

# BRAKE SYSTEM

## 1993 Jeep Cherokee

1993 BRAKES

Chrysler Corp. - Disc & Drum

Jeep; Cherokee, Grand Cherokee, Grand Wagoneer, Wrangler

### DESCRIPTION

Floating caliper disc brake assembly uses a single piston caliper which floats on 2 bolts. As brake pedal is depressed, hydraulic pressure passes through a proportioning valve to brake caliper piston.

This force is transmitted to inboard brake pad, forcing it against braking surface of rotor. Pressure then moves outer caliper housing and pad inward on caliper mounting bolts, forcing outer pad against outer braking surface of rotor.

A combination proportioning valve/pressure differential switch is used on all models. Proportioning valve is not serviceable. Valve must be replaced if it malfunctions.

A pressure differential brake warning light switch is used to warn vehicle operator that one side of the hydraulic system has failed. When hydraulic pressure is equal in both front and rear systems, switch piston remains centered and does not contact terminal in switch. If one side of brake system fails, hydraulic pressure moves piston toward failed side. Shoulder of piston contacts switch terminal, grounding brake warning light.

Proportioning valve operates by restricting hydraulic pressure to rear brakes at a given ratio when system hydraulic pressure reaches a certain point. This improves front-to-rear brake balance during high speed braking, when a percentage of rear weight is transferred to front wheels. Valve reduces rear brake pressure and delays rear wheel skid. On light brake application, valve allows full hydraulic pressure to rear brakes.

### BLEEDING BRAKE SYSTEM

NOTE: Brake bleeding procedures for models with anti-lock brakes are not covered in this article. See ANTI-LOCK BRAKE SYSTEM article for proper procedure.

### BLEEDING SEQUENCE

Before bleeding system, exhaust all vacuum from power unit by depressing brake pedal several times. When bleeding disc brakes, air may tend to cling to caliper walls. To aid in removal of air, lightly tap caliper while bleeding.

Fill master cylinder with clean brake fluid. Fluid should meet DOT 3 specifications. Bleed master cylinder with bleeder valves (if equipped). Bleed wheel cylinders and calipers in sequence. See BRAKELINE BLEEDING SEQUENCE table.

BRAKELINE BLEEDING SEQUENCE TABLE

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Application	Sequence
All Models .....	RR, LR, RF, LF

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### MASTER CYLINDER BLEEDING

#### Bench Bleeding

1) Master cylinder must be bled before installation to prevent excessive amounts of air from entering hydraulic system, creating poor brake operation.

2) Place master cylinder in soft-jawed vise. DO NOT tighten vise enough to damage master cylinder. Install bleed tubes in both outlets of master cylinder. See Fig. 1.

3) Fill master cylinder with clean brake fluid. Fluid should meet DOT 3 specifications. Ensure end of bleed tubes are submerged in brake fluid.

4) Using proper size rod, apply and release master cylinder until no air bubbles exist in brake fluid flow. When all air bubbles are gone from master cylinder, cap outlet ports. Install reservoir cover and seal. Install master cylinder and bleed on vehicle.

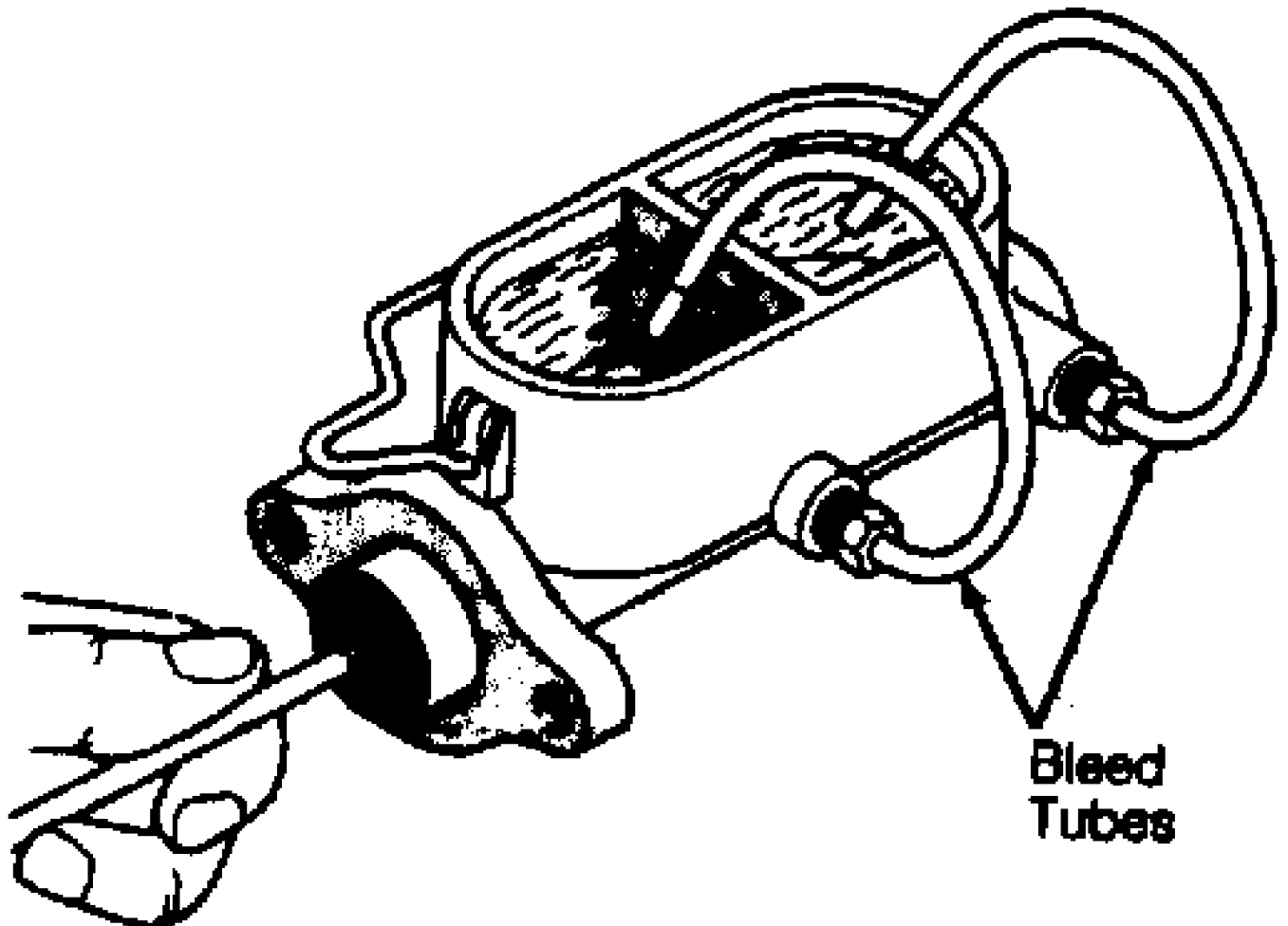


Fig. 1: Bleeding Master Cylinder (Typical)  
Courtesy of Chrysler Motors.

#### On-Vehicle Bleeding

1) Install master cylinder on vehicle after bench bleeding. Remove bleeder lines and install brakelines. DO NOT tighten brakelines yet.

2) Slowly force brake pedal to floor and hold in this position. Tighten brakelines, and release brake pedal. Repeat procedure until no air bubbles exist at brakelines. Tighten

brakelines. Check for leaks.

## PRESSURE BLEEDING

**CAUTION:** Front brake metering valve is located in front end of combination valve. Valve stem **MUST** be pressed inward or held outward slightly to bleed front brakes.

1) Clean master cylinder cap and surrounding area. Remove cap. With pressure tank at least 1/2 full, connect to master cylinder with adapters. Attach bleed hose to first bleeder valve to be serviced. See BRAKELINE BLEEDING SEQUENCE table under BLEEDING SEQUENCE.

2) Place other end of hose in clean glass jar partially filled with clean brake fluid so end of hose is submerged in fluid.

3) Open release valve on pressure bleeder. Follow equipment manufacturer's pressure instructions or see PRESSURE BLEEDER SETTINGS table. Open bleeder valve 3/4 turn, and note fluid flow.

4) Close bleeder screw when fluid is free of bubbles. Repeat procedure on remaining wheels in proper sequence. Check brake pedal operation after bleeding has been completed.

5) Remove pressure bleeding equipment and valve retainer from hold-off valve. Ensure master cylinder is full of fluid. Check for leaks.

### PRESSURE BLEEDER SETTINGS TABLE

Application	psi (kg/cm <sup>2</sup> )
All Models .....	15-20 (1.1-1.4)

## MANUAL BLEEDING

**NOTE:** Some models are equipped with anti-lock brake system. See ANTI-LOCK BRAKE SYSTEM article for bleeding procedure.

Cherokee & Wrangler

1) Fill master cylinder with clean brake fluid. Fluid should meet DOT 3 specifications. Open ALL bleed valves. Close bleeder valves when fluid begins flowing from each valve. Refill master cylinder.

2) Install bleed hose to first bleeder valve to be serviced. See BRAKELINE BLEEDING SEQUENCE table under BLEEDING SEQUENCE. Submerge other end of hose in clean glass jar partially filled with clean brake fluid. See Fig. 2.

**NOTE:** Ensure bleeder valve is closed when brake pedal is released. **DO NOT** allow master cylinder to run out of fluid.

3) Open bleeder valve 3/4 turn. Depress brake pedal slowly through full travel. Close bleeder valve, and release pedal. Repeat procedure until flow of fluid shows no signs of air bubbles.

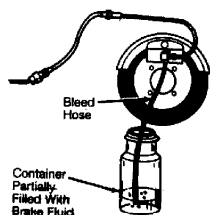


Fig. 2: Bleeding Brakes (Manual Procedure)  
Courtesy of Chrysler Motors.

## ADJUSTMENTS

### BRAKE PEDAL

Brake pedal push rod length is preset by manufacturer. No adjustment is possible.

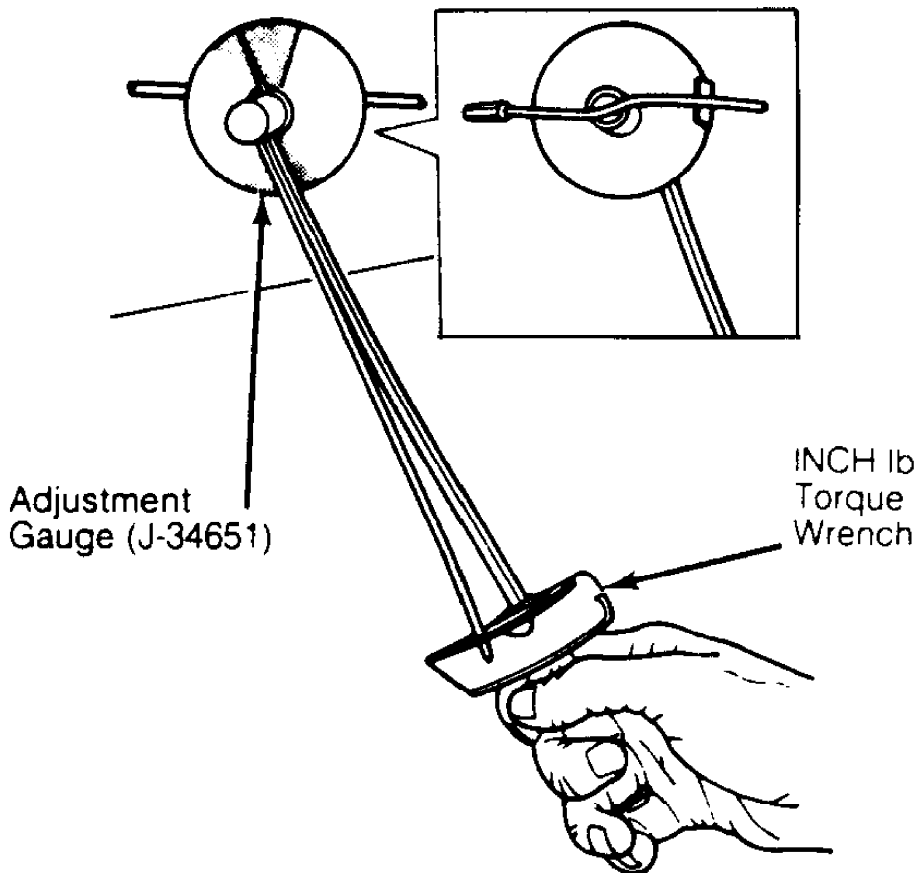
### PARKING/EMERGENCY BRAKE

Cherokee & Wrangler

1) Adjust rear brakes. See REAR BRAKE SHOES under ADJUSTMENTS . Check cable for binding, kinking or fraying. Replace cable as required. Apply and release parking brake 5 times.

2) Place parking brake lever in fifth notch. Raise and support vehicle. Position Adjustment Gauge (J-34651) on one of rear parking brake cables. See Fig. 3. Apply and hold a torque of 50 INCH lbs. (6 N.m) on adjustment gauge, and note position of gauge pointer.

3) If adjustment gauge pointer is not within okay band, turn parking brake cable equalizer adjustment nut in or out until pointer is within okay band. Remove tools, and lower vehicle. Ensure proper parking brake operation.



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Fig. 3: Adjusting Parking Brake (Cherokee & Wrangler)  
Courtesy of Chrysler Motors.

Grand Cherokee & Grand Wagoneer

1) Adjust rear brakes. See REAR BRAKE SHOES under ADJUSTMENTS

. Check cable for binding, kinking or fraying. Replace cable as required.

2) Fully apply parking brake. Raise and support vehicle. Mark position of adjusting nut on threaded end of cable tensioner. Tighten adjusting nut about 1/2" (13 mm). Replace tensioner if there are not enough threads for proper adjustment.

3) Lower vehicle until wheels are about 6" off floor. Release parking brake. Verify that rear wheels rotate freely and no drag is felt. Lower vehicle, and ensure parking brake operates properly.

## REAR BRAKE SHOES

**NOTE:** Brakes are self-adjusting. Under normal circumstances, manual adjustment is only required if shoes are removed. Replace brake shoes when lining is 1/16" on bonded linings and 1/32" from rivet on riveted linings.

1) Raise and support vehicle. Remove wheels and brake drums. Ensure right and left automatic adjuster lever and cable are properly connected.

2) Insert Brake Shoe Adjustment Gauge (J-21177-01) in drum. See Fig. 4. Expand gauge until inner legs contact drum braking surface. Lock gauge in position.

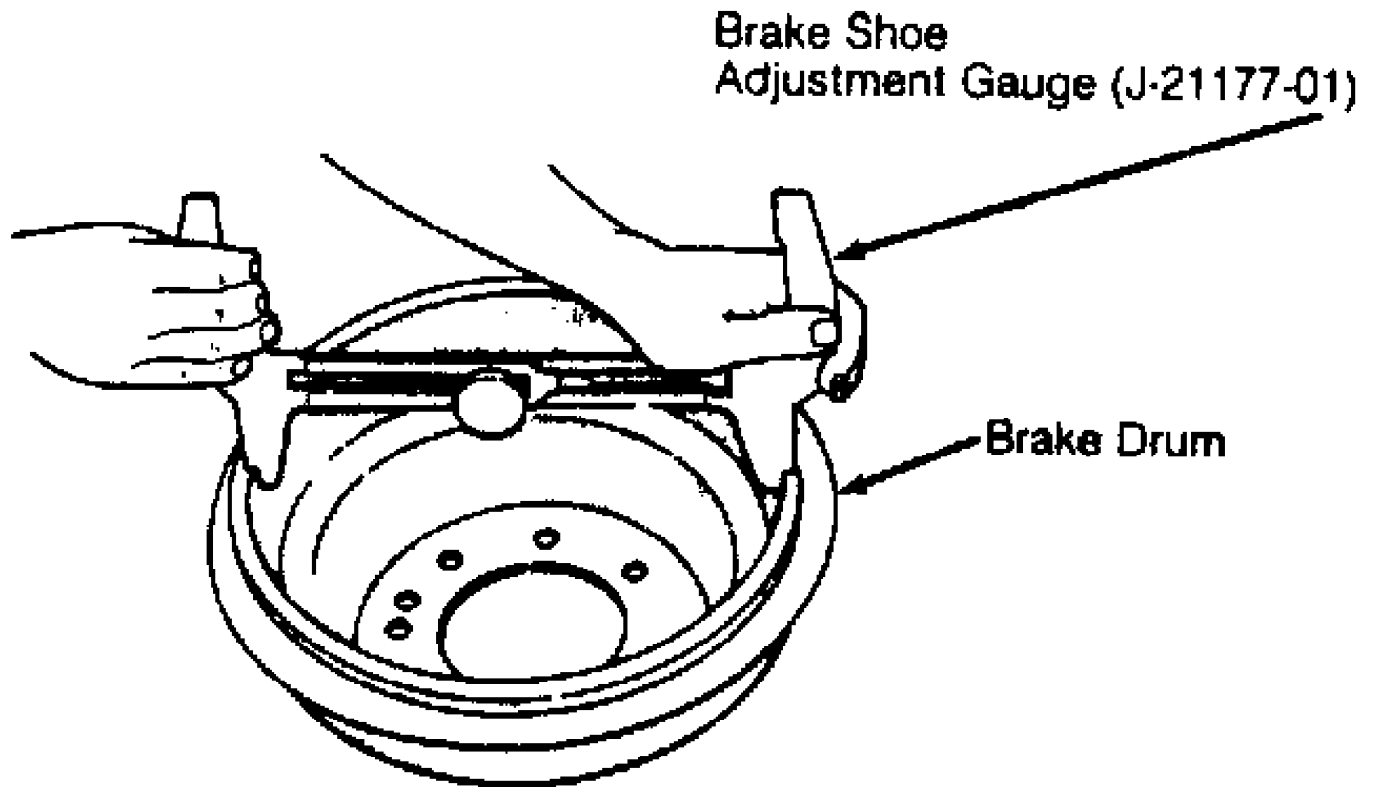


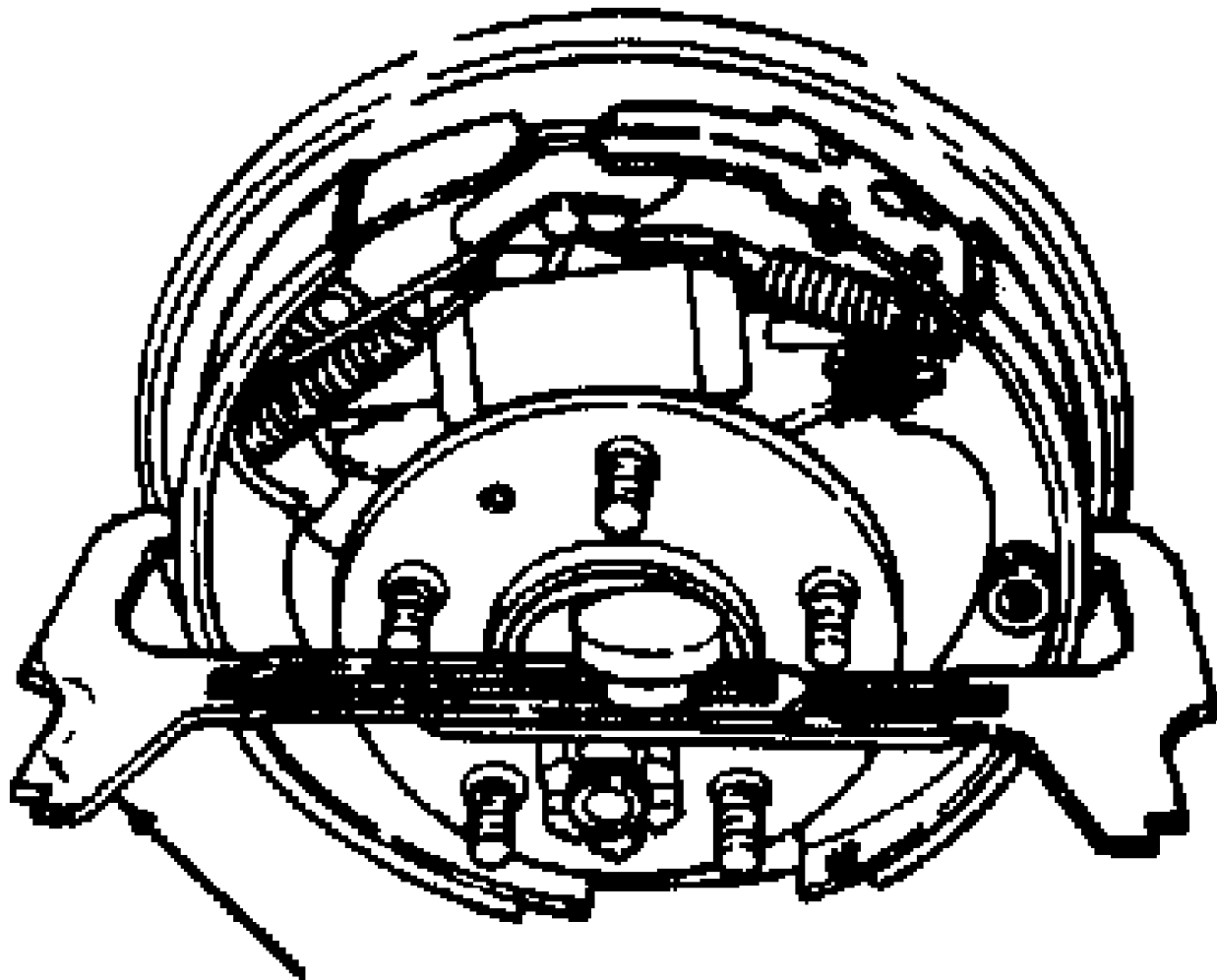
Fig. 4: Measuring Brake Drum Diameter  
Courtesy of Chrysler Motors.

3) Reverse brake shoe adjustment gauge, and install it on brake shoes. See Fig. 5. Position gauge legs at shoe centers. If gauge does not fit (too loose or too tight), adjust brake shoes accordingly.

4) Turn star adjuster wheel (by hand) to expand or retract brake shoes. Continue adjustment until gauge outside legs have a slight drag on shoes. Repeat procedure on opposite brake shoe

assembly.

5) Install brake drum and wheels. Lower vehicle. Make final adjustment by driving vehicle and making one forward stop (complete stop), followed by one reverse stop (complete stop). Repeat procedure 8-10 times to operate automatic adjusters and equalize adjustment.



## **Brake Shoe Adjustment Gauge (J-21177-01)**

Fig. 5: Measuring Brake Shoe Diameter  
Courtesy of Chrysler Motors.

### **STOPLIGHT SWITCH**

Move brake pedal forward by hand until free play is taken up. If clearance between stoplight switch plunger and brake pedal is  $\frac{1}{8}$ " (3 mm) and stoplight functions properly, no adjustment is needed. If adjustment is necessary, press brake pedal forward by hand. Push stoplight switch forward in mounting bracket as far as possible. Grasp brake pedal and pull rearward to stop and release. Recheck clearance and stoplight operation.

## TESTING

### POWER BOOSTER

#### Master Cylinder/Power Booster

- 1) Start engine, and check power booster vacuum hose for leaks. Repair as required. Stop engine, and place gear selector in Neutral. Pump brake pedal until all vacuum reserve is depleted.
- 2) Press and hold brake pedal under light foot pressure. If pedal does not hold firm and falls away, master cylinder is leaking internally. Repair or replace as required. If brake pedal holds firm, proceed to next step.
- 3) While holding light pressure on pedal, start engine, and note pedal action. If no pedal action is noticeable, power booster or vacuum check valve is faulty. Replace check valve, and repeat test. If pedal falls away slightly then holds firm, proceed to next step.
- 4) Release brake pedal. Increase engine speed to 1500 RPM, close throttle and immediately stop engine. Wait at least 90 seconds and retest pedal action. Booster should provide 2 or more vacuum assisted pedal applications. If pedal action is not as specified, perform CHECK VALVE & POWER BOOSTER VACUUM test.

#### Check Valve & Power Booster Vacuum

- 1) Disconnect vacuum hose from check valve. Remove check valve and seal from booster. Using a hand-held vacuum pump, apply 15-20 in. Hg at large end of check valve. If gauge on pump indicates any vacuum loss, valve is faulty and must be replaced. If gauge holds steadily, proceed to next step.
- 2) Reinstall check valve and seal into power booster. Tee a vacuum gauge into vacuum hose between power booster and vacuum source. Start engine, and let idle one minute. Clamp hose shut between vacuum source and power booster.
- 3) Stop engine, and observe vacuum gauge. If vacuum drops more than one in. Hg within 15 seconds, booster diaphragm or check valve is faulty. Replace as required.

### BRAKE WARNING LIGHT SYSTEM

#### Electrical Circuit

Disconnect wire from switch terminal, and ground wire to chassis. Turn ignition on. Warning light should come on. If light does not operate, bulb or wiring circuit is defective. Replace bulb or repair wiring as necessary. If light illuminates, turn off ignition, and connect wire.

#### Warning Light Switch

- 1) Attach a bleeder hose to bleeder valve at either rear brake. Immerse other end of hose in container with brake fluid. Turn ignition on.
- 2) Open bleeder valve while pressure is being applied to brake pedal. Warning light should activate. Close bleeder valve before pressure is released from pedal.
- 3) Reapply brake pedal using moderate to heavy pressure. Light should go out. Repeat test on front brake system. System should function in same manner. Turn ignition off.
- 4) If light does not operate as specified for either system but comes on when electrical circuit is tested, warning light switch portion of valve is defective.

## REMOVAL & INSTALLATION

## FRONT BRAKE CALIPER & BRAKE PADS

NOTE: Replace brake pads when lining is 1/32" (.8 mm) from rivet heads.

### Removal

1) Drain about half of brake fluid from master cylinder reservoir. Raise and support vehicle. Remove front wheels.

2) Place "C" clamp on caliper. Solid end of clamp should contact back of caliper. Screw end should contact metal part of outboard pad. Tighten "C" clamp until piston is forced to bottom of bore.

3) On 4WD models, do not allow "C" clamp screw to bear directly on outboard shoe retainer spring. If necessary, use wood or metal spacer between pad and "C" clamp screw.

4) On all models, remove caliper mounting pins. Lift caliper off rotor and anchor plate. On 4WD models, brake pads will remain attached to caliper. On 2WD models, brake pads will remain on caliper support.

5) On 4WD models, remove outboard pad. Press one end of outboard pad inward to disengage pad lug, and rotate shoe outward until retainer spring clears caliper. Press opposite end of pad inward to disengage opposite pad lug, and rotate pad up and out of caliper. To remove inboard pad, grasp ends of pad, and tilt pad outward to release springs from caliper piston. Remove pad from piston.

6) On 2WD models, hold lower anti-rattle clip against support bracket and remove outboard brake pad from caliper support. Remove inboard brake pad and both anti-rattle clips from caliper support.

7) On all models, disconnect brakeline at caliper, and cap hole to prevent contamination while removing caliper from vehicle.

### Installation

1) To install, reverse removal procedure. Apply a light coat of multipurpose grease to caliper sliding surfaces. Lubricate caliper mounting pins and bushings with silicone.

2) Torque caliper mounting pins to specification. See, at the end of this article, TORQUE SPECIFICATIONS. Add brake fluid to reservoir. Apply brakes until brake pedal is firm. Check brake fluid level.

## ROTOR

NOTE: DO NOT disconnect brake hose from caliper unless caliper is to be disassembled.

### Removal (2WD)

1) Raise and support vehicle. Remove front wheels. Remove caliper. See FRONT BRAKE CALIPER & BRAKE PADS under REMOVAL & INSTALLATION. Suspend caliper from frame or suspension with wire.

2) Remove cap, cotter pin, nut retainer, adjusting nut and front bearing from spindle. Remove rotor from spindle. Remove grease seal and rear bearing from hub.

### Installation (2WD)

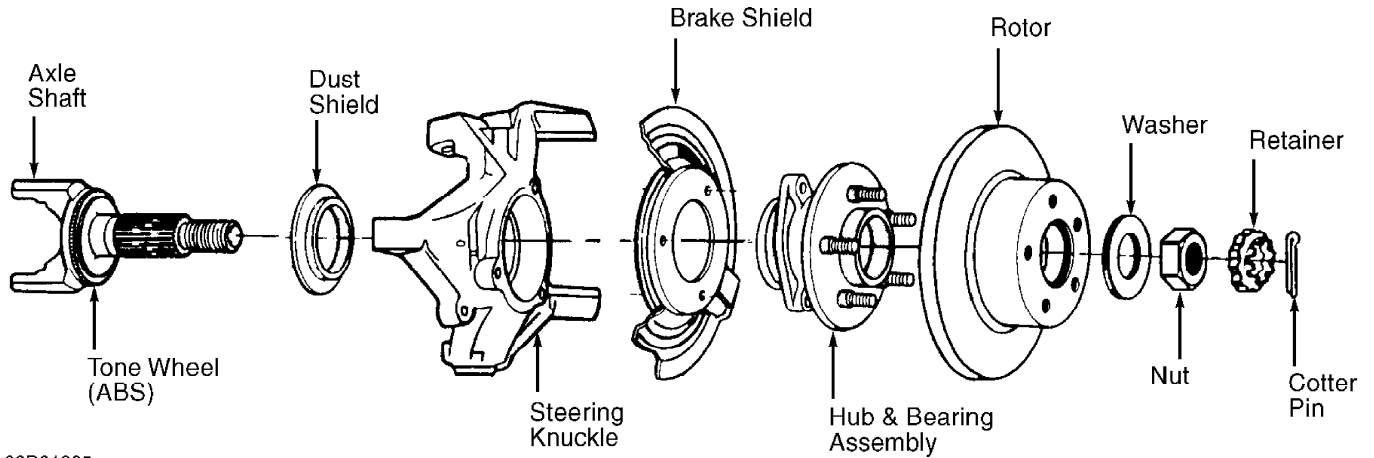
1) Clean, inspect and repack wheel bearings. Replace grease seal. Coat spindle, bearing races and rotor hub cavity with grease. Clean rotor surface as required.

2) To install, reverse removal procedure. Tighten spindle nut to specification while rotating rotor to seat bearings. See, at the end of this article, TORQUE SPECIFICATIONS. Apply brakes until brake pedal is firm. Check brake fluid level.

### Removal & Installation (4WD)



Raise and support vehicle. Remove front wheels. Remove caliper. See, under REMOVAL & INSTALLATION, FRONT BRAKE CALIPER & BRAKE PADS. Suspend caliper from frame or suspension. Remove retainers securing rotor to hub. Remove rotor from hub. To install, reverse removal procedure. See Fig. 6.



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Fig. 6: Exploded View Of Rotor & Hub Assembly  
Courtesy of Chrysler Motors.

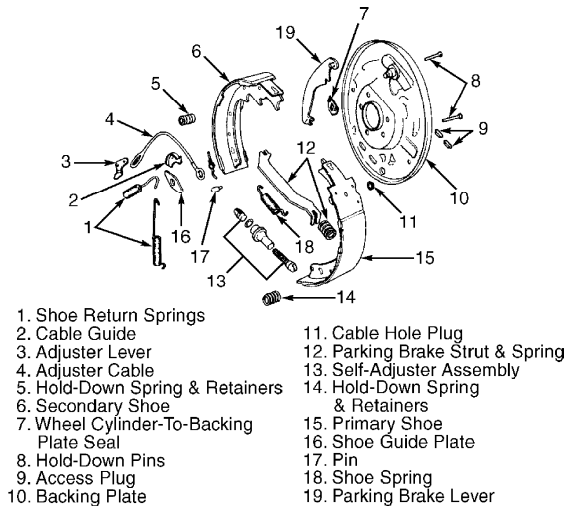
## REAR BRAKE SHOES

### Removal

1) Raise and support vehicle. Remove wheels and brake drum. Remove "U" clip and washer from parking brake lever pivot pin. Place Wheel Cylinder Clamp (J-8002) over wheel cylinder.

2) Remove primary and secondary shoe return springs, hold-down spring and retainers and pins. See Fig. 7 or 8. Remove self-adjuster lever, adjuster and adjuster spring from brake shoes.

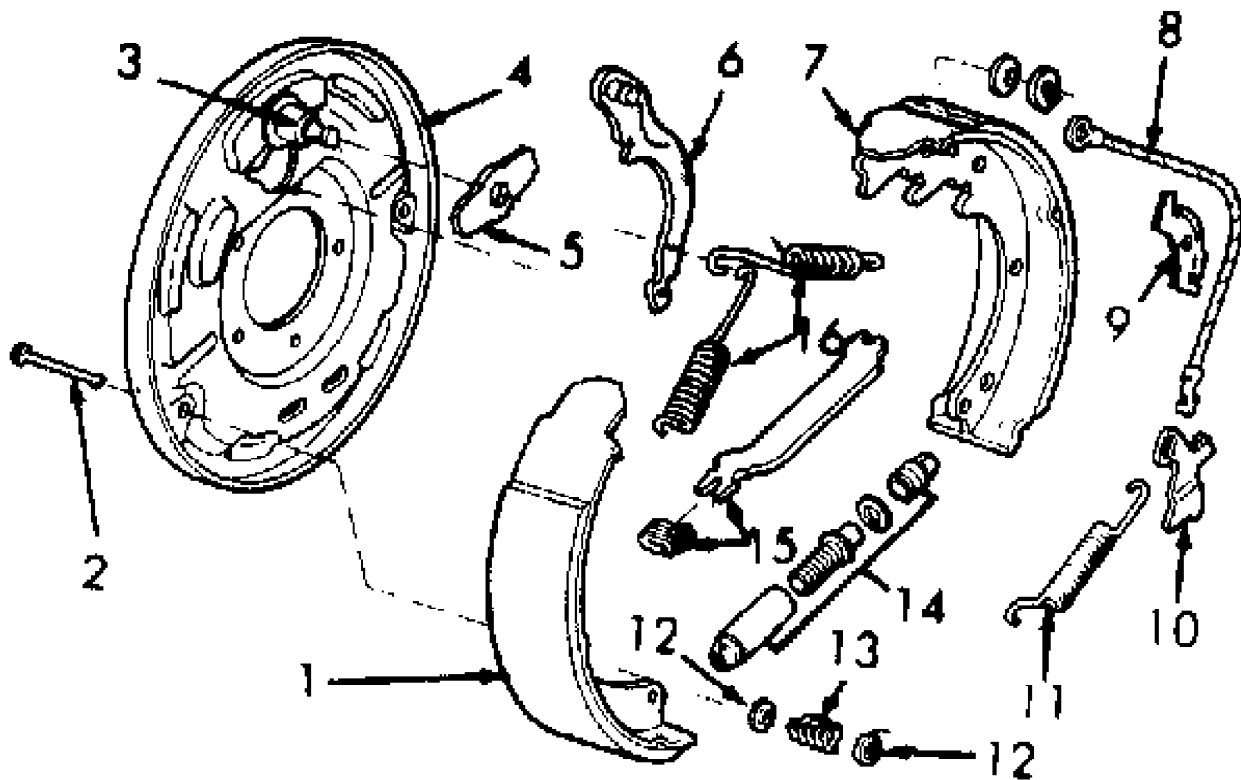
3) Remove brake shoes. Disconnect parking brake cable from parking brake lever, and remove lever.



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Fig. 7: Rear Drum Brake Assembly (Cherokee & Wrangler)  
Courtesy of Chrysler Motors.

## LEFT REAR BRAKE ASSEMBLY



- |                        |                             |
|------------------------|-----------------------------|
| 1. Primary Shoe        | 9. Cable Guide              |
| 2. Hold-Down Pin       | 10. Adjuster Lever          |
| 3. Anchor Pin          | 11. Shoe Spring             |
| 4. Backing Plate       | 12. Spring Retainers        |
| 5. Shoe Guide Plate    | 13. Hold-Down Spring        |
| 6. Parking Brake Lever | 14. Adjuster Screw Assembly |
| 7. Secondary Shoe      | 15. Strut & Spring          |
| 8. Adjuster Cable      | 16. Return Springs          |

Fig. 8: Rear Drum Brake Assembly (Grand Cherokee & Grand Wagoneer)  
Courtesy of Chrysler Motors.

### Installation

1) Lubricate backing plate ledges, anchor pin, cable guide, self-adjuster screw assembly, parking brake lever and lever pivot pin with White lithium grease. See Fig. 7 or 8.

2) Connect parking brake lever to secondary brake shoe with washer and "U" clip. Crimp ends of clip to secure clip on pivot. Remove wheel cylinder clamp. Position brake shoes on brake support plate, and install hold-down springs.

3) Install parking brake lever strut and spring. Install cable guide plate and adjuster cable on anchor pin. Install primary return spring. Install guide to secondary brake shoe. Install secondary return spring.

4) Install adjuster screw, spring and lever. Connect lever to

cable. Using Brake Shoe Adjustment Gauge (J-21177-01), preset brake shoe adjustment. See REAR BRAKE SHOES under ADJUSTMENTS. Install brake drums. Install wheels, and lower vehicle. Check brake fluid. Road test vehicle.

## OVERHAUL

NOTE: For overhaul, refer to appropriate illustration for exploded view of component. See Fig. 9 or 10.

## CALIPER

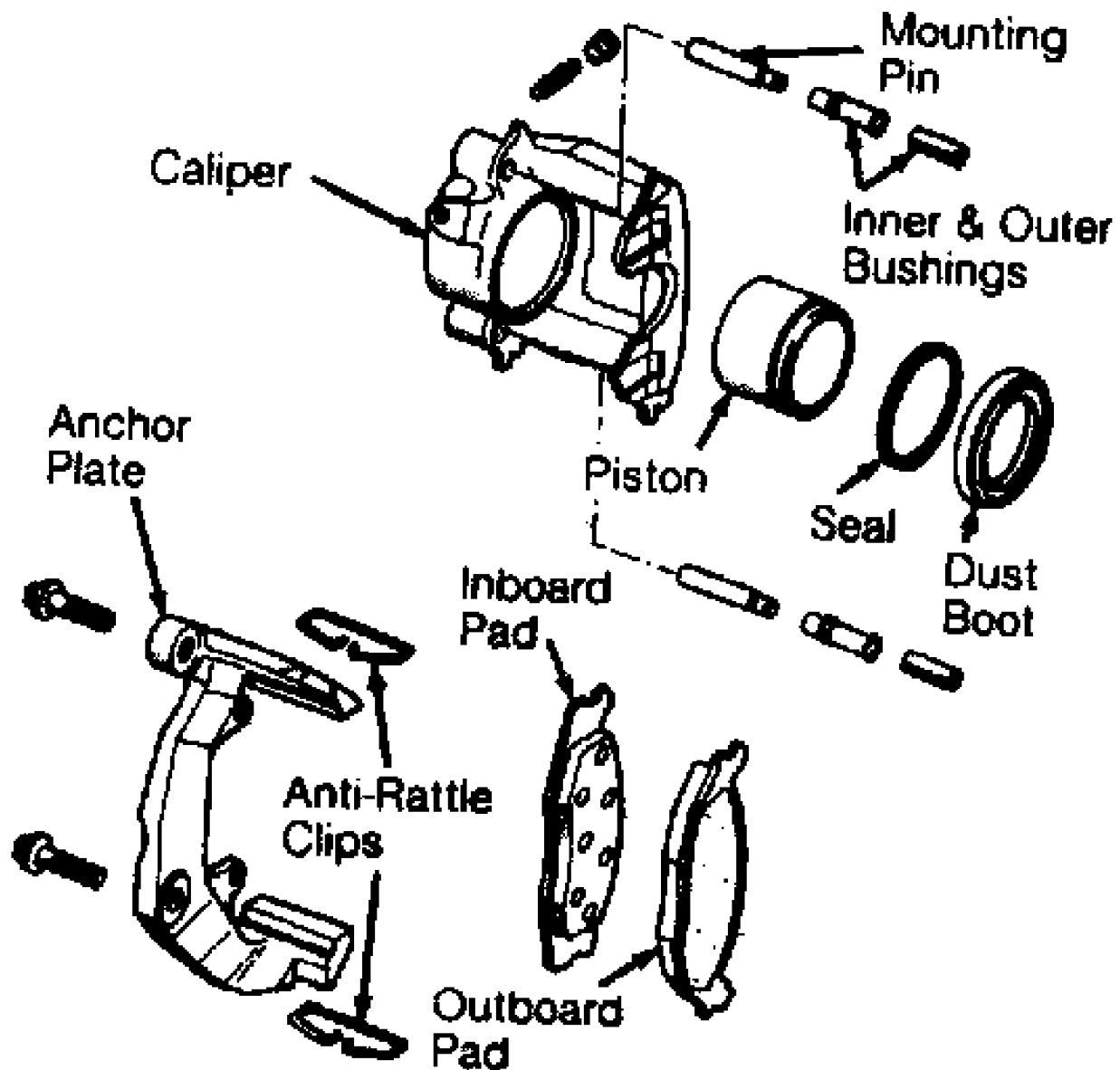


Fig. 9: Exploded View Of Caliper Assembly  
Courtesy of Chrysler Motors.

## MASTER CYLINDER

NOTE: On vehicles with Anti-Lock Brake System (ABS), manufacturer does not recommend overhaul of master cylinder. If defective, replace master cylinder and power brake booster as an assembly.

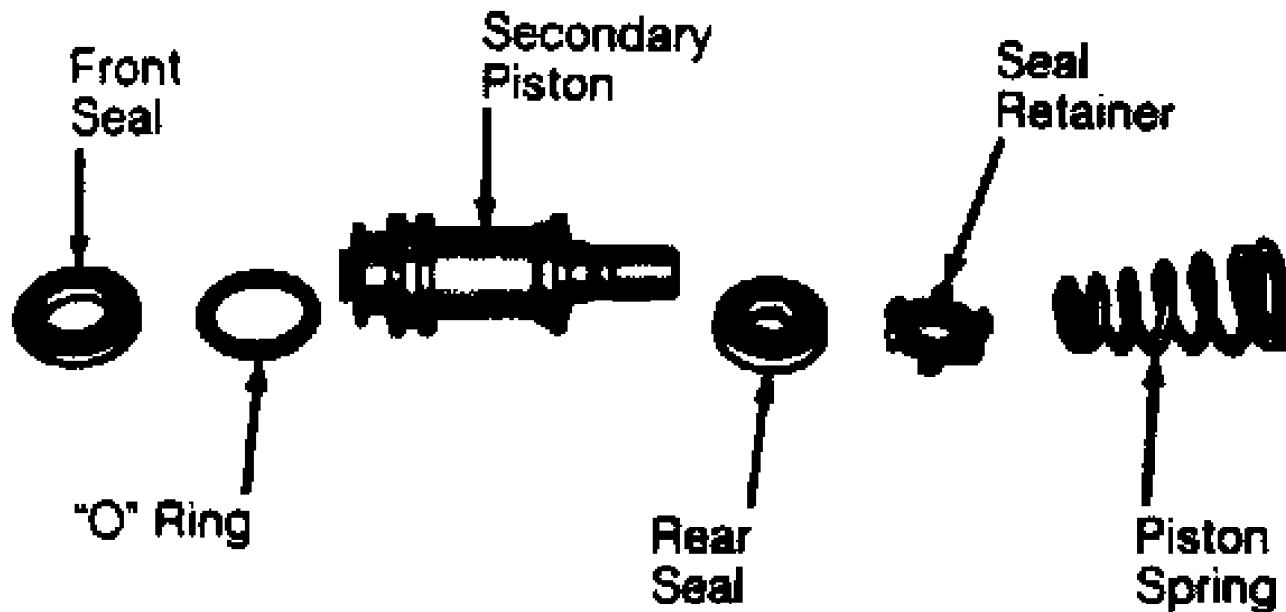


Fig. 10: Exp. View Of 2ndary Piston Components (Exc. Vehicles W/ ABS)  
 Courtesy of Chrysler Motors.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Backing Plate Bolt	32 (43)
Brake Hose-To-Caliper	23 (31)
Brakeline-To-Master Cylinder	15 (21)
Brakeline-To-Wheel Cylinder	13 (18)
Caliper Mounting Pins	
2WD	25-35 (34-47)
4WD	7-15 (10-20)
Master Cylinder-To-Power Booster Nuts	15 (21)
Wheel Bearing	(1) 17-25 (23-34)
Wheel Lug Nuts	
Cherokee & Wrangler	75 (102)
Grand Cherokee & Grand Wagoneer	88 (120)
	INCH Lbs. (N.m)
Wheel Cylinder Bolts	72-156 (8-18)

(1) - Tighten bearing nut while rotating wheel. Loosen nut 1/2 turn, and retighten to 19 INCH lbs. (2 N.m).

## DISC BRAKE SPECIFICATIONS

### DISC BRAKE ROTOR SPECIFICATIONS TABLE

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Application	In. (mm)
Disc Diameter .....	11.02 (279.9)
Lateral Runout	
Cherokee & Wrangler .....	.003 (.08)
Grand Cherokee & Grand Wagoneer .....	.005 (.13)
Parallelism .....	.0005 (.013)
Original Thickness .....	(1)
Minimum Refinish Thickness	
Cherokee	
2WD .....	.86 (22)
4WD .....	.89 (23)
All Others .....	.89 (23)

(1) - Information is not available.

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## DRUM BRAKE SPECIFICATIONS

DRUM BRAKE SPECIFICATIONS TABLE

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Application	In. (mm)
Drum Diameter	
Cherokee & Wrangler .....	9.00 (228.6)
Grand Cherokee & Grand Wagoneer .....	(1)
Drum Width .....	(1)
Maximum Drum Refinish Diameter	
Cherokee & Wrangler .....	9.050 (230.00)
Grand Cherokee & Grand Wagoneer .....	(1)
Wheel Cylinder Diameter .....	(1)
Master Cylinder Diameter .....	(1)

(1) - Information is not available.

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