

## SECTION : 206-00 Brake System — General Information

**VEHICLE APPLICATION :** 2008.0 Falcon

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## SPECIFICATIONS

### General Specifications

Description	Specification
Lining wear limit (above backing plate or rivets )	1.0 mm (0.040 in)
<b>Lubricants</b>	
High Performance SUPER DOT 4 Brake Fluid	ESA-M6C25-A
High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA	ESE-M12A4-A
<b>Disc Brakes</b>	
Brake disc maximum run out	0.035 mm (0.001 in)
Brake disc maximum thickness variation	0.009 mm (0.0004 in)
<b>Brake Booster</b>	
Dual Diaphragm Diameter	230 mm
<b>Master Cylinder</b>	
Type	PBR Dual Line
Main Bore Diameter	23.8 mm
Fast Fill Bore Diameter	31.75 mm
Min. Total Stroke	33.5 mm
Split Point (non EBD only)	3/4 Tonne Ute with prop valve = 2.5mPa
	1 Tonne Ute with prop valve (Load proportioning valve fitted to this variant) = 0MPa
Displacement (min.)	Primary - 9.0 cc Secondary - 5.12 cc
<b>Caliper(Front)</b>	
Type	Twin Piston floating Caliper
Bore Diameter	42.0 mm
<b>Caliper(Rear)</b>	
Type	Single Piston floating Caliper
Bore Diameter	40.5 mm
<b>Rotor (Front)</b>	
Type	Cast Iron - Ventilated
Diameter	298 mm
Thickness (New)	28 mm
Max. Runout (brake disc only)	0.035 mm
Max. Runout (installed on the vehicle)	0.050mm
Thickness Variation	0.009 mm
Min. Thickness resurfaced (overall)	26.0 mm
Min. Thickness resurfaced (individual sides of rotor)	6.5 mm
Surface Finish (Ra)	3.2 µm maximum
Balance	54 gcm
<b>Rotor (Rear)</b>	
Type	Cast Iron - Solid
Diameter	303 mm
Thickness (New)	16 mm
Max. Runout	0.035 mm
Thickness Variation	0.009 mm
Min. Thickness Refaced (overall)	14.5 mm
Brake Face Surface Finish (Ra)	3.2 µm maximum



**SPECIFICATIONS (Continued)**

Description	Specification
Park Brake Bore Surface Finish (Ra)	3.2 $\mu$ m maximum
Max. Park Brake drum diameter	190.4 mm
<b>Disc Pads</b>	
Front Material	JB1 NF85H FF
Rear Material	JB1 NF85 FF
<b>Brake Pedal Height</b>	
Minimum height without fluid in system and master cylinder Bottomed out	25 mm
<b>ABS System</b>	
System and motor dropout threshold	8.7V
Fuse	30A
Warning lamp	1.2W
Current draw - motor (under load)	50A
Front Wheel Sensor Resistance	1.65 kOhm $\pm$ 0.2 kOhm
Rear Wheel Sensor Resistance	1.65 kOhm $\pm$ 0.2 kOhm

**Torque Specifications**

Description	Nm
Cruise control switch	14 - 20
Master Cylinder to Booster	10 - 20
Booster to Dash panel	22.5 $\pm$ 3.5
Brake Master Cylinder to Brake Tube Nuts	13.5 $\pm$ 2.1
Secondary Piston Stop Plug	10.5 $\pm$ 1.5
Master cylinder End Plug	20 - 30
Reservoir Attaching Bolt	4 $\pm$ 1.5
Brake Tube Nuts	13.5 $\pm$ 2.1
Brake Line Connector to Rear Axle Housing	25
Front Brake Hose to Caliper (Banjo Bolt)	13 $\pm$ 1
Rear Brake Hose to Caliper (Banjo Bolt)	13 $\pm$ 1
Caliper bleeder screw, rear	11.5 $\pm$ 2.5
Caliper bleeder screw, front	11.5 $\pm$ 2.5
Front Caliper Anchor to Suspension Knuckle	115 $\pm$ 17
Rear Caliper Anchor to Axle Housing or Suspension Knuckle	103 $\pm$ 16
Front Caliper Housing to Anchor (Guide Pin Bolts)	42 $\pm$ 3
Rear Caliper Housing to Anchor (Guide Pin Bolts)	31 $\pm$ 3
Splash Shield to Rear Axle Housing	11 $\pm$ 1.1
Park Brake Control to Body	25
Park Brake Equalizer Nut	15
Load Proportioning Valve to Chassis	25 $\pm$ 5
Load Proportioning Valve to Rear Axle Housing	11 $\pm$ 1.1
Brake Tube Nuts to Load Proportioning Valve	13.5 $\pm$ 2.1
Wheel Nuts	140

Description	Nm
Cable Bracket Nuts	8
Modulator Nuts to Bracket	15
Brake Pipe Tube Nuts (modulator)	13
Wheel Speed Sensor Screws	9
Pump Motor earth strap screw	12

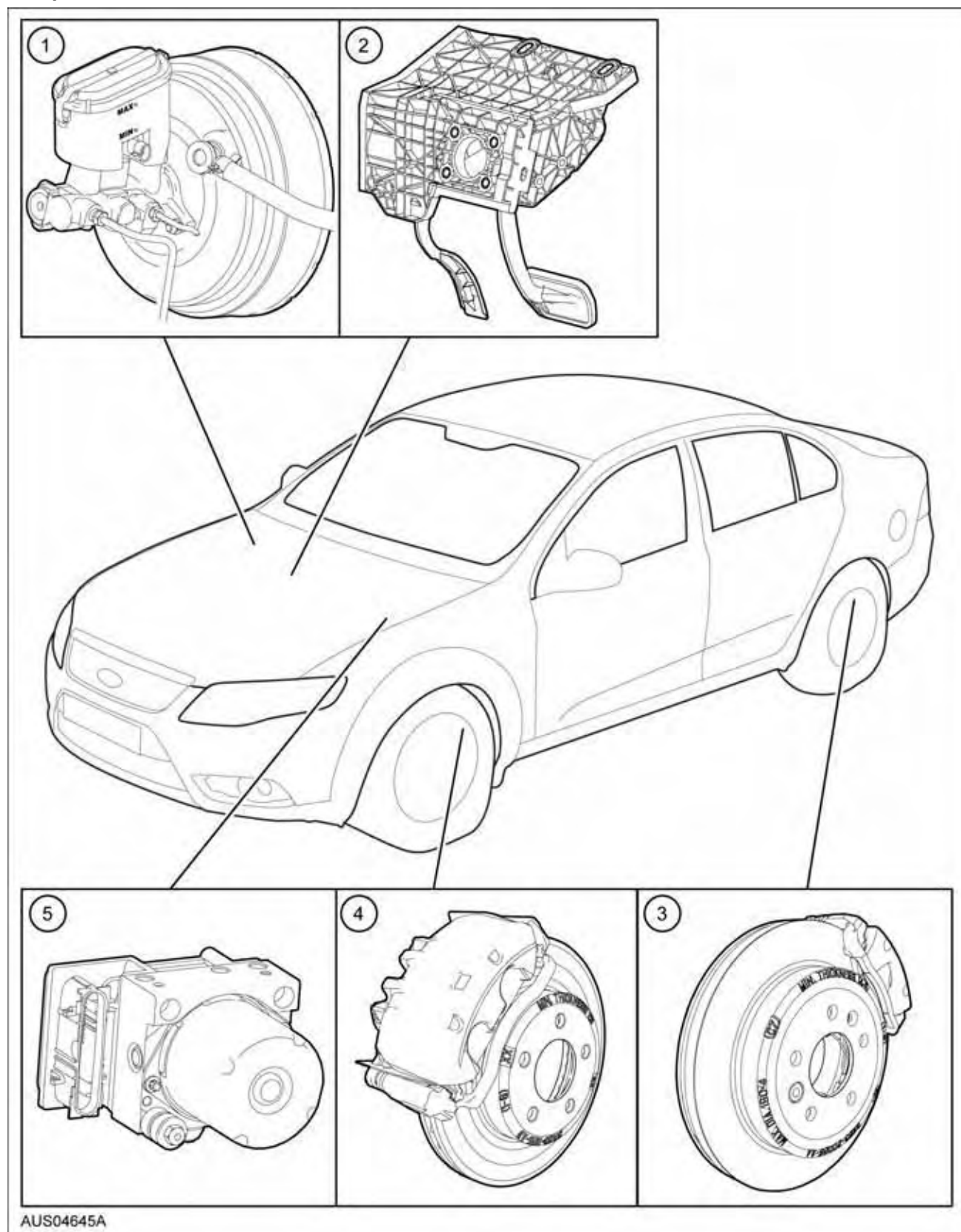
**NOTE:** All Hydraulic Lines must be tightened to the specified torque and be free from leakage.



## DESCRIPTION AND OPERATION

### Brake System

#### Component Locator



## DESCRIPTION AND OPERATION (Continued)

Item	Description
1	Brake master cylinder and booster assembly
2	Pedal box
3	Rear disc brake assembly
4	Front disc brake assembly
5	Anti-lock electronic control module

When the vehicle carries its maximum load, the piston is positioned so that fluid can flow unrestricted through the load proportioning valve to the rear wheel calipers.

The vehicle is equipped with a vacuum-assisted power braking system. For additional information, refer to Section 206-06.

The braking system is a front-to-rear split hydraulic system. For additional information, refer to Section 206-06.

The front brakes utilise a dual-piston brake caliper and disc brake system. For additional information, refer to Section 206-03.

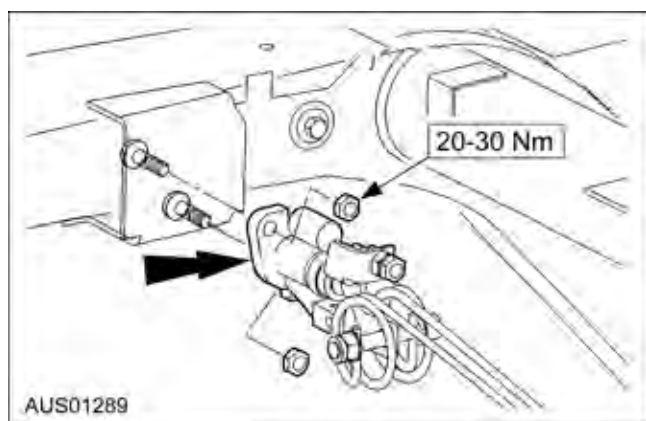
The rear brakes utilise a single piston caliper and disc brake system with the parking brake assembly located inside the drum and hat-type brake disc. For additional information, refer to Section 206-04.

The parking brake system is a shoe and drum system that is located inside the drum and hat-type rear brake discs. For additional information, refer to Section 206-05.

A 4-wheel anti-lock brake system (4WABS) is standard (except on XL & XLS utes). For additional information, refer to Section 206-09.

### Load Proportioning Valve 1 Tonne Ute

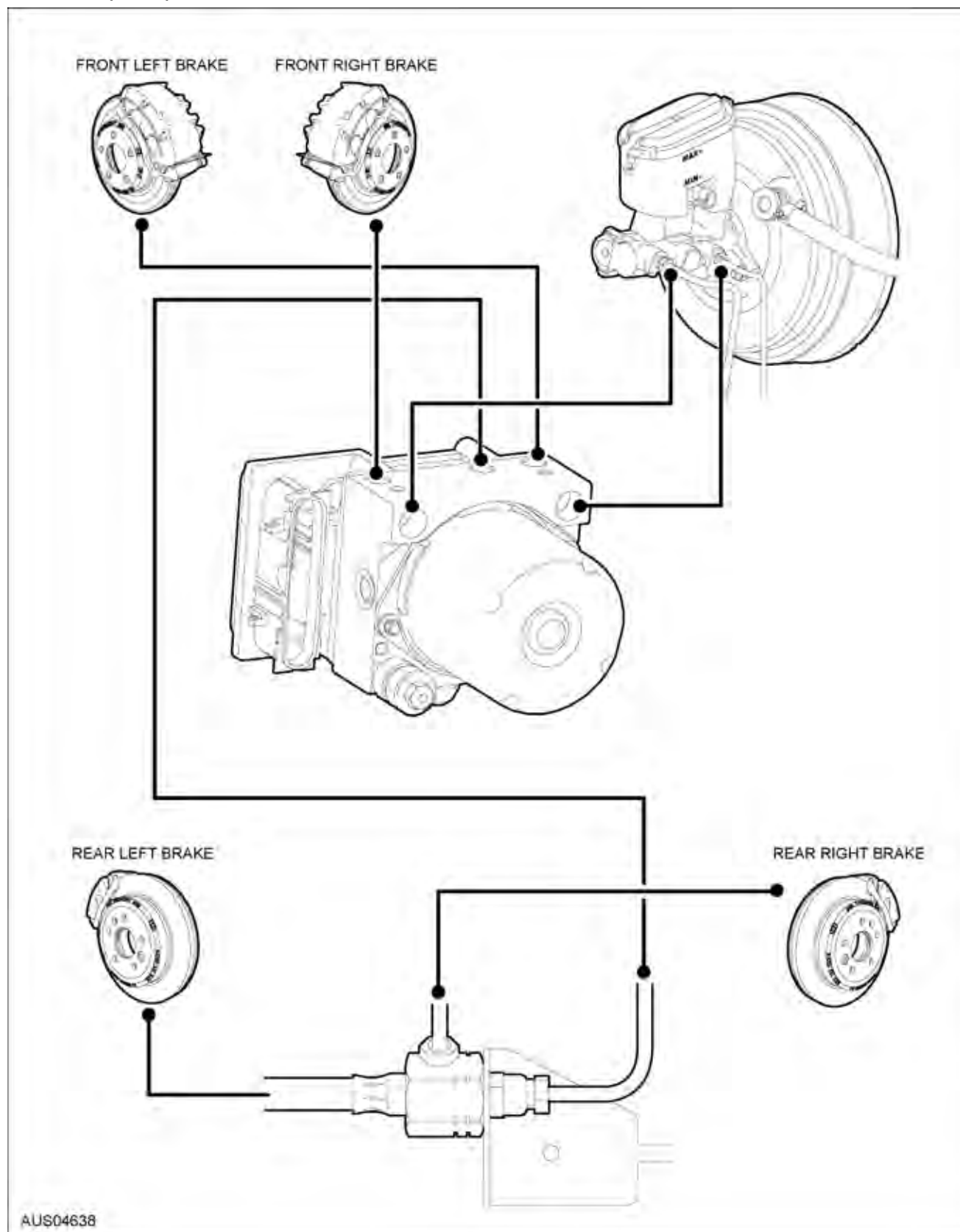
The load proportioning valve regulates the rear brake system hydraulic pressure and is located at the rear of the vehicle.

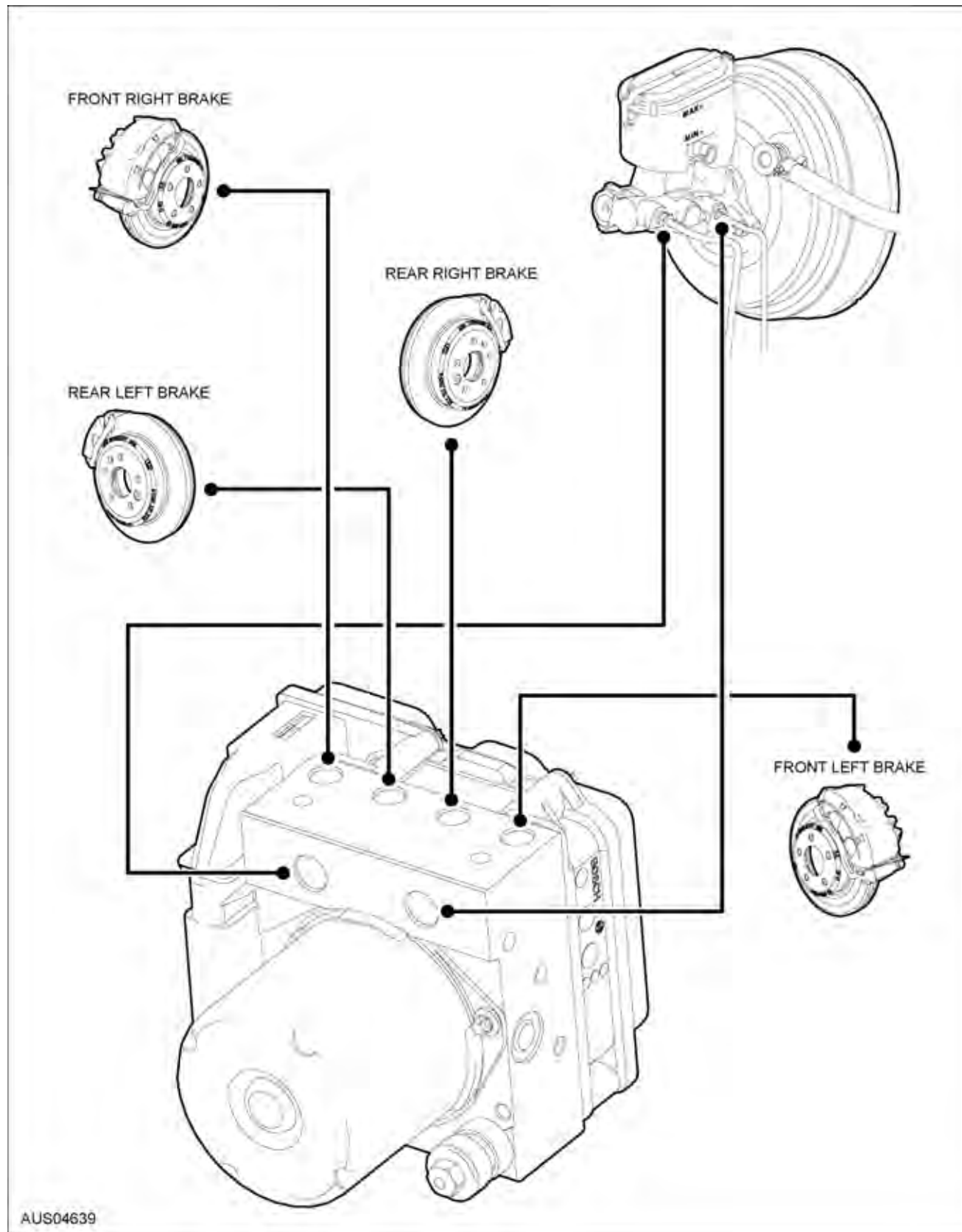


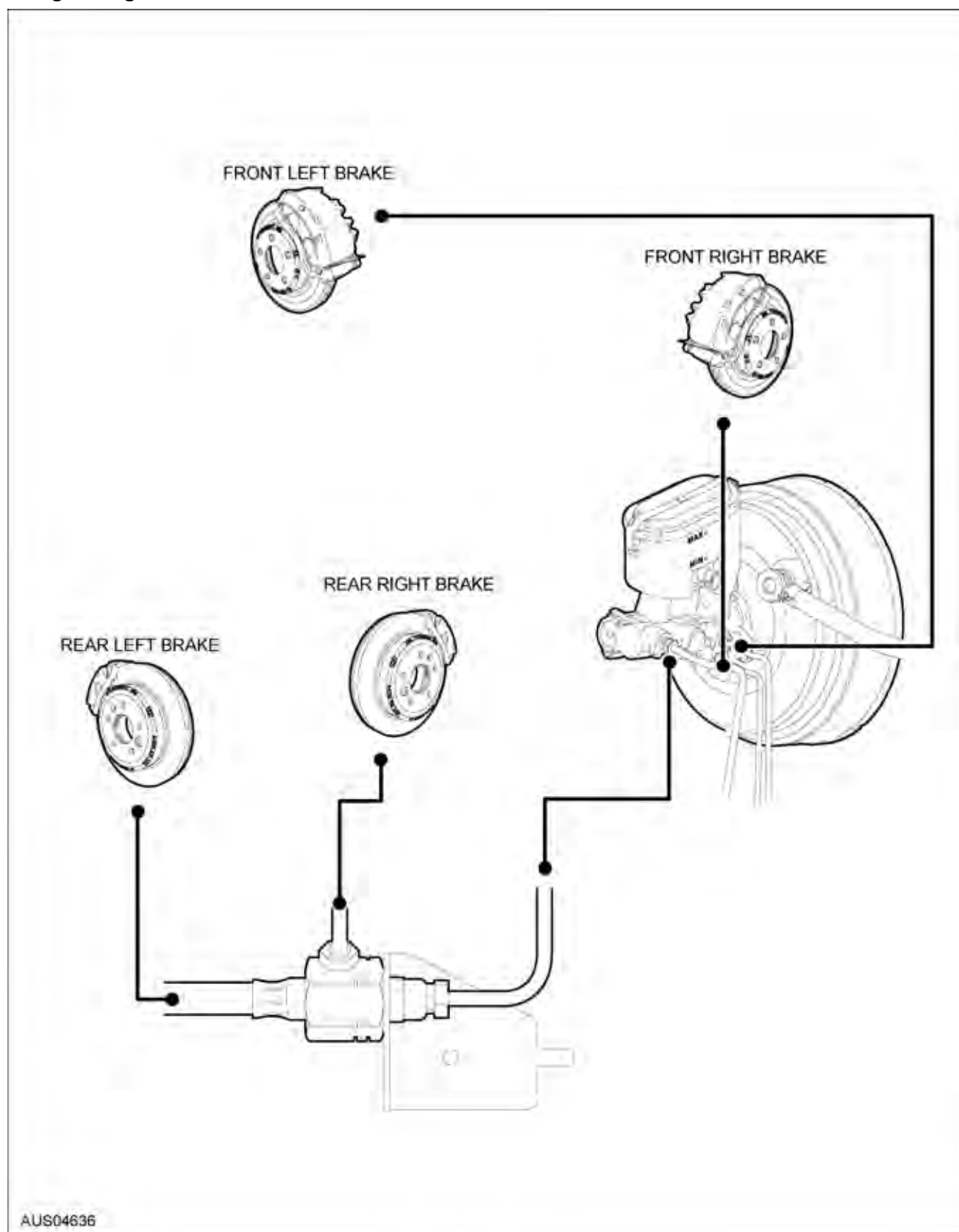
The load proportioning piston is positioned by the use of two springs. The static spring applies a constant force on the piston while the sensing torsion spring applies a variable force depending on the axle load.

When the vehicle is lightly loaded the torsion spring has its maximum effect. The total force on the piston and plunger is greatest. This force positions the load proportioning piston to restrict the flow of fluid through the outlet port to the rear brakes.

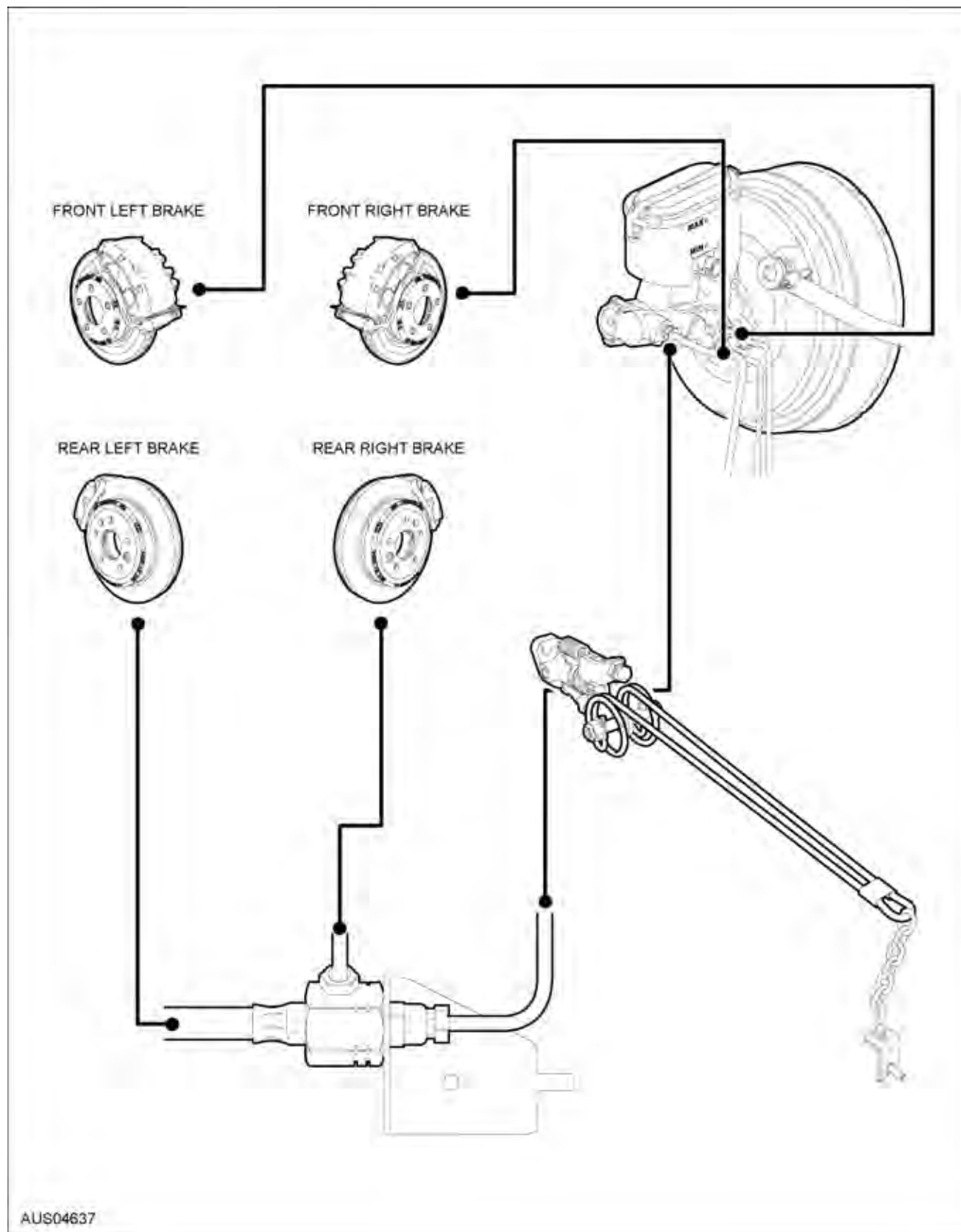


**DESCRIPTION AND OPERATION (Continued)****BRAKE SYSTEM HYDRAULIC CIRCUITS****ABS 3-CH (ABS8)**

**DESCRIPTION AND OPERATION (Continued)****4CH ABS / Traction Control (TCS8) / Dynamic Stability Control (DSC8)**


**DESCRIPTION AND OPERATION (Continued)****750kg / 550kg Ute Non-ABS**



**DESCRIPTION AND OPERATION (Continued)****1T Ute NON-abs**

## DIAGNOSIS AND TESTING

### Brake System

Special Tool(s)	
	Vacuum Pump 416-D002 (D95L-7559-A) or equivalent

### Inspection and Verification

**⚠ WARNING:** Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with eyes. Wash hands thoroughly after handling. If brake fluid contacts eyes, flush eyes with running water for 15 minutes. Get medical attention if irritation persists. If taken internally, drink water and induce vomiting. Get medical attention immediately. Failure to follow these instructions may result in personal injury.

**⚠ CAUTION:** Do not spill brake fluid onto painted surfaces. If spilled, wipe it up immediately.

**NOTE:** Always check the fluid level in the brake master cylinder before carrying out the test procedures. If the fluid level is not above the MIN line, add High Performance Motor vehicle brake fluid meeting Ford specification ESZ-M6C55-A or equivalent Super DOT4 fluid.

**NOTE:** Prior to carrying out any diagnosis, verify that the brake warning indicator is functional. Apply the parking brake. If the brake warning indicator does not illuminate, refer to Brake fail warning light component test.

**NOTE:** The primary indicators of brake system concerns are a change in the feeling through the brake pedal, the brake warning indicator, and the brake fluid level. If a problem exists, refer to the following diagnosis guide.

#### Pad Wear

1. Remove the wheel to inspect the pads. Refer Warning under Service Precautions.
2. If a lining has worn to a thickness of 1.0 mm at any one of three measuring locations or if there is more than 3 mm taper from end to end replace all (4) pad assemblies on both front or both rear wheels to maintain even braking. Refer to Section 206-03 or Section 206-04 for replacement of parts.

#### Rotor Wear and Runout

1. Remove the wheel to inspect the rotor.
2. Check the rotor for scoring. Minor scores need not be removed. If the rotor is excessively scored, refinish it in accordance with the Specifications or replace the rotor.
3. When checking front rotor runout, be sure to take the wheel bearing end play into account. Remove the rotor if necessary.
4. Front wheel bearing end play is critical and must be within specifications.
5. To check the rear rotor run-out either apply a load to the end of the axle shaft to remove the end float in the bearing or remove the axle shaft and rotor assembly from the housing and check the run-out by mounting the axle on its centres.
6. Clamp a dial indicator to the caliper housing so that the stylus contacts the braking surface of the rotor approximately 32 mm from the outer edge for a front rotor or 3mm from the outer edge for a rear rotor.
7. Rotate the rotor and take an indicator reading. If the total lateral run-out exceeds 0.05 mm for a front rotor or 0.05 mm for a rear rotor, resurface or replace the rotor.
8. Refer to Specifications section for refinishing specifications. Refer to Section 206-03 or Section 206-04 for information regarding rotor replacement.

#### Disc Thickness Variation

This is the variation in thickness between the two braking surfaces of the rotor measured circumferentially.

Disc thickness variation may cause a pulsating pedal or noisy operation.

Two methods may be used to measure thickness variation.

A micrometer can be used to measure the rotor thickness at 12 points approximately 30 degrees apart and 25 mm from the outer edge of the rotor.

The other method is to mount the rotor on a precision lathe designed for machining disc brake rotors. Attach two dial indicators, one each side of the rotor, so that the stylus of each indicator contacts the rubbing surface approximately 25 mm from the outer edge of the rotor.

Zero both indicators and rotate the rotor while watching both dials. If the total readings of both indicators exceed the specified limit for thickness variation, the rotor must be refinished or replaced.



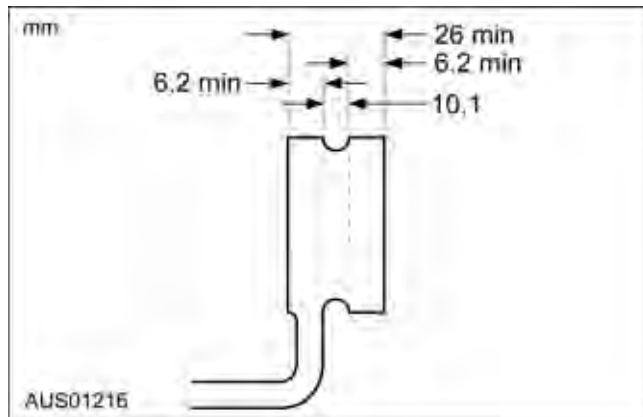
## DIAGNOSIS AND TESTING (Continued)

### Rotor Thickness and Refinishing

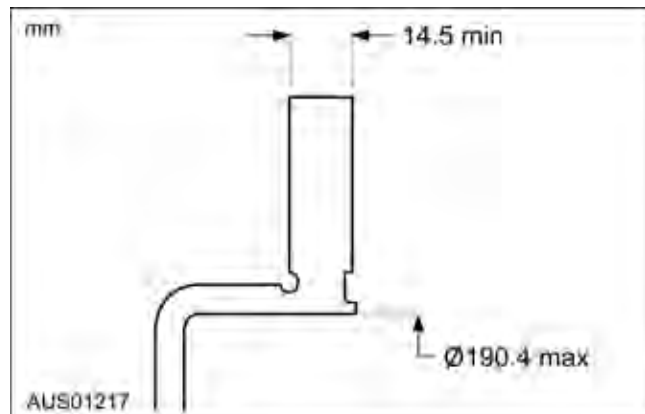
Measure the thickness of the rotor to determine if it is within the specifications.

Use a disc brake lathe to refinish the disc brake rotors. Refer to Specifications for the remainder of the refinishing specifications.

#### Front Disc Brake Resurfacing Limits



#### Rear Disc Brake Resurfacing Limits



## Symptom Chart

### Symptom Chart

Condition	Source	Action
<ul style="list-style-type: none"> <li>Excessive effort needed to depress brake pedal or has a rough or raspy or sticky feel</li> </ul>	<ul style="list-style-type: none"> <li>Brake pedal binds at pivot</li> </ul>	<ul style="list-style-type: none"> <li>INSTALL a new brake pedal</li> </ul>
	<ul style="list-style-type: none"> <li>Brake booster</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake booster and REFER to the Booster Section.</li> </ul>
	<ul style="list-style-type: none"> <li>Return Booster spring damaged or incorrectly positioned</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake booster and REFER to the Booster Section.</li> </ul>
	<ul style="list-style-type: none"> <li>Worn or damaged brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>INSTALL a new brake pedal.</li> </ul>
	<ul style="list-style-type: none"> <li>Foreign object caught in brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake pedal.</li> </ul>
<ul style="list-style-type: none"> <li>Brake pedal does not return freely</li> </ul>	<ul style="list-style-type: none"> <li>Weak or broken Booster return spring</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake booster and REFER to the Booster Section.</li> </ul>
	<ul style="list-style-type: none"> <li>Foreign object caught in brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake pedal.</li> </ul>
<ul style="list-style-type: none"> <li>No response from the brake lights when the brake pedal is pressed</li> </ul>	<ul style="list-style-type: none"> <li>Unconnected light switch</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the connection between the light switch and the light.</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty brake switch flag</li> </ul>	<ul style="list-style-type: none"> <li>INSTALL a new brake pedal.</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect position of the light switch</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the light switch. REPLACE or CHANGE light switch.</li> </ul>
<ul style="list-style-type: none"> <li>No response from the cruise control when the brake pedal is pressed</li> </ul>	<ul style="list-style-type: none"> <li>Unconnected cruise switch</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the connection between the cruise switch and the cruise control.</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty brake switch flag</li> </ul>	<ul style="list-style-type: none"> <li>INSTALL a new brake pedal.</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect position of the cruise switch</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the cruise switch. REPLACE or CHANGE cruise switch.</li> </ul>



**DIAGNOSIS AND TESTING (Continued)**

Condition	Source	Action
<ul style="list-style-type: none"> <li>No deceleration when the brake pedal is pressed</li> </ul>	<ul style="list-style-type: none"> <li>Connection between the Booster rod and the brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>CHECK connection</li> <li>PUT the booster rod in the cantilever pin of the brake pedal if the booster rod is not connected to the cantilever pin of the brake pedal.</li> <li>CHECK Booster clip, CHANGE it if necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty booster</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake booster and REFER to the Booster Section.</li> </ul>
<ul style="list-style-type: none"> <li>Discomfort on Brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>Brake pedal pad worn or loose</li> </ul>	<ul style="list-style-type: none"> <li>CHECK brake pedal pad and CHANGE it if necessary.</li> </ul>
<ul style="list-style-type: none"> <li>Padal feel</li> </ul>	<ul style="list-style-type: none"> <li>Brake Pedal Not Returning on Release</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test B</li> </ul>
	<ul style="list-style-type: none"> <li>Excessive Pedal Travel</li> </ul>	<ul style="list-style-type: none"> <li>Braking System Diagnosis. Refer to Brake System Leak Check or System Manual Bleed in this section.</li> </ul>
	<ul style="list-style-type: none"> <li>"Raspy" feel</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test B</li> </ul>
	<ul style="list-style-type: none"> <li>Pedal Binding at Pivot</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test A</li> </ul>
	<ul style="list-style-type: none"> <li>Pedal Pad Worn</li> </ul>	<ul style="list-style-type: none"> <li>CHECK brake pedal pad and CHANGE it if necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>Obstruction at Pedal</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test B</li> </ul>
<ul style="list-style-type: none"> <li>Poor braking efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Faulty Brake Booster</li> </ul>	<ul style="list-style-type: none"> <li>Braking System Diagnosis. Refer to Section 206-00.</li> </ul>
	<ul style="list-style-type: none"> <li>Brake Disc Pads Worn</li> </ul>	<ul style="list-style-type: none"> <li>Refer to Section 206-03 and Section 206-04.</li> </ul>
	<ul style="list-style-type: none"> <li>Vacuum Poor, Leaking or disconnection at the Brake Booster</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the brake booster and REFER to the Booster Section.</li> </ul>
<ul style="list-style-type: none"> <li>Cruise control not turning off when brake applied</li> </ul>	<ul style="list-style-type: none"> <li>Brake Master Cylinder Leaking / Faulty</li> </ul>	<ul style="list-style-type: none"> <li>Braking System Diagnosis. Refer to Brake System Leak Check or System Manual Bleed in this section.</li> </ul>
	<ul style="list-style-type: none"> <li>Cruise Control Switch Faulty / Plug Disconnected</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test D</li> </ul>
	<ul style="list-style-type: none"> <li>Stop Lamp Switch Faulty / Plug Disconnected</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test C</li> </ul>
<ul style="list-style-type: none"> <li>Adjustable brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>Cannot Adjust Pedals</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test E</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty Memory</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test E</li> </ul>
	<ul style="list-style-type: none"> <li>Pedal "Step Over" Height Incorrect</li> </ul>	<ul style="list-style-type: none"> <li>GO to Pinpoint Test E.</li> </ul>
<ul style="list-style-type: none"> <li>Stop lamp switch</li> </ul>	<ul style="list-style-type: none"> <li>Stop Lamp Switch Faulty</li> </ul>	<ul style="list-style-type: none"> <li>Go to PinPoint Test C</li> </ul>

**Symptom Chart-(For adjustable pedal box only)**

Condition	Source	Action
<ul style="list-style-type: none"> <li>Unable to adjust the brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>Unconnected Adjustment motor</li> </ul>	<ul style="list-style-type: none"> <li>CHECK the connection between the motor and the MSC</li> </ul>
	<ul style="list-style-type: none"> <li>Disengaged adjustment cable in the brake pedal</li> </ul>	<ul style="list-style-type: none"> <li>RECONNECT adjustment cable</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty Potentiometer (Memory Pedal Box Only)</li> </ul>	<ul style="list-style-type: none"> <li>REPLACE potentiometer</li> </ul>
	<ul style="list-style-type: none"> <li>Faulty memory settings (Memory Pedal Box Only)</li> </ul>	<ul style="list-style-type: none"> <li>RESET memory</li> </ul>



## DIAGNOSIS AND TESTING (Continued)

Condition	Source	Action
<ul style="list-style-type: none"> <li>Incorrect step over between brake pedal and accelerator pedal</li> </ul>	<ul style="list-style-type: none"> <li>Incorrect-adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Refer to disassembly and assembly instructions: Indexing pedals ( Section 206-06)</li> </ul>

**NOTE:** Do not stall through accelerator transmission.

### Brake Master Cylinder

## Components Tests

### Brake Booster

With the transmission in neutral, stop the engine and apply the parking brake. Depress the service brake pedal several times to exhaust all vacuum in the system. Then, depress the pedal and hold it in the applied position. Start the engine. If the vacuum system is operating the pedal will tend to fall away under foot pressure and less pressure will be required to hold the pedal in the applied position. If no action is felt, the vacuum booster system is not functioning.

Refer to the Diagnosis Guide.

For booster removal and installation procedures refer to Section 206-06.

For cleaning and inspection refer to the following pages in this part.

### Brake Fail Warning Light Test

Turn the ignition key to the ignition ON position, the warning lamp should illuminate for 3 seconds. If the lamp remains illuminated after 3 seconds, a defect exists in the system and may be:

- Insufficient brake fluid in the reservoir.
- Brake fluid indication switch (in reservoir) has been disconnected.
- Grounded switch wires.

### Road Test

The vehicle should be road tested only if the brakes will safely stop the vehicle. Apply the brakes at a speed of 40- 50 km/h to check for any of the trouble symptoms listed in the Diagnosis Guide with the exception of those resolved in the preliminary tests and brake chatter. For each of the symptoms encountered, check and eliminate the causes. To check for brake chatter or surge apply the brakes lightly from approximately 80 km/h.

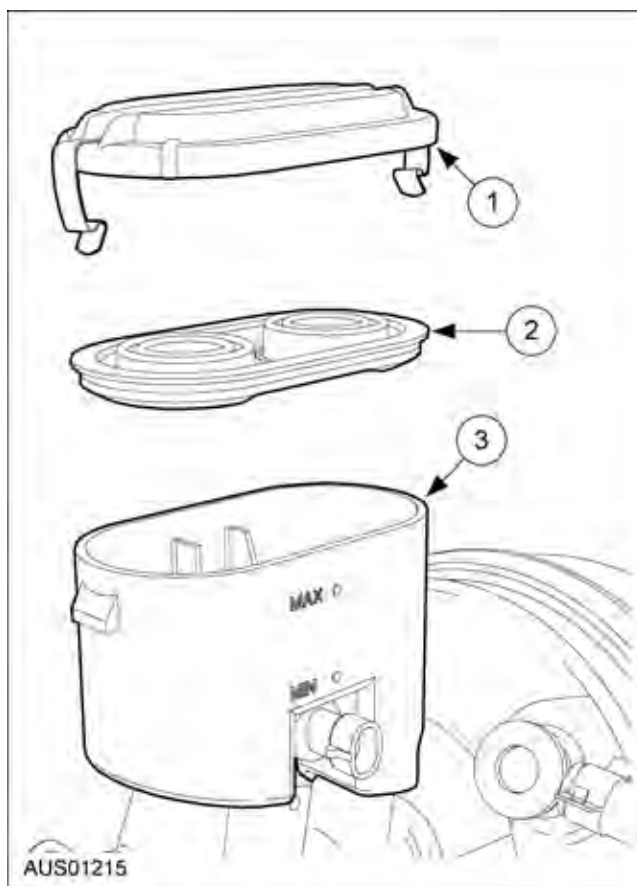
If the preliminary tests show that the booster is inoperative or if a hard pedal condition exists the trouble may be caused by vacuum leakage. Disconnect the vacuum line at the booster, remove the vacuum manifold and check valve assembly and look for a sticking or faulty check valve. Check all vacuum connections for leakage or obstruction. Check all hoses for a leaking or collapsed condition. Repair or replace as necessary.

If the trouble persists, replace the vacuum booster. The booster is not a serviceable item and if found defective must be replaced.

**CAUTION:** The braking system should be filled with a special high boiling point (280°C) brake fluid which must not be contaminated with ordinary brake fluid. Ensure only approved brake fluid is used (refer Specifications section).

Brake fluid is hygroscopic, which means that it takes in moisture from the air. Water-affected brake fluid has a reduced boiling point. The heat generated by repeated heavy braking causes the fluid to boil at a lower temperature, resulting in loss of braking. The water also helps corrosion start in the braking system. The brake fluid must be replaced at least every two years if the brakes are to remain fully effective.

If brake fluid is spilt on paintwork, the affected area must be washed down with cold water immediately.



Item	Description
1	Reservoir Cover
2	Diaphragm
3	Reservoir Chamber



## DIAGNOSIS AND TESTING (Continued)

### To Check Fluid Level

To check the level of the brake fluid in the master cylinder, visually inspect the fluid level in the transparent plastic reservoirs, without removing the reservoir cover.

The fluid level should be within the maximum and minimum marks on the Right Hand side of the chamber. The fluid level will decrease gradually as the linings wear. Any rapid change in fluid level should be investigated immediately.

To reduce the possibility of fluid contamination, the reservoir cover should be removed only when absolutely necessary. To remove the cover, first clean all dirt from around the cover. Refill to the maximum level mark.

Prior to installing the master cylinder cover ensure that the diaphragm gasket is correctly positioned in its original form in the reservoir cover.

The cover should be fitted so that lettering on cover is the correct way when viewed from the right hand side of vehicle.

Use only the specified brake fluid or equivalent.



## GENERAL PROCEDURES

### Hydraulic System Bleeding

1. When any part of the hydraulic system has been disconnected for repair or replacement, air may get into the system and cause spongy pedal action. Bleed the hydraulic system after it has been properly connected to be sure that all air is expelled. Press the pedal several times and check for leakage.
2. The hydraulic system can be bled manually or with pressure bleeding equipment.
3. Bleed the longest line first on the individual system being serviced.

**NOTE:** Clean all dirt from the master cylinder reservoir cover before removing the cover. The cover should be fitted so that lettering on cover is the correct way when viewed from the right hand side of the vehicle.

Do not mix low temperature brake fluids with the specified fluid. Never re-use brake fluid which has been drained from the hydraulic system.

When the bleeding operation is completed the reservoir should be filled to the MAX FLUID LEVEL mark on the R.H. side of the reservoirs. Be sure the diaphragm type gasket is properly positioned in the master cylinder cover and is positioned in the configuration as shown in Section 206-06 prior to installation. If brake fluid is split on the paintwork the affected area must be washed with water immediately.

### Manual System Bleeding

**NOTE:** When bleeding brakes do not pump the pedal.

1. The front and rear hydraulic brake systems are individual systems and are bled separately. During the complete bleeding operation, DO NOT allow the reservoir to run dry.
  - To bleed the rear brake system, position a suitable ring spanner on the bleeder fitting on the wheel cylinder/ caliper. Attach a drain tube to the bleeder fitting. The end of the tube should fit snugly around the bleeder fitting.
  - Submerge the free end of the tube in a container partially filled with clean brake fluid. Route the tube upwards from the nipple to the container, which should be positioned higher than the nipple. Loosen the bleeder fitting approximately 3/4 of a turn.
  - Push the brake pedal down slowly through its full travel. Close the bleeder fitting, then return the pedal slowly to the full release position. Wait 5 seconds then repeat this operation until air bubbles cease to appear at the submerged end of the bleeder tube.
  - When the fluid is completely free of air bubbles, close the bleeder fitting and remove the bleeder tube.

- Repeat this procedure at the wheel cylinder/caliper on the opposite side. Refill the master cylinder reservoir after each wheel cylinder/caliper is bled and install the master cylinder cover and diaphragm seal.
- If the front brake system is to be bled, repeat steps 1-5 at the left front brake caliper and ending at the right front brake caliper.
- Be sure that the caliper pistons are returned to their normal positions and that the pad assemblies are properly seated by depressing the brake pedal several times until normal pedal travel is established.

### System Pressure Bleeding

1. The bleeder tank should contain enough new Brake Fluid to complete the bleeding operation. Never exceed 340 kilopascals pressure.
2. The tank should be charged with 70 to 200 kilopascals of air pressure.



**WARNING: Ensure the adaptor is clamped securely to reservoir before applying pressure.**

3. Install the pressure bleeder adaptor tool to the master cylinder and attach the bleeder tank hose to the fitting on the adaptor.
4. Master cylinder pressure bleeder adaptor tools can be obtained from the various manufacturers of pressure bleeding equipment. Follow the instructions of the manufacturer when installing the adaptor.
  - If the rear wheel calipers are to be bled, position a ring spanner on the bleeder fitting on the left wheel caliper. Attach a bleeder tube to the bleeder fitting. The end of the tube should fit snugly around the bleeder fitting.
  - Open the valve on the bleeder tank to admit pressurised brake fluid to the master cylinder reservoir.
  - Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting.
  - When air bubbles cease to appear in the fluid at the submerged end of the bleeder tube, close the bleeder fitting and remove the tube.
  - Repeat steps 3 to 7 at the right rear brake.
  - Repeat steps 4 to 7, starting at the left front caliper and ending at the right front caliper.
  - When the bleeding operation is completed, close the bleeder tank valve and remove the tank hose from the adaptor fitting.
  - Be sure that the caliper pistons are returned to their normal positions and that the pad assemblies are properly seated by depressing the brake pedal several times until normal pedal travel is established.



## GENERAL PROCEDURES (Continued)

- Remove the Pressure Bleeder Adaptor Tool.

### Service Precautions

1. Do not attempt to clean or restore brake fluid, oil or grease soaked brake pads. When contaminated pads are found, brake pads must be replaced in complete axle sets.
2. Check the brake hoses for signs of softening, cracking, leaks or abrasions. Replace them if necessary.
3. If the vehicle caliper parts show signs of overheating are present when relining brakes, the wheel calipers should be disassembled and inspected for wear and dirt and an overhaul kit installed, thus avoiding future problems.



**WARNING:** Under no circumstances should compressed air blow off be used to clean brakes and associated components. Breathing in dust from the pads is a health hazard. Remove dust and dirt with the rotunda brake vacuum (4-0009) or equivalent or the rotunda brake parts washer (65-0016) or equivalent.

4. If a piston is removed from a master cylinder or caliper for any reason the piston seals must be replaced.
  - All foreign material must be kept off braking surfaces and associated components. Handling of components should be done in a way to avoid deformation, nicking or scratching of brake pads or braking surfaces.

### Changing Brake Fluid

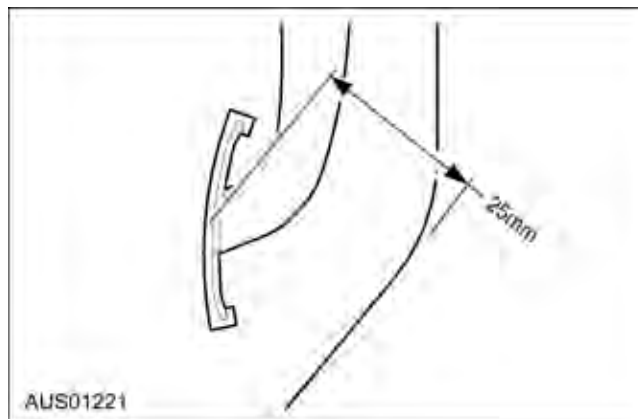
**NOTE:** Do not allow the reservoirs to empty.

1. If this procedure is adhered to, air will not enter the system and the time taken to change the fluid will be kept to a minimum.
  - Proceed in the same manner and order as for bleeding the system using a transparent bleed tube attached to a bleed screw and a glass jar. Refer to Brake Bleeding in this section.
  - Pump out most, but not all, of the fluid in the reservoirs.
  - Top up the reservoirs with new unused fluid.
  - Ensure the reservoirs are kept topped up. When new fluid is seen in the transparent tube, continue to bleed for two full strokes of the pedal and close the bleed screw.
  - Repeat the procedure at each bleed screw in turn.
  - Top up the reservoir and road test vehicle.

### Brake Pedal Clearance Check

1. The brake system is designed to permit full stroke of the master cylinder when the brake pedal is fully depressed.

2. No brake pedal clearance adjustment is required or provided for. With the brake master cylinder outlet lines disconnected and the brake pedal fully depressed, the centre of the top surface of the brake pedal pad should be 25 mm from the floor surface.
3. If the pedal height is below specification make the necessary repairs.



### Caliper

1. Check the caliper attaching bolts torque. Torque them to specification, if required.
2. Visually check the caliper. If the caliper housing is leaking it should be replaced. If a seal is leaking the caliper must be disassembled and new seals installed. If a piston is seized in the bore and upon disassembly is found to be scored it must be replaced. If the caliper is found to be distorted or damaged or if the cylinder bores are excessively scored or worn replace the caliper assembly. Refer to Warning under Service Precautions.
3. Wash all parts with methylated spirits and dry with compressed air or lint free cloth.
4. Blow out the caliper bore and all drilled passages with compressed air.
5. Inspect the piston for scoring, pitting, corrosion or areas where the chrome plating has worn off. If any damage is present replace the piston. Black stains, caused by the seal, will do no harm.
6. Inspect the caliper bore for scoring, pitting, corrosion or damage and replace the caliper if any of these factors are present. The caliper must not be honed.
7. Inspect all other components and replace if wear or damage exists.
8. The calipers must not be interchanged from one side to the other. When the caliper is installed on its proper side the bleeder screw will be at the top of the piston bore.
9. Refer to Section 206-03 or Section 206-04 for detailed Caliper replacement information.

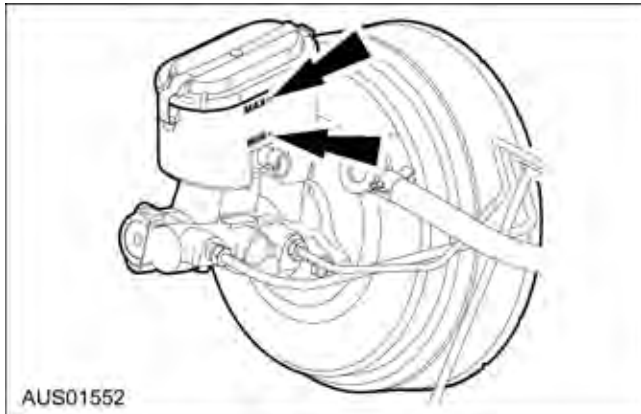




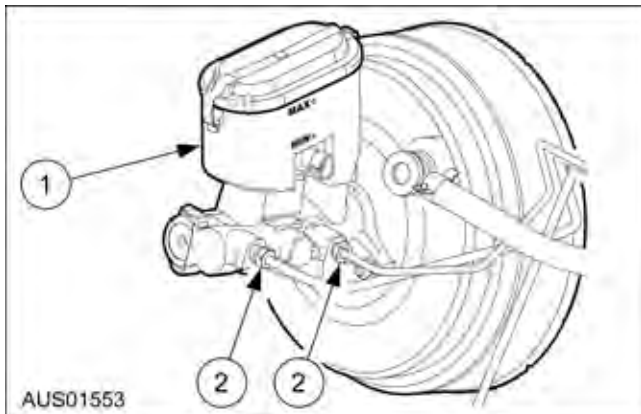
## GENERAL PROCEDURES (Continued)

### Brake System Leak Check

1. Check the brake fluid level. If the fluid level is below the MIN line on the brake master cylinder reservoir add the necessary amount of High Performance SUPER DOT 4 brake fluid meeting Ford Specification ESA-M6C25-A or SUPER DOT 4 equivalent.



2. Inspect the (2) brake line nuts and the (1) brake master cylinder reservoir for fluid leaks.



3. Inspect the brake lines and hoses for fluid leaks.
4. Inspect the rear disk brake caliper for leaks.
5. Inspect the front disk brake calipers for leaks.
6. If a hydraulic leak is detected, refer to Section 206-06.

