Workshop Manual

Karoq 2018 ➤

Brake systems

Edition 10.2017

List of Workshop Manual Repair Groups

Repair Group

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

Contents

00 – Technical data

1 Safety instructions

(SRL001130; Edition 10.2017)

⇒ “1.1 Safety precautions when working on vehicles with start-stop system”, page 1

⇒ “1.2 Safety precautions during road tests in which testing and measuring equipment is used”, page 1

1.1 Safety precautions when working on vehicles with start-stop system

When working on vehicles with start/stop system, please observe the following instructions:

CAUTION

Risk of injury as a result of automatic engine start in vehicles with start/stop system.

- In vehicles with the start/stop system activated (identifiable by an indication in the dash panel insert) the engine can start automatically if required.
- Make sure that the start-stop system is deactivated when carrying out work on the vehicle (switch ignition off, if necessary switch ignition on again).

1.2 Safety precautions during road tests in which testing and measuring equipment is used

Note the following if testers and measuring instruments have to be used during a road test:

WARNING

There is a risk of accident from deflection and insufficient securing of testers and measuring instruments.

- Using testers and measuring instruments during driving operation causes distraction.
- There is an increased risk of injury from unsecured testers and measuring instruments.
- Always attach the testing and measurement equipment to the rear seat.
- Always have the testing and measurement equipment operated by a 2nd person.
- Always operate the testing and measurement equipment from the rear seat.
- Do not operate the testing and measurement equipment from the front passenger seat.
- Persons can be injured by the release of the passenger airbag in the event of an accident.

2 Denomination

⇒ “2.1 PR number assignment – brake”, page 2

2.1 PR number assignment – brake

The brake type installed in the vehicle is indicated by PR numbers.

The PR numbers are indication on the vehicle data sticker in the luggage compartment floor as well as in the Service Schedule. Information about the installed brakes can be found in the ELSA Pro vehicle data system.

Assignment is dependent on the engine type ⇒ Electronic Catalogue of Original Parts .

3 Technical data

⇒ “3.1 Technical data for brakes”, page 3

3.1 Technical data for brakes

⇒ “3.1.1 Master brake cylinder and brake servo”, page 3

⇒ “3.1.2 Front brakes”, page 3

⇒ “3.1.3 Rear brake”, page 3

⇒ “3.1.4 Brake fluid”, page 4

3.1.1 Master brake cylinder and brake servo

Assignment is dependent on the engine type ⇒ Electronic Catalogue of Original Parts .

Master brake cylinder - ∅	mm	23.81	
Brake servo unit - ∅	Inch	Left-hand drive:	11
		Right-hand drive:	8"/8"

3.1.2 Front brakes

Assignment is dependent on the engine type ⇒ Electronic Catalogue of Original Parts .

Explanations concerning PR Numbers
⇒ “2.1 PR number assignment – brake”, page 2 .

Front brake PC 57

Front brake caliper (type denomination)		PC 57 (16")
PR number		**1ZA**
Front brake caliper, piston - ∅	mm	57
Front brake disc – ∅	mm	312
Brake disc, thickness	mm	25
Brake disc, minimum thickness	mm	22
Pad thickness without supporting plate	mm	14
Minimum pad thickness without supporting plate	mm	2

3.1.3 Rear brake

Assignment is dependent on the engine type ⇒ Electronic Catalogue of Original Parts .

Explanations concerning PR Numbers
⇒ “2.1 PR number assignment – brake”, page 2 .

Rear wheel brake FNc-M38

Rear brake caliper (type denomination)		FNc-M38 (15”)
PR number		**1KE**
Rear brake caliper, piston - ∅	mm	38

Rear brake caliper (type denomination)		FNc-M38 (15”)
PR number		**1KE**
Rear brake disc – ∅	mm	272
Brake disc, thickness	mm	10
Brake disc, minimum thickness	mm	8
Pad thickness without supporting plate	mm	11
Minimum pad thickness without supporting plate	mm	2

3.1.4 Brake fluid

Classification	Only use new original brake fluid N.052.766.Z0 as per US standard FMVSS 571.116, DOT 4 and VW standard 501 14
Change	⇒ Maintenance ; Booklet Karoq

4 Brake inspection

4.1 General points

- The test stand is used as drive.
- During the testing, the idling speed must be set on vehicles with manual gearbox and the driving position »N« must be engaged on vehicles with automatic gearbox.
- When conducting the test, observe the specifications provided by the manufacturer of the test rig.

Note

The brake regulation systems do not function when ignition is off.

4.2 Checking vehicles with front-wheel drive

The brake test must be performed on a single-axle roller dynamometer.

The test speed must not exceed 6 km/h.

The test stands approved by Škoda comply with these conditions.

4.3 Testing vehicles with four-wheel drive

The brake inspection must be performed on a contra-rotative single axle roller type test stand for vehicles with four-wheel drive.

Contra-rotative means: The test stand rollers of the single axle roller type test stand rotate forwards on the one side and backwards on the other side.

Thus, a transfer of the braking forces in the drive train is prevented.

The wheel which rotates forwards is measured each time during the test, this requires the need of two braking tests per axle.

The test speed must not exceed 6 km/h.

The test stands approved by Škoda comply with these conditions.

If a test stand is not available for vehicles with four-wheel drive, the brake inspection can also be performed on a standard single axle roller type test stand as follows:

– Drive the vehicle forwards onto the rollers.
– Switch off engine and wait 2 seconds.
– Perform brake inspection at the front.
– Start engine and wait approx. 5 seconds until adequate vacuum has built up.
– Drive the vehicle forwards until the rear wheels are standing on the rollers.
– Switch off engine and wait 2 seconds.
– Perform brake inspection at the rear.

– Start engine and wait approx. 5 seconds until adequate vacuum has built up.

4.4 Check the parking brake

⇒ “4.4.1 Check electromechanical parking brake, vehicles with front drive”, page 7

⇒ “4.4.2 Check electromechanical parking brake, vehicles with all-wheel drive”, page 7

4.4.1 Check electromechanical parking brake, vehicles with front drive

Enable »MOT mode«

- Safety belt is installed.
- Rear axle is on the 1-axle roller test stand
- Ignition is switched on.
- »Auto Hold« is switched off.
- Front wheels must be stationary.
- The rear wheels must rotate constantly between 2.5 and 9 km / h for at least 5 seconds.

Enabled »MOT mode« is signalled by the yellow Electric parking and handbrake fault lamp - K214- lighting up.

Note

The electromechanical parking brake does not fully close in »MOT mode« when the button for the electromechanical parking brake - E538- is pressed for the first time.

After the Button for the electromechanical parking brake - E538- is pressed four times in succession, the parking brake fuly locks.

Pressing the button for the electromechanical parking brake - E538- leads to the electromechanical parking brake being released.

End »MOT mode«

- Front wheels have a speed greater than 0 km / h.
- Rear wheels have a speed less than 2.5 km / h or greater than 9 km / h.
- Ignition is switched off.

4.4.2 Check electromechanical parking brake, vehicles with all-wheel drive

Enable »MOT mode«

- Safety belt is installed.
- Rear axle is on the 1-axle roller test stand
- Ignition is switched on.
- »Auto Hold« is switched off.
- Front wheels must be stationary.
- The rear wheels must rotate constantly between 2.5 and 9 km / h for at least 5 seconds.

Enabled »MOT mode« is signalled by the yellow Electric parking and handbrake fault lamp - K214- lighting up.

Note

The electromechanical parking brake does not fully close in »MOT mode« when the button for the electromechanical parking brake - E538- is pressed for the first time.

After the Button for the electromechanical parking brake - E538- is pressed four times in succession, the parking brake fuly locks.

Pressing the button for the electromechanical parking brake - E538- leads to the electromechanical parking brake being released.

– Start engine and wait approx. 5 seconds until adequate vacuum has built up.

End »MOT mode«

- Front wheels have a speed greater than 0 km / h.
- Rear wheels have a speed less than 2.5 km / h or greater than 9 km / h.
- Ignition is switched off.

45 – Anti-lock brake system

1 General points

⇒ “1.1 Repair instructions for repair work on ABS”, page 9

1.1 Repair instructions for repair work on ABS

The ABS brake system is split diagonally. Brake servo assistance is provided pneumatically by the vacuum brake servo.

Vehicles fitted with ABS do not have a mechanical brake pressure regulator. Specifically matched software in the ABS control unit - J104- regulates the brake pressure distribution on the rear axle.

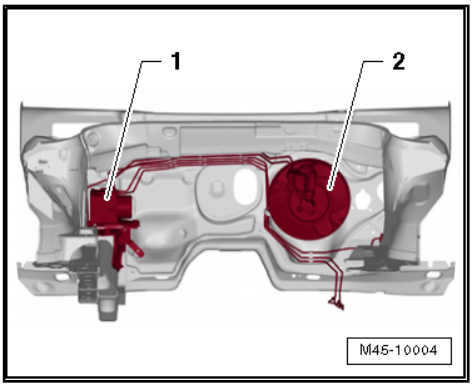
Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- and the ABS hydraulic unit - N55- must be fully replaced.*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55-*
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*
- *Faults in the ABS do not influence the brake system and servo assistance. The conventional braking system remains fully functional even without ABS. There will be a change in braking behaviour. After the ABS warning lamp comes on, the rear wheels may lock prematurely during braking.*

Arrangement of the ABS, left-hand drive vehicle

1 - ABS hydraulic unit - N55- with ABS control unit - J104-

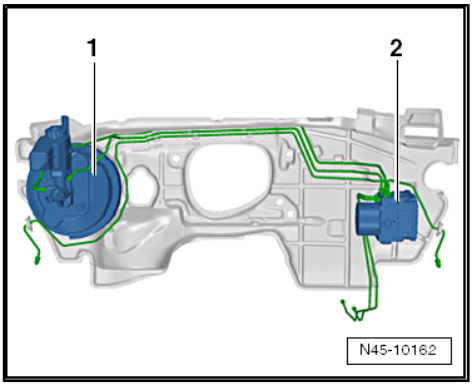
2 - Brake servo

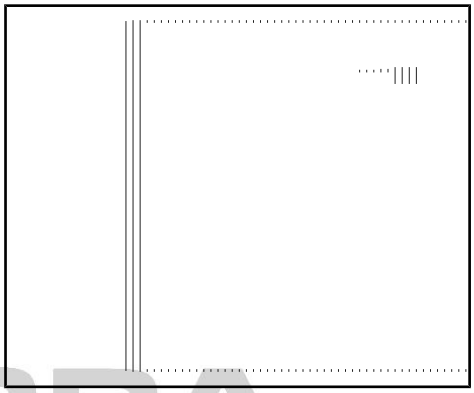


Arrangement of the ABS in right-hand drive vehicles

1 - Brake servo

2 - ABS hydraulic unit - N55- with ABS control unit - J104-





The ABS control unit - J104- -1- and the ABS hydraulic unit - N55- -2- form a single unit. They can only be separated after the complete unit is removed. The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55-
⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 . The hydraulic pump -3- must not be separated from the ABS hydraulic unit - N55- -2-.

New control units supplied by the spare parts area are not coded. They must be coded after installation ⇒ Vehicle diagnostic tester.

- Before starting work on anti-lock brake systems, query the event memory to check for complaints and conduct guided fault finding ⇒ Vehicle diagnostic tester.
- Do not separate plug connections unless the ignition is switched off.
- Before working on anti-lock braking systems, switch off the ignition and disconnect the ground strap from the battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnect and connect battery .
- If the battery earth strap is disconnected and connected, carry out additional operations ⇒ Electrical System; Rep. gr. 27 ; Battery .
- Welding work using electric welding equipment may affect the ABS system.
- Do the following before commencing welding work using electrical welding tool:

– Disconnect the earth strap from the negative terminal of the battery and cover the negative terminal.

– Connect the earth connection of the electric welding tool directly to the part to be welded. There must not be any electrically insulated parts between the earth connection and the welding point.

– Electronic control units and electrical wiring must not touch the earth connection or the welding electrode.

- During painting operations, the ABS control unit - J104- may be exposed to a maximum temperature of 95 °C for only a short period, and to a maximum of 85 °C for longer periods (approx. 2 hours).
- Do not drive the vehicle if the connector is unplugged from the ABS control unit - J104- .
- Absolute cleanliness is required when working on the anti-lock brake system. It is not permitted to use any products which contain mineral oil, such as oils, greases etc.
- Thoroughly clean connection points and the surrounding area before disconnecting, but do not use any aggressive cleaning agents, such as brake cleaner, petroleum, thinner or similar.
- Place removed parts on a clean surface and cover.
- Carefully cover or close opened components if the repair is not completed immediately (use plugs from the repair kit - 1H0 698 311 A-).
- Only use lint-free cloths.
- Do not remove spare parts from their wrappings until immediately before installation.
- Use only genuine wrapped parts.
- When the system is open, do not work with compressed air and do not move the vehicle.

- The valve coils in the ABS control unit - J104- must not be calibrated.
- The valve coils in the ABS control unit - J104- cannot be replaced.
- The pressure sensor must not be modified or damaged.
- The pressure sensor cannot be replaced.
- The sensor housing must not be subjected to mechanical load.
- No measurements must be carried out at the contact points of the ABS control unit - J104- .
- No measurements must be carried out at the contact points of the ABS hydraulic unit - N55- .
- The valve domes of the ABS hydraulic unit - N55- must not be damaged or bent.
- The contacts on the ABS control unit - J104- and the ABS hydraulic unit - N55- cannot be replaced.
- Do not use contact spray.
- No contamination or foreign object may located between ABS control unit - J104- and ABS hydraulic unit - N55- .
- Ensure that no brake fluid enters connectors.
- Observe the relevant instructions when handling brake fluid.
- After completing work which involved opening the brake system, bleed the brake system with the brake filling and bleeding device , e. g. -VAS 5234- ,
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .
- During the subsequent road test, ensure that at least one controlled brake application is performed (pulsing must be felt on the brake pedal).

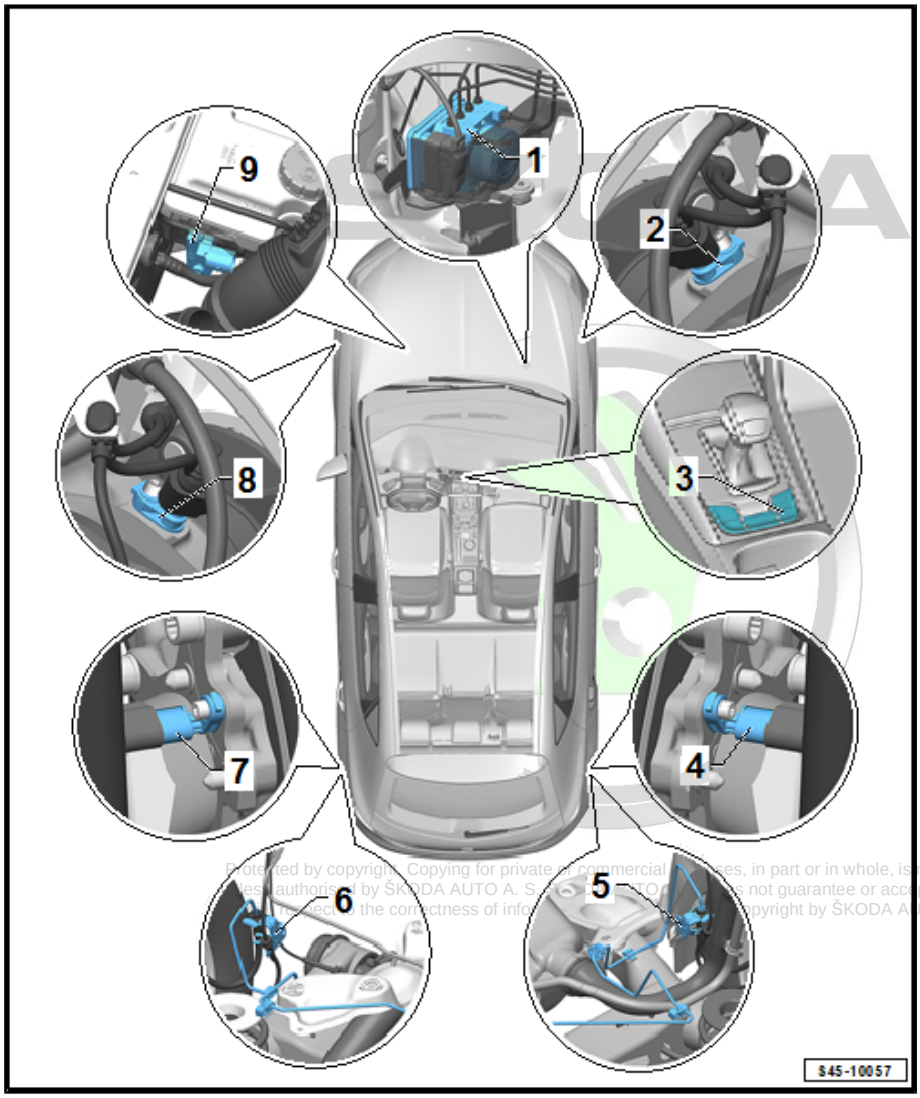
2 Installation location overview

⇒ “2.1 ABS/ESP installation location overview”, page 12

2.1 ABS/ESP installation location overview

Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .*
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*



1 - ABS hydraulic unit - N55- with ABS control unit - J104-

- ❑ Fitting location ⇒ “1.1 Repair instructions for repair work on ABS”, page 9

The following components are integrated in the ABS control unit - J104- :

- Lateral acceleration sender - G200-
- Yaw rate sender - G202-
- Brake pressure sender 1 - G201-
- the components cannot be changed individually
  - ❑ Check ⇒ Vehicle diagnostic tester
  - ❑ Removing and installing ⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18
  - ❑ Disconnecting the control unit from the hydraulic unit ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29
  - ❑ Fitting the control unit to the hydraulic unit ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 30

2 - Front right wheel speed sensor - G45-

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ “4.6 Removing and installing front speed sensors G45 / G47 ”, page 35

3 - TCS and ESP button - E256-

- ❑ 2 versions of ESC operation depending on vehicle equipment fitted

1. Button on the centre console

2. In the Infotainment system “settings” menu

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ The button is part of the switch unit and can not be replaced individually ⇒ Electrical system; Rep. gr. 96 ; controls; Button for electromechanical parking brake - E538- / Button for AUTO HOLD - E540- Removing and installing

4 - Rear right wheel speed sensor - G44-

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Removing and installing
  ⇒ “4.7 Removing and installing the rear speed sensors G44 / G46 ”, page 35

5 - Brake line

- ❑ to rear right brake caliper
- ❑ 14 Nm

6 - Brake line

- ❑ to rear left brake caliper
- ❑ 14 Nm

7 - Speed sensor rear left - G46-

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Removing and installing
  ⇒ “4.7 Removing and installing the rear speed sensors G44 / G46 ”, page 35

8 - Front left wheel speed sensor - G47-

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ “4.6 Removing and installing front speed sensors G45 / G47 ”, page 35

9 - Brake light switch - F-

- ❑ Fitting location: on master brake cylinder
- ❑ Removing and installing ⇒ “3.2 Removing and installing brake light switch”, page 84

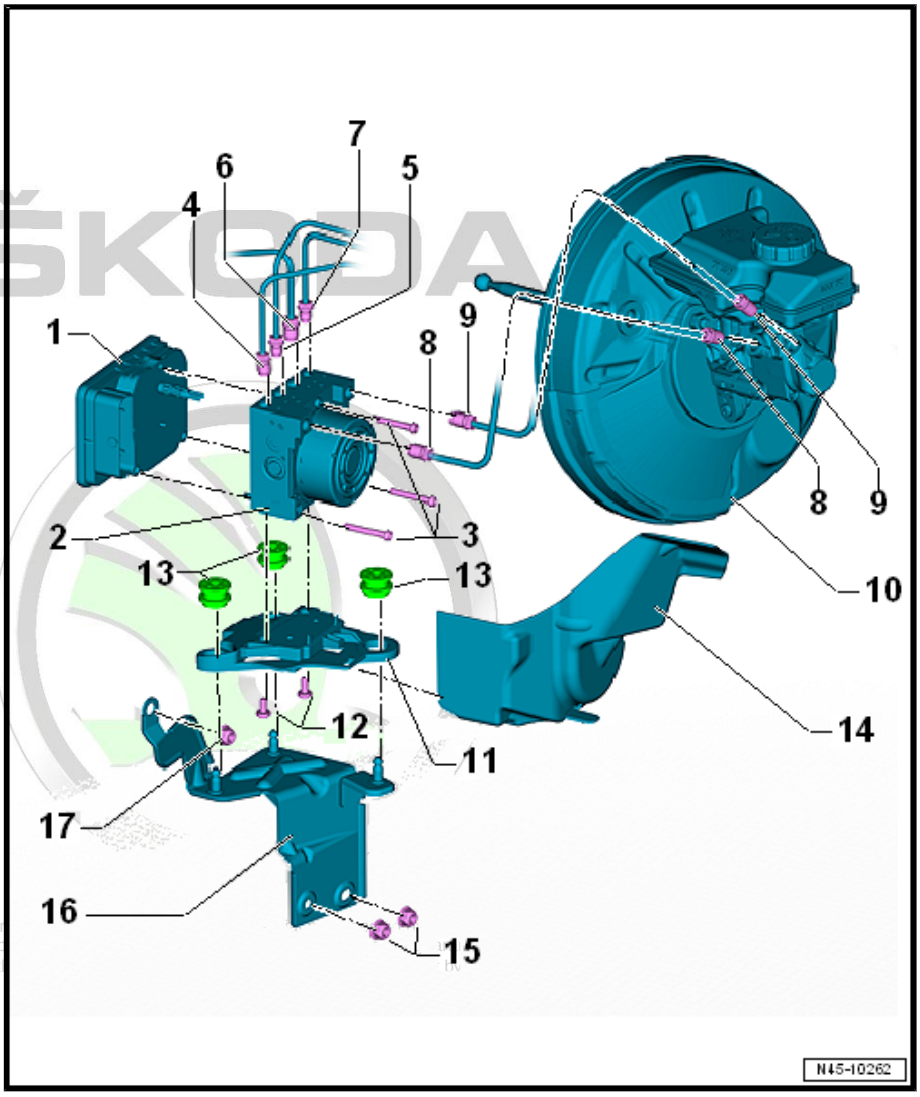
3 Control unit and hydraulic unit

3.1 Exploded view – control unit and hydraulic unit

3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle

Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .*
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*



1 - ABS control unit - J104-

- ❑ Removing and installing ⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18
- ❑ Disconnecting the control unit from the hydraulic unit ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29
- ❑ Fitting the control unit to the hydraulic unit ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 30

2 - ABS hydraulic unit - N55-

- ❑ Removing and installing ⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18

3 - Screw

- ❑ tighten Torx screw in 2 stages alternately on after the other
- ❑ 1st level: Preliminary tightening torque: 1 Nm to 1.5 Nm (to fit the seal)
- ❑ 2nd level: final tightening torque: 2.5 Nm

4 - Brake line

- ❑ to rear right brake caliper
- ❑ Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

5 - Brake line

- ❑ to front left brake caliper
- ❑ Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M10 x 1
- ❑ 14 Nm

6 - Brake line

- ❑ to front right brake caliper
- ❑ Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

7 - Brake line

- ❑ to rear left brake caliper
- ❑ Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M10 x 1
- ❑ 14 Nm

8 - Brake line

- ❑ from master brake cylinder (push rod piston circuit) to ABS hydraulic unit - N55-
- ❑ Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

9 - Brake line

- ❑ from master brake cylinder (floating piston circuit) to ABS hydraulic unit - N55-
- ❑ Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

10 - Brake servo

- ❑ Removing and installing ⇒ “3.3 Removing and installing brake servo”, page 86

11 - Mounting bracket

12 - Screw

- ❑ 8 Nm

13 - Rubber shock absorber bushing

14 - Heat shield

Assignment ⇒ Electronic Catalogue of Original Parts

15 - Nut

- ❑ 20 Nm

16 - Mounting bracket

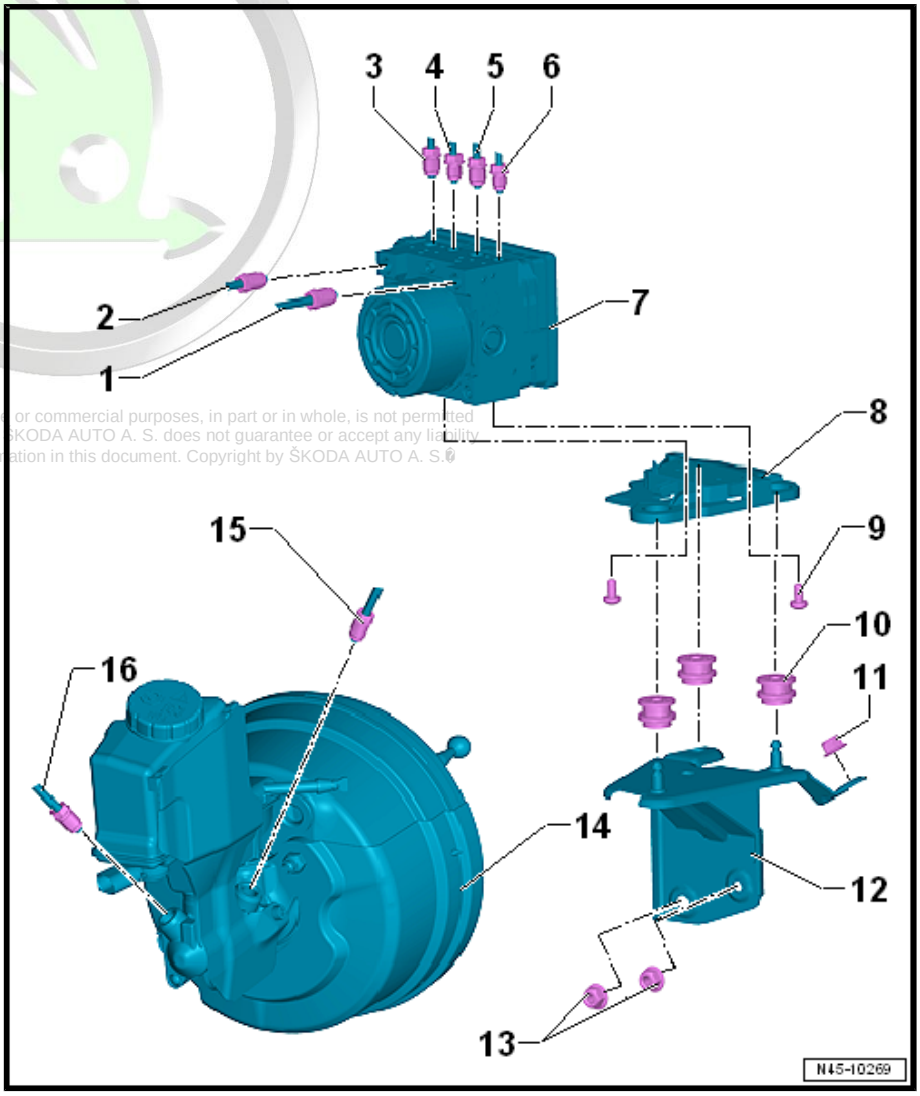
17 - Nut

- ❑ 20 Nm

3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle

Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ "3.3 Disconnecting the control unit from the hydraulic unit", page 29 .*
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*



1 - Brake line

- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- 14 Nm

2 - Brake line

- from master brake cylinder (push rod piston circuit) to ABS hydraulic unit
- Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- 14 Nm

3 - Brake line

- to rear right brake caliper
- Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M12 x 1
- 14 Nm

4 - Brake line

- to front left brake caliper
- Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M10 x 1
- 14 Nm

5 - Brake line

- to front right brake caliper
- Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M12 x 1
- 14 Nm

6 - Brake line

- to rear left brake caliper
- Distinguishing feature: ∅ 5.25 mm and pipe screw with long thread M10 x 1
- 14 Nm

7 - ABS hydraulic unit - N55- with ABS control unit - J104-

- ❑ Removing and installing
  ⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18
- ❑ Disconnecting the control unit from the hydraulic unit
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29
- ❑ Fitting the control unit to the hydraulic unit
  ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 30
- ❑ Tightening torques of the fixing screws for the ABS control unit - J104- Pos. 3
  ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14

8 - Mounting bracket

9 - Screw

- ❑ 8 Nm

10 - Rubber shock absorber bushing

11 - Nut

- ❑ 20 Nm

12 - Mounting bracket

13 - Nut

- ❑ 20 Nm

14 - Brake servo

- ❑ if there are faults replace completely

15 - Brake line

- ❑ from master brake cylinder (push rod piston circuit) to ABS hydraulic unit - N55-
- ❑ Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

16 - Brake line

- ❑ from master brake cylinder (floating piston circuit) to ABS hydraulic unit - N55-
- ❑ Distinguishing feature: ∅ 6 mm and pipe screw with long thread M12 x 1
- ❑ 14 Nm

3.2 Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55-

⇒ “3.2.1 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 , vehicles with left-hand drive and petrol engine”, page 18

⇒ “3.2.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 , vehicles with left-hand drive and diesel engine”, page 22

⇒ “3.2.3 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 , right-hand drive vehicles”, page 26

3.2.1 Removing and installing the ABS control unit - J104- / ABS hydraulic unit - N55- , vehicles with left-hand drive and petrol engine

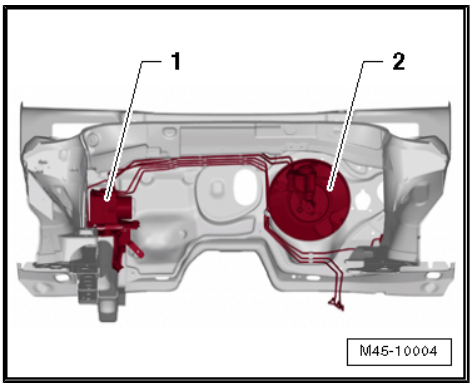
Special tools and workshop equipment required

- ♦ Brake pedal load e.g. -V.A.G 1869/2-
- ♦ Repair kit - 1H0 698 311 A-

Removing

Fitting location:

The ABS control unit - J104- is bolted to the ABS hydraulic unit - N55- and is located in the engine compartment on the right side.



Note

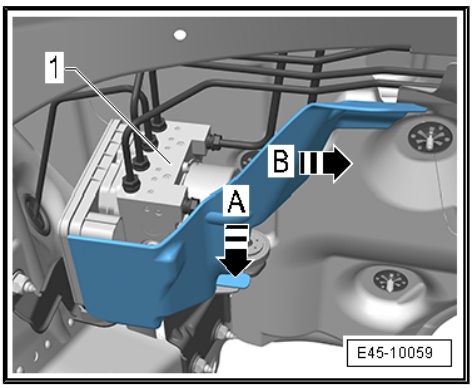
Do not bend the brake lines in the area of the hydraulic unit.

– Read out and note the actual control unit coding ⇒ Vehicle diagnostic tester.

– Disconnect battery earth strap ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– If present, remove the engine cover.

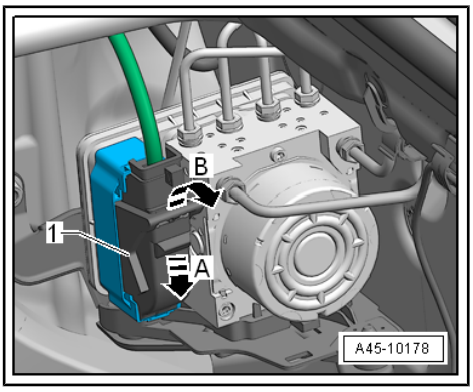
– Loosen clamp in the direction of -arrow A- in the lower part of the cover and remove the cover in the direction of -arrow B-.



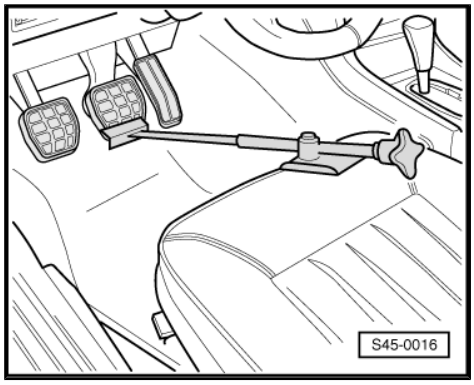
Note

The protection plate is installed depending on the vehicle equipment fitted.

– Release the fuse plug -1- -in the direction of arrow A- and pull it off the ABS control unit - J104- -in the direction of arrow B-.



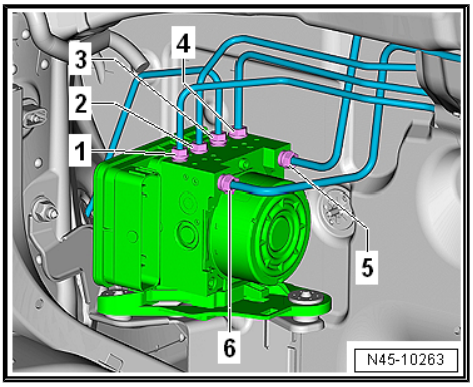
– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Close front left and rear left bleeder valves.
– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .
– Place a sufficient non-fluffing cloths under and around the ABS control unit - J104- and the ABS hydraulic unit - N55- .



NOTICE

Make sure that no brake fluid gets onto the contacts of the ABS control unit - J104- .

– Mark both brake lines -5- and -6- from the master brake cylinder and unscrew from the ABS hydraulic unit - N55- .
– Close the brake lines and threaded holes immediately with plugs from the repair kit - 1H0 698 311 A- .
– Mark the brake lines (for brake calliper) -1- to -4-, unscrew and close with plugs from the repair kit - 1H0 698 311 A- .
– If necessary, detach the electric cable of the lambda probe upstream of catalytic converter from the brackets.
– Pull the ABS hydraulic unit - N55- and the ABS control unit - J104- upwards and out of the shock absorbers.



Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55-*
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *Only remove plugs from the new ABS hydraulic unit - N55- if the relevant brake line is installed.*
- *If the plugs were already removed from the ABS hydraulic unit - N55- , then brake fluid may escape and adequate filling and bleeding of the unit can no longer be guaranteed.*
- *Make sure that the rubber bearings are not pressed out of the console when installing the bracket. After installing, check for tight fight, otherwise failure may be caused by a malfunction of the ABS hydraulic unit - N55- .*

– If necessary, attach the electric cable of the lambda probe upstream of catalytic converter again.
– Remove brake pedal load e.g. -V.A.G 1869/2- .
– Bleed brake system
  ⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .
– Code the control unit - J104- ⇒ Vehicle diagnostic tester.

While doing so, a basic setting of the steering angle sender - G85- , the lateral acceleration sender - G200- , the brake pressure sender 1 - G201- and the longitudinal acceleration sender - G251- must be performed ⇒ Vehicle diagnostic tester.

Tightening torques

- ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14

3.2.2 Removing and installing the ABS control unit - J104- / ABS hydraulic unit - N55- , vehicles with left-hand drive and diesel engine

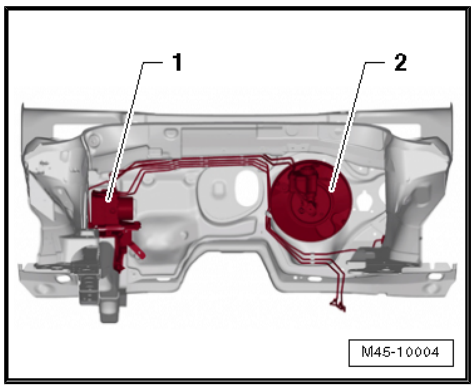
Special tools and workshop equipment required

- Brake pedal load e.g. -V.A.G 1869/2-
- Repair kit -1H0 698 311 A-
- Engine support bracket - T10533-

Removing

Fitting location:

The ABS control unit - J104- is bolted to the ABS hydraulic unit - N55- and is located in the engine compartment on the right side.



Note

Do not bend the brake lines in the area of the hydraulic unit.

– Read out and note the actual control unit coding ⇒ Vehicle diagnostic tester.

– Disconnect battery earth strap ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– If present, remove the engine cover.

– Remove the noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Summary of components - noise insulation .

– If present, remove the axle cover.

– Remove the coupling rod ⇒ Rep. gr. 10 ; Powertrain mounting; remove and install coupling rod .

– Remove front part of the exhaust system ⇒ Rep. gr. 26 ; Exhaust pipes/silencers; Removing and installing front part of exhaust system .

For vehicles with four-wheel drive

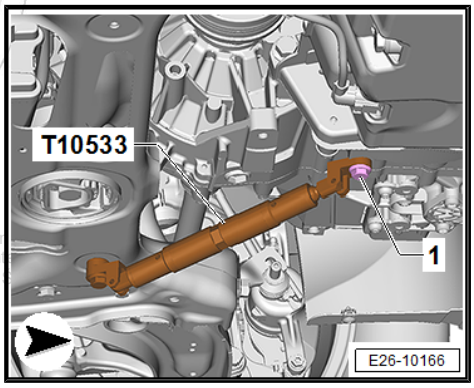
– Remove propshaft from front gearbox and place to one side ⇒ Rep. gr. 39 ; Propshaft; Removing and installing propshaft .

Continued for all vehicles

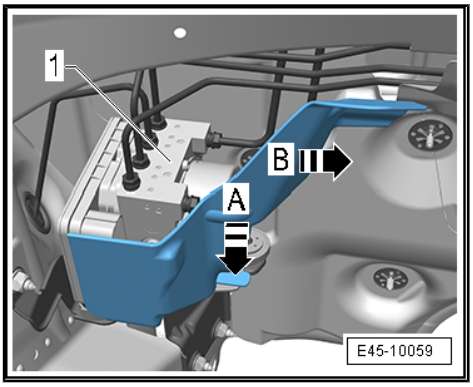
– Remove connector for Oil level and oil temperature encoder - G266- and disconnect the electric cable from the unit carrier.

– Fit engine support bracket - T10533- to gearbox and assembly carrier as per figure.

– Press the engine with gearbox forwards using the support bracket - T10533- .



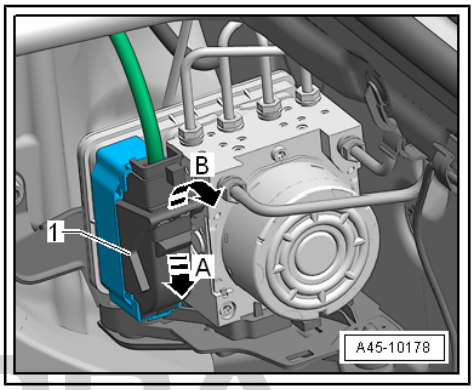
– Loosen clamp in the direction of -arrow A- in the lower part of the cover and remove the cover in the direction of -arrow B-.



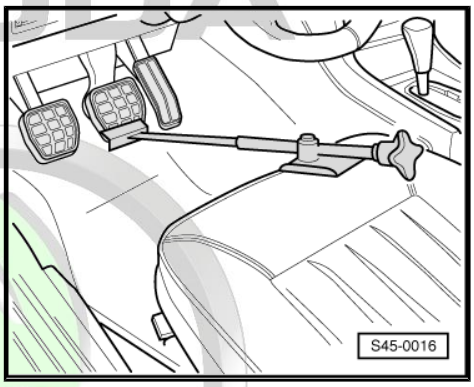
Note

The protection plate is installed depending on the vehicle equipment fitted.

– Release the fuse plug -1- -in the direction of arrow A- and pull it off the ABS control unit - J104- -in the direction of arrow B-.



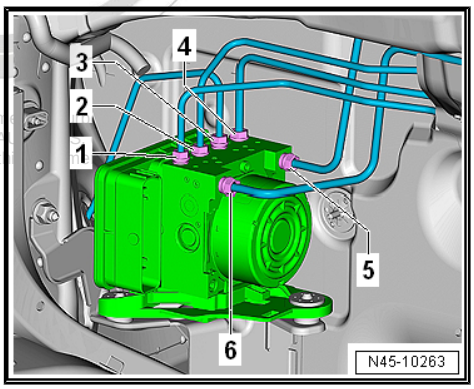
– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Close front left and rear left bleeder valves.
– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .
– Place a sufficient non-fluffing cloths under and around the ABS control unit - J104- and the ABS hydraulic unit - N55- .



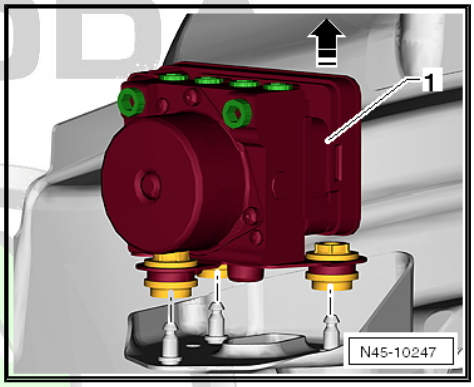
NOTICE

Make sure that no brake fluid gets onto the contacts of the ABS control unit - J104- .

– Mark both brake lines -5- and -6- from the master brake cylinder and unscrew from the ABS hydraulic unit - N55- .
– Close the brake lines and threaded holes immediately with plugs from the repair kit - 1H0 698 311 A-
– Mark the brake lines (for brake calliper) -1- to -4-, unscrew and close with plugs from the repair kit - 1H0 698 311 A- .

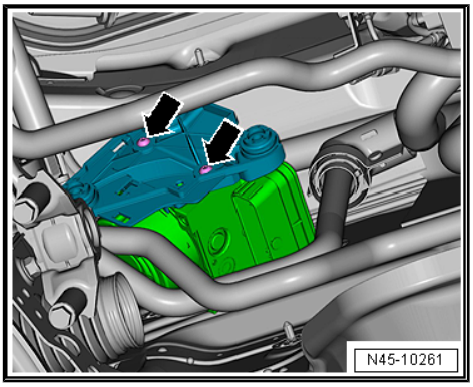


– Pull the ABS hydraulic unit - N55- and the ABS control unit - J104- -1- in the -direction of the arrow- and out of the shock absorbers.
– Lower the Hydraulic unit for ABS - N55- with control unit for ABS - J104- As low as possible on the unit carrier.
– Raise vehicle.



For vehicles with auxiliary heating

– Remove mounting bracket -arrows- in the vehicle from the ABS hydraulic unit - N55- .



Continued for all vehicles

– Remove the ABS hydraulic unit - N55- and the ABS control unit - J104- at the bottom from the vehicle.

Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55-*
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *Only remove plugs from the new ABS hydraulic unit - N55- if the relevant brake line is installed.*
- *If the plugs were already removed from the ABS hydraulic unit - N55- , then brake fluid may escape and adequate filling and bleeding of the unit can no longer be guaranteed.*
- *Make sure that the rubber bearings are not pressed out of the console when installing the bracket. After installing, check for tight fight, otherwise failure may be caused by a malfunction of the ABS hydraulic unit - N55- .*

– Remove brake pedal load e.g. -V.A.G 1869/2- .

– Bleed brake system.

– Code the control unit - J104- ⇒ Vehicle diagnostic tester.

While doing so, a basic setting of the steering angle sender - G85- , the lateral acceleration sender - G200- , the brake pressure sender 1 - G201- and the longitudinal acceleration sender - G251- must be performed ⇒ Vehicle diagnostic tester.

Tightening torques

- ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14
- ⇒ “1.1 Summary of components - front brake caliper”, page 73
- ⇒ “2.1 Summary of components - rear brake caliper”, page 76
- Noise insulation ⇒ General body repairs, exterior ; Rep. gr. 66 ; Noise insulation; Summary of components- noise insulation
- Pendulum support ⇒ Rep. gr. 10 ; Assembly mountings; Summary of components - assembly mountings

- Front part of the exhaust system ⇒ Rep. gr. 26 ; Exhaust pipes/silencers; Summary of components - silencers
- Remove the propshaft ⇒ Rep. gr. 39 ; Propshaft; Summary of components - propshaft .

3.2.3 Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55- , right-hand drive vehicles

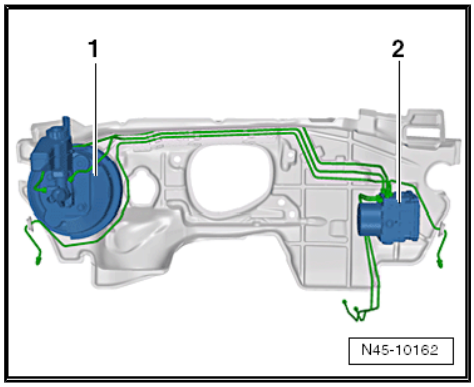
Special tools and workshop equipment required

- Brake pedal load e.g. -V.A.G 1869/2-
- Repair kit -1H0 698 311 A-

Removing

Fitting location:

The ABS control unit - J104- is bolted to the ABS hydraulic unit - N55- and is located in the engine compartment on the left side.



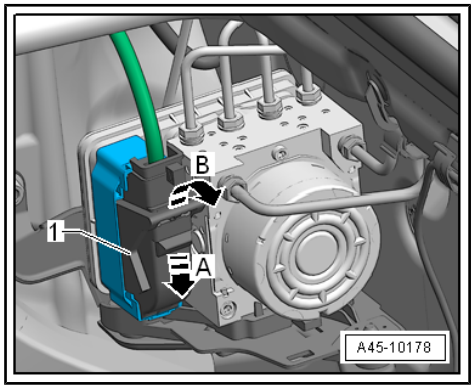
Note

Do not bend the brake lines in the area of the hydraulic unit.

– Read out and note the actual control unit coding ⇒ Vehicle diagnostic tester.

– Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

– Release the fuse plug -1- -in the direction of arrow A- and pull it off the ABS control unit - J104- -in the direction of arrow B-.



Note

The illustration shows the hydraulic unit for ABS - N55- with control unit for ABS/ESC - J104- for left-hand drives.

– Position brake pedal load , e.g. -V.A.G 1869/2- .

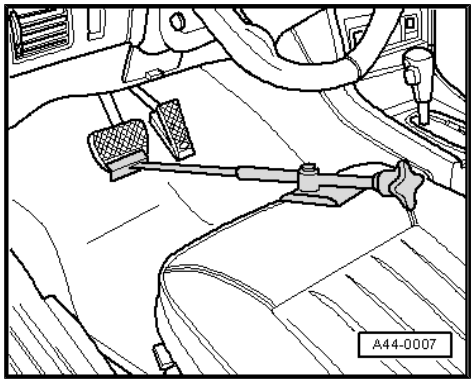
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.

– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.

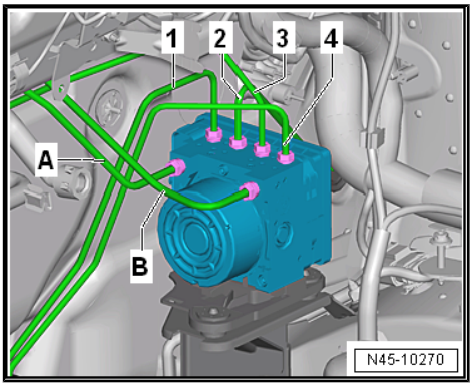
– Close front left and rear left bleeder valves.

– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .

– Place a sufficient non-fluffing cloths under and around the ABS control unit - J104- and the ABS hydraulic unit - N55- .

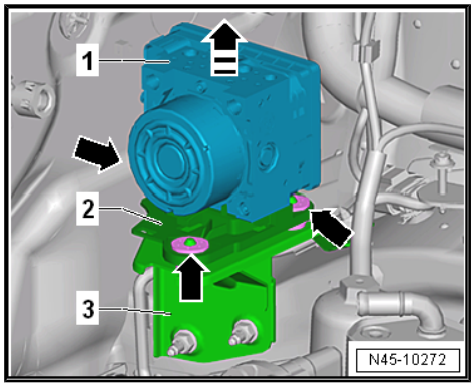


– Mark both brake lines -A- and -B- from the master brake cylinder and unscrew from the ABS hydraulic unit - N55- .
– Close the brake lines and threaded holes immediately with plugs from the repair kit - 1H0 698 311 A- .
– Mark the brake lines (for brake calliper) -1- to -4-, unscrew and close with plugs from the repair kit - 1H0 698 311 A- .



– Pull the ABS hydraulic unit - N55- and the ABS control unit - J104- -1- with the bracket -2- in the -direction of the arrow- and out of the shock absorbers.

– Remove the ABS control unit - J104- and the ABS hydraulic unit - N55- from the vehicle.



Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55-*
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *Only remove plugs from the new ABS hydraulic unit - N55- if the relevant brake line is installed.*
- *If the plugs were already removed from the ABS hydraulic unit - N55- , then brake fluid may escape and adequate filling and bleeding of the unit can no longer be guaranteed.*
- *Make sure that the rubber bearings are not pressed out of the console when installing the bracket. After installing, check for tight fight, otherwise failure may be caused by a malfunction of the ABS hydraulic unit - N55- .*

– Observe the tightening sequence of the brake lines
⇒ Fig. ““Tightening sequence of the brake lines””, page 29 .

– Remove brake pedal load e.g. -V.A.G 1869/2- .

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

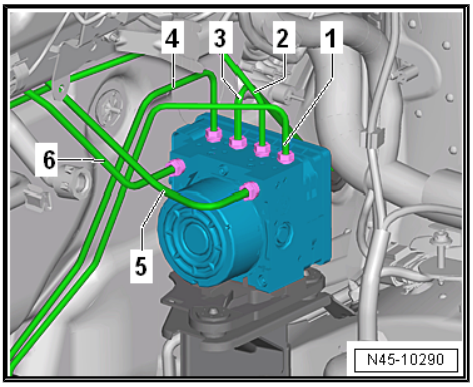
– Code the control unit - J104- ⇒ Vehicle diagnostic tester.

While doing so, a basic setting of the steering angle sender - G85- , the lateral acceleration sender - G200- , the brake pressure sender 1 - G201- and the longitudinal acceleration sender - G251- must be performed ⇒ Vehicle diagnostic tester.

Tightening sequence of the brake lines

Tightening torques

- ⇒ “3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle”, page 17
- ⇒ “1.1 Summary of components - front brake caliper”, page 73
- ⇒ “2.1 Summary of components - rear brake caliper”, page 76
- Battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray



3.3 Disconnecting the control unit from the hydraulic unit

- In the case of a malfunction of the ABS control unit - J104- , the control unit must be disconnected from the ABS hydraulic unit - N55- and replaced individually.
- In the case of a malfunction of the ABS hydraulic unit - N55- , the ABS hydraulic unit - N55- must be completely replaced together with the ABS control unit - J104- .

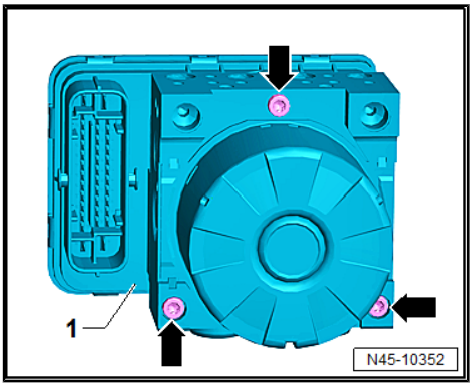
Note

- *The hydraulic pump - V64- and ABS hydraulic unit - N55- must not be separated from each other.*
- *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*
- *No moisture and no dirt particles must penetrate into the interior of the ABS control unit - J104- .*
- *Electrostatic charge can cause malfunctions of the ABS control unit - J104- .*
- *Before handling the ABS control unit - J104- , the technician must discharge himself electrostatically. The electrostatic discharge is achieved by touching earthed metal parts. Do not grab directly at the plug contacts or electronic components.*

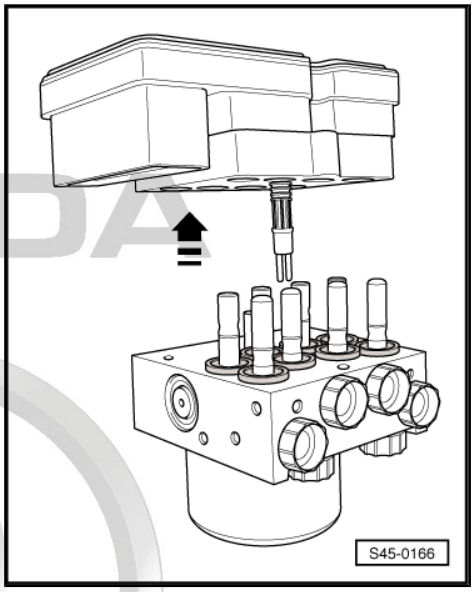
– Remove the ABS hydraulic unit - N55- with the ABS control unit - J104-
⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18 .

– Lay the ABS hydraulic unit - N55- with the ABS control unit - J104- on a clean flat surface facing upwards.

– Unscrew the fixing screws -arrows- of the ABS control unit - J104- and place to one side immediately (danger of mixing with new screws).



– Separate the ABS control unit - J104- from the ABS hydraulic unit - N55- in the -direction of arrow-.



Note

The ABS control unit - J104- may not tilt when it is pulled off from the ABS hydraulic unit - N55- .

– Cover the solenoid coils of the ABS control unit - J104- with a non-fluffing cloth.

After separating from the ABS control unit - J104- and the ABS hydraulic unit - N55- , use the transport protection for valve domes.

– Check the sealing surface of the ABS hydraulic unit - N55- for cleanliness. If necessary clean with white spirits and a non-fluffing cloth.

Note

- *The sealing surface of the ABS control unit - J104- may not be repaired using a file, metal scraper or similar.*
- *If the sealing surface is damaged, replace the sealing surface of the ABS control unit - J104- .*
- *The seal of the ABS control unit - J104- must not be damaged.*
- *The seal is not designed as spare part, so it is part of the new ABS control unit - J104- .*

3.4 Fitting the control unit to the hydraulic unit

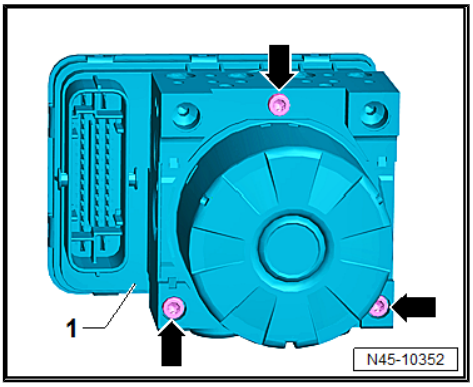
Note

Strong vibrations (e.g. fall, knock) can destroy the ABS control unit - J104- . The ABS control unit - J104- must no longer be used.

- The contact surfaces must be cleaned before assembling.
- The seal of the ABS control unit - J104- must not be damaged.

– Position the ABS control unit - J104- without tilting it onto the ABS hydraulic unit - N55- .

– Start by bolting the ABS control unit - J104- to the ABS hydraulic unit - N55- by hand using new screws -arrows-.



Note

- *A new ABS control unit - J104- may only be installed on the remaining ABD hydraulic unit - N55- a maximum of three times in order to ensure leak-tightness of the elastic seal.*
- *If the ABS control unit - J104- has already been installed and used in the vehicle, it must not be installed a second time.*
- *The threads in the ABS hydraulic unit - N55- must not be repaired or recut.*
- *If the thread is damaged, the ABS hydraulic unit - N55- must be replaced.*

– Tighten the screws in two stages
⇒ “3.1 Exploded view – control unit and hydraulic unit”, page 14 .

4 Sensors

4.1 Assembly overview - speed sensor on front axle

1 - Wheel hub with wheel bearing

- ❑ Sensor ring for ABS is built into the wheel hub

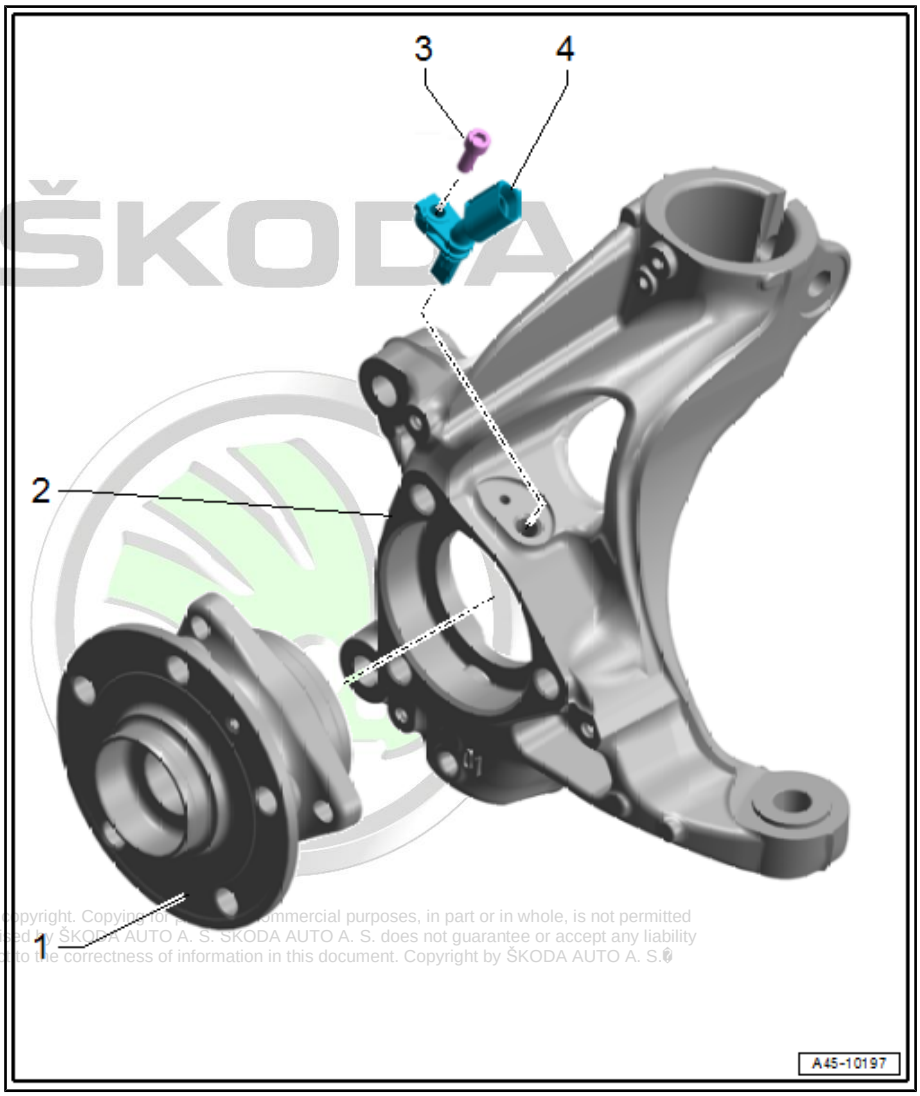
2 - Wheel bearing housing

3 - Screw

- ❑ 8 Nm

4 - Front speed sensor - G45- / -G47-

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .
- ❑ Removing and installing ⇒ “4.6 Removing and installing front speed sensors G45 / G47 ”, page 35



4.2 Assembly overview - speed sensor on rear axle

⇒ “4.2.1 Summary of components - speed sensor on rear axle, torsion beam axle”, page 33

⇒ “4.2.2 Summary of components - speed sensor on rear axle, multi-link axle”, page 34

4.2.1 Summary of components - speed sensor on rear axle, torsion beam axle

1 - Wheel hub with wheel bearing

- ❑ Sensor ring for ABS is built into the wheel hub

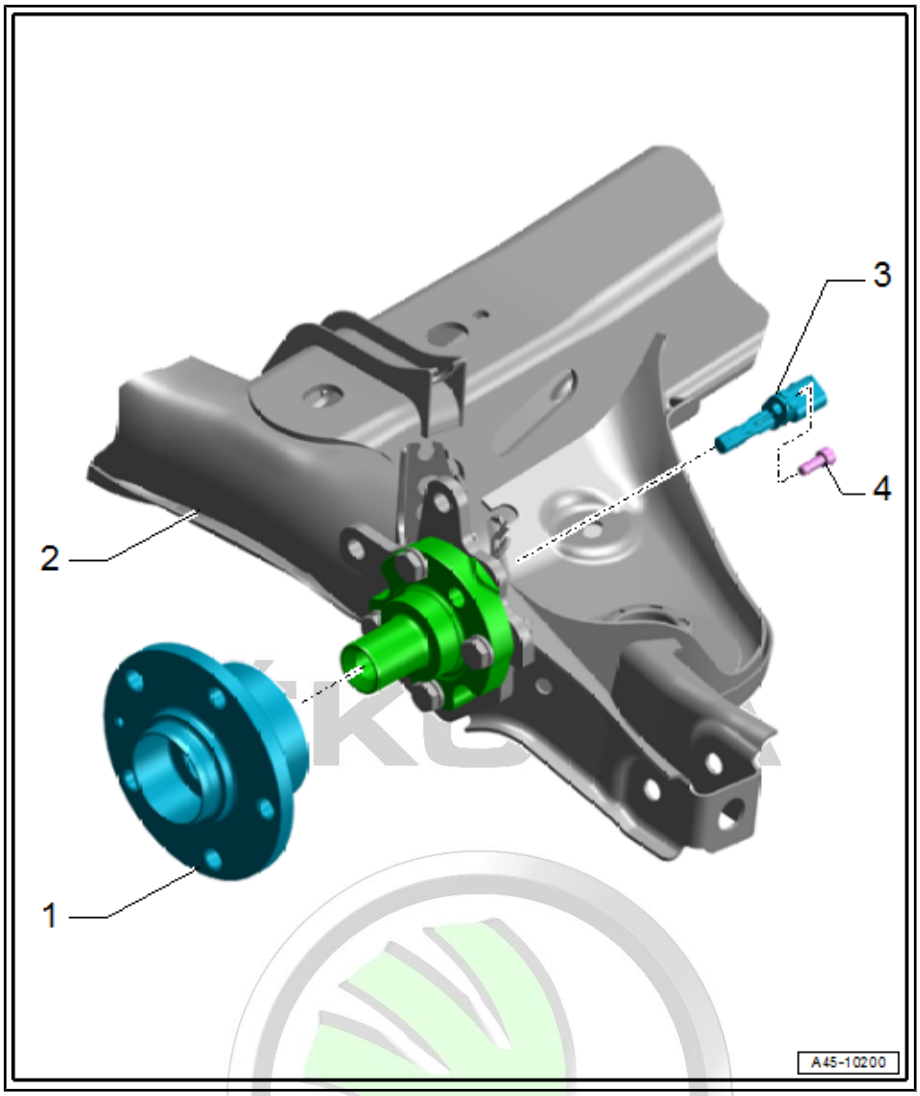
2 - Assembly carrier

3 - Rear speed sensor - G44- / -G46-

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .
- ❑ Removing and installing ⇒ “4.7 Removing and installing the rear speed sensors G44 / G46 ”, page 35

4 - Screw

- ❑ 8 Nm



4.2.2 Summary of components - speed sensor on rear axle, multi-link axle

1 - Wheel hub with wheel bearing

- ❑ Sensor ring for ABS is built into the wheel hub

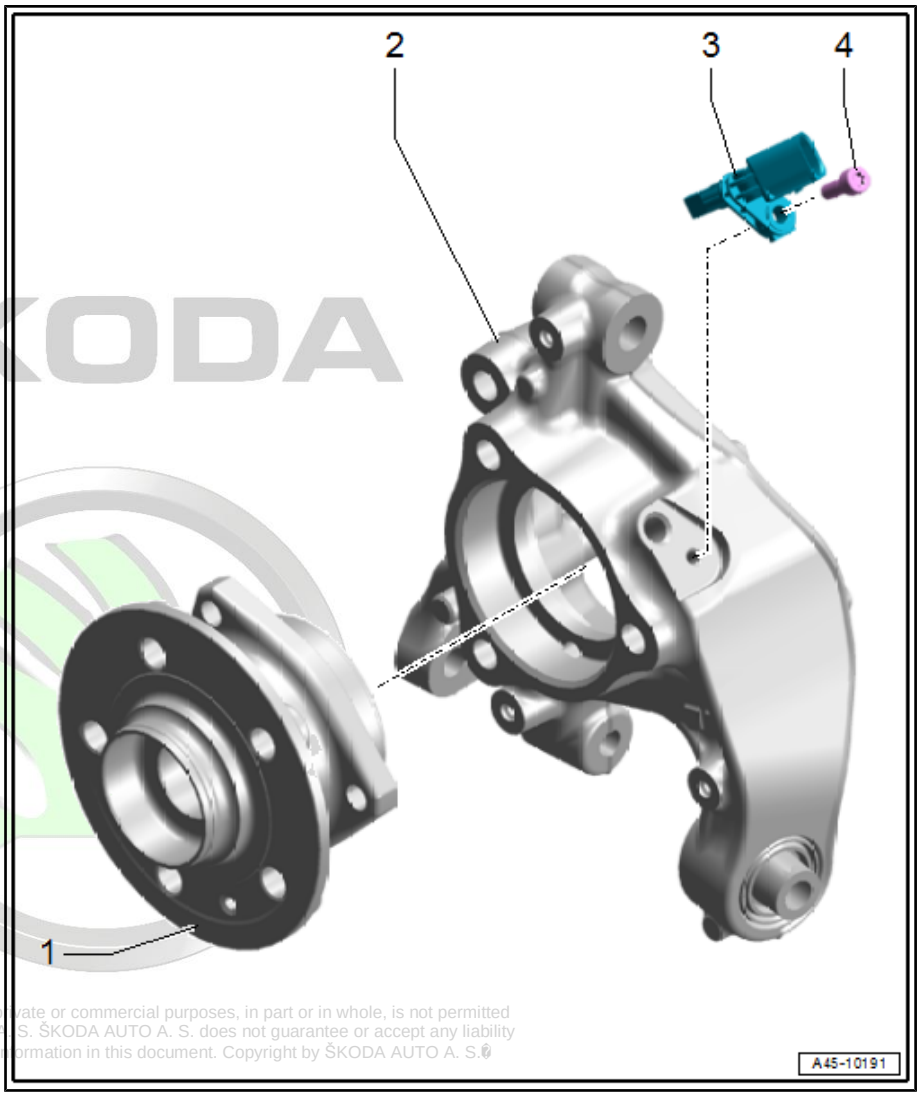
2 - Wheel bearing housing

3 - Rear speed sensor - G44- / -G46-

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .
- ❑ Removing and installing ⇒ “4.7 Removing and installing the rear speed sensors G44 / G46 ”, page 35

4 - Screw

- ❑ 8 Nm



4.3 Removing and installing the brake pressure sender

The brake pressure sender sensor 1 - G201- is integrated in the ABS hydraulic unit - N55- and cannot be removed separately.

If brake pressure sender 1 - G201- is damaged, the ABS control unit - J104- with the ABS hydraulic unit - N55- must be fully replaced
⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18 .

4.4 Removing and installing the handbrake switch

The handbrake switch is integrated into a housing with the vehicle's central locking switch ⇒ Electrical system; Rep. gr. 96 ; Controls .

4.5 Removing and installing the sensor unit for stabilisation program - G419-

The ESP sensor unit - G419- is integrated into the ABS control unit - J104- and cannot be removed separately.

If the ESP sensor unit - G419- is damaged, the ABS control unit - J104- must be replaced
⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29 .

4.6 Removing and installing front speed sensors -G45- / -G47-

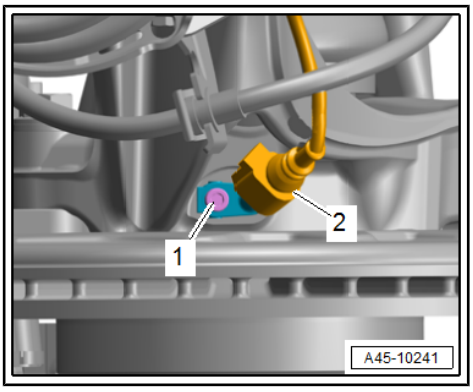
Removing

– Remove wheel.

– Disconnect plug -2- on the front wheel speed sensor - G45- / -G47- .

– Release screw -2-.

– Pull front speed sensor - G45- / -G47- -1- out of the wheel bearing housing.



Installing

Installation is carried out in the reverse order.

Tightening torques

- ⇒ “4.1 Assembly overview - speed sensor on front axle”, page 32
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

4.7 Removing and installing the rear speed sensors -G44- / -G46-

⇒ “4.7.1 Removing and installing the rear speed sensors G44 / G46 , torsion beam axle”, page 35

⇒ “4.7.2 Removing and installing the rear speed sensors G44 / G46 , multi-link axle”, page 36

4.7.1 Removing and installing the rear speed sensors -G44- / -G46- , torsion beam axle

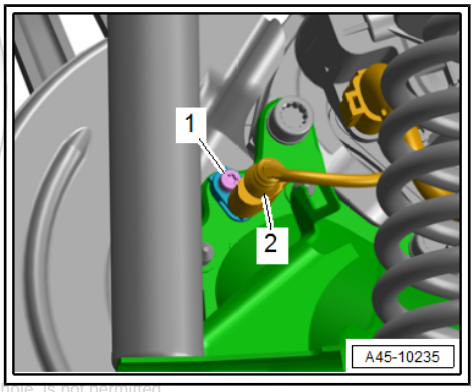
Removing

– Raise vehicle.

– Disconnect plug -2- on the rear speed sensor - G44- / -G46- .

– Release screw -1-.

– Pull rear speed sensor - G44- / -G46- out of the axle.



Installing

Installation is carried out in the reverse order.

Tightening torques

- ⇒ “4.2 Assembly overview - speed sensor on rear axle”, page 33

4.7.2 Removing and installing the rear speed sensors -G44- / -G46- , multi-link axle

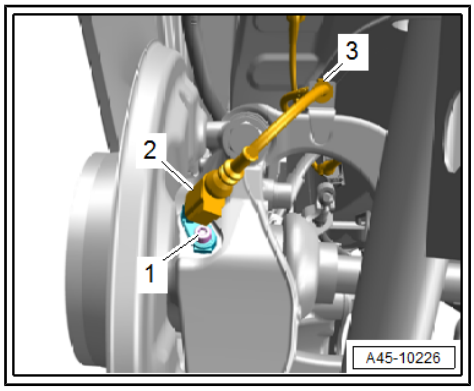
Removing

– Raise vehicle.

– Disconnect plug -2- on the rear speed sensor - G44- / -G46- .

– Release screw -1-.

– Pull rear speed sensor - G44- / -G46- -1- out of the wheel bearing housing.



Installing

Installation is carried out in the reverse order.

Tightening torques

◆ ⇒ “4.2 Assembly overview - speed sensor on rear axle”, page 33

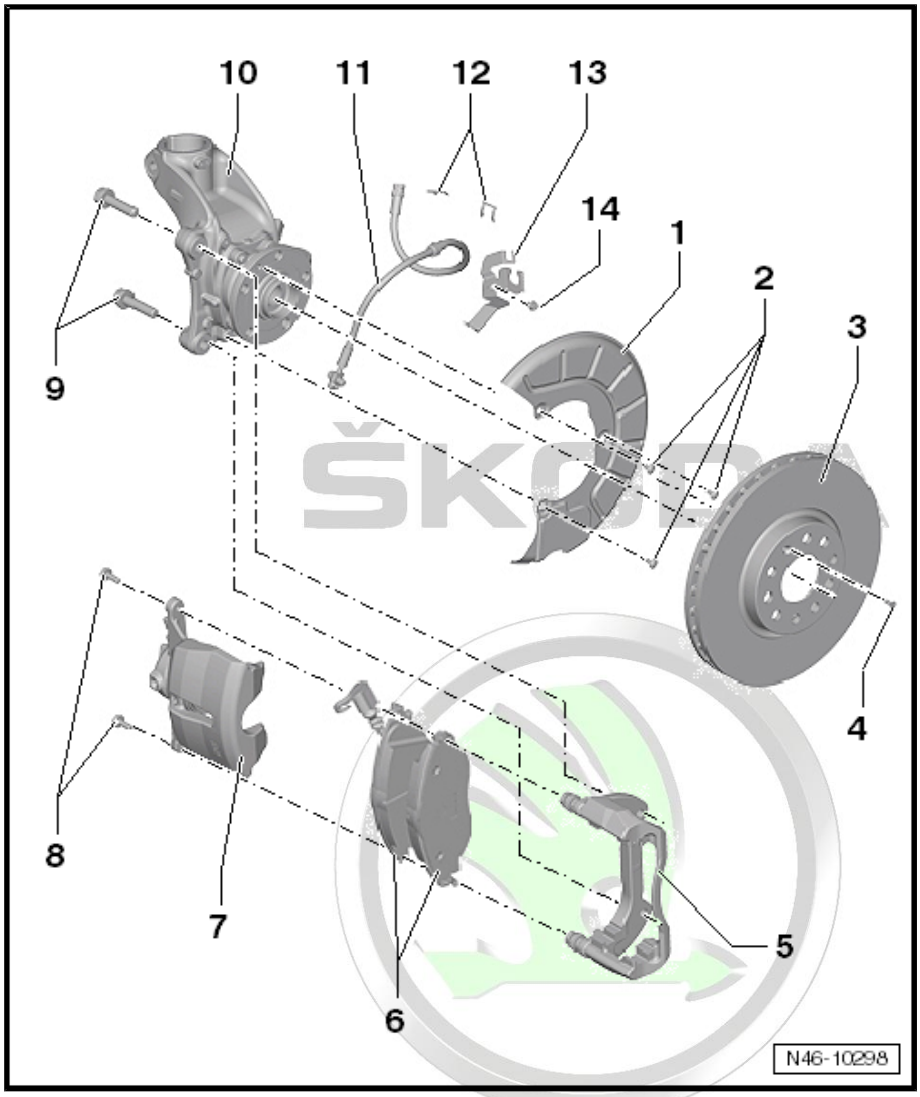
46 – Brakes - mechanism

1 Front brakes

1.1 Assembly overview - front brakes

Note

- *Observe the instructions for changing the pad* *⇒ “1.2.1 Changing the brake pads of the front brake - Mounting instructions”, page 39*
- *Brake inspection* *⇒ “4 Brake inspection”, page 6* *.*
- *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- *Use the brake pedal load , e.g. -V.A.G 1869/2- , before removing a brake calliper or separating a brake hose from the brake calliper.*



1 - Protection plate

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Removing and installing ⇒ “1.5 Removing and installing brake shield plate”, page 46

2 - Screw

- ❑ 12 Nm

3 - Brake disc

- ❑ internally ventilated
- ❑ Removing and installing ⇒ “1.4 Removing and installing brake disc”, page 46
- ❑ Dimensions and wear limit ⇒ “3.1 Technical data for brakes”, page 3
- ❑ always replace axle-wise
- ❑ Do not use force to separate the brake discs from the wheel hub, if necessary use rust solvent; as you could otherwise damage the brake discs.
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

4 - Screw

- ❑ 8 Nm

5 - Brake carrier

- ❑ screwed onto the wheel-bearing housing

6 - Brake pads

- ❑ do not unscrew the brake hose when replacing the brake pad
- ❑ Removing and installing ⇒ “1.2.2 Removing and installing brake pads”, page 39
- ❑ Thickness, wear limit ⇒ “3.1 Technical data for brakes”, page 3
- ❑ always replace axle-wise
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Observe the instructions for changing the pad ⇒ “1.2.1 Changing the brake pads of the front brake - Mounting instructions”, page 39

7 - Brake caliper

- ❑ Removing and installing ⇒ “1.3 Removing and installing brake caliper”, page 43
- ❑ Summary of components ⇒ “1.1 Summary of components - front brake caliper”, page 73
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

8 - Screw

- ❑ self-locking
- ❑ Replace after removal
- ❑ 35 Nm

9 - Screw

- ❑ clean when using again

❑ 200 Nm

10 - Wheel bearing housing

❑ with bolted brake carrier
❑ Assignment ⇒ Electronic Catalogue of Original Parts

11 - Brake hose

❑ with banjo union and hollow screw
❑ pay attention to correct installation position
❑ 35 Nm

12 - Retaining clip

13 - Mounting bracket

14 - Screw

❑ 8 Nm

1.2 Removing and installing brake pads

⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39

⇒ "1.2.2 Removing and installing brake pads", page 39

1.2.1 Changing the brake pads of the front brake - Mounting instructions

When changing the pads, pay attention to the following points:

– Check protective collar of brake calliper piston.

Replace protective cap if damaged.

When replacing the protective cap:

– Check the contact surfaces of the brake piston and the brake caliper for any dirt (oxidation).

Carefully clean the piston as well as the brake caliper if dirty and replace the sealing cap.

– Check the brake piston and the brake caliper (corrosion, grooves on the outside of the cylinder surface), replace the brake caliper completely if damaged.

For brake caliper piston, press into the initial position:

– Check if the piston can be slightly pressed into the brake caliper.

If the piston cannot be slightly pressed into the brake caliper:

– Check and clean the brake piston as well as the brake caliper, replace sealing sleeve and protective cap.

Replace the brake caliper completely if damaged.

1.2.2 Removing and installing brake pads

Special tools and workshop equipment required

♦ Piston jig - T10145-

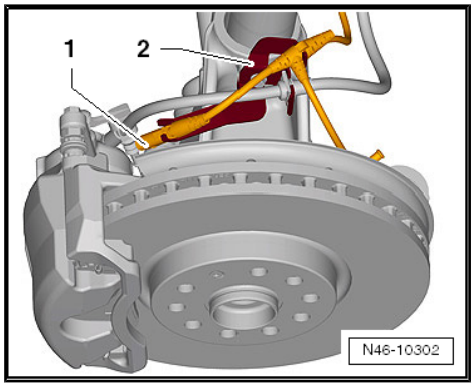
Note

- *Observe the instructions for changing the pad ⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39 .*
- *When removing mark the brake pads (inner and outer) you intend to keep using. Fit in same position when installing, or braking will be uneven!*
- *Do not unscrew the brake hose when replacing the brake pad.*

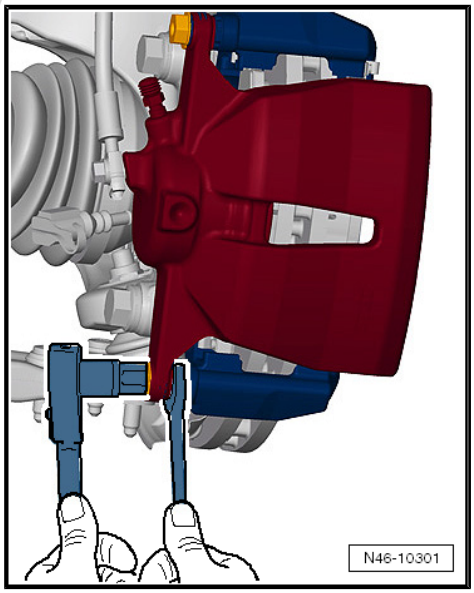
Removing

– Remove wheels.

– Disconnect the plug connection -1- for the brake pad wear indicator.

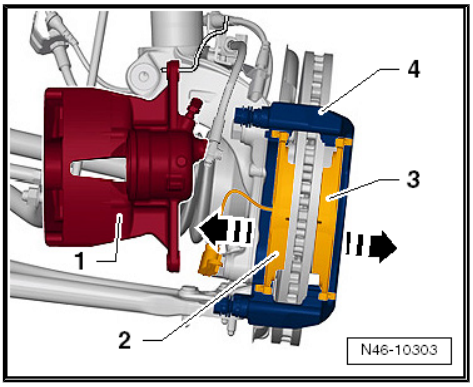


– Remove both fixing screws while counterholding the guide bolts.



– Remove the brake caliper -1- and secure with wire in such a way that the weight of the brake caliper does not burden or damage the brake hose

– Remove brake pads -2- and -3- from the brake caliper -4-.



Clean

WARNING

Do not flush the brake system with compressed air. The dust that is generated is hazardous to health!

– Thoroughly clean guiding surface for brake pads on brake carrier and remove corrosion.

– Clean brake caliper.

Note

Use spirits only to clean the brake caliper housing.

Installing

Note

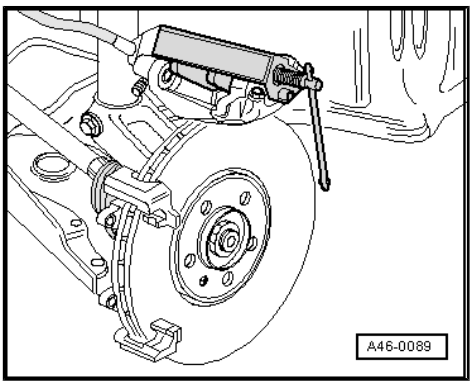
- *Observe the instructions for changing the pad ⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39 .*
- *Observe correct installation of the inner brake pads ⇒ page 42 !*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *When resetting the piston with a piston resetting device the automatic reset in the brake caliper is destroyed.*

CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

– Press the piston into the brake caliper using the piston resetting jig - T10145- .

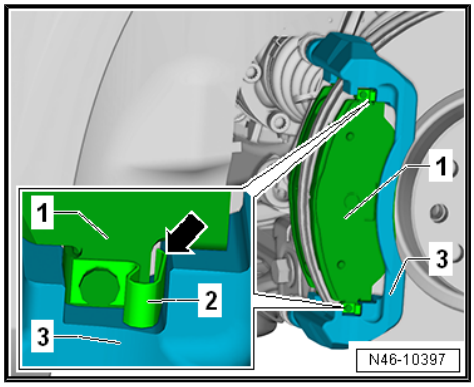
– Lightly grease guiding surface for brake pads on brake carrier with grease from the repair kit.



Note

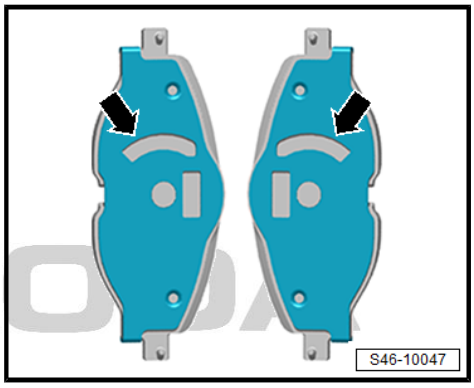
Do not interchange the inside and outside brake pads. Pay attention to identification.

– Insert brake pads -1- with retaining springs -2- into the recesses in the brake carrier -3-.



Installation of the inner brake pads

– The recesses in the back plate -arrows- must point upwards.

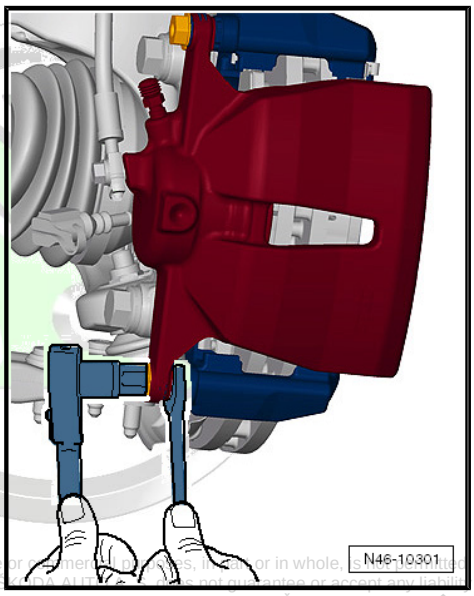


NOTICE

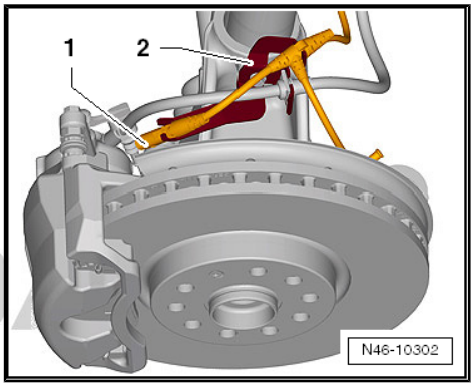
If the internal brake linings are incorrectly installed, uneven wear of the brake discs occurs.

– Carefully position the brake caliper on the brake carrier.

– Screw the brake caliper onto the brake carrier with new self-locking screws, while counterholding the guide bolts.



– Mount plug connection -1- for brake pad wear indicator.
– Attach the wheels.



Note

- *After each brake pad replacement, forcefully apply the brake pedal repeatedly to ensure the brake pads go into their normal operating position.*
- *Check brake fluid level after changing brake pads.*

Tightening torques

- ⇒ “1.1 Assembly overview - front brakes”, page 37
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

1.3 Removing and installing brake caliper

Special tools and workshop equipment required

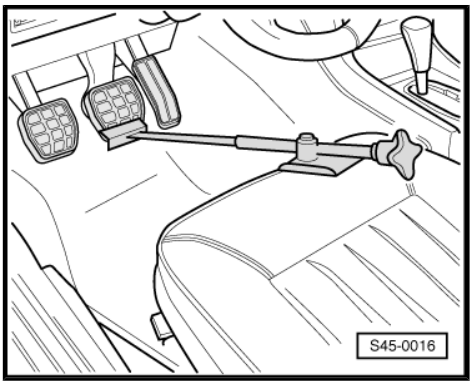
- Brake pedal load , e.g. -V.A.G 1869/2-

Note

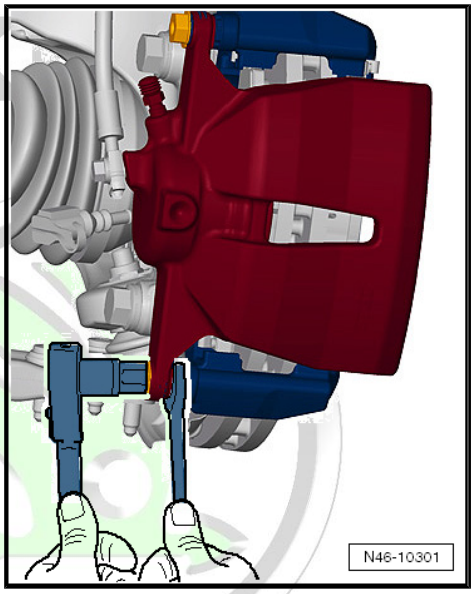
- *Observe the instructions for changing the pad ⇒ “1.2.1 Changing the brake pads of the front brake - Mounting instructions”, page 39 .*
- *When removing mark the brake pads (inner and outer) you intend to keep using. Fit in same position when installing, or braking will be uneven!*
- *Do not unscrew the brake hose when replacing the brake pad.*
- *This procedure applies only to exchanging or the following repair work on the brake caliper.*

Removing

– Remove wheel.
– Disconnect the connector for the brake pad wear indicator.
– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Tighten the drain plug.
– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .
– Remove brake hose.



– Remove both fixing screws while counterholding the guide bolts.
– Pull off brake caliper from brake carrier.



Clean

WARNING

Do not flush the brake system with compressed air. The dust that is generated is hazardous to health!

– Thoroughly clean guiding surface for brake pads on brake carrier and remove corrosion.
– Clean brake caliper.

Note

Use spirits only to clean the brake caliper housing.

Installing

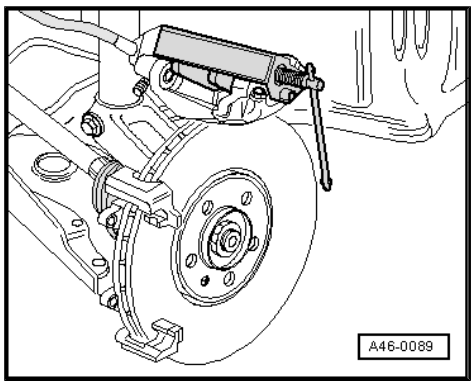
Note

- *Observe the instructions for changing the pad* *⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39* .
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *When resetting the piston with a piston resetting device the automatic reset in the brake caliper is destroyed.*

CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

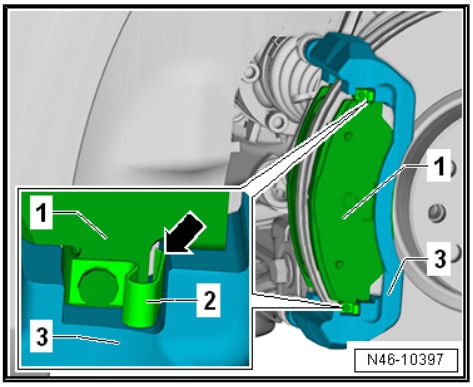
– Press the piston into the brake caliper using the piston resetting jig - T10145- .
– Lightly grease guiding surface for brake pads on brake carrier with grease from the repair kit.



Note

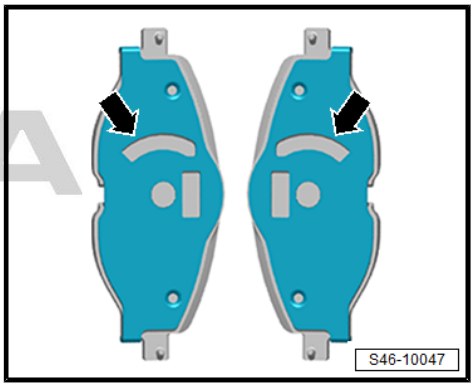
Do not interchange the inside and outside brake pads. Pay attention to identification.

– Insert brake pads -1- with retaining springs -2- into the recesses in the brake carrier -3-.



Installation of the inner brake pads

– The recesses in the back plate -arrows- must point upwards.

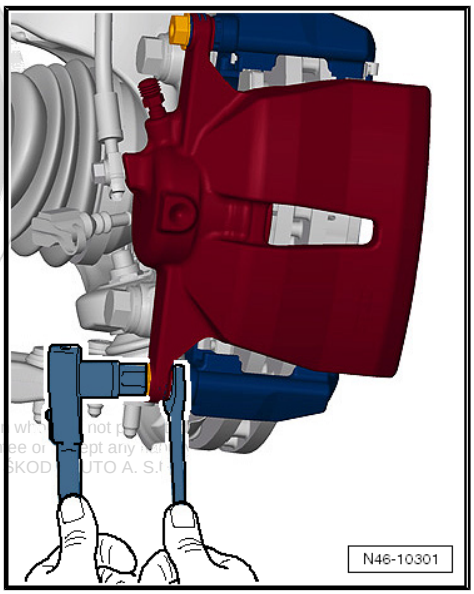


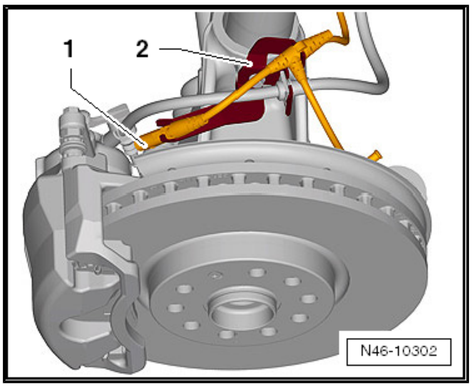
NOTICE

If the internal brake linings are incorrectly installed, uneven wear of the brake discs occurs.

– Carefully place the brake caliper on the brake carrier.

– Screw the brake caliper onto the brake carrier with new self-locking screws, while counterholding the guide bolts.





– Mount plug connection -1- for brake pad wear indicator.
– Install brake hose.
– Remove brake pedal load e.g. -V.A.G 1869/2- .
– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .
– Attach the wheel.

Note

♦ *Observe the instructions for changing the pad ⇒ “1.2.1 Changing the brake pads of the front brake - Mounting instructions”, page 39 .*
♦ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
♦ *Check brake fluid level.*

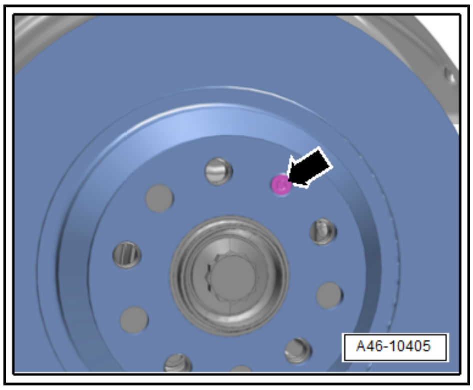
Tightening torques

♦ ⇒ “1.1 Assembly overview - front brakes”, page 37
♦ Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

1.4 Removing and installing brake disc

Removing

– Remove wheel.
– Remove the brake pads
⇒ “1.2 Removing and installing brake pads”, page 39 .
– Remove screws for brake carrier
⇒ “1.1 Assembly overview - front brakes”, page 37 pos. -9- and brakes.
– Remove the screw -arrow- and take off the brake disc.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clean the surfaces for the brake disc and wheel hub.

Tightening torques

♦ ⇒ “1.1 Assembly overview - front brakes”, page 37
♦ Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

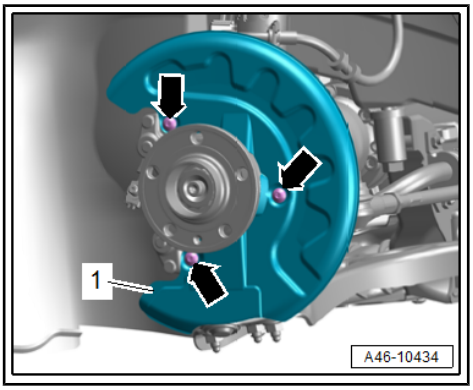
1.5 Removing and installing brake shield plate

Removing

– Remove wheel.
– Remove brake disc
⇒ “1.4 Removing and installing brake disc”, page 46 .

– Remove screws -arrows-.

– Remove the cover plate -1- from the wheel bearing housing.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clean the contact surfaces for the cover plate and the wheel bearing housing.

Tightening torques

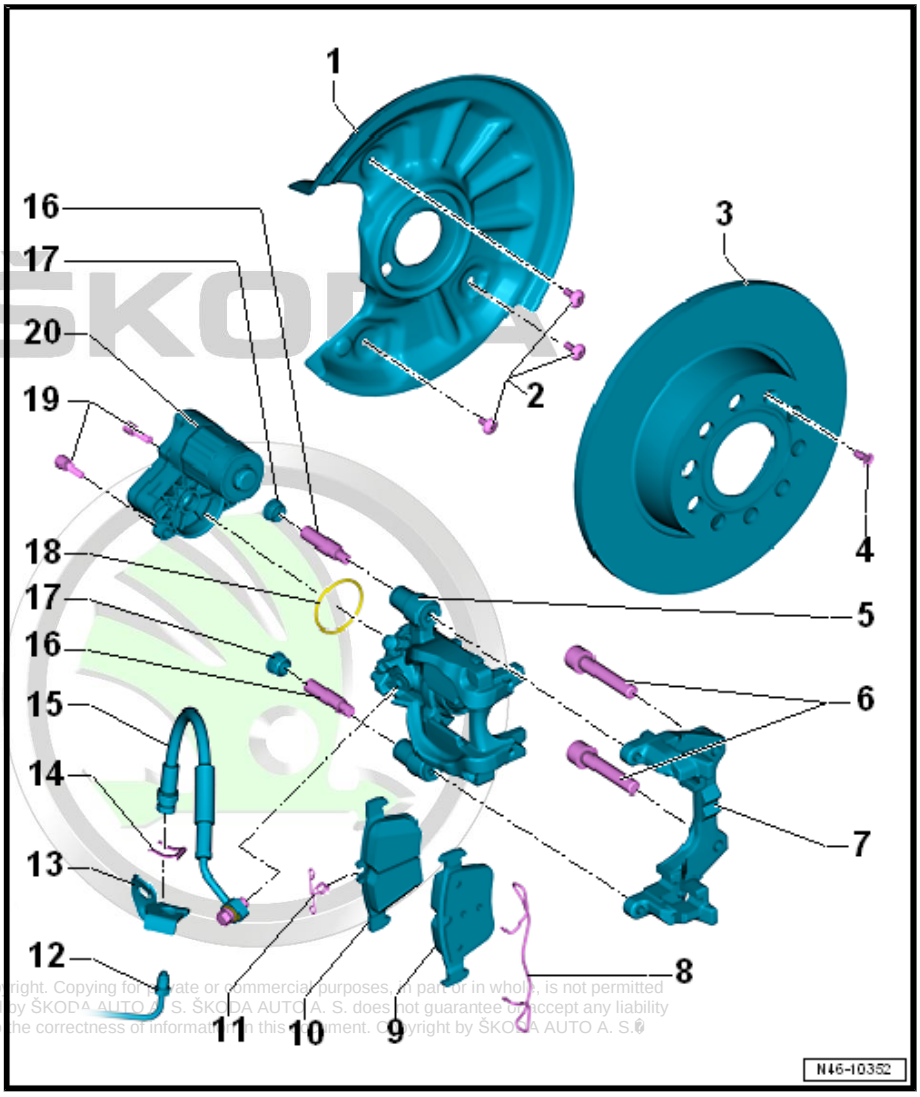
- ⇒ “1.1 Assembly overview - front brakes”, page 37
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

2 Rear brakes

2.1 Assembly overview - rear brakes

Note

- *Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50*
- *Brake inspection ⇒ “4 Brake inspection”, page 6 .*
- *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- *Use the brake pedal load , e.g. -V.A.G 1869/2- , before removing a brake calliper or separating a brake hose from the brake calliper.*



1 - Protection plate

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Removing and installing ⇒ “2.5 Removing and installing brake shield plate”, page 58

2 - Screw

- ❑ 12 Nm

3 - Brake disc

- ❑ internally ventilated
- ❑ Removing and installing ⇒ “2.4 Removing and installing brake disc”, page 58
- ❑ Dimensions and wear limit ⇒ “3.1 Technical data for brakes”, page 3
- ❑ always replace axle-wise
- ❑ unscrew the brake caliper before removing
- ❑ Do not use force to separate the brake discs from the wheel hub, if necessary use rust solvent; as you could otherwise damage the brake discs.
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

4 - Screw

- ❑ 8 Nm

5 - Brake caliper

- ❑ do not unscrew the brake hose when replacing the brake pad
- ❑ Removing and installing ⇒ “2.3 Removing and installing brake caliper”, page 54
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50
- ❑ After repair or replacement, carry out “basic setting” with the ⇒ Vehicle diagnostic tester

6 - Screw

- ❑ Replace after removal
- ❑ 90 Nm + 90°.

7 - Brake carrier

8 - Spring

9 - Outer brake pad

- ❑ Dimensions and wear limit ⇒ “3.1 Technical data for brakes”, page 3
- ❑ always replace axle-wise
- ❑ Removing and installing ⇒ “2.2 Removing and installing brake pads”, page 50
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50

10 - Inner brake pad

- ❑ Dimensions and wear limit ⇒ “3.1 Technical data for brakes”, page 3
- ❑ always replace axle-wise
- ❑ Removing and installing ⇒ “2.2 Removing and installing brake pads”, page 50
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50

11 - Spring

- ❑ Only on inner brake pad
- ❑ Check fitting position

12 - Brake line

- ❑ 14 Nm

13 - Brake line holder

14 - Safety mechanism

15 - Brake hose

- ❑ with banjo union and hollow screw
- ❑ To the brake calliper: 35 Nm
- ❑ To the brake line: 14 Nm

16 - Guide bolt

- ❑ 35 Nm

17 - Cover caps

18 - Sealing ring

- ❑ for handbrake motor
- ❑ Replace after removal

19 - Screw

- ❑ 8 Nm

20 - Handbrake motor -V282- / -V283-

- ❑ Removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 61

2.2 Removing and installing brake pads

⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50

⇒ “2.2.2 Removing and installing brake pads”, page 51

2.2.1 Changing the brake pads of the rear brake - Mounting instructions

When changing the pads, pay attention to the following points:

– Check protective collar of brake calliper piston.

Replace protective cap if damaged.

When replacing the protective cap:

– Check the contact surfaces of the brake piston and the brake caliper for any dirt (oxidation).

Carefully clean the piston as well as the brake caliper if dirty and replace the sealing cap.

– Check the brake piston and the brake caliper (corrosion, grooves on the outside of the cylinder surface), replace the brake caliper completely if damaged.

For brake caliper piston, press into the initial position:

– Check if the piston can be slightly pressed into the brake caliper.

If the piston cannot be slightly pressed into the brake caliper:

– Check and clean the brake piston as well as the brake caliper, replace sealing sleeve and protective cap.

Replace the brake caliper completely if damaged.

2.2.2 Removing and installing brake pads

Special tools and workshop equipment required

- Vehicle diagnosis, measurement and information system
- Tool set for brake bleeding - VAS 6564- and -VAS 6564/9-
- Brake filling and bleeding device , e. g. -VAS 5234-
- Piston jig - T10145-

Removing

Note

- *Observe the instructions for changing the pad* *⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39* .
- *When removing mark the brake pads (inner and outer) you intend to keep using. Fit in same position when installing, or braking will be uneven!*
- *Do not disconnect the connectors of the handbrake motor.*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *Do not unscrew the brake hose when replacing the brake pad.*
- *Do not operate the handbrake for any reason! If the handbrake is operated, the brake caliper is permanently damaged.*

CAUTION

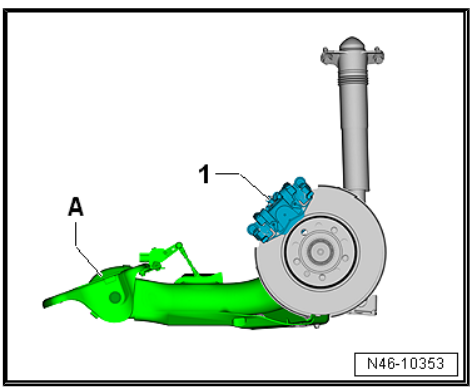
Brake fluid is toxic and must never be sucked up by mouth!

- Electronic handbrake not actuated.

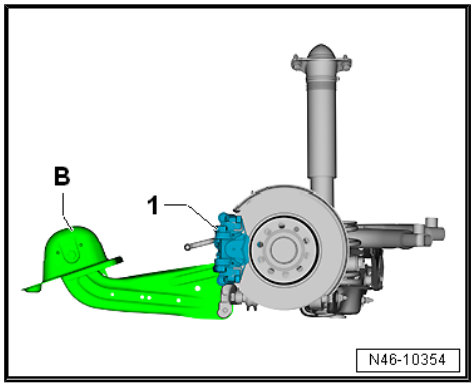
Summary of components - brake calliper, torsion beam axle

1 - Brake caliper

A - Torsion beam axle



Summary of components - brake calliper, multi-link axle



1 - Brake caliper

B - Multi-link rear suspension

Note

Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the parking brake piston.

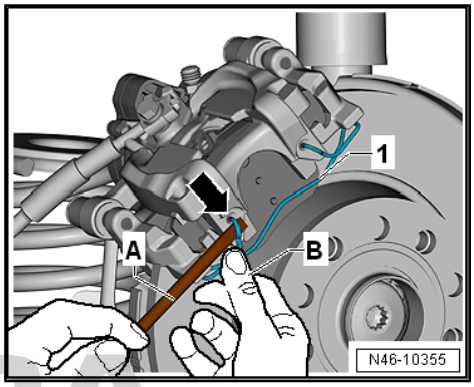
– Reset the pistons for the electronic handbrake ⇒ Vehicle diagnostic tester.

– Remove wheels.

CAUTION

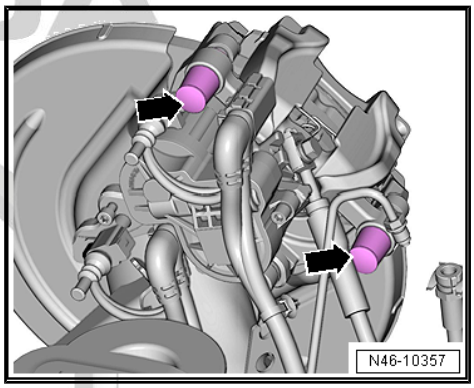
The retaining spring is under load – there is a risk of injury.

– Lever the retaining spring -1- for the brake pads out of the brake caliper -arrow- with a screwdriver -A-.

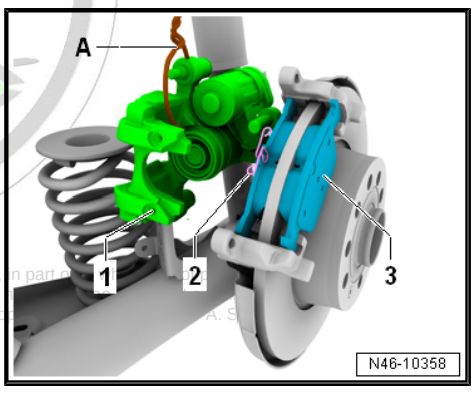


– Remove caps -arrows-.

– Remove both guide bolts from the brake caliper.



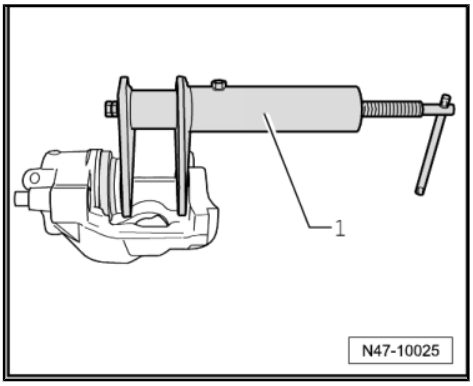
– Remove the brake caliper -1- and secure with wire -A- in such a way that the weight of the brake caliper does not load or damage the brake hose.



Note

- *Do not operate the handbrake for any reason! If the handbrake is operated, the brake caliper is permanently damaged.*
- *You must set back the pistons with the ⇒ Vehicle diagnostic testerin all cases! The compressor nut in the piston has a sleeve bearing, so that the piston can only be pushed out and cannot be pulled back. Only the spindle is driven back with the compressor nut.*

– Push back the piston completely with the piston resetting tool - T10145- .

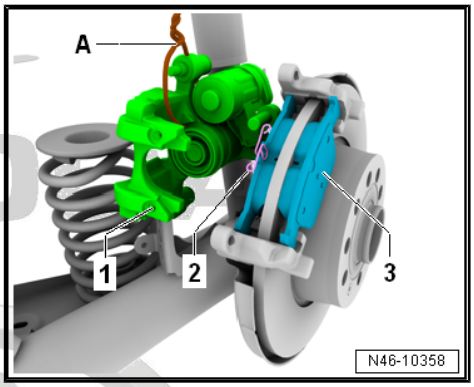


– Remove brake pads -2- and -3-.

Clean

WARNING

Do not flush the brake system with compressed air. The dust that is generated is hazardous to health!



– Thoroughly clean guiding surface for brake pads on brake carrier and remove corrosion.

– Clean brake caliper.

Note

Use spirits only to clean the brake caliper housing.

Installing

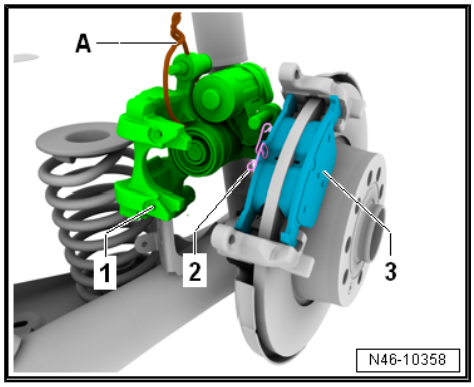
Note

- *Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 50 .*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *Do not operate the handbrake for any reason! If the handbrake is operated, the brake caliper is permanently damaged.*

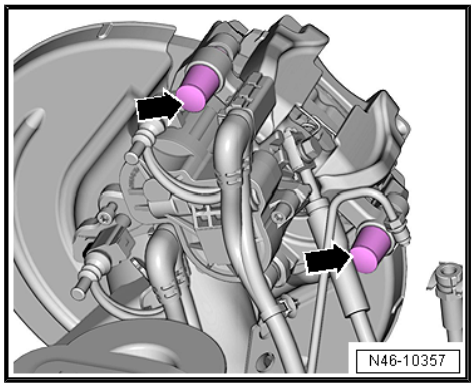
CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

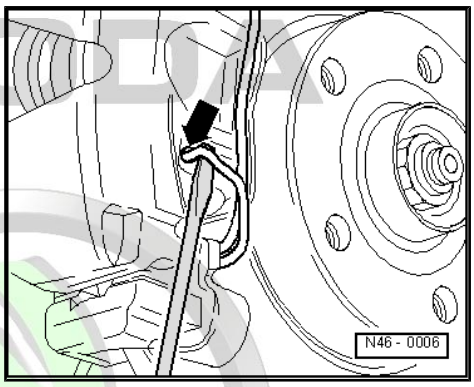
– Insert inner -2- and outer -3- brake pads into the brake carrier.
– Install brake caliper:



– Insert caps -arrows-.



– Insert retaining spring for brake pads into the bore of the brake caliper -arrow-.



Note

Ensure that the retaining spring is correctly seated in the bores of the brake caliper.

– Bring the brake system to basic position ⇒ Vehicle diagnostic tester.
– Attach the wheels.

Note

Check brake fluid level, if necessary top up with brake fluid.

Tightening torques

- ⇒ “2.1 Assembly overview - rear brakes”, page 48
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

2.3 Removing and installing brake caliper

Special tools and workshop equipment required

- Vehicle diagnosis, measurement and information system
- Tool set for brake bleeding - VAS 6564- and -VAS 6564/9-
- Piston jig - T10145-
- Brake pedal load - V.A.G 1869/2-

Removing

Note

- *This procedure applies only to exchanging or the following repair work on the brake caliper.*
- *Observe the instructions for changing the pad ⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39 .*
- *When removing mark the brake pads (inner and outer) you intend to keep using. Fit in same position when installing, or braking will be uneven!*
- *Do not disconnect the connectors of the handbrake motor.*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *Do not unscrew the brake hose when replacing the brake pad.*
- *Do not operate the handbrake for any reason! If the handbrake is operated, the brake caliper is permanently damaged.*

CAUTION

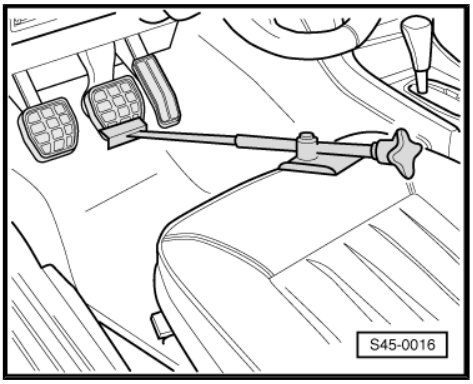
Brake fluid is toxic and must never be sucked up by mouth!

- Electronic handbrake not actuated.

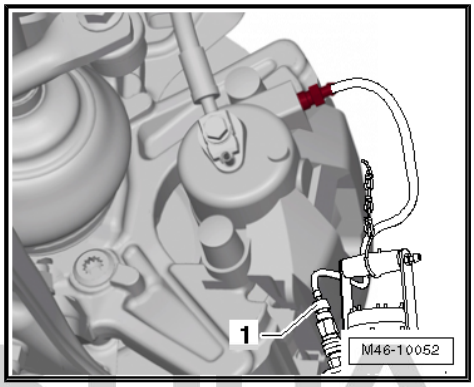
Note

Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the parking brake piston.

– Reset the pistons for the electronic handbrake ⇒ Vehicle diagnostic tester.
– Remove wheels.
– Remove handbrake motor ⇒ "3.3 Removing and installing handbrake motor V282 / V283", page 61 .
– Position brake pedal load , e.g. -V.A.G 1869/2- .



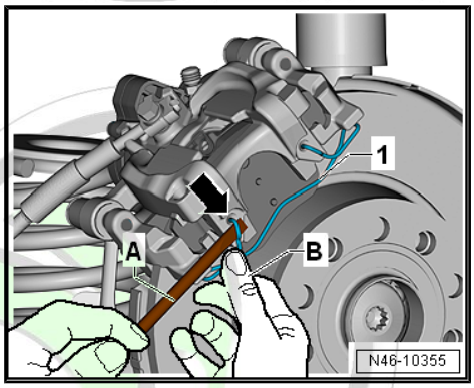
– Fit the bleeder hose of the bleeding bottle -1- onto the bleeder valve and release bleeder valve.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Tighten the drain plug.
– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .
– Unscrew brake hose.



CAUTION

The retaining spring is under load – there is a risk of injury.

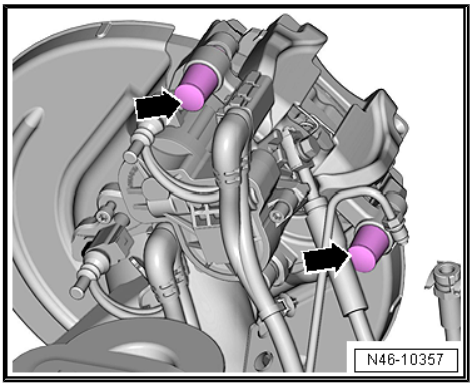
– Lever the retaining spring -1- for the brake pads out of the brake caliper -arrow- with a screwdriver -A-.



– Remove caps -arrows-.

– Remove both guide bolts from the brake caliper.

– Pull off brake caliper from brake carrier.



Clean

WARNING

Do not flush the brake system with compressed air. The dust that is generated is hazardous to health!

– Thoroughly clean guiding surface for brake pads on brake carrier and remove corrosion.

– Clean brake caliper.

Note

Use spirits only to clean the brake caliper housing.

Installing

Note

- *Observe the instructions for changing the pad ⇒ "2.2.1 Changing the brake pads of the rear brake - Mounting instructions", page 50 .*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.*
- *Do not operate the handbrake for any reason! If the handbrake is operated, the brake caliper is permanently damaged.*

CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

- The brake pads are fitted in the retaining springs on the brake caliper.

– Fit brake caliper to the brake carrier.

– Install both brake caliper guide pins.

– Install handbrake motor ⇒ "3.3 Removing and installing handbrake motor V282 / V283", page 61 .

– Bolt brake hose to brake caliper.

– Bleed brake system ⇒ "6.3 Bleeding hydraulic system following standard procedure", page 128 .

– Perform basic setting of the brake system with the ⇒ Vehicle diagnostic tester.

– Attach the wheels.

Note

Check brake fluid level, if necessary top up with brake fluid.

Tightening torques

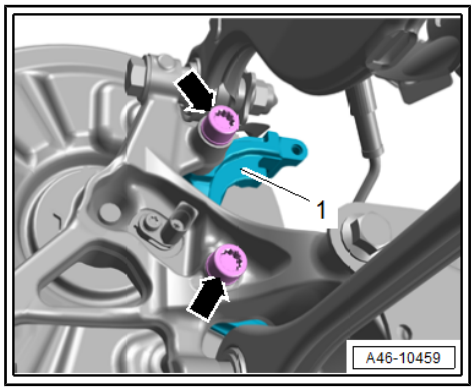
- ⇒ “2.1 Assembly overview - rear brakes”, page 48
- ⇒ “2.1 Summary of components - rear brake caliper”, page 76
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

2.4 Removing and installing brake disc

Removing

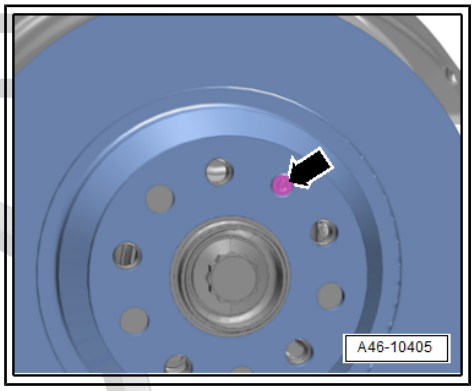
– Remove the brake pads ⇒ “2.2 Removing and installing brake pads”, page 50 .

– Remove screws -arrows- and remove brake carrier -1-.



– Unscrew screw -arrow-.

– Remove brake disc -1-.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clean the surfaces for the brake disc and wheel hub.

Tightening torques

- ⇒ “2.1 Assembly overview - rear brakes”, page 48
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

2.5 Removing and installing brake shield plate

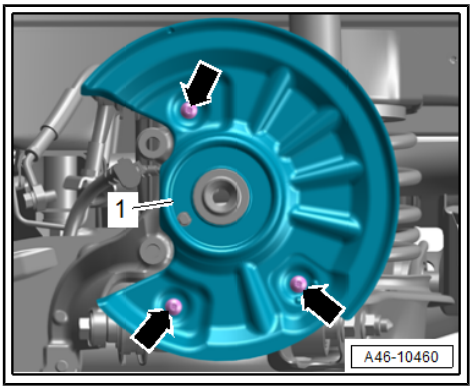
Removing

– Remove brake disc ⇒ “2.4 Removing and installing brake disc”, page 58 .

– Removing wheel hub ⇒ Chassis, axles, steering; Rep. gr. 42 ; Wheel bearing, trailing arm; Removing and installing wheel bearing unit .

– Remove screws -arrows-.

– Remove cover plate -1-.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clean the contact surfaces for the cover plate and the wheel bearing housing.

Tightening torques

- ⇒ “2.1 Assembly overview - rear brakes”, page 48
- Wheel hub ⇒ Chassis, axles, steering; Rep. gr. 42 ; Wheel bearing, trailing arm; Summary of components - wheel bearing
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

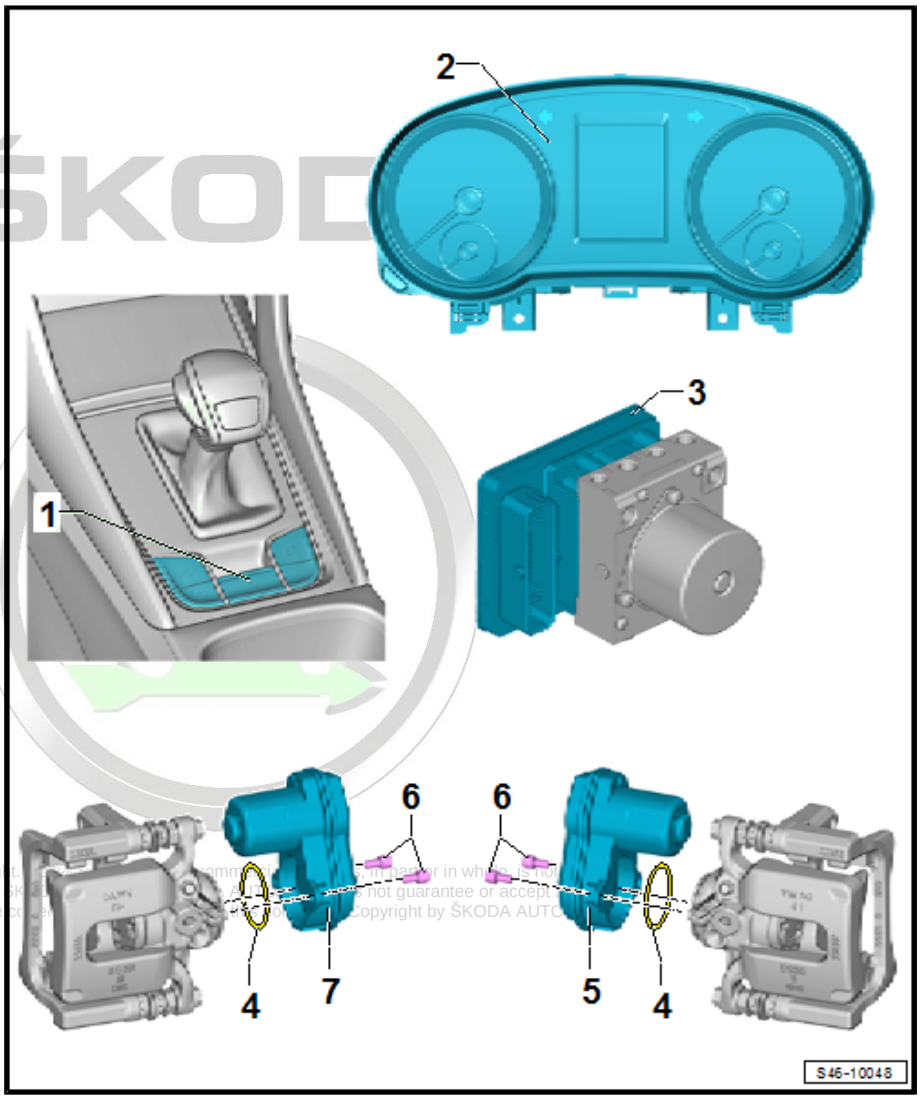
3 Handbrake

⇒ “3.1 Assembly overview - parking brake”, page 60

⇒ “3.2 Removing and installing control unit for electronic handbrake J540 ”, page 61

⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 61

3.1 Assembly overview - parking brake



1 - Switch unit

- ❑ Summary of components: on the centre console
- ❑ includes:
- ♦ Button for AUTO HOLD - E540-
- ♦ Control light for AUTO HOLD - K237-
- ♦ Indicator light for electro-mechanical parking brake - K213-
- ♦ Button for electro-mechanical parking brake - E538-
- ❑ Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Removing and installing buttons for electro-mechanical handbrake - E538- / Buttons for AUTO HOLD - E540-

2 - Dash panel insert

- ❑ with fault lamp for electronic parking/handbrake - K214-
- ❑ with brake system warning light - K118-
- ❑ with acoustic signal

3 - Control unit for electronic handbrake - J540-

- ❑ integrated into the ABS control unit - J104- and cannot be replaced separately
- ❑ Removing and installing ABS control unit - J104- ⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18
- ❑ Separate the ABS control unit - J104- from the ABS hydraulic unit - N55- ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 29

4 - Sealing ring

- ❑ Replace after removal

5 - Parking motor on the left - V282-

- ❑ Fitting location: on rear left brake caliper
- ❑ Removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 61
- ❑ Basic braking system setting ⇒ Vehicle diagnostic tester

6 - Screw

- ❑ 8 Nm

7 - Right parking motor - V283-

- ❑ Fitting location: on rear right brake caliper
- ❑ Removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 61
- ❑ Basic braking system setting ⇒ Vehicle diagnostic tester

3.2 Removing and installing control unit for electronic handbrake - J540-

It is not possible to remove these parts separately.

Control unit for electronic handbrake - J540- integrated into the ABS control unit - J104-
⇒ “3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 ”, page 18 .

3.3 Removing and installing handbrake motor -V282- / -V283-

Special tools and workshop equipment required

- ♦ Vehicle diagnosis tester

Removing

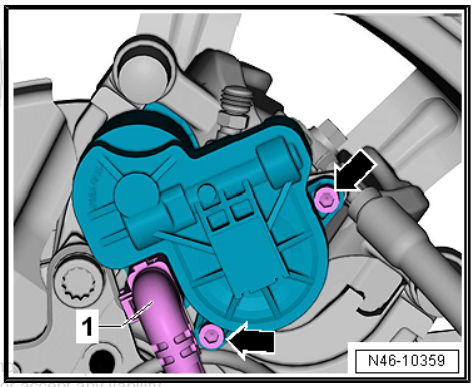
Note

The ignition must be switched off for at least 30 seconds before disconnecting the connector.

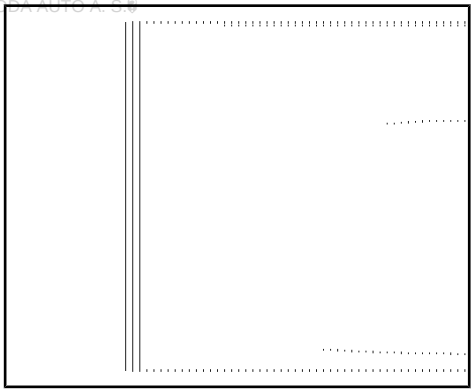
– Pull connector -1- off the handbrake motor.

– Remove screws -arrows- of the handbrake motor.

– Pull the handbrake motor off the brake caliper, turning the handbrake motor back and forth slightly as you do so.



– Take out sealing ring.



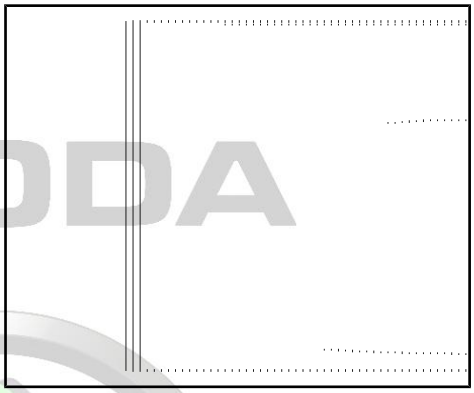
Note

Make sure that the annular groove of the sealing ring and the contact surface of the handbrake motor are not damaged.

– Clean the annular groove and the contact surface of the handbrake motor.

Installing

– Lightly grease the new sealing ring and install it, ensuring that the sealing ring is kept straight and not damaged.
– Fully grease the drive shaft of the handbrake motor.



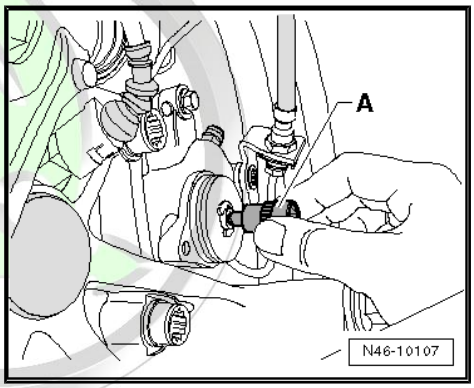
Note

The sealing ring must not be twisted out while assembling the handbrake motor!

– Carefully slide the handbrake motor onto the brake caliper, while ensuring that the sealing ring is seated correctly.

Note

If necessary, drive back the drive shaft slightly with an E11 Torx insert -A- so that you can position the handbrake motor correctly.

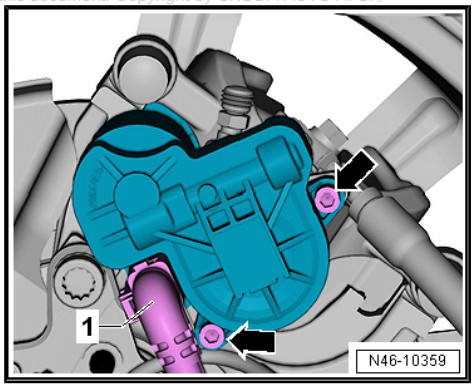


– Twist the handbrake motor until the screw holes and thread are aligned.

Note

Make sure the handbrake motor is in contact with the brake caliper. Do not tighten the screws if the handbrake motor is not in contact with the brake caliper.

– Screw in the screws -arrow-.
– Reconnect connector -1-.
– Bring the brake system to basic position ⇒ Vehicle diagnostic tester.



Tightening torques

◆ ⇒ “3.1 Assembly overview - parking brake”, page 60

4 Brake pedal

4.1 Assembly overview - brake pedal

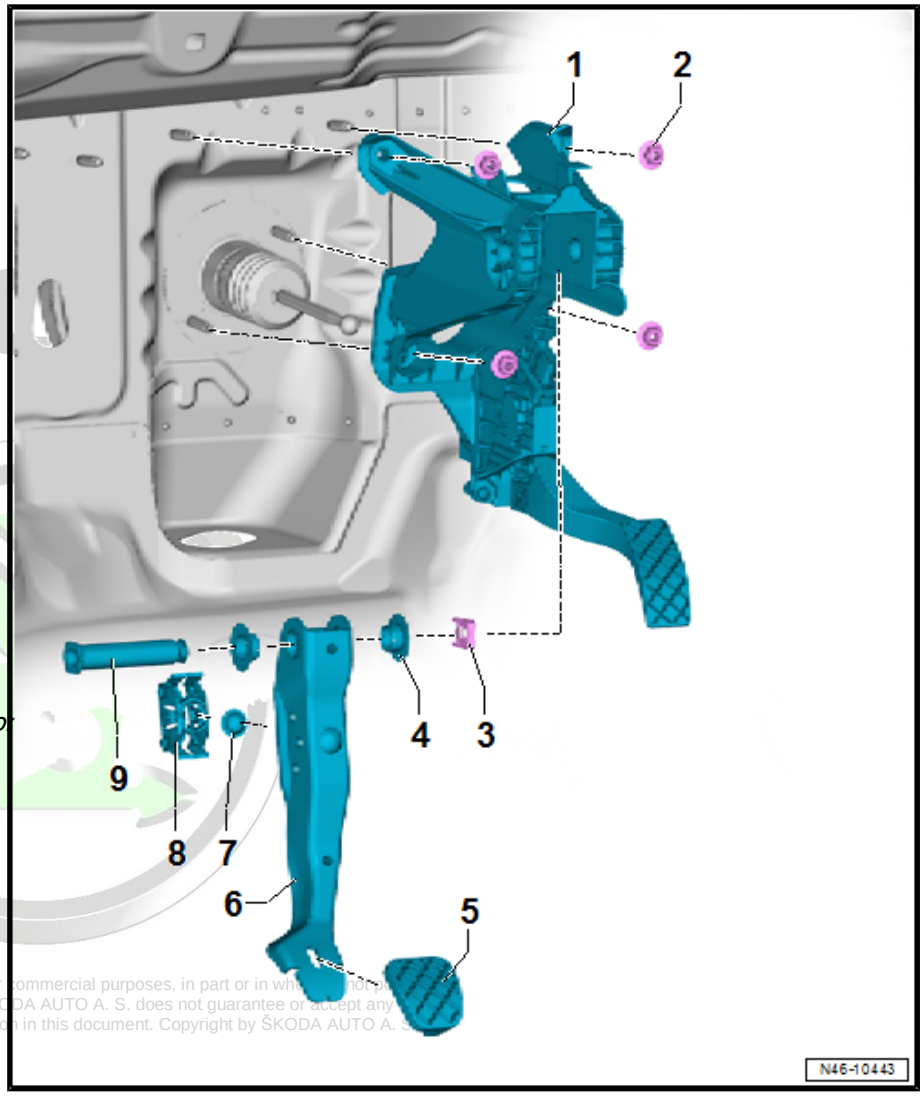
4.1.1 Summary of components - brake pedal, left-hand drive

WARNING

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

Note

- *Grease all bearing surfaces with polycarbamide grease - G 052 142 A2- before assembly.*
- *Do not grease the bearing bolt. The bearing bolt must remain dry.*
- *The brake light switch - F- and brake pedal switch - F47- are located on the master brake cylinder.*



1 - Bearing bracket

- ❑ Removing and installing
  ⇒ “4.2 Removing and installing bearing bracket”, page 67

2 - Nut

- ❑ self-locking
- ❑ Replace after removal
- ❑ Observe tightening sequence
  ⇒ Fig. ““Order of tightening”“ , page 65
- ❑ 25 Nm

3 - Retaining clip

- ❑ Replace after removal
- ❑ inserted into both bearing bracket bore holes

4 - Bushing

Note

Note installation positio

5 - Cap

6 - Brake pedal

- ❑ separate from the brake servo unit
  ⇒ “4.3 Separating brake pedal from brake servo”, page 70
- ❑ insert with brake servo unit
  ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70
- ❑ Removing and installing
  ⇒ “4.5.1 Removing and installing the brake pedal, left-hand drive vehicles”, page 71
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

7 - Bearing shell

8 - Support

- ❑ for ball head of pressure rod of brake servo unit

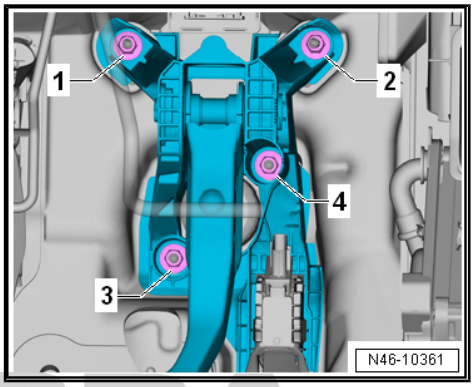
9 - Bearing shaft

- ❑ Replace after removal

Note

Do not grease the bearing bolt. The bearing bolt must remain dry.

Order of tightening



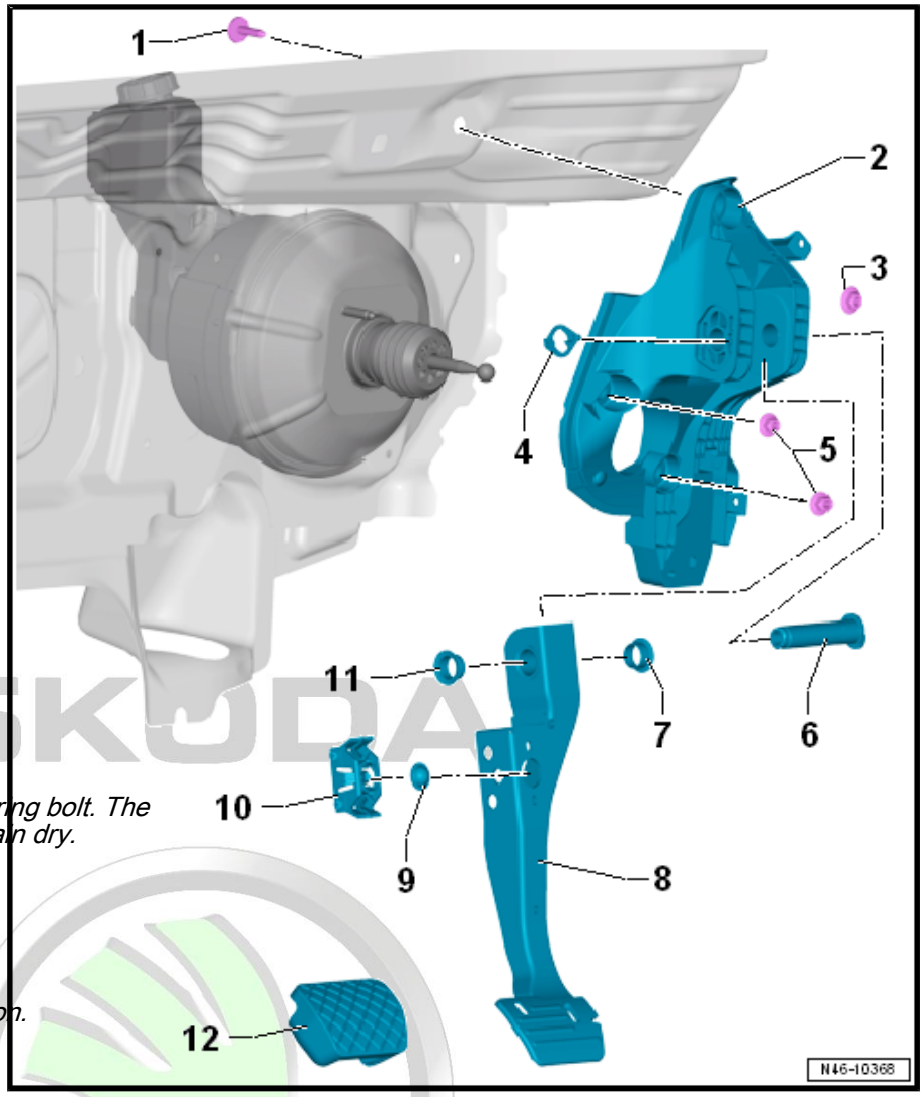
4.1.2 Summary of components - brake pedal, right-hand drive

WARNING

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

Note

- *Grease all bearing surfaces with polycarbamide grease - G 052 142 A2- before assembly.*
- *Do not grease the bearing bolt. The bearing bolt must remain dry.*
- *The brake light switch - F- and brake pedal switch - F47- are located on the master brake cylinder.*



1 - Screw

- ❑ 20 Nm

2 - Bearing bracket

- ❑ Removing and installing ⇒ “4.2 Removing and installing bearing bracket”, page 67

3 - Nut

- ❑ self-locking
- ❑ 25 Nm

4 - Retaining clip

- ❑ Replace after removal
- ❑ inserted into both bearing bracket bore holes

5 - Nut

- ❑ self-locking
- ❑ 25 Nm

6 - Bearing shaft

- ❑ Replace after removal

Note

Do not grease the bearing bolt. The bearing bolt must remain dry.

7 - Bushing

Note

Note installation position.

8 - Brake pedal

- ❑ separate from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 70
- ❑ insert with brake servo unit ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70
- ❑ Removing and installing ⇒ “4.5.2 Removing and installing the brake pedal, right-hand drive vehicles”, page 72
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

9 - Bearing shell

10 - Support

- ❑ for ball head of pressure rod of brake servo unit

11 - Bushing

Note

Note installation position.

12 - Cap

4.2 Removing and installing bearing bracket

⇒ “4.2.1 Removing and installing bushing, left-hand drive vehicles”, page 67

⇒ “4.2.2 Removing and installing bearing bracket, right-hand drive vehicles”, page 68

4.2.1 Removing and installing bushing, left-hand drive vehicles

Removing

– Disconnect battery earth strap ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

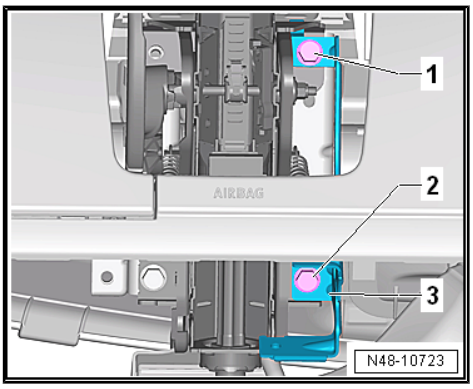
– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .

– Remove bottom steering column trim ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments/covers; Removing and installing bottom steering column trim .

– Remove crash strut -1- ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut .

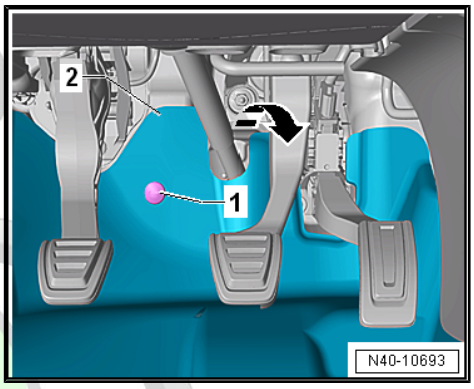
– Remove screws-1- and -2- and remove right holder for knee airbag -3- .

– Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .



– Remove screw -1- and open the footwell covering -2- in -direction of arrow-.

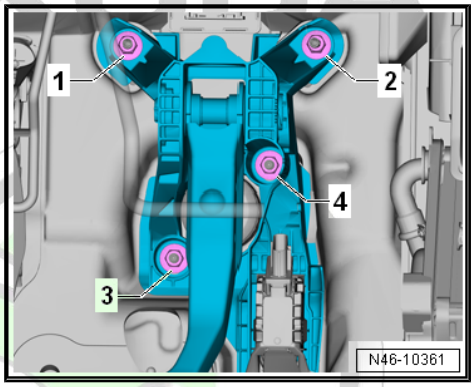
– Remove accelerator pedal module ⇒ Rep. gr. 20 ; Throttle control; Removing and installing accelerator pedal module GX2 .



– Release the nuts -1- to -4-.

– Detach all the electrical cables from the bearing bracket.

– Remove bracket.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clip the brake pedal onto the brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70 .

– Observe tightening sequence
⇒ Fig. ““Order of tightening”“ , page 65

Tightening torques

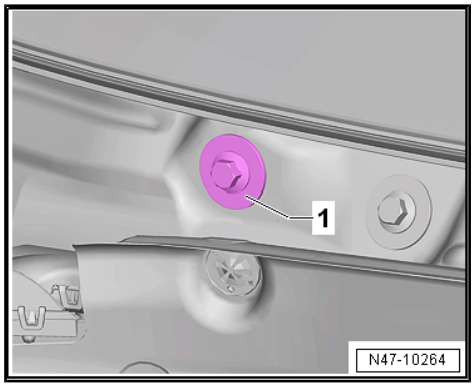
- ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 63
- Crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter
- Accelerator pedal module ⇒ Rep. gr. 20 ; Throttle control; Removing and installing accelerator pedal module GX2 ,

4.2.2 Removing and installing bearing bracket, right-hand drive vehicles

Removing

– Remove windscreen wiper motor with linkage ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing windscreen wiper motor - V- .

– Release screw -1-.



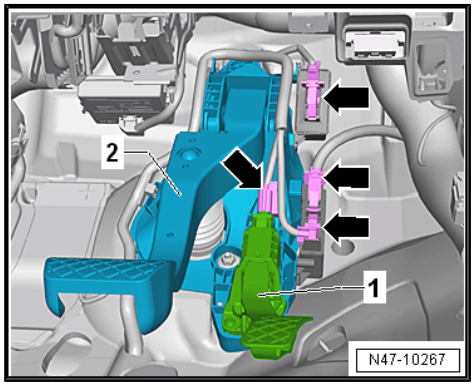
– Remove trim of the centre console ⇒ General body repairs, interior dash panel; Rep. gr. 70 ; ; remove and install dash panel .

– Remove knee airbag ⇒ Interior body work; Rep. gr. 69 ; Knee airbags; removing and installing knee airbag with ignition

– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .

– Remove crash strut -1- ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut .

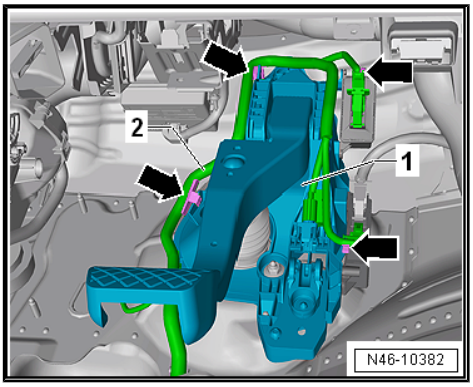
– Disconnect the plug connections -arrows-.



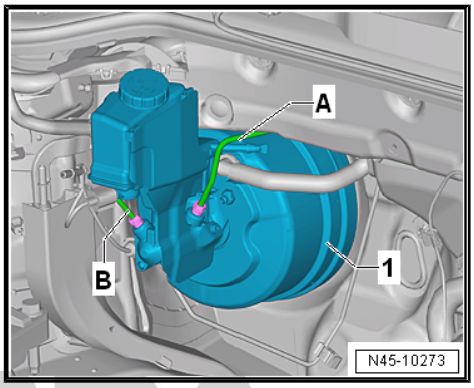
– Remove accelerator pedal module ⇒ Rep. gr. 20 ; Throttle control; Removing and installing accelerator pedal module GX2 .

– Unclip the electric wiring harness -2- from the bearing block -1- -arrows-.

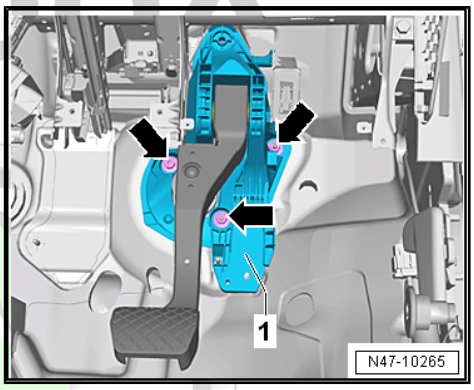
– Separating the brake pedal from the brake servo ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .



– Secure brake servo -1- to prevent it from falling out.



– Release fixing nuts -arrows-.



Note

The nut on the right for the bearing block can be removed via the open glove compartment on the driver's side.

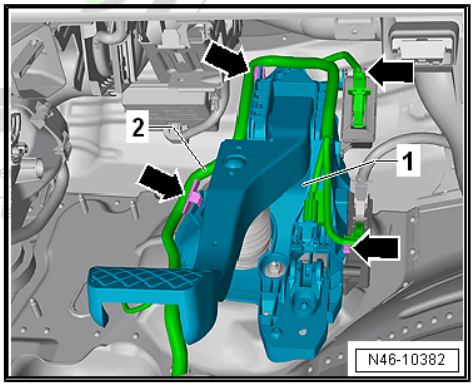
– Remove bracket.

Installing

Installation is performed in the reverse order; pay attention to the following points:

– Clip the brake pedal onto the brake servo ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70 .

– Install the electric wiring harness -2- so that it is not then trapped between pedal and bearing bracket.



Tightening torques

- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 65
- Crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter
- Accelerator pedal module ⇒ Rep. gr. 20 ; Throttle control; Removing and installing accelerator pedal module GX2 ,
- Wiper motor with linkage ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Summary of components - windscreen wiper system

4.3 Separating brake pedal from brake servo

Special tools and workshop equipment required

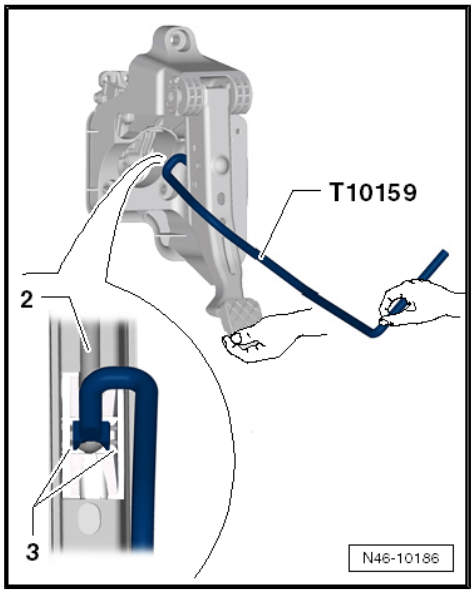
- ♦ Release tool - T10159A- or -T10159B-

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

2 - Plunger rod

3 - Retaining lugs

– Insert release tool - T10159A- or -T10159B- and pull it in the direction of the driver's seat while counterholding the brake pedal (the pedal must not move backwards during this operation). This pushes the retaining lugs -3- of the mount off the ball head of the push rod -2-.



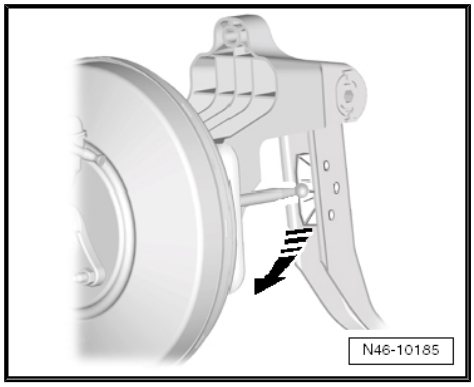
The fig. shows the separation of the brake pedal from the brake servo unit with the foot controls removed for clarity.

– Pull release tool - T10159A- or -T10159B- and brake pedal together towards the driver's seat. (This causes the brake pedal to be drawn off the ball head of the push rod).

4.4 Clipping the brake pedal onto the brake servo unit

– Hold ball head of push rod in front of mount and push brake pedal in direction of brake servo, so that the ball head clicks into place.

– Check that it is correctly locked in place by briefly pulling on the brake pedal.



4.5 Removing and installing brake pedal

⇒ “4.5.1 Removing and installing the brake pedal, left-hand drive vehicles”, page 71

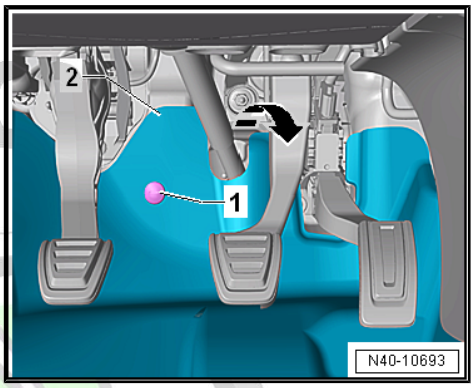
⇒ “4.5.2 Removing and installing the brake pedal, right-hand drive vehicles”, page 72

4.5.1 Removing and installing the brake pedal, left-hand drive vehicles

Removing

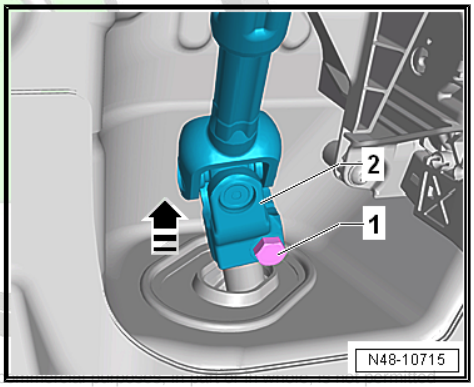
– Remove screw -1- and open the footwell covering -2- in -direction of arrow-.

– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .



– Remove bolt -1- from universal coupling -2- and pull off universal joint in -direction of arrow-.

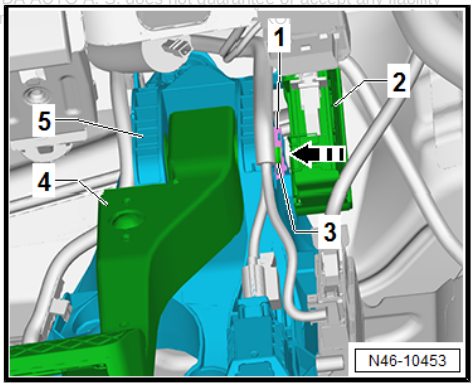
– Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .



– Remove retaining clips -1-.

– Pull out bearing bolts -3- in the -direction of arrow-.

– Take the brake pedal out of the bearing bracket.



Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *Replace bearing pin and securing clip.*
- *Do not grease the bearing bolt. The bearing bolt must remain dry.*

Tightening torques

- Universal joint ⇒ Chassis, axles, steering; Rep. gr. 48 ; Steering column; Summary of components - steering column

4.5.2 Removing and installing the brake pedal, right-hand drive vehicles

– Remove cover panel on the driver's side ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel; installing and removing dash panel .

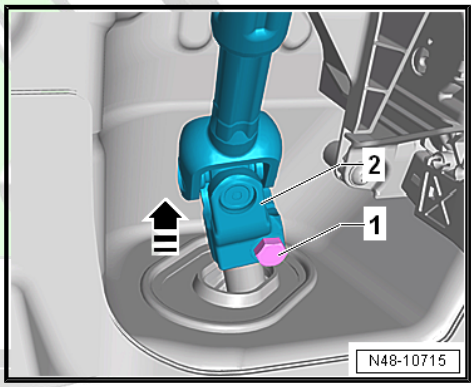
– Remove footrest for driver and push floor covering backwards.

– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .

– Remove bolt -1- from universal coupling -2- and pull off universal joint in -direction of arrow-.

– Remove screw for crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut .

– Separating the brake pedal from the brake servo unit ⇒ "4.3 Separating brake pedal from brake servo", page 70 .

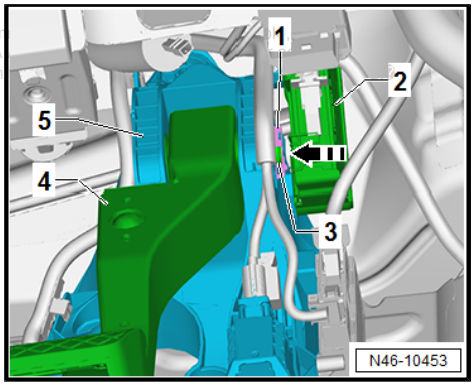


– Remove retaining clips -1-.

– Push the control unit -2- to the side.

– Press the shock absorber slightly forward and pull out the bearing pin -3- in -arrow-.

– Take the brake pedal out of the bearing bracket.



Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *Replace bearing pin and securing clip.*
- *Do not grease the bearing bolt. The bearing bolt must remain dry.*

Tightening torques

- Universal joint ⇒ Chassis, axles, steering; Rep. gr. 48 ; Steering column; Summary of components - steering column
- Crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut

47 – Brakes - hydraulics

1 Front brake calipers

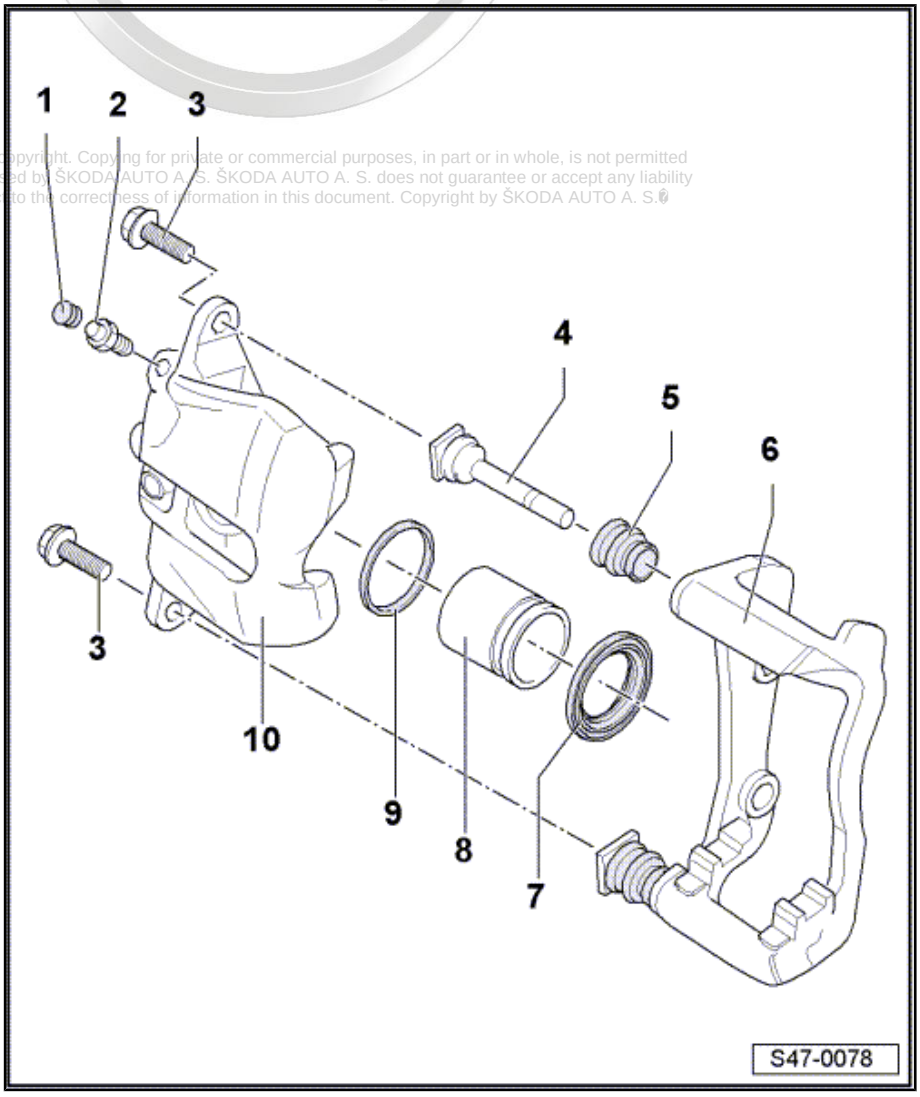
⇒ “1.1 Summary of components - front brake caliper”, page 73

⇒ “1.2 Removing and installing brake caliper piston”, page 74

1.1 Summary of components - front brake caliper

Note

- *Install the complete repair set when undertaking repairs.*
- *Use only methylated spirit for cleaning.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .*



1 - Dust cap

2 - Vent valve

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

3 - Screw

- ❑ Replace after removal
- ❑ 35 Nm

4 - Guide bolt

5 - Collar

- ❑ insert into the slot of the brake carrier and of the guide pin; grease the slot first using grease packing from the repair kit

6 - Brake carrier

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

7 - Boot

- ❑ Removing and installing ⇒ “1.2 Removing and installing brake caliper piston”, page 74
- ❑ do not damage when inserting the piston

8 - Piston

- ❑ Removing and installing ⇒ “1.2 Removing and installing brake caliper piston”, page 74

9 - Sealing ring

❑ Removing and installing ⇒ “1.2 Removing and installing brake caliper piston”, page 74

10 - Brake caliper

❑ Removing and installing ⇒ “1.3 Removing and installing brake caliper”, page 43

1.2 Removing and installing brake caliper piston

Special tools and workshop equipment required

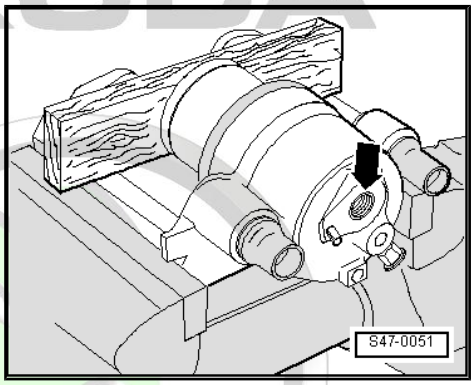
- Piston jig - T10145-
- Plastic wedge - 3409-
- Lithium grease - G 052 150 A2-

Removing

– Remove brake caliper ⇒ “1.3 Removing and installing brake caliper”, page 43 .

– Insert wooden plate to avoid damaging the piston as it is being pressed out.

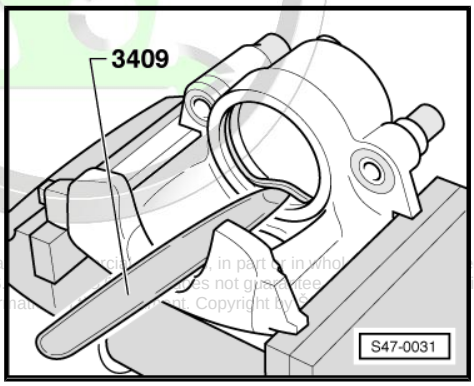
– Press the piston out of the brake caliper housing using compressed air -arrow-.



Note

Make sure that the cylinder surface is not damaged when removing the gasket ring.

– Remove gasket ring with disassembly wedge - 3409- .



Installing

Note

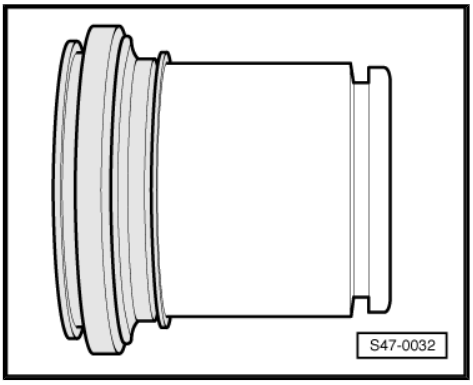
- *Always install the complete repair kit when repairing the brake calliper.*
- *Use only methylated spirits for cleaning the brake.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *It is absolutely necessary, if repairs are being undertaken, to pre-bleed the brake calipers before installing them in the vehicle (without brake pads)* *⇒ page 75* .

– Clean piston and gasket ring with white spirits and dry off.

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

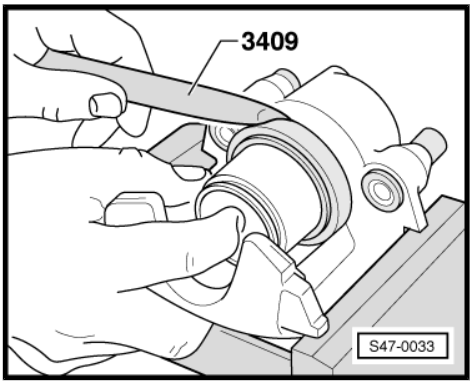
– Insert new gasket ring in the groove of the brake caliper.

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

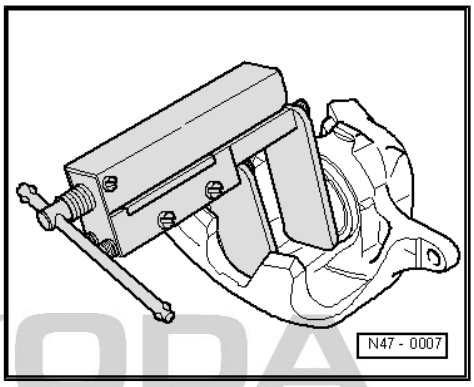


– Insert inner sealing lip of the protective cap with disassembly wedge - 3409- in the groove of the cylinder.

  To do so hold the piston with the hand.



– Press the piston into the brake caliper using the piston resetting jig - T10145- .



Note

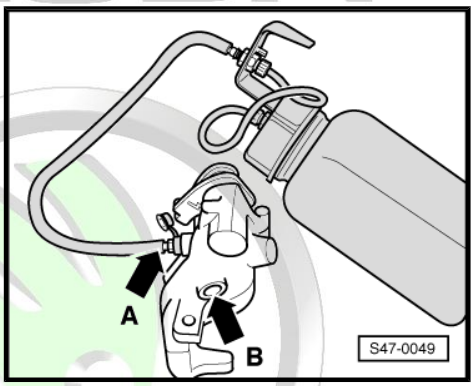
The outer sealing lip of the protective cap will clip into the piston groove.

– Install brake caliper
  ⇒ “1.3 Removing and installing brake caliper”, page 43 .

Pre-bleeding the brake caliper

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

– Open vent valve -arrow A-.
– Using a commercially available ventilation reservoir pour in brake fluid until bubble-free brake fluid drips out of the threaded bore (brake hose connection) -arrow B-.
– Close vent valve.



2 Rear brake caliper

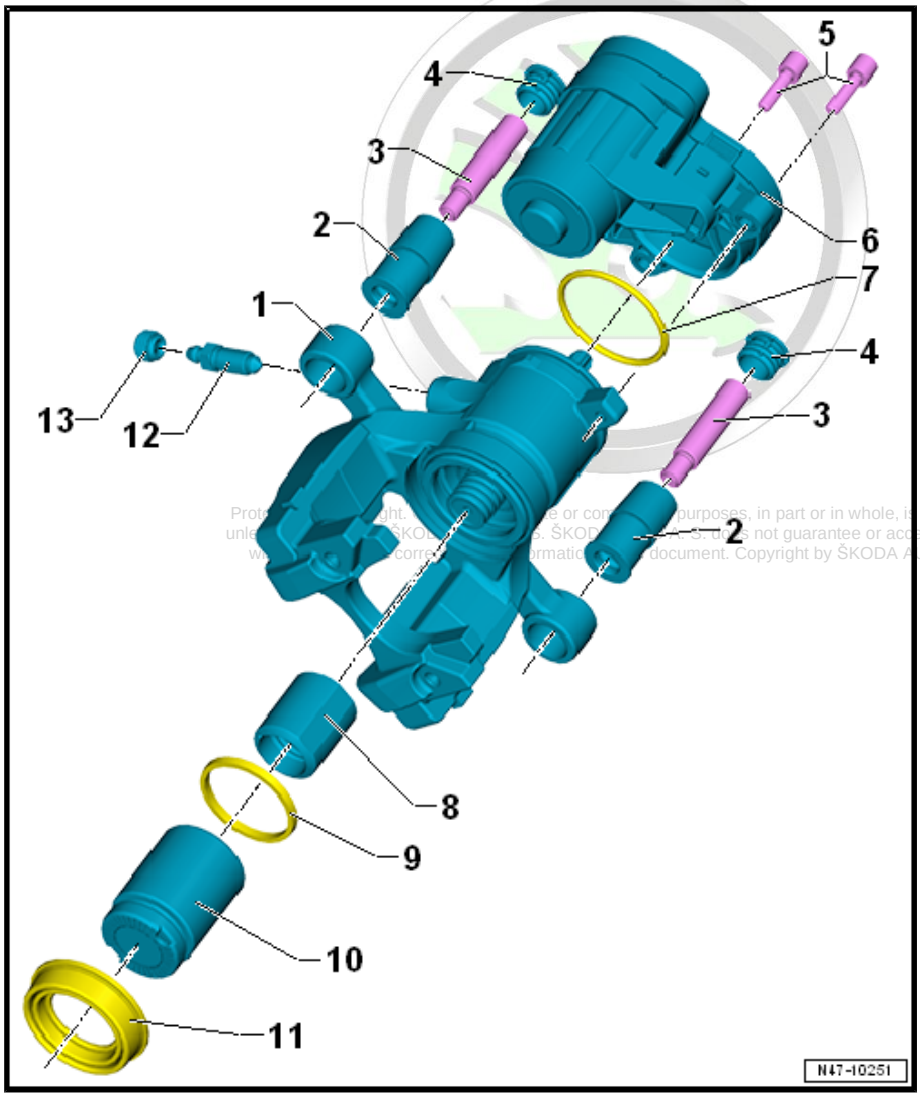
⇒ “2.1 Summary of components - rear brake caliper”, page 76

⇒ “2.2 Removing and installing protective cover”, page 77

2.1 Summary of components - rear brake caliper

Note

- *Install the complete repair set when undertaking repairs.*
- *Use only methylated spirit for cleaning.*
- *Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .*



1 - Brake caliper housing

- ❑ replace brake caliper housing if the lever for the handbrake cable is not sealed

2 - Damping sleeve

3 - Guide bolt

4 - Cap

5 - Screw

- ❑ Tightening torque ⇒ “2.1 Assembly overview - rear brakes”, page 48

6 - Handbrake motor

- ❑ Removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 61

7 - Sealing ring

- ❑ Replace after removal

8 - Compressor nut

- ❑ Cannot be removed

9 - Sealing ring

- ❑ Cannot be removed

10 - Piston

- ❑ Cannot be removed

11 - Boot

- ❑ Removing and installing ⇒ “2.2 Removing and installing protective cover”, page 77

12 - Vent valve

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

13 - Dust cap

2.2 Removing and installing protective cover

Special tools and workshop equipment required

- Piston jig - T10145-
- Assembly tool - T10146-
- Plastic wedge - 3409-

Removing

Only the protective cover always has to be replaced.

Note

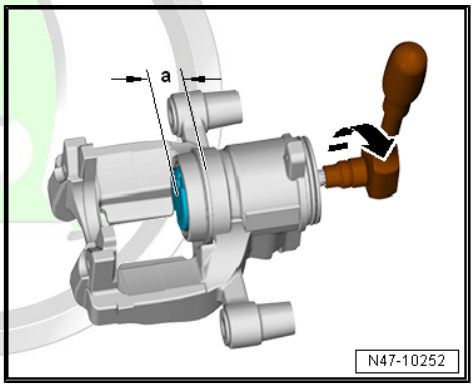
If the protective cover is replaced, the brake caliper does not have to be removed or the brake hose unscrewed.

- The piston is pushed back.
- Handbrake control motor has been removed.

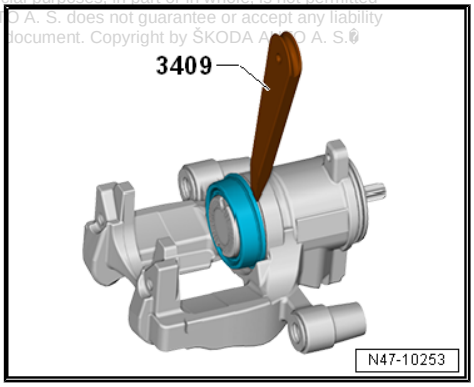
NOTICE

- **When the piston and compressor nut are removed, the thread is destroyed.**
- **Never completely unscrew the compressor nuts and piston!**

– Unscrew the piston in -direction of arrow- by maximum of 20mm -a-.



– Use the disassembly wedge - 3409- to remove the protective cover from the brake caliper.



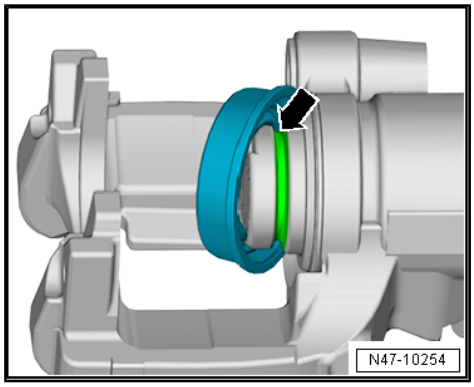
Installing

Note

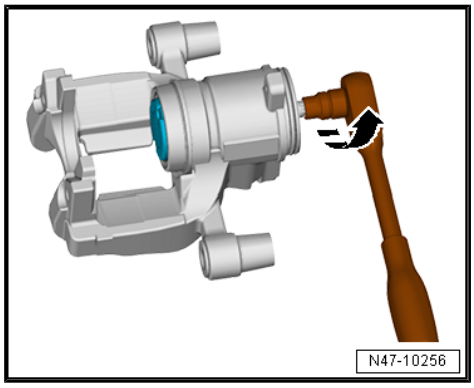
Use only methylated spirits for cleaning the brake.

– The piston surfaces and brake caliper must be cleaned with spirit and then left to dry.

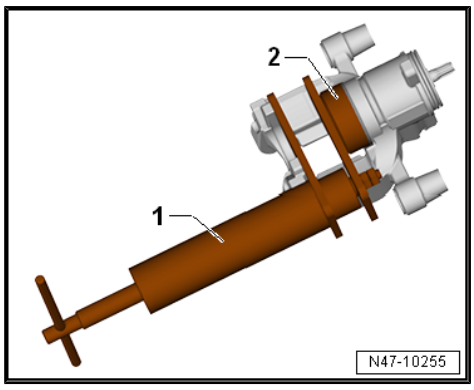
– Fit protective cover into the groove -arrow- on the piston.



– Screw in piston in -direction of arrow-.



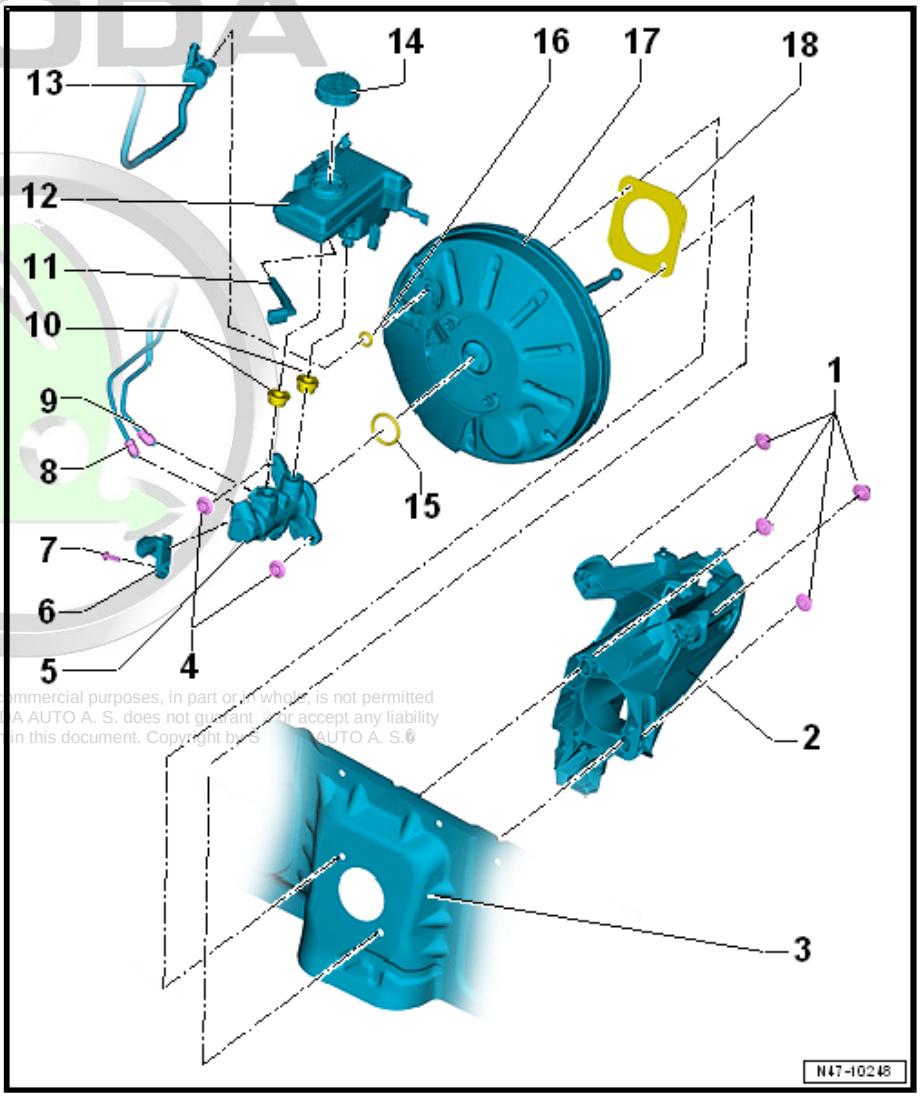
– Press the protective cover with the piston resetting tool - T10145- -1- and assembly device - T10146/5- -2- onto the brake caliper so that it is in contact around the circumference of the brake caliper.



3 Brake servo unit and master brake cylinder

3.1 Summary of components - brake servo unit and master brake cylinder

3.1.1 Summary of components - brake servo unit/master brake cylinder, left-hand drive vehicles



1 - Nut

- ❑ self-locking
- ❑ Replace after removal
- ❑ Observe tightening sequence ⇒ Fig. ““Order of tightening”“ , page 65
- ❑ Tightening torque ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 63

2 - Bearing bracket

3 - Front wall

4 - Nut

- ❑ self-locking
- ❑ Replace after removal
- ❑ 23 Nm

5 - Master brake cylinder

- ❑ cannot be repaired, replace completely in the event of faults
- ❑ Removing and installing ⇒ “3.4.1 Removing and installing master brake cylinder, left-hand drive vehicles”, page 102
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

6 - Brake light switch - F-

- ❑ Removing and installing

⇒ “3.2.1 Removing and installing brake light switch, left-hand drive vehicles”, page 84

- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Fitting overview, vehicles with petrol engine ⇒ Fig. ““Fitting overview, vehicles with petrol engine”“ , page 81
- ❑ Fitting overview, vehicles with diesel engine ⇒ Fig. ““For vehicles with diesel engine”“ , page 81

7 - Screw

- ❑ 8 Nm

8 - Brake line

- ❑ from master brake cylinder (floating piston circuit) to ABS hydraulic unit - N55-
- ❑ Tightening torque ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14

9 - Brake line

- ❑ from master brake cylinder (push rod piston circuit) to ABS hydraulic unit - N55-
- ❑ Tightening torque ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14

10 - Plugs

- ❑ moisten with brake fluid, insert in the brake cylinder and press in the brake fluid reservoir

11 - Brake fluid level warning contact - F34-

- ❑ Fitting overview, vehicles with petrol engine ⇒ Fig. ““Fitting overview, vehicles with petrol engine”“ , page 81
- ❑ Fitting overview, vehicles with diesel engine ⇒ Fig. ““For vehicles with diesel engine”“ , page 81

12 - Brake fluid reservoir

- ❑ Fixing screw, 8 Nm

13 - Vacuum line

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Non-return valve (in vacuum hose); Functional test ⇒ “4.3 Checking the non-return valve”, page 113
- ❑ the vacuum sender - G608- is installed in some vehicles with petrol engines ⇒ “4.4 Removing and installing vacuum sensor G608 ”, page 113

14 - Cover

15 - Seal

- ❑ replace if damaged

16 - Seal

- ❑ replace if damaged

17 - Brake servo

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ separate from brake pedal ⇒ “4.3 Separating brake pedal from brake servo”, page 70
- ❑ Removing and installing ⇒ “3.3 Removing and installing brake servo”, page 86
- ❑ Check for proper operation ⇒ “3.5 Check the operation of the brake servo unit”, page 109
- ❑ if there are faults replace completely

18 - Seal

- ❑ Replace after removal
- ❑ only glued with the series
- ❑ The gluing on the brake booster and the end wall must not be restored

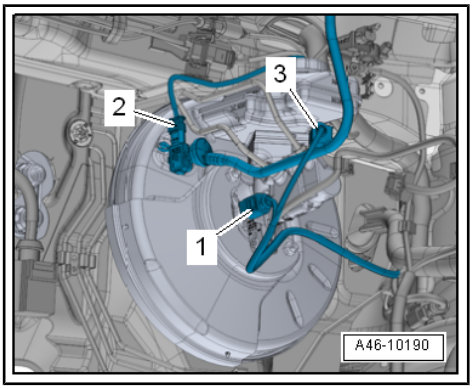
Fitting overview, vehicles with petrol engine

1 - Brake light switch - F-

2 - Vacuum sensor in the brake servo unit - G608-

only on some vehicles with petrol engine

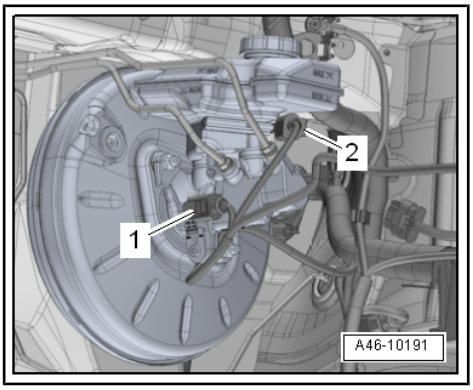
3 - Brake fluid level warning contact - F34-



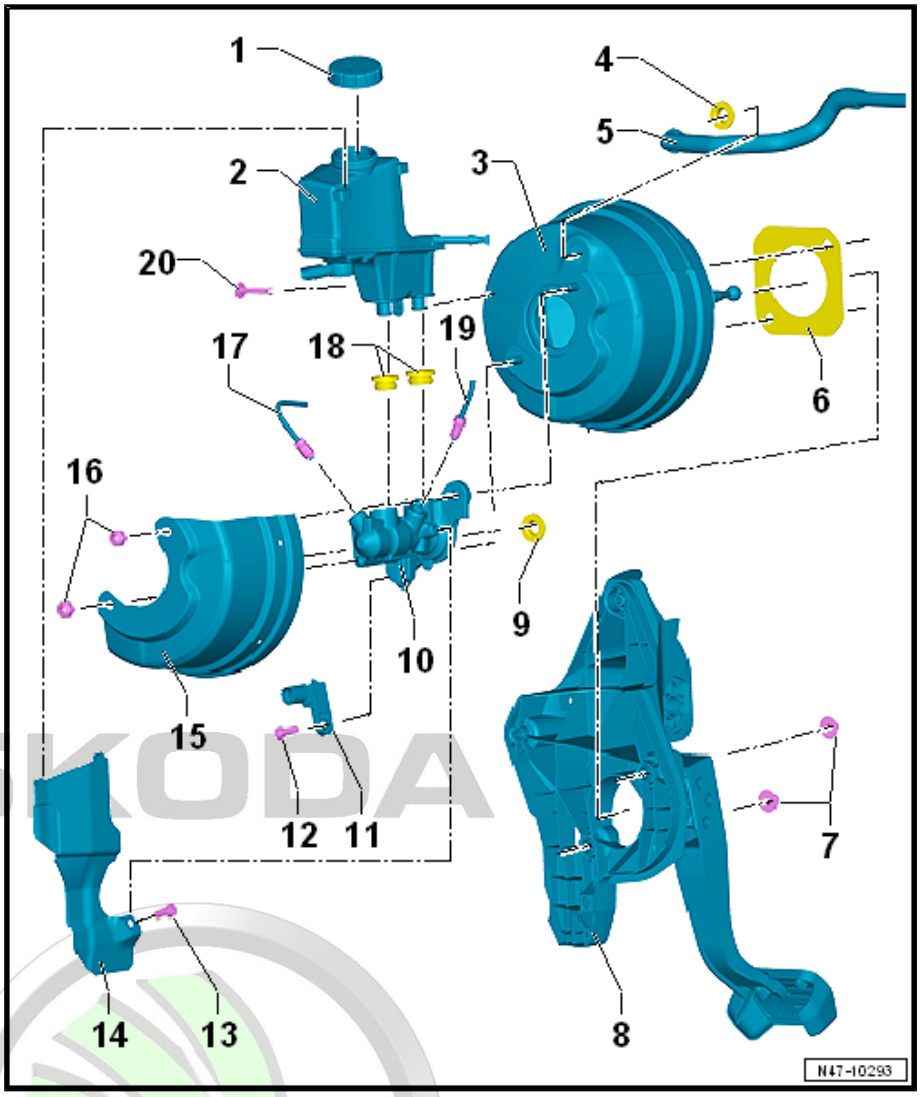
For vehicles with diesel engine

1 - Brake light switch - F-

2 - Brake fluid level warning contact - F34-



3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles



1 - Cover

2 - Brake fluid reservoir

- ❑ with Warning contact for brake fluid level - F34-

3 - Brake servo

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ separate from brake pedal ⇒ “4.3 Separating brake pedal from brake servo”, page 70
- ❑ Removing and installing ⇒ “3.3 Removing and installing brake servo”, page 86
- ❑ Check for proper operation ⇒ “3.5 Check the operation of the brake servo unit”, page 109
- ❑ if there are faults replace completely

4 - Seal

- ❑ replace if damaged

5 - Vacuum line

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Non-return valve (in vacuum hose); Functional test ⇒ “4.3 Checking the non-return valve”, page 113
- ❑ the vacuum sender - G608- is installed in some vehicles with petrol engines ⇒ “4.4 Removing and installing vacuum sensor G608 ”, page 113

6 - Seal

- ❑ Replace after removal
- ❑ only glued with the series
- ❑ The gluing on the brake booster and the end wall must not be restored

7 - Nut

- ❑ self-locking
- ❑ Tightening torque ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 65

8 - Bearing bracket

9 - Seal

- ❑ replace if damaged

10 - Master brake cylinder

- ❑ cannot be repaired, replace completely in the event of faults
- ❑ Removing and installing ⇒ “3.4.2 Removing and installing master brake cylinder, right-hand drive vehicles”, page 104
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

11 - Brake light switch -F -

- ❑ Removing and installing
  ⇒ “3.2.2 Removing and installing brake light switch, right-hand drive vehicles”, page 85
- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Fitting overview, vehicles with petrol engine
  ⇒ Fig. ““Fitting overview, vehicles with petrol engine”“ , page 83
- ❑ Fitting overview, vehicles with diesel engine ⇒ Fig. ““For vehicles with diesel engine”“ , page 84

12 - Screw

- ❑ 8 Nm

13 - Screw

- ❑ 8 Nm

14 - Heat shield

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

15 - Protection plate

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

16 - Nut

- ❑ self-locking
- ❑ Replace after removal
- ❑ 25 Nm

17 - Brake line

- ❑ from master brake cylinder (floating piston circuit) to ABS hydraulic unit - N55-
- ❑ Tightening torque
  ⇒ “3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle”, page 17

18 - Plugs

- ❑ moisten with brake fluid, insert in the brake cylinder and press in the brake fluid reservoir

19 - Brake line

- ❑ from master brake cylinder (push rod piston circuit) to ABS hydraulic unit - N55-
- ❑ Tightening torque
  ⇒ “3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle”, page 17

20 - Body-bound rivet

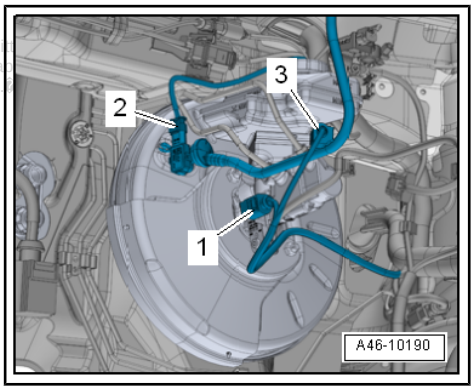
Fitting overview, vehicles with petrol engine

1 - Brake light switch - F-

2 - Vacuum sensor in the brake servo unit - G608-

only on some vehicles with petrol engine

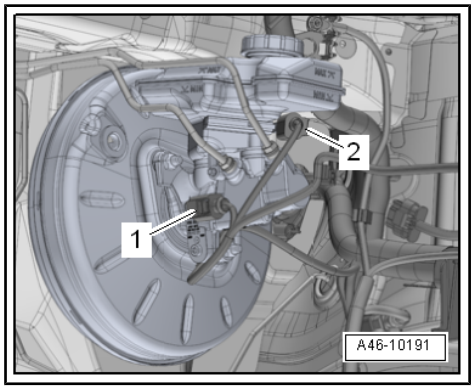
3 - Brake fluid level warning contact - F34-



For vehicles with diesel engine

1 - Brake light switch - F-

2 - Brake fluid level warning contact - F34-



3.2 Removing and installing brake light switch

⇒ “3.2.1 Removing and installing brake light switch, left-hand drive vehicles”, page 84

⇒ “3.2.2 Removing and installing brake light switch, right-hand drive vehicles”, page 85

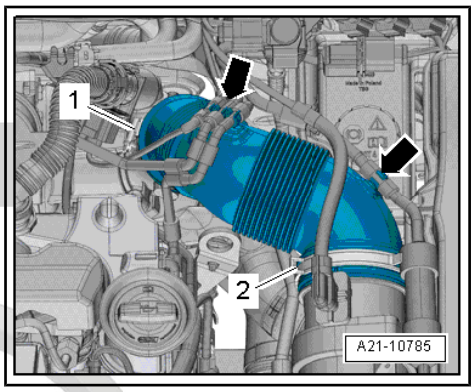
3.2.1 Removing and installing brake light switch, left-hand drive vehicles

Removing

For vehicles with diesel engine

– Remove connecting hose to intake manifold flap ⇒ Rep. gr. 21 ; Charge air system; Summary of components - charge air system .

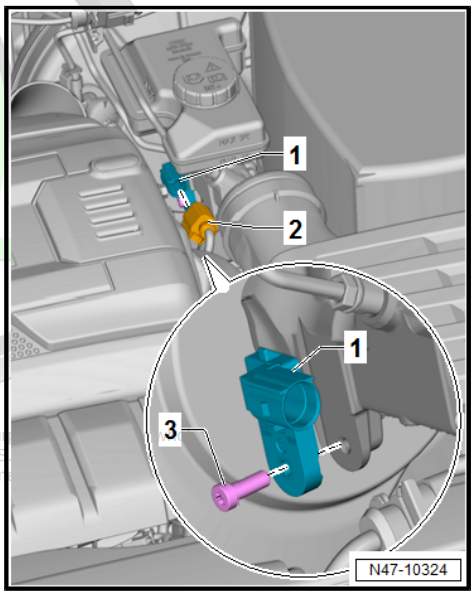
Continued for all vehicles



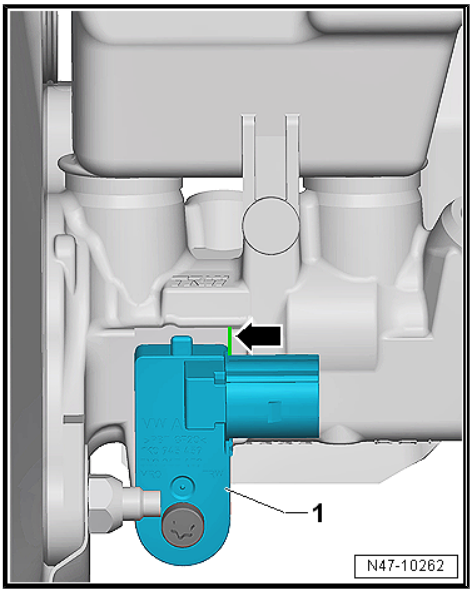
– Disconnect connector -2- from the brake light switch - F- -2-.
– Unscrew fixing screw -3- from the brake light switch - F- -1-.
– Remove the brake light switch - F- -1-.

Installing

Installation is performed in the reverse order; pay attention to the following points:



– The brake light switch - F- -1- must be in contact with the edge -arrow- of the brake master cylinder.



Tightening torques

♦ ⇒ “3.1.1 Summary of components - brake servo unit/master brake cylinder, left-hand drive vehicles”, page 79

3.2.2 Removing and installing brake light switch, right-hand drive vehicles

Special tools and workshop equipment required

♦ Socket insert T30 with spherical head - T10405-

Removing

For vehicles with diesel engine

– Remove the engine cover panel ⇒ Rep. gr. 10 ; Engine cover panel; removing and installing engine cover panel .

– Remove fuel filter for spacial reasons, and put aside ⇒ Rep. gr. 20 ; Fuel filter; Removing and installing fuel filter

⚠ CAUTION

The fuel system is under pressure.
Risk of injury from ejected fuel.
– Wear safety goggles.
– Wear protective gloves.
– Relieve the pressure: place clean cloths around the connection point and carefully open the connecting point.

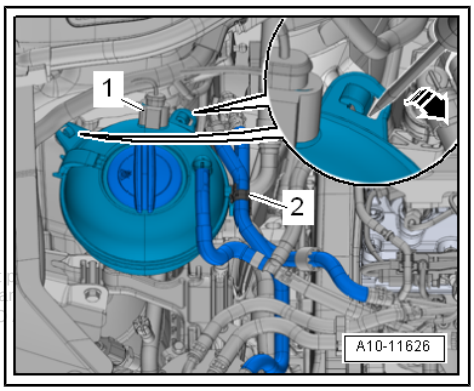
Continued for all vehicles

– Separate electrical plug connection -1-.

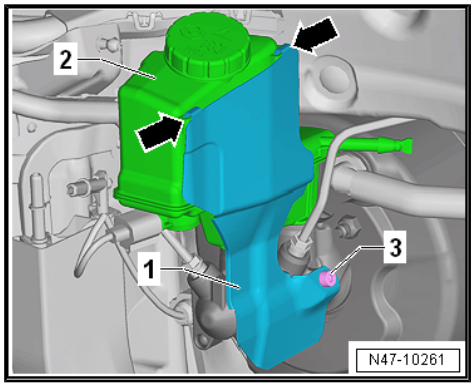
– Carefully release the locks with a screwdriver -arrow-.

– Remove coolant expansion bottle and place on the engine.

– Remove top belt guard ⇒ Rep. gr. 15 ; Toothed belt drive; Removing and installing toothed belt .



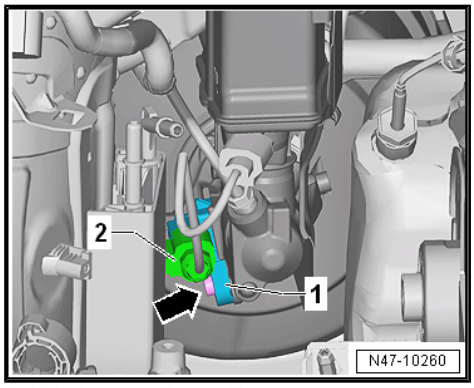
– Remove protective cover -1-, if available.
– Remove screw -3- with plug-in insert T30 with ball head - T10405- .
– Remove protective cover -1- from above -arrows- from the brake fluid reservoir -2-.



– Disconnect connector -2- from the brake light switch - F- -1-.
– Unscrew fixing screw -arrow- from the brake light bracket - F- .
– Remove the brake light switch - F- -1-.

Installing

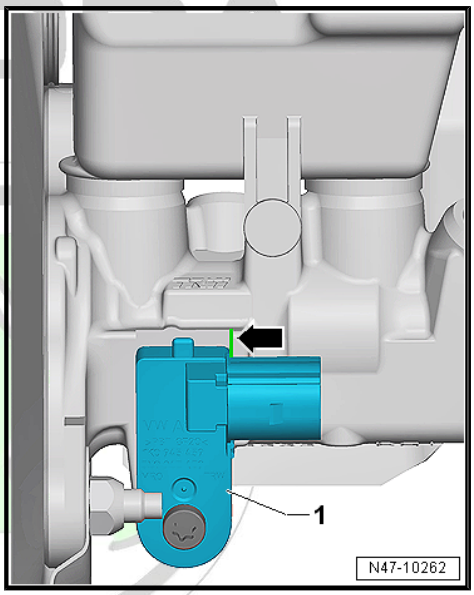
Installation is performed in the reverse order; pay attention to the following points:



– The brake light switch - F- -1- must be in contact with the edge -arrow- of the brake master cylinder.

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 81
- Fuel filter ⇒ Rep. gr. 20 ; Fuel filter; Summary of components - fuel filter
- Toothed belt guard on top ⇒ Rep. gr. 15 ; Toothed belt drive; Summary of components - Toothed belt protection



3.3 Removing and installing brake servo

⇒ “3.3.1 Removing and installing brake servo unit, left-hand drive vehicles”, page 86

⇒ “3.3.2 Removing and installing brake servo, right-hand drive - diesel engines”, page 88

⇒ “3.3.3 Removing and installing brake servo, right-hand drive - petrol engines”, page 96

3.3.1 Removing and installing brake servo unit, left-hand drive vehicles

Special tools and workshop equipment required

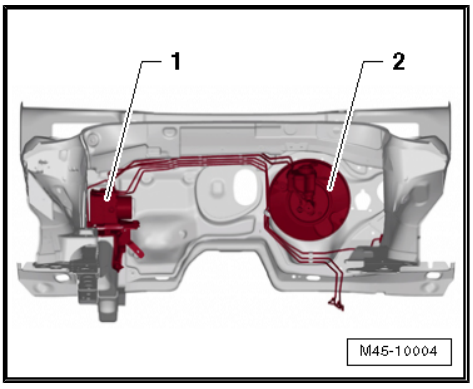
- Brake filling and bleeding device , e. g. -VAS 5234-

- Extraction bottle (commercially available)
- Repair kit - 1H0 698 311 A-

Fitting location for

1 - ABS hydraulic unit - N55- with ABS control unit - J104-

2 - Brake servo



Removing

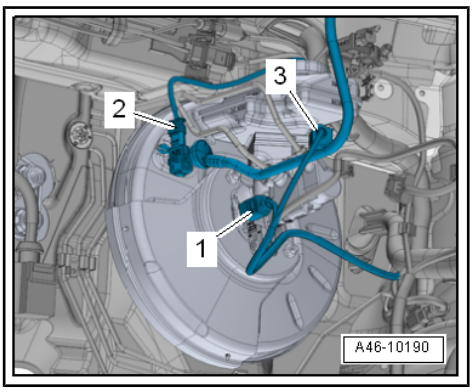
– By pressing the brake pedal several times, eliminate the vacuum in the brake servo unit.

– Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

– Remove master brake cylinder ⇒ “3.4 Removing and installing master brake cylinder”, page 102 .

For vehicles with petrol engine

– Remove Vacuum transducer - G608- -2- from the brake booster.



Continued for all vehicles

– Pull vacuum hose out of brake servo.

– If necessary, remove heat shield for brake booster.

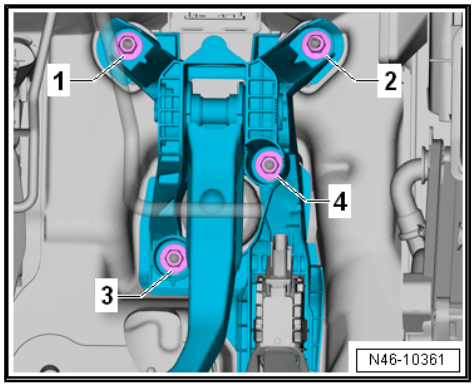
– Remove knee airbag ⇒ Interior body work; Rep. gr. 69 ; Knee airbags; removing and installing knee airbag with ignition

– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .

– Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .

– Release the nuts -3- and -4-.

– Carefully remove the brake servo unit from the vehicle.



Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *The brake booster is only glued to the seal in the series.*
- *The gluing on the brake booster and the end wall must not be restored.*

– Remove adhesive residues on brake booster and end wall with hot air blower.

NOTICE

Do not use high temperatures.

– Clean the surfaces for the brake booster and the end wall.

– Insert the new seal.

– Clip the brake pedal onto the brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

Vehicles fitted with a manual gearbox

– Bleed the clutch ⇒ Rep. gr. 30 ; Clutch mechanism; Bleed the clutch mechanism .

Tightening torques

- ⇒ “3.1.1 Summary of components - brake servo unit/master brake cylinder, left-hand drive vehicles”, page 79
- ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 63
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Summary of components - knee airbag

3.3.2 Removing and installing brake servo, right-hand drive - diesel engines

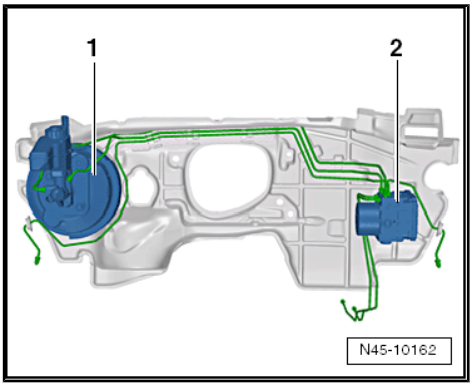
Special tools and workshop equipment required

- Brake filling and bleeding device , e. g. -VAS 5234-
- Extraction bottle (commercially available)
- Repair kit - 1H0 698 311 A-

Fitting location for

1 - Brake servo

2 - ABS hydraulic unit - N55- with ABS control unit - J104-

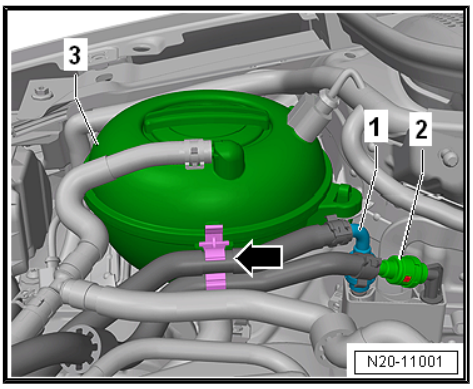


Removing

– Remove the engine cover panel ⇒ Rep. gr. 10 ; Engine cover panel; removing and installing engine cover panel .

– Pull off fuel lines -1- and -2-.

– Separate quick couplings ⇒ Rep. gr. 20 ; Quick couplings; separating quick couplings .



CAUTION

The fuel system is under pressure.

Risk of injury from ejected fuel.

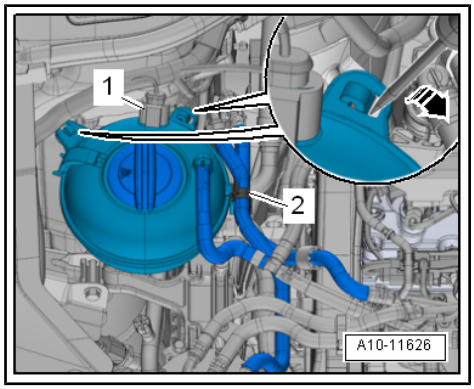
- **Wear safety goggles.**
- **Wear protective gloves.**
- **Relieve the pressure: place clean cloths around the connection point and carefully open the connecting point.**

Note

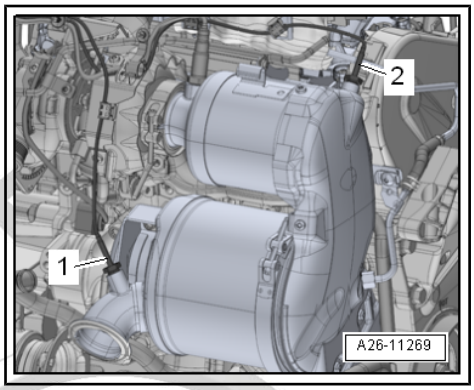
When the battery is connected, the fuel pump is activated by opening a door! Fuel can spill out when the system is open.

– Remove fuel filter for spacial reasons, and put aside ⇒ Rep. gr. 20 ; Fuel filter; Removing and installing fuel filter

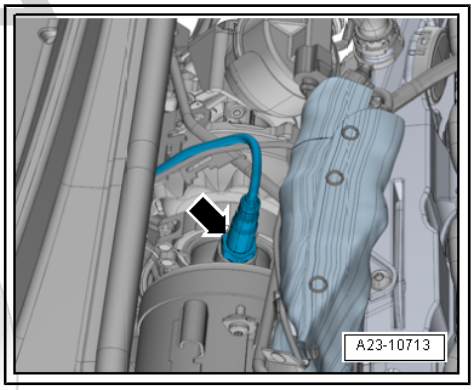
– Separate electrical plug connection -1-.
– Carefully release the locks with a screwdriver -arrow-.
– Remove coolant expansion bottle and place on the engine.
– Remove the noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Summary of components - noise insulation .
– Remove rear underfloor trim panel behind the assembly carrier ⇒ General body repairs, exterior; Rep. gr. 66 ; Underfloor trim panel; Installation location overview - underfloor trim panels .
– Remove the assembly carrier with steering gear ⇒ Chassis, axles, steering; Rep. gr. 40 ; Assembly carrier; Removing and installing assembly carrier with steering gear .
– Remove the pre-exhaust pipe ⇒ Rep. gr. 26 ; Pre-exhaust pipes/silencer; remove and install front exhaust pipe .
– Drain coolant ⇒ Rep. gr. 19 ; Cooling system, coolant; Draining and filling coolant .
– Remove coolant pipes on the right ⇒ Rep. gr. 19 ; Coolant pipes; Removing and installing coolant pipes .
– Remove rear coolant pipe ⇒ Rep. gr. 19 ; Coolant pipes; Removing and installing coolant pipes .
– Remove radiator for exhaust gas recirculation ⇒ Rep. gr. 26 ; Exhaust gas recirculation; Removing and installing radiator for exhaust gas recirculation .



– Exhaust gas temperature encoder -1- and -2- extend ⇒ Rep. gr. 26 ; Exhaust gas temperature control; Summary of components - Exhaust gas temperature control .



– Removing and installing lambda probe -arrow- in front of catalytic converter ⇒ Rep. gr. 23 ; Lambda probe; removing and installing lambda probe .



– Remove top belt guard ⇒ Rep. gr. 15 ; Toothed belt drive; Removing and installing toothed belt guard .
– Remove exhaust gas cleaning module ⇒ Rep. gr. 26 ; Exhaust gas cleaning; removing and installing exhaust gas cleaning module .

Vehicles with air conditioning

Note

Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Empty the refrigerant circuit with the aid of the A/C service station .

Note

Observe safety precautions when working on the air conditioning system and working with the refrigerant.

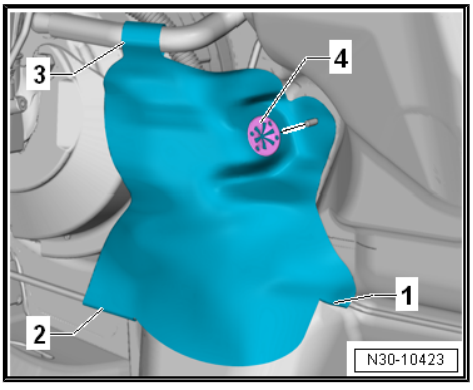
– Remove refrigerant lines ⇒ Heating, Air Conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing the refrigerant lines with inner heat exchanger .

Note

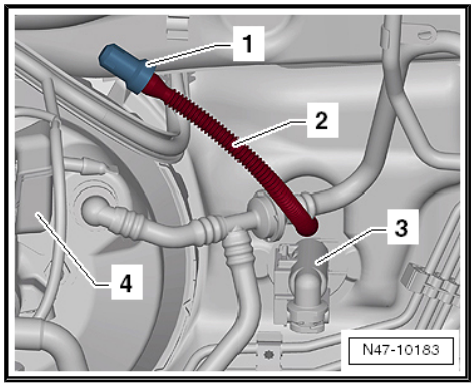
To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.

Vehicles fitted with a manual gearbox

– If present, remove heat shield collar.
– Remove plate nut -4-.
– Unclip and remove the protective collar -1-.

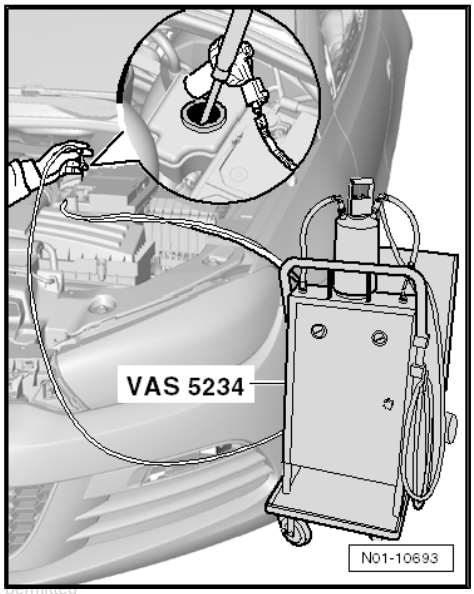


– Detach the return hose -2- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.



Continued for all vehicles

– Use brake filling and bleeding device , e.g. -VAS 5234- , to extract as much brake fluid as possible with the extraction bottle from the brake fluid reservoir.



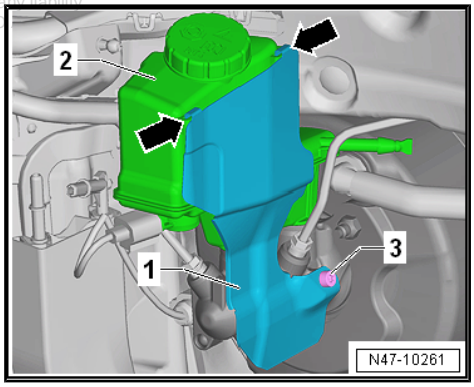
CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

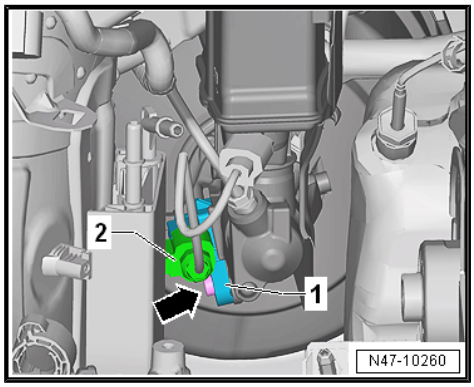
– Remove protective cover -1-, if available.

– Remove screw -3- with plug-in insert T30 with ball head - T10405- .

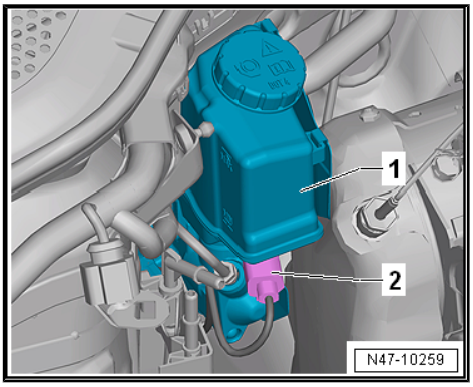
– Remove protective cover -1- from above -arrows- from the brake fluid reservoir -2-.



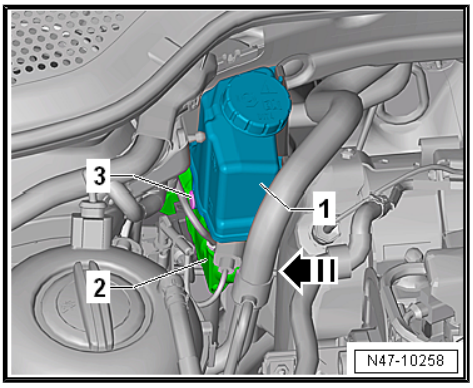
– Disconnect connector -2- from the brake light switch - F- -1-.



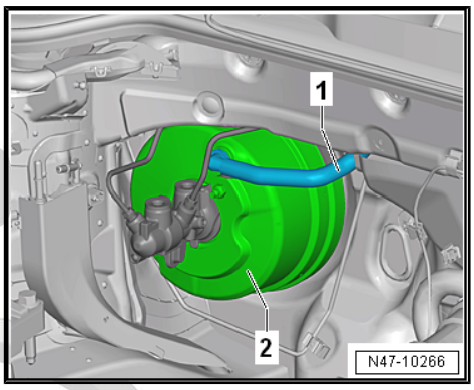
– Disconnect plug -2- from the brake fluid level warning contact - F34- .

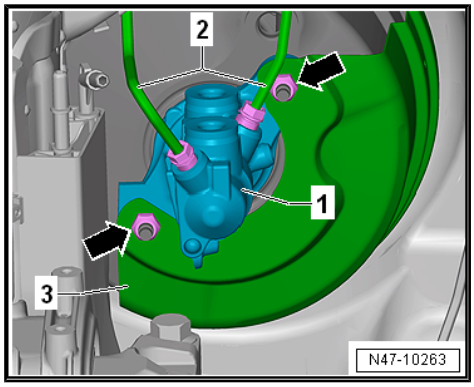


– Removing body-bound rivet -3-.
– Pull the brake fluid reservoir -2- out of the plugs.



– Detach the vacuum hose -1- from the brake servo unit -2-.

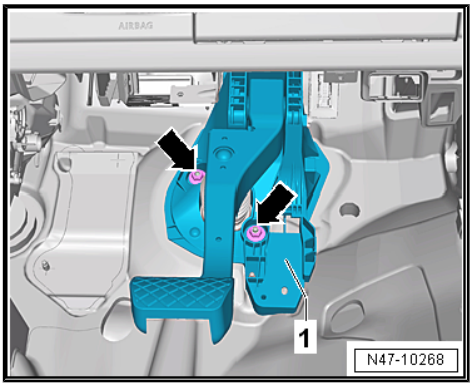




- Mark brake lines -2-.
- Unscrew the brake lines -2- at the master brake cylinder -1-, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
- Unscrew nuts -arrows- from brake master cylinder.
- If present, remove the protection plate -3-.
- Carefully remove brake master cylinder from brake servo.
- Disconnect brake servo from brake pedal ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .
- Remove side dash panel cover on the driver’s side ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel; installing and removing dash panel .
- Remove driver's side footwell cover ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments/covers .
- Remove cover panel on the driver’s side ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel; installing and removing dash panel .
- Remove trim of the centre console ⇒ General body repairs, interior dash panel; Rep. gr. 70 ; ; remove and install dash panel .
- Remove knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Summary of components - knee airbag .
- Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .
- Unscrew the crash strut and put it to the side ⇒ Body - assembly work, interior; Rep. gr. 70 ; Cross-member for dash panel; Removing and installing crash strut .
- Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 70 .

– Release fixing nuts -arrows-.

– Remove the brake servo unit downwards out of the vehicle.



Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *The brake booster is only glued to the seal in the series.*
- *The gluing on the brake booster and the end wall must not be restored.*

– Remove adhesive residues on brake booster and end wall with hot air blower.

NOTICE

Do not use high temperatures.

– Clean the surfaces for the brake booster and the end wall.

– Insert the new seal.

– Clip the brake pedal onto the brake servo ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70 .

– Fill up with new brake fluid.

– Bleed brake system ⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

Vehicles fitted with a manual gearbox

– Bleed the clutch ⇒ Rep. gr. 30 ; Clutch mechanism; Bleed the clutch mechanism .

Vehicles with air conditioning

Note

Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Fill the refrigerant circuit with the aid of the A/C service station . Observe the notes ⇒ Heating, Air conditioning; Rep. gr. 00 ; Repair instructions; General repair instructions .

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 81
- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 65
- Crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Summary of components - knee airbag

- Refrigerant lines ⇒ Heating, Air conditioning; Rep. gr. 87 ; Refrigerant circulation; Removing and installing expansion valve
- Coolant pipes ⇒ Rep. gr. 19 ; Coolant pipes; Summary of components - Coolant pipes
- Assembly carrier ⇒ Chassis, axles, steering; Rep. gr. 40 ; Assembly carrier; Summary of components - assembly carrier .
- Exhaust gas cleaning module ⇒ Rep. gr. 26 ; Exhaust gas cleaning; Summary of components - exhaust gas cleaning
- Toothed belt guard on top ⇒ Rep. gr. 15 ; Toothed belt drive; Summary of components - Toothed belt protection
- Lambda probe ⇒ Rep. gr. 23 ; Lambda probe; Summary of components - Lambda probe
- Exhaust gas temperature encoder ⇒ Rep. gr. 26 ; Exhaust gas temperature control; summary of components - Exhaust gas temperature control .
- Cooler for exhaust gas recirculation ⇒ Rep. gr. 26 ; Exhaust gas recirculation; summary of components - Exhaust gas recirculation .
- Pre-exhaust pipe ⇒ Rep. gr. 26 ; Exhaust pipes / exhaust; Summary of components - Pre-exhaust pipe
- Fuel filter ⇒ Rep. gr. 20 ; Fuel filter; Summary of components - fuel filter
- Noise insulation ⇒ General body repairs, exterior ; Rep. gr. 66 ; Noise insulation; Summary of components- noise insulation

3.3.3 Removing and installing brake servo, right-hand drive - petrol engines

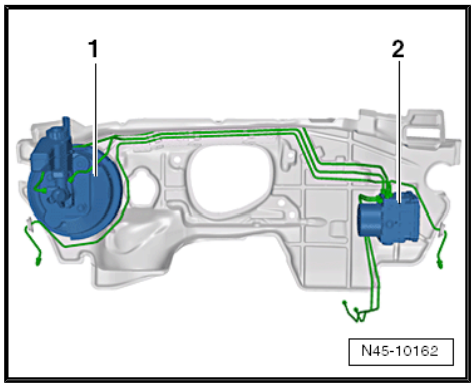
Special tools and workshop equipment required

- Brake filling and bleeding device , e. g. -VAS 5234-
- Extraction bottle (commercially available)
- Repair kit - 1H0 698 311 A-

Fitting location for

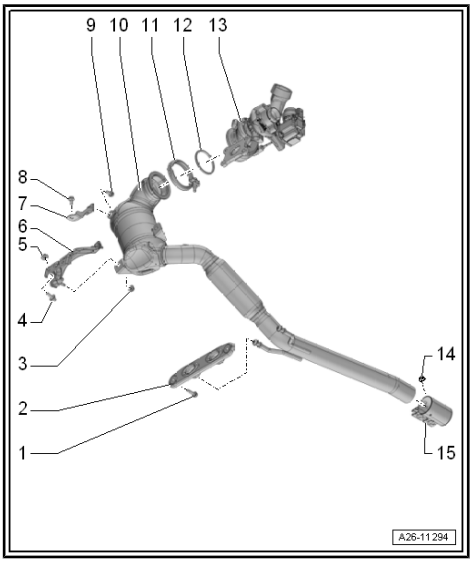
1 - Brake servo

2 - ABS hydraulic unit - N55- with ABS control unit - J104-

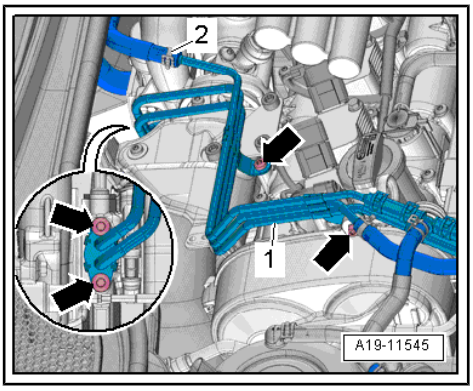


Removing

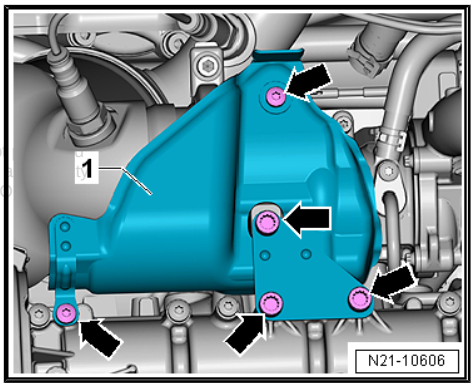
– Remove catalytic converter -10- ⇒ Rep. gr. 26 ; Exhaust gas cleaning; removing and installing catalytic converter .
– Remove bracket -1-.
– Drain coolant ⇒ Rep. gr. 19 ; Cooling system, coolant; Draining and filling coolant .



– Slacken clamp -2- and detach coolant hose.
– Remove screws -arrows- and lay the coolant lines -1- to the side.

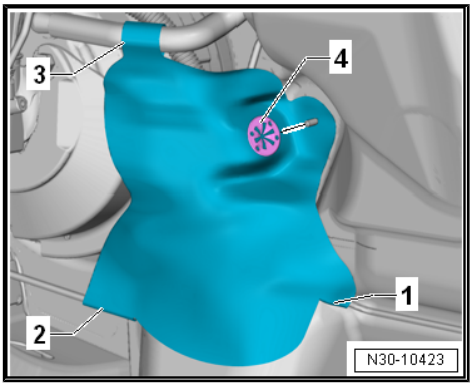


– Remove screws -arrows- and remove head shield -1-.
– Remove top belt guard ⇒ Rep. gr. 15 ; Toothed belt drive; Removing and installing toothed belt guard .

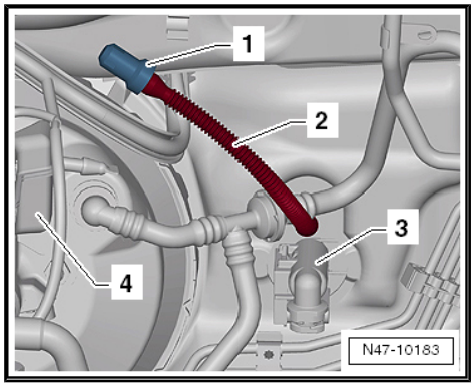


Vehicles fitted with a manual gearbox

– If present, remove heat shield collar.
– Remove plate nut -4-.
– Unclip and remove the protective collar -1-.



– Detach the return hose -2- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.



Vehicles with air conditioning

Note

Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Empty the refrigerant circuit with the aid of the A/C service station .

Note

Observe safety precautions when working on the air conditioning system and working with the refrigerant.

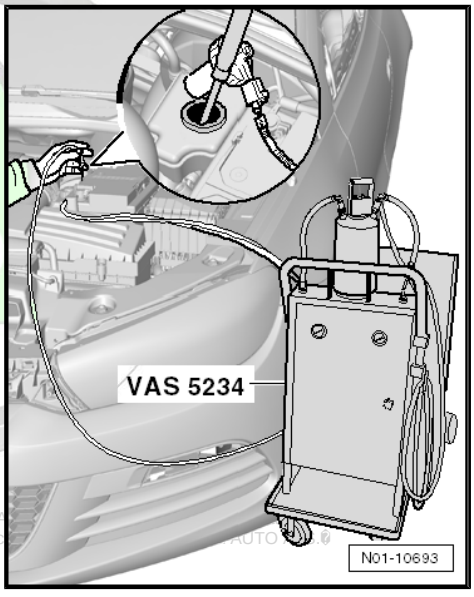
– Remove refrigerant lines ⇒ Heating, Air Conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing the refrigerant lines with inner heat exchanger .

Note

To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.

Continued for all vehicles

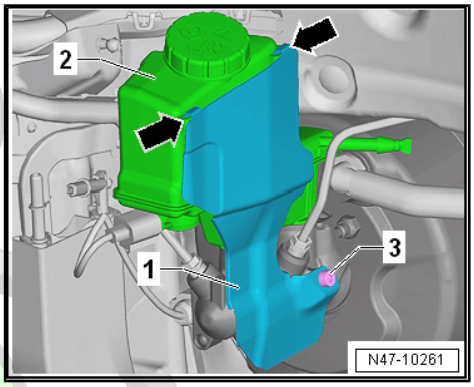
– Use brake filling and bleeding device , e.g. -VAS 5234- , to extract as much brake fluid as possible with the extraction bottle from the brake fluid reservoir.



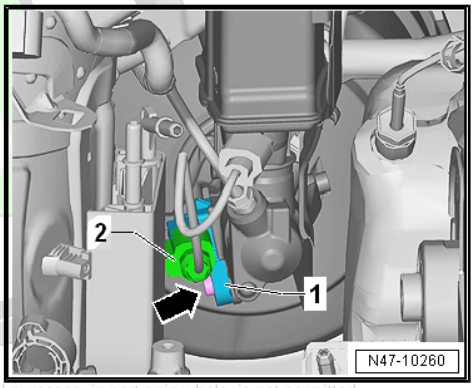
CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

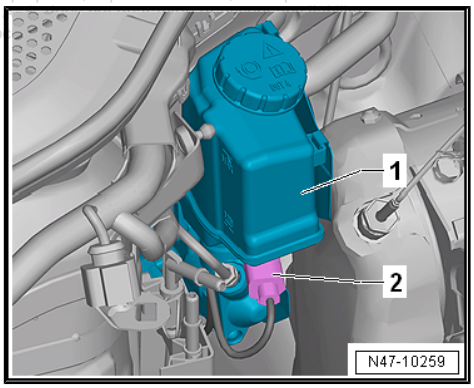
– Remove protective cover -1-, if available.
– Remove screw -3- with plug-in insert T30 with ball head - T10405- .
– Remove protective cover -1- from above -arrows- from the brake fluid reservoir -2-.



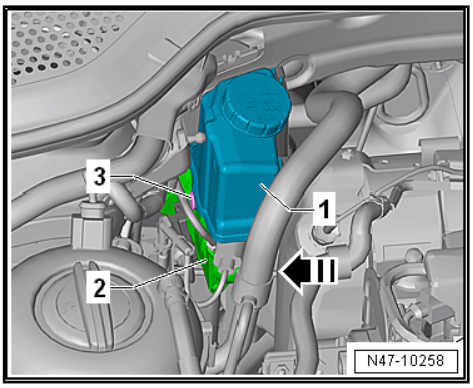
– Disconnect connector -2- from the brake light switch - F- -1-.



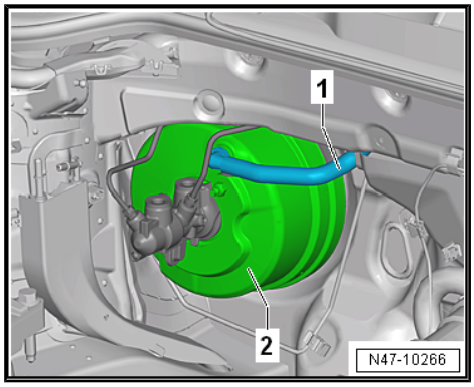
– Disconnect plug -2- from the brake fluid level warning contact - F34- .



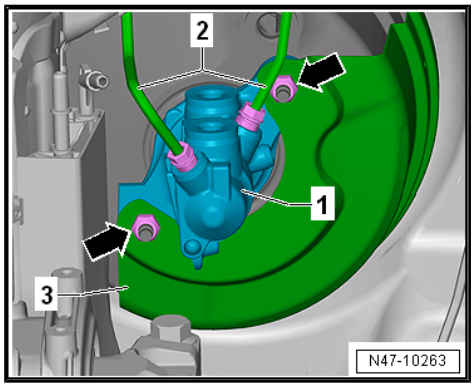
– Removing body-bound rivet -3-.
– Pull the brake fluid reservoir -2- out of the plugs.



– Detach the vacuum hose -1- from the brake servo unit -2-.



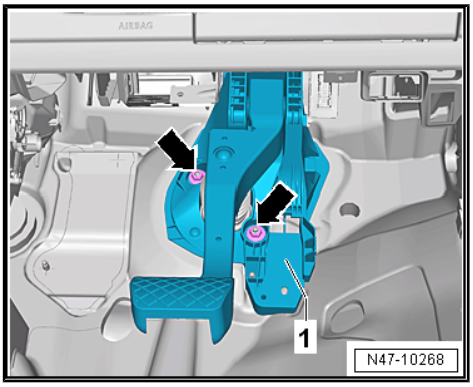
– Mark brake lines -2-.
– Unscrew the brake lines -2- at the master brake cylinder -1-, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
– Unscrew nuts -arrows- from brake master cylinder.
– If present, remove the protection plate -3-.
– Carefully remove brake master cylinder from brake servo.



– Remove side dash panel cover on the driver's side ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel; installing and removing dash panel .
– Remove driver's side footwell cover ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments/covers .
– Remove driver's side storage compartment ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments/covers .
– Remove trim of the centre console ⇒ General body repairs, interior dash panel; Rep. gr. 70 ; ; remove and install dash panel .
– Remove knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Summary of components - knee airbag .
– Remove the driver side footwell vent ⇒ Heating system, air conditioning system; Rep. gr. 87 ; Air duct; Remove and install driver side footwell vent .
– Unscrew the crash strut and put it to the side ⇒ Body - assembly work, interior; Rep. gr. 70 ; Cross-member for dash panel; Removing and installing crash strut .
– Separating the brake pedal from the brake servo unit ⇒ "4.3 Separating brake pedal from brake servo", page 70 .

– Release fixing nuts -arrows-.

– Remove the brake servo unit from the vehicle.



Installing

Installation is performed in the reverse order; pay attention to the following points:

Note

- *The brake booster is only glued to the seal in the series.*
- *The gluing on the brake booster and the end wall must not be restored.*

– Remove adhesive residues on brake booster and end wall with hot air blower.

NOTICE

Do not use high temperatures.

– Clean the surfaces for the brake booster and the end wall.

– Insert the new seal.

– Clip the brake pedal onto the brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 70 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

Vehicles fitted with a manual gearbox

– Bleed the clutch ⇒ Rep. gr. 30 ; Clutch mechanism; Bleed the clutch mechanism .

Vehicles with air conditioning

Note

Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Fill the refrigerant circuit with the aid of the A/C service station . Observe the notes ⇒ Heating, Air conditioning; Rep. gr. 00 ; Repair instructions; General repair instructions .

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 81
- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 65
- Crash strut ⇒ General body repairs, interior; Rep. gr. 70 ; cross member; installing and removing crash strut
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Summary of components - knee airbag

- Refrigerant lines ⇒ Heating, Air conditioning; Rep. gr. 87 ; Refrigerant circulation; Removing and installing expansion valve
- Toothed belt guard on top ⇒ Rep. gr. 15 ; Toothed belt drive; Summary of components - Toothed belt protection
- Pre-exhaust pipe ⇒ Rep. gr. 26 ; Exhaust pipes / exhaust; Summary of components - Pre-exhaust pipe
- Noise insulation ⇒ General body repairs, exterior ; Rep. gr. 66 ; Noise insulation; Summary of components- noise insulation

3.4 Removing and installing master brake cylinder

⇒ "3.4.1 Removing and installing master brake cylinder, left-hand drive vehicles", page 102

⇒ "3.4.2 Removing and installing master brake cylinder, right-hand drive vehicles", page 104

3.4.1 Removing and installing master brake cylinder, left-hand drive vehicles

Special tools and workshop equipment required

- Brake filling and bleeding device , e. g. -VAS 5234-
- Extraction bottle (commercially available)
- Repair kit - 1H0 698 311 A-

Note

- *The master brake cylinder must not be repaired.*
- *Assignment ⇒ Electronic Catalogue of Original Parts .*

Removing

For vehicles with diesel engine

– Remove the engine cover panel ⇒ Rep. gr. 10 ; Engine cover panel; removing and installing engine cover panel .

Continued for all vehicles

– Remove air filter:

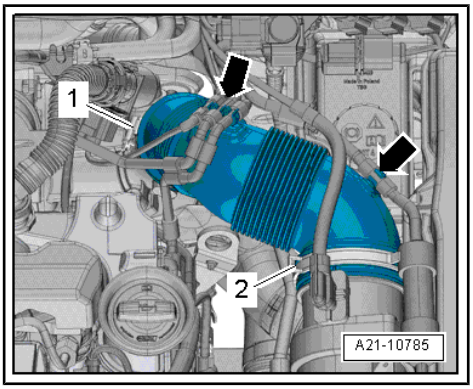
- Petrol engines ⇒ Rep. gr. 24 ; Air filter; Removing and installing air filter housing
- Diesel engines ⇒ Rep. gr. 23 ; Air filter; Removing and installing air filter housing

– Remove battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery .

– Remove battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery .

– Remove connecting hose to intake manifold flap ⇒ Rep. gr. 21 ; Charge air system; Summary of components - charge air system .

– Lay sufficient non-fluffing cloths around the engine and gearbox.

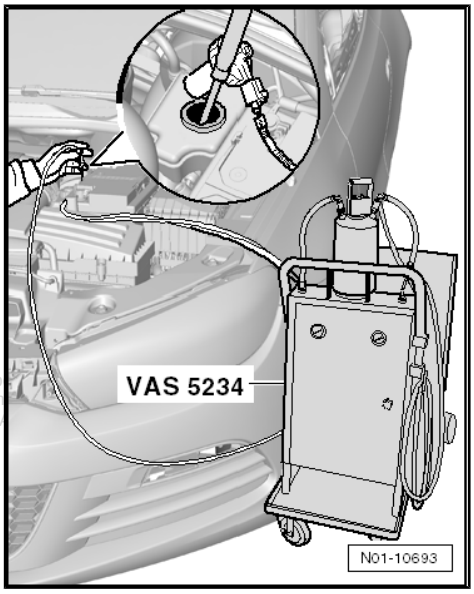


– Use brake filling and bleeding device , e.g. -VAS 5234- , to extract as much brake fluid as possible with the extraction bottle from the brake fluid reservoir.

CAUTION

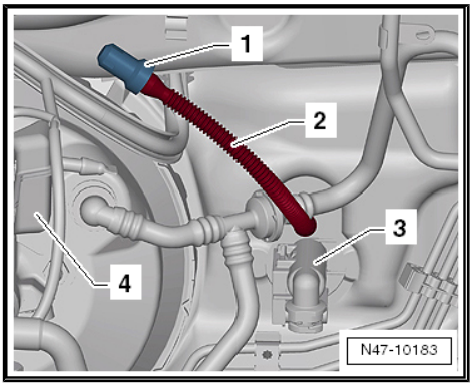
Brake fluid is toxic and must never be sucked up by mouth!

For vehicles with manual gearbox



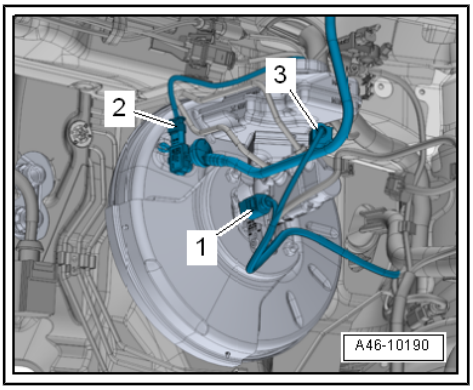
– Detach the return hose -2- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.

Continued for all vehicles

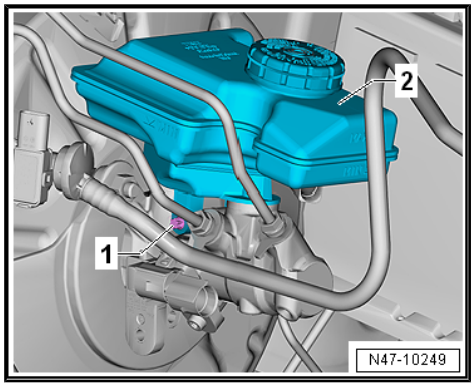


– If present, disconnect the plug -1- from the brake light switch, - F- the plug -2- from the vacuum sensor - G608- and the plug -3- from the brake fluid level warning contact - F34- .

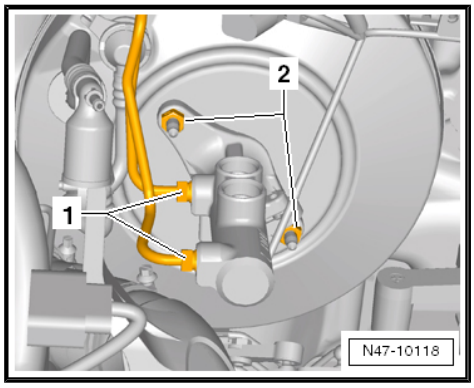
– Remove wiring harness from brake master cylinder.



– Release screw -1-.
– Pull the brake fluid reservoir -2- out of the plugs.



– Mark brake lines -1-.
– Unscrew the brake lines -1- at the master brake cylinder, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
– Unscrew nuts -2- from brake master cylinder.
– If present, remove the protection plate.
– Carefully remove brake master cylinder from brake servo.



Installing

Installation is performed in the reverse order; pay attention to the following points:

– When installing the master brake cylinder with the brake servo unit pay attention to the correct positioning of the pressure rod in the master brake cylinder.
– Fill up with new brake fluid.
– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

Vehicles fitted with a manual gearbox

– Bleed the clutch ⇒ Rep. gr. 30 ; Clutch mechanism; Bleed the clutch mechanism .

Tightening torques

♦ ⇒ “3.1.1 Summary of components - brake servo unit/master brake cylinder, left-hand drive vehicles”, page 79
♦ ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 14
♦ Battery, battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Summary of components - battery
♦ Air filter (petrol engines) ⇒ Rep. gr. 24 ; Air filter; Summary of components - air filter housing
♦ Air filter (diesel engines) ⇒ Rep. gr. 23 ; Air filter; Summary of components - air filter housing
♦ Engine cover ⇒ Rep. gr. 10 ; Engine cover; Removing and installing engine cover .

3.4.2 Removing and installing master brake cylinder, right-hand drive vehicles

Special tools and workshop equipment required

♦ Repair kit - 1H0 698 311 A-

- Brake filling and bleeding device , e. g. -VAS 5234-
- Extraction bottle

Note

- *The master brake cylinder must not be repaired.*
- *Assignment ⇒ Electronic Catalogue of Original Parts .*

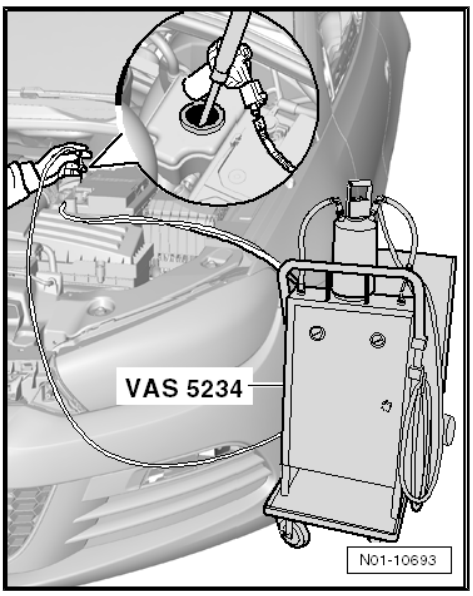
Removing

For vehicles with diesel engine

– Remove the engine cover panel ⇒ Rep. gr. 10 ; Engine cover panel; removing and installing engine cover panel .

Continued for all vehicles

– Use brake filling and bleeding device , e.g. -VAS 5234- , to extract as much brake fluid as possible with the extraction bottle from the brake fluid reservoir.



CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

Vehicles with diesel engines

– Remove fuel filter for spacial reasons, and put aside ⇒ Rep. gr. 20 ; Fuel filter; Removing and installing fuel filter

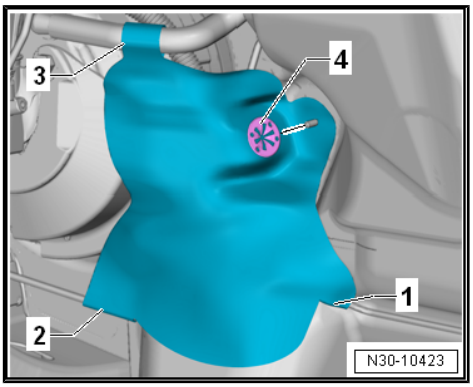
– Remove top belt guard ⇒ Rep. gr. 15 ; Toothed belt drive; Removing and installing toothed belt guard .

Vehicles fitted with a manual gearbox

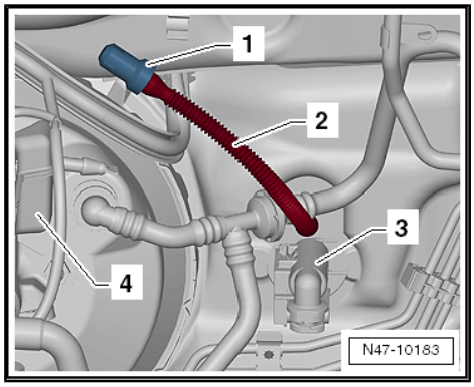
– If present, remove heat shield collar.

– Remove plate nut -4-.

– Unclip and remove the protective collar -1-.



– Detach the return hose -2- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.



Vehicles with air conditioning

Note

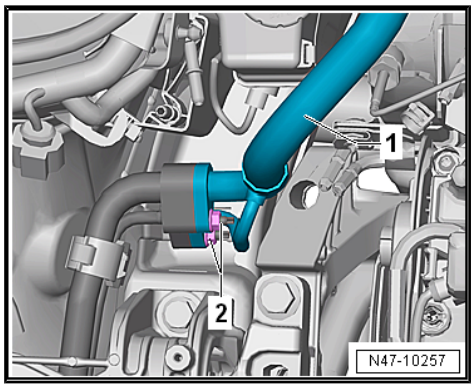
Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Empty the refrigerant circuit with the aid of the A/C service station .

Note

Observe safety precautions when working on the air conditioning system and working with the refrigerant.

– Remove nuts -2- and unclip the line -1-.

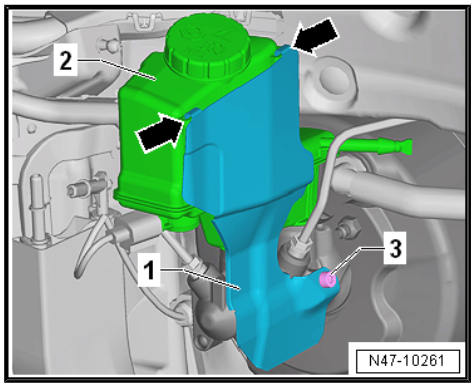


Note

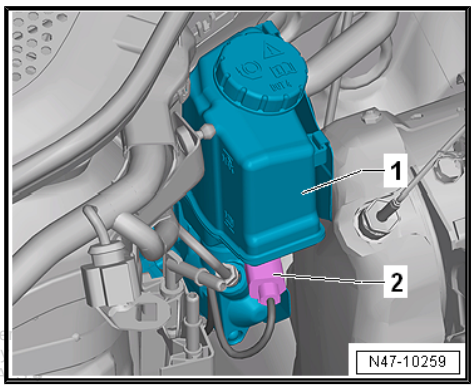
To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.

Continued for all vehicles

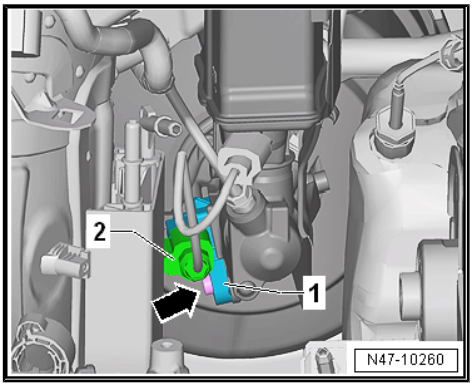
– Remove protective cover -1-, if available.
– Remove screw -3- with plug-in insert T30 with ball head - T10405- .
– Remove protective cover -1- from above -arrows- from the brake fluid reservoir -2-.



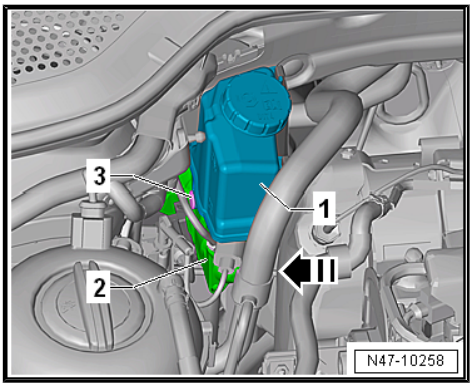
– Remove plug from the brake fluid level warning contact - F34- -2- .



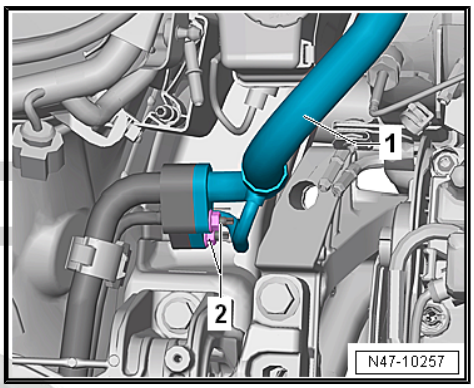
– Remove plug -2- from the brake light switch - F- -1- and remove switch.
– Lay sufficient non-fluffing cloths around the engine and gearbox.

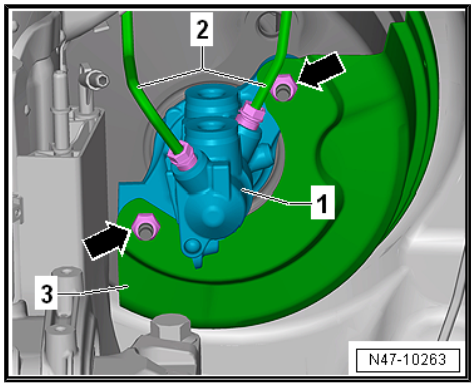


– Removing body-bound rivet -3-.
– Pull the brake fluid reservoir -1- out of the plugs.



– To do this, lift the refrigerant line -1- slightly.





– Mark brake lines -2-.
– Unscrew the brake lines -2- at the master brake cylinder -1-, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
– Remove nuts -arrows- from brake master cylinder.
– If present, remove the protection plate -3-.
– Carefully remove brake master cylinder from brake servo.

Installing

Installation is performed in the reverse order; pay attention to the following points:

– When installing the master brake cylinder with the brake servo unit pay attention to the correct positioning of the pressure rod in the master brake cylinder.
– Fill up with new brake fluid.
– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

Vehicles fitted with a manual gearbox

– Bleed the clutch ⇒ Rep. gr. 30 ; Clutch mechanism; Bleed the clutch mechanism .

Vehicles with air conditioning

Note

Repairs may only be carried out in specialist service centres which have suitably trained personnel and are fitted out for working on the refrigerant circuit.

– Fill the refrigerant circuit with the aid of the A/C service station . Observe the notes ⇒ Heating, Air conditioning; Rep. gr. 00 ; Repair instructions; General repair instructions .

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 81
- ⇒ “3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle”, page 17
- Fuel filter ⇒ Rep. gr. 20 ; Fuel filter; Summary of components - fuel filter
- Refrigerant lines ⇒ Heating, Air conditioning; Rep. gr. 87 ; Refrigerant circulation; system overview - Refrigerant circuit
- Engine cover ⇒ Rep. gr. 10 ; Engine cover; Removing and installing engine cover .

3.5 Check the operation of the brake servo unit

Note

- *For petrol engines, the required vacuum is taken from the intake manifold and the vacuum pump.*
- *vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure*

– Check all underpressure lines of the brake servo unit.

– Checking the non-return valve
⇒ “4.3 Checking the non-return valve”, page 113 .

– With the engine off press down brake pedal repeatedly with force, this reduces the low pressure already present in the system.

– Hold the brake pedal in brake position using a medium foot pressure and start the engine.

If the brake servo unit operates perfectly the brake pedal must yield noticeably under your foot after starting the engine (servo boost takes effect).

Replace faulty brake servo units
⇒ “3.3 Removing and installing brake servo”, page 86 .

4 Vacuum system

4.1 Summary of components - electric vacuum pump

4.1.1 Summary of components - electric vacuum pump, vehicles with 1.0 TSI engines

Note

- *Vacuum pump for brake - V192- cannot be repaired. If the Vacuum pump for brake - V192- fails, it must be replaced.*
- *The brake vacuum pump - V192- is located on the right in the engine compartment (in the direction of travel).*

1 - Mounting bracket

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

2 - Screw

- ❑ 20 Nm

3 - Vacuum sender - G608-

- ❑ Removing and installing ⇒ “4.4 Removing and installing vacuum sensor G608 ”, page 113

4 - Rubber bearing

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Note installation position ⇒ Fig. ““Rubber bearing installation position”“ , page 112 .

5 - Screw

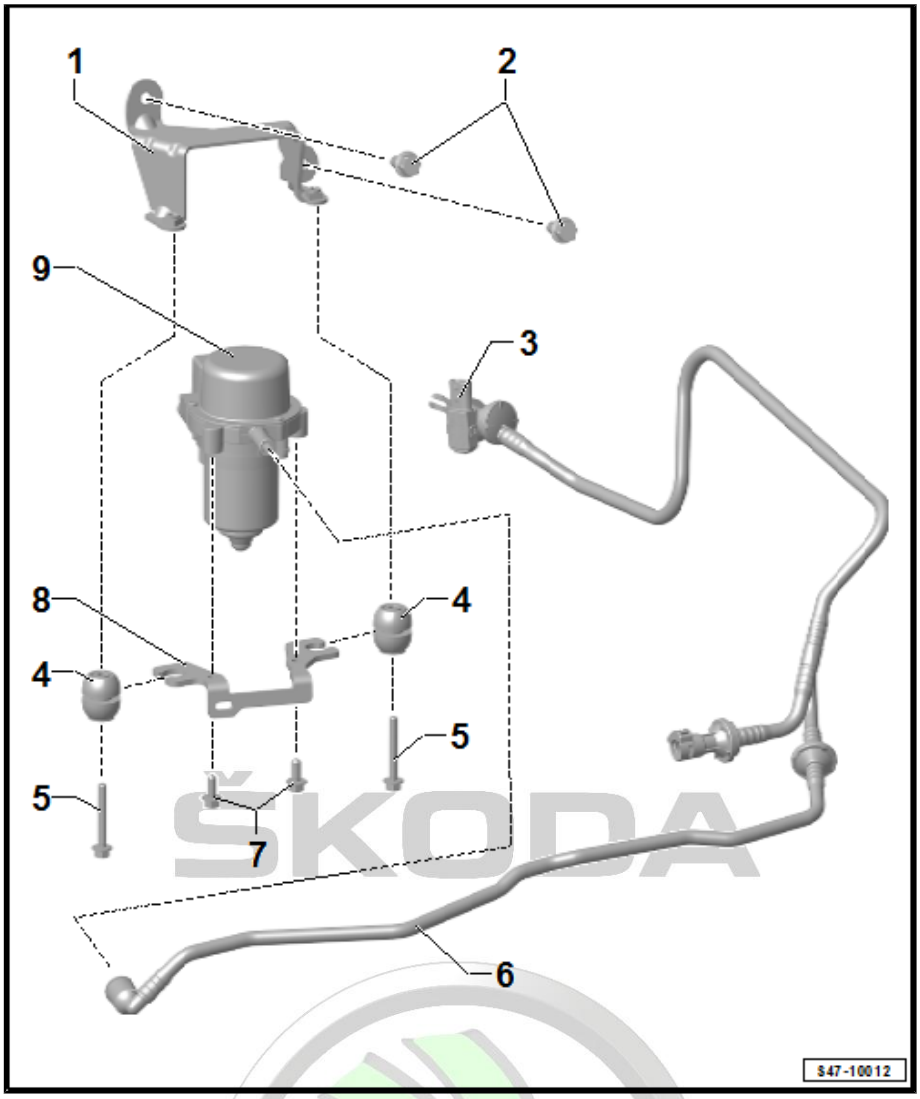
- ❑ 8 Nm

6 - Vacuum line

- ❑ In RHD vehicles, ensure that the vacuum lines are correctly connected to the waterbox front wall ⇒ Fig. ““Connect vacuum lines to the waterbox front wall, RHD”“ , page 111

7 - Screw

- ❑ 8 Nm



8 - Mounting bracket

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

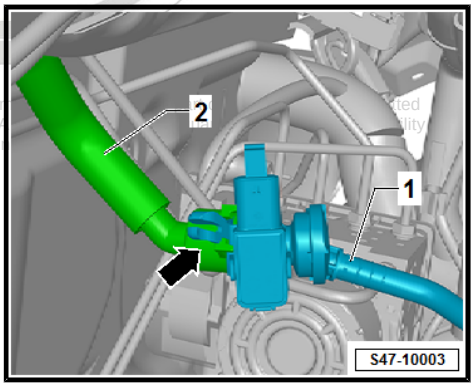
9 - Vacuum pump for brake - V192-

- ❑ Removing and installing ⇒ “4.6.1 Removing and installing electric vacuum pump, vehicles with 1.0 TSI engine”, page 118
- ❑ Check function ⇒ Vehicle diagnostic tester.

Connect vacuum lines to the waterbox front wall, RHD

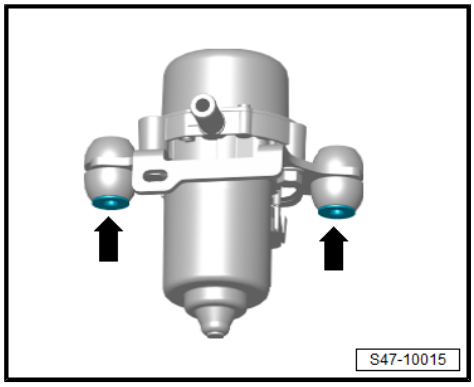
Note

The safety catch -arrow- of the vacuum line -1- must engage correctly installed in the vacuum line connector -2-.



Rubber bearing installation position

– The washers are located on the bottom of the bearings -arrows-.



4.1.2 Summary of components - electric vacuum pump, vehicles with 1.5 TSI engines

Note

- *Vacuum pump for brake - V192- cannot be repaired. If the Vacuum pump for brake - V192- fails, it must be replaced.*
- *The brake vacuum pump - V192- is located on the right in the engine compartment (in the direction of travel).*

1 - Relay

2 - Nut

- ❑ 8 Nm

3 - Vacuum pump for brake - V192-

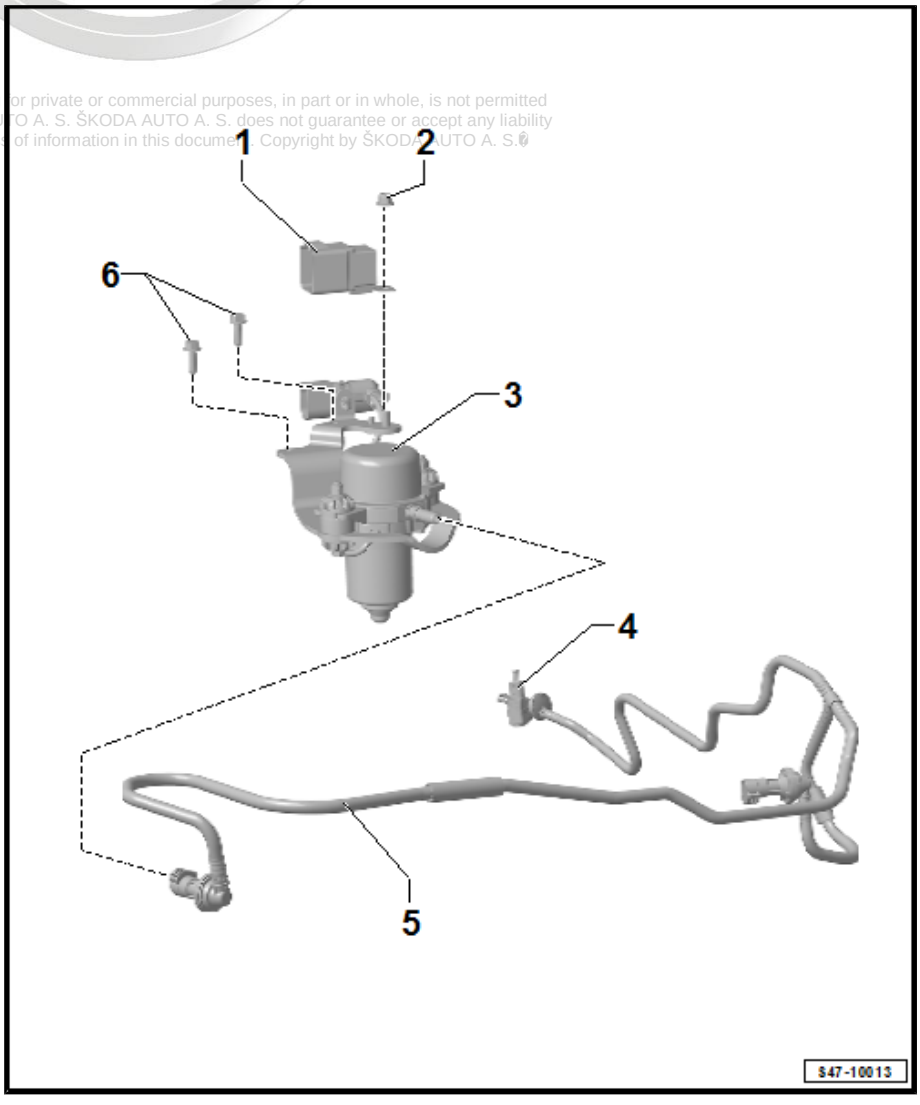
- ❑ Removing and installing ⇒ “4.6.2 Removing and installing electric vacuum pump, vehicles with 1.5 TSI engine”, page 120
- ❑ Check function ⇒ Vehicle diagnostic tester.

4 - Vacuum sender - G608-

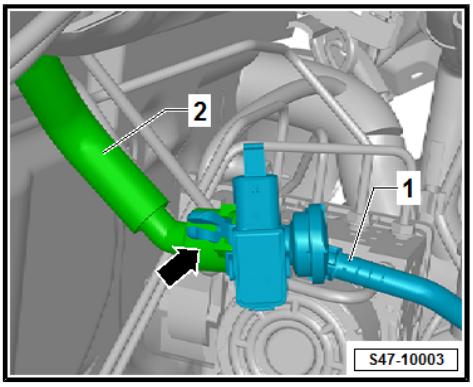
- ❑ Removing and installing ⇒ “4.4 Removing and installing vacuum sensor G608 ”, page 113

5 - Vacuum line

- ❑ In RHD vehicles, ensure that the vacuum lines are correctly connected to the waterbox front wall ⇒ Fig. ““Connect vacuum lines to the waterbox front wall, RHD”“ , page 113



Connect vacuum lines to the waterbox front wall, RHD



Note

The safety catch -arrow- of the vacuum line -1- must engage correctly installed in the vacuum line connector -2-.

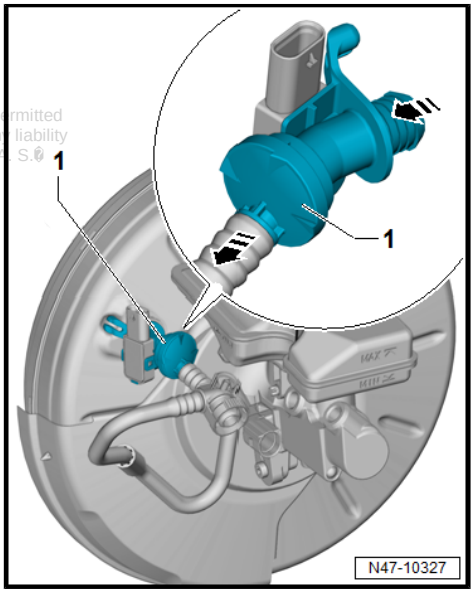
4.2 Exploded view – vacuum pump

⇒ "4.2.1 Summary of components - vacuum pump, vehicles with diesel engines", page 113

4.2.1 Summary of components - vacuum pump, vehicles with diesel engines

The vacuum supply to the brake servo on vehicles with turbocharged engines is provided by a vacuum pump which is part of the oil pump ⇒ Rep. gr. 17 ; Oil sump/Remove and install oil pump .

4.3 Checking the non-return valve



– Pull the non-return valve with vacuum line -1- out of the brake servo.
– Air must pass through the non-return valve -1- in -direction of arrow-.
– Non-return valve must remain closed in opposite direction.

Pay attention to correct installation position.

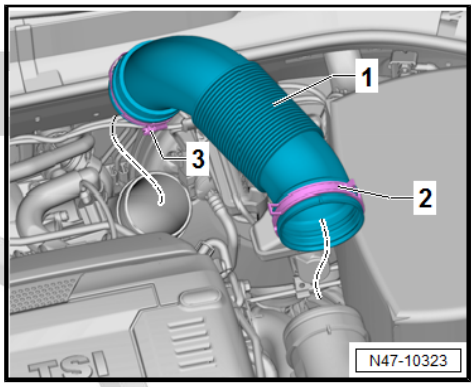
4.4 Removing and installing vacuum sensor - G608-

Note

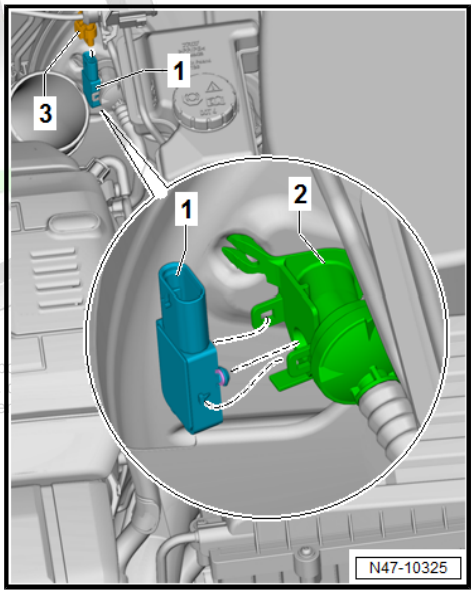
The vacuum sender - G608- is only installed with some petrol engines.

Removing

– If necessary, disconnect intake hose -1-.



– Disconnect plug -3- for vacuum sensor - G608- -1-.
– Pull vacuum hose out of brake servo.
– Carefully lever the vacuum sender - G608- -1- out of the vacuum line -2-.



Installing

Installation is carried out in the reverse order.

4.5 Checking vacuum system

⇒ “4.5.1 General points”, page 114

⇒ “4.5.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 115

⇒ “4.5.3 Checking vacuum generation”, page 115

⇒ “4.5.4 Checking for leaks”, page 116

⇒ “4.5.5 Vacuum generation with manual vacuum pump VAS 6213 ”, page 118

4.5.1 General points

The following instructions are intended to help you find the causes of problems effectively and objectively in the event of complaints about the brake servo or in the event of a so-called »hard brake pedal«.

This check relates to the following components:

- Brake servo
- Oil seal between brake master cylinder and brake servo.
- Non-return valve
- Vacuum hoses with connectors
- Vacuum pump (if included)

The measuring results will be influenced by the geographical location. The higher the location is above sea level, the lower the air pressure will be.

Take note of the following test requirements:

- Visual inspection of all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached
- Ensure cleanliness when working on vacuum system.
- Before starting work, clean engine compartment if necessary.

4.5.2 Connecting vacuum gauge for brake servo - VAS 6721-

Special tools and workshop equipment required

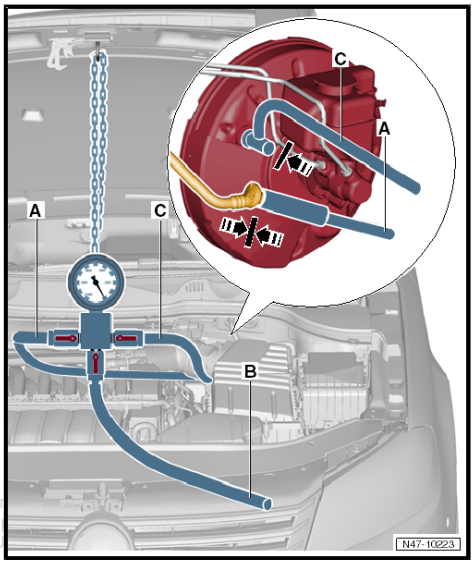
- Vacuum gauge for brake servo - VAS 6721-

– Pull vacuum hose out of brake servo.

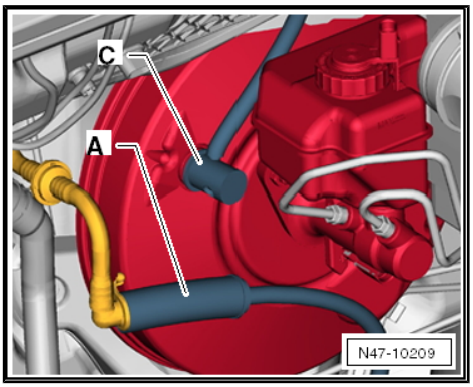
First press the brake pedal several times in order to facilitate removal of the vacuum hose.

– Place brake servo vacuum gauge - VAS 6721- between them -see following illustrations-.

Pos.	Component	Meaning
A	Cut-off valve	In direction of vacuum hose, non-return valve and, if included, vacuum pump
B	Cut-off valve	♦ Open to facilitate removal of brake servo vacuum gauge - VAS 6721- ♦ Open to simulate a fault source ♦ Connection of manual vacuum pump - VAS 6213-
C	Cut-off valve	In direction of brake servo



– Push hose -A- of brake servo vacuum gauge - VAS 6721- onto vacuum hose and press adapter -C- into brake servo.



4.5.3 Checking vacuum generation

Special tools and workshop equipment required

- Vacuum gauge for brake servo - VAS 6721-

Note

- *The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1,000 m altitude). Local and time fluctuations also influence vacuum generation.*
- *A cold engine, a switched-on air-conditioning system as well as engine idling have an adverse influence on generation of a vacuum.*

– Before starting work, check all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached

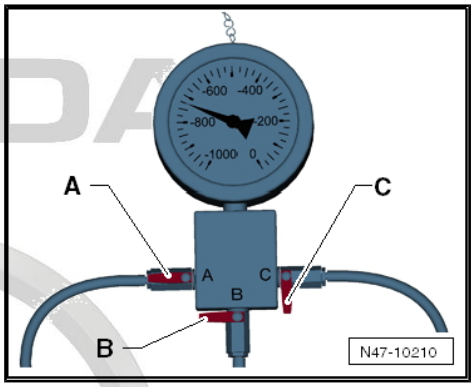
– Place vacuum gauge for brake servo - VAS 6721- in between ⇒ “4.5.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 115 .

– Open locking valve -A-.

– Close cut-off valves -B+C-.

– Start warm engine (> 60°C), press accelerator briefly (engine speed greater than 2000/min).

– Read indicated measured value.



Normally (see notes), the vacuum that is generated should be between 600 and 950 mbar (depending on engine size).

If the measured value is not reached even through the preconditions (see notes) have been met, the vacuum system must first be checked for tightness.

– For comparison purposes, generate the vacuum with the manual vacuum pump - VAS 6213- ⇒ “4.5.5 Vacuum generation with manual vacuum pump VAS 6213 ”, page 118 .

Open cut-off valve -B- to facilitate removal of hose connections and adapter.

4.5.4 Checking for leaks

Special tools and workshop equipment required

- Vacuum gauge for brake servo - VAS 6721-

Note

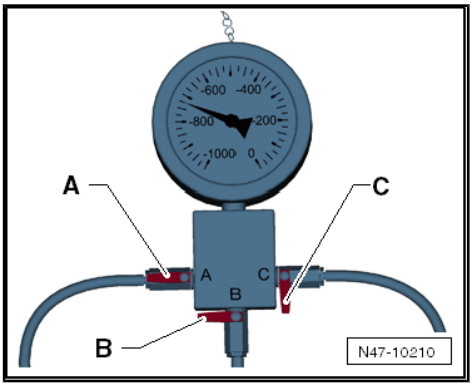
- *The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1,000 m altitude). Local and time fluctuations also influence vacuum generation.*
- *A cold engine, a switched-on air-conditioning system as well as engine idling have an adverse influence on generation of a vacuum.*

– Before starting work, check all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached

– Place vacuum gauge for brake servo - VAS 6721- in between ⇒ “4.5.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 115 .

– Open locking valve -A-.
– Close cut-off valves -B+C-.
– Start warm engine (> 60°C), press accelerator briefly (engine speed greater than 2000/min).

Normally (see notes), the vacuum that is generated should be between 600 and 950 mbar (depending on engine size).



– Open cut-off valve -C- to evacuate brake servo.
– Switch off engine.
– Read and make a note of measured value shown.

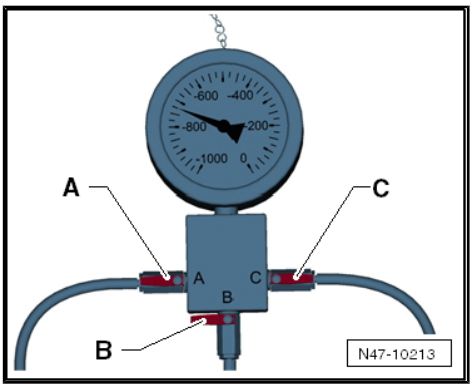
A vacuum decrease of 400 mbar in 12 hours is permissible.

If the vacuum decrease is greater, then check for leaks in the vicinity of:

1 - Brake servo

or

2 - Non-return valve, vacuum hoses with connectors and vacuum pump/intake manifold.

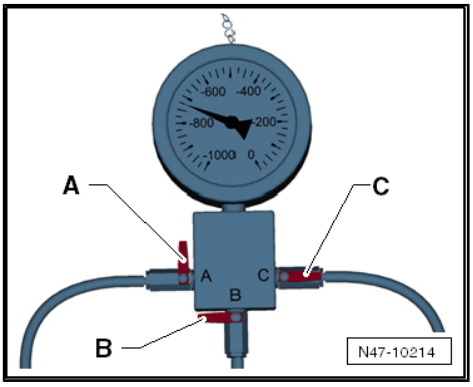


If there are large leaks, the vacuum decreases steeply within a few seconds.

Vacuum check in vicinity of brake servo:

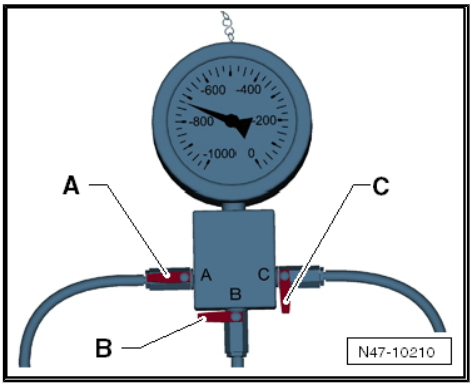
– After generation of vacuum, close cut-off valve -A- in order to check brake servo vacuum system.

Vacuum check in vicinity of non-return valve, vacuum hoses with connectors and vacuum pump/intake manifold:



– Once vacuum has been generated, close the shut-off valve -C- in order to check the vacuum system of the brake servo vacuum gauge - VAS 6721- up to the intake manifold or the vacuum pump.

Open cut-off valve -B- to facilitate removal of hose connections and adapter.



4.5.5 Vacuum generation with manual vacuum pump - VAS 6213-

Special tools and workshop equipment required

- Hand vacuum pump - VAS 6213-

Instead of vacuum generation by means of engine or vacuum pump, the vacuum can be generated with the manual vacuum pump - VAS 6213- in certain cases.

– Connect manual vacuum pump - VAS 6213- to vacuum hose from connection -B- on brake servo vacuum gauge - VAS 6721- .

– Open cut-off valve -B-.

– Generate vacuum with hand vacuum pump - VAS 6213- until between 600 and 950 mbar is shown on brake servo vacuum gauge - VAS 6721- .

– Subsequently, carry out the corresponding checks.

4.6 Removing and installing electric vacuum pump

⇒ “4.6.1 Removing and installing electric vacuum pump, vehicles with 1.0 TSI engine”, page 118

⇒ “4.6.2 Removing and installing electric vacuum pump, vehicles with 1.5 TSI engine”, page 120

4.6.1 Removing and installing electric vacuum pump, vehicles with 1.0 TSI engine

Note

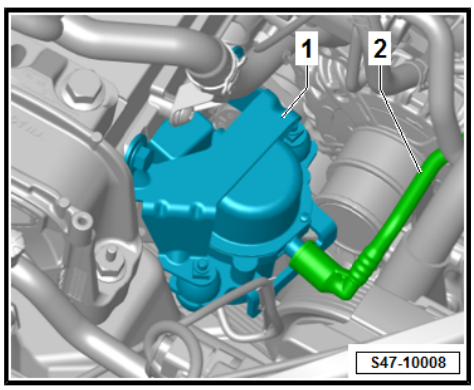
- *Vacuum pump for brake - V192- cannot be repaired. If the Vacuum pump for brake - V192- fails, it must be replaced.*
- *The brake vacuum pump - V192- is located on the right in the engine compartment (in the direction of travel).*

Removing

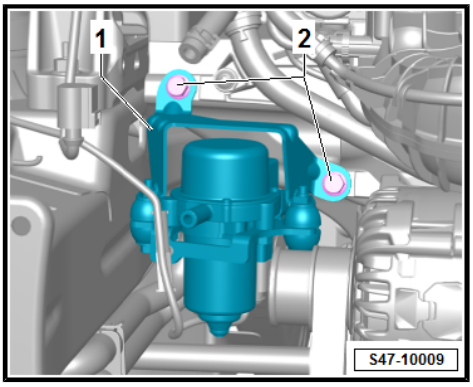
NOTICE

Do not damage the vacuum hose. Replace if damaged.

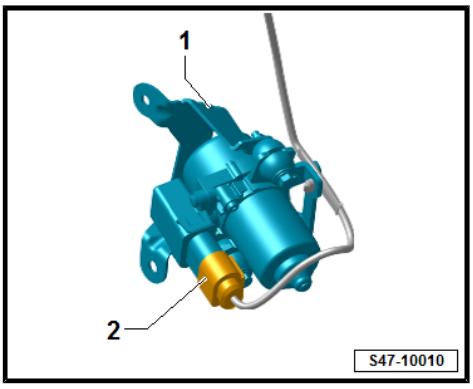
– Detach the vacuum line -2- from the brake vacuum pump - V192- -1-.



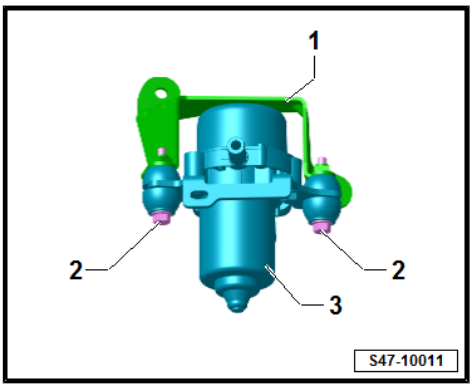
– Remove the screws -2- and remove the vacuum pump for brake from the - V192- -1-.



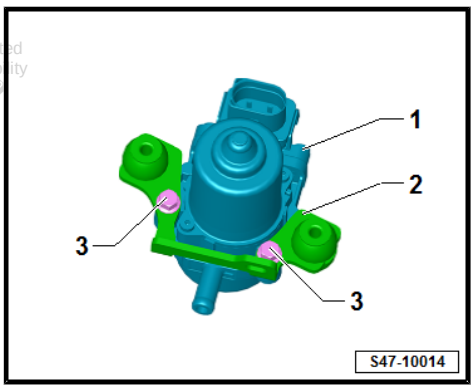
– Remove the connector-2- and remove the electrical line -arrow- from the Vacuum pump for brake - V192- -1-.
– Remove the vacuum pump for brake - V192- from the vehicle.



– Remove the screws -2- and remove the bracket -1- from the vacuum pump for brake - V192- -3-.



– Remove the screws -3- and remove the bracket -2- from the vacuum pump for brake - V192- -1-.

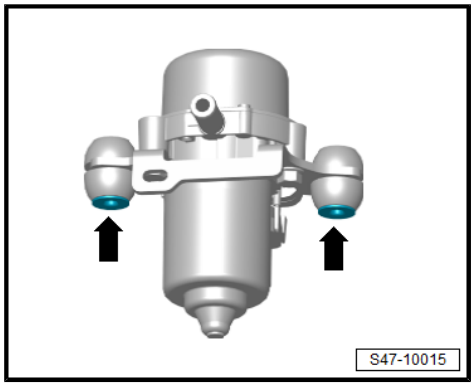


Installing

Installation is performed in the reverse order; pay attention to the following points:

– When replacing the rubber mountings, ensure that the installation position is correct:
– The washers are located on the bottom of the bearings -arrows-.

The washer is located on the bottom of the bearing.



Tightening torques

◆ ⇒ “4.1.1 Summary of components - electric vacuum pump, vehicles with 1.0 TSI engines”, page 110

4.6.2 Removing and installing electric vacuum pump, vehicles with 1.5 TSI engine

Note

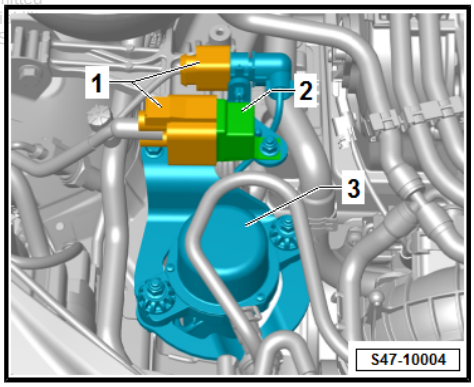
◆ *Vacuum pump for brake - V192- cannot be repaired. If the Vacuum pump for brake - V192- fails, it must be replaced.*
◆ *The brake vacuum pump - V192- is located on the right in the engine compartment (in the direction of travel).*

Removing

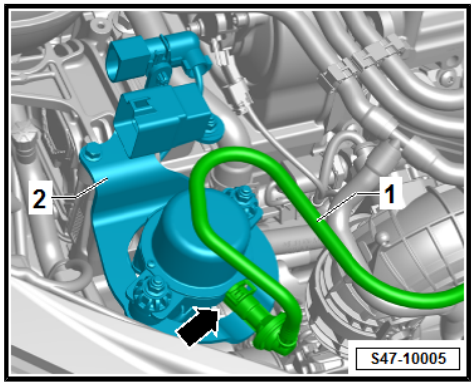
NOTICE

Do not damage the vacuum hose. Replace if damaged.

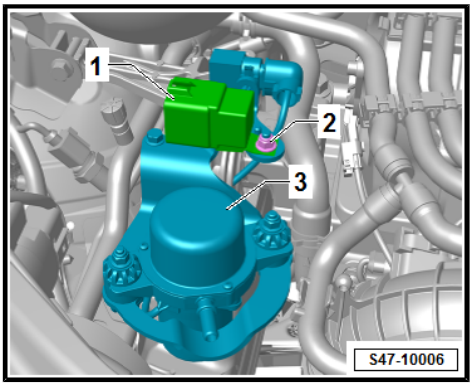
– Remove the connector -1- from the brake vacuum pump - V192- -3-, as the well as the relay -2-.



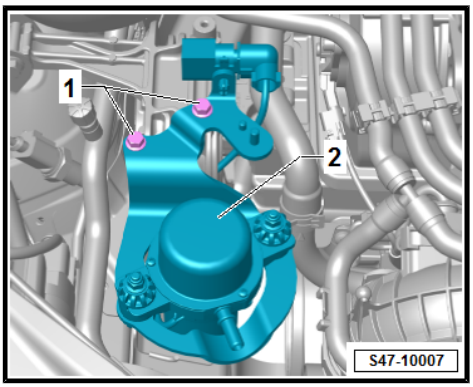
– Release the vacuum line -1- -arrow- from the brake vacuum pump - V192- -2-.



– Remove the nut -2- and separate the relay -1- from the vacuum pump for brake - V192- -3-.



– Remove the screws -1- and the vacuum pump for brake - V192- -2- from the vehicle.



Installing

Installation is carried out in the reverse order.

Tightening torques

- ⇒ “4.1.2 Summary of components - electric vacuum pump, vehicles with 1.5 TSI engines”, page 112

5 Brake lines

⇒ “5.1 Repairing brake lines”, page 122

5.1 Repairing brake lines

⇒ “5.1.1 Assembly overview - Flaring tool”, page 122

⇒ “5.1.2 Work instruction”, page 123

5.1.1 Assembly overview - Flaring tool

List of individual tools

1 - Flaring tool - VAS 6056/1-

- ❑ The flaring chucks - VAS 6056/6- are included in the flaring tool - VAS 6056/1-

2 - Pipe cutter - VAS 6056/2-

3 - Brake line-peeler - VAS 6056/3-

- ❑ The grub screws (in the shank and sideways) are adjusted and must not be altered!

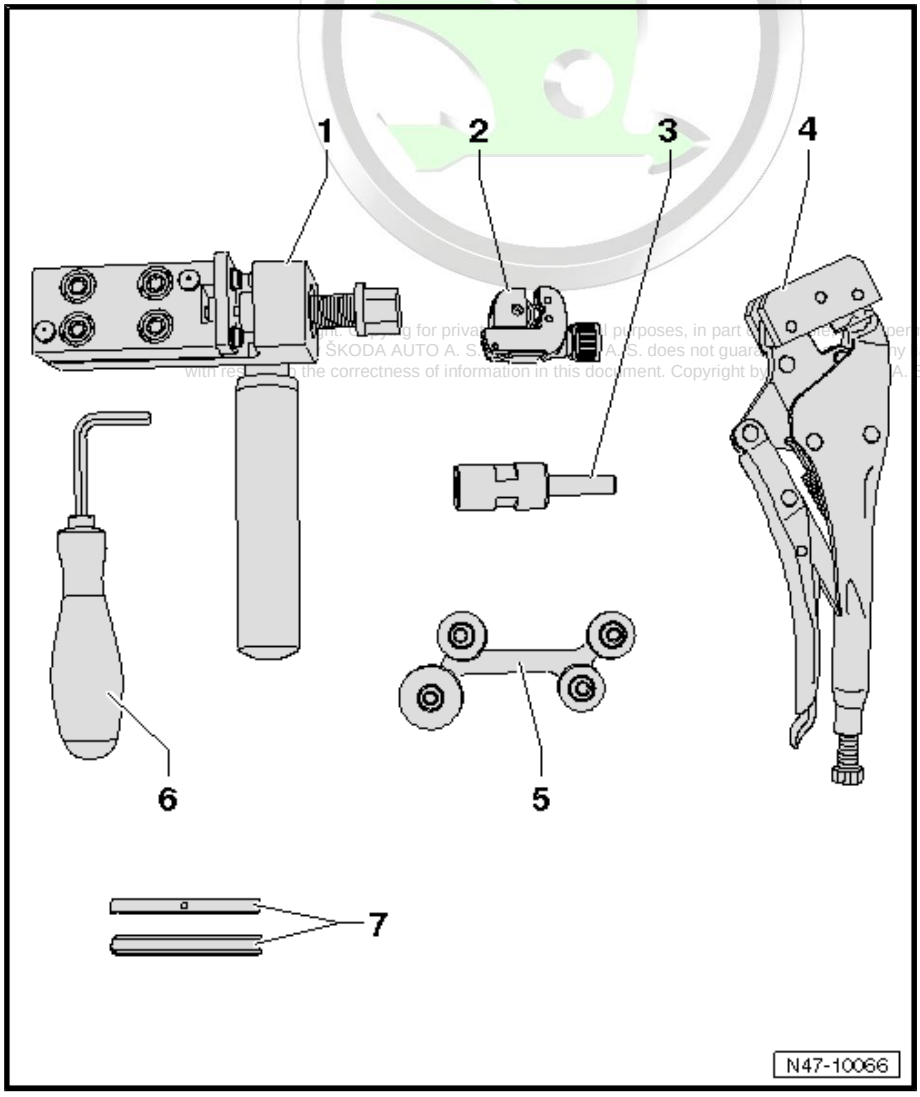
4 - Gripping pliers with plastic chuck jaws - VAS 6056/4-

5 - Pipe bending tool - VAS 6056/5-

6 - Screwdriver SW6

- ❑ Short

7 - Flaring chucks - VAS 6056/7-



Assembly overview - Flaring tool

1 - Flaring tool upper part

- ❑ unscrew for changing the flaring chucks

2 - Attachment for door handle

- ❑ must be unscrewed to access securing bolt for upper part

3 - Fixing screw

- ❑ For flanging tool upper part

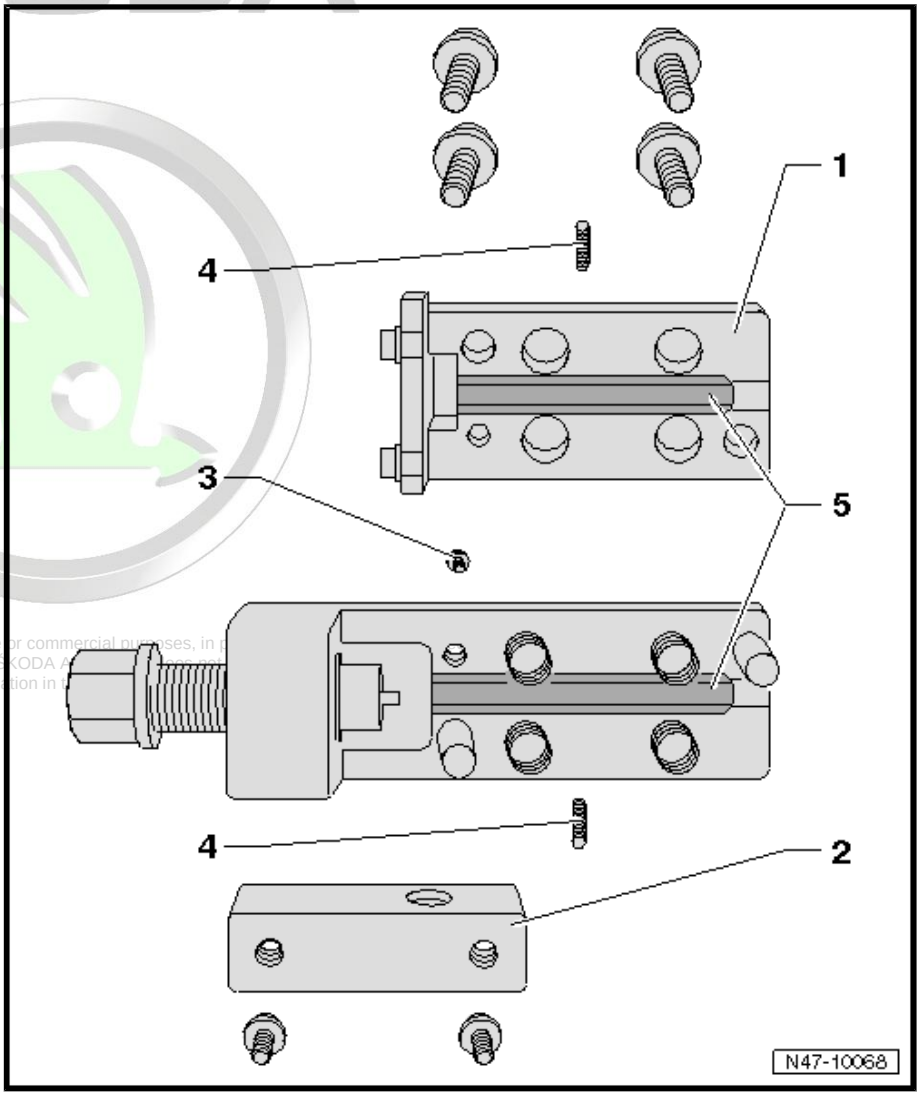
4 - Grub screws for flaring chucks

- ❑ For centring and holding the flaring chucks
- ❑ 2 mm hexagon socket

5 - Flaring chucks

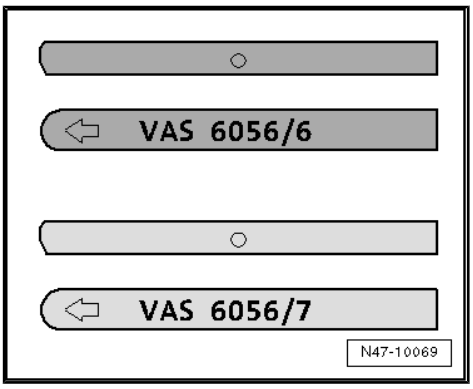
- ❑ Various
- ❑ Assembly instructions

⇒ Fig. ""Mounting instruction for flaring chucks:"" , page 123



Mounting instruction for flaring chucks:

- ♦ VAS 6056/6 (dark) for black brake lines
- ♦ VAS 6056/7 (bright) for green brake lines



Note

The arrow, on the rounded side of the flaring chucks, must point to the housing edge and the straight side of the flaring chucks must be installed to the spindle, otherwise the flaring head is not properly formed.

5.1.2 Work instruction

Special tools and workshop equipment required

- ♦ Brake line flaring tool - VAS 6056-
- ♦ Brake filling and bleeding device - VAS 5234-

NOTICE

- **Brake fluid must never come into contact with fluids containing mineral oils (oil, petrol, cleaning agent, because the fluids damage the sealing rings and boots of the brake system.**
- **Because of its caustic effect, the brake fluid must not come into contact with paint.**
- **Observe the applicable disposal instructions.**
- **Only use new brake fluid.**

CAUTION

Brake fluid is toxic and must never be sucked up by mouth!

Note

- *Brake lines must only be bent max. 90°, otherwise they kink or present deformations, which constrain the line cross-section in an unauthorized manner.*
- *Preferably separate brake lines at underbody.*
- *The positions of the intermediate pieces must be selected so that they cannot chafe on moving parts.*
- *Do not grease spindle and only clean with methylated spirits.*
- *The arrow, on the rounded side of the flaring chucks, must point to the housing edge. The straight sides of the flaring chucks must be installed facing the spindle, otherwise the flaring head is not correctly positioned.*

Using the brake line flaring tool - VAS 6056- , the brake lines can be crimped with a pipe outside diameter of 5 mm, without damaging the coating. So that in certain cases parts of the brake lines can be replaced cheaply.

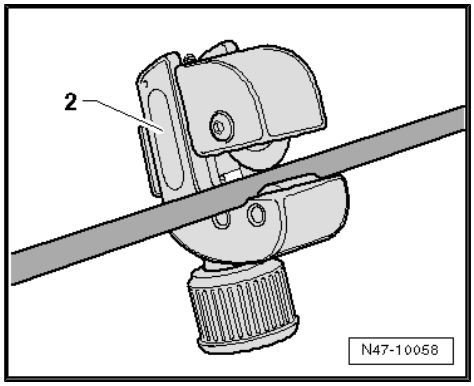
Separate

– Unscrew the affected brake line on the brake caliper or wheel-brake cylinder, while doing so collect escaping brake fluid and dispose according to the specifications.

– Cut through the brake line in a suitable location (straight, freely accessible piece) with the pipe cutter -2-.

– Remove the part to be replaced.

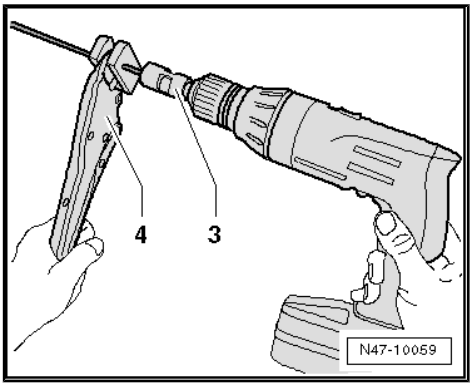
– Degrease the surface of the brake line.



– Clamp the brake line in the gripping pliers -4- tight enough, so that it protrudes approx. 50 mm out of the plastic chuck jaws.
– Tension the peeler -3- in a boring machine and place it onto the brake line.
– Peel off the coating of the brake line using the slower speed of the boring machine and by exerting a slight pressure against the brake line.

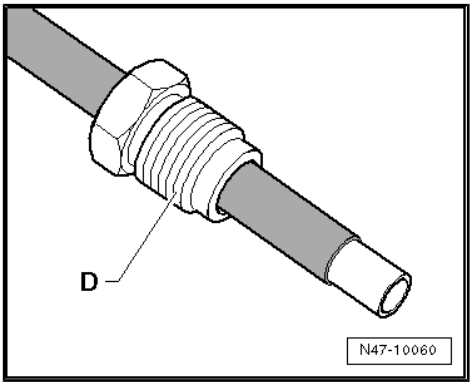
The length of the peeling is determined by the stop in the peeler.

– Separate the peeler from the brake line and remove peel residues.
– Remove gripping pliers.

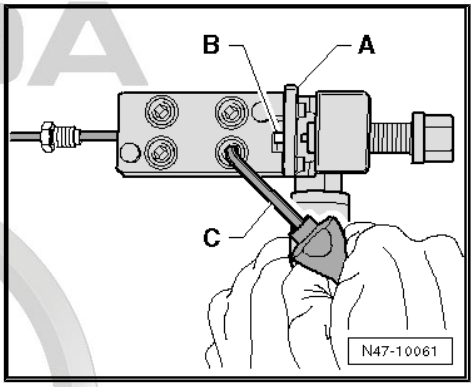


Crimping

– Slide pipe screw -D- onto the brake line.



– Push the brake line -B- against the stop -A- in the flaring tool.

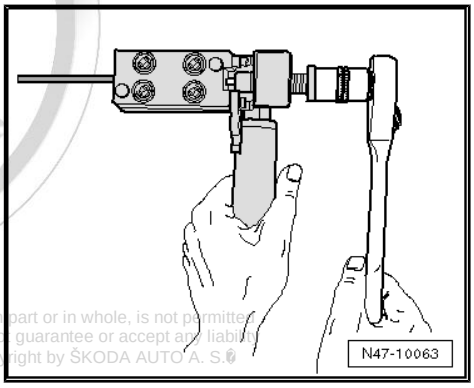


Note

When tightening the Allen screws the brake line must lie against the stop, otherwise the flaring head does not function properly.

– Pre-tension the brake line in the flaring tool so that the brake line can no longer be moved. Fold up the stop -A- and then tighten the Allen screws crosswise completely with the offset screwdriver -C-.

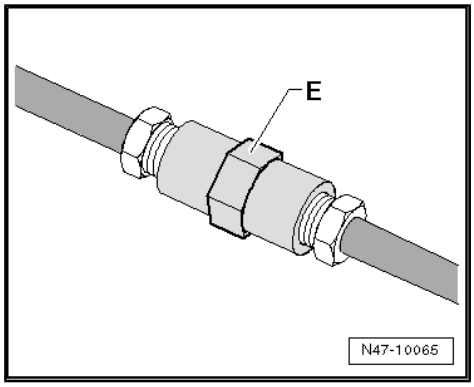
– Turn the spindle in the flaring tool up to the stop.
– Turn back the spindle once again.
– Loosen the Allan screws crosswise.
– Take the brake line out of the flaring tool, clean and check the brake line as well as the flaring head.



Briefly flush the part of the brake line still in the vehicle:

– Connect the brake filling and bleeding device - VAS 5234- , fit the hose of the bleeding bottle onto the flaring head of the brake line and allow the brake filling and bleeding device - VAS 5234- to run briefly until some brake fluid has passed through.
– Purge the brake line that you will be fitting with compressed air.

– Assemble the brake lines together with the connecting piece -E-.
– Install brake line.
– Bleeding Brake System
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128



6 Hydraulic system

6.1 General notes on brake fluid

- The brake fluid is hygroscopic, i.e. it retains humidity from the ambient air, and must therefore always be stored in airtight containers.
- Brake fluid must never come into contact with fluids containing mineral oils (oil, petrol, cleaning agent). Mineral oils damage the plugs and boots of the brake system.
- Drained (used) brake fluid must never be used again.
- The brake fluid is toxic, avoid skin contact.
- Because of its caustic effect, the brake fluid must not come into contact with paint.
- Rinse off spilled brake fluid using plenty of water.
- Dispose of brake fluid in compliance with the applicable waste disposal and environmental regulations.
- Only use new brake fluid in accordance with the specification ⇒ “3.1.4 Brake fluid”, page 4 .

6.2 Prebleeding the hydraulic system

Special tools and workshop equipment required

- Brake filling and bleeding device , e. g. - VAS 5234-
- Brake fluid

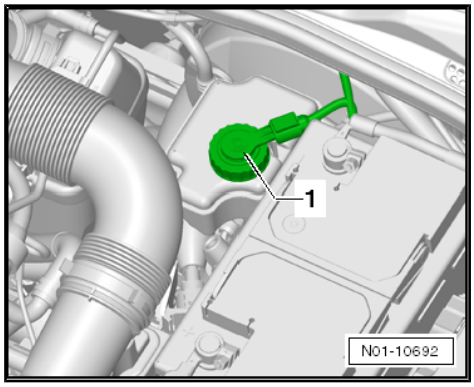
Note

For vehicles with EDL/TCS, or with EDL/TCS/ESC, if one chamber of the brake fluid return tank has run dry e.g. due to a leak, the system must be bled first.

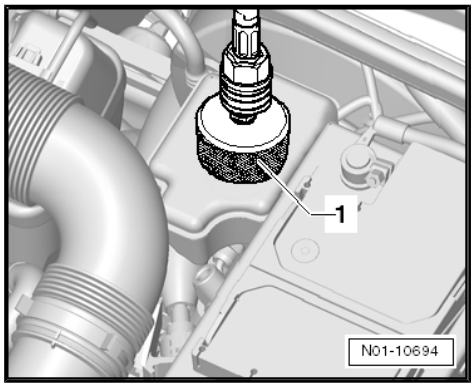
– Note the general instructions on brake fluid ⇒ “6.1 General notes on brake fluid”, page 127 .

A pre-pressure of 0,2 MPa (2 bar) is required to bleed the brake system.

– Unscrew cap -1- from the brake fluid reservoir.



– Connect the thread plug -1- of the brake filling and bleeding device e.g. -VAS 5234- to the brake fluid reservoir.



– Provide a suitable catch pan for used brake fluid.

1. Bleed the front left and front right brake calipers at the same time.
2. Bleed the rear left and rear right brake calipers/cylinders at the same time.

– Allow brake fluid to drain until even the smallest air bubbles have escaped.

– Initiate basic setting ⇒ Vehicle diagnostic tester.

– Then perform normal bleeding
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 128 .

6.3 Bleeding hydraulic system following standard procedure

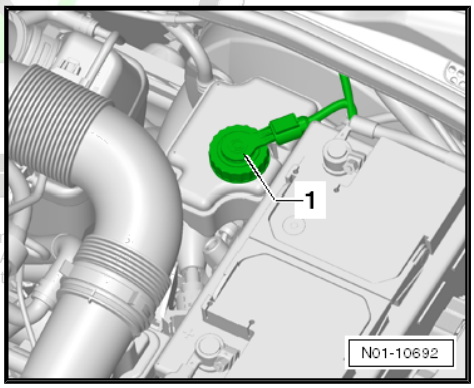
Special tools and workshop equipment required

- Brake filling and bleeding device , e. g. - VAS 5234-
- Brake fluid

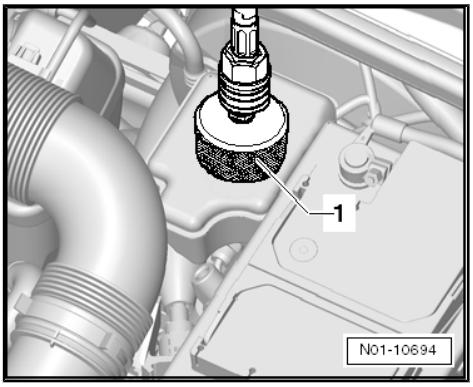
– Note the general instructions on brake fluid
⇒ “6.1 General notes on brake fluid”, page 127 .

A pre-pressure of 0,2 MPa (2 bar) is required to bleed the brake system.

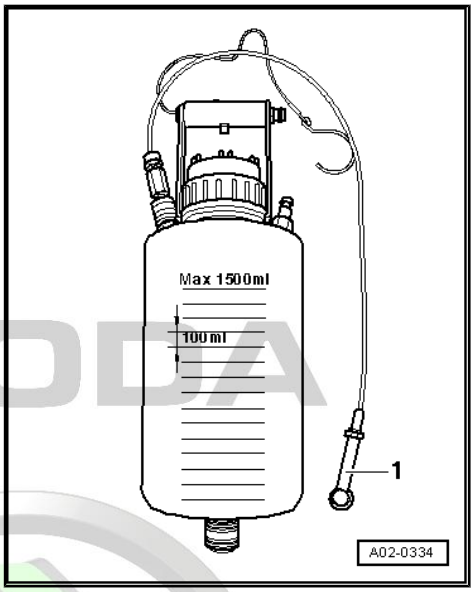
– Unscrew cap -1- from the brake fluid reservoir.



– Connect the thread plug -1- of the brake filling and bleeding device e.g. -VAS 5234- to the brake fluid reservoir.
– Provide a suitable catch pan for used brake fluid.
– Remove the dust caps of the bleeder valves at the brake calipers.
– Switch on the brake filling and bleeding device and activate the system with a brake fluid pressure of approx. 0.2 MPa.



– Fit the hose of the bleeding bottle -1- onto the corresponding bleeder valve.
– Loosen bleeder valve.
– Extract as much brake fluid as possible until even the smallest air bubbles have escaped.
– Close vent valve.
– Repeat this procedure for all brake calipers in the prescribed sequence until the brake system is fully bled.



Bleeding sequence

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

– Inspect pedal position and idle travel at brake pedal. Idle travel: max. 1/3 of pedal travel.
– Repeat the whole procedure if necessary (several times), until perfect bleeding is achieved.
– After bleeding close the relevant vent valve and fit dust cap.
– If necessary, correct the brake fluid level in the brake fluid reservoir.
– Disconnect the brake filling and bleeding device .
– Disconnect the brake filling and bleeding device from the brake fluid reservoir.
– Perform a test drive. While doing so, at least one ABS adjustment must be carried out on vehicles with ABS!

6.4 Subsequent bleeding of hydraulic system

Special tools and workshop equipment required

- Bleeder bottle
- Brake fluid

Subsequent bleeding must be performed if the brake pedal travels too far or if the »brake pedal "feels" soft«.

Note

A second mechanic is needed for this task.

– Firmly push the brake pedal to the floor and keep it held down.
– Connect the bleeder bottle.
– Open the bleeder screw on the brake caliper.
– Fully depress brake pedal.
– Close bleeder valve with pedal held down.
– Release brake pedal slowly.
– Repeat this operation on all calipers in the prescribed sequence at least 5 times.

Bleeding sequence

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

– Perform a test drive. While doing so, at least one ABS adjustment must be carried out on vehicles with ABS!

6.5 Testing leak-tightness

Special tools and workshop equipment required

♦ Brake system tester e. g. -V.A.G 1310 A-
♦ Adapter M 10 e.g. -V.A.G 1310/6-

Test requirements:

• Function and tightness of the brake system (brake lines, brake hoses, brake calipers, hydraulic unit) O.K.

– Unscrew and remove the bleeder screw on one of the front brake calipers.
– Connect the brake system tester e.g. - V.A.G 1310 A- to the brake caliper and bleed.
– Push down brake pedal until the pressure gauge indicates 5 MPa (50 bar). Throughout the test which lasts 45 s the pressure loss must not exceed 0.4 MPa (4 bar). If the loss of pressure is higher, replace the master brake cylinder.
– Separate brake system tester e.g. - V.A.G 1310 A- .
– Screw the bleeder screw into the caliper and bleed the brake caliper.