SECTION : 206-03A Front Disc Brake - High Series

VEHICLE APPLICATION : 2008.0 Falcon

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SPECIFICATIONS

General Specifications

Description	Specification
Front disc brake minimum thickness	26.0mm.
Lubricants	
High melting point grease	PBR MS1124
Fluid	
Brake fluid	ESZ-M6C55-A
Pad	
Minimum thickness above metal backing plate	1.0 mm

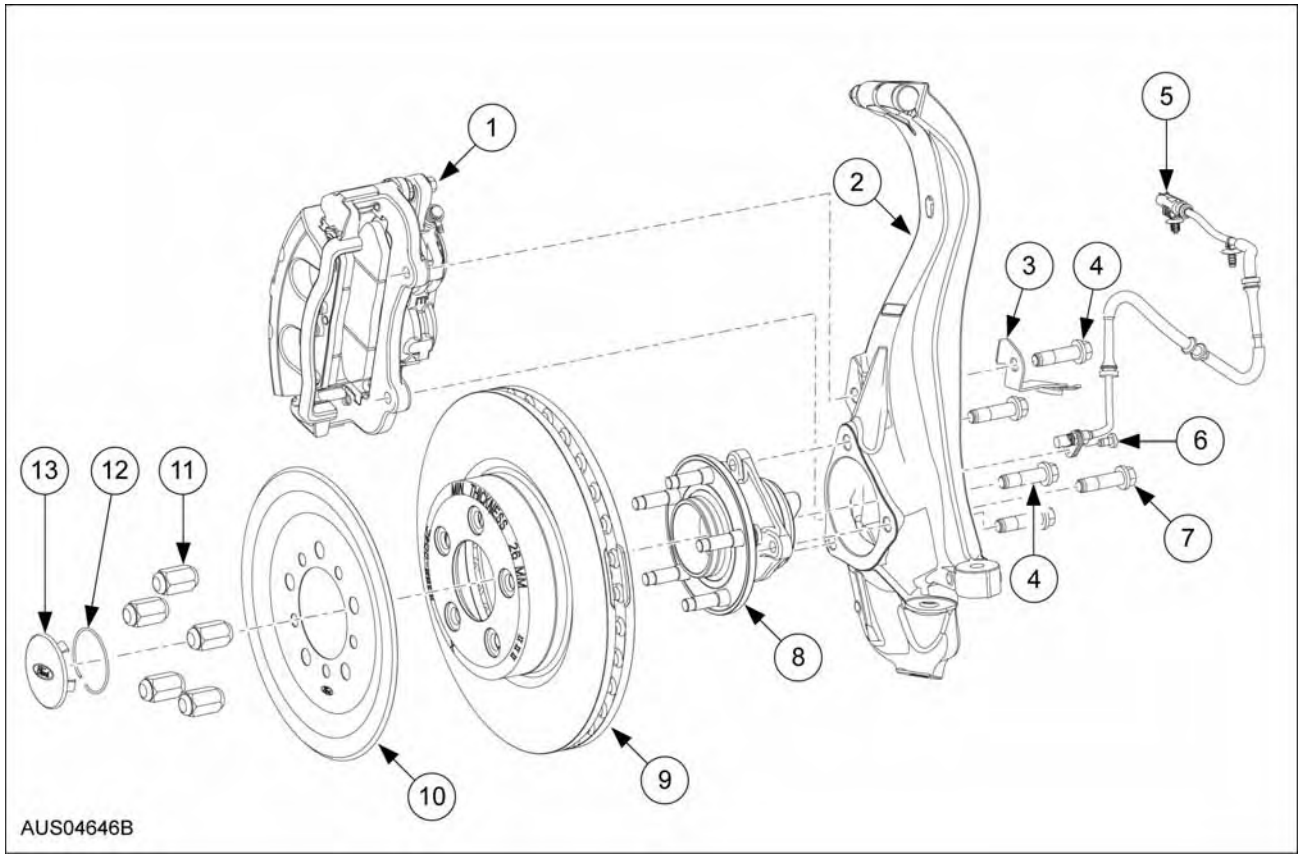
Torque Specifications

Description	Specification
Front Brake Hose to Caliper (Banjo Bolt)	13 ± 1 Nm plus 90° ± 3 ° further rotation
Front Caliper Anchor to Suspension Knuckle	115 ± 17 Nm
Caliper bleed screw	11.5 ± 2.5 Nm
Front Caliper Housing to Anchor (Guide Pin Bolts)	42 ± 3 Nm

DESCRIPTION AND OPERATION

Front Disc Brake

Front Disc Brake Assembly Components



Knuckle Assembly

Item	Description
1	Front Disc Caliper Assembly
2	Front Wheel Knuckle
3	Brake Line Bracket
4	Caliper Retaining Bolt x 2
5	ABS Sensor and Elec. Cable
6	ABS Sensor Retaining Bolt
7	Hub Unit Mounting Bolt × 3
8	Hub Unit Assembly
9	Brake Disc Rotor
10	Sight Shield
11	Wheel Nuts
12	Wheel Centre Cap Retaining Clip
13	Wheel Centre Cap

The brake caliper housing contains two piston bores in the inboard section of the casting. (Inboard refers to the side of the casting that is nearest the centreline of the vehicle when the caliper is mounted). The fluid inlet port and bleeder valve port are machined into the inboard section of the caliper and connect directly to the piston bores. Each cylinder contains a piston and seal. The seal has a square section, and is located in a groove machined in the cylinder bore. The seal fits around the outside diameter of the piston to provide a hydraulic seal between the piston and the cylinder wall.

Rubber boots seal the caliper piston and bore from contamination. The outside diameter of the boot is captured in a recess in the top of the cylinder bore and the piston. The inside diameter of the boot fits into the groove which is machined in the piston. The use of abrasives or any attempt to re-machine the piston will destroy the required surface finish.

The sliding caliper feature automatically compensates for lining wear. The abutment bracket is rigidly fixed to the steering knuckle, while the housing slides within the abutment bracket by means of two guide pins bolted to the housing. Each caliper contains two pad assemblies. They are constructed of a stamped metal backing plate with a moulded lining.

When the brake pedal is applied, brake fluid is displaced into the cylinders moving the pistons outward. This action forces the inner pad and lining assembly against the brake disc. The resultant reaction forces the caliper housing and outboard pad assembly inward against the brake disc. The resultant forces of the pads on the brake disc are equal. Braking torque is transferred from the brake pad

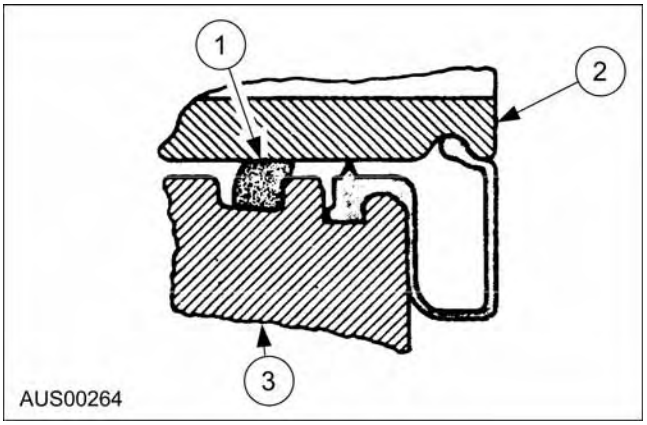
DESCRIPTION AND OPERATION (Continued)

backing plates into the abutment bracket and into the knuckle.

When the brake pedal is released the seals retract the pistons into the cylinders and the caliper housing slides outward, releasing the brake.

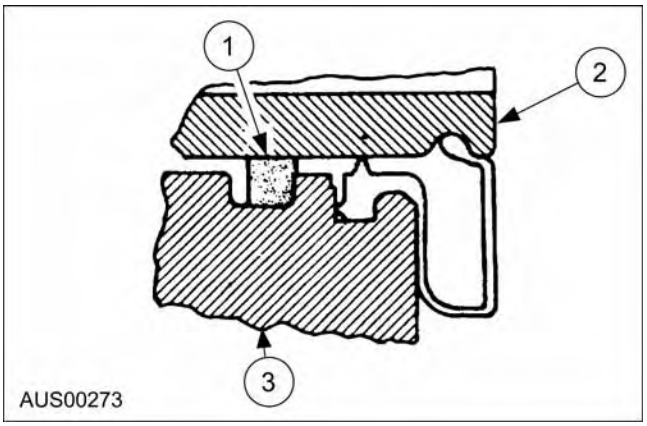
Disc Pad Running Clearance

Brakes Applied



Item	Description
1	Piston seal distorted
2	Piston
3	Caliper housing

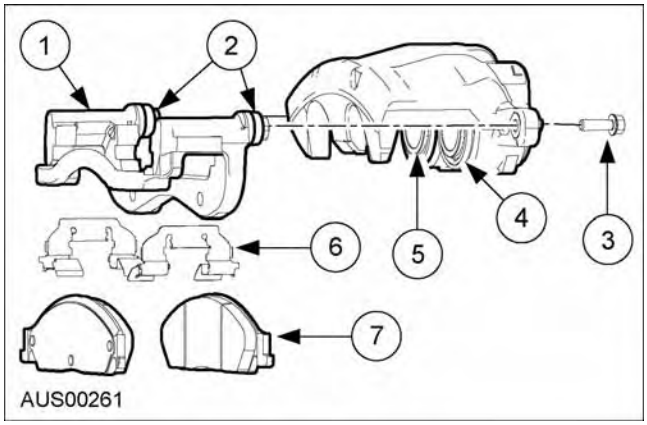
Brakes Released



Item	Description
1	Piston seal relaxed
2	Piston
3	Caliper housing

The figures above show what happens to the pistons and the seals during usage. The pistons seals perform the self-adjusting action. When the pistons are pushed out by hydraulic pressure the piston seals distort. When the hydraulic pressure is relieved the seals relax and drag the pistons back in, creating a disc to pad running clearance.

Guide Pin Adjustments



Item	Description
1	Pad abutment bracket
2	Guided pin and boot assembly
3	Guide pin bolt
4	Piston dust boot
5	Piston
6	Pad abutment shim
7	Pads

The figure above shows the guide pin installation. Running clearance - the caliper head moves back and forth on lubricated guide pins. These guide pins are intended to accommodate disc runout and bearing float. If friction in the guide pin slide is high, instead of the caliper head sliding back and forth, the disc will knock the piston into the caliper housing, causing a spongy pedal on subsequent applications.

Wear Adjustment

Pad wear is taken up during brake application as follows:

By the piston sliding past the seal to a new position.

By movement of the caliper head on the guide pin.

Brake disc

The cast iron disc is of the ventilated brake disc-type and is separate from the front hub.

DIAGNOSIS AND TESTING

Brake Calipers

Refer to Section 206-00.

Inspection

1. Clean all residue from the disc pads, spring clips, guide surfaces on the anchor bracket, and caliper housing.
   NOTE: Always replace both caliper pads as a set.
2. Inspect inner and outer pads. Lining wear limit is 1.0 mm.
3. Inspect anchor bracket. Replace anchor bracket if corroded, worn or damaged.
4. Remove the caliper from the knuckle. Refer this Section - Brake Caliper Assembly, Removal.
5. Disassemble the caliper assembly. Refer this Section - Brake Caliper, Disassembly and Assembly.
6. Clean piston, housing and bleed screw. Use only clean methylated spirits for cleaning. Dry, filtered compressed air should be used to dry all components and blow out all passages in the caliper housing and bleed screw. Care should be taken to keep methylated spirits and debris away from eyes.

   CAUTION: All components must be kept away from any type of mineral oil as it will damage rubber components.
7. Inspect piston. Replace piston if scoring, nicks, corrosion, wear or damage is evident.
8. Inspect housing. Replace housing if bore is scored, corroded, worn or damaged.
9. Inspect the guide pin dust covers; replace if torn or damaged. Check that the guide pins slide freely in the housing.
10. Inspect the pads; check for signs of excessive heat, glazing or cracking. Inspect the noise shim on the back of the pad backing plate, for any signs of movement or de-lamination. Replace the pads if necessary.

REMOVAL AND INSTALLATION

Brake Pads

Removal

WARNING: Although original equipment pad material is asbestos free. If non genuine pads are used, the following applies:

- Asbestos fiber dust may be present on brake and clutch assemblies and is hazardous to health if inhaled.
- Brake and clutch assemblies should be cleaned using a vacuum cleaner recommended for use with asbestos fibers such as a brake/clutch/service vacuum. The bag must be labeled per OSHA instructions, sealed, and the trash hauler notified as to the bag's contents.
- If the vacuum suitable for asbestos is not available, cleaning should be done wet. If dust generation is still possible, technicians should wear government-approved toxic dust purifying respirators. Failure to follow these instructions may result in personal injury.

1. Clean and remove master cylinder reservoir cap. Loosen front brake line connection at the master cylinder, allowing fluid to bleed into a container until master cylinder reservoir is one-third full. Re tighten line connection and replace master cylinder cap.

   WARNING: Brake fluid will damage paintwork.

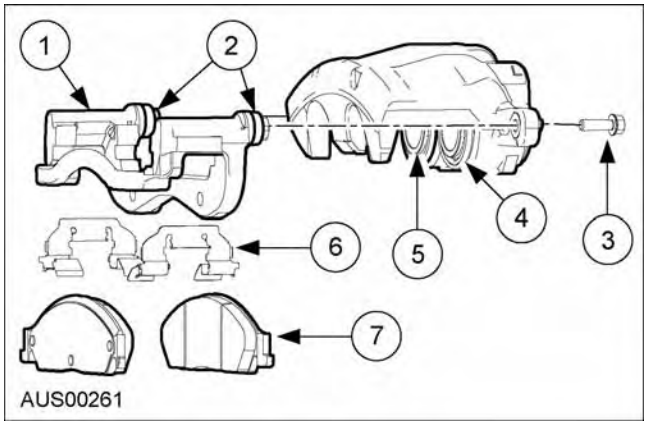
   NOTE: Do not completely remove brake line or empty the reservoir or it will be necessary to bleed the system.

   NOTE: Discard the fluid removed. DO NOT RE-USE.

   NOTE: Removal of the fluid is necessary to prevent reservoir overflow when the caliper piston is pushed back in its bore during pad replacement.

2. With vehicle raised evenly on a hoist or jack stands, mark relationship of wheel to hub and remove the front wheels.
   Using wheel nuts secure rotor to hub during work.
   NOTE: If more than one brake requires service, work on only one brake at a time. Pad assemblies, must always be replaced in both brakes.

3. Using G-clamps, tighten until each piston bottoms on each bore.
   NOTE: Ensure that one end of the G-clamp rests on (or is adjacent to) the brake hose attaching bolt head, and the other against the outer pad.
   DO NOT exert excess force on the clamps as damage to steel pistons may result.



Item	Description
1	Pad Abutment Bracket
2	Guided pin and boot assembly
3	Guide pin bolt
4	Piston dust boot
5	Piston
6	Pad abutment shim
7	Pads

4. Using a suitable size open-end spanner to hold the lower guide pin (2), remove and discard the guide pin bolt (3).
   NOTE: Old bolts must not be re-used, as they are vital safety components that have a micro encapsulated adhesive on the bolt thread.
5. Disengage brake hose grommet from bracket attached with caliper mounting bolt.
6. Swing caliper housing about the existing guide pin until housing is clear of pads.
7. Remove worn pads (7) from abutment bracket (6) and inspect condition of brake disc. Discard end abutment shims (6).
8. Check guide pins for free movement in abutment bracket. If there is restriction of movement, replace guide pins and/or guide pin boots. Including high lube grease.
9. Clean any dirt from both the piston face, which contacts the inner pad, and the caliper head area that contacts the outer pad.
10. Inspect caliper assembly for fluid leaks or damage.

Installation

1. Replace end abutment shims (6) in abutment bracket (1), ensuring they are secure and clear of the rotor being careful not to bend them.
2. Install the inner (7) and outer pads to the abutment bracket (1), against the inner and outer surface of the brake disc respectively.
3. Lower the brake caliper housing, ensuring that the piston boots (4) do not get caught between the piston and inner pad (7).

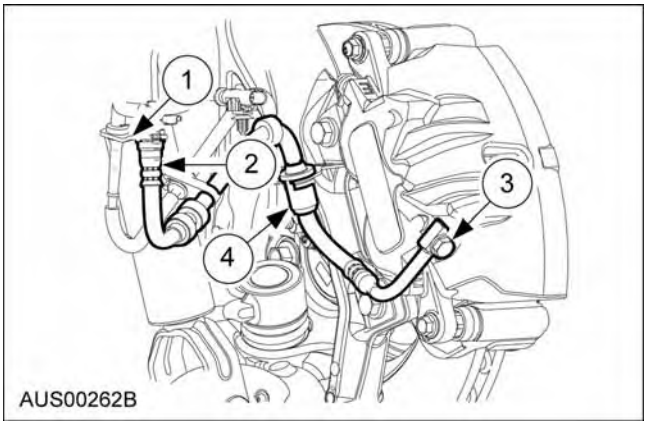
REMOVAL AND INSTALLATION (Continued)

4. Install and tighten the new guide pin bolt (3) to the correct torque specification.
   NOTE: Do not wedge anything between the guide pin hex and the caliper as it could cause incorrect alignment of the free sliding of the caliper relative to the anchor plate.
5. Refit brake hose grommet to bracket attached to caliper bracket, as previously positioned.
6. Replenish the brake fluid in the master cylinder with fresh specified fluid.
7. Pump the brake pedal several times to position the pad assemblies.
8. Check for fluid leakage at all connections under pedal pressure.
9. Re-check fluid level in master cylinder reservoir.
10. Remove wheel nuts.
11. Reinstall wheels, aligning marks made prior to removal and remove jack stands or lower hoist.
12. Tighten wheel, securing nuts to the specified torque.
13. Road test vehicle and make several light 60-0km/h stops to seat the linings. (The vehicle may pull slightly to one side for the first few applications. This is normal until linings are seated).

Front Brake Hose

Removal

1. Remove banjo bolt and washers.



Item	Description
1	Clip
2	Brake tube connector
3	Banjo bolt
4	Grommet

2. Remove grommer from hose positioning bracket.
3. Disconnect the brake tube connector.
4. Remove clip.
5. Remove hose assembly.

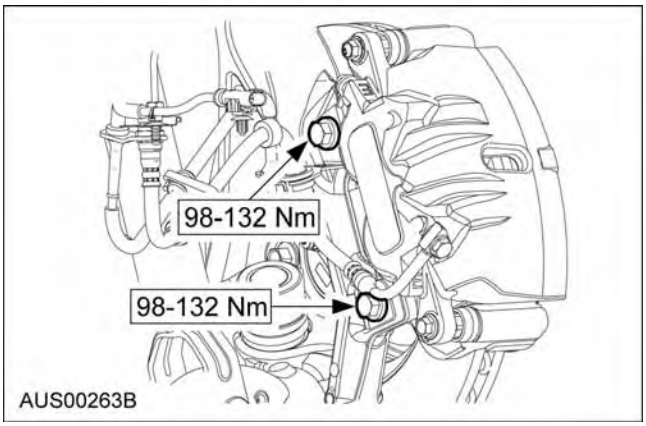
Installation

1. Install grommet into hose positioning bracket.
2. Install banjo bolt and new washers. Torque to specification.
3. Install hose into body bracket and install clip.
   NOTE: Ensure hose is engaged to bracket prior to fitment of banjo bolt. Check routing for correct clearance on completion.
4. Connect brake tube and torque to specification.
5. Bleed as outlined in procedure.

Brake Caliper Body

Removal

1. Raise and support the vehicle to ensure it is stable and secure. Mark the relationship of the wheel and the rotor and remove wheel.
2. Place a drain tray beneath caliper assembly. Loosen and remove attaching bolt and hose end. Discard washers and plug caliper body inlet port and hose end to prevent contamination or fluid loss.



3. Disconnect hose. Discard copper sealing rings.

Installation

1. Assemble caliper body to abutment bracket by securing upper guide pin using a new guide pin bolt.
2. Lower the brake caliper housing, ensuring that the piston boots do not get caught between the piston and inner pad.
3. Install and tighten the new guide pin bolt to the correct torque specification.
   NOTE: Ensure hose is engaged to bracket prior to fitment of banjo bolt. Check routing for correct clearance on completion.

   NOTE: Do not wedge anything between the guide pin hex and the caliper as it could cause incorrect alignment of the free sliding of the caliper relative to the anchor plate.

REMOVAL AND INSTALLATION (Continued)

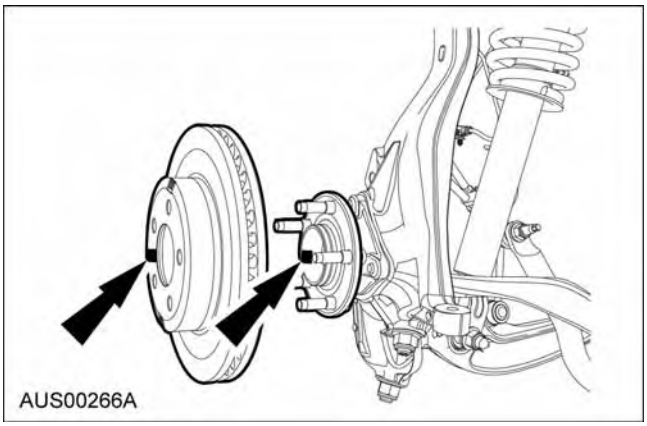
4. Reconnect new brake hose, using new, dry, sealing washers. Tighten attaching bolt to the correct torque specification ensuring hose routing is removed.
5. Bleed brake system, refer to Brake system Bleed in this section.

Brake Disc Removal

1. Remove the wheel and tyre from the hub.
2. Remove the caliper assembly from the spindle and the rotor, as previously described in this section. If the caliper does not require servicing, it is not necessary to disconnect the brake hose. Position the caliper out of the way, and support it with a wire to avoid damaging the caliper or the hose. Handle the rotor, linings and caliper assemblies carefully to avoid deformation, nicking, scratching or contamination.
3. Remove the rotor from hub.

Installation

1. Position the rotor on the axle flange.
   NOTE: Ensure that all mounting surfaces are clean and free from contamination which could cause possible disc runout.

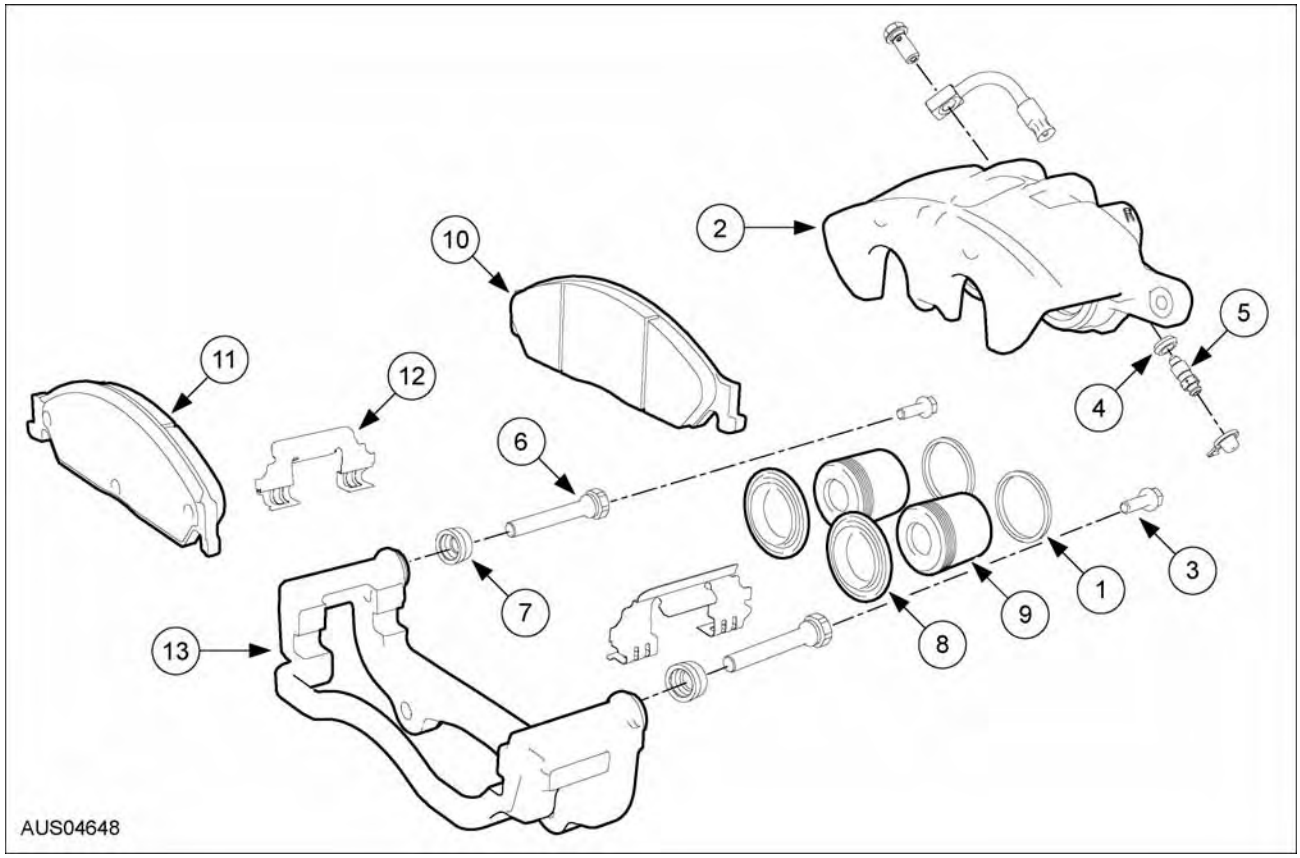


2. Mount the caliper assembly on the spindle following the Disc Brake Caliper Assembly Installation procedure in this section.
3. Install the wheel.

DISASSEMBLY AND ASSEMBLY

Brake Caliper

Disassembly



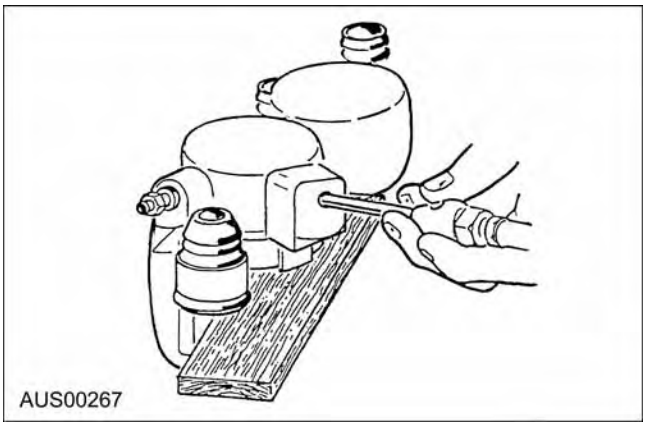
Item	Description
1	Sealing Ring
2	Caliper Body
3	Guide Pin Bolt
4	Bleed Screw Sealing Ring
5	Bleed Screw
6	Guide Pin
7	Guide Pin Boot
8	Piston Boot
9	Piston
10	Inner Pad Assembly
11	Outer Pad Assembly
12	Pad Abutment Shim
13	Abutment Bracket

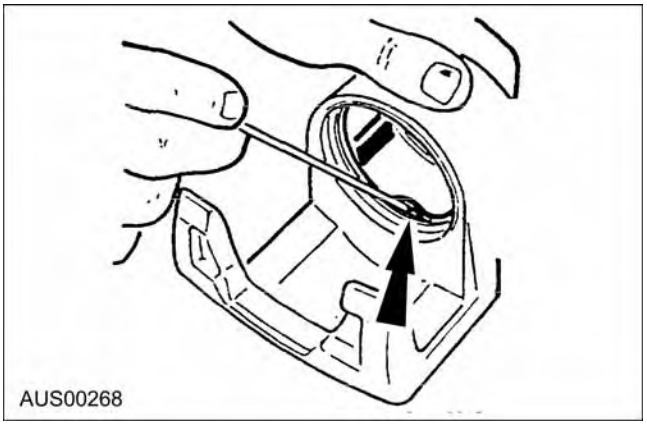
1. Remove Brake Caliper. For additional information, refer to Removal of Brake Caliper Body in this section.
   NOTE: Ensure hose is engaged to bracket prior to fitment of banjo bolt. Check routing for correct clearance on completion.
2. Remove brake pads (10&11) from abutment bracket.
3. Remove abutment bracket from mounting knuckle. Remove abutment shims (12) from abutment bracket.
4. Withdraw guide pins (6) and boots (7) from anchor plate. Separate boots from pins.
5. Remove pistons (9) by placing a spacer between the pistons and the caliper fingers and applying air at the inlet port of the caliper housing until each piston is forced out of the bores.

   ⚠ CAUTION: Inject air lightly and progressively increase the pressure until the piston is forced out of the bore. This procedure is advisable to avoid physical injury, as the pistons may develop considerable force due to sudden pressure increases.
6. Remove rubber piston boot (8) from bore.

DISASSEMBLY AND ASSEMBLY (Continued)

7. Remove piston seal (1) from bore taking care not to damage bore or seal locating groove.

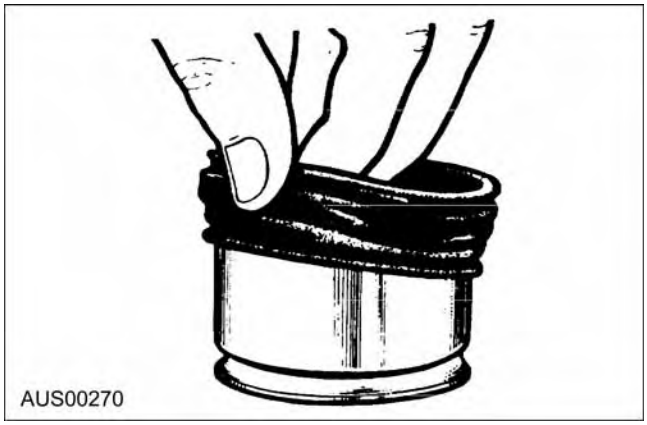




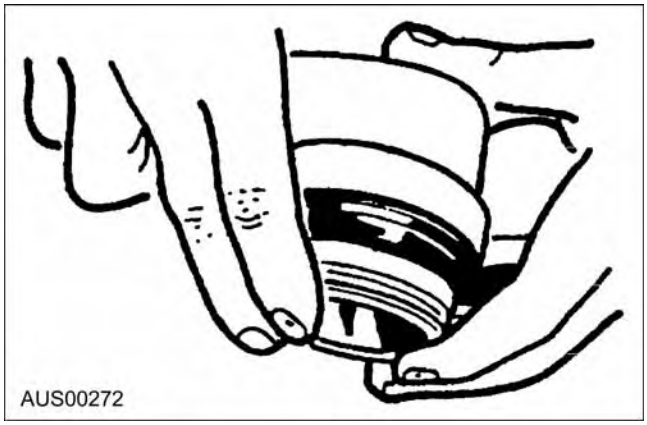
8. Remove bleed screw (5). Discard bleed screw seal ring (4).
9. Inspect all parts as described in Cleaning and Inspection.

Assembly

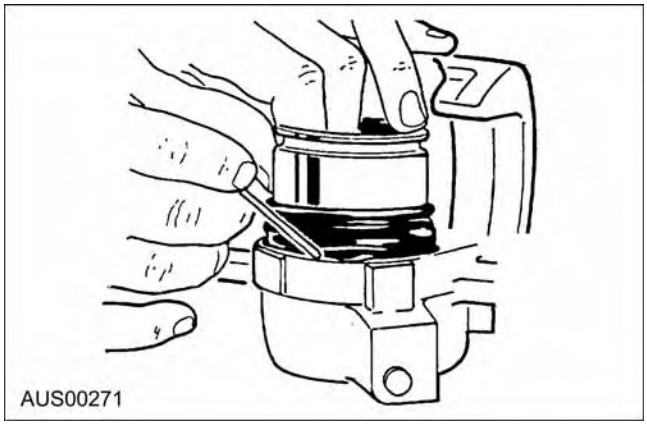
1. Place caliper assembly on a clean bench area with the open end of caliper body (2) up.
2. Lubricate cylinder bores and pistons (9) with specified fluid.
3. Fit new seals (1) by positioning seal at one area in the groove and gently work around the cylinder bore with a finger until properly seated. Check to be sure the seal is not twisted or rolled in its groove.
4. Coat piston boots (8) in specified grease and place boot over end of piston. Position each piston into caliper housing, seating each boot into groove in caliper bore. Ensure the boot is squarely and firmly seated in groove.



5. Push each piston squarely into each bore by hand until fully seated.



6. Ensure boot is fully seated in piston a caliper grooves.



7. Fit new bleed screw sealing ring (4).Reinstall bleed screw (5).
8. Lubricate guide pins (6) with specified grease. Install new guide pin boots (7) onto the guide pins.

DISASSEMBLY AND ASSEMBLY (Continued)

9. Reinstall guide pins into anchor plate, pushing the guide pin boot over its groove. Ensure there is no air trapped inside the boot.
10. Ensure abutment bracket mounting surfaces are clean. Reinstall abutment bracket over brake disc, securing anchor plate to mounting knuckle.