Workshop Manual

Kodiaq 2017 ➤

Brake systems

Edition 10.2016

List of Workshop Manual Repair Groups

Repair Group

00 - Technical data
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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

(SRL000977; Edition 10.2016)

⇒ “1.1 Safety precautions when working on vehicles with a 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 a 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 an activated start-stop system (indicated by a message in the dash panel insert), the engine can start automatically if necessary.
- It is necessary to ensure that the start-stop system is deactivated when carrying out work on the vehicle (switch ignition off and if required switch ignition on again).

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

If test and measuring devices are required during test drives observe the following:

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 creates a risk of deflection.
- 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 Identification

⇒ “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 Brake master cylinder and brake servo”, page 3

⇒ “3.1.2 Front brakes”, page 3

⇒ “3.1.3 Rear brake”, page 4

⇒ “3.1.4 Brake fluid”, page 4

3.1.1 Brake master cylinder and brake servo

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

Master brake cylinder - ∅	mm	23,81; 25,4
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

Front brake C 60

Front brake caliper (type denomination)		C 60 (16")
PR number		**1LW**
Front brake caliper, piston - ∅	mm	60
Front brake disc – ∅	mm	314
Brake disc, thickness	mm	30
Brake disc, minimum thickness	mm	27

Front brake caliper (type denomination)		C 60 (16")
PR number		**1LW**
Pad thickness without supporting plate	mm	14
Minimum pad thickness without supporting plate	mm	2

Front brake C 60

Front brake caliper (type denomination)		C 60 (17")
PR number		**1LA**
Front brake caliper, piston - ∅	mm	60
Front brake disc – ∅	mm	340
Brake disc, thickness	mm	30
Brake disc, minimum thickness	mm	27
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 brake FNcM42

Rear brake caliper (type denomination)		FNc-M42 (16”)
PR number		**1KU**
Rear brake caliper, piston - ∅	mm	42
Rear brake disc – ∅	mm	300
Brake disc, thickness	mm	12
Brake disc, minimum thickness	mm	10
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
Top-up	⇒ Maintenance ; Booklet Kodiaq

4 Brake test

4.1 General points

- The drive is provided by the roller dynamometer.
- 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 maximum 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 maximum 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.

45 – Anti-lock brake system

1 General points

⇒ "1.1 Repair instructions for repair work on ABS", page 7

1.1 Repair instructions for repair work on ABS

The ABS brake system is divided diagonally. The servo-assistance is effected pneumatically by the vacuum brake servo unit.

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.

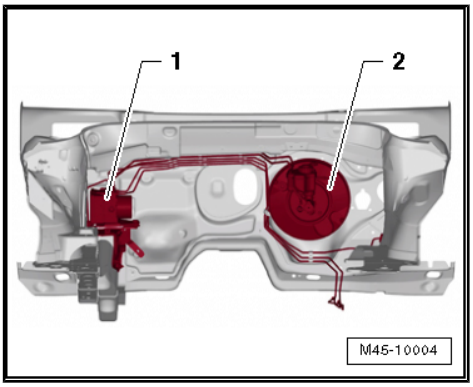
Note

- *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- 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 27 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*
- *Problems related to the ABS do not affect the braking system or the servo boost. The conventional brake system remains functional even without ABS. A change in braking behaviour is to be reckoned with. 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-

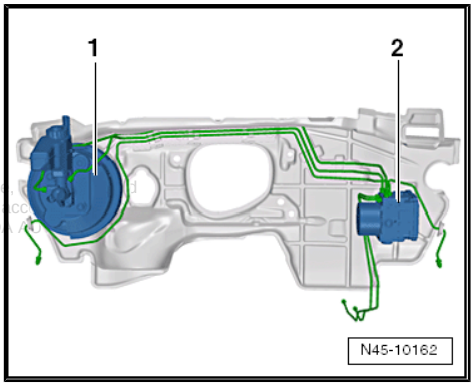
2 - Brake servo

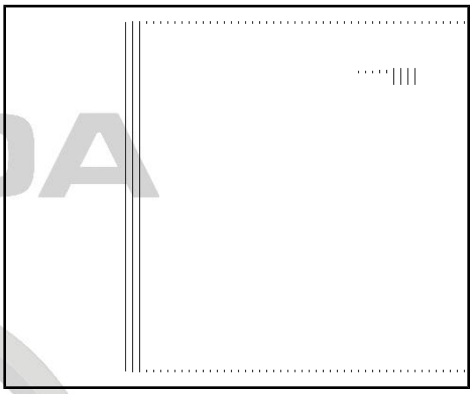


Arrangement of the ABS in right-hand drive vehicles

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 27 . 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.
- ♦ Remove spare parts from their wrapping immediately before fitting.
- ♦ 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 that requires 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 105 .
- During the final road test, ensure that a controlled brake test is performed at least once (pulsations must be felt at the brake pedal).

2 Installation location overview

⇒ “2.1 ABS/ESP installation location overview”, page 10

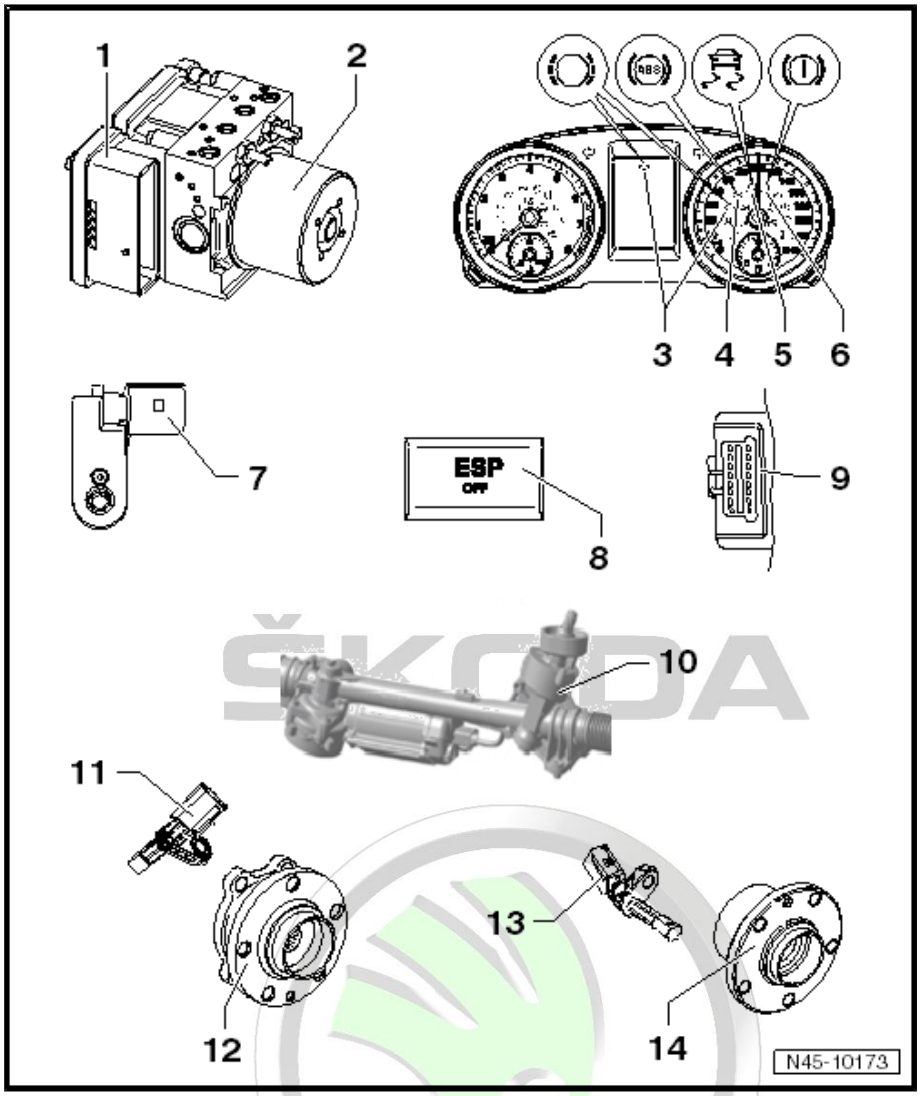
2.1 ABS/ESP installation location overview

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 27 .*
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

1 - ABS control unit - J104-

- ❑ Fitting location: on the hydraulic unit for ABS - N55- in engine compartment
- ❑ do not disconnect the plug connection before the self-diagnosis is complete; switch off the ignition before disconnecting the plug connection



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

- Sensor unit for ESP - G419-
- Control unit for electronic handbrake - J540-
- Lateral acceleration sender - G200-
- Yaw rate sender - G202-
- Longitudinal acceleration sender - G251- (depending on equipment fitted)
- the components cannot be changed individually
  - ❑ checking ⇒ Vehicle diagnostic tester.
  - ❑ Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ “3.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16
  - ❑ Disconnecting the control unit from the hydraulic unit ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 27
  - ❑ Fitting the control unit to the hydraulic unit ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 28

2 - ABS hydraulic unit - N55-

- ❑ Fitting location: in the engine compartment on the front passenger's side

The ABS hydraulic unit - N55- consists of these components:

- ♦ ABS hydraulic pump - V64-
- ♦ Brake pressure sender 1 - G201-
- ♦ Valve block (contains inlet and outlet valves).
  - ❑ Do not separate the ABS hydraulic pump - V64- from the valve block.
  - ❑ removing and installing
    ⇒ “3.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16

3 - Brake pad warning light - K32-

- ❑ Fitting location: in the dash panel insert

4 - ABS warning lamp - K47-

- ❑ Fitting location: in the dash panel insert

5 - ESP and TCS warning lamp - K155-

- ❑ Fitting location: in the dash panel insert

6 - Brake system warning lamp - K118-

- ❑ Fitting location: in the dash panel insert

7 - Brake light switch - F-

- ❑ Fitting location: at brake master cylinder
- ❑ removing and installing ⇒ “3.2 Removing and installing brake light switch”, page 80

8 - TCS and ESP button - E256-

- ❑ 2 variants, therefore 2 installation locations:

- ♦ as button on the centre console
- ♦ via function buttons on the Infotainment system menu
  - ❑ The button is part of the switch unit and cannot be replaced separately ⇒ Electrical system; Rep. gr. 96 ; Controls

9 - Diagnostic connection

- ❑ Fitting location: Driver's footwell cover

10 - Steering angle sender - G85-

- ❑ Fitting location: in the steering gear
- ❑ the steering angle sender - G85- cannot be changed separately

11 - Front right and left wheel speed sensors - G45- / -G47-

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

12 - Wheel hub with wheel bearing

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

13 - Rear right and left wheel speed sensors - G44- / -G46-

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

14 - Wheel hub with wheel bearing

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

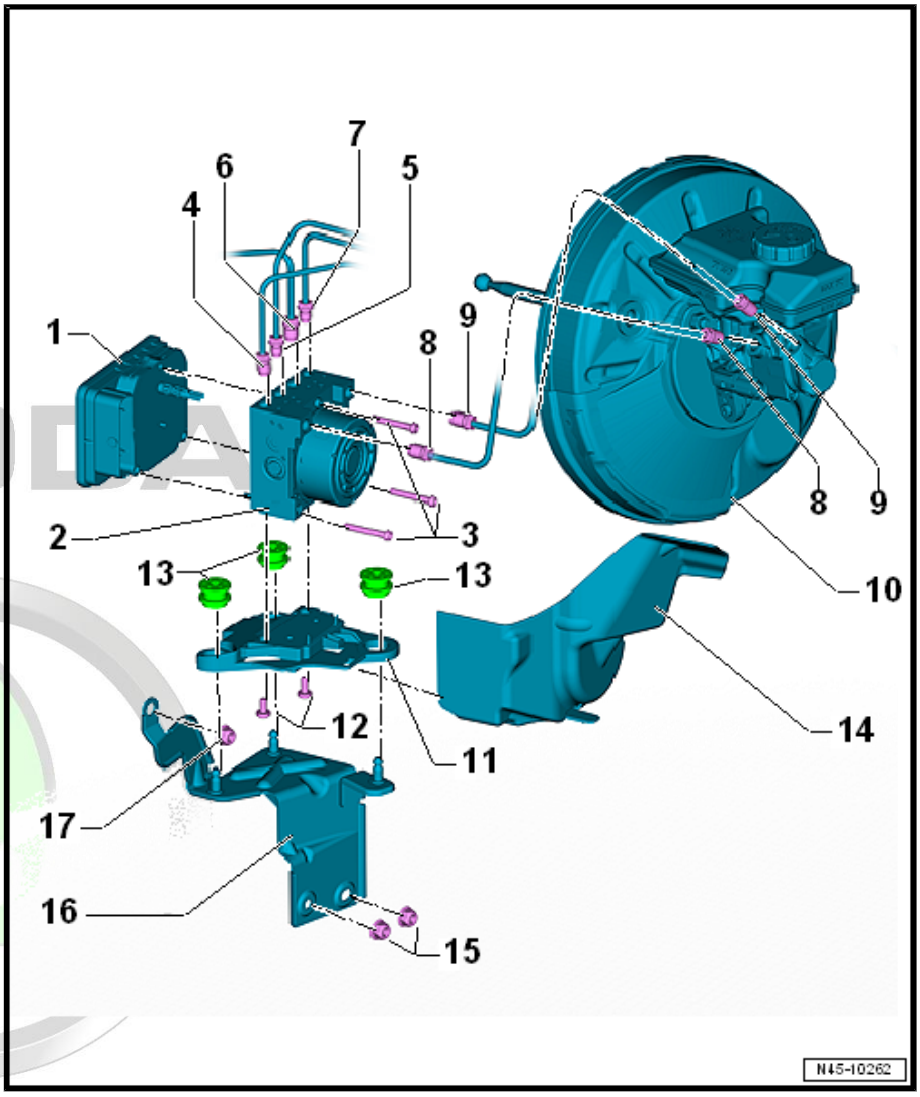
3 Control unit and hydraulic unit

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 27 .*
- *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 the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16
- ❑ Disconnecting the control unit from the hydraulic unit ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 27
- ❑ Fitting the control unit to the hydraulic unit ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 28

2 - ABS hydraulic unit - N55-

- ❑ removing and installing ⇒ “3.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16

3 - Screw

- ❑ tighten Torx screw in 2 stages alternately on after the other
- ❑ 1. Stage: Preliminary tightening torque: 1 Nm to 1.5 Nm (to position the seal)
- ❑ 2. Stage: 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 82

11 - Uchwyt

12 - Screw

- ❑ 8 Nm

13 - Rubber shock absorber bushing

14 - Heat shield

Assignment ⇒ Electronic Catalogue of Original Parts

15 - Nut

- ❑ 20 Nm

16 - Uchwyt

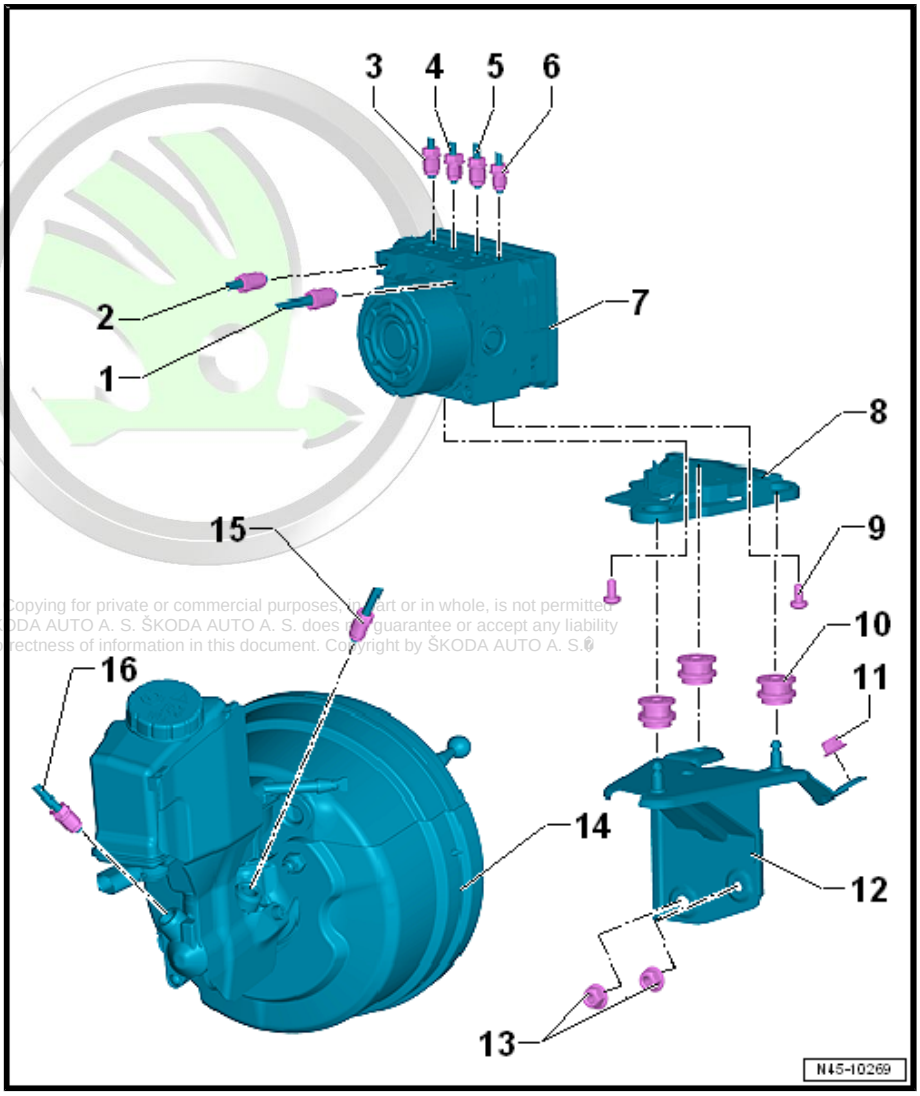
17 - Nut

- ❑ 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 27 .*
- *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 the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16
- ❑ Disconnecting the control unit from the hydraulic unit
  ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 27
- ❑ Fitting the control unit to the hydraulic unit
  ⇒ “3.4 Fitting the control unit to the hydraulic unit”, page 28
- ❑ 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 12

8 - Uchwyt

9 - Screw

- ❑ 8 Nm

10 - Rubber shock absorber bushing

11 - Nut

- ❑ 20 Nm

12 - Uchwyt

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 the 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 16

⇒ “3.2.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 , vehicles with left-hand drive and diesel engine”, page 20

⇒ “3.2.3 Removing and installing ABS control unit J104 / ABS hydraulic unit N55 , right-hand drive vehicles”, page 24

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

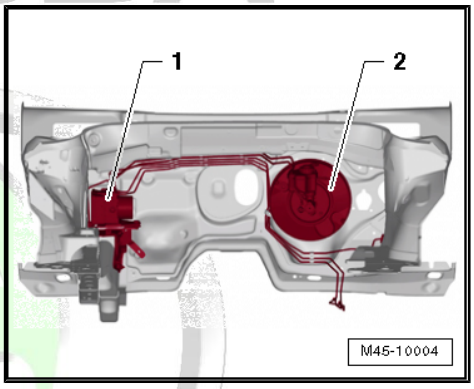
Special tools and workshop equipment required

- ♦ 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

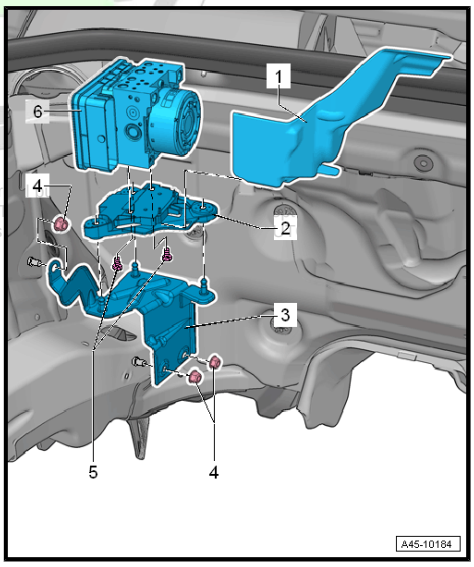
Do not bend the brake lines in the area of the hydraulic unit.

– Read out and note the existing control unit code.

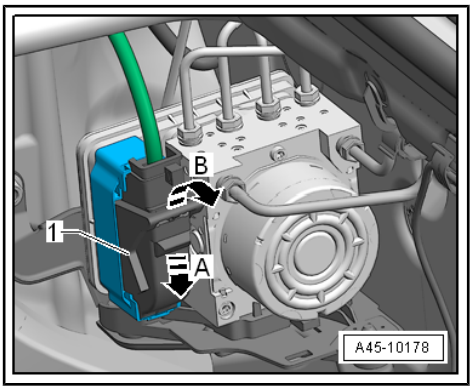
– Disconnect battery earth strap ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– Remove engine trim panel where present ⇒ Rep. gr. 10 ; Engine trim panel; removing and installing engine trim panel .

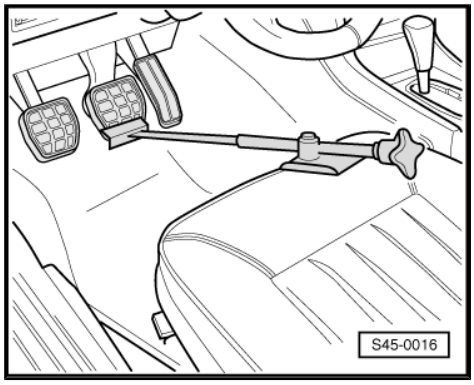
– Remove protective cover -1-, if present.



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

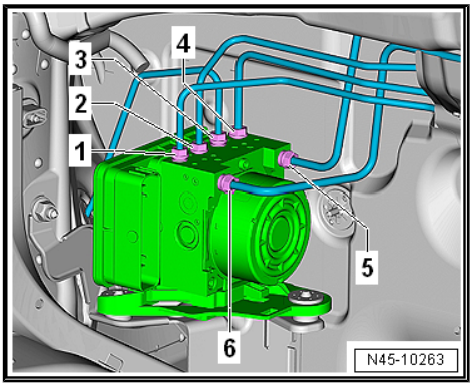


– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Close front left and rear 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 27 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Install

Installation is carried out in the reverse order. When installing, observe the following:

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- .*

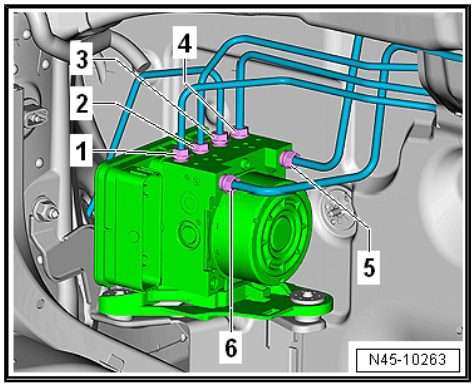
– Observe the tightening sequence of the brake lines
⇒ Fig. ""Tightening sequence of the brake lines"", page 20 .
– If necessary, attach the electric cable of the lambda probe upstream of catalytic converter again.
– Remove brake pedal load e.g. -V.A.G 1869/2- .
– Bleed brake system
⇒ "6.3 Bleeding hydraulic system following standard procedure", page 105 .
– 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

- ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 12



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

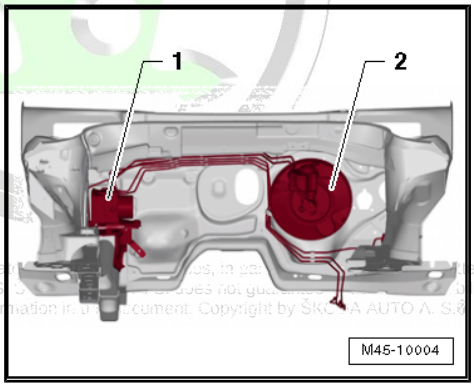
Special tools and workshop equipment required

- 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.

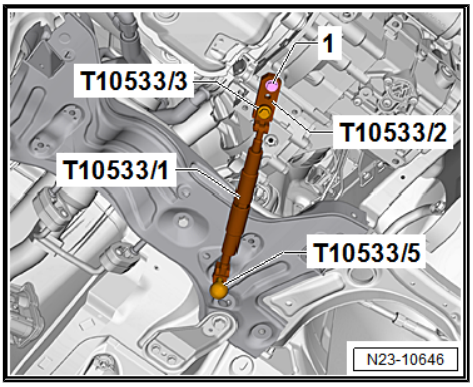
– Read out and note the existing control unit code.
– Disconnect battery earth strap ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
– Remove the sound dampening system ⇒ General body repairs, exterior ; Rep. gr. 66 ; Noise insulation; Summary of components - noise insulation .
– If present, remove the axle cover.
– Remove the coupling rod ⇒ Rep. gr. 10 ; Powertrain mounting; remove and install coupling rod .
– Remove the exhaust front pipe ⇒ Rep. gr. 26 ; Exhaust pipe/silencer .

For vehicles with four-wheel drive

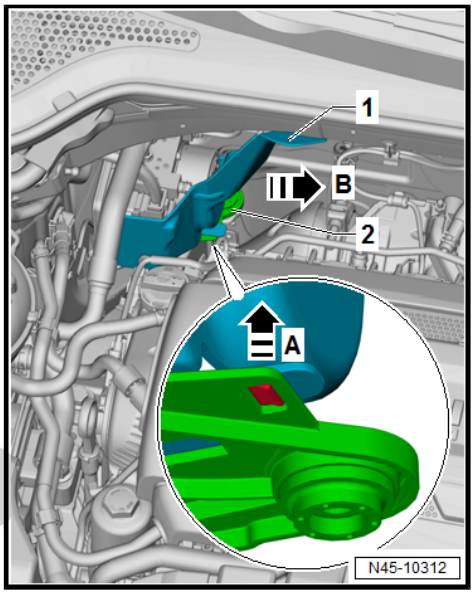
– Remove propshaft from front gearbox and place to one side ⇒ Rep. gr. 39 ; Propshaft; Removing and installing propshaft .

Continued for all vehicles

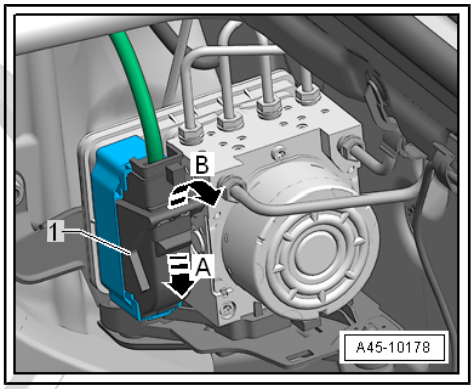
– Fit engine support bracket - T10533- to gearbox and assembly carrier as per figure (N23-10646).
– Press the engine with gearbox forwards using the support bracket - T10533- .



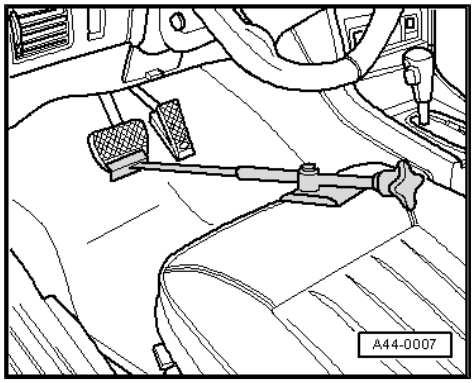
– Remove heat shield -1-, if present.
– Unclip cable guide.



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



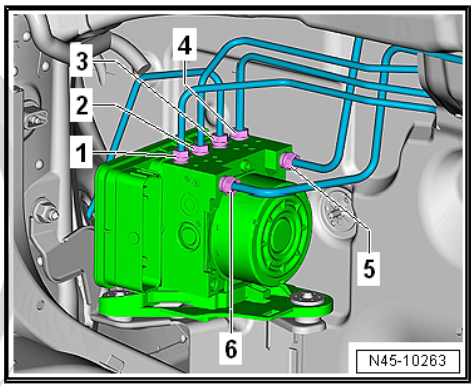
– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Close front left and rear 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- .



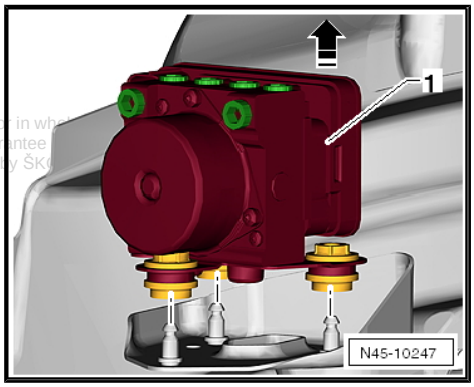
NOTICE

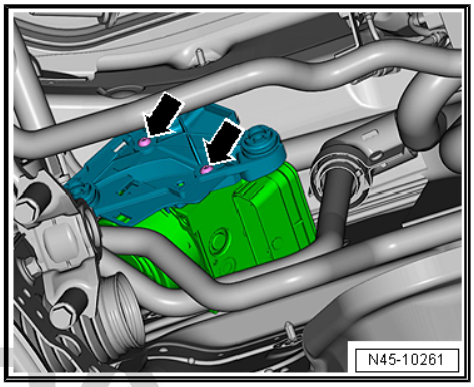
Make sure that no brake fluid gets onto the contacts of the ABS control unit - J104- .

– Detach the top section of the heat-protection matting on the front wall and shift to side.
– Clip the brake lines off the two mounting brackets.
– 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.





– Remove mounting bracket -arrows- in the vehicle from the ABS hydraulic unit - N55- .
– Lay the ABS hydraulic unit - N55- with the ABS control unit - J104- facing downwards in the engine compartment.
– Raise vehicle.
– 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 27 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Install

Installation is carried out in the reverse order. When installing, observe the following:

Note

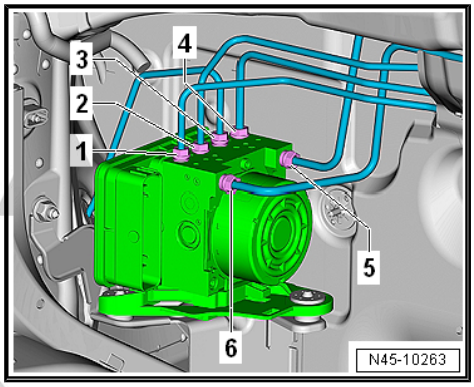
- *Only remove plugs from the new ABS hydraulic unit - N55- if the relevant brake line is installed.*
- *If the plugs were already removed from the ABS hydraulic unit - N55- , then brake fluid may escape and adequate filling and bleeding of the unit can no longer be guaranteed.*
- *Make sure that the 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 24 .
– 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 sequence of the brake lines

Tightening torques



- ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 12
- ⇒ “1.1 Assembly overview - front brake caliper”, page 70
- ⇒ “2.1 Assembly overview - rear brake calliper”, page 73
- 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
- Pre-exhaust pipe ⇒ Rep. gr. 26 ; Exhaust pipes/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

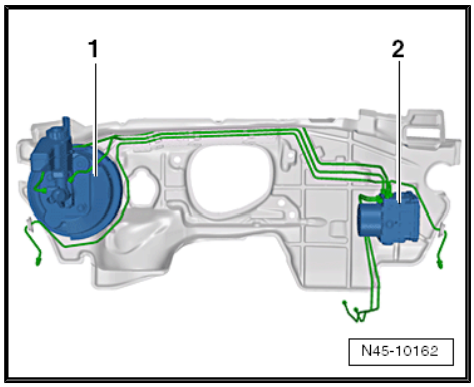
Special tools and workshop equipment required

- 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.

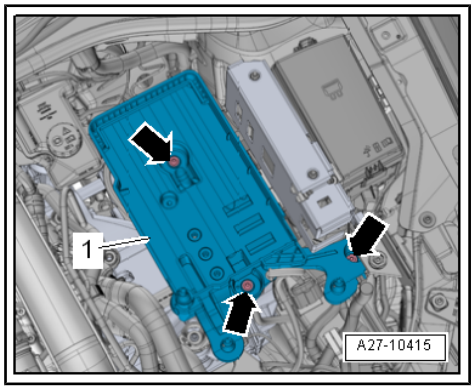


Note

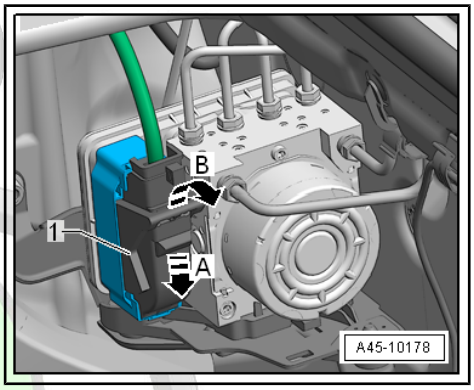
Do not bend the brake lines in the area of the hydraulic unit.

– Read out and note the existing control unit code.

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



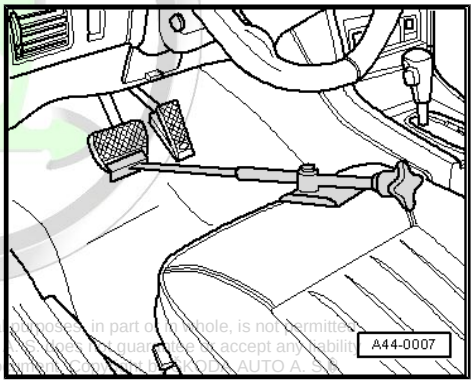
– Unlock the fuse plug -1- in direction of arrow -A- and pull it off the ABS control unit - J104- in direction of arrow -B-.



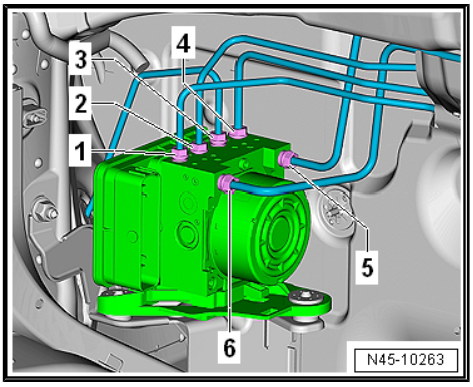
Note

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

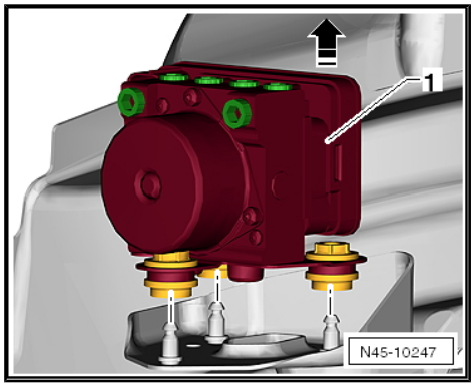
– Position brake pedal load , e.g. -V.A.G 1869/2- .
– Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Close front left and rear 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- 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 27 .
- *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

Install

Installation is carried out in the reverse order. When installing, observe the following:

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- .*

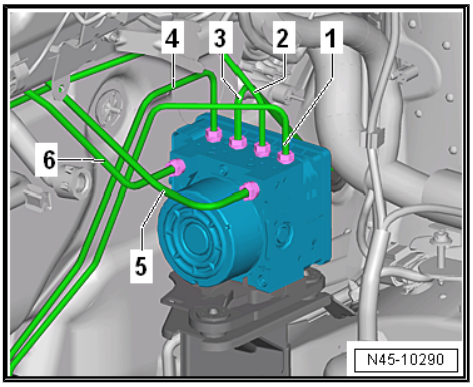
– Observe the tightening sequence of the brake lines
⇒ Fig. ““Tightening sequence of the brake lines”“ , page 27 .
– Remove brake pedal load e.g. -V.A.G 1869/2- .
– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .
– Code the control unit - J104- ⇒ Vehicle 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 15



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

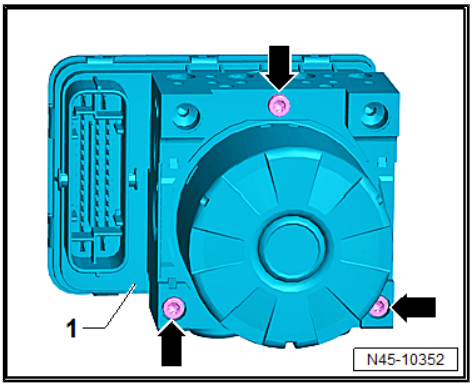
- *The hydraulic pump - V64- and the ABS hydraulic unit - N55- must not be separated from each other.*
- *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*

- *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.*

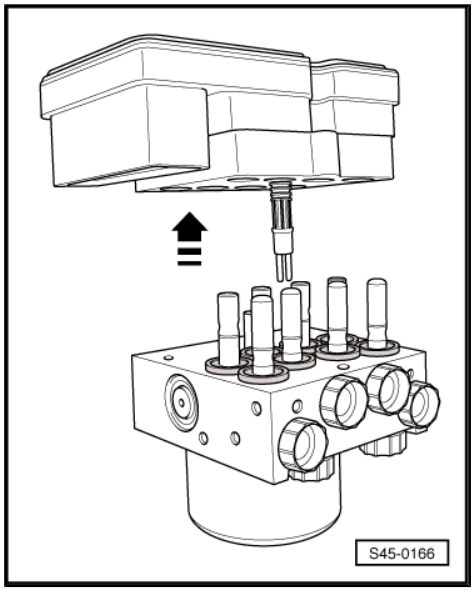
– Remove the ABS hydraulic unit - N55- with the ABS control unit - J104-
⇒ “3.2 Removing and installing the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16 .

– 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

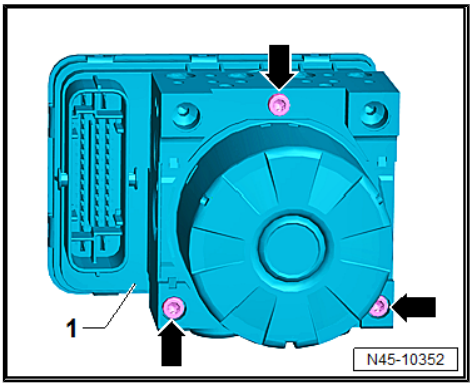
Note

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 12 .

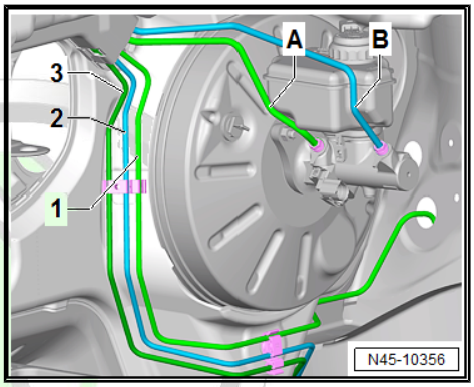
3.5 Connecting brake lines to hydraulic unit

⇒ “3.5.1 Connect the brake lines to the hydraulic unit, left-hand drive vehicle”, page 29

⇒ “3.5.2 Connect the brake lines to the hydraulic unit, right-hand drive vehicle”, page 30

3.5.1 Connect the brake lines to the hydraulic unit, left-hand drive vehicle

At brake master cylinder



A - Primary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

B - Secondary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

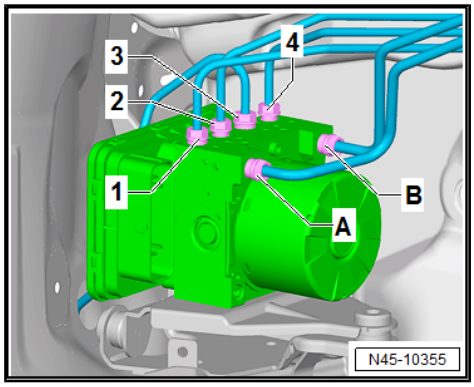
- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

1 - from the ABS hydraulic unit - N55- to the front left brake caliper

2 - from the ABS hydraulic unit - N55- to the rear right brake caliper

3 - from the ABS hydraulic unit - N55- to the rear left brake caliper

On the ABS hydraulic unit - N55-



A - Primary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

B - Secondary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

1 - from the ABS hydraulic unit - N55- to the rear right brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with short thread M 12 x 1

2 - from the ABS hydraulic unit - N55- to the front left brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with thread M 10 x 1

3 - from the ABS hydraulic unit - N55- to the front right brake caliper

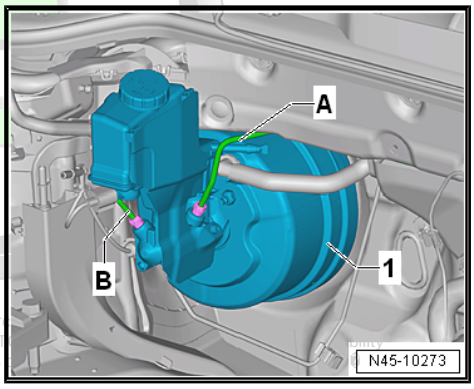
- Distinguishing feature: ∅ 5.25 mm and pipe screw with short thread M 12 x 1

4 - from the ABS hydraulic unit - N55- to the rear left brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with thread M 10 x 1

3.5.2 Connect the brake lines to the hydraulic unit, right-hand drive vehicle

At brake master cylinder



A - Primary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

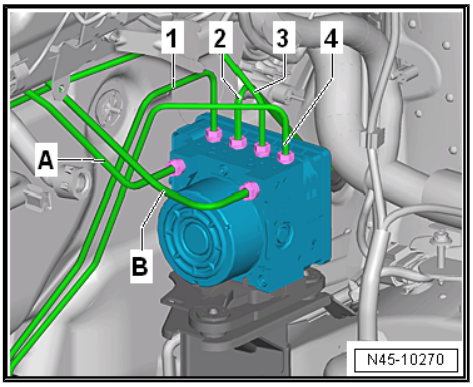
- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

B - Secondary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

1 - Brake servo with brake master cylinder

On the ABS hydraulic unit - N55-



A - Primary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

B - Secondary piston circuit of brake master cylinder to ABS hydraulic unit - N55-

- Distinguishing feature: ∅ 6 mm and pipe screw with thread M 12 x 1

1 - from the ABS hydraulic unit - N55- to the rear right brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with short thread M 12 x 1

2 - from the ABS hydraulic unit - N55- to the front left brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with thread M 10 x 1

3 - from the ABS hydraulic unit - N55- to the front right brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with short thread M 12 x 1

4 - from the ABS hydraulic unit - N55- to the rear left brake caliper

- Distinguishing feature: ∅ 5.25 mm and pipe screw with thread M 10 x 1

4 Sensors

4.1 Assembly overview - speed sensor on front axle

1 - 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

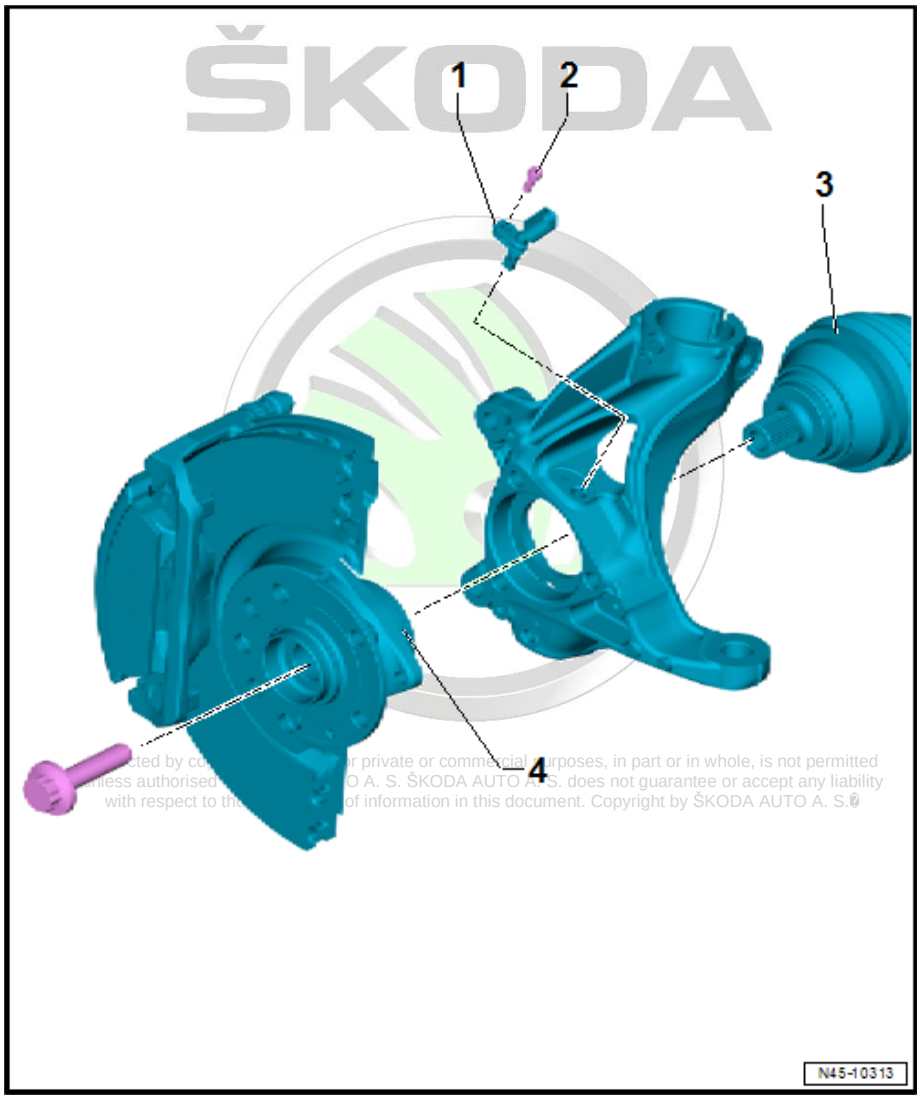
2 - Screw

- ❑ 8 Nm

3 - Drive shaft

4 - Wheel hub with wheel bearing

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



4.2 Assembly overview - speed sensor on rear axle

⇒ “4.2.1 Summary of components - speed sensors on rear axle, vehicles with front-wheel drive”, page 33

⇒ “4.2.2 Summary of components - speed sensors on rear axle, vehicles with four-wheel drive”, page 34

4.2.1 Summary of components - speed sensors on rear axle, vehicles with front-wheel drive

1 - Rear speed sensor - G44- / -G46-

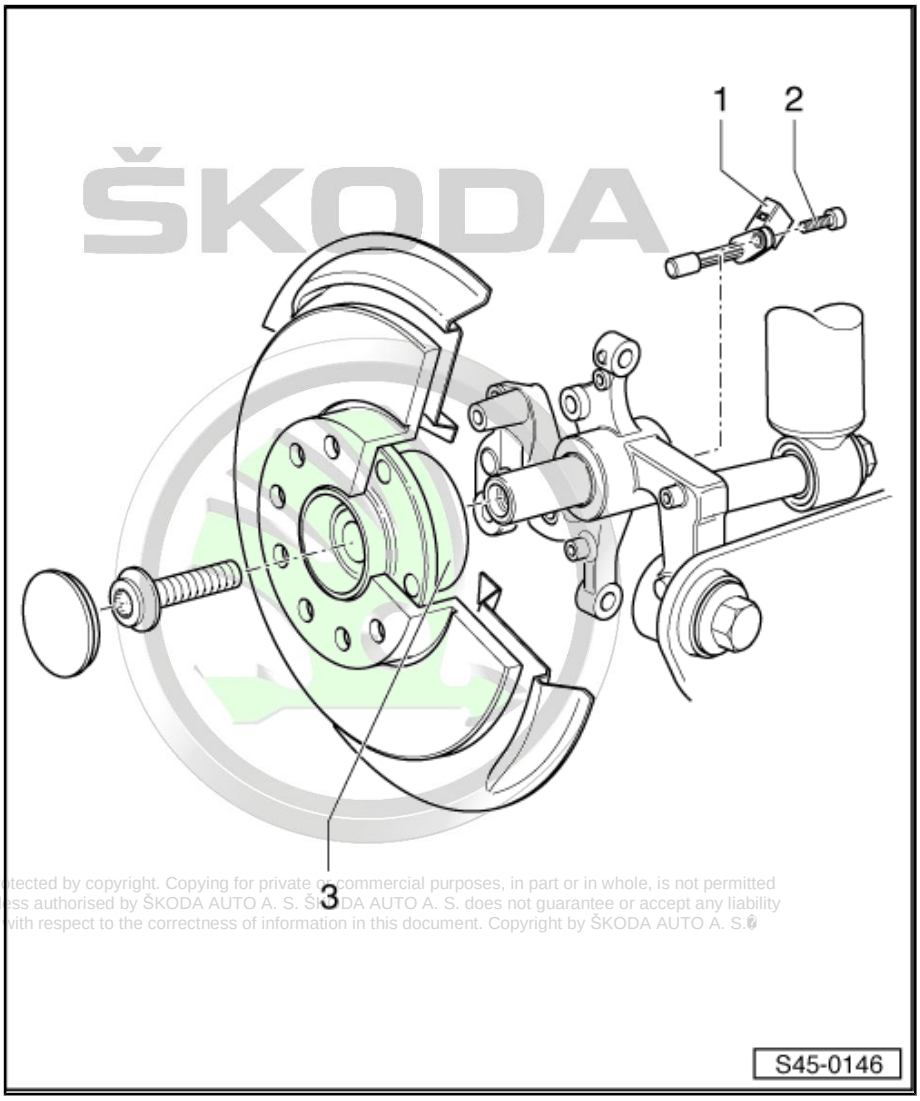
- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .
- ❑ removing and installing ⇒ “4.7 Removing and installing the rear speed sensors G44 / G46 ”, page 35

2 - Screw

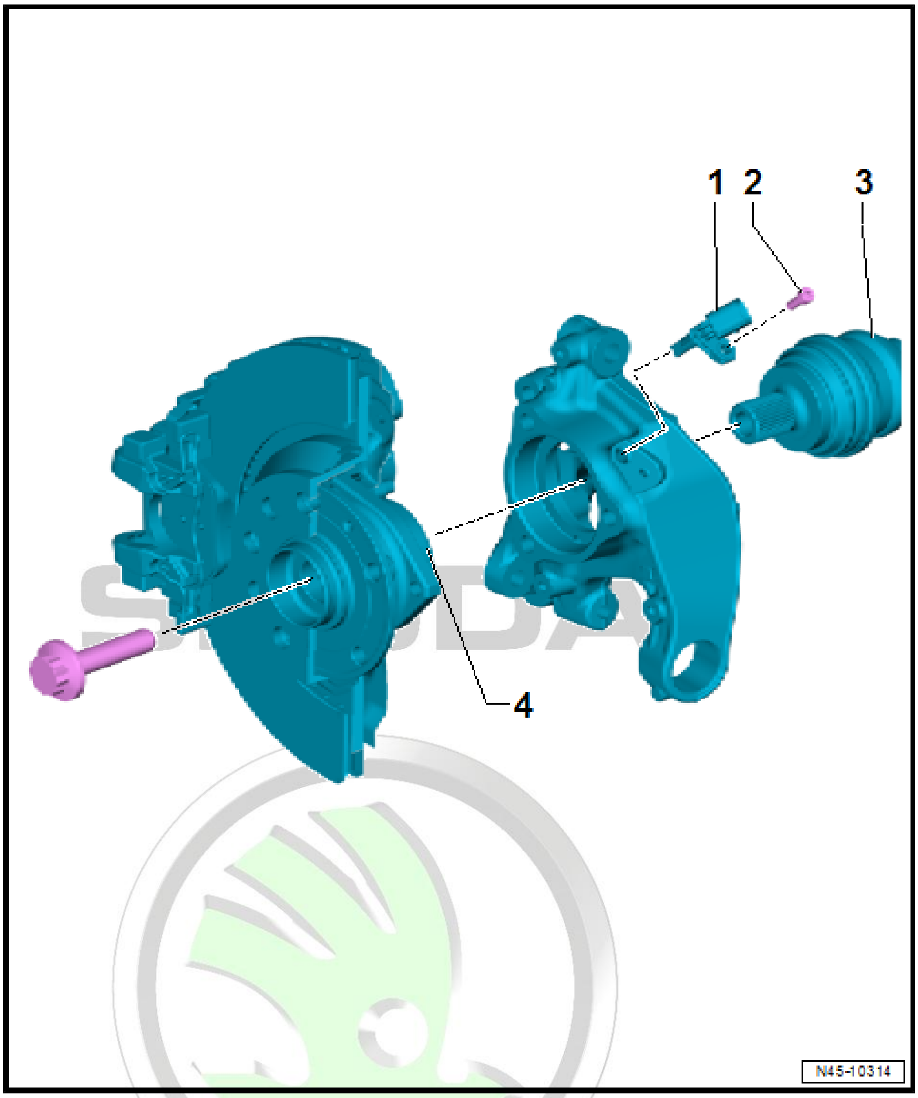
- ❑ 8 Nm

3 - Wheel hub with wheel bearing

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



4.2.2 Summary of components - speed sensors on rear axle, vehicles with four-wheel drive



1 - 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

2 - Screw

- ❑ 8 Nm

3 - Drive shaft

4 - Wheel hub with wheel bearing

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

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 the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16 .

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 sensor unit for ESP - 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 27 .

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

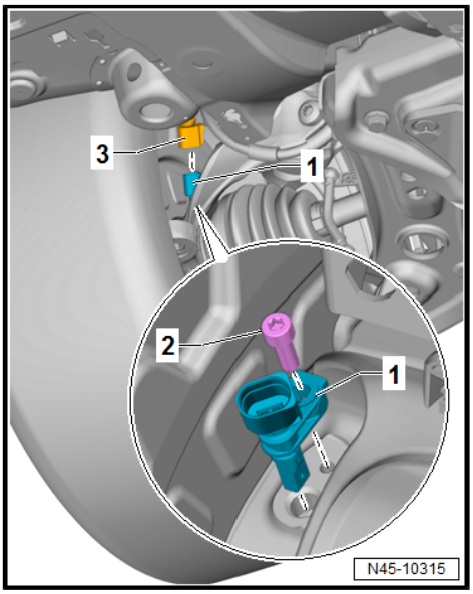
Removing

– Raise vehicle.

– Disconnect plug -3- on the front wheel speed sensor - G45- / -G47- .

– Release screw -2-.

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



Install

– Installation is carried out in the reverse order.

Tightening torques

◆ ⇒ “4.1 Assembly overview - speed sensor on front axle”, page 32

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

⇒ “4.7.1 Removing and installing rear speed sensors G44 / G46 , vehicles with front-wheel drive”, page 35

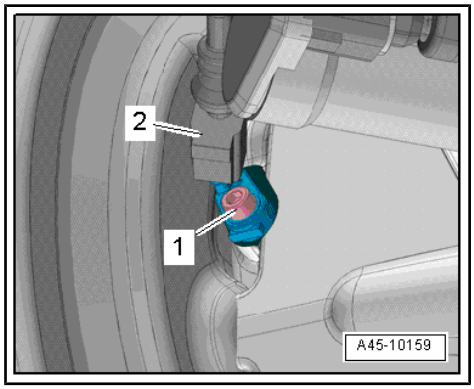
⇒ “4.7.2 Removing and installing rear speed sensors G44 / G46 , vehicles with four-wheel drive”, page 36

4.7.1 Removing and installing rear speed sensors -G44- / -G46- , vehicles with front-wheel drive

Removing

– Raise vehicle.

– Disconnect plug -1- on the rear speed sensor - G44- / -G46- .
– Release screw -2-.
– Pull the rear speed sensor - G44- / -G46- out of the axle stud and brake carrier.



Install

– Installation is carried out in the reverse order.

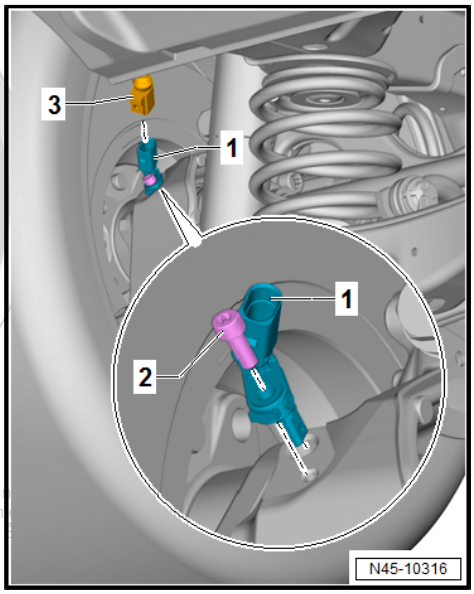
Tightening torques

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

4.7.2 Removing and installing rear speed sensors -G44- / -G46- , vehicles with four-wheel drive

Removing

– Raise vehicle.
– Disconnect plug -3- on the rear speed sensor - G44- / -G46- .
– Release screw -2-.
– Pull rear speed sensor - G44- / -G46- -1- out of the wheel bearing housing.



Install

– Installation is carried out in the reverse order.

Tightening torques

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

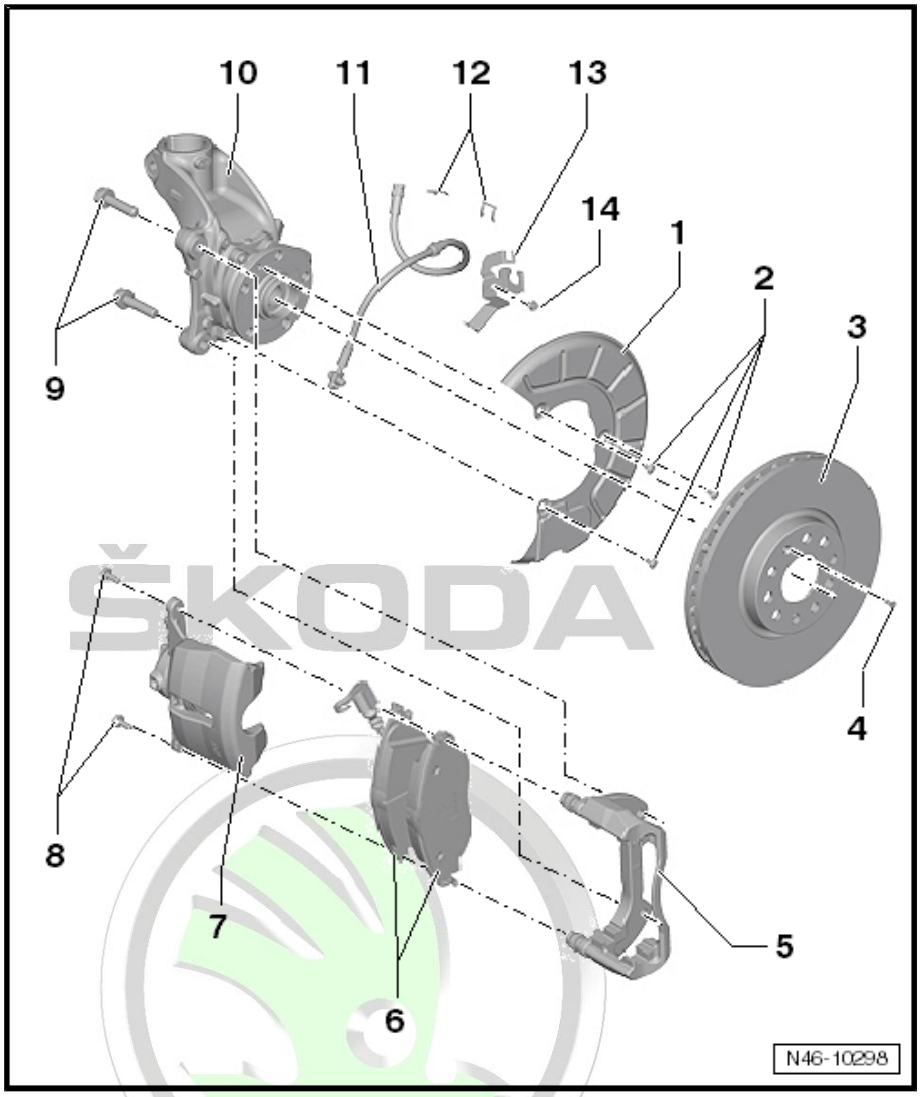
46 – Brakes - mechanism

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 test”, 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 - Cover plate

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

2 - Screw

- ❑ 12 Nm

3 - Brake disc

- ❑ internally ventilated
- ❑ 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 backplate

- ❑ 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/linings”, 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 42
- ❑ Summary of components ⇒ “1.1 Assembly overview - front brake caliper”, page 70
- ❑ 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 - Uchwyt

14 - Screw

❑ 8 Nm

1.2 Removing and installing brake pads/linings

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

⇒ "1.2.2 Removing and installing brake pads/linings", 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 (oxydation).

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/linings

Special tools and workshop equipment required

♦ Piston resetting appliance - T10145-

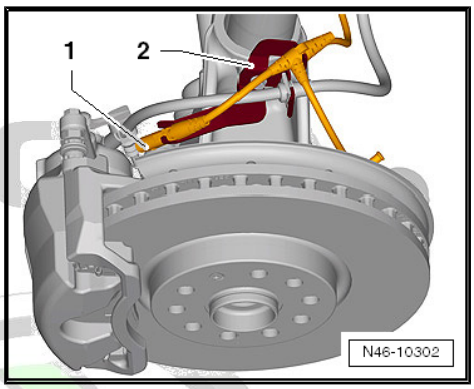
Note

- *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, 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.*

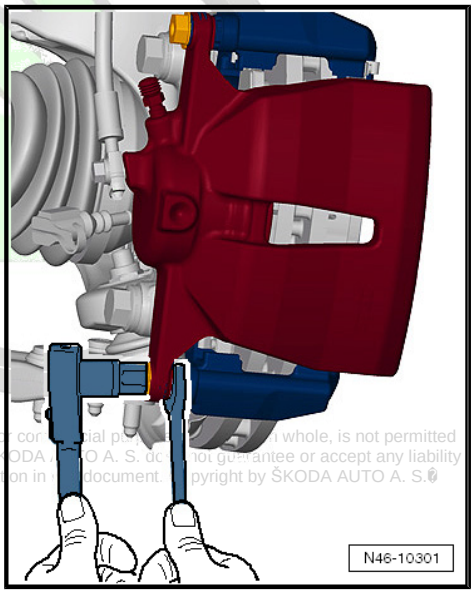
Removing

– Remove wheels.

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

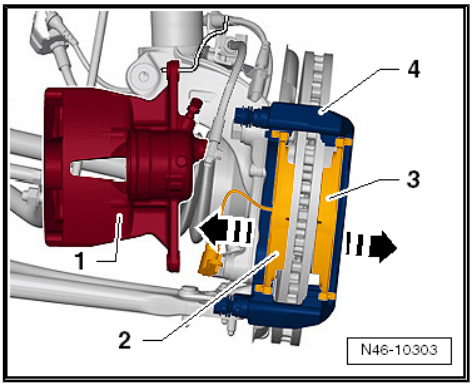


– Remove both fixing screws while counterholding the guide bolts.



– 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.

Install

Note

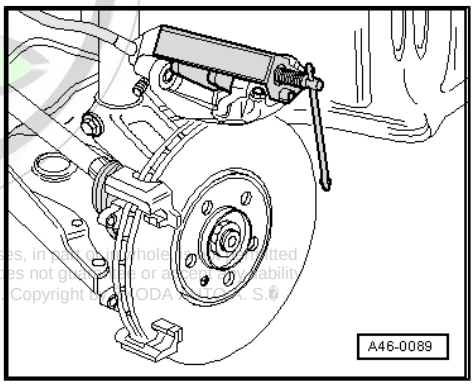
- *Observe the instructions for changing the pad ⇒ "1.2.1 Changing the brake pads of the front brake - Mounting instructions", page 39 .*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle 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- .

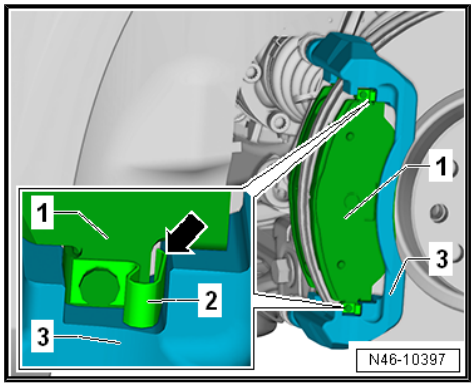
– Lightly grease guiding surface for brake pads on brake carrier with grease from the repair kit.



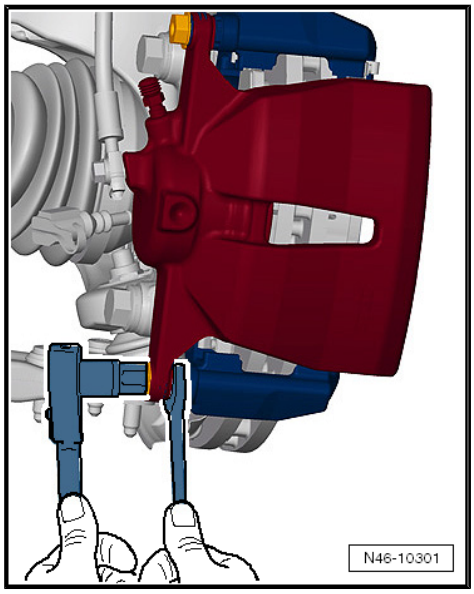
Note

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

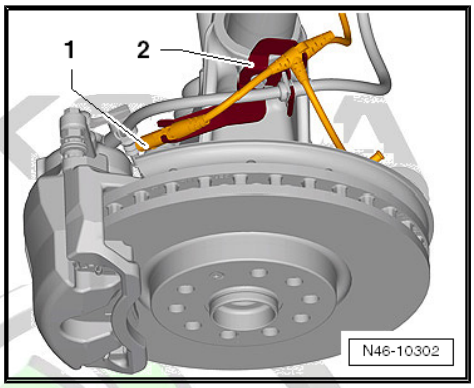
– Insert brake pads -1- with retaining springs -2- into the recesses in the brake carrier -3-.
– Carefully position the brake caliper on the brake carrier.



– 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, 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.

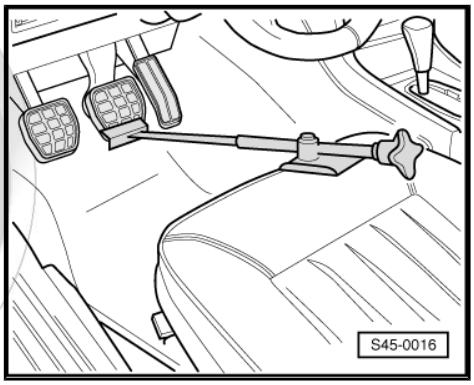
– Position brake pedal load , e.g. -V.A.G 1869/2- .

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

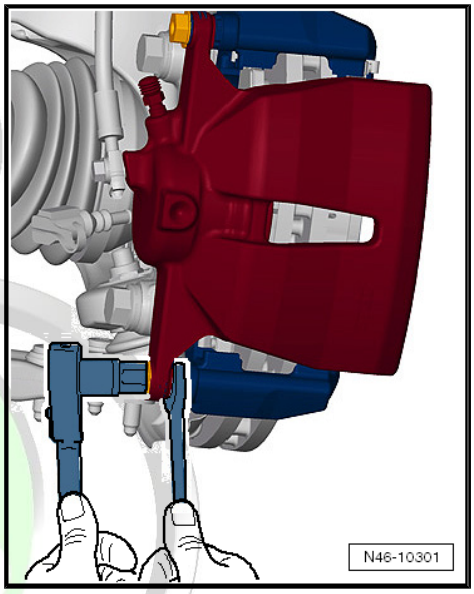
– Tighten the drain plug.

– 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.

Install

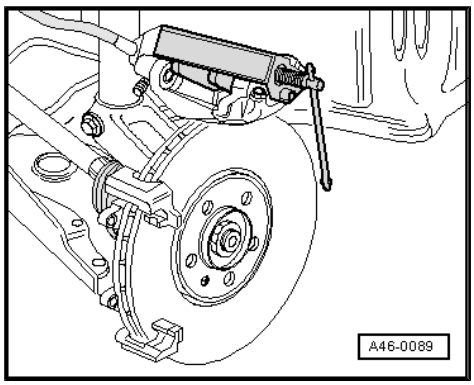
Note

- *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.

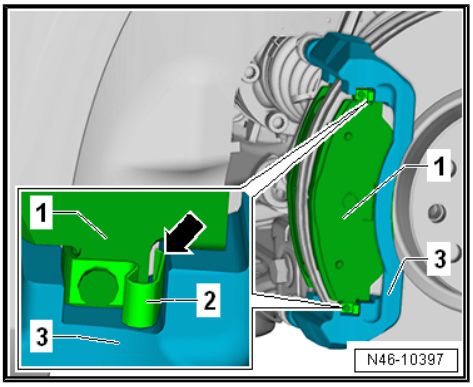


Note

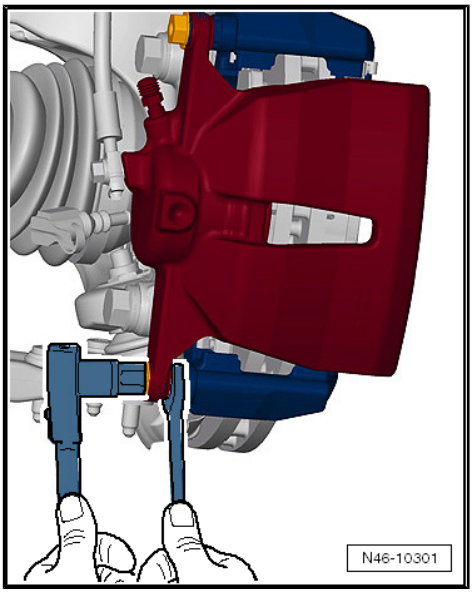
Do not interchange the inside and outside brake pads. Pay attention to identification.

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

– 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.



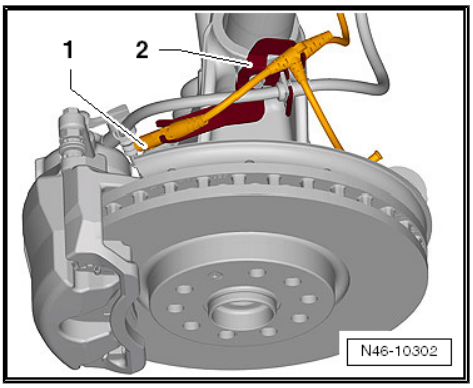
– Mount plug connection -1- for brake pad wear indicator.

– 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 105 .

– 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

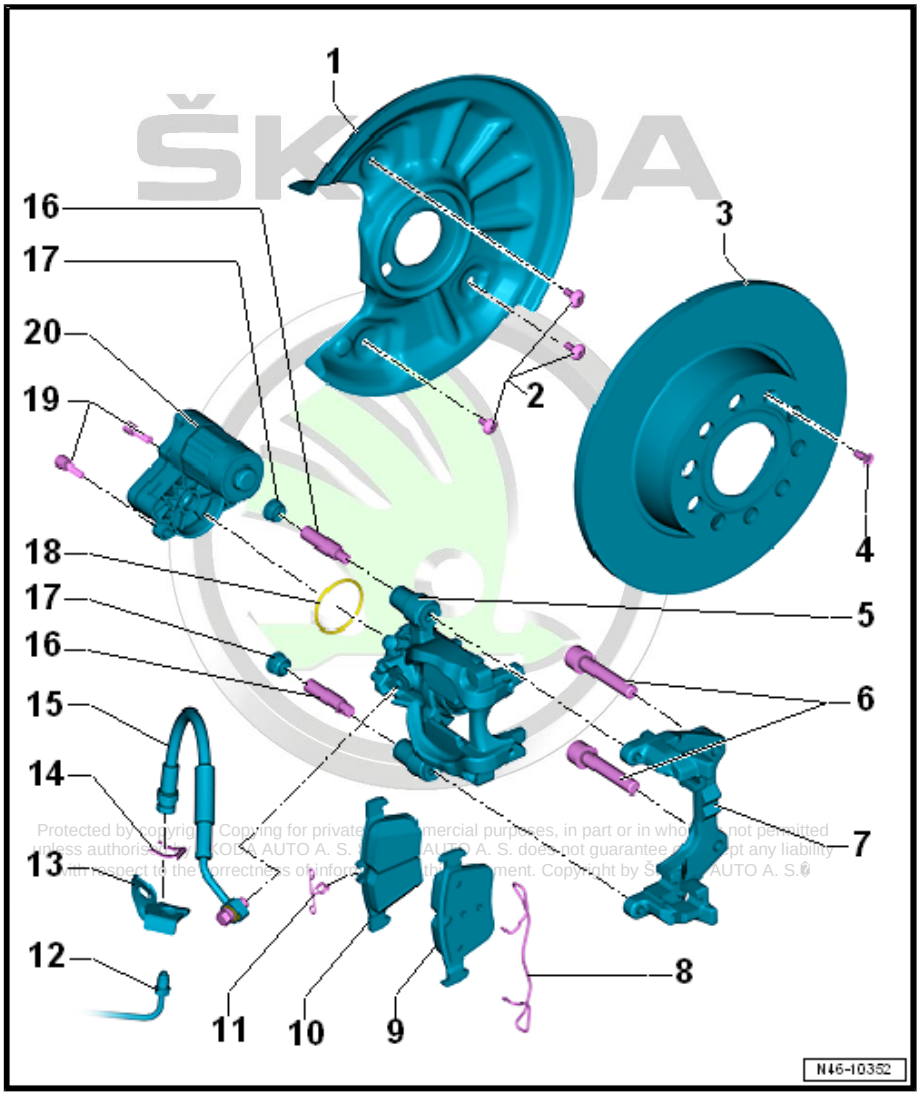
- ⇒ “1.1 Assembly overview - front brakes”, page 37
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

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 48*
- *Brake inspection ⇒ “4 Brake test”, 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 - Cover plate

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts

2 - Screw

- ❑ 12 Nm

3 - Brake disc

- ❑ internally ventilated
- ❑ 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 52
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 48

6 - Screw

- ❑ replace after removal
- ❑ 90 Nm + 90°

7 - Brake backplate

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/linings”, page 48
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 48

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/linings”, page 48
- ❑ Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 48

11 - Spring

- ❑ Only on inner brake pad
- ❑ Note installation position

12 - Brake line

- ❑ 14 Nm

13 - Brake line holder

14 - Retaining clip

15 - Brake hose

- ❑ with banjo union and hollow screw
- ❑ to brake calliper: 35 Nm
- ❑ to 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 58

2.2 Removing and installing brake pads/linings

⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 48

⇒ “2.2.2 Removing and installing brake pads/linings”, page 49

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 (oxydation).

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/linings

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 resetting appliance - 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, 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.

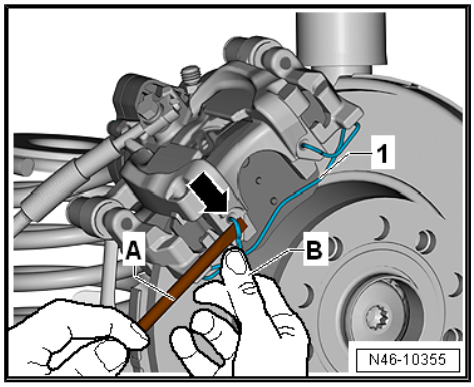
– Remove wheels.

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

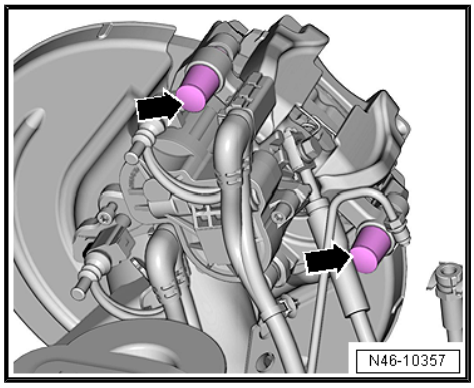
CAUTION

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

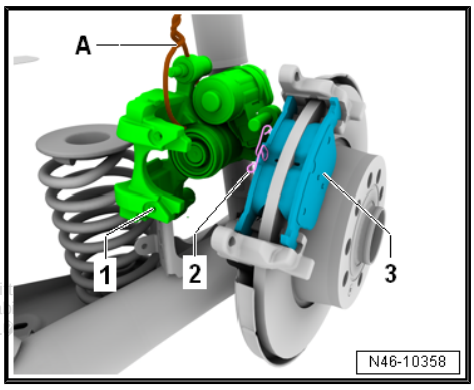
– Lever the retaining spring -1- for the brake pads out of the brake caliper -arrow- with a screwdriver -A-.



– Remove caps -arrows-.
– Remove both guide bolts from the brake caliper.



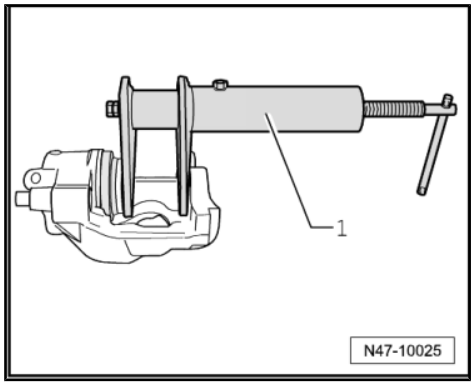
– Remove the brake caliper -1- and secure with wire -A- in such a way that the weight of the brake caliper does not load or damage the brake hose.



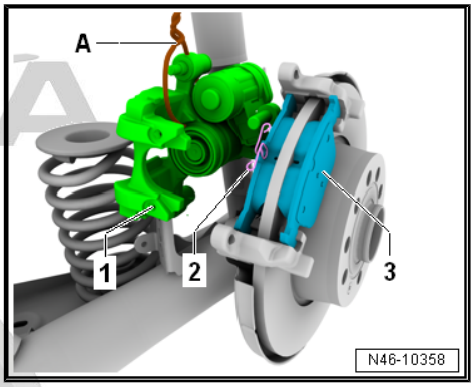
Note

- *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.

Install

Note

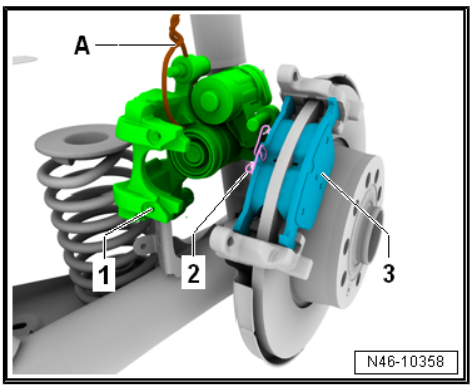
- *Observe the instructions for changing the pad ⇒ "2.2.1 Changing the brake pads of the rear brake - Mounting instructions", page 48 .*
- *The adherend for the brake pads must be free from glue residues and grease.*
- *Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before 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

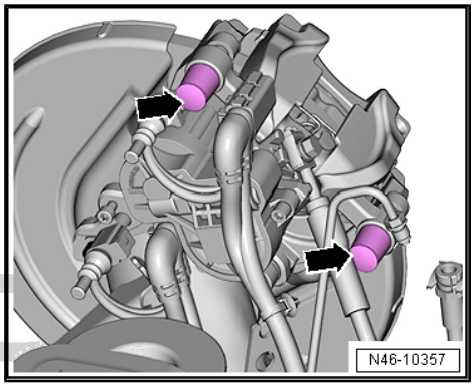
Brake fluid is toxic and must never be sucked up by mouth!

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

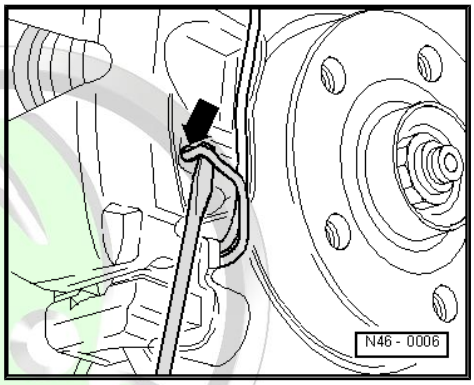
– Install brake caliper:



– 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 46

♦ 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 resetting appliance - T10145-

♦ Brake pedal depressor - 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, 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!

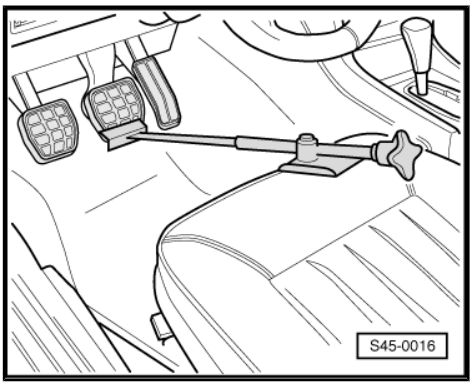
- Electronic handbrake not actuated.

– Remove wheels.

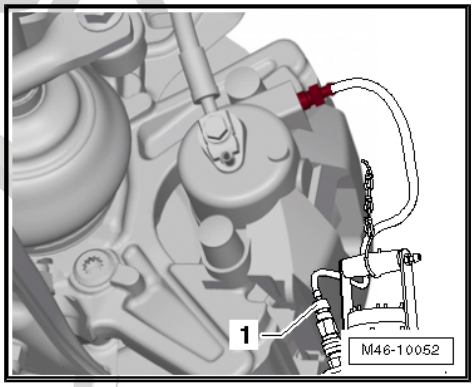
– Reset the pistons for the electronic handbrake ⇒ Vehicle diagnostic tester.

– Remove handbrake motor ⇒ "3.3 Removing and installing handbrake motor V282 / V283", page 58 .

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



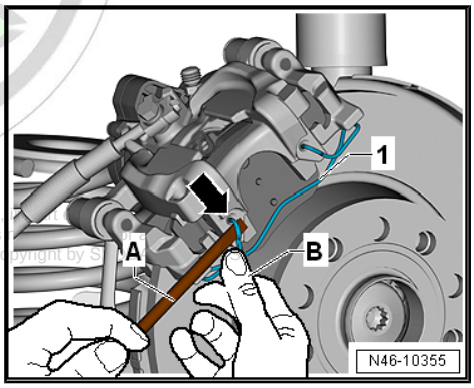
– Fit the bleeder hose of the bleeding bottle -1- onto the bleeder valve and release bleeder valve.
– Press down brake pedal with brake pedal load , e.g. -V.A.G 1869/2- , at least 60 mm.
– Tighten the drain plug.
– Do not remove brake pedal load , e. g. -V.A.G 1869/2- .
– Unscrew brake hose.



CAUTION

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

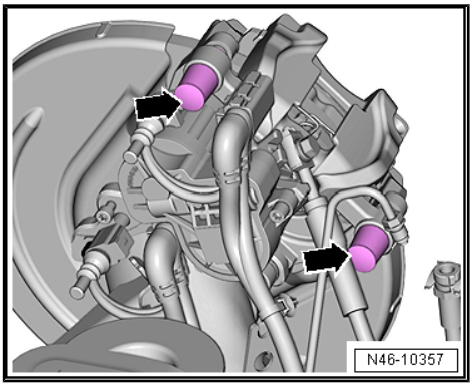
– Lever the retaining spring -1- for the brake pads out of the brake caliper -arrow- with a screwdriver -A-.



– 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.

Install

Note

- *Observe the instructions for changing the pad ⇒ “2.2.1 Changing the brake pads of the rear brake - Mounting instructions”, page 48 .*
- *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 58 .

– Bolt brake hose to brake caliper.

– Bleed brake system ⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .

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

– Attach the wheels.

Note

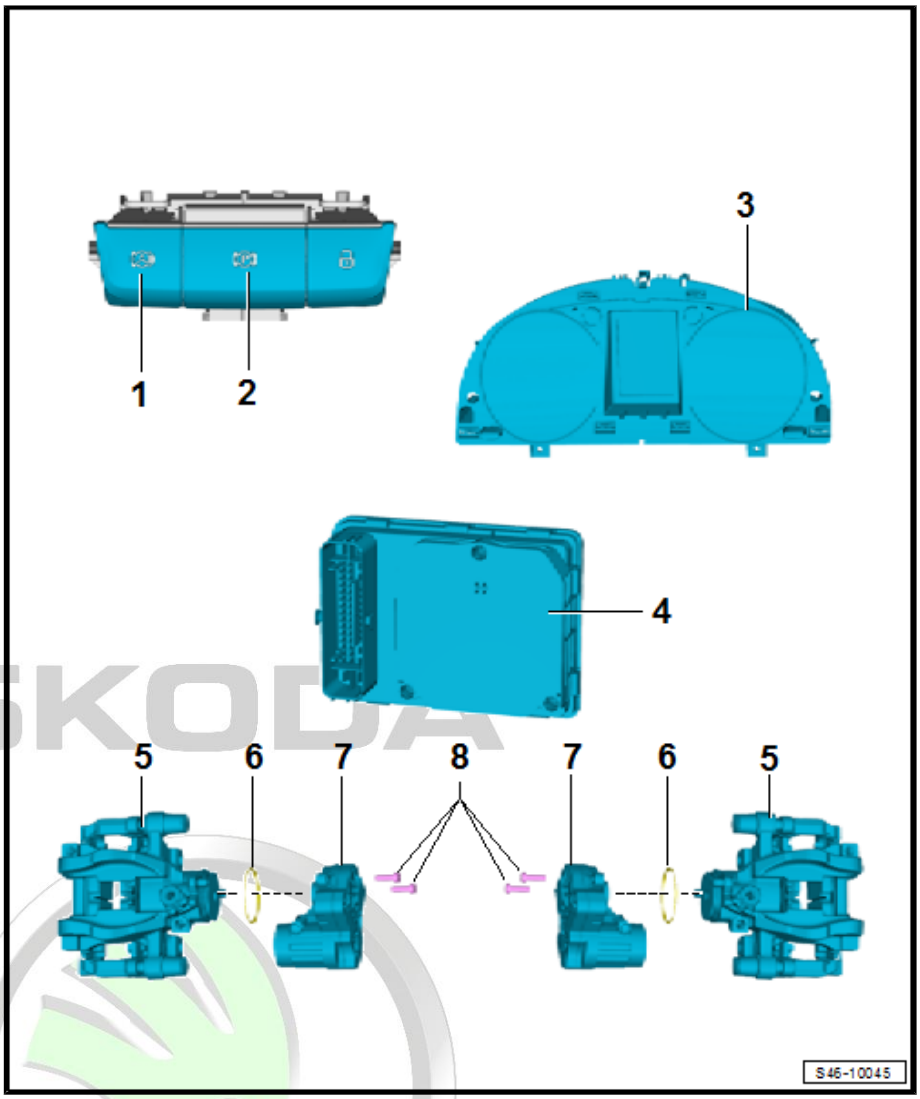
Check brake fluid level, if necessary top up with brake fluid.

Tightening torques

- ⇒ “2.1 Assembly overview - rear brakes”, page 46
- ⇒ “2.1 Assembly overview - rear brake calliper”, page 73
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Specified torque for wheel bolts .

3 Handbrake

3.1 Assembly overview - parking brake



1 - AUTO HOLD button - E540- with AUTO HOLD indicator light - K237-

- ❑ Summary of components: on centre console
- ❑ Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Removing and installing buttons for electro-mechanical handbrake - E538- / Buttons for AUTO HOLD - E540-

2 - Electronic handbrake button - E538- with electronic handbrake indicator light - K213-

- ❑ Summary of components: on centre console
- ❑ Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Removing and installing buttons for electro-mechanical handbrake - E538- / Buttons for AUTO HOLD - E540-

3 - Dash panel insert

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

4 - 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 the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16
- ❑ Separate the ABS control unit - J104- from the ABS hydraulic unit - N55- ⇒ “3.3 Disconnecting the control unit from the hydraulic unit”, page 27

5 - Rear brake caliper

6 - Sealing ring

- ❑ replace after removal

7 - Handbrake motor

- ❑ Left handbrake motor - V282- , installation location: on rear left brake caliper
- ❑ Right handbrake motor - V283- , installation location: on rear right brake caliper
- ❑ removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 58

8 - Screw

- ❑ 12 Nm

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 the ABS control unit J104 / ABS hydraulic unit N55 ”, page 16 .

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

Special tools and workshop equipment required

- ♦ Vehicle diagnosis tester

Removing

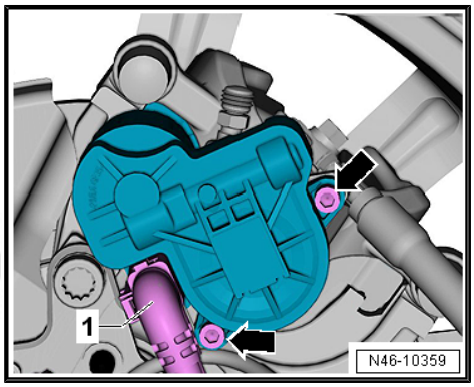
Note

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

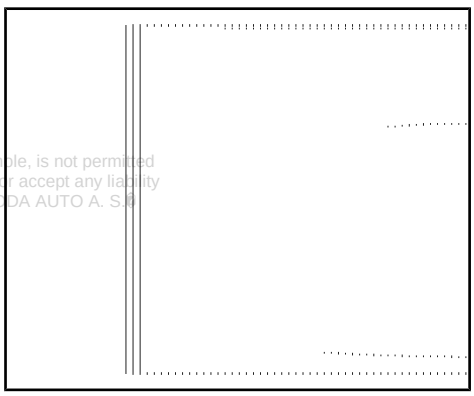
– Pull connector -1- off the handbrake motor.

– 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.



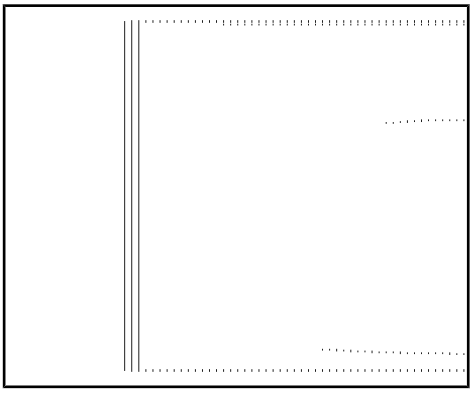
Note

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.

Install

– 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.



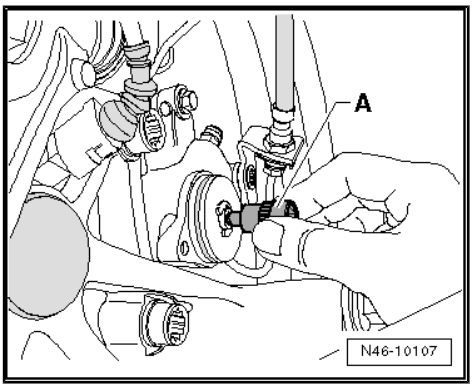
Note

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.

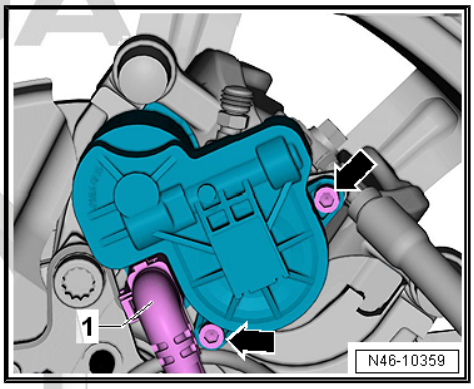


– Twist the handbrake motor until the screw holes and thread are aligned.

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 57

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 64

2 - Nut

- ❑ self-locking
- ❑ replace after removal
- ❑ observe the order of tightening up ⇒ Fig. ““Tightening order”“ , page 62
- ❑ 25 Nm

3 - Retaining clip

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

4 - Sleeve bearing

Note

Check fitting position.

5 - Cap

6 - Brake pedal

7 - Sleeve bearing

8 - Support

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

9 - Pivot pin

- ❑ replace after removal
- ❑ removing:

– Removing bracket ⇒ “4.2 Removing and installing bearing bracket”, page 64 .

– Turn bearing bolts anti-clockwise, the bearing bolt catches will break off.

– Pull out bearing bolt.

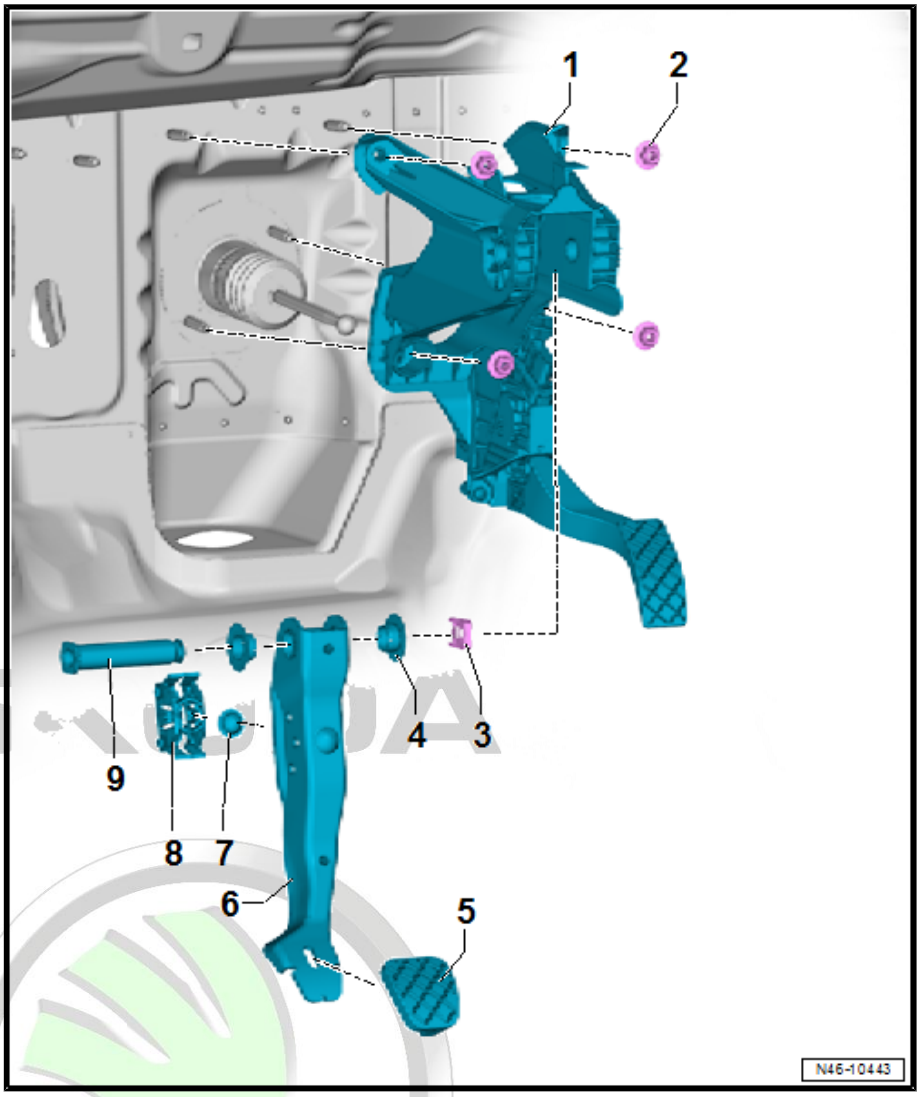
Note

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

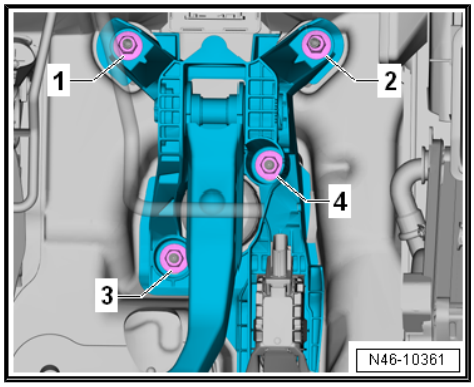
- ❑ the installation occurs in reverse order.

Note

The screw for the bearing bolt must click audibly into place when tightening.



Tightening order



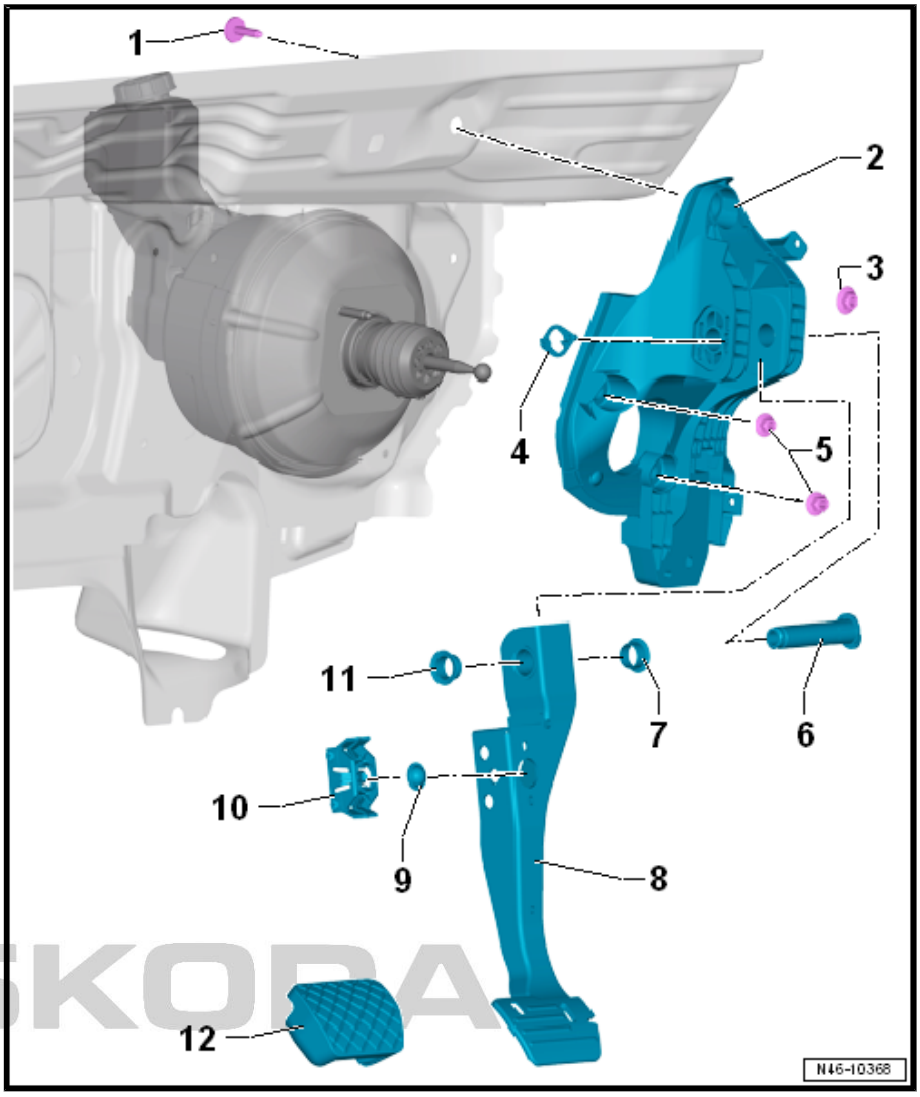
4.1.2 Summary of components - brake pedal, right-hand drive

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 64

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 - Pivot pin

- ❑ replace after removal
- ❑ removing:

– Removing bracket ⇒ “4.2 Removing and installing bearing bracket”, page 64 .

– Turn bearing bolts anticlockwise, the bearing bolt catches will break off.

– Pull out bearing bolt.

Note

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

- ❑ the installation occurs in reverse order.

Note

The screw for the bearing bolt must click audibly into place when tightening.

7 - Sleeve bearing

Note

Check fitting position.

8 - Brake pedal

9 - Sleeve bearing

10 - Support

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

11 - Sleeve bearing

Note

Check fitting position.

12 - Cap

4.2 Removing and installing bearing bracket

⇒ “4.2.1 Removing and installing bushing, left-hand drive vehicles”, page 64

⇒ “4.2.2 Removing and installing bearing bracket, right-hand drive vehicles”, page 66

4.2.1 Removing and installing bushing, left-hand drive vehicles

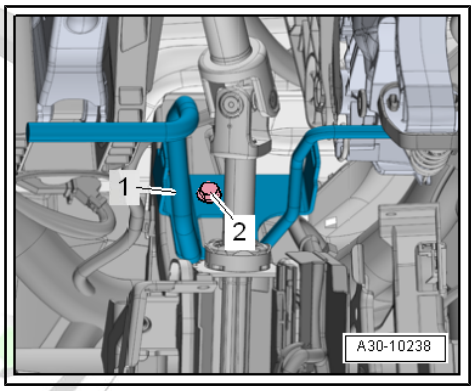
Removing

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

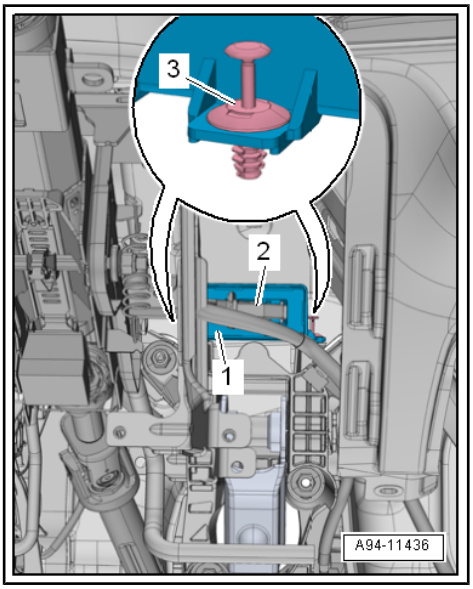
– Remove knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter

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

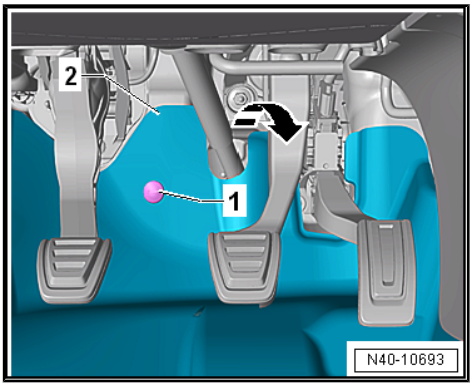
– Remove impact absorber -1- ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel cross member



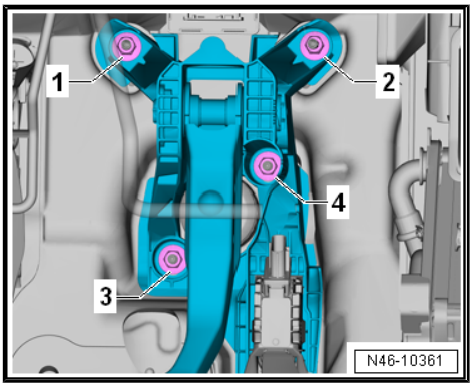
– Disconnect plug -2- from the control unit for variable front lighting.



– Remove screw -1- and open the footwell covering -2- in -direction of arrow-.
– Remove the accelerator pedal ⇒ Rep. gr. 20 ; throttle control .
– Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 67 .



– Release the nuts -1- to -4-.
– Detach all the electrical cables from the bearing bracket.
– Remove bracket.



Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .
– observe the order of tightening up ⇒ Fig. ““Tightening order”“ , page 62

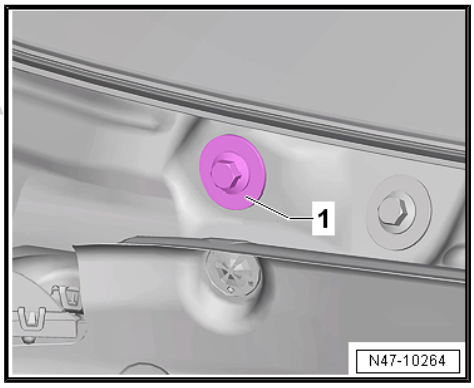
Tightening torques

- ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 60
- Impact absorber ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel cross member
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter
- Accelerator pedal ⇒ Rep. gr. 20 ; Accelerator control

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

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

– Release screw -1-.



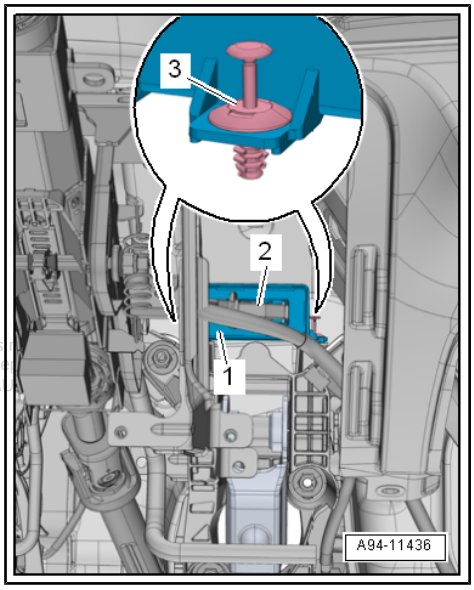
– Remove knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter

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

– Remove impact absorber ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel cross member .

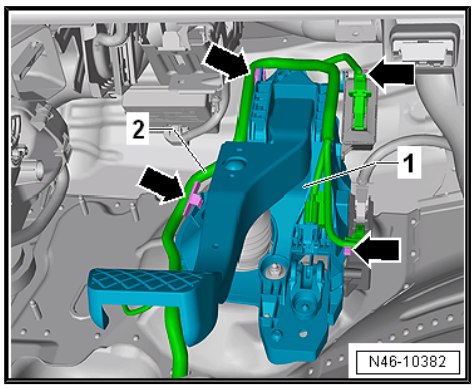
– Remove the accelerator pedal ⇒ Rep. gr. 20 ; throttle control .

– Disconnect plug -2- from the control unit for variable front lighting.

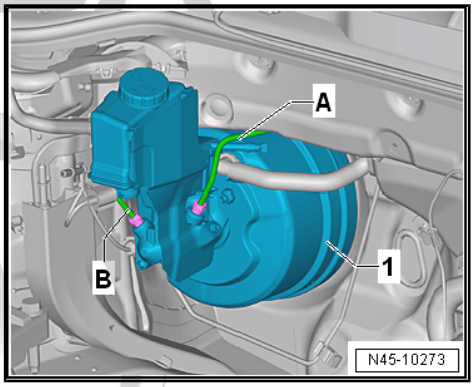


– Disconnect wiring loom -2- from bearing bracket -1-.

– Separating the brake pedal from the brake servo unit ⇒ “4.3 Separating brake pedal from brake servo”, page 67 .



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

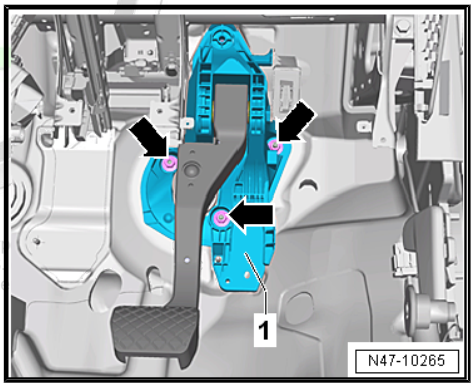


– Release fixing nuts -arrows-.
– Remove bracket.

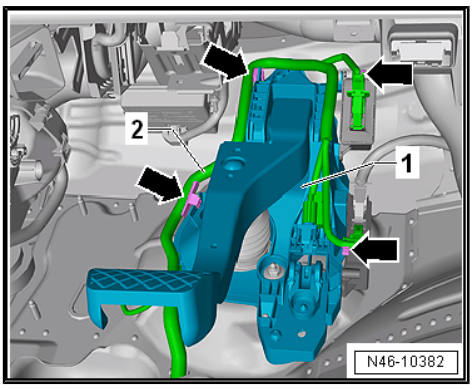
Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo ⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .



– 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 62
- Impact absorber ⇒ General body repairs, interior; Rep. gr. 70 ; Dash panel cross member
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter
- Accelerator pedal ⇒ Rep. gr. 20 ; Accelerator control
- 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 - T10159B-

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

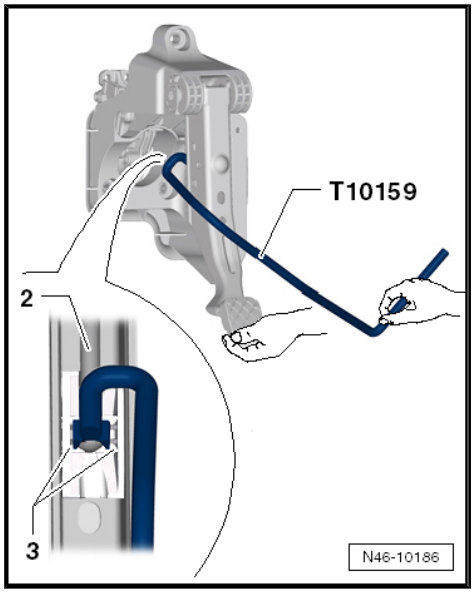
2 - Plunger rod

3 - Retaining lugs

– Insert release tool - T10159B- and pull in direction of driver seat. When doing this, counter-hold on brake pedal. (At this stage the brake pedal must not be allowed to move backwards.) This action will press retaining lugs -3- of mounting off ball head of plunger rod -2-.

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

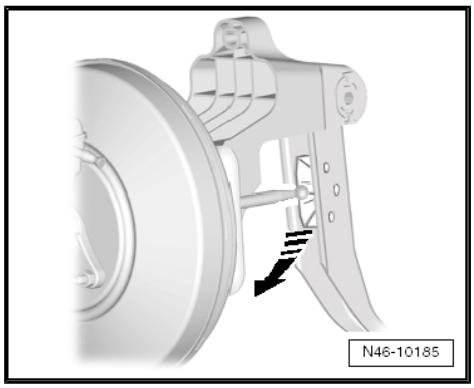
– Pull release tool - T10159B- and brake pedal together towards driver seat. (This action will pull the brake pedal off the ball head of the plunger rod).



4.4 Clipping the brake pedal onto the brake servo unit

– Hold ball head of plunger rod in front of mounting 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

It is not possible to remove the brake pedal in the vehicle.

Removing

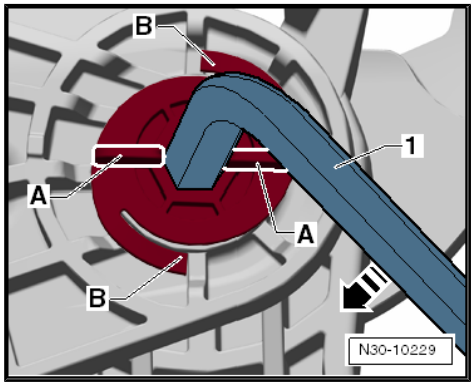
– Removing bracket
⇒ “4.2 Removing and installing bearing bracket”, page 64 .

Left-hand drive

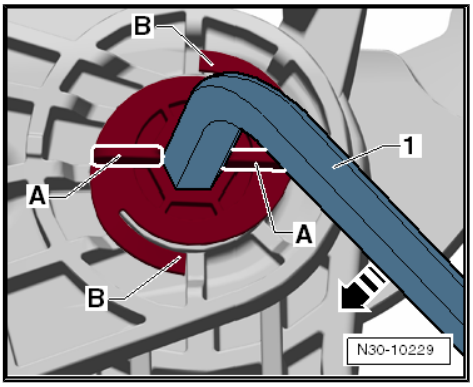
– Unscrew bearing bolt in -direction of the arrow-.

The fuses -B- break off.

Right-hand drive



– Unscrew bearing bolt against -direction of the arrow-.



The fuses -A- break off.

Continued for all vehicles

– Pull out bearing bolt.

– Remove brake pedal.

Install

Note

- *Replace bearing bolt with screw for bearing bolt.*
- *Do not grease the bearing bolt. The bearing bolt must remain dry.*

– Insert the brake pedal in the bearing bracket.

– Insert new bearing bolt.

– Tighten bushings

The safety tabs for the bearing bolt must click audibly into place.

– Fit a new retaining clip for the bearing bolt
⇒ “4.1 Assembly overview - brake pedal”, page 60 .

– Installing bracket
⇒ “4.2 Removing and installing bearing bracket”, page 64 .

47 – Brakes - hydraulics

1 Front brake calipers

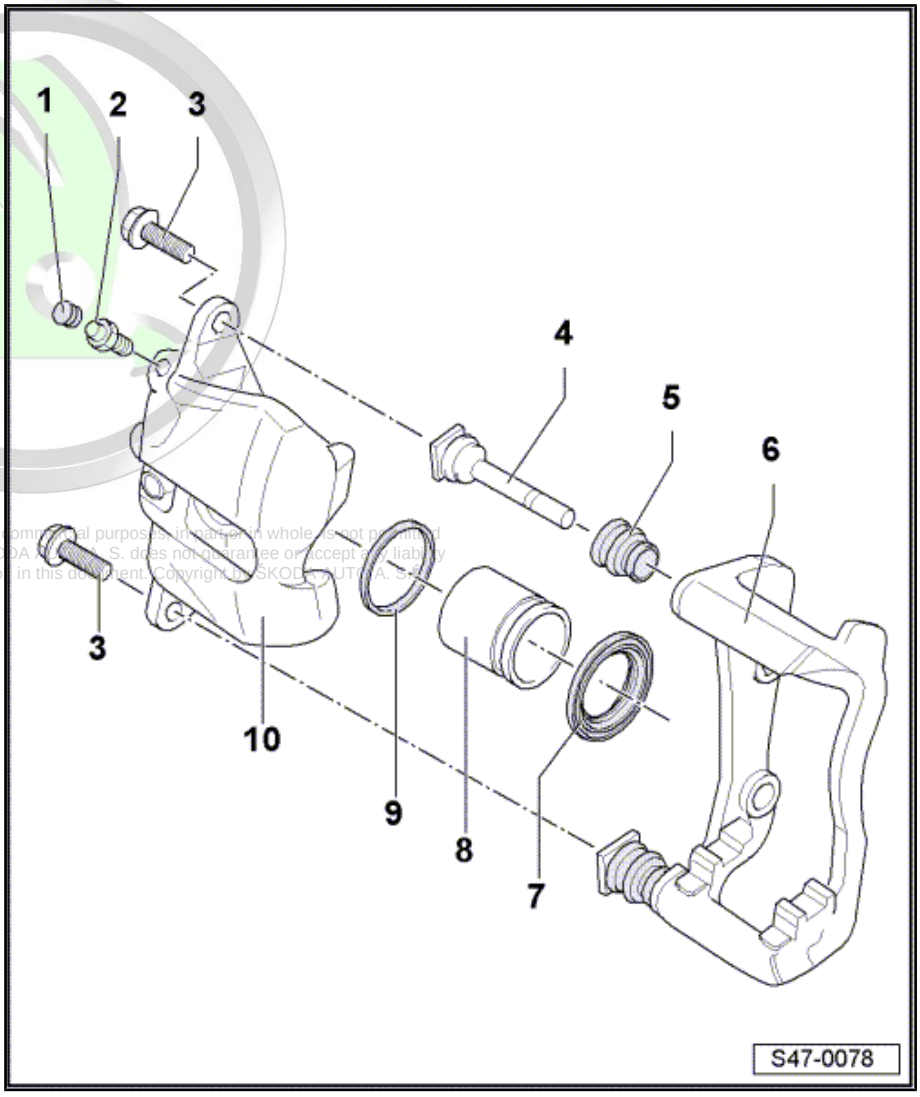
⇒ “1.1 Assembly overview - front brake caliper”, page 70

⇒ “1.2 Removing and installing brake caliper piston”, page 71

1.1 Assembly overview - 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 backplate

- ❑ 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 71
- ❑ do not damage when inserting the piston

8 - Piston

- ❑ removing and installing ⇒ “1.2 Removing and installing brake caliper piston”, page 71

9 - Sealing ring

❑ removing and installing ⇒ “1.2 Removing and installing brake caliper piston”, page 71

10 - Brake caliper

❑ removing and installing ⇒ “1.3 Removing and installing brake caliper”, page 42

1.2 Removing and installing brake caliper piston

Special tools and workshop equipment required

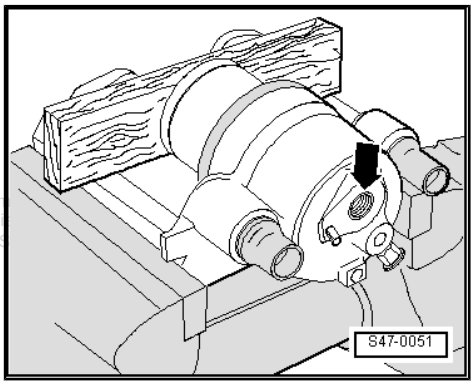
- Piston resetting appliance - T10145-
- Plastic wedge - 3409-
- Lithium grease - G 052 150 A2-

Removing

– Remove brake caliper ⇒ “1.3 Removing and installing brake caliper”, page 42 .

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

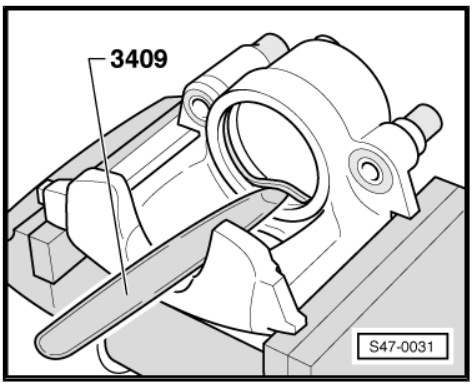
– Press the piston out of the brake caliper housing using compressed air -arrow-.



Note

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

– Remove gasket ring with disassembly wedge - 3409- .



Install

Note

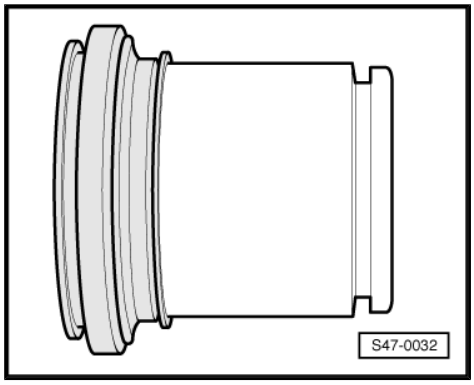
- *Always install the complete repair kit when repairing the brake calliper.*
- *Use only methylated spirits for cleaning the brake.*
- *New brake calipers are filled with brake fluid and are pre-bled.*
- *It is absolutely necessary, if repairs are being undertaken, to pre-bleed the brake calipers before installing them in the vehicle (without brake pads) ⇒ page 72 .*

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

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

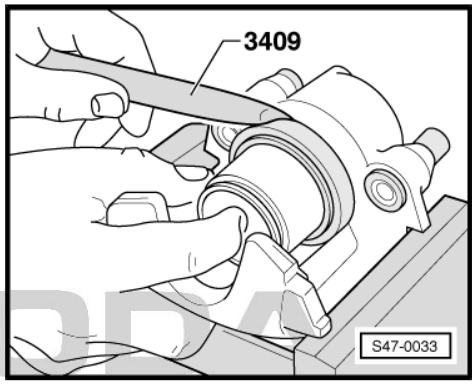
– Insert new gasket ring in the groove of the brake caliper.

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

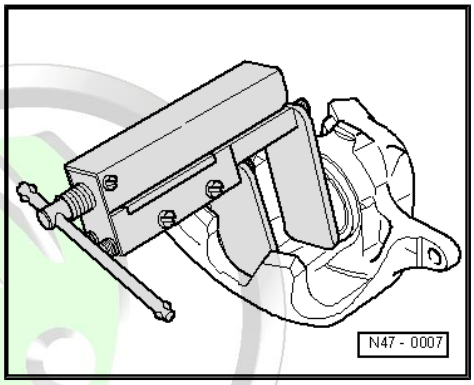


– Insert inner sealing lip of the protective cap with disassembly wedge - 3409- in the groove of the cylinder.

  To do so hold the piston with the hand.



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



Note

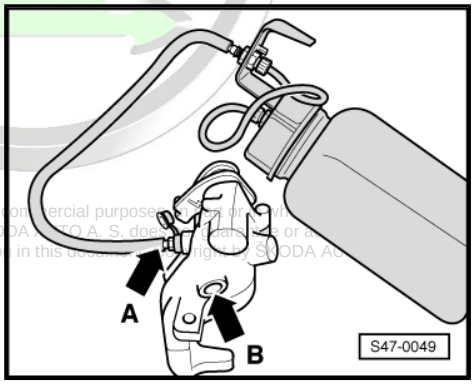
The outer sealing lip of the protective cap will clip into the piston groove.

– Install brake caliper
  ⇒ “1.3 Removing and installing brake caliper”, page 42 .

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 bleeder bottle, 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

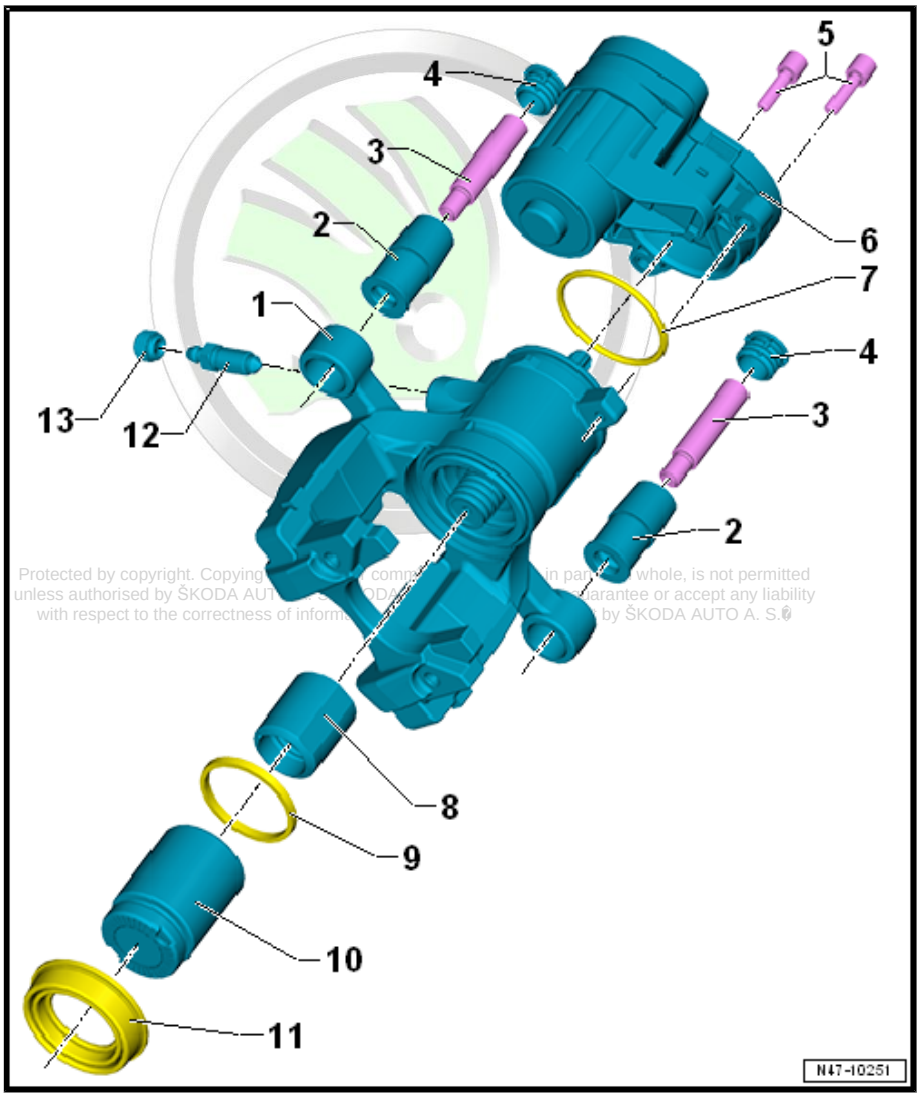
⇒ “2.1 Assembly overview - rear brake calliper”, page 73

⇒ “2.2 Removing and installing protective cover”, page 74

2.1 Assembly overview - rear brake calliper

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 46

6 - Handbrake motor

- ❑ removing and installing ⇒ “3.3 Removing and installing handbrake motor V282 / V283 ”, page 58

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 74

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 resetting appliance - T10145-
- Assembly tool - T10146-
- Plastic wedge - 3409-

Removing

Only the protective cover always has to be replaced.

Note

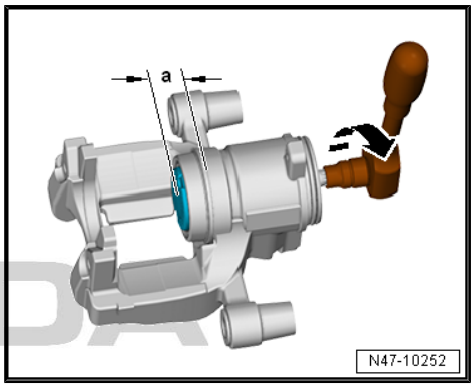
If the protective cover is replaced, the brake caliper does not have to be removed or the brake hose unscrewed.

- Piston is pressed back.
- Handbrake control motor has been removed.

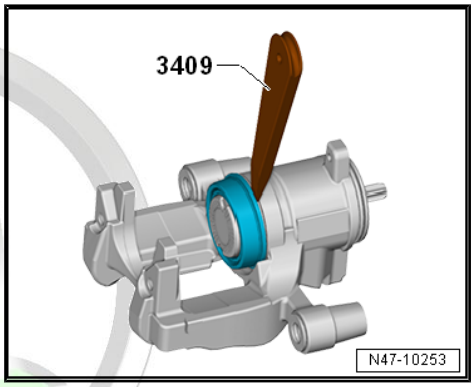
NOTICE

- **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.



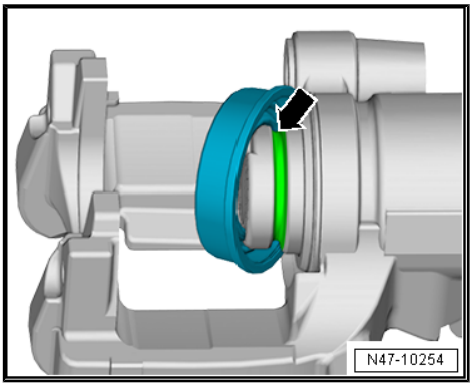
Install

Note

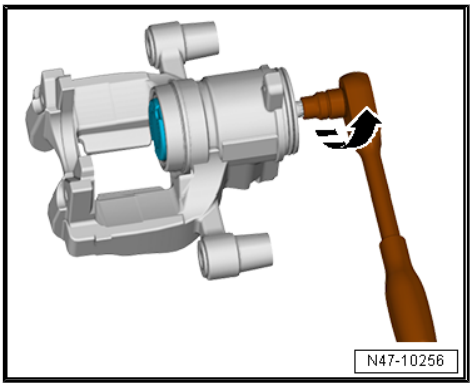
Use only methylated spirits for cleaning the brake.

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

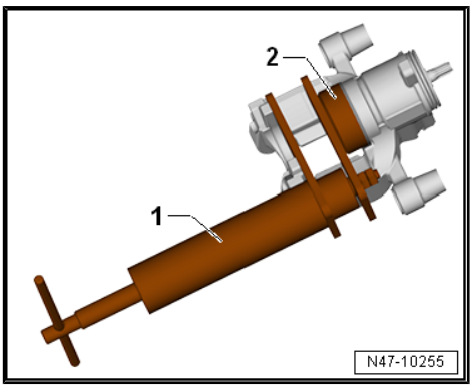
– Fit protective cover into the groove -arrow- on the piston.



– Screw in piston in -direction of arrow-.



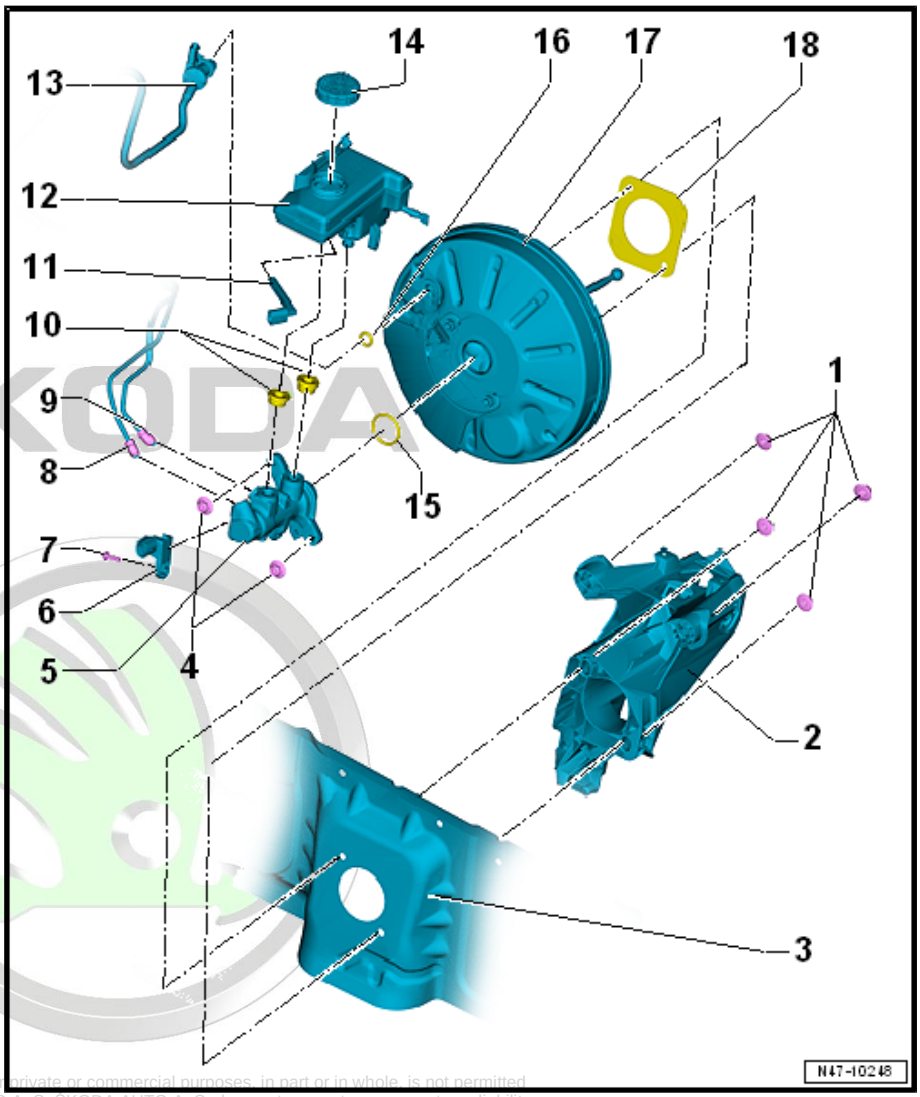
– Press the protective cover with the piston resetting tool - T10145- -1- and assembly device - T10146/5- -2- onto the brake caliper so that it is in contact around the circumference of the brake caliper.



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 the order of tightening up ⇒ Fig. ““Tightening order”“ , page 62
- ❑ Tightening torque ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 60

2 - Bearing bracket

3 - Front wall

4 - Nut

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

5 - Brake master 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 86
- ❑ 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 80

- ❑ checking ⇒ Vehicle diagnostic tester.

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 12

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 12

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-

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 ⇒ “4.2 Checking non-return valve”, page 93
- ❑ the vacuum sender - G608- is installed in some vehicles with petrol engines
  ⇒ “4.3 Removing and installing vacuum sensor G608 ”, page 93

14 - Cover

15 - Gasket

- ❑ replace if damaged

16 - Gasket

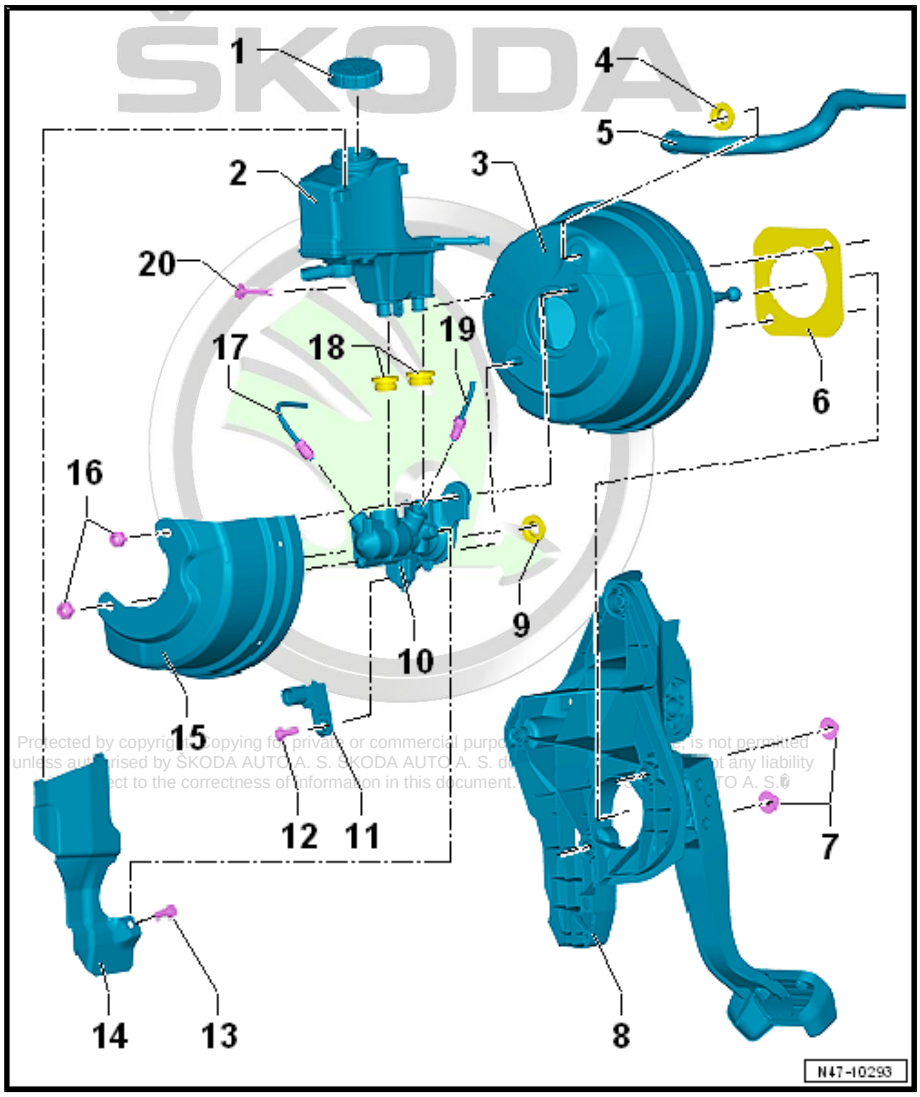
17 - Brake servo

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ separate from brake pedal ⇒ “4.3 Separating brake pedal from brake servo”, page 67
- ❑ removing and installing ⇒ “3.3 Removing and installing brake servo”, page 82
- ❑ Inspect proper operation ⇒ “3.5 Check the operation of the brake servo unit”, page 92
- ❑ if there are faults replace completely

18 - Gasket

- ❑ replace after removal

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



1 - Cover

2 - Brake fluid reservoir

3 - Brake servo

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ separate from brake pedal ⇒ “4.3 Separating brake pedal from brake servo”, page 67
- ❑ removing and installing ⇒ “3.3 Removing and installing brake servo”, page 82
- ❑ Inspect proper operation ⇒ “3.5 Check the operation of the brake servo unit”, page 92
- ❑ if there are faults replace completely

4 - Gasket

5 - Vacuum line

- ❑ Assignment ⇒ Electronic Catalogue of Original Parts
- ❑ Non-return valve (in vacuum hose); Functional test ⇒ “4.2 Checking non-return valve”, page 93
- ❑ the vacuum sender - G608- is installed in some vehicles with petrol engines ⇒ “4.3 Removing and installing vacuum sensor G608 ”, page 93

6 - Gasket

- ❑ replace after removal

7 - Nut

- ❑ self-locking
- ❑ Tightening torque ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 62

8 - Bearing bracket

9 - Gasket

- ❑ replace if damaged

10 - Brake master 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 89
- ❑ 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 81
- ❑ checking ⇒ Vehicle diagnostic tester.

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 15

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 15

20 - Body-bound rivet

3.2 Removing and installing brake light switch

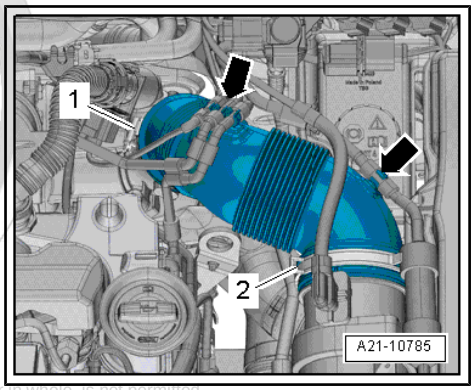
⇒ “3.2.1 Removing and installing brake light switch, left-hand drive vehicles”, page 80

⇒ “3.2.2 Removing and installing brake light switch, right-hand drive vehicles”, page 81

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

Removing

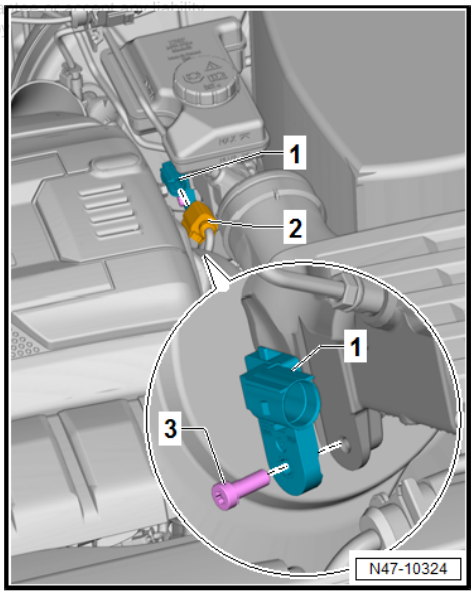
– Remove connecting hose to intake manifold flap ⇒ Rep. gr. 21 ; Charge air system; Summary of components - charge air system .



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

Install

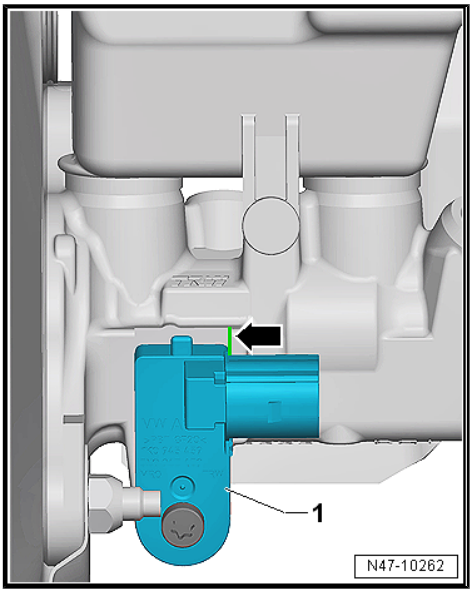
Installation is carried out in the reverse order. When installing, observe the following:



– 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 76



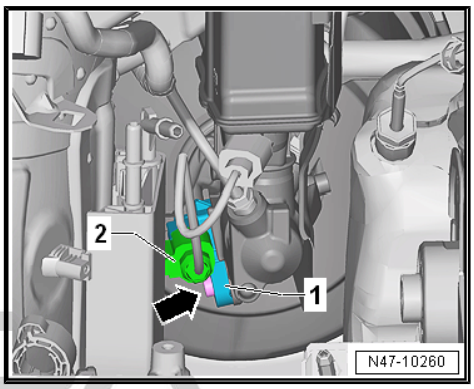
3.2.2 Removing and installing brake light switch, right-hand drive vehicles

Removing

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

– Unscrew fixing screw -arrow- from the brake light bracket - F- .

– Remove brake light switch - F- -1-.



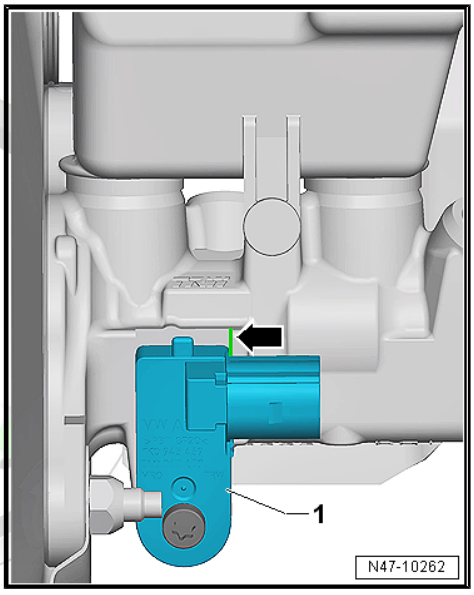
Install

Installation is carried out in the reverse order. When installing, observe the following:

– 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 78



3.3 Removing and installing brake servo

⇒ “3.3.1 Removing and installing brake servo unit, left-hand drive vehicles”, page 82

⇒ “3.3.2 Removing and installing brake servo, right-hand drive - diesel engines”, page 83

⇒ “3.3.3 Removing and installing brake servo, right-hand drive - petrol engines”, page 85

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-

Removing

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

– Remove master brake cylinder ⇒ “3.4 Removing and installing brake master cylinder”, page 86 .

– Pull vacuum hose out of brake servo.

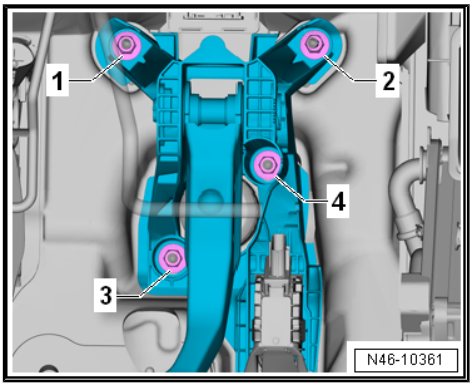
– Remove knee airbag ⇒ General body repairs, interior; Rep. gr. 69 ; Knee airbags; Removing and installing knee airbag with igniter

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

– Separate brake pedal from brake servo ⇒ “4.3 Separating brake pedal from brake servo”, page 67 .

– Release the nuts -3- and -4-.

– Carefully remove the brake servo unit from the vehicle.



Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .

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 76
- ⇒ “4.1.1 Summary of components - brake pedal, left-hand drive”, page 60
- 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-

Vehicles with exhaust gas cleaning module

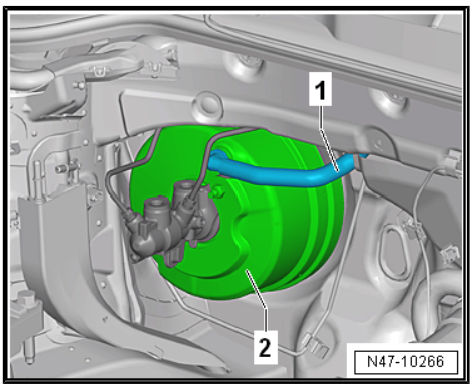
Removing

– Remove exhaust gas cleaning module ⇒ Rep. gr. 26 ; Exhaust gas cleaning; removing and installing exhaust gas cleaning module .

– Remove master brake cylinder
⇒ “3.4 Removing and installing brake master cylinder”, page 86 .

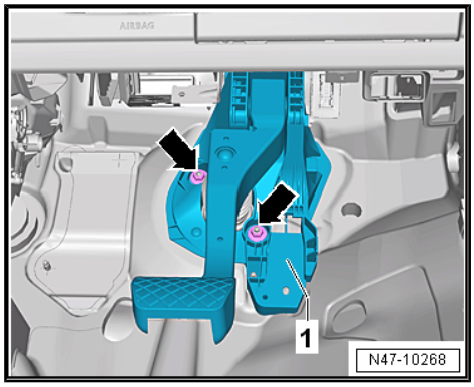
– Detach the vacuum hose -1- from the brake servo unit -2-.

– Disconnect brake servo from brake pedal
⇒ “4.3 Separating brake pedal from brake servo”, page 67 .



– Release fixing nuts -arrows-.

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



Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .

Vehicles fitted with a manual gearbox

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

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 78
- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 62
- Exhaust gas cleaning module ⇒ Rep. gr. 26 ; Exhaust gas cleaning; Summary of components - exhaust gas cleaning

Vehicles with catalytic converter

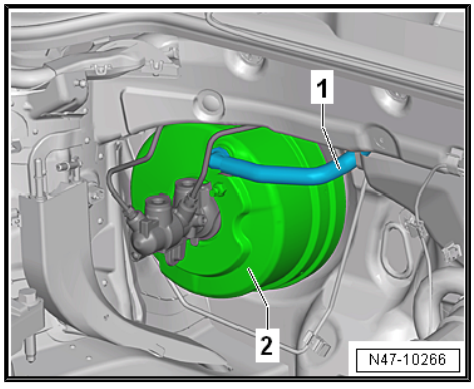
Removing

– Remove catalytic converter ⇒ Rep. gr. 26 ; Exhaust gas cleaning .

– Remove master brake cylinder
⇒ “3.4 Removing and installing brake master cylinder”, page 86 .

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

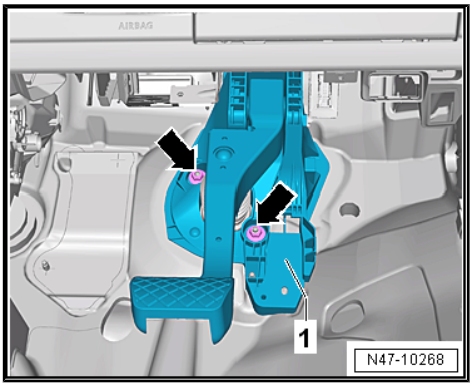
– Disconnect brake servo from brake pedal
⇒ “4.3 Separating brake pedal from brake servo”, page 67 .



– Release fixing nuts -arrows-.

– Lower front axle with steering gear to service position ⇒ Running gear, axles, steering; Rep. gr. 40 ; Assembly carrier; lower assembly carrier .

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



Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .

Vehicles fitted with a manual gearbox

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

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 78
- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 62
- Catalytic converter ⇒ Rep. gr. 26 ; Exhaust gas cleaning

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

Special tools and workshop equipment required

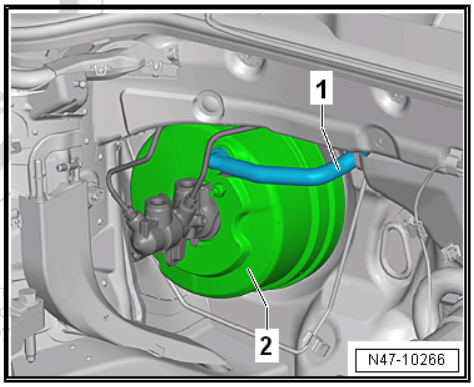
- Brake filling and bleeding device , e. g. -VAS 5234-
- Extraction bottle (commercially available)
- Repair kit - 1H0 698 311 A-

– Remove pre-exhaust pipe with catalytic converter ⇒ Rep. gr. 26 ; Exhaust pipes/silencer .

– Remove master brake cylinder
⇒ “3.4 Removing and installing brake master cylinder”, page 86 .

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

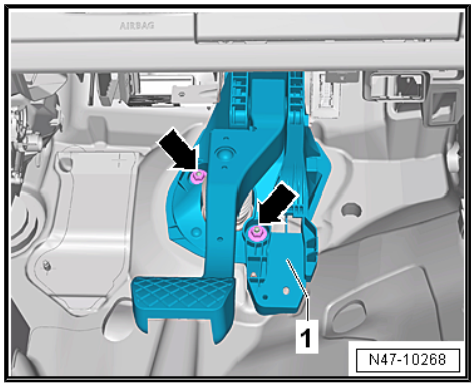
– Disconnect brake servo from brake pedal
⇒ “4.3 Separating brake pedal from brake servo”, page 67 .



– Release fixing nuts -arrows-.

– Lower front axle with steering gear to service position ⇒ Running gear, axles, steering; Rep. gr. 40 ; Assembly carrier; lower assembly carrier .

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



Install

Installation is carried out in the reverse order. When installing, observe the following:

– Clip brake pedal to brake servo
⇒ “4.4 Clipping the brake pedal onto the brake servo unit”, page 68 .

– Fill up with new brake fluid.

– Bleed brake system
⇒ “6.3 Bleeding hydraulic system following standard procedure”, page 105 .

Vehicles fitted with a manual gearbox

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

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 78
- ⇒ “4.1.2 Summary of components - brake pedal, right-hand drive”, page 62
- Front axle ⇒ Chassis, axles, steering; Rep. gr. 40 ; Assembly carrier; Summary of components - assembly carrier .
- Pre-exhaust pipe with catalytic converter ⇒ Rep. gr. 26 ; Exhaust gas cleaning; Summary of components - exhaust gas cleaning

3.4 Removing and installing brake master cylinder

⇒ “3.4.1 Removing and installing master brake cylinder, left-hand drive vehicles”, page 86

⇒ “3.4.2 Removing and installing master brake cylinder, right-hand drive vehicles”, page 89

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

– Remove engine trim panel where present ⇒ Rep. gr. 10 ; Engine trim panel; removing and installing engine trim panel .

– Remove air filter:

♦ Petrol engines ⇒ Rep. gr. 24 ; Air filter; Removing and installing air filter housing

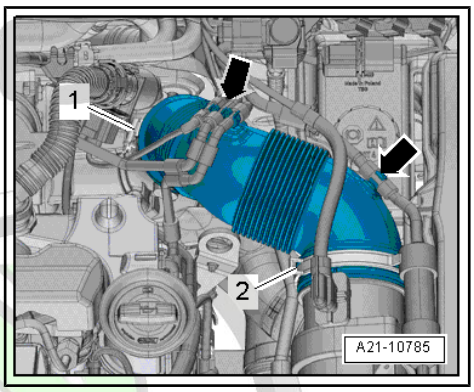
♦ Diesel engines ⇒ Rep. gr. 23 ; Air filter; Removing and installing air filter housing

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

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

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

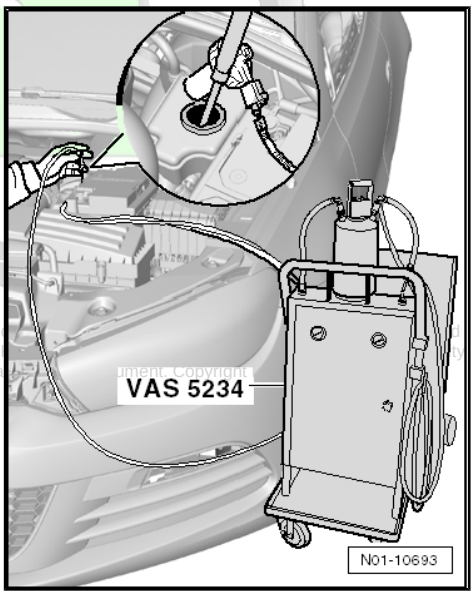
– Lay sufficient non-fluffing cloths around the engine and gearbox.



– 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.

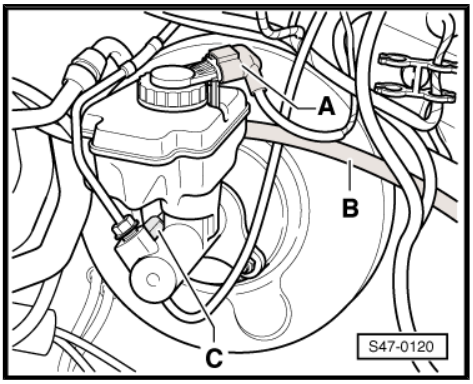
⚠ CAUTION

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



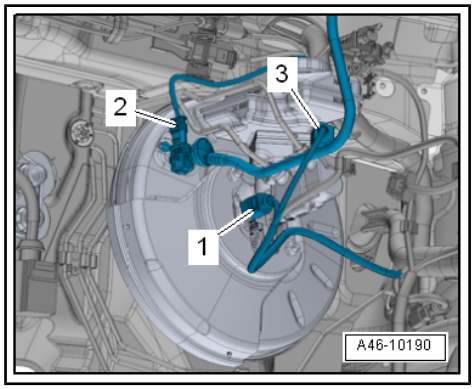
For vehicles with manual gearbox

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

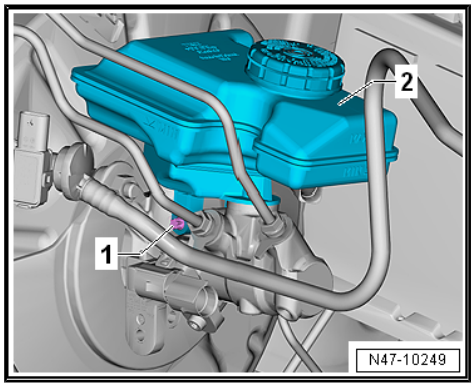


Continued for all vehicles

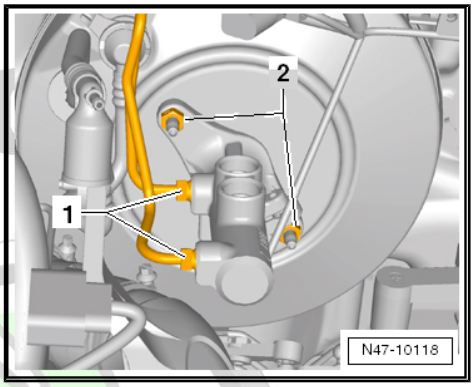
– If present, disconnect the plug -1- from the brake light switch - F- , the plug -2- from the vacuum sensor - G608- and the plug -3- from the brake fluid level warning contact - F34- .
– Remove wiring harness from brake master cylinder.



– 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 take the master brake cylinder out of the brake servo unit.



Install

Installation is carried out in the reverse order. When installing, observe the following:

– 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 105 .

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 76
- ⇒ “3.1.1 Exploded view – control unit and hydraulic unit, left-hand drive vehicle”, page 12
- 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 trim panel, if present ⇒ Rep. gr. 10 ; Engine trim panel; removing and installing engine trim panel .

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

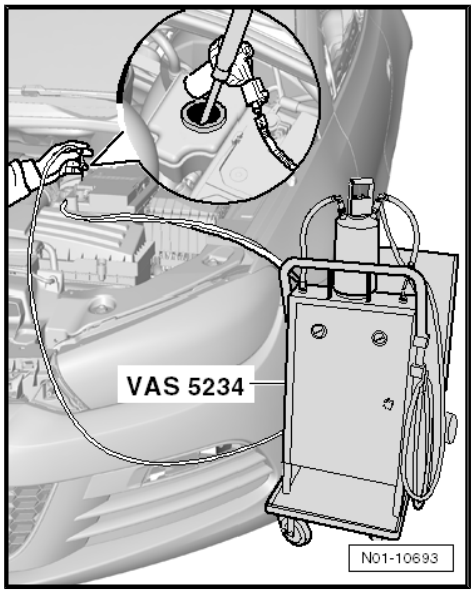
Note

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

Removing

– Remove engine trim panel where present ⇒ Rep. gr. 10 ; Engine trim panel; removing and installing engine trim panel .

– 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.

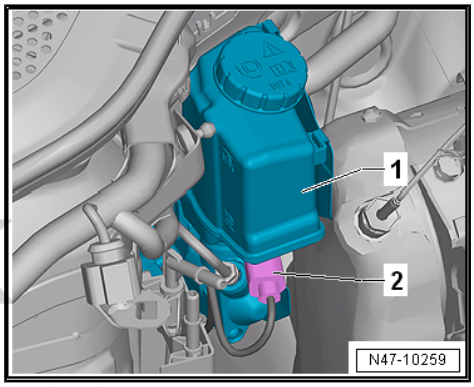


CAUTION

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

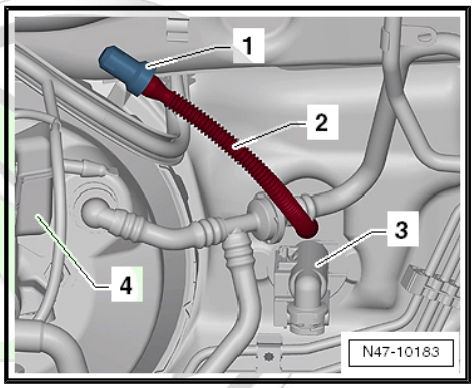
– Remove plug from the brake fluid level warning contact - F34- -2- .

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



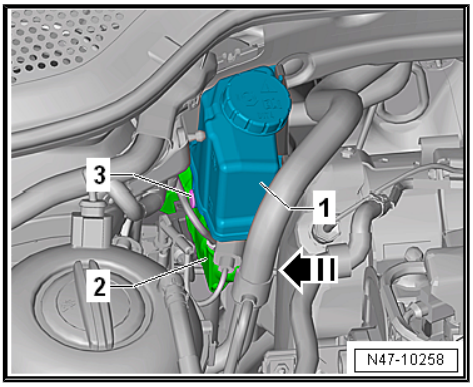
For vehicles with manual gearbox

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

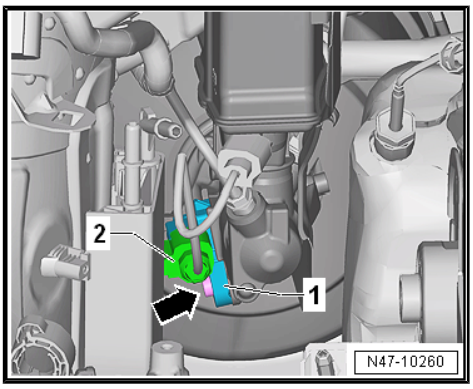


Continued for all vehicles

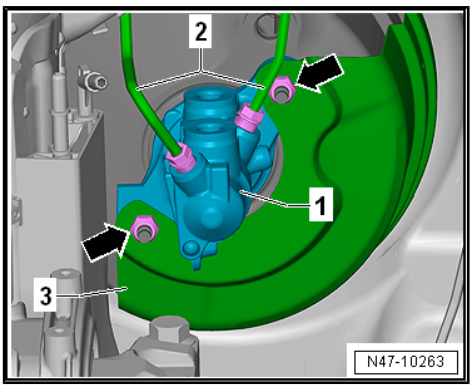
– Removing body-bound rivet -3-.
– Pull the brake fluid reservoir -2- out of the plugs.



– Remove plug -2- from the brake light switch - F- -1- and remove switch.



– 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 take the master brake cylinder out of the brake servo unit.



Install

Installation is carried out in the reverse order. When installing, observe the following:

– 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 105 .

Vehicles fitted with a manual gearbox

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

Tightening torques

- ⇒ “3.1.2 Summary of components - brake servo unit/master brake cylinder, right-hand drive vehicles”, page 78
- ⇒ “3.1.2 Exploded view – control unit and hydraulic unit, right-hand drive vehicle”, page 15
- Engine trim panel, if present ⇒ Rep. gr. 10 ; Engine trim panel; removing and installing engine trim panel .

3.5 Check the operation of the brake servo unit

Note

- *on petrol engines the required negative pressure is drawn from the intake manifold*
- *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
⇒ “4.2 Checking non-return valve”, page 93 .

– 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 82 .

4 Vacuum system

4.1 Exploded view – vacuum pump

4.1.1 Vehicles with petrol engines

on petrol engines the required negative pressure is drawn from the intake manifold

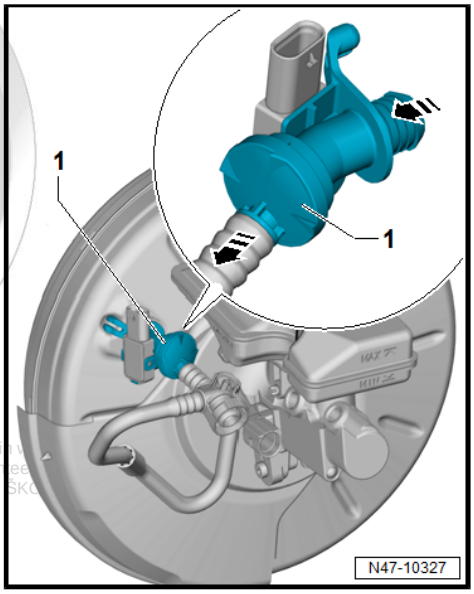
4.1.2 Vehicles with diesel engines

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

4.2 Checking 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.



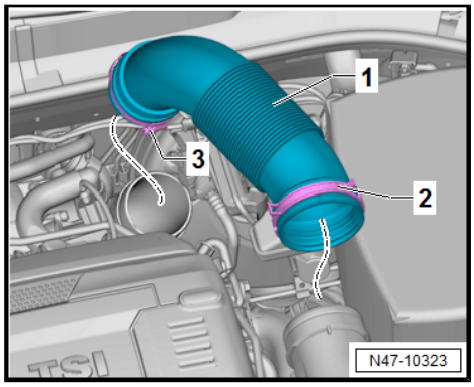
4.3 Removing and installing vacuum sensor - G608-

Note

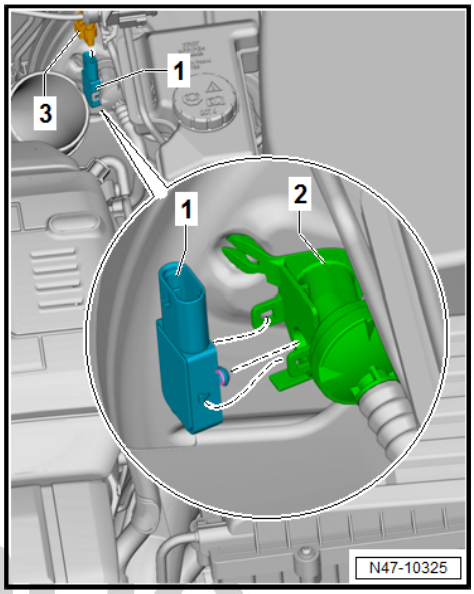
The vacuum sender - G608- is only installed with some petrol engines.

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-.



Install

Installation is carried out in the reverse order.

4.4 Inspect the vacuum system

⇒ “4.4.1 General points”, page 94

⇒ “4.4.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 95

⇒ “4.4.3 Checking vacuum generation”, page 95

⇒ “4.4.4 Checking for leaks”, page 96

⇒ “4.4.5 Vacuum generation with manual vacuum pump VAS 6213 ”, page 98

4.4.1 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.

4.4.2 Connecting vacuum gauge for brake servo - VAS 6721-

Special tools and workshop equipment required

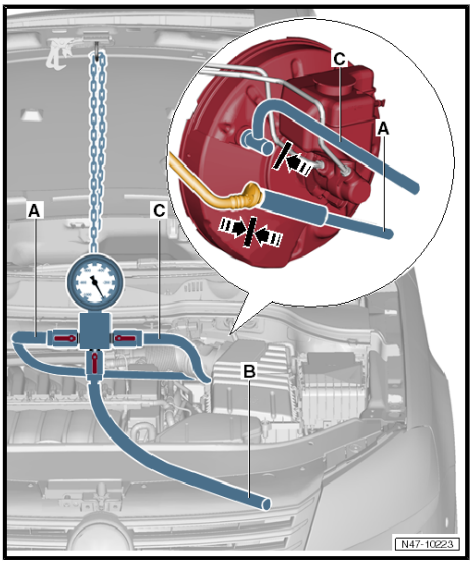
- Vacuum gauge for brake servo - VAS 6721-

– Pull vacuum hose out of brake servo.

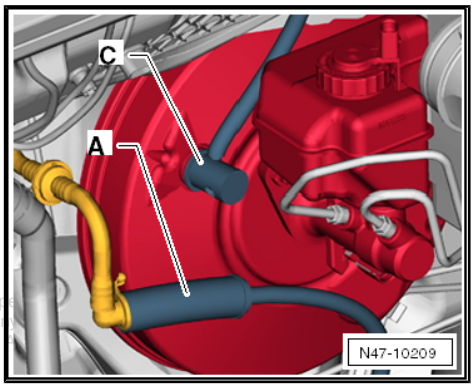
First press the brake pedal several times in order to facilitate removal of the vacuum hose.

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

Item number	Component	Explanation
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.



4.4.3 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

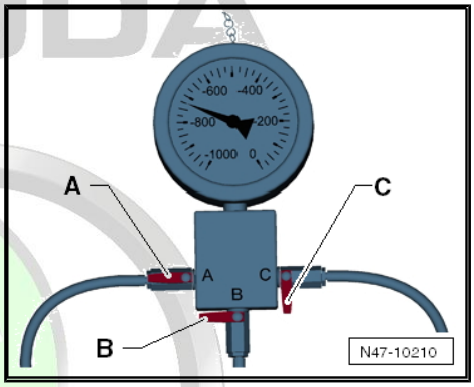
– Place vacuum gauge for brake servo - VAS 6721- in between ⇒ “4.4.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 95 .

– 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-
⇒ “4.4.5 Vacuum generation with manual vacuum pump VAS 6213 ”, page 98 .

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

4.4.4 Checking for leaks

Special tools and workshop equipment required

- Vacuum gauge for brake servo - VAS 6721-

Note

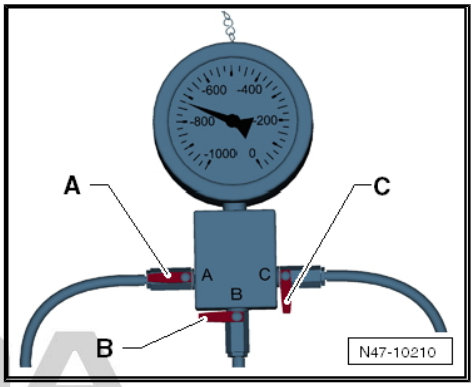
- *The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1,000 m altitude). Local and time fluctuations also influence vacuum generation.*
- *A cold engine, a switched-on air-conditioning system as well as engine 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 ⇒ “4.4.2 Connecting vacuum gauge for brake servo VAS 6721 ”, page 95 .

– 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.

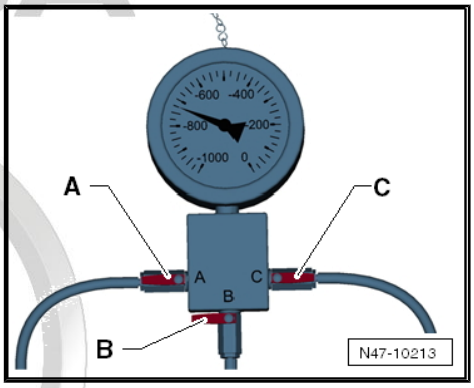
A vacuum decrease of 400 mbar in 12 hours is permissible.

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

1 - For brake servo.

or

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

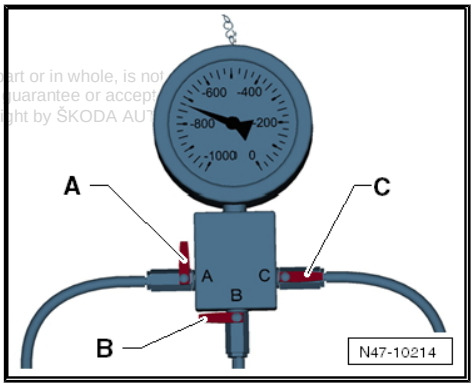


If there are large leaks, the vacuum decreases steeply within a few seconds.

Vacuum check in vicinity of brake servo:

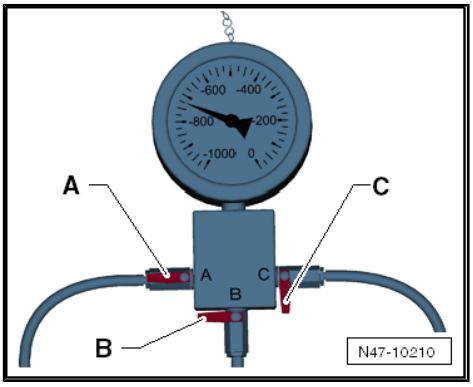
– After generation of vacuum, close cut-off valve -A- in order to check brake servo vacuum system.

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.



4.4.5 Vacuum generation with manual vacuum pump - VAS 6213-

Special tools and workshop equipment required

- Manual 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.

5 Brake lines

⇒ “5.1 Repairing brake lines”, page 99

5.1 Repairing brake lines

⇒ “5.1.1 Assembly overview - Flaring tool”, page 99

⇒ “5.1.2 Work instructions”, page 100

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-

- ❑ Grub screws (in shaft and at side) are adjusted and must not be readjusted!

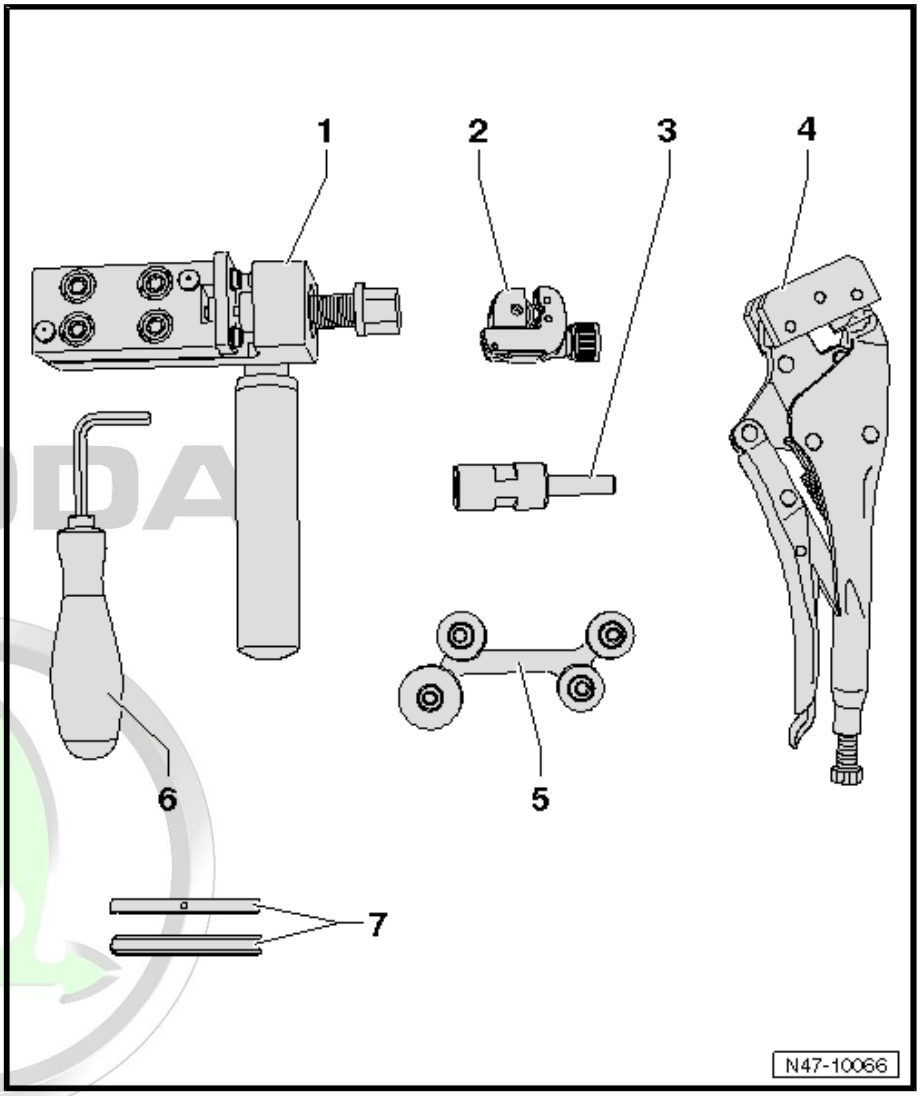
4 - Set of grips with plastic jaws - VAS 6056/4-

5 - Pipe bending tool - VAS 6056/5-

6 - Screwdriver SW6

- ❑ Short

7 - Flanging jaws - VAS 6056/7-



Assembly overview - Flaring tool

1 - Flanging tool upper part

- ❑ unscrew for changing the flaring chucks

2 - Fastening for handle

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

3 - Securing bolt

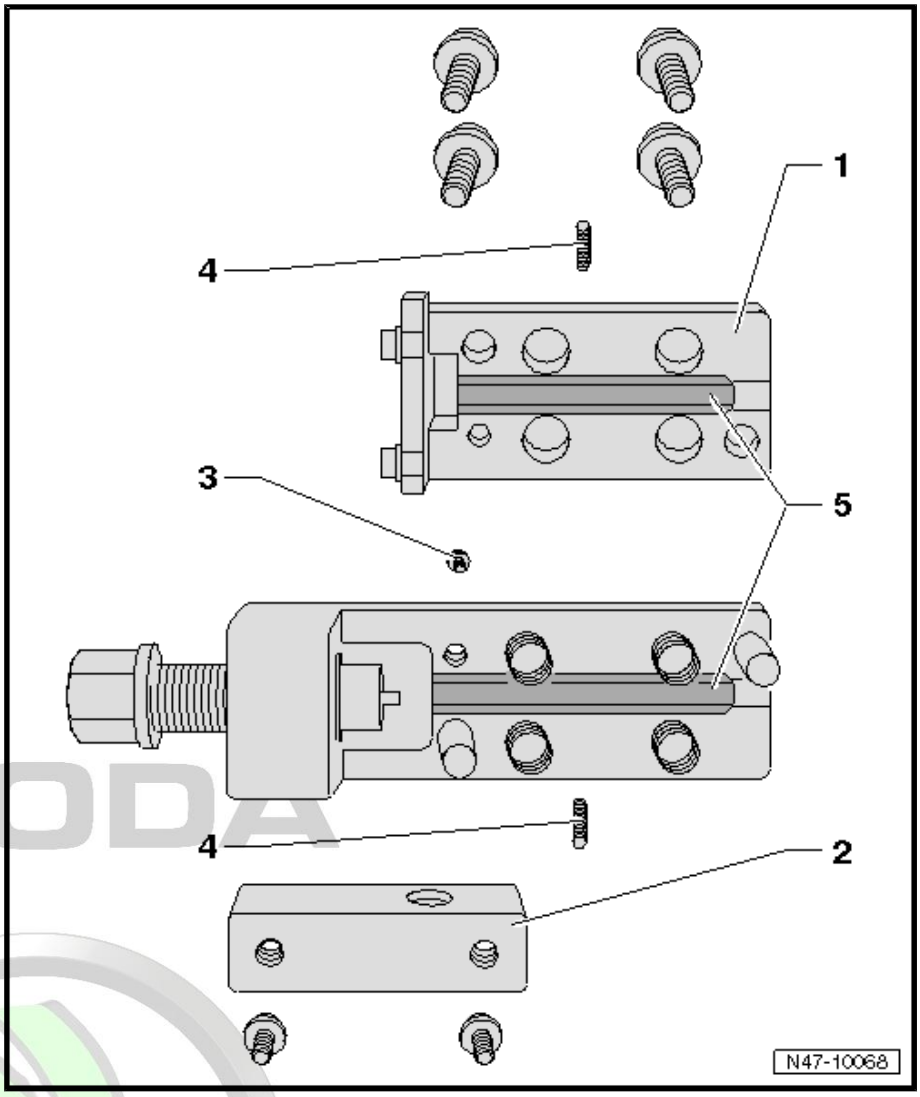
- ❑ For flanging tool upper part

4 - Grub screws for flanging jaws

- ❑ For centring and holding flanging jaws
- ❑ Hexagon socket head bolt, 2 mm

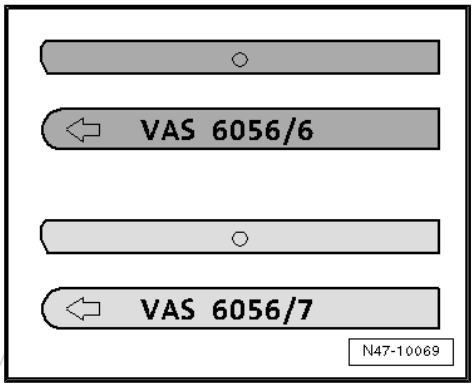
5 - Flanging jaws

- ❑ Various
- ❑ Assembly instructions ⇒ Fig. ""Mounting instruction for flaring chucks:"" , page 100



Mounting instruction for flaring chucks:

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



Note

The arrow on the rounded side of the flanging jaws must point to the edge of the housing, and the straight side of the flanging jaws must be installed towards the spindle, or the flange will not be formed correctly.

5.1.2 Work instructions

Special tools and workshop equipment required

- ♦ Flanging tool for brake lines - 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 may only be bent to max. 90°, as they otherwise kink or display deformations which constrict the cross-section of the line to an impermissible degree.*
- *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; merely 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.*

The flanging tool for brake lines - VAS 6056- can be used to flange brake lines with an outer pipe diameter of 5 mm without damaging the coating. In certain cases, this allows sections of brake lines to be renewed at less expense.

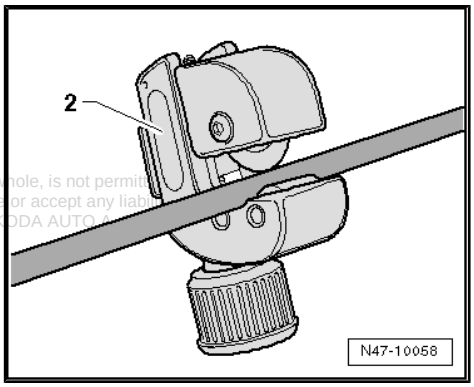
Separate

– 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.

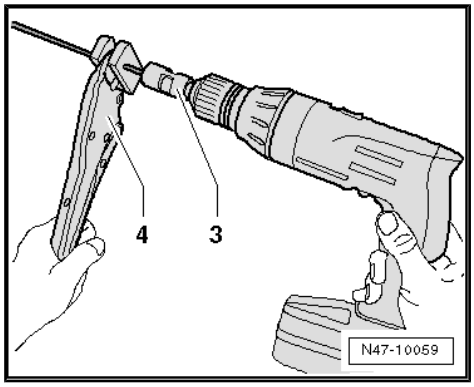
– Cut through the brake line in a suitable location (straight, freely accessible piece) with the pipe cutter -2-.

– Remove section to be renewed.

– Degrease brake line surface.



– 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.

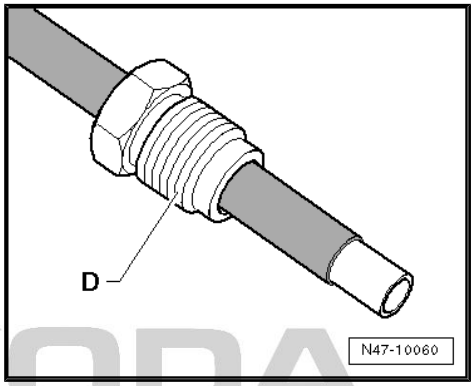


Length of scraping is determined by stop in scraper.

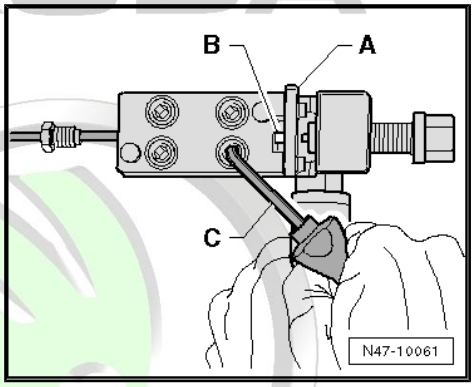
– Separate the peeler from the brake line and remove peel residues.
– Remove gripping pliers.

Crimping

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



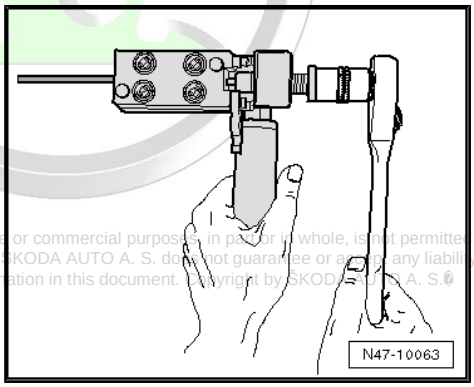
– Push the brake line -B- against the stop -A- in the flaring tool.



Note

Brake line must be positioned against stop when the hexagon socket head bolts are tightened, or the flange will not be formed correctly.

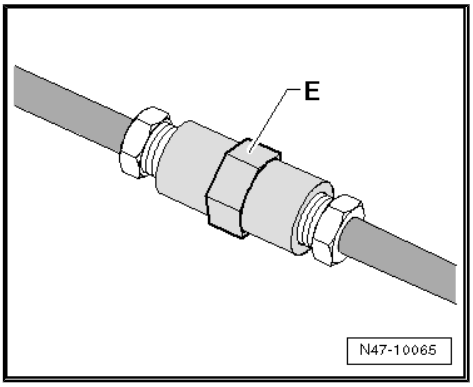
– Pre-tension the brake line in the flaring tool so that the brake line can no longer be moved. Fold up the stop -A- and then tighten the Allen screws crosswise completely with the offset screwdriver -C-.
– Turn the spindle in the flaring tool up to the stop.
– Turn back the spindle once again.
– Loosen 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 rinse the part of the brake line remaining in the 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.
– Blow out new brake line to be inserted 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 105



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 Pre-bleeding the hydraulic system

Special tools and workshop equipment required

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

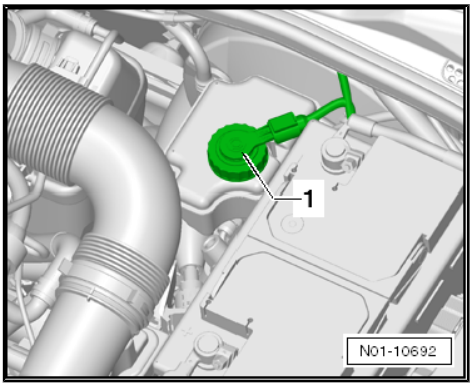
Note

For vehicles with EDL/TCS, or with EDL/TCS/ESC, if one chamber of the brake fluid return tank has run dry due to a leak, the system must be pre-bleed.

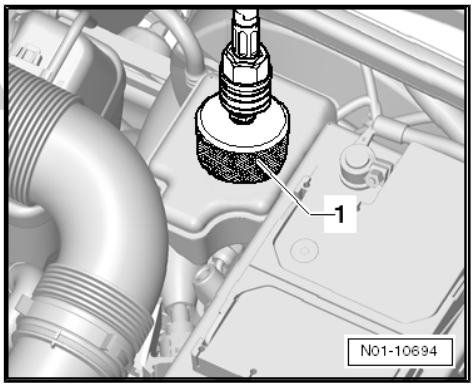
– Note the general instructions on brake fluid ⇒ “6.1 General notes on brake fluid”, page 104 .

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 105 .

6.3 Bleeding hydraulic system following standard procedure

Special tools and workshop equipment required

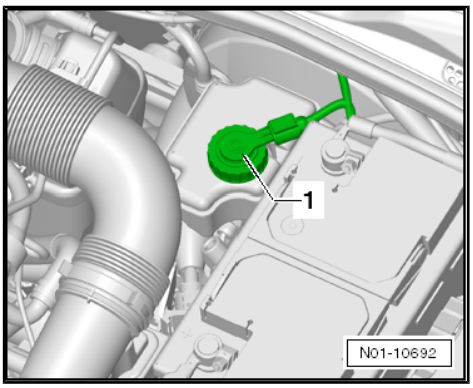
♦ Brake filling and bleeding device , e. g. - VAS 5234-

♦ Brake fluid

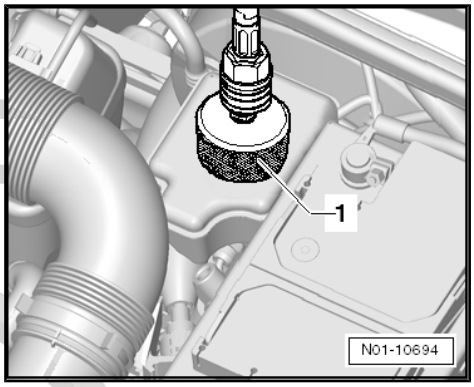
– Note the general instructions on brake fluid
⇒ “6.1 General notes on brake fluid”, page 104 .

A pre-pressure of 0.2 MPa (2 bar) is required to bleed the brake system.

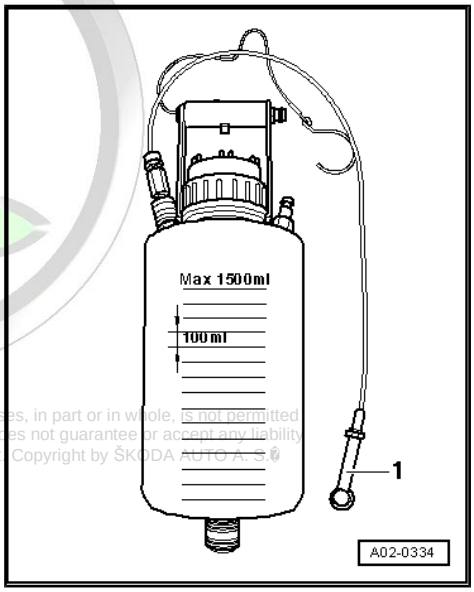
– Unscrew cap -1- from the brake fluid reservoir



– 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 the 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 prerequisites:

• Function and tightness of the brake system (brake lines, brake hoses, brake calipers, hydraulic unit) O.K.

– Remove bleeder valve at one of 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). Renew brake master cylinder if drop in pressure exceeds specification.
– Separate brake system tester e.g. - V.A.G 1310 A- .
– Screw the bleeder screw into the caliper and bleed the brake caliper.