

SECTION 4B

REAR AXLE

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 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

STANDARD REAR AXLE ASSEMBLY

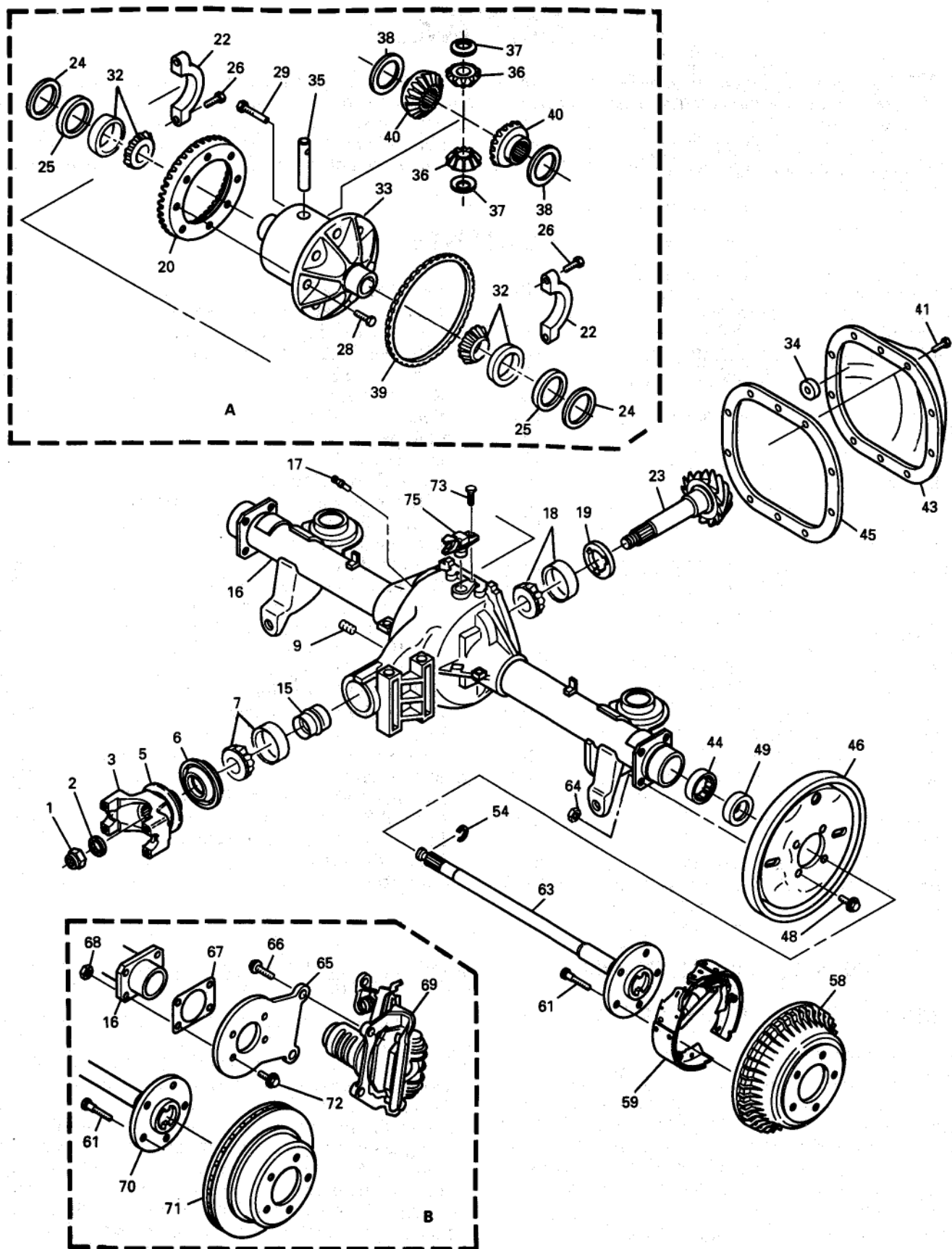
Figures 1 through 4

The rear axle assembly is the semi-floating hypoid type in which the vehicle weight is carried on the housing assembly (16). The rear axle assembly is designed for use with an open driveline and coil spring assemblies. The rear axle assembly has a hypoid type ring gear (20) with the centerline of the drive pinion gear (23) below the centerline of the ring gear (20).

All parts necessary to transmit power from the propeller shaft to the rear tire and wheel assemblies are enclosed in the housing assembly (16). A removable steel cover (43) bolted to the rear of the housing assembly (16)

permits service of the rear axle assembly without removing the entire assembly from the vehicle.

A universal joint connects the rear end of the propeller shaft to the yoke (3). The yoke (3) has a splined end which fits over and drives the drive pinion gear (23). Two preloaded tapered roller bearing assemblies support the drive pinion gear (23) in the housing assembly (16). The races of the inner bearing assembly (18) and the outer bearing assembly (7) are a tight press fit in the housing assembly (16). The inner bearing assembly (18) is a tight press fit onto the drive pinion gear (23). The outer bearing assembly (7) combines a light press fit to a close sliding fit on the yoke end of the pinion gear stem. The races of the inner and outer bearing assemblies (18 and 7) are pressed against shoulders recessed in the housing assembly (16).



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Figure 1 – Standard Rear Axle Assembly

- | | |
|---|--|
| A DIFFERENTIAL ASSEMBLY | 36 GEAR, DIFFERENTIAL PINION |
| B OPTIONAL DISC BRAKE ASSEMBLY | 37 WASHER, DIFFERENTIAL PINION GEAR THRUST |
| 1 NUT, DIFFERENTIAL DRIVE PINION GEAR | 38 WASHER, DIFFERENTIAL SIDE GEAR THRUST |
| 2 WASHER, DIFFERENTIAL DRIVE PINION GEAR | 39 WHEEL, REAR WHEEL SPEED SENSOR RELUCTOR |
| 3 YOKE, DIFFERENTIAL DRIVE PINION GEAR | 40 GEAR, DIFFERENTIAL SIDE |
| 5 DEFLECTOR, DIFFERENTIAL DRIVE PINION GEAR DIRT | 41 BOLT/SCREW, REAR AXLE HOUSING |
| 6 SEAL, DIFFERENTIAL DRIVE PINION GEAR | 43 COVER, REAR AXLE HOUSING |
| 7 BEARING ASSEMBLY, DIFFERENTIAL DRIVE PINION GEAR OUTER | 44 BEARING ASSEMBLY, REAR AXLE SHAFT |
| 9 PLUG, REAR AXLE HOUSING DRAIN | 45 GASKET, REAR AXLE HOUSING COVER |
| 15 SPACER, DIFFERENTIAL DRIVE PINION GEAR BEARING | 46 PLATE, REAR BRAKE BACKING |
| 16 HOUSING, ASSEMBLY, REAR AXLE | 48 BOLT/SCREW, REAR BRAKE BACKING |
| 17 VENT, REAR AXLE | 49 SEAL, REAR AXLE SHAFT BEARING |
| 18 BEARING ASSEMBLY, DIFFERENTIAL DRIVE PINION GEAR INNER | 54 LOCK, REAR AXLE SHAFT |
| 19 SHIM, DIFFERENTIAL DRIVE PINION GEAR | 58 DRUM ASSEMBLY, REAR BRAKE |
| 20 GEAR, DIFFERENTIAL RING | 59 BRAKE ASSEMBLY, REAR |
| 22 CAP, DIFFERENTIAL CARRIER BEARING | 61 BOLT/SCREW, REAR WHEEL |
| 23 GEAR, DIFFERENTIAL DRIVE PINION | 63 SHAFT REAR AXLE (DRUM BRAKE ASSEMBLIES) |
| 24 SHIM, DIFFERENTIAL BEARING | 64 NUT, REAR BRAKE BACKING PLATE |
| 25 SPACER, DIFFERENTIAL BEARING | 65 PLATE, REAR BRAKE CALIPER ASSEMBLY MOUNTING |
| 26 BOLT/SCREW, DIFFERENTIAL BEARING CAP | 66 BOLT/SCREW, CALIPER ASSEMBLY MOUNTING |
| 28 BOLT/SCREW, DIFFERENTIAL RING GEAR | 67 SHIM, AXLE TUBE FLANGE |
| 29 BOLT/SCREW, DIFFERENTIAL PINION GEAR SHAFT LOCK | 68 NUT, REAR BRAKE CALIPER MOUNTING PLATE |
| 32 BEARING ASSEMBLY, DIFFERENTIAL | 69 CALIPER ASSEMBLY, REAR BRAKE |
| 33 CASE, DIFFERENTIAL | 70 SHAFT, REAR AXLE (DISC BRAKE ASSEMBLIES) |
| 34 MAGNET, REAR AXLE HOUSING CHIP COLLECTING | 71 ROTOR ASSEMBLY, REAR BRAKE |
| 35 SHAFT, DIFFERENTIAL PINION GEAR | 72 BOLT/SCREW, REAR BRAKE BACKING PLATE |
| | 73 BOLT/SCREW, SENSOR PLUG MOUNTING |
| | 75 SENSOR ASSEMBLY, WHEEL SPEED |

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Figure 2 – Standard Rear Axle Assembly – Legend

Tightening nut (1) compresses a collapsible spacer (15) that bears against the outer bearing assembly (7) and a shoulder on the pinion stem. This spacer (15) is used to enable automatic bearing preload adjustment and maintain a preload on both inner and outer bearing assemblies (18 and 7). Adjustment of the fore-and-aft position of the drive pinion gear (23) is obtained by placing selective shims (19) between the head of the drive pinion gear (23) and the inner bearing assembly (18).

The case (33) is one piece and is supported in the housing assembly (16) by two tapered roller side bearing assemblies (32). These are preloaded by inserting shims (24) between the bearing assemblies (32) and the housing assembly (16). The case (33) is positioned for proper differential ring gear-to-differential drive pinion gear backlash by varying the shim thickness from side to side. The ring gear (20) is bolted to the case (33). A speed sensor reluctor wheel (39) is press fit to the case (33). A wheel speed sensor assembly (75) is mounted to the housing assembly (16) (Figure 1) or the mounting plate (65) (Figure 3). This sensor provides wheel speed information to the electronic brake control module (EBCM) assembly. For further information, refer to SECTION 5E1.

Two side gears (40) have splined bores for driving the axle shafts (63 or 70). They are positioned to turn in counterbored cavities in the case (33). The pinion gears (36) have smooth bores and are held in position by a solid pinion gear shaft (35), mounted and locked in the case (33). All four gears are in mesh with each other. The pinion gears (36) turn freely on the pinion gear shaft (35),

acting as idler gears when the rear wheel assemblies are turning at different speeds. The pinion gears (36) and side gears (40) are backed by steel thrust washers (37 and 38).

Operation

When the vehicle turns a corner, the differential assembly allows the outer rear tire and wheel assembly to turn faster than the inner tire and wheel assembly. The inner tire and wheel assembly, turning slower with respect to the outer tire and wheel assembly, slows its differential side gear (as the axle shaft is splined to the side gear). The differential pinion gears roll around the slowed differential side gear, driving the other differential side gear tire and wheel assembly faster.

LIMITED SLIP REAR AXLE ASSEMBLY

Limited slip rear axle assemblies have several definite operating characteristics. An understanding of these characteristics is necessary to aid diagnosis.

The energizing force comes from the thrust side of the gears. Consequently, a free spinning tire and wheel assembly may not have enough resistance to driving torque to apply the clutch packs or cones. If this occurs, applying the parking brake a few notches will provide enough resistance to energize the cones.

Energizing the cones is independent of acceleration; therefore, a very slow application of the throttle on starting is recommended to provide maximum traction by preventing "break away" of either rear tire and wheel assembly.

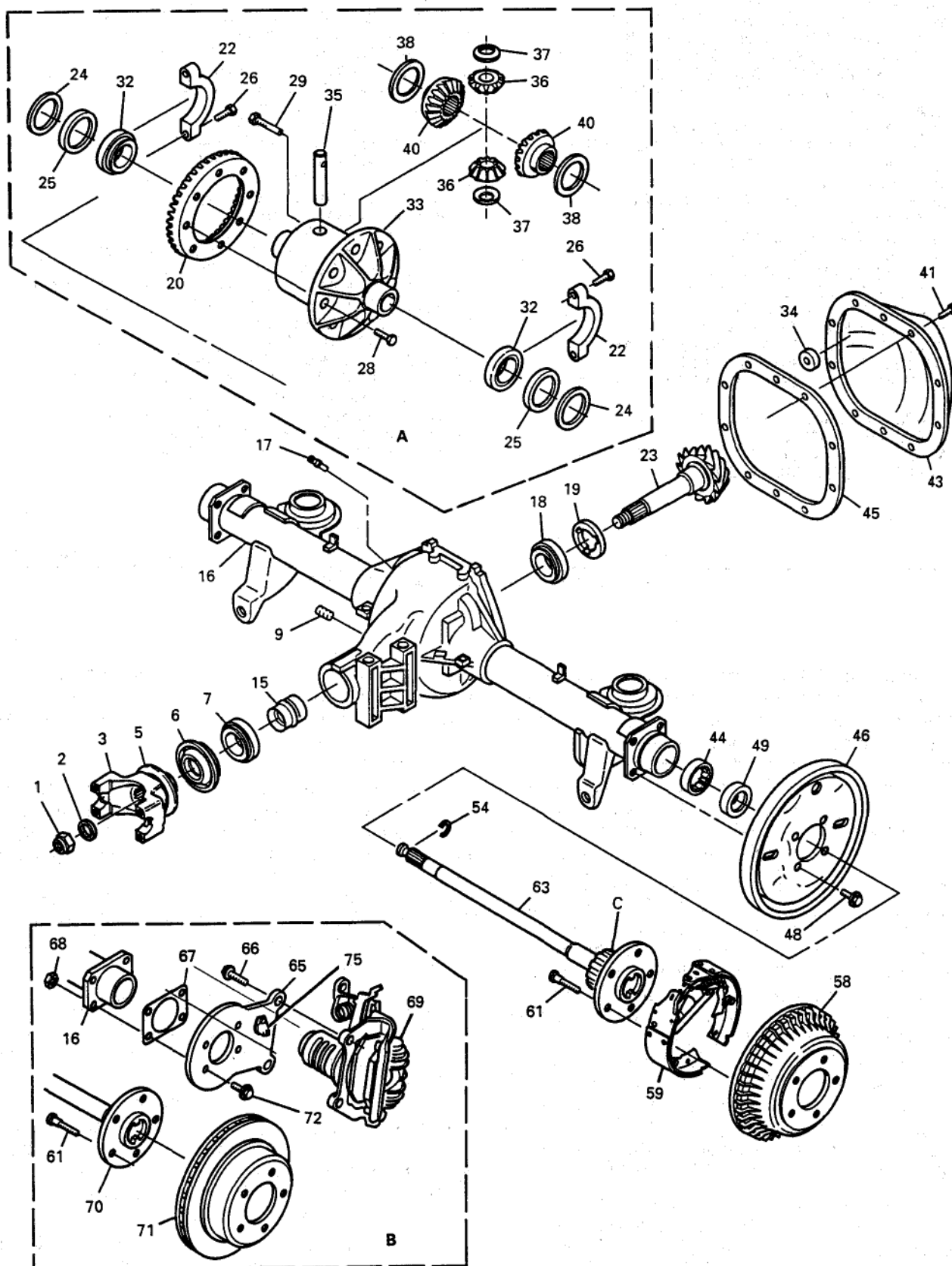


Figure 3 – Rear Axle Assembly Equipped With Traction Control (Acceleration Slip Regulation)

- | | |
|---|--|
| <p>A DIFFERENTIAL ASSEMBLY
 B OPTIONAL DISC BRAKE ASSEMBLY
 C WHEEL, REAR WHEEL SPEED SENSOR RELUCTOR
 1 NUT, DIFFERENTIAL DRIVE PINION GEAR
 2 WASHER, DIFFERENTIAL DRIVE PINION GEAR
 3 YOKE, DIFFERENTIAL DRIVE PINION GEAR
 5 DEFLECTOR, DIFFERENTIAL DRIVE PINION GEAR DIRT
 6 SEAL, DIFFERENTIAL DRIVE PINION GEAR
 7 BEARING ASSEMBLY, DIFFERENTIAL DRIVE PINION GEAR OUTER
 9 PLUG, REAR AXLE HOUSING DRAIN
 15 SPACER, DIFFERENTIAL DRIVE PINION GEAR BEARING
 16 HOUSING, ASSEMBLY, REAR AXLE
 17 VENT, REAR AXLE
 18 BEARING ASSEMBLY, DIFFERENTIAL DRIVE PINION GEAR INNER
 19 SHIM, DIFFERENTIAL DRIVE PINION GEAR
 20 GEAR, DIFFERENTIAL RING
 22 CAP, DIFFERENTIAL CARRIER BEARING
 23 GEAR, DIFFERENTIAL DRIVE PINION
 24 SHIM, DIFFERENTIAL BEARING
 25 SPACER, DIFFERENTIAL BEARING
 26 BOLT/SCREW, DIFFERENTIAL BEARING CAP
 28 BOLT/SCREW, DIFFERENTIAL RING GEAR
 29 BOLT/SCREW, DIFFERENTIAL PINION GEAR SHAFT LOCK
 32 BEARING ASSEMBLY, DIFFERENTIAL
 33 CASE, DIFFERENTIAL
 34 MAGNET, REAR AXLE HOUSING CHIP COLLECTING</p> | <p>35 SHAFT, DIFFERENTIAL PINION GEAR
 36 GEAR, DIFFERENTIAL PINION
 37 WASHER, DIFFERENTIAL PINION GEAR THRUST
 38 WASHER, DIFFERENTIAL SIDE GEAR THRUST
 40 GEAR, DIFFERENTIAL SIDE
 41 BOLT/SCREW, REAR AXLE HOUSING
 43 COVER, REAR AXLE HOUSING
 44 BEARING ASSEMBLY, REAR AXLE SHAFT
 45 GASKET, REAR AXLE HOUSING COVER
 46 PLATE, REAR BRAKE BACKING
 48 BOLT/SCREW, REAR BRAKE BACKING
 49 SEAL, REAR AXLE SHAFT BEARING
 54 LOCK, REAR AXLE SHAFT
 58 DRUM ASSEMBLY, REAR BRAKE
 59 BRAKE ASSEMBLY, REAR
 61 BOLT/SCREW, REAR WHEEL
 63 SHAFT REAR AXLE (DRUM BRAKE ASSEMBLIES)
 64 NUT, REAR BRAKE BACKING PLATE
 65 PLATE, REAR BRAKE CALIPER ASSEMBLY MOUNTING
 66 BOLT/SCREW, CALIPER ASSEMBLY MOUNTING
 67 SHIM, AXLE TUBE FLANGE
 68 NUT, REAR BRAKE CALIPER MOUNTING PLATE
 69 CALIPER ASSEMBLY, REAR BRAKE
 70 SHAFT, REAR AXLE (DISC BRAKE ASSEMBLIES)
 71 ROTOR ASSEMBLY, REAR BRAKE
 72 BOLT/SCREW, REAR BRAKE BACKING PLATE
 75 SENSOR ASSEMBLY, WHEEL SPEED</p> |
|---|--|

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Figure 4 – Rear Axle Equipped With Traction Control (Acceleration Slip Regulation) – Legend

All rear axle parts of vehicles with the limited slip rear axle assembly are interchangeable with those equipped with the standard rear axle assembly, except for the differential case. It is similar in all respects to the standard differential case, with the addition of cone clutches splined to each side gear. The Auburn limited slip differential case is non-serviceable and must be replaced.

REAR AXLE ASSEMBLY IDENTIFICATION

Figure 5

The rear axle assembly identification code and manufacturer's code must be known before attempting to adjust or repair axle shafts or the differential assembly. Rear axle ratio, differential type, manufacturer, and build date information is stamped on the right axle tube on the forward side or on a metal tag on the housing cover (43). The service parts identification label also has RPO codes for the rear axle assembly printed on it.

MAINTENANCE AND LUBRICATION

Figures 1 through 4

NOTICE: See "Notice" on page 4B-1 of this section.

To check or add lubricant, hoist vehicle at suspension contact points. Refer to SECTION 0A. Keep vehicle level. Clean dirt or foreign material from around plug opening before removing the plug (9). Maintain lubricant

level from flush with bottom of opening to no lower than 15 mm (9/16 inch) below opening. Always replace plug (9). Tighten to 35 N•m (26 lb. ft.). Use GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.

Limited slip differential assemblies should have lubricant drained and refilled at the first 12 500 km (7,500 miles). Limited slip differential assemblies also require 118 ml (4 fl. oz.) of GM P/N 1052358 limited slip differential additive and GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.

If the vehicle is used to pull a trailer, change lubricant every 12 500 km (7,500 miles) in either type differential assembly.

DIAGNOSIS

Many noises reported as coming from the rear axle assembly actually originate from other sources such as tire and wheel assemblies, road surfaces, wheel bearing assemblies, engine assembly, transmission assembly, muffler or body. A thorough and careful check should be made to determine the source of the noise before taking apart the rear axle assembly. Noise which originates in other places cannot be corrected by adjustment or replacement of parts in the rear axle assembly. Rear axle differential gears, like any other mechanical device, are not absolutely quiet and should be accepted as being commercially quiet unless some abnormal noise is present.

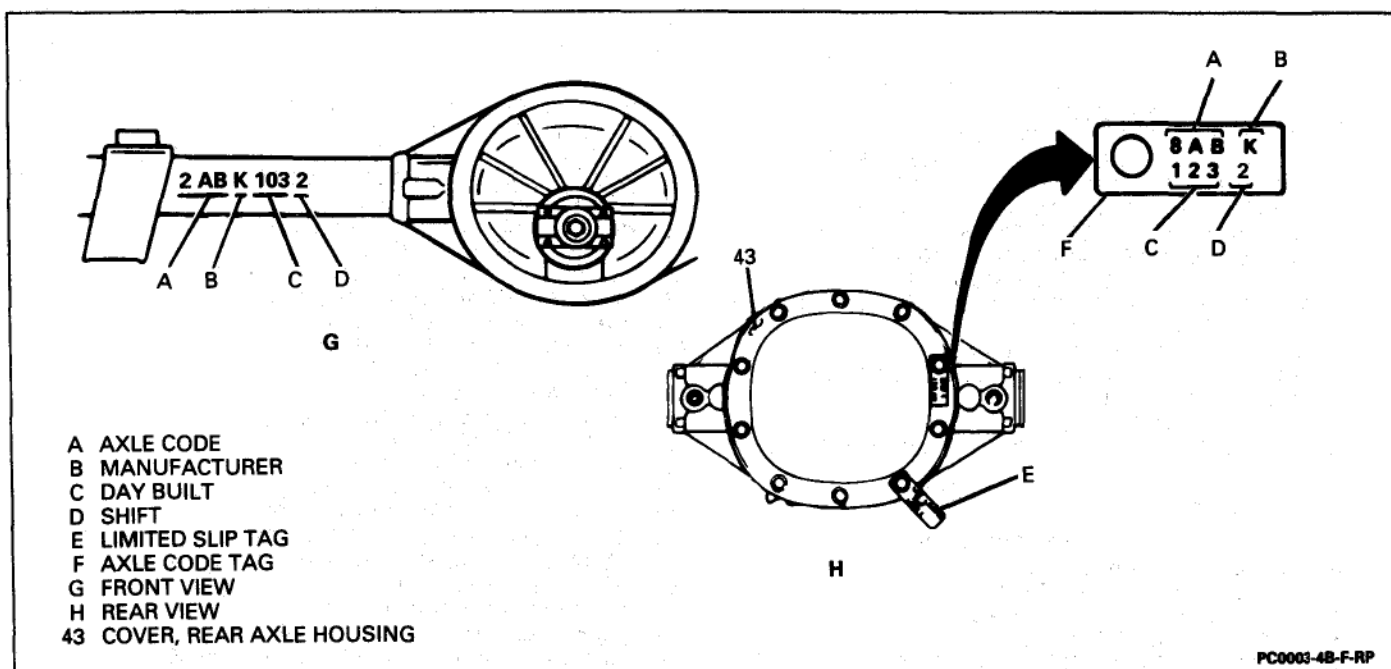


Figure 5 - Rear Axle Assembly Identification

To make a systematic check for axle noise under standard conditions, observe the following:

1. Check rear axle lubricant to ensure correct level, then drive vehicle far enough to thoroughly warm up rear axle lubricant.
2. Select a level asphalt road to reduce tire noise and body drumming.
3. Note speed at which noise occurs. Then stop vehicle and with the transmission assembly control lever in "NEUTRAL," run engine slowly up and down through engine speeds, corresponding to vehicle speed at which noise was most pronounced, to determine if it is caused by exhaust, muffler roar or other engine conditions.
4. Tire noise changes with different road surfaces, but rear axle noise does not. Temporarily inflating all tires to approximately 345 Kpa (50 psi) for test purposes only, will alter noise caused by the tires, but will not affect noise caused by the rear axle assembly. Rear axle noise usually stops when coasting at speeds under 48 km/h (30 mph). Tire noise continues, but with a lower tone as vehicle speed is reduced. Rear axle noise usually changes when comparing drive and coast, but tire noise remains about the same.
 - Distinguish between tire noise and rear axle noise by noting if noise varies with various speeds or sudden acceleration and deceleration. Exhaust and axle assembly noises show variations under these conditions while tire noise remains constant and is more noticeable at speeds of 32 to 48 km/h (20 to 30 mph). Check for tire noise by driving vehicle over smooth pavements or dirt roads (not gravel) with tires at normal pressure. If noise is caused by tires, it will noticeably change or disappear and appear again with changes in the road surface.
5. Loose or rough front wheel inner or outer bearing assemblies will cause a noise which may be confused with rear axle noise. Front wheel inner or outer bearing noise does not change when comparing drive and coast. Light application of the brake pedal assembly while holding the vehicle speed steady will often cause front wheel inner and outer bearing noise to diminish, as this takes some weight off the bearing assembly. Front wheel inner and outer bearing assemblies may be easily checked for noise by jacking up the tire and wheel assemblies and spinning them or by shaking the tire and wheel assemblies to determine if bearing assemblies are loose.
6. Rear suspension rubber bushings and spring insulators dampen out rear axle assembly noise when correctly installed. Check that no metallic contact exists between the spring and spring opening in the underbody or between lower control arm bushings and underbody or axle housing brackets. Metal-to-metal contact at those points may result in telegraphing road noise and normal axle noise which would not be objectionable if dampened by bushings.

REAR AXLE NOISES

Gear Noise

After the noise has been determined as being in the rear axle assembly, the type of noise should be established to help in making repairs if necessary.

Gear noise (whine) is audible from 32 to 89 km/h (20 to 55 mph) under four driving conditions:

1. Drive - Acceleration or heavy pull.
2. Road Load - Vehicle driving load or constant speed.
3. Float - Using enough throttle to keep the vehicle from driving the engine assembly, the vehicle slows down gradually but the engine assembly still pulls slightly.

4. Coast – Throttle closed and vehicle in gear. Gear noise most frequently has periods where noise is more noticeable, usually 48 to 64 km/h (30 to 40 mph) and 80 to 89 km/h (50 to 55 mph).

Bearing Noise

Bad bearing assemblies generally produce more of a rough growl or grating sound, rather than the whine typical of gear noise. Bearing noise frequently “wow-wows” at constant bearing rpm, indicating a faulty differential drive pinion gear or side bearing assembly. This noise could easily be confused with rear axle shaft bearing noise. Inspect and replace as required.

Rear Axle Shaft Bearing Noise

A rough rear axle shaft bearing assembly produces a noise that continues with the vehicle coasting at low speed and transmission assembly control lever in “NEUTRAL.” Noise may diminish by gentle braking. With rear tire and wheel assemblies jacked up, spin rear tire and wheel assemblies by hand while listening at hub assemblies for evidence of rough (noisy) rear axle shaft bearing assembly.

Knock at Low Speeds

Low speed knock can be caused by a worn universal joint or a side gear hub counterbore in the differential case worn oversize. Inspect and replace universal joint or the differential case and side gear as required.

Backlash Clunk

Excessive clunk with acceleration and deceleration is caused by worn differential drive pinion gear shaft, worn differential case, excessive clearance between the rear axle shaft and side gear splines, excessive clearance between side gear hub and counterbore in case, worn differential drive pinion gear and side gear teeth, worn differential pinion gear thrust washers and excessive differential ring gear-to-differential drive pinion gear backlash. Remove worn parts and replace as required, selecting close fitting parts when possible. Adjust differential ring gear-to-differential drive pinion gear backlash. Refer to “Differential Ring Gear-to-Differential Drive Pinion Gear Backlash” in this section.

LIMITED SLIP REAR AXLE ASSEMBLY

Improper operation is generally indicated by clutch slippage or grabbing. Sometimes this produces a chatter or whirring sound. These sounds are not always indicative of failure as they could be produced from lack of proper lubrication. For example, under certain conditions where one tire and wheel assembly is on a very slippery surface and the other on dry pavement, wheel spin can occur if hard acceleration is attempted. Continued spinning may cause audible noise, such as a whirring sound, due to the cones lacking sufficient lubricant. This does not necessarily indicate a failure of the unit.

During regular operation (straight ahead driving) when both tire and wheel assemblies rotate at equal speeds, there is an equal driving force delivered to each tire and wheel assembly. When cornering, the inside tire and wheel assembly requires extra driving force causing slippage in the clutch cone. Consequently, the operational

life of the limited slip unit is dependent upon equal rotation of both tire and wheel assemblies during straight ahead operation. If wheel rotation for both rear tire and wheel assemblies is not equal during straight ahead operation, the limited slip unit will constantly be functioning as if the vehicle were cornering. This will impose constant slippage on the clutch and will eventually lead to abnormal wear on clutch cone.

Checking Limited Slip Operation

Figure 6

Tools Required:

J 2619-01 Slide Hammer
with 1/2 x 13 Adapter

J 21579 Axle Shaft Remover

1. Place transmission assembly control lever in “PARK” position, or in gear if manual transmission assembly, parking brake lever assembly released.
2. Raise both rear tire and assemblies off the floor.
3. Remove one tire and wheel assembly. Refer to SECTION 3E.
4. Install J 21579, 1/2 x 13 adapter from J 2619-01 and a torque wrench.
5. Measure torque required to rotate one tire and wheel assembly. Torque should be between 169 and 305 N•m (125 and 225 lb. ft.).
6. Place transmission assembly control lever in “NEUTRAL” position and lower one rear tire and wheel assembly to ground.
7. Measure torque required to rotate raised tire and wheel assembly. Torque should be between 58 and 91 N•m (43 and 67 lb. ft.).
8. Install tire and wheel assembly. Refer to SECTION 3E.

The differential case must be replaced as an assembly if any of the above checks do not fall within specifications.

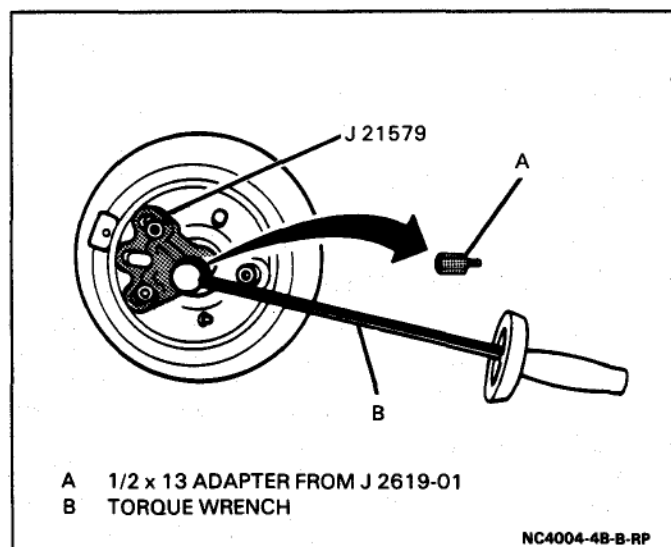


Figure 6 – Measuring Limited Slip Rotating Torque

REAR AXLE STANDARD AND LIMITED SLIP DIAGNOSIS

CONDITION	CAUSE
1. Noise is the same in "DRIVE" or when coasting.	a. Road noise. b. Tire noise. c. Front wheel bearing noise. d. Incorrect driveline angles.
2. Noise changes on a different type of road.	a. Tire noise. b. Road noise.
3. Noise tone lower as vehicle speed is lowered.	a. Tire noise.
4. Noise is produced with vehicle standing and driving.	a. Engine noise. b. Transmission noise.
5. Vibration.	a. Rough rear axle shaft bearing assembly. b. Unbalanced or damaged propeller shaft assembly. c. Tire unbalance. d. Worn universal joint in propeller shaft assembly. e. Incorrect driveline angles. f. Mis-indexed propeller shaft assembly at drive pinion gear yoke. g. Drive pinion gear yoke runout too great.
6. A knock or click approximately every two revolutions of rear wheel assembly.	a. Rear axle shaft bearing assembly.
7. Noise most pronounced on turns.	a. Differential side gear and pinion gear noise.
8. Continuous low pitch whirring or scraping noise starting at relatively low speed.	a. Drive pinion gear inner or outer bearing noise.
9. Drive noise, coast noise or float noise.	a. Ring and drive pinion gear noise.
10. Clunk on acceleration or deceleration.	a. Worn differential pinion gear shaft in case or side gear hub counterbore in case worn oversize. b. Worn universal joint on propeller shaft assembly. c. Differential drive pinion gear yoke lubrication insufficient.
11. Groan in forward or reverse.	a. Wrong lubricant in rear axle assembly.
12. Chatter on turns.	a. Wrong lubricant in rear axle assembly. b. Clutch cones worn (limited slip).
13. Clunk or knock on rough road operation.	a. Excessive end play of rear axle shafts.

INSPECTION AND DIAGNOSIS

A close examination of the rear axle assembly prior to taking it apart will often reveal valuable information as to the extent and type of repairs or adjustments necessary. This information and the report of the malfunction provides a basis for determining the degree of tearing down required. Frequent causes of rear axle noise are improper backlash, differential drive pinion gear inner or outer bearing preload, differential side bearing preload, or a combination of these items. A few simple adjustments

may be all that are necessary to correct the problem.

Before removing the differential case from the housing assembly, these items should be checked and the results recorded and analyzed: (1) backlash; (2) total differential assembly preload; and (3) tooth contact pattern.

Use care at all times to keep dirt and other foreign matter, such as grinder dust, soot, or sand, away from the rear axle assembly to prevent the possibility of subsequent failure.

Differential Ring Gear Tooth Nomenclature

Figure 7

The side of the differential ring gear tooth which curves outward, or is convex, is referred to as the "drive" side. The concave side is the "coast" side. The end of the tooth nearest center of the differential ring gear is referred to as the "toe" end. The end of the tooth farthest away from the center is the "heel" end. The toe end of the tooth is smaller than the heel end.

Tooth Contact Pattern Test

Figures 1 through 4, 7 and 8

Tool Required:

J 39446 ABS Exciter Ring Protector Kit

NOTICE: It is very important that tooth contact be tested before the differential assembly is taken apart. Variations in the differential assembly or differential drive pinion gear inner bearing assembly may cause the differential drive pinion gear to be too far away from, or close to, the differential ring gear. Thus, the tooth contact must be tested and corrected, if necessary, or the gears may be noisy.

NOTICE: See "Notice" on page 4B-1 of this section.

Clean

1. All dirt from area of cover (43) before removing cover (43).
2. Remove housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.
3. Wipe oil out of the housing assembly (16) and carefully clean each tooth of the ring gear (20).
4. Select correct exciter ring protector from J 39446 and attach to speed sensor reluctor wheel (39) on vehicles with standard rear axle assemblies only.

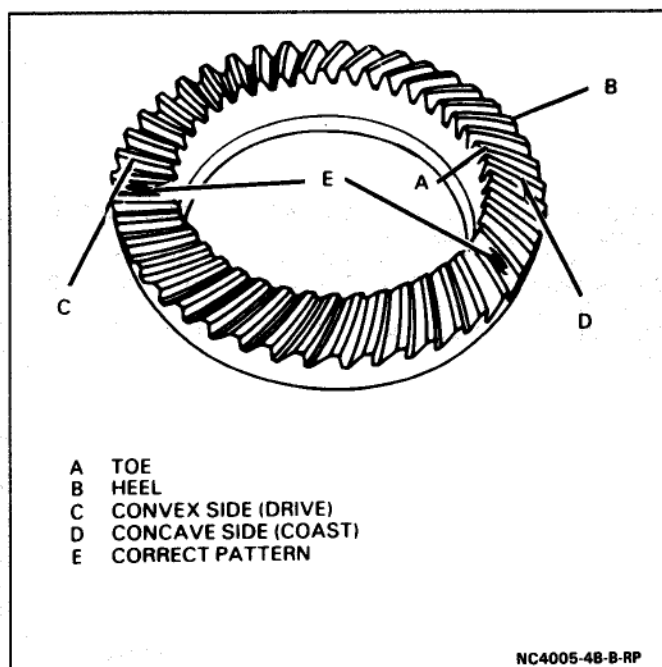


Figure 7 – Differential Ring Gear Tooth Nomenclature

5. Use gear marking compound GM P/N 1052351 or equivalent and apply this mixture sparingly to all ring gear teeth, using a medium stiff brush. When properly used, the area of differential drive pinion gear tooth contact will be visible when hand load is applied.

Tighten

- Bolts/screws (26) to 75 N•m (55 lb. ft.).
6. Apply parking brake until a torque of 54 to 70 N•m (40 to 52 lb. ft.) is required to turn drive pinion gear (23).
A test made without loading the gears will not give a satisfactory pattern. Turn yoke (3) with a wrench so that ring gear (20) rotates one full revolution. Reverse rotation so that ring gear (20) rotates one revolution in the opposite direction.
 7. Observe pattern on the ring gear teeth and compare with Figure 8.
 8. If pattern is acceptable, remove J 39446.
 9. Install housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.

Effects of Increasing Load on Tooth Contact Pattern

When the "load" on the differential ring and drive pinion gears is increased, such as when the vehicle is accelerated forward from standstill or from normal drive, the tooth contact will tend to spread out and, under very heavy load, will extend from near toe to near heel on the drive side. The entire contact also tends to shift toward the heel under increasingly heavier loads and will become somewhat broader with respect to tops and bottoms of teeth. The patterns obtained by this tooth contact pattern test approximate a light load and, for this reason, they will extend only about halfway.

The important thing to note is that the contact pattern is centrally located up and down on the face of the differential ring gear teeth.

Insufficiently preloaded drive pinion gear and differential bearing assemblies will also cause a change in tooth contact pattern under load.

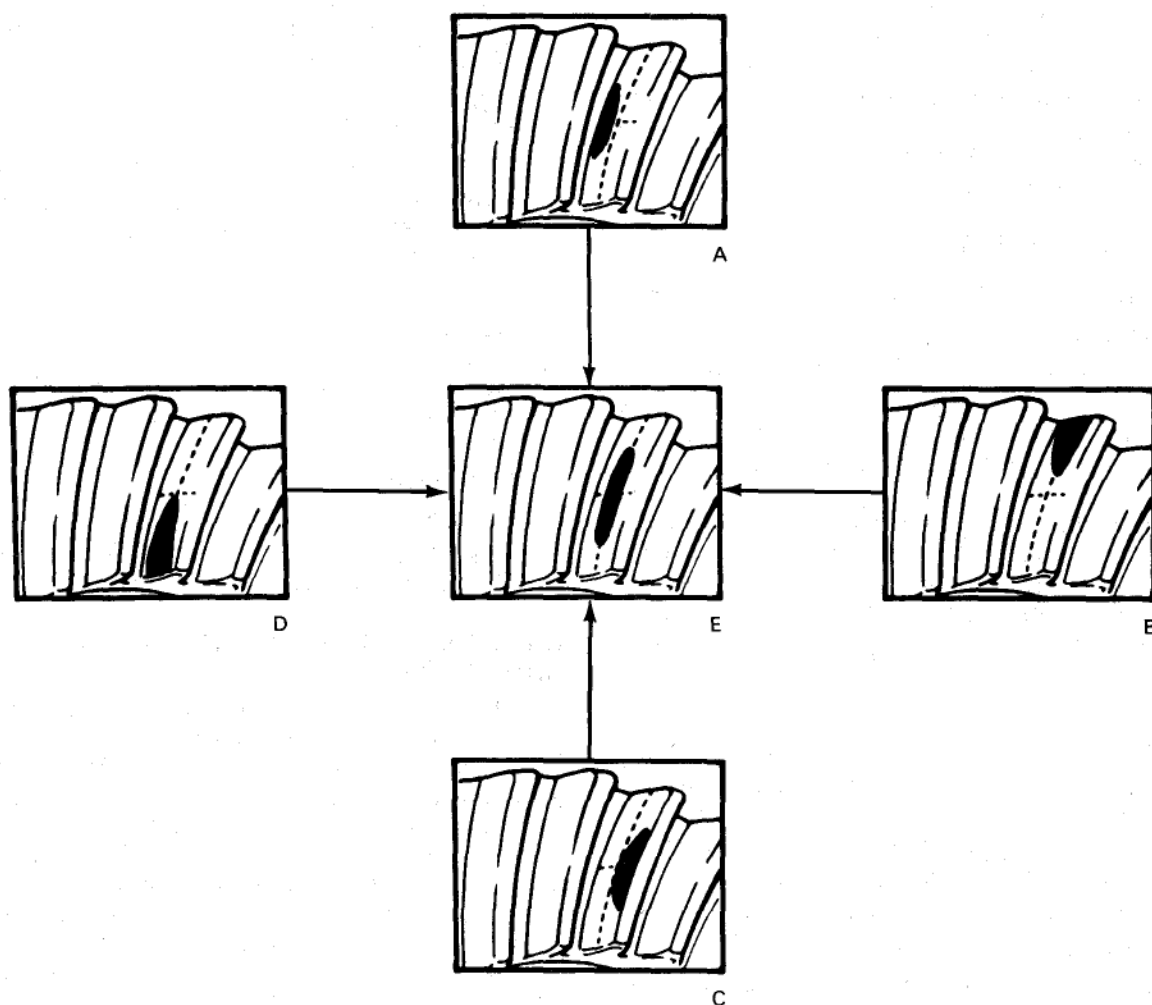
Adjustments Affecting Tooth Contact

Figure 9

Two adjustments can be made which will affect the tooth contact pattern: backlash and position of drive pinion gear (23) in the housing assembly. The effects of bearing preloads are not readily apparent on hand-loaded tooth contact pattern tests.

Backlash is adjusted by means of shims (24). They move the entire differential assembly closer to or farther from the drive pinion gear (23). Shims (24) are also used to set differential bearing preload. If the thickness of the right shim (24) is increased, along with decreasing the left shim thickness, backlash will increase. The backlash will decrease if the left shim thickness is increased, along with a decrease in right shim thickness.

The position of the drive pinion gear (23) is adjusted by increasing or decreasing the shim thickness between



- A** LOW FLANK CONTACT: DECREASE DIFFERENTIAL DRIVE PINION GEAR BEARING SHIM THICKNESS — MOVES SMALLER DIAMETER OF DIFFERENTIAL DRIVE PINION GEAR OUT TOWARD DIFFERENTIAL RING GEAR CENTER LINE
- B** HEEL CONTACT: DECREASE BACKLASH — MOVES AREA OF DIFFERENTIAL DRIVE PINION GEAR CONTACT TOWARD TOE
- C** HIGH FACE CONTACT: INCREASE DIFFERENTIAL DRIVE PINION GEAR BEARING SHIM THICKNESS — MOVES LARGER DIAMETER OF DIFFERENTIAL DRIVE PINION GEAR IN TOWARD CENTER OF DIFFERENTIAL RING GEAR
- D** TOE CONTACT: INCREASE BACKLASH — MOVES AREA OF DIFFERENTIAL DRIVE PINION GEAR CONTACT TOWARD HEEL
- E** DESIRED PATTERN: IN CENTER OF DIFFERENTIAL RING GEAR TOOTH

Figure 8 – Differential Ring Gear Tooth Contact Pattern Diagnosis Chart

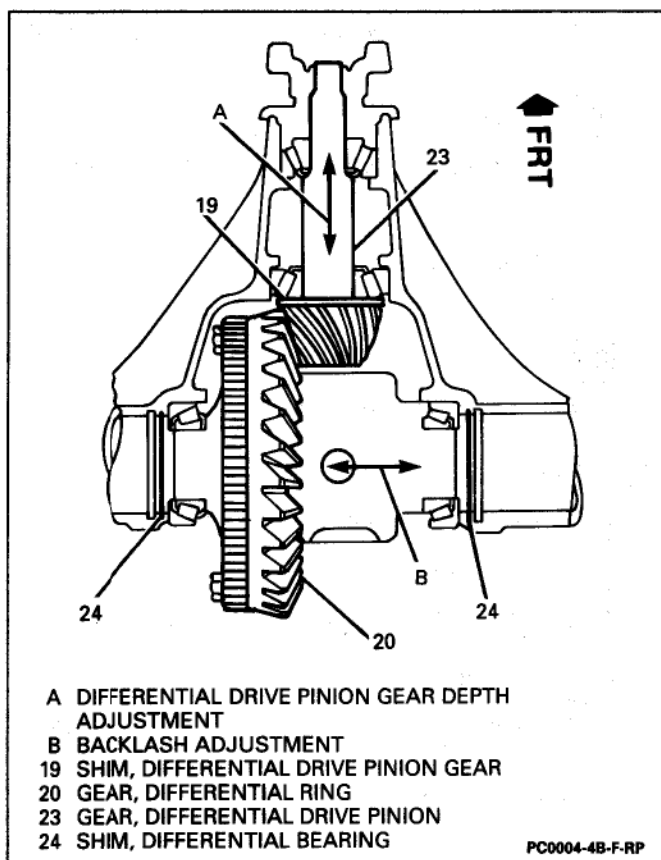


Figure 9 – Tooth Contact Adjustments

the drive pinion gear head and race of the differential drive pinion gear inner bearing assembly. The shim (19) is used in the rear axle assembly to compensate for manufacturing tolerances. Increasing shim thickness moves the drive pinion gear (23) closer to the centerline of the ring gear (20). Decreasing shim thickness moves the drive pinion gear (23) farther away from the centerline of the ring gear (20).

Effects of Differential Drive Pinion Gear Position on Tooth Pattern

Figure 10

When the differential drive pinion gear is too far away from the centerline of the differential ring gear, the pattern will be a high heel contact on the drive side and high toe contact on the coast side. Moving the differential drive pinion gear closer to the centerline of the differential ring gear by decreasing backlash will cause the high heel contact on the drive side to move down and toward the toe: the high toe contact on the coast side will move down and toward the heel.

When the differential drive pinion gear is too close to the centerline of the differential ring gear, the pattern will be a low toe contact on the drive side, and a low heel contact on the coast side. Moving the differential drive pinion gear farther away from the differential ring gear by increasing backlash will cause low toe contact on the drive side to move up and toward the heel: the low heel contact on the coast side will move up and toward the toe.

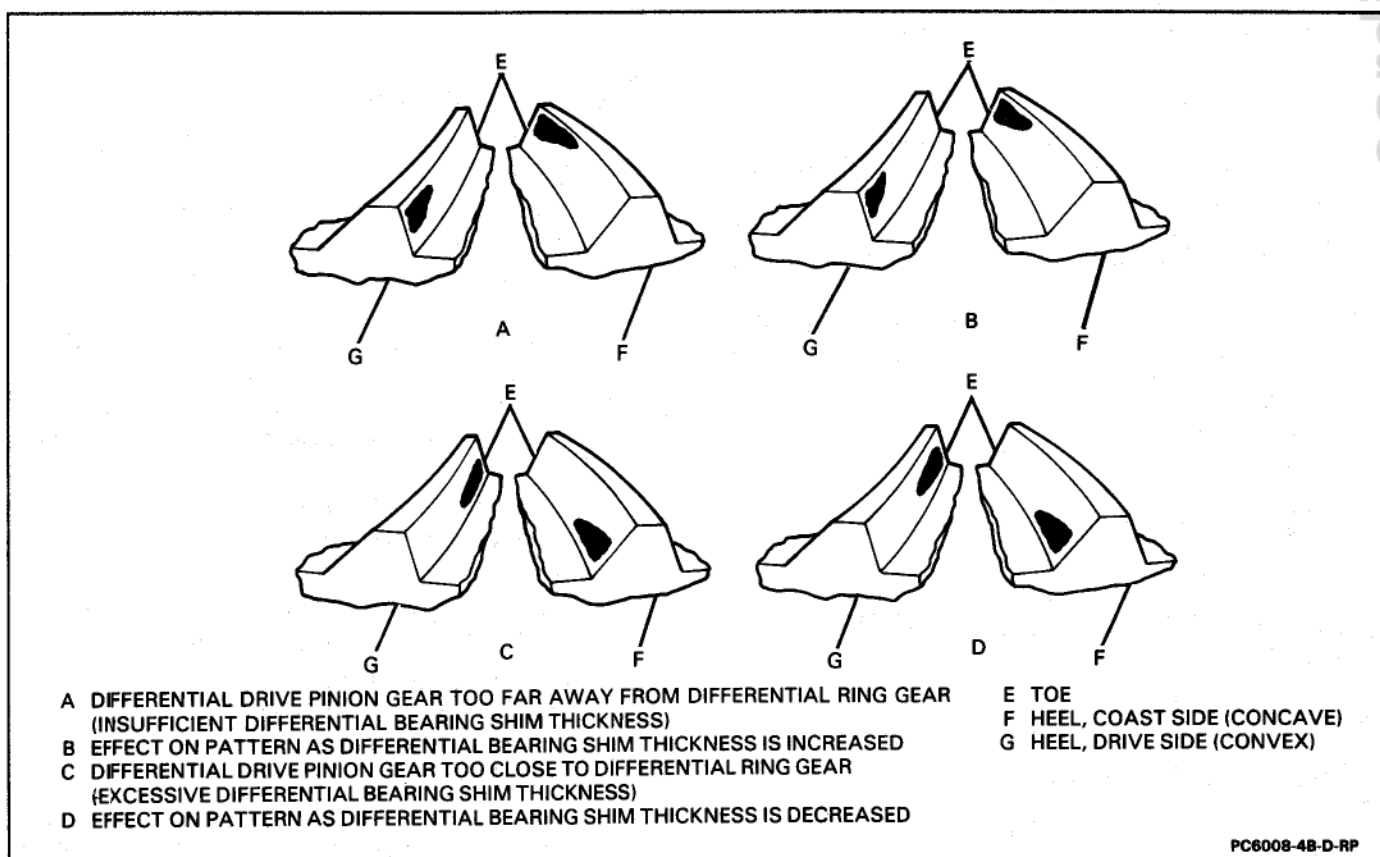


Figure 10 – Differential Bearing Shim Thickness Effect on Tooth Pattern

ON-VEHICLE SERVICE

Before attempting any service procedures, the technician must know what type rear axle assembly is to be serviced. Refer to "Rear Axle Assembly Usage" in this section to identify codes, differential ring gear size, and ratios. Also, refer to the service parts identification label on the vehicle.

Most rear axle assembly service repairs can be made with the vehicle properly supported and the rear axle housing assembly lowered to its lowest travel. On some vehicles, it may be necessary to disconnect shock absorber assemblies to obtain additional clearance. When doing this, do not allow the rear brake hose assemblies to become kinked or stretched.

Lubricant may be drained by removing all rear axle housing bolts/screws and breaking the rear axle housing cover loose at the bottom.

If the rear axle housing assembly is removed for any reason, rear axle assembly service can be performed on the bench.

When a new differential ring gear and differential drive pinion gear are installed, the owner should be advised not to accelerate rapidly or exceed 80 km/h (50 mph) for the first 80 km (50 miles) of driving.

REAR AXLE LUBRICANT FILL AND CHECK

Figures 1 through 4

NOTICE: See "Notice" on 4B-1 of this section.

1. Raise and suitably support vehicle. Refer to SECTION 0A.
 - Keep vehicle level.
2. Clean dirt or foreign material from around plug opening before removing plug (9).
3. Remove plug (9).
4. Maintain axle lubricant level from flush with bottom of plug opening to no lower than 15 mm (9/16 inch) below plug opening.
5. Add or replace axle lubricant using GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.
6. If equipped with limited slip differential assemblies, add 118 ml (4 fl. oz.) of GM P/N 1052358 limited slip differential additive or equivalent.
7. Install plug (9).



Tighten

- Plug (9) to 35 N•m (26 lb. ft.).
8. Lower vehicle.

REAR AXLE HOUSING COVER AND GASKET

Figures 1 through 4

Remove or Disconnect

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

2. Bolts/screws (41), parking brake cable guides and pry cover (43) loose.



Clean

- All dirt from area of cover (43) before removing cover (43).

3. Drain lubricant.

4. Gasket (45).



Clean

- Both gasket sealing surfaces.



Install or Connect

NOTICE: See "Notice" on page 4B-1 of this section.

1. New gasket (45) and cover (43).
2. Parking brake cable guides and bolts/screws (41).



Tighten

- Bolts/screws (41) in a crosswise pattern to 30 N•m (22 lb. ft.).
3. Lubricant. Refer to "Rear Axle Lubricant Fill and Check" in this section.
 4. Lower vehicle.

REAR AXLE SHAFT

Figures 1 through 4, and 11

Tool Required:

J 39446 ABS Exciter Ring Protector Kit



Remove or Disconnect

1. Rear tire and wheel assembly. Refer to SECTION 3E.
2. Rear brake drum assembly and components, if equipped. Refer to SECTION 5C2.
3. Rear brake rotor assembly, if equipped. Refer to SECTION 5B2.
4. Rear axle housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.
5. Install J 39446 to speed sensor reluctor wheel (39) on vehicles equipped with standard rear axle assemblies.
6. Bolt/screw (29) from case (33).
7. Pinion gear shaft (35) from case (33).
8. Shaft lock (54).
 - Access by pushing flanged end of axle shaft (63 or 70) into housing assembly (16).
9. Axle shaft (63 or 70) from housing assembly (16), being careful not to damage seal (49).



Important

- If vehicle is equipped with traction control (acceleration slip regulation), be careful not to damage rear wheel speed sensor reluctor wheel

located on axle shaft when removing the axle shaft assembly. If damage has occurred to the rear wheel speed sensor reluctor wheel on vehicles equipped with traction control, the rear axle shaft assembly must be replaced.

Install or Connect

NOTICE: See "Notice" on page 4B-1 of this section.

1. Axle shaft (63 or 70) into place, taking care that splines on end of axle shaft (63 or 70) do not damage seal (49) and that they engage with splines of side gear (40).
2. Shaft lock (54).
 - Push axle shaft (63 or 70) outward so that shaft lock (54) seats in counterbore of side gear (40).
3. Pinion gear shaft (35) through case (33), thrust washers (37) and pinion gears (36), aligning hole in pinion gear shaft (35) with lock bolt/screw hole in case (33).
4. Bolt/screw (29).

Important

- Coat bolt/screw (29) with Loctite® 242 or equivalent before installing.

Tighten

- Bolt/screw (29) to 36 N•m (27 lb. ft.).
5. Remove J 39446 from speed sensor reluctor wheel (39) if vehicle is equipped with standard rear axle assembly. If new speed sensor reluctor wheel (39) was installed, remove protective covering and throw away.
 6. Rear axle housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.
 7. Rear brake rotor assembly, if equipped. Refer to SECTION 5B2.
 8. Rear brake drum assembly and components, if equipped. Refer to SECTION 5C2.
 9. Rear tire and wheel assembly. Refer to SECTION 3E.

REAR AXLE SHAFT BEARING ASSEMBLY AND/OR BEARING SEAL

Figures 12 through 15

Tools Required:

- J 2619-01 Slide Hammer with 1/2 x 13 Adapter
- J 8092 Driver Handle
- J 22813-01 Axle Bearing Remover
- J 23765 Axle Bearing Installer
- J 23771 Axle Oil Seal Installer

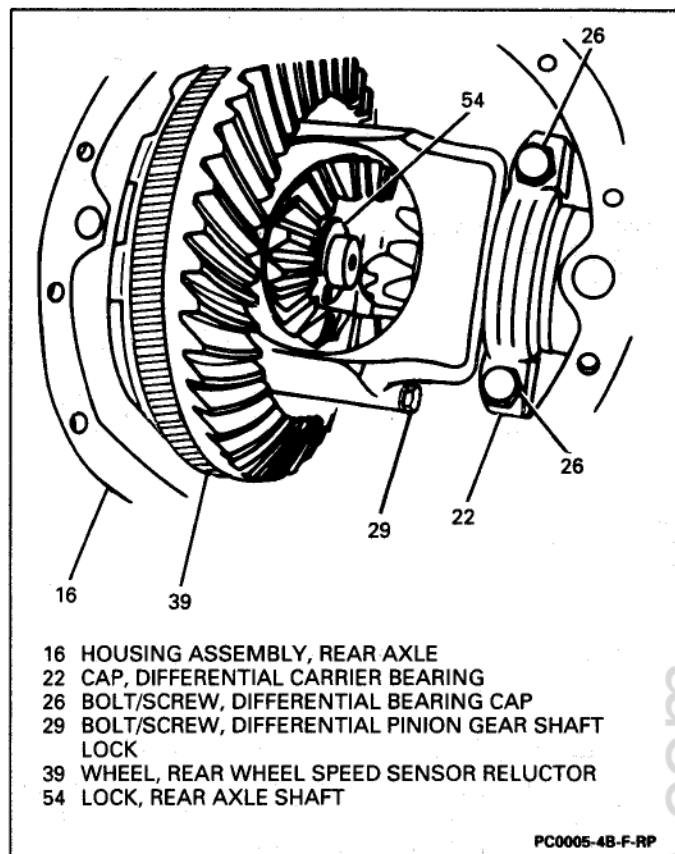


Figure 11 – Internal View of Rear Axle Housing Assembly (Typical)

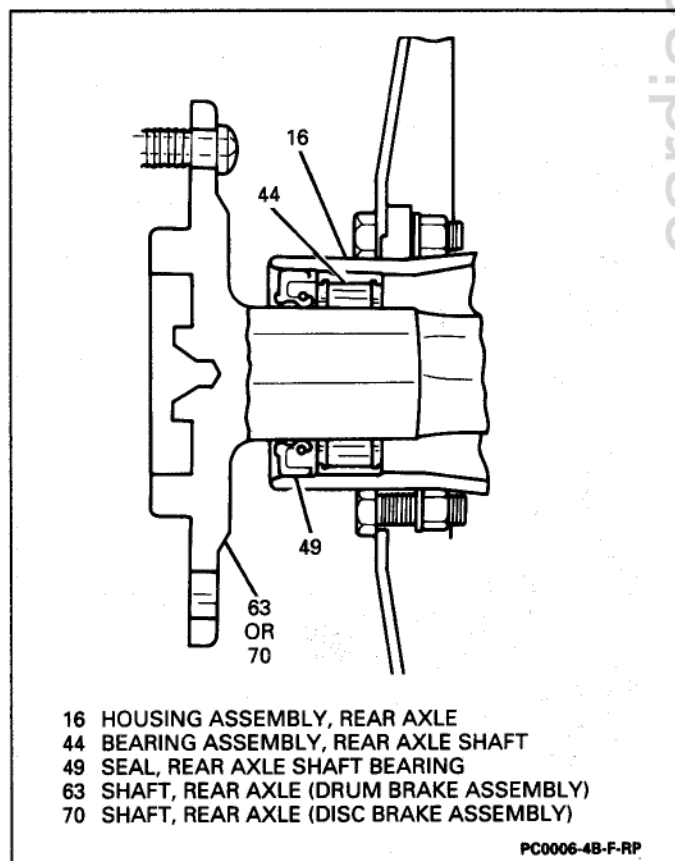


Figure 12 – Rear Axle Shaft (Typical)

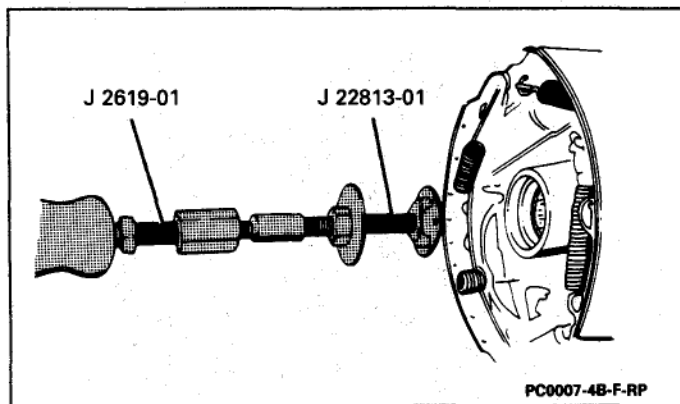


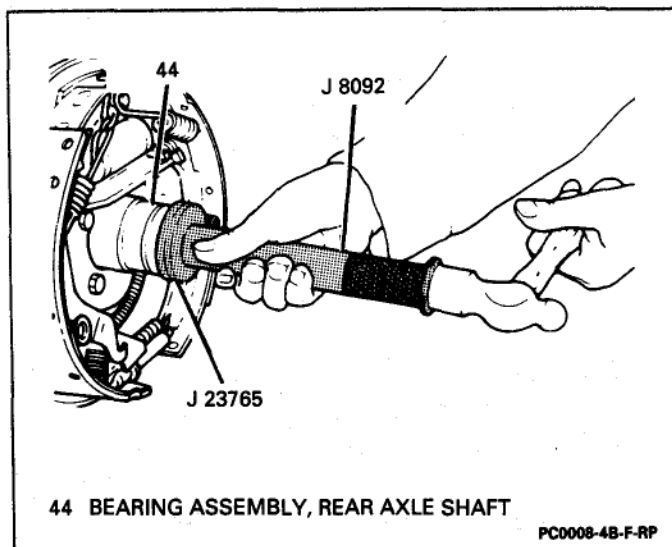
Figure 13 – Removing Rear Axle Shaft Bearing Assembly

Remove or Disconnect

1. Rear axle shaft. Refer to "Rear Axle Shaft" in this section.
2. Rear brake backing plate, if equipped. Refer to SECTION 5C2.
3. Rear brake caliper anchor bracket and mounting plate, if equipped. Refer to SECTION 5B2.
4. Seal (49) from housing assembly (16) with a pry bar behind steel case of seal (49), being careful not to damage housing assembly (16).
5. Insert J 22813-01 into bore and position it behind shaft bearing assembly (44) so tangs on tool engage bearing outer race.
6. Shaft bearing assembly (44), using J 2619-01.

Install or Connect

1. Lubricate new shaft bearing assembly (44) with GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.
2. Shaft bearing assembly (44) so that tool bottoms against shoulder in housing assembly (16), using J 23765 and J 8092.



44 BEARING ASSEMBLY, REAR AXLE SHAFT

Figure 14 – Installing Rear Axle Shaft Bearing Assembly

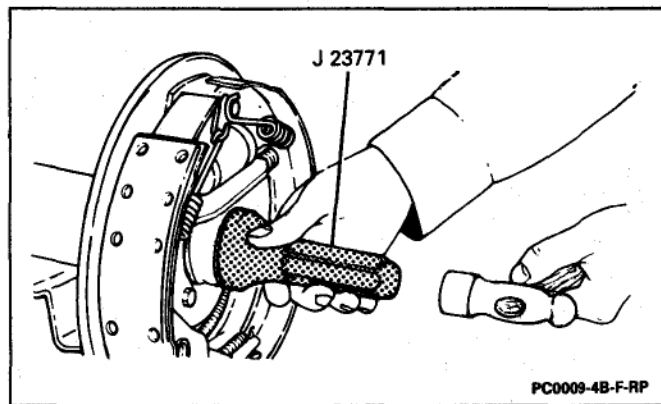


Figure 15 – Installing Rear Axle Shaft Bearing Seal

3. Lubricate sealing lips with GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.
4. Position seal (49) on J 23771 and direct seal (49) into housing bore.
5. Seal (49) into place, flush with axle tube.
6. Rear brake backing plate, if equipped. Refer to SECTION 5C2.
7. Rear brake caliper anchor bracket and mounting plate, if equipped. Refer to SECTION 5B2.
8. Rear axle shaft. Refer to "Rear Axle Shaft" in this section.

Inspect

- Operation of rear axle assembly.

DIFFERENTIAL DRIVE PINION GEAR YOKE AND SEAL

Figures 1 through 4 and 16 through 19

Tools Required:

- J 8614-2 Pinion Flange Remover Adapter
- J 8614-3 Pinion Flange Remover Screw
- J 8614-10 Pinion Flange Remover
- J 23911 Pinion Oil Seal Installer

Remove or Disconnect

1. Both tire and wheel assemblies. Refer to SECTION 3E.
2. Rear brake drum assemblies, if equipped. Refer to SECTION 5C2.
3. Rear brake rotor assemblies, if equipped. Refer to SECTION 5B2.
4. Propeller shaft assembly from differential drive pinion gear yoke. Refer to SECTION 4A.
5. Mark position of yoke (3), drive pinion gear (23) and nut (1) so proper drive pinion gear inner and outer bearing assembly preload can be maintained.
6. If joint bearing assemblies are not retained by a retainer strap, use a piece of tape to hold bearing assemblies on their journals.
7. Check preload with a pound-inch torque wrench and record. This will give combined drive pinion gear

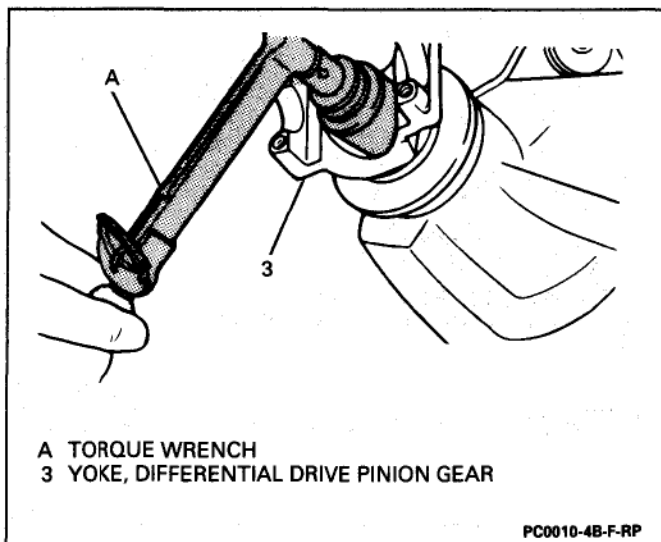


Figure 16 – Checking Differential Drive Pinion Gear Preload

inner and outer bearing, axle shaft bearing and differential bearing preload.

8. Nut (1) and washer (2), using J 8614-10.
 - Use a suitable container to hold any fluid that may drain from rear axle assembly.
9. Yoke (3), using J 8614-2, J 8614-3 and J 8614-10.
10. Seal (6) by driving it out of housing assembly (16) with a blunt chisel. Do not damage housing assembly (16).

Inspect

- Differential drive pinion gear seal surface of yoke (3) for tool marks, nicks, or damage, such as a groove worn by seal (6). If damaged, replace yoke (3).
- Housing assembly bore and remove any burrs that might cause leaks around outer diameter (OD) of seal (6).

Install or Connect

NOTICE: See “Notice” on page 4B-1 of this section.

1. New seal (6), using J 23911.
2. Apply pinion gear seal lubricant, GM P/N 1050169 or equivalent, to the OD of yoke (3) and sealing lip of new seal (6).
3. Yoke (3).
4. Washer (2) and nut (1) finger tight.
5. While holding yoke (3), using J 8614-10, tighten nut gradually and turn drive pinion gear (23) several revolutions after each tightening to set the bearing assemblies. Check preload of bearing assemblies each time with a pound-inch torque wrench until preload is 0.3 to 0.6 N•m (3 to 5 lb. in.) more than reading obtained in removal procedure.
6. Propeller shaft assembly to differential drive pinion gear yoke. Refer to SECTION 4A.

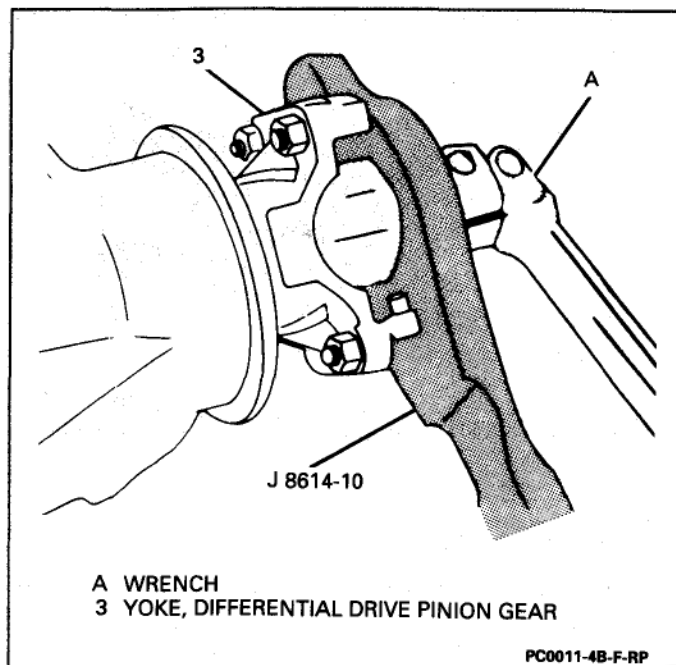


Figure 17 – Removing Differential Drive Pinion Gear Nut

7. Rear brake drum assemblies, if equipped. Refer to SECTION 5C2.
8. Rear brake rotor assemblies, if equipped. Refer to SECTION 5B2.
9. Tire and wheel assemblies. Refer to SECTION 3E.
10. Lubricant. Refer to “Rear Axle Lubricant Fill and Check” in this section.
11. Lower vehicle.

Inspect

- Operation of rear axle assembly.

REAR AXLE ASSEMBLY

Figures 1 through 4

Remove or Disconnect

1. Rear tire and wheel assemblies. Refer to SECTION 3E.
2. Mark propeller shaft assembly and yoke (3).
3. Propeller shaft assembly. Refer to SECTION 4A.
4. Rear stabilizer shaft. Refer to SECTION 3D.
5. Support housing assembly (16) with adjustable lifting device.
6. Shock absorber assemblies from housing assembly. Refer to SECTION 3D.
7. Rear axle tie rod assembly. Refer to SECTION 3D.
8. Rear brake (center) hose assembly from rear brake (center) hose assembly junction block. Refer to SECTION 5.
9. Rear spring assemblies. Refer to SECTION 3D.
10. Parking brake cable assemblies from housing assembly. Refer to SECTION 5F.

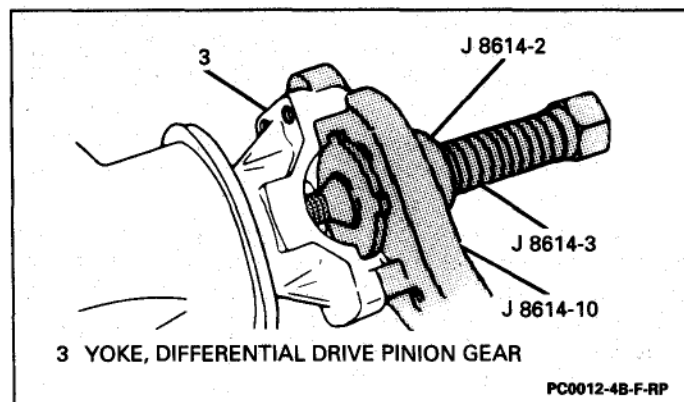


Figure 18 – Removing Differential Drive Pinion Gear Yoke

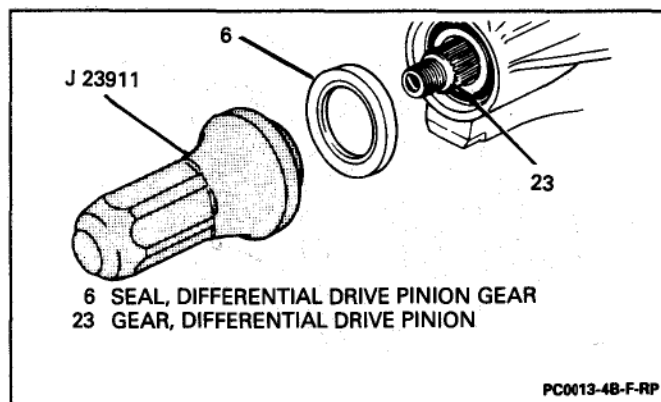


Figure 19 – Installing Differential Drive Pinion Gear Seal

11. Electrical connector from wheel speed sensor assembly (75).
12. Rear axle torque arm from housing assembly. Refer to SECTION 3D.
13. Rear axle lower control arm assemblies from housing assembly. Refer to SECTION 3D.
14. Housing assembly (16) with aid of helper.

Install or Connect

1. Housing assembly (16), with aid of helper.
2. Rear axle lower control arm assemblies to housing assembly. Refer to SECTION 3D.
3. Rear axle torque arm to housing assembly. Refer to SECTION 3D.
4. Electrical connector to wheel speed sensor assembly (75).
5. Parking brake cable assemblies to housing assembly. Refer to SECTION 5F.
6. Rear spring assemblies. Refer to SECTION 3D.
7. Rear brake (center) hose assembly to rear brake (center) hose assembly junction block. Refer to SECTION 5.
8. Rear axle tie rod assembly. Refer to SECTION 3D.
9. Shock absorber assemblies to housing assembly. Refer to SECTION 3D.
10. Remove adjustable lifting device from housing assembly (16).
11. Rear stabilizer shaft. Refer to SECTION 3D.
12. Propeller shaft assembly. Refer to SECTION 4A.
13. Bleed hydraulic brake system. Refer to SECTION 5E1.
14. Rear tire and wheel assemblies. Refer to SECTION 3E.

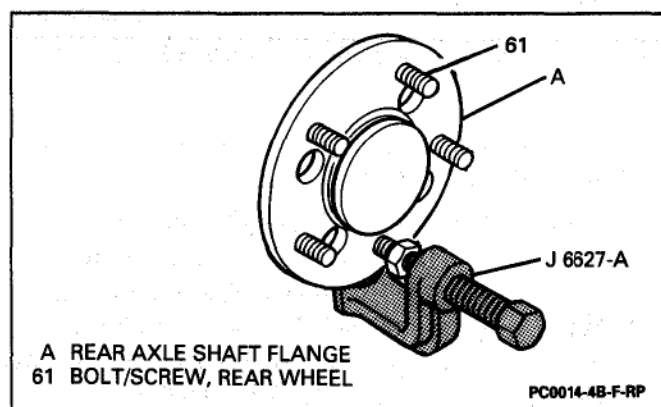


Figure 20 – Removing Rear Wheel Bolt/Screw

REAR WHEEL BOLT/SCREW

Figures 20 and 21

Tool Required:

J 6627-A Wheel Stud Remover

When replacing wheel bolts (hub studs), use the following guide:

- Stripped bolts/screws – Replace bolts/screws involved.
- One loose bolt/screw – Replace all bolts/screws.
- One broken bolt/screw – Replace all bolts/screws.
- Wheel bolt/screw hole elongated – Replace axle shaft.

Remove or Disconnect

1. Rear tire and wheel assembly. Refer to SECTION 3E.
2. Rear brake drum assembly, if equipped. Refer to SECTION 5C2.
3. Rear brake rotor assembly, if equipped. Refer to SECTION 5B2.
4. Wheel bolt/screw (61) from axle shaft flange using J 6627-A.

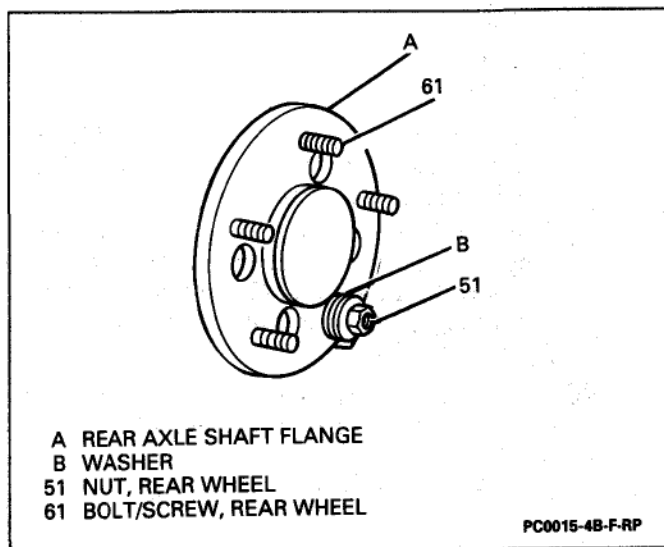


Figure 21 – Installing Rear Wheel Bolt/Screw

Install or Connect

NOTICE: See “Notice” on page 4B-1 of this section.

1. Wheel bolt/screw (61), four washers and wheel nut (51) to axle shaft flange.
2. Wheel nut (51) until wheel bolt/screw (61) is completely seated against axle shaft flange.

Tighten

- Wheel nut (51) to 140 N•m (100 lb. ft.).
3. Remove wheel nut (51) and four washers.
 4. Rear brake drum assembly, if equipped. Refer to SECTION 5C2.
 5. Rear brake rotor assembly, if equipped. Refer to SECTION 5B2.
 6. Rear tire and wheel assembly. Refer to SECTION 3E.

UNIT REPAIR

NOTICE: Any time components are removed or replaced within the rear axle housing assembly on vehicles with standard rear axle assemblies only, use J 39446, ABS Exciter Ring Protector Kit, to prevent damage to the rear wheel speed sensor reluctor wheel.

Important

- The driveline components in this vehicle have been factory system balanced. System balance provides a smoother running driveline operation. However, it is essential that the positions of all driveline components relative to the propeller shaft and rear axle assembly be observed and **ACCURATELY REFERENCE MARKED PRIOR TO DISASSEMBLY**. These components include the propeller shaft assemblies, rear axle assemblies, differential drive pinion gear yoke, output shaft, etc. **ALL COM-**

PONENTS MUST BE REASSEMBLED IN THE EXACT RELATIONSHIP TO EACH OTHER AS THEY WERE WHEN REMOVED. Additionally, the published specifications and torque values, as well as any measurements made prior to disassembly must be followed to maintain the factory balance.

When a new differential ring gear and drive pinion gear are installed, the original differential drive pinion gear yoke should be replaced with a service differential drive pinion gear yoke. The owner should be advised not to accelerate rapidly or exceed 80 km/h (50 mph) for the first 80 km (50 miles) of driving.

Any time the rear axle assembly is taken apart for service, the following cleaning and inspecting procedures should be followed:

- Select correct ABS exciter ring protector from J 39446 and attach to speed sensor reluctor wheel on vehicles with standard rear axle assemblies only.

Clean

- All differential bearing assemblies thoroughly in clean solvent.

Inspect

- Bearing assemblies visually and by feel. Bearing assemblies should feel smooth when oiled and rotated while applying as much hand pressure as possible. Minute scratches and pits that appear on rollers and races at low mileage are due to the initial preload, and bearing assemblies having these marks should not be replaced.
- Sealing surface of differential drive pinion gear yoke for nicks, burrs, or rough tool marks which would cause damage to the differential drive pinion gear seal and result in an oil leak. Replace if damaged.
- Housing assembly bore and remove any burrs that might cause leaks around the OD of the drive pinion gear seal.
- Differential ring gear and drive pinion gear teeth for excessive wear and scoring. If any of these conditions exist, replacement of the gears as a set will be required.
- Differential drive pinion gear shaft for unusual wear. Also, check the differential pinion and side gears and differential pinion gear thrust washers.
- Press fit of the differential bearing assembly inner race on the differential case hub by prying against the shoulder at the puller recess in the case. Differential bearing assemblies must be press fit on the hub.
- Rear axle assembly failures such as chipped bearing assemblies, loose (lapped-in) bearing assemblies, chipped gears, etc. are indications that foreign material is present. The rear axle housing assembly must be cleaned.
- Speed sensor reluctor wheel on vehicles with standard rear axle assemblies for chipped or missing teeth; also check for looseness or wobble. Replace speed sensor reluctor wheel if damaged.

DIFFERENTIAL CASE

Figures 1 through 4 and 22 through 26

Tools Required:

- J 22888-20 Differential Side Bearing Remover
- J 8107-2 Differential Side Bearing Remover Plug
- J 8092 Driver Handle
- J 21465-13 Driver Handle Extension
- J 25299 Differential Side Bearing Installer
- J 25588 Side Bearing Shim Installer
- J 39446 ABS Exciter Ring Protector Kit

Remove or Disconnect

Figures 1 through 4 and 22

Important

- Before removing the differential case from the rear axle housing assembly, differential ring gear-to-differential drive pinion gear backlash must be checked. Refer to "Differential Ring Gear-to-Differential Drive Pinion Gear Backlash" in this section. This will indicate gear or bearing wear or an error in backlash or preload setting which will help in determining the cause of axle noise.

1. Rear axle shafts. Refer to "Rear Axle Shaft" in this section.
2. Bolt/screw (73) from wheel speed sensor assembly (75) on vehicles with standard rear axle assemblies only.
3. Wheel speed sensor assembly (75) on vehicles with standard rear axle assemblies only.
 - Carefully place wheel speed sensor assembly (75) along side of housing assembly (16).

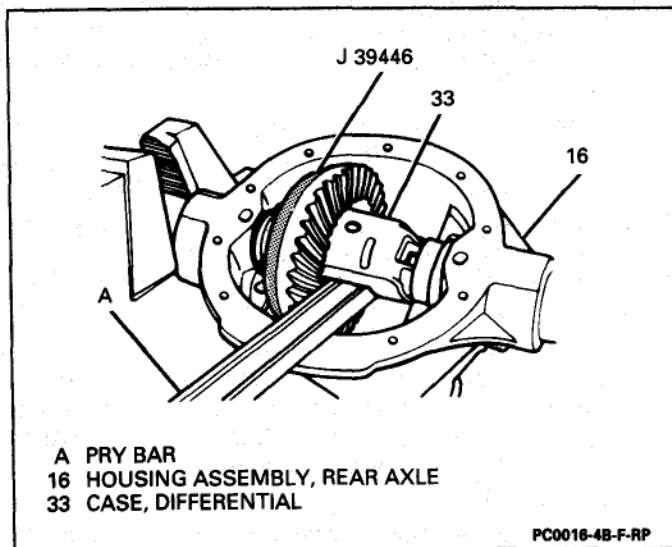


Figure 22 - Removing Differential Case

4. Bolts/screws (26).

Important

- A. Bearing caps (22) should be marked "R" and "L" to make sure they will be assembled in their original locations.
- B. Place right and left bearing outer races of bearing assemblies (32) and shims (24) in sets with marked bearing caps (22) so that they can be reinstalled in their original positions.

5. Shims (24).

NOTICE: Exercise caution in prying on rear axle housing assembly so gasket sealing surface is not damaged.

6. Case (33) from housing assembly (16).

Disassemble

Figures 1 through 4 and 23

1. Differential bearing assembly (32) from case (33), if replacing, using J 22888-20 and J 8107-2. If removing an Auburn type limited slip differential case, skip step 2.
2. Pinion gears (36), thrust washers (37), side gears (40) and thrust washers (38) from case (33).
 - Mark side gears (40) and case (33) so side gears (40) can be reinstalled in their original position.
3. All bolts/screws (28) from case (33), if replacing ring gear (20) or speed sensor reluctor wheel (39).
 - Bolts/screws (28) are left-hand thread type.
 - Discard bolts/screws (28).
4. Ring gear (20) from case (33).
 - Do not pry between ring gear (20), speed sensor reluctor wheel (39) and case (33), if ring gear (20) is on tight.
 - Drive ring gear (20) from case (33) using brass drift and hammer.

Important

- Speed sensor reluctor wheel must be replaced if removed from vehicles with standard rear axle assemblies.
5. Speed sensor reluctor wheel (39) only if necessary, using brass hammer.
 - Discard speed sensor reluctor wheel (39).

Assemble

Figures 1 through 4, 24 and 25

NOTICE: See "Notice" on page 4B-1 of this section.

Important

- Before assembling the differential assembly, lubricate all parts with GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.

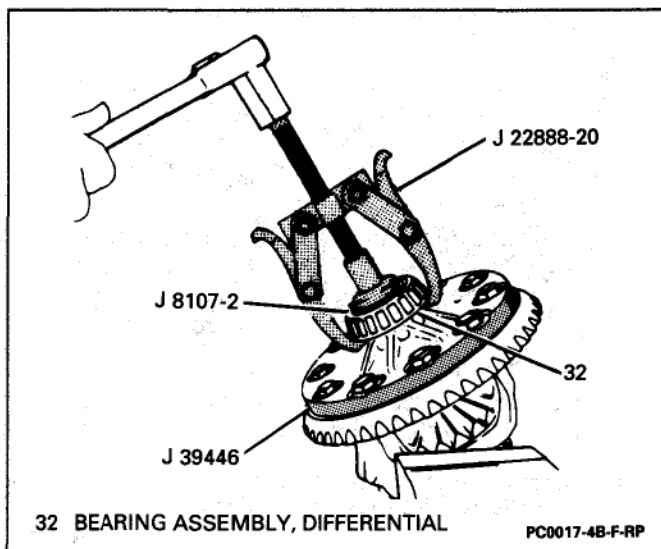


Figure 23 – Removing Differential Bearing Assembly

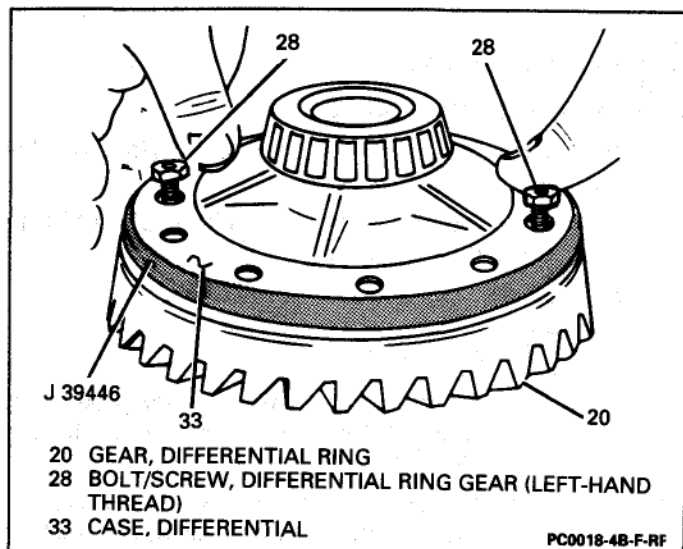


Figure 24 – Differential Ring Gear-to-Differential Case



Clean

- Connecting surfaces of ring gear (20) and case (33), if replacing ring gear (20).

CAUTION: Once the speed sensor reluctor wheel has been removed from the differential case, a new speed sensor reluctor wheel must be installed. The press fit may be lost if the speed sensor reluctor wheel is used more than once. This would allow the speed sensor reluctor wheel to rotate freely on the differential case causing a significant reduction in performance of the antilock brake system, which could result in bodily injury.

- Speed sensor reluctor wheel (39), if removed from vehicles with standard rear axle assemblies.
 - Carefully place speed sensor reluctor wheel (39) over case (33) on ring gear side.
- Ring gear (20), if removed.
 - On vehicles with standard rear axle assemblies, position ring gear (20) over speed sensor reluctor wheel (39).
- Two bolts/screws (28) into opposite sides of ring gear (20). If converting to an Auburn type limited slip differential case, skip step 4.
 - Install remaining new bolts/screws (28) until just snug.



Tighten

- New bolts/screws (28) alternately in progressive stages to 120 N•m (89 lb. ft.).
- Thrust washers (38), side gears (40), pinion gears (36) and thrust washers (37) into case (33).
 - Position thrust washers (38) over side gear hubs and install side gears (40) in case (33). If same parts are reused, install in original sides.

- Position one pinion gear (36), without thrust washer (37), between side gears (40) and rotate side gears (40) until pinion gear (36) is directly opposite loading opening in case (33). Place other pinion gear (36) between side gears (40) so that pinion gear shaft holes are in line: then rotate gears, lining up holes in pinion gears (36) with holes in case (33).
- Rotate pinion gears (36) back toward loading opening just enough to permit sliding in thrust washers (37).

- Differential bearing assemblies (32) to case (33), if removed, using J 8092, J 25299 and J 21465-13.

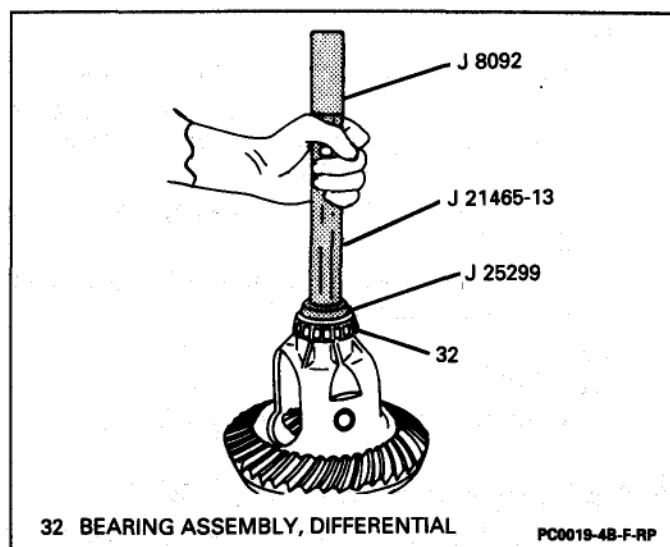


Figure 25 – Installing Differential Bearing Assembly

Install or Connect

Figures 1 through 4 and 26

NOTICE: See "Notice" on page 4B-1 of this section.

1. Case (33) into housing assembly (16). Refer to "Differential Case" in this section.
2. Shims (24).

Important

- Do not attempt to reinstall the production shims as they may break when tapped into place.
 - If service shims were previously installed, they can be reused, but whether using new or old differential bearing assemblies (32), adhere to the following procedure in all cases. If differential bearing assemblies (32) are used again, they must have original outer races in place. Refer to "Differential Bearing Assembly Preload Adjustment" in this section.
 - Keep shim packs in their respective position, right or left side.
- A. Select a shim 0.10 mm (0.004 inch) thicker than the one removed from the left side, then insert left side shim pack between the spacer and the left bearing race.
 - B. Loosely install bearing cap (22).
 - C. Select a shim 0.10 mm (0.004 inch) thicker than the one removed from the right side and insert between the spacer (25) and the right bearing assembly race.
 - D. It will be necessary to drive the right shim into position using J 25588.
3. Bolts/screws (26).

Tighten

- Bolts/screws (26) to 75 N•m (55 lb. ft.).
4. Check backlash and correct if necessary. Refer to "Differential Ring Gear-to-Differential Drive Pinion Gear Backlash" in this section.
 5. Rear axle shafts (63 or 70). Refer to "Rear Axle Shaft" in this section.
 6. Wheel speed sensor assembly (75) and bolt/screw (73), if removed.

Tighten

- Bolt/screw (73) to 10 N•m (89 lb. in.).

SPEED SENSOR RELUCTOR WHEEL

Refer to "Differential Case" above, for removal and installation of the speed sensor reluctor wheel on vehicles with standard rear axle assemblies. On vehicles with traction control (acceleration slip regulation), the speed sen-

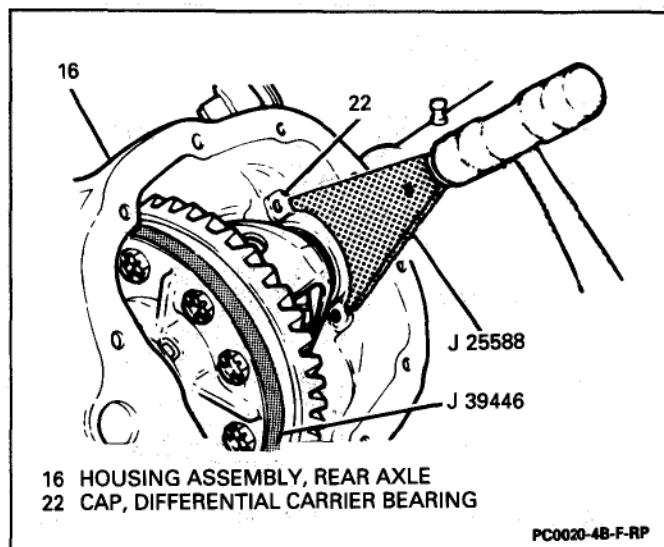


Figure 26 – Installing Differential Bearing Shims

sor reluctor wheel is not serviceable. If the speed sensor reluctor wheel is damaged, the rear axle drive shaft assembly must be replaced. Refer to "Rear Axle Shaft" in this section.

DIFFERENTIAL RING GEAR-TO-DIFFERENTIAL DRIVE PINION GEAR BACKLASH

Figure 27

Tool Required:

J 8001 Dial Indicator Set

Remove or Disconnect

- Rear axle housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.

Measure

1. Rotate case (33) several times to seat bearing assemblies. Mount J 8001.
 - A. Use a small button on indicator stem so that contact can be made near heel end of tooth.
 - B. Set J 8001 so that stem is in line with gear rotation and perpendicular to tooth angle for accurate backlash reading.
2. Check backlash at three or four points around ring gear (20).
 - A. Lash must not vary over 0.05 mm (0.002 inch) around ring gear (20).
 - B. Drive pinion gear must be held stationary when checking backlash.

Important

- If variation is over 0.05 mm (0.002 inch), check for burrs, uneven bolting conditions or distorted case flange and make corrections as necessary.

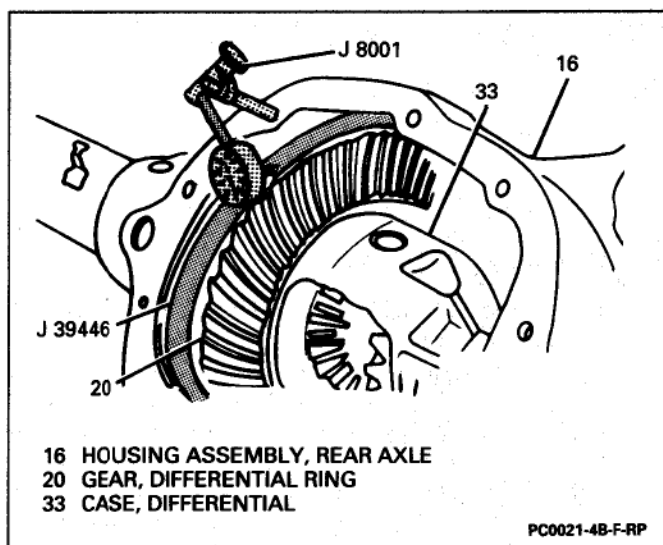


Figure 27 – Checking Differential Ring Gear-to-Differential Drive Pinion Gear Backlash



Adjust

- Backlash at the point of minimum lash should be between 0.13 mm and 0.23 mm (0.005 inch and 0.009 inch) for all new gears.
- Backlash by increasing thickness of one shim and decreasing thickness of other shim the same amount.
 - For each 0.03 mm (0.001 inch) change in backlash desired, transfer 0.05 mm (0.002 inch) in shim thickness.
 - To decrease backlash 0.03 mm (0.001 inch), decrease thickness of right shim 0.05 mm (0.002 inch) and increase thickness of left shim 0.05 mm (0.002 inch). To increase backlash 0.05 mm (0.002 inch), increase thickness of right shim 0.10 mm (0.004 inch) and decrease thickness of left shim 0.10 mm (0.004 inch).
 - Refer to "Differential Bearing Assembly Preload Adjustment" in the following procedure for further information.

4.32 mm (0.170") SERVICE DIFFERENTIAL BEARING SPACER	
TOTAL THICKNESS OF BOTH PRODUCTION DIFFERENTIAL BEARING SHIMS REMOVED	TOTAL THICKNESS OF SERVICE DIFFERENTIAL BEARING SHIMS TO BE USED AS A STARTING POINT
10.57 mm (0.416")	1.52 mm (0.060")
10.92 mm (0.430")	1.78 mm (0.070")
11.18 mm (0.440")	2.03 mm (0.080")
11.43 mm (0.450")	2.29 mm (0.090")
11.68 mm (0.460")	2.54 mm (0.100")
11.94 mm (0.470")	2.79 mm (0.110")
12.19 mm (0.480")	3.05 mm (0.120")
12.45 mm (0.490")	3.30 mm (0.130")
12.70 mm (0.500")	3.56 mm (0.140")
12.95 mm (0.510")	3.81 mm (0.150")
13.21 mm (0.520")	4.06 mm (0.160")
13.46 mm (0.530")	4.32 mm (0.170")
13.97 mm (0.550")	4.83 mm (0.190")

PC8030-4B-D-RP

Figure 28 – Differential Bearing Shim Thickness



Install or Connect

- Rear axle housing cover. Refer to "Rear Axle Housing Cover and Gasket" in this section.

DIFFERENTIAL BEARING ASSEMBLY PRELOAD ADJUSTMENT

Figures 1 through 4 and 28

The differential bearing assembly preload adjustment is to be made before installing the drive pinion gear (23). If drive pinion gear (23) is installed, remove ring gear (20). Refer to "Differential Case" in this section.

Differential bearing assembly preload is adjusted by changing the thickness of both the right and left shims (24) by an equal amount.

By changing the thickness of both shims (24) equally, the original backlash will be maintained.

Production shims (24) are cast iron and vary in thickness from 5.33 mm to 6.91 mm (0.210 inch to 0.272 inch) in increments of 0.05 mm (0.002 inch).

Standard service spacers (25) are 4.32 mm (0.170 inch) thick and steel service shims (24) are available from 1.02 mm to 2.08 mm (0.040 inch to 0.082 inch) in increments of 0.05 mm (0.002 inch).



Important

- Do not attempt to reinstall the production shims (24) as they may break when tapped into place.
- If service shims (24) were previously installed, they can be reused, but whether using new or old differential bearing assemblies (32), adhere to the following procedure in all cases. If differential bearing assemblies (32) are used again, they must have original outer races in place.



Adjust

- Determine the approximate thickness of shims (24) needed by measuring each production shim (24) or each service spacer (25) and shim pack.
 - In addition to the service spacer (25), service shims (24) will be needed. Select a starting point in service shim thickness. Refer to Figure 28.
- Place case (33) with differential bearing assembly outer races in position in the housing assembly (16).
- Slip the service spacer (25) between each differential bearing assembly race and housing assembly (16) with chamfered edge against housing assembly (16).

NOTICE: Install the left side differential bearing cap loosely so the differential case may be moved while checking adjustments. Another differential bearing assembly cap bolt/screw can be added in the lower right side differential bearing cap hole. This will prevent the case from dropping while making shim adjustments.

4. Select one or two shims (24) totalling the amount shown in the right-hand column of Figure 28 and position between the right side differential bearing assembly race and service spacer (25).

- Be sure left side differential bearing assembly race and spacer (25) are against left side of housing assembly (16).

5. Insert progressively larger feeler gage sizes 0.25 mm, 0.30 mm, 0.36 mm, etc. (0.010 inch, 0.012 inch, 0.014 inch, etc.) between the right shim (24) and service spacer (25) until there is noticeable increase in drag.

6. Push feeler gage downward until end of gage makes contact with housing assembly bore to obtain a correct reading.

- The point just before additional drag begins is the correct feeler gage thickness.

7. Rotate case (33) while using feeler gage to ensure an even reading.

- The original light drag is caused by weight of case (33) against housing assembly (16) while additional drag is caused by differential bearing assembly preload.

- By starting with a thin feeler gage, a sense of "feel" is obtained so the beginning of preload can be recognized to obtain zero clearance.

- It will be necessary to work case (33) in and out and to the left in order to insert feeler gage.

8. Remove left side differential bearing assembly cap (22) and shim (24) from housing assembly (16).

9. The total shim pack needed, with no preload on differential bearing assemblies (32), is the feeler gage reading found in step 7 plus the thickness of shims (24) installed in step 4.

10. Select two shims (24) of approximately equal size whose total thickness is equal to the value obtained in step 9.

- These shims (24) will be installed between each differential bearing assembly race and service spacer (25) when case (33) is installed in housing assembly (16).

- The preload will not be added until case (33) is installed.

11. If drive pinion gear is in position, install ring gear. Refer to "Differential Case" in this section.

DIFFERENTIAL DRIVE PINION GEAR

Figures 1 through 4, 16, 19, 29 and 30

Tools Required:

J 22536 Pinion Driver

J 23911 Pinion Oil Seal Installer

↔ Remove or Disconnect

1. Differential case. Refer to "Differential Case" in this section.
2. Check differential drive pinion gear inner and outer bearing assembly preload. If there is no preload reading, check for looseness of drive pinion gear (23) by shaking. Looseness could be caused by defective inner and outer bearing assemblies (18 and 7) or worn yoke (3). If the rear axle assembly was operated for an extended period with very loose inner and outer bearing assemblies (18 and 7), ring gear (20) and drive pinion gear (23) will also require replacement.
3. Differential drive pinion gear yoke. Refer to "Differential Drive Pinion Gear Yoke and Seal" in this section.
4. Drive pinion gear (23), using J 22536. Apply heavy hand pressure on J 22536 toward housing assembly (16) to keep outer bearing assembly (7) seated to avoid damage to outer race.

→ Install or Connect

1. If installing new ring gear and drive pinion gear, measure differential drive pinion gear depth. Refer to "Differential Drive Pinion Gear Depth" in this section.
2. Drive pinion gear (23) into housing assembly (16).
3. Differential drive pinion gear yoke (3).
 - A. Install new seal (6) using J 23911.
 - B. Apply pinion gear seal lubricant GM P/N 1050169 or equivalent to yoke (3) and sealing lip of new seal (6).
 - C. Yoke (3).
 - D. Washer (2) and nut (1) finger tight.
 - E. Hold yoke (3).
 - F. While intermittently rotating drive pinion gear (23) to seat inner and outer bearing assemblies (18 and 7), tighten nut (1) until end play begins to be taken up.

⚠ Important

- When no further end play is detectable and when holder will no longer pivot freely as drive pinion gear (23) is rotated, preload specifications are being approached.
- No further tightening should be attempted until preload has been checked.
- After preload has been checked, final tightening should be done very carefully.
- Additional tightening of nut (1) can add many additional pound inches of torque.

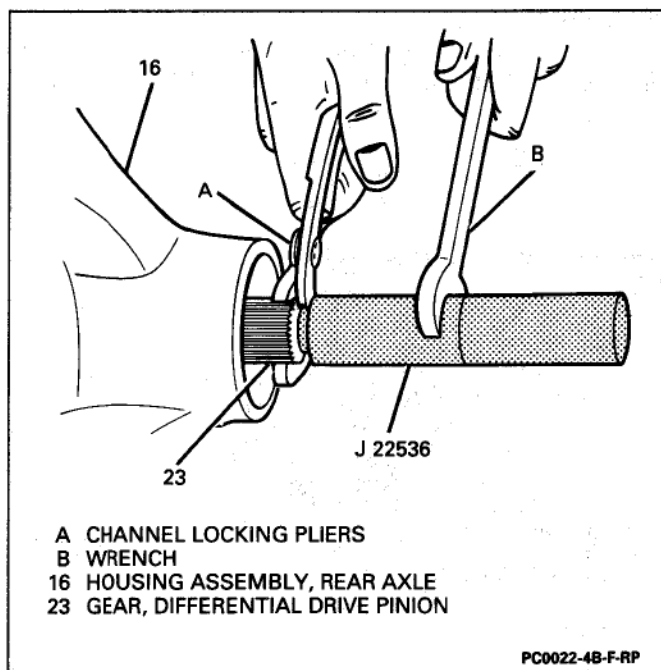


Figure 29 – Installing Differential Drive Pinion Gear Driver

- Nut (1) should be further tightened only slightly and preload should be checked after each tightening.
 - Exceeding preload specifications will compress the collapsible spacer (15) too far and require installation of a new collapsible spacer (15).
4. Set preload at 1.7 N•m to 3.4 N•m (15 lb. in. to 30 lb. in.) on new inner and outer bearing assemblies (18 and 7) or 1.0 N•m to 1.7 N•m (10 lb. in. to 15 lb. in.) on used inner and outer bearing assemblies (18 and 7).
 5. Rotate drive pinion gear (23) several times to ensure that inner and outer bearing assemblies (18 and 7) have been seated.
 - A. Check preload again.
 - B. If preload has been reduced by rotating drive pinion gear (23), reset preload to specifications.
 6. Differential case. Refer to “Differential Case” in this section.

Differential Drive Pinion Gear Outer Bearing Assembly

Figures 1 through 4 and 31

Tools Required:

J 8092 Driver Handle

J 7817 Front Pinion Bearing Cup Installer

Remove or Disconnect

1. Differential drive pinion gear from rear axle housing assembly. Refer to “Differential Drive Pinion Gear” in this section.

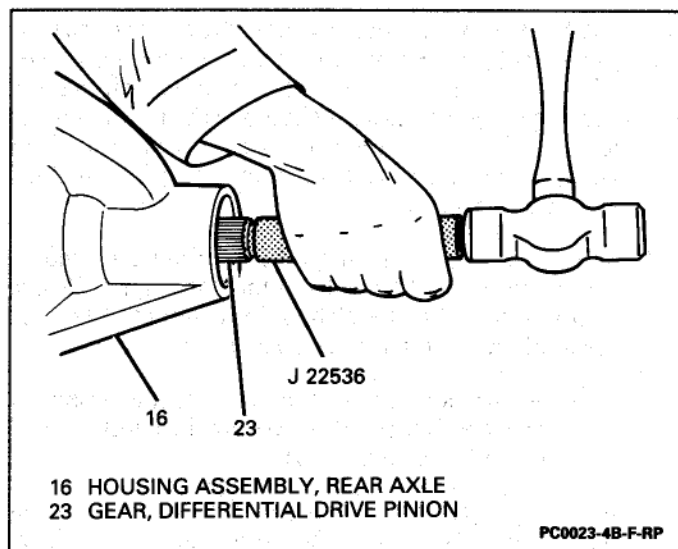


Figure 30 – Removing Differential Drive Pinion Gear

2. Differential drive pinion gear seal from rear axle housing assembly. Refer to “Differential Drive Pinion Gear Yoke and Seal” in this section.
3. Outer bearing assembly (7) from housing assembly (16).
4. Outer bearing assembly race from housing assembly (16), if replacing outer bearing assembly (7).
 - Drive race from housing assembly (16), using a punch in slots provided for this purpose.

Install or Connect

1. Outer bearing assembly race into housing assembly (16), if removed, using J 8092 and J 7817.
2. Outer bearing assembly (7) into housing assembly (16).
3. Differential drive pinion gear seal. Refer to “Differential Drive Pinion Gear Yoke and Seal” in this section.
4. Differential drive pinion gear. Refer to “Differential Drive Pinion Gear” in this section.

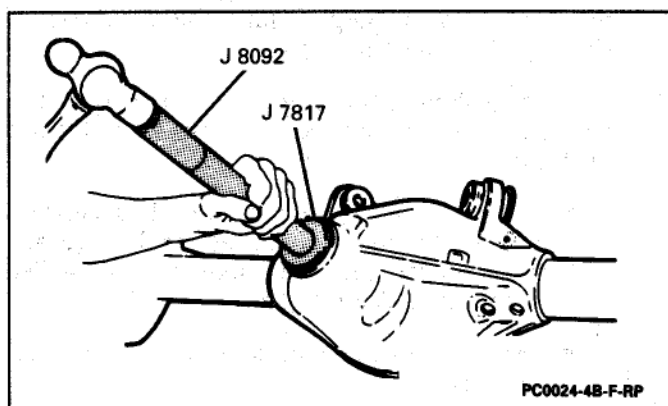


Figure 31 – Installing Differential Drive Pinion Gear Outer Bearing Assembly Race

Differential Drive Pinion Gear Inner Bearing Assembly

Figures 1 through 4 and 32 through 34

Tools Required:

- J 22912-01 Rear Pinion Bearing Remover
- J 8092 Driver Handle
- J 29609 Rear Pinion Bearing Cup Installer
- J 5590 Rear Pinion Bearing Cone Installer

Remove or Disconnect

1. Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.
2. Spacer (15) from drive pinion gear (23).
 - Discard spacer (15).
3. Drive pinion gear inner bearing assembly race from housing assembly (16), if replacing inner bearing assembly (18).
 - Drive race from housing assembly (16) using a punch in slots provided for this purpose.
4. Drive inner bearing assembly (18) from drive pinion gear (23) using J 22912-01.

Install or Connect

1. Inner bearing assembly (18) onto drive pinion gear (23) using J 5590.
2. Drive inner bearing assembly race into housing assembly (16) using J 8092 and J 29609, if inner bearing assembly (18) was replaced.
3. New spacer (15) onto drive pinion gear (23).
4. Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.

DIFFERENTIAL DRIVE PINION GEAR DEPTH

Figures 1 through 4, 35 and 36

Tools Required:

- J 8001 Dial Indicator Set
- J 23597-1 Pinion Setting Gage – Arbor
- J 23597-11 Pinion Setting Gage – Gage Plate
- J 21777-40 Pinion Setting Gage – Rear Pilot Washer
- J 21777-42 Pinion Setting Gage – Front Pilot Washer
- J 21777-43 Pinion Setting Gage – Stud Assembly – Bolt
- J 21777-45 Pinion Setting Gage – Side Bearing Discs

Differential drive pinion gear depth is measured with a pinion setting gage. The gage provides a "nominal" or "zero" pinion as a gaging reference.

Disassemble

- Differential case. Refer to "Differential Case" in this section.

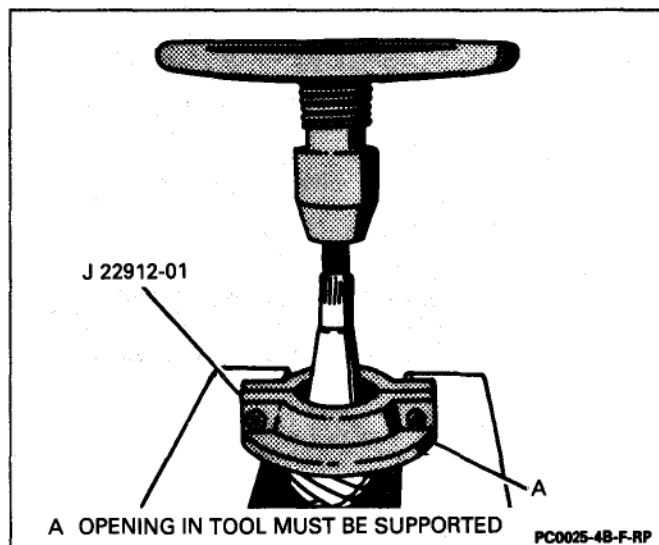


Figure 32 – Removing Differential Drive Pinion Gear Inner Bearing Assembly

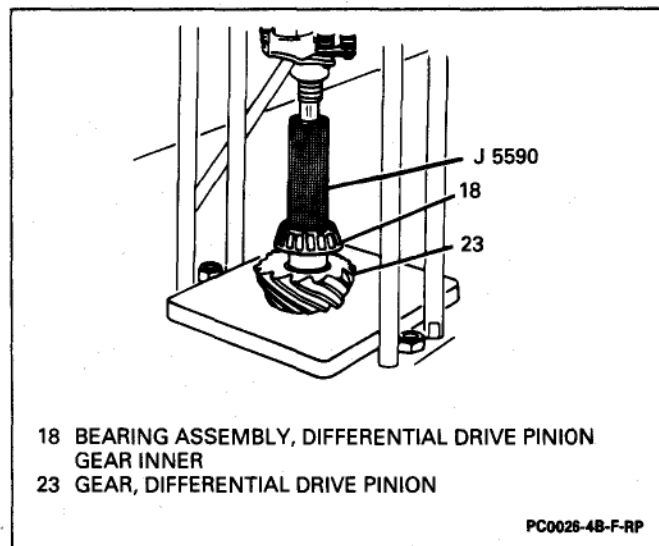


Figure 33 – Installing Differential Drive Pinion Gear Inner Bearing Assembly

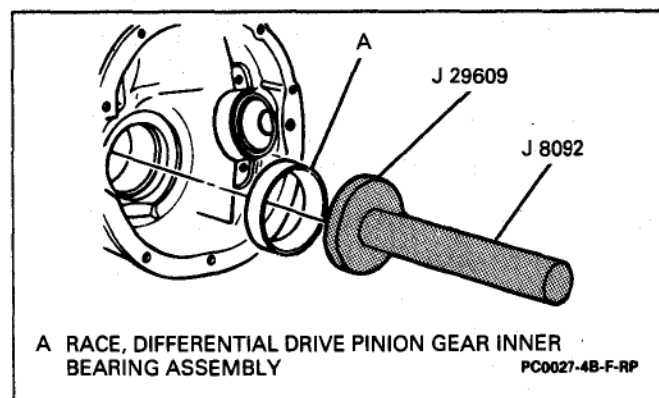


Figure 34 – Installing Differential Drive Pinion Gear Inner Bearing Assembly Race

Remove or Disconnect

- Differential drive pinion gear inner bearing assembly. Refer to "Differential Drive Pinion Gear Inner Bearing Assembly" in this section.

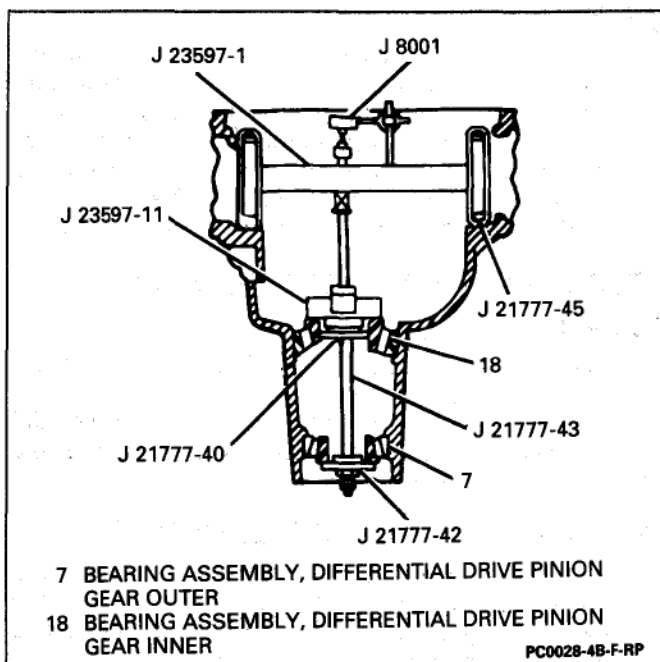


Figure 35 – Pinion Gage Plate Installed in Rear Axle Housing Assembly

Clean

- All parts of gage.
- Differential bearing assembly bore.
- Inner and outer bearing assembly cups.
- Lubricate inner and outer bearing assemblies (18 and 7) with GM P/N 12345977 axle lubricant or SAE 80W-90 GL-5 gear lubricant or equivalent.

Install or Connect

NOTICE: See "Notice" on page 4B-1 of this section.

- J 21777-40 through J 21777-43.
- J 23597-11.
- J 1777-42 and nut in housing assembly (16).

Tighten

- Nut to 2.3 N•m (20 lb. in.).
- Rotate J 23597-11 to seat inner and outer bearing assemblies (18 and 7).
 - Mount J 8001 on J 23597-1 and preload indicator against plunger about 1.27 mm (0.050 inch).
 - J 21777-45 on J 23597-1 and position unit in housing assembly (16).

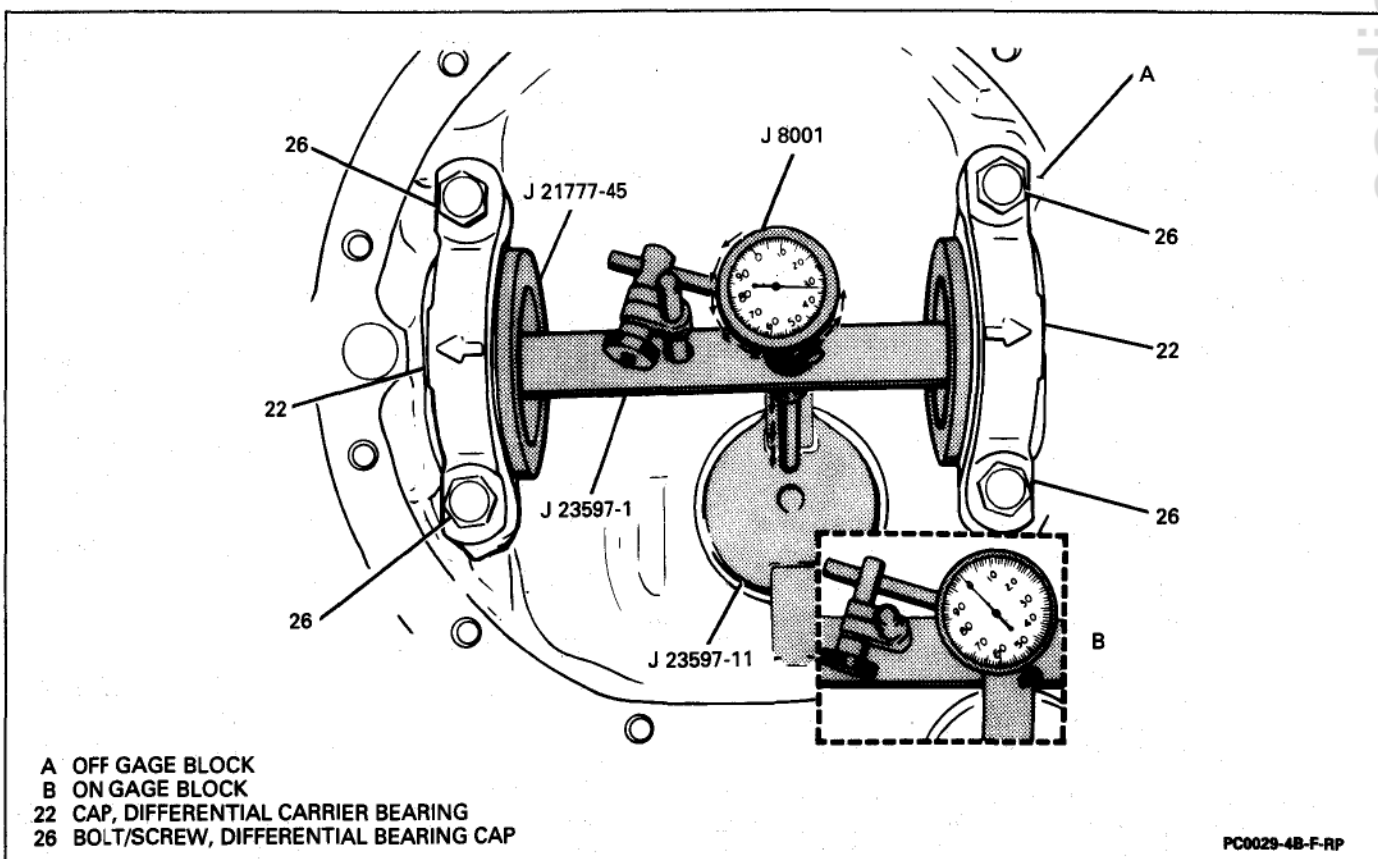


Figure 36 – Checking Differential Drive Pinion Gear Depth

7. Bearing caps (22) and bolts/screws (26).

Tighten

- Bolts/screws (26) to 75 N•m (55 lb. ft.).

Measure

- Differential drive pinion gear depth.
 - Rotate J 23597-1 slowly back and forth until J 8001 reads the greatest deflection (the point where the needle changes direction). At that point, set J 8001 to zero.
 - Repeat rocking action to verify zero setting.
 - After zero setting is obtained, rotate J 23597-1 just until plunger no longer touches J 23597-11. This provides the gaging reference of a "zero" or "nominal" drive pinion gear (23).
 - Record J 8001 reading at pointer position. This indicates the proper shim to use. Example: if pointer moved counterclockwise 1.70 mm (0.067 inch) to a dial reading of 0.84 mm (0.033 inch), this indicates a shim thickness of 0.84 mm (0.033 inch).
 - Required shim thickness is EQUAL to J 8001 reading.
 - Shims are available in 0.03 mm to 0.94 mm (0.001 inch to 0.037 inch). Shim thickness is etched on the flat surface for easy identification.

Install or Connect

- Loosen J 21777-43 and remove special tools and inner and outer bearing assemblies (18 and 7) from housing assembly (16).
- Correct shim (19) on drive pinion gear (23).

Important

- Proper drive pinion gear depth setting is a two-step procedure.
 - The set-up dimension arrived at using J 8001 is to be considered a starting point.
 - A ring gear tooth pattern check is necessary to fine tune the drive pinion gear depth and may indicate additional shim changes to the drive pinion gear stem. Refer to "Tooth Contact Pattern Test" in this section.
 - Both procedures must be performed to ensure proper rear axle assembly performance.
- Differential drive pinion gear inner and outer bearing assemblies. Refer to "Differential Drive Pinion Gear Inner Bearing Assembly" and "Differential Drive Pinion Gear Outer Bearing Assembly" in this section.

Assemble

- Differential case. Refer to "Differential Case" in this section.

Measure

- Preload of the total assembly at the drive pinion gear nut (1). With new inner and outer bearing assemblies (18 and 7), preload is 3.6 N•m to 6.2 N•m (32 lb. in. to 55 lb. in.) rotating torque with a new seal (6). With used inner and outer bearing assemblies (18 and 7), preload is 1.8 N•m to 3.1 N•m (16 lb. in. to 28 lb. in.) rotating torque with a new seal (6).

DIFFERENTIAL CASE (LIMITED SLIP)

Figure 37

The Auburn limited slip differential assembly case (80) is non-serviceable and must be replaced as an assembly. Removal and replacement of the differential case and service on the side bearings and ring gear is the same as for the standard rear axle assembly.

REAR AXLE HOUSING REPLACEMENT

It is not necessary to remove the rear axle housing assembly for any normal repairs. However, if the rear axle housing assembly is damaged, it may be removed and installed using the following procedures:

Rear Axle Housing Assembly with Drum Brakes

Remove or Disconnect

- Rear axle assembly. Refer to "Rear Axle Assembly" in this section.
- Rear brake pipe assemblies from rear wheel brake cylinders. Refer to SECTION 5.
- Rear brake pipe assemblies from rear brake (center) hose assembly junction block. Refer to SECTION 5.
- Rear brake (center) hose assembly junction block from housing assembly. Refer to SECTION 5.
- Rear brake pipe assemblies from housing assembly. Refer to SECTION 5.
- Rear axle shaft bearing assemblies and seals. Refer to "Rear Axle Shaft Bearing Assembly and/or Bearing Seal" in this section.
- Rear brake backing plates. Refer to SECTION 5C2.
- Differential case. Refer to "Differential Case" in this section.
- Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.

Install or Connect

- Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.
- Differential case. Refer to "Differential Case" in this section.
- Rear brake backing plates. Refer to SECTION 5C2.
- Rear axle shaft bearing assemblies and seals. Refer to "Rear Axle Shaft Bearing Assembly and/or Bearing Seal" in this section.

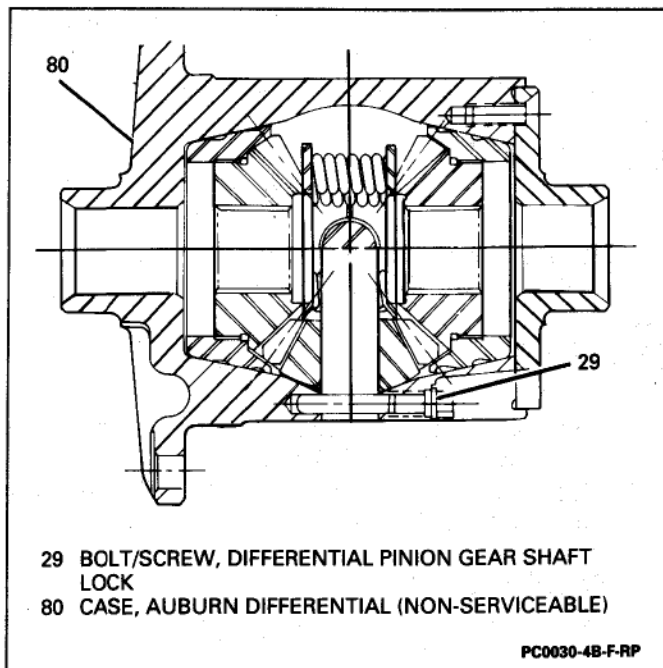


Figure 37 – Limited Slip Rear Axle Assembly – Auburn-Type

5. Rear brake pipe assemblies to housing assembly. Refer to SECTION 5.
6. Rear brake pipe assemblies to rear wheel brake cylinders. Refer to SECTION 5.
7. Rear brake (center) hose assembly junction block to housing assembly. Refer to SECTION 5.

8. Rear brake pipe assemblies to rear brake (center) hose assembly junction block. Refer to SECTION 5.
9. Rear axle assembly. Refer to "Rear Axle Assembly" in this section.

REAR AXLE ASSEMBLY WITH DISC BRAKES

Figures 1 through 4 and 38

A shim (67) may be installed between the rear brake caliper assembly mounting plate (65) and the axle shaft tube flange on the housing assembly (16). This shim (67) centers the rear brake caliper and pad assemblies over the brake rotor assembly (71), ensuring even brake pad assembly pressure during braking. This shim (67) may have to be changed when the housing assembly (16) is replaced.



Remove or Disconnect

- Rear axle assembly. Refer to "Rear Axle Assembly" in this section.



Disassemble

1. Rear brake pipe assemblies from brake hose assemblies. Refer to SECTION 5.
2. Rear brake pipe assemblies from rear brake (center) hose assembly junction block. Refer to SECTION 5.
3. Rear brake (center) hose assembly junction block from housing assembly. Refer to SECTION 5.
4. Rear brake pipe assemblies from housing assembly. Refer to SECTION 5.

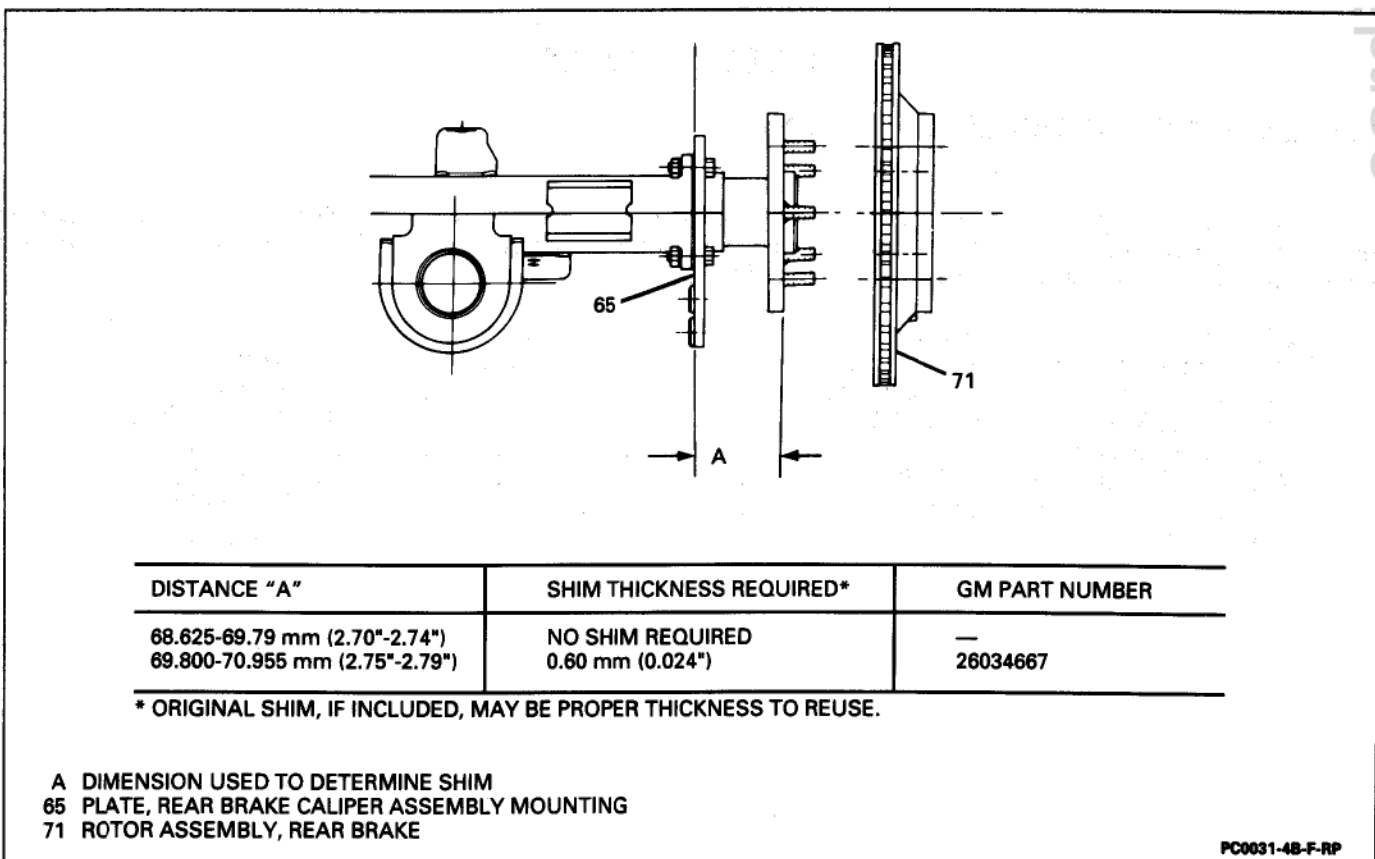


Figure 38 – Brake Caliper Assembly Mounting Plate Shim Selection

5. Rear brake hose assemblies from housing assembly. Refer to SECTION 5.
6. Rear brake shaft bearing assemblies and seals. Refer to "Rear Axle Shaft Bearing Assembly and/or Bearing Seal" in this section.
7. Rear brake caliper anchor brackets and mounting plates. Refer to SECTION 5B2.
8. Shim (67), if installed.
9. Differential case. Refer to "Differential Case" in this section.
10. Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.

**Assemble**

1. Differential drive pinion gear. Refer to "Differential Drive Pinion Gear" in this section.
2. Differential case. Refer to "Differential Case" in this section.
3. Rear brake caliper anchor brackets and mounting plates. Refer to SECTION 5B2.
4. Rear axle shaft bearing assemblies and seals, but do not tighten lock bolt/screw at this time. Leave lock bolt/screw finger tight. Refer to "Rear Axle Shaft Bearing Assembly and/or Bearing Seal" in this section.

**Measure**

1. Distance from rear face of rear brake caliper assembly mounting plate (65) (tube flange mount-

ing surface) to front face of machined axle shaft tube flange, using a caliper.

2. Select shim (67). Refer to Figure 38.

**Disassemble**

1. Rear axle shaft. Refer to "Rear Axle Shaft" in this section.
2. Rear brake caliper anchor brackets and mounting plates. Refer to SECTION 5B2.

**Assemble**

1. Shim (67), if necessary.
2. Rear brake caliper anchor brackets and mounting plates. Refer to SECTION 5B2.
3. Rear brake hose assemblies to housing assembly. Refer to SECTION 5.
4. Rear brake pipe assemblies to housing assembly. Refer to SECTION 5.
5. Rear brake (center) hose assembly junction block to housing assembly. Refer to SECTION 5.
6. Rear brake pipe assemblies to rear brake (center) brake assembly junction block. Refer to SECTION 5.
7. Rear brake pipe assemblies to brake hose assemblies. Refer to SECTION 5.

**Install or Connect**

- Rear axle assembly. Refer to "Rear Axle Assembly" in this section.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Use a reliable torque wrench to tighten the parts listed to make sure the parts are properly tightened without straining or distorting parts. These specifications are for clean and lightly-lubricated threads only; dry or dirty threads produce increased friction which prevents measurement of tightness.

Differential Bearing Cap Bolt/Screw	75 N•m (55 lb. ft.)
Differential Drive Pinion Gear Setting Gage Nut	2.3 N•m (20 lb. in.)
Differential Pinion Gear Shaft Lock Bolt/Screw	36 N•m (27 lb. ft.)
Differential Ring Gear (Left-Hand Thread) Bolt/Screw	120 N•m (89 lb. ft.)
Rear Axle Housing Bolt/Screw	30 N•m (22 lb. ft.)
Rear Axle Housing Drain (Fill) Plug	35 N•m (26 lb. ft.)
Sensor Plug Mounting Bolt/Screw	10 N•m (89 lb. in.)
Wheel Nut	140 N•m (100 lb. ft.)

GENERAL SPECIFICATIONS

Rear Axle Type	Semi-Floating Hypoid
Drive and Torque	Through 4 Arms
Ring and Drive Pinion Gear Set Type	Hypoid
Rear Axle Lubricant Capacity	1.65 L (2.90 pt.)
Rear Axle Lubricant	
Standard Differential	GM P/N 12345977 Axle Lubricant or SAE 80W-90 GL-5 Gear Lubricant or equivalent
Limited Slip Differential	118 ml (4 fl. oz.) GM P/N 1052358 Limited Slip Differential Lubricant and GM P/N 12345977 Axle Lubricant or SAE 80W-90 GL-5 Gear Lubricant or equivalent
Pinion Gear Seal Lubricant	GM P/N 1050169 or equivalent
Gear Marking Compound	GM P/N 1052351 or equivalent

LIMITS FOR FITTING AND ADJUSTING

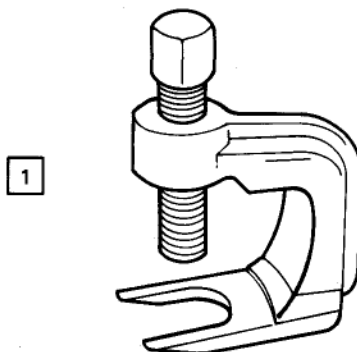
Differential Drive Pinion Gear Inner and Outer Bearing Preload (Measured at Drive Pinion Gear Nut)	
New Bearing Assemblies	1.7 – 3.4 N•m (15 – 30 lb. in.) Rotating Torque with New Seal
Used Bearing Assemblies	1.0 – 1.7 N•m (10 – 15 lb. in.) Rotating Torque with New Seal
Total Assembly Preload (Measured at Drive Pinion Gear Nut)	
New Bearing Assemblies	3.6 – 6.2 N•m (32 – 55 lb. in.) Rotating Torque with New Seal
Used Bearing Assemblies	1.8 – 3.1 N•m (16 – 28 lb. in.) Rotating Torque with New Seal
Differential Ring Gear-to-Differential Drive Pinion Gear Backlash	0.13 – 0.23 mm (0.005" – 0.009")

REAR AXLE ASSEMBLY USAGE

RING GEAR DIAMETER	AXLE GEAR RATIO	REAR BRAKE DRUM DISC	TEETH RING GEAR: PINION	AXLE RATIO
7.62"	2.73	—	41:15	GU2
		DISC		
	3.23	CAST IRON DRUM	42:13	GU5
		DISC		

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SPECIAL TOOLS

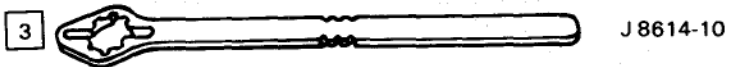


J 6627-A

1 WHEEL STUD REMOVER

MC1001-3E-B-RP

J 8614-01 SET



J 8614-01 SET.

- 1 PINION FLANGE REMOVER ADAPTER
- 2 PINION FLANGE REMOVER SCREW
- 3 PINION FLANGE REMOVER

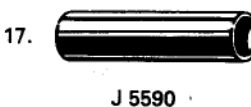
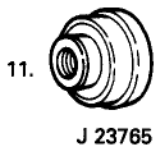
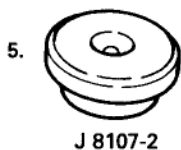
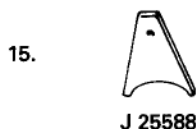
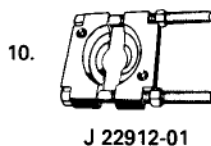
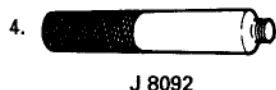
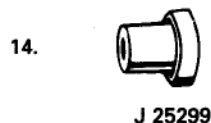
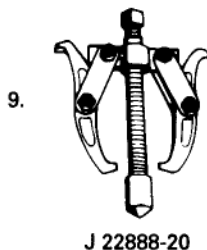
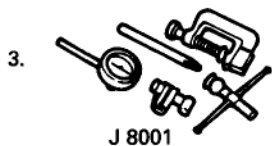
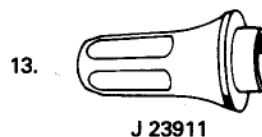
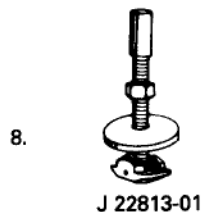
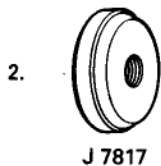
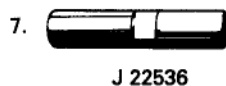
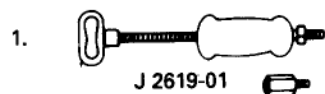
LC0027-4B-F-RP



7 1/2" AND 7 5/8" RING GEAR REAR AXLE

- 1. PINION SETTING GAGE — ARBOR
- 2. PINION SETTING GAGE — GAGE PLATE
- 3. PINION SETTING GAGE — REAR PILOT WASHER
- 4. PINION SETTING GAGE — FRONT PILOT WASHER
- 5. PINION SETTING GAGE — STUD ASM-BOLT
- 6. PINION SETTING GAGE — SIDE BEARING DISCS

PC0034-4B-F-RP



7 1/2" AND 7 5/8" RING GEAR REAR AXLE

1. SLIDE HAMMER WITH 1/2 X 13 ADAPTER
2. FRONT PINION BEARING CUP INSTALLER
3. DIAL INDICATOR SET
4. DRIVER HANDLE
5. DIFFERENTIAL SIDE BEARING REMOVER PLUG
6. AXLE SHAFT REMOVER
7. PINION DRIVER
8. AXLE BEARING REMOVER
9. DIFFERENTIAL SIDE BEARING REMOVER
10. REAR PINION BEARING REMOVER
11. AXLE BEARING INSTALLER
12. AXLE OIL SEAL INSTALLER
13. PINION OIL SEAL INSTALLER
14. DIFFERENTIAL SIDE BEARING INSTALLER
15. SIDE BEARING SHIM INSTALLER
16. REAR PINION BEARING CUP INSTALLER
17. REAR PINION BEARING CONE INSTALLER
18. ABS EXCITER RING PROTECTOR KIT
19. DRIVER HANDLE EXTENSION

