Workshop Manual
Tiguan 2021 ➤
Tiguan RUS 2021 ➤

Brake system

Edition 10.2020

List of Workshop Manual Repair Groups

Repair Group

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 information

(VRL014829; Edition 10.2020)

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⇒ p1.2 recautions when working on a high-voltage system", page 1

⇒ p1.3 recautions when working in the vicinity of high-voltage components", page 2

1.1 Safety precautions when using testers and measuring instruments during a road test

Risk of injury caused by unsecured testing and measuring instruments

When the front passenger airbag is triggered in an accident, insufficiently secured testing and measuring instruments become dangerous projectiles.

– Secure testing and measuring instruments on the rear seat.

Or

– Have a second person operate the test and measuring equipment on the rear seat.

1.2 Safety precautions when working on a high-voltage system

Danger to life from high voltage

The high-voltage system is under high voltage. Severe or fatal injury from electric shock.

– Persons with life-preserving or other electronic medical devices in or on their body must not perform any work on the high-voltage system. Such medical devices include internal analgesic pumps, implanted defibrillators, pacemakers, insulin pumps and hearing aids.

– The high-voltage system must be de-energised by a suitably qualified technician.

Risk of injury due to unexpected engine start

On electric and hybrid vehicles, it can easily be missed that the vehicle is in "ready" mode. There is a risk of parts of the body becoming trapped or drawn in.

– Switch off ignition.

– Always store the ignition key outside the vehicle.

Risk of damage to high-voltage cables

Improper handling of high-voltage cables or high-voltage connectors may result in damage to their insulation.

- Never support body weight on high-voltage cables or high-voltage connectors.
- Never support any tools on high-voltage cables or high-voltage connectors.
- Never kink or severely bend high-voltage cables.
- Always observe the coding when connecting high-voltage connectors.

1.3 Safety precautions when working in the vicinity of high-voltage components

Danger to life from high voltage

The high-voltage system is under high voltage. Damage to high-voltage components can result in severe or fatal injury from electric shock.

- Perform visual check of high-voltage components and high-voltage cables.
- Never use cutting or forming tools, or any other sharp-edged tools.
- Never use heat sources such as welding, brazing, soldering, hot air or thermal bonding equipment.

2 Identification

⇒ o2.1 f PR number - brakes", page 3

2.1 Allocation of PR number - brakes

⇒ b2.1.1 rake", page 3

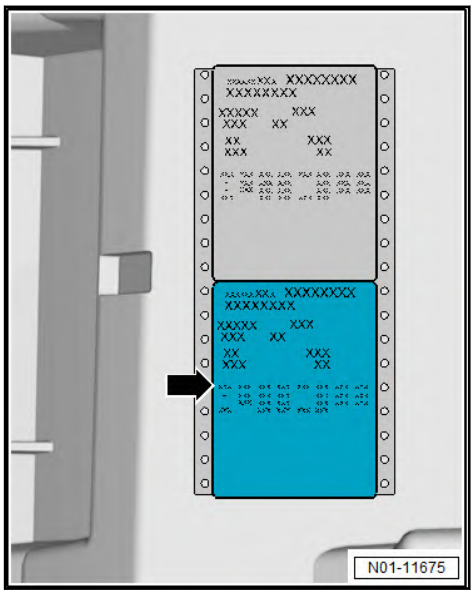
⇒ b2.1.2 rake", page 4

2.1.1 Front brake

The type of brake system installed in the vehicle is indicated among other things by the corresponding PR number on the vehicle data sticker.

The vehicle data sticker can be found in the spare wheel well and in the service schedule.

– Also view information about the brake system installed in the vehicle in the vehicle-specific notes in ELSA.



In this example the rear brake "1KU" is installed in the vehicle.

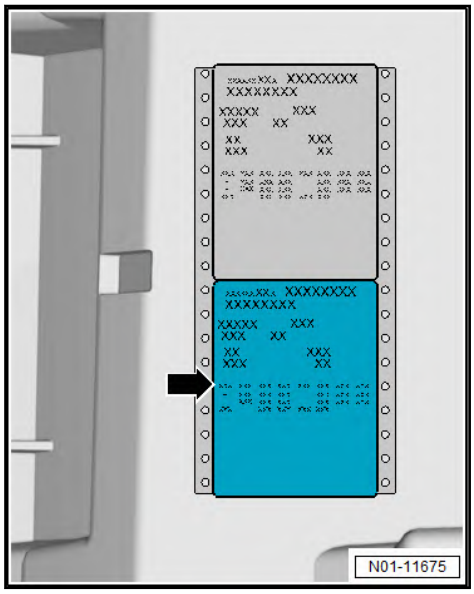
- Allocation ⇒ Electronic parts catalogue (ETKA)
- The following table explains the PR numbers. The table is important for the brake caliper/brake disc and brake pad combination.

PR No.	Front brake
1ZK	PC 57 (16)
1ZC	PC 57 (16) blue
1ZA	PC 57 (16)
1ZD	PC 57 (16)
1ZG	PC 57 (16) blue
1ZL	PC 57 (16)
1LA	C60 (17)
1LB	C60 (17)

2.1.2 Rear brake

The type of brake system installed in the vehicle is indicated among other things by the corresponding PR number on the vehicle data sticker.

The vehicle data sticker can be found in the spare wheel well and in the service schedule.



– Information about the brake system installed in the vehicle can also be viewed in the vehicle-specific notes in ELSA.

In this example the rear brake “1KU” is installed in the vehicle.

- Allocation ⇒ Electronic parts catalogue (ETKA)
- The following table explains the PR numbers. The table is important for the brake caliper/brake disc and brake pad combination.

PR No.	Rear brake
1KU	FN c - M42 (16)
2EM	FN c - M42 (16)
2EA	FN c - M42 (16) blue
1KZ	FN c - M42 (17)
2 ER	FN c - M42 (17)

3 Technical data

⇒ d3.1 ata for brakes", page 5

3.1 Technical data for brakes

⇒ m3.1.1 aster cylinder and brake servo", page 5

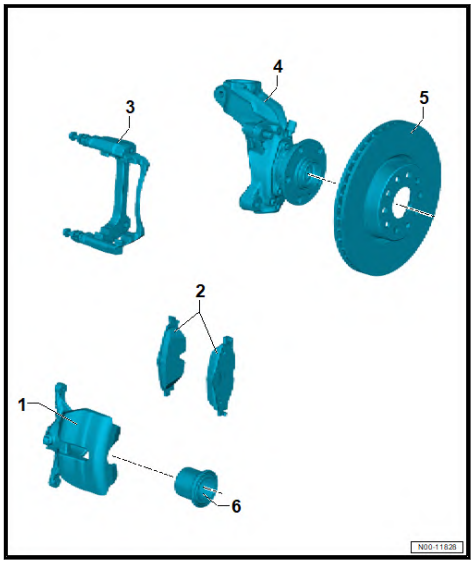
⇒ b3.1.2 rakes", page 5

⇒ b3.1.3 rakes", page 5

3.1.1 Brake master cylinder and brake servo

Brake master cylinder	Diameter in mm	23.81
Brake servo	Electromechanical brake servo	

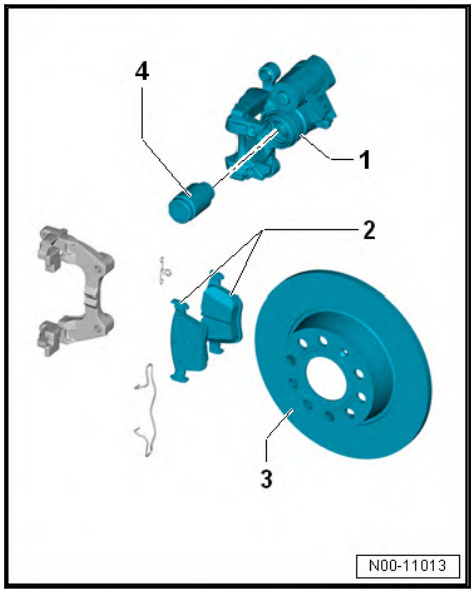
3.1.2 Front brakes



Item	PR No.		1ZC / 1ZK / 1ZA / 1ZD / 1ZG / 1ZL	1LA/1LB
1	Brake caliper		PC 57 (16)	C60 (17)
2	Brake lining, thickness	mm	14	13
	Brake pad, wear limit without backplate	mm	2	2
3	Brake disc	Diameter in mm	312	340
	Brake disc, thickness	mm	25	30
	Brake disc, wear limit	mm	22	27
4	Brake caliper piston	Diameter in mm	57	60

3.1.3 Rear brakes

Rear brake FN c - M42:



Item	PR No.		1KU / 2EA / 2EM	1KZ / 2 ER
1	Brake caliper		FN c - M42 (16)	FN c - M42 (17)
2	Brake lining, thickness	mm	11	11
	Brake pad, wear limit without backplate	mm	2	2
3	Brake disc	Diameter in mm	300	310
	Brake disc, thickness	mm	12	22
	Brake disc, wear limit	mm	10	20
4	Brake caliper piston	Diameter in mm	42	42

4 Brake test

4.1 General information

- The drive is provided by the test rig.
- For the test, ensure for vehicles with a manual gearbox that the gear lever is in neutral, and for vehicles with an automatic gearbox that the selector lever is in »N«.
- When conducting the test, observe the specifications provided by the manufacturer of the test rig.

NOTICE

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

4.2 Checking vehicles with front-wheel drive

Carry out the brake test on a single-axle roller dynamometer.

The maximum test speed is 6 km/h.

The test rigs authorised by Volkswagen fulfil these requirements.

4.3 Checking vehicles with all-wheel drive

4.3.1 On a regulated roller dynamometer with counter-rotating rollers for four-wheel drive vehicles

NOTICE

The brake test must be performed on a controlled contra-rotating single-axle roller dynamometer for four-wheel drive vehicles.

"Counter-rotating" means that the dynamometer rollers of the single-axle roller dynamometer are driven forwards on one side and backwards on the other.

The rollers drive the wheels of one axle in opposite directions to avoid transmitting torque to the other axle.

"Regulated" means that the speed of the brake test stand rollers is so controlled so that there is no difference in speed during the brake test.

This prevents the transfer of force through the stationary wheels (not on the set of rollers) via the propshaft to the rotating wheels on the rollers.

The forward rotating wheel is measured during the test, which means two brake tests per axle must be performed.

The maximum test speed is 6 km/h.

The test rigs authorised by Volkswagen fulfil these requirements.

4.3.2 Without roller dynamometer for four-wheel drive vehicles

NOTICE

If no test rig is available for four-wheel drive vehicles, the brake test can also be carried out on a standard single-axle roller dynamometer as follows:

- Drive vehicle forwards onto the rollers.
- Switch off engine and wait for 2 seconds.
- Carry out front brake test.
- Start engine and wait for approx. 5 seconds until sufficient vacuum has been built up.
- Drive vehicle forwards until rear wheels are positioned on rollers.
- Switch off engine and wait for 2 seconds.
- Carry out rear brake test.
- Start engine and wait for approx. 5 seconds until sufficient vacuum has been built up.

4.4 Checking parking brake

⇒ p4.4.1 arking brake, vehicles with front-wheel drive", page 8

4.4.1 Checking parking brake, vehicles with front-wheel drive

Activate »TÜV mode«:

- Seat belt is fitted
- Rear axle on single-axle roller dynamometer
- Ignition remains switched on
- Auto-hold is switched off
- Front wheels must be stationary
- Rear wheels must rotate for at least 5 seconds at a constant speed between 2.5 and 9 km/h.

When entering »TÜV mode«, the yellow electric parking brake and handbrake fault warning lamp -K214- will light up.

NOTICE

In »TÜV mode«, the electromechanical parking brake does not close fully when the button is first pressed.

The tension is increased gradually by actuating the electromechanical parking brake button -E538- 4 times in succession.

Actuating the electromechanical parking brake button -E538- a fifth time releases the electromechanical parking brake.

End »TÜV mode«:

- Front wheels, speed over 0 km/h
- Rear wheels, speed under 2.5 km/h or over 9 km/h
- Ignition off.

45 – Anti-lock brake system

1 General information

⇒ i1.1 nstructions for repair work on ABS", page 10

1.1 Repair instructions for repair work on ABS

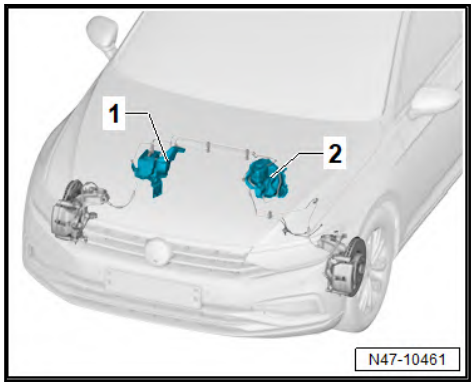
The ABS brake system is divided diagonally. The servo-assistance is effected pneumatically by the vacuum brake servo unit.

Vehicles with ABS are not fitted with a mechanical brake pressure regulator. Specially matched software in the control unit regulates the brake force distribution on the rear axle.

NOTICE

Faults in the ABS do not influence the brake system and servo assistance. 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.

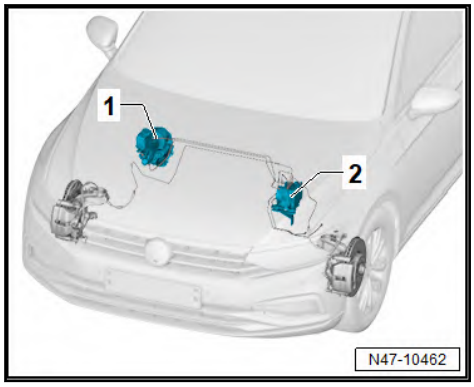
Location of anti-lock brake system on left-hand drive vehicle:



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

2 - Brake servo

Location of anti-lock brake system on right-hand drive vehicle:



1 - Brake servo

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

The control unit and hydraulic are combined in a single component. They can be separated only when removed. Hydraulic pump must not be separated from hydraulic unit either.

- Before carrying out repair work on the anti-lock brake system, determine the cause of the fault as well as the control unit code using “Guided Fault Finding”.

“Fault finding” is performed with ⇒ Vehicle diagnostic tester.

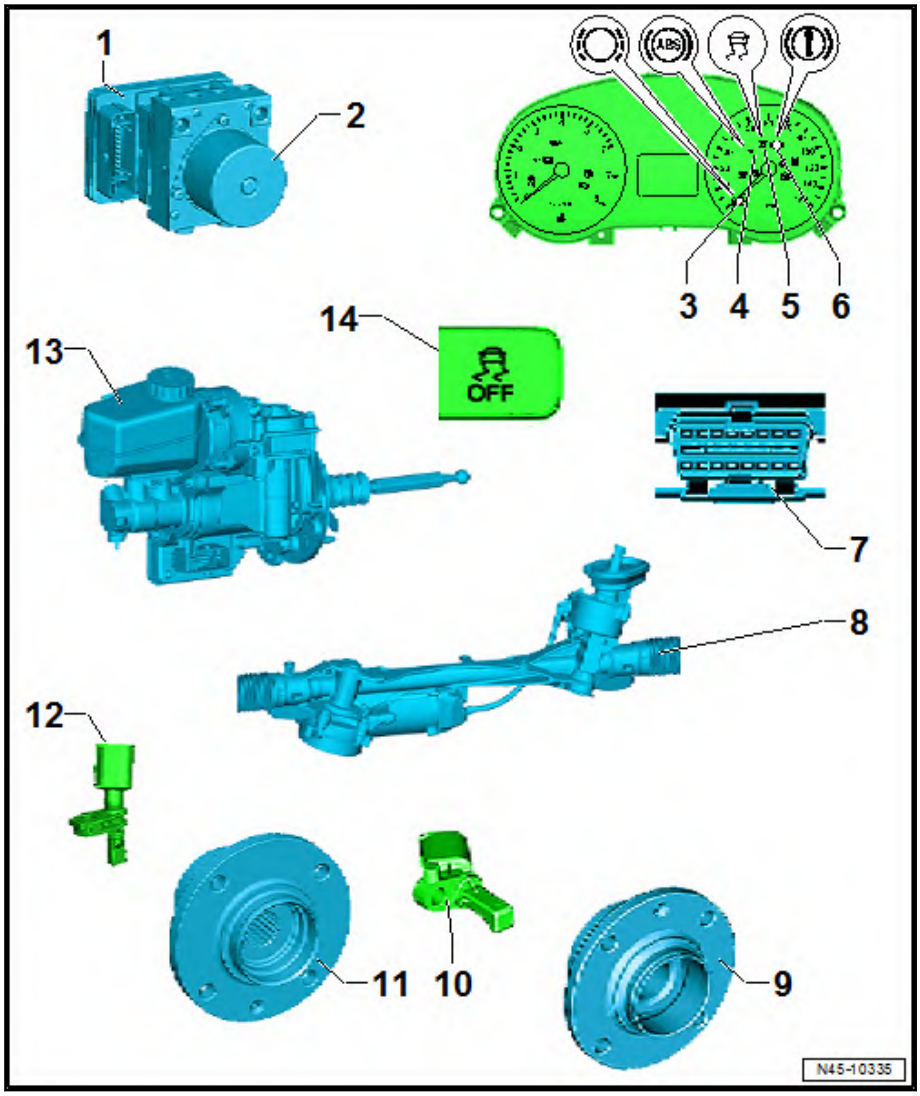
- With ignition switched off, disconnect battery earth strap.
- Before carrying out welding work with an electric welding unit, see ⇒ General Information; Body Repairs, General Body Repairs.
- When working with brake fluid, observe the relevant safety precautions and notes ⇒ page 126 .
- After work for which the brake system had to be opened, bleed the brake system with brake filling and bleeding unit -VAS 6860- ⇒ page 126 .
- During the final road test, ensure that a controlled brake application is performed at least once. A pulsation of the brake pedal must be noticeable.
- Absolute cleanliness is required when working on the anti-lock brake system.
- Auxiliary items containing mineral oil, e.g. oils, greases, etc. must never be used.
- Thoroughly clean all unions and adjacent areas before loosening. Do not use aggressive cleaning agents such as brake cleaner, petrol, thinners or similar.
- Place removed parts on a clean surface and cover them over.
- Carefully cover opened components or seal them if repairs cannot be carried out immediately.
- Only use lint-free cloths.
- Remove packing from replacement parts immediately prior to installation and not before.
- Only use parts from original packaging.
- Do not work with compressed air if the system is open. Do not move the vehicle.
- The valve coils in the control unit cannot be adjusted.
- The valve coils in the control unit cannot be renewed.
- Pressure sensor must not be changed or damaged.
- The pressure sensor cannot be renewed.
- The sensor housing must not be exposed to mechanical stress.
- No measurements must be taken on contact points of control unit.
- No measurements must be taken on contact points of hydraulic unit.
- Contact pins of hydraulic unit must not be bent or damaged.
- The contacts cannot be renewed.
- No contact sprays may be used on the contacts or the pressure sensor.

- Foreign bodies must not get between the control unit and the hydraulic unit.
- The electronic control unit can 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). Ensure that no brake fluid enters connectors.

2 Overview of fitting locations

⇒ o2.1 f fitting locations – ABS/ESP", page 13

2.1 Overview of fitting locations – ABS/ESP



1 - ABS control unit -J104-

- ❑ Installation location: on hydraulic unit, on passenger side of engine compartment.
- ❑ Do not separate connector before successfully completing self-diagnosis. Switch ignition off before separating connector.

The following components are integrated into the control unit:

- ♦ Control unit for electromechanical parking brake -J540-
- ♦ Lateral acceleration sender -G200-
- ♦ Yaw rate sender -G202-
- ♦ Longitudinal acceleration sender -G251- (depending on equipment fitted)
- ♦ The components cannot be renewed individually.
  - ❑ Assembly overview ⇒ page 16
  - ❑ Removing and installing ⇒ page 21

2 - ABS hydraulic unit -N55-

- ❑ Fitting location: on passenger side of engine compartment

The hydraulic unit consists of the components:

- ♦ ABS hydraulic pump -V64-
- ♦ Brake pressure sender -G201-
- ♦ Valve block (contains inlet and outlet valves).
  - ❑ ABS hydraulic pump -V64- and valve block must not be separated from one another.
  - ❑ Assembly overview ⇒ page 16
  - ❑ Removing and installing ⇒ page 21

3 - Brake pad warning lamp -K32-

- ❑ Location: in dash panel insert

4 - ABS warning lamp -K47-

- ❑ Location: in dash panel insert

5 - ESP and TCS warning lamp -K155-

- ❑ Location: in dash panel insert

6 - Brake system warning lamp -K118-

- ❑ Location: in dash panel insert

7 - Diagnostic connection

- ❑ Location: Driver footwell cover.

8 - Steering angle sender -G85-

- ❑ Fitting location: in steering rack.
- ❑ The steering angle sender -G85- cannot be renewed separately.
- ❑ Removing and installing steering ⇒ Running gear, axles, steering; Rep. gr. 48; Steering rack; Removing and installing steering rack.

9 - Wheel hub with wheel bearing

- ❑ ABS sensor ring is installed in wheel bearing

10 - Front right/left speed sensor -G45-/-G47-

- ❑ Removing and installing ⇒ page 42

11 - Wheel hub with wheel bearing

- ❑ ABS sensor ring is installed in wheel bearing

12 - Rear right/left speed sensor -G44-/-G46-

- ❑ Removing and installing ⇒ page 43

13 - Brake servo

- ❑ Assembly overview ⇒ page 96
- ❑ Removing and installing ⇒ page 100

14 - TCS and ESP button -E256-

- ❑ Two versions, therefore two fitting locations:

♦ Button in centre console

♦ Function button in menu of infotainment system

- ❑ Removing and installing TCS and ESP button -E256- in centre console ⇒ Electrical system; Rep. gr. 96; Controls; Removing and installing TCS and ESP button -E256-

3 Control unit and hydraulic unit

⇒ o3.1 verview – control unit and hydraulic unit", page 16

⇒ a3.2 nd installing ABS control unitJ104 and ABS hydraulic unitN55", page 21

⇒ b3.3 rake lines to hydraulic unit", page 36

⇒ c3.4 ontrol unit from hydraulic unit", page 39

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3.1 Assembly overview – control unit and hydraulic unit

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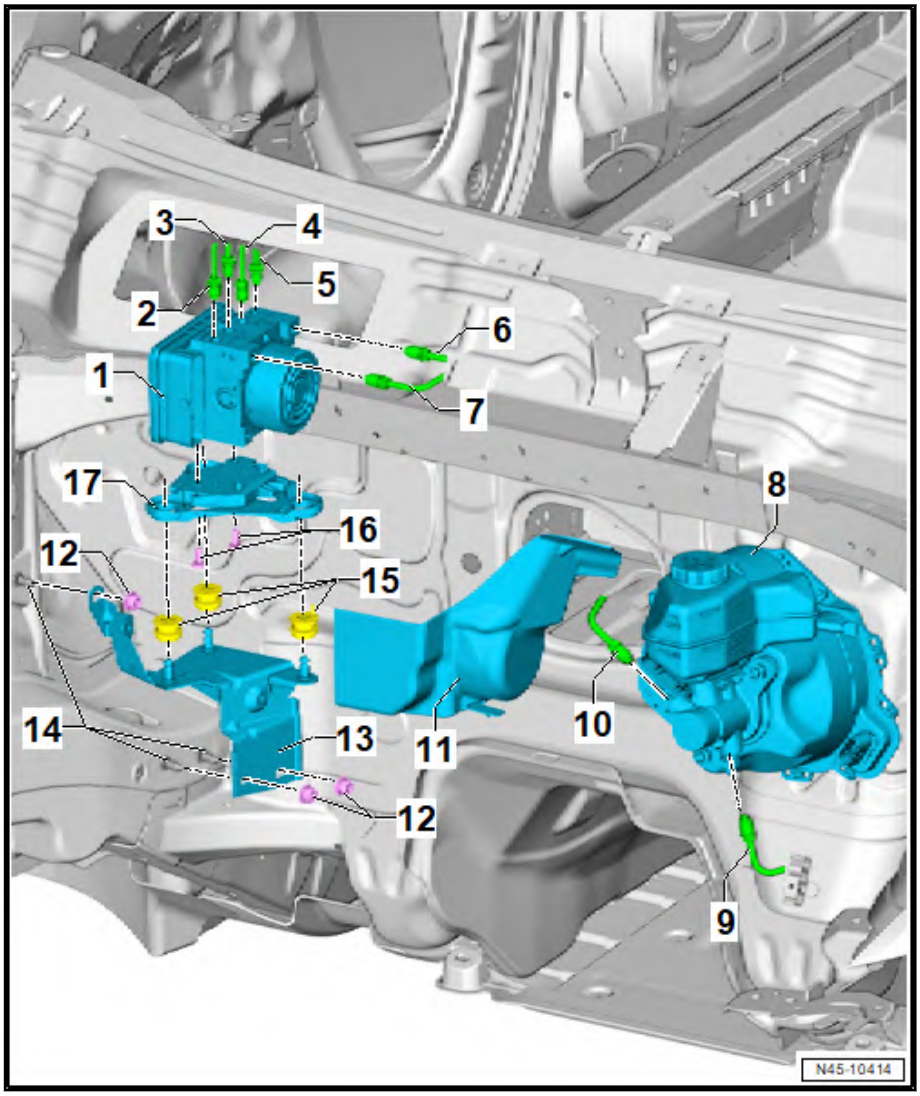
⇒ o3.1.2 verview – control unit and hydraulic unit, right-hand drive", page 18

3.1.1 Assembly overview – control unit and hydraulic unit, left-hand drive vehicles



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

- ❑ Removing and installing ⇒ page 21

2 - Brake line

- ❑ To rear right brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

3 - Brake line

- ❑ To front left brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

4 - Brake line

- ❑ To front right brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

5 - Brake line

- ❑ To rear left brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

6 - Brake line

- ❑ Leading to brake master cylinder/secondary piston circuit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

7 - Brake line

- ❑ Leading to brake master cylinder/primary piston circuit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

8 - Brake servo and brake master cylinder

- ❑ Assembly overview ⇒ page 96
- ❑ Checking brake servo ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ page 100

9 - Brake line

- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

10 - Brake line

- ❑ Brake master cylinder/secondary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

11 - Heat insulation

12 - Nut

- ❑ 20 Nm

13 - Bracket

14 - Stud

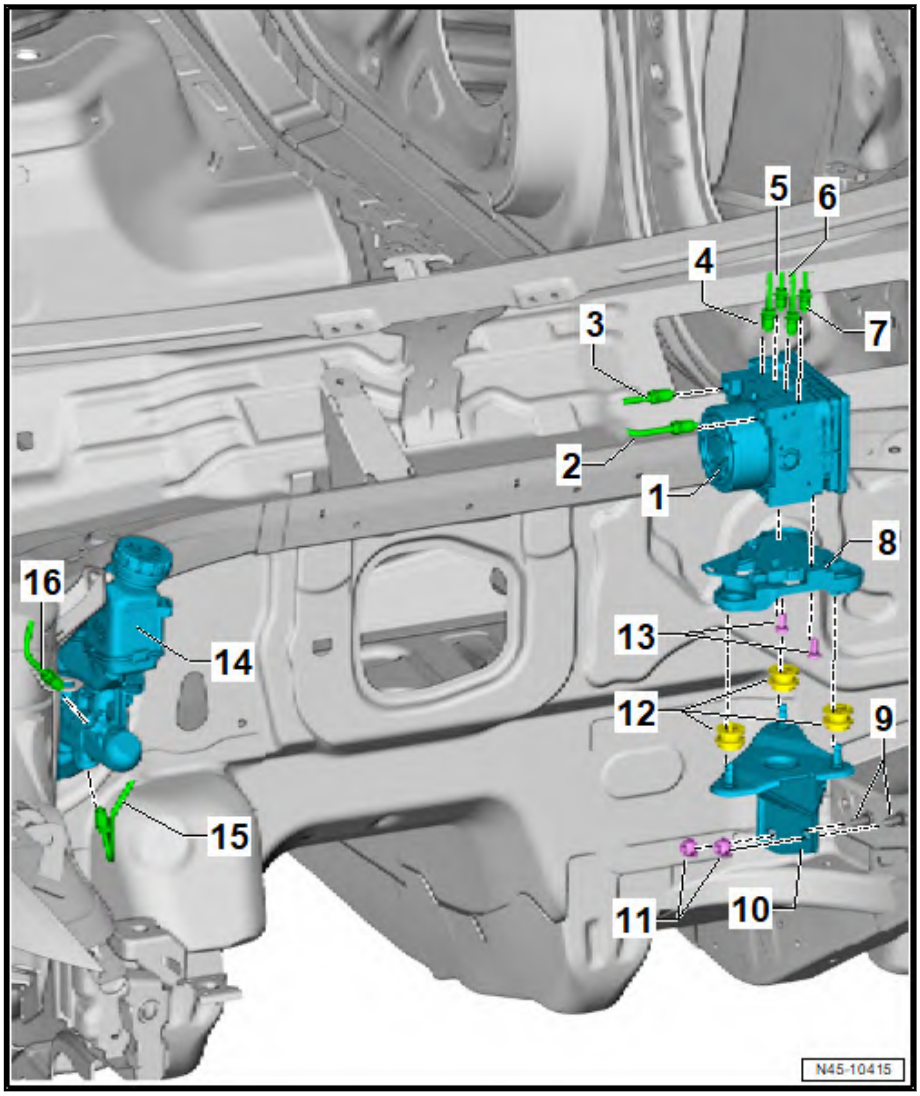
15 - Rubber damper

16 - Bolt

- ❑ 8 Nm

17 - Bracket

3.1.2 Assembly overview – control unit and hydraulic unit, right-hand drive



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

- ❑ Overview of fitting locations ⇒ page 10
- ❑ Assembly overview ⇒ page 18
- ❑ Removing and installing ⇒ page 30
- ❑ Separating ABS control unit -J104- from ABS hydraulic unit -N55- ⇒ page 39
- ❑ Attaching ABS control unit -J104- to ABS hydraulic unit -N55- ⇒ page 40
- ❑ Connecting brake line ⇒ page 38

2 - Brake line

- ❑ Brake master cylinder/secondary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ Repairing brake lines ⇒ page 122
- ❑ 14 Nm

3 - Brake line

- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ Repairing brake lines ⇒ page 122
- ❑ 14 Nm

4 - Brake line

- ❑ To rear right brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ Repairing brake lines ⇒ page 122
- ❑ 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

5 - Brake line

- ❑ To front left brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ Repairing brake lines ⇒ page 122
- ❑ 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

6 - Brake line

- ❑ To front right brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ Repairing brake lines ⇒ page 122

- ❑ 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

7 - Brake line

- ❑ To rear left brake caliper
- ❑ Identification: 5.25 mm diameter and union screw with M10 × 1 thread
- ❑ Repairing brake lines ⇒ page 122
- ❑ 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

8 - Bracket

- ❑ Check for secure seating after installing.

9 - Stud

10 - Bracket

11 - Nut

- ❑ Qty. 2
- ❑ 20 Nm

12 - Rubber damper

- ❑ Qty. 3

13 - Bolt

- ❑ Qty. 2
- ❑ 8 Nm

14 - Brake servo and brake master cylinder

- ❑ Assembly overview ⇒ page 98
- ❑ Checking brake servo ⇒ Vehicle diagnostic tester
- ❑ Removing and installing ⇒ page 103
- ❑ Removing and installing brake master cylinder ⇒ page 112

15 - Brake line

- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

16 - Brake line

- ❑ Brake master cylinder/secondary piston circuit to hydraulic unit
- ❑ Identification: 6 mm diameter and union screw with M12 × 1 thread
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

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

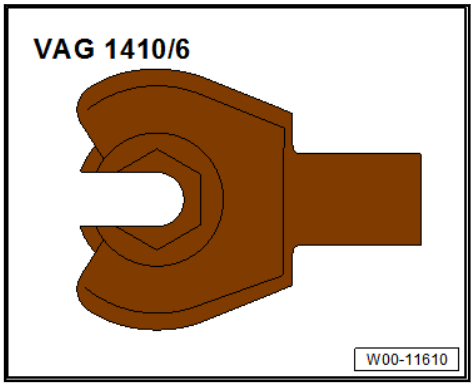
⇒ a3.2.1 nd installing ABS control unitJ104/ABS hydraulic unitN55, LHD vehicles", page 21

⇒ a3.2.2 nd installing control unit and hydraulic unit, right-hand drive vehicles", page 30

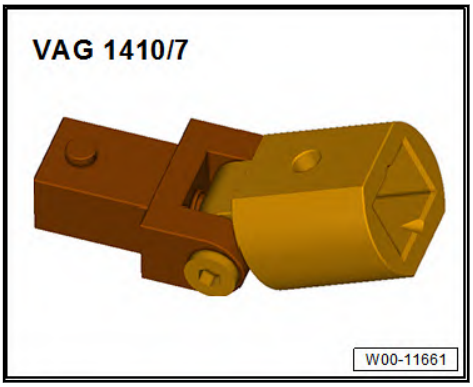
3.2.1 Removing and installing ABS control unit -J104-/ABS hydraulic unit -N55-, LHD vehicles

Special tools and workshop equipment required

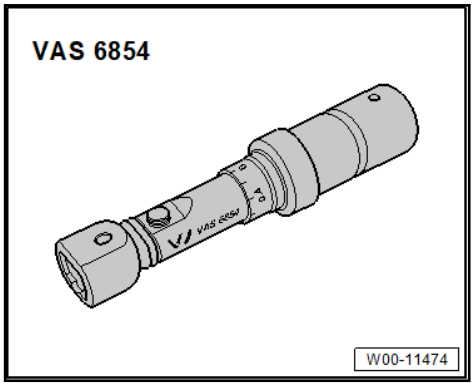
- Ring spanner insert AF 11 -V.A.G 1410/6-



- Universal joint -V.A.G 1410/7-

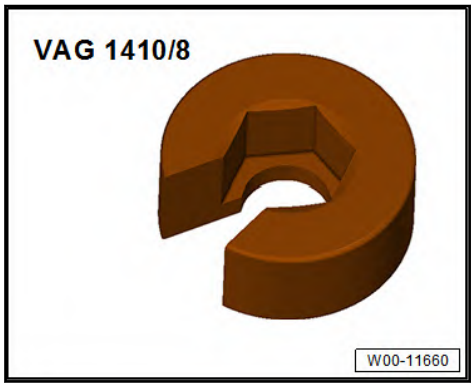


- Torque wrench -VAS 6854-

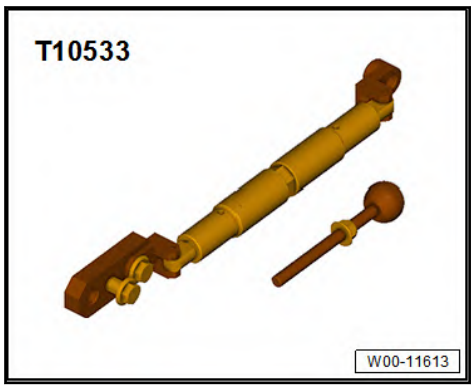


- Brake pedal depressor -V.A.G 1869/2-

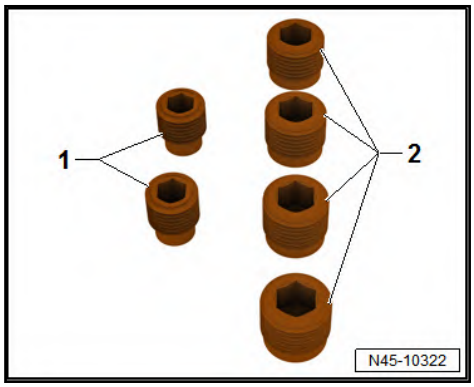
- Assembly tool -V.A.G 1410/8-



- Engine support -T10533-



Sealing plugs, assembly part no. 5Q0 698 311



1 - Sealing plug M10

2 - Sealing plug M12

Removing

Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on left-hand drive vehicle:"", page 10 :

NOTICE

Risk of damage to brake lines if bent.

- **Never excessively bend the brake lines in the area of the hydraulic unit.**

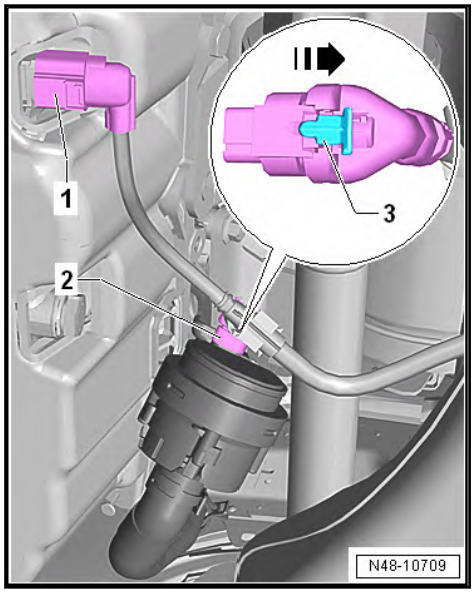
- If ABS control unit -J104- is renewed, use ⇒ Vehicle diagnostic tester.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.
- Remove engine cover ⇒ Rep. gr. 10; Engine cover; Removing and installing engine cover.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.

Vehicles with hybrid drive:

- Remove catalytic converter ⇒ Rep. gr. 26; Emission control; Removing and installing catalytic converter.

Vehicles with diesel engine:

- Remove pressure differential sender -G505- and exhaust gas pressure sensor 1 -G450- from cylinder head cover ⇒ Rep. gr. 23; Senders and sensors; Removing and installing pressure differential sender -G505-.
- If fitted, detach exhaust gas pressure sensor 1 -G450- from cylinder head cover ⇒ Rep. gr. 23; Senders and sensors; Removing and installing exhaust gas pressure sensor 1 -G450-.
- Remove exhaust gas temperature sender 3 -G495- ⇒ Rep. gr. 26; Removing and installing exhaust gas temperature sender 3 G495.
- Remove injector for reducing agent -N474- on exhaust gas cleaning module and place on right with lines still attached ⇒ Rep. gr. 26; SCR system (Selective Catalytic Reduction); Removing and installing injector for reducing agent.
- Release and pull off connector -1- for oil level and oil temperature sender -G266-.

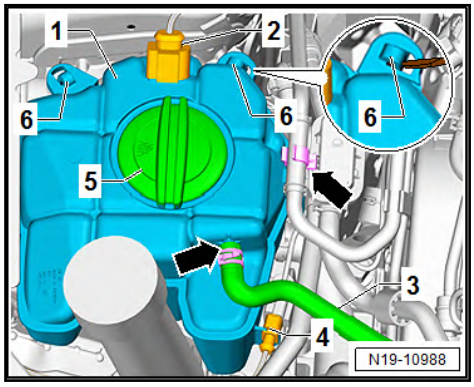


– If fitted, release and pull off connector -2- on auxiliary pump for heating -V488-.
– Remove front exhaust pipe on emission control module ⇒ Rep. gr. 26; Exhaust pipes/silencers; Removing and installing front exhaust pipe.
– Remove pendulum support ⇒ Rep. gr. 10; Assembly mountings; Removing and installing pendulum support.

Vehicle with diesel engine and four-wheel drive

– Unbolt propshaft from bevel box at front ⇒ Propshaft and rear final drive; Rep. gr. 39; Propshaft; Assembly overview - propshaft, and lay it to one side.

Vehicles with bi-turbo diesel engine



– Unbolt fuel filter, and place it on engine with fuel lines connected ⇒ Rep. gr. 20; Fuel filter; Removing and installing fuel filter.
– Release and pull off connector -2- on coolant expansion tank.
– Unclip, release and pull off connector -4-.
– Unclip retainer for fuel lines on coolant expansion tank -arrow-.
– Using a screwdriver, release catches -6-.
– Place coolant expansion tank -1- on engine.

Continued for all vehicles with diesel engine:

– Fit engine support -T10533- as shown in illustration and tighten bolts by hand.

♦ Bolt -3- = original pendulum support bolt

♦ Screw an M8 × 30 mm bolt -1- with a washer -2- into threaded hole of noise insulation.

♦ -A- thin end

♦ -B- thick end

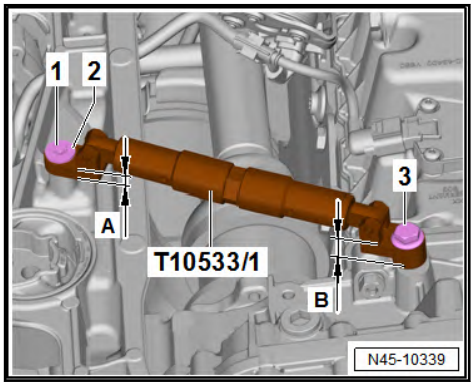
NOTICE

For all-wheel drive vehicles, fit a longer bolt into the pendulum support to serve as a spacer between the gearbox and the engine support.

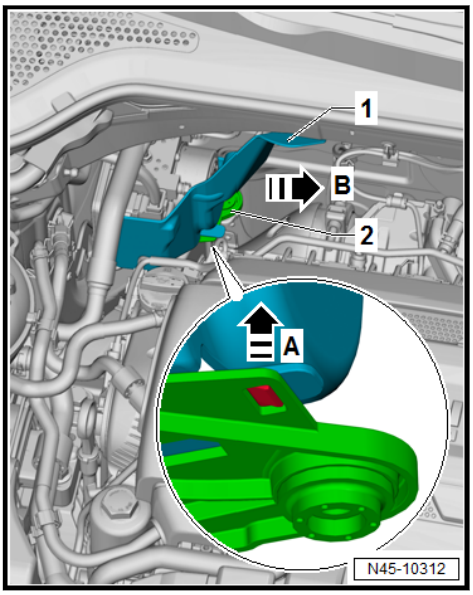
Use the front hole in the aluminium section to do so.

– To start the second bolt, push the engine forwards slightly by hand.

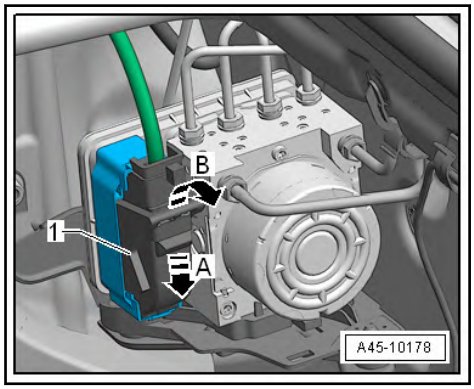
– Push engine with engine support -T10533- forwards.



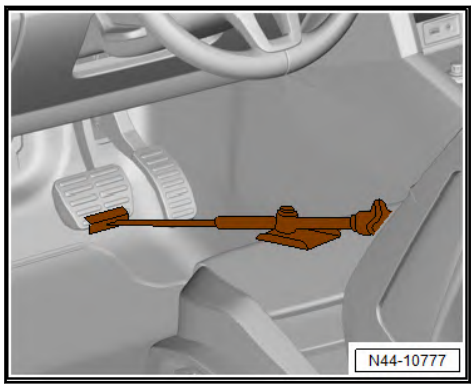
Continued for all vehicles:



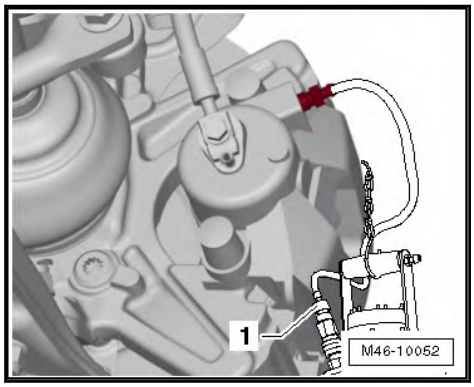
– On vehicles with heat shield, remove heat shield -1-.



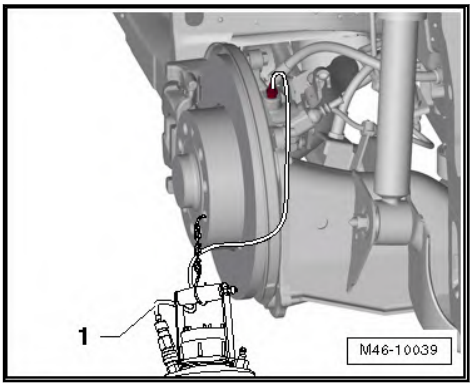
– Press down retainer catch -arrow A-.
– Release electrical connector -arrow B-.
– Pull off electrical connector -1-.
– Apply brake pedal depressor -V.A.G 1869/2-.



– Connect hose of bleeder bottle -1- to bleeder valve of front left brake caliper.



– Open bleeder valve.
– Connect hose of bleeder bottle -1- to bleeder valve of rear left brake caliper.

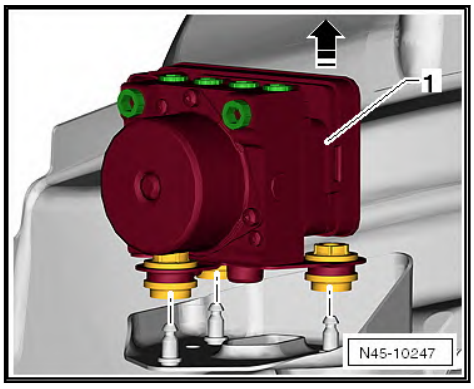


– Open bleeder valve.
– Depress brake pedal at least 60 mm using brake pedal depressor -V.A.G 1869/2-.
– Close front left and rear left bleeder valve.
– Do not remove brake pedal depressor -V.A.G 1869/2-.

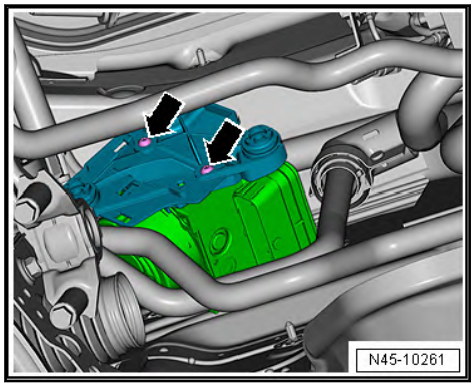
NOTICE

Ensure no brake fluid gets onto contacts.

– Pull cover off bulkhead and unclip brake lines.
– First, mark both brake lines from brake master cylinder, and unscrew them from hydraulic unit.
– Seal threaded holes immediately using sealing plugs from the assembly kit, part no. 5Q0 698 311.
– Mark, unscrew and seal threaded holes of remaining brake lines (brake calipers).
– Pull hydraulic unit together with control unit upwards out of dampers -arrow-.



– Unbolt bracket from hydraulic unit -arrows- in vehicle.



– Remove hydraulic unit.

Installing

Install in reverse order of removal, observing the following:

NOTICE

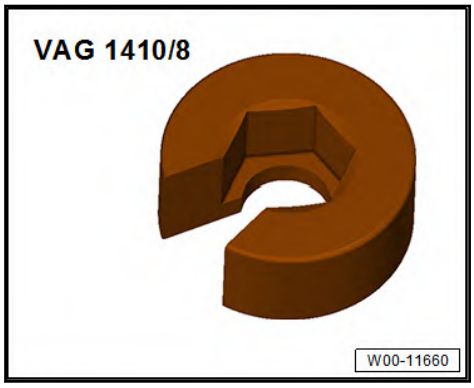
Remove sealing plugs from new hydraulic unit only when the corresponding brake line is going to be fitted.

If the sealing plugs are removed from the hydraulic unit, brake fluid can escape, and it can then no longer be guaranteed that the unit is sufficiently filled and bled.

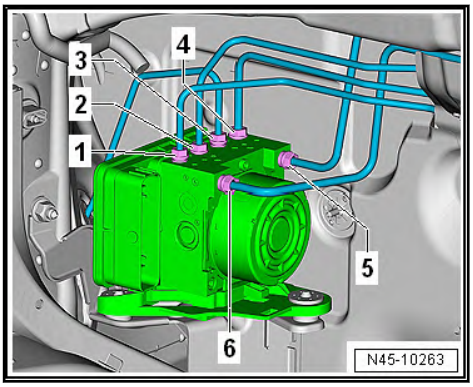
Ensure that rubber dampers of retainer are not pressed out of bracket when installing. After installation, check hydraulic unit for firm seating to avoid malfunctions.

– Before installing bracket of ABS hydraulic unit -N55- into bracket, spray rubber dampers with silicone lubricant -D 007 000 A2-.

– Using assembly tool -V.A.G 1410/8-, carefully fit brake lines.



Tightening sequence of brake lines:



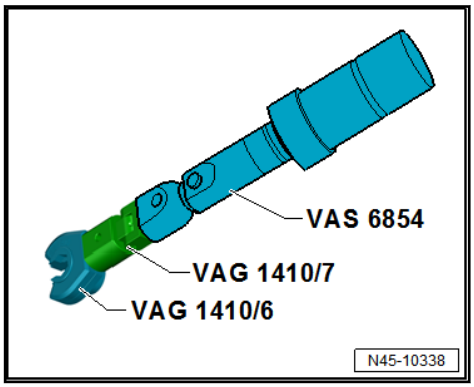
– Remove brake pedal actuator -V.A.G 1869/2-.

– Bleed brake system ⇒ page 126 .

– If ABS control unit -J104- was renewed, use ⇒ Vehicle diagnostic tester.

Torque settings

Assembling special tools for tightening brake lines



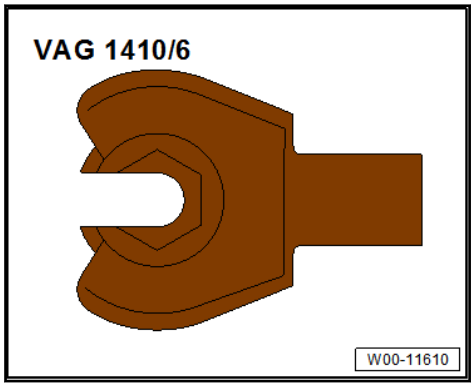
- ⇒ o3.1.1 verview – control unit and hydraulic unit, left-hand drive vehicles", page 16
- ⇒ Rep. gr. 26; Emission control system; Assembly overview - emission control system
- ⇒ Rep. gr. 26; Exhaust pipes/silencers; Assembly overview - front exhaust pipe
- ⇒ Rep. gr. 26; Exhaust gas temperature control; Assembly overview - exhaust gas temperature control
- ⇒ Rep. gr. 10; Assembly mountings; Assembly overview - assembly mountings
- ⇒ Rep. gr. 20; Fuel filter; Assembly overview - fuel filter
- ⇒ Rep. gr. 26; SCR system (Selective Catalytic Reduction); Assembly overview - injector for reducing agent
- ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery
- ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.
- ⇒ Propshaft and rear final drive; Rep. gr. 39; Propshaft; Assembly overview - propshaft
- Front bleeder valves ⇒ o1.1 verview – front brake caliper", page 86

- Rear bleeder valves ⇒ o2.1 verview – rear brake caliper", page 91

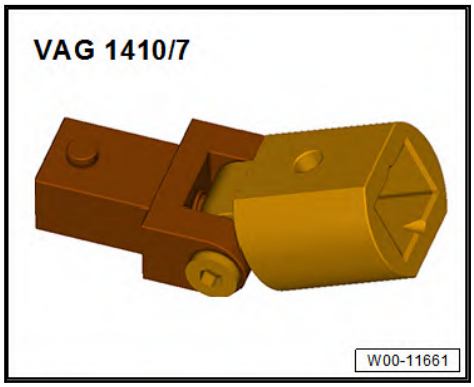
3.2.2 Removing and installing control unit and hydraulic unit, right-hand drive vehicles

Special tools and workshop equipment required

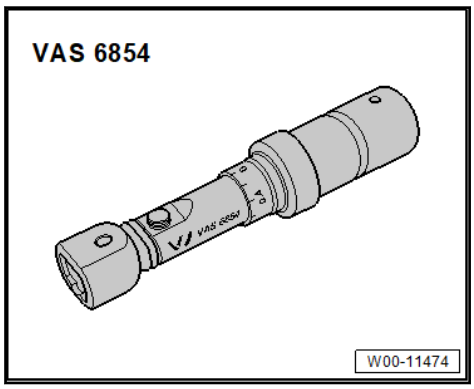
- Ring spanner insert AF 11 -V.A.G 1410/6-



- Universal joint -V.A.G 1410/7-

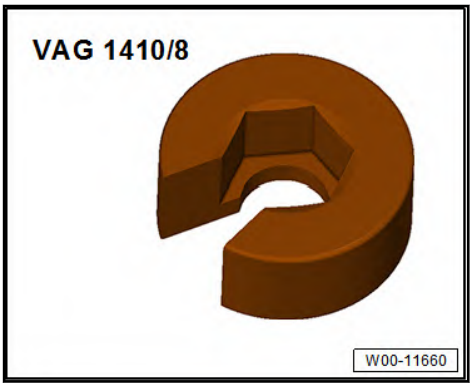


- Torque wrench -VAS 6854-

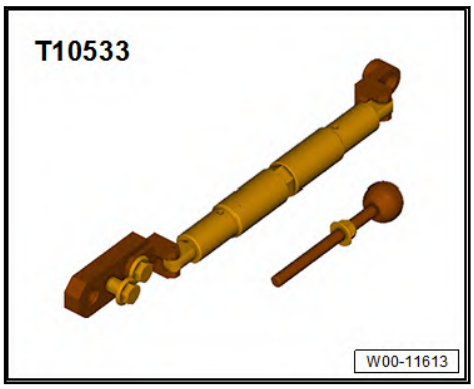


- Brake pedal depressor -V.A.G 1869/2-

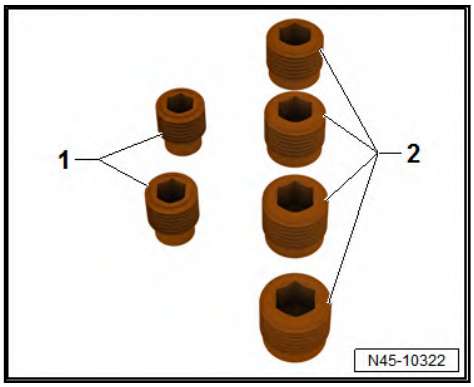
- Assembly tool -V.A.G 1410/8-



- Engine support -T10533-



Sealing plugs, assembly part no. 5Q0 698 311



1 - Sealing plug M10

2 - Sealing plug M12

Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on right-hand drive vehicle:"", page 10 :

Removing

NOTICE

Risk of damage to brake lines if bent.

- **Never excessively bend the brake lines in the area of the hydraulic unit.**

- If ABS control unit -J104- was renewed, perform function `0003 - Renew control unit (commissioning)`. Use ⇒ Vehicle diagnostic tester for this.

Vehicles with 12 V battery in engine compartment

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

Vehicles with 12 V battery in luggage compartment

- Remove air filter carrier ⇒ Rep. gr. 24; Air filter; Removing and installing air filter housing.

Vehicles with hybrid drive:

- Observe safety precautions when working on the high-voltage system ⇒ page 1 .
- Observe the risk category of the high-voltage system ⇒ Rep. gr. 00; Risk category of the high-voltage system.

DANGER

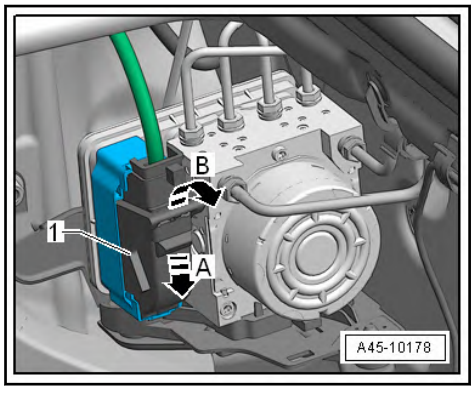
Danger to life due to high voltage.

Severe or fatal injury from electric shock.

- **The high-voltage system must be de-energised by a suitably qualified technician.**

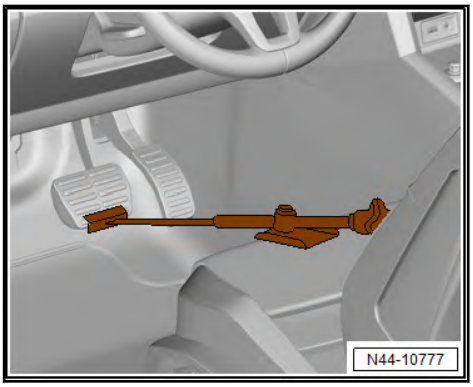
- De-energise high-voltage system now ⇒ Electric drive; Rep. gr. 93; De-energising high-voltage system.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and connecting battery.

Continued for all vehicles:

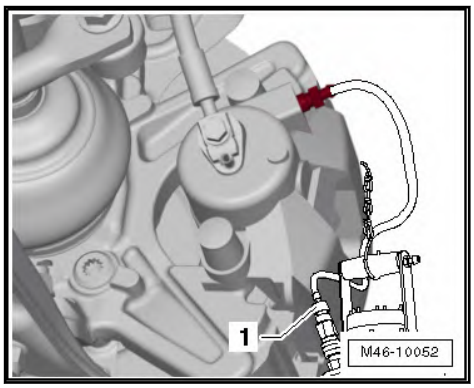


- Press down retainer catch -arrow A-.
- Release electrical connector -arrow B-.
- Pull off electrical connector -1-.

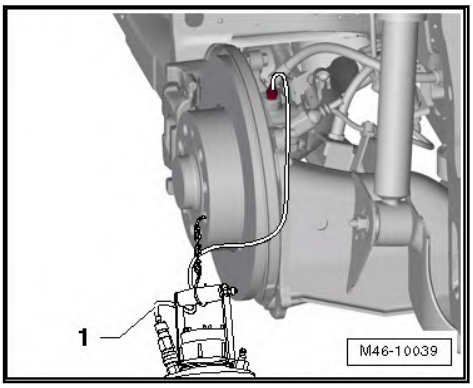
– Apply brake pedal depressor -V.A.G 1869/2-.



– Connect hose of bleeder bottle -1- to bleeder valve of front left brake caliper.



– Open bleeder valve.
– Connect hose of bleeder bottle -1- to bleeder valve of rear left brake caliper.

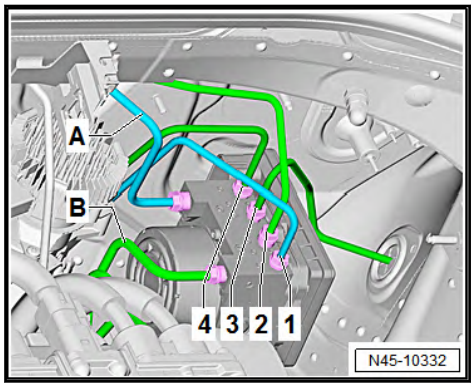


– Open bleeder valve.
– Depress brake pedal at least 60 mm using brake pedal depressor -V.A.G 1869/2-.
– Close front left and rear left bleeder valve.
– Do not remove brake pedal depressor -V.A.G 1869/2-.
– Place sufficiently lint-free cloths under ABS control unit -J104- and ABS hydraulic unit -N55-.

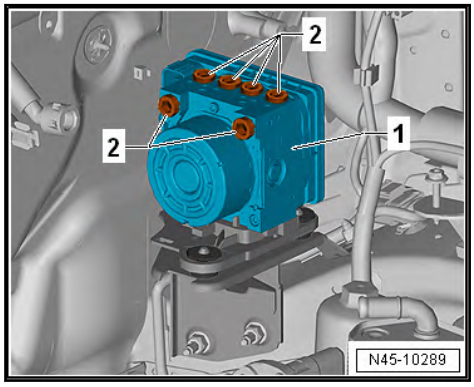
NOTICE

Make sure no brake fluid gets onto electrical contacts on ABS control unit -J104-.

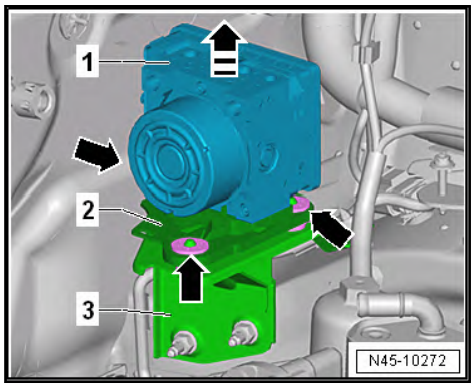
– Unclip brake lines from plenum chamber bulkhead.
– First, mark the two brake lines -A- and -B- coming from brake master cylinder.



– Unscrew both brake lines -A- and -B- from ABS hydraulic unit -N55-.
– Seal threaded holes immediately using sealing plugs 5Q0 698 311.
– Mark and unscrew remaining brake lines (brake calipers). Seal threaded holes -2-.



– Pull off ABS hydraulic unit -N55- -1- together with bracket -2- in -direction of arrow-.



– The rubber dampers -arrows- will be pulled off the studs of bracket -3- while doing so.
– Guide hydraulic unit out of vehicle.

Installing

Install in reverse order of removal, observing the following:

NOTICE

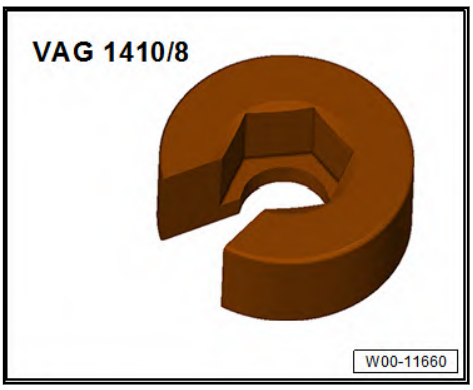
Remove sealing plugs from new hydraulic unit only when the corresponding brake line is going to be fitted.

If the sealing plugs are removed from the hydraulic unit, brake fluid can escape, and it can then no longer be guaranteed that the unit is sufficiently filled and bled.

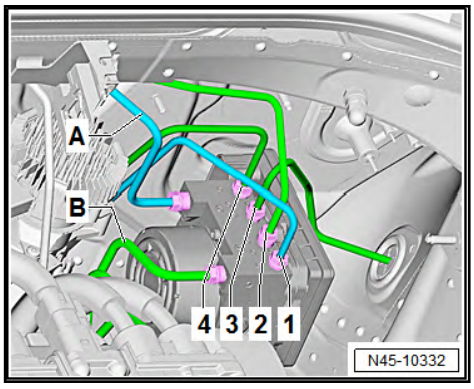
Ensure that rubber dampers of retainer are not pressed out of bracket when installing. After installation, check hydraulic unit for firm seating to avoid malfunctions.

– Before installing bracket of ABS hydraulic unit -N55- into bracket, spray rubber dampers with silicone lubricant -D 007 000 A2-.

– Using assembly tool -V.A.G 1410/8-, carefully fit brake lines.



Tightening sequence of brake lines:



– First, attach and tighten brake lines in sequence -4- to -1-.

– Then, tighten attach and tighten brake lines in sequence -A- to -B-.

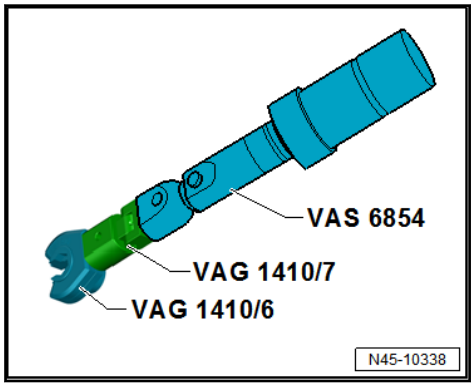
– Remove brake pedal actuator -V.A.G 1869/2-.

– Bleed brake system ⇒ page 126 .

– If ABS control unit -J104- was renewed, perform function `0003 - Renew control unit (commissioning)`. Use ⇒ Vehicle diagnostic tester for this.

Torque settings

Assembling special tools for tightening brake lines



- ⇒ o3.1.2 verview – control unit and hydraulic unit, right-hand drive", page 18
- Battery ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery
- Noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation
- ⇒ Rep. gr. 23; Air filter; Assembly overview - air filter housing
- Front bleeder valves ⇒ o1.1 verview – front brake caliper", page 86
- Rear bleeder valves ⇒ o2.1 verview – rear brake caliper", page 91

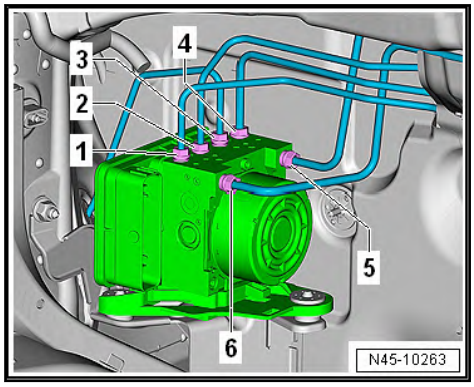
3.3 Connecting brake lines to hydraulic unit

⇒ b3.3.1 rake lines to hydraulic unit, left-hand drive vehicles", page 36

⇒ b3.3.2 rake lines to hydraulic unit, right-hand drive vehicles", page 38

3.3.1 Connecting brake lines to hydraulic unit, left-hand drive vehicles

On hydraulic unit:



1 - Hydraulic unit to rear right brake caliper

- Identification: 5.25 mm diameter and union screw with short M12 × 1 thread

2 - From hydraulic unit to front left brake caliper

- Identification: 5.25 mm diameter and union screw with M10 × 1 thread

3 - From hydraulic unit to front right brake caliper.

- Identification: 5.25 mm diameter and union screw with short M12 × 1 thread

4 - From hydraulic unit to rear left brake caliper

- Identification: 5.25 mm diameter and union screw with M10 × 1 thread

5 - From hydraulic unit to secondary piston circuit of brake master cylinder.

- Identification: 6 mm diameter and union screw with M12 × 1 thread

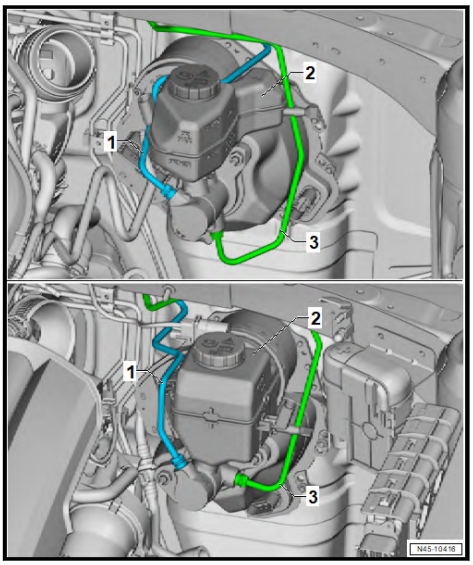
6 - From hydraulic unit to primary piston circuit of brake master cylinder.

- Identification: 6 mm diameter and union screw with M12 × 1 thread

Torque settings

- ⇒ o3.1 verview – control unit and hydraulic unit", page 16
- ⇒ a3.2 nd installing ABS control unitJ104 and ABS hydraulic unitN55", page 21

On tandem brake master cylinder:



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

2 - Brake servo and brake master cylinder

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

Abbildung oben - Vehicles without biturbo diesel engine

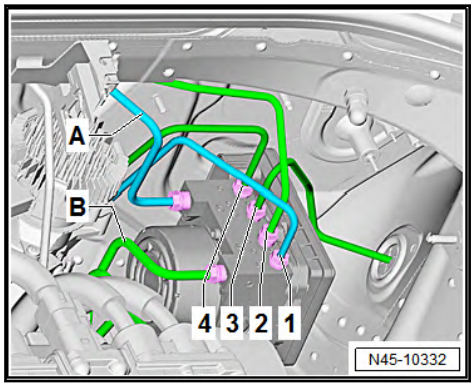
Abbildung unten - Vehicles with biturbo diesel engine

Torque settings

- ⇒ o3.1 verview – control unit and hydraulic unit", page 16
- ⇒ o3.1 verview – brake servo/brake master cylinder", page 96

3.3.2 Connecting brake lines to hydraulic unit, right-hand drive vehicles

On hydraulic unit:



1 - From hydraulic unit to rear left brake caliper

- Identification: 5.25 mm diameter and union screw with M10 × 1 thread

2 - From hydraulic unit to front right brake caliper.

- Identification: 5.25 mm diameter and union screw with short M12 × 1 thread

3 - From hydraulic unit to front left brake caliper

- Identification: 5.25 mm diameter and union screw with M10 × 1 thread

4 - Hydraulic unit to rear right brake caliper

- Identification: 5.25 mm diameter and union screw with short M12 × 1 thread

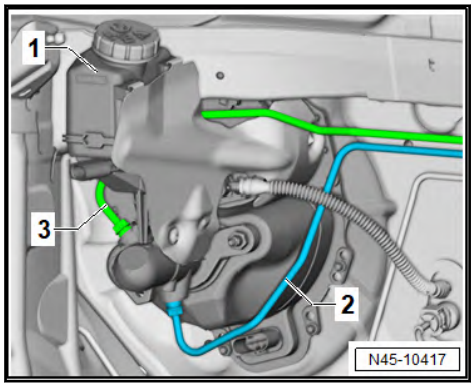
A - From hydraulic unit to primary piston circuit of brake master cylinder.

- Identification: 6 mm diameter and union screw with M12 × 1 thread

B - From hydraulic unit to secondary piston circuit of brake master cylinder.

- Identification: 6 mm diameter and union screw with M12 × 1 thread

On brake master cylinder:



1 - Between brake master cylinder and brake servo

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

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

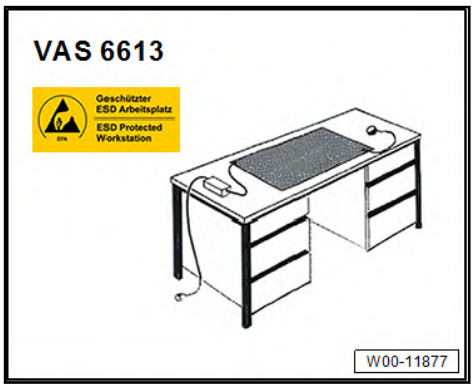
Torque settings

- ⇒ o3.1.2 verview – control unit and hydraulic unit, right-hand drive", page 18
- ⇒ o3.1.2 verview – brake servo/brake master cylinder, right-hand drive vehicles", page 98

3.4 Separating control unit from hydraulic unit

Special tools and workshop equipment required

- ESD workplace -VAS 6613-



- Torx insert T25
- If a control unit is defective, detach the control unit from the hydraulic unit. Renew only the control unit.
- If the hydraulic unit is defective, the hydraulic unit must be renewed together with the control unit.
- To separate the control unit from the hydraulic unit, the ESP unit must be removed first.

NOTICE

Risk of damage to hydraulic unit caused by removal of the return flow pump.

– Never detach the return flow pump from the hydraulic unit.

NOTICE

Risk of irreparable damage to control unit caused by electrostatic charge and dirt.

– Discharge any electrostatic electricity: touch an ESD workplace (earth yourself).

– Protect interior of control unit from moisture and dirt.

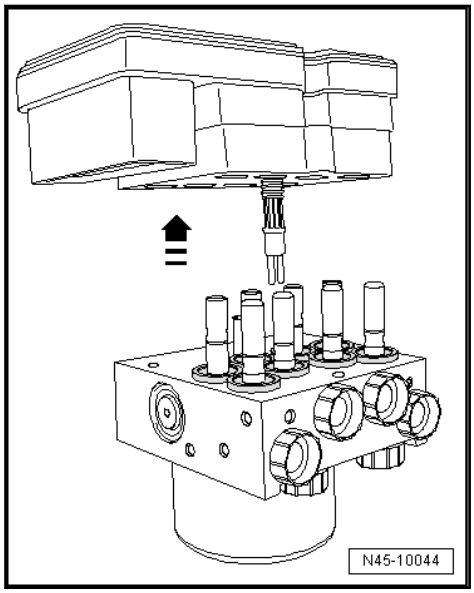
This electrostatic charge can cause malfunctions if you touch electric components.

– Before working on electric components, touch an earthed object, ESD workplace -VAS 6613-. Do not directly touch connector contacts or electronic components.

– Lay down hydraulic unit together with control unit on ESD workplace -VAS 6613-.

– Unscrew the 3 Torx bolts from control unit and lay them aside immediately (to avoid interchanging with the new Torx bolts).

– Set hydraulic unit with control unit facing upwards on ESD workplace -VAS 6613-.
– Taking care not to tilt control unit, pull it off hydraulic unit.



– Cover control unit solenoids with a lint-free cloth.
– Check cleanliness of hydraulic unit sealing surface; clean with methylated spirits and a lint-free cloth if necessary.

Hydraulic unit sealing surface must not be worked with a file, metal scraper, sandpaper or similar.

If hydraulic unit sealing surface is damaged (e.g. scoring, scratches), hydraulic unit must be renewed together with control unit.

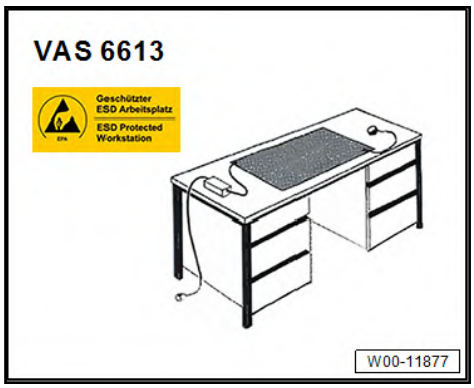
The seal of the control unit may not be pulled out or raised.

The seal of the control unit cannot be renewed.

3.5 Fitting control unit to hydraulic unit

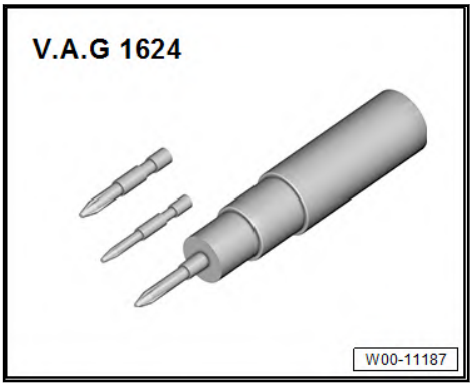
Special tools and workshop equipment required

♦ ESD workplace -VAS 6613-



♦ Torque screwdriver -V.A.G 1624-

- Torx insert T25



NOTICE

Severe shocks (e.g. dropping, impact) may destroy the control unit. Control unit must not then be used.

The threads of the hydraulic unit for securing the control unit must not be recut. If the thread is damaged, e.g. bolts difficult to turn in by hand or cannot be tightened to the specified torque. Renew the hydraulic unit.

A new control unit may be mounted on an existing hydraulic unit max. three times to guarantee impermeability of the elastic seal.

A control unit which has already been operated in a vehicle must not be installed a second time.

- Clean surfaces before assembling.

– Place control unit on hydraulic unit without tilting it.

– Tighten hydraulic unit and control unit alternately in 2 stages to specified torque using new Torx bolts provided.

Torque settings

- Tighten new Torx bolts alternately in 2 stages
- Stage 1: preliminary tightening torque: 1 Nm to 1.5 Nm (to allow seal to settle).
- Stage 2: final specified torque: 2.5 Nm.
- ⇒ o3.1 verview – control unit and hydraulic unit", page 16

4 Sensors

4.1 Assembly overview – speed sensor on front axle

The overview is shown for the left side of vehicle as an example.

1 - Front left speed sensor - G47-/front right speed sensor -G45-

- ❑ Removing and installing ⇒ page 44

2 - Bolt

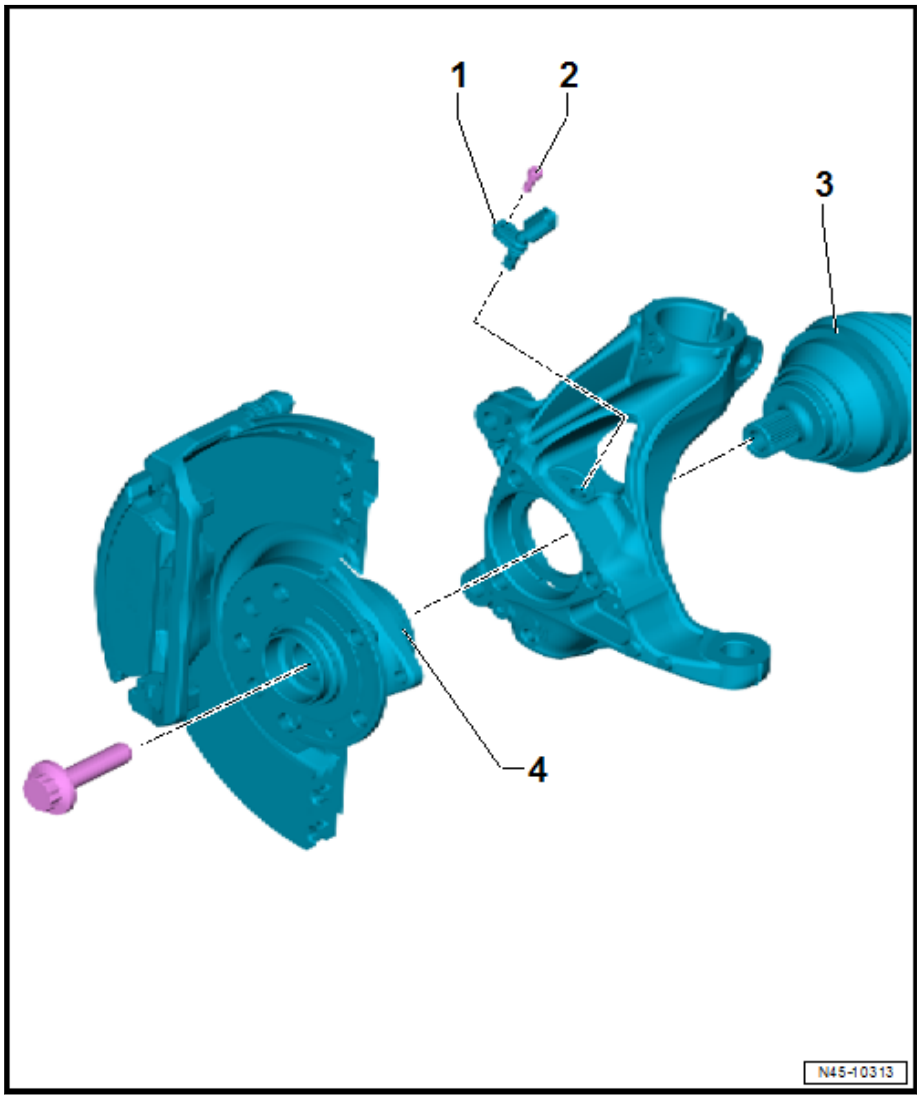
- ❑ 8 Nm

3 - Drive shaft

- ❑ Assembly overview ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Assembly overview - drive shaft.
- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 40; Drive shaft; Removing and installing drive shaft.

4 - Wheel hub with wheel bearing unit

- ❑ The ABS sensor ring is integrated in the wheel bearing unit.
- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 40; Wheel bearings; Removing and installing wheel bearing unit.



4.2 Assembly overview – speed sensors on rear axle

⇒ o4.2.1 verview - rear speed sensor, front-wheel drive", page 43

⇒ o4.2.2 verview – speed sensors at rear, all-wheel drive", page 43

4.2.1 Assembly overview - rear speed sensor, front-wheel drive

The overview is shown for the left side of vehicle as an example.

1 - Wheel hub with wheel bearing unit

- ❑ The ABS sensor ring is integrated in the wheel bearing unit.
- ❑ Check ABS sensor ring ⇒ page 47
- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearings, trailing arm; Removing and installing wheel bearing unit

2 - Wheel bearing housing

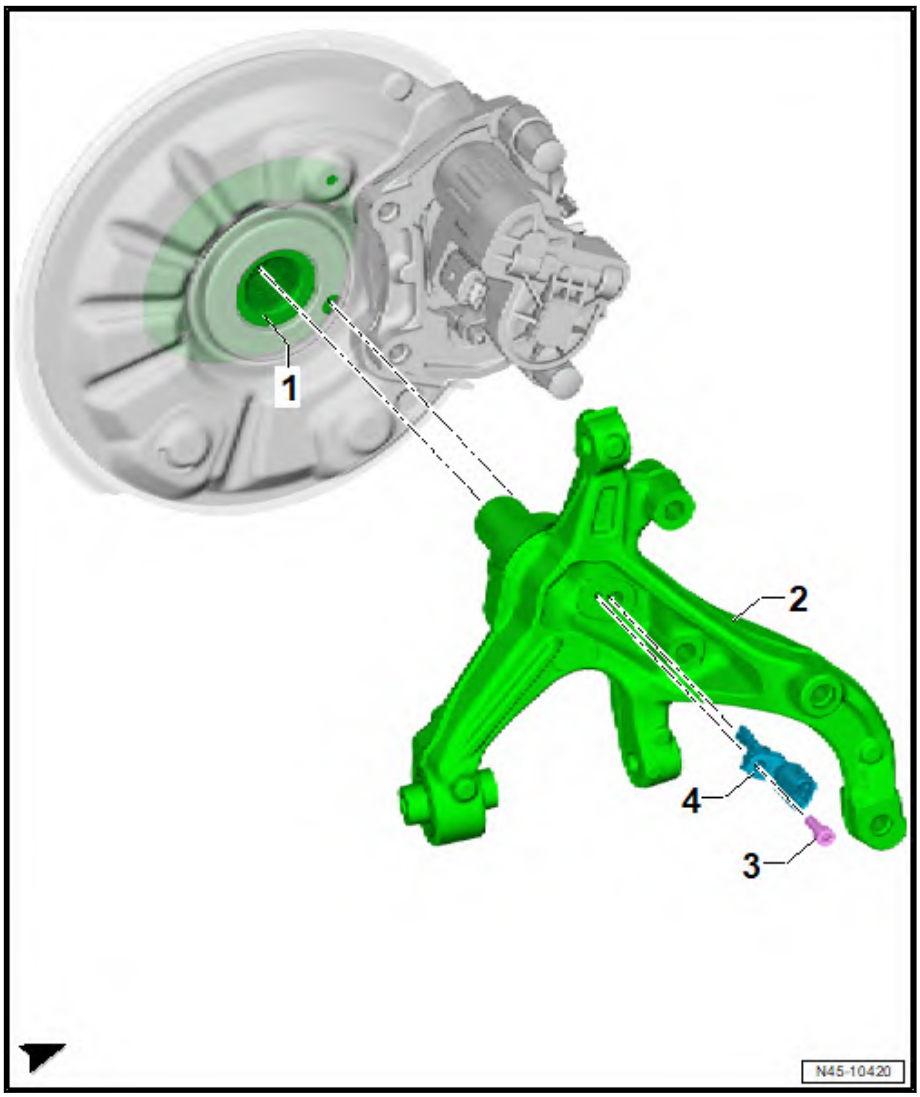
- ❑ Assembly overview ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearing, trailing arm; Assembly overview - wheel bearing

3 - Bolt

- ❑ 8 Nm

4 - Rear right speed sensor -G44-/rear left speed sensor -G46-

- ❑ Clean inside surface of hole before inserting sensor
- ❑ Coat inside surface with high-temperature paste -G 052 112 A3-
- ❑ Removing and installing ⇒ a4.5 nd installing speed sensors on rear axle G44/G46", page 45



4.2.2 Assembly overview – speed sensors at rear, all-wheel drive

The overview is shown for the left side of vehicle as an example.

1 - Rear right speed sensor -G44-/rear left speed sensor -G46-

- ❑ Clean inside surface of hole before inserting sensor
- ❑ Coat inside surface with high-temperature paste -G 052 112 A3-
- ❑ Removing and installing ⇒ a4.5 nd installing speed sensors on rear axle G44/G46", page 45

2 - Bolt

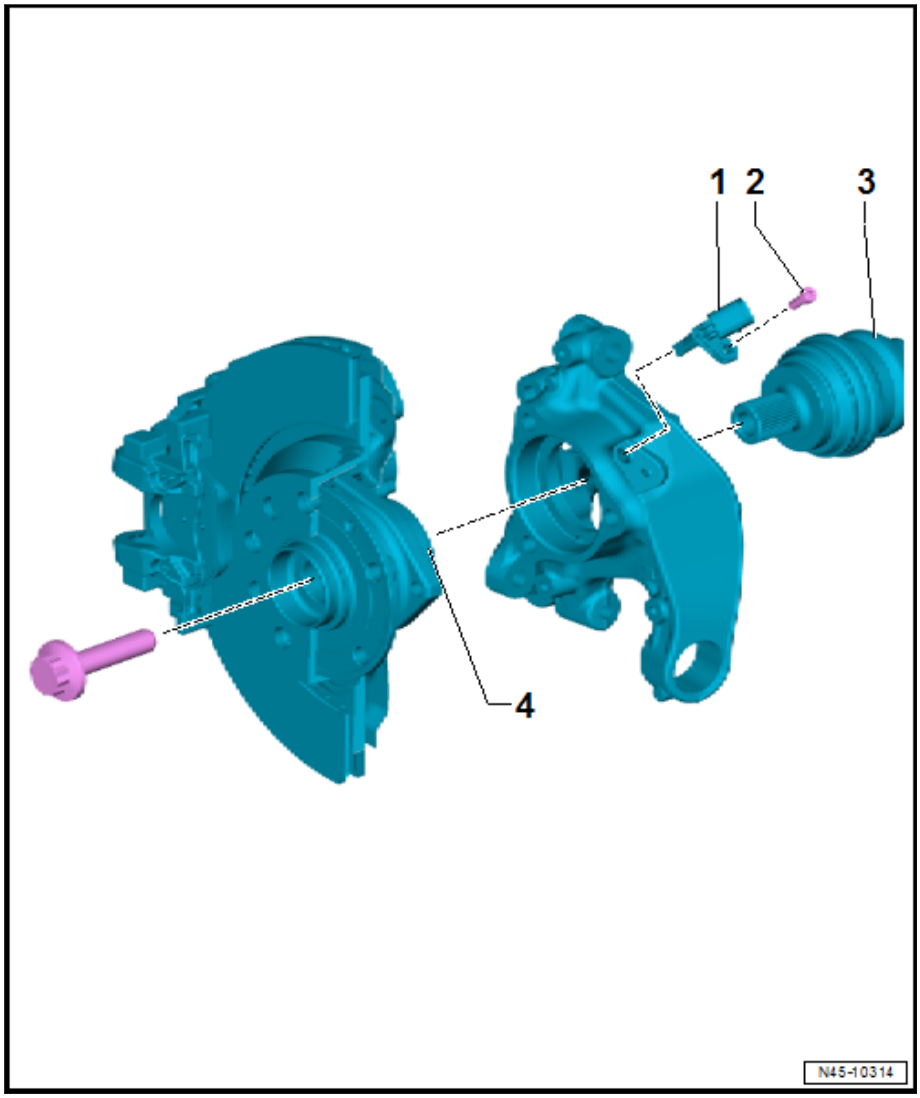
- ❑ 8 Nm

3 - Drive shaft

- ❑ Assembly overview ⇒ Running gear, axles, steering; Rep. gr. 42; Drive shaft; Assembly overview - drive shaft.
- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Drive shaft; Removing and installing drive shaft.

4 - Wheel hub with wheel bearing unit

- ❑ The ABS sensor ring is integrated in the wheel bearing unit.
- ❑ Check ABS sensor ring ⇒ page 47
- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearings, trailing arm; Removing and installing wheel bearing unit



4.3 Removing and installing ESP sensor unit -G419-

The lateral acceleration sender -G200-, the yaw rate sender -G202- and the longitudinal acceleration sender -G251- are installed together with the control unit for electromechanical parking brake -J540- in the ABS control unit -J104-.

The components cannot be renewed individually.

– Removing and installing ABS control unit -J104- ⇒ page 21 .

4.4 Removing and installing speed sensors on front axle -G45-/-G47-

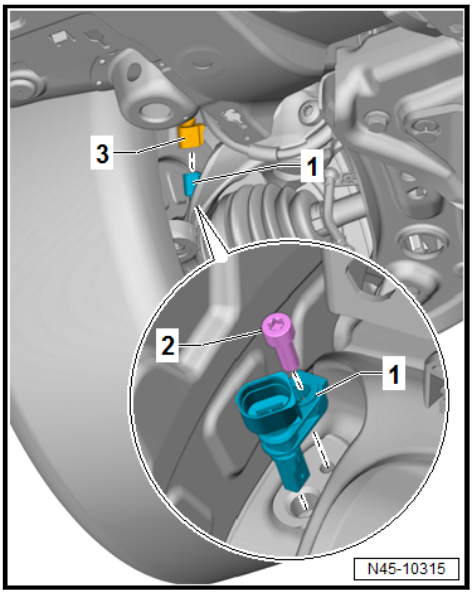
Removing

Removal and installation are described for the left side of vehicle as an example.

Front left speed sensor -G47- and front right speed sensor -G45- will be henceforth referred to as front speed sensor.

– Raise vehicle.

– Release and pull off electrical connector -3- from front speed sensor -1-.



– Unscrew bolt -2-, and pull front speed sensor -1- out of wheel bearing housing.

Installing

Install in reverse order of removal, observing the following:

– Clean inside surface of hole before inserting speed sensor. Coat front speed sensor all-round with high-temperature paste -G 052 112 A3-.

Torque settings

◆ ⇒ o4.1 verview – speed sensor on front axle", page 42

4.5 Removing and installing speed sensors on rear axle -G44-/-G46-

⇒ a4.5.1 nd installing rear speed sensor", page 45

⇒ a4.5.2 nd installing speed sensor on rear axle G44/G46, vehicles with all-wheel drive", page 46

4.5.1 Removing and installing rear speed sensor

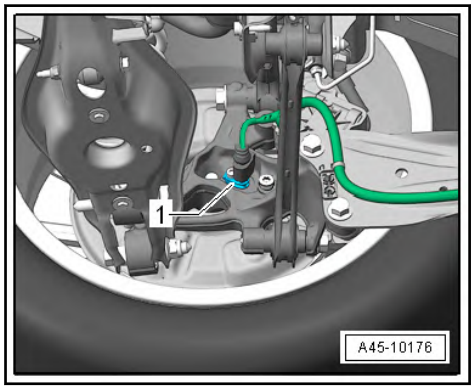
Removing

Removal and installation are described for the left side of vehicle as an example.

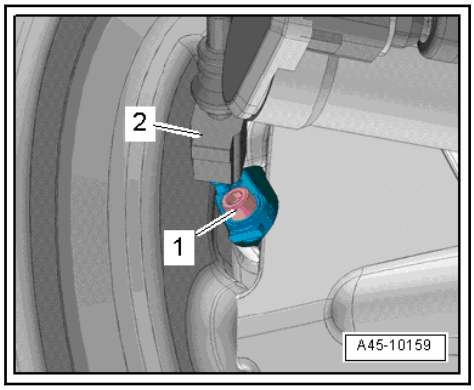
Rear right speed sensor -G44- and rear left speed sensor -G46- will be henceforth referred to as rear speed sensor.

– Raise vehicle.

Rear speed sensor -1-.



– Disconnect connector -2- from rear speed sensor.



– Unscrew bolt -1- and pull speed sensor out of wheel bearing housing.

Installing

Install in reverse order of removal, observing the following:

– Before inserting rear speed sensor, clean inner surface of hole. Coat rear speed sensor all around with high-temperature paste G 052 112 A3.

Torque settings

♦ ⇒ o4.2 verview – speed sensors on rear axle", page 43

4.5.2 Removing and installing speed sensor on rear axle -G44-/-G46-, vehicles with all-wheel drive

Special tools and workshop equipment required

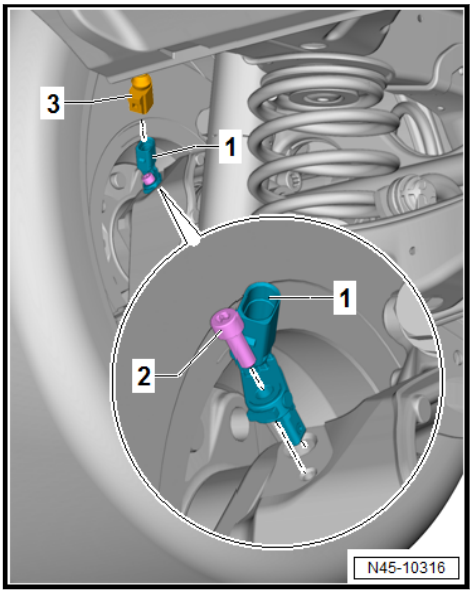
♦ Lubricating paste -G 000 650- ⇒ Electronic parts catalogue (ETKA)

Removing

Removal and installation are described for the left side of vehicle as an example.

Rear right speed sensor -G44- and rear left speed sensor -G46- will be henceforth referred to as rear speed sensor.

– Disconnect electrical connector -3- of rear speed sensor -1-.



– Unscrew bolt -2-, and pull rear speed sensor -1- out of wheel bearing housing.

Installing

Install in reverse order of removal, observing the following:

– Before inserting rear speed sensor, clean inner surface of hole.

– Coat rear speed sensor all around with high-temperature paste G 052 112 A3.

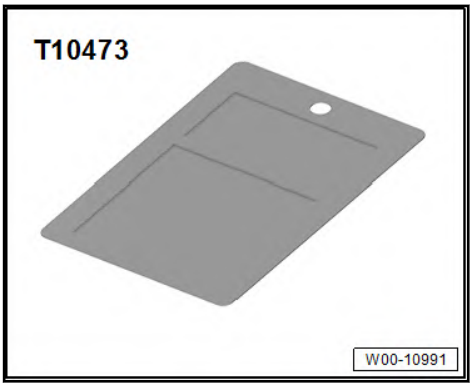
Torque settings

♦ ⇒ o4.2.2 verview – speed sensors at rear, all-wheel drive", page 43

4.6 Checking ABS sensor ring

Special tools and workshop equipment required

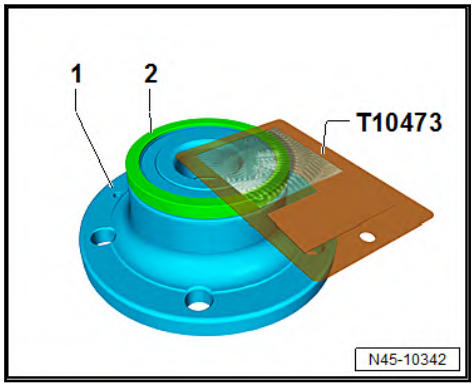
♦ Sensor gauge -T10473-



Procedure

• Wheel bearing unit is removed.

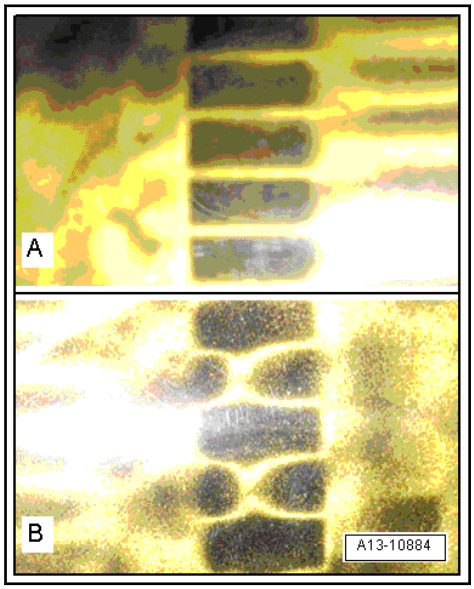
– Using sensor gauge -T10473-, check ABS sensor ring -2- all around, as shown in illustration.



1 - Wheel bearing unit

2 - Seal with integrated ABS sensor ring

Test pattern for ABS sensor ring:



A - ABS sensor ring is OK

B - ABS sensor ring is defective

4.7 Removing and installing steering angle sender -G85-

The steering angle sender -G85- is installed in steering rack.

The steering angle sender -G85- cannot be renewed separately.

– Removing and installing steering ⇒ Running gear, axles, steering; Rep. gr. 48; Steering rack; Removing and installing steering rack.

46 – Brakes - mechanism

1 Front brake

⇒ o1.1 verview – front brake", page 49

⇒ a1.2 nd installing brake pads", page 51

⇒ a1.3 nd installing brake caliper", page 54

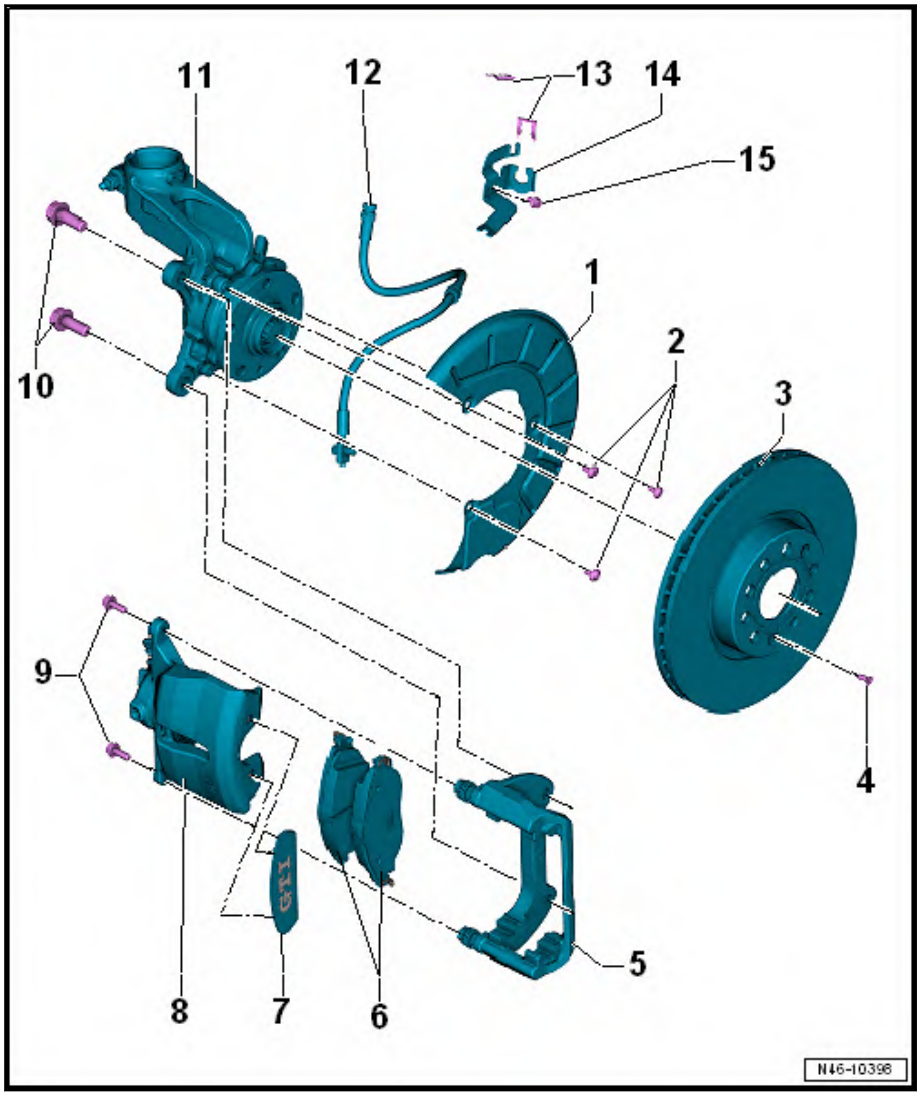
1.1 Assembly overview – front brake

NOTICE

Every time after changing pads, depress brake pedal firmly several times with vehicle stationary, so that brake pads are properly seated in their normal operating position.

Use the brake filling and bleeding equipment -VAS 6860- to draw off brake fluid from the brake fluid reservoir.

Fit brake pedal depressor -V.A.G 1869/2- before removing a brake caliper or disconnecting a brake hose (release pressure in system).



1 - Cover plate

2 - Torx bolt

- ❑ 12 Nm

3 - Brake disc

- ❑ Internally ventilated
- ❑ Wear limits ⇒ page 5
- ❑ Always replace on both sides
- ❑ Unbolt brake caliper and brake carrier before removing

4 - Torx bolt

- ❑ 4.5 Nm

5 - Brake carrier

- ❑ Lightly grease guide surfaces. For grease allocation, see ⇒ Electronic parts catalogue (ETKA)

6 - Brake pads

- ❑ Thickness 14 mm not including backplate
- ❑ With front right brake pad wear indicator
- ❑ When wear reaches a predetermined limit (approx. 4 mm), the warning lamp in the dash panel insert comes on. Sensors can be renewed individually.
- ❑ Wear limit: 2 mm excluding backing plate.
- ❑ Check thickness ⇒ Maintenance; Booklet ; Checking condition of discs and thickness of pads at front and rear
- ❑ Always replace on both sides
- ❑ Removing and installing ⇒ page 51

7 - Trim with badge

Allocation ⇒ Electronic parts catalogue (ETKA)

8 - Brake caliper

- ❑ Do not disconnect brake hose when changing pads.
- ❑ Removing and installing ⇒ page 54
- ❑ Repairing ⇒ page 86

Allocation ⇒ Electronic parts catalogue (ETKA)

9 - Hexagon bolt (self-locking)

- ❑ Renew after removal
- ❑ 35 Nm

10 - Ribbed bolt

- ❑ Clean if reusing
- ❑ 200 Nm

11 - Wheel bearing housing

❑ With bolted brake carrier

Allocation ⇒ Electronic parts catalogue (ETKA)

12 - Brake hose with banjo union and banjo bolt

❑ Ensure correct installation position

❑ 35 Nm

13 - Retaining clip

14 - Bracket

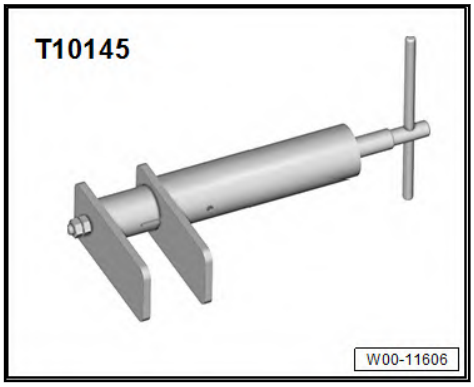
15 - Bolt

❑ 8 Nm

1.2 Removing and installing brake pads

Special tools and workshop equipment required

♦ Piston resetting appliance -T 10145-



Removing

NOTICE

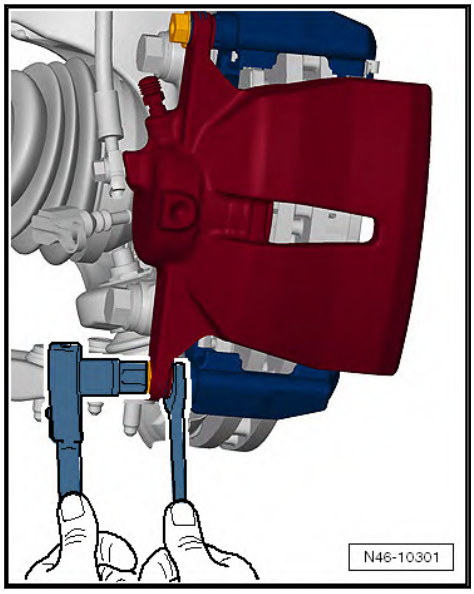
Mark brake pads when removing if they are to be reused. Fit in same position when installing, or braking will be uneven.

– Remove wheels.

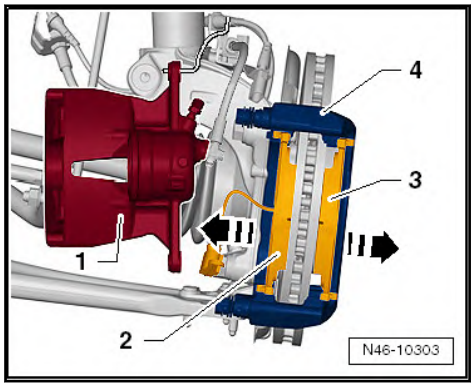
– Disconnect connector for brake pad wear indicator.

The brake pad wear indicator is installed on front right.

– Unscrew both securing bolts from brake caliper, counter holding on guide pin.



– Remove brake caliper -1- and secure with wire so that weight of brake caliper does not strain or damage brake hose.



– Remove brake pads -2 and 3- from brake carrier -4-.

Cleaning:

WARNING

Health hazard due to poisonous dust from brake system.

Risk of irreversibly deposited dust particles in the lungs. Risk of respiratory health problems.

– Never blow out the brake system with compressed air.

– Thoroughly clean contact surfaces for brake pads on brake carrier and remove any corrosion.

– Clean brake caliper.

NOTICE

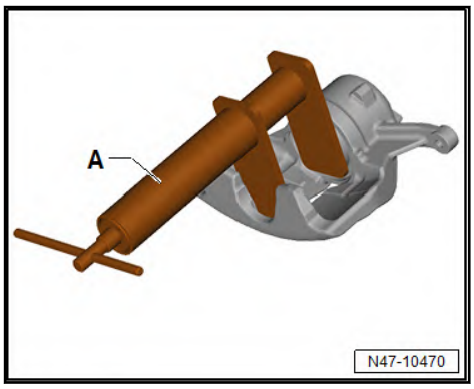
Use only methylated spirits for cleaning the brake caliper.

Installing

NOTICE

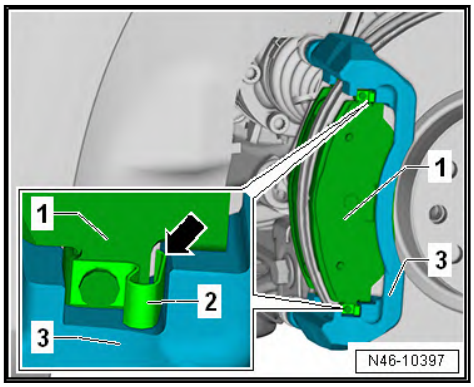
Before pushing the piston back into the cylinder using the piston resetting appliance, extract brake fluid from the brake fluid reservoir. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

– Press back piston in brake caliper using piston resetting appliance -T10145- -A-.



– Lightly grease guide surfaces on brake carrier. For allocation of grease, see ⇒ Electronic parts catalogue (ETKA)

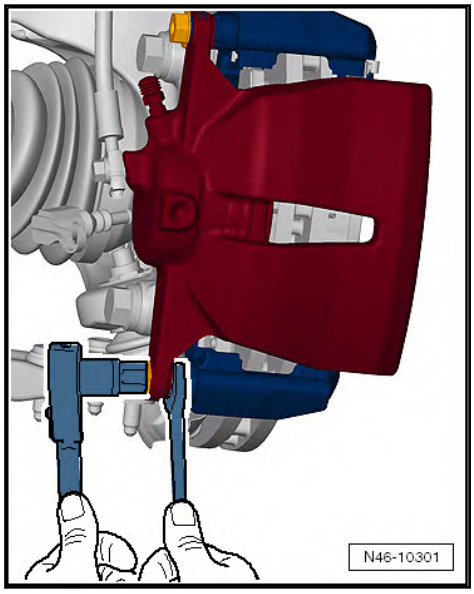
– Place brake pads -1- together with retaining springs -2- in recess of brake carrier -3-.



– After fitting brake pads, make sure that all retaining springs -2- are properly seated -arrow-.

– Carefully place brake caliper on brake carrier.

– Secure brake caliper to brake carrier with new self-locking bolts, counter holding on guide pin.



– Connect brake pad wear indicator connector.
– Install wheels.

NOTICE

Every time after changing pads, depress brake pedal firmly several times with vehicle stationary, so that brake pads are properly seated in their normal operating position.

After changing brake pads, check brake fluid level.

Torque settings

- ⇒ o1.1 verview – front brake", page 49
- 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 depressor -V.A.G 1869/2-

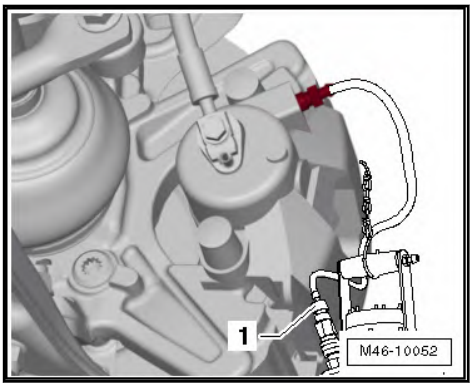
NOTICE

This procedure is only relevant when replacing or repairing the brake caliper.

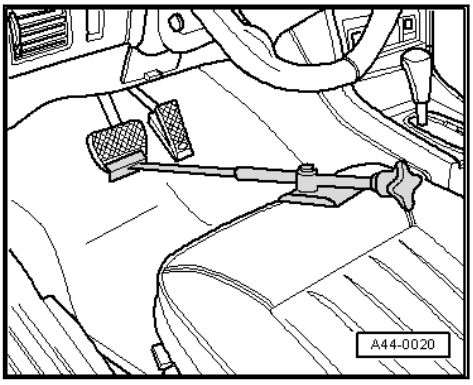
Removing

– Remove wheels.

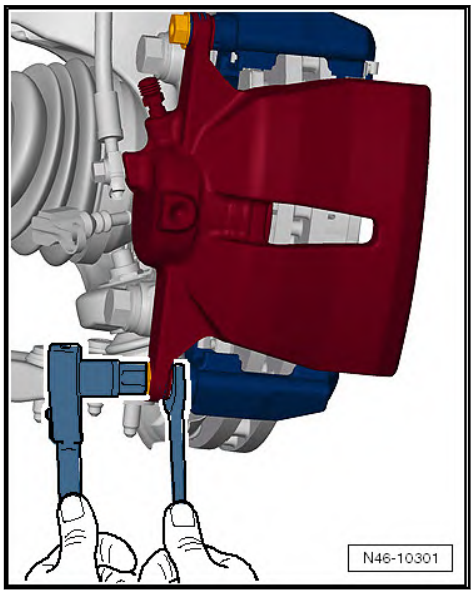
– Disconnect connector for brake pad wear indicator.
– Connect bleed bottle bleeder hose -1- to bleeder valve of brake caliper.



– Open bleeder valve.
– Apply brake pedal depressor -V.A.G 1869/2-.



– Close bleed valve and remove bleed bottle.
– Unscrew brake hose.
– Unscrew both securing bolts from brake caliper, counter holding on guide pin.



– Pull brake caliper off brake carrier.

Installing

- The piston is pressed back.
- The two brake pads are seated in the retaining springs on the brake carrier.

– Carefully place brake caliper on brake carrier.

– Secure brake caliper to brake carrier with new self-locking bolts, counter holding on guide pin.

– Screw brake hose onto brake caliper.

– Remove brake pedal actuator -V.A.G 1869/2-.

– Connect brake pad wear indicator connector.

– Bleed brake system ⇒ page 126 .

– Install wheels.

NOTICE

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.

Torque settings

- ⇒ o1.1 verview – front brake", page 49
- Bleed valve ⇒ o1.1 verview – front brake caliper", page 86
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts.

2 Rear brake

⇒ o2.1 verview – rear brakes", page 57

⇒ a2.2 nd installing brake pads", page 59

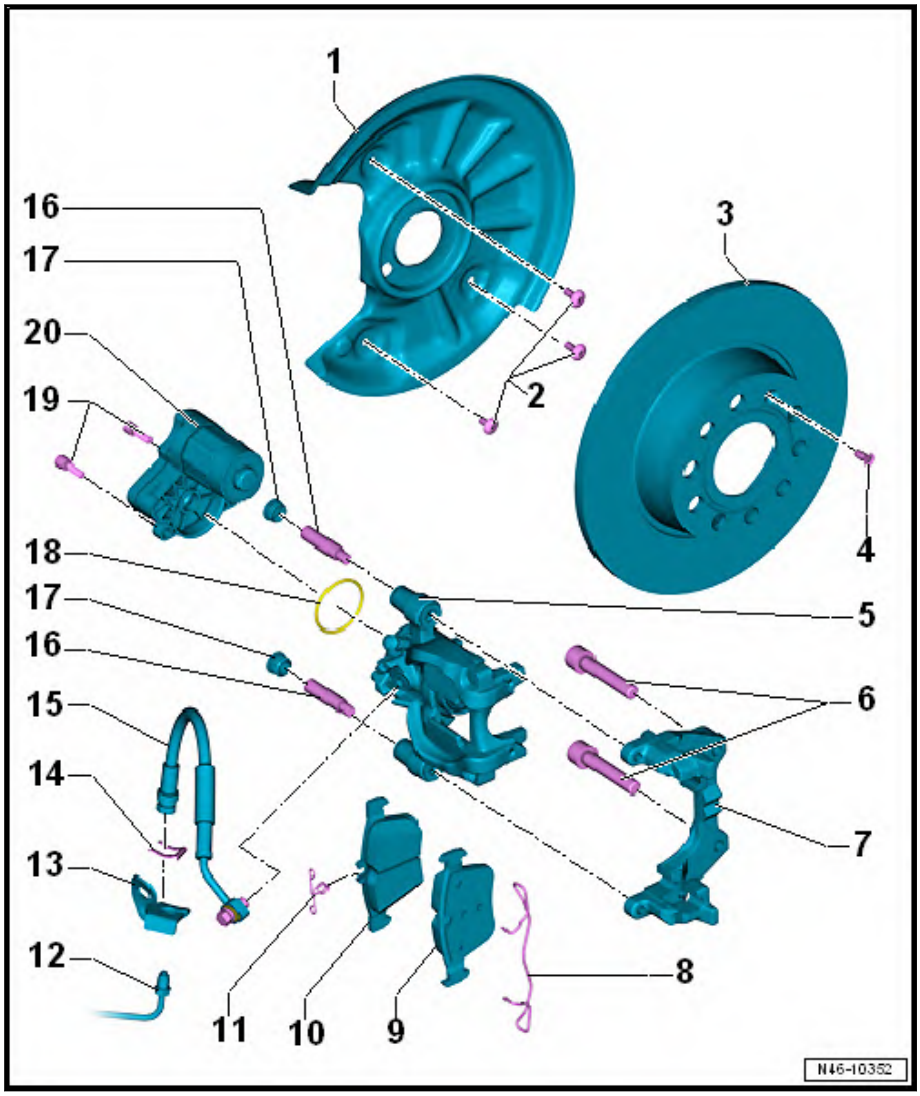
⇒ a2.3 nd installing brake caliper", page 65

2.1 Assembly overview – rear brakes

NOTICE

Use the brake filling and bleeding equipment -VAS 6860- to draw off brake fluid from the brake fluid reservoir.

Fit brake pedal depressor -V.A.G 1869/2- before removing a brake caliper or disconnecting a brake hose (release pressure in system).



1 - Splash plate for brakes

- ❑ Allocation ⇒ Electronic parts catalogue (ETKA)

2 - Torx bolt

- ❑ 12 Nm

3 - Brake disc

- ❑ Wear limits ⇒ page 5
- ❑ Never remove brake discs from wheel hub by force. If necessary use penetrating fluid, because otherwise brake discs can be damaged.
- ❑ If worn, renew on both sides of axle.
- ❑ Unbolt brake caliper and brake carrier before removing

4 - Torx bolt

- ❑ 8 Nm

5 - Brake caliper

- ❑ Do not disconnect brake hose when changing pads.
- ❑ Removing and installing ⇒ page 65
- ❑ Repairing ⇒ page 91
- ❑ Following repair or replacement, perform “Basic setting” using ⇒ Vehicle diagnostic tester.

6 - Multi-point socket head bolt

- ❑ Remove and install using socket insert -T10035- ⇒ page 59 .
- ❑ Renew after removal
- ❑ 90 Nm +90°

7 - Brake carrier

8 - Retaining spring

9 - Outer brake pad

- ❑ Thickness 11 mm not including backplate
- ❑ Wear limit: 2 mm excluding backing plate.
- ❑ Check thickness ⇒ Maintenance; Booklet ; Checking condition of discs and thickness of pads at front and rear
- ❑ Always replace on both sides
- ❑ Removing and installing ⇒ page 59

10 - Inner brake pad

- ❑ With spring
- ❑ Thickness 11 mm not including backplate
- ❑ Wear limit: 2 mm excluding backing plate.
- ❑ Check thickness ⇒ Maintenance; Booklet ; Checking condition of discs and thickness of pads at front and rear

- ❑ Always replace on both sides
- ❑ Removing and installing ⇒ page 59

11 - Spring

- ❑ Fitted only on inner brake pad
- ❑ Ensure correct installation position

12 - Brake line

- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

13 - Bracket

14 - Retaining spring for brake hose to retainer

15 - Brake hose with banjo union and banjo bolt

- ❑ To brake caliper 35 Nm
- ❑ With standard tool: 14 Nm
- ❑ With special tools VAS 6854, VAG 1410/7 and VAG 1410/6: 12 Nm

16 - Guide pin

- ❑ 35 Nm

17 - Caps

- ❑ For guide pins

18 - Seal

- ❑ For parking brake motor
- ❑ Renew

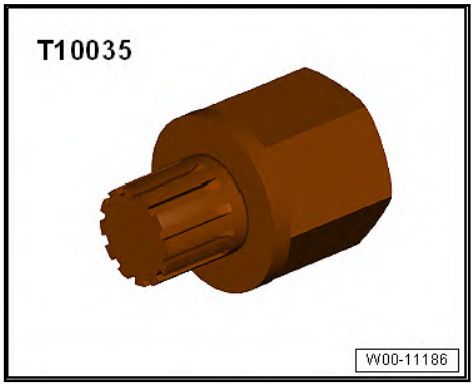
19 - Hexagon socket head bolt

- ❑ 8 Nm

20 - Parking brake motor

- ❑ Removing and installing ⇒ page 71

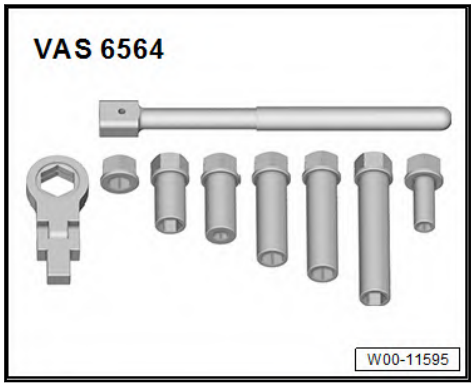
Socket -T10035-



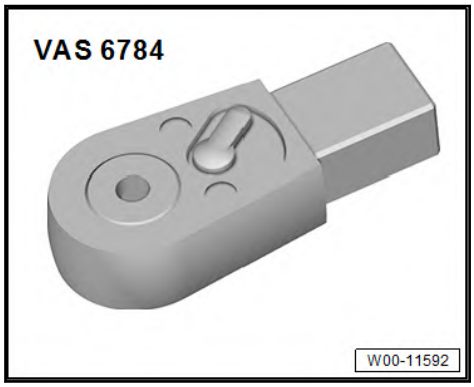
2.2 Removing and installing brake pads

Special tools and workshop equipment required

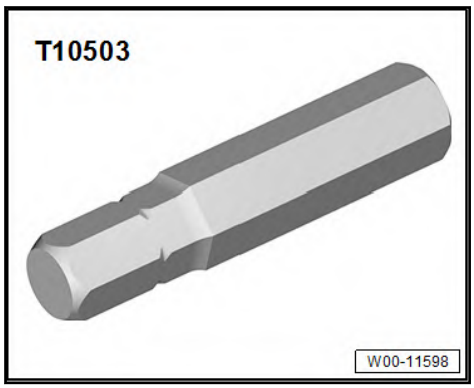
- Tool set for brake bleeding -VAS 6564-



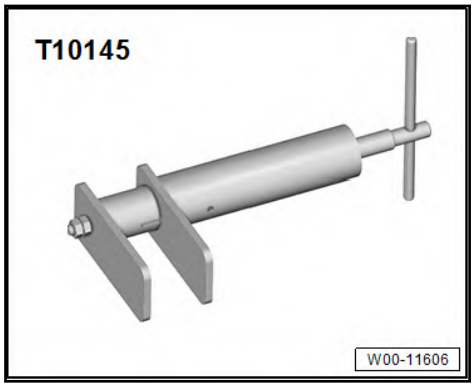
- Insert tool with ratchet -VAS 6784-



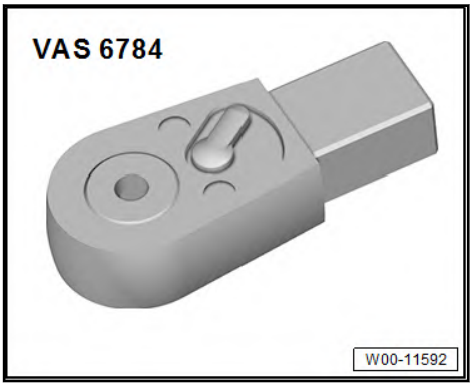
- Bit, 7 mm -T10503-



- Piston resetting appliance -T10145-

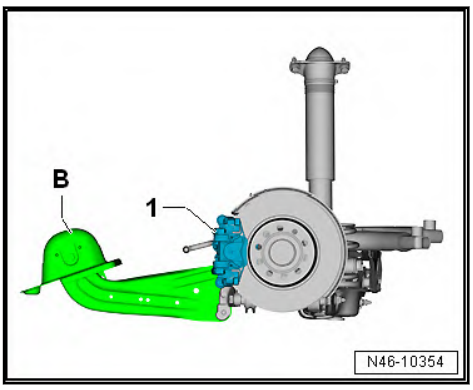


♦



♦ ⇒ Vehicle diagnostic tester

Installation position, multi-link suspension:



1 - Brake caliper

B - Multi-link suspension

Removing

Mark brake pads when removing if they are to be reused. Fit in same position when installing, or braking will be uneven.

NOTICE

Do not separate connectors of parking brake motors.

Before resetting the pistons, brake fluid must be extracted from the brake fluid reservoir. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

- Electromechanical parking brake not operated.

– Remove wheels.

The electromechanical parking brake pistons must be moved back using ⇒ Vehicle diagnostic tester.

– Move back pistons using ⇒ Vehicle diagnostic tester.

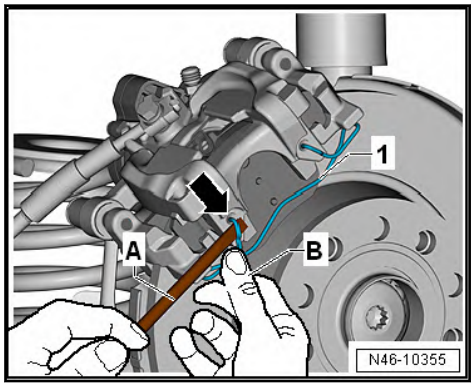
CAUTION

Risk of injury due to tensioned retaining spring.

The retaining spring might jump out and cause injury to eyes and skin.

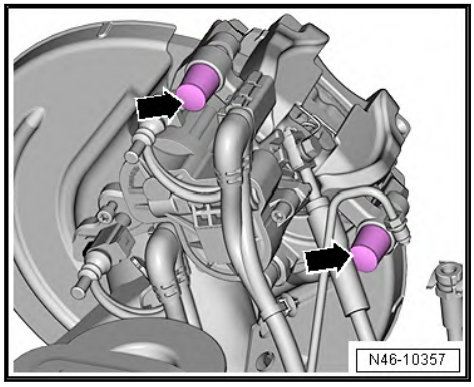
– Make sure to firmly hold the retaining spring.

– Use a screwdriver -A- to lever retaining spring -1- out of brake caliper -arrow-.

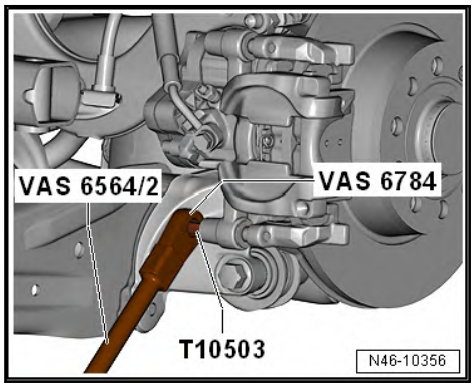


– When doing this, support retaining spring with the other hand.

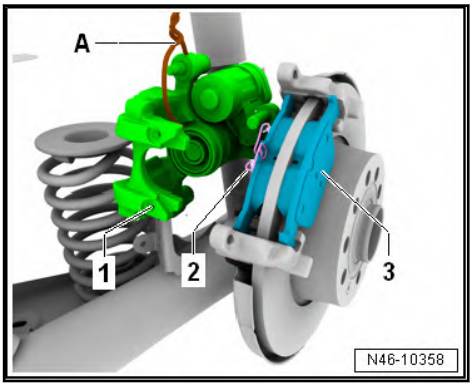
– Remove protective caps -arrows-.



– Unscrew both guide pins from brake caliper using bit, 7 mm -T10503- and insert tool with ratchet -VAS 6784-.



– Remove brake caliper -1- and secure it with wire -A- so that weight of brake caliper does not strain or damage brake hose.

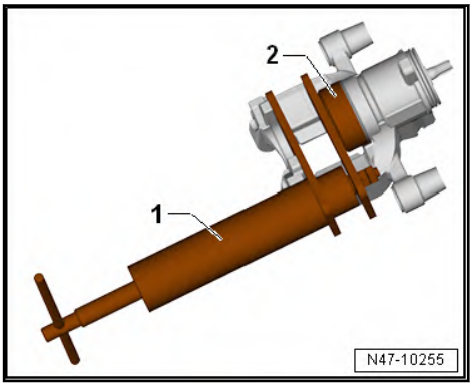


NOTICE

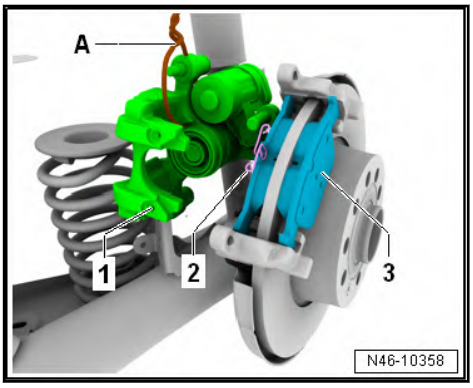
It is essential that the pistons are reset using ⇒ Vehicle diagnostic tester. The compressor nut in the piston is fitted on a floating bearing. Therefore, the piston can only be compressed but not pulled back. Only the spindle with the thrust nut will be moved back.

- The piston must be reset beforehand using ⇒ Vehicle diagnostic tester.

– Push piston -2- back completely using piston resetting tool -T10145- -1-.



– Remove brake pads -2 and 3-.



Cleaning:

WARNING

Health hazard due to poisonous dust from brake system.

Risk of irreversibly deposited dust particles in the lungs. Risk of respiratory health problems.

– Never blow out the brake system with compressed air.

– Thoroughly clean contact surfaces for brake pads on brake carrier and remove any corrosion.

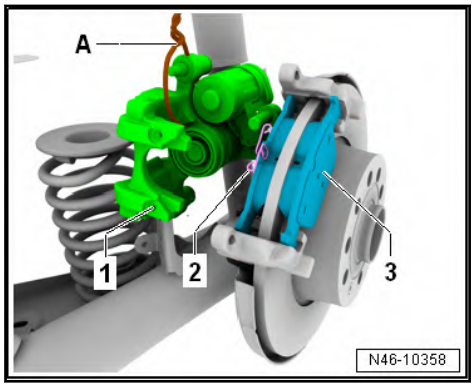
– Clean brake caliper.

NOTICE

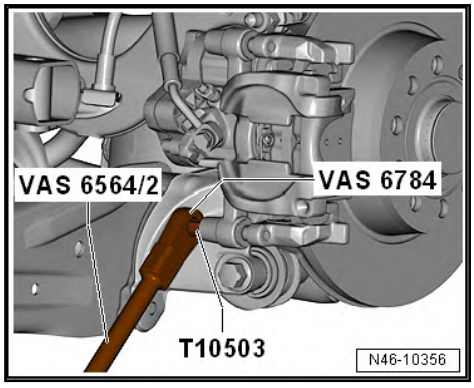
Use only methylated spirits for cleaning the brake caliper.

Installing

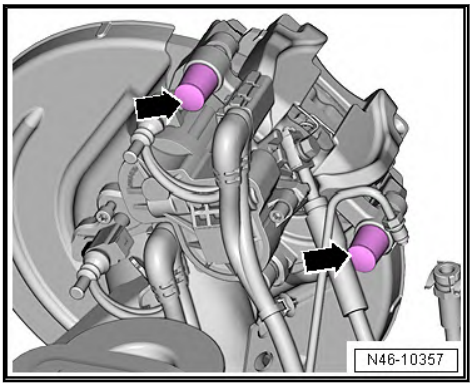
– Insert inner brake pad -2- and outer brake pad -3- into brake carrier.



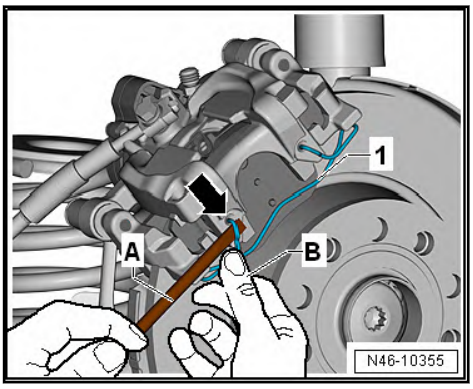
– Secure brake caliper.



– Insert cover caps -arrows-.



– Insert brake pad retaining spring -1- into hole in brake caliper -arrow-.



NOTICE

Make sure that the retaining spring is seated properly in the holes in the brake caliper.

After moving the pistons forwards, carry out basic setting of the brake system ⇒ Vehicle diagnostic tester.

– Carry out basic setting of brake system using ⇒ Vehicle diagnostic tester.

– Install wheels.

NOTICE

After changing brake pads, check brake fluid level.

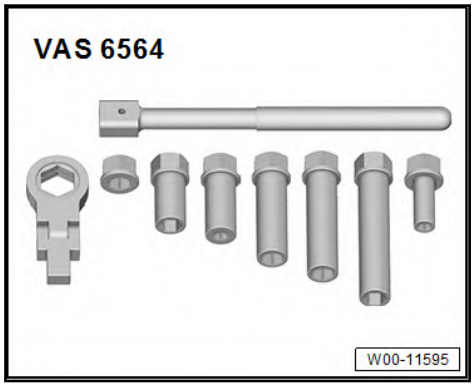
Torque settings

- ⇒ o2.1 verview – rear brakes", page 57
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts.

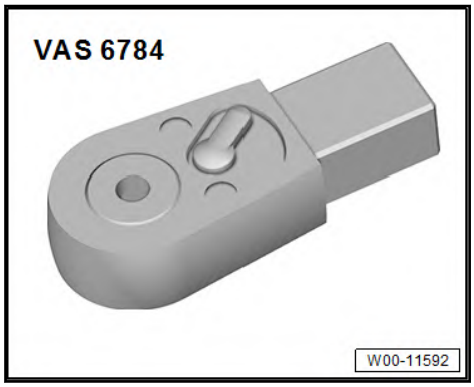
2.3 Removing and installing brake caliper

Special tools and workshop equipment required

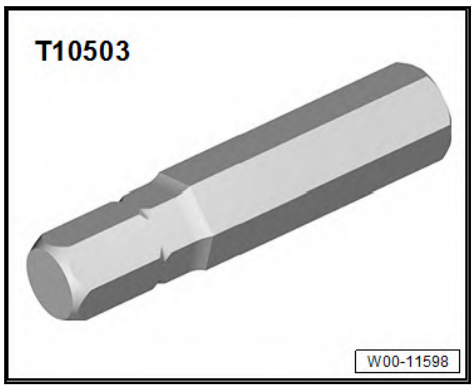
- Tool set for brake bleeding -VAS 6564-



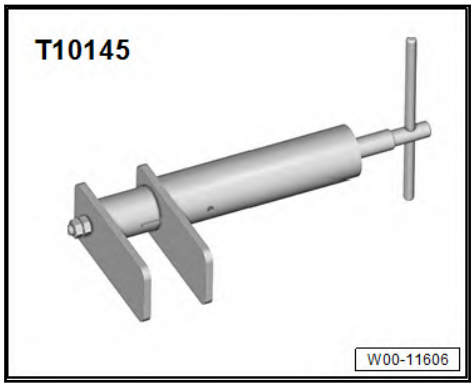
- Insert tool with ratchet -VAS 6784-



- Bit, 7 mm -T10503-



- Piston resetting appliance -T10145-



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

- ⇒ Vehicle diagnostic tester

Removing

NOTICE

This procedure is only relevant when replacing or repairing the brake caliper.

Do not separate connectors of parking brake motors.

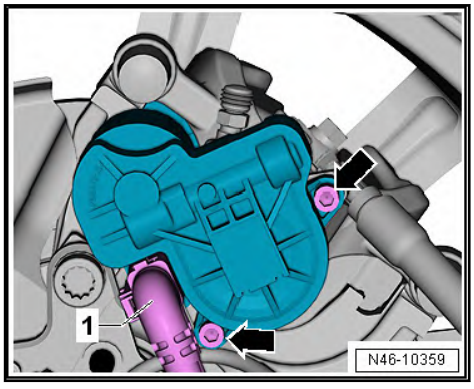
– Remove wheels.

The electromechanical parking brake pistons must be moved back using ⇒ Vehicle diagnostic tester.

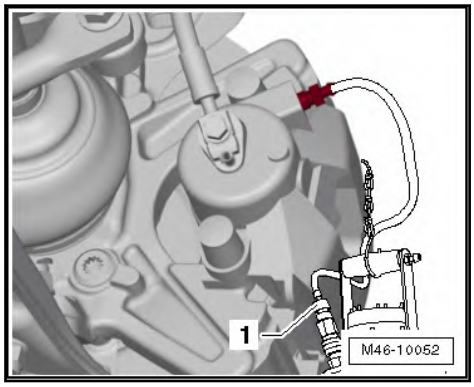
NOTICE

Before pushing back the piston, extract brake fluid from the brake fluid reservoir. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

– Move back pistons using ⇒ Vehicle diagnostic tester.
– Unscrew bolts -arrows- for parking brake motor.



– Pull off parking brake motor and place it to one side without disconnecting the connector.
– Connect bleed bottle bleeder hose -1- to bleeder valve of brake caliper.



– Open bleeder valve.
– Apply brake pedal depressor -V.A.G 1869/2-.
– Close bleed valve and remove bleed bottle.
– Unscrew brake hose.

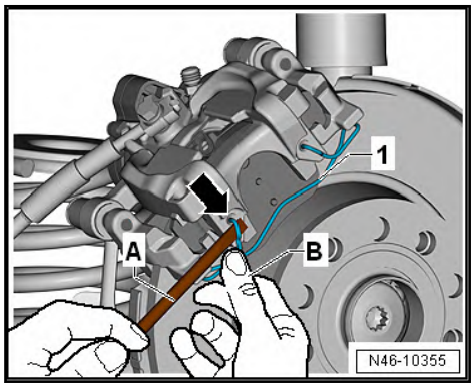
CAUTION

Risk of injury due to tensioned retaining spring.

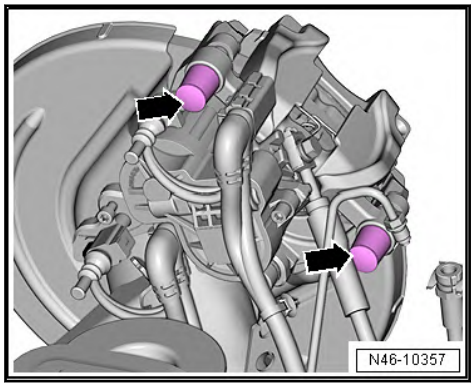
The retaining spring might jump out and cause injury to eyes and skin.

– Make sure to firmly hold the retaining spring.

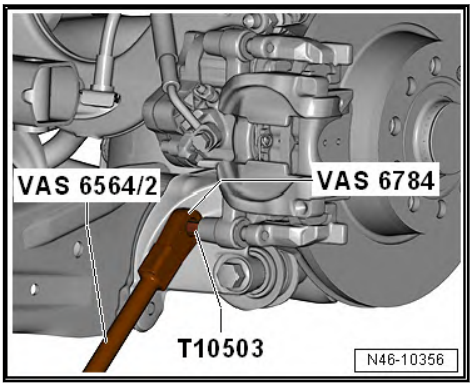
– Use a screwdriver -A- to lever retaining spring -1- out of brake caliper -arrow-.



– When doing this, support retaining spring with the other hand.
– Remove protective caps -arrows-.



– Unscrew both guide pins from brake caliper using bit, 7 mm -T10503- and insert tool with ratchet -VAS 6784-.



– Pull brake caliper off brake carrier.

Installing

- The brake pads are seated in the retaining springs on the brake carrier.

– Secure brake caliper to brake carrier with new self-locking bolts.

– Fit parking brake motor ⇒ page 71 .

– Start new hexagon socket head bolts by hand and tighten them.

– Attach brake hose to brake caliper.

– Bleed brake system ⇒ page 126 .

After moving the pistons forwards using ⇒ Vehicle diagnostic tester, carry out a basic setting of brake system.

– Carry out basic setting of brake system using ⇒ Vehicle diagnostic tester.

– Install wheels.

– Check brake fluid level.

Torque settings

- ⇒ o2.1 verview – rear brakes”, page 57
- Bleed valve ⇒ o2.1 verview – rear brake caliper”, page 91
- Wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts.

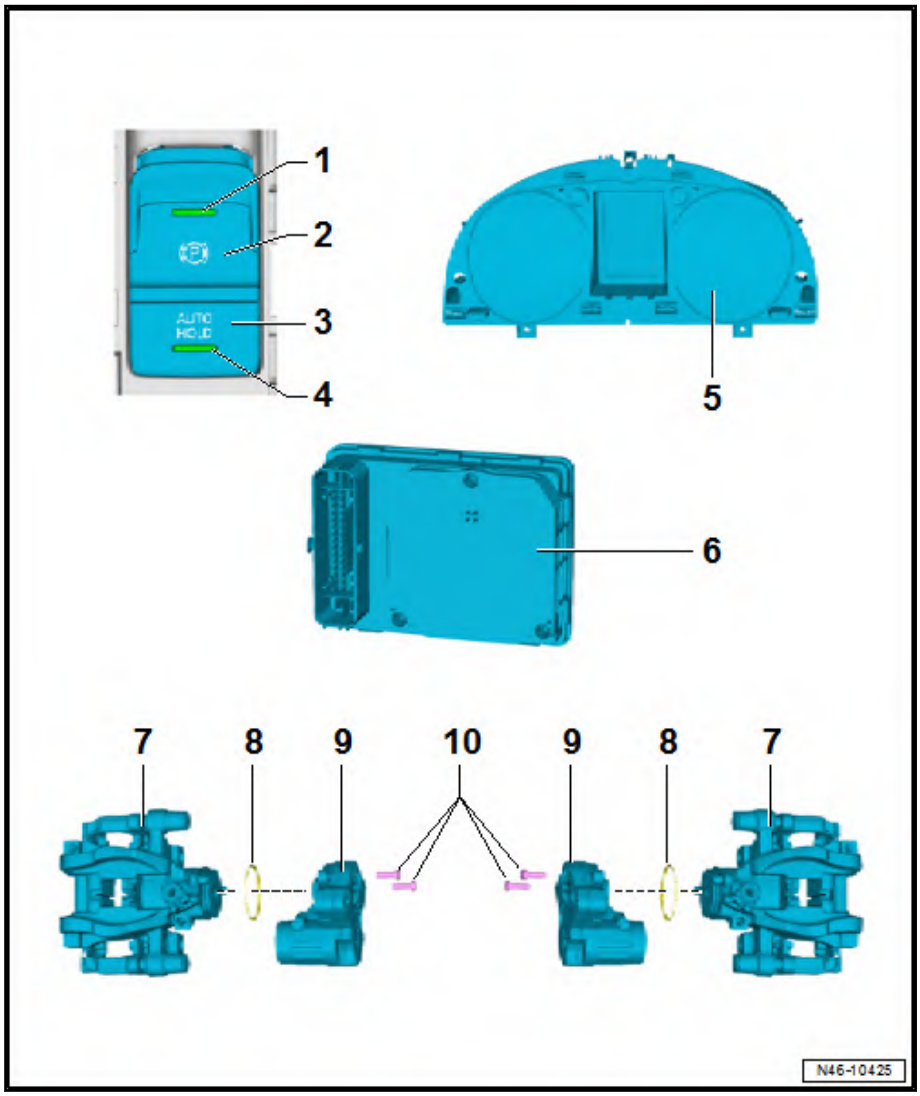
3 Parking brake

⇒ o3.1 f fitting locations – parking brake", page 70

⇒ a3.2 nd installing control unit for electromechanical parking brakeJ540", page 71

⇒ a3.3 nd installing parking brake motor V282/V283", page 71

3.1 Overview of fitting locations – parking brake



1 - Electromechanical parking brake button -E538-

- ❑ Located in centre console

2 - Electromechanical parking brake warning lamp -K213-

- ❑ Location: in electromechanical parking brake button -E538-.

3 - Auto-hold button -E540-

- ❑ Located in centre console

4 - Auto-hold warning lamp -K237-

- ❑ Location: in auto-hold button -E540-

5 - Dash panel insert

- ❑ With electromechanical parking brake warning lamp -K214-
- ❑ With brake system warning lamp -K118-
- ❑ With acoustic signal

6 - Control unit for electromechanical parking brake -J540-

- ❑ Integrated into ABS control unit -J104- and cannot be renewed individually
- ❑ Removing and installing ABS control unit -J104- ⇒ page 21

7 - Rear brake calipers

8 - Seal

9 - Parking brake motors

- ❑ Left parking brake motor -V282-, fitting location: on rear left brake caliper.
- ❑ Right parking brake motor -V283-, fitting location: on rear right brake caliper.
- ❑ Removing and installing ⇒ page 71

10 - Torx socket head bolt

- ❑ 12 Nm

3.2 Removing and installing control unit for electromechanical parking brake - J540-

The control unit for electromechanical parking brake -J540- is integrated into the ABS control unit -J104- and cannot be renewed individually.

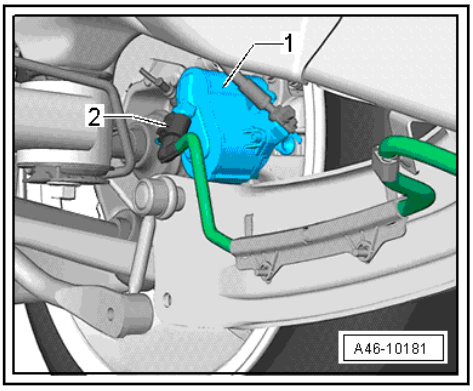
– Removing and installing ABS control unit -J104- ⇒ page 21 .

3.3 Removing and installing parking brake motor -V282-/-V283-

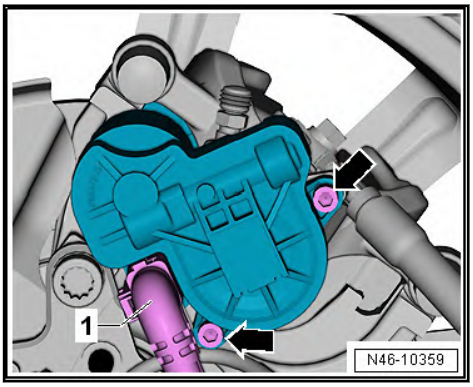
Removing

– Deactivate vehicle's drive system, and switch off all electrical consumers.

– Disconnect connector -2- from parking brake motor -1-.



– Unscrew both hexagon socket head bolts -arrows- from parking brake motor.



– Pull parking brake motor off brake caliper while twisting parking brake motor back and forth slightly.

– Take out seal.

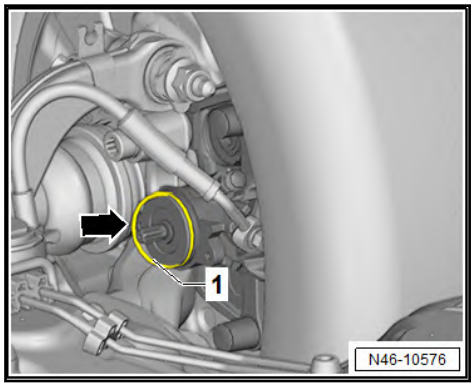
NOTICE

Take care not to damage annular groove of the seal and the contact surface of the parking brake motor.

Installing

– Clean annular groove and contact surface of parking brake motor.

– Lightly grease new seal -1- and install. Do not twist or damage seal when doing this -arrow-.



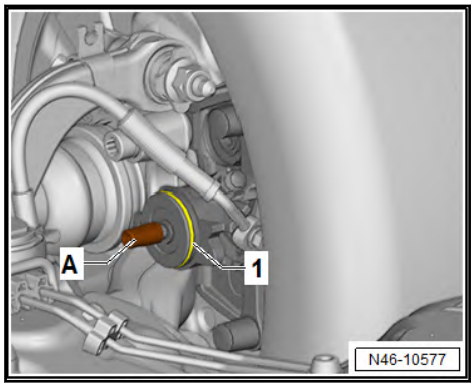
– Grease Torx socket on input shaft of parking brake motor completely.

NOTICE

The sealing ring must not be allowed to turn out while the parking brake motor is being installed!

– Carefully push parking brake motor onto brake caliper while ensuring that seal is seated correctly.

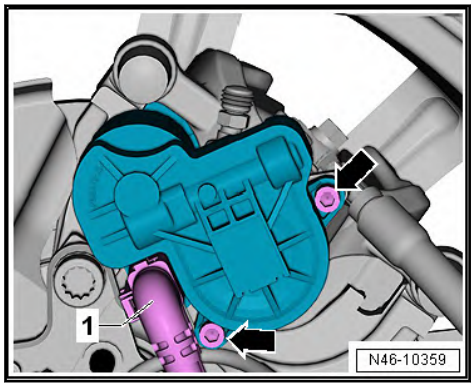
– Turn parking brake motor until bolt hole and thread align.



– If necessary, turn input shaft back slightly using an E11 Torx socket -A- until parking brake motor can be properly fitted.

– Make sure that parking brake motor is flush with brake caliper. Never pull parking brake motor onto brake caliper using securing bolts.

– Position hexagon socket head bolts -arrows- by hand and tighten them.



– Install connector -1-.
– Carry out basic setting of brake system using ⇒ Vehicle diagnostic tester.

Torque settings

◆ ⇒ o3.1 f fitting locations – parking brake”, page 70

4 Brake pedal

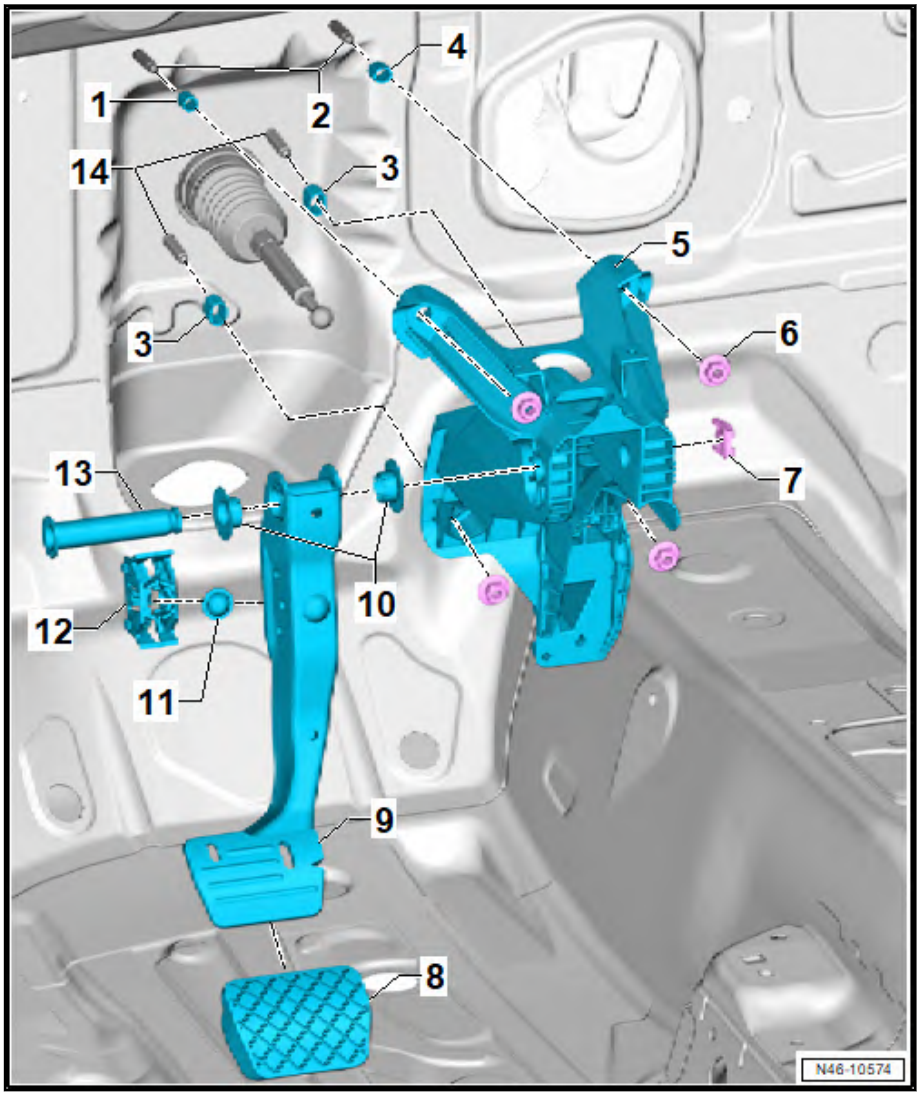
4.1 Assembly overview – brake pedal

4.1.1 Assembly overview – brake pedal, left-hand drive vehicles

WARNING

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

Do not lubricate or grease the pivot pin. The pivot pin must remain dry.



1 - Guide bush

2 - Stud

- ❑ On body

3 - Guide bush

4 - Guide bush

5 - Mounting bracket

- ❑ Removing and installing ⇒ page 77

6 - Hexagon nut, self-locking

- ❑ Renew after removal
- ❑ Bolting sequence ⇒ page 75
- ❑ 25 Nm

7 - Securing clip

8 - Cap

- ❑ For brake pedal

9 - Brake pedal

- ❑ Separating brake pedal from brake servo ⇒ page 80
- ❑ Connect brake pedal to brake servo ⇒ page 81
- ❑ Removing and installing ⇒ page 82

10 - Bearing bush

- ❑ Ensure correct installation position

11 - Bearing shell

12 - Support

- ❑ For ball head of brake servo plunger rod.

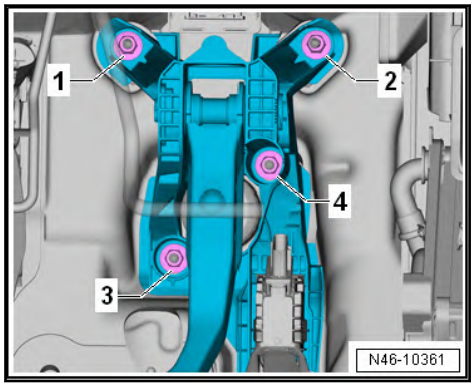
13 - Bearing mounting

- ❑ To remove, remove mounting bracket first
- ❑ Do not lubricate or grease the pivot pin. The pivot pin must remain dry.

14 - Stud

- ❑ From brake servo

Bolting sequence:



4.1.2 Assembly overview – brake pedal, right-hand drive vehicles

WARNING

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

Do not lubricate or grease the pivot pin. The pivot pin must remain dry.

1 - Bolt

- ❑ 20 Nm

2 - Stud

3 - Guide bush

4 - Mounting bracket

- ❑ Removing and installing ⇒ page 78

5 - Thread insert

6 - Retaining ring

7 - Securing clip

8 - Nut

- ❑ 25 Nm

9 - Bearing bush

10 - Brake pedal

- ❑ Separating brake pedal from brake servo ⇒ page 80
- ❑ Connect brake pedal to brake servo ⇒ page 81
- ❑ Removing and installing ⇒ page 82

11 - Cap

12 - Support

- ❑ For ball head of brake servo plunger rod.

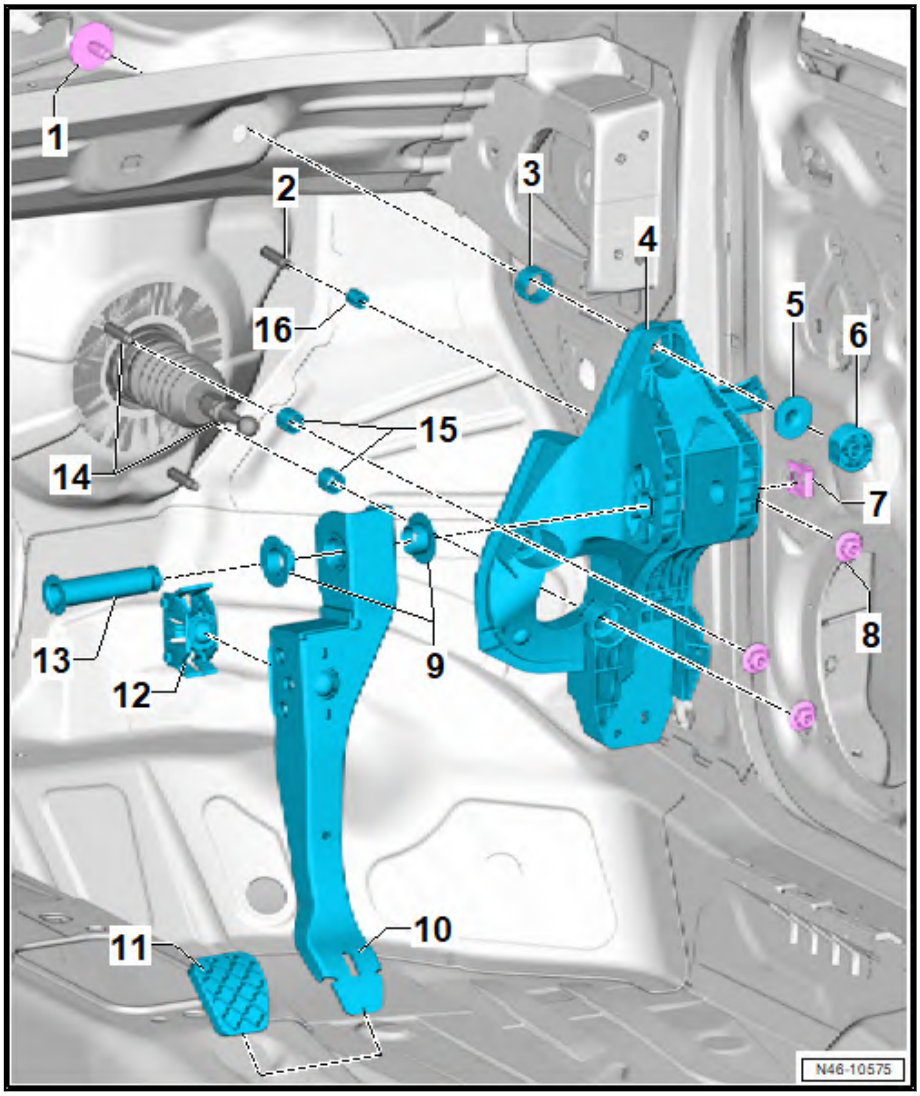
13 - Bearing mounting

- ❑ Do not lubricate or grease the pivot pin. The pivot pin must remain dry.

14 - Stud

15 - Guide bush

16 - Guide bush



4.2 Removing and installing mounting bracket

⇒ a4.2.1 nd installing mounting bracket, left-hand drive vehicles", page 77

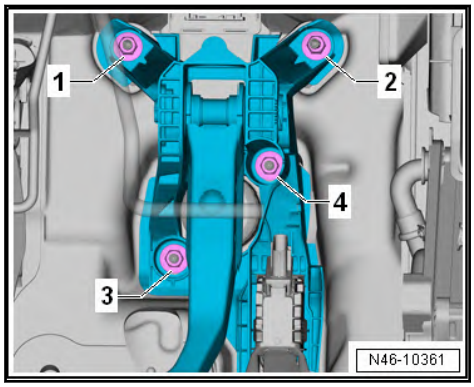
⇒ a4.2.2 nd installing mounting bracket, right-hand drive vehicles", page 78

4.2.1 Removing and installing mounting bracket, left-hand drive vehicles

– Remove brake pedal ⇒ page 82 .

– Remove accelerator pedal module -GX2- ⇒ Rep. gr. 20; Accelerator mechanism; Removing and installing accelerator pedal module -GX2-.

– Unscrew nuts -1 to 4-.



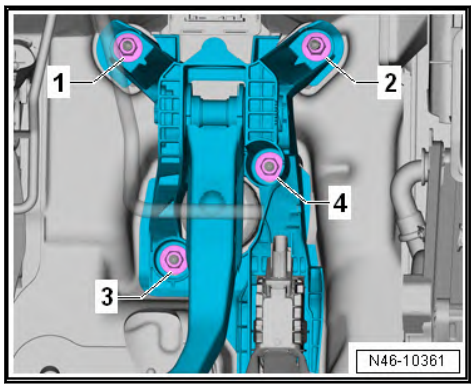
– Carefully remove foot pedal cluster.

Installing

Install in reverse order of removal, observing the following:

– Connect brake pedal to brake servo ⇒ page 81 .

Tightening sequence for securing nuts:



Torque settings

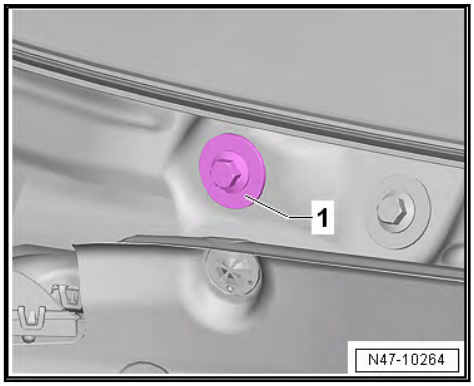
- ⇒ o4.1.1 verview – brake pedal, left-hand drive vehicles", page 74
- ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Assembly overview - central tube for dash panel
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ General body repairs, interior; Rep. gr. 69; Knee airbags; Assembly overview - knee airbag.
- ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations – compartments/covers
- ⇒ Rep. gr. 20; Accelerator mechanism; Assembly overview - accelerator module

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

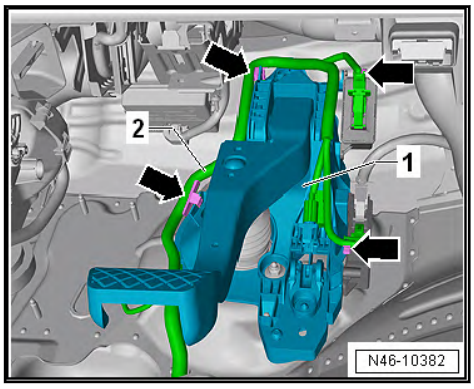
Removing

– Remove wiper arms ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing wiper arms.

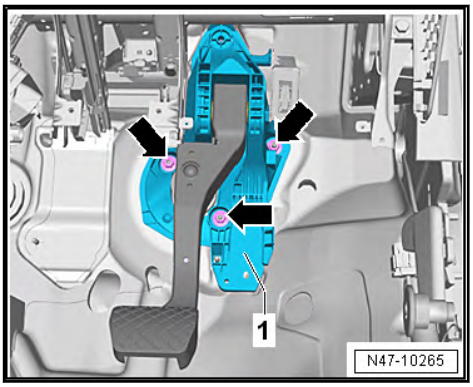
– Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Bulkhead; Removing and installing plenum chamber cover.
– Remove wiper motor -V- ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing wiper motor V.
– Unscrew bolt -1-.



– Ensure that wiring harness -2- is routed correctly to prevent it from being trapped.



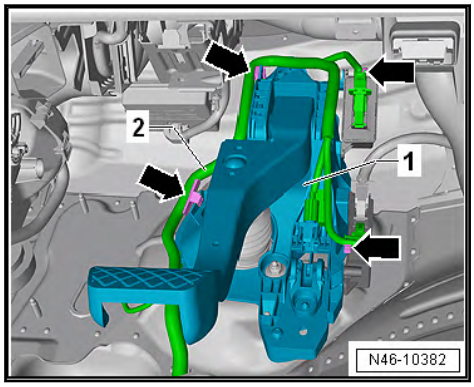
– Remove brake pedal ⇒ page 82 .
– Remove accelerator pedal module -GX2- ⇒ Fuel supply system - petrol engines; Rep. gr. 20; Accelerator mechanism; Removing and installing accelerator pedal module.
– Remove nuts -arrows- from mounting bracket -1-.



Installing

Install in reverse order of removal, observing the following:

– Ensure that wiring harness -2- is routed correctly to prevent it from being trapped.



– Clip wiring harness -2- to mounting bracket -1- -arrows-.
– Connect brake pedal to brake servo ⇒ page 81 .

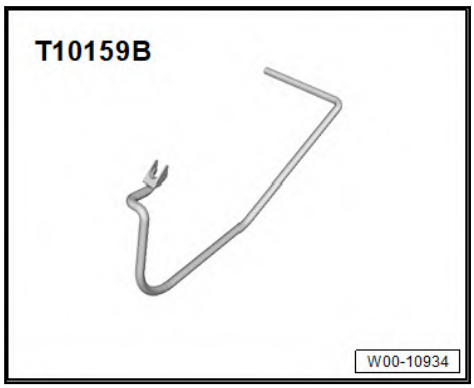
Torque settings

- ⇒ o4.1.2 verview – brake pedal, right-hand drive vehicles", page 76
- Crash bar ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Assembly overview - central tube for dash panel
- Footwell vents ⇒ Heating, air conditioning system; Rep. gr. 87; Air duct; Assembly overview - air duct and air distribution in passenger compartment.
- Knee airbag ⇒ General body repairs, interior; Rep. gr. 69; Knee airbags; Assembly overview - knee airbag.
- Covers on driver side ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations - compartments/covers
- Windscreen wiper system ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Assembly overview - windscreen wiper system
- Plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50; Plenum chamber bulkhead; Assembly overview - plenum chamber cover

4.3 Separating brake pedal from brake servo

Special tools and workshop equipment required

- Release tool -T10159B-



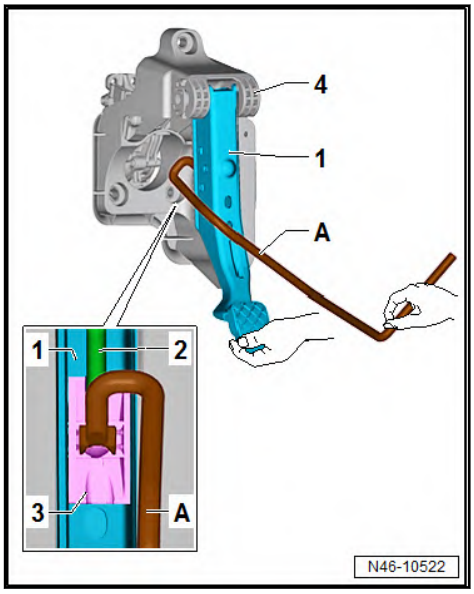
– Remove storage compartment on driver side ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations - compartments/covers.

– Remove dash panel trim on driver side ⇒ General body repairs, interior; Rep. gr. 68; Storage compartments/covers; Assembly overview – dash panel trim on driver side.

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

– Remove footwell vent driver side ⇒ Heater, air conditioning system; Rep. gr. 87; Air duct; Removing and installing footwell vent on driver side.

– First press brake pedal -1- in direction of brake servo, and hold it in this position.



1 - Brake pedal

2 - Push rod

3 - Retaining lugs

4 - Mounting bracket

– Insert release tool -T10159B- -A- and pull in direction of driver seat while counter-holding on brake pedal -1-. At this moment, brake pedal must not be allowed to move towards driver seat. This action will press retaining lugs -3- of mounting off ball head of plunger rod -2-.

For the sake of clarity, separation of brake pedal from brake servo is shown with pedal cluster removed.

– Pull release tool -T10159B- and brake pedal together towards driver's seat. As a result, brake pedal is pulled off push rod ball head.

Specified torque

♦ Remove footwell cover on driver side ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations - compartments/covers.

4.4 Connecting brake pedal to brake servo

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

– Check engagement by pulling briefly on brake pedal.

Further installation is performed in the reverse order.

4.5 Removing and installing brake pedal

⇒ a4.5.1 nd installing brake pedal, left-hand drive vehicles", page 82

⇒ a4.5.2 nd installing brake pedal, right-hand drive vehicles", page 84

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

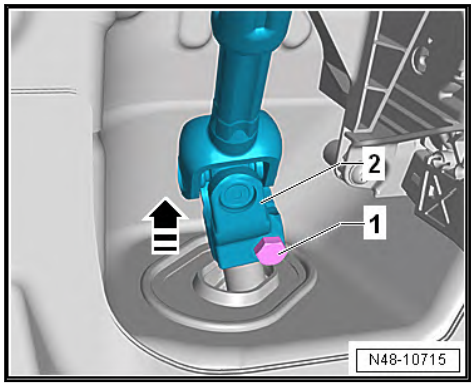
– Remove storage compartment on driver side ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations - compartments/covers.

– Remove dash panel trim on driver side ⇒ General body repairs, interior; Rep. gr. 68; Storage compartments/covers; Assembly overview – dash panel trim on driver side.

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

– Remove footwell vent driver side ⇒ Heater, air conditioning system; Rep. gr. 87; Air duct; Removing and installing footwell vent on driver side.

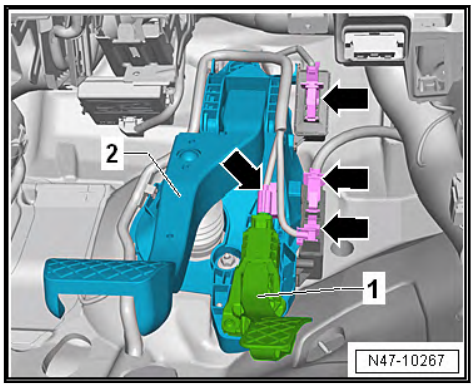
– Remove steering column universal joint -2- from steering rack ⇒ Running gear, axles, steering; Rep. gr. 48; Steering column; Removing and installing steering column.



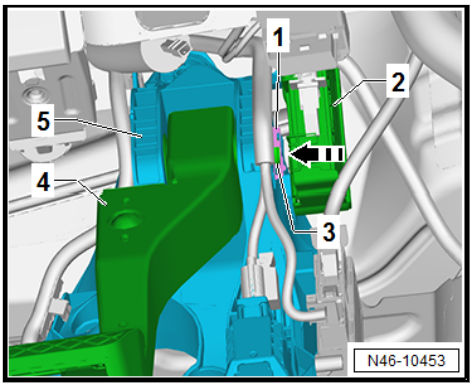
– Pull off universal joint and swivel steering column to one side.

– If present, remove crash bar ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Removing and installing crash bar.

– To do this, remove data bus diagnostic interface -J533- ⇒ Electrical system; Rep. gr. 97; Control units; Removing and installing data bus diagnostic interface -J533-.
– Unscrew bolt for brake pedal crash bar.
– Separate brake pedal from brake servo ⇒ page 80 .
– Release and pull off connectors -arrows-.



– Lay wiring harness to side.
– Pull off securing clip -1-.



– Pull out pin -3- towards left in direction of -arrow-.
– Remove brake pedal downwards from mounting bracket.

Installing

Install in reverse order of removal, observing the following:

– Connect brake pedal to brake servo ⇒ page 81 .

Torque settings

- ⇒ o4.1.1 verview – brake pedal, left-hand drive vehicles", page 74
- ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Assembly overview - central tube for dash panel
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ General body repairs, interior; Rep. gr. 69; Knee airbags; Assembly overview - knee airbag.
- ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations – compartments/covers

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

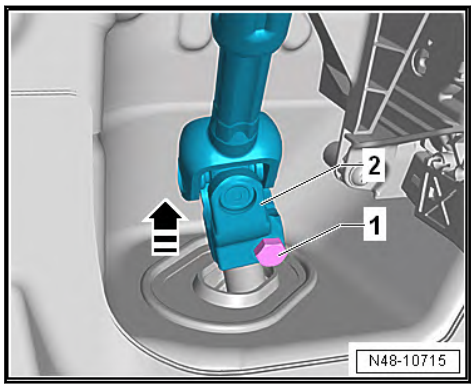
– Remove storage compartment on driver side ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations - compartments/covers.

– Remove dash panel trim on driver side ⇒ General body repairs, interior; Rep. gr. 68; Storage compartments/covers; Assembly overview – dash panel trim on driver side.

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

– Remove footwell vent driver side ⇒ Heater, air conditioning system; Rep. gr. 87; Air duct; Removing and installing footwell vent on driver side.

– Remove steering column universal joint -2- from steering rack ⇒ Running gear, axles, steering; Rep. gr. 48; Steering column; Removing and installing steering column.



– Pull off universal joint and swivel steering column to one side.

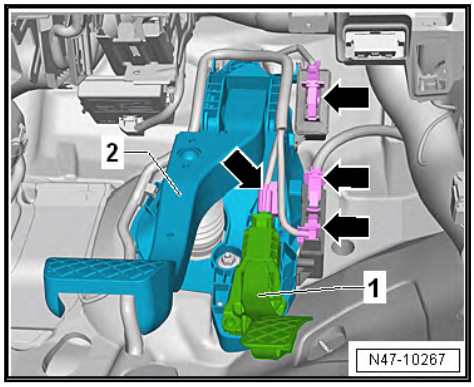
– If present, remove crash bar ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Removing and installing crash bar.

– To do this, remove data bus diagnostic interface -J533- ⇒ Electrical system; Rep. gr. 97; Control units; Removing and installing data bus diagnostic interface -J533-.

– Unscrew bolt for brake pedal crash bar.

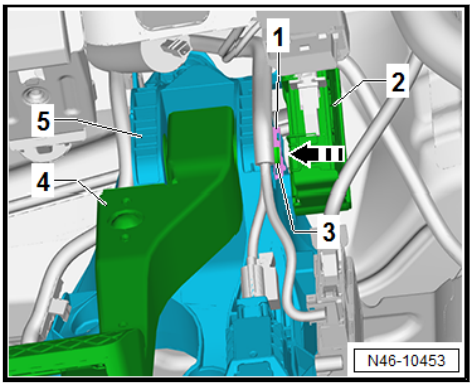
– Separate brake pedal from brake servo ⇒ page 80 .

– Release and pull off connectors -arrows-.



– Lay wiring harness to side.

– Pull off securing clip -1-.



– While doing this, push control unit -2- to one side slightly.
– Pull out pin -3- towards left in direction of -arrow-.
– Pull crash bar for brake pedal forwards and guide out pin.
– Guide out pin on steering pillar.
– Remove brake pedal downwards from mounting bracket.

Installing

Install in reverse order of removal, observing the following:

– Connect brake pedal to brake servo ⇒ page 81 .

Torque settings

- ⇒ o4.1.2 verview – brake pedal, right-hand drive vehicles”, page 76
- ⇒ General body repairs, interior; Rep. gr. 70; Central tube for dash panel; Assembly overview - central tube for dash panel
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ General body repairs, interior; Rep. gr. 69; Knee airbags; Assembly overview - knee airbag.
- ⇒ General body repairs, interior; Rep. gr. 68; Compartments/covers; Overview of fitting locations – compartments/covers

47 – Brakes - hydraulics

1 Front brake caliper

⇒ o1.1 verview – front brake caliper", page 86

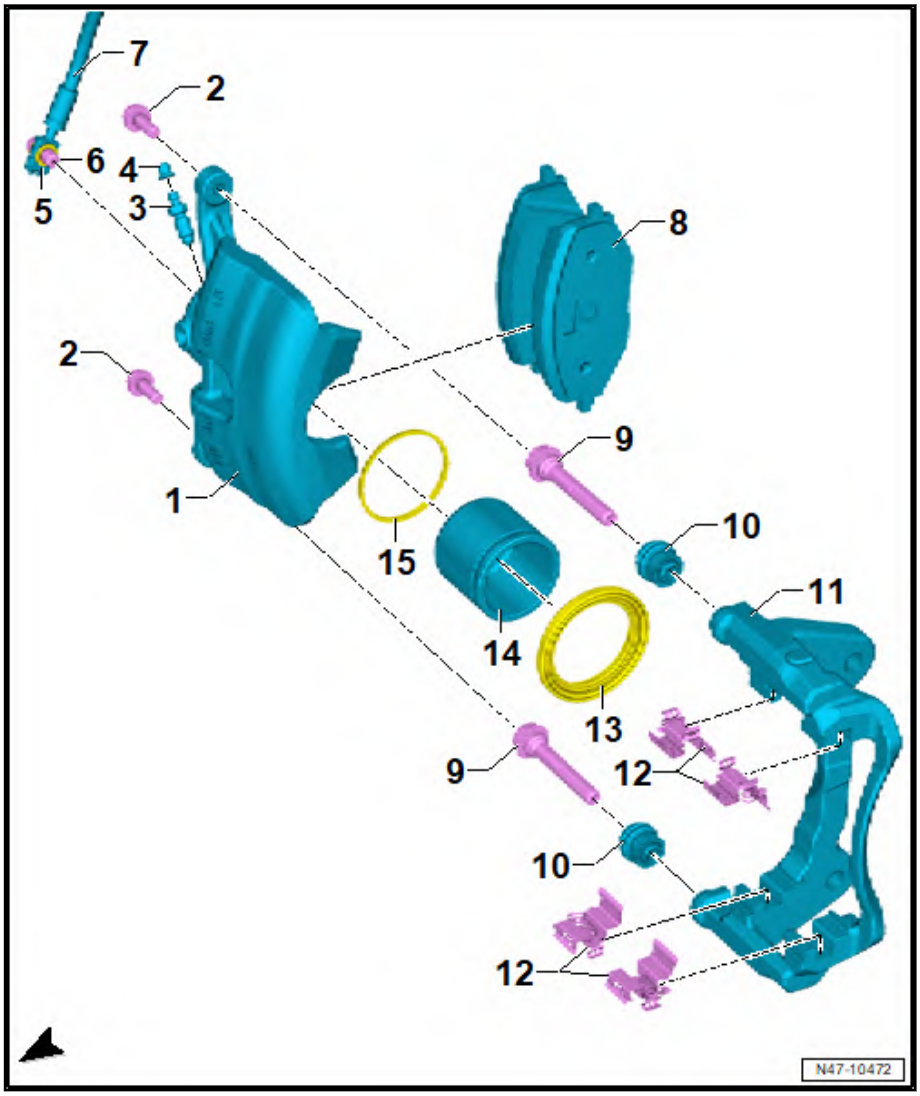
⇒ a1.2 nd installing brake caliper piston", page 88

1.1 Assembly overview – front brake caliper

⇒ o1.1.1 verview - brake caliper PC57 and C60", page 86

1.1.1 Assembly overview - brake caliper PC57 and C60

- Install complete repair kit when servicing.
- Use only methylated spirits for cleaning the brake.
- Apply thin coat of assembly paste G 052 150 A2 to brake cylinders, pistons and seals.



1 - Brake caliper

- ❑ Removing and installing ⇒ page 54

2 - Hexagon bolt

- ❑ Renew after removal
- ❑ 35 Nm

3 - Bleeder valve

- ❑ Lightly lubricate thread before screwing in. For allocation, see ⇒ Electronic parts catalogue (ETKA)
- ❑ 10 Nm

4 - Dust cap

- ❑ Fit onto bleeder valve

5 - Seal

- ❑ Captive, cannot be renewed individually

6 - Banjo bolt

- ❑ Cannot be renewed individually
- ❑ 35 Nm

7 - Brake hose

- ❑ With ring connector, banjo union and seal
- ❑ Ensure correct installation position

8 - Brake pads

- ❑ Removing and installing ⇒ page 51

9 - Guide pin

10 - Protective cap

- ❑ Grease groove and insert in brake carrier and guide pin, use grease from repair kit.

11 - Brake carrier

- ❑ Supplied as pre-assembled replacement part with greased guide pins and protective caps.
- ❑ If protective caps or guide pins are damaged, install repair kit. Use lubricant sachet supplied to lubricate guide pins.

12 - Not fitted

13 - Protective cap

- ❑ Removing and installing ⇒ page 88
- ❑ When inserting piston, take care not to damage protective cap

14 - Piston

- ❑ Removing and installing ⇒ page 88
- ❑ Apply thin coat of assembly paste G 052 150 A2 to piston before installing.

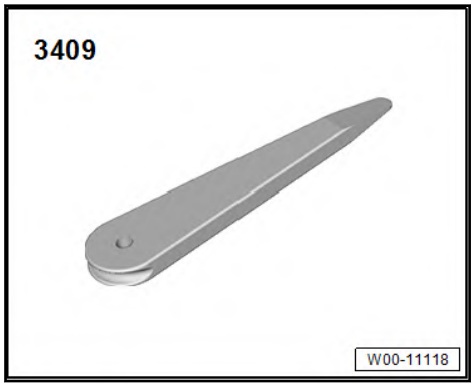
15 - Seal

- ❑ Removing and installing ⇒ page 88

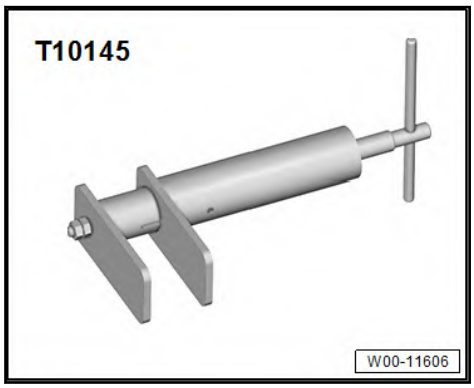
1.2 Removing and installing brake caliper piston

Special tools and workshop equipment required

- Removal wedge -3409-

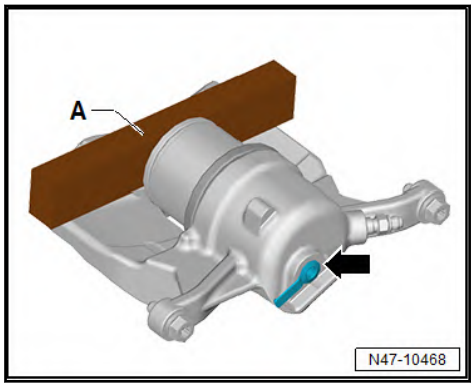


- Piston resetting appliance -T10145-



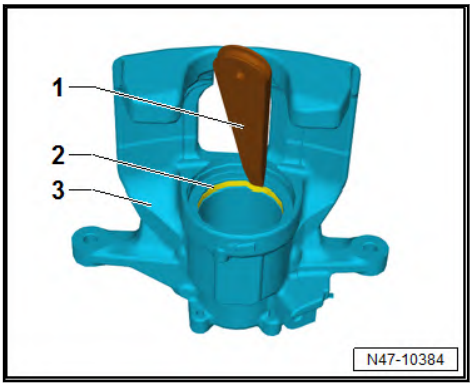
Removing

Place a piece of wood -A- in the recess to prevent damage to the piston.



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

– Remove seal -2- using removal wedge -3409- -1-.

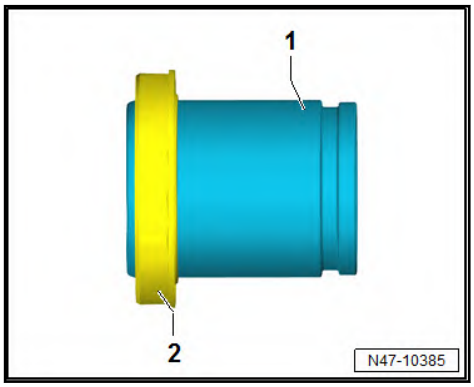


When removing ensure that the surface of the cylinder is not damaged.

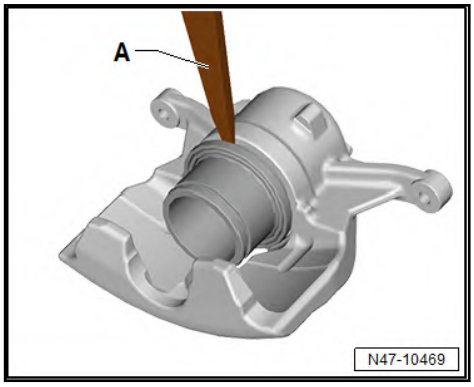
Installing

Install in reverse order of removal, observing the following:

- The surfaces of the piston and seal must be cleaned only with methylated spirits and then dried.
- Before inserting, apply thin coat of assembly paste G 052 150 A2 to piston and seal.
- Insert seal in brake caliper.
- Place protective cap with outer sealing lip on piston.

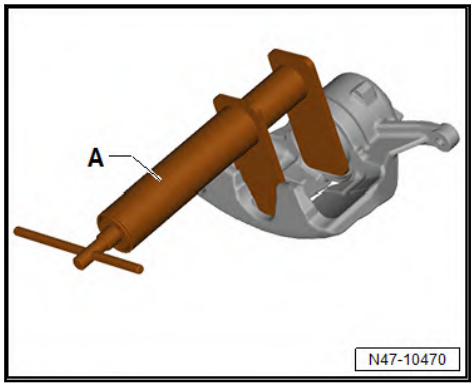


- Using removal wedge -3409- -A-, insert inner sealing lip into cylinder groove.



When doing this, hold piston in front of brake caliper.

- Press piston into brake caliper using piston resetting appliance -T10145- -A-.



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

2 Rear brake caliper

⇒ o2.1 verview – rear brake caliper", page 91

⇒ a2.2 nd installing protective cap", page 92

2.1 Assembly overview – rear brake caliper

- Install complete repair kit when servicing.
- Use only methylated spirits for cleaning the brake.
- New brake calipers are filled with brake fluid and are pre-bled.

1 - Brake caliper

2 - Damper bushes

3 - Guide pin

4 - Caps

5 - Hexagon socket head bolt

- ❑ 8 Nm

6 - Parking brake motor

7 - Seal

- ❑ Renew

8 - Thrust nut

- ❑ Removing and installing not possible

9 - Seal

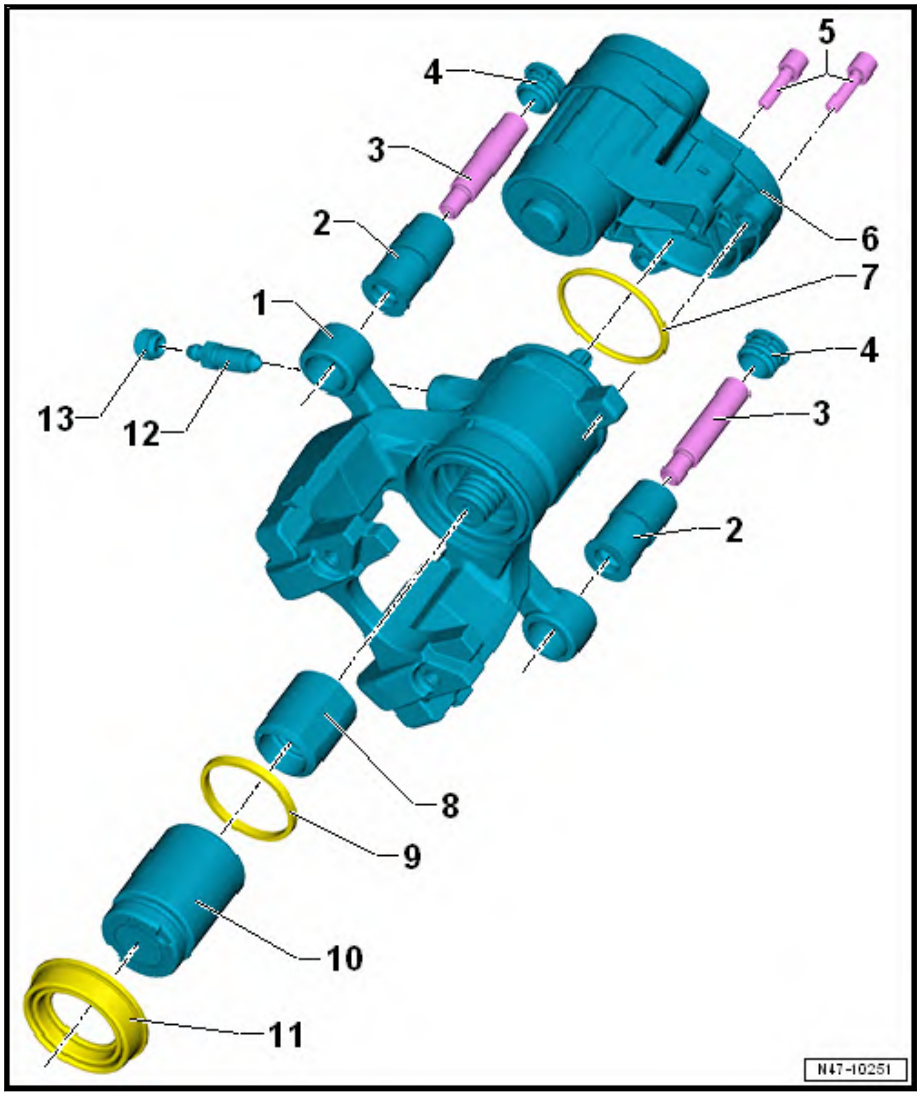
- ❑ Removing and installing not possible

10 - Piston

- ❑ Removing and installing not possible

11 - Protective cap

- ❑ Removing and installing ⇒ page 92



Note

The brake caliper does not need to be removed in order to renew the protective cap; do not unbolt the break hose.

12 - Bleeder valve

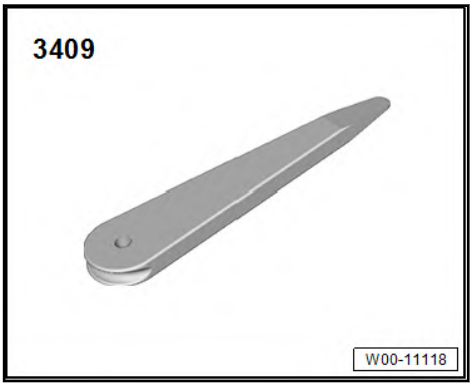
- ❑ Lightly lubricate thread before screwing in. For allocation, see ⇒ Electronic parts catalogue (ETKA)
- ❑ 10 Nm

13 - Dust cap

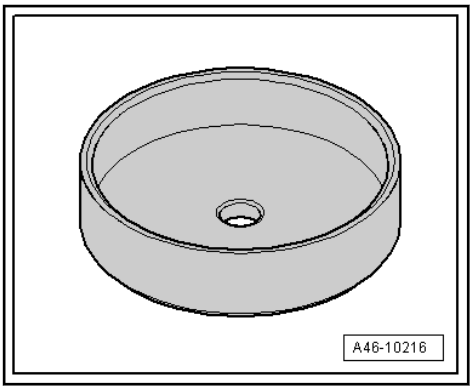
2.2 Removing and installing protective cap

Special tools and workshop equipment required

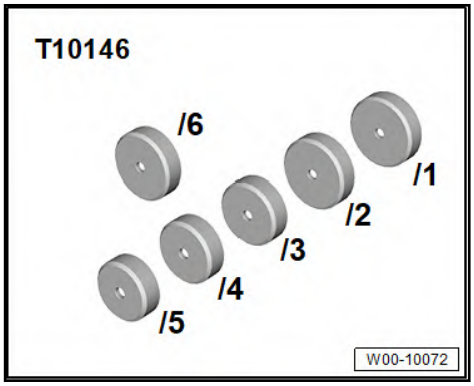
- Removal wedge -3409-



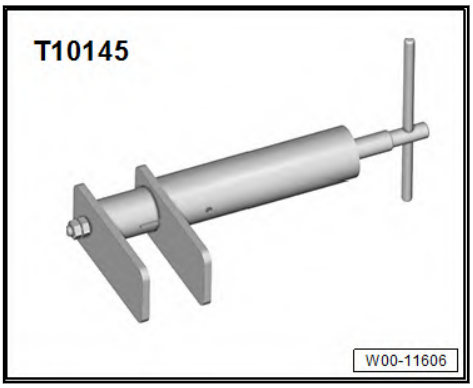
- Assembly tool -T10502- for rear brake FN c - M38 (15)



- Assembly tool -T10146/5- for rear brake FN c - M42 (17)



- Piston resetting appliance -T 10145-



Removing

Only the protective cap is intended to be renewed.

NOTICE

The brake caliper does not need to be removed in order to renew the protective cap; do not unbolt the break hose.

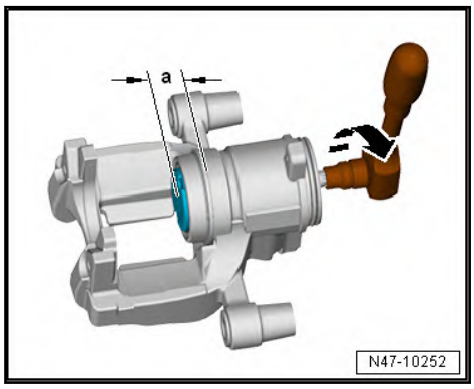
- Piston has been moved back.
- Parking brake motor has been removed.

NOTICE

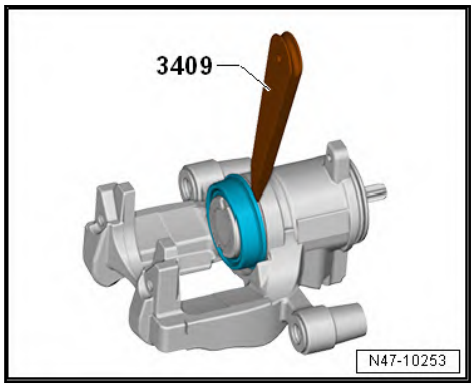
Risk of damage to ball screw assembly due to removal of piston and compressor nut.

– Never unscrew piston and compressor nut completely.

– Unscrew piston (-direction of arrow-) by maximum of 20 mm (-dimension a-) using an E11 Torx socket.



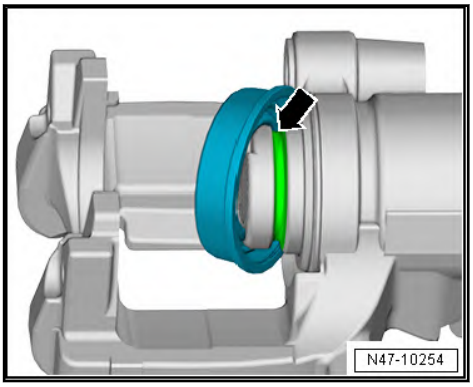
– Lever protective cap off brake caliper using wedge 3409 -arrows-.



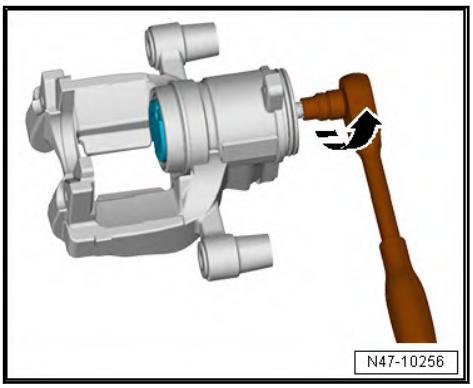
Installing

– The surfaces of the piston and brake caliper must be cleaned only with methylated spirits and then dried.

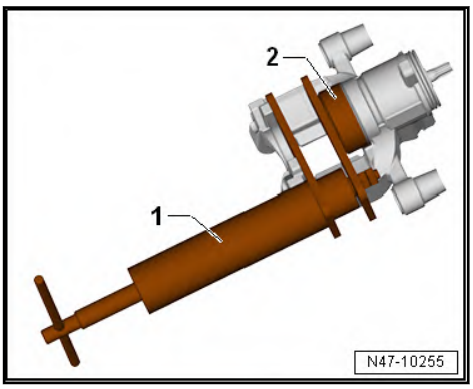
– Insert protective cap into groove -arrow- in piston.



– Screw piston back in (-direction of arrow-).



– Push protective cap onto brake caliper using assembly tool -T10502- -2- and piston resetting appliance -T 10145- -1- in such a way that protective cap rests against brake caliper all-round.



3 Brake servo and brake master cylinder

⇒ o3.1 verview – brake servo/brake master cylinder", page 96

⇒ a3.2 nd installing brake servo", page 100

⇒ a3.3 nd installing brake master cylinder", page 106

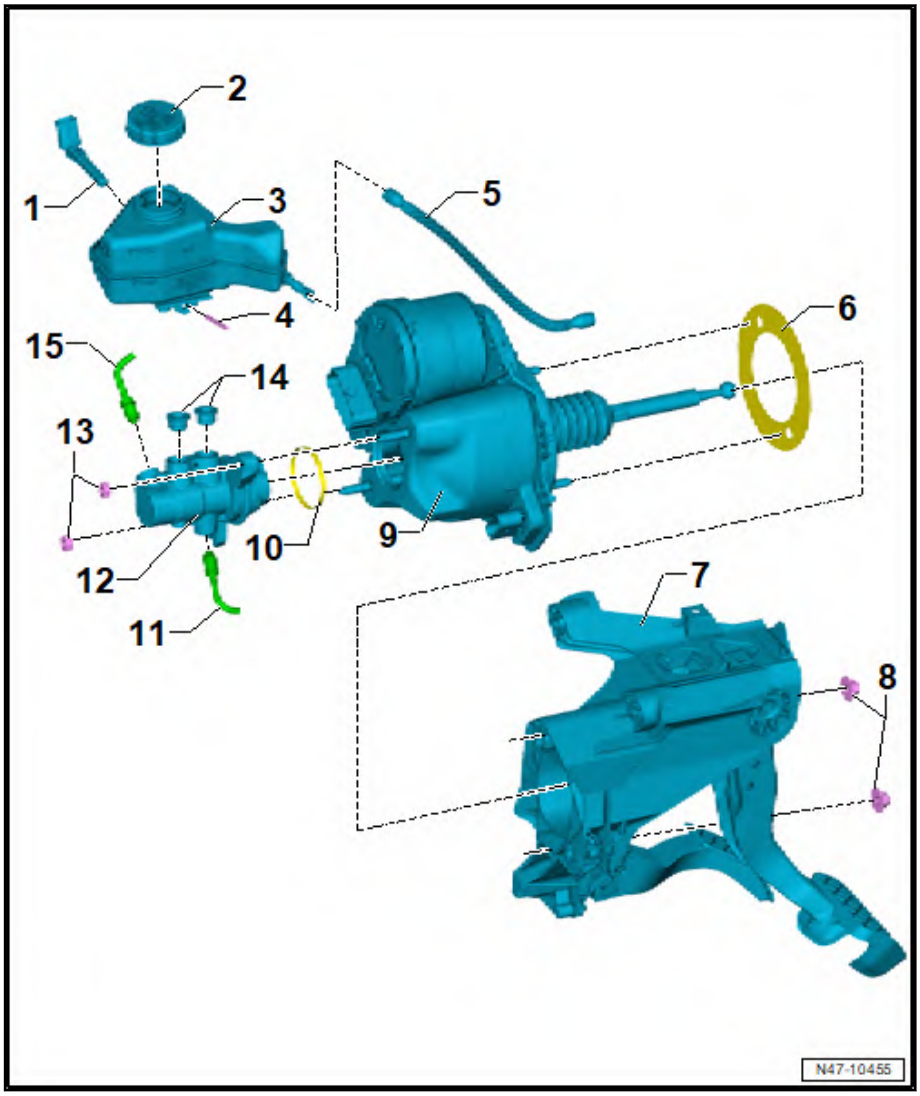
⇒ a3.4 nd installing brake fluid level warning contactF34", page 120

3.1 Assembly overview – brake servo/brake master cylinder

⇒ o3.1.1 verview – brake servo/brake master cylinder, left-hand drive vehicles", page 96

⇒ o3.1.2 verview – brake servo/brake master cylinder, right-hand drive vehicles", page 98

3.1.1 Assembly overview – brake servo/brake master cylinder, left-hand drive vehicles



1 - Warning contact for brake fluid level -F34-

- ❑ Removing and installing ⇒ a3.4 nd installing brake fluid level warning contactF34", page 120

2 - Cap

3 - Brake fluid reservoir

4 - Locking pin

5 - Supply hose

- ❑ For vehicles with manual gearbox

6 - Seal

- ❑ For brake servo
- ❑ Check for damage

7 - Mounting bracket with brake pedal

- ❑ Assembly overview ⇒ page 74
- ❑ Removing and installing ⇒ page 77

8 - Nut

- ❑ Renew after each removal
- ❑ 25 Nm

9 - Brake servo

- ❑ Removing and installing ⇒ page 100

The following electrical components are integrated in the brake servo:

- ♦ Brake pedal position sender -G100-
- ♦ Brake pedal position sender 2 -G836-
- ♦ Voltage supply sender 1 -G730-
- ♦ Voltage supply sender 2 -G731-
- ♦ Brake servo current sensor -G822-
- ♦ Brake servo temperature sender 1 -G838-
- ♦ Brake servo temperature sender 2 -G839-
- ♦ Motor position sender for brake servo -G840-
- ♦ Brake servo control unit -J539-
- ♦ Electromechanical brake servo motor -V548-

10 - Seal

- ❑ Renew

11 - Brake line

- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ With thread M12 x 1
- ❑ 14 Nm

12 - Brake master cylinder

- ❑ Cannot be repaired. If faulty, renew complete.
- ❑ Removing and installing ⇒ page 106

13 - Nut

- ❑ Renew after removal
- ❑ 22 Nm

14 - Plug

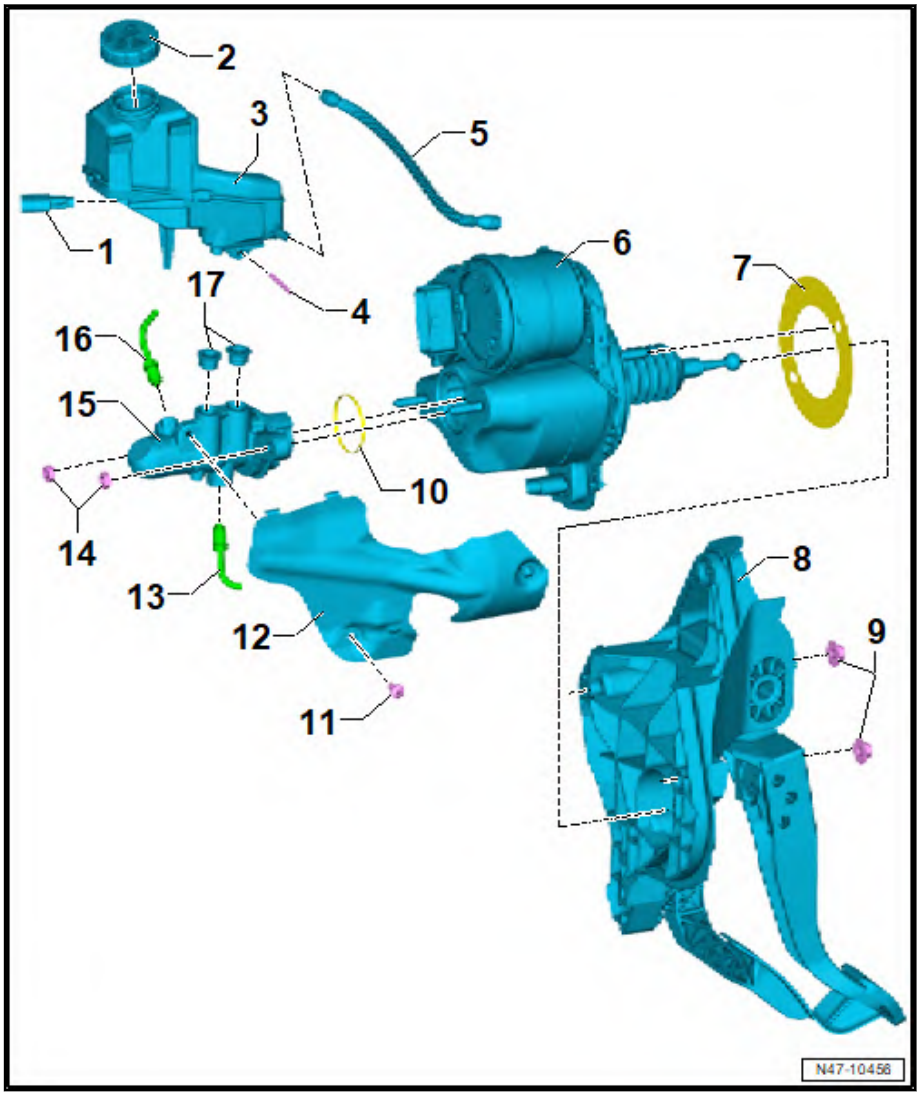
- ❑ Moisten with brake fluid before installing

15 - Brake line

- ❑ Brake master cylinder/secondary piston circuit to hydraulic unit
- ❑ With thread M12 x 1
- ❑ 14 Nm

3.1.2 Assembly overview – brake servo/brake master cylinder, right-hand drive vehicles

Brake master cylinders and brake servos can be renewed independently of each other.



1 - Warning contact for brake fluid level -F34-

2 - Cap

3 - Brake fluid reservoir

4 - Locking pin

5 - Supply hose

- ❑ For vehicles with manual gearbox

6 - Brake servo

- ❑ Removing and installing ⇒ page 103

The following electrical components are integrated in the brake servo:

- ♦ Brake pedal position sender -G100-
- ♦ Brake pedal position sender 2 -G836-
- ♦ Voltage supply sender 1 -G730-
- ♦ Voltage supply sender 2 -G731-
- ♦ Brake servo current sensor -G822-
- ♦ Brake servo temperature sender 1 -G838-
- ♦ Brake servo temperature sender 2 -G839-
- ♦ Motor position sender for brake servo -G840-
- ♦ Brake servo control unit -J539-
- ♦ Electromechanical brake servo motor -V548-

7 - Seal

- ❑ For brake servo
- ❑ Renew
- ❑ Bonded (only when originally assembled at factory)
- ❑ Bonded joint at brake servo and bulkhead does not have to be renewed

8 - Mounting bracket with brake pedal

- ❑ Assembly overview ⇒ page 76
- ❑ Removing and installing brake pedal ⇒ page 82
- ❑ Removing and installing mounting bracket ⇒ page 78

9 - Nut

- ❑ Renew after each removal.
- ❑ 25 Nm

10 - Seal

- ❑ Renew

11 - Bolt

- ❑ 8 Nm

12 - Heat shield

13 - Brake line

- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ With thread M12 x 1
- ❑ 14 Nm

14 - Nut

- ❑ Renew after each removal.
- ❑ 22 Nm

15 - Brake master cylinder

- ❑ Cannot be repaired. If faulty, renew complete.
- ❑ Removing and installing ⇒ page 112

16 - Brake line

- ❑ Brake master cylinder/secondary piston circuit to hydraulic unit
- ❑ With thread M12 x 1
- ❑ 14 Nm

17 - Plug

- ❑ Moisten with brake fluid before installing

3.2 Removing and installing brake servo

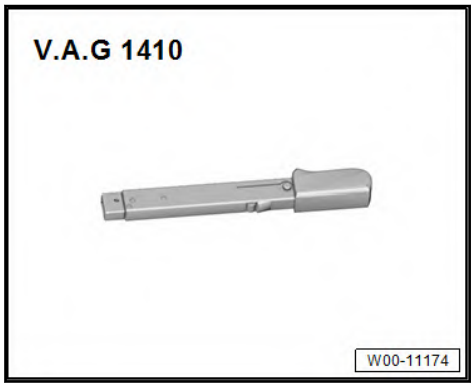
⇒ a3.2.1 nd installing brake servo, left-hand drive vehicles”, page 100

⇒ a3.2.2 nd installing brake servo, right-hand drive vehicles”, page 103

3.2.1 Removing and installing brake servo, left-hand drive vehicles

Special tools and workshop equipment required

- ♦ Torque wrench -V.A.G 1410-



- Hot air blower, e.g. hot air blower -VAS 1978/14A-

Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on left-hand drive vehicle:"", page 10 :

Removing:

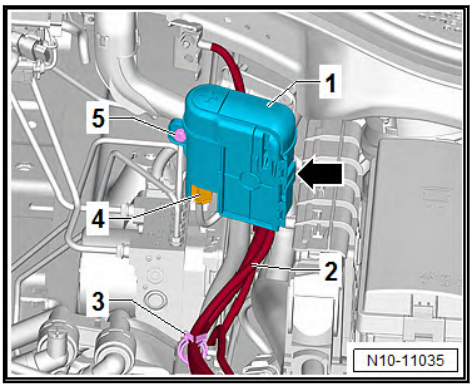
– Remove brake master cylinder ⇒ page 106 .

Vehicles with hybrid drive:

– Detach high-voltage cables from bracket and lay aside ⇒ Rep. gr. 93; High-voltage cables.

– Remove bracket for high-voltage cables on the gearbox ⇒ Rep. gr. 93; High-voltage cables.

Vehicles with 12 V battery in luggage compartment



– Remove bolt -5-.

– Unclip wiring harness -2- -3-.

– Release potential distributor -1- on bracket -arrow-.

– Release and pull off connector -4-.

– Move potential distributor -1- to one side.

Vehicles with diesel engine:

– Remove air intake pipe ⇒ Rep. gr. 21; Charge air system; Removing and installing air intake pipe.

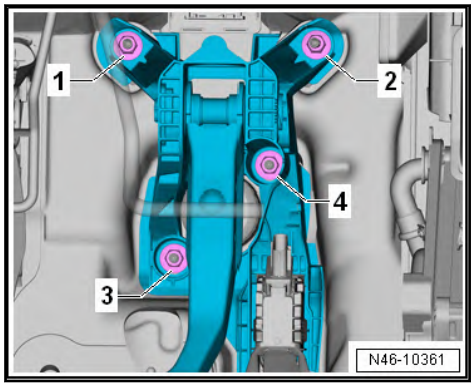
Vehicles with dual clutch gearbox:

– Remove selector cable and cable support bracket from gearbox ⇒ Rep. gr. 34; Selector mechanism; Assembly overview - selector mechanism.

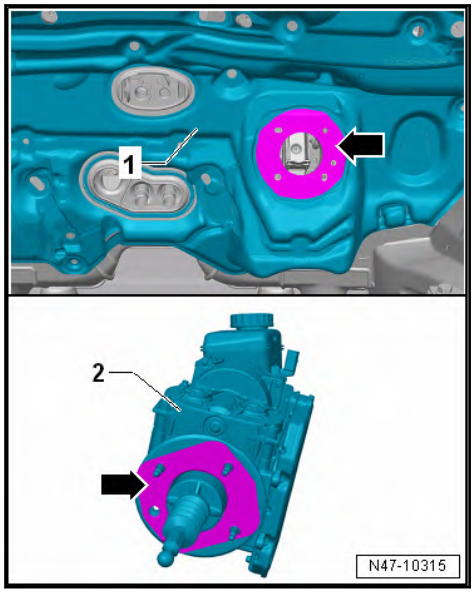
Continued for all vehicles:

– Separate brake pedal from brake servo ⇒ page 80 .

– Unscrew nuts -3 and 4- from brake servo.



– Carefully pull brake servo off plenum chamber bulkhead.
– Carefully remove brake servo from the vehicle.
– Remove adhesive residue -arrows- from brake servo -2- and plenum chamber bulkhead -1-.



– To do so, apply gentle heat from hot air blower to the adhesive residue and pull it off.
– Thoroughly clean surfaces.

Installing:

Install in reverse order of removal, observing the following:

NOTICE

The brake servo is given the additional bonded joint only during factory assembly.

The adhesive bond between the brake servo and the bulkhead does not need to be renewed, but the seal does.

– Renew gasket between brake servo and bulkhead ⇒ page 96 .
– Carefully insert brake servo and tighten nuts hand-tight.
– When assembling brake master cylinder with brake servo, make sure push rod is properly positioned in brake master cylinder.

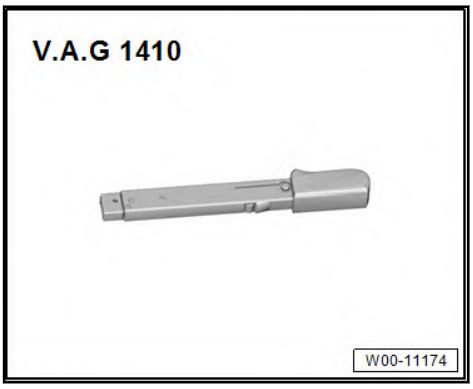
– When joining brake master cylinder to brake servo, ensure that seal ⇒ Item 10 (page 97) is properly seated.
– Ensure that seals ⇒ Item 14 (page 98) are correctly seated in brake master cylinder.
– Coat sealing plugs with brake fluid before pressing brake fluid reservoir into brake master cylinder.
– Connect brake pedal to brake servo ⇒ page 81 .
– Code brake servo control unit -J539- ⇒ Vehicle diagnostic tester.
– Perform basic setting for electromechanical brake servo ⇒ Vehicle diagnostic tester.

Torque settings

- ⇒ o3.1.1 verview – brake servo/brake master cylinder, left-hand drive vehicles", page 96
- ⇒ Rep. gr. 93; Power and control electronics for electric drive
- ⇒ Rep. gr. 93; High-voltage cables
- ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery
- ⇒ General body repairs, interior; Rep. gr. 68; Compartments and covers; Assembly overview – Dash panel cover on driver side
- ⇒ Running gear, axles, steering; Rep. gr. 48; Steering column; Assembly overview - steering column
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ Rep. gr. 34; Selector mechanism; Assembly overview – selector mechanism

3.2.2 Removing and installing brake servo, right-hand drive vehicles

- Torque wrench -V.A.G 1410-



- Hot air blower, e.g. hot air blower -VAS 1978/14A-

Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on right-hand drive vehicle:"", page 10 :

Vehicles with hybrid drive:

– Observe safety precautions when working on the high-voltage system ⇒ page 1 .

– Observe the risk category of the high-voltage system ⇒ Rep. gr. 00; Risk category of the high-voltage system.

Danger to life from high voltage

The high-voltage system is under high voltage. Damage to high-voltage components can result in severe or fatal injury from electric shock.

– Perform visual check of high-voltage components and high-voltage cables.

– Never use cutting or forming tools, or any other sharp-edged tools.

– Never use heat sources such as welding, brazing, soldering, hot air or thermal bonding equipment.

Vehicles with emission control module:

– Remove emission control module ⇒ Rep. gr. 26; Emission control; Removing and installing emission control module.

Vehicles with particulate filter:

– Remove particulate filter ⇒ Rep. gr. 26; Emission control; Removing and installing particulate filter.

Vehicles with auxiliary heater:

– Remove coolant pipes on bulkhead ⇒ Auxiliary heater, supplementary heating system; Rep. gr. 82; Coolant circuit with auxiliary heater/supplementary heating system.

Vehicles with catalytic converter

– Remove catalytic converter ⇒ Rep. gr. 26; Emission control; Removing and installing catalytic converter.

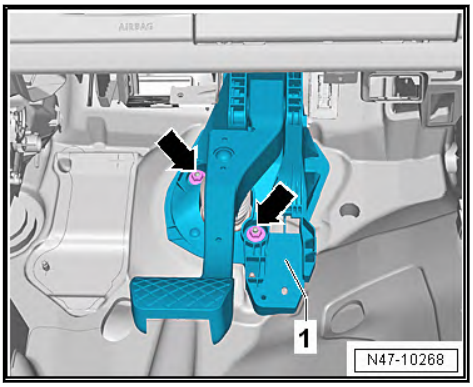
Continued for all vehicles:

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

– Separate brake pedal from brake servo ⇒ page 80 .

– Remove brake master cylinder ⇒ a3.3.2 nd installing brake master cylinder, right-hand drive vehicles", page 112 .

– Remove nuts -arrows- from mounting bracket.



– Pull brake servo off bulkhead, applying force to separate bonded joint.

NOTICE

Risk of damage to the plenum chamber bulkhead due to improper separation of the bonded joint.

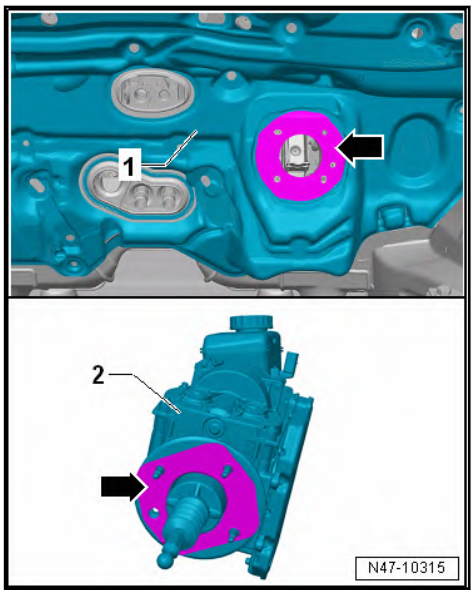
– **Never lever the brake servo off the plenum chamber bulkhead to separate the bonded joint.**

– Lay brake servo to side.

– Remove brake servo downwards.

– Carefully remove brake servo from the vehicle.

– Remove adhesive residue -arrows- from brake servo -2- and plenum chamber bulkhead -1-.



– To do so, apply gentle heat from hot air blower to the adhesive residue and pull it off.

– Remove adhesive residue from brake servo and plenum chamber bulkhead.

– To do so, apply gentle heat from hot air blower to the adhesive residue and pull it off.

– Thoroughly clean surfaces.

Installing:

Install in reverse order of removal, observing the following:

NOTICE

The brake servo is given the additional bonded joint only during factory assembly.

The adhesive bond between the brake servo and the bulkhead does not need to be renewed, but the seal does.

- Renew gasket between brake servo and bulkhead ⇒ Item 7 (page 99) .
- Carefully insert brake servo and tighten nuts hand-tight.
- When assembling brake master cylinder with brake servo, make sure push rod is properly positioned in brake master cylinder.
- When joining brake master cylinder to brake servo, make sure seal ⇒ Item 10 (page 99) is properly seated.
- Ensure that seals ⇒ Item 17 (page 100) are correctly seated in brake master cylinder.
- Coat sealing plugs with brake fluid before pressing brake fluid reservoir into brake master cylinder.

Continued for all vehicles:

- Code brake servo control unit -J539- ⇒ Vehicle diagnostic tester.
- Perform basic setting for electromechanical brake servo ⇒ Vehicle diagnostic tester.

Torque settings

- ⇒ o3.1.2 verview – brake servo/brake master cylinder, right-hand drive vehicles", page 98
- ⇒ General body repairs, interior; Rep. gr. 68; Compartments and covers; Assembly overview – Dash panel cover on driver side
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment

3.3 Removing and installing brake master cylinder

⇒ a3.3.1 nd installing brake master cylinder, left-hand drive vehicles", page 106

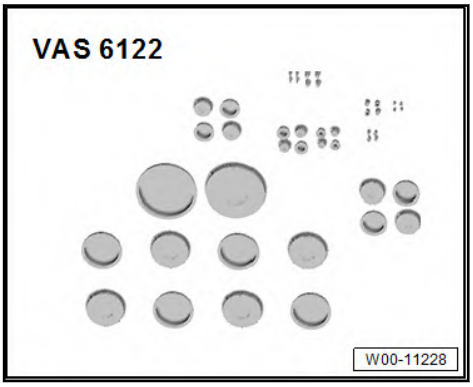
⇒ a3.3.2 nd installing brake master cylinder, right-hand drive vehicles", page 112

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

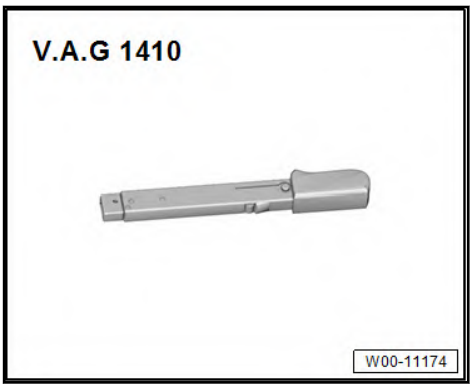
Special tools and workshop equipment required

- Brake filling and bleeding equipment -VAS 6860-

- Engine bung set -VAS 6122-

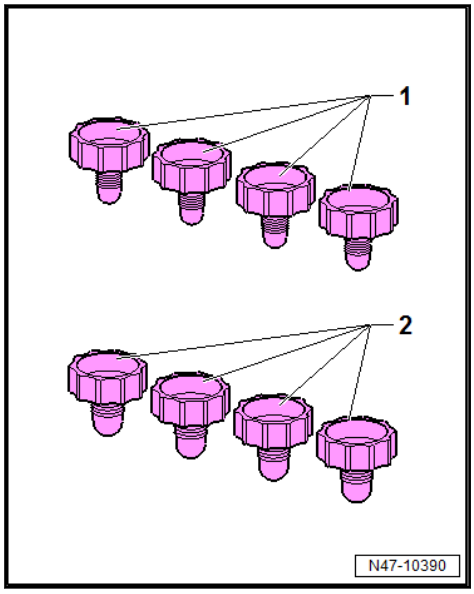


- Torque wrench -V.A.G 1410-

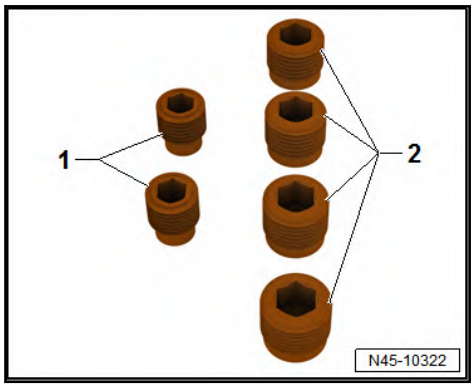


- Ring spanner insert set AF 11 -V.A.G 1331/2-

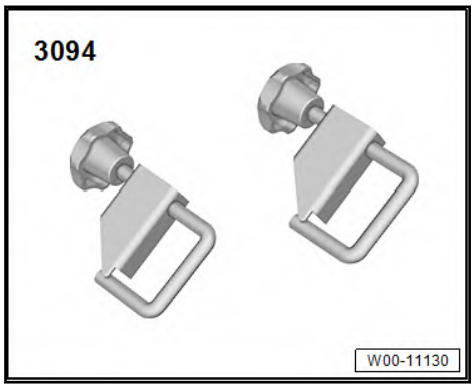
- Sealing plug repair kit -1H0 698 311 A-



- Sealing plugs, assembly part no. 5Q0 698 311



- Hose clamps, up to 25 mm -3094-



Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on left-hand drive vehicle:"", page 10 **:**

Removing

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

Vehicles with hybrid drive:

Danger to life from high voltage

The high-voltage system is under high voltage. Damage to high-voltage components can result in severe or fatal injury from electric shock.

– Perform visual check of high-voltage components and high-voltage cables.

– Never use cutting or forming tools, or any other sharp-edged tools.

– Never use heat sources such as welding, brazing, soldering, hot air or thermal bonding equipment.

– Remove power and control electronics for electric drive -JX1- ⇒ Rep. gr. 93; Power and control electronics for electric drive; Removing and installing power and control electronics for electric drive.

– Remove bracket for power and control electronics for electric drive -JX1- ⇒ Electric motor (270, LS2); Rep. gr. 93; Power and control electronics for electric drive; Removing and installing bracket for power and control electronics for electric drive.

Vehicles with turbocharger:

– Remove air filter housing ⇒ Rep. gr. 23; Air filter; Assembly overview - air filter housing.

– Remove air intake hose between turbocharger and air filter housing ⇒ Rep. gr. 24; Air filter; Assembly overview - air filter housing.

– Remove turbocharger connection ⇒ Rep. gr. 21; Turbocharger; Removing and installing turbocharger connection.

Vehicles with 12 V battery in engine compartment

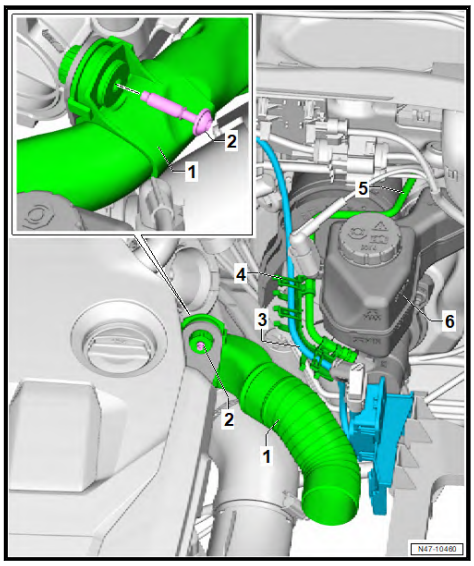
– Remove battery ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery.

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

Vehicles with 12 V battery in luggage compartment

– Remove air filter carrier ⇒ Rep. gr. 23; Air filter; Assembly overview - air filter housing.

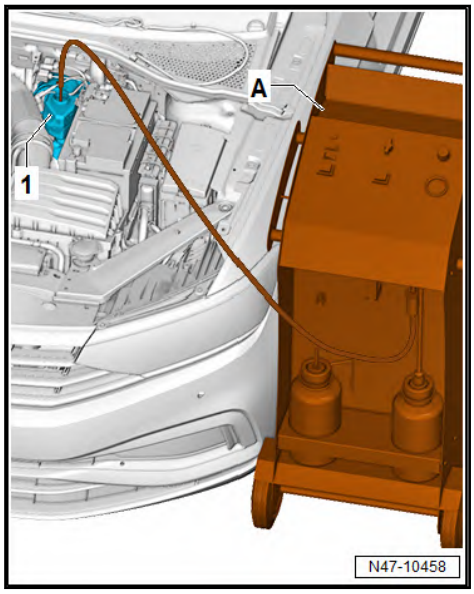
Vehicles with diesel engine:



– If present, free off wiring harness -3- from brake line -5-.

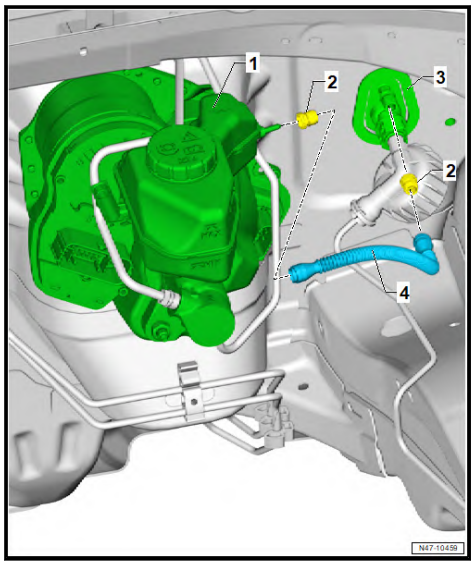
– Lay control unit for NOx sender -J583- to one side.
– Unclip line retainer -4- on brake line -5-.
– Unscrew bolt -2- and remove air intake pipe -1-.

Continued for all vehicles:



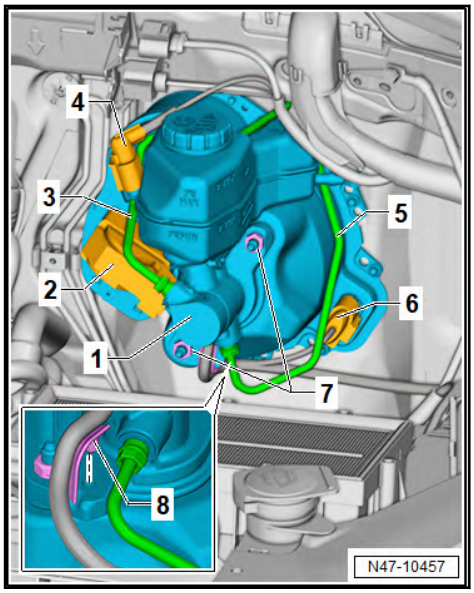
– Place sufficient lint-free cloths in area of engine, subframe and gearbox.
– Extract as much brake fluid as possible from brake fluid reservoir -1- using brake filling and bleeding equipment -VAS 6860- -A-.

Vehicles with manual gearbox:



– Pull off supply hose -4- on clutch master cylinder -3- and brake fluid reservoir -1-.
– Seal supply hose -4- for clutch master cylinder using engine bung set -VAS 6122- or hose clamps to 25 mm -3094-.

Continued for all vehicles:



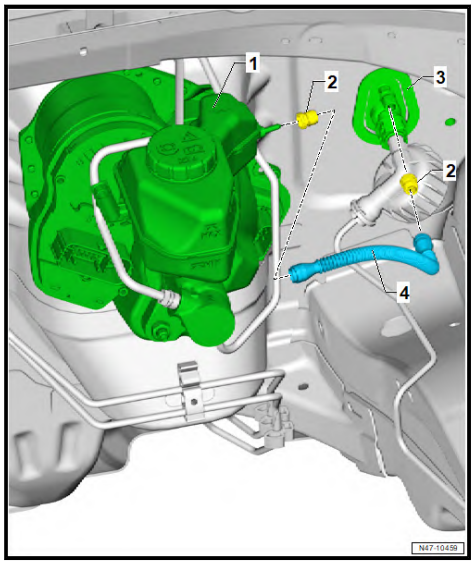
- Release and disconnect connector -4- for brake fluid level warning contact -F34- from brake fluid reservoir.
- Unclip wiring harness -8- on brake master cylinder -1-.
- Unscrew brake lines -3- and -5- from brake master cylinder -1-.
- Seal threaded holes immediately using sealing plugs -1H0 698 311 A- or sealing plugs with assembly part number 5Q0 698 311.
- Seal brake lines using plugs from repair set part number 1H0 698 311 A or bung set for engine -VAS 6122-. If necessary, fit dust caps from bleeder valves on brake lines.
- Unscrew nuts -7-.
- Release and pull off electrical connectors -2- and -6-.
- Carefully take brake master cylinder -1- out of brake servo.

Installing

Install in reverse order of removal, observing the following:

- When assembling brake master cylinder with brake servo, make sure push rod is properly positioned in brake master cylinder.
- When assembling brake master cylinder with brake servo, make sure seal ⇒ Item 10 (page 97) is seated correctly.
- Fit sealing plugs onto brake fluid reservoir ⇒ Item 14 (page 98) .
- Coat sealing plugs with brake fluid before pressing brake fluid reservoir into brake master cylinder.
- Bleed brake system ⇒ page 126 .
- Subsequently bleeding the brake system ⇒ page 127 .

Vehicles with manual gearbox:



- Check seals -2- for damage and renew supply hose -4- if necessary.
- Make sure that seals -2- engage correctly in supply hose -4-.
- Fit supply hose -4- on clutch master cylinder -3- and brake fluid reservoir -1-.
- Bleed clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

Continued for all vehicles:

- Perform basic setting for electromechanical brake servo ⇒ Vehicle diagnostic tester.

Torque settings

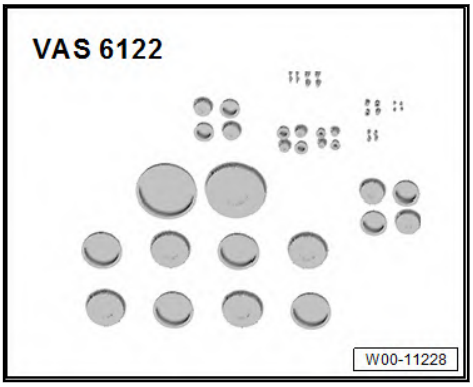
- ⇒ o3.1.1 verview – brake servo/brake master cylinder, left-hand drive vehicles", page 96
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ Rep. gr. 93; Power and control electronics for electric drive
- ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery
- ⇒ Rep. gr. 21; Turbocharger; Assembly overview – turbocharger
- ⇒ Rep. gr. 23; Air filter; Assembly overview - air filter housing
- ⇒ Rep. gr. 24; Air filter; Assembly overview - air filter housing

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

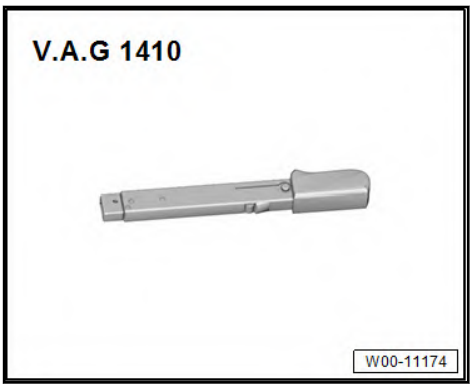
Special tools and workshop equipment required

- Brake filling and bleeding equipment -VAS 6860-

- Engine bung set -VAS 6122-

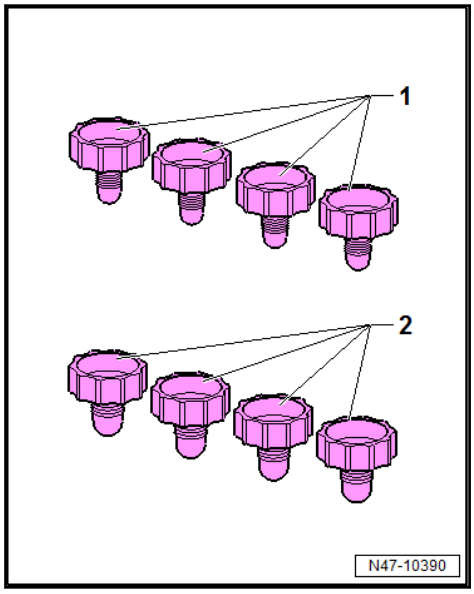


- Torque wrench -V.A.G 1410-

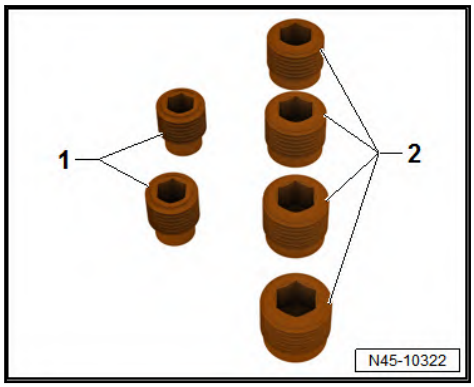


- Ring spanner insert set AF 11 -V.A.G 1331/2-

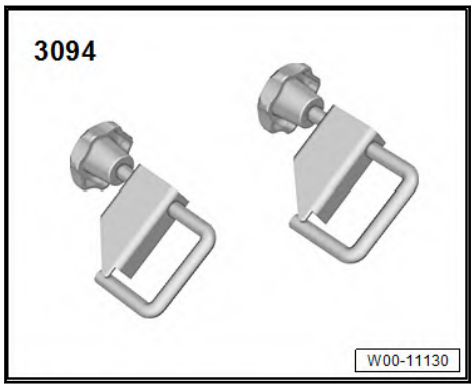
- Sealing plug repair kit -1H0 698 311 A-



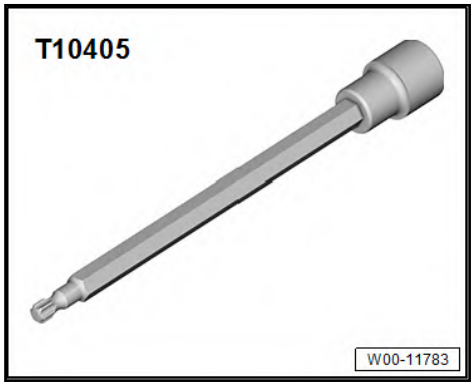
- Sealing plugs, assembly part no. 5Q0 698 311



- Hose clamps, up to 25 mm -3094-



- Socket Torx T 30 -T10405-



Overview of fitting locations ⇒ Fig. ""Location of anti-lock brake system on right-hand drive vehicle:"", page 10 :

Removing:

– If fitted, remove engine cover panel ⇒ Rep. gr. 10; Engine cover panel; Removing and installing engine cover panel.

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

Vehicles with hybrid drive:

– Observe safety precautions when working on the high-voltage system ⇒ page 1 .

– Observe the risk category of the high-voltage system ⇒ Rep. gr. 00; Risk category of the high-voltage system.

Vehicles with diesel engine:

– Remove lines for injector for reducing agent -N474- at top of toothed belt cover ⇒ Rep. gr. 15; Toothed belt drive; Removing and installing toothed belt cover.

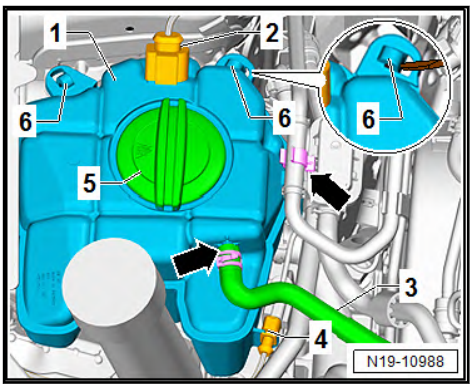
– Remove injector for reducing agent -N474- on exhaust gas cleaning module and lay aside with lines attached ⇒ Rep. gr. 26; SCR system (Selective Catalytic Reduction); Removing and installing injector for reducing agent.

– Remove differential pressure sender -G505- and exhaust gas pressure sensor 1 -G450- from cylinder head ⇒ Rep. gr. 23; Senders and sensors; Removing and installing differential pressure sender G505.

– Remove exhaust gas temperature sender 3 -G495- ⇒ Rep. gr. 26; Removing and installing exhaust gas temperature sender 3.

– Unbolt fuel filter, and place it on engine with fuel lines connected ⇒ Rep. gr. 20; Fuel filter; Removing and installing fuel filter.

Vehicles with bi-turbo diesel engine



– Release and pull off connector -2- on coolant expansion tank.

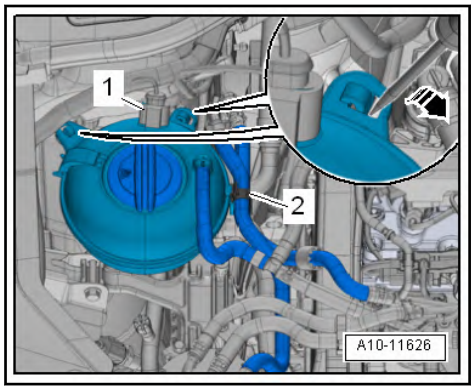
– Unclip, release and pull off connector -4-.

– Unclip retainer for fuel lines on coolant expansion tank -arrow-.

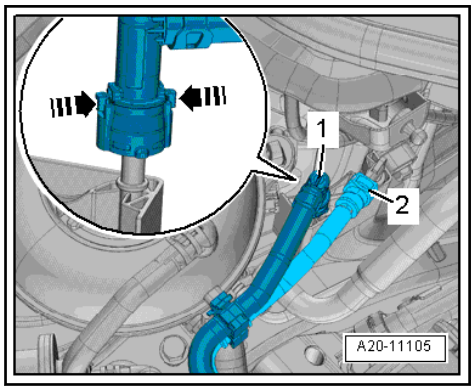
– Using a screwdriver, release catches -6-.

– Place coolant expansion tank -1- on engine.

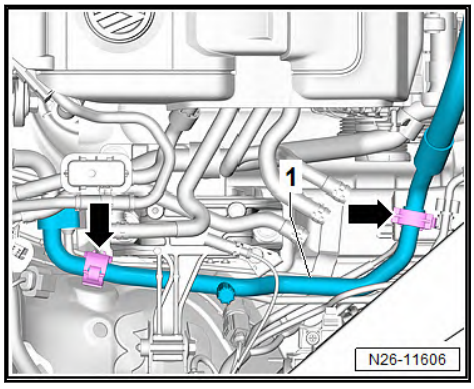
Continued for all vehicles:



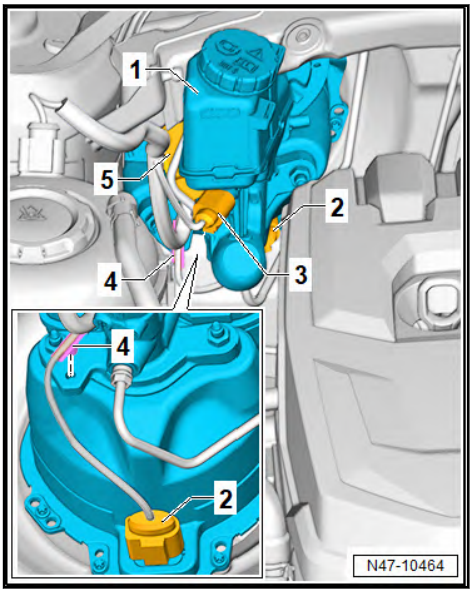
– Disconnect electrical connector -1-.
– Disconnect bracket -2- with fuel hoses.
– Remove coolant hoses from engine. To do this, open retainers.
– Use a screwdriver to release fasteners -arrow- and place coolant expansion tank on engine.
– Disconnect fuel lines -1- and -2- and lay to side. Disconnect plug-in connectors ⇒ Rep. gr. 20; Plug-in connectors; Disconnecting plug-in connectors.



– Unclip air conditioning line in the area of the brake servo ⇒ Heating, air conditioning; Rep. gr. 87; Refrigerant circuit; System overview - Refrigerant circuit.

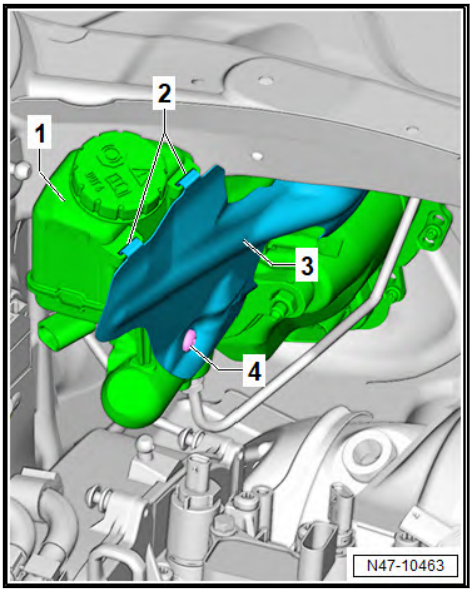


– Unclip refrigerant lines -1- on longitudinal member on right side. To do this, open retainers -arrows-.
– Release and disconnect connector -3- from brake fluid level warning contact -F34- at brake fluid reservoir -1-.



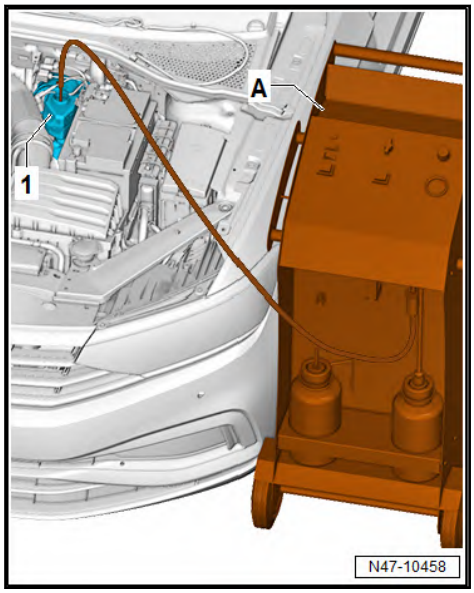
– Unclip wiring harness -4- on brake master cylinder.
– Release and pull off electrical connectors -2- and -5-.

Vehicle with heat shield:



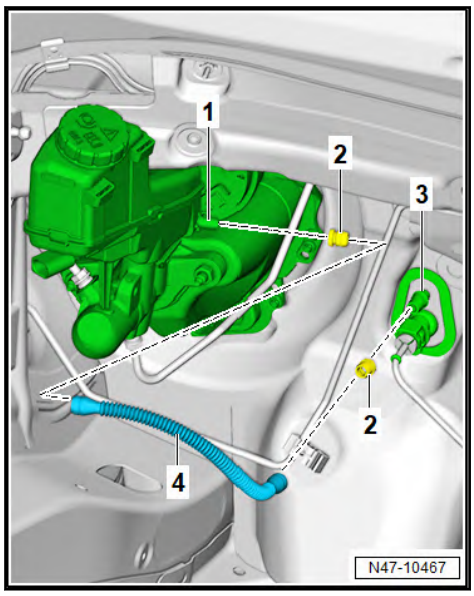
– Remove bolt -4-.
– Detach heat shield -3- on brake fluid reservoir -1- from top mountings -2- and remove.

Continued for all vehicles:



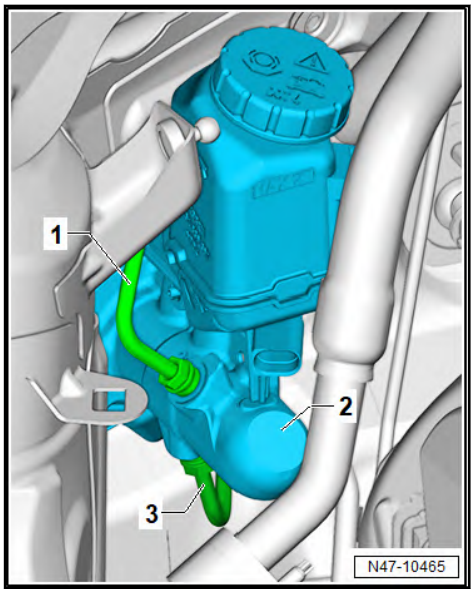
– Lay out sufficient lint free clothes in area of engine and subframe.
– Extract as much brake fluid as possible from brake fluid reservoir -1- using brake filling and bleeding equipment -VAS 6860- -A-.

Vehicles with manual gearbox:

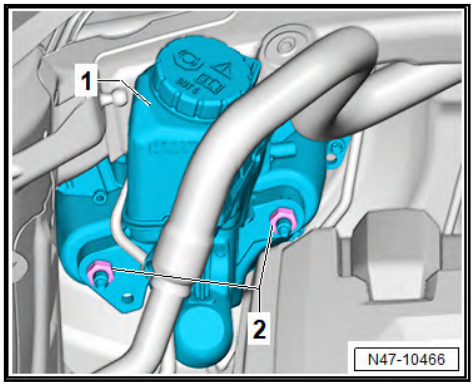


– Pull off supply hose -4- on clutch master cylinder -3- and brake fluid reservoir -1-.
– Seal supply hose -4- for clutch master cylinder using engine bung set -VAS 6122- or hose clamps to 25 mm -3094-.

Continued for all vehicles:



– Unscrew brake lines -1- and -3- from brake master cylinder -2-.
– Seal threaded holes immediately using sealing plugs -1H0 698 311 A- or sealing plugs with assembly part number 5Q0 698 311.
– Seal brake lines using plugs from repair set part number 1H0 698 311 A or bung set for engine -VAS 6122-. As appropriate, fit dust caps from bleeder screws onto brake line.
– Unscrew nuts -2-.



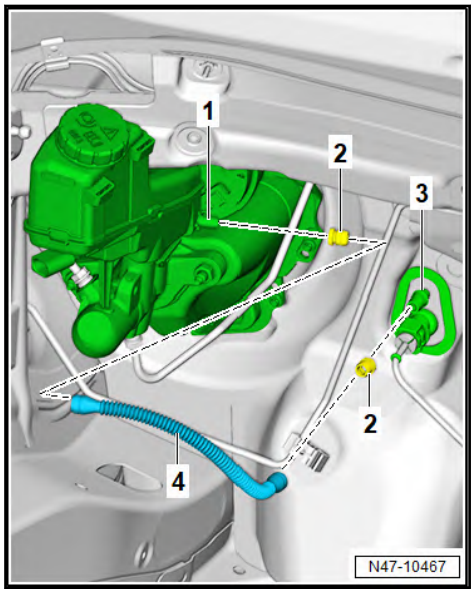
– Remove brake master cylinder -1- from brake booster.

Installing:

Install in reverse order of removal, observing the following:

– When assembling brake master cylinder with brake servo, make sure push rod is properly positioned in brake master cylinder.
– When joining brake master cylinder to brake servo, make sure seal is properly seated.
– Bleed brake system ⇒ page 126 .
– Subsequently bleeding the brake system ⇒ page 127 .

Vehicles with manual gearbox:



– Check seals -2- for damage and renew if necessary.
– Make sure that seals -2- engage correctly in supply hose -4-.
– Connect supply hose -4-.
– Bleed clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

Continued for all vehicles:

– Perform basic setting for electromechanical brake servo ⇒ Vehicle diagnostic tester.

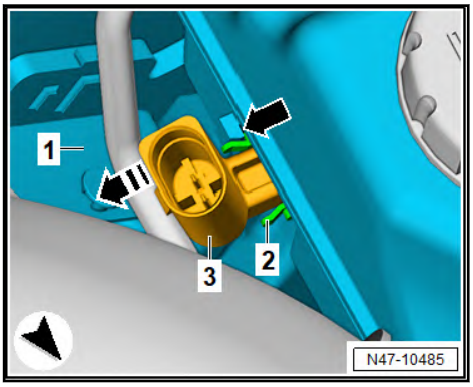
Torque settings

- ⇒ o3.1.2 verview – brake servo/brake master cylinder, right-hand drive vehicles", page 98
- ⇒ Heating, air conditioning; Rep. gr. 87; Air duct; Assembly overview – air duct and air distribution in passenger compartment
- ⇒ Rep. gr. 15; Toothed belt drive; Assembly overview - toothed belt guard
- ⇒ Rep. gr. 26; SCR system (Selective Catalytic Reduction); Assembly overview - injector for reducing agent
- ⇒ Rep. gr. 23; Lambda probe; Exploded view - Lambda probe
- ⇒ Rep. gr. 20; Fuel filter; Assembly overview - fuel filter
- ⇒ Heating, air conditioning; Rep. gr. 87; Overview of fitting locations - air conditioning system

3.4 Removing and installing brake fluid level warning contact -F34-

Removing:

– Push locking element -2- on retaining tab -arrow- of brake fluid reservoir inwards.



– Pull out brake fluid level warning contact -F34- -3- in direction of -arrow-.

Installing:

Push warning contact for brake fluid level -F34- -3- into brake fluid reservoir and engage.

4 Brake lines

⇒ b4.1 rake lines", page 122

4.1 Repairing brake lines

⇒ o4.1.1 verview - flanging tool", page 122

⇒ f4.1.2 or use of flanging tool", page 123

4.1.1 Assembly overview - flanging tool

With flanging tool for brake lines -VAS 6056-, a flange can be made on brake lines with 5 mm external pipe diameter without damaging the lining. This allows partial replacement of brake lines to save costs

NOTICE

Brake lines may only be bent to max. 90°, as they otherwise kink or reveal deformations which constrict the line cross-section to an impermissible degree.

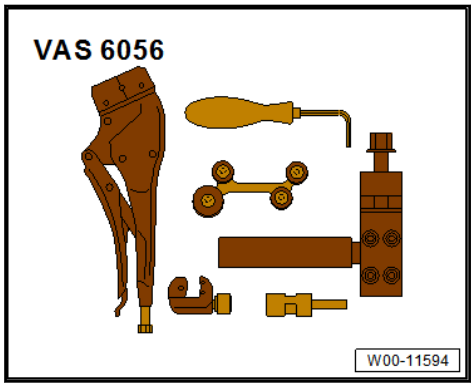
Preferably separate brake lines at underbody.

The positions of the intermediate pieces must be selected so that they cannot chafe on moving parts.

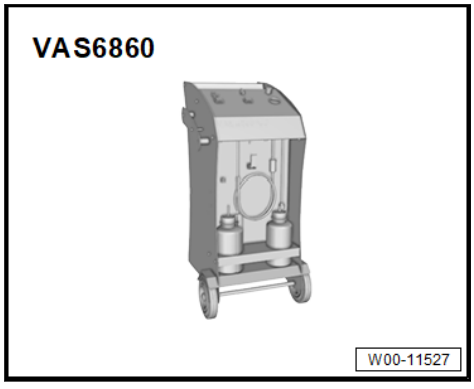
Do not grease spindle; merely clean with methylated spirits.

Special tools and workshop equipment required

- Flanging tool for brake lines -VAS 6056-



- Brake filling and bleeding equipment -VAS 6860-



A - Flanging tool -VAS 6056/1-

- ❑ Flanging tool -VAS 6056/1- contains flanging jaws -VAS 6056/6-

B - Pipe cutter -VAS 6056/2-

C - Brake line scraper -VAS 6056/3-

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

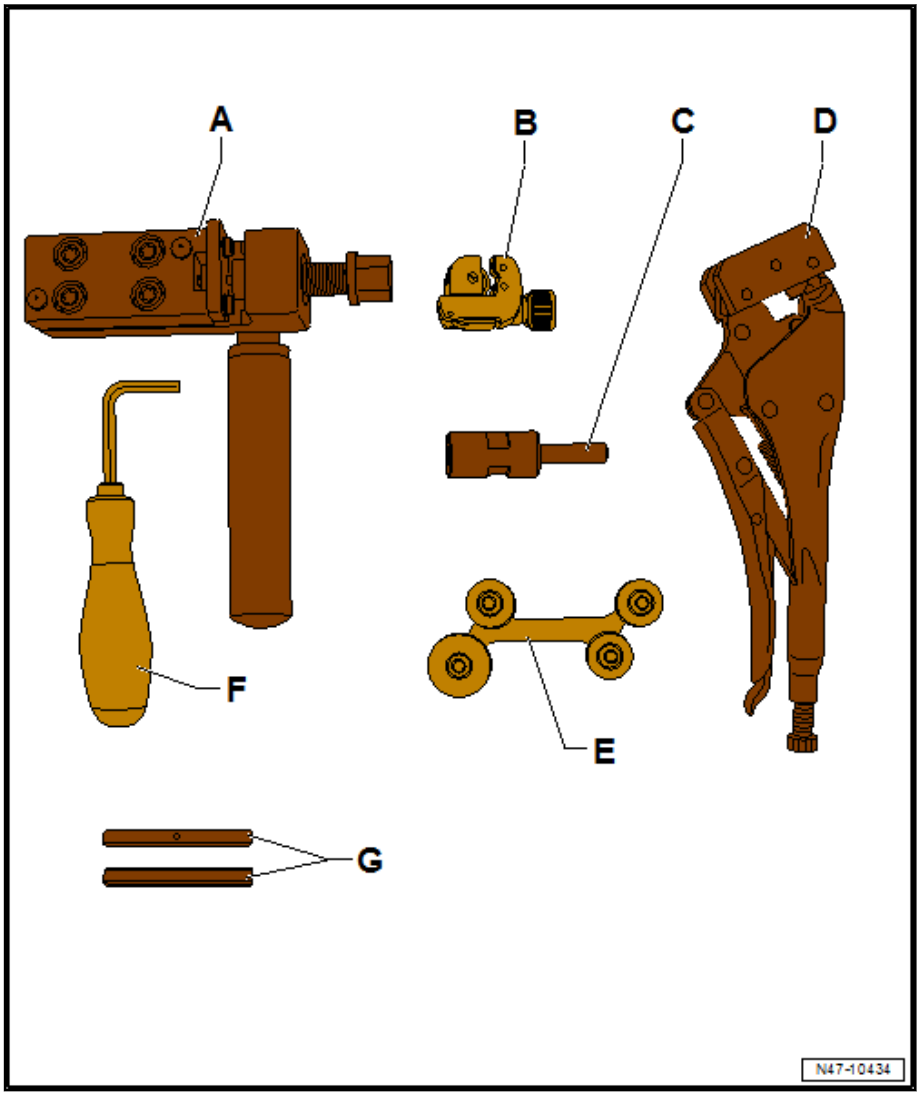
D - Set of grips with plastic jaws -VAS 6056/4-

E - Pipe bending tool -VAS 6056/5-

F - Special wrench, 6 mm

G - Clamp jaws -VAS 6056/6- or clamp jaws -VAS 6056/7-

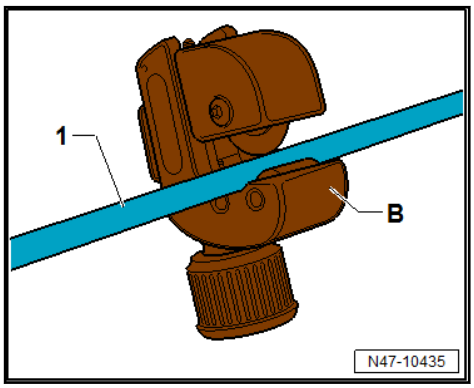
- ❑ -VAS 6056/6- for black brake lines
- ❑ -VAS 6056/7- for green brake lines



4.1.2 Instructions for use of flanging tool

– Unbolt respective brake line from brake caliper or wheel brake cylinder. Catch escaping brake fluid and dispose of this as per regulations.

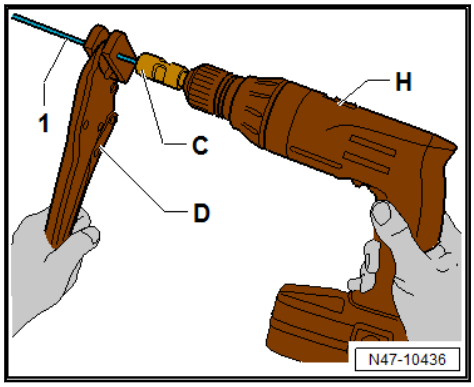
– Cut through brake line at a suitable point (straight, freely accessible section) using pipe cutter -VAS 6056/2- -B-.



– Remove section to be renewed.

– Degrease brake line surface.

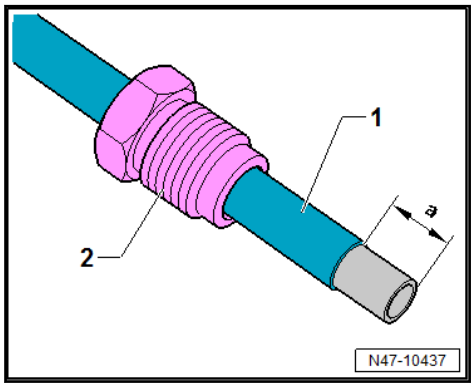
– Clamp brake line -1- in set of grips -D- so that approx. 50 mm project from plastic jaws.



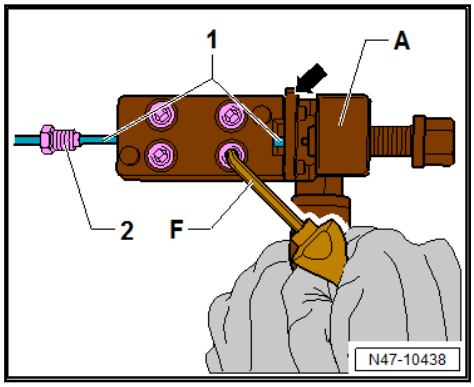
– Clamp scraper -3- into a drill and place it onto brake line.
– At slow drill speed and with gentle pressure on brake line, scrape coating off brake line.

Length of scraping is determined by stop in scraper.

– Pull scraper off brake line and remove scrapings.
– Remove set of grips and slide union bolt -2- onto brake line.



– Push brake line -1- against stop -arrow- in flanging tool -A-.

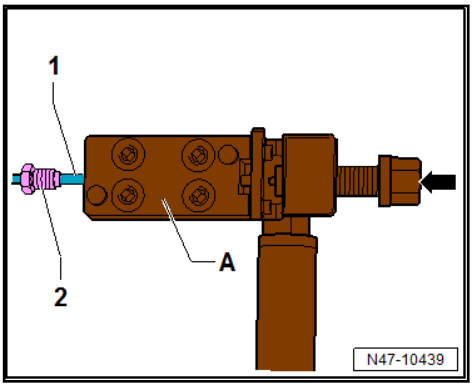


NOTICE

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

– Tighten brake line in flanging tool until brake line can no longer be moved. Then fold up stop -A-. Now tighten hexagon socket head bolts diagonally using angle screw driver -C-.

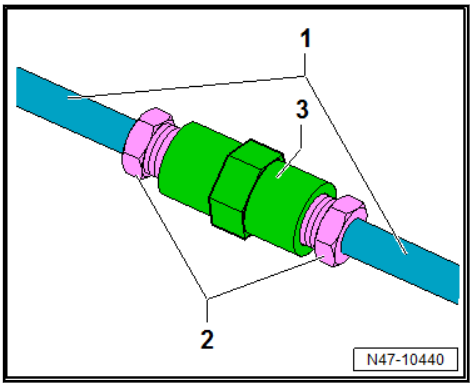
– Turn spindle -arrow- to stop into flanging tool -A-.



– Turn spindle back again.
– Unscrew hexagon socket head bolts in diagonal sequence.
– Remove brake line from flanging tool, then clean and inspect brake line and flange.

Briefly flush the section of brake line remaining in the vehicle:

– Connect brake filling and bleeding unit -VAS 6860-, connect bleeder bottle hose to brake line flange and allow brake filling and bleeding unit -VAS 6860- to run briefly until a little of brake fluid has run through.
– Blow out the new brake line to be inserted with compressed air.
– Join brake lines -1- using connecting piece -3-.



– Install brake line.
– Bleed brake system ⇒ page 126 .

5 Hydraulic system

5.1 General notes on brake fluid

NOTICE

Only use new brake fluid conforming to VW standard (VW 501 14).

Brake fluid is poisonous. In addition, due to its corrosive effect brake fluid must not come into contact with paintwork.

Brake fluid is hygroscopic, which means it absorbs moisture from the ambient air. Therefore, always store it in air tight containers.

Wash away spilt brake fluid using plenty of water.

⇒ Maintenance; Booklet ; Brake and clutch system: Changing brake fluid

5.2 Bleeding hydraulic system following standard procedure

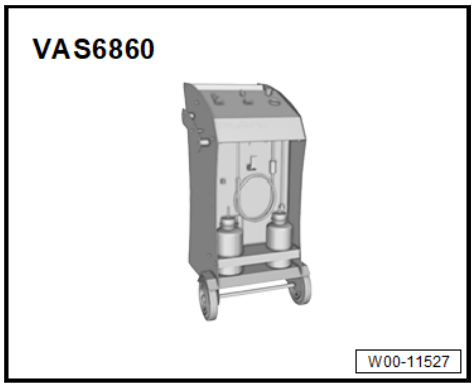
NOTICE

Bleeding the hydraulic system using brake filling and bleeding equipment -VAS 6860- is described.

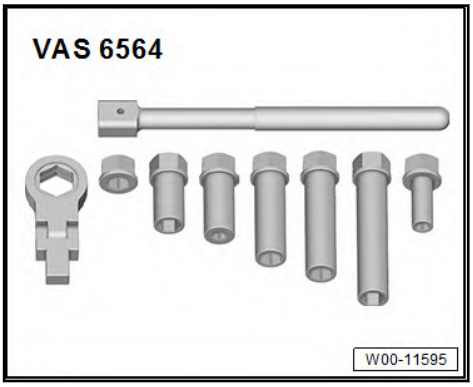
A pre-pressure of 2 bar is required for bleeding the ABS hydraulic unit -N55-.

Special tools and workshop equipment required

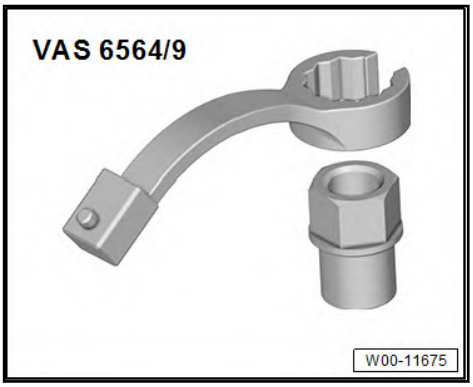
- Brake filling and bleeding equipment -VAS 6860-



- Tool set for brake bleeding -VAS 6564-



- Ring spanner insert -VAS 6564/9-



Carry out the following work:

– On vehicles with 15” rims, remove rear wheels.

NOTICE

Adhere strictly to work sequence when bleeding brake system.

– Connect brake filling and bleeding appliance -VAS 6860-.

– Open bleeder valves in specified order and bleed brake calipers.

1 - Front left brake caliper

2 - Front right brake caliper

3 - Rear left wheel brake cylinder

4 - Rear right wheel brake cylinder

Use an appropriate bleeder hose. It must be firmly seated on the bleeder valve so that no air can enter the brake system:

– Leave bleeder valve of each brake caliper open with bleeder hose fitted until brake fluid discharges free of air bubbles.

5.3 Subsequent bleeding of hydraulic system

NOTICE

Re-bleeding is necessary due to the following:

- brake pedal travel is too long or so-called »soft brake pedal«

Subsequent bleeding requires the assistance of a second mechanic.

– Connect brake filling and bleeding appliance -VAS 6860-.
– Depress brake pedal firmly and hold.
– Open bleeder valve on brake caliper.
– Fully depress brake pedal.
– Close bleed valve with pedal held down.
– Release brake pedal slowly.

NOTICE

This bleed sequence must be carried out 5 times per brake caliper.

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

Use an appropriate bleeder hose. It must be firmly seated on the bleeder valve so that no air can enter the brake system:

– Leave bleeder valve of each brake caliper open with bleeder hose fitted until brake fluid discharges free of air bubbles.

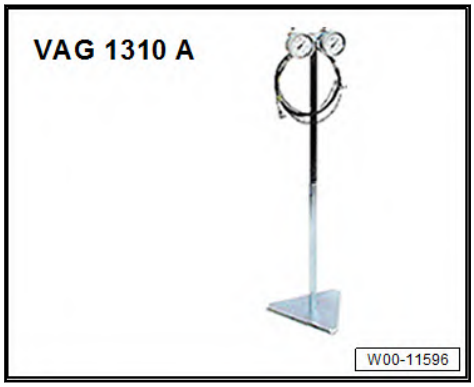
NOTICE

A road test must be carried out after the brakes have been bled. When doing this an ABS regulation must be performed at least once!

5.4 Testing for leaks

Special tools and workshop equipment required

- Tester for brake pressure regulator -V.A.G 1310 A-
- Adapter M10 -V.A.G 1310/6-



Prerequisite for testing:

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

Checking

– Remove bleeder valve at one of front brake calipers.
– Connect pressure gauge -V.A.G 1310 A- and bleed.
– Apply pressure to brake pedal until gauge indicates a pressure of 50 bar. The pressure must not drop by more than 4 bar during the test period of 45 seconds. Renew brake master cylinder if drop in pressure exceeds specification.