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Workshop Manual

Audi A4 2015 ➤

Audi A4 China 2016 ➤

Audi A5 2016 ➤

Brake system

Edition 03.2019



List of Workshop Manual Repair Groups

Repair Group

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



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



Contents

00 - Technical data	1
1 Identification	1
1.1 PR number and type of brake system	1
2 Safety precautions	2
2.1 Safety precautions when working on vehicles with start/stop system	2
2.2 Safety precautions when using testers and measuring instruments during a road test	2
3 Repair notes	3
3.1 Rules for cleanliness	3
3.2 General repair instructions	3
3.3 Contact corrosion	3
4 Technical data	4
4.1 Technical data for brakes	4
5 Brake test	6
5.1 General notes	6
5.2 Testing vehicles with front-wheel drive	6
5.3 Testing vehicles with four-wheel drive	6
5.4 Testing parking brake	7
5.5 Visible features of ceramic brake discs	8
5.6 Superficial cracks in cooling channel lands	9
5.7 Cracks in area of bolted connection on ceramic brake discs	10
5.8 Edge fractures	10
5.9 Chipping on ceramic brake discs	11
5.10 Cracks extending into cooling channels	11
5.11 Wear assessment of ceramic brake disc without tester VAS 6813	11
5.12 Wear assessment of ceramic brake disc with tester VAS 6813	16
45 - Anti-lock brake system	22
1 General notes	22
1.1 Notes for repair work on the ABS	22
2 Overview of fitting locations	23
2.1 Overview of fitting locations - ABS/ESP	23
3 Control unit and hydraulic unit	25
3.1 Exploded view - control unit and hydraulic unit	25
3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55	27
3.3 Separating control unit from hydraulic unit	31
3.4 Attaching control unit to hydraulic unit	32
4 Sensors	34
4.1 Exploded view - front wheel speed sensor	34
4.2 Exploded view - rear wheel speed sensor	35
4.3 Removing and installing brake light switch	35
4.4 Removing and installing front wheel speed sensor G45 / G47	36
4.5 Removing and installing rear wheel speed sensor G44 / G46	37
46 - Brakes - mechanism	38
1 Front brakes	38
1.1 Exploded view - front brakes	38
1.2 Removing and installing brake pads	53
1.3 Removing and installing brake caliper	69
1.4 Renewing brake caliper	81
1.5 Removing and installing brake carrier	97
1.6 Removing and installing brake disc	98
1.7 Removing and installing splash plate	102



1.8	Removing and installing pad wear indicator wire	103
2	Rear brakes	105
2.1	Exploded view - rear brakes	105
2.2	Removing and installing brake pads	108
2.3	Removing and installing brake caliper	112
2.4	Renewing brake caliper	114
2.5	Removing and installing brake carrier	117
2.6	Removing and installing brake disc	118
2.7	Removing and installing splash plate	120
2.8	Removing and installing pad wear indicator wire	121
3	Parking brake	123
3.1	Exploded view - parking brake	123
3.2	Removing and installing parking brake motor V282 / V283	124
3.3	Releasing parking brake manually	125
4	Brake pedal	127
4.1	Exploded view - brake pedal	127
4.2	Removing and installing mounting bracket	128
4.3	Separating brake pedal from brake servo	130
4.4	Connecting brake pedal to brake servo	130
4.5	Removing and installing brake pedal	131
47 - Brakes - hydraulics		133
1	Front brake caliper	133
1.1	Exploded view - front brake caliper	133
1.2	Removing and installing brake caliper piston	135
1.3	Renewing bearing bushes and guide pins	143
2	Rear brake caliper	144
2.1	Exploded view - rear brake caliper	144
2.2	Removing and installing brake caliper piston	144
3	Brake servo / brake master cylinder	148
3.1	Exploded view - brake servo / brake master cylinder	148
3.2	Note on activation pin	150
3.3	Removing and installing brake servo	150
3.4	Removing and installing brake master cylinder	154
3.5	Removing and installing brake fluid reservoir	156
3.6	Removing and installing brake fluid level warning contact F34	158
4	Vacuum system	160
4.1	Exploded view - vacuum pump	160
4.2	Checking non-return valve	164
4.3	Removing and installing non-return valve	165
4.4	Removing and installing vacuum pump	167
4.5	Removing and installing brake servo pressure sensor	171
4.6	Checking vacuum system	171
5	Brake lines	176
6	Hydraulic system	177
6.1	General notes on brake fluid	177
6.2	Bleeding hydraulic system	178
6.3	Leak test	184

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1



2 Safety precautions

⇒ "2.1 Safety precautions when working on vehicles with start/stop system", page 2

⇒ "2.2 Safety precautions when using testers and measuring instruments during a road test", page 2

2.1 Safety precautions when working on vehicles with start/stop system

Risk of injury - engine may start unexpectedly

The engine can start unexpectedly if the vehicle's start/stop system is activated. A message in the instrument cluster indicates whether the start/stop system is activated.

- To deactivate the start/stop system, switch off the ignition.

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

Risk of injury if test equipment is not secured

If an accident occurs and the front passenger's airbag is triggered, test equipment which is not secured adequately may be catapulted through the vehicle with potentially serious consequences.

- Secure test equipment to the rear seat.

Or

- Have another person operate the test equipment from the rear seat.



3 Repair notes

⇒ [“3.1 Rules for cleanliness”, page 3](#)

⇒ [“3.2 General repair instructions”, page 3](#)

⇒ [“3.3 Contact corrosion”, page 3](#)

3.1 Rules for cleanliness

- ◆ Absolute cleanliness is required when working on the anti-lock brake system; avoid any products that contain mineral oil, such as oil, grease, etc.
- ◆ Thoroughly clean all connections and the adjacent areas before loosening, but do not use aggressive cleaning agents such as brake cleaner, petrol, thinners or similar.
- ◆ After removal, place parts on a clean surface and cover them.
- ◆ If repairs cannot be completed immediately, carefully cover or seal open components (use sealing plugs from engine bung set - VAS 6122-).
- ◆ Only use lint-free cloths.
- ◆ Only remove replacement parts from packaging immediately prior to installation.
- ◆ Only use genuine spare parts from original packaging.
- ◆ When the system is open, do not work with compressed air and do not move the vehicle.
- ◆ Ensure that no brake fluid enters electrical 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 present 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 Contact corrosion

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Contact corrosion can occur if unsuitable fasteners are used (e.g. bolts, nuts, washers, etc.).

For this reason, only fasteners with a special surface coating are fitted.

Additionally, all rubber and plastic parts and all adhesives are made of non-conductive materials.

Always install new parts if you are not sure whether used parts can be re-fitted ⇒ Electronic parts catalogue .

Please note:

- ◆ We recommend using only Audi genuine replacement parts; these have been tested and approved.
- ◆ We recommend the use of Audi Genuine Accessories.



4 Technical data

⇒ "4.1 Technical data for brakes", page 4

4.1 Technical data for brakes

Brake system

Component	Version
Brake circuit split	Front/rear dual circuit braking system: front left and right, rear left and right
Brake master cylinder	Tandem brake master cylinder
Brake servo	Vacuum brake servo
Brake pressure regulation	By ABS control unit - J104-

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PR No.		1LA/1LB	1LC, 1LD, 1LG	1LE, 1LF, 1LH
Version		Steel	Steel	Steel
Brake caliper		Continental Teves	Continental Teves	Continental Teves
Brake caliper piston		1	4	4
Brake disc	Ø mm	314	318	338
Thickness when new	mm	25	30	30
Wear limit	mm	23 ^{1), 2)}	28 ^{1), 2)}	28 ^{1), 2)}

1) If different, the wear limit shown on the brake disc applies.

2) Wear limits of brake pads ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness

⇒ "1 Front brakes", page 38

Front brakes

PR No.		1LJ	1LL/1ZA/1ZC/1ZK	1LM/1LY/1LX 1LZ/1ZX
Version		Steel	Steel	Steel
Brake caliper		Akebono	Akebono	Akebono
Brake caliper piston		6	6	6
Brake disc	Ø mm	350	350	375
Thickness when new	mm	34	34	36
Wear limit	mm	32 ^{3) 4)}	32 ^{3) 4)}	34 ^{3) 4)}

3) If different, the wear limit shown on the brake disc applies.

4) Wear limits of brake pads ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness

⇒ "1 Front brakes", page 38

Front brakes

PR No.		1LU/1LN/1LT		
Version		Ceramic		
Brake caliper		Brembo		
Brake caliper piston		6		
Brake disc	Ø mm	400		



PR No.		1LU/1LN/1LT		
Version		Ceramic		
Thickness when new	mm	38		
Wear limit	mm	Assessing degree of wear ➔ page 11 ⁵⁾		

5) Wear limits of brake pads ➔ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness

➔ ["1 Front brakes", page 38](#)

Rear brakes

PR No.		1KD/1KE/1KI	1KF/1KJ/1KK/1KP 1KQ/1KR/1KU/2EJ	
Version		Steel	Steel	
Brake caliper		TRW	TRW	
Brake caliper piston		1	1	
Brake disc	Ø mm	300	330	
Thickness when new	mm	12	22	
Wear limit	mm	10 ^{6) 7)}	20 ^{6) 7)}	

6) If different, the wear limit shown on the brake disc applies.

7) Wear limits of brake pads ➔ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness

➔ ["2 Rear brakes", page 105](#)



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5 Brake test

⇒ [“5.1 General notes”, page 6](#)

⇒ [“5.2 Testing vehicles with front-wheel drive”, page 6](#)

⇒ [“5.3 Testing vehicles with four-wheel drive”, page 6](#)

⇒ [“5.4 Testing parking brake”, page 7](#)

⇒ [“5.5 Visible features of ceramic brake discs”, page 8](#)

⇒ [“5.6 Superficial cracks in cooling channel lands”, page 9](#)

⇒ [“5.7 Cracks in area of bolted connection on ceramic brake discs”, page 10](#)

⇒ [“5.8 Edge fractures”, page 10](#)

⇒ [“5.9 Chipping on ceramic brake discs”, page 11](#)

⇒ [“5.10 Cracks extending into cooling channels”, page 11](#)

⇒ [“5.11 Wear assessment of ceramic brake disc without tester VAS 6813”, page 11](#)

⇒ [“5.12 Wear assessment of ceramic brake disc with tester VAS 6813”, page 16](#)

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5.1 General notes

- ◆ The wheels are driven by the brake test rollers.
- ◆ On vehicles with manual gearbox, the engine must be idling.
- ◆ On vehicles with automatic gearbox or dual clutch gearbox, shift gearbox into position “N”.
- ◆ Follow the instructions provided by the manufacturer of the brake test equipment when performing the test.

Vehicles with vacuum brake servo:

Electronic brake control systems are inoperative when the ignition is switched off.

Vehicles with electromechanical brake servo:

Electronic brake control systems remain operative for a while after the ignition has been switched off.

5.2 Testing vehicles with front-wheel drive

⇒ [“5.1 General notes”, page 6](#)

⇒ [“5.3 Testing vehicles with four-wheel drive”, page 6](#)

⇒ [“5.4 Testing parking brake”, page 7](#)

- ◆ Perform brake test on a single-axle brake dynamometer.
- ◆ The test speed must not exceed 5 km/h. Otherwise the EDL control can activate the brakes if the rollers start at different points in time.
- ◆ All brake test equipment approved by Audi meets these requirements.

5.3 Testing vehicles with four-wheel drive

⇒ [“5.1 General notes”, page 6](#)

Note:

Follow the instructions on the test equipment screen.



Testing on a single-axle brake dynamometer



Note

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- ◆ *Brakes on front and rear axles must only be checked with engine switched off.*
 - ◆ *In order to prevent power transmission from one axle to the other, always switch off the engine during brake tests on single-axle roller dynamometers.*
 - ◆ *Only start the engine in order to create the necessary brake pressure for the brake test.*
 - ◆ *Then switch the engine off again.*

Test sequence:

- ◆ The wheels are driven by the brake test rollers.
- ◆ On vehicles with manual gearbox, the engine must be idling.
- ◆ On vehicles with automatic gearbox or dual clutch gearbox, shift gearbox into position "N".
- ◆ The rollers drive the wheels of one axle in opposite directions to avoid transmitting torque to the other axle.
- ◆ The test speed must not exceed 6 km/h. Otherwise the EDL control can activate the brakes if the rollers start at different points in time.
- ◆ All brake test equipment approved by Audi meets these requirements.

5.4 Testing parking brake

Note:

Follow the instructions on the test equipment screen.

Activating test mode »TÜV mode«:

- Driver is wearing seat belt
- Rear wheels on single-axle brake dynamometer
- Engine not running; ignition switched on
- Hold assist function (Auto Hold) switched off
- Front wheels stationary
- Rear wheels must rotate for at least 5 seconds at a constant speed between 2.5 and 9 km/h.

The test mode is active when the yellow electric parking brake fault warning lamp - K214- lights up.

- The instrument cluster will then display a crossed-out yellow symbol for the electromechanical parking brake ⇒ Owner's Manual; Instruments and warning/indicator lamps .

Note:

- ◆ In test mode, the electromechanical parking brake does not immediately close fully.
- ◆ The clamping force is increased gradually by actuating the electromechanical parking brake button - E538- three to four times in succession.
- ◆ The electromechanical parking brake is released when the electromechanical parking brake button - E538- is actuated a fifth time.



- Start engine and wait for approx. 5 seconds until sufficient vacuum has built up.

Exiting test mode:

- Speed of front wheels above 0 km/h
- Speed of rear wheels below 2.5 km/h or above 9 km/h
- Ignition off

5.5 Visible features of ceramic brake discs

Designation of ceramic brake disc on brake disc hub

1 - Direction of rotation

2 - Production date of brake disc

- ☐ Example

3 - Minimum thickness of brake disc

- ☐ Example
- ☐ Wear limit ➔ [page 14](#)

4 - Minimum weight of brake disc with brake disc hub

- ☐ Example

5 - Supplier

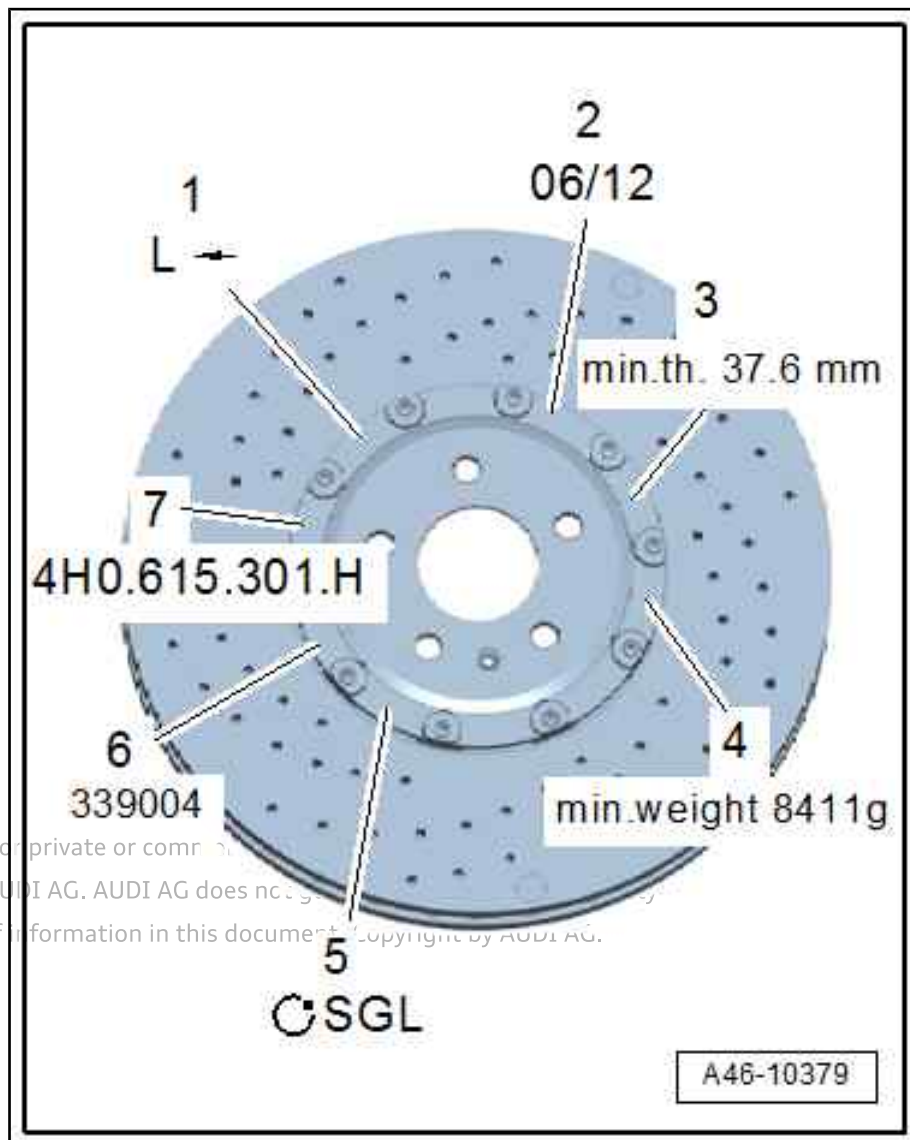
- ☐ Example

6 - Serial production number of brake disc

- ☐ Example

7 - Audi part number

- ☐ Example



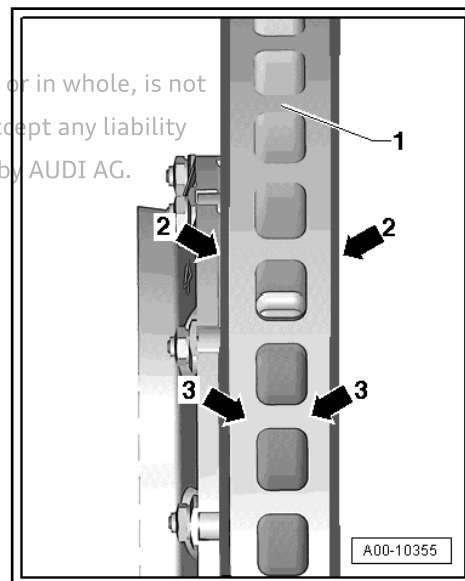
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Brake disc structure

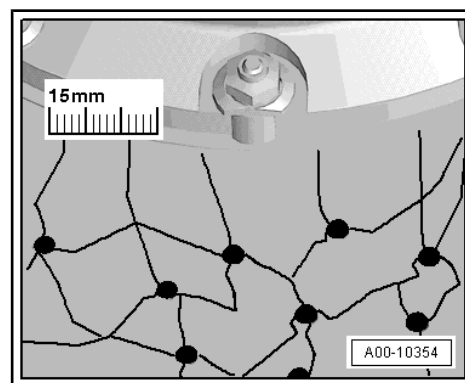
- 1 - Cooling channel lands
- 2 - Friction layer
- 3 - Carrier material

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Due to the production process there already are relaxation cracks (varying degrees) on the friction surface of the brake disc when it is new.

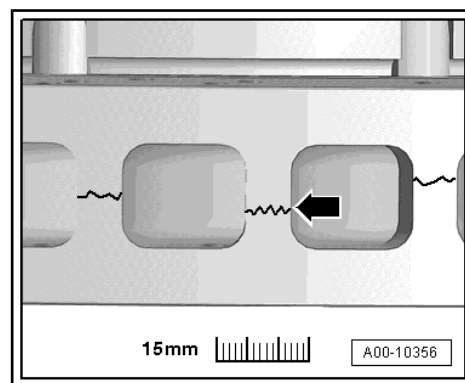
- ◆ Relaxation cracks on a ceramic brake disc do not constitute a technical problem.
- ◆ The relaxation cracks may be clearly visible and vary in size.
- Check area of bolted connection on friction ring and brake disc hub ⇒ [page 10](#) .



5.6 Superficial cracks in cooling channel lands

Superficial cracks -arrow- in the cooling channel lands are caused during manufacturing.

- ◆ Superficial cracks in the cooling channel lands do not constitute a technical problem on the ceramic brake discs.





5.7 Cracks in area of bolted connection on ceramic brake discs

WARNING

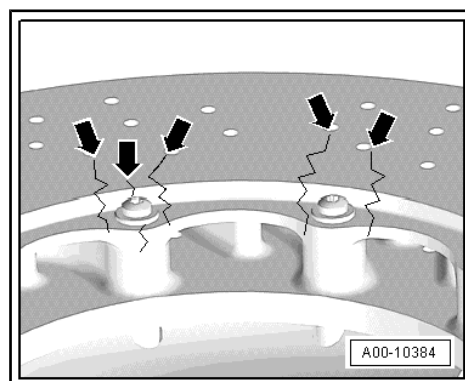
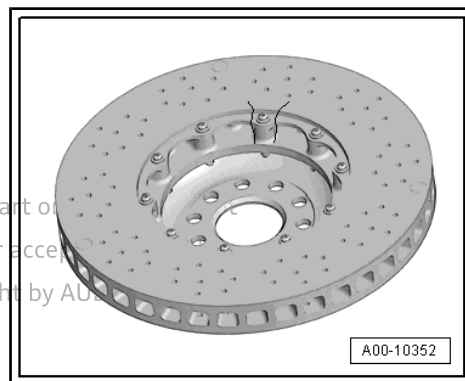
Risk of accident due to slackened bolts

- Never slacken bolted connection between brake disc rotor and brake disc hub.

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- ◆ Radial cracks in the area of the bolted connection of the brake disc hub extending into the friction surface of the brake disc -arrows-

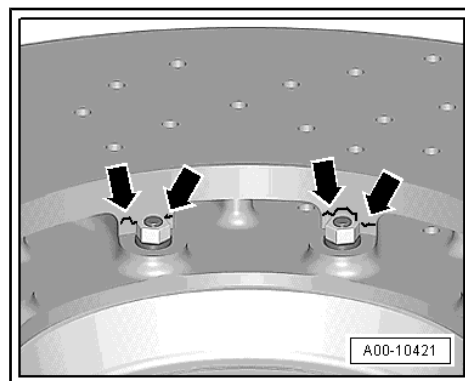


- ◆ Tangential cracks -arrows- in the bolted joint area

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.



5.8 Edge fractures

Edge fractures -arrow- are caused by mechanical damage to the edges.

Permissible:

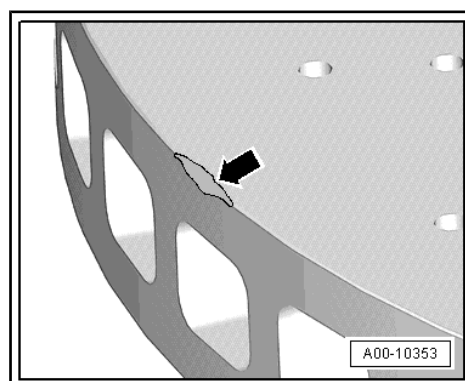
- ◆ max. width/depth = 2 mm
- ◆ max. length = 10 mm
- ◆ max. 3 edge fractures per brake disc

Renew the ceramic brake discs if the specified limits have been exceeded.

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.





5.9 Chipping on ceramic brake discs

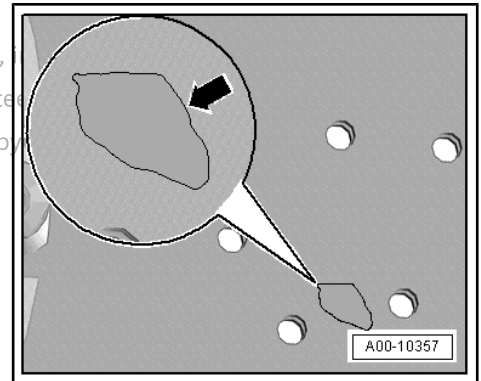
Renew the ceramic brake discs if the following types of damage have occurred:

- ◆ Chipping (larger than 1 cm² -arrow-) on the friction surface

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.



5.10 Cracks extending into cooling channels

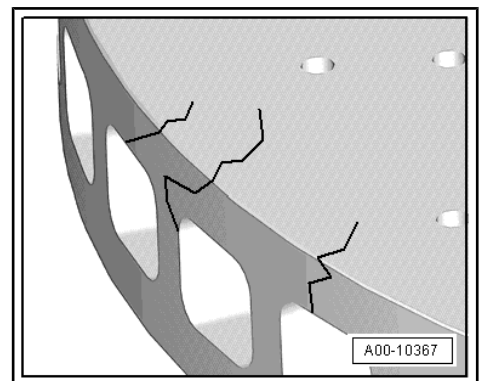
Renew the ceramic brake discs if the following types of damage have occurred:

- ◆ A crack extending from the friction surface of the brake disc to the cooling channel or through the cooling channel

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.



5.11 Wear assessment of ceramic brake disc without tester - VAS 6813-

⇒ ["5.11.1 Assessing degree of wear", page 11](#)

⇒ ["5.11.2 Wear assessment by checking thickness of brake disc", page 12](#)

⇒ ["5.11.3 Wear assessment by weighing brake disc", page 13](#)

⇒ ["5.11.4 Wear assessment according to wear indicators", page 14](#)

5.11.1 Assessing degree of wear

- The brake disc must first be cleaned before assessing the degree of wear as described below.
- The brake disc ventilation drillings must be completely free of brake dust and dirt. Clear out carefully with a suitable tool if necessary. Do not use force.

WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Observe respiratory protection requirements when cleaning ceramic brake discs.

- Thoroughly blow out the brake discs with compressed air (including the area between the cooling channels and ventilation drillings).



- To assess the brake disc wear, proceed as follows:
- ◆ 1. Wear assessment by checking thickness of brake disc
- ◆ 2. Wear assessment by weighing brake disc
- ◆ 3. Wear assessment according to wear indicators

1. Wear assessment by checking thickness of brake disc ⇒ page 12	
Thickness of brake disc in permissible range → brake disc OK	
Brake disc thickness in critical range min. th + 0.2 mm	Value at or below limit
↓↓	↓↓
Further wear assessment by weighing brake disc	Renew brake disc
↓↓	End
2. Wear assessment by weighing brake disc ⇒ page 13	
Weight of brake disc in permissible range → brake disc OK	
Brake disc weight in critical range min. weight + 20 g	Value at or below limit
↓↓	↓↓
Further wear assessment according to wear indicators	Renew brake disc
↓↓	End
3. Wear assessment according to wear indicators ⇒ page 14	
None of the six wear indicators fully worn out → brake disc OK	
One of the six wear indicators fully worn out	
↓↓	
Renew brake disc	



WARNING

Accident risk due to insufficient braking effect as a result of worn ceramic brake discs

It is not permitted to continue using ceramic brake discs after the wear limit has been reached.

- Renew the ceramic brake discs immediately once any of the wear limits defined below has been reached.



CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

5.11.2 Wear assessment by checking thickness of brake disc

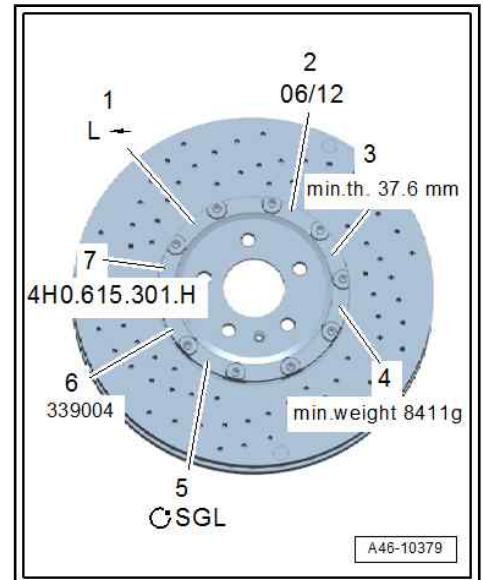
Special tools and workshop equipment required

- ◆ Commercially available caliper gauge or micrometer gauge



Procedure

- The minimum permissible thickness of the brake disc is engraved as "min.th." -item 3- on the brake disc hub.



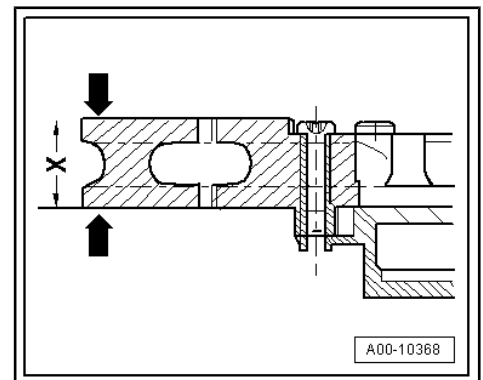
- Measure the thickness -x- of the brake disc next to each wear indicator all around the brake disc (three times).
- If the thickness is down to -x- = min. th. + 0.2 mm, additionally check the wear of the brake disc by inspecting the wear indicators ➤ [page 14](#) .

WARNING

Accident risk due to insufficient braking effect as a result of worn ceramic brake discs

It is not permitted to continue using ceramic brake discs after the wear limit has been reached.

- Renew the ceramic brake discs immediately once any of the wear limits defined below has been reached.



CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

5.11.3 Wear assessment by weighing brake disc

Special tools and workshop equipment required

- ◆ Commercially available scales with a tolerance of ± 1 g



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Procedure

- The minimum permissible weight of the brake disc is engraved as "min.weight" -item 4- on the brake disc hub.
- Remove brake disc for weighing
⇒ ["1.6.2 Removing and installing brake disc - ceramic brakes", page 100](#) .
- The brake disc must be cleaned and dry before it is weighed.



WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Observe respiratory protection requirements when cleaning ceramic brake discs.



NOTICE

Risk of incorrect measurements due to improper handling

- Never use water or other liquids to clean brake discs.
- The brake disc ventilation drillings must be completely free of dirt. Clear out carefully with a suitable tool if necessary.
- Thoroughly blow out the brake discs with compressed air (including the area between the cooling channels and ventilation drillings).
- Carefully place the clean brake disc on the scales.
- If the weight loss is only 20 g within this limit, additionally check the wear of the brake disc according to the wear indicators
⇒ [page 14](#) .



WARNING

Accident risk due to insufficient braking effect as a result of worn ceramic brake discs

It is not permitted to continue using ceramic brake discs after the wear limit has been reached.

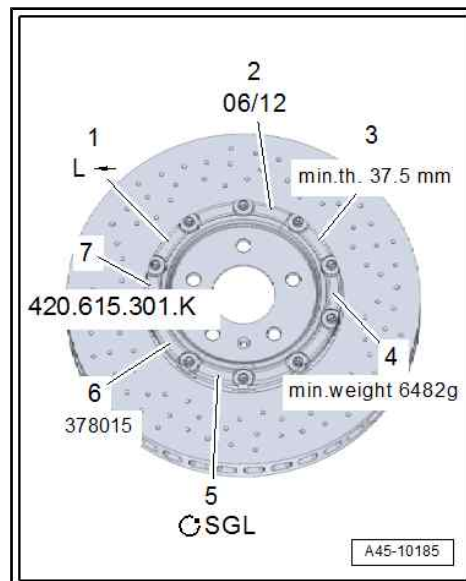
- Renew the ceramic brake discs immediately once any of the wear limits defined below has been reached.



CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.



5.11.4 Wear assessment according to wear indicators

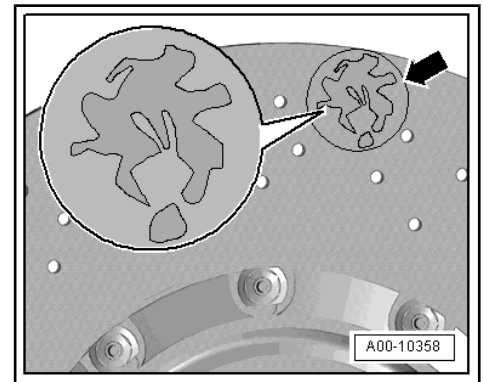
Wear indicators are positioned at intervals of 120 degrees on the friction surface of the brake disc.



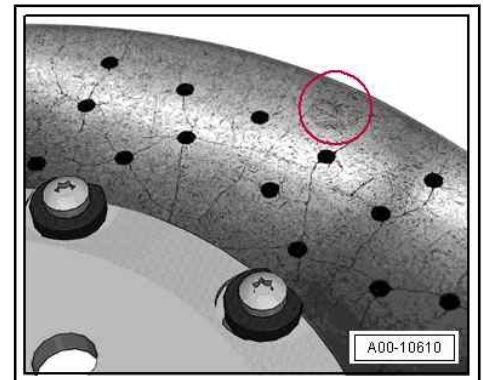
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- ◆ The wear indicators -arrow- appear in a different colour.
- ◆ There are three wear indicators on each side of the brake disc (front and reverse side).

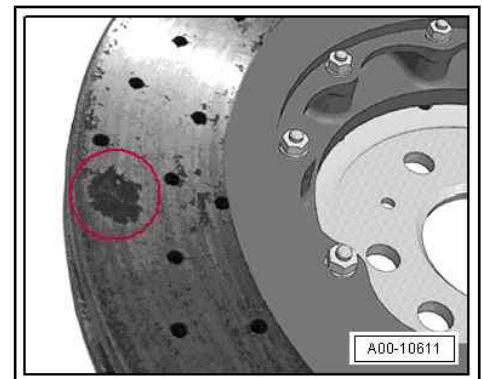


Wear indicator OK



Wear indicator burnt out - example 1

- With increasing brake disc wear, a dark burnt-out recess appears at the wear indicators.
- The ceramic brake disc must be renewed even if only one of the six wear indicators is fully worn out.



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Wear indicator burnt out - example 2

- With increasing brake disc wear, a dark burnt-out recess appears at the wear indicators.
- The ceramic brake disc must be renewed even if only one of the six wear indicators is fully worn out.

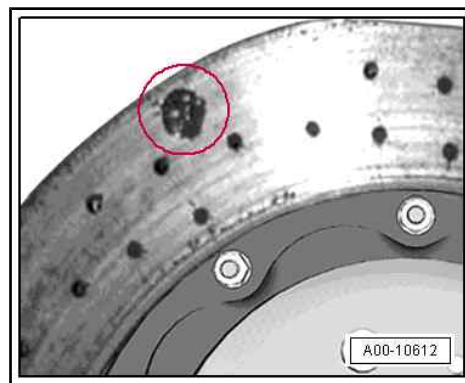


WARNING

Accident risk due to insufficient braking effect as a result of worn ceramic brake discs

It is not permitted to continue using ceramic brake discs after the wear limit has been reached.

- Renew the ceramic brake discs immediately once any of the wear limits defined below has been reached.



CAUTION

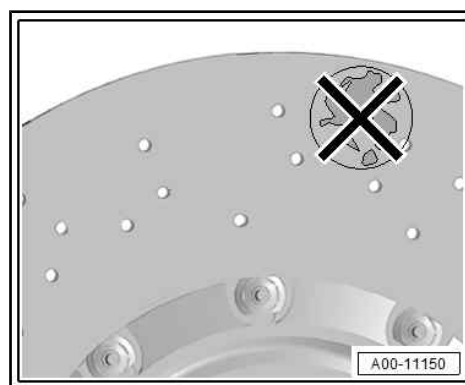
Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

5.12 Wear assessment of ceramic brake disc with tester - VAS 6813-

- ◆ The following applies for wear assessment with the tester - VAS 6813- :
- ◆ This is a new method for measuring the wear limit of ceramic brake discs.
- ◆ The wear indicators on the brake disc are no longer visible.
- ◆ The brake does not have to be weighed.

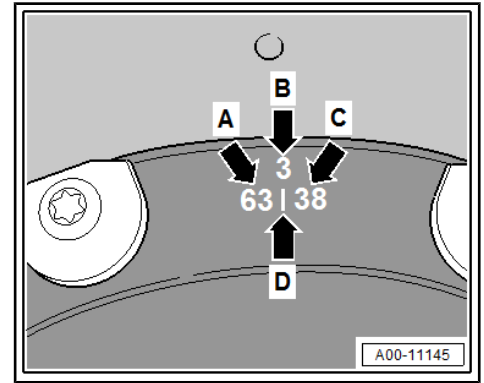
You can identify the brake disc as follows:



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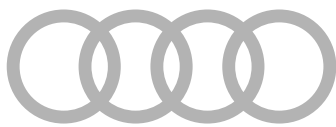
- ◆ The wear indicators -arrow- on the friction surface of the brake disc are no longer visible
- ◆ By looking at the laser-etched markings -A to D-
- ◆ The degree of wear is determined by measuring the brake disc thickness AND the wear value using the tester - VAS 6813- ; both values must be measured three times each.
- ◆ The minimum permissible thickness of the brake disc is engraved as "min.th." on the brake disc hub.
- ◆ The wear value -C- of the brake disc for the tester - VAS 6813- is engraved on the brake disc hub.
- ◆ Value -A- is a value from the production of the new brake disc.
- ◆ Values -A and C- may vary depending on the measuring point.
- ◆ Values -A and C- may vary depending on the brake disc.



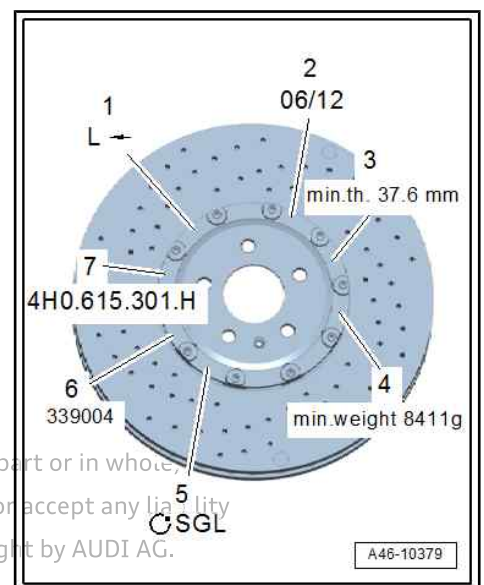
Example of minimum brake disc thickness (min.th. -3-); the brake disc thickness must not be less than this value.

Note:

Value -3- may vary depending on the brake disc.



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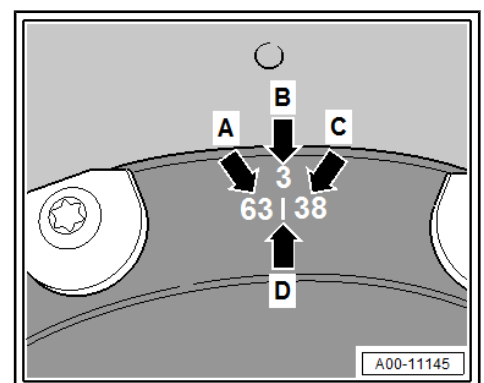
5.12.1 Checking brake disc thickness

The markings for measuring the degree of wear are spaced at intervals of 120°.

Measure the brake disc thickness at these three points.

Example shows third measuring point

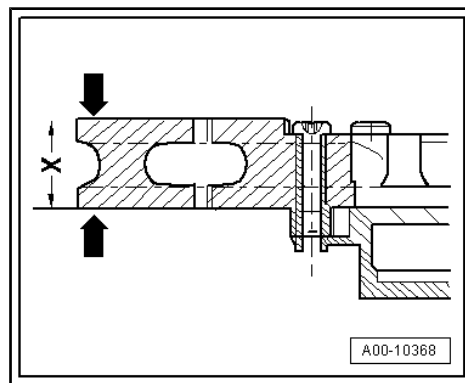
The minimum permissible thickness of the brake disc is engraved as "min.th." on the brake disc hub.





- Measure the thickness -x- of the brake disc at the measuring points all around the brake disc (three times).

If the thickness of the brake disc is below the "min.th." value at one of the measuring points, the brake disc must be renewed.



Example of minimum brake disc thickness (min.th. -3-); the brake disc thickness must not be less than this value.

Note:

Value -3- may vary depending on the brake disc.

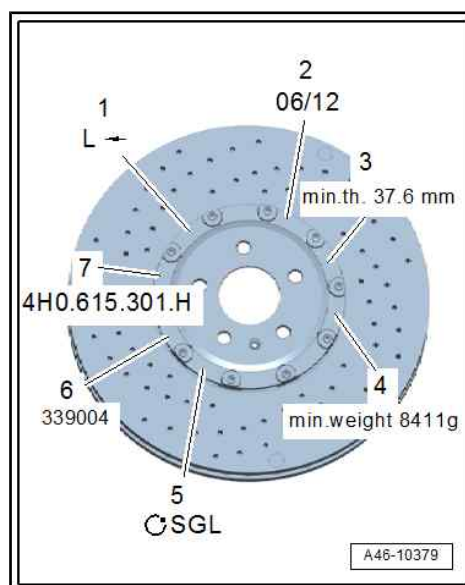
CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

If the thickness of the brake disc is not below the minimum value, proceed to

⇒ ["5.12.3 Wear assessment with tester VAS 6813", page 19](#).



5.12.2 Checking tester - VAS 6813-

Before taking measurements, the tester - VAS 6813- must be checked using the measuring plate provided.

Measuring plate:

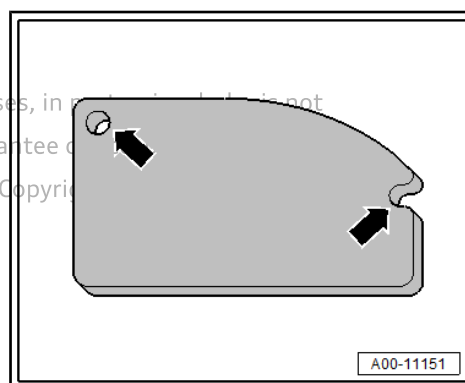
- Place tester in both openings -arrows- of measuring plate so that laser beam points downwards towards marking with affixed reference value.

- Switch on tester.

The value now shown must correspond to the reference value affixed to the measuring plate.

Note:

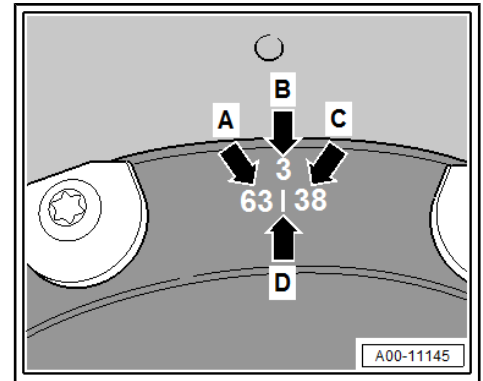
- ◆ If the value shown differs from the reference value by more than ± 2.0 units, the tester must be re-calibrated by the supplier.
- ◆ Please refer to the enclosed instructions for further information.





5.12.3 Wear assessment with tester - VAS 6813-

- ◆ The degree of wear is determined by measuring the brake disc thickness AND the wear value using the tester - VAS 6813- ; both values must be measured three times each.
- ◆ The wear value -C- for the tester - VAS 6813- is engraved on the brake disc hub.
- ◆ Values -A and C- may vary depending on the measuring point.
- ◆ Values -A and C- may vary depending on the brake disc.
- ◆ Value -A- is a value from the production of the new brake disc.
- Wheel has been removed.
- Brake disc thickness has been checked.



- Tester has been checked

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Special tools and workshop equipment required

- ◆ Tester - VAS 6813-

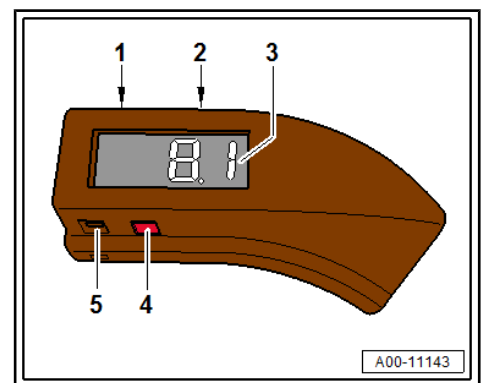
Tester - VAS 6813- :

- ◆ 1 ON/OFF switch
- ◆ 2 Button for taking measurement
- ◆ 3 Display for measurement
- ◆ 4 Laser beam for positioning
- ◆ 5 Interface

Please refer to the enclosed instructions for further information about the tester - VAS 6813- .

Measurement:

- ◆ The brake disc must be clean.
- ◆ The brake disc must be dry.



⚠ WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Observe respiratory protection requirements when cleaning ceramic brake discs.

The markings for measuring the degree of wear are spaced at intervals of 120°.

The measuring procedure described below must be performed at all three measuring points to ensure that the degree of wear is determined reliably.



-A-: new value, -C-: wear value, -B-: measuring point number,
-D-: marking for laser beam for measuring wear value.

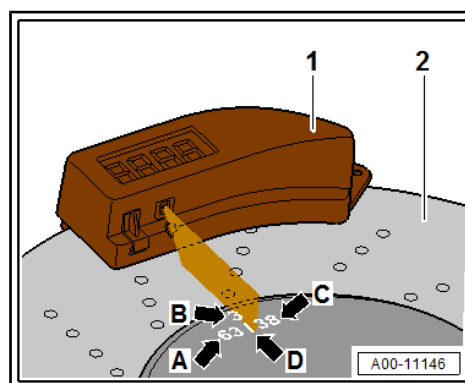
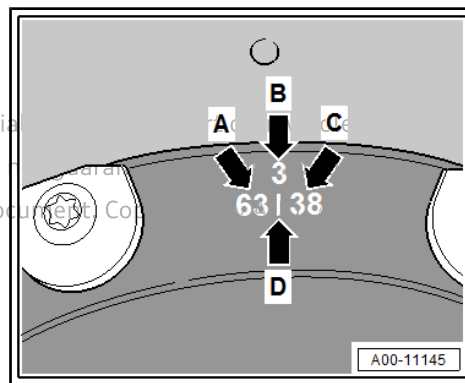
The third measuring point -B- (of points 1 to 3) can be seen in the example.

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Note

- ◆ Values -A and C- vary depending on the measuring point.
- ◆ Values -A and C- vary depending on the brake disc.
- Place tester - VAS 6813- at outer edge of brake disc so that it is flush.
- Switch on tester - VAS 6813- .
- Move tester - VAS 6813- -1- along outer edge -2- until laser beam points exactly towards marking -D- on brake disc.
- Measure wear at all three measuring points (1 to 3) on brake disc.
- To do so, read off value displayed on tester - VAS 6813- .



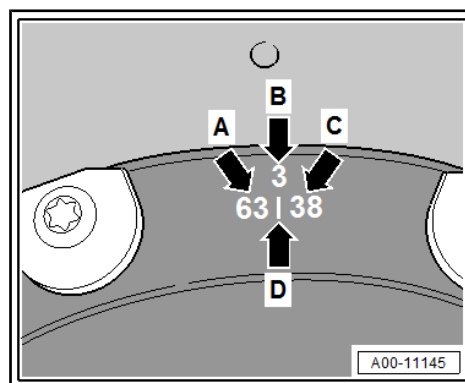
The brake disc must be removed and checked further for wear if the value is less than or equal to one of the three wear values -C- .

Note:

Wear value -C- varies depending on the measuring point.

- Remove brake disc.
- To ensure that the following measurement is completely accurate, place the brake disc on a non-conductive surface (e.g. wooden table).
- The surface must be clean and dry.
- The brake disc must be clean and dry.
- Place tester - VAS 6813- at outer edge of brake disc again so that it is flush.

The measuring procedure must be performed at all three measuring points to ensure that the degree of wear is determined reliably.





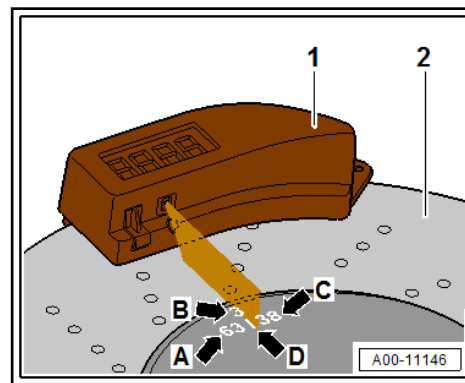
- Move tester - VAS 6813- -1- along outer edge -2- until laser beam points exactly towards marking -D- on brake disc.
- Measure wear at all three measuring points (1 to 3) on brake disc.
- To do so, read off value displayed on tester - VAS 6813- .

The brake disc must be renewed if the value is less than or equal to one of the three wear values -C- .

⚠ CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

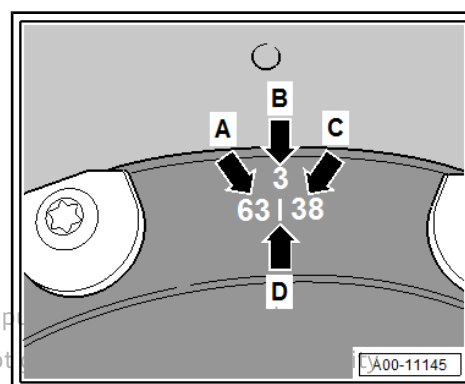


5.12.4 Notes on ceramic brake disc wear limit



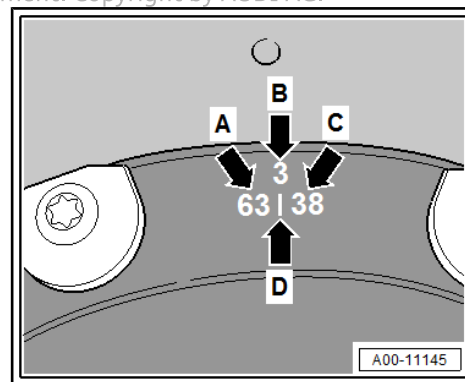
Note

- ◆ The degree of wear is determined by measuring the brake disc thickness AND the wear value using the tester - VAS 6813- ; both values must be measured three times each.
- ◆ The brake disc hub is engraved with the minimum permissible thickness of the brake disc ("min.th.") and the wear value -C- for the tester - VAS 6813- .
- ◆ The wear value -C- varies depending on the brake disc and the measuring point.



Note

- ◆ If the thickness of the brake disc is below the "min.th." value at one of the measuring points, the brake disc must be renewed.
- ◆ "Or"
- ◆ If the value is less than or equal to one of the three wear values -C- when determining the degree of wear with the tester - VAS 6813- , the brake disc must be renewed.



Note

The wear value -C- varies depending on the brake disc.

⚠ CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.



45 – Anti-lock brake system

1 General notes

⇒ [“1.1 Notes for repair work on the ABS”, page 22](#)

1.1 Notes for repair work on the ABS

- ◆ Malfunctions in the ABS system do not influence the brake system and servo action. The conventional braking system remains functional even without ABS. However, the vehicle's braking behaviour can change. After the ABS warning lamp comes on, the rear wheels can lock early when braking.
- ◆ The anti-lock brake system is basically maintenance-free.
- ◆ Testing, removing, installing and repair work may only be performed by qualified personnel.
- ◆ Failure to observe the information described in this Workshop Manual may result in damage to the system and could make the vehicle unsafe.
- ◆ Before carrying out repair work on the anti-lock brake system, determine the cause of the problem using self-diagnosis.
- ◆ With ignition switched off, disconnect battery earth strap.
- ◆ When working with brake fluid, observe the relevant safety precautions and notes ⇒ [page 177](#).
- ◆ Always bleed the brake system (using brake filling and bleeding equipment - VAS 5234-) after all work which involves opening the hydraulic system. In addition, a high and low-pressure test should be carried out on the brake system.
- ◆ During the final road test, ensure that at least one ABS-controlled braking operation is performed (pulsations must be felt at the brake pedal).



2 Overview of fitting locations

⇒ **"2.1 Overview of fitting locations - ABS/ESP", page 23**

2.1 Overview of fitting locations - ABS/ESP

1 - Front speed sensor

- ◆ Front right speed sensor - G45-

- ◆ Front left speed sensor - G47-

- ⇒ **"4.1 Exploded view - front wheel speed sensor", page 34**

2 - Hydraulic control unit

- Fitting location: in engine compartment (front left)

- With:

- ◆ ABS control unit - J104-

- ◆ ABS hydraulic unit - N55-

- Fitting location: in engine compartment (front left)

- Control unit and hydraulic unit can be separated

- ⇒ **"3.1 Exploded view - control unit and hydraulic unit", page 25**

3 - Vacuum sender - G608-

- ⇒ **"4.1 Exploded view - vacuum pump", page 160**

4 - Centre switch module in dash panel - EX22-

- With:

- ◆ TCS and ESP button - E256-

- ◆ Hill descent control button - E618- (equipment version)

- Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Overview of fitting locations - controls in centre console

5 - Electromechanical parking brake button - E538-

- With:

- ◆ Electromechanical parking brake button - E538-

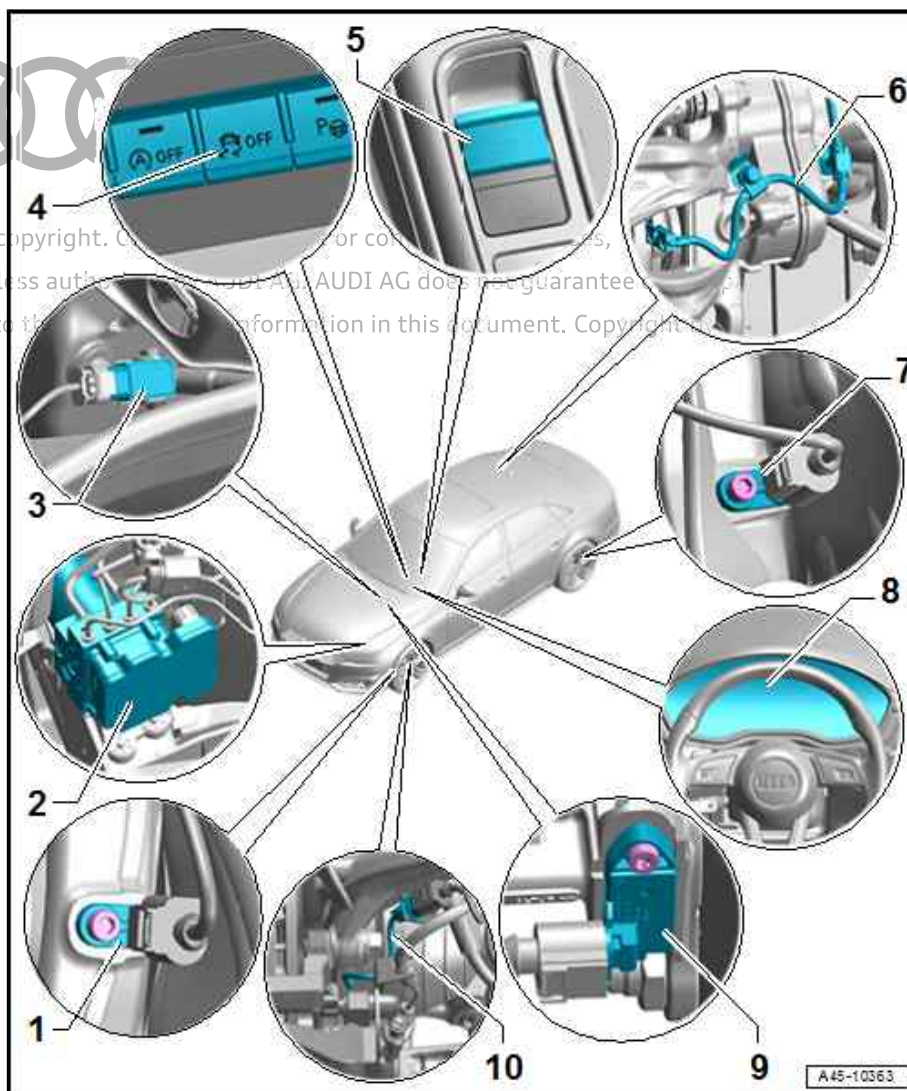
- ◆ Auto-hold button - E540-

- ◆ Electromechanical parking brake warning lamp - K213-

- ◆ Auto-hold warning lamp - K237-

- ◆ Button illumination bulb - L76-

- Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Removing and installing electromechanical parking brake button - E538- / auto-hold button - E540-





6 - Rear right brake pad wear sender - G37-

- ☐ In inner brake pad (right-side) only
- ☐ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)

7 - Rear speed sensor

- ◆ Rear right speed sensor - G44-
- ◆ Rear left speed sensor - G46-
- ☐ ⇒ [“4.2 Exploded view - rear wheel speed sensor”, page 35](#)

8 - Dash panel insert with control unit in dash panel insert - J285-

- ☐ Warning lamps cannot be renewed separately
- ☐ Renew dash panel insert if there is a fault ⇒ Electrical system; Rep. gr. 90 ; Dash panel insert; Exploded view - dash panel insert

9 - Brake light switch - F-

- ☐ Location: on brake master cylinder
- ☐ ⇒ [“3.1 Exploded view - brake servo / brake master cylinder”, page 148](#)

10 - Front brake pad wear sender

- ◆ Front left brake pad wear sender - G34-
- ◆ Front right brake pad wear sender - G35- ; not fitted on all models; for allocation refer to ⇒ Electronic parts catalogue
- ☐ In inner brake pad
- ☐ ⇒ [“1.1 Exploded view - front brakes”, page 38](#)



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3 Control unit and hydraulic unit

⇒ [“3.1 Exploded view - control unit and hydraulic unit”, page 25](#)

⇒ [“3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55”, page 27](#)

⇒ [“3.3 Separating control unit from hydraulic unit”, page 31](#)

⇒ [“3.4 Attaching control unit to hydraulic unit”, page 32](#)

3.1 Exploded view - control unit and hydraulic unit

Control unit and hydraulic unit

1 - Rubber damper

2 - Mounting bracket

3 - Bolt

- ☐ Tighten in two stages alternately
- ☐ Stage 1: 1 Nm to 1.5 Nm (to settle seal)
- ☐ Stage 2: 2.5 Nm

4 - ABS control unit - J104-

◆ If ABS control unit - J104- is defective, it can be renewed separately

◆ If ABS hydraulic unit - N55- is defective, it must be renewed together with ABS control unit - J104-

- ☐ ⇒ [“3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55”, page 27](#)
- ☐ Can be renewed separately if defective
- ☐ ⇒ [“3.3 Separating control unit from hydraulic unit”, page 31](#)
- ☐ ⇒ [“3.4 Attaching control unit to hydraulic unit”, page 32](#)

5 - Brake line

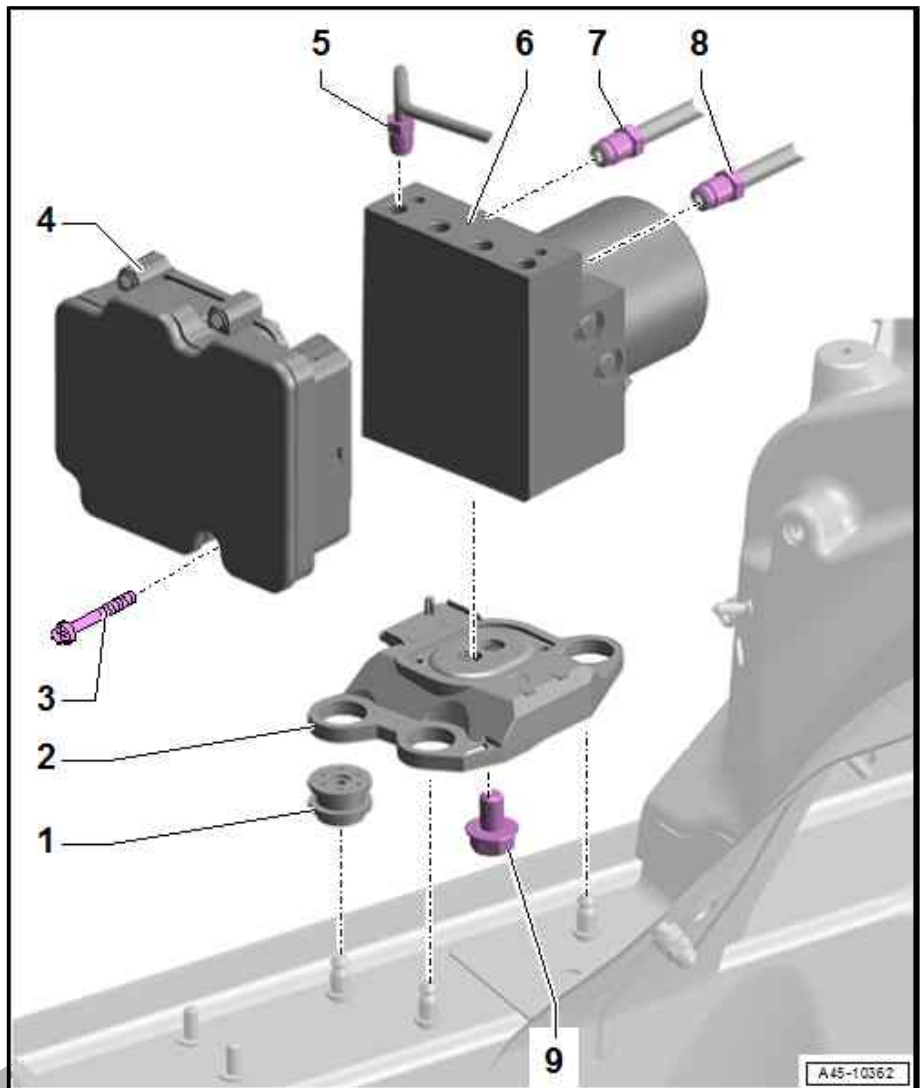
- ☐ To brake caliper
- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ 14 Nm

6 - ABS hydraulic unit - N55-

◆ If ABS control unit - J104- is defective, it can be renewed separately

◆ If ABS hydraulic unit - N55- is defective, it must be renewed together with ABS control unit - J104-

- ☐ ⇒ [“3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55”, page 27](#)
- ☐ ⇒ [“3.3 Separating control unit from hydraulic unit”, page 31](#)
- ☐ ⇒ [“3.4 Attaching control unit to hydraulic unit”, page 32](#)



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7 - Brake line

- ☐ From brake master cylinder to hydraulic unit
- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ 16 Nm

8 - Brake line

- ☐ From brake master cylinder to hydraulic unit
- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ 14 Nm

9 - Bolt

- ☐ 25 Nm

ABS control unit - J104-

1 - Pressure sensor contact

- ☐ Do not touch contacts
- ☐ Some versions may differ from this illustration

2 - Pressure sensor

- ☐ Must not be modified or damaged
- ☐ Cannot be replaced
- ☐ Some versions may differ from this illustration

3 - Gasket

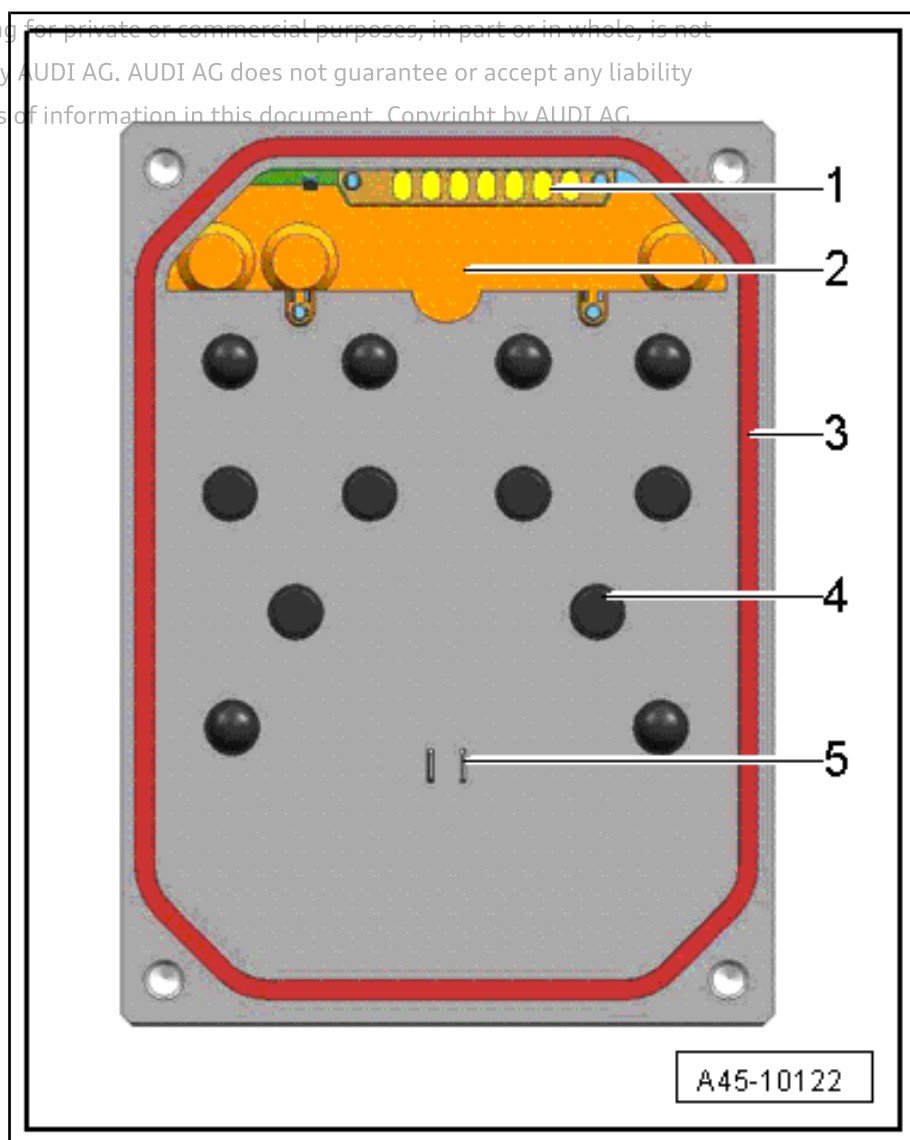
- ☐ Do not pull out or lift off
- ☐ Cannot be renewed separately

4 - Contact pins

- ☐ Must not be damaged
- ☐ Never apply tools

5 - Contact for pump motor

- ☐ Must not be damaged





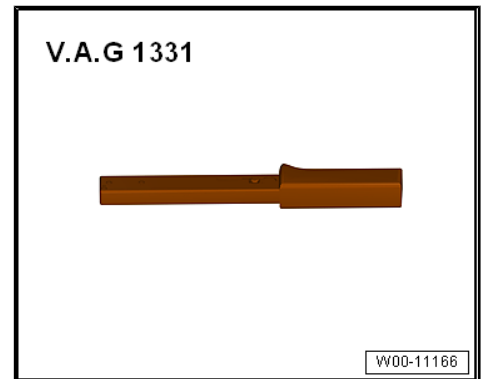
3.2 Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55-

Fitting location

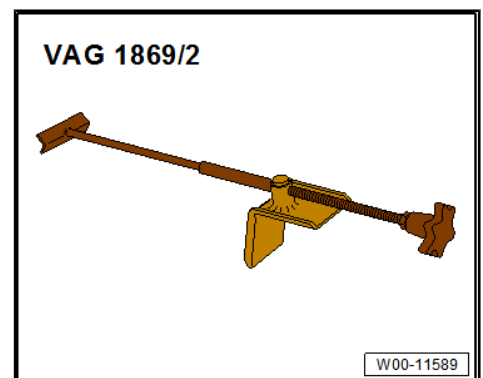
⇒ ["2.1 Overview of fitting locations - ABS/ESP", page 23](#)

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Torque wrench - V.A.G 1331-



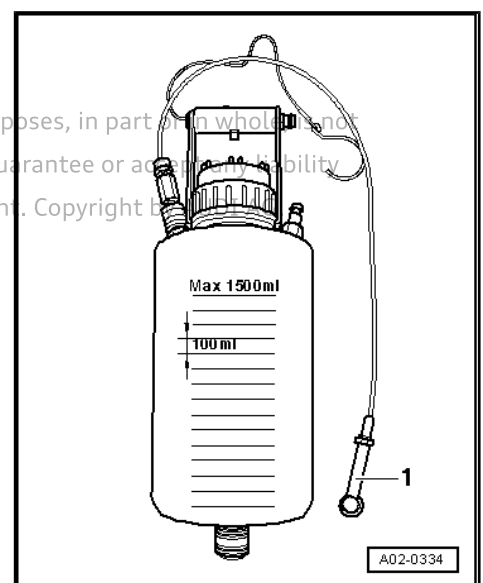
- ◆ Brake pedal actuator - V.A.G 1869/2-



- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-

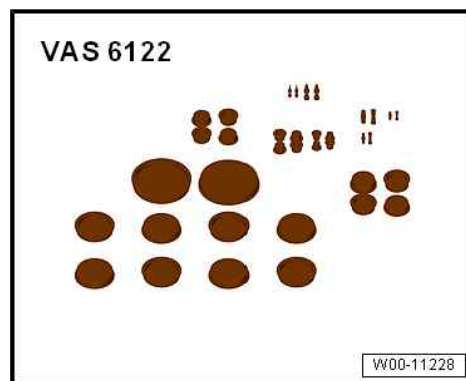


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♦ Engine bung set - VAS 6122-



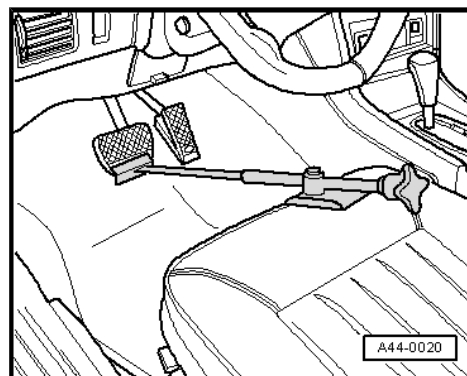
♦ Protective gloves

Removing

- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal by at least 60 mm.

Note:

This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.



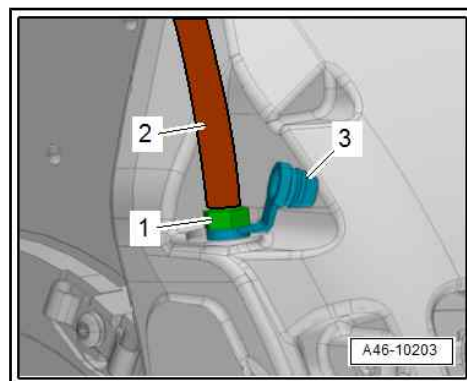
CAUTION

Risk of injury from escaping brake fluid

Skin can suffer irritation or injuries.

- Put on protective gloves.

- Detach protective cap -3- from bleeder screw -1- on one of the front brake calipers.
- Connect hose -2- of bleeder bottle.
- Open bleeder screw to relieve pressure in brake system.
- Close bleeder screw and remove bleeder bottle.
- Repeat procedure on one of the rear brake calipers.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.
- Remove engine control unit ⇒ Engine; Rep. gr. 23 ; Engine control unit; Removing and installing engine control unit - J623- , or ⇒ Engine; Rep. gr. 24 ; Engine control unit; Removing and installing engine control unit - J623- .



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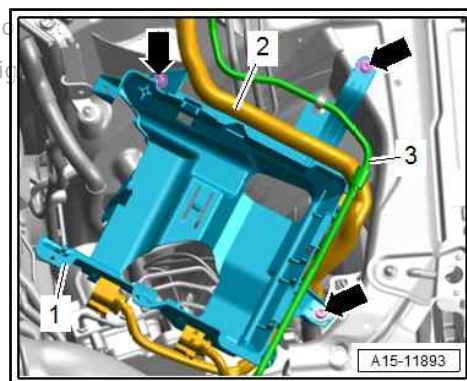
- If necessary, move coolant line -3- and electrical wiring harness -2- clear.

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- Remove bolts (2 or 3 depending on model) -arrows- and detach mounting for engine control unit.

- To protect against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath hydraulic control unit.

- Mark brake lines for re-installation.



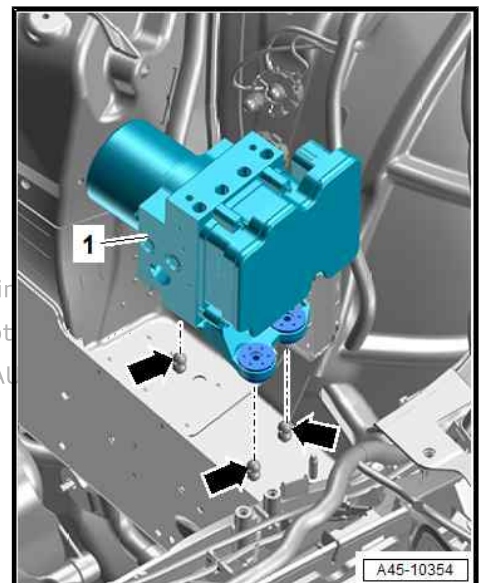
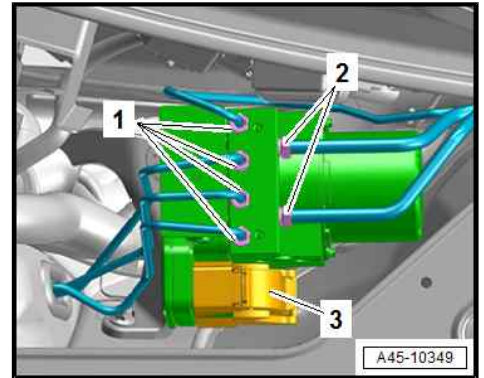


- Unscrew brake lines -1, 2- from ABS hydraulic unit - N55- .

! NOTICE

Risk of irreparable damage to brake lines if they are bent.

- **Never bend brake lines out of their original shape.**
- Seal brake lines and threaded holes immediately using clean sealing plugs from engine bung set - VAS 6122- .
- Carefully pull ABS control unit - J104- with ABS hydraulic unit - N55- -item 1- off studs -arrows-.
- Only take hydraulic control unit out of vehicle as far as necessary to unplug electrical connector.

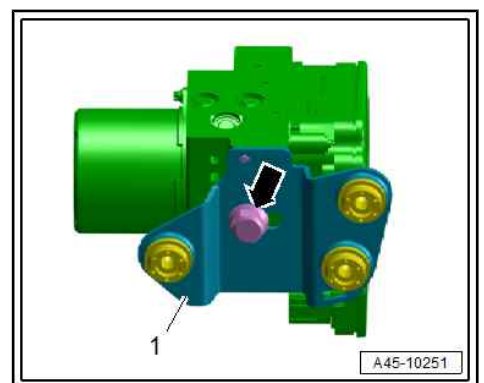
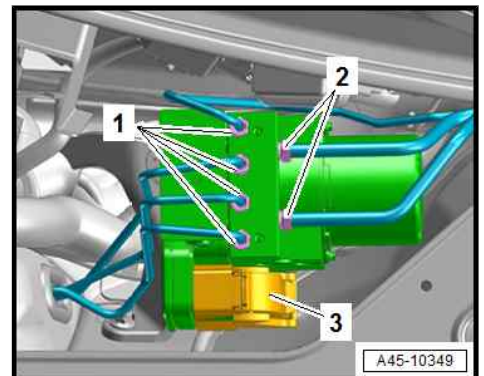


- Release electrical connector for ABS control unit - J104- -3- and unplug from control unit.

Note:

Make sure brake fluid does not get into connector housing of control unit.

- Take ABS control unit - J104- with ABS hydraulic unit - N55- out of vehicle.
- Turn ABS control unit - J104- with ABS hydraulic unit - N55- .
- Seal brake lines and threaded holes immediately using clean sealing plugs from engine bung set - VAS 6122- .
- If necessary, remove bolt -arrow- and detach bracket -1-.

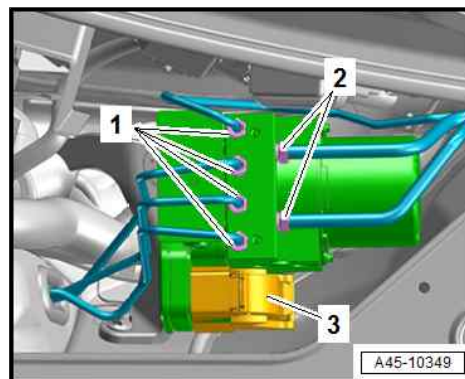




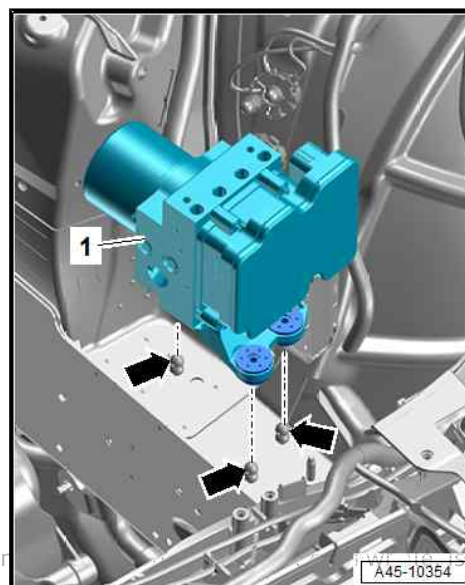
Installing

Installation is carried out in reverse order; note the following:

- If necessary, fit bracket for hydraulic control unit.
- Insert hydraulic control unit into vehicle as far as necessary to connect electrical connector -3-.



- Carefully press hydraulic control unit -1- onto studs -arrows-.
- The hydraulic control unit must be seated correctly on all studs.
- Remove sealing plugs.



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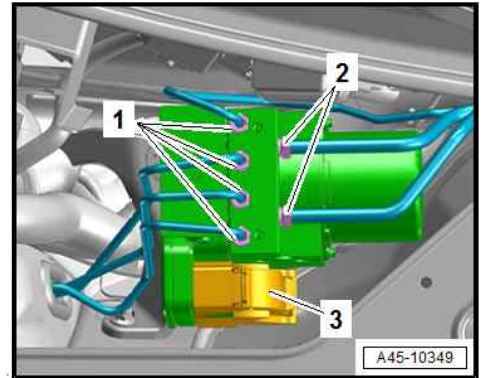


- Insert brake lines -1, 2- into ABS hydraulic unit - N55- , screw in union screws by hand and tighten.
- Perform final control diagnosis after securing brake lines to hydraulic unit ⇒ Vehicle diagnostic tester.

Note:

Final control diagnosis can be used to establish whether line connections have been interchanged.

- Remove brake pedal actuator - V.A.G 1869/2- .
- Remove all cloths that you have previously placed in the vehicle.
- Bleed brake system ⇒ [page 178](#) .
- When renewing ABS control unit - J104- / ABS hydraulic unit N55- , select the "Replace" function for the ABS control unit - J104- / ABS hydraulic unit - N55- using ⇒ Vehicle diagnostic tester, Guided Functions.



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

Tightening torques

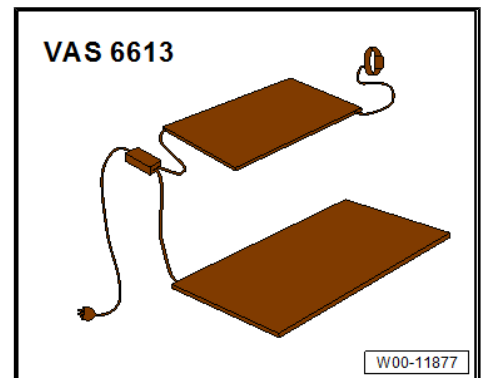
- ◆ ⇒ ["3.1 Exploded view - control unit and hydraulic unit", page 25](#)
- ◆ ⇒ Engine; Rep. gr. 23 ; Engine control unit; Removing and installing engine control unit - J623- , or ⇒ Engine; Rep. gr. 24 ; Engine control unit; Removing and installing engine control unit - J623-

3.3 Separating control unit from hydraulic unit

- The ABS hydraulic unit - N55- and the ABS control unit - J104- must be removed in order to separate the control unit from the hydraulic unit.
- The return pump must not be unbolted from the ABS hydraulic unit - N55- .

Special tools and workshop equipment required

- ◆ ESD (electrostatic discharge) workplace - VAS 6613-



Procedure

- Remove hydraulic control unit
⇒ ["3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55", page 27](#) .



! NOTICE

Risk of irreparable damage to control unit due to electrostatic discharge and insufficient attention to cleanliness.

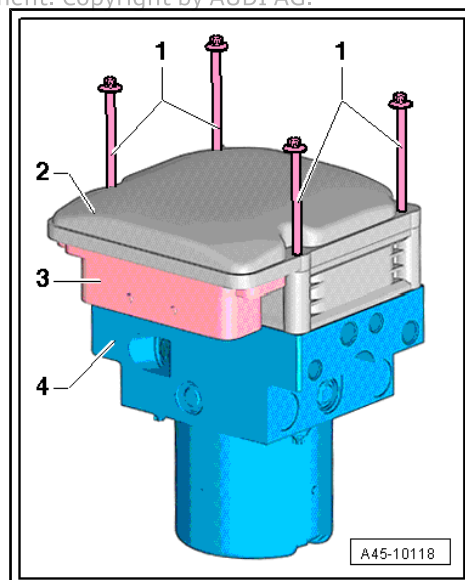
- Discharge static electricity by touching ESD workplace.
- Keep inside of control unit clean and dry.

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

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- The control unit -2- faces upwards; the hydraulic unit -4- with the pump motor and connector -3- faces downwards.
- Remove and discard bolts -1-.
- Carefully lift off control unit vertically upwards, making sure that it is kept straight.
- Do not blow out the control unit or hydraulic unit with compressed air.
- The contact pins in the hydraulic unit must not be damaged or bent.
- Cover open hydraulic unit with a lint-free cloth.
- Check sealing surface of hydraulic unit and clean with methylated spirits and a lint-free cloth if necessary.
- A damaged sealing surface must not be worked on. If a hydraulic unit has a defective sealing surface, the unit must be renewed.



! NOTICE

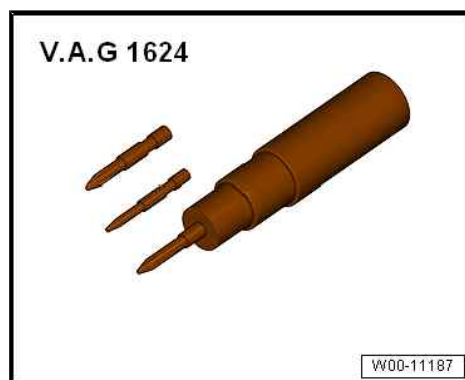
Risk of damage to control unit if it is handled incorrectly

- Do not lift or pull out seal.

3.4 Attaching control unit to hydraulic unit

Special tools and workshop equipment required

- ◆ Torque screwdriver - V.A.G 1624-





- ◆ ESD (electrostatic discharge) workplace - VAS 6613-



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- ◆ Screwdriver bit, T25 bit, Torx - VAS 5377-

Procedure

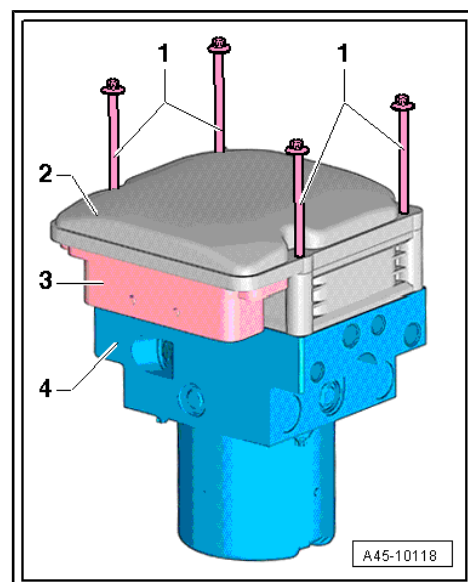
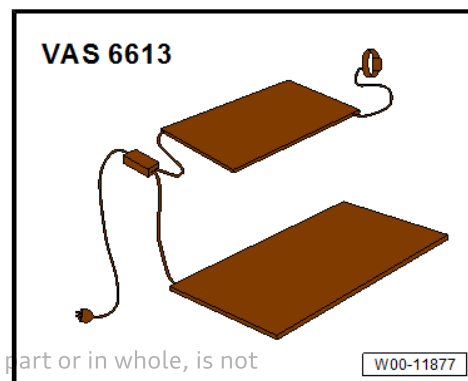
- Use all parts supplied in the repair kit when fitting.
- Take care to protect ABS control unit from knocks and impact; if it is dropped, control unit must no longer be used.
- The hydraulic unit -4- with the pump motor and connector -3- faces downwards.
- Carefully place control unit -2- on hydraulic unit from above, taking care to keep it straight.
- Screw in new bolts -1- by hand until control unit makes uniform contact with hydraulic unit.

If the bolts securing the control unit to the hydraulic unit are difficult to screw in or if they cannot be tightened to the specified torque, the hydraulic unit must be renewed.

- Tighten bolts in diagonal sequence and in 2 stages.
- Install hydraulic control unit
⇒ [“3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55”, page 27](#) .
- After the hydraulic control unit has been fitted and the brake system bled, select “Replace” function for ABS control unit - J104- / ABS hydraulic unit - N55- in **Guided Functions** mode of ⇒ Vehicle diagnostic tester.

Tightening torques

- ◆ ⇒ [“3.1 Exploded view - control unit and hydraulic unit”, page 25](#)





4 Sensors

⇒ "4.1 Exploded view - front wheel speed sensor", page 34

⇒ "4.2 Exploded view - rear wheel speed sensor", page 35

⇒ "4.3 Removing and installing brake light switch", page 35

⇒ "4.4 Removing and installing front wheel speed sensor G45 / G47", page 36

⇒ "4.5 Removing and installing rear wheel speed sensor G44 / G46", page 37

4.1 Exploded view - front wheel speed sensor

1 - Wheel bearing housing

- ☐ Clean inner surface of bore before inserting speed sensor

2 - Front speed sensor

- ◆ Front right speed sensor - G45-

- ◆ Front left speed sensor - G47-

- ☐ ⇒ "4.4 Removing and installing front wheel speed sensor G45 / G47", page 36

- ☐ Before installing, lubricate speed sensor all round with lubricating paste - G 000 650-

3 - Bolt

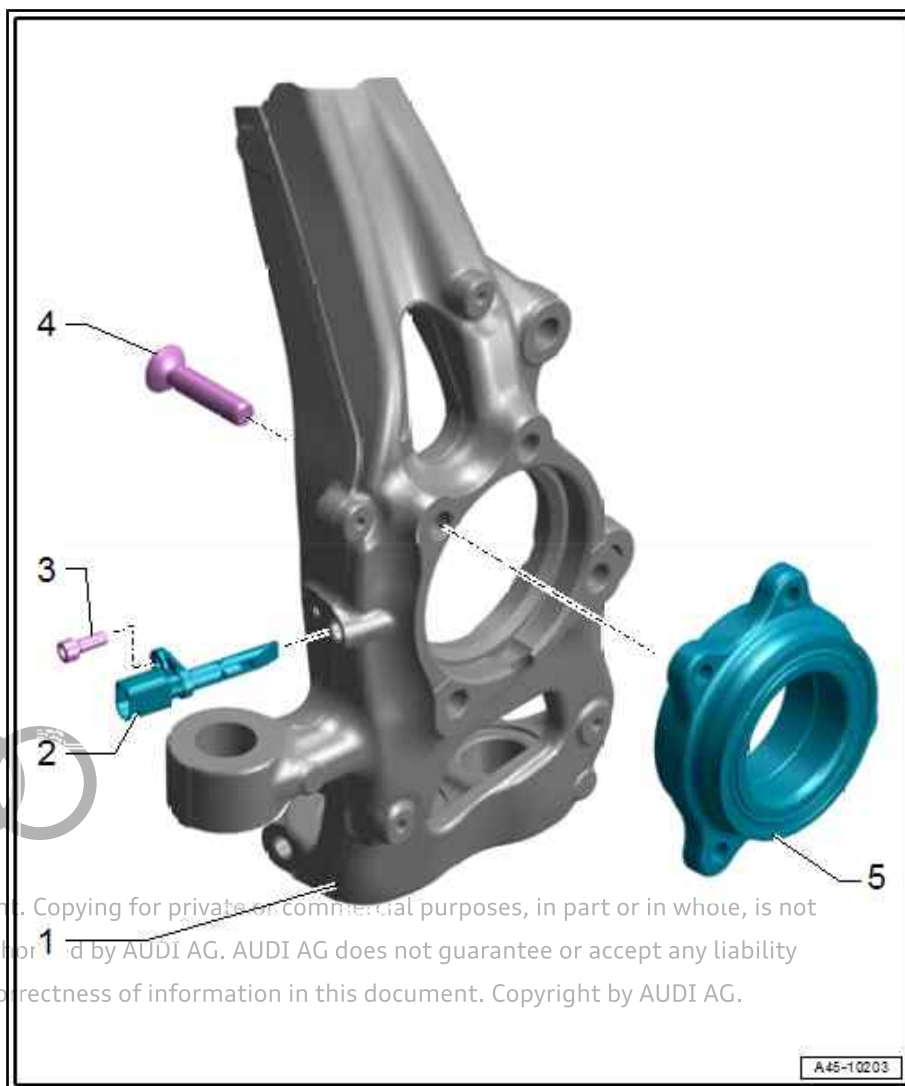
- ☐ 9 Nm

4 - Bolt

- ☐ Tightening torque ⇒ Running gear, axles, steering; Rep. gr. 40 ; Wheel bearing; Exploded view - wheel bearing

5 - Wheel bearing

- ☐ With integrated ABS sensor ring





4.2 Exploded view - rear wheel speed sensor

1 - Wheel bearing

- ☐ With integrated ABS sensor ring

2 - Wheel bearing housing

- ☐ Clean inner surface of bore before inserting speed sensor

3 - Bolt

- ☐ Tightening torque ➔ Running gear, axles, steering; Rep. gr. 42 ; Wheel bearing, trailing arm; Exploded view - wheel bearing

4 - Bolt

- ☐ 9 Nm

5 - Rear speed sensor

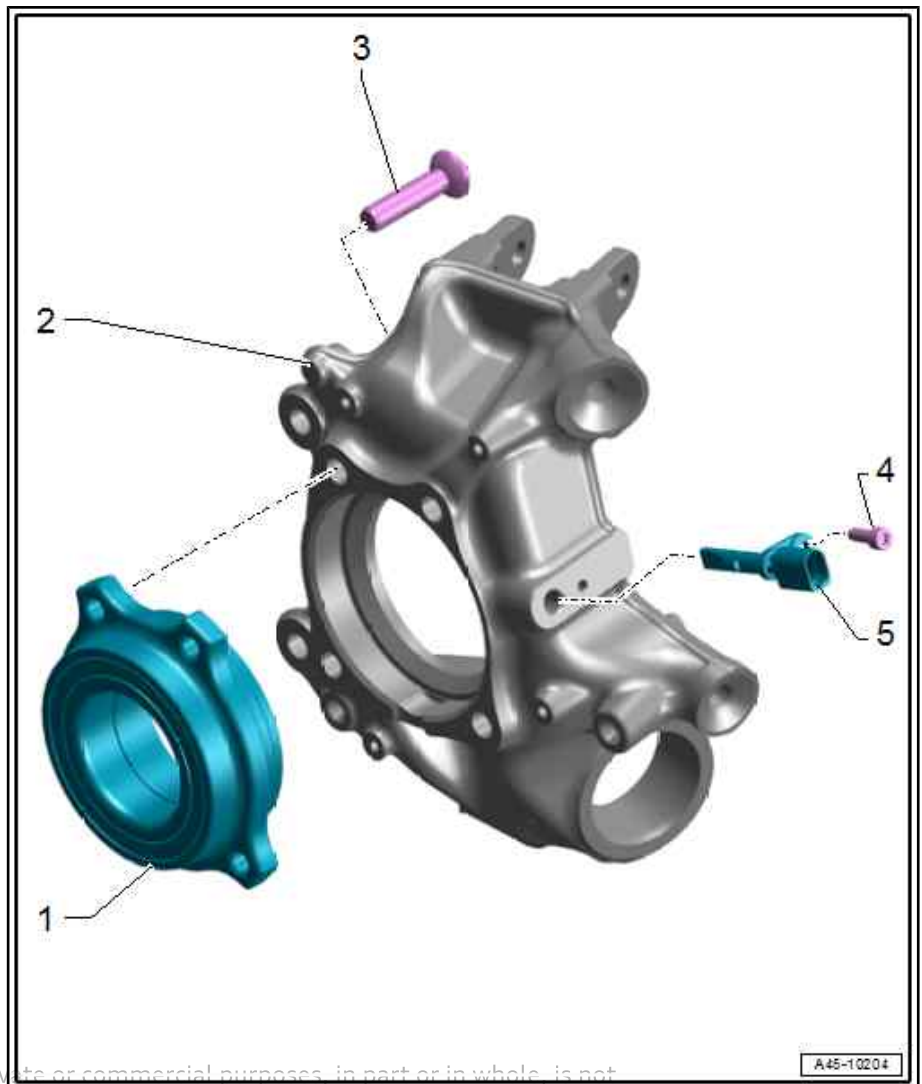
- ☐ Different installation position for front-wheel drive and four-wheel drive

- ◆ Rear right speed sensor - G44-

- ◆ Rear left speed sensor - G46-

- ☐ ➔ ["4.5 Removing and installing rear wheel speed sensor G44 / G46", page 37](#)

- ☐ Before installing, lubricate speed sensor all round with lubricating paste - G 000 650-



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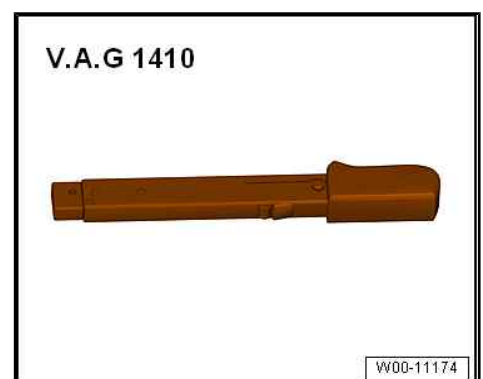
4.3 Removing and installing brake light switch

Fitting location

➔ ["2.1 Overview of fitting locations - ABS/ESP", page 23](#)

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-

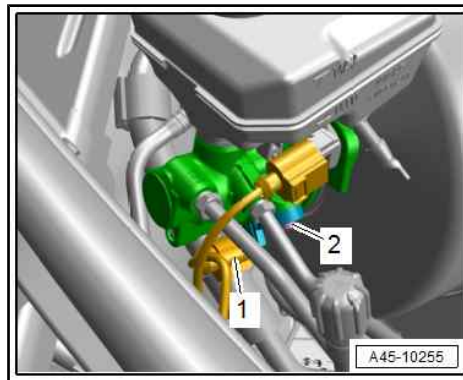


W00-11174



Removing

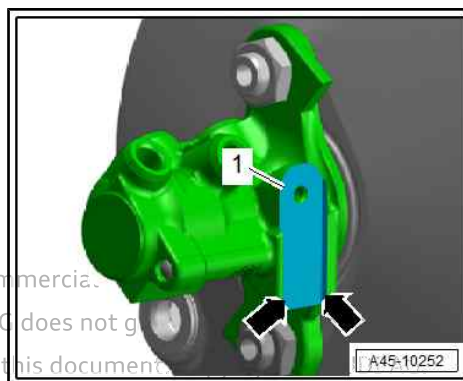
- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Unplug electrical connector -1-.
- Remove bolt -2- and detach brake light switch - F- from brake master cylinder.



Installing

Installation is carried out in reverse order; note the following:

- Clean contact surface -1- for brake light switch - F- .
- Brake light switch must be fitted between both edges -arrows- of brake master cylinder.
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Make sure that the brake light switch works properly before the vehicle is driven on the road.



Tightening torques

- ◆ ⇒ [Item 21 \(page 150\)](#)

4.4 Removing and installing front wheel speed sensor -G45- / -G47-

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



- ◆ Lubricating paste - G 000 650- ⇒ Electronic parts catalogue



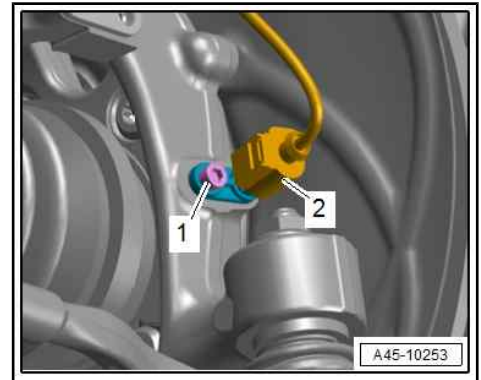
Removing

- Unplug electrical connector -1-.
- Unscrew bolt -2- and pull speed sensor out of wheel bearing housing.

Installing

Install in reverse sequence, paying attention to the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Before inserting speed sensor, clean inner surface of fitting hole and coat speed sensor thoroughly with grease - G 000 650- .
- After installation, turn steering to full left and right lock and check clearance of speed sensor wire.



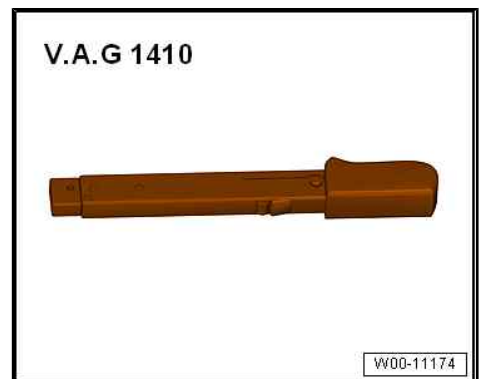
Tightening torques

- ◆ ⇒ [“4.1 Exploded view - front wheel speed sensor”, page 34](#)

4.5 Removing and installing rear wheel speed sensor -G44- / -G46-

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



- ◆ Lubricating paste - G 000 650- ⇒ Electronic parts catalogue

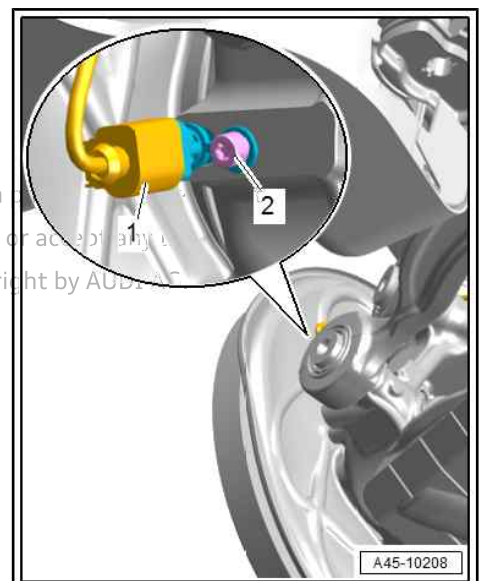
Removing

- Unplug electrical connector -1-.
- Unscrew bolt -2- and pull speed sensor out of wheel bearing housing (illustration shows vehicle with four-wheel drive).

Installing

Install in reverse sequence, paying attention to the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Before inserting speed sensor, clean inner surface of fitting hole and coat speed sensor thoroughly with grease - G 000 650- .



Tightening torques

- ◆ ⇒ [“4.2 Exploded view - rear wheel speed sensor”, page 35](#)



46 – Brakes - mechanism

1 Front brakes

- ⇒ [“1.1 Exploded view - front brakes”, page 38](#)
- ⇒ [“1.2 Removing and installing brake pads”, page 53](#)
- ⇒ [“1.3 Removing and installing brake caliper”, page 69](#)
- ⇒ [“1.4 Renewing brake caliper”, page 81](#)
- ⇒ [“1.5 Removing and installing brake carrier”, page 97](#)
- ⇒ [“1.6 Removing and installing brake disc”, page 98](#)
- ⇒ [“1.7 Removing and installing splash plate”, page 102](#)
- ⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#)

1.1 Exploded view - front brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

- ⇒ [“1.1.1 Exploded view - front brakes, steel version \(1LA/1LB\)”, page 38](#)
- ⇒ [“1.1.2 Exploded view - front brake, steel version \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 42](#)
- ⇒ [“1.1.3 Exploded view - front brake, steel version \(1LJ/1LL/1ZA/1ZC/1ZK\)”, page 45](#)
- ⇒ [“1.1.4 Exploded view - front brake, steel version \(1LM/1LX/1LY/1LZ/1ZX\)”, page 48](#)
- ⇒ [“1.1.5 Exploded view - front brake, ceramic version \(1LN/1LU/1LT\)”, page 51](#)

1.1.1 Exploded view - front brakes, steel version (1LA/1LB)

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⇒ "1.7 Removing and installing splash plate", page 102

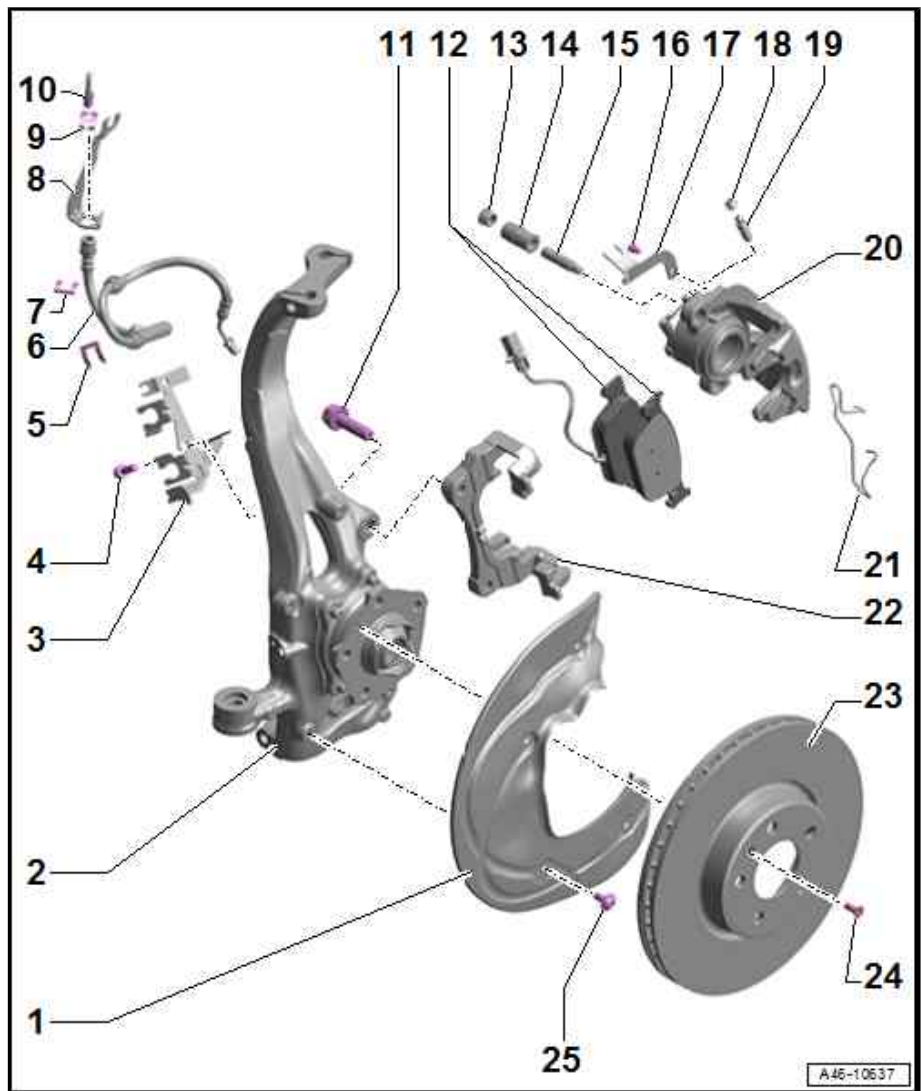
3 - Bracket

- For brake hose and electrical wiring

- ❑ Clean before reinstalling
- ❑ Renew if damaged
- ❑ Renew self-locking bolts and nuts after removing
- ❑ 20 Nm

☐ For brake hose

- ❑ Make sure the brake hose is routed correctly. The brake hose must not be kinked, crushed or twisted at any point, or chafe against any part of the vehicle.
- ❑ Renew if damaged
- ❑ Ensure that lugs are properly seated in grooves in bracket
- ❑ Tightening torque, brake hose to brake caliper: 14 Nm



☐ For brake hose

- ☐ For brake line/hose
- ☐ On body

☐ Renew if damaged

- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ Tightening torque, brake line to brake hose: 14 Nm

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 200 Nm

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Inner brake pad (left-side) with front left brake pad wear sender - G34-



- ☐ Renew brake pads if brake pad wear indicator wire is damaged
- ☐ Check brake pad thickness; for wear limit, refer to ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ ⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”, page 53](#)
- ☐ ⇒ [Fig. “Installation position of brake pads - steel version brakes \(1LA/1LB\)”, page 41](#)

13 - Trim cap

14 - Bearing bush

- ☐ ⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#)

15 - Guide pin

- ☐ ⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#)
- ☐ 30 Nm

16 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 9 Nm

17 - Bracket

- ☐ For brake hose and electrical wiring

18 - Protective cap

19 - Bleeder screw

- ☐ ⇒ [“6.2 Bleeding hydraulic system”, page 178](#)
- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 18 Nm

20 - Brake caliper housing

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Unscrew from brake carrier to renew brake pads
- ☐ ⇒ [“1.3.1 Removing and installing brake caliper - steel version brakes \(1LA/1LB\)”, page 69](#)
- ☐ ⇒ [“1.4.1 Renewing brake caliper - steel version brakes \(1LA/1LB\)”, page 81](#)
- ☐ Servicing ⇒ [“1.2.1 Removing and installing brake caliper piston - single-piston brakes”, page 135](#)

21 - Retaining spring

- ☐ Insert in both holes in brake caliper housing
- The retaining spring must be pressed under the brake carrier after inserting into both holes. If incorrectly installed, the wear of the outer pad cannot be adjusted, and the pedal travel will be increased as a result.

22 - Brake carrier

- ☐ ⇒ [“1.5 Removing and installing brake carrier”, page 97](#)
- ☐ Remove and install together with brake caliper
⇒ [“1.3.1 Removing and installing brake caliper - steel version brakes \(1LA/1LB\)”, page 69](#)

23 - Brake disc

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Wear limit ⇒ [“4.1 Technical data for brakes”, page 4](#)
- ☐ Lateral run-out: max. 0.06 mm
- ☐ Perform measurement with dial gauge - VAS 6079- and dial gauge bracket for brake discs - 6079/1- with brake disc installed
- ☐ Perform measurement at a distance of 10 mm from outer edge of brake disc; remove dirt and corrosion from brake disc first
- ☐ Never remove brake disc from wheel hub by force; if necessary use rust remover, as brake disc may otherwise be damaged
- ☐ ⇒ [“1.6.1 Removing and installing brake disc - steel version brakes”, page 98](#)



24 - Bolt

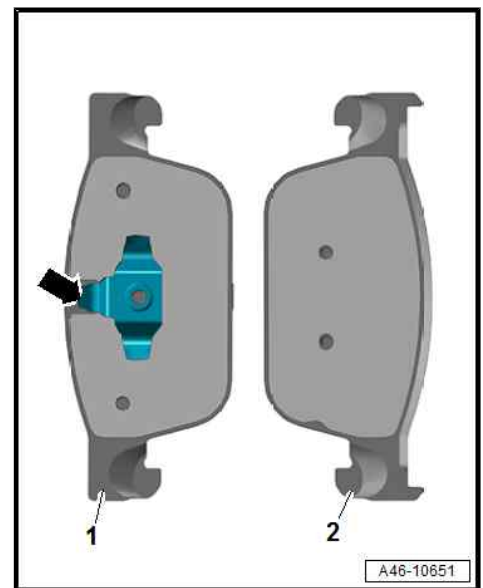
- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

25 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 10 Nm

Installation position of brake pads - steel version brakes (1LA/1LB)

- 1 - Clip inner brake pad with retaining spring -arrow- into brake caliper piston.
- 2 - Engage outer brake pad in brake carrier.





1.1.2 Exploded view - front brake, steel version (1LC/1LD/1LE/1LF/1LG/1LH)

1 - Splash plate for brakes

- ❑ ➔ "1.7 Removing and installing splash plate", page 102

2 - Wheel bearing housing

3 - Bracket

- ❑ For brake hose and electrical wiring

4 - Bolt

- ❑ Clean before reinstalling
- ❑ Renew if damaged
- ❑ Renew self-locking bolts and nuts after removing
- ❑ 20 Nm

5 - Hose retainer

- ❑ For brake hose

6 - Brake hose

- ❑ Make sure the brake hose is routed correctly. The brake hose must not be kinked, crushed or twisted at any point, or chafe against any part of the vehicle.
- ❑ Renew if damaged
- ❑ Ensure that lugs are properly seated in grooves in bracket
- ❑ Tightening torque, brake hose to brake caliper: 14 Nm

7 - Hose retainer

- ❑ Renew if damaged

8 - Bracket

- ❑ For brake line/hose
- ❑ On body

9 - Retaining spring

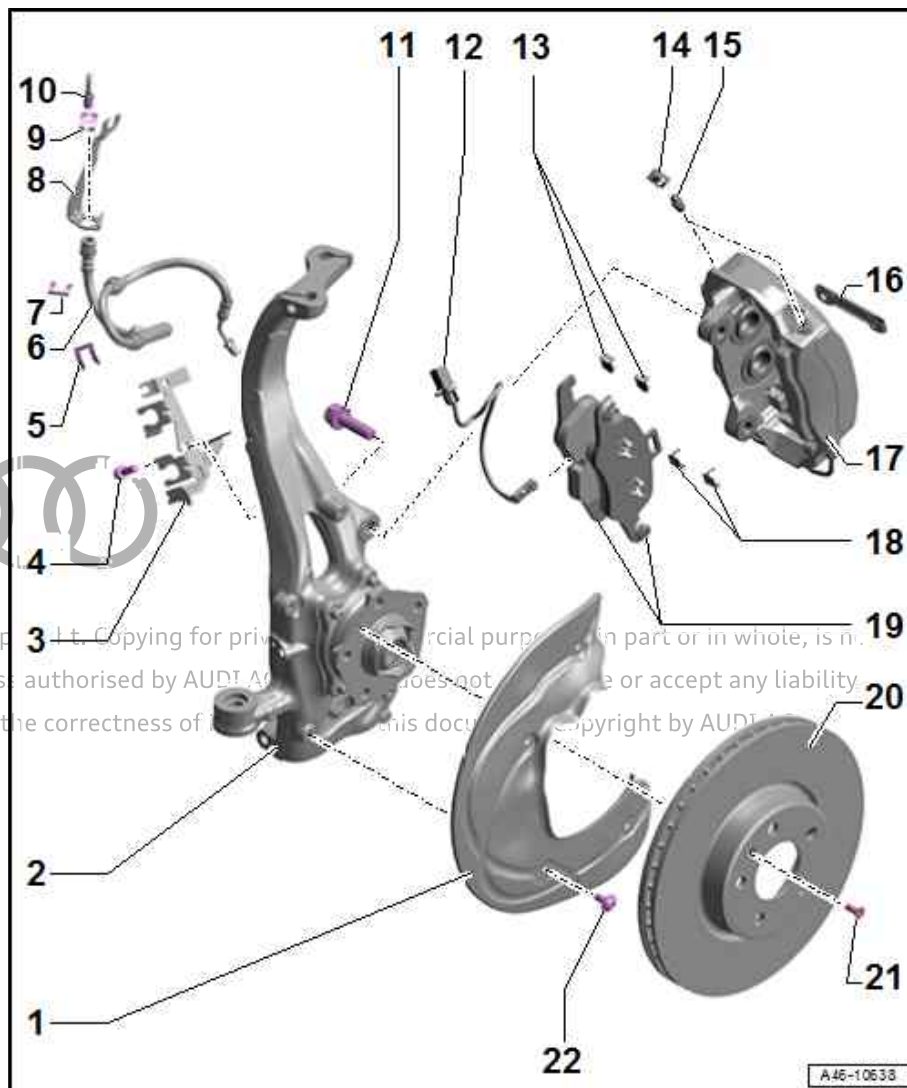
- ❑ Renew if damaged

10 - Brake line

- ❑ Do not alter shape
- ❑ Renew brake line if it is damaged or deformed
- ❑ Tightening torque, brake line to brake hose: 14 Nm

11 - Bolt

- ❑ Clean before reinstalling
- ❑ Renew if damaged
- ❑ Renew self-locking bolts and nuts after removing
- ❑ 200 Nm





12 - Electrical wire for brake pad wear indicator

- ☐ For inner brake pad (left-side) with front left brake pad wear sender - G34-
- ☐ Renew when changing pads
- ☐ ⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#)

13 - Sliding plates

- ☐ Installation position ⇒ [page 44](#)

14 - Protective cap

15 - Bleeder screw

- ☐ ⇒ [“6.2 Bleeding hydraulic system”, page 178](#)
- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 18 Nm

16 - Spring clip

- ☐ Installing ⇒ [page 44](#)

17 - Brake caliper

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ ⇒ [“1.3.2 Removing and installing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 72](#)
- ☐ ⇒ [“1.4.2 Renewing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 85](#)
- ☐ Servicing ⇒ [“1.2.2 Removing and installing brake caliper pistons - four-piston brakes”, page 138](#)

18 - Sliding plates

- ☐ Installation position ⇒ [page 44](#)

19 - Brake pads

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Inner brake pads with mounting for brake pad wear sender
- ☐ Check brake pad thickness; for wear limit, refer to ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ ⇒ [“1.2.2 Removing and installing brake pads - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 58](#)
- ☐ ⇒ [Fig. “Installation position of brake pads - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)””, page 44](#)

20 - Brake disc

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Wear limit ⇒ [“4.1 Technical data for brakes”, page 4](#)
- ☐ Lateral run-out: max. 0.06 mm
- ☐ Perform measurement with dial gauge - VAS 6079- and dial gauge bracket for brake discs - 6079/1- with brake disc installed
- ☐ Perform measurement at a distance of 10 mm from outer edge of brake disc; remove dirt and corrosion from brake disc first
- ☐ Never remove brake disc from wheel hub by force; if necessary use rust remover, as brake disc may otherwise be damaged
- ☐ ⇒ [“1.6.1 Removing and installing brake disc - steel version brakes”, page 98](#)

21 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

22 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged



- ❑ Renew self-locking bolts and nuts after removing
- ❑ 10 Nm

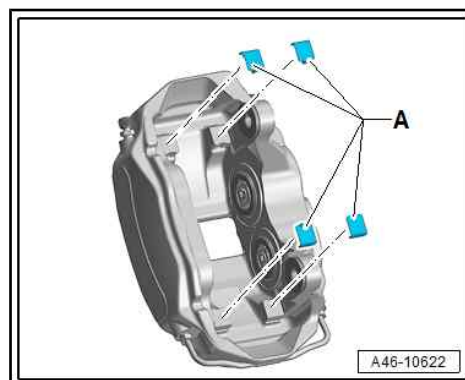
Installation position of sliding plates -A-

CAUTION

Risk of malfunctions due to missing sliding plates

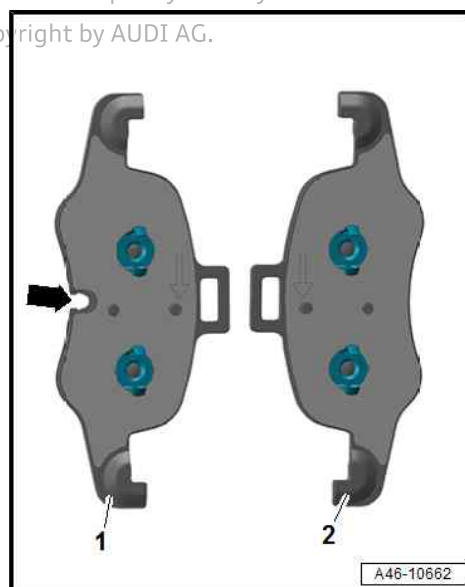
- Check that all sliding plates are installed in the correct positions before inserting brake pads.

- Insert all four sliding plates -A- in contact surfaces for brake pads, as shown in illustration.
- Installation position of sliding plates: small, narrow tab faces brake caliper.
- Before installing brake pads, make sure installation position is correct.



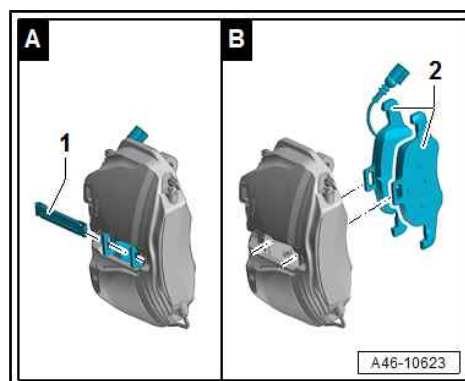
Installation position of brake pads - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)

- 1 - Inner brake pad with groove -arrow- for brake pad wear sender
 - 2 - Outer brake pad
- Clip brake pads into brake caliper pistons with retaining springs.



Installing spring clip

- After inserting brake pads -2-, slide spring clip -1- through eyelets on brake pads and engage in mounting.
- You must be able to hear and feel the spring clip engaging in the brake caliper.





1.1.3 Exploded view - front brake, steel version (1LJ/1LL/1ZA/1ZC/1ZK)

1 - Splash plate for brakes

- ☐ ⇒ "1.7 Removing and installing splash plate", page 102

2 - Wheel bearing housing

3 - Bracket

- ☐ For brake hose and electrical wiring

4 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 20 Nm

5 - Hose retainer

- ☐ For brake hose

6 - Brake hose

- ☐ Make sure the brake hose is routed correctly. The brake hose must not be kinked, crushed or twisted at any point, or chafe against any part of the vehicle.
- ☐ Renew if damaged
- ☐ Ensure that lugs are properly seated in grooves in bracket
- ☐ Tightening torque, brake hose to brake caliper: 14 Nm

7 - Hose retainer

- ☐ Renew if damaged

8 - Bracket

- ☐ For brake line/hose
- ☐ On body

9 - Retaining spring

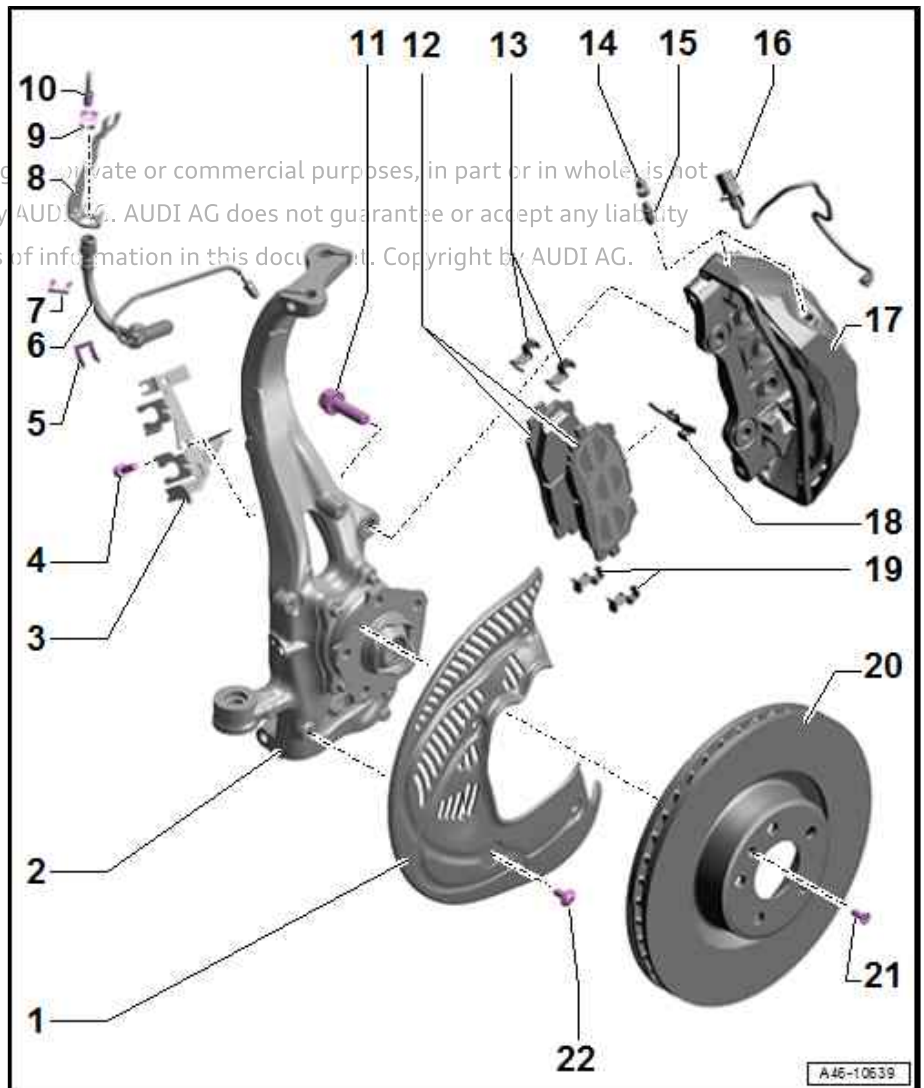
- ☐ Renew if damaged

10 - Brake line

- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ Tightening torque, brake line to brake hose: 14 Nm

11 - Bolt

- ☐ Clean bolts before reusing
- ☐ Renew damaged bolts
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 200 Nm





12 - Brake pads

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Inner brake pads with mounting for brake pad wear sender
- ☐ Check brake pad thickness; for wear limit, refer to ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ ⇒ [“1.2.3 Removing and installing brake pads - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 61](#)
- ☐ ⇒ [Fig. “Installation position of brake pads - six-piston brakes””, page 47](#)

13 - Pad retainers

- ☐ Renew when changing pads
- ☐ Must be properly seated

14 - Protective cap

15 - Bleeder screw

- ☐ ⇒ [“6.2 Bleeding hydraulic system”, page 178](#)
- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 18 Nm

16 - Electrical wire for brake pad wear indicator

- ☐ For inner brake pad (left-side) with front left brake pad wear sender - G34-
- ☐ Renew when changing pads
- ☐ ⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#)

17 - Brake caliper

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Do not loosen bolts securing brake caliper to brake carrier
⇒ [Fig. “Do not loosen bolts securing brake caliper to brake carrier””, page 47](#)
- ☐ ⇒ [“1.3.3 Removing and installing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 75](#)
- ☐ ⇒ [“1.4.3 Renewing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 89](#)
- ☐ Servicing ⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)

18 - Pad retaining spring

- ☐ Renew when changing pads
- ☐ Must be properly seated

19 - Pad retainers

- ☐ Renew when changing pads
- ☐ Must be properly seated

20 - Brake disc

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Wear limit ⇒ [“4.1 Technical data for brakes”, page 4](#)
- ☐ Lateral run-out: max. 0.06 mm
- ☐ Perform measurement with dial gauge - VAS 6079- and dial gauge bracket for brake discs - 6079/1- with brake disc installed
- ☐ Perform measurement at a distance of 10 mm from outer edge of brake disc; remove dirt and corrosion from brake disc first
- ☐ Never remove brake disc from wheel hub by force; if necessary use rust remover, as brake disc may otherwise be damaged
- ☐ ⇒ [“1.6.1 Removing and installing brake disc - steel version brakes”, page 98](#)

21 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged



- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

22 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 10 Nm

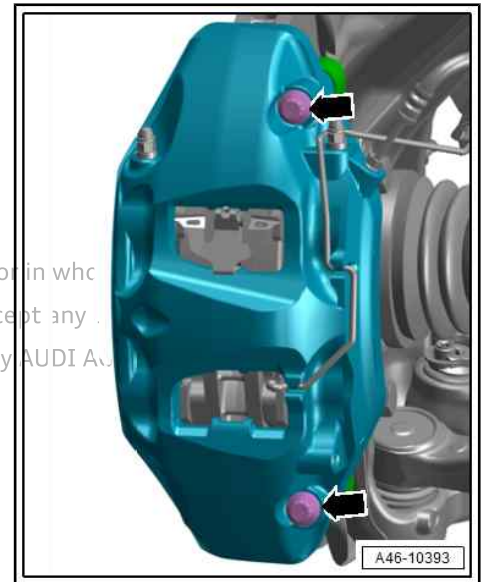
Do not loosen bolts securing brake caliper to brake carrier



Risk of irreparable damage to brake caliper if handled incorrectly

- **Never loosen bolts securing brake caliper to brake carrier.**

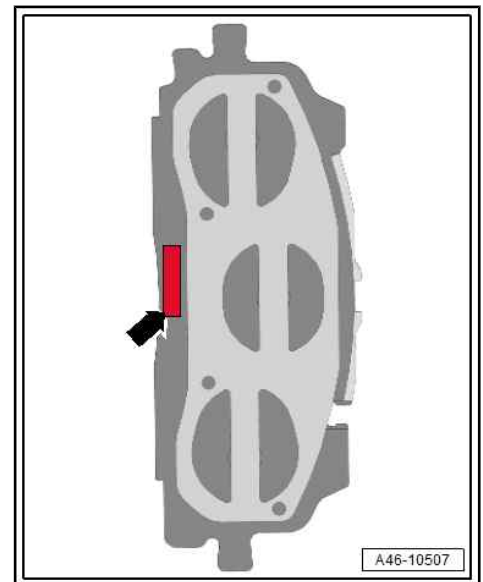
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Installation position of brake pads - six-piston brakes

Version 1:

- Note information -arrow- on brake pads:
- ◆ LEFT OUTER
- ◆ LEFT INNER
- ◆ RIGHT OUTER
- ◆ RIGHT INNER





Version 2:

– Note information -2- on brake pads:

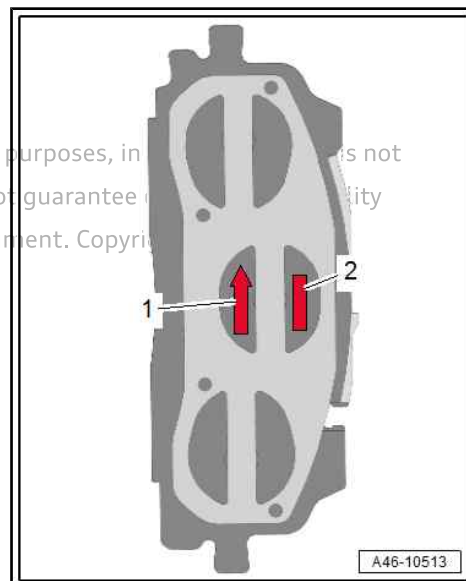
◆ LEFT OUTER

◆ LEFT INNER

◆ RIGHT OUTER

◆ RIGHT INNER

- When installed, arrow -1- on backplate of brake pad must face upwards.



1.1.4 Exploded view - front brake, steel version (1LM/1LX/1LY/1LZ/1ZX)

1 - Splash plate for brakes

- ❑ ⇒ "1.7 Removing and installing splash plate", page 102

2 - Wheel bearing housing

3 - Bracket

- ❑ For brake hose and electrical wiring

4 - Bolt

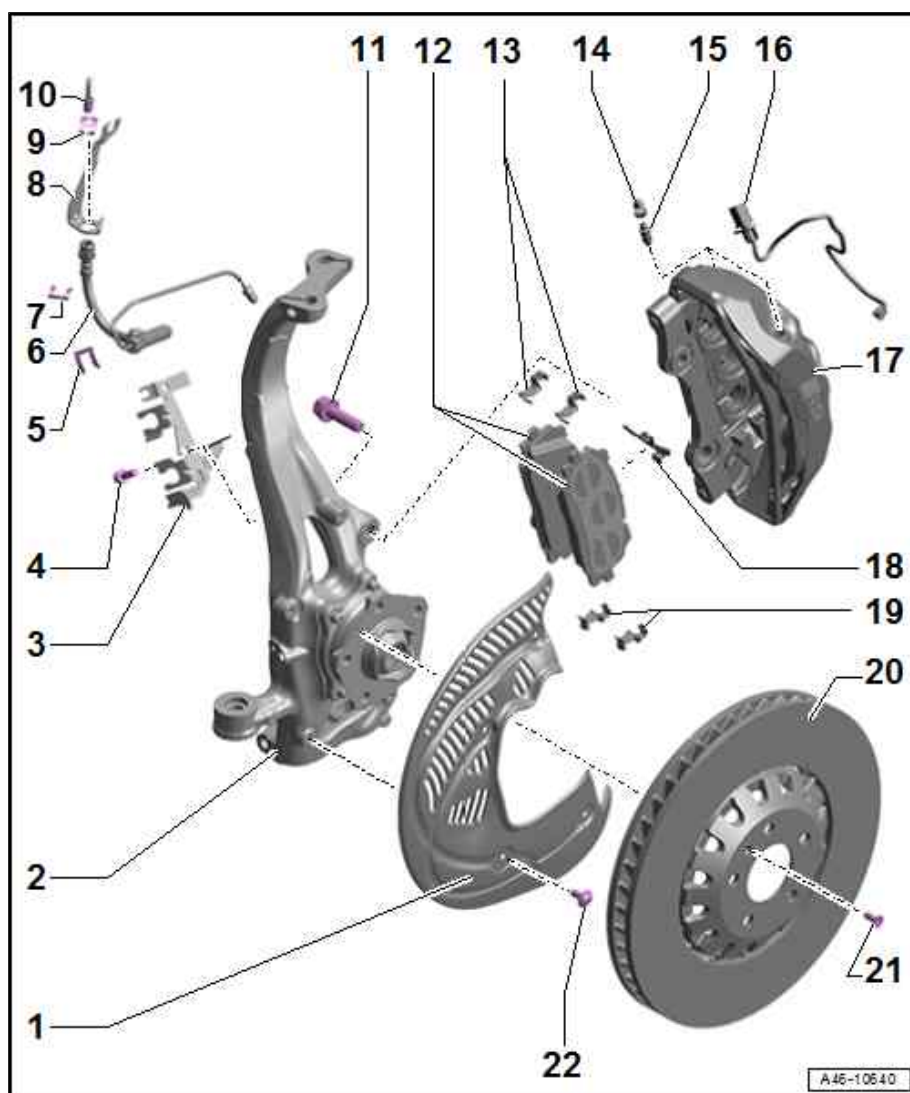
- ❑ Clean before reinstalling
- ❑ Renew if damaged
- ❑ Renew self-locking bolts and nuts after removing
- ❑ 20 Nm

5 - Hose retainer

- ❑ For brake hose

6 - Brake hose

- ❑ Make sure the brake hose is routed correctly. The brake hose must not be kinked, crushed or twisted at any point, or chafe against any part of the vehicle.
- ❑ Renew if damaged
- ❑ Ensure that lugs are properly seated in grooves in bracket
- ❑ Tightening torque, brake hose to brake caliper: 14 Nm





7 - Hose retainer

- ☐ For brake hose

8 - Bracket

- ☐ For brake line/hose
- ☐ On body

9 - Retaining spring

- ☐ Renew if damaged

10 - Brake line

- ☐ Do not alter shape
- ☐ Renew brake line if it is damaged or deformed
- ☐ Tightening torque, brake line to brake hose: 14 Nm

11 - Bolt

- ☐ Clean bolts before reusing
- ☐ Renew damaged bolts
- ☐ Renew self-locking bolts if removed
- ☐ 200 Nm

12 - Brake pads

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Inner brake pads with mounting for brake pad wear sender
- ☐ Check brake pad thickness; for wear limit, refer to ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ ⇒ [“1.2.3 Removing and installing brake pads - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 61](#)
- ☐ ⇒ [Fig. “Installation position of brake pads - six-piston brakes””, page 47](#)

13 - Pad retainers

- ☐ Renew when changing pads
- ☐ Must be properly seated

14 - Protective cap

15 - Bleeder screw

- ☐ ⇒ [“6.2 Bleeding hydraulic system”, page 178](#)
- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 18 Nm

16 - Electrical wire for brake pad wear indicator

- ☐ For inner brake pads; with:
- ◆ Front left brake pad wear sender - G34-
- ◆ Front right brake pad wear sender - G35-

- ☐ Renew when changing pads
- ☐ ⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#)

17 - Brake caliper

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Do not loosen bolts ⇒ [page 47](#)
- ☐ ⇒ [“1.3.3 Removing and installing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 75](#)
- ☐ ⇒ [“1.4.3 Renewing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 89](#)
- ☐ Servicing ⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)



18 - Pad retaining spring

- ☐ Renew when changing pads
- ☐ Must be properly seated

19 - Pad retainers

- ☐ Renew when changing pads
- ☐ Must be properly seated

20 - Brake disc

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Wear limit ⇒ ["4.1 Technical data for brakes", page 4](#)
- ☐ Lateral run-out: max. 0.06 mm
- ☐ Perform measurement with dial gauge - VAS 6079- and dial gauge bracket for brake discs - 6079/1- with brake disc installed
- ☐ Perform measurement at a distance of 10 mm from outer edge of brake disc; remove dirt and corrosion from brake disc first
- ☐ Never remove brake disc from wheel hub by force; if necessary use rust remover, as brake disc may otherwise be damaged
- ☐ ⇒ ["1.6.1 Removing and installing brake disc - steel version brakes", page 98](#)

21 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

22 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 10 Nm



1.1.5 Exploded view - front brake, ceramic version (1LN/1LU/1LT)

1 - Splash plate for brakes

- ☐ ⇒ ["1.7 Removing and installing splash plate", page 102](#)

2 - Wheel bearing housing

3 - Bracket

- ☐ For brake hose and electrical wiring

4 - Bolt

- ☐ 20 Nm

5 - Hose retainer

- ☐ For brake hose

6 - Brake hose

- ☐ Make sure the brake hose is routed correctly. The brake hose must not be kinked, crushed or twisted at any point, or chafe against any part of the vehicle.
- ☐ Renew if damaged
- ☐ Ensure that lugs are properly seated in grooves in bracket
- ☐ Tightening torque, brake hose to brake caliper: 14 Nm

7 - Hose retainer

- ☐ For brake hose

8 - Bracket

- ☐ For brake hose
- ☐ On body

9 - Retaining spring

- ☐ Renew if damaged

10 - Brake line

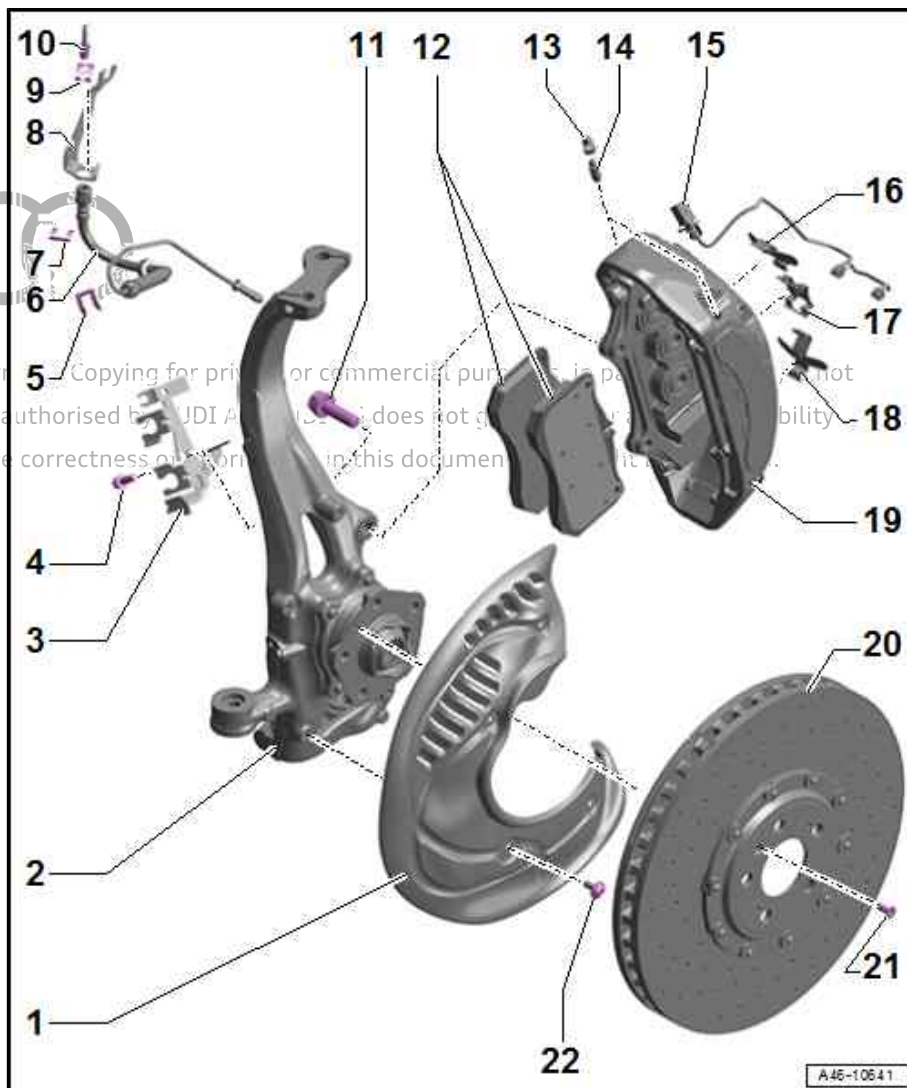
- ☐ Tightening torque, brake line to brake hose: 14 Nm

11 - Bolt

- ☐ Clean bolts before reusing
- ☐ Renew damaged bolts
- ☐ Renew self-locking bolts if removed
- ☐ 200 Nm

12 - Brake pads

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Inner brake pads with mounting for brake pad wear sender
- ☐ Check brake pad thickness; for wear limit, refer to ⇒ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ ⇒ ["1.2.4 Removing and installing brake pads - ceramic brakes", page 65](#)
- ☐ ⇒ [Fig. "Installation position of brake pads - six-piston brakes", page 47](#)





13 - Protective cap

14 - Bleeder screw

- ☐ ⇒ [“6.2 Bleeding hydraulic system”, page 178](#)
- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 18 Nm

15 - Electrical wire for brake pad wear indicator

- ☐ For inner and outer brake pads; with:
- ◆ Front left brake pad wear sender - G34-
- ◆ Front right brake pad wear sender - G35-
 - ☐ Renew when changing pads
 - ☐ ⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#)

16 - Retaining spring (top)

- ☐ Note correct installation position
- ☐ Renew when changing pads
- ☐ Ensure correct positioning in brake caliper

17 - Bracket

- ☐ For electrical wire for brake pad wear indicator

18 - Pad retaining spring (bottom)

- ☐ Note correct installation position
- ☐ Renew when changing pads
- ☐ Ensure correct positioning in brake caliper

19 - Brake caliper

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Do not loosen bolts ⇒ [page 53](#)
- ☐ ⇒ [“1.3.4 Removing and installing brake caliper - ceramic brakes”, page 78](#)
- ☐ ⇒ [“1.4.4 Renewing brake caliper - ceramic brakes”, page 93](#)
- ☐ Servicing ⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)

20 - Brake disc

- ☐ For correct version refer to ⇒ Electronic parts catalogue
- ☐ Do not loosen bolts ⇒ [page 53](#)
- ☐ Wear assessment ⇒ [“5.11 Wear assessment of ceramic brake disc without tester VAS 6813 ”, page 11](#)
or ⇒ [“5.12 Wear assessment of ceramic brake disc with tester VAS 6813 ”, page 16](#)
- ☐ Also check for:

- ◆ Cracks in the bolted joint area ⇒ [page 10](#)
- ◆ Edge fractures ⇒ [page 10](#)
- ◆ Chipping ⇒ [page 11](#)
- ◆ Cracks extending into cooling channels ⇒ [page 11](#)
 - ☐ ⇒ [“1.6.2 Removing and installing brake disc - ceramic brakes”, page 100](#)
 - ☐ Note direction of rotation

21 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

22 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged



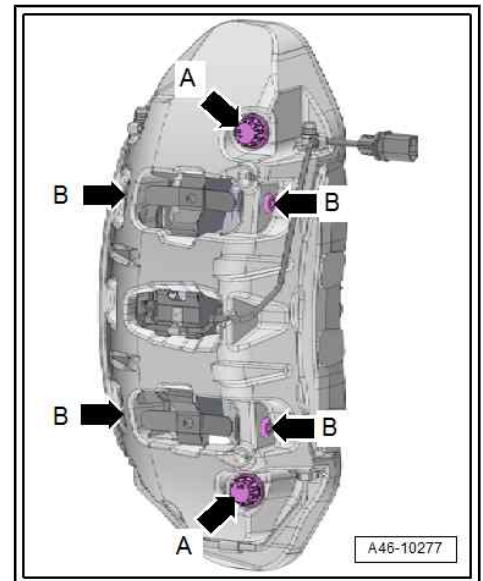
- ❑ Renew self-locking bolts and nuts after removing
- ❑ 10 Nm

Do not loosen bolts -arrows A and B- on brake caliper.

! NOTICE

Risk of malfunctions due to loosened bolts

- Never loosen bolts or guide pins on brake caliper.

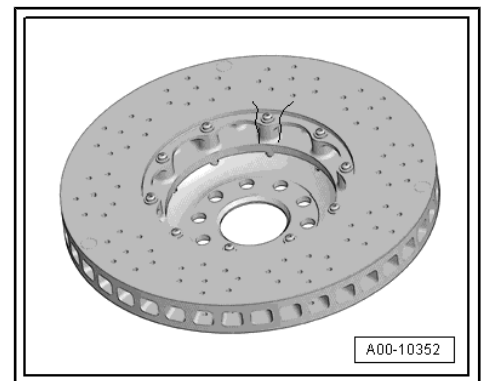


Do not loosen bolts on ceramic brake disc.

! WARNING

Risk of accident due to loosened bolts on ceramic brake disc

- Never loosen bolts on ceramic brake disc.



1.2 Removing and installing brake pads

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”, page 53](#)

⇒ [“1.2.2 Removing and installing brake pads - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 58](#)

⇒ [“1.2.3 Removing and installing brake pads - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 61](#)

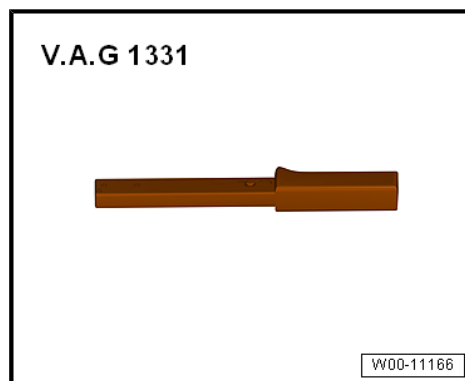
⇒ [“1.2.4 Removing and installing brake pads - ceramic brakes”, page 65](#)

1.2.1 Removing and installing brake pads - steel version brakes (1LA/1LB)

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- ◆ Torque wrench - V.A.G 1331- or torque wrench, 20-120 Nm - VAS 5507-



- ◆ Piston resetting appliance - T10145-



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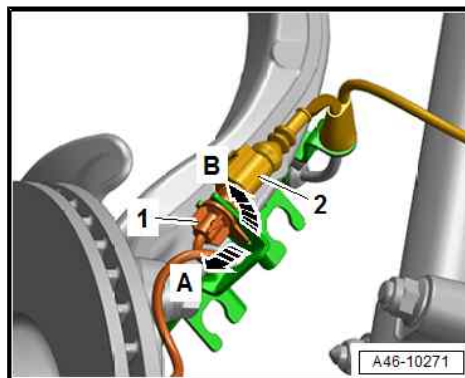
Removing

- Remove front wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

Note:

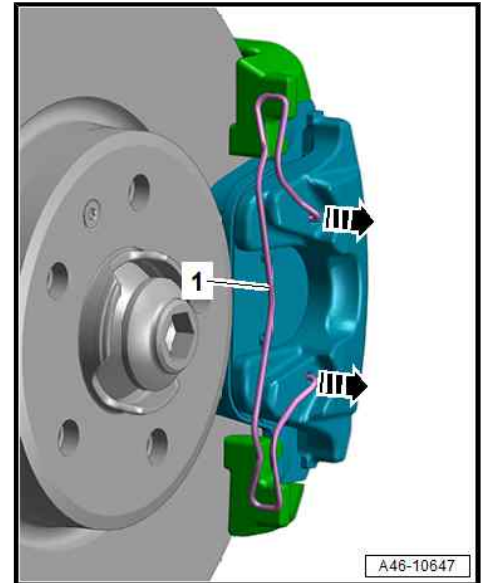
Mark brake pads when removing them if they are to be reinstalled. Reinstall in their original position to prevent uneven braking.

- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.



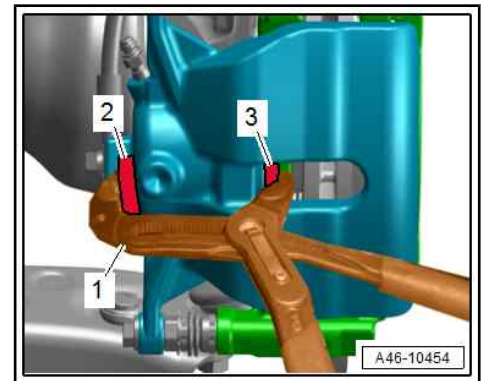


- Pry retaining spring -1- out of brake caliper housing -arrow- and detach it.



Note:

To make it easier to detach the brake caliper housing from the brake disc, use suitable pliers -1- to press back the brake pad -2- slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -3- between the caliper and the pliers (illustration shows a different brake caliper).



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- Remove protective caps -2, 3- from guide pins.

NOTICE

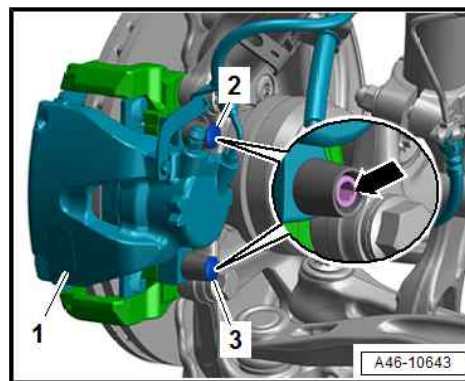
Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Unscrew guide pin -arrow- and remove brake caliper housing -1-.
- Tie brake caliper housing up with suitable wire.
- Remove brake pads.

NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.



Installing

Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Wear limit of brake discs
⇒ [“4.1 Technical data for brakes”, page 4](#)

WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

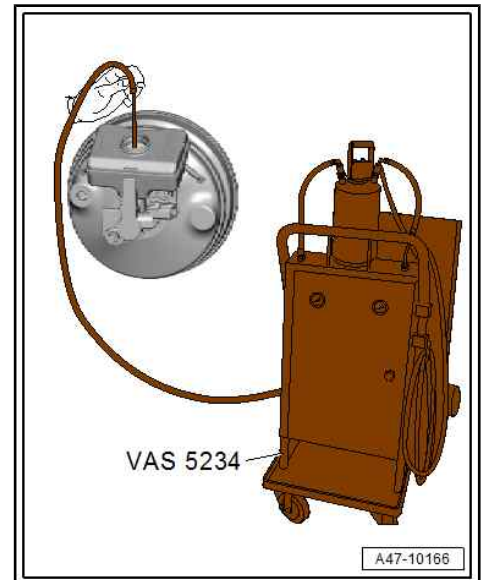
- Use only methylated spirits for cleaning the brake caliper housing.
- Check protective caps on brake caliper pistons for damage; if necessary, install all parts supplied in repair kit
⇒ [“1.2.1 Removing and installing brake caliper piston - single-piston brakes”, page 135](#) .
- Check bearing bushes on guide pins for damage and ensure that guide pins move freely; if necessary, install all parts supplied in repair kit
⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#) .



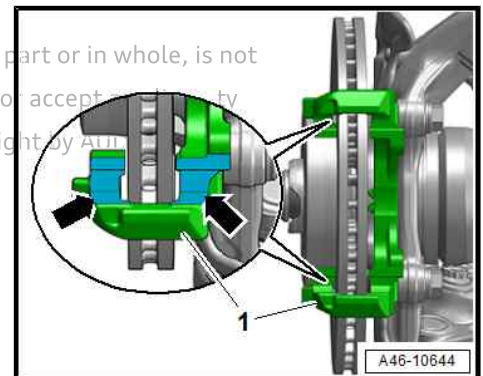
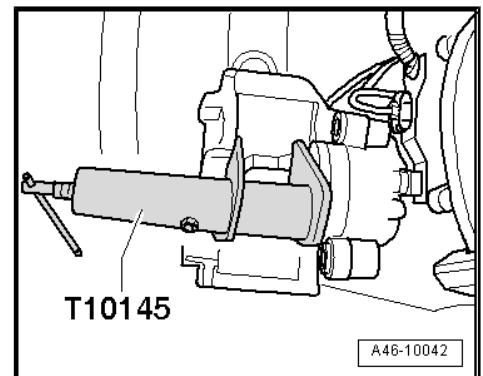
! NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

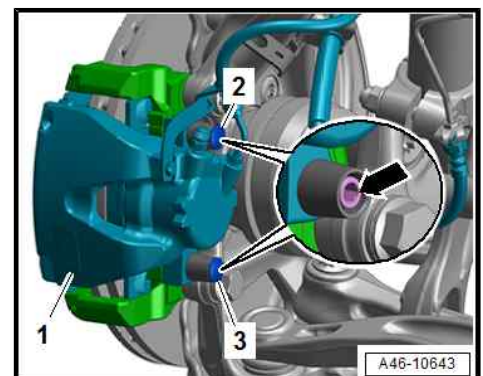
- Before pressing the piston(s) back, check the brake fluid level.
- Brake fluid must be extracted if the fluid level is up to the "MAX" mark and used brake pads are being installed.
- Use brake filling and bleeding equipment - VAS 5234- to extract brake fluid from brake fluid reservoir.
- Press brake caliper pistons all the way back into brake caliper housing using piston resetting appliance - T10145- .



- Clean contact surfaces (to brake pads) -arrows- on brake carrier -1-.
- If fitted, pull protective foil off pad backplates.
- If used pads are being re-fitted, take care to install the marked pads in their original positions.
- Bring brake pads into installation position ➤ [page 41](#) .

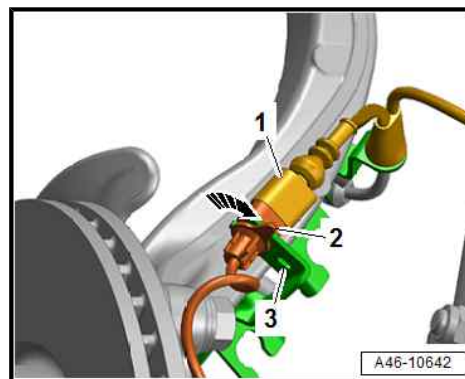


- Bring brake caliper housing -1- into installation position and tighten guide pin -arrow-.
- Fit protective caps -2, 3-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.





- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-.



- Insert retaining spring -1- in both holes -2- in brake caliper housing.
- The retaining spring must be pressed under the brake carrier -arrows- after inserting into both holes.

Note:

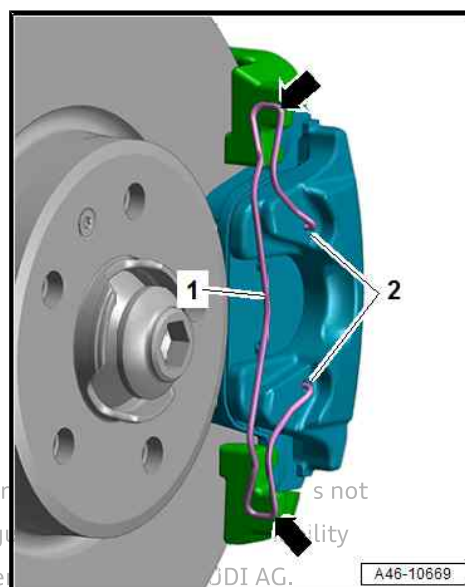
If incorrectly installed, the wear of the outer pad cannot be adjusted, and the pedal travel will be increased as a result.

- Check brake fluid level and top up if necessary.

CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.



- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ ["1.1.1 Exploded view - front brakes, steel version \(1LA/1LB\)", page 38](#)

1.2.2 Removing and installing brake pads - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)

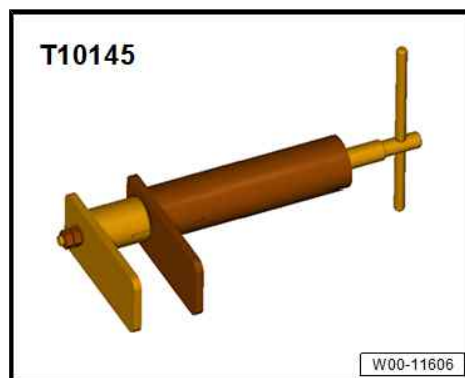
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ♦ Piston resetting appliance - T10145-





Removing

- Remove brake caliper
⇒ [“1.3.2 Removing and installing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 72](#) .

Note:

Mark brake pads when removing them if they are to be reinstalled. Reinstall in their original position to prevent uneven braking.

- Hold brake pads -1- in place, release fastener -arrows B- and pull off spring clip -2- -arrow A-.



- Pull brake pads -1- off brake caliper pistons and detach them.
- Detach sliding plates -2-.

Installing

Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Wear limit of brake discs
⇒ [“4.1 Technical data for brakes”, page 4](#)



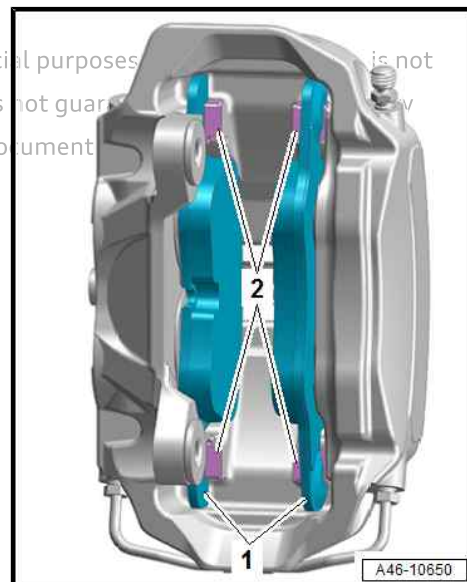
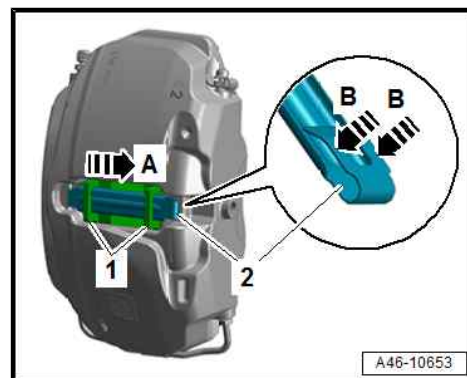
WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Check protective caps on brake caliper pistons for damage; if necessary, install all parts supplied in repair kit
⇒ [“1.2.2 Removing and installing brake caliper pistons - four-piston brakes”, page 138](#) .

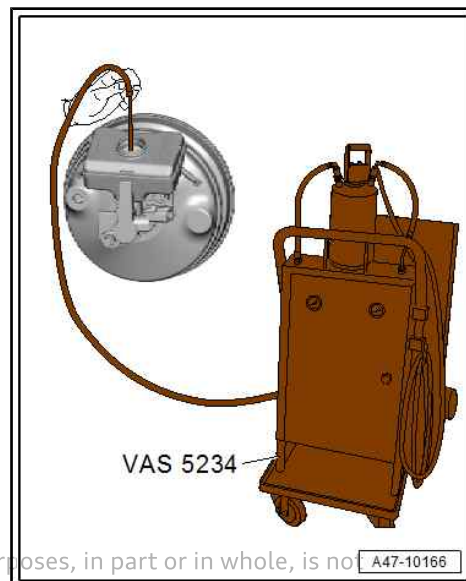




NOTICE

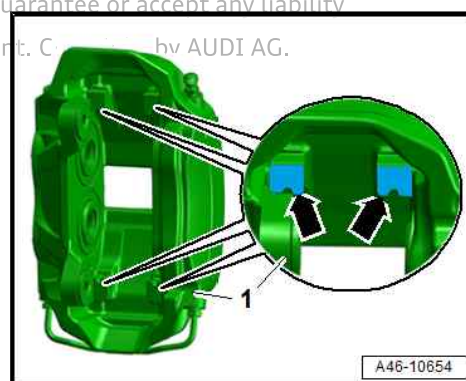
Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Before pressing the piston(s) back, check the brake fluid level.
- Brake fluid must be extracted if the fluid level is up to the “MAX” mark and used brake pads are being installed.
- Use brake filling and bleeding equipment - VAS 5234- to extract brake fluid from brake fluid reservoir.
- Press brake caliper pistons all the way back into caliper using piston resetting appliance - T10145- .



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- Clean contact surfaces -arrows- for sliding plates on brake caliper -1-.
- Install sliding plates
⇒ Fig. “Installation position of sliding plates -A-” , page 44 .
- If fitted, pull protective foil off pad backplates.
- If used pads are being re-fitted, take care to install the marked pads in their original positions.
- Bring brake pads into installation position
⇒ Fig. “Installation position of brake pads - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)” , page 44 .
- Install spring clip ⇒ Fig. “Installing spring clip” , page 44 .
- Install brake caliper with brake pads fitted
⇒ “1.3.2 Removing and installing brake caliper - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)” , page 72 .
- Check brake fluid level and top up if necessary.



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.
- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ “1.1.2 Exploded view - front brake, steel version (1LC/1LD/1LE/1LF/1LG/1LH)” , page 42



1.2.3 Removing and installing brake pads - steel version brakes (1LJ/1LL/1LM/1LX/ 1LY/1LZ/1ZA/1ZC/1ZK/1ZX)

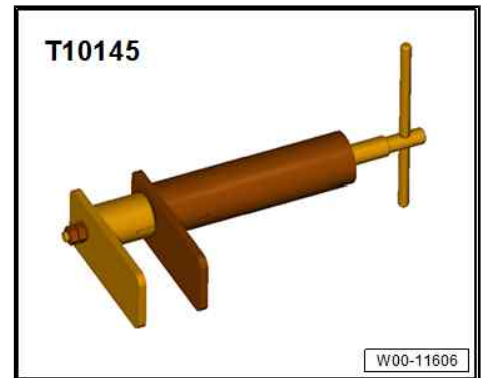
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

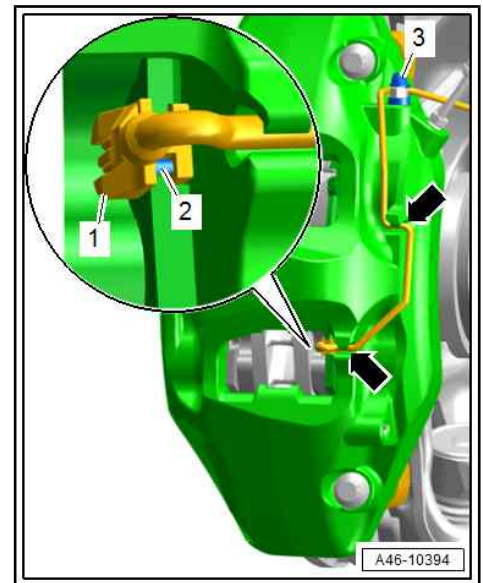
Special tools and workshop equipment required

- ◆ Piston resetting appliance - T10145-



Removing

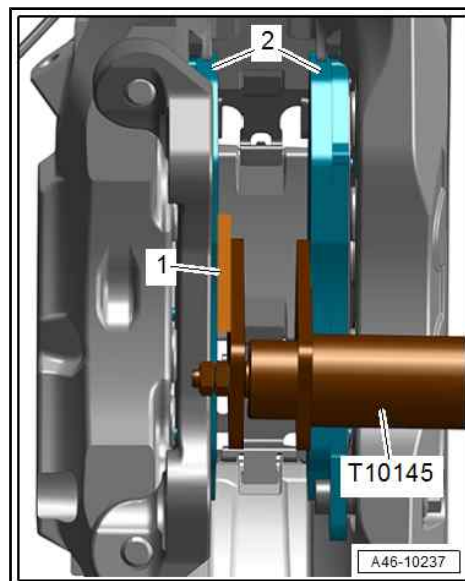
- Remove brake caliper
⇒ ["1.3.3 Removing and installing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)"](#), [page 75](#) .
- Open protective cap -3-, disengage wire from brake caliper -arrows- and move electrical wire for brake pad wear sender -1- clear.



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- If brake pads are being renewed: Place piston resetting appliance - T10145- on old brake pads (place a piece of wood -1- in between) and fully press brake caliper piston back into brake caliper.



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Note:

Mark brake pads when removing them if they are to be reinstalled. Reinstall in their original position to prevent uneven braking.

- Detach brake pads -3, 4- one after the other towards centre of caliper.
- Unclip pad retainers -1-.
- Pad retaining springs -2- must also be unclipped at top and bottom when brake pads are renewed.
- If brake pads are to be used again, check pad retaining springs and pad retainers for damage and renew if necessary.
- Do not attempt to bend pad retaining springs and pad retainers to a different shape.

Installing

Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Wear limit of brake discs
⇒ [“4.1 Technical data for brakes”, page 4](#)



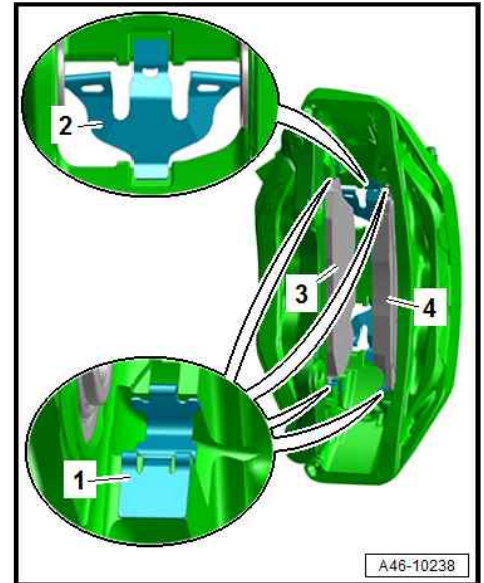
WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Check protective caps on brake caliper pistons for damage; if necessary, install all parts supplied in repair kit
⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#) .



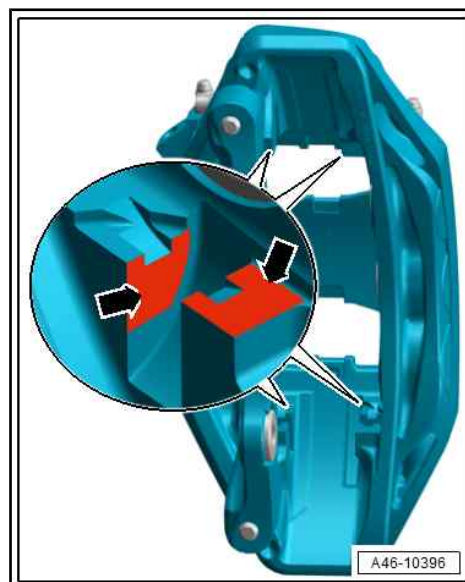
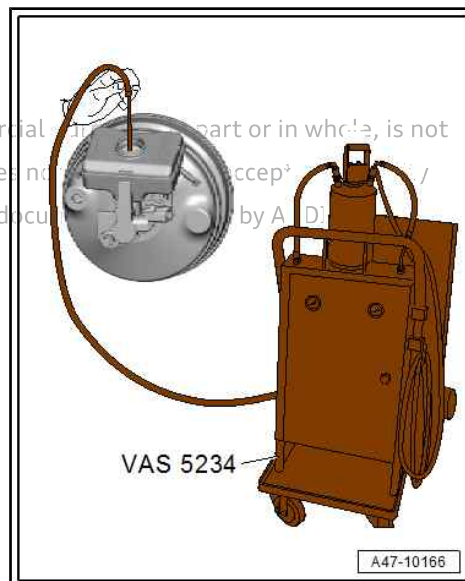
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NOTICE

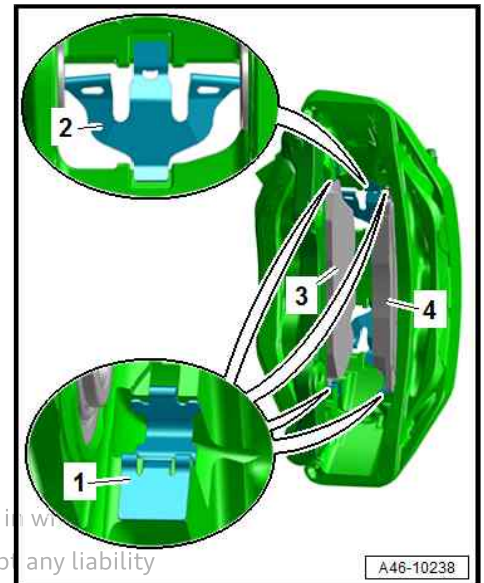
Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Before pressing the piston(s) back, check the brake fluid level.
- Brake fluid must be extracted if the fluid level is up to the “MAX” mark and used brake pads are being installed.
- Use brake filling and bleeding equipment - VAS 5234- to extract brake fluid from brake fluid reservoir.
- Press brake caliper pistons all the way back into caliper using piston resetting appliance - T10145- .
- Clean contact surfaces -arrows- for pad retainers on brake caliper.





- Clip pad retainers -1- and pad retaining springs -2- into brake caliper.
- If used pads are being re-fitted, take care to install the marked pads in their original positions.
- Insert brake pads -3, 4- into brake caliper one after the other, pressing each pad against pad retaining springs and fully onto pad retainers.
- Install pad wear sender
⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#).
- Install brake caliper
⇒ [“1.3.3 Removing and installing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 75](#).
- Check brake fluid level and top up if necessary.



CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“1.1.3 Exploded view - front brake, steel version \(1LJ/1LL/1ZA/1ZC/1ZK\)”, page 45](#)
- ◆ ⇒ [“1.1.4 Exploded view - front brake, steel version \(1LM/1LX/1LY/1LZ/1ZX\)”, page 48](#)

1.2.4 Removing and installing brake pads - ceramic brakes

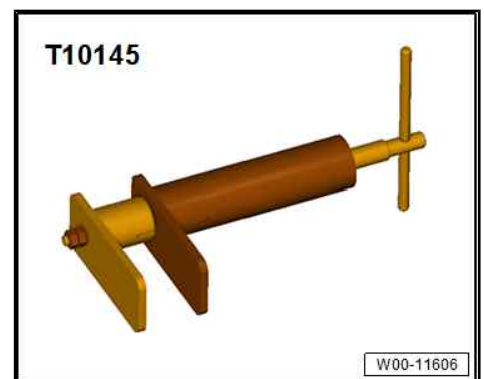
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Piston resetting appliance - T10145-



Removing

- Remove brake caliper
⇒ [“1.3.4 Removing and installing brake caliper - ceramic brakes”, page 78](#).



- Remove pad wear sender
⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#).
- If brake pads are being renewed: Place piston resetting appliance - T10145- on old brake pads (place a piece of wood -1- in between) and fully press brake caliper piston back into brake caliper.

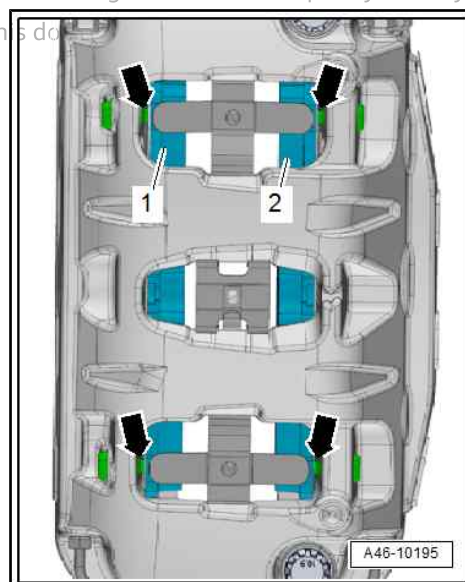
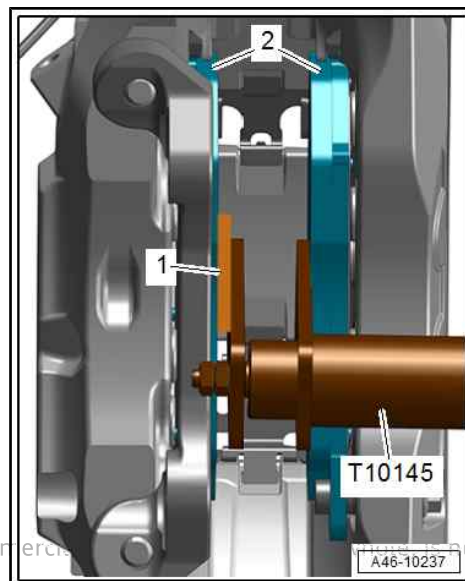
Note:

Mark brake pads when removing them if they are to be reinstalled. Reinstall in their original position to prevent uneven braking.



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- Detach brake pads 1 and 2 from guide pins - arrows, one after the other.





- The pad retaining springs must also be renewed when the brake pads are renewed. To do so, use a screwdriver to pry pad retaining springs -1 and 2- out of brake caliper -arrows-.

Installing

Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Assessing degree of wear on ceramic brake discs
⇒ [“5.12 Wear assessment of ceramic brake disc with tester VAS 6813”, page 16](#) or
⇒ [“5.11 Wear assessment of ceramic brake disc without tester VAS 6813”, page 11](#)
- ◆ Cracks in the bolted joint area ⇒ [page 10](#)
- ◆ Edge fractures ⇒ [page 10](#)
- ◆ Chipping ⇒ [page 11](#)
- ◆ Cracks extending into cooling channels ⇒ [page 11](#)

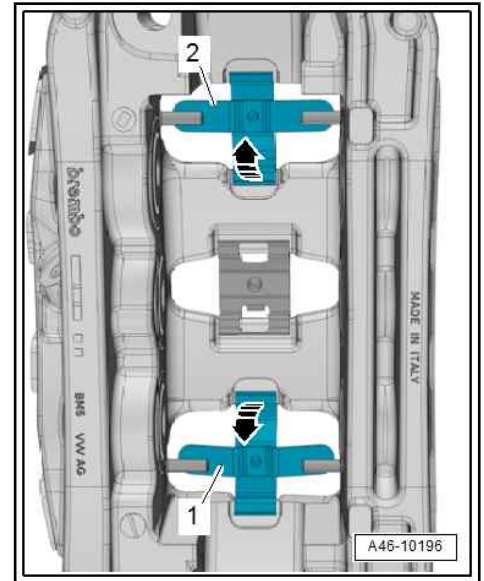
WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- **Do NOT blow out brake system with compressed air.**

- Use only methylated spirits to clean the brake caliper.
- Do not clean ceramic brake disc with fluids.
- Check protective caps on brake caliper pistons for damage; if necessary, install all parts supplied in repair kit
⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#) .



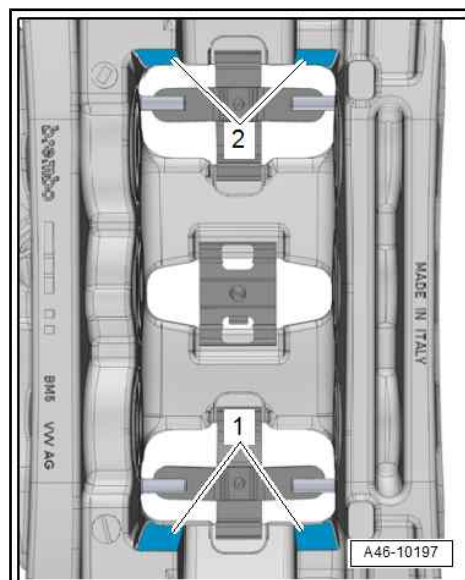
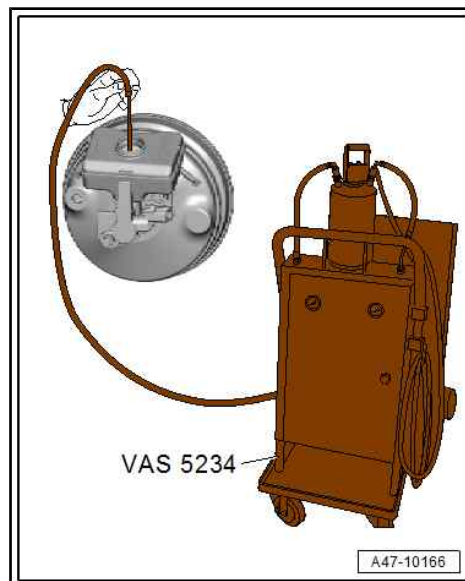
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NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Before pressing the piston(s) back, check the brake fluid level.
- Brake fluid must be extracted if the fluid level is up to the “MAX” mark and used brake pads are being installed.
- Use brake filling and bleeding equipment - VAS 5234- to extract brake fluid from brake fluid reservoir.
- Press brake caliper pistons all the way back into caliper using piston resetting appliance - T10145- .
- Clip new pad retaining springs into brake caliper.
- The pad retaining springs must engage fully in the brake caliper.
- Clean surfaces -1, 2- on brake caliper that make contact with brake pads.



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- Insert brake pads -1- into brake caliper one after the other, pressing each pad against pad retaining springs -arrows A- and fully onto guide pins -arrow B-.
- Install brake caliper
⇒ [“1.3.4 Removing and installing brake caliper - ceramic brakes”, page 78](#) .
- Install pad wear sender
⇒ [“1.8 Removing and installing pad wear indicator wire”, page 103](#) .
- Check brake fluid level and top up if necessary.

⚠ CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“1.1.5 Exploded view - front brake, ceramic version \(1LN/1LU/1LT\)”, page 51](#)

1.3 Removing and installing brake caliper

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“1.3.1 Removing and installing brake caliper - steel version brakes \(1LA/1LB\)”, page 69](#)

⇒ [“1.3.2 Removing and installing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 72](#)

⇒ [“1.3.3 Removing and installing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 75](#)

⇒ [“1.3.4 Removing and installing brake caliper - ceramic brakes”, page 78](#)

1.3.1 Removing and installing brake caliper - steel version brakes (1LA/1LB)

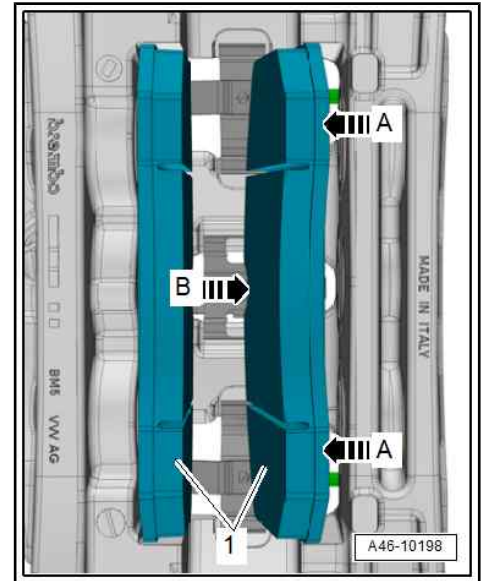
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

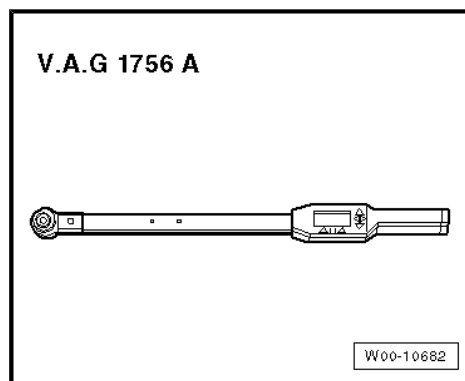
In the following procedure the brake caliper is removed together with the brake carrier. The brake hose remains connected.

Special tools and workshop equipment required





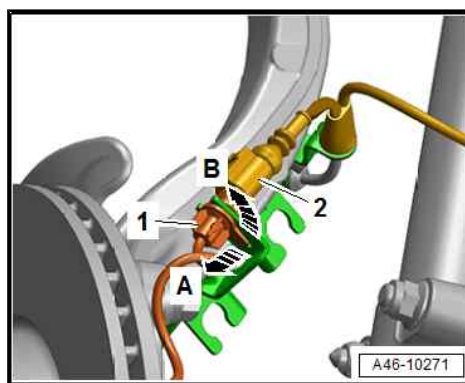
- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-



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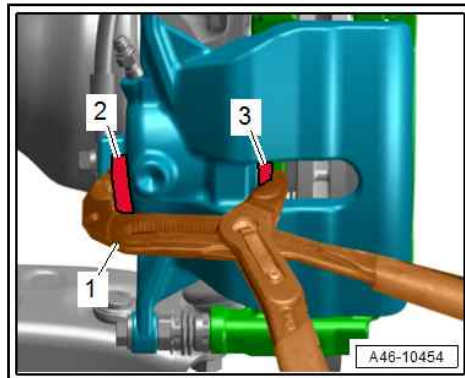
Removing

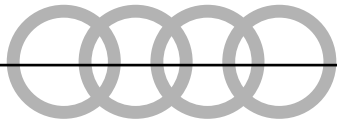
- Remove front wheel ⇒ **Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .**
- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.



Note:

To make it easier to detach the brake caliper from the brake disc, use suitable pliers -1- to press back the brake pad -2- slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -3- between the caliper and the pliers (illustration shows a different brake caliper).





! NOTICE

Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Remove bolts -arrows-.
- Carefully pull brake caliper -1- and brake carrier off brake disc with pads installed, taking care not to damage brake hose.
- Tie brake caliper up with suitable wire.

! NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

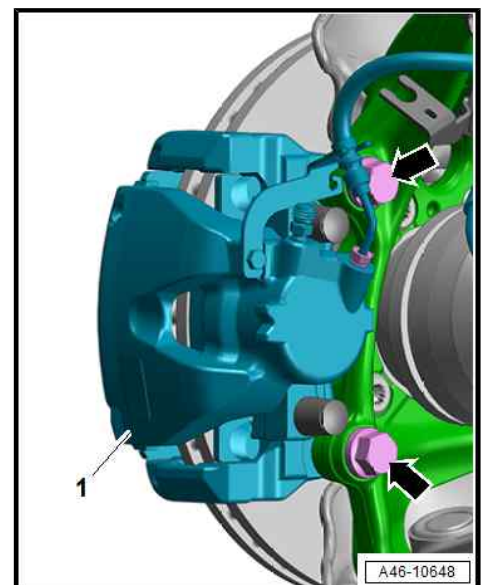
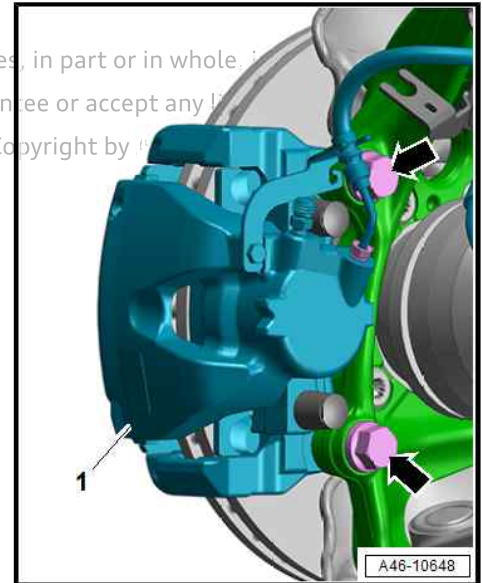
! WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Clean brake caliper.
- Carefully slide brake caliper -1- with brake carrier and brake pads fitted over brake disc.
- Tighten new bolts -arrows-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.



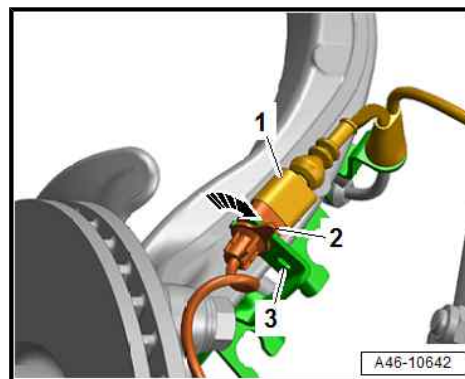


- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-.

CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**
- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.



Tightening torques

- ♦ ⇒ ["1.1.1 Exploded view - front brakes, steel version \(1LA/1LB\)", page 38](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.3.2 Removing and installing brake caliper - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)

Always renew self-locking bolts/nuts.

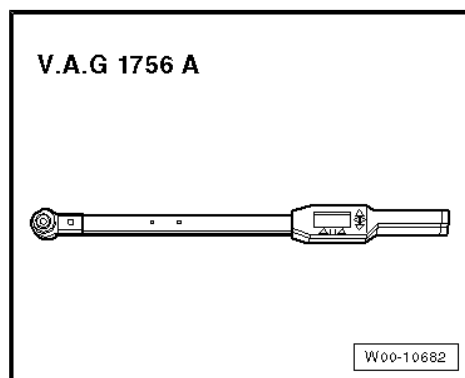
Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed together with the brake pads. The brake hose remains connected.

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-

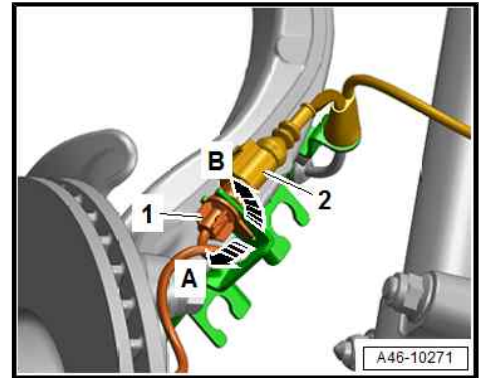


Removing

- Remove front wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



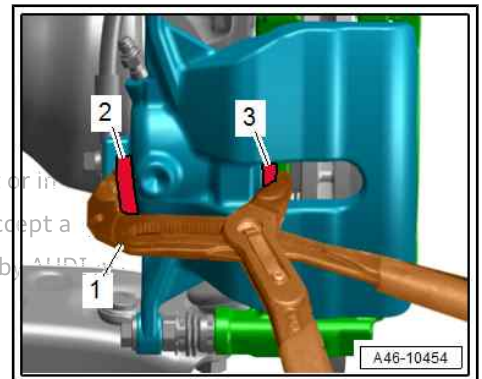
- Unplug electrical connector -2- and move electrical wiring harness clear at bracket.
- If brake pads or brake pad wear sender -1- are to be removed: Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender off bracket and move it clear at protective cap.



Note:

To make it easier to detach the brake caliper from the brake disc, use suitable pliers -1- to press back the brake pad -2- slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -3- between the caliper and the pliers (illustration shows a different brake caliper).

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NOTICE

Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Unscrew bolts -4- and -arrows-.
- Carefully pull brake caliper -1- and bracket -3- off brake disc with pads installed, taking care not to damage brake hose.
- Tie brake caliper up with suitable wire.

NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.

Installing

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

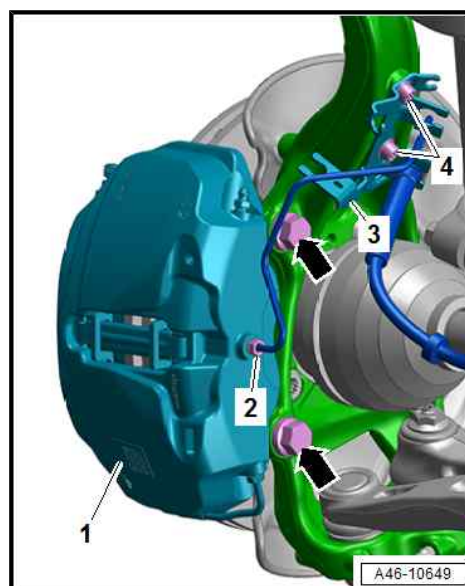
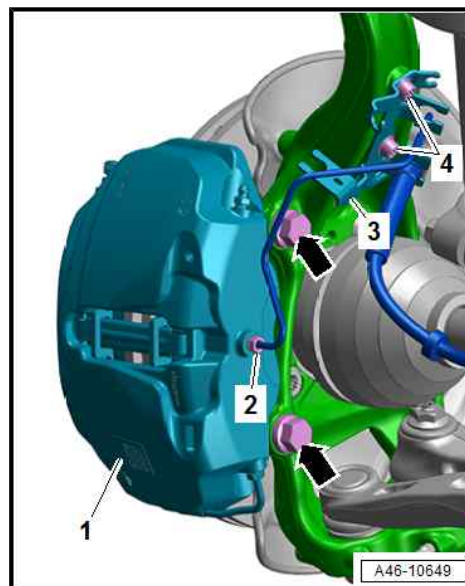
WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Clean brake caliper.
- Carefully slide brake caliper -1- over brake disc with brake pads installed, taking care not to damage brake hose.
- Tighten new bolts -arrows-.
- Tighten bolts -4-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.



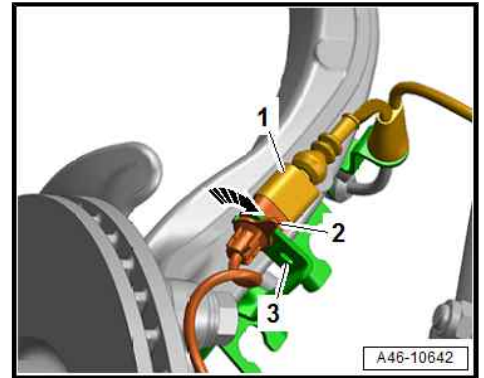


- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Secure electrical wire at protective cap.
- Plug in electrical connector -1- and secure electrical wiring harness at bracket.

CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**



- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ ["1.1.2 Exploded view - front brake, steel version \(1LC/1LD/1LE/1LF/1LG/1LH\)", page 42](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.3.3 Removing and installing brake caliper - steel version brakes (1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX)

Always renew self-locking bolts/nuts.

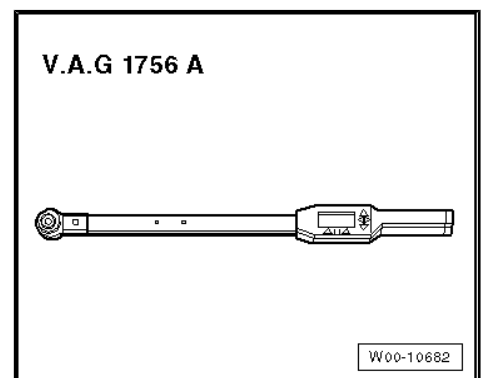
Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed together with the brake pads. The brake hose remains connected.

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-

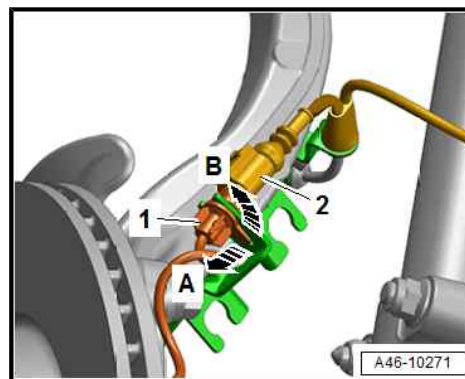


Removing

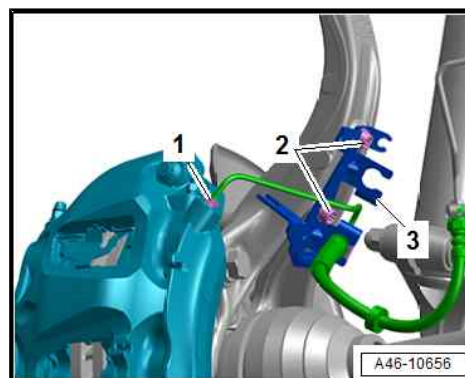
- Remove front wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



- Unplug electrical connector -2- and move electrical wiring harness clear at bracket.
- If brake pads are to be removed: Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender off bracket and move it clear at protective cap.

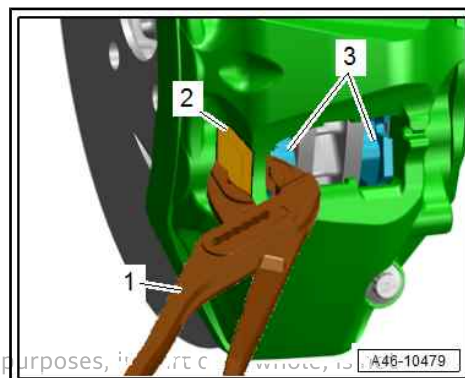


- Remove bolts -2- for bracket -3-.



Note:

To make it easier to detach the brake caliper from the brake disc, use suitable pliers -1- to press back the brake pads -3- slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -2- between the caliper and the pliers.



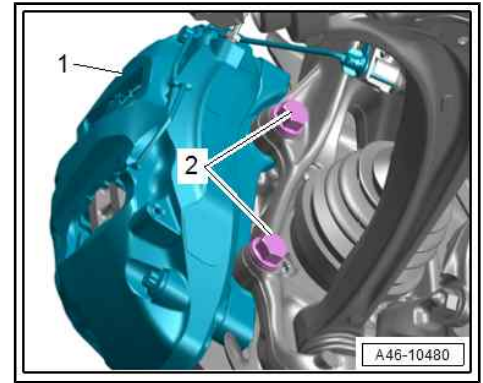
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! NOTICE

Risk of irreparable damage to brake caliper if handled incorrectly

- Never loosen bolts securing brake caliper to brake carrier.
- Do not loosen bolts securing brake caliper to brake carrier
⇒ [page 47](#) .
- Remove bolts -2-.
- Carefully pull brake caliper -1- off brake disc with brake pads installed, taking care not to damage brake hose.



! NOTICE

Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Tie brake caliper up with suitable wire.

! NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

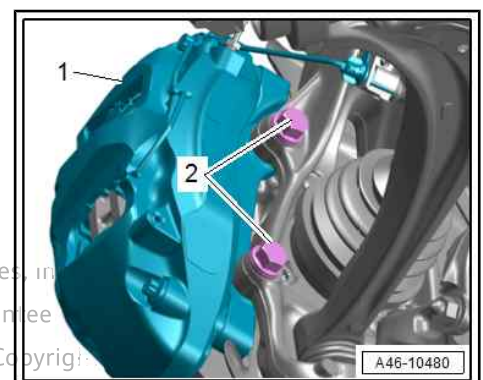
! WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

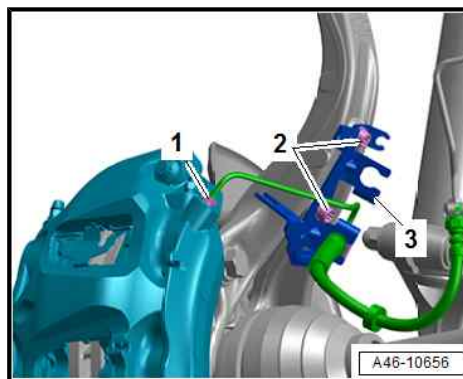
- Use only methylated spirits to clean the brake caliper.
- Clean brake caliper.
- Carefully slide brake caliper -1- over brake disc with brake pads installed, taking care not to damage brake hose.
- Tighten new bolts -2-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.



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- Tighten bolts -2- for bracket -3-.



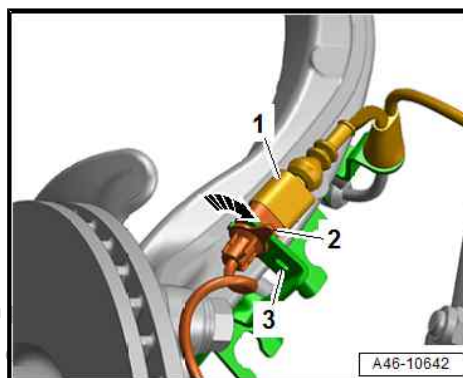
- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Secure electrical wire at protective cap.
- Plug in electrical connector -1-.



CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**
- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.



Tightening torques

- ♦ ⇒ [“1.1.3 Exploded view - front brake, steel version \(1LJ/1LL/1ZA/1ZC/1ZK\)”, page 45](#)
- ♦ ⇒ [“1.1.4 Exploded view - front brake, steel version \(1LM/1LX/1LY/1LZ/1ZX\)”, page 48](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.3.4 Removing and installing brake caliper - ceramic brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

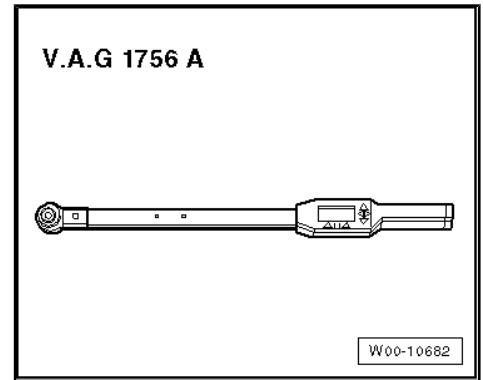
Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed together with the brake pads. The brake hose remains connected.

Special tools and workshop equipment required

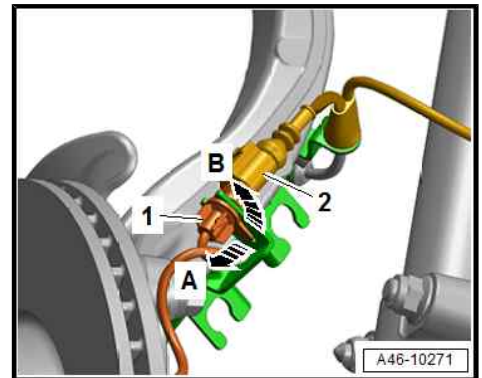


- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-



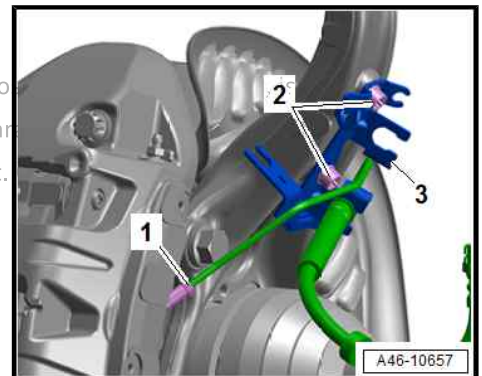
Removing

- Remove front wheel; observe precautions for vehicles with ceramic brakes ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Unplug electrical connector -2- and move electrical wiring harness clear at bracket.
- If brake pads are to be removed: Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender off bracket and move it clear at protective cap.



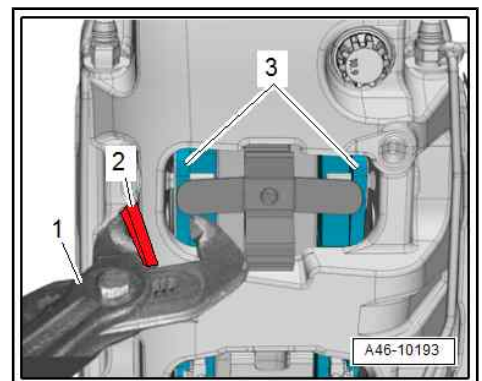
- Remove bolts -2- for bracket -3-.

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Note:

To make it easier to detach the brake caliper from the brake disc, use suitable pliers -1- to press back the brake pads -3- slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -2- between the caliper and the pliers.





NOTICE

Risk of irreparable damage to brake caliper if handled incorrectly

- Never loosen bolts securing brake caliper to brake carrier.
- Do not slacken bolts securing brake caliper/brake carrier or guide pins ⇒ [page 53](#) .
- Remove bolts -1-.
- Carefully pull brake caliper with brake pads installed off brake disc, taking care not to damage brake hose.

NOTICE

Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Tie brake caliper up with suitable wire.

NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

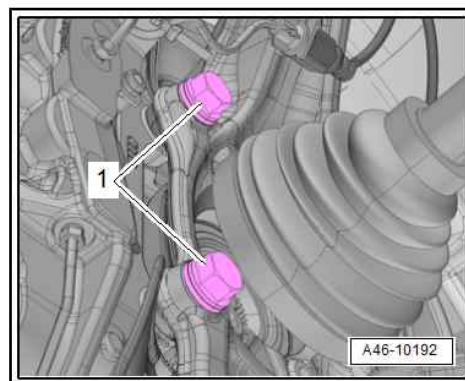
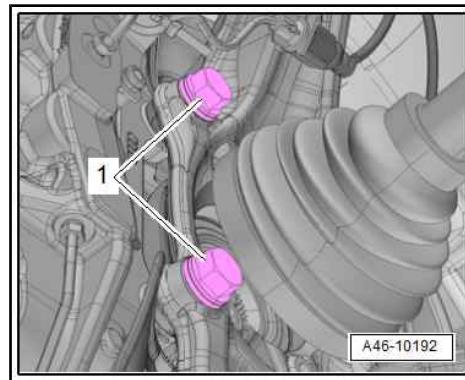
WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Clean brake caliper.
- Carefully slide brake caliper over brake disc with brake pads installed, taking care not to damage brake hose.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.
- Tighten new bolts -1-.





- Tighten bolts -2- for bracket -3-.



- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-.

CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“1.1.5 Exploded view - front brake, ceramic version \(1LN/1LU/1LT\)”, page 51](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.4 Renewing brake caliper

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“1.4.1 Renewing brake caliper - steel version brakes \(1LA/1LB\)”, page 81](#)

⇒ [“1.4.2 Renewing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 85](#)

⇒ [“1.4.3 Renewing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”, page 89](#)

⇒ [“1.4.4 Renewing brake caliper - ceramic brakes”, page 93](#)

1.4.1 Renewing brake caliper - steel version brakes (1LA/1LB)

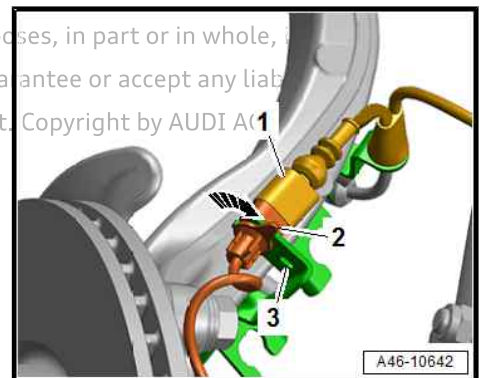
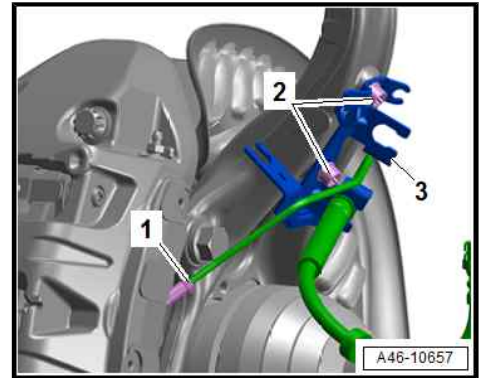
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed and disconnected from the hydraulic system. The brake hose is disconnected.

Special tools and workshop equipment required

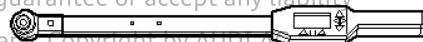




- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-

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V.A.G 1756 A



W00-10682

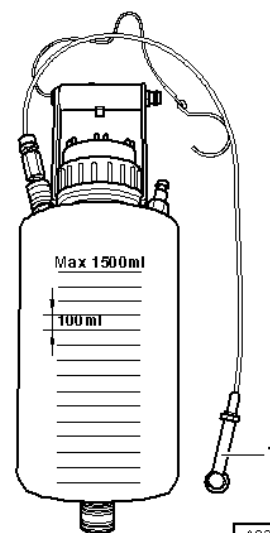
- ◆ Brake pedal actuator - V.A.G 1869/2-

VAG 1869/2



W00-11589

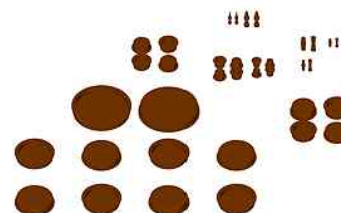
- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-



A02-0334

- ◆ Engine bung set - VAS 6122-

VAS 6122



W00-11228



◆ Protective gloves

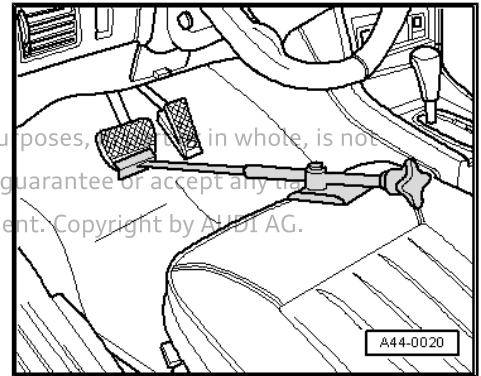
Removing

- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal at least 60 mm.

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This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.

- Remove front wheel ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



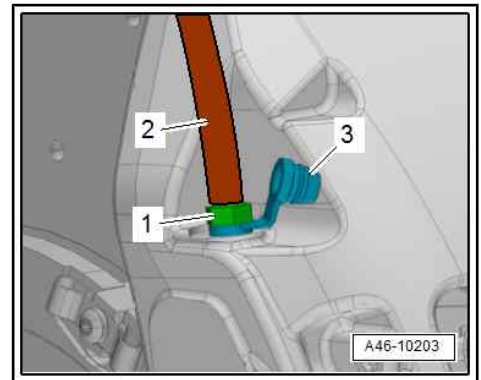
- Detach protective cap -3- from bleeder screw -1- on brake caliper.

! CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.

- Connect hose -2- of bleeder bottle.
- Open bleeder screw to relieve pressure in hydraulic system.
- Close bleeder screw and remove bleeder bottle.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.



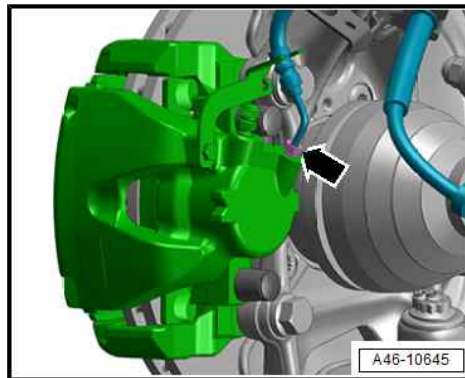


- Place a cloth under the connection to catch escaping brake fluid.

⚠ CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
 - Do NOT wear gloves contaminated with oil or grease.
-
- Unscrew union screw -arrow- and detach brake hose from brake caliper.
 - Seal open connections immediately using clean sealing plugs from engine bung set VAS 6122.



ⓘ NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Rinse off brake fluid spillages immediately using plenty of water.
-
- Remove brake pads
⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”, page 53](#) .

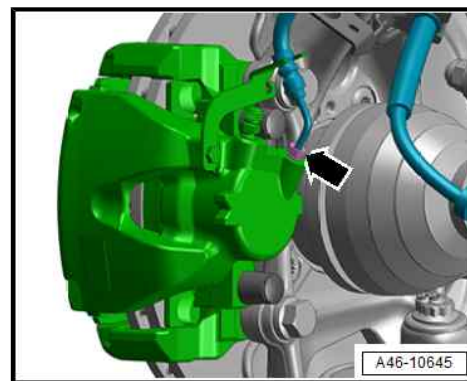
Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
 - Renew damaged bolts and nuts.
 - Renew self-locking bolts and nuts after removing.
-
- Install brake pads
⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”, page 53](#) .



- Locate brake hose in installation position and tighten union screw -arrow-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.
- Remove brake pedal actuator - V.A.G 1869/2- .
- Bleed brake system (only at wheel where caliper was detached and brake hose disconnected) ⇒ [page 178](#) .
- If the brake pedal still feels “soft”, bleed the complete brake system ⇒ [page 178](#) .
- Check brake fluid level and top up if necessary.



⚠ CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“1.1.1 Exploded view - front brakes, steel version \(1LA/1LB\)”, page 38](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.4.2 Renewing brake caliper - steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH)

Always renew self-locking bolts/nuts.

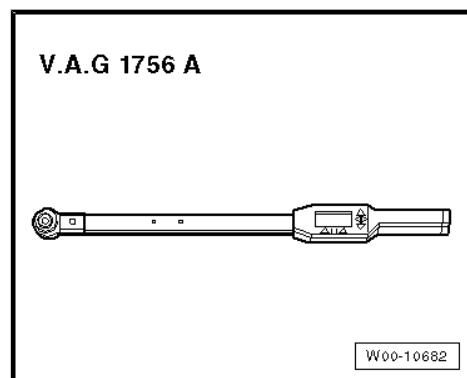
Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed and disconnected from the hydraulic system. The brake hose is disconnected.

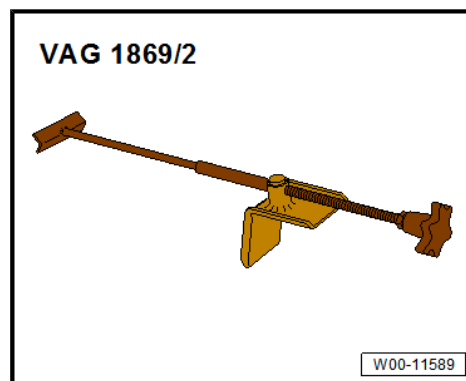
Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-

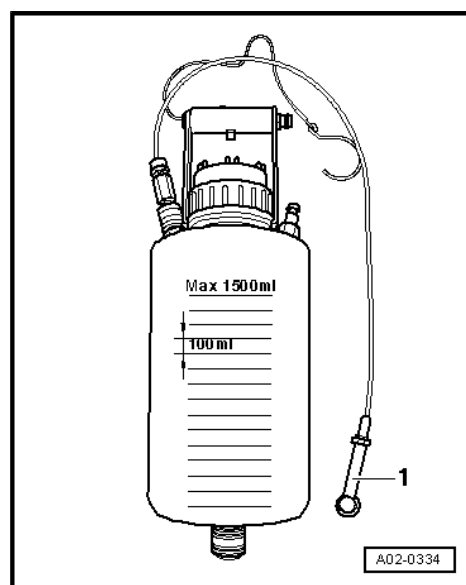




- ◆ Brake pedal actuator - V.A.G 1869/2-



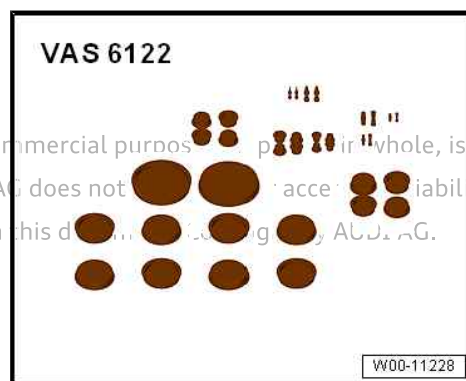
- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-



- ◆ Engine bung set - VAS 6122-



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- ◆ Protective gloves



Removing

- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal at least 60 mm.

Note:

This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.

- Remove front wheel ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



- Detach protective cap -3- from bleeder screw -1- on brake caliper.

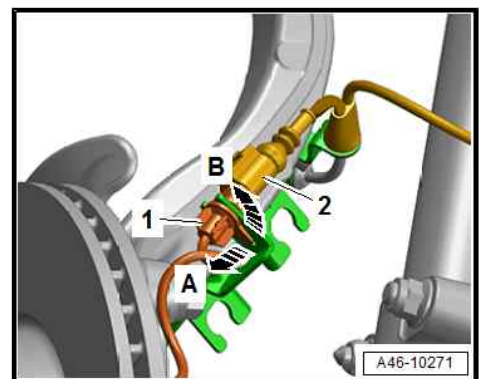
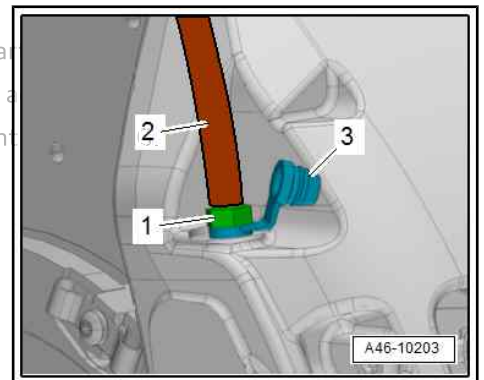
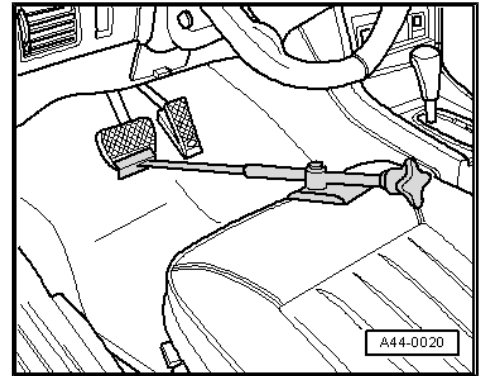


CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.

- Connect hose -2- of bleeder bottle.
- Open bleeder screw to relieve pressure in hydraulic system.
- Close bleeder screw and remove bleeder bottle.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.
- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.





- Remove bolts -4-.
- Place a cloth under the connection to catch escaping brake fluid.

⚠ CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.

- Unscrew union screw -2- and move bracket with brake hose to one side.
- Seal open connections immediately using clean sealing plugs from engine bung set - VAS 6122- .

ⓘ NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

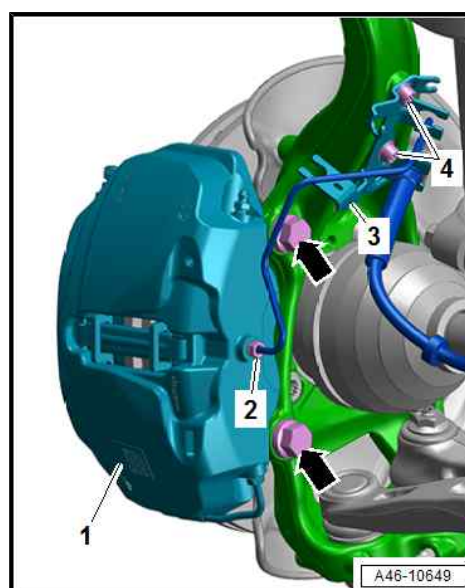
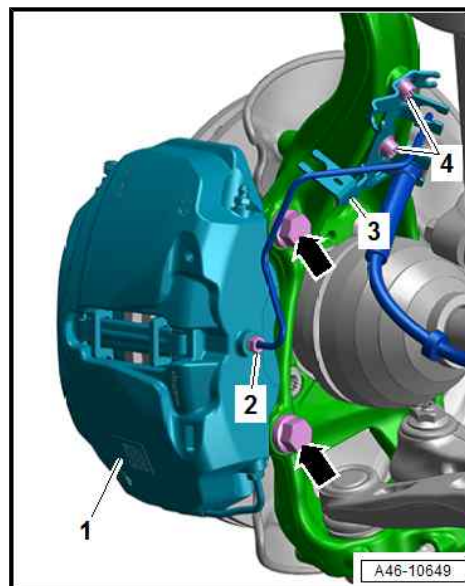
- Rinse off brake fluid spillages immediately using plenty of water.

- Remove brake pads
⇒ ["1.2.2 Removing and installing brake pads - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)", page 58](#) .

Installing

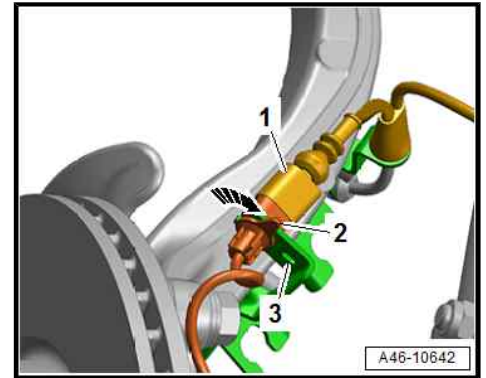
Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Install brake pads
⇒ ["1.2.2 Removing and installing brake pads - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)", page 58](#) .
- Bring bracket -3- with brake hose into installation position and tighten union screw -2- and bolts -4-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.





- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-.
- Remove brake pedal actuator - V.A.G 1869/2- .
- Bleed brake system (only at wheel where caliper was detached and brake hose disconnected) ➔ [page 178](#) .
- If the brake pedal still feels “soft”, bleed the complete brake system ➔ [page 178](#) .
- Check brake fluid level and top up if necessary.



CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ➔ [“1.1.2 Exploded view - front brake, steel version \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 42](#)
- ◆ ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.4.3 Renewing brake caliper - steel version brakes (1LJ/1LL/1LM/1LX/1LY/1LZ/ 1ZA/1ZC/1ZK/1ZX)

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed and disconnected from the hydraulic system. The brake hose is disconnected.

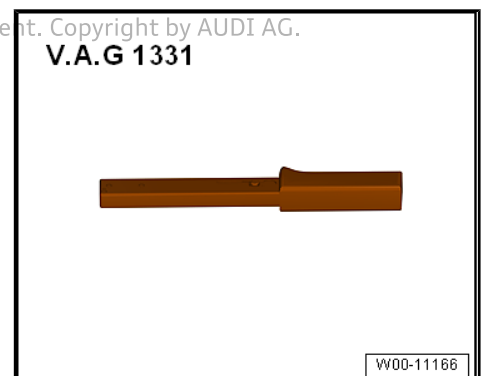
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Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331- or torque wrench, 20-120 Nm - VAS 5507-

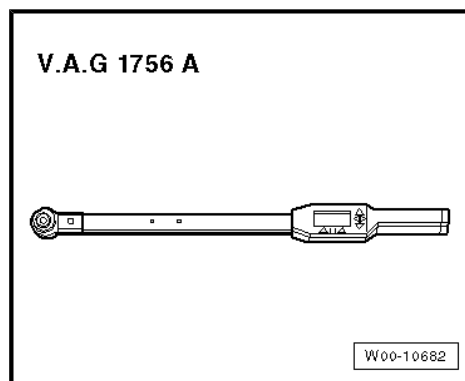
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V.A.G 1331

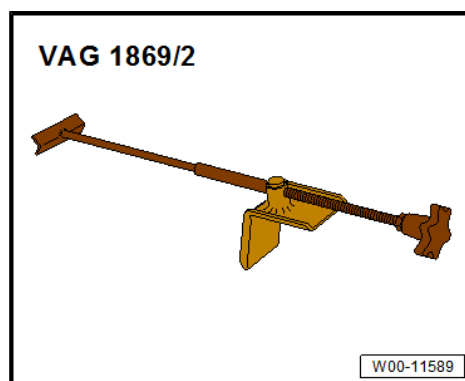




- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-



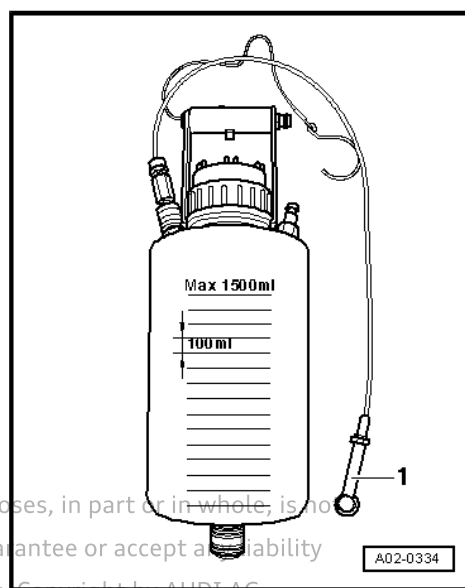
- ◆ Brake pedal actuator - V.A.G 1869/2-



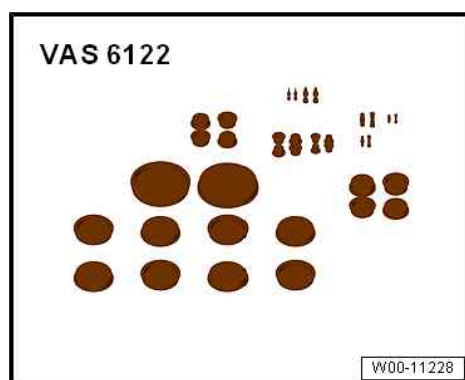
- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-



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- ◆ Engine bung set - VAS 6122-





◆ Protective gloves

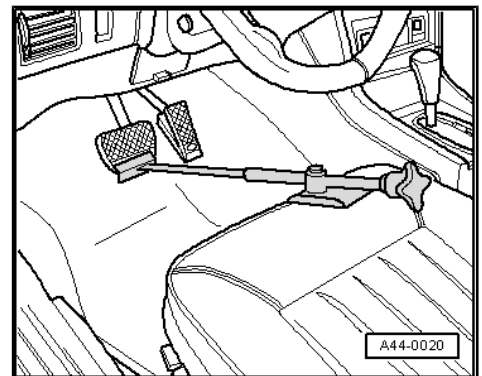
Removing

- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal at least 60 mm.

Note:

This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.

- Remove front wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



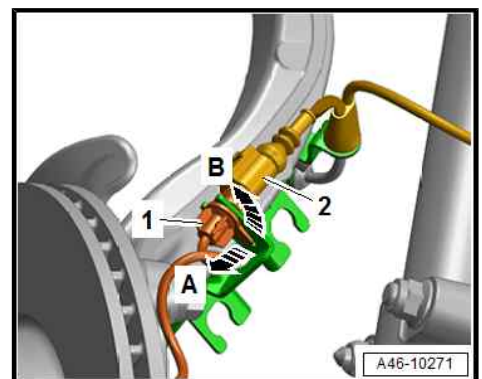
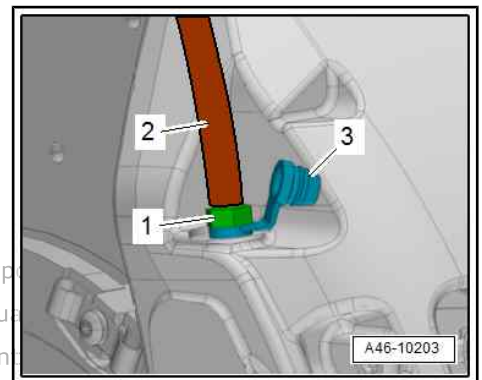
- Detach protective cap -3- from bleeder screw -1- on brake caliper.

⚠ CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.

- Connect hose -2- of bleeder bottle.
- Open bleeder screw to relieve pressure in hydraulic system.
- Close bleeder screw and remove bleeder bottle.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.
- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.





- Remove bolts -2- for bracket -3-.
- Place a cloth under the connection to catch escaping brake fluid.

CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.

- Unscrew union screw -1- and move brake hose to one side.
- Seal open connections immediately using clean sealing plugs from engine bung set - VAS 6122-.

NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Rinse off brake fluid spillages immediately using plenty of water.

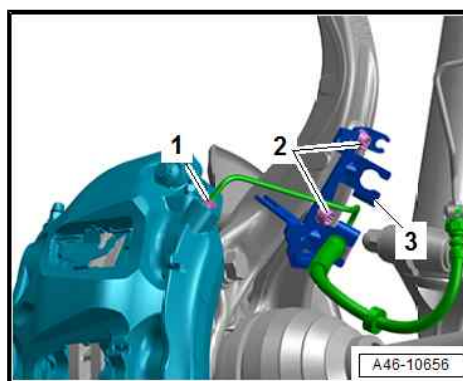
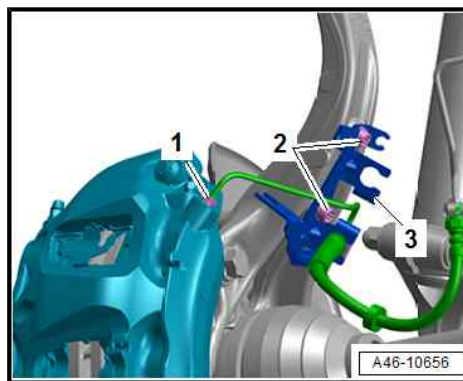
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- Remove brake pads
⇒ [“1.2.3 Removing and installing brake pads - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”](#),
[page 61](#) .

Installing

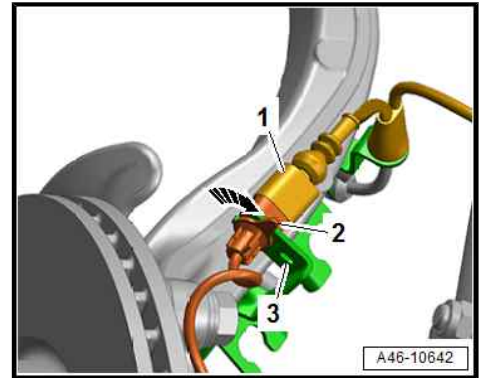
Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Install brake pads
⇒ [“1.2.3 Removing and installing brake pads - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)”](#),
[page 61](#) .
- Bring bracket -3- with brake hose into installation position and tighten union screw -1- and bolts -2-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.





- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-.
- Remove brake pedal actuator - V.A.G 1869/2- .
- Bleed brake system (only at wheel where caliper was detached and brake hose disconnected) ➔ [page 178](#) .
- If the brake pedal still feels “soft”, bleed the complete brake system ➔ [page 178](#) .
- Check brake fluid level and top up if necessary.



CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ➔ [“1.1.3 Exploded view - front brake, steel version \(1LJ/1LL/1ZA/1ZC/1ZK\)”, page 45](#)
- ◆ ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

1.4.4 Renewing brake caliper - ceramic brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed and disconnected from the hydraulic system. The brake hose is disconnected.

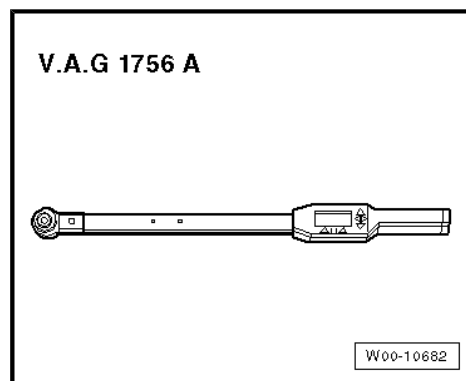
Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331- or torque wrench, 20-120 Nm - VAS 5507-

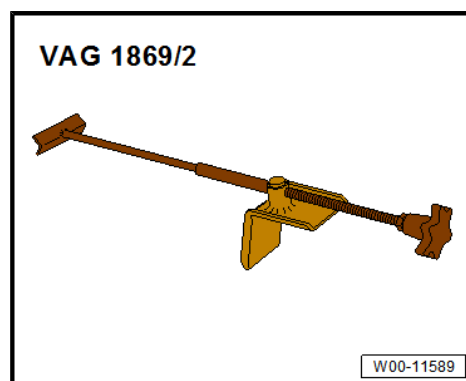




- ◆ Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-



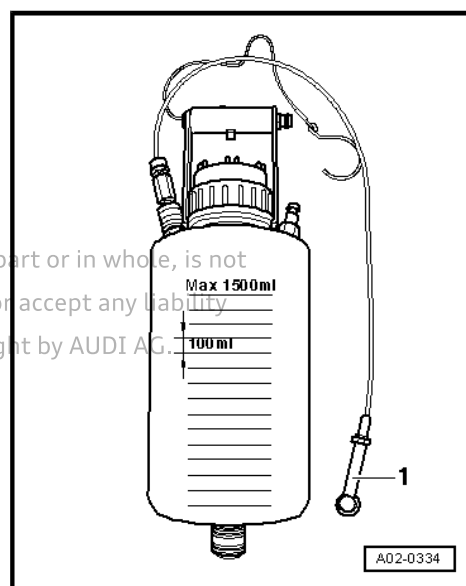
- ◆ Brake pedal actuator - V.A.G 1869/2-



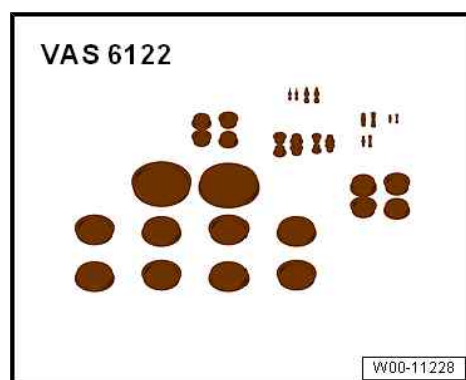
- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-



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- ◆ Engine bung set - VAS 6122-





◆ Protective gloves

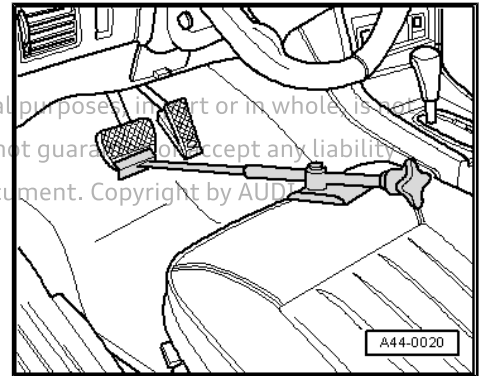
Removing

- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal at least 60 mm.

Note:

This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.

- Remove front wheel ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

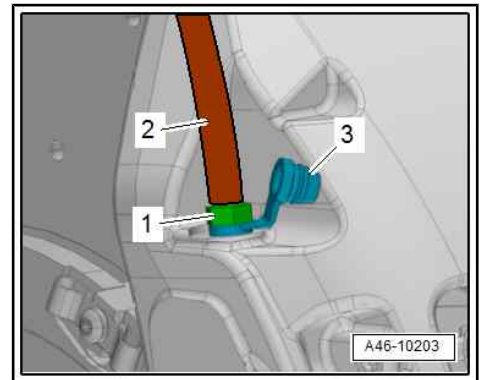


- Detach protective cap -3- from bleeder screw -1- on brake caliper.

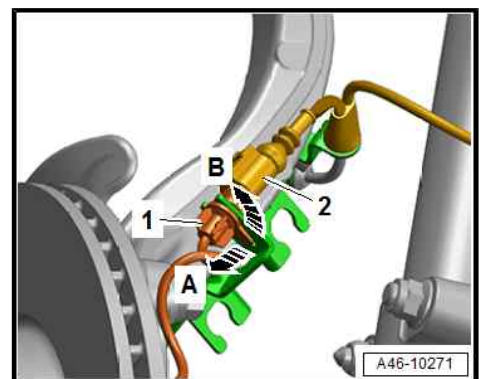
⚠ CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.



- Connect hose -2- of bleeder bottle.
- Open bleeder screw to relieve pressure in hydraulic system.
- Close bleeder screw and remove bleeder bottle.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.
- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.



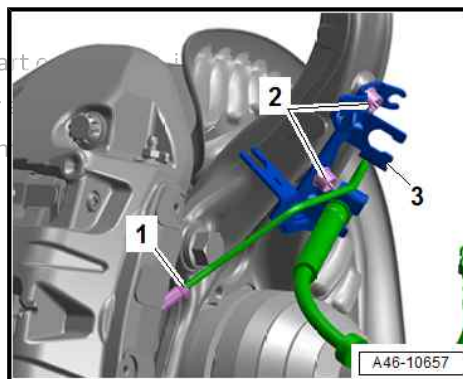
- Remove bolts -2- for bracket -3-.

Place a cloth under the connection to catch escaping brake fluid.

⚠ CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.



- Unscrew union screw -1- and move brake hose to one side.
- Seal open connections immediately using clean sealing plugs from engine bung set - VAS 6122- .

ⓘ NOTICE

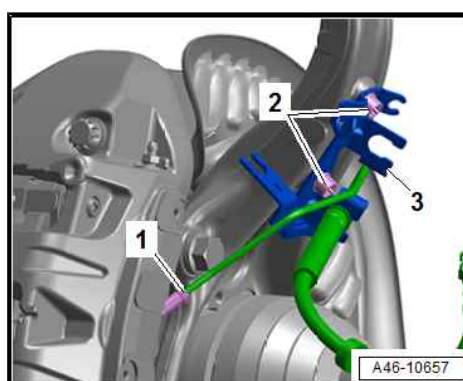
Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Rinse off brake fluid spillages immediately using plenty of water.
- Remove brake pads
⇒ [“1.2.4 Removing and installing brake pads - ceramic brakes”, page 65](#) .

Installing

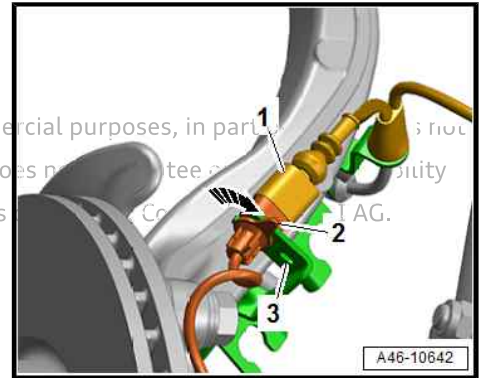
Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Install brake pads
⇒ [“1.2.4 Removing and installing brake pads - ceramic brakes”, page 65](#) .
- Bring bracket -3- with brake hose into installation position and tighten union screw -1- and bolts -2-.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.





- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.
- Plug in electrical connector -1-
- Remove brake pedal actuator - V.A.G 1869/2-
- Bleed brake system (only at wheel where caliper was detached and brake hose disconnected) ➤ [page 178](#) .
- If the brake pedal still feels “soft”, bleed the complete brake system ➤ [page 178](#) .
- Check brake fluid level and top up if necessary.



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ➤ “1.1.3 Exploded view - front brake, steel version (1LJ/1LL/1ZA/1ZC/1ZK)”, [page 45](#)
- ◆ ➤ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

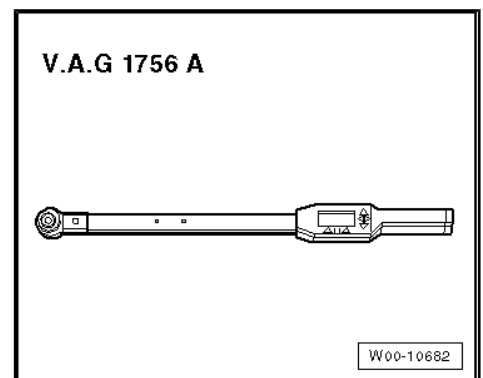
1.5 Removing and installing brake carrier

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Torque wrench - V.A.G 1756A- or torque wrench, 60-320 Nm - VAS 5509-





Removing

- Remove brake pads ⇒ [page 53](#) .
- Remove bolts -arrows- and detach brake carrier -1-.

Installing

Installation is carried out in reverse order; note the following:

- Renew bolts for brake carrier after removal.



WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits for cleaning the brake carrier.
- Clean brake carrier.
- Install brake pads ⇒ [page 53](#) .



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ [“1.1.1 Exploded view - front brakes, steel version \(1LA/1LB\)”, page 38](#)

1.6 Removing and installing brake disc

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“1.6.1 Removing and installing brake disc - steel version brakes”, page 98](#)

⇒ [“1.6.2 Removing and installing brake disc - ceramic brakes”, page 100](#)

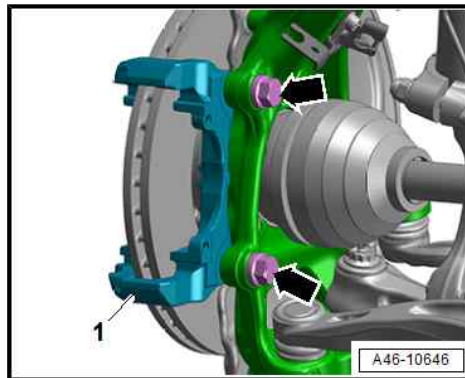
1.6.1 Removing and installing brake disc - steel version brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

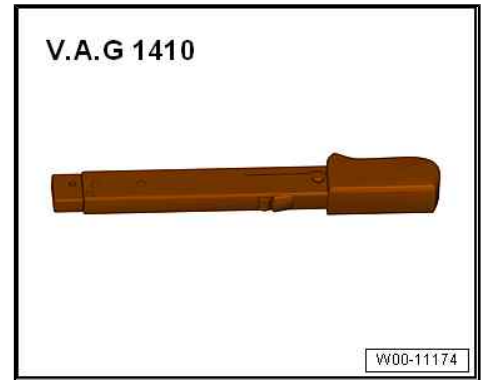
Clean bolts and nuts before reusing.

Special tools and workshop equipment required





- ◆ Torque wrench - V.A.G 1410-



Removing

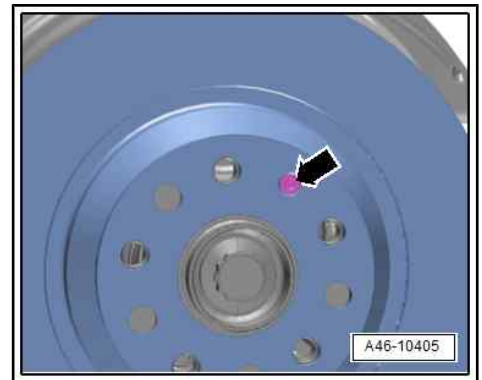
- Remove brake caliper
⇒ "1.3 Removing and installing brake caliper", page 69 .



NOTICE

Risk of damage to brake discs if force is applied.

- Do not force brake disc off wheel hub.
 - Use rust remover.
 - Remove bolt -arrow- and take off brake disc.
- ### Installing
- Installation is carried out in reverse order; note the following:
- Clean bolts and nuts before reusing.
 - Renew damaged bolts and nuts.
 - Renew self-locking bolts and nuts after removing.
 - Check brake discs for wear and damage before reinstalling:
- ◆ Wear limit of brake discs ⇒ page 4



CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.
- Clean contact surface of brake disc and wheel hub thoroughly and remove corrosion.
- Take care to keep the brake disc straight when fitting it on the wheel hub.



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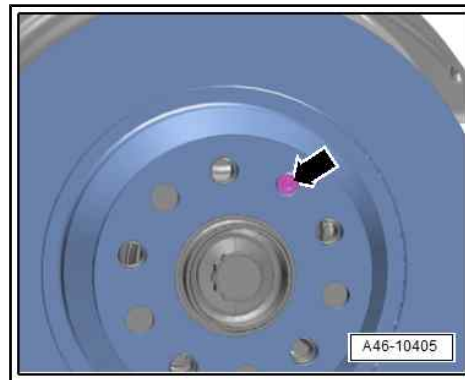


- Tighten bolt -arrow-.
- Install brake caliper
⇒ ["1.3 Removing and installing brake caliper", page 69](#) .

CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**
- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.



Tightening torques

- ♦ ⇒ ["1.1 Exploded view - front brakes", page 38](#)

1.6.2 Removing and installing brake disc - ceramic brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1410-



Removing

- Remove brake caliper
⇒ ["1.3.4 Removing and installing brake caliper - ceramic brakes", page 78](#) .



- Remove bolt -1-.

NOTICE

Risk of damage to brake discs if force is applied.

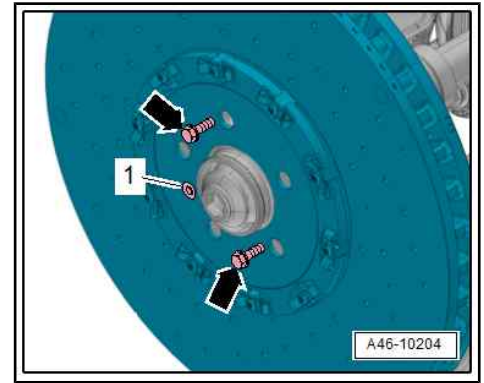
- Do not force brake disc off wheel hub.
- Use rust remover.

- Take off brake disc by hand; do not use tools.

Note:

If the brake disc is difficult to remove, proceed as follows:

- Screw two M8 bolts -arrows- into threaded holes in brake disc until they make contact.
- Continue to screw in bolts alternately, $\frac{1}{2}$ a turn at a time, so that brake disc comes off wheel hub.



Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check ceramic brake discs for wear and damage before re-installing:
 - ◆ Assessing degree of wear on ceramic brake discs
 - ⇒ ["5.12 Wear assessment of ceramic brake disc with tester VAS 6813", page 16](#) or
 - ⇒ ["5.11 Wear assessment of ceramic brake disc without tester VAS 6813", page 11](#)
 - ◆ Cracks in the bolted joint area ⇒ [page 10](#)
 - ◆ Edge fractures ⇒ [page 10](#)
 - ◆ Chipping ⇒ [page 11](#)
 - ◆ Cracks extending into cooling channels ⇒ [page 11](#)

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

- Clean contact surface of brake disc and wheel hub thoroughly and remove corrosion.
- Take care to keep the brake disc straight when fitting it on the wheel hub.
- Tighten bolt.
- Install brake caliper
 - ⇒ ["1.3.4 Removing and installing brake caliper - ceramic brakes", page 78](#)

CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

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- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ [⇒ "1.1.5 Exploded view - front brake, ceramic version \(1LN/1LU/1LT\)", page 51](#)

1.7 Removing and installing splash plate

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



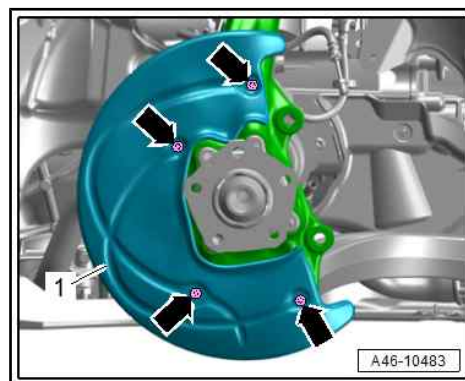
Removing

- Remove brake disc [⇒ page 98](#).
- Remove bolts -arrows- and detach splash plate -1- (illustration shows steel version brakes).

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Clean contact surfaces on splash plate and wheel hub.
- Install brake disc [⇒ page 98](#).



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

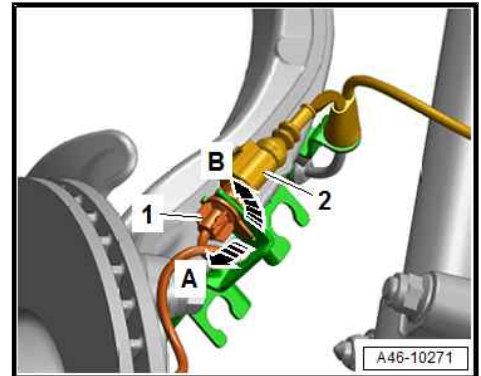
- ◆ [⇒ "1.1 Exploded view - front brakes", page 38](#)



1.8 Removing and installing pad wear indicator wire

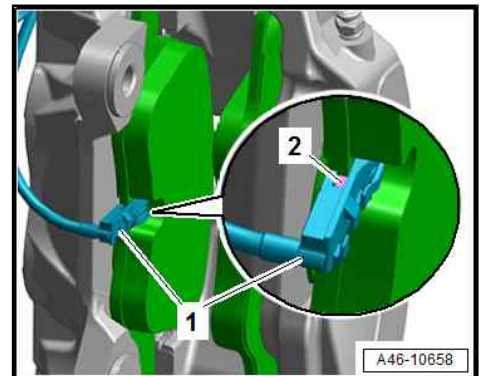
Removing

- Remove front wheel ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Unplug electrical connector -2-.
- Release tab -arrow A-; at the same time turn it 90° -arrow B-, pull brake pad wear sender -1- off bracket and move it clear.



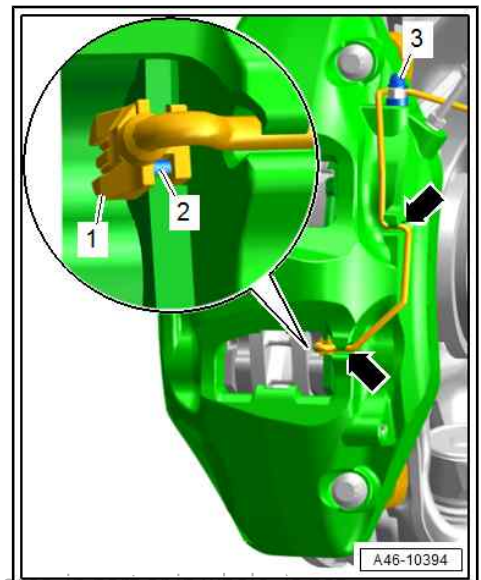
Vehicles with steel version brakes (1LC/1LD/1LE/1LF/1LG/1LH):

- Remove brake caliper
➔ ["1.3.2 Removing and installing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)", page 72](#) .
- Move electrical wire clear.
- Pull contact -1- for pad wear indicator out of brake pad, paying attention to retaining clip -2-.



Vehicles with steel version brakes (1LJ/1LL/1LM/1LY/1LZ/1ZA/1ZC/1ZK/1ZX):

- Open protective cap -3-, disengage wiring from brake caliper -arrows- and move electrical wiring clear.
- Pull contact -1- for pad wear indicator out of brake pad, paying attention to retaining clip -2-.

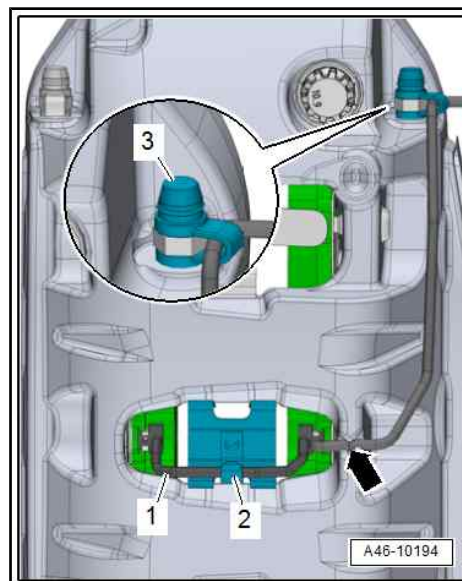


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Vehicles with ceramic brakes:

- Move electrical wiring -1- clear; to do so, open protective cap -3-, guide wiring out of bracket -2- and brake caliper -arrow-



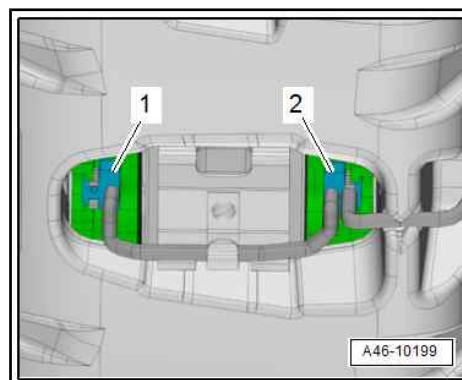
- Pull contacts -1 and 2- for pad wear indicator out of brake pads using pliers, paying attention to retaining clips.

Installing

Note:

The pad wear indicator wire must be renewed if the retaining clip is lost.

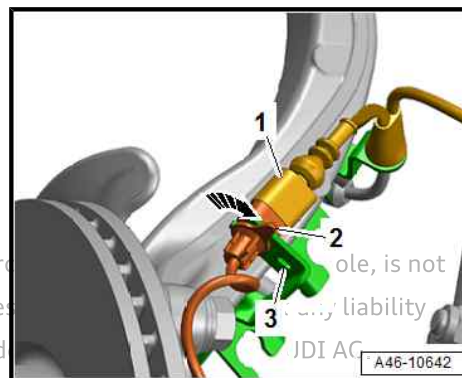
- Insert contact for pad wear indicator with retaining clip into brake pad so that it engages.
- Resecure pad wear indicator wire in original position.



- Bring brake pad wear sender into installation position in bracket and turn in direction of -arrow- until tab -2- engages in hole -3- in bracket.

- Plug in electrical connector -1-.

- Install brake caliper
⇒ [“1.3.2 Removing and installing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)”, page 72](#) .



Tightening torques

- ♦ ⇒ Running gear, axles, steering, Rep. gr. 44, Wheels, tyres



2 Rear brakes

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“2.1 Exploded view - rear brakes”, page 105](#)

⇒ [“2.2 Removing and installing brake pads”, page 108](#)

⇒ [“2.3 Removing and installing brake caliper”, page 112](#)

⇒ [“2.4 Renewing brake caliper”, page 114](#)

⇒ [“2.5 Removing and installing brake carrier”, page 117](#)

⇒ [“2.6 Removing and installing brake disc”, page 118](#)

⇒ [“2.7 Removing and installing splash plate”, page 120](#)

⇒ [“2.8 Removing and installing pad wear indicator wire”, page 121](#)

2.1 Exploded view - rear brakes

1 - Bleeder screw

- ☐ Apply a thin coat of assembly paste - G 052 150 A2- before fitting
- ☐ 11 Nm

2 - Protective cap

3 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ Counter-hold guide pin when loosening and tightening
- ☐ 35 Nm

4 - Seal

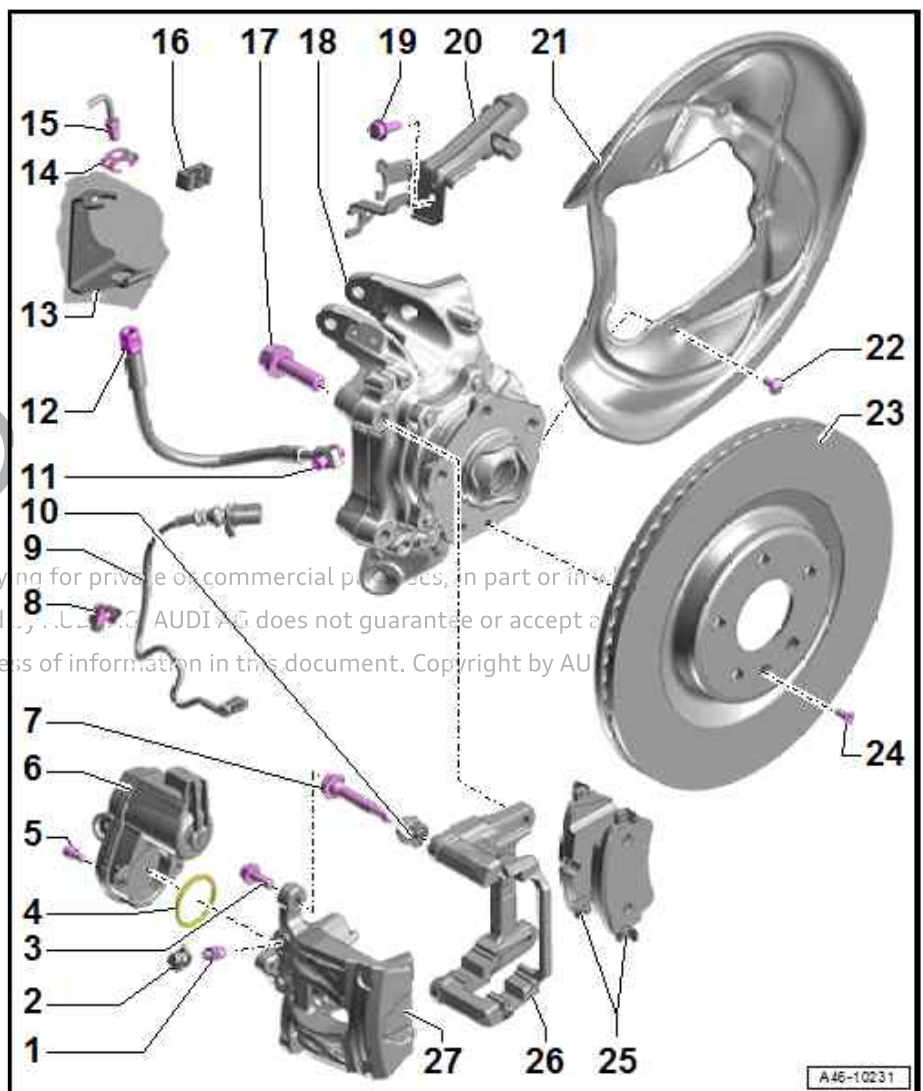
- ☐ Renew after removing

5 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 13 Nm

6 - Electromechanical parking brake motor

- ◆ Left parking brake motor - V282-
- ◆ Right parking brake motor - V283-





- ☐ ⇒ [“3.2 Removing and installing parking brake motor V282 / V283 ”, page 124](#)

7 - Guide pin

- ☐ Check for ease of movement

8 - Clip

9 - Electrical wire for brake pad wear indicator

- ☐ With rear right brake pad wear sender - G37-
- ☐ Only for inner brake pad (right-side)
- ☐ Renew when changing pads
- ☐ ⇒ [“2.8 Removing and installing pad wear indicator wire”, page 121](#)

10 - Protective cap

- ☐ Renew if damaged

11 - Banjo bolt

- ☐ Captive version with seals
- ☐ Check for damage
- ☐ Renew with brake hose
- ☐ Clean sealing surface on brake caliper to remove corrosion
- ☐ 35 Nm

12 - Brake hose

- ☐ Ensure correct routing: the brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point
- ☐ Renew if damaged
- ☐ Ensure that lugs are properly seated in grooves in bracket

13 - Bracket

- ☐ For brake line/hose
- ☐ On body

14 - Retaining spring

- ☐ Renew if damaged

15 - Brake line

- ☐ Tightening torque, brake line to brake hose: 14 Nm

16 - Bracket

- ☐ For brake line

17 - Bolt

- ☐ Renew after removing
- ☐ 100 Nm +90°

18 - Wheel bearing housing

19 - Bolt

- ☐ 20 Nm

20 - Bracket

- ☐ For brake line/hose

21 - Splash plate for brakes

- ☐ ⇒ [“2.7 Removing and installing splash plate”, page 120](#)

22 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 10 Nm



23 - Brake disc

- ☐ Never remove brake disc from wheel hub by force; if necessary use rust remover, as brake disc may otherwise be damaged
- ☐ Lateral run-out: max. 0.06 mm
- ☐ Perform measurement with dial gauge - VAS 6079- and dial gauge bracket for brake discs - 6079/1- with brake disc installed
- ☐ Perform measurement at a distance of 10 mm from outer edge of brake disc; remove dirt and corrosion from brake disc first
- ☐ ➔ ["2.6 Removing and installing brake disc", page 118](#)

24 - Bolt

- ☐ Clean before reinstalling
- ☐ Renew if damaged
- ☐ Renew self-locking bolts and nuts after removing
- ☐ 8 Nm

25 - Brake pads

- ☐ Check brake pad thickness; for wear limit, refer to ➔ Maintenance ; Booklet 830 ; Maintenance; Brake pads: checking thickness
- ☐ Always renew on both sides of axle
- ☐ For correct version refer to ➔ Electronic parts catalogue
- ☐ ➔ ["2.2 Removing and installing brake pads", page 108](#)
- ☐ Installation position ➔ [page 107](#)

26 - Brake carrier

- ☐ Replacement carriers are supplied assembled and with sufficient grease on guide pins
- ☐ ➔ ["2.5 Removing and installing brake carrier", page 117](#)
- ☐ Clean and then apply a thin coat of lithium grease - G 052 150 A2- to contact surfaces for brake pads

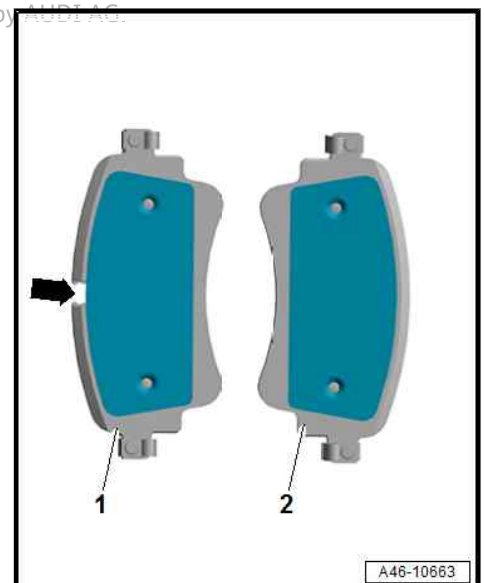
27 - Brake caliper

- ☐ ➔ ["2.3 Removing and installing brake caliper", page 112](#)
- ☐ ➔ ["2.4 Renewing brake caliper", page 114](#)
- ☐ Perform "basic setting" after servicing or renewing ➔ [Vehicle diagnostic tester](#)

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Installation position of brake pads

- 1 - Engage inner brake pad with groove -arrow- for brake pad wear sender in brake carrier.
- 2 - Engage outer brake pad in brake carrier.





2.2 Removing and installing brake pads

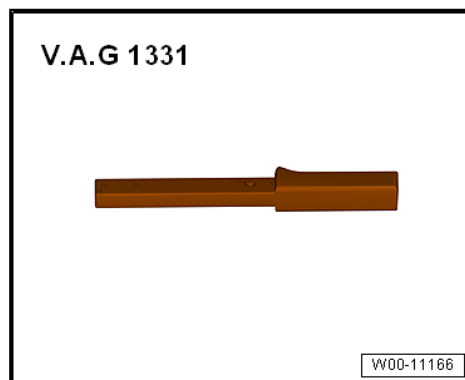
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

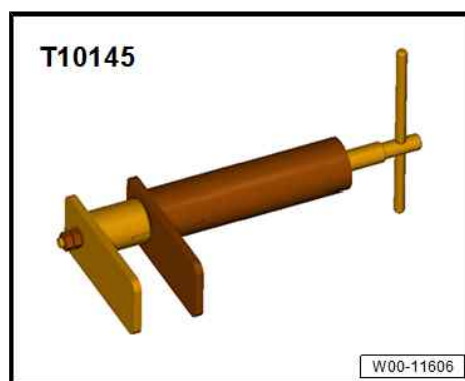
Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Torque wrench - V.A.G 1331- or torque wrench, 20-120 Nm - VAS 5507-



- ◆ Piston resetting appliance - T10145-



- ◆ Lithium grease - G 052 150 A2- ⇒ Electronic parts catalogue

Removing

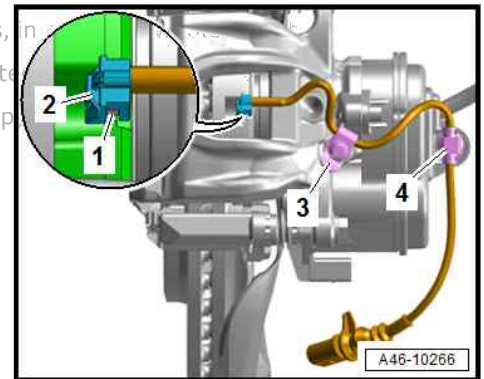
- Release parking brake.
- Switch off ignition.
- Mark brake pads when removing them if they are to be reinstalled. Reinstall in their original position to prevent uneven braking.
- Do not unplug electrical connectors of parking brake motors.
- Remove rear wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

The parking brake motors must be moved back with the vehicle diagnostic tester if the brake pads are being renewed.

- Move parking brake motors back:
- With ignition switched off, connect vehicle diagnostic tester to diagnostic connection in vehicle.
- Switch on ignition.
- Select **Diagnosis** and start the diagnosis.
- Select **Test plan** tab.



- Press **Select own test** and then select the following menu items:
 - ◆ Running gear
 - ◆ Brake system
 - ◆ 0001 - Self-diagnosis compatible systems
 - ◆ 0003 - ABS control unit J104 integrated parking brake
 - ◆ 0003 - Functions - electromechanical parking brake
 - ◆ 0003 - Remove brake pads
- Start selected program and follow instructions shown on display of vehicle diagnostic tester.
- Pull protective cap -3- off bleeder screw, remove clip -4- and move electrical wiring clear.
- Using suitable pliers, carefully pull off contact -1- for pad wear indicator, paying attention to retaining clip -2-.
- The pad wear indicator wire must be renewed if the retaining clip is lost.





- Counterhold guide pins -1 and 2- and remove bolts -arrows-.
- Detach brake caliper (guide out pad wear indicator wire).

NOTICE

Risk of damage to brake hose due to weight of brake caliper

- **Do NOT** leave brake caliper hanging from brake hose.
- Tie brake caliper up with suitable wire.

NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- **Do NOT** press brake pedal when brake caliper is removed.
- Remove brake pads.

Installing

Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads. In addition, use a new wire for the pad wear indicator.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

Note:

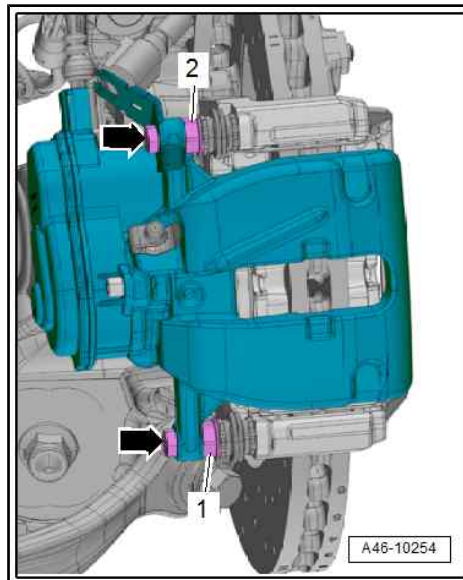
- ◆ Coat brake pad backplate with lubricating paste.
- ◆ Coat guide pin(s) with lithium grease.
- ◆ Do NOT coat rubber parts, seals, gaskets and bonding surfaces on brake pad backplate with grease or paste.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Wear limit of brake discs ➤ [page 4](#)

WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- **Do NOT** blow out brake system with compressed air.



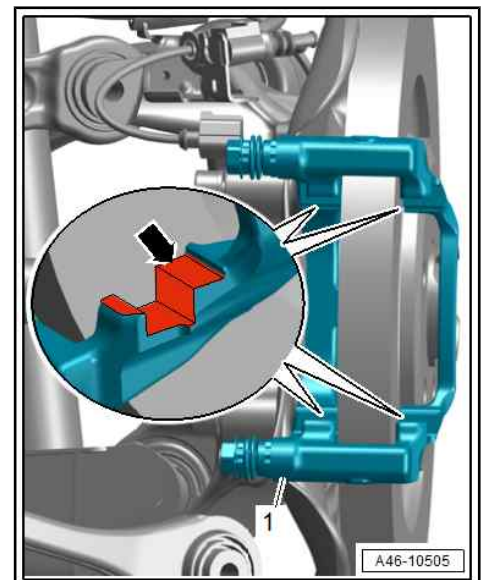
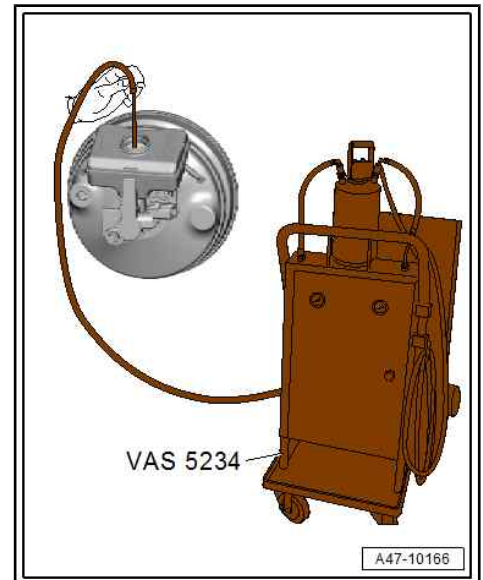
- Use only methylated spirits to clean the brake caliper.
- Check protective caps on brake caliper pistons for damage; if necessary, install all parts supplied in repair kit
➤ [“2.2 Removing and installing brake caliper piston”](#),
[page 144](#) .



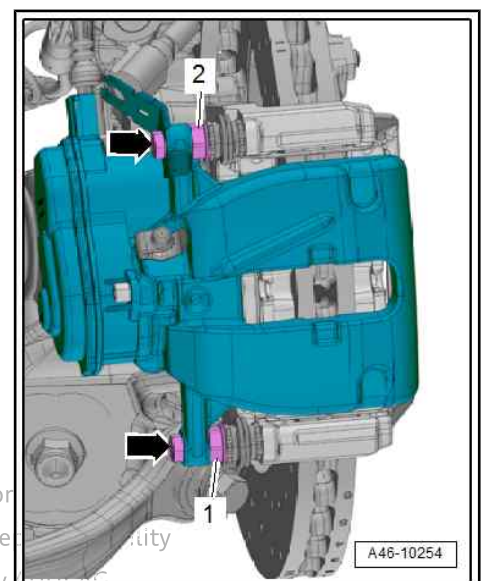
NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Before pressing the piston(s) back, check the brake fluid level.
- Brake fluid must be extracted if the fluid level is up to the “MAX” mark and used brake pads are being installed.
- Use brake filling and bleeding equipment - VAS 5234- to extract brake fluid from brake fluid reservoir.
- Press brake caliper piston fully back with piston resetting appliance - T10145- .
- Clean brake carrier -1- at contact surfaces -arrow- for pad retaining springs and apply a small amount of lithium grease.
- If used pads are being re-fitted, take care to install the marked pads in their original positions.
- Fit brake pads in brake carrier.



- Slide brake caliper over fitted brake pads.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.
- Counterhold guide pins -1 and 2- and tighten bolts -arrows- for brake caliper.
- Check for damage to contact for pad wear indicator and renew if necessary.
- Make sure the contact for the pad wear indicator is properly seated in the brake pad.
- The pad wear indicator wire must be renewed if the retaining clip is lost.



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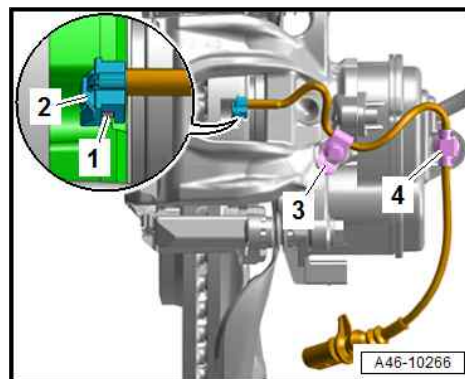


- Pull protective cap -3- off bleeder screw, remove clip -4- and move electrical wiring clear.
- Using suitable pliers, carefully pull off contact -1- for pad wear indicator, paying attention to retaining clip -2-.
- Move parking brake motors forward using ⇒ Vehicle diagnostic tester; to do so follow the instructions on the screen.

CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**



- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

2.3 Removing and installing brake caliper

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed together with the brake carrier and brake pads. The brake hose remains connected.

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1332-

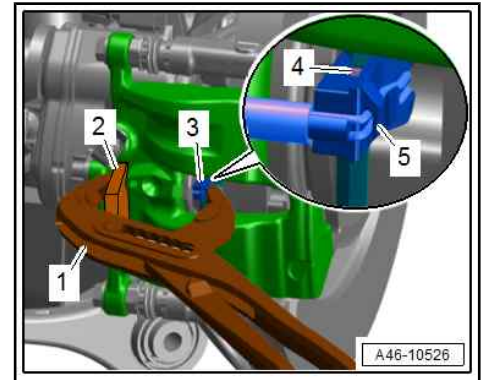


Removing

- Release parking brake.
- Switch off ignition.
- Do not unplug electrical connectors of parking brake motors.
- Remove rear wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .



- Using suitable pliers, carefully pull off contact -5- for pad wear indicator, paying attention to retaining clip -4-.
- The pad wear indicator wire must be renewed if the retaining clip is lost.
- To make it easier to detach the brake caliper from the brake disc, use suitable pliers -1- to press back the inner brake pad slightly into the brake caliper. To avoid damaging the paint on the caliper, insert a piece of rubber -2- between the caliper and the pliers.
- Take care not to damage contact -3- for pad wear indicator.



- Remove bolts -arrows- securing brake carrier.
- Pull brake caliper with brake carrier and brake pads fitted off brake disc.
- If the brake disc is worn down to such an extent that the brake caliper cannot be pulled off, the parking brake must be retracted as required ➔ [page 108](#).

NOTICE

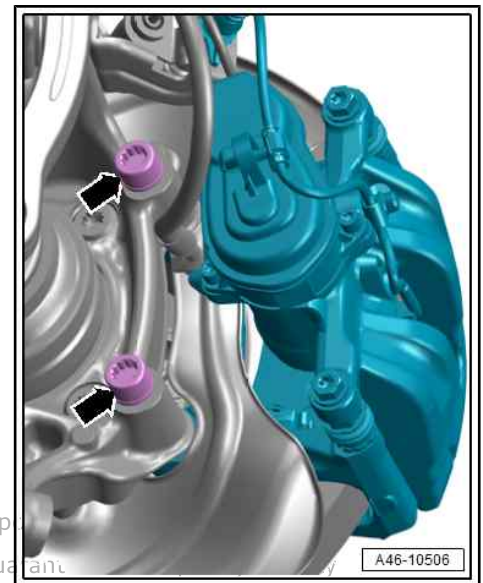
Risk of damage to brake hose due to weight of brake caliper

- Do NOT leave brake caliper hanging from brake hose.
- Tie brake caliper up with suitable wire.

NOTICE

Risk of damage to brake caliper piston if handled incorrectly

- Do NOT press brake pedal when brake caliper is removed.



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Installation is carried out in reverse order; note the following:

- Always renew brake pads on both sides of axle.
- Install all parts supplied in the repair kit when fitting new brake pads.
- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Check brake discs for wear and damage when renewing brake pads.
- ◆ Wear limit of brake discs
 ➔ ["4.1 Technical data for brakes", page 4](#)

WARNING

Health risk due to toxic dust from brake system

Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits to clean the brake caliper.
- Slide brake caliper with brake carrier and brake pads fitted carefully over brake disc.



- Tighten bolts -arrows- for brake carrier.
- Make sure the brake hose is routed correctly.
- The brake hose must not be kinked, crushed or twisted or chafe against parts of the vehicle at any point.
- Install pad wear indicator wire ⇒ [page 121](#) .
- Move parking brake motors forward using ⇒ Vehicle diagnostic tester; to do so follow the instructions on the screen.

⚠ CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

2.4 Renewing brake caliper

Always renew self-locking bolts/nuts.

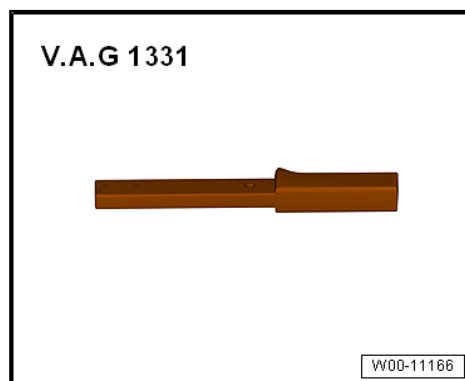
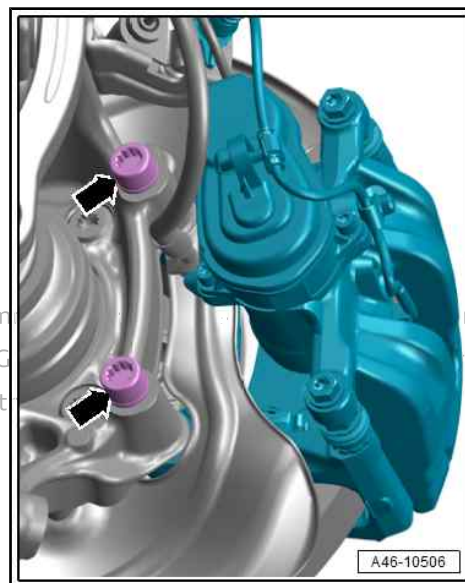
Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

In the following procedure the brake caliper is removed and disconnected from the hydraulic system. The brake hose is disconnected.

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1331-





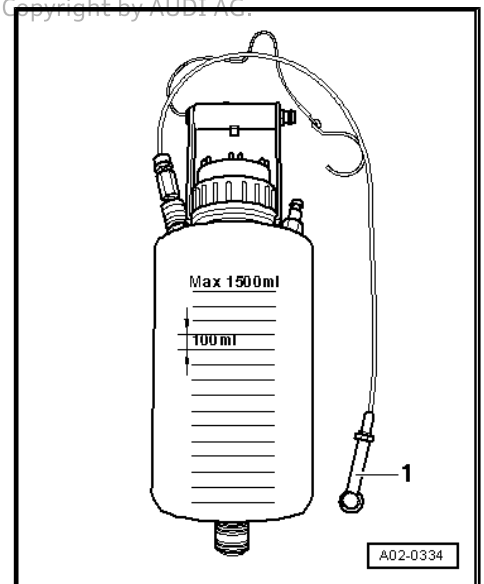
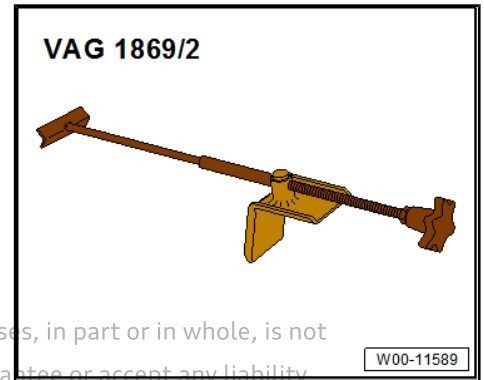
- ◆ Brake pedal actuator - V.A.G 1869/2-



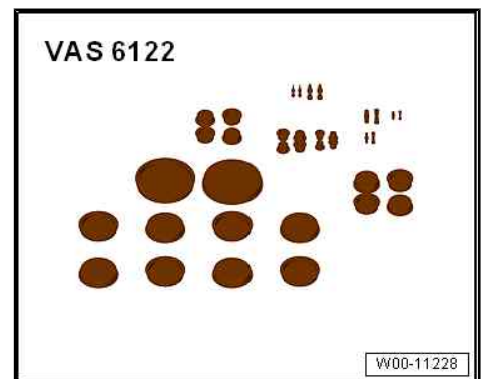
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- ◆ Bleeder bottle from brake filling and bleeding equipment - VAS 5234-

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- ◆ Engine bung set - VAS 6122-



- ◆ Lithium grease - G 052 150 A2- ➔ Electronic parts catalogue
- ◆ Protective gloves



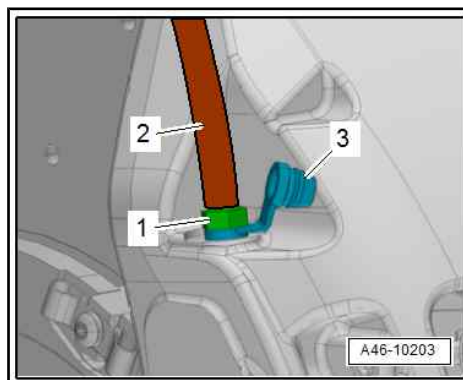
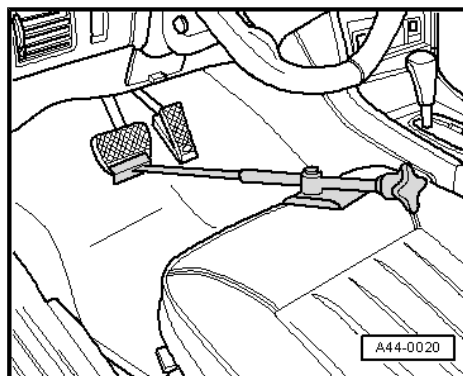
Removing

- Release parking brake.
- Switch off ignition.
- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Depress brake pedal at least 60 mm.

Note:

This closes the valves in the brake master cylinder and stops the brake fluid reservoir from running empty.

- Remove rear wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Detach protective cap -3- from bleeder screw -1- on front brake caliper.
- Connect hose -2- of bleeder bottle.



CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

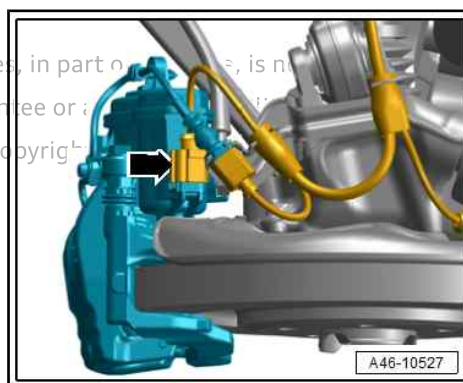
- Put on protective gloves.

- Open bleeder screw to relieve pressure in brake system.
- Close bleeder screw and remove bleeder bottle.
- Repeat procedure on one of the rear brake calipers.
- The brake pedal actuator - V.A.G 1869/2- must not be removed.
- Unplug electrical connector -arrow- at electromechanical parking brake motor.

NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Rinse off brake fluid spillages immediately using plenty of water.
- Place a cloth under the connection to catch escaping brake fluid.





⚠ CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.

- Remove banjo bolt -arrow-.
- Remove brake pads
⇒ [“2.2 Removing and installing brake pads”, page 108](#) .
- Remove electromechanical parking brake motor
⇒ [“3.2 Removing and installing parking brake motor V282 / V283”, page 124](#) .

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Install electromechanical parking brake motor
⇒ [“3.2 Removing and installing parking brake motor V282 / V283”, page 124](#) .
- Install brake pads
⇒ [“2.2 Removing and installing brake pads”, page 108](#) .
- Tighten banjo bolt -arrow- for brake hose on brake caliper.
- Remove brake pedal actuator - V.A.G 1869/2- .
- Bleed brake system (only at wheel where caliper was detached and brake hose disconnected)
⇒ [“6.2 Bleeding hydraulic system”, page 178](#) .
- If the brake pedal still feels “soft”, bleed the complete brake system ⇒ [“6.2 Bleeding hydraulic system”, page 178](#) .

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ♦ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

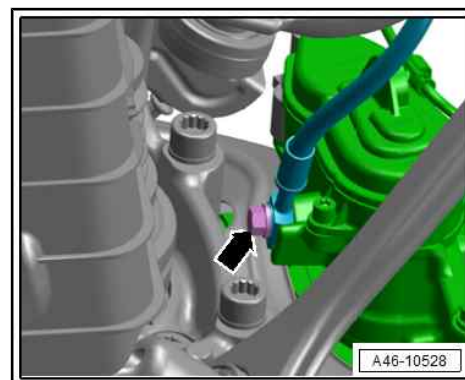
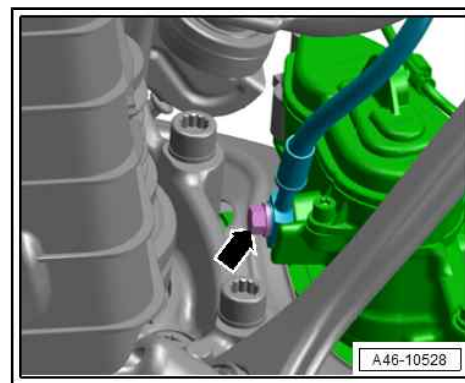
2.5 Removing and installing brake carrier

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required





- ◆ Torque wrench - V.A.G 1332-



Removing

- Remove brake pads ⇒ [page 108](#) .
- Remove bolts -arrows- and detach brake carrier -1-.

Installing

Installation is carried out in reverse order; note the following:

Note:

- ◆ Clean bolts and nuts before reusing.
- ◆ Renew damaged bolts and nuts.
- ◆ Renew self-locking bolts and nuts after removing.



WARNING

Health risk due to toxic dust from brake system
Risk of irreversible dust deposits in lungs, which could lead to respiratory problems

- Do NOT blow out brake system with compressed air.

- Use only methylated spirits for cleaning the brake carrier.
- Install brake pads ⇒ [page 108](#) .



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)

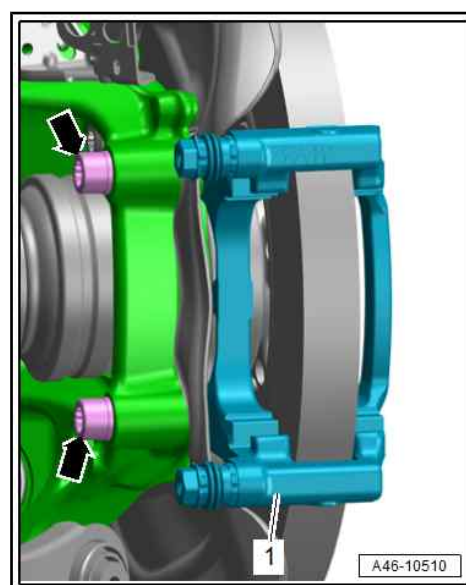
2.6 Removing and installing brake disc

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

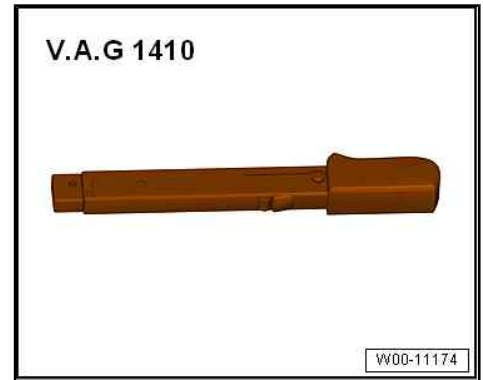
Clean bolts and nuts before reusing.

Special tools and workshop equipment required





- ◆ Torque wrench - V.A.G 1410-



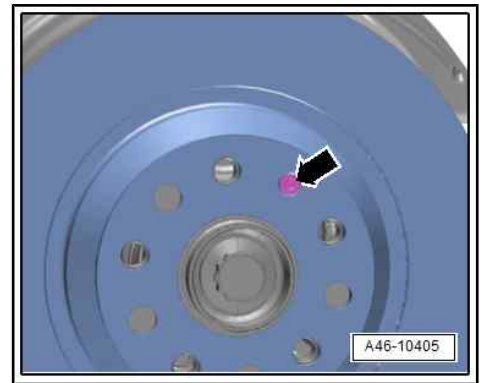
Removing

- Remove brake caliper ⇒ [page 112](#) .

NOTICE

Risk of damage to brake discs if force is applied.

- Do not force brake disc off wheel hub.
- Use rust remover.
- Remove bolt -arrow- and take off brake disc.



Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.

CAUTION

Accident risk (uneven braking effect)

- If one brake disc is damaged or worn, the other discs must also be checked for damage and wear.

- Check brake discs for wear and damage before reinstalling:
- ◆ Wear limit of brake discs ⇒ [page 4](#)
- Clean contact surface of brake disc and wheel hub thoroughly and remove corrosion.
- Take care to keep the brake disc straight when fitting it on the wheel hub.



- Tighten bolt -arrow-.
- Install brake caliper ⇒ [page 112](#) .

CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**
- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

Tightening torques

- ◆ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)

2.7 Removing and installing splash plate

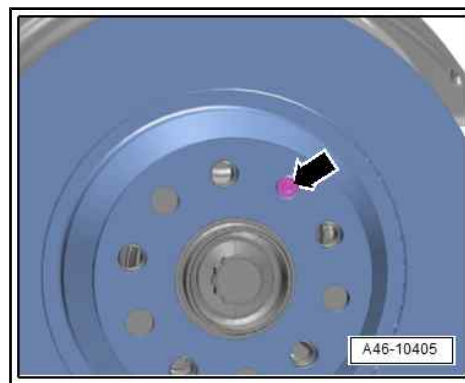
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



Removing

- Remove brake disc ⇒ [page 118](#) .



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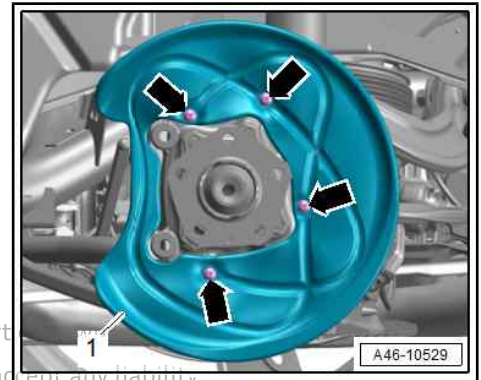
- Remove bolts -arrows- and detach splash plate -1-.

Installing

Installation is carried out in reverse order; note the following:

- Clean bolts and nuts before reusing.
- Renew damaged bolts and nuts.
- Renew self-locking bolts and nuts after removing.
- Clean contact surfaces on splash plate and wheel hub.

- Install brake disc ➔ [page 118](#).



CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.

- Depress brake pedal firmly several times with vehicle stationary so that brake pads are properly seated in normal operating position.

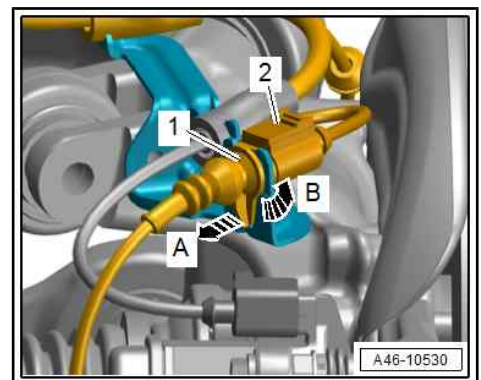
Tightening torques

- ◆ ➔ [“2.1 Exploded view - rear brakes”, page 105](#)

2.8 Removing and installing pad wear indicator wire

Removing

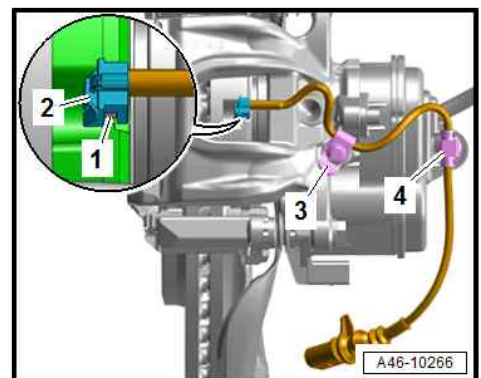
- Remove rear wheel ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Unplug electrical connector -2- for contact for brake pad wear indicator.
- Release electrical connector -1- for contact for pad wear indicator from bracket -arrow A- and at the same time turn 90° -arrow B-.



- Pull protective cap -3- off bleeder screw, remove clip -4- and move electrical wiring clear.
- Using suitable pliers, carefully pull off contact -1- for pad wear indicator, paying attention to retaining clip -2-.

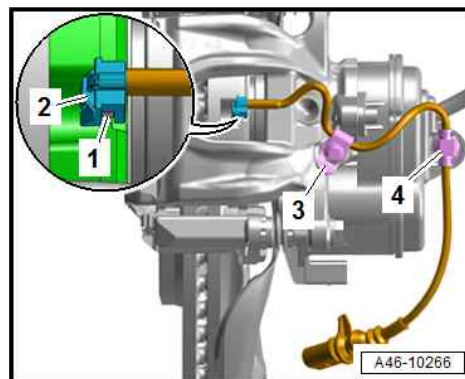
Installing

- Check for damage to contact for pad wear indicator and renew if necessary.
- Make sure the contact for the pad wear indicator is properly seated in the brake pad.
- The pad wear indicator wire must be renewed if the retaining clip is lost.





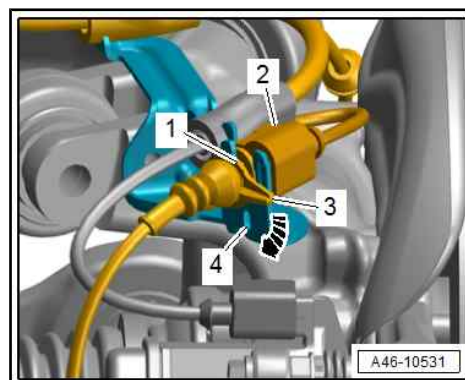
- Insert contact -1- for pad wear indicator with retaining clip -2- into inner brake pad so that it engages.
- Secure electrical wire for pad wear indicator with protective cap -3- and clip -4-.



- Locate electrical connector -1- in installation position and turn in direction of -arrow- until tab -3- engages in hole -4- in bracket.
- Plug in electrical connector -2-.

Tightening torques

- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres



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3 Parking brake

⇒ [“3.1 Exploded view - parking brake”, page 123](#)

⇒ [“3.2 Removing and installing parking brake motor V282 / V283”, page 124](#)

⇒ [“3.3 Releasing parking brake manually”, page 125](#)

3.1 Exploded view - parking brake

A mechanical or electrical fault may make it necessary to release the parking brake mechanically in order to move the vehicle
⇒ [page 125](#) .

1 - Rear brake caliper

2 - Seal

- ☐ Renew after removing

3 - Bolt

- ☐ Self-locking
- ☐ Renew after removing
- ☐ 13 Nm

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before re-using.

4 - Electromechanical parking brake motor

- ◆ Left parking brake motor - V282-

- ◆ Right parking brake motor - V283-

- ☐ ⇒ [“3.2 Removing and installing parking brake motor V282 / V283”, page 124](#)

5 - ABS control unit - J104-

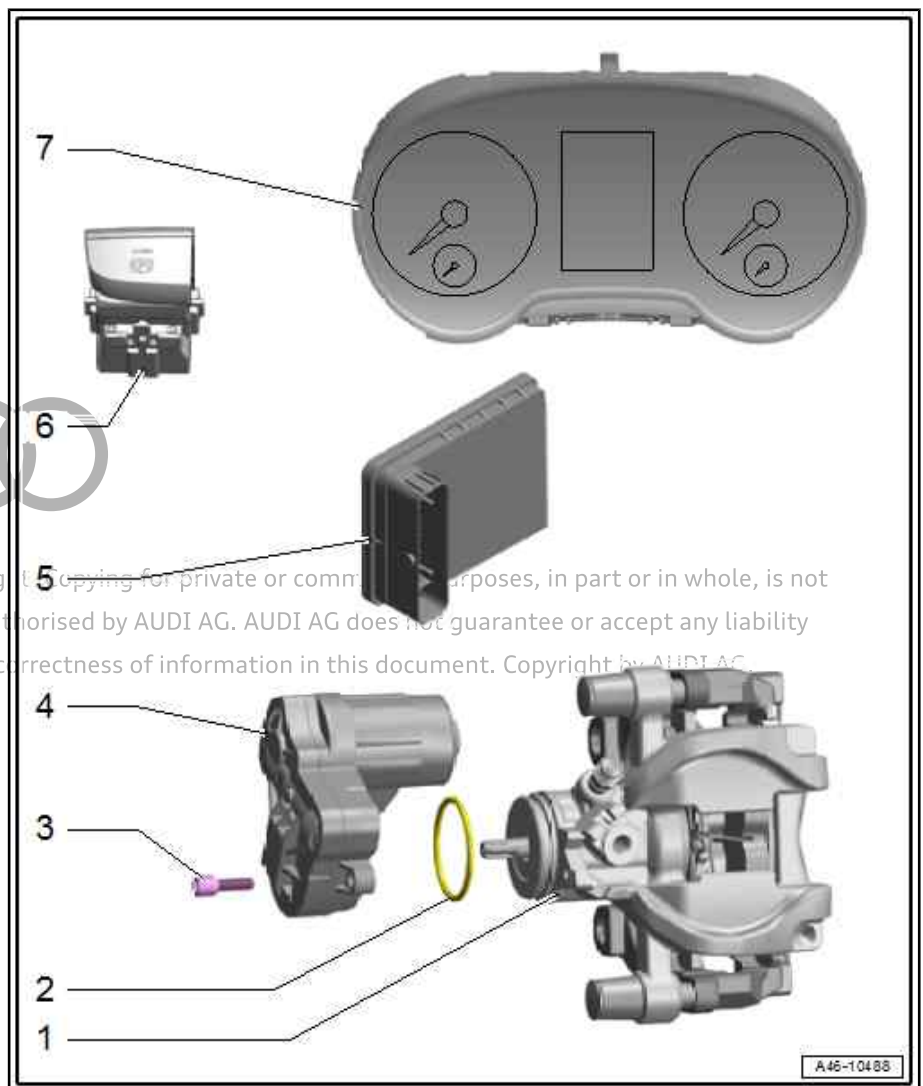
- ☐ With integrated control function for electromechanical parking brake
- ☐ ⇒ [“3.2 Removing and installing ABS control unit J104 / ABS hydraulic unit N55”, page 27](#)

6 - Electromechanical parking brake button - E538-

- ☐ With electromechanical parking brake warning lamp - K213-
- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 96 ; Controls; Overview of fitting locations - controls in centre console

7 - Dash panel insert

- ☐ With control unit in dash panel insert - J285- for displaying warning and indicator lamps





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

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Torque wrench - V.A.G 1331-

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V.A.G 1331

W00-11166

Removing

- Release parking brake.
- Switch off ignition.
- Remove rear wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Unplug electrical connector -3- for parking brake motor.
- Open clip -2- and move electrical wire for pad wear indicator clear.
- Remove bolts -arrows-.
- Detach parking brake motor -1- from brake caliper.
- Take off seal.

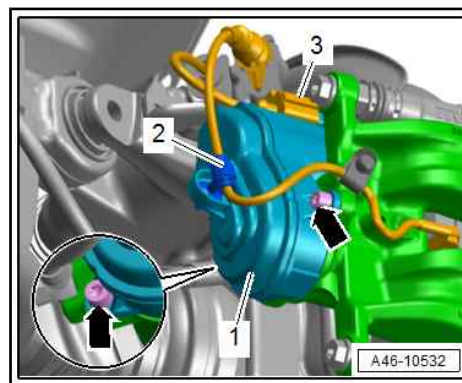
Installing

Installation is carried out in reverse order; note the following:

- Always renew oil seal if removed.
- The annular groove for the seal and the contact surface of the parking brake motor must not be damaged.
- Clean annular groove and contact surface of parking brake motor.
- Fit new seal.

Note:

Make sure that the seal does not move out of position while the parking brake motor is being installed.



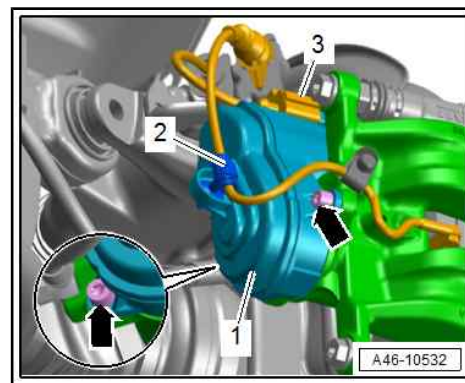


- Bring parking brake motor -1- into installation position by turning it back and forth slightly.
- Tighten bolts -arrows-.
- The parking brake motor must make flush contact with the brake caliper; it must NOT be pulled down against the brake caliper with the bolts.

! NOTICE

Risk of damage to threads if handled incorrectly.

- **Never use an impact wrench to loosen or tighten.**
- **Fit bolts by hand; make the first few turns by hand.**



- Basic setting must be performed after installation:
- With ignition switched off, connect vehicle diagnostic tester to diagnostic connection in vehicle.
- Switch on ignition.
- Select **Diagnosis** and start the diagnosis.
- Select **Test plan** tab.
- Choose **Select own test** and select following options one after the other:
 - ◆ Running gear
 - ◆ Brake system
 - ◆ 0001 - Self-diagnosis compatible systems
 - ◆ 0003 - ABS control unit J104 integrated parking brake
 - ◆ 0003 - Functions - electromechanical parking brake
 - ◆ 0003 - Basic setting
- Start selected program and follow instructions shown on display of vehicle diagnostic tester.

! CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

Tightening torques

- ◆ ⇒ [“3.1 Exploded view - parking brake”, page 123](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres

3.3 Releasing parking brake manually

A mechanical or electrical fault may make it necessary to release the parking brake mechanically in order to move the vehicle.

Procedure

! CAUTION

Accident risk; vehicle can start rolling.

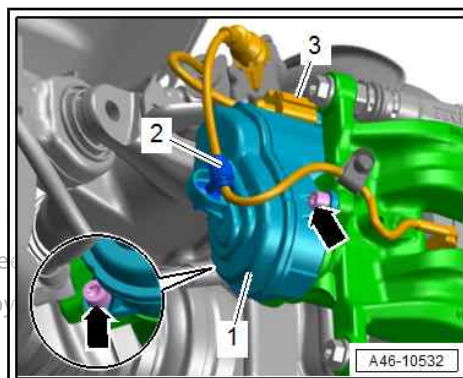
- **Before removing parking brake motor, secure vehicle to prevent it from rolling.**

- Release parking brake.



- Switch off ignition.
- Remove rear wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .
- Unplug electrical connector -3- for parking brake motor.
- Open clip -2- and move electrical wire for pad wear indicator clear.
- Remove bolts -arrows-.
- Detach parking brake motor -1- from brake caliper.
- Take off seal.

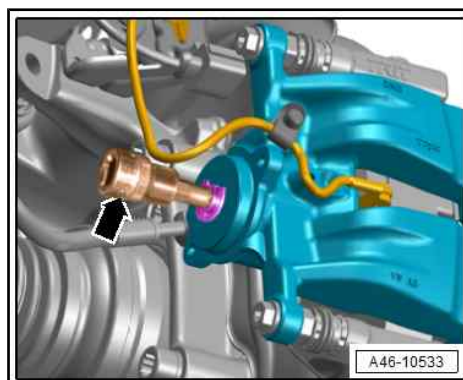
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- Use socket TX45 -arrow- to turn drive shaft back until brake is released.
- Install parking brake motor after fault has been rectified
⇒ [page 124](#) .

Tightening torques

- ♦ ⇒ [“3.1 Exploded view - parking brake”, page 123](#)
- ♦ ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres





4 Brake pedal

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

⇒ [“4.1 Exploded view - brake pedal”, page 127](#)

⇒ [“4.2 Removing and installing mounting bracket”, page 128](#)

⇒ [“4.3 Separating brake pedal from brake servo”, page 130](#)

⇒ [“4.4 Connecting brake pedal to brake servo”, page 130](#)

⇒ [“4.5 Removing and installing brake pedal”, page 131](#)

4.1 Exploded view - brake pedal

1 - Brake pedal

- ☐ The brake pedal travel must not be restricted by additional floor coverings.
- ☐ ⇒ [“4.3 Separating brake pedal from brake servo”, page 130](#)
- ☐ ⇒ [“4.4 Connecting brake pedal to brake servo”, page 130](#)
- ☐ ⇒ [“4.5 Removing and installing brake pedal”, page 131](#)

2 - Bolt

- ☐ Holds pivot pin in position
- ☐ 8 Nm

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

3 - Securing clip

- ☐ Renew after removing

4 - Nut

- ☐ 8 Nm

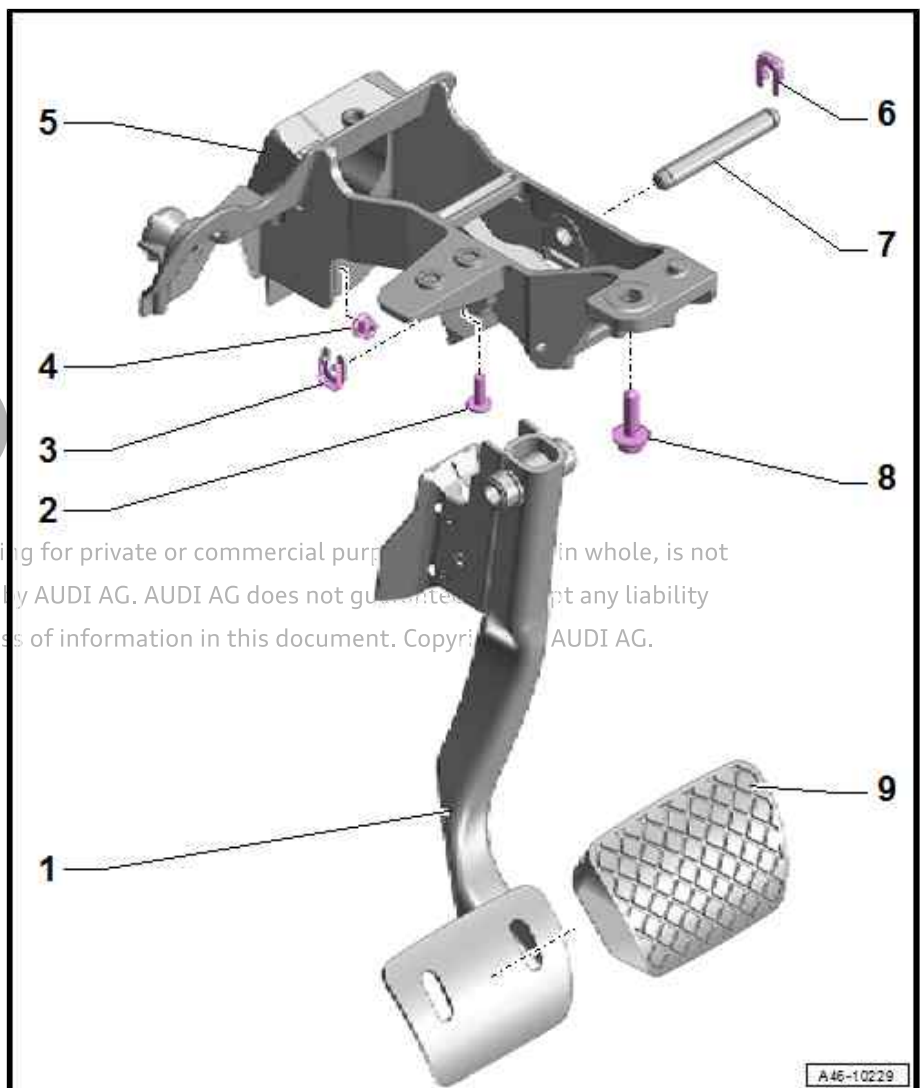
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

5 - Mounting bracket

- ☐ For pedal cluster
- ☐ ⇒ [“4.2 Removing and installing mounting bracket”, page 128](#)





6 - Pivot pin

- ☐ For brake pedal

7 - Securing clip

- ☐ Renew after removing

8 - Bolt

- ☐ Pedal bracket to steering column
- ☐ 20 Nm

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

9 - Pedal rubber

4.2 Removing and installing mounting bracket

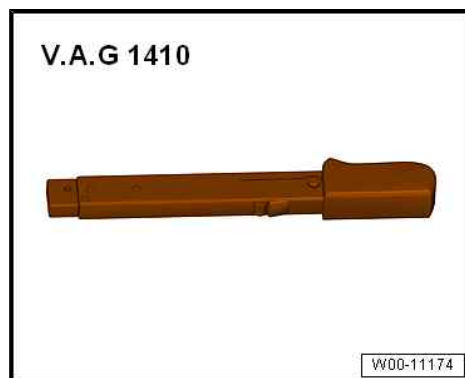
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

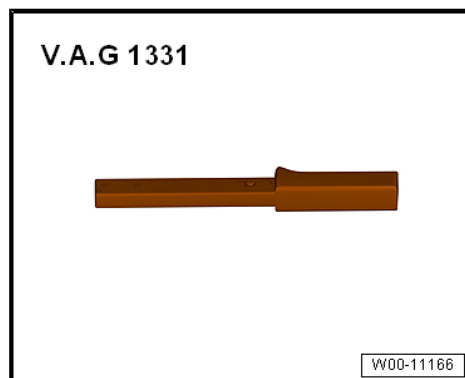
Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



- ◆ Torque wrench - V.A.G 1331-



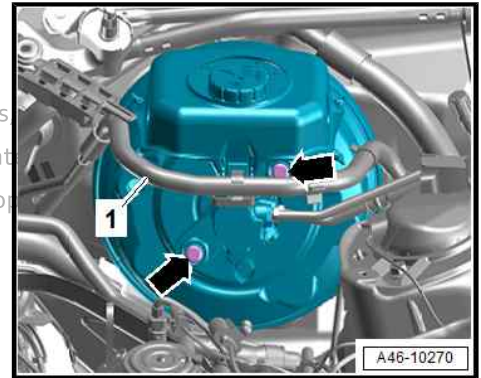
Removing

- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .
- Separate brake pedal from brake servo ⇒ [page 130](#) .



- Remove bolts -arrows-.
- Unbolt steering column from dash panel cross member and set it down ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering column; Removing and installing steering column.

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- Unplug electrical connectors -arrows- and move electrical wires clear.
- Remove bolt -1- and nut -2- and detach mounting bracket together with brake pedal and accelerator pedal module.
- Remove brake pedal ⇒ [page 131](#) .
- Remove accelerator pedal module ⇒ Fuel supply system; Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator pedal module with accelerator position sender - G79- / -G185- .

Installing

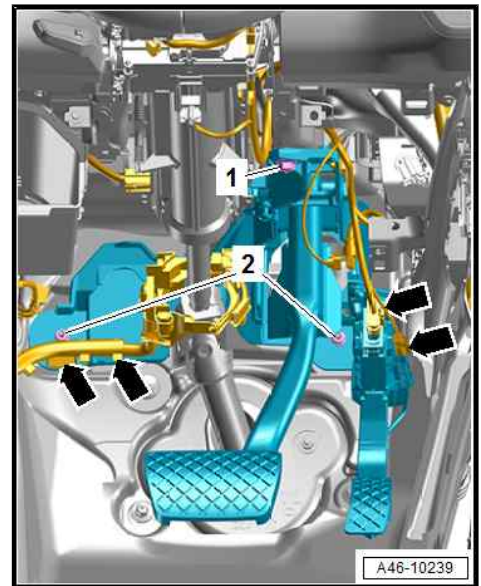
Installation is carried out in reverse order; note the following:

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

- Install accelerator pedal module ⇒ Fuel supply system; Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator pedal module with accelerator position sender - G79- / -G185- .
- Install brake pedal ⇒ [page 131](#) .
- Locate mounting bracket (with brake pedal fitted) and accelerator pedal module in installation position.
- The mounting bracket must be seated in the guides on the bulkhead and in all the studs.
- Connect brake pedal to brake servo ⇒ [page 130](#) .



⚠ CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .

Tightening torques

- ◆ ⇒ [“4.1 Exploded view - brake pedal”, page 127](#)
- ◆ ⇒ [“3.1 Exploded view - brake servo / brake master cylinder”, page 148](#)



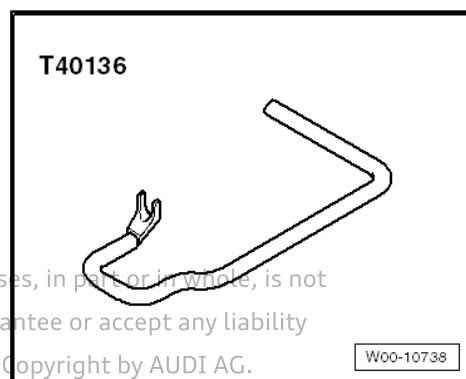
4.3 Separating brake pedal from brake servo

Special tools and workshop equipment required

- ◆ Release tool - T40136-



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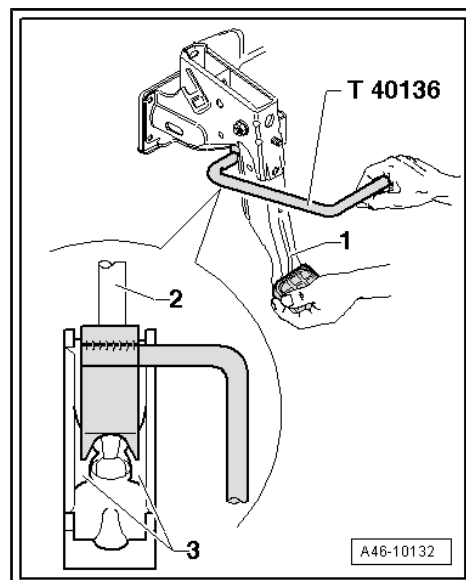
Procedure

- Remove footwell vent ⇒ Heating, air conditioning; Rep. gr. 87 ; Air duct system; Removing and installing footwell vent (driver side) .
- First press brake pedal in direction of brake servo and hold.
- Insert release tool - T40136- and pull towards driver's seat, at the same time holding brake pedal -1- in position to stop it moving towards the rear. This will press the retaining lugs -3- of the mounting off the ball head of the push rod -2-.

Note:

For greater clarity, the illustration shows the installation position with the pedal cluster removed.

- Pull release tool - T40136- and brake pedal together towards driver's seat (this will pull the brake pedal off the ball head of the push rod).



4.4 Connecting brake pedal to brake servo

Procedure

- Hold ball head of push rod in front of mounting and push brake pedal towards brake servo -arrow- until ball head audibly locks into place.
- Install footwell vent ⇒ Heating, air conditioning; Rep. gr. 87 ; Air duct system; Removing and installing footwell vent (driver side) .

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.





4.5 Removing and installing brake pedal

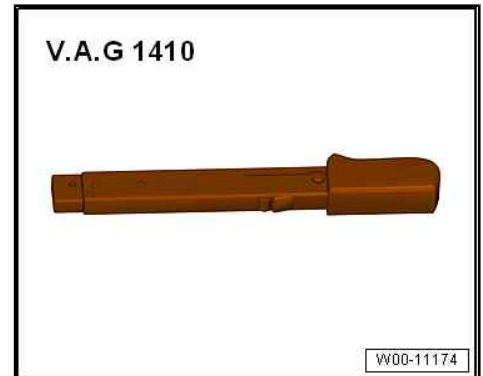
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

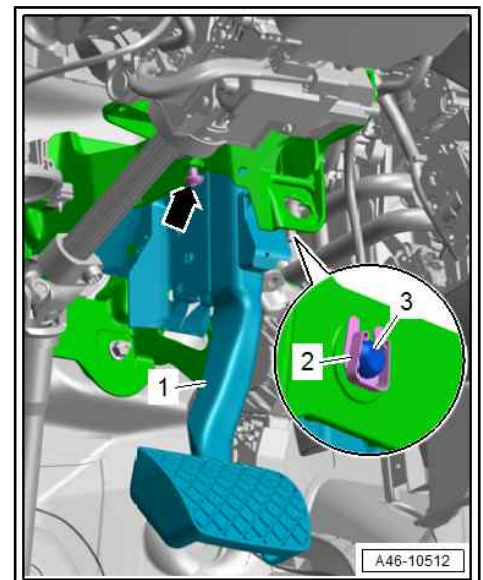
Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1410-



Removing

- Separate brake pedal from brake servo ➔ [page 130](#) .
- Release retaining bolt -arrow- and detach securing clip -2-.
- Pull pivot pin -3- off towards left and detach brake pedal -1-.



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Installing

Installation is carried out in reverse order; note the following:

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

- Slide pivot pin -3- in from left as far as stop and secure with retaining clip -2- and retaining bolt -arrow-.
- Connect brake pedal -1- to brake servo ⇒ [page 130](#) .

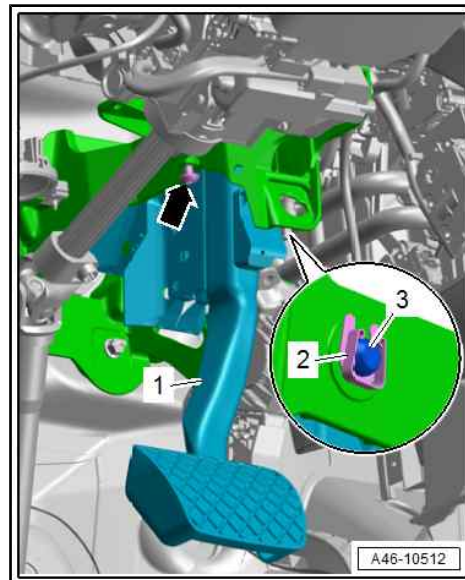
CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

Tightening torques

- ♦ ⇒ ["4.1 Exploded view - brake pedal", page 127](#)



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47 – Brakes - hydraulics

1 Front brake caliper

⇒ [“1.1 Exploded view - front brake caliper”, page 133](#)

⇒ [“1.2 Removing and installing brake caliper piston”, page 135](#)

⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#)

1.1 Exploded view - front brake caliper

⇒ [“1.1.1 Exploded view - front brake caliper, single-piston brakes”, page 133](#)

⇒ [“1.1.2 Exploded view - front brake caliper, four-piston brakes”, page 134](#)

⇒ [“1.1.3 Exploded view - front brake caliper, six-piston brakes”, page 135](#)

1.1.1 Exploded view - front brake caliper, single-piston brakes

1 - Brake caliper housing

2 - Bearing bush

- ❑ ⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#)

3 - Guide pin

- ❑ ⇒ [“1.3 Renewing bearing bushes and guide pins”, page 143](#)

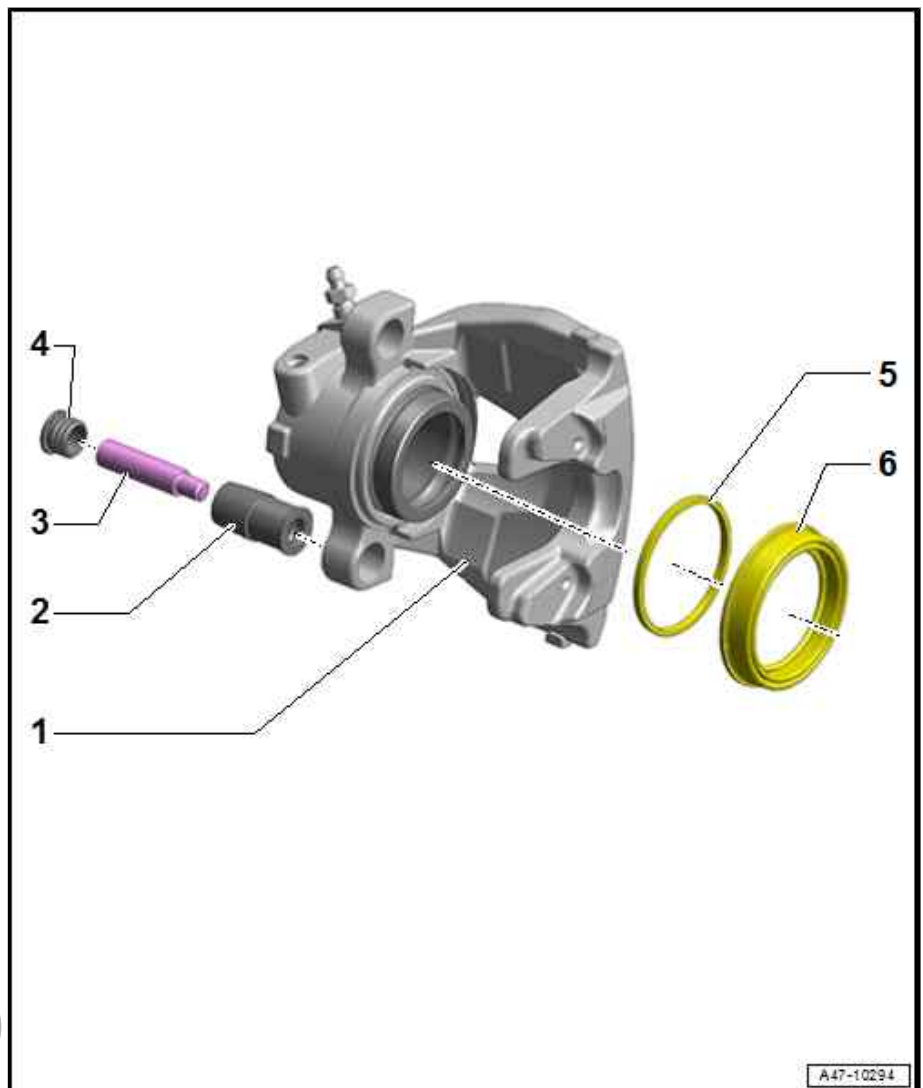
4 - Trim cap

5 - Seal

- ❑ ⇒ [“1.2.1 Removing and installing brake caliper piston - single-piston brakes”, page 135](#)

6 - Protective cap

- ❑ If damaged, install all parts supplied in set of replacement seals
- ❑ ⇒ [“1.2.1 Removing and installing brake caliper piston - single-piston brakes”, page 135](#)
- ❑ Pull sealing lip of protective cap onto brake caliper piston





1.1.2 Exploded view - front brake caliper, four-piston brakes

1 - Brake caliper

2 - Seal

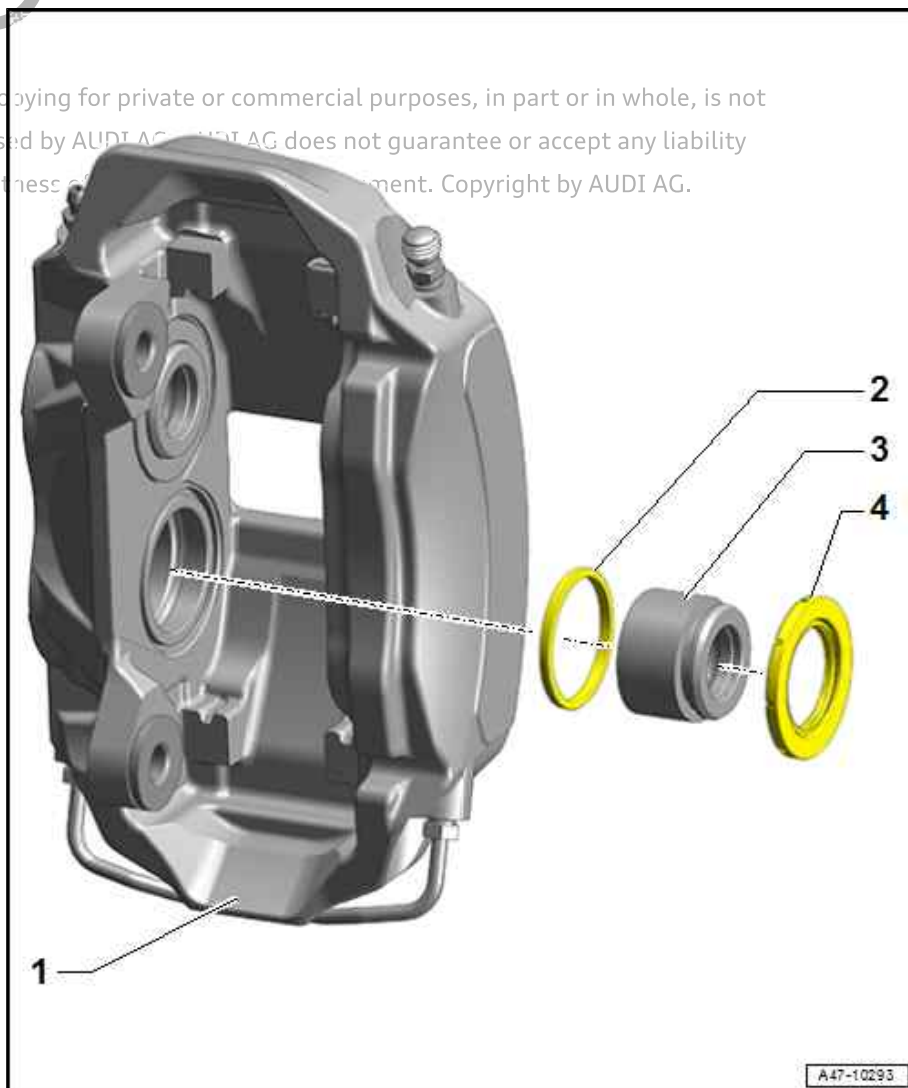
- ☐ If damaged, install all parts supplied in set of replacement seals
- ☐ ⇒ ["1.2.2 Removing and installing brake caliper pistons - four-piston brakes", page 138](#)

3 - Brake caliper piston

- ☐ Not available as replacement part

4 - Protective cap

- ☐ If damaged, install all parts supplied in set of replacement seals
- ☐ ⇒ ["1.2.2 Removing and installing brake caliper pistons - four-piston brakes", page 138](#)
- ☐ Pull sealing lip of protective cap onto brake caliper piston





1.1.3 Exploded view - front brake caliper, six-piston brakes

1 - Brake caliper

2 - Seal

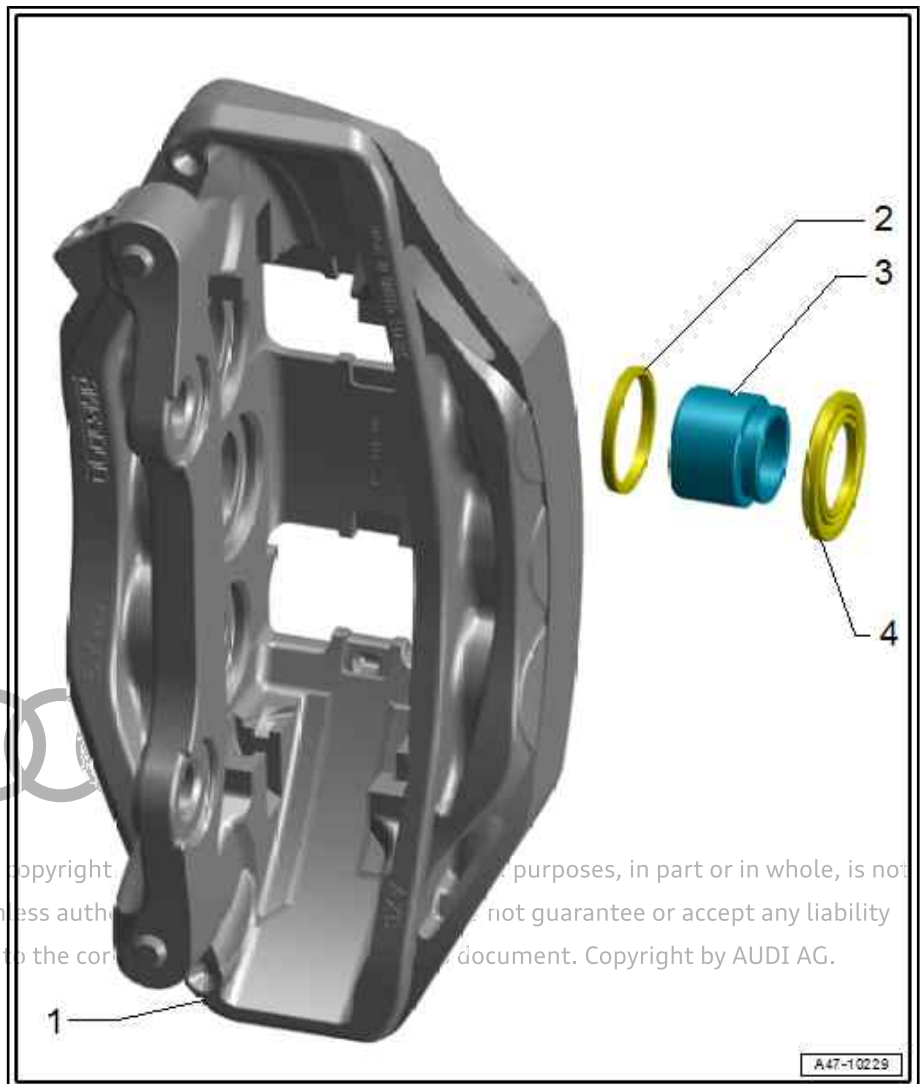
- ☐ If damaged, install all parts supplied in set of replacement seals
- ☐ ⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)

3 - Brake caliper piston

- ☐ Not available as replacement part

4 - Protective cap

- ☐ If damaged, install all parts supplied in set of replacement seals
- ☐ ⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)
- ☐ Pull sealing lip of protective cap onto brake caliper piston



1.2 Removing and installing brake caliper piston

⇒ [“1.2.1 Removing and installing brake caliper piston - single-piston brakes”, page 135](#)

⇒ [“1.2.2 Removing and installing brake caliper pistons - four-piston brakes”, page 138](#)

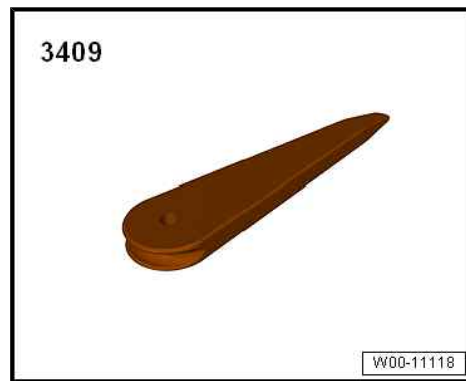
⇒ [“1.2.3 Removing and installing brake caliper pistons - six-piston brakes”, page 141](#)

1.2.1 Removing and installing brake caliper piston - single-piston brakes

Special tools and workshop equipment required



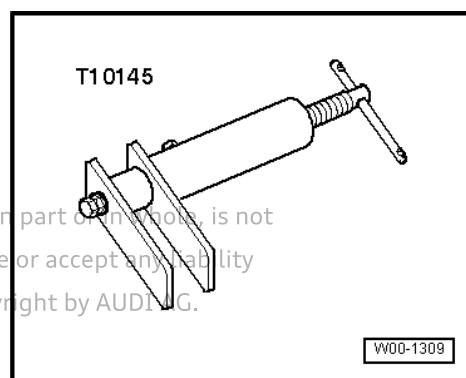
◆ Removal wedge - 3409-



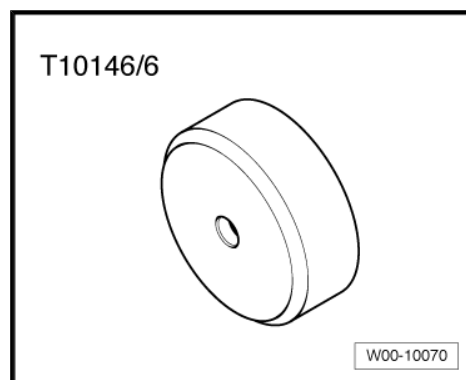
◆ Piston resetting appliance - T10145-



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◆ Assembly tool for protective caps - T10146/6-



◆ Removal tool - T40338- (not illustrated)

Removing

- Brake caliper removed and disconnected from hydraulic system
⇒ ["1.4.1 Renewing brake caliper - steel version brakes \(1LA/1LB\)", page 81](#) .

Note:

Take care not to damage paint on brake caliper when removing brake caliper pistons and protective caps.



CAUTION

Risk of injury from escaping brake fluid
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.

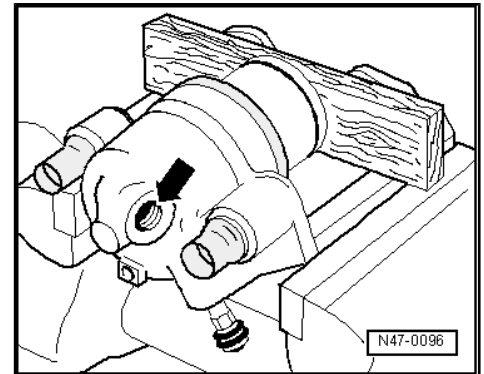


- Place a cloth over bore in brake caliper to catch any brake fluid spatter. Wrap another cloth tightly around nozzle of compressed-air gun applied to brake caliper.
- Clamp brake caliper in jaws of vice. Use protective jaw covers.

Note:

Place a piece of wood in the recess to prevent damaging the brake caliper piston.

- The bleeder screws must be closed.
- Apply compressed air nozzle to threaded hole for brake hose -arrow- and press piston out of caliper.

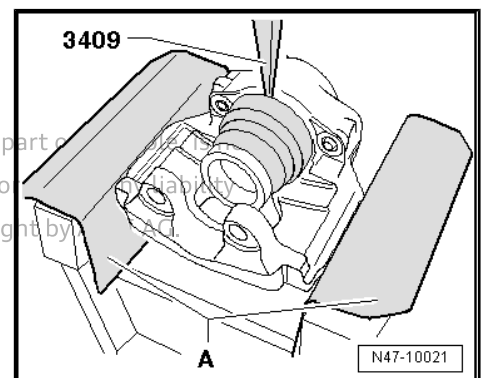


Note:

If the same protective cap is to be re-installed, use removal tool - T40338- instead of removal wedge - 3409- to ensure cap is not damaged during removal.

- Prise protective cap off brake caliper.

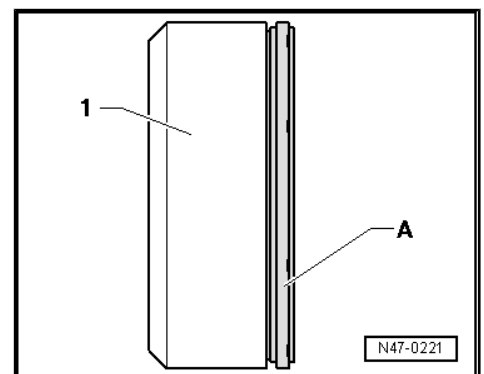
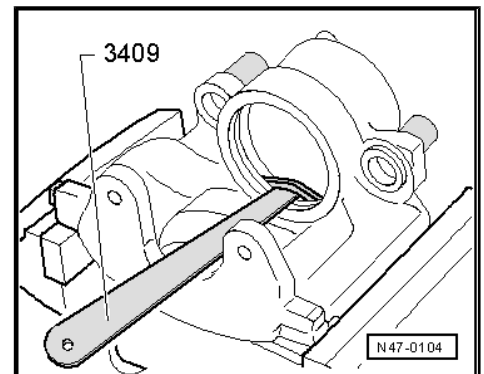
A - Jaw covers for vice



- Remove seal using removal wedge - 3409- .
- When removing ensure that the bore of the cylinder is not damaged.

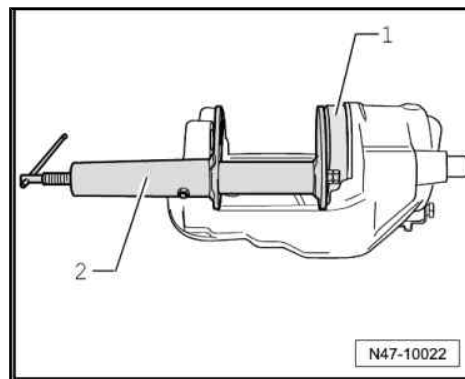
Installing

- Install all parts supplied in repair kit.
- Use only methylated spirits to clean the brake components.
- The brake caliper must be replaced if a brake caliper piston or piston bore is damaged.
- The surfaces of the brake caliper piston must be cleaned (with methylated spirits only) and then dried.
- Insert seal in brake caliper.
- Fit protective cap -A- in assembly tool - T10146/6- -item 1-.

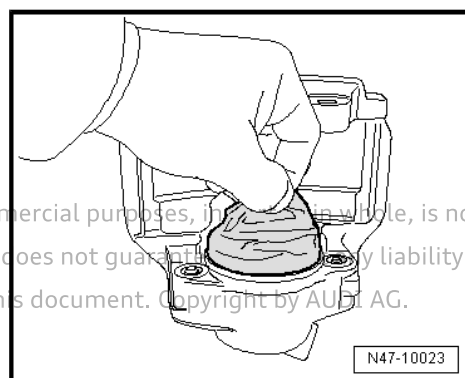




- Using assembly tool and piston resetting tool - T10145-
-item 2-, press protective cap onto brake caliper so it makes
full contact with brake caliper all around.

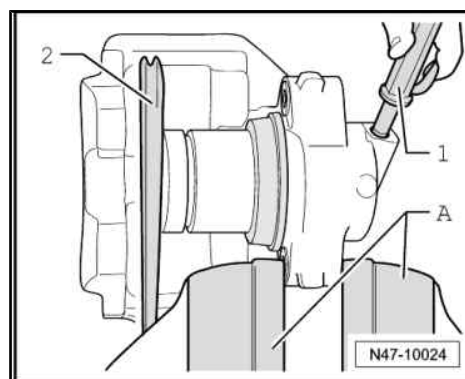


- Checking correct seating of protective cap:
 - At this stage it should not be possible to remove the protective
cap from the brake caliper by hand.

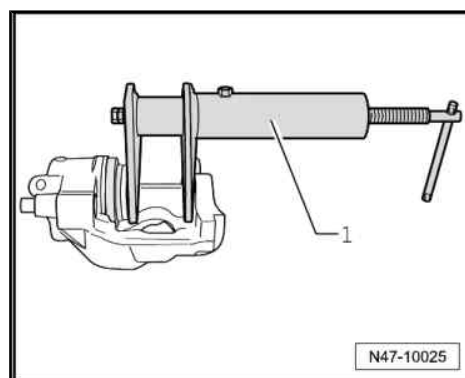


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- Press brake caliper piston lightly onto protective cap and lock
it in this position using removal wedge - 3409- -item 2- or sim-
ilar.
- Blow out protective cap with compressed air (maximum 3 bar)
-1-. The protective cap will then locate around the brake caliper
piston.
- Keep the brake caliper piston straight to avoid damaging the
sealing collar.



- Press piston into brake caliper using piston resetting tool -
T10145- -item 1-.
- The outer sealing lip of the protective cap will then lock in the
groove on the piston.

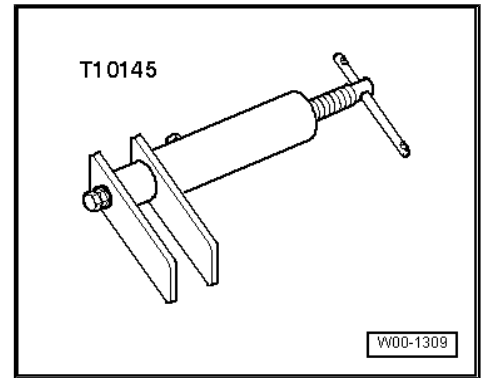


1.2.2 Removing and installing brake caliper pistons - four-piston brakes

Special tools and workshop equipment required



◆ Piston resetting appliance - T10145-



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- ◆ Thrust piece - T40325- (not illustrated)
 - ◆ Removal tool - T40338- (not illustrated)

Removing

- Brake caliper removed and disconnected from hydraulic system
⇒ ["1.4.2 Renewing brake caliper - steel version brakes \(1LC/1LD/1LE/1LF/1LG/1LH\)", page 85](#) .
- Clamp brake caliper in jaws of vice. Use protective jaw covers.

Note:

Take care not to damage paint on brake caliper when removing brake caliper pistons and protective caps.

⚠ CAUTION

Risk of injury from escaping brake fluid
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.

- Place a cloth over bore in brake caliper to catch any brake fluid spatter. Wrap another cloth tightly around nozzle of compressed-air gun applied to brake caliper.

⚠ CAUTION

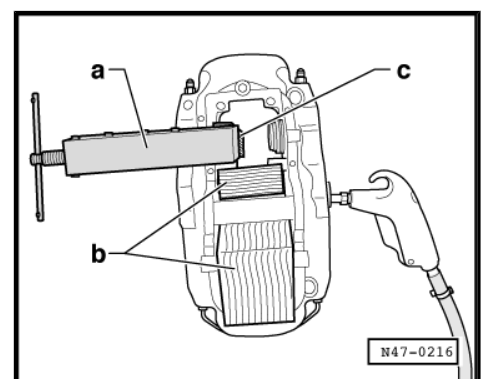
Brake caliper piston is released abruptly when it is pressed out - risk of injury.

- Do NOT reach into brake caliper with your fingers.

Note:

The brake caliper pistons can only be removed one at a time.

- Use the piston resetting appliance - T10145- -item a- to hold the opposite brake caliper piston in place in the brake caliper.
- To avoid damaging the paint on the caliper, insert a piece of rubber between the piston resetting appliance - T10145- and the caliper.

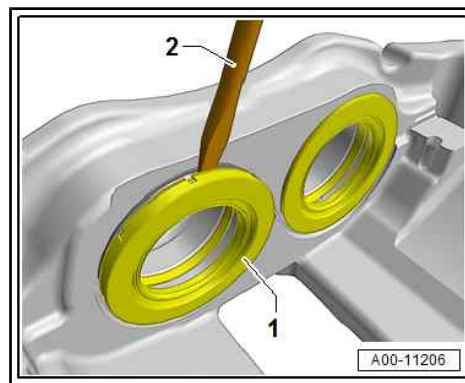




Note:

If the same protective caps are to be re-installed, use removal tool - T40338- to ensure caps are not damaged during removal.

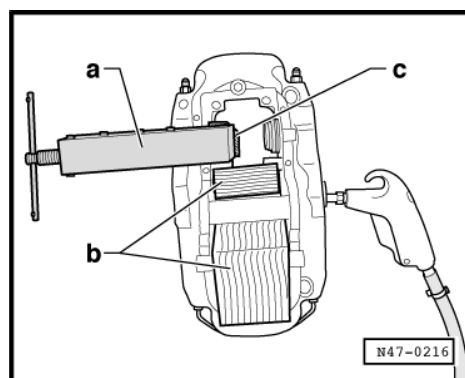
- Carefully lever protective cap -1- and seal out of brake caliper with gentle movements using removal tool - T40338- -2-; take care not to damage groove for protective cap in brake caliper.



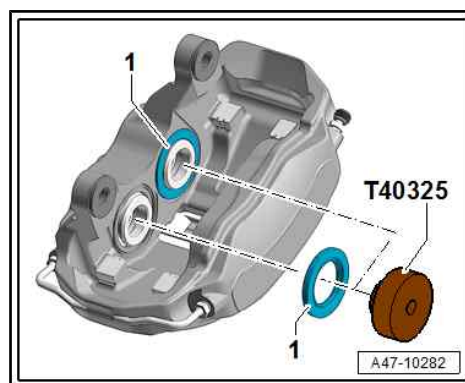
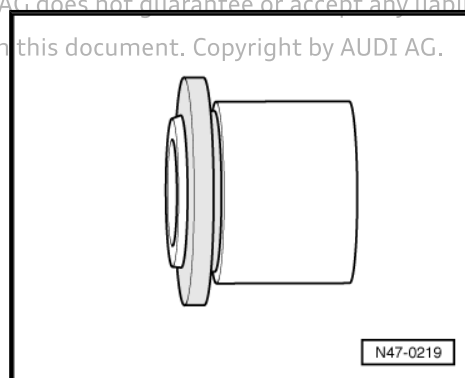
- Use blocks of wood or similar -b- to keep the other brake caliper pistons in place. Also place a piece of wood -c- against the piston resetting appliance - T10145- -a- to prevent the brake caliper piston from being damaged when it is forced out.
- The bleeder screws must be closed.
- Apply compressed air nozzle to threaded hole for brake hose and press piston out of caliper.

Installing

- Install all parts supplied in repair kit.
- Use only methylated spirits to clean the brake components.
- The brake caliper must be replaced if a brake caliper piston or piston bore is damaged.
- The surfaces of the brake caliper piston must be cleaned (with methylated spirits only) and then dried.
- Insert seal in brake caliper.
- Fit protective cap onto brake caliper piston.
- Push piston (with protective cap pressed on) into caliper, exerting even pressure and making sure piston is straight.
- Fit piston resetting appliance - T10145- and thrust piece - T40325- on brake caliper.



- Slowly press on protective cap -1- using piston resetting appliance - T10145- and thrust piece - T40325- .
- The protective cap must be securely seated in the groove. If necessary, press in further using piston resetting appliance - T10145- .
- At this stage it should not be possible to remove the protective cap from the brake caliper by hand.
- Repeat procedure on next brake caliper piston.





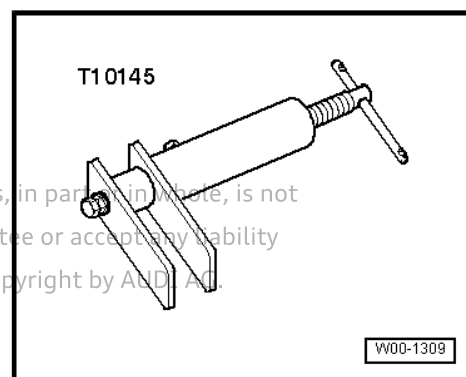
1.2.3 Removing and installing brake caliper pistons - six-piston brakes

Special tools and workshop equipment required

- ◆ Piston resetting appliance - T10145-



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- ◆ Thrust piece - T40325- (not illustrated)
- ◆ Removal tool - T40338- (not illustrated)

Removing

- Brake caliper removed and disconnected from hydraulic system
⇒ ["1.4.3 Renewing brake caliper - steel version brakes \(1LJ/1LL/1LM/1LX/1LY/1LZ/1ZA/1ZC/1ZK/1ZX\)", page 89](#) or
⇒ ["1.4.4 Renewing brake caliper - ceramic brakes", page 93](#) .
- Clamp brake caliper in jaws of vice. Use protective jaw covers.

Note:

Take care not to damage paint on brake caliper when removing brake caliper pistons and protective caps.

CAUTION

Risk of injury from escaping brake fluid
Eyes and skin can suffer irritation or injuries.

- Put on safety goggles.
- Put on protective gloves.

- Place a cloth over bore in brake caliper to catch any brake fluid spatter. Wrap another cloth tightly around nozzle of compressed-air gun applied to brake caliper.

CAUTION

Brake caliper piston is released abruptly when it is pressed out - risk of injury.

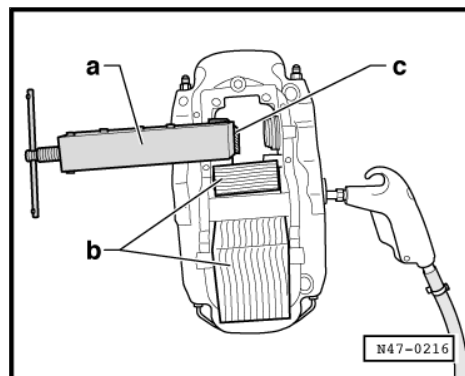
- Do NOT reach into brake caliper with your fingers.



Note:

The brake caliper pistons can only be removed one at a time.

- Use the piston resetting appliance - T10145- -item a- to hold the opposite brake caliper piston in place in the brake caliper.
- To avoid damaging the paint on the caliper, insert a piece of rubber between the piston resetting appliance - T10145- and the caliper.
- Use blocks of wood or similar -b- to keep the other brake caliper pistons in place. Also place a piece of wood -c- against the piston resetting appliance - T10145- -a- to prevent the brake caliper piston from being damaged when it is forced out.
- The bleeder screws must be closed.
- Apply compressed air nozzle to threaded hole for brake hose and press piston out of caliper.



Note:

If the same protective caps are to be re-installed, use removal tool - T40338- to ensure caps are not damaged during removal.

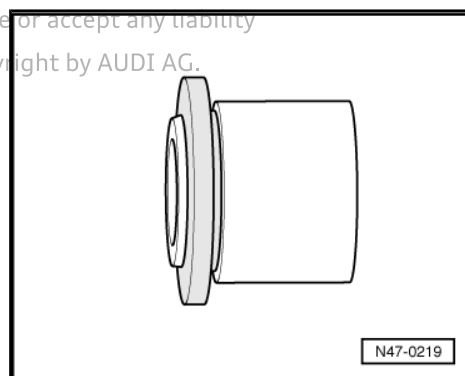
- Carefully lever protective cap -1- and seal out of brake caliper with gentle movements using removal tool - T40338- -2-; take care not to damage groove for protective cap in brake caliper.

Installing

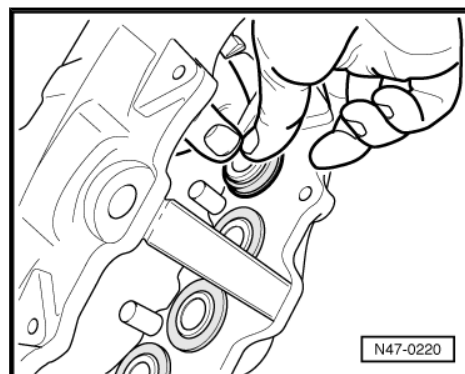
- Install all parts supplied in repair kit.
- Use only methylated spirits to clean the brake components.
- The brake caliper must be replaced if a brake caliper piston or piston bore is damaged.
- The surfaces of the brake caliper piston must be cleaned (with methylated spirits only) and then dried.
- Insert seal in brake caliper.
- Fit protective cap onto piston.



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- Push piston into caliper, exerting even pressure and making sure piston is straight.
- Press protective cap into groove on brake caliper.
- The protective cap must be securely seated in the groove. If necessary, press in further using piston resetting appliance - T10145- .
- Repeat procedure on next brake caliper piston.





1.3 Renewing bearing bushes and guide pins

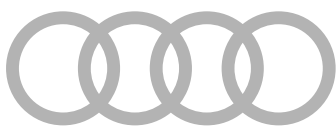
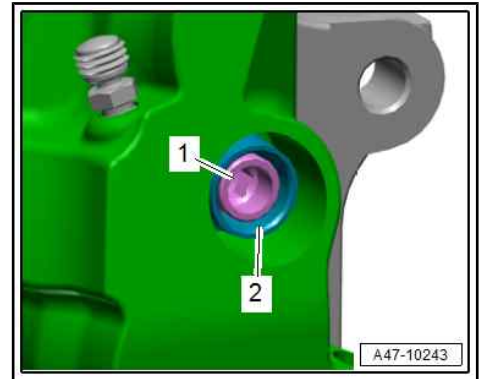
The following procedure applies to single-piston brakes.

Special tools and workshop equipment required

- ◆ Lithium grease ⇒ Electronic parts catalogue

Removing

- Remove brake pads
⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”](#), page 53 .
- Pull guide pin -1- outwards out of bearing bush.
- Pull bearing bush -2- out of brake caliper.
- Insert bearing bush into brake caliper.
 - Bearing bush must be seated centrally in brake caliper.
- Apply a small amount of grease (from repair kit) to guide pin.
- Push guide pin into bearing bush.
- Check that both guide pins move easily.
 - It should be possible to slide both guide pins in and out.
- Install brake pads
⇒ [“1.2.1 Removing and installing brake pads - steel version brakes \(1LA/1LB\)”](#), page 53 .



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2 Rear brake caliper

⇒ [“2.1 Exploded view - rear brake caliper”, page 144](#)

⇒ [“2.2 Removing and installing brake caliper piston”, page 144](#)

2.1 Exploded view - rear brake caliper

1 - Protective cap

- ⇒ [“2.2 Removing and installing brake caliper piston”, page 144](#)

2 - Brake caliper piston

- ⇒ [“2.2 Removing and installing brake caliper piston”, page 144](#)

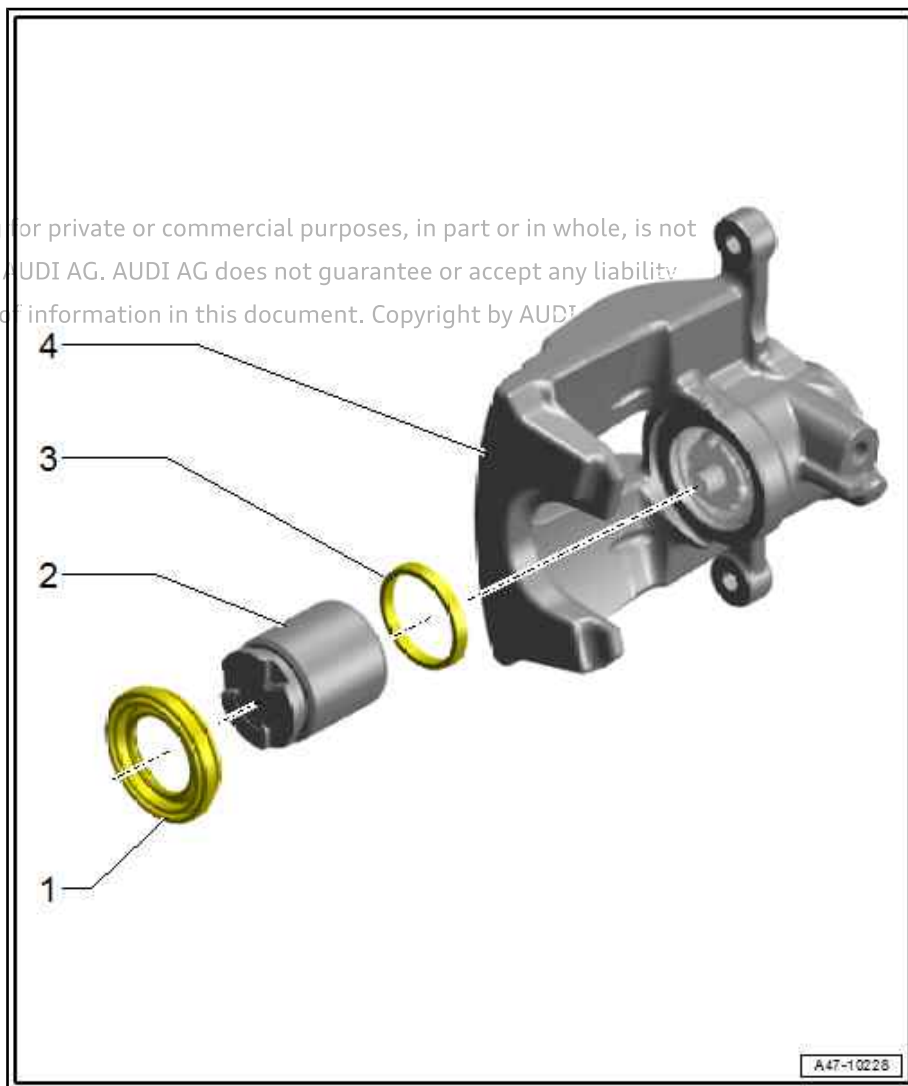
Protecting the brake system from private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with regard to the correctness of information in this document. Copyright by AUDI AG.

- Apply a thin coat of lithium grease G 052 150 A2-

3 - Seal

- ⇒ [“2.2 Removing and installing brake caliper piston”, page 144](#)

4 - Brake caliper



2.2 Removing and installing brake caliper piston

Special tools and workshop equipment required



◆ Removal wedge - 3409-



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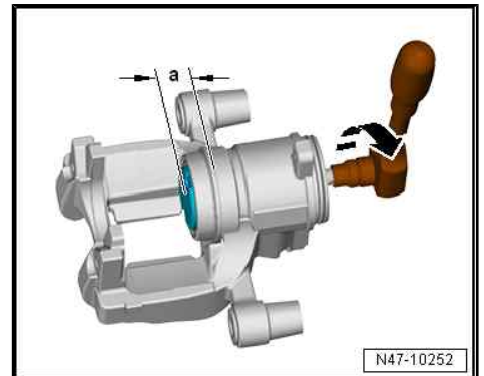
3409



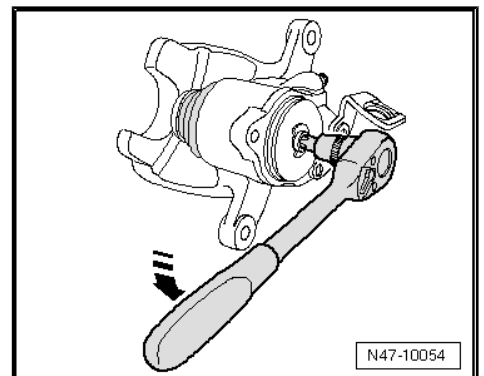
W00-11118

Removing

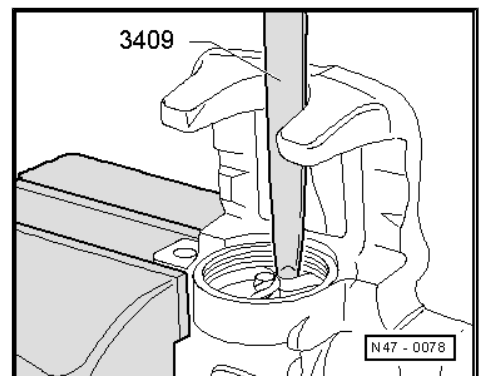
- Brake caliper removed ➔ [page 114](#)
 - Parking brake motor removed ➔ [page 124](#)
 - Install complete repair kit when servicing.
 - Use only methylated spirits to clean the brake components.
 - Apply a thin coat of lithium grease - G 052 150 A2- to brake cylinders, brake caliper pistons and seals.
-
- Turn spindle anti-clockwise -arrow- with 8 mm multi-point bit so that compressor nut presses brake caliper piston out of brake caliper.
 - Take brake caliper piston with protective cap out of brake caliper.
-
- Remove seal using removal wedge - 3409- .
 - The surfaces of the brake caliper piston and seal must be cleaned (with methylated spirits only) and then dried.



N47-10252



N47-10054

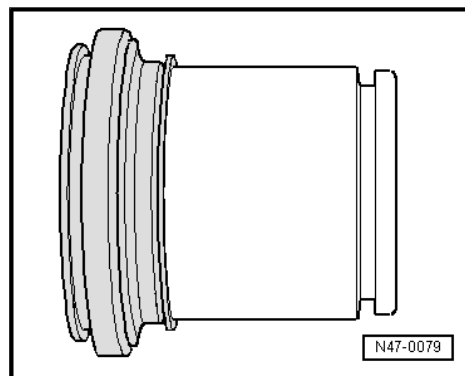


N47 - 0078

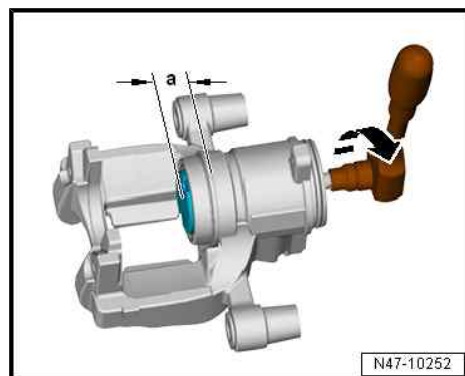


Installing

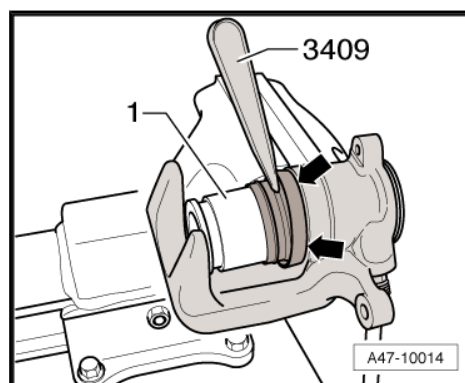
- Before installing, lightly lubricate brake caliper piston and seal with lithium grease - G 052 150 A2- .
- Insert seal in brake caliper.
- Place outer sealing lip of protective cap on brake caliper piston.



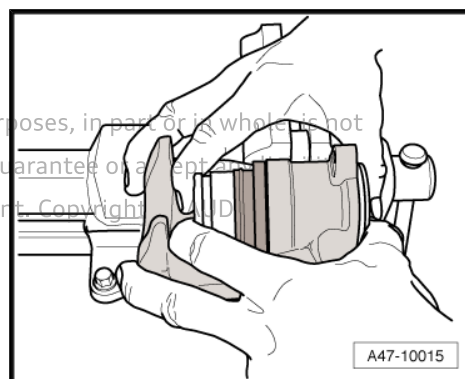
- Screw compressor nut onto spindle until dimension -a- = 15 mm.



- Insert inner sealing lip of protective cap into groove -arrows- in brake caliper using removal wedge - 3409- .
- Push brake caliper piston -1- onto compressor nut; this is only possible in four positions.
- Carefully press piston into brake caliper, moving piston as required.



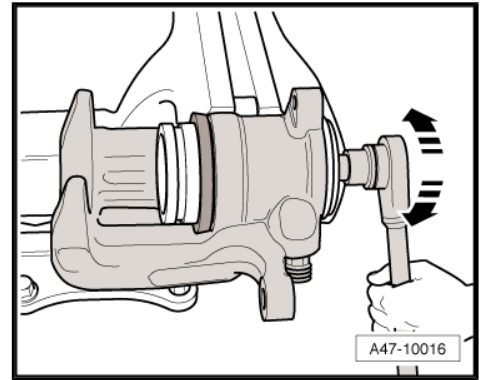
- Continue pressing brake caliper piston into brake caliper until it rests against compressor nut.



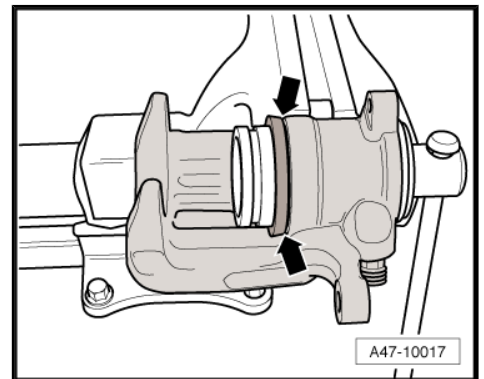
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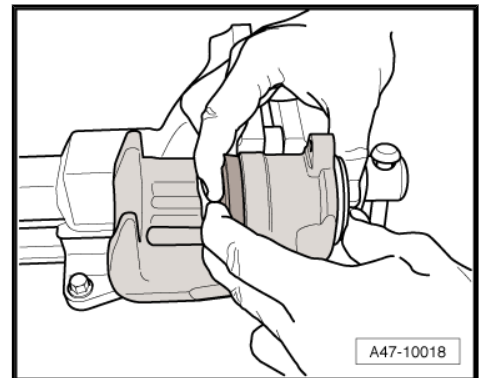
- Carefully turn spindle clockwise -top arrow- until compressor nut is located on stop.



- The protective cap must make contact all round on the brake caliper -arrows-.



- Press brake caliper piston into brake caliper by hand.
- The outer sealing lip of the protective cap will then lock in the groove on the piston.



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3 Brake servo / brake master cylinder

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

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⇒ "3.1 Exploded view - brake servo / brake master cylinder", page 148

⇒ "3.3 Removing and installing brake servo", page 150

⇒ "3.4 Removing and installing brake master cylinder", page 154

⇒ "3.5 Removing and installing brake fluid reservoir", page 156

⇒ "3.6 Removing and installing brake fluid level warning contact F34", page 158

3.1 Exploded view - brake servo / brake master cylinder

1 - Brake line

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

2 - Brake master cylinder

- ☐ Renew fully if defective
- ☐ ⇒ "3.4 Removing and installing brake master cylinder", page 154

3 - Bolt

- ☐ 25 Nm

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

4 - Nut

- ☐ Renew after removing
- ☐ 49 Nm

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

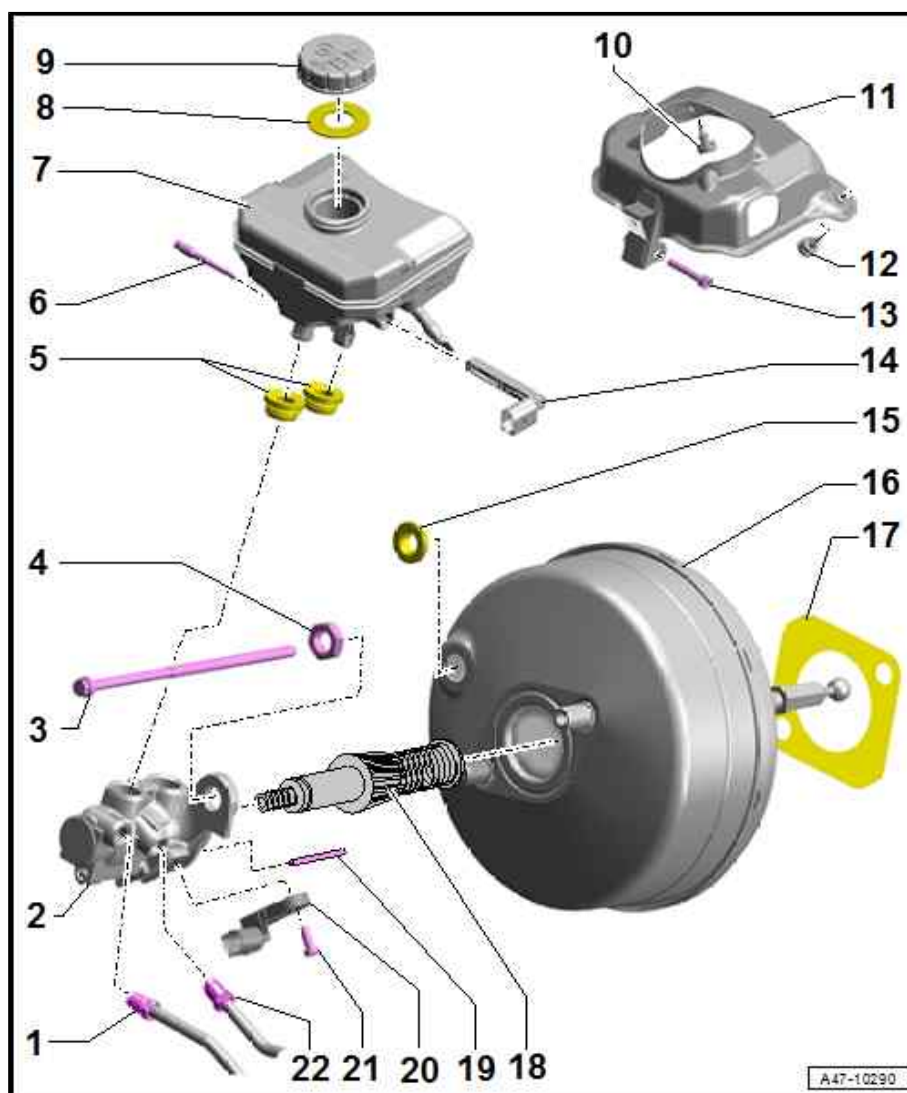
Clean bolts and nuts before reusing.

5 - Sealing plug

- ☐ Moisten with brake fluid when fitting

6 - Locking pin

- ◆ Locking pin must go through lugs on brake fluid reservoir





◆ Locking pin must go through brake master cylinder

◆ Locking pin must be tightened

☐ 8 Nm

7 - Brake fluid reservoir

☐ Filling pressure max. 6 bar

◆ Locking pin must go through lugs on brake fluid reservoir

◆ Locking pin must go through brake master cylinder

◆ Locking pin must be tightened

☐ ⇒ [“3.5 Removing and installing brake fluid reservoir”, page 156](#)

8 - Seal

☐ Renew if damaged

9 - Cap

10 - Rubber buffer

11 - Guard plate

☐ Depending on version

12 - Rubber buffer

13 - Bolt

☐ 8 Nm

14 - Brake fluid level warning contact - F34-

☐ ⇒ [“3.6 Removing and installing brake fluid level warning contact F34”, page 158](#)

15 - Seal

☐ Renew after removing

16 - Brake servo

☐ Functional check:

– Firmly depress brake pedal several times with engine switched off (to vent vacuum in servo unit)

– Then hold brake pedal in applied position employing moderate force and start engine. If the servo unit is working properly, the pedal will give slightly under foot (servo assistance becomes activated).

☐ ⇒ [“3.3 Removing and installing brake servo”, page 150](#)

☐ Adjusting ball head ⇒ [Fig. “Adjusting ball head on brake servo”, page 150](#)

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

17 - Gasket

☐ Renew after removing

18 - Push rod

☐ Push rod is only inserted loosely in brake master cylinder and could fall into the brake servo when being removed.

19 - Activation pin

☐ For brake light switch - F-

☐ The activation pin only activates the brake lights; it does not have any function for the brake system itself.

☐ If the activation pin is missing or damaged, the brake lights will not function.

☐ Must not fall into brake servo when brake master cylinder is being removed or accept any liability

☐ Must always be inserted in hole in brake master cylinder directly at brake light switch IFAG.

☐ Do NOT bend



- ☐ Cannot be renewed separately

⇒ **“3.2 Note on activation pin”, page 150**

20 - Brake light switch - F-

- ☐ ⇒ **“4.3 Removing and installing brake light switch”, page 35**

21 - Bolt

- ☐ Brake light switch must be flush with outer edge of mounting
- ☐ 8 Nm

22 - Brake line

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

Adjusting ball head on brake servo



WARNING

Danger of brakes overheating if length of operating rod is incorrect.

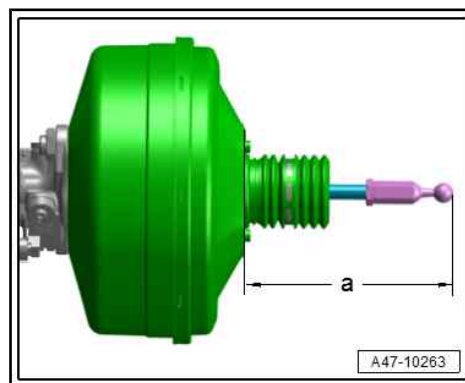
- Before installing brake servo, adjust length of operating rod with ball head to correct dimension.

Left-hand drive vehicles:

- Dimension -a- = 164.7 mm ± 0.5 mm
- The ball head must be set at right angles to the surface of the brake servo when taking the measurement.
- Measure to end of ball head without gasket fitted.

Tightening torques

Component	Nm
Ball head to brake servo	30



3.2 Note on activation pin

The activation pin must always be inserted in the hole on the brake master cylinder directly at the brake pedal position sender - G100-.

The activation pin must not be bent.

If the pin is missing or damaged, the brake lights will not function.

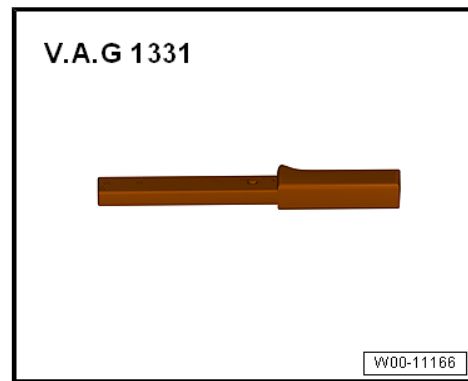
The activation pin cannot be renewed separately.

3.3 Removing and installing brake servo

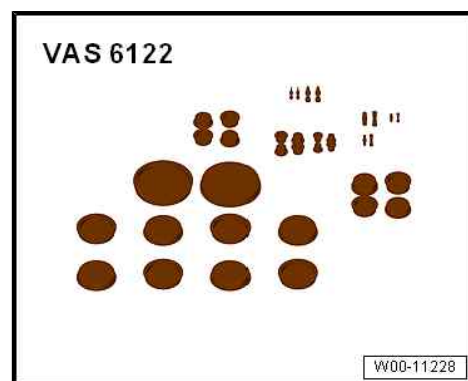
Special tools and workshop equipment required



- ◆ Torque wrench - V.A.G 1331-



- ◆ Engine bung set - VAS 6122-



- ◆ Protective gloves

Removing

- Switch off ignition.
- Release brake servo vacuum by pressing the brake pedal several times.
- Separate brake pedal from brake servo ⇒ [page 130](#) .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .
- Remove brake fluid reservoir ⇒ [page 156](#) .

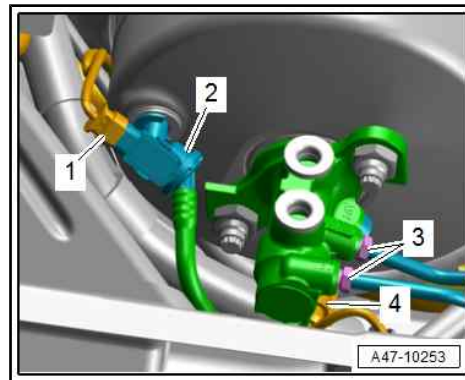


- Unplug electrical connector -1- for vacuum sender - G608- and -4- for brake light switch - F- .
- Remove vacuum sender - G608- -item 2- ➔ [page 171](#) .
- Detach vacuum hose from brake servo, making sure not to damage it.
- To protect against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake servo.

⚠ CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.



- Unscrew union screws -3- for brake lines, detach brake lines from brake master cylinder and press slightly to side.

ⓘ NOTICE

Risk of irreparable damage to brake lines if they are bent.

- Never bend brake lines out of their original shape.

- Seal open connections immediately using clean sealing plugs from engine bung set - VAS 6122-.
- Removing wiper arms ➔ [Electrical system; Rep. gr. 92](#) ; Windscreen wiper system; Removing and installing wiper arms

- Remove bolts -arrows-.
- Hold refrigerant line -1- upwards.
- Carefully pull brake servo with brake master cylinder forwards out of plenum chamber and then swivel it out upwards.
- Make sure that the push rod and the activation pin for the brake lights do not fall into the brake servo.

Installing

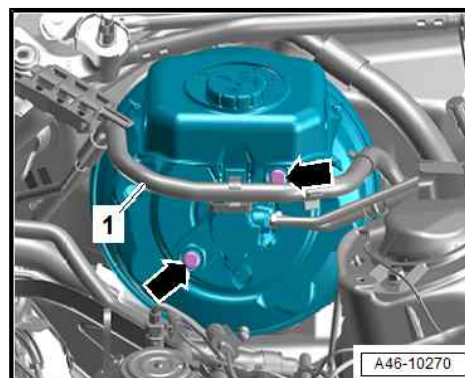
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Installation is carried out in reverse order; note the following:

- Do not move/transport brake servo by operating rod.
- Make sure that the activation pin ➔ [Item 19 \(page 149\)](#) for the brake lights is inserted in the brake master cylinder. If this pin is not present, the brake lights will not function.
- Always renew bolts after removal.
- Before fitting, check vacuum hoses for damage and renew if necessary.



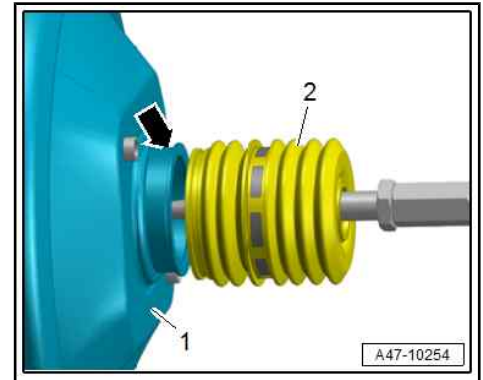


- Check that boot -2- has not slipped out of annular groove -arrow- on brake servo -1- as shown in illustration.
- The boot -2- must be seated securely in the groove -arrow- all the way around
- Carefully insert brake servo with brake master cylinder.

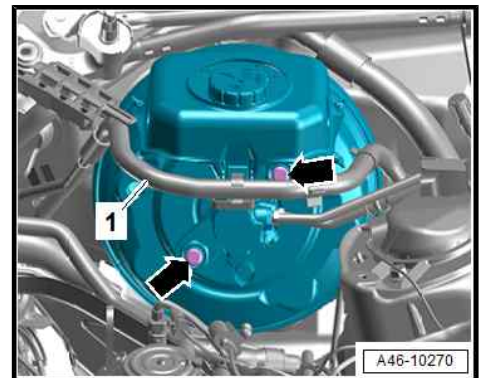
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.



- Tighten bolts -arrows- and tighten to specified torque
⇒ [Item 3 \(page 148\)](#) .

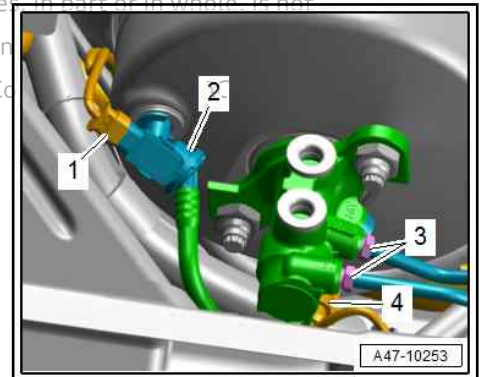


- Push vacuum hose into brake servo.
- Install vacuum sender - G608- -item 2- ⇒ [page 171](#) .
- Slide vacuum hose firmly onto vacuum sender - G608- .
- Make sure the vacuum hose is connected at all connection points.
- Plug in electrical connector -1- for vacuum sender - G608- and -4- for brake light switch - F- .

! NOTICE

Risk of irreparable damage to brake lines if they are bent.

- **Never bend brake lines out of their original shape.**



- Fit brake lines in brake master cylinder by hand.
- Tighten union screws -3- for brake lines to specified torque
⇒ [Item 1 \(page 148\)](#) and ⇒ [Item 22 \(page 150\)](#) .
- Install brake fluid reservoir ⇒ [page 156](#) .
- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .
- Install wiper arms ⇒ Electrical system; Rep. gr. 92 ; Wind-screen wiper system; Removing and installing wiper arms .

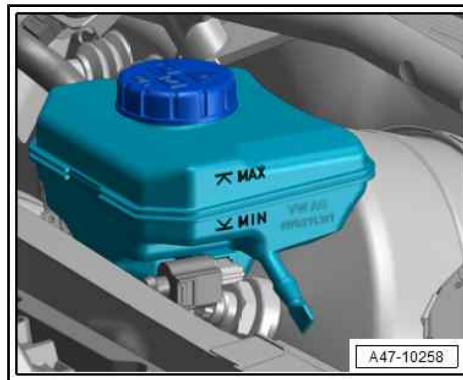


- Fill brake fluid reservoir up to “MIN” mark.
- Connect brake pedal to brake servo ⇒ [page 130](#) .
- Remove all cloths that you have previously placed in the vehicle.
- Bleed brake system ⇒ [page 178](#) .
- Ensure that brake lights are functioning properly.

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.



Tightening torques

- ♦ ⇒ “3.1 Exploded view - brake servo / brake master cylinder”, [page 148](#)

3.4 Removing and installing brake master cylinder

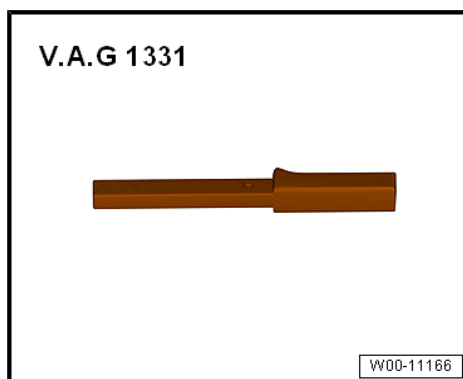
Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

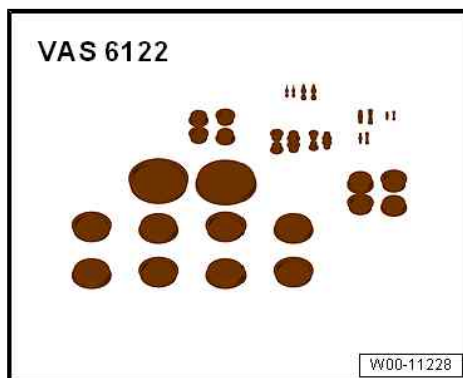
Clean bolts and nuts before reusing.

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1331-



- ♦ Engine bung set - VAS 6122-



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Removing

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- Remove brake fluid reservoir ⇒ [page 156](#) .
- Remove body brace (left-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Removing and installing body brace .

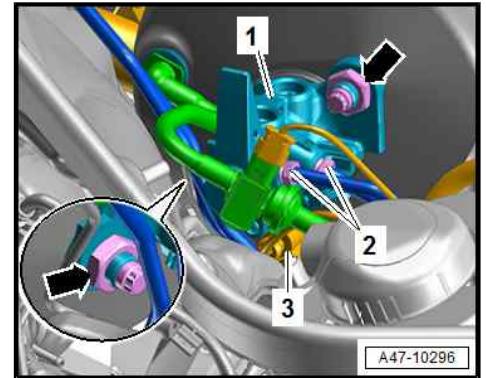


- Unplug electrical connector -3- for brake light switch - F- .
- To protect against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.

! NOTICE

Risk of irreparable damage to brake lines if they are bent.

- **Never bend brake lines out of their original shape.**
- Unscrew union screws -2- for brake lines and detach brake lines from brake master cylinder.
- Seal open connections immediately using clean sealing plugs from engine bung set - VAS 6122- .
- Remove nuts -arrows-.
- It is very important that nothing falls into the brake servo when the brake master cylinder is being removed.
- The activation pin for the brake light switch must not be lost.
- Detach brake master cylinder from brake servo and remove.



Installing

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

Installation is carried out in reverse order; note the following:

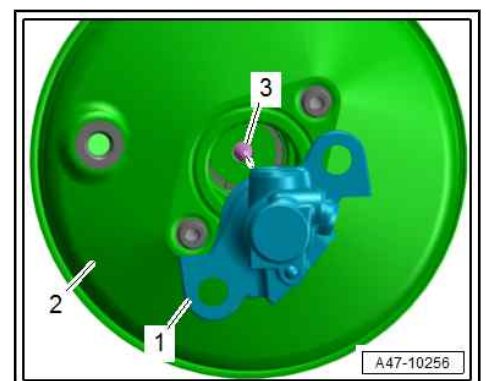
- Renew gasket after removing.
- Brake fluid must not be allowed to enter the brake servo.
- The activation pin ⇒ [Item 19 \(page 149\)](#) for the brake light switch must be inserted in the brake master cylinder.

Always renew self-locking bolts/nuts.

Renew damaged bolts and nuts.

Clean bolts and nuts before reusing.

- When fitting brake master cylinder -1-, make sure that push rod -3- is correctly positioned in brake servo -2-.
- If necessary, have a second mechanic depress brake pedal slightly to facilitate insertion of brake master cylinder in push rod.
- Install body brace ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper links; Removing and installing body brace .
- Install brake fluid reservoir ⇒ [page 156](#) .



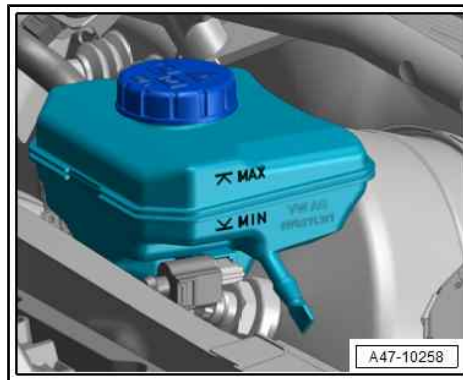


- Fill brake fluid reservoir up to “MIN” mark.
- Remove all cloths that you have previously placed in the vehicle.
- Bleed brake system ➔ [page 178](#) .

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.



Tightening torques

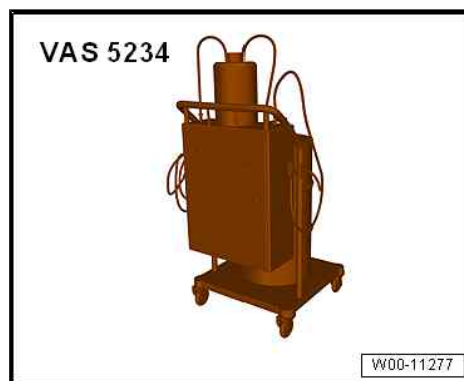
- ♦ ➔ [“3.1 Exploded view - brake servo / brake master cylinder”, page 148](#)

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3.5 Removing and installing brake fluid reservoir

Special tools and workshop equipment required

- ♦ Brake filling and bleeding equipment - VAS 5234- with adapter - VAS 5234/1A-



- ♦ Protective gloves

Removing

- Remove plenum chamber cover ➔ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Place a cloth under the connection to catch escaping brake fluid.



! CAUTION

Risk of injury from escaping brake fluid
Skin can suffer irritation or injuries.

- Put on protective gloves.

- Open brake fluid reservoir.

! CAUTION

Risk of accident due to brake malfunction

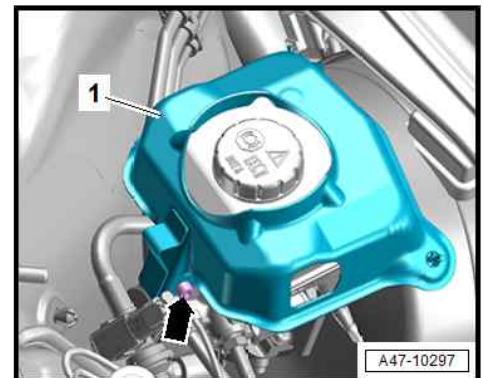
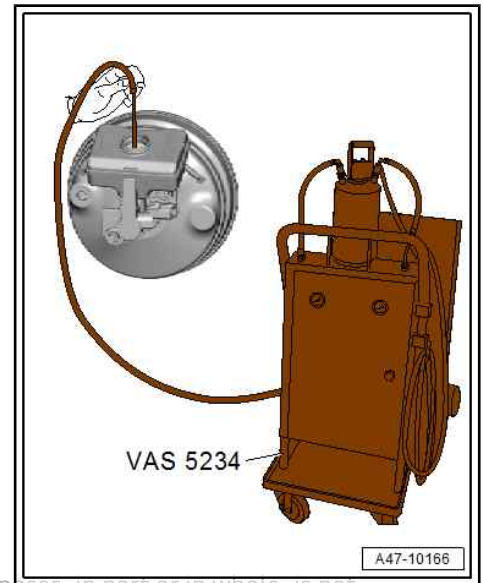
- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.

- Draw off as much brake fluid as possible from brake fluid reservoir using brake filling and bleeding equipment - VAS 5234- with adapter - VAS 5234/1A-

! NOTICE

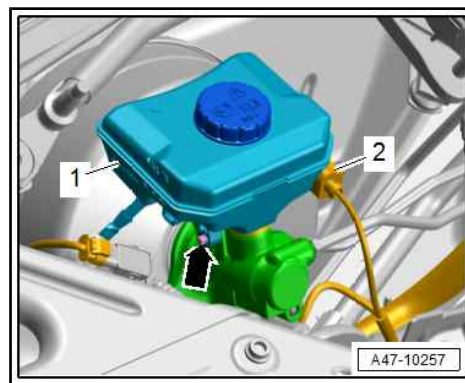
Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- Rinse off brake fluid spillages immediately using plenty of water.
- To protect against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake fluid reservoir.
- Remove bolt -arrow- and detach guard plate -1-.





- Unplug electrical connector -2- from brake fluid level warning contact - F34- .
- To protect against escaping brake fluid, place a sufficient number of lint-free cloths in area beneath brake master cylinder.
- Unscrew locking pin -arrow- for brake fluid reservoir sideways out of brake fluid reservoir and brake master cylinder.
- Pull brake fluid reservoir -1- off sealing plugs and remove reservoir.
- Seal off open lines and connections immediately with plugs from engine bung set - VAS 6122- .

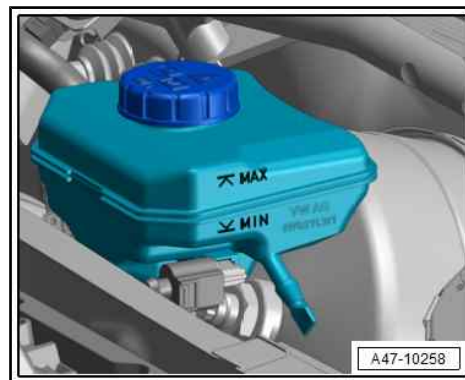


Installing

- Lubricate sealing plugs on brake fluid reservoir with brake fluid.
- Insert brake fluid reservoir in sealing plugs in brake master cylinder.

Remaining installation steps are the reverse of removal; note the following:

- Fill brake fluid reservoir up to "MIN" mark.
- Remove all cloths that you have previously placed in the vehicle.
- Bleed brake system ⇒ [page 178](#) .
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .



CAUTION

Accident risk due to insufficient braking effect

- **Make sure that the brakes work properly before the vehicle is driven on the road.**

- Check brake fluid level and top up if necessary.

Tightening torques

- ◆ ⇒ ["3.1 Exploded view - brake servo / brake master cylinder", page 148](#)

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

Removing

- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .

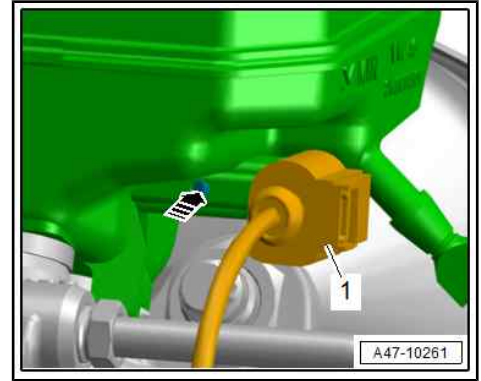


- Unplug electrical connector -1-.
- Release fastener -arrow- and pull brake fluid level warning contact - F34- out of brake fluid reservoir.

Installing

Installation is carried out in reverse order; note the following:

- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .



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4 Vacuum system

⇒ [“4.1 Exploded view - vacuum pump”, page 160](#)

⇒ [“4.2 Checking non-return valve”, page 164](#)

⇒ [“4.3 Removing and installing non-return valve”, page 165](#)

⇒ [“4.4 Removing and installing vacuum pump”, page 167](#)

⇒ [“4.5 Removing and installing brake servo pressure sensor”,
page 171](#)

⇒ [“4.6 Checking vacuum system”, page 171](#)

4.1 Exploded view - vacuum pump

⇒ [“4.1.1 Exploded view - vacuum pump, vehicles with 2.0 ltr. TFSI
engine”, page 160](#)

⇒ [“4.1.3 Exploded view - vacuum pump, vehicles with 2.0 ltr. TDI
evo engine”, page 163](#)

⇒ [“4.1.2 Exploded view - vacuum pump, vehicles with 3.0 ltr. TFSI
engine”, page 162](#)

⇒ [“4.1.4 Exploded view - vacuum pump, vehicles with 3.0 ltr. TDI
engine”, page 164](#)

4.1.1 Exploded view - vacuum pump, vehicles with 2.0 ltr. TFSI engine



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1 - Vacuum pump

- ❑ Removing and installing
⇒ ["4.4.1 Removing and installing vacuum pump - vehicles with 2.0 ltr. TFSI engine"](#),
[page 167](#)

2 - Gasket

- ❑ Renew after removing

3 - Vacuum hose

4 - Bolt

- ❑ 8 Nm +180°
- ❑ Renew after removing

5 - Vacuum line

- ❑ From activated charcoal filter solenoid valve 1 - N80- to activated charcoal filter

6 - Bolt

- ❑ 9 Nm

7 - Bolt

- ❑ 9 Nm

8 - Bolt

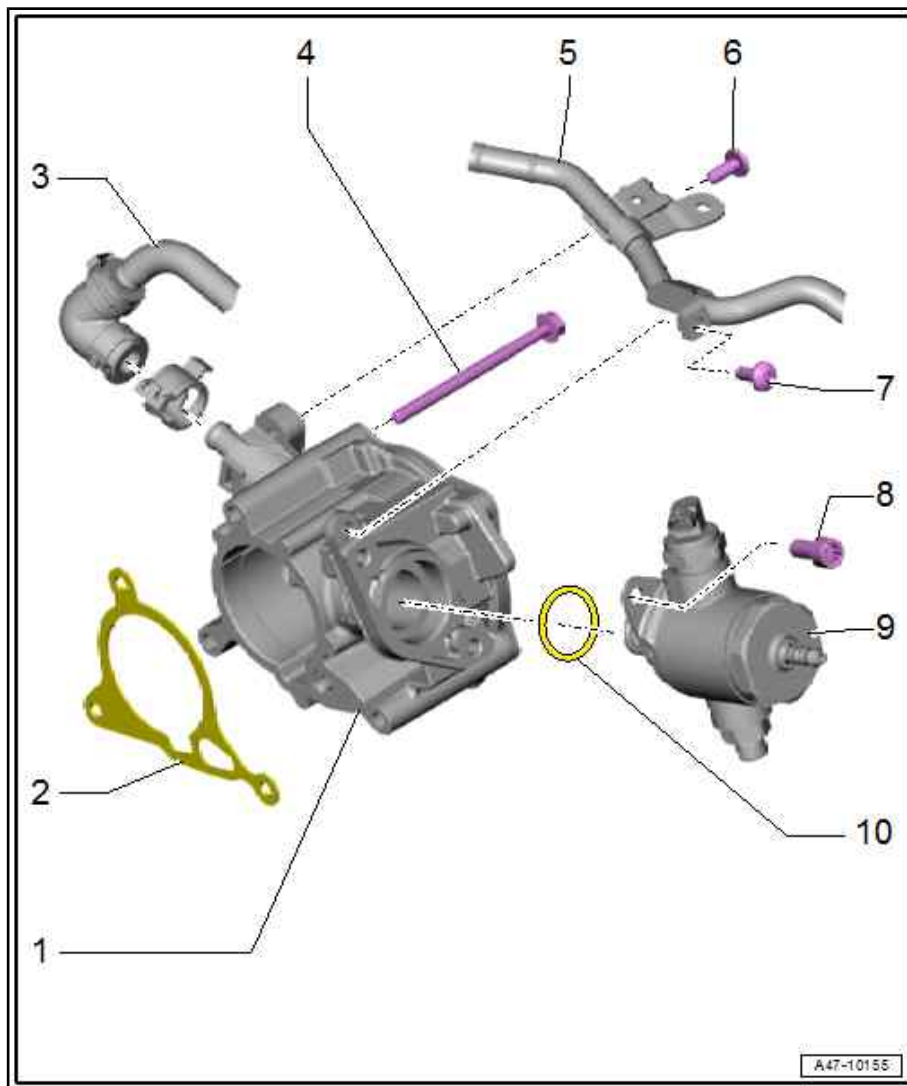
- ❑ Tightening torque ⇒
Rep. gr. 24 ; High-pressure pump; Exploded view - high-pressure pump

9 - High-pressure pump

- ❑ Removing and installing
⇒ Rep. gr. 24 ; High-pressure pump; Removing and installing high-pressure pump

10 - O-ring

- ❑ Renew after removing



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4.1.2 Exploded view - vacuum pump, vehicles with 3.0 ltr. TFSI engine

1 - Vacuum pump

- ❑ ⇒ [“4.4.2 Removing and installing vacuum pump - vehicles with 3.0 ltr. TFSI engine”, page 168](#)

2 - Bolt

- ❑ 9 Nm

3 - Seal

4 - Vacuum sender - G608-

- ❑ ⇒ [“4.5 Removing and installing brake servo pressure sensor”, page 171](#)

5 - O-ring

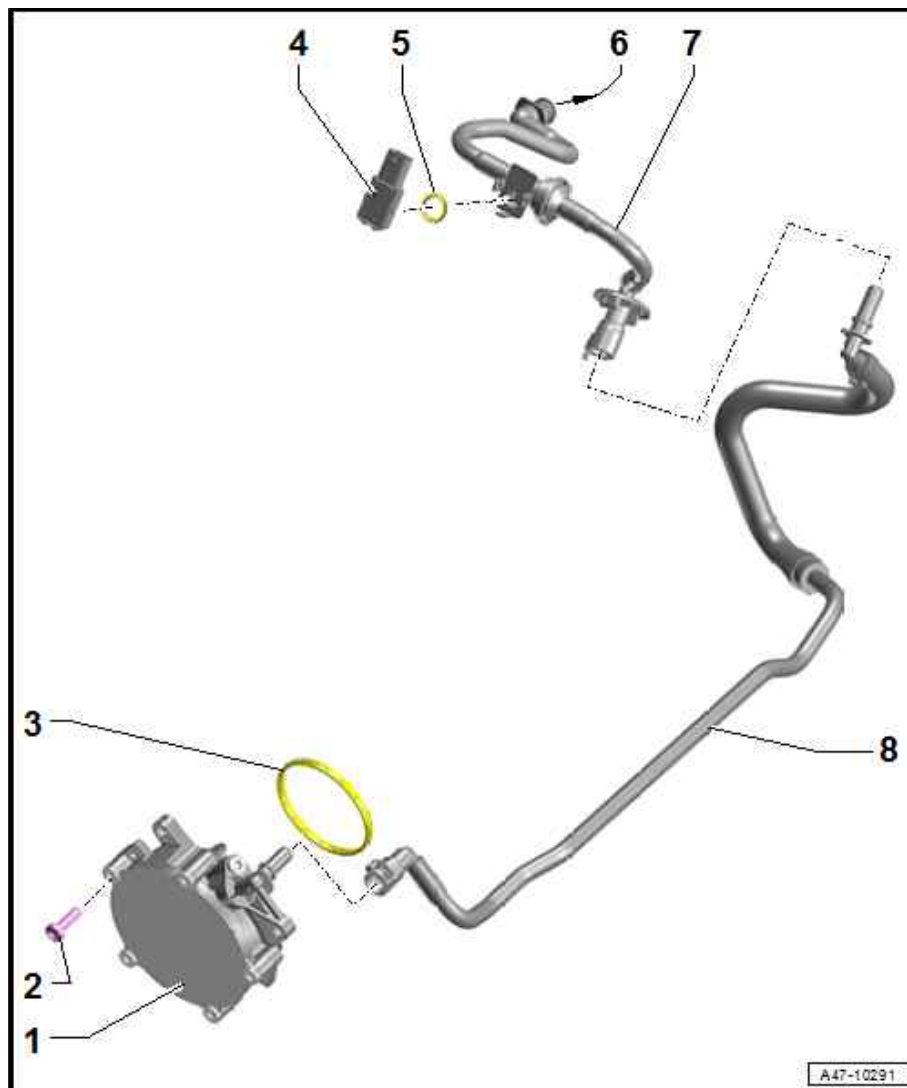
- ❑ Cannot be renewed separately
- ❑ If damaged, renew vacuum sender - G608-

6 - To brake servo

7 - Vacuum line

- ❑ With integrated non-return valve (cannot be renewed separately)
- ❑ ⇒ [“4.2 Checking non-return valve”, page 164](#)
- ❑ ⇒ [“4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber”, page 165](#)

8 - Vacuum line

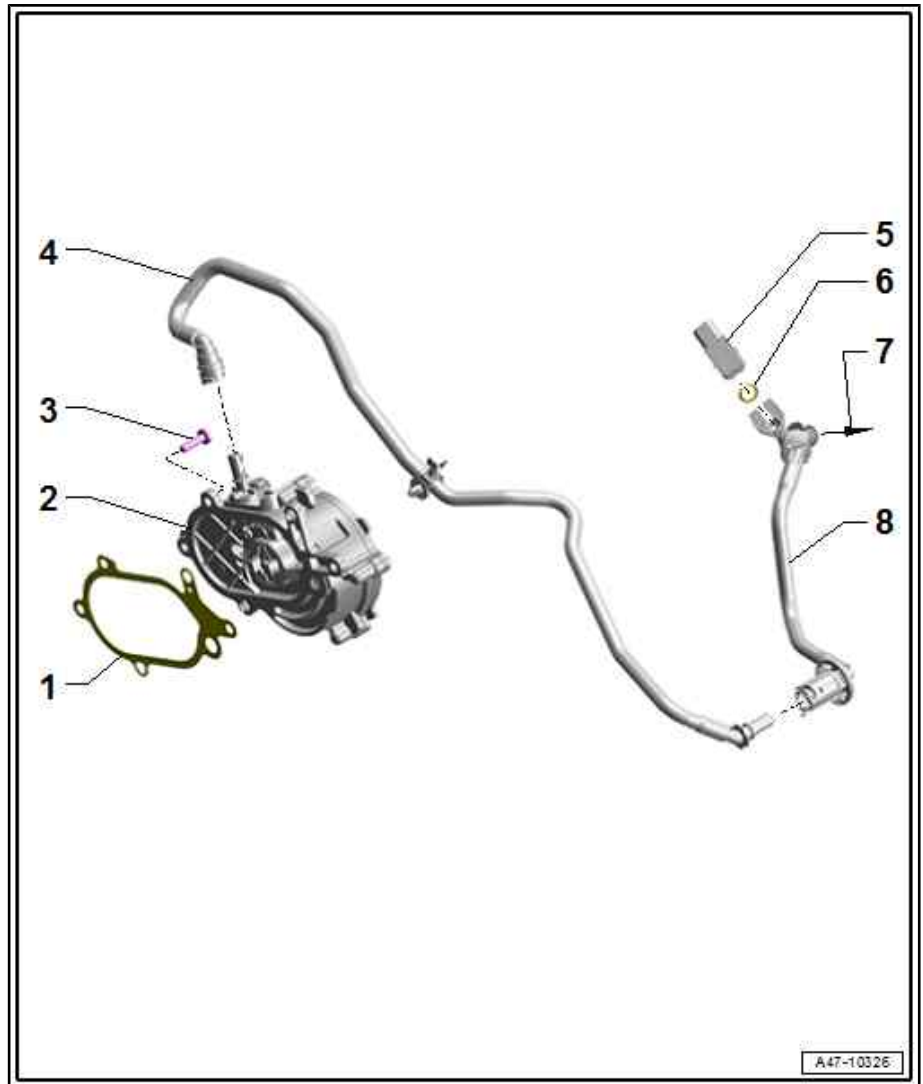


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4.1.3 Exploded view - vacuum pump, vehicles with 2.0 ltr. TDI evo engine

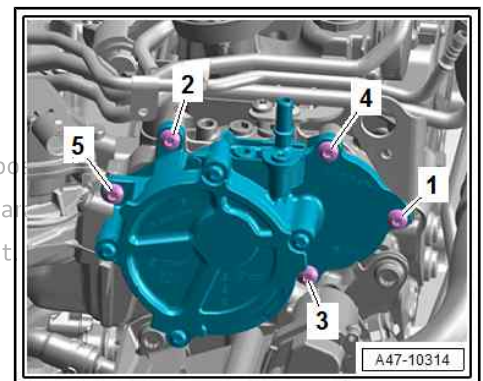
- 1 - Gasket
- 2 - Vacuum pump
 - ❑ ⇒ ["4.4.3 Removing and installing vacuum pump - vehicles with 2.0 ltr. TDI evo engine", page 169](#)
- 3 - Bolt
 - ❑ Tightening torque and tightening sequence
⇒ [page 163](#)
- 4 - Vacuum line
 - ❑ With integrated non-return valve (cannot be renewed separately)
 - ❑ ⇒ ["4.2 Checking non-return valve", page 164](#)
 - ❑ ⇒ ["4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber", page 165](#)
- 5 - Vacuum sender - G608-
 - ❑ ⇒ ["4.5 Removing and installing brake servo pressure sensor", page 171](#)
- 6 - O-ring
 - ❑ Cannot be renewed separately
 - ❑ If damaged, renew vacuum sender - G608-
- 7 - To brake servo
- 8 - Vacuum line
 - ❑ Insert until it engages audibly



Vacuum pump - tightening torque and sequence

– Tighten bolts -1 ... 5- in stages in the sequence shown:

Stage	Tightening torque
1.	Screw in by hand until contact is made
2.	8 Nm





4.1.4 Exploded view - vacuum pump, vehicles with 3.0 ltr. TDI engine

1 - Vacuum pump

- ☐ Integrated in oil pump
⇒ [Item 12 \(page 164\)](#)

2 - Seal

- ☐ Renew after removing

3 - Vacuum line

4 - Bolt

- ☐ 9 Nm

5 - Vacuum sender - G608-

- ☐ ⇒ ["4.5 Removing and installing brake servo pressure sensor"](#), [page 171](#)

6 - O-ring

- ☐ Cannot be renewed separately
- ☐ If damaged, renew vacuum sender - G608-

7 - To brake servo

8 - Vacuum line

- ☐ With integrated non-return valve (cannot be renewed separately)
- ☐ ⇒ ["4.2 Checking non-return valve"](#), [page 164](#)
- ☐ ⇒ ["4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber"](#), [page 165](#)

9 - Vacuum line

10 - Vacuum line

- ☐ With integrated non-return valve (cannot be renewed separately)
- ☐ ⇒ ["4.2 Checking non-return valve"](#), [page 164](#)
- ☐ ⇒ ["4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber"](#), [page 165](#)

11 - Seal

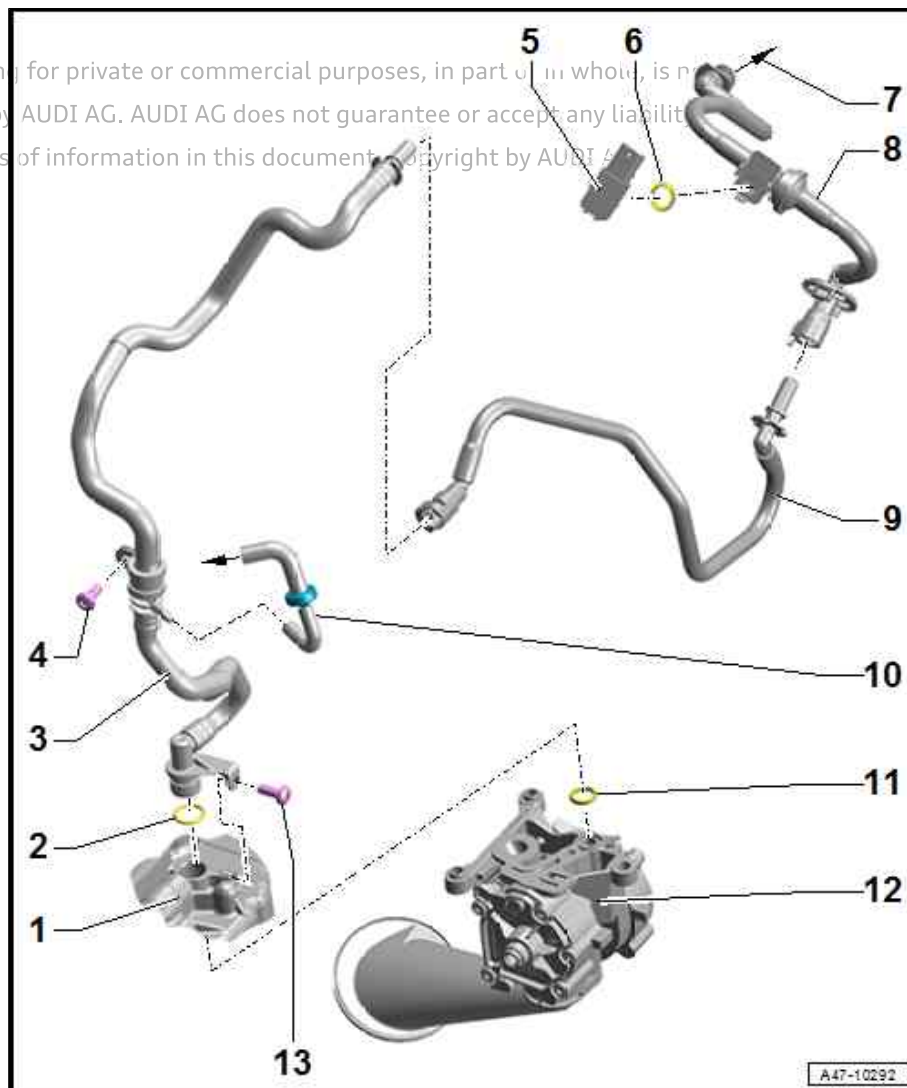
- ☐ Renew after removing

12 - Oil pump with vacuum pump

- ☐ Removing and installing ⇒ Engine; Rep. gr. 17 ; Sump/oil pump; Removing and installing oil pump

13 - Bolt

- ☐ 9 Nm



4.2 Checking non-return valve

- Remove non-return valve ⇒ [page 165](#) .
- Air must pass through valve in direction of vacuum pump.
- Valve must remain closed in direction of brake servo.
- Install non-return valve ⇒ [page 165](#) .



- Pay attention to direction of flow: the arrow symbol points towards the vacuum pump.

4.3 Removing and installing non-return valve

⇒ [“4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber”, page 165](#)

⇒ [“4.3.2 Removing and installing non-return valve with vacuum line in engine compartment - vehicles with 3.0 ltr. TFSI engine”, page 165](#)

4.3.1 Removing and installing non-return valve with vacuum line in plenum chamber

The non-return valve is integrated into the vacuum line and cannot be renewed separately.

Removing

- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Release fastener -arrow- and detach vacuum hose -1-.



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- Unplug electrical connector -2- for vacuum sender - G608 - in this document.
- Release fasteners and carefully pull vacuum line -3- off plenum chamber partition panel -4-.
- Carefully detach vacuum line -3- from brake servo -1-.

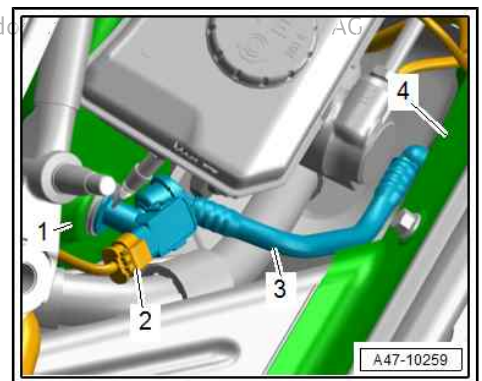
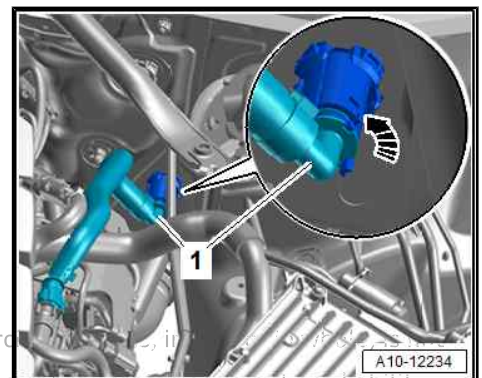
Installing

Installation is carried out in reverse order; note the following:

Note:

To facilitate installation, moisten the vacuum line with water, but not with oil.

- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .



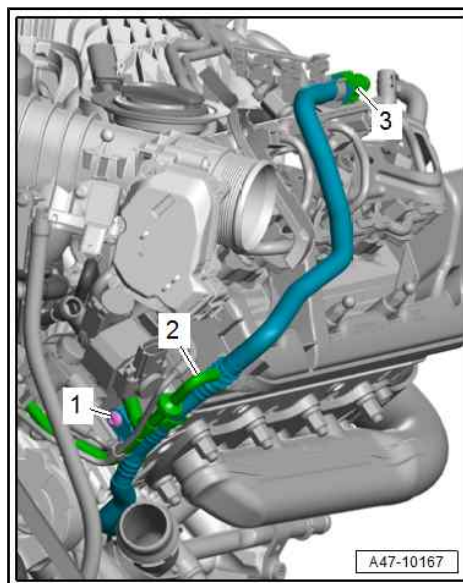
4.3.2 Removing and installing non-return valve with vacuum line in engine compartment - vehicles with 3.0 ltr. TFSI engine

The non-return valve is integrated into the vacuum line and cannot be renewed separately.



Removing

- Remove air cleaner housing ⇒ Engine; Rep. gr. 24 ; Air cleaner; Removing and installing air cleaner housing .
- Remove bracket for air conditioner compressor ⇒ Engine; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries .
- Detach vacuum line -2-.
- Remove bolt -1-.
- If fitted, disconnect vacuum line -3-; to do so, press release tabs on both sides.



- Remove bolt -2- and detach vacuum line -1- with non-return valve.

Installing

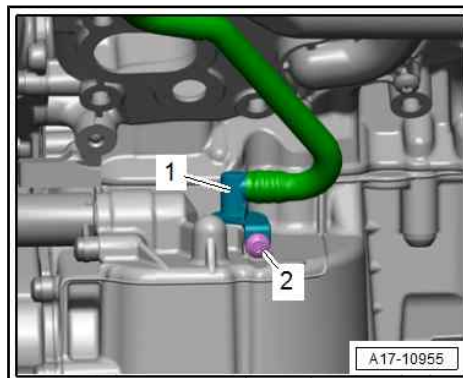
Installation is carried out in reverse order; note the following:

- Renew O-rings after removing.

Note:

To facilitate installation, moisten the vacuum line with water, but not with oil.

- Install bracket for air conditioner compressor ⇒ Engine; Rep. gr. 13 ; Cylinder block (pulley end); Removing and installing bracket for ancillaries .
- Install air cleaner housing ⇒ Engine; Rep. gr. 24 ; Air cleaner; Removing and installing air cleaner housing .



Tightening torques

- ♦ ⇒ ["4.1.2 Exploded view - vacuum pump, vehicles with 3.0 ltr. TFSI engine", page 162](#)



4.4 Removing and installing vacuum pump

⇒ ["4.4.1 Removing and installing vacuum pump - vehicles with 2.0 ltr. TFSI engine", page 167](#)

⇒ ["4.4.2 Removing and installing vacuum pump - vehicles with 3.0 ltr. TFSI engine", page 168](#)

⇒ ["4.4.3 Removing and installing vacuum pump - vehicles with 2.0 ltr. TDI evo engine", page 169](#)

⇒ ["4.4.4 Removing and installing vacuum pump - vehicles with 3.0 ltr. TDI engine", page 170](#)

4.4.1 Removing and installing vacuum pump - vehicles with 2.0 ltr. TFSI engine

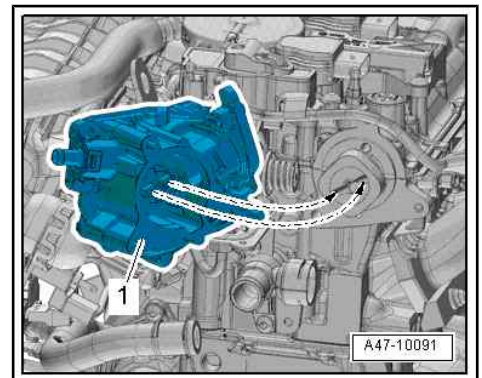
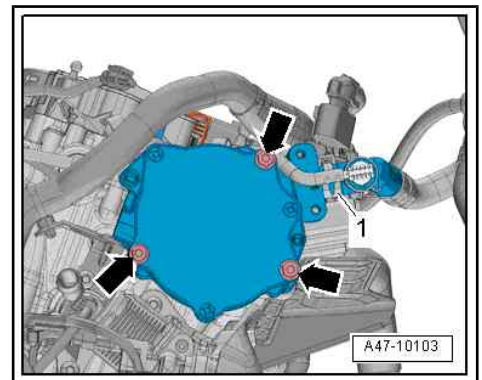
Removing

- Remove high-pressure pump ⇒ Rep. gr. 24 ; High-pressure pump; Removing and installing high-pressure pump .
- Release hose clip -1- and detach vacuum hose, taking care not to damage it.
- Remove bolts -arrows-.
- Pull vacuum pump out of its mounting and detach.

Installing

Installation is carried out in reverse order; note the following:

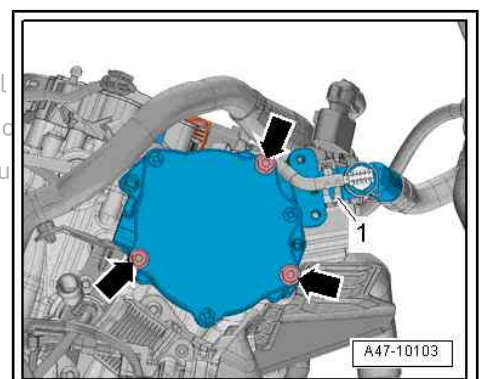
- Renew gasket after removing.
- Before fitting, check vacuum lines for damage and renew if necessary.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .
- Turn drive lugs of vacuum pump -1- so they engage in slot in camshaft when vacuum pump is installed -arrows-.



- Fit vacuum hose with hose clip -1- connected.
- Tighten bolts -arrows-.
- Install high-pressure pump ⇒ Rep. gr. 24 ; High-pressure pump; Removing and installing high-pressure pump .

Tightening torques

- ◆ ⇒ ["4.1.1 Exploded view - vacuum pump, vehicles with 2.0 ltr. TFSI engine", page 160](#)





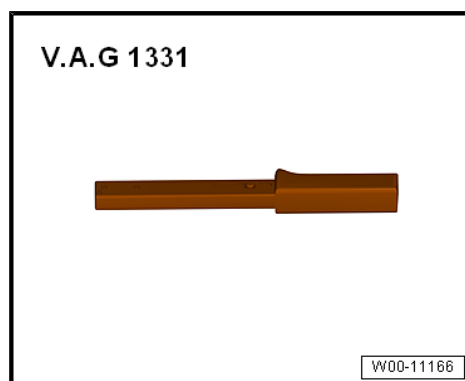
4.4.2 Removing and installing vacuum pump - vehicles with 3.0 ltr. TFSI engine

Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1275 A-



- ◆ Torque wrench - V.A.G 1331-



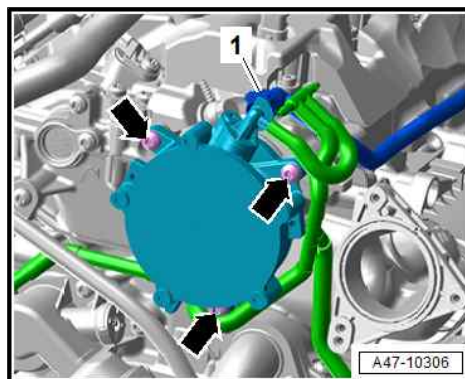
Removing

- Remove air pipe (bottom) ⇒ Engine; Rep. gr. 21 ; Charge air system; Removing and installing air pipe .
- Release hose clip -1- and detach vacuum line, taking care not to damage it.
- Remove bolts -arrows- and detach vacuum pump.

Installing

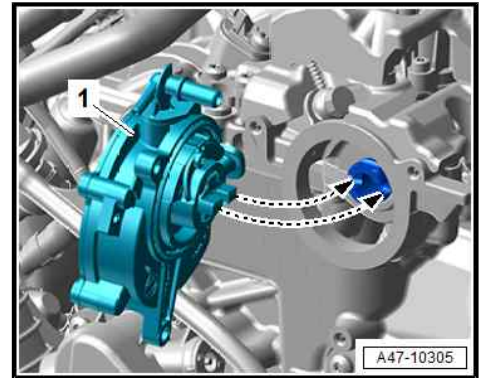
Installation is carried out in reverse order; note the following:

- Renew gasket after removing.
- Before fitting, check vacuum lines for damage and renew if necessary.
- Secure all hose connections with correct type of hose clips (as original equipment) ⇒ Electronic parts catalogue .





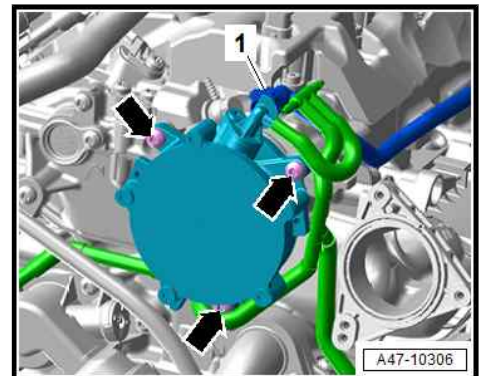
- Set drive lugs of vacuum pump -1- so they engage in symmetrical slot in camshaft when vacuum pump is installed -arrows-.



- Fit vacuum line with hose clip -1- connected.
- Install air pipe (bottom) ⇒ Engine; Rep. gr. 21 ; Charge air system; Removing and installing air pipe .

Tightening torques

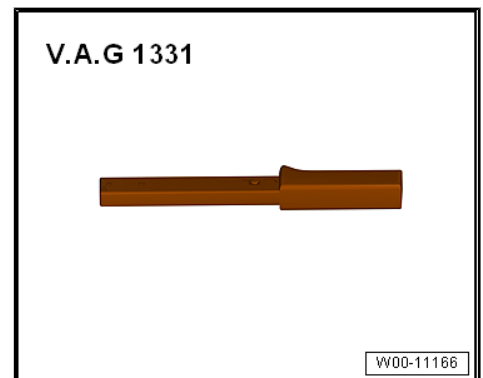
- ◆ ⇒ [“4.1.2 Exploded view - vacuum pump, vehicles with 3.0 ltr. TFSI engine”, page 162](#)



4.4.3 Removing and installing vacuum pump - vehicles with 2.0 ltr. TDI evo engine

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



Removing

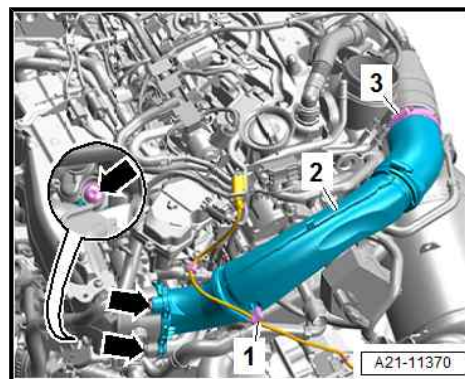
- Remove engine cover panel ⇒ Engine; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .
- Remove plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .



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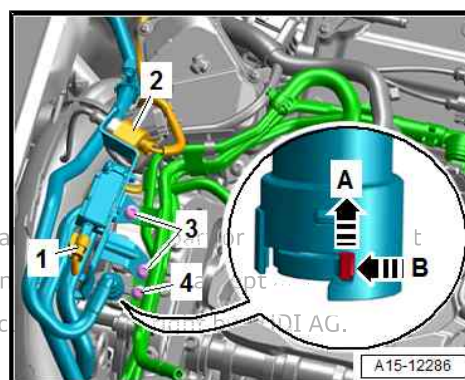
- Move electrical wiring clear at clip -1-.
- Remove bolts -arrows-.
- Release screw-type clip -3- and detach air pipe.



- Unplug electrical connector -1- for exhaust gas pressure sensor 1 - G450- .
- Take electrical connector -2- for exhaust gas temperature sender 3 - G495- / exhaust gas temperature sender 4 - G648- out of bracket.

Note:

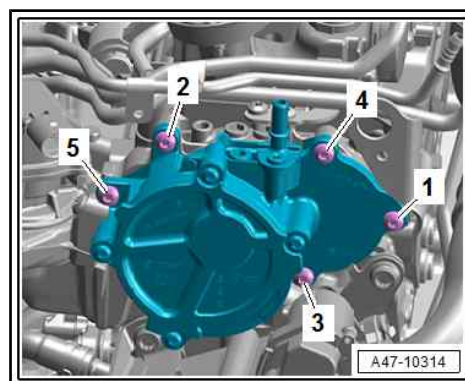
- ◆ Take care not to damage the vacuum hose.
- ◆ Damaged vacuum hoses must be renewed.
- Unlock -arrow A- and release -arrow B- fastener, and detach vacuum hose.
- Remove bolts -3- and press bracket to one side.
- Remove bolts -1 ... 5- and detach vacuum pump.



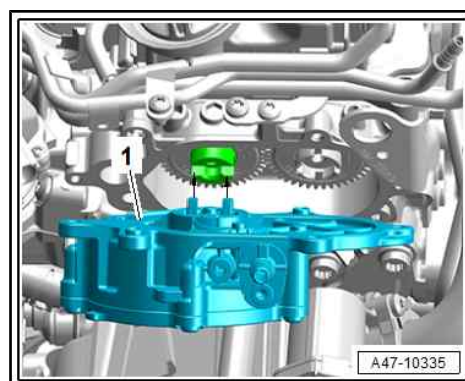
Installing

Installation is carried out in reverse order; note the following:

- Renew gasket after removing.
- Before fitting, check vacuum lines for damage and renew if necessary.



- Set drive lugs of vacuum pump -1- so they engage in symmetrical slot in camshaft when vacuum pump is installed -arrows-.
- Install air pipe ⇒ Engine; Rep. gr. 21 ; Charge air system; Exploded view - charge air system .
- Install plenum chamber partition panel ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber partition panel .
- Install engine cover panel ⇒ Engine; Rep. gr. 10 ; Engine cover panel; Removing and installing engine cover panel .



4.4.4 Removing and installing vacuum pump - vehicles with 3.0 ltr. TDI engine

The vacuum pump and oil pump are combined as a single unit.

Removing and installing ⇒ Engine; Rep. gr. 17 ; Sump/oil pump;
Removing and installing oil pump



4.5 Removing and installing brake servo pressure sensor

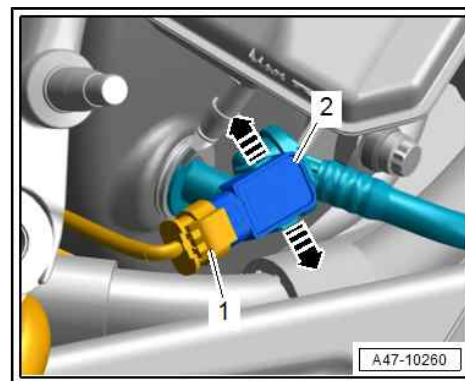
Removing

- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .
- Unplug electrical connector -1-.
- Release fasteners -arrows- and carefully detach vacuum sender - G608- -item 2-.

Installing

Installation is carried out in reverse order; note the following:

- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover .



4.6 Checking vacuum system

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⇒ ["4.6.1 Test and test requirements", page 171](#)

⇒ ["4.6.2 Connecting brake servo tester", page 172](#)

⇒ ["4.6.3 Checking vacuum generation", page 172](#)

⇒ ["4.6.4 Checking for leaks", page 173](#)

⇒ ["4.6.5 Generating vacuum with hand vacuum pump", page 174](#)

4.6.1 Test and test requirements

The following instructions are intended to help the causes of faults to be traced quickly and effectively in the event of problems involving the brake servo or in the event of a »hard brake pedal«.

This check relates to the following components:

- ◆ Brake servo
- ◆ Seal between brake master cylinder and brake servo.
- ◆ Non-return valve
- ◆ Vacuum lines with plug-in connectors
- ◆ Vacuum pump (if fitted)

Note:

When evaluating the measurements, bear in mind that they will be influenced by your geographical location. The higher your location is above sea level, the lower the air pressure will be.

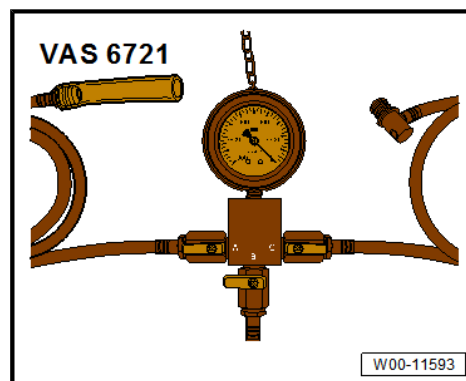
Note the test requirements:

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

Special tools and workshop equipment required



◆ Brake servo tester - VAS 6721-



4.6.2 Connecting brake servo tester

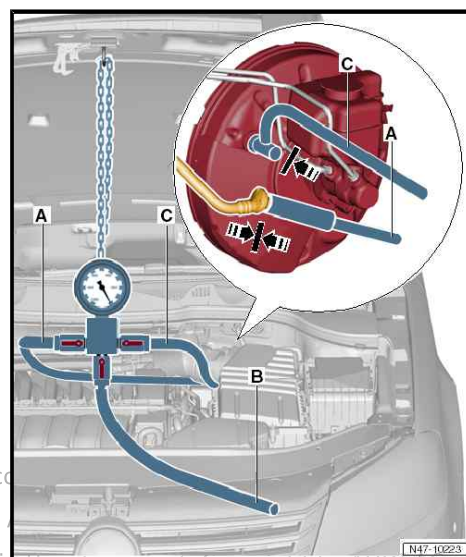
- Pull vacuum hose out of brake servo.

Note:

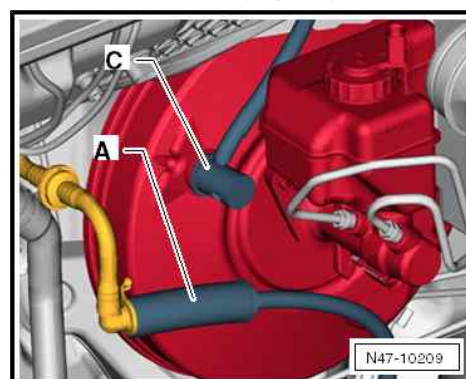
First press the brake pedal several times in order to facilitate removal of the vacuum hose.

- Connect brake servo tester - VAS 6721- .

Item	Component	Explanation
A	Shut-off valve	To vacuum hose, non-return valve and (if fitted) vacuum pump
B	Shut-off valve	◆ Open to facilitate removal of brake servo tester - VAS 6721- ◆ Open to simulate a fault ◆ Connection for hand vacuum pump - VAS 6213-
C	Shut-off valve	To brake servo



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



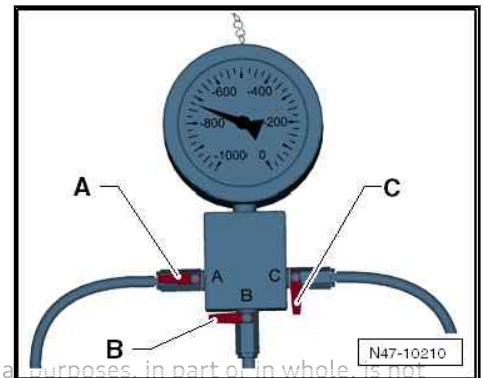
4.6.3 Checking vacuum generation

Note:

- ◆ The mean atmospheric pressure at sea level is 1013 mbar and decreases rapidly with increasing altitude (approx. 100 mbar per 1,000 m of altitude). Fluctuations at different locations and times also influence vacuum generation.

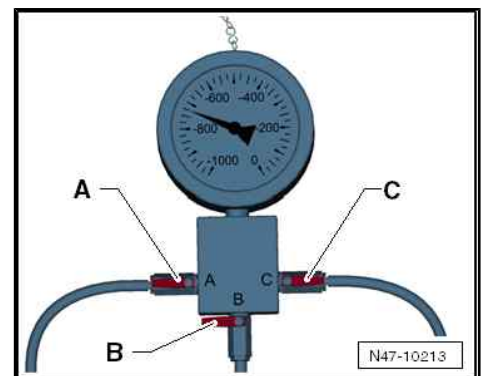
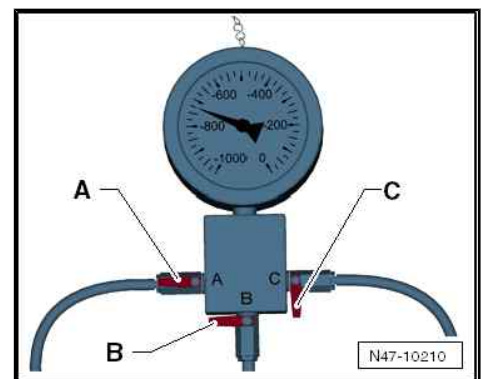


- ◆ A cold engine, an active air-conditioning system as well as engine idling have an adverse influence on vacuum generation.
- Connect brake servo tester - VAS 6721- ➤ [page 172](#) .
- Open shut-off valve -A-.
- Close shut-off valves -B and C-.
- Start warm engine ($>60^{\circ}\text{C}$), press accelerator briefly (engine speed greater than 2000/min).
- Read indicated value.
- Under normal conditions (see notes), the generated vacuum should be between 600 and 950 mbar (depending on engine version).
- If the specified value is not obtained even though the test conditions (see notes) have been met, the vacuum system must first be checked for leaks.
- For comparison purposes, generate the vacuum with the hand vacuum pump - VAS 6213- ➤ [page 174](#) .
- Open shut-off valve -B- to facilitate removal of hose connections and adapter.



4.6.4 Checking for leaks

- Connect brake servo tester - VAS 6721- ➤ [page 172](#) .
- Open shut-off valve -A-.
- Close shut-off valves -B and C-.
- Start warm engine ($>60^{\circ}\text{C}$), press accelerator briefly (engine speed greater than 2000/min).
- Under normal conditions (see notes), the generated vacuum should be between 600 and 950 mbar (depending on engine version).
- 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.



Note:

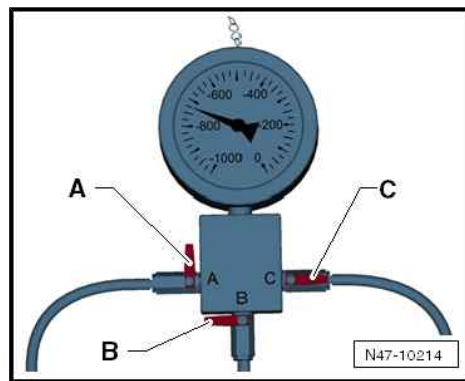
If there are major leaks, the vacuum will decrease rapidly within a few seconds.

- If there is a large drop in vacuum, trace the leak as follows:



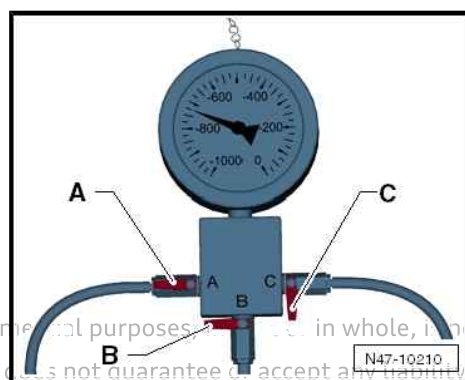
A - Vacuum check in vicinity of brake servo

- After building up vacuum, close shut-off valve -A- in order to check brake servo vacuum system.



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

- After building up vacuum, close shut-off valve -C- in order to check vacuum system from brake servo tester - VAS 6721- to intake manifold or vacuum pump.
- Open shut-off valve -B- to facilitate removal of hose connections and adapter.

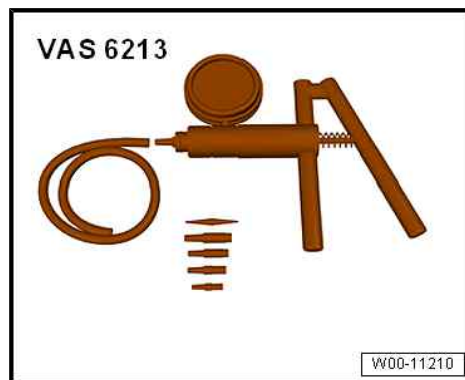


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4.6.5 Generating vacuum with hand vacuum pump

Special tools and workshop equipment required

- ♦ Hand vacuum pump - VAS 6213-

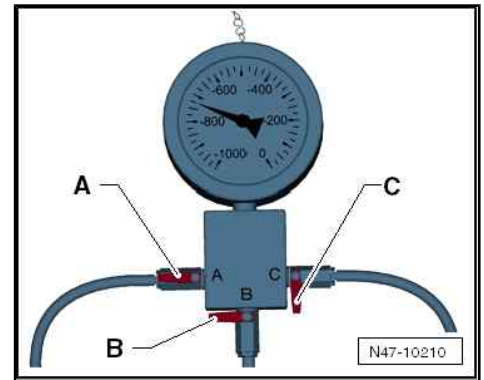


Procedure

Instead of vacuum generation using the engine or vacuum pump, vacuum can also be generated by means of the hand 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 brake servo tester - VAS 6721- indicates between 600 and 950 mbar.
- Then carry out the corresponding checks.



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5 Brake lines

Replacement brake hoses and brake lines are supplied as spare parts ready to be installed.

Secure brake hoses and brake lines to the original mounting points when installing.



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6 Hydraulic system

⇒ [“6.1 General notes on brake fluid”, page 177](#)

⇒ [“6.2 Bleeding hydraulic system”, page 178](#)

⇒ [“6.3 Leak test”, page 184](#)

6.1 General notes on brake fluid

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

WARNING

Accident risk if the water content in the brake fluid is too high. Brake fluid is hygroscopic, i.e. it absorbs moisture from the surrounding air.

Vapour bubbles in brake fluid - risk of brake failure

- Keep brake fluid in sealed airtight containers.
- Immediately seal open brake hoses and lines.

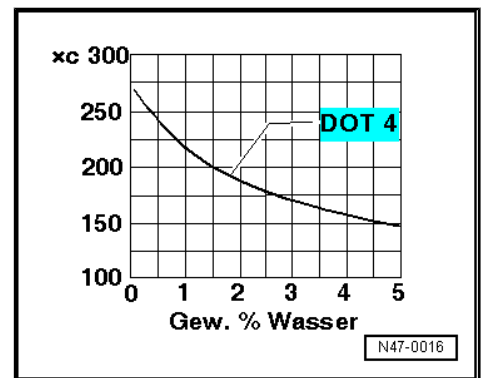
The boiling point decreases as the water content increases, which means a considerable rise in brake fluid temperature can lead to formation of vapour bubbles and brake failure.

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 change in colour is caused by chemical reactions.

CAUTION

Risk of accident due to brake malfunction

- Brake fluid must NOT come into contact with fluids containing mineral oils (oil, petrol, cleaning agents).
- Do NOT wear gloves contaminated with oil or grease.



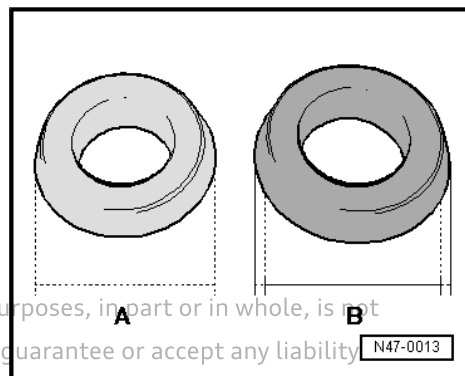
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Even minute quantities of mineral oil coming into contact with a seal or sleeve will affect the component and could impair brake operation. The consequences of a contaminated brake system only become apparent months later, and then give rise to greater expenses, particularly in vehicles equipped with ABS.

A - Sleeve (original size)

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



⚠ CAUTION

Fluid is toxic - health risk!

– **Brake fluid must NOT be drawn off using your mouth.**

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.
- ◆ Brake fluid containers should be kept completely separate from oils (including hydraulic fluid) and cleaning agents to prevent any mixture of fluids or even filling of the brake system with an incorrect fluid.

⚠ CAUTION

Risk of injury from escaping brake fluid

Skin can suffer irritation or injuries.

– **Put on protective gloves.**

- Seal off open brake hoses and lines with plugs from engine bung set - VAS 6122- .
- Always keep brake fluid in sealed airtight containers.

! NOTICE

Escaping brake fluid can cause the vehicle to become dirty and may damage the paintwork.

- **Rinse off brake fluid spillages immediately using plenty of water.**
- Use only new brake fluid.
- Always observe the relevant environmental regulations for disposal.

6.2 Bleeding hydraulic system

⇒ **"6.2.1 Bleeding hydraulic system with brake filling and bleeding equipment", page 178**

⇒ **"6.2.2 Bleeding hydraulic system without brake filling and bleeding equipment", page 181**

6.2.1 Bleeding hydraulic system with brake filling and bleeding equipment

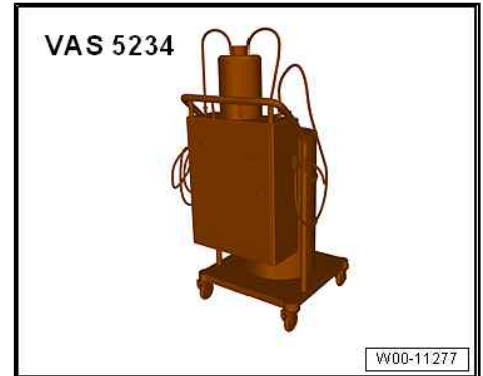
- ◆ The brake system on this vehicle has a front/rear split.
- ◆ Front axle (left and right)
- ◆ Rear axle (left and right)



- ◆ Bleeding of the hydraulic system is described using brake filling and bleeding equipment - VAS 5234- .
- ◆ A pressure of 2 bar is required to bleed the ABS hydraulic unit - N55- .

Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment - VAS 5234- with adapter - VAS 5234/1A-



- ◆ Tool set for brake bleeding - VAS 6564-



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Procedure

- Wheels removed ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

Note:

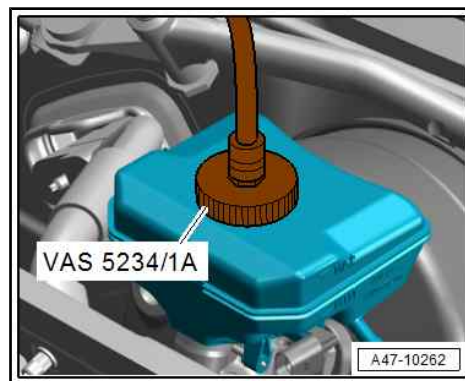
Make sure brake fluid reservoir is always full (but not above the "MAX" mark).

- Fill brake fluid reservoir up to "MAX" mark.





- Connect brake filling and bleeding equipment - VAS 5234- .
- Screw adapter - VAS 5234/1A- onto brake fluid reservoir.
- Set correct pressure on -VAS 5234- → operating instructions for -VAS 5234- .



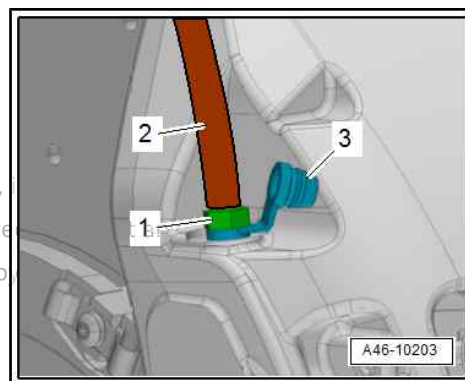
- Detach protective cap -3- from bleeder screw -1- on brake caliper.
- Connect hose -2- of bleeder bottle.

Note:

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

Each front brake caliper has two bleeder screws.

Bleed brake caliper at each bleeder screw.



Bleeding sequence

- 1 - Outer brake caliper (front left) - not steel version brakes 1LA/1LB
 - 2 - Inner brake caliper (front left)
 - 3 - Outer brake caliper (front right) - not steel version brakes 1LA/1LB
 - 4 - Inner brake caliper (front right)
 - 5 - Rear left brake caliper
 - 6 - Rear right brake caliper
- With bleeder hose attached, leave bleeder screw open until the brake fluid which emerges is clear and free of bubbles.
 - Press brake pedal 5 times to assist bleeding process.
 - Tighten bleeder screw, detach bleeder hose and fit dust cap on bleeder screw.
 - Repeat bleeding procedure in stated sequence at other brake calipers.

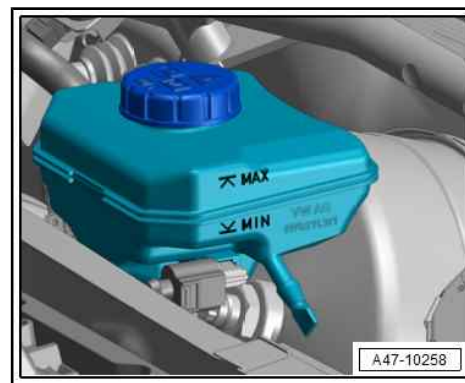


- Fill brake fluid reservoir up to “MAX” mark (depending on degree of pad wear) and screw on filler cap.
- To prevent brake fluid from overflowing from the reservoir, the brake fluid level must not be above the “MAX” mark.
- Start engine and check brake pedal travel and brake pedal pressure.
- In the event of excessive pedal travel, check brake system for leaks and/or repeat bleeding procedure.
- Perform road test after completion of bleeding. At least one ABS control operation must be applied at all four wheels.

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.



Changing brake fluid ⇒ Maintenance ; Booklet 830 ; Maintenance work; Changing brake fluid

Tightening torques

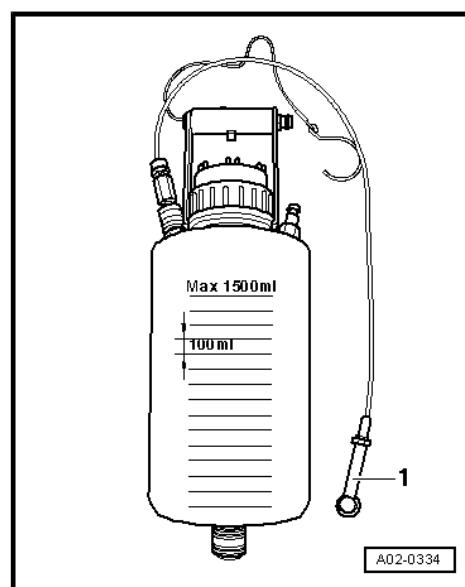
- ◆ ⇒ [“1.1 Exploded view - front brakes”, page 38](#)
- ◆ ⇒ [“2.1 Exploded view - rear brakes”, page 105](#)

6.2.2 Bleeding hydraulic system without brake filling and bleeding equipment

- ◆ The brake system on this vehicle has a front/rear split.
- ◆ Front axle (left and right)
- ◆ Rear axle (left and right)

Special tools and workshop equipment required

- ◆ Reservoir -1-



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- ◆ Tool set for brake bleeding - VAS 6564-



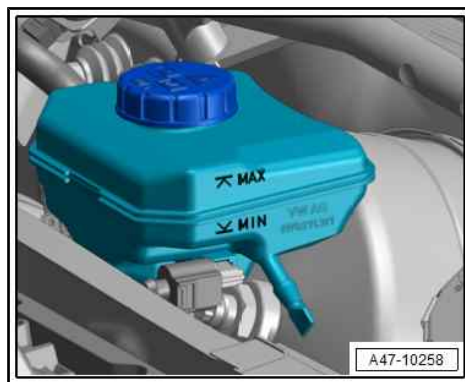
Procedure

- Wheels removed ➔ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres .

Note:

Make sure brake fluid reservoir is always full.

- Fill brake fluid reservoir up to “MAX” mark.





- Detach protective cap -3- from bleeder screw -1- on brake caliper.
- Connect hose -2- of bleeder bottle.

Note:

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

Each front brake caliper has two bleeder screws.

Bleed brake caliper at each bleeder screw.

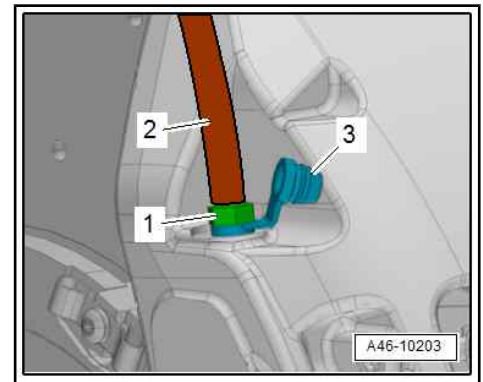
Bleeding sequence

- 1 - Outer brake caliper (front left) - not steel version brakes 1LA/1LB
 - 2 - Inner brake caliper (front left)
 - 3 - Outer brake caliper (front right) - not steel version brakes 1LA/1LB
 - 4 - Inner brake caliper (front right)
 - 5 - Rear left brake caliper
 - 6 - Rear right brake caliper
- Build up pressure in brake system by pumping brake pedal.

Note:

Press brake pedal slowly to avoid formation of bubbles.

- Once pressure has built up, keep brake pedal depressed.
- Open bleeder screw with hose of bleeder bottle attached until pressure has dissipated (pedal sags).
- Keep pedal depressed and close bleeder screw.
- Release brake pedal and wait approx. 2 seconds to allow brake fluid to flow in from brake fluid reservoir.
- Repeat procedure until emerging brake fluid is clear and free from bubbles.
- Tighten bleeder screw, detach bleeder hose and fit protective cap on bleeder screw.
- Repeat bleeding procedure in stated sequence at other brake calipers.



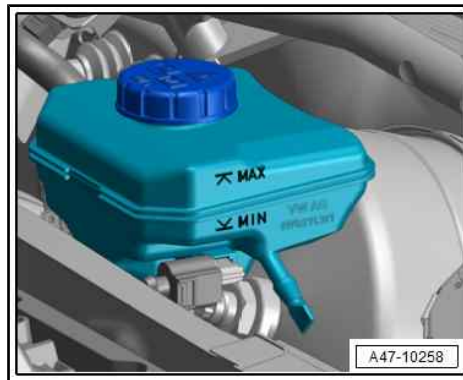


- Fill brake fluid reservoir up to “MAX” mark (depending on degree of pad wear) and screw on filler cap.
- To prevent brake fluid from overflowing from the reservoir, the brake fluid level must not be above the “MAX” mark.
- Start engine and check brake pedal travel and brake pedal pressure.
- In the event of excessive pedal travel, check brake system for leaks and/or repeat bleeding procedure.

⚠ CAUTION

Accident risk due to insufficient braking effect

- Make sure that the brakes work properly before the vehicle is driven on the road.



Changing brake fluid ➔ Maintenance ; Booklet 830 ; Maintenance work; Changing brake fluid

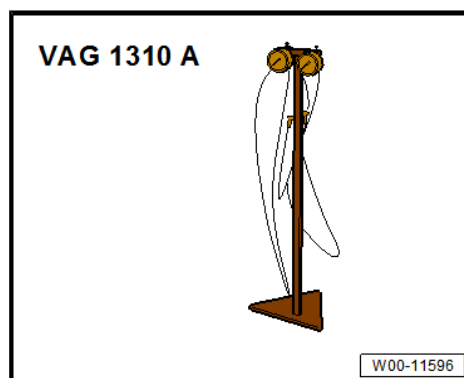
Tightening torques

- ♦ ➔ [“1.1 Exploded view - front brakes”, page 38](#)
- ♦ ➔ [“2.1 Exploded view - rear brakes”, page 105](#)

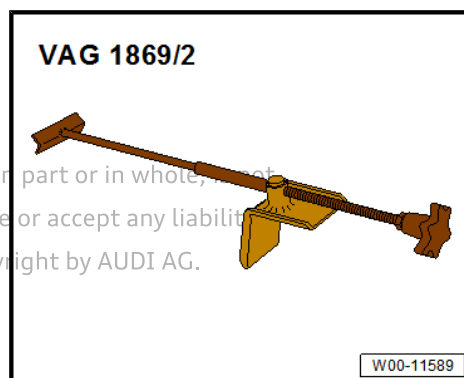
6.3 Leak test

Special tools and workshop equipment required

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



- ♦ Brake pedal actuator - V.A.G 1869/2-



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High-pressure test:

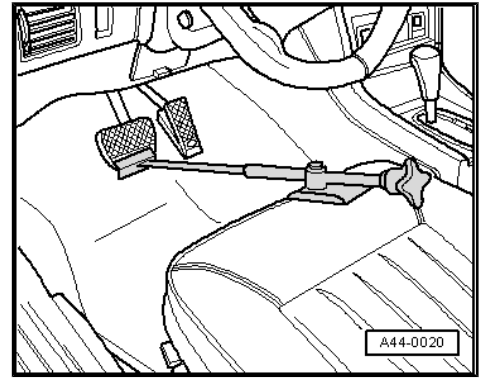
- Make sure that the brake system (master cylinder, brake hoses, brake lines and brake calipers) works properly and is free of leaks.
- Unscrew bleeder screw at one of the front brake calipers. Connect tester for brake pressure regulator - V.A.G 1310A- and bleed.



- Insert brake pedal actuator - V.A.G 1869/2- between brake pedal and driver seat. Apply pressure to brake pedal until the gauge indicates a pressure of 50 bar. The pressure must not drop by more than 4 bar during the test period of 45 seconds.
- Renew brake master cylinder if drop in pressure exceeds the specification.

Low-pressure test:

- Move the brake pedal actuator back until the pressure gauge indicates a pressure of 6 bar.
- The pressure should not drop by more than 1 bar within the test period of 3 minutes.
- Renew brake master cylinder if drop in pressure exceeds the specification.



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