ROCKWELL F-130-NX SINGLE SPEED

Dodge
M600 Motor Home Chassis

DESCRIPTION

The axle has a banjo-type housing with a removable carrier. The drive pinion is straddle mounted with opposed tapered roller bearings at the forward end and a straight roller pilot bearing at the rear. The pinion bearing preload is adjusted by substituting different sized spacers. The pinion depth is adjusted by shims. The preload of the differential side bearings is set by adjusting nuts on which the bearing cups rest. A thrust block is installed against the back of the ring gear. The thrust block is adjusted by a screw accessible from outside of axle housing. The differential has a two piece case and four differential pinion gears.

AXLE RATIO

The axle ratio on the Rockwell F-130-NX for this vehicle is 4.88:1.

REMOVAL & INSTALLATION

AXLE SHAFTS

Removal – Remove axle flange nuts and lock washers. Strike end of axle shaft sharply with a hammer to loosen tapered dowels. Remove tapered dowels and axle shafts. Do Not pry axle loose with a screwdriver as axle flange may be damaged.

Installation – Clean gasket area with a suitable solvent. Install a new flange gasket and slide axle shaft into position. If equipped with an outer wheel seal, install new gaskets on both sides of seal. Install tapered dowels, lock washers and nuts. Tighten nuts to specifications.

ADJUSTMENT

REAR WHEEL BEARING

See Rear Wheel Bearing Adjustment in WHEEL ALIGNMENT Section.

OVERHAUL

DISASSEMBLY

1) Remove axle shafts as previously outlined. Drain lubricant and disconnect propeller shaft at yoke. Loosen two top nuts securing carrier to axle housing and remove all remaining nuts. Loosen carrier at axle housing with a soft hammer. Remove remaining two nuts and remove carrier from housing. Clean carrier and place in a suitable holding fixture.

2) Mark side bearing caps to ensure that they are installed in original position. Cut and remove lock wire. Remove side bearing adjusting ring lock bolts and locks. Remove bearing cap stud nuts. Remove bearing caps and adjusting nuts. Loosen lock nut and back off thrust block adjusting screw. Lift differential out of carrier. Remove thrust block from end of adjusting screw.

3) Center punch mark differential case halves to ensure that they are aligned correctly during reassembly. Cut and remove lock wires. Remove differential case half bolts and separate case halves. Remove pinion shaft, pinions, side gears, and thrust washers. Remove bearing cones from differential halves using a suitable puller (DD-914-P). To remove ring gear, drill out rivets with a 1/32" drill. Drive out rivets and remove ring gear from differential case half.

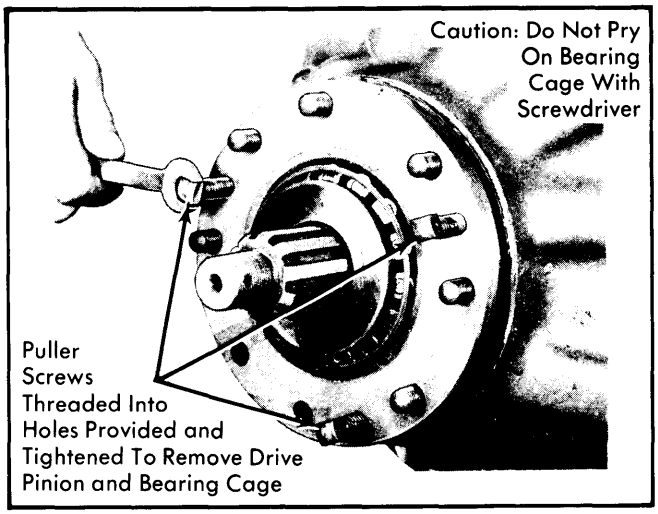

Fig. 1 Drive Pinion Shaft and Bearing Cage Removal

4) Hold yoke with a suitable holding tool (DD-949) and remove nut and washer. Pull off yoke using a suitable puller (C-549). **CAUTION** – *Do not drive off yoke as damage may be caused.* Remove drive pinion bearing cover and oil seal as an assembly. Remove bearing cage using puller screws screwed into holes provided. *See Fig. 1.* **CAUTION** – *Do not pry bearing cage loose as bearing lock ring groove will be damaged.* Attach bearing cage shim pack to bearing cage for reassembly.

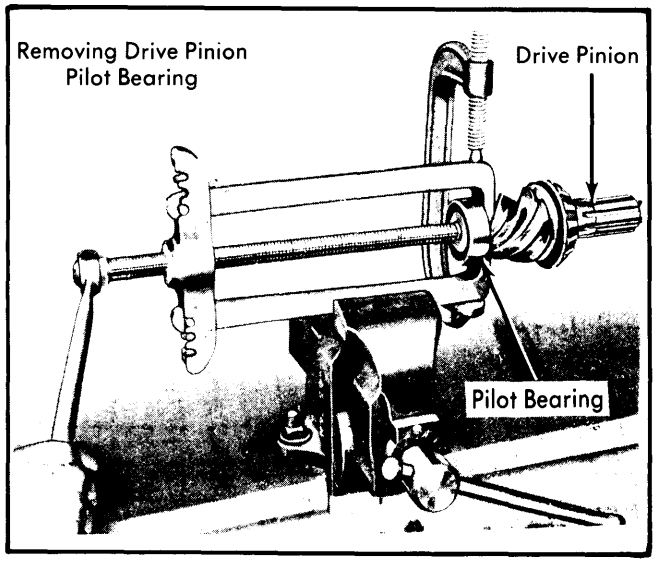

Fig. 2 Drive Pinion Pilot Bearing Removal With Puller

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5) Tap drive pinion shaft out of cage with a soft hammer or press shaft from cage. Remove spacers from shaft and remove inner bearing with a suitable puller (DD-914P). Remove pilot bearing lock ring and remove bearing using a suitable puller (C-549). See *Fig. 2*. Remove oil seal from bearing cover.

REASSEMBLY & ADJUSTMENT

1) Position drive pinion inner bearing on shaft and press into position. Make sure bearing cone is firmly seated against shoulder. Press pilot bearing on to drive pinion shaft and install snap ring. Position bearing cups in bearing cage and press into position. Lubricate bearings and insert drive pinion and bearings into bearing cage. Position original spacers on pinion shaft. Install front bearing and press firmly against spacer. Rotate cage on pinion to ensure that bearing contact is correct.

2) If a press is not available, install yoke and pinion nut, and tighten nut to specification. While unit is still in press or with pinion nut tightened to specification, check bearing preload. Consult Pinion Bearing Preload chart to determine correct press pressure or correct pinion nut torque required to obtain correct drive pinion bearing preload.

Pinion Bearing Preload Chart

Pinion Shaft Threads Per Inch	Press Pressure (Lbs.)	Torque (Ft. Lbs.)
1"x 20	12,000	300-400
1 1/4"x 18	22,000	700-900
1 1/2"x 12	28,000	800-1100
1 1/2"x 18	28,000	800-1100
1 3/4"x 12	28,000	800-1100

3) Wrap a soft wire around cage and pull on wire with a pound scale. If pinion bearing cage diameter is 6", then pulling radius is 3". If INCH pound scale reads a 5 INCH lb. pull, then preload would be 15 INCH lbs. Always use rotating torque, not starting torque. Use a thinner spacer to increase preload and a thicker spacer to decrease preload. Specified preload is 5 to 15 INCH Lbs. If old bearings are reinstalled, preload should be near low limit. If new bearings are installed, preload should be near high limit. See *Fig. 3*.

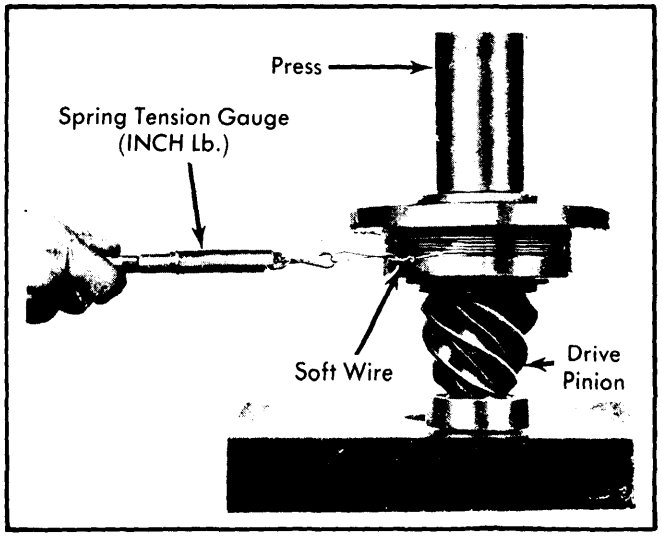

Fig. 3 Checking Drive Pinion Bearing Preload

4) Remove yoke. Lubricate pinion seal lip and coat outside of seal with a non-hardening sealer. Install seal in cover using a suitable driver. See *Fig. 4*. Install bearing cover and seal, using a new gasket. Install pinion yoke, washer and nut. Hold yoke and tighten nut to specification. Install cotter key. Do not back off nut to align cotter key hole. Place original pinion depth shims over studs in carrier. Position pinion bearing cage and drive pinion over stud and tap into position using a soft hammer. Install lock washers and nuts. Tighten nuts to specification. If a new ring gear and pinion are being installed, proceed to Pinion Depth Adjusment.

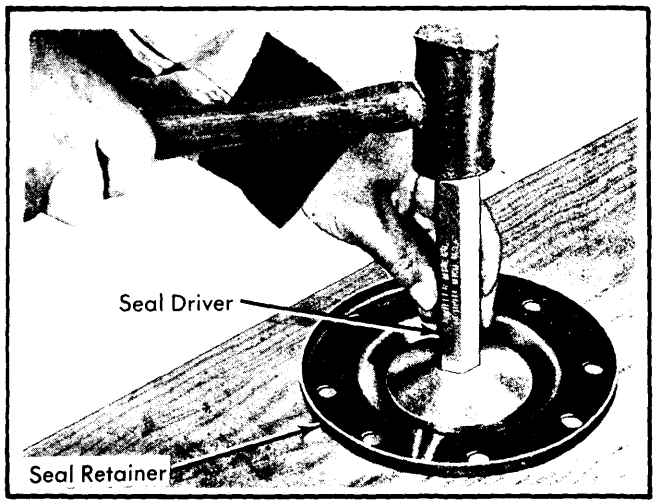

Fig. 4 Installing Drive Pinion Oil Seal In Retainer

5) Install ring gear on differential half and rivet into place. Rivets should be installed cold and not heated. If correct rivet is used, rivet head will be approximately 1/8" larger than rivet hole and approximately the same height as preformed rivet head. If correct size rivets are not available, service replacement bolts can be installed. Lubricate machined surfaces on inside of differential halves and all components. Install one thrust washer and side gear in ring gear half. Install pinion gears and thrust washers on pinion shafts and place assembly in position in differential case half. Place other side gear and thrust washer in position on pinion gears. See *Fig. 5*.

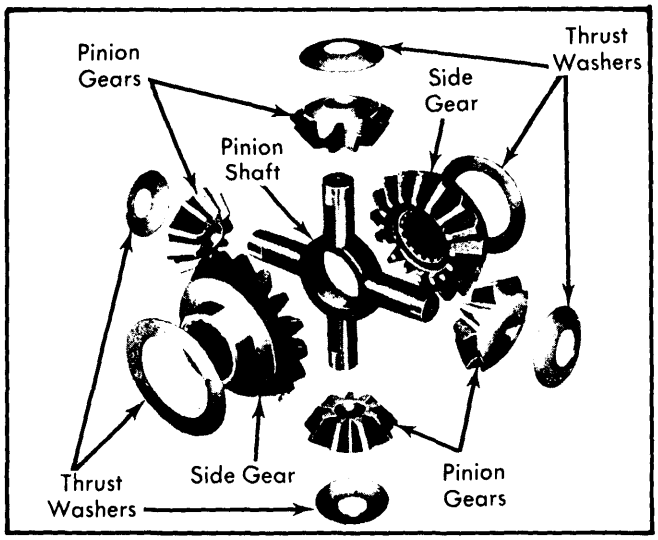

Fig. 5 Differential Pinion Shaft Pinion Gears, Side Gears, Thrust Washers

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6) Place opposite side case half on assembly aligning mating marks. Draw case halves together with four bolts. Make sure pinion gears and side gears rotate freely. Install remaining bolts, tighten to specification and install lock wire. Press side bearings onto differential. Place differential into position in carrier. Lubricate bearings and install bearing cups. Make sure bearing cups fit easily into bearing bore in carrier. Install bearing adjusting ring. Install bearing caps in correct location as marked during disassembly. Make sure caps are correctly installed over adjusting rings and not cross threaded. Make sure some backlash is present between drive gear and pinion. Install bearing cap nuts and tighten to specifications.

7) Attach a dial indicator to carrier with pointer contacting back face of ring gear. Rotate right adjusting nut until all carrier end play is eliminated. Rotate ring gear and measure runout. If runout exceeds .008", remove carrier and check for cause. Tighten adjusting rings, one notch at a time to preload bearings. Position dial indicator pointer so that it rests against face of one ring gear tooth. Check backlash at 90° intervals around ring gear. Specified backlash is .006-.012" (the low limit is preferred, especially on new gears). When adjusting backlash, back off one adjusting ring and tighten other the same amount. This will maintain preload.

NOTE – *If a new ring and pinion gear set was installed, and pinion depth was set using procedure outlined under Pinion Depth Adjustment, proceed to step* **8**). *If old ring gear and pinion were installed, check pinion depth now using the Gear Tooth Contact Patterns outlined at the start of this section.*

8) Tighten bearing cap bolts to specification. Install adjusting ring locks and screws. Tighten to specification and install lock wire. Position ring gear thrust block on back face of gear using heavy grease. Rotate ring gear until thrust block is aligned with adjusting screw hole in carrier case. Tighten screw until there is no play between block and ring gear. Back off ¼ turn. This will allow .010-.015" end play. Tighten lock nut and check end play to ensure that there is a minimum of .010". Clean inside of axle housing before installing carrier assembly. To install carrier assembly, reverse removal procedure. Fill axle housing to correct level with lubricant.

Pinion Depth Adjustment – 1) This procedure should be used to check and adjust pinion depth if a new ring gear and pinion are being installed. The nominal dimension, stamped in gear end of pinion, is for the purpose of correctly adjusting pinion depth. Actual measuring points in nominal dimension are shown in *Fig. 6*. Each pinion is also stamped with its individual variation from the nominal depth. The variation is either a plus or a minus figure. Plus figures should be added to the nominal depth and minus figures subtracted. Another code stamped in end of pinion and on ring gear face, indicate a matched set. Correct backlash specification is also stamped on ring gear. This specification falls betwen specification given in specification table and in text. *See Fig. 7.*

2) Pinion depth adjustment is accomplished using tool assembly DD-1238. Using this tool assembly, place adapter sleeves on gauge arbor, with threaded ends toward center of arbor. Position gauge arbor and sleeve assembly in checking fixture with ground sleeve surfaces on fixture. Using check block, check micrometer accuracy. Accuracy should be within .005".

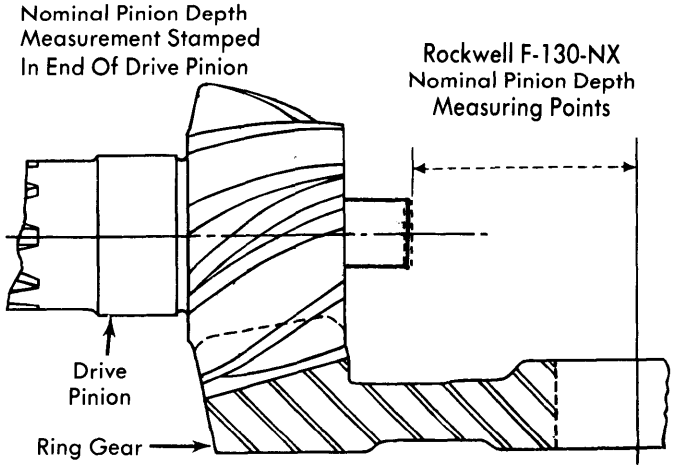

Fig. 6 Nominal Pinion Depth Measuring Points For Rockwell F-130-NX Drive Axle

3) Thread adapters on arbor so that small .O.D of tapered disc is toward threaded end of sleeve. Slide sleeve and disc assembly on gauge arbor so that threaded ends of sleeve are toward arbor. With pinion assembled and bearing preload set, install pinion assembly in carrier using original shim pack. Tighten bolts to specification. Make sure all burrs and rough spots are removed from carrier side bearing bores.

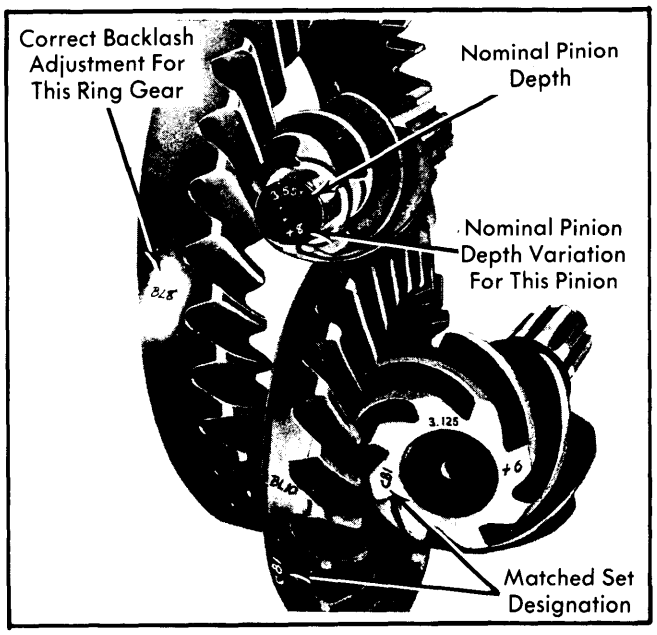

Fig. 7 Drive Pinion and Ring Gear Marking Codes

4) Position step plate on end of pinion and connect step plate bracket to one of the carrier flange bolts. Space bracket out away from flange ledge. Tighten step plate screw so that plate is held tight against pinion. Back off micrometer and position gauge assembly in housing. Position micrometer directly over and at 90° angle to step plate. Screw micrometer down until it contacts step plate. Record micrometer reading.

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5) To determine correct shim pack thickness, add step plate thickness (0.400") to recorded reading. This will give pinion depth with original shim pack. Now add or subtract nominal pinion depth variation to nominal pinion depth. This will give correct pinion depth figure. Subtract actual pinion depth figure from adjusted nominal pinion depth figure. This will give the thickness of shims needed to increase original shim pack to correct size.

Example:

+3.128" (Micrometer Reading)
+0.400" (Step Plate Thickness)
= 3.528" (Pinion Depth With Old Shim Pack)

+3.551" (Nominal Depth)
+0.006" (Nominal Depth Variation)
= 3.557" (Correct Pinion Depth)

+3.557" (Correct Pinion Depth)
− 3.528" (Pinion Depth With Old Shim Pack)
= 0.029" (Amount Of Shims To Add To Original Shim Pack)

AXLE ASSEMBLY SPECIFICATIONS

Application	Specification
Pinion Bearing Preload	5-15 Inch Lbs.
Ring Gear Runout	.008"
Backlash	①.006-.012"
Thrust Block Clearance	.010-.015"
Pinion Depth (Nominal)	②

① − Backlash should be adjusted as close as possible to figure on ring gear face.

② − Stamped in end of drive pinion.

6) With correct shim pack thickness determined, remove gauge tool assembly. Remove pinion and cage assembly. Disassemble and add required number and thickness of shims. Reinstall pinion and cage assembly and proceed to step 5) in Reassembly & Adjustment.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Axle Flange Nuts	35
Carrier To Axle Housing Bolt Or Nut	
1/2"	94-102
5/8"	186-205
3/4"	325-360
Differential Case Bolts	
1/2"	94-102
9/16"	132-145
5/8"	186-205
3/4"	325-360
Differential Bearing Cap Bolts	
5/8"	127-140
3/4"	230-250
7/8x9"	345-370
7/8x14"	375-415
1"	555-615
Differential Bearing Adjuster Lock Bolt	
5/16"	15-17
1/2"	85-91
Pinion Cage Bolt	
3/8"	26-29
1/2"	85-91
9/16"	168-180
5/8"	168-180
Pinion Shaft Yoke Nut	
1"	300-400
1 1/4"	700-900
1 1/2"	800-1100
1 3/4"	800-1100