

CHRYSLER CORP. IMPORTS

**Arrow Pickup, Challenger
Ram-50 Pickup, Sapporo**

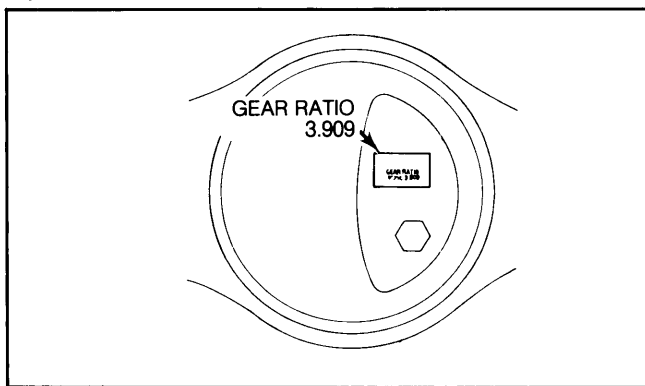
DESCRIPTION

The rigid type rear axle features a banjo type axle housing and semi-floating rear axle shafts. The differential consists of hypoid reduction gears and straight bevel differential gears.

AXLE RATIO & IDENTIFICATION

The sticker indicating gear ratio is attached to the axle housing. Challenger and Sapporo use a 3.545:1 ratio for both manual and automatic transmissions.

Fig. 1: Axle Ratio Identification Tag Location



Gear ratio is the number of ring gear teeth divided by the number of drive pinion teeth.

Arrow and Ram-50 Pickups use a 3.909:1 ratio differential for 4-speed manual transmissions, and a 3.545:1 ratio differential for 5-speed manual transmissions and for automatic transmissions.

Side bearing preload is adjusted by side bearing nuts. Pinion bearing preload and pinion depth adjustments are made with shims, while differential side gears are adjusted with spacers.

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

Removal (Pickups)

1) Raise and support rear axle housing so rear wheels clear ground. Remove rear wheel and brake drum. Disconnect hydraulic line from wheel cylinder.

2) Disconnect bearing case from axle housing. Remove backing plate, bearing case and axle shaft as an assembly. Use puller if required, and remove axle shaft.

3) Remove "O" ring and shims, retain shims for reassembly. Remove and discard inner axle shaft oil seal. Mount back plate, bearing case, and axle shaft assembly in a vise.

4) Loosen axle shaft bearing lock washer. Remove lock nut on rear of back plate. Remove washers and reinstall lock nut on axle shaft approximately 3 turns.

5) Install puller to bearing case on rear of back plate. Remove bearing case. Using a hammer and drift, remove bearing outer race. Remove outer bearing oil seal.

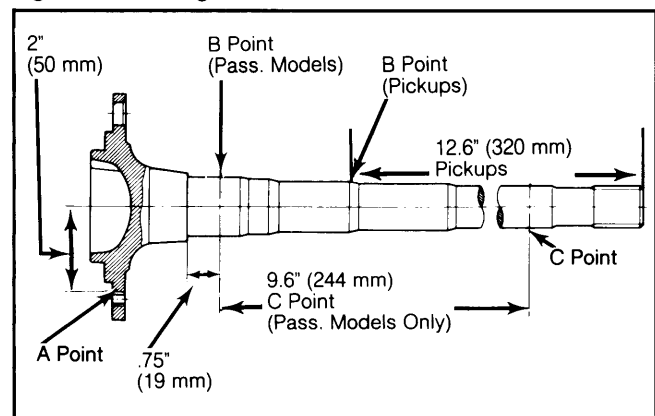
6) Using a dial indicator, inspect axle shaft deflection at points indicated in Fig. 2. Replace axle shaft

if specifications are exceeded. Inspect wheel hub bolts for tightness and bearing outer retainer for deformation, replace defective parts as necessary.

AXLE SHAFT DEFLECTION TABLE

Application	Service Limit In. (mm)
Point "A"	
Pickups	0-.0024 (0-.06)
All Others	0-.0015 (0-.04)
Point "B"	
Pickups	0-.039 (0-1)
All Others	0-.001 (0-.025)
Point "C" (Passenger Only)	0-.039 (0-1)

Fig. 2: Measuring Axle Shaft Deflection



Hold axle shaft between lathe centers and check runout with dial indicator.

Installation (Pickups)

1) Apply grease to outer surface of bearing outer race and to lip of new oil seal (outer). Drive into bearing case. Slide bearing case and bearing over rear axle shaft. Apply grease on bearing rollers. Fit bearing inner race by a thrust.

2) Apply grease to bearing rollers. Install washer, lock washer and lock nut. Tighten lock nut to specifications. Bend tab on lock washer into groove on lock nut. Apply grease to lip of oil seal (inner). Drive oil seal into rear axle housing end.

3) Before assembly operations, remove old sealer and any rust from mating face of bearing case and housing. Insert a .04" (1.0 mm) shim and "O" ring into left side of housing.

4) Apply sealer to mating face of bearing case. Fit left side axle shaft assembly into left side of housing and tighten bearing case and bearing to specifications.

5) Fit right side shaft assembly into right side housing. Do not use a shim or an "O" ring. Temporarily tighten bearing case to torque of 5 INCH lbs. (0.6 N.m). Measure the gap between bearing case and housing with a feeler gauge.

6) Loosen bearing case nuts and separate axle shaft assembly from housing. Select 1 shim with a thickness equivalent to gap measured in step 5), and a second shim with a thickness of from .0020-.0079" (.05-.20 mm). Insert shims selected and "O" ring into housing. Apply sealer to mating face of bearing case.

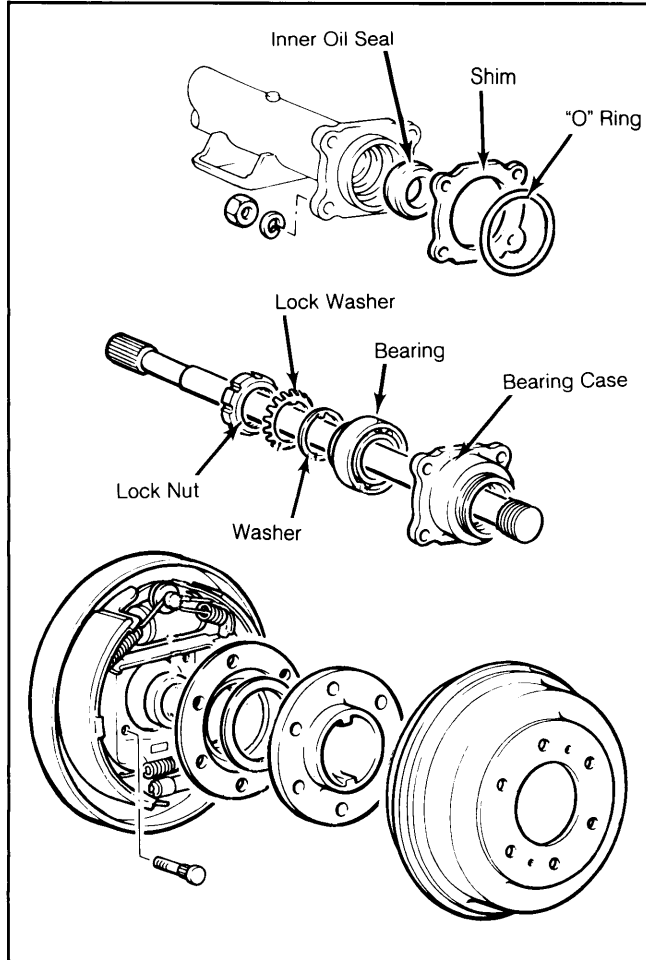
7) Fit right side axle shaft assembly into housing and tighten bearing case and bearing to specifica-

Drive Axles

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tions. Using dial indicator check axial play of axle shaft. Axial play of rear axle shaft should be .002-.008" (.05-.20 mm).

Fig. 3: Exploded View of Pickup Axle Assembly



Removal (All Except Pickups)

1) Raise and support rear axle housing so rear wheels clear ground. Remove rear wheel and backing plate nuts.

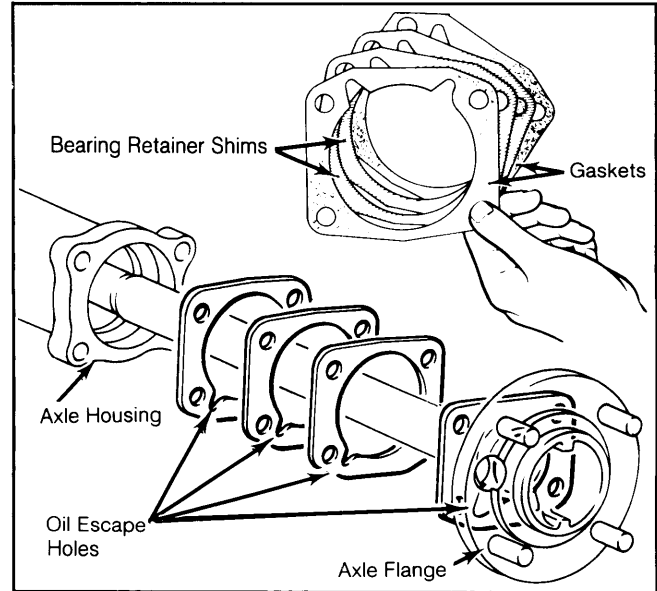
2) If equipped with disc brakes, remove caliper support together with parking brake rear cable, caliper assembly and brake hose. Remove brake disc.

3) Remove bolts attaching bearing outer retainer to axle housing through hole in flange. Attach puller to lug studs and work slide hammer until axle shaft is free to be withdrawn. Set brake backing plate with parking brake attached out of way. Remove oil seal.

4) Axle bearing removal procedure is as follows. Grind down bearing retainer at 1 point until retainer thickness is .04-.06" (1.0-1.5 mm). Chisel ground portion and remove retainer. Using bearing puller or press remove bearing from axle.

5) Using a dial indicator, inspect axle shaft deflection at 3 points. See Fig. 2. Replace axle shaft if specifications listed in table are exceeded. Rear axle bearing should be replaced when bearing noise is detected. Inspect wheel hub bolts for tightness and bearing outer retainer for deformation. Replace as necessary.

Fig. 4: Exploded View of Axle Shaft Assembly (All Except Pickup)



Oil escape holes must face downward.

Installation (All Except Pickups)

1) Install onto rear axle shaft the bearing outer retainer, rear wheel bearing and bearing inner retainer. Press onto rear axle shaft bearing inner retainer until its face is firmly pressed against rear wheel bearing. Make sure pressure applied to install bearing inner retainer is less than 13,200 lbs. (58,800 N).

2) Clean rear axle housing oil seal and apply multi-purpose grease. Tap new oil seal into axle housing until it contacts rear of axle housing. Apply grease to oil seal lip and to oil seal surface with contacts bearing inner retainer.

3) Insert rear axle assembly into rear axle housing, taking care not to damage oil seal. Attach bearing outer retainer by tightening in a criss-cross pattern. Tighten to specifications.

4) Vehicles with rear brake drums: Remove rear brake shoes and lining from backing plate. Measure clearance between bearing outer retainer and backing plate. According to measurement obtained, select gasket(s) and bearing retainer shim(s) so that clearance is within standard value of 0.01" (0-.25 mm).

5) Remove rear axle shaft assembly and install selected gasket(s) and bearing retainer shim(s) with oil escape holes downward. Reassemble as previously described.

DIFFERENTIAL CARRIER

Removal

1) Drain oil from rear axle differential housing. Mark flange yoke and companion flange and disconnect propeller shaft.

2) Pull out both rear axle shafts 2 1/2". Remove differential gear housing mounting nuts and withdraw the differential gear carrier. See Fig. 5. It may be necessary to tap outside of housing to break gear carrier loose.

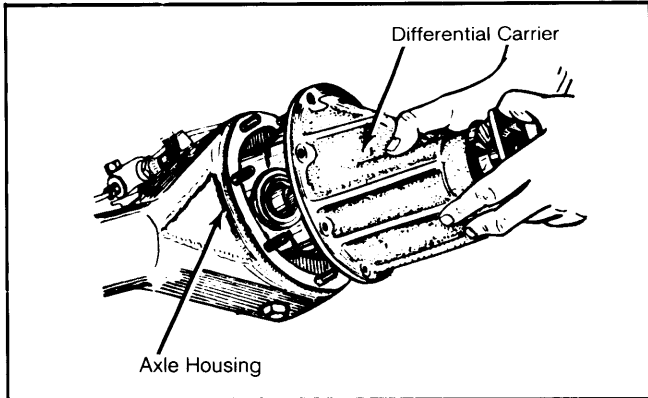
Installation

1) Lightly coat each bearing and gear with oil. Apply sealing compound on packing and axle housing seat.

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2) Assemble gear carrier to axle housing with nuts and tighten. Fill differential gear housing with 1.4 quarts of multi-purpose gear oil.

Fig. 5: Removing Differential Gear Housing



Tap on housing to break loose.

OVERHAUL

DISASSEMBLY

Differential Gear Assembly

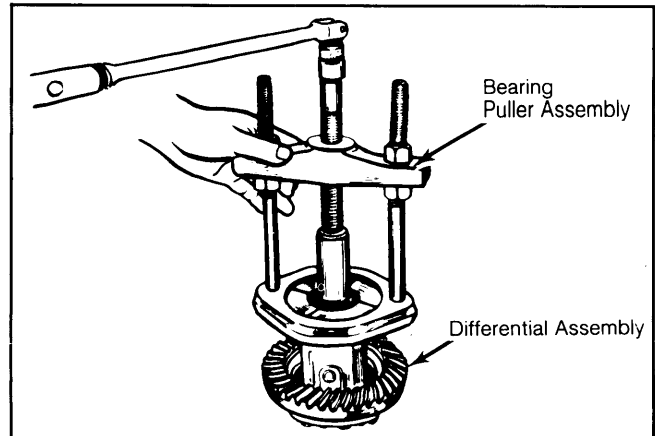
1) With assembly out of case, remove lock plate. Remove side bearing nut. Remove bearing carrier cap and lever gear case assembly from housing.

2) Using bearing puller, remove differential side bearing. See Fig. 7. Keep right and left bearings and shims in sequence for reassembly.

3) Remove ring gear lock plate tabs and loosen bolts in diagonal sequence. Remove ring gear. Drive out pinion shaft lock pin from ring gear back side using a punch; pull out pinion shaft and pinion.

4) Pinion side gears and spacers are now accessible. Note placement of pinion side gear and spacers and ensure they are reassembled in same position.

Fig. 7: Removing Differential Side Bearings

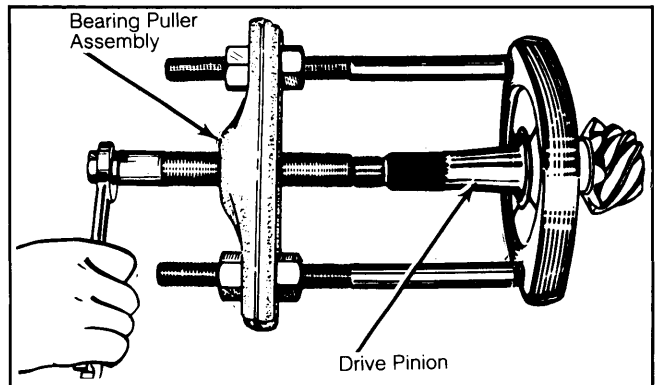


Note position of pinion side gear and spacers for reassembly.

Drive Pinion

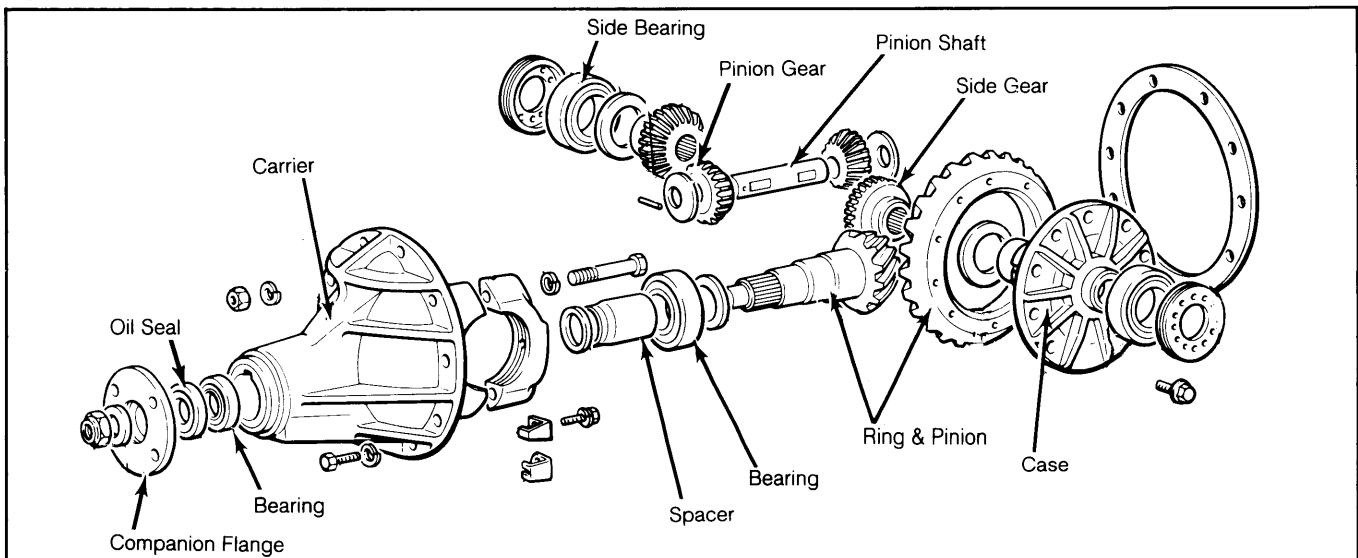
1) Hold end yoke and remove lock nut. Remove end yoke. Using a wheel puller, force out drive pinion with adjusting shim, rear inner bearing race, spacer and preload adjusting shim. See Fig. 8.

Fig. 8: Removing Rear Drive Pinion Bearing



Rear bearing outer race is removed by same method.

Fig. 6: Exploded View of Chrysler Corp. Import Differential For Challenger & Sapporo Models



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2) With bearing puller, remove rear bearing inner race and at same time, pull off drive pinion adjusting shim. Using drift, remove front drive pinion bearing outer race and oil seal. Repeat same procedure to remove rear bearing outer race.

INSPECTION

1) Check differential gears for correct tooth contact and replace gears if wear is excessive. Inspect bearing faces for roughness or score marks and replace bearing assembly, if necessary.

2) Ensure splines of side gears and rear axle shafts fit correctly. Check clearance between pinion gears and pinion shaft, if wear is excessive, replace components.

NOTE: To check gear tooth contact using paint impression method, refer to beginning of this section.

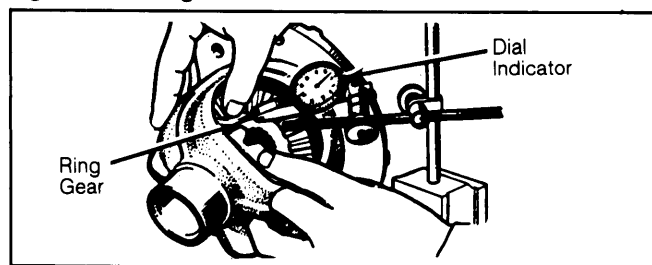
REASSEMBLY & ADJUSTMENT

Case Assembly

1) Install thrust washers (spacers) behind side gears in their original position and assembly pinion and side gears in differential. Insert both pinion gears, with pinion washers attached, so they mesh with side gears. It may be necessary to slightly rotate pinions to achieve desired meshing. Insert drive pinion shaft.

2) Check pinion and side gear backlash as shown in Fig. 9. If backlash is beyond .002-.005" (.05-.127 mm) on pickups or .006" (.15 mm) on all other models adjust by selecting a side gear thrust washer (spacer) of correct size. If backlash is to be adjusted, ensure right and left sides are equally shimmed.

Fig. 9: Checking Differential and Side Gear Backlash



Right and left sides must be equally shimmed.

3) Align drive pinion shaft with drive pinion shaft lock pin hole in differential case and drive lock pin into hole from back side of ring gear. Securely stake lock pin in 2 places to prevent movement.

4) Remove old adhesive from ring gear mounting bolts and gear mounting surface. Apply Loctite and install bolts and lock washers. Tighten bolts alternately in a diagonal sequence and bend over lock tabs. Ensure lock washers are in contact with case rib after final torque has been achieved.

NOTE: To harden adhesive, keep differential stationary for 1/2 to 1 hour.

Drive Pinion

1) Using a drift and hammer or a press, seat front and rear bearing outer races into gear carrier ensuring that outer races do not cock. Ensure bearing races are completely seated before proceeding. Install

shim between drive pinion and rear bearing. Press bearing onto drive pinion shaft.

2) If drive pinion and bearings are scheduled to be reused, shims should be replaced with new shims of same thickness. In instances where the gear set is to be replaced, install new shims that are the same thickness as the used shims on drive pinion.

NOTE: When determining the desired thickness of shim pack, amount of compression (sinkage) of shim pack and wear of the bearing (where old bearing is reused) must be taken into consideration

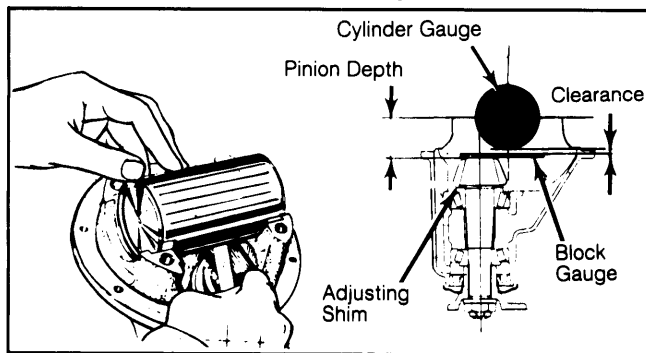
Drive Pinion Depth

1) Install drive pinion spacer, front bearing, washer, end yoke and washer in order of removal. Fit pinion shaft retaining nut and slowly tighten nut, continuously checking, until pinion bearing preload is 6-9 INCH lbs. (.7-1.0 N.m) with oil seal not installed.

2) Place cylinder gauge on inside bearing pedestals of gear carrier housing. Place a block gauge on top end of drive pinion and slip a feeler gauge between the 2 gauges to obtain correct pinion height. Select appropriate shim(s) to adjust pinion height to within $\pm .0012$ " (.03 mm) of measurement taken with block gauge and feeler gauge. See Fig. 10.

NOTE: If pinion depth has to be adjusted by more than .065" (1.65 mm), use two shims. One MUST be .0118" (.30 mm).

Fig. 10: Measuring Drive Pinion Depth



Insert feeler gauge between block gauge and cylinder gauge.

Pinion Bearing Preload

1) This adjustment must be performed after setting of drive pinion depth. Remove end yoke and insert bearing preload adjusting shim between pinion spacer and bearing. Tighten end yoke to 9-11 INCH lbs. (1.0-1.3 N.m) with oil seal installed.

2) In addition to preload adjusting shims, there are spacers available to provide proper adjustment. After finishing adjustment of drive pinion bearing preload, remove end yoke and apply a thin coat of grease to outer surface of oil seal.

3) Drive seal into position in gear carrier. After greasing oil seal lip, insert end yoke and tighten nut.

Side Bearing

1) Install side bearing inner races with installer. Install differential carrier in housing and install outer races. Align bearing cap index marks and tighten cap bolts to specifications.

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2) Install bearing nuts. Tighten bearing nuts in clockwise rotation until bearing outer surface is flush with bearing cap outer surface. Back nut out counterclockwise and retighten nut to completely seat bearing. Tighten bearing nuts to 11. ft. lbs. (15 N.m).

Ring Gear Runout

Attach a dial indicator to back side of ring gear and measure runout. If ring gear has excessive runout, correct position of assembly by tightening/loosening bearing nuts. Replace ring gear or differential case if runout exceeds .002" (.05 mm).

Drive Pinion Backlash

Measure backlash of drive pinion in at least four different spots on ring gear face with drive pinion securely fixed in final position. Set up a dial indicator on ring gear teeth edges. If measured backlash exceeds .005-.007", correct position of assembly as described for Ring Gear Deflection.

NOTE: Check gear tooth contact using paint impression method described at beginning of this section.

Final Inspection & Assembly

1) Lightly coat each gear and bearing before and during reassembly with gear oil. After installing each component, ensure all rotating parts are free to move smoothly.

2) Install differential gear assembly to axle housing after applying sealing agent and tighten gear carrier mounting nuts in diagonal sequence.

AXLE ASSEMBLY SPECIFICATIONS

Application	Specifications In. (mm)
Bearing-to-Bearing Retainer	
Pickup002-.008 (.05-.20)
All Others	0-.01 (0-.30)
Differential Pinion-to-Pinion Shaft	
Pickup0-.0025 (0-.07)
All Others	0-.006 (.15)
Differential Pinion and Side Gear Backlash	
Pickup002-.005 (.05-.013)
All Others	0-.006 (.15)
Drive Pinion and Ring Gear Backlash005-.007 (.13-.18)
Ring Gear Runout (Backside)	0-.002 (0-.05)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Outer Bearing Retainer	25-36 (33-48)
Ring Gear-to-Differential Case	58-65 (78-88)
Final Drive End Yoke (Final Torque)	
Pickup	137-180 (186-245)
All Others	137-181 (185-245)
Differential Carrier Cap	
Pickup	40-47 (54-64)
All Others	25-29 (34-39)
Differential Gear Carrier	
Assembly-to-Axle Housing	18-22 (25-29)
Lock Plate	11-16 (15-22)