

## SECTION 5C2

## DUO-SERVO DRUM BRAKES

**CAUTION:** When servicing brake parts, do not create dust by grinding, sanding brake linings or by cleaning brake parts with a dry brush or compressed air. Many brake parts contain asbestos fibers which can become airborne if dust is created during servicing. Breathing dust containing asbestos fibers may cause serious bodily harm. A water dampened cloth or water based solution should be used to remove any dust on brake parts. Equipment is commercially available to perform this washing function. These wet methods will prevent asbestos fibers from becoming airborne.

**CAUTION:** Brake fluid may irritate eyes and skin. In case of contact, take the following actions:

- Eye contact – rinse thoroughly with water.
- Skin contact – wash with soap and water.

**NOTICE:** Avoid spilling brake fluid on any of the vehicle's painted surfaces, wiring cables or electrical connectors. Brake fluid will damage paint and electrical connections. If any fluid is spilled on the vehicle, flush the area with water to lessen damage.

**NOTICE:** When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

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## GENERAL DESCRIPTION

The rear drum brake assembly is a duo-servo design. In the duo-servo brake, the force which the rear wheel cylinder applies to the primary shoe is multiplied by the primary lining friction to provide a very large force applied to the secondary shoe. Adjustment for both the primary and secondary shoe and lining assemblies is automatic during reverse brake applications.

The rear brake drum assembly has a honed friction surface that reduces shoe slap, increases lining life, and reduces the break-in time.

## DIAGNOSIS

## PRIMARY AND SECONDARY SHOES INSPECTION

When the thickness of any lining is worn within 0.76 mm (0.030 inch) of the primary or secondary shoe, the primary and secondary shoes must be replaced. Replace shoes in axle sets only.

## DRUM ASSEMBLY INSPECTION

Pulsation in the brake pedal assembly is usually corrected by servicing the front brakes. Service the rear brakes only if the problem persists.

To determine if the front or rear brakes are at fault, drive the vehicle in an area away from people and moving traffic (such as a large parking lot), and at a slow speed. Lightly apply the parking brake assembly, and feel for the pulsation. Be careful not to lock the brakes and flat-spot the rear tires. If the pulsation is not noticed, the fault is probably in the front brakes.

When drum assemblies are removed, thoroughly clean and inspect them for cracks, scores, deep grooves, out-of-round and taper.

### Surface Finish

Normal light scoring of the drum assembly surfaces not exceeding 0.51 mm (0.020 inch) in depth will not affect brake operation.

### Inside Diameter Check

The nominal inside diameter of the drum assembly is 241.30 mm (9.500 inches).

### Out-of-Round or Taper Check

An out-of-round or tapered drum assembly makes accurate primary or secondary shoe adjustment impossible and is likely to cause excessive wear of other parts of brake mechanism due to its eccentric action. An out-of-round drum assembly can also cause severe and irregular tire tread wear as well as a pulsating brake pedal assembly. When the drum assembly exceeds the specification limits in taper and/or out-of-round, refinish drum assembly to true up the braking surface. Out-of-round as well as taper and wear can be accurately measured with an inside micrometer fitted with proper extension rods.

When measuring a drum assembly for out-of-round, taper, and wear, take measurements at the open and closed edges of machined surface and at right angles (90 degrees) to each other.

### Runout Check

Runout for drum assemblies is not to exceed 0.15 mm (0.006 inch).

### Balance

During manufacture, weights are used to balance drum assemblies. These weights must not be removed.

After drum assemblies have been refinished or if difficulty is experienced in maintaining proper wheel balance, drum assemblies should be checked for balance. Drum assemblies may be checked for balance on most off-the-vehicle wheel balancers.

## ON-VEHICLE SERVICE

**NOTICE:** Do not use lubricated shop air on brake parts as damage to rubber components may result.

### Important

- Replace all components included in repair kits used to service this drum brake.
- Lubricate parts as specified.

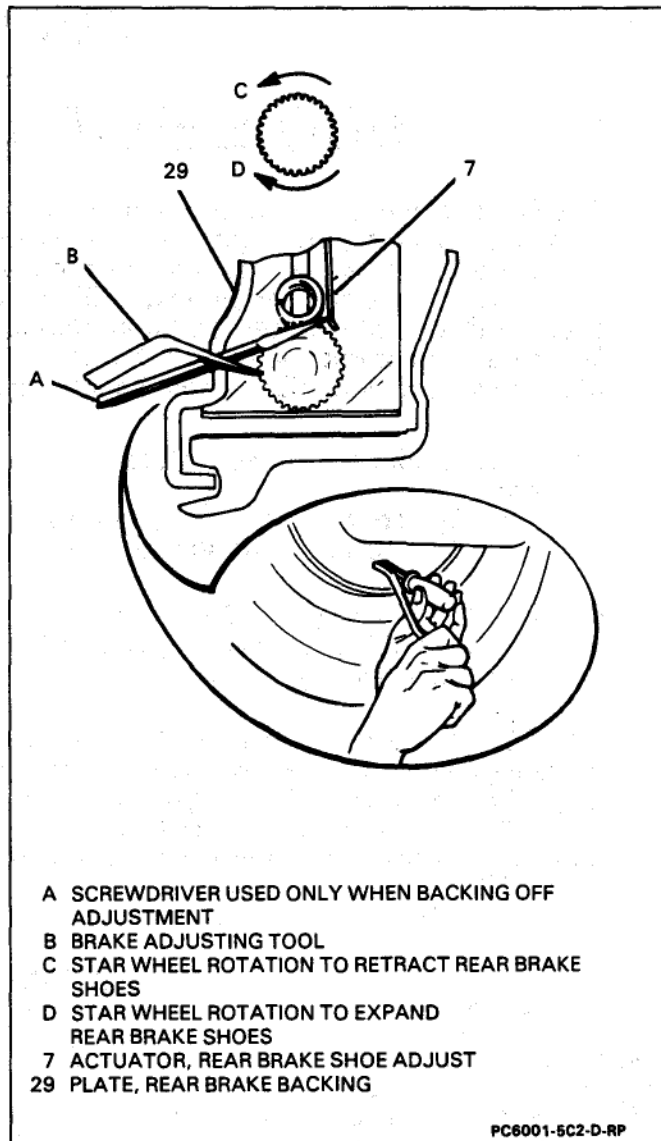


Figure 1 – Backing Off Rear Brake Shoe Adjustment

- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system.
- Replace shoe and lining assemblies in axle sets only.
- The torque values specified are for dry, unlubricated fasteners.
- Perform service operations on a clean bench, free from all mineral oil materials.

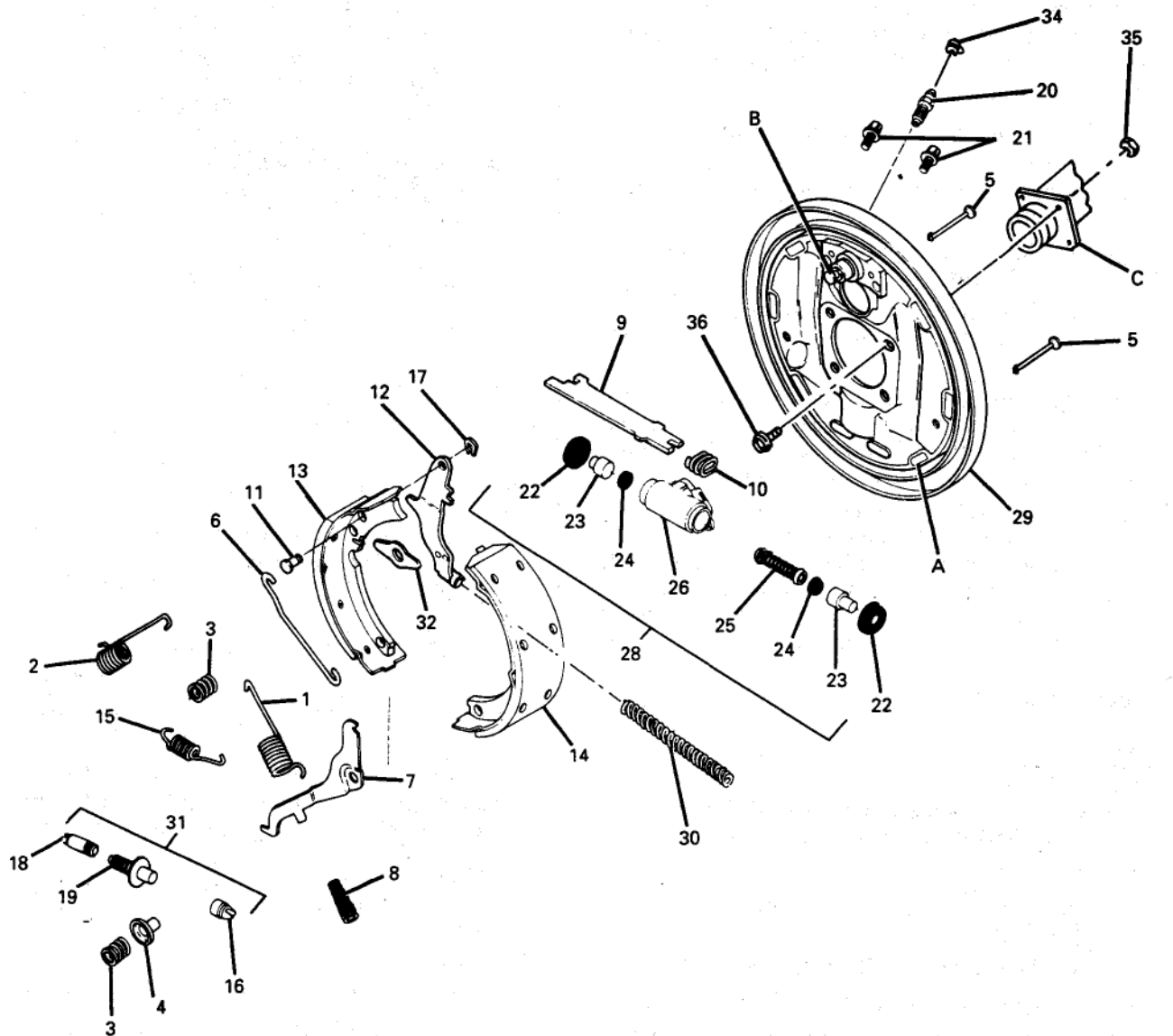
## DRUM ASSEMBLY

Figure 1

### Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Tire and wheel assembly. Refer to SECTION 3E.
  - Mark relationship of wheel to axle flange.

**NOTICE:** Be careful not to drop the brake drum assemblies during handling. Out-of-round can occur



- A SHOE PAD
- B ANCHOR PIN
- C REAR AXLE ASSEMBLY FLANGE
- 1 SPRING, REAR BRAKE SHOE RETURN
- 2 SPRING, REAR BRAKE SHOE RETURN
- 3 SPRING, REAR BRAKE SHOE HOLD-DOWN
- 4 PIVOT, REAR BRAKE SHOE ADJUST ACTUATOR
- 5 PIN, REAR BRAKE SHOE
- 6 LINK, REAR BRAKE SHOE ADJUST ACTUATOR
- 7 ACTUATOR, REAR BRAKE SHOE ADJUST
- 8 SPRING, REAR BRAKE SHOE ADJUST ACTUATOR RETURN
- 9 STRUT, REAR PARKING BRAKE LEVER
- 10 SPRING, REAR PARKING BRAKE LEVER STRUT
- 11 PIN, REAR PARKING BRAKE LEVER PIVOT
- 12 LEVER ASSEMBLY, REAR PARKING BRAKE
- 13 SHOE, REAR BRAKE PRIMARY
- 14 SHOE, REAR BRAKE SECONDARY
- 15 SPRING, REAR BRAKE SHOE ADJUST
- 16 SOCKET, REAR BRAKE SHOE ADJUST

- 17 RING, REAR PARKING BRAKE LEVER RETAINER
- 18 NUT, REAR BRAKE SHOE ADJUST
- 19 ADJUSTER, REAR BRAKE SHOE
- 20 VALVE, REAR BRAKE BLEEDER, 6 N·m (53 LB. IN.)
- 21 BOLT/SCREW, REAR WHEEL CYLINDER, 13 N·m (115 LB. IN.)
- 22 BOOT, REAR WHEEL CYLINDER PISTON
- 23 PISTON, REAR WHEEL CYLINDER
- 24 SEAL, REAR WHEEL CYLINDER PISTON
- 25 SPRING, REAR WHEEL CYLINDER PISTON
- 26 BODY, REAR WHEEL CYLINDER
- 28 CYLINDER, REAR WHEEL
- 29 PLATE, REAR BRAKE BACKING
- 30 SPRING, PARKING BRAKE CABLE RETURN
- 31 ADJUSTER ASSEMBLY, REAR BRAKE SHOE
- 32 GUIDE, REAR BRAKE SHOE
- 34 CAP, BLEEDER VALVE
- 35 NUT, REAR BRAKE BACKING PLATE, 58 N·m (43 LB. FT.)
- 36 BOLT/SCREW, REAR BRAKE BACKING PLATE

Figure 2 – Rear Brake Assembly Components

from even the smallest fall, resulting in brake pulsation.

**NOTICE:** Do not pry against the splash shield that surrounds the backing plate in an attempt to free the drum assembly. This will bend the splash shield.

### 3. Drum assembly.

- A. Mark relationship of drum assembly to axle flange.
- B. If you have trouble removing rear brake drum assembly, try the following:
  - a. Make sure parking brake assembly is released.
  - b. Disconnect parking brake cable assemblies from equalizer. Refer to SECTION 5F.
  - c. Remove adjusting hole cover or knock-out plate from backing plate (29) and back off adjusting screw, using screwdriver and brake adjusting tool.
  - d. Use rubber mallet to tap gently on outer rim of drum and/or around inner drum diameter by axle flange and/or axle pilot, while pulling outward on drum assembly. Take care not to deform drum assembly by excessive use of force.

## Install or Connect



### Adjust

- Rear drum brake assemblies. Refer to "Rear Drum Brake Adjustment" in this section.
1. Drum assembly.
    - Align locating marks on drum assembly and axle flange.
  2. Tire and wheel assembly. Refer to SECTION 3E.
    - Align locating marks on wheel and axle flange.
    - If knockout plate was removed, an adjusting hole cover, GM P/N 5464803 must be installed.
    - If parking brake cable assemblies were disconnected from equalizer, install to equalizer.
  3. Lower vehicle.
  4. Cycle parking brake lever assembly three times.

## PRIMARY AND SECONDARY SHOES

### Figures 2 through 4

Tools Required:

- J 8049 Brake Spring Remover and Installer
- J 8057 Brake Spring Pliers



### Remove or Disconnect

1. Drum assembly. Refer to "Drum Assembly" under "On-Vehicle Service" in this section.

**CAUTION:** Keep fingers away from rear brake shoe return springs to prevent

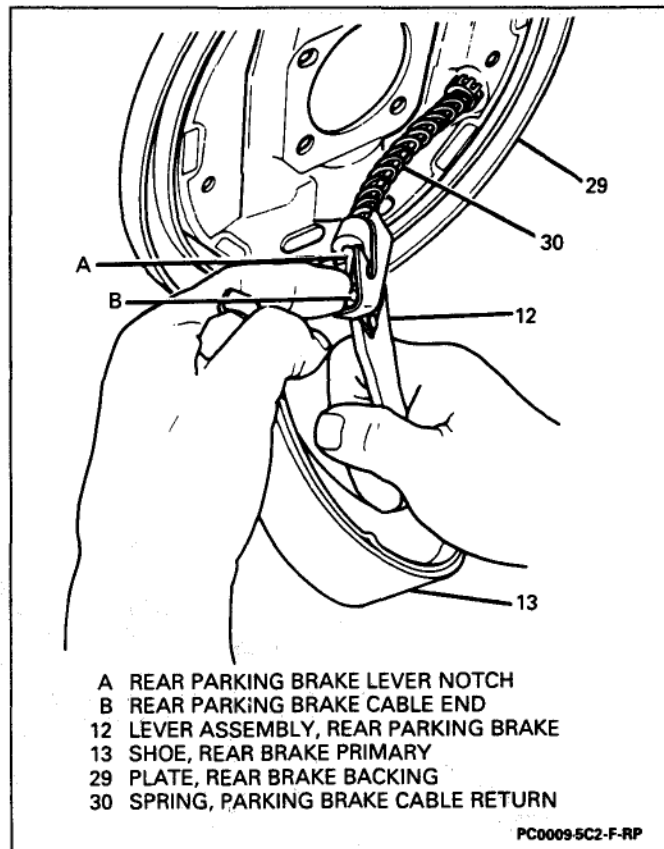


Figure 3 - Removing Parking Brake Cable Assembly

fingers from being pinched between rear brake shoe return spring and shoe web or return spring and backing plate.

2. Return springs (1 and 2) using J 8049.
3. Hold-down springs (3) and pins (5) using suitable pliers.
4. Actuator pivot (4).
5. Actuator link (6) while lifting up on actuator (7).
6. Actuator (7) and actuator return spring (8).
7. Shoe guide (32), strut (9) and strut spring (10).
8. Primary shoe (13) and secondary shoe (14) from backing plate (29) and parking brake rear cable assembly.
9. Adjuster assembly (31) and spring (15).
10. Parking brake cable assembly from parking brake lever assembly (12) by pushing parking brake lever assembly (12) into parking brake cable return spring (30). Disengage cable end from parking brake lever assembly (12).
11. Primary shoe (13) with parking brake lever assembly (12) and parking brake cable return spring (30).
12. Parking brake lever assembly (12).
  - A. Pry open retainer ring (17), remove and discard.
  - B. Push out pivot pin (11).



### Clean

1. Adjuster assembly (31).

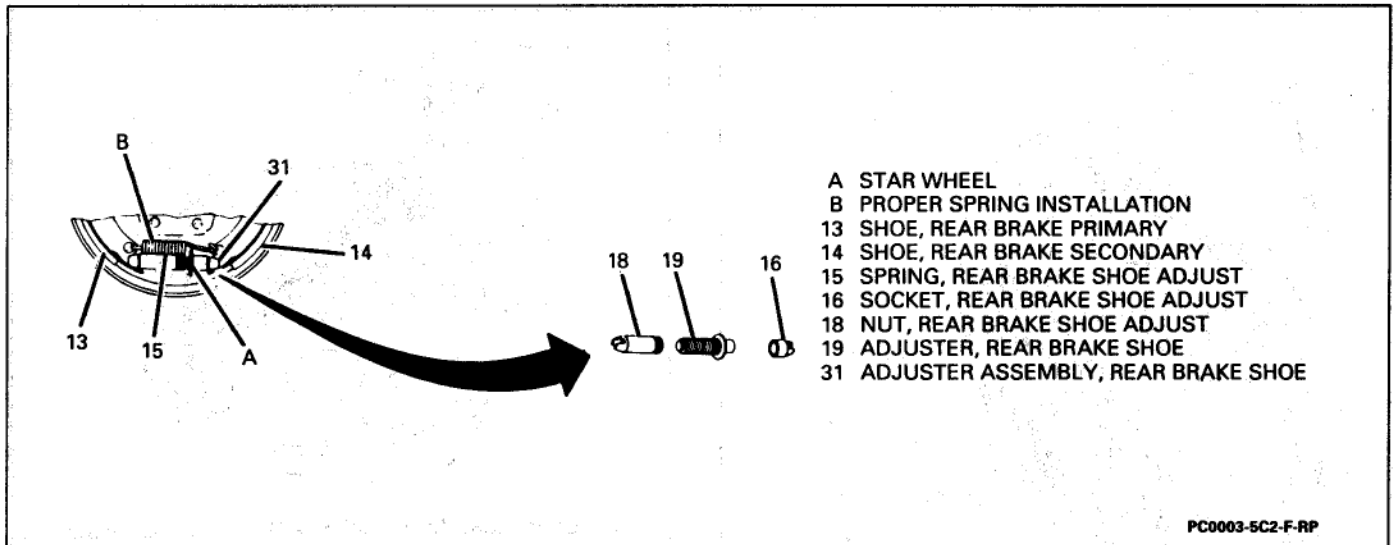


Figure 4 – Rear Brake Shoe Adjuster Assembly

- A. Clean adjusting screw threads with wire brush.
- B. Wash all components in clean denatured alcohol.
- C. Apply brake lubricant, GM P/N 9985907 or equivalent, to adjuster threads, inside diameter of adjust socket (16) and adjust socket face.

- Adequate lubrication is achieved when a continuous bead of lubricant is at open end of adjust nut (18) and adjust socket (16) when threads are fully engaged.

2. Backing plate (29) and lubricate contact surfaces with brake lubricant, GM P/N 9985907 or equivalent.

### Inspect

1. Threads of adjuster (19) for smooth rotation over full length.
2. All parts.
  - If any parts are of doubtful strength or quality due to discoloration from heat, overstress, or wear, the parts should be replaced.

### Install or Connect

**NOTICE:** See "Notice" on page 5C2-1 of this section.

1. Parking brake lever assembly (12).
  - A. Insert pivot pin (11) through holes in primary shoe (13) and parking brake lever assembly (12).
  - B. Install and crimp new retainer ring (17).
2. Parking brake cable assembly to parking brake lever assembly (12) by pulling back parking brake cable return spring (30). Engage cable end into parking brake lever assembly (12).
3. Adjuster assembly (31) and spring (15).
4. Primary shoe (13) and secondary shoe (14) to backing plate (29) and parking brake rear cable assembly.

5. Strut (9) and strut spring (10) by spreading primary shoe (13) and secondary shoe (14) apart. For proper positioning:

- A. Strut end without strut spring (10) engages parking brake lever assembly (12) and primary shoe (13) or secondary shoe (14).
- B. Strut end with strut spring (10) engages opposite primary shoe (13) or secondary shoe (14).

6. Shoe guide (32).
7. Actuator (7) and actuator return spring (8).
8. Pins (5), actuator pivot (4) and hold-down springs (3).
9. Actuator link (6) on anchor pin.
10. Actuator link (6) into actuator (7) while holding up on actuator (7).
11. Return springs (1 and 2) using J 8057.
12. Drum assembly. Refer to "Drum Assembly" under "On-Vehicle Service" in this section.

## WHEEL CYLINDER

Figure 5

### Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.

### Clean

- Dirt and foreign material around wheel cylinder (28) and rear brake rear pipe assembly.
2. Primary and secondary shoes. Refer to "Primary and Secondary Shoes" in this section.
  3. Brake pipe fitting and rear brake rear pipe assembly.
    - Plug opening in rear brake rear pipe assembly to prevent brake fluid loss and contamination.
  4. Bolts/screws (21).
  5. Wheel cylinder (28).

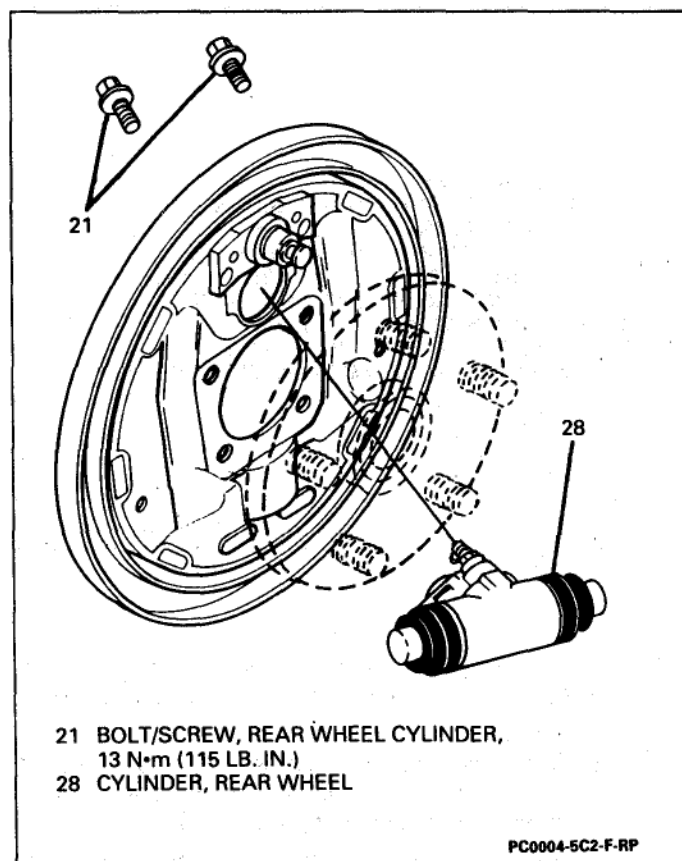


Figure 5 – Rear Wheel Cylinder

### Install or Connect

**NOTICE:** See “Notice” on page 5C2-1 of this section.

1. Wheel cylinder (28).
  - Hold in place with wooden block between wheel cylinder (28) and axle flange.
2. Bolts/screws (21).

### Tighten

- Bolts/screws (21) to 13 N•m (115 lb. in.).

3. Rear brake rear pipe assembly.

### Tighten

- Brake pipe fitting to 17 N•m (13 lb. ft.).

4. Primary and secondary shoes. Refer to “Primary and Secondary Shoes” in this section.
5. Lower vehicle.
6. Bleed brake hydraulic system. Refer to SECTION 5E1.

## BACKING PLATE

Figure 2

### Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.

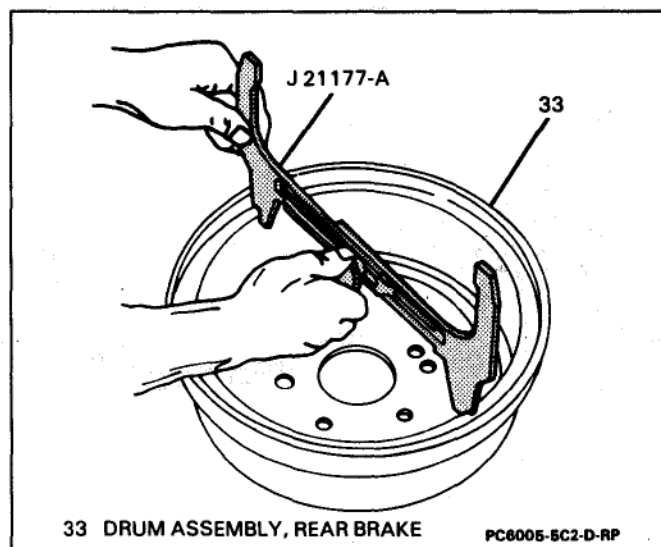


Figure 6 – Setting Tool to Rear Brake Drum Assembly

2. Primary and secondary shoes. Refer to “Primary and Secondary Shoes” in this section.
3. Rear axle shaft. Refer to SECTION 4B.
4. Parking brake cable assembly from rear brake backing plate. Refer to SECTION 5F.
5. Brake pipe assembly from wheel cylinder (28).
6. Wheel cylinder. Refer to “Wheel Cylinder” under “On-Vehicle Service” in this section.
7. Backing plate bolts/screws (36) and nuts (35).
8. Backing plate (29) from axle flange.

### Install or Connect

**NOTICE:** See “Notice” on page 5C2-1 of this section.

1. Backing plate (29) to axle flange.
2. Backing plate bolts/screws (36) and nuts (35).

### Tighten

- Backing plate nuts (35) to 58 N•m (43 lb. ft.).

3. Wheel cylinder. Refer to “Wheel Cylinder” under “On-Vehicle Service” in this section.
4. Rear brake rear pipe assembly to wheel cylinder (28).

### Tighten

- Brake pipe fitting to 17 N•m (13 lb. ft.).

5. Parking brake cable assembly to brake backing plate. Refer to SECTION 5F.
6. Rear axle shaft. Refer to SECTION 4B.
7. Primary and secondary shoes. Refer to “Primary and Secondary Shoes” in this section.
8. Bleed brake hydraulic system. Refer to SECTION 5E1.

### Adjust

- Rear drum brake assemblies. Refer to “Rear Drum Brake Adjustment” in this section.

9. Lower vehicle.
10. Cycle parking brake lever assembly three times.

## REAR DRUM BRAKE ADJUSTMENT

**Figures 4, 6 and 7**

Tool Required:

J 21177-A Drum-to-Brake Shoe Clearance Gage

### Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Tire and wheel assemblies. Refer to SECTION 3E.
  - Mark relationship of wheel to axle flange.
3. Drum assemblies. Refer to "Drum Assembly" under "On-Vehicle Service" in this section.

### Adjust

- Rear brake assemblies.
  - A. Set J 21177-A so that it contacts inside diameter of drum assembly (33).
  - B. Position J 21177-A over primary and secondary shoes (13 and 14).
  - C. Turn star wheel on adjuster (19) until primary and secondary shoes (13 and 14) contact J 21177-A.
    - Outside diameter of primary shoe (13) and secondary shoe (14) will be approximately 1.27 mm (0.050 inch) less than inside diameter of drum assembly (33) on each wheel.

### Install or Connect

1. Drum assemblies. Refer to "Drum Assembly" under "On-Vehicle Service" in this section.
2. Tire and wheel assemblies. Refer to SECTION 3E.
3. Lower vehicle.
4. Make several stops, applying firm force to brake pedal assembly.
  - Repeat until ample pedal reserve is built up.

## UNIT REPAIR

### DRUM ASSEMBLY

#### Cracked, Scored or Grooved

A cracked drum assembly is unsafe for further service and must be replaced. Do not attempt to weld a cracked drum assembly.

Smooth up any slight scores. Heavy or extensive scoring will cause excessive brake lining wear, and it may be necessary to refinish the drum braking surface.

If the brake linings are slightly worn, but still reusable, and the drum assembly is grooved, polish the drum assembly with fine emery cloth but do not refinish. Eliminating all grooves in the drum assembly and smoothing

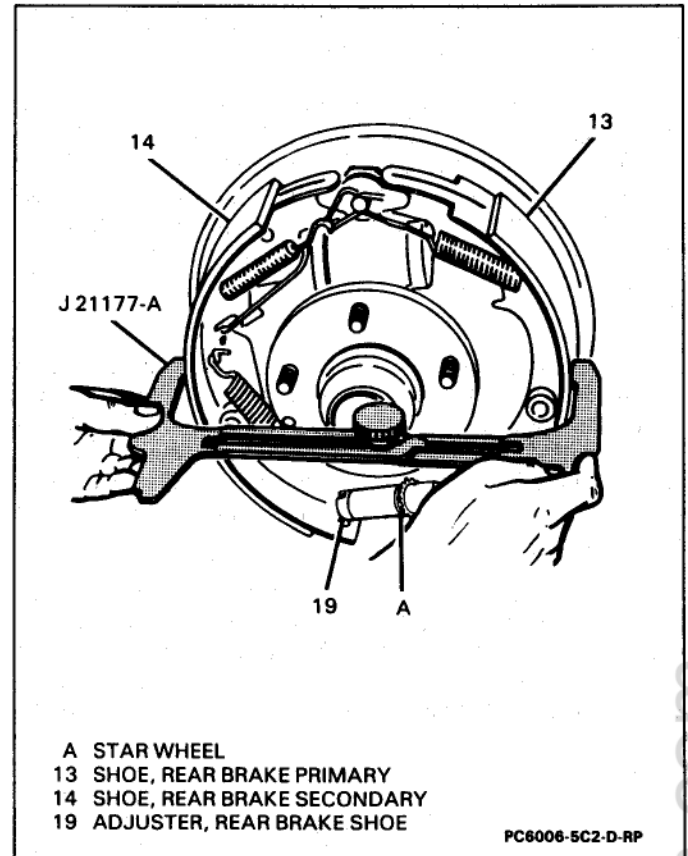


Figure 7 – Setting Rear Brake Primary and Secondary Shoes to Tool

the ridges on the shoe linings would require removing too much metal and lining, while if left alone, the grooves and ridges match and satisfactory service can be obtained.

If brake linings are to be replaced, refinish a grooved drum assembly. A grooved drum assembly, if used with new lining, will not only wear the lining, but will make it difficult, if not impossible, to obtain proper brake performance.

#### Out-of-Round or Tapered

An out-of-round or tapered drum assembly prevents accurate rear brake shoe adjustment and is likely to cause excessive wear of other brake parts due to its eccentric action. An out-of-round drum assembly can also cause severe and irregular tire tread wear as well as a pulsating brake pedal assembly. When the drum assembly exceeds the specification limits in taper and/or out-of-round, refinish drum assembly to true up the braking surface. Out-of-round as well as taper and wear can be accurately measured with an inside micrometer and extension rods.

When measuring a drum assembly for out-of-round, taper, and wear, take measurements at the open and closed edges of the machined surface and at right angles (90 degrees) to each other.

#### Refinishing

All drum assemblies have a maximum diameter cast into them. This diameter is the maximum wear diameter and not a refinish diameter. Do not refinish a drum assembly that will not meet the specifications. Refer to "Specifications" at the end of this section.

Any drum assembly that does not meet specifications shown should be replaced.

When refinishing a drum assembly, resurface the drum assembly to no more than a dimension of 0.76 mm (0.030 inch) less than the discard diameter. The refinish diameter is the maximum diameter the drum assembly should be refinished to, and still allow safe braking action. If this dimension is exceeded, the drum assembly will wear beyond the discard diameter during normal brake wear.

If a drum assembly must be refinished, remove only enough metal to obtain a true, smooth braking surface. If a drum assembly does not clean-up when refinished to a maximum rebores diameter as shown at the end of this section, replace it. Removal of more metal will affect heat dissipation and may cause rear brake drum assembly distortion.

When refinishing drum assemblies, always use sharp cutting tools or bits. Dull or worn tools leave a poor surface finish which will affect initial braking performance. Vibration dampening attachments should always be used when refinishing braking surfaces. These attachments eliminate tool chatter and will result in better surface finish.

The optimum spindle speed for refinishing braking surfaces is 200 rpm. Crossfeed for rough cutting should range from 0.15-0.25 mm (0.006-0.010 inch) per revolution. Finish cuts should be made at crossfeeds no greater than 0.05 mm (0.002 inch) per revolution.

After making the finish cuts, sand the brake drum friction surface for at least 60 seconds. Use 150 grit aluminum oxide sandpaper on a curved sanding block. Make smooth in-and-out motions with the block while sanding. This procedure will simulate the original factory surface finish.

## Replacing Drum Assemblies

When installing new drum assemblies, do not refinish the braking surface. New drum assemblies have the correct level of surface finish.

## Balance

During manufacture, weights are used to balance drum assemblies. Do not remove these weights.

After drum assemblies have been refinished, or when maintaining proper wheel balance is difficult, check the drum assemblies for balance. They can be checked on most off-the-vehicle balancers. If found to be out of balance, replace drum assembly.

**NOTICE:** Be careful not to drop the brake drum assemblies during handling. Out-of-round can occur from even the smallest fall, resulting in brake pulsation.

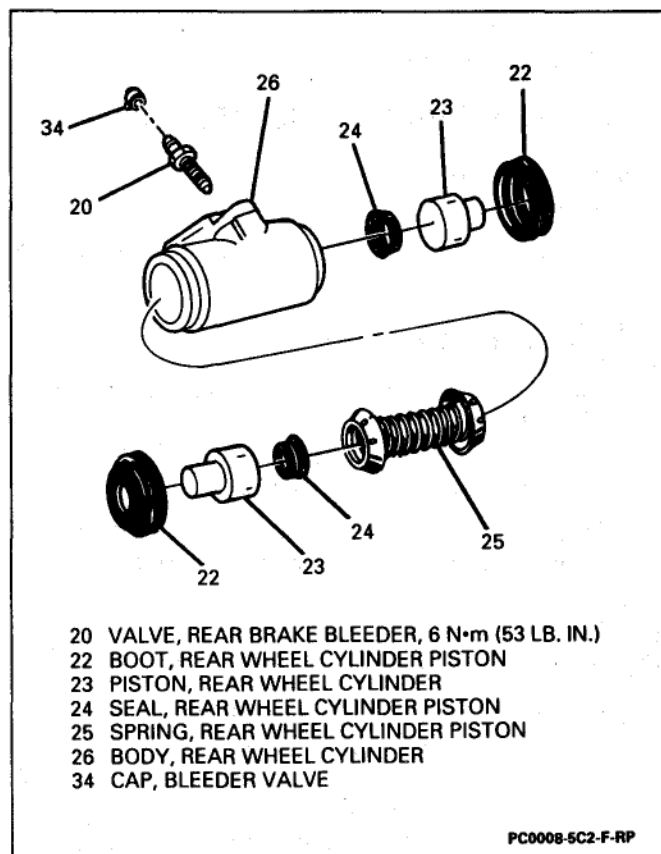


Figure 8 – Rear Wheel Cylinder Components

## WHEEL CYLINDER

Figure 8

### Disassemble

1. Wheel cylinder completely from vehicle. Refer to "Wheel Cylinder" under "On-Vehicle Service" in this section.
2. Boots (22).
3. Pistons (23) and seals (24).
4. Piston spring (25).
5. Bleeder valve cap (34).
6. Bleeder valve (20) from wheel cylinder body (26).

### Inspect

- Wheel cylinder bore for scoring, nicks, corrosion and wear.

### Clean

1. All parts in clean denatured alcohol.
2. Dry with unlubricated compressed air.
3. Lubricate new seals (24) with clean brake fluid.

### Assemble

**NOTICE:** See "Notice" on page 5C2-1 of this section.

1. Bleeder valve (20).

**Tighten**

- Bleeder valve (20) to 6 N•m (53 lb. in.).
- 2. Bleeder valve cap (34).
- 3. Piston spring (25).
- 4. Seals (24), pistons (23) and boots (22).
- 5. Wheel cylinder. Refer to "Wheel Cylinder" under "On-Vehicle Service" in this section.

**SPECIFICATIONS****GENERAL SPECIFICATIONS**

|                                         |                    |
|-----------------------------------------|--------------------|
| Rear Wheel Cylinder Bore Diameter ..... | 20.6 mm (0.81")    |
| Brake Lubricant .....                   | GM P/N 9985907     |
| Rear Brake Drum Assembly                |                    |
| Inside Diameter (Nominal) .....         | 241.30 mm (9.500") |
| Runout .....                            | 0.15 mm (0.006")   |
| Maximum Refinish Diameter .....         | 242.82 mm (9.560") |
| Discard Diameter .....                  | 243.59 mm (9.590") |

All rear brake drum assemblies have a discard dimension cast into them. This is a wear dimension and not a refinish dimension. Any rear brake drum assembly which does not meet the specification should be replaced.

**FASTENER TIGHTENING SPECIFICATIONS**

|                                      |                      |
|--------------------------------------|----------------------|
| Rear Brake Backing Plate Nut .....   | 58 N•m (43 lb. ft.)  |
| Rear Brake Bleeder Valve .....       | 6 N•m (53 lb. in.)   |
| Rear Brake Rear Pipe Fitting .....   | 17 N•m (13 lb. ft.)  |
| Rear Wheel Cylinder Bolt/Screw ..... | 13 N•m (115 lb. in.) |

**SPECIAL TOOLS**

1. BRAKE SPRING REMOVER AND INSTALLER
2. BRAKE SPRING PLIERS
3. DRUM-TO-BRAKE SHOE CLEARANCE GAGE

PC8008-5C2-D-RP

