

## 2001-2003 BRAKES

## Disc

## MODEL IDENTIFICATION

Several different brake versions are used by Volkswagen. To aid in identifying brake system installed on a particular model, see **BRAKE SYSTEM IDENTIFICATION** table.

## BRAKE SYSTEM IDENTIFICATION

Model	Engine Size/M Number	Brake System
Beetle	1.8L	FN3
Beetle	1.9L & 2.0L	FS III
Cabrio	(1)	(1)
EuroVan (2)	2.8L 1LU With 15" Wheels	FN3
EuroVan (2)	2.8L 1LP With 15" Wheels	(3) C54
EuroVan (2)	2.8L 1LE With 15" Wheels	(4) RC54
EuroVan (2)	2.8L 1LB With 16" Wheels	FN3 Or FNR
Golf, GTI & Jetta	1.8L	FN3
Golf, GTI & Jetta	1.8L GTI 337 Edition	FN3
Golf, GTI & Jetta	1.9L	FS III
Golf, GTI & Jetta	2.0L	FS III
Golf, GTI & Jetta	2.8L	FN3
Passat	1.6L, 1.8L 1.9L & 2.0L With 15" Wheels (5)	FN3
Passat	2.3L, 2.5L & 2.8L With 16" Wheels (5)	FN3
Passat	4.0L With 16" Wheels (6)	HP2
Passat	4.0L With 17" Wheels (6)	2FN

(1) For Cabrio repair procedures and specifications, see **DISC & DRUM** article in 1999-2000 BRAKES.

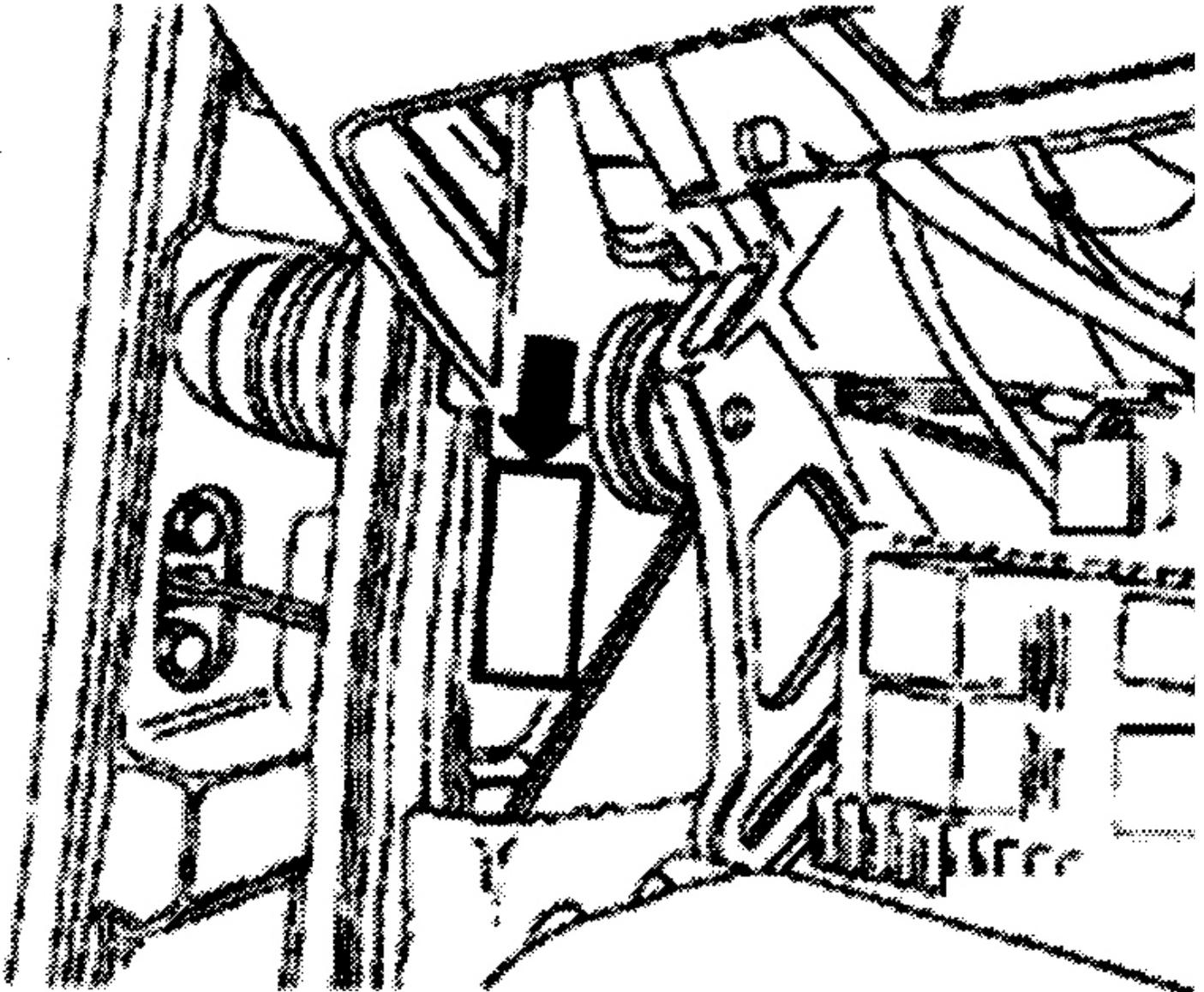
(2) Identify brake version ("M" number) by reading number on vehicle data plate. Data plate is located on left "A" pillar, next to central electronics. See **Fig. 1**.

(3) Equipped with Lucas fist caliper.

(4) Equipped with Lucas frame caliper.

(5) 2001 year models.

(6) 2002 year models.



4189 58-5-4248 995 FR  
WVZZZZ70 z MH024053  
70B 1F2  
T4 KO KR GRUND 1  
57 KW D 5G  
AAB AYF

**Fig. 1: Locating & Reading Vehicle Data Plate (EuroVan)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

## DESCRIPTION & OPERATION

All models are equipped with front and rear disc brakes. Parking brake acts on rear brakes and is cable-actuated. Some models use a pressure regulator between front and rear brake circuits to avoid rear wheel lock-up during hard braking. Vehicles with Mark 60 or Bosch 5.3 Anti-Lock Brake Systems (ABS) do not have a mechanical brake pressure regulator. Specially matched software in the ABS ECU controls pressure regulation to rear axle brake.

Hydraulic brake system uses a tandem master cylinder with vacuum assist. Hydraulic system is diagonally split. Left front and right rear wheels form one circuit. Right front and left rear wheels form the other circuit.

Gasoline models with automatic transmissions are equipped with an auxiliary electric vacuum pump. Vacuum pump supplies vacuum to brake booster ensuring adequate vacuum for proper vacuum assist. Vacuum pump is activated by a signal from ABS control module, and is located under master cylinder. Vacuum sensor located in vacuum line to brake booster sends signal to ABS control module indicating vacuum level.

Brake booster sender 1 and brake pressure sensor 2 (Beetle, Golf, GTI & Jetta) are located on brake master cylinder, and send brake pressure information to ABS control module.

Vehicles manufactured from 02/2002 are equipped with brake assist. When brake pedal is depressed, mechanical brake assist is activated. Brake pedal can now be partially released and pressed again with less force. It is not possible to repair the brake assist, the complete brake booster must be replaced.

## BLEEDING BRAKE SYSTEM

**WARNING:** Use only DOT 4 brake fluid from a sealed container. DO NOT mix brake fluid with any other type.

**CAUTION:** Brake fluid will damage painted surfaces. If brake fluid is spilled on painted surface, wipe it off immediately and clean with alcohol.

## BLEEDING PROCEDURES

**CAUTION:** If a model equipped with ABS runs out brake fluid in either side of reservoir, it will be necessary to use scan tool (VAG 1551) to bleed brakes. See BLEEDING in appropriate ANTI-LOCK & TRACTION CONTROL article.

**CAUTION:** Bleeding procedure is same for pressure bleeding with US1116 (pressure bleeder), or manually. DO NOT exceed 14.5 psi. (1 bar) pressure in US1116. Brake system will not bleed completely with excessive pressure.

1. Exhaust vacuum reserve from power unit by depressing brake pedal several times. On ABS-equipped vehicles, depress brake pedal at least 20 times to relieve system pressure.
2. On all vehicles, fill master cylinder with clean brake fluid. If master cylinder was replaced, bleed master cylinder before bleeding wheel calipers. Connect bleeder hose to appropriate bleeder valve.

See **BRAKELINE BLEEDING SEQUENCE** table.

### BRAKELINE BLEEDING SEQUENCE

Application <sup>(1)</sup>	Sequence
All Models	RR, LR, RF, LF
(1) On all vehicles (if equipped), push brake pressure regulator lever in direction of rear axle when bleeding rear brakes. Pressure regulator is mounted on a bracket near rear trailing arm.	

- Submerge other end of hose in clean glass jar partially filled with clean brake fluid. Pump brake pedal several times, then hold down. Open bleeder valve. Holding pedal down, close bleeder valve. Release brake pedal.
- Repeat procedure until brake fluid shows no signs of air bubbles. When bleeding rear brakes, push lever of pressure regulator in direction of rear axle.
- After bleeding ABS-equipped vehicles, a test drive must be carried out after bleeding brakes. When doing this an ABS regulation must be performed at least once. Turn ignition on. Allow pump to run until it shuts off. If pump runs longer than 2 minutes, allow pump to cool for 10 minutes. On all vehicles, top master cylinder reservoir as necessary.

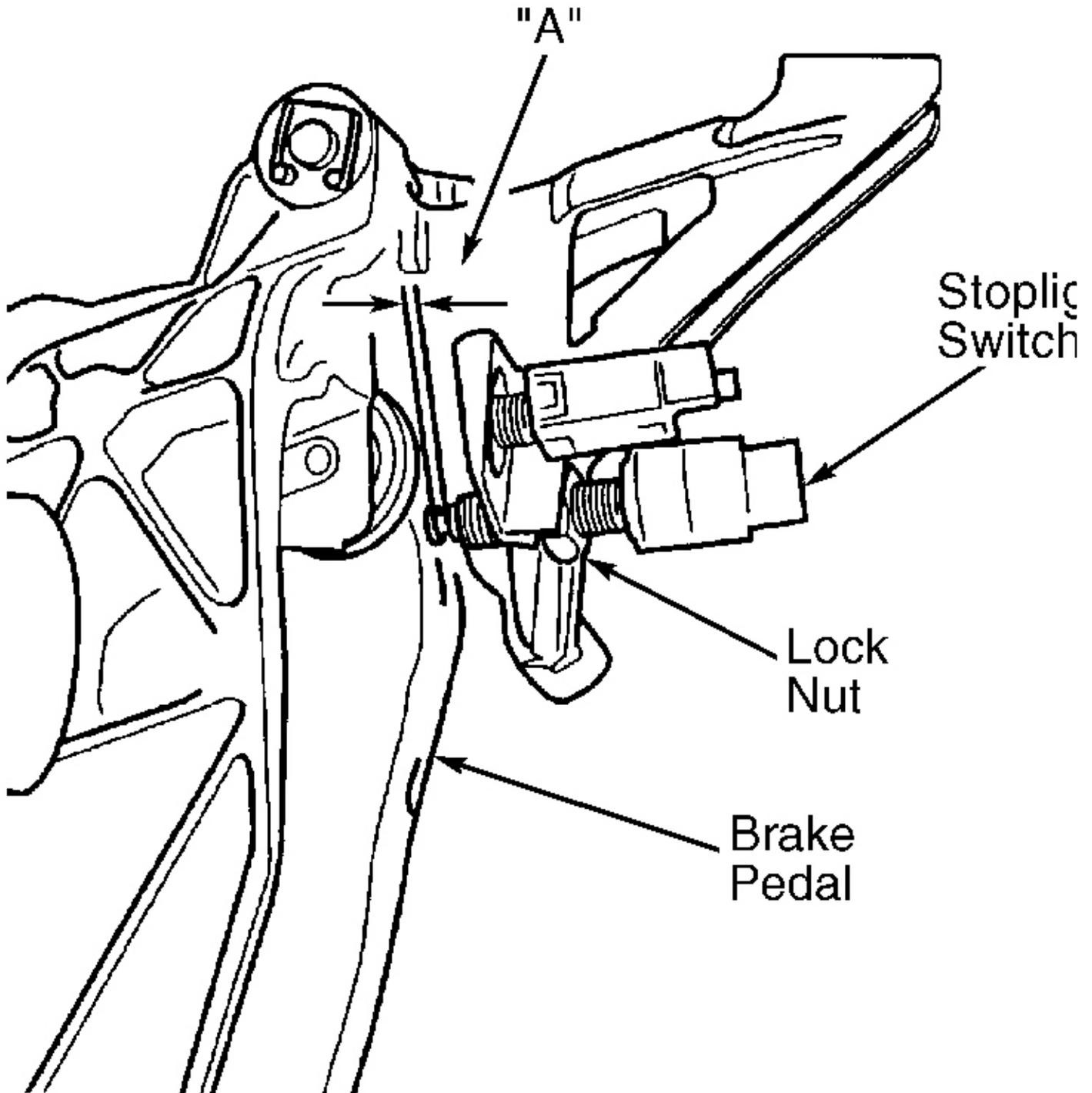
## ADJUSTMENTS

### BRAKE LIGHT SWITCH

**NOTE:** For brakelight switch adjustment on all models except Passat, see **BRAKELIGHT SWITCH** under **REMOVAL & INSTALLATION**.

#### Passat

With brake pedal released, measure distance "A". See **Fig. 2** . If distance is not .020"-.060" (0.5-1.5 mm), loosen lock nut and adjust as necessary.



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**Fig. 2: Adjusting Brakelight Switch**  
Courtesy of AUDI OF AMERICA, INC.

**BRAKE PRESSURE REGULATOR**

**NOTE:** For brake pressure regulator testing and adjustments, see **BRAKE PRESSURE REGULATOR** under **ADJUSTMENTS** in **DISC & DRUM** article in **1999-2000 BRAKES**.

## MASTER CYLINDER PUSH ROD

**NOTE:** Master cylinder push rod is not adjustable.

## PARKING BRAKE

**NOTE:** Due to self-adjusting rear brakes adjustment is normally only necessary after replacing parking brake cables, brake calipers, brake pads and/or brake discs, backing plate or brake linings.

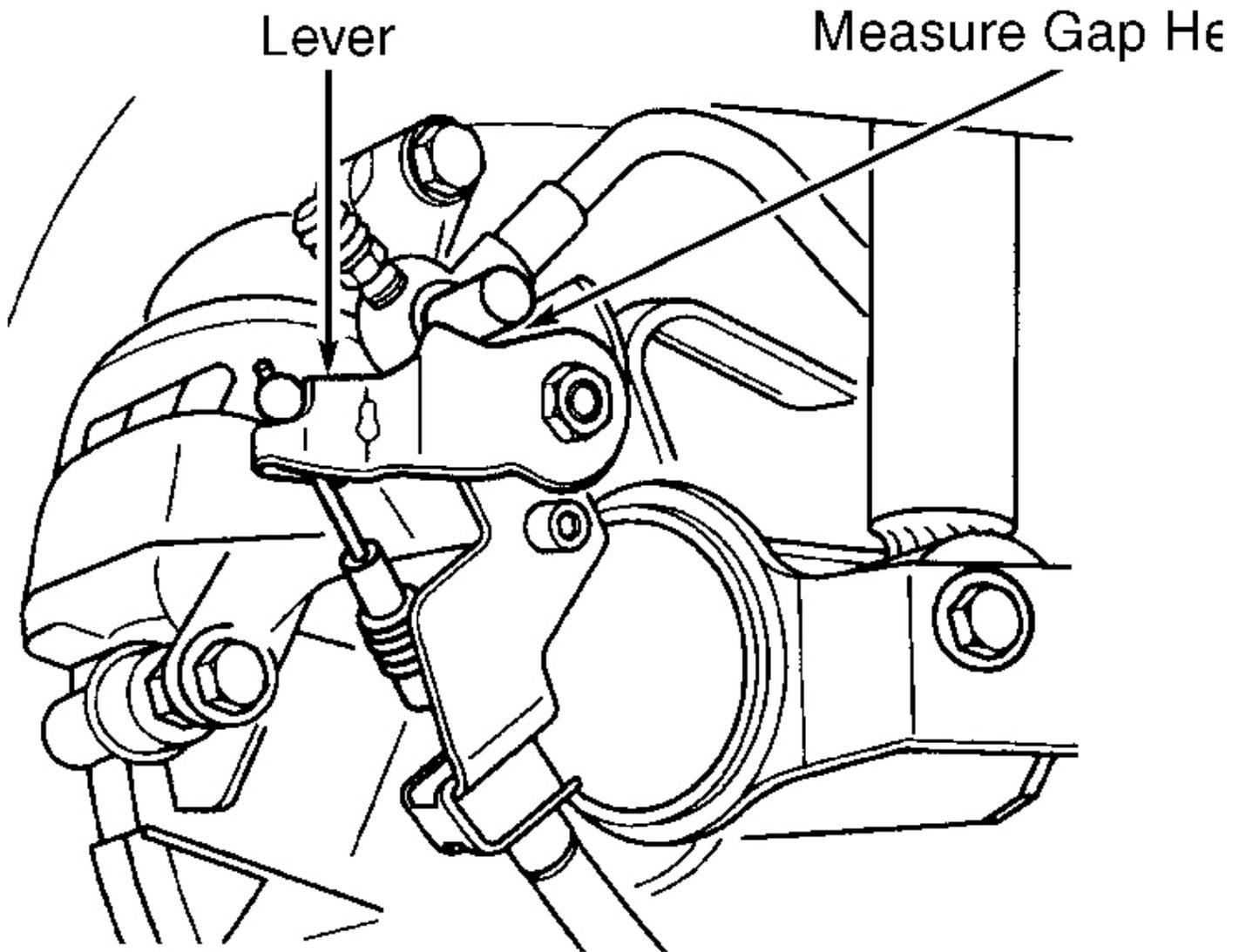
## Rear Disc (Except Passat)

1. Raise and support vehicle. Operate parking brake lever 3 times. Disengage parking brake. Loosen locking nuts at parking brake lever.
2. Tighten adjusting nuts until levers on calipers just move off stops. Measure gap between stop and lever. See **Fig. 3**. Maximum clearance between parking brake lever (on caliper) and stop should be as specified. See **PARKING BRAKE ADJUSTMENT SPECIFICATION** table.

**PARKING BRAKE ADJUSTMENT SPECIFICATION**

Model	Specification In. (mm)
Beetle	.060 (1.5)
EuroVan	.040 (1)
Golf, GTI & Jetta	.040-.118 (1-3)

3. Apply and release parking brake. Ensure rear wheels rotate freely. Adjust as necessary. Tighten lock nuts.



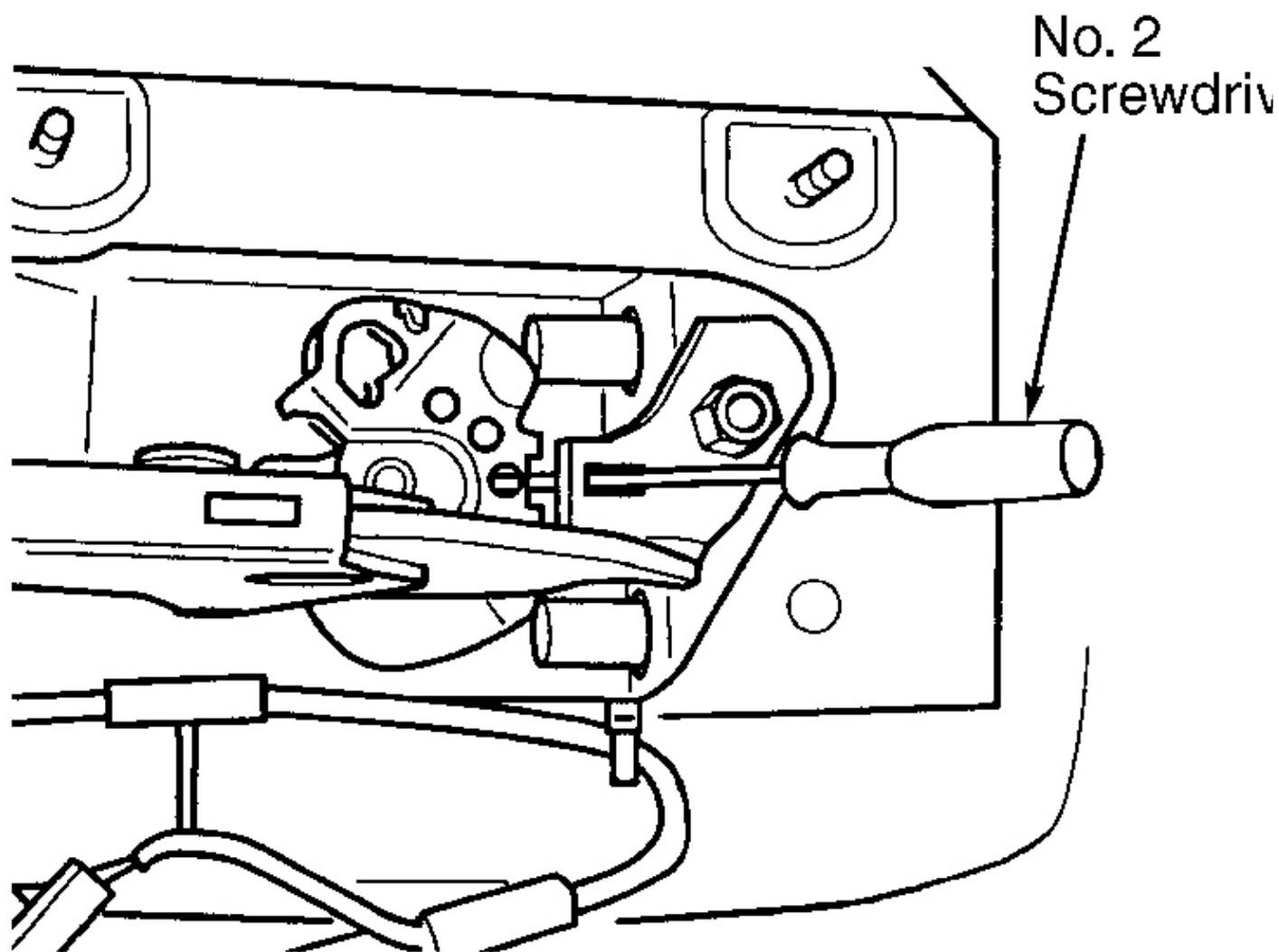
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**Fig. 3: Adjusting Rear Disc Parking Brake**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

## Rear Disc (Passat)

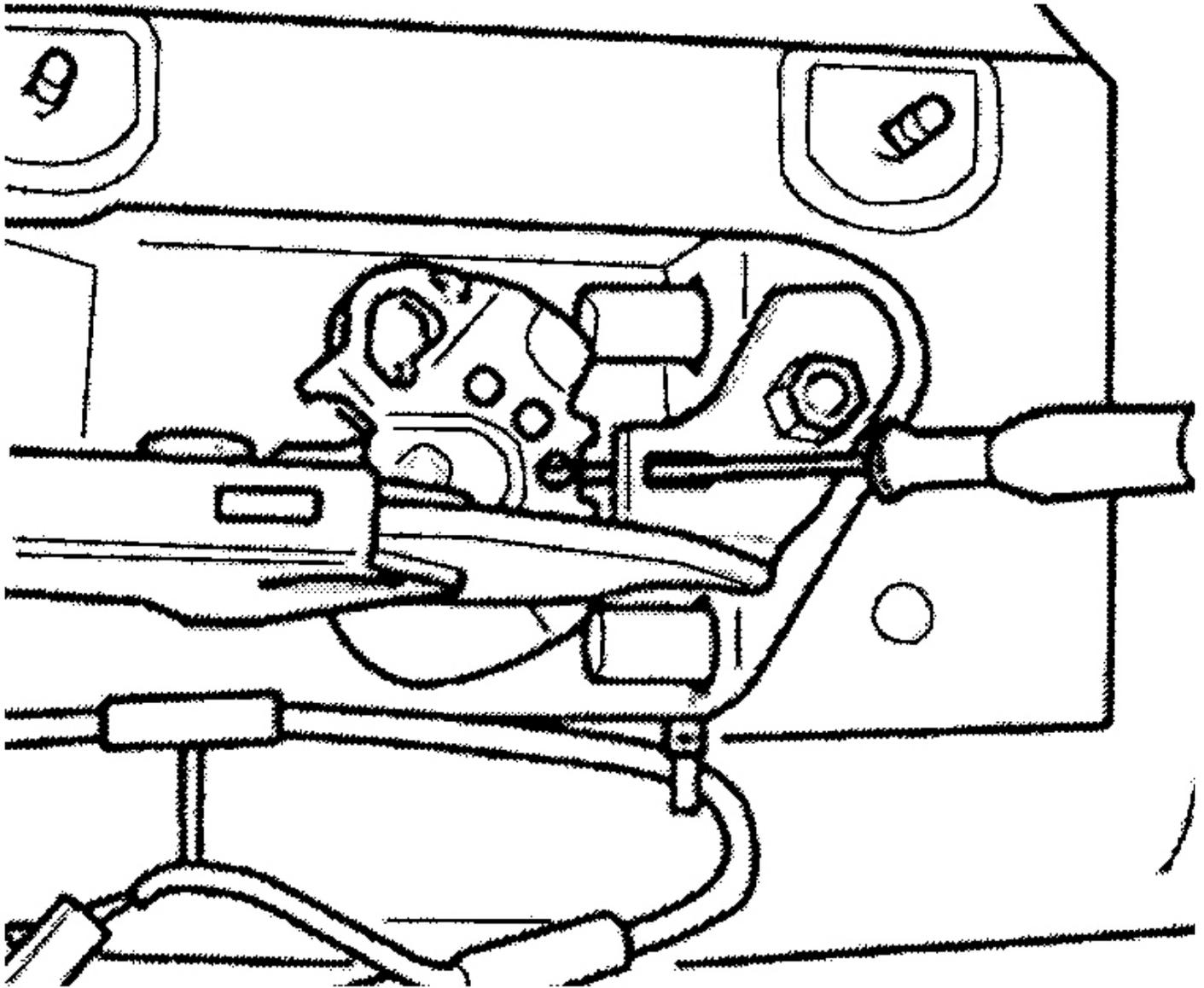
1. Release parking brake lever. Press and release brake pedal. Remove rear passenger compartment ashtray. Remove plastic shielding and discard (if present). Using screwdriver, lock compensating bar in place to prevent turning. See **Fig. 4**.
2. Raise and support vehicle. Locate parking brake adjustment nuts in tunnel near exhaust shield on front wheel drive vehicles. On all wheel drive vehicles adjusting nuts are in front of rear lower control arms. Remove locking clip "D". See **Fig. 5**.
3. Counter-holding hex "E", turn adjusting nut "C" until it stops. Slide cable adjuster "B" together. Turn adjusting nut until slot for locking clip is visible. Install locking clip "D".
4. Pull both cable sleeve adjusters apart simultaneously until cables are tensioned. Lever at rear brake caliper must not lift from stop. Remove screwdriver from compensator. Apply and release parking brake 3 times. Check parking brake adjustment. If necessary, fine tune adjustment by turning cable adjuster "B".



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**Fig. 4: Locking Compensating Bar (Passat - Shown With Center Bracket Removed)**

Courtesy of AUDI OF AMERICA, INC.



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**Fig. 5: Adjusting Parking Brake (Passat)**  
Courtesy of AUDI OF AMERICA, INC.

#### WHEEL BEARINGS

**NOTE:** Front and rear wheel bearings, also called hub or axle bearings, are sealed units. Bearings are not adjustable.

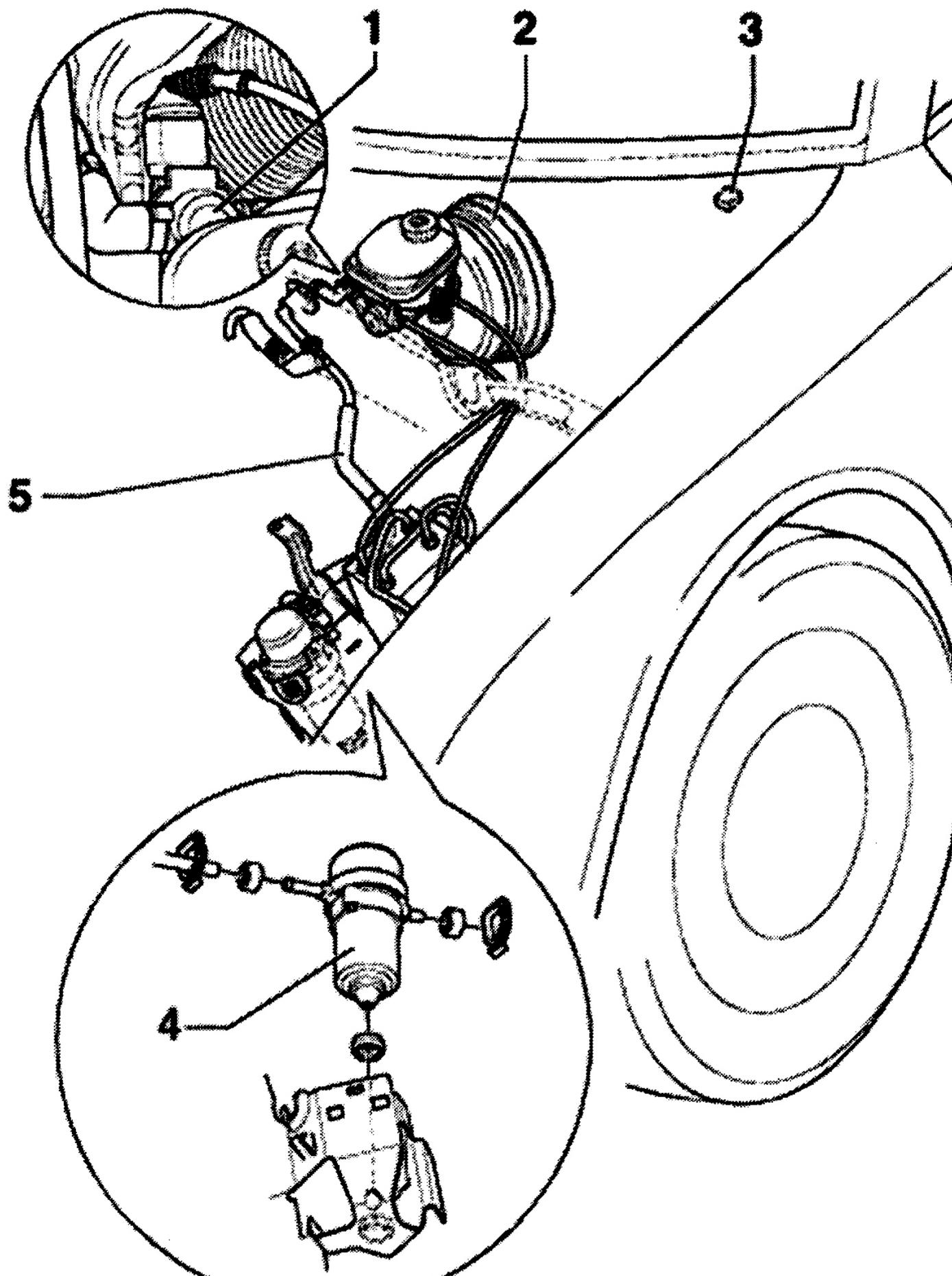
#### TESTING

##### BRAKE BOOSTER BRAKE ASSIST

Vehicles manufactured from 02/2002 are equipped with brake assist. To test brake assist, start engine and depress brake pedal to ensure full vacuum boost. When brake pedal is depressed, a "click" must be audible, activating mechanical brake assist. Brake pedal can now be partially released and pressed again with less force. It is not possible to repair the brake assist, complete brake booster must be replaced.

**ELECTRIC VACUUM PUMP**

During start-up, brake system vacuum pump must run briefly. To test, raise and support vehicle. Start engine. Check by touch that the brake system vacuum pump is running with the assistance of a second person. See **Fig. 6** . If brake system vacuum pump does not run, check for Diagnostic Trouble Codes (DTCs) stored in ECM or ABS ECU memory. See FUNCTION 02 - READING DTC MEMORY in appropriate ENGINE PERFORMANCE or ANTI-LOCK BRAKE SYSTEM article. If any DTCs are retrieved, perform appropriate test. If no DTCs are stored in memory, perform electrical testing. See **ELECTRIC VACUUM PUMP** under ELECTRICAL TESTING.

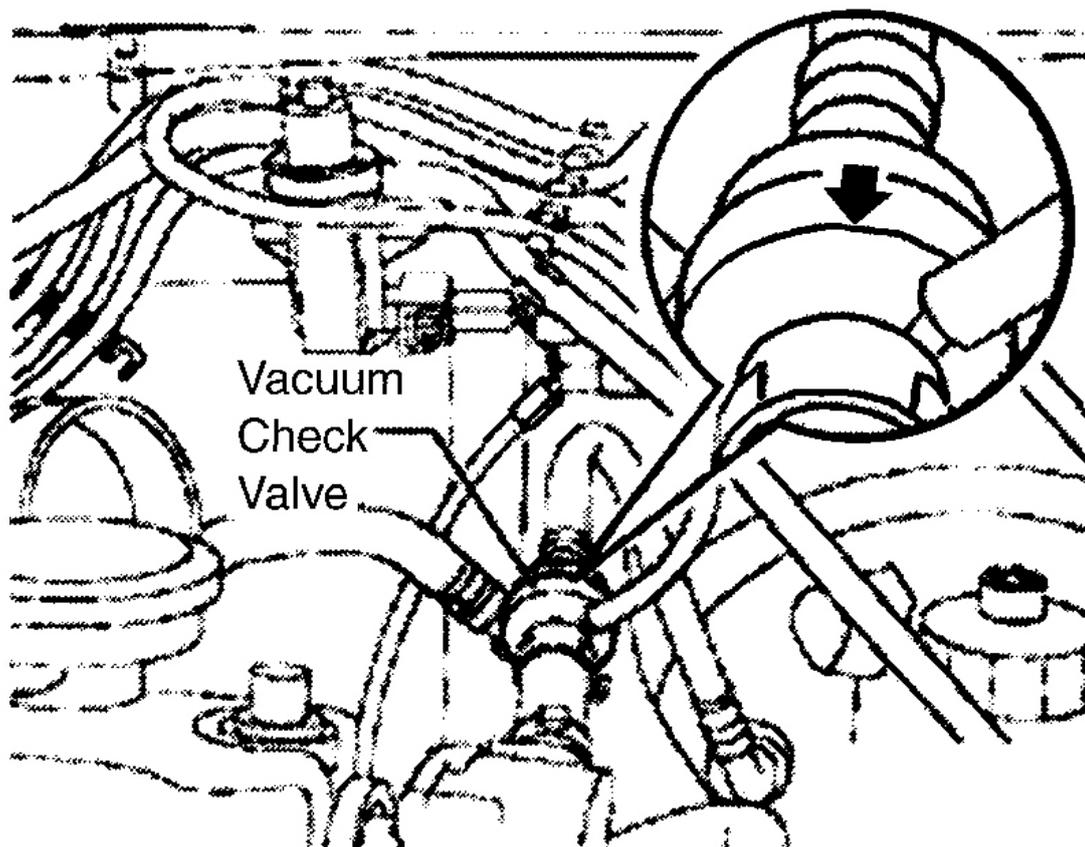


**Fig. 6: Locating Electric Vacuum Pump**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**VACUUM CHECK VALVE**

To check function of check valve, blow air through valve. Air must pass through in direction of arrow. See **Fig. 7** . Valve must remain closed in opposite direction. Ensure that check valve is installed correctly.



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**Fig. 7: Checking Function Of Vacuum Check Valve**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

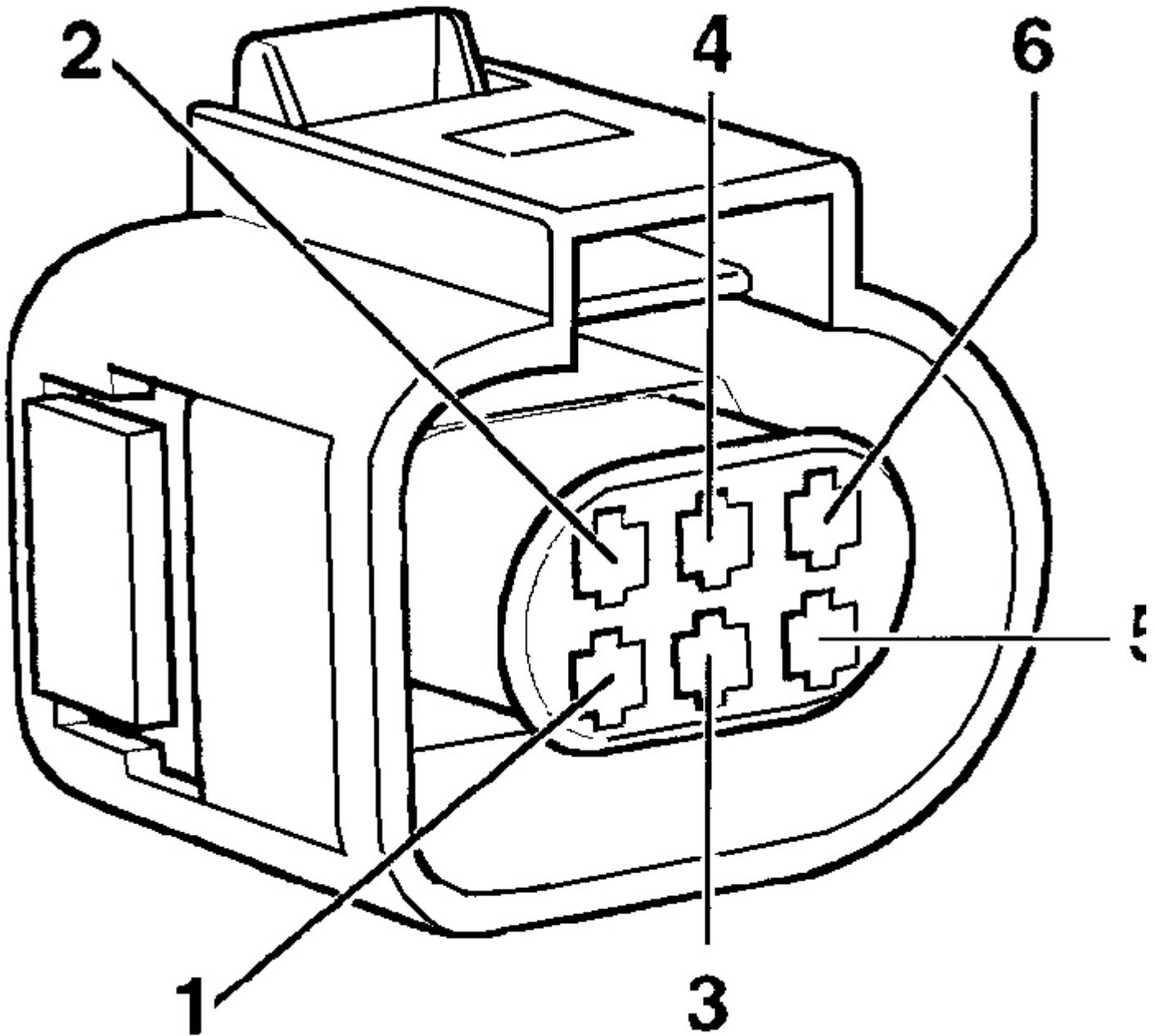
**ELECTRICAL TESTING**

**NOTE:** If the measured figures only deviate slightly from the specifications, clean sockets and plugs of the testers and adapter cables (with contact spray G 000 700 04 or equivalent) and repeat check. Before replacing components, check wiring and connections and also, particularly for specifications of less than 10 ohms, repeat resistance check on component.

**ELECTRIC VACUUM PUMP (MODELS UP TO 05/2002)**

Disconnect electric brake vacuum pump 6-pin harness connector. Vacuum pump is located under brake master cylinder. See **Fig. 6** . Check for poor, loose, corroded or damaged terminal connection. Also, check instrument panel fuses No. 31 and 51. If problem is found, repair as necessary. After repair, recheck vacuum pump operation. See **ELECTRIC VACUUM PUMP** under TESTING.

If no problem with terminals is found, perform electrical testing of vacuum pump. See **ELECTRIC VACUUM PUMP TESTING (MODELS UP TO 05/2002)** table. For aid in identifying terminals and circuits, see **Fig. 8**, also see **WIRING DIAGRAMS**. For Engine Control Module (ECM) terminal testing and identification, see appropriate article in ENGINE PERFORMANCE.



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**Fig. 8: Identifying Brake System Vacuum Pump Harness Connector Terminals**  
Courtesy of AUDI OF AMERICA, INC.

**ELECTRIC VACUUM PUMP TESTING (MODELS UP TO 05/2002)**

Test	Perform Test Step No.	See Fig.
Brake System Vacuum Pump Resistance	1	<b>Fig. 9</b>
Communication Signal From ECM To Brake System	2	<b>Fig. 9</b>

**2003 Volkswagen Passat GLX 4Motion**

DISC

Vacuum Pump		
Ignition/Starter Switch Voltage Supply To Brake System Vacuum Pump	3	<b>Fig. 10</b>
Resistance Of Ignition/Starter Switch To Brake System Vacuum Pump Circuit	4	<b>Fig. 11</b>
Resistance Of Battery To Brake System Vacuum Pump Circuit	5	<b>Fig. 12</b>
Brake System Vacuum Pump Battery Voltage Supply	6	<b>Fig. 13</b>

**Switch to measuring range:**

**Resistance measurement ( $\Omega$ )**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations f specification
1	1 + Ground	Resistance of -V192- brake system vacuum pump	<ul style="list-style-type: none"> <li>Ignition switched off</li> </ul>	5.0...5.3 $\Omega$	<ul style="list-style-type: none"> <li>- Check wiring using wiring diagram.</li> <li>- See Wiring Diagrams</li> </ul>
2	2 + pin 22	Communication signal of engine control unit to -V192- brake system vacuum pump	<ul style="list-style-type: none"> <li>Ignition switched off</li> </ul>	0.0...0.1 $\Omega$	<ul style="list-style-type: none"> <li>- Check wiring using wiring diagram.</li> <li>- See Wiring Diagrams</li> </ul>

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**Fig. 9: Vacuum Pump Electrical Test Steps No. 1 & 2 (Models Up To 05/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Switch to measuring range:**

**Voltage measurement (20 V =)**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
3	3 + 1	Voltage supply from ignition/starter switch to - V192- brake system vacuum pump	<ul style="list-style-type: none"> <li>Ignition switched on</li> </ul>	12.0...12.60 V (approx. battery voltage)	<ul style="list-style-type: none"> <li>- Check wiring using wirin diagram.</li> <li>- See Wiring Diagrams.</li> </ul>

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**Fig. 10: Vacuum Pump Electrical Test Step No. 3 (Models Up To 05/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**2003 Volkswagen Passat GLX 4Motion**

DISC

**Switch to measuring range:**

**Resistance measurement ( $\Omega$ )**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
4	3 + fuse 31	Resistance of connection of ignition/starter switch to -V192- brake vacuum pump	• Ignition switched off	0.1...0.9 $\Omega$	- Check wiring using wiring diagram - See Wiring Diagrams

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**Fig. 11: Vacuum Pump Electrical Test Step No. 4 (Models Up To 05/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Switch to measuring range:**

**Resistance measurement ( $\Omega$ )**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
5	5 + fuse 51	Resistance of connection of battery to -V192- brake system vacuum pump	• Ignition switched off	1.7...1.8 $\Omega$	- Check wiring using wiring diagram - See Wiring Diagrams.

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**Fig. 12: Vacuum Pump Electrical Test Step No. 5 (Models Up To 05/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Switch to measuring range:**

**Voltage measurement (20 V =)**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
6	5 + 1	Voltage supply of Battery to -V192- brake system vacuum pump	• Ignition switched on	12.0...12.81 V (approx. battery voltage)	- Check wiring using wiring diagram - See Wiring Diagrams

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**Fig. 13: Vacuum Pump Electrical Test Step No. 6 (Models Up To 05/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**ELECTRIC VACUUM PUMP (MODELS FROM 06/2002)**

Disconnect electric vacuum pump 6-pin harness connector. Electric vacuum pump is located under brake master cylinder. See **Fig. 6** . Check for poor, loose, corroded or damaged terminal connection. Also, check instrument panel fuse No. 51. If problem is found, repair as necessary. After repair, recheck vacuum pump operation. See **ELECTRIC VACUUM PUMP** under TESTING.

If no problem with terminals is found, perform electrical testing of vacuum pump. See **ELECTRIC VACUUM PUMP TESTING (MODELS FROM 06/2002)** table. For aid in identifying terminals and circuits, see **Fig. 8** . Also, see **WIRING DIAGRAMS** . For Engine Control Module (ECM) terminal testing and identification, see appropriate article in ENGINE PERFORMANCE.

**ELECTRIC VACUUM PUMP TESTING (MODELS FROM 06/2002)**

Test	Perform Test Step No.	See Fig.
Brake System Vacuum Pump Resistance	1	<b>Fig. 14</b>
Communication Signal From ECM To Brake System Vacuum Pump	2	<b>Fig. 14</b>
Resistance Of Battery Power Supply To Brake System Vacuum Pump Circuit	3	<b>Fig. 15</b>
Brake System Vacuum Pump Battery Voltage Supply	4	<b>Fig. 16</b>

**Switch to measuring range:**

**Resistance measurement ( $\Omega$ )**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations if specification
1	1 + ground	Resistance of -V192- brake system vacuum pump	• Ignition switched off	5.0 to 5.3 $\Omega$	- Check wiring using wiring diagram. - See Wiring Diagrams
2	2 + pin 22	Communication signal of engine control module to -V192- brake system vacuum pump	• Ignition switched off	0.0 to 0.1 $\Omega$	- Check wiring using wiring diagram - See Wiring Diagrams

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**Fig. 14: Vacuum Pump Electrical Test Steps No. 1 & 2 (Models From 06/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Switch to measuring range:****Resistance measurement ( $\Omega$ )**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
3	5 + fuse 51	Resistance of connection of battery to -V192- brake system vacuum pump	• Ignition switched off	1.7 to 1.8 $\Omega$	- Check wiring using wiring diagram - See Wiring Diagrams

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**Fig. 15: Vacuum Pump Electrical Test Step No. 3 (Models From 06/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Switch to measuring range:****Voltage measurement (20 V =)**

Test step	Contact	Item tested	• Test conditions	Specification	Measures for deviations from specification
4	5 + 1	Voltage supply of Battery to -V192- brake system vacuum pump	• Ignition switched off	12.0 to 12.81 V (approx. battery voltage)	- Check wiring using wiring diagram. - See Wiring Diagrams.

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**Fig. 16: Vacuum Pump Electrical Test Step No. 4 (Models From 06/2002)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**SERVICING**

**WARNING:** Use only DOT 4 brake fluid from a sealed container. DO NOT mix brake fluid with any other type.

**CAUTION:** Brake fluid will damage painted surfaces. If brake fluid is spilled on painted surface, wipe it off immediately and clean with alcohol.

Manufacturer recommends replacing brake fluid every 2 years. After replacing brake fluid, bleed brake system. See **BLEEDING BRAKE SYSTEM**.

**REMOVAL & INSTALLATION**

**CAUTION:** Brake fluid will damage painted surfaces. If brake fluid is spilled on painted surface, wipe it off immediately and wash with water.

**CAUTION:** When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until adaptation systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES**

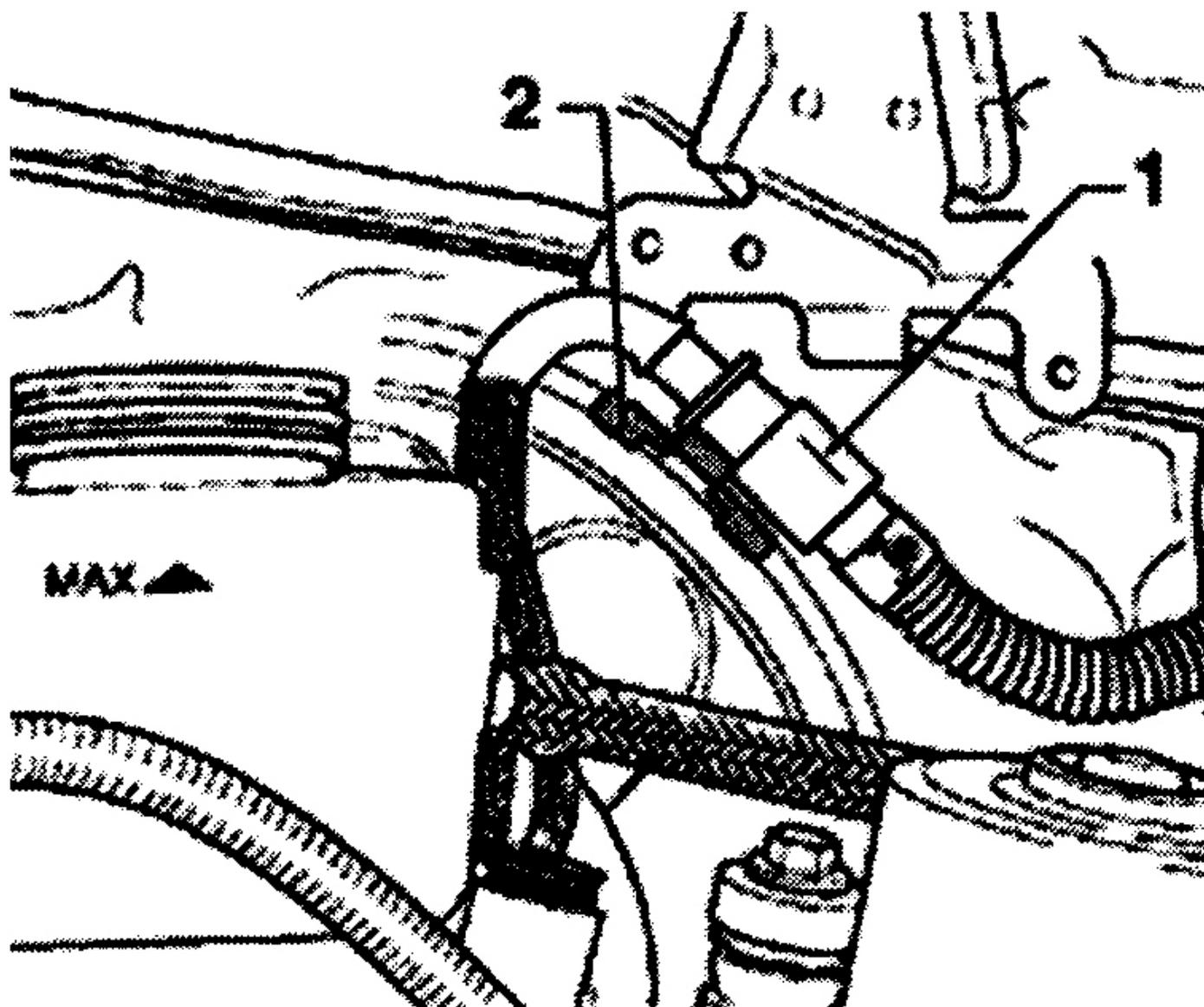
article in **GENERAL INFORMATION** before disconnecting battery.

**NOTE:** Before disconnecting battery, on vehicles equipped with coded anti-theft radio, note radio code, obtain if necessary.

## BRAKE BOOSTER

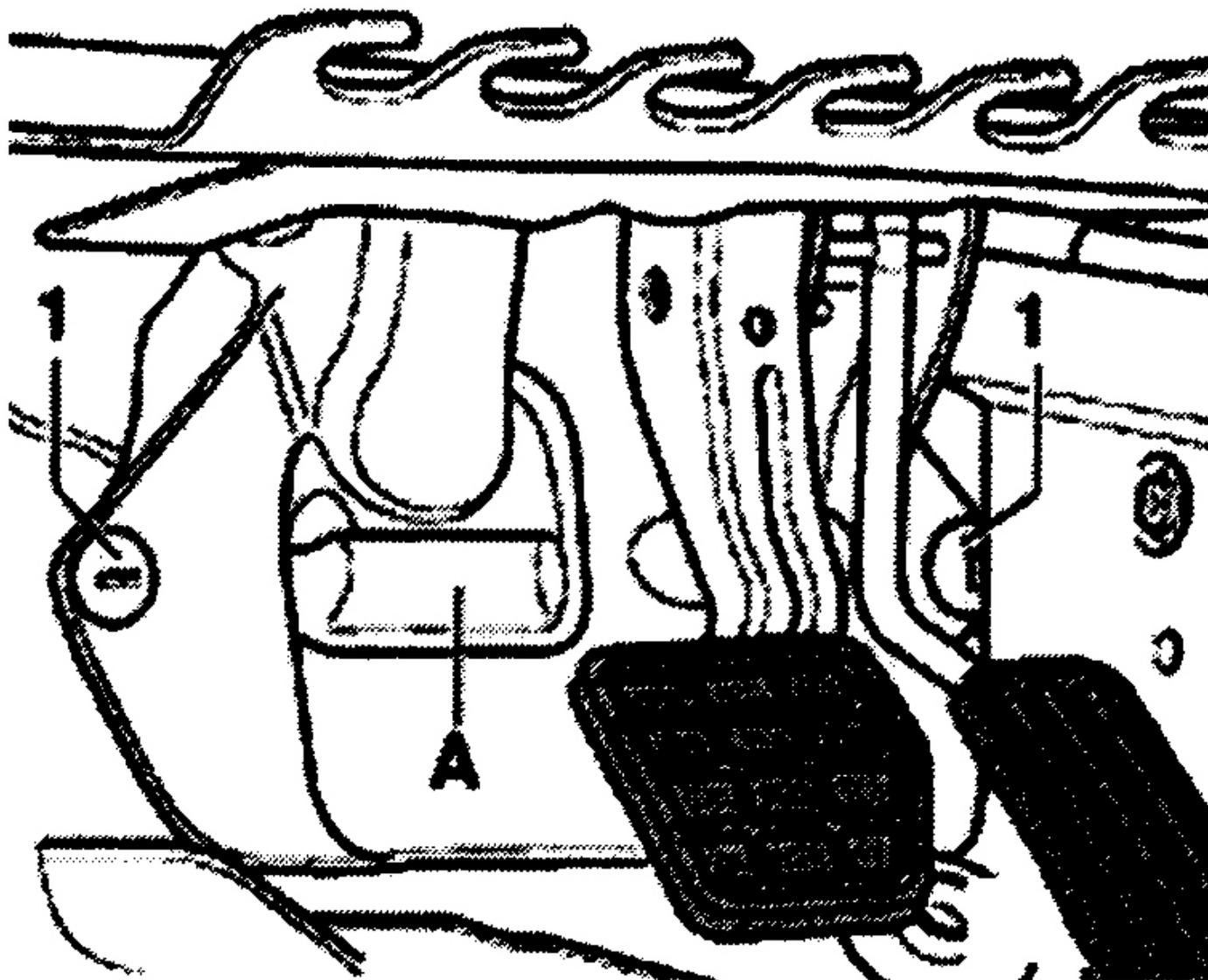
### Removal (Beetle)

1. Disconnect battery. Clamp and remove clutch master cylinder supply hose. Remove ABS control module and hydraulic unit. See **REMOVAL & INSTALLATION** in appropriate **ANTI-LOCK BRAKE SYSTEM** article. Disconnect brake lines to master cylinder. Disconnect vacuum hose from brake booster.
2. On vehicles equipped with 1.9L TDI engine, remove retainer for wiring harness from vacuum pump.
3. Remove harness connector from retainer (2). See **Fig. 17** . Disconnect in-line harness connector (1).
4. Remove lower instrument panel trim. Remove bolts (1) and remove cover "A". See **Fig. 18** . On vehicles equipped with manual transmission, remove connecting plate between clutch and brake pedals. Remove brake light switch. See appropriate procedure under **BRAKELIGHT SWITCH** .
5. Remove brake pedal from brake booster by first pressing brake pedal in direction of brake booster and hold. Insert special tool T 10006 and pull in direction of driver's seat, when doing this counter-hold on brake pedal (at this moment the pedal must not be allowed to move backward). See **Fig. 19** . Mounting retaining tabs will be pressed off the ball head of the push rod. For ease of illustration separating the brake pedal from the brake booster is shown with the pedal cluster removed.
6. Remove brake booster-to-firewall nuts. Guide brake booster with brake master cylinder forward to remove.



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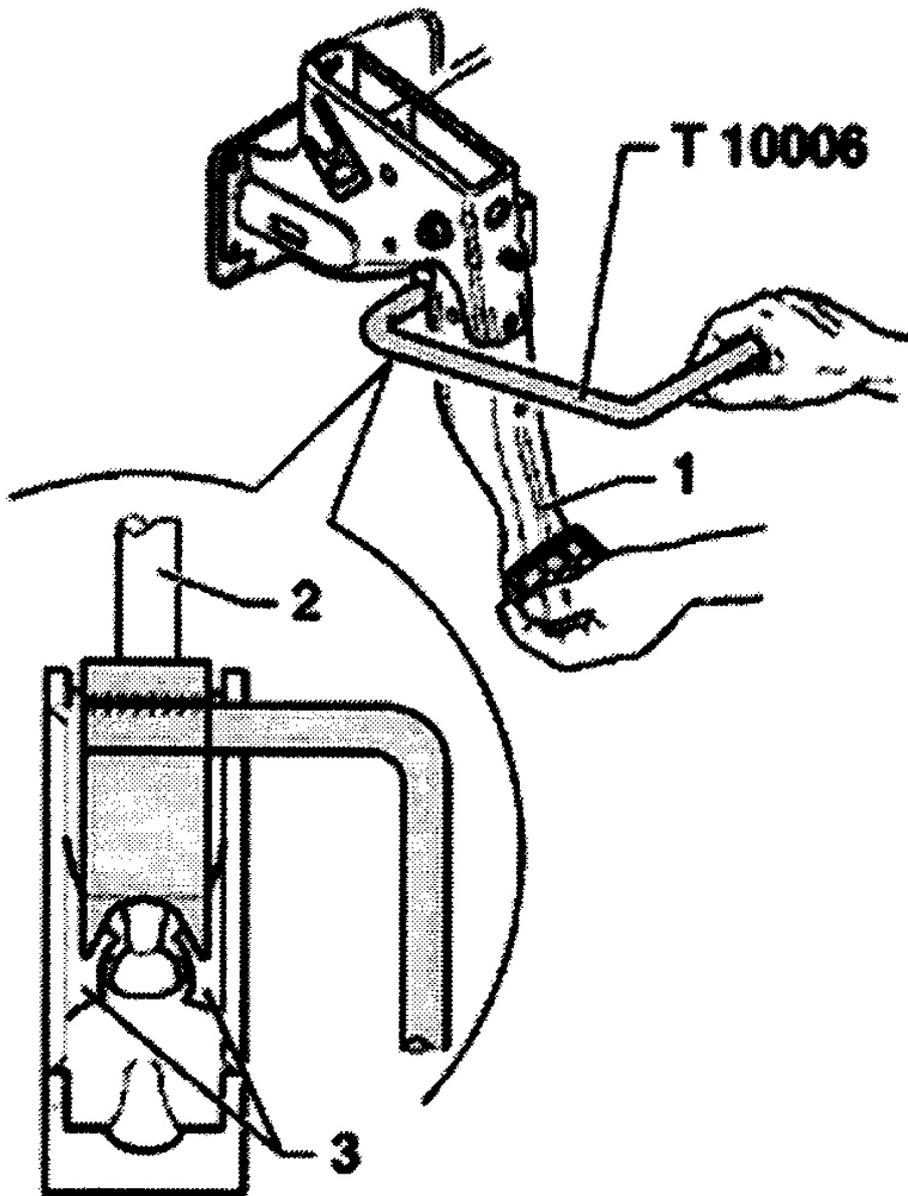
**Fig. 17: Removing Brake Booster (1 Of 2 - Beetle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.



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**Fig. 18: Removing Brake Booster (2 Of 2 - Beetle)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.



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**Fig. 19: Disconnecting Brake Pedal From Booster**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

#### Installation (Beetle)

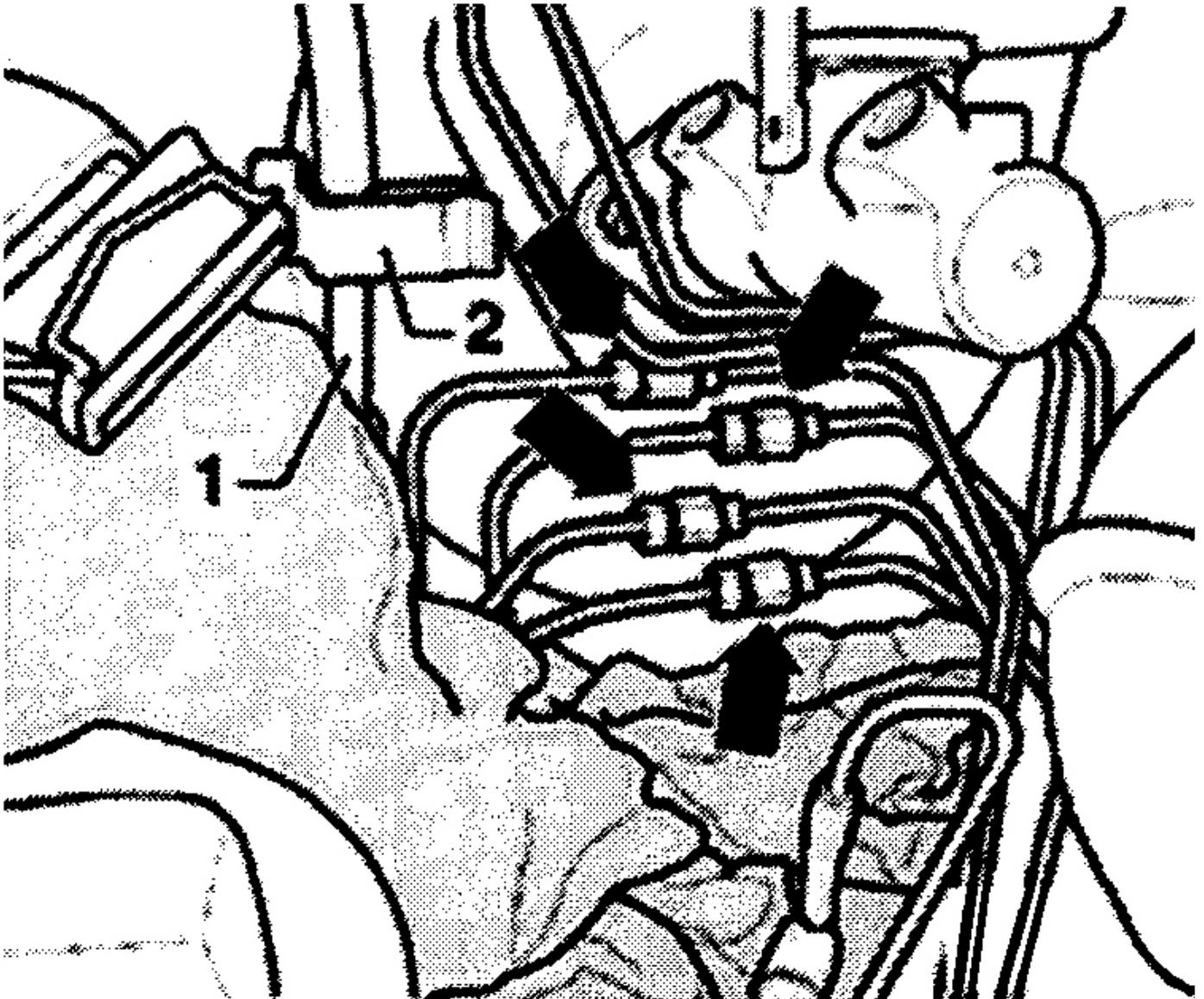
Before installing master cylinder, clean residual brake fluid from brake booster. Ensure push rod is properly centered in master cylinder. To install, reverse removal procedure. Hold push rod ball head in front of mounting and push brake pedal in direction of brake booster until the ball head engages audibly. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Adjust brake light switch. See **BRAKELIGHT SWITCH** under ADJUSTMENTS. Bleed brake system. See **BLEEDING BRAKE SYSTEM**.

#### Removal (EuroVan)

1. Remove master cylinder from brake booster. See **MASTER CYLINDER**.
2. Disconnect connections for brake lines (arrows). See **Fig. 20**. Remove wire (1) from bracket (2). Unbolt engine coolant expansion tank and lay aside. **DO NOT** open coolant system. Disconnect

vacuum hose from brake booster.

3. Remove trim from under driver's side instrument panel. Remove clevis pin clip and pin. Remove brake booster-to-firewall nuts. Remove brake booster.



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**Fig. 20: Removing Brake Lines & Wiring To Brake Booster (EuroVan)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Installation (EuroVan)**

Before installing master cylinder clean residual brake fluid from brake booster. Ensure push rod is properly centered in master cylinder. To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Bleed brake system. See **BLEEDING BRAKE SYSTEM**.

**Removal (Golf, GTI & Jetta)**

1. Disconnect battery. Clamp and remove clutch master cylinder supply hose (if equipped). Remove ABS control module and hydraulic unit. See REMOVAL & INSTALLATION in appropriate ANTI-

LOCK BRAKE SYSTEM article. Disconnect brake lines to master cylinder. Disconnect vacuum hose from brake booster.

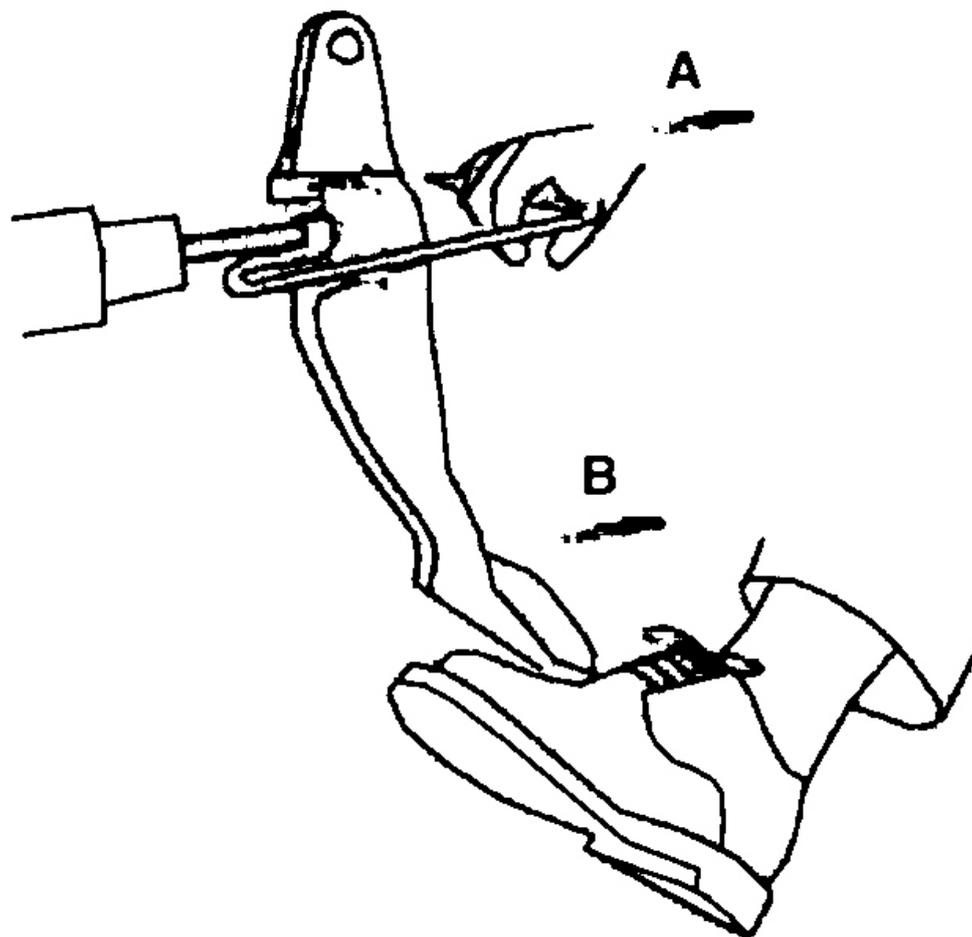
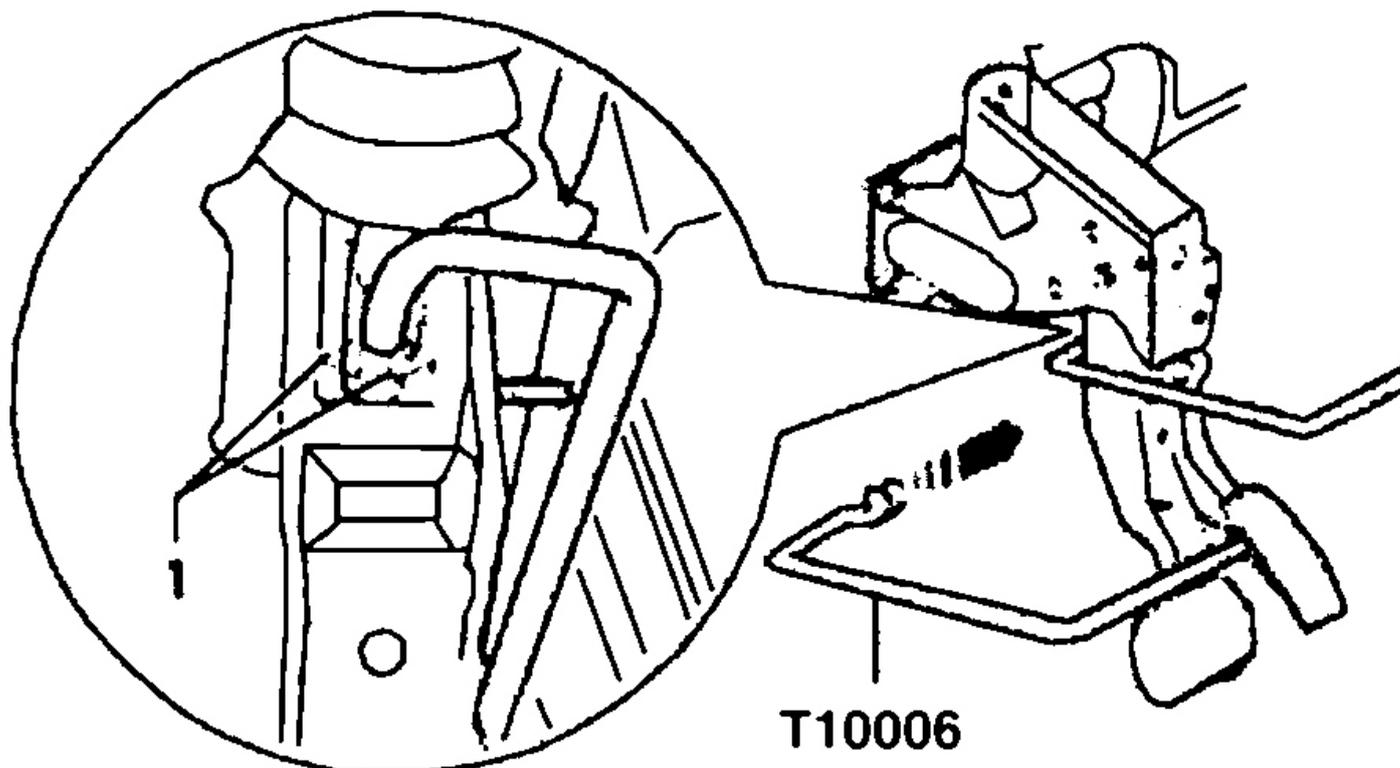
2. Remove lower instrument panel trim. Remove bolts (1) and remove cover "A". See **Fig. 18** . On vehicles equipped with manual transmission, remove connecting plate between clutch and brake pedals. Remove brake light switch. See appropriate procedure under **BRAKELIGHT SWITCH** .
3. Remove brake pedal from brake booster by first pressing brake pedal in direction of brake booster and hold. Insert special tool T 10006 and pull in direction of driver's seat, when doing this counter-hold on brake pedal (at this moment the pedal must not be allowed to move backward). See **Fig. 19** . Mounting retaining tabs will be pressed off the ball head of the push rod. For ease of illustration separating the brake pedal from the brake booster is shown with the pedal cluster removed.
4. Remove brake booster-to-firewall nuts. Guide brake booster with brake master cylinder forward to remove.

#### Installation (Golf, GTI & Jetta)

To install, reverse removal procedure. Hold push rod ball head in front of mounting and push brake pedal in direction of brake booster until the ball head engages audibly. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . Adjust brake light switch. See **BRAKELIGHT SWITCH** under ADJUSTMENTS. Bleed brake system. See **BLEEDING BRAKE SYSTEM** .

#### Removal (Passat)

1. Remove master cylinder from brake booster. See **MASTER CYLINDER** . Remove vacuum hose on brake booster unit.
2. Remove trim from under driver's side instrument panel. On vehicles equipped with a manual transmission, remove connecting piece between brake and clutch pedals. Disconnect brake light switch harness connector. Remove brake light switch. See appropriate procedure under **BRAKELIGHT SWITCH** .
3. Using Release Tool (T10006), disconnect brake pedal from brake booster. See **Fig. 21** . Remove fasteners holding brake booster and master cylinder to firewall. Remove brake booster and master cylinder.



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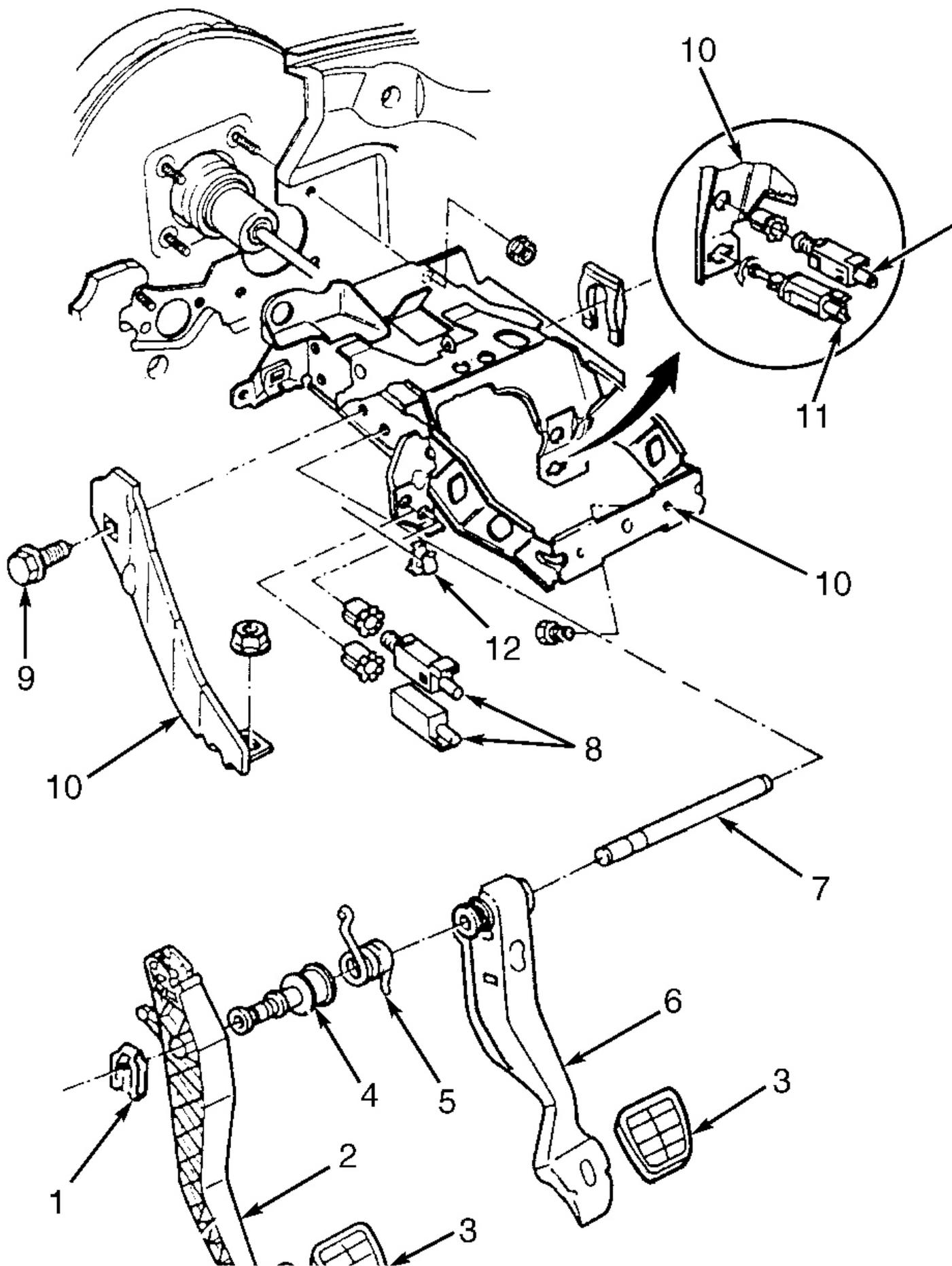
**Fig. 21: Removing Brake Booster (Passat)**

**Courtesy of AUDI OF AMERICA, INC.****Installation (Passat)**

Before installing master cylinder, clean residual brake fluid from brake booster. Ensure push rod is properly centered in master cylinder. To install, reverse removal procedure. Hold push rod ball head in front of mounting and push brake pedal in direction of brake booster until the ball head engages audibly. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Adjust brake light switch. See **BRAKELIGHT SWITCH** under ADJUSTMENTS. Bleed brake system. See **BLEEDING BRAKE SYSTEM**.

**BRAKELIGHT SWITCH****Brakelight Switch (Beetle, EuroVan, Golf, GTI & Jetta)**

Brakelight switch is located on bracket above brake pedal. To replace, disconnect brakelight switch harness connector. Turn brakelight switch 45° counterclockwise (on Beetle, Jetta, GTI and Golf) or 90° (on EuroVan), and guide switch from bracket. To install, pull switch plunger out to stop. With brake pedal in rest position, guide switch into opening and turn 45° clockwise (on Beetle, Jetta, GTI and Golf) or 90° (on EuroVan). Verify proper functioning of brake lights. See **Fig. 22**.



**Fig. 22: Locating Brakelight Switch**

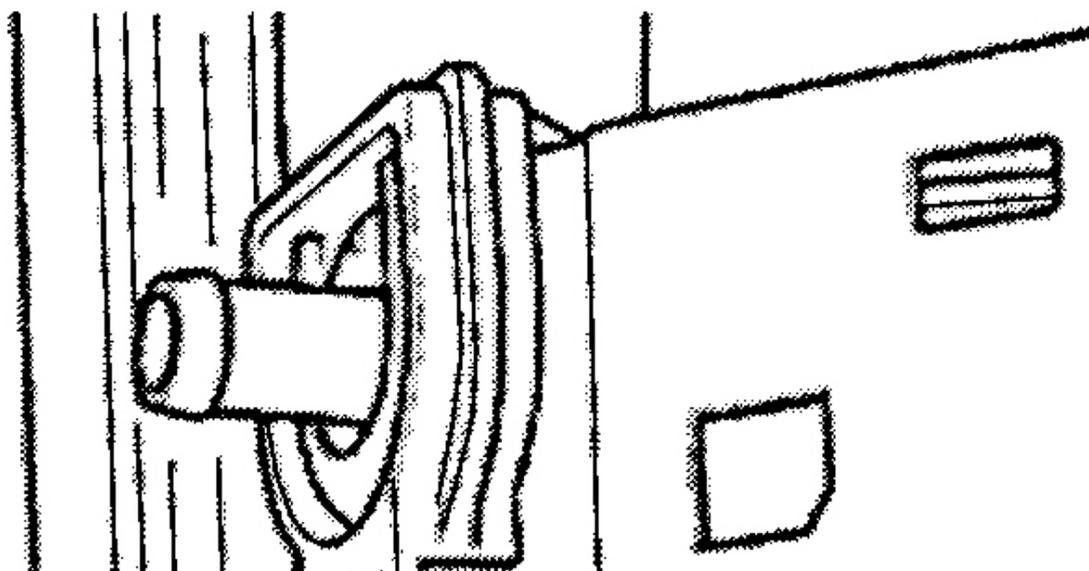
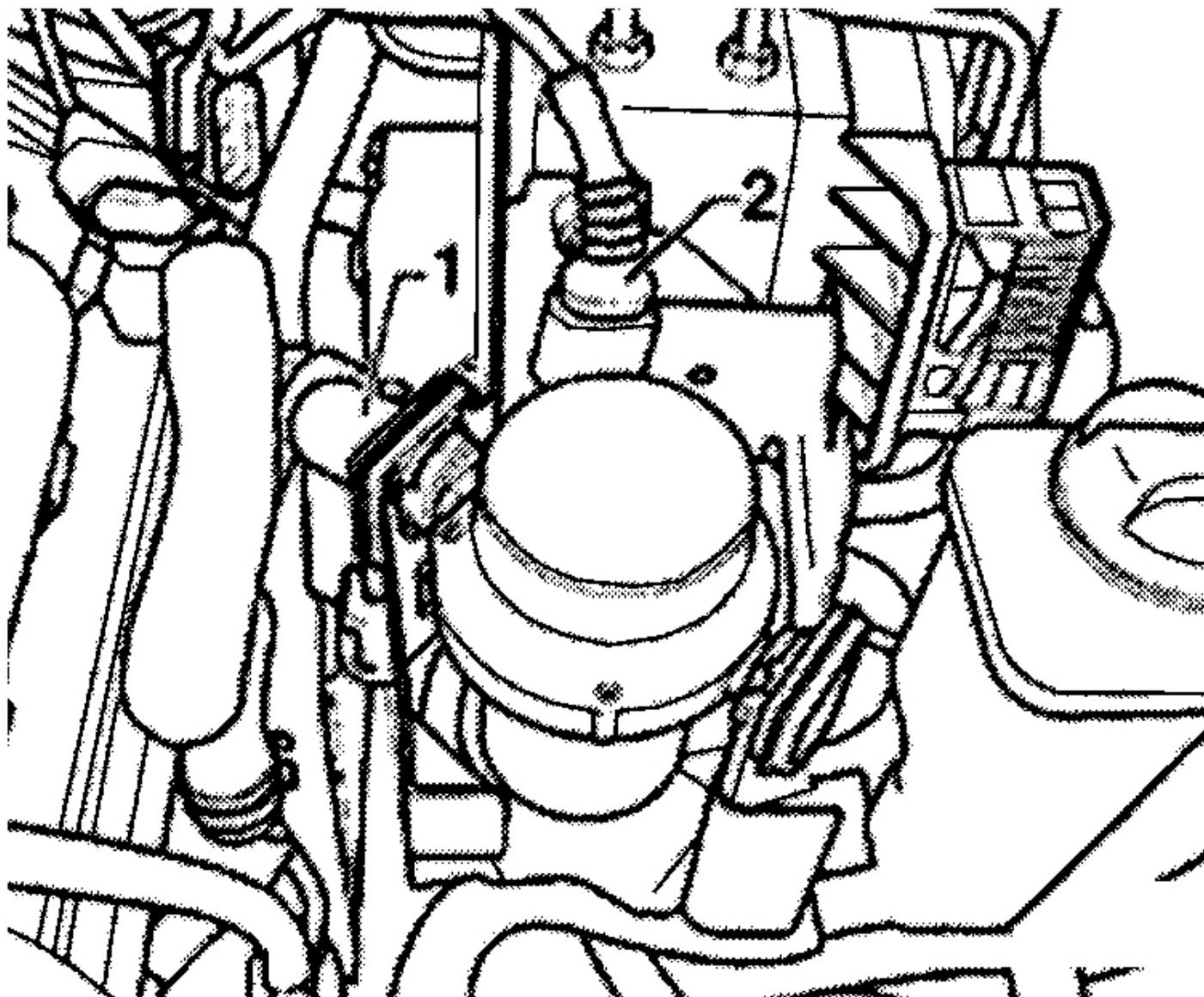
Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Brakelight Switch (Passat)**

Remove storage compartment on driver's side. Disconnect brakelight switch harness connector. Loosen lock nut, and remove switch by turning switch counterclockwise. Installation is reverse of removal. After installing switch, adjustment is necessary. See **BRAKE LIGHT SWITCH** under ADJUSTMENTS. Verify proper functioning of brake lights.

**ELECTRIC VACUUM PUMP**

Remove engine cover. Disconnect electric vacuum pump harness connector. Vacuum pump is located below master cylinder. See **Fig. 6** and **Fig. 23** . Remove vacuum hose. Unclip pump by hand, and pull up on vacuum pump. To install, reverse removal procedure.



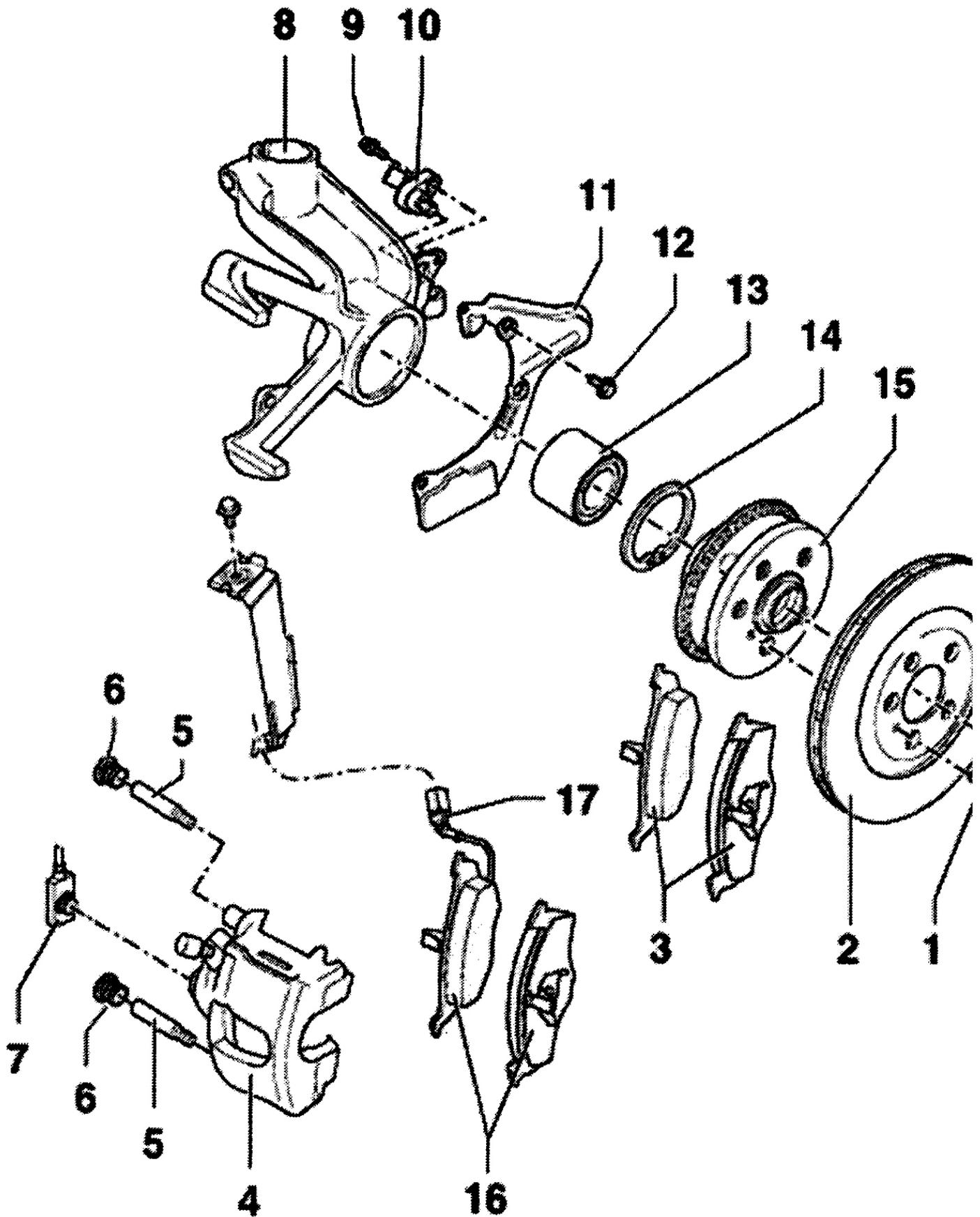
**Fig. 23: Removing & Installing Electric Vacuum Pump**  
Courtesy of AUDI OF AMERICA, INC.

**FRONT DISC BRAKE PADS**

**NOTE:** To identify brake system equipped on vehicle, see **BRAKE SYSTEM IDENTIFICATION** table under **IDENTIFICATION**.

**Removal (FS III)**

1. Raise and support vehicle. Remove front wheels. Remove guide pin protective caps. See **Fig. 24** . Disconnect brake pad wear indicator harness connector.
2. Remove both guide pins from brake caliper. Remove brake caliper housing and secure with wire so that the weight of the brake caliper does not stress or damage brake hose. Remove brake pads from front brake caliper housing.



1. Disc Retaining Screw  
2. Vented Disc

10. Wheel Speed Sensor  
11. Splash Shield

**Fig. 24: Exploded View Of FS III Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

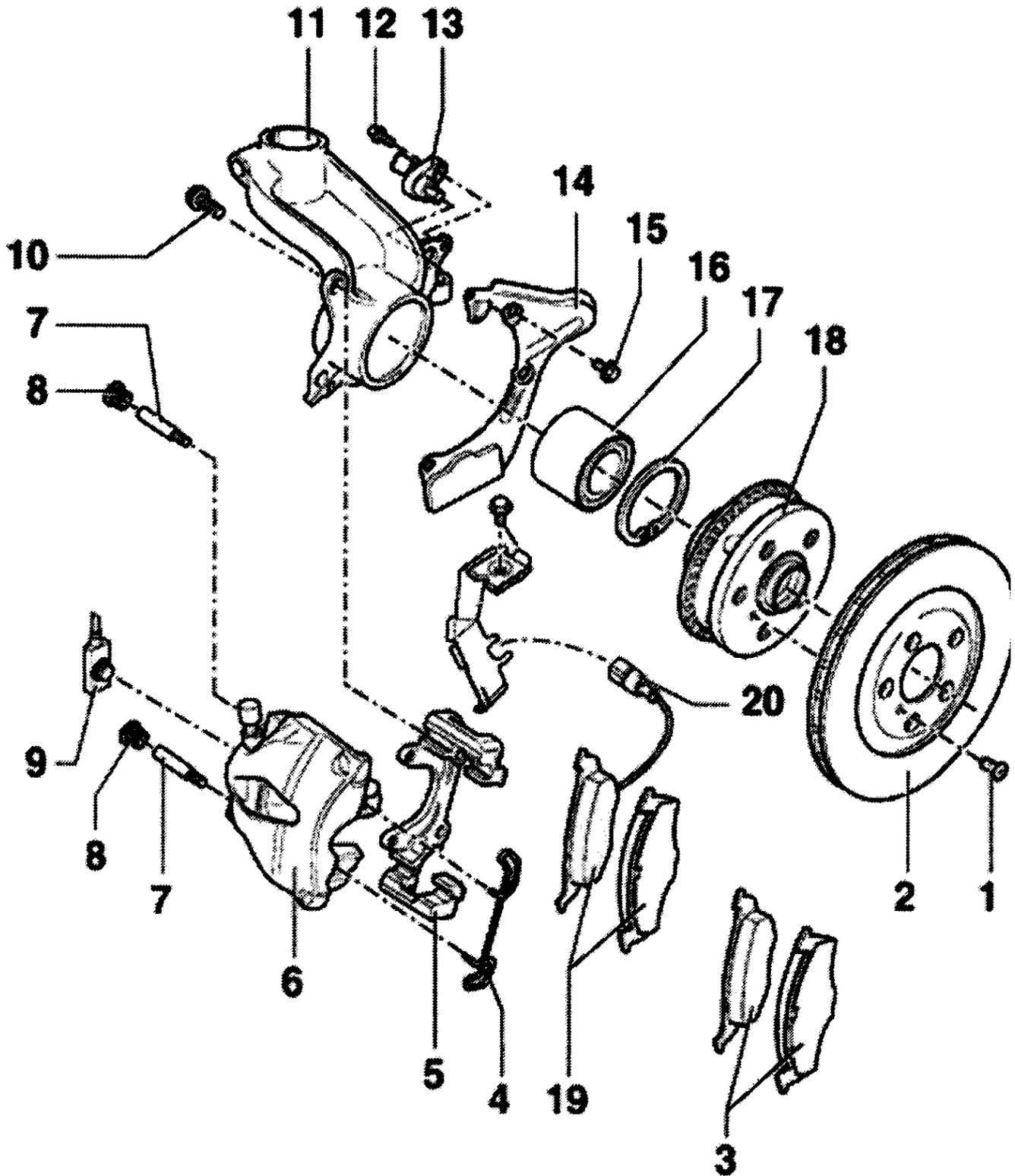
**Installation (FS III)**

**NOTE:** Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage.

1. Before inserting new brake pads, press piston back into the cylinder with piston resetting tool. Brake pad with black three finger clip is to be used on the outer side of brake caliper housing.
2. Install brake caliper housing with brake pads on wheel bearing housing, lower part of brake caliper housing first. Brake caliper housing lug must be behind the wheel bearing housing guide. Secure brake caliper housing to brake carrier with both guide pins and tighten to specification. See **TORQUE SPECIFICATIONS**.
3. Connect brake pad wear indicator harness connector. After 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. Check brake fluid level.

**Removal (FN3)**

1. Raise and support vehicle. Remove front wheels. Remove guide pin protective caps. See **Fig. 25**. Pry brake pad retaining spring out from brake caliper housing with a screwdriver and remove. Disconnect brake pad wear indicator harness connector.
2. Remove both guide pins from brake caliper. Remove brake caliper housing and secure with wire so that the weight of the brake caliper does not stress or damage brake hose. Remove brake pads from brake caliper housing.



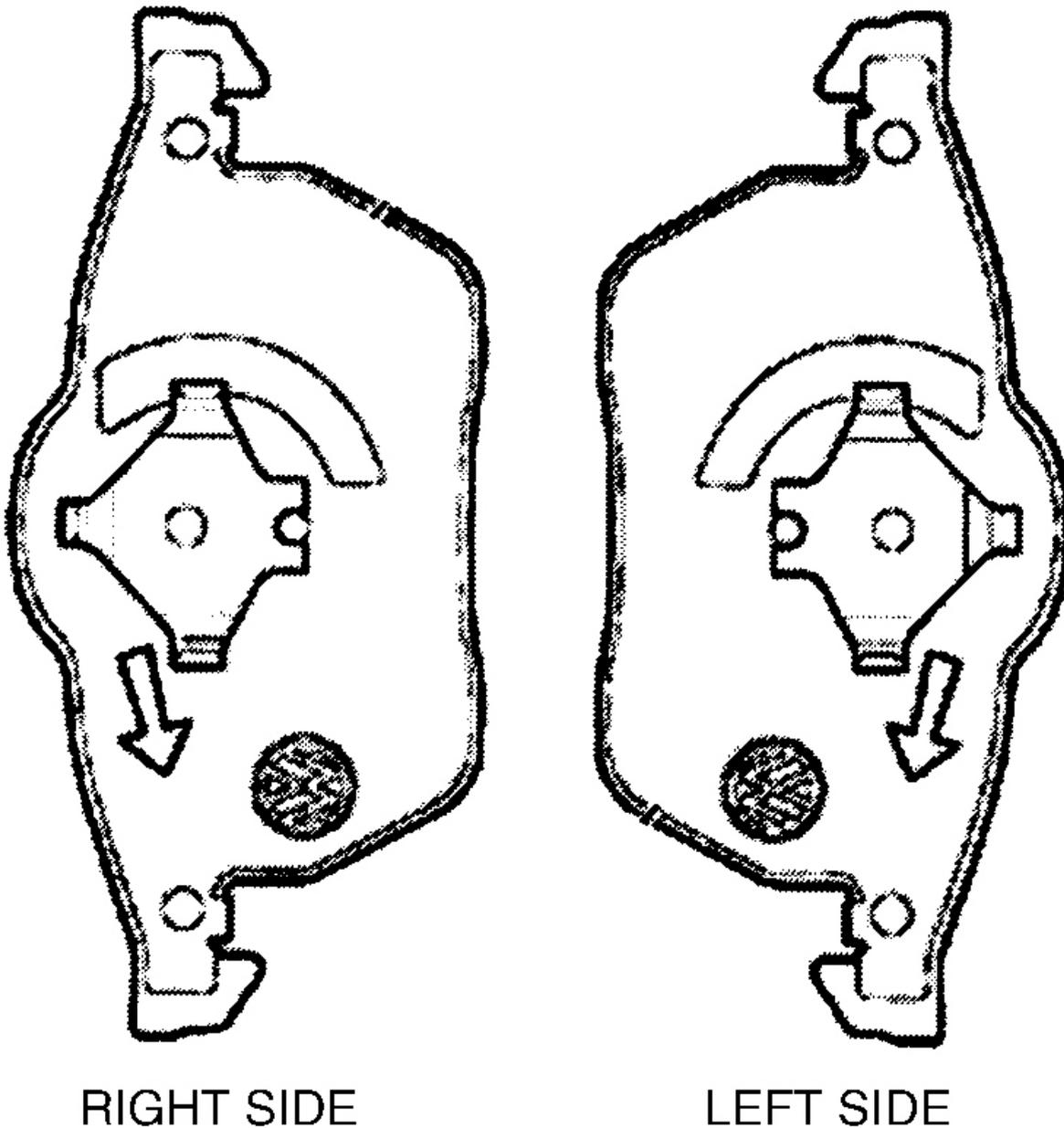
- 1. Disc Retaining Screw
- 2. Vented Disc
- 3. Brake Pads
- 4. Anti-Rattle Spring
- 5. Brake Pad Carrier
- 6. Brake Caliper (FN3)
- 7. Guide Pin

- 11. Wheel Bearing Housing
- 12. Wheel Speed Sensor Retaining Screw
- 13. Wheel Speed Sensor
- 14. Splash Shield
- 15. Splash Shield Retaining Bolt
- 16. Wheel Bearing
- 17. Wheel Bearing Snap Ring

**Fig. 25: Exploded View Of FN3 Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Installation (FN3)**

1. Before inserting new brake pads, press piston back into the cylinder with piston resetting tool. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage. When installed arrow on brake pad backplate must point downward. Ensure this pads are installed correctly. See **Fig. 26** .
2. Install brake caliper housing with brake pads on wheel bearing housing, lower part of brake caliper housing first. Brake caliper housing lug must be behind the wheel bearing housing guide. Secure brake caliper housing to brake carrier with both guide pins and tighten to specification. See **TORQUE SPECIFICATIONS** .
3. Connect brake pad wear indicator harness connector. After brake pad change firmly depress brake pedal several times with vehicle stationary, so that the brake pads are properly seated. Check brake fluid level.

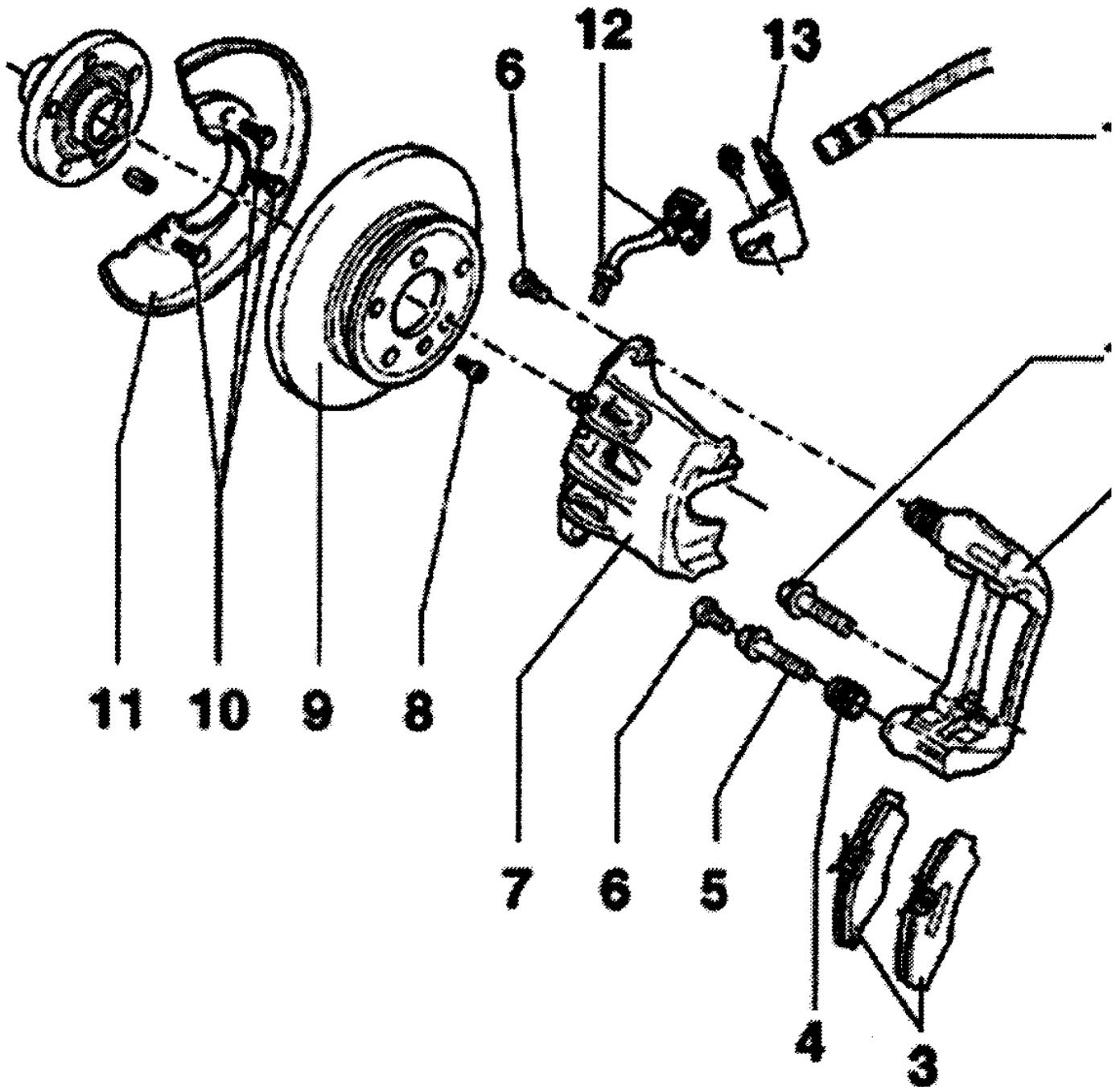


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**Fig. 26: Identifying Brake Pad Installation Position (FN3)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removal (C54)

Raise and support vehicle. Remove front wheels. Unscrew lower mounting bolt for brake caliper housing. See **Fig. 27**. Counter-hold at guide pin. Swing brake caliper housing upward. Remove brake pads.



- |   |                           |
|---|---------------------------|
| 1. Caliper-To-Wheel Bearing Housing Bolts | 8. Disc Retaining Screw   |
| 2. Brake Pad Carrier                      | 9. Solid Disc             |
| 3. Brake Pads                             | 10. Splash Shield Bolt    |
| 4. Guide Pin Seals                        | 11. Splash Shield         |
| 5. Guide Pin                              | 12. Brake Line (Metal)    |
| 6. Brake Caliper Bolts (Always Replace)   | 13. Brake Line Bracket    |
| 7. Brake Caliper (C54)                    | 14. Brake Line (Flexible) |

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**Fig. 27: Exploded View Of Lucas C54 Brake Components (Front Axle)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

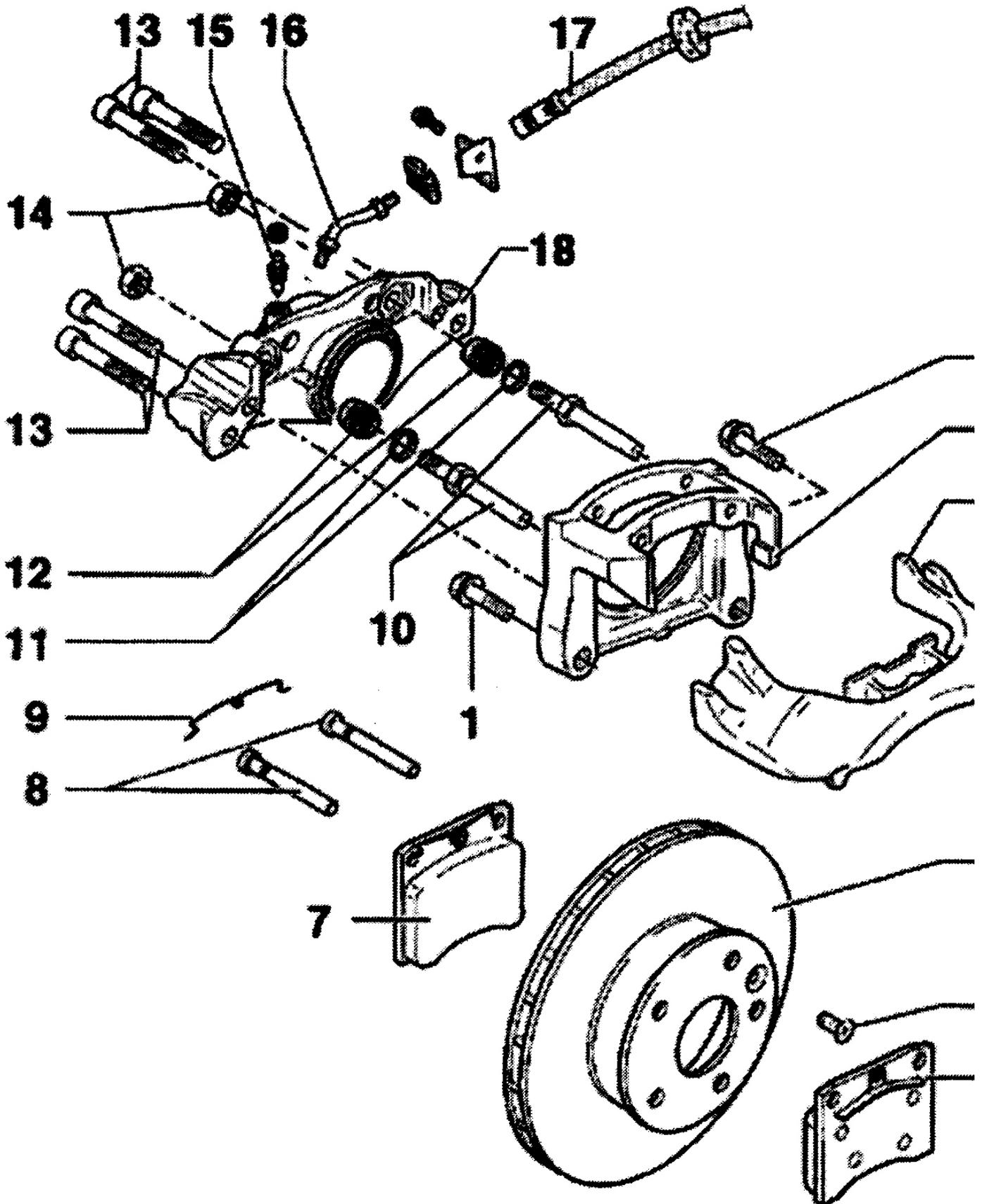
## Installation (C54)

**NOTE:** Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage.

Before inserting new brake pads, press piston back into the cylinder with piston resetting tool. Insert brake pads. Swing brake caliper housing downward and tighten mounting bolts to specification. See **TORQUE SPECIFICATIONS**. Repair kit includes two self-locking hex-bolts which must always be installed.

## Removal (RC54)

Remove wheels. Remove securing spring. See **Fig. 28**. Drive out brake pad retaining pins using drift. Remove inner brake pad. Shift frame. Loosen outer brake pad from brake pad mounting surface at bridge using a flat-bladed tool. Remove outer brake pad.



- 1. Brake Pad Carrier-To-Frame Bolts
- 2. Brake Pad Carrier
- 3. Frame

11. Guide Pin Seal

**Fig. 28: Exploded View Of Lucas RC54 Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation (RC54)

**NOTE:** Before pushing back piston, siphon some of the brake fluid out of brake fluid reservoir. If reservoir has been topped off, fluid will overflow and cause damage.

Press piston back into caliper housing using resetting tool before inserting new brake pads. Clean brake caliper housing, especially the adhesive surface for brake pad, it must be free of residual adhesive and grease. Install inner brake pad. Install pad retaining pins enough that inner pad is held on. Carefully insert outer brake pads. Press brake pad retaining pins completely through and install securing spring. When inserting outer brake pad, be sure that it does not adhere to brake caliper housing prior to achieving correct installation position. Do not damage adhesive surfaces. After installing new brake pads, operate brake pedal powerfully two or three times and hold pedal for 5 to 10 seconds so that outer pads adhere securely to brake caliper housing. This helps ensure a reliable adhesion of the outer pad and noise-free braking.

Removal (FNR)

1. Raise and support vehicle. Remove front wheels. Remove guide pin protective caps. See **Fig. 29** . Pry brake pad retaining spring out from brake caliper housing with a screwdriver and remove. Disconnect brake pad wear indicator harness connector. Lift securing strap slightly at bottom of harness connector and then rotate 90°. Remove harness connector from bracket.
2. Remove both guide pins from brake caliper. Remove brake caliper housing and secure with wire so that the weight of the brake caliper does not stress or damage brake hose. Remove brake pads front brake caliper housing.



**Fig. 29: Exploded View Of FNR Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

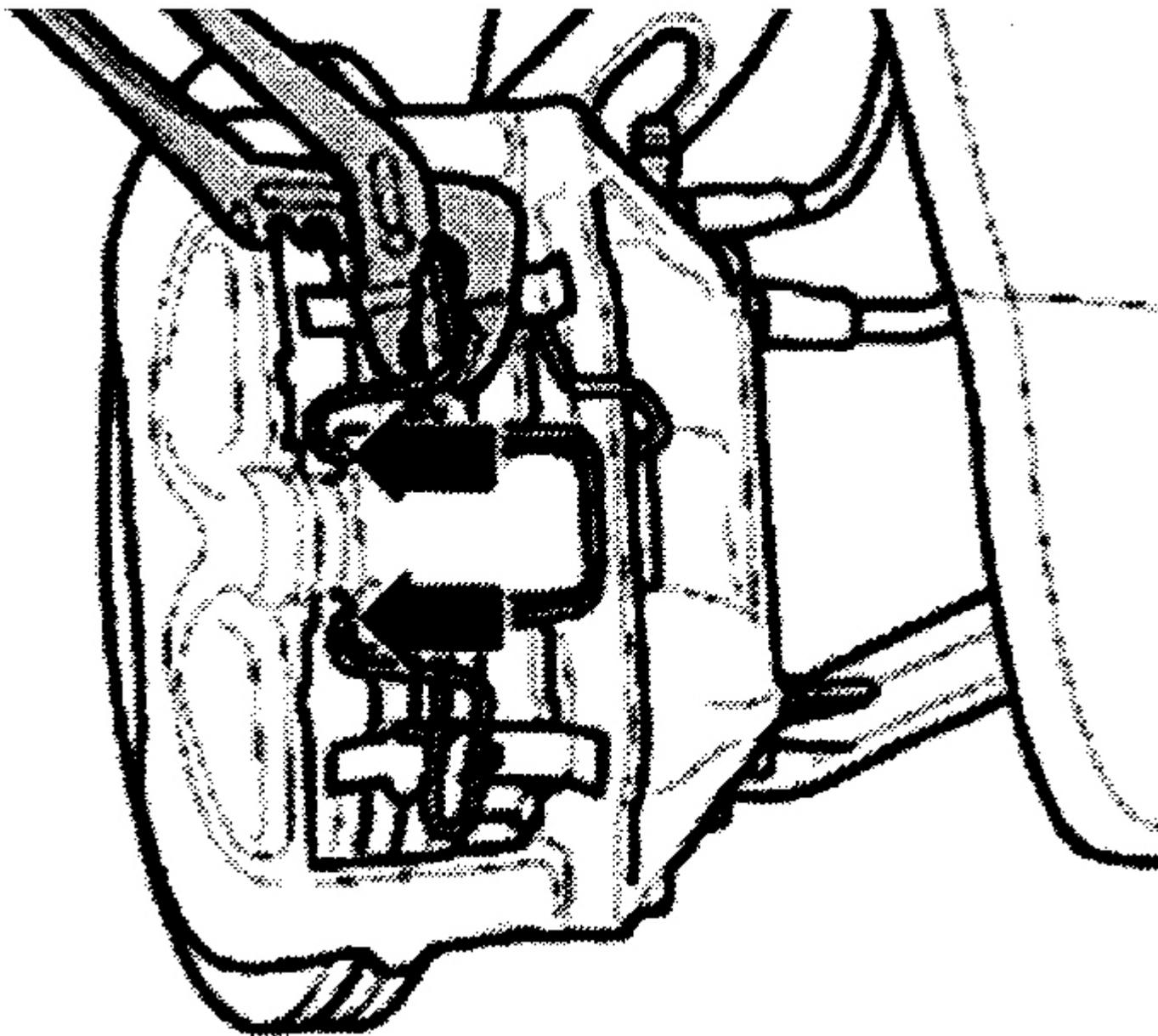
**Installation (FNR)**

**NOTE:** Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage.

1. Before inserting new brake pads, press piston back into the cylinder with piston resetting tool. Install brake caliper housing with brake pads on wheel bearing housing, lower part of brake caliper housing first. Brake caliper housing lug must be behind the wheel bearing housing guide.
2. Secure brake caliper housing to brake carrier with both guide pins and tighten to specification. See **TORQUE SPECIFICATIONS**.
3. Connect brake pad wear indicator harness connector. After 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. Check brake fluid level.

**Removal (HP2)**

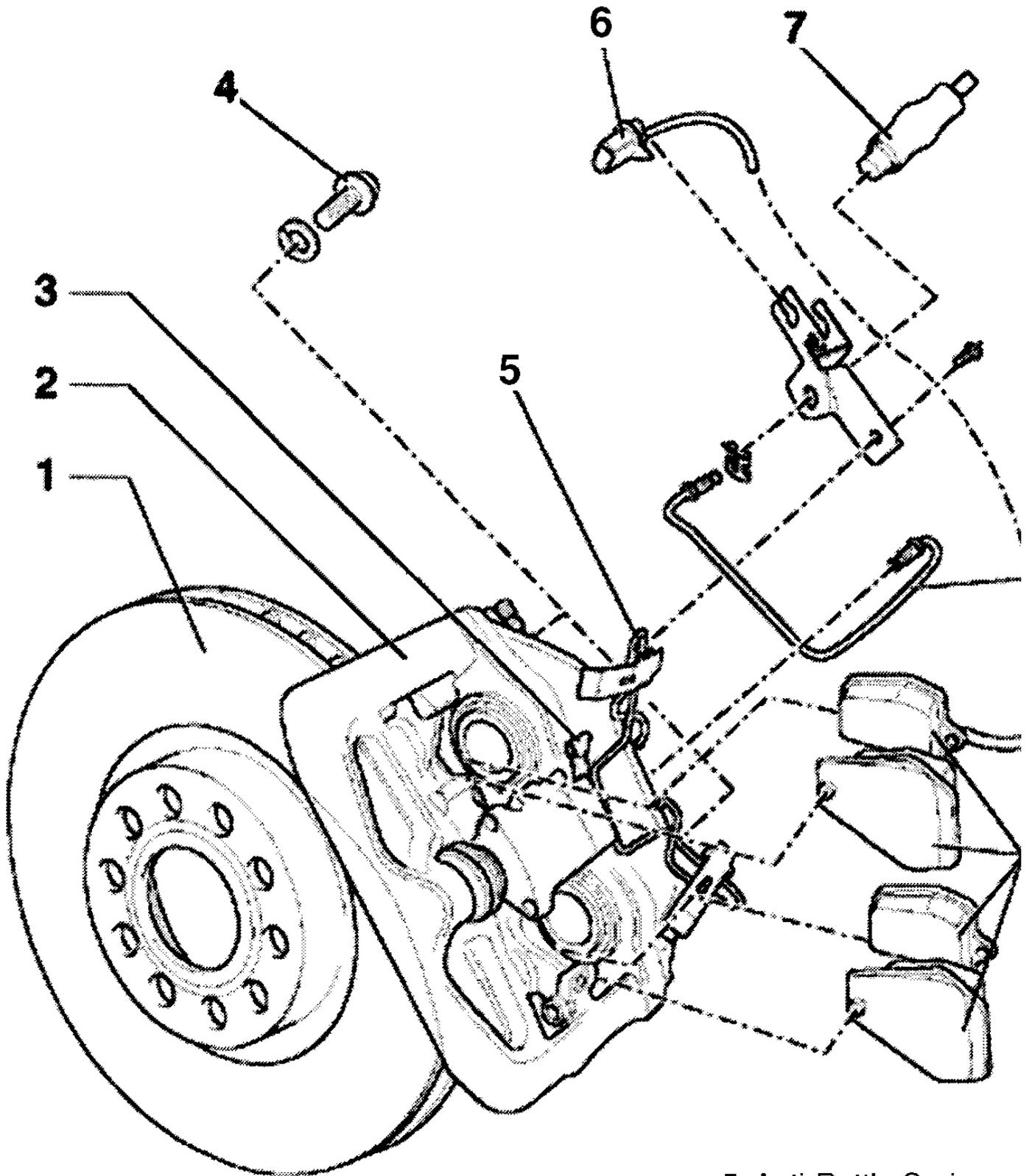
1. Raise and support vehicle. Remove front wheels. Secure brake disc by threading a wheel lug into hub. Unclip upper and lower parts of retaining spring using a pair of pliers. See **Fig. 30** and **Fig. 31**. Push spring sideways. Spring cannot be completely removed from caliper.
2. Disconnect brake pad wear indicator harness connector. Lift securing strap slightly at bottom of harness connector and then rotate 90° and remove harness connector from bracket.
3. Using a flat-bladed tool, press piston back into the cylinder. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage.
4. Using a flat-bladed tool, first press outer brake pads off caliper and then remove. Push floating caliper in direction of arrow until caliper stops. See **Fig. 32**. Carefully press inner brake pads out of pistons and remove from floating caliper. Clean floating caliper, in particular the adhesive surface for outer brake pads. This area must be free of adhesive residue and grease.



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**Fig. 30: Removing Retaining Spring (HP2)**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

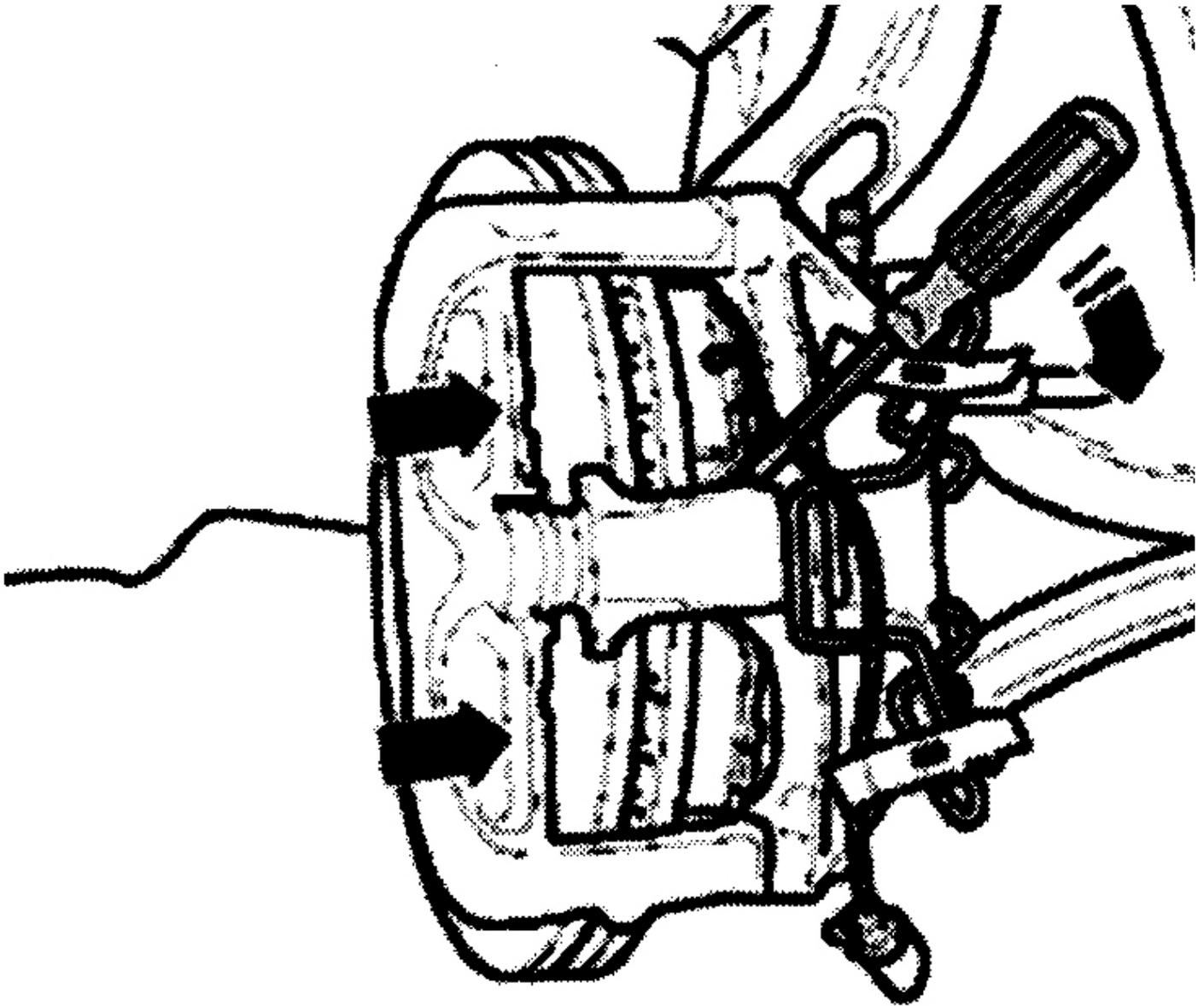


- 1. Vented Brake Disc
- 2. Brake Caliper (HP2)
- 3. Brake Pad Sensor Bracket
- 4. Caliper-To-Wheel Bearing Housing Bolts

- 5. Anti-Rattle Spring
- 6. Brake Pad Sensor
- 7. Brake Line (Flexible)
- 8. Brake Line (Metal)
- 9. Brake Pads

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**Fig. 31: Exploded View Of HP2 Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.



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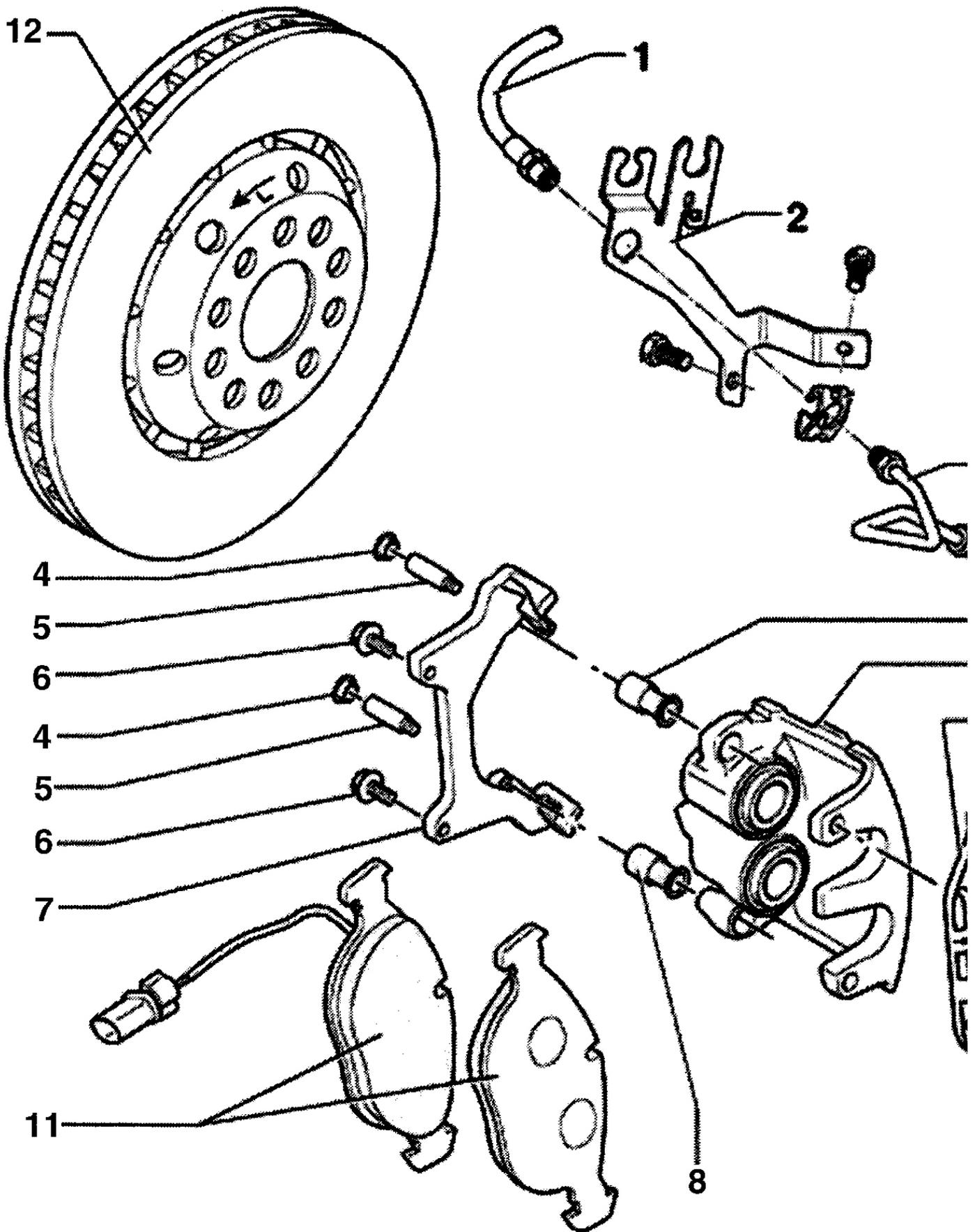
**Fig. 32: Removing Brake Pads (HP2)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Installation (HP2)**

1. Carefully install inner brake pads in caliper. Press floating caliper outwards until it stops. Pull off protective foil on backing plates of outer brake pads. Install outer pads in floating caliper. Ensure that lugs of the backing plates are located correctly in floating caliper.
2. Install brake wear indicator connector into bracket on brake caliper. Clip in upper and lower parts of retaining spring.
3. After 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. Check brake fluid level.

Removal (2FN)

1. Raise and support vehicle. Remove front wheels. Push retaining spring in upwards direction and remove from brake caliper sideways. See **Fig. 33** . Remove guide pin protective caps. Disconnect brake pad wear indicator harness connector. Lift securing strap slightly at bottom of harness connector and then rotate 90°. Remove harness connector from bracket.
2. Remove both guide pins from brake caliper. Remove brake caliper housing and secure with wire so that the weight of the brake caliper does not stress or damage brake hose. Remove brake pads from brake caliper housing.



1. Brake Line (Flexible)

2. Brake Line Bracket

7. Brake Pad Carrier

8. Guide Pin Seals

**Fig. 33: Exploded View Of 2FN Brake Components (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation (2FN)

**NOTE:** Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage.

1. Before inserting new brake pads, press piston back into the cylinder with piston resetting tool. Install brake caliper housing with brake pads on wheel bearing housing, lower part of brake caliper housing first. Brake caliper housing lug must be behind the wheel bearing housing guide.
2. Secure brake caliper housing to brake carrier with both guide pins and tighten to specification. See **TORQUE SPECIFICATIONS**.
3. Connect brake pad wear indicator harness connector. After 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. Check brake fluid level.

**FRONT & REAR BRAKE CALIPER**

Removal & Installation

1. Raise and support vehicle. Remove wheels. Disconnect brakeline from caliper, and plug openings. Bend back locking tabs (if equipped) on mounting bolts. If removing rear brake calipers, disconnect parking brake cables.
2. On all calipers, remove caliper mounting bolts. Remove caliper assembly from wheel bearing housing. To install, reverse removal procedure. Use NEW lock plates (if equipped) and mounting bolts. Bleed hydraulic brake system. See **BLEEDING PROCEDURES** under BLEEDING BRAKE SYSTEM.

**FRONT & REAR BRAKE ROTOR**

Removal & Installation

Raise and support vehicle. Remove wheels. Remove brake caliper. See **FRONT & REAR BRAKE CALIPER**. Secure caliper with wire so that the weight of the brake caliper does not stress or damage brake hose. Remove countersunk screw that holds rotor to hub. Pull rotor off hub. To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**.

**MASTER CYLINDER**

Removal (Beetle)

1. Disconnect battery. Remove intake hose and harness connector from mass air flow sensor. Remove air cleaner complete. On vehicles equipped with a 2.0L or 1.8L engines, remove protective housing for relays from cable channel.
2. To catch leaking brake fluid, place sufficient lint free cloths in area of plenum chamber, engine and transmission. Install bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw. Operate brake pedal until sufficient amount of brake fluid has been pumped out for the brake fluid level in the brake fluid reservoir to sink below the clutch master cylinder supply hose (if equipped). Close front left bleeder screw.

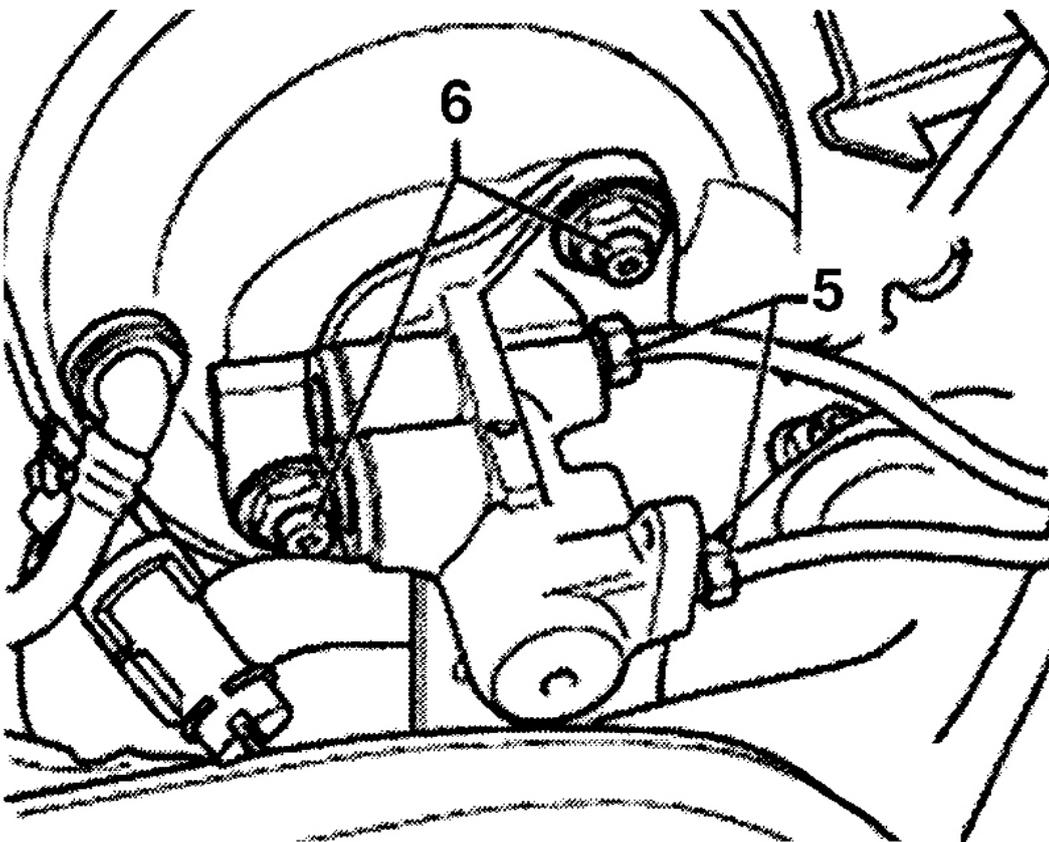
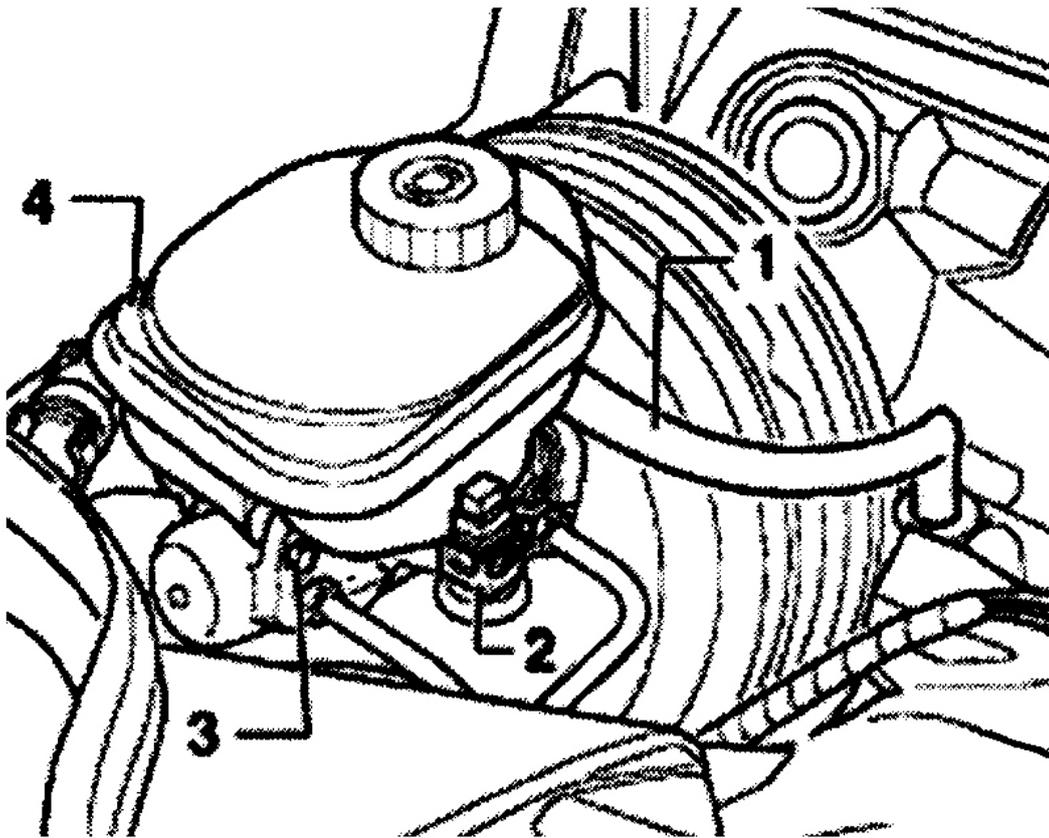
3. Disconnect and clamp clutch master cylinder supply hose (if equipped) and seal with a plug. Disconnect brake fluid level warning indicator sensor harness connector. Disconnect brake pressure sender harness connectors.
4. Disconnect brake lines on brake master cylinder and seal brake lines and threaded holes with plugs from repair kit Part No. 1H0 698 311 A. Remove brake master cylinder nuts. Carefully remove brake master cylinder from brake booster unit.

**Installation (Beetle)**

To install, reverse removal procedure. Always use NEW "O" ring between master cylinder and brake booster. When installing the brake master cylinder and brake booster unit together, make sure that the push rod is correctly located in the brake master cylinder. Apply slight pressure to the brake pedal to move the push rod towards brake master cylinder; this makes it easier to guide brake master cylinder onto the push rod. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Bleed hydraulic system. See **BLEEDING BRAKE SYSTEM**.

**Removal (EuroVan & Passat)**

1. To catch leaking brake fluid, place sufficient lint free cloths in area of plenum chamber, engine and transmission. Install bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw. Operate brake pedal until sufficient amount of brake fluid has been pumped out for the brake fluid level in the brake fluid reservoir to sink below the clutch master cylinder supply hose (if equipped). Close front left bleeder screw.
2. Disconnect and clamp clutch master cylinder supply hose (if equipped) and seal with a plug. Disconnect brake fluid level warning indicator sensor harness connector. See **Fig. 34**. Remove reservoir retaining bolt. Remove brake fluid reservoir. To do this press down the locking tab on the reservoir and at the same time pull the brake fluid reservoir out of the sealing plugs.
3. Disconnect brake lines on brake master cylinder and seal brake lines and threaded holes with plugs from repair kit Part No. 1H0 698 311 A. Remove brake master cylinder nuts. Remove brake booster unit Torx head bolts (T45) using special tool (3320). Carefully remove brake master cylinder from brake booster unit.



**Fig. 34: Removing & Installing Brake Master Cylinder (Passat)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Installation (EuroVan & Passat)**

To install, reverse removal procedure. Always use NEW "O" ring between master cylinder and brake booster. When installing the brake master cylinder and brake booster unit together, make sure that the push rod is correctly located in the brake master cylinder. Apply slight pressure to the brake pedal to move the push rod towards brake master cylinder; this makes it easier to guide brake master cylinder onto the push rod. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Bleed hydraulic system. See **BLEEDING BRAKE SYSTEM**.

**Removal (Golf, GTI & Jetta)**

1. To catch leaking brake fluid, place sufficient lint free cloths in area of plenum chamber, engine and transmission. Install bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw. Operate brake pedal until sufficient amount of brake fluid has been pumped out for the brake fluid level in the brake fluid reservoir to sink below the clutch master cylinder supply hose (if equipped). Close front left bleeder screw.
2. Disconnect and clamp clutch master cylinder supply hose (if equipped) and seal with a plug. Disconnect brake fluid level warning indicator sensor harness connector. Disconnect brake pressure sender No. 1 and 2 harness connectors.
3. Disconnect brake lines on brake master cylinder and seal brake lines and threaded holes with plugs from repair kit Part No. 1H0 698 311 A. Remove heat shield, if equipped. Remove brake master cylinder nuts. Carefully remove brake master cylinder from brake booster unit.

**Installation (Golf, GTI & Jetta)**

To install, reverse removal procedure. Always use NEW "O" ring between master cylinder and brake booster. When installing the brake master cylinder and brake booster unit together, make sure that the push rod is correctly located in the brake master cylinder. Apply slight pressure to the brake pedal to move the push rod towards brake master cylinder; this makes it easier to guide brake master cylinder onto the push rod. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS**. Bleed hydraulic system. See **BLEEDING BRAKE SYSTEM**. After installing master cylinder, a zero compensation of brake pressure sender 1 and brake pressure sensor 2 must be performed in addition to basic settings on vehicles with ABS/EDL/ASR/ESP. See FUNCTION 04 - BASIC SETTING in appropriate ANTI-LOCK BRAKE SYSTEM article.

**PRESSURE SWITCHES**

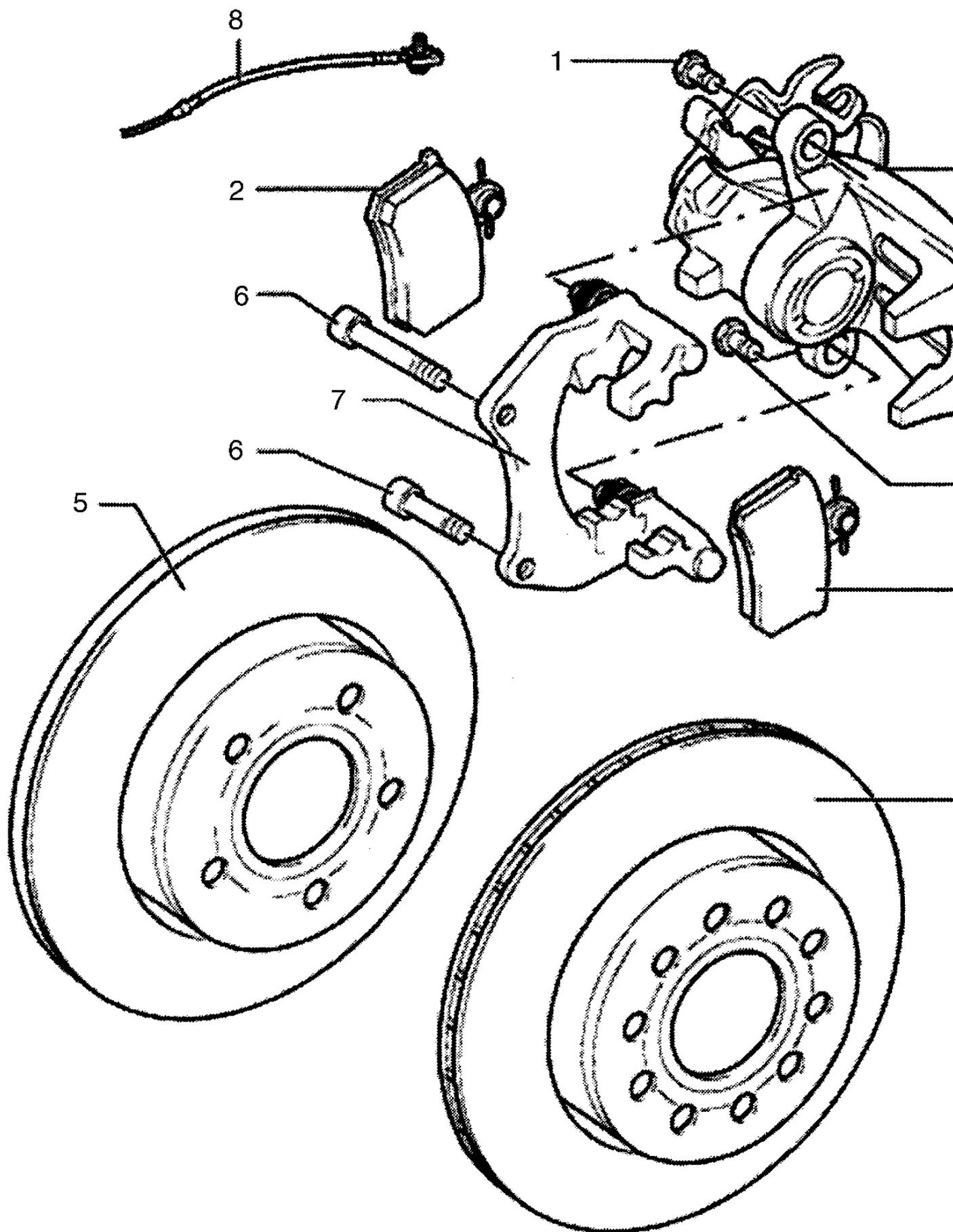
**Removal & Installation**

To catch leaking brake fluid, place sufficient lint free cloths in area of plenum chamber, engine and transmission. Install bleeder hose and bleeder bottle to the front left brake caliper bleeder screw and open bleeder screw. Operate brake pedal until sufficient amount of brake fluid has been pumped out for the brake fluid level in the brake fluid reservoir to sink below the clutch master cylinder supply hose (if equipped). Close front left bleeder screw. Disconnect pressure switch harness connector. Remove pressure switch. To install, reverse removal procedure. Tighten switch to specification. See **TORQUE SPECIFICATIONS**. Bleed hydraulic system. See **BLEEDING BRAKE SYSTEM**. A zero compensation of brake pressure sender 1 and brake pressure sensor 2 must be performed in addition to basic settings on vehicles with ABS/EDL/ASR/ESP. See FUNCTION 04 - BASIC SETTING in appropriate ANTI-LOCK BRAKE SYSTEM article.

**REAR DISC BRAKE PADS**

**Removal**

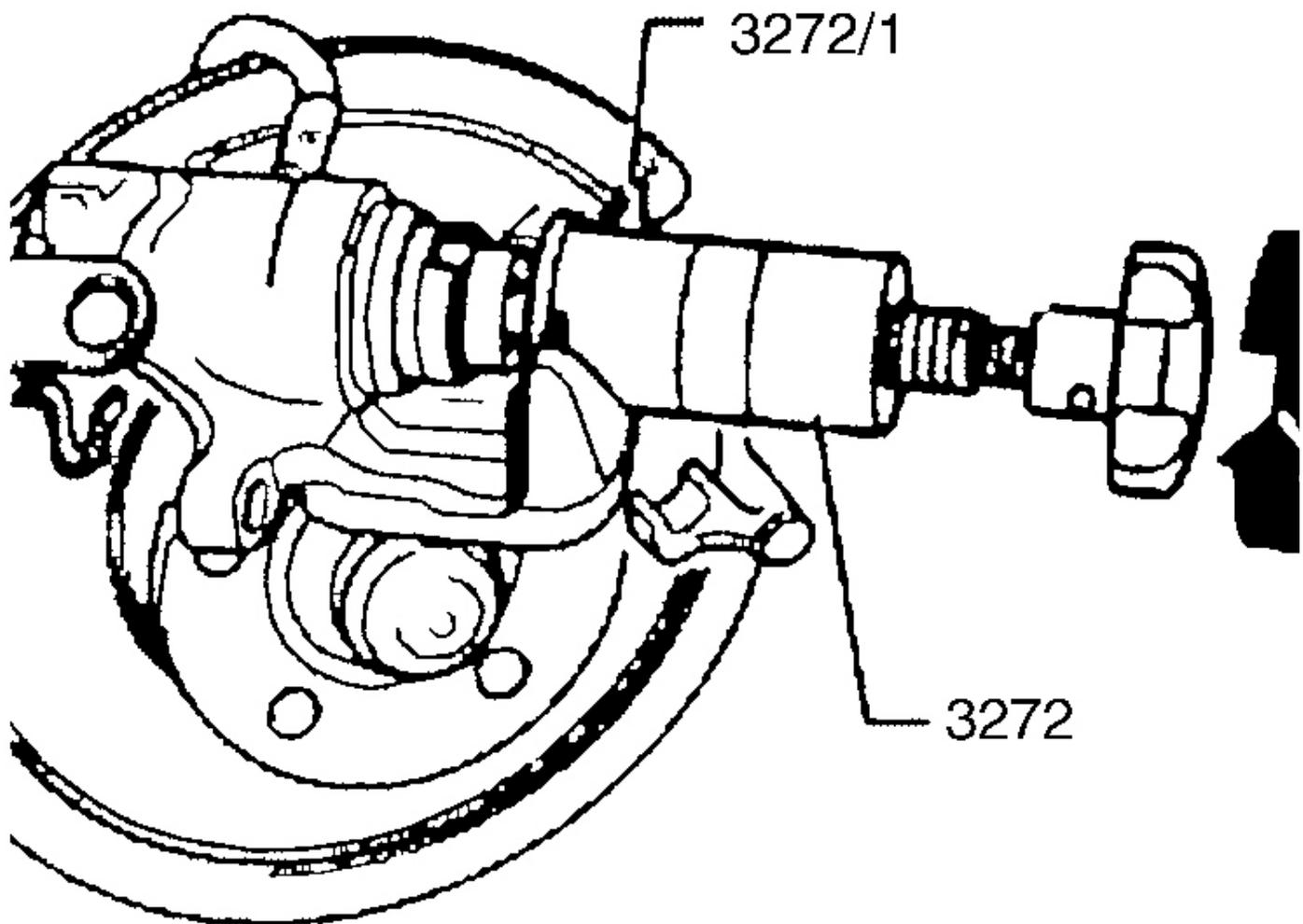
Raise and support vehicle. Remove rear wheels. Disconnect parking brake cable from caliper. Remove guide pins, or caliper mounting bolts. See **Fig. 35** . Remove caliper, and wire aside. **DO NOT** allow caliper to hang by brake hose. Remove pads and retaining springs from caliper support.



**Fig. 35: Exploded View Of Rear Brake Components (Typical)**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

#### Installation

Use Special Tool (VW 3272) along with Collar (3272/1) or equivalent, to seat caliper piston fully into cylinder bore. See **Fig. 36**. Seat piston by turning special tool until piston is bottomed out in bore. Before pressing the piston back, draw off brake fluid from the reservoir with a bleeder bottle. Otherwise if reservoir has been topped off, fluid will overflow and cause damage. Install brake pads, note positioning of pad to caliper (pin on pad must fit into groove on caliper piston). If reusing old pads, ensure that pads are installed in original positions or braking may be uneven. Position caliper. Install caliper mounting bolts. With engine off, depress brake pedal several times to allow pads to move into operating position. Ensure master cylinder reservoir fluid level is full. Adjust parking brake as necessary. See **PARKING BRAKE** under **ADJUSTMENTS**.



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**Fig. 36: Compressing Rear Brake Caliper Piston**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

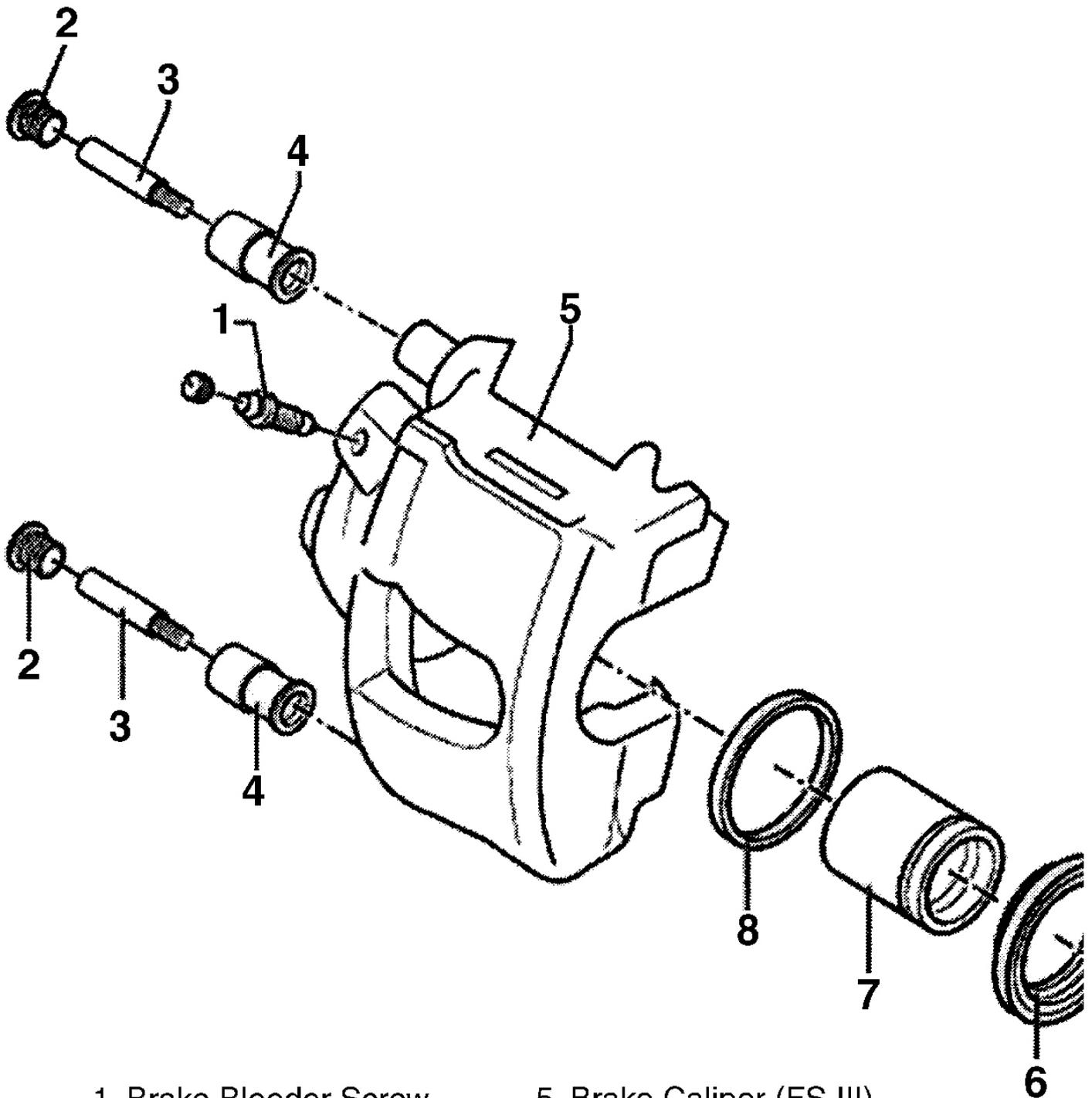
## OVERHAUL

### BRAKE CALIPER

**NOTE:** Black staining from piston seal wear may show on caliper bore walls and piston. This staining is normal.

**Disassembly**

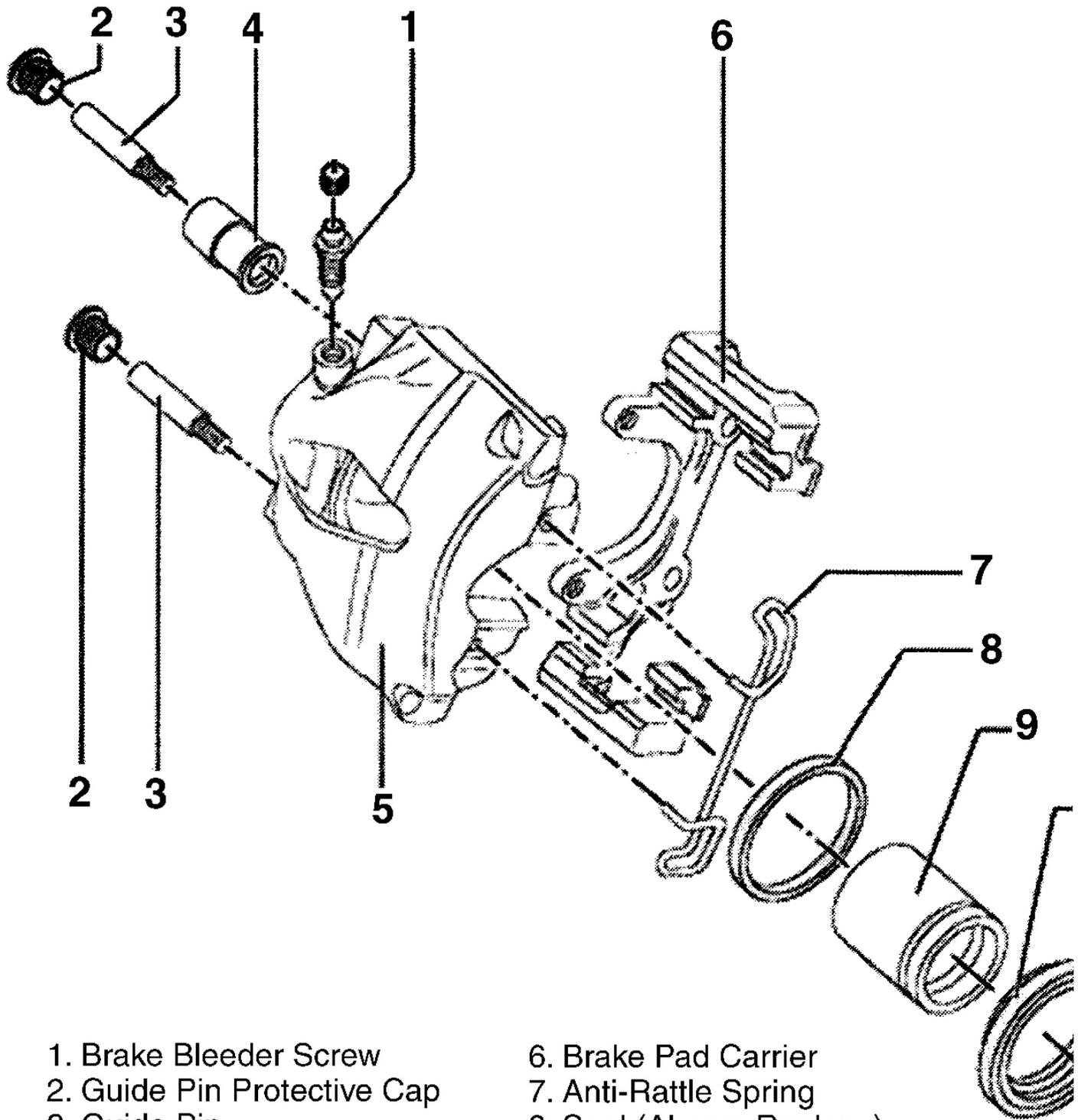
Remove brake caliper. See **FRONT & REAR BRAKE CALIPER** under REMOVAL & INSTALLATION. Remove caliper from vehicle. Remove pads, and clean exterior surfaces. Use air pressure to force piston from cylinder. Use a block of wood between piston and housing to prevent damage to piston. Remove dust seal. Remove piston seal without damaging bore or groove. Use following illustrations to aid in overhaul. See **Fig. 37 -Fig. 43** .



- |                             |                                 |
|-----------------------------|---------------------------------|
| 1. Brake Bleeder Screw      | 5. Brake Caliper (FS III)       |
| 2. Guide Pin Protective Cap | 6. Piston Seal (Always Replace) |
| 3. Guide Pin                | 7. Caliper Piston               |
| 4. Guide Pin Seal           | 8. Seal (Always Replace)        |

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**Fig. 37: Exploded View Of FS III Caliper (Front Axle)**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

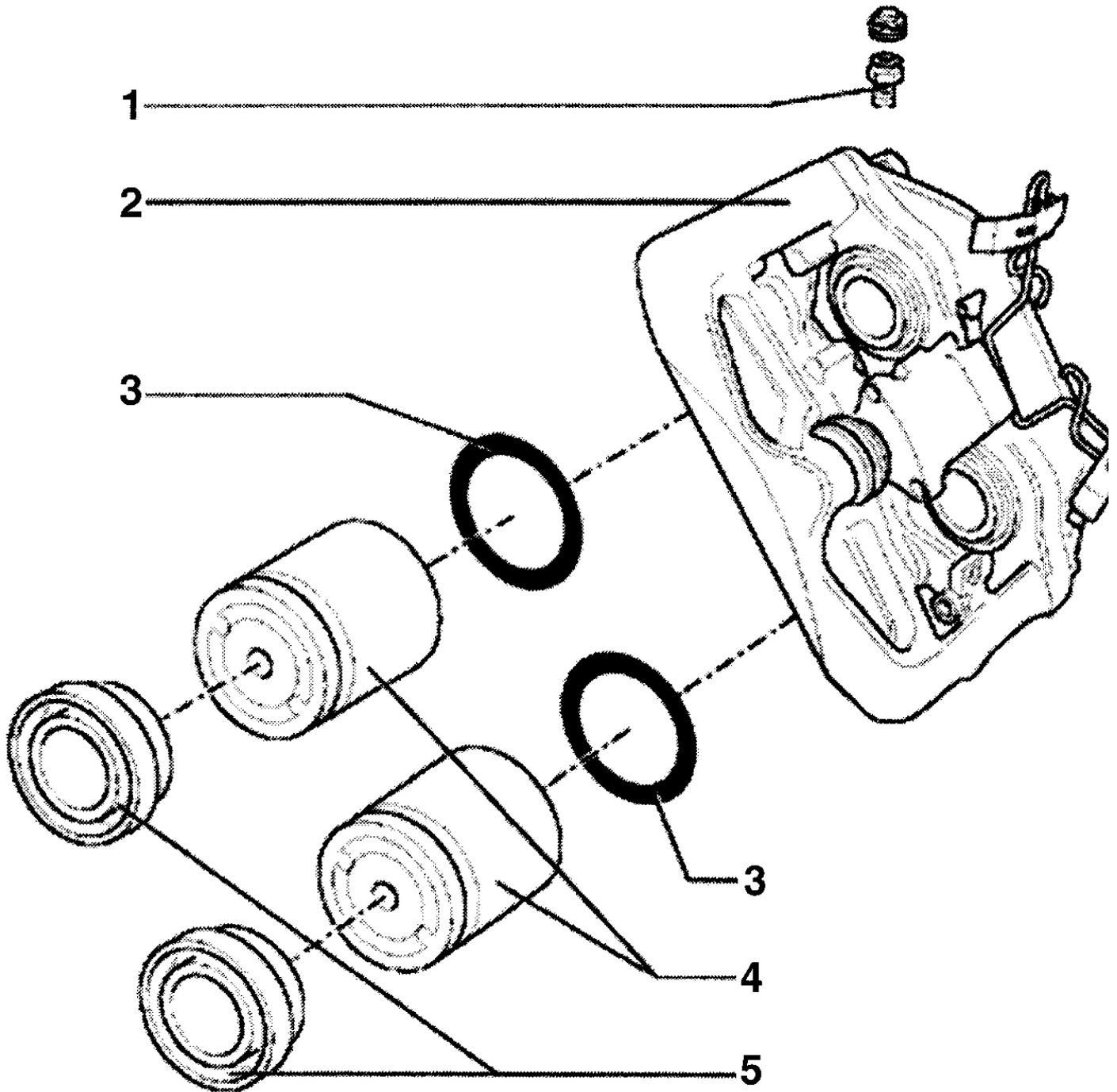


1. Brake Bleeder Screw
2. Guide Pin Protective Cap
3. Guide Pin
4. Guide Pin Seal
5. Brake Caliper (FN3)

6. Brake Pad Carrier
7. Anti-Rattle Spring
8. Seal (Always Replace)
9. Caliper Piston
10. Piston Seal (Always Replace)

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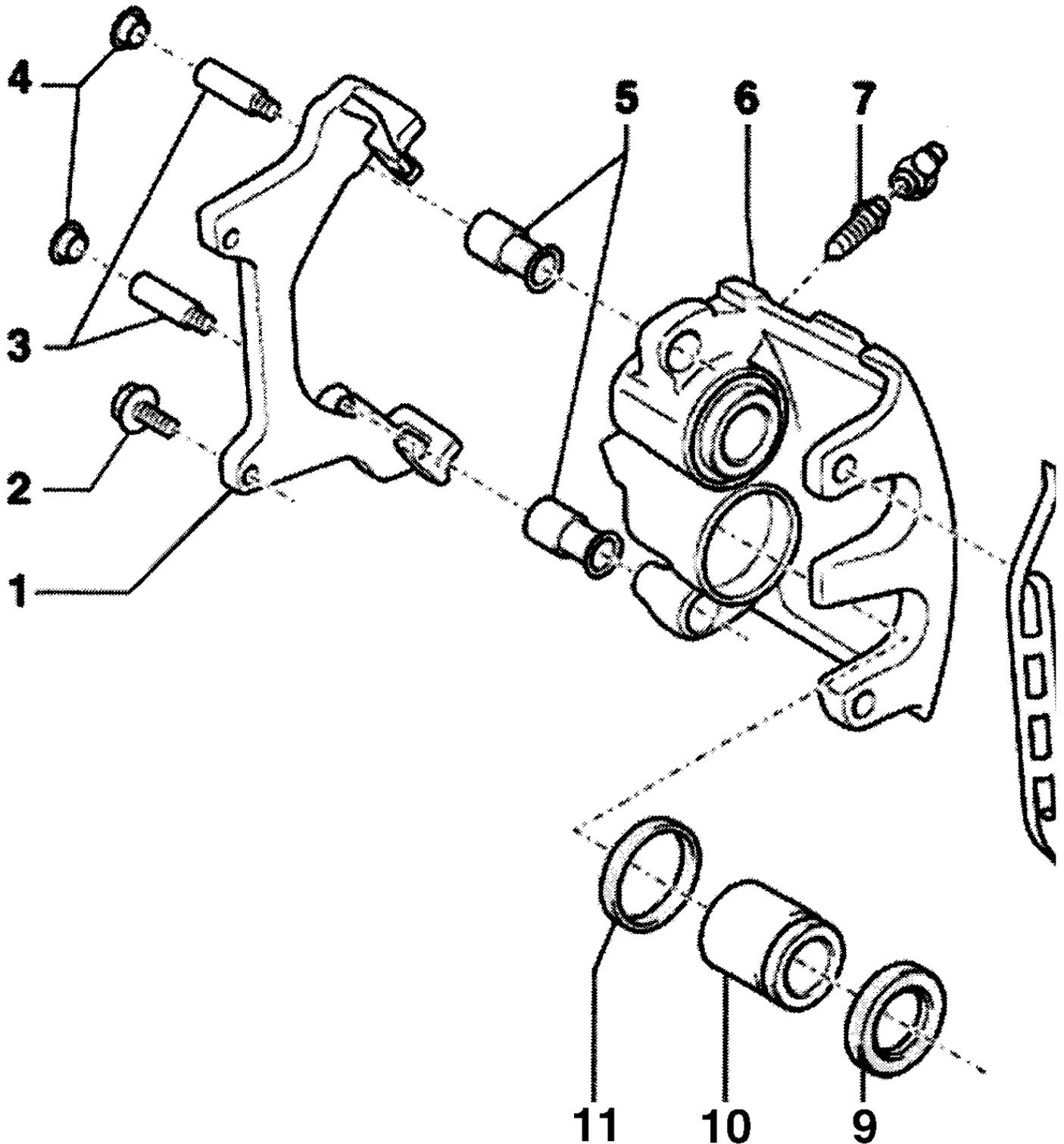
**Fig. 38: Exploded View OF FN3 Caliper (Front Axle)**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.



- 1. Brake Bleeder Screw
- 2. Brake Caliper (HP2)
- 3. Seal (Always Replace)
- 4. Caliper Piston
- 5. Piston Seal (Always Replace)

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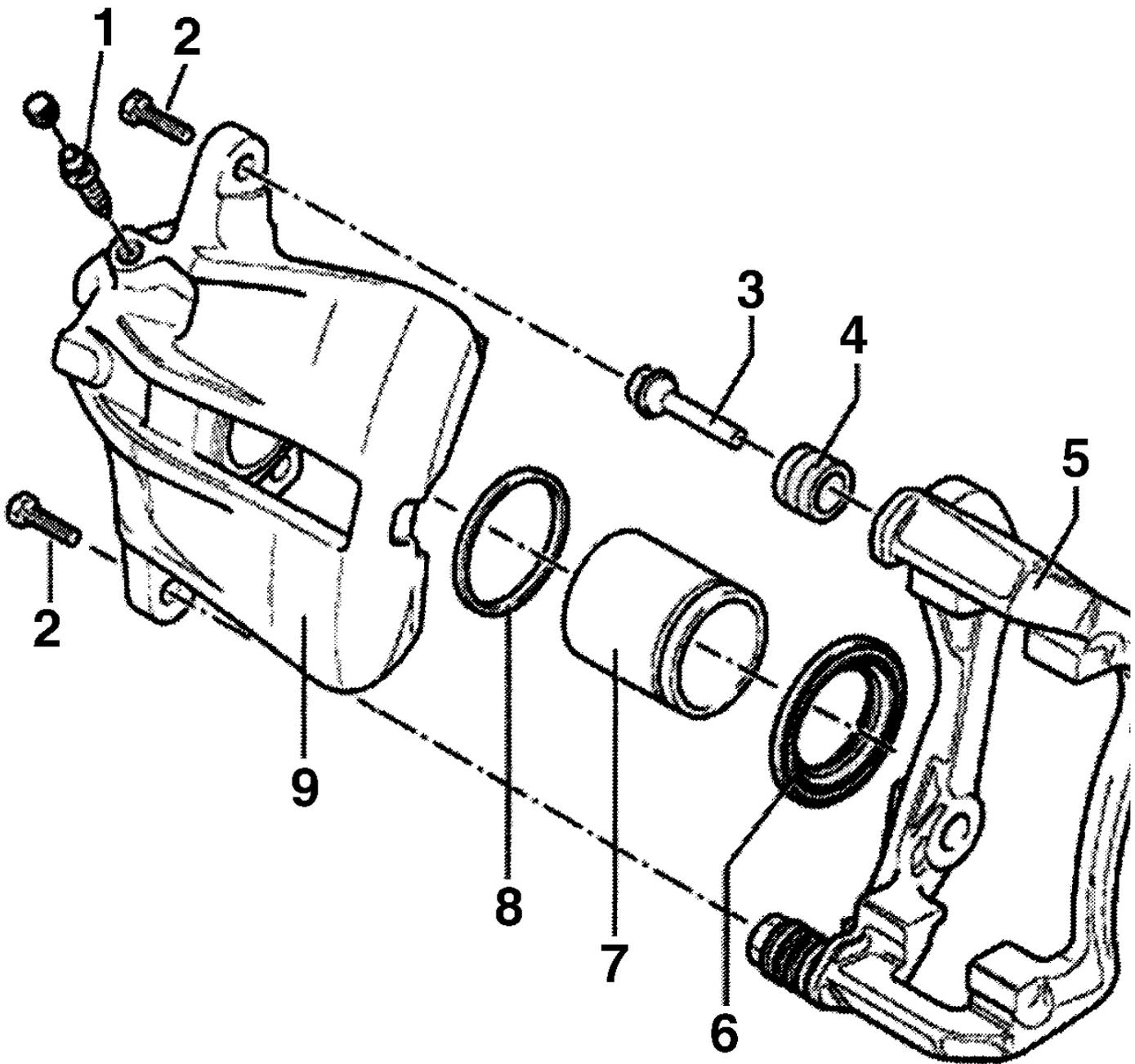
**Fig. 39: Exploded View Of HP2 Caliper (Front Axle)**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.



- |   |                               |
|---|-------------------------------|
| 1. Brake Pad Carrier                      | 7. Brake Bleeder Screw        |
| 2. Caliper-To-Wheel Bearing Housing Bolts | 8. Anti-Rattle Spring         |
| 3. Guide Pin                              | 9. Piston Seal (Always Replac |
| 4. Guide Pin Protective Cap               | 10. Caliper Piston            |
| 5. Guide Pin Seal                         | 11. Seal (Always Replace)     |
| 6. Brake Caliper (2FN)                    |                               |

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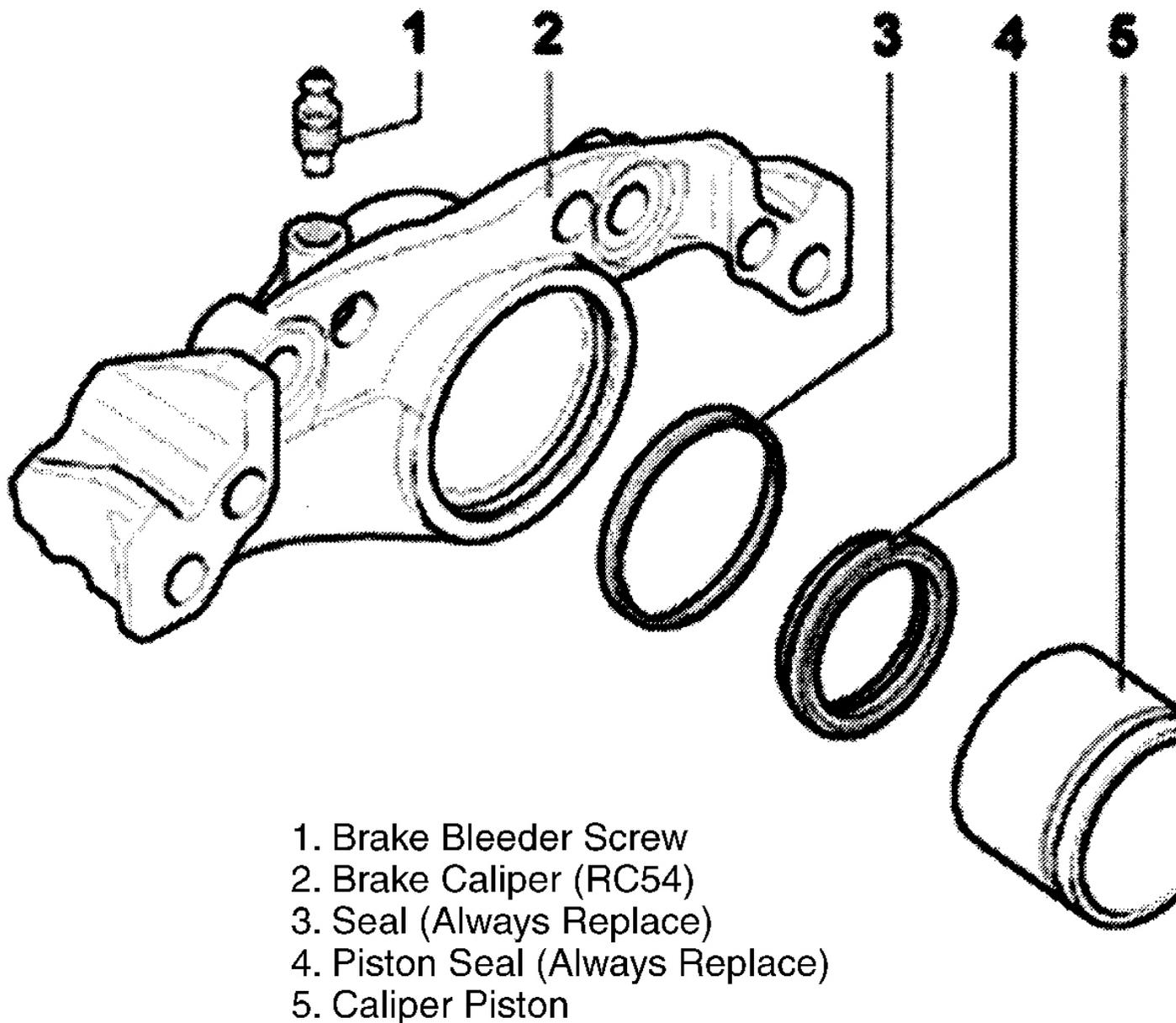
**Fig. 40: Exploded View Of 2FN Caliper (Front Axle)**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.



1. Brake Bleeder Screw
2. Caliper-To-Guide Pin Bolts (Always Replace)
3. Guide Pin
4. Guide Pin Seal
5. Brake Pad Carrier
6. Piston Seal (Always Replace)
7. Caliper Piston
8. Seal (Always Replace)
9. Brake Caliper (C54)

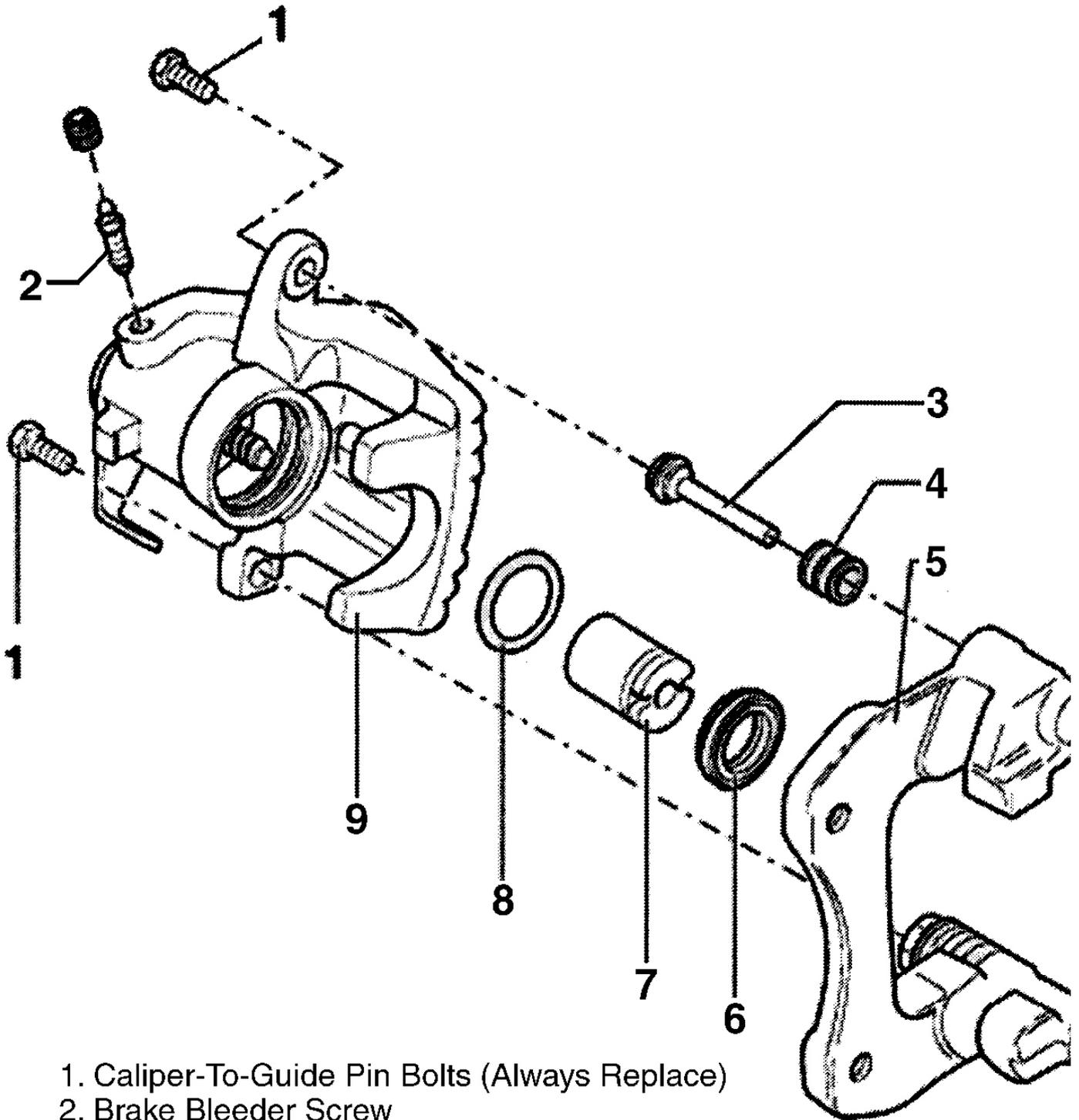
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**Fig. 41: Exploded View Of C54 Caliper (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.



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**Fig. 42: Exploded View Of RC54 Calliper (Front Axle)**  
Courtesy of VOLKSWAGEN UNITED STATES, INC.



1. Caliper-To-Guide Pin Bolts (Always Replace)
2. Brake Bleeder Screw
3. Guide Pin
4. Guide Pin Seal
5. Brake Pad Carrier
6. Piston Seal (Always Replace)
7. Caliper Piston
8. Seal (Always Replace)
9. Self-Adjusting Rear Brake Caliper

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**Fig. 43: Exploded View Of Self-Adjusting Rear Brake Caliper**  
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

**Cleaning & Inspection**

Use alcohol or brake cleaning fluid to clean hydraulic chambers. Check cylinder bore and piston for corrosion and damage. Replace defective parts as necessary.

**Reassembly**

1. Use all parts supplied in repair kit. Coat piston, cylinder bore and NEW seal with clean brake fluid. Fit piston seal into cylinder. Slide dust seal onto piston. Slowly insert piston into bore.
2. Seat inner lip of dust seal in groove on cylinder housing. Open bleed screw and push piston into bore as far as possible. Fit outer lip of dust seal into piston groove.

**MASTER CYLINDER**

**NOTE:** Manufacturer does not recommend overhaul of master cylinder.

**TORQUE SPECIFICATIONS**

**TORQUE SPECIFICATIONS**

Application	Ft. Lbs. (N.m)
<b>Front</b>	
Beetle, Golf, GTI & Jetta	
Banjo Bolt <sup>(1)</sup>	
FS III (280mm Disc)	26 (35)
FN 3 (288mm Disc)	11 (15)
Caliper Guide Pins	21 (28)
Caliper-to-Steering Knuckle Bolts	92 (125)
<b>Cabrio</b>	
Caliper Guide Pin Bolts <sup>(2)</sup>	26 (35)
Caliper-to-Steering Knuckle Bolts	92 (125)
<b>EuroVan</b>	
Caliper Guide Pins	18 (25)
FN 3 With 15 In. Wheels (280mm Disc)	
Caliper-to-Steering Knuckle Bolts	207 (280)
FN 3 With 16 In. Wheels (300mm Disc)	
Caliper-to-Steering Knuckle Bolts	207 (280)
FNR With 16 In. Wheels (313mm Disc)	
Caliper-to-Steering Knuckle Bolts	262 (355)
<b>Passat</b>	
Brake Line	11 (15)
Caliper Guide Pins	18 (25)
FN 3 With 15 & 16 In. Wheels (1.8 L Turbo & 2.8L V6)	
Caliper-to-Steering Knuckle Bolts	89 (120)

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### DISC

HP 2 & 2 FN With 16 & 17 In. Wheels (4.0L W8)	
Caliper-to-Steering Knuckle Bolts	140 (190)
<b>Rear</b>	
Beetle, Golf, GTI & Jetta	
Banjo Bolt <sup>(1)</sup>	29 (39)
Caliper Guide Pin Bolts <sup>(2)</sup>	26 (35)
Caliper-to-Spindle Bolts	48 (65)
Cabrio	
Caliper Guide Pin Bolts <sup>(2)</sup>	26 (35)
Caliper-to-Spindle Bolts	41 (56)
EuroVan	
Caliper Guide Pin Bolts <sup>(2)</sup>	26 (35)
Caliper-to-Control Arm Bolts	126 (170)
Passat	
Banjo Bolt With Aluminum Sealing Washer (Silver) <sup>(1)</sup>	33 (45)
Banjo Bolt With Titanium Washer (Black) <sup>(1)</sup>	28 (38)
Caliper Guide Pin Bolts <sup>(2)</sup>	26 (35)
Caliper-to-Control Arm Bolts	70 (95)
Pressure Switch	18 (25)
<b>Wheel Lug Bolt</b>	
Beetle, Cabrio, Golf, GTI, Jetta & Passat	89 (120)
EuroVan	126 (170)
(1) For brake line-to-caliper.	
(2) Always replace all self-locking bolts.	

## DISC BRAKE SPECIFICATIONS

### DISC BRAKE SPECIFICATIONS <sup>(1)</sup>

Application	In. (mm)
<b>Front</b>	
Beetle, Golf, GTI & Jetta	
FS III Brake Disc	
Disc Diameter	11.023 (280)
Original Thickness	.866 (22)
Wear Limit	.748 (19)
FN 3 Brake Disc	
Disc Diameter	11.338 (288)
Original Thickness	.984 (25)
Wear Limit	.866 (22)
Brake Pads	
Original Thickness	.551 (14)

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### DISC

Wear Limit (With Pad Backing Plate)	.276 (7)
<b>Cabrio</b>	
<b>Brake Disc</b>	
Disc Diameter	10.078 (256)
Original Thickness	.787 (20)
Wear Limit	.709 (18)
<b>Brake Pads</b>	
Original Thickness	.551 (14)
Wear Limit (With Pad Backing Plate)	.276 (7)
<b>EuroVan</b>	
<b>FN 3 Brake Disc With 15 In. Wheels</b>	
Disc Diameter	11.023 (280)
Original Thickness	.944 (24)
Wear Limit	.787 (20)
<b>FN 3 Brake Disc With 16 In. Wheels</b>	
Disc Diameter	11.811 (300)
Original Thickness	1.023 (26)
Wear Limit	.866 (22)
<b>FN 3 Brake Pads</b>	
Original Thickness	.531 (13.5)
Wear Limit (With Pad Backing Plate)	.315 (8)
<b>FNR Brake Disc With 16 In. Wheels</b>	
Disc Diameter	12.322 (313)
Original Thickness	1.023 (26)
Wear Limit	.866 (22)
<b>FNR Brake Pads</b>	
Original Thickness	.551 (14)
Wear Limit (With Pad Backing Plate)	.276 (7)
<b>Passat</b>	
<b>FN 3 Brake Disc With 15 In. Wheels (1.8L Turbo)</b>	
Disc Diameter	11.338 (288)
Original Thickness	.984 (25)
Wear Limit	.905 (23)
<b>FN 3 Brake Disc With 16 In. Wheels (2.8L V6)</b>	
Disc Diameter	12.283 (312)
Original Thickness	.984 (25)
Wear Limit	.905 (23)
<b>HP 2 Brake Disc With 16 In. Wheels (4.0L W8)</b>	
Disc Diameter	12.637 (321)
Original Thickness	1.181 (30)
Wear Limit	1.102 (28)
<b>2 FN Brake Disc With 17 In. Wheels (4.0L W8)</b>	

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### DISC

Disc Diameter	13.149 (334)
Original Thickness	1.260 (32)
Wear Limit	1.181 (30)
<b>Brake Pads</b>	
Original Thickness	.551 (14)
Wear Limit (With Pad Backing Plate)	.276 (7)
<b>Rear</b>	
Beetle, Golf, GTI & Jetta	
<b>Brake Disc</b>	
Disc Diameter	9.133 (232)
Original Thickness	.354 (9)
Wear Limit	.276 (7)
<b>Brake Pads</b>	
Original Thickness	.472 (12)
Wear Limit (With Pad Backing Plate)	.276 (7)
<b>Cabrio</b>	
Disc Diameter	8.897 (226)
Original Thickness	.393 (10)
Wear Limit	.315 (8)
Disc Diameter	12.637 (321)
Original Thickness	1.181 (30)
Wear Limit	1.102 (28)
<b>Brake Pads</b>	
Original Thickness	.472 (12)
Wear Limit (With Pad Backing Plate)	.276 (7)
<b>EuroVan</b>	
<b>Brake Disc With 15 In. Wheels</b>	
Disc Diameter	11.023 (280)
Original Thickness	.472 (12)
Wear Limit	.393 (10)
<b>Brake Pads With 15 In. Wheels</b>	
Original Thickness	.453 (11.5)
Wear Limit	.079 (2)
<b>Brake Disc With 16 In. Wheels</b>	
Disc Diameter	(2)
Original Thickness	.531 (13.5)
Wear Limit	.453 (11.5)
<b>Brake Pads With 16 In. Wheels</b>	
Original Thickness	.531 (13.5)
Wear Limit (With Pad Backing Plate)	.335 (8.5)
<b>Passat</b>	
<b>Brake Disc With 15 &amp; 16 In. Wheels (Front Wheel Drive)</b>	

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DISC

Disc Diameter	9.645 (245)
Original Thickness	.393 (10)
Wear Limit	.314 (8)
<b>Brake Disc With 15 In. Wheels (All Wheel Drive)</b>	
Disc Diameter	10.039 (255)
Original Thickness	.393 (10)
Wear Limit	.314 (8)
<b>Brake Disc With 16 In. Wheels (2.8L V6 All Wheel Drive)</b>	
Disc Diameter	10.078 (256)
Original Thickness	.866 (22)
Wear Limit	.787 (20)
<b>Brake Disc With 16 &amp; 17 In. Wheels (4.0L W8)</b>	
Disc Diameter	13.149 (269)
Original Thickness	.866 (22)
Wear Limit	.787 (20)
<b>Brake Pads</b>	
Original Thickness	.472 (12)
Wear Limit (With Pad Backing Plate)	.276 (7)

(1) Maximum lateral runout is .003" (.08 mm).

(2) Information is not available from manufacturer.

**WIRING DIAGRAMS**

**NOTE:** See **ANTI-LOCK BRAKES** in appropriate **SYSTEM WIRING DIAGRAMS - VOLKSWAGEN** article.