Drive Axles

CHRYSLER CORP. 8¾" & 9¼" RING GEAR

Dodge, Plymouth
All 150 Models, Rear Axle

DESCRIPTION

The axle assembly is hypoid gear type with an integral carrier housing. It is used on light duty vehicles with semi-floating axles. Pinion bearing preload adjustment is made with a collapsible spacer. Differential bearing preload adjustment is made with the adjusting nuts on which bearing cups seat.

A removable housing cover permits inspection and minor servicing of differential without removal from vehicle. Service procedures are the same for both size assemblies, except for some tightening specifications and special tool numbers.

AXLE RATIO & IDENTIFICATION

A small metal tag attached to rear axle housing cover bolt, identifies axle ratio. Chrysler Corp. also uses Spicer (Dana) axles for some applications. To distinguish these models from Chrysler Corp. models, refer to *Spicer (Dana) axle articles in this Section.*

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

Removal

1) Raise vehicle and remove wheel, tire and brake drum. Loosen housing cover attaching bolts to drain lubricant. Remove housing cover. Remove pinion shaft lock screw and differential pinion shaft.

2) Force axle shaft toward center of vehicle. Remove "C" washer lock from groove in axle shaft. Pull axle shaft out of housing, using care not to damage roller bearing. Remove oil seal from housing bore.

3) To remove axle shaft bearing from axle housing, use bearing puller (C-4167). Attach a slide hammer to puller and remove axle shaft bearing and inspect. Discard if axle or bearing shows any signs of brinnelling, spalling or pitting.

4) 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. Inspect both axle and bearing. If either show signs of excessive wear, discard bearing.

NOTE: Always install new axle shaft oil seal.

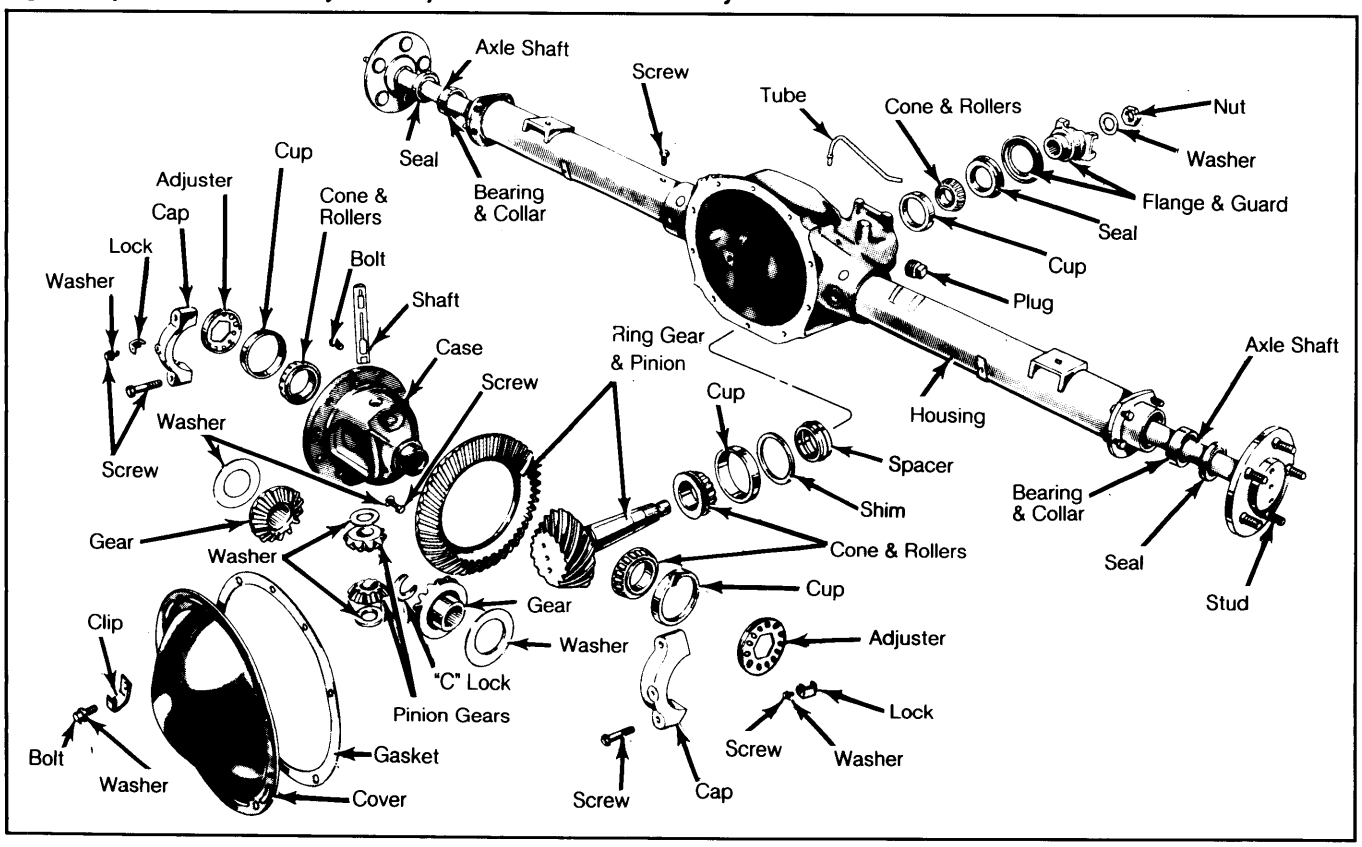
Installation

1) Clean all parts thoroughly. Install axle shaft bearing squarely into housing bore. Making sure bearing is bottomed against shoulder in bore. Oil and install oil seal in housing bore.

2) Slide axle shaft into place being careful not to damage oil seal. Install "C" washer lock into groove in axle shaft. Pull outward on axle shaft so that "C" washer lock seats in counterbore of differential side gear.

3) Install differential pinion shaft through case and pinions. Aligning hole in shaft with lock screw hole in case. Install pinion shaft lock screw and tighten securely. Install housing cover and identification tag.

Fig. 1: Exploded View of Chrysler Corp. 8¾" Drive Axle Assembly — 9¼" Similar.



CHRYSLER CORP. 8 3/8" & 9 1/4" RING GEAR (Cont.)

PINION FLANGE & SEAL

Removal

1) Raise vehicle, mark propeller shaft universal joint, drive pinion flange and pinion stem for reassembly. Disconnect propeller shaft and tie out of way. Remove rear wheels and brake drums to prevent false preload reading.

2) Using an INCH lb. torque wrench, measure and record pinion bearing preload. Remove drive pinion nut and pull off flange using puller. Pry out oil seal, taking care not to damage machined surface.

Installation

1) Install new pinion oil seal squarely into bore in housing until seal flange seats against housing flange face. Position pinion flange on pinion stem, making sure marks are aligned. Install pinion washer (convex side out) and nut. Tighten nut to specifications and rotate pinion through several revolutions to be sure bearing rollers are properly seated.

NOTE: Outside diameter of seal is precoated with a special sealer, so no sealing compound is required.

2) Measure pinion bearing preload. Continue tightening pinion nut until preload is same as that noted before disassembly. Under no circumstances should preload be more than 10 INCH lbs. (1.1 N.m) 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.

AXLE ASSEMBLY

Removal & Installation

1) Raise vehicle and block brake pedal in "Up" position. Remove wheels, tires and brake drums. Disconnect brake lines at wheel cylinders and cap to prevent fluid loss. Disconnect parking brake cables.

2) Mark propeller shaft universal joint, drive pinion flange and pinion stem for reassembly. Disconnect propeller shaft and tie out of way. Remove shock absorbers and rear spring "U" bolts. Remove rear axle assembly. To install, reverse removal procedure.

OVERHAUL

DISASSEMBLY

NOTE: It is not necessary to remove complete rear axle assembly to overhaul differential.

1) Remove wheels and brake drums. Mark propeller shaft and universal joint for reassembly, remove propeller shaft and tie out of way. Drain lubricant and remove housing cover. Measure and record axle shaft end play.

2) Insert feeler gauge between each end of axle shaft and pinion shaft. Record maximum thickness that can be inserted in each side. If end play is less than .005" (.13 mm), measure side gear clearance.

3) Using 2 feeler gauges of equal thickness, insert 1 gauge above and 1 gauge below side gear hub next to thrust surface. If clearance is more than .012" (.30 mm), replace side gear. Remove axle shafts as previously described.

4) Measure and record differential side play, ring gear runout and pinion bearing preload. Mark differential gear and case at point of maximum runout. There should be no side play and ring gear runout should not exceed .005" (.13 mm).

5) If ring gear runout exceeded .005" (.13 mm), differential case flange runout must be checked. Using Hex Adjuster tool (C-4164 or equivalent), tighten adjusters until all case side play is eliminated.

6) Mount dial indicator to housing and place indicator stem on ring gear flange of differential case. Rotate case several times, checking reading on dial indicator. If reading varies more than .005" (.13 mm), replace differential case.

7) Remove drive pinion flange and seal as previously described. Mark side bearing caps and axle housing for reassembly. Remove adjuster locks, loosen but do not remove bearing caps. Insert Hex Adjuster tool (C-4164 or equivalent) through axle tube and loosen hex adjuster on each side.

8) Remove bearing caps, adjusters and differential case assembly. Be sure to keep all bearing cups and adjusters with their respective bearing cones. Using soft drift punch and hammer, drive pinion shaft out of housing.

NOTE: Bearing cones, cups, collapsible spacer and shim(s) must be replaced after driving out pinion.

9) Drive bearing cups out of housing using a hammer and soft drift punch, remove shim(s) from behind rear cup and record thickness. Remove bearing cones from pinion shaft using puller and adapter (C-293-P and C-293-42 or equivalent).

10) Mount differential case assembly in a soft-jawed vise. Remove and discard ring gear bolts (left-hand thread). Using a soft-faced hammer, drive ring gear off differential case.

NOTE: Do not remove ring gear from differential case unless case or gear set is replaced.

CLEANING & INSPECTION

1) Clean all components in cleaning solvent. Inspect all machined surfaces for smoothness or raised edges, and polish or flatten as required.

2) Inspect all bearings and cups for wear and/or pitting and replace as a set. Inspect all gear teeth for wear and/or chipping and replace as a matched set only. Inspect all splined components for wear or damage and replace as required.

REASSEMBLY & ADJUSTMENT

Case Assembly

1) Install thrust washers on differential side gears and position gears in differential case. Place thrust washers on differential pinion gears and position gears in case so that they are 180° apart when they are in mesh with side gears.

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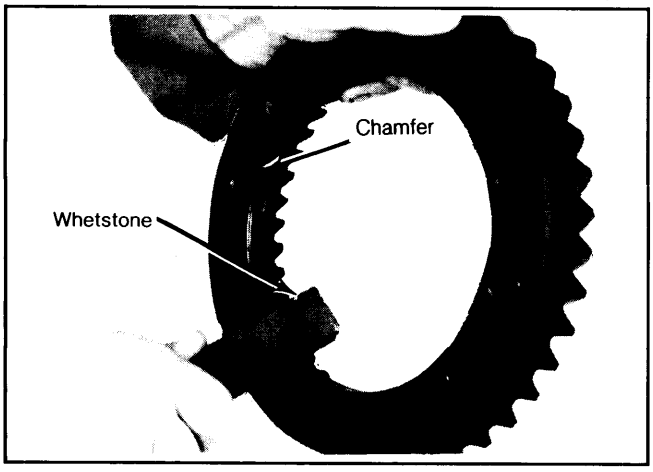
2) Rotate side gears until holes in pinion gears are in alignment with pinion shaft holes in case. Install differential pinion shaft, making sure hole in shaft is aligned with lock screw hole in case.

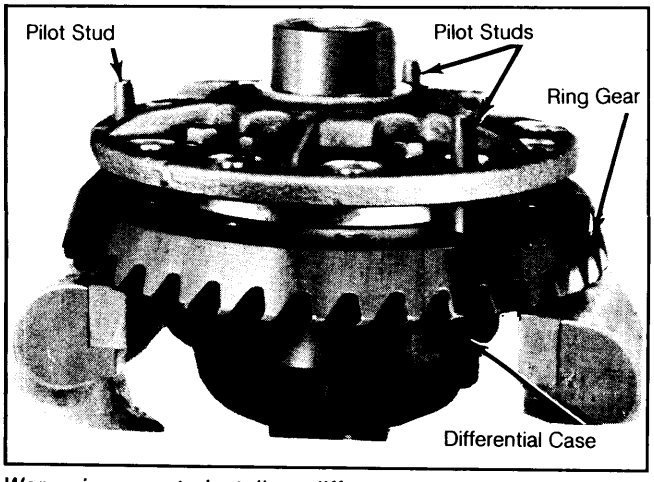
Fig. 2: 8¾" & 9¼" Ring Gear — Relieving Chamfer Edge.



Surfaces of ring gear & case flange must be smooth.

3) Make sure contact surface of ring gear and case flange is clean and free of all nicks and burrs. Using a fine whetstone, relieve any sharp edge of the chamfer on inside diameter of ring gear. Relieving chamfer insures that no burrs will become imbedded between case flange and ring gear causing ring gear distortion. *See Fig. 2.*.

Fig. 3: Installing Ring Gear on Differential Case



Warm ring gear to install on differential case.

4) Heat ring gear using heat lamp, hot oil or water; not to exceed 300°F (149° C). Do not use torch to heat ring gear. Install 3 equally spaced pilot studs on ring gear. Place heated ring gear on jaws of vise and install case using new left-hand threaded bolts. *See Fig. 3.*

5) Tighten ring gear-to-case bolts alternately and evenly to specifications. Install side bearings on case using Bearing Installer and Driver (C-4340 & C-4171 on 8¾" ring gear. C-4213 & C-4171 on 9¼" ring gear). Lubricate assembly with hypoid gear lubricant.

Drive Pinion Depth

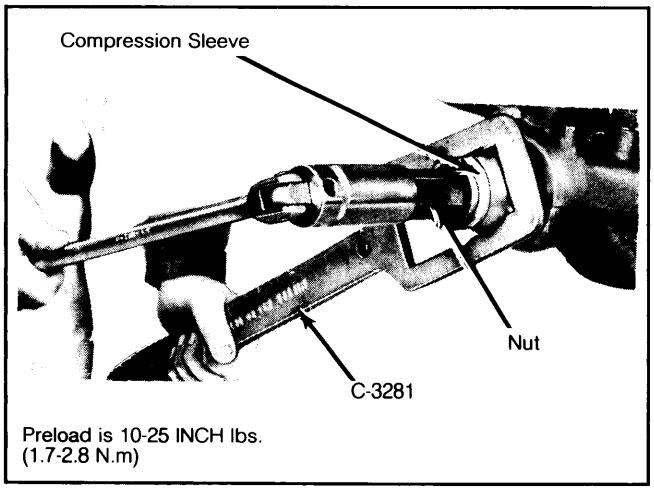
1) Install both drive pinion bearing cups into axle housing bores. Assemble pinion locating spacer (SP-60-30) over body of main stem (SP-5385) followed by rear pinion bearing cone. Insert assembly into axle carrier from rear.

NOTE: Tool numbers used apply to 8¾" ring gear axles. For equivalent tool numbers for 9¼" ring gear axles, *see Equivalent Tool Number Chart.*

2) On 8¾" assembly, hold spacer and main stem assembly in position and install front pinion bearing over spacer (SP-5382) and position over main stem of tool. On 9¼" assembly, position spacer and main stem assembly in housing. Install front pinion bearing cone and washer (SP-6022).

3) Procedure from this point is same for both assemblies except for tool numbers (see note in preceding step). Position Compression Sleeve (Sp-3194B), centralizing washer (SP-534), and main screw nut (SP-3193) on main stem. Hold compression sleeve with Companion Flange Wrench (C-3281) and tighten nut. Allow tool to rotate while nut is being tightened to prevent damaging bearings and cups. *See Fig. 4.*

Fig. 4: Seating Pinion Bearing Cups on 8¾" & 9¼" Differentials.



Rotate while tightening pinion nut.

3) Loosen tool nut, then retighten to obtain pinion bearing preload of 10-25 INCH lbs. (1.7-2.8 N.m). Rotate tool after tightening to properly seat pinion bearings. Install gauge block (SP-5383) on main tool and tighten screw.

4) Position cross bore arbor (SP-6029) in housing side bearing seats and center arbor in bore. Position bearing caps on carrier pedestals and insert .002" (.051 mm) spacer between arbor and each cap. Install cap bolts and tighten to 10 ft. lbs. (14 N.m).

5) Use feeler gauge to determine proper thickness of shims that will fit snugly between arbor and gauge block. This fit must be snug but not excessively tight.

6) To select correct shim pack, read markings on end of pinion head. When marking is minus, add that amount of thickness to feeler gauge thickness to obtain thickness of correct shim pack. When marking is plus, subtract that amount of thickness. Remove all tools and rear pinion bearing cup from housing. *See Fig. 5.*

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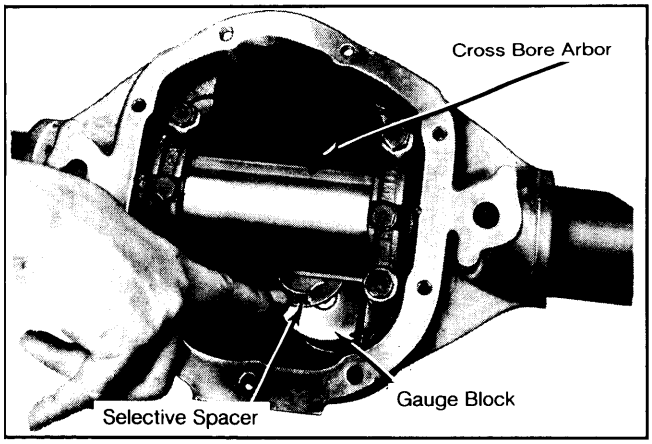
Fig. 5: Measuring Shim Pack Thickness



Using selective spacer, determine correct shim thickness.

EQUIVALENT TOOL NUMBER CHART

Application	8¾"	9¼"
Spacer	SP-6030	SP-6017
Main Stem	SP-5385	SP-526
Spacer	SP-5382	SP-1730
Washer	SP-6022	SP-6022
Comp. Sleeve	SP-3194B	SP-535A
Cent. Washer	SP-534	SP-534
Nut	SP-3193	SP-533
Holding Tool	C-3281	C-3281
Gauge Block	SP-5383	SP-6020
Cross Bore Arbor	SP-6029	SP-6018
Bearing Installer	DD-955	DD-955

Pinion Bearing Preload

1) Place selected shim in pinion shaft bore and reinstall rear pinion bearing cup. Lubricate rear pinion bearing and press into position on drive pinion stem.

2) Insert drive pinion assembly through axle housing. Install collapsible spacer and front pinion bearing onto stem of gear. Install pinion flange and tighten nut until front bearing is seated.

NOTE: Use care not to collapse spacer. If spacer is collapsed, new spacer must be installed.

3) With front bearing fully seated, remove pinion flange. Install new pinion oil seal into housing so flange of seal is fully seated against housing flange face.

4) Install pinion flange, Belleville washer (convex side out) and nut on pinion stem. While rotating pinion assembly (to insure proper bearing seating), tighten pinion flange nut until all end play is removed.

5) Tighten pinion nut to specified torque and measure pinion bearing preload by rotating pinion through several revolutions with an INCH lb. torque wrench. Continue tightening pinion flange nut in small increments until correct bearing preload is obtained. Do not back off nut to lessen bearing preload. If desired preload is exceeded, a new collapsible spacer must be installed and nut retightened until proper preload is obtained.

Backlash & Side Bearing Preload

1) Two precautions must be observed when checking and adjusting ring gear backlash and differential bearing preload.

- Index gears so same teeth are meshed during all backlash measurements. Permissible backlash variation is .003" (.08 mm). For example, if backlash at minimum point is .006" (.15 mm) and backlash at maximum point is .009" (.23 mm), variation is correct.
- It is also important to maintain specified adjuster torque to obtain accurate differential bearing preload.

2) Using Hex Adjuster tool (C-4164) turn each adjuster until bearing free play is eliminated with approximately .010" (.25 mm) backlash. Seat differential roller bearings. Differential bearings do not always move with adjusters. To ensure accurate adjustment, bearings must be seated by oscillating drive pinion ½ turn in each direction 5-10 times each time adjusters are moved.

3) Install dial indicator on cover flange. Position indicator stem against drive side of ring gear. Check backlash every 90° to find point of minimum backlash. Mark each position so backlash readings will be taken with same teeth meshed. Rotate ring gear to point of minimum backlash.

4) Loosen right adjuster and tighten left adjuster until backlash is .003-.004" (.08-.10 mm) with each adjuster tightened to 10 ft. lbs. (14 N.m). Seat bearings as previously described. Tighten bearing cap bolts to 100 ft. lbs. (136 N.m). Using Hex Adjuster tool (C-4164), tighten right adjuster to 70 ft. lbs. (95 N.m). Seat bearings and continue to tighten right adjuster until torque remains constant at 70 ft. lbs. (95 N.m).

5) Check backlash again with indicator. If backlash is not between .006-.008" (.15-.20 mm), increase torque on right adjuster and seat bearings. Continue this operation until backlash is .006-.008" (.15-.20 mm). Tighten left adjuster to 70 ft. lbs. (95 N.m) and seat bearings. With adjustments completed, install adjuster locks. Make sure lock teeth are engaged in adjuster threads. Tighten lock screws to 90 INCH lbs. (8 N.m).

Final Inspection & Assembly

With pinion bearing preload and ring gear backlash properly adjusted, make a tooth pattern contact check. When pattern is satisfactory, install axle shafts, brake drums, wheels and tires, axle housing cover and refill with hypoid gear lubricant.

AXLE ASSEMBLY SPECIFICATIONS

Application	Specifications
Ring Gear Backlash	.006-.008" (.15-.20 mm)
Pinion Bearing Preload	
New Bearings	20-35 INCH Lbs. (2.3-4.0 N.m)
Used Rear,	
New Front Bearing	10 INCH Lbs. (1.1 N.m)
Maximum Ring Gear Runout	.005" (.13 mm)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Ring Gear-to-Diff. Case Bolts [1]	
8¾" Ring Gear	55 (75)
9¼" Ring Gear	70 (95)
Drive Pinion Nut (Minimum)	210 (286)
Side Bearing Cap Bolts	
8¾" Ring Gear	55 (75)
9¼" Ring Gear	100 (136)
Bearing Adjuster Lock Bolts	90 INCH lbs.(8 N.m)

[1] — Left-hand threaded bolts.