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-> Fig.1 Installation position of brake pads

- Pad with large three-prong clip -1- facing piston end
- Pad with small three-prong clip -2- (black colour) facing outside of brake caliper



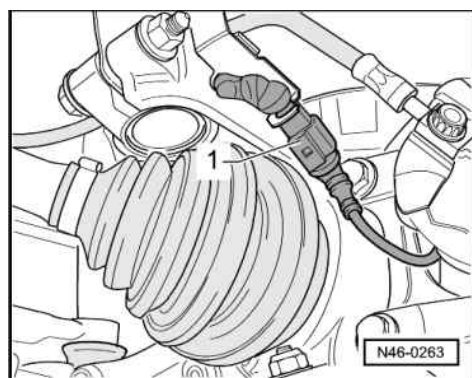
-> Fig.2 Brake hose connection with locating pin

- Make sure groove in banjo union of brake hose is inserted in locating lug -arrow-.

1.3 - Removing and installing brake pads - Front brake FS 3

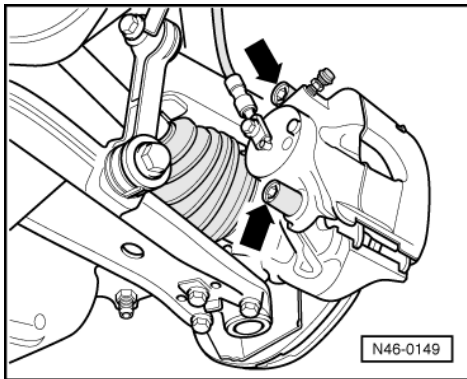
Special tools and workshop equipment required

- ♦ Piston resetting tool



Removing

- Unscrew both front wheels.
- -> Unplug connector -1- of brake pad wear indicator at left brake.



- Detach caps.
- -> Screw out guide pins -arrows-.
- Detach brake caliper and hang up with piece of wire.

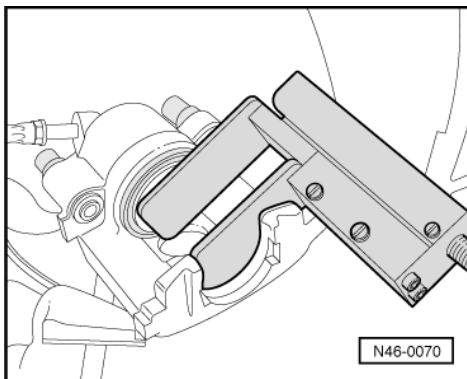
Note:

Brake hose/pipe is never to be twisted or kinked.

- Take out brake pads.

Note:

Mark brake pads on removal if they are to be re-used. Re-install in same position to prevent uneven braking.



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Installing

Install in reverse order, paying attention to the following:

- Clean brake caliper.

Only use white spirit to clean brake caliper housing.

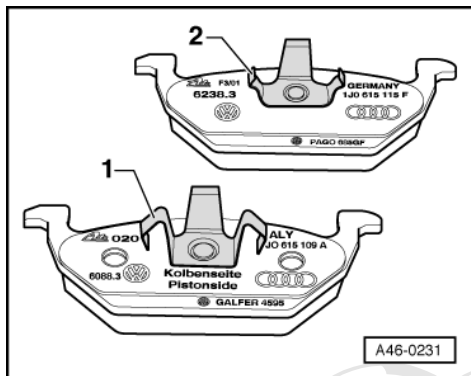
- -> Press back piston.

Note:

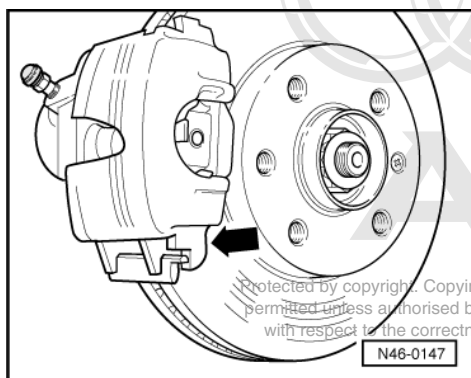
Prior to fitting new brake pads, use resetting tool to press piston into cylinder. Before pressing back, use bleeder bottle to draw off brake fluid from reservoir. If this is not done, brake fluid may escape and cause damage if fluid has been topped up in the meantime.

Attention:

Brake fluid is poisonous and is never to be sucked off by mouth with a hose.



- Insert brake pads, paying attention to installation position.
 - -> Pad with large three-prong clip -1- facing piston end
 - Pad with small three-prong clip -2- (black colour) facing outside of brake caliper



- -> Starting at bottom, attach brake caliper with brake pads to wheel bearing housing.
 - Pin -arrow- of brake caliper housing must be behind guide of wheel bearing housing

Attention:

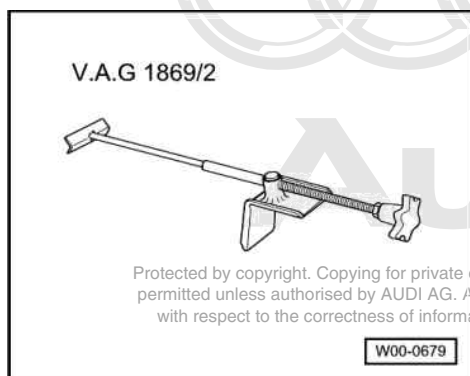
After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.

- Check brake fluid level and top up if necessary.

Tightening torque

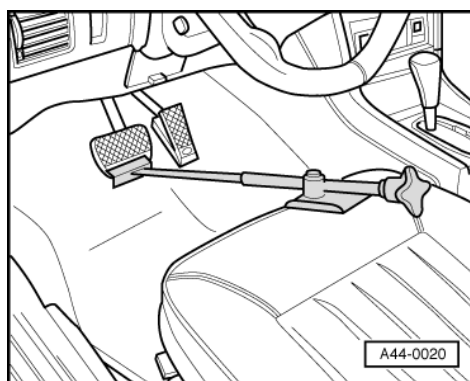
Component	Nm
Brake caliper to wheel bearing housing	28

1.4 - Removing and installing brake caliper - Front brake FS 3



Special tools and workshop equipment required

- ♦ Brake pedal depressor V.A.G 1869/2



Removing

- Remove brake pads => Page 98 .
- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.

Note:

This closes valves in brake master cylinder and stops brake fluid reservoir running empty.

- Connect hose of bleeder bottle to bleed screw of front brake caliper removed and rear brake caliper on same side of vehicle.
- Open bleed screws.
- Close rear bleed screw.
- Leave brake pedal depressor V.A.G 1869/2 in position.
- Unscrew brake hose from brake caliper.

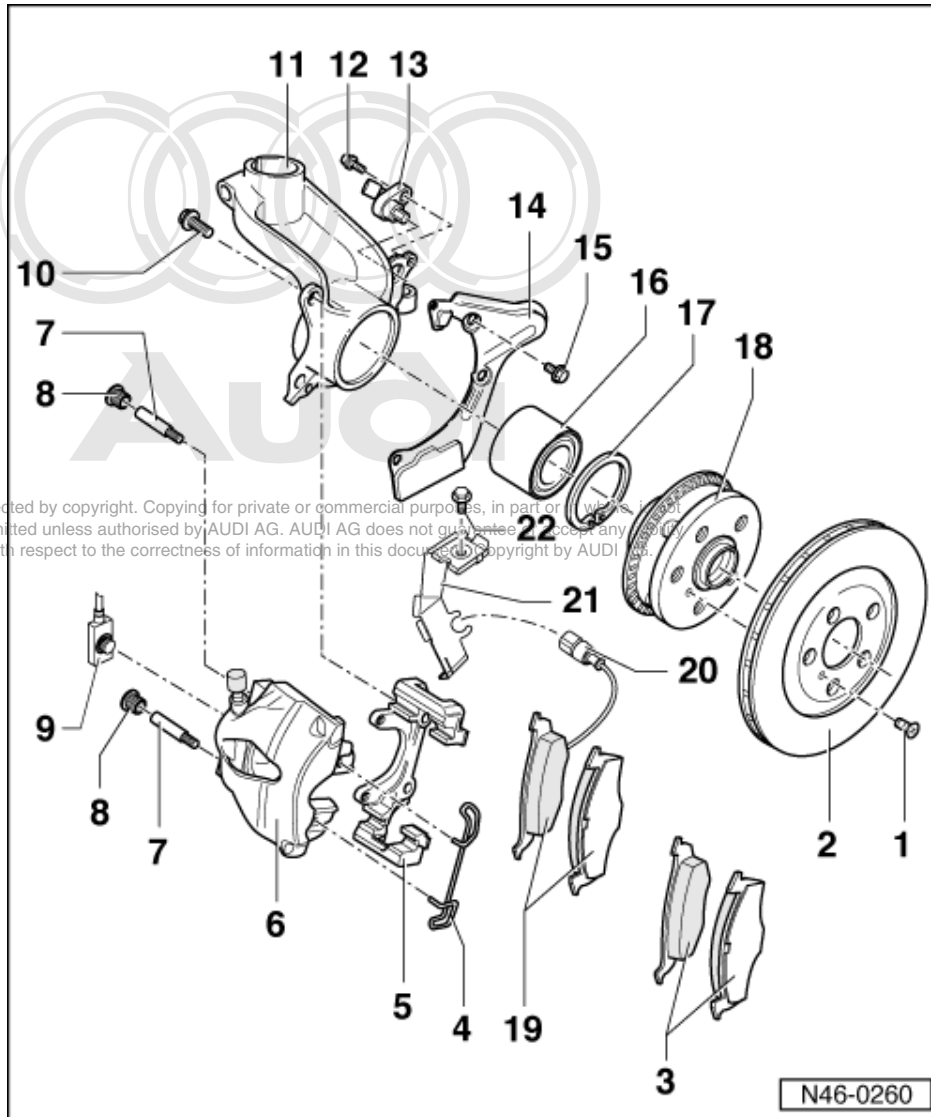
Installing

Install in reverse order, paying attention to the following:

- Fit brake pads => Page 99 .
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .

Tightening torque

Component	Nm
-----------	----



3 Brake pad

- ◆ Pad thickness, wear limit=>Page 00-4
- ◆ Different versions

=> Parts List

- ◆ Checking pad thickness

=> Maintenance

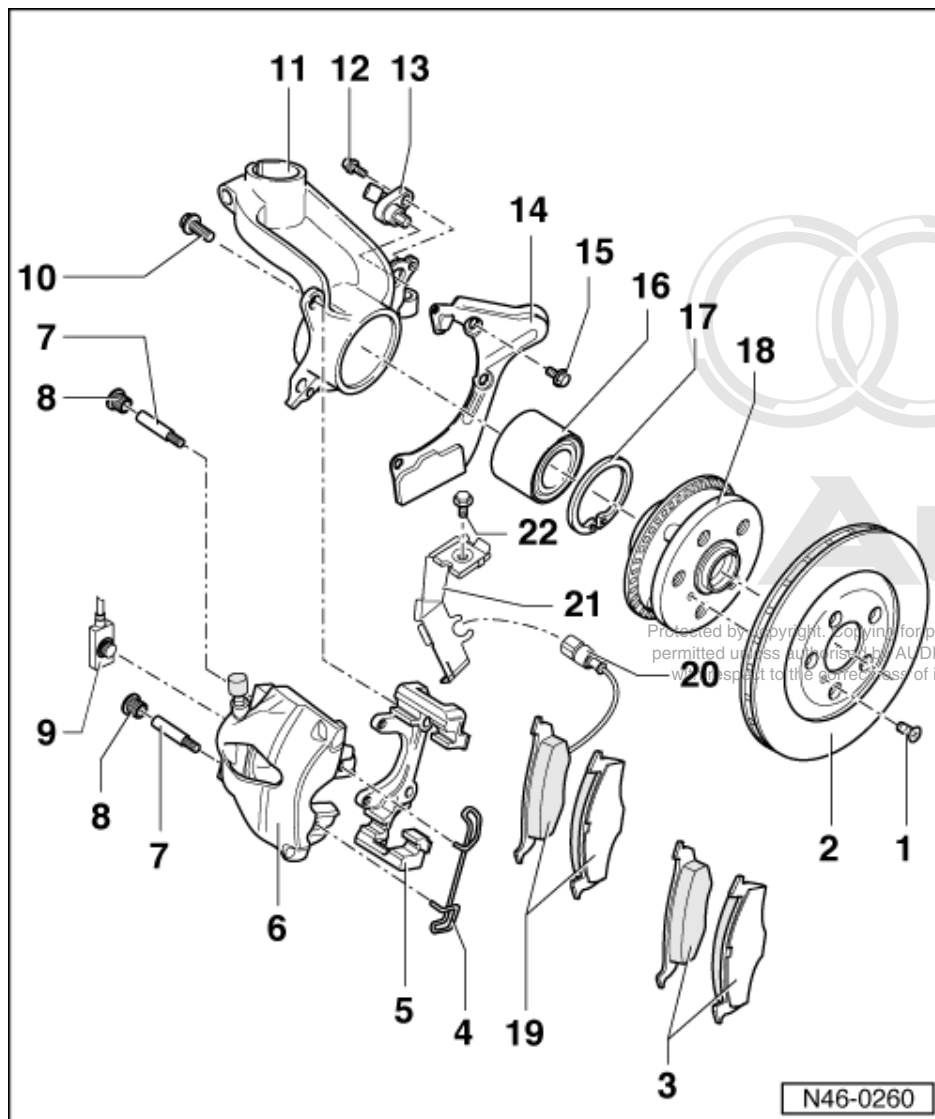
- ◆ Removing and installing=>Page 107
- ◆ Heed installation position => Fig. 1
- ◆ Always replace on an axle basis

4 Retaining spring

- ◆ Insert in both holes in brake caliper housing

5 Brake carrier

- ◆ Replacement carriers are supplied assembled and with sufficient grease at guide pins
- ◆ Fit repair set in the event of damage to protective caps; use grease pad provided to lubricate guide pins



6 Brake caliper housing

- ♦ Piston diameter => Page 00-4
- ♦ Different versions

=> Parts List

- ♦ Unscrew from brake carrier to replace brake pads
- ♦ Removing and installing=>Page **111**
- ♦ Servicing => Page **151**

7 Guide pin, 28 Nm

8 Cap

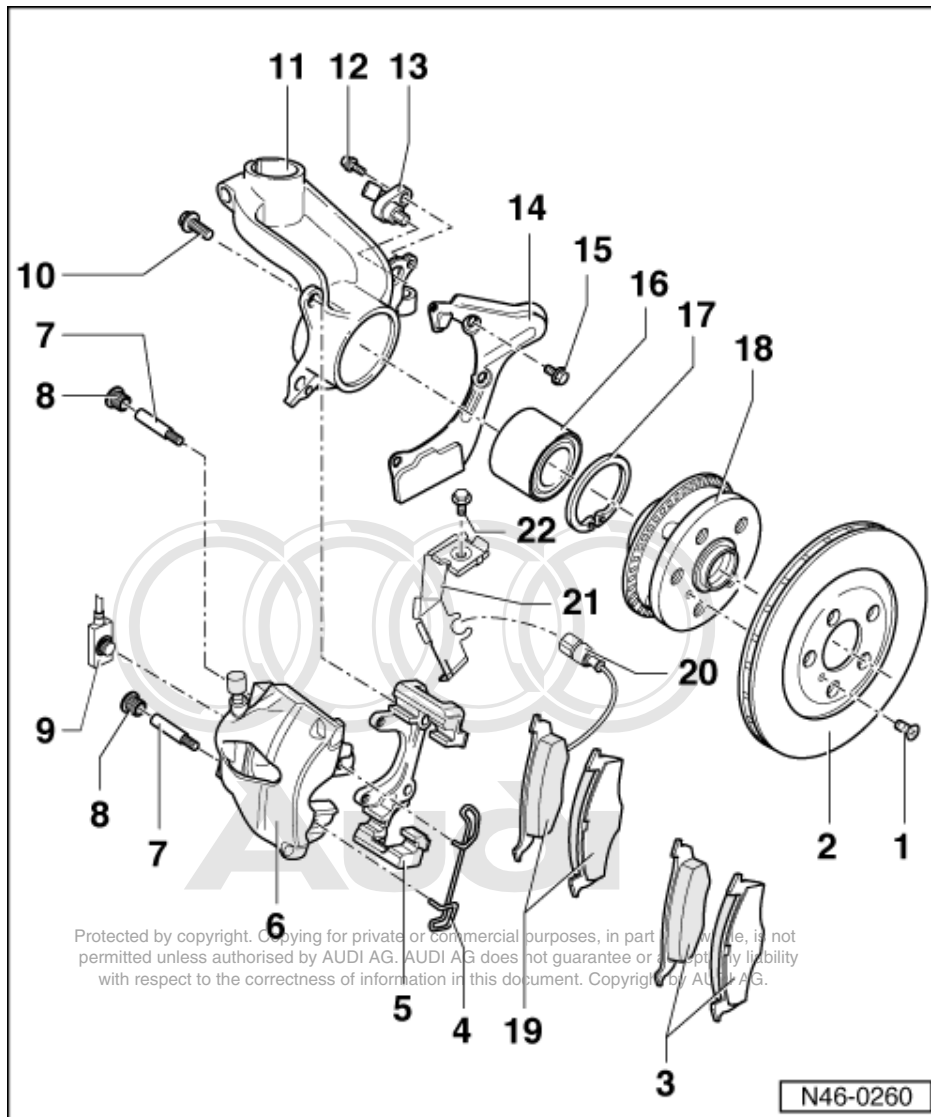
9 Brake hose with banjo union and banjo bolt, 35 Nm

- ♦ Locating pin => Fig. **2**

10 Ribbed bolt, 125 Nm

- ♦ Clean ribs if bolt is to be re-used

11 Wheel bearing housing



12 Hexagon socket-head bolt

- ♦ Tightening torque => Page 30

13 Speed sensor

- ♦ Removing and installing=>Page 32

14 Splash plate

15 Bolt, 10 Nm

16 Wheel bearing

- ♦ Removing and installing

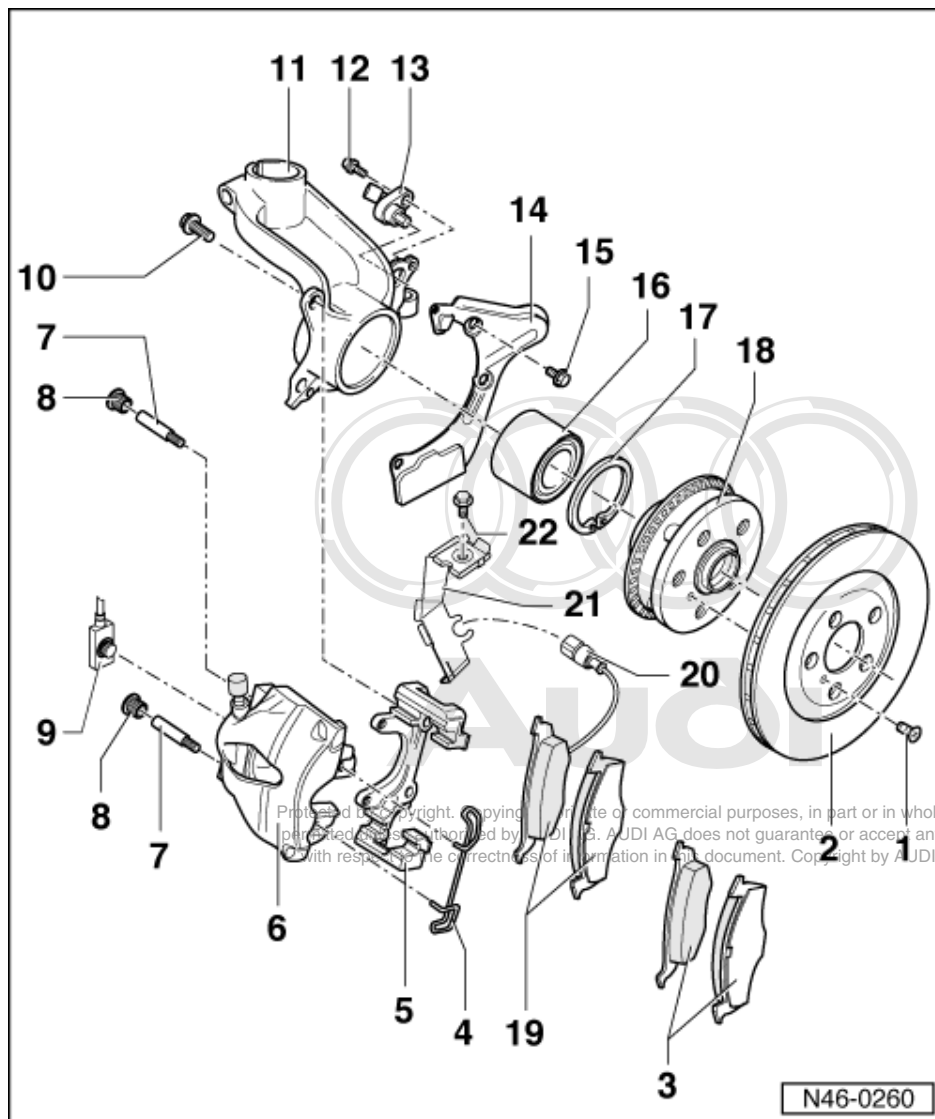
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing

17 Circlip

18 Wheel hub with rotor

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Wheel bearing housing Wheel bearing housing



19 Brake pad

- ♦ With wear indicator (left side only)
 - Warning lamp in dash panel insert lights on reaching wear limit
- ♦ Pad thickness, wear limit=>Page 00-4
- ♦ Different versions

=> Parts List

- ♦ Checking pad thickness

=> Maintenance

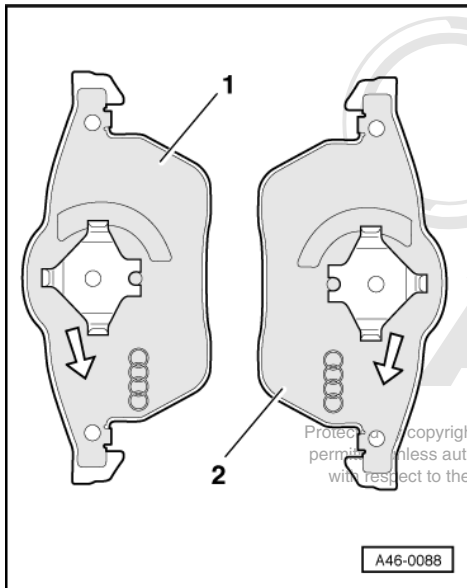
- ♦ Removing and installing=>Page 107
- ♦ Heed installation position => Fig. 1
- ♦ Always replace on an axle basis

20 Connector

- ♦ Take out of holder -item 21 - on replacing pad

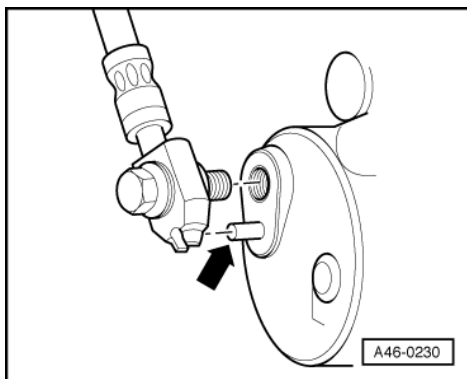
21 Holder

22 Self-tapping screw



-> Fig.1 Installation position of brake pads

- 1 - Right piston-end brake pad
- 2 - Left piston-end brake pad
- When installed, arrow on backplate of brake pad must face downwards.



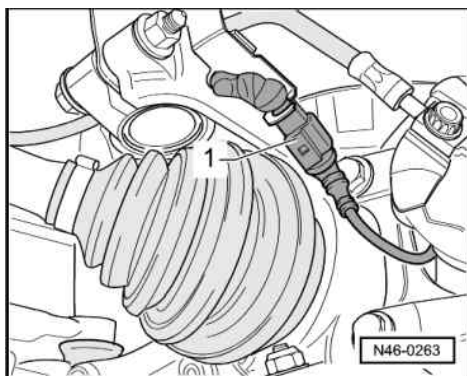
-> Fig.2 Brake hose connection with locating pin

- Make sure groove in banjo union of brake hose is inserted in locating lug -arrow-.

1.6 - Removing and installing brake pads - Front brake FN 3

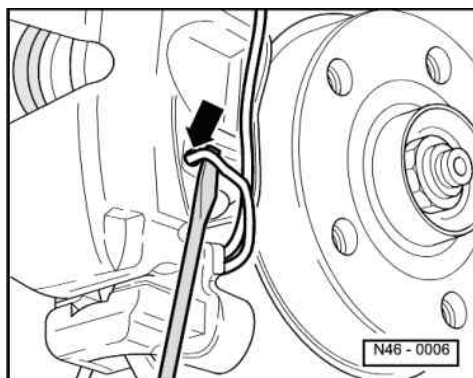
Special tools and workshop equipment required

- ♦ Piston resetting tool

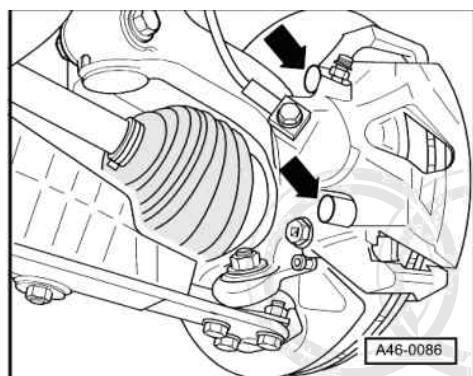


Removing

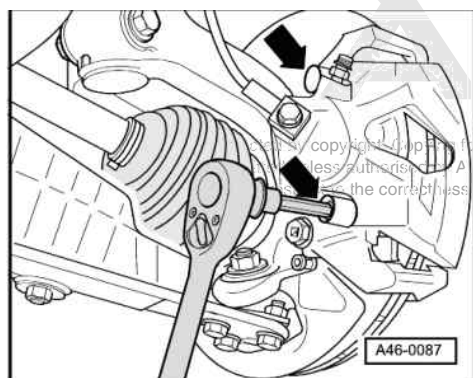
- Unscrew both front wheels.
- -> Unplug connector -1- of brake pad wear indicator at left brake.



- -> Use screwdriver to prise retaining springs for brake pads out of brake caliper housing -arrow- and detach.



- -> Detach caps -arrows-.



- -> Screw out guide pins -arrows-.
- Detach brake caliper and hang up with piece of wire.

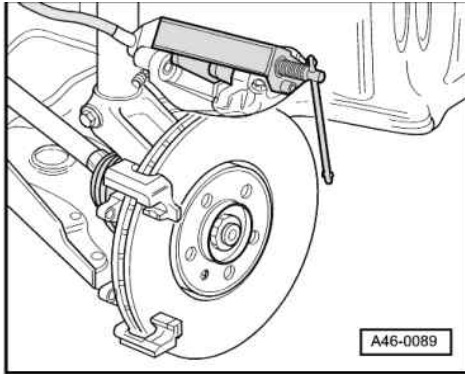
Note:

Brake hose/pipe is never to be twisted or kinked.

- Take brake pad out of brake caliper housing/detach from brake carrier.

Note:

Mark brake pads on removal if they are to be re-used. Re-install in same position to prevent uneven braking.



Installing

Install in reverse order, paying attention to the following:

- Clean brake caliper housing and in particular bonding surface for brake pad, which must be free from residual adhesive and grease.

Only use white spirit to clean brake caliper housing.

- -> Press back piston.

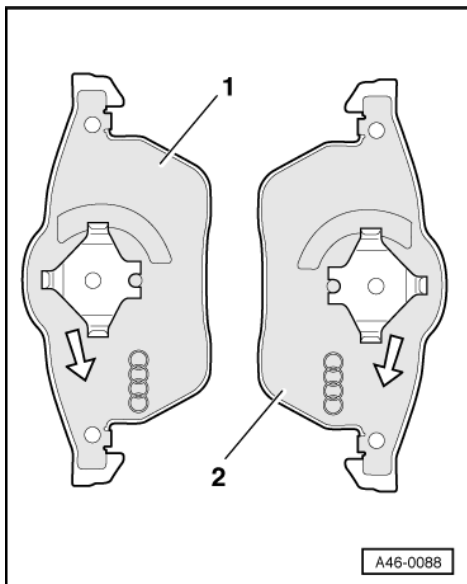
Note:

Prior to fitting new brake pads, use resetting tool to press piston into cylinder. Before pressing back, use bleeder bottle to draw off brake fluid from reservoir. If this is not done, brake fluid may escape and cause damage if fluid has been topped up in the meantime.

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Attention:

Brake fluid is poisonous and is never to be sucked off by mouth with a hose.

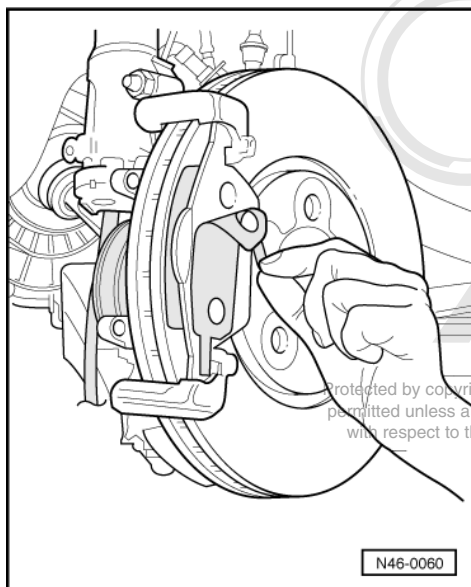


- Insert brake pads, paying attention to installation position.

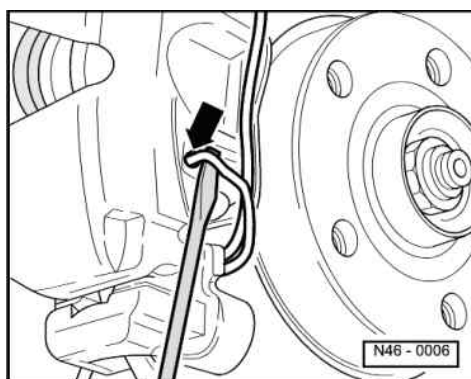
- 1 - -> Right piston-end brake pad
- 2 - Left piston-end brake pad



- When installed, arrow on backplate of brake pad must face downwards.



- Position outer brake pad on brake carrier.
- -> Pull protective sheeting off backplate of outer brake pad.



- -> Insert retaining spring -arrow- in brake caliper housing.

Attention:

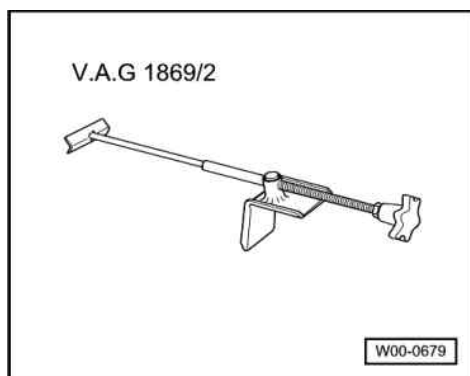
- ♦ After insertion in both holes, retaining spring must be pressed beneath brake carrier. Compensation for outer brake pad wear cannot be provided in the event of incorrect installation, thus increasing the pedal travel.
- ♦ After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.

- Check brake fluid level and top up if necessary.

Tightening torque

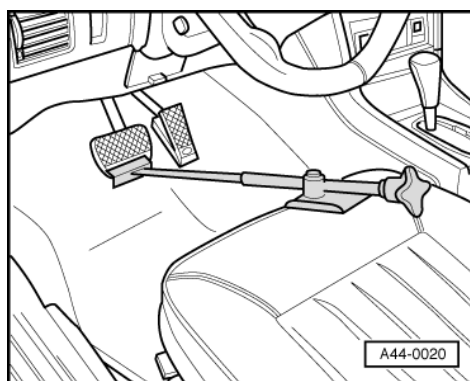
Component	Nm
Brake caliper housing to brake carrier	28

1.7 - Removing and installing brake caliper - Front brake FN 3



Special tools and workshop equipment required

- ◆ Brake pedal depressor V.A.G 1869/2



Removing

- Remove brake pads => Page 107 .
- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.

Note:

This closes valves in brake master cylinder and stops brake fluid reservoir running empty.

- Connect hose of bleeder bottle to bleed screw of front brake caliper removed and rear brake caliper on same side of vehicle.
- Open bleed screws.
- Close rear bleed screw.
- Leave brake pedal depressor V.A.G 1869/2 in position.
- Unscrew brake hose from brake caliper.

Installing

Install in reverse order, paying attention to the following:

- Fit brake pads => Page 109 .
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .

Tightening torque

Component	Nm
-----------	----



Brake hose to brake caliper	35
-----------------------------	----

2 - Servicing rear brake

2.1 - Servicing rear brake

General

- ♦ Use brake filling and bleeding appliance VAS 5234 or extractor V.A.G 1869/4 to draw off brake fluid from brake fluid reservoir.
- ♦ Before removing brake caliper or disconnecting brake hose from brake caliper, insert brake pedal depressor V.A.G 1869/2 to stop brake fluid reservoir running empty.

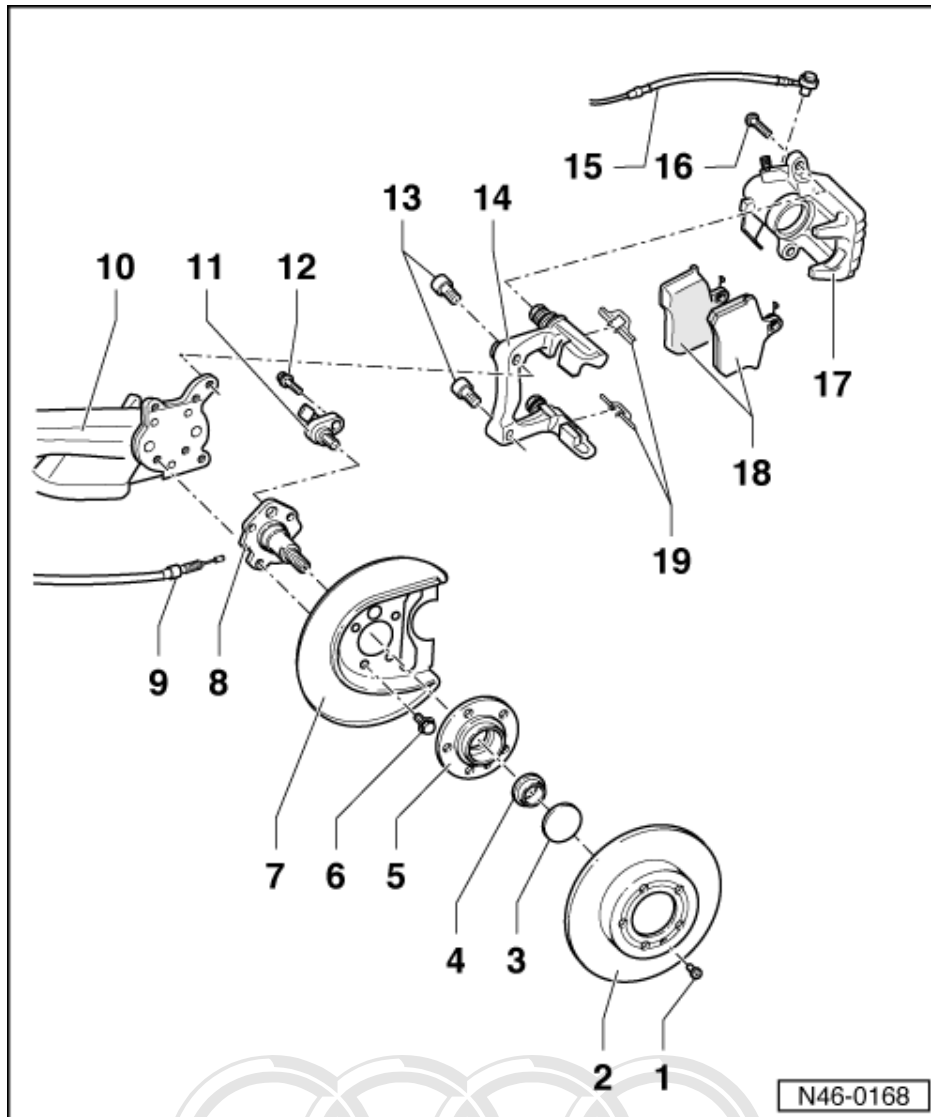
Attention:

After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.



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2.2 - Exploded view of rear brake for front-wheel drive vehicles



General information => Page **112**

1 Cross-head bolt, 4 Nm

2 Brake disc

- ♦ Assignment, dimensions, wear limit => Page **1** onwards
- ♦ Do not force brake discs off wheel hub; use rust remover if necessary to avoid damaging brake discs
- ♦ Always replace on an axle basis

3 Grease cap

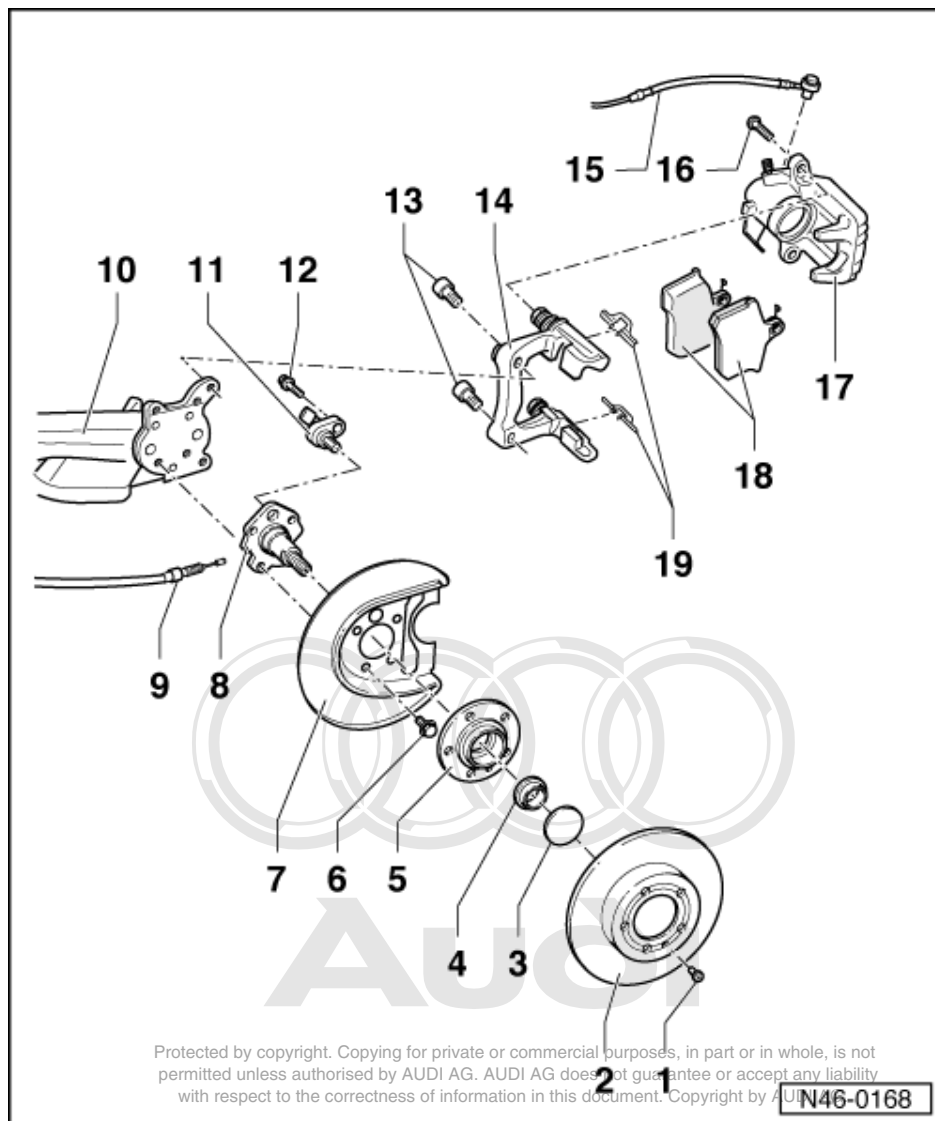
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

4 Twelve-point nut

- ♦ Tightening torque

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42



5 Wheel hub with wheel bearing and rotor

- ♦ Replace only as complete assembly
- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

6 Bolt, 60 Nm

7 Splash plate

8 Stub axle

9 Handbrake cable

- ♦ Removing and installing=>Page 132
- ♦ Adjusting handbrake => Page 136

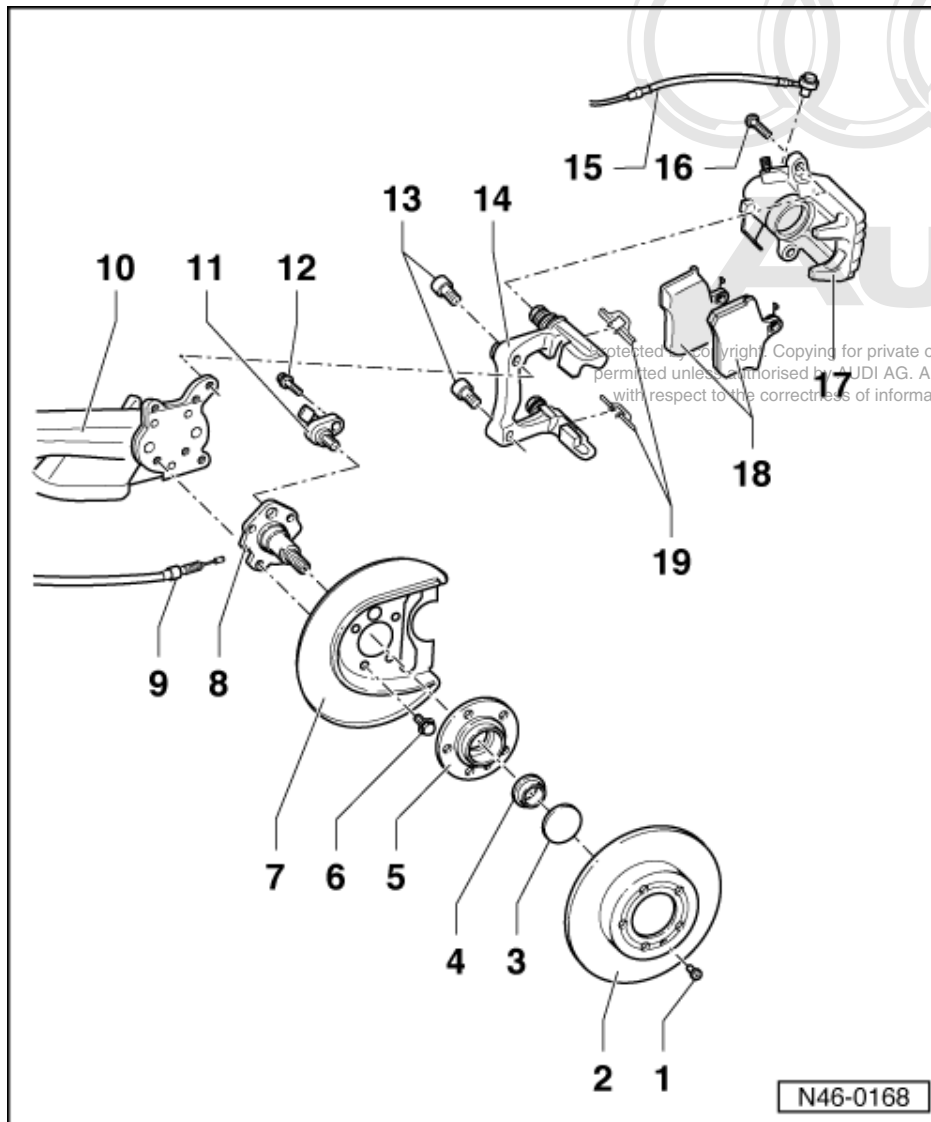
10 Axle beam

11 Speed sensor

- ♦ Removing and installing=>Page 83

12 Hexagon socket-head bolt

- ♦ Tightening torque => Page 83



13 Hexagon socket-head bolt - 65Nm

14 Brake carrier

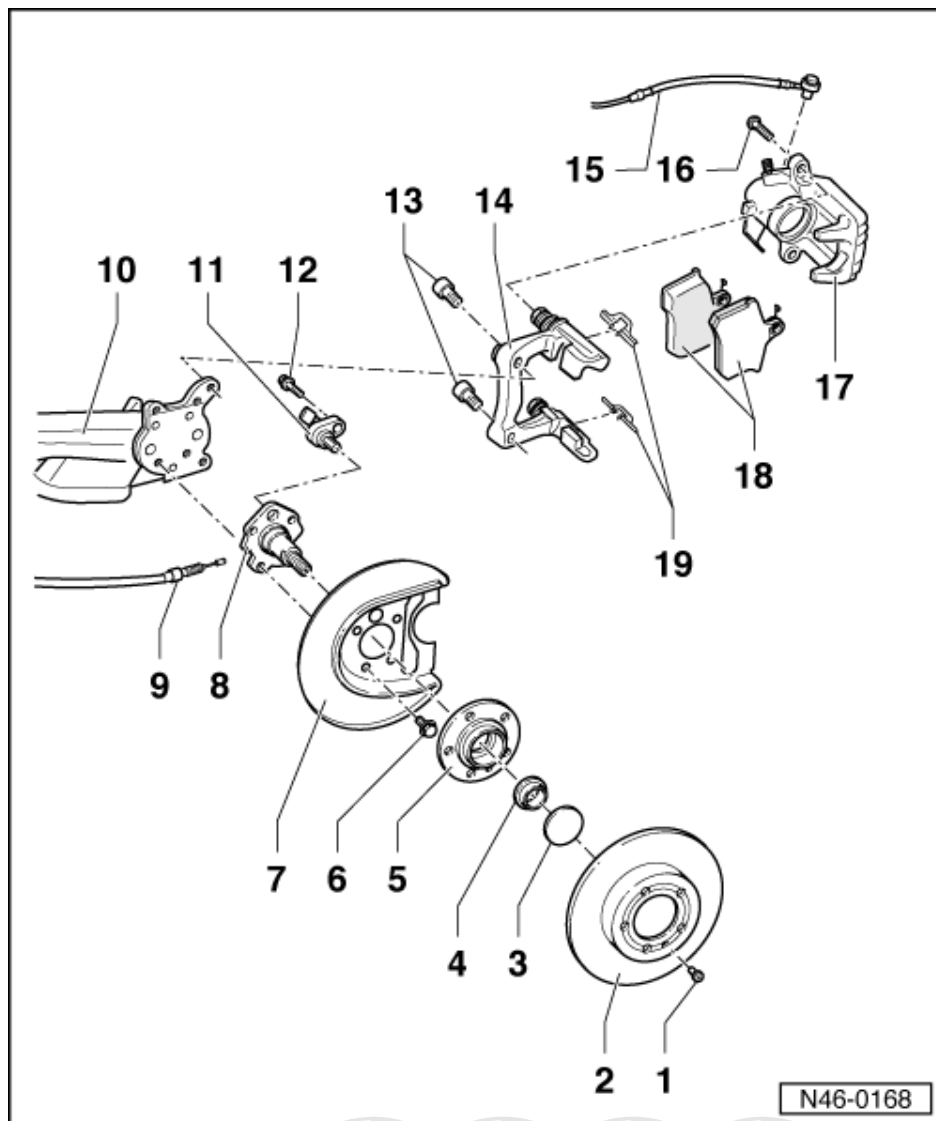
- ◆ With guide pin and protective cap
- ◆ Replacement carriers are supplied assembled and with sufficient grease at guide pins
- ◆ Fit repair set in the event of damage to protective caps; use grease pad provided to lubricate guide pins

15 Brake hose/brake pipe

- ◆ With banjo bolt and sealing rings
- ◆ Replace after slackening off banjo bolt
- ◆ Tighten banjo bolt to 38 Nm

16 Bolt, 35 Nm

- ◆ Self-locking
- ◆ Support at guide pin when slackening off and tightening
- ◆ Always replace after removing

**17 Brake caliper housing**

- ◆ Piston diameter => Page 2
- ◆ Removing and installing=>Page 119
- ◆ Servicing => Page 155
- ◆ After servicing or replacement start by adjusting handbrake cable => Page 136

18 Brake pad

- ◆ Pad thickness, wear limit=>Page 2
- ◆ Checking pad thickness

=> Maintenance

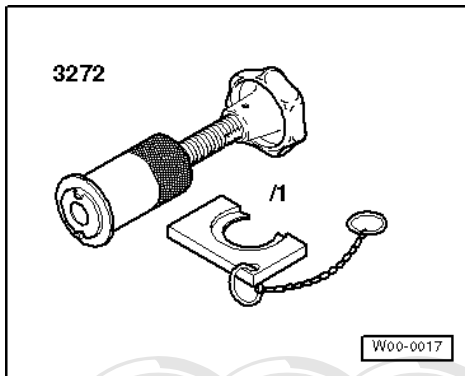
- ◆ Removing and installing=>Page 117
- ◆ Always replace on an axle basis

19 Pad retaining spring

- ◆ Always replace together with pad

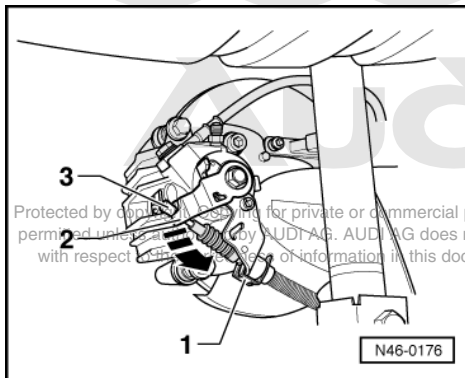
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2.3 - Removing and installing brake pads - front-wheel drive vehicles



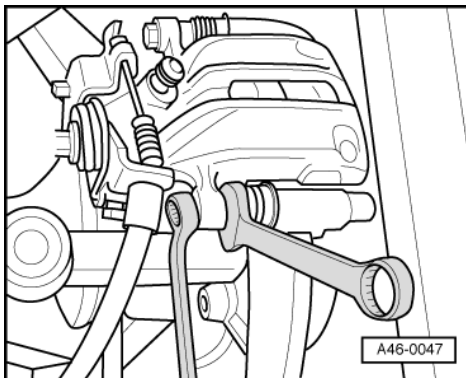
Special tools and workshop equipment required

- ◆ Resetting and extracting tool 3272



Removing

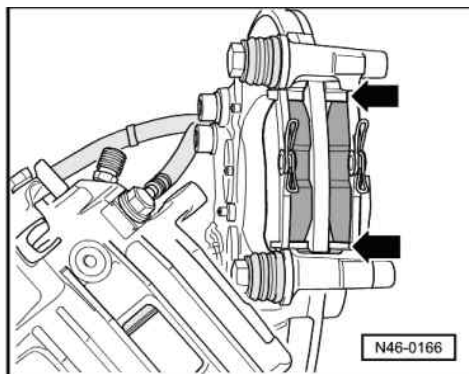
- Remove wheels.
- -> Prise off locking element -1- for handbrake cable.
- Press brake lever -2- in direction of arrow and disengage handbrake cable -3-.



- -> Provide support at guide pin and detach brake caliper housing.
- Tie up brake caliper housing with a piece of wire.

Note:

Brake hose/pipe is never to be twisted or kinked.



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

Note:

Mark brake pads on removal if they are to be re-used. Re-install in same position to prevent uneven braking.

Installing

Install in reverse order, paying attention to the following:

- Clean brake caliper housing and in particular bonding surface for brake pad, which must be free from residual adhesive and grease.

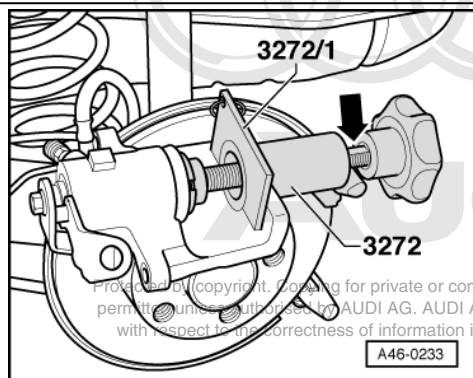
Only use white spirit to clean brake caliper housing.

Note:

Before resetting pistons, extract small quantity of brake fluid from reservoir. To do so, make use of bleeder bottle or plastic bottle kept specially for this purpose.

Attention:

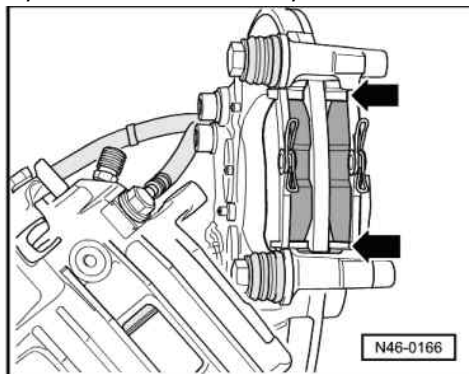
Brake fluid is poisonous and is never to be sucked off by mouth with a hose.



- -> Apply special tool 3272 with 3272/1 to piston of brake caliper housing.
- Screw in piston by turning knurled wheel of special tool 3272 clockwise (take care not to damage protective cap).

Note:

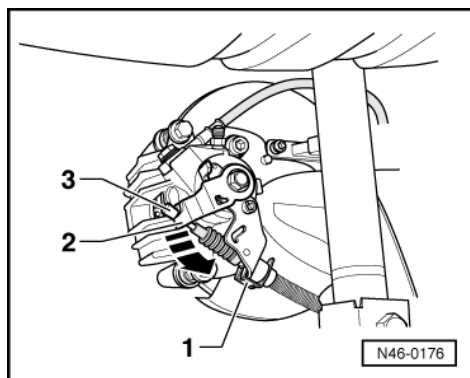
If piston is stiff, 13 mm open-ended wrench can be applied at appropriate flats -arrow-.



- -> Insert pad retaining springs -arrows- and brake pads in brake carrier.
- Pull protective sheeting off backplate of brake pad.
- Use new self-locking bolts to secure brake caliper housing.

Note:

The repair set contains four self-locking hexagon bolts, which are always to be fitted.



- -> Press brake lever -2- in direction of arrow and engage handbrake cable -3-.
- Press on locking element -1- for handbrake cable.

Attention:

After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.

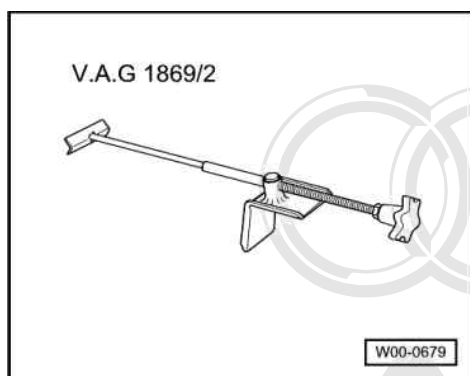
- Check brake fluid level and top up if necessary.

Tightening torques

Component	Nm
Brake caliper housing to brake carrier	35 1)

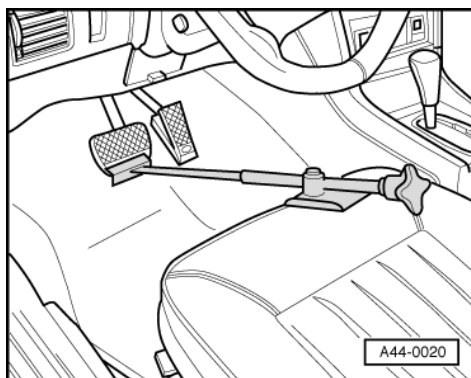
- 1) Replace bolts

2.4 - Removing and installing brake caliper - front-wheel drive vehicles



Special tools and workshop equipment required

- ♦ Brake pedal depressor V.A.G 1869/2
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Removing

- Remove brake pads => Page 117 .
- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.

Note:

This closes valves in brake master cylinder and stops brake fluid reservoir running empty.

- Connect hose of bleeder bottle to bleed screw of rear brake caliper removed and front brake caliper on same side of vehicle.
- Open bleed screws.
- Close front bleed screw.
- Leave brake pedal depressor V.A.G 1869/2 in position.
- Unscrew brake hose from brake caliper.

Installing

Install in reverse order, paying attention to the following:

- Fit brake pads => Page 118 .
- After fitting serviced or new brake caliper, adjust handbrake => Page 136 . Do not press foot brake until handbrake has been adjusted.
- Bleed brake system: ABS/ESP Mark 20 => Page 167 .

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Tightening torque

Component	Nm
Brake hose to brake caliper	38 1)

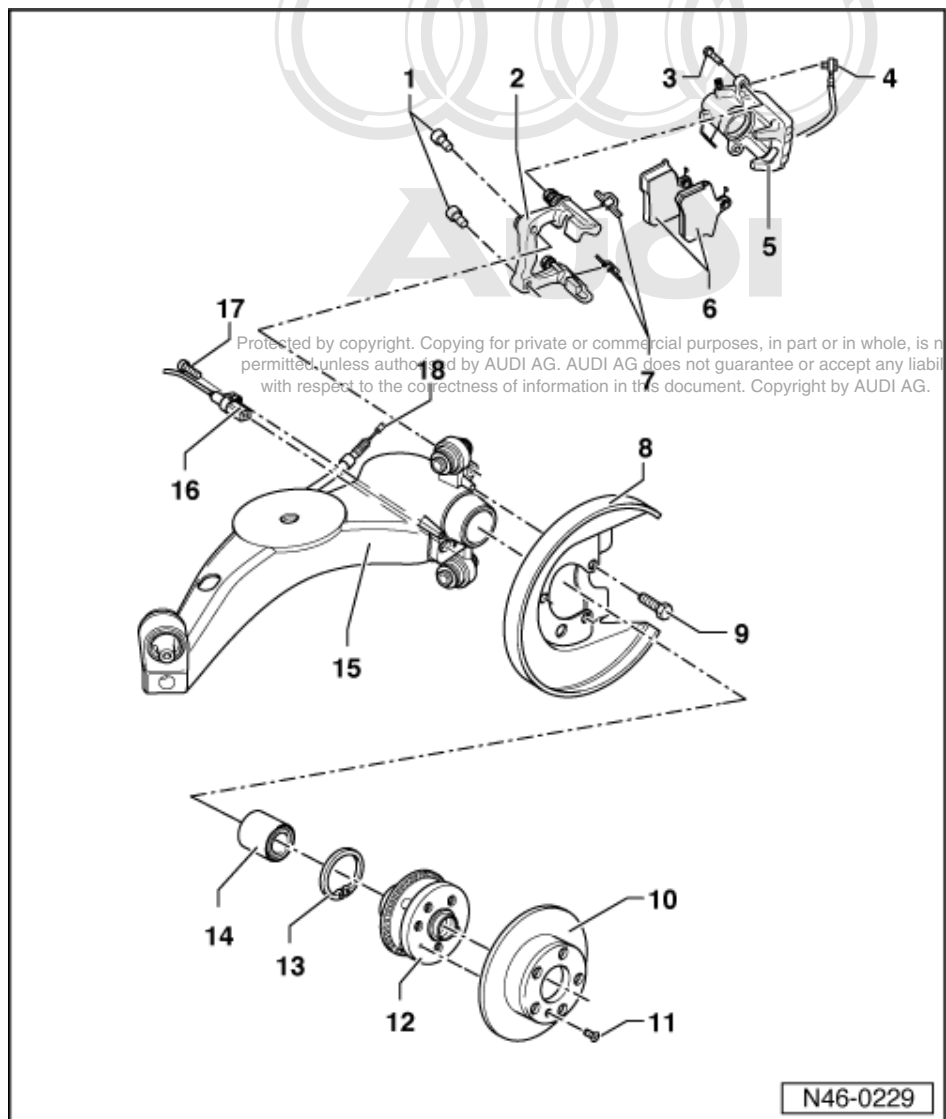
- 1) Replace brake hose/brake pipe with banjo bolt whenever banjo bolt has been slackened off

This exploded view diagram illustrates the assembly of a rear wheel hub and brake system. The components are numbered as follows:

- 1:** Two pins for the upper suspension bracket.
- 2:** Upper suspension bracket.
- 3:** Upper ball joint.
- 4:** Upper ball joint pin.
- 5:** Brake master cylinder.
- 6:** Brake master cylinder bracket.
- 7:** Lower suspension bracket.
- 8:** Wheel rim.
- 9:** Wheel hub nut.
- 10:** Wheel hub flange.
- 11:** Wheel hub mounting pins.
- 12:** Brake drum.
- 13:** Brake drum flange.
- 14:** Brake drum pin.
- 15:** Lower control arm.
- 16:** Lower control arm pin.
- 17:** Lower control arm bushing.
- 18:** Lower control arm pin.

The diagram shows the spatial relationship between these parts, with dashed lines indicating the assembly path. The wheel hub (10) is mounted to the axle (12) using the hub nut (9) and pins (11). The brake drum (12) is attached to the hub flange (13) with the pin (14). The lower control arm (15) is connected to the chassis via pins (16, 17, 18) and the upper suspension bracket (2).

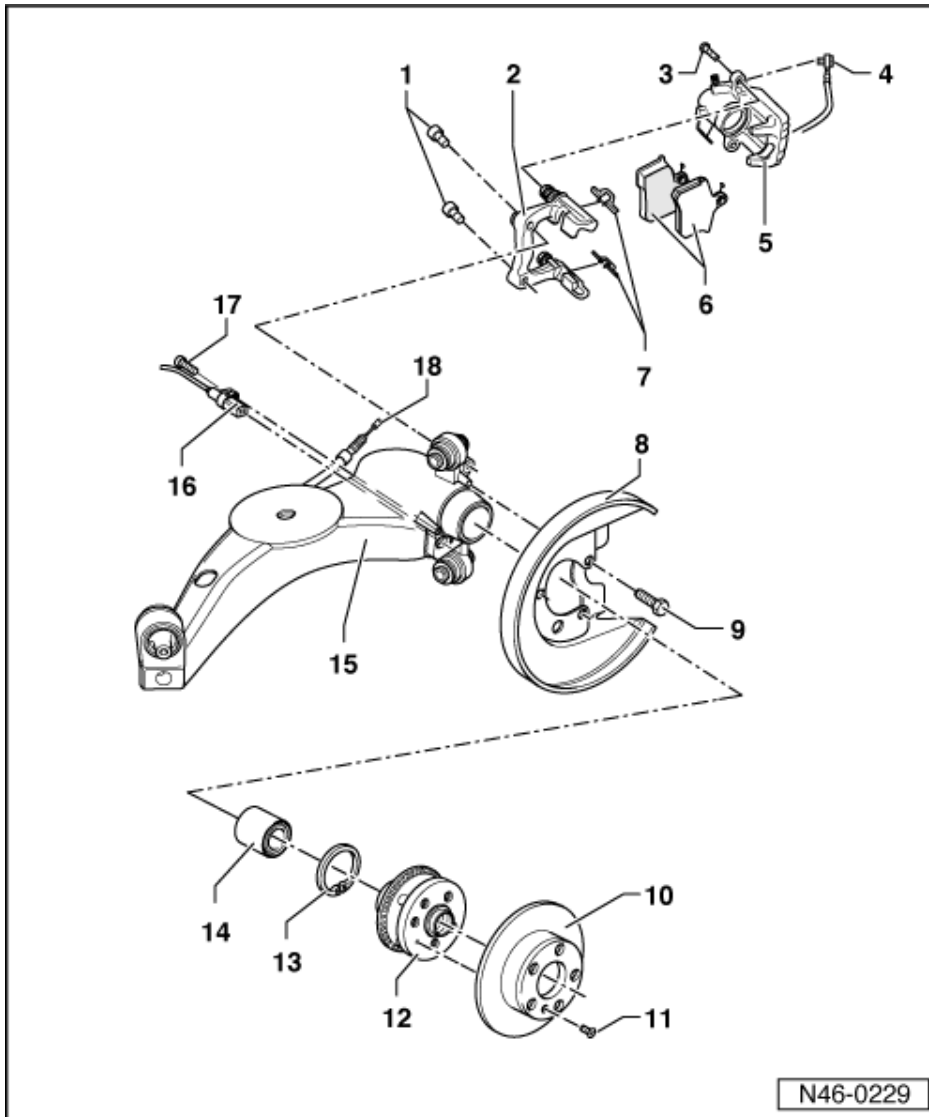
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- ◆ With banjo bolt and sealing rings
- ◆ Replace angle piece with banjo bolt after slackening off banjo bolt
- ◆ Tighten banjo bolt to 38 Nm

- ◆ Piston diameter => Page 2
- ◆ Different versions

- ◆ Removing and installing=>Page 128
- ◆ Servicing => Page 155
- ◆ After servicing or replacement start by adjusting handbrake cable => Page 136



6 Brake pad

- ♦ Pad thickness, wear limit=>Page 2
- ♦ Different versions

=> Parts List

- ♦ Checking pad thickness

=> Maintenance

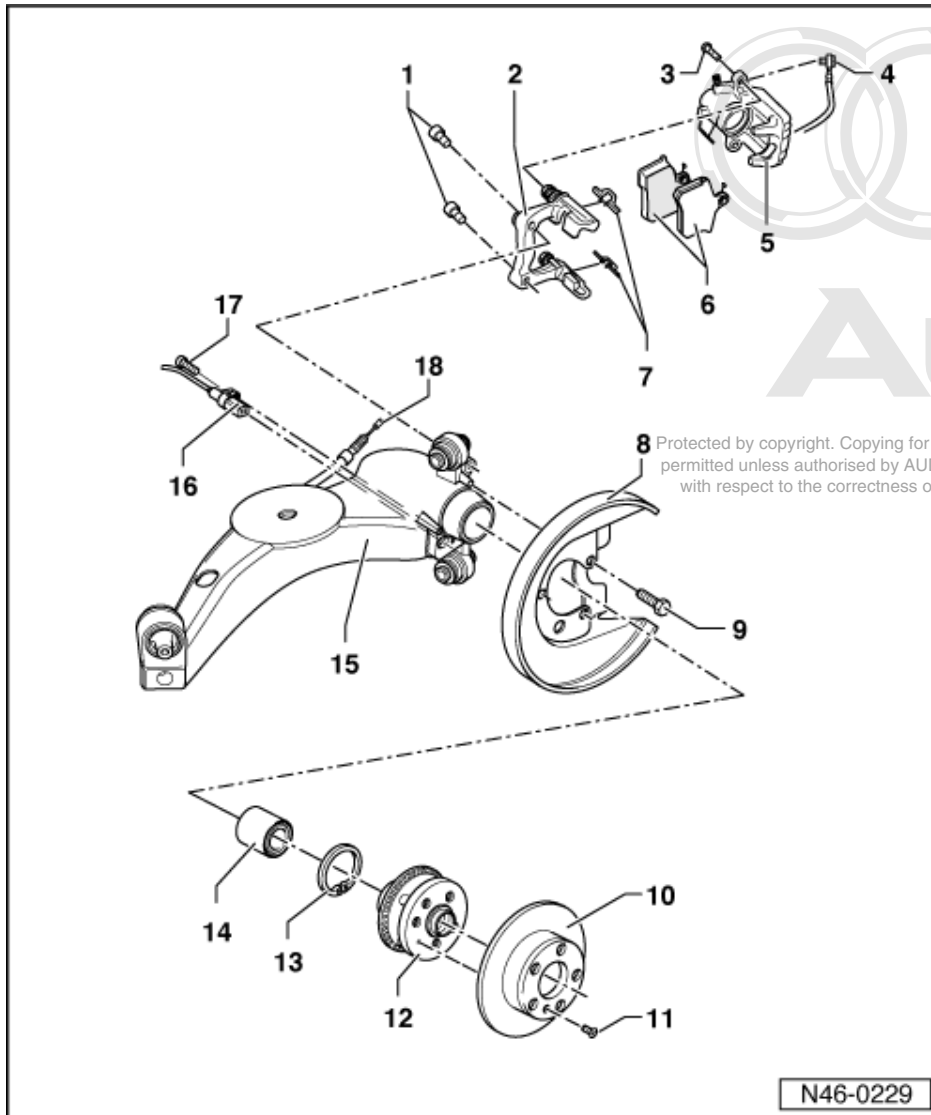
- ♦ Removing and installing=>Page 126
- ♦ Always replace on an axle basis

7 Pad retaining spring

- ♦ Always replace together with pad

8 Splash plate

9 Bolt, 10 Nm



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10 Brake disc

- ◆ Assignment, dimensions, wear limit => Page 1 onwards
- ◆ Different versions

=> Parts List

- ◆ Do not force brake discs off wheel hub; use rust remover if necessary to avoid damaging brake discs
- ◆ Always replace on an axle basis

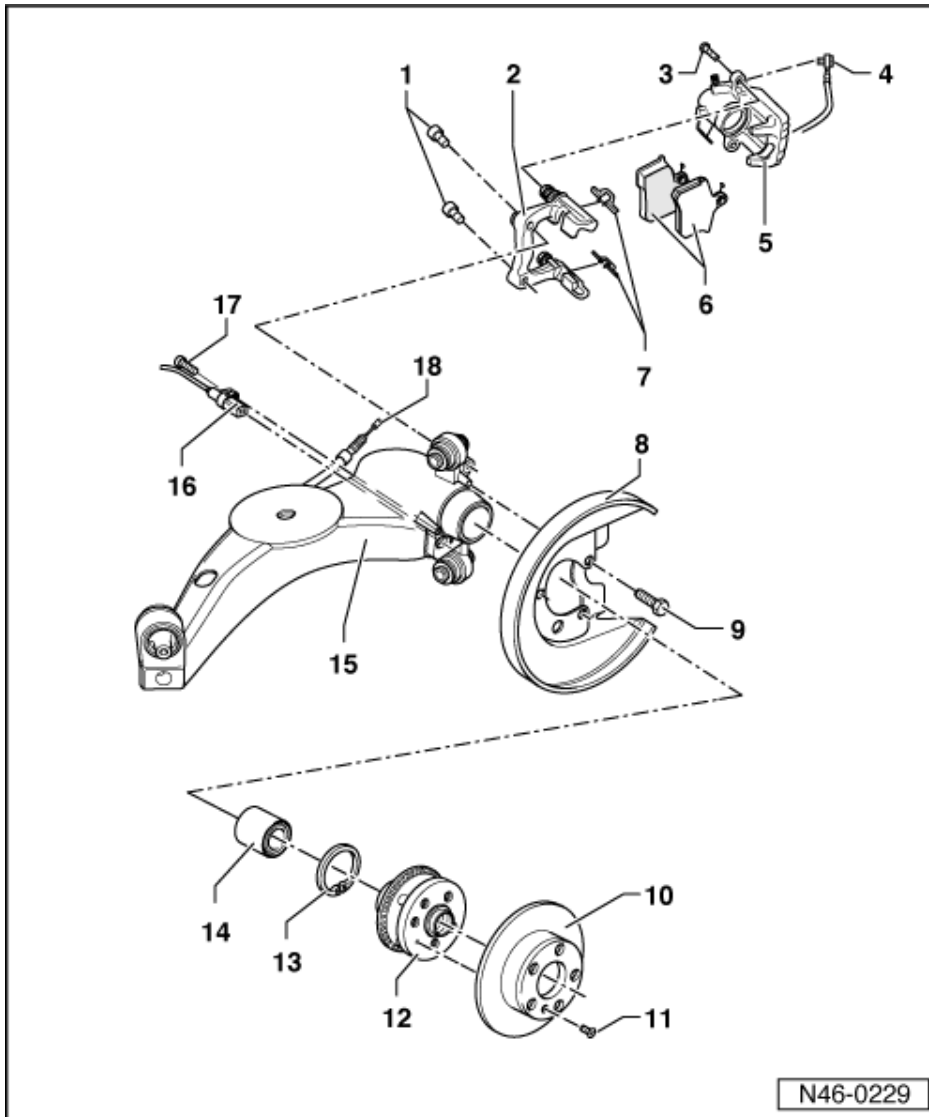
11 Cross-head bolt, 4 Nm

12 Wheel hub with rotor

- ◆ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

13 Circlip



14 Wheel bearing

- ♦ Removing and installing

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42

15 Trailing arm

16 Speed sensor

- ♦ Removing and installing=>Page 89

17 Hexagon socket-head bolt

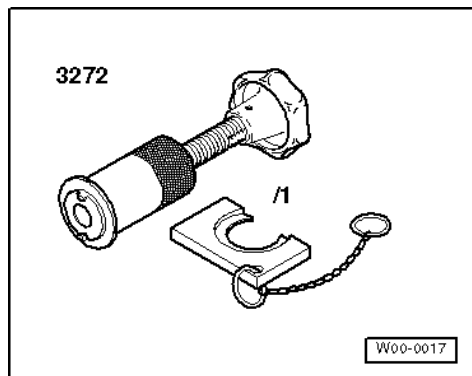
- ♦ Tightening torque => Page 45-58 or 89

18 Handbrake cable

- ♦ Removing and installing=>Page 134
- ♦ Adjusting handbrake => Page 136

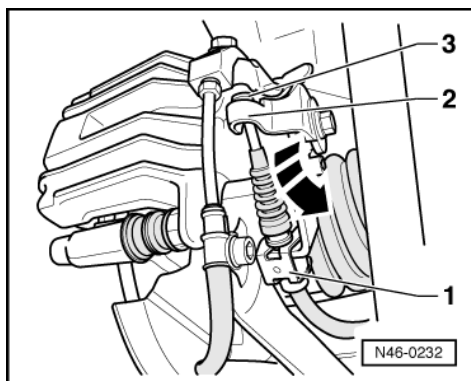
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2.6 - Removing and installing brake pads - four-wheel drive vehicles



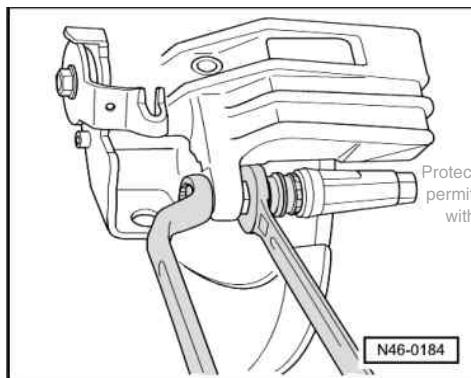
Special tools and workshop equipment required

- ♦ Resetting and extracting tool 3272



Removing

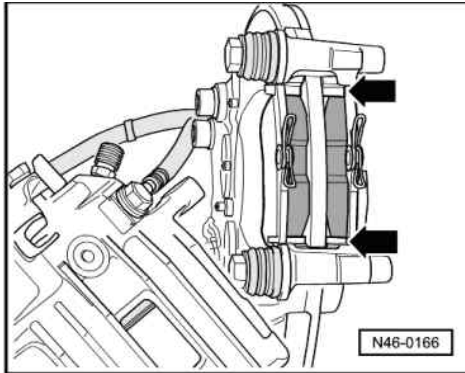
- Remove wheels.
- -> Prise off locking element -1- for handbrake cable.
- Press brake lever -2- in direction of arrow and disengage handbrake cable -3-.



- -> Provide support at guide pin and detach brake caliper housing.
- Tie up brake caliper housing with a piece of wire.

Note:

Brake hose/pipe is never to be twisted or kinked.



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

Note:

Mark brake pads on removal if they are to be re-used. Re-install in same position to prevent uneven braking.

Installing

Install in reverse order, paying attention to the following:

- Clean brake caliper housing and in particular bonding surface for brake pad, which must be free from residual adhesive and grease.

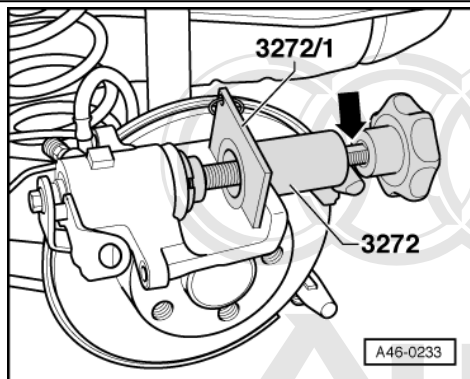
Only use white spirit to clean brake caliper housing.

Note:

Before resetting pistons, extract small quantity of brake fluid from reservoir. To do so, make use of bleeder bottle or plastic bottle kept specially for this purpose.

Attention:

Brake fluid is poisonous and is never to be sucked off by mouth with a hose.

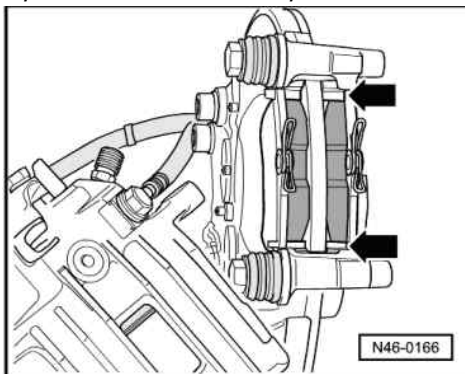


- -> Apply special tool 3272 with 3272/1 to piston of brake caliper housing.
- Screw in piston by turning knurled wheel of special tool 3272 clockwise (take care not to damage protective cap).

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Note:

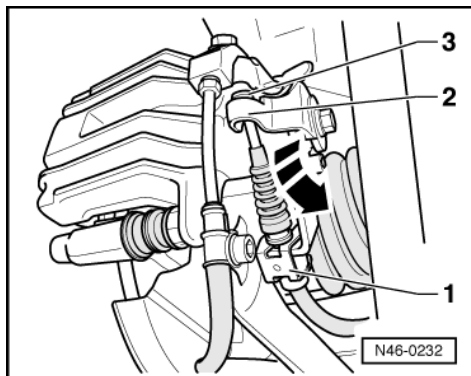
If piston is stiff, 13 mm open-ended wrench can be applied at appropriate flats -arrow-.



- -> Insert pad retaining springs -arrows- and brake pads in brake carrier.
- Pull protective sheeting off backplate of brake pad.
- Use new self-locking bolts to secure brake caliper housing.

Note:

The repair set contains four self-locking hexagon bolts, which are always to be fitted.



- -> Press brake lever -2- in direction of arrow and engage handbrake cable -3-.
- Press on locking element -1- for handbrake cable.

Attention:

After fitting brake pads, press brake pedal firmly several times with vehicle stationary to ensure that pads become properly seated.

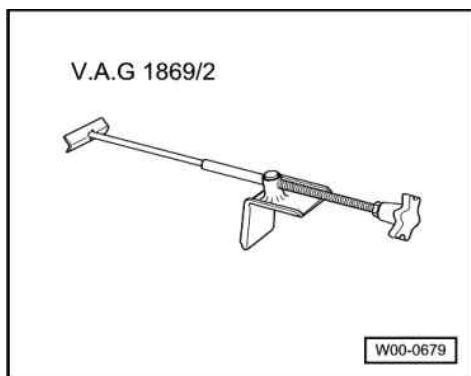
- Check brake fluid level and top up if necessary.

Tightening torque

Component	Nm
Brake caliper housing to brake carrier	35 1)

- 1) Replace bolts

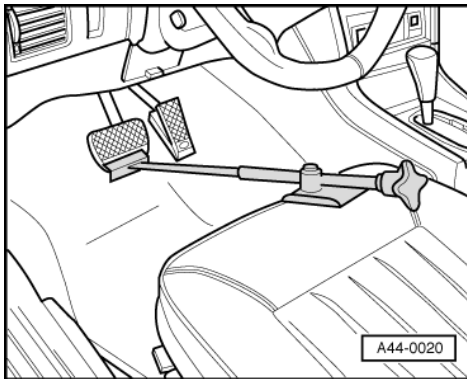
2.7 - Removing and installing brake caliper - four-wheel drive vehicles



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Special tools and workshop equipment required

- ♦ Brake pedal depressor V.A.G 1869/2



Removing

- Remove brake pads => Page 126 .
- -> Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Depress brake pedal at least 60 mm.

Note:

This closes valves in brake master cylinder and stops brake fluid reservoir running empty.

- Connect hose of bleeder bottle to bleed screw of rear brake caliper removed and front brake caliper on same side of vehicle.
- Open bleed screws.
- Close front bleed screw.
- Leave brake pedal depressor V.A.G 1869/2 in position.
- Unscrew brake hose from brake caliper.

Installing

Install in reverse order, paying attention to the following:

- Fit brake pads => Page 127 .
- After fitting serviced or new brake caliper, adjust handbrake => Page 136 . Do not press foot brake until handbrake has been adjusted.
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .

Tightening torque

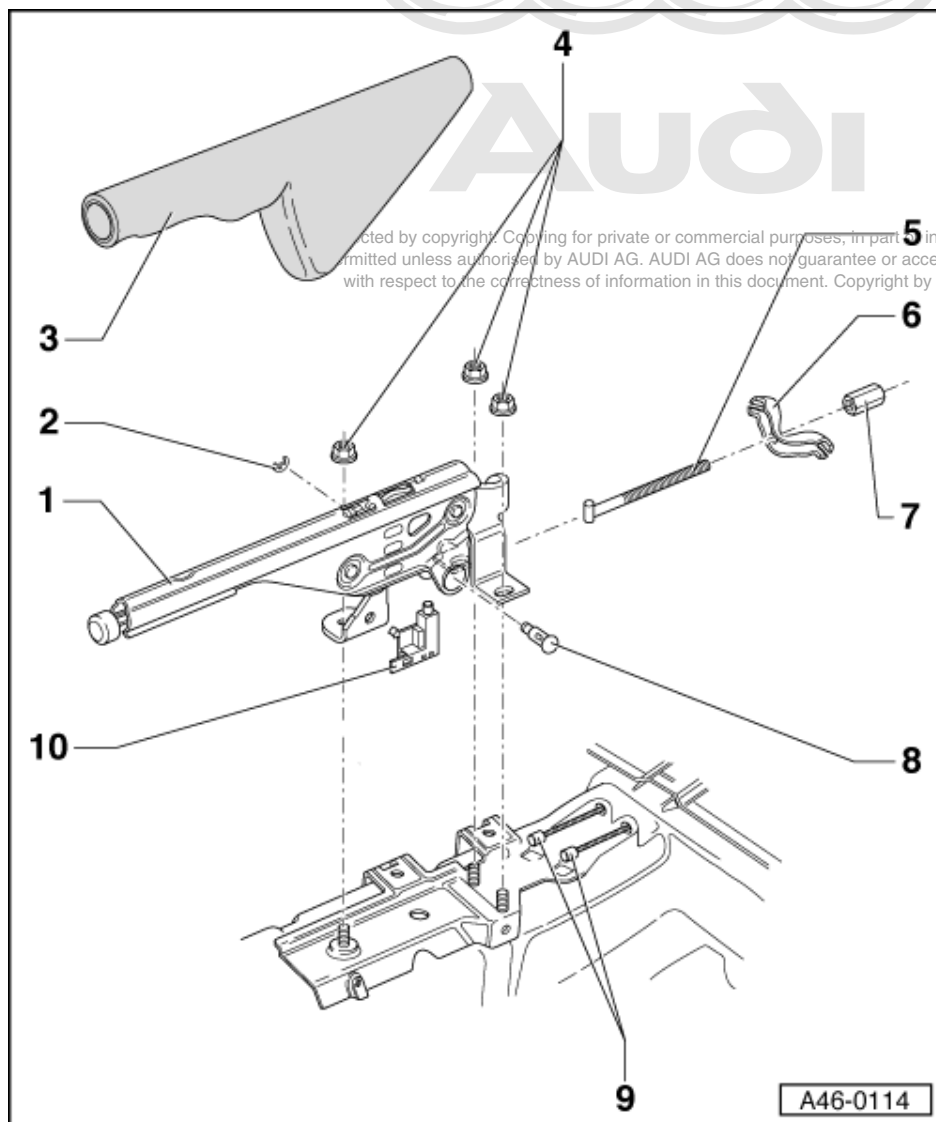
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Component	Nm
Brake hose to brake caliper	38 1)

- 1) Replace brake hose/brake pipe with banjo bolt whenever banjo bolt has been slackened off

3 - Handbrake

3.1 - Handbrake



3.2 - Exploded view of handbrake

1 Handbrake lever

- ◆ Replacement part is supplied assembled with rods, locking pawl, pushbutton, spring and locking segment
- ◆ Take out lower centre console before removing lever

=> General Body Repairs, Interior; Repair Group 68

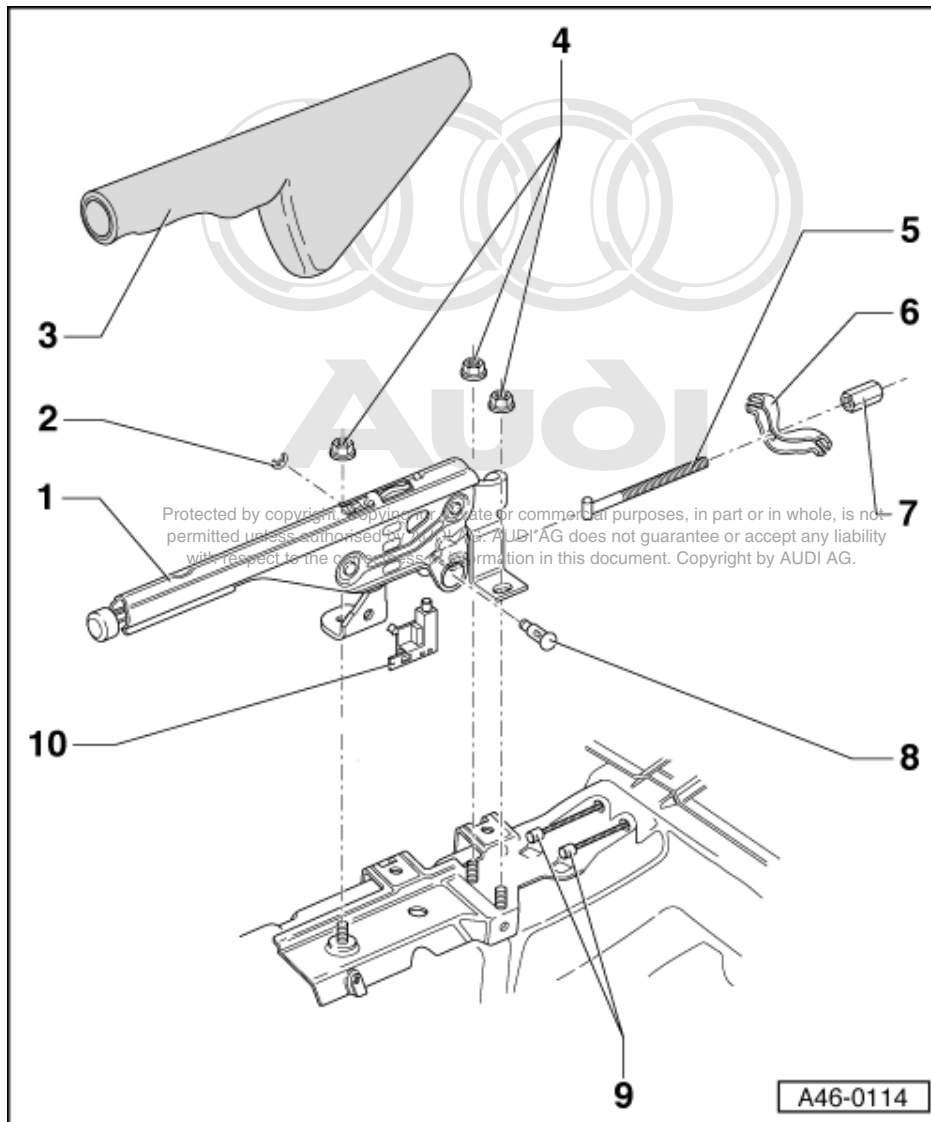
2 Circlip

3 Trim for handbrake lever

- ◆ Pull off to front

4 Nut, 18 Nm

5 Pull rod



6 Compensator

7 Nut, 8 Nm

- ◆ Self-locking
- ◆ For handbrake adjustment
- ◆ Adjusting handbrake => Page 136

8 Pivot pin

- ◆ For handbrake lever
- ◆ Insert pull rod -Item 5 - in hole of pivot pin

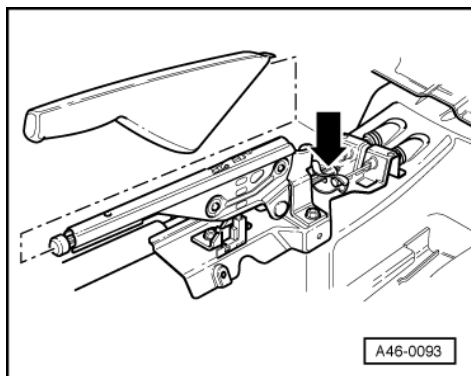
9 Handbrake cable

- ◆ Removing and installing on FWD vehicles => Page 132
- ◆ Removing and installing on 4WD vehicles => Page 134
- ◆ Adjusting handbrake => Page 136

10 Switch

- ◆ For handbrake warning

3.3 - Removing and installing handbrake cable - front-wheel drive vehicles

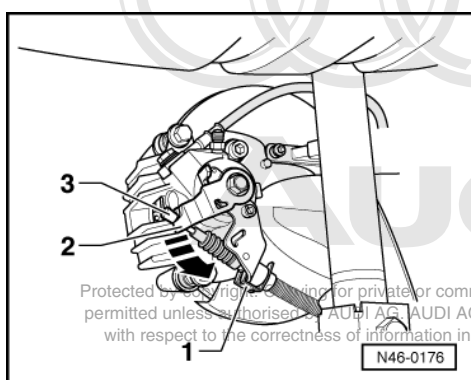


Removing

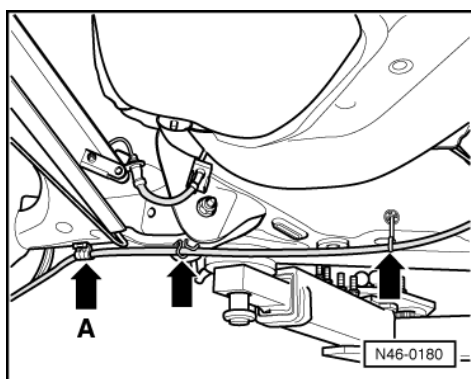
- Release handbrake.
- Take rear ashtray out of centre console.
- -> Slacken off adjusting nut -arrow- until handbrake cable can be disengaged from compensator.

Note:

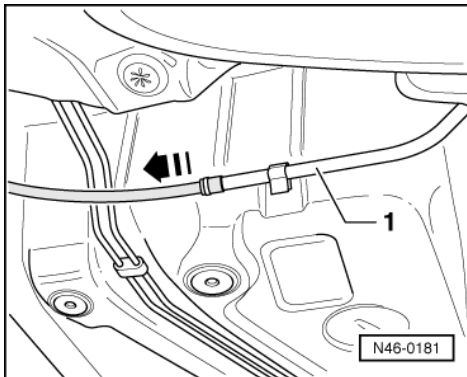
Centre console has been removed in Fig.



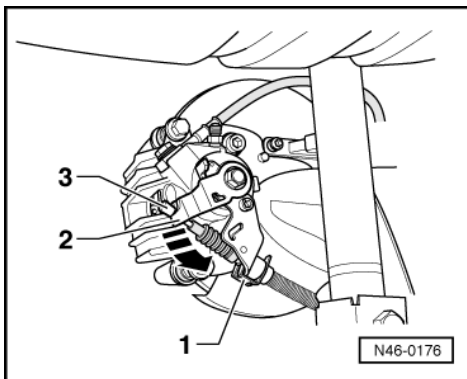
- -> Prise off locking element -1- for handbrake cable.
- Press brake lever -2- in direction of arrow and disengage handbrake cable -3-.



- -> Unclip handbrake cable from mount at rear axle beam -arrow A- and disengage from mounts -arrows-.



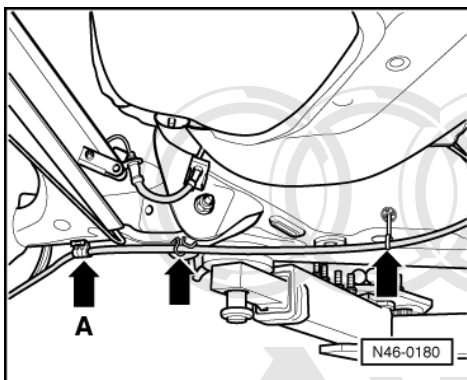
- -> Pull handbrake cable in direction of arrow out of guide tube -1-.



Installing

Install in reverse order, paying attention to the following:

- Slide handbrake cable into guide tube.
- -> Press brake lever -2- in direction of arrow and engage handbrake cable -3-.
- Press on locking element -1- for handbrake cable.

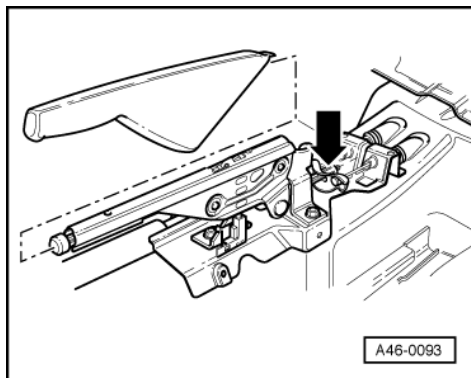


- -> Clip handbrake cable into mount at rear axle beam -arrow A-.

Note:

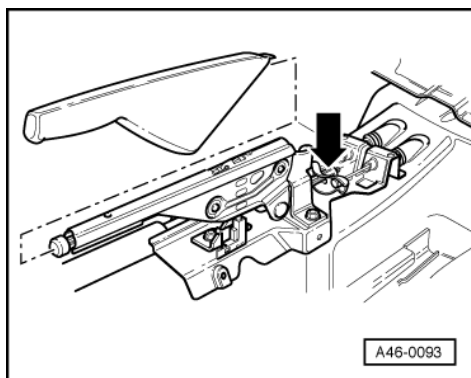
Clamping ring at handbrake cable must be positioned in centre of clip.
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- Engage handbrake cable in mounts -arrows-.



- Engage handbrake cable in compensator.
- -> Pre-tension handbrake cable with adjusting nut -arrow-.
- Adjust handbrake => Page **136** .

3.4 - Removing and installing handbrake cable - four-wheel drive vehicles



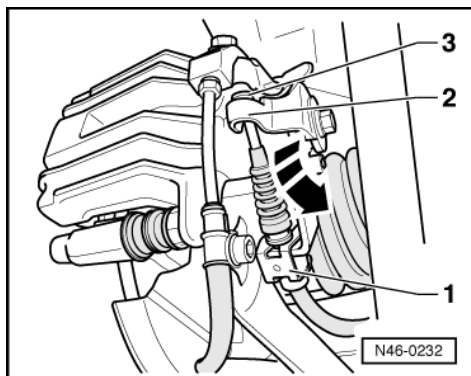
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Removing

- Release handbrake.
- Take rear ashtray out of centre console.
- -> Slacken off adjusting nut -arrow- until handbrake cable can be disengaged from compensator.

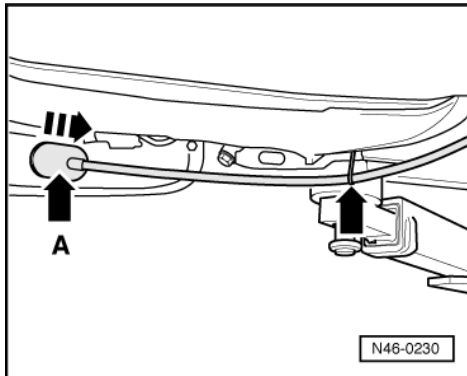
Note:

Centre console has been removed in Fig.

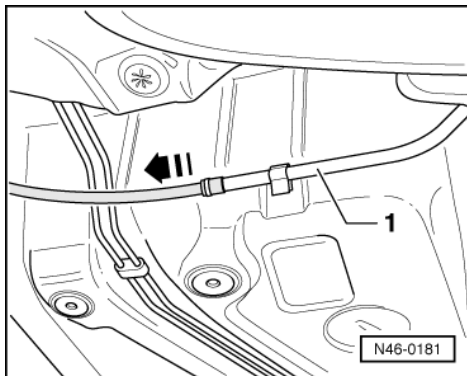


- -> Prise off locking element -1- for handbrake cable.

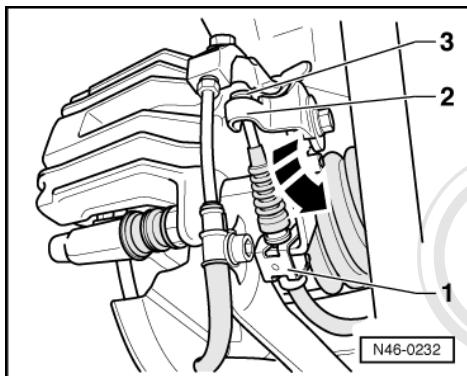
- Press brake lever -2- in direction of arrow and disengage handbrake cable -3-.



- -> Remove rubber grommet -arrow A- from trailing arm.
- Disengage handbrake cable from mount -arrow- and pull out of trailing arm in direction of arrow.



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

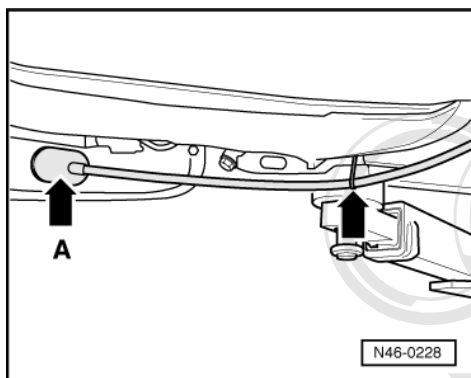


Installing

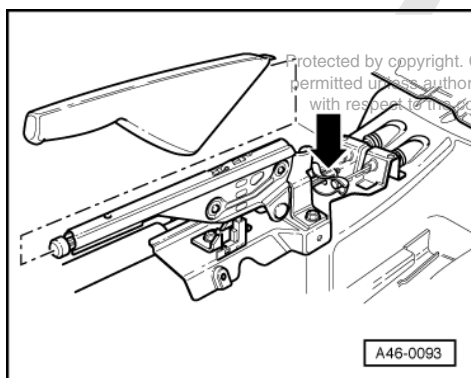
Install in reverse order, paying attention to the following:

- Slide handbrake cable into guide tube.
- -> Press brake lever -2- in direction of arrow and engage handbrake cable -3-.
- Press on locking element -1- for handbrake cable.

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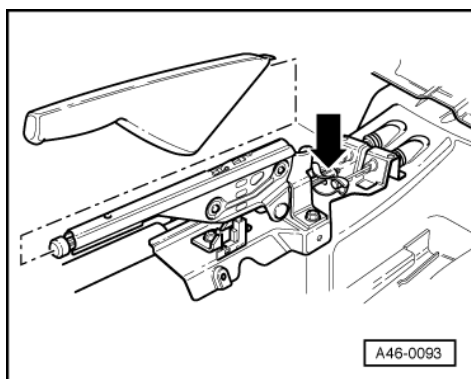


- -> Install rubber grommet -arrow A- in trailing arm.
- Engage handbrake cable in mount -arrow-.



- Engage handbrake cable in compensator.
- -> Pre-tension handbrake cable with adjusting nut -arrow-.
- Adjust handbrake => Page 136 .

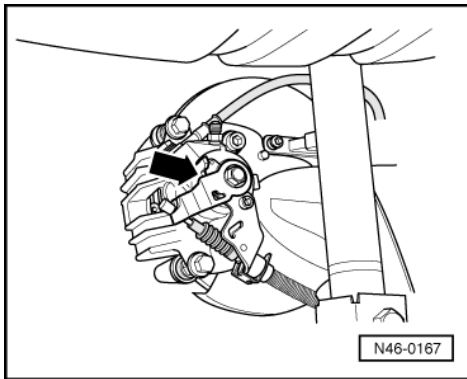
3.5 - Adjusting handbrake



Note:

Re-adjustment is only necessary on replacing handbrake cables, brake calipers and brake discs.

- Take rear ashtray out of centre console.
- -> With handbrake lever in rest position, tighten adjusting nut -arrow- ...



- -> ... until levers -arrow- at brake calipers are lifted off stop.
- The maximum permissible distance from the stop on either side is 3 mm.
- Apply handbrake firmly 3 times and then release.
- With handbrake released, check whether both wheels turn freely.

Note:

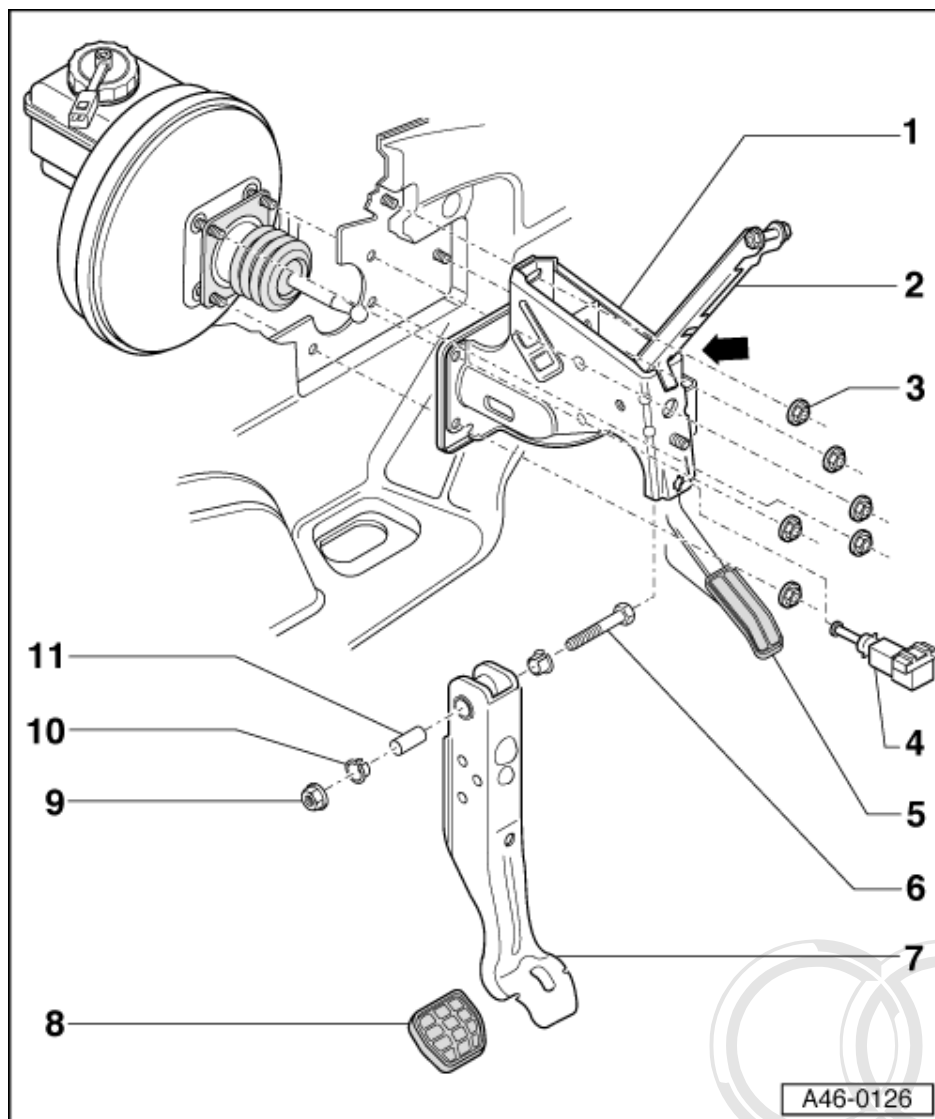
Due to the automatic adjustment of the rear brake, it is no longer necessary to adjust the handbrake after performing re-adjustment work.



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4 - Brake pedal

4.1 - Brake pedal



4.2 - Exploded view of brake pedal (LHD)

Attention:

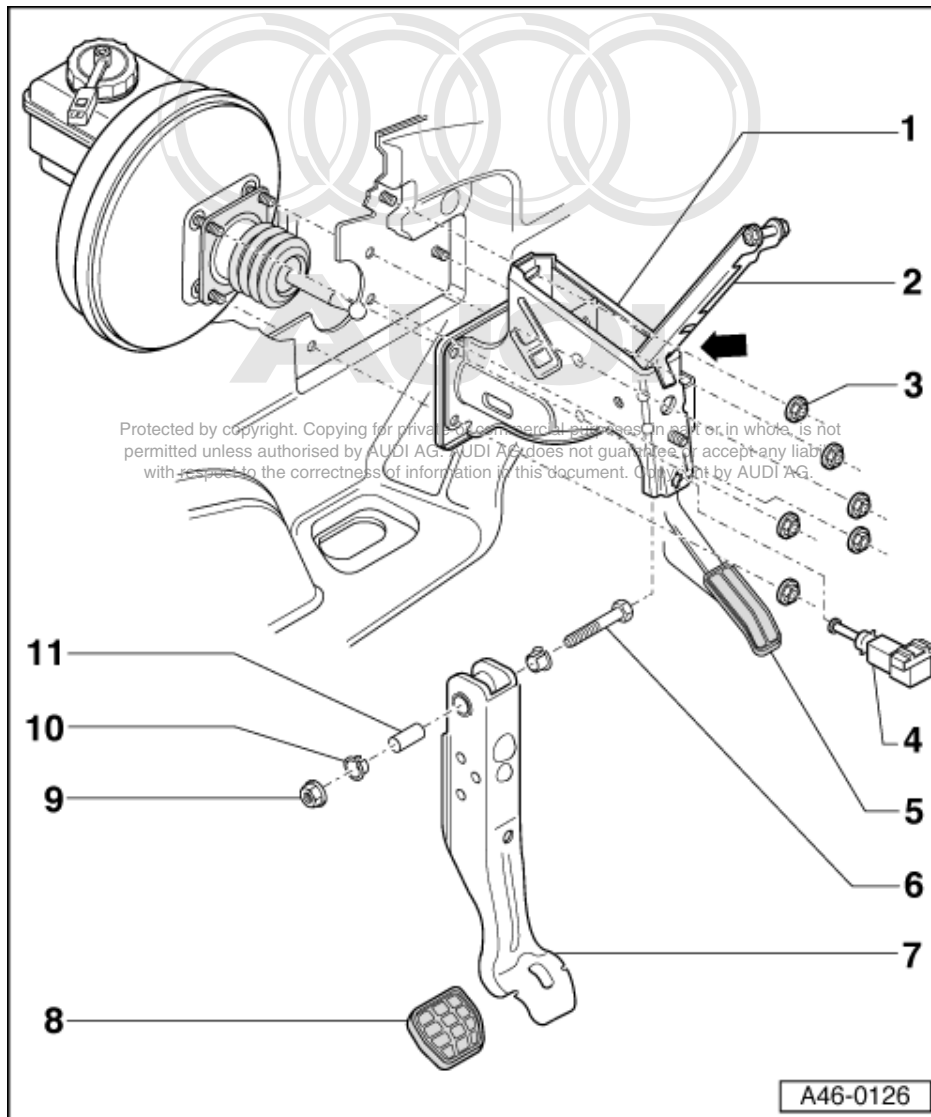
Brake pedal travel must not be shortened by additional floor coverings.

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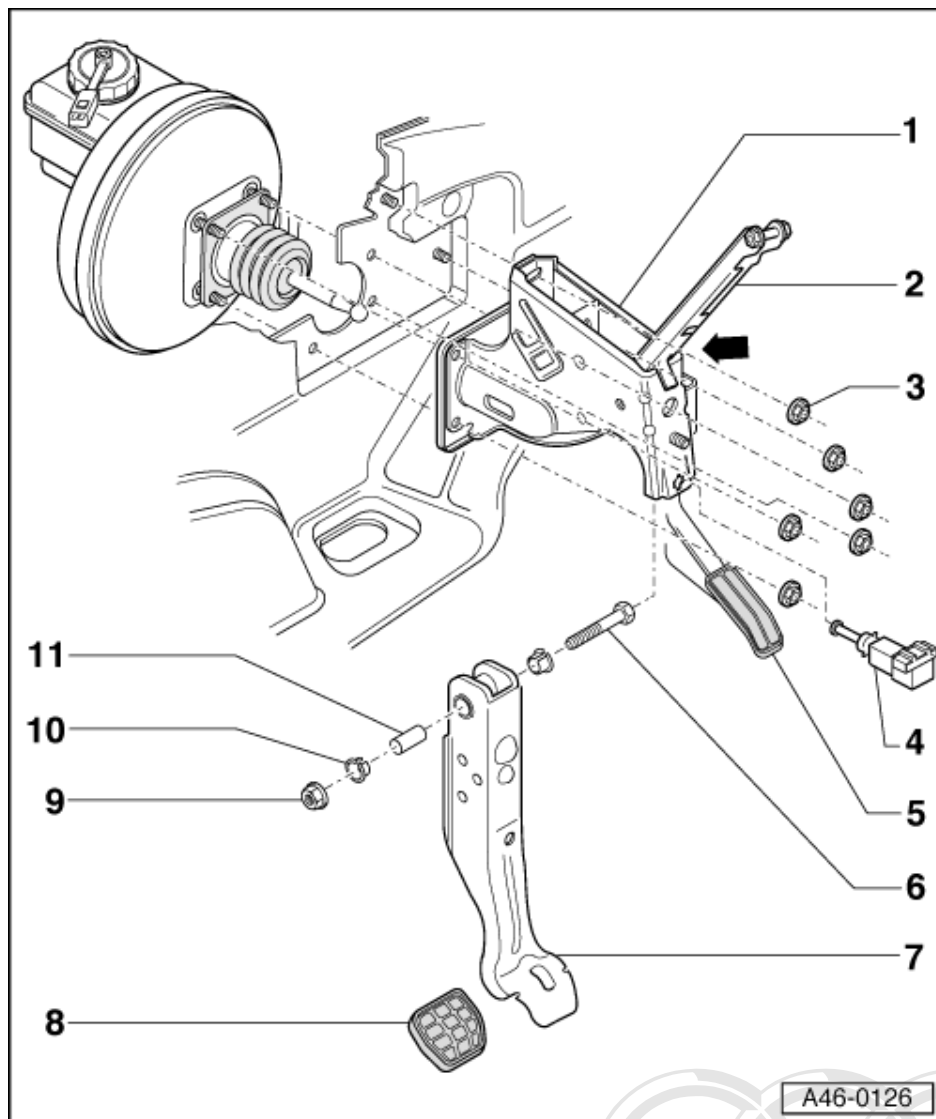
1 Mounting bracket

- ◆ As of approx. 06.99 with brace - Item **2** -
- ◆ On installing a new mounting bracket with brace in vehicles prior to approx. 06.99 with no means of attaching brace, this must be cut off at location shown by arrow

2 Brace



- 3 Nut, 28 Nm**
 - ◆ Self-locking
 - ◆ Always replace after removing
- 4 Brake light switch**
 - ◆ Removing, installing and adjusting (square housing) => Page **13**
 - ◆ Removing, installing and adjusting (round housing) => Page **57**
- 5 Accelerator pedal**
- 6 Bolt**
- 7 Brake pedal**
 - ◆ Removing and installing=>Page **144**
 - ◆ Separating from brake servo
=>Page **145**
 - ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings
- 8 Cap**



9 Nut, 20 Nm

- ◆ Self-locking
- ◆ Always replace after removing

10 Mounting bush

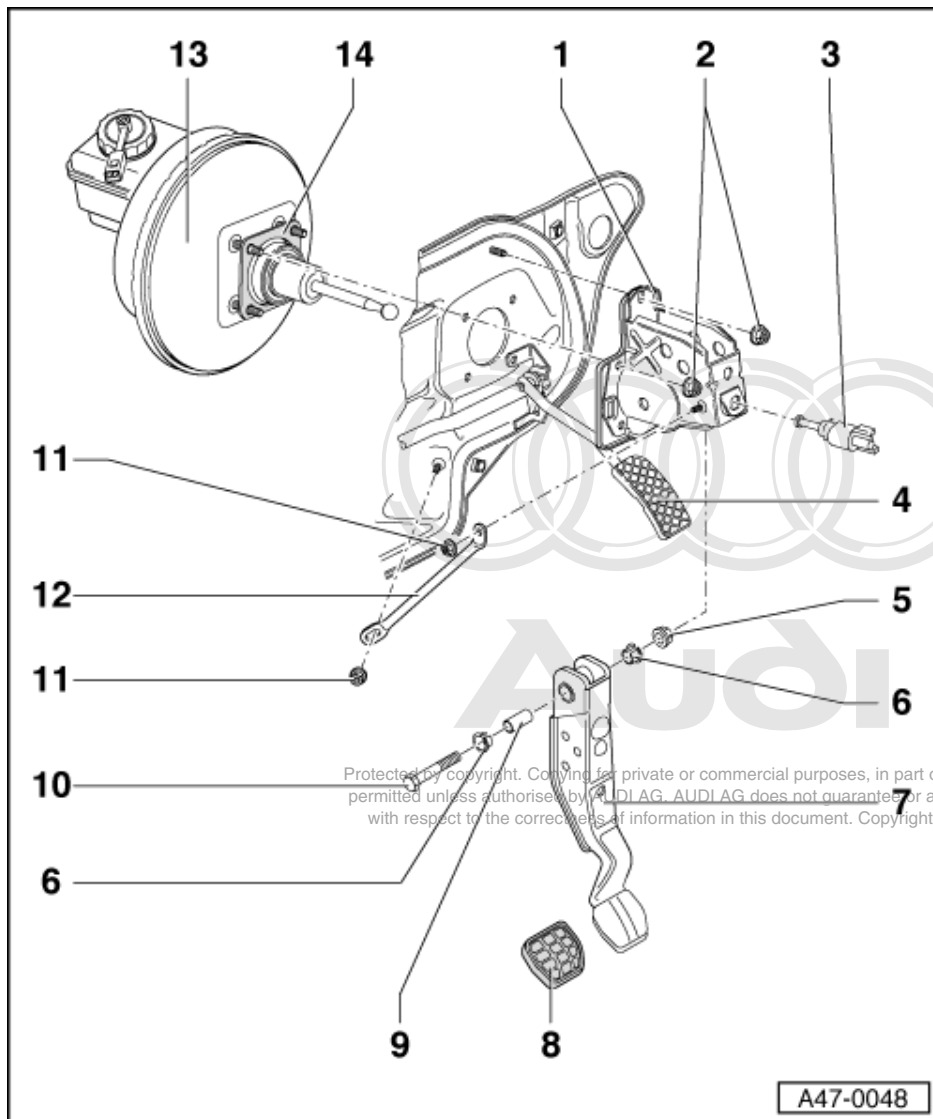
- ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings

11 Pivot pin

- ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings

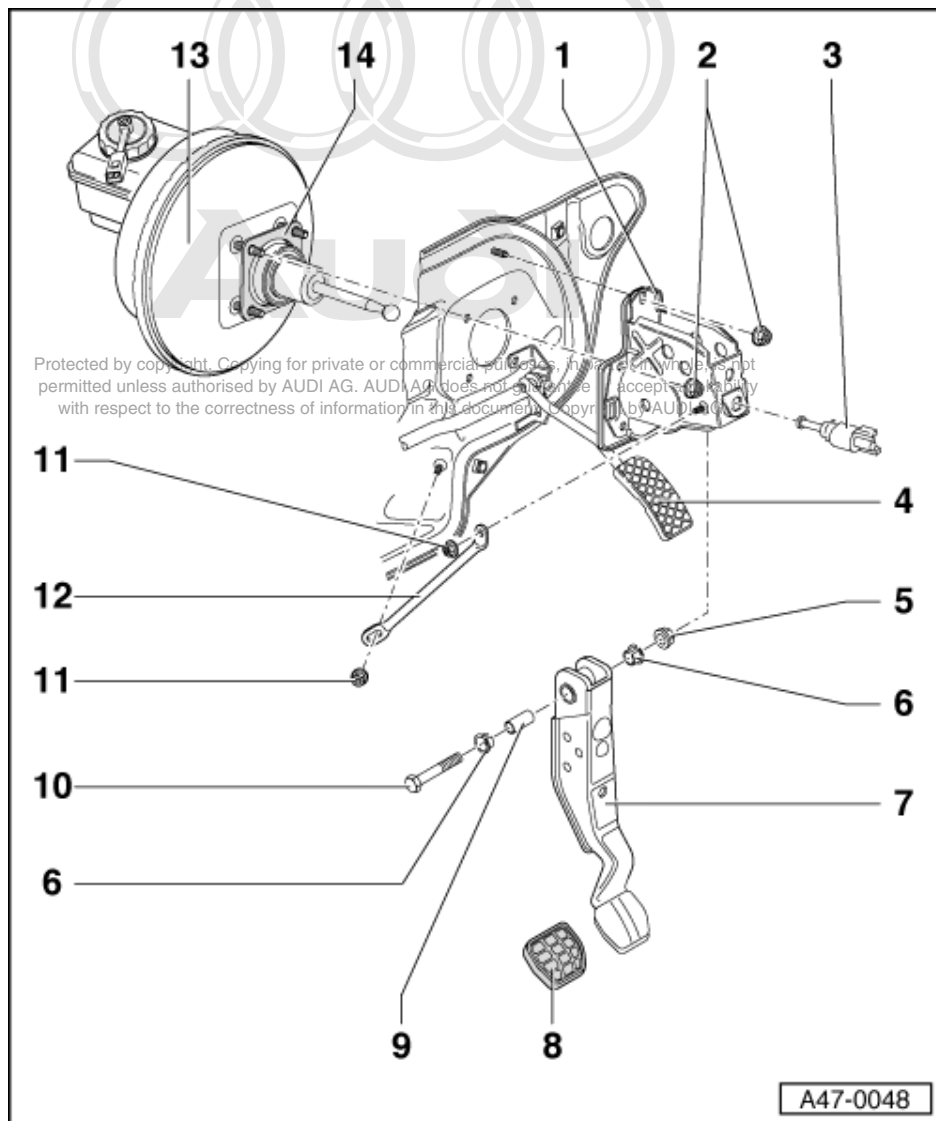
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4.3 - Exploded view of brake pedal (RHD)



Attention:
 Brake pedal travel must not be shortened by additional floor coverings.

- 1 Mounting bracket**
- 2 Nut, 28 Nm**
 - ♦ Self-locking
 - ♦ Always replace after removing
- 3 Brake light switch**
 - ♦ Removing, installing and adjusting (square housing) => Page 13
 - ♦ Removing, installing and adjusting (round housing) => Page 57
- 4 Accelerator pedal**



5 Nut, 25 Nm

- ◆ Self-locking
- ◆ Always replace after removing

6 Mounting bush

- ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings

7 Brake pedal

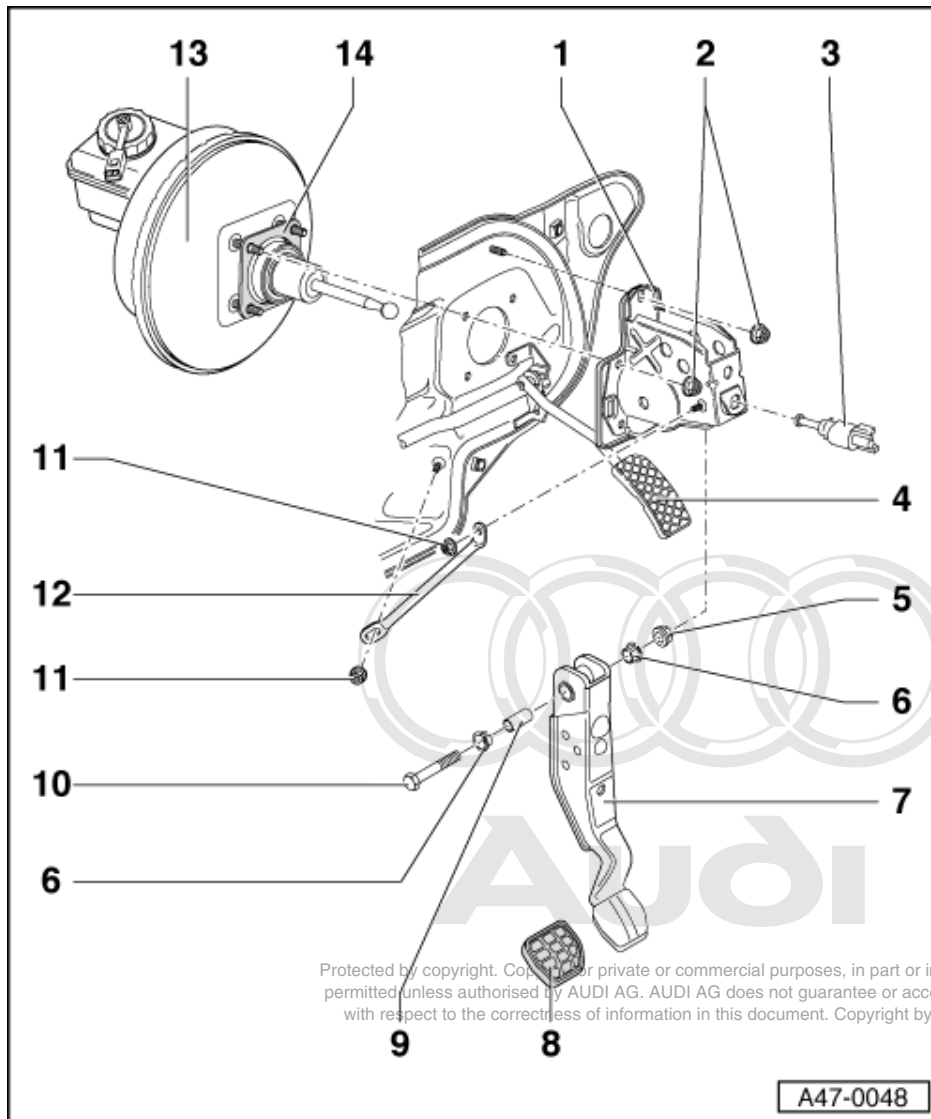
- ◆ Removing and installing=>Page **144**
- ◆ Separating from brake servo
=>Page **145**
- ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings

8 Cap

9 Pivot pin

- ◆ Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings

10 Bolt



11 Nut, 10 Nm

- ♦ Self-locking
- ♦ Always replace after removing

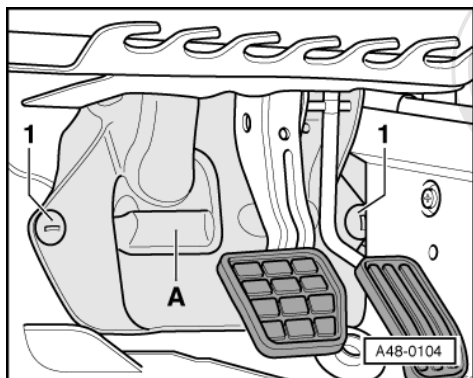
12 Mounting bracket support

13 Brake servo

14 Gasket

- ♦ For brake servo

4.4 - Removing and installing brake pedal



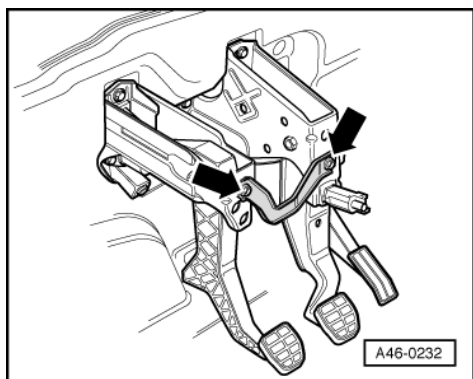
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Removing

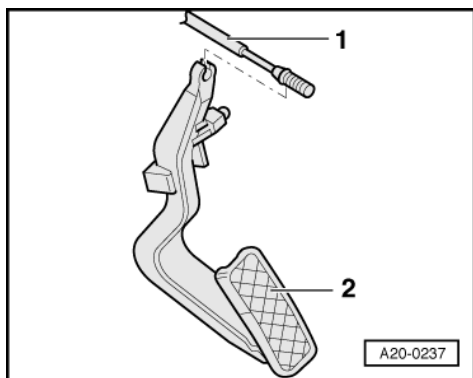
- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

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



- Remove brake light switch (square housing) => Page 13 .
- Remove brake light switch (round housing) => Page 57 .
- -> On vehicles with manual gearbox, remove -arrows- connecting plate between clutch and brake pedals.



Left-hand drive vehicles with mechanical accelerator mechanism:

- -> Disengage end of throttle cable -1- at top of accelerator pedal -2-.

Left-hand drive vehicles with electronic engine output control (electronic throttle):

- Unplug 6-pin connector at accelerator pedal module.

All models:

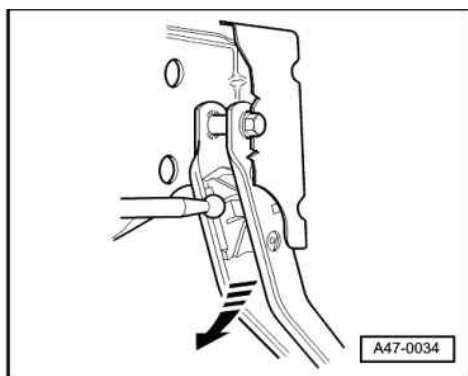
- Disconnect brake pedal from brake servo => Page 145 .

Left-hand drive vehicles:

- Unscrew nut -Item 140 and detach brake pedal.

Right-hand drive vehicles:

- Unscrew nuts -Item 141 .
- Take out mounting bracket with pedals.
- Remove brake pedal.



Installing

Install in reverse order, paying attention to the following:

Note:

Prior to assembly, apply polycarbamide grease G 052 142 A2 to mountings.

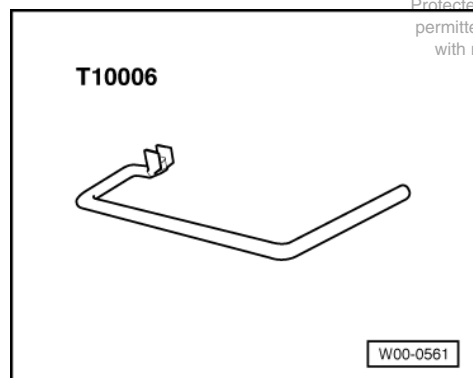
- -> Hold ball end of pushrod in front of mount and press brake pedal towards brake servo such that ball end is heard to engage.
- Fit brake light switch (square housing) => Page 14 .
- Fit brake light switch (round housing) => Page 58 .

Tightening torque

Component	Nm
Brake servo/mounting bracket to bulkhead	28 1)

- 1) Replace nuts

4.5 - Separating brake pedal from brake servo



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Special tools and workshop equipment required

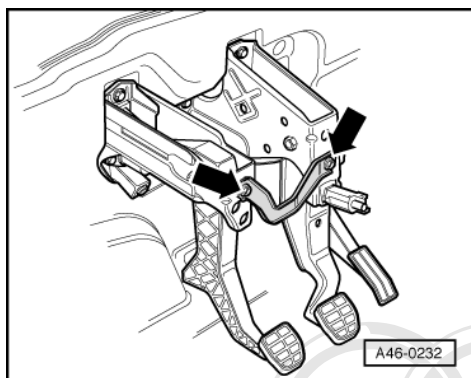
- ♦ Release tool T10006

Separating

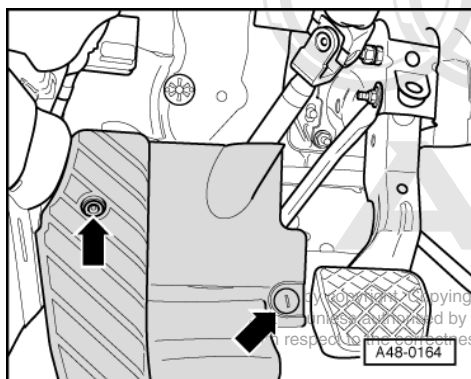
- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Remove brake light switch (square housing) => Page 13 .
- Remove brake light switch (round housing) => Page 57 .
- Unplug connectors at clutch pedal switch/interlock switch.

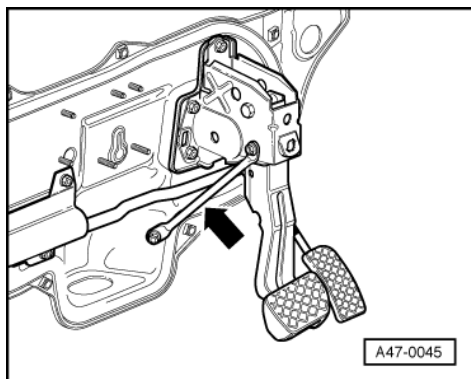


- -> On vehicles with manual gearbox, remove -arrows- connecting plate between clutch and brake pedals.

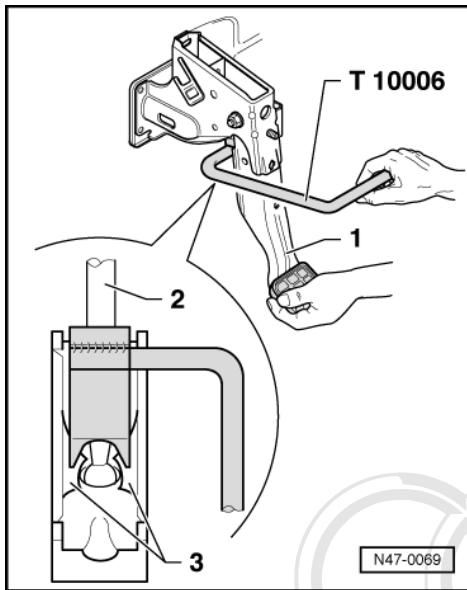


Right-hand drive vehicles:

- -> Remove footrest -arrows-.



- -> If fitted, remove mounting bracket support -arrow-.



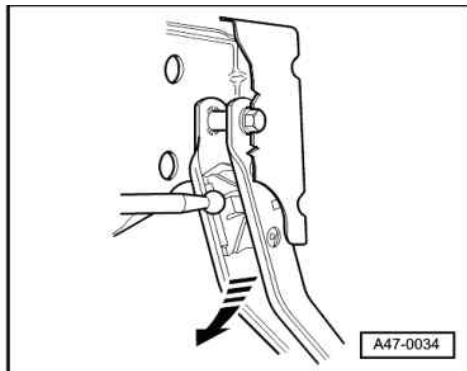
All models:

- -> Press brake pedal -1- towards brake servo and hold it in this position.
- Insert release tool T10006 as shown and pull it towards driver's seat whilst counterholding brake pedal -1- (pedal must not move to rear in this instant). This presses retainers tabs -3- off ball end.
- Pull both release tool T10006 and brake pedal towards driver's seat and thus disconnect brake pedal from ball end of pushrod.

Note:

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Fig. shows separation of brake pedal from brake servo with pedal cluster removed.



Installing

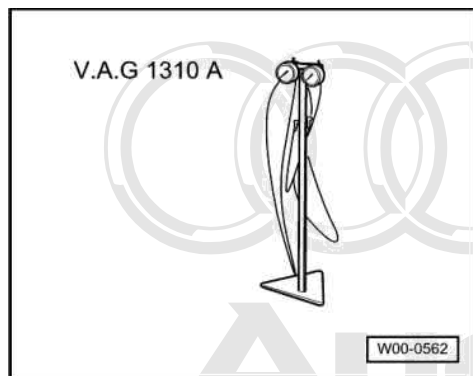
Install in reverse order, paying attention to the following:

- -> Hold ball end of pushrod in front of mount and press brake pedal towards brake servo such that ball end is heard to engage.
- Fit brake light switch (square housing) => Page 14 .
- Fit brake light switch (round housing) => Page 58 .

47 - Brakes, Brake hydraulics

1 - High and low-pressure test

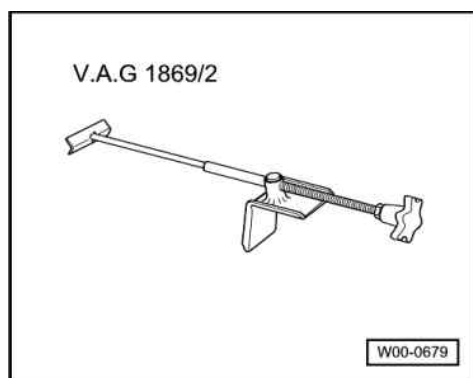
1.1 - High and low-pressure test



Special tools and workshop equipment required

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- ♦ V.A.G 1310 A



- ♦ V.A.G 1869/2

Test requirement:

- Brake system (brake master cylinder, brake hoses, brake pipes and brake calipers) checked for proper operation and freedom from leaks

High-pressure test:

- Screw out bleed screw at one of the front brake calipers. Connect up pressure gauge V.A.G 1310 A and perform bleeding.
- Insert brake pedal depressor V.A.G 1869/2 between brake pedal and driver's seat. Pre-tension brake pedal until pressure gauge reading is 50 bar. During the 45 s test period, drop in pressure must not exceed 4 bar.

If it does, replace hydraulic control unit.

Low-pressure test:

- Set brake pedal depressor such that pressure gauge reading is 6 bar.

- During the 3 minute test period, drop in pressure must not exceed 1 bar.

If it does, replace hydraulic control unit.

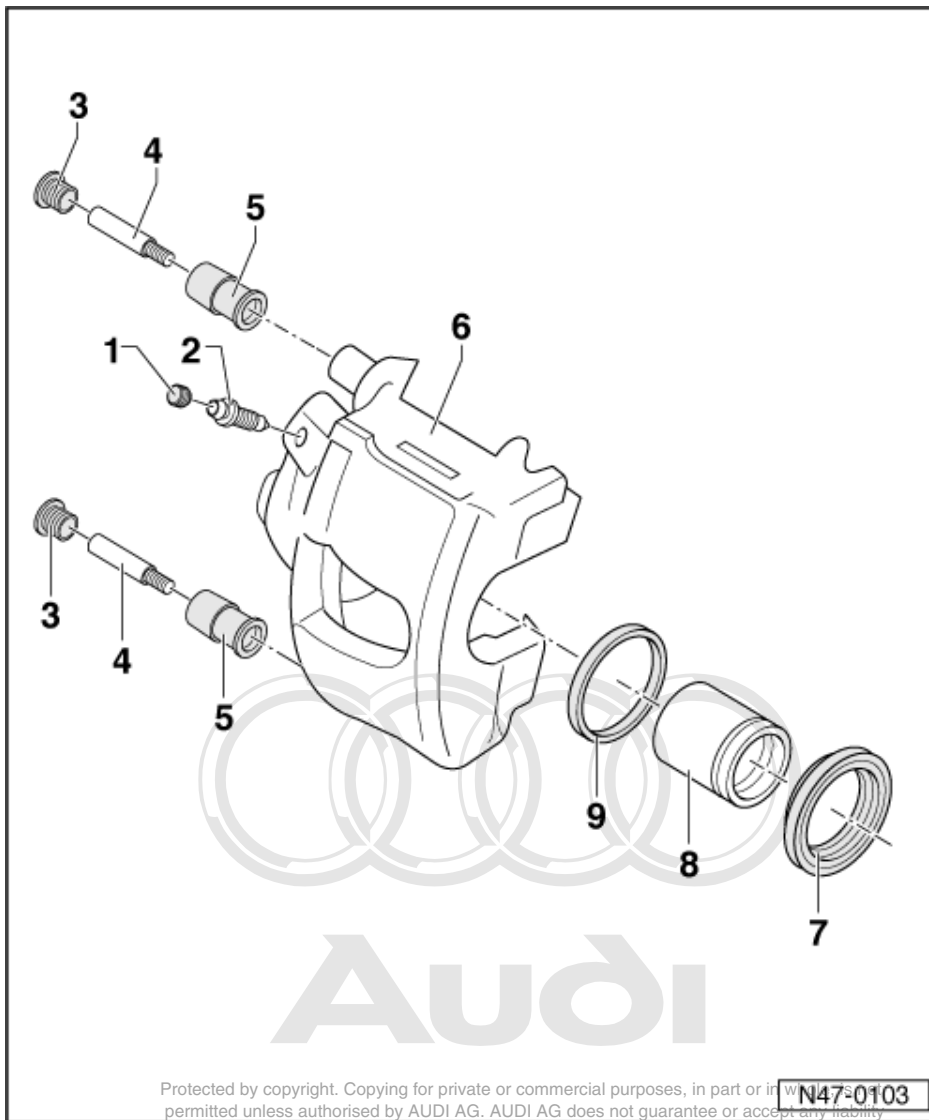
2 - Servicing front brake caliper

2.1 - Servicing front brake caliper

Notes:

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

2.2 - Exploded view of brake caliper FS 3



1 Protective cap

2 Bleed screw, 10 Nm

- ♦ Before screwing in, grease thread with small quantity of assembly paste G 052 150 A2



3 Cap

- ♦ Insert in mounting bush

4 Guide pin, 28 Nm

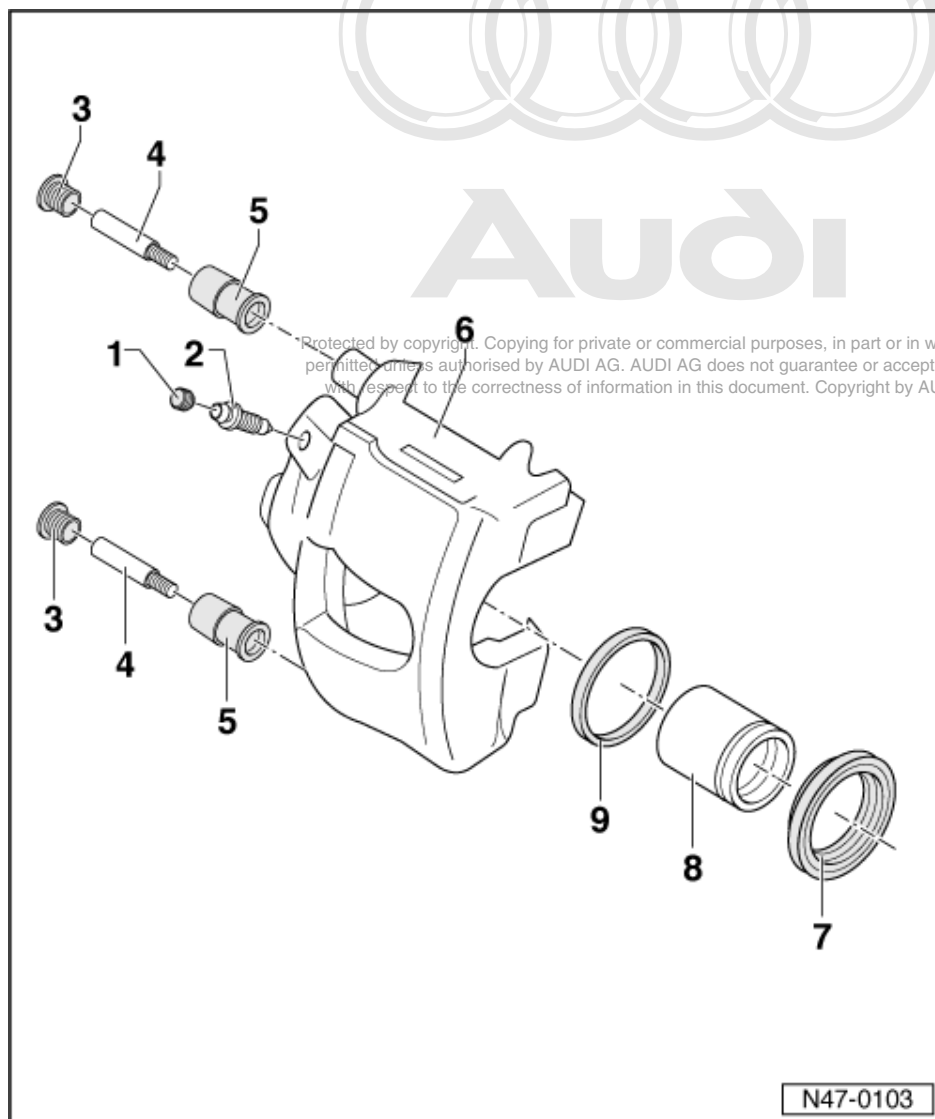
5 Mounting bush

- ♦ Insert in brake caliper

6 Brake caliper

7 Protective cap

- ♦ Position outer sealing lip on piston
- ♦ Removing and installing=>Page 153



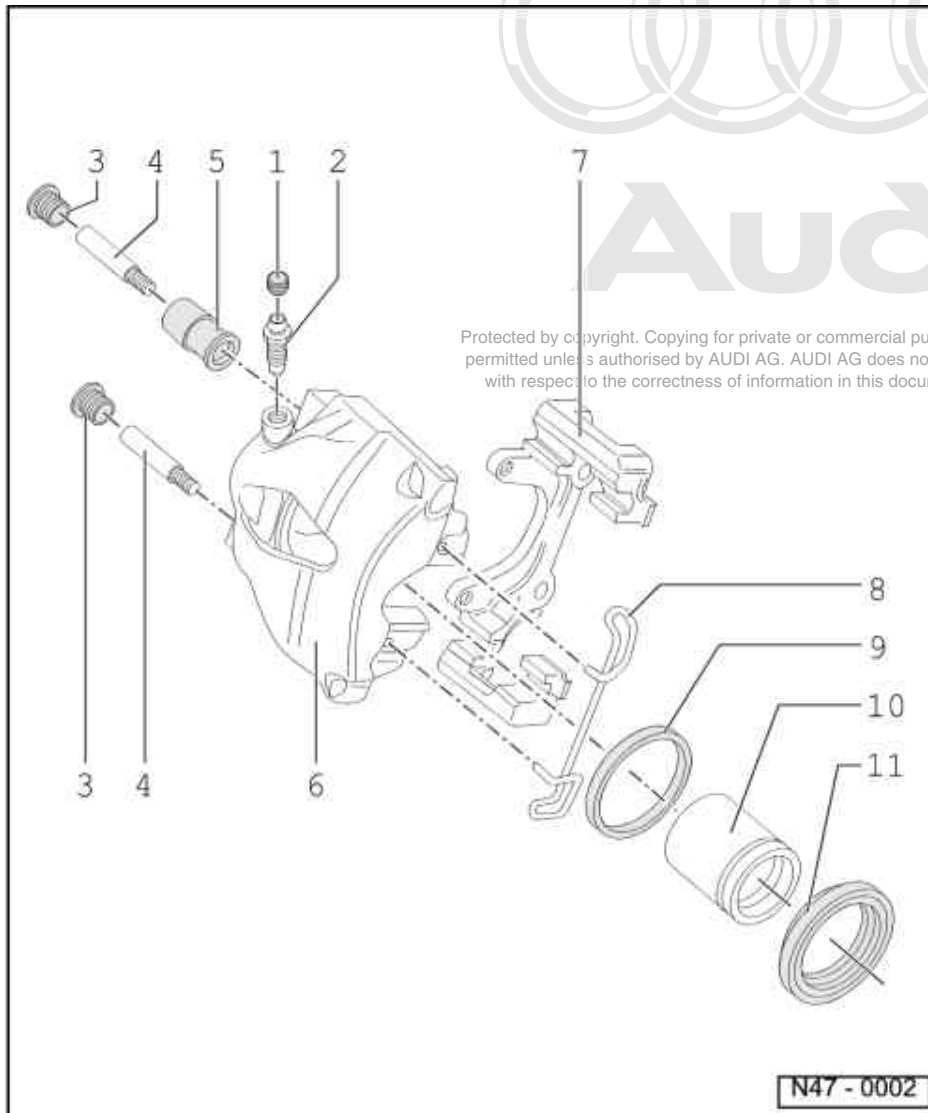
8 Piston

- ♦ Removing and installing=>Page 153
- ♦ Apply thin coat of assembly paste G 052 150 A2 to piston

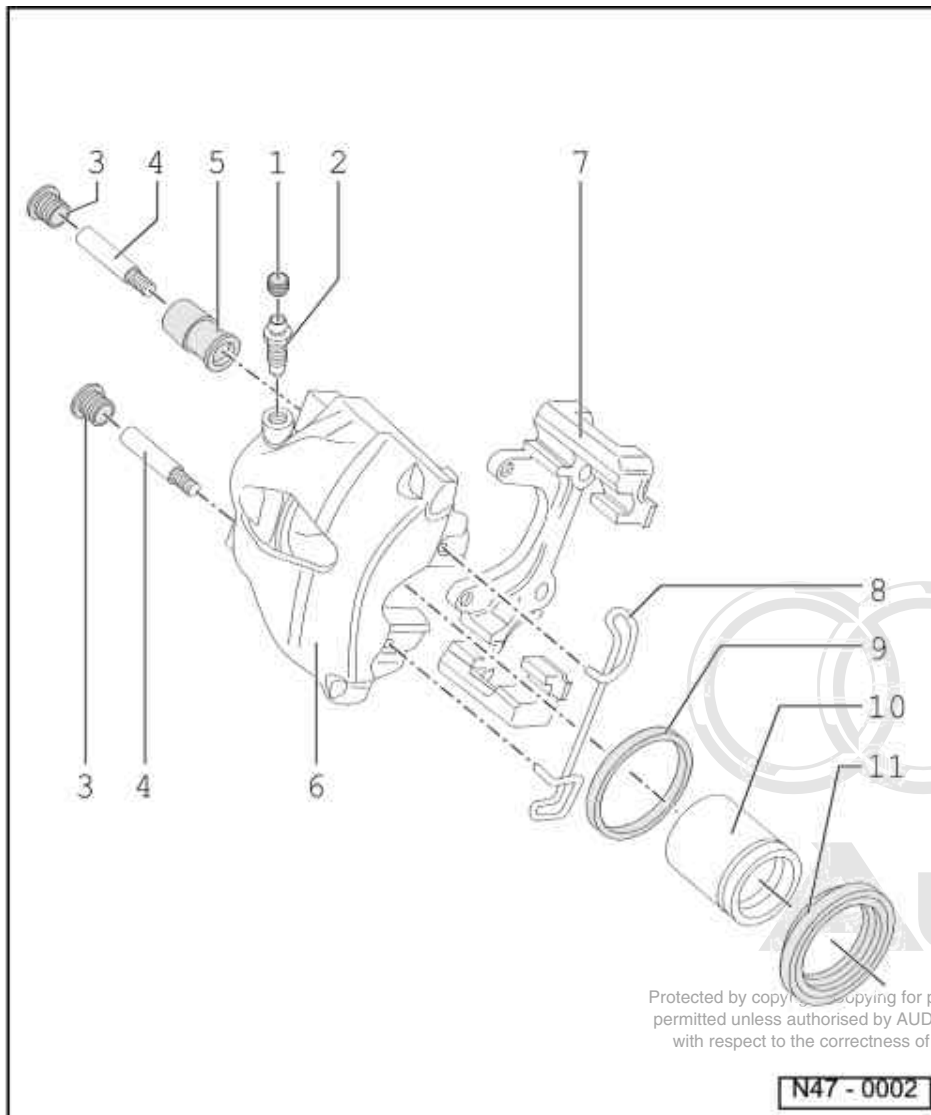
9 Sealing ring

- ♦ Take care not to damage on inserting piston
- ♦ Removing and installing=>Page 153

2.3 - Exploded view of brake caliper FN 3



- 1 Protective cap
- 2 Bleed screw, 10 Nm
 - ♦ Before screwing in, grease thread with small quantity of assembly paste G 052 150 A2
- 3 Cap
 - ♦ Insert in mounting bush
- 4 Guide pin, 28 Nm
- 5 Mounting bush
 - ♦ Insert in brake caliper housing
- 6 Brake caliper housing
- 7 Brake carrier



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N47 - 0002

8 Retaining spring

- ♦ Insert both ends in holes in brake caliper housing

9 Sealing ring

- ♦ Take care not to damage on inserting piston
- ♦ Removing and installing=>Page 153

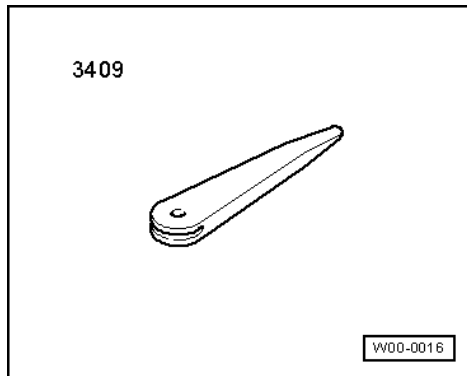
10 Piston

- ♦ Removing and installing=>Page 153
- ♦ Apply thin coat of assembly paste G 052 150 A2 to piston

11 Protective cap

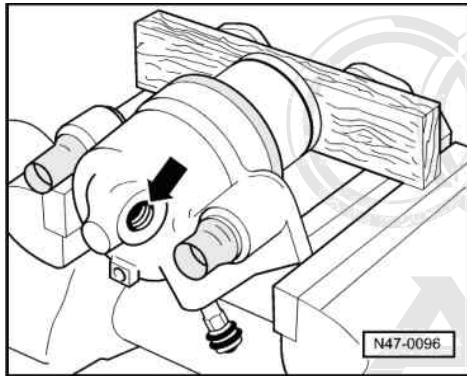
- ♦ Position outer sealing lip on piston
- ♦ Removing and installing=>Page 153

2.4 - Removing and installing piston for front brake caliper



Special tools and workshop equipment required

- ◆ Assembly wedge 3409
- ◆ Piston resetting tool



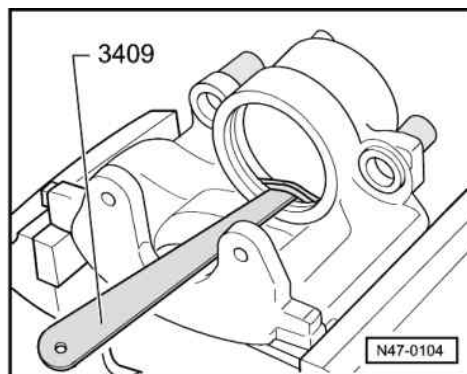
Removing

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- -> Use compressed air to force piston out of brake caliper housing.

Note:

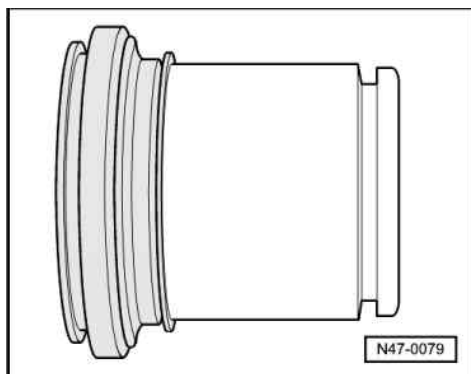
Insert block of wood in shaft to avoid damaging piston.



- -> Use assembly wedge 3409 to take out sealing ring.

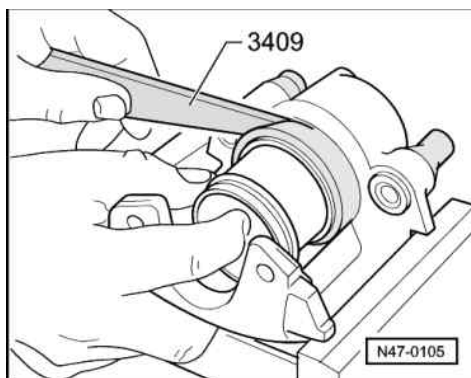
Note:

On removal, take care not to damage surface of cylinder.



Installing

- Clean surfaces of piston and sealing ring (white spirit only) and then dry.
- Before fitting, apply thin coat of assembly paste G 052 150 A2 to piston and sealing ring.
- Insert sealing ring in brake caliper housing.
- -> Position outer sealing lip of protective cap on piston.

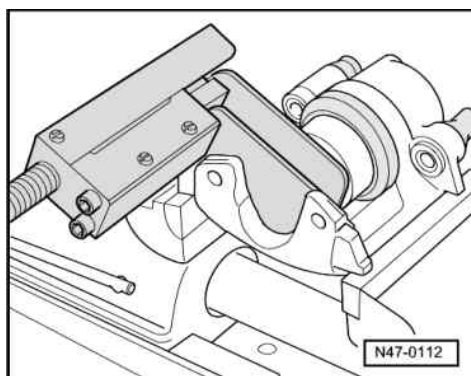


- -> Use assembly wedge 3409 to insert inner sealing lip in groove of cylinder.

Note:

In doing so, hold piston in front of brake caliper housing.

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- -> Use resetting tool to press piston into brake caliper housing.

Note:

This causes outer sealing lip of protective cap to be positioned in groove at piston.

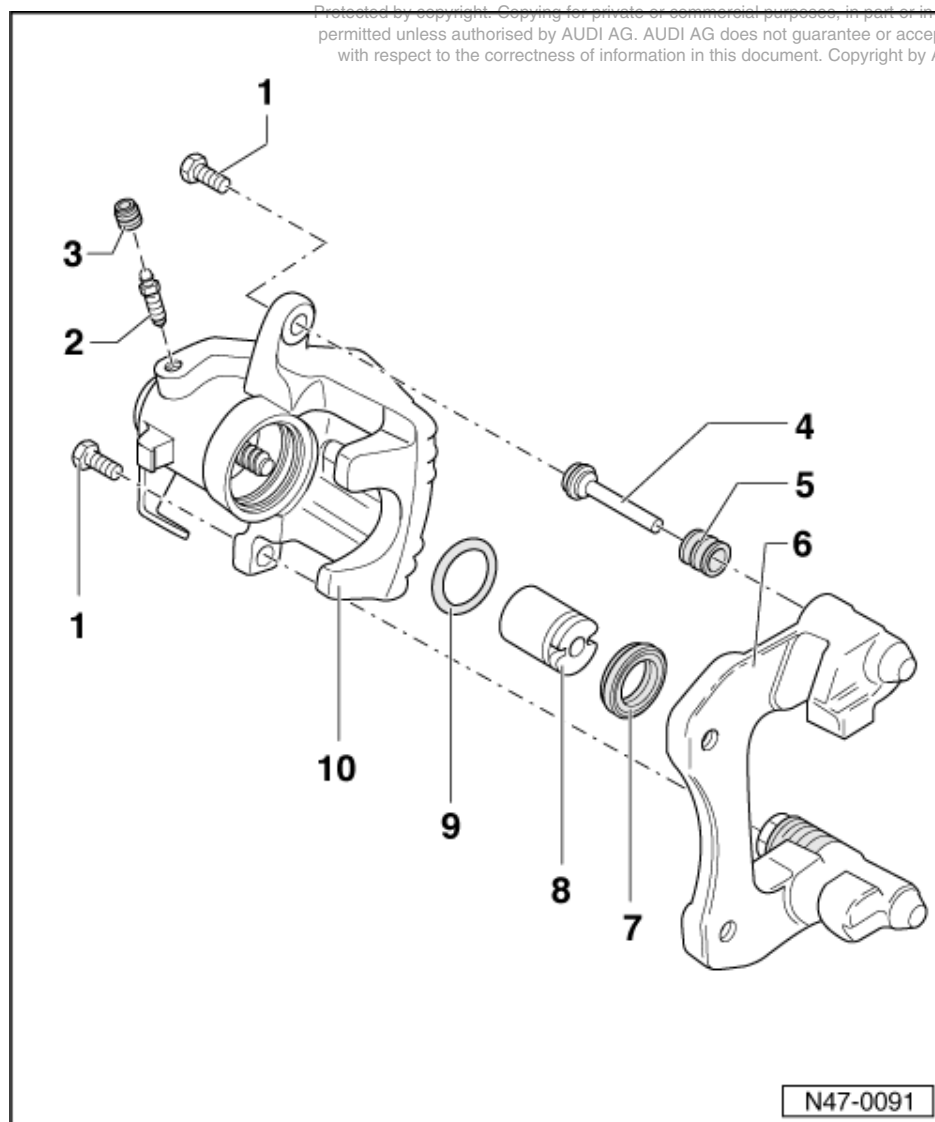
3 - Servicing rear brake caliper

3.1 - Servicing rear brake caliper

Notes:

- ♦ Fit entire repair set when performing servicing work.
- ♦ New brake calipers are filled with brake fluid and pre-bled.
- ♦ Apply thin coat of assembly paste G 052 150 A2 to brake cylinder, piston and sealing ring.
- ♦ When performing repair work, always pre-bleed brake calipers accordingly prior to installation in vehicle (without brake pads) => Page 160.

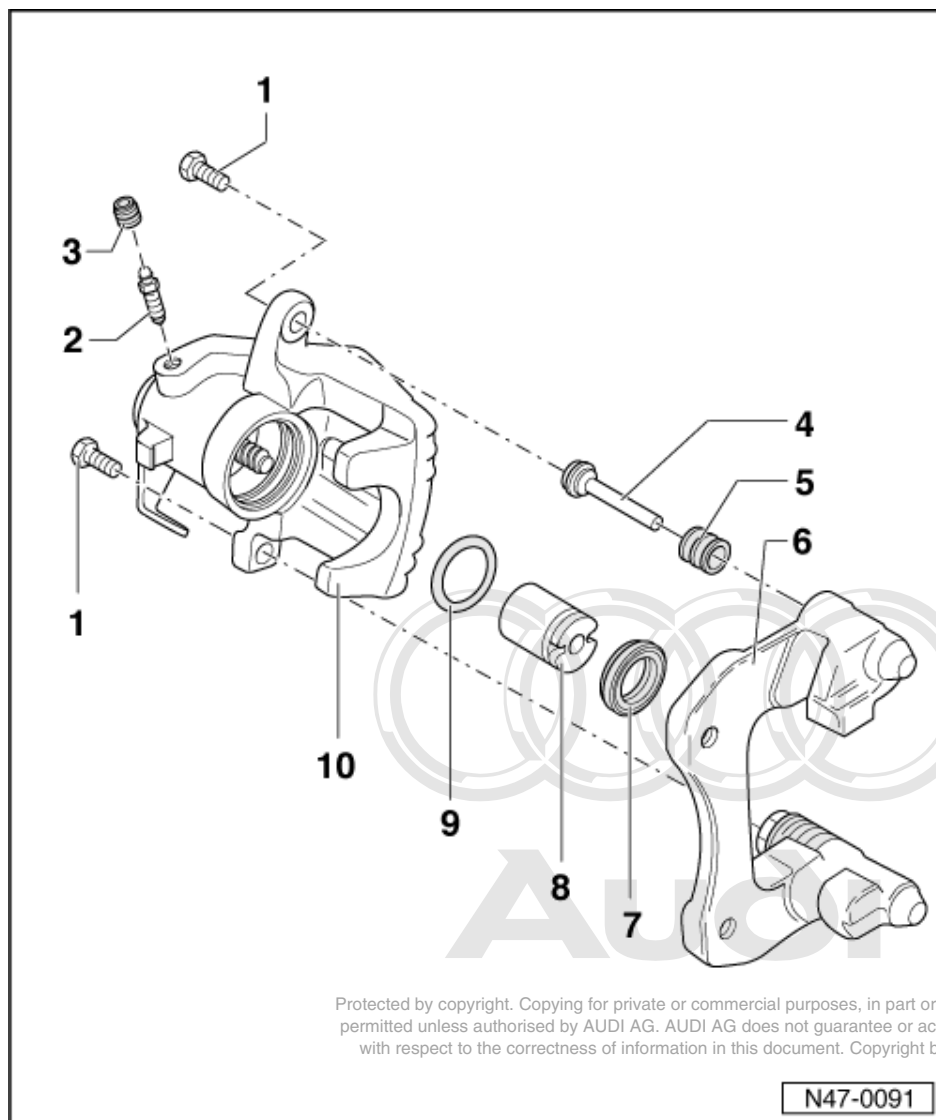
3.2 - Exploded view



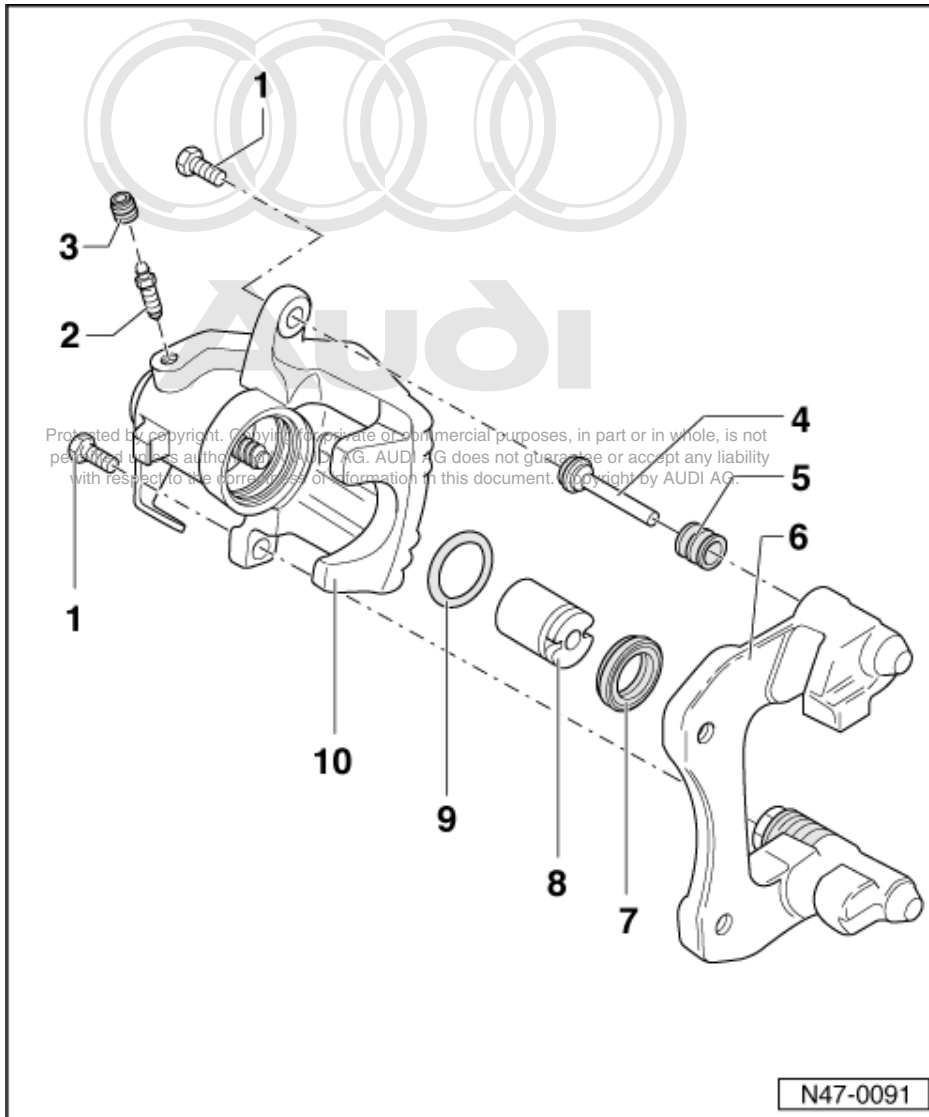
- 1 Bolt, 35 Nm**
- ♦ Self-locking



- ♦ Always replace after removing
 - ♦ Support at guide pin when slackening off and tightening
- 2 Bleed screw, 10 Nm**
- ♦ Before screwing in, grease thread with small quantity of assembly paste G 052 150 A2
- 3 Protective cap**
- 4 Guide pin**
- ♦ Grease before fitting protective cap
- 5 Protective cap**
- ♦ Attach to brake carrier and guide pin



- 6 Brake carrier with guide pin and protective cap**
- ♦ Replacement carriers are supplied assembled and with sufficient grease at guide pins
 - ♦ Fit repair set in the event of damage at protective caps or guide pins; use pad provided to grease guide pins
- 7 Protective cap**
- ♦ Position outer sealing lip on piston
- 8 Piston with automatic adjuster**
- ♦ Removing and installing=>Page 158
 - ♦ Apply thin coat of assembly paste G 052 150 A2 to piston



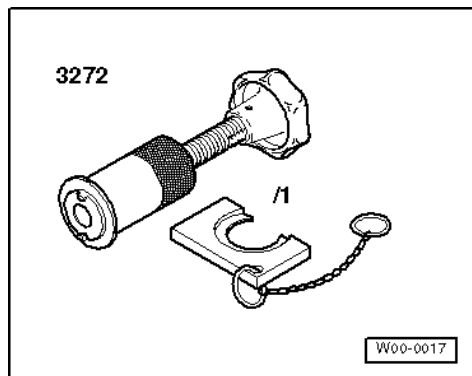
9 Sealing ring

- ♦ Take care not to damage on inserting piston
- ♦ Removing and installing=>Page **158**

10 Brake caliper housing with lever for handbrake cable

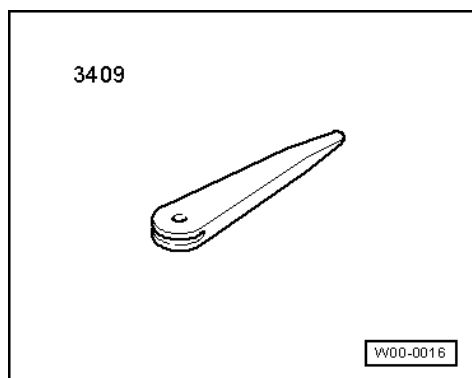
- ♦ Replace brake caliper housing in the event of leakage at lever for handbrake cable
- ♦ After servicing, pre-bleed brake caliper housing => Page **160**

3.3 - Removing and installing piston for rear brake caliper

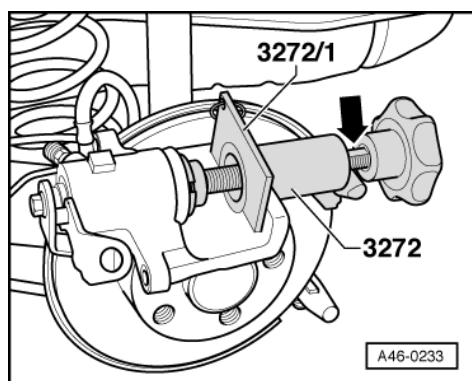


Special tools and workshop equipment required

- ♦ Resetting and extracting tool 3272



- ♦ Assembly wedge 3409
- ♦ Bleeder container

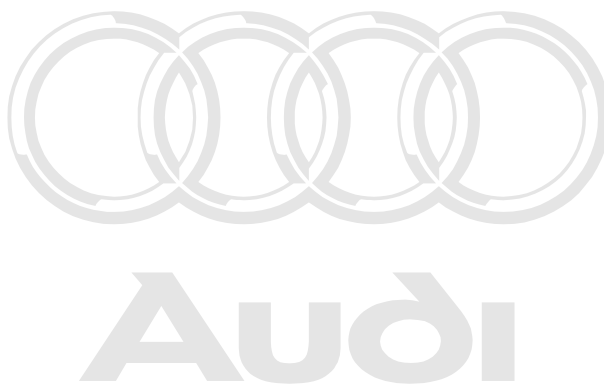


Removing

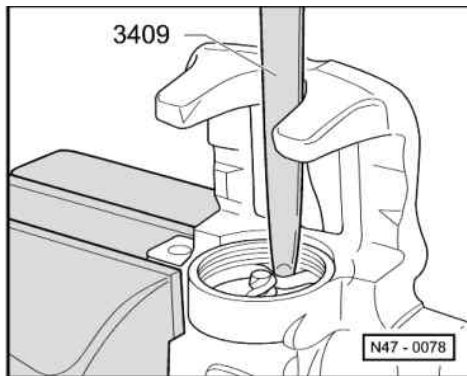
- -> Apply special tool 3272 with 3272/1 to piston of brake caliper housing.
- Screw piston out of brake caliper housing by turning knurled wheel anti-clockwise.

Note:

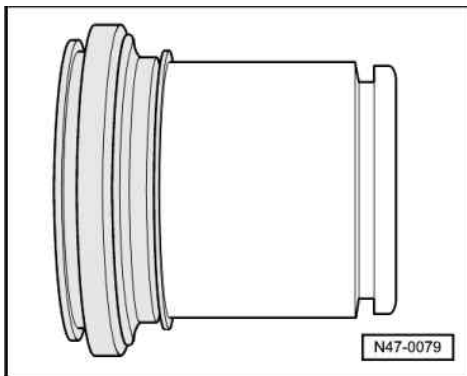
If piston is stiff, 13 mm open-ended wrench can be applied at appropriate flats -arrow-.



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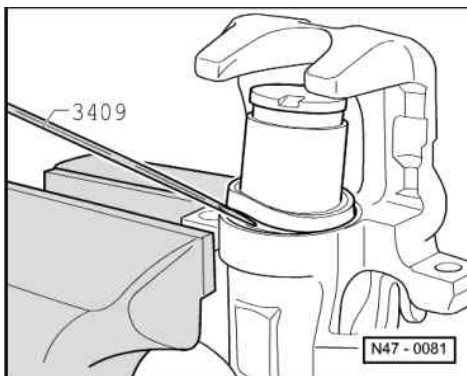
- -> Use assembly wedge 3409 to take out sealing ring.



Installing

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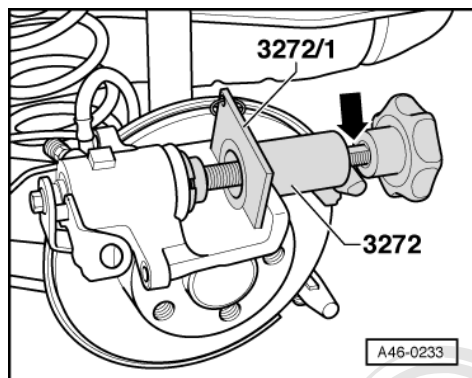
- Clean surfaces of piston and sealing ring (white spirit only) and then dry.
- Before fitting, apply thin coat of assembly paste G 052 150 A2 to piston and sealing ring.
- Insert sealing ring in brake caliper housing.
- -> Position outer sealing lip of protective cap on piston.



- -> Use assembly wedge 3409 to insert inner sealing lip in groove of cylinder.

Note:

In doing so, hold piston in front of brake caliper housing.

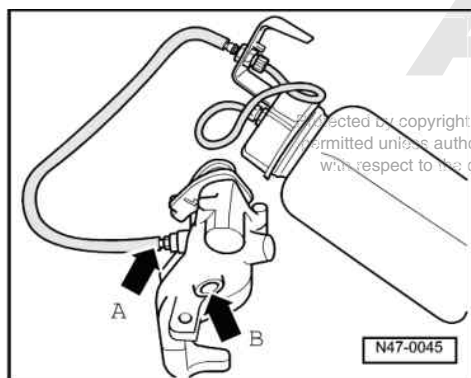


- -> Apply special tool 3272 with 3272/1 to piston of brake caliper housing.
- Screw in piston by turning knurled wheel clockwise.

Note:

Adjusting piston with resetting tool destroys automatic adjuster in brake caliper.

- Insert brake pads.

**Pre-bleeding brake caliper**

- -> Open bleed screw -arrow A- and use commercially available bleeder container to pour in brake fluid until bubble-free fluid emerges from tapped hole (brake hose connection) -arrow B-. Close bleed screw.

Note:

Set up brake caliper as shown in Fig. for pre-bleeding.

4 - Bleeding brake system - ABS/ESP ITT Mark 20

4.1 - Bleeding brake system - ABS/ESP ITT Mark 20

Attention:

- ♦ Never allow brake fluid to come into contact with liquids containing mineral oil (oil, petrol, cleaning agents) as mineral oils would damage the plugs and collars in the brake system.
- ♦ Brake fluid is poisonous and is never to be sucked off by mouth with a hose. On account of its corrosive effect it must also not be allowed to come into contact with paintwork.
- ♦ Brake fluid is hygroscopic, i.e. it absorbs moisture from the atmosphere and is therefore always to be kept in containers with an air-tight seal.
- ♦ Observe disposal regulations.

Special feature of vehicles with ABS/EDL

If one chamber of the brake fluid reservoir is completely empty (e.g. on account of leaks in brake system), hydraulic unit must be bled with vehicle diagnostic, testing and information system VAS 5051 using function "04 - Basic setting" =>Page 162.

When using filling and bleeding appliance, e.g. VAS 5234 or V.A.G 1869 A, to replenish brake fluid care must be taken to ensure that filling pressure does not exceed 1 bar.

In the event of a filling pressure greater than 1 bar, a hydraulically actuated switching valve for the EDL control system prevents full flushing of the areas of the hydraulic unit specific to EDL. Proper bleeding is then no longer guaranteed.

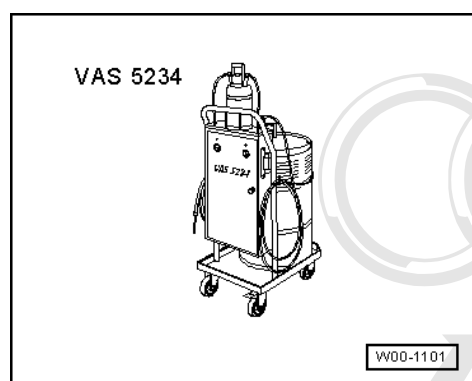
The brake fluid pressure at the filling and bleeding appliance must therefore be reduced to 1 bar.

=> VAS 5234 or V.A.G 1869 A operating instructions

Notes:

- ◆ Make exclusive use of fresh brake fluid, part no. B 000 700 A (in container sizes from 0.25 to 30 litres).
- ◆ Rinse off any brake fluid which escapes using copious amounts of water.

4.2 - Bleeding brake system using brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A



Special tools and workshop equipment required

- ◆ Brake filling and bleeding appliance VAS 5234
- Or

- ◆ Brake filling and bleeding appliance V.A.G 1869 A

Sequence of operations

- Connect up brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A.
- Detach protective cap at bleed screw of brake caliper and attach bleed hose of bleeder bottle to bleed screw.

Bleeding sequence

- 1 - Front left brake caliper
 - 2 - Front right brake caliper
 - 3 - Rear left brake caliper
 - 4 - Rear right brake caliper
- With bleeder bottle hose attached, leave bleed screw open until the brake fluid which emerges is clear and free from bubbles.
 - Press brake pedal 5 times to assist bleeding process.

- Tighten bleed screw to 10 Nm, detach bleed hose and attach protective cap to bleed screw.
- Repeat bleeding procedure in stated sequence at other brake calipers.
- Making allowance for pad wear, fill brake fluid reservoir as far as max. mark and screw on cap.
- Start engine and check both brake pedal travel and pressure.
- In the event of excessive pedal travel, check brake system for leaks/repeat bleeding procedure.

On completion of bleeding, perform test drive involving at least one ABS control operation at all four wheels.

Changing brake fluid

=> Maintenance

4.3 - Bleeding brake system without brake filling and bleeding appliance

Note:

Make sure brake fluid reservoir is always full.

- Detach protective cap at bleed screw of brake caliper and attach bleed hose of bleeder bottle to bleed screw.

Bleeding sequence => Page **161**

- Build up pressure in brake system by pumping with pedal.

Note:

Press brake pedal slowly to avoid formation of bubbles.

- Once pressure has built up, keep brake pedal depressed.
- Open bleed screw with hose of bleeder bottle attached until pressure has been dissipated (pedal sags).
- Keep pedal depressed and close bleed screw.

- Release brake pedal and wait approx. 2 seconds to allow brake fluid to flow in from brake fluid reservoir.
- Repeat procedure until brake fluid emerging is clear and free from bubbles.
- Tighten bleed screw to 10 Nm, detach bleed hose and attach protective cap to bleed screw.
- Repeat bleeding procedure in stated sequence at other brake calipers.

Notes:

- ♦ If one chamber of brake fluid reservoir is completely empty (e.g. on account of leaks in brake system), brake system must be pre-bled => Page **163**.
- ♦ On right-hand drive vehicles, brake master cylinder must additionally be bled. Bleeding sequence => Page **167**

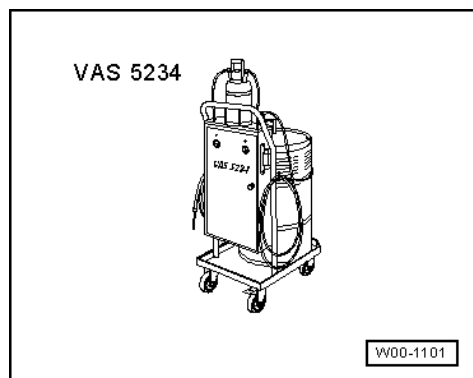
- Making allowance for pad wear, fill brake fluid reservoir as far as max. mark and screw on cap.
- Start engine and check both brake pedal travel and pressure.
- In the event of excessive pedal travel, check brake system for leaks/repeat bleeding procedure.

Changing brake fluid

=> Maintenance

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4.4 - Bleeding brake system if brake fluid reservoir has run empty

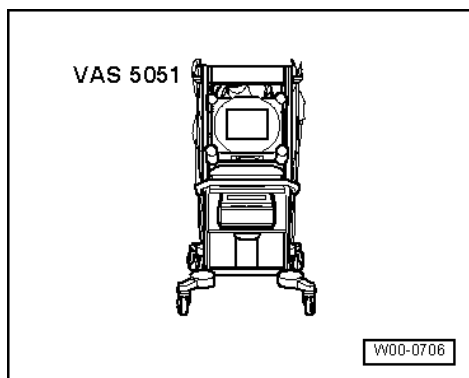


Special tools and workshop equipment required

- ◆ Brake filling and bleeding appliance VAS 5234

Or

- ◆ Brake filling and bleeding appliance V.A.G 1869 A



- ◆ Vehicle diagnostic, testing and information system VAS 5051 with VAS 5051/1

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Basic setting is only necessary on vehicles with ABS/EDL.

When using filling and bleeding appliance, e.g. VAS 5234 or V.A.G 1869 A, to replenish brake fluid care must be taken to ensure that filling pressure does not exceed 1 bar.

In the event of a filling pressure greater than 1 bar, a hydraulically actuated switching valve for the EDL control system prevents full flushing of the areas of the hydraulic unit specific to EDL. Proper bleeding is then no longer guaranteed.

The brake fluid pressure at the filling and bleeding appliance must therefore be reduced to 1 bar.

=> VAS 5234 or V.A.G 1869 A operating instructions

The filling and bleeding appliance V.A.G 1238/B is not suitable for bleeding the brake system using the "Starting basic setting" function.

If this is the only equipment available, the filling and bleeding appliance V.A.G 1238/B must be switched on and off as appropriate to ensure that there is always sufficient brake fluid in the reservoir.

Requirement:

- Vehicle diagnostic, testing and information system VAS 5051 connected up; vehicle self-diagnosis and vehicle system "03 - Brake electronics" selected

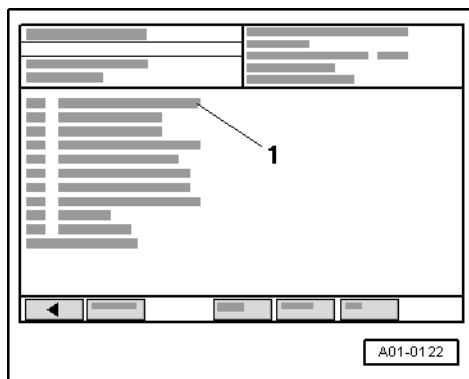
=> Running Gear, Self-diagnosis; Repair Group 01

Pre-bleeding

- Connect up brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A.
- Open bleed screws in prescribed sequence and pre-bleed brake calipers.

- 1 - Simultaneously bleed both front left and front right brake caliper
- 2 - Simultaneously bleed both rear left and rear right brake caliper

- With bleeder bottle hoses attached, leave bleed screws open until the brake fluid which emerges is free from bubbles.



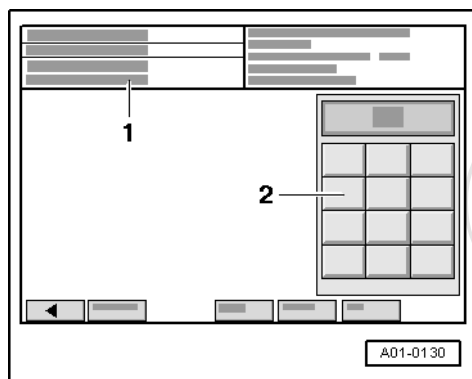
Bleeding

-> Display on VAS 5051:

- From list -1- select diagnosis function "04 - Basic setting".

Note:

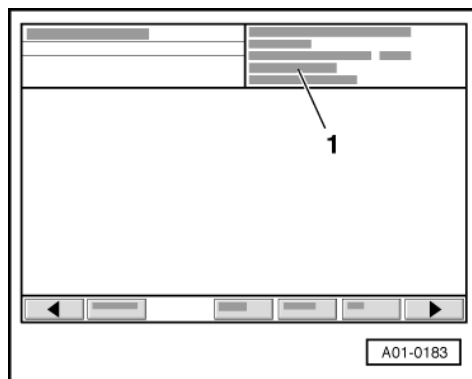
ABS warning lamp flashes in the course of the following operations.



-> Display on VAS 5051:

- 1 - Enter display group

- Use keypad -2- to enter "001" for "Display group number 001" and confirm by touching Q key.



-> Display on VAS 5051:

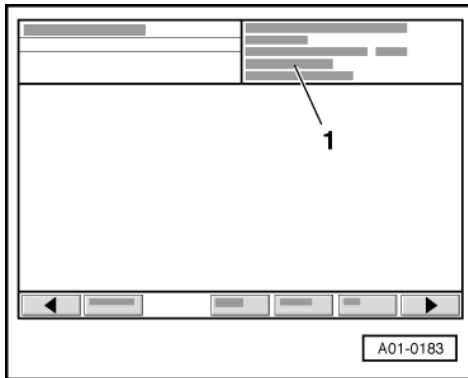
- 1 - Basic setting
- 2 - Display group 1
- 3 - Press and hold pedal ...

- Press pedal firmly and hold in position.
 - Pedal sags, hydraulic pump starts up briefly, pedal returns

Display on VAS 5051:

- 3 - Release pedal; FR/FL bleed screws OPEN <>

- Release pedal, open front bleed screws.



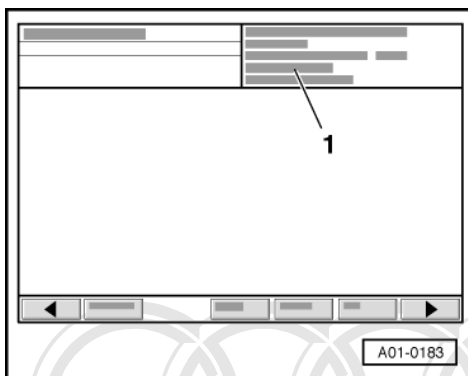
- Touch s key to switch to display group 002.

-> Display on VAS 5051:

- 1 - Basic setting
 - 2 - Display group 2
 - 3 - Please wait .. (10 sec.)
- Wait 10 seconds.
 - Hydraulic pump starts up briefly

Display on VAS 5051:

- 3 - Press pedal 10X; bleed screws CLOSED <>
- Press pedal 10 times, close front bleed screws.

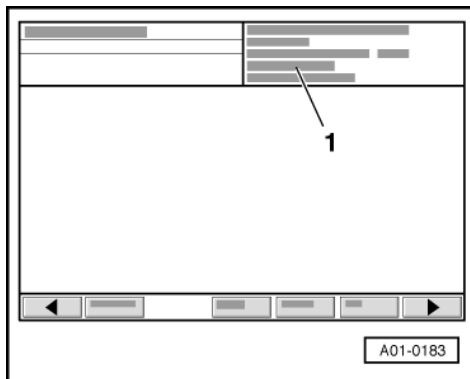


- Touch s key to switch to display group 003.

-> Display on VAS 5051:

- 1 - Basic setting
 - 2 - Display group 3
 - 3 - Press and hold pedal ...
- Repeat bleeding procedure as described above.
 - Touch s key in each case to switch to next highest display group until display group 17 is reached.

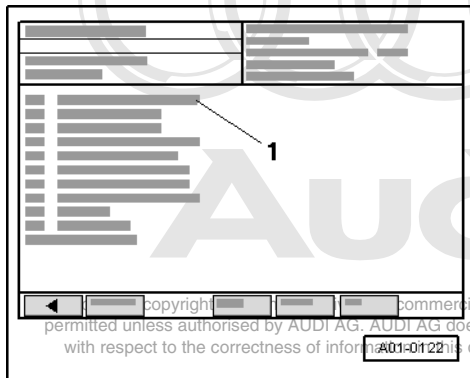
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-> Display on VAS 5051:

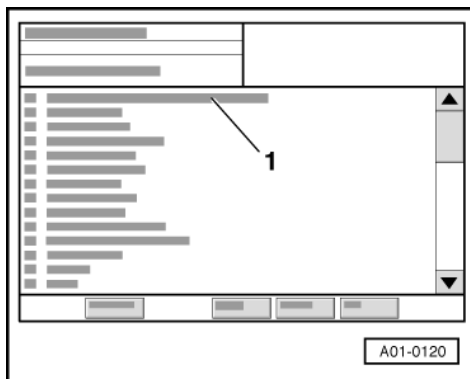
- 1 - Basic setting
- 2 - Display group 17
- 3 - Partial bleeding over ...

- Terminate function "04 - Basic setting" by touching ◀ key.



-> Display on VAS 5051:

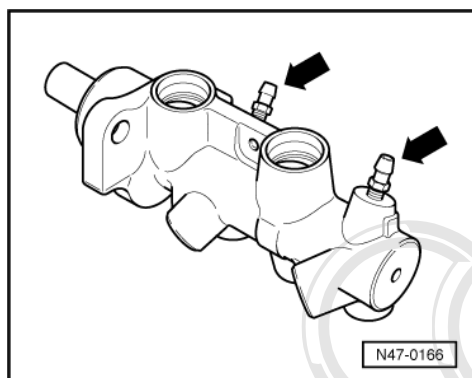
- From list -1- select diagnosis function "06 - End of output".



-> Display on VAS 5051:

- Switch off ignition and unplug diagnostic connector when this display appears.

- Brake system must then be bled => Page 160 .



Special feature of right-hand drive vehicles:

-> If one chamber of brake fluid reservoir is completely empty, brake master cylinder must be bled at bleed screws -arrows- on completion of basic setting.

5 - Bleeding brake system - ITT ABS/ESP Mark 60

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5.1 - Bleeding brake system - ITT ABS/ESP Mark 60

Attention:

- ◆ Never allow brake fluid to come into contact with liquids containing mineral oil (oil, petrol, cleaning agents) as mineral oils would damage the plugs and collars in the brake system.
- ◆ Brake fluid is poisonous and is never to be sucked off by mouth with a hose. On account of its corrosive effect it must also not be allowed to come into contact with paintwork.
- ◆ Brake fluid is hygroscopic, i.e. it absorbs moisture from the atmosphere and is therefore always to be kept in containers with an air-tight seal.
- ◆ Observe disposal regulations.

If one chamber of brake fluid reservoir is completely empty (e.g. on account of leaks in brake system), start by pre-bleeding brake system => Page 170 .

Hydraulic unit must then be bled with vehicle diagnostic, testing and information system VAS 5051 using function "04 - Basic setting"
 =>Page 169 .

When using filling and bleeding appliance, e.g. VAS 5234 or V.A.G 1869 A, to replenish brake fluid care must be taken to ensure that filling pressure does not exceed 1 bar.

In the event of a filling pressure greater than 1 bar, a hydraulically actuated switching valve for the EDL control system prevents full flushing of the areas of the hydraulic unit specific to EDL. Proper bleeding is then no longer guaranteed.

The brake fluid pressure at the filling and bleeding appliance must therefore be reduced to 1 bar.

=> VAS 5234 or V.A.G 1869 A operating instructions

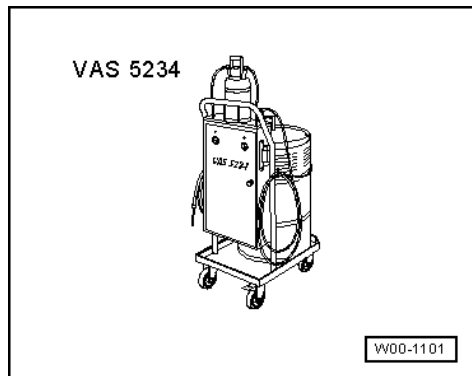
Notes:

- ◆ Make exclusive use of fresh brake fluid, part no. B 000 700 A (in container sizes from 0.25 to 30 litres).



- ♦ Rinse off any brake fluid which escapes using copious amounts of water.

5.2 - Bleeding brake system using brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A



Special tools and workshop equipment required

- ♦ Brake filling and bleeding appliance VAS 5234

Or

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

Sequence of operations

- Connect up brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A.
- Detach protective cap at bleed screw of brake caliper and attach bleed hose of bleeder bottle to bleed screw.

Bleeding sequence

- 1 - Front left brake caliper
 - 2 - Front right brake caliper
 - 3 - Rear left brake caliper
 - 4 - Rear right brake caliper
- With bleeder bottle hose attached, leave bleed screw open until the brake fluid which emerges is clear and free from bubbles.
 - Press brake pedal 5 times to assist bleeding process.
 - Tighten bleed screw to 10 Nm, detach bleed hose and attach protective cap to bleed screw.
 - Repeat bleeding procedure in stated sequence at other brake calipers.
 - Making allowance for pad wear, fill brake fluid reservoir as far as max. mark and screw on cap.
 - Start engine and check both brake pedal travel and pressure.
 - In the event of excessive pedal travel, check brake system for leaks/repeat bleeding procedure.

After bleeding brake system, zero position compensation must be performed for brake pressure sender -1- - G201.

=> Running Gear, Self-diagnosis; Repair Group 01

On completion of bleeding, perform test drive involving at least one ABS control operation at all four wheels.

Changing brake fluid

=> Maintenance

5.3 - Bleeding brake system without brake filling and bleeding appliance

Note:

Make sure brake fluid reservoir is always full.

- Detach protective cap at bleed screw of brake caliper and attach bleed hose of bleeder bottle to bleed screw.

Bleeding sequence => Page **168**

- Build up pressure in brake system by pumping with pedal.

Note:

Press brake pedal slowly to avoid formation of bubbles.

- Once pressure has built up, keep brake pedal depressed.
- Open bleed screw with hose of bleeder bottle attached until pressure has been dissipated (pedal sags).
- Keep pedal depressed and close bleed screw.
- Release brake pedal and wait approx. 2 seconds to allow brake fluid to flow in from brake fluid reservoir.
- Repeat procedure until brake fluid emerging is clear and free from bubbles.
- Tighten bleed screw to 10 Nm, detach bleed hose and attach protective cap to bleed screw.
- Repeat bleeding procedure in stated sequence at other brake calipers.

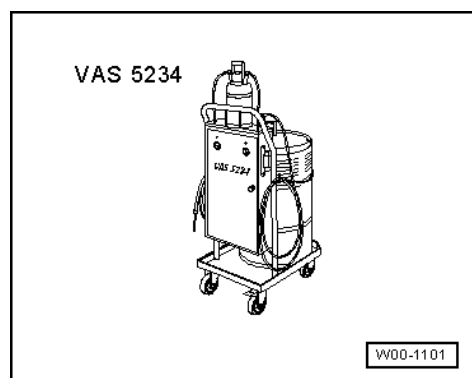
Notes:

- ♦ If one chamber of brake fluid reservoir is completely empty (e.g. on account of leaks in brake system), brake system must be pre-bled => Page **170**.
- ♦ On right-hand drive vehicles, brake master cylinder must additionally be bled. Bleeding sequence => Page **174**.
- Making allowance for pad wear, fill brake fluid reservoir as far as max. mark and screw on cap.
- Start engine and check both brake pedal travel and pressure.
- In the event of excessive pedal travel, check brake system for leaks/repeat bleeding procedure.

Changing brake fluid

=> Maintenance

5.4 - Bleeding brake system if brake fluid reservoir has run empty

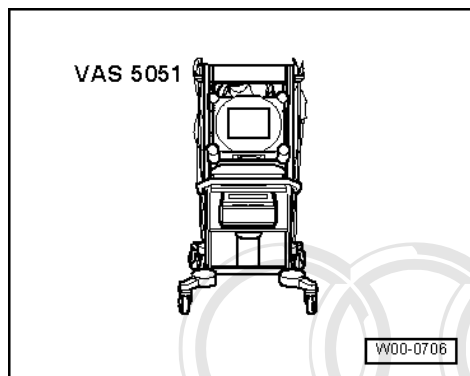


Special tools and workshop equipment required

- ♦ Brake filling and bleeding appliance VAS 5234

Or

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



- ♦ Vehicle diagnostic, testing and information system VAS 5051 with VAS 5051/1

When using filling and bleeding appliance, e.g. VAS 5234 or V.A.G 1869 A, to replenish brake fluid care must be taken to ensure that filling pressure does not exceed 1 bar.

In the event of a filling pressure greater than 1 bar, a hydraulically actuated switching valve for the EDL control system prevents full flushing of the areas of the hydraulic unit specific to EDL. Proper bleeding is then no longer guaranteed.

The brake fluid pressure at the filling and bleeding appliance must therefore be reduced to 1 bar.

=> VAS 5234 or V.A.G 1869 A operating instructions

The filling and bleeding appliance V.A.G 1238/B is not suitable for bleeding the brake system using the "Starting basic setting" function.

If this is the only equipment available, the filling and bleeding appliance V.A.G 1238/B must be switched on and off as appropriate to ensure that there is always sufficient brake fluid in the reservoir.

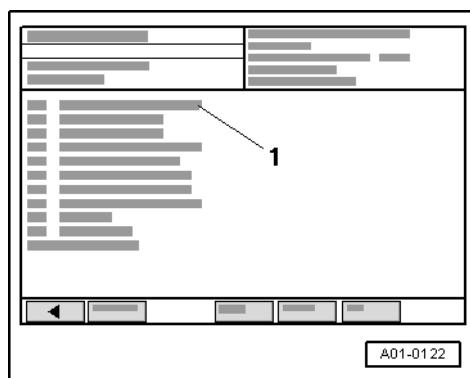
Requirement:

- Vehicle diagnostic, testing and information system VAS 5051 connected up; vehicle self-diagnosis and vehicle system "03 - Brake electronics" selected

=> Running Gear, Self-diagnosis; Repair Group 01

Pre-bleeding

- Connect up brake filling and bleeding appliance VAS 5234 or V.A.G 1869 A.
- Open bleed screws in prescribed sequence and pre-bleed brake calipers.
 - 1 - Simultaneously bleed both front left and front right brake caliper
 - 2 - Simultaneously bleed both rear left and rear right brake caliper
- With bleeder bottle hoses attached, leave bleed screws open until the brake fluid which emerges is free from bubbles.



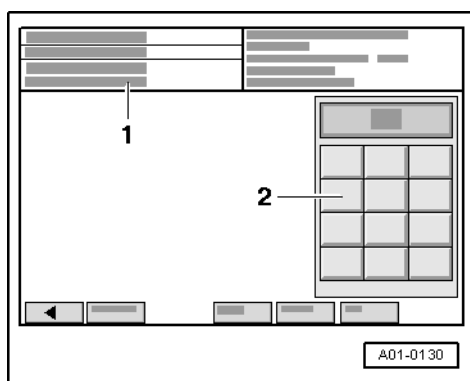
Bleeding

-> Display on VAS 5051:

- From list -1- select diagnosis function "04 - Basic setting".

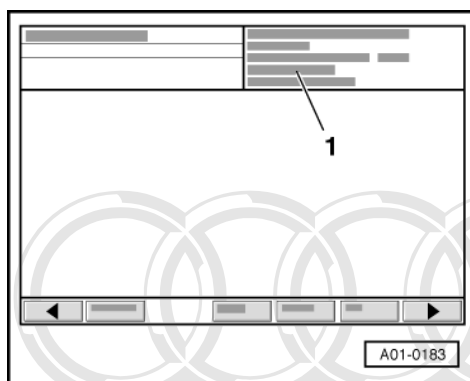
Note:

ABS warning lamp flashes in the course of the following operations.



-> Display on VAS 5051:

- 1 - Enter display group
- Use keypad -2- to enter "001" for "Display group number 001" and confirm by touching Q key.



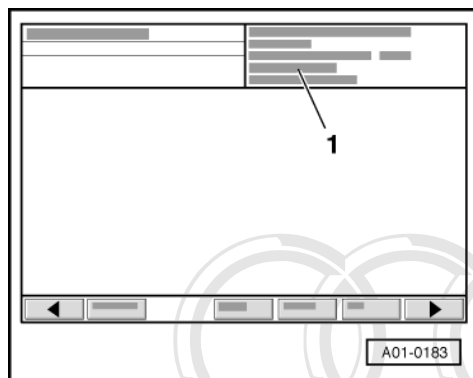
-> Display on VAS 5051:

- 1 - Basic setting
- 2 - Display group 1
- 3 - Press and hold pedal ...

Press pedal firmly and hold in position.
 Pedal sags, hydraulic pump starts up briefly, pedal returns

Display on VAS 5051:

- 3 - Release pedal; FR/FL bleed screws OPEN <>
- Release pedal, open front bleed screws.



- Touch s key to switch to display group 002.

-> Display on VAS 5051:

- 1 - Basic setting
- 2 - Display group 2
- 3 - Please wait .. (10 sec.)

- Wait 10 seconds.

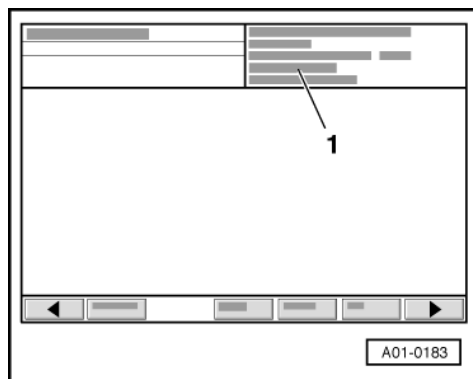
- Hydraulic pump starts up briefly

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Display on VAS 5051:

- 3 - Press pedal 10X; bleed screws CLOSED <>

- Press pedal 10 times, close front bleed screws.

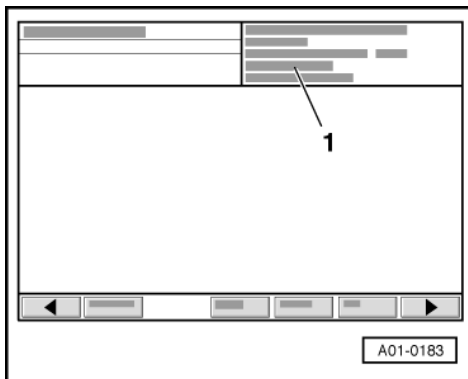


- Touch s key to switch to display group 003.

-> Display on VAS 5051:

- 1 - Basic setting
- 2 - Display group 3
- 3 - Press and hold pedal ...

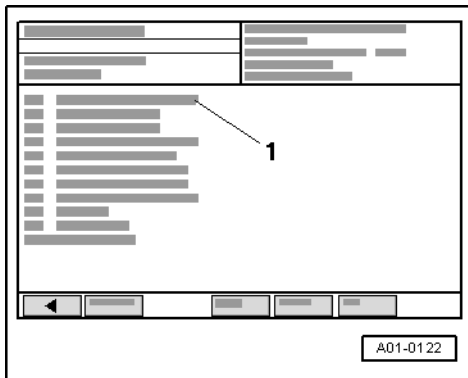
- Repeat bleeding procedure as described above.
- Touch s key in each case to switch to next highest display group until display group 17 is reached.



-> Display on VAS 5051:

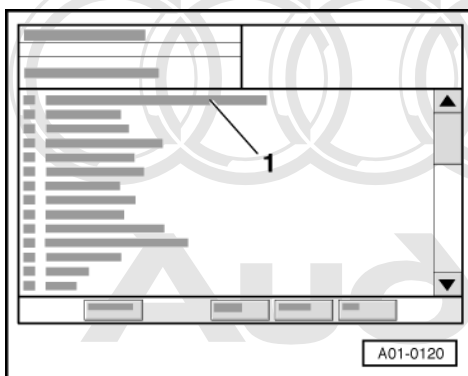
- 1 - Basic setting
- 2 - Display group 17
- 3 - Partial bleeding over ...

- Terminate function "04 - Basic setting" by touching ◀ key.



-> Display on VAS 5051:

- From list -1- select diagnosis function "06 - End of output".



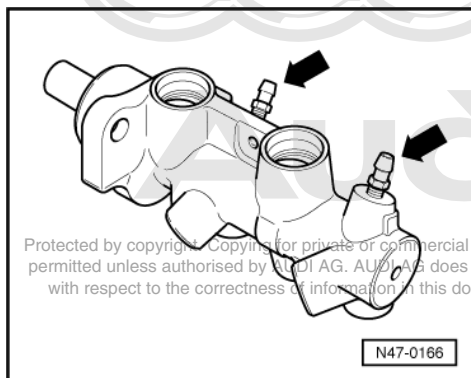
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-> Display on VAS 5051:

- Switch off ignition and unplug diagnostic connector when this display appears.



- Brake system must then be bled => Page 168 .



Special feature of right-hand drive vehicles:

-> If one chamber of brake fluid reservoir is completely empty, brake master cylinder must be bled at bleed screws -arrows- on completion of basic setting.

6 - Vacuum booster pump

6.1 - Vacuum booster pump

As of Model Year 2001 certain petrol engines with automatic gearbox are fitted with an electric vacuum pump to boost the vacuum for the brake servo.

All TDI engines feature a pump for generating the brake servo vacuum.

- ♦ TDI engines with distributor-type injection pump have a separate vacuum pump
- ♦ TDI engines with unit injector system are fitted with a tandem pump which is also responsible for fuel delivery

6.2 - Checking vacuum pump for brake -V192

Test sequence

- Drive vehicle onto lifting platform and switch off engine.
- Start engine.
 - On starting, vacuum pump for brake -V192 (at subframe on left in front of steering box) must start up briefly
- A second person is required to check operation of vacuum pump for brake -V192 by way of touch.

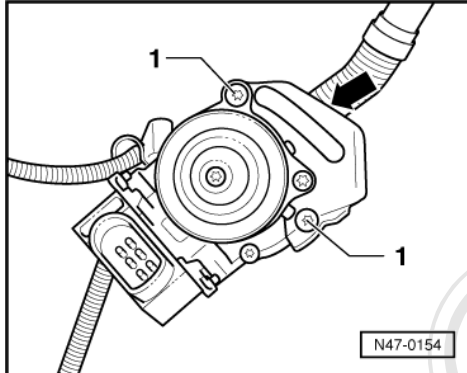
If vacuum pump for brake -V192 does not start up:

- Interrogate fault memory of engine control unit.

=> Injection and Ignition System; Repair Group 01

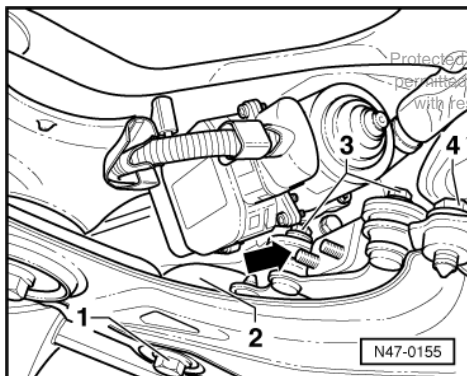
6.3 - Removing and installing vacuum pump for brake -V192

No provision is made for servicing vacuum pump for brake -V192. In the event of a fault, vacuum pump for brake -V192 must be replaced.



Removing

- -> Screw out bolts -1- at bracket for vacuum pump on left of subframe.
- Pull vacuum hose -arrow- off vacuum pump.
- Unplug connector.
- Take out vacuum pump for brake -V192.



- -> To remove bracket -arrow- screw nut -2- off bolt -1-.
- Screw out bolt -4- and detach bracket.
- To further dismantle bracket -arrow- screw out bolts -3-.

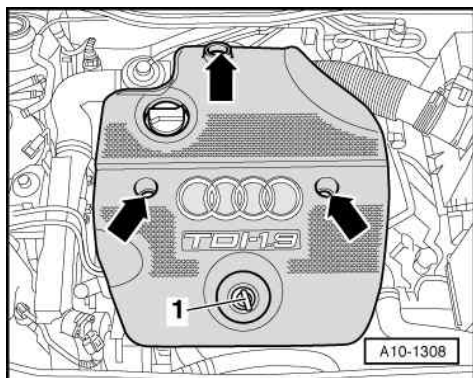
Installing

Install in reverse order.

Tightening torques

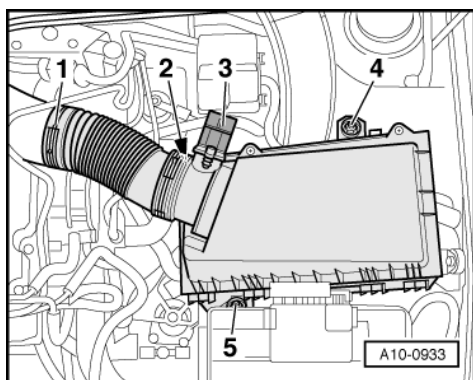
Component	Nm
Bracket for vacuum pump to subframe	20
Vacuum pump to bracket	8
Air cleaner housing	10

6.4 - Removing and installing vacuum pump - Vehicles with distributor-type injection pump

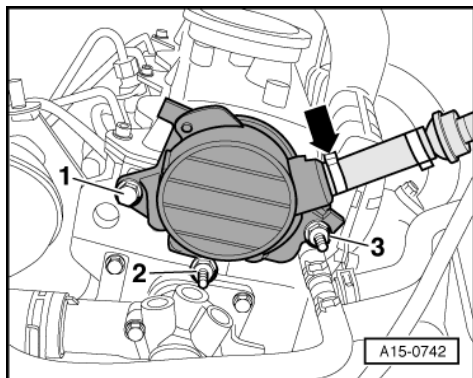


Removing

- -> Pull dipstick -1- out of guide tube.
- Unclip caps.
- Unfasten nuts -arrows- and detach engine cover.
- Re-insert dipstick in guide tube.



- -> Detach air hose -1- at air pipe.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.
- Disconnect breather hose -2- on back of air cleaner housing.
- Take out air cleaner housing.
- Pull vacuum hose off vacuum reservoir.



- -> If fitted, unscrew holder for vacuum hose from bolts -2- and -3-.
- Detach vacuum hose -arrow- to brake servo.
- Screw out bolts 1... 3 and detach vacuum pump.



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Installing

Install in reverse order, paying attention to the following:

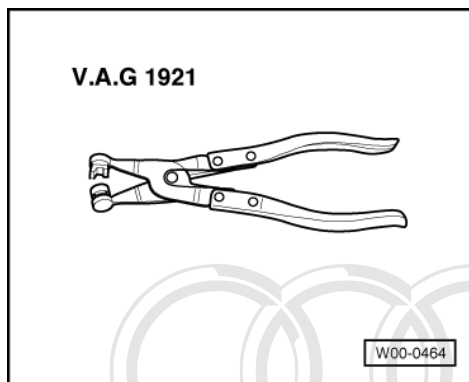
Note:

Replace gasket.

Tightening torques

Component	Nm
Vacuum pump to cylinder head	20
Bracket to vacuum pump	10

6.5 - Removing and installing tandem pump - Vehicles with UIS engine



Special tools and workshop equipment required

- ♦ V.A.G 1921

Or

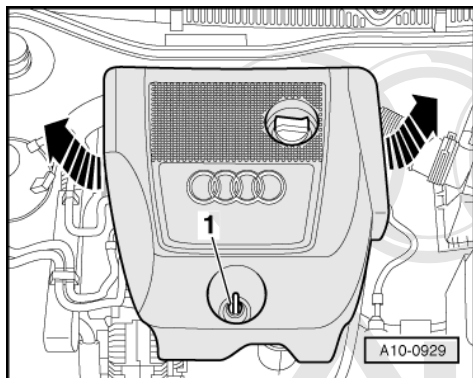
- ♦ VAS 5024



- ♦ VAS 5226

Or

- ♦ Vacuum hand pump V.A.G 1390 with bleeder container V.A.G 1390/1

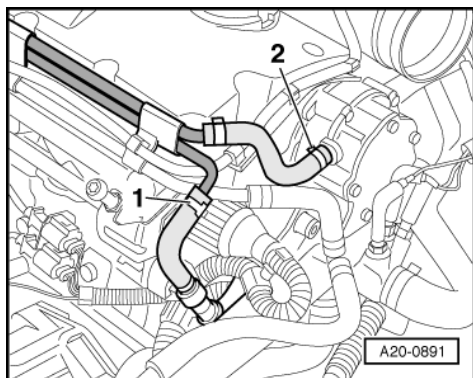


Removing

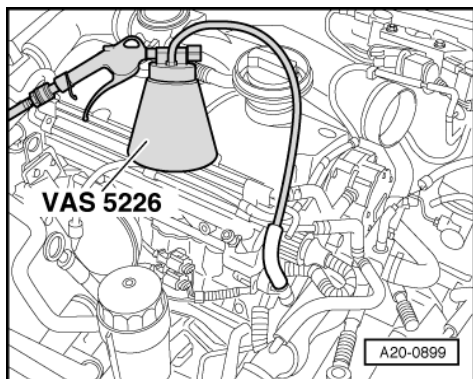
- -> Pull dipstick **1** out of guide tube.
- Pull off engine cover **arrows**.
- Re-insert dipstick in guide tube.
- Detach air hose between air pipe at top and air cleaner housing.

Attention:

- ♦ **Fuel system is pressurised. Wrap cloth around joint before opening system. Then dissipate pressure by carefully unfastening joint.**
- ♦ **In extreme cases, temperature of fuel pipes/fuel may be as high as 100 °C on vehicles with UIS engine. To avoid acute danger of burns, allow fuel to cool before unfastening pipe connections.**
- ♦ **Wear protective gloves.**
- ♦ **Use safety goggles.**



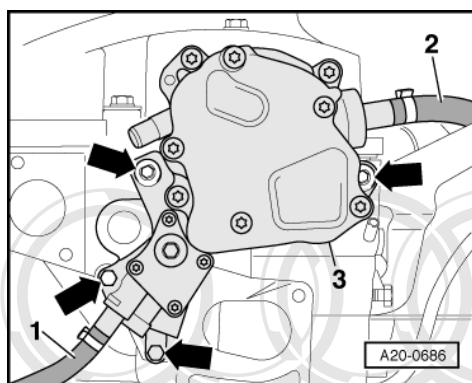
- -> Disconnect fuel supply hose **-2-** from tandem pump.
- Pull fuel return hose **-1-** (blue mark) off fuel pipe.



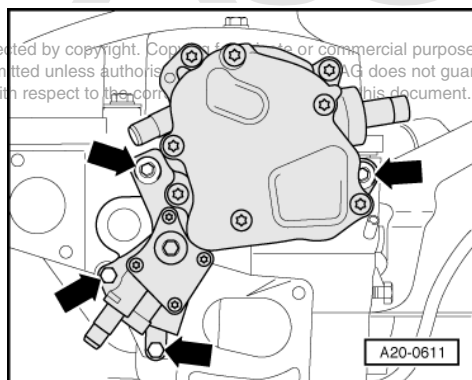
- Connect compressed-air supply to diesel extractor VAS 5226.
- -> Connect diesel extractor VAS 5226 to fuel return hose.

Notes:

- ◆ Instead of diesel extractor VAS 5226, use can also be made of vacuum hand pump V.A.G 1390 with bleeder container V.A.G 1390/1.
- ◆ Drain bleeder container in good time. Fuel must not be allowed to ingress into vacuum hand pump.
- Keep operating diesel extractor VAS 5226 until no further fuel emerges from return hose.



- -> Detach fuel return hose -1- from tandem pump.
- Detach vacuum hose -2- from tandem pump.
- Screw out bolts -arrows-.
- Detach tandem pump -3- from cylinder head.



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Installing

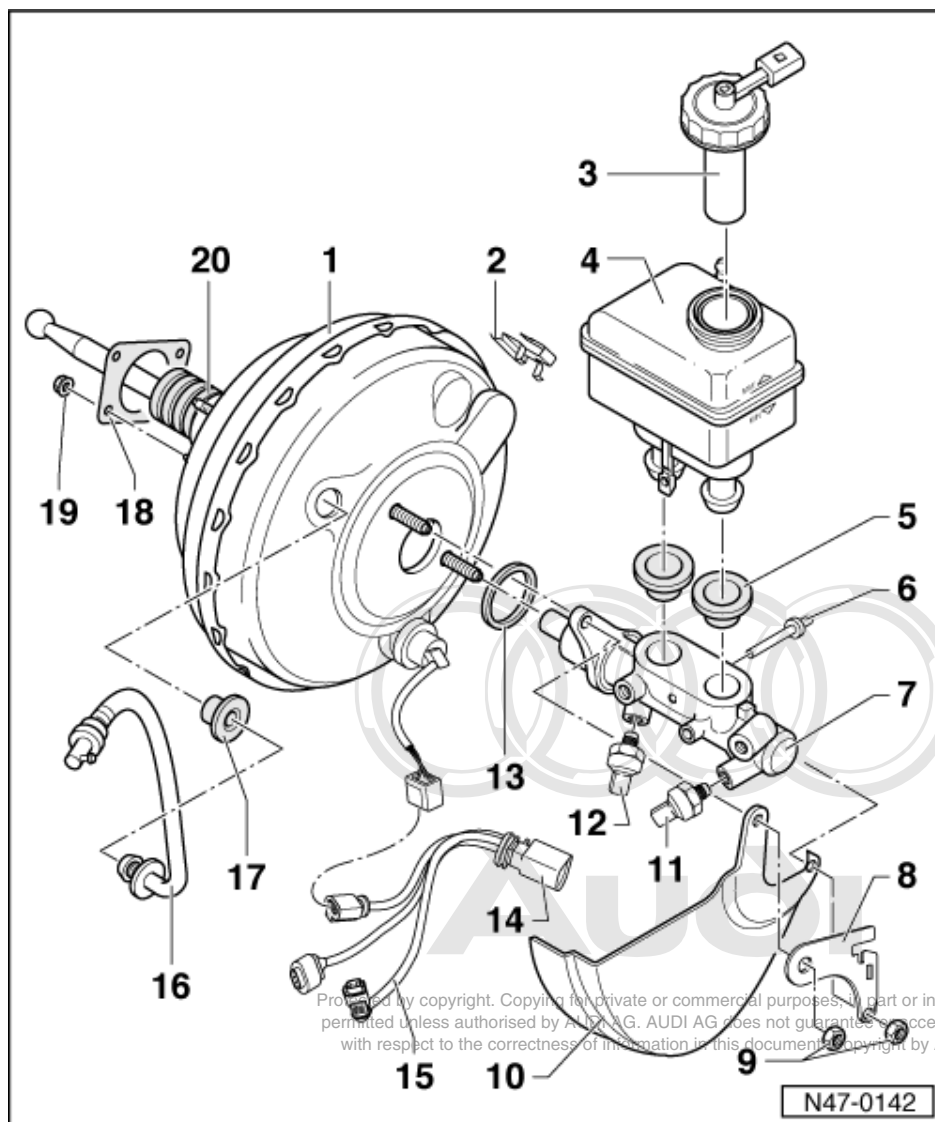
Install in reverse order, paying attention to the following:

Notes:

- ◆ Always replace tandem pump seals.
- ◆ Ensure proper seating of tandem pump driver in camshaft.
- -> Install tandem pump and tighten upper bolts to 20 Nm.
- Tighten lower bolts to 10 Nm.
- Attach all hoses to tandem pump.

7 - Brake servo/brake master cylinder - LHD

7.1 - Brake servo/brake master cylinder - LHD



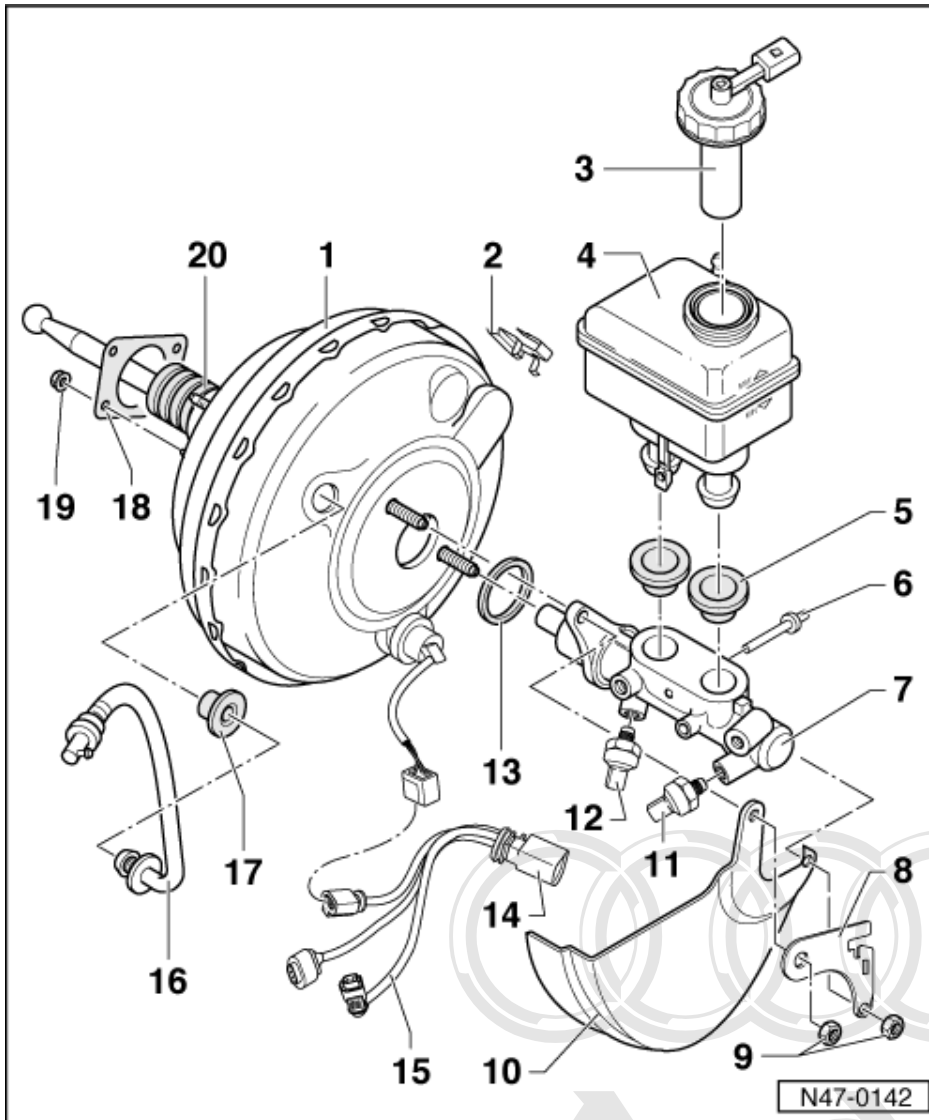
7.2 - Exploded view

Note:

Brake master cylinder and brake servo assemblies can be replaced separately.

1 Brake servo

- ◆ Checking operation
 - Floor brake pedal firmly several times with engine stopped to dissipate vacuum in unit
 - Then hold brake pedal in applied position employing moderate force and start engine; if brake servo is operating properly, brake pedal will be felt to sag (servo action)



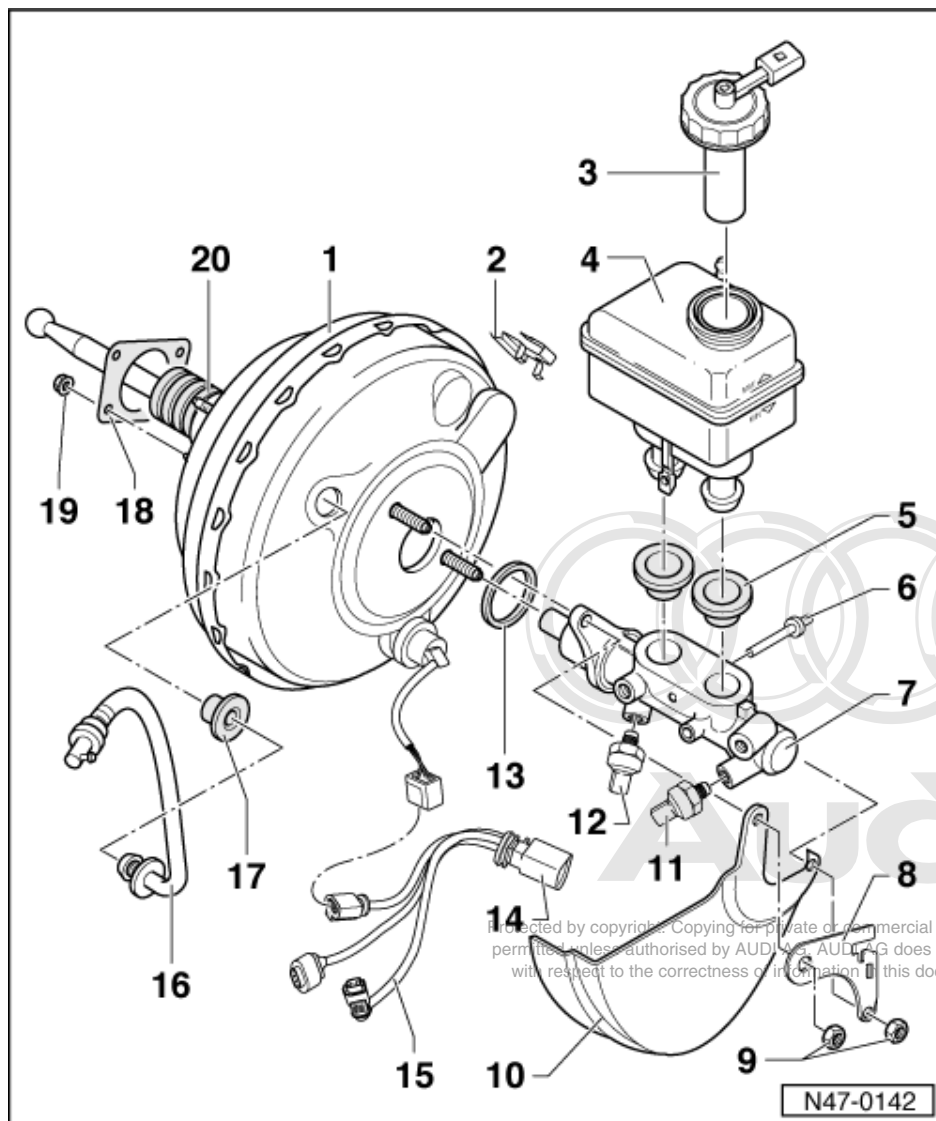
- ♦ On petrol engines, vacuum required is tapped at intake manifold or generated by vacuum pump for brake => Page 174
- ♦ TDI engines are fitted with vacuum pump/tandem pump for vacuum generation => Page 174
- ♦ In the event of loud suction noise on braking, check position of inner bellows -Item 20 -
- ♦ Separating from brake pedal 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.
=> Page 145
- ♦ Removing and installing
=> Page 188

2 Holder

- ♦ For connector -Item 14 -
- ♦ Vehicles with ESP only

3 Cap

- ♦ With integrated float and warning contact for brake fluid level



4 Brake fluid reservoir

- ◆ Moisten with brake fluid and insert in sealing plug in brake master cylinder
- ◆ Secure with retaining pin -Item 6 -
- ◆ With integrated warning contact for brake fluid level (gradual introduction)
- ◆ Replacement of warning contact involves removing brake fluid reservoir

5 Sealing plug

- ◆ Moisten with brake fluid and insert in brake master cylinder
- ◆ Press brake fluid reservoir into sealing plug

6 Retaining pin

- ◆ For brake fluid reservoir

7 Brake master cylinder

- ◆ Removing and installing
=> Page 185

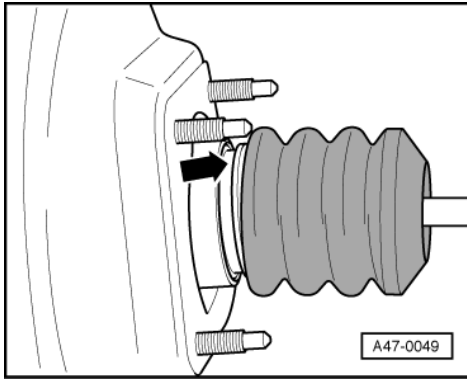
This exploded view diagram illustrates the components of a vehicle's rear brake system. The main assembly includes a brake drum (1) mounted on an axle (20) with a hub (18) and a wheel cylinder (7). The wheel cylinder is connected to a master cylinder (4) via brake lines (11, 12) and fittings (5, 6). A brake pedal (9) is shown at the bottom right, connected to the master cylinder. A brake hose (16) with a fitting (17) is shown on the left. A brake cable (14) with a bracket (15) is shown at the bottom. A brake shoe (10) is shown at the bottom right, connected to the wheel cylinder. A brake master cylinder (4) is shown at the top right, connected to the wheel cylinder. A brake pedal (9) is shown at the bottom right, connected to the master cylinder. A brake hose (16) with a fitting (17) is shown on the left. A brake cable (14) with a bracket (15) is shown at the bottom. A brake shoe (10) is shown at the bottom right, connected to the wheel cylinder. A brake master cylinder (4) is shown at the top right, connected to the wheel cylinder. A brake pedal (9) is shown at the bottom right, connected to the master cylinder. A brake hose (16) with a fitting (17) is shown on the left. A brake cable (14) with a bracket (15) is shown at the bottom. A brake shoe (10) is shown at the bottom right, connected to the wheel cylinder.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

N47-0142

- ◆ Checking position in the event of loud suction noise on braking => Fig. 1

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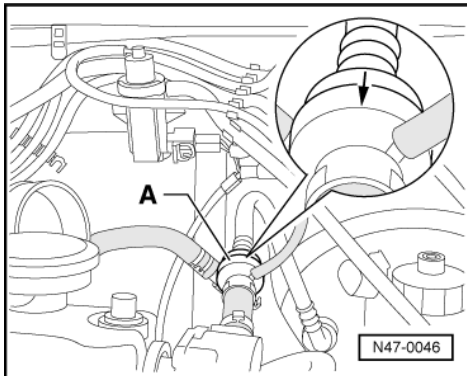


-> Fig.1 Checking inner bellows at brake servo

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Check that bellows have not slipped out of all-round groove as shown in Fig.
- Insertion of bellows involves removing brake pedal mounting bracket =>Page 141 .



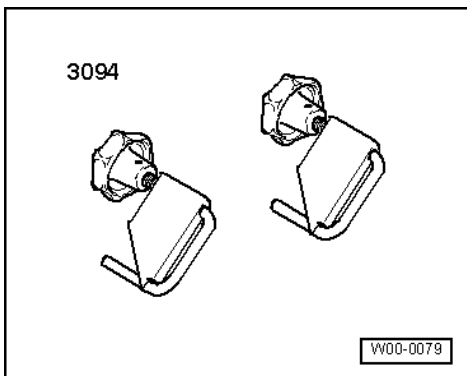
-> Fig.2 Checking non-return valve

- ♦ Non-return valve -A- must be open in direction of arrow and it must be possible to blow through it
- ♦ Non-return valve must remain closed in opposite direction and it must not be possible to blow through it

Note:

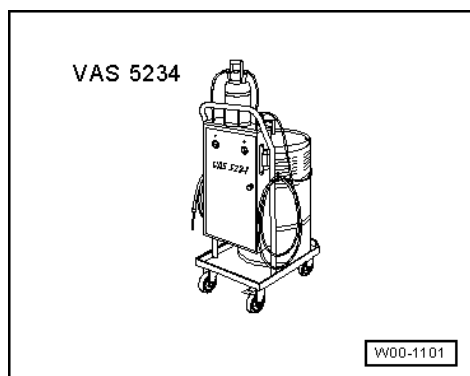
Pay attention to correct position on installation.

7.3 - Removing and installing brake master cylinder



Special tools and workshop equipment required

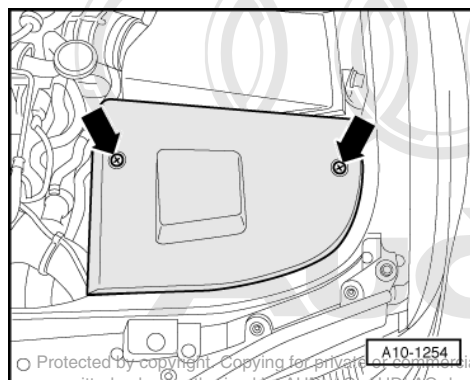
- ◆ Hose clamps 3094



- ◆ Brake filling and bleeding appliance VAS 5234

Or

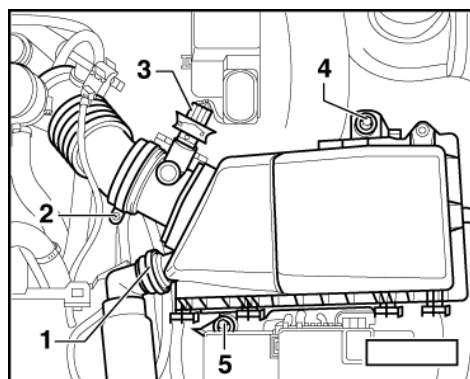
- ◆ Brake filling and bleeding appliance V.A.G 1869 A



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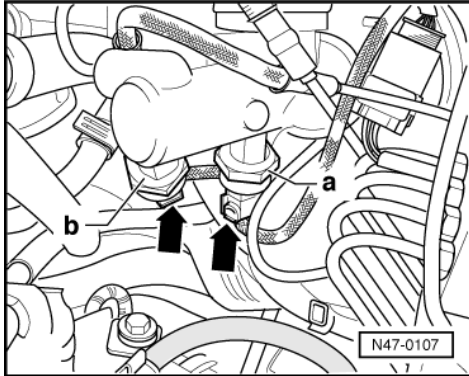
Removing

- Where necessary, remove engine cover.
- -> If fitted, remove front left cover -arrows-.



- -> If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air hose -2- at air-mass meter.
- Unplug connector for air-mass meter -3-.
- Screw out bolts -4- and -5-.

- Take out air cleaner housing.
- As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.
- Use brake filling and bleeding appliance VAS 5234 or extractor V.A.G 1869/4 to draw off as much brake fluid as possible from brake fluid reservoir.
- Use hose clamp 3094 to pinch off supply hose of clutch master cylinder.
- Pull off supply hose for clutch master cylinder.
- If fitted, unplug connector at warning contact for brake fluid level.



- -> If fitted, unplug connectors -arrows- at brake pressure senders -a- and -b-.
- Unscrew brake pipes at brake master cylinder and seal brake pipes with plugs from repair set, part no. 1H0 698 311 A.
- Unscrew securing nuts for brake master cylinder.
- If fitted, detach heat shield with retaining plate.
- Pull brake master cylinder off brake servo.

Installing

Install in reverse order, paying attention to the following:

- Replace sealing ring between brake master cylinder and brake servo.
- On inserting brake master cylinder, ensure correct positioning of pushrod in brake servo.
- Depress brake pedal slightly to facilitate insertion of brake master cylinder in pushrod.
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .
- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- On vehicles with ABS/ESP, start basic setting for brake pressure sender(s).

=> Running Gear, Self-diagnosis; Repair Group 01

- On vehicles with ABS/ESP Mark 60, perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torques

Component	Nm
Brake master cylinder to brake servo	20 1)
Brake pressure sender to brake master cylinder	14
Air cleaner housing	10

- 1) Replace nuts

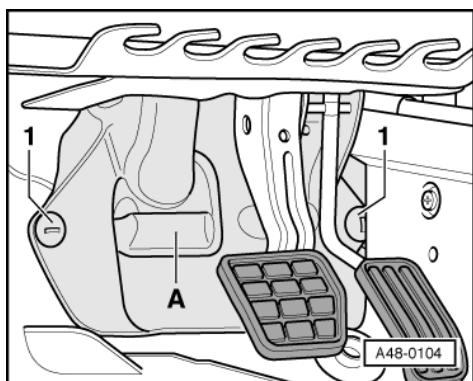
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7.4 - Removing and installing brake servo

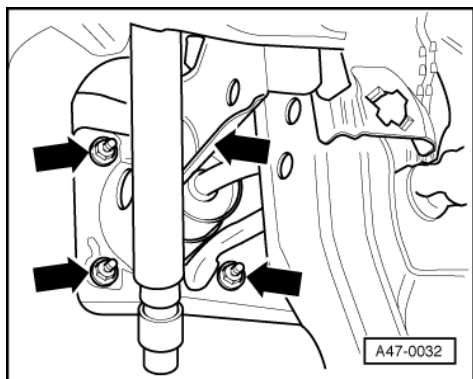
Removing

- Dissipate vacuum in brake servo by pressing brake pedal several times.
- Remove brake master cylinder => Page 185 .
- Pull vacuum pipe out of brake servo.
- If fitted, unplug connectors at brake servo.
- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment



- -> Screw out bolts -1-.
- Remove cover -A-.
- Disconnect brake pedal from brake servo => Page 145 .



- -> Unscrew nuts -arrows-.
- Detach brake servo.

Installing

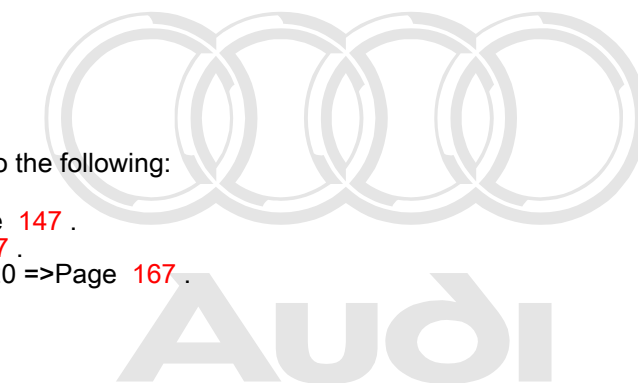
Install in reverse order, paying attention to the following:

- Fit brake pedal at brake servo =>Page 147 .
- Fit brake master cylinder => Page 187 .
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .
- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- On vehicles with ABS/ESP, start basic setting for brake pressure sender(s).

=> Running Gear, Self-diagnosis; Repair Group 01



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- On vehicles with ABS/ESP Mark 60, perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

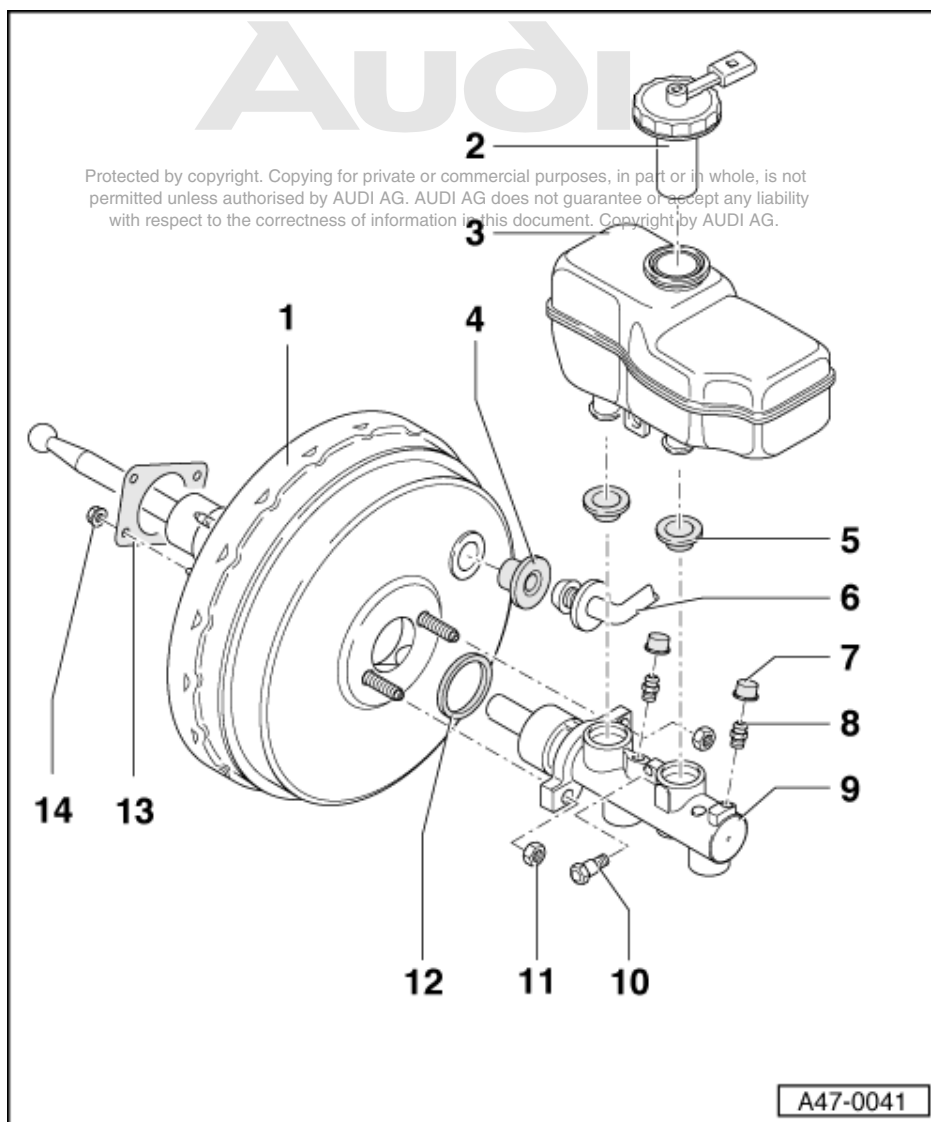
Tightening torque

Component	Nm
Brake servo/mounting bracket to bulkhead	28 1)

- 1) Replace nuts

8 - Brake servo/brake master cylinder - RHD

8.1 - Brake servo/brake master cylinder - RHD



8.2 - Exploded view

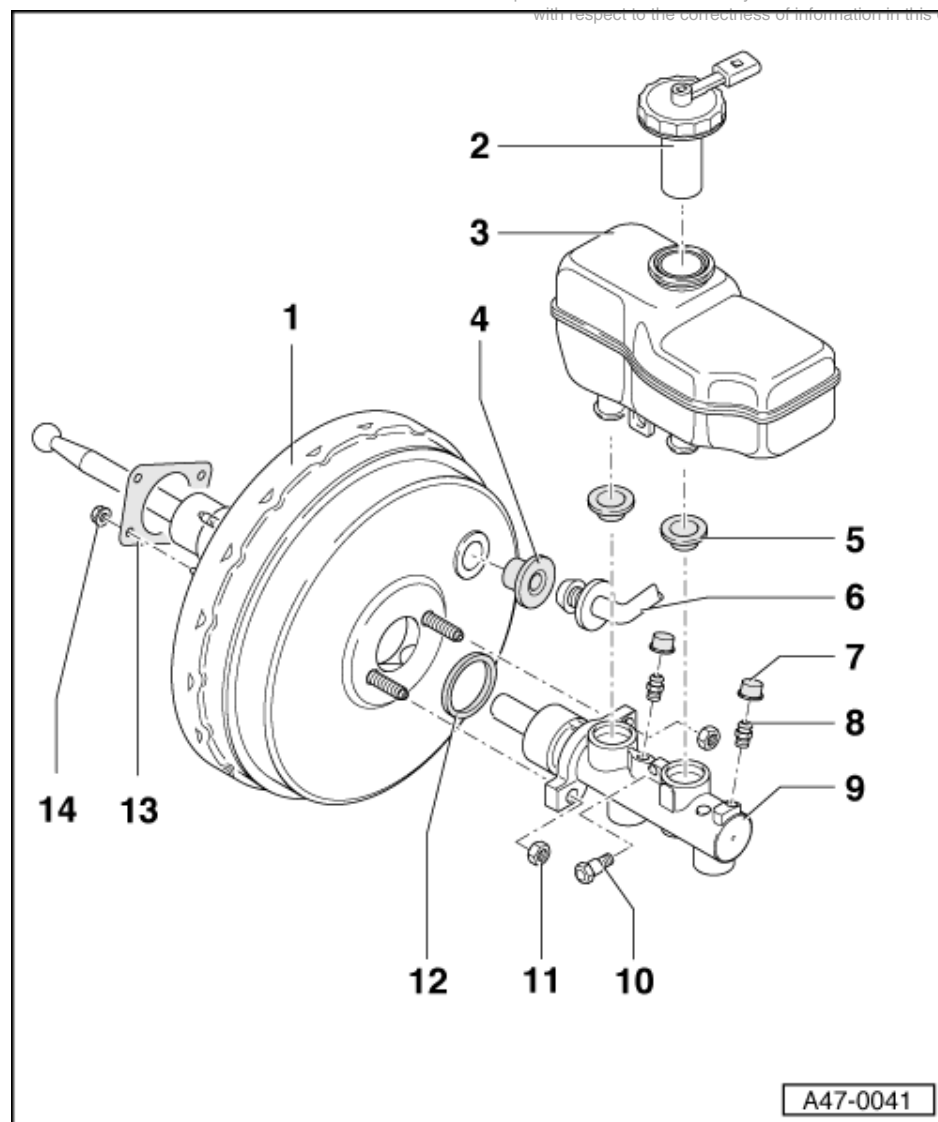
Note:

Brake master cylinder and brake servo assemblies can be replaced separately.

1 Brake servo

- ◆ Checking operation
 - Floor brake pedal firmly several times with engine stopped to dissipate vacuum in unit
 - Then hold brake pedal in applied position employing moderate force and start engine; if brake servo is operating properly, brake pedal will be felt to sag (servo action)

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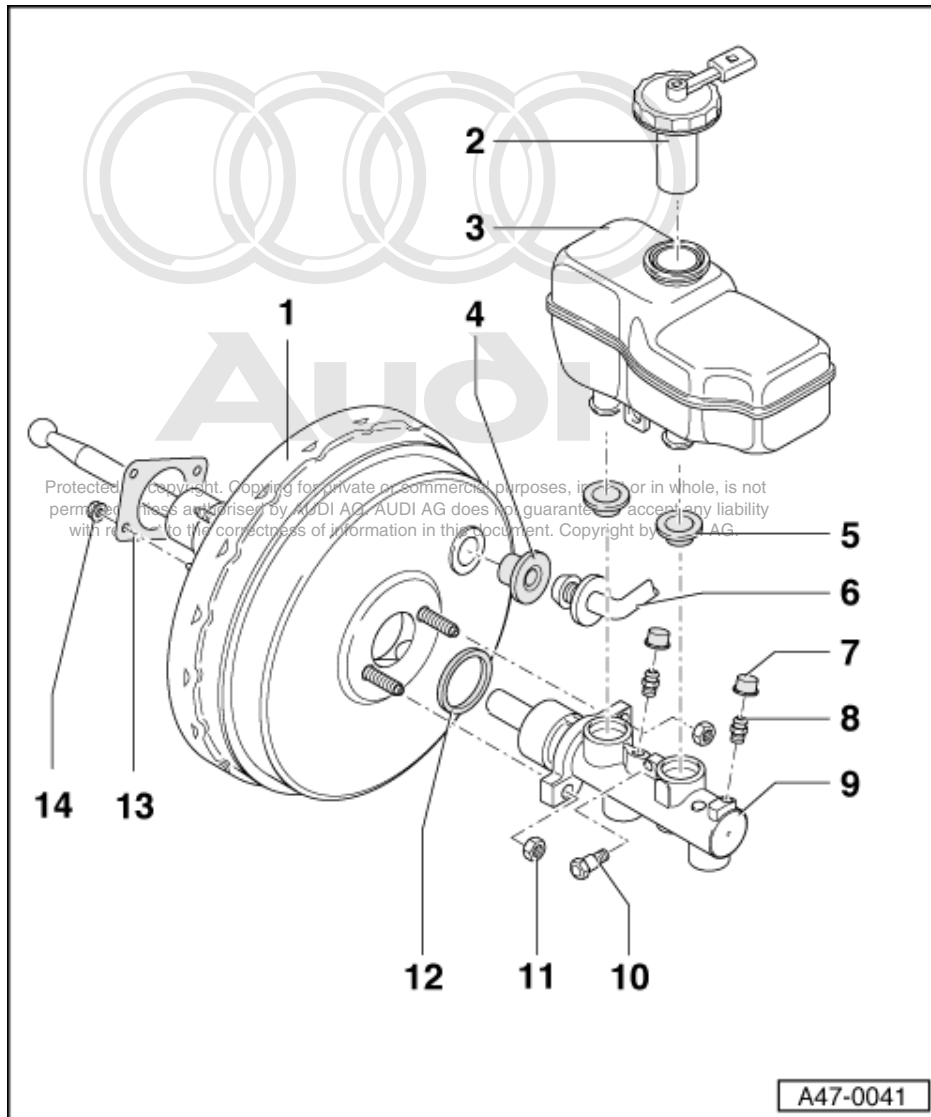


- ◆ On petrol engines, vacuum required is tapped at intake manifold or generated by vacuum pump for brake => Page 174
- ◆ TDI engines are fitted with vacuum pump/tandem pump for vacuum generation => Page 174
- ◆ In the event of loud suction noise on braking, check position of inner bellows => Fig. 1
- ◆ Separating from brake pedal
=> Page 145
- ◆ Removing and installing

=> Page 195

2 Cap

- ♦ With integrated float and warning contact for brake fluid level



3 Brake fluid reservoir

- ♦ Can only be detached after removing brake master cylinder => Page 193
- ♦ Moisten with brake fluid and insert in sealing plug in brake master cylinder
- ♦ With integrated warning contact for brake fluid level (gradual introduction)
- ♦ Replacement of warning contact involves removing brake fluid reservoir

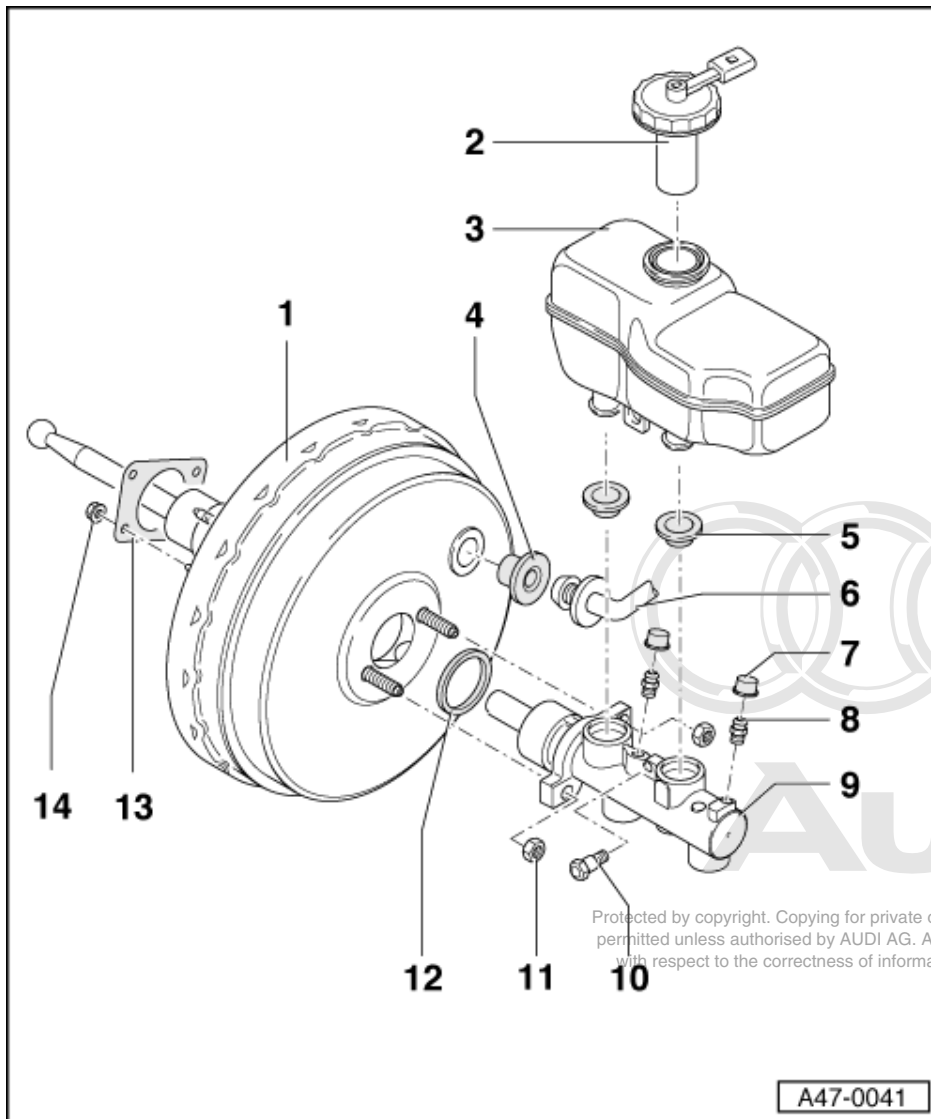
4 Sealing plug

5 Sealing plug

- ♦ Moisten with brake fluid and insert in brake master cylinder
- ♦ Press brake fluid reservoir into sealing plug

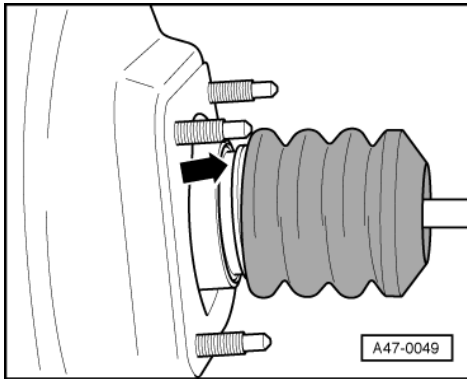
6 Vacuum pipe

- ♦ With non-return valve
- ♦ Checking non-return valve => Fig. 2



- 7 Dust cap
- 8 Bleed valve, 7 Nm
- 9 Brake master cylinder
 - ♦ Removing and installing
 - => Page 193
- 10 Locking bolt, 2 Nm
 - ♦ For brake fluid reservoir
 - ♦ Can only be screwed out after removing brake master cylinder
 - => Page 194
- 11 Nut, 20 Nm
 - ♦ Self-locking
 - ♦ Always replace after removing
- 12 Sealing ring
 - ♦ Replace
- 13 Gasket
 - ♦ For brake servo
- 14 Nut, 28 Nm
 - ♦ Self-locking

- ♦ Always replace after removing

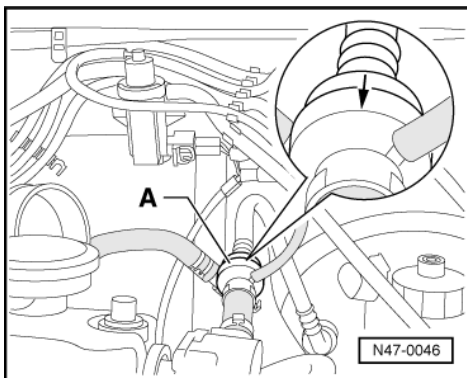


-> **Fig.1 Checking inner bellows at brake servo**

- Remove driver's storage compartment.

=> General Body Repairs, Interior; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Check that bellows have not slipped out of all-round groove as shown in Fig.
- Insertion of bellows involves removing brake pedal mounting bracket =>Page 141 .



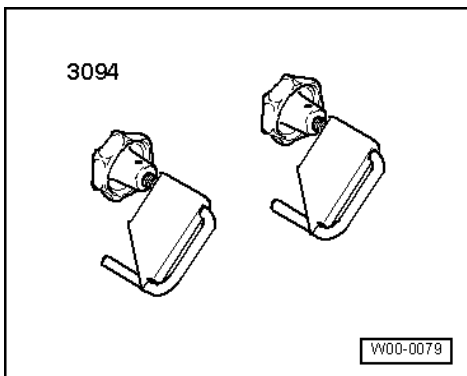
-> **Fig.2 Checking non-return valve**

- ♦ Non-return valve -A- must be open in direction of arrow and it must be possible to blow through it
- ♦ Non-return valve must remain closed in opposite direction and it must not be possible to blow through it

Note:

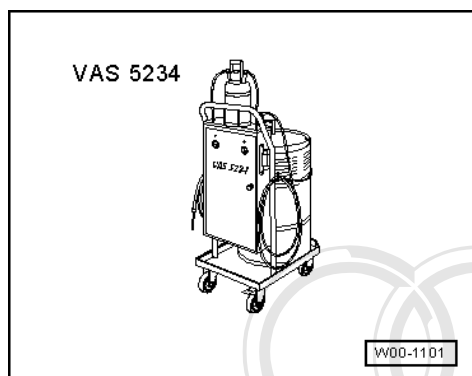
Pay attention to correct position on installation.

8.3 - Removing and installing brake master cylinder



Special tools and workshop equipment required

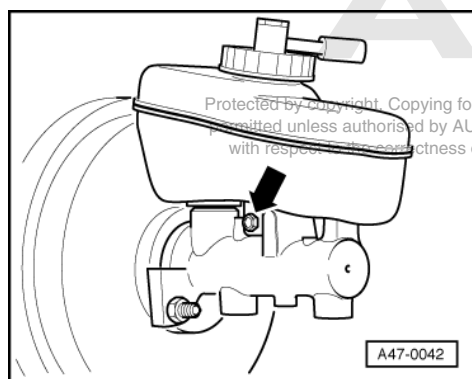
- ♦ Hose clamps 3094



- ♦ Brake filling and bleeding appliance VAS 5234

Or

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

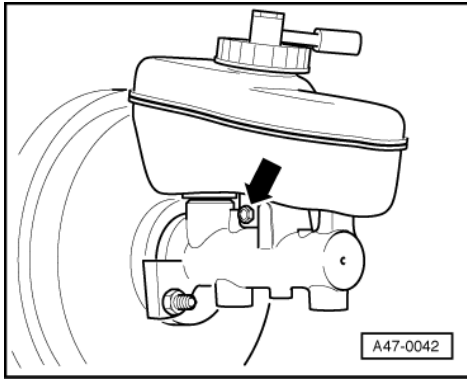


Removing

Note:

-> Brake fluid reservoir can only be detached after removing brake master cylinder, as locking bolt -arrow- is otherwise not accessible.

- As protection against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.
- Use brake filling and bleeding appliance VAS 5234 or extractor
- V.A.G 1869/4 to draw off as much brake fluid as possible from brake fluid reservoir.
- Use hose clamp 3094 to pinch off supply hose of clutch master cylinder.
- Pull off supply hose for clutch master cylinder.
- If fitted, unplug connector at warning contact for brake fluid level.
- If fitted, unplug connectors at brake pressure senders.
- Unscrew brake pipes at brake master cylinder and seal brake pipes with plugs from repair set, part no. 1H0 698 311 A.
- Unscrew securing nuts for brake master cylinder.
- Pull brake master cylinder off brake servo.



Installing

Install in reverse order, paying attention to the following:

- -> Fit brake fluid reservoir with locking bolt -arrow- at brake master cylinder.
- Replace sealing ring between brake master cylinder and brake servo.
- On inserting brake master cylinder, ensure correct positioning of pushrod in brake servo.
- Depress brake pedal slightly to facilitate insertion of brake master cylinder in pushrod.
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .
- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- On vehicles with ABS/ESP, start basic setting for brake pressure sender(s).

=> Running Gear, Self-diagnosis; Repair Group 01

- On vehicles with ABS/ESP Mark 60, perform ESP drive test.

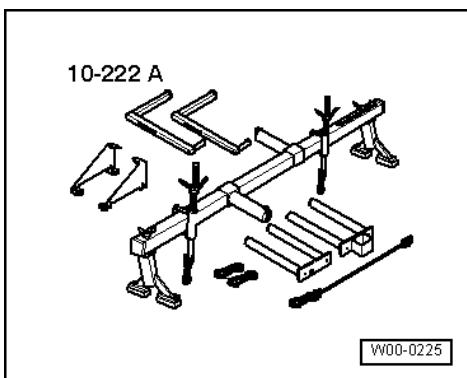
=> Running Gear, Self-diagnosis; Repair Group 01

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Tightening torques

Component	Nm
Locking bolt for brake fluid reservoir	2
Brake pressure sender to brake master cylinder	14

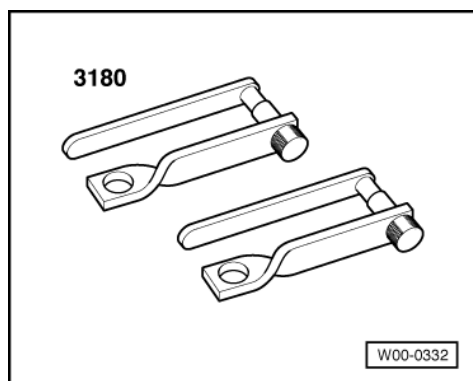
8.4 - Removing and installing brake servo





Special tools and workshop equipment required

- ♦ Support bar 10-222 A



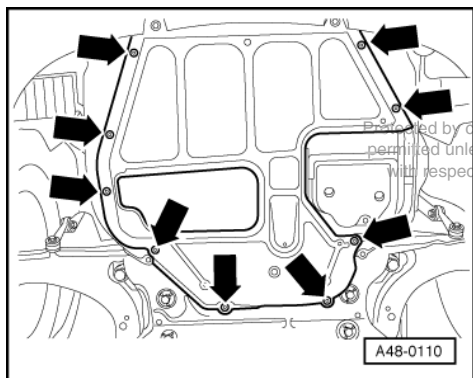
- ♦ Holder 3180

Removing

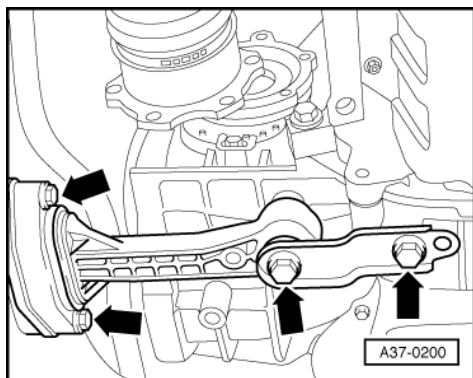
Note:

This sequence of operations is described for a petrol engine with turbocharger. Procedure may differ depending on engine.

- Dissipate vacuum in brake servo by pressing brake pedal several times.
- Remove brake master cylinder => Page 193 .
- Pull vacuum pipe out of brake servo.



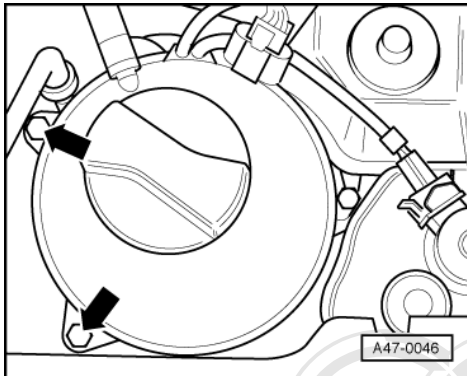
- -> If necessary, detach noise insulation -arrows-.



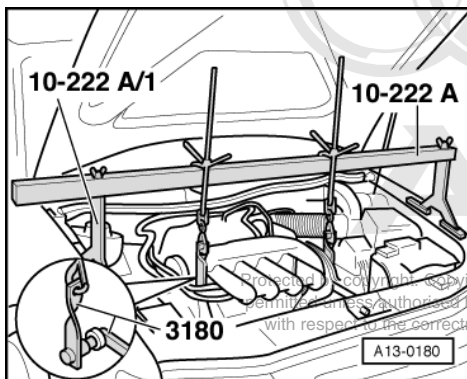
- Unscrew right drive shaft from flange shaft/gearbox.
- -> Unscrew -arrows- pendulum support.

- Remove front exhaust pipe.

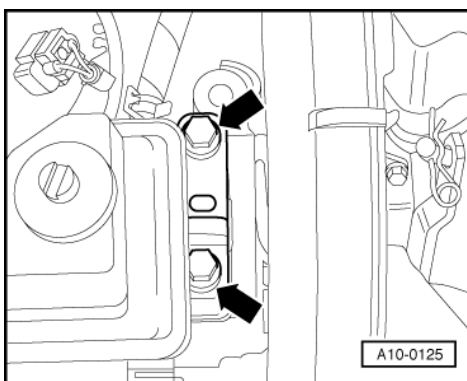
=> Engine, Mechanics; Repair Group 26



- -> If necessary for access to bolted joints of engine support, unscrew coolant expansion tank -arrows- (leave hoses connected).



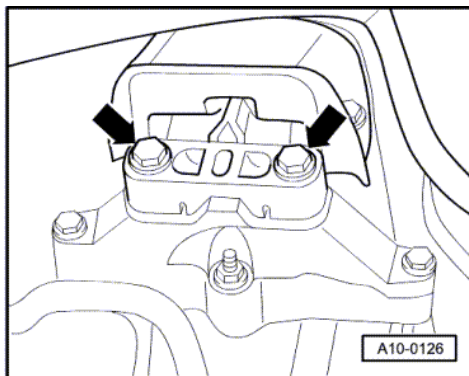
- -> Position support bar 10-222 A in front of gas-filled strut on wing mounting flange with spindles at front.
- Screw holder 3180 to right lifting eye and engage at spring hook of spindle on right.
- Engage spring hook of spindle at left lifting eye.
- Raise engine slightly and evenly with both spindles.



Note:

Mark installation position of engine/gearbox supports.

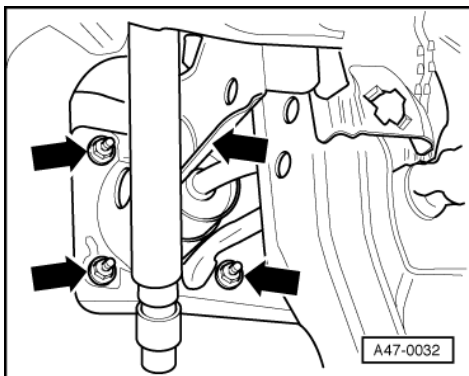
- -> Unscrew engine support from engine console -arrows-.



- -> Unscrew gearbox support from gearbox console -arrows-.
- Lower engine/gearbox by adjusting spindles at support bar 10-222 A.
 - Engine end: approx. 60 mm
 - Gearbox end: approx. 90 mm

Note:

When lowering, take care not to strain coolant hoses to heating system heat exchanger.



- Disconnect brake pedal from brake servo => Page 145 .
- -> Unscrew nuts -arrows-.
- Detach brake servo.
- Removal of brake servo involves second mechanic pulling engine in direction of travel.

Installing

Install in reverse order, paying attention to the following:

- Adjust engine mountings.

=> Engine, Mechanics; Repair Group 10

- Screw right drive shaft to flange shaft/gearbox.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

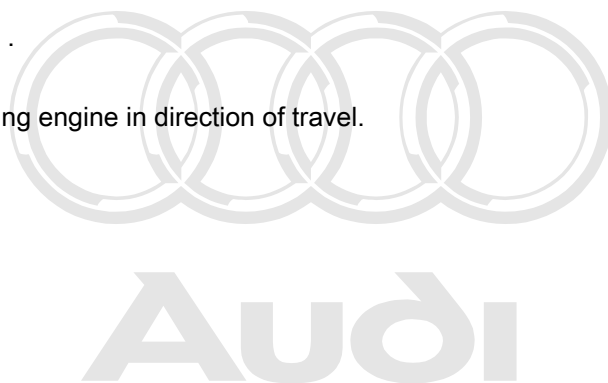
- Screw on pendulum support.

=> Engine, Mechanics; Repair Group 10

- Install front exhaust pipe.

=> Engine, Mechanics; Repair Group 26

- Fit brake pedal at brake servo =>Page 147 .
- Fit brake master cylinder => Page 195 .
- Bleed brake system: ABS/ESP Mark 20 =>Page 167 .



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- Bleed clutch hydraulics.

=> Manual Gearbox; Repair Group 30

- On vehicles with ABS/ESP, start basic setting for brake pressure sender(s).

=> Running Gear, Self-diagnosis; Repair Group 01

- On vehicles with ABS/ESP Mark 60, perform ESP drive test.

=> Running Gear, Self-diagnosis; Repair Group 01

Tightening torque

Component	Nm
Brake servo/mounting bracket to bulkhead	28 1)

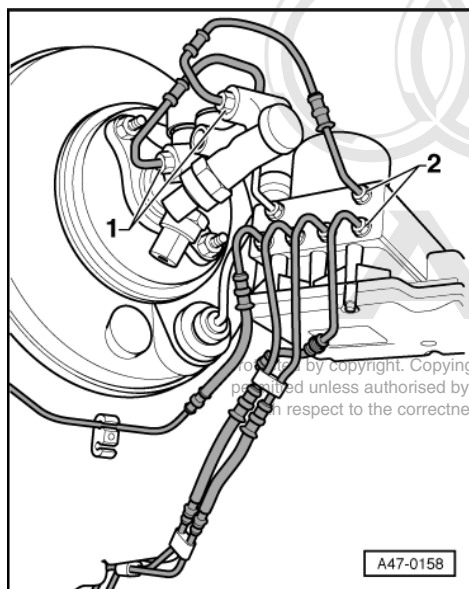
- 1) Replace nuts

9 - Brake pipes and brake hoses

9.1 - Brake pipes and brake hoses

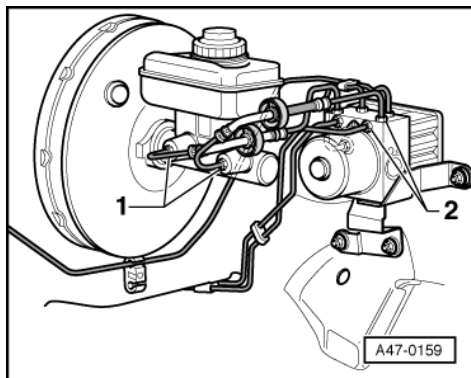
9.2 - Removing and installing brake pipes and brake hoses

The various brake pipe and brake hose installation positions and torques are given in the following.



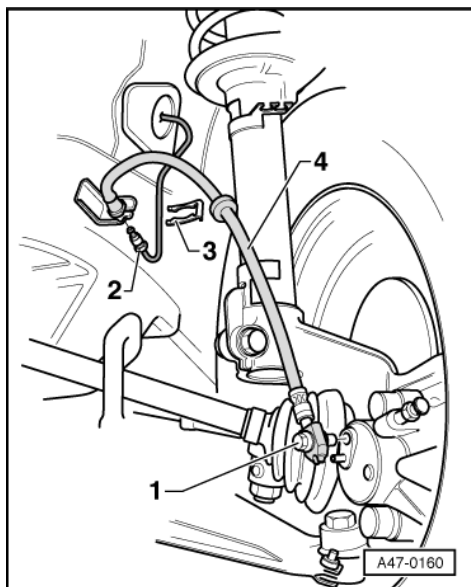
-> Brake pipes in area of brake master cylinder/hydraulic unit ITT Mark 20

- 1 - Brake pipe to brake master cylinder, 14 Nm
- 2 - Brake pipe to hydraulic unit, 14 Nm



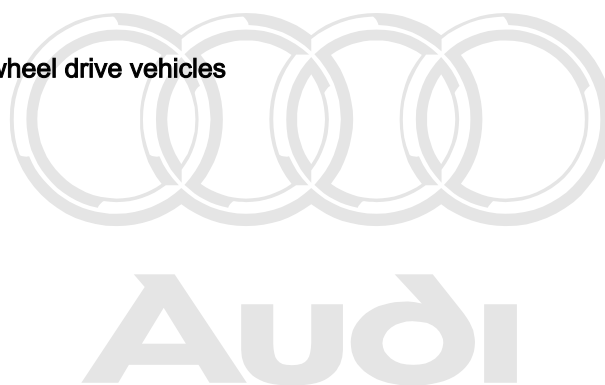
-> Brake pipes in area of brake master cylinder/hydraulic unit ITT Mark 60

- 1 - Brake pipe to brake master cylinder, 14 Nm
- 2 - Brake pipe to hydraulic unit, 14 Nm

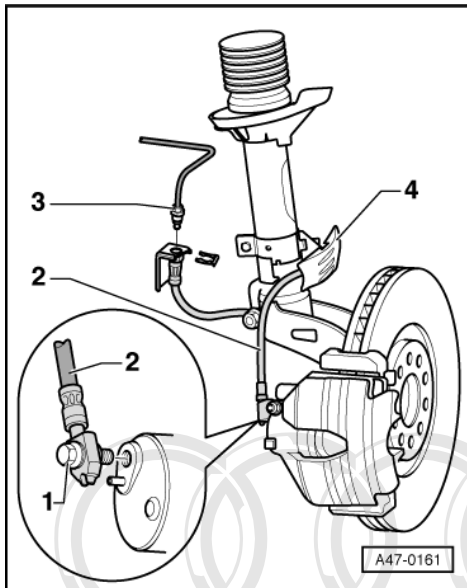


-> Brake pipes/brake hoses in area of front wheel - front-wheel drive vehicles

- 1 - Banjo bolt, 35 Nm
- 2 - Brake pipe, 14 Nm
- 3 - Clip
- 4 - Brake hose

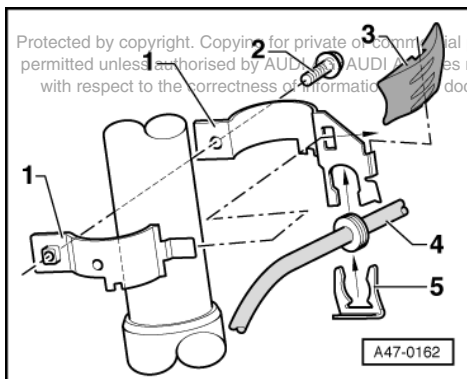


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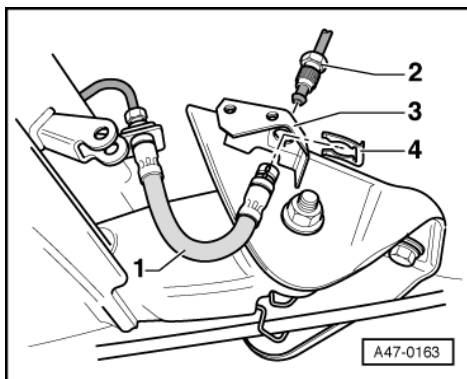
-> Brake pipes/brake hoses in area of front wheel - four-wheel drive vehicles

- 1 - Banjo bolt, 35 Nm
- 2 - Brake pipe, 14 Nm
- 3 - Clip
- 4 - Heat shield
- Attachment to suspension strut => Next Fig.



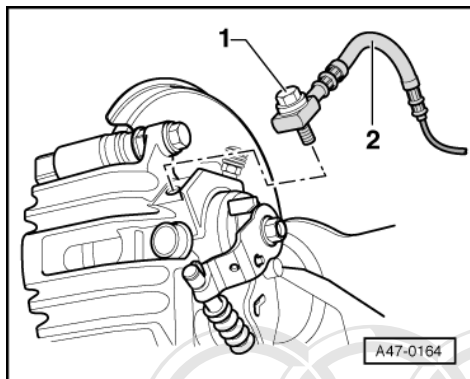
-> Attachment of brake hose to suspension strut - front-wheel drive vehicles

- 1 - Clamp
- 2 - Bolt, 9 Nm
- 3 - Heat shield
- 4 - Brake hose
- 5 - Clip

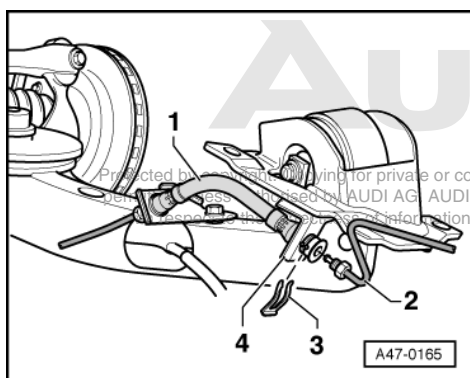


-> Brake pipe/brake hoses in area of rear wheels - front-wheel drive vehicles

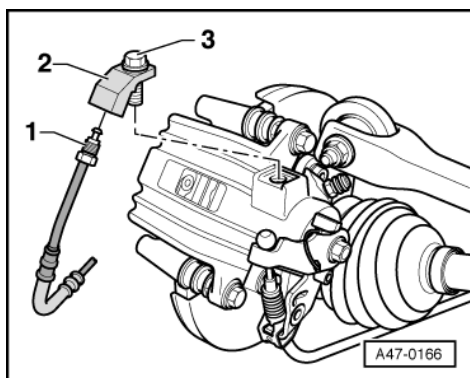
- 1 - Brake hose
- 2 - Brake pipe, 14 Nm
- 3 - Bracket
- 4 - Clip

**-> Attachment of brake hose to brake caliper - front-wheel drive vehicles**

- 1 - Banjo bolt, 38 Nm
- Replace brake hose/brake pipe with banjo bolt whenever banjo bolt has been slackened off
- 2 - Brake hose

**-> Brake pipe/brake hoses in area of rear wheels - four-wheel drive vehicles**

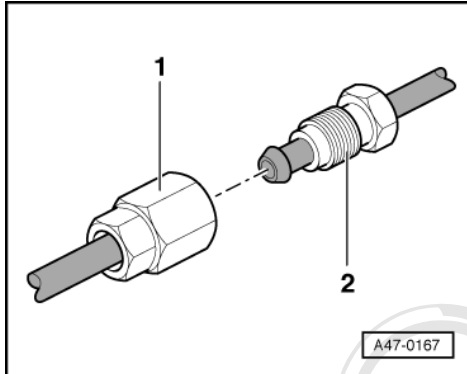
- 1 - Bracket
- 2 - Brake hose
- 3 - Brake pipe, 14 Nm
- 4 - Clip



-> Attachment of brake pipe/angle piece to brake caliper - four-wheel drive vehicles

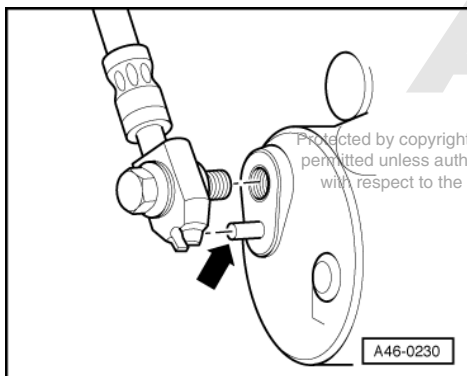
- 1 - Brake pipe, 14 Nm
- 2 - Angle piece
- 3 - Banjo bolt, 38 Nm

Always replace angle piece with banjo bolt after slackening off banjo bolt



-> Brake pipe connection

- Support hollow nut -1- when tightening banjo bolt -2-.
- Tightening torque 14 Nm



-> Brake hose connection with locating pin

- Make sure groove in banjo union of brake hose is inserted in locating lug -arrow-.