## CHRYSLER CORP. – 8¼" & 9¼" RING GEAR

**Chrysler Corp.**
**(All Rear Wheel Drive Models)**

NOTE – *Some models use other units. See Chrysler Corp. 7¼" Ring Gear, or Sure Grip Differential in this section.*

### DESCRIPTION

Axle assembly is of the integral housing, hypoid gear type in which centerline of drive pinion is mounted below centerline of ring gear. A removable cover permits inspection and service of differential. Wheel bearings are straight roller type and roll directly on axle shaft. There is no external adjustment.

CAUTION – *Should rear axle become submerged in water, lubricant must be changed immediately to avoid possibility of early axle failure resulting from contamination of lubricant by water drawn into vent hole.*

### AXLE RATIO & IDENTIFICATION

Axle ratio identification number stamped on metal tag affixed to one of the cover screws. All 8¼" axles have a 10 bolt cover, 9¼" axles have a 12 bolt cover.

**Axle Ratio Identification**

| Axle Ratio | No. of Teeth: Pinion Gear | Ring Gear |
|---|---|---|
| 8¼" Ring Gear | | |
| 2.24:1 | 21 | 47 |
| 2.45:1 | 20 | 49 |
| 2.71:1 | 17 | 46 |
| 2.94:1 | 16 | 47 |
| 9¼" Ring Gear | | |
| 2.94:1 | 16 | 47 |
| 3.21:1 | 14 | 45 |

### REMOVAL & INSTALLATION

#### AXLE SHAFTS & BEARINGS

**Removal** – 1) Raise and support vehicle. Remove wheels and brake drums. Loosen housing cover screws to drain lubricant. Remove housing cover.

2) Turn differential case for access to lock screw. **Remove lock** screw and pinion shaft. Push axle shafts toward center of vehicle. Remove "C" locks from groove in axle shafts. **Remove** shafts from housing.

3) Do not damage roller bearing which remains in axle housing. Remove shaft seal from housing bore using button end of axle shaft. Dents caused by axle shaft splines should be polished smooth or rubber on outside diameter of seal will be torn and seal leakage will result.

4) To remove bearing, use suitable bearing separator tool (C-4167). If axle shaft and bearing are not damaged, then they may be reused. DO NOT reuse axle shaft seal after removal.

**Installation** – 1) Clean all parts thoroughly. Install axle shaft bearing. Make sure bearing is not cocked in bore. Bottom bearing against shoulder. Install axle shaft bearing seal and slide shaft into place. Install "C" washer lock in groove of axle shaft. Pull outward on shaft so that "C" lock seats in counterbore of differential side gear.

2) Install differential pinion shaft through case and pinions. When installing pinion shaft, align hole in shaft with lock screw hole. Install lock screw and tighten. Install cover with suitable Silicone Rubber Sealant (Part No. 3683829) and tighten cover bolts.

NOTE – *Reinstall axle ratio identification tag under 1 cover bolt.*

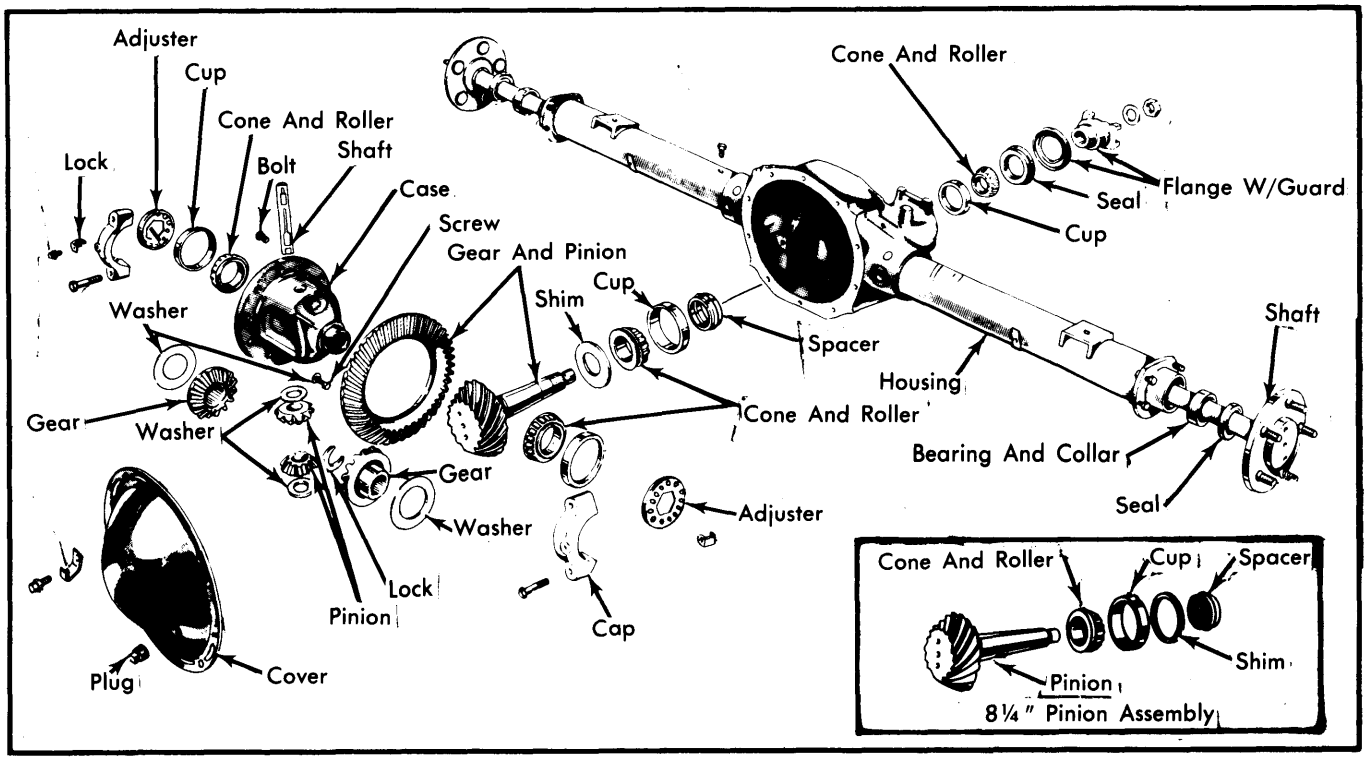


***Fig. 1 Exploded View of Chrysler Corp. 8¼" and 9¼" Rear Axle Assembly***

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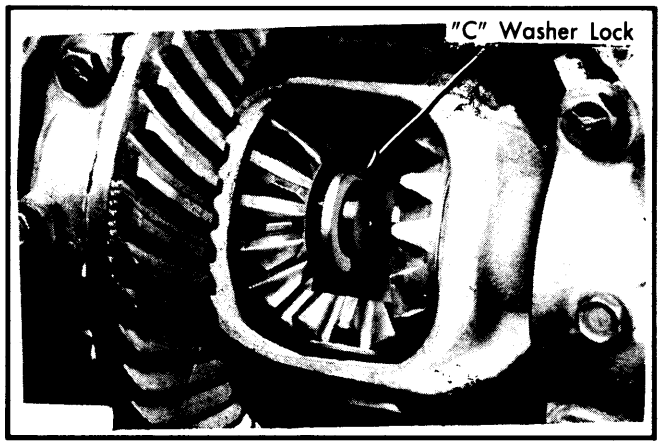


*Fig. 2 Location of "C" Washer Lock*

### PINION FLANGE & OIL SEAL

**Removal – 1)** Raise and support vehicle. Place alignment marks on propeller shaft, companion flange and end of pinion stem for installation reference. Disconnect propeller shaft and support out of the way.

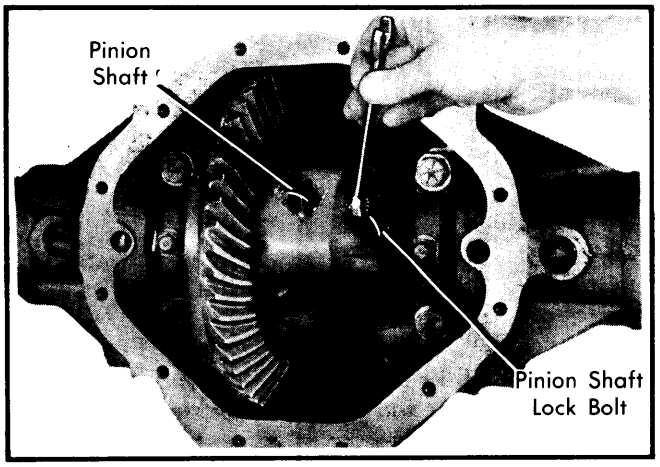


*Fig. 3 Differential Pinion Shaft Lock Location*

**2)** To prevent drag while measuring pinion bearing preload, remove wheels and any part of brake assembly which may cause drag. Measure pinion bearing preload by rotating pinion with an INCH pound torque wrench. Rotate pinion through several revolutions and record readings.

**3)** With suitable tool (C-3281), hold companion flange and remove drive pinion nut and Belleville washer. Remove flange and pinion seal.

**Installation – 1)** Inspect flange for damage, and repair if necessary. Using seal installer (C-4076 on 8¼" axles or C-3980 on 9¼" axles), install new pinion oil seal. Seal is properly installed when seal flange contacts housing flange face. Position flange on pinion stem (align reference marks). Install Belleville washer (convex side of washer out) and nut. Tighten nut.

**2)** Rotate pinion several revolutions to seat bearings. Measure pinion bearing preload with an INCH Lb. torque wrench. Continue tightening pinion nut and checking preload until preload is at original setting. Preload should not exceed 10 INCH Lbs. over original setting.

CAUTION – *Under no circumstances should pinion nut be backed off to lessen preload. If desired preload is exceeded, a new collapsible spacer must be installed and nut retightened until proper preload is obtained. Also, universal joint flange must never be hammered on or installed with power tools.*

### REAR AXLE HOUSING

**Removal – 1)** Raise vehicle and support body at front of rear springs. Block brake pedal in "up" position. Remove wheel and drum assemblies. Remove brake hose and junction block from axle housing.

**2)** Remove brake backing plate retainer nuts. Remove backing plates (with shoes and parking brake cables attached) and wire to frame. Place alignment marks on propeller shaft and companion flange for installation reference. Disconnect and support propeller shaft out of the way. Remove shock absorbers and spring "U" bolts. Remove rear axle assembly from vehicle.

**Installation –** To install, reverse removal procedure.

## OVERHAUL

NOTE – *Overhaul may be accomplished without removing complete axle assembly from vehicle.*

### DISASSEMBLY

NOTE – *Side play and runout checks should be made during disassembly for use during reassembly.*

**1)** Drain fluid from housing, then remove cover and clean interior of differential. Measure axle shaft end play by inserting a feeler gauge between end of axle shaft and differential pinion shaft. Record greatest thickness which can be inserted for both right and left sides.

**2)** If axle shaft end play is less than .005", measure side gear clearance by inserting 2 feeler gauges of same thickness at side gear thrust surface (1 above and 1 below side gear hub). If greater than .012", replace side gears.

**3)** Push both axles toward center of case, remove "C" washers, pinion shaft lock and pinion shaft. Remove axle shafts. Position screwdriver between left side of housing and differential case flange. Using a prying motion, determine if side play is present. No side play should be present.

NOTE – *Side play resulting from bearing cones becoming loose on differential case hubs requires replacement of case. Otherwise, tighten threaded adjusting nut to remove side play.*

**4)** Mount a dial indicator and load the indicator stem slightly when plunger is at right angles to back face of ring gear. Measure ring gear runout by turning ring gear several complete revolutions. Mark ring gear and differential case at point of maximum runout. Runout should not exceed .005".

NOTE – *If runout exceeds .005", differential case may be damaged.*

**5)** Mark axle housing and bearing caps for installation in original positions during reassembly. Remove adjuster lock from each bearing cap. Loosen but DO NOT remove bearing caps. Insert hex adjuster tool through axle tube on each side

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and loosen hex adjusters. Hold differential in position. Using extreme caution, remove bearing caps, adjusters and differential assembly.

**6)** Mount differential case and ring gear assembly in soft-jawed vise. Remove and discard ring gear bolts. Using a brass drift or plastic mallet, tap ring gear loose from differential case and remove ring gear.

NOTE – *Ring gear bolts are left hand threads. If ring gear runout did not exceed .005" in step* **4)**, *DO NOT remove ring gear unless case or gear set is to be replaced.*

**7)** If ring gear runout exceeded .005", remove ring gear and install differential case and respective bearings, adjusters and caps in housing. Tighten bearing caps lightly and using hex tool inserted through axle tubes, tighten hex adjusters to remove all side play.

**8)** Mount a dial indicator to housing and position plunger so it contacts ring gear side of differential case flange. Rotate differential case several complete revolutions and note total indicator reading. Runout must not exceed .003". If runout exceeds .003", replace differential case. Remove dial indicator, bearing cap bolts, caps, hex adjusters and case.

NOTE – *If runout does not exceed .003", runout may be reduced by positioning ring gear 180° from point of maximum runout during reassembly.*

**9)** With differential case mounted in soft-jawed vise, rotate side gears until pinion gears appear at case window. Remove pinion gears, side gears and thrust washers. Remove case from vise and remove side bearings with suitable puller and adapter.

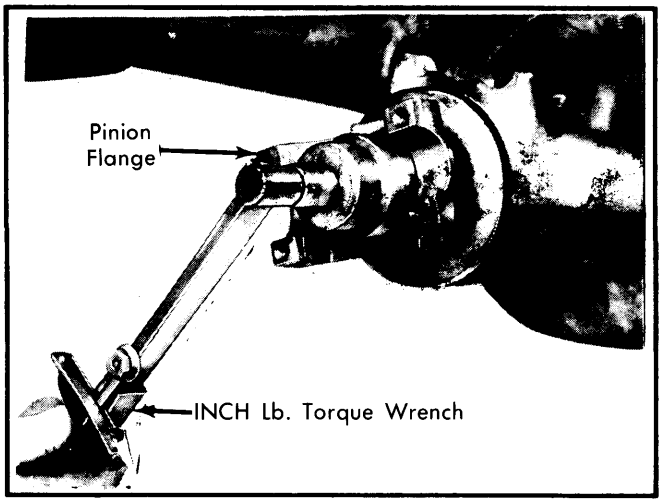


***Fig. 4 Measuring Pinion Bearing Preload***

**10)** Using an INCH Lb. torque wrench, measure pinion bearing preload and record reading. Remove pinion nut and washer. Using holding tool (C-3281) and puller (C-452), remove pinion flange. Remove and discard pinion oil seal. Remove pinion and front bearing.

NOTE – *To remove drive pinion or front pinion bearing, pinion must be driven rearward out of bearing. This will damage bearing rollers and cup, so new cone and cup assembly must be installed.*

**11)** Discard collapsible spacer. Using a brass drift and hammer, remove front and rear bearing cups from housing. Remove rear pinion bearing from pinion with puller and suitable adapters. Remove shim from pinion (if equipped) and measure thickness.

NOTE – *A shim is located behind rear bearing cup in 8¼" housing. Record thickness of shim and discard shim.*

### REASSEMBLY

**Differential Case – 1)** Lubricate all parts when assembling and adjusting. If axle shaft end play exceeded .005" during disassembly, replace thrust washers with thickest pair that will reduce axle shaft end play to less than .005". Install thrust washers on side gears and position gears in case. Place thrust washers on pinion gears. Mesh pinion gears with side gears, with pinion gears 180° apart.

**2)** Rotate side gears to align pinion gears and washers with pinion shaft hole in case. Recheck side gear clearance. If, with maximum thickness thrust washers installed, side gear clearance exceeds .005" and axle shaft end play cannot be reduced to .005" or less, replace differential case.

**3)** If ring gear was removed, using suitable stone, relieve sharp edge of chamfer on inside diameter of ring gear. Heat ring gear with heat lamp or by immersing in hot water or oil. Temperature should not exceed 300°F. Using pilot studs to align gear to case, install new ring gear bolts (left hand threads) through case flange and into ring gear.

NOTE – *Do not use a torch to heat ring gear.*

**4) Position each differential bearing cone on hub of differential case (taper away from drive gear) and install bearing cones using suitable tool. An arbor press may be used, however, never exert pressure against bearing cage.**

**Pinion Bearing Cup Installation – 1)** Lubricate all parts before assembly. Start both drive pinion bearing cups and make sure they are not cocked.

**2)** On 8¼" axles, assemble pinion locating spacer (SP-6030) over body of main tool (SP-5385) followed by rear bearing cone. Position tool in rear axle housing, then install shaft locating sleeve (SP-5382), front pinion bearing cone, compression sleeve (SP-3194-B), centralizing washer (SP-534) and compression nut (SP-3193).

**3)** On 9¼" axles, assemble pinion locating spacer (SP-6017) over body of main tool (SP-526) followed by rear bearing cone. Position tool in rear axle housing, then install front pinion bearing cone, washer (SP-6022), compression sleeve (SP-535-A), centralizing washer (SP-534) and compression nut (SP-533).

**4)** On all axles, hold compression sleeve with holding tool (C-3281) and tighten nut. Allow tool to rotate as nut is being tightened in order not to damage bearing or cups. Leave tool in carrier for determining depth of mesh.

**Pinion Setting (With Tool C-3715) – 1) With main tool left in axle housing after installing drive pinion bearing cups, loosen tool nut and retighten nut to 15-25 INCH lbs. of preload. Rotate after tightening to align bearing rollers. Install gauge block, SP-5383 for 8¼" or SP-6020 for 9¼", on main tool and tighten cap screw with Allen wrench.**

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2) Position crossbore arbor, SP-6029 for 8¼" or SP-6018 for 9¼", in axle housing differential bearing seat. Center arbor so that equal distance is maintained at both ends. Position bearing caps and attaching bolts on carrier pedestals and insert a piece of .002" shim stock between arbor and each cap. Tighten cap bolts to 10 ft. lbs.

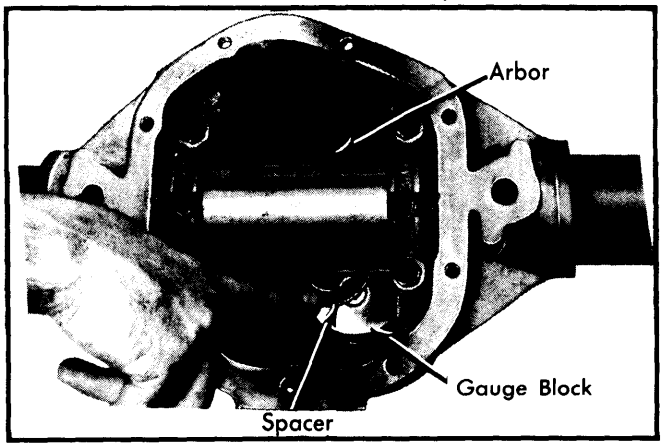


*Fig. 5 Measuring Housing for Pinion Shim Thickness*

3) Select rear pinion bearing mounting shim which will fit between crossbore arbor and gauge block. This fit must be snug but not tight.

4) To select shim pack for installation, read markings on end of pinion head. When marking is minus (–), add that amount to thickness of shim pack. When marking is plus (+), subtract that amount. Shims are available in increments of .001" from .020" to .038".

**Pinion Installation & Bearing Preload – 1)** On 8¼" axles, use hammer and soft punch and remove rear bearing cup from housing. Place selected shim in axle housing rear pinion cup bore and install rear bearing cup. Lubricate rear pinion bearing cone and install on pinion stem using suitable tool (DD-955). On 9¼" axles, place selected shim on pinion stem followed by rear pinion bearing cone. Using tool C-3095 (or equivalent), press bearing on pinion stem. On both axles, an arbor press may be used with installation tools.

2) Insert drive pinion and bearing assembly up through axle housing. Install a new collapsible spacer followed by front pinion bearing cone on pinion stem. Install companion flange.

**CAUTION** – *Use care not to collapse the spacer.*

3) Install drive pinion oil seal until seal flange contacts housing flange face. Outside diameter of seal is precoated with a special sealer so no sealing compound is required.

4) With pinion supported in axle assembly, install companion flange on pinion stem, followed by Belleville washer and nut. Using suitable tool, (C-3718 for 8¼" axles) or (DD-999 for 9¼" axles), and holding tool C-3281 (or equivalent), draw flange into position. Hold universal joint flange with holding tool and retighten pinion nut to remove end play in pinion, while rotating the pinion to insure proper bearing roller seating.

5) Tighten pinion nut to 210 ft. lbs. and measure pinion bearing preload by rotating pinion with an INCH lb. torque wrench. The correct bearing preload specifications are 20-35 INCH lbs. for new bearings. With original rear pinion bearing and new front bearing, 10 INCH lbs. more than recorded before teardown. If correct preload cannot be obtained at 210 ft. lbs., tighten in small increments until proper preload is obtained.

**NOTE** – *DO NOT back off nut to lessen preload. If desired preload is exceeded, a new collapsible spacer must be installed and nut retightened until proper preload is obtained.*

**Differential Bearing Preload & Ring and Pinion Backlash Adjustment – 1)** Coat differential bearings, caps and adjusters with axle lubricant. Carefully position differential case (with bearing cups installed) and hex adjusters in housing. Install bearing caps in original position. Tighten top cap bolts to 10 ft. lbs. and lower bolts finger tight, until head is just seated on bearing cap.

2) Using hex adjuster tool, turn each hex adjuster in until bearing free play is eliminated with approximately .010" backlash existing between ring gear and pinion. Seat bearings.

**NOTE** – *Differential bearing cups will not always move directly with adjusters, therefore to insure accurate adjustment changes and to maintain gear mesh index, bearings must be seated by rotating pinion ½ turn in each direction 5-10 times EACH TIME adjusters are moved.*

3) Install a dial indicator and position plunger against drive side of a ring gear tooth. Find point of minimum backlash by checking at 4 positions approximately 90° apart around ring gear. Rotate ring gear to position of least backlash and mark index so all backlash readings will be taken with same teeth in mesh.

4) Loosen right adjuster and tighten left adjuster until backlash is .003-.004", with each adjuster tightened to 10 ft. lbs. Seat bearings and tighten bearing cap bolts to 100 ft. lbs. Tighten right adjuster to 70 ft. lbs. on 8¼" axles or 75 ft. lbs. on 9¼" axles and seat bearings at same time, until torque remains constant.

**NOTE** – *Maintain specified torque to obtain accurate backlash and preload readings.*

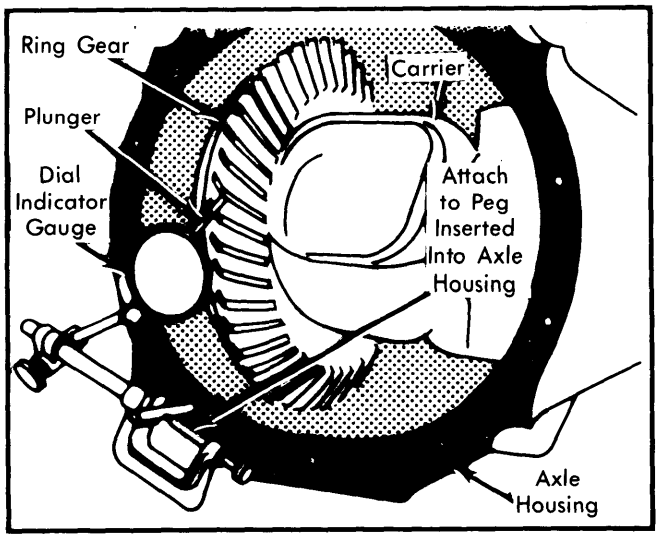


*Fig. 6 Measuring Ring and Pinion Backlash*

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**5)** Measure backlash. Backlash should be .006-.008". If backlash does not meet specifications, increase torque on right adjuster and seat bearings until correct backlash is obtained. Tighten left adjuster to 70 ft. lbs. on 8¼" axles or 75 ft. lbs. on 9¼" axles and seat bearings at same time, until torque remains constant.

NOTE – *If all steps were performed correctly, initial reading on left adjuster should be approximately 70 ft. lbs. on 8¼" axles or 75 ft. lbs. on 9¼" axles. If it is substantially less, complete procedure must be repeated.*

### AXLE ASSEMBLY SPECIFICATIONS

| Application | Specification |
|---|---|
| Ring Gear & Pinion Backlash | ①.006-.008" |
| Pinion Bearing Preload | |
| New Bearings | ②20-35 INCH Lbs. |
| New Front and Used Rear Bearings | ②10-25 INCH Lbs. |
| Ring Gear Backface Runout | .005" (Max.) |

① – At point of minimum backlash.
② – Turning torque.

**6)** After adjustments are completed, install adjuster locks. Lock teeth on 9¼" axles must engage adjuster threads. Lock finger on 8¼" axles must engage adjuster hole. Tighten lock screws to 90 INCH Lbs.

### TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. |
|---|---|
| Differential Bearing Cap Bolts | 100 |
| Ring Gear-to-Case Bolts | 70 |
| Pinion Flange Nut | 210 (Min) |
| Carrier Cover Bolts | 250 INCH lbs. |
| Brake Support Plate Retainer Nuts | 35 |
| Propeller Shaft Bolts | 170-200 INCH lbs. |
| "U" Bolt Nuts | 45 |
| Wheel Stud Nuts | 85 |
| Shock Absorber Nuts | 50 |