



Workshop Manual Amarok 2011 ➤

Brake systems

Edition 05.2013





List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 45 - Anti-lock brake system
- 46 - Brakes - mechanism
- 47 - Brakes - hydraulics

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

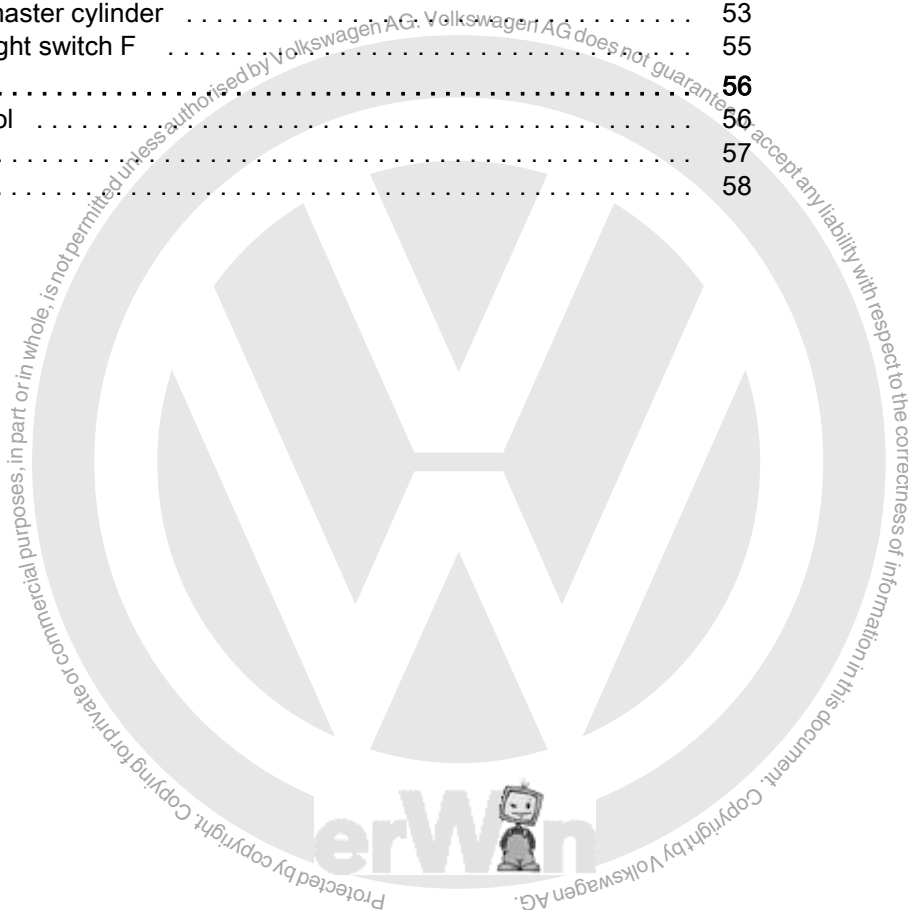


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00 – Technical data

1 Technical data

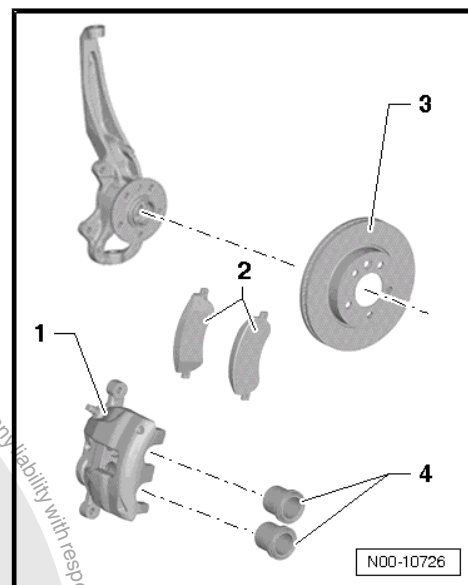
(VRL005543; Edition 05.2013)

⇒ **"1.1 Technical data for brakes", page 1**

1.1 Technical data for brakes

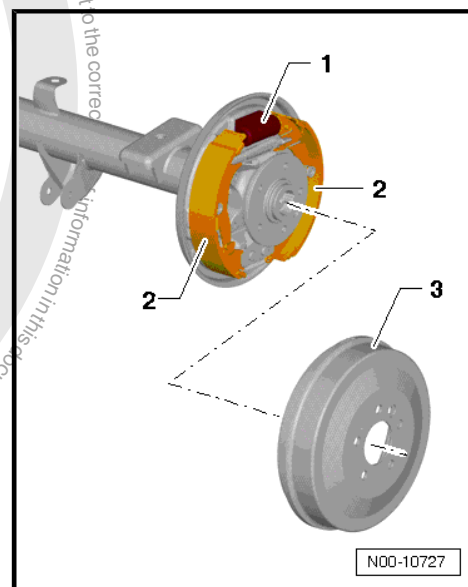
Front brakes

Item	Component		
1	Brake caliper		Double-piston floating caliper disc brake (16")
2	Brake pad thickness (without backplate)	mm	12.5
	Brake pad, wear limit without backplate	mm	2
3	Brake disc	Ø in mm	303
	Brake disc, thickness	mm	28
	Brake disc, wear limit	mm	26
4	Brake piston	Ø in mm	2 x 48



Rear brake (drum brake)

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



Brake master cylinder and brake booster

Brake master cylinder	Ø in mm	26.99
Brake booster (LHD vehicles)	Ø in inches	10" / 10" - tandem
Brake booster (RHD vehicles)	Ø in inches	10" / 10" - tandem



2 Brake test

⇒ ["2.1 General information", page 2](#)

⇒ ["2.2 Brake test", page 2](#)

2.1 General information

- ◆ The drive is provided by the test rig.
- ◆ For vehicles with a manual gearbox, ensure that the gear lever is in neutral for the test. For vehicles with an automatic gearbox, ensure 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.

2.2 Brake test

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

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 brake forces being transferred to the drive train.

Test speed should not exceed 6 km/h. Otherwise, the EDL control will activate the brakes if the rollers start at different speeds.

The test rigs authorised by Volkswagen fulfil these requirements.



45 – Anti-lock brake system

1 General information

⇒ [“1.1 General notes on ABS”, page 3](#)

⇒ [“1.2 Repair instructions for repair work on ABS”, page 3](#)

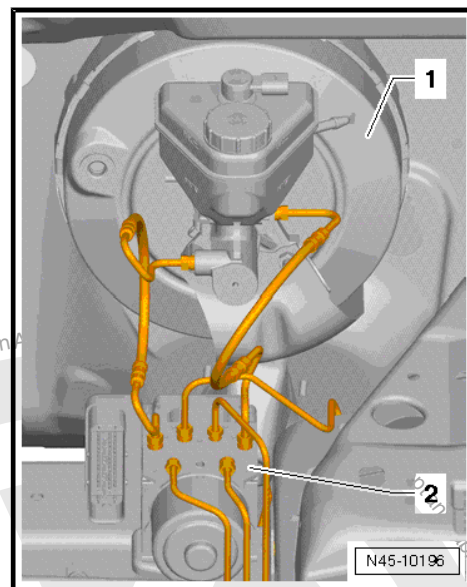
1.1 General notes on ABS

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

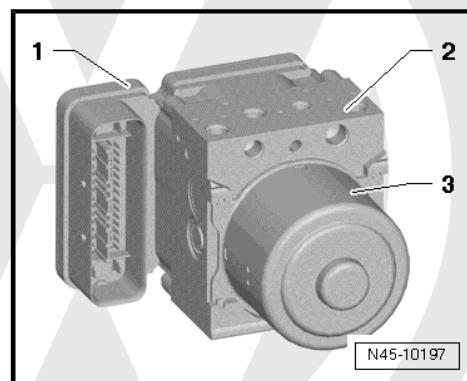
Faults in the ABS do not influence the brake system and servo assistance. The conventional brake system remains functional even without ABS. A change in braking behaviour is to be reckoned with. After the ABS warning lamp - K47- comes on, the rear wheels may lock prematurely.

ABS layout in left-hand drive vehicle:

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



The hydraulic unit -2- and control unit -1- form one component. Hydraulic pump -3- must not be separated from 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.

- ◆ Disconnect battery earth strap with ignition switched off.



- ◆ Before carrying out welding work with an electric welding unit, note ⇒ 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 46](#) .
- ◆ 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 the adjacent areas before loosening. Do not use aggressive cleaning agents such as brake cleanser, petrol, thinners or similar.
- ◆ Place removed parts on a clean surface and cover.
- ◆ If repairs cannot be carried out immediately, carefully cover or seal open components.
- ◆ Only use lint-free cloths.
- ◆ Only unpack replacement parts immediately prior to fitting.
- ◆ 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 only briefly, 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

⇒ **"2.1 Components and fitting locations - (ABS, EDL, ASR, ESP)", page 5**

2.1 Components and fitting locations - (ABS, EDL, ASR, ESP)

1 - Dash panel insert

- ☐ Removing and installing
⇒ Electrical system;
Rep. gr. 90 ; Dash panel
insert; Removing and in-
stalling dash panel in-
sert .
- ☐ Renewing ⇒ Vehicle di-
agnostic tester.

2 - Driving program button - E598-

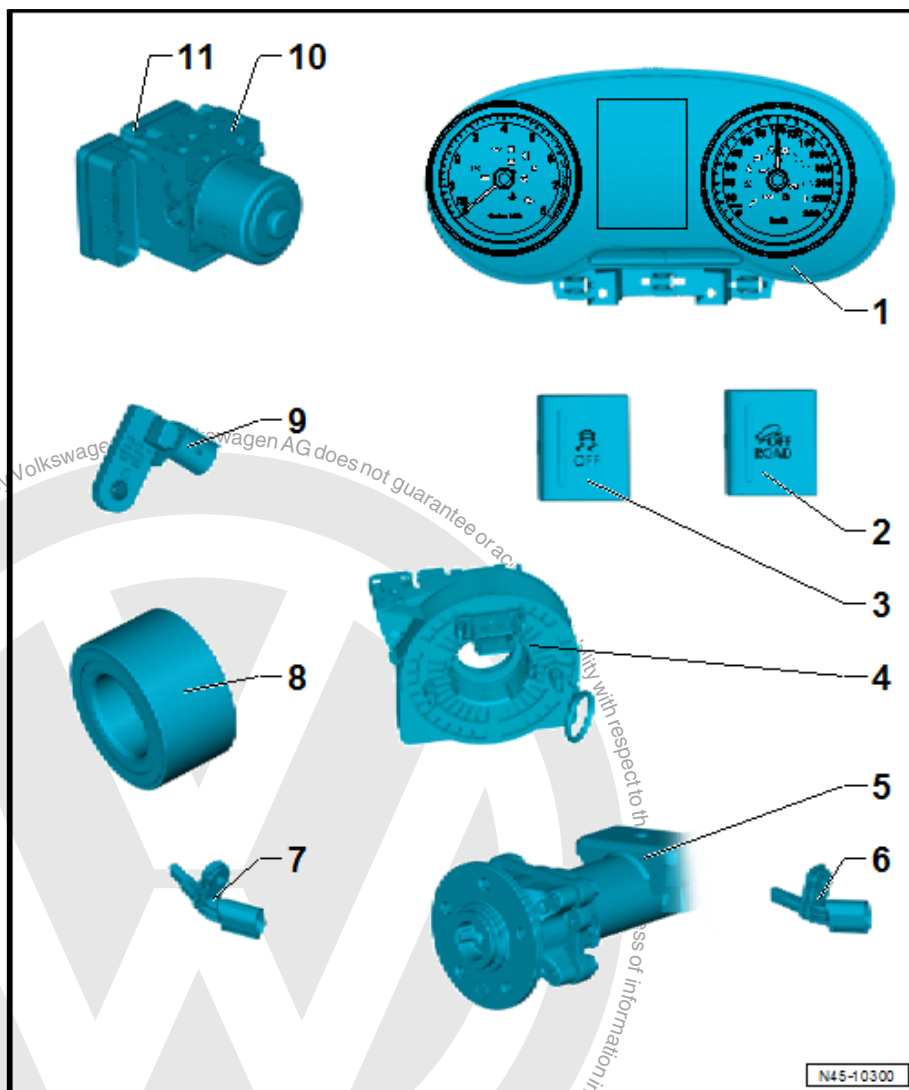
- ☐ Location: in centre con-
sole.

3 - TCS and ESP button - E256-

- ☐ Location: in centre con-
sole.

4 - Steering angle sender - G85-

- ☐ Only on vehicles having
ESP.
- ☐ Location: on steering
column between steer-
ing wheel and steering
column switch.
- ☐ Removing and installing
⇒ Electrical system;
Rep. gr. 94 ; Lights,
bulbs, switches - exteri-
or; Steering column
switch
- ☐ After installing, perform
basic setting for steering
angle sender - G85-
⇒ Vehicle diagnostic
tester.



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

- ☐ The ABS sensor ring is installed on the rear axle shaft.

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

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 16](#)

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

- ☐ Can be tested using ⇒ Vehicle diagnostic tester.
- ☐ Removing and installing ⇒ [page 15](#)

8 - Wheel bearing

- ☐ ABS sensor ring is installed in wheel bearing

9 - Brake light switch - F-

- ☐ Including brake pedal switch - F47- .



- ❑ Removing and installing ⇒ [page 55](#)

10 - ABS hydraulic unit - N55-

The hydraulic unit consists of the components:

- ❑ ABS return flow pump - V39-
- ❑ Brake pressure sender 1 - G201-
- ❑ Valve block (contains inlet and outlet valves)
- ❑ ABS return flow pump - V39- and valve block must not be separated from one another.
- ❑ Assembly overview ⇒ [page 7](#) .
- ❑ Removing and installing ⇒ [page 9](#)

11 - ABS control unit - J104-

- ❑ Location: on hydraulic unit, on left in engine compartment
- ❑ Can be tested using ⇒ Vehicle diagnostic tester.
- ❑ Do not separate connector before successfully completing self-diagnosis. Switch ignition off before separating connector.

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 7](#) .
- ❑ Removing and installing ⇒ [page 11](#)



3 Control unit and hydraulic unit

⇒ [“3.1 Assembly overview - control unit and hydraulic unit”, page 7](#)

⇒ [“3.2 Removing and installing ABS control unit J104 and ABS hydraulic unit N55”, page 9](#)

⇒ [“3.3 Removing and installing ABS control unit J104 without ABS hydraulic unit N55”, page 11](#)

⇒ [“3.4 Connecting brake lines to hydraulic unit”, page 13](#)

3.1 Assembly overview - control unit and hydraulic unit

1 - Brake servo

- ☐ With brake master cylinder and brake fluid reservoir
- ☐ Removing and installing
⇒ [page 51](#)

2 - Connection for brake line

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

3 - Connection for brake line

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

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

- ☐ ABS return flow pump - V39- and valve block should not be separated from each other
- ☐ 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 9](#) .

- ☐ Removing and installing ABS control unit - J104- without ABS hydraulic unit - N55- ⇒ [page 11](#) .

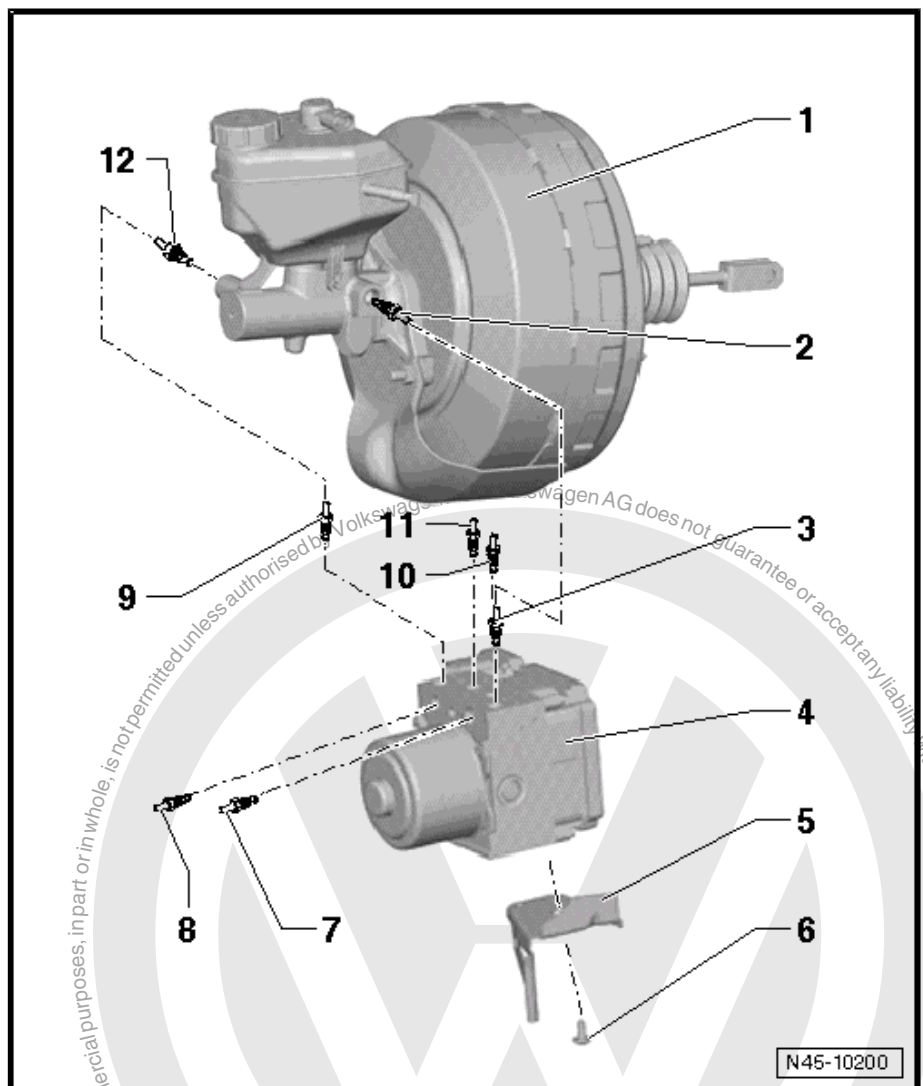
5 - Bracket/frame

6 - Bolt

- ☐ 8 Nm

7 - Connection for brake line

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





8 - Connection for brake line

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

9 - Connection for brake line

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

10 - Connection for brake line

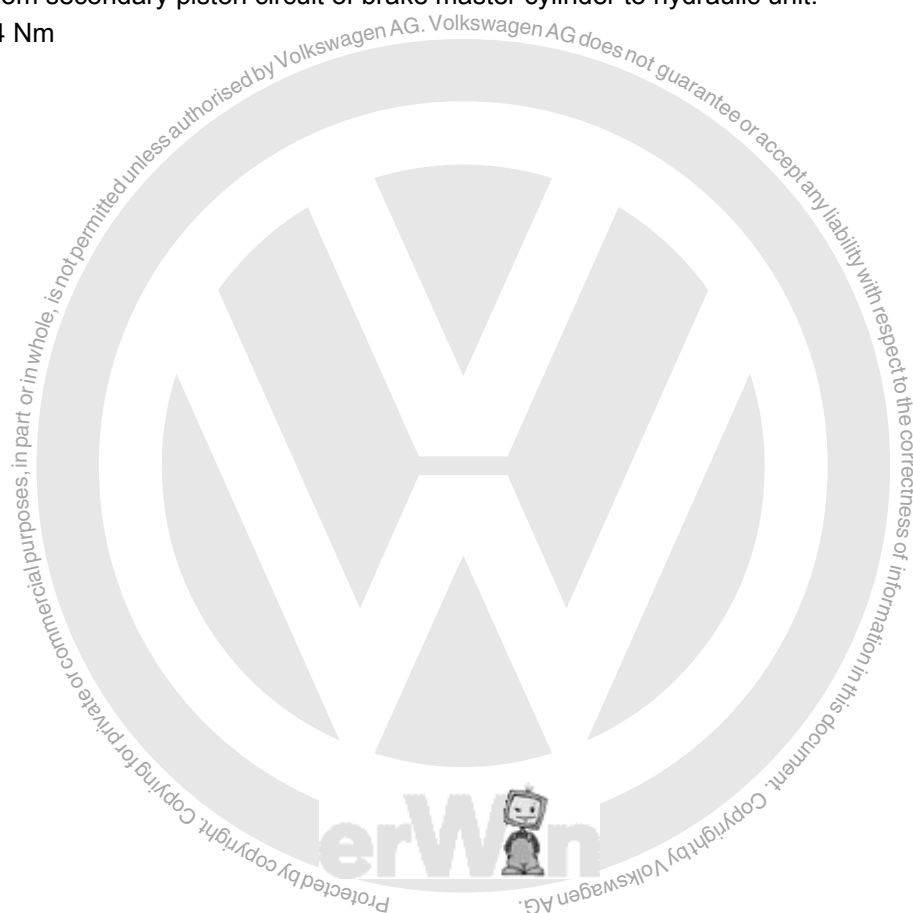
- ☐ From hydraulic unit to front right brake caliper.
- ☐ Identification: union nut with thread M10 x 1
- ☐ 14 Nm

11 - Connection for brake line

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

12 - Connection for brake line

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

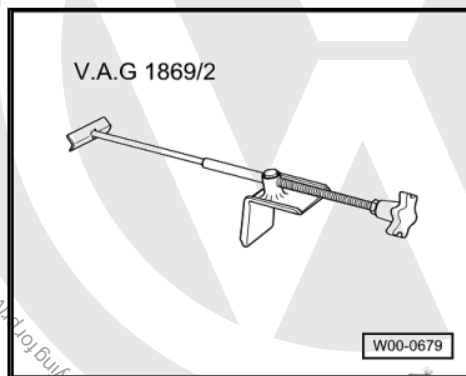




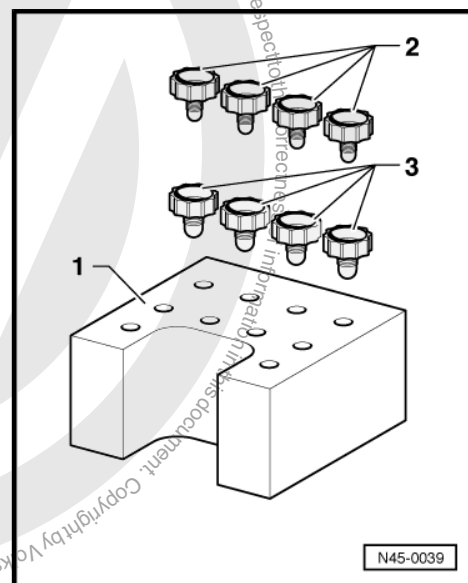
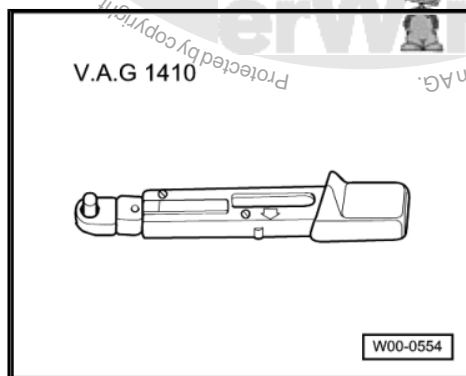
3.2 Removing and installing ABS control unit - J104- and ABS hydraulic unit - N55-

Special tools and workshop equipment required

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



- ◆ Torque wrench - V.A.G 1410-



Sealing plug repair kit

Location:

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



WARNING

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

Removing

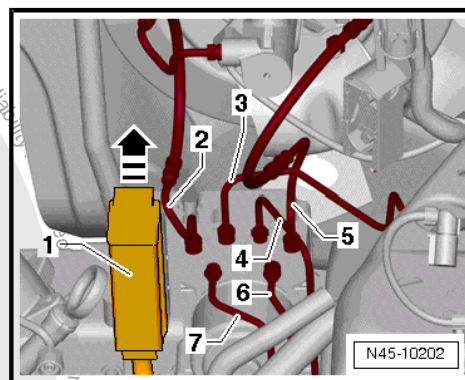
- Read out and note the existing control unit code.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Disconnecting and reconnecting battery .



- Connect bleeder bottle hose to front left brake caliper bleeder valve and open bleeder valve.
- Use brake pedal actuator - V.A.G 1869/2- to press on brake pedal.
- Close front left bleeder valve.
- Place sufficient lint-free cloths under the control unit and hydraulic unit.

Ensure no brake fluid gets onto contacts.

- Unscrew brake lines -2- to -7- from ABS hydraulic unit - N55-
- Seal brake lines and threaded holes using sealing plugs from sealing plug repair kit ⇒ Electronic Parts Catalogue (ETKA) .
- Unlock connector from ABS control unit - J104- in direction of arrow- and pull it off forwards.
- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .





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

Installing

Installation is performed in reverse sequence; note 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.



Caution

It must be possible to screw brake line nuts to end of threads into ABS hydraulic unit - N55- by hand.

Only then may the nuts be tightened to the specified torque.

- Remove brake pedal depressor - V.A.G 1869/2- .
- Bleed brake system ⇒ [page 46](#) .
- Code ABS control unit - J104- using ⇒ Vehicle diagnostic tester.

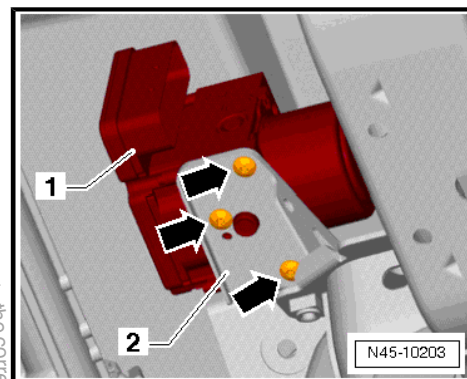
Specified torques

- ◆ ⇒ [“3.1 Assembly overview - control unit and hydraulic unit”, page 7](#)

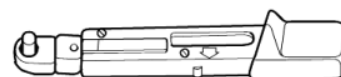
3.3 Removing and installing ABS control unit - J104- without ABS hydraulic unit - N55-

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



V.A.G 1410



W00-0554

Location:

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



WARNING

- ◆ *Do not bend the brake lines in the area of the hydraulic unit!*
- ◆ *Neither moisture nor particles of dirt may enter the interior of the control unit.*
- ◆ *Avoid electrostatic charge!*

Removing



Note

The hydraulic lines remain connected.

- Follow the instructions for repair work on the anti-lock braking system ➔ [page 3](#).
- Read out and note the existing control unit code ➔ Vehicle diagnostic tester.
- Disconnect battery ➔ Electrical system; Rep. gr. 27 ; Disconnecting and reconnecting battery .
- Release electrical connector.



Note

The ABS control unit - J104- is removed downwards.

- Loosen bolted connections -2- on ABS control unit - J104- / ABS hydraulic unit - N55-. Then, remove ABS control unit - J104- -1-.

Installing

Installation is performed in reverse sequence; note the following:



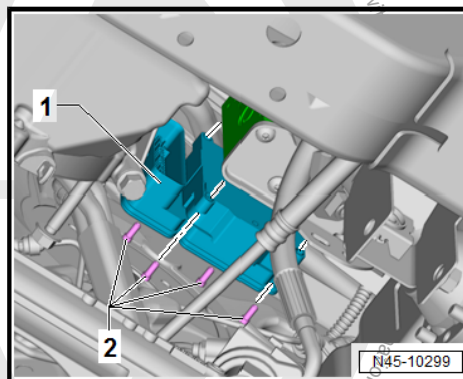
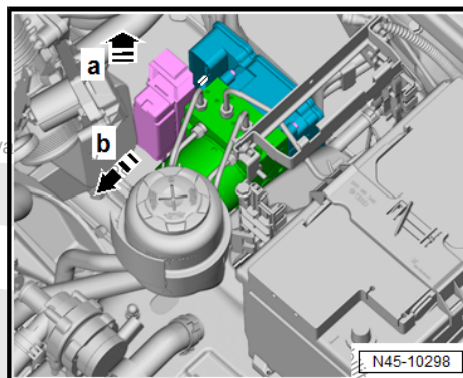
Note

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 torque

Component	Specified torque
Bolted connection ABS control unit - J104- / ABS hydraulic unit - N55-	4 Nm





3.4 Connecting brake lines to hydraulic unit

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.

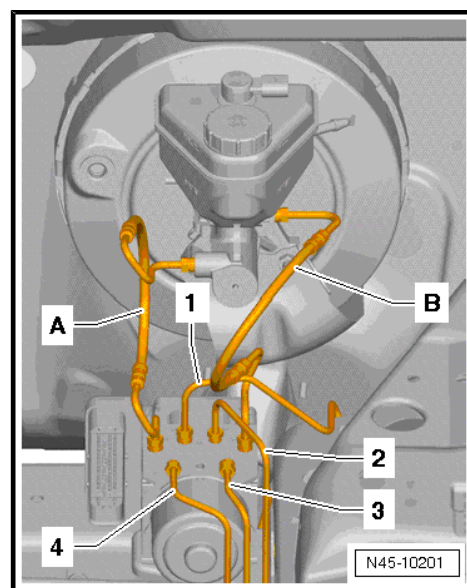
B - From hydraulic unit to primary piston circuit of brake master cylinder.

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





4 Sensors

⇒ "4.1 Assembly overview - front axle speed sensors G45 / G47", page 14

⇒ "4.2 Assembly overview - rear axle speed sensors G44 / G46", page 15

⇒ "4.3 Removing and installing front axle speed sensors G45 / G47", page 15

⇒ "4.4 Removing and installing rear axle speed sensors G44 / G46", page 16

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

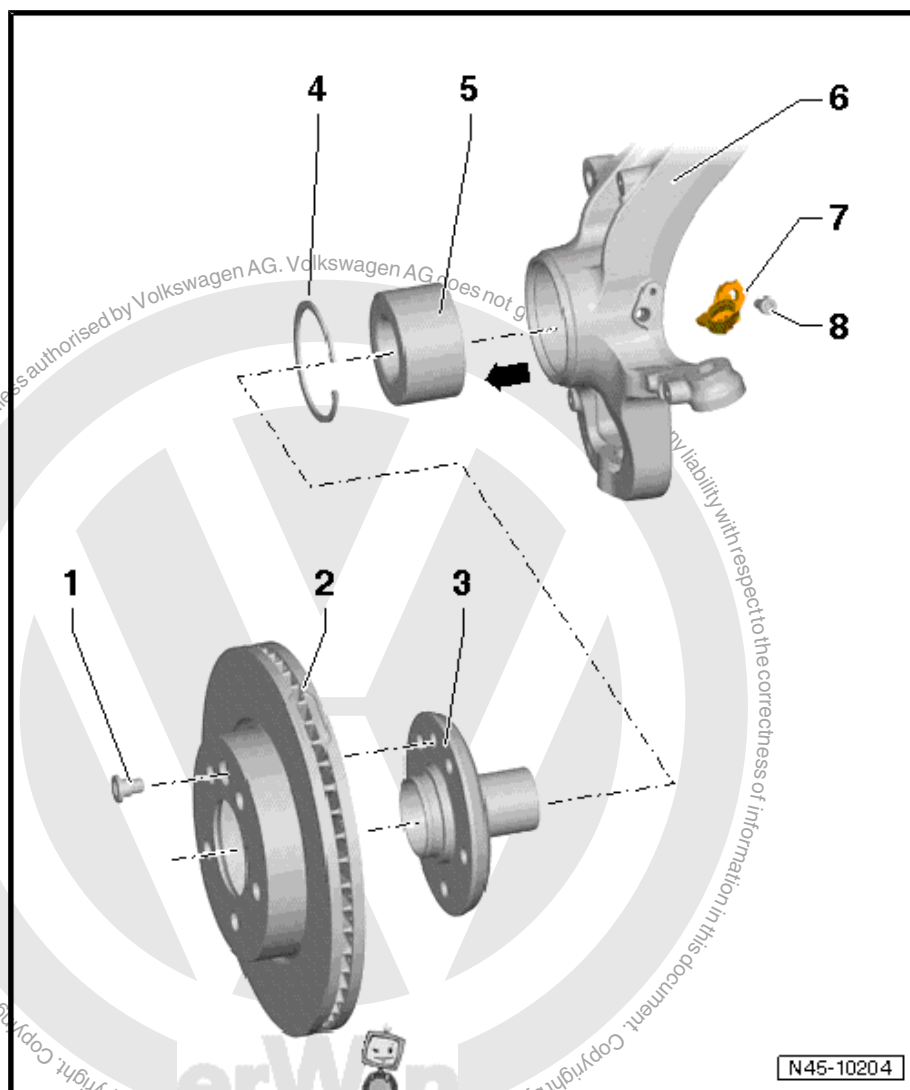
6 - Wheel bearing housing

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 (ET-KA).
- Removing and installing ⇒ page 15

8 - Bolt

- 8 Nm





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

1 - Brake backplate

- ❑ Reset brake before removing brake drum
⇒ [page 31](#)

2 - Bolt

- ❑ Always renew after removing
- ❑ 150 Nm +90°

3 - Axle beam

4 - Speed sensors - G44- / -G46-

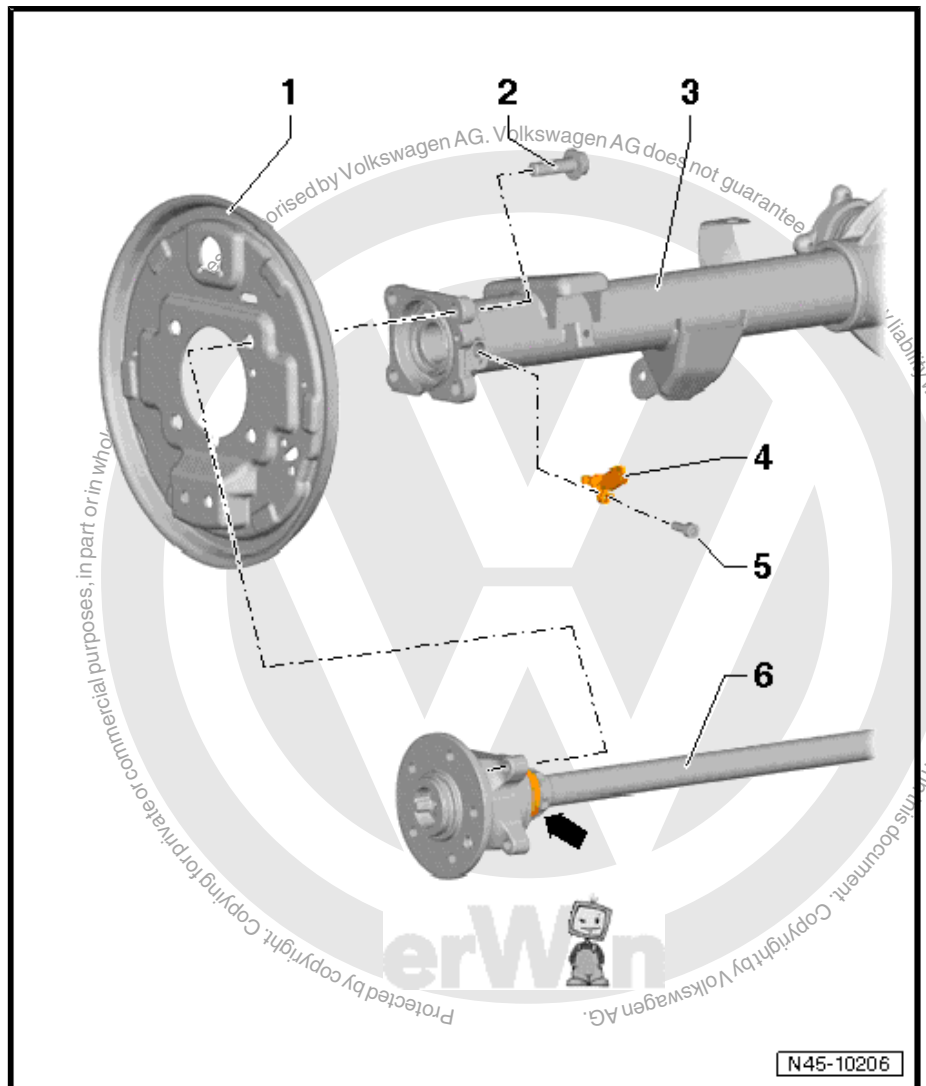
- ❑ Before inserting speed sensor, clean inner surface of hole and coat it with polycarbamide grease ⇒ Electronic Parts Catalogue (ETKA).
- ❑ Removing and installing
⇒ [page 16](#)

5 - Bolt

- ❑ 8 Nm

6 - Rear axle shaft

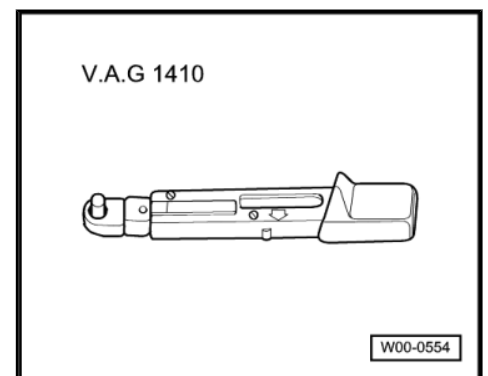
- ❑ With wheel bearing/ wheel bearing unit and sensor ring -arrow- for ABS



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

- Raise vehicle ➔ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .
- Pull connector -1- of speed sensor wire off speed sensor -2-.
- Remove bolt -arrow- from wheel bearing housing.
- Pull speed sensor -2- out of wheel bearing housing.

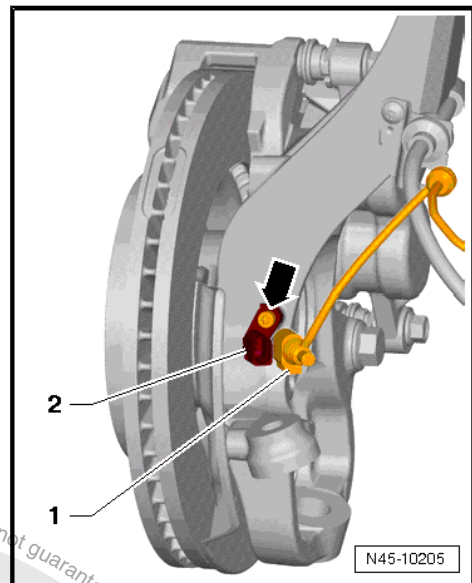
Installing

Installation is performed in reverse sequence; note 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.
- Push connector of speed sensor wire onto speed sensor .
- Turn steering to full left and right lock and check clearance to speed sensor wire.

Specified torques

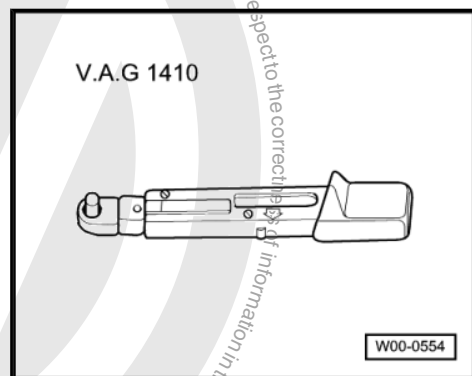
- ♦ ➔ [“4.1 Assembly overview - front axle speed sensors G45 / G47”, page 14](#)



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

Special tools and workshop equipment required

- ♦ Torque wrench V.A.G 1410-



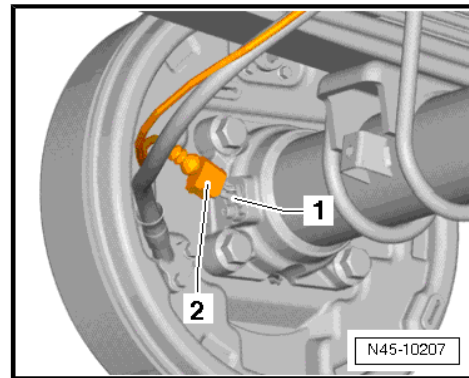
- ♦ Polycarbamide grease ➔ Electronic Parts Catalogue (ETKA) .

Removing

- Raise vehicle ➔ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .



- Pull connector -2- off speed sensor -1-.

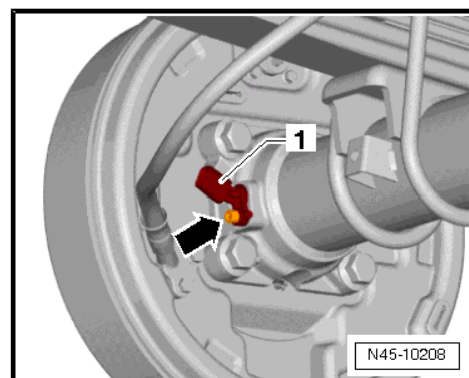


- Remove bolt -arrow-.
- Pull speed sensor out of axle beam.

Installing

Installation is performed in reverse sequence; note 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.
- Push connector of speed sensor wire onto speed sensor .



Specified torques

- ◆ ⇒ ["4.2 Assembly overview - rear axle speed sensors G44 / G46"](#)
page 15





46 – Brakes - mechanism

1 Front brakes

⇒ "1.1 Assembly overview - front brakes", page 18

⇒ "1.2 Removing and installing brake pads or linings", page 19

⇒ "1.3 Removing and installing brake caliper", page 22

1.1 Assembly overview - front brakes



Note

- ◆ After replacing brake pads/linings, depress brake pedal firmly several times with vehicle stationary so that the brake pads/linings 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 - Bracket

- For brake hose and speed sensor wire

3 - Bolt

- For bracket on wheel bearing housing
- 9.5 Nm

4 - Splash plate

5 - Brake disc

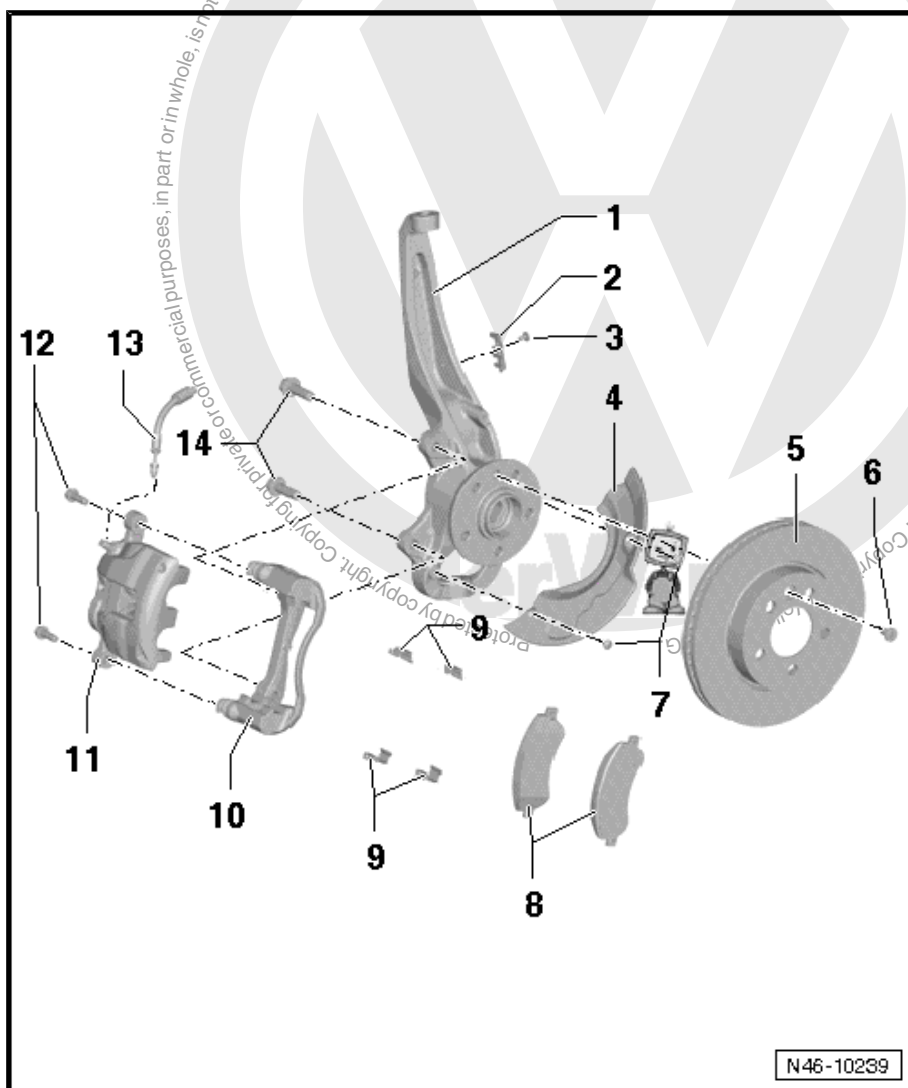
- Internally ventilated
- Brake disc Ø 303 mm
- Thickness: 28 mm
- Wear limit: 26 mm.
- When worn, renew on both sides of axle.
- Unscrew brake caliper prior to removing.
- Never remove brake discs from wheel hub by force. If necessary use penetrating fluid, because otherwise brake discs can be damaged.

6 - Bolt

- 20 Nm

7 - Bolt

- 9.5 Nm





8 - Brake pads

- ☐ Thickness: 12.5 mm not including backplate.
- ☐ Pad wear limit: 2 mm without backplate (remaining pad thickness)
- ☐ Check thickness ⇒ Maintenance ; Booklet ; Descriptions of work; Brake system: Conducting visual examination for leaks and damage
- ☐ Always replace on both sides
- ☐ Removing and installing ⇒ [page 19](#)

9 - Pad retainer

- ☐ Always renew when changing pads.

10 - Brake carrier

- ☐ With guide pins and protective caps
- ☐ Bolt to wheel bearing housing.
- ☐ Supplied as genuine part, assembled with sufficient grease on guide pins.
- ☐ If protective caps or guide pins are damaged, install repair kit and use lubricant sachet supplied to lubricate guide pins
- ☐ Installation position of guide pins ⇒ [page 19](#)

11 - Brake caliper

- ☐ Removing and installing ⇒ [page 22](#)

12 - Bolt

- ☐ Always renew after removing
- ☐ 65 Nm

13 - Brake hose

- ☐ Install without twisting
- ☐ Specified torque when being secured to brake caliper: 14 Nm (pipe with union nut).
- ☐ Specified torque when being secured to brake caliper: 17 Nm (threaded pipe).

14 - Bolt

- ☐ Always renew after removing
- ☐ 150 Nm +90°

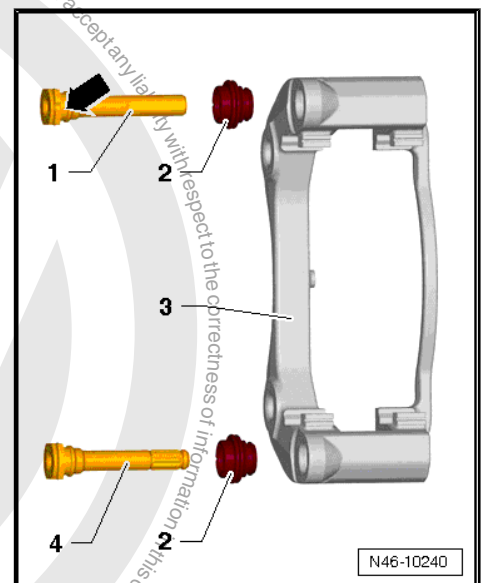
Installation position of guide pins

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



Note

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

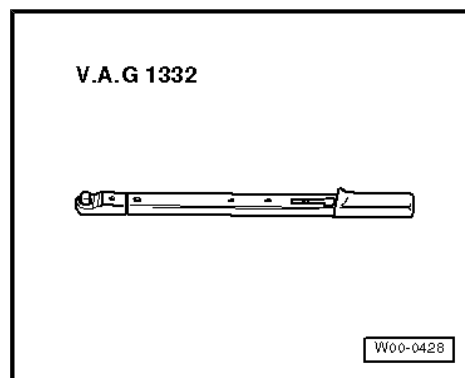


1.2 Removing and installing brake pads or linings

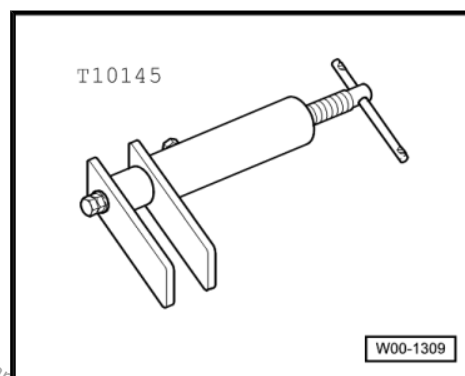
Special tools and workshop equipment required



◆ Torque wrench - V.A.G 1332-



◆ Piston resetting appliance - T10145-



Caution

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

- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .
- Remove front wheels.



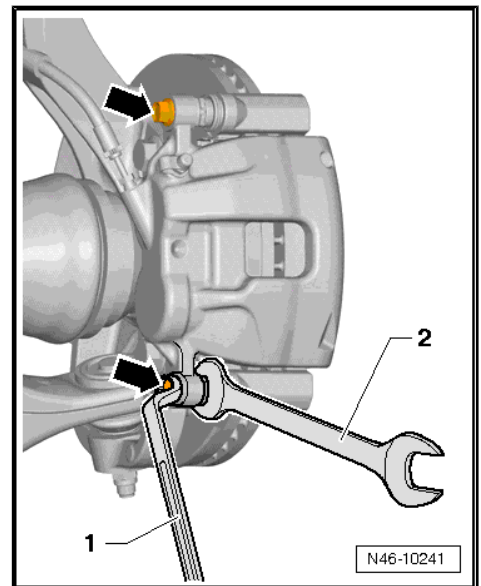
Note

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

- Remove bolts -arrows- for securing brake caliper with spanner -1- (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.



- Remove brake pads -A- from brake carrier sideways.
- Then remove pad retainers from brake carrier.
- Clean brake caliper housing.



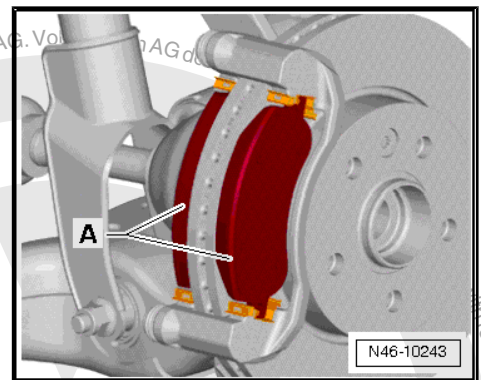
WARNING

Do not blow out brake system with compressed air; the resulting dust constitutes a health hazard!



Note

Only use methylated spirits to clean brake caliper housing.

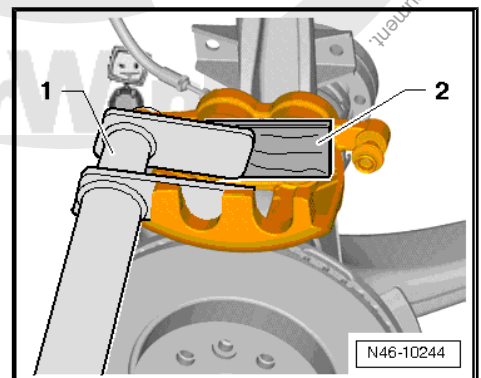


Installing

Installation is performed in reverse sequence; note 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 with piston resetting tool -T10145--1-.



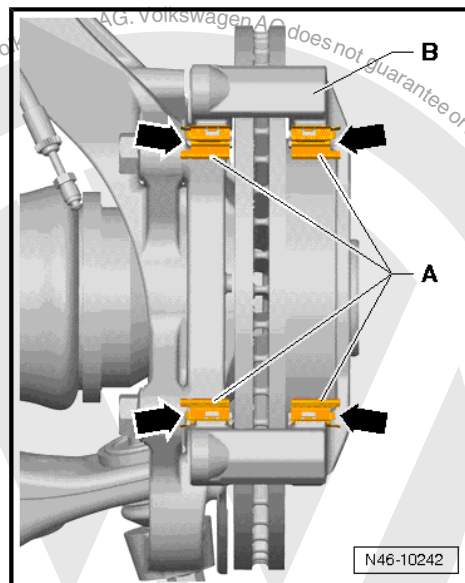


- Insert pad retainers -A- into brake carrier -B-.



Note

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

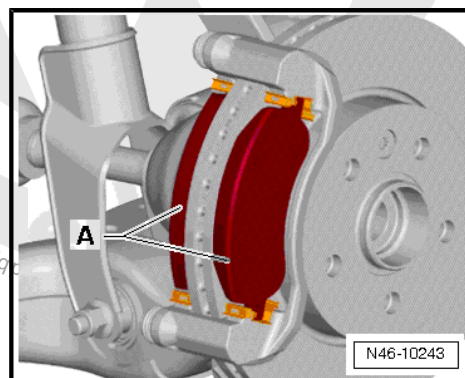


- Insert brake pads -A- into pad retainers of brake carrier.
- Fit brake caliper onto brake carrier and tighten securing bolts.
- Fit wheels.



Note

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



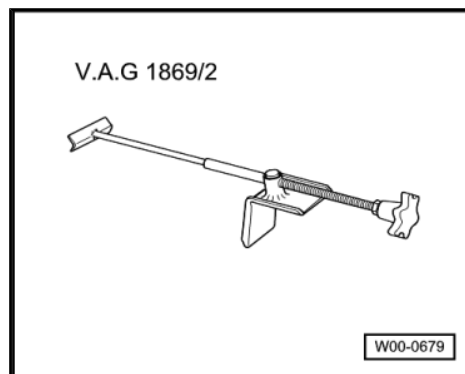
Specified torques

- ◆ ➔ ["1.1 Assembly overview - front brakes", page 18](#)
- ◆ Wheels, tyres; Specified torque for wheel bolts ➔ Rep. gr. 44 ; Specified torque for wheel bolts .

1.3 Removing and installing brake caliper

Special tools and workshop equipment required

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





Removing



Note

This procedure applies only to exchanging or the following repair work on the brake caliper.

- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work ; Raising vehicle .
- Remove front wheels.
- Connect bleeder bottle hose to brake caliper 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.
- Unscrew brake hose.
- Remove bolts -arrows- for securing brake caliper with spanner -1- (15 mm). When doing this, counterhold on guide pin using open jaw spanner -2- (21 mm).
- Remove brake caliper from brake carrier.

Installing

Installation is performed in reverse sequence; note the following:

- The pistons are pressed back.
- The brake pads are seated on the brake carrier.
- Fit brake caliper on brake carrier.
- Bolt brake hose to brake caliper.
- Remove brake pedal actuator - V.A.G 1869/2- .
- Bleed brake system ⇒ [page 46](#) .
- Fit wheels.

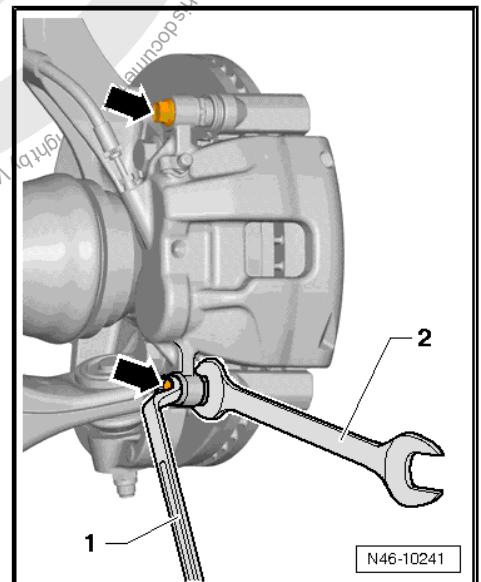


Note

- ◆ *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

- ◆ ⇒ [“1.1 Assembly overview - front brakes”, page 18](#)
- ◆ Wheels, tyres; Specified torque for wheel bolts ⇒ Rep. gr. 44 ; Specified torque for wheel bolts .





2 Rear brakes

⇒ "2.1 Assembly overview - rear brakes", page 24

⇒ "2.2 Removing and installing brake carrier", page 27

⇒ "2.3 Removing and installing brake shoes", page 28

⇒ "2.4 Resetting drum brakes", page 31

⇒ "2.5 Removing and installing wheel brake cylinder", page 33

2.1 Assembly overview - rear brakes



Note

- ◆ After renewing wheel brake cylinder, brake carrier and brake shoes, basic setting of the adjuster needs to be performed ⇒ [page 31](#). 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.
- Brake drum diameter: 295 mm
- Wear limit: 296.5 mm.
- Check wear limit using brake drum calliper gauge - VAS 6787-
- Reset brake before removing brake drum
⇒ [page 31](#)

3 - Rear axle shaft

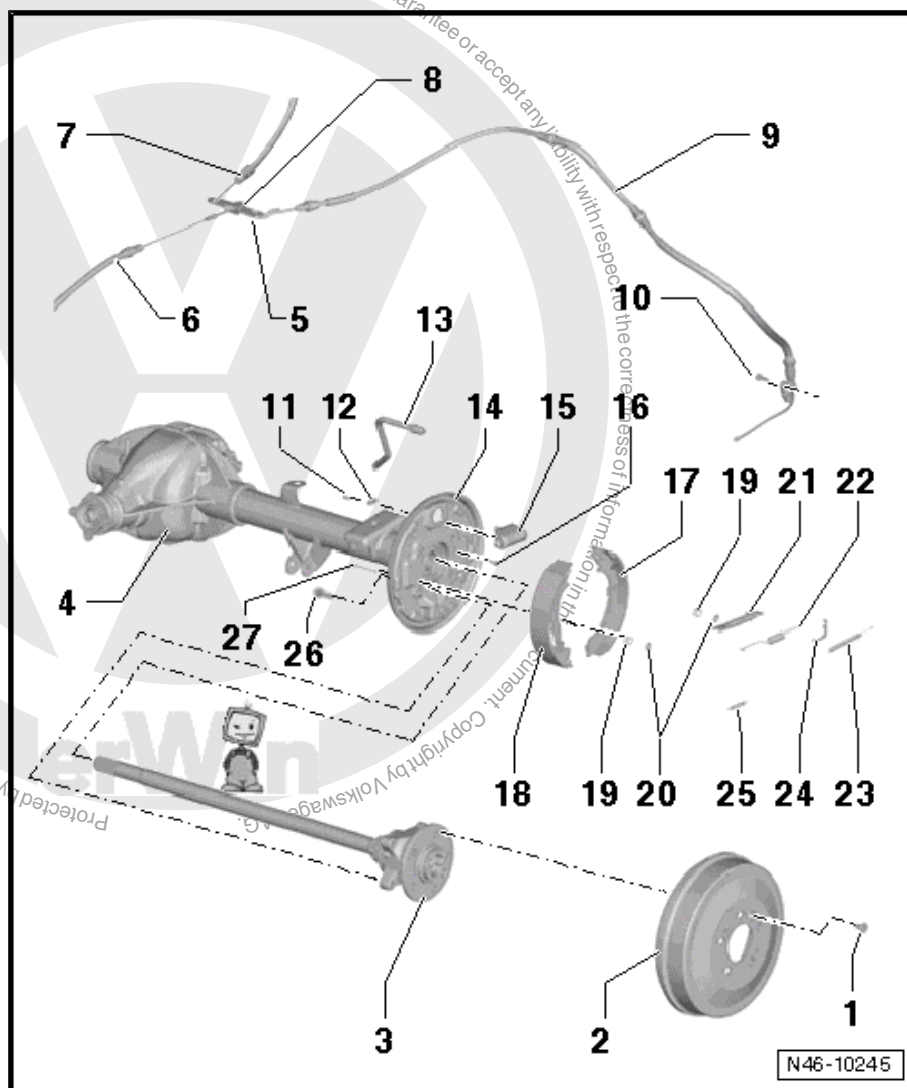
- With wheel bearing/ wheel bearing unit and sensor ring for ABS
- Before removal, remove rear right speed sensor - G44- / rear left speed sensor - G46-
⇒ [page 16](#)
- Do not remove for renewing brake shoes or wheel brake cylinder

4 - Axle beam

5 - Compensator

6 - Handbrake cable front

- Removing and installing





⇒ [page 35](#)

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 36](#)

8 - Adjustment nut

- ☐ Adjusting handbrake ⇒ [page 38](#) .

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 36](#)

10 - Bolt

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

11 - Bolt

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

12 - Cap

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

13 - Brake line

- ☐ 14 Nm

14 - Brake backplate

- ☐ Removing and installing ⇒ [page 27](#)

15 - Wheel brake cylinder

- ☐ Check for leaks ⇒ [page 26](#) .
- ☐ Assembly overview ⇒ [page 27](#) .
- ☐ Removing and installing ⇒ [page 33](#)

16 - Bolt

- ☐ Self-locking (micro-encapsulated)
- ☐ Always renew after removing
- ☐ Clean residual locking fluid out of threaded hole in axle beam



Note

Threaded holes into which self-locking bolts or bolts with locking fluid have been screwed must be cleaned (e.g. using a thread chaser). Otherwise, there is a risk that bolts will shear off when removed once again.

- ☐ 30 Nm

17 - Brake shoe

- ☐ Installed at rear in direction of travel
- ☐ Wear limit ⇒ [page 1](#)
- ☐ Removing and installing ⇒ [page 28](#)

18 - Brake shoe with lever for handbrake

- ☐ Installed at front in direction of travel



- ☐ Wear limit ⇒ [page 1](#)
- ☐ Removing and installing ⇒ [page 28](#)

19 - Compression spring

20 - Spring plate

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

21 - Plunger rod

- ☐ Note correct installation position ⇒ [page 30](#)



Note

- ◆ *Adjusters on plunger rod differ according to whether they have a right-hand or left-hand thread, depending on the installation position.*
- ◆ *Adjuster marked "L" (left-hand thread) belongs on right of vehicle, and vice versa.*

22 - Upper return spring

- ☐ Note installation position: steeply offset side points towards lever for handbrake.
- ☐ Removing and installing ⇒ [page 30](#)

23 - Adjuster spring

- ☐ Engage in lever ⇒ [Item 24 \(page 26\)](#) with longer end of leg.

24 - Lever

- ☐ Secures adjusters on plunger rod to prevent them 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: openings in hooks point towards brake carrier.

26 - Bolt

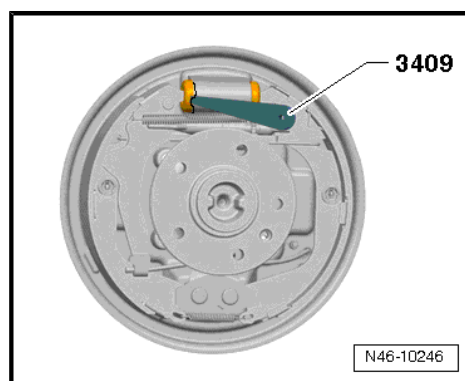
- ☐ For rear axle shaft on axle beam
- ☐ 150 Nm +90°

27 - Shoe steady 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 (ETKA) .
- 3 - Wheel brake cylinder

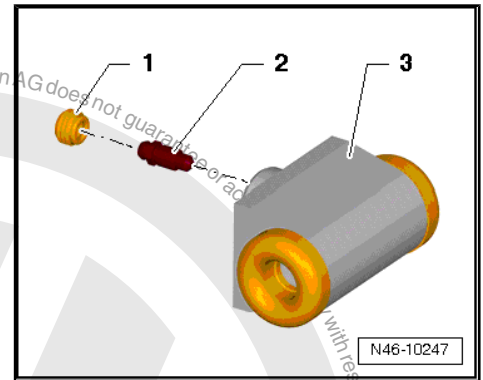


Note

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

Specified torque

Component	Specified torque
Bleeder valve in wheel brake cylinder	8 Nm



2.2 Removing and installing brake carrier

Removing

- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .
- Remove rear wheels.
- Resetting brake and removing brake drum ⇒ [page 31](#) .
- Remove brake shoes ⇒ [page 28](#) .
- Remove wheel brake cylinder ⇒ [page 33](#) .
- 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

Installation is performed in reverse sequence; note 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 fluid have been screwed must be cleaned (e.g. using a thread chaser). Otherwise, there is a risk that bolts will shear off when removed once again.*
- ◆ *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 46](#) .

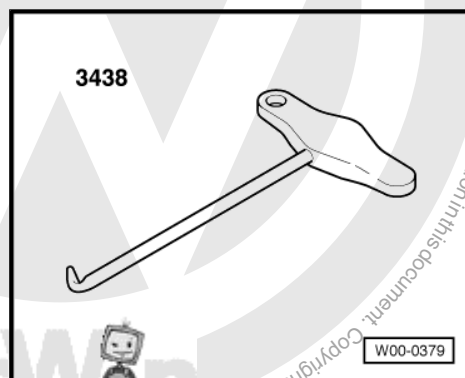
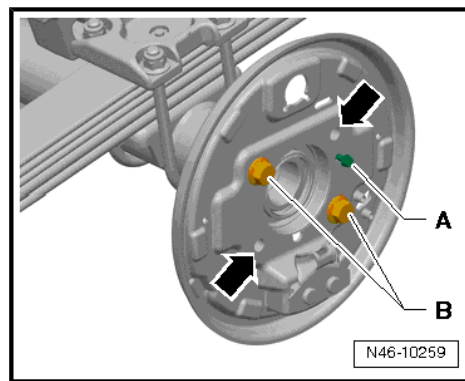
Specified torques

- ◆ ⇒ [“2.1 Assembly overview - rear brakes”, page 24](#)
- ◆ Rear axle shafts; Assembly overview - rear axle shafts ⇒ Running gear, axles, steering; Rep. gr. 42 ; Assembly overview - rear axle shafts .
- ◆ Wheels, tyres; Specified torque for wheel bolts ⇒ Rep. gr. 44 ; Specified torque for wheel bolts .

2.3 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.
- Resetting brake and removing brake drum ⇒ [page 31](#) .



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 only methylated spirits for cleaning the brake system.



WARNING

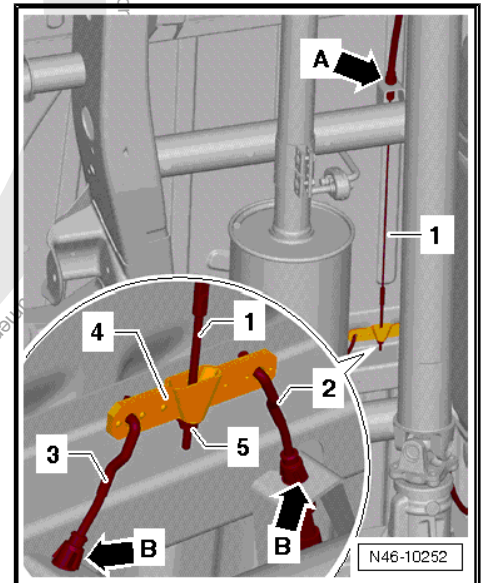
Do not blow out brake system with compressed air; the resulting dust constitutes a health hazard!

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

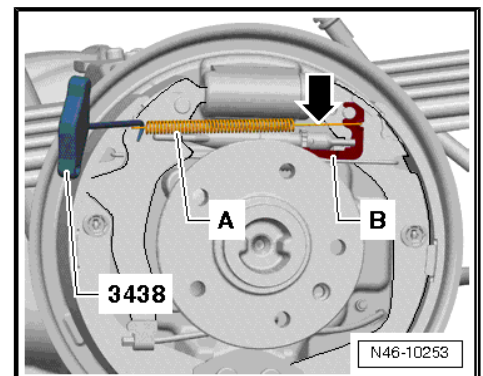


Note

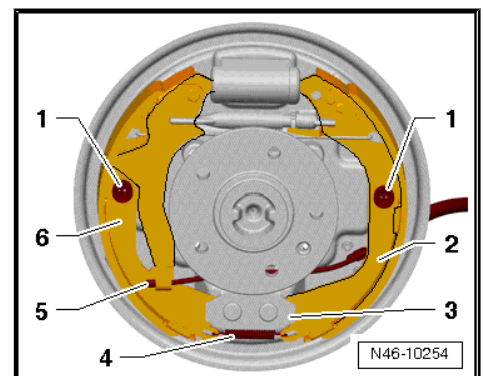
-Pos. 2 ... 4- are not relevant.



- 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.*
- ♦ *Adjuster marked "R" -arrow B- belongs on left of vehicle, and vice versa.*

- Unhook complete plunger rod -2- and upper return spring -1- from brake shoes -3- and -4-.

Assemble plunger rod as follows:

- Place thermoclip -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

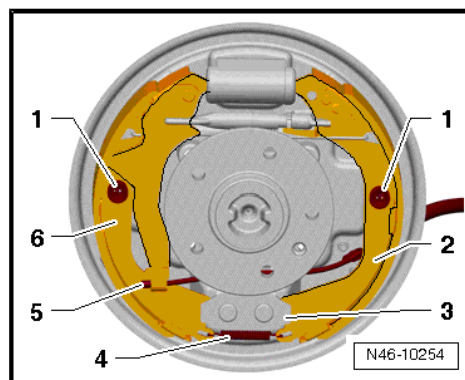
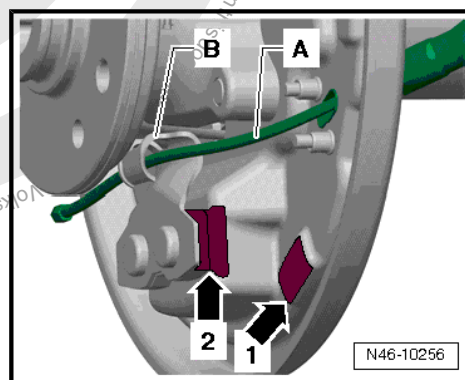
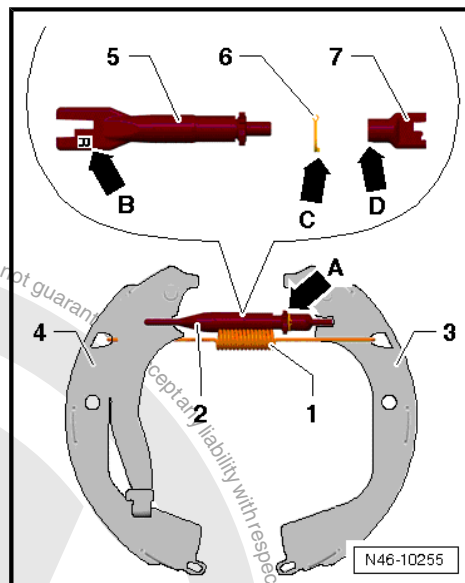
- Handbrake cable -A- must be within support plate bracket -B-.
- Grease contact surfaces for brake shoes on support plate -arrow 2- and on brake carrier -arrow 1- (qty. 6 distributed around circumference) with lubricating paste ⇒ Electronic Parts Catalogue (ETKA) .
- Guide brake shoes in together with 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.



Caution

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 38](#) .

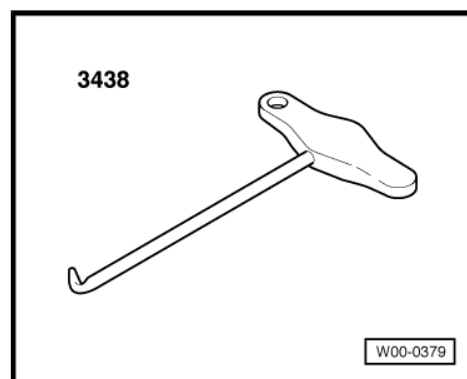
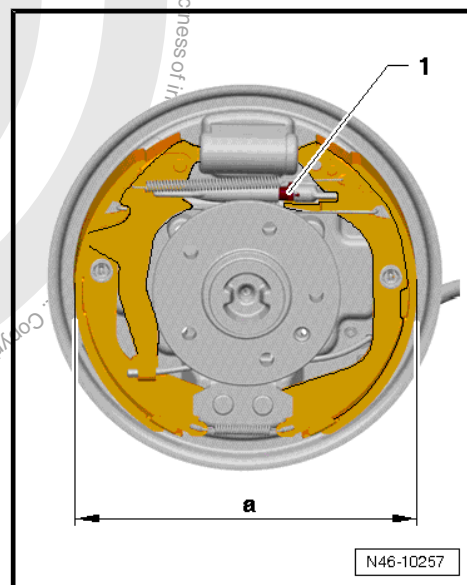
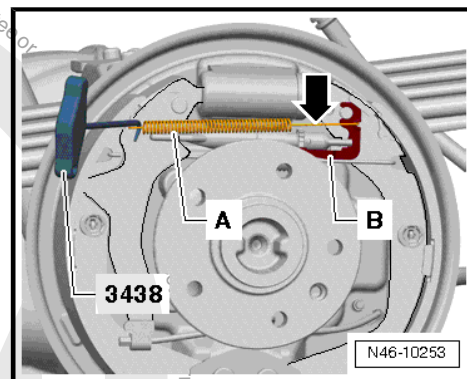
Specified torques

- ◆ ⇒ [“2.1 Assembly overview - rear brakes”, page 24](#)
- ◆ Wheels, tyres; Specified torque for wheel bolts ⇒ Rep. gr. 44 ; Specified torque for wheel bolts .

2.4 Resetting drum brakes

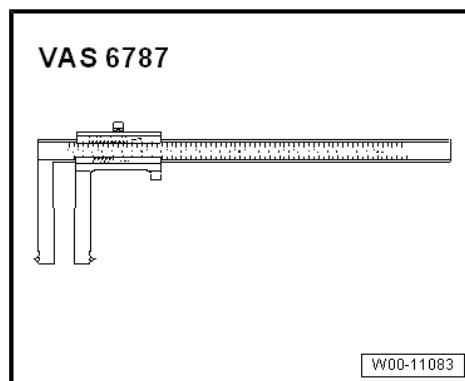
Special tools and workshop equipment required

- ◆ Hook - 3438-



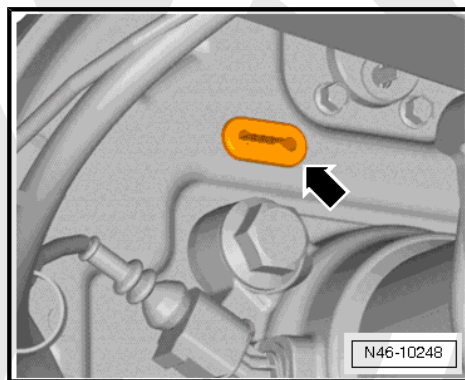


◆ Brake drum calliper gauge - VAS 6787-

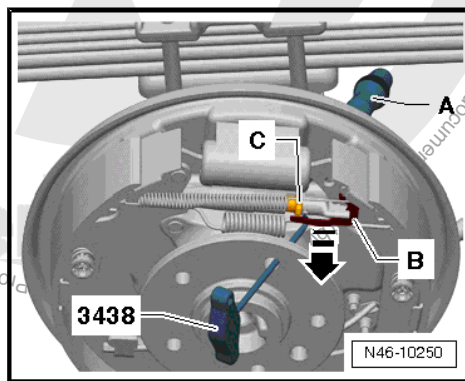


Procedure

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

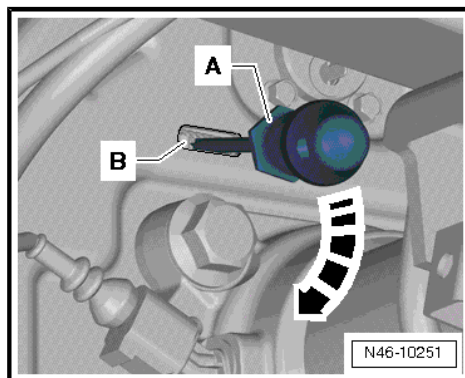


- Pass a hook , e.g. -3438- through a threaded hole for wheel bolts in brake drum/wheel hub to pull lever -B- carefully in -direction of arrow-.
- The guide a short screwdriver -A- through opening in brake carrier and position against pinion of adjuster -C-.



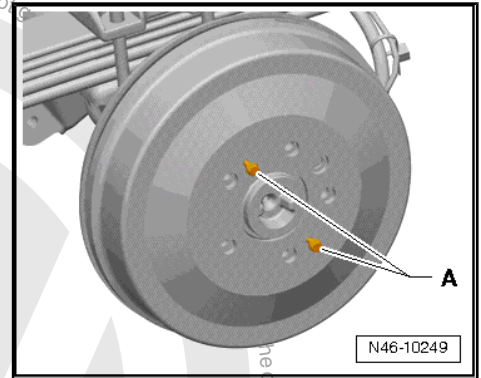
Note

- ◆ 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.





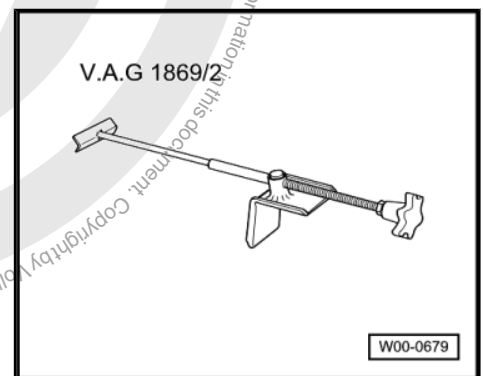
- Due to corrosion, it may be necessary to press brake drum off wheel hub.
- Screw 2 bolts M 8 -A- into threaded holes in brake drum and tighten one then the other by a $\frac{1}{2}$ turn at a time.
- Check wear limit of brake drum using brake drum calliper gauge - VAS 6787- .



2.5 Removing and installing wheel brake cylinder

Special tools and workshop equipment required

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



Removing

- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .
- Remove rear wheels.
- 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 31](#) .
- Remove brake shoes ⇒ [page 28](#) .
- Remove bolts -2- for wheel brake cylinder on brake carrier and take off wheel brake cylinder.

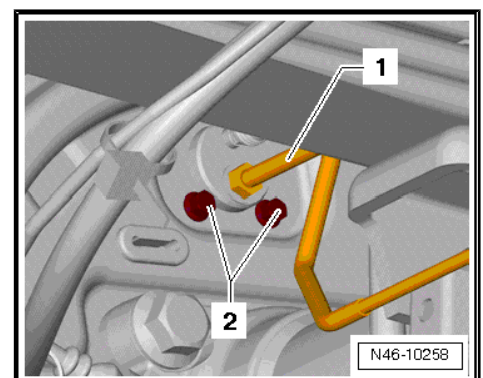
Installing

Installation is performed in reverse sequence; note the following:

- Install brake shoes and brake drum ⇒ [page 28](#) .
- Bleed brake system ⇒ [page 46](#) .

Specified torques

- ◆ ⇒ [“2.1 Assembly overview - rear brakes”, page 24](#)
- ◆ Wheels, tyres; Specified torque for wheel bolts ⇒ Rep. gr. 44 ; Specified torque for wheel bolts .





3 Handbrake

⇒ [“3.1 Assembly overview - parking brake”, page 34](#)

⇒ [“3.2 Removing and installing handbrake lever”, page 34](#)

⇒ [“3.3 Removing and installing front handbrake cable”, page 35](#)

⇒ [“3.4 Removing and installing rear handbrake cable”, page 36](#)

⇒ [“3.5 Adjusting parking brake”, page 38](#)

3.1 Assembly overview - parking brake

1 - Handbrake lever trim

- Release ⇒ [page 35](#) .

2 - Nut

- For front handbrake cable on handbrake lever

3 - Handbrake lever

- Removing and installing ⇒ [page 34](#)

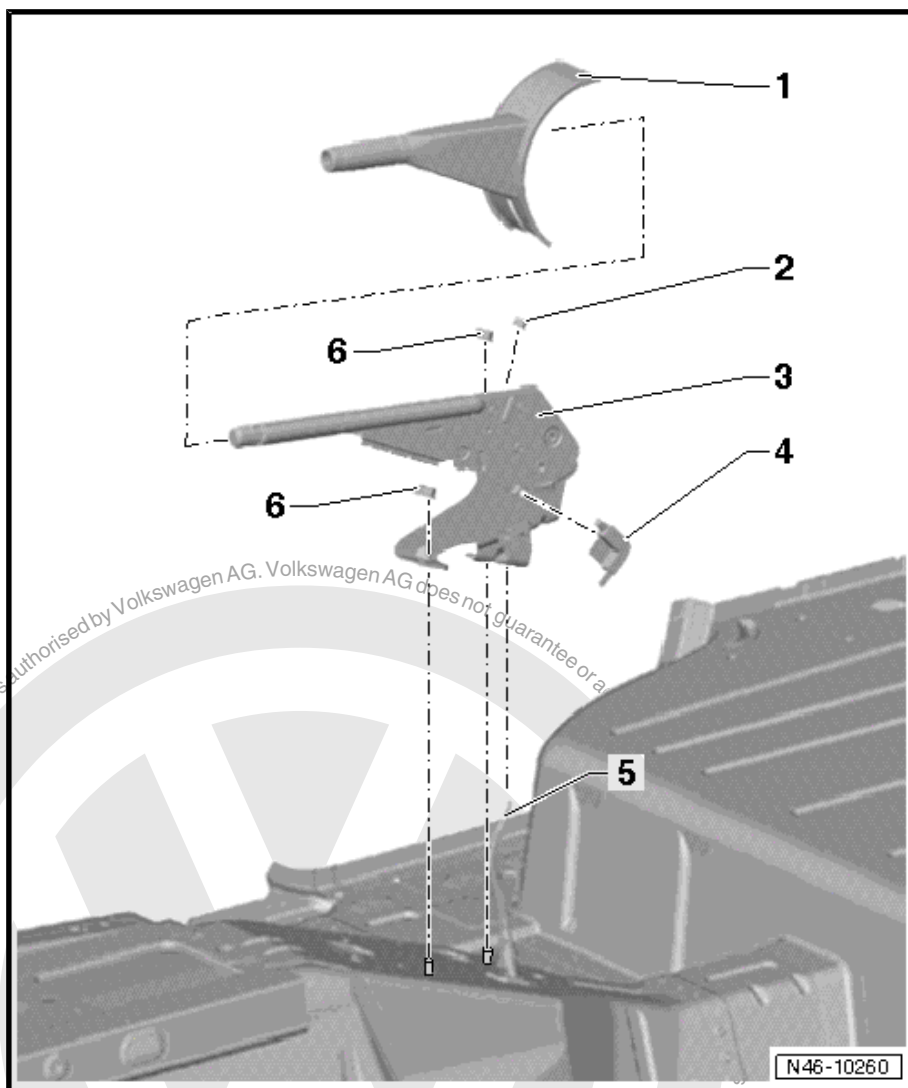
4 - Handbrake warning switch - F9-

5 - Handbrake cable front

- Removing and installing ⇒ [page 35](#)
- Adjusting ⇒ [page 38](#) .

6 - Nut

- For handbrake lever on body
- 20 Nm



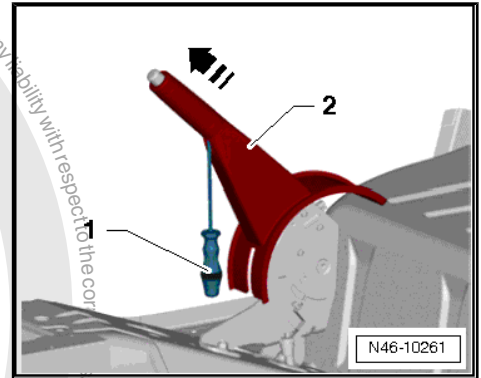
3.2 Removing and installing handbrake lever

Removing

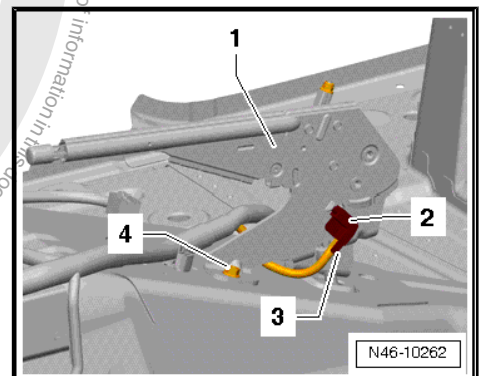
- Remove centre console ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments, covers and trims; Removing centre console .



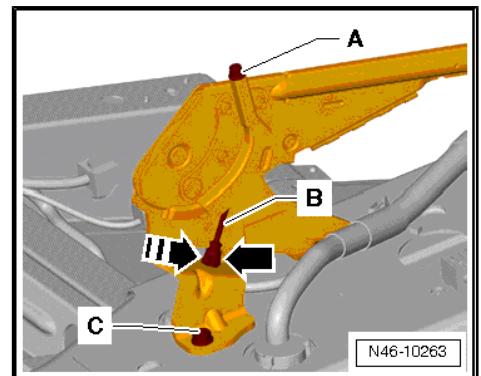
- Unlock tab in rear lower area of handle with a screwdriver -1-.
- Then pull trim -2- off handbrake lever in -direction of arrow-.



- Handbrake lever -1- is in its lowest position, and is not applied.
- Pull connector -3- off 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

Installation is performed in reverse sequence; note the following:

- Nut -A- must be screwed over end of front handbrake cable -B-.
- Adjust handbrake ⇒ [page 38](#) .

Specified torques

- ♦ ⇒ [“3.1 Assembly overview - parking brake”, page 34](#)
- ♦ Installing centre console ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments, covers and trims; Installing centre console .

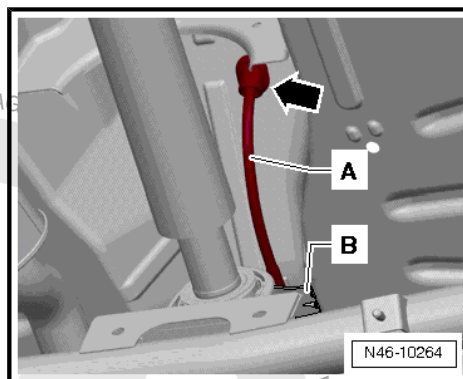
3.3 Removing and installing front handbrake cable

Removing

- Remove handbrake lever ⇒ [page 34](#) .
- 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

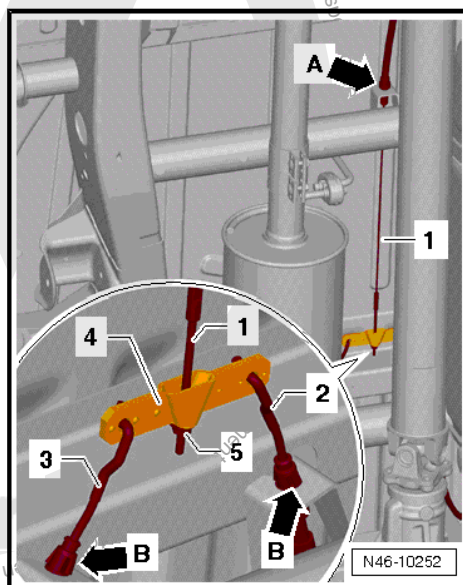
Handbrake cables at rear left -2- and right -3- remain in compensator -4-.

- 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

Installation is performed in reverse sequence; note the following:

- Locking projections on cable support bracket -arrow A- of front handbrake cable must be horizontal after installation.
- Install handbrake lever ⇒ [page 34](#) .
- Adjust handbrake ⇒ [page 38](#) .



Specified torques

- ♦ ⇒ [“3.1 Assembly overview - parking brake”, page 34](#)
- ♦ Installing centre console ⇒ General body repairs, interior; Rep. gr. 68 ; Compartments, covers and trims; Installing centre console .

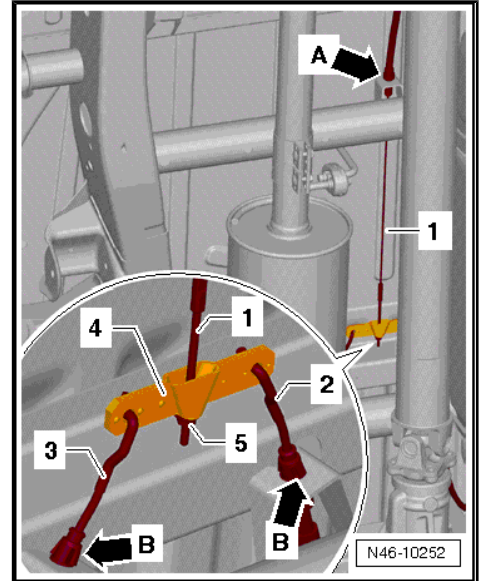
3.4 Removing and installing rear handbrake cable

Removing

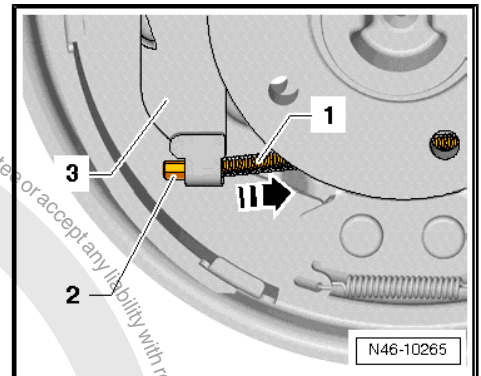
- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .
- Remove rear wheels.



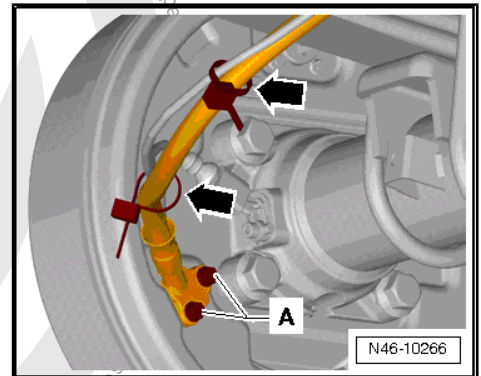
- Unscrew adjustment nut -5- from front handbrake cable -1-.
- Unhook corresponding handbrake cable at rear left -2- or right -3- from compensator -4-.
- Using pliers, press together both locking projections on cable support bracket -arrow B- of corresponding rear handbrake cable, and remove handbrake cable from cable support bracket.
- Resetting brake and removing brake drum ⇒ [page 31](#) .



- Push spring -1- of handbrake cable back in -direction of arrow- and hold it with pliers.
- Unhook handbrake cable -2- from lever -3-.



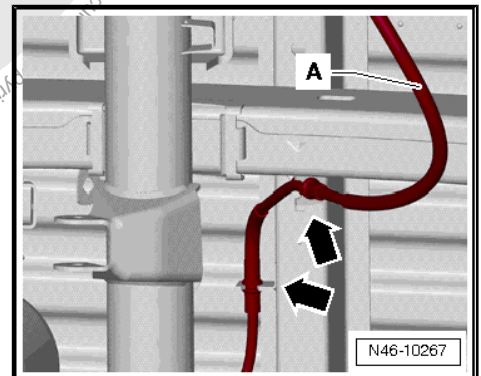
- Remove cable ties -arrows- for speed sensor wire from handbrake cable.
- Remove bolts -A- and take handbrake cable off brake carrier.



- Then pull handbrake cable -A- out of brackets on frame, pull out and remove body -arrows-.

Installing

Installation is performed in reverse sequence; note the following:



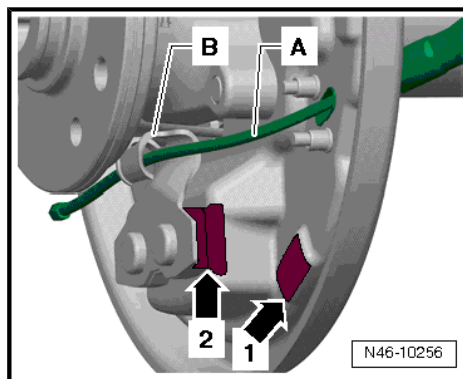


- Handbrake cable -A- must be within support plate bracket -B-.

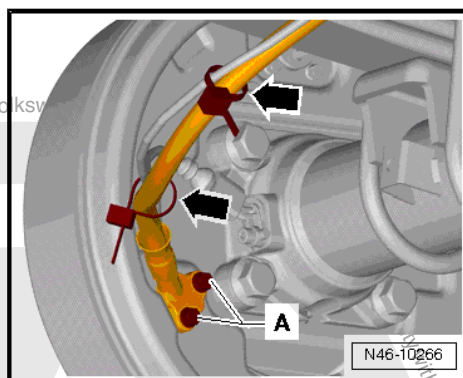


Note

- ◆ For reasons of clarity, brake shoes are removed in illustration.
- ◆ -Arrow 1- and -arrow 2- are not relevant.



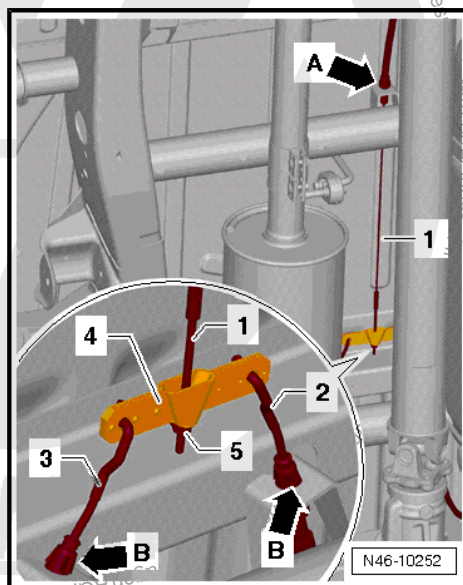
- Tighten bolts -A- to specified torque.
- Fit new cable ties -arrows- for speed sensor wire on handbrake cable.



- Take handbrake cable that is to be installed at rear left -2- or right -3- and hook it into compensator -4-.
- Locking projections 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 38](#)

Specified torques

- ◆ ⇒ [“3.1 Assembly overview - parking brake”, page 34](#)
- ◆ Wheels, tyres; Specified torque for wheel bolts ⇒ Rep. gr. 44 ; Specified torque for wheel bolts .



3.5 Adjusting parking brake

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

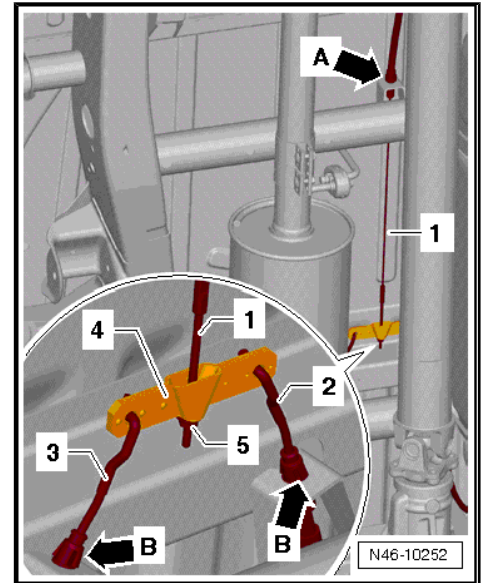
Procedure

- Raise vehicle ⇒ Maintenance ; Booklet ; Descriptions of work; Raising vehicle .



- The foot brake must be functional and bled.
- Brake shoes are set to basic dimension 294 mm after removal and installation ⇒ [page 31](#) .
- Front handbrake cable -1- is not allowed to hang down (no slack in cable).
- Release handbrake.
- Firmly depress brake pedal three 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.



4 Brake pedal

⇒ "4.1 Assembly overview - brake pedal", page 40

⇒ "4.2 Removing and installing brake pedal", page 41

4.1 Assembly overview - brake pedal



WARNING

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 41](#)

2 - Pin

- ☐ For plunger rod of brake booster on brake pedal

3 - Nut

- ☐ Always renew after removing
- ☐ For pedal cluster/brake pedal on plenum chamber bulkhead
- ☐ 25 Nm

4 - Nut

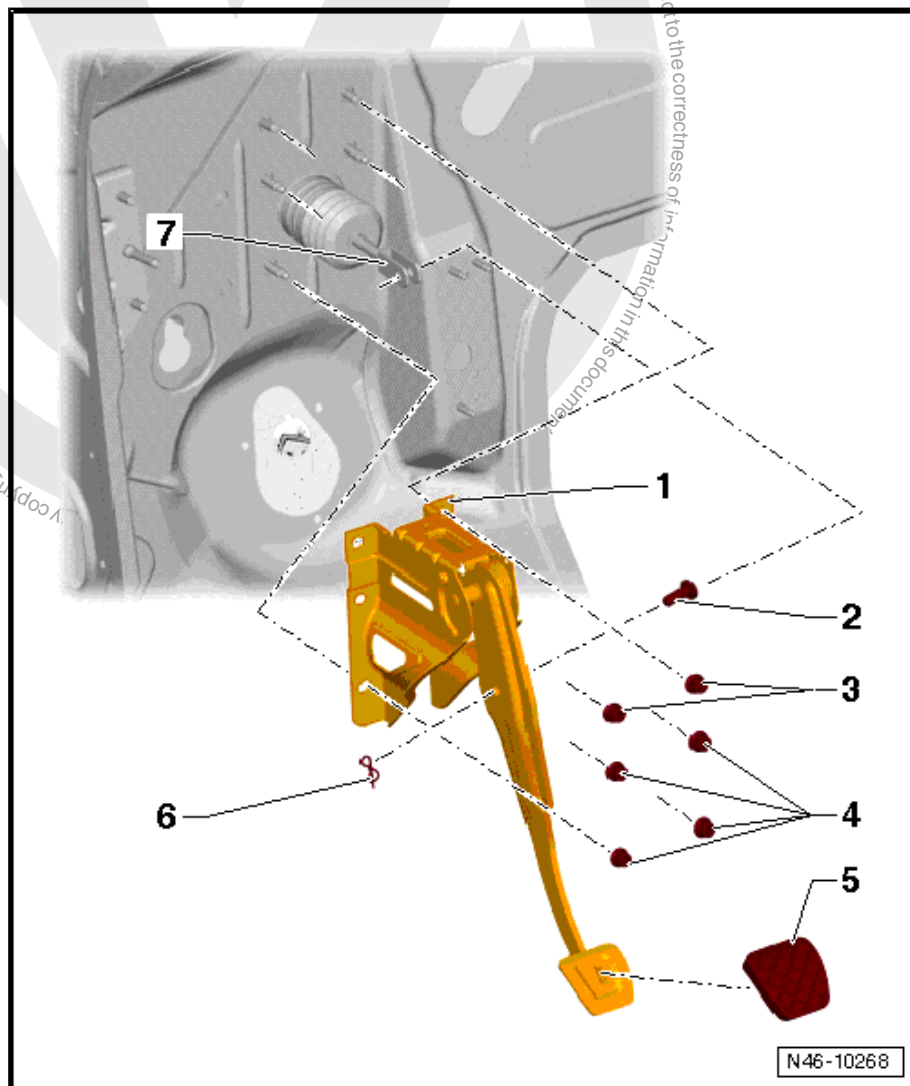
- ☐ Always renew after removing
- ☐ For pedal cluster/brake pedal and brake booster on plenum chamber bulkhead
- ☐ 25 Nm

5 - Cap

6 - Securing spring

- ☐ Secures pin
⇒ [Item 2 \(page 40\)](#)

7 - Yoke head/servo-assistance





4.2 Removing and installing brake pedal

Removing

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

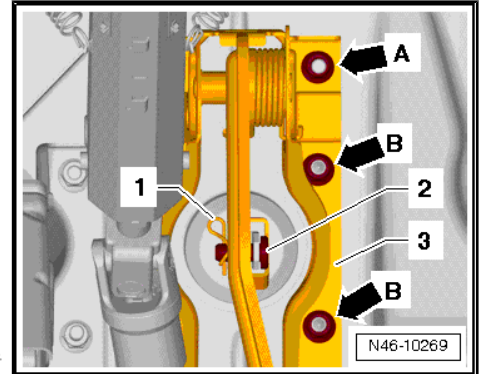
Installing

Installation is performed in reverse sequence; note 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 booster on brake pedal and push in securing spring -1-.

Specified torques

⇒ ["4.1 Assembly overview - brake pedal", page 40](#)





47 – Brakes - hydraulics

1 Front brake caliper

⇒ [“1.1 Assembly overview - front brake caliper”, page 42](#)

⇒ [“1.2 Removing and installing brake caliper piston”, page 43](#)

1.1 Assembly overview - front brake caliper



Note

- ◆ When carrying out repairs, install all parts supplied in repair kit.
- ◆ Use only methylated spirits for cleaning 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
- ❑ Specified torque when being secured to brake caliper: 14 Nm (pipe with union nut).
- ❑ Specified torque when being secured to brake caliper: 17 Nm (threaded pipe).

4 - Brake caliper housing

5 - Sealing ring

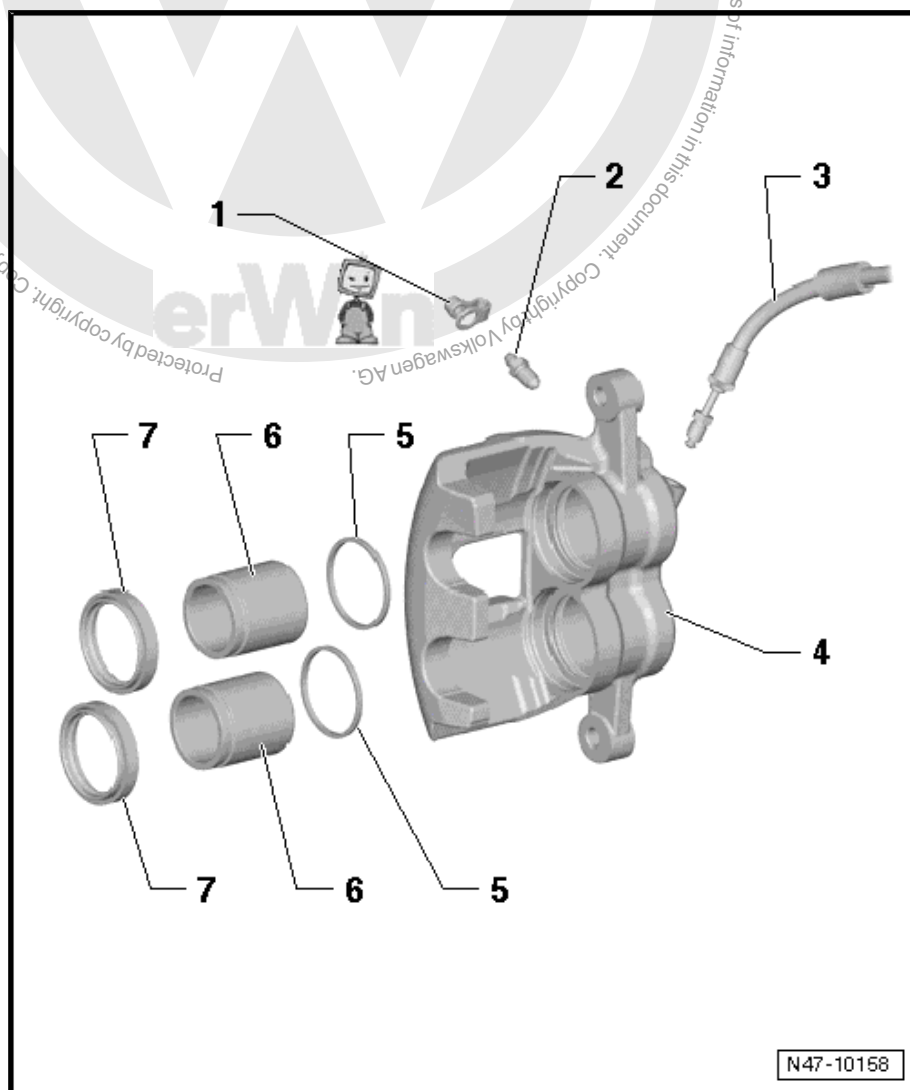
- ❑ Removing and installing
⇒ [page 43](#)

6 - Piston

- ❑ Removing and installing
⇒ [page 43](#)

7 - Protective cap

- ❑ Take care not to damage when inserting piston.



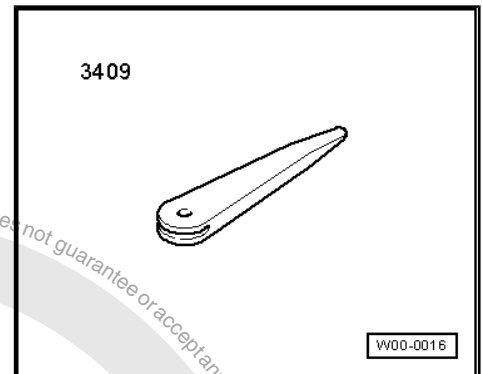
N47-10158



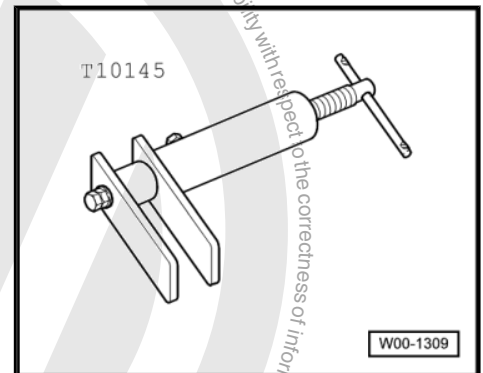
1.2 Removing and installing brake caliper piston

Special tools and workshop equipment required

- ◆ Removal wedge - 3409-



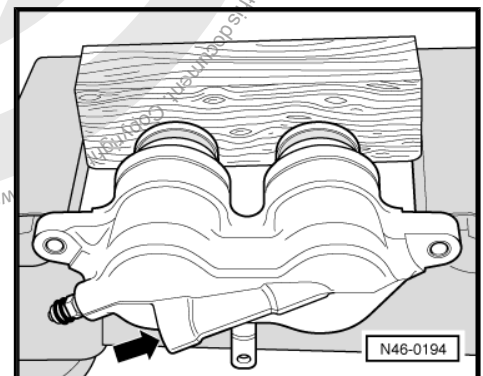
- ◆ Piston resetting appliance - T10145-



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.



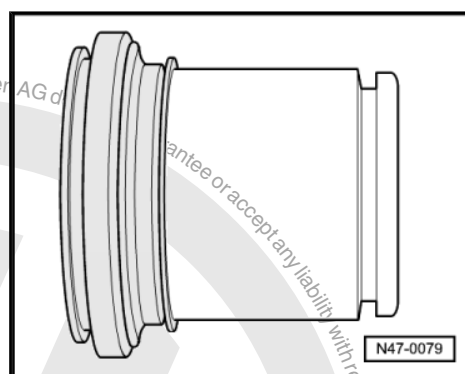
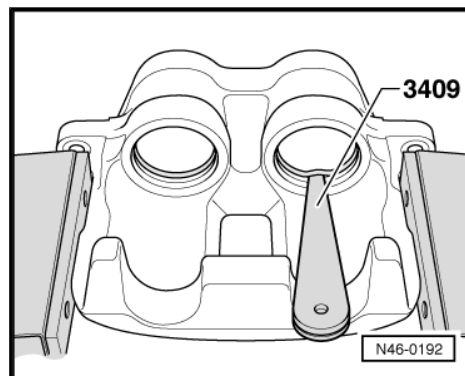
Note

Only use methylated spirits to clean brake caliper housing.

Installing

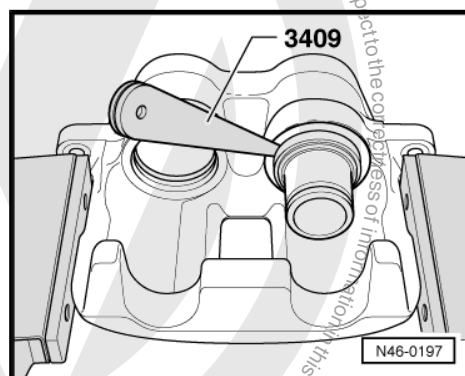
Installation is performed in reverse sequence; note the following:

- 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 cap with outer sealing lip on piston.



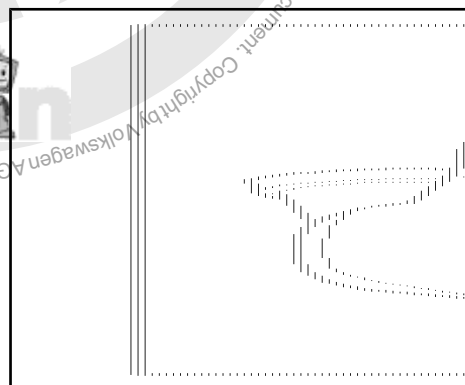
- Using removal wedge - 3409- , insert inner sealing lip into cylinder groove.

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 cap will then slip into the piston groove.





2 Hydraulic system

⇒ [“2.1 General notes on brake fluid”, page 45](#)

⇒ [“2.2 Pre-bleeding hydraulic system”, page 46](#)

⇒ [“2.3 Bleeding hydraulic system following standard procedure”, page 48](#)

⇒ [“2.4 Subsequent bleeding of hydraulic system”, page 48](#)

⇒ [“2.5 Testing for leaks”, page 48](#)

2.1 General notes on brake fluid

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

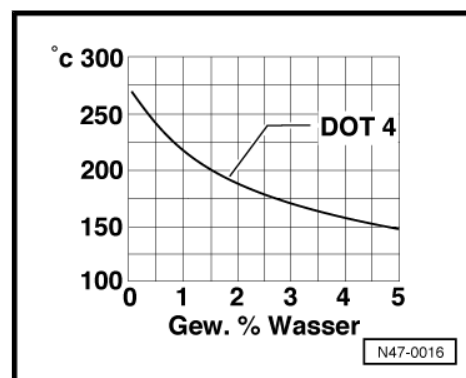
As the water content in the brake fluid rises, so its boiling point falls. If the brake fluid gets very hot, this can lead to vapour bubbles being formed, and failure of the brake.

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.



WARNING

Rubber parts of brake system (sleeves, seals) are not compatible with mineral oil, fuel 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.



Caution

Brake fluid specification

- ♦ *Volkswagen recommends using new brake fluid in accordance with VW Standard 501 14 in order to ensure optimum function of the brake system. Alternatively, it is possible to use a brake fluid that complies with the requirements of US Standard FMVSS 116 DOT 4 or DIN ISO 4925 CLASS 4. The specification is stated on the brake fluid packaging.*
- ♦ *Suitable brake fluids are available from a Volkswagen partner.*



Note

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

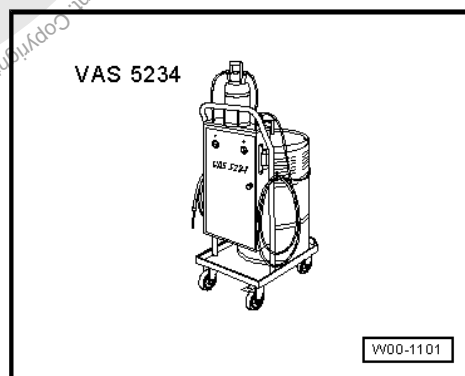
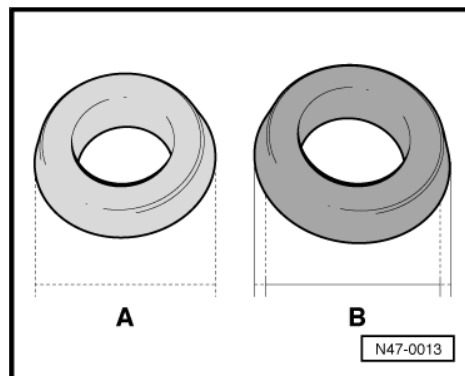
Changing brake fluid

⇒ Maintenance ; Booklet ; Descriptions of work; brake fluid: changing

2.2 Pre-bleeding hydraulic system

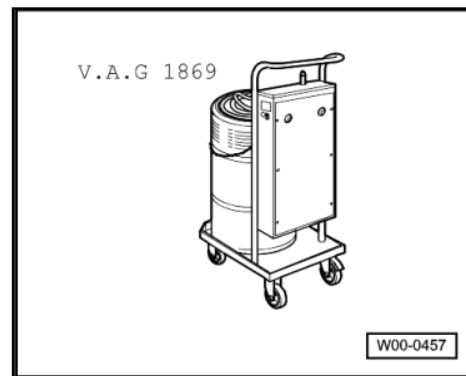
Special tools and workshop equipment required

- ♦ 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.*
- ◆ *Rinse off spilled 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 brake fluid reservoir is completely empty (e.g. brake system leaking) in these vehicles, 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 rear left and rear right wheel brake cylinders 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 48](#) .



2.3 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 - Rear left wheel brake cylinder
 - 4 - Rear right wheel brake cylinder

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

2.4 Subsequent bleeding of hydraulic system

Carry out subsequent bleeding when:

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

Subsequent bleeding requires the assistance of a second mechanic.

- Connect brake filling and bleeding 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 - Rear left wheel brake cylinder
- 4 - Rear right wheel brake cylinder

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!

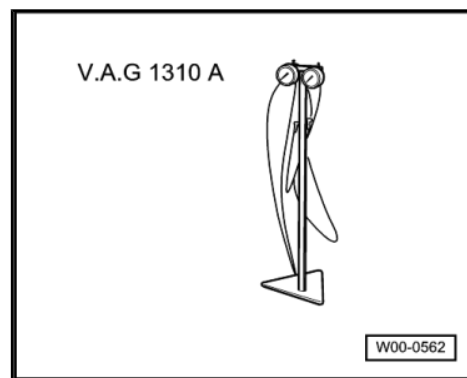
2.5 Testing for leaks

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.



3 Brake booster and brake master cylinder

⇒ "3.1 Assembly overview - brake booster/brake master cylinder", page 50

⇒ "3.2 Removing and installing brake booster", page 51

⇒ "3.3 Removing and installing brake master cylinder", page 53

⇒ "3.4 Removing and installing brake light switch F", page 55

3.1 Assembly overview - brake booster/brake master cylinder

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



Caution

Brake fluid specification

1 - Cap

2 - Brake fluid level warning contact - F34-

3 - Brake fluid reservoir

4 - Connection

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

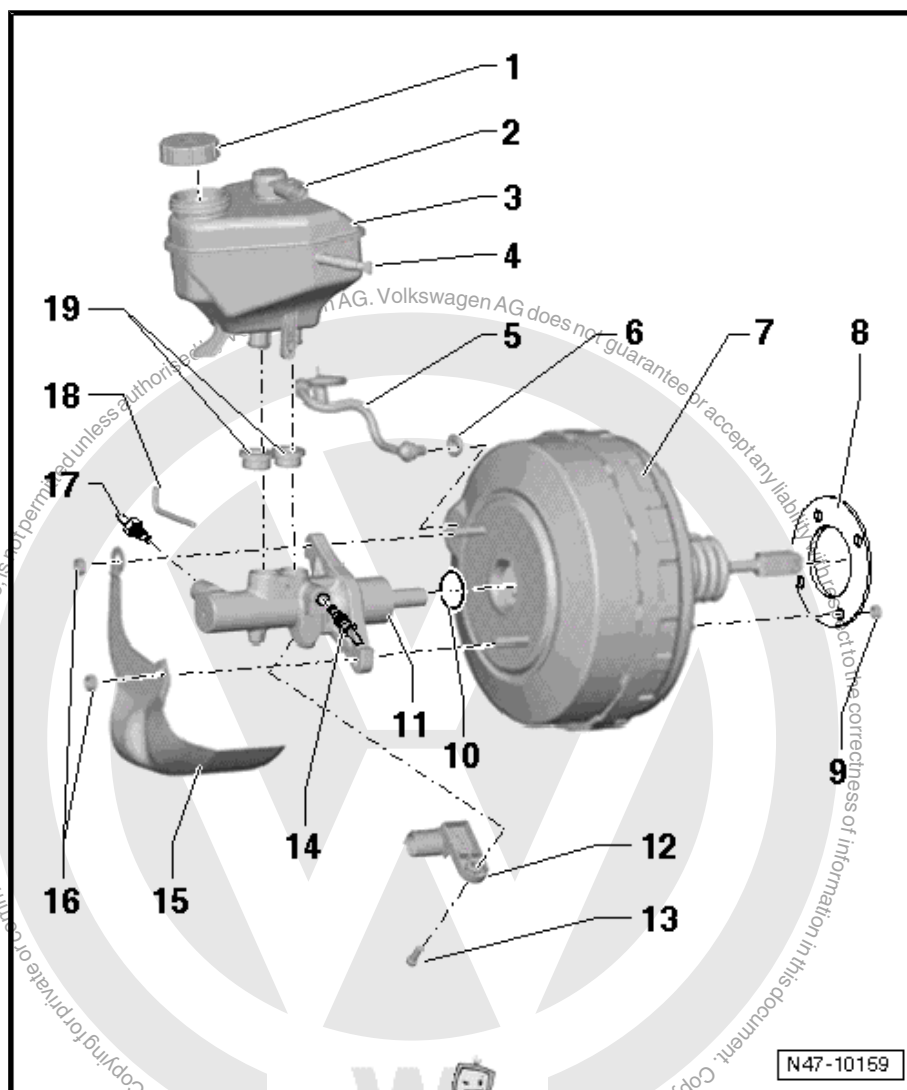
5 - Vacuum hose

6 - Sealing plug

7 - Brake booster

- ☐ 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 vacuum in unit)
 - Now step on and hold brake pedal with medium pressure and start engine. If the brake booster is functioning properly, the brake pedal will be felt to go down as the servo takes effect.

- ☐ If faulty, renew complete (check all vacuum lines first).



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- ☐ Removing and installing ⇒ [page 51](#)

8 - Seal

- ☐ For brake booster on plenum chamber bulkhead

9 - Nut

- ☐ Always renew after removing
- ☐ For brake booster and pedal cluster/brake pedal on plenum chamber bulkhead
- ☐ 25 Nm

10 - Sealing ring

11 - Brake master cylinder

- ☐ Allocation ⇒ Electronic Parts Catalogue (ETKA) .
- ☐ Cannot be repaired. If faulty, renew as a complete unit.
- ☐ Removing and installing ⇒ [page 53](#)

12 - Brake light switch - F-

- ☐ Including brake pedal switch - F47-
- ☐ Removing and installing ⇒ [page 55](#)

13 - Bolt

- ☐ 5 Nm

14 - Brake line

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

15 - Splash plate

16 - Nut

- ☐ Always renew after removing
- ☐ 25 Nm

17 - Brake line

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

18 - Pin

- ☐ Secures brake fluid reservoir on brake master cylinder
- ☐ Engage angle piece into retainer on brake fluid reservoir

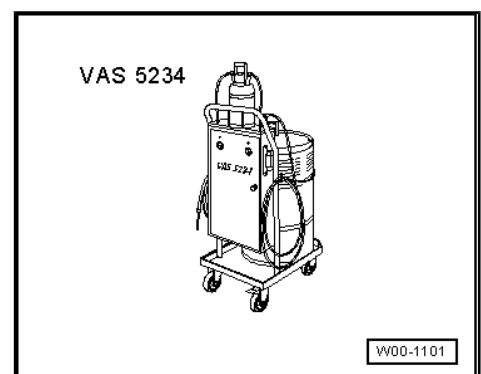
19 - Sealing plug

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

3.2 Removing and installing brake booster

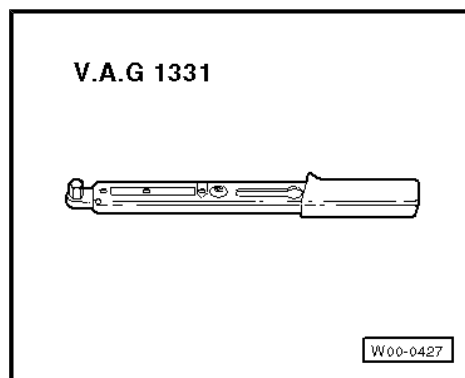
Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment - VAS 5234-





- ◆ Torque wrench - V.A.G 1331-



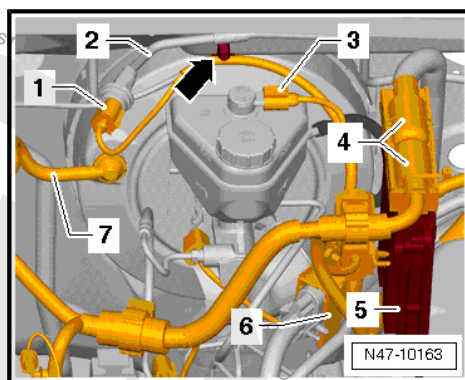
Removing

Vehicles with air conditioning system:

- Pull connector -1- off refrigerant line -2-
- Remove refrigerant line -2- from plenum chamber bulkhead -arrow- and carefully tie up slightly higher.

Continuation for all models:

- Disconnect connector -3- from brake fluid level warning contact - F34- .
- Detach 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 booster.
- Lay out a sufficient number of lint-free cloths under brake master cylinder.
- Draw off as much brake fluid as possible from brake fluid reservoir using brake filling and bleeding equipment - VAS 5234- or upgrade kit and extraction unit - V.A.G 1869/4- .

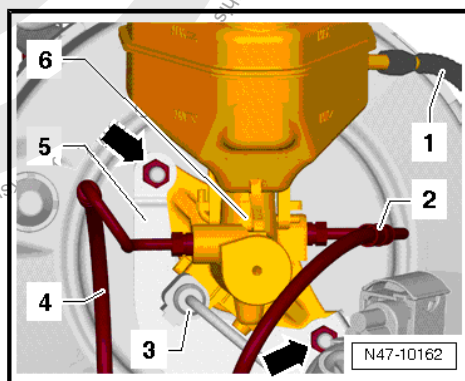


Vehicles with manual gearbox:

- Detach supply hose -1- for clutch master cylinder and seal.

Continuation for all models:

- Pull connector -3- off brake light switch - F- .
- Unscrew brake lines -2- and -4- from brake master cylinder and seal brake lines using sealing plugs from repair kit part number 1H0 698 311 A.
- Remove nuts -arrows- for brake master cylinder from brake booster.
- If installed, remove cover plate -5-.
- Carefully take brake master cylinder -6- out of brake booster together with brake fluid reservoir.





- Remove securing spring -1- from pin -2- for yoke head/brake booster 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 booster jams in holes during removal and installation.
- Carefully remove brake booster from the vehicle. If necessary, push fuel lines and electrical cables slightly to one side.

Installing

Installation is performed in reverse sequence; note 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 booster on brake pedal and push in securing spring -1-.
- After installation, brake system ⇒ [page 46](#) and clutch mechanism need to be bled ⇒ Power transmission; Rep. gr. 30 ; Bleeding clutch mechanism .

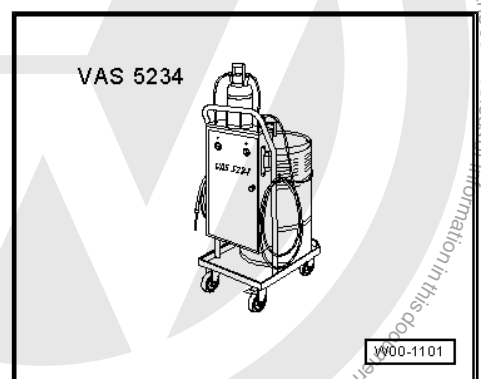
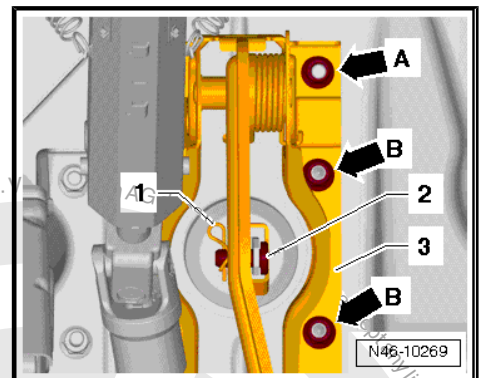
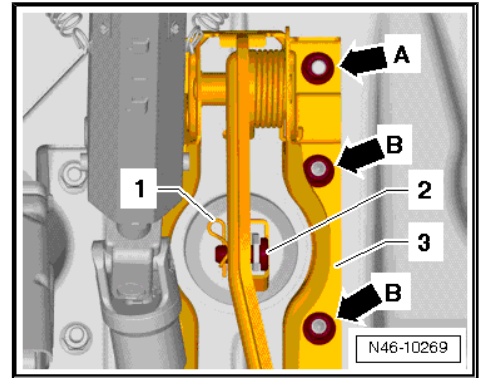
Specified torques

- ◆ ⇒ [“3.1 Assembly overview - brake booster/brake master cylinder”, page 50](#)
- ◆ ⇒ [“4.1 Assembly overview - brake pedal”, page 40](#)

3.3 Removing and installing brake master cylinder

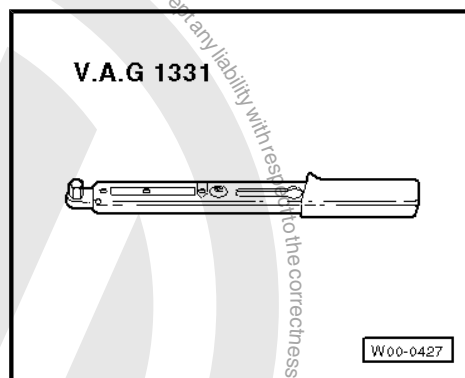
Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment - VAS 5234-





- ◆ Torque wrench - V.A.G. 1331-



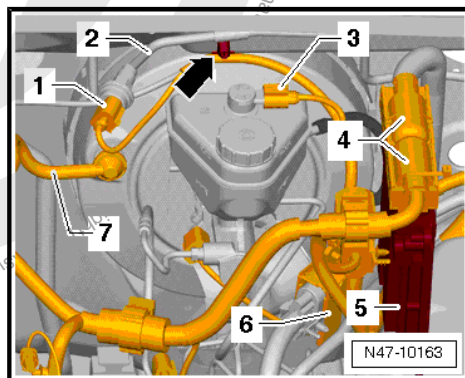
Removing

- Disconnect 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.
- Draw off as much brake fluid as possible from brake fluid reservoir using brake filling and bleeding equipment - VAS 5234- or upgrade kit and extraction unit - V.A.G 1869/4- .

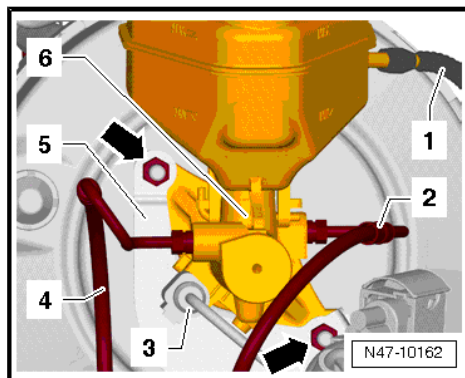


Vehicles with manual gearbox:

- Detach supply hose -1- for clutch master cylinder and seal.

Continuation for all models:

- Pull connector -3- off brake light switch - F- .
- Unscrew brake lines -2- and -4- from brake master cylinder and seal brake lines using sealing plugs from repair kit part number 1H0 698 311 A.
- Remove nuts -arrows- for brake master cylinder from brake booster.
- Remove heat shield (if installed) -5-.
- Carefully take brake master cylinder -6- out of brake booster.



Installing

Installation is performed in reverse sequence; note the following:

- When assembling brake master cylinder with brake booster, make sure plunger rod is properly positioned in brake master cylinder.
- After installation, brake system ⇒ [page 46](#) and clutch mechanism need to be bled ⇒ Power transmission; Rep. gr. 30 ; Bleeding clutch mechanism .

Specified torques

- ◆ ⇒ ["3.1 Assembly overview - brake booster/brake master cylinder", page 50](#)



3.4 Removing and installing brake light switch - F-

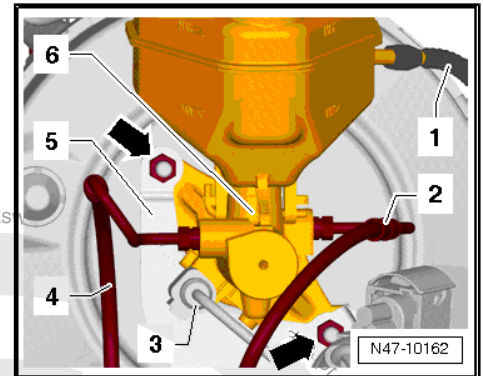
Removing

- Pull connector -3- off 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-.

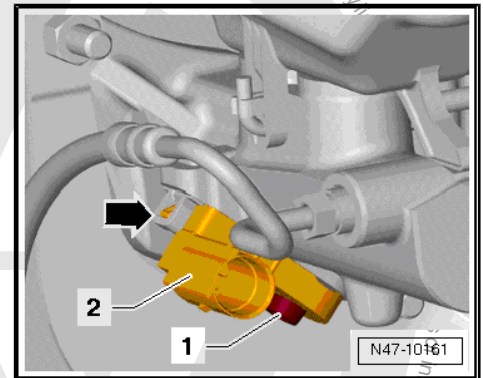
Installing

Installation is performed in reverse sequence; note the following:

- Tighten bolt -1-.

Specified torques

- ◆ [⇒ "3.1 Assembly overview brake booster/brake master cylinder", page 50](#)





4 Brake lines

⇒ "4.1 Assembly overview - flanging tool", page 56

⇒ "4.2 Required tools", page 57

⇒ "4.3 Repairing brake lines", page 58

4.1 Assembly overview - flanging tool

1 - Flanging tool upper part

- ☐ Unbolt to change flanging jaws .

2 - Fastening for handle

- ☐ Must be unbolted to gain access to securing bolt for upper part.

3 - Securing bolt

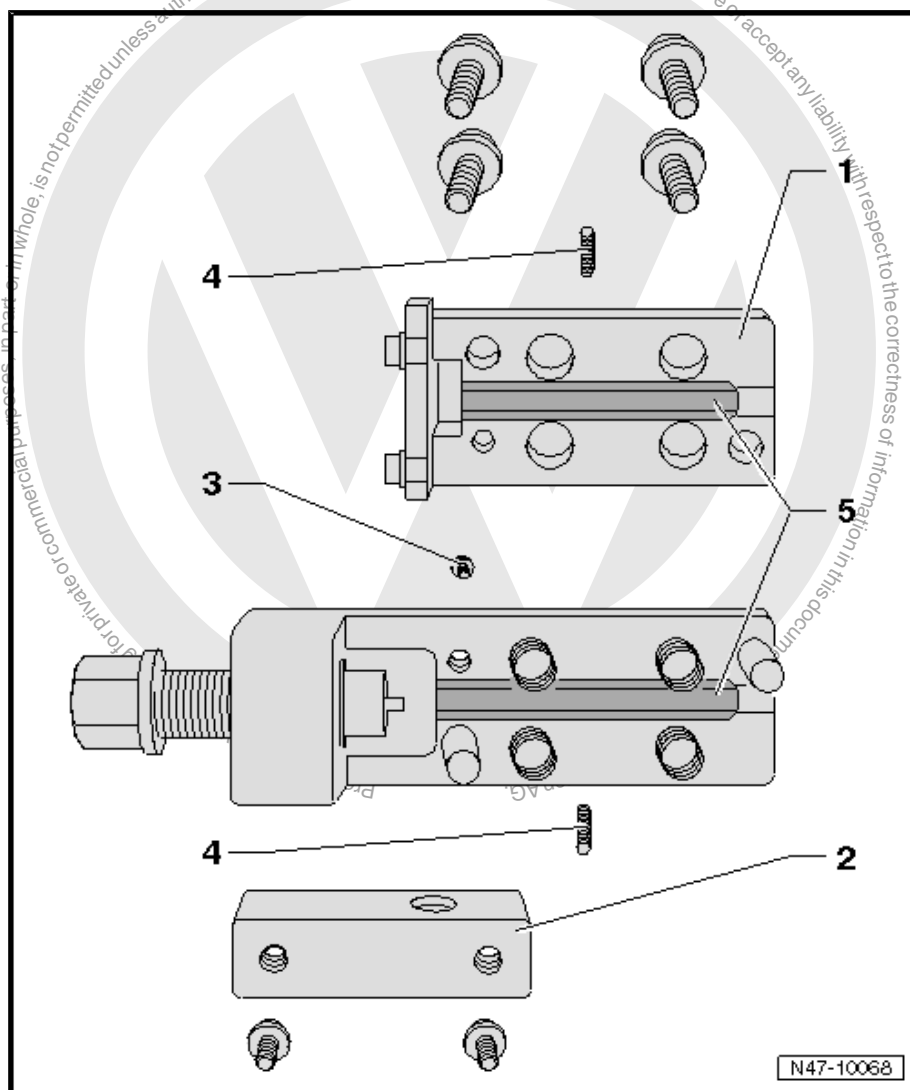
- ☐ For flanging tool upper part

4 - Grub screws for flanging jaws

- ☐ Centring and holding flanging jaws .
- ☐ Hexagon socket head bolt, 2 mm

5 - Flanging jaws

- ☐ Various
- ☐ Assembly instructions
⇒ [page 56](#)



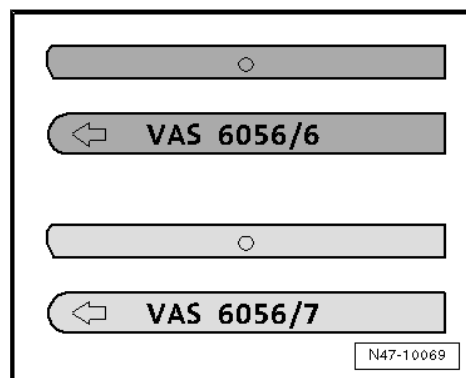
Flanging jaw assembly instructions:

- ◆ -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.





4.2 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 allows sections of brake lines 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.

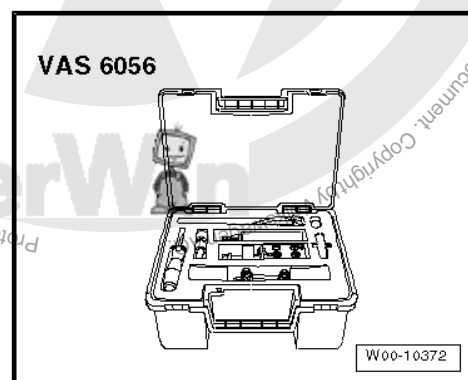


Note

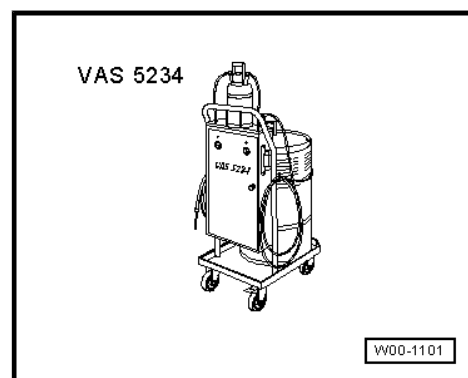
- ◆ *Brake pipes may only be bent up to max. 90°. They otherwise kink or reveal deformations which impermissibly constrict the pipe cross-section.*
- ◆ *Preferably separate brake lines at underbody.*
- ◆ *The positions of the intermediate pieces must be selected so that they cannot chafe on moving parts.*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

Special tools and workshop equipment required

- ◆ Flanging tool for brake lines - VAS 6056-



- ◆ Brake filling and bleeding equipment - VAS 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-

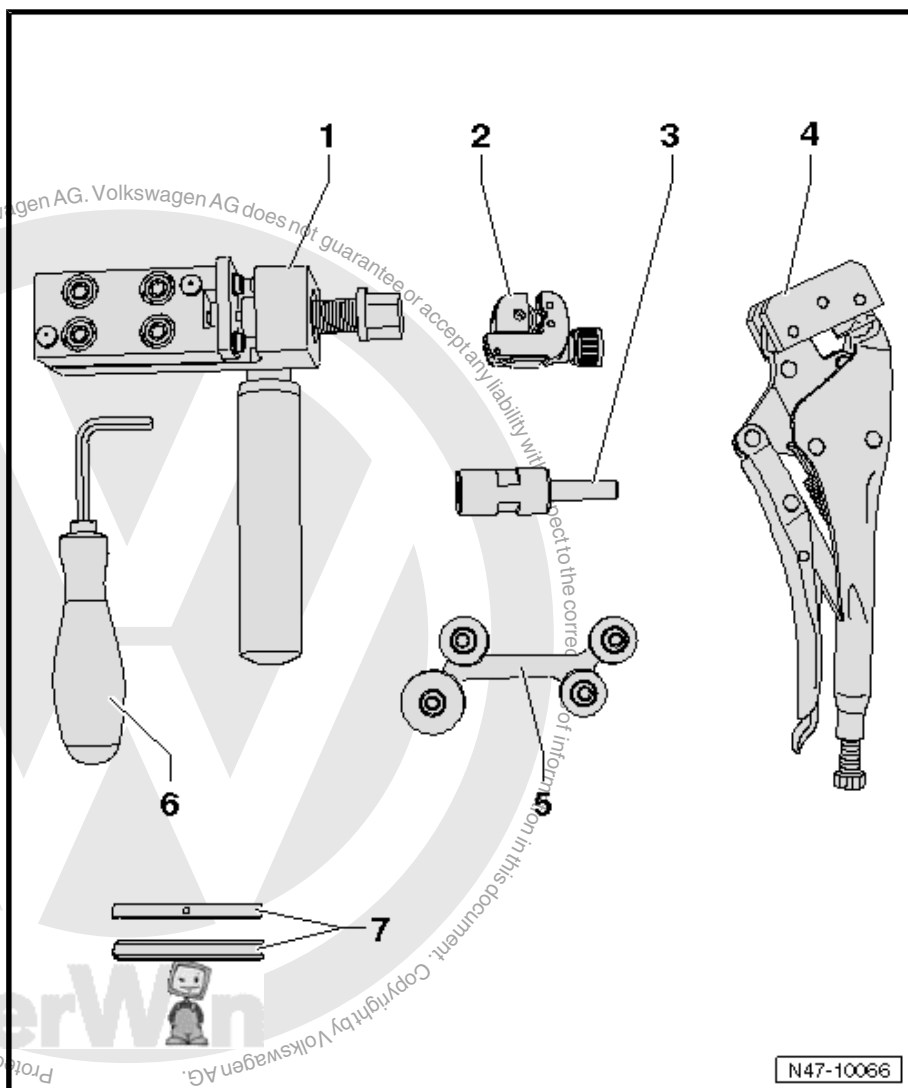
- Grub screws (in shaft and at side) are adjusted and must not be readjusted!

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

5 - Pipe bending tool - VAS 6056/5-

6 - Special wrench, 6 mm

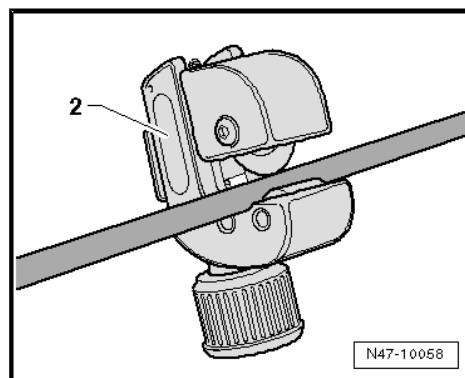
7 - Flanging jaws - VAS 6056/7-



4.3 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.





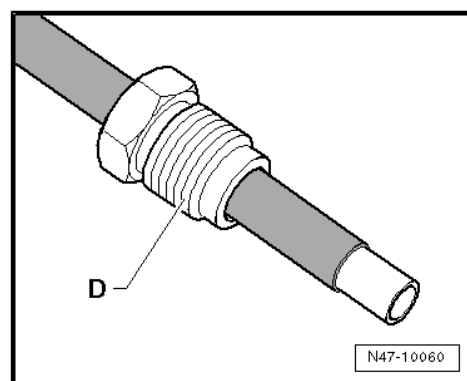
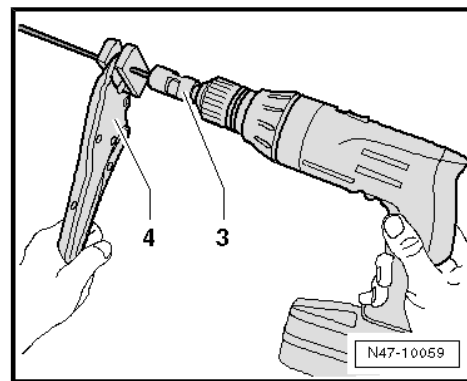
- Clamp brake line tightly in grip wrench -4- so that approx. 50 mm project from plastic jaws.
- Clamp scraper -3- into a drill and position onto brake line.
- Applying slight pressure against brake line, scrape coating off brake line. Select a slow speed on the drill when doing this.



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.



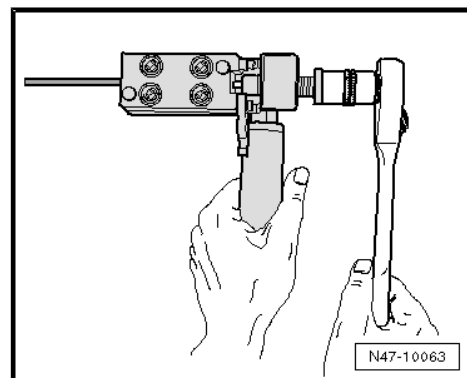
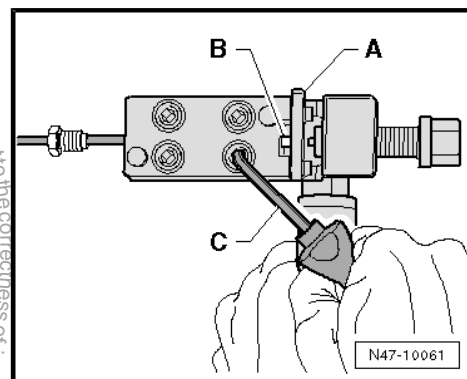
Note

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 new brake line to be inserted with compressed air.





- Join brake lines using connector -E-.
- Install brake line.
- Bleed brake system ⇒ [page 46](#) .

