SERVICE MANUAL SECTION

DIAMONDLIFE™ (BOSCH PIN SLIDE) DISC BRAKES For Vehicles Built After June 2, 2002

Unit Code: 04JNA

Unit Code: 04JNB

Unit Code: 04NNB

Unit Code: 04NNC

S04047

3/21/2003

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1. DESCRIPTION

Hydraulic pin slide disc brakes are two-piston sliding caliper brakes and are used at both front and rear wheels (Figure 1 and Figure 2) (See Figure 2, page 2). The pin slide caliper disc brake is made up of four major components: caliper, anchor plate, rotor and disc brake pads.

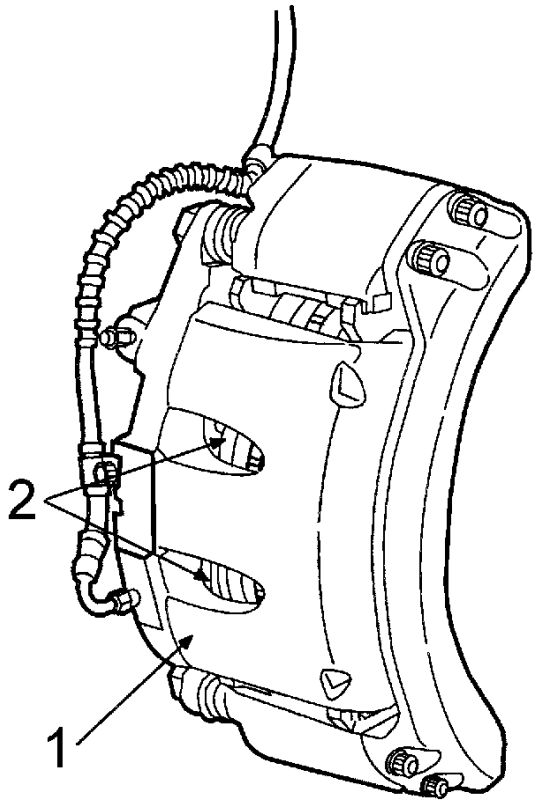


Figure 1 Hydraulic Pin Slide Disc Brake — Driver Side Front (73 mm)

1. CALIPER
2. HYDRAULIC PISTON

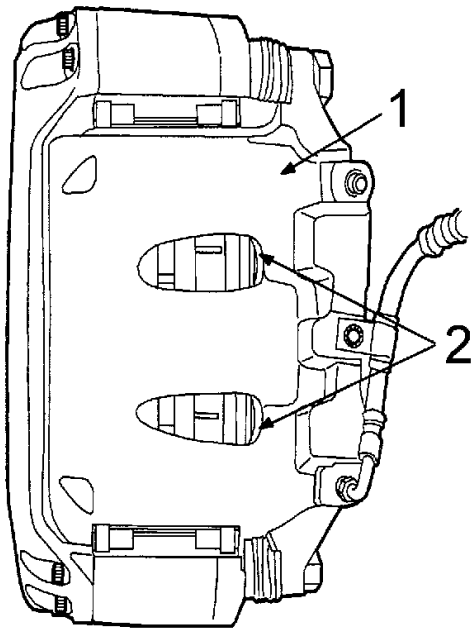


Figure 2 Hydraulic Pin Slide Disc Brake — Driver Side Rear (73 mm)

1. CALIPER
2. HYDRAULIC PISTON

1.1. DISC BRAKE PADS

There are three types of lining materials available for the hydraulic pin slide brake system. HX–7A1–EE brake pads and SOFTER lining brake pads identified by lining code 7610 with smooth backing plates for heavy duty braking applications, and HX–402–EE brake pads for light duty braking applications.

- The HX–7A1–EE lining material of inboard disc brake pad (Item 1, Figure 3) (See Figure 3, page 3) and outboard disc brake pad (Item 2, Figure 3) (See Figure 3, page 3) are chamfered and are marked with an “ARROW” and the word “FORWARD” for proper installation. Brake pads are NOT interchangeable from inboard to outboard side on the same wheel.

  The HX–7A1–EE lining material was developed to meet heavy duty conditions and as a result, some lining life trade off may occur if used for light duty applications.
- The optional HX–402–EE lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.

  The HX–402–EE lining material was developed to improve lining life for certain light duty applications. Since HX–402–EE is targeted only for light duty use, it is important that following the recommendations for it’s application be adhered to, otherwise unacceptable lining life may result.
- The optional SOFTER lining brake pad material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3), identified by lining code 7610 with smooth backing plates, are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel. This brake pad lining is for heavy duty braking applications and is soft to cut down on rotor wear.

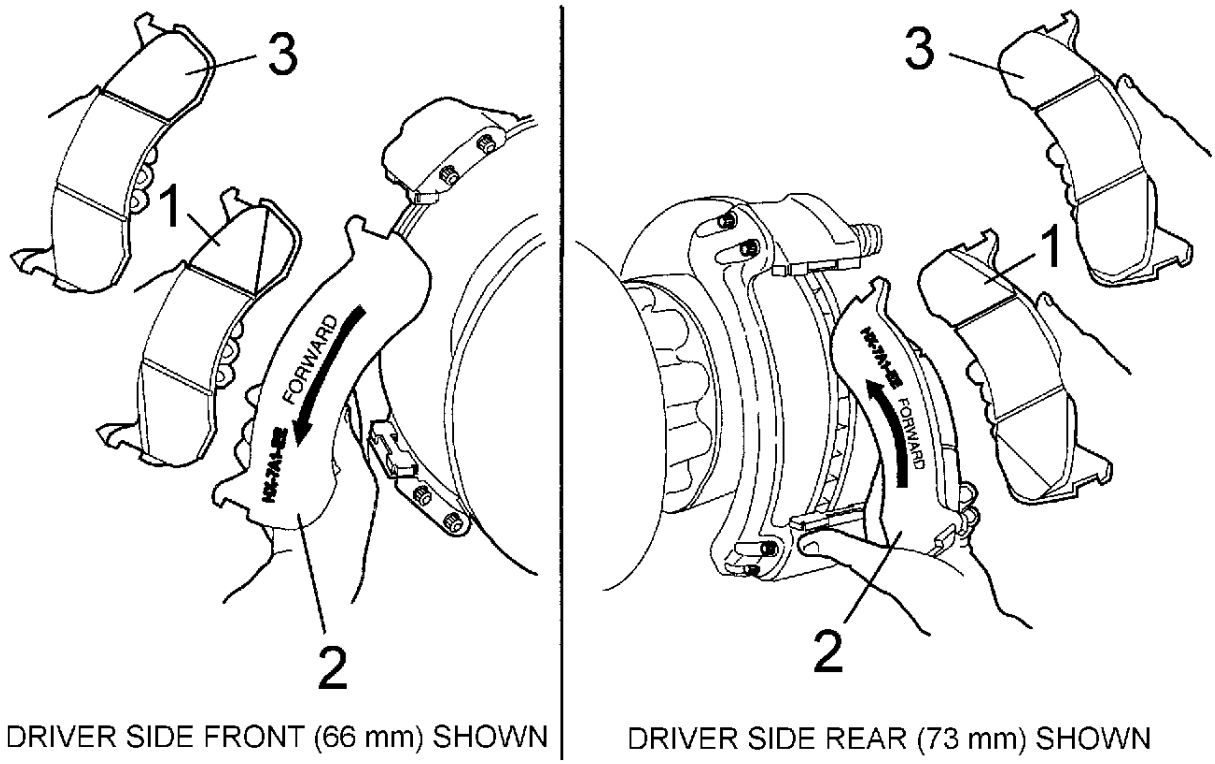


Figure 3 Disc Brake Pads — Inboard and Outboard

1. HX–7A1–EE INBOARD DISC BRAKE PAD (CHAMFERED LINING)
2. HX–7A1–EE OUTBOARD DISC BRAKE PAD (CHAMFERED LINING)
3. HX–402–EE INBOARD OR OUTBOARD DISC BRAKE PAD (NOT CHAMFERED) AND SOFTER DISC BRAKE PAD WITH LINING CODE 7610 AND SMOOTH BACKING PLATE (NOT CHAMFERED)

1.2. CALIPER

Refer to Figure 4 (See Figure 4, page 4) for Items in parentheses.

The caliper (Item 1) is a single piece casting which contains an internal fluid passageway between the two hydraulic piston bores (Item 2). The piston bores contain the two pistons, piston boots (Items 3 and 4) and piston seals which are not visible.

There are two different sizes of the pin slide disc brake assemblies: 66 mm and 73 mm. These calipers can be used in the following combinations based on specific vehicle applications:

- 66 mm front and rear
- 66 mm front and 73 mm rear
- 73 mm front and rear

The specific caliper combinations depends on the load rating for the vehicle.

IMPORTANT – NEVER change the caliper size in the field from what was original equipment on the vehicle.

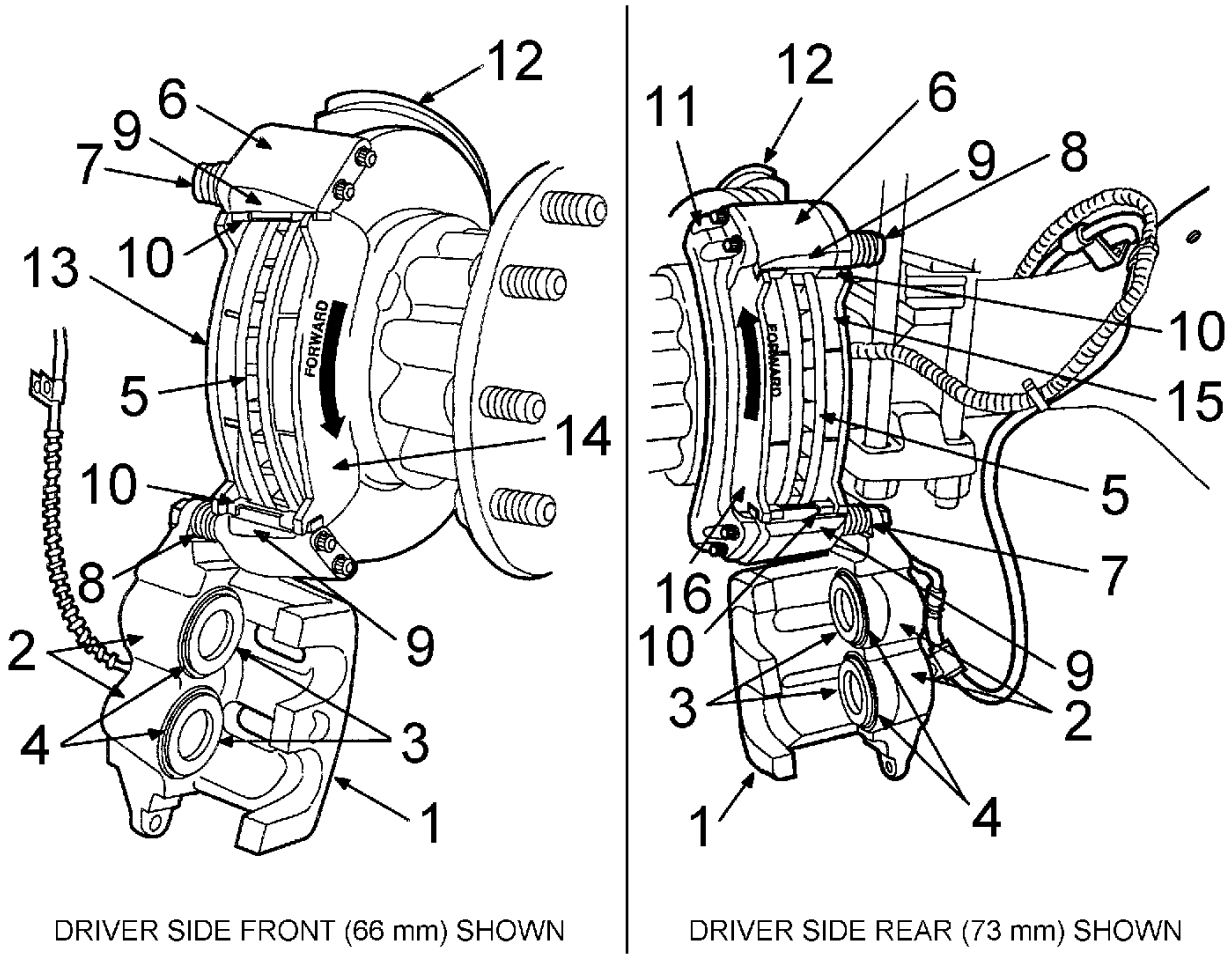


Figure 4 Caliper, Rotor, and Anchor Plate And Splash Shield

1. CALIPER
2. HYDRAULIC PISTON BORE
3. PISTON
4. PISTON BOOT
5. ROTOR
6. ANCHOR PLATE
7. LEADING GUIDE PIN AND RUBBER BOOT
8. TRAILING GUIDE PIN AND RUBBER BOOT
9. ANCHOR PLATE PAD ABUTMENT
10. ANCHOR PLATE PAD ABUTMENT SLIPPER
11. TIE BAR
12. SPLASH SHIELD
13. FRONT INBOARD BRAKE PAD
14. FRONT OUTBOARD BRAKE PAD
15. REAR INBOARD BRAKE PAD
16. REAR OUTBOARD BRAKE PAD

1.3. ROTOR

The cast rotor has cooling fins cast between the machined braking surfaces of the rotor (Item 5, Figure 4) (See Figure 4, page 4).

1.4. ANCHOR PLATE AND SPLASH SHIELD

Refer to Figure 4 for Items in parentheses.

The anchor plate (Item 6) includes lubricated floating leading guide pin and rubber boot (Item 7) and trailing guide pin and rubber boot (Item 8) and anchor plate pad abutments (Item 9) are protected by stainless steel slippers (Item 10). A tie bar (Item 11) is used on 73 mm pin slide disc brake only. A splash shield (Item 12) helps protect the brake assembly from road contamination.

2. OPERATION

The caliper attaches to and slides on sealed and lubricated leading and trailing guide pins located within an anchor plate, hence the terminology “sliding” or “floating” caliper. The anchor plate is mounted on the steering knuckle flange on front axles and on the axle flange at rear axles.

The pin slide caliper disc brake has two disc brake pads. One pad is mounted on each side of the rotor and grips the rotor when hydraulic pressure is applied to the two hydraulic pistons.

NOTE – It is not uncommon for disc brakes to have a slight drag. The amount of drag will depend upon the type of brake application made before the inspection is made.

Chassis equipped with these pin slide disc brakes will have a split hydraulic system without ABS brake system (Figure 5) and with ABS brake system (Figure 6) (See Figure 6, page 7).

The brake power assist is a Hydro-Max Booster system. Refer to GROUP 04 — BRAKES in the Master Service Manual for complete details covering this booster system.

The split hydraulic system has a dual chamber master cylinder. The master cylinder assembly also includes an integral pressure differential valve and brake warning light switch which senses a pressure loss in either of the hydraulic systems should a failure occur. Refer to GROUP 04 — BRAKES in the Master Service Manual for information pertaining to the pressure differential valve and brake warning light switch in the Hydro-Max Booster system.

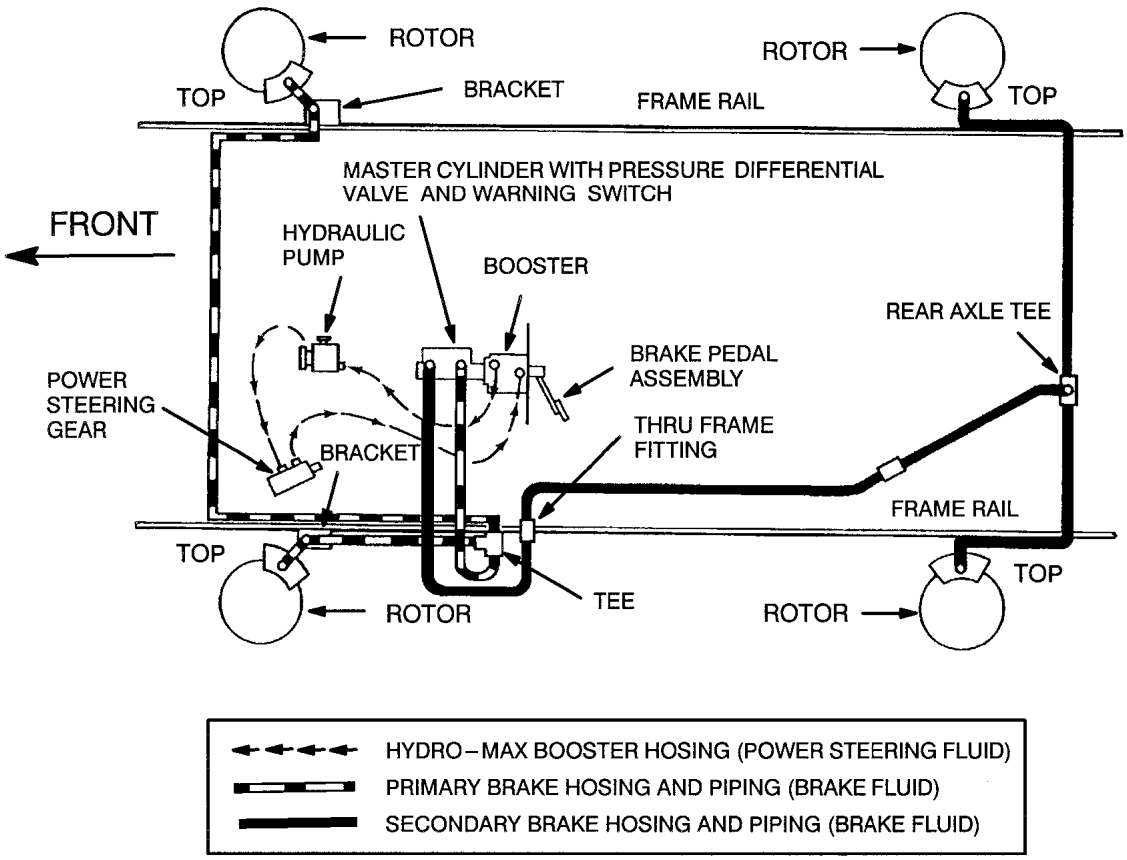


Figure 5 Hydraulic System Without ABS Brake System

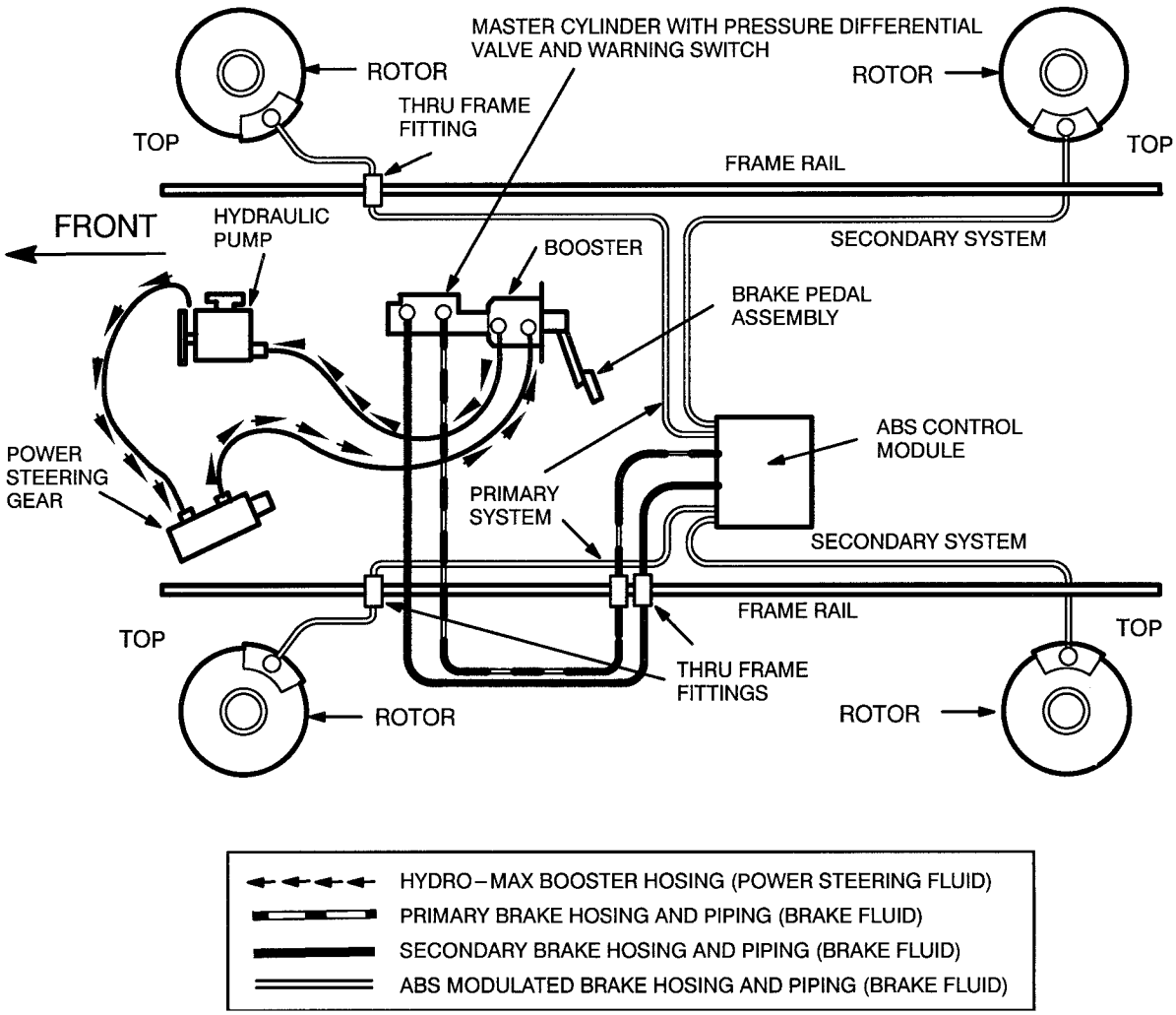


Figure 6 Hydraulic System With ABS Brake System

2.1. DISC BRAKE PADS

Refer to Figure 4 (See Figure 4, page 4) for Items in parentheses unless otherwise noted.

The inboard and outboard disc brake pads (Items 13 thru 16) are positioned with both ends mounted on stainless steel slippers (Item 10) covering the anchor plate pad abutments (Item 9). The HX–7A1–EE lining material of inboard disc brake pad (Item 1, Figure 3) (See Figure 3, page 3) and outboard disc brake pad (Item 2, Figure 3) (See Figure 3, page 3) are chamfered and are marked with an “ARROW” and the word “FORWARD” for proper installation. Brake pads are NOT interchangeable from inboard to outboard side on the same wheel. The optional HX–402–EE lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel. The optional SOFTER lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.

2.2. CALIPER

Refer to Figure 4 (See Figure 4, page 4) for Items in parentheses.

The caliper pistons (Item 3) push against the inboard disc brake pad (Items 13 and 15) which forces the lining of both inboard and outboard disc brake pads (Items 13 thru 16) against the rotor (Item 5) during brake pedal application.

2.3. ROTOR

Refer to Figure 7 for Items in parentheses.

The rotor (Item 1) is bolted to the wheel hub assembly (Item 2) in the same manner as brake drums. Cooling fins (Item 3) cast between the machined braking surfaces of the rotor allow air to flow between the rotor braking surfaces while the wheel turns.

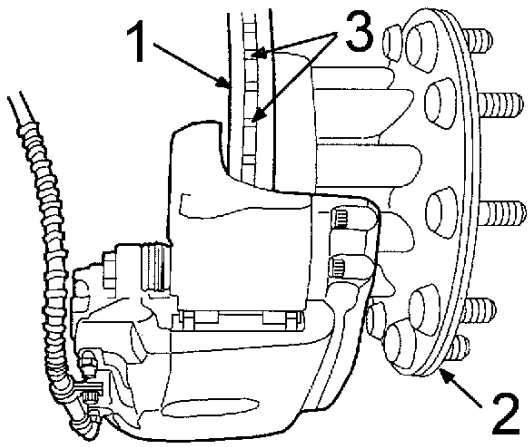


Figure 7 Rotor and Wheel Hub Assembly

DRIVER SIDE FRONT (73 mm SHOWN)
1. ROTOR
2. WHEEL HUB ASSEMBLY
3. COOLING FINS

2.4. ANCHOR PLATE AND SPLASH SHIELD

Refer to Figure 8 (See Figure 8, page 9) for Items in parentheses.

The caliper (Item 1) is positioned on the anchor plate (Item 2) and mounted to the leading and trailing floating guide pins (Items 3 and 4) located at each end of the anchor plate. Caliper hex mounting bolts (Item 5) attach the caliper to each guide pin. A tie bar (Item 6) is used for added support on 73 mm pin slide disc brakes only.

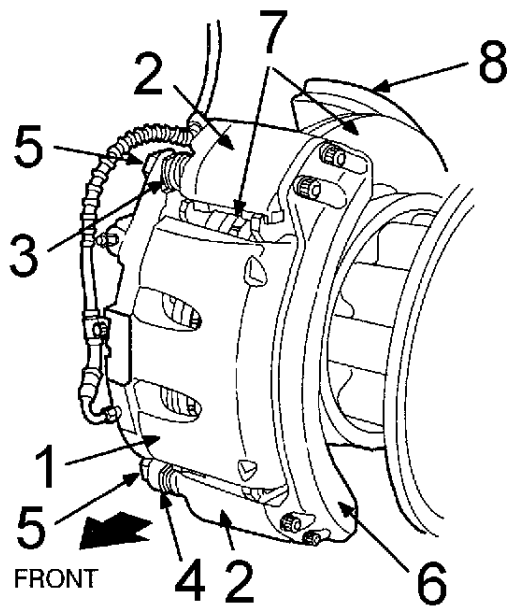


Figure 8 Anchor Plate and Splash Shield

DRIVER SIDE FRONT (73 mm SHOWN)
1. CALIPER
2. ANCHOR PLATE
3. LEADING GUIDE PIN (FLOATING)
4. TRAILING GUIDE PIN (FLOATING)
5. HEX BOLT (CALIPER MOUNTING)
6. TIE BAR
7. ROTOR
8. SPLASH SHIELD

Refer to Figure 9 (See Figure 9, page 10) for Items in parentheses unless otherwise noted.

The rotors (Item 7, Figure 8) (See Figure 8, page 9) on both front and rear brake groups are protected on the inboard side by a splash shield (Item 8, Figure 8) (See Figure 8, page 9). The splash shield (Item 1) is attached to the anchor plate (Item 2) with three 12–point head bolts (Item 3). Refer to Figure 9 (See Figure 9, page 10) for proper splash shield mounting on anchor plate for 66 mm and 73 mm brakes.

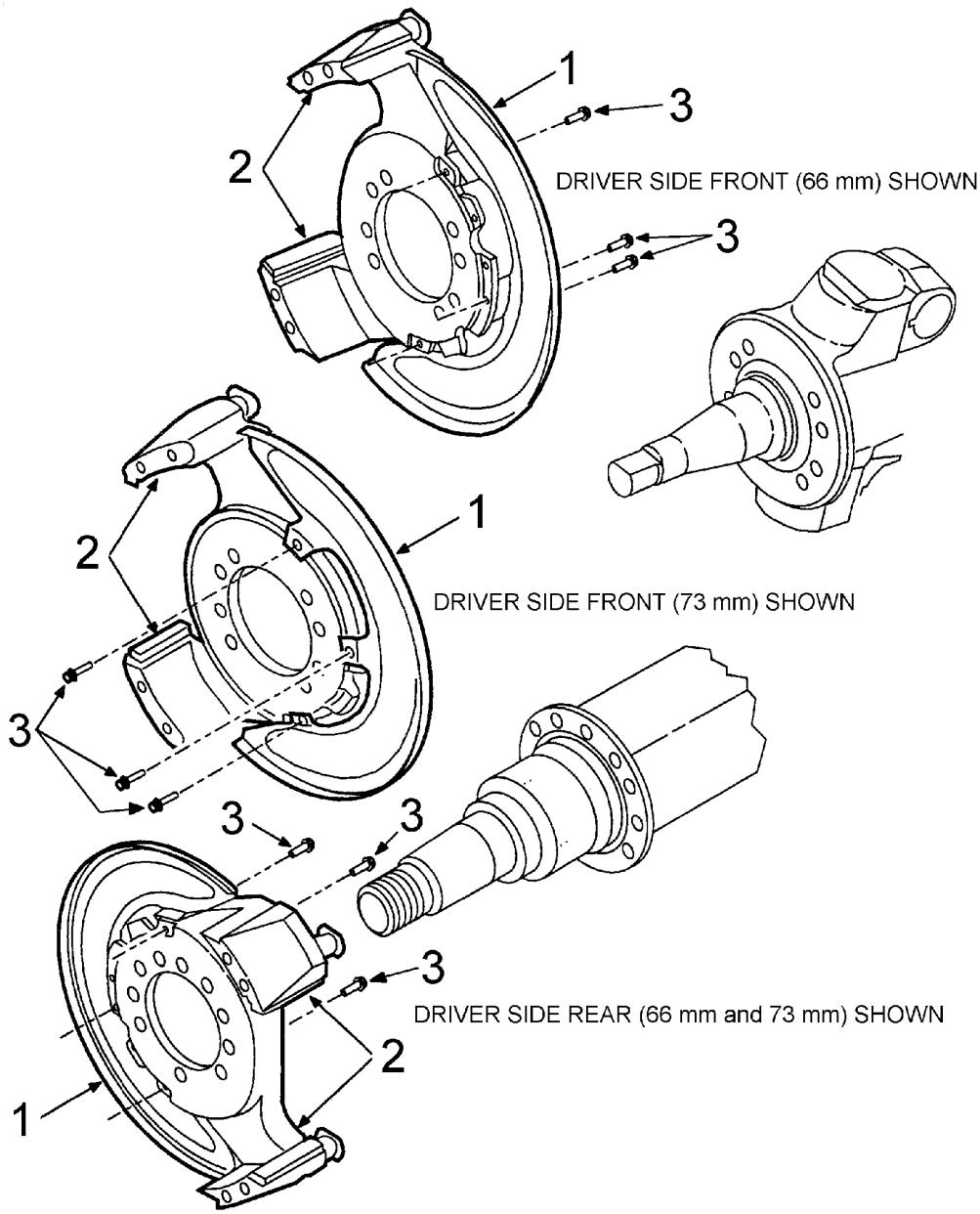


Figure 9 Splash Shield Mounting to Anchor Plate

1. SPLASH SHIELD
2. ANCHOR PLATE
3. 12–POINT HEAD BOLT

3. MAINTENANCE

3.1. GENERAL

WARNING – Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

WARNING – To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, emulsion-type cleaners and petroleum-based cleaners. To avoid serious personal injury when you use solvent cleaners, you must carefully follow the manufacturer's product instructions and these procedures:

- **Wear safe eye protection.**
- **Wear clothing that protects your skin.**
- **Work in a well-ventilated area.**
- **Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.**
- **You must use hot solution tanks or alkaline solutions correctly. Follow the manufacturer's instructions carefully.**

WARNING – Hydraulic brake fluid is a caustic substance. Contact with hydraulic brake fluid can cause skin irritation. Do not let hydraulic brake fluid touch any painted surfaces, as it will remove the paint. Hydraulic brake fluid may also damage certain non-metal surfaces. Do not let fluid get on brake pads, shoes, rotors or disks.

It is difficult to determine an exact maintenance schedule (time or mileage) since vehicles will be used in wide varieties of operational applications and conditions.

Vehicles operating under severe conditions, such as frequent stop and go driving, mountainous terrain or loaded more than 50% of payload, will require more service maintenance checks than a vehicle which is used over the road. Therefore, a regular schedule for periodic inspection should be established based on past experience and type of operation.

Disc brakes do not require adjustment since the clearance is maintained by the movement of the caliper pistons.

Be sure to keep in mind that the Hydro-Max Booster system consists of two completely separate hydraulic systems operating on two different incompatible fluids; power steering fluid and hydraulic brake fluid. Refer to GROUP 04 — BRAKES and GROUP 05 — STEERING in the Master Service Manual for complete details covering the Hydro-Max Booster system and Power Steering.

Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper fluids and grease.

3.2. WHEEL BEARING ADJUSTMENT

It is important to the operation of disc brakes that the wheel bearing adjustment be maintained to limit excessive lateral runout of the disc brake rotors.

Refer to ADJUSTMENTS (See ADJUSTMENTS, page 93) for wheel bearing adjustments.

3.3. DISC BRAKE PADS

There are three types of lining materials available for the hydraulic pin slide brake system. HX-7A1–EE brake pads and softer lining brake pads identified by lining code 7610 with smooth backing plates for heavy duty braking applications and HX–402–EE brake pads for light duty braking applications.

- The HX–7A1–EE lining material of inboard disc brake pad (Item 1, Figure 3) (See Figure 3, page 3) and outboard disc brake pad (Item 2, Figure 3) (See Figure 3, page 3) are chamfered and are marked with an “ARROW” and the word “FORWARD” for proper installation. Brake pads are NOT interchangeable from inboard to outboard side on the same wheel.
- The optional HX–402–EE lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.
- The optional SOFTER lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.

To inspect disc brake pads for wear, position vehicle on suitable floor stands and remove wheel (tire and rim) assemblies.

WARNING – A jack must never be used alone to support a vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with suitable floor stands.

Visually inspect the pad lining by checking each visible end and inspecting through openings of caliper. If lining thickness at the thinnest point appears to be 3/16 inch (4.76 mm) or less, the pads must be replaced (Figure 10). Refer to Disc Brake Pads, Remove (See DISC BRAKE PADS, page 15) and Disc Brake Pads, Install (See DISC BRAKE PADS, page 62).

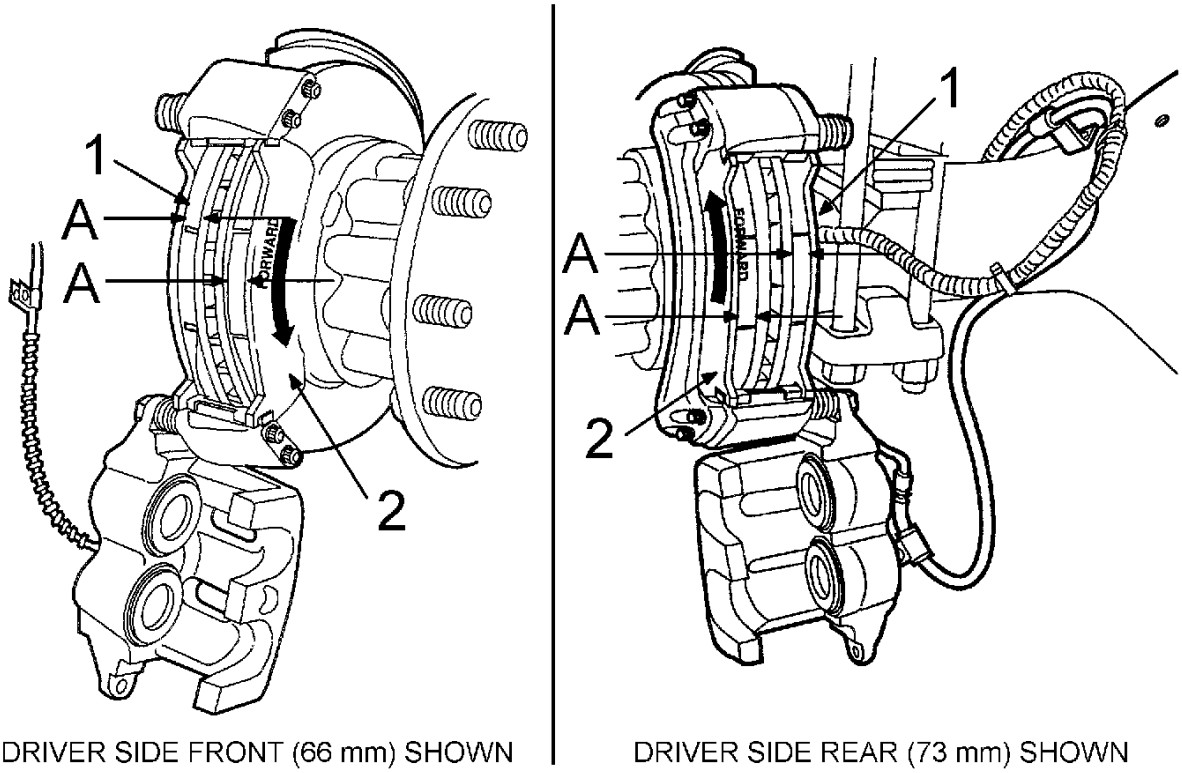


Figure 10 Visually Inspect Pad Lining

A. 3/16 INCH (4.76 mm) OR LESS
1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD

It is recommended that all disc brake pads be replaced at the same time since this will maintain balanced braking of the vehicle. If complete replacement is not desirable or necessary, be sure that all disc brake pads on one axle (both sides) are replaced at the same time.

NOTE – When replacing disc brake pads, be sure to use the same lining material type on both axles. Mixing lining types can result in unbalanced braking and pad wear.

Disc brake pads should not be replaced only because of visual erosion or pitting. This is a normal characteristic of semi-metallic pad lining material. Should erosion reduce the polished contact area to less then 80% of total surface area, replace pads.

Disc brake pads with lining material that shows excessive erosion at the edges or from the contact area with rotor (Figure 11) must be replaced.

Pads must be replaced if an examination of disc brake pads reveals excessive chipping, flaking or severe cracks and 80% or less contact area with rotor.

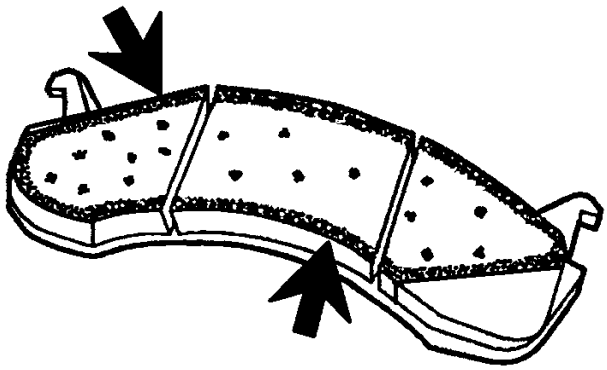


Figure 11 Unserviceable Brake Pad

Refer to Figure 12 which illustrates two progressive conditions of pad to rotor contact. The polished contact area is represented in the illustration by the white area on the pad surface.

The top view illustrates a new or like new pad with full contact with rotor. The bottom view shows a pad with 80% or less contact with rotor and must be replaced.

Disc brake pads must be replaced if contaminated by oil, grease or other foreign material which cannot be easily removed with a clean rag.

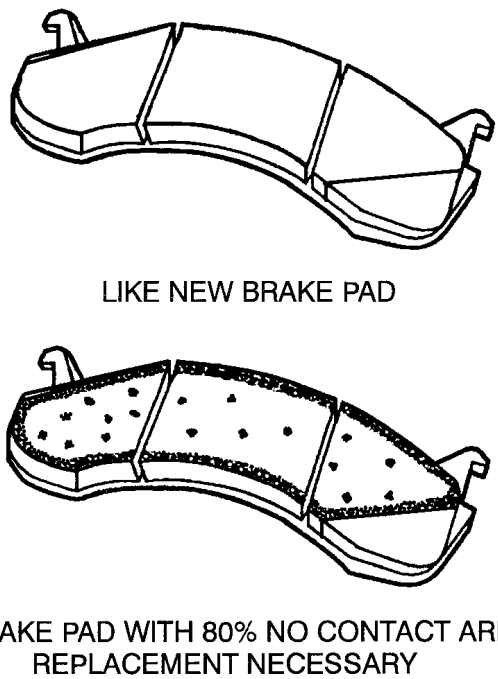


Figure 12 Progressive Conditions Of Pad To Rotor Contact

3.4. CALIPERS

Visually inspect calipers for brake fluid leakage around pistons, inlet or bleed valve, damage or defects to pistons or piston boots, bleed valve or caliper mounting bolts. If there is leakage, damage or other defects, the caliper should be repaired or replaced. Refer to CALIPER, Remove (See CALIPER, page 24), CALIPER, Disassemble (See CALIPER, page 41), CALIPER, Clean and Inspect (See CALIPER, page 47), CALIPER, Assemble (See CALIPER, page 54) and CALIPER, Install (See CALIPER, page 71) to remove, disassemble, clean and inspect, assemble and install to repair or replace caliper.

3.5. ROTOR

Visually inspect rotor for scoring, warping, cracks, bluing or heat spots or other damage or defects. If signs of damage or defects are found, the rotor should be replaced. Refer to ROTOR AND WHEEL HUB ASSEMBLY, Remove (See ROTOR AND WHEEL HUB ASSEMBLY, page 31) and ROTOR AND WHEEL HUB ASSEMBLY, Install (See ROTOR AND WHEEL HUB ASSEMBLY, page 80). Refer to GROUP 04 — BRAKES in the Master Service Manual for details pertaining to reconditioning rotors.

3.6. ANCHOR PLATE

Visually inspect anchor plate for worn or damaged slippers, damaged or dislodged guide pin boots, damaged leading and trailing caliper guide pins, damaged mounting bolts or other defects. If signs of wear, damage or defects are found, the anchor plate should be repaired or replaced. Refer to ANCHOR PLATE AND SPLASH SHIELD, Remove (See ANCHOR PLATE AND SPLASH SHIELD, page 37), ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51), ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) and ANCHOR PLATE AND SPLASH SHIELD, Install (See ANCHOR PLATE AND SPLASH SHIELD, page 85) to remove, disassemble, clean and inspect, assemble and install to repair or replace anchor plate.

4. REMOVE

Wheel bearing specified end play is most important. Check wheel bearings for wear or damage when servicing brakes. Adjust wheel bearings when brake service has been completed, before wheel (tire and rim) is reinstalled. Refer to GROUP 02 — FRONT AXLE and GROUP 14 — REAR AXLE in the Master Service Manual for proper wheel bearing maintenance and adjustment.

4.1. DISC BRAKE PADS

There are three types of lining materials available for the hydraulic pin slide brake system. HX-7A1–EE brake pads and softer lining brake pads identified by lining code 7610 with smooth backing plates for heavy duty braking applications and HX–402–EE brake pads for light duty braking applications.

- The HX–7A1–EE lining material of inboard disc brake pad (Item 1, Figure 3) (See Figure 3, page 3) and outboard disc brake pad (Item 2, Figure 3) (See Figure 3, page 3) are chamfered and are marked with an “ARROW” and the word “FORWARD” for proper installation. Brake pads are NOT interchangeable from inboard to outboard side on the same wheel.
- The optional HX–402–EE lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.
- The optional SOFTER lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.

As lining wears on disc brake pads, brake fluid level in the reservoir will lower. Before servicing the calipers, inspect the fluid level. If the fluid level is at or near proper fluid level, remove some brake fluid from the reservoir, using a siphon or syringe. When the pistons are pushed back into the caliper piston bores the fluid will be pushed back to the reservoir and may overflow if not removed. Discard the used fluid removed from the master cylinder.

If inspection reveals that caliper piston boots are worn or damaged, replace them. Refer to CALIPER, Remove (See CALIPER, page 24), CALIPER, Disassemble (See CALIPER, page 41), CALIPER, Clean and Inspect (See CALIPER, page 47), CALIPER, Assemble (See CALIPER, page 54) and CALIPER, Install (See CALIPER, page 71) to remove, disassemble, clean and inspect, assemble and install to repair or replace caliper.

During service procedure, keep grease and other foreign material from caliper assembly, disc brake pads, brake rotor and external surfaces of hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Remove

1. Position vehicle on suitable floor stands and remove wheel (tire and rim). Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel (tire and rim) removal.

WARNING – A jack must never be used alone to support a vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with suitable floor stands.

2. Inspect master cylinder fluid level and remove fluid if necessary as described above.

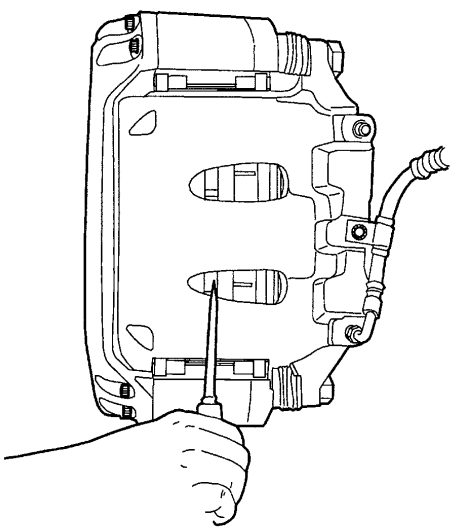


Figure 13 Push Caliper Outboard Pushing Pistons into Piston Bores

3. Insert a screwdriver in one of the rotor cooling fin slots and pry the caliper outboard pushing the caliper pistons into the piston bores. This will allow removal of caliper (Figure 13).

Refer to Figure 14 for Items in parentheses.

4. On front axles only, remove hex nut and lock washer (Item 1) and lift brake line retaining clip (Item 2) off threaded stud (Item 3) on the steering knuckle hose support bracket (Item 4). This will allow the brake line hose to hang free.

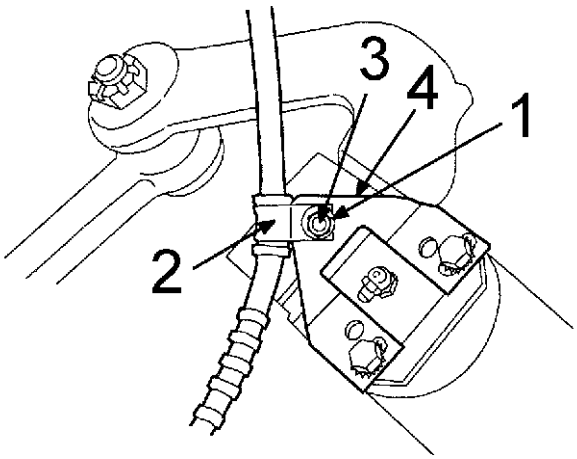


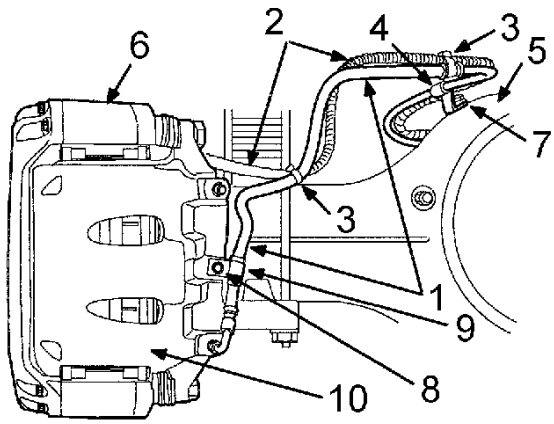
Figure 14 Removing Brake Line Retaining Clip from Front Axle Hose Support Bracket

DRIVER SIDE FRONT SHOWN
1. HEX NUT AND LOCK WASHER
2. BRAKE LINE RETAINING CLIP
3. THREADED STUD
4. HOSE SUPPORT BRACKET

Refer to Figure 15 for Items in parentheses.

5. On rear axles only, if vehicle is equipped with ABS brake system and/or air suspension system, note that the brake line hose (Item 1) is attached to ABS sensor cable (Item 2) with tywrap straps (Item 3) from retaining clip (Item 4) on axle (Item 5) to disc brake assembly (Item 6). Remove hex head bolt (Item 7) from retaining clip (Item 4). Remove hex head bolt (Item 8) and brake line retaining clip (Item 9) from caliper (Item 10). This will allow the brake line hose to hang free while rotating the caliper down to replace disc brake pads.

IMPORTANT – If it becomes necessary to cut any of the tywrap straps (Item 3) to allow caliper to rotate all the way down during disc brake pad replacement, note the location of the tywrap strap before cutting it off, so it can be replaced in the proper place after service is completed.



DRIVER SIDE REAR (73 mm) SHOWN

Figure 15 Removing Brake Line Retaining Clips from Rear Axle and Caliper

1. BRAKE LINE HOSE
2. ABS SENSOR CABLE
3. TYWRAP STRAP
4. RETAINING CLIP
5. AXLE
6. DISC BRAKE ASSEMBLY
7. HEX HEAD BOLT
8. HEX HEAD BOLT
9. RETAINING CLIP
10. CALIPER

WARNING – Never remove lower (bottom) hex flanged mounting bolt securing caliper to anchor plate during disc brake pad service procedure. The caliper will not rotate over top center and will fall, which may cause personal injury (Figure 16).

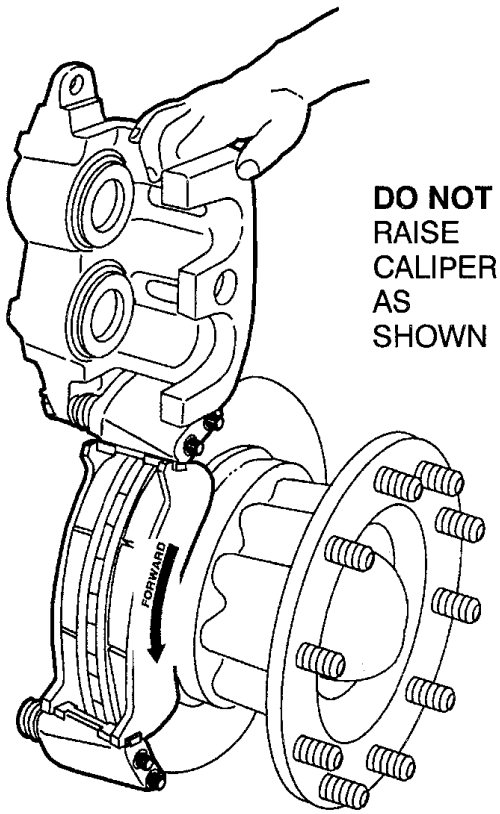


Figure 16 DO NOT Raise Caliper as Shown

Refer to Figure 17 for Items in parentheses.

6. Remove upper (top) hex flanged mounting bolt (Item 1) securing the caliper (Item 2) to the anchor plate (Item 3), driver side front brake shown.

IMPORTANT – When servicing disc brake pads only, loosen and remove the upper (top) caliper hex flanged mounting bolt (Item 1) only. Do not loosen lower (bottom) hex flanged mounting bolt (Item 4). For proper tightening and torquing sequence refer to install section for disc brake pads.

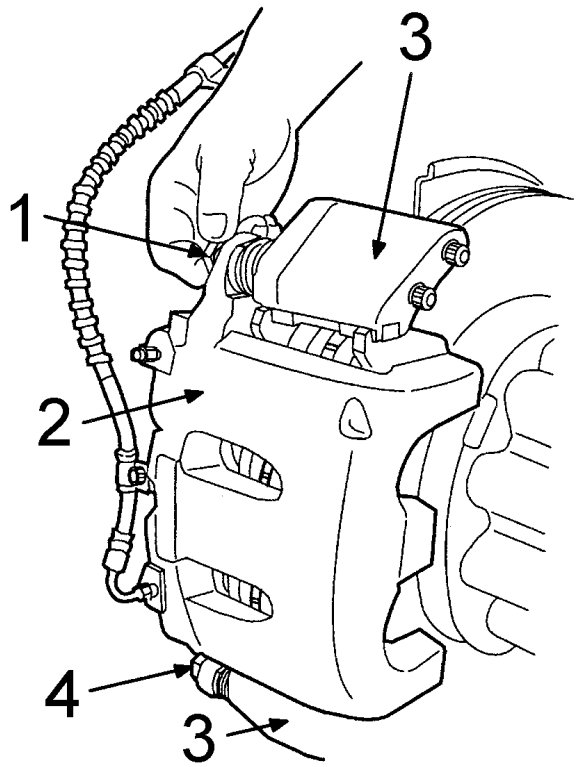


Figure 17 Remove Upper Hex Mounting Bolt to Lower Caliper to Replace Disc Brake Pads

DRIVER SIDE FRONT (66 mm) SHOWN
1. UPPER HEX FLANGED MOUNTING BOLT
2. CALIPER
3. ANCHOR PLATE
4. LOWER HEX FLANGED MOUNTING BOLT

Refer to Figure 18 for Items in parentheses.

7. Carefully rotate the caliper (Item 1) open about the lower (bottom) hex flanged mounting bolt and guide pin (Items 2 and 3).

   Do not allow the brake line hose (Item 4) to become pinched or kinked, driver side front brake shown.

CAUTION – Use care to avoid damaging or dislodging the upper (top) or lower (bottom) guide pin boots (Items 5 and 7). Do not pull on guide pins (Items 3 and 6), this may dislodge guide pin boot from guide pin or anchor plate grooves. If boot is dislodged, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to repair or replace guide pin boots.

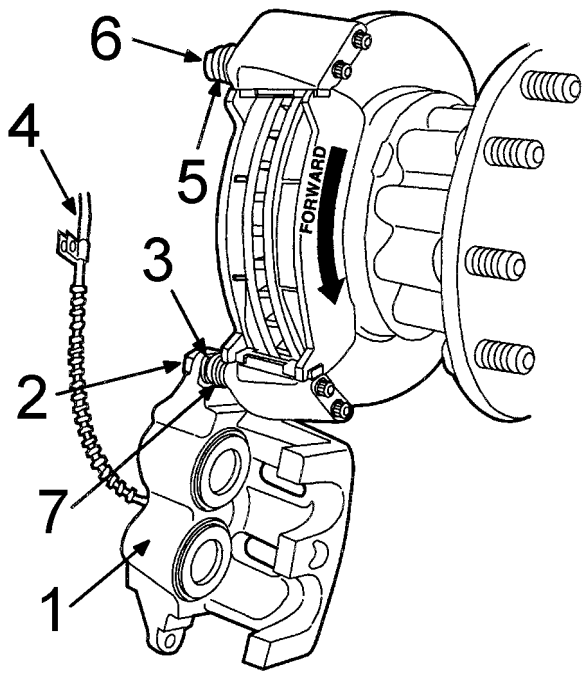


Figure 18 Rotate Caliper Open About Lower Hex Mounting Bolt and Guide Pin

DRIVER SIDE FRONT (66 mm) SHOWN
1. CALIPER
2. LOWER HEX FLANGED MOUNTING BOLT
3. LOWER GUIDE PIN
4. BRAKE LINE HOSE
5. UPPER GUIDE PIN BOOT
6. UPPER GUIDE PIN
7. LOWER GUIDE PIN BOOT

Refer to Figure 19 for Items in parentheses.

8. Remove inboard and outboard disc brake pads (Items 1 and 2) from anchor plate pad abutment slippers (Item 3), driver side front and rear brake shown.

9. Remove anchor plate pad abutment slippers (Item 3) from anchor plate pad abutment, driver side front and rear brake shown. New anchor plate pad abutment slippers are supplied with new disc brake pad sets.

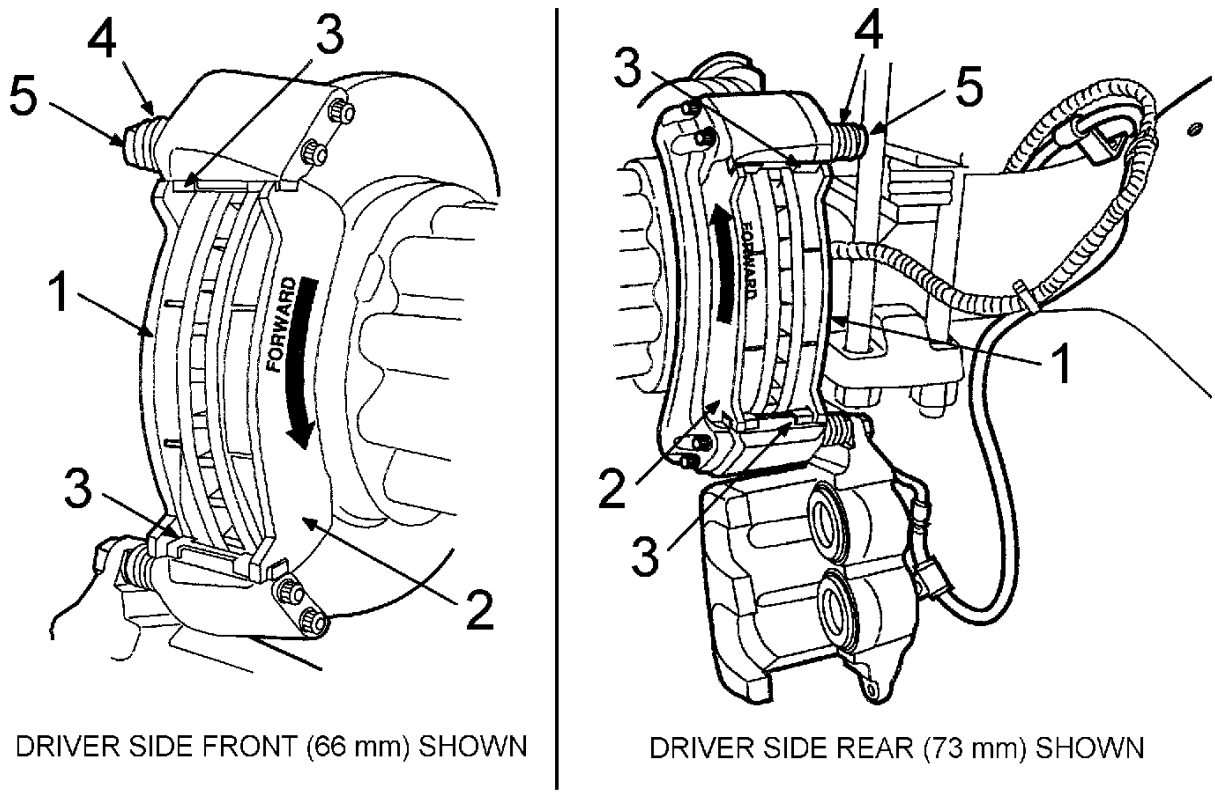


Figure 19 Remove Inboard and Outboard Disc Brake Pads

1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD
3. ANCHOR PLATE PAD ABUTMENT SLIPPER
4. GUIDE PIN BOOT
5. UPPER GUIDE PIN

CAUTION – Use care to avoid damaging or dislodging the guide pin boots (Item 4, Figure 19) (See Figure 19, page 22) while cleaning machined surfaces of caliper, guide pin mounting face and anchor plate with hand held wire brush. If boot is damaged or dislodged, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to repair or replace guide pin boots. Do not get solvent on guide pin boots, damage to boots will occur.

10. Check machined surfaces of caliper, guide pin mounting face and anchor plate. If any rust or corrosion is present, use a hand held wire brush to clean these surfaces. It is important to clean those areas of the caliper, guide pins and anchor plate that are in contact with the brake pads or each other. If leading or trailing guide pins have rust or corrosion and can not be cleaned, it is recommended that the guide pins be replaced. Refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to replace guide pins.

11. Visually inspect caliper for leakage, damage or defects to piston boots or pistons. If leakage, damage or defects are found, repair or replace as required. Refer to CALIPER, Remove (See CALIPER, page 24), CALIPER, Disassemble (See CALIPER, page 41), CALIPER, Clean and Inspect (See CALIPER, page 47), CALIPER, Assemble (See CALIPER, page 54) and CALIPER, Install (See CALIPER, page 71) to remove, disassemble, clean and inspect, assemble and install to repair or replace caliper.

12. Position a metal plate over both caliper pistons, then use a “C” clamp to push both pistons into the caliper (Figure 20). Pushing the caliper pistons into the caliper will provide clearance for new disc brake pads when caliper is rotated back into position.

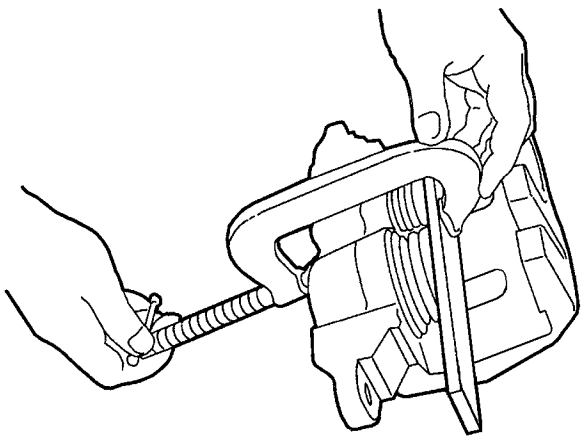


Figure 20 Push Both Pistons Into Caliper

13. Visually inspect anchor plate for damage or defects to mating surfaces at anchor plate pad abutment slippers (Item 3, Figure 19)(See Figure 19, page 22) and upper guide pin head (Item 5, Figure 19)(See Figure 19, page 22). Check that the upper guide pin is free to slide and rotate, making sure the upper guide pin head, upper hex flanged mounting bolt and mating caliper surfaces are clean and free of grease or foreign substances. Also check that lower guide pin is free to slide and rotate before moving to next step. If guide pins are not free to rotate or slide or if other damage or defects are found, repair or replace as required.

    If it is necessary to replace the guide pins, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to repair or replace guide pins.

14. Visually inspect rotor for scoring, warping, cracks, bluing, heat spots or other damage or defects. If any damage or defects are found, repair or replace as required. Refer to ROTOR AND WHEEL HUB ASSEMBLY, Remove (See ROTOR AND WHEEL HUB ASSEMBLY, page 31) and ROTOR AND WHEEL HUB ASSEMBLY, Install (See ROTOR AND WHEEL HUB ASSEMBLY, page 80).

4.2. CALIPER

During service procedure, keep grease and other foreign material away from caliper assembly, disc brake pads, brake rotor and external surfaces of hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

In the event the original disc brake pads are to be used again, be sure to mark them in some manner so that they are reinstalled in same location.

IMPORTANT – If a new caliper assembly is being installed, be sure that the bleeder screw (Item 1, Figure 21) is installed in Upper (top) hydraulic line port of caliper (Item 2, Figure 21).

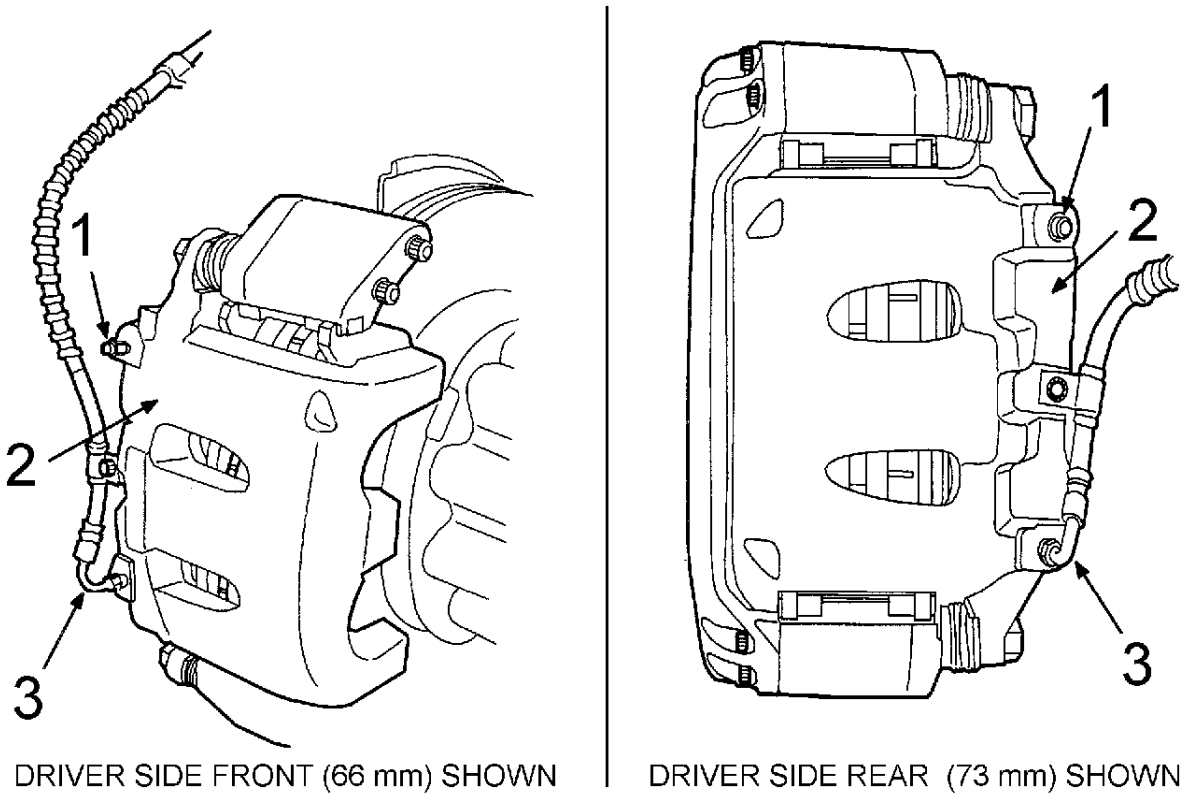


Figure 21 Installing Bleeder Screw

1. BLEEDER SCREW WITH CAP (UPPER HYDRAULIC LINE PORT)
2. CALIPER
3. HYDRAULIC BRAKE LINE HOSE (LOWER HYDRAULIC LINE PORT)

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Remove

1. Position vehicle on suitable floor stands and remove wheel (tire and rim). Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel (tire and rim) removal.

> **WARNING – A jack must never be used alone to support a vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with suitable floor stands.**

IMPORTANT – As lining wears on disc brake pads, brake fluid level in the reservoir will lower. Before servicing the calipers, inspect the fluid level. If the fluid level is at or near proper fluid level, remove some brake fluid from the reservoir, using a siphon or syringe. When the pistons are pushed back into the caliper piston bores the fluid will be pushed back to the reservoir and may overflow if not removed. Discard the used fluid removed from the master cylinder.

2. Insert a screwdriver in one of the rotor cooling fin slots and pry the caliper outboard pushing the caliper pistons into the piston bores. This will allow removal of caliper assembly (Figure 22).

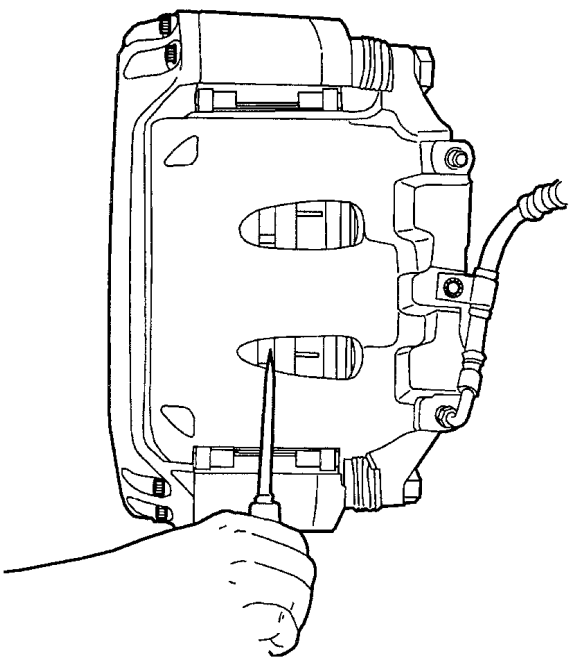


Figure 22 Push Caliper Outboard Pushing Pistons into Piston Bores

Refer to Figure 23 for Items in parentheses.

3. On front axles only, remove hex nut and lock washer (Item 1) and lift brake line retaining clip (Item 2) off threaded stud (Item 3) on the steering knuckle hose support bracket (Item 4). This will allow the brake line hose to hang free.

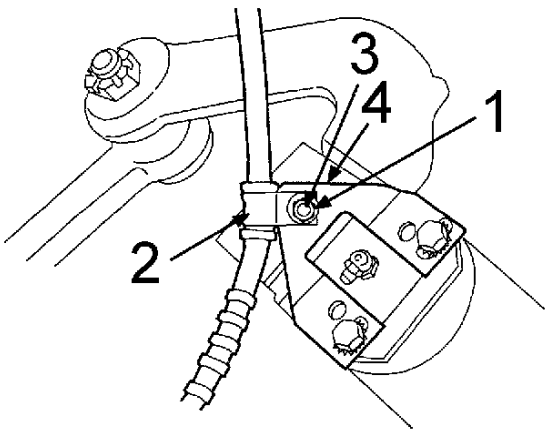


Figure 23 Removing Brake Line Retaining Clip from Front Axle Hose Support Bracket

DRIVER SIDE FRONT SHOWN
1. HEX NUT AND LOCK WASHER
2. BRAKE LINE RETAINING CLIP
3. THREADED STUD
4. HOSE SUPPORT BRACKET

Refer to Figure 24 for Items in parentheses.

4. On front brakes, remove hex head bolt (Item 1) and remove brake line retaining clip (Item 2) from caliper (Item 3).

5. Disconnect hydraulic brake line hex fitting (Item 4) from the caliper (Item 3) and remove brake line hose (Item 5). Cap the brake line hose and plug the caliper inlet to prevent brake fluid leakage. Position brake line hose out of the way. Be careful to avoid getting grease or brake fluid on disc pads.

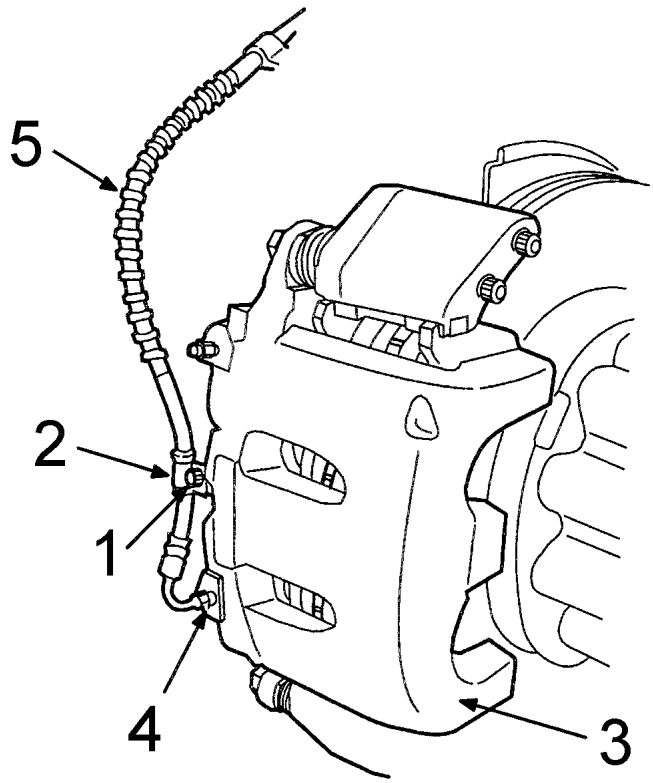


Figure 24 Remove Front Brake Line Hose from Caliper

DRIVER SIDE FRONT (66 mm) SHOWN
1. HEX HEAD BOLT
2. BRAKE LINE RETAINING CLIP
3. CALIPER
4. HYDRAULIC BRAKE LINE HEX FITTING
5. BRAKE LINE HOSE

Refer to Figure 25 for Items in parentheses.

6. On rear brakes, if vehicle is equipped with ABS brake system and/or air suspension system, note that the brake line hose (Item 1) is attached to ABS sensor cable (Item 2) with tywrap straps (Item 3) from retaining clip (Item 4) on axle (Item 5) to disc brake assembly (Item 6). Remove hex head bolt (Item 7) from retaining clip (Item 4). Remove hex head bolt (Item 8) and brake line retaining clip (Item 9) from caliper (Item 10). This will allow the brake line hose to hang free while rotating the caliper down.

IMPORTANT – If it becomes necessary to cut any of the tywrap straps (Item 3) to allow caliper to rotate all the way down during caliper removal, note the location of the tywrap strap before cutting it off, so it can be replaced in the proper place after service is completed.

7. Disconnect hydraulic brake line hex fitting (Item 11) from brake caliper (Item 10) and remove brake line hose (Item 1). Cap the brake line hose and plug the caliper inlet to prevent brake fluid leakage. Position brake line hose out of the way. Be careful to avoid getting grease or brake fluid on disc pads.

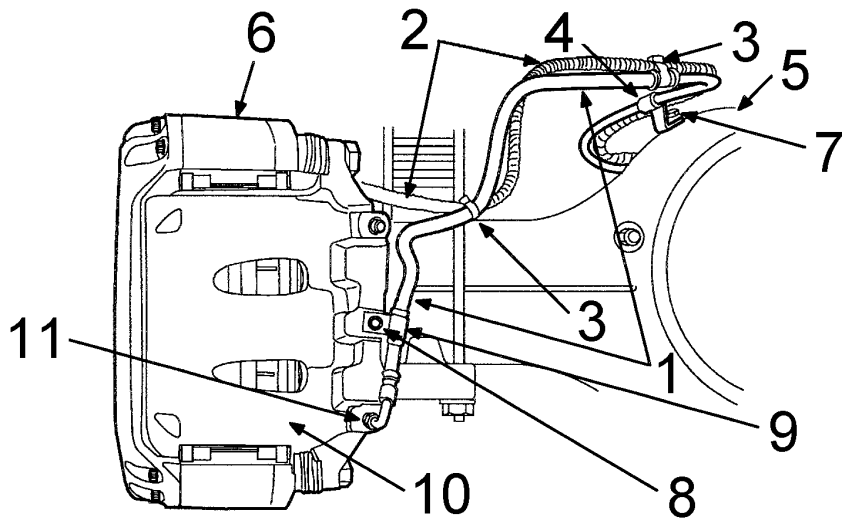


Figure 25 Remove Rear Brake Line Hose from Caliper

DRIVER SIDE REAR (73 mm) SHOWN
1. BRAKE LINE HOSE
2. ABS SENSOR CABLE
3. TYWRAP STRAP
4. RETAINING CLIP
5. AXLE
6. DISC BRAKE ASSEMBLY
7. HEX HEAD BOLT
8. HEX HEAD BOLT
9. RETAINING CLIP
10. CALIPER
11. HYDRAULIC BRAKE LINE HEX FITTING

Refer to Figure 26 for Items in parentheses.

8. Remove upper (top) hex flanged mounting bolt (Item 1) securing the caliper (Item 2) to the anchor plate (Item 3), driver side front brake shown.

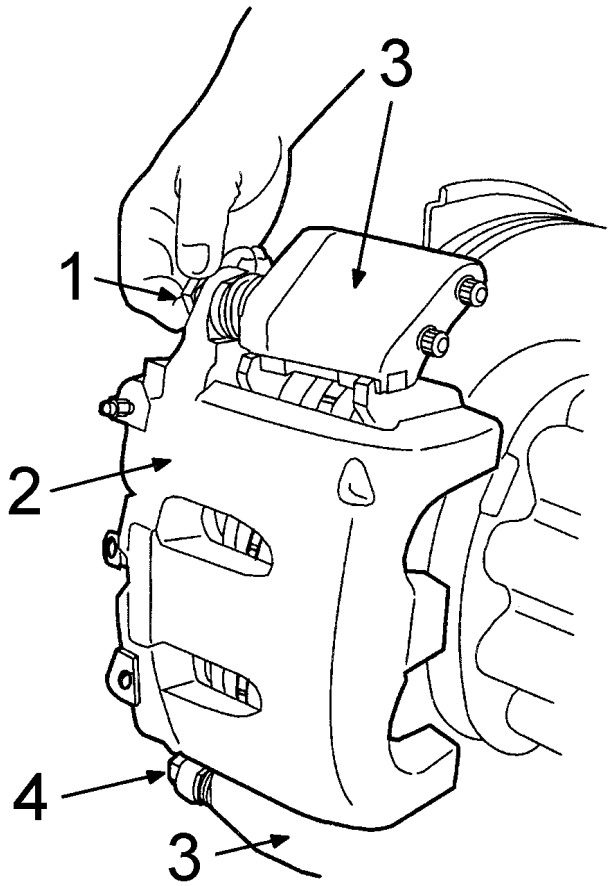


Figure 26 Remove Upper Hex Mounting Bolt to Lower and Remove Caliper

DRIVER SIDE FRONT (66 mm) SHOWN
1. UPPER HEX FLANGED MOUNTING BOLT
2. CALIPER
3. ANCHOR PLATE
4. LOWER HEX FLANGED MOUNTING BOLT

Refer to Figure 27 for Items in parentheses.

9. Carefully rotate the caliper (Item 1) open about the lower (bottom) hex flanged mounting bolt and guide pin (Items 2 and 3), driver side front brake shown.

10. Remove lower (bottom) hex flanged mounting bolt (Item 2) securing the caliper (Item 1) to the anchor plate (Item 4) and remove caliper, driver side front brake shown.

CAUTION – Use care to avoid damaging or dislodging the guide pin boots (Items 5 and 7). Do not pull on guide pins (Items 3 and 6), this may dislodge guide pin boot from guide pin or anchor plate grooves. If boot is dislodged, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to repair or replace guide pin boots.

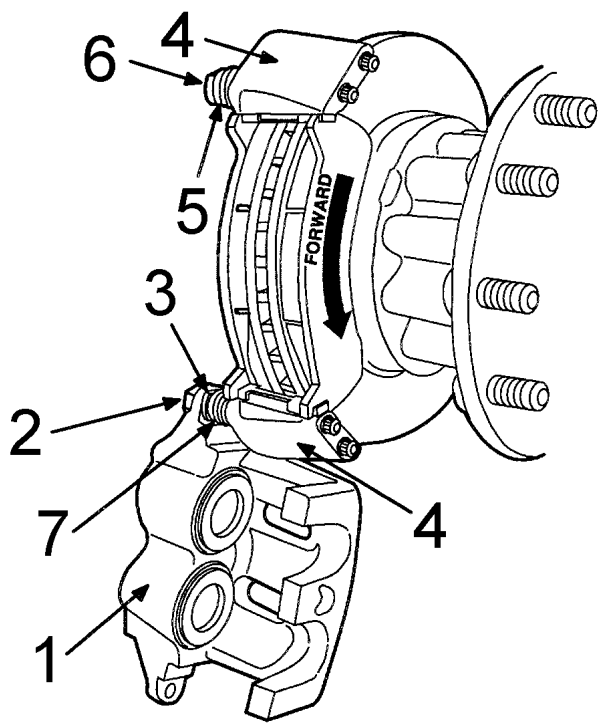


Figure 27 Rotate Caliper Open About Lower Hex Mounting Bolt and Guide Pin

DRIVER SIDE FRONT (66 mm) SHOWN
1. CALIPER
2. LOWER HEX FLANGED MOUNTING BOLT
3. LOWER GUIDE PIN
4. ANCHOR PLATE
5. UPPER GUIDE PIN BOOT
6. UPPER GUIDE PIN
7. LOWER GUIDE PIN BOOT

11. Once the caliper is removed and placed on a clean dry work surface, refer to CALIPER, Disassemble (See CALIPER, page 41), CALIPER, Clean and Inspect (See CALIPER, page 47) and CALIPER, Assemble (See CALIPER, page 54) to disassemble, clean and inspect and assemble to repair or rebuild caliper.

4.3. ROTOR AND WHEEL HUB ASSEMBLY

The anchor plate tie bar (Item 1, Figure 28) (See Figure 28, page 32), if so equipped (73 mm brake assembly only), must be removed and the caliper (Item 4, Figure 28) (See Figure 28, page 32) rotated down out of the way, before the wheel hub and rotor can be removed.

During service procedure, keep grease and other foreign material from caliper assembly, disc brake pads, brake rotor and external surfaces of wheel hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Remove

1. Position vehicle on suitable floor stands and remove wheel (tire and rim). Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel removal.

> **WARNING – A jack must never be used alone to support a vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with suitable floor stands.**

Refer to Figure 28 for Items in parentheses unless otherwise noted.

2. Remove anchor plate tie bar (Item 1), if so equipped (73 mm brake assembly only), from anchor plate (Item 2) by removing 12–point head bolts (Item 3), and lay them out of the way. Save for reinstallation.

3. Rotate caliper (Item 4) open about the lower (bottom) hex flanged mounting bolt and guide pin. Refer to DISC BRAKE PADS, Remove, steps 1 thru 7 (See DISC BRAKE PADS, page 15).

NOTE – It is not necessary to remove the caliper from the anchor plate to remove the rotor and hub assembly from the vehicle.

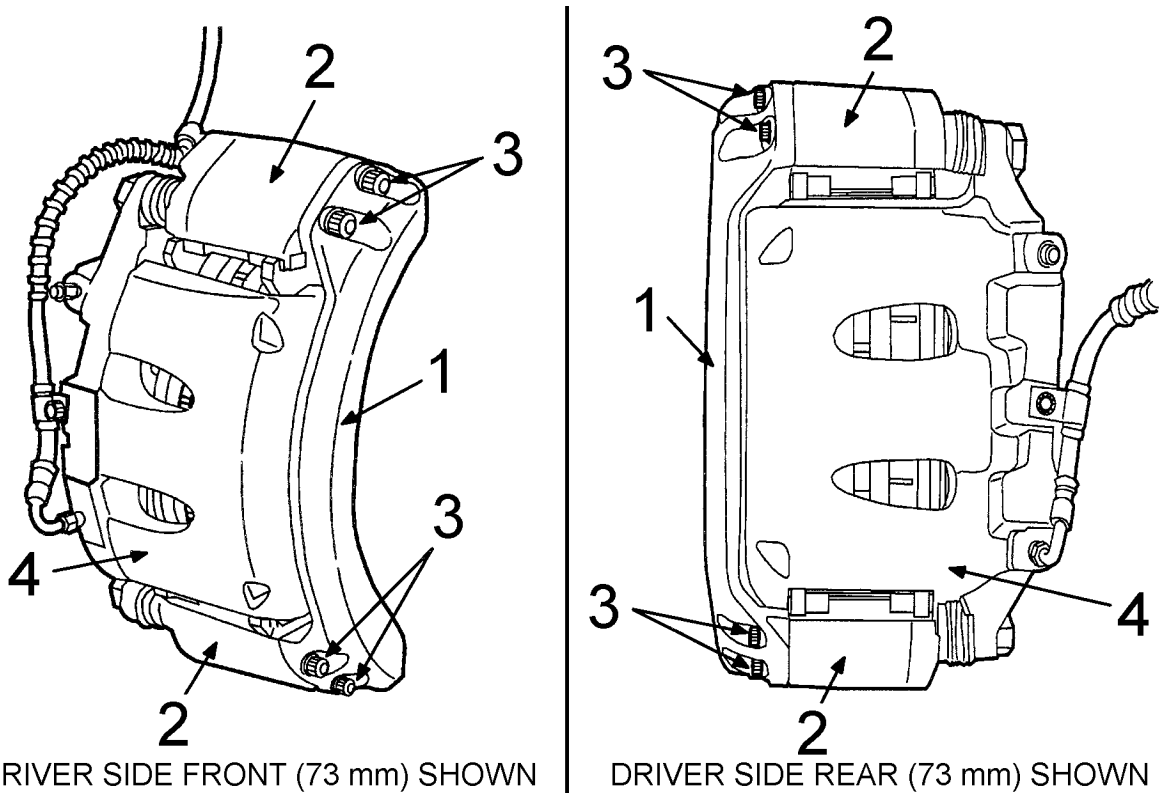


Figure 28 Removing Rotor And Wheel Hub Assembly

1. ANCHOR PLATE TIE BAR
2. ANCHOR PLATE
3. 12–POINT HEAD BOLT
4. CALIPER

4. Remove inboard and outboard disc brake pads (Items 1 and 2, Figure 29) from anchor plate pad abutment slippers (Item 3, Figure 29), driver side front and rear brake shown.

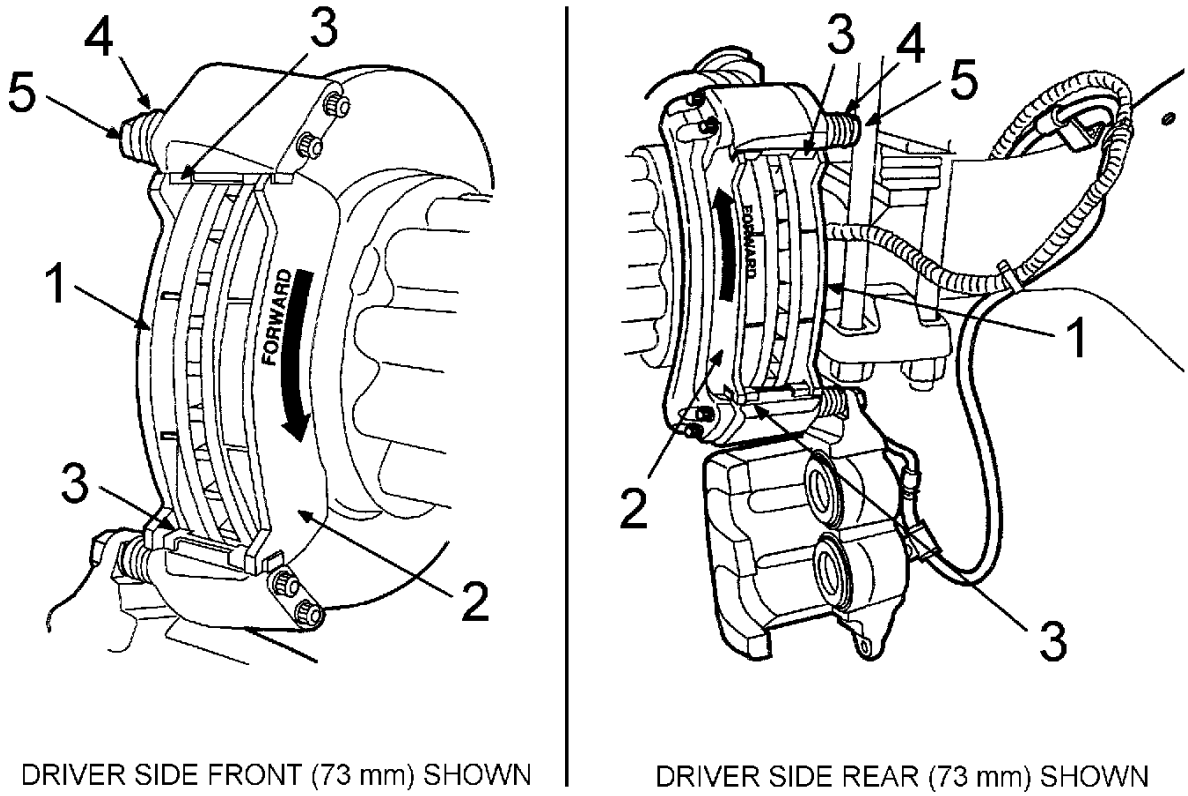


Figure 29 Remove Inboard and Outboard Disc Brake Pads

1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD
3. ANCHOR PLATE PAD ABUTMENT SLIPPER
4. GUIDE PIN BOOT
5. GUIDE PIN

NOTE – In the event the original disc brake pads are to be used again, be sure to mark them in some manner so that they are reinstalled in same location.

CAUTION – The HX–7A1–EE inboard and outboard disc brake pads (Items 1 and 2, Figure 68) (See Figure 68, page 73) are not interchangeable. The word "FORWARD" and the "ARROW" markings on the brake pad backing plate show forward rotation direction of the rotor (Item 4, Figure 68) (See Figure 68, page 73). The arrow MUST point in the forward rotor rotation direction (Figure 69) (See Figure 69, page 74). The optional HX–402–EE and SOFTER lining brake pads, inboard and outboard disc brake pads (Item 4, Figure 59) (See Figure 59, page 64) are interchangeable between the inner and outer locations.

5. On front axles, for removal of rotor and wheel hub assembly (Items 12 and 8, Figure 30) (See Figure 30, page 34) and (Items 12 and 8, Figure 31) (See Figure 31, page 35), refer to GROUP 02– FRONT AXLE in the Master Service Manual for proper rotor and wheel hub assembly removal. Place rotor and wheel hub assembly along with bearings and related components on a clean, dry surface out of the way and save for reinstallation.

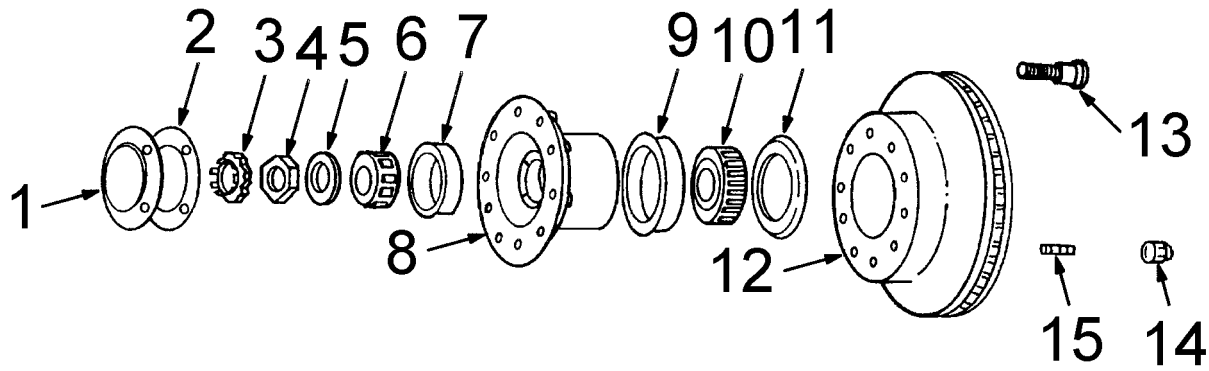


Figure 30 Remove Front Rotor And Wheel Hub Assembly

1. HUB CAP OIL/GREASE
2. HUB CAP GASKET
3. WHEEL BEARING ADJUSTER NUT LOCK
4. WHEEL BEARING ADJUSTER NUT
5. WHEEL BEARING RETAINER WASHER
6. OUTER BEARING
7. CUP OUTER BEARING
8. WHEEL HUB
9. CUP INNER BEARING
10. INNER BEARING
11. SEAL OIL/GREASE
12. BRAKE ROTOR
13. WHEEL RETAINING STUD
14. ROTOR RETAINING NUT AND WASHER
15. ROTOR RETAINING STUD

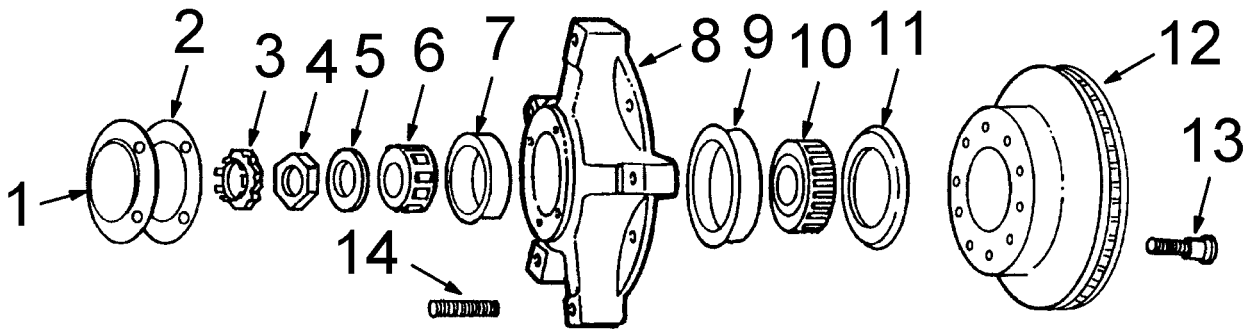


Figure 31 Remove Front Rotor And Wheel Hub Assembly

1. CAP WHEEL/GREASE
2. CAP GASKET
3. WHEEL BEARING ADJUSTER NUT LOCK
4. WHEEL BEARING ADJUSTER NUT
5. WHEEL BEARING RETAINER WASHER
6. OUTER WHEEL BEARING
7. CUP OUTER BEARING
8. WHEEL HUB
9. CUP INNER BEARING
10. INNER BEARING
11. SEAL WHEEL
12. BRAKE ROTOR
13. ROTOR RETAINING BOLT, WASHER AND NUT
14. RIM CLAMP RETAINING STUD

6. On rear axles, for removal of rotor and wheel hub assembly (Items 11 and 7, Figure 32) (See Figure 32, page 36) and (Items 11 and 7, Figure 33) (See Figure 33, page 36), refer to GROUP 14 — REAR AXLE in the Master Service Manual for proper rotor and wheel hub assembly removal. Place rotor and wheel hub assembly along with bearings and related components on a clean, dry surface out of the way and save for reinstallation.

7. Separate front rotor from wheel hub (Items 12 and 8, Figure 30) (See Figure 30, page 34) and (Items 12 and 8, Figure 31) (See Figure 31, page 35) by removing retaining nuts and washers (Item 14, Figure 30) (See Figure 30, page 34) or retaining bolts, washers and nuts (Item 13, Figure 31) (See Figure 31, page 35) securing them together.

8. Separate rear rotor from wheel hub (Items 11 and 7, Figure 32 (See Figure 32, page 36) and Figure 33) (See Figure 33, page 36) by removing retaining nuts (Item 12, Figure 32) (See Figure 32, page 36) or retaining bolts, washers and nuts (Item 12, Figure 33) (See Figure 33, page 36) securing them together.

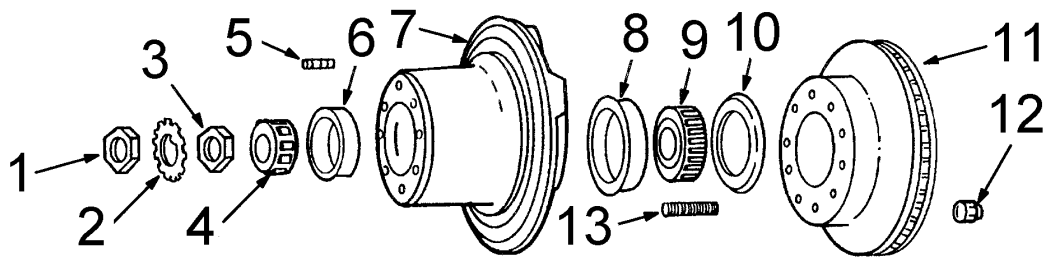


Figure 32 Remove Rear Rotor And Wheel Hub Assembly

1. OUTER WHEEL BEARING ADJUSTER NUT
2. WHEEL BEARING ADJUSTER NUT LOCK
3. INNER WHEEL BEARING ADJUSTER NUT
4. OUTER WHEEL BEARING
5. AXLE SHAFT FLANGE STUD
6. CUP WHEEL BEARING
7. WHEEL HUB
8. CUP INNER BEARING
9. INNER BEARING
10. SEAL, OIL
11. BRAKE ROTOR
12. BRAKE ROTOR RETAINING NUT
13. WHEEL AND BRAKE ROTOR RETAINING STUD

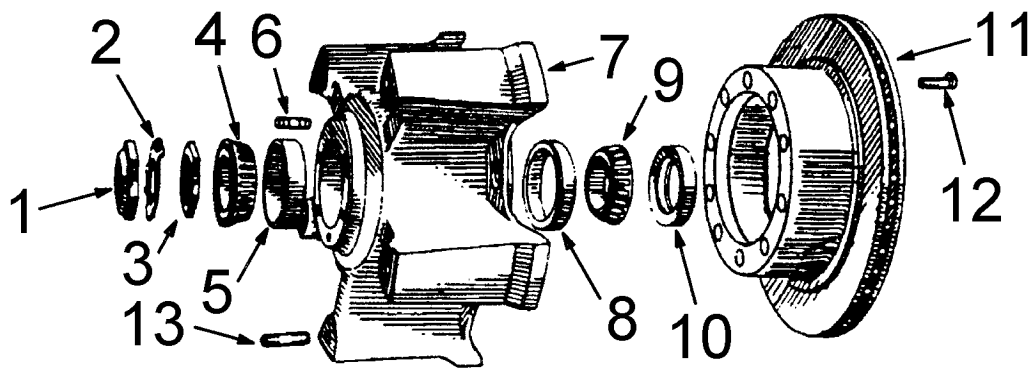


Figure 33 Remove Rear Rotor And Wheel Hub Assembly

1. OUTER WHEEL BEARING ADJUSTER NUT
2. WHEEL BEARING ADJUSTER NUT LOCK
3. INNER WHEEL BEARING ADJUSTER NUT
4. OUTER WHEEL BEARING
5. CUP OUTER BEARING
6. AXLE SHAFT FLANGE STUD
7. WHEEL HUB
8. CUP INNER BEARING
9. INNER BEARING
10. SEAL, OIL
11. BRAKE ROTOR
12. BRAKE ROTOR RETAINING BOLT, WASHER AND NUT
13. RIM CLAMP RETAINING STUD

9. Once the rotor and wheel hub assembly is removed and placed on a clean dry work surface, refer to ROTOR AND WHEEL HUB ASSEMBLY, Clean and Inspect (See ROTOR AND WHEEL HUB ASSEMBLY, page 50) to clean and inspect and for specifications on inspecting and reconditioning of rotors.

4.4. ANCHOR PLATE AND SPLASH SHIELD

The caliper, anchor plate tie bar, if so equipped (73 mm brake assembly only) and hub and rotor must be removed before the anchor plate and splash shield can be removed.

During service procedure, keep grease and other foreign material from caliper assembly, disc brake pads, brake rotor and external surfaces of wheel hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

In the event the original disc brake pads are to be used again, be sure to mark them in some manner so that they are reinstalled in same location.

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Remove

1. Position vehicle on suitable floor stands and remove wheel (tire and rim). Refer to GROUP 17– WHEELS in the Master Service Manual for proper wheel removal.

WARNING – A jack must never be used alone to support a vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with suitable floor stands.

Refer to Figure 34 for Items in parentheses.

2. Remove anchor plate tie bar (Item 1), if so equipped (73 mm brake assembly only), from anchor plate (Item 2) by removing 12–point head bolts (Item 3), and lay it out of the way. Save for reinstallation.

3. Remove caliper assembly (Item 4). Refer to CALIPER, Remove (See CALIPER, page 24).

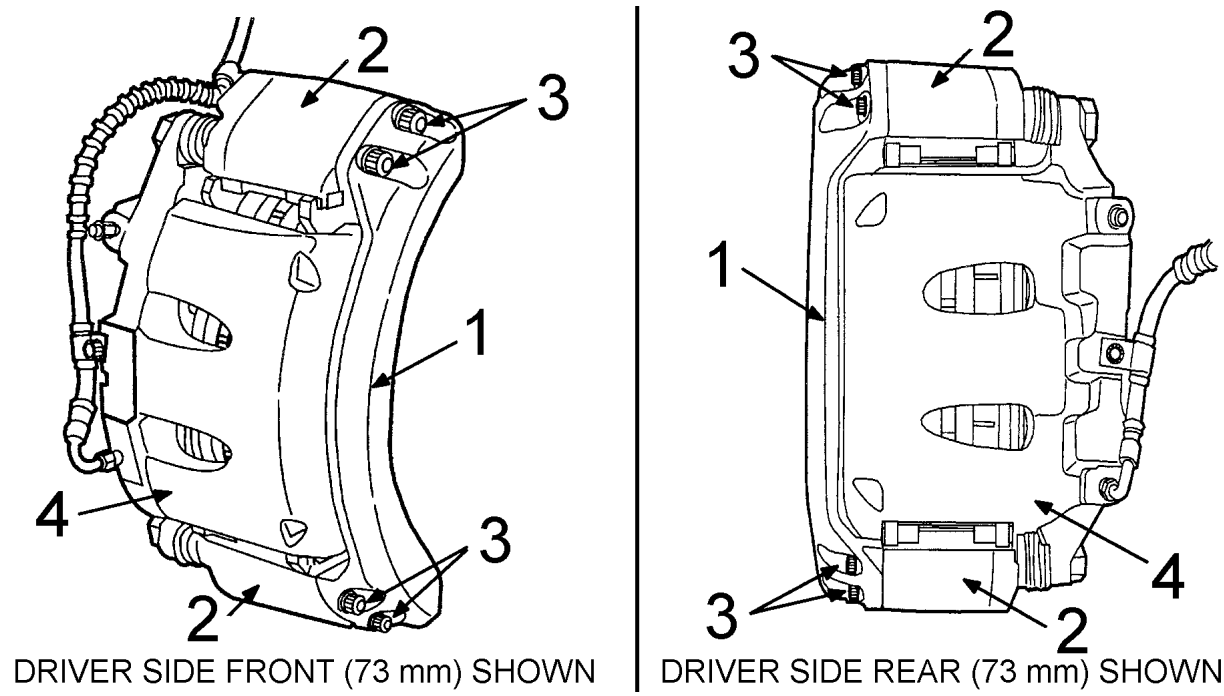


Figure 34 Install Anchor Plate Tie Bar

1. ANCHOR PLATE TIE BAR
2. ANCHOR PLATE
3. 12–POINT HEAD BOLT
4. CALIPER

4. Remove rotor and wheel hub assembly (Items 1 and 2, Figure 35), driver side front shown. Refer to ROTOR AND WHEEL HUB ASSEMBLY, Remove (See ROTOR AND WHEEL HUB ASSEMBLY, page 31).

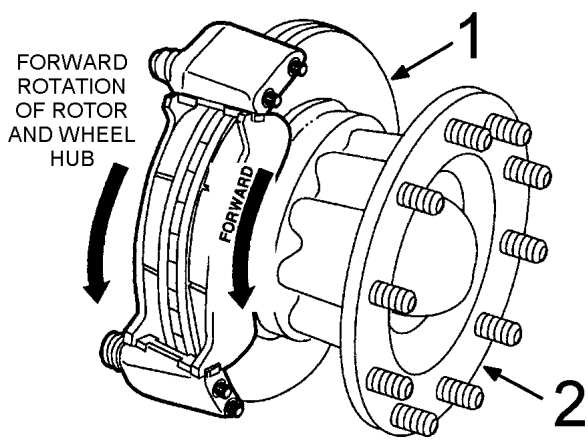


Figure 35 Remove Rotor and Wheel Hub Assembly

1. ROTOR
2. WHEEL HUB

5. Before removing the anchor plate and splash shield from the steering knuckle flange (Item 4, Figure 36) (See Figure 36, page 39) you must remove the ABS sensor (if so equipped) from the ABS sensor bracket (Item 1, Figure 43) (See Figure 43, page 46).

CAUTION – When removing the ABS sensor from the ABS sensor bracket on the anchor plate, use your thumb and fore-finger to get hold of the rear of the sensor where the cable enters the sensor. Use extreme caution not to pull on the cable while twisting and pulling at the same time to remove the sensor.

Refer to Figure 36 for Items in parentheses.

6. On front axles with both 66 mm and 73 mm disc brakes, remove anchor plate and splash shield (Items 1 and 2) by removing hex lock nuts (Item 3) from inboard side of steering knuckle flange (Item 4).

7. Remove hex bolts (Item 5) and anchor plate and splash shield (Items 1 and 2) from outboard side of steering knuckle flange (Item 4). Place anchor plate, splash shield and mounting hardware on a clean, dry surface out of the way and save for reinstallation.

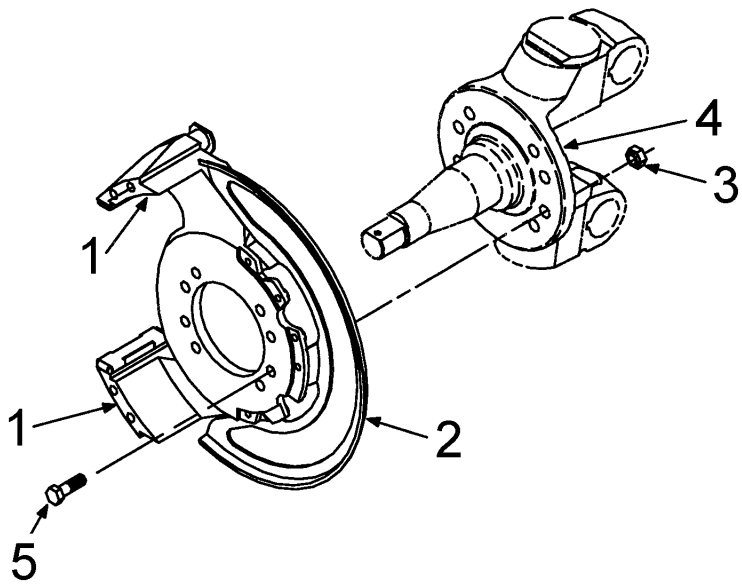


Figure 36 Remove Front Anchor Plate and Splash Panel

1. ANCHOR PLATE
2. SPLASH SHIELD
3. HEX LOCK NUT
4. STEERING KNUCKLE FLANGE
5. HEX BOLT

8. Before removing the anchor plate and splash shield from the rear axle flange (Item 6, Figure 37) (See Figure 37, page 40) you must remove the ABS sensor (if so equipped) from the ABS sensor bracket (Item 1, Figure 43) (See Figure 43, page 46).

CAUTION – When removing the ABS sensor from the ABS sensor bracket on the anchor plate, use your thumb and fore-finger to get hold of the rear of the sensor where the cable enters the sensor. Use extreme caution not to pull on the cable while twisting and pulling at the same time to remove the sensor.

Refer to Figure 37 for Items in parentheses.

9. On rear axles with both 66 mm and 73 mm disc brakes, remove anchor plate and splash shield (Items 1 and 2) by removing hex lock nuts with flat washers (Items 3 and 4) from outboard side of anchor plate.

10. Remove hex bolts (Item 5) from inboard side and anchor plate and splash shield (Items 1 and 2) from outboard side of axle flange (Item 6). Place anchor plate, splash shield and mounting hardware on a clean dry surface out of the way and save for reinstallation.

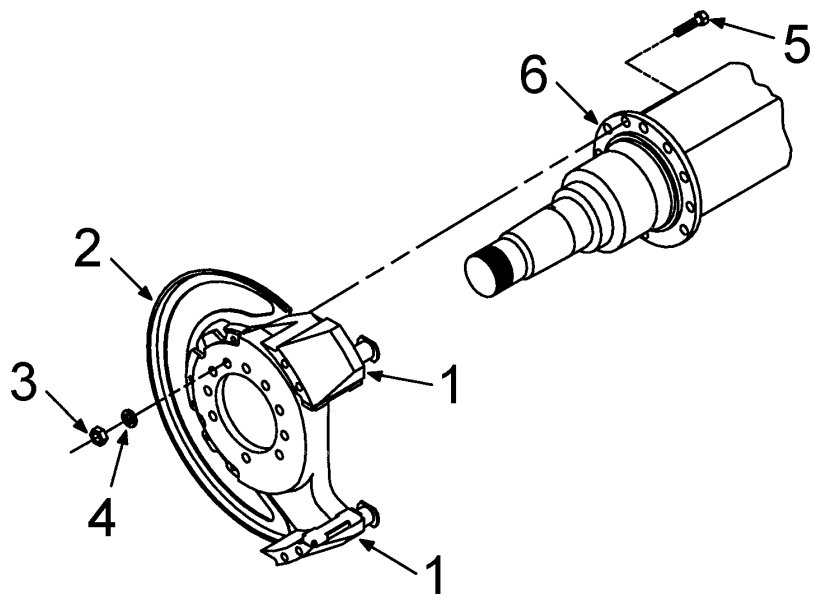


Figure 37 Remove Rear Anchor Plate and Splash Shield

DRIVER SIDE REAR (66 mm AND 73 mm) SHOWN
1. ANCHOR PLATE
2. SPLASH SHIELD
3. HEX LOCK NUT
4. FLAT WASHER
5. HEX BOLT
6. AXLE FLANGE

11. Once the anchor plate and splash shield is removed and placed on a clean dry work surface, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble to repair or rebuild anchor plate and splash shield.

5. DISASSEMBLE

5.1. CALIPER

Disassembly of Caliper Components

WARNING – Safety glasses should be worn at all times when assembling or disassembling.

Refer to Figure 38 for Items in parentheses.

1. With the caliper (Item 1) removed and placed on a clean work surface, clean all road contamination from the exterior of caliper around the caliper pistons and piston boots (Items 2 and 3) with solvent before removing caliper pistons and piston boots.

2. Before removing caliper pistons (Item 2) from caliper (Item 1), drain brake fluid from caliper.

3. Remove caliper pistons (Item 2) from caliper (Item 1) using compressed air.

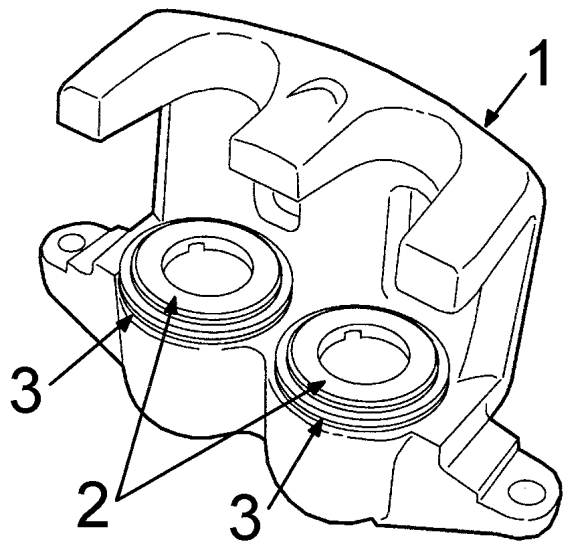


Figure 38 Disassembly Of Caliper Components

1. CALIPER
2. CALIPER PISTON
3. PISTON BOOT

Refer to Figure 39 (See Figure 39, page 42) for Items in parentheses.

4. Before using compressed air, place a wood block (Item 1) between the caliper and caliper pistons. Leave approximately 1 to 1–1/2 inch clearance (Item 2) between caliper pistons and wood block.

NOTE – When using compressed air to remove the pistons and piston boots, use air lines that are completely free of oil and moisture.

WARNING – Do not insert any part of your hand between the caliper and block of wood or between the piston and caliper housing when injecting compressed air into the caliper to remove caliper pistons. Personal injury may occur.

WARNING – Use just enough air pressure to ease pistons from caliper bore. Keep hands out of area between piston and caliper to avoid personal injury. If high pressures are applied, the piston may "POP" out with considerable force. Also be careful to avoid spray of brake fluid.

5. Remove plug (Item 3) from hydraulic line inlet port of caliper.

6. Using a rubber tip air blow nozzle (Item 4), insert the rubber nozzle into hydraulic line inlet port of caliper and inject air into caliper pushing caliper pistons out of caliper piston bores.

7. Remove wood block (Item 1) and remove pistons from caliper.

8. If the caliper pistons are seized or cocked and do not come out, release air pressure and use a soft (brass) hammer to rap sharply on and around the top of the pistons. Then place the wood block (Item 1) back between the caliper and caliper pistons and re-apply air pressure to remove pistons. If not damaged, save for reinstallation.

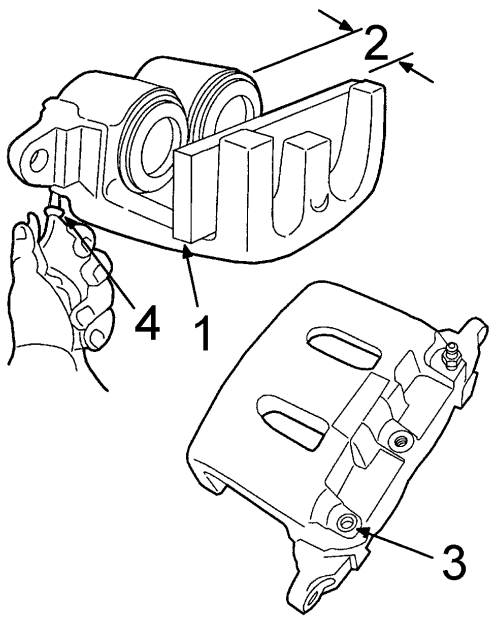


Figure 39 Remove Caliper Pistons using Compressed Air

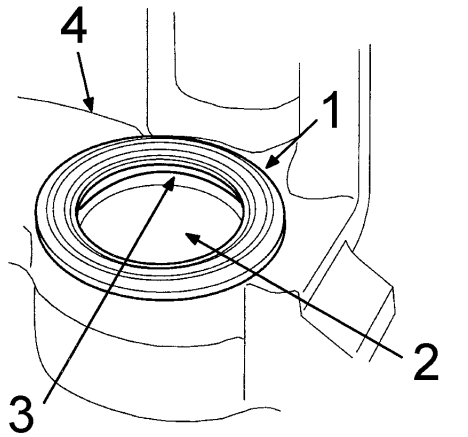
1. WOOD BLOCK
2. 1 INCH TO 1–1/2 INCH CLEARANCE
3. PLUG
4. RUBBER TIP AIR BLOW NOZZLE

Refer to Figure 40 for Items in parentheses.

9. Remove piston boot (Item 1) from the caliper piston bore (Item 2) by prying them out with a small blunt screw driver. Be careful not to damage the caliper piston bore in the caliper. Do NOT re-use piston boot.

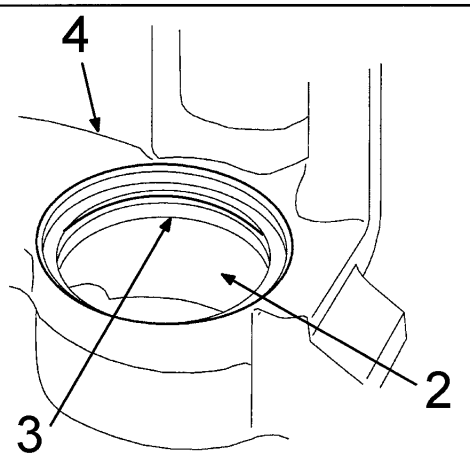
10. Remove piston seal (Item 3) from inside piston bore (Item 2) of the caliper (Item 4). Do NOT re-use piston seal.

11. Repeat steps 9 and 10 above to remove the other piston boot and seal.



PISTON REMOVED

PISTON BOOT AND PISTON SEAL SHOWN



PISTON AND PISTON BOOT REMOVED

PISTON SEAL SHOWN

Figure 40 Remove Caliper Piston Boot from Caliper Piston Bore

1. PISTON BOOT
2. PISTON BORE
3. PISTON SEAL
4. CALIPER

12. Once the caliper has been disassembled, refer to CALIPER, Clean and Inspect (See CALIPER, page 47) to clean and inspect and rebuild the caliper.

5.2. ANCHOR PLATE AND SPLASH SHIELD

Disassembly of Anchor Plate Components

WARNING – Safety glasses should be worn at all times when assembling or disassembling.

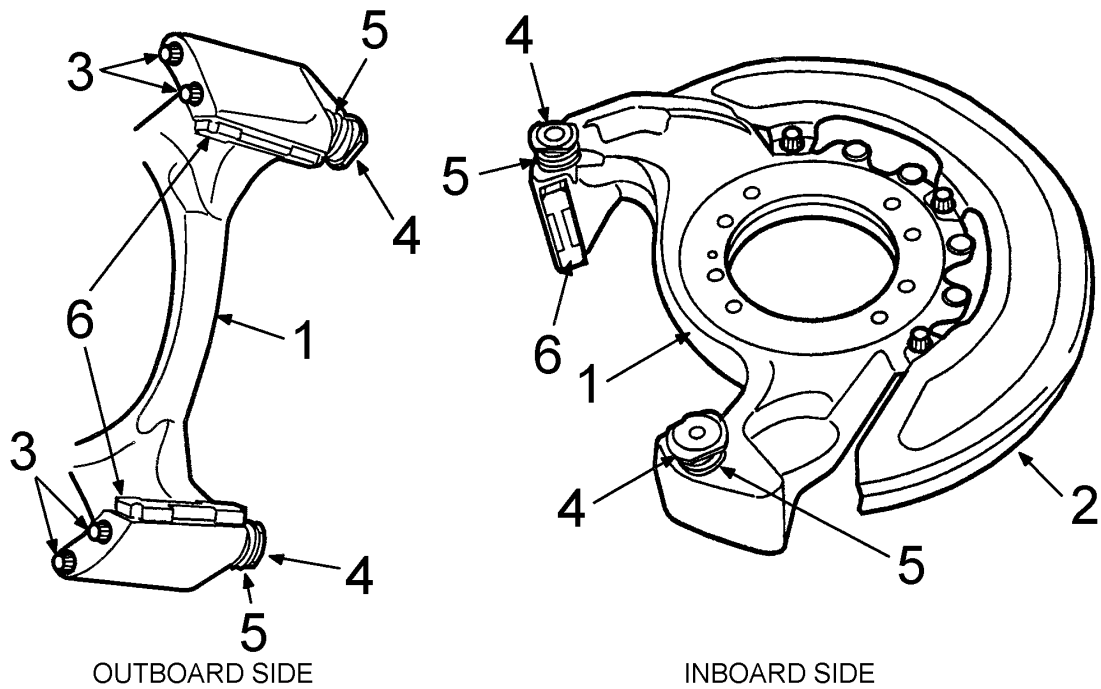


Figure 41 Disassembly Of Anchor Plate Components

DRIVER SIDE FRONT (66 mm) SHOWN
1. ANCHOR PLATE
2. SPLASH SHIELD
3. 12–POINT HEAD BOLT PLUG
4. GUIDE PIN
5. GUIDE PIN BOOT
6. BRAKE PAD ABUTMENT SLIPPER

Refer to Figure 41 (See Figure 41, page 44) for Items in parentheses unless otherwise noted.

1. With the anchor plate and splash shield (Items 1 and 2) removed and placed on a clean work surface, remove brake pad abutment slippers (Item 6) using a blunt nose drift or screwdriver and a light hammer. Avoid marring anchor plate abutment surfaces of anchor plate (Item 1).

2. On front and rear axles with 66 mm disc brakes, remove 12–point head bolt plugs (Item 3) from anchor plate tie bar mounting holes of the anchor plate (Item 1).

3. Remove guide pins and guide pin boots (Items 4 and 5) by pulling guide pin out of anchor plate (Item 1) with a slight twisting motion. The guide pin boot (Item 3, Figure 42) (See Figure 42, page 45) will

pull off the anchor plate boot groove (Item 4, Figure 42) (See Figure 42, page 45). Remove guide pin boots from guide pins.

NOTE – If the guide pins (Item 4) are frozen in the anchor plate (Item 1), use a blunt nose drift through the threaded hole of the 12–point head bolt plug (Item 3) in line with guide pin and carefully drive the guide pin out of the anchor plate guide pin bore.

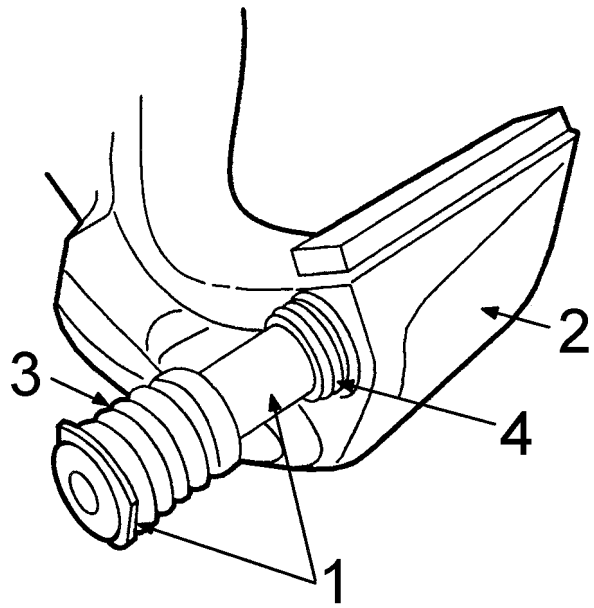


Figure 42 Remove Guide Pins and Guide Pin Boots from Anchor Plate

1. GUIDE PIN
2. ANCHOR PLATE
3. GUIDE PIN BOOT
4. ANCHOR PLATE BOOT GROOVE

Refer to Figure 43 for Items in parentheses.

4. If so equipped, remove ABS sensor bracket (Item 1) from anchor plate (Item 2) by removing two 12–point head bolts (Item 3), driver side front and rear shown.

5. Remove splash shield (Item 4) from anchor plate (Item 2) by removing three 12–point head bolts (Item 5), driver side front and rear shown.

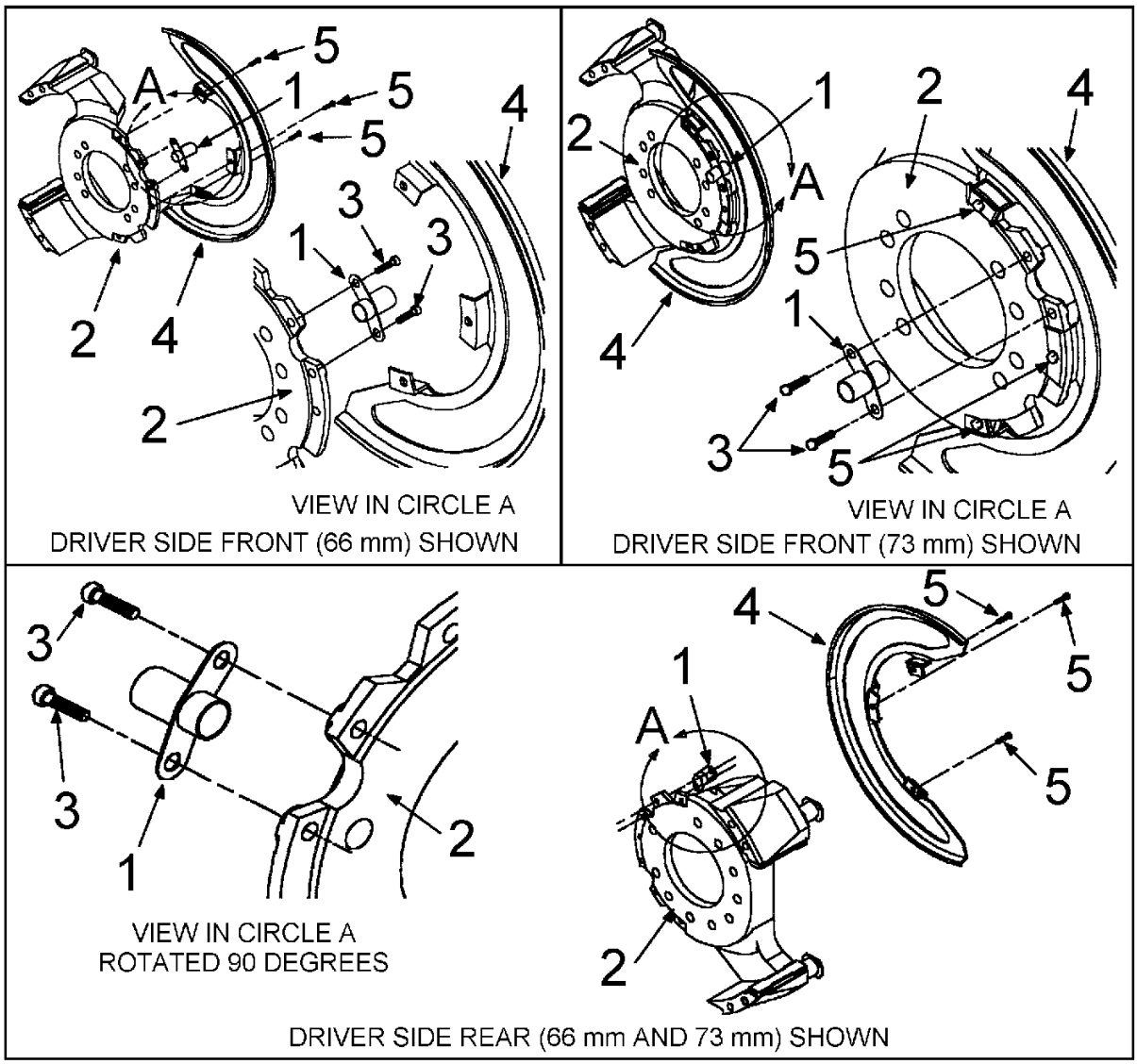


Figure 43 Remove ABS Sensor Bracket and Splash Shield from Anchor Plate

1. ABS SENSOR BRACKET
2. ANCHOR PLATE
3. 12–POINT HEAD BOLT
4. SPLASH SHIELD
5. 12–POINT HEAD BOLT

6. Once the anchor plate and splash shield has been disassembled, refer to ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) to clean and inspect and rebuild the anchor plate and splash shield.

6. CLEAN AND INSPECT

6.1. CALIPER

Clean and Inspect Caliper Components

WARNING – If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent injury, follow the instructions supplied by the manufacturer. Do not use gasoline to clean parts. Gasoline can explode.

Refer to Figure 44 for Items in parentheses.

1. Visually inspect caliper (Item 1) for damage or defects to piston bores or piston seal groove and piston boot groove (Items 2, 3 and 4). If damage or defects are found, repair or replace as required. Always use new piston seals and piston boots during installation of pistons.

2. Check machined surfaces of caliper (Item 1) that are in contact with the guide pin heads, pistons, piston seals, piston boots and brake pads. If any rust or corrosion is present, use a hand held wire brush to clean these surfaces. It is important to clean these areas of the caliper. If any rust is found in the piston seal groove, replace caliper housing.

3. Clean caliper and caliper piston bores (Items 1 and 2) with solvent. Use compressed air to clean out and dry grooves and passages. If piston bores are not clean, wipe out the bore with a dry clean cloth and use 320 to 400 grit emery cloth to lightly sand piston bores. Repeat cleaning with solvent and use compressed air to clean out and dry grooves and passages.

NOTE – When using compressed air, use air lines that are completely free of oil and moisture.

4. Visually inspect caliper piston bores and piston seal groove and piston boot groove (Items 2, 3 and 4). Make sure they are free of foreign matter, pitting, scoring or corrosion. If damage or defects are found, repair or replace caliper housing as required.

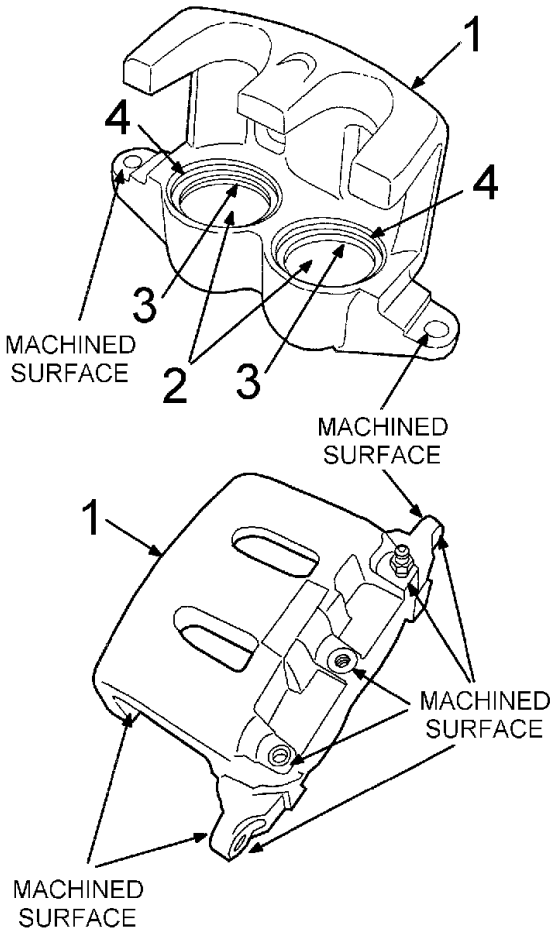


Figure 44 Clean And Inspect Caliper Piston Bores and Machined Surfaces

1. CALIPER
2. PISTON BORE
3. PISTON SEAL GROOVE
4. PISTON BOOT GROOVE

5. Using a pick type tool (Figure 45), be sure caliper piston seal groove and piston boot groove in caliper are free of all foreign materials. Use compressed air to clean out and dry grooves.

NOTE – When using compressed air, use air lines that are completely free of oil and moisture.

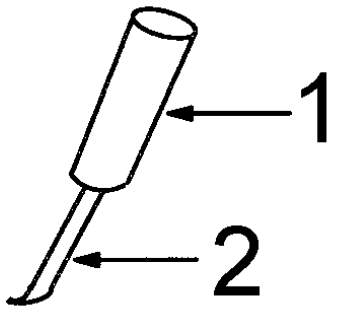


Figure 45 Pick Type Tool

1. HANDLE
2. STEEL SHANK

6. Clean caliper pistons (Item 1, Figure 46) with solvent.

7. Visually inspect caliper pistons for pitting, scoring or excessive wear. If damage or defects are found, replace as required. If foreign material is found in caliper position boot groove (Item 2, Figure 46), use a fiber brush to remove it.

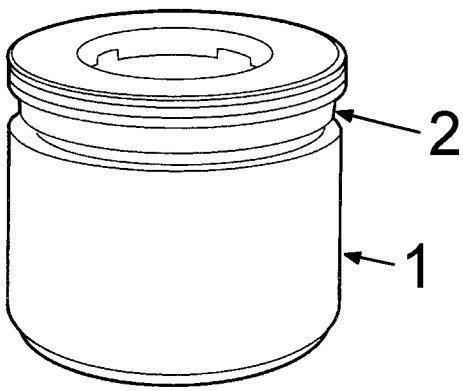


Figure 46 Clean And Inspect Caliper Pistons

1. CALIPER PISTON
2. PISTON BOOT GROOVE

8. Replace piston boots during servicing of caliper. Visually inspect both inside and outside of new piston boot (Figure 47). Do not use if torn or punctured.

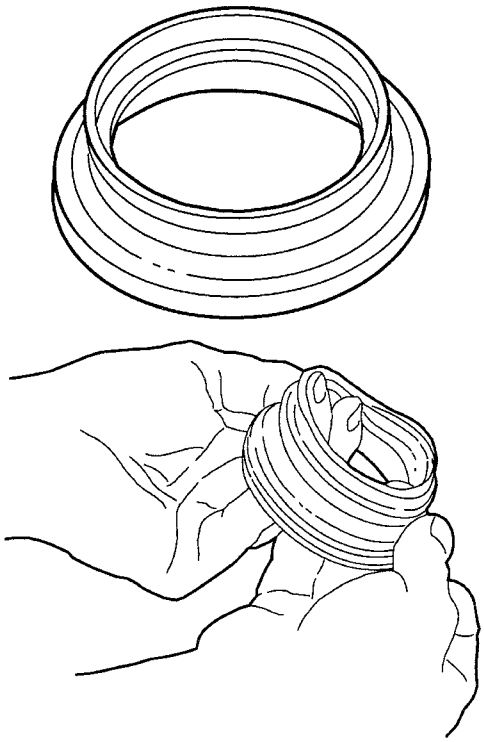


Figure 47 Inspect New Piston Boots

9. Once the caliper has been cleaned and inspected, refer to CALIPER, Assemble (See CALIPER, page 54) to assemble and rebuild the caliper.

6.2. ROTOR AND WHEEL HUB ASSEMBLY

Clean and Inspect Rotor

WARNING – If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent injury, follow the instructions supplied by the manufacturer. Do not use gasoline to clean parts. Gasoline can explode.

1. Clean rotor and wheel hub (Items 12 and 8, Figure 30) (See Figure 30, page 34) and (Items 12 and 8, Figure 31) (See Figure 31, page 35) for front, and (Items 11 and 7, Figure 32) (See Figure 32, page 36) and (Items 11 and 7, Figure 33) (See Figure 33, page 36) for rear with solvent. Use compressed air to dry and clean out clogged or restricted rotor vent holes. If rotor vent holes are not clean, use a screwdriver to dislodge any foreign material and blow out with compressed air.

NOTE – When using compressed air, use air lines that are completely free of oil and moisture.

2. Visually inspect rotor machined surfaces that are in contact with disc brake pads, for grease, brake fluid leakage, scoring, warping, cracks, bluing, heat spots or other damage or defects. If grease, brake fluid leakage, damage or defects are found, repair or replace as required. Refer to GROUP 04 — BRAKES in the Master Service Manual for specifications on inspecting and reconditioning of rotors.

6.3. ANCHOR PLATE AND SPLASH SHIELD

Clean and Inspect Anchor Plate Components

WARNING – If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent injury, follow the instructions supplied by the manufacturer. Do not use gasoline to clean parts. Gasoline can explode.

NOTE – When using compressed air, use air lines that are completely free of oil and moisture.

Refer to Figure 48 for Items in parentheses.

1. Clean anchor plate, guide pin bores and brake pad abutments (Items 1, 2 and 3) with a brush and solvent. Use compressed air to clean out and dry guide pin bores.

2. Check guide pin bores (Item 2) for excessive wear. Replace anchor plate if necessary.

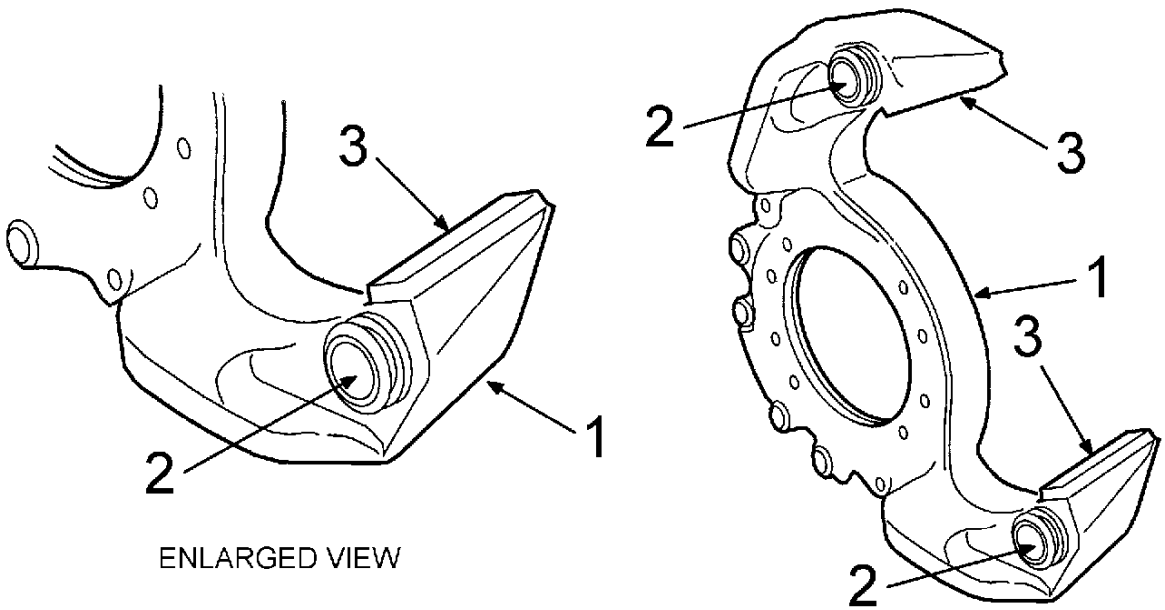


Figure 48 Clean And Inspect Anchor Plate

1. ANCHOR PLATE
2. GUIDE PIN BORES
3. BRAKE PAD ABUTMENT

Refer to Figure 49 for Items in parentheses.

3. Make sure anchor plate pad abutments (Item 1), anchor plate tie bar mounting surfaces (Item 2), axle flange mounting surface (Item 3) and anchor plate tie bar pads (Item 4), if so equipped (73 mm brakes only) are clean and free of any rust or corrosion.

4. Use a hand held wire brush to clean these surfaces. It is important to clean these areas of the anchor plate. Also make sure the tie bar mounting threads (Item 5) are clean and free of foreign matter.

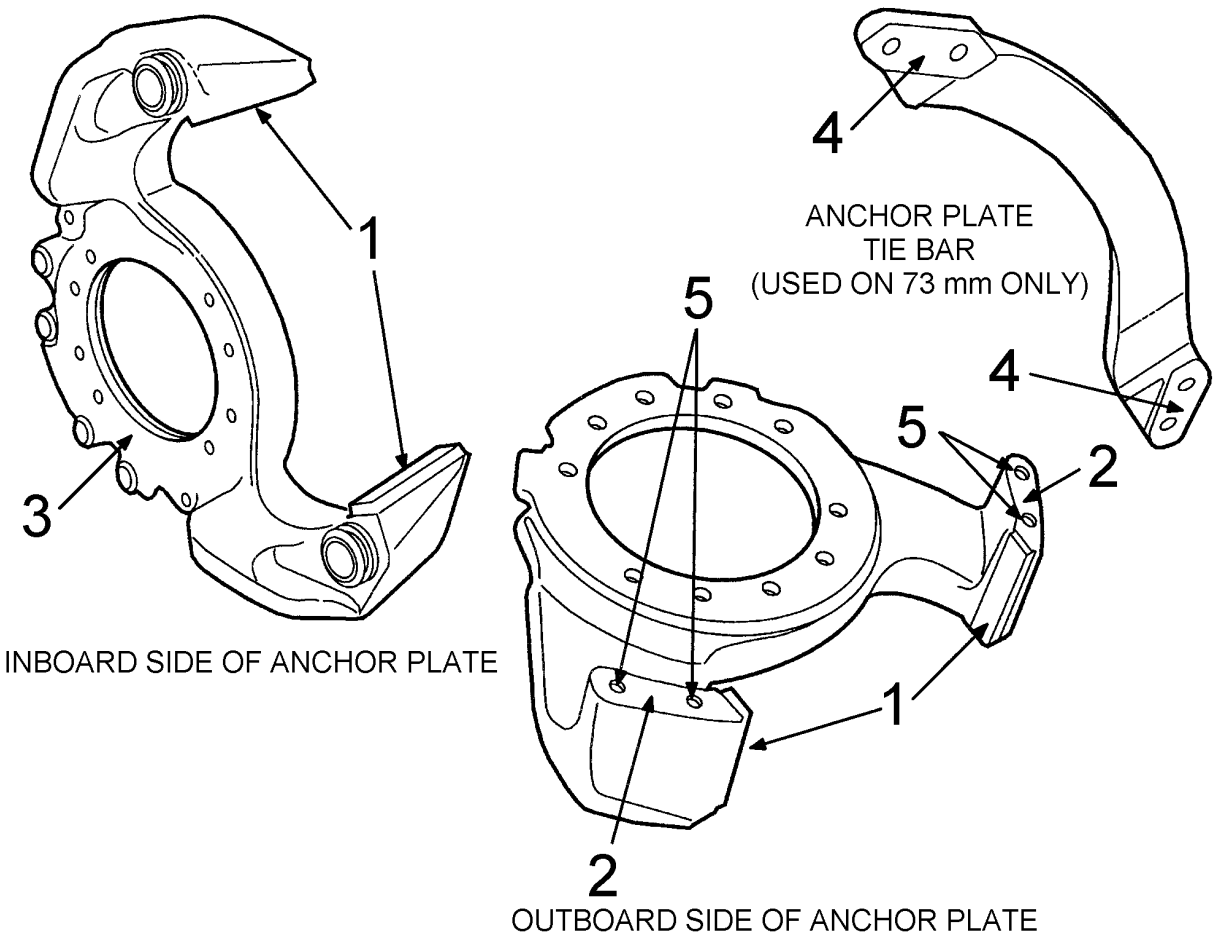


Figure 49 Clean And Inspect Anchor Plate Component Mating Surfaces

1. ANCHOR PLATE PAD ABUTMENT SURFACE
2. ANCHOR PLATE TIE BAR MOUNTING SURFACE
3. AXLE FLANGE MOUNTING SURFACE
4. ANCHOR PLATE TIE BAR PAD MOUNTING SURFACE
5. ANCHOR PLATE TIE BAR MOUNTING THREADS

5. Make sure guide pin bores are free of foreign matter and corrosion. If not clean, use a wire bore brush with solvent and clean out guide pin bores. Use compressed air to clean and dry. Wipe out the bore with a dry, clean, lint free cloth.

Refer to Figure 50 for Items in parentheses unless otherwise noted.

6. Clean abutment slippers (Item 4) and ABS sensor bracket (Item 1, Figure 43) (See Figure 43, page 46) with solvent. Use compressed air to clean and dry. Wipe off with a dry, clean, lint free cloth.

7. Make sure bolt threads in leading and trailing guide pins (Items 1 and 2) are free of foreign matter. Make sure caliper hex flanged mounting bolts (Figure 70) (See Figure 70, page 75) thread in and out of leading and trailing guide pins by hand.

8. Check guide pin boots (Item 3) for damage or defects. If damage or defects are found, they must be replaced. If guide pin boots are not damaged or defective, wash them in soapy water and dry them. Once again, after the guide pin boots have been cleaned and dried, inspect them for damage or defects. If damage or defects are found, they must be replaced.

9. Inspect abutment slippers (Item 4) for damage or wear. Replace if damaged or excessive wear is present.

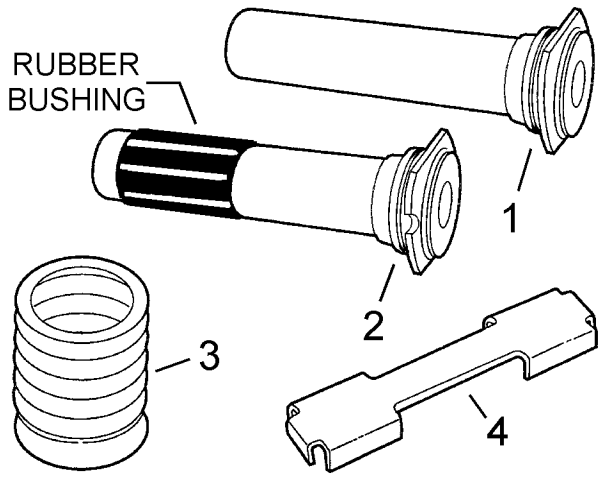


Figure 50 Clean and Inspect Guide Pin Boots and Abutment Slippers

1. LEADING GUIDE PIN
2. TRAILING GUIDE PIN
3. GUIDE PIN BOOT
4. ANCHOR PLATE PAD ABUTMENT SLIPPER

10. Once the anchor plate and splash shield has been cleaned and inspected, refer to ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to assemble and rebuild the anchor plate and splash shield.

7. ASSEMBLE

7.1. CALIPER

Assembly of Caliper Components

WARNING – Safety glasses should be worn at all times when assembling or disassembling.

1. Use new piston seals (Item 1, Figure 51). Dip piston seals in clean hydraulic brake fluid and install in piston seal groove (Item 2, Figure 51) of caliper piston bore. With piston seal positioned in groove, gently work around groove with clean fingers until seal is properly seated into groove. Be sure seal is not twisted or rolled. NEVER USE OLD PISTON SEALS.

2. Repeat step 1 above to install the other piston seal.

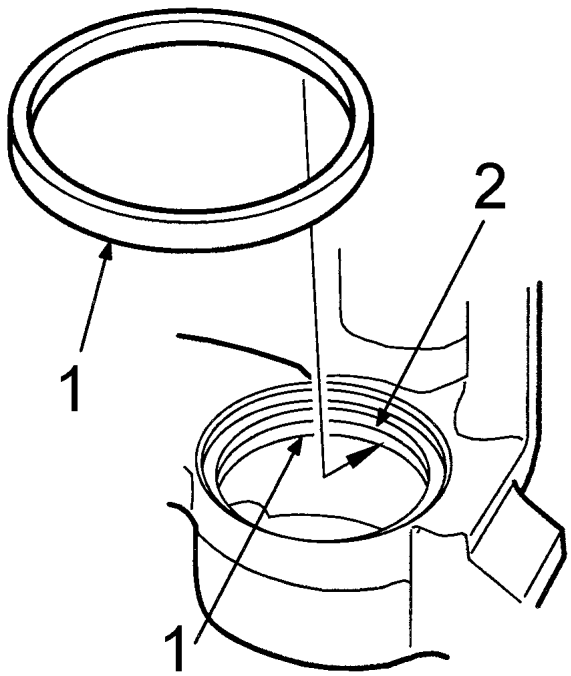


Figure 51 Install Caliper Piston Seal into Caliper Piston Bore Groove

1. PISTON SEAL
2. PISTON SEAL GROOVE

Refer to Figure 52 for Items in parentheses.

3. Apply a thin film of Batco grease (from 3 oz. tube in rebuild kit) to the caliper bore between the piston seal (Item 3) and piston boot groove (Item 2). Apply the grease around the entire circumference of the caliper bore piston boot groove land area (Figure 52).

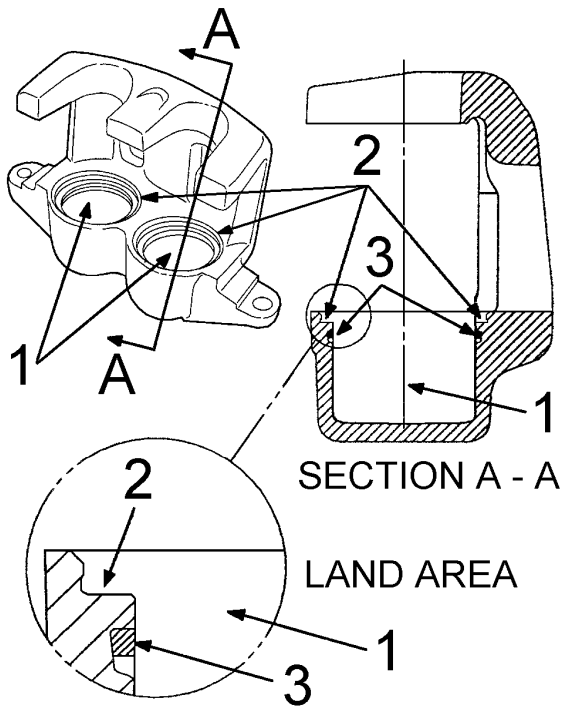


Figure 52 Apply Batco Grease To Caliper Bore Piston Boot Groove between Piston Seal and Piston Boot Groove Land Area

1. PISTON BORE
2. PISTON BOOT GROOVE
3. PISTON SEAL

Refer to Figure 53 (See Figure 53, page 56) for Items in parentheses.

4. Install new piston boot (Item 1) onto caliper piston (Item 2) as follows:

   - Step 1 — Position new piston boot (Item 1) on top end of caliper piston (Item 2) with piston boot top flange (Item 3) properly oriented.
   - Step 2 — Carefully pull piston boot top flange (Item 3) down over the top of the caliper piston (Item 2).
   - Step 3 — Continue pulling piston boot top flange (Item 3) down over caliper piston (Item 2) until inner bead (Item 4) of piston boot (Item 1) is in place at piston boot groove (Item 5) of caliper piston in step 1.
   - Step 4 — Make sure inner bead (Item 4) of piston boot (Item 1) is seated in the piston boot groove (Item 5) in step 1.
   - Step 5 — Pull piston boot top flange (Item 3) back up over the top of the caliper piston (Item 2). Be careful not to dislodge inner bead (Item 4) of piston boot (Item 1) from piston boot groove (Item 5) of the caliper piston in step 1.
   - Step 6 — Return the piston boot (Item 1) to the collapsed or folded position. Make sure the inner bead (Item 4) of piston boot is fully seated in the piston boot groove (Item 5, step 1) by grasping the piston boot flange and turning piston back and forth.

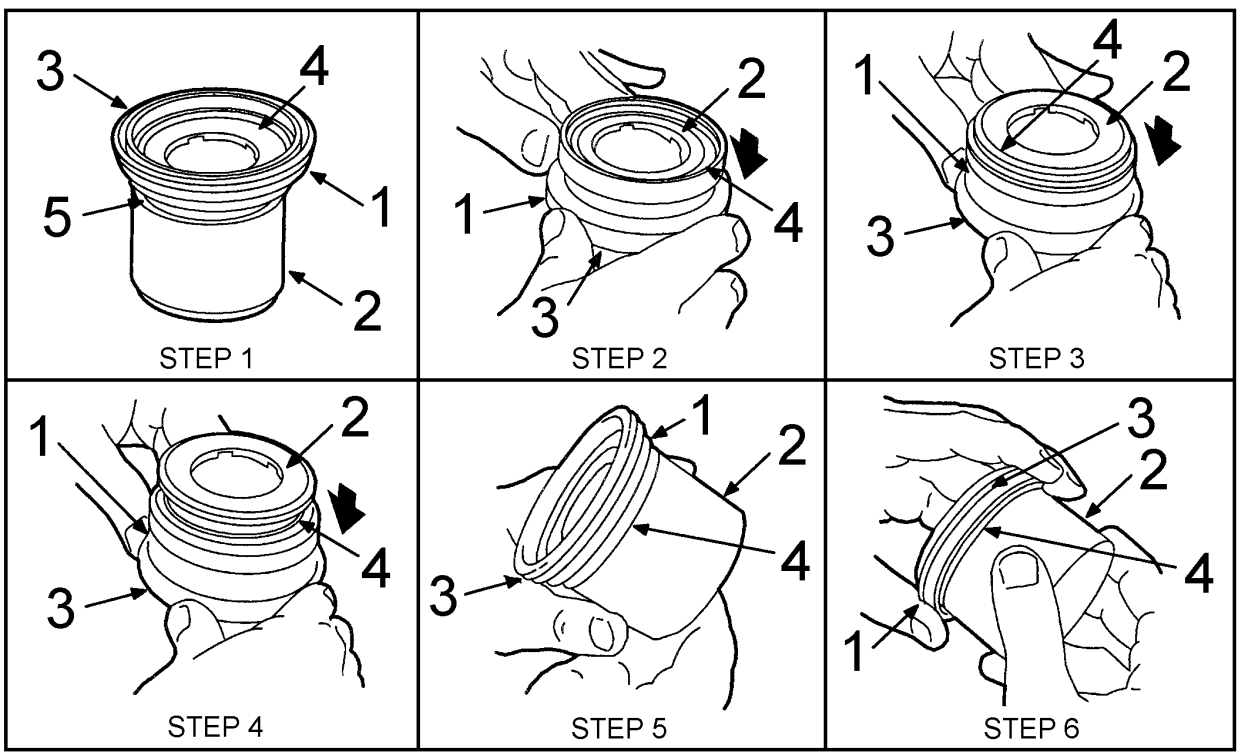


Figure 53 Install Caliper Piston Boot into Caliper Piston Boot Groove

1. PISTON BOOT
2. CALIPER PISTON
3. PISTON BOOT TOP FLANGE
4. INNER BEAD
5. PISTON BOOT GROOVE

Refer to Figure 54 for Items in parentheses.

5. Apply clean hydraulic brake fluid to outside of caliper piston (Item 1) and carefully position caliper piston with piston boot (Item 2) into caliper piston bore (Item 3). By hand, gently push caliper piston past piston seal. Avoid cocking or binding caliper piston during installation.

6. Position caliper piston and boot installation tool (Item 4), either 66 mm or 73 mm, depending on which brake size is being serviced, into position on top of piston and piston boot so the word “boot” is on the bottom side toward the piston. Refer to SPECIAL SERVICE TOOLS (See SPECIAL SERVICE TOOLS, page 97).

7. Use a “C” clamp (Item 5) or arbor press on top of piston and boot installation tool (Item 4) and the back of the caliper and carefully push piston and piston boot (Items 1 and 2) into piston bore until they are fully seated (Item 6) into caliper. Remove “C” clamp or arbor press. Make sure that the piston boot flange ring is fully seated into piston boot groove of piston bore.

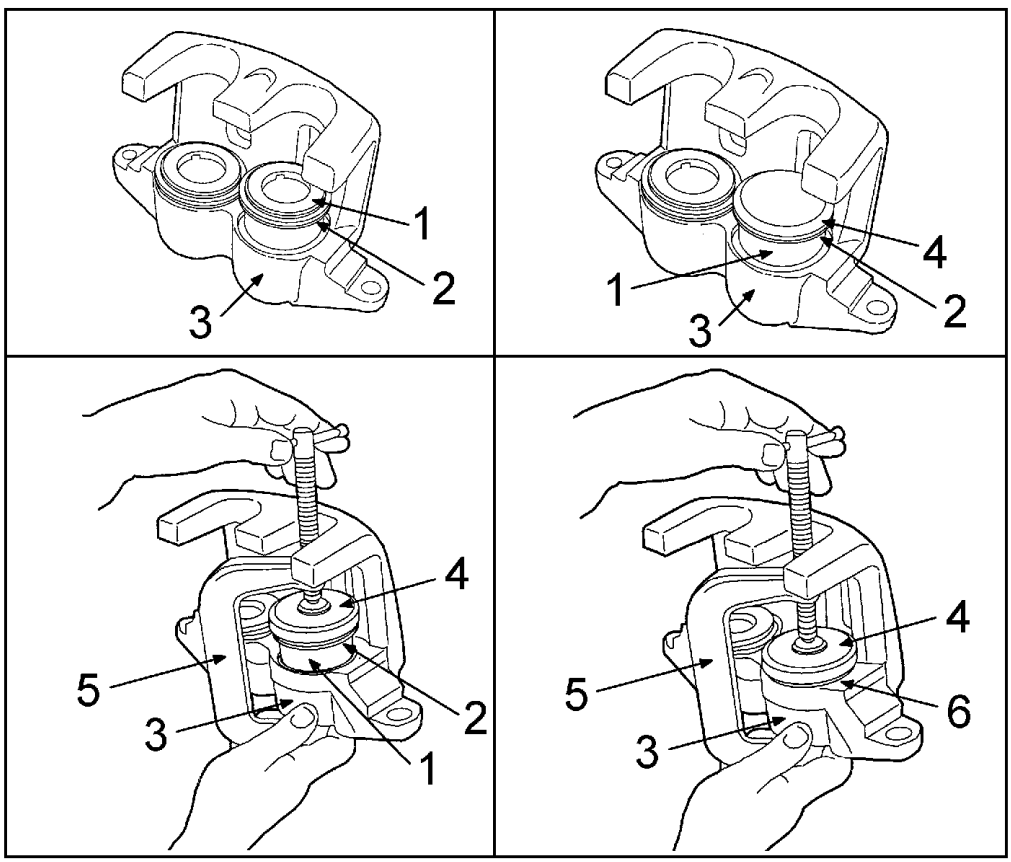


Figure 54 Install Caliper Pistons and Boots into Caliper Piston Bores

1. CALIPER PISTON
2. PISTON BOOT
3. PISTON BORE
4. PISTON AND BOOT INSTALLATION TOOL
5. “C” CLAMP
6. PISTON AND BOOT FULLY SEATED

8. Repeat this procedure for other caliper piston.

9. Once the caliper has been assembled, refer to CALIPER, Install (See CALIPER, page 71) to install the caliper.

7.2. ANCHOR PLATE AND SPLASH SHIELD

Assembly of Anchor Plate Components

> **WARNING – Safety glasses should be worn at all times when assembling or disassembling.**

1. Uniformly apply Shell/Albida PPS 1 grease (from 3 oz. tube in rebuild kit) to both guide pin bores (Item 2, Figure 48) (See Figure 48, page 51) of anchor plate (Item 1, Figure 48) (See Figure 48, page 51) and on the shaft of both leading guide pin and trailing guide pin (including rubber bushing) (Items 1 and 2, Figure 50) (See Figure 50, page 53). Use 1/8 ounce of grease to thoroughly lube each guide pin and guide pin bore set.

2. Installing guide pin boots (Item 3, Figure 50) (See Figure 50, page 53). Apply a thin coat of Shell/Albida PPS 1 grease (from 3 oz. tube in rebuild kit) to the inside opening at each end of the guide pin boot. **When rebuilding the anchor plate, use new guide pin boots**.

Refer to Figure 55 (See Figure 55, page 59) for Items in parentheses unless otherwise noted.

3. Once the grease has been applied to the leading guide pin (Item 1, View A) and guide pin boot (Item 2, View A), slide the leading guide pin through the guide pin boot.

4. Before installing leading guide pin and trailing guide pin with rubber bushing, determine which anchor plate guide pin bore is the leading guide pin bore and which is the trailing guide pin bore. Leading guide pin bore position and trailing guide pin bore positions of the anchor plate are based on the forward rotation of the rotor and wheel hub (Items 1 and 2, Figure 56) (See Figure 56, page 60).
   a. Leading guide pin (Item 3, Figure 56) (See Figure 56, page 60) always goes in the anchor plate guide pin bore which is always the entry point of the caliper by rotation of the rotor in the forward direction, driver side shown.
   b. Trailing guide pin with rubber bushing (Item 4, Figure 56) (See Figure 56, page 60) always goes in the anchor plate guide pin bore which is always the exit point of the caliper by rotation of the rotor in the forward direction, driver side shown.

5. Once the leading guide pin bore position has been identified, insert leading guide pin (Item 1, View B) with guide pin boot (Item 2, View B) into leading guide pin bore position (Item 3, View B) of anchor plate (Item 4, View B) until guide pin boot (Item 2, View C) is completely compressed.

6. Rotate leading guide pin (Item 1) 1/4 to 1/2 turn and back to seat guide pin boot (Item 2) at both ends (Item 5, View D). Inspect guide pin boot to ensure boot is fully seated all around guide pin and anchor plate boot retaining grooves (Item 5, View D).

7. Repeat this procedure to install the trailing guide pin with rubber bushing (Item 4, Figure 56) (See Figure 56, page 60) and guide pin boot into the trailing guide pin bore position of anchor plate. It may be necessary to use a wrench on the trailing guide pin with rubber bushing to rotate it 1/4 to 1/2 turn and back

to seat guide pin boot at both ends because of the snug fit in the guide pin bore. Inspect guide pin boot to ensure boot is fully seated all around guide pin and anchor plate boot retaining grooves (Item 5, View D).

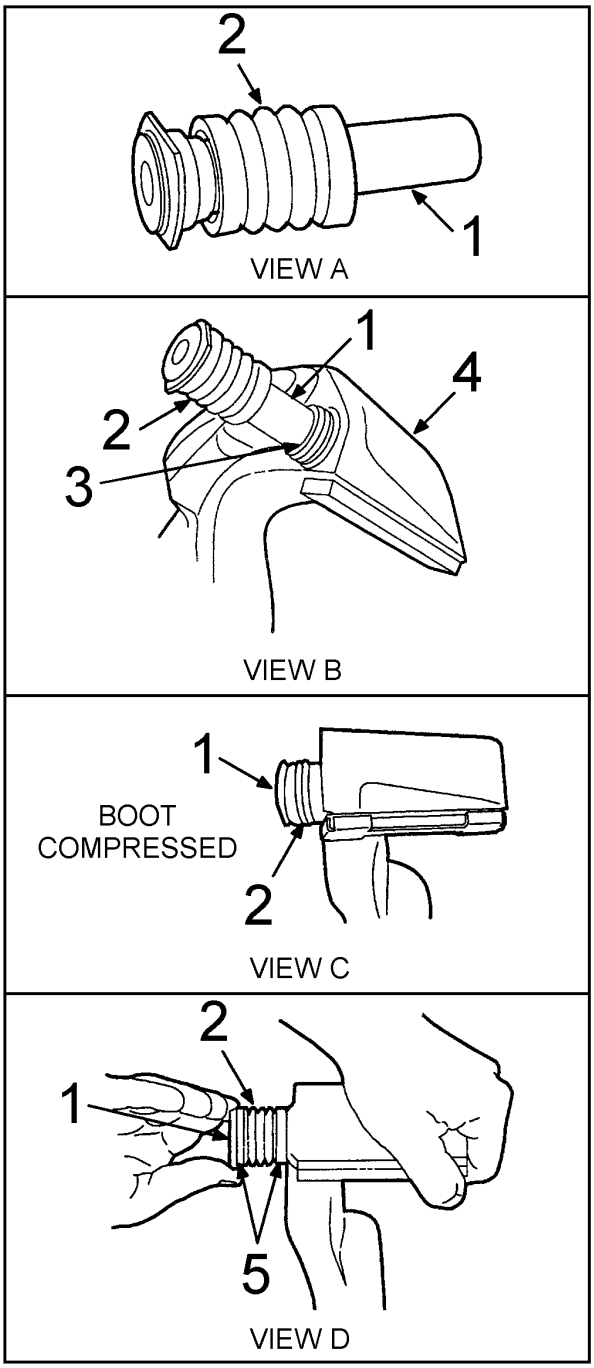


Figure 55 Install Guide Pin Boot on Guide Pin and Anchor Plate Boot Grooves

1. LEADING GUIDE PIN
2. GUIDE PIN BOOT
3. LEADING GUIDE PIN BORE POSITION
4. ANCHOR PLATE
5. SEATED FULLY INTO GUIDE PIN AND ANCHOR PLATE GROOVES

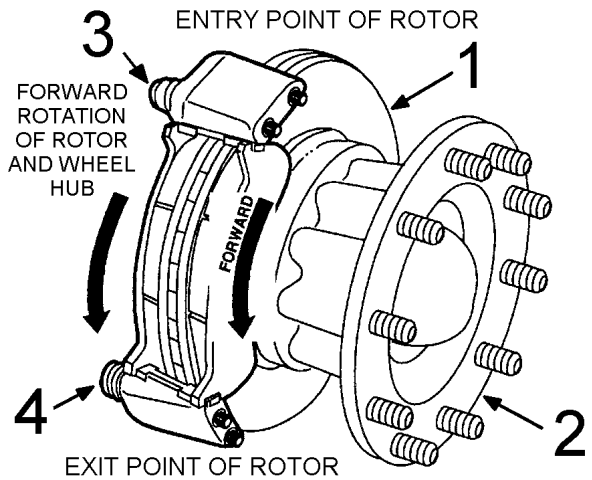


Figure 56 Forward Rotation of Rotor and Wheel Hub

DRIVER SIDE SHOWN
1. ROTOR
2. WHEEL HUB
3. LEADING GUIDE PIN
4. TRAILING GUIDE PIN WITH RUBBER BUSHING

Refer to Figure 57 for Items in parentheses.

8. Install anchor plate pad abutment slippers (Item 1) onto anchor plate abutments (Item 2) using soft brass or light hammer. Avoid marring anchor plate abutment and slipper surfaces.

9. On front and rear axles with 66 mm disc brakes, install 12–point head bolt plug (Item 3) into anchor plate tie bar mounting holes of the anchor plate (Item 4). Tighten to 40 to 50 lbf-ft (54 to 68 N•m).

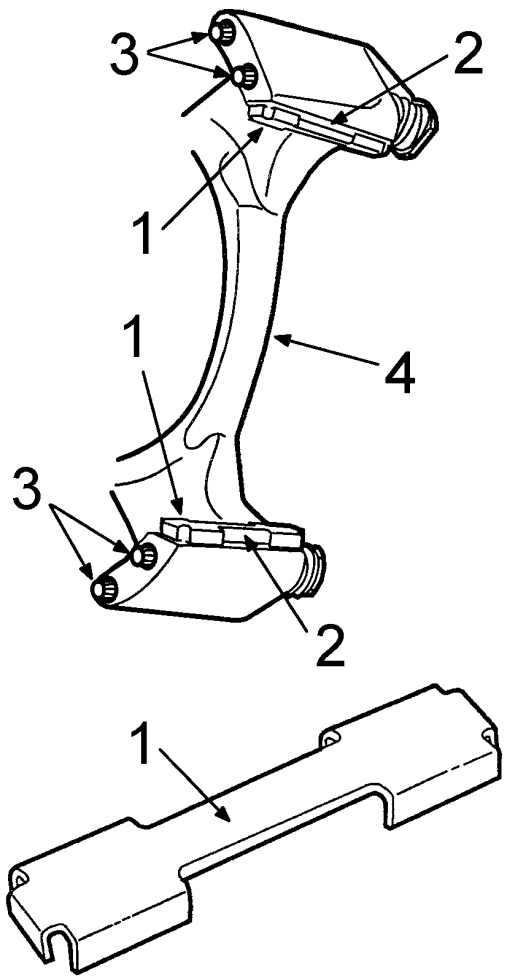


Figure 57 Install Abutment Slippers and 12–Point Head Bolt Plugs

1. ANCHOR PLATE PAD ABUTMENT SLIPPER
2. ANCHOR PLATE PAD ABUTMENT
3. 12–POINT HEAD BOLT PLUG
4. ANCHOR PLATE

10. Once the anchor plate and splash shield has been assembled, refer to ANCHOR PLATE AND SPLASH SHIELD, Install (See ANCHOR PLATE AND SPLASH SHIELD, page 85) to install the anchor plate and splash shield.

8. INSTALL

8.1. DISC BRAKE PADS

There are three types of lining materials available for the hydraulic pin slide brake system. HX-7A1–EE brake pads and softer lining brake pads identified by lining code 7610 with smooth backing plates for heavy duty braking applications and HX–402–EE brake pads for light duty braking applications.

- The HX–7A1–EE lining material of inboard disc brake pad (Item 1, Figure 3) (See Figure 3, page 3) and outboard disc brake pad (Item 2, Figure 3) (See Figure 3, page 3) are chamfered and are marked with an “ARROW” and the word “FORWARD” for proper installation. Brake pads are NOT interchangeable from inboard to outboard side on the same wheel.
- The optional HX–402–EE lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.
- The optional SOFTER lining material of inboard and outboard disc brake pads (Item 3, Figure 3) (See Figure 3, page 3) are NOT chamfered and ARE interchangeable from inboard to outboard side on the same wheel.

If inspection reveals that caliper piston boots are worn or damaged, replace them. Refer to CALIPER, Remove (See CALIPER, page 24), CALIPER, Disassemble (See CALIPER, page 41), CALIPER, Clean and Inspect (See CALIPER, page 47), CALIPER, Assemble (See CALIPER, page 54) and CALIPER, Install (See CALIPER, page 71) to remove, disassemble, clean and inspect, assemble and install caliper and replace caliper piston boots.

During service procedure, keep grease and other foreign material from caliper assembly, disc brake pads, brake rotor and external surfaces of hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Install

NOTE – When replacing disc brake pads, be sure to use the same brake lining material type on both axles. Mixing lining types can result in unbalanced braking and pad wear.

NOTE – New disc brake pads come in axle sets, and new anchor plate pad abutment slippers are supplied with disc brake pad axle sets.

Refer to Figure 58 for Items in parentheses.

1. Install new anchor plate pad abutment slippers (Item 3) onto anchor plate pad abutment, driver side front and rear brake shown.

2. Position inboard and outboard disc brake pads (Items 1 and 2) onto anchor plate pad abutment slippers (Item 3) with the lining facing toward the rotor, driver side front and rear brake shown.

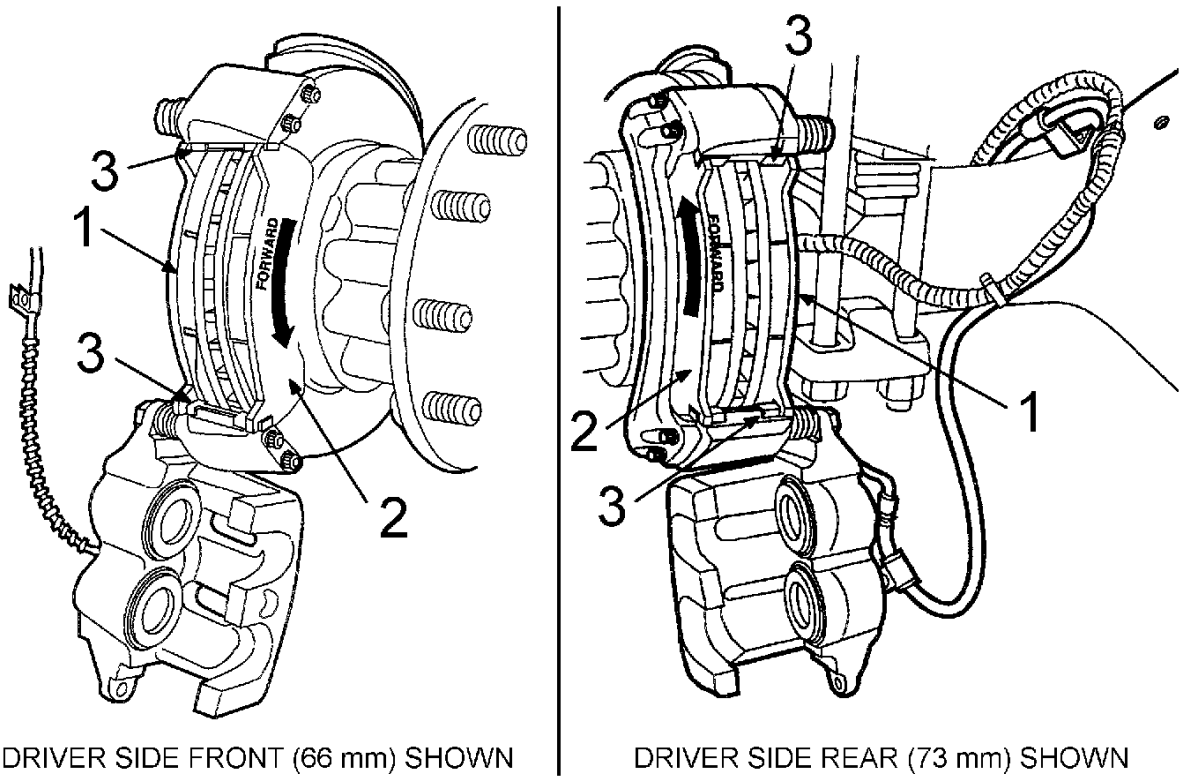


Figure 58 Installing Disc Brake Pads

1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD
3. ANCHOR PLATE PAD ABUTMENT SLIPPER

CAUTION – The HX–7A1–EE inboard and outboard disc brake pads (Items 1 and 2, Figure 59) are not interchangeable. The word "FORWARD" and the "ARROW" markings on the brake pad backing plate show forward rotation direction of the rotor (Item 3, Figure 59). The arrow MUST point in the forward rotor rotation direction (Figure 60) (See Figure 60, page 65). The optional HX–402–EE and SOFTER lining brake pads inboard and outboard disc brake pads (Item 4, Figure 59) are interchangeable between the inner and outer locations.

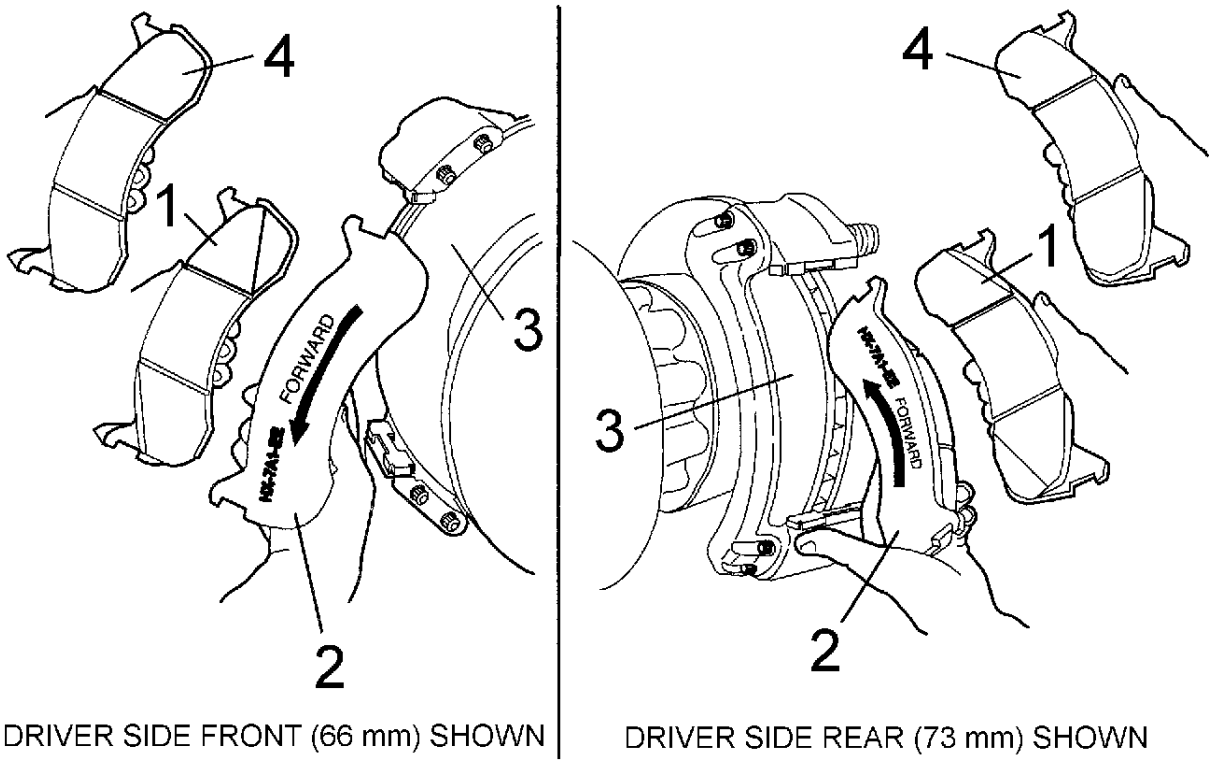


Figure 59 HX–7A1–EE Disc Brake Pads with FORWARD and ARROW Markings Show Forward Rotation Direction of Rotor

1. HX–7A1–EE INBOARD DISC BRAKE PAD (CHAMFERED LINING)
2. HX–7A1–EE OUTBOARD DISC BRAKE PAD (CHAMFERED LINING)
3. ROTOR
4. HX–402–EE INBOARD OR OUTBOARD DISC BRAKE PAD (NOT CHAMFERED) AND SOFTER DISC BRAKE PAD WITH LINING CODE 7610 AND SMOOTH BACKING PLATE (NOT CHAMFERED)

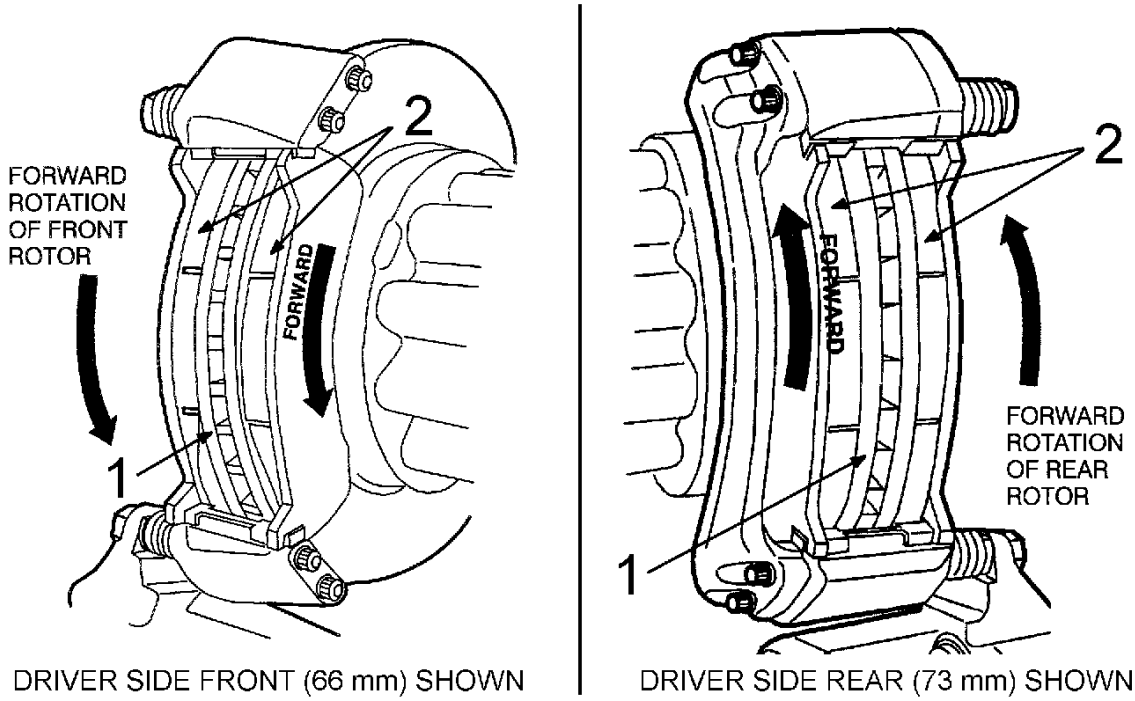


Figure 60 Install HX–7A1–EE Inboard and Outboard Disc Brake Pads with Arrow in Forward Rotor Rotation Direction

1. ROTOR
2. DISC BRAKE PAD

3. Make sure both caliper pistons are fully bottomed into caliper piston bores to provide clearance for new disc brake pads before caliper is rotated back into position.

Refer to Figure 61 for Items in parentheses.

4. Carefully rotate the caliper (Item 1) closed about the lower (bottom) hex flanged mounting bolt and guide pin (Items 2 and 3). Do not allow the brake line hose (Item 4) to become pinched or kinked, driver side front brake shown.

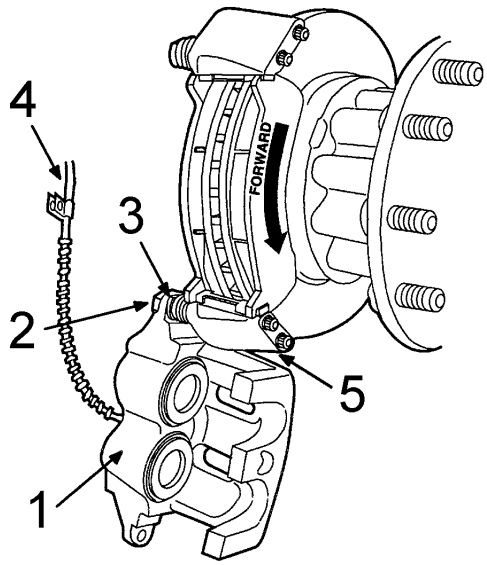


Figure 61 Rotate Caliper Closed About Lower Hex Mounting Bolt and Guide Pin

DRIVER SIDE FRONT (66 mm) SHOWN
1. CALIPER
2. LOWER HEX FLANGED MOUNTING BOLT
3. LOWER GUIDE PIN
4. BRAKE LINE HOSE
5. ANCHOR PLATE

Refer to Figure 62 (See Figure 62, page 67) for Items in parentheses unless otherwise noted.

5. Align flat on upper (top) guide pin head (Item 1) with the flat on caliper upper (top) guide pin boss (Item 2). Use care when positioning caliper (Item 3) over the disc brake pads, rotor and upper (top) guide pin head (Items 4, 5 and 6) to avoid tearing, cutting or dislodging piston boots or guide pin boot (Items 7 and 8), driver side front brake shown.

6. Hold caliper (Item 3) in closed position with caliper upper guide pin boss hole aligned with threads in upper (top) guide pin head (Item 6), driver side front brake shown.

IMPORTANT – Check hex flanged mounting bolts for adhesive patch (Figure 70) (See Figure 70, page 75), if an adhesive patch is found, using a steel brush, buff the adhesive residue from the bolt threads. **Buff ONLY the area where the adhesive is present so as to not remove the protective black coating on the remainder of the threads.** Be sure to completely remove the existing adhesive so that bare steel is showing where the adhesive was on the threads, or if no adhesive patch is found, apply a small patch of liquid Loctite 2440 to the area indicated as adhesive patch in (Figure 70) (See Figure 70, page 75). For best Loctite 2440 performance, surfaces should be clean and free of grease. Loctite should be applied to the bolt in sufficient quantity to fill all engaged threads. Loctite develops usable strength within 1 hour and full strength at room temperature in 3 hours.

WARNING – Take care when you use Loctite, to avoid serious personal injury. Follow the manufacturer's instructions to prevent irritation to the eyes and skin.

7. Install upper (top) hex flanged mounting bolt (Item 9) finger tight, securing the caliper (Item 3) to the anchor plate (Item 10), driver side front brake shown.

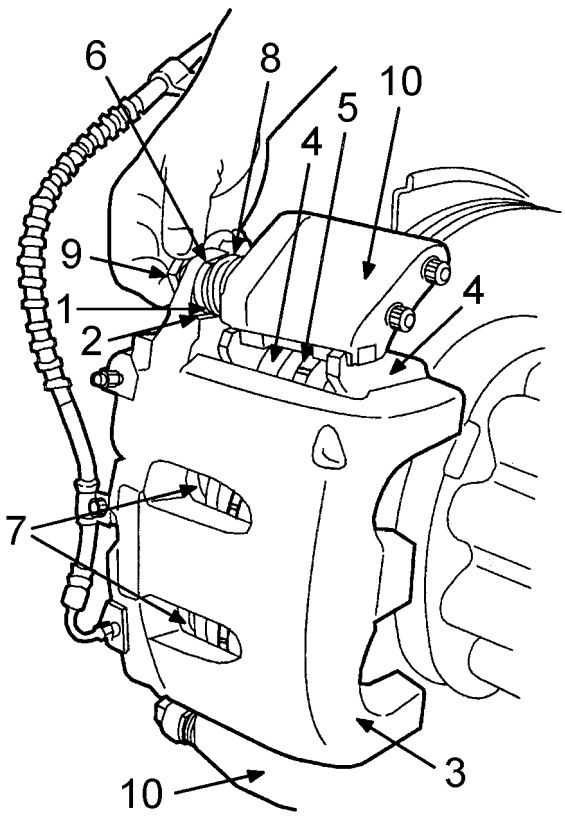


Figure 62 Rotate Caliper Closed and Install Upper Hex Mounting Bolt

DRIVER SIDE FRONT (66 mm) SHOWN
1. UPPER GUIDE PIN HEAD FLAT
2. CALIPER UPPER GUIDE PIN BOSS FLAT
3. CALIPER
4. DISC BRAKE PAD
5. ROTOR
6. UPPER GUIDE PIN
7. PISTON BOOT
8. GUIDE PIN BOOT
9. UPPER HEX FLANGED MOUNTING BOLT
10. ANCHOR PLATE

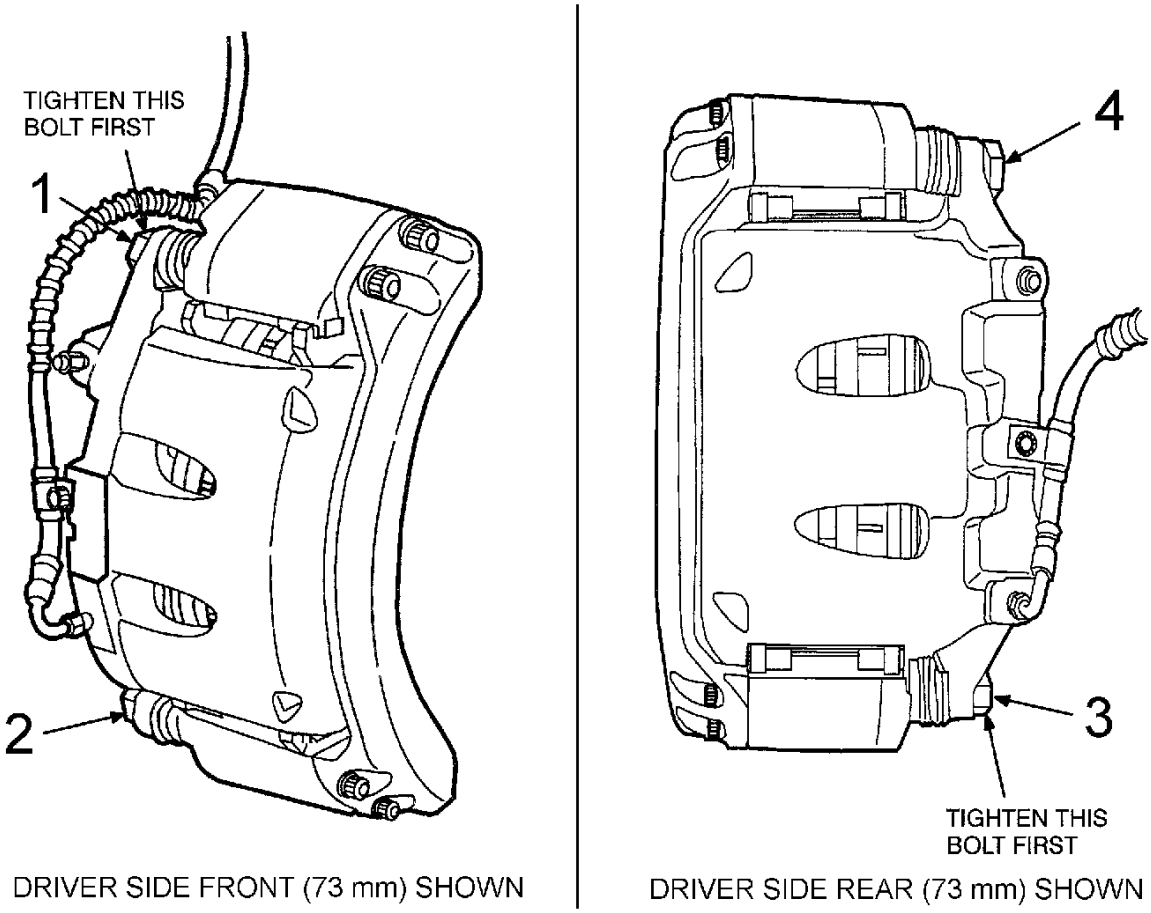


Figure 63 Proper Sequence for Tightening Caliper Hex Mounting Bolts

1. UPPER MOUNTING BOLT (FRONT BRAKES)
2. LOWER MOUNTING BOLT (FRONT BRAKES)
3. LOWER MOUNTING BOLT (REAR BRAKES)
4. UPPER MOUNTING BOLT (REAR BRAKES)

CAUTION – After caliper has been secured by upper mounting bolt (Item 1, Figure 63) (See Figure 63, page 68) on front caliper or (Item 4, Figure 63) (See Figure 63, page 68) on rear caliper, loosen lower mounting bolt (Item 2, Figure 63) (See Figure 63, page 68) on front caliper or (Item 3, Figure 63) (See Figure 63, page 68) on rear caliper, it is important to tighten the mounting bolts in the proper sequence. Increased brake drag may result from not tightening in proper sequence. Use the tighten sequence and torque requirements in step 8 below:

Refer to Figure 63 (See Figure 63, page 68) for Items in parentheses.

8. Tighten the caliper mounting bolts on front brakes and rear brakes in the proper sequence and to the specified torque requirements in steps a and b below:

a. For FRONT brakes, upper (top) mounting bolt (Item 1) should be tightened first, tighten to 93 to 107 lbf-ft (126 to 145 N•m). Then tighten lower (bottom) mounting bolt (Item 2), tighten to 93 to 107 lbf-ft (126 to 145 N•m).

b. For REAR brakes, lower (bottom) mounting bolt (Item 3) should be tightened first, tighten to 93 to 107 lbf-ft (126 to 145 N•m). Then tighten upper (top) mounting bolt (Item 4), tighten to 93 to 107 lbf-ft (126 to 145 N•m).

Refer to Figure 64 for Items in parentheses.

9. On front axles only, position brake line retaining clip (Item 2) over threaded stud (Item 3) on the steering knuckle hose support bracket (Item 4); make sure the brake line hose is not pinched or kinked. Install hex nut and lock washer (Item 1). Tighten to 115 to 140 lbf-in (13 to 16 N•m).

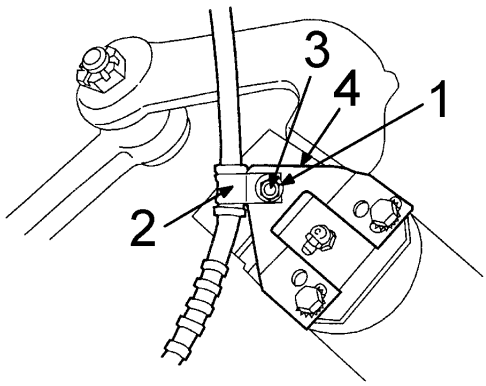


Figure 64 Install Brake Line Retaining Clip and Install Hex Nut and Flat Washer

DRIVER SIDE FRONT SHOWN
1. HEX NUT AND LOCK WASHER
2. BRAKE LINE RETAINING CLIP
3. THREADED STUD
4. HOSE SUPPORT BRACKET

Refer to Figure 65 for Items in parentheses.

10. On rear axles only, if vehicle is equipped with ABS brake system and/or air suspension system, place brake line retaining clip (Item 1) in position on caliper (Item 2) and install hex head bolt (Item 3). Tighten to 18 to 22 lbf-ft (24 to 30 N•m). Place brake line retaining clip (Item 4) in position on axle (Item 5) and install hex head bolt (Item 6). Tighten to 20 lbf-ft (27 N•m).

IMPORTANT – If any of the tywrap straps (Item 7) were cut off to allow caliper to rotate down during disc brake pad replacement, install new tywrap straps in the proper places after caliper and brake line hose have been secured.

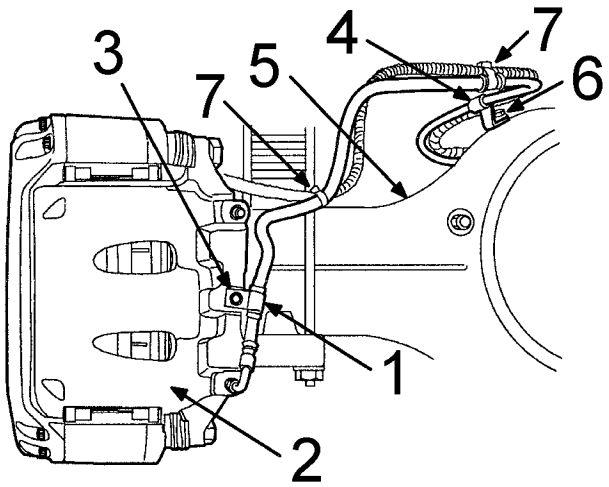


Figure 65 Install Brake Line Retaining Clips on Rear Axle and Caliper

DRIVER SIDE REAR (73 mm) SHOWN
1. RETAINING CLIP
2. CALIPER
3. HEX HEAD BOLT
4. RETAINING CLIP
5. AXLE
6. HEX HEAD BOLT
7. TYWRAP STRAP

11. If necessary, bleed brakes. Refer to BLEEDING INSTRUCTIONS (See BLEEDING INSTRUCTIONS, page 93).

12. Check the master cylinder reservoir and fill if necessary. Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper brake fluid.

WARNING – When adding fluids, take care to identify fluids (power steering fluid or brake fluid) and use only in the proper system. Discard all fluid bled or drained from either system. Do not use for refill, cleaning or any other purpose. Failure to observe these precautions could result in failure of the brake system, with resultant personal injury and/or property damage.

13. Install wheel (tire and rim) on vehicle and remove floor stands. Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel installation. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications based on mounting hardware size and thread type.

NOTE – When installing the wheel on disc brake axles, make sure the tire valve stem clears the brake caliper. The use of a valve stem retainer or a tire manufacturer's stem forming tool are the only acceptable methods of obtaining clearance when necessary.

14. After any brake service, be sure to test brakes prior to returning vehicle to service. A firm pedal should be felt during brake application.

8.2. CALIPER

During service procedure, keep grease and other foreign material away from caliper assembly, disc brake pads, brake rotor and external surfaces of hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

In the event the original disc brake pads are to be used again, use the markings made during removal, so that they are reinstalled in same location.

IMPORTANT – If a new caliper assembly is being installed, be sure that the bleeder screw (Item 1, Figure 21) (See Figure 21, page 24) is installed in Upper (top) hydraulic line port of caliper (Item 2, Figure 21) (See Figure 21, page 24).

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Install

Refer to Figure 66 for Items in parentheses unless otherwise noted.

1. Before installing caliper, visually inspect anchor plate (Item 1) for damage or defects to mating surfaces at anchor plate pad abutment slippers (Item 2) and check guide pin heads (Item 3). If damage or defects are found they must be replaced. Refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to remove and install guide pins or anchor plate pad abutment slippers.

2. If guide pins are being replaced with new guide pins (Figure 67) (See Figure 67, page 72). Pull guide pin boots (Item 4) off anchor plate (Item 1) or old guide pins and check for damage or defects. If damage or defects are found, they must be replaced. If guide pin boots are not damaged or defective, wash them in soapy water and dry them. Once again, after the guide pin boots have been cleaned and dried, inspect them for damage or defects. If damage or defects are found, they must be replaced. Refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to remove and install guide pin boots.

3. Also, visually inspect rotor (Item 5) for scoring, warping, cracks, bluing, heat spots or other damage or defects. If damage or defects are found, repair or replace as required. Refer to ROTOR AND WHEEL HUB ASSEMBLY, Remove (See ROTOR AND WHEEL HUB ASSEMBLY, page 31) and ROTOR AND WHEEL HUB ASSEMBLY, Install (See ROTOR AND WHEEL HUB ASSEMBLY, page 80).

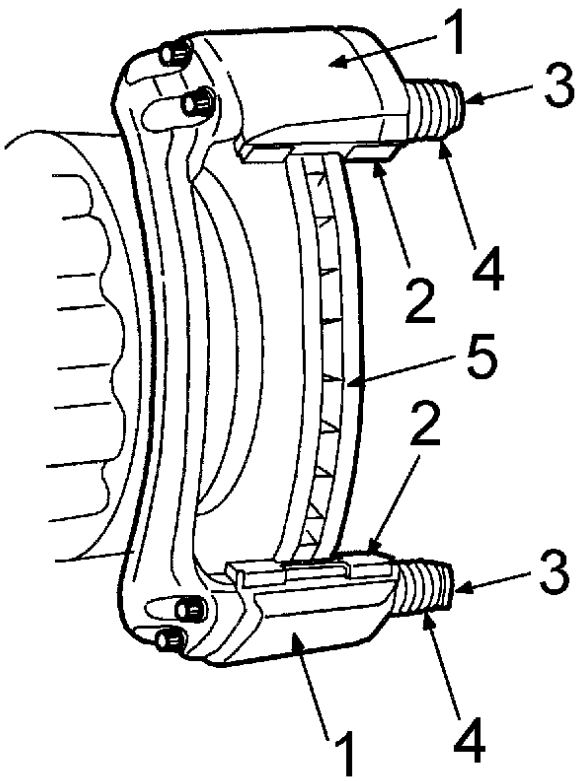


Figure 66 Inspect Anchor Plate, Slippers, Guide Pin Heads, Guide Pin Boots and Rotor

1. ANCHOR PLATE
2. ANCHOR PLATE PAD ABUTMENT SLIPPER
3. GUIDE PIN HEAD
4. GUIDE PIN BOOT
5. ROTOR

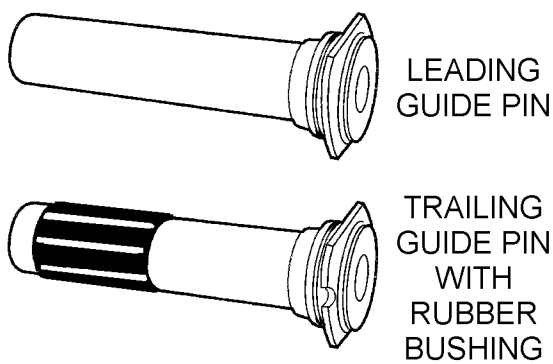


Figure 67 Leading Guide Pin and Trailing Guide Pin with Rubber Bushing

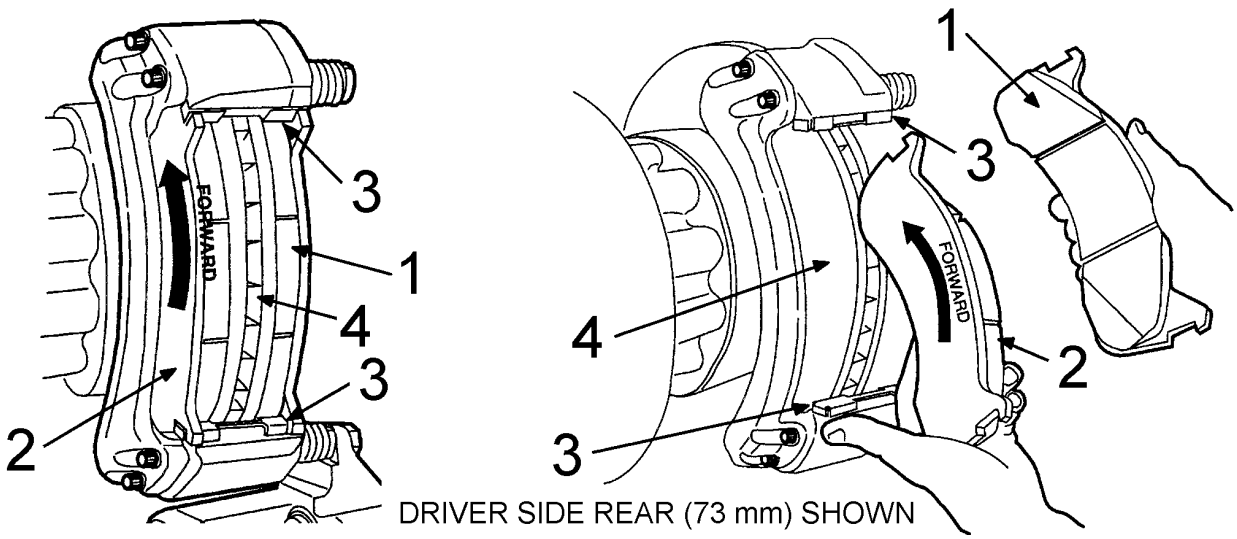


Figure 68 Install Inboard and Outboard Disc Brake Pads

1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD
3. ANCHOR PLATE PAD ABUTMENT SLIPPER
4. ROTOR

Refer to Figure 68 for Items in parentheses.

4. If old disc brake pads were removed and are being reinstalled, position inboard and outboard disc brake pads (Items 1 and 2) onto anchor plate pad abutment slippers (Item 3) with the lining facing toward the rotor (Item 4), driver side rear brake shown.

CAUTION – The HX–7A1–EE inboard and outboard disc brake pads (Items 1 and 2, Figure 68) (See Figure 68, page 73) are not interchangeable. The word "FORWARD" and the "ARROW" markings on the brake pad backing plate show forward rotation direction of the rotor (Item 4, Figure 68) (See Figure 68, page 73). The arrow MUST point in the forward rotor rotation direction (Figure 69) (See Figure 69, page 74). The optional HX–402–EE and SOFTER lining brake pads, inboard and outboard disc brake pads (Item 4, Figure 59) (See Figure 59, page 64) are interchangeable between the inner and outer locations.

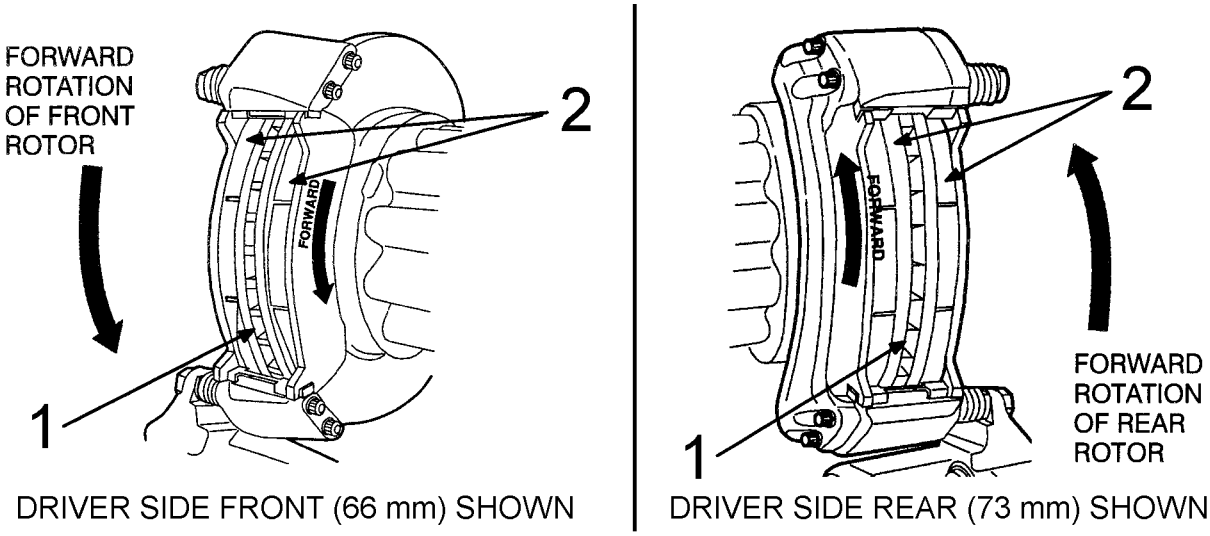


Figure 69 Install Inboard and Outboard Disc Brake Pads with Arrow in Forward Rotor Rotation Direction

1. ROTOR
2. DISC BRAKE PAD

5. If new disc brake pads are being installed, refer to DISC BRAKE PADS, Install (See DISC BRAKE PADS, page 15).

CAUTION – Be sure that the correct caliper hex flanged mounting bolt M12–1.25 x 40 mm long, fine thread, dark-gray/black color (Figure 70) (See Figure 70, page 75), torque sequence and torque value is used during caliper installation.

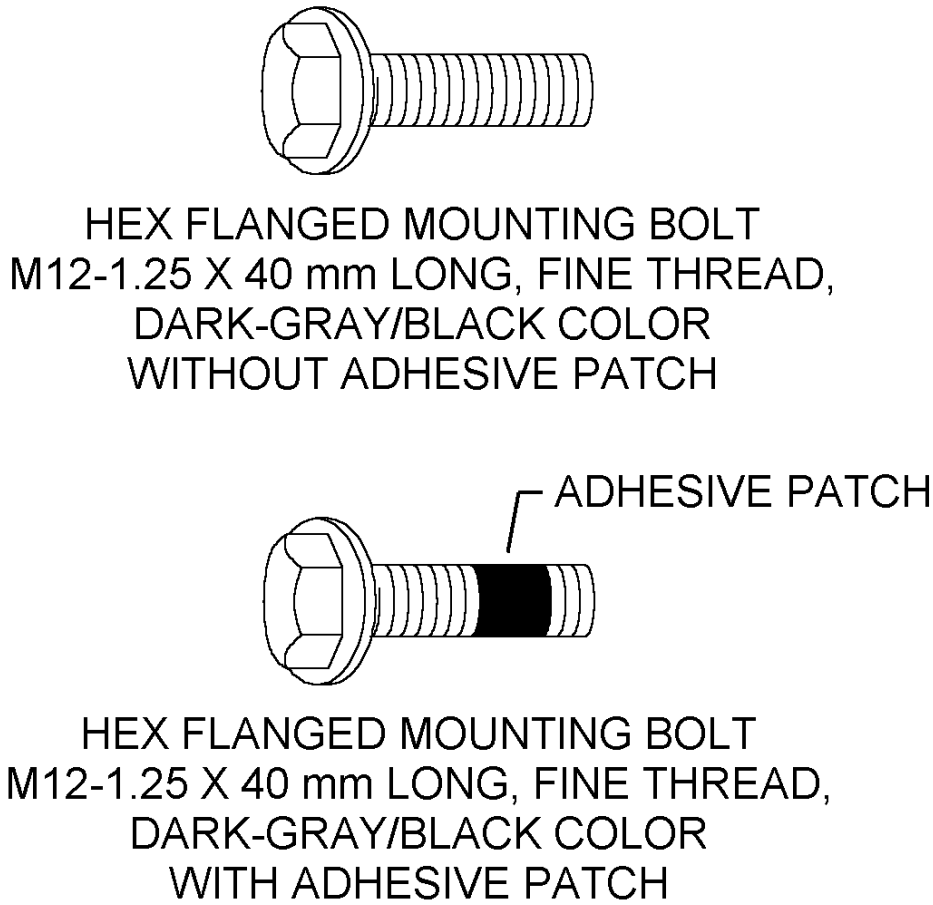


Figure 70 Caliper Mounting Bolts

IMPORTANT – Check hex flanged mounting bolts for adhesive patch (Figure 70) (See Figure 70, page 75), if an adhesive patch is found, using a steel brush, buff the adhesive residue from the bolt threads. Buff ONLY the area where the adhesive is present so as to not remove the protective black coating on the remainder of the threads. Be sure to completely remove the existing adhesive so that bare steel is showing where the adhesive was on the threads, or if no adhesive patch is found, apply a small patch of liquid Loctite 2440 to the area indicated as adhesive patch in (Figure 70) (See Figure 70, page 75). For best Loctite 2440 performance, surfaces should be clean and free of grease. Loctite should be applied to the bolt in sufficient quantity to fill all engaged threads. Loctite develops usable strength within 1 hour and full strength at room temperature in 3 hours.

WARNING – Take care when you use Loctite, to avoid serious personal injury. Follow the manufacturer's instructions to prevent irritation to the eyes and skin.

Refer to Figure 71 for Items in parentheses.

6. Make sure guide pin heads, hex flanged mounting bolts and mating caliper surfaces are dry and void of grease or foreign matter. Position caliper (Item 1) in place at lower mounting and align flat on guide pin head (Item 2) with the flat on caliper guide pin boss (Item 3), then install the lower (bottom) hex flanged mounting bolt (Item 4) securing the caliper to the anchor plate (Item 5). Tighten to finger tight, driver side front brake shown.

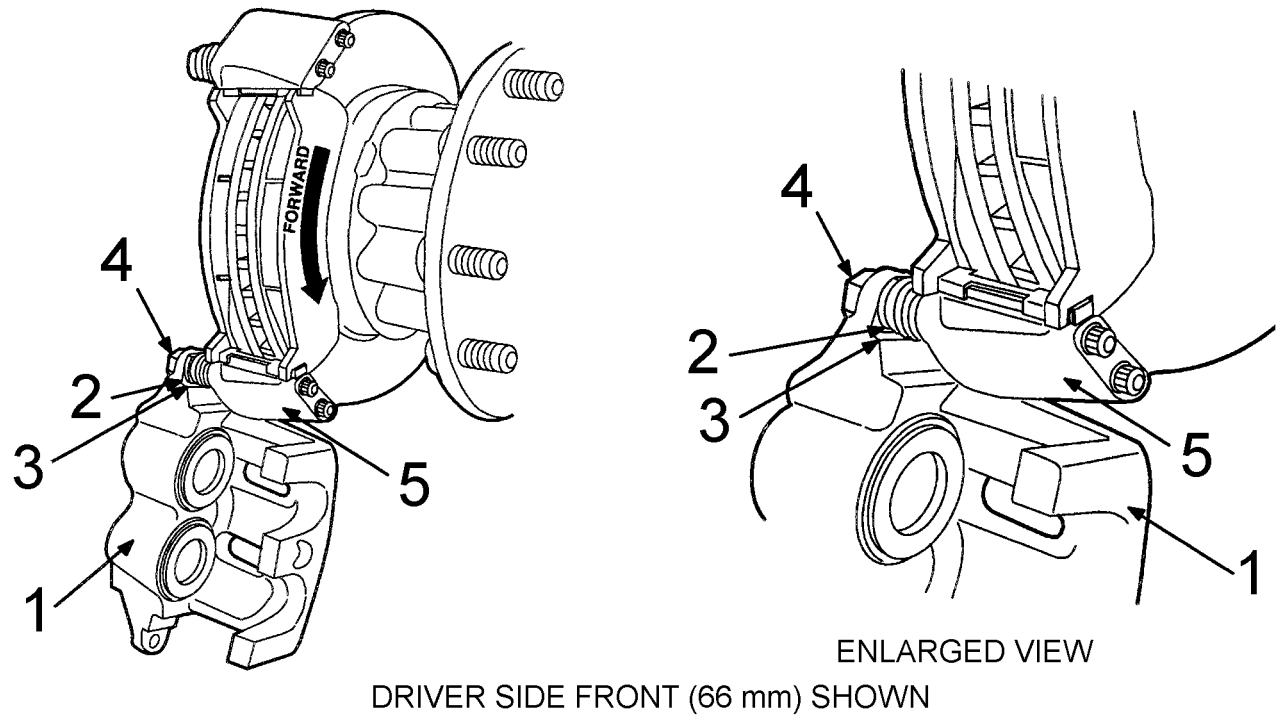


Figure 71 Install Caliper onto Anchor Plate and Install Lower Hex Flanged Mounting Bolt

1. CALIPER
2. LOWER GUIDE PIN FLAT
3. CALIPER GUIDE PIN BOSS FLAT
4. LOWER HEX FLANGED MOUNTING BOLT
5. ANCHOR PLATE

Refer to Figure 72 for Items in parentheses.

7. Carefully rotate caliper (Item 1) closed about the lower (bottom) hex flanged mounting bolt and guide pin (Items 2 and 3).

8. Align flat on upper (top) guide pin head (Item 4) with the flat on caliper upper (top) guide pin boss (Item 5). Use care when positioning caliper (Item 1) over the disc brake pads, rotor and upper (top) guide pin head (Items 6, 7 and 8) to avoid tearing, cutting or dislodging piston boots or guide pin boot (Items 9 and 10), driver side front brake shown.

9. Hold caliper (Item 1) in closed position with upper (top) guide pin boss hole aligned with threads in upper guide pin (Item 8), driver side front brake shown.

10. Install upper (top) hex flanged mounting bolt (Item 11) securing the caliper (Item 1) to the anchor plate (Item 12). Tighten to finger tight, driver side front brake shown.

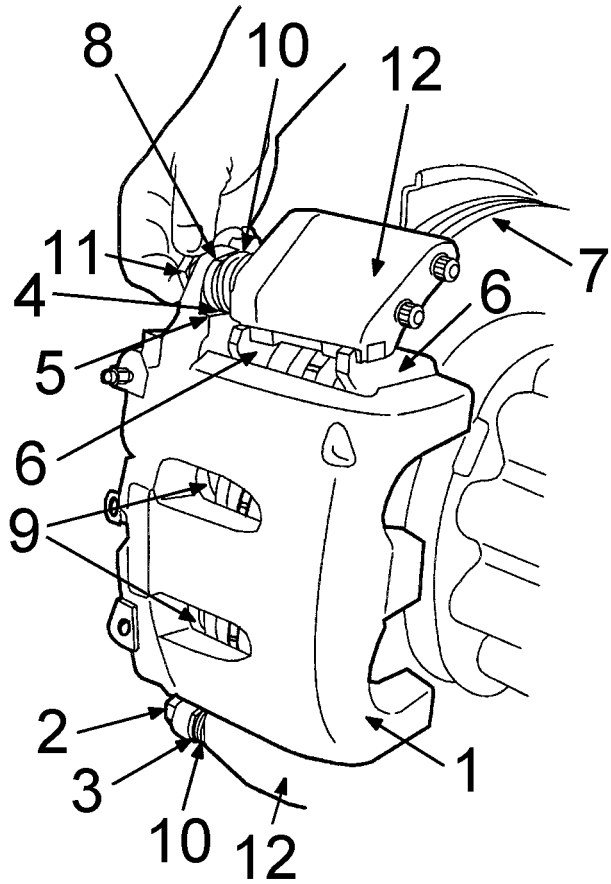


Figure 72 Rotate Caliper Closed about Lower Hex Flanged Mounting Bolt and Install Upper Hex Flanged Mounting Bolt

DRIVE SIDE FRONT (66 mm) SHOWN
1. CALIPER
2. LOWER HEX FLANGED MOUNTING BOLT
3. LOWER GUIDE PIN
4. UPPER GUIDE PIN HEAD FLAT
5. CALIPER UPPER GUIDE PIN BOSS FLAT
6. DISC BRAKE PAD
7. ROTOR
8. UPPER GUIDE PIN
9. PISTON BOOT
10. GUIDE PIN BOOT
11. UPPER HEX FLANGED MOUNTING BOLT
12. ANCHOR PLATE.

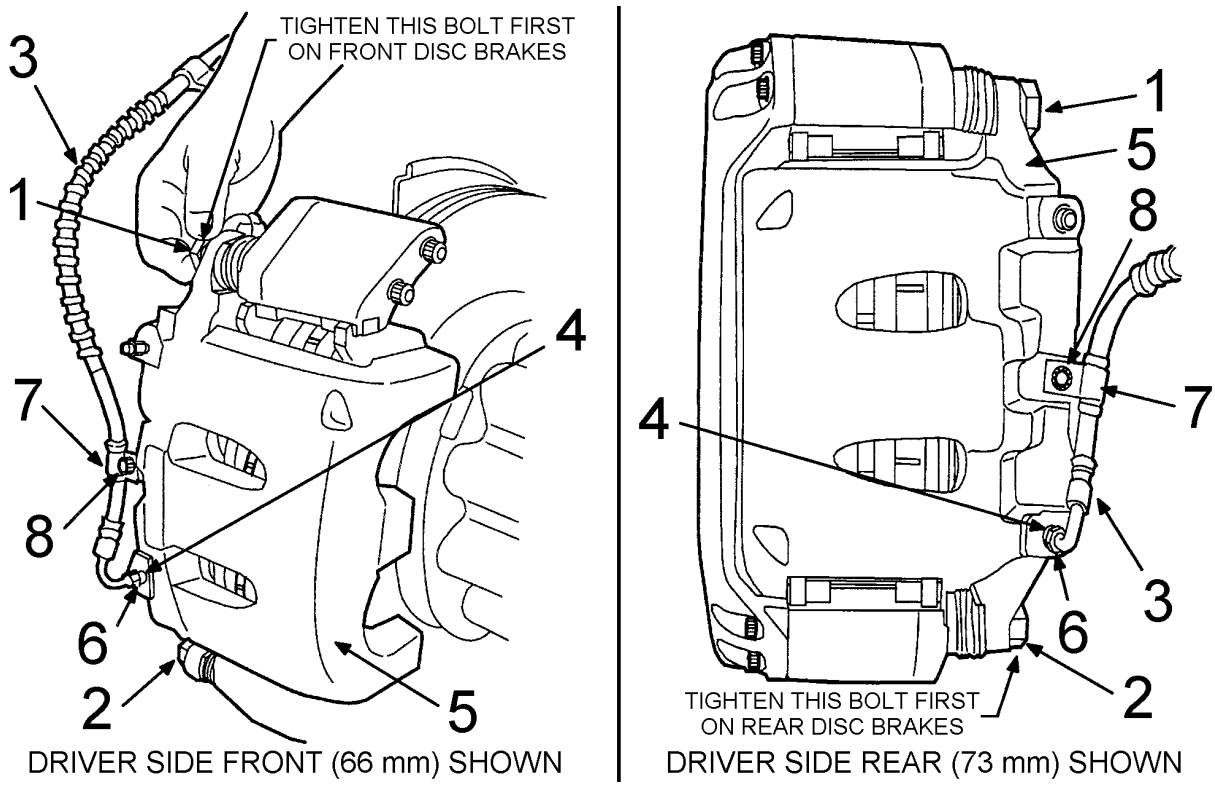


Figure 73 Tightening Upper and Lower Caliper Mounting Bolts in Proper Sequence

1. UPPER CALIPER MOUNTING BOLT
2. LOWER CALIPER MOUNTING BOLT
3. BRAKE LINE HOSE
4. LOWER HYDRAULIC BRAKE LINE PORT
5. CALIPER
6. HYDRAULIC BRAKE LINE HEX FITTING
7. BRAKE LINE RETAINING CLIP
8. HEX HEAD BOLT

CAUTION – When both caliper mounting bolts (Items 1 and 2, Figure 73) (See Figure 73, page 78) have been loosened or removed, it is important to tighten the caliper mounting bolts in the proper sequence. Increased brake drag may result from not tightening in proper sequence.

For FRONT brakes, upper (top) caliper mounting bolt (Item 1, Figure 73) (See Figure 73, page 78) should be tightened first, then tighten lower (bottom) caliper mounting bolt (Item 2, Figure 73) (See Figure 73, page 78).

For REAR brakes, lower caliper mounting bolt (Item 2, Figure 73) (See Figure 73, page 78) should be tightened first, then tighten upper caliper mounting bolt (Item 1, Figure 73) (See Figure 73, page 78).

Refer to Figure 73 (See Figure 73, page 78) for Items in parentheses unless otherwise noted.

11. Tighten upper (top) and lower (bottom) caliper mounting bolts (Items 1 and 2) for both front and rear disc brakes in the proper sequence as noted in CAUTION above. Tighten upper and lower caliper mounting bolts in the proper sequence to 93 to 107 lbf-ft (126 to 145 N•m).

12. Position brake line hose (Item 3) at the lower hydraulic brake line port (Item 4) on the caliper (Item 5) and install hydraulic brake line hex fitting (Item 6) into the caliper. Tighten to 7.5 to 15 lbf-ft (10 to 20 N•m).

13. Position brake line retaining clip (Item 7) on the caliper (Item 5) and install hex head bolt (Item 8). Tighten to 18 to 22 lbf-ft (24 to 30 N•m).

Refer to Figure 74 for Items in parentheses.

14. On front axles only, position brake line retaining clip (Item 2) over threaded stud (Item 3) on the steering knuckle hose support bracket (Item 4), make sure the brake line hose is not pinched or kinked. Install hex nut and lock washer (Item 1). Tighten to 115 to 140 lbf-in (13 to 16 N•m).

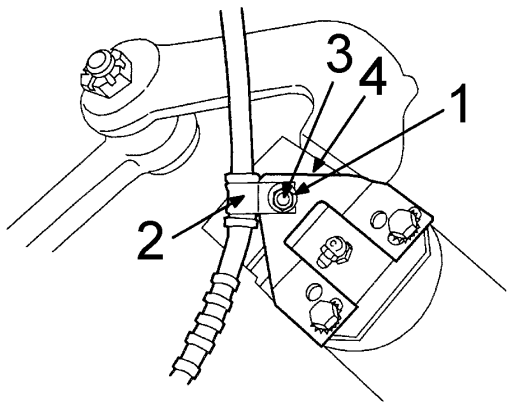


Figure 74 Install Brake Line Retaining Clip and Install Hex Nut and Flat Washer

1. HEX NUT AND LOCK WASHER
2. BRAKE LINE RETAINING CLIP
3. THREADED STUD
4. HOSE SUPPORT BRACKET

15. After replacing caliper, bleed brakes. Refer to BLEEDING INSTRUCTIONS (See BLEEDING INSTRUCTIONS, page 93).

16. Check the master cylinder reservoir and fill if necessary. Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper brake fluid.

WARNING – When adding fluids, take care to identify fluids (power steering fluid or brake fluid) and use only in the proper system. Discard all fluid bled or drained from either system. Do not use for refill, cleaning or any other purpose. Failure to observe these precautions could result in failure of the brake system, with resultant personal injury and/or property damage.

17. Install wheel (tire and rim) on vehicle and remove floor stands. Refer to GROUPS 17 — WHEELS in the Master Service Manual for proper wheel installation. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications based on mounting hardware size and thread type.

NOTE – When installing the wheel (tire and rim) on disc brake axles, make sure the tire valve stem clears the brake caliper. The use of a valve stem retainer or a tire manufacturer's stem forming tool are the only acceptable methods of obtaining clearance when necessary.

18. After any brake service, be sure to test brakes prior to returning vehicle to service. A firm pedal should be felt during brake application.

8.3. ROTOR AND WHEEL HUB ASSEMBLY

Install

1. Install front rotor onto wheel hub (Items 12 and 8, Figure 30) (See Figure 30, page 34) and (Items 12 and 8, Figure 31) (See Figure 31, page 35) by installing retaining nuts and washers (Item 14, Figure 30) (See Figure 30, page 34) or retaining bolts, washers and nut (Item 13, Figure 31) (See Figure 31, page 35) securing them together. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications.

2. Install rear rotor onto wheel hub (Items 11 and 7, Figure 32) (See Figure 32, page 36) and (Items 11 and 7, Figure 33) (See Figure 33, page 36) by installing retaining nuts (Item 12, Figure 32) (See Figure 32, page 36) or retaining bolts, washers and nuts (Item 12, Figure 33) (See Figure 33, page 36) securing them together. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications.

3. On front axles, for installation of rotor and wheel hub assembly (Items 12 and 8, Figure 30) (See Figure 30, page 34) and (Items 12 and 8, Figure 31) (See Figure 31, page 35), refer to GROUP 02 — FRONT AXLE in the Master Service Manual for proper rotor and wheel hub assembly installation along with bearings and related components.

4. On rear axles, for installation of rotor and wheel hub assembly (Items 11 and 7, Figure 32) (See Figure 32, page 36) and (Items 11 and 7, Figure 33) (See Figure 33, page 36), refer to GROUP 14 — REAR AXLE in the Master Service Manual for proper rotor and wheel hub assembly installation along with bearings and related components.

5. Before proceeding to next step, adjust wheel bearings. Refer to ADJUSTMENTS(See ADJUSTMENTS, page 93), WHEEL BEARING ADJUSTMENT for proper procedures.

Refer to Figure 75 (See Figure 75, page 81) for Items in parentheses unless otherwise noted.

6. Before installing caliper, visually inspect anchor plate (Item 1) for damage or defects to mating surfaces at anchor plate pad abutment slippers (Item 2), anchor plate tie bar (Item 3), if so equipped (73 mm brakes only) and check guide pin heads (Item 4). If the anchor plate pad abutment slippers or guide pins are damaged or defective they must be replaced. If the anchor plate pad abutment slippers or guide pins are being replaced, refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble anchor plate pad abutment slippers and guide pins.

7. If guide pins (Figure 67) (See Figure 67, page 72) are being replaced. Pull guide pin boots (Item 5) off anchor plate (Item 1) or guide pins (Item 4) and check for damage or defects. If damage or defects are found, they must be replaced. If guide pin boots are not damaged or defective, wash them in soapy water and dry them. Once again, after the guide pin boots have been cleaned and dried, inspect them for damage or defects. If damage or defects are found, they must be replaced. Refer to ANCHOR PLATE AND SPLASH SHIELD, Disassemble (See ANCHOR PLATE AND SPLASH SHIELD, page 44), ANCHOR PLATE AND SPLASH SHIELD, Clean and Inspect (See ANCHOR PLATE AND SPLASH SHIELD, page 51) and ANCHOR PLATE AND SPLASH SHIELD, Assemble (See ANCHOR PLATE AND SPLASH SHIELD, page 58) to disassemble, clean and inspect and assemble guide pin boots.

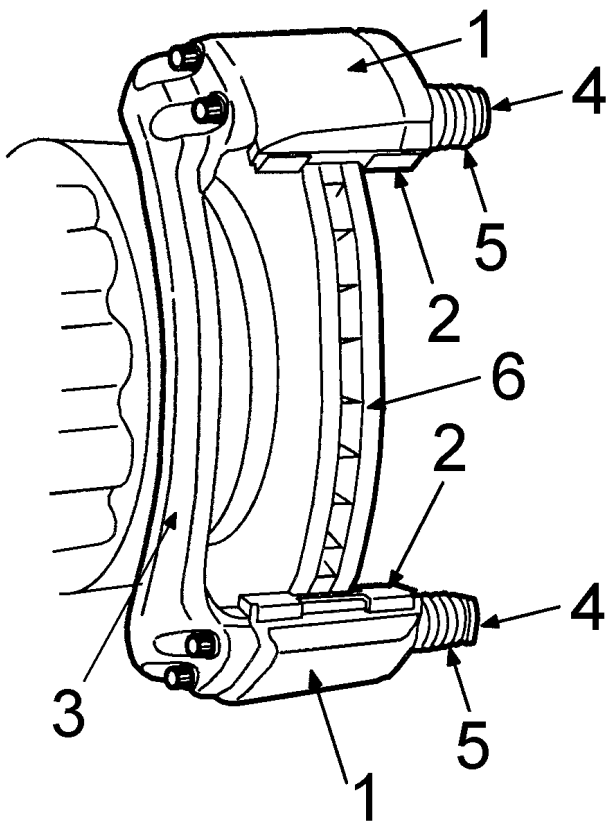


Figure 75 Inspect Anchor Plate for Damage or Defects

1. ANCHOR PLATE
2. ANCHOR PLATE PAD ABUTMENT SLIPPER
3. ANCHOR PLATE TIE BAR
4. GUIDE PIN HEAD
5. GUIDE PIN BOOT
6. ROTOR

Refer to Figure 76 for Items in parentheses.

8. If old disc brake pads are being reinstalled, position inboard and outboard disc brake pads (Items 1 and 2) on front brakes and (Items 3 and 4) on rear brakes, onto anchor plate pad abutment slippers (Item 5) with the lining facing toward the rotor (Item 6), driver side front and rear brake shown. Using markings made during removal be sure to install disc brake pad back on the same wheel it was removed from and also in the same inboard and outboard location.

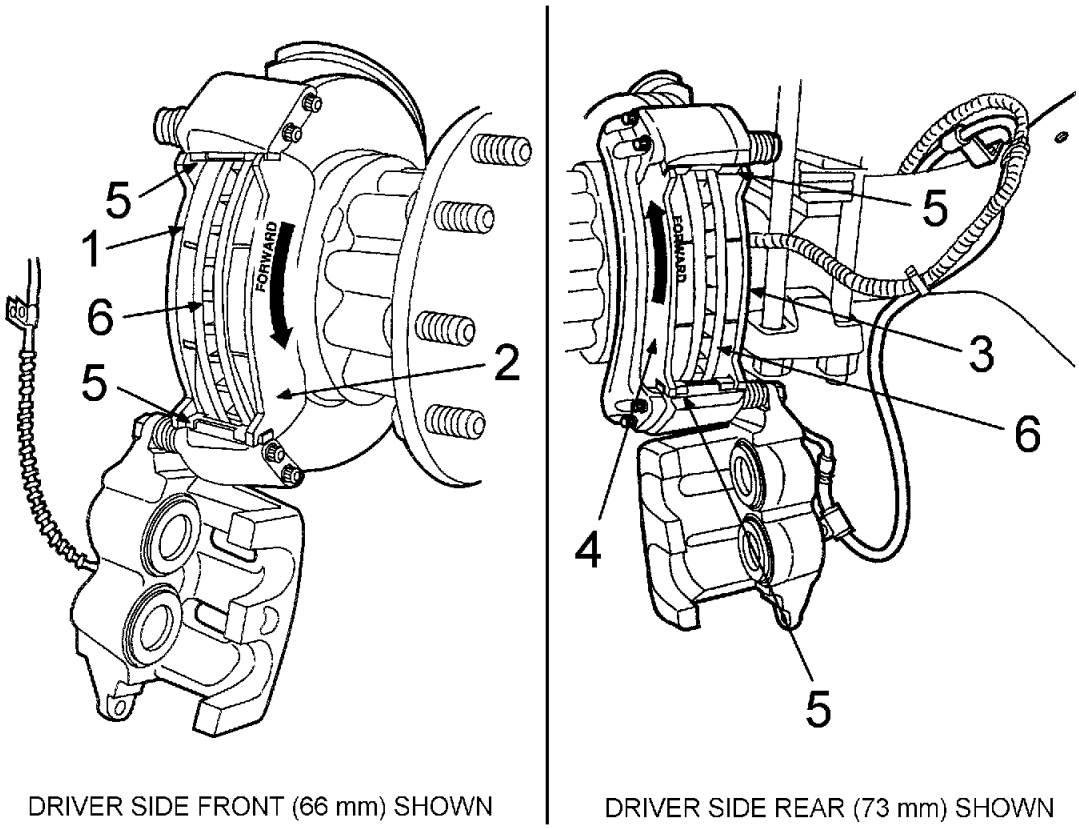


Figure 76 Install Inboard and Outboard Disc Brake Pads

1. FRONT INBOARD BRAKE PAD
2. FRONT OUTBOARD BRAKE PAD
3. REAR INBOARD BRAKE PAD
4. REAR OUTBOARD BRAKE PAD
5. ANCHOR PLATE PAD ABUTMENT SLIPPER
6. ROTOR

CAUTION – The HX–7A1–EE inboard and outboard disc brake pads (Items 1 and 2, Figure 77) are not interchangeable. The word "FORWARD" and the "ARROW" markings on the brake pads backing plate show forward rotation direction of the rotor (Item 4, Figure 77). The arrow MUST point in the forward rotor rotation direction (Figure 78). The optional HX–402–EE and SOFTER lining brake pads inboard and outboard disc brake pads (Item 4, Figure 59) (See Figure 59, page 64) are interchangeable between the inner and outer locations.

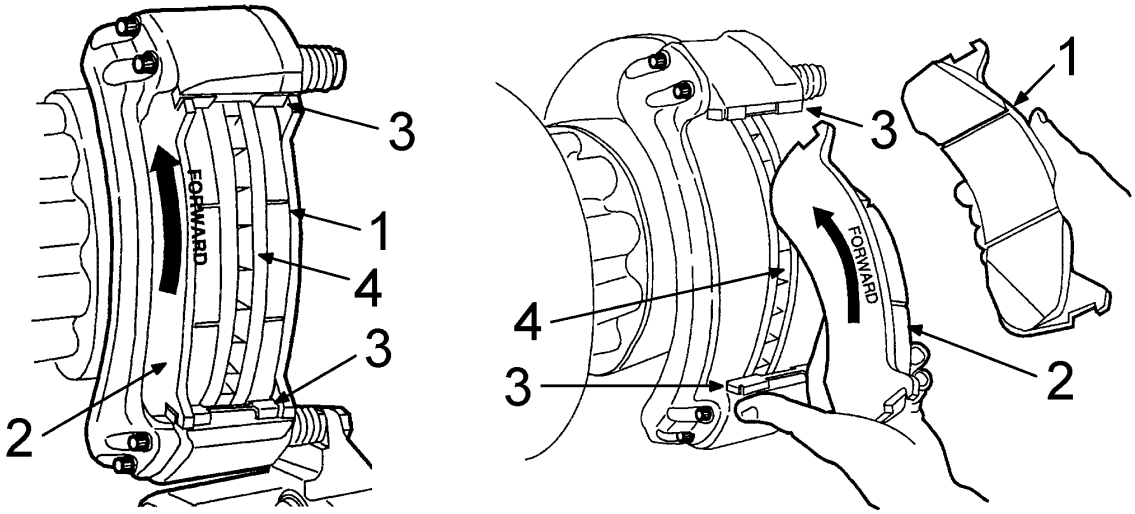


Figure 77 Inboard and Outboard Disc Brake Pads Marking of Arrow and Forward

DRIVER SIDE REAR BRAKE PADS (73 mm) SHOWN
1. INBOARD DISC BRAKE PAD
2. OUTBOARD DISC BRAKE PAD
3. ANCHOR PLATE PAD ABUTMENT SLIPPER
4. ROTOR

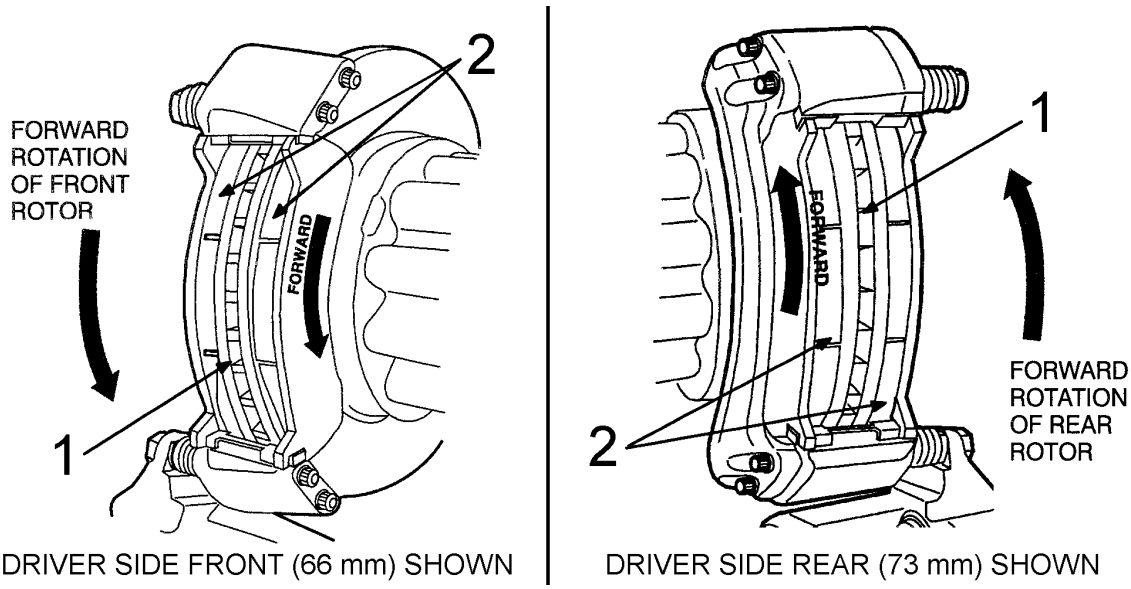


Figure 78 Install Inboard and Outboard Disc Brake Pads (HX–7A1–EE with Arrow in Forward Rotor Rotation Direction)

1. ROTOR
2. DISC BRAKE PAD

9. Carefully rotate the caliper (Item 1, Figure 79) closed about the lower (bottom) hex flanged mounting bolt and guide pin (Items 2 and 3, Figure 79). Refer to DISC BRAKE PADS, Install (See DISC BRAKE PADS, page 15).

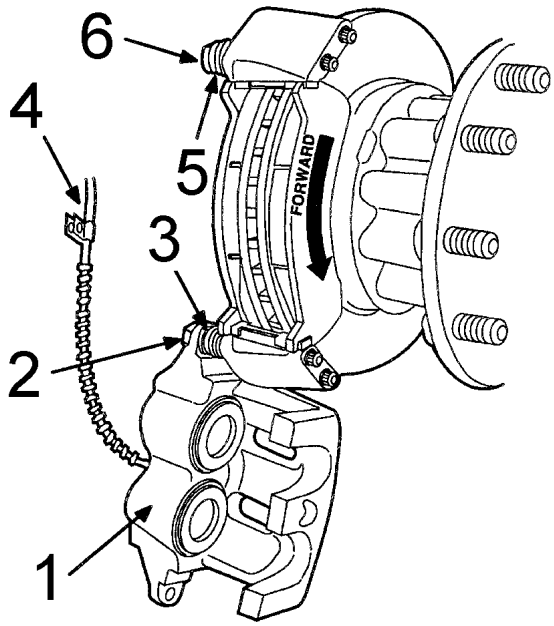


Figure 79 Rotate Caliper Closed About Lower Hex Mounting Bolt and Guide Pin

1. CALIPER
2. LOWER HEX FLANGED MOUNTING BOLT
3. LOWER GUIDE PIN
4. BRAKE LINE HOSE
5. UPPER GUIDE PIN BOOT
6. UPPER GUIDE PIN

Refer to Figure 34 (See Figure 34, page 38) for Items in parentheses.

10. Install anchor plate tie bar (Item 1), if so equipped (73 mm brake assembly only), to anchor plate (Item 2) by installing 12–point head bolts (Item 3). Tighten to 40 to 50 lbf-ft (54 to 68 N•m).

11. If necessary, bleed brakes, Refer to BLEEDING INSTRUCTIONS (See BLEEDING INSTRUCTIONS, page 93).

12. Check the master cylinder reservoir and fill if necessary. Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper brake fluid.

WARNING – When adding fluids, take care to identify fluids (power steering fluid or brake fluid) and use only in the proper system. Discard all fluid bled or drained from either system. Do not use for refill, cleaning or any other purpose. Failure to observe these precautions could result in failure of the brake system, with resultant personal injury and/or property damage.

13. Install wheel (tire and rim) on vehicle and remove floor stands. Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel installation. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications based on mounting hardware size and thread type.

NOTE – When installing the wheel (tire and rim) on disc brake axles, make sure the tire valve stem clears the brake caliper. The use of a valve stem retainer or a tire manufacturer's stem forming tool are the only acceptable methods of obtaining clearance when necessary.

14. After any brake service, be sure to test brakes prior to returning vehicle to service. A firm pedal should be felt during brake application.

8.4. ANCHOR PLATE AND SPLASH SHIELD

During service procedure, keep grease and other foreign material from caliper assembly, disc brake pads, brake rotor and external surfaces of wheel hub. Handle parts carefully to avoid damage to caliper, rotor, disc brake pads and brake lines.

In the event the original disc brake pads are to be used again, use the markings made during removal, so that they are reinstalled in same location.

The following steps refer to only one wheel. The same procedure will need to be performed at each wheel.

Install

Refer to Figure 80 (See Figure 80, page 86) for Items in parentheses.

1. Install splash shield (Item 4) onto anchor plate (Item 2) as follows:
   a. When installing the splash shield (Item 4) on the anchor plate (Item 2) for 66 mm front and rear and 73 mm rear brakes, the splash shield is mounted on the inboard side of the anchor plate and the three 12–point head bolts (Item 5) are installed from the inboard side. Tighten to 13 to 16 lbf-ft (17 to 21 N•m).
   b. On the 73 mm front brakes, the splash shield (Item 4) is mounted on the outboard side of the anchor plate (Item 2) and the three 12–point head bolts (Item 5) are installed from the outboard side. Tighten to 13 to 16 lbf-ft (17 to 21 N•m).

IMPORTANT – When installing the ABS sensor bracket (Item 1), the bracket is always installed on the same side of anchor plate as the splash shield, on the machined surface, with the long portion of the bracket on the same side as the mounting bolt heads.

2. If so equipped, install ABS sensor bracket (Item 1) on anchor plate (Item 2) by installing two 12–point head bolts (Item 3), driver side front and rear shown. Tighten to 13 to 16 lbf-ft (17 to 21 N•m).

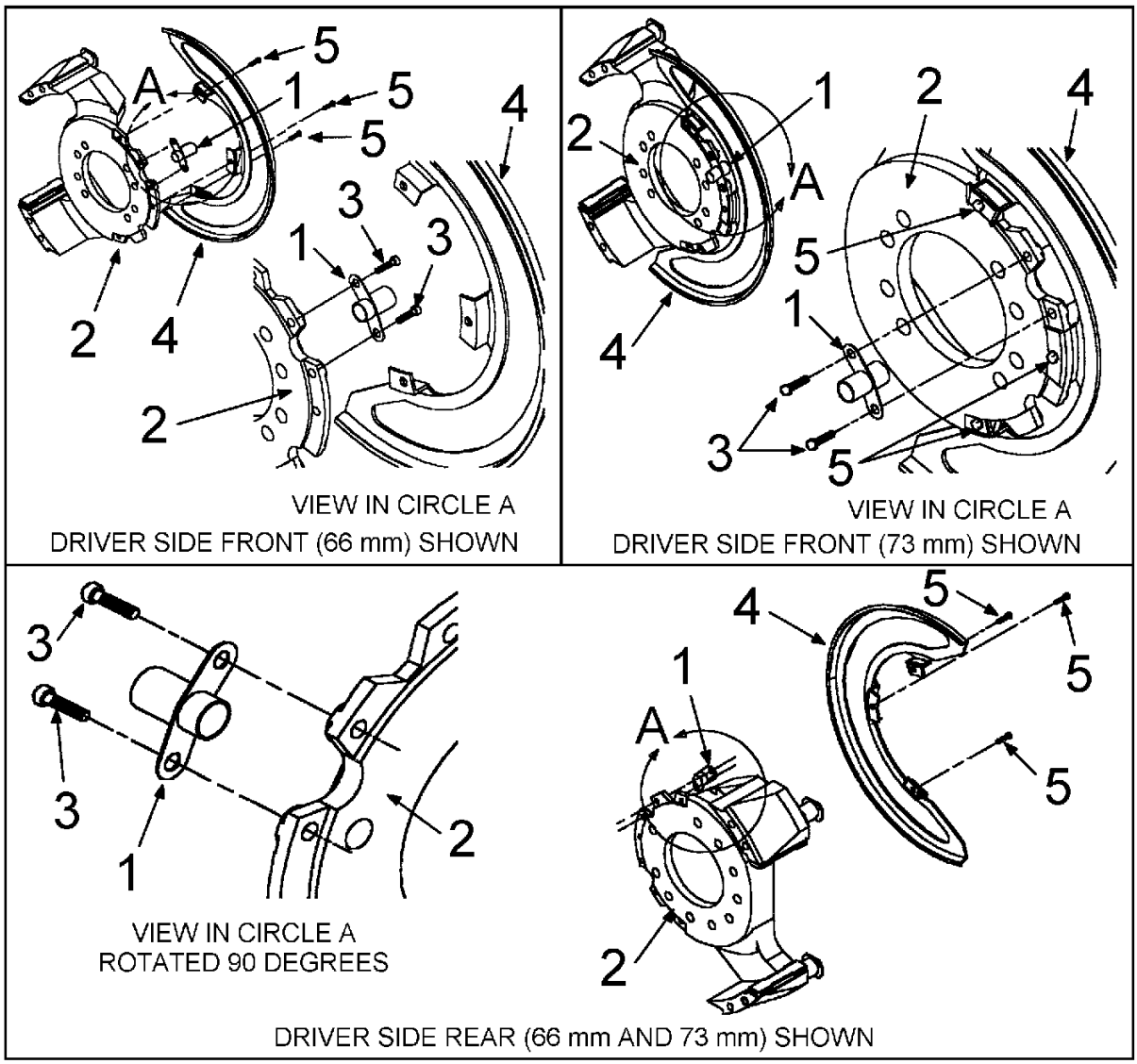


Figure 80 Install Splash Shield and ABS Sensor Bracket on Anchor Plate

1. ABS SENSOR BRACKET
2. ANCHOR PLATE
3. 12–POINT HEAD BOLT
4. SPLASH SHIELD
5. 12–POINT HEAD BOLT

Refer to Figure 81 for Items in parentheses.

3. On front axles with both 66 mm and 73 mm disc brakes, install anchor plate and splash shield (Items 1 and 2) on outboard side of steering knuckle flange (Item 4); align holes of anchor plate with holes in steering knuckle flange.

4. When reinstalling anchor plate, use new mounting hardware; this will ensure proper torque requirements. Install hex bolts (Item 5) from outboard side through anchor plate (Item 1) and steering knuckle flange (Item 4) and install hex lock nuts (Item 3) from inboard side of steering knuckle flange. Refer to TORQUE CHART (See TORQUE, page 94) section for proper tightening specifications.

NOTE – Install lock nut so that it seats firmly in chamfer against surface of the steering knuckle.

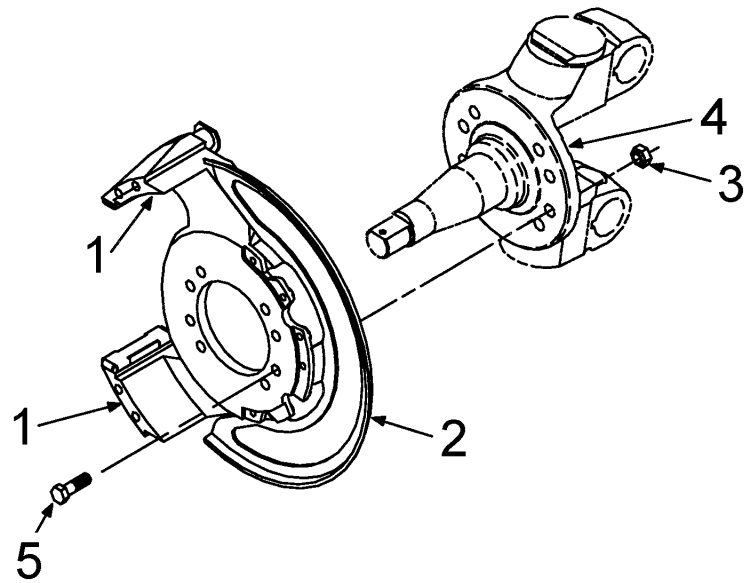


Figure 81 Install Anchor Plate and Splash Shield Assembly on Front Axle

1. ANCHOR PLATE
2. SPLASH SHIELD
3. HEX LOCK NUT
4. STEERING KNUCKLE FLANGE
5. HEX BOLT

Refer to Figure 82 for Items in parentheses.

5. On rear axles with both 66 mm and 73 mm disc brakes, install anchor plate and splash shield (Items 1 and 2) on outboard side of axle flange (Item 6); align holes of anchor plate with holes in axle flange.

6. When reinstalling anchor plate, use new mounting hardware; this will ensure proper torque requirements. Install hex bolts (Item 5) from inboard side through axle flange (Item 6) and anchor plate (Item 1) and install hex lock nuts with flat washers (Items 3 and 4) from outboard side of anchor plate. Tighten to 115 to 125 lbf-ft (156 to 170 N•m).

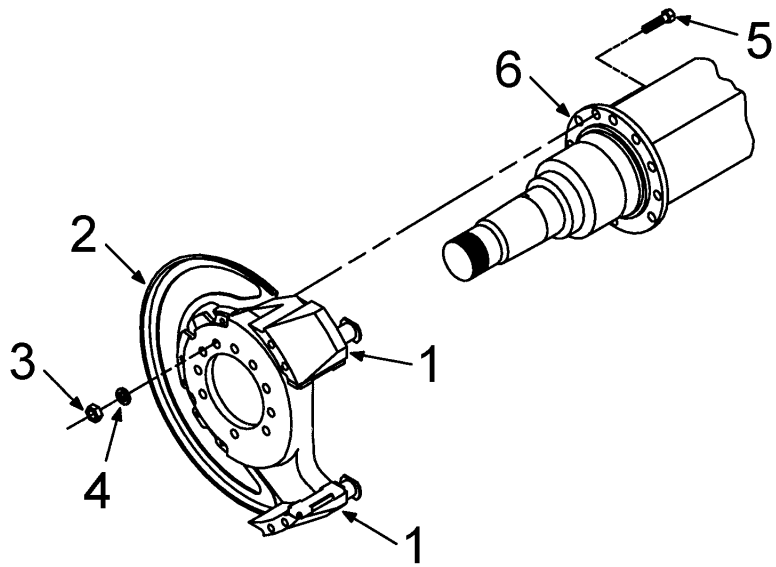


Figure 82 Install Anchor Plate and Splash Shield Assembly on Rear Axle

1. ANCHOR PLATE
2. SPLASH SHIELD
3. HEX LOCK NUT
4. FLAT WASHER
5. HEX BOLT
6. AXLE FLANGE

7. Install rotor and wheel hub assembly (Items 1 and 2, Figure 83). Refer to ROTOR AND WHEEL HUB ASSEMBLY, Install (See ROTOR AND WHEEL HUB ASSEMBLY, page 80).

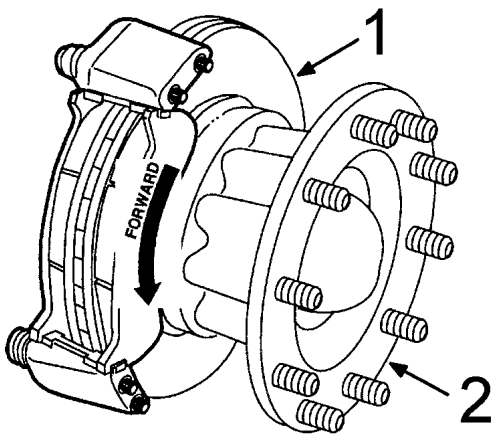
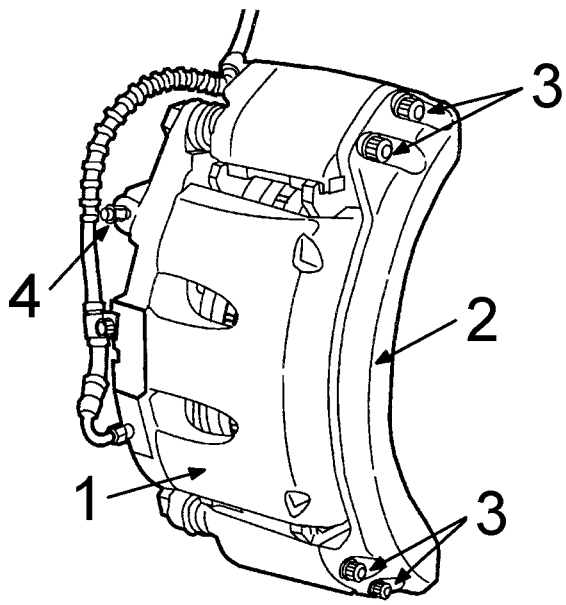
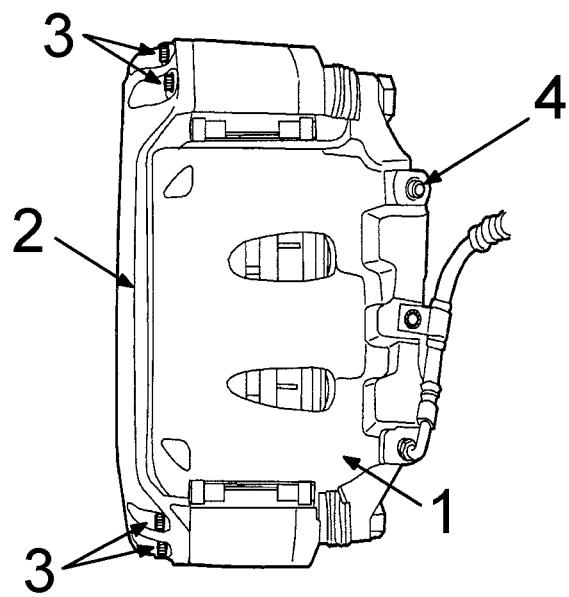


Figure 83 Install Rotor and Wheel Hub Assembly

DRIVER SIDE FRONT (66 mm) SHOWN
1. ROTOR
2. WHEEL HUB



DRIVER SIDE FRONT (73 mm) SHOWN



DRIVER SIDE REAR (73 mm) SHOWN

Figure 84 Install Caliper Assembly and Anchor Plate Tie Bar

1. CALIPER ASSEMBLY
2. ANCHOR PLATE TIE BAR
3. 12–POINT HEAD BOLT
4. BLEEDER SCREW AND CAP

Refer to Figure 84 for Items in parentheses unless otherwise noted.

8. Install caliper assembly (Item 1). Refer to CALIPER, Install (See CALIPER, page 71).

CAUTION – Be sure that the correct caliper hex flanged mounting bolt M12–1.25 x 40 mm long, fine thread, dark-gray/black color (Figure 70) (See Figure 70, page 75), torque sequence and torque value is used during caliper installation.

9. Install anchor plate tie bar (Item 2), if so equipped (73 mm brake assembly only), by installing 12–point head bolts (Item 3). Tighten to 40 to 50 lbf-ft (54 to 68 N•m).

10. If necessary, bleed brakes. Refer to BLEEDING INSTRUCTIONS(See BLEEDING INSTRUCTIONS, page 93).

11. Check the master cylinder reservoir and fill if necessary. Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper brake fluid.

WARNING – When adding fluids, take care to identify fluids (power steering fluid or brake fluid) and use only in the proper system. Discard all fluid bled or drained from either system. Do not use for refill, cleaning or any other purpose. Failure to observe these precautions could result in failure of the brake system, with resultant personal injury and/or property damage.

12. Install wheel (tire and rim) on vehicle and remove floor stands. Refer to GROUP 17 — WHEELS in the Master Service Manual for proper wheel installation. Refer to TORQUE CHART (See TORQUE, page 94) for proper tightening specifications based on mounting hardware size and thread type.

NOTE – When installing the wheel on disc brake axles, make sure the tire valve stem clears the brake caliper. The use of a valve stem retainer or a tire manufacturer's stem forming tool are the only acceptable methods of obtaining clearance when necessary.

13. After any brake service, be sure to test brakes prior to returning vehicle to service. A firm pedal should be felt during brake application.

9. TROUBLESHOOTING

Table 1 Troubleshooting Chart

CONDITION	CAUSE	REMEDY
NOISE AND CHATTER (Squealing, clicking or scraping sound upon brake application)	1. Bent, damaged or incorrect pads.	1. Replace with correct pads. Always replace in axle sets.
	2. Worn out lining (plates rubbing rotor).	2. Resurface or replace rotor. Replace pads in axle sets.
	3. Rotor polished/ linings glazed.	3. Remove polish/glaze.
	4. Foreign material imbedded in linings.	4. Replace pads in axle sets.
	5. Excessive rotor thickness variations or lateral runout.	5. Resurface or replace rotor.
GRABBY BRAKES (Severe reaction to pedal pressure)	1. Incorrect pads, or pads loose on plate.	1. Replace with correct pads and plates in axle sets.
	2. Grease or brake fluid on linings.	2. Repair grease seal or caliper as required. Replace pads in axle sets.
	3. Loose caliper at anchor plate guide pins.	3. Tighten to specifications.
	4. Excessive rotor lateral runout.	4. Check bearing adjustment. Resurface or replace rotor.
VEHICLE PULLS TO ONE SIDE	1. Incorrect pads or loose lining on plates.	1. Replace with correct pads and plates in axle sets.
	2. Grease or brake fluid on pads.	2. Repair grease seal or caliper as required. Replace pads in axle sets.
	3. Loose caliper or anchor plate.	3. Tighten to specifications.
	4. Caliper piston sticking.	4. Repair or replace piston or replace caliper.
	5. Caliper guide pins sticking.	5. Repair or replace guide pins and boots. Clean pin bores and lubricate.
	6. Excessive rotor lateral runout.	6. Check bearing adjustment. Resurface or replace rotor.
PULSATING BRAKE PEDAL	1. Worn or damaged front wheel bearings.	1. Replace wheel bearings.
	2. Excessive variation in rotor thickness.	2. Refinish or replace rotor.
SPRINGY OR SPONGY PEDAL (Pedal has a soft, springy or spongy feel when depressed)	1. Excessive rotor lateral runout.	1. Resurface or replace rotor.
	2. Poor quality brake fluid (low boiling point).	2. Drain hydraulic system and fill with approved brake fluid.
	3. Weak brake hoses that expand under pressure.	3. Replace defective hoses.
	4. Air in hydraulic system.	4. Bleed hydraulic system.

Table 1 Troubleshooting Chart (cont.)

CONDITION	CAUSE	REMEDY
ALL BRAKES DRAG (But brake adjustment is correct)	1. Binding brake pedal.	1. Free up and lubricate.
	2. Soft or swollen rubber parts caused by incorrect or contaminated brake fluid.	2. Replace all rubber parts, flush hydraulic system and fill with approved brake fluid.
	3. Trapped pressure in brake lines caused by master cylinder/booster or ABS not fully releasing.	3. Repair or replace master cylinder and/or booster or ABS as necessary.
ONE BRAKE DRAGS	1. Loose or worn front wheel bearings.	1. Adjust to specifications, or replace.
	2. Defective brake hose or hydraulic tube (preventing return of brake fluid).	2. Replace defective hose or tube, as necessary.
	3. Sticking caliper piston.	3. Repair or replace caliper.
	4. Swollen caliper piston seal.	4. Repair or replace caliper. Flush hydraulic system and fill with approved fluid.
	5. Sticking caliper guide pin(s).	5. Repair or replace guide pins and guide pin boots, lubricate with approved grease.
	6. Trapped pressure in brake lines caused by master cylinder/booster or ABS not fully releasing.	6. Repair or replace master cylinder and/or booster or ABS as necessary.
	7. Incorrect caliper guide pin torque sequence.	7. Loosen and tighten caliper guide pins in correct sequence.
LOW PEDAL (Pedal may go to floor under steady pressure)	1. Leak in hydraulic system.	1. Check master cylinder, calipers, tubes and hoses for leakage — repair or replace faulty parts.
	2. Air in hydraulic system.	2. Bleed hydraulic system.
	3. Poor quality brake fluid (low boiling point).	3. Drain hydraulic system and fill with approved brake fluid.
	4. Low brake fluid level.	4. Fill master cylinder and bleed hydraulic system.
	5. Weak brake hoses that expand under pressure.	5. Replace defective hoses.
LOW PEDAL (Pedal may go to floor on first application and is OK on subsequent applications)	1. Pad and piston knockback caused by loose wheel bearings.	1. Adjust or tighten parts, or replace faulty parts, as necessary.
	2. Air in brake system.	2. Bleed brake system.

10. LUBRICATION

Use Shell/Albida PPS 1 grease (from 3 oz. tube in rebuild kit) as required when servicing the anchor plate guide pins, guide pin boots and guide pin bores. Use 1/8 ounce of grease to thoroughly lube each guide pin and guide pin bore set.

Use Batco grease (from 3 oz. tube in rebuild kit) as required when servicing the caliper piston bores.

Refer to GROUP 10 — LUBRICATION in the Master Service Manual for other proper fluids and grease while servicing the brakes.

11. ADJUSTMENTS

11.1. BRAKE ADJUSTMENT

The pin slide caliper disc brakes do not require adjustments since the clearance is maintained by the movement of the caliper.

11.2. WHEEL BEARING ADJUSTMENT

Lateral runout or wobble in disc brakes can cause an increase in pedal travel due to piston knockback, brake pedal pulsation during brake applications and increase piston seal wear since the pad is required to follow the disc wobble. This wobbling condition causes the piston to become cocked in the piston bores, distorting the seals.

To limit lateral runout of a rotor (disc) due to loose bearings, refer to GROUP 02 — FRONT AXLE and GROUP 14 — REAR AXLE in the Master Service Manual for proper wheel bearing adjustment.

To limit lateral runout of a rotor (disc) due to a warped rotor, refer to GROUP 04 — BRAKES in the Master service Manual for proper reconditioning of rotors.

11.3. BLEEDING INSTRUCTIONS

WARNING – Failure to bleed the system whenever any hydraulic system fitting is loosened or disconnected will allow air to remain in the system. This will prevent the hydraulic pressure in the brake system from rising enough to apply the brakes properly. This will cause the stopping distance to increase and can result in serious personal injury.

Properly discard hydraulic brake fluid that is removed from the brake system. Hydraulic brake fluid that is removed can be contaminated and can cause damage, loss of braking and serious personal injury.

Use only the type of hydraulic brake fluid specified by the equipment manufacturer. Do not use or mix different types of hydraulic brake fluid. The wrong hydraulic brake fluid will damage the rubber parts of the brake caliper and can cause damage, loss of braking and serious personal injury.

The bleeder screw (Item 4, Figure 84) (See Figure 84, page 89) is located in the upper (top) brake fluid port of caliper. It is not necessary to remove the wheel (tire and rim) to bleed the brakes.

A brake fluid distribution passage between the two pistons is cast into the caliper, allowing brake fluid to pass from piston bore to piston bore. This requires only one bleeder screw. Tighten to 7.5 to 15 lbf-ft (10 to 20 N•m).

Check the master cylinder reservoir and fill if necessary. Refer to GROUP 10 — LUBRICATION in the Master Service Manual for proper brake fluid.

Bleed brakes in the following order: Right Rear, Left Rear, Right Front and Left Front.

For brake bleeding procedure, refer to GROUP 04 — BRAKES in the Master Service Manual.

CAUTION – All International vehicles equipped with hydraulic disc brakes are equipped with a Hydro-Max Brake Booster System. This system has two sections and each section is separate from the other. Each section uses different types of fluid. The two fluids are NOT compatible and if mixed, severe damage will occur to the contaminated component.

The Hydro-Max Booster is operated by the power steering system and uses power steering fluid only.

The Braking System (Master Cylinder) uses hydraulic brake fluid only.

NOTE – Contaminated brake fluid is a maintenance error and is not covered by warranty.

12. SPECIFICATIONS

Table 2 Specifications

FRONT	Two Piston Type Caliper (66 mm)
	Two Piston Type Caliper (73 mm)
REAR	Two Piston Type Caliper (66 mm)
	Two Piston Type Caliper (73 mm)

Table 3 Caliper Specifications

CALIPER	METRIC MILLIMETERS	ENGLISH INCHES
Piston Bore Diameter Nominal (each)	66.07	2.60
Piston Bore Diameter Nominal (each)	73.13	2.88

TORQUE

Table 4 Torque Chart

Item No.*	Location (Figure No.)	Lbf-In/Ft	N•m
14	Rotor to Wheel Hub Nuts 9/16 inch – 18 UNF Front (Figure 30) (See Figure 30, page 34)	130 to 160 lbf-ft	176 to 217
14	Rotor to Wheel Hub Nuts 3/4 inch – 16 UNF Front (Figure 30) (See Figure 30, page 34)	275 to 325 lbf-ft	373 to 441

Table 4 Torque Chart (cont.)

Item No.*	Location (Figure No.)	Lbf-In/Ft	N•m
13	Rotor to Wheel Hub Bolts and Nuts 9/16 inch – 18 UNF Front (Figure 31) (See Figure 31, page 35)	130 to 160 lbf-ft	176 to 217
13	Rotor to Wheel Hub Bolts and Nuts 3/4 inch – 16 UNF Front (Figure 31) (See Figure 31, page 35)	275 to 325 lbf-ft	373 to 441
12	Rotor to Wheel Hub Nuts 9/16 inch – 18 UNF Rear (Figure 32) (See Figure 32, page 36)	130 to 160 lbf-ft	176 to 217
12	Rotor to Wheel Hub Nuts 3/4 inch – 16 UNF Rear (Figure 32) (See Figure 32, page 36)	275 to 325 lbf-ft	373 to 441
12	Rotor to Wheel Hub Bolts and Nuts 9/16 inch – 18 UNF Rear (Figure 33) (See Figure 33, page 36)	130 to 160 lbf-ft	176 to 217
12	Rotor to Wheel Hub Bolts and Nuts 3/4 inch – 16 UNF Rear (Figure 33) (See Figure 33, page 36)	275 to 325 lbf-ft	373 to 441
3	Anchor Plate Tie Bar to Anchor Plate 12–Point Head Mounting Bolt (Figure 34) (See Figure 34, page 38)	40 to 50 lbf-ft	54 to 68
3	66 mm Anchor Plate 12–Point Head Mounting Bolt Plug (Figure 57) (See Figure 57, page 61)	40 to 50 lbf-ft	54 to 68
1	Front Caliper to Anchor Plate Upper (Top) Hex Flanged Mounting Bolt (Figure 63) (See Figure 63, page 68)	93 to 107 lbf-ft	126 to 145
2	Front Caliper to Anchor Plate Lower (Bottom) Hex Flanged Mounting Bolt (Figure 63) (See Figure 63, page 68)	93 to 107 lbf-ft	126 to 145
3	Rear Caliper to Anchor Plate Lower (Bottom) Hex Flanged Mounting Bolt (Figure 63) (See Figure 63, page 68)	93 to 107 lbf-ft	126 to 145
4	Rear Caliper to Anchor Plate Upper (Top) Hex Flanged Mounting Bolt (Figure 63) (See Figure 63, page 68)	93 to 107 lbf-ft	126 to 145
1	Brake Line Retaining Clip on Hose Support Bracket Hex Mounting Nut (Figure 64) (See Figure 64, page 69)	115 to 140 lbf-in	13 to 16
3	Brake Line Retaining Clip to Caliper Hex Head Bolt (Figure 65) (See Figure 65, page 70)	18 to 22 lbf-ft	24 to 30
6	Brake Line Retaining Clip on Rear Axle Housing Hex Head Bolt (Figure 65) (See Figure 65, page 70)	20 lbf-ft	27
1, 2	Front and Rear Caliper to Anchor Plate Upper (Top) and Lower (Bottom) Hex Flanged Mounting Bolts (Figure 73) (See Figure 73, page 78)	93 to 107 lbf-ft	126 to 145

Table 4 Torque Chart (cont.)

Item No.*	Location (Figure No.)	Lbf-In/Ft	N•m
6	Brake Line Hex fitting to Caliper (Figure 73) (See Figure 73, page 78)	7.5 to 15 lbf-ft	10 to 20
8	Brake Line Retaining Clip to Caliper Hex Head Bolt (Figure 73) (See Figure 73, page 78)	18 to 22 lbf-ft	24 to 30
1	Brake Line Retaining Clip on Hose Support Bracket Hex Mounting Nut (Figure 74) (See Figure 74, page 79)	115 to 140 lbf-in	13 to 16
3	ABS Sensor Bracket to Anchor Plate 12–Point Head Mounting Bolts (Figure 80) (See Figure 80, page 86)	13 to 16 lbf-ft	17 to 21
5	Splash Shield to Anchor Plate 12–Point Head Mounting Bolts (Figure 80) (See Figure 80, page 86)	13 to 16 lbf-ft	17 to 21
3, 5	Anchor Plate Mounting Bolts and Lock Nuts (1/2 inch x 20 UNF) Front (Figure 81) (See Figure 81, page 87)	90 to 100 lbf-ft	122 to 136
3, 5	Anchor Plate Mounting Bolts and Lock Nuts (5/8 inch x 18 UNF) Front (Figure 81) (See Figure 81, page 87)	175 to 190 lbf-ft	237 to 258
3, 5	Anchor Plate Mounting Bolts and Lock Nuts (9/16 inch x 18 UNF) Rear (Figure 82) (See Figure 82, page 88)	115 to 125 lbf-ft	156 to 170
3	Anchor Plate Tie Bar to Anchor Plate 12–Point Head Mounting Bolts (Figure 84) (See Figure 84, page 89)	40 to 50 lbf-ft	54 to 68
4	Bleeder Screw (Figure 84) (See Figure 84, page 89)	7.5 to 15 lbf-ft	10 to 20
None	Wheel Mounting Bolts (Nuts) 3/4 inch — 16 NC (Figure none)	450 to 500 lbf-ft	610 to 678
None	Rim Mounting Bolts (Cast Wheels) 5/8 inch — 11 NC Front (Figure none)	160 to 175 lbf-ft	217 to 237
None	Rim Mounting Bolts (Cast Wheels) 3/4 inch — 10 NC Rear (Figure none)	200 to 240 lbf-ft	271 to 325
*Refer to figures specified in the location column.			

SPECIAL SERVICE TOOLS

Refer to Figure 85 and Figure 86 for Special Service Tools referred to in Table 5 below.

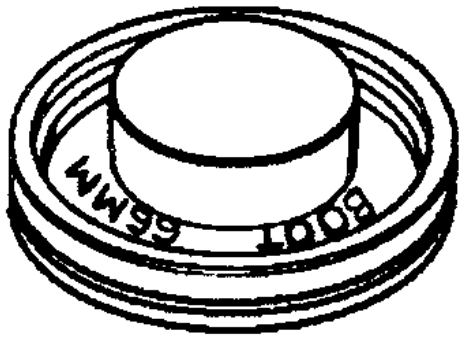


Figure 85 ZTSE4417

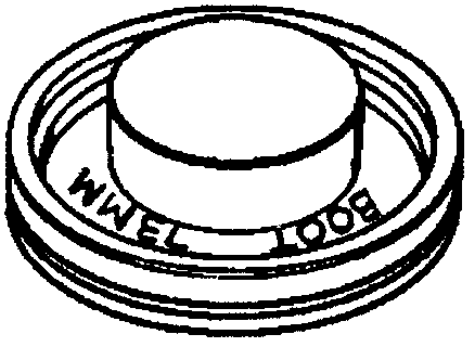


Figure 86 ZTSE4418

Table 5 Special Tools

ORDER NO.	DESCRIPTION	APPLICATION
ZTSE4417 Figure 85 (See Figure 85, page 97)	**Disc Brake Caliper Piston and Boot Installer** — The 66 mm caliper assembly includes a boot to protect the caliper piston and piston bore from road splash and contaminants.	66 mm Disc Brake Caliper
ZTSE4418 Figure 86 (See Figure 86, page 97)	**Disc Brake Caliper Piston and Boot Installer** — The 73 mm caliper assemble includes a boot to protect the caliper piston and piston bore from road splash and contaminants.	73 mm Disc Brake Caliper