



Workshop Manual

Amarok 2011 ➤

Amarok 2017 ➤

Brake systems

Edition 12.2020



List of Workshop Manual Repair Groups

Repair Group

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



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00 – Technical data

1 Safety information

(VRL014992; Edition 12.2020)

⇒ m1.1 easures when working on vehicles with a start/stop system", page 1

⇒ p1.2 recautions when using testers and measuring instruments during a road test", page 1

1.1 Safety measures when working on vehicles with a start/stop system

Risk of injury due to unexpected engine start

If the vehicle's start/stop system is activated, the engine can start unexpectedly. A message in the dash panel insert indicates whether the start/stop system is activated.

- Deactivate start/stop system by switching off the ignition.

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

Risk of injury from unsecured test instruments and measuring equipment

If the front passenger airbag is triggered in an accident, test instruments and measuring equipment become dangerous projectiles unless properly secured.

- Secure test instruments and measuring equipment on the rear seat.

or

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



2 Identification

⇒ o2.1 f PR number - brakes", page 2

2.1 Allocation of PR number - brakes

⇒ b2.1.1 rake", page 2

⇒ b2.1.2 rake", page 2

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 is located on the bottom A-pillar trim in the driver footwell and in the service schedule.

- The relevant information on the installed brake system can also be viewed in the vehicle-specific notes in ELSA.

Fahrzeugdaten			
Marke:	V	Fahrzeugident.-Nr.:	WVG222N2W00029
Modelljahr:	2009	Beschreibung:	Tiguan Trendline TDI140A
Verkaufstyp:	DN043	Produktionsdatum:	2007-09-04
MSR:	CBAB	Auslieferungsdatum:	---
GR:	260	Leasing:	---
Farbausstattung			
Typ	Farbcode	Lecknummer (Leck ED-10)	Beschreibung
außen (Karosserie/Gad)	RE/RE	LE/LE	Reflexsilber Metallic/Reflexsilber Metallic
innen	YY		Consolid. Weiss/Schwarz/Schwarz
PR-Nummern			
PR-Nr.	HL	HL	Familie
8	015	L	KLZ
9	018	L	GM
10	147	L	MS
11	100	L	AMV
12	100	L	SZU
13	100	L	MS
14	101	L	T-1
15	101	L	
16	101	L	
17	101	L	
18	101	L	
19	101	L	
20	101	L	
21	101	L	
22	101	L	
23	101	L	
24	101	L	
25	101	L	
26	101	L	

In this example, the front brake "1LJ" is installed in the vehicle.

- ◆ Allocation ⇒ Electronic parts catalogue (ETKA)
- ◆ The following table explains the PR numbers. These are important for the brake caliper/brake disc and brake pads.

Front brakes are differentiated according to running gear sizes.

Running gear size in inches	PR no.
16	2E3
17	2E4

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 relevant information relating to which braking system is installed can also be called up via ELSA/vehicle-specific notes.

A distinction is made between disc brake and drum brake on the rear braking system.



3 Repair instructions

⇒ [f3.1 or cleanliness", page 3](#)

⇒ [r3.2 repair instructions", page 3](#)

⇒ [v3.3 vacuum system", page 3](#)

3.1 Rules for cleanliness

- ◆ Absolute cleanliness is required when working on the anti-lock brake system. It is not permitted to use any products that contain mineral oil, such as oil, grease etc.
- ◆ 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.
- ◆ If the repair is not performed immediately, carefully cover or seal opened components.
- ◆ Only use lint-free cloths.
- ◆ Do not remove packaging from replacement parts until immediately before installation.
- ◆ Only use genuine packed parts.
- ◆ When the system is open, do not work with compressed air and do not move the vehicle.
- ◆ Ensure that no brake fluid enters connectors.

3.2 General repair instructions

- ◆ When performing repair work on brakes, hairline cracks are often found on the friction surface of the brake discs. Hairline cracks up to a length of 10 mm do not represent a technical problem and do not justify a renewal of brake discs.
- ◆ Brake discs and pads with cracks going all the way across the friction surface must be renewed.

3.3 Checking vacuum system

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

This check relates to the following components:

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

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

The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1000 m altitude). Local and time fluctuations also influence vacuum generation.



A cold engine, a switched-on air-conditioning system as well as engine idling have an adverse influence on generation of a vacuum.

Take note of the following test requirements:

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

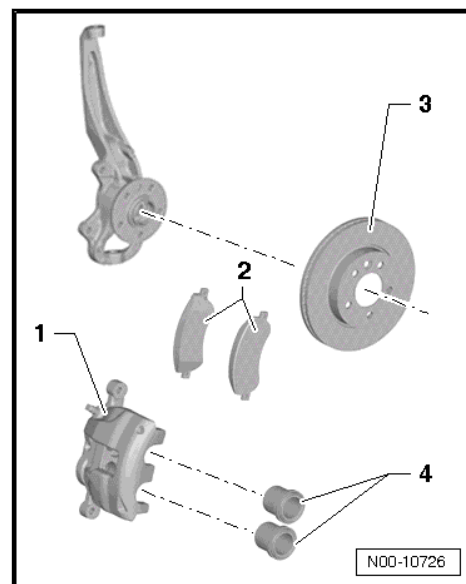


4 Technical data

⇒ d4.1 ata for brakes", page 5

4.1 Technical data for brakes

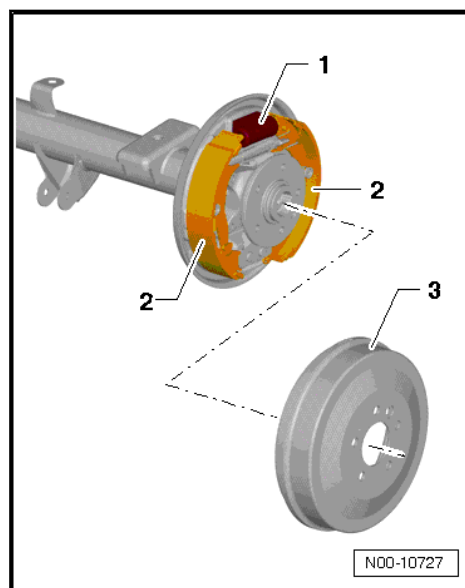
Front brake



Item	Component		Dual-piston floating caliper disc brake (16)	Dual-piston floating caliper disc brake (17)
1	Brake caliper			
2	Brake pad thickness (without backplate)	mm	12.5	12.35
	Brake pad, wear limit without backplate	mm	2	2
3	Brake disc	Diameter in mm	303	332
	Brake disc, thickness	mm	28	30
	Brake disc, wear limit	mm	26	27
4	Brake piston	Diameter in mm	2 x 48	2 x 48

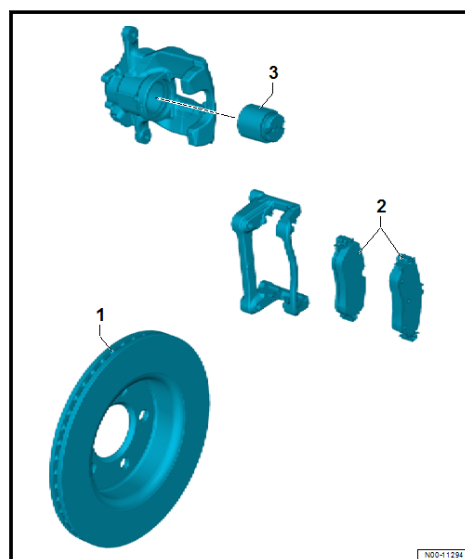


Rear brake



Item	Component		
1	Wheel brake cylinder	mm	26.99
2	Brake lining, width	mm	55
	Brake pad, thickness	mm	6.7
	Brake lining, minimum thickness (without carrier plate)	mm	1.25
3	Brake drum	Diameter in mm	295
	Brake drum, wear limit	Diameter in mm	296.5

Rear brakes (disc brakes)





Item	Component		
	Brake caliper		Single-piston floating caliper disc brake 16
1	Brake disc	Diameter in mm	300
	Brake disc, thickness	mm	22
	Brake disc, wear limit	mm	19
2	Brake pad thickness (without backplate)	mm	12.5
	Brake pad, wear limit without backplate	mm	2
3	Brake piston	Diameter in mm	48

Brake master cylinder and brake servo

Brake master cylinder	Diameter in mm	26.99
Brake servo (left-hand drive vehicles)	Ø in inches	10 / 10 - tandem
Brake servo (RHD vehicles)	Ø in inches	10 / 10 - tandem



5 Brake test

⇒ [i5.1 nformation", page 8](#)

⇒ [v5.2 ehicles with rear-wheel drive", page 8](#)

⇒ [v5.3 ehicles with all-wheel drive", page 8](#)

5.1 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.



Note

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

5.2 Checking vehicles with rear-wheel drive

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

The maximum test speed is 6 km/h.

The test rigs authorised by Volkswagen fulfil these requirements.

5.3 Checking vehicles with all-wheel drive

⇒ [a5.3.1 regulated roller dynamometer with counter-rotating rollers for four-wheel drive vehicles", page 8](#)

⇒ [r5.3.2 oller dynamometer for four-wheel drive vehicles", page 9](#)

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



Note

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 a 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.

5.3.2 Without roller dynamometer for four-wheel drive vehicles



Note

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.



45 – Anti-lock brake system

1 General information

⇒ [n1.1 otes on ABS", page 10](#)

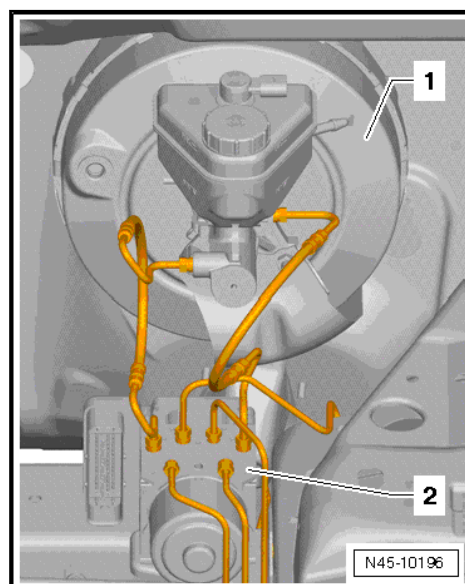
⇒ [i1.2 nstructions for repair work on ABS", page 11](#)

1.1 General notes on ABS

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

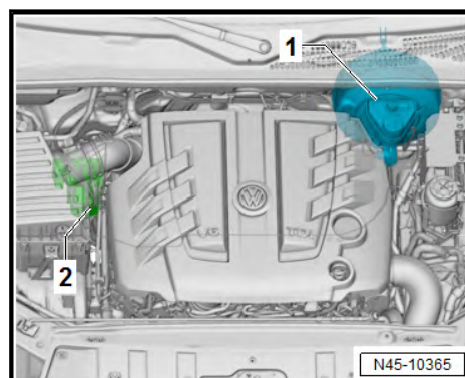
Faults in the ABS do not influence the brake system and servo assistance. The conventional brake system remains functional even without ABS. A change in braking behaviour is to be reckoned with. After the ABS warning lamp -K47- comes on, the rear wheels may lock prematurely.

ABS layout in left-hand drive vehicle



- 1 - Brake servo
- 2 - Hydraulic unit and control unit

ABS layout in left-hand drive vehicle with 6-cyl. engine



- 1 - Brake servo
- 2 - Hydraulic unit and control unit



! 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.

1.2 Repair instructions for repair work on ABS

- ◆ Before carrying out repair work on the anti-lock braking system, determine the cause of the fault.

Use ⇒ Vehicle diagnostic tester for fault finding.

- ◆ 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 valid, relevant safety precautions and notes.
- ◆ After work for which the brake system had to be opened, bleed the brake system with brake filling and bleeding equipment -VAS 5234- or -V.A.G 1869- ⇒ [page 107](#).
- ◆ During the final road test, ensure that a controlled brake test is performed at least once (pulsations must be felt at the brake pedal).
- ◆ 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.
- ◆ If repair work cannot be performed immediately, cover new parts which have been removed from their packing.
- ◆ Only use lint-free cloths.
- ◆ Do not remove packaging from replacement parts until immediately before installation.
- ◆ Only use genuine packed parts.
- ◆ Do not work with compressed air if the system is open. Do not move the vehicle.
- ◆ During painting operations, 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 - \(ABS, EDL, TCS, ESP\)", page 12](#)

2.1 Overview of fitting locations - (ABS, EDL, TCS, ESP)

Overview of fitting locations - (ABS, EDL, TCS, ESP), 4-cylinder engines



Note

The illustration shows fitting locations for left-hand drive vehicles. Fitting locations for right-hand drive vehicles are similar.



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

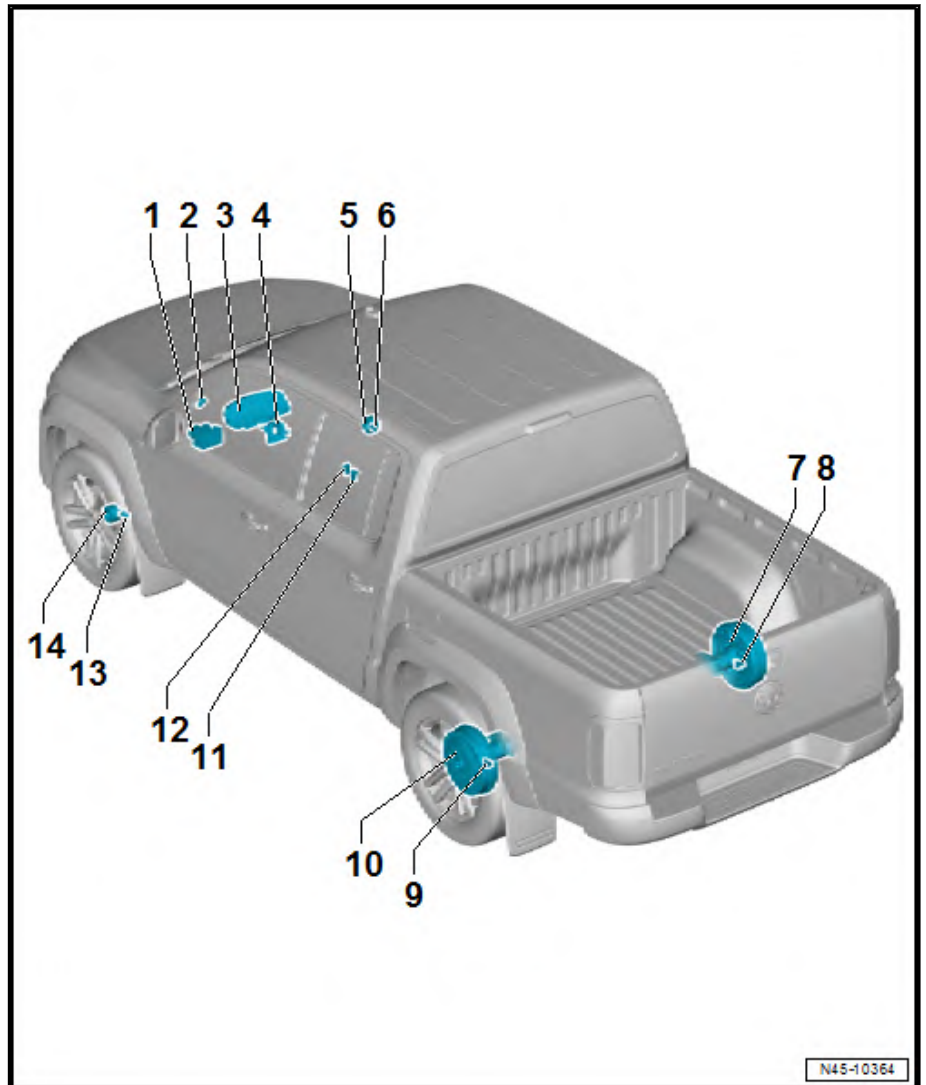
The following components are integrated in the hydraulic unit:

- ◆ ABS return flow pump - V39-
- ◆ Brake pressure sender 1 - G201-
- ◆ Valve block (contains inlet and outlet valves)
- ◆ Do not separate ABS return flow pump -V39- and valve block
 - ☐ Assembly overview ⇒ [page 17](#)
 - ☐ Removing and installing ⇒ [page 21](#)

ABS control unit -J104-

The following components are integrated into the control unit:

- ◆ Longitudinal acceleration sender -G251-
- ◆ Lateral acceleration sender -G200- (only on vehicles having ESP).
- ◆ Yaw rate sender -G202- (only on vehicles having ESP).
 - ☐ Assembly overview ⇒ [page 17](#)
 - ☐ Removing and installing ⇒ [page 31](#)



2 - Brake light switch -F-

- ☐ Including brake pedal switch -F47-.
- ☐ Removing and installing ⇒ [page 113](#)

3 - Dash panel insert

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 90; Dash panel insert; Removing and installing dash panel insert KX2
- ☐ Renewing ⇒ Vehicle diagnostic tester

4 - Steering angle sender -G85-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 94; Steering column switch module; Removing and installing steering column switch module
- ☐ After installing, perform basic setting for steering angle sender -G85- ⇒ Vehicle diagnostic tester.

5 - Wheel bearing

- ☐ ABS sensor ring is installed in wheel bearing
- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearing; Removing and installing wheel bearing.

6 - Front right speed sensor -G45-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 44](#)

7 - Rear axle shaft with wheel bearing/wheel bearing unit



- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

8 - Rear right speed sensor -G44-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 45](#)

9 - Rear left speed sensor -G46-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 45](#)

10 - Rear axle shaft with wheel bearing/wheel bearing unit

- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

11 - Driving program button -E598-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 96; Lights and controls in centre console; Removing and installing buttons in centre console.

12 - TCS and ESP button -E256-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 96; Lights and controls in centre console; Removing and installing buttons in centre console.

13 - Front left speed sensor -G47-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 44](#)

14 - Wheel bearing

- ☐ ABS sensor ring is installed in wheel bearing
- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearing; Removing and installing wheel bearing.

Overview of fitting locations - (ABS, EDL, TCS, ESP), 6-cylinder engine



1 - Brake light switch -F-

- ☐ Including brake pedal switch -F47-.
- ☐ Removing and installing ⇒ [page 113](#)

2 - Dash panel insert

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 90; Dash panel insert; Removing and installing dash panel insert KX2
- ☐ Renewing ⇒ Vehicle diagnostic tester

3 - Steering angle sender -G85-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 94; Steering column switch module; Removing and installing steering column switch module
- ☐ After installing, perform basic setting for steering angle sender -G85- ⇒ Vehicle diagnostic tester.

4 - ABS hydraulic unit -N55-/ABS control unit -J104-

The following components are integrated in the hydraulic unit:

- ◆ ABS return flow pump -V39-
- ◆ Brake pressure sender 1 -G201-
- ◆ Valve block (contains inlet and outlet valves)
- ◆ Do not separate ABS return flow pump -V39- and valve block
 - ☐ Assembly overview ⇒ [page 17](#)
 - ☐ Removing and installing ⇒ [page 21](#)

ABS control unit -J104-

The following components are integrated into the control unit:

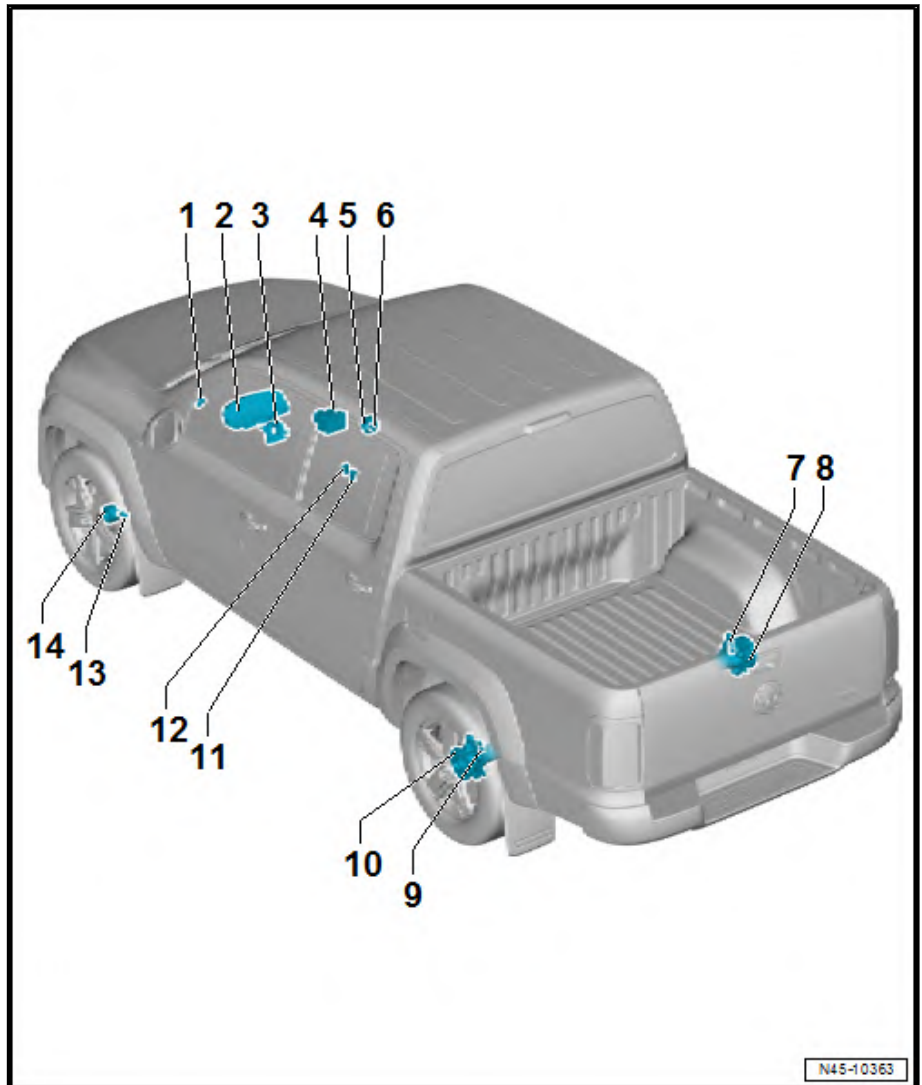
- ◆ Longitudinal acceleration sender -G251-
- ◆ Lateral acceleration sender -G200- (only on vehicles having ESP).
- ◆ Yaw rate sender -G202- (only on vehicles having ESP).
 - ☐ Assembly overview ⇒ [page 17](#)
 - ☐ Removing and installing ⇒ [page 31](#)

5 - Wheel bearing

- ☐ ABS sensor ring is installed in wheel bearing
- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearing; Removing and installing wheel bearing.

6 - Front right speed sensor -G45-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 44](#)



N45-10363



7 - Rear right speed sensor -G44-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 45](#)

8 - Rear axle shaft with wheel bearing/wheel bearing unit

- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

9 - Rear left speed sensor -G46-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 45](#)

10 - Rear axle shaft with wheel bearing/wheel bearing unit

- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

11 - Driving program button -E598-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 96; Lights and controls in centre console; Removing and installing buttons in centre console.

12 - TCS and ESP button -E256-

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 96; Lights and controls in centre console; Removing and installing buttons in centre console.

13 - Front left speed sensor -G47-

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 44](#)

14 - Wheel bearing

- ☐ ABS sensor ring is installed in wheel bearing
- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Wheel bearing; Removing and installing wheel bearing.



3 Control unit and hydraulic unit

⇒ [o3.1 overview - control unit and hydraulic unit", page 17](#)

⇒ [a3.2 and installing ABS control unit J104 and ABS hydraulic unit N55", page 21](#)

⇒ [a3.3 and installing ABS control unit J104 without ABS hydraulic unit N55", page 31](#)

⇒ [c3.4 control unit from hydraulic unit", page 34](#)

⇒ [c3.5 control unit to hydraulic unit", page 35](#)

⇒ [b3.6 brake lines to hydraulic unit", page 37](#)

3.1 Assembly overview - control unit and hydraulic unit

Vehicles up to model year 2017



1 - Brake servo

- ❑ With brake master cylinder and brake fluid reservoir
- ❑ Removing and installing ➔ [page 114](#)

2 - Connection for brake line

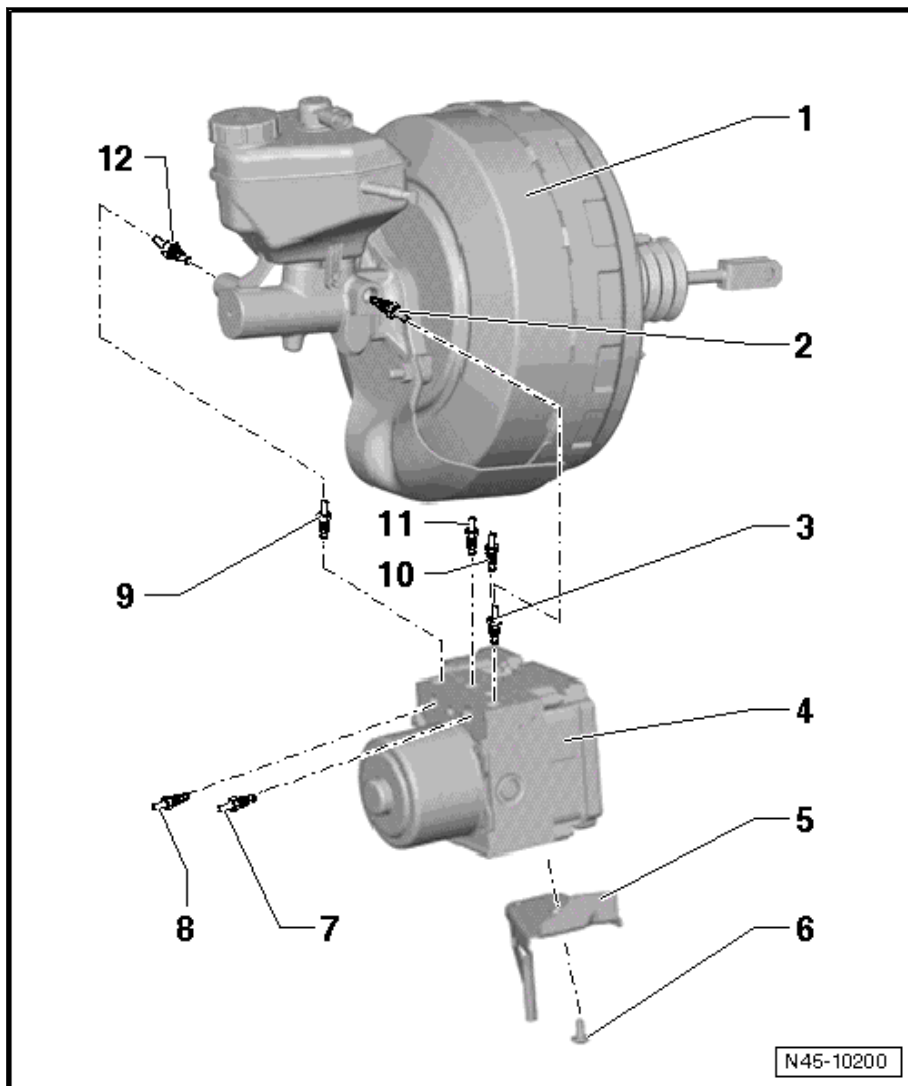
- ❑ Brake master cylinder/primary piston circuit to hydraulic unit
- ❑ 14 Nm

3 - Connection for brake line

- ❑ Hydraulic unit to primary piston circuit of brake master cylinder
- ❑ Identification: union screw with M12 x 1 thread
- ❑ 14 Nm

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

- ❑ Do not separate ABS return flow pump -V39- and valve block
- ❑ When replacing the hydraulic unit, always seal the old part with plugs from the repair kit ➔ Electronic parts catalogue (ETKA).
- ❑ Removing and installing ABS hydraulic unit -N55- with ABS control unit -J104- ➔ [page 21](#).



- ❑ Removing and installing ABS control unit -J104- without ABS hydraulic unit -N55- ➔ [page 31](#).

5 - Bracket/frame

6 - Bolt

- ❑ 9 Nm

7 - Connection for brake line

- ❑ To rear left wheel brake cylinder
- ❑ Identification: union screw with M12 x 1 thread
- ❑ 14 Nm

8 - Connection for brake line

- ❑ To rear right wheel brake cylinder
- ❑ Identification: union screw with M10 x 1 thread
- ❑ 14 Nm

9 - Connection for brake line

- ❑ Hydraulic unit to secondary piston circuit of brake master cylinder
- ❑ Identification: union screw with M12 x 1 thread
- ❑ 14 Nm

10 - Connection for brake line

- ❑ From hydraulic unit to front right brake caliper.
- ❑ Identification: union screw with M10 x 1 thread



- ☐ 14 Nm

11 - Connection for brake line

- ☐ From hydraulic unit to front left brake caliper
- ☐ Identification: union screw with M12 x 1 thread
- ☐ 14 Nm

12 - Connection for brake line

- ☐ Brake master cylinder/secondary piston circuit to hydraulic unit
- ☐ 14 Nm

Vehicles as of model year 2017



1 - Brake servo

- ❑ With brake master cylinder and brake fluid reservoir
- ❑ Removing and installing ➔ [page 114](#)

2 - Brake line

- ❑ From primary piston circuit of brake master cylinder to ABS hydraulic unit -N55-.
- ❑ 14 Nm

3 - Brake line

- ❑ To front right brake caliper
- ❑ 14 Nm

4 - Brake line

- ❑ To rear left wheel brake cylinder
- ❑ 14 Nm

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

- ❑ Removing and installing ➔ [page 21](#)

6 - Brake line

- ❑ From hydraulic unit to secondary piston circuit of brake master cylinder.
- ❑ 14 Nm

7 - Bolts

- ❑ Qty. 3 ➔ [Item 11 \(page 20\)](#)
- ❑ Qty. 2 ➔ [Item 8 \(page 20\)](#)
- ❑ Renew after removal
- ❑ 20 Nm +90°

8 - Bracket

- ❑ 6-cylinder engine

9 - Bolts

- ❑ Qty. 3 ➔ [Item 11 \(page 20\)](#)
- ❑ Qty. 3 ➔ [Item 8 \(page 20\)](#)
- ❑ 9 Nm

10 - Nut

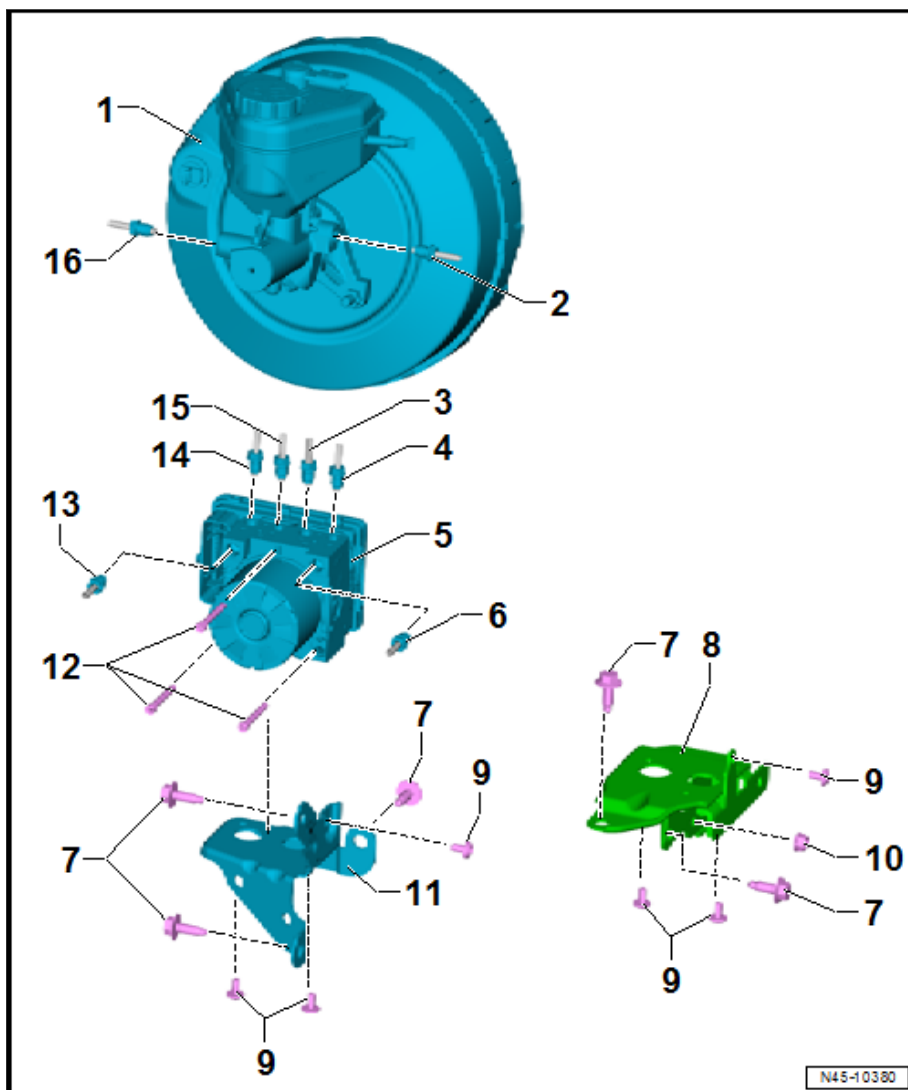
- ❑ Renew after removal
- ❑ 20 Nm +90°

11 - Bracket

- ❑ 4-cylinder engines

12 - Bolts

- ❑ Qty. 3
- ❑ Renew after removal
- ❑ Stage 1: preliminary tightening torque: 1 Nm to 1.5 Nm (to allow seal to settle).





- ☐ Stage 2: final specified torque: 2.5 Nm.

13 - Brake line

- ☐ From hydraulic unit to primary piston circuit of brake master cylinder.
- ☐ 14 Nm

14 - Brake line

- ☐ To rear right wheel brake cylinder
- ☐ 14 Nm

15 - Brake line

- ☐ To front left brake caliper
- ☐ 14 Nm

16 - Brake line

- ☐ Brake master cylinder/secondary piston circuit to ABS hydraulic unit -N55-.
- ☐ 14 Nm

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

⇒ [a3.2.1 nd installing ABS control unitJ104 and ABS hydraulic unitN55, 4-cylinder engines up to model year 2017", page 21](#)

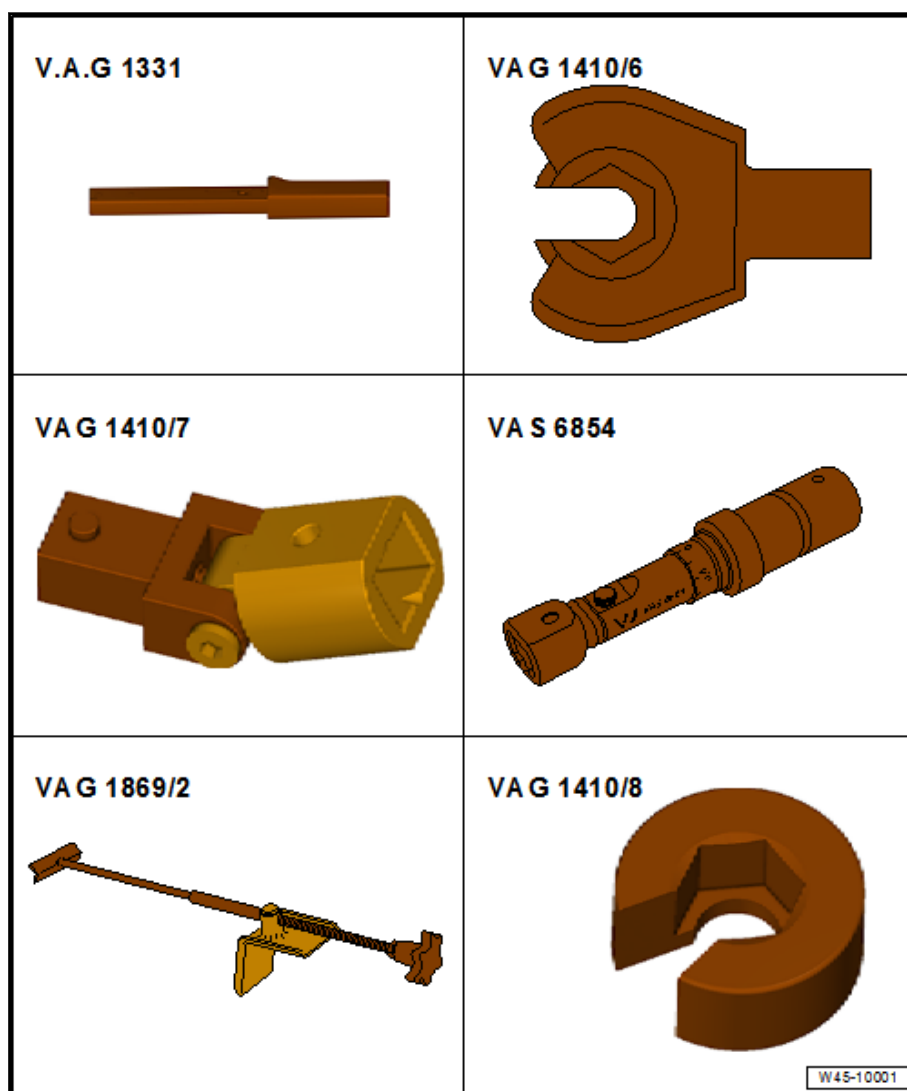
⇒ [a3.2.2 nd installing ABS control unitJ104 and ABS hydraulic unitN55, 4-cylinder engines as of model year 2017", page 24](#)

⇒ [a3.2.3 nd installing ABS control unitJ104 and ABS hydraulic unitN55, 6-cylinder engine", page 27](#)

3.2.1 Removing and installing ABS control unit -J104- and ABS hydraulic unit -N55-, 4-cylinder engines up to model year 2017



**Special tools and workshop
equipment required**



- ◆ Torque wrench -V.A.G 1331-
- ◆ 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-

Removing

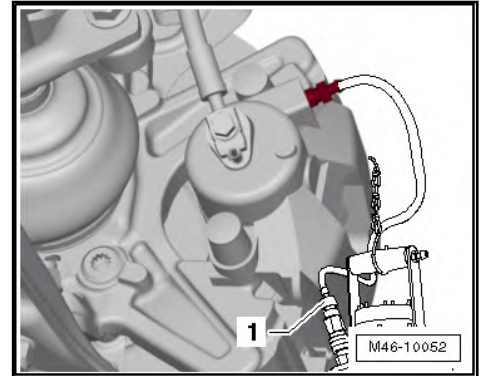


Note

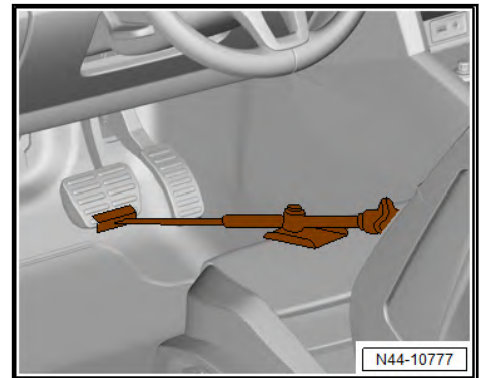
- ◆ *After unscrewing the hydraulic lines from the hydraulic unit, always ensure that the bung set is used ⇒ Electronic parts catalogue (ETKA).*
 - ◆ *The bung set prevents the ingress of dirt and water in the hydraulic unit.*
- Read out and note the existing control unit code.



- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.
- Observe general information on brake fluid ⇒ [page 106](#) .
- Connect bleeder bottle hose to front left brake caliper bleed valve and open bleed valve.



- Use brake pedal actuator -V.A.G 1869/2- to press on brake pedal.



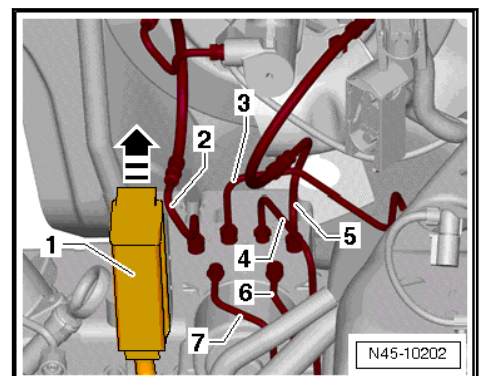
- Close front left bleed valve.
- Place sufficient lint-free cloths under the control unit and hydraulic unit.

Ensure no brake fluid gets onto contacts.

! NOTICE

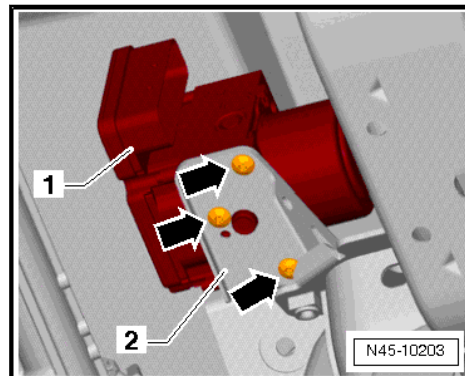
Risk of damage to brake lines if bent.

- **Never excessively bend the brake lines in the area of the hydraulic unit.**
- Unscrew brake lines -2- to -7- from ABS hydraulic unit -N55-.





- Release electrical connector -1- from ABS control unit -J104- in direction of -arrow- and separate forwards.
- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Remove bolts -arrows-



- Remove ABS hydraulic unit -N55- -1- upwards from bracket/ frame -2-.

Installing

Install in reverse order, noting the following:



Note

- ♦ *Remove sealing plugs from new hydraulic unit only when the corresponding brake line is to be fitted.*
- ♦ *If sealing plugs are removed too early from the hydraulic unit, brake fluid can escape, and it can then no longer be guaranteed that the unit can be sufficiently filled and bled.*
- Remove brake pedal actuator -V.A.G 1869/2-.
- Connect brake line ⇒ [b3.6.1 rake lines to hydraulic unit, 4-cylinder engines", page 37](#) .
- Bleed brake system ⇒ [page 107](#) .
- Code ABS control unit -J104- using ⇒ Vehicle diagnostic tester.

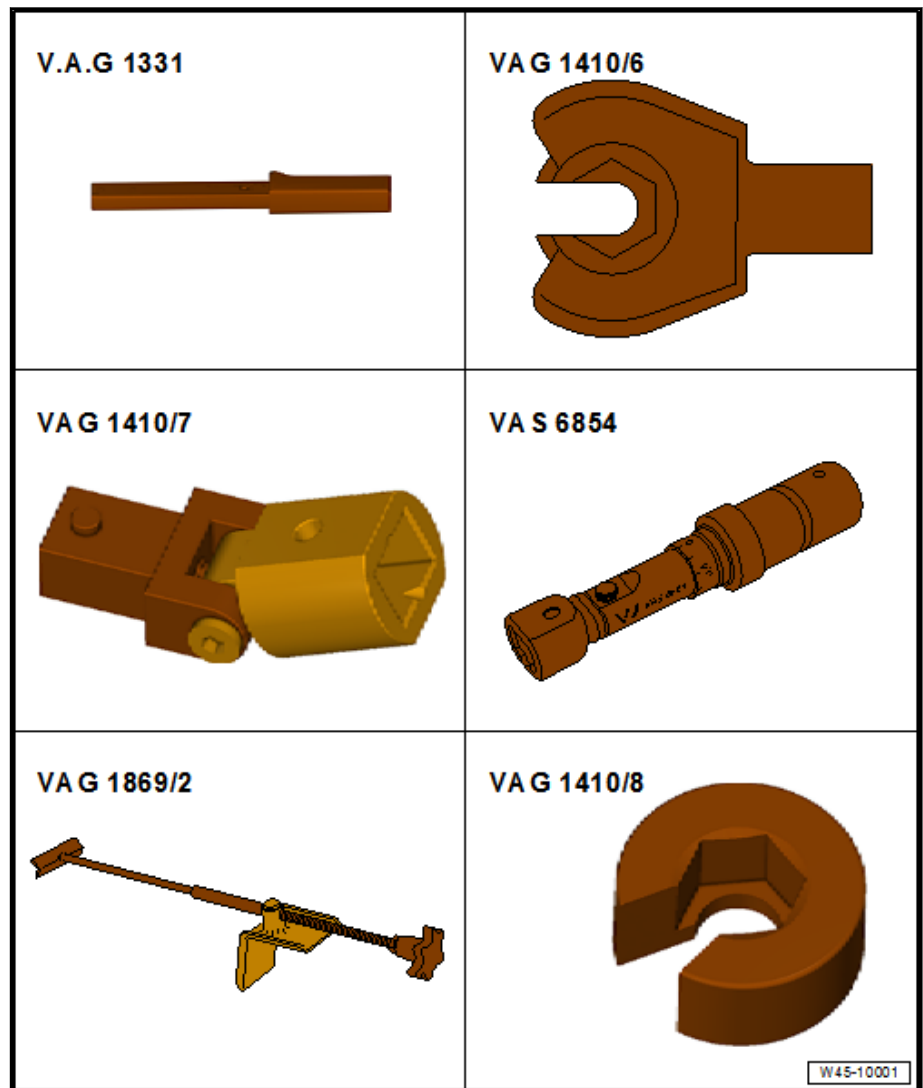
Specified torques

- ♦ ⇒ [o3.1 verview - control unit and hydraulic unit", page 17](#)

3.2.2 Removing and installing ABS control unit -J104- and ABS hydraulic unit -N55-, 4-cylinder engines as of model year 2017



Special tools and workshop equipment required



- ◆ Torque wrench -V.A.G 1331-
- ◆ 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-

Removing

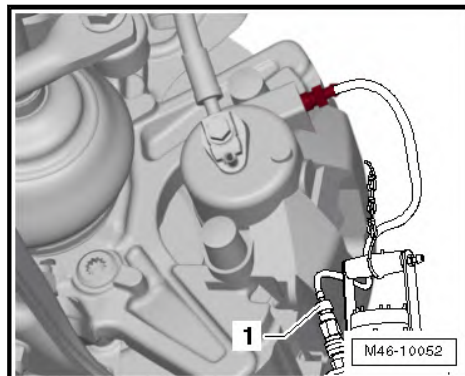


Note

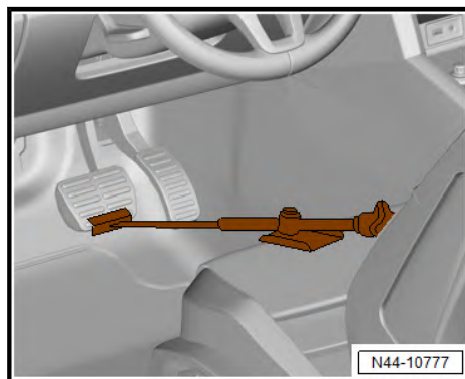
- ◆ *After unscrewing the hydraulic lines from the hydraulic unit, always ensure that the bung set is used ⇒ Electronic parts catalogue (ETKA).*
 - ◆ *The bung set prevents the ingress of dirt and water in the hydraulic unit.*
- Read out and note the existing control unit code.



- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.
- Observe general information on brake fluid ⇒ [page 106](#).
- Connect bleeder bottle hose to front left brake caliper bleed valve and open bleed valve.



- Use brake pedal actuator -V.A.G 1869/2- to press on brake pedal.



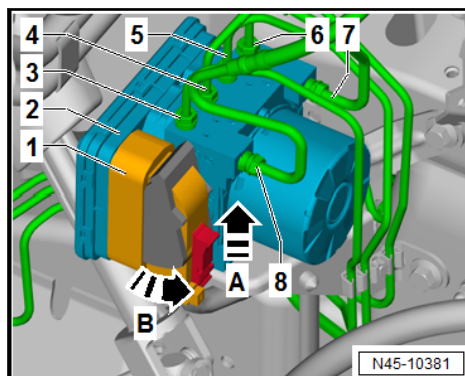
- Close front left bleed valve.
- Place sufficient lint-free cloths under the control unit and hydraulic unit.

Ensure no brake fluid gets onto contacts.

NOTICE

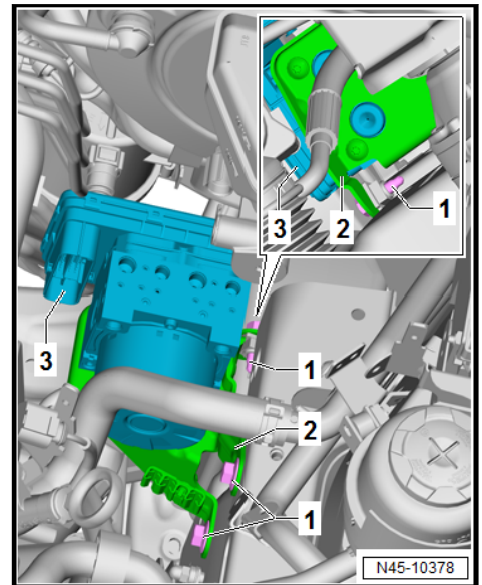
Risk of damage to brake lines if bent.

- **Never excessively bend the brake lines in the area of the hydraulic unit.**
- Unscrew brake lines -3- to -8- from ABS hydraulic unit -N55-.





- Push locking element upwards in direction of -arrow A-.
- Swivel release lever in direction of -arrow B-.
- Pull off electrical connector -1- on ABS control unit -J104- -2-.
- If fitted, remove engine/gearbox guard ⇒ General body repairs, exterior; Rep. gr. 66; Engine/gearbox guard; Removing and installing engine/gearbox guard.
- Unscrew bolts -1- from bracket -2-.



- Remove ABS control unit -J104- and ABS hydraulic unit -N55- -3-.

Installing

Install in reverse order, noting the following:



Note

- ◆ *Remove sealing plugs from new hydraulic unit only when the corresponding brake line is to be fitted.*
- ◆ *If sealing plugs are removed too early from the hydraulic unit, brake fluid can escape, and it can then no longer be guaranteed that the unit can be sufficiently filled and bled.*
- Remove brake pedal actuator -V.A.G 1869/2-.
- Connect brake line ⇒ [page 37](#) .
- Bleed brake system ⇒ [page 107](#) .
- Code ABS control unit -J104- using ⇒ Vehicle diagnostic tester.


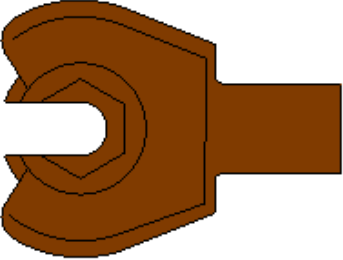

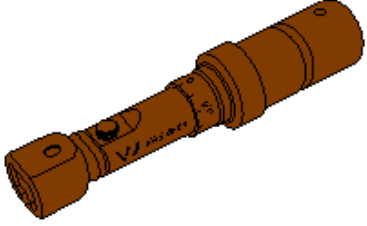


Specified torques

- ◆ ⇒ [o3.1 verview - control unit and hydraulic unit", page 17](#)

3.2.3 Removing and installing ABS control unit -J104- and ABS hydraulic unit -N55-, 6-cylinder engine



**Special tools and workshop
equipment required**

V.A.G 1331 	VAG 1410/6 
VAG 1410/7 	VA S 6854 
VAG 1869/2 	VAG 1410/8  <small>W45-10001</small>

- ◆ Torque wrench -V.A.G 1331-
- ◆ 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-

Removing

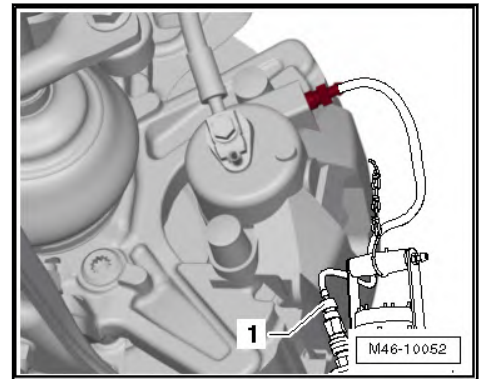


Note

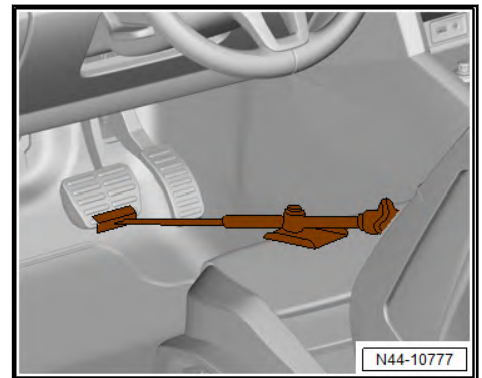
- ◆ *After unscrewing the hydraulic lines from the hydraulic unit, always ensure that the bung set is used ⇒ Electronic parts catalogue (ETKA).*
 - ◆ *The bung set prevents the ingress of dirt and water in the hydraulic unit.*
- Read out and note the existing control unit code.



- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.
- Remove front right wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Changing wheel.
- Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liner; Removing and installing wheel housing liner.
- Observe general information on brake fluid ⇒ [page 106](#) .
- Connect bleeder bottle hose to front left brake caliper bleed valve and open bleed valve.



- Use brake pedal actuator -V.A.G 1869/2- to press on brake pedal.



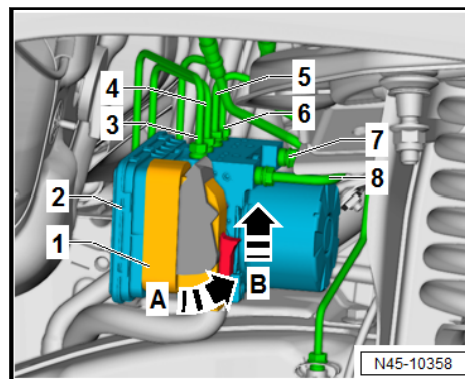
- Close front left bleed valve.
- Place sufficient lint-free cloths under the control unit and hydraulic unit.

Ensure no brake fluid gets onto contacts.

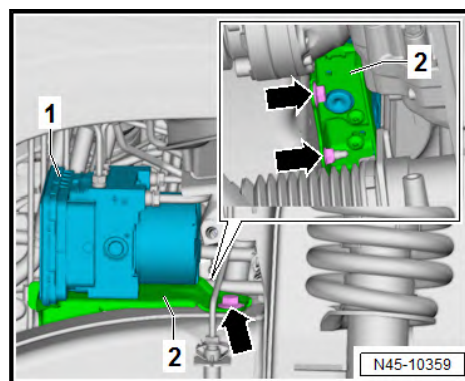
! NOTICE

Risk of damage to brake lines if bent.

- **Never excessively bend the brake lines in the area of the hydraulic unit.**
- Unscrew brake lines -3- to -8- from ABS hydraulic unit -N55-.



- Push locking element upwards in direction of -arrow B-.
- Swivel release lever in direction of -arrow A-.
- Pull off electrical connector -1- on ABS control unit -J104- -2-.
- Unscrew bolts -arrows- from bracket -2-.



- Unscrew nut -arrow-.
- Remove ABS control unit -J104- and ABS hydraulic unit -N55- -1-.

Installing

Install in reverse order, noting the following:



Note

- ♦ *Remove sealing plugs from new hydraulic unit only when the corresponding brake line is to be fitted.*
- ♦ *If sealing plugs are removed too early from the hydraulic unit, brake fluid can escape, and it can then no longer be guaranteed that the unit can be sufficiently filled and bled.*
- Remove brake pedal actuator -V.A.G 1869/2-.
- Connect brake line ⇒ [page 40](#) .
- Bleed brake system ⇒ [page 107](#) .
- Code ABS control unit -J104- using ⇒ Vehicle diagnostic tester.



Note

Renew nuts and bolts after each removal.

Specified torques

◆ [⇒ o3.1 verview - control unit and hydraulic unit", page 17](#)

3.3 Removing and installing ABS control unit -J104- without ABS hydraulic unit -N55-

[⇒ a3.3.1 nd installing ABS control unitJ104 without ABS hydraulic unitN55, 4-cylinder engines up to model year 2017", page 31](#)

[⇒ a3.3.2 nd installing ABS control unitJ104 without ABS hydraulic unitN55, 6-cylinder engine", page 33](#)

3.3.1 Removing and installing ABS control unit -J104- without ABS hydraulic unit -N55-, 4-cylinder engines up to model year 2017

Special tools and workshop equipment required

◆ Torque wrench -V.A.G 1410-



Removing



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.



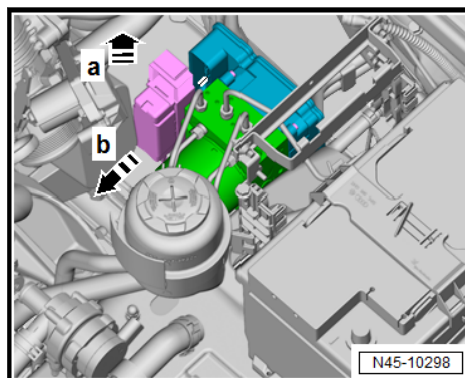
Note

The hydraulic lines remain connected.

- Read out existing control unit code and make a note of it
⇒ Vehicle diagnostic tester.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.



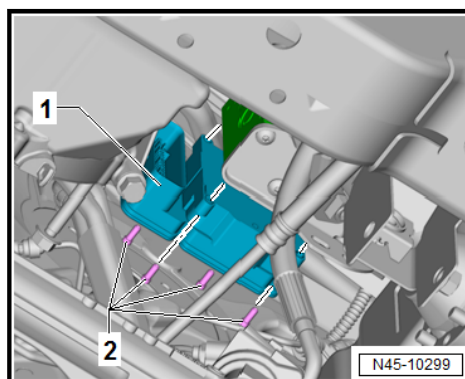
- Release electrical connector in direction of -arrow a-, separate in direction of -arrow b-.



Note

The ABS control unit -J104- is removed downwards.

- Unscrew bolts -2- from ABS control unit -J104-/ABS hydraulic unit -N55-.



- Remove ABS control unit -J104- -1-.

Installing

Install in reverse order, noting the following:



Note

Valve calibration must always be carried out after MK25A system has been disconnected. This does not affect the MK25E ⇒ Vehicle diagnostic tester.

- Code ABS control unit -J104- using ⇒ Vehicle diagnostic tester.

Specified torques

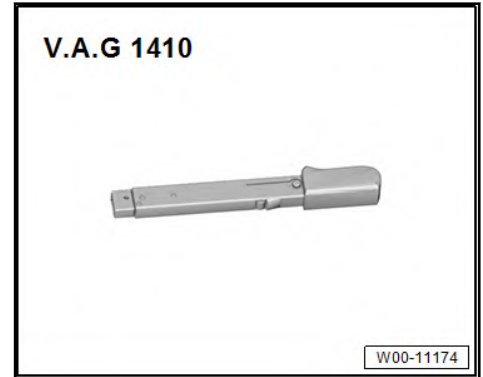
Component	Specified torque
Bolt securing ABS control unit -J104-/ABS hydraulic unit -N55-	4 Nm



3.3.2 Removing and installing ABS control unit -J104- without ABS hydraulic unit -N55-, 6-cylinder engine

Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1410-



Removing

NOTICE

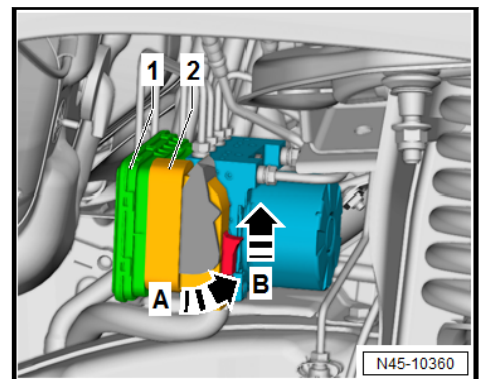
Risk of irreparable damage to control unit caused by electrostatic charge and dirt.

- Discharge any electrostatic electricity: touch an ESD workplace (earth yourself).
- Protect interior of control unit from moisture and dirt.

Note

The hydraulic lines remain connected.

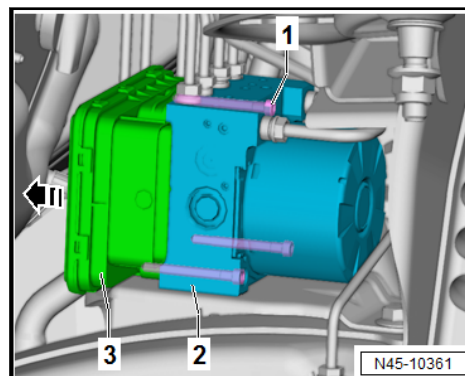
- Read out existing control unit code and make a note of it
⇒ Vehicle diagnostic tester.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27; Battery; Disconnecting and reconnecting battery.
- Remove front right wheel ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Changing wheel.
- Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66; Wheel housing liner; Removing and installing wheel housing liner.
- Push locking element upwards in direction of -arrow B-.



- Swivel release lever in direction of -arrow A-.



- Pull off electrical connector -2- on ABS control unit -J104- -1-.
- Unscrew bolts -1- for ABS control unit -J104- -3- from ABS hydraulic unit -N55- -2-.



- Remove ABS control unit -J104- -3- in direction of -arrow-.

Installing

Install in reverse order, noting the following:



Note

Valve calibration must always be carried out after MK25A system has been disconnected. This does not affect the MK25E ⇒ Vehicle diagnostic tester.

- Code ABS control unit -J104- using ⇒ Vehicle diagnostic tester.

Specified torques

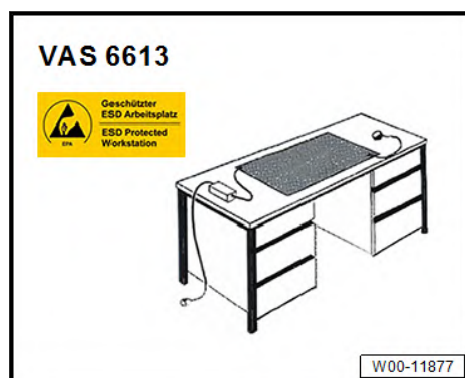
- ♦ ⇒ [o3.1 verview - control unit and hydraulic unit", page 17](#)

3.4 Separating control unit from hydraulic unit

4-cylinder engines as of model year 2017

Special tools and workshop equipment required

- ♦ ESD workplace -VAS 6613-





Note

- ◆ If a control unit is defective, the control unit must be disconnected from the hydraulic unit and only the control unit renewed.
- ◆ If the hydraulic unit is defective, the hydraulic unit must be renewed together with the control unit.



NOTICE

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

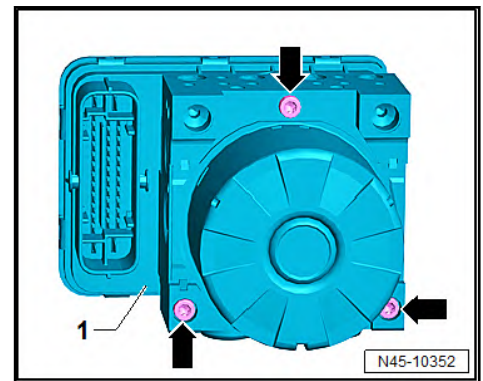
- Never detach the return flow pump from the hydraulic unit.



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.
- Remove ABS control unit -J104- and ABS hydraulic unit -N55- -1- ➔ [page 24](#).
- Set down ABS hydraulic unit -N55- together with ABS control unit -J104- -1- on ESD workplace -VAS 6613-.
- Remove bolts -arrows-



- Pull ABS control unit -J104- off ABS hydraulic unit -N55- making sure not to tilt the control unit.

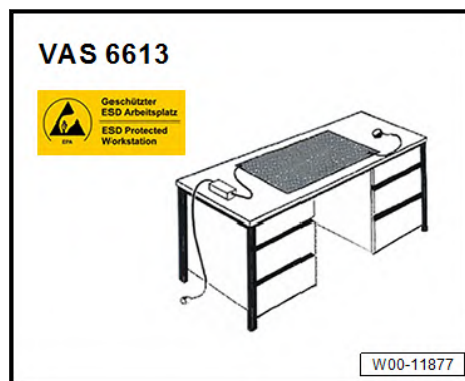
3.5 Fitting control unit to hydraulic unit

4-cylinder engines as of model year 2017

Special tools and workshop equipment required



◆ ESD workplace -VAS 6613-



◆ Torque screwdriver -VAS 6494-



Note

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

- Surfaces must be clean.



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.
- Place control unit on hydraulic unit without tilting it.
- Tighten hydraulic unit and control unit alternately in 2 stages to specified torque using new bolts provided.



Note

- ◆ *The threads of the hydraulic unit for securing the control unit must not be recut.*
- ◆ *If the threads are damaged (bolts difficult to turn in by hand or cannot be tightened to the specified torque), hydraulic unit must be renewed.*

Specified torques

- ◆ [⇒ o3.1 verview - control unit and hydraulic unit", page 17](#)



3.6 Connecting brake lines to hydraulic unit

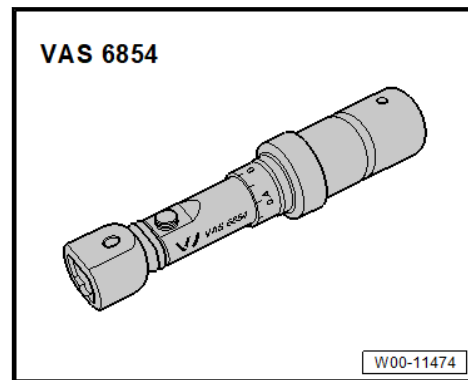
⇒ [b3.6.1 rake lines to hydraulic unit, 4-cylinder engines", page 37](#)

⇒ [b3.6.2 rake lines to hydraulic unit, 6-cylinder engine", page 40](#)

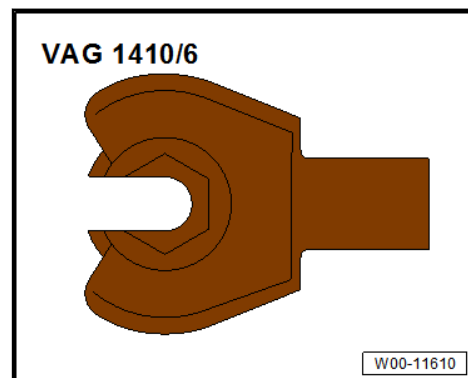
3.6.1 Connecting brake lines to hydraulic unit, 4-cylinder engines

Special tools and workshop equipment required

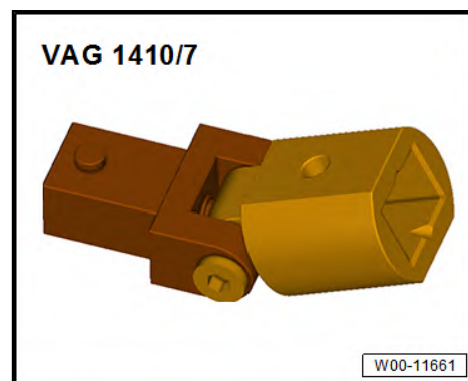
- ◆ Torque wrench -VAS 6854-



- ◆ Ring insert tool, open, AF 11 -V.A.G 1410/6-



- ◆ Universal joint -V.A.G 1410/7-





◆ Assembly tool -V.A.G 1410/8-



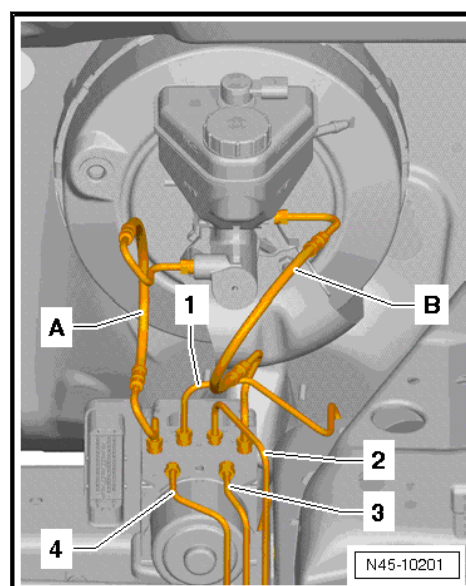
NOTICE

Risk of damage to brake lines if bent.

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

Up to model year 2017

On brake master cylinder



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

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

On hydraulic unit

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

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

1 - From hydraulic unit to front left brake caliper

2 - From hydraulic unit to front right brake caliper.

3 - Hydraulic unit to rear left wheel brake cylinder

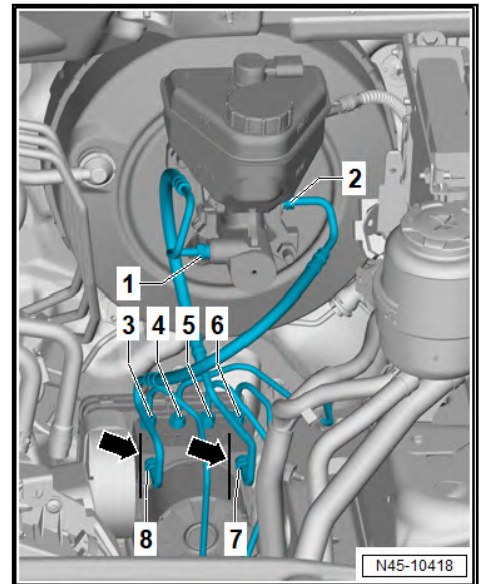
4 - Hydraulic unit to rear right wheel brake cylinder



- Align brake lines, ensure sufficient clearance to every component.
- Attach brake lines free of stress.
- Ensure that the brake lines do not touch other components.

As of model year 2017

On brake master cylinder



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

2 - Primary piston circuit of brake master cylinder to hydraulic unit.

On hydraulic unit

3 - Hydraulic unit to rear right wheel brake cylinder

4 - From hydraulic unit to front left brake caliper

5 - From hydraulic unit to front right brake caliper.

6 - Hydraulic unit to rear left wheel brake cylinder

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

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

Continued for all vehicles

- It must be possible to screw brake line nuts to end of threads into ABS hydraulic unit -N55- by hand.
- Align brake lines -7- and -8-. Brake lines must be aligned in parallel with edges -arrows-.
- Ensure that the brake lines do not touch other components.
- Tighten nuts to specified torque.

Specified torques

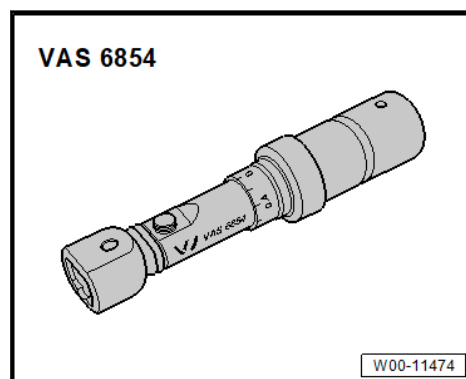
- ◆ ⇒ [o3.1 verview - control unit and hydraulic unit", page 17](#)



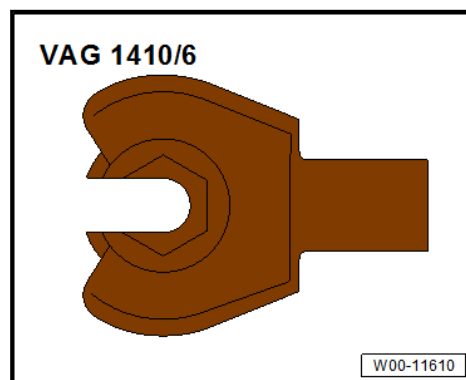
3.6.2 Connecting brake lines to hydraulic unit, 6-cylinder engine

Special tools and workshop equipment required

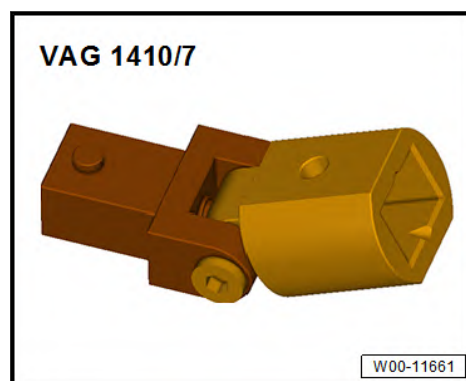
- ◆ Torque wrench -VAS 6854-



- ◆ Ring insert tool, open, AF 11 -V.A.G 1410/6-



- ◆ Universal joint -V.A.G 1410/7-



- ◆ Assembly tool -V.A.G 1410/8-



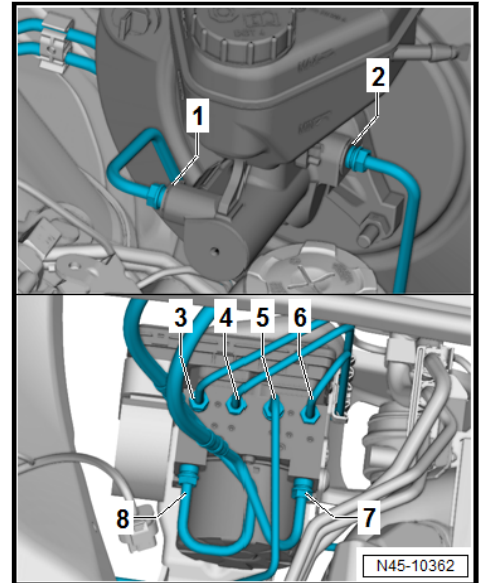


! NOTICE

Risk of damage to brake lines if bent.

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

On brake master cylinder



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

2 - Primary piston circuit of brake master cylinder to hydraulic unit.

On hydraulic unit

3 - Hydraulic unit to rear right brake caliper

4 - From hydraulic unit to front left brake caliper

5 - From hydraulic unit to front right brake caliper.

6 - From hydraulic unit to rear left brake caliper

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

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

- It must be possible to screw brake line nuts to end of threads into ABS hydraulic unit -N55- by hand.
- Align brake lines, ensure sufficient clearance to every component.
- Attach brake lines free of stress.
- Ensure that the brake lines do not touch other components.
- Tighten nuts to specified torque.

Specified torques

- ◆ ⇒ [o3.1 verview - control unit and hydraulic unit", page 17](#)



4 Sensors

⇒ [o4.1 verview - front axle speed sensorsG45/G47", page 42](#)

⇒ [o4.2 verview - rear axle speed sensorsG44/G46", page 42](#)

⇒ [a4.3 nd installing front axle speed sensorsG45/G47", page 44](#)

⇒ [a4.4 nd installing rear axle speed sensorsG44/G46", page 45](#)

4.1 Assembly overview - front axle speed sensors -G45-/-G47-

1 - Bolt

- 20 Nm

2 - Brake disc

3 - Wheel hub

4 - Retaining ring

- Secures wheel bearing in wheel bearing housing

5 - Wheel bearing

- ABS sensor ring -arrow- is installed in wheel bearing

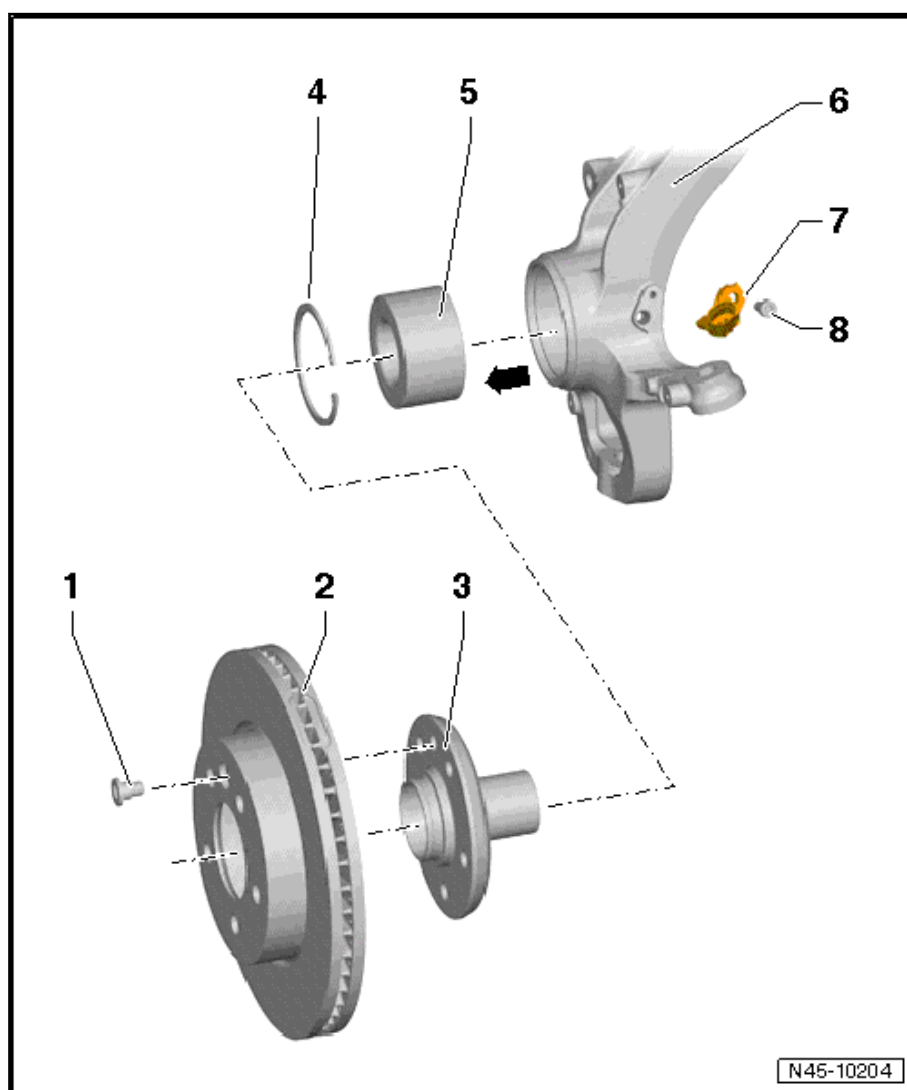
6 - Wheel bearing housing

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

- Before inserting speed sensor, clean inner surface of hole and coat it with polycarbamide grease ⇒ Electronic parts catalogue (ETKA).
- Removing and installing ⇒ [page 44](#)

8 - Bolt

- 8 Nm



4.2 Assembly overview - rear axle speed sensors -G44-/-G46-

Drum brakes

Disc brakes ⇒ [page 43](#)



1 - Brake carrier

- ☐ Reset brake before removing brake drum ➔ [page 76](#)

2 - Bolts

- ☐ Qty. 4
- ☐ Renew after removal
- ☐ 150 Nm +90°

3 - Rear axle

- ☐ Removing and installing ➔ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle

4 - Speed sensors -G44-/-G46-

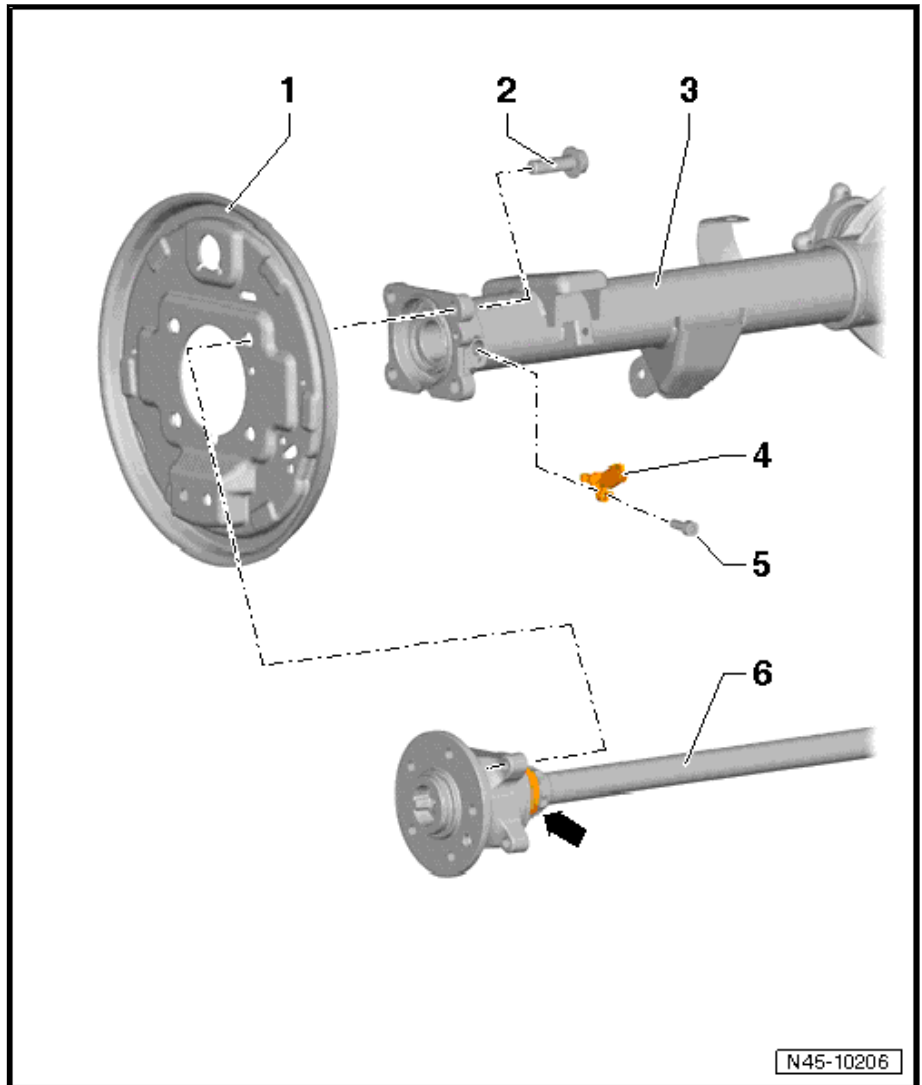
- ☐ Before inserting speed sensor, clean inner surface of hole and coat it with polycarbamide grease ➔ Electronic parts catalogue (ETKA).
- ☐ Removing and installing ➔ [page 45](#)

5 - Bolt

- ☐ 8 Nm

6 - Rear axle shaft

- ☐ Removing and installing ➔ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft
- ☐ With wheel bearing/wheel bearing unit and sensor ring -arrow- for ABS



Disc brakes



1 - Rear axle

- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle

2 - Bolts

- ❑ Qty. 4
- ❑ Renew after removal
- ❑ 150 Nm +90°

3 - Bolt

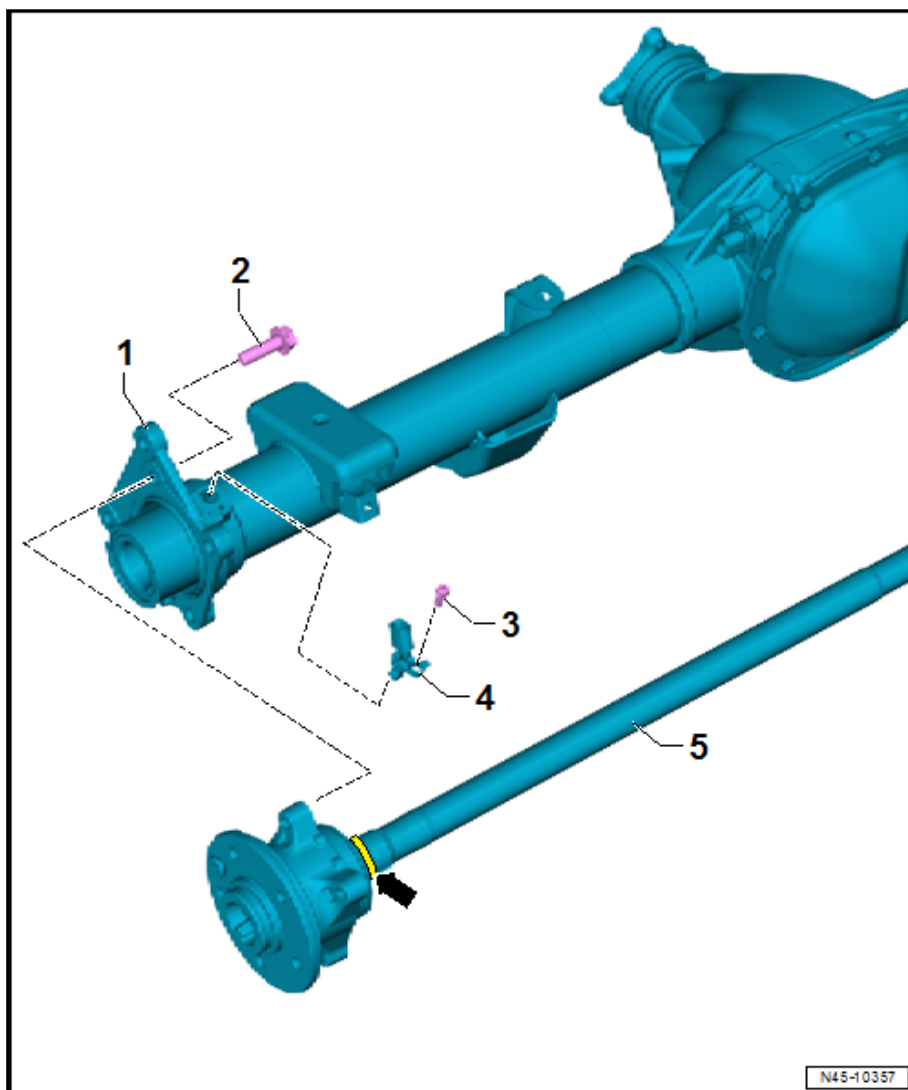
- ❑ 8 Nm

4 - Speed sensors -G44/-G46-

- ❑ Removing and installing ⇒ [page 45](#)

5 - Rear axle shaft

- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft
- ❑ With wheel bearing/wheel bearing unit and sensor ring -arrow- for ABS



4.3 Removing and installing front axle speed sensors -G45/-G47-

Special tools and workshop equipment required

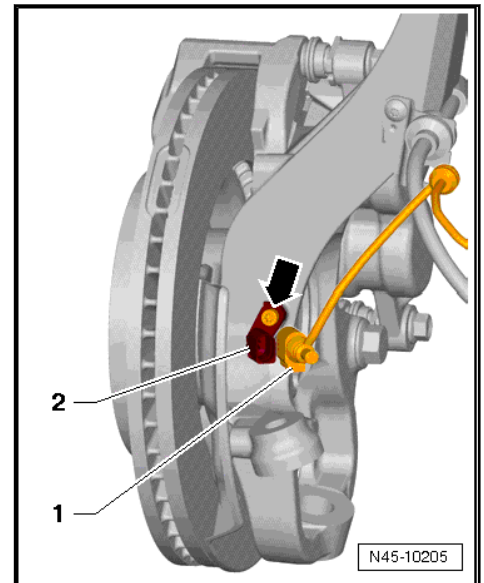
- ◆ Torque wrench -V.A.G 1410-



- ◆ Polycarbamide grease ⇒ Electronic parts catalogue (ETKA).

Removing

- Separate electrical connector -1- from speed sensor -2-.



- Remove bolt -arrow- from wheel bearing housing.
- Pull speed sensor -2- out of wheel bearing housing.

Installing

Install in reverse order, noting the following:

- Before inserting speed sensor, clean inner surface of hole, and coat speed sensor all-round with polycarbamide grease
⇒ Electronic parts catalogue (ETKA).
- Insert speed sensor into hole in wheel bearing housing, and tighten bolt.
- Turn steering to full left and right lock and check clearance to speed sensor wire.

Specified torques

- ◆ [⇒ o4.1 verview - front axle speed sensorsG45/G47", page 42](#)

4.4 Removing and installing rear axle speed sensors -G44-/-G46-

[⇒ a4.4.1 nd installing speed sensorG44/G46 on rear axle, drum brake", page 45](#)

[⇒ a4.4.2 nd installing speed sensorsG44/G46 on rear axle, disc brake", page 47](#)

4.4.1 Removing and installing speed sensor -G44-/-G46- on rear axle, drum brake

Special tools and workshop equipment required



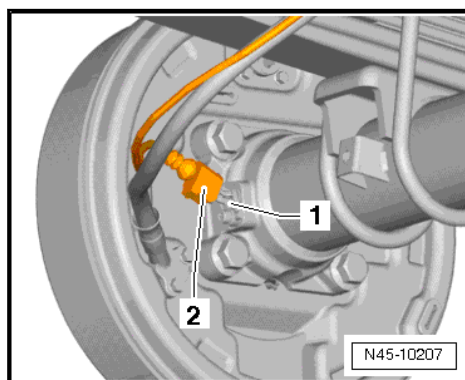
- ◆ Torque wrench -V.A.G 1410-



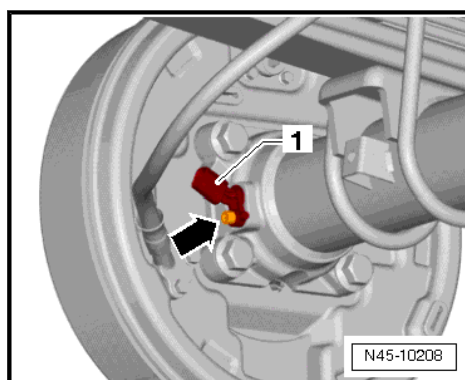
- ◆ Polycarbamide grease ⇒ Electronic parts catalogue (ETKA).

Removing

- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Separate electrical connector -2-.



- Unscrew bolt -arrow-.



- Pull out speed sensor -1- from axle beam.

Installing

Install in reverse order, noting the following:

- Before inserting speed sensor, clean inner surface of hole, and coat speed sensor all-round with polycarbamide grease ⇒ Electronic parts catalogue (ETKA).
- Insert speed sensor into hole in axle beam and tighten bolt.

Specified torques

- ◆ ⇒ [o4.2 verview - rear axle speed sensorsG44/G46", page 42](#)



4.4.2 Removing and installing speed sensors -G44-/-G46- on rear axle, disc brake

Special tools and workshop equipment required

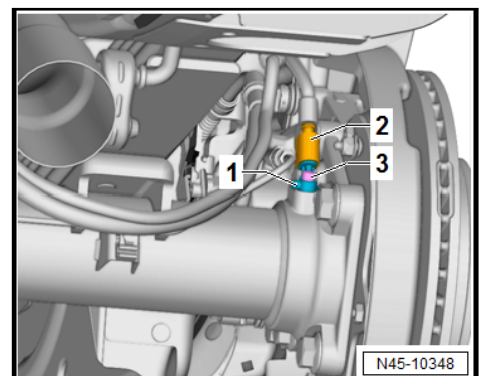
- ◆ Torque wrench -V.A.G 1410-



- ◆ Polycarbamide grease ⇒ Electronic parts catalogue (ETKA).

Removing

- Raise vehicle ⇒ Maintenance; Booklet ; Descriptions of work; Raising vehicle.
- Separate electrical connector -2-.



- Unscrew bolt -3-.
- Pull out speed sensor -1- from axle beam.

Installing

Install in reverse order, noting the following:

- Before inserting speed sensor, clean inner surface of hole, and coat speed sensor all-round with polycarbamide grease ⇒ Electronic parts catalogue (ETKA).

Specified torques

- ◆ ⇒ [o4.2 verview - rear axle speed sensorsG44/G46", page 42](#)



46 – Brakes - mechanism

1 Front brake

⇒ [o1.1 verview - front brake", page 48](#)

⇒ [a1.2 nd installing brake pads", page 51](#)

⇒ [a1.3 nd installing brake caliper", page 54](#)

1.1 Assembly overview - front brake



Note

- ◆ *After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the pads are properly seated in their normal operating position.*
- ◆ *Use brake filling and bleeding equipment -VAS 5234- or upgrade kit and extraction unit -V.A.G 1869/4- to extract brake fluid from brake fluid reservoir.*
- ◆ *Before removing a brake caliper or disconnecting a brake hose, fit brake pedal depressor -V.A.G 1869/2- (when doing this, release pressure in system).*



1 - Wheel bearing housing

- ☐ With wheel bearing and wheel hub

2 - Holder

- ☐ For brake hose and speed sensor wire

3 - Bolt

- ☐ For bracket on wheel bearing housing
- ☐ 9.5 Nm

4 - Cover plate

5 - Brake disc

- ☐ Always replace on both sides
- ☐ Wear limit ➔ [page 5](#)

6 - Bolt

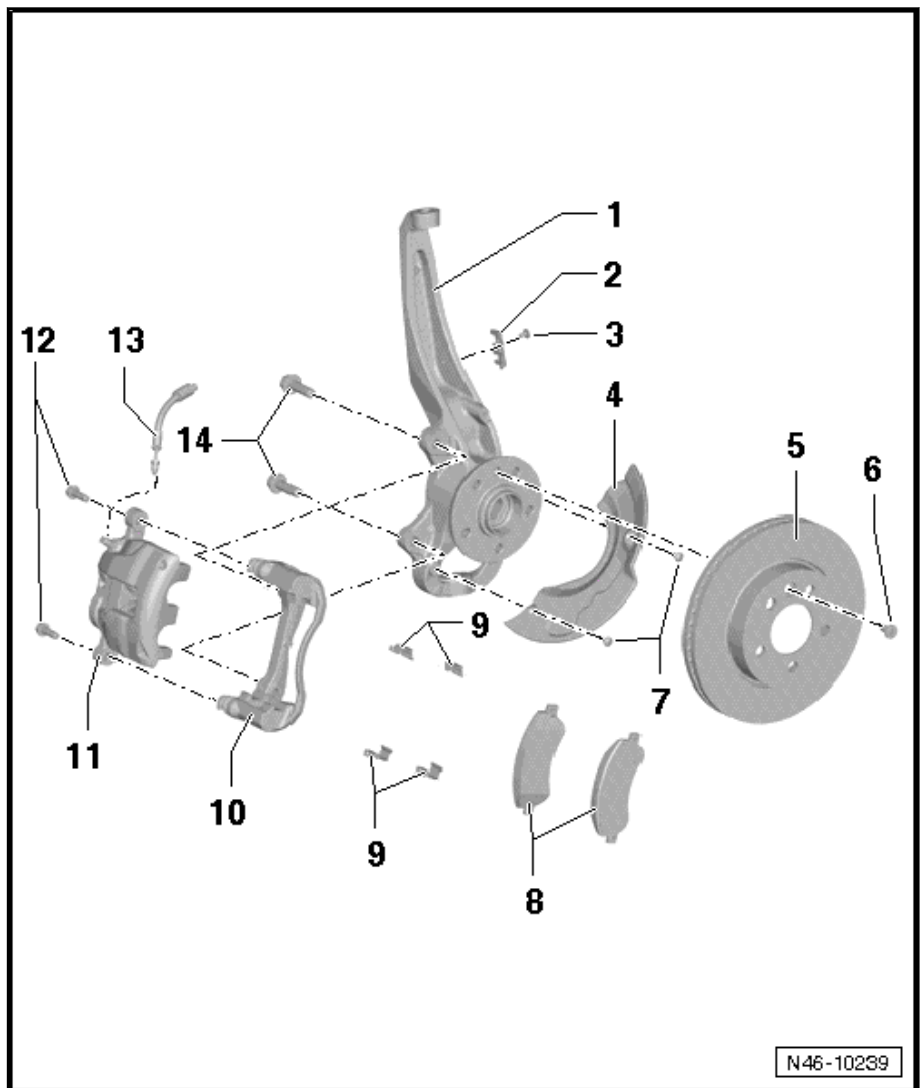
- ☐ 20 Nm

7 - Bolt

- ☐ 9.5 Nm

8 - Brake pads

- ☐ Check thickness
➔ Maintenance; Booklet ; Descriptions of work; Brake system:
Conducting visual examination for leaks and damage
- ☐ Always replace on both sides
- ☐ Wear limit ➔ [page 5](#)
- ☐ Removing and installing ➔ [page 51](#)



9 - Pad retainer

- ☐ Always renew when changing pads.

10 - Brake carrier

- ☐ With guide pins and protective sleeve
- ☐ Bolt to wheel bearing housing.
- ☐ Supplied as genuine part, assembled with sufficient grease on guide pins.
- ☐ If protective sleeves or guide pins are damaged, install repair kit and use lubricant sachet supplied to lubricate guide pins
- ☐ Installation position of guide pins ➔ [page 50](#)

11 - Brake caliper

- ☐ Removing and installing ➔ [page 54](#)

12 - Bolts

- ☐ Qty. 2
- ☐ Renew after removal
- ☐ 65 Nm

13 - Brake hose

- ☐ Install without twisting
- ☐ 14 Nm on brake caliper (pipe with union nut)

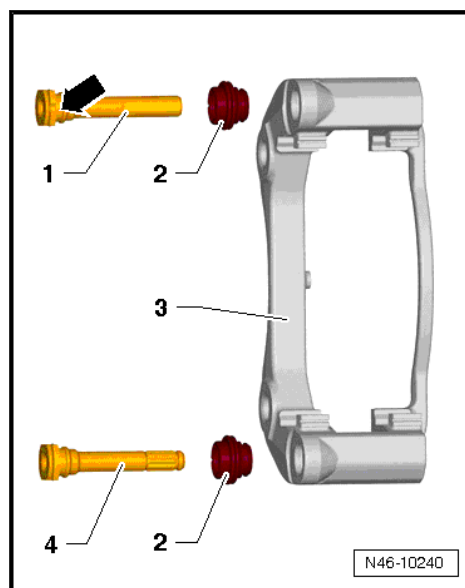


- ☐ 17 Nm on brake caliper (threaded pipe)
- ☐ 35 Nm on brake caliper (banjo bolt) 17" brakes from model year 2017
- ☐ Installation position of brake hose on 17" brakes from model year 2017 ➔ [page 50](#)

14 - Bolts

- ☐ Qty. 2
- ☐ Renew after removal
- ☐ 150 Nm +90° on 16" brakes
- ☐ 180 Nm +90° on 17" brakes from model year 2017

Installation position of guide pins



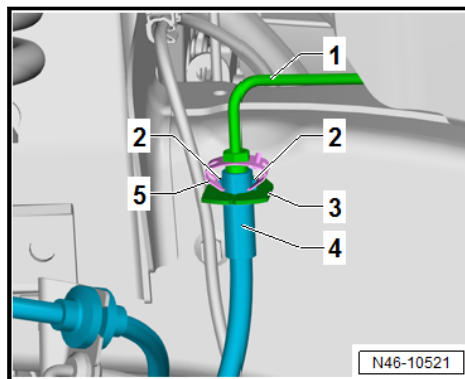
- Guide pin -1- with notch -arrow- must be installed in brake carrier -3- at top (inlet side).



Note

If protective sleeves -2- or guide pins -1- and -4- are damaged, install repair kit and use lubricant sachet supplied to lubricate guide pins.

Installation position of brake hose on 17" brakes from model year 2017



- Screw brake hose -4- onto brake caliper ➔ [page 54](#) .
- Insert brake hose -4- into bracket -3-.

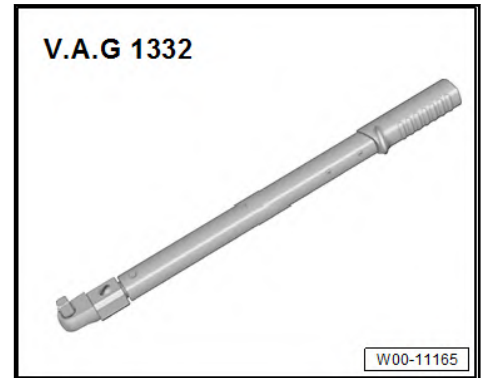


- Turn brake hose -4- 45° so that retaining tabs -2- engage in bracket -3- longitudinally to direction of travel.
- Fit clip -5-.
- Install brake line -1-.

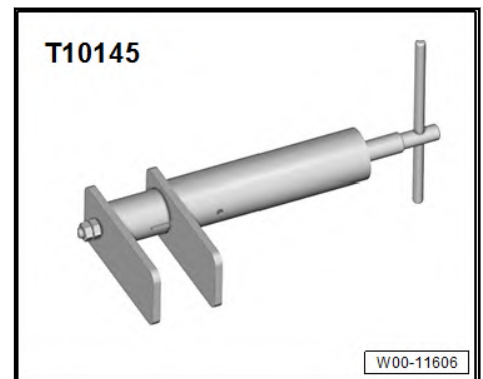
1.2 Removing and installing brake pads

Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1332-



- ◆ Piston resetting appliance -T10145-

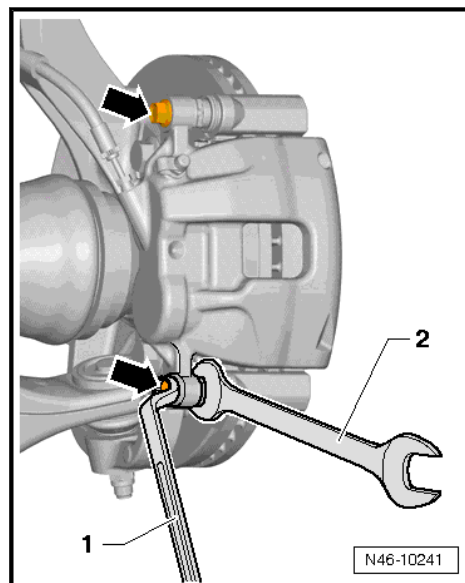


Note

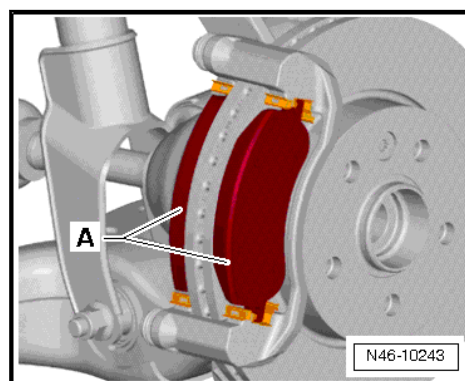
Removal and installation of brake pads is shown for left side of front axle only. Brake pad removal and installation on right side of front axle are analogous.

Removing

- Unscrew bolts -arrows- for securing brake caliper using spanner -1- (AF 15 mm). When doing this, counterhold on guide pin using open jaw spanner -2- (21 mm).



- Remove brake caliper from brake carrier.
- Secure brake caliper with wire so that the weight of the brake caliper does not stress or damage the brake hose.
- If brake pads/linings are to be reused, mark before removal.
- Remove brake pads -A- from brake carrier sideways.



- Then remove pad retainers from brake carrier.
- Clean brake caliper housing.



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.



Note

Use only brake and clutch cleaner to clean the brake caliper housing.

Installing

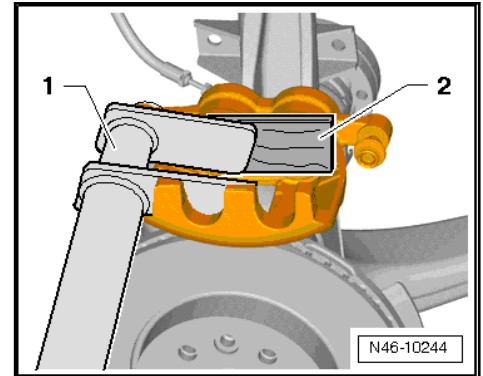
Install in reverse order, noting the following:

Before inserting new brake pads, press piston back into cylinder using piston resetting tool -T10145-. Before pressing piston

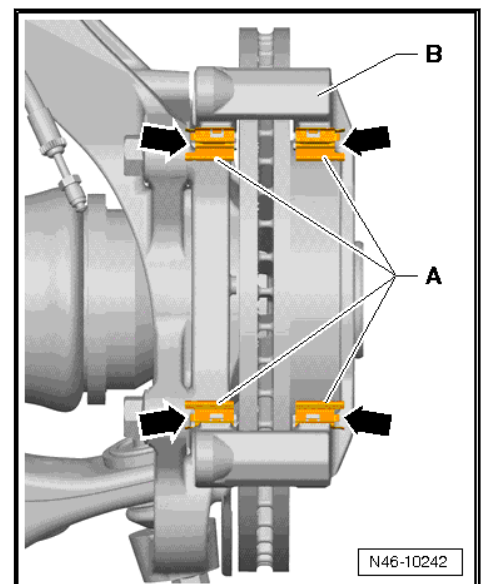


back, draw off brake fluid from brake fluid reservoir with bleeder bottle. Otherwise, fluid can overflow and cause damage, particularly if reservoir has been topped up.

- Place a piece of wood -2- or a brake pad in the recess so that both pistons are pressed back at the same time.

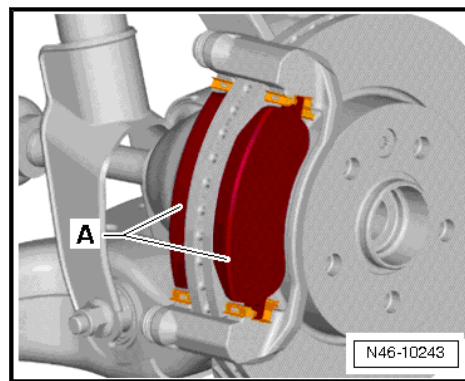


- Press both pistons back using piston resetting appliance -T10145- -1-.
- Insert pad retainers -A- into brake carrier -B-.



Note

- ◆ *Always renew pad retainers -A- when changing pads.*
- ◆ *Fit pad retainers with chamfered projection -arrows- outward on brake carrier.*
- Insert brake pads -A- into pad retainers of brake carrier.



- Fit brake caliper onto brake carrier and tighten securing bolts.



Note

- ◆ *After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the pads are properly seated in their normal operating position.*
- ◆ *After changing brake pads, check brake fluid level.*

Specified torques

- ◆ ⇒ [o1.1 verview - front brake", page 48](#)

1.3 Removing and installing brake caliper

Special tools and workshop equipment required

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





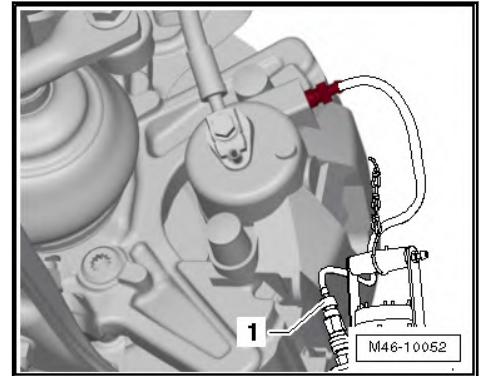
Removing



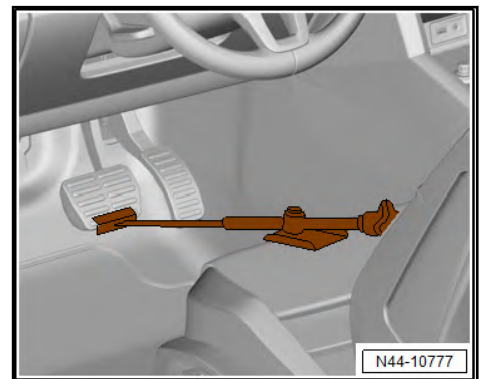
Note

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

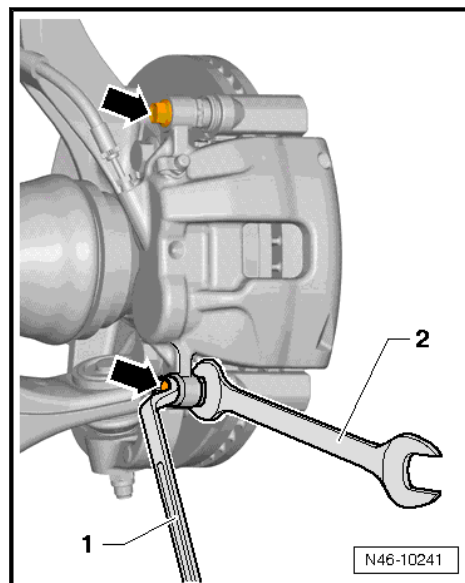
- Observe general information on brake fluid ⇒ [page 106](#) .
- Connect bleeder bottle hose to brake caliper bleed valve and open bleed valve.



- Then apply brake pedal actuator -V.A.G 1869/2-.



- Following this, close bleeder valve and remove bleeder bottle.
- Unscrew brake hose.
- Unscrew bolts -arrows- for securing brake caliper using spanner -1- (AF 15 mm). When doing this, counterhold on guide pin using open jaw spanner -2- (21 mm).



- Remove brake caliper from brake carrier.

Installing

Install in reverse order, noting the following:

- The pistons are pressed back.
- The brake pads are seated on the brake carrier.
- Fit brake caliper on brake carrier.
- Screw brake hose onto brake caliper.
- Remove brake pedal depressor -V.A.G 1869/2-.
- Bleed brake system ⇒ [page 107](#) .



Note

- ◆ *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.*

Specified torques

- ◆ ⇒ [o1.1 verview - front brake", page 48](#)



2 Rear brake

⇒ [o2.1 verview - rear brakes", page 57](#)

⇒ [a2.2 nd installing brake pads", page 63](#)

⇒ [a2.3 nd installing brake caliper", page 66](#)

⇒ [a2.4 nd installing brake carrier", page 70](#)

⇒ [a2.5 nd installing brake shoes", page 71](#)

⇒ [d2.6 rum brakes", page 76](#)

⇒ [a2.7 nd installing wheel brake cylinder", page 78](#)

2.1 Assembly overview - rear brakes

Drum brakes

Disc brakes ⇒ [page 61](#)



Note

- ◆ *After renewing wheel brake cylinder, brake carrier and brake shoes, basic setting of the adjuster needs to be performed ⇒ [page 75](#). Then, with vehicle stationary and brake drum installed, depress brake pedal firmly 10 times so that the brake shoes are properly seated in their normal operating position.*
- ◆ *After work for which the brake system had to be opened, bleed the brake system with brake charge and bleed system -VAS 5234- or extraction unit -V.A.G 1869/4-.*
- ◆ *Before removing a wheel brake cylinder or brake backplate or disconnecting a brake line from the wheel brake cylinder, fit brake pedal depressor -V.A.G 1869/2- (release pressure in system).*



1 - Bolt

- 20 Nm

2 - Brake drum

- ❑ Clean carefully and check for wear, damage, dimensional accuracy and flawless brake surface.
- ❑ Wear limit ➡ [page 5](#)
- ❑ Check wear limit using brake drum calliper gauge -VAS 6787-
- ❑ Reset brake before removing brake drum ➡ [page 76](#)

3 - Rear axle shaft

- ❑ Before removal, remove rear right speed sensor -G44- / rear left speed sensor -G46- ➞ [page 45](#)
- ❑ Removing and installing ➞ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

4 - Rear axle

- Removing and installing → Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle

5 - Compensator

6 - Handbrake cable front

- ❏ Removing and installing ⇒ page 85

7 - Handbrake cable rear right

- ❑ To week 25/2011: secured on rear axle with a spring
- ❑ From week 25/2011: revised handbrake cable, spring discontinued
- ❑ Removing and installing ⇒ page 86

8 - Adjustment nut

- ❑ Adjusting handbrake ⇒ [page 91](#) .

9 - Handbrake cable rear left

- ❑ To week 25/2011: secured on rear axle with a spring
- ❑ From week 25/2011: revised handbrake cable, spring discontinued
- ❑ Removing and installing ⇒ **page 86**

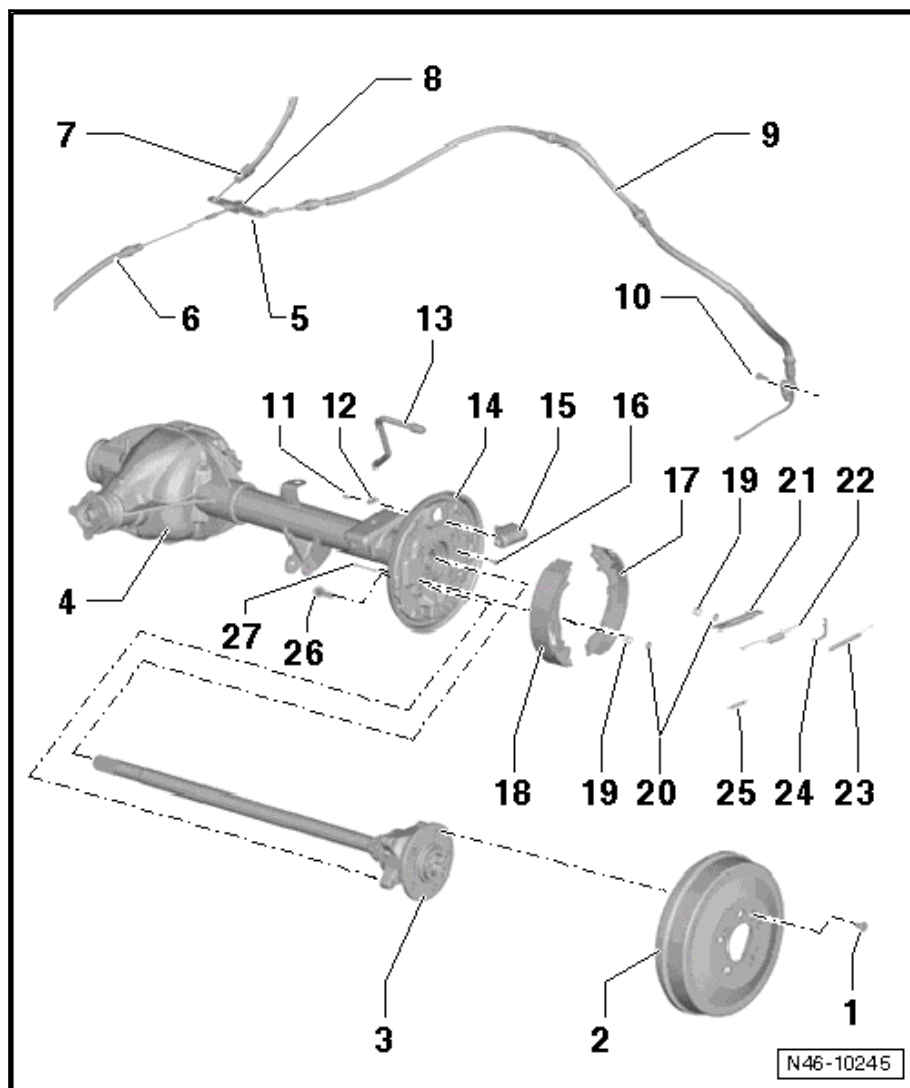
10 - Bolt

- ☐ For rear handbrake cable on brake carrier
- ☐ 9.5 Nm

11 - Bolt

- ☐ For wheel brake cylinder on brake carrier
- ☐ 8 Nm

12 - Sealing cover





- ☐ Unclip from brake carrier
- ☐ Reset brake shoes through this opening before removing brake drum

13 - Brake line

- ☐ 14 Nm

14 - Brake carrier

- ☐ Removing and installing ⇒ [page 70](#)

15 - Wheel brake cylinder

- ☐ Check for leaks ⇒ [page 60](#)
- ☐ Assembly overview ⇒ [page 60](#)
- ☐ Removing and installing ⇒ [page 78](#)

16 - Bolt

- ☐ Self-locking (micro-encapsulated)
- ☐ Renew after removal
- ☐ Clean residual locking fluid out of threaded hole in axle beam



Note

Threaded holes into which self-locking bolts or bolts with locking agent have been screwed must be cleaned (e.g. with a screw tap). Otherwise, there is a danger that the bolts will shear off when refitted.

- ☐ 30 Nm

17 - Brake shoe

- ☐ Installed at rear in direction of travel
- ☐ Wear limit ⇒ [page 5](#)
- ☐ Removing and installing ⇒ [page 71](#)

18 - Brake shoe with lever for handbrake

- ☐ Installed at front in direction of travel
- ☐ Wear limit ⇒ [page 5](#)
- ☐ Removing and installing ⇒ [page 71](#)

19 - Spring

20 - Spring plate

- ☐ To remove, push against compression spring and turn through 90°.

21 - Push bar

- ☐ Note installation position ⇒ [page 73](#)



Note

- ◆ *Adjusters on plunger rod differ according to whether they have a right-hand or left-hand thread, depending on the installation position.*
- ◆ *Right-hand thread = direction of travel, right*
- ◆ *Left-hand thread = direction of travel, left*

22 - Upper return spring



- ❑ Note installation position: steeply offset side points towards lever for handbrake
- ❑ Removing and installing ⇒ [page 73](#)

23 - Adjuster spring

- ❑ Hook into lever with longer end of leg ⇒ [Item 24 \(page 60\)](#)

24 - Lever

- ❑ Secures adjusters on plunger rod to prevent it from turning back
- ❑ Must be carefully pushed away from adjuster (towards brake drum) when brake shoes are reset

25 - Lower return spring

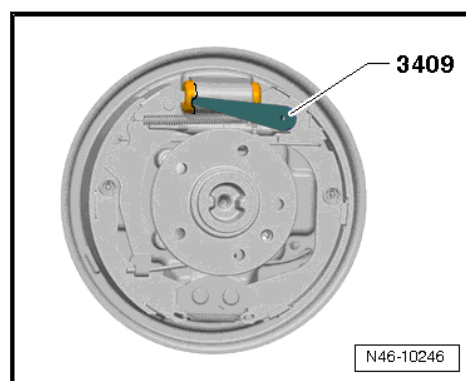
- ❑ Note installation position: opening in hooks points towards brake carrier

26 - Bolts

- ❑ Qty. 4
- ❑ Renew after removal
- ❑ For rear axle shaft on axle beam
- ❑ 150 Nm +90°

27 - Hold-down pin

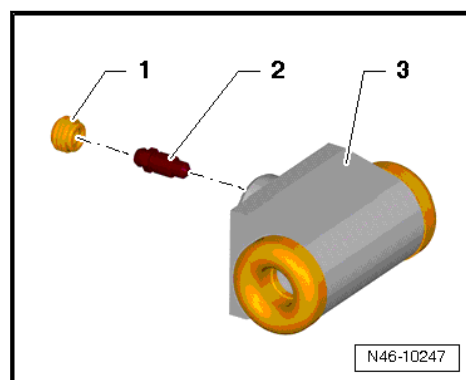
Checking wheel brake cylinder for leaks



- Lift off dust boot with removal wedge -3409-.
- If brake fluid is found in the dust boot, renew wheel brake cylinder.

Ensure the dust boot is not damaged when lifting off.

Assembly overview - wheel brake cylinder



- 1 - Dust cap; fit onto bleeder valve
- 2 - Bleeder valve; before screwing in, apply thin coat of assembly paste to thread ⇒ Electronic parts catalogue (ET-KA).



3 - Wheel brake cylinder



Note

Renew wheel brake cylinder in case of leaks or if damaged.

Specified torque

Component	Specified torque
Bleeder valve in wheel brake cylinder	8 Nm

Disc brakes



1 - Rear axle

- ❑ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle

2 - Handbrake cable

- ❑ Removing and installing ⇒ [page 86](#)

3 - Bolts

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ 30 Nm

4 - Brake caliper

- ❑ Removing and installing ⇒ [page 66](#)

5 - Pad retainers

- ❑ Always renew when changing pads.

6 - Brake pads

- ❑ Check thickness ⇒ Maintenance; Booklet 11; Descriptions of work; Brake system: Visual check for leaks and damage
- ❑ Always replace on both sides
- ❑ Wear limit ⇒ [page 5](#)
- ❑ Removing and installing ⇒ [page 63](#)

7 - Brake carrier

- ❑ Removing and installing ⇒ [page 70](#)
- ❑ Installation position of guide pins ⇒ [page 63](#)

8 - Brake hose

- ❑ 35 Nm on brake caliper
- ❑ 14 Nm on brake line

9 - Bolts

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ Brake carrier to axle beam
- ❑ 150 Nm +90°

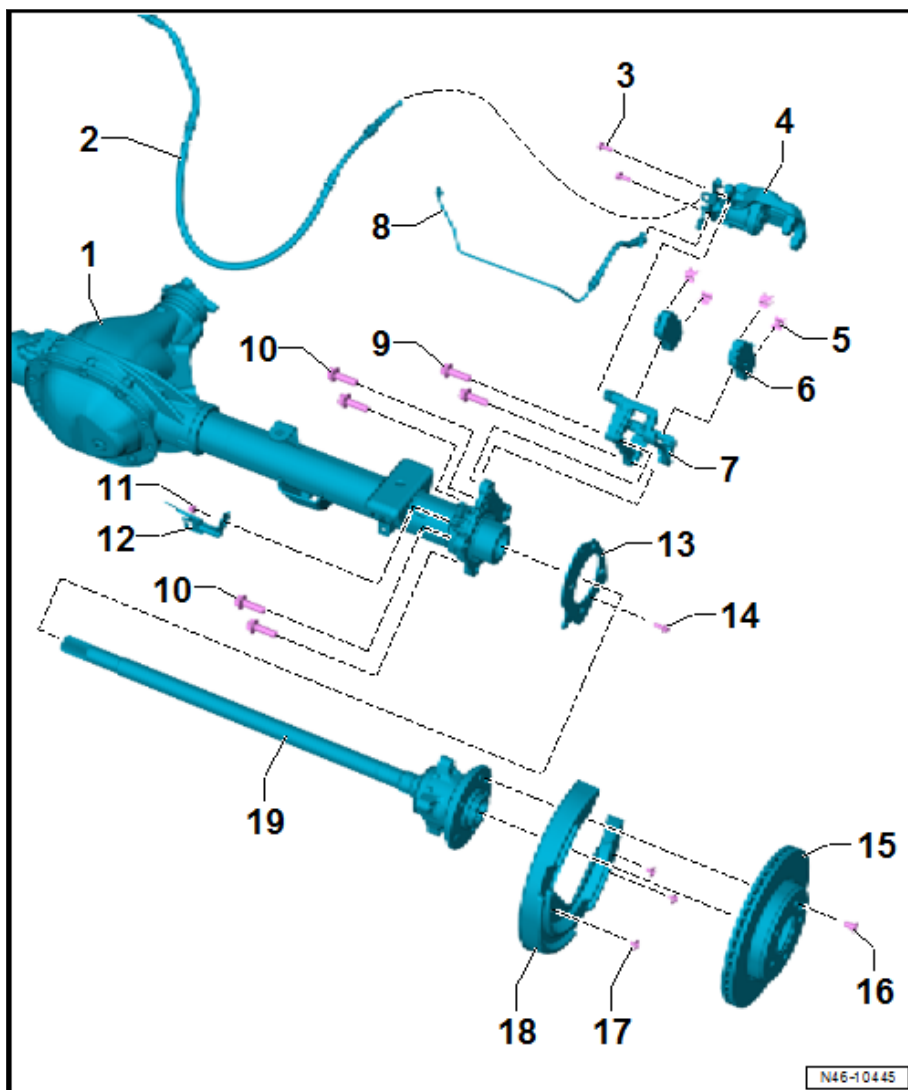
10 - Bolts

- ❑ Qty. 4
- ❑ Renew after removal
- ❑ Rear axle shaft to axle beam
- ❑ 150 Nm +90°

11 - Nut

- ❑ 20 Nm

12 - Holder





13 - Holder

- ☐ For cover plate

14 - Bolt

- ☐ 30 Nm

15 - Brake disc

- ☐ Check thickness ⇒ Maintenance; Booklet 11; Descriptions of work; Brake system: Visual check for leaks and damage
- ☐ Always replace on both sides
- ☐ Wear limit ⇒ [page 5](#)

16 - Bolt

- ☐ 20 Nm

17 - Bolts

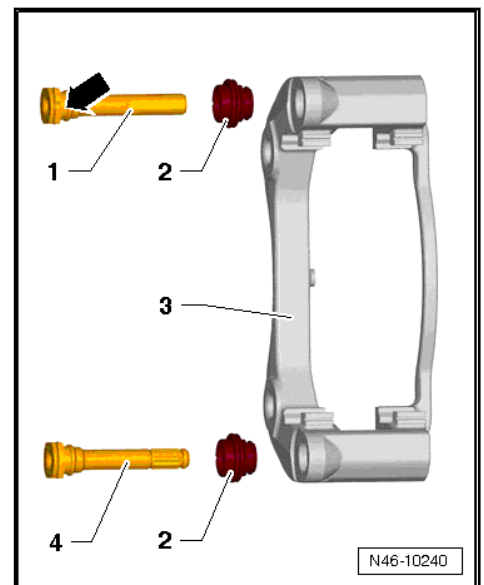
- ☐ Qty. 3
- ☐ 9 Nm

18 - Cover plate

19 - Rear axle shaft

- ☐ Before removal, remove rear right speed sensor -G44- / rear left speed sensor -G46- ⇒ [page 45](#)
- ☐ Removing and installing ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle; Removing and installing rear axle shaft

Installation position of guide pins



- Guide pin -1- with notch -arrow- must be installed in brake carrier -3- at top (inlet side).



Note

If protective sleeves -2- or guide pins -1- and -4- are damaged, install repair kit and use lubricant sachet supplied to lubricate guide pins.

2.2 Removing and installing brake pads

Special tools and workshop equipment required



- ◆ Brake piston tool set -VAS 761 001-

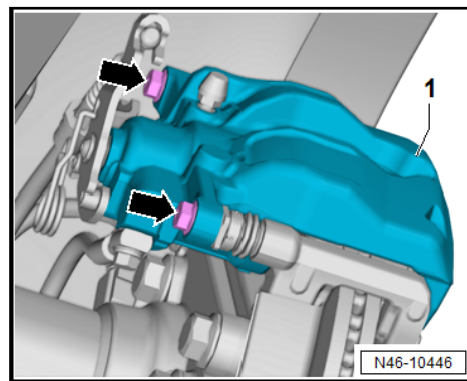


- ◆ Torque wrench -V.A.G 1331-



Removing

- Remove bolts -arrows-



- Remove brake caliper -1- and secure with wire so that weight of brake caliper does not strain or damage brake hose.
- If brake pads/linings are to be reused, mark before removal.
- Take brake pads out of brake carrier.
- Remove pad retainers.

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.



Note

Use brake and clutch cleaner to clean the brake caliper.

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

Installing

Install in reverse order, noting the following:

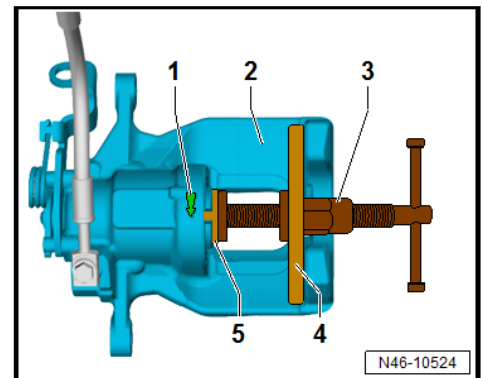
- Extract brake fluid from brake fluid reservoir using bleeder bottle.



Note

Observe the arrow -1- cast on the brake caliper -2- for the screw in direction.

- Fit suitable adapter -5- from brake piston tool set -VAS 761 001- -3-.



- Mount retaining plate -4- from brake piston tool set -VAS 761 001- -3-.
- Insert brake piston tool set -VAS 761 001- -3- in brake caliper -2- as shown in illustration.



Note

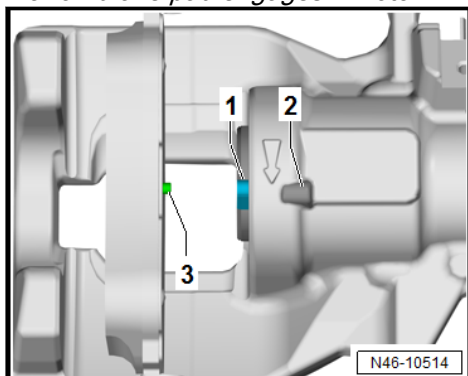
When screwing in, do not damage the boot that protects the piston.

- Screw in brake piston by turning handle of brake piston tool set -VAS 761 001- -3- in direction of arrow -1- cast on brake caliper -2-.
- Turn brake piston until notch -1- aligns with protrusion -2-.



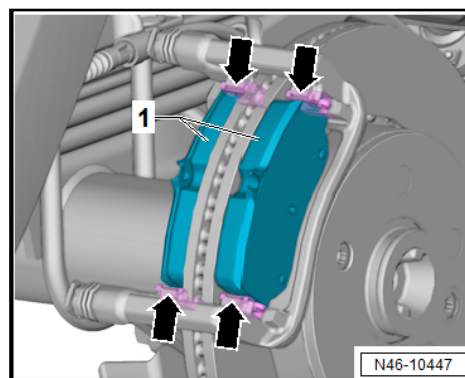
Note

Pin -3- on brake pad engages in notch -1-.



With new brake pads, use the pad retainers included in the repair kit.

- Make sure that protective caps are not damaged and are seated correctly.
- Make sure that guide pins are free to move.
- Insert pad retainers -arrows-.



- Insert brake pads -1-.



Note

- ♦ *Ensure that brake pads -1- are seated correctly in pad retainers -arrows-.*
- ♦ *After changing brake pads, firmly depress brake pedal several times with vehicle stationary, so that the brake pads are properly seated in their normal operating position.*
- ♦ *After changing brake pads, check brake fluid level.*

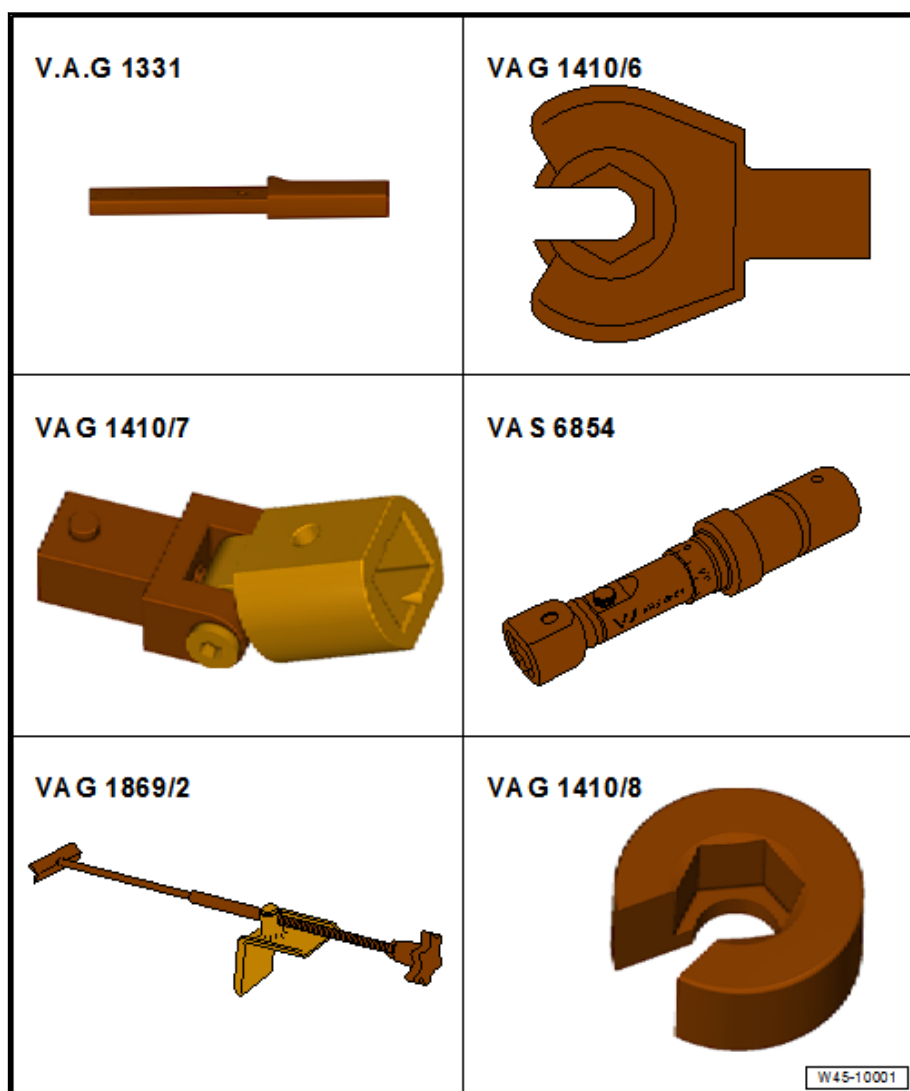
Specified torques

- ♦ ➔ [o2.1 verview - rear brakes", page 57](#)

2.3 Removing and installing brake caliper



Special tools and workshop equipment required



- ◆ Torque wrench -V.A.G 1331-
- ◆ 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-

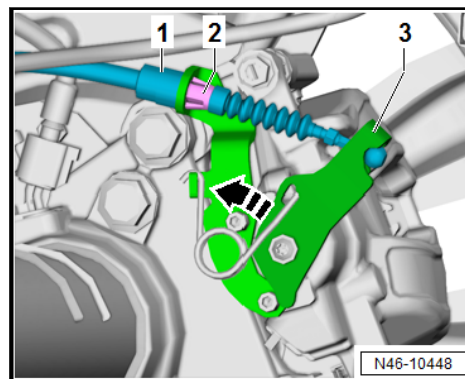
Removing



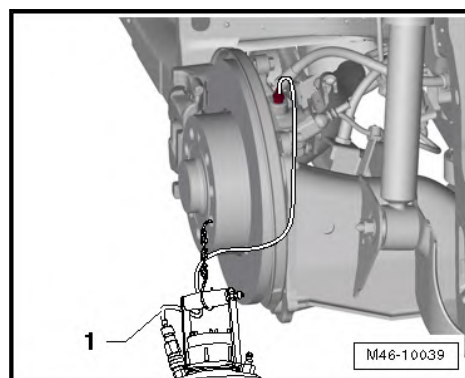
Note

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

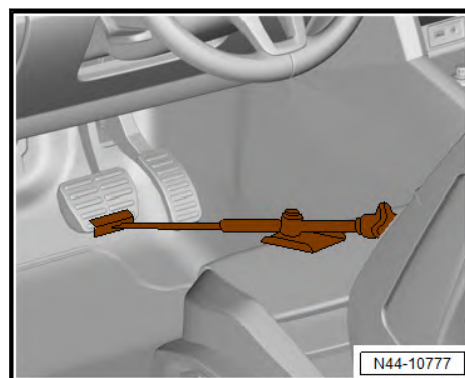
- Push actuating lever -3- in direction of -arrow-.



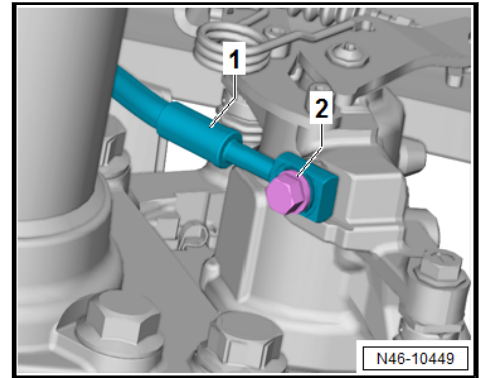
- Disengage handbrake cable -1- from actuating lever -3-.
- Press together locking tabs on cable support bracket -2- using pliers.
- Remove handbrake cable -1-.
- Observe general information on brake fluid ➔ [page 106](#) .
- Connect bleeder hose of bleeder bottle -1- to bleeder valve of brake caliper and open bleeder valve.



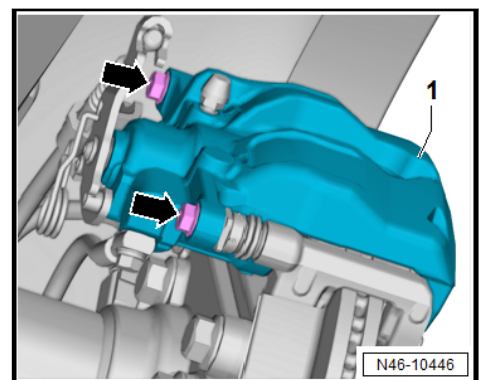
- Apply brake pedal depressor -V.A.G 1869/2-.



- Close bleeder screw and remove bleeder bottle.
- Unscrew banjo bolt -2-.



- Remove brake hose -1-.
- Remove bolts -arrows-



- Remove brake caliper -1- from brake carrier.

Installing

Install in reverse order, noting the following:

- The piston is pressed back.
- The brake pads are seated in the retaining springs on the brake carrier.
- Bleed brake system ➔ [page 107](#) .
- Adjust handbrake ➔ [page 91](#) .



Note

- ◆ *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.*

Specified torques

- ◆ ➔ [o2.1 verview - rear brakes](#)”, [page 57](#)



2.4 Removing and installing brake carrier

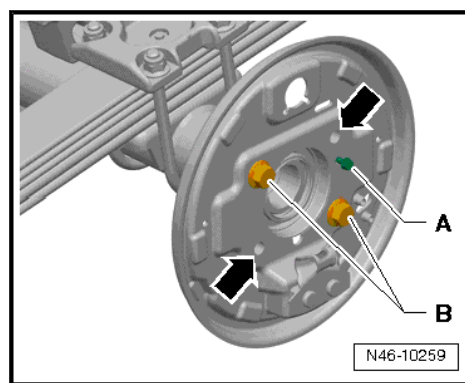
⇒ [a2.4.1 nd installing brake carrier, drum brakes](#)", page 70

⇒ [a2.4.2 nd installing brake carrier for disc brakes](#)", page 71

2.4.1 Removing and installing brake carrier, drum brakes

Removing

- Resetting brake and removing brake drum ⇒ [page 76](#) .
- Remove brake shoes ⇒ [page 71](#) .
- Remove wheel brake cylinder ⇒ [page 78](#) .
- Remove rear axle shaft ⇒ Running gear, axles, steering; Rep. gr. 42; Rear axle shafts.
- Remove bolt -A- and take brake carrier off axle beam.



Installing

Install in reverse order, noting the following:



Note

- ♦ *Before installing brake carrier, clean threaded hole for bolt -A- in axle beam.*
- ♦ *Threaded holes into which self-locking bolts or bolts with locking agent have been screwed must be cleaned (e.g. with a screw tap). Otherwise, there is a danger that the bolts will shear off when refitted.*
- ♦ *Insert 2 securing bolts -B- for rear axle shaft so that holes -arrows- of brake carrier are centred on axle beam.*
- Tighten new bolt -A-.
- Bleed brake system ⇒ [page 107](#) .

Specified torques

- ♦ ⇒ [o2.1 verview - rear brakes](#)", page 57
- ♦ Rear axle shafts; Assembly overview - rear axle shafts
⇒ Running gear, axles, steering; Rep. gr. 42; Assembly overview - rear axle shafts.

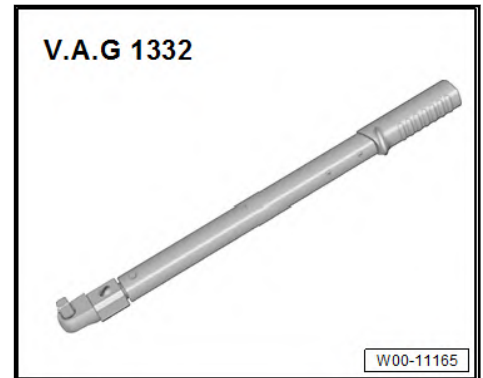


2.4.2 Removing and installing brake carrier for disc brakes

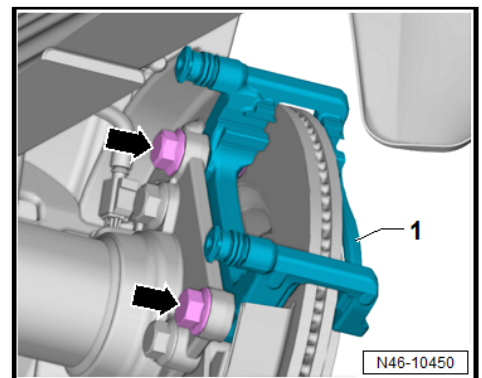
Removing

Special tools and workshop equipment required

- ◆ Torque wrench -V.A.G 1332-



- Remove brake pads ⇒ [page 63](#) .
- Remove bolts -arrows-



- Remove backplate -1-.

Installing

Install in reverse order, noting the following:

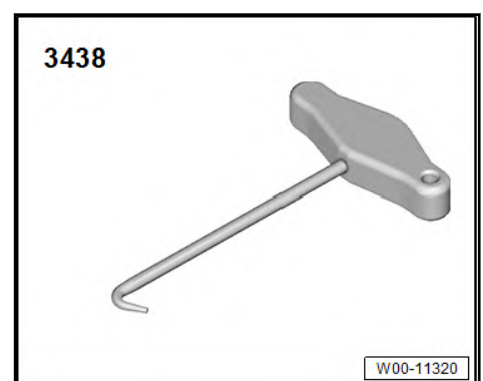
Specified torques

- ◆ ⇒ [o2.1 verview - rear brakes", page 57](#)

2.5 Removing and installing brake shoes

Special tools and workshop equipment required

- ◆ Hook -3438-





- ◆ Lubricating paste ⇒ Electronic parts catalogue (ETKA).

Removing

- Raise vehicle ⇒ Maintenance; Booklet ; Descriptions of work; Raising vehicle.
- Remove rear wheels ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Changing wheel.
- Resetting brake and removing brake drum ⇒ [page 76](#) .



Note

- ◆ *Removal and installation of brake shoes is shown for left side of rear axle only. Brake shoe removal and installation on right side are analogous.*
- ◆ *Use brake and clutch cleaner to clean the brake system.*

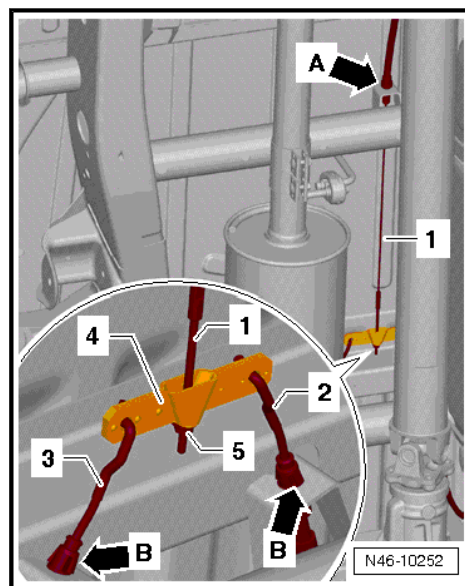


WARNING

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.

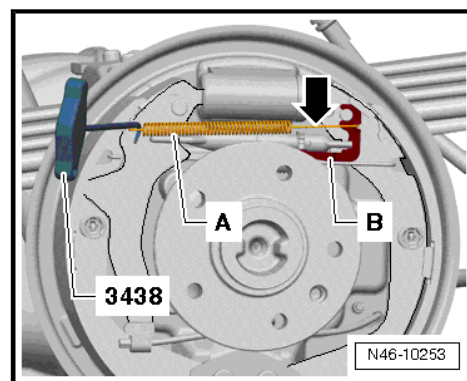
- Turn back adjustment nut -5- on front handbrake cable -1-.



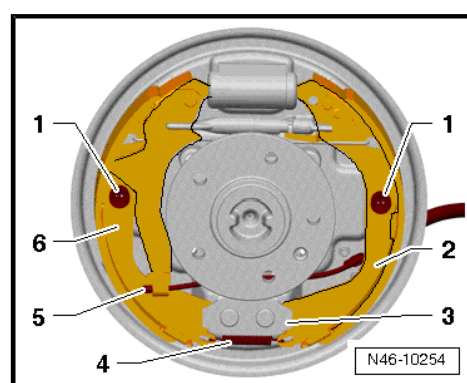
Note

-Items 2 to 4- can be disregarded.

- Detach adjuster spring -A- from front brake shoe and remove it from lever -B- -arrow-.

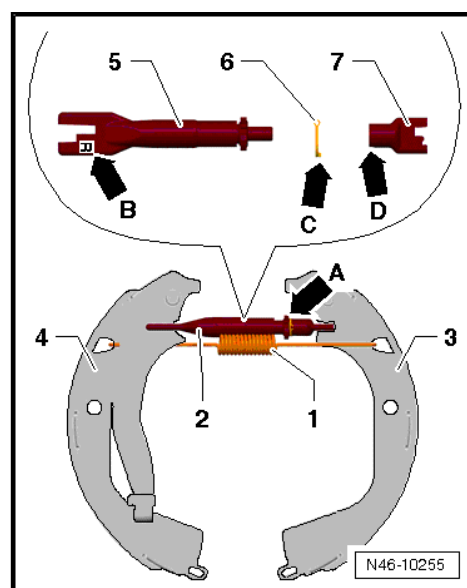


- Remove lever -B-.
- Remove spring plate -1- with springs.



- Then lift rear brake shoe -2- in front of support plate -3-.
- Unhook lower return spring -4-.
- Detach handbrake cable -5- from front brake shoe -6-.
- Guide brake shoes out together with plunger rod and return spring upwards between wheel hub and wheel brake cylinder.

Removing and installing upper return spring -1- and plunger rod -2- from brake shoes.



- Turn back pinion of adjuster -arrow A-.



Note

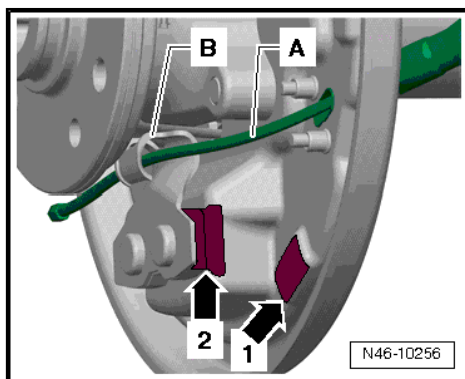
- ♦ *Adjusters on plunger rod differ according to whether they have a right-hand or left-hand thread, depending on the installation position.*
- ♦ *Right-hand thread = direction of travel, right*
- ♦ *Left-hand thread = direction of travel, left*
- Unhook complete plunger rod -2- and upper return spring -1- from brake shoes -3- and -4-.

Assemble plunger rod as follows:

- Place thermal clip -6- and end piece -7- onto plunger rod -5- with adjuster. Make sure that projection -arrow C- is inserted into notch -arrow D-.
- Hook in upper return spring.
- Note installation position: steeply offset side of spring points in direction of travel, towards lever for handbrake -4-.
- Then insert plunger rod.
- Insert brake shoes into lower notches in plunger rod.

Installing

- Handbrake cable -A- must be within support plate bracket -B-.



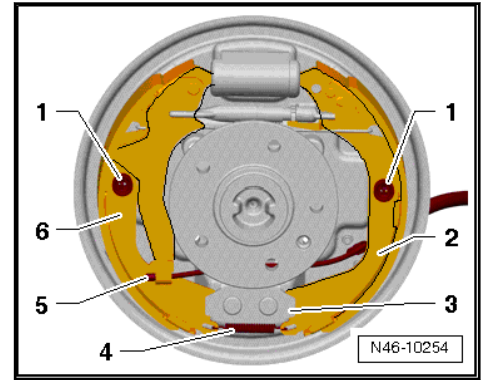
- Grease contact surfaces for brake shoes on support plate -arrow 2- and on brake carrier -arrow 1- (qty. 6 distributed around circumference) with lubricating paste ⇒ Electronic parts catalogue (ETKA).
- Guide brake shoes in together with plunger rod and return spring from top between wheel hub and wheel brake cylinder.
- Fit brake shoes onto wheel cylinder pistons.



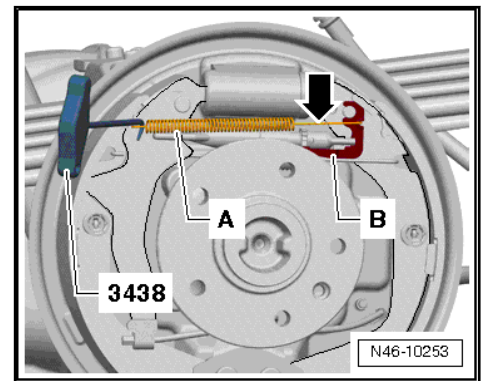
Note

Do not damage dust protection shields on wheel brake cylinder!

- Hook handbrake cable -5- onto lever.

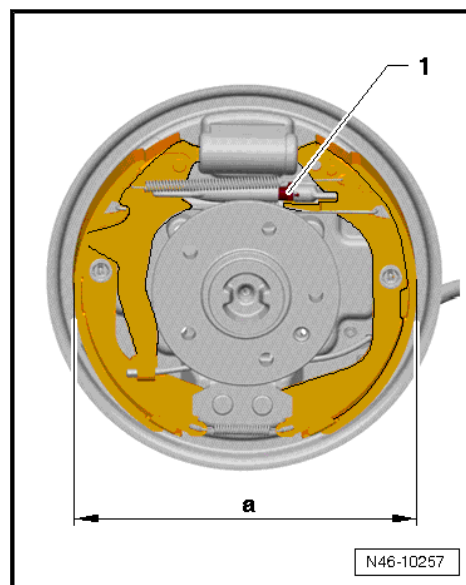


- Then place front brake shoe -6- behind lower support -3-.
- Hook in lower return spring -4-.
- Note installation position: openings in hooks point towards brake carrier.
- Then lift rear brake shoe -2- behind support plate -3-.
- Install compression spring with spring plate -1-.
- Install lever -B- and hook in adjuster spring -A-, as illustrated -arrow-.



Note

- ◆ *Handbrake must be released.*
- ◆ *If a used plunger rod is installed, it must be checked for ease of movement and cleaned if necessary.*
- Perform basic setting.
Use adjuster pinion -1- to set brake shoes to dimension
-a- = 294 mm.



Note

If distance -a- is too small then plunger rod might slip out of brake shoe guide when brake is first applied, leading to malfunction.

- Install brake drum.
- Firmly depress brake pedal 10 times.
- Fit wheels.
- Adjust handbrake ⇒ [page 91](#) .

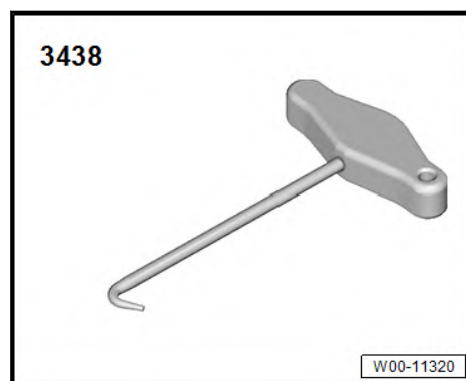
Specified torques

- ♦ ⇒ [o2.1 verview - rear brakes", page 57](#)
- ♦ Wheels, tyres; Specified torque for wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts

2.6 Resetting drum brakes

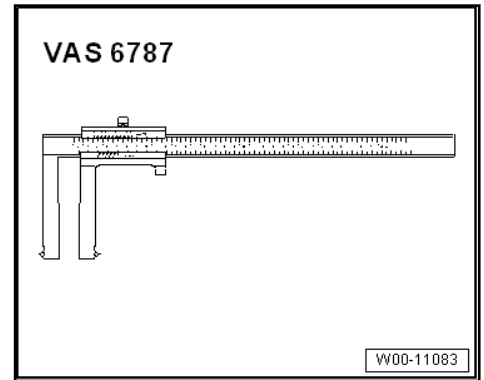
Special tools and workshop equipment required

- ♦ Hook -3438-



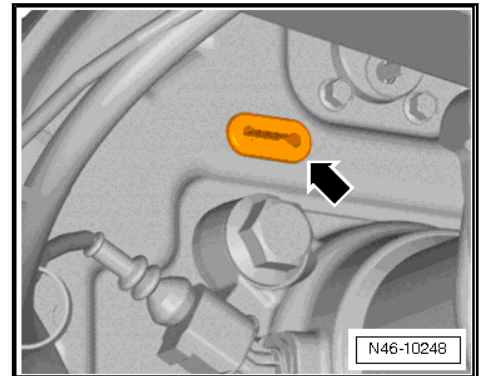


◆ Brake drum calliper gauge -VAS 6787-

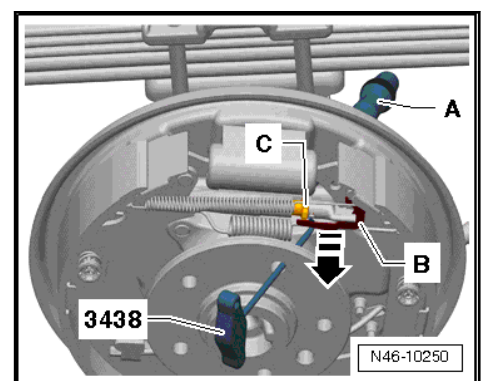


Procedure

- Raise vehicle ⇒ Maintenance; Booklet ; Descriptions of work; Raising vehicle.
- Remove rear wheels.
- The handbrake is released.
- Unclip sealing cover -arrow- from brake drum.



- Pass a hook, e.g. -3438- through a threaded hole for wheel bolts in brake drum/wheel hub to pull lever -B- carefully in -direction of arrow-.

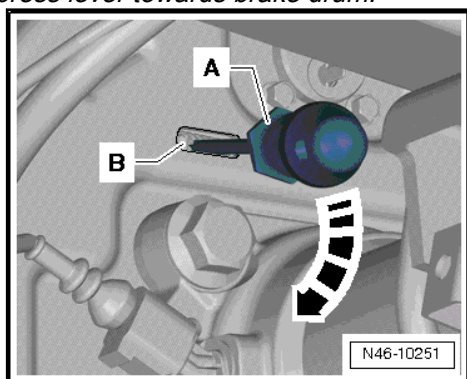


- The guide a short screwdriver -A- through opening in brake carrier and position against pinion of adjuster -C-.

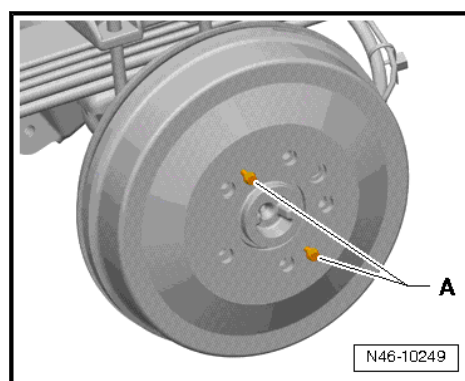


Note

- ◆ For reasons of clarity, brake drum is removed in illustration.
- ◆ If necessary, brake drum can also be removed without resetting brake shoes.
- ◆ To press lever away from adjuster, it is also possible to insert a second screwdriver into opening -B- in brake carrier. This can be used to press lever towards brake drum.



- Use screwdriver -A- to turn adjuster in -direction of arrow-. This causes pinion of adjuster to be turned upwards.
- Due to corrosion, it may be necessary to press brake drum off wheel hub.

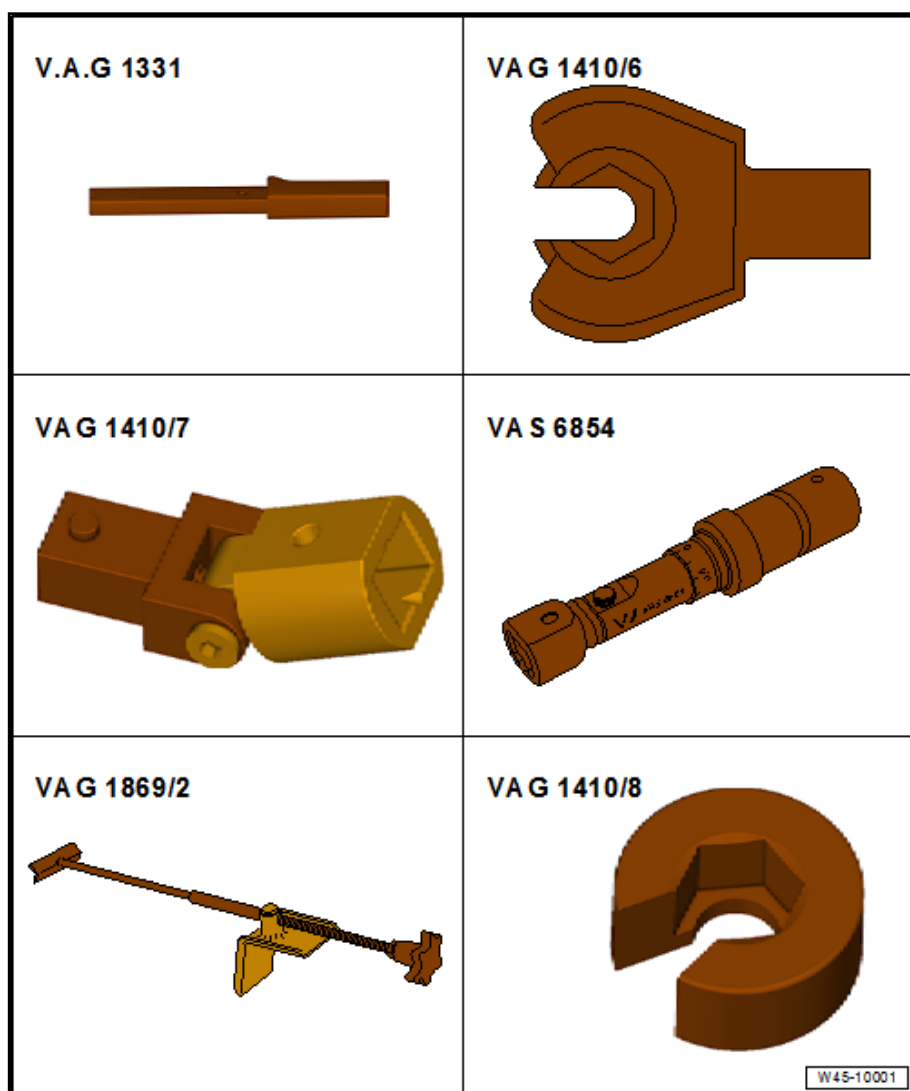


- Screw 2 bolts M 8 -A- into threaded holes in brake drum and tighten one then the other by a $1/2$ turn at a time.
- Check wear limit of brake drum using brake drum calliper gauge -VAS 6787-.

2.7 Removing and installing wheel brake cylinder



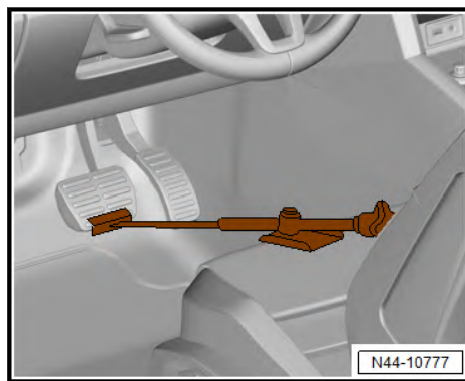
Special tools and workshop equipment required



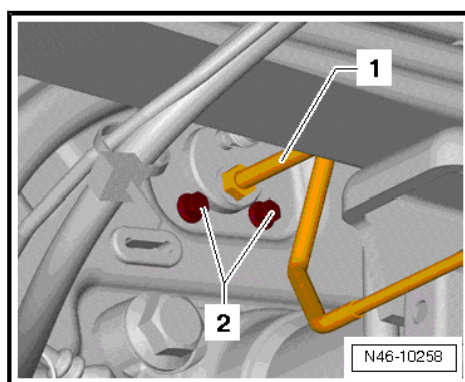
- ◆ Torque wrench -V.A.G 1331-
- ◆ Ring spanner insert AF 11 -V.A.G 1410/6-
- ◆ Universal joint -V.A.G 1410/7-
- ◆ Torque wrench -VAS 6854-
- ◆ Brake pedal depressor -V.A.G 1869/2-
- ◆ Assembly tool -V.A.G 1410/8-

Removing

- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Remove rear wheels ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Changing wheel.
- Observe general information on brake fluid ⇒ [page 106](#) .
- Connect bleeder bottle hose to wheel brake cylinder bleeder valve and open bleeder valve.
- Then apply brake pedal actuator -V.A.G 1869/2-.



- Following this, close bleeder valve and remove bleeder bottle.
- Remove brake line -1- from wheel brake cylinder.



- Resetting brake and removing brake drum ⇒ [page 76](#) .
- Remove brake shoes ⇒ [page 71](#) .
- Remove bolts -2- for wheel brake cylinder on brake carrier and take off wheel brake cylinder.

Installing

Install in reverse order, noting the following:

- Install brake shoes and brake drum ⇒ [page 71](#) .
- Bleed brake system ⇒ [page 107](#) .

Specified torques

- ♦ ⇒ [o2.1 verview - rear brakes", page 57](#)
- ♦ Wheels, tyres; Specified torque for wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts



3 Parking brake

⇒ [o3.1 verview - parking brake", page 81](#)

⇒ [o3.2 verview - brake cable", page 81](#)

⇒ [a3.3 nd installing handbrake lever", page 83](#)

⇒ [a3.4 nd installing front handbrake cable", page 85](#)

⇒ [a3.5 nd installing rear handbrake cable", page 86](#)

⇒ [p3.6 arking brake", page 91](#)

3.1 Assembly overview - parking brake

1 - Handbrake lever trim

- ❑ Releasing ⇒ [page 83](#)

2 - Nut

- ❑ For front handbrake cable on handbrake lever

3 - Handbrake lever

- ❑ Removing and installing ⇒ [page 83](#)

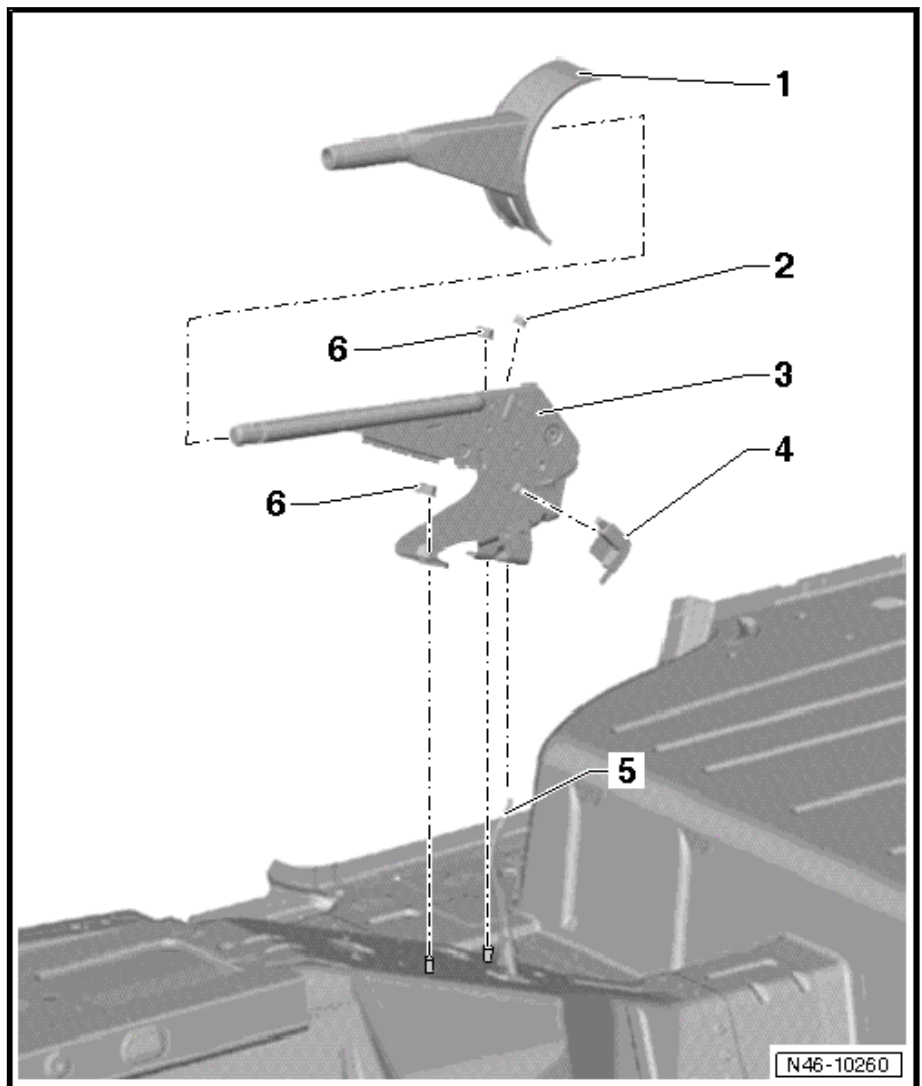
4 - Handbrake warning switch -F9-

5 - Handbrake cable

- ❑ Front
- ❑ Removing and installing ⇒ [page 85](#)
- ❑ Adjusting ⇒ [page 91](#)

6 - Nut

- ❑ For handbrake lever on body
- ❑ 20 Nm



3.2 Assembly overview - brake cable

⇒ [o3.2.1 verview – brake cable, drum brake", page 81](#)

⇒ [o3.2.2 verview – brake cable, disc brake", page 82](#)

3.2.1 Assembly overview – brake cable, drum brake

1 - Seal

2 - Handbrake cable

- ☐ Front
- ☐ Removing and installing ➤ [page 85](#)
- ☐ Adjusting ➤ [page 91](#)

3 - Handbrake cable

- ☐ Rear
- ☐ Right
- ☐ Removing and installing ➤ [page 86](#)
- ☐ Renew only in pairs

4 - Bolts

- ☐ Qty. 2
- ☐ 8 Nm

5 - Nut

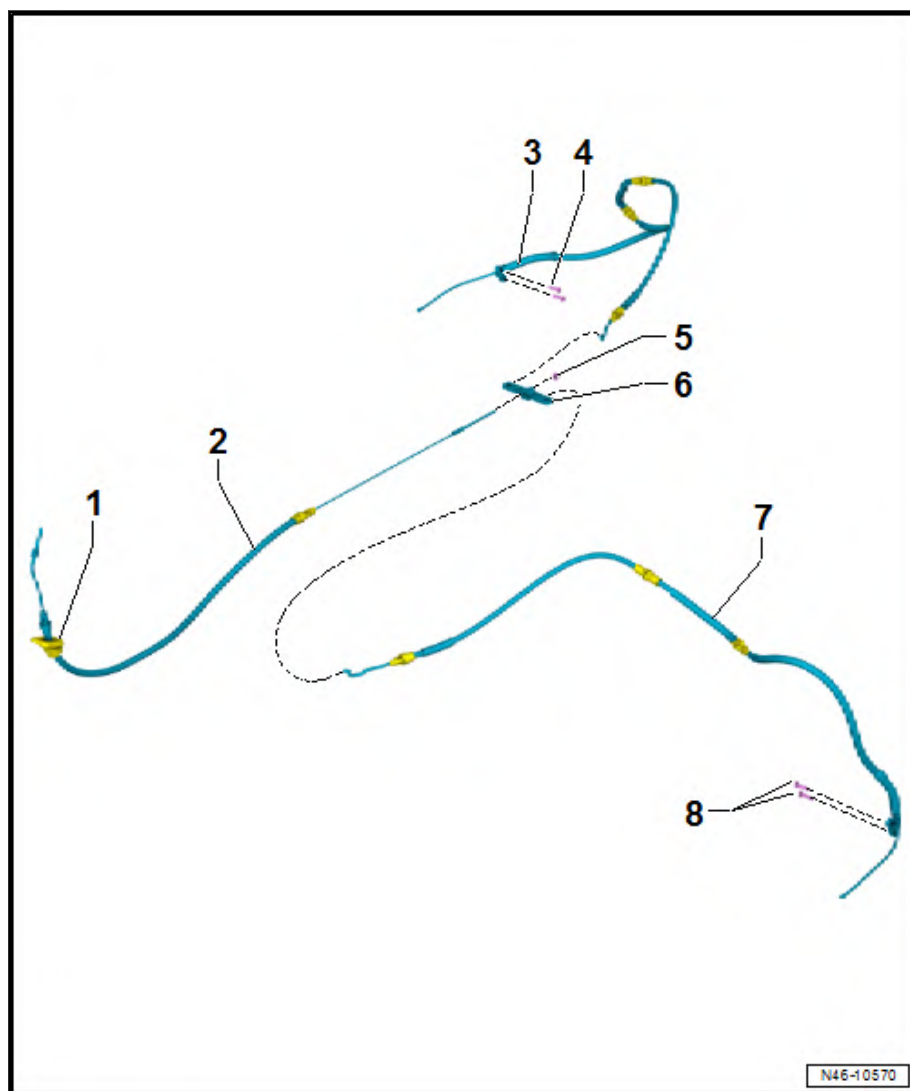
6 - Compensator

7 - Handbrake cable

- ☐ Rear
- ☐ Left
- ☐ Removing and installing ➤ [page 86](#)
- ☐ Renew only in pairs

8 - Bolts

- ☐ Qty. 2
- ☐ 8 Nm



3.2.2 Assembly overview – brake cable, disc brake



1 - Seal

2 - Handbrake cable

- ☐ Front
- ☐ Removing and installing ➔ [page 85](#)
- ☐ Adjusting ➔ [page 91](#)

3 - Bolt

- ☐ 30 Nm

4 - Lever

5 - Handbrake cable

- ☐ Rear
- ☐ Right
- ☐ Removing and installing ➔ [page 89](#)
- ☐ Renew only in pairs

6 - Nut

7 - Compensator

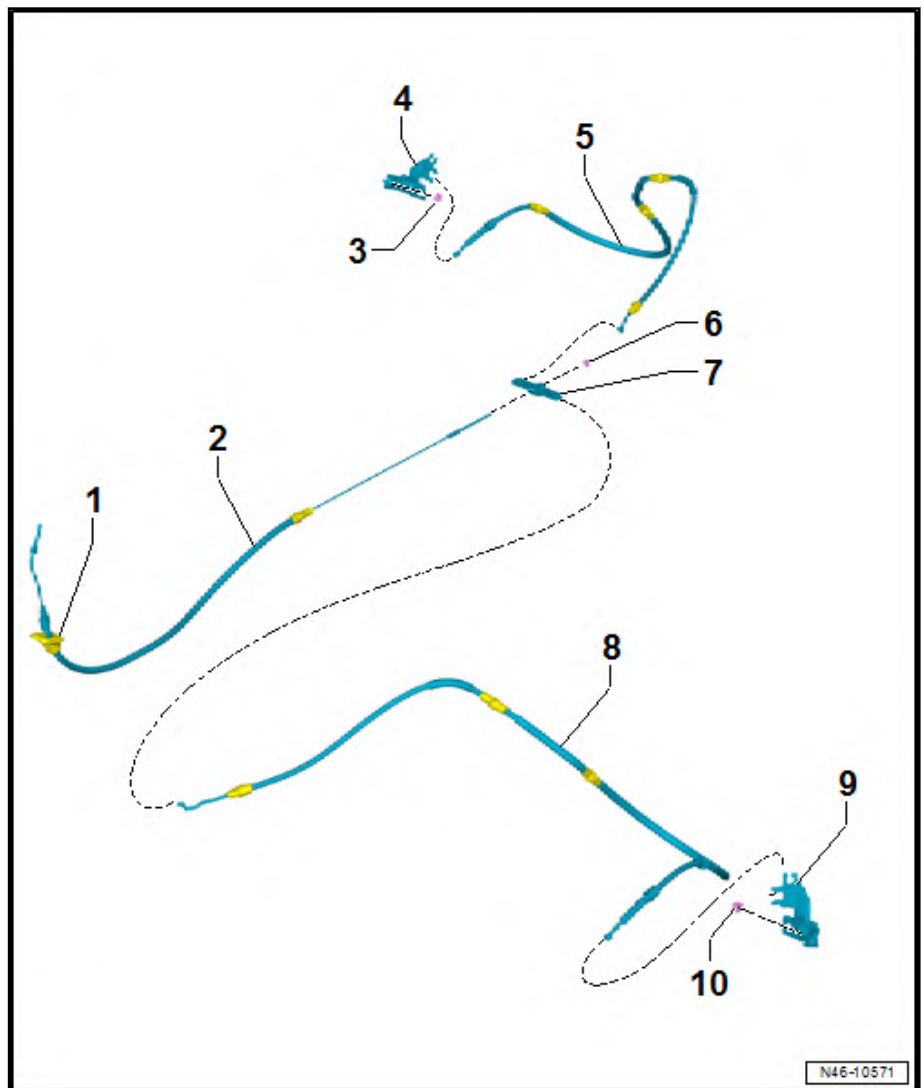
8 - Handbrake cable

- ☐ Rear
- ☐ Left
- ☐ Removing and installing ➔ [page 89](#)
- ☐ Renew only in pairs

9 - Lever

10 - Bolt

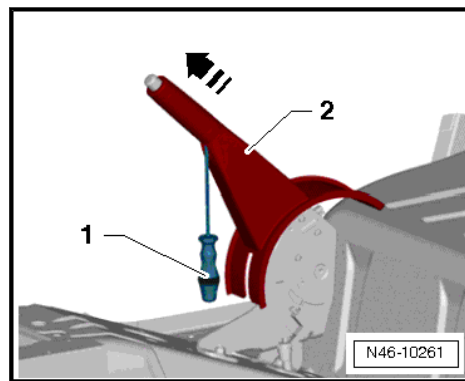
- ☐ 30 Nm



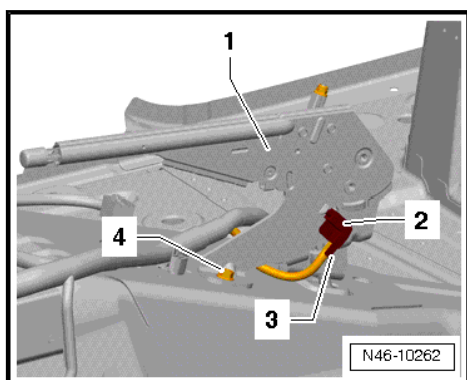
3.3 Removing and installing handbrake lever

Removing

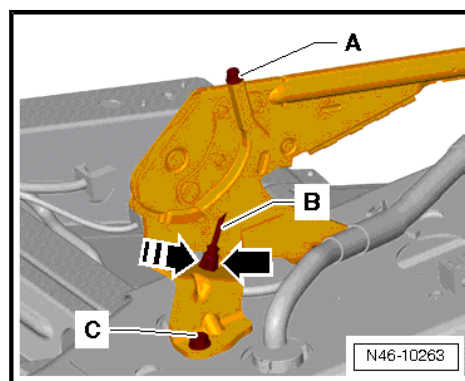
- Remove centre console ➔ General body repairs, interior; Rep. gr. 68; Compartments, covers and trims; Removing centre console.
- Unlock tab in rear lower area of handle with a screwdriver -1-.



- Then pull trim -2- off handbrake lever in -direction of arrow-.
- Handbrake lever -1- is in its lowest position, and is not applied.



- Separate electrical connector -3- on handbrake warning switch -F9- -2-.
- Unscrew nut -4-.
- Unscrew nut -A- from front handbrake cable -B-.



- Unscrew nut -C-.
- Press both projections -arrows- together with pliers and remove handbrake lever. Thread front handbrake cable out at same time.

Installing

Install in reverse order, noting the following:

- Nut -A- must be screwed over end of front handbrake cable -B-.
- Adjust handbrake ➤ [page 91](#) .



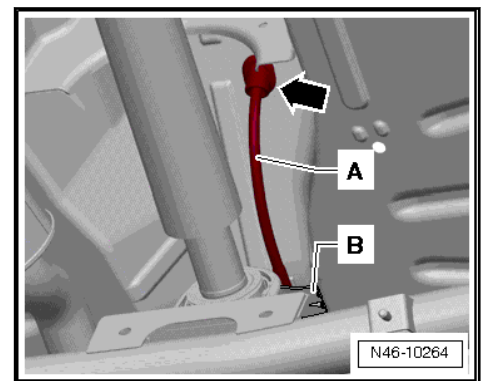
Specified torques

- ◆ ⇒ [o3.1 verview - parking brake", page 81](#)
- ◆ Installing centre console ⇒ General body repairs, interior; Rep. gr. 68; Compartments, covers and trims; Installing centre console.

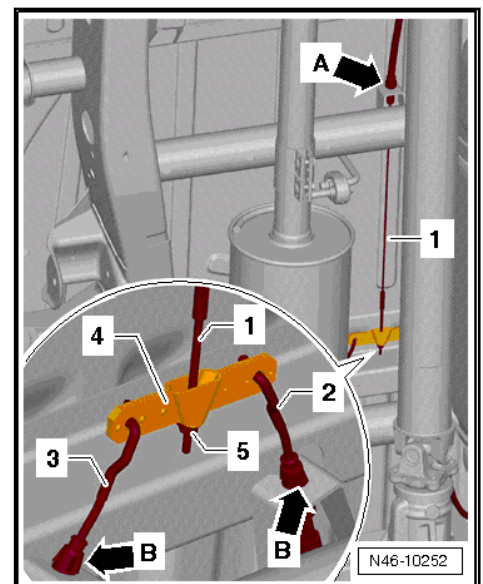
3.4 Removing and installing front handbrake cable

Removing

- Remove handbrake lever ⇒ [page 83](#) .
- Raise vehicle ⇒ Maintenance; Booklet ; Descriptions of work; Raising vehicle.
- Unhook front handbrake cable -A- from bracket -B- and pull out downwards with grommet -arrow-.



- Unscrew adjustment nut -5- from front handbrake cable -1-.



Note

Handbrake cables at rear left -2- and right -3- remain in compensator -4-.

- Using pliers, press together both locking projections on cable support bracket -arrow A- of front handbrake cable, and remove handbrake cable -1- from cable support bracket.



Installing

Install in reverse order, noting the following:

- Locking projections on cable support bracket -arrow A- of front handbrake cable must be horizontal after installation.
- Install handbrake lever ⇒ [page 83](#) .
- Adjust handbrake ⇒ [page 91](#) .

Specified torques

- ♦ ⇒ [o3.1 verview - parking brake", page 81](#)
- ♦ Installing centre console ⇒ General body repairs, interior; Rep. gr. 68; Compartments, covers and trims; Installing centre console.

3.5 Removing and installing rear handbrake cable

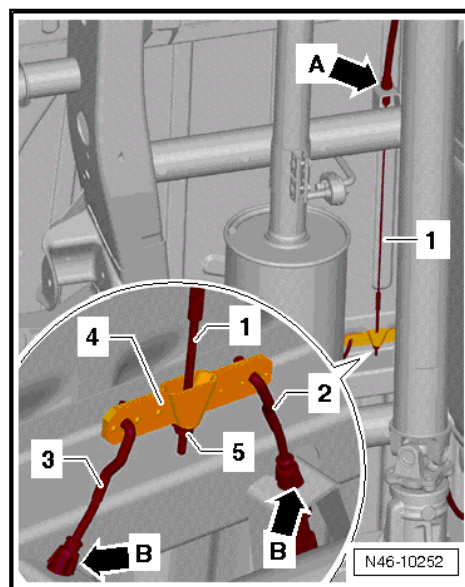
⇒ [a3.5.1 nd installing rear handbrake cable, drum brakes", page 86](#)

⇒ [a3.5.2 nd installing rear handbrake cable, disc brakes", page 89](#)

3.5.1 Removing and installing rear handbrake cable, drum brakes

Removing

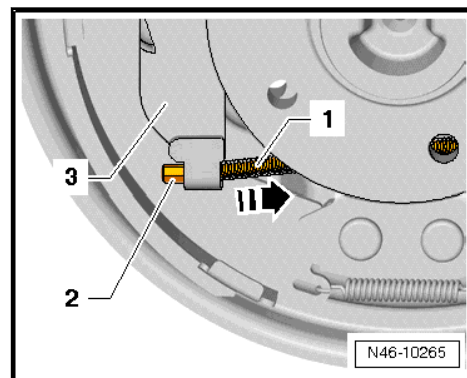
- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Remove rear wheels.
- Unscrew adjustment nut -5- from front handbrake cable -1-.



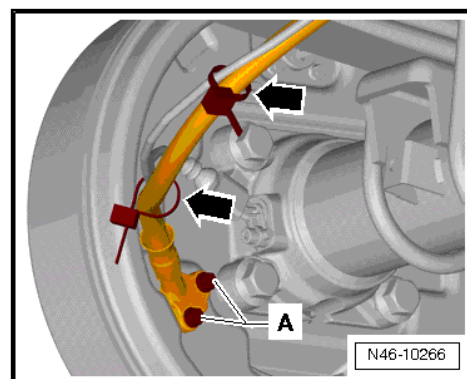
- Unhook corresponding handbrake cable at rear left -2- or right -3- from compensator -4-.
- Using pliers, press together both locking projections on cable support bracket -arrow B- of corresponding rear handbrake cable, and remove handbrake cable from cable support bracket.
- Resetting brake and removing brake drum ⇒ [page 76](#) .



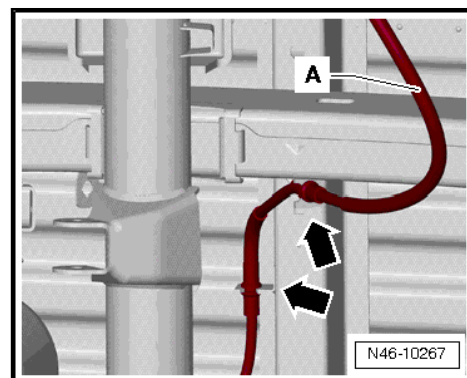
- Push spring -1- of handbrake cable back in direction of -arrow- and hold it with pliers.



- Unhook handbrake cable -2- from lever -3-.
- Remove cable ties -arrows- for speed sensor wire from handbrake cable.



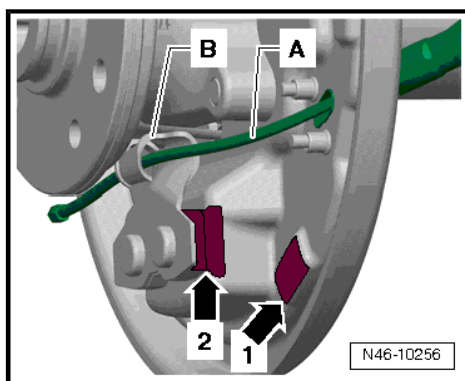
- Remove bolts -A- and take handbrake cable off brake carrier.
- Then pull handbrake cable -A- out of brackets on frame, pull out and remove body -arrows-.



Installing

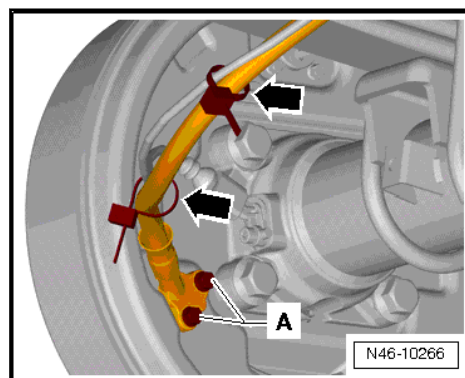
Install in reverse order, noting the following:

- Handbrake cable -A- must be within support plate bracket -B-.

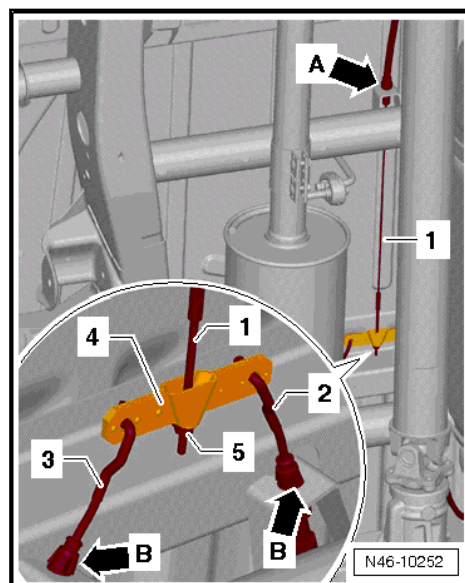


Note

- ◆ For reasons of clarity, brake shoes are removed in illustration.
- ◆ -Arrow 1- and -arrow 2- are not relevant.
- Tighten bolts -A- to specified torque.



- Fit new cable ties -arrows- for speed sensor wire on handbrake cable.
- Take handbrake cable that is to be installed at rear left -2- or right -3- and hook it into compensator -4-.





- Locking lugs on cable support bracket -arrow B- of rear handbrake cables must be horizontal after installation.
- Connect compensator -4- to front handbrake cable -1-.
- Adjust handbrake ⇒ [page 91](#) .

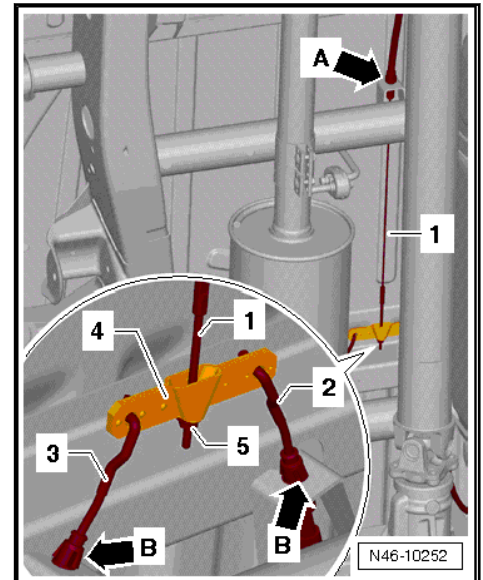
Specified torques

- ◆ ⇒ [o3.1 verview - parking brake", page 81](#)
- ◆ Specified torque for wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts

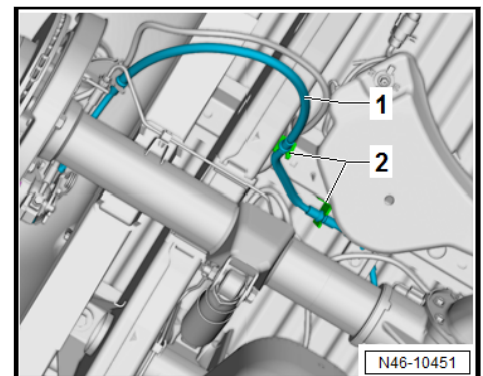
3.5.2 Removing and installing rear handbrake cable, disc brakes

Removing

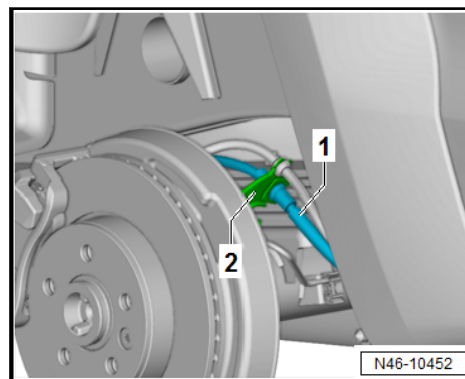
- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Remove rear wheel.
- Unscrew adjustment nut -5- from front handbrake cable -1-.



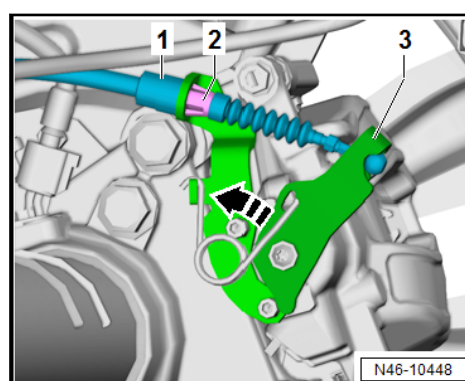
- Unhook corresponding handbrake cable at rear left -2- or right -3- from compensator -4-.
- Then unclip handbrake cable -1- from retainers -2- on underbody.



- Unclip handbrake cable -1- from bracket -2-.



- Remove cable ties from handbrake cable -1-.
- Push actuating lever -3- in direction of -arrow-.

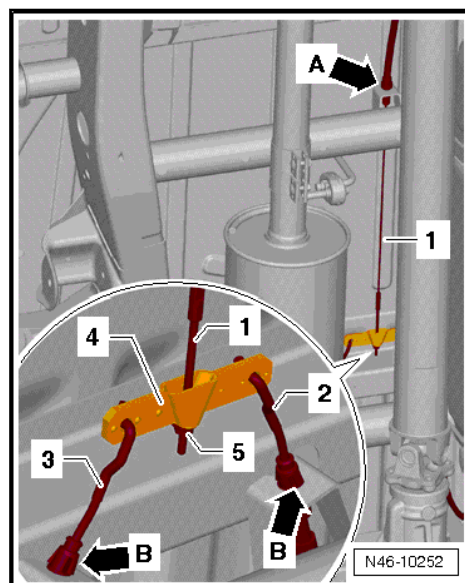


- Disengage handbrake cable -1- from actuating lever -3-.
- Press together locking tabs on cable support bracket -2- using pliers.
- Remove handbrake cable -1-.

Installing

Install in reverse order, noting the following:

- Take handbrake cable that is to be installed at rear left -2- or right -3- and hook it into compensator -4-.





- Locking projections on cable support bracket -arrow B- of rear handbrake cables must be horizontal after installation.
- Connect compensator -4- to front handbrake cable -1-.



Note

Fit cable ties in their original position.

- Adjust handbrake ⇒ [page 91](#) .

Specified torques

- ◆ Specified torque for wheel bolts ⇒ Running gear, axles, steering; Rep. gr. 44; Wheels, tyres; Specified torque for wheel bolts

3.6 Adjusting parking brake

⇒ [p3.6.1 arking brake - drum brake up to 2016-06", page 91](#)

⇒ [p3.6.2 arking brake - drum brake as of 2016-06", page 92](#)

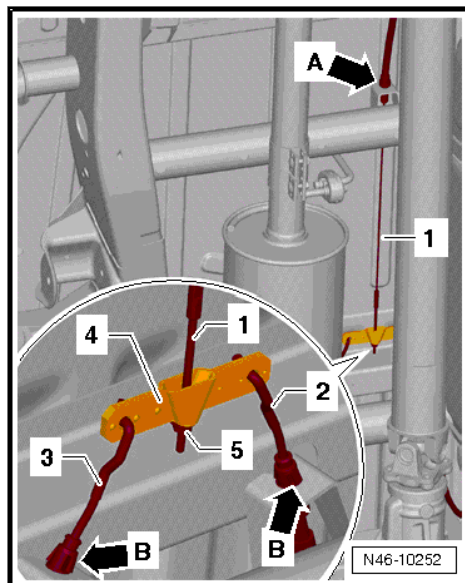
⇒ [h3.6.3 andbrake - disc brake", page 93](#)

3.6.1 Adjusting parking brake - drum brake up to 2016-06

A new adjustment is only necessary when the handbrake cables, brake carrier or brake shoes are renewed.

Procedure

- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Foot brake must be functional and bled.
- Brake shoes are set to basic dimension 294 mm after removal and installation ⇒ [page 75](#) .
- Front handbrake cable -1- is not allowed to hang down (no slack in cable).



- Release handbrake.
- Firmly depress brake pedal 3 times.
- Pull firmly on handbrake lever 5 times.



- Adjust handbrake at adjustment nut -5- so that:
 - ◆ Brake rubs in first catch
 - ◆ Wheels can still just be turned by hand in second catch
 - ◆ Wheels can no longer be turned by hand in third catch
- Release handbrake and check that both wheels turn freely. If required turn adjustment nuts -5- back slightly.

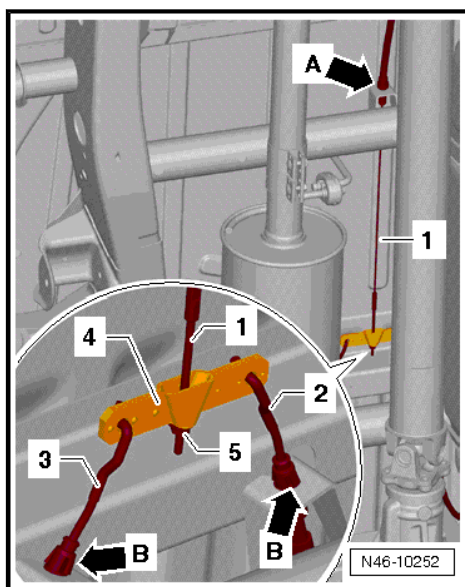
Due to the automatic rear wheel brake adjustment there is no requirement to adjust the handbrake after making new/initial adjustment.

3.6.2 Adjusting parking brake - drum brake as of 2016-06

A new adjustment is only necessary when the handbrake cables, brake carrier or brake shoes are renewed.

Procedure

- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Foot brake must be functional and bled.
- Brake shoes are set to basic dimension 294 mm after removal and installation ⇒ [page 75](#).
- Front handbrake cable -1- is not allowed to hang down (no slack in cable).



- Release handbrake.
- Firmly depress brake pedal 3 times.
- Pull firmly on handbrake lever 5 times.
- Adjust handbrake at adjustment nut -5- so that:
 - ◆ Wheels can no longer be turned by hand in first detent
- Release handbrake and check that both wheels turn freely. If required turn adjustment nuts -5- back slightly.

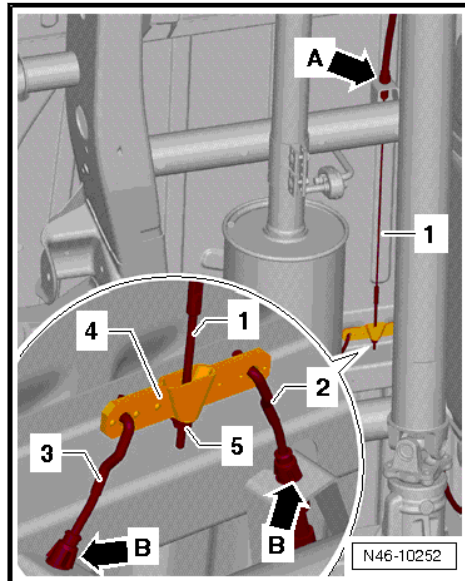
Due to the automatic rear wheel brake adjustment there is no requirement to adjust the handbrake after making new/initial adjustment.



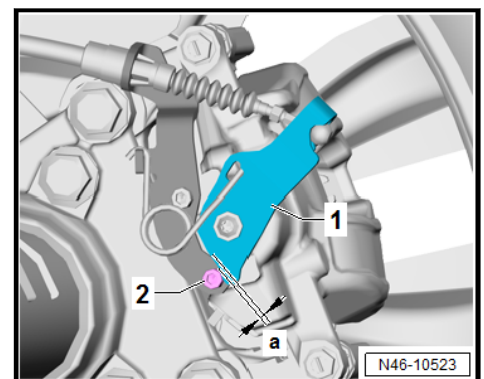
3.6.3 Adjusting handbrake - disc brake

Procedure

- Raise vehicle ⇒ Maintenance; Booklet 11; Descriptions of work; Raising vehicle.
- Foot brake must be functional and bled.
- Front handbrake cable -1- is not allowed to hang down (no slack in cable).
- The handbrake cables on the brake caliper must be disengaged for the actuating levers on the caliper to be in the zero position.



- Release handbrake.
- Depress brake pedal 3 times.
- Engage handbrake cable on caliper. If necessary, adjust handbrake cable -1- with adjustment nut -5- so that it does not sag.
- Actuate handbrake lever 5 times.
- Adjust handbrake via adjustment nut -5- so that:



- Wheels can no longer be turned by hand in the first detent.
- With handbrake lever released, gap -a- between actuating lever -1- and bolt -2- of cable support bracket on left and right brake calipers is max. 1 mm on each side.
- Release handbrake.



- Check that both wheels turn freely. If required, turn adjustment nut -5- back.

If gap -a- is considerably larger than 1 mm, wheels turn freely.

- ◆ Unhook handbrake cables.
- ◆ Adjusting piston hydraulically by depressing brake pedal

Due to the automatic rear wheel brake adjustment there is no requirement to adjust the handbrake after making new/initial adjustment.



4 Brake pedal

⇒ [o4.1 verview - brake pedal", page 95](#)

⇒ [a4.2 nd installing brake pedal", page 95](#)

4.1 Assembly overview - brake pedal



Note

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

Grease all bearing points with polycarbamide grease before installing ⇒ Electronic parts catalogue (ETKA).

Brake light switch -F- is located on brake master cylinder.

1 - Pedal cluster/brake pedal

- ❑ Removing and installing ⇒ [page 95](#)

2 - Pin

- ❑ For plunger rod of brake servo on brake pedal

3 - Nuts

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ For pedal cluster/brake pedal on plenum chamber bulkhead
- ❑ 25 Nm

4 - Nuts

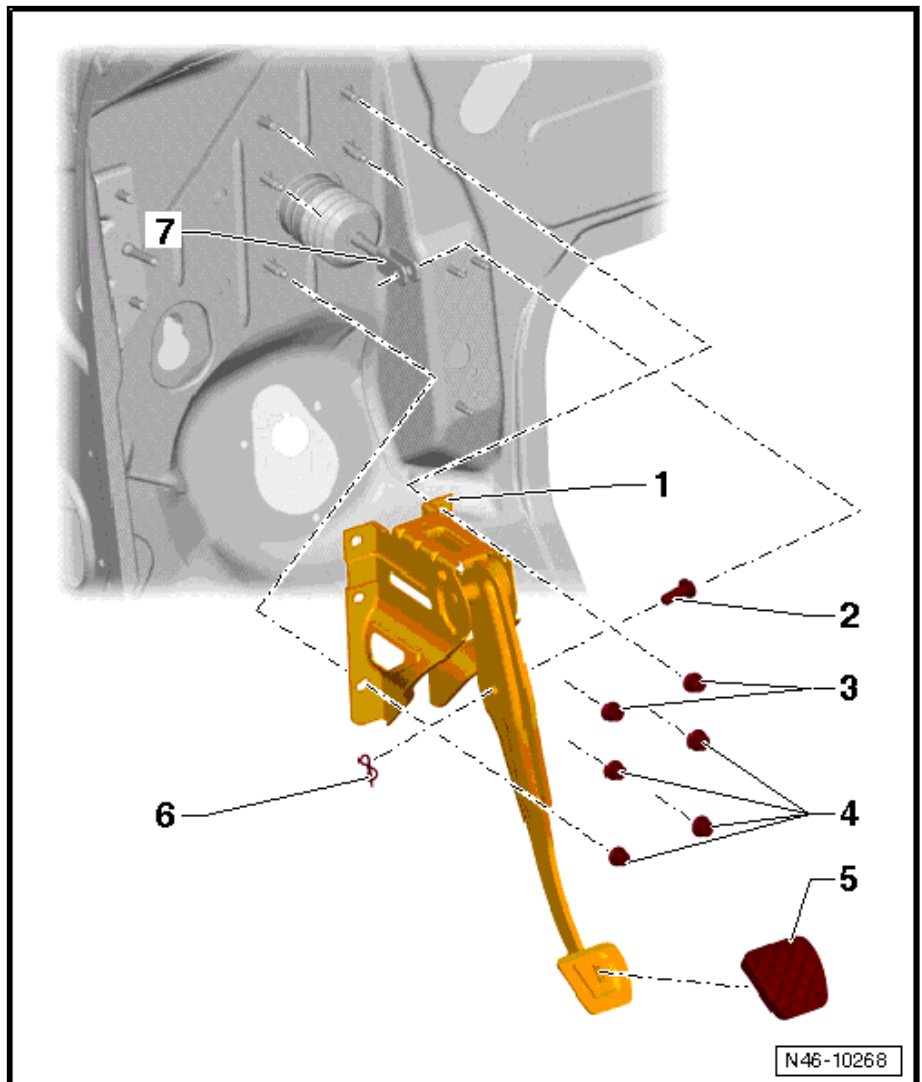
- ❑ Qty. 4
- ❑ Renew after removal
- ❑ For pedal cluster/brake pedal and brake servo on plenum chamber bulkhead
- ❑ 25 Nm

5 - Cap

6 - Securing spring

- ❑ Secures pin ⇒ [Item 2 \(page 95\)](#)

7 - Yoke head/servo-assistance

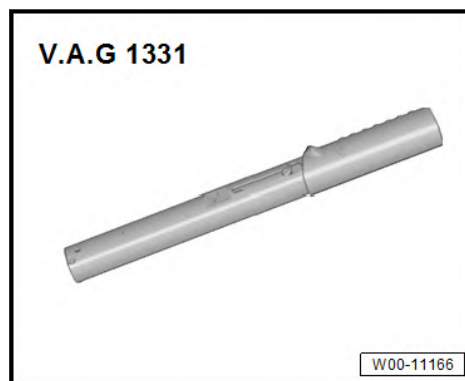


4.2 Removing and installing brake pedal

Special tools and workshop equipment required

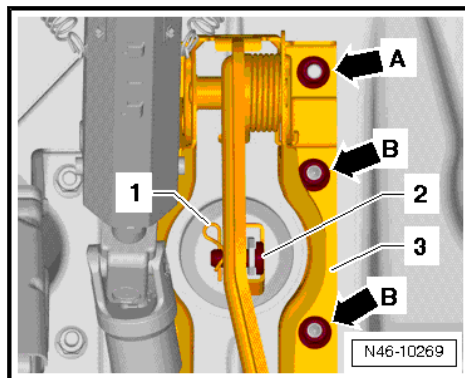


- ◆ Torque wrench -V.A.G 1331-



Removing

- If fitted, remove holder or clips for electrical cables from pedal cluster.
- Remove securing spring -1- from pin -2- for yoke head/brake servo connection on brake pedal.



- Pull out pin -2-.
- Remove nuts -arrows A- and -arrows B-, total qty. 6, on both sides of pedal mechanism.



Note

Nuts on left side are concealed by steering column.

- Remove pedal cluster/brake pedal -3-.

Installing

Install in reverse order, noting the following:

- Fit new nuts -arrows A- and -arrows B- on both sides of pedal cluster, and tighten them.
- Push pin -2- from right to left into yoke head/brake servo on brake pedal and push in securing spring -1-.

Specified torques

- ◆ ⇒ [o4.1 verview - brake pedal", page 95](#)



47 – Brakes - hydraulics

1 Front brake caliper

⇒ [01.1 verview – front brake caliper”, page 97](#)

⇒ [a1.2 nd installing brake caliper piston”, page 98](#)

1.1 Assembly overview – front brake caliper



Note

- ◆ *Install complete repair kit when servicing.*
- ◆ *Use only brake and clutch cleaner to clean the brake.*
- ◆ *Apply thin coat of assembly paste to brake cylinder, piston and seal ⇒ Electronic parts catalogue (ETKA).*

1 - Dust cap

2 - Bleeder valve

- ❑ Before screwing in, apply thin coat of assembly paste to thread
⇒ Electronic parts catalogue (ETKA).

- ❑ 12 Nm

3 - Brake hose

- ❑ Install without twisting

4 - Brake caliper housing

5 - Oil seals

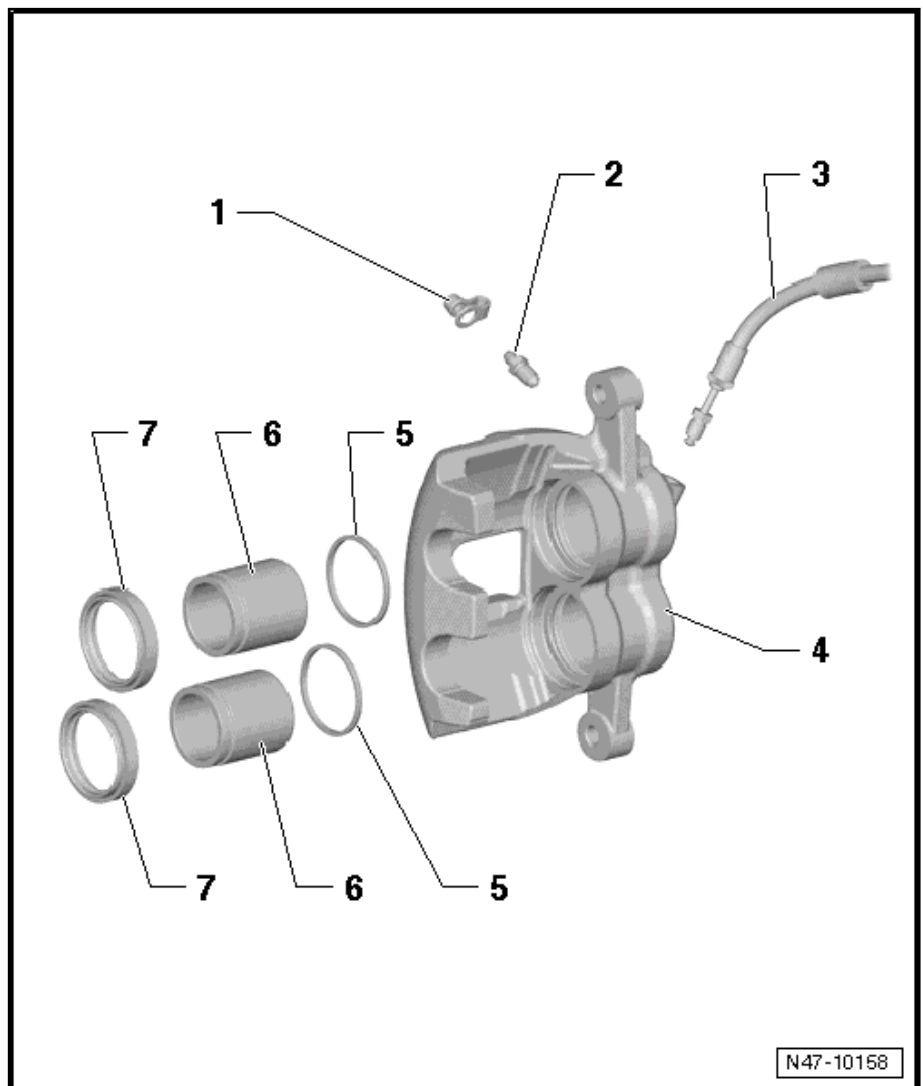
- ❑ Removing and installing ⇒ [page 98](#)

6 - Piston

- ❑ Removing and installing ⇒ [page 98](#)

7 - Protective sleeve

- ❑ Do not damage when inserting piston.





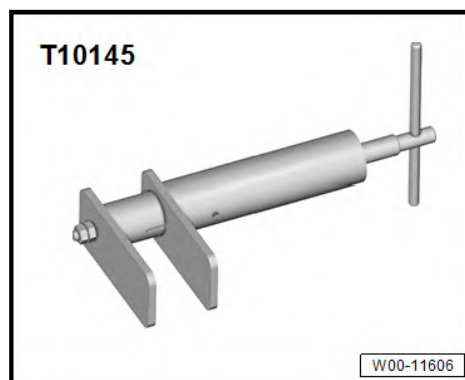
1.2 Removing and installing brake caliper piston

Special tools and workshop equipment required

- ◆ Removal wedge -3409-

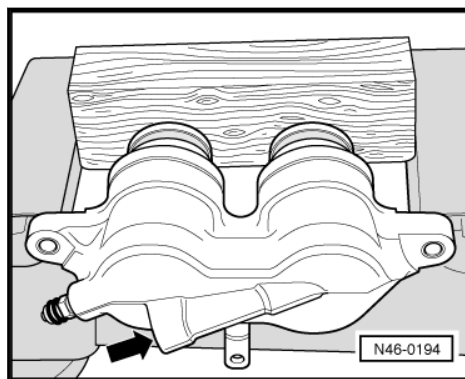


- ◆ Piston resetting appliance -T10145-



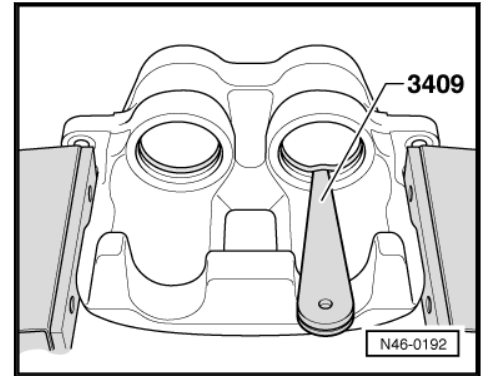
Removing

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



Place a piece of wood in the recess to prevent damage to the pistons.

- Remove seals using removal wedge -3409-.



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



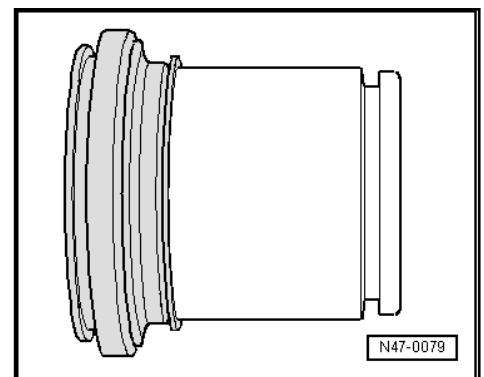
Note

Use brake and clutch cleaner to clean the brake caliper housing.

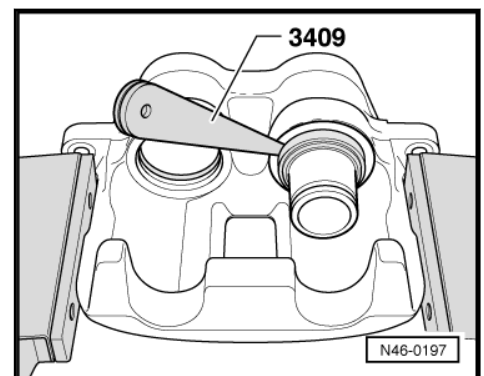
Installing

Install in reverse order, noting the following:

- Apply a thin coat of assembly paste to pistons and seals before inserting ⇒ Electronic parts catalogue (ETKA).
- Insert oil seals in brake caliper housing.
- Place protective sleeve with outer sealing lip on piston.



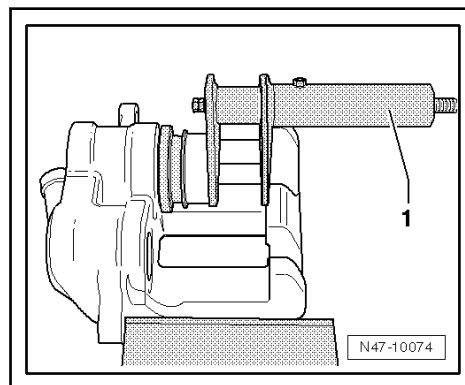
- Using removal wedge -3409-, insert inner sealing lip into cylinder groove.



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



- Press piston into brake caliper housing using piston resetting tool -T10145- -1-.



The outer sealing lip on the protective sleeve will then slip into the piston groove.



2 Rear brake caliper

⇒ [o2.1 verview – rear brake caliper](#)", page 101

⇒ [a2.2 nd installing brake caliper piston](#)", page 101

2.1 Assembly overview – rear brake caliper

1 - Protective sleeve

- ❑ Removing and installing ⇒ [page 101](#)

2 - Piston

- ❑ Removing and installing ⇒ [page 101](#)

3 - Sealing ring

- ❑ Removing and installing ⇒ [page 101](#)

4 - Brake caliper

- ❑ Removing and installing ⇒ [page 66](#)

5 - Dust cap

6 - Bleeder valve

- ❑ Before screwing in, apply thin coat of assembly paste to thread
⇒ Electronic parts catalogue (ETKA).
- ❑ 10 Nm

7 - Bolts

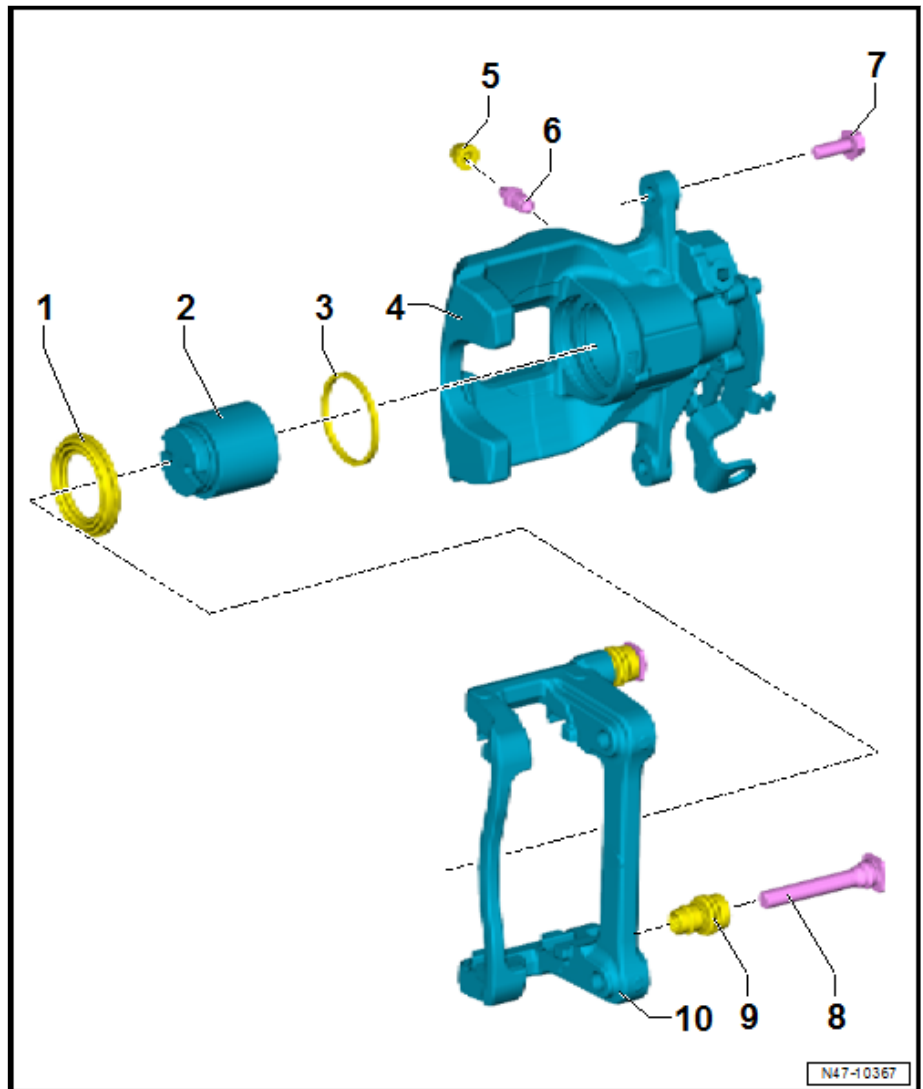
- ❑ Qty. 2

8 - Guide pin

9 - Protective boot

10 - Brake carrier

- ❑ Removing and installing ⇒ [page 71](#)



2.2 Removing and installing brake caliper piston

Special tools and workshop equipment required



- ◆ Brake piston tool set -VAS 761 001-

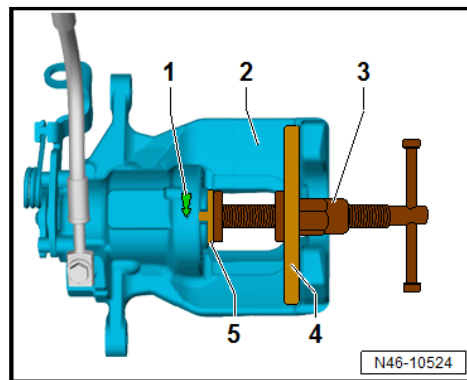


- ◆ Removal wedge -3409-

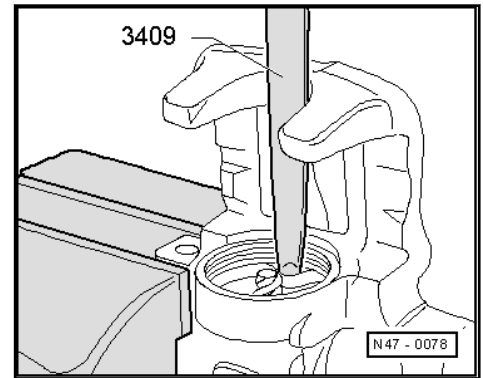


Removing

- Rear brake caliper removed
- Fit suitable adapter -5- from brake piston tool set -VAS 761 001- -3-.



- Mount retaining plate -4- from brake piston tool set -VAS 761 001- -3-.
- Insert brake piston tool set -VAS 761 001- -3- in brake caliper -2- as shown in illustration.
- Unscrew piston in direction opposite to that of arrow -1- cast on brake caliper -2-.
- Remove seal using removal wedge -3409-.



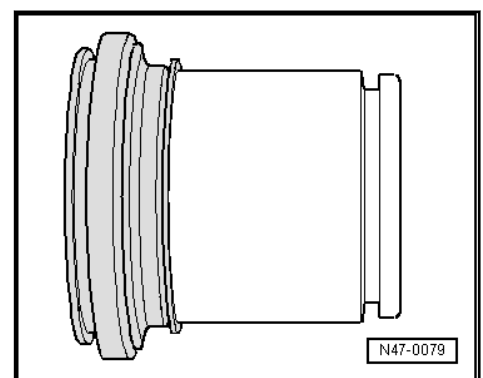
Installing

Install in reverse order, noting the following:

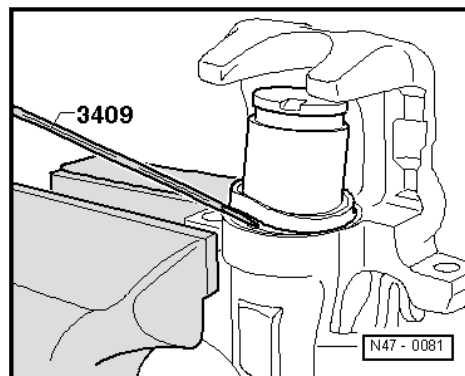


Note

- ◆ *When conducting repairs on the brake caliper, always install the complete repair kit.*
- ◆ *Use brake and clutch cleaner to clean the brake.*
- ◆ *New brake calipers are filled with brake fluid and are pre-bled.*
- ◆ *Apply thin coat of assembly paste -G 052 150 A2- to brake cylinder, piston and seal.*
- ◆ *When repairs are performed, it is essential to appropriately pre-bleed the brake calipers (without brake pads) before installing them in the vehicle ➔ [page 107](#).*
- The surfaces of the piston and seal must be cleaned with clutch and brake cleaner and then dried.
- Apply a thin coat of assembly paste G 052 150 A2 to piston and seal before inserting.
- Place protective sleeve with outer sealing lip on piston.



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



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

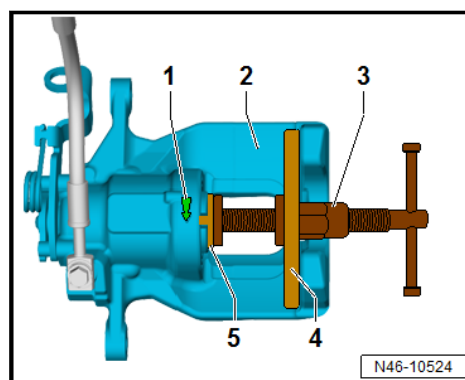
Apply brake piston tool set -VAS 761 001- so that collar of tool rests on brake caliper.



Note

Observe the arrow -1- cast on the brake caliper -2- for the screw in direction.

- Fit suitable adapter -5- from brake piston tool set -VAS 761 001- -3-.



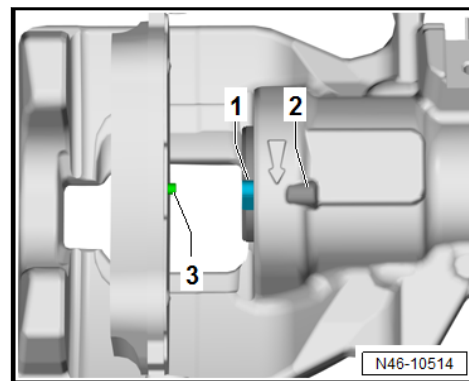
- Mount retaining plate -4- from brake piston tool set -VAS 761 001- -3-.



Note

When screwing in, do not damage the boot that protects the piston.

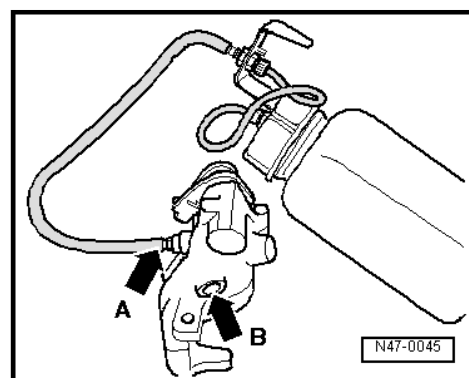
- Screw in brake piston by turning handle of brake piston tool set -VAS 761 001- -3- in direction of arrow -1- cast on brake caliper -2-.
- Turn brake piston until notch -1- aligns with protrusion -2-.



Note

Pin -3- on brake pad engages in notch -1-.

Pre-bleeding brake caliper



- Position brake caliper as illustrated to pre-bleed.
- Open bleeder valve -arrow A- and, using a commercially available bleeder bottle, fill with brake fluid until bubble-free brake fluid flows out of threaded hole of brake hose connection -arrow B-. Then close bleeder screw.



3 Hydraulic system

⇒ [n3.1 notes on brake fluid", page 106](#)

⇒ [h3.2 ydraulic system", page 107](#)

⇒ [h3.3 ydraulic system following standard procedure", page 109](#)

⇒ [b3.4 leeding of hydraulic system", page 109](#)

⇒ [t3.5 est", page 109](#)

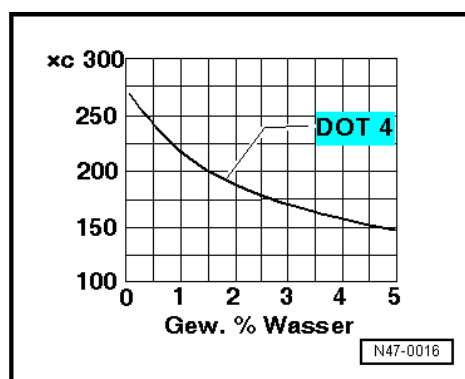
3.1 General notes on brake fluid



Note

- ◆ Only use new brake fluid conforming to VW standard (VW 501 14).
- ◆ Brake fluid is poisonous. Also 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 and should therefore always be stored in air-tight containers.
- ◆ Wash away any spilt brake fluid using plenty of water.

As the water content in the brake fluid rises, so its boiling point falls. If the brake fluid gets very hot, this can lead to vapour bubbles being formed, and failure of the brake.



The colour of the brake fluid becomes darker over the course of time. A dark brake fluid colour is not an indication of its condition. The discolouration is caused by chemical reactions.

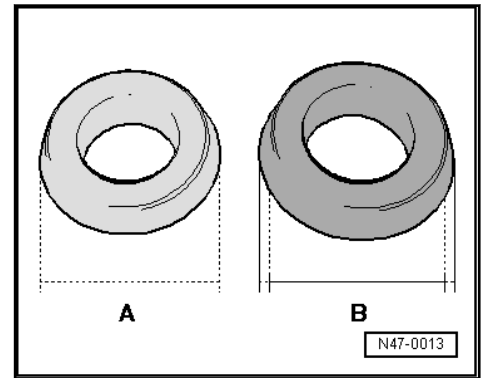


Note

Seals, sleeves and boots of brake system and clutch mechanism are not compatible with mineral oil, petrol and aggressive cleaning agents.

Even the smallest amounts on a seal or a sleeve will result in changes to the parts. The consequences of a contaminated brake system only become apparent months later, and then give rise to greater expenses, particularly in vehicles equipped with ABS.

-A- = Sleeve (original size)



-B- = Sleeve (swollen due to contact with mineral oil)

Summary of the above mentioned points:

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

Carefully store brake fluid containers separately from oil (including hydraulic oil) and cleaning fluids. This is in order to avoid confusion with other fluids or even filling a brake system with the wrong product.



Comply with the brake fluid change intervals as stated in the Maintenance Tables and the Service Schedule.

Changing brake fluid

⇒ Maintenance; Booklet 11; Descriptions of work; brake fluid: Changing

3.1.1 Changing brake fluid



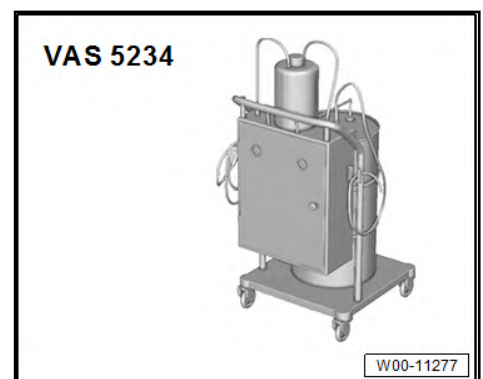
Comply with the brake fluid change intervals as stated in the Maintenance Tables and the Service Schedule.

⇒ Maintenance; Booklet 11; Brake and clutch system: Changing brake fluid

3.2 Pre-bleeding hydraulic system

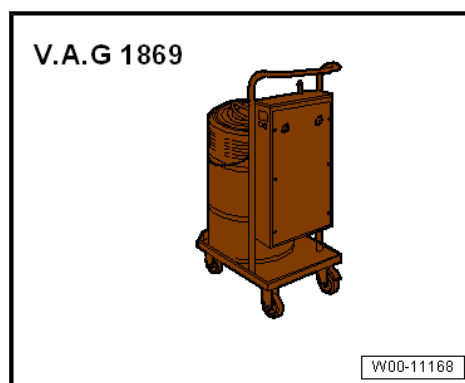
Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment -VAS 5234- or





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



◆ Upgrade kit and extraction unit -V.A.G 1869/4-

Bleeding the brake system is described for brake filling and bleeding equipment -VAS 5234- and -V.A.G 1869-.



Note

- ◆ *Bleeding brake system on vehicles with ABS is performed in same way as vehicles with a conventional brake system.*
- ◆ *Only use new brake fluid conforming to US standard FMVSS 116 DOT 4.*
- ◆ *Genuine VW/Audi brake fluid conforms to this specification.*
- ◆ *Brake fluid is poisonous. Also 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 and should therefore always be stored in air-tight containers.*
- ◆ *Wash away any spilt brake fluid using plenty of water.*

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

Vehicles with EDL, EDL/TCS or EDL/TCS/ESP:



Note

If a chamber in the brake fluid reservoir is completely empty (e.g. brake system leaking) in these vehicles, the brake system must be pre-bled first.

- Connect brake filling and bleeding equipment -VAS 5234- or -V.A.G 1869-.

Bleeding sequence:

- 1 - Bleed front left and front right brake calipers simultaneously.
 - 2 - Bleed wheel brake cylinders (drum brake), brake calipers (disc brake) on rear left and right simultaneously.
- Leave bleeder valves open with brake fluid hoses connected until brake fluid free from air bubbles flows out.

Hydraulic unit must then be bled again using function Basic setting of the ⇒ Vehicle diagnostic tester.

Initiate basic setting (to bleed brake system):

Connect ⇒ Vehicle diagnostic tester, and select function.



- Then bleed brake system as normal ⇒ [page 109](#) .

3.3 Bleeding hydraulic system following standard procedure

Adhere strictly to work sequence when bleeding brake system.

- Connect brake filling and bleeding equipment -VAS 5234- or -V.A.G 1869-.
- Open bleeder valves in the specified order and bleed brake calipers or wheel brake cylinders.
 - 1 - Front left brake caliper
 - 2 - Front right brake caliper
 - 3 - Wheel brake cylinder (drum brake), rear left brake caliper (disc brake)
 - 4 - Wheel brake cylinder (drum brake), rear right brake caliper (disc brake)

Use suitable bleeder hose. It must sit tightly on the bleeder valve so that no air can enter the brake system.

- Leave bleeder valve of a brake caliper or wheel brake cylinder open until, with bleed hoses still fitted, brake fluid discharges free of air bubbles.

3.4 Subsequent bleeding of hydraulic system

Re-bleeding is carried out in connection with excessive brake pedal travel or so-called »spongy« brakes.

Subsequent bleeding requires the assistance of a second mechanic.

- Connect brake filling and bleeding equipment -VAS 5234-.
- Depress brake pedal firmly and hold.
- Open bleeder valve on brake caliper.
- Fully depress brake pedal.
- Close bleed valve with brake pedal held down.
- Release brake pedal slowly.

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

Bleeding sequence:

- 1 - Front left brake caliper
- 2 - Front right brake caliper
- 3 - Wheel brake cylinder (drum brake), rear left brake caliper (disc brake)
- 4 - Wheel brake cylinder (drum brake), rear right brake caliper (disc brake)

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!

3.5 Leakage test

Special tools and workshop equipment required



- ◆ Tester for brake pressure regulator -V.A.G 1310A-



- ◆ Adapter M10 -V.A.G 1310/6-

Check following components of brake system for leaks and that they are functioning correctly:

- ◆ Hydraulic unit
- ◆ Brake hoses
- ◆ Brake lines
- ◆ Brake calipers or wheel brake cylinders
- 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 within the test period of 45 seconds. Renew brake master cylinder if drop in pressure exceeds specification.



4 Brake servo and brake master cylinder

⇒ [04.1 overview - brake servo/brake master cylinder", page 111](#)

⇒ [a4.2 nd installing brake light switchF", page 113](#)

⇒ [a4.3 nd installing brake servo", page 114](#)

⇒ [a4.4 nd installing brake master cylinder", page 125](#)

⇒ [a4.5 nd installing brake fluid reservoir", page 128](#)

4.1 Assembly overview - brake servo/brake master cylinder

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

1 - Sealing cover

2 - Brake fluid level warning contact -F34-

3 - Brake fluid reservoir

- ☐ Removing and installing ⇒ [page 128](#)

4 - Union

- ☐ For supply hose to master cylinder
- ☐ Only for vehicles with manual gearbox

5 - Vacuum hose

6 - Sealing plug

7 - Brake servo

- ☐ In petrol engines, necessary vacuum is obtained from intake manifold and from vacuum pump.
- ☐ Diesel engines are fitted with a vacuum pump to generate the necessary vacuum.
- ☐ Functional check:
 - With engine switched off, depress brake pedal firmly several times (to exhaust any negative pressure in the unit).
 - Now depress brake pedal with average foot pressure, hold and start engine. If the servo unit is working properly, the brake pedal will now give perceptibly under foot (servo assistance becomes activated).
- ☐ If faulty, renew complete (check all vacuum lines first).
- ☐ Removing and installing ⇒ [page 114](#)

8 - Seal

- ☐ For brake servo on plenum chamber bulkhead

9 - Nut

- ☐ For brake servo and pedal cluster/brake pedal on plenum chamber bulkhead
- ☐ Renew after removal
- ☐ 25 Nm

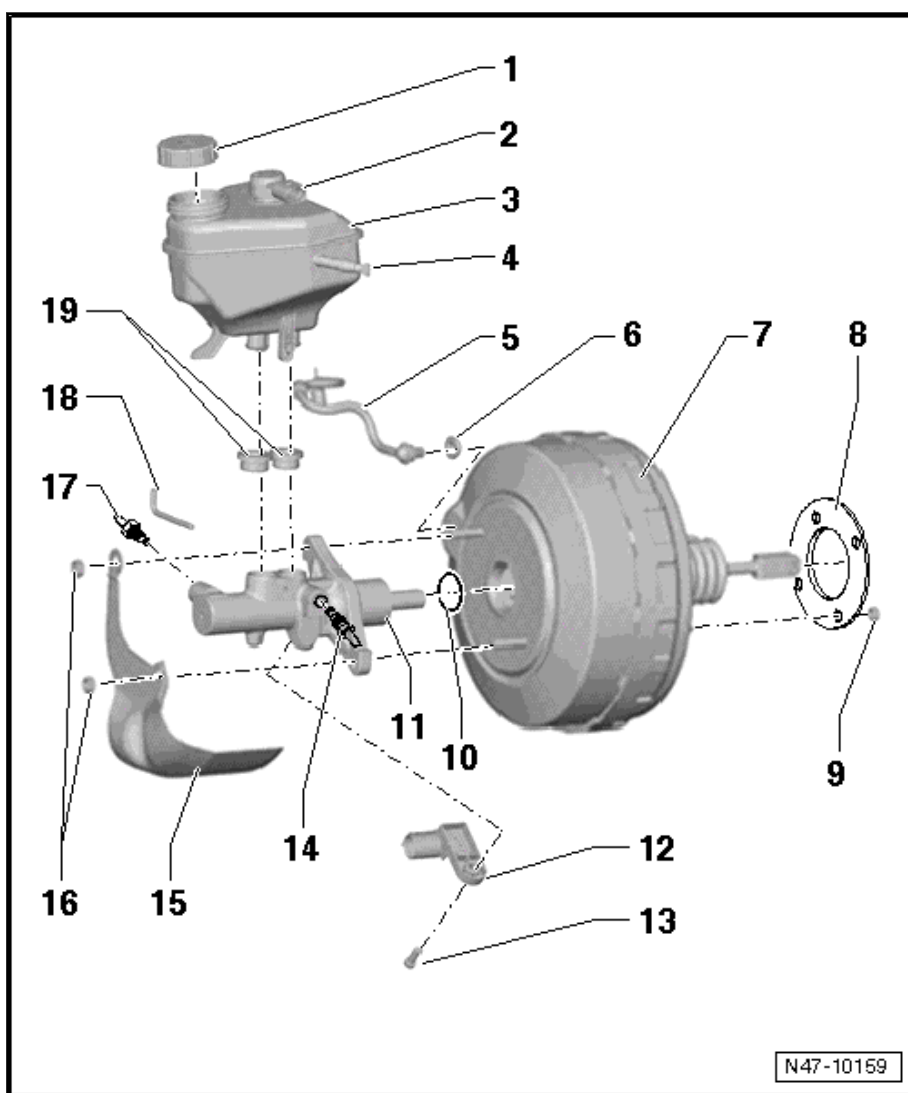
10 - Sealing ring

11 - Brake master cylinder

- ☐ Allocation ⇒ Electronic parts catalogue (ETKA)
- ☐ Cannot be repaired. If faulty, renew complete.
- ☐ Removing and installing ⇒ [page 125](#)

12 - Brake light switch -F-

- ☐ Including brake pedal switch -F47-.
- ☐ Removing and installing ⇒ [page 113](#)





13 - Bolt

- ☐ 5 Nm

14 - Brake line

- ☐ Brake master cylinder/primary piston circuit to hydraulic unit
- ☐ 14 Nm

15 - Heat shield

- ☐ Discontinued on LHD vehicles from mid 2014

16 - Nuts

- ☐ Qty. 2
- ☐ Renew after removal
- ☐ 25 Nm

17 - Brake line

- ☐ Brake master cylinder/secondary piston circuit to hydraulic unit
- ☐ 14 Nm

18 - Pin

- ☐ Secures brake fluid reservoir to brake master cylinder
- ☐ Angled piece must engage in retainer on brake fluid reservoir

19 - Sealing plug

- ☐ Moisten with brake fluid and press into brake fluid reservoir.

4.2 Removing and installing brake light switch -F-

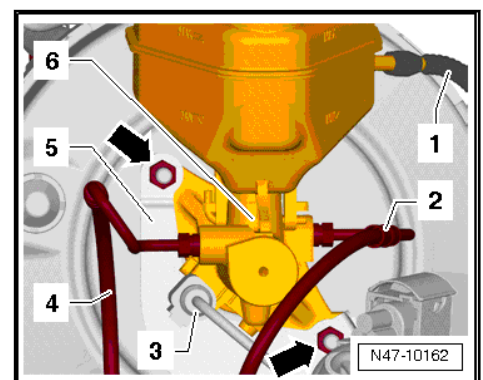
Removing

Vehicles with 6-cylinder engine

- Remove engine cover ⇒ Rep. gr. 10; Engine cover; Removing and installing engine cover.

Continued for all vehicles

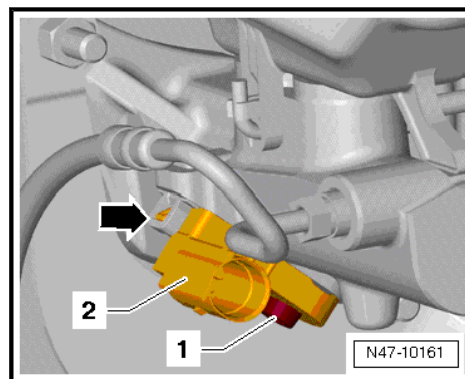
- Separate electrical connector -3- for brake light switch -F-.



Note

The other items in the illustration are not relevant.

- Remove bolt -1- from brake master cylinder.



- Pull brake light switch -F- -2- off the brake master cylinder underneath and out of the clip at the top -arrow-.

Installing

Install in reverse order, noting the following:

- Tighten bolt -1-.

Specified torques

- ♦ ⇒ [o4.1 verview - brake servo/brake master cylinder", page 111](#)

4.3 Removing and installing brake servo

⇒ [a4.3.1 nd installing brake servo, 4-cylinder engines", page 114](#)

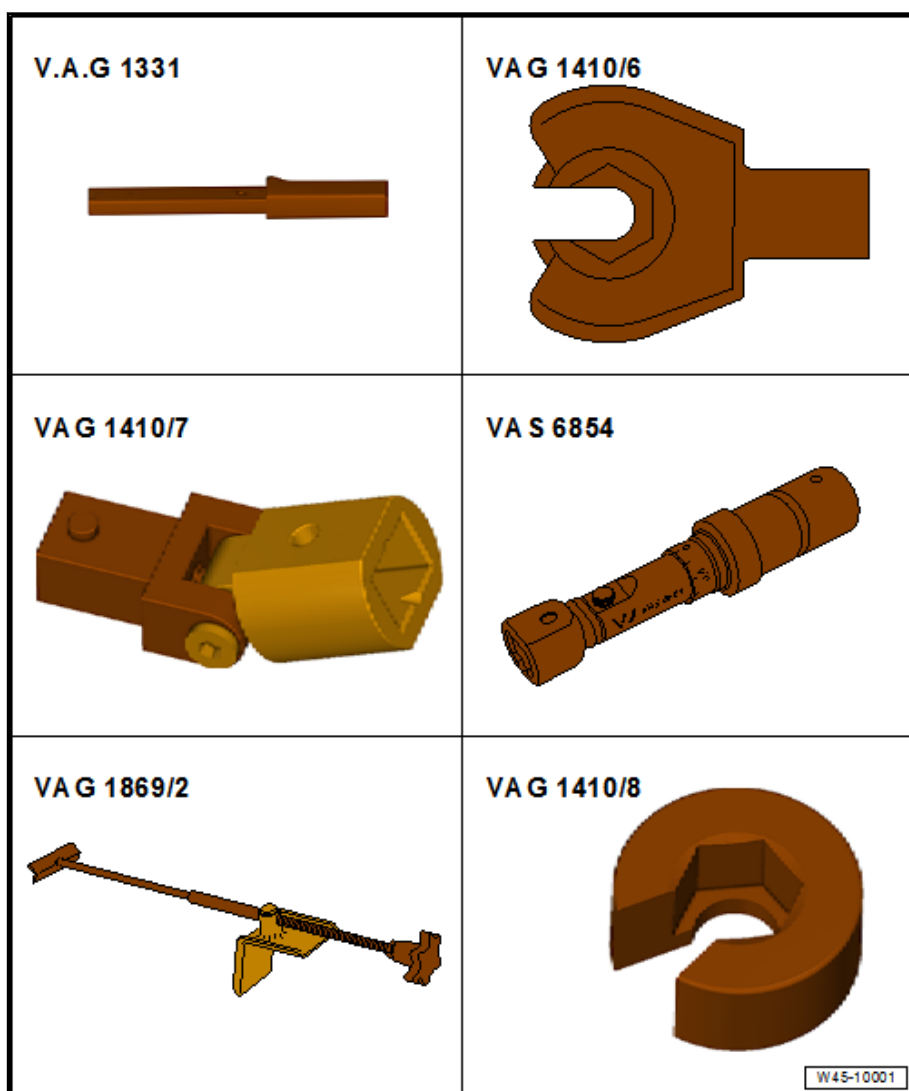
⇒ [a4.3.2 nd installing brake servo, 6-cylinder engine \(LHD vehicles\)", page 118](#)

⇒ [a4.3.3 nd installing brake servo, 6-cylinder engine \(RHD vehicles\)", page 121](#)

4.3.1 Removing and installing brake servo, 4-cylinder engines



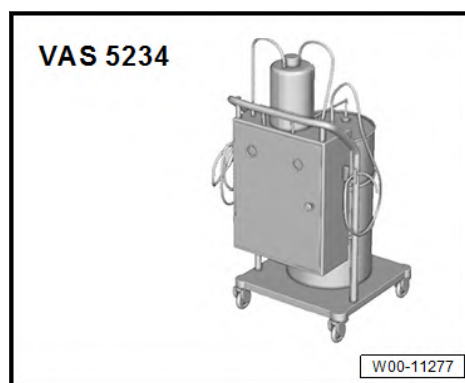
**Special tools and workshop
equipment required**



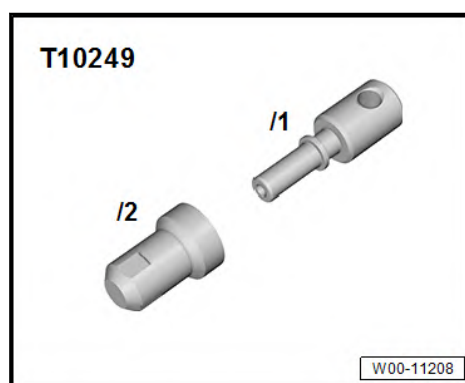
- ◆ Torque wrench -V.A.G 1331-
- ◆ Ring spanner insert AF 11 -V.A.G 1410/6-
- ◆ Universal joint -V.A.G 1410/7-
- ◆ Torque wrench -VAS 6854-
- ◆ Brake pedal depressor -V.A.G 1869/2-
- ◆ Assembly tool -V.A.G 1410/8-



- ◆ Brake filling and bleeding equipment -VAS 5234-



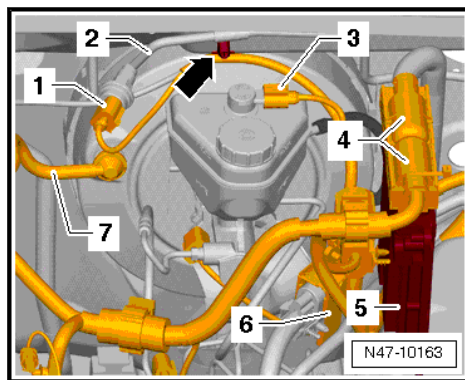
- ◆ Sealing tool -T10249-



Removing

Vehicles with air conditioning system

- Separate connector -1- on refrigerant line -2-.



- Remove refrigerant line -2- from plenum chamber bulkhead -arrow- and carefully tie up slightly higher.

Continued for all vehicles

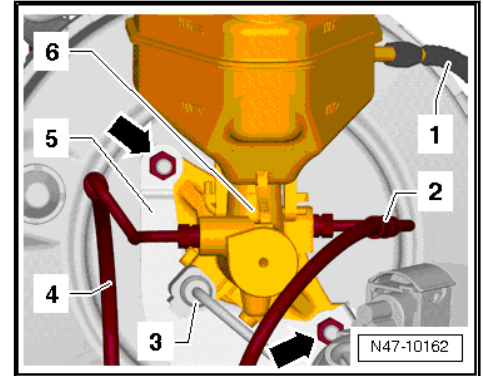
- Separate electrical connector -3-.
- Separate connector -4- from engine control unit.
- Remove engine control unit -5- with bracket.
- Unclip electrical connector -6- from wiring retainer and tie to one side.
- Pull vacuum hose -7- out of brake servo.
- Lay out a sufficient number of lint-free cloths under brake master cylinder.



- Empty brake fluid reservoir with brake filling and bleeding equipment -VAS 5234-.

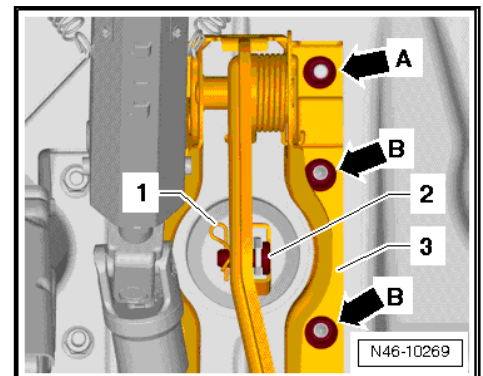
Vehicles with manual gearbox

- Disconnect supply hose -1- from clutch master cylinder and plug hose using sealing tool -T10249-.



Continued for all vehicles

- Separate electrical connector -3-.
- Mark and unscrew brake lines -2- and -4- from brake master cylinder.
- Seal brake pipes with sealing plugs from repair kit Part No. 1H0 698 311 A.
- Remove nuts -arrows- for brake master cylinder from brake servo.
- Remove heat shield (if installed) -5-.
- Carefully take brake master cylinder -6- out of brake servo together with brake fluid reservoir.
- Remove securing spring -1- from pin -2- for yoke head/brake servo connection on brake pedal.



- Pull out pin -2-.
- Remove nuts -arrows B-, total qty. 4, on both sides of pedal mechanism/brake pedal.



Note

- ◆ Nuts on left side are concealed by steering column.
- ◆ Do not remove both top nuts -arrow A- (qty. 2) unless brake servo jams in holes during removal and installation.

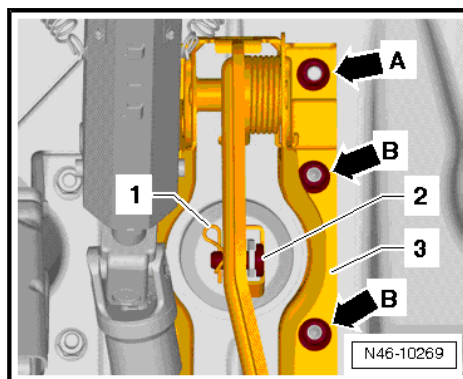


- Carefully remove brake servo from the vehicle. If necessary, push fuel lines and electrical cables slightly to one side.

Installing

Install in reverse order, noting the following:

- Tighten new nuts -arrows B- and, if loosened beforehand, also nut -arrow A- on both sides of pedal cluster.



- Push pin -2- from right to left into yoke head/brake servo on brake pedal and push in securing spring -1-.
- After installing, bleed brake system ⇒ [page 107](#) and clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

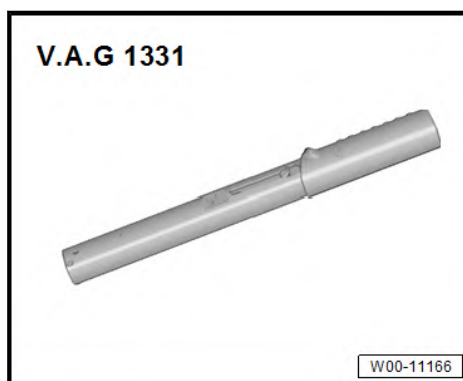
Specified torques

- ♦ ⇒ [o4.1 verview - brake servo/brake master cylinder](#)", [page 111](#)
- ♦ ⇒ [o4.1 verview - brake pedal](#)", [page 95](#)

4.3.2 Removing and installing brake servo, 6-cylinder engine (LHD vehicles)

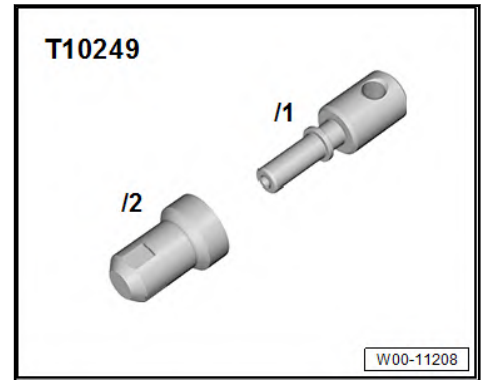
Special tools and workshop equipment required

- ♦ Torque wrench -V.A.G 1331-

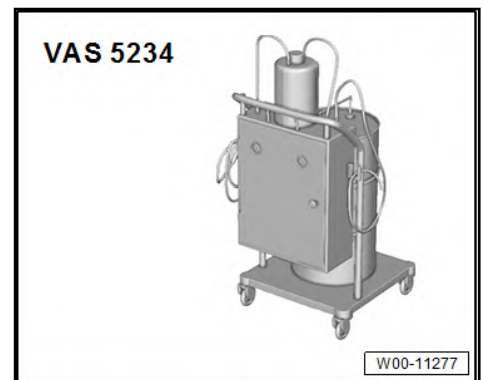




◆ Sealing tool -T10249-



◆ Brake filling and bleeding equipment -VAS 5234-

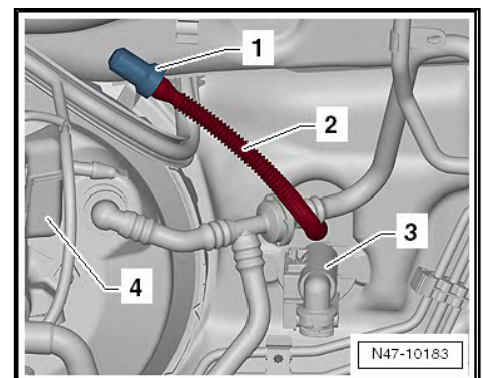


Removing

- Lay out a sufficient number of lint-free cloths under brake master cylinder.
- Empty brake fluid reservoir with brake filling and bleeding equipment -VAS 5234-.

Vehicles with manual gearbox

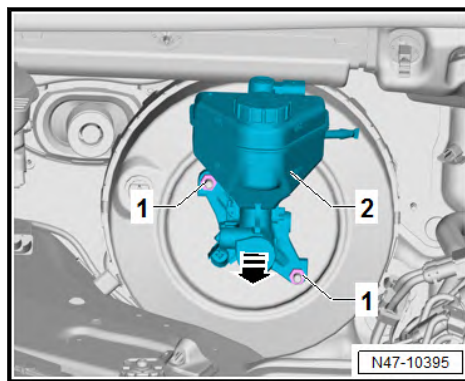
- Pull off supply hose -2- for clutch master cylinder -3- from brake fluid reservoir -4-.



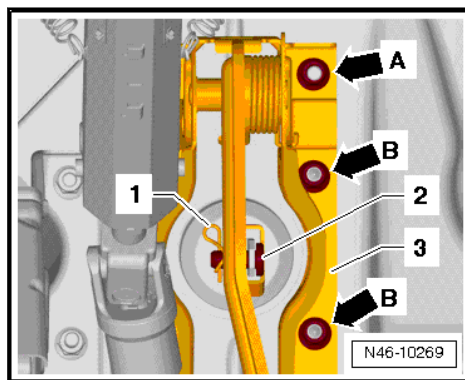
- Seal supply hose -2- for clutch master cylinder -3- with sealing tool -T10249- -1-, raise and tie.

Continued for all vehicles

- Remove cab ⇒ General body repairs, exterior; Rep. gr. 55; Cab; Removing and installing cab.
- Unscrew nuts -1-.



- Pull out brake master cylinder in direction of -arrow- from brake servo.
- Remove securing spring -1- from pin -2- for yoke head/brake servo connection on brake pedal.



- Pull out pin -2-.
- Remove nuts -arrows B-, total qty. 4, on both sides of pedal mechanism/brake pedal.



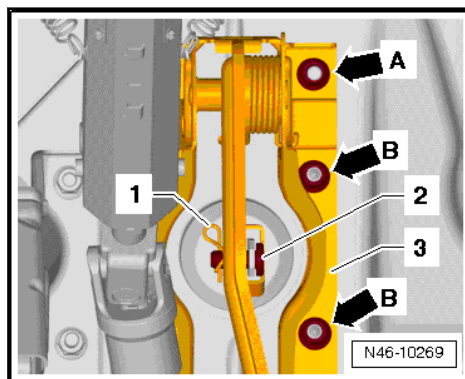
Note

- ♦ Nuts on left side are concealed by steering column.
- ♦ Do not remove both top nuts -arrow A- (qty. 2) unless brake servo jams in holes during removal and installation.

Installing

Install in reverse order, noting the following:

- Tighten new nuts -arrows B- and, if loosened beforehand, also nut -arrow A- on both sides of pedal cluster.





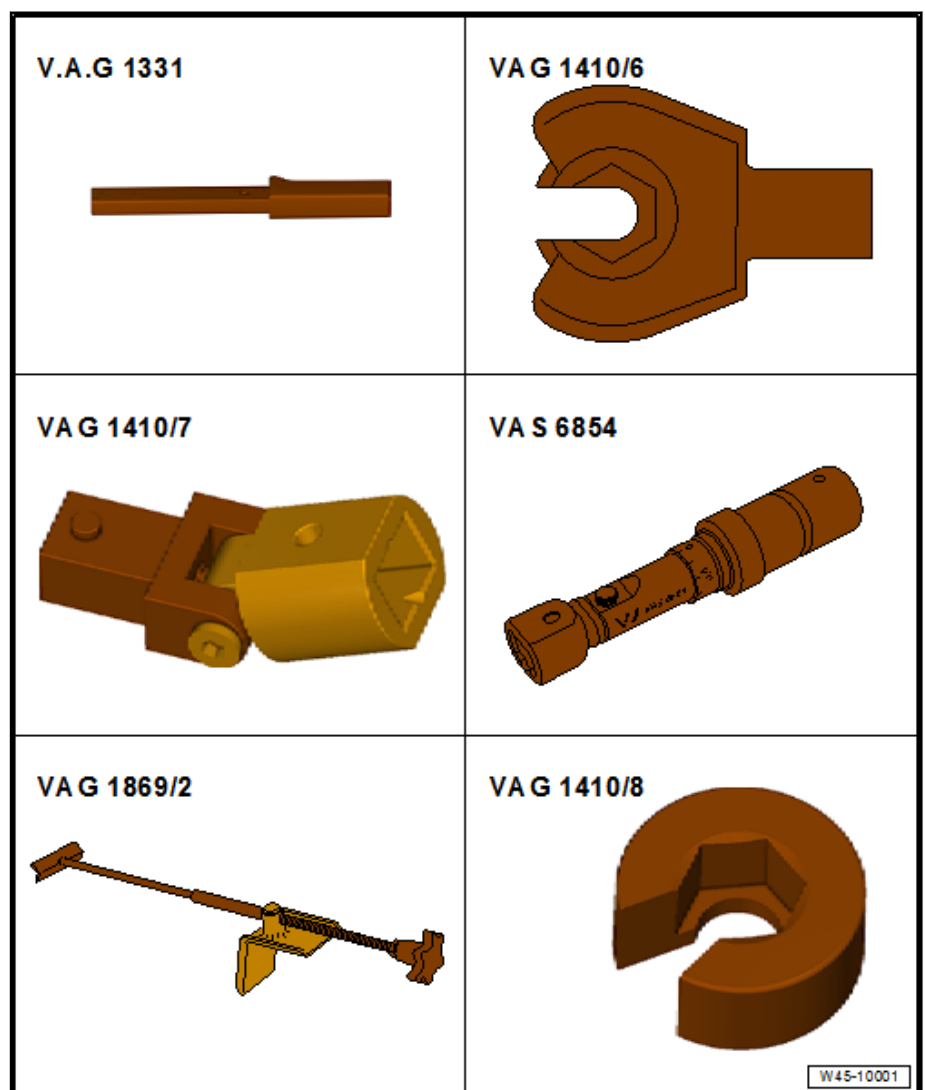
- Push pin -2- from right to left into yoke head/brake servo on brake pedal and push in securing spring -1-.
- Install cab ⇒ General body repairs, exterior; Rep. gr. 55; Cab; Removing and installing cab.
- After installing, bleed brake system ⇒ [page 107](#) and clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

Specified torques

- ◆ ⇒ [o4.1 verview - brake servo/brake master cylinder", page 111](#)
- ◆ ⇒ [o4.1 verview - brake pedal", page 95](#)

4.3.3 Removing and installing brake servo, 6-cylinder engine (RHD vehicles)

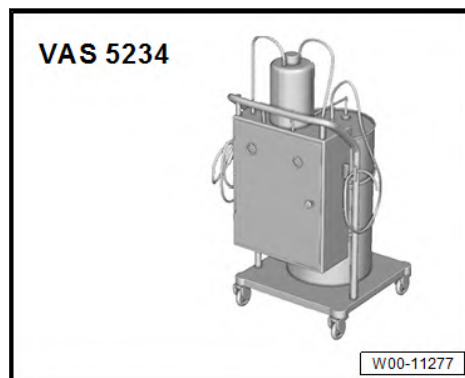
Special tools and workshop equipment required



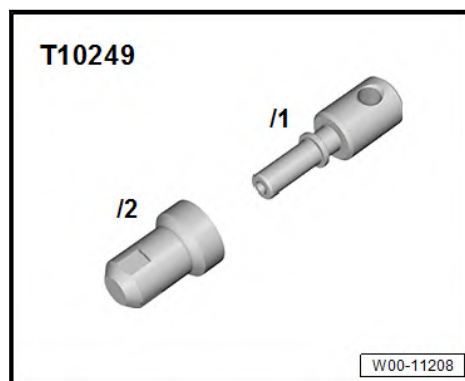
- ◆ Torque wrench -V.A.G 1331-
- ◆ Ring spanner insert AF 11 -V.A.G 1410/6-
- ◆ Universal joint -V.A.G 1410/7-
- ◆ Torque wrench -VAS 6854-
- ◆ Brake pedal depressor -V.A.G 1869/2-



- ◆ Assembly tool -V.A.G 1410/8-
- ◆ Brake filling and bleeding equipment -VAS 5234-

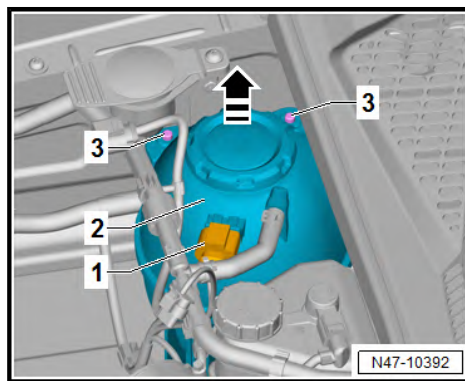


- ◆ Sealing tool -T10249-

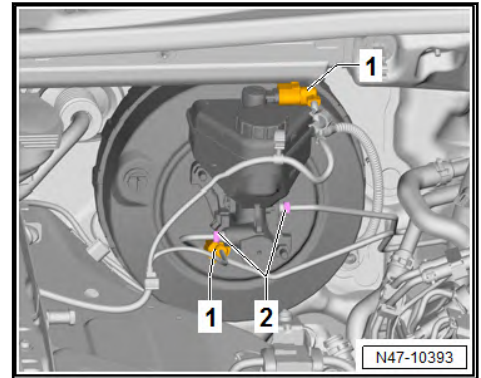


Removing

- Remove engine cover ⇒ Rep. gr. 10; Engine cover; Removing and installing engine cover.
- Remove air filter housing ⇒ Rep. gr. 10; Air filter; Removing and installing air filter housing.
- Separate electrical connector -1-.



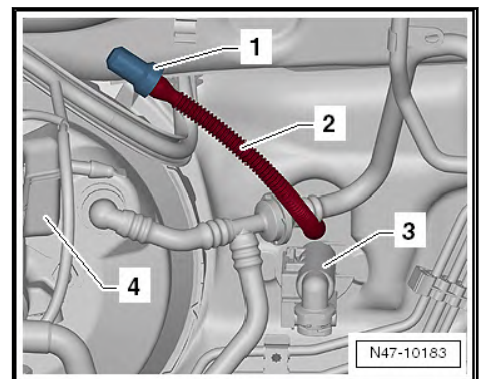
- Pull out expansion tank -2- in direction of -arrow- from retainers -3-.
- Place expansion tank -2- to one side.
- Lay out a sufficient number of lint-free cloths under brake master cylinder.
- Empty brake fluid reservoir with brake filling and bleeding equipment -VAS 5234-.
- Separate electrical connectors -1-.



- Unscrew brake lines -2- from brake master cylinder.
- Seal brake lines -2- with sealing plugs from repair kit part no. 1H0 698 311 A.

Vehicles with manual gearbox

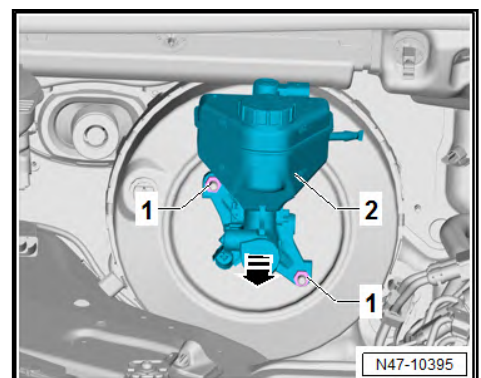
- Pull off supply hose -2- for clutch master cylinder -3- from brake fluid reservoir -4-.



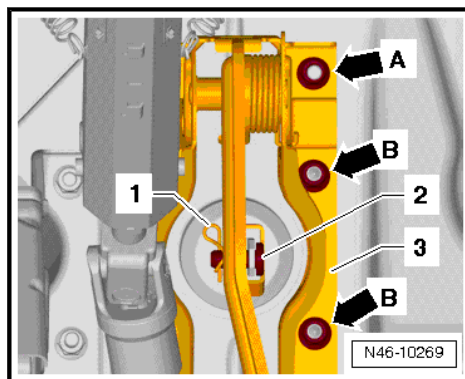
- Seal supply hose -2- for clutch master cylinder -3- with sealing tool -T10249- -1-, raise and tie.

Continued for all vehicles

- Unscrew nuts -1-.



- Pull out brake master cylinder in direction of -arrow- from brake servo.
- Remove securing spring -1- from pin -2- for yoke head/brake servo connection on brake pedal.

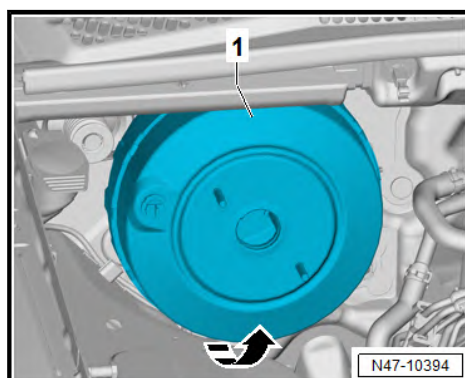


- Pull out pin -2-.
- Remove nuts -arrows B-, total qty. 4, on both sides of pedal mechanism/brake pedal.



Note

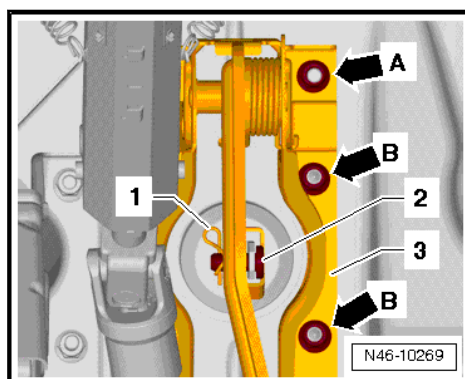
- ♦ *Nuts on left side are concealed by steering column.*
- ♦ *Only remove both top nuts -arrow A- (qty. 2) if brake servo jams in holes during removal and installation.*
- Remove brake servo -1- in direction of -arrow- from vehicle.



Installing

Install in reverse order, noting the following:

- Tighten new nuts -arrows B- and, if loosened beforehand, also nut -arrow A- on both sides of pedal cluster.



- Push pin -2- from right to left into yoke head/brake servo on brake pedal and push in securing spring -1-.



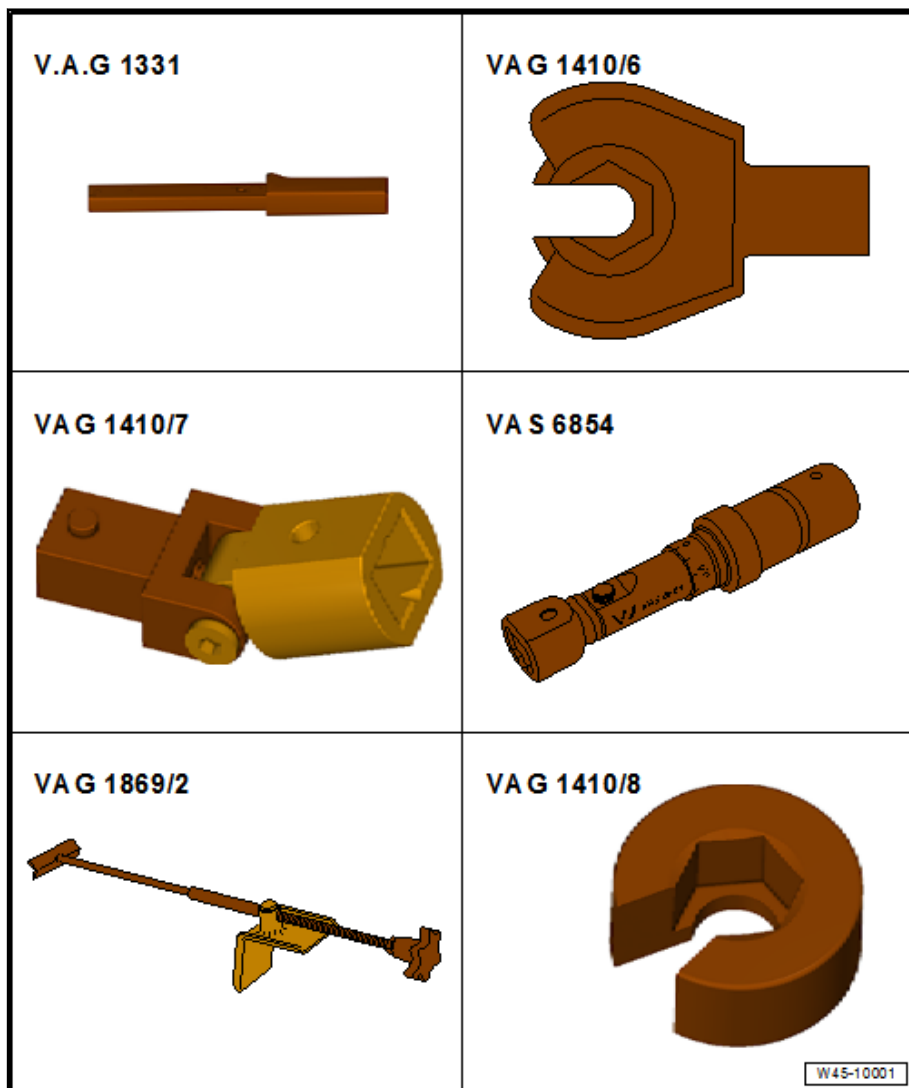
- After installing, bleed brake system ➤ [page 107](#) and clutch mechanism ➤ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

Specified torques

- ◆ ➤ [o4.1 verview - brake servo/brake master cylinder", page 111](#)
- ◆ ➤ [o4.1 verview - brake pedal", page 95](#)

4.4 Removing and installing brake master cylinder

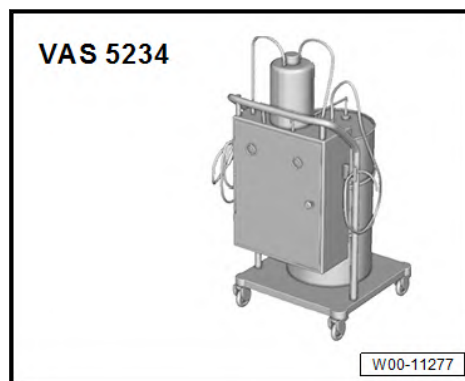
Special tools and workshop equipment required



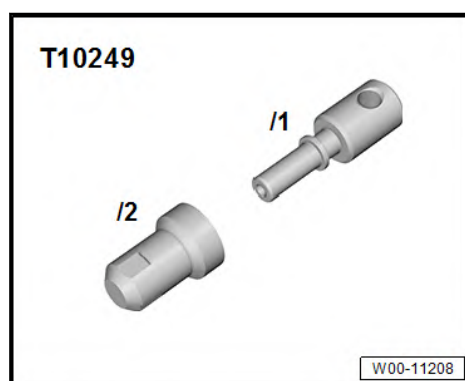
- ◆ Torque wrench -V.A.G 1331-
- ◆ Ring spanner insert AF 11 -V.A.G 1410/6-
- ◆ Universal joint -V.A.G 1410/7-
- ◆ Torque wrench -VAS 6854-
- ◆ Brake pedal depressor -V.A.G 1869/2-
- ◆ Assembly tool -V.A.G 1410/8-



◆ Brake filling and bleeding equipment -VAS 5234-



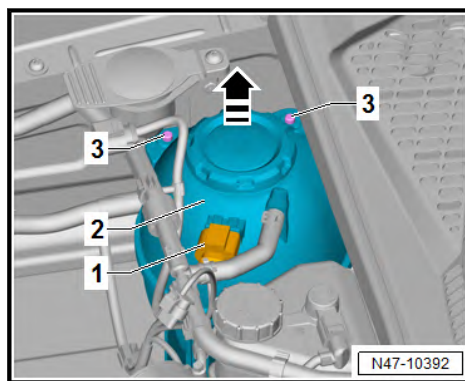
◆ Sealing tool -T10249-



Removing

Vehicles with 6-cylinder engine (RHD vehicles)

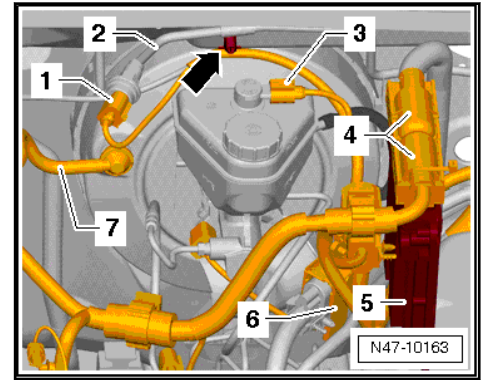
- Remove engine cover ⇒ Rep. gr. 10; Engine cover; Removing and installing engine cover.
- Remove air filter housing ⇒ Rep. gr. 10; Air filter; Removing and installing air filter housing.
- Separate electrical connector -1-.



- Pull out expansion tank -2- in direction of -arrow- from retainers -3-.
- Place expansion tank -2- to one side.

Continued for all vehicles

- Separate electrical connector -3- from brake fluid level warning contact -F34-.

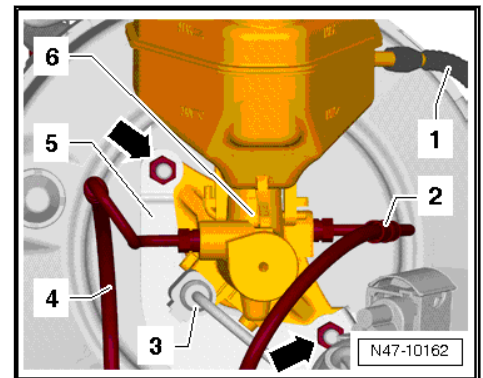


Note

- ◆ *The other items in the illustration are not relevant.*
- ◆ *Removing and installing brake master cylinder together with brake fluid reservoir.*
- Lay out a sufficient number of lint-free cloths under brake master cylinder.
- Empty brake fluid reservoir with brake filling and bleeding equipment -VAS 5234-.

Vehicles with manual gearbox

- Disconnect supply hose -1- from clutch master cylinder and plug hose using sealing tool -T10249-.



Continued for all vehicles

- Separate electrical connector -3-.
- Unscrew brake lines -2- and -4- from brake master cylinder -6-.
- Seal brake pipes with sealing plugs from repair kit Part No. 1H0 698 311 A.
- Remove nuts -arrows- for brake master cylinder from brake servo.
- If fitted, remove heat shield -5-.
- Carefully take brake master cylinder -6- out of brake servo.

Installing

Install in reverse order, noting the following:



- When assembling brake master cylinder with brake servo, make sure plunger rod is properly positioned in brake master cylinder.
- After installing, bleed brake system ⇒ [page 107](#) and clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

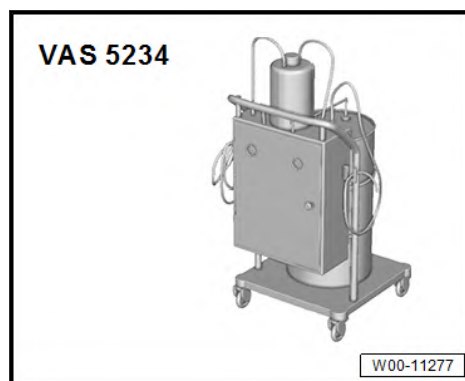
Specified torques

- ♦ ⇒ [o4.1 overview - brake servo/brake master cylinder", page 111](#)

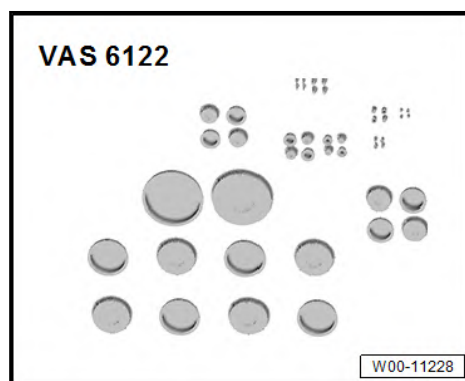
4.5 Removing and installing brake fluid reservoir

Special tools and workshop equipment required

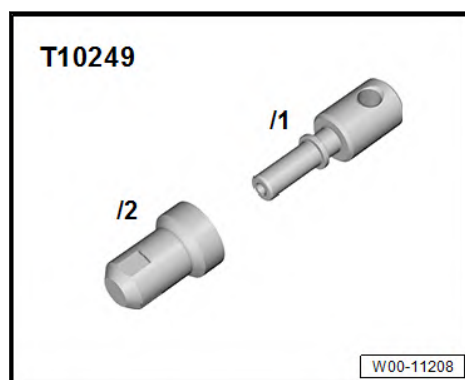
- ♦ Brake filling and bleeding equipment -VAS 5234-



- ♦ Upgrade kit and extraction unit -V.A.G 1869/4-
- ♦ Engine bung set -VAS 6122-



- ♦ Sealing tool -T10249-

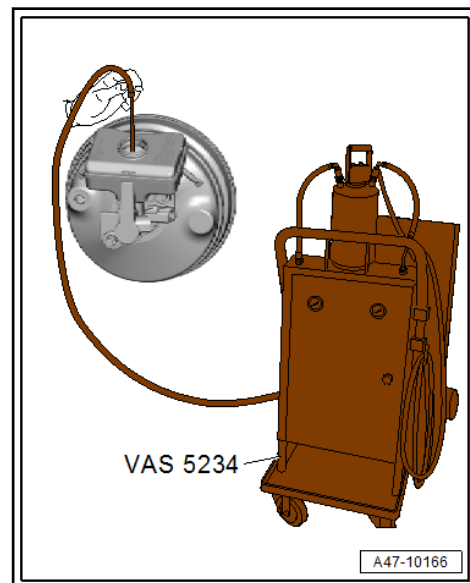


Removing

- Lay a sufficient number of lint-free cloths under brake master cylinder.

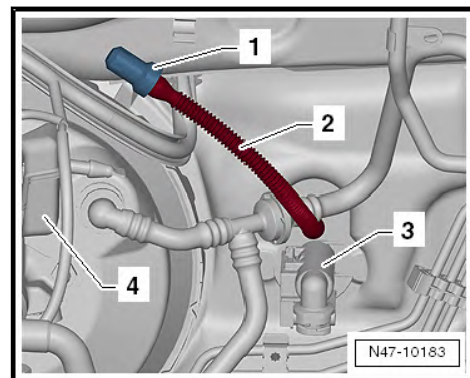


- Empty brake fluid reservoir with brake filling and bleeding equipment -VAS 5234-.



Vehicles with manual gearbox

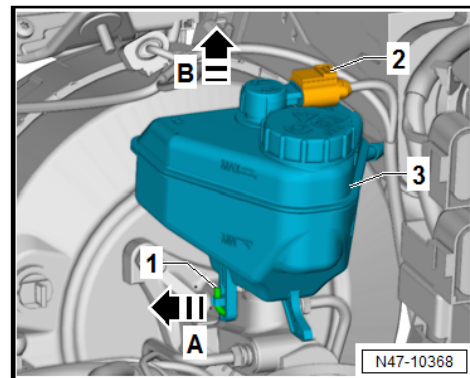
- Pull off supply hose -2- for clutch master cylinder -3- from brake fluid reservoir -4-.



- Seal return hose -2- for clutch master cylinder -3- with sealing tool -T10249- -1- or engine bung set -VAS 6122-, and tie it up.

Continued for all vehicles

- Separate electrical connector -2- from brake fluid level warning contact -F34-.





- Pull out locking pin -1- in direction of -arrow A- from brake fluid reservoir -3-.
- Remove brake fluid reservoir -3- from brake master cylinder in direction of -arrow B-.

Installing

Install in reverse order, noting the following:



Note

Make sure that the sealing plugs are correctly seated in the brake master cylinder.

- Coat sealing plugs with brake fluid before pressing brake fluid reservoir -3- into brake master cylinder.

Vehicles with manual gearbox



Note

Make sure seals are correctly seated in supply hose.

- Bleed clutch mechanism ⇒ Rep. gr. 30; Clutch mechanism; Bleeding clutch mechanism.

Continued for all vehicles

- Bleed brake system ⇒ [page 106](#) .



5 Vacuum system

⇒ [o5.1 verview – vacuum pump”, page 131](#)

⇒ [n5.2 on-return valve”, page 131](#)

⇒ [a5.3 nd installing non-return valve”, page 131](#)

⇒ [v5.4 acuum system”, page 132](#)

5.1 Assembly overview – vacuum pump

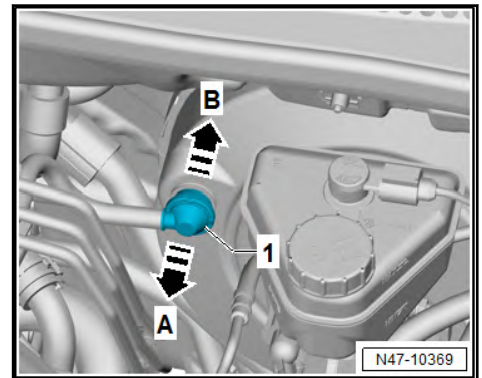
Petrol engine ⇒ Rep. gr. 15; Cylinder head; Assembly overview - cylinder head.

Diesel engine ⇒ Rep. gr. 15; Cylinder head; Assembly overview - cylinder head.

Vehicles with 6-cylinder engine ⇒ Rep. gr. 17; oil pan/oil pump; assembly overview - oil pan/oil pump.

5.2 Checking non-return valve

- Carefully pull non-return valve together with vacuum line -1- out of brake servo.
- Blow a little air through non-return valve, first in one direction and then in other.



- Air must pass through non-return valve -1- in direction of -arrow A-.
- Non-return valve -1- must remain closed in direction of -arrow B-. If this is not the case, renew non-return valve or, if necessary, complete vacuum line.

5.3 Removing and installing non-return valve



Note

The non-return valve forms a unit with the vacuum line. In the event of a defect, replace the complete vacuum line with non-return valve.



5.4 Checking vacuum system

⇒ [b5.4.1 rake servo testerVAS 6721", page 132](#)

⇒ [v5.4.2 acuum generation", page 133](#)

⇒ [f5.4.3 or leaks", page 134](#)

⇒ [g5.4.4 eneration with manual vacuum pumpVAS 6213", page 135](#)

5.4.1 Connecting brake servo tester -VAS 6721-

Special tools and workshop equipment required

- ◆ Brake servo tester -VAS 6721-

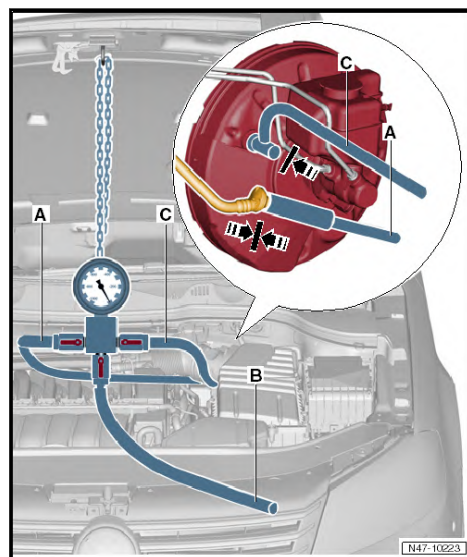


Observe the notes before performing any tests ⇒ [page 10](#) .

- Pull vacuum hose out of brake servo.

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

- Place brake servo tester -VAS 6721- in between
-see following illustrations-.

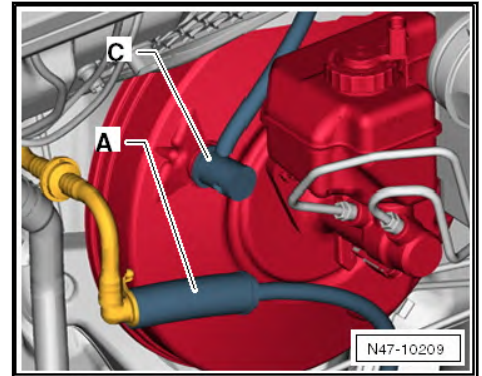


Item	Component	Explanation
A	Cut-off valve	In direction of vacuum hose, non-return valve and, if fitted, vacuum pump
B	Cut-off valve	◆ Open to facilitate removal of brake servo tester -VAS 6721- ◆ Open to simulate a fault source ◆ Connection of manual vacuum pump -VAS 6213-



Item	Component	Explanation
C	Cut-off valve	In direction of brake servo

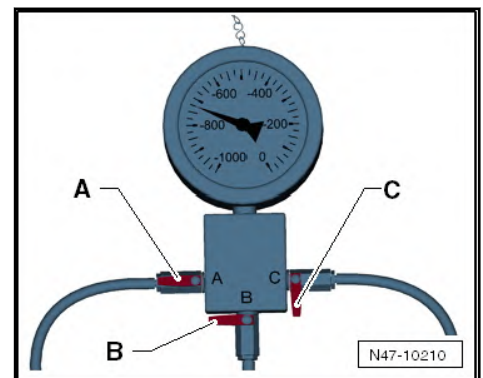
- Fit hose -A- of brake servo tester -VAS 6721- on vacuum hose and press adapter -C- into brake servo.



5.4.2 Checking vacuum generation

Observe the notes before performing any tests on the vacuum system ➔ [page 3](#).

- Connect brake servo tester -VAS 6721- ➔ [page 132](#).
- Open shut-off valve -A-.
- Close shut-off valves -B- and -C-.



- Start warm engine ($>60^{\circ}\text{C}$), press accelerator briefly (engine speed above 2000 rpm).
- Read measured value shown.

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

If the measured value is not reached even through the pre-conditions have been met, the vacuum system must first be checked for leaks.

- For comparison purposes, generate the vacuum with the manual vacuum pump -VAS 6213- ➔ [page 135](#).

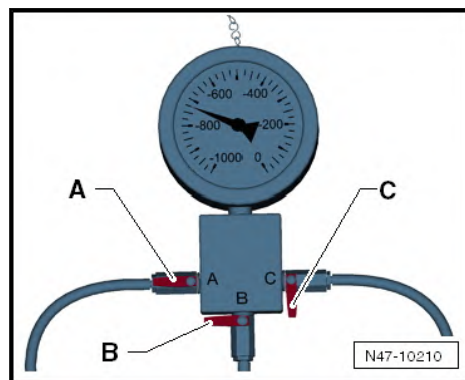
Open cut-off valve -B- to facilitate removal of hose connections and adapter.



5.4.3 Checking for leaks

Observe the notes before performing any tests on the vacuum system ➔ [page 3](#) .

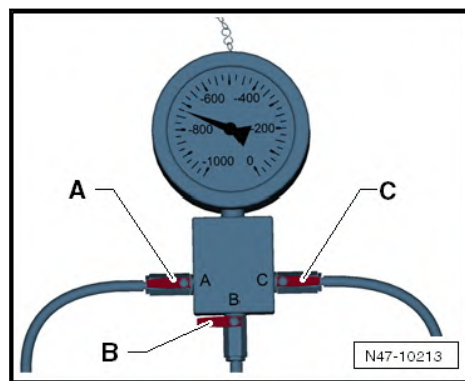
- Connect brake servo tester -VAS 6721- ➔ [page 132](#) .
- Open shut-off valve -A-.
- Close shut-off valves -B- and -C-.



- Start warm engine ($>60^{\circ}\text{C}$), press accelerator briefly (engine speed above 2000 rpm).

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

- Open shut-off valve -C- to evacuate brake servo.



- Switch off engine.
- Read and make a note of measured value shown.

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

If the vacuum decrease is greater, check in the vicinity of the

- 1 - Brake servo

or

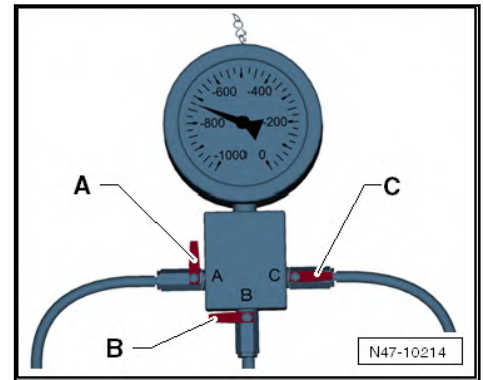
- 2 - non-return valve, vacuum hoses with push-on connections and vacuum pump/intake manifold

if the leak can be found there.

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

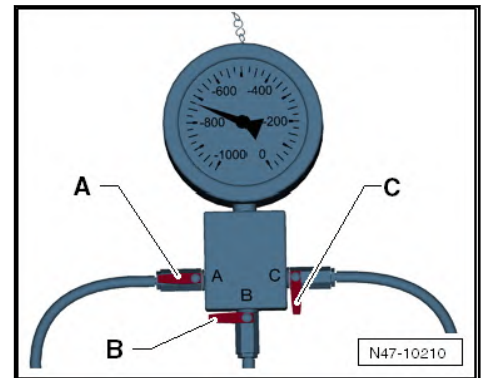
Vacuum check in vicinity of brake servo:

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



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

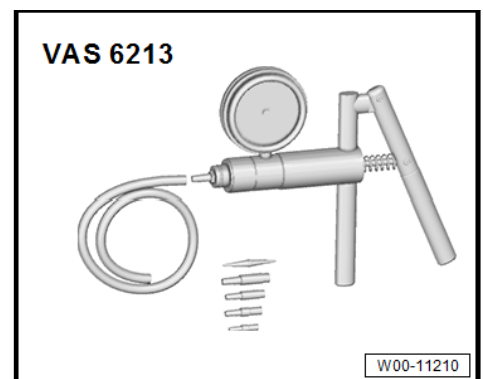
- After generating a vacuum, close shut-off valve -C- in order to check vacuum system from brake servo tester -VAS 6721- to intake pipe or to vacuum pump.



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

5.4.4 Vacuum generation with manual vacuum pump -VAS 6213-

Observe the notes before performing any tests on the vacuum system ➔ [page 3](#).



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

- To do this, connect hand vacuum pump -VAS 6213- to vacuum hose from connection -B- on brake servo tester -VAS 6721-.
- Open shut-off valve -B-.



- Generate vacuum with hand vacuum pump -VAS 6213- until between 600 and 950 mbar is shown on brake servo vacuum gauge -VAS 6721-.
- Then, carry out the corresponding checks.



6 Brake lines

⇒ [b6.1 rake lines", page 137](#)

6.1 Repairing brake lines

⇒ [b6.1.1 rake lines", page 137](#)

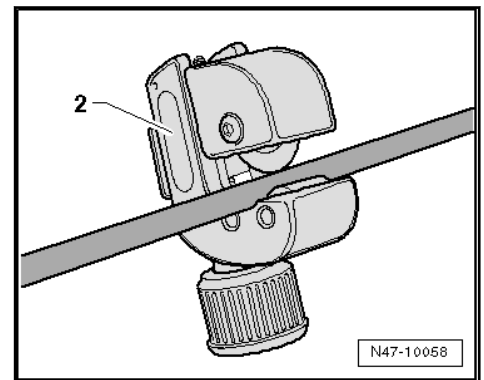
⇒ [o6.1.2 verview - flanging tool", page 139](#)

⇒ [t6.1.3 ools", page 141](#)

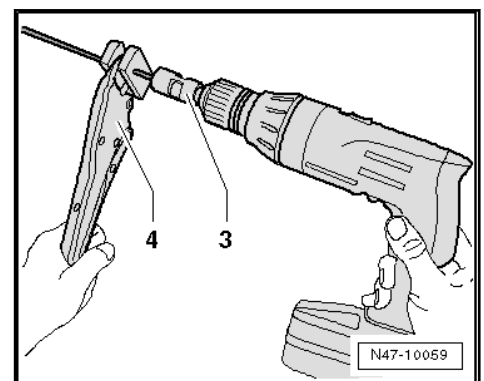
6.1.1 Repairing brake lines

Procedure

- Unbolt relevant brake line at 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) with pipe cutter -2-.



- Remove section to be renewed.
- Degrease brake line surface.
- Clamp brake line tightly in grip wrench -4- so that approx. 50 mm project from plastic jaws.



- Clamp scraper -3- into a drill and position onto brake line.
- Applying slight pressure against brake line, scrape coating off brake line. Select a slow speed on the drill when doing this.

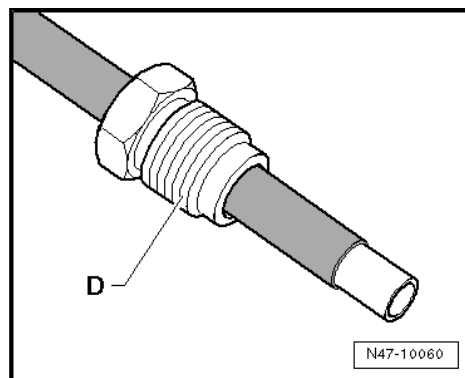


Note

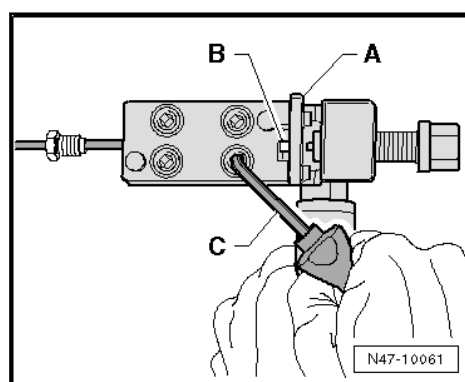
Length of scraping is determined by stop in scraper.



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



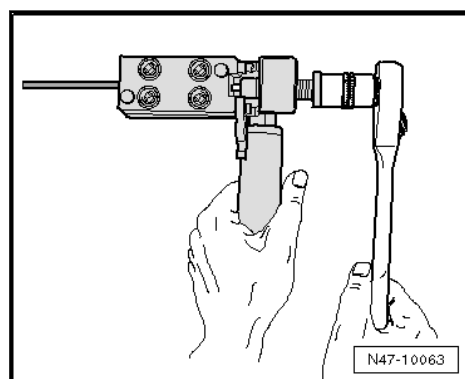
- Slide brake line -B- up to stop -A- in flanging tool.



Note

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

- Clamp brake line in flanging tool until brake line can no longer be moved. Then fold up stop -A- and use angled driver -C- to tighten hexagon socket head bolts in diagonal sequence.
- Turn spindle as far as stop in flanging tool.



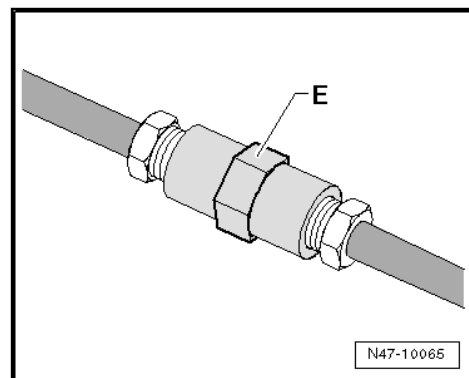
- Then turn spindle back again.
- Unscrew hexagon socket head bolts in diagonal sequence.
- Remove brake line from flanging tool and clean it.



- Check brake line and flanging head.

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

- Connect brake filling and bleeding unit -VAS 5234-, connect bleeder bottle hose to brake line flange and allow brake filling and bleeding unit -VAS 5234- to run briefly until a little brake fluid has run through.
- Blow out the new brake line to be inserted with compressed air.
- Join brake lines with the connector -E-.



- Install brake line.
- Bleed brake system ⇒ [h3.2 ydraulic system", page 107](#) .

6.1.2 Assembly overview - flanging tool



1 - Flanging tool upper part

- ❑ Unbolt to change flanging jaws.

2 - Fastening for handle

- ❑ Must be unbolted to access securing bolt for upper part

3 - Securing bolt

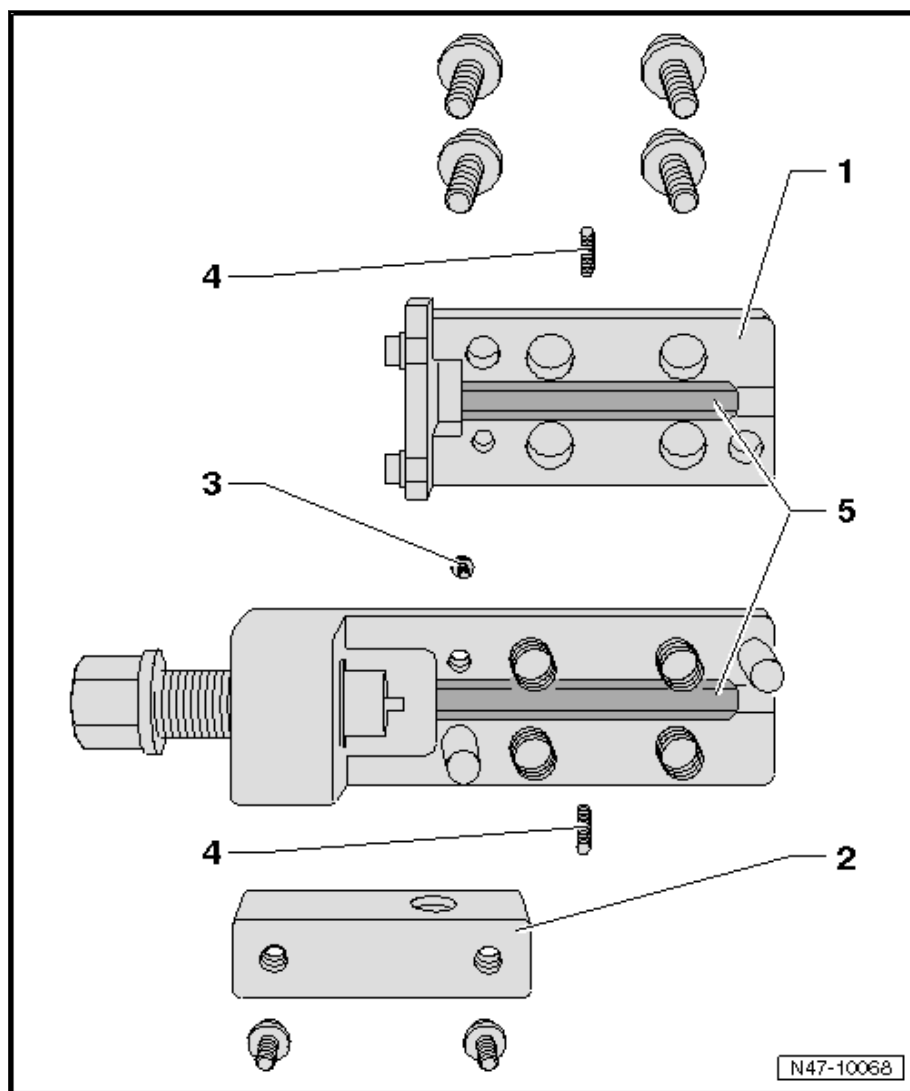
- ❑ For flanging tool upper part

4 - Grub screws for flanging jaws

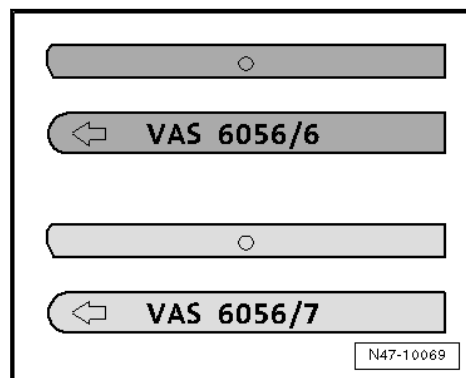
- ❑ Centring and holding flanging jaws.
- ❑ Allen head bolt, 2 mm

5 - Flanging jaws

- ❑ Various.
- ❑ Assembly instructions ➔ [page 140](#) .



Flanging jaw assembly instructions:



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



Note

Arrow on rounded side of flanging jaws must point to edge of housing. Straight side of flanging jaws must be installed to spindle, as flanging head is not otherwise formed correctly.

6.1.3 Required tools

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

The use of flanging tool V.A.G. 1356 is not permitted due to the coating and the diameter of the black brake lines.

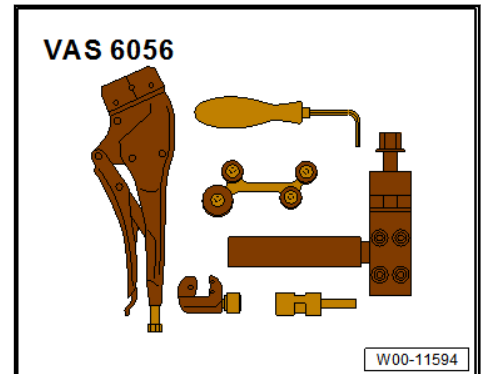


Note

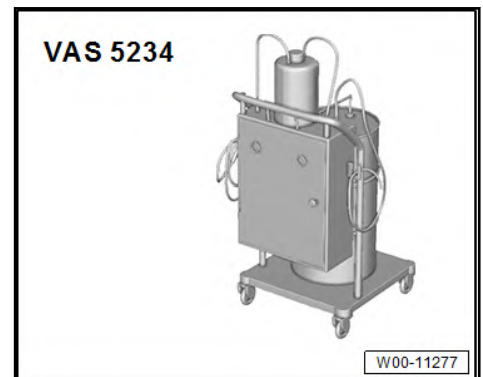
- ◆ *Brake pipes may only be bent up to max. 90°. They otherwise kink or reveal deformations which constrict the pipe cross-section unacceptably.*
- ◆ *Preferably separate brake lines at underbody.*
- ◆ *The positions of the intermediate pieces must be selected so that they cannot chafe on moving parts.*
- ◆ *Do not grease spindle; use only clutch and brake cleaner.*

Special tools and workshop equipment required

- ◆ Flanging tool for brake lines -VAS 6056-



- ◆ Brake filling and bleeding equipment -VAS 5234-



List of individual tools:



1 - Flanging tool -VAS 6056/1-

- ❑ The flanging tool -VAS 6056/1- contains flanging jaws -VAS 6056/6-.

2 - Pipe cutter -VAS 6056/2-

3 - Brake line scraper -VAS 6056/3-

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

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

5 - Pipe bending tool -VAS 6056/5-

6 - Special wrench, 6 mm

7 - Flanging jaws -VAS 6056/7-

