

2005 Audi A4 Quattro**BRAKES Brake System****00 - GENERAL, TECHNICAL DATA****BRAKES****Vehicles with front and rear disc brakes****Brake system**

Dual-circuit brake system with diagonal distribution. ABS Bosch 5.7 or ABS Bosch 8.0 with Electronic Brake Distribution (EBD)/ESP Brake booster operating with manifold vacuum or vacuum pump

Brake master cylinder	Dia. mm	25.4	26.99
Brake booster, vacuum	Dia. in inches	8" and 9" tandem	8" and 9" tandem/Dual Rate
Assist factor	i	5.5	5.5/12

Front brakes							
Brake caliper		C 54	FN 3	FN 3	FNR-G 60	FNR-G 60	Brembo
Disc size (inches)		15	15	16	16	17	18
Production relevant no.	Pr.- No.	1LZ	1LB/1LE	1LT/1LF	1LA/1LD	1LJ	1LP
Front brake caliper, piston diameter	mm	54	57	57	60	60	28/32
Front brake disc	mm	280	288	312	320	345	365
Brake disc thickness, internally ventilated;	mm	22	25	25	30	30	34
Brake disc wear limit	mm	20	23	23	28	28	32
Pad thickness, with backing plate and dampening sheet	mm	19.3	20.3	20.3	20.3	20.3	-

Brake discs

2005 Audi A4 Quattro

BRAKES Brake System

NOTE:

- Hairline cracks on brake disc friction surfaces are often observed during brake repairs. Hairline cracks up to 10 mm long are not a technical flaw and are not cause for brake disc replacement.
- Brake discs with friction surfaces that have worn through should be replaced.

Rear brakes						
Rear brake caliper		C38	C38	C41	C43	C43
Disc size (inches)		15	16	16	16	18
Production relevant no.	Pr.- No.	1KD	1KP	1KW	1KE	1KY
Rear brake caliper, piston diameter	mm	38	38	41	43	43
Brake disc	mm	245	255	288	300	335
Brake disc thickness	mm	10	12	12	22	22
Brake disc wear limit	mm	8	10	10	20	20
Brake pad, thickness with backing plate	mm	16	16	16	17.5	-
Brake pad wear limit with backing plate	mm	7	7	7	8	-

BRAKE FLUID

General notes

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

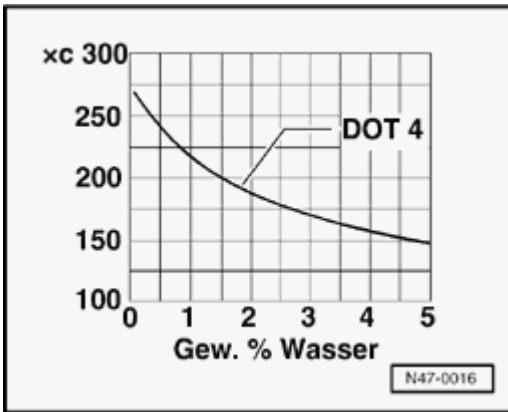


Fig. 1: Brake Fluid Graph

Courtesy of VOLKSWAGEN UNITED STATES, INC.

If water has been absorbed, the boiling point will drop, i.e., during high braking temperatures the brake fluid may develop steam bubbles and cause the brakes to fail.

Over time, brake fluid will darken in color. Dark-colored brake fluid does not specify anything about its quality. The coloring occurs through chemical reactions and can occur after a short time (several weeks), especially in vehicles with ABS.

CAUTION: Avoid any contact of rubber components of the brake system (boots, seals) with mineral oil, gasoline and cleaning solvents!

Even the smallest amount on a seal or boot can cause the part to change and thereby affect the function of the brake system. The results of an unclean brake system first show themselves months later, causing increased repair costs, especially on vehicles with ABS.

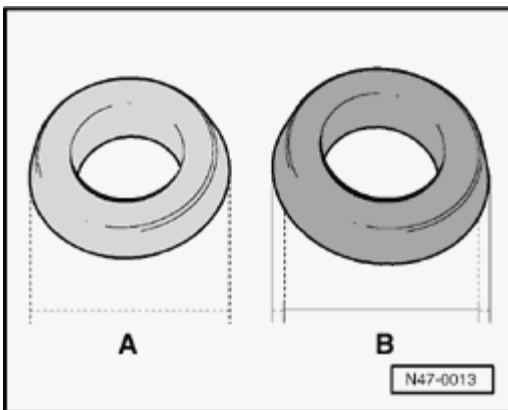


Fig. 2: Sleeve Original Size And Swollen As A Result Of Contact With Mineral Oil

Courtesy of VOLKSWAGEN UNITED STATES, INC.

A = Boot - original size

B = Boot (swollen due to contact with mineral oil)

The above mentioned points require special rules for handling:

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.

Front-wheel drive vehicles

Perform brake test on a single-axle brake dynamometer.

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

All brake test equipment approved by Audi meets these requirements.

All-wheel drive vehicles**Test on a single-axle brake dynamometer for all-wheel drive vehicles**

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

Test speed must not exceed 6 km/h, otherwise the EDL control can activate the brakes if the rollers start at different speeds.

CAUTION: The Torsen differential will be seriously damaged if test speed exceeds 6 km/h.

All brake test equipment approved by Audi meets these requirements.

Test on a single-axle brake dynamometer

Test speed must not exceed 6 km/h, otherwise the EDL control can activate the brakes if the rollers start at different speeds.

All brake test equipment approved by Audi meets these requirements.

General notes

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

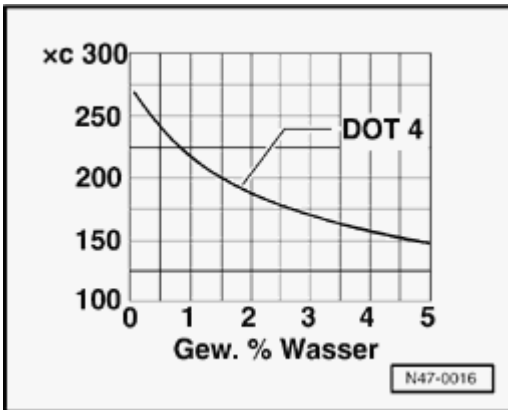


Fig. 3: Brake Fluid Graph

Courtesy of VOLKSWAGEN UNITED STATES, INC.

An increase in water content in the brake fluid causes its boiling point to drop. A reduced boiling point can cause vapor bubbles to develop as the fluid heats up under intense braking. In this condition the brake is likely to fail completely.

The color of the brake fluid becomes darker over a period of time. A dark brake fluid color is not an indication of its condition. The change in color is caused by chemical reactions and may occur within a short period (several weeks), particularly in vehicles equipped with ABS.

CAUTION: Avoid any contact of rubber components of the brake system (sleeves, sealing rings) with mineral oil, gasoline and cleaning solvents!

Even very small amounts of the above substances will transform structure and dimension of a sealing ring or sleeve enough to adversely affect brake function. The effects of a polluted brake system will not be noticed for several months until they have caused damage that requires extensive servicing, especially on vehicles installed with ABS.

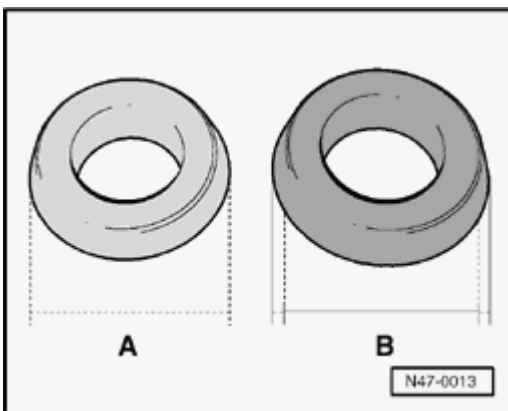


Fig. 4: Sleeve Original Size And Swollen As A Result Of Contact With Mineral Oil

Courtesy of VOLKSWAGEN UNITED STATES, INC.

A = Sleeve (original size)

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

The above mentioned points require special rules for handling:

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.

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46 - BRAKES - MECHANICAL COMPONENTS

FRONT BRAKES C54

Front brakes, servicing

NOTE:

- Install complete repair kit.
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
- To extract brake fluid from the brake fluid reservoir, use a bleeder bottle that only comes into contact with brake fluid. Brake fluid is poisonous and must never be extracted by mouth using a hose!
- When replacing brake components (brake discs, brake calipers or brake pads), always make sure you install the correct parts for the vehicle. This is essential for the proper function of the ESP.
- Brake line torque specification is 15 Nm.



- 1 - Brake disc cover
- 2 - Collar bolt, 10 Nm
 - M6x12
- 3 - Brake hose
 - Do not disconnect brake hose when changing brake pads
- 4 - Spring clip
- 5 - Brake line, 15 Nm

- Screw into brake caliper housing
- Screw into brake hose, counter hold on brake hose hexagon.

6 - Self-locking bolt, 30 Nm

- Always replace
- When loosening and tightening, counter-hold on guide pin

7 - Ribbed bolt, 190 Nm

- Clean ribs if using again

8 - Brake carrier with guide pins and protective cap

- Replacement carriers are supplied assembled with sufficient grease on guide pins

9 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Resurface evenly, on both sides, starting from thickness when new
- Thickness --> **Brakes**
- Allocation --> **Brakes**

10 - Wheel bolts

- Installing wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

11 - Torx bolt

- Tightening torque: 5 Nm

12 - Heat shield

- Insert into piston

13 - Brake caliper housing

- Do not disconnect brake hose when changing brake pads

14 - Bracket

- Bolt to brake caliper housing

15 - Hex bolt, 10 Nm-

16 - Brake pads

- With left and right wear indicator
- Warning lamp in instrument cluster will light up when wear limit (2 to 3 mm) is reached.
- Always replace both sides
- Before installing pads, clean guide surfaces and apply a thin coating of *lubricating paste G 000 650* .
- Removing and installing --> **Brake pads, removing and installing**
- Checking pad thickness:
- Different versions see ETKA

17 - Connector

18 - Bracket

Brake pads, removing and installing

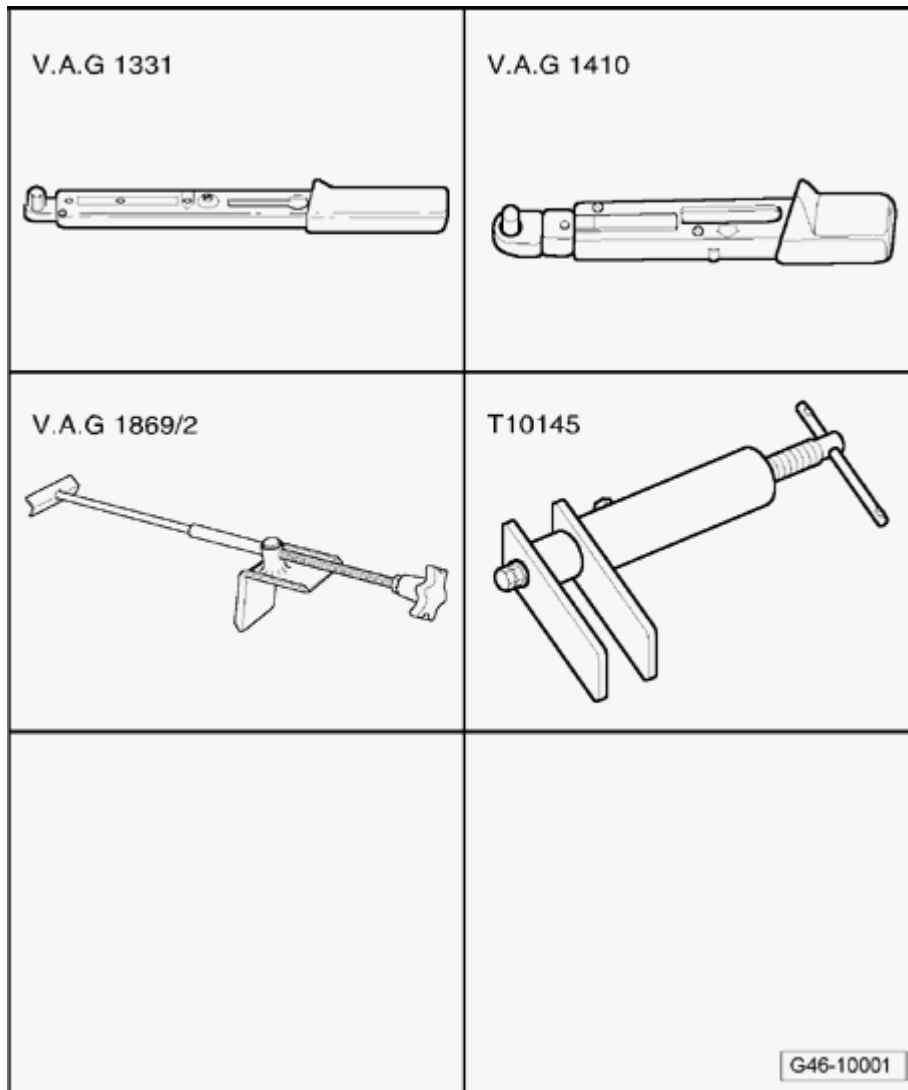


Fig. 60: Identifying Special Tools - Brake Pads, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Torque wrench V.A.G 1331
- Torque wrench V.A.G 1410
- Brake pedal actuator V.A.G 1869/2
- Piston resetting tool T10145
- Torque wrench V.A.G 1332

Removing

NOTE:

- Mark brake pads when removing them if they are to be reused. Reinstall in

their original position to prevent uneven braking.

- Remove wheels.

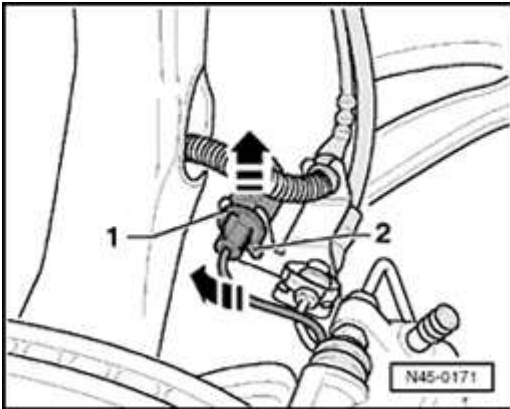


Fig. 61: Brake Wear Pad Indicator Connector

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On vehicles equipped with a brake pad wear indicator, disconnect connector - 1 -.
- Lift locating lug slightly on lower part of connector - 2 - and turn 90°.
- Pull connector lower part out of bracket.
- Raise vehicle.
- Remove wheels.

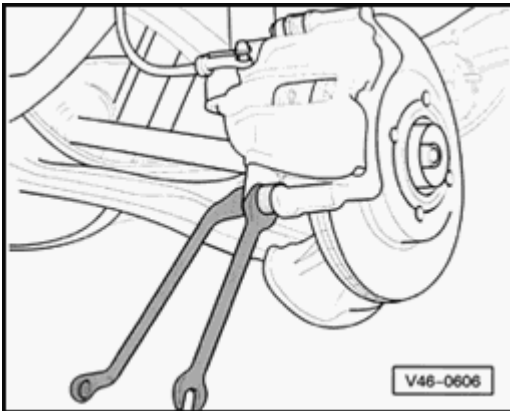


Fig. 62: Removing Securing Bolts From Brake Caliper Housing, While Counter-Holding On Guide Pins

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts from brake caliper housing, while counter-holding on guide pins.

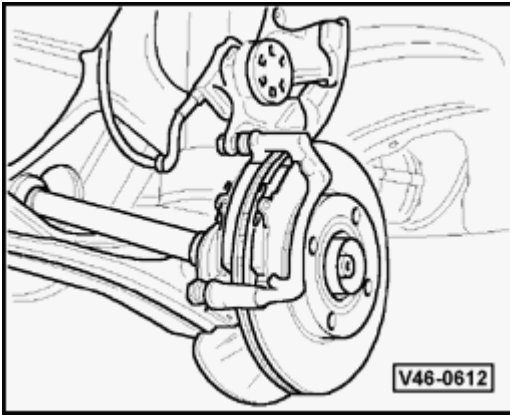


Fig. 63: Swinging Brake Caliper Housing Upward And Removing Brake Pads
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Swing brake caliper housing upward and remove brake pads.

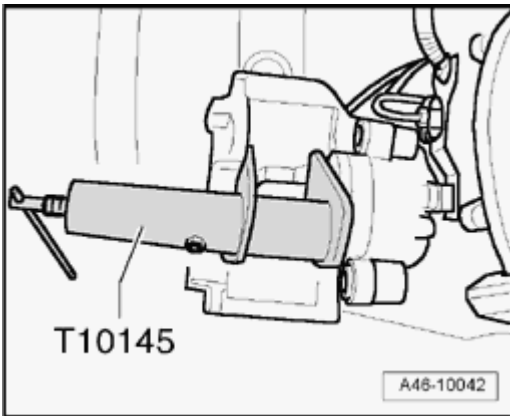


Fig. 64: Pressing Piston Back Into Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press piston back into caliper housing.

NOTE:

- Press piston back into the cylinder with resetting tool, before inserting new brake pads. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise, fluid can overflow and cause damage, particularly if reservoir has been topped off.

CAUTION: Brake fluid is poisonous and must never be extracted by mouth using a hose!

Installing

Use methylated spirits to clean brake caliper housing.

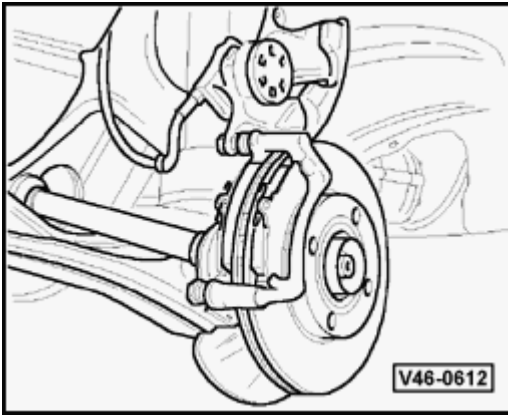


Fig. 65: Swinging Brake Caliper Housing Upward And Removing Brake Pads
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install brake pads.
- Swing brake caliper housing down and tighten securing bolt to 30 Nm.

NOTE:

- The repair kit includes four self-locking hex bolts which must be installed.
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.

- Mount wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Check brake fluid level and top off if necessary.

FRONT BRAKES FN3

Front brakes, servicing

NOTE:

- Install repair kit complete.
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the pads are properly seated in their normal operating position.
- To draw off brake fluid from brake fluid reservoir use a bleeder bottle which is used only for brake fluid. Brake fluid is poisonous and must on no account be siphoned out by mouth using a hose!

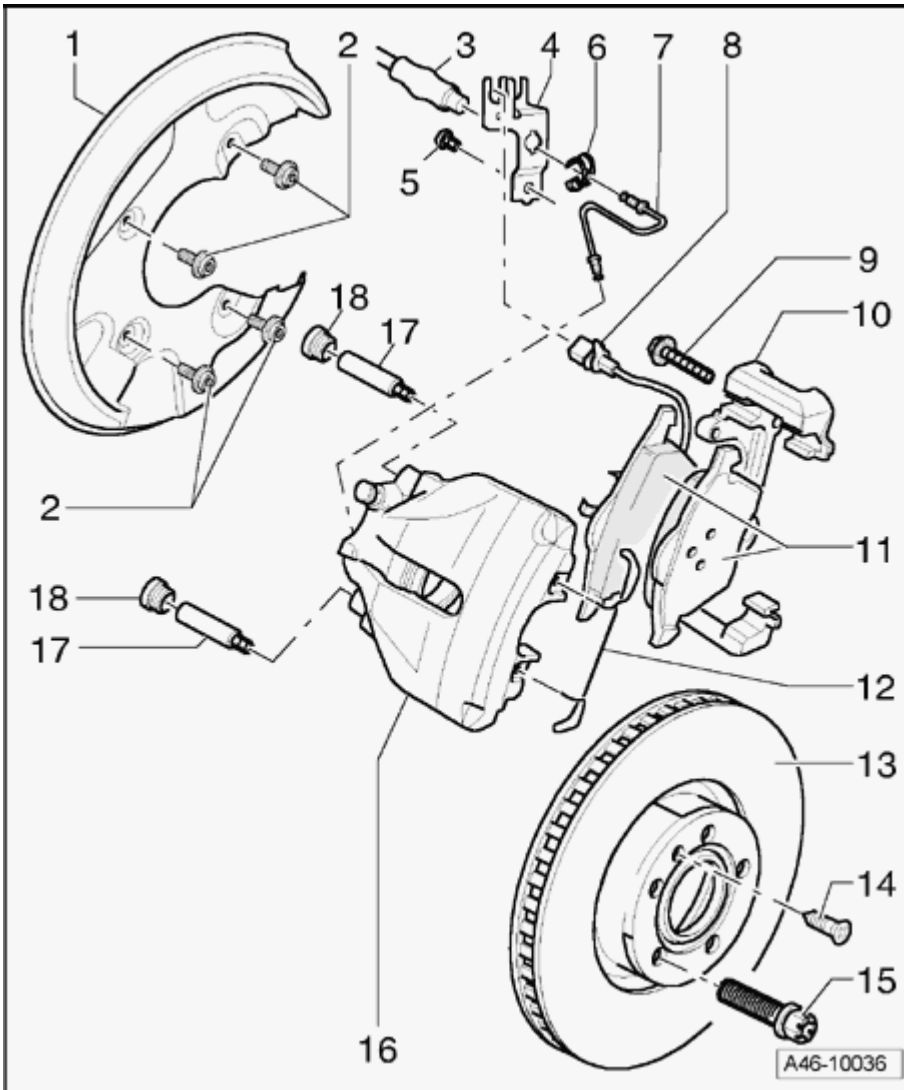


Fig. 66: Exploded View Of Front Brakes FN3

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - Brake disc cover
- 2 - Collar bolt, 10 Nm
 - M6x12
- 3 - Brake hose
 - Do not disconnect brake hose when changing brake pads
- 4 - Bracket
 - Bolt to brake caliper housing

5 - Hex bolt, 10 Nm-

6 - Spring clip

7 - Brake line

- Tightening torque for brake line at bracket 15 Nm
- Tightening torque for brake line at brake caliper: 15 Nm
- Screw into brake caliper housing
- Screw into brake hose, counter hold on brake hose hex.
- Make sure that lugs are properly seated in grooves in bracket.

8 - Connector

9 - Ribbed bolt, 190 Nm

- Clean ribs if using again

10 - Brake carrier

- Bolt to wheel bearing housing

11 - Brake pads

NOTE:

- The inner surface (with tension spring) is indicated by an arrow. The arrow must point in direction of brake disc rotation when moving forward. If installed incorrectly this may cause noise problems.
- Clean guide surfaces and apply a thin coating of *polycarbamide grease G 052 142 A2* before inserting pads.
- There is an adhesive foil on the back plates of the outer brake pads. The protective foil must be pulled off before inserting.
- Brake pad wear indicator (left front and right front)
- Warning lamp in instrument cluster will light up when wear limit (2 to 3 mm) is reached.
- Always replace both sides
- Removing and installing --> Brake pads, removing and installing
- Checking pad thickness:
- Different versions see ETKA

NOTE:

- Always clean the brake caliper (grease-free) before inserting new brake pads. When doing this, make sure that all adhesive foil residue on the contact surfaces for the outer brake pad is removed.

12 - Retaining spring

- Before inserting pads, clean guide surfaces and apply a thin coating of *polycarbamide grease G 052 142 A2* .
- Insert in both holes in brake caliper housing

NOTE:

- **After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.**

13 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Thickness --> **Brakes**
- Allocation --> **Brakes**

14 - Torx bolt

- Tightening torque: 5 Nm

15 - Wheel bolts

- Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

16 - Brake caliper housing

- Remove from brake carrier to replace brake pads
- Servicing brake caliper --> **Brake caliper, servicing**

17 - Guide pins, 30 Nm

18 - Protective cap

- Remove

Brake pads, removing and installing

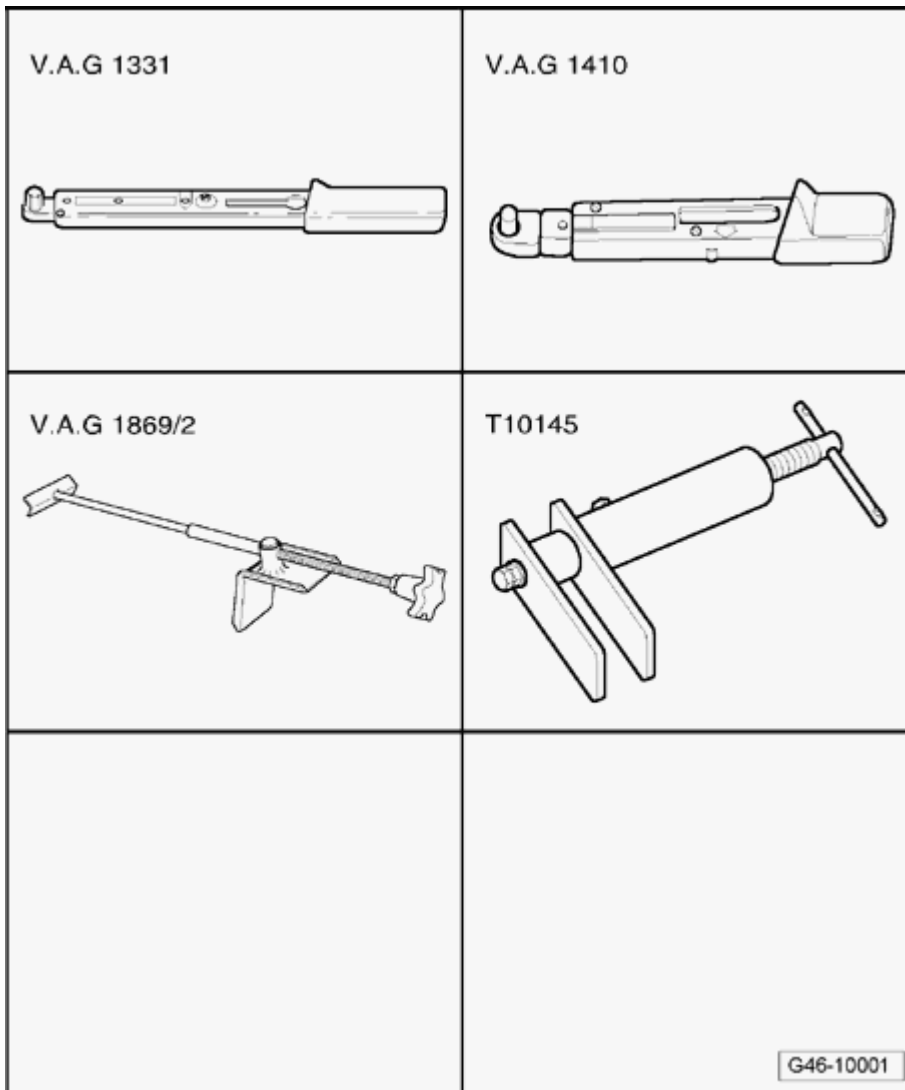


Fig. 67: Identifying Special Tools - Brake Pads, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Torque wrench V.A.G 1331
- Torque wrench V.A.G 1410
- Brake pedal actuator V.A.G 1869/2
- Piston resetting tool T10145
- Torque wrench V.A.G 1332

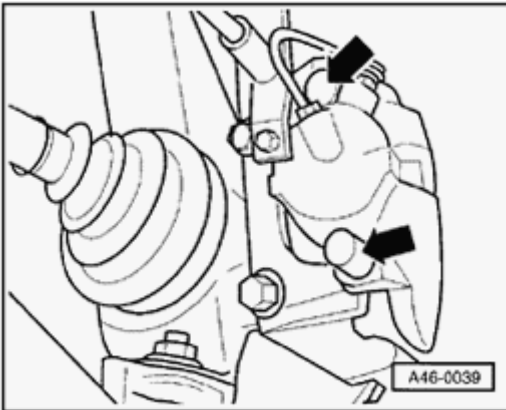
Removing

- Raise vehicle.

- Remove wheels.

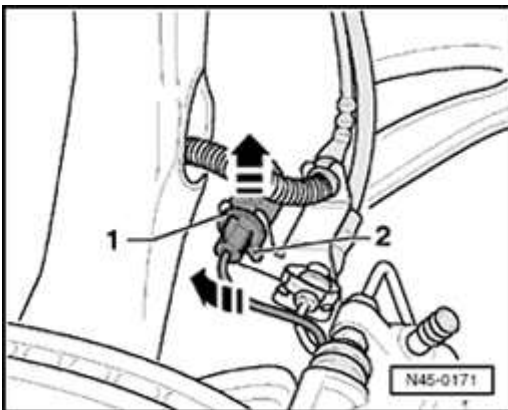
NOTE:

- If reusing brake pads, mark location. Install in same position when installing otherwise uneven braking will occur!
- The brake disc is secured with a Torx bolt.

**Fig. 68: Caliper Guide Pin Caps**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove protective caps - **arrows** -.

**Fig. 69: Brake Wear Pad Indicator Connector**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On vehicles equipped with a brake pad wear indicator disconnect connector - **1** -.
- Slightly lift up locating lug on lower part of connector - **2** - and turn 90°.
- Pull lower part of connector out of holder.

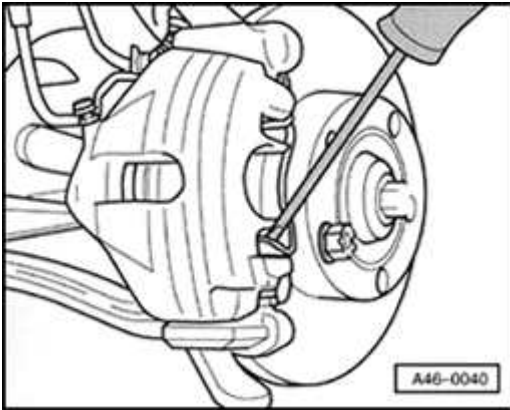


Fig. 70: Removing Brake Pad Retaining Spring From Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use a screwdriver to pry off brake pad retaining spring from brake caliper housing and remove.

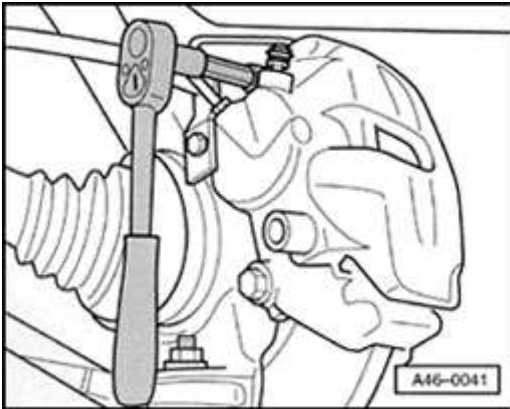


Fig. 71: Removing/Installing Caliper Guide Pins
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew and remove both guide pins from brake caliper.
- Remove brake caliper housing and lay to one side so that the weight of the brake caliper does not stress or damage the brake hose.
- Remove brake pads from brake caliper housing and/or brake carrier.

Installing

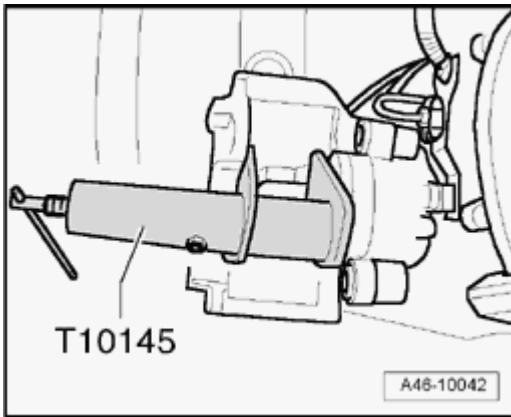


Fig. 72: Pressing Piston Back Into Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press piston back into caliper housing.

Use methyated spirits to clean brake caliper housing.

NOTE:

- Before inserting new brake pads, press the piston back into the cylinder using the piston resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise fluid will overflow and cause damage if the reservoir was topped off during repair work.

CAUTION: Brake fluid is poisonous and must never be extracted by mouth using a hose!

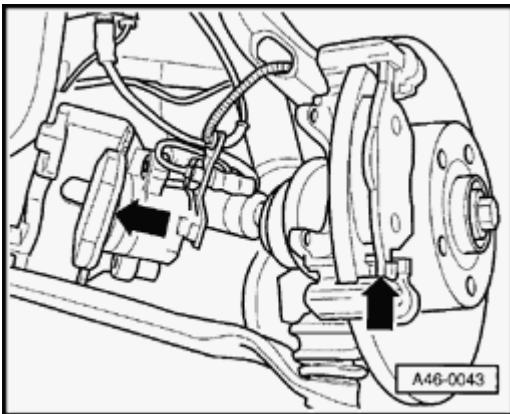


Fig. 73: Inserting Brake Pad With Retaining Spring Into Brake Caliper Housing (Piston)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert brake pad with retaining spring into brake caliper housing (piston).

NOTE:

- The inner surface (with tension spring) is indicated by an arrow. The arrow

must point in the rotation direction of the brake rotor when driving forward. If improperly installed, noises could result.

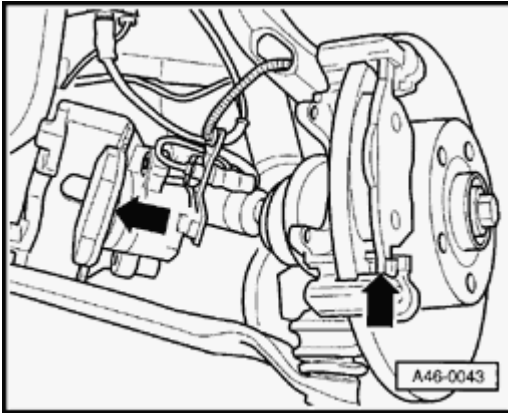


Fig. 74: Inserting Brake Pad With Retaining Spring Into Brake Caliper Housing (Piston)
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull off protective foil on backing plate of outer brake pad.
- Install outer brake pad onto brake carrier.
- Secure brake caliper housing to brake carrier with both guide pins (tighten to 25 Nm).
- Install both protective caps.
- Insert retaining spring into brake caliper housing.
- Connect electrical connector for brake pad wear indicator.

Mount wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT** .

NOTE:

- 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.
- After installing the brake pads, depress pedal firmly several times with the vehicle stationary, so that the brake pads are properly seated in their normal operating position.

- Check brake fluid level and top off if necessary.

FRONT BRAKES FNR-G60

Front brakes, servicing

NOTE:

- Install complete repair kit.
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their

normal operating position.

- To extract brake fluid from the brake fluid reservoir, use a bleeder bottle that only comes into contact with brake fluid. Brake fluid is poisonous and must never be extracted by mouth using a hose!
- Check brake caliper for ease of movement by moving it sideways.

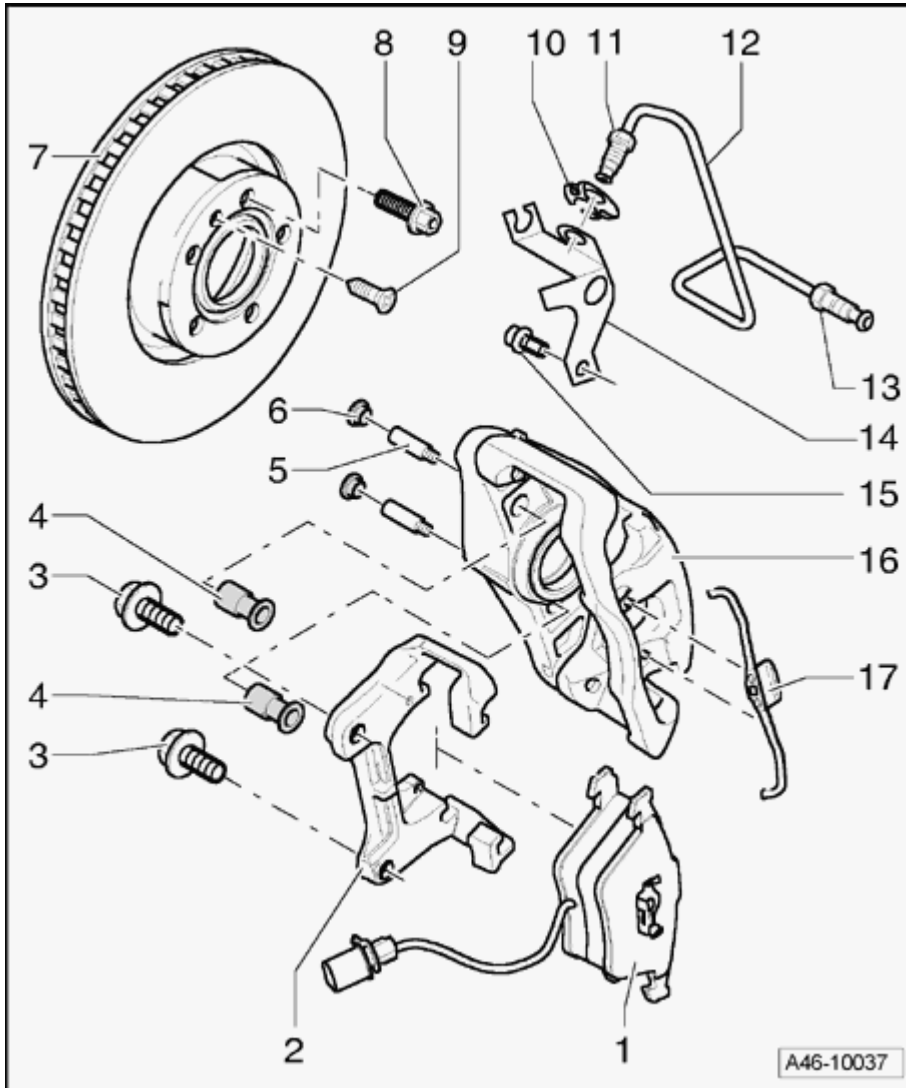


Fig. 75: Exploded View Of Front Brakes FNR-G60
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake pads

NOTE:

- The inner surface (with tension spring) is equipped with a cable for wear indicator.
- Always replace both sides

- Before installing the brake pads, clean guide surfaces and apply a thin coating of *polycarbamide grease G 052 142 A2* .
- Removing and installing --> Brake pads, removing and installing
- Checking pad thickness:
- Different versions ETKA

NOTE:

- Always clean the brake caliper thoroughly (grease-free) before inserting new brake pads. It is important to make sure that contact surfaces for brake pads are clean.

2 - Brake carrier

- Bolt to wheel bearing housing

3 - Ribbed bolt, 190 Nm

- Clean ribs if using again
- M14x1.5x 38

4 - Bearing bushing

- Insert into brake caliper housing

5 - Guide pins, 30 Nm

6 - Protective cap

- Remove
- Insert wear indicator wire in protective cap

7 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Lubricate contact surfaces between brake disc and wheel hub with *polycarbamide grease G 052 142 A2* .
--> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Thickness --> **Brakes**
- Application --> **Brakes**

8 - Wheel bolts

- Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

9 - Torx bolt

- Tightening torque: 5 Nm

10 - Spring clip

11 - Brake line connection to brake hose, 15 Nm

12 - Brake line

- Screw into brake caliper housing
- Screw into brake hose, counter hold on brake hose hex.
- Do not twist hose when installing
- Make sure that lugs are properly seated in grooves in bracket.

13 - Brake line connection to brake caliper, 17 Nm

14 - Bracket

- Bolt to brake caliper housing
- Attach brake line

15 - Hex bolt M 8 x 16

- Tightening torque: 25 Nm

16 - Brake caliper housing

- If assembly work is required, do not leave caliper hanging from brake hose but secure it to body with binding wire
- With exception of "replacing brake pads" --> **Brake pads, removing and installing** and "Servicing front brake caliper", no repairs may be performed on the brake caliper.
- Do not twist hose when installing

17 - Retaining spring

- Note correct installation position.

NOTE:

- After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.

Brake pads, removing and installing

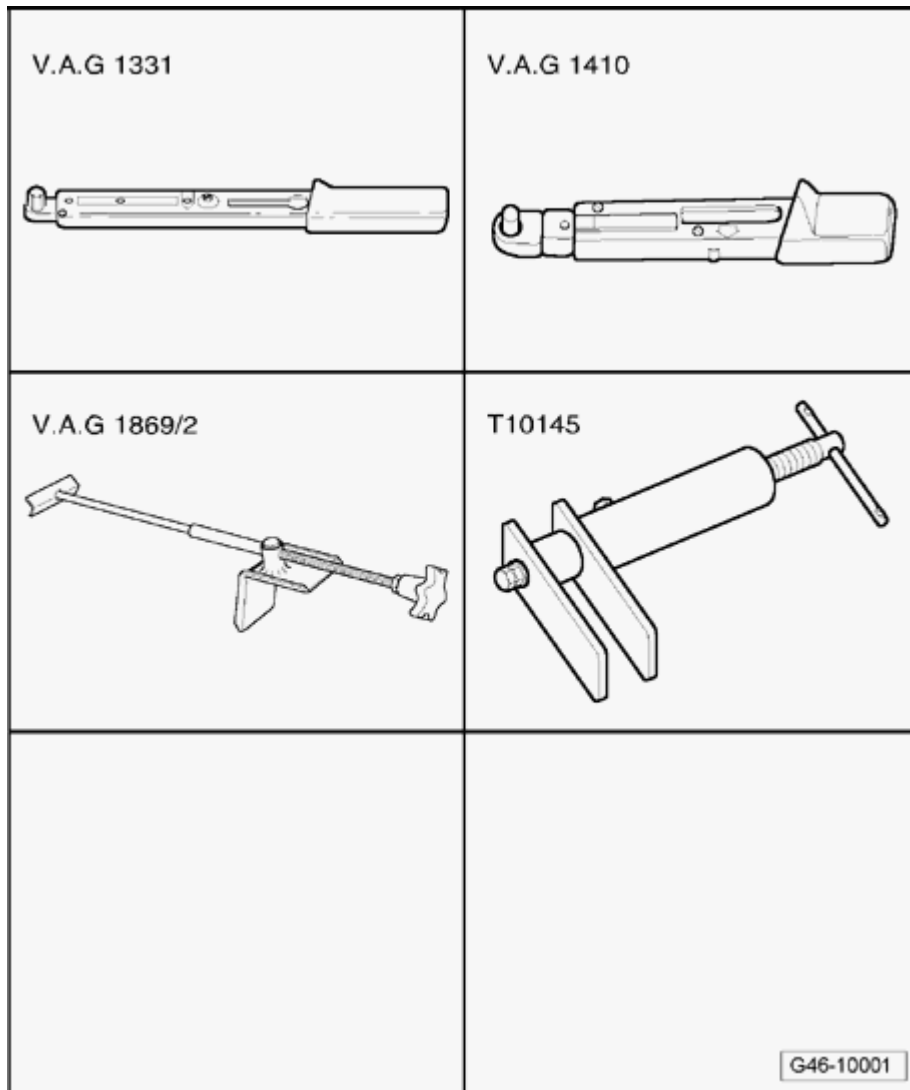


Fig. 76: Identifying Special Tools - Brake Pads, Removing And Installing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Torque wrench V.A.G 1331
- Torque wrench V.A.G 1410
- Brake pedal actuator V.A.G 1869/2
- Piston resetting tool T10145
- Torque wrench V.A.G 1332

Removing

NOTE:

- Mark brake pads when removing them if they are to be reused. Reinstall in

their original position to prevent uneven braking.

- The brake disc is secured with a Torx bolt.

- Raise vehicle.
- Remove wheels.
- The brake disc is secured with a Torx bolt. - 1 -.

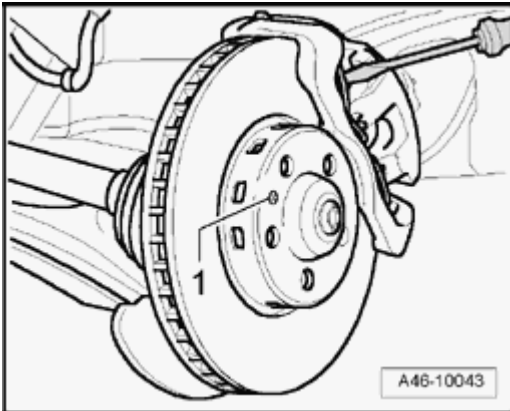


Fig. 77: Using Screwdriver To Pry Off Brake Pad Retaining Spring From Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use a screwdriver to pry off brake pad retaining spring from brake caliper housing and remove.

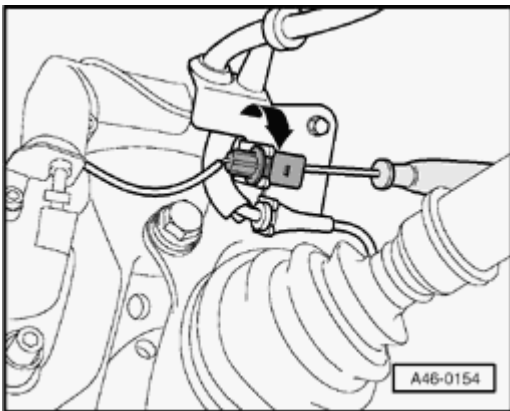


Fig. 78: Turning Connector 90° While Using Screwdriver To Release Connector From Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connector for brake pad wear indicator.
- Turn connector 90° while using a screwdriver to release connector from bracket.
- Pull connector upward out of bracket and detach wire.

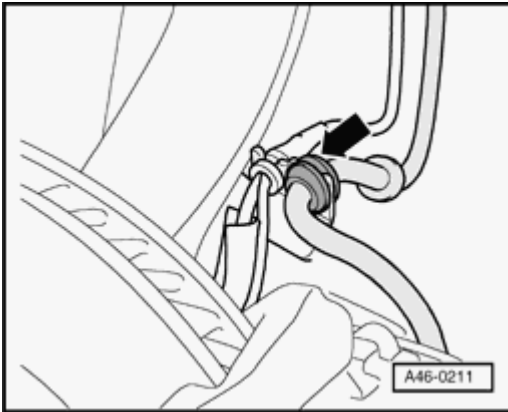


Fig. 79: Detaching Brake Line From Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach brake line from retainer.

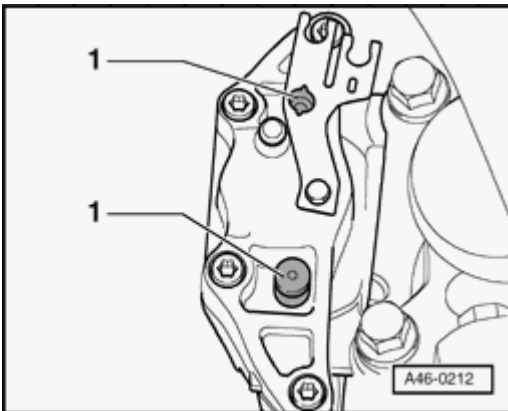


Fig. 80: Removing Protective Caps

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove protective caps - 1 -.

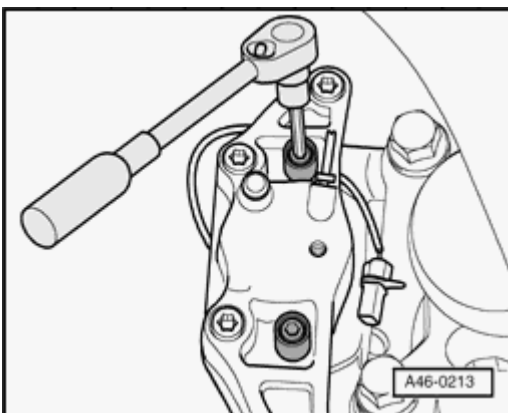


Fig. 81: Securing Brake Caliper Housing To Brake Carrier With Both Guide Pins

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unfasten and remove both guide pins from brake caliper.
- Remove brake caliper housing and lay to one side so that the weight of the brake caliper does not stress or damage the brake hose.
- Take brake pads out of brake caliper housing or from brake carrier.

Use methylated spirits to clean the brake caliper housing.

Installing

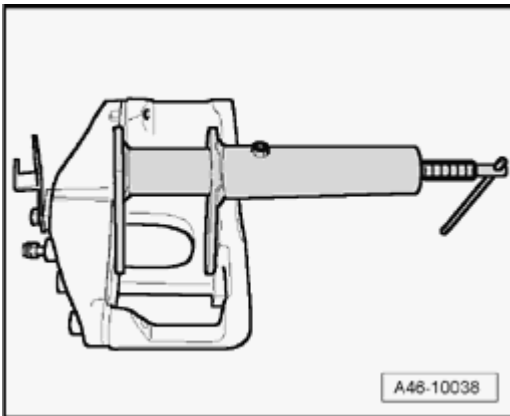


Fig. 82: Pressing Piston Back Into Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press piston back into caliper housing.

NOTE:

- Press piston back into the cylinder with resetting tool, before inserting new brake pads. Draw off brake fluid from the reservoir with a bleeder bottle before pressing piston back. Otherwise brake fluid which was used to top off brake fluid reservoir, may run out and cause damage.

CAUTION: Brake fluid is poisonous and must never be extracted by mouth using a hose!

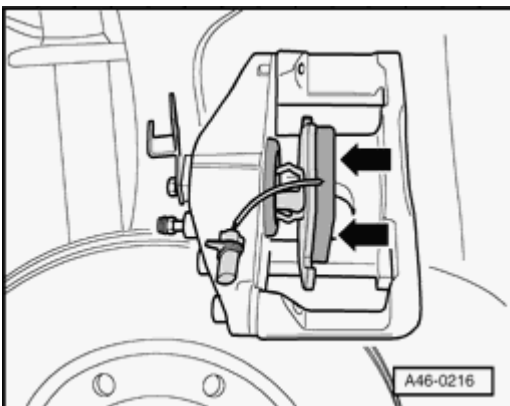
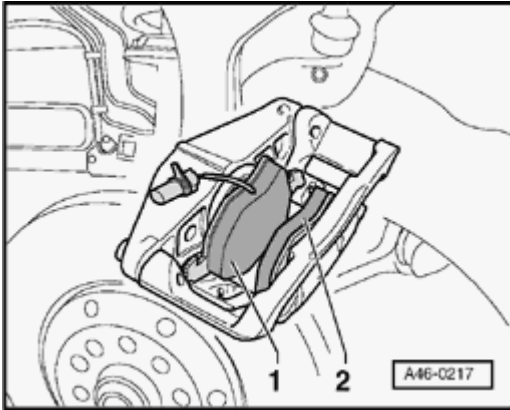


Fig. 83: Inserting Inner Brake Pad With Retaining Spring In Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert brake pad with retaining spring and wear indicator into brake caliper housing (piston).

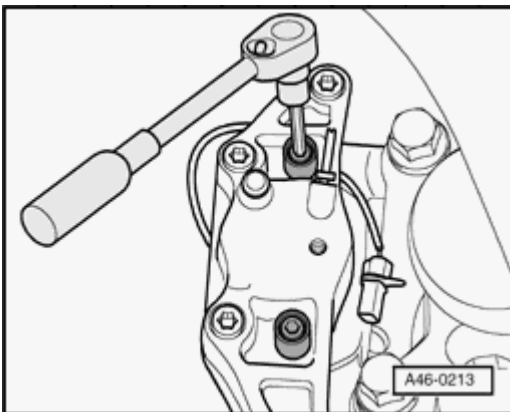
**Fig. 84: Setting Outer Brake Pad With Retaining Springs Into Brake Caliper**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install outer brake pad - 2 - onto brake caliper.

NOTE:

- Insert brake pads into brake caliper and install assembly on brake carrier/brake disc.

**Fig. 85: Securing Brake Caliper Housing To Brake Carrier With Both Guide Pins**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure brake caliper housing to brake carrier with both guide pins (tighten to 30 Nm).
- Make sure not to twist the brake hose when installing.
- Install both protective caps.
- Insert retaining spring into brake caliper housing.
- Attach brake line

- Connect wear indicator connector and insert wire in dust cap and protective cap.
- Installing wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

NOTE:

- After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.
- After installing the brake pads, depress pedal firmly several times with the vehicle stationary, so that the brake pads are properly seated in their normal operating position.

- Check brake fluid level and top up if necessary.

FRONT BRAKES, BREMBO 18**Front brakes, servicing**

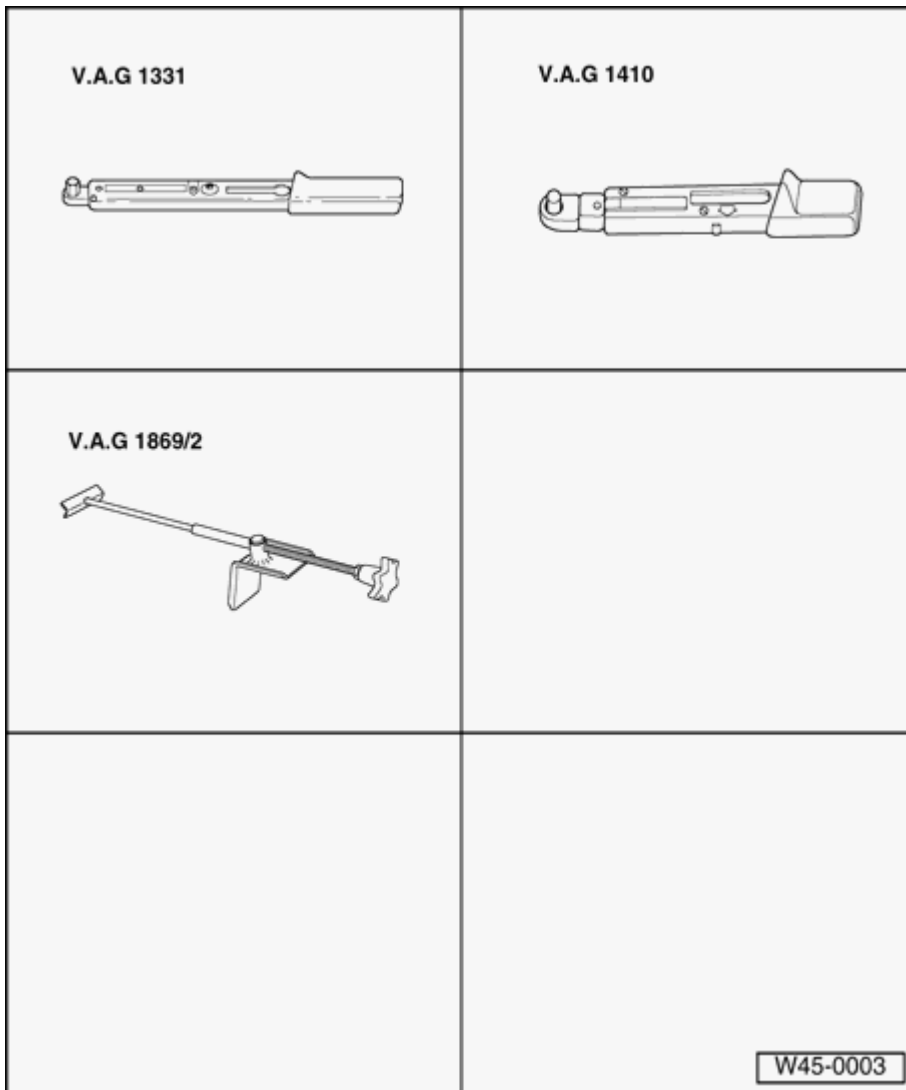


Fig. 86: Identifying Special Tools - Front Brakes, Brembo 18
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Torque wrench V.A.G 1331
- Torque wrench V.A.G 1410
- Brake pedal actuator V.A.G 1869/2

NOTE:

- Install complete repair kit
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
- To extract brake fluid from the brake fluid reservoir, use a bleeder bottle that only comes into contact with brake fluid. Brake fluid is poisonous and

must never be extracted by mouth using a hose!

CAUTION: If brake pads are ceramics, wheel must not fall on brake disc, otherwise it will be irreparably damaged. To remove/install wheel, insert two assembly pins in wheel bolt mount.

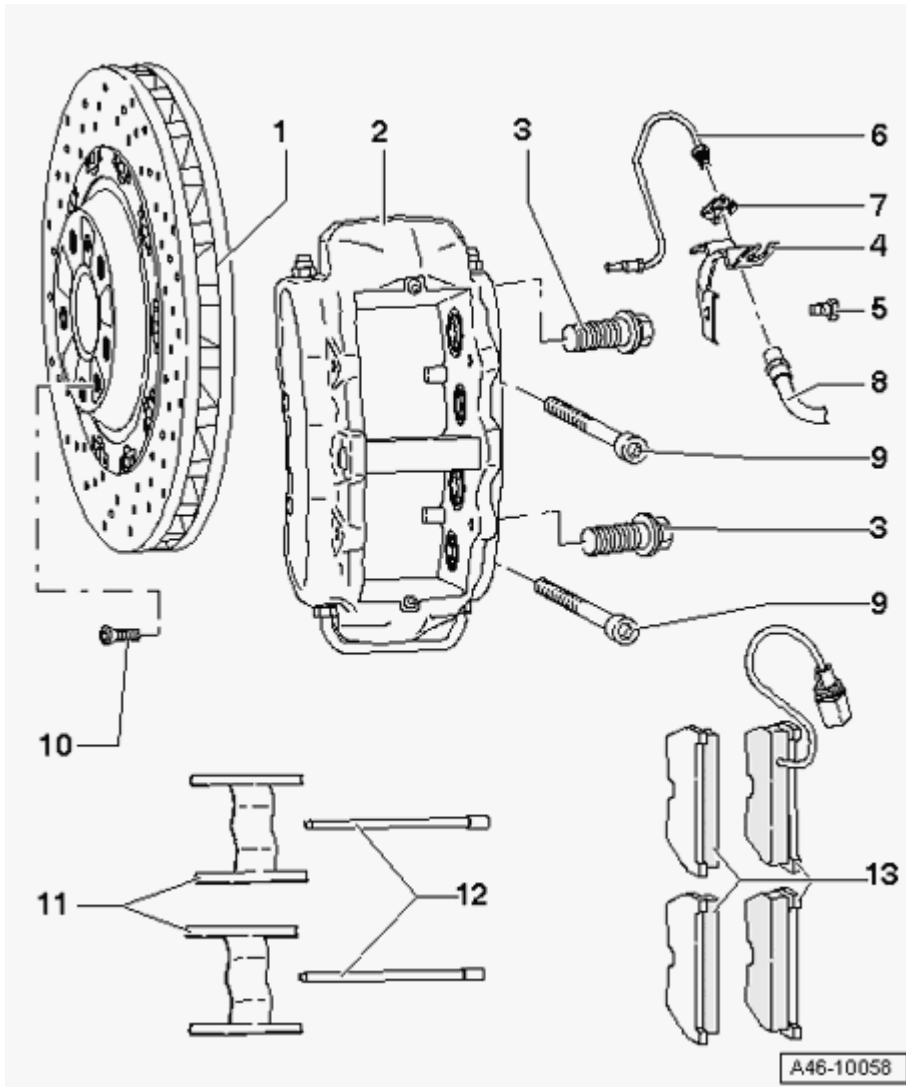


Fig. 87: Exploded View Of Front Brakes, Brembo 18
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake disc

- Ventilated brake disc: 365 mm diameter
- Brake disc thickness: 34 mm
- Wear limit: 32 mm
- Always replace both sides

- Remove brake caliper prior to removing

2 - Brake caliper

- Do not disconnect brake line when changing brake discs
- **Removing:**
- Insert brake pedal actuator V.A.G 1869/2
- Removing and installing --> **Brake pads, removing and installing**
- **Installing:**
- Remove brake pedal actuator V.A.G 1869/2
- Bleed braking system --> **Brake system, bleeding**

3 - Ribbed bolt, 200 Nm

- If re-using, clean ribs

4 - Bracket

- Bolt to brake caliper housing

5 - Hex head bolt, 25 Nm

6 - Brake line, 15 Nm

- Screw into brake caliper housing
- Screw into brake hose, counter hold on brake hose hex.
- Make sure that lugs are properly seated in grooves in bracket.

7 - Spring clip

8 - Brake hose

- Do not disconnect brake line when changing brake discs

9 - Hex socket head bolt, 110 Nm

- Replace each time

10 - Torx screw

- Torque specification 5 Nm

11 - Retaining springs

12 - Brake pad retaining pins

13 - Brake pads

- With wear indicator
- Thickness 11.4 mm without backing plate
- Wear limit: 7 mm including backing plate
- When wear limit is reached (limit: 2 to 3 mm), a warning light comes on in instrument cluster
- Checking thickness 803Work sequences; Front and rear brake pads/linings; Checking thickness
- Always replace both sides
- Removing and installing --> **Brake pads, removing and installing**

Brake pads, removing and installing

Special tools, testers and auxiliary items required

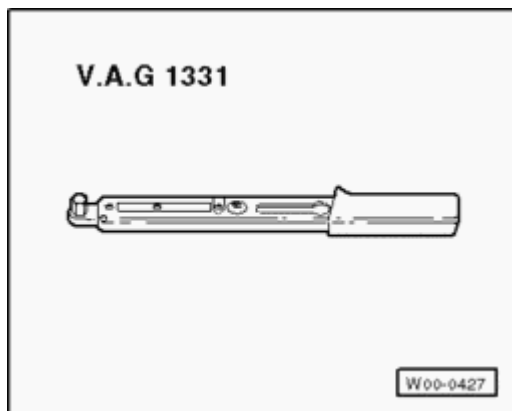


Fig. 88: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench V.A.G 1331

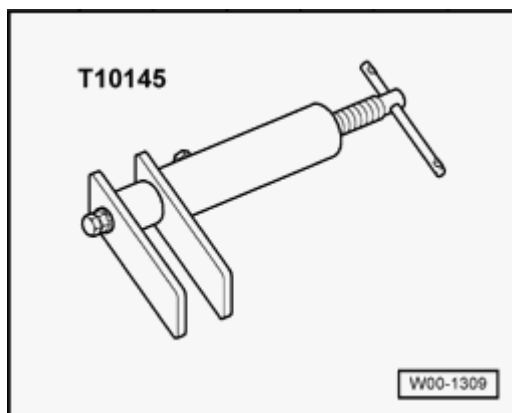


Fig. 89: Piston Resetting Tool T10145

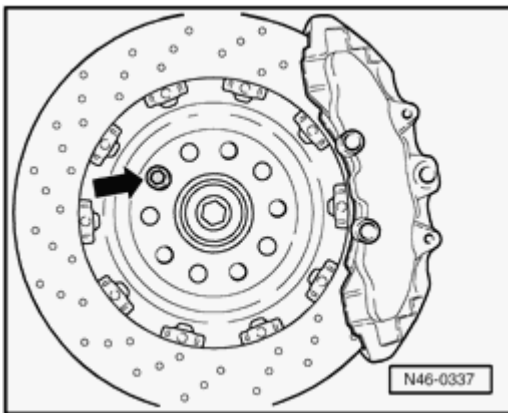
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Piston resetting tool T10145

Removing**NOTE:**

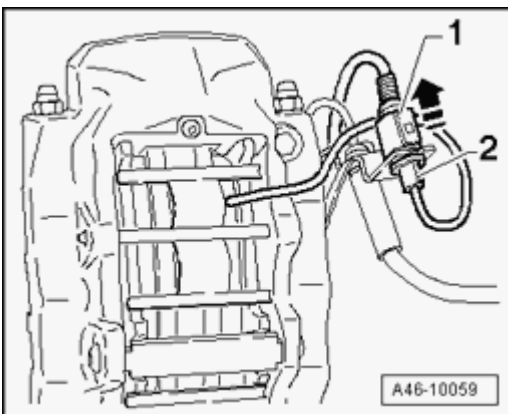
- If reusing brake pads, mark location. Install in same position when installing otherwise uneven braking will occur!

- Remove wheels.

**Fig. 90: Securing Brake Disc With A Wheel Bolt**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure brake disc with a wheel bolt.

**Fig. 91: Disconnecting Connector For Brake Pad Wear Indicator & Lifting Fixing Latch Somewhat On Lower Part Of Connector**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connector - 1 - for brake pad wear indicator.
- Lift fixing latch somewhat on the lower part of connector - 2 - and turn 90°.

- Pull lower part of connector from holder.

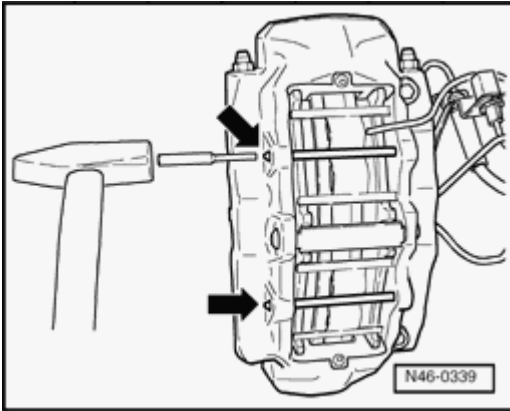


Fig. 92: Driving Out Brake Pad Retaining Pins
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive out brake pad retaining pins - **arrows** -.

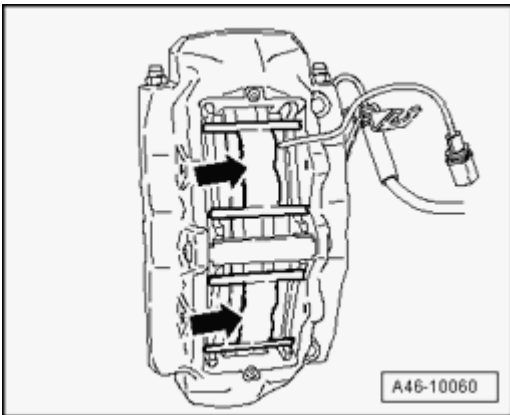


Fig. 93: Removing/Installing Retaining Springs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining springs - **arrows** -.

Before pressing piston back, draw off brake fluid from reservoir using a bleeder bottle. Otherwise fluid will overflow and cause damage if the reservoir was topped off during repair work.

- Press brake pads away from brake disc and then remove from brake caliper housing.

Installing

Before inserting new brake pads, press piston back into the cylinder using the piston resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise fluid will overflow and cause damage if the reservoir was topped off during repair work.

- Press piston back into caliper housing.
- Insert brake pads in brake caliper housing.
- Brake pads are directional and specific to each vehicle side. Observe markings on dampening sheet.

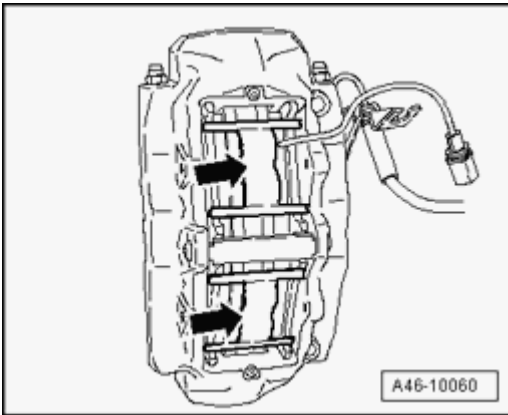


Fig. 94: Removing/Installing Retaining Springs
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install retaining springs - **arrows** -.
- Press retaining springs into position and drive brake pad retaining pins in to stop.

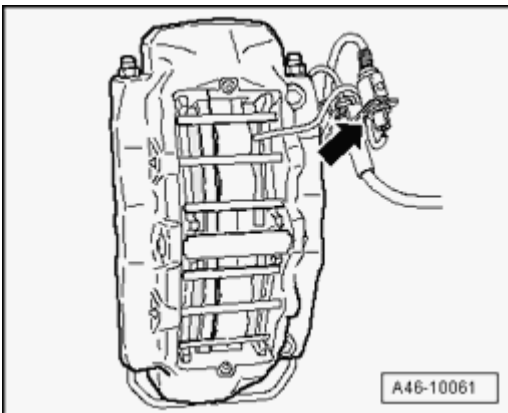


Fig. 95: Inserting Brake Wear Indicator Connector And Wire Into Bracket On Brake Caliper
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert brake wear indicator connector and wire - **arrow** - into bracket on brake caliper.
- Join connector for brake wear indicator.

Mount wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT** .

NOTE:

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

- After changing brake pads check brake fluid level.

REAR BRAKES C38

Brake calipers, servicing

Rear brakes with automatic adjustment

NOTE:

- Install all parts supplied in repair kit.

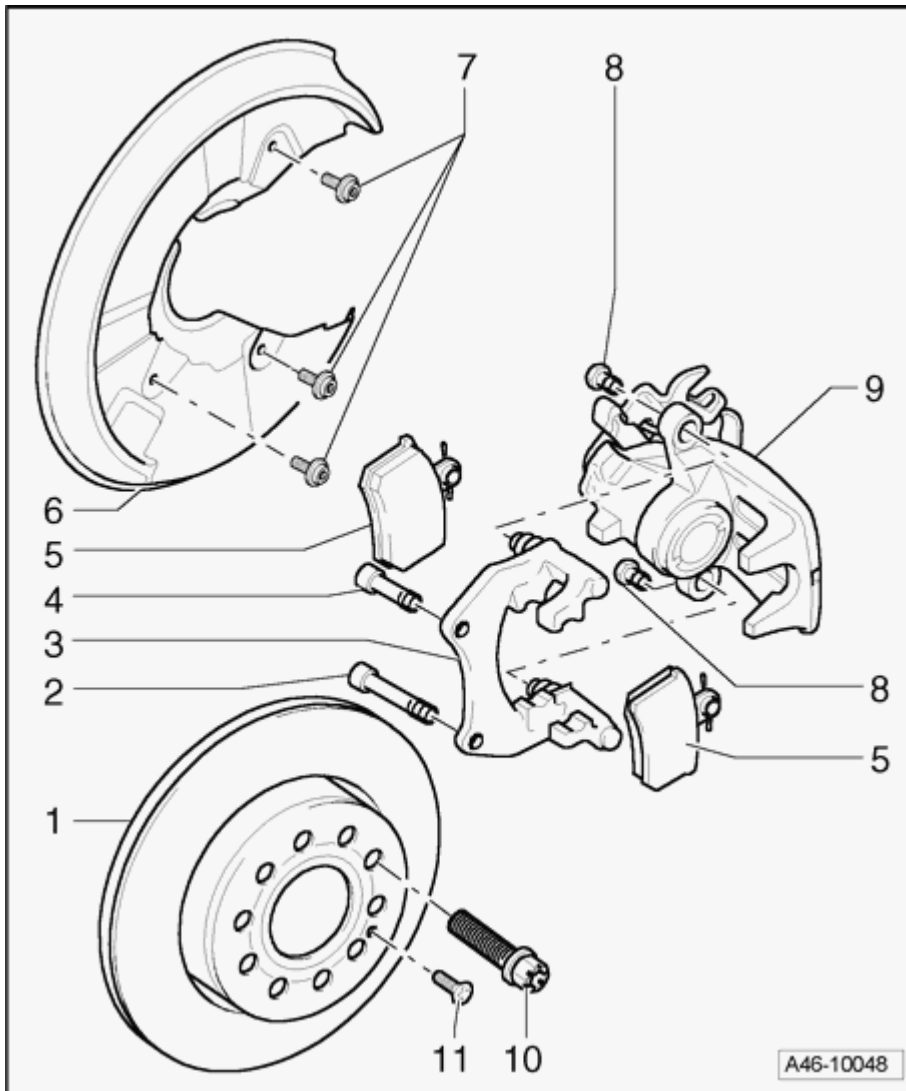


Fig. 96: Exploded View Of Brake Calipers C38

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Tighten evenly, on both sides, starting from thickness when new
- Allocation --> **Brakes**
- Thickness --> **Brakes**

2 - Ribbed bolt, 75 Nm

- M10x1.25 x 60
- Always replace
- Use socket T40027

3 - Brake carrier with guide pins and protective caps

- Replacement carriers are supplied assembled and with sufficient grease on guide pins
- If protective caps or guide pins are damaged, replace using repair kit. Use grease packet supplied to lubricate guide pins.

4 - Ribbed bolt, 75 Nm

- Always replace
- M10x1.25 x 50

5 - Brake pads

- Always replace both sides
- Removing and installing --> **Brake pads, removing and installing**
- Checking pad thickness:
- Different versions ETKA

6 - Brake disc cover

7 - Collar bolt, 10 Nm

- M6x12

8 - Self-locking bolt, 35 Nm

- Always replace
- When loosening and tightening, counter-hold on guide pin

9 - Brake caliper housing

- Do not disconnect brake hose when changing brake pads
- Servicing brake calipers

10 - Wheel bolts

- Installing wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

11 - Torx bolt

- Tightening torque: 5 Nm

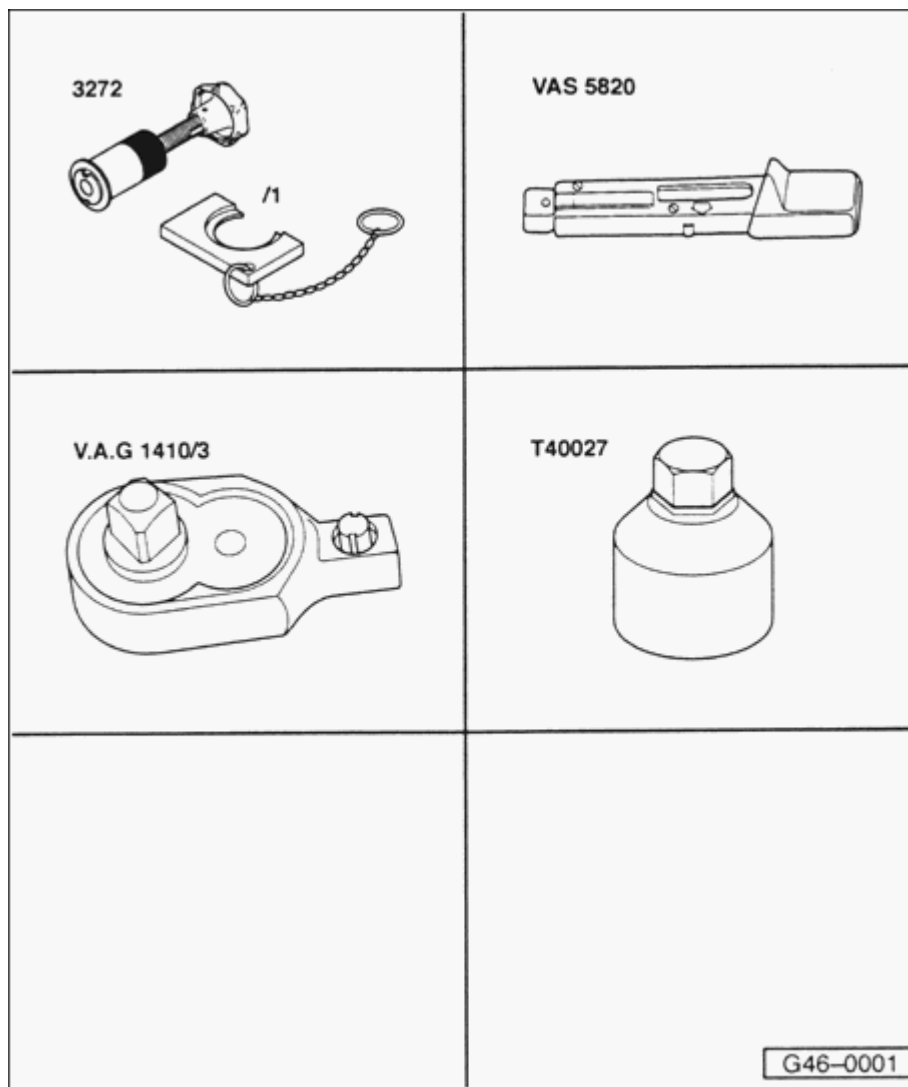
Brake pads, removing and installing

Fig. 97: Identifying Special Tools - Brake Pads, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Reset and screw out tool 3272 or
- Resetting extracting tool T10165
- Torque wrench VAS 5820
- Ratchet V.A.G 1410/3
- Socket T40027

Removing**NOTE:**

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

- Raise vehicle.
- Remove wheels.

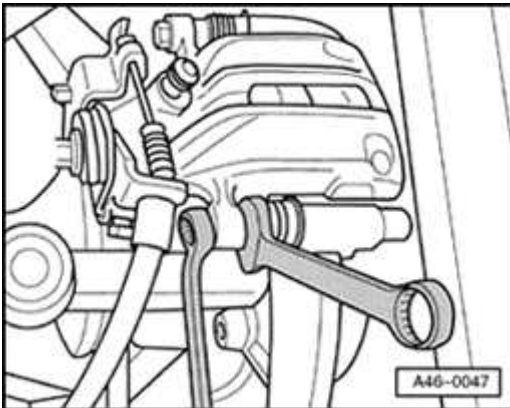


Fig. 98: Removing Securing Bolts From Brake Caliper Housing, While Counter-Holding On Guide Pins
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts from brake caliper housing, while counter-holding on guide pins.
- Remove brake pads.

Installing

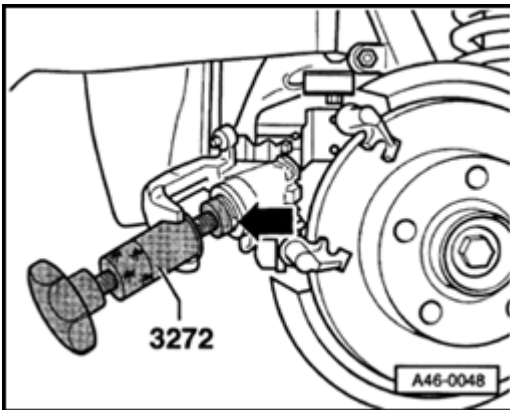


Fig. 99: Installing Piston By Turning Reset And Screwing Out Tool 3272 In Clockwise Direction
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install piston by turning reset and screw out tool 3272 in clockwise direction.

NOTE:

- Insert reset and screw out tool 3272 so that the collar is positioned against the piston.
- Press piston back into the cylinder with resetting tool, before inserting new brake pads. Draw off brake fluid from the reservoir with a bleeder bottle before pressing piston back. Otherwise brake fluid which was used to top off brake fluid reservoir, may run out and cause damage.

CAUTION: Brake fluid is poisonous and must never be extracted by mouth using a hose!

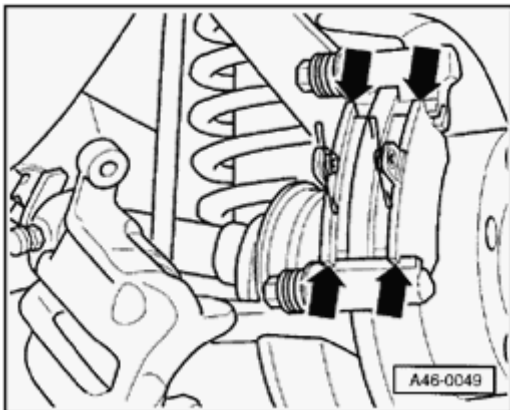


Fig. 100: Installing Brake Pads
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install brake pads.

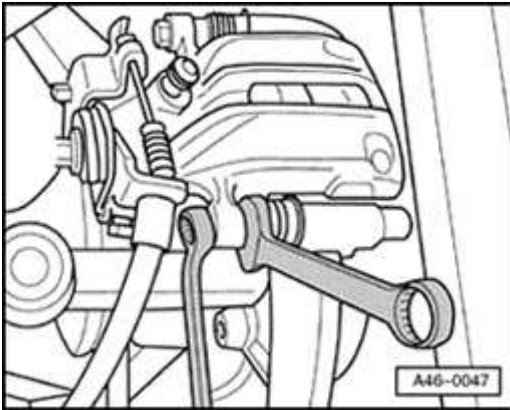


Fig. 101: Removing/Installing Securing Bolts From/To Brake Caliper Housing, While Counter-Holding On Guide Pins

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure brake caliper housing with new self-locking bolts.
- Tighten bolts on brake caliper housing, 35 Nm.

NOTE:

- The repair kit includes four self-locking hex bolts which must be installed in all cases.
- After each brake pad change firmly depress brake pedal several times with vehicle stationary, so that the brake pads are properly seated in their normal operating position.

Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT** .

- Check brake fluid level and top off if necessary.

REAR BRAKES C41/C43

Brake calipers, servicing

Rear wheel brakes with automatic adjustment

NOTE:

- Install all parts supplied in repair kit.
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
- To extract brake fluid from the brake fluid reservoir, use a bleeder bottle that only comes into contact with brake fluid. Brake fluid is poisonous and must never be extracted by mouth using a hose!



- Always replace
- Counter hold guide pin when loosening and tightening

- Remove before replacing brake pads
- Do not twist hose when installing
- Do not disconnect brake hose when changing brake pads
- Servicing brake calipers

3 - Brake pads

- Always replace both sides
- Do not disconnect brake hose when changing brake pads
- Removing and installing --> **Brake pads, removing and installing**
- Checking pad thickness:
- Different versions ETKA

4 - Brake pad retaining spring

- Always replace when changing pads

5 - Wheel bolts

- Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

6 - Torx bolt

- Tightening torque: 5 Nm

7 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Lubricate contact surfaces between brake disc and wheel hub with *polycarbamide grease G 052 142 A2*.
- Make sure there is sufficient wear limit
- Allocation --> **Brakes**
- Thickness --> **Brakes**

8 - Hex socket head bolts, 75 Nm

- M10x60
- Always replace

9 - Brake carrier with guide pins and protective caps

- Replacement carriers are supplied assembled and with sufficient grease on guide pins
- If protective caps or guide pins are damaged, replace using repair kit. Use grease packet supplied to lubricate guide pins.

10 - Banjo bolt, 45 Nm

11 - Brake line with banjo union

- Do not twist hose when installing
- Remove from brake carrier to replace brake pads
- Do not twist hose when installing
- Do not disconnect brake hose when changing brake pads
- Servicing brake calipers

12 - Seals

Brake pads, removing and installing



Fig. 103: Identifying Special Tools - Brake Pads, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Reset and screw out tool 3272 or
- Resetting extracting tool T10165
- Torque wrench VAS 5820
- Ratchet V.A.G 1410/3
- Socket T40027

Removing**NOTE:**

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

- Raise vehicle.
- Remove wheels.

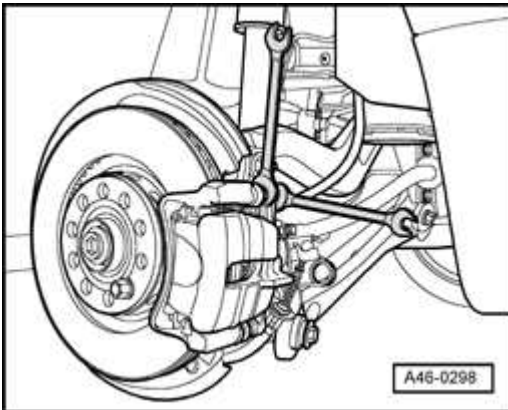


Fig. 104: Removing/Installing Securing Bolts From/To Brake Caliper Housing, While Counter-Holding On Guide Pins

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts from brake caliper housing, while counter-holding on guide pins.

NOTE:

- To replace the lower brake caliper bolt on quattro versions, first disengage the brake cable.

NOTE:

- On RS-4 model 8EC, do not loosen upper bolt with damper and only fold brake caliper up to change brake pad.

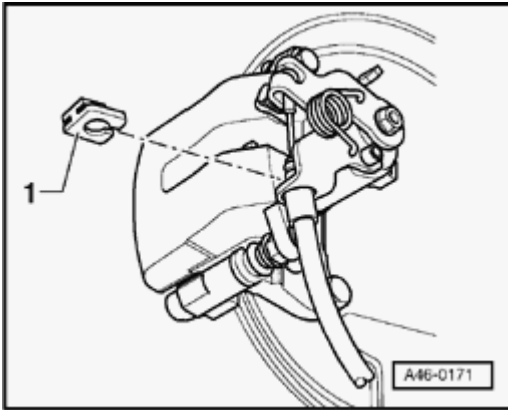


Fig. 105: Removing/Installing Retaining Clip And Disconnecting/Connecting Parking Brake Cables At Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining clip - **1** - and disconnect parking brake cables at brake caliper.
- Remove brake caliper housing and lay to one side so that the weight of the brake caliper does not stress or damage the brake hose.

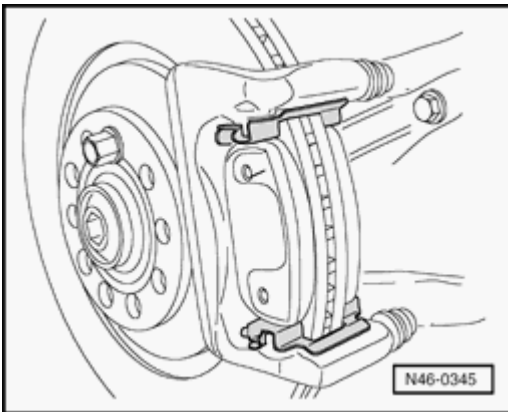


Fig. 106: Identifying Brake Pads, Guide Clips & Brake Caliper Housing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove brake pads.
- Remove guide clips.
- Remove brake pads from housing.
- Clean brake caliper housing, especially brake pad contact surface.

Use methylated spirits to clean the brake caliper housing.

NOTE:

- Press piston back into the cylinder with resetting tool, before inserting new brake pads. Draw off brake fluid from the reservoir with a bleeder bottle before pressing piston back. Otherwise brake fluid which was used to top off brake fluid reservoir, may run out and cause damage.

CAUTION: Brake fluid is poisonous and must never be extracted by mouth using a hose!

Installing

Use methyated spirits to clean the brake caliper housing.

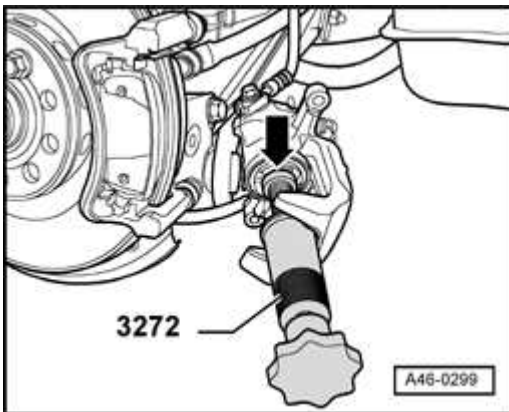


Fig. 107: Screwing In Piston By Turning Reset And Screw Out Tool 3272 Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw in piston by turning reset and screw out tool 3272 clockwise.

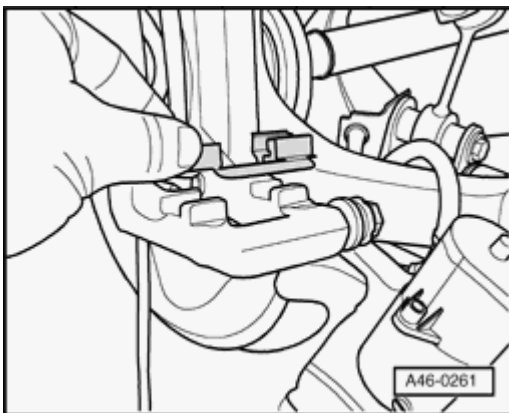


Fig. 108: Inserting Pad Retaining Springs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert pad retaining springs.

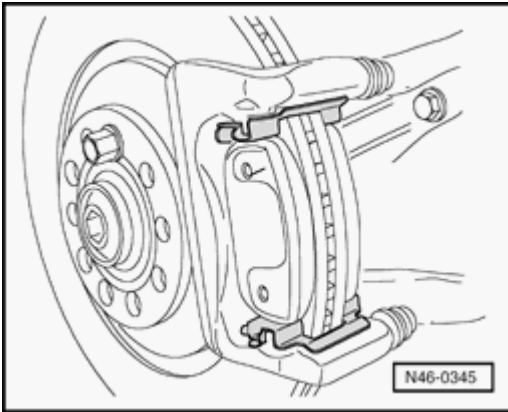


Fig. 109: Identifying Brake Pads, Guide Clips & Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install brake pads.

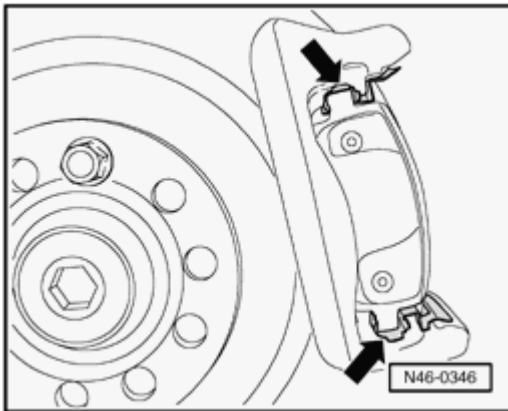


Fig. 110: Identifying Brake Pads Are Located Correctly In Anti-Rattle Springs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure that the brake pads are located correctly in the anti-rattle springs - **arrows** -.

NOTE:

- The repair kit includes four self-locking hex bolts which must be installed in all cases.

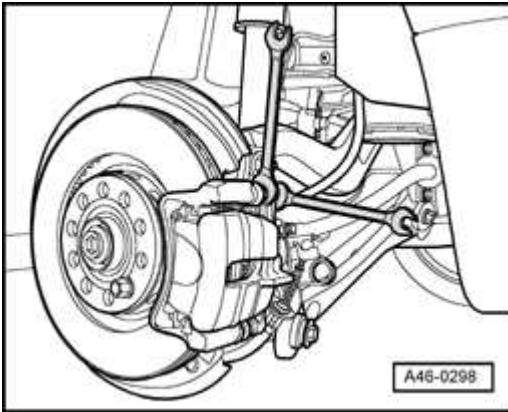


Fig. 111: Removing/Installing Securing Bolts From/To Brake Caliper Housing, While Counter-Holding On Guide Pins

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure brake caliper housing with new self-locking bolts.
- Make sure not to twist the brake hose when installing.
- Tighten bolts on brake caliper housing, 35 Nm.
- Install brake cable.

NOTE:

- After each brake pad change firmly depress brake pedal several times with vehicle stationary, so that the brake pads are properly seated in their normal operating position.

Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT** .

- Check brake fluid level and top off if necessary.

REAR BRAKES, RS4 (MODEL 8EC)/C43

Brake caliper, servicing

Rear wheel brake with automatic adjustment

NOTE:

- Only install complete repair kit
- After replacing brake pads, depress brake pedal firmly several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.
- To extract brake fluid from the brake fluid reservoir, use a bleeder bottle that only comes into contact with brake fluid. Brake fluid is poisonous and must never be extracted by mouth using a hose!
- Brake testing can be done on all commercially-available brake test stands, as long as the drive speed of both test stand drive rollers is not more than 5.5 km/h.

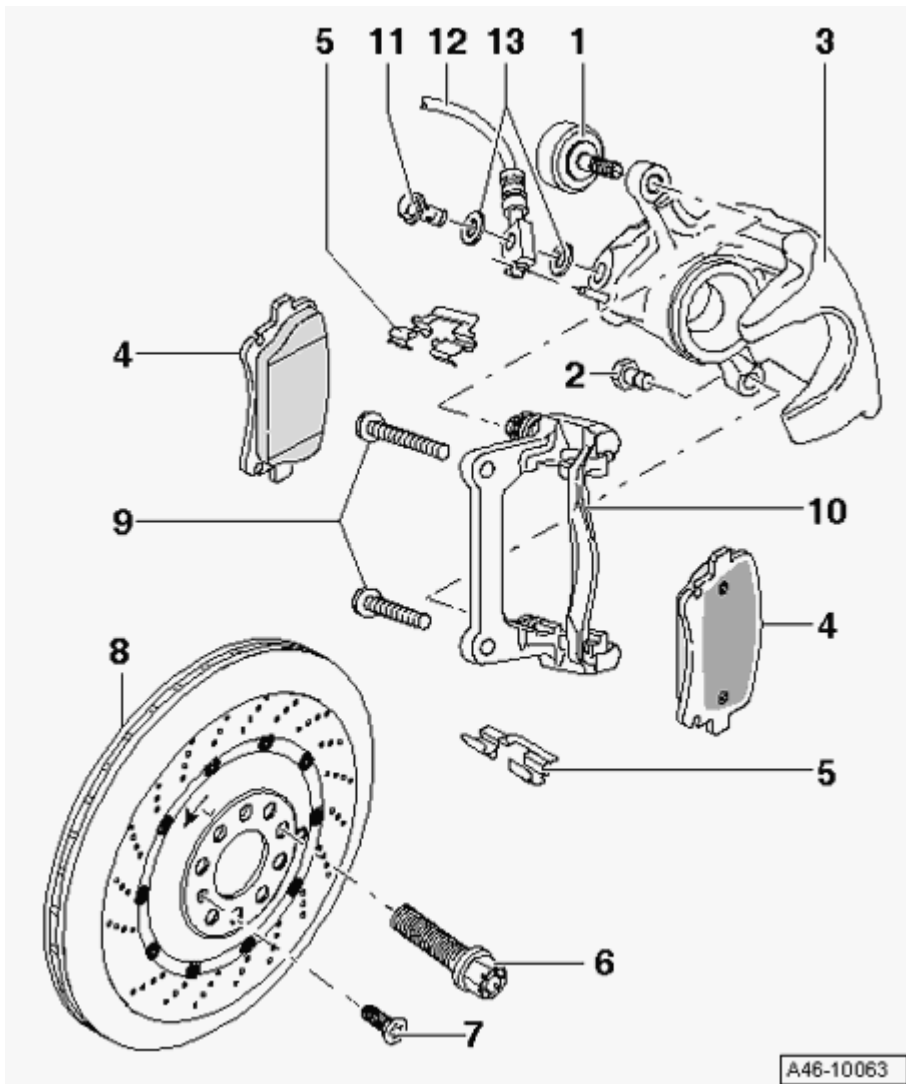


Fig. 112: Exploded View Of Rear Brakes, RS4 (Model 8EC)/C43
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Hex socket head screw with damper, self-locking, 35 Nm

NOTE:

- Do not loosen screw with damper when changing brake pads!
- Always replace
- When loosening and tightening counter hold on guide pin

2 - Hex socket head screw, self-locking, 35 Nm

- Always replace
- When loosening and tightening counter hold on guide pin

3 - Brake caliper housing

- Unclip parking brake cable from caliper. --> **Parking brake cables (AWD vehicles), removing and installing**
- Fold upward to replace brake pads.
- Hose must be installed free of twists
- Do not disconnect brake hose when changing brake pads
- Brake caliper, servicing

4 - Brake pads

- Always replace both sides
- Do not disconnect brake hose when changing brake pads
- To change brake pads, only remove lower brake caliper bolt, item 2, and fold caliper up.
- Removing and installing --> **Brake pads, removing and installing**
- Checking brake pad thickness: 803
- Different versions ETKA

5 - Brake pad retaining spring

- Always replace when changing pads

6 - Wheel bolts

- Mounting wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

7 - Torx bolt

- Torque specification 5 Nm

8 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Coat contact surfaces between brake disc and wheel hub with *Polycarbamide grease G 052 142 A2* .
- Ensure sufficient wear limit
- Application --> **Brakes**
- Thickness --> **Brakes**

9 - Hex socket heat screw, 75 Nm

- M10x60

- Always replace

10 - Brake carrier with guide pins and protective cap

- Supplied as replacement part assembled with sufficient grease on guide pins
- If protective caps or guide pins are damaged use repair kit. Use supplied grease packet to lubricate guide pins.

11 - Banjo bolt, 45 Nm

12 - Brake line with banjo fitting

- Hose must be installed free of twists
- To replace brake pads, unfasten from brake carrier
- Do not disconnect brake hose when changing brake pads
- Brake caliper, servicing

13 - Seals

PARKING BRAKE CABLES (FWD VEHICLES), REMOVING AND INSTALLING

Parking brake cables (FWD vehicles), removing and installing

Removing:

- Remove center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove wheels.
- Detach underside panel on left rear and right rear and unclip parking brake cables.
- Detach underside panel (left-side) - approx. 8 bolts.
- Detach inner underside panel at exhaust pipe.
- Detach rear exhaust pipe.

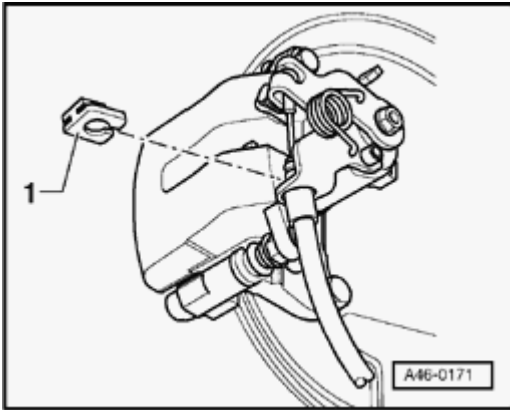


Fig. 113: Removing/Installing Retaining Clip And Disconnecting/Connecting Parking Brake Cables At Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out retaining clip - 1 - and unhook parking brake cables at brake caliper.

NOTE:

- Do not damage parking brake boot when removing and installing.

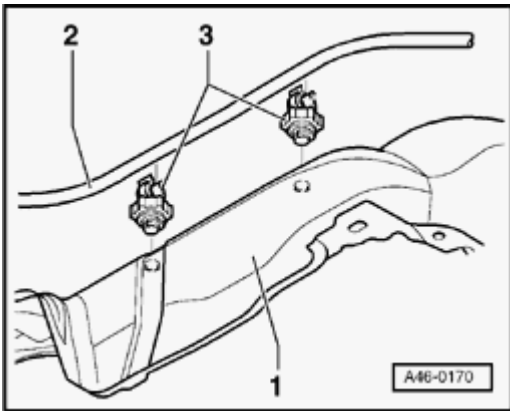


Fig. 114: Unclipping Brake Line From Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip brake line - 2 - from retainer - 3 -.

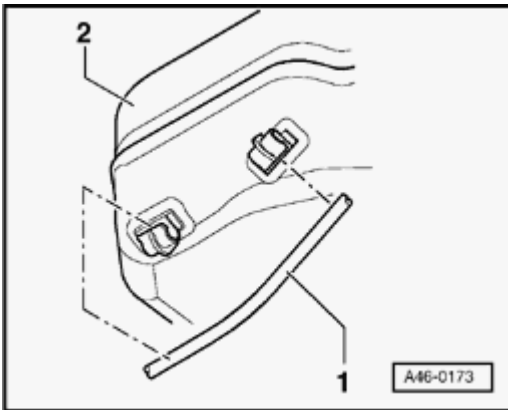


Fig. 115: Unclipping Parking Brake Cables From Fuel Tank (Clip)
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip parking brake cables - 1 - from fuel tank (clip) - 2 -.

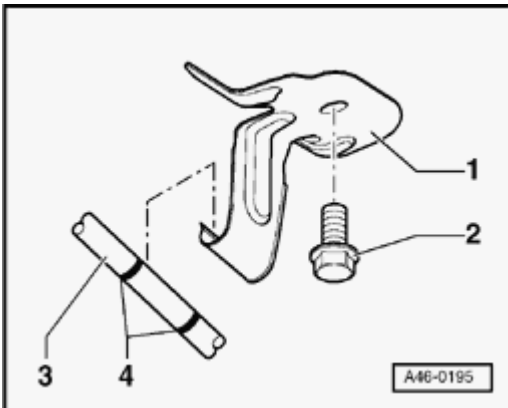


Fig. 116: Unclipping Parking Brake Cables From Retainer
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip parking brake cables - 3 - from retainer - 1 -.

Before installing new parking brake cables you must remove the parking brake lever and reset the mechanism.

Removing and installing parking brake lever --> **Parking brake handle, removing and installing**

Installing

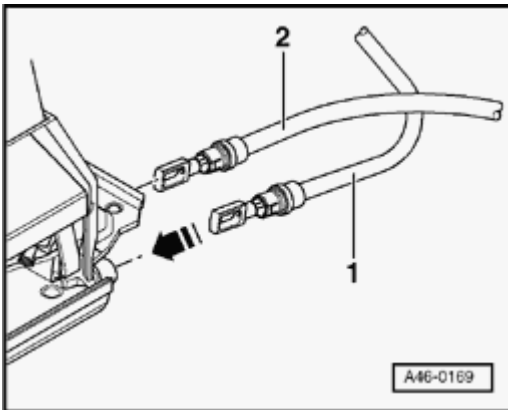


Fig. 117: Clipping On Parking Brake Cable Until It Engages
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clip on parking brake cable until it engages.

NOTE:

- Cable - 1 - must lie under cable - 2 - at cross point.

- Clip cable into retainers provided.

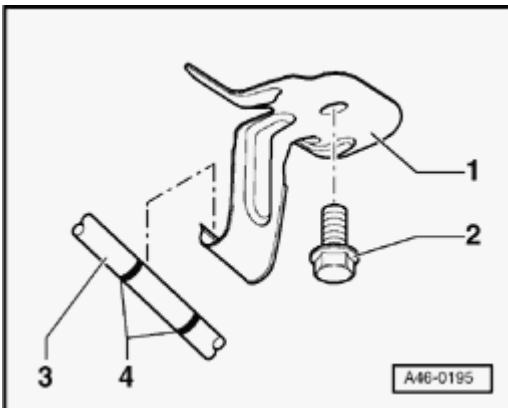


Fig. 118: Unclipping Parking Brake Cables From Retainer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The clip loop on the retainer must be located between the two positioning rings - 4 -.
- Tightening torque for item - 2 - : 25 Nm
- Secure parking brake cables to underside and fuel tank.

NOTE:

- Do not damage parking brake boot when removing and installing.

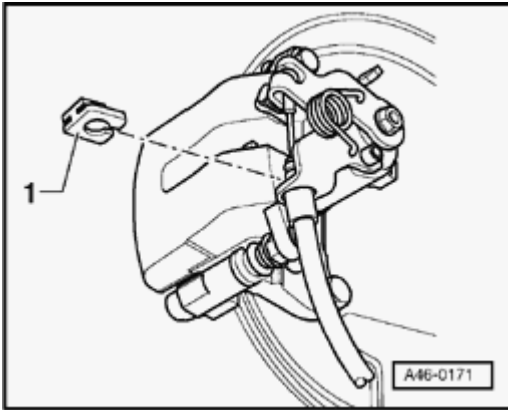


Fig. 119: Removing/Installing Retaining Clip And Disconnecting/Connecting Parking Brake Cables At Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hook parking brake cable into brake caliper and insert retaining clip - 1 -.

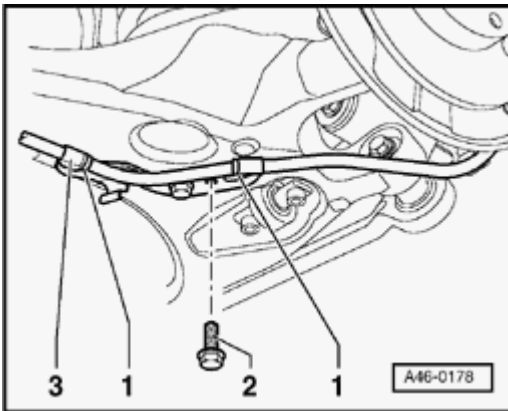


Fig. 120: Identifying Positioning Rings Should Be On Inner Side Of Clips On Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Positioning rings - 1 - should be on the inner side of the clips on the retainer.
- Tightening torque for item - 2 - : 25 Nm
- Install heat shields.
- Install center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Adjust parking brake --> **Parking brake, adjusting.**

Parking brake, adjusting

NOTE:

- The rear brakes are self-adjusting, so the parking brake does not require adjustment in normal operation. Adjustment is only necessary after

replacing parking brake cables, brake calipers, brake pads or brake discs.

- The foot brake system must be bled and must be functioning properly.
- The parking brake lever, parking brake cables and brackets must be fully installed.

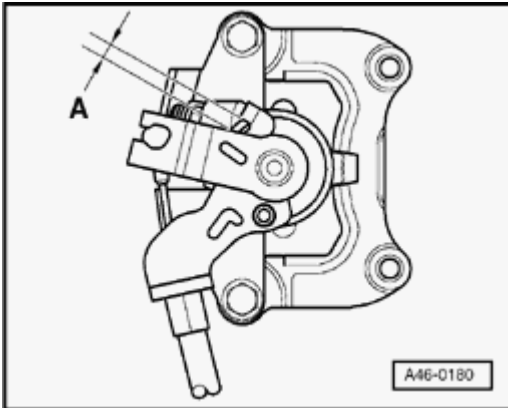


Fig. 121: Adjusting Lever Position At Brake Calipers

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Adjust lever position at brake calipers using feeler gauges to ensure that $A = 1.5 \text{ mm}$.
- Depress brake pedal firmly at least three times.

For ease of illustration the diagram shows parking brake lever removed from vehicle.

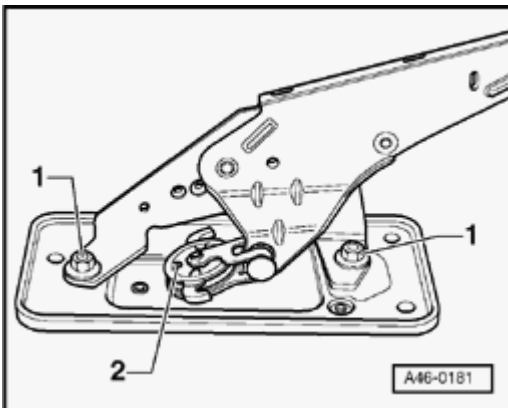


Fig. 122: Identifying Collar Nuts & Parking Brake Lever

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press release button - 2 -. (Both spring-loaded hooks must catch eyelets on parking brake cable).
- Let go of release button.
- Firmly apply parking brake lever at least 3 times.
- Place parking brake lever in rest position.
- Press release button. (Both spring-loaded hooks must catch eyelets on parking brake cable).

- Let go of release button.
- Remove feeler gauge from brake calipers.

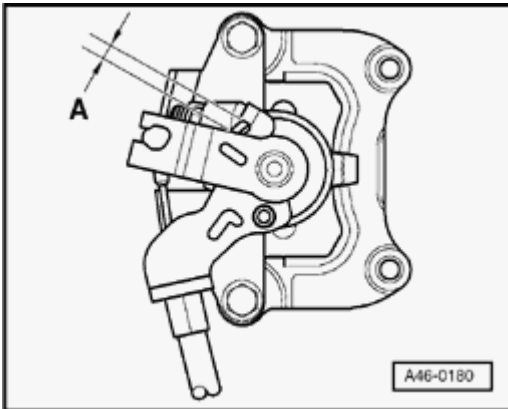


Fig. 123: Adjusting/Checking Lever Position At Brake Calipers
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check lever position at brake calipers.
- Distance A between lever and stop must be between 0 and 1.5 mm.

PARKING BRAKE CABLES (AWD VEHICLES), REMOVING AND INSTALLING

Parking brake cables (AWD vehicles), removing and installing

NOTE:

- The parking brake cable adjusting elements are in front of the rear lower transverse links.

Removing:

- Remove center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove wheels.
- Detach rear exhaust.
- Remove heat shield at rear of fuel tank.
- Remove rear tunnel heat shield (below drive shaft).
- Remove rear tunnel heat shield (above drive shaft).

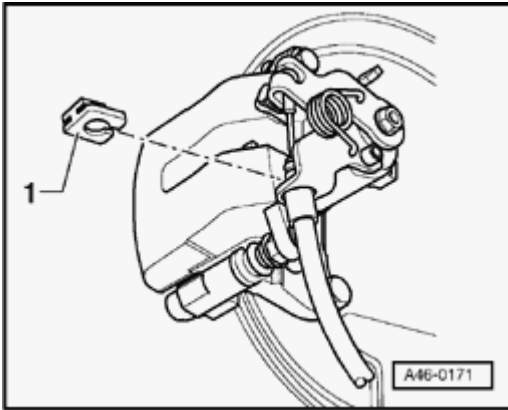


Fig. 124: Removing/Installing Retaining Clip And Disconnecting/Connecting Parking Brake Cables At Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out retaining clip - 1 - and unhook parking brake cables at brake caliper.

NOTE:

- Do not damage parking brake boot when removing and installing.

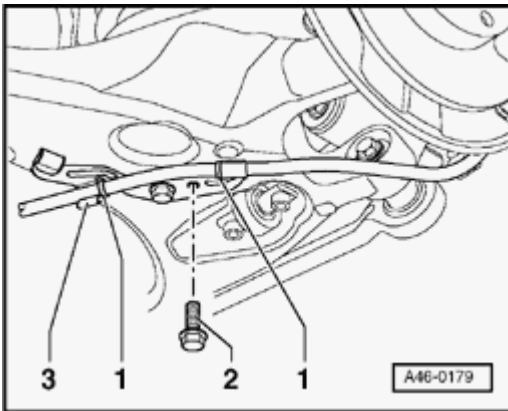


Fig. 125: Unclipping Brake Cable From Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip brake cable - 1 - from retainer - 3 -.

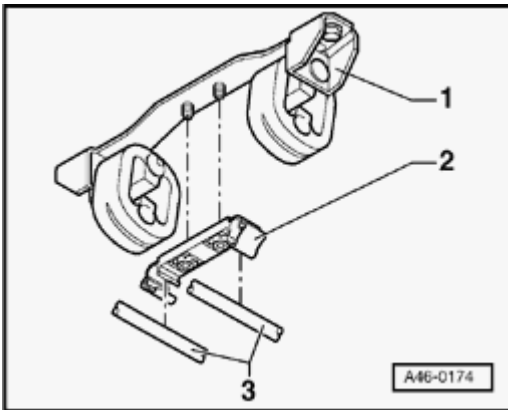


Fig. 126: Unclipping Brake Cable From Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip brake cable - 3 - from retainer - 2 -.

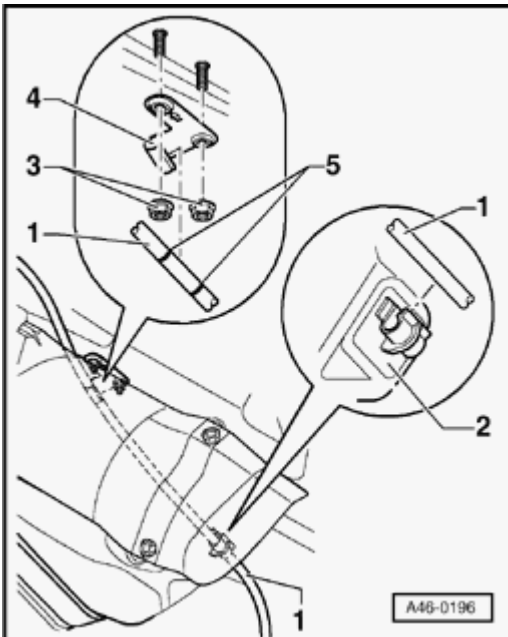


Fig. 127: Unclipping/Clipping Brake Cables From/To Retainers

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip brake cables - 1 - from retainers - 2 - and - 4 -.

Before installing new parking brake cables you must remove the parking brake lever and reset the mechanism.

Removing and installing parking brake lever --> **Parking brake handle, removing and installing**

Installing

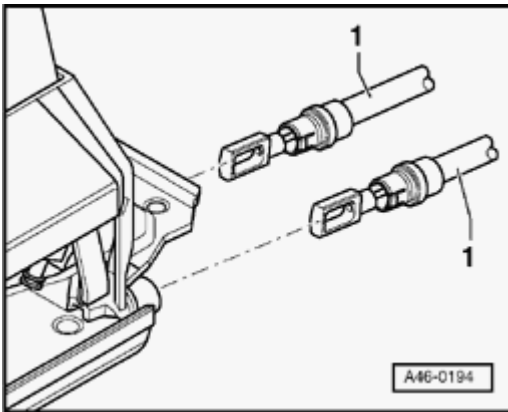


Fig. 128: Clipping On Parking Brake Cable Until It Engages
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clip on parking brake cable - 1 - until it engages.

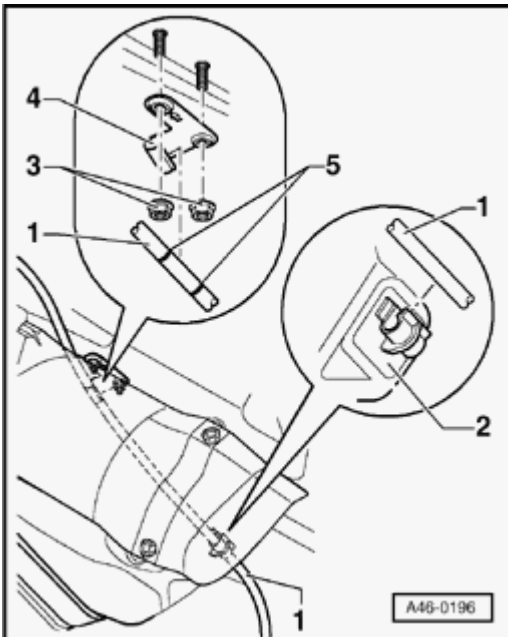


Fig. 129: Unclipping/Clipping Brake Cables From/To Retainers
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The clip loop on retainer must be located between two positioning rings - 5 -.

NOTE:

- **Clip attachment on retainer - 4 - must always face outside of the vehicle.**

- Tightening torque for item 3: 1.5 Nm
- Engage cable at exhaust mount.
- Attach parking brake cables to underside and tank and insert them into lever at brake caliper.

NOTE:

- Do not damage parking brake boot when removing and installing.

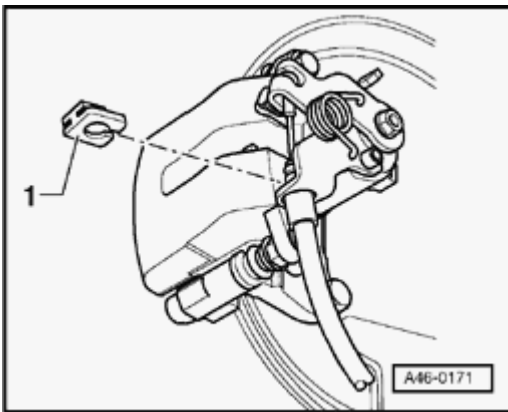


Fig. 130: Removing/Installing Retaining Clip And Disconnecting/Connecting Parking Brake Cables At Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hook parking brake cable into brake caliper and insert retaining washer - 1 -.

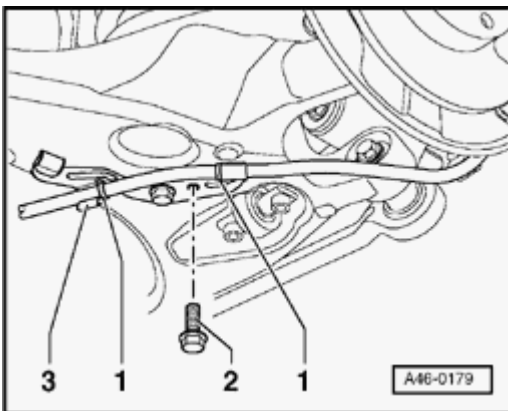


Fig. 131: Unclipping Brake Cable From Retainer

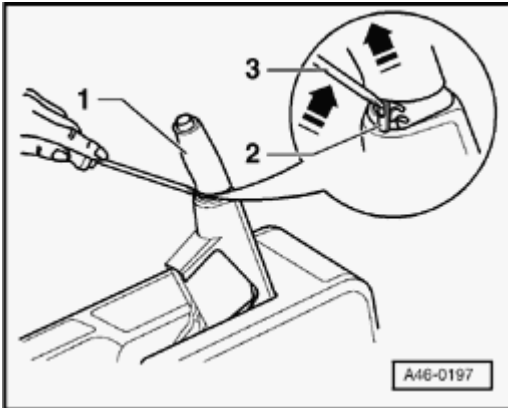
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Positioning rings - 1 - must align with clips on retainer.
- Tightening torque for Item - 2 - : 25 Nm
- Install heat shields.
- Adjust parking brake --> **Parking brake, adjusting.**
- Install center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

PARKING BRAKE LEVER WITH UNDER TRAY, REMOVING AND INSTALLING

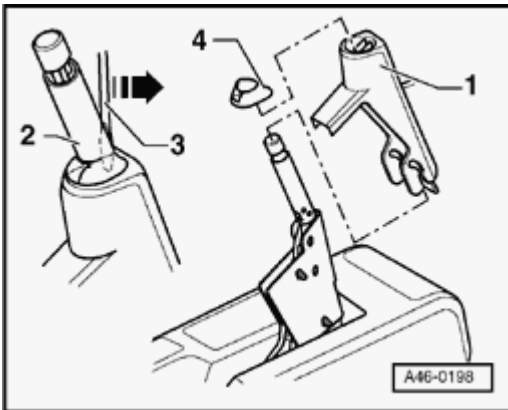
Parking brake lever with under tray, removing and installing**Removing**

- Remove center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

**Fig. 132: Releasing Handle With Screwdriver**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release handle - 1 - with a screwdriver - 3 - and remove.

**Fig. 133: Removing Cover And Handle**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - 4 - and handle - 1 -.

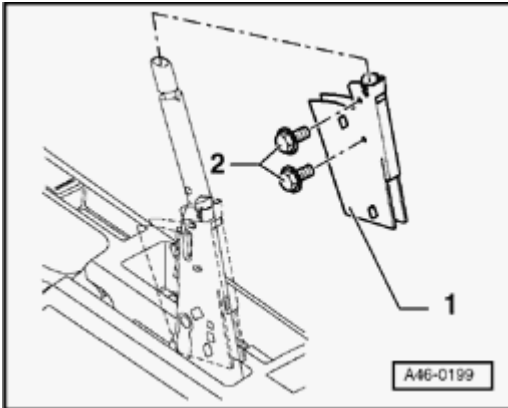


Fig. 134: Removing Hex Bolts And Carrier

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolts - 2 - and remove carrier - 1 - (tightening torque: 6 Nm).
- Remove floor covers.
- Remove left floor trim approx. 8 bolts.
- Remove inner floor trim at exhaust pipe
- Detach rear exhaust pipe.
- Remove heat shield at rear of fuel tank.
- Detach rear tunnel heat shield.
- Disconnect parking brake contact switch.

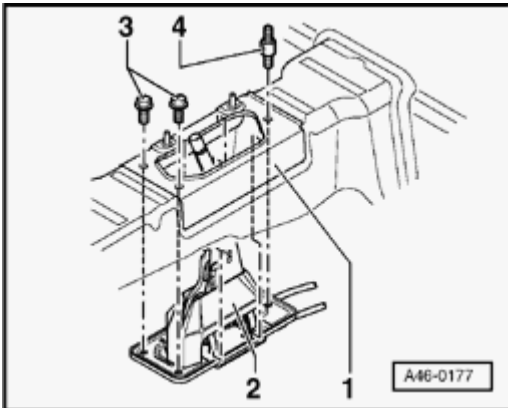


Fig. 135: Tightening Torque For Hex Bolt & Torque For Adapter With Washer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts, Items - 3 and 4 -.
- Remove parking brake lever downward.

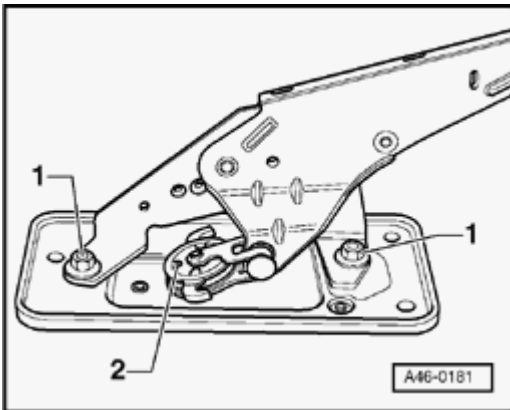


Fig. 136: Identifying Collar Nuts & Parking Brake Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove collar nuts - 1 - (tightening torque 25 Nm).
- Remove parking brake lever - 2 - from mounting plate.

Reset adjusting mechanism

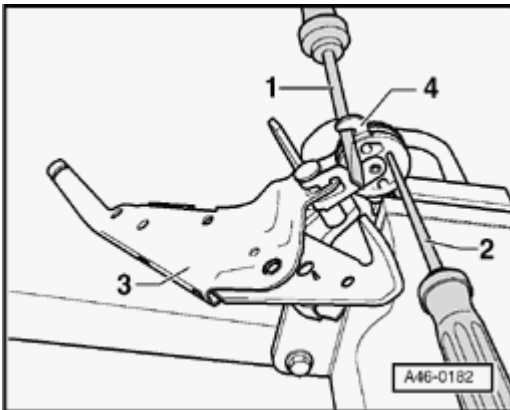


Fig. 137: Releasing Mechanism With Screwdriver & Pressing Back Second Spring-Loaded Hook With Another Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clamp one of the spring-loaded hooks in a vise.
- Release mechanism with a screwdriver - 2 - , at the same time pressing back the second spring-loaded hook with another screwdriver.

Installing

Installation is in reverse order of removal.

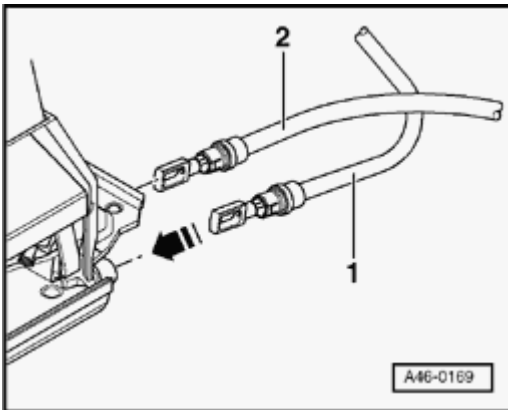


Fig. 138: Clipping On Parking Brake Cable Until It Engages
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert parking brake cable into compensator. (Vehicles with FWD drive)

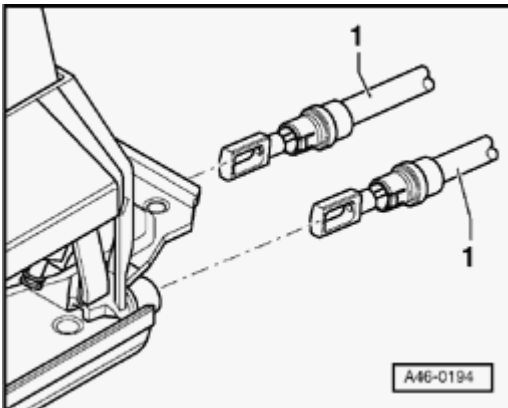


Fig. 139: Inserting Parking Brake Cable Into Compensator
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert parking brake cable into compensator. (Vehicles with AWD)

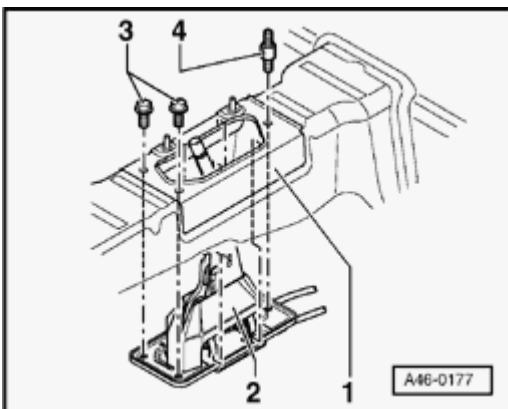


Fig. 140: Tightening Torque For Hex Bolt & Torque For Adapter With Washer
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tightening torque for hex bolt - 3 - : 25 Nm
- Tightening torque for adapter with washer - 4 - : 25 Nm
- Install center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Adjust parking brake --> **Parking brake, adjusting.**

Parking brake, adjusting

NOTE:

- The rear brakes are self-adjusting, so the parking brake does not require adjustment in normal operation. Adjustment is only necessary after replacing parking brake cables, brake calipers, brake pads or brake discs.
- The parking brake system must be bled and must be functioning properly.
- The parking brake lever, parking brake cables and brackets must be fully installed.

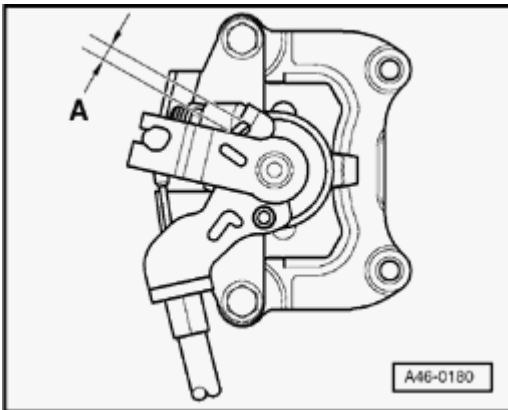


Fig. 141: Adjusting Lever Position At Brake Calipers

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Adjust lever position at brake calipers using feeler gauges to ensure that $A = 1.5$ mm.
- Depress brake pedal firmly at least three times.

For ease of illustration the diagram shows parking brake lever removed from vehicle.

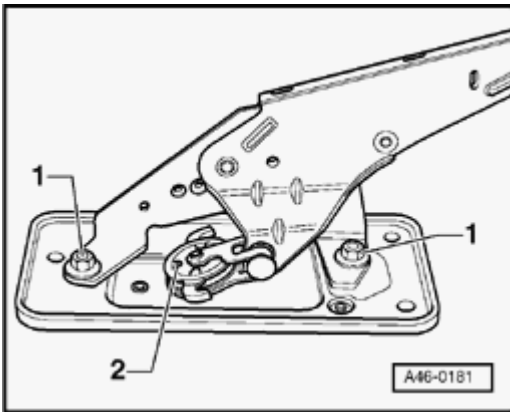


Fig. 142: Identifying Collar Nuts & Parking Brake Lever
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press release button - 2 -. (Both spring-loaded hooks must catch eyelets on parking brake cable).
- Let go of release button.
- Firmly apply parking brake lever at least 3 times.
- Place parking brake lever in rest position.
- Press release button. (Both spring-loaded hooks must catch eyelets on parking brake cable).
- Let go of release button.
- Remove feeler gauge from brake calipers.

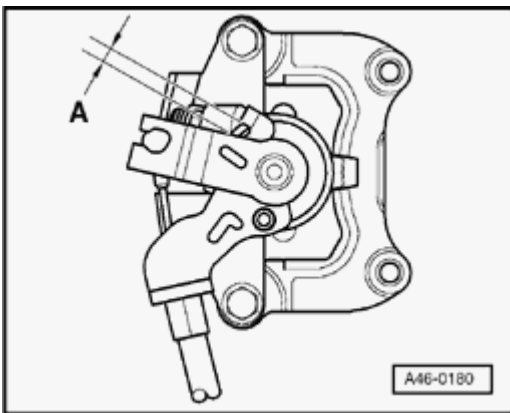


Fig. 143: Adjusting Lever Position At Brake Calipers
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check lever position at brake calipers.
- Distance A between lever and stop must be between 0 and 1.5 mm.

PARKING BRAKE HANDLE, REMOVING AND INSTALLING

Parking brake handle, removing and installing

Removing

- Remove center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

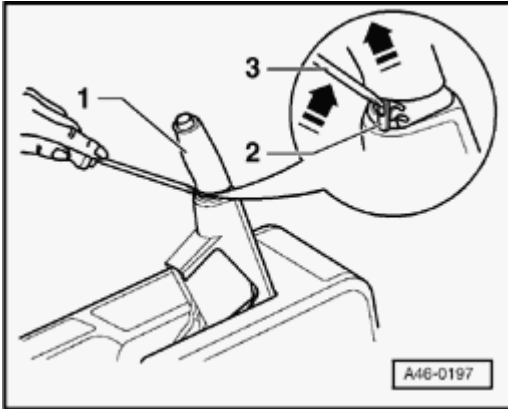


Fig. 144: Releasing Handle With Screwdriver

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release handle - 1 - with a screwdriver - 3 - and remove.

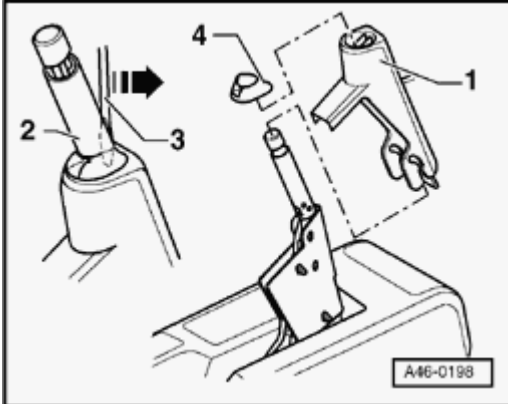


Fig. 145: Removing Cover And Handle

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - 4 - and handle - 1 -.

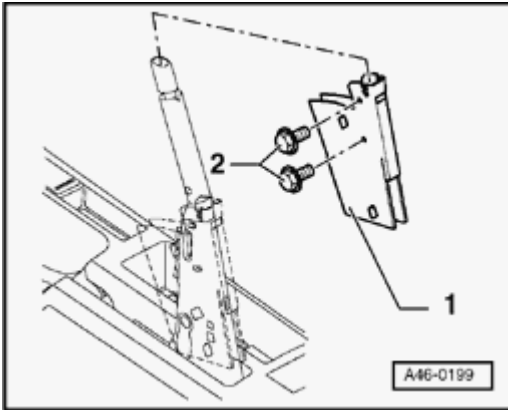


Fig. 146: Removing Hex Bolts And Carrier

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolts - 2 - and remove carrier - 1 - (tightening torque: 6 Nm).

With two cables attached

- Insert screwdriver into release opening.
- Push screwdriver in direction of "center adjustment".
- Keep screwdriver in this position and slowly operate parking brake lever.

NOTE:

- Make sure that the cable eyelets do not come off the hooks.

- Remove screwdriver.
- Unhook parking brake cables.

With one cable attached

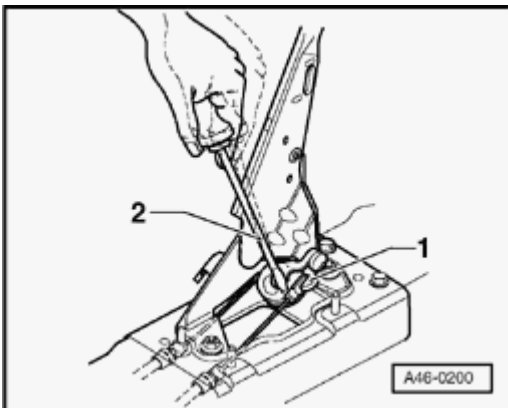


Fig. 147: Releasing Mechanism With Screwdriver & Pressing Back Second Spring-Loaded Hook

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release mechanism with a screwdriver - 2 - , at the same time pressing back the second spring-loaded

hook - 1 - with another screwdriver.

- Remove collar nuts - 1 - (tightening torque 25 Nm).
- Disconnect parking brake contact switch.

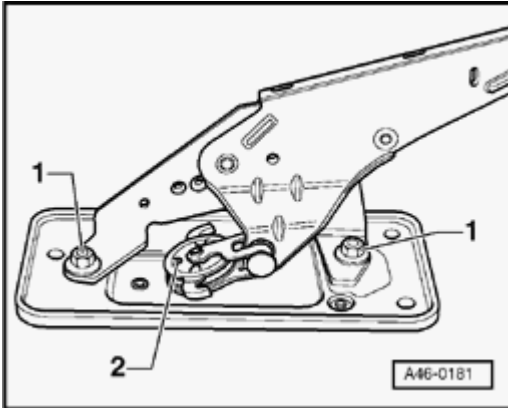


Fig. 148: Identifying Collar Nuts & Parking Brake Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove parking brake lever - 2 - from mounting plate.

Resetting adjustment mechanism

- Clamp spring-loaded hook in a vise.

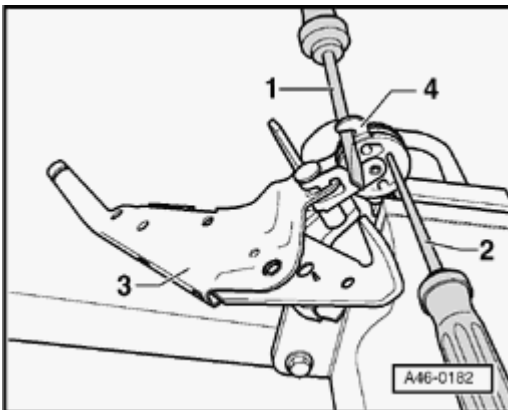


Fig. 149: Releasing Mechanism With Screwdriver & Pressing Back Second Spring-Loaded Hook With Another Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release mechanism with screwdriver - 2 - , at the same time pressing back second spring-loaded hook with another screwdriver.

Installing

- Installation is in reverse order of removal.

- Install center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Hand tighten both nuts - 1 -.

NOTE:

- The rear nut can be accessed through the ashtray opening, and the front one through a opening in the bottom of the storage compartment.

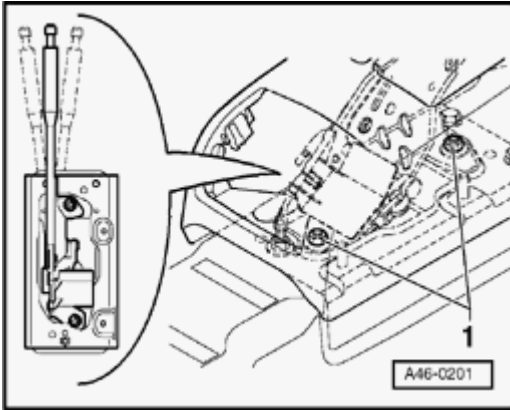


Fig. 150: Aligning Parking Brake Cable So That It Is In The Middle Of Recess For Center Console
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Align parking brake cable so that it is in the middle of the recess for the center console.
- Tighten nuts, tightening torque: 25 Nm
- Adjust parking brake --> **Parking brake, adjusting.**

BRAKE PEDAL, ASSEMBLY OVERVIEW**Brake pedal, assembly overview**

CAUTION: The brake pedal travel must not be restricted/shortened by additional floor coverings.

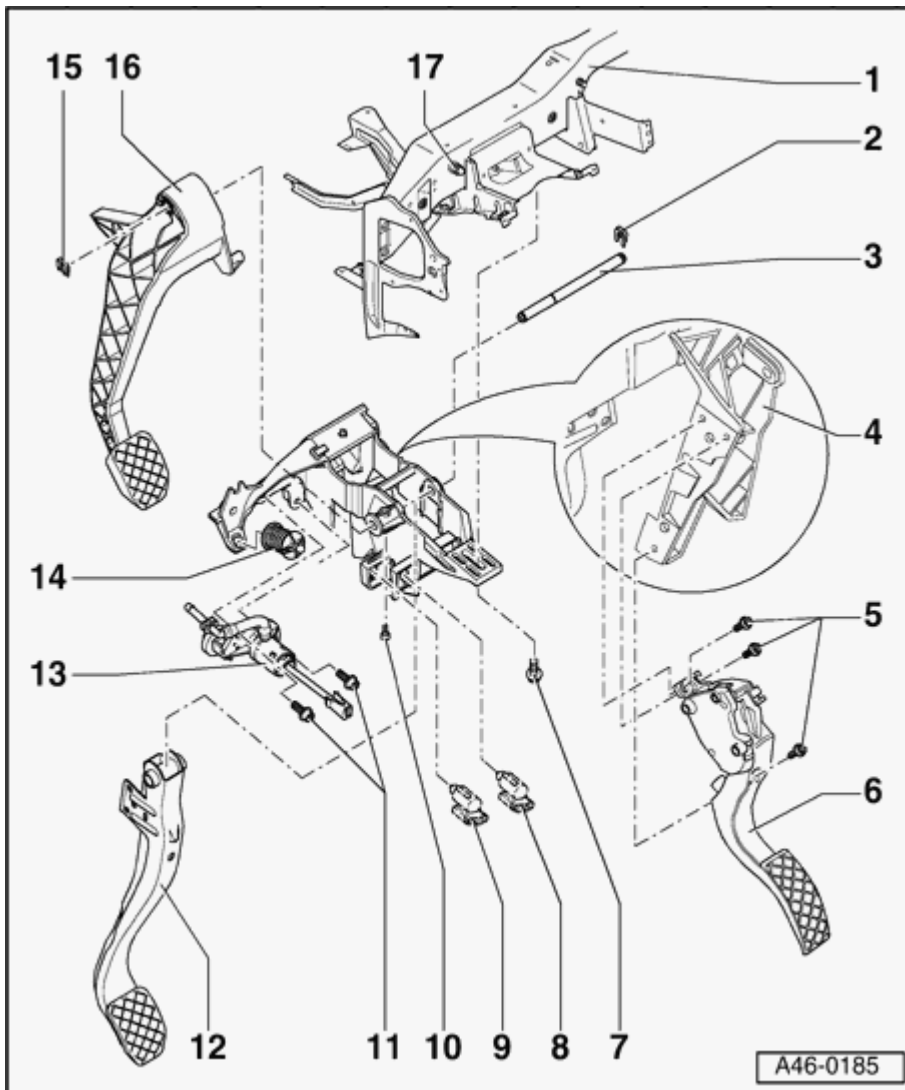


Fig. 151: Brake Pedal, Assembly Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Instrument panel cross member

2 - Retaining clip (2x)

- Always replace
- Install onto pin

3 - Pin

- Insert into clutch pedal and brake pedal
- Lock pin in pedal.

4 - Mounting bracket

- Accelerator pedal stop plate

5 - Hex socket head bolt, 10 Nm

6 - Accelerator module

- Screw into pedal bracket

7 - Combi bolt, 25 Nm

- Tighten in vehicle after brake booster has been installed

8 - Brake light switch

- Removing and installing --> **Brake light switch, removing and installing**

9 - Clutch switch

10 - Socket head bolts, 5 Nm

11 - Combi bolt, 20 Nm

- Always replace

12 - Brake pedal

- Install pin.
- Engage brake pedal in brake booster (you should hear it click into place).

13 - Master cylinder

- Seal must not be removed.

14 - Spring

- White spring mounting to pedal bracket, black spring mounting to clutch pedal

15 - Retainer

16 - Clutch pedal

- Secured by adjusting clutch master cylinder

17 - Pin

- Install pedal bracket onto pin.

BRAKE PEDAL BRACKET, REMOVING AND INSTALLING

Brake pedal bracket, removing and installing

Special tools, testers and auxiliary items required

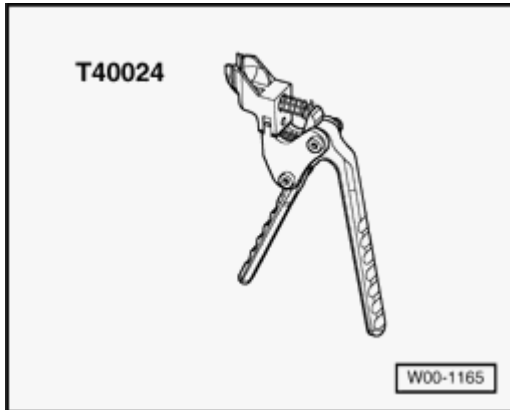


Fig. 152: Release Tool T40024

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release tool T40024

Removing

- Remove storage compartment on drivers side. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

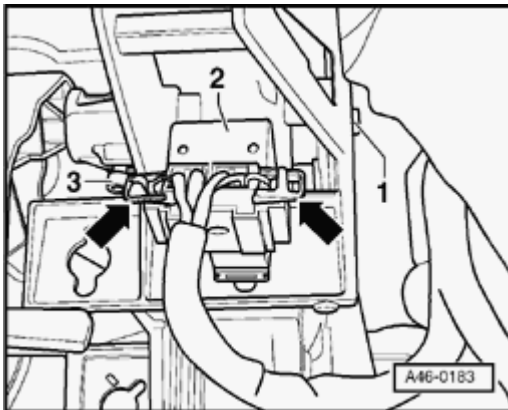


Fig. 153: Loosening Anti-Rotation Device (Socket Head Bolt) On Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen anti-rotation device (socket head bolt) - 3 - on bracket.

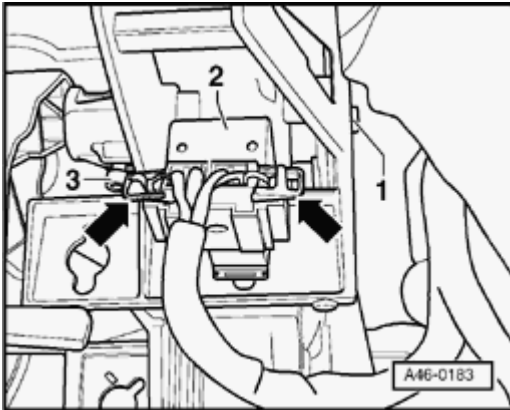


Fig. 154: Loosening Anti-Rotation Device (Socket Head Bolt) On Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press connector - 2 - together in direction of - **arrows** - and detach brake light switch.

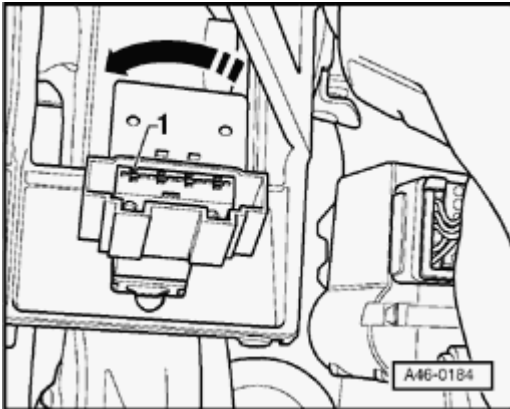


Fig. 155: Rotating Brake Light Switch 45° In Counter-Clockwise Direction And Remove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate brake light switch - 1 - 45° in counter-clockwise direction and remove.

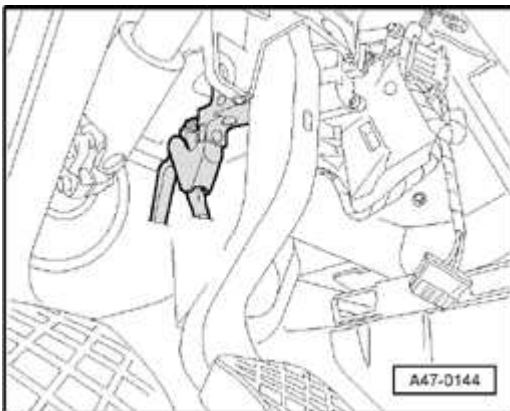


Fig. 156: Using Release Tool T40024 To Separate Brake Pedal From Brake Booster
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use release tool T40024 to separate brake pedal from brake booster.

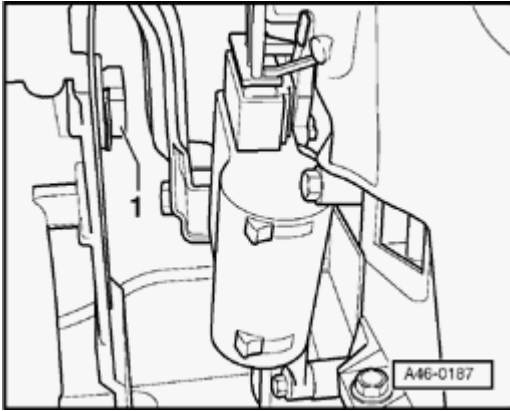


Fig. 157: Removing Circlip On Right Side

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - 1 - on right side.
- Pull pin far enough out to release brake pedal.
- Remove brake pedal.

Installing

- Insert pin through brake pedal.
- Only tighten anti-rotation device (socket head bolt) until retaining clips have been installed.

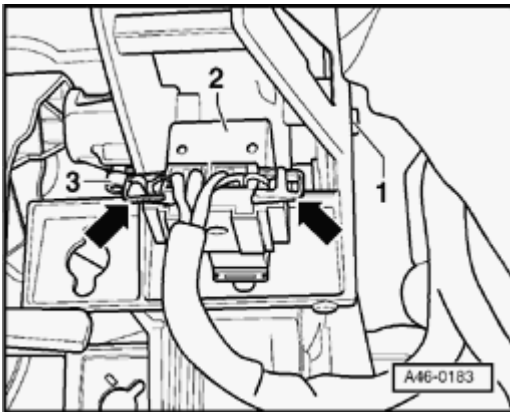


Fig. 158: Loosening Anti-Rotation Device (Socket Head Bolt) On Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install anti-rotation device (socket head bolt) - 3 - onto bracket.
- Install brake light switch --> **Brake light switch, removing and installing**

Installation is in reverse order of removal.

47 - BRAKES - HYDRAULIC COMPONENTS

PRESSURIZED LEAK TEST

Pressurized leak test

Special tools, testers and auxiliary items required

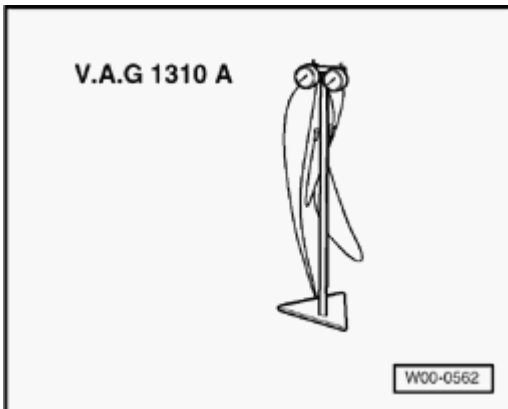


Fig. 159: Brake Pressure Gauge V.A.G 1310 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Brake pressure gauge 0-250 bar V.A.G 1310A

High and low pressure testing

Before starting:

Make sure that the brake system (master cylinder, brake hoses, brake lines and brake calipers) is free of leaks.

High-pressure test:

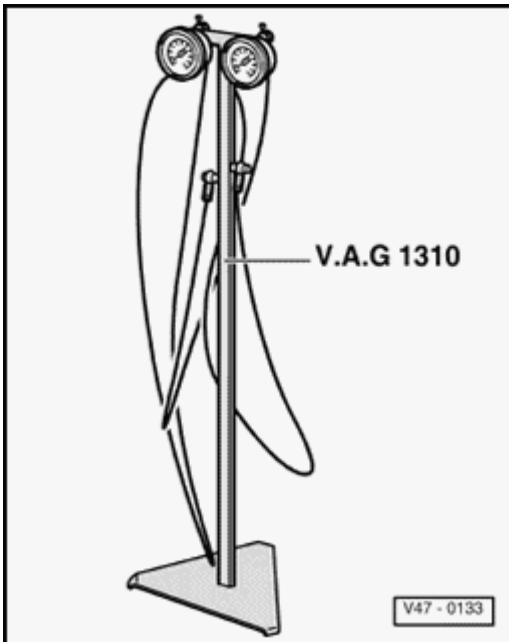


Fig. 160: Brake Pressure Gauge 0-250 Bar V.A.G 1310A
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bleeder screw at one of the front brake calipers. Connect brake pressure gauge 0-250 bar V.A.G 1310A and bleed tester.
- Start engine.
- Insert brake pedal depressor between brake pedal and drivers seat. Apply pressure to brake pedal until the gauge indicates a pressure of 50 bar.
- Switch off engine.
- The pressure must not drop by more than 4 bar during the test period of 45 seconds.

If pressure drops by more than 4 bar, inspect brake system for leaks and repair as required.

Low-pressure testing:

NOTE:

- Only perform low-pressure test if result of high-pressure test is OK.

- Adjust brake pedal loading device so that pressure gauge reads 6 bar positive pressure.
- The pressure must not drop by more than 1 bar during test period of 3 minutes.

If drop in pressure exceeds specification: replace ABS hydraulic unit.

Residual pressure test

Special tools, testers and auxiliary items required

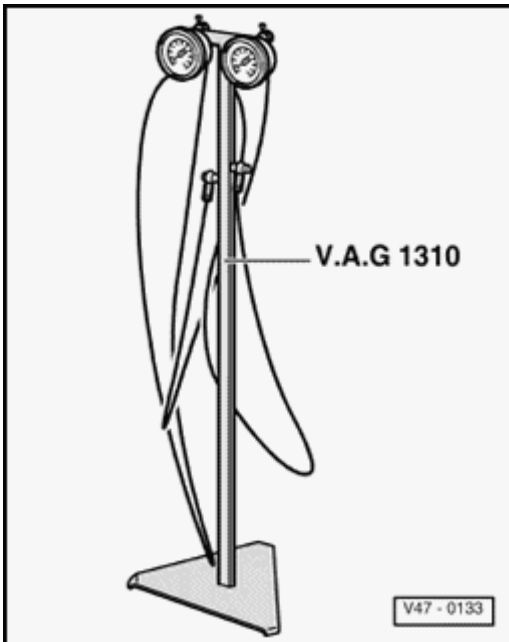


Fig. 161: Brake Pressure Gauge 0-250 Bar V.A.G 1310A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Brake pressure gauge 0-250 bar V.A.G 1310A

Make sure adequate brake booster pressure for this test.

Before starting:

- Vehicle raised on a two-column hoist.

Make sure that the brake system (master cylinder, brake hoses, brake lines and brake calipers) works properly and is free of leaks.

- Connect Brake pressure gauge 0-250 bar V.A.G 1310A.

Troubleshooting procedure if pads are worn on one side of the vehicle:

- Remove bleeder screw at one of the front brake calipers. Connect pressure gauge (brake pressure gauge 0-250 bar V.A.G 1310A).
- Start engine.

Simulate brake applications at various pressures up to approx. 100 bar.

- Operate brake pedal slowly at various pressures.
- Operate brake pedal rapidly at various pressures.
- Firmly depress brake pedal once as far as it will go.

If wheel is difficult to turn and there is no residual pressure in the system:

- The pad may be sticking in guide rail in caliper, or caliper may be dirty.
- The piston may be seized or sticking in caliper.

If wheel is difficult to turn and there is residual pressure in the system:

- The pedal mechanism may be sticking, or foreign bodies in pedal mechanism.
- If it is possible to pull back the brake pedal slightly so that the brake pressure drops to zero, the brake booster must be replaced, or the pedal mechanism is sticking.

Checking brake master cylinder

- Connect brake pressure gauge 0-250 bar V.A.G 1310A and build up a pressure of 5 - 10 bar without vacuum. Replace brake master cylinder if pedal yields continuously under this pressure.

BRAKE CALIPER C54

Brake calipers, servicing

NOTE:

- Install complete repair kit when servicing.
- New brake calipers are filled with brake fluid and are pre-bled.
- Apply thin coat of *lithium grease G 052 150 A2* to brake cylinder, piston and seal.

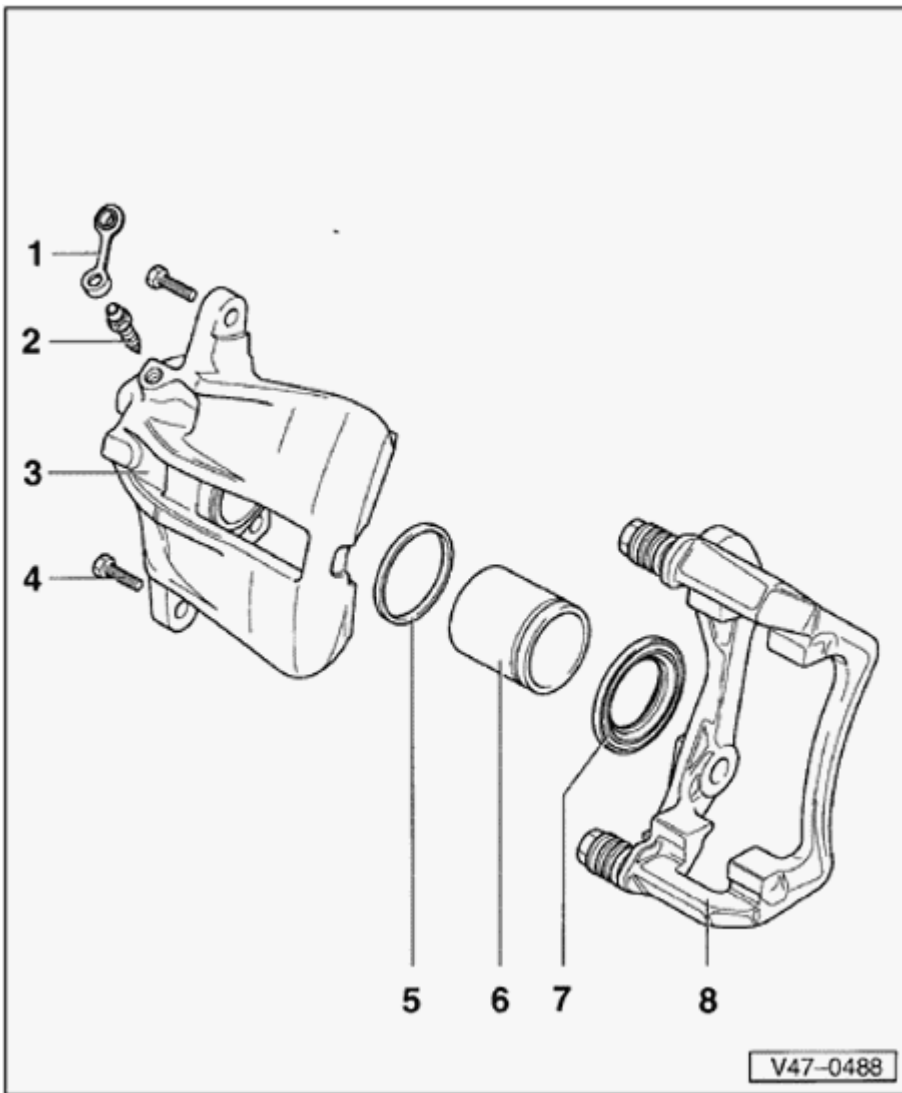


Fig. 162: Exploded View Of Brake Caliper C54

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Dust cap

- Push onto bleeder valve

2 - Bleeder valve

- Apply thin coat of *lithium grease G 052 150 A2* before screwing in

3 - Brake caliper housing

4 - Self-locking bolts, 30 Nm

- Always replace

- Counter-hold on guide pin when loosening and tightening

5 - Seal

- Removing and installing --> **Front caliper piston, removing and installing**

6 - Piston

- Removing and installing --> **Front caliper piston, removing and installing**
- Apply a thin coat of *lithium grease G 052 150 A2* to piston

7 - Protective seal

- Do not damage when inserting piston

8 - Brake carrier with guide pins and protective caps

- Replacement carriers are supplied assembled and with sufficient grease on guide pins

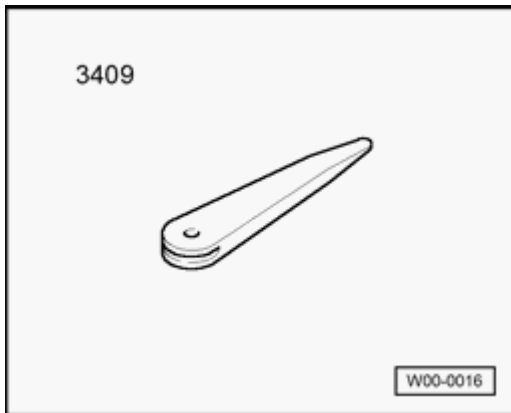
Front caliper piston, removing and installing**Special tools, testers and auxiliary items required**

Fig. 163: Identifying Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Trim removal wedge 3409

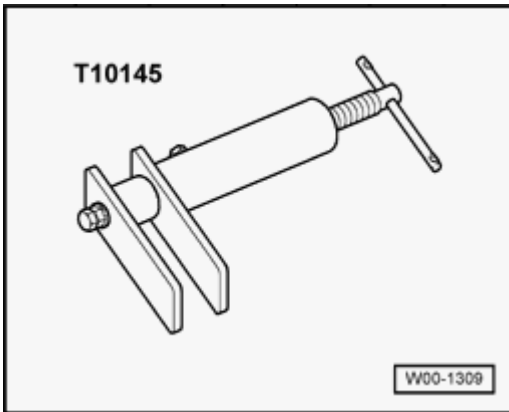


Fig. 164: Piston Resetting Tool T10145

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Piston resetting tool T10145

Removing

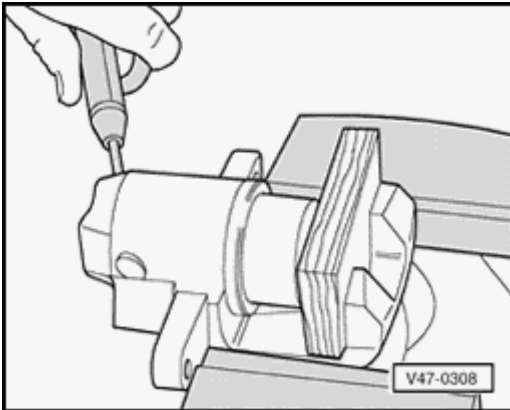


Fig. 165: Force Piston Out Of Brake Caliper Housing Using Compressed Air

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use compressed air to force piston out of brake caliper housing.

NOTE:

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

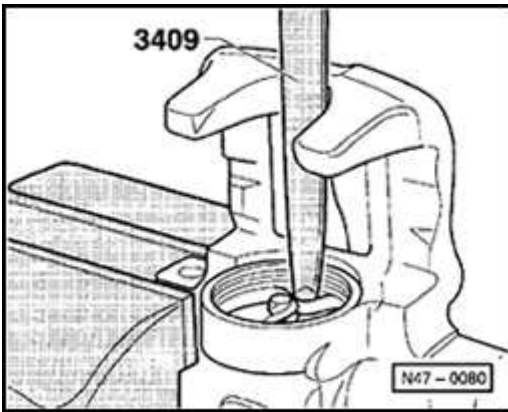


Fig. 166: Removing Seal Using Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove seal using trim removal wedge 3409.

NOTE:

- When removing, make sure that the surface of the cylinder is not damaged.

Installing

- Cleaned the surface of the piston and seal with methylated spirits and then dried.
- Apply a thin coat of *lithium grease G 052 150 A2* to piston and seal before inserting.

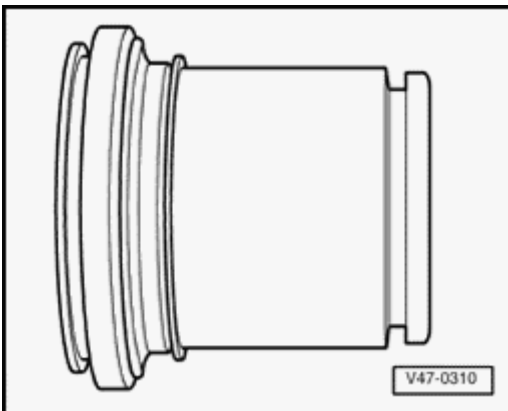


Fig. 167: Placing Protective Seal With Outer Sealing Lip On Piston
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place protective seal with outer sealing lip on piston.

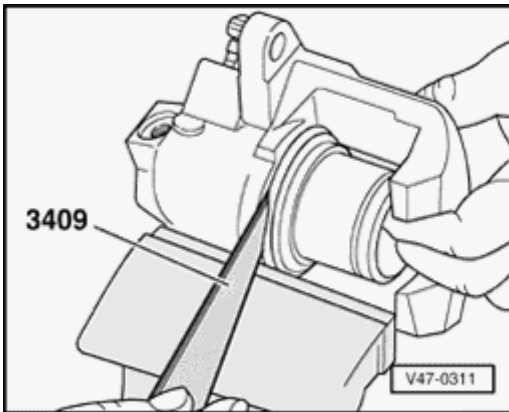


Fig. 168: Inserting Inner Sealing Lip Into Groove In Cylinder
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

NOTE:

- When doing this hold piston in front of caliper housing.

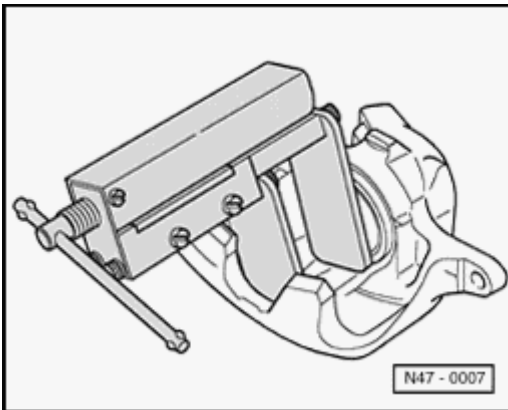


Fig. 169: Pressing Piston Into Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

NOTE:

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

BRAKE CALIPER FN3

Brake caliper, servicing

NOTE:

- Install complete repair kit when servicing.
- New brake calipers are filled with brake fluid and are pre-bled.

- Apply thin coat of *lithium grease G 052 150 A2* to brake cylinder, piston and seal.

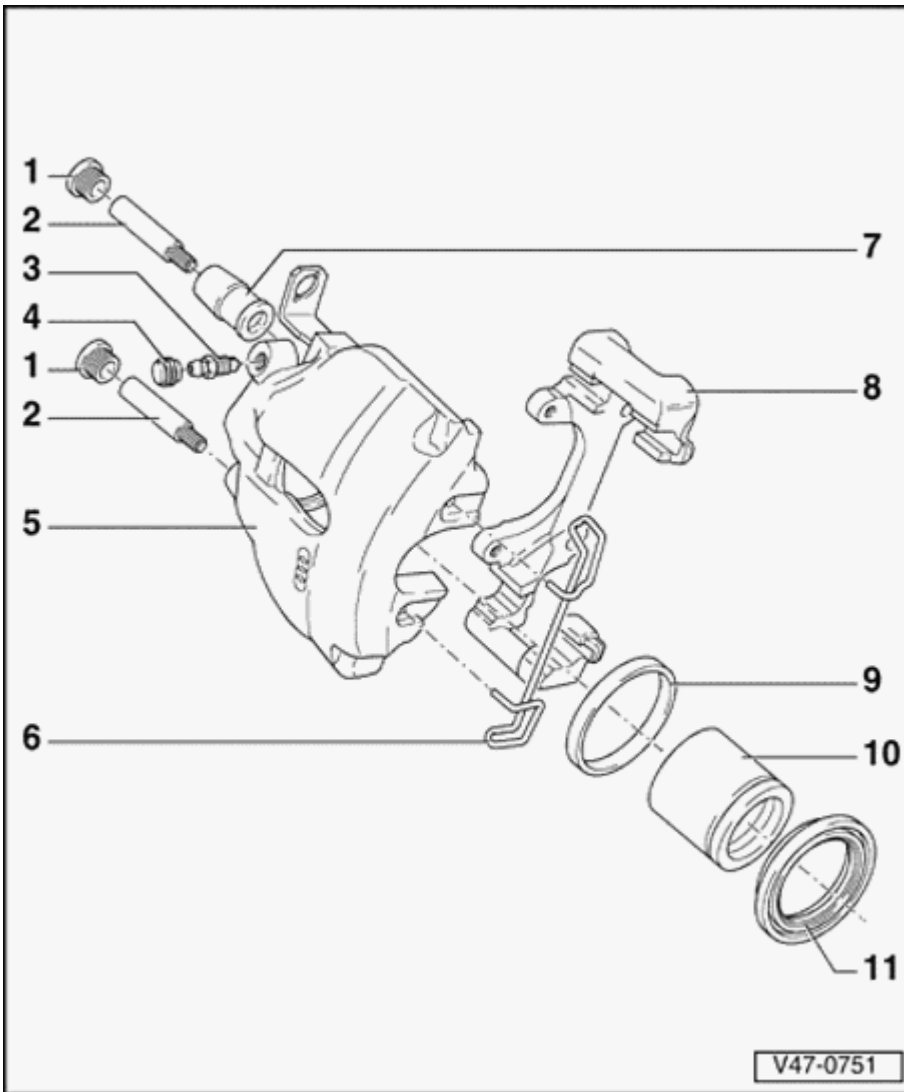


Fig. 170: FN3 Brake Caliper, Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Cap

- Insert into bushing

2 - Guide pins, 30 Nm

3 - Bleeder valve, 10 Nm

- Apply thin coat of *lithium grease G 052 150 A2* before screwing in

4 - Protective cap

- Push onto bleeder valve

5 - Brake caliper housing

6 - Retaining spring

- Insert with both ends in the holes in brake caliper housing

NOTE:

- **After inserting the retaining spring into the two holes, press it under the brake carrier. If incorrectly installed, it is not possible to adjust the wear of the outer pad, and the pedal travel will be increased as a result.**

7 - Bushing

- Insert into brake caliper housing

8 - Brake carrier

- Bolt to brake caliper housing

9 - Seal

10 - Piston

- Apply a thin coat of *lithium grease G 052 150 A2* to piston before inserting

11 - Protective cap

- Do not damage when inserting piston

Piston for front brake caliper, removing and installing**Special tools, testers and auxiliary items required**

- *Assembly paste G 052 150 A2*

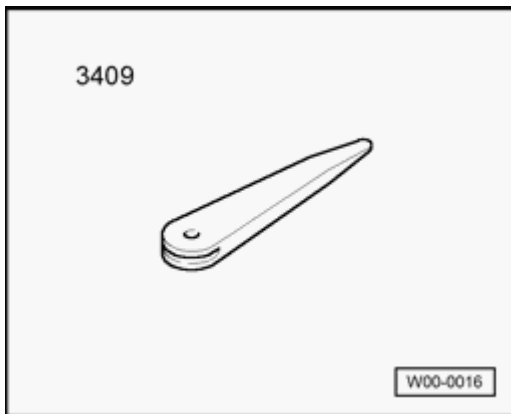


Fig. 171: Identifying Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Trim removal wedge 3409

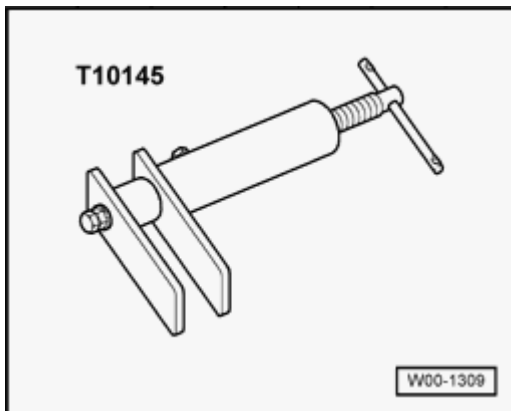


Fig. 172: Piston Resetting Tool T10145
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Piston resetting tool T10145

Removing

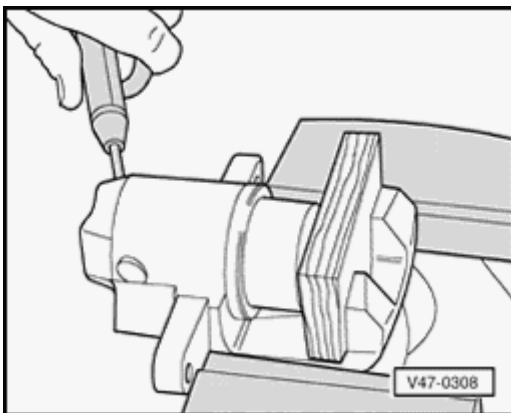


Fig. 173: Force Piston Out Of Brake Caliper Housing Using Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use compressed air to force piston out of brake caliper housing.

NOTE:

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

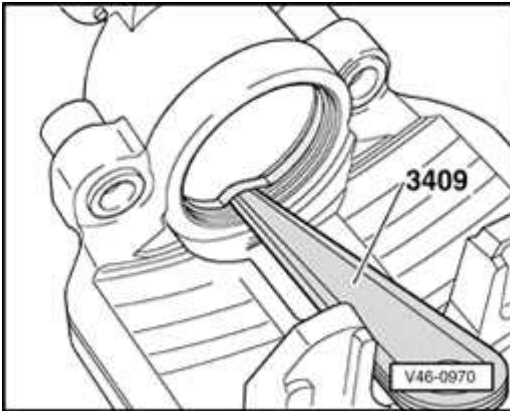


Fig. 174: Removing/Installing Seal Using Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove seal.
- Use trim removal wedge 3409 for this step.

NOTE:

- When removing, make sure that the surface of the cylinder is not damaged.

Installing

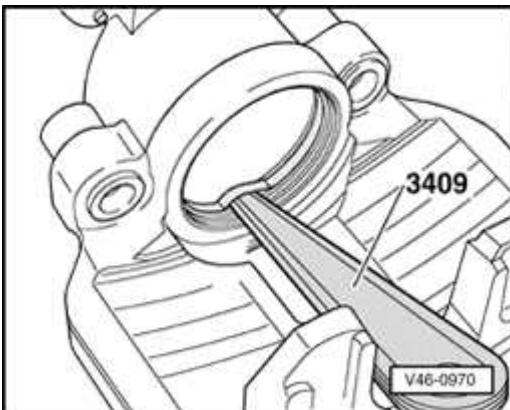


Fig. 175: Removing/Installing Seal Using Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert seal.

- Use trim removal wedge 3409 for this.

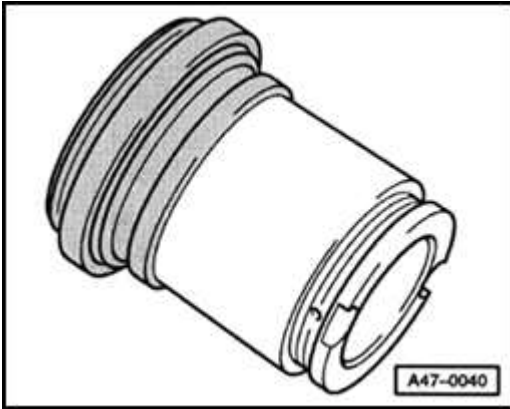


Fig. 176: Placing Protective Cap With Outer Sealing Lip On Piston
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place protective cap with outer sealing lip on the piston
- The surface of the piston and seal should be cleaned using only methylated spirits and then dried.
- Apply a thin coat of *lithium grease G 052 150 A2* to piston and seal before inserting.

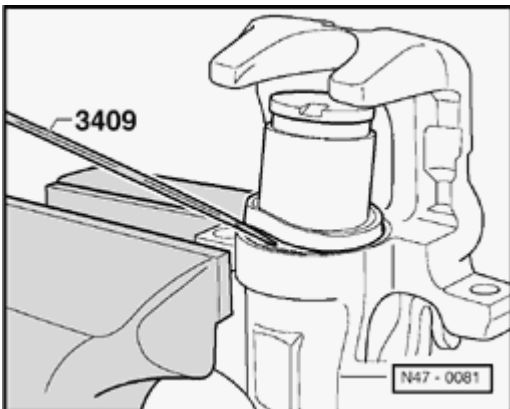


Fig. 177: Inserting The Inner Sealing Lip Into The Groove In The Cylinder Using Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

NOTE:

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

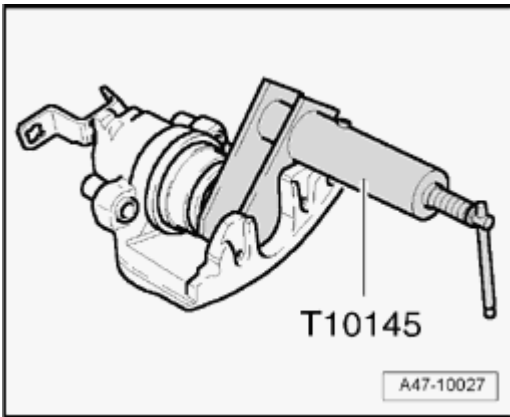


Fig. 178: Pressing Piston Into Brake Caliper Housing Using Piston Resetting Tool T10145
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

NOTE:

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

BRAKE CALIPER FNR-G60

Brake caliper, servicing

NOTE:

- Install complete repair kit when servicing.
- Apply thin coat of *lithium grease G 052 150 A2* to brake cylinder, piston and seal.

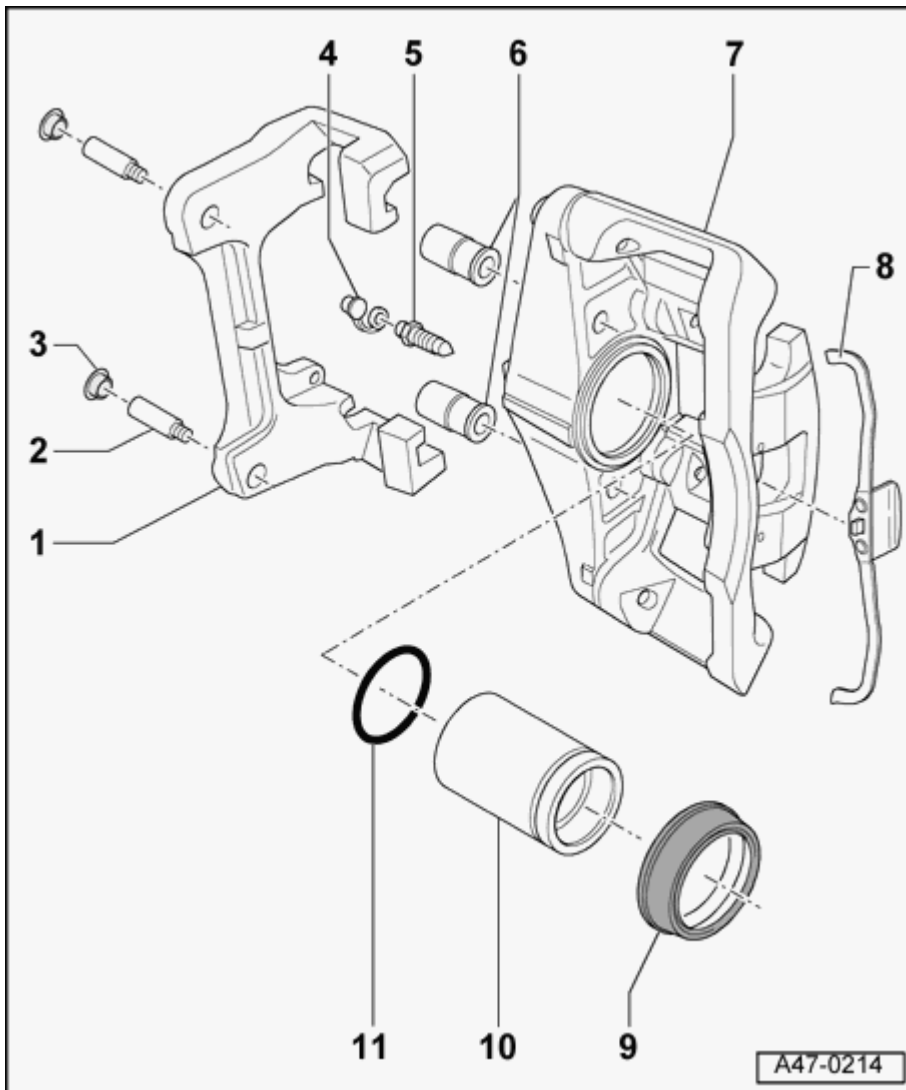


Fig. 179: Exploded View Of Brake Caliper FNR-G60
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake carrier

- Bolt to brake caliper housing

2 - Guide pins, 30 Nm

3 - Dust cap

- Insert into bushing

4 - Protective cap

- Push onto bleeder valve

5 - Bleeder valve, 15 Nm

- Apply thin coat of *lithium grease G 052 150 A2* before screwing in

6 - Bearing bushing

- Insert into brake caliper housing

7 - Brake caliper housing

8 - Retaining spring

- Note correct installation position.
- Engage onto both brake caliper housing studs and onto outer pad retaining spring.

9 - Protective seal

- Do not damage when inserting piston
- Apply a thin coat of *lithium grease G 052 150 A2*

10 - Piston

- Apply a thin coat of *lithium grease G 052 150 A2* to piston

11 - Seal

- Apply a thin coat of *lithium grease G 052 150 A2*

Front brake caliper piston, removing and installing

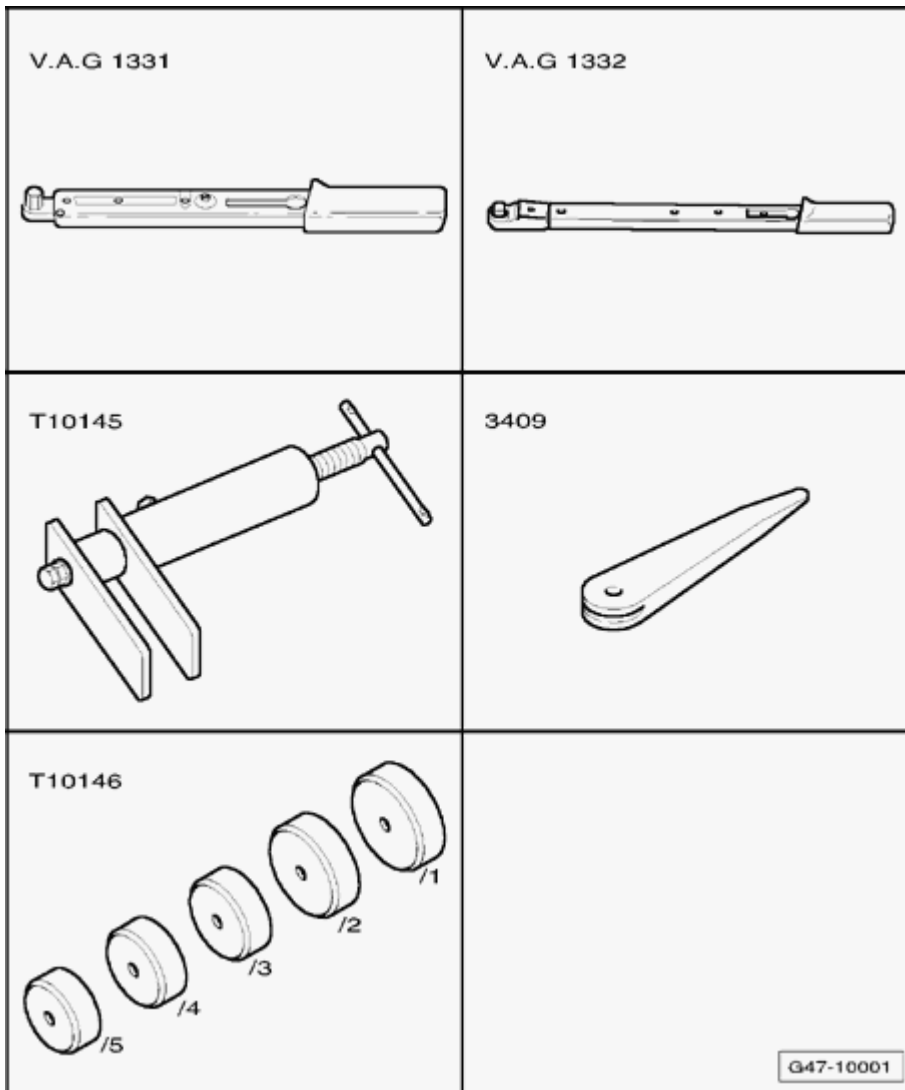


Fig. 180: Identifying Special Tools - Front Brake Caliper Piston, Removing And Installing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Torque wrench V.A.G 1331
- Torque wrench V.A.G 1332
- Piston resetting tool T10145
- Trim removal wedge 3409
- Assembly tool for protective caps T10146/5
- *Lithium grease G 052 150 A2*

Removing

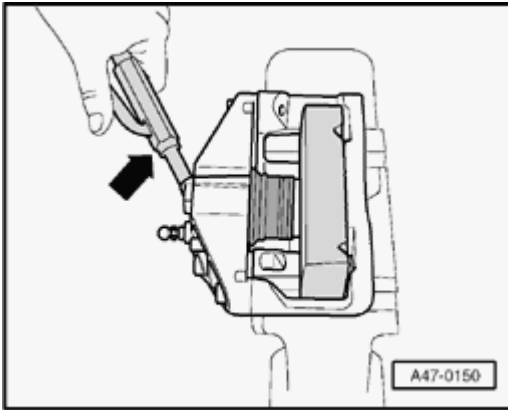


Fig. 181: Using Compressed Air To Force Piston Out Of Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use compressed air to force piston out of brake caliper housing.

NOTE:

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

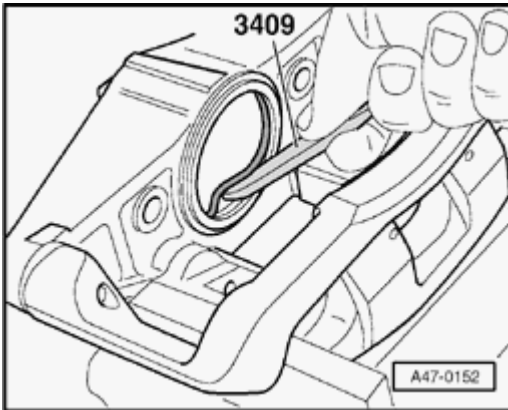


Fig. 182: Removing Seal With Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove seal.
- Use trim removal wedge 3409 for this.

NOTE:

- When removing make sure that the surface of the cylinder is not damaged.

Installing

- The surface of the piston and seal should be cleaned using methylated spirits and then dried.
- Apply a thin coat of *lithium grease G 052 150 A2* to piston and seal before inserting.

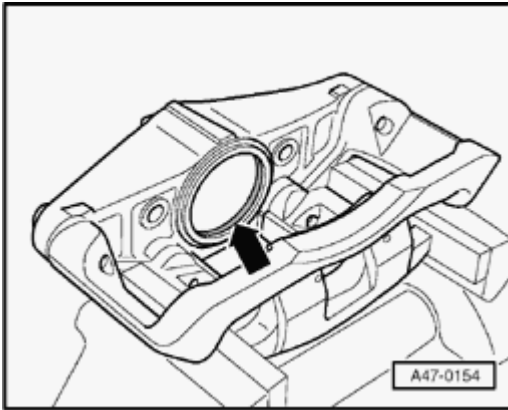


Fig. 183: Installing Sealing Ring In Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert inner seal in brake caliper housing groove using trim removal wedge 3409.

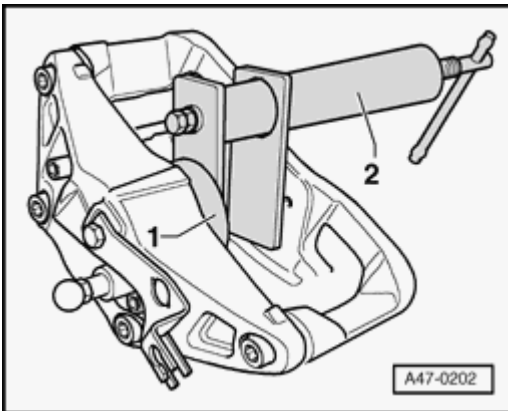


Fig. 184: Pressing Protective Cap With Assembly Tool And Piston Resetting Tool Into Brake Caliper

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press in protective cap with special tool - 1 - and - 2 -.
- Item - 1 - Assembly tool for protective caps T10146/1
- Item - 2 - Piston resetting tool T10145

NOTE:

- Use jaw protectors

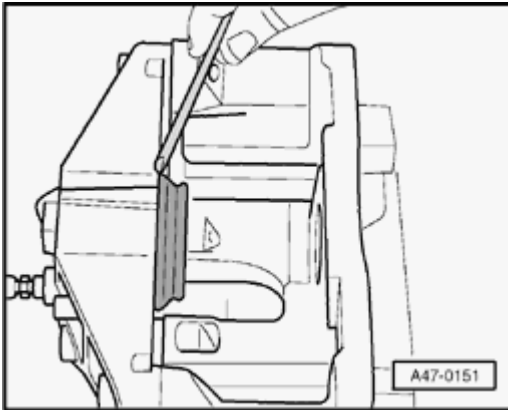


Fig. 185: Pushing Protective Seal Onto Brake Caliper Housing So That It Lies Against Housing All Round

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push protective seal onto brake caliper housing so that it lies against the housing all round.
- It should not be possible to remove the protective seal from the brake caliper housing by hand.
- Apply a thin coat of *lithium grease G 052 150 A2* to piston and seal before inserting.

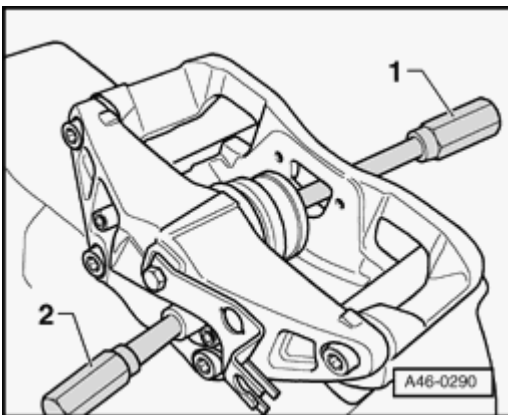


Fig. 186: Lifting Up Piston With Standard Extension And Ratchet Attachment

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift up piston with standard extension and ratchet attachment as shown in illustration and press lightly onto protective cap.

NOTE:

- **Make sure not to tilt piston to avoid damage to the seal.**

- Inflate protective cap with compressed air (maximum 3 bar). The protective cap will then locate around the brake piston.

Use jaw protectors

- Press piston into brake caliper housing by hand.

- NOTE:**
- The protective seal inner sealing lip will then locate in the piston groove.

BRAKE CALIPER, BREMBO 18

Brake caliper, servicing

- NOTE:**
- Only use methylated spirits to clean brake parts.
 - When carrying out repairs, install all parts supplied in repair kit.
 - New brake calipers are filled with brake fluid and pre-bled.
 - Apply thin coat of *lithium grease G 052 150 A2* to brake cylinders, pistons and seals.

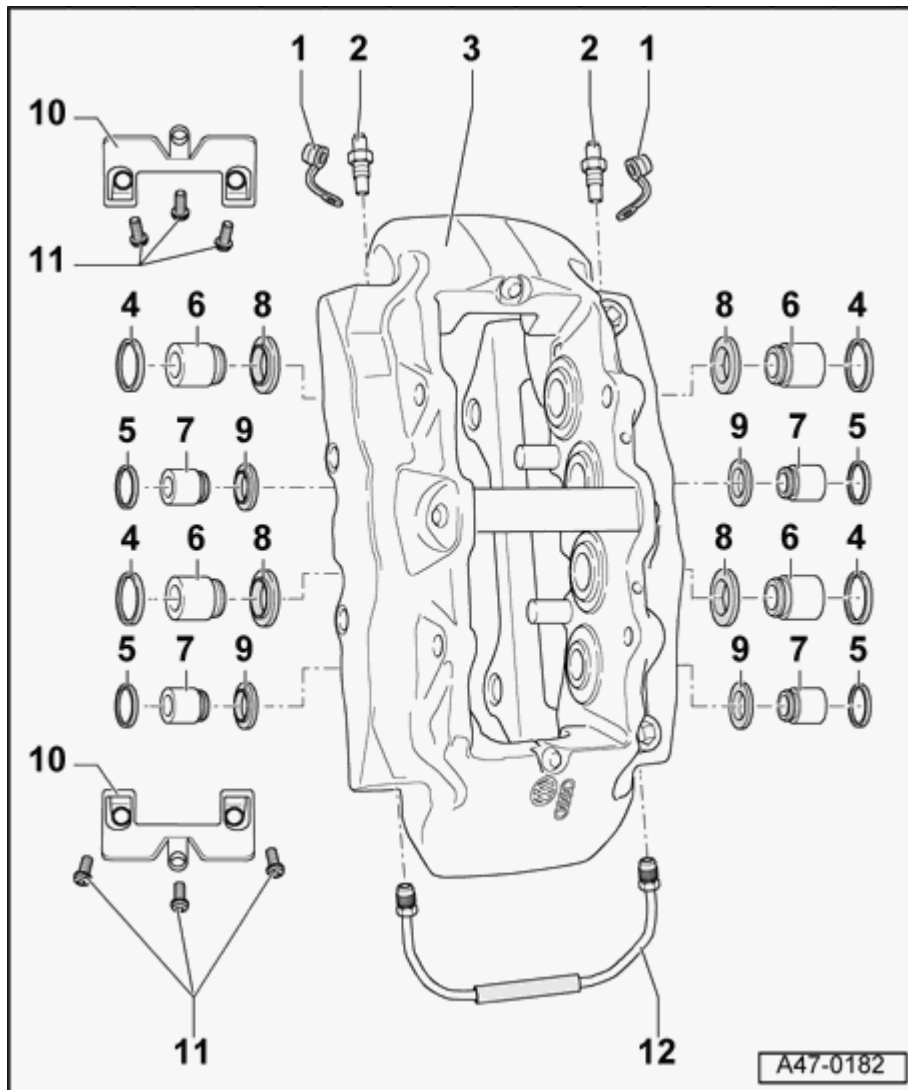


Fig. 187: Exploded View Of Brake Caliper, Brembo 18
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Dust cap

- Install onto bleeder valve

2 - Bleeder valve, 12 Nm

- Apply a thin coat of *lithium grease G 052 150 A2* to the threads before screwing in.

3 - Brake caliper housing

4 - Seal, 32 mm piston

- Removing and installing --> **Piston for front brake caliper, removing and installing**

5 - Seal, 28 mm piston

- Removing and installing --> **Piston for front brake caliper, removing and installing**

6 - Piston, 32 mm

- Removing and installing --> **Piston for front brake caliper, removing and installing**
- Apply thin coat of *lithium grease G 052 150 A2* to piston beforehand

7 - Piston, 28 mm

- Removing and installing --> **Piston for front brake caliper, removing and installing**
- Apply thin coat of *lithium grease G 052 150 A2* to piston beforehand

8 - Protective cap for 32 mm piston

- Do not damage when inserting piston

9 - Protective cap for 28 mm piston

- Do not damage when inserting piston

10 - Support plate

11 - Hex socket head bolt, 6 Nm

12 - Connecting line, 17 Nm

Piston for front brake caliper, removing and installing**Special tools, testers and auxiliary items required**

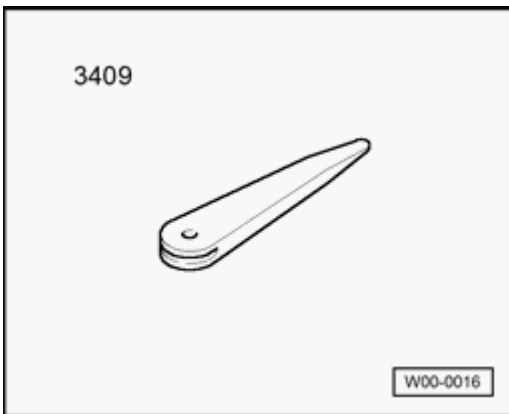


Fig. 188: Identifying Trim Removal Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Wedge 3409

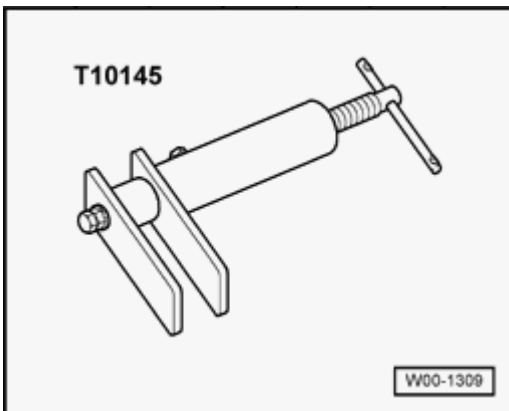


Fig. 189: Piston Resetting Tool T10145
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Piston resetting tool T10145
- *Lithium grease G 052 150 A2*

Removing

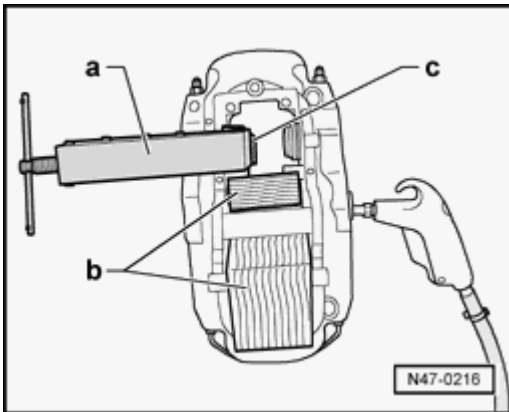


Fig. 190: Forcing Pistons Out Individually Of Brake Caliper Housing Using Compressed Air
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Force pistons out individually of brake caliper housing using compressed air.

Only one piston can be forced out at a time. When doing this, hold the opposing piston in the caliper using the piston resetting tool - **a** -. Block = other pistons using a suitable item, such as a block of wood - **b** -. When using piston resetting tool, place an additional piece of wood - **c** - between tool and piston to prevent damage to the piston when it is pushed out.

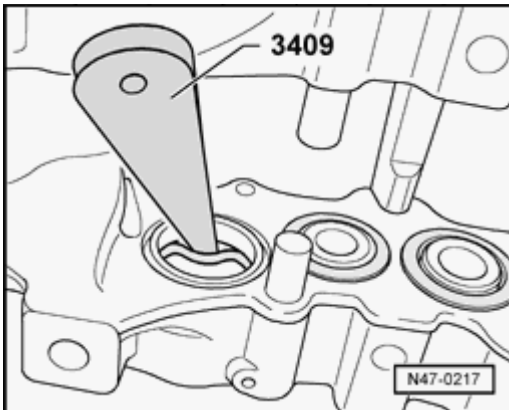


Fig. 191: Removing Seal Using Trim Removal Wedge 3409
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove seal using Trim Removal Wedge 3409.

When removing make sure that the surface of the cylinder is not damaged.

Installing

- The surface of the piston and seal must only be cleaned with methylated spirits and then dried.
- Thinly coat piston and seal with *lithium grease G 052 150 A2* before inserting.

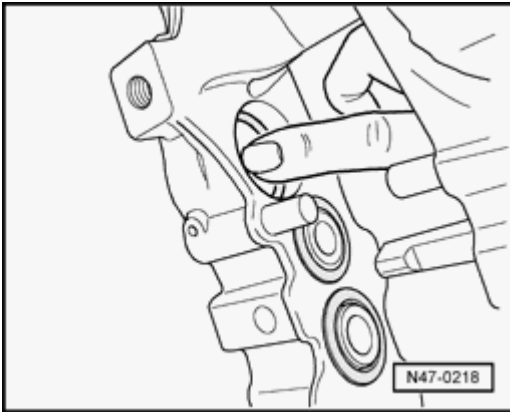


Fig. 192: Inserting Oil Seal In Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert oil seal in brake caliper housing.

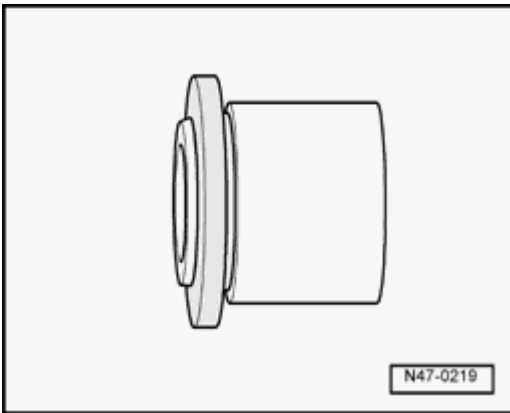


Fig. 193: Placing Protective Seal On Piston
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place protective seal on piston.

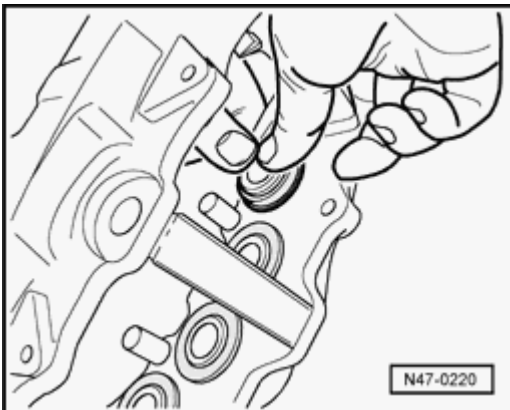


Fig. 194: Using Equal Pressure To Push Piston Into Brake Caliper Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Using equal pressure, push piston into brake caliper housing.

The protective seal should locate securely in the piston groove. If not, use piston resetting tool to push piston in further.

REAR BRAKE CALIPER C38

Brake calipers, servicing

NOTE:

- When carrying out repairs install all parts supplied in repair kit.
- Apply thin coat of *lithium grease G 052 150 A2* to brake cylinder, piston and seal.

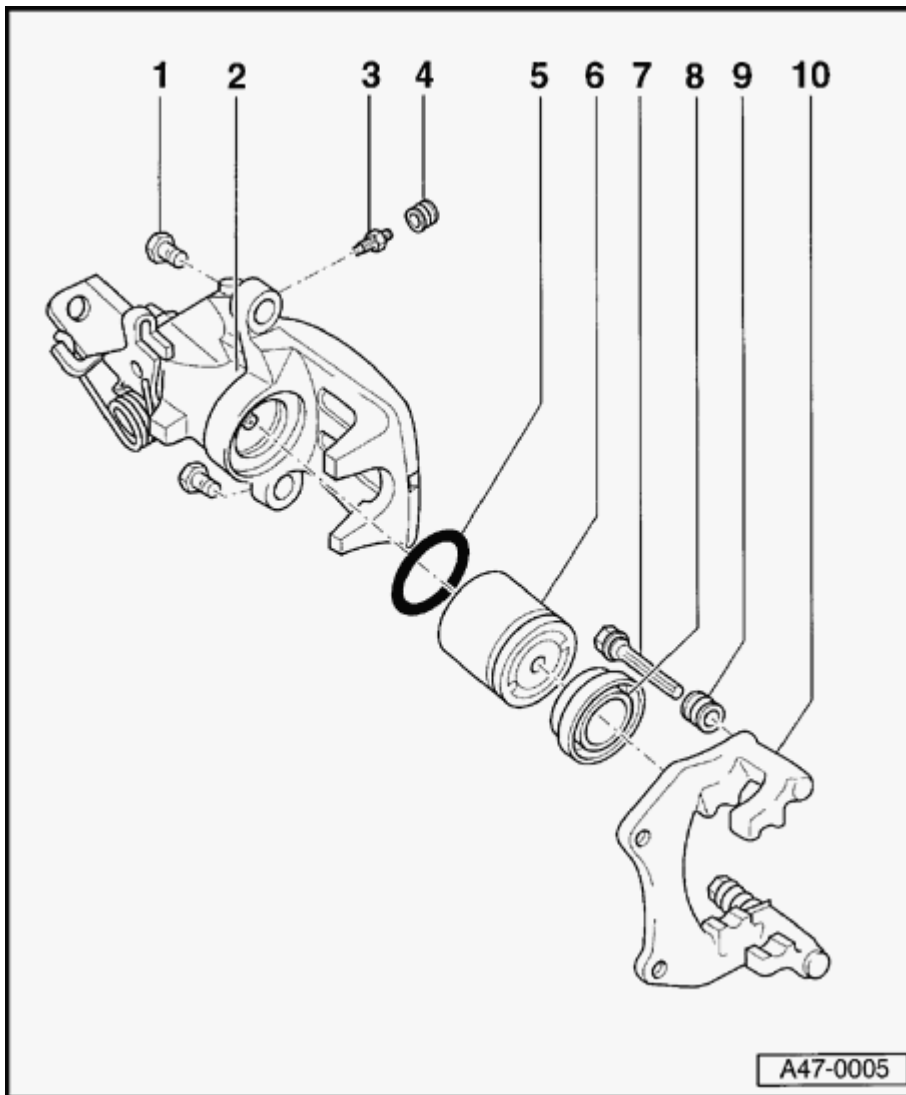


Fig. 195: Exploded View Of Rear Brake Caliper C38
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Self-locking bolt, 35 Nm

- Always replace
- Counter hold on guide pin when loosening and tightening

2 - Brake caliper housing with lever for parking brake cable

- Replace brake caliper housing if there is a leak at the lever for parking brake cable
- After repairing, pre-bleed brake caliper housing --> **Brake system, bleeding**

3 - Bleeder valve

4 - Dust cap

- Install onto bleeder valve

5 - Sealing ring

- Removing and installing --> **Rear brake caliper piston, removing and installing**

6 - Piston with automatic adjustment

- Removing and installing --> **Rear brake caliper piston, removing and installing**

7 - Guide pin

- Lubricate before installing protective cap

8 - Protective seal

- Removing and installing
- Push outer sealing lip onto piston

9 - Protective cap

- Insert onto brake carrier and guide pin

10 - Brake carrier with guide pins and protective cap

- Replacement carriers are supplied assembled and with sufficient grease on guide pins
- If protective caps or guide pins are damaged, replace using repair kit. Use grease packet supplied to lubricate guide pins.

Rear brake caliper piston, removing and installing**Special tools, testers and auxiliary items required**

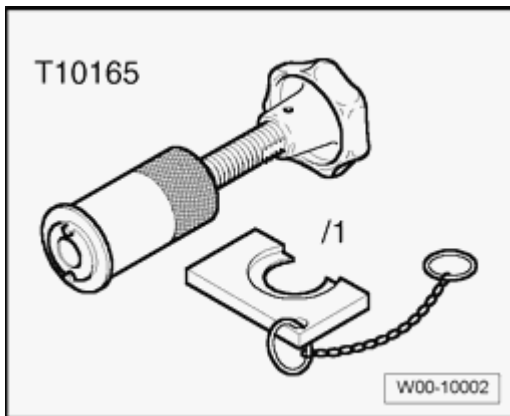


Fig. 196: Resetting Extracting Tool T10165

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Resetting extracting tool T10165
- or Reset and screw out tool 3272

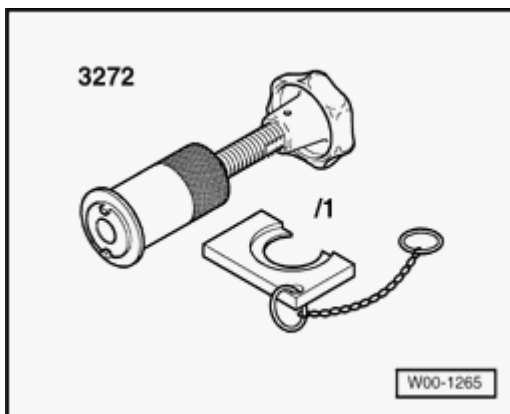


Fig. 197: Plate 3272/1

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Plate 3272/1

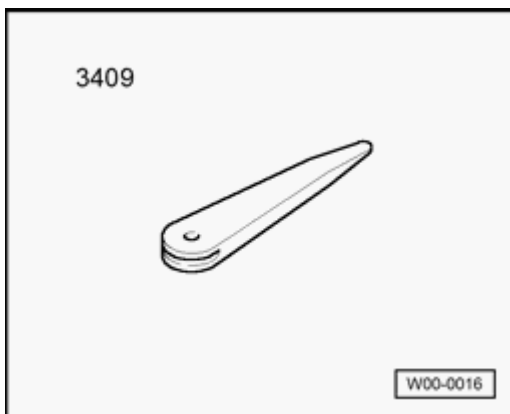


Fig. 198: Identifying Trim Removal Wedge 3409

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Trim removal wedge 3409
- Bleeder bottle

Removing

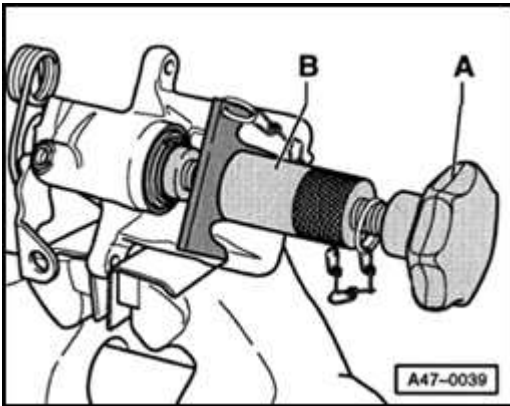


Fig. 199: Extracting Piston From Brake Caliper Housing By Turning Knurled Wheel Counter-Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Extract piston from brake caliper housing by turning knurled wheel counter-clockwise.

NOTE:

- Install reset and screw out tool 3272 so that the collar is positioned against the piston.
- If piston is difficult to move, use a 13 mm open end wrench on the flats - arrow A -.

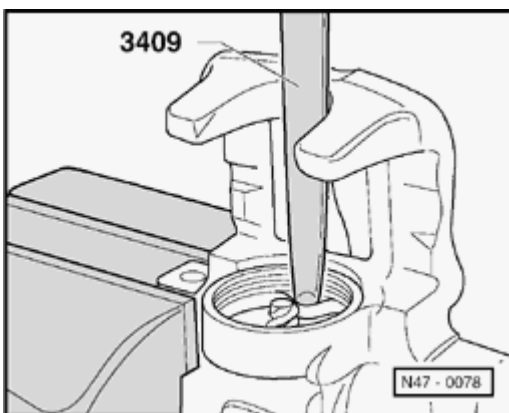


Fig. 200: Removing Seal Using Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use trim removal wedge 3409 to remove seal.

NOTE:

- When removing make sure that the hole of the cylinder is not damaged.

Installing

- The surface of the piston and seal should be cleaned using only methylated spirits and then dried.
- Apply a thin coat of *lithium grease G 052 150 A2* to piston and seal before inserting.
- Insert O-ring into brake caliper housing.

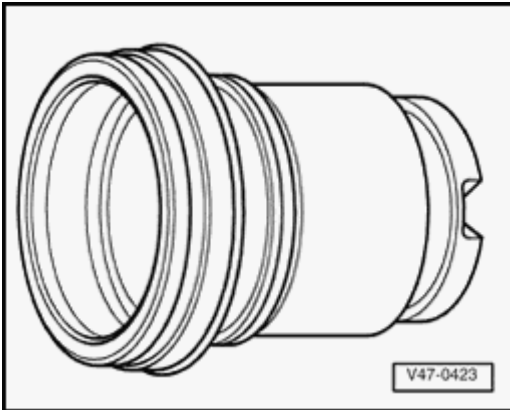


Fig. 201: Placing Protective Seal With Outer Sealing Lip On The Piston
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place protective cap with the outer sealing lip on the piston.

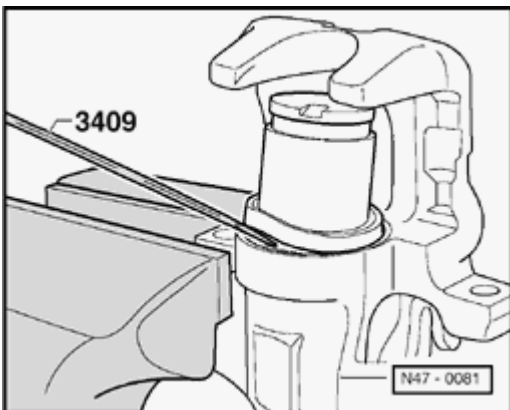


Fig. 202: Inserting Inner Sealing Lip Into The Groove In The Cylinder Using Wedge 3409
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

NOTE:

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

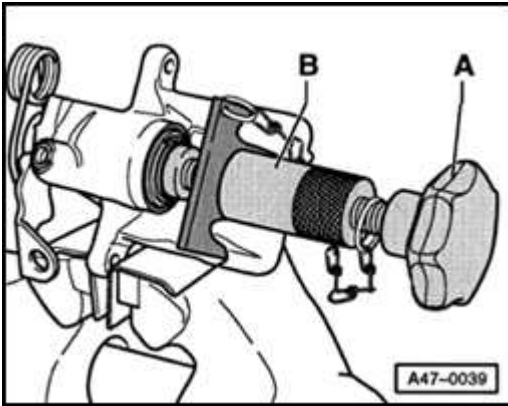


Fig. 203: Extracting Piston From Brake Caliper Housing By Turning Knurled Wheel Counter-Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw piston in by turning knurled wheel clockwise.

NOTE:

- Install reset and screw out tool 3272 so that the collar of the tool is positioned against plate 3272/1.
- If piston is difficult to move, use a 13 mm open end wrench on the flats - arrow A -.

- Install brake pads.

Pre-bleeding brake caliper

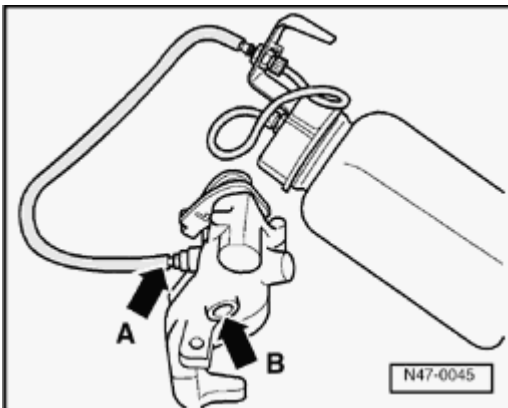


Fig. 204: Identifying Bleed Valve, Standard Bleeder Bottle & Threaded Hole
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open bleeder valve - **arrow A** - and, using a standard bleeder bottle, fill with brake fluid until bubble-free brake fluid flows from the threaded hole - **arrow B** - (brake hose connection). Close bleeder valve.

NOTE:

- Position brake caliper as illustrated for pre-bleeding.

Brake fluid, changing**Changing brake fluid**

Description of operations; Changing brake fluid (every 2 years)

BRAKE SYSTEM, BLEEDING**Brake system, bleeding****CAUTION:**

- Do not under any circumstances allow brake fluid to come into contact with fluids that contain mineral oils (e.g. oil, gasoline, cleaning agents). Mineral oils damage the plugs and seals in the brake system.
- Brake fluid is poisonous and must on no account be siphoned by mouth through a hose. Because of its caustic properties it must also not come into contact with paint.
- Brake fluid is hygroscopic, i.e. it absorbs moisture from the surrounding air, and should always be stored in airtight containers.
- Always observe environmental regulations for disposal.

NOTE:

- Only use new brake fluid conforming to US standard FMVSS 116 DOT 4.
- Genuine Audi brake fluid conforms to this specification.
- Use plenty of water to flush away any brake fluid spillage.
- When the system is open do not work with compressed air and do not move the vehicle.
- During the final road test, make sure that at least one ABS-controlled braking operation is performed (pulsations must be felt at the brake pedal).

Bleeding sequence for vehicles with Electronic Stabilization Program (ESP)**NOTE:**

- A pressure of at least 2 bar is required for bleeding the hydraulic unit. For this reason it is important to always check the pressure setting on the bleeder unit.
- Use the brake pedal depressor when installing brake system components, and bleed the system afterward.

Special tools, testers and auxiliary items required

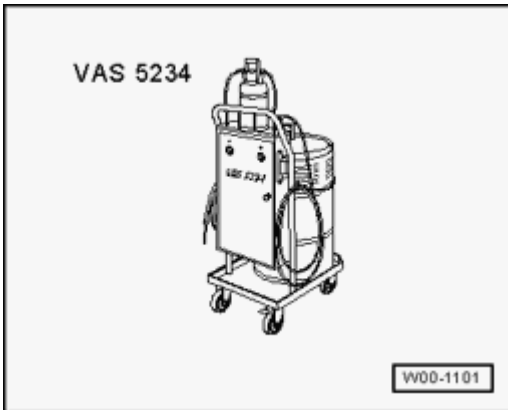


Fig. 205: Identifying Brake Filler And Bleeder Unit VAS 5234
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Brake filler/bleeder unit VAS 5234

Bleeding brake system using brake filler and bleeder unit VAS 5234

Follow operating instructions.

- Connect brake filler and bleeder unit VAS 5234.
- Open bleeder screws in the specified order and bleed brake calipers (assist as required with pedal pressure).

Bleed sequence

- 1 - Left front brake caliper
- 2 - Right front brake caliper
- 3 - Left rear brake caliper
- 4 - Right rear brake caliper

- Keep bleeding calipers until clear, foam-free brake fluid emerges.
- Close bleeder screw.

Brake fluid, changing

Changing brake fluid

Description of operations; Changing brake fluid (every 2 years)

TANDEM BRAKE BOOSTER/BRAKE MASTER CYLINDER, ASSEMBLY OVERVIEW

Tandem brake booster/brake master cylinder, assembly overview

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NOTE:

- Brake master cylinders can no longer be disassembled, i.e. no provision is made for servicing.
- Use only new brake fluid. Observe information on brake fluid reservoir!
- Assignment of brake line connections

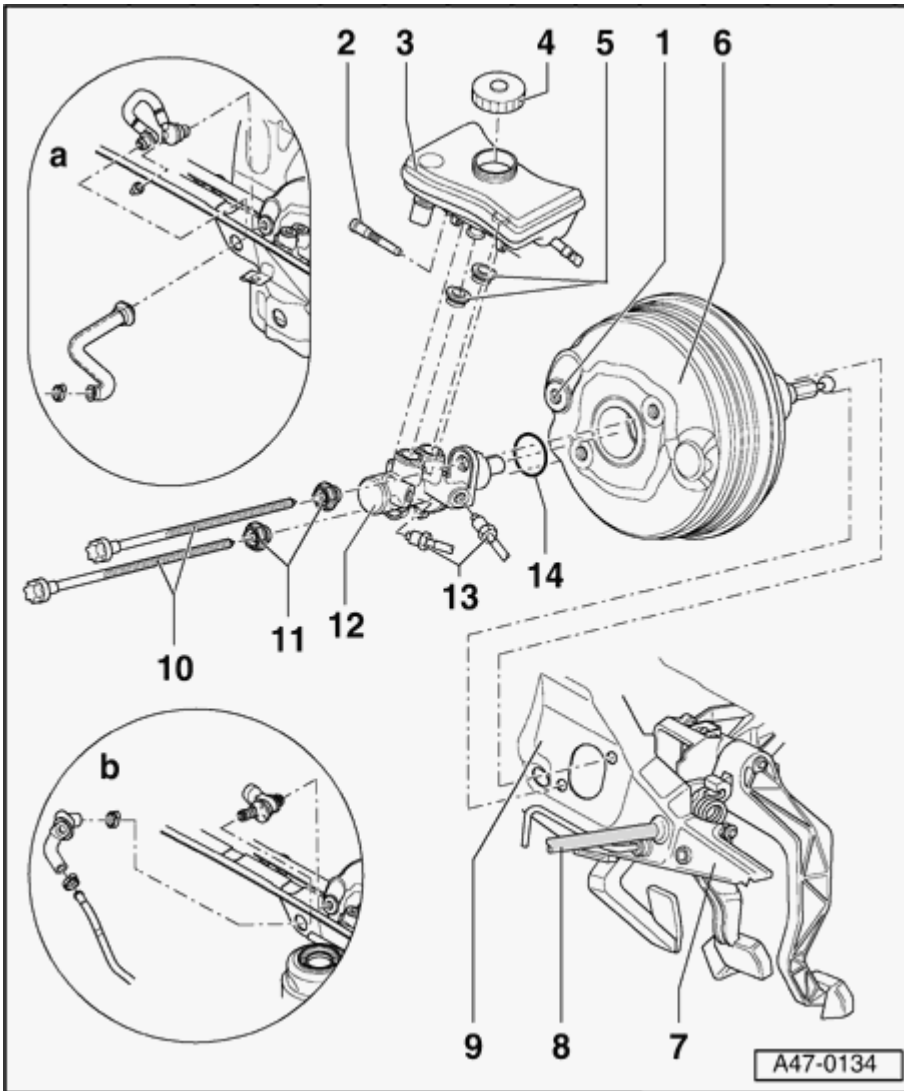


Fig. 206: Tandem Brake Booster/Brake Master Cylinder, Assembly Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - - **a** - Vacuum hose

- On gasoline engines the vacuum required is taken from the intake manifold and/or a mechanical vacuum pump.
- Insert into brake booster unit

1 - - **b** - Vacuum hose

- On gasoline engines the vacuum required is taken from the intake manifold and/or a mechanical vacuum pump.
- An additional electrical vacuum pump is installed on vehicles where vacuum is taken from intake manifold only
- Insert into brake booster unit

2 - Trunion bolt, 8 Nm

- Screw in as far as stop
- Unscrew to remove brake fluid reservoir

3 - Brake fluid reservoir with float warning indicator

- Functional test
- With the ignition switched on, remove filler cap and press with your hand on the strainer that is visible in the reservoir. Warning lamp in instrument cluster should light up and acoustic alarm should sound.
- Removing and installing --> **Brake master cylinder with brake booster, removing and installing**
- Refer to label on reservoir before topping off brake fluid

4 - Filler cap

5 - Sealing plug

- Moisten with brake fluid and insert into brake master cylinder
- Press brake fluid reservoir into sealing plugs

6 - Brake booster

- Removing and installing --> **Brake master cylinder with brake booster, removing and installing**
- Adjusting ball head --> **Ball head, adjusting**
- Functional check
- With the engine switched off, firmly depress the brake pedal several times (this reduces the vacuum present in the servo unit).
- Then hold brake pedal in applied position with moderate force and start engine. If the servo unit is working properly, the pedal will give slightly under foot (servo assist becomes activated).
- If faulty replace complete.

7 - Pedal bracket

8 - Supply hose

- Keep both ends closed off until it is installed.

- Push on hose as far as it will go.

9 - Bulkhead

10 - Bolt, 25 Nm

11 - Collar nut, 50 Nm

- Always replace

12 - Brake master cylinder

- Cannot be repaired. If faulty, replace complete.
- Has to be removed and installed together with the brake booster unit.
- Removing and installing --> **Brake master cylinder with brake booster, removing and installing**

13 - Brake line, 15 Nm

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

14 - Sealing ring

- Insert into groove on brake master cylinder
- Replace after removing brake master cylinder

Ball head, adjusting

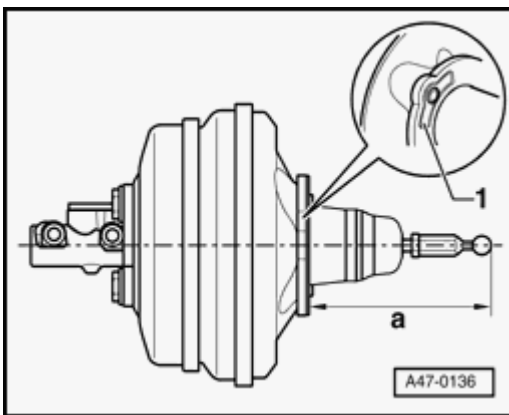


Fig. 207: Adjusting Ball Plunger

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Adjusting ball head

$a = 159 \text{ mm} \pm 0.5 \text{ mm}$

NOTE:

- **Surface - 1 - for measuring**
- **The ball head must be set at right angles to the surface of the brake booster when taking the measurement.**
- **Measure to end of ball head without gasket installed.**

Tightening torque for ball head to brake booster: 30 Nm

BRAKE MASTER CYLINDER WITH BRAKE BOOSTER, REMOVING AND INSTALLING

Brake master cylinder with brake booster, removing and installing

Special tools, testers and auxiliary items required

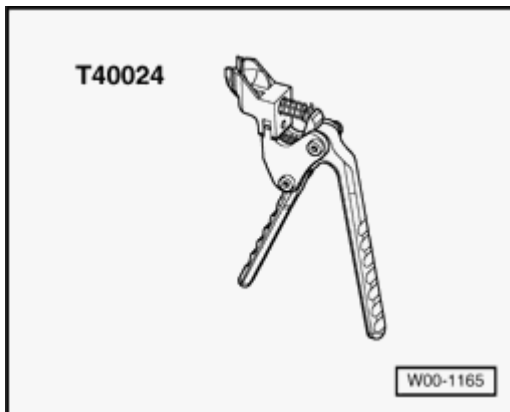


Fig. 208: Release Tool T40024

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release tool T40024

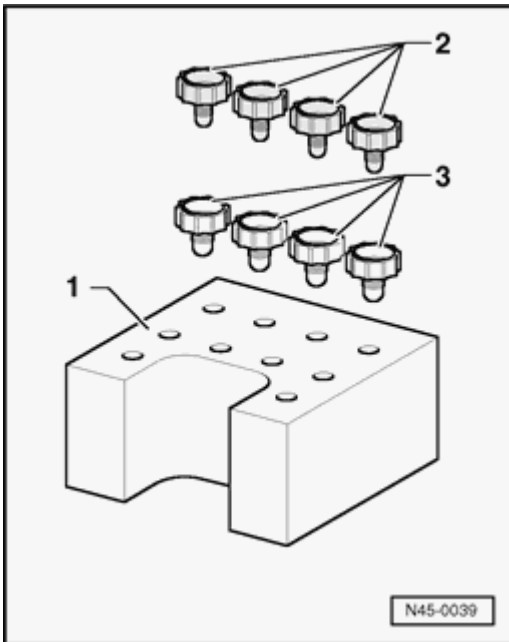


Fig. 209: Sealing Plug Repair Set, Part No. 1H0 698 311 A
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Sealing plug repair kit, Part no. 1H0 698 311 A

Removing

- Remove glove compartment on drivers side. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

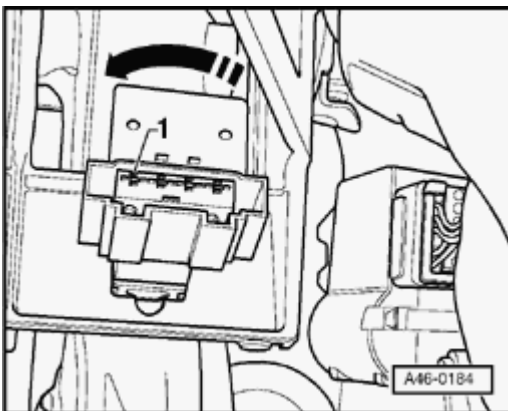


Fig. 210: Rotating Brake Light Switch 45° In Counter-Clockwise Direction And Remove
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate brake light switch - 1 - 45° to left and remove.

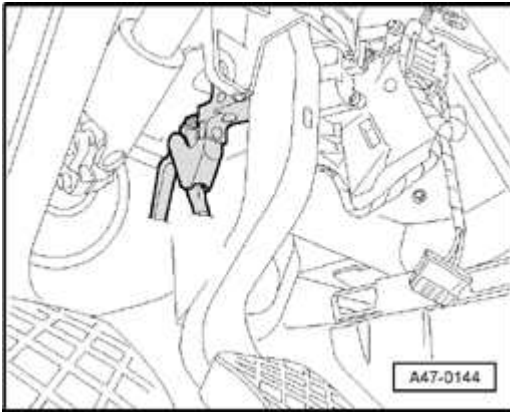


Fig. 211: Using Release Tool T40024 To Separate Brake Pedal From Brake Booster
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use release tool T40024 to separate brake pedal from brake booster.

Extracting brake fluid using brake filler/bleeder unit VAS 5234

- Remove plenum chamber cover.

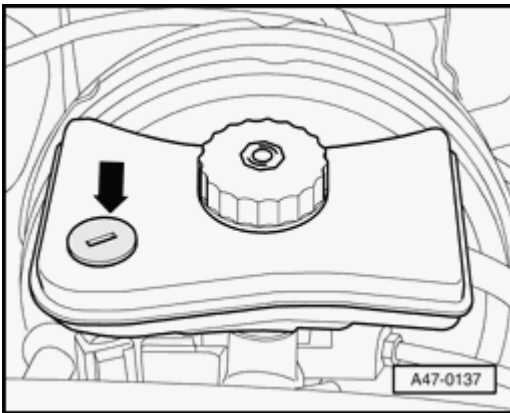


Fig. 212: Open Brake Fluid Reservoir
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lay out sufficient lint-free cloths in area of plenum chamber.
- Open brake fluid reservoir.

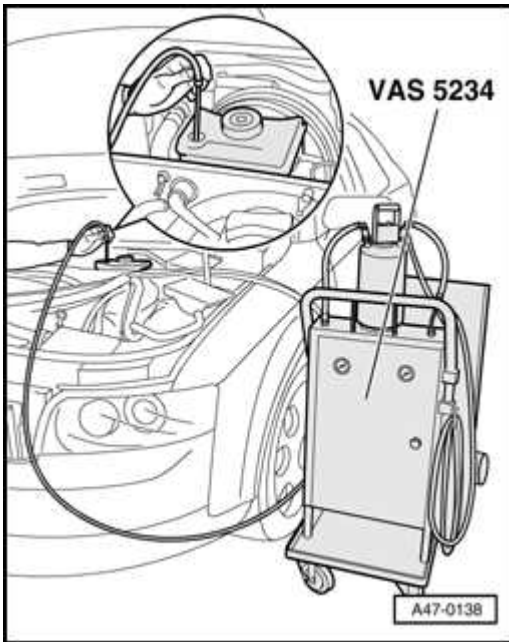


Fig. 213: Extracting Brake Fluid Using Brake Filler And Bleeder Unit VAS 5234
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Extract brake fluid.

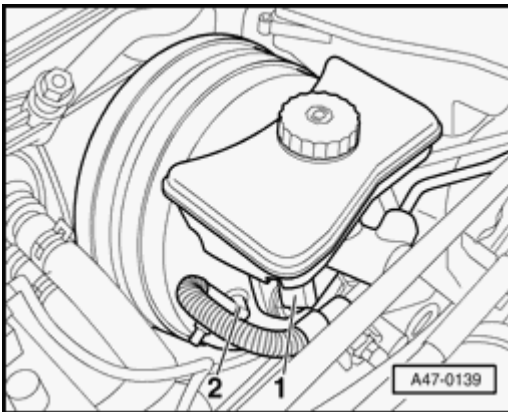


Fig. 214: Location Of Brake Fluid Level Warning Switch F34 And Vacuum Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connector from float warning indicator sensor - 1 -.
- Disconnect vacuum hose - 2 -.

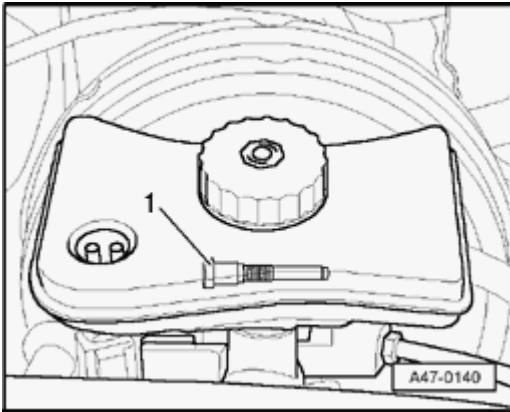


Fig. 215: Location Of Brake Fluid Reservoir Dowel Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolt - 1 - for brake fluid reservoir.

NOTE:

- Protect the plenum chamber against any escaping brake fluid.
- The underside of the brake fluid reservoir clips into the brake master cylinder.

- To remove reservoir, press locking tab down and at the same time, remove brake fluid reservoir from sealing plugs.
- Remove brake fluid reservoir and lay it to one side.

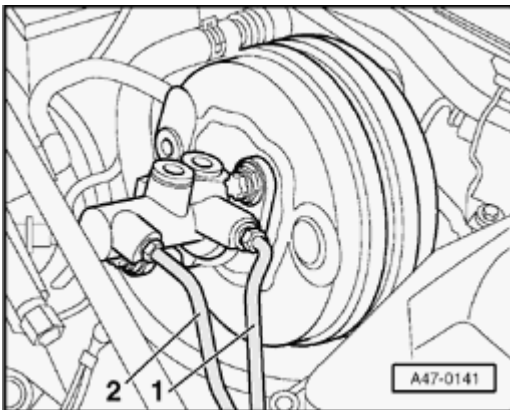


Fig. 216: Disconnecting Brake Lines And Sealing With Sealing Plugs From Repair Kit, Part No. 1H0 698 311 A

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake lines - 1 - and - 2 - and seal with sealing plugs from repair kit, Part No. 1H0 698 311 A.
- Lay out sufficient lint-free cloths in the area of the hydraulic control unit.

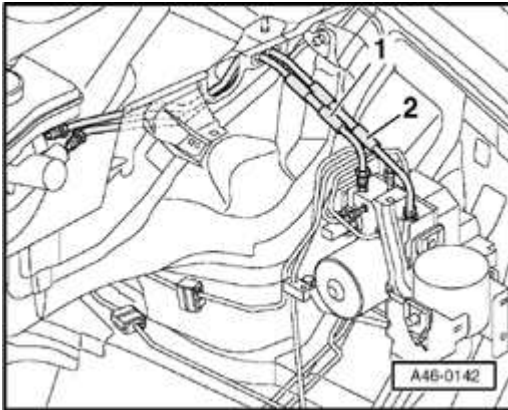


Fig. 217: Disconnecting Brake Lines And Removing Together With Rubber Grommet
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake lines - 1 - and - 2 - and remove together with rubber grommet.

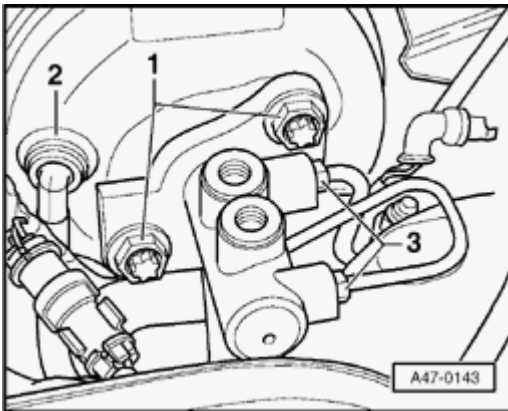


Fig. 218: Removing Brake Booster Securing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove brake booster securing bolts - 1 - (Torx T45).
- Remove brake booster with brake master cylinder.

On vehicles installed with cross brace the cross brace must be removed.

- Removing and installing cross brace --> **40 - FRONT SUSPENSION** .

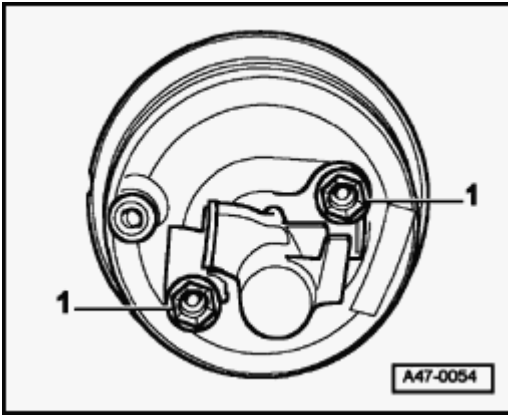


Fig. 219: Brake Master Cylinder Nuts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing nuts for brake master cylinder - 1 -.
- Carefully remove brake master cylinder from brake booster.

Installing

When installing, note the following points:

NOTE:

- Clean any residual brake fluid off plenum chamber before installing brake master cylinder.
 - When assembling brake master cylinder with brake booster unit, make sure push rod is properly positioned in brake master cylinder.
- Adjust brake light switch.
 - Bleeding brake system --> **Brake system, bleeding.**

Brake system vacuum pump V192, removing and installing

The vacuum pump is not intended to be serviced. If problems occur, trace the malfunction by means of a function test and/or pressurized leak test. If a malfunction is found, the brake system vacuum pump V192 must be replaced.

Removing:

- Remove trim cover.

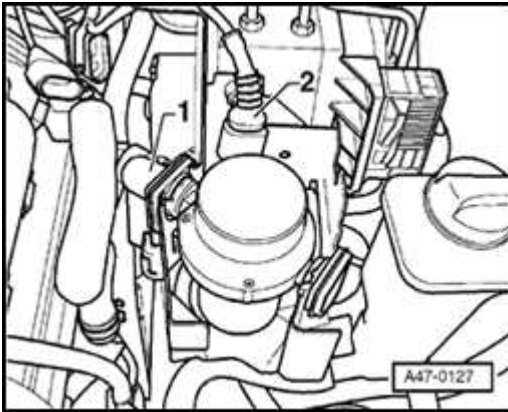


Fig. 220: Disconnecting Electrical Connector & Vacuum Hose From Vacuum Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - 2 -.
- Disconnect vacuum hose - 1 - from vacuum pump.

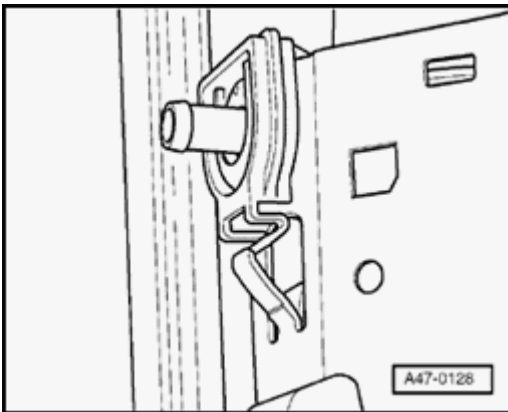


Fig. 221: Identifying Brake System Vacuum Pump V192
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press clip out of bracket by hand.
- Lift out brake system vacuum pump V192.

Installing

Installation is carried out in reverse sequence.

Brake system vacuum pump V192, checking

Special tools, testers and auxiliary items required

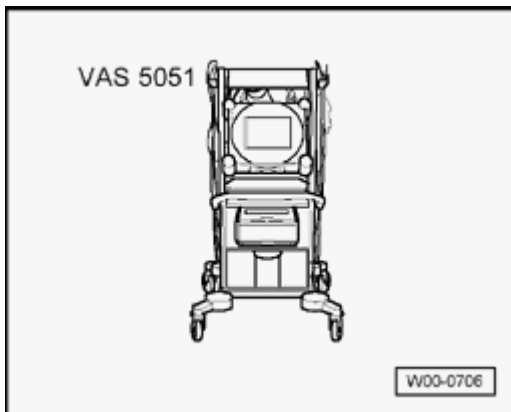


Fig. 222: Identifying Vehicle Diagnosis, Testing And Information System VAS 5051
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Vehicle diagnostic, testing and information system VAS5051
- Diagnosis lead VAS5051/1 or diagnosis lead VAS5051/3

Procedure

- With ignition switched off, connect vehicle diagnostic, testing and information system VAS5051 to diagnostic connection with diagnosis lead VAS5051/1 or diagnosis lead VAS5051/3.

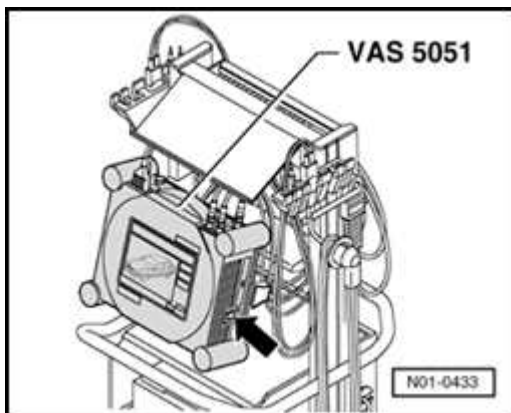


Fig. 223: Special Tool - VAS 5051 & On Switch
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch on tester - **arrow** -.

The tester may need up to 3minutes before it is ready for operation.

- Switch on ignition.
- Select mode: Press button on display for "Vehicle self-diagnosis".
- Select vehicle system: Press button for "01 - Engine electronics".

The control module identification and coding will appear at top right of display.

2005 Audi A4 Quattro

BRAKES Brake System

- Select diagnosis function (all diagnosis functions are available at this stage).
- Select "04 - Basic setting" on display.
- Press buttons 0, 0 and 8.
- Confirm entry with Q key.

The following information will appear at the bottom of the display:

Basic setting	
	Not operated
	Pump off
	xxx mbar
	Test off

- Firmly depress brake pedal several times in succession until test is activated.

The following information will appear at bottom of display:

Basic setting	
	Not operated
	Pump on
	xxx mbar
	Test on

Do not press brake pedal again once test has been activated.

The Brake System Vacuum Pump V192 supplies vacuum to brake booster. The diagnosis of the brake booster system runs in the control module at the same time.

The system passes the test if the pressure in the brake booster reaches the shut-off threshold within time limit set by diagnostic function.

The following information will appear at bottom of display:

Basic setting	
	Not operated
	Pump off
	xxx mbar
	Syst. OK

- You can cancel or exit from this mode by pressing Go to button.

The system fails the test if pressure in brake booster does not reach shut-off threshold within time limit set by diagnostic function.

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The following information will appear at bottom of display:

Basic setting	
	Not operated
	Pump off
	xxx mbar
	Syst.n.OK

- Follow "Guided Fault Finding" procedure using vehicle diagnostic, testing and information system VAS5051.

Brake booster pressure sensor G294, removing and installing

Removing

- Remove plenum chamber cover.
- Pull electrical connector out downward.

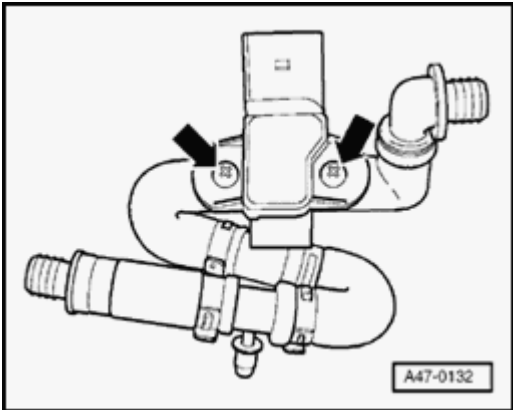


Fig. 224: Removing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.

NOTE: • The pressure sensor may be secured with clips on some versions.

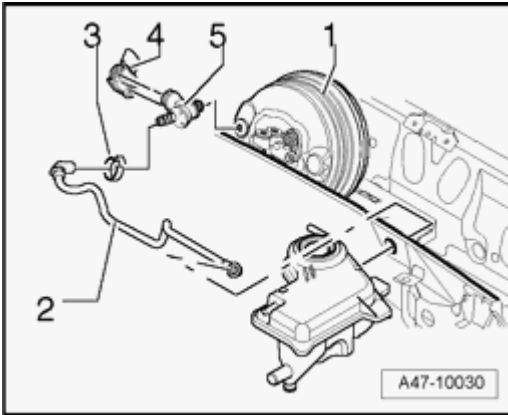


Fig. 225: Disconnecting Brake System Vacuum Pump V192 From Non-Return Valve
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake system vacuum pump V192 from non-return valve as shown in illustration.
- - 1 - Brake booster
- - 2 - Vacuum line
- - 3 - Hose clip
- - 4 - Pressure sensor
- - 5 - Non-return valve
- Remove pressure sensor.

Installing

Installation is in reverse sequence.

Non-return valve, checking

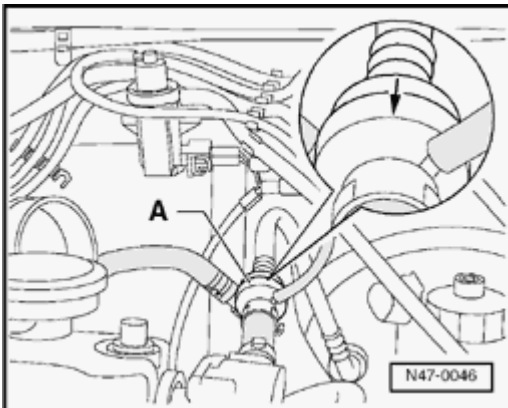


Fig. 226: Locating Check Valve
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The valve should allow passage of air in direction of arrow - A -.

- The valve should remain closed in opposite direction.

Note correct installation position.

BRAKE SYSTEM VACUUM PUMP V192

Assembly overview

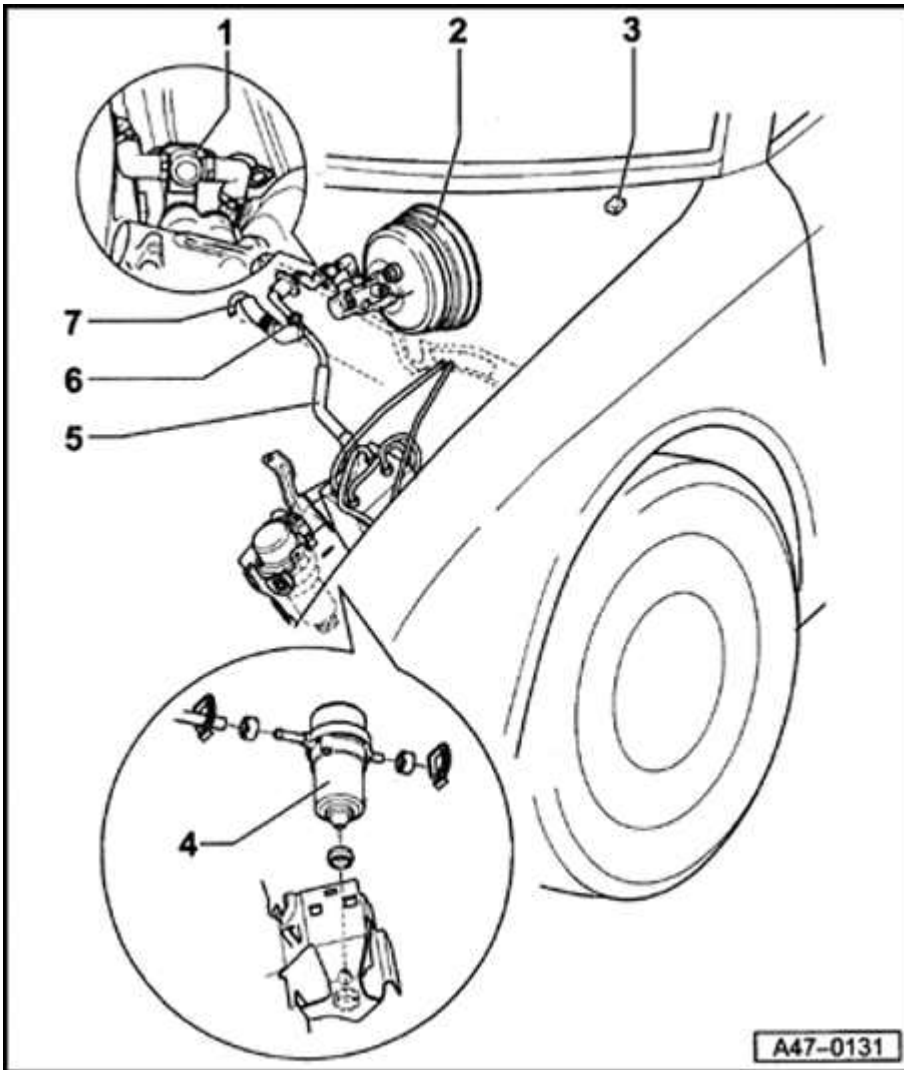


Fig. 227: Brake System Vacuum Pump V192 Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake booster pressure sensor G294

- Removing and installing --> **Brake booster pressure sensor G294 , removing and installing**

2 - Brake booster

3 - Brake booster relay J569

- Removing and installing --> Electrical Wiring Diagrams, Troubleshooting and Component Locations

4 - Vacuum pump for brakes V192

- Removing and installing --> **Brake system vacuum pump V192 , removing and installing**
- Checking --> **Electric vacuum pump**

5 - Vacuum hose

6 - Check valve

7 - Vacuum hose

- To engine

Brake system vacuum pump V192 , removing and installing

The vacuum pump is not intended to be serviced. If problems occur, trace the malfunction by means of a function test and/or pressurized leak test. If a malfunction is found, the brake system vacuum pump V192 must be replaced.

Removing:

- Remove trim cover.

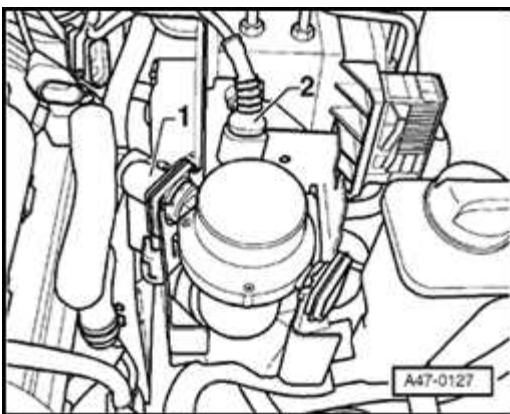


Fig. 228: Disconnecting Electrical Connector & Vacuum Hose From Vacuum Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - 2 -.
- Disconnect vacuum hose - 1 - from vacuum pump.

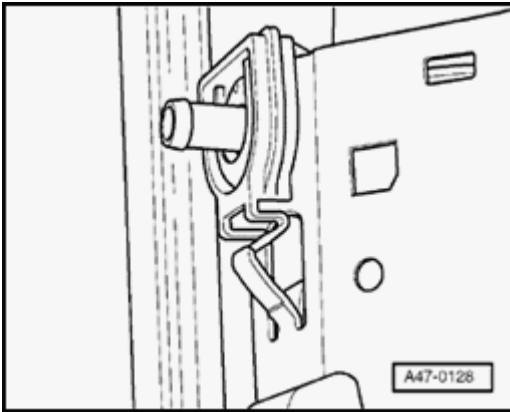


Fig. 229: Identifying Brake System Vacuum Pump V192
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press clip out of bracket by hand.
- Lift out brake system vacuum pump V192.

Installing

Installation is in reverse order of removal.

Brake system vacuum pump V192 , checking

Special tools, testers and auxiliary items required

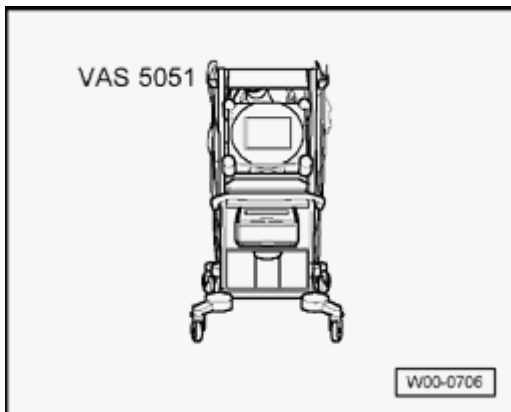


Fig. 230: Identifying Vehicle Diagnosis, Testing And Information System VAS 5051
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Vehicle diagnostic, testing and information system VAS 5051
- Diagnosis lead VAS 5051/1 or diagnosis lead VAS 5051/3

Procedure

- With ignition switched off, connect vehicle diagnostic, testing and information system VAS 5051 to

diagnostic connection with diagnosis lead VAS 5051/1 or diagnosis lead VAS 5051/3.

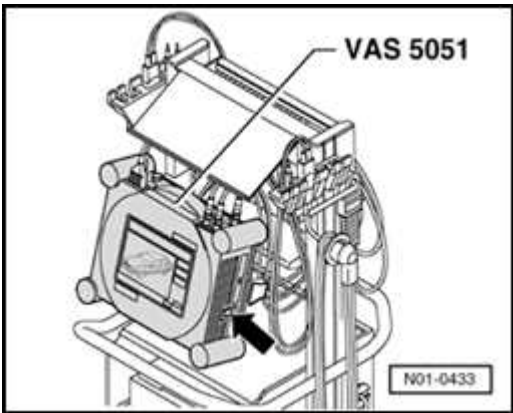


Fig. 231: Special Tool - VAS 5051 & On Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch on tester - **arrow** -.

The tester may need up to 3 minutes before it is ready for operation.

- Switch on ignition.
- Select mode: Press button on display for "Vehicle self-diagnosis".
- Select vehicle system: Press button for "01 - Engine electronics".

The control module identification and coding will appear at top right of display.

- Select diagnosis function (all diagnosis functions are available at this stage).
- Select "04 - Basic setting" on display.
- Press buttons 0 , 0 and 8.
- Confirm entry with Q key.

The following information will appear at the bottom of the display:

Basic setting	
	Not operated
	Pump off
	xxx mbar
	Test off

- Firmly depress brake pedal several times in succession until test is activated.

The following information will appear at bottom of display:

Basic setting	
1:04:18 AM	Page 53

2005 Audi A4 Quattro

BRAKES Brake System

	Not operated
	Pump on
	xxx mbar
	Test on

Do not press brake pedal again once test has been activated.

The Brake System Vacuum Pump V192 supplies vacuum to brake booster. The diagnosis of the brake booster system runs in the control module at the same time.

The system passes the test if the pressure in the brake booster reaches the shut-off threshold within time limit set by diagnostic function.

The following information will appear at bottom of display:

Basic setting	
	Not operated
	Pump off
	xxx mbar
	Syst. OK

- You can cancel or exit from this mode by pressing Go to button.

The system fails the test if pressure in brake booster does not reach shut-off threshold within time limit set by diagnostic function.

The following information will appear at bottom of display:

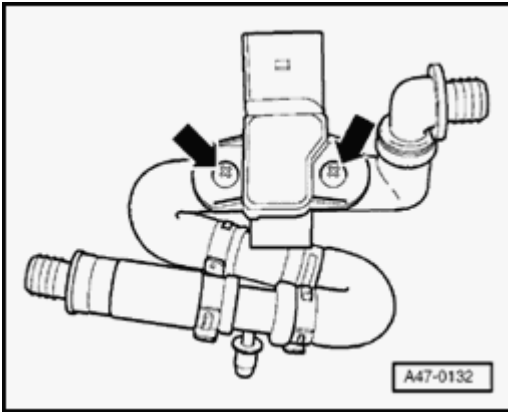
Basic setting	
	Not operated
	Pump off
	xxx mbar
	Syst.n.OK

- Follow "Guided Fault Finding" procedure using vehicle diagnostic, testing and information system VAS 5051.

Brake booster pressure sensor G294 , removing and installing

Removing

- Remove plenum chamber cover.
- Pull electrical connector out downward.

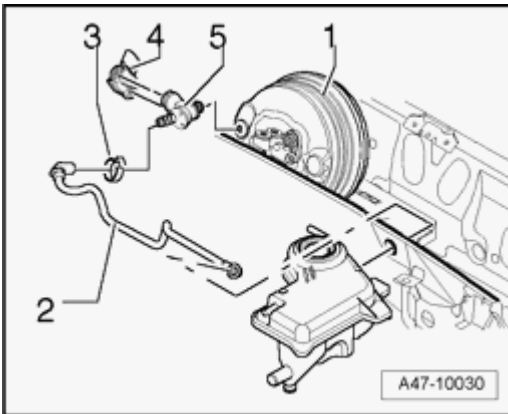
**Fig. 232: Removing Bolts**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.

NOTE:

- The pressure sensor may be secured with clips on some versions.

**Fig. 233: Disconnecting Brake System Vacuum Pump V192 From Non-Return Valve**

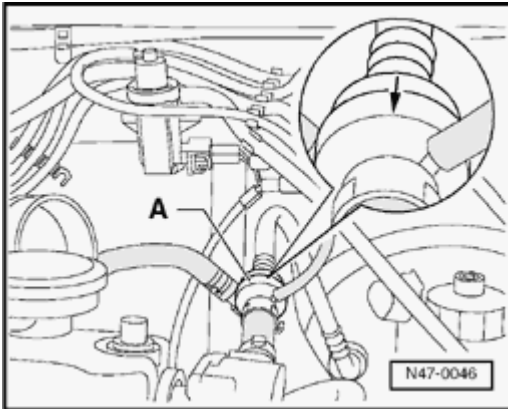
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake system vacuum pump V192 from non-return valve as shown in illustration.
- - **1** - Brake booster
- - **2** - Vacuum line
- - **3** - Hose clamp
- - **4** - Pressure sensor
- - **5** - Check valve
- Remove pressure sensor.

Installing

Installation is in reverse order of removal.

Check valve , checking

**Fig. 234: Locating Check Valve**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The check valve - **A** - must allow air through in direction of arrow.
- The check valve should remain closed in opposite direction.

Note correct installation position.

Reading measured value block

- Connect scan tool and select function "engine electronics" --> **Vehicle diagnostic, testing and information system VAS 5051 or scan tool V.A.G 1551 , connecting.**
- Press --> key.

Indicated on display (function selection): Vehicle system - test HELP Select function XX

- Press keys 0 and 8 for the function "Read measured value block".
- Confirm entry with Q key.

Indicated on display: Read measured value block HELP Enter display group number XXX

- Press keys 0, 0 and 8.
- Confirm entry with Q key.

Display group 008

Read measured value block			8 -->	Indicated on display:
Operated/not operated	Pump off Pump on	XXX mbar	Test off/Test on	
			Test	
			• Test (short test) off	

2005 Audi A4 Quattro

BRAKES Brake System

			• Test (short test) on
		Vacuum • Vacuum measured at brake booster unit	• Display for ventilated brake booster unit approx. 960, for evacuated brake booster unit approx. 450, depending on ambient pressure.
	Vacuum pump • Pump off • Pump on		○ If pump does not run although display shows "Pump on" conduct fault finding according to current flow diagram.
Brake pedal:	• Brake pedal not depressed • Brake pedal depressed		○ In the event of any deviations check brake light switch.

DTC table

DTC code		DTC text	Corrective action
SAE	V.A.G		
P1427	17835	Activation of vacuum pump for brake system, short to positive	
P1428	17836	Activation of vacuum pump for brake system, short to earth	○ Trace and repair open circuit or short.
P1429	17837	Activation of vacuum pump for brake system, open circuit	
P1479	17887	Vacuum system for brakes, mechanical malfunction	○ Perform final control diagnosis in engine control

			module to determine whether vacuum pump is running or is being activated. ○ Check hoses leading to pump and those leading from pump to brake booster unit. ○ Perform short trip test of engine control module (Basic setting; Display group 8; ignition switched on and selector lever in position "P" or "N").
--	--	--	---

DTC code		DTC text	Corrective action
SAE	V.A.G		
P1912	18320	Brake booster pressure sensor G294, open circuit/short to positive	
P1913	18321	Brake booster pressure sensor G294, open circuit/short to earth	○ Trace and repair open circuit or short
P1914	18322	Brake booster pressure sensor G294, implausible signal	

ELECTRIC VACUUM PUMP

Description and function

Only vehicles with automatic transmission are equipped with an electric vacuum pump. It is switched on by the engine control module, depending on intake manifold pressure.

The vacuum pump can be tested with On Board Diagnostic (OBD): any detected malfunctions are stored in the engine control module.

The engine must not be running when checking the function of the electrical vacuum pump via (OBD).

Vehicle diagnostic, testing and information system VAS 5051 or scan tool V.A.G 1551 , connecting

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Test requirements:**NOTE:**

- Battery voltage at least 11 V
- Ground (GND) connections at engine and transmission OK
- Engine off
- Automatic transmission in position "P" or "N"

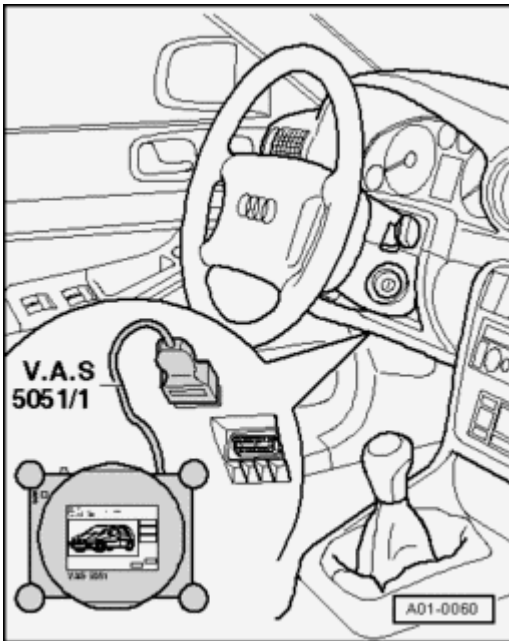
Procedure

Fig. 235: Identifying Vehicle Diagnosis, Testing and Information System VAS 5051 and Data Link Connector (DLC)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch off ignition and connect VAS 5051 with accessory pack VAS 5050/1. Alternatively, connect the scan tool V.A.G 1551 with the diagnosis lead for the vehicle diagnostic, testing and information system VAS 5051.

NOTE:

- The following description only covers the procedure for On Board Diagnostic (OBD when using the scan tool V.A.G 1551.
- When using vehicle diagnostic, testing and information system VAS 5051 , follow the procedures described in the operating instructions for the tester.

* See note Indicated on display:

V.A.G - SELF-DIAGNOSIS HELP

1 - Rapid data transfer

V.A.G - SELF-DIAGNOSIS HELP

2- Flash code output

and

* alternating displays

NOTE:

- If display screen remains blank: Operating instructions for scan tool

- Switch ignition on.
- Switch on scan tool printer by pressing Print button. Indicator lamp in button must come on.
- Press button 1 for "Rapid data transfer".

If the following is indicated on display:

Rapid data transfer HELP

Enter address word XX

NOTE:

- Address word 00 starts the automatic test sequence, i.e. the fault memories of all vehicle systems with self-diagnosis capability are interrogated by way of rapid data transfer.

- Enter "01" for the address word "Engine electronics" and confirm your entry by pressing the Q button.

The scan tool V.A.G 1551 will display the control unit identification details, for example:

3B0907552A 2.7ltr. V6/5V G 0002 ->

Coding 05002 WSC 12345

NOTE:

- The control module identification can be printed out by pressing the PRINT button on the scan tool V.A.G 1551.

Control module identification (example)

• 3B0907552 A	Part No, allocation.
• 2.7 ltr.	Engine capacity
• V6/5V	Engine design (V-engine with 6 cylinders, 5 valves)
• "G" or no display	Vehicle with or without cruise control system
• 0002	Data level (software version) of the control module

2005 Audi A4 Quattro

BRAKES Brake System

• Code 05002	Control module code
• WSC 12345	Dealership identifier of V.A.G 1551 with which coding was last performed

Selecting functions

After establishing diagnostic communication, checking the control module version and pressing the --> key proceed as follows:

Indicated on display: (Function selection, e.g. 02 - interrogate DTC memory)

Rapid data transfer HELP
Select function XX

The engine control module provides the following functions for carrying out self-diagnosis on the vacuum pump:

02 -	Interrogating DTC memory
03 -	Final control diagnosis
04 -	Initiating basic setting
08 -	Reading measured value block

Basic setting (performing "short trip" test)

- Press --> button until the following is indicated on the display:

Indicated on display (function selection):

Vehicle system - test HELP
Select function XX

- Press keys 0 and 4 for "Basic setting" and confirm the entry with the Q button.

Indicated on display (function selection):

Basic setting
Enter display group number XXX

- Press keys 0, 0 and 8 for "Perform short trip test UP 28" and confirm the entry with the Q key.

Indicated on display (function selection):

System in basic setting 8 off (4 on) ->
not oper. Pump off XXX mbar test off

- Press 4
- Firmly depress the brake pedal several times in succession (venting the brake booster) until the test is activated.

Indicated on display (function selection):

System in basic setting 8 on (8 off) ->
Oper./not oper. Pump on XXX mbar test on

- The brake pedal must not be pressed once the test has been activated, as the pump is switched off when the brake pedal is actuated.

The pump evacuates the brake booster. The diagnosis of the brake booster system runs in parallel in the control module. The system passes the test if the pressure in the brake booster reaches the shut-off threshold within the time limit set by the diagnostic function (max. 20 sec).

Indicated on display (function selection):

System in basic setting 8 on (8 off) ->
not oper. Pump off XXX mbar system OK

- Press 8
- Remove diagnosis lead from diagnostic connection.

or:

Indicated on display (function selection):

System in basic setting 8 ->
not oper. Pump off XXX mbar Syst.n.OK

If the test shows the system is not OK, read out the DTC memory and repair the malfunction (ignition must be switched off!).

- Afterwards perform short trip test again.

Performing final control diagnosis

- Connect scan tool and select function "engine electronics" --> **Vehicle diagnostic, testing and information system VAS 5051 or scan tool V.A.G 1551 , connecting.**
- Press --> key.

Indicated on display (function selection):

Vehicle system - test HELP

Select function XX

- Press keys 0 and 3 for "Final control diagnosis" and confirm the entry with the Q key.
- Press the --> key until the following text appears:

Indicated on display (function selection):

Final control diagnosis
Actuation of vacuum pump for brake system

- Confirm entry with the Q button.

The electric vacuum pump should now run for approx. 10 sec.

- Remove diagnosis lead from diagnostic connection.

Reading measured value block

- Connect scan tool and select function "engine electronics" --> **Vehicle diagnostic, testing and information system VAS 5051 or scan tool V.A.G 1551 , connecting.**
- Press --> key.

Indicated on display (function selection):

Vehicle system - test HELP
Select function XX

- Press keys 0 and 8 for the function "Read measured value block".
- Confirm entry with Q button.

Indicated on display:

Read measured value block HELP
Enter display group number XXX

- Press keys 0 , 0 and 8.
- Confirm entry with Q button.

Display group 008

Read measured value block			8 -->	Indicated on display:
Operated/not operated	Pump off Pump on	XXX mbar	Test off Test on	
			Test	

2005 Audi A4 Quattro

BRAKES Brake System

			• Test (short test) off • Test (short test) on
		Vacuum • Vacuum measured at brake booster unit	• Display for ventilated brake booster unit approx. 960, for evacuated brake booster unit approx. 450, depending on ambient pressure.
	Vacuum pump • Pump off • Pump on		○ If pump does not run although display shows "Pump on" conduct fault finding according to current flow diagram.
Brake pedal: • Brake pedal not depressed • Brake pedal depressed			○ In the event of any deviations check brake light switch.

DTC table

DTC code		DTC text	Corrective action
SAE	V.A.G		
P1427	17835	Brake vacuum pump activation Short circuit to B+	
P1428	17836	Brake vacuum pump activation Short circuit to Ground (GND)	○ Trace and repair open circuit or short. --> Electrical Wiring Diagrams, Troubleshooting and Component Locations
P1429	17837	Activation of brake vacuum pump Open	

		circuit	
P1479	17887	Brake vacuum system Mechanical malfunction	○ Perform final control diagnosis in engine control module to determine whether vacuum pump is running or is being activated. ○ Check hoses leading to pump and those leading from pump to brake booster unit. ○ Perform short trip test of engine control module (Basic setting; Display group 8; ignition switched on and selector lever in position "P" or "N").

DTC code		DTC text	Corrective action
SAE	V.A.G		
P1912	18320	Brake booster pressure sensor G294 , circuit to B+	
P1913	18321	Brake booster pressure sensor G294 , Short circuit to Ground (GND)	○ Trace and repair open circuit or short --> Electrical Wiring Diagrams, Troubleshooting and Component Locations
P1914	18322	Brake booster pressure sensor G294 , Unplausible signal	

BRAKE HOSES AND BRAKE LINES

Brake hoses/lines, routing

Replacement brake hoses and brake lines are supplied as spare parts ready to be installed.

Secure brake hoses and brake lines to the original locations when installing.

Tightening torques

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2005 Audi A4 Quattro**BRAKES Brake System**

Brake caliper C54	
Brake carrier to wheel bearing housing	190 Nm
Brake caliper to brake carrier	30 Nm
Brake caliper FN3	
Brake caliper to brake carrier	30 Nm
Brake carrier to wheel bearing housing	190 Nm
Brake caliper FNR-G60	
Brake caliper to brake carrier	30 Nm
Brake carrier to wheel bearing housing	190 Nm
Bleeder valve to brake caliper	10 Nm
Bleeder valve to brake caliper FNR-G60	15 Nm
Hydraulic unit with bracket to longitudinal member (Bosch 8.0)	10 Nm
ABS sensors to wheel bearing housing	10 Nm
Splash plates to wheel bearing housing	10 Nm
Rear brake caliper C38	
Brake hose to brake caliper (banjo union with banjo bolt)	38 Nm
Brake caliper to brake carrier	35 Nm
Brake carrier to wheel bearing housing	75 Nm
Rear brake caliper C43	
Brake hose to brake caliper (banjo union with banjo bolt)	38 Nm
Brake caliper to brake carrier	35 Nm
Brake carrier to wheel bearing housing	75 Nm

Brembo 18" brake caliper

Brake caliper to brake carrier	110 Nm
Brake carrier to stub axle carrier	190 Nm
Bleeder valve to brake caliper	10 Nm
Brake lines to brake hoses	15 Nm
ABS sensors to wheel bearing housing	10 Nm
Brake pads to wheel bearing housing	10 Nm

45 - ANTI-LOCK BRAKE SYSTEM

INFORMATION FOR REPAIR WORK ON ABS

CAUTION: 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 article may result in damage to the system and could make the vehicle unsafe.

NOTE:

- Before carrying out repair work on the anti-lock brake system, determine the cause of the problem using On Board Diagnostic (OBD).
- When installing a new hydraulic control unit, always check the coding VAS 5051 vehicle diagnostic, testing and information system.
- Always switch off the ignition before carrying out installation or repair work. On vehicles with a coded radio, find out the anti-theft code and disconnect the battery Ground (GND) strap.
- Observe the relevant safety precautions and information when handling brake fluid.
- If hydraulic system has to be opened, bleed the braking system after the work is finished using brake filler bleeder unit VAS 5234. In addition, a high- and low-pressure test should be carried out on the brake system.
- During the final road test, make sure that at least one ABS-controlled braking operation is performed (pulsations must be felt at the brake pedal) VAS 5051 vehicle diagnostic, testing and information system.
- 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; do not use harsh cleaning agents such as brake cleaner, fuel, thinners or similar.
- Place removed parts on a clean surface and cover them up.
- Carefully cover or seal open components, if repairs are not to be carried out immediately. (Use sealing plugs from repair kit 1 H0 698 311 A).
- Only use lint-free cloths.
- Only remove replacement parts from packaging immediately prior to installation.
- Only use genuine parts in their original packaging.
- When the system is open do not work with compressed air and do not move the vehicle.

- Make sure that no brake fluid enters electrical connectors.

ABS/ESP SYSTEM, COMPONENT OVERVIEW

ABS/ESP system, component overview

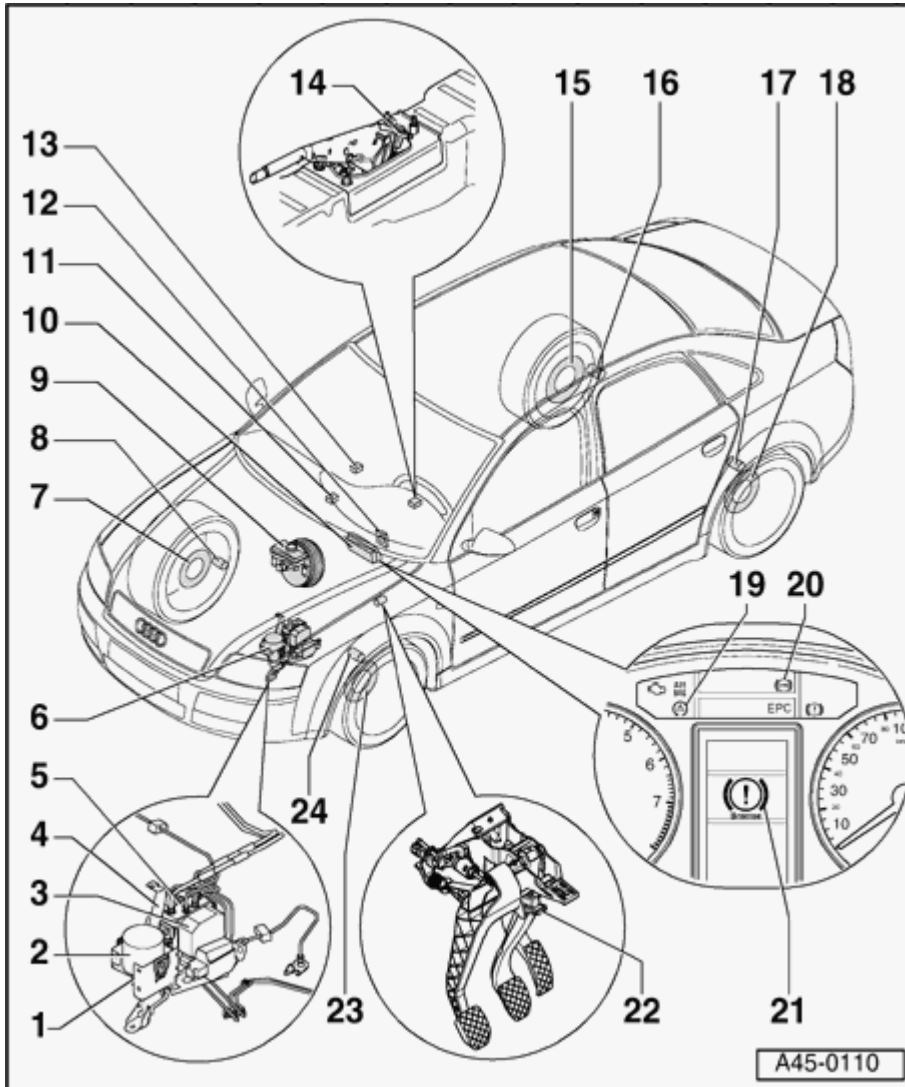


Fig. 5: ABS/ESP System, Component Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bracket for hydraulic control unit

- Removing and installing --> **Hydraulic control unit, removing and installing**

2 - Brake booster vacuum pump

- Only on gasoline engines with automatic transmission

3 - ABS control module J104

- The ABS hydraulic unit N55 and ABS control module J104 together make up the hydraulic control unit.
- Removing and installing --> **Hydraulic control unit, removing and installing**

4 - ABS hydraulic unit N55 with ABS control module J104

- The ABS hydraulic unit N55 and ABS control module J104 together make up hydraulic control unit.
- Removing and installing --> **Hydraulic control unit, removing and installing**

5 - Brake pressure sensor 1 G201

- Screws onto hydraulic unit

6 - ABS hydraulic unit N55 with ABS control module J104

7 - Rotor for right front speed sensor

- Checking/removing and installing **Front axle rotor, checking or removing and installing**

8 - Right Front ABS Wheel Speed Sensor G45

- Removing and installing --> **Front axle speed sensor, removing and installing**

9 - Brake fluid level warning switch F34

10 - Instrument cluster

11 - Anti-slip control switch E132

- Location: on center console

12 - Steering angle sensor G85

- Location: Incorporated in return spring with slip ring on steering column -->
 - **69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS**
 - **69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS** for BODY EXTERIOR - CABRIOLET
- Performing zero compensation VAS 5051 vehicle diagnostic, testing and information system

13 - Transverse Acceleration Sensor G200 and Rotation Rate Sensor G202

- Location: Underneath radio
- Removing and installing --> **Transverse acceleration sensor G200 and Rotation rate sensor G202 , removing and installing**

14 - Parking brake warning light switch F9

- Location: On parking brake lever unit

15 - Rotor for right rear speed sensor

- Checking front wheel drive **Rear axle rotor, checking**
- Checking all wheel drive **Checking rotor on rear axle**

16 - Right rear ABS wheel speed sensor G44

- Removing and installing (vehicles with front wheel drive) --> **Speed sensor on rear axle, removing and installing**
- Removing and installing (vehicles with all wheel drive) --> **Speed sensor on rear axle, removing and installing**

17 - Left rear ABS wheel speed sensor G46

- Removing and installing (vehicles with front wheel drive) --> **Speed sensor on rear axle, removing and installing**
- Removing and installing (vehicles with all wheel drive) --> **Speed sensor on rear axle, removing and installing**

18 - Rotor for left rear speed sensor

- Checking front wheel drive **Rear axle rotor, checking**
- Checking all wheel drive **Checking rotor on rear axle**

19 - Traction control indicator lamp K86

- Location: In instrument cluster
- See Owners Manual for further information

20 - ABS warning lamp K47

- Location: In instrument cluster
- See Owners Manual for further information

21 - Brake System Warning Lamp K118 ; "brake warning" symbol

- Location: In instrument cluster in driver information system
- See Owners Manual for further information

22 - Brake light switch F

- Removing and installing brake light switch --> **Brake light switch, removing and installing.**
- Adjusting --> **Brake light switch, removing and installing**

23 - Rotor for front left speed sensor

- Checking/removing and installing **Front axle rotor, checking or removing and installing**

24 - Left front ABS wheel speed sensor G47

- Removing and installing --> **Front axle speed sensor, removing and installing**

Vehicle diagnostic, testing and information system VAS 5051 , connecting and selecting functions

Special tools, testers and auxiliary items required

- Vehicle diagnostic, testing and information system. VAS 5051

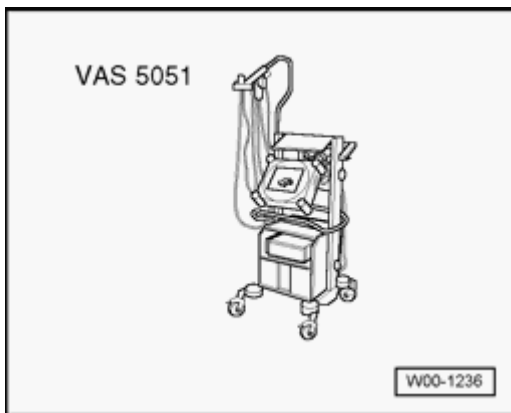


Fig. 6: Identifying Vehicle Diagnosis, Testing And Information System VAS 5051
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Diagnostic lead VAS 5051/1 or VAS 5051/3

CAUTION:

- Testers and measuring instruments are always to be attached to rear seat during test drive.
- These devices may be operated only by a passenger during a test drive.

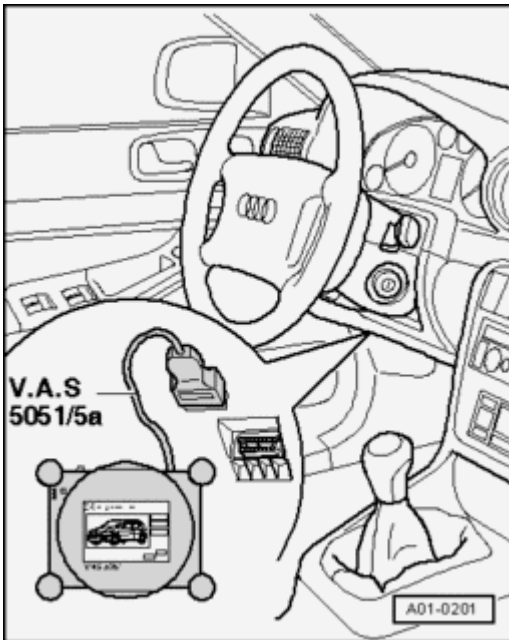


Fig. 7: Connecting Diagnostic Lead Connector VAS 5051/1 Or VAS 5051/3 At Data Link Connector (DLC)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect diagnostic lead connector VAS 5051/1 or VAS 5051/3 at Data Link Connector (DLC) - **arrow** -.

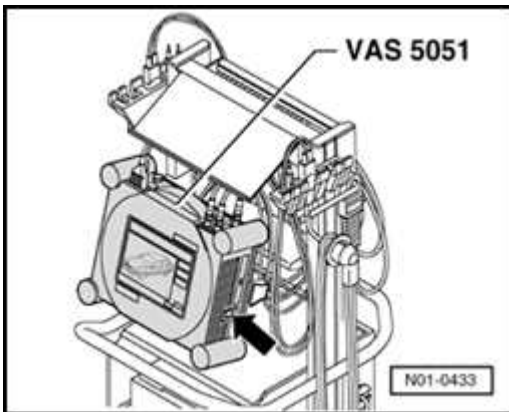


Fig. 8: Special Tool - VAS 5051 & On Switch

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch on tester - **arrow** -.

The tester is operational when it displays a picture of a car.

- Switch on ignition.
- Touch Guided Fault Finding button on display screen.
- Select the following:

- Make
- Model
- Model year
- Version

- Engine code letters
- Confirm entered data.

Wait until tester has interrogated all the control modules in the vehicle.

- Press Go to button and select "Function/component selection".
- Select "Suspension" on display.
- Select "Brake system" on display.
- Select "01 - On Board Diagnostic Capable System".

- Select "Anti-lock brake system" on display.
- Select "Function" on display.

Now, all possible functions of Anti-lock Brake System (ABS) installed in vehicle are displayed.

- Select desired function on display.

ANTI-LOCK BRAKE SYSTEM (ABS) BOSCH 5.7

Anti-lock brake system (ABS) Bosch 5.7

Anti-Slip Regulation (ASR) is offered as optional equipment on front wheel drive vehicles.

The ABS brake system is divided diagonally. The brake booster assist is provided pneumatically by the vacuum brake booster unit.

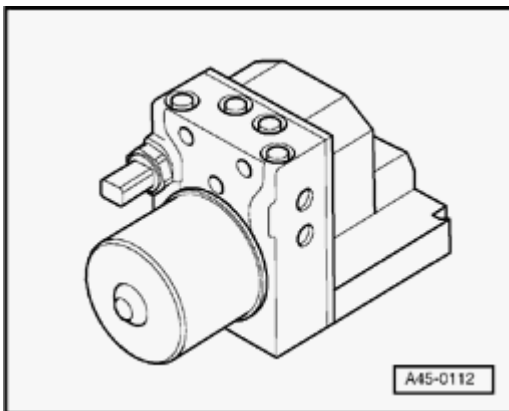


Fig. 9: Anti-Lock Brake System (ABS) Bosch 5.7

Courtesy of VOLKSWAGEN UNITED STATES, INC.

The hydraulic unit and control module form a single unit, which is referred to as the hydraulic control unit.

Malfunction sources are reduced by direct connection of components named. Hydraulic control module is serviced by replacing it.

The bolts which connect the individual components of the hydraulic control unit must not be loosened.

Hydraulic unit and brake lines

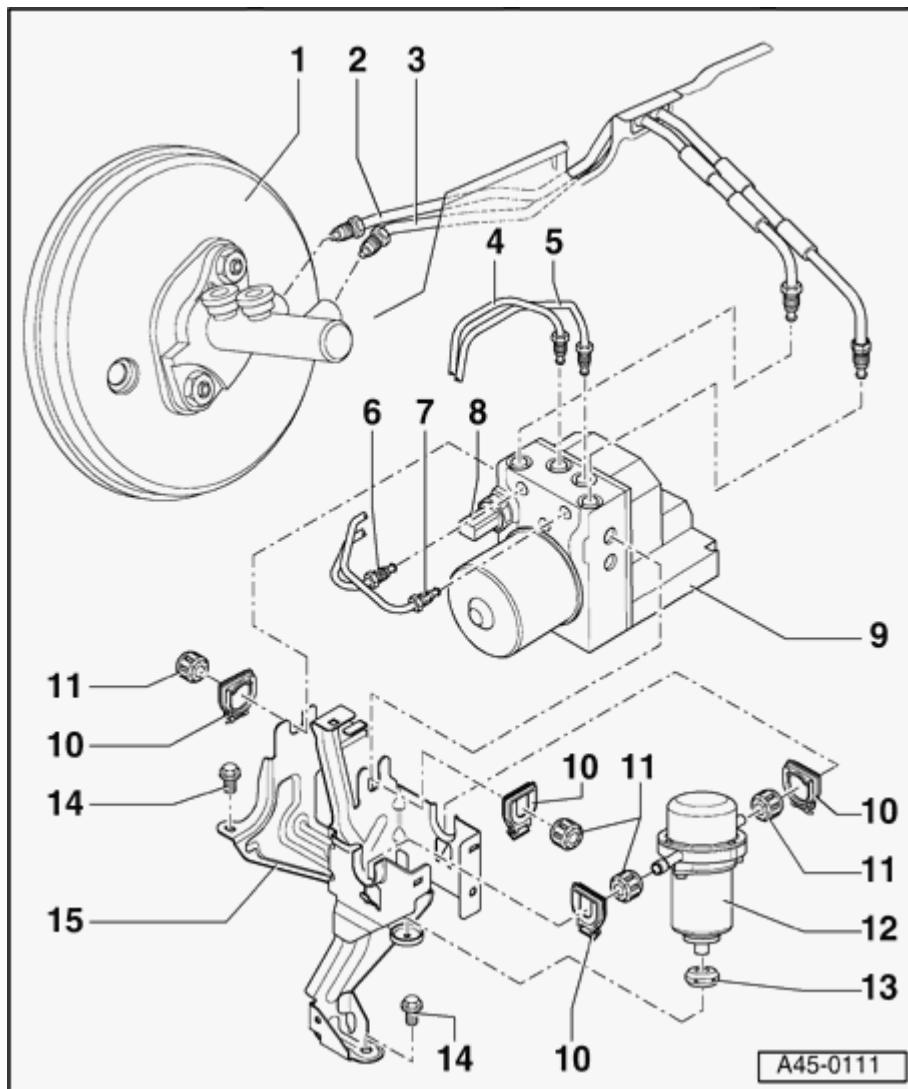


Fig. 10: Exploded View Of Hydraulic Unit And Brake Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Brake master cylinder and brake booster

2 - Brake line

- Brake master cylinder/primary piston circuit to hydraulic unit
- Tightening torque: 20 Nm

3 - Brake line

- Brake master cylinder/secondary piston circuit to hydraulic unit
- Tightening torque: 20 Nm

4 - Brake line

- Hydraulic unit to left front brake caliper
- Tightening torque: 12 Nm

5 - Brake line

- Hydraulic unit to right front brake caliper
- Tightening torque: 12 Nm

6 - Brake line

- Hydraulic unit to right rear brake caliper
- Tightening torque: 12 Nm

7 - Brake line

- Hydraulic unit to left rear brake caliper
- Tightening torque: 12 Nm

8 - Brake pressure sensor 1 G201

- Bolts onto hydraulic unit
- Tightening torque: 20 Nm
- Removing and installing --> **Brake pressure sensor 1 G201 , removing and installing**

9 - ABS Hydraulic Unit N55 with ABS Control Module J104

- Removing and installing --> **Hydraulic control unit, removing and installing**

10 - Locking clip

11 - Spacer (4x)

12 - Vacuum pump

- Removing and installing --> **Brake system vacuum pump V192, removing and installing**

13 - Spacer (1x)

14 - Hex bolt (3x), 10 Nm

15 - Bracket

Hydraulic control unit, removing and installing

Special tools, testers and auxiliary items required

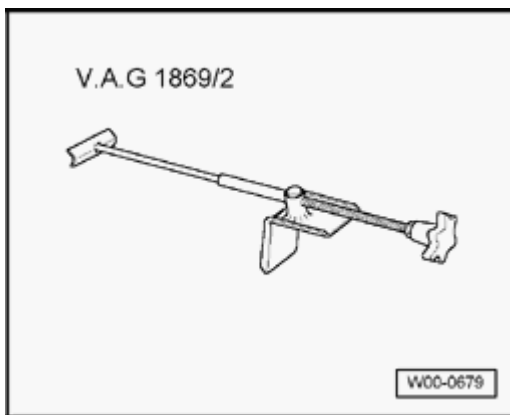


Fig. 11: Identifying Brake Pedal Depressor V.A.G 1869/2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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

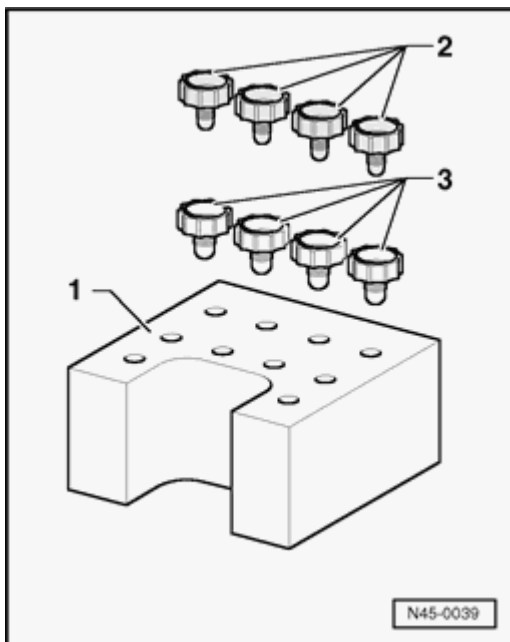


Fig. 12: Sealing Plug Repair Set, Part No. 1H0 698 311 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Sealing plug repair kit, Part no. 1H0 698 311 A

Location:

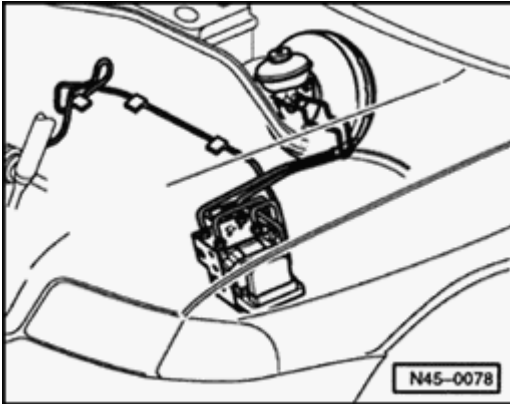


Fig. 13: ABS Layout
Courtesy of VOLKSWAGEN UNITED STATES, INC.

The hydraulic control unit is installed on left-hand side of engine compartment.

Removing

CAUTION: Brake lines must not be bent.

- Note or request radio code on vehicles with coded radio, if necessary.
- Disconnect battery. -->
 - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
 - **27 - BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT - GENERAL INFORMATION

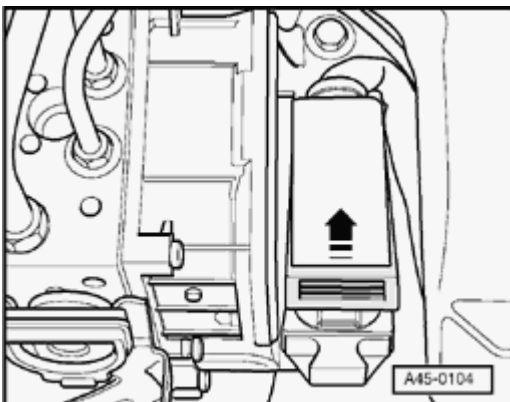


Fig. 14: Removing Connector From Control Module

Courtesy of VOLKSWAGEN UNITED STATES, INC.

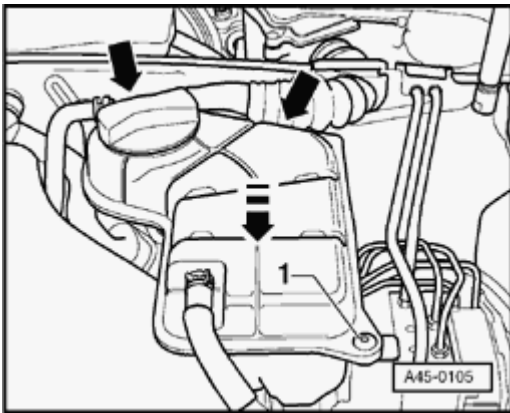
- Release connector from control unit in direction of - **arrow** - and disconnect.
- Insert brake pedal actuator V.A.G 1869/2 between brake pedal and drivers seat. Depress brake pedal at least 60 mm.

The brake pedal actuator V.A.G 1869/2 must remain in position until all brake lines have been reconnected to the hydraulic unit.

NOTE:

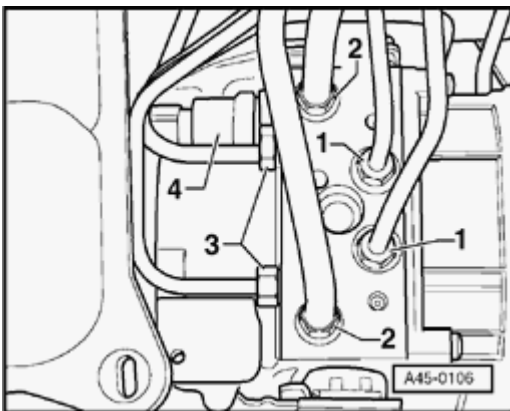
- **Protect engine compartment against escaping brake fluid.**

- Disconnect brake lines from hydraulic unit.

**Fig. 15: Loosening Securing Bolt And Pulling Coolant Expansion Tank**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen securing bolt - 1 - and pull coolant expansion tank out in direction of - **arrow** - , then swivel tank to one side.
- Tightening torque: 6 Nm

**Fig. 16: Identifying Brake Lines**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Seal brake lines and threaded holes with plugs from repair kit Part No. 1H0 698 311 A.

NOTE:

- Protect plenum chamber and engine compartment against escaping brake fluid.

- Remove lines - 1 - , -2- and - 3 -.

NOTE:

- On vehicles from model year 2002 a flexible hose has been installed as part of the brake lines; on vehicles built before model year 2002 the brake lines have to be disconnected at brake booster.

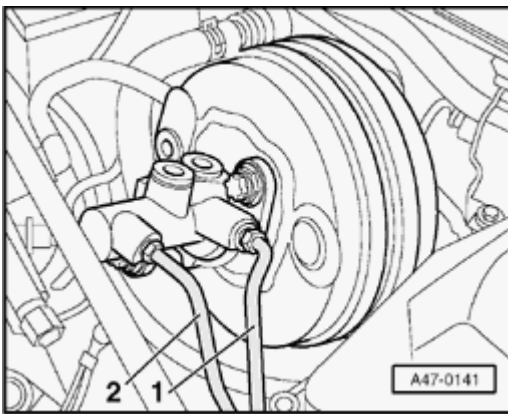


Fig. 17: Disconnecting Brake Lines And Sealing With Sealing Plugs From Repair Kit, Part No. 1H0 698 311 A

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake lines - 1 - and - 2 - and seal with sealing plugs from repair kit, Part No. 1H0 698 311 A.

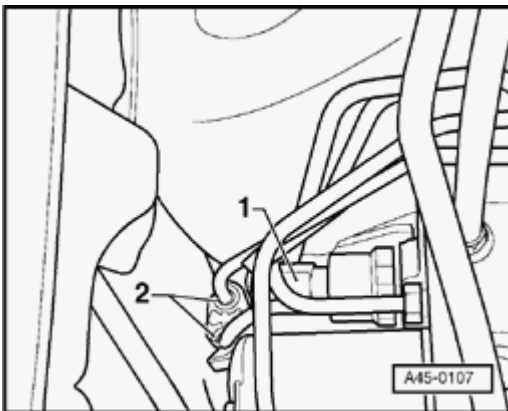


Fig. 18: Loosening Connectors & Unclipping Brake Lines From Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen connectors -1-.
- Unclip brake lines from bracket - 2 -.

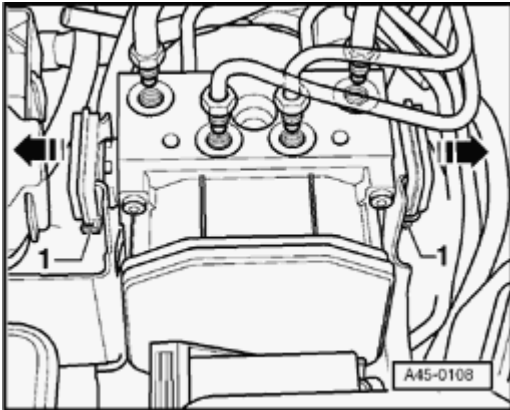


Fig. 19: Identifying Locking Clips

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release retaining clip from below - **1** - and pull it out in direction of - **arrow** -.
- Remove hydraulic control unit.

Installing

When installing, observe the following:

NOTE:

- Do not remove sealing plugs from new hydraulic control unit until corresponding brake line is to be installed.
- If sealing plugs are removed too early, brake fluid can escape, and can no longer be guaranteed that unit is sufficiently filled or adequately bled.

- Bleed brake system.
- Enter radio code.
- Connect battery. -->
 - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
 - **27 - BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT - GENERAL INFORMATION

Tightening torques

Component	Nm
Brake lines to hydraulic unit M10 (brake line diameter 5 mm)	12
Brake lines to hydraulic unit M12 (brake line diameter 5 mm)	12
Brake lines to hydraulic unit M12 (brake line diameter 8 mm)	20

ANTI-LOCK BRAKE SYSTEM (ABS) BOSCH 8.0**ABS Bosch 8.0**

The following versions are possible with Bosch 8.0 ABS:

- ABS/EDL/ASR/ESP

The ABS brake system is divided diagonally. The brake booster assist is provided pneumatically by the vacuum brake booster unit.

Malfunctions in the ABS system do not influence the brake system and booster. The conventional braking system remains functional even without ABS. A change in braking behavior must be looked at. After the ABS warning lamp comes on, the rear wheels can lock early when braking!

Malfunction sources are reduced by direct connection of components named. Hydraulic control module is serviced by replacing it.

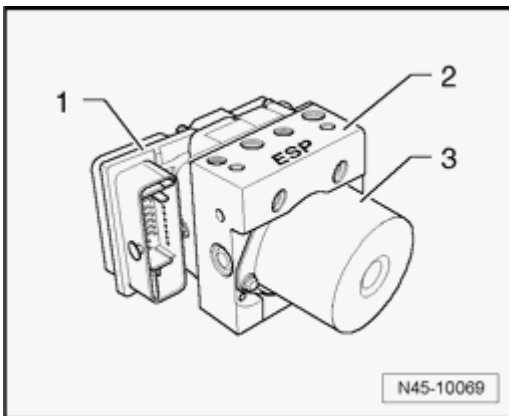


Fig. 20: Identifying Control Module Bosch 8.0 ABS/EDL/ASR/ESP
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Bosch 8.0 ABS/EDL/ASR/ESP:

Removing and installing control module and hydraulic unit

--> **Hydraulic control unit, removing and installing**

Hydraulic unit and brake lines

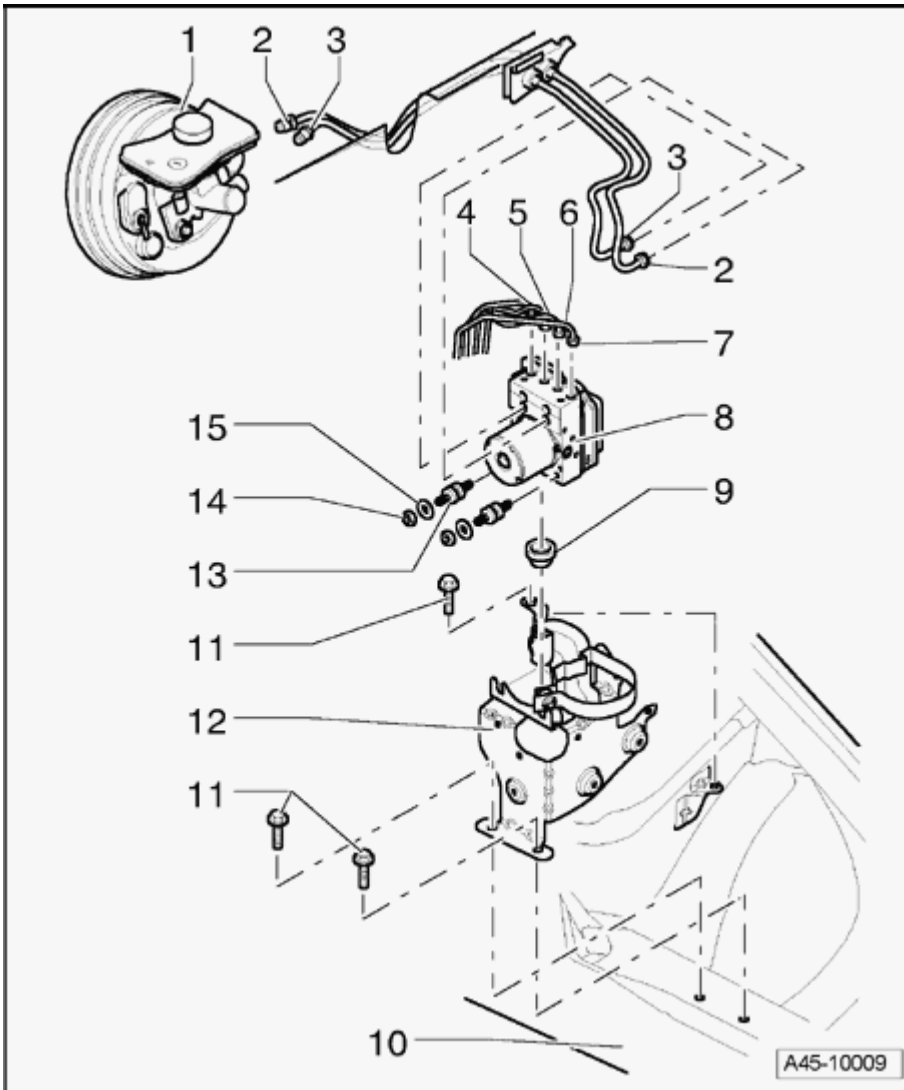


Fig. 21: Exploded View Of Hydraulic Unit And Brake Lines
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - Brake master cylinder and brake booster
- 2 - Brake line
 - Brake master cylinder/primary piston circuit to hydraulic unit
- 3 - Brake line
 - Brake master cylinder/secondary piston circuit to hydraulic unit
- 4 - Brake line
 - Hydraulic unit to right front brake caliper

5 - Brake line

- Hydraulic unit to left rear brake caliper

6 - Brake line

- Hydraulic unit to right rear brake caliper

7 - Brake line

- Hydraulic unit to left front brake caliper

8 - ABS hydraulic unit N55 with ABS control module J104

- With integrated brake pressure sensor
- Removing and installing --> **Hydraulic control unit, removing and installing**

9 - Spacer (2 x)

10 - Longitudinal member (body)

11 - Combi nut, 10 Nm

12 - ESP bracket

13 - Bolt with bonded rubber bushing, tightening torque 10 Nm

- Cannot be removed from component

14 - Combi nut, 8 Nm

15 - Washer

Hydraulic control unit, removing and installing**Special tools, testers and auxiliary items required**



Fig. 22: Identifying Torque Wrench V.A.G. 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench V.A.G 1331

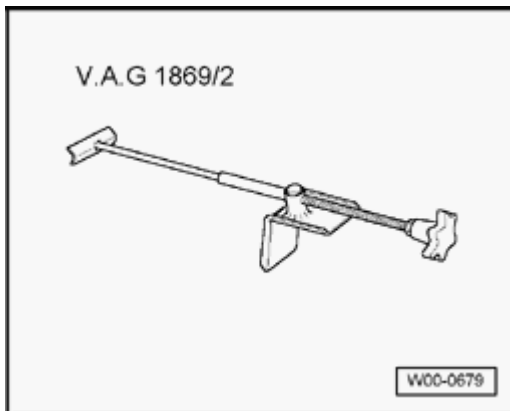


Fig. 23: Identifying Brake Pedal Depressor V.A.G 1869/2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Brake pedal actuator V.A.G 1869/2
- Sealing plugs (repair kit) 1H0 698 311 A

Removing

Location:

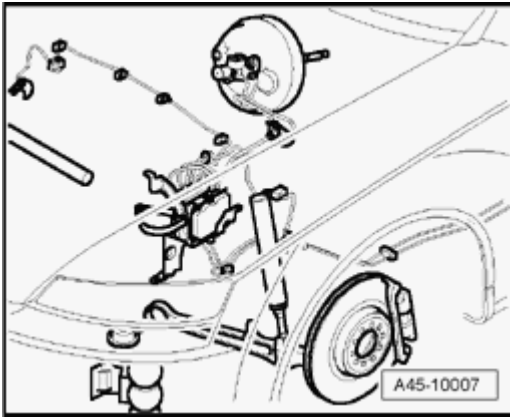


Fig. 24: Locating Hydraulic Unit

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Hydraulic unit is located on left-hand side of engine compartment.

CAUTION: Brake lines must not be bent.

- Note or request radio code on vehicles with coded radio if necessary.
- Disconnect battery -->
 - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
 - **27 - BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT - GENERAL INFORMATION

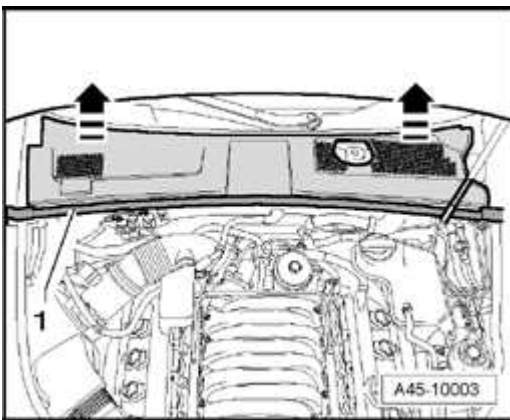


Fig. 25: Removing Plenum Chamber Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove plenum chamber cover.

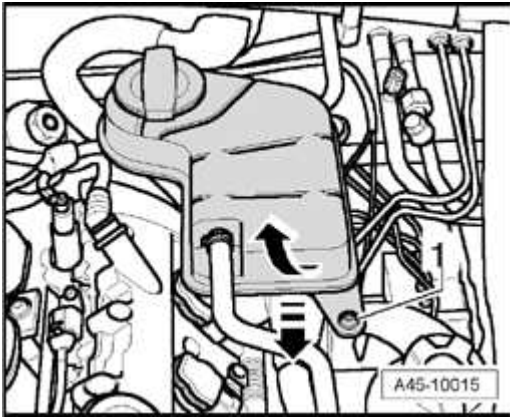


Fig. 26: Removing Hex Bolts Securing Coolant Expansion Tank & Disconnecting Connector From Coolant Expansion Tank

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolts - 1 - securing coolant expansion tank.
- Disconnect connector from coolant expansion tank.

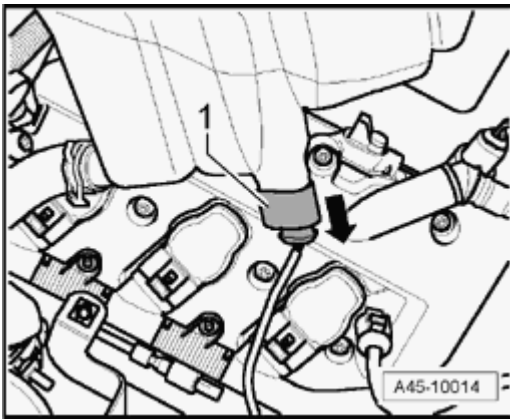


Fig. 27: Moving Coolant Expansion Tank Clear To One Side

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Move coolant expansion tank clear to one side.

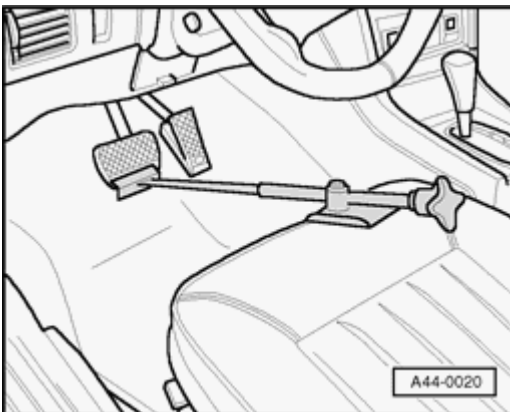


Fig. 28: Brake Pedal Depressor VAG 1869/2 Inserted Between Brake Pedal And Driver's Seat
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert brake pedal actuator V.A.G 1869/2 between brake pedal and drivers seat. Depress brake pedal at least 60 mm.
- Connect bleeder bottle hose to bleeder screws on left front and left rear brake caliper and open bleeder screws.

NOTE:

- The pressure in the hydraulic unit is then released.

- Close left front and left rear bleeder screws.
- Do not remove brake pedal actuator V.A.G 1869/2.
- To protect against escaping brake fluid, place a lint-free rag in the area under the control module and hydraulic unit.

NOTE:

- Number brake lines.

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

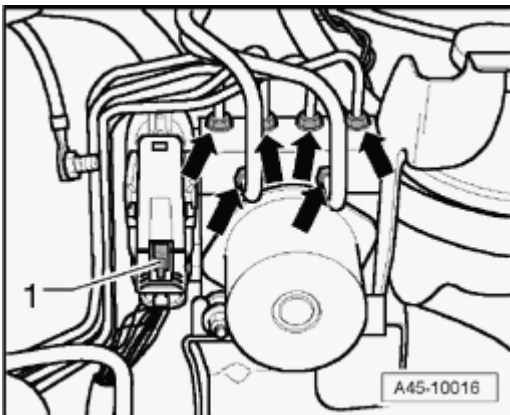


Fig. 29: Identifying Brake Lines

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect brake lines between hydraulic unit and brake master cylinder.
- Disconnect remaining brake lines - **arrows** - from hydraulic unit.
- Seal brake lines and threaded holes with sealing plugs from repair kit.

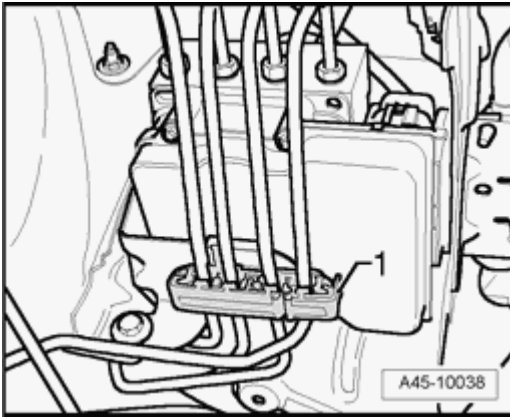


Fig. 30: Identifying Brake Line Retainer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open brake line retainer - **1** -.

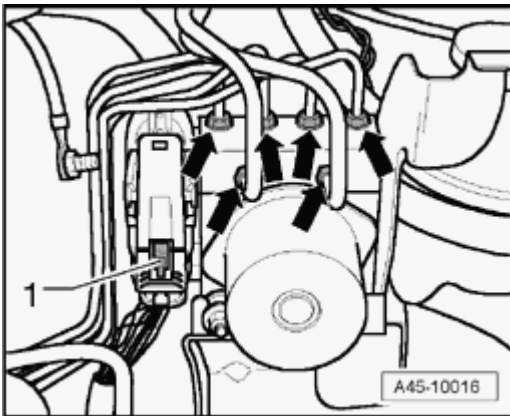


Fig. 31: Identifying Brake Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press red locking slide upward.

NOTE:

- Make sure that no brake fluid gets into the control module connector housing. This could lead to corrosion of the contacts and thereby cause the system to fail.
- Clean a dirty connector housing thoroughly with compressed air.

- Release control module connector - **arrow** - and disconnect.

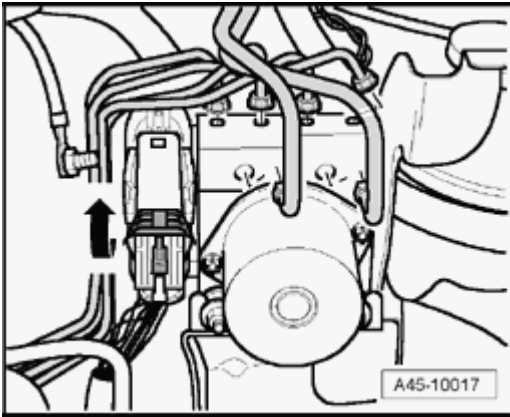


Fig. 32: Pushing Retaining Plate And Disconnecting Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push retaining plate in direction of - **arrow** - and disconnect connector.

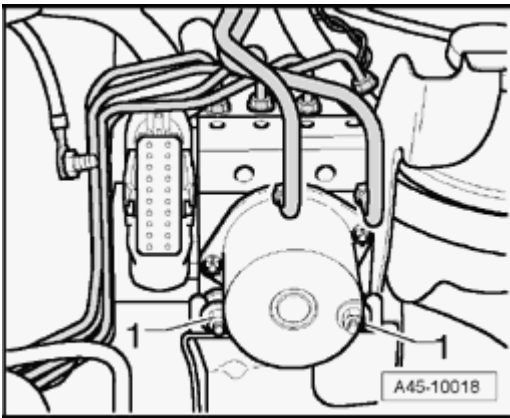


Fig. 33: Removing Hex Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolts -1-.
- Remove hydraulic control unit.

Installing

Installation is in reverse order of removal. Note the following:

NOTE:

- Remove sealing plugs on new hydraulic unit when the corresponding brake line is going to be installed.
- If the sealing plugs are removed too early, brake fluid can escape, and can no longer be guaranteed that the unit is sufficiently filled or adequately bled.

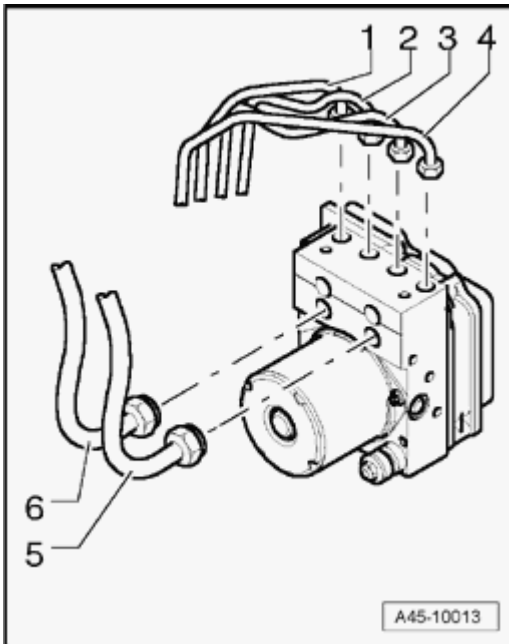


Fig. 34: Connecting Brake Caliper & Piston Circuit Lines
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect lines as previously marked:

- 1 - To right front brake caliper
- 2 - To left rear brake caliper
- 3 - To right rear brake caliper
- 4 - To left front brake caliper
- 5 - To primary piston circuit
- 6 - To secondary piston circuit

- Install connector on hydraulic pump.
- Clip ABS unit onto bracket.

NOTE:

- **Do not tighten bolts completely. This will make attaching the individual brake lines easier.**

- After tightening brake lines, tighten hydraulic unit.
- Remove brake pedal depressor V.A.G 1869/2.
- Bleed brake system --> **Brake system, bleeding.**
- Code ABS control module J104. Code control unit using VAS 5051 via Guided fault finding function.

- When replacing the control module, select function "Replacing" for the respective control module in the "Guided fault finding".

For this, use vehicle diagnosis, testing and information system VAS 5051.

- After fastening the brake lines to the hydraulic unit, perform final control diagnosis Vehicle diagnostic, testing and information system. VAS 5051

NOTE:

- **Final control diagnosis can be used to establish whether line connections have been interchanged --> ABS system components on front axle, removing and installing.**

Tightening torques

Component	Nm
Brake lines to hydraulic unit M10 (brake line diameter 5 mm)	12
Brake lines to hydraulic unit M12 (brake line diameter 5 mm)	12
Brake lines to hydraulic unit M12 (brake line diameter 8 mm)	16

ABS SYSTEM COMPONENTS ON FRONT AXLE, REMOVING AND INSTALLING

ABS system components on front axle, removing and installing

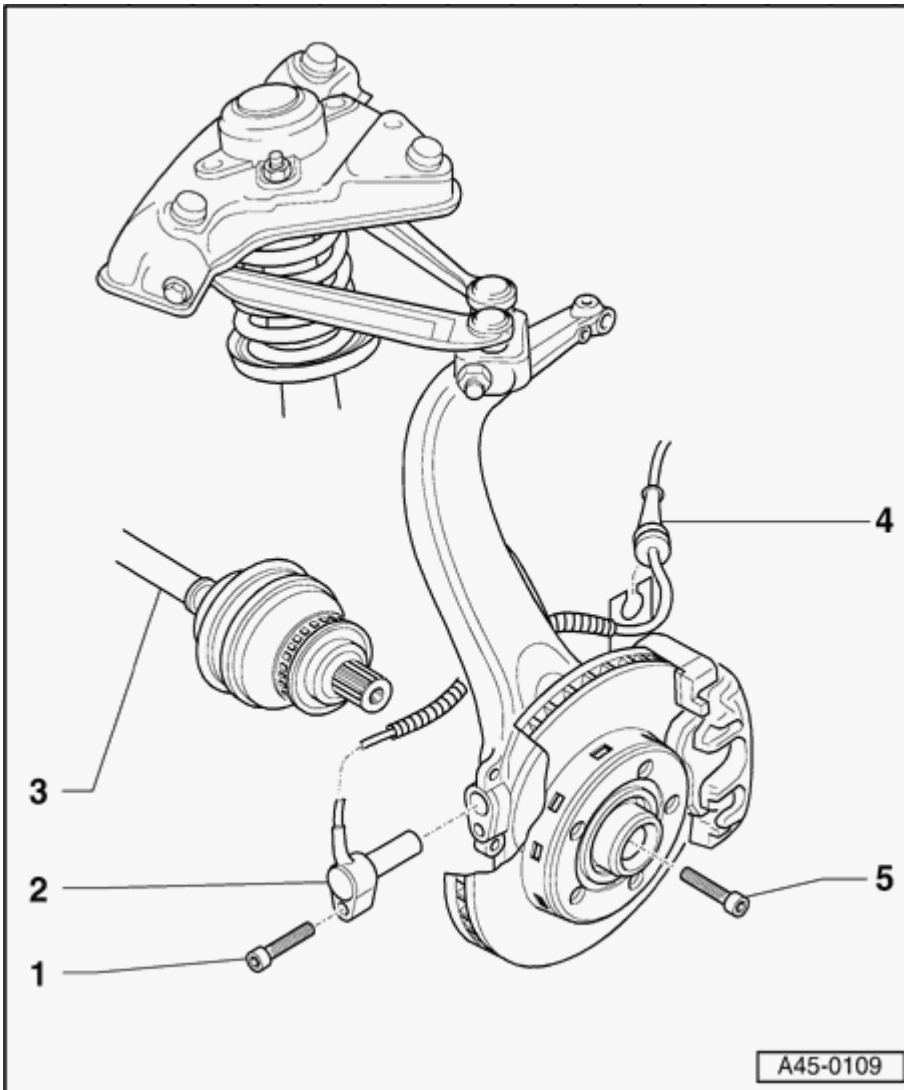


Fig. 35: ABS System Components On Front Axle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Hex socket head bolt

- Tightening torques: 10 Nm

2 - Speed sensor

- Left and right identical
- Removing and installing --> **Front axle speed sensor, removing and installing**
- Speed sensor connector --> **Front axle speed sensor, removing and installing**
- Before inserting into wheel bearing housing, lubricate circumference with *grease G 000 650*
- Press into wheel bearing housing onto stop

3 - Drive axle with rotor

- Checking rotor for dirt and damage **Front axle rotor, checking or removing and installing**
- If rotor is damaged, outer CV joint must be replaced together with rotor --> **40 - FRONT SUSPENSION**
- Outer CV joint is supplied as a replacement part with the rotor.

4 - Speed sensor wire

- Install into retainers provided

5 - Hex socket head bolt

- Always replace
- Different versions see ETKA

Vehicle must be standing on ground when tightening

Tightening torques: --> **42 - REAR SUSPENSION**

Front axle speed sensor, removing and installing**Removing**

- Loosen wheel bolts.
- Raise vehicle.
- Remove wheel.

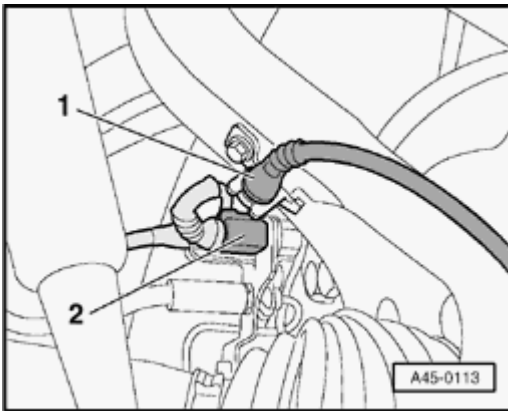


Fig. 36: Unclipping Speed Sensor Wiring From Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip speed sensor wiring from retainers - 1 -.

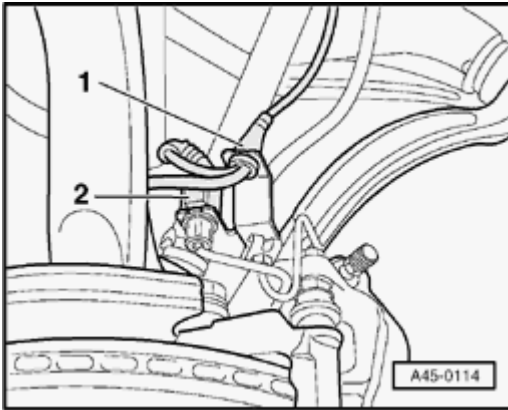


Fig. 37: Unclipping Speed Sensor Wiring From Retainers & Disconnecting Speed Sensor Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip speed sensor wiring from retainers - 1 -.
- Disconnect speed sensor connector - 2 -.
- Unclip speed sensor wiring from retainers - 2 -.

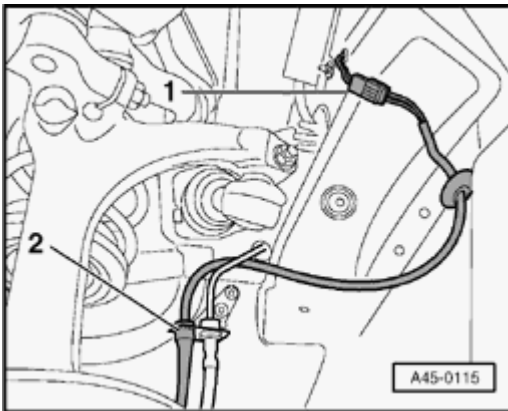


Fig. 38: Releasing Grommet In Wheel Housing & Removing ABS Speed Sensor From Wheel Bearing Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release grommet - 1 - in wheel housing.
- Remove ABS speed sensor from wheel bearing housing.
- Disconnect connector.

Installing

- Before installing speed sensor, install sealing collar and coat speed sensor all round with *lubricating paste G 000 650* .
- Install ABS speed sensor.
- Clip speed sensor wiring into retainers and install grommet in wheel housing.

Install wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT** .

- Turn steering completely to left and right and check clearance of speed sensor wire.

Front axle rotor, checking or removing and installing

- Remove wheel.
- Remove speed sensor from wheel bearing housing.
- Check rotor for contamination and damage.

NOTE:

- If rotor is damaged or dirty, remove drive axle. If damaged, replace outer CV joint together with rotor.
- The outer CV joint is supplied as a replacement part with the rotor. --> **40 - FRONT SUSPENSION**

ABS SYSTEM COMPONENTS ON REAR AXLE (FWD VEHICLES), REMOVING AND INSTALLING

ABS system components on rear axle (FWD vehicles), removing and installing

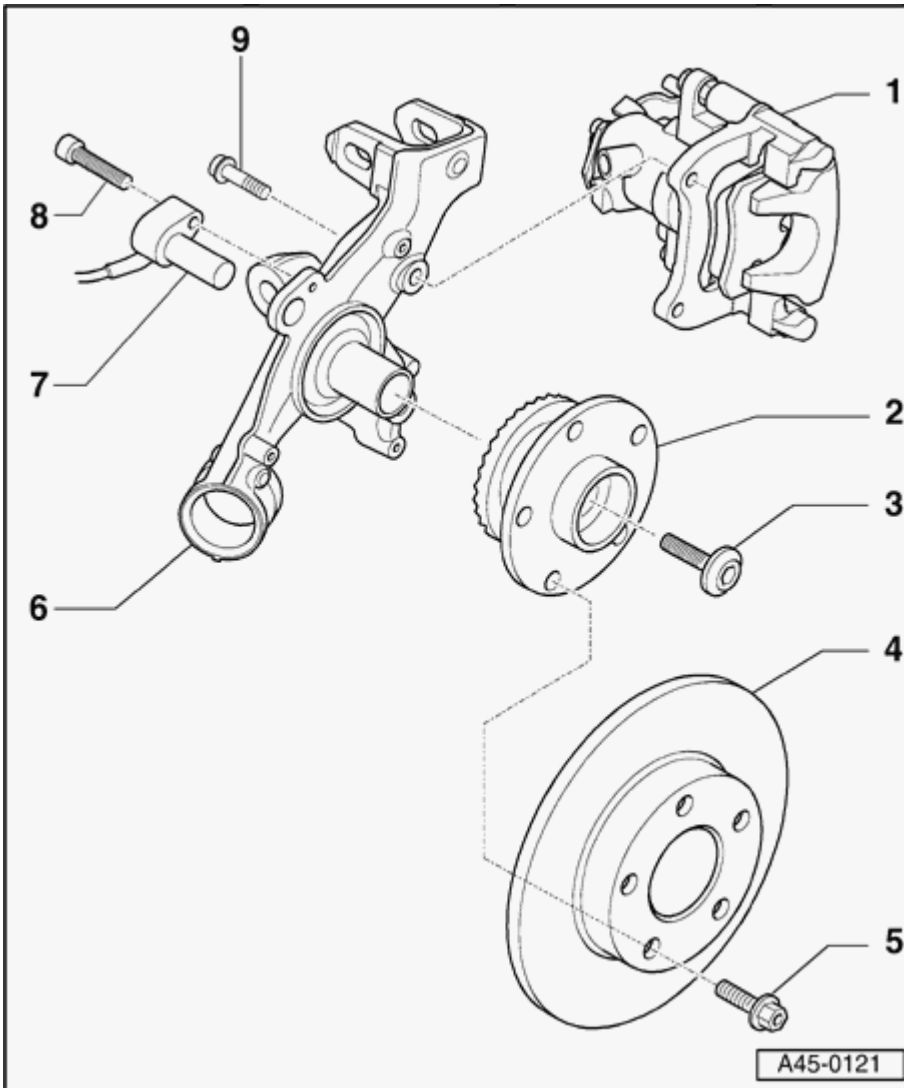


Fig. 39: ABS System Components On Rear Axle (FWD Vehicles)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rear brake caliper

- Removing and installing --> **Brake calipers, servicing**

2 - Wheel hub with rotor

- Removing and installing --> **42 - REAR SUSPENSION**
- Checking rotor

3 - Collar bolt

Vehicle must be standing on the ground when tightening

- Always replace
- Tightening torque --> **42 - REAR SUSPENSION**

4 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Allocation --> **Brakes**
- Thickness --> **Brakes**

5 - Wheel bolt

Vehicle must be standing on the ground when tightening

- Installing wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

6 - Wheel bearing housing

- Removing and installing --> **42 - REAR SUSPENSION**

7 - Speed sensor

- Left and right identical
- Removing and installing --> **Speed sensor on rear axle, removing and installing**
- Before inserting into wheel bearing housing, lubricate circumference with *grease G 000 650*
- Press into wheel bearing housing onto stop
- Release speed sensor connector and disconnect. Unclip speed sensor wiring.

8 - Hex socket head bolt

- Tightening torques: 10 Nm

9 - Ribbed bolt, 75 Nm

- Always replace

Speed sensor on rear axle, removing and installing

Removing

- Loosen wheel bolts.
- Raise vehicle.
- Remove wheel.

- Switch ignition off.

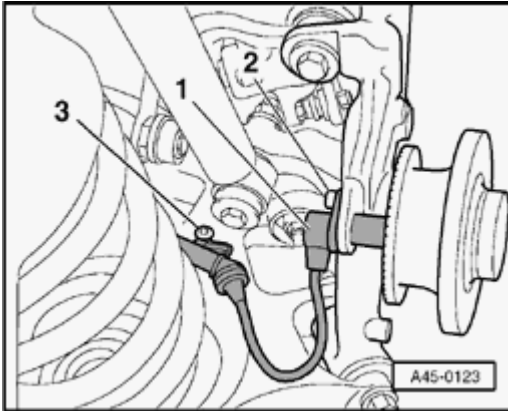


Fig. 40: Removing Hex Bolt, Speed Sensor From Wheel Bearing Housing, Loosening Torx Bolt And Removing Cable Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolt - 2 -.
- Remove speed sensor - 1 - from wheel bearing housing.
- Loosen Torx bolt - 3 - and remove cable bracket.

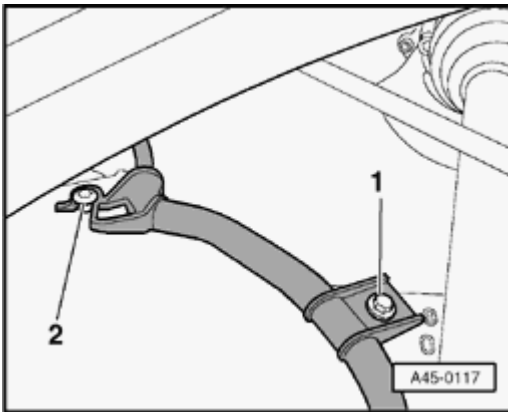


Fig. 41: Removing Hex Bolt, Loosening Torx Bolt And Pulling Out Cable Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolt - 1 -.
- Loosen Torx bolt - 2 - and pull out cable bracket.

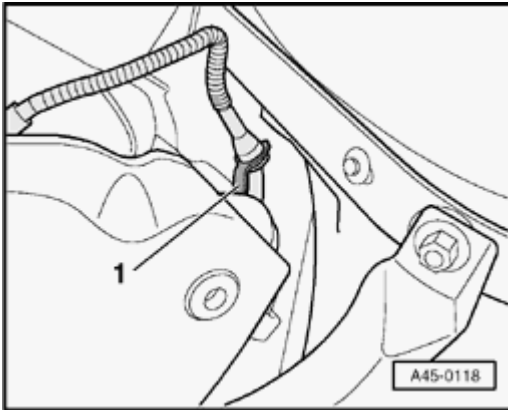


Fig. 42: Unclipping Speed Sensor Wiring From Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip speed sensor wiring from retainers.

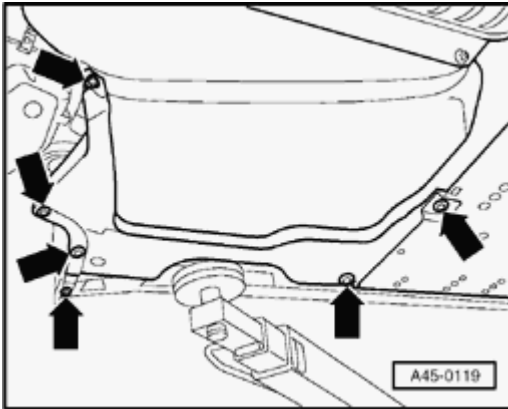


Fig. 43: Detaching Underside Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach underside cover - **arrows** -.
- Lift rear seat out of locking device.
- On Convertible vehicles, also remove side trim.

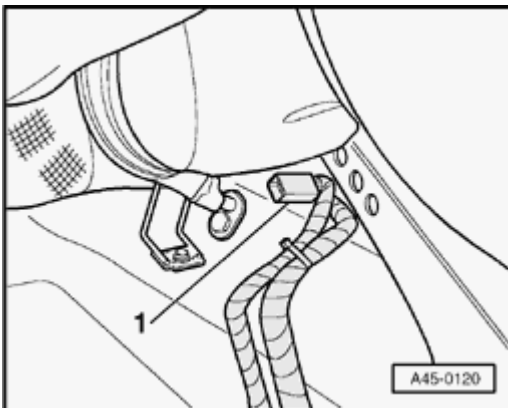


Fig. 44: Disconnecting Speed Sensor Connector And Pressing Out Grommet
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release cable bracket, disconnect speed sensor connector - **1** - and press out grommet (left and right sides are the same).

Installing

Installation is in reverse order of removal.

- Before installing, lubricate speed sensor seal all around with *lubricating paste G 000 650* .

Rear axle rotor, checking

- Raise vehicle.
- Remove wheel.
- Remove speed sensor from wheel bearing housing.
- Check rotor for contamination and damage.

Removing and installing rotor on rear axle

Removing

- Raise vehicle.
- Remove wheel.
- Remove brake caliper
- Check rotor for contamination and damage.
- Check that rotor is not damaged or dirty.
- If rotor is damaged, remove and replace wheel hub together with rotor.
- Removing and installing wheel hub --> **42 - REAR SUSPENSION**

Installing

Installation is in reverse order of removal.

- Route speed sensor wire back in original position.
- Before installing, lubricate speed sensor seal all around with *lubricating paste G 000 650* .

ABS SYSTEM COMPONENTS ON REAR AXLE (AWD VEHICLES), REMOVING AND INSTALLING

ABS system components on rear axle (AWD vehicles), removing and installing

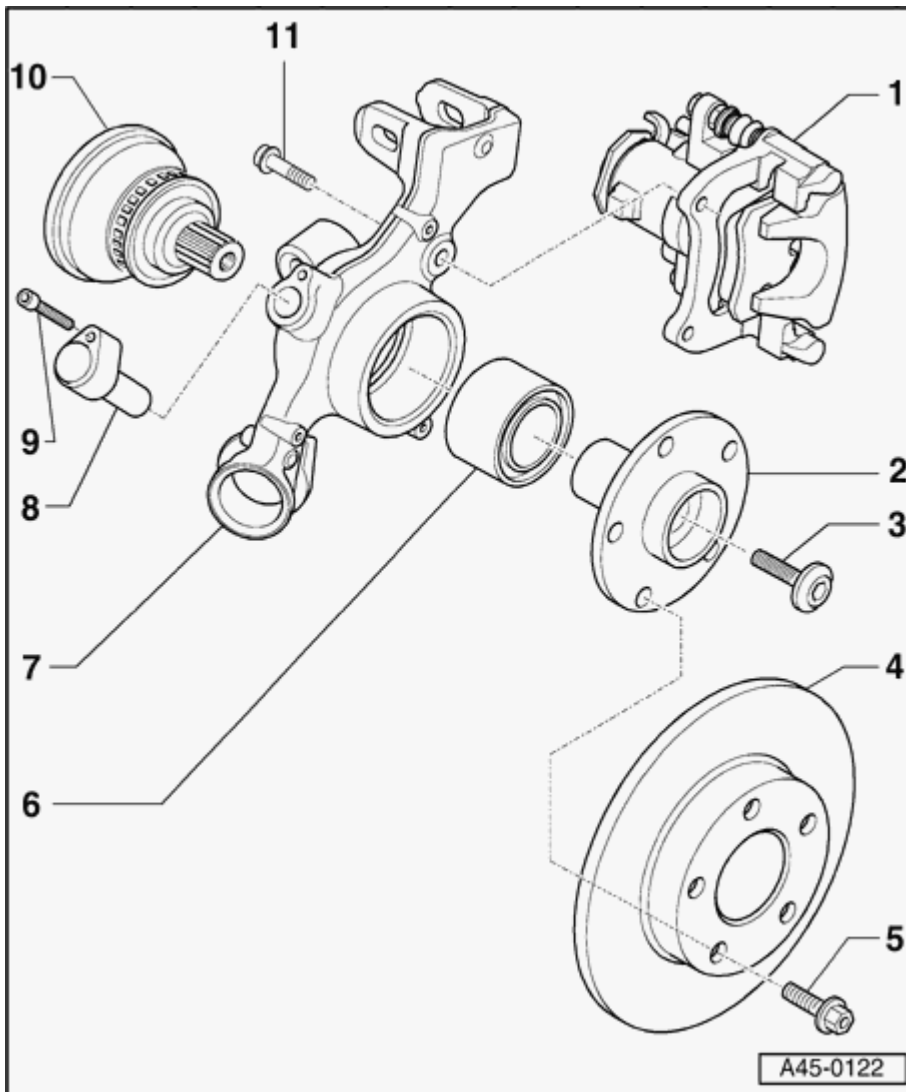


Fig. 45: ABS System Components On Rear Axle (AWD Vehicles)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rear brake caliper

- Removing and installing --> **Brake calipers, servicing**

2 - Wheel hub

- Removing and installing --> **42 - REAR SUSPENSION**

3 - Collar bolt

Vehicle must be standing on the ground when tightening

- Always replace

- Tightening torque --> **42 - REAR SUSPENSION**

4 - Brake disc

- Always replace both sides
- Remove brake caliper prior to removing
- Thickness --> **Brakes**
- Allocation --> **Brakes**

5 - Wheel bolt

Vehicle must be standing on the ground when tightening

- Installing wheels --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**

6 - Wheel bearing

- Removing and installing --> **42 - REAR SUSPENSION**

7 - Wheel bearing housing

- Removing and installing --> **42 - REAR SUSPENSION**

8 - Speed sensor

- Left and right identical
- Removing and installing --> **Speed sensor on rear axle, removing and installing**
- Before inserting into wheel bearing housing, lubricate circumference with *lubricating paste G 000 650*
- Press into wheel bearing housing onto stop
- Release speed sensor connector and disconnect. Unclip speed sensor wiring.

9 - Hex socket head bolt

- Tightening torques: 10 Nm

10 - Drive axle with rotor

- Check rotor for contamination and damage
- If rotor is damaged, replace outer CV joint --> **42 - REAR SUSPENSION**
- Outer CV joint is delivered as replacement part with rotor

11 - Ribbed bolt, 75 Nm

- Always replace

Speed sensor on rear axle, removing and installing

- Loosen wheel bolts.
- Raise vehicle.
- Remove wheel.
- Switch ignition off.

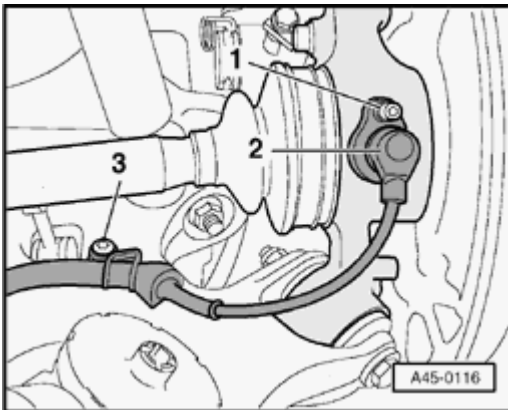


Fig. 46: Removing Hex Bolt, Speed Sensor From Wheel Bearing Housing, Loosening Torx Bolt And Removing Cable Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolt - 1 -.
- Remove speed sensor from wheel bearing housing.
- Loosen Torx bolt - 3 - and remove cable bracket.

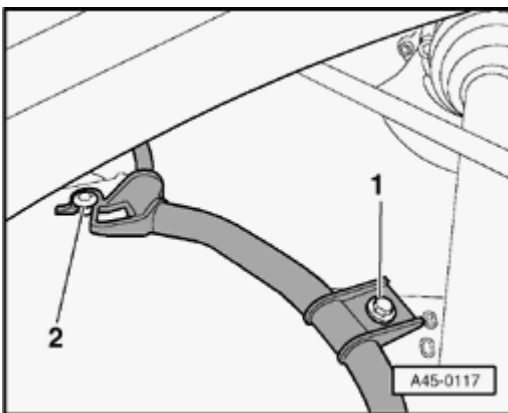


Fig. 47: Removing Hex Bolt, Loosening Torx Bolt And Removing Cable Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove hex bolt - 1 -.
- Loosen Torx bolt - 2 - and remove cable bracket.

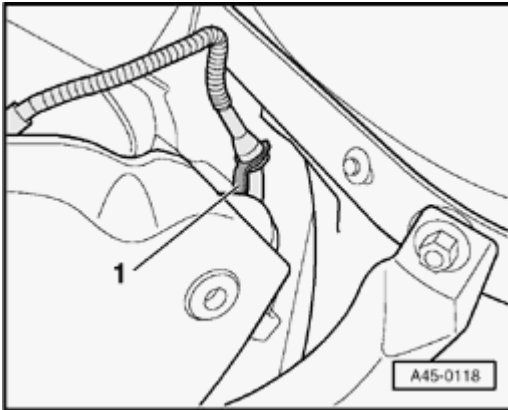


Fig. 48: Unclipping Speed Sensor Wiring From Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip speed sensor wiring from retainers.

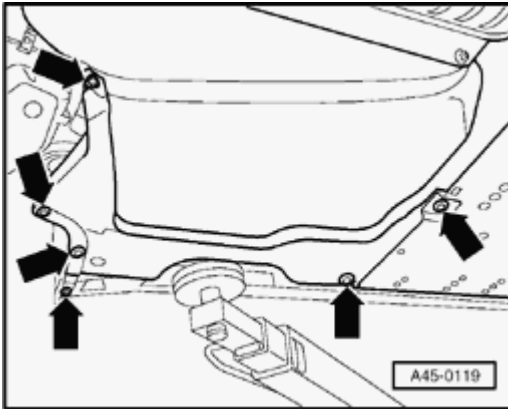


Fig. 49: Detaching Underside Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach underbody cover - **arrow** -
- Lift rear seat out of locking device.

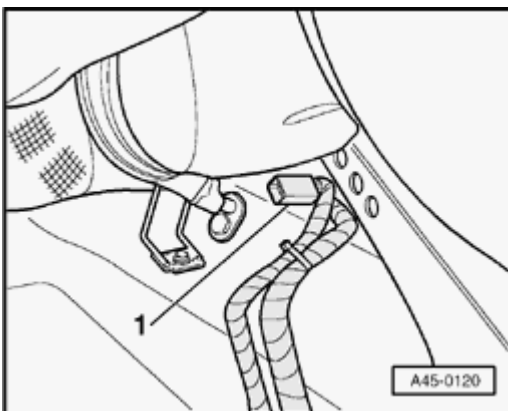


Fig. 50: Disconnecting Speed Sensor Connector And Pressing Out Grommet

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release cable bracket, disconnect speed sensor connector - **1** - and press out grommet (left and right sides are mirror image).

Installing

Installation is in reverse order of removal.

- Before installing, lubricate speed sensor seal all around with *lubricating paste G 000 650* .

Checking rotor on rear axle

- Raise vehicle.
- Remove wheel.
- Remove speed sensor from wheel bearing housing.
- Inspect rotor for signs of damage or dirt.

Removing and installing rotor on rear axle**Removing**

- Raise vehicle.
- Remove wheel.
- Remove brake caliper --> **Brake pads, removing and installing.**
- Hang up brake caliper on body.
- Inspect rotor for signs of damage or dirt.
- If rotor is damaged, remove drive axle with rotor and replace outer joint.
- Removing and installing drive axle --> **42 - REAR SUSPENSION**

Installing

Installation is in reverse order of removal.

- Route speed sensor wire back in original position.
- Before installing, lubricate speed sensor seal all around with *lubricating paste G 000 650* .

NOTE:

- **If rotor is damaged or dirty, remove drive axle. If damaged, replace outer CV joint together with rotor.**
- **The outer CV joint is supplied as a replacement part with the rotor. --> 42 - REAR SUSPENSION**

ABS/ESP SYSTEM COMPONENTS, REMOVING AND INSTALLING

Brake light switch, removing and installing**NOTE:**

- Remove brake light switch to adjust.
- To ensure a secure fit, the switch may only be installed once.

Removing

- Disconnect electrical connector.
- Turn brake light switch counter-clockwise 45° to remove.

Installing

Installation is in reverse order of removal. Note the following:

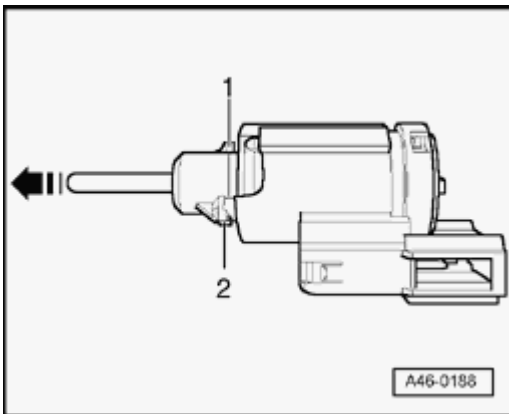


Fig. 51: Pulling Out Switch Plunger & Identifying Retainer Tabs On Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out brake light switch plunger as far as it will go - **arrow** -.
- Insert switch with tabs - **1** - and - **2** - in designated retainers in assembly opening.
- Remove driver side storage tray: -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

NOTE:

- The brake pedal must not be actuated during installation.
- When installing brake switch, plunger adjusts itself automatically.

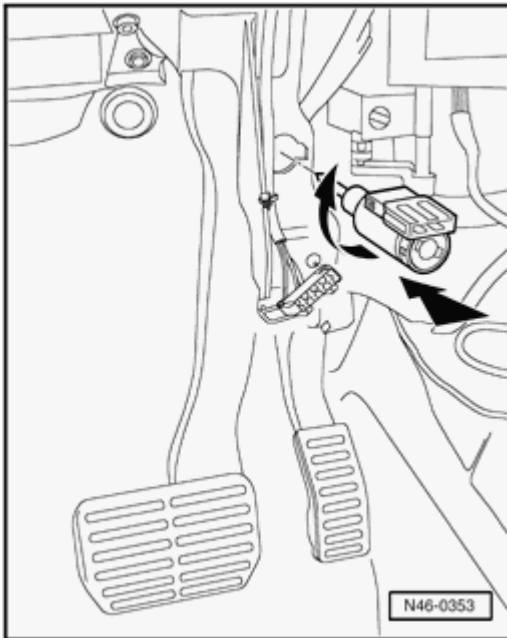


Fig. 52: Guiding Switch Through Installation Hole, Pressing Against Pedal And Securing By Turning 45° Clockwise

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Guide switch through installation hole, press against pedal and secure by turning 45° clockwise.

After adjusting the brake light switch check whether the brake pedal is on the end stop (rest position).

Transverse acceleration sensor G200 and Rotation rate sensor G202 , removing and installing

Removing:

- Remove center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Item 3, ESP sensor
- Item 1, A/C operating unit

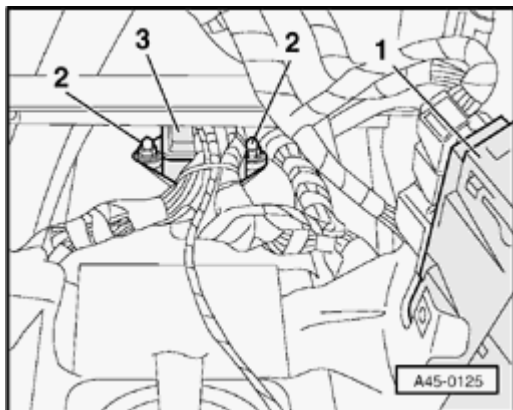


Fig. 53: Locating ESP Sensor

Courtesy of VOLKSWAGEN UNITED STATES, INC.

ESP sensor is located in center console beneath ashtray.

- ESP sensor connector is located behind large wiring harness.

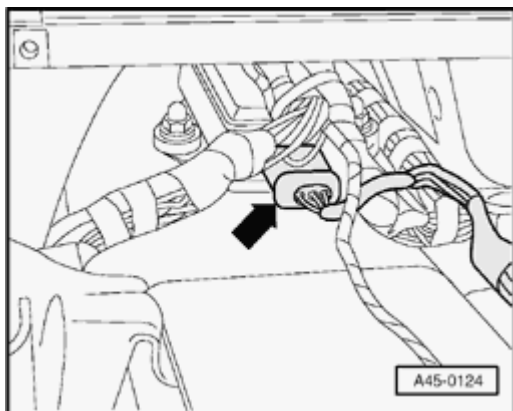


Fig. 54: Disconnecting ESP Sensor Connector

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect ESP sensor connector - **arrow** -

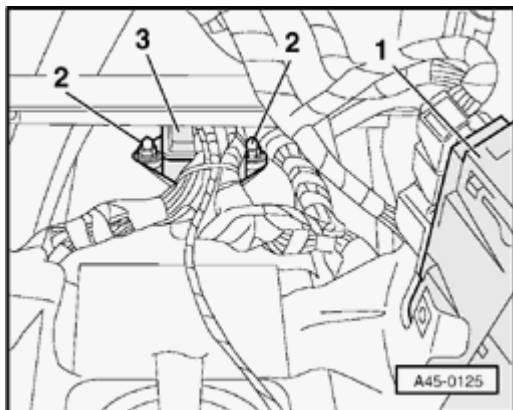


Fig. 55: Locating ESP Sensor

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cap nuts - 2 - (2x).

Tightening torque for nuts: 10 Nm.

Installing

Installation steps are carried out in reverse order:

- Install center console extension. -->
 - **68 - INTERIOR EQUIPMENT**
 - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

NOTE:

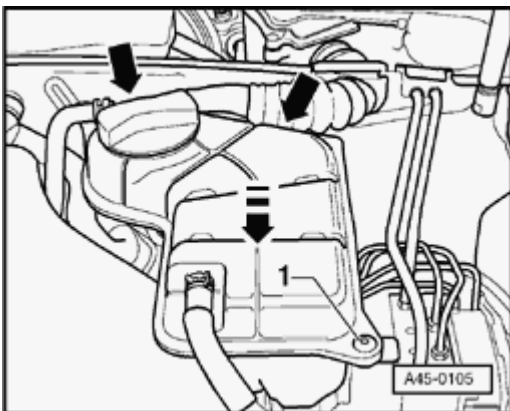
- Transverse acceleration sensor is sensitive to strong vibrations.
- If sensor falls on floor, proper sensor function can no longer be guaranteed. Do not use sensor.

BRAKE PRESSURE SENSOR 1 G201 , REMOVING AND INSTALLING

Brake pressure sensor 1 G201 , removing and installing

Removing**NOTE:**

- Protect engine compartment against escaping brake fluid.

**Fig. 56: Loosening Securing Bolt And Pulling Coolant Expansion Tank**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen securing bolt - 1 - and pull coolant expansion tank out in direction of - **arrow** - , then swivel tank to one side.
- Tightening torque: 6 Nm

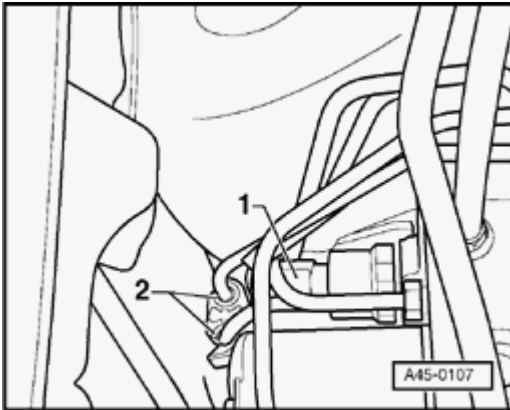


Fig. 57: Loosening Connectors & Unclipping Brake Lines From Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connectors - 1 -.

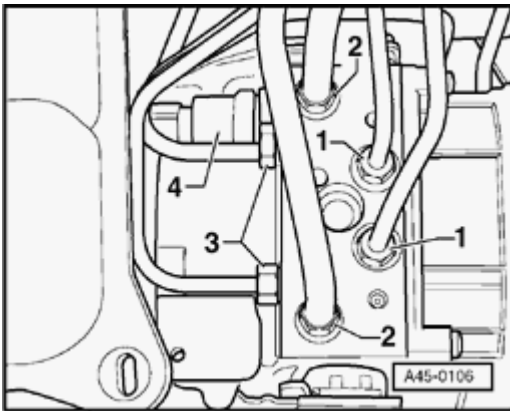


Fig. 58: Identifying Brake Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove brake pressure sensor - 4 -.

Installing

Remaining installation is in reverse order of removal.

- Bleed brake system.
- Perform ESP road test VAS 5051 vehicle diagnostic, testing and information system