

REAR AXLE - 194RBI

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REAR AXLE - 194RBI

DESCRIPTION

The Rear Beam-design Iron (RBI) axle housing has an iron center casting (differential housing) with axle shaft tubes extending from either side. The tubes are pressed into and welded to the differential housing to form a one-piece axle housing. The housing has the centerline of the pinion set below the centerline of the ring gear. The axles are semi-floating axle shafts, meaning that loads are supported by the axle shaft and bearings. The axle shafts are retained by C-clips in the differential side gears.

OPERATION

The axle receives power from the transmission/transfer case through the rear propeller shaft. The rear propeller shaft is connected to the pinion gear which rotates the differential through the gear mesh with the ring gear bolted to the differential case. The engine power is transmitted to the axle shafts through the pinion mate and side gears. The side gears are splined to the axle shafts.

DIAGNOSIS AND TESTING

GEAR NOISE

Axle gear noise can be caused by insufficient lubricant, incorrect backlash, incorrect pinion depth, tooth contact, worn/damaged gears, or the carrier housing not having the proper offset and squareness.

Gear noise usually happens at a specific speed range. The noise can also occur during a specific type of driving condition. These conditions are acceleration, deceleration, coast, or constant load.

When road testing, first warm-up the axle fluid by driving the vehicle at least 5 miles and then accelerate the vehicle to the speed range where the noise is the greatest. Shift out-of-gear and coast through the peak-noise range. If the noise stops or changes greatly:

- Check for insufficient lubricant.
- Incorrect ring gear backlash.
- Gear damage.

Differential side gears and pinions can be checked by turning the vehicle. They usually do not cause noise during straight-ahead driving when the gears are unloaded. The side gears are loaded during vehi-

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cle turns. A worn pinion shaft can also cause a snapping or a knocking noise.

BEARING NOISE

The axle shaft, differential and pinion bearings can all produce noise when worn or damaged. Bearing noise can be either a whining, or a growling sound.

Pinion bearings have a constant-pitch noise. This noise changes only with vehicle speed. Pinion bearing noise will be higher pitched because it rotates at a faster rate. Drive the vehicle and load the differential. If bearing noise occurs, the rear pinion bearing is the source of the noise. If the bearing noise is heard during a coast, the front pinion bearing is the source.

Worn or damaged differential bearings usually produce a low pitch noise. Differential bearing noise is similar to pinion bearing noise. The pitch of differential bearing noise is also constant and varies only with vehicle speed.

Axle shaft bearings produce noise and vibration when worn or damaged. The noise generally changes when the bearings are loaded. Road test the vehicle. Turn the vehicle sharply to the left and to the right. This will load the bearings and change the noise level. Where axle bearing damage is slight, the noise is usually not noticeable at speeds above 30 mph.

LOW SPEED KNOCK

Low speed knock is generally caused by a worn U-joint or by worn side-gear thrust washers. A worn pinion shaft bore will also cause low speed knock.

VIBRATION

Vibration at the rear of the vehicle is usually caused by a:

- Damaged drive shaft.

- Missing drive shaft balance weight(s).
- Worn or out-of-balance wheels.
- Loose wheel lug nuts.
- Worn U-joint(s).
- Loose/broken springs.
- Damaged axle shaft bearing(s).
- Loose pinion gear nut.
- Excessive pinion yoke run out.
- Bent axle shaft(s).

Check for loose or damaged front-end components or engine/transmission mounts. These components can contribute to what appears to be a rearend vibration. Do not overlook engine accessories, brackets and drive belts.

NOTE: All driveline components should be examined before starting any repair.

DRIVELINE SNAP

A snap or clunk noise when the vehicle is shifted into gear (or the clutch engaged), can be caused by:

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints.
- Loose spring mounts.
- Loose pinion gear nut and yoke.
- Excessive ring gear backlash.
- Excessive side gear to case clearance.

The source of a snap or a clunk noise can be determined with the assistance of a helper. Raise the vehicle on a hoist with the wheels free to rotate. Instruct the helper to shift the transmission into gear. Listen for the noise, a mechanics stethoscope is helpful in isolating the source of a noise.

DIAGNOSTIC CHART

Condition	Possible Causes	Correction
Wheel Noise	1. Wheel loose. 2. Faulty, brinelled wheel bearing.	1. Tighten loose nuts. 2. Replace bearing.
Axle Shaft Noise	1. Misaligned axle tube. 2. Bent or sprung axle shaft.	1. Inspect axle tube alignment. Correct as necessary. 2. Inspect and correct as necessary.

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Condition	Possible Causes	Correction
Axle Shaft Broke	<ol style="list-style-type: none"> 1. Misaligned axle tube. 2. Vehicle overloaded. 3. Erratic clutch operation. 4. Grabbing clutch. 	<ol style="list-style-type: none"> 1. Replace the broken shaft after correcting tube mis-alignment. 2. Replace broken shaft and avoid excessive weight on vehicle. 3. Replace broken shaft and avoid or correct erratic clutch operation. 4. Replace broken shaft and inspect and repair clutch as necessary.
Differential Cracked	<ol style="list-style-type: none"> 1. Improper adjustment of the differential bearings. 2. Excessive ring gear backlash. 3. Vehicle overloaded. 4. Erratic clutch operation. 	<ol style="list-style-type: none"> 1. Replace case and inspect gears and bearings for further damage. Set differential bearing pre-load properly. 2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly. 3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight. 4. Replace case and inspect gears and bearings for further damage. Avoid erratic use of clutch.
Differential Gears Scored	<ol style="list-style-type: none"> 1. Insufficient lubrication. 2. Improper grade of lubricant. 3. Excessive spinning of one wheel/tire. 	<ol style="list-style-type: none"> 1. Replace scored gears. Fill differential with the correct fluid type and quantity. 2. Replace scored gears. Fill differential with the correct fluid type and quantity. 3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	<ol style="list-style-type: none"> 1. Lubricant level too high. 2. Worn axle shaft seals. 3. Cracked differential housing. 4. Worn pinion seal. 5. Worn/scored yoke. 6. Axle cover not properly sealed. 	<ol style="list-style-type: none"> 1. Drain lubricant to the correct level. 2. Replace seals. 3. Repair as necessary. 4. Replace seal. 5. Replace yoke and seal. 6. Remove, clean, and re-seal cover.
Axle Overheating	<ol style="list-style-type: none"> 1. Lubricant level low. 2. Improper grade of lubricant. 3. Bearing pre-loads too high. 4. Insufficient ring gear backlash. 	<ol style="list-style-type: none"> 1. Fill differential to correct level. 2. Fill differential with the correct fluid type and quantity. 3. Re-adjust bearing pre-loads. 4. Re-adjust ring gear backlash.

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Condition	Possible Causes	Correction
Gear Teeth Broke	<ol style="list-style-type: none"> 1. Overloading. 2. Erratic clutch operation. 3. Ice-spotted pavement. 4. Improper adjustments. 	<ol style="list-style-type: none"> 1. Replace gears. Examine other gears and bearings for possible damage. 2. Replace gears and examine the remaining parts for damage. Avoid erratic clutch operation. 3. Replace gears and examine remaining parts for damage. 4. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.
Axle Noise	<ol style="list-style-type: none"> 1. Insufficient lubricant. 2. Improper ring gear and pinion adjustment. 3. Unmatched ring gear and pinion. 4. Worn teeth on ring gear and/or pinion. 5. Loose pinion bearings. 6. Loose differential bearings. 7. Mis-aligned or sprung ring gear. 8. Loose differential bearing cap bolts. 9. Housing not machined properly. 	<ol style="list-style-type: none"> 1. Fill differential with the correct fluid type and quantity. 2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth. 3. Replace gears with a matched ring gear and pinion. 4. Replace ring gear and pinion. 5. Adjust pinion bearing pre-load. 6. Adjust differential bearing pre-load. 7. Measure ring gear run-out. Replace components as necessary. 8. Inspect differential components and replace as necessary. Ensure that the bearing caps are torqued to the proper specification. 9. Replace housing.

REMOVAL

- (1) Raise and support the vehicle.
- (2) Position a suitable lifting device under the axle.
- (3) Secure axle to device.
- (4) Remove the wheels and tires.
- (5) Remove the brake drums from the axle. Refer to Group 5, Brakes, for proper procedures.
- (6) Disconnect parking brake cables from brackets and lever.
- (7) Remove wheel speed sensors, if necessary. Refer to Group 5, Brakes, for proper procedures.
- (8) Disconnect the brake hose at the axle junction block. Do not disconnect the brake hydraulic lines at the wheel cylinders. Refer to Group 5, Brakes, for proper procedures.
- (9) Disconnect the vent hose from the axle shaft tube.

(10) Mark the propeller shaft and yokes for installation alignment reference.

- (11) Remove propeller shaft.
- (12) Disconnect stabilizer bar links.
- (13) Disconnect shock absorbers from axle.
- (14) Disconnect upper and lower control arms from the axle brackets.
- (15) Separate the axle from the vehicle.

INSTALLATION

NOTE: The weight of the vehicle must be supported by the springs before suspension arms and track bar fasteners can be tightened. If the springs are not at their normal ride position, vehicle ride height and handling could be affected.

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(1) Raise the axle with lifting device and align the spring centering bolts with the mating holes in the axle spring perch.

(2) Install the upper and lower control arms in the axle brackets. Install the mounting bolts but do not tighten at this time.

(3) Install shock absorbers and tighten nuts to torque specification.

(4) Install stabilizer bar links and tighten nuts to torque specification.

(5) Install the wheel speed sensors, if necessary. Refer to Group 5, Brakes, for proper procedures.

(6) Connect parking brake cable to brackets and lever.

(7) Install the brake drums. Refer to Group 5, Brakes, for proper procedures.

(8) Connect the brake hose to the axle junction block. Refer to Group 5, Brakes, for proper procedures.

(9) Install axle vent hose.

(10) Align propeller shaft and pinion yoke reference marks. Install U-joint straps and bolts. Tighten to 19 N-m (14 ft. lbs.).

(11) Install the wheels and tires.

(12) Add gear lubricant, if necessary. Refer to Lubricant Specifications in this section for lubricant requirements.

(13) Remove lifting device from axle and lower the vehicle.

(14) Tighten upper and lower control arms nuts to torque specification.

ADJUSTMENTS

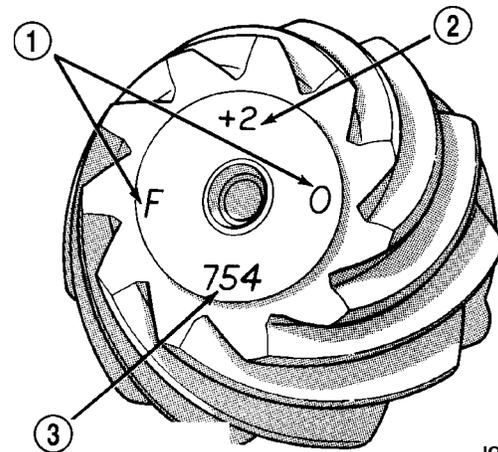
ADJUSTMENT

RING AND PINION GEAR

Ring and pinion gears are supplied as matched sets only. The identifying numbers for the ring and pinion gear are etched into the face of each gear (Fig. 1). A plus (+) number, minus (-) number or zero (0) is etched into the face of the pinion gear. This number is the amount (in thousandths of an inch) the depth varies from the standard depth setting of a pinion etched with a (0). The standard depth provides the best teeth contact pattern. Refer to Backlash and Contact Pattern Analysis Paragraph in this section for additional information.

Compensation for pinion depth variance is achieved with select shims. The shims are placed under the inner pinion bearing cone (Fig. 2).

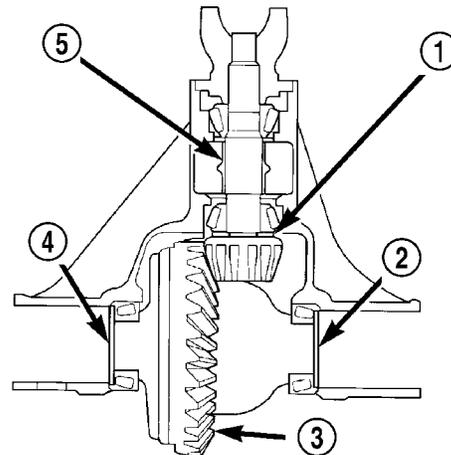
If a new gear set is being installed, note the depth variance etched into both the original and replacement pinion gear. Add or subtract the thickness of the original depth shims to compensate for the differ-



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Fig. 1 PINION GEAR ID NUMBERS

- 1 - PRODUCTION NUMBERS
- 2 - DRIVE PINION GEAR DEPTH VARIANCE
- 3 - GEAR MATCHING NUMBER



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Fig. 2 ADJUSTMENT SHIM LOCATIONS

- 1 - PINION GEAR DEPTH SHIM
- 2 - DIFFERENTIAL SHIM-PINION GEAR SIDE
- 3 - RING GEAR
- 4 - DIFFERENTIAL SHIM-RING GEAR SIDE
- 5 - COLLAPSIBLE SPACER

ence in the depth variances. Refer to the Depth Variance charts.

Note where Old and New Pinion Marking columns intersect. Intersecting figure represents plus or minus amount needed.

Note the etched number on the face of the drive pinion gear (-1, -2, 0, +1, +2, etc.). The numbers represent thousands of an inch deviation from the standard. If the number is negative, add that value to the required thickness of the depth shim(s). If the number is positive, subtract that value from the thickness of the depth shim(s). If the number is 0 no change is necessary. Refer to the Pinion Gear Depth Variance Chart.

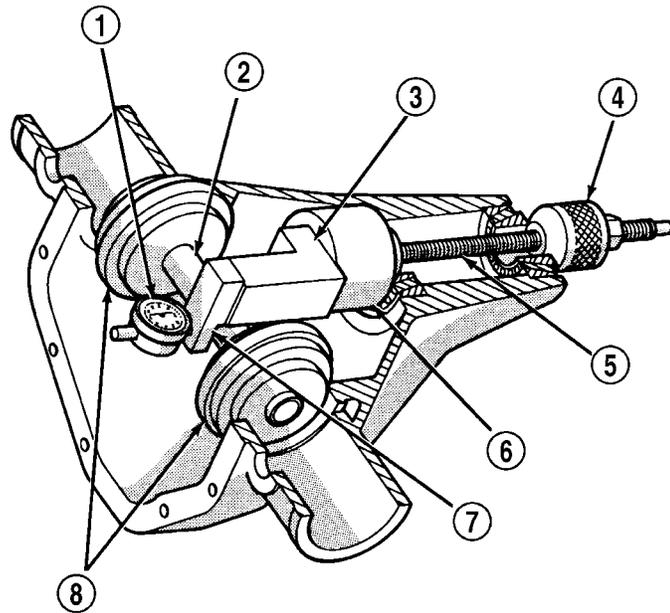
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PINION GEAR DEPTH VARIANCE

Original Pinion Gear Depth Variance	Replacement Pinion Gear Depth Variance								
	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008

PINION DEPTH MEASUREMENT

Measurements are taken with pinion cups and pinion bearings installed in the housing. Take measurements with a Pinion Gauge Set, Pinion Block 6735, Arbor Discs 6732 and Dial Indicator C-3339 (Fig. 3).



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Fig. 3 PINION GEAR DEPTH TOOLS

- 1 - DIAL INDICATOR
- 2 - ARBOR
- 3 - PINION HEIGHT BLOCK
- 4 - CONE
- 5 - SCREW
- 6 - PINION BLOCK
- 7 - SCOOTER BLOCK
- 8 - ARBOR DISC

(1) Assemble Pinion Height Block 6739, Pinion Block 6735 and rear pinion bearing onto Screw 6741 (Fig. 3).

(2) Insert assembled height gauge components, rear bearing and screw into the housing through pinion bearing cups (Fig. 4).

(3) Install front pinion bearing and Cone 6740 hand tight.

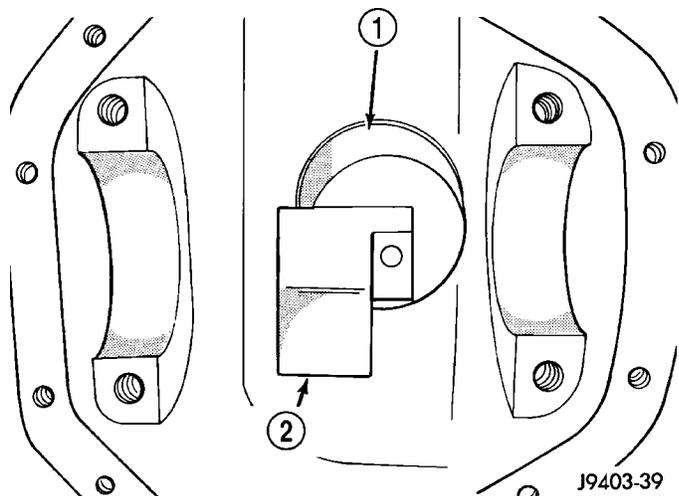


Fig. 4 PINION HEIGHT BLOCK

- 1 - PINION BLOCK
- 2 - PINION HEIGHT BLOCK

(4) Place Arbor Disc 6732 on Arbor D-115-3 in position in the housing side bearing cradles (Fig. 5). Install differential bearing caps on Arbor Discs and tighten cap bolts. Refer to the Torque Specifications in this section.

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NOTE: Arbor Discs 6732 have different step diameters to fit other axle sizes. Pick correct size step for axle being serviced.

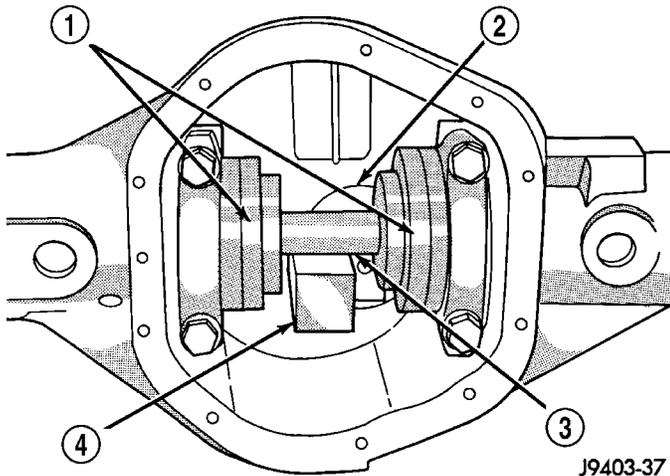


Fig. 5 GAUGE TOOLS IN HOUSING

- 1 - ARBOR DISC
- 2 - PINION BLOCK
- 3 - ARBOR
- 4 - PINION HEIGHT BLOCK

(5) Assemble Dial Indicator C-3339 into Scooter Block D-115-2 and secure set screw.

(6) Position Scooter Block/Dial Indicator flush on the pinion height block. Hold scooter block and zero the dial indicator.

(7) Slowly slide the scooter block across the pinion height block over to the arbor (Fig. 6). Move the scooter block till the dial indicator probe crests the arbor, then record the highest reading.

(8) Select a shim equal to the dial indicator reading plus the drive pinion gear depth variance number etched in the face of the pinion gear (Fig. 1) using the opposite sign on the variance number. For example, if the depth variance is -2 , add $+0.002$ in. to the dial indicator reading.

(9) Remove the pinion depth gauge components from the housing

DIFFERENTIAL BEARING PRELOAD

Differential side bearing preload and gear backlash is achieved by selective shims inserted between the bearing cup and the housing. The proper shim thickness can be determined using slip-fit Dummy Bearings D-348 in place of the differential side bearings and a Dial Indicator C-3339. Before proceeding with the differential bearing preload and gear backlash measurements, measure the pinion gear depth and prepare the pinion gear for installation. Establishing proper pinion gear depth is essential to establishing gear backlash and tooth contact patterns. After the overall shim thickness to take up differential side play is measured, the pinion gear is installed and the

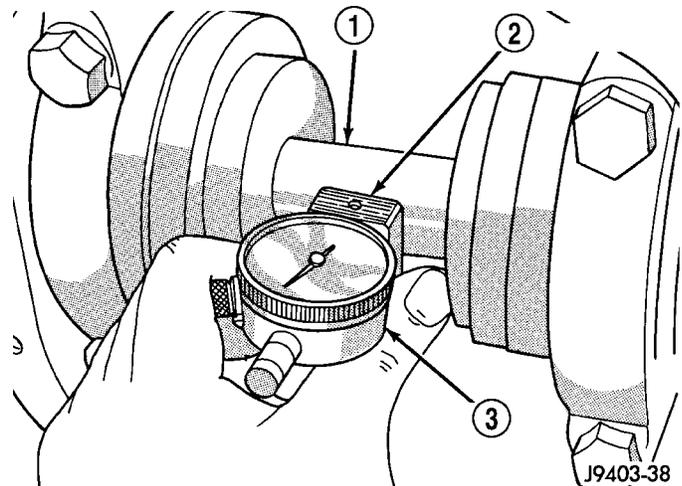


Fig. 6 PINION GEAR DEPTH MEASUREMENT

- 1 - ARBOR
- 2 - SCOOTER BLOCK
- 3 - DIAL INDICATOR

gear backlash shim thickness is measured. The overall shim thickness is the total of the dial indicator reading, starting point shim thickness and the preload specification added together. The gear backlash measurement determines the thickness of the shim used on the ring gear side of the differential case. Subtract the gear backlash shim thickness from the total overall shim thickness and select that amount for the pinion gear side of the differential (Fig. 7).

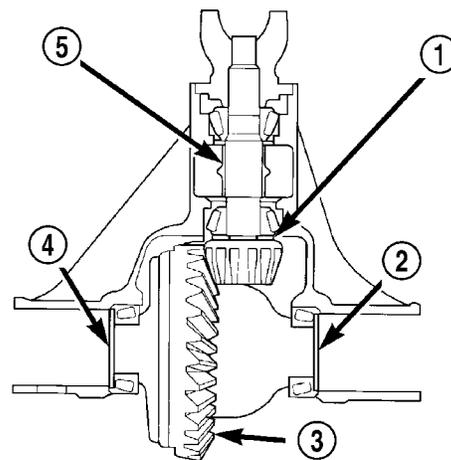


Fig. 7 SHIM LOCATIONS

- 1 - PINION GEAR DEPTH SHIM
- 2 - DIFFERENTIAL SHIM-PINION GEAR SIDE
- 3 - RING GEAR
- 4 - DIFFERENTIAL SHIM-RING GEAR SIDE
- 5 - COLLAPSIBLE SPACER

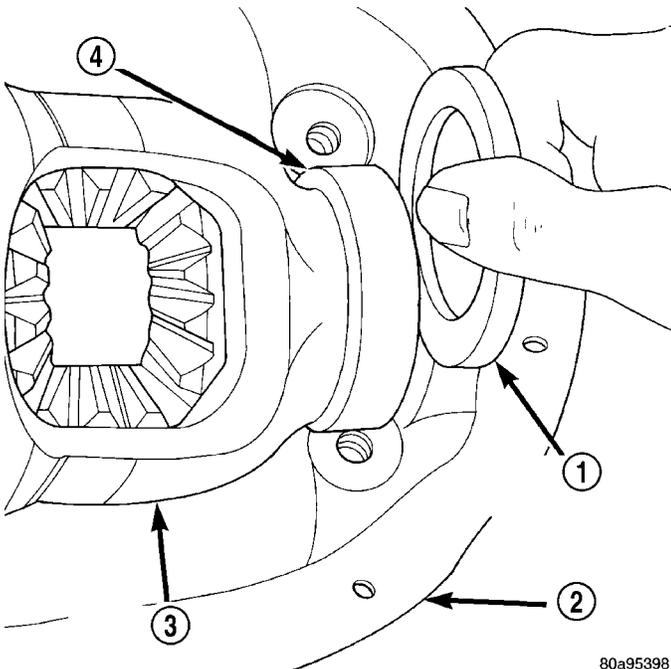
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PRELOAD SHIM SELECTION

NOTE: It is difficult to salvage the differential side bearings during the removal procedure. Install replacement bearings if necessary.

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- (1) Remove side bearings from differential case.
- (2) Install ring gear, if necessary, on differential case and tighten bolts to specification.
- (3) Install Dummy Bearings D-348 on differential case.
- (4) Install differential case in the housing.
- (5) Insert Dummy Shims 8107 (3.0 mm / 0.118 in.) starting point shims between the dummy bearing and the housing (Fig. 8).

**Fig. 8 DUMMY SHIM LOCATION**

- 1 - DUMMY SHIM
- 2 - DIFFERENTIAL HOUSING
- 3 - DIFFERENTIAL CASE
- 4 - DUMMY BEARING

(6) Install bearing caps in their correct positions and snug the bolts.

(7) Using a dead-blow hammer to seat the differential dummy bearings to each side of the housing (Fig. 9) and (Fig. 10).

(8) Thread Pilot Stud C-3288-B into rear cover bolt hole below ring gear (Fig. 11).

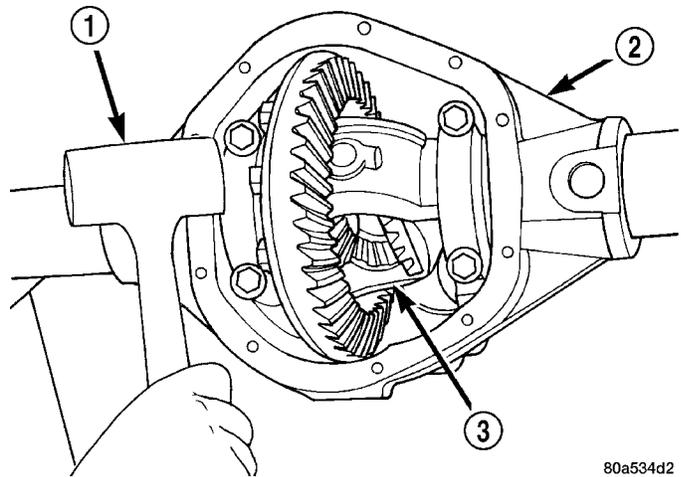
(9) Attach Dial Indicator C-3339 to the pilot stud and position indicator plunger on a flat surface of the ring gear bolt head (Fig. 11).

(10) Push differential case to the pinion gear side of the housing (Fig. 12) and zero dial indicator.

(11) Push differential case to the ring gear side and record dial indicator reading (Fig. 13).

(12) Add the dial indicator reading to the starting point shim thickness to determine total shim thickness to achieve zero differential end play.

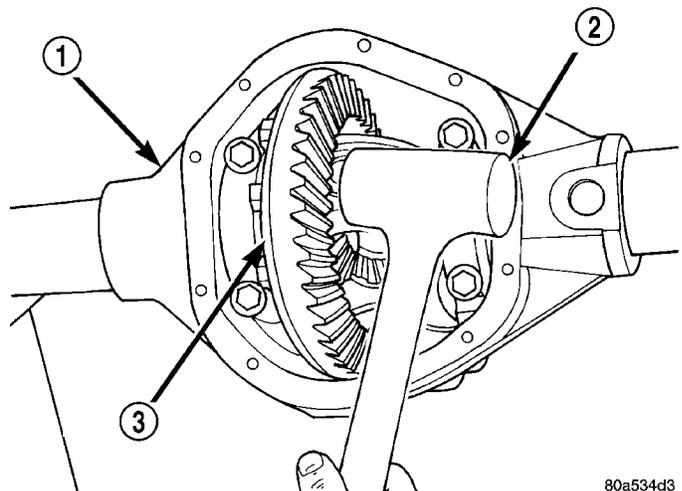
(13) Add 0.008 in. (0.2 mm) to the zero end play total. This new total represents the thickness of shims to compress or preload the new bearings when the differential is installed.



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Fig. 9 SEAT DUMMY BEARING PINION GEAR SIDE

- 1 - MALLET
- 2 - DIFFERENTIAL HOUSING
- 3 - DIFFERENTIAL CASE



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Fig. 10 SEAT DUMMY BEARING RING GEAR SIDE

- 1 - DIFFERENTIAL HOUSING
- 2 - MALLET
- 3 - DIFFERENTIAL CASE

(14) Rotate dial indicator out of the way.

(15) Remove differential case, dummy bearings and starting point shims from the housing.

(16) Install pinion gear in the housing. Install the yoke and establish the correct pinion rotating torque.

(17) Install differential case and dummy bearings in the housing (without shims) and tighten retaining cap bolts.

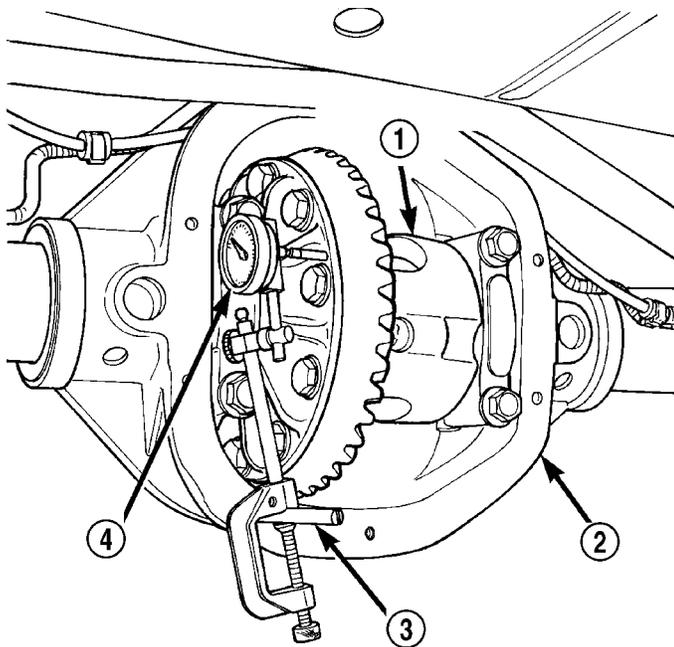
(18) Position the dial indicator plunger on a flat surface between the ring gear bolt heads (Fig. 11).

(19) Push and hold differential case toward pinion gear.

(20) Zero dial indicator face to pointer.

(21) Push and hold differential case to ring gear side of the housing and record dial indicator reading.

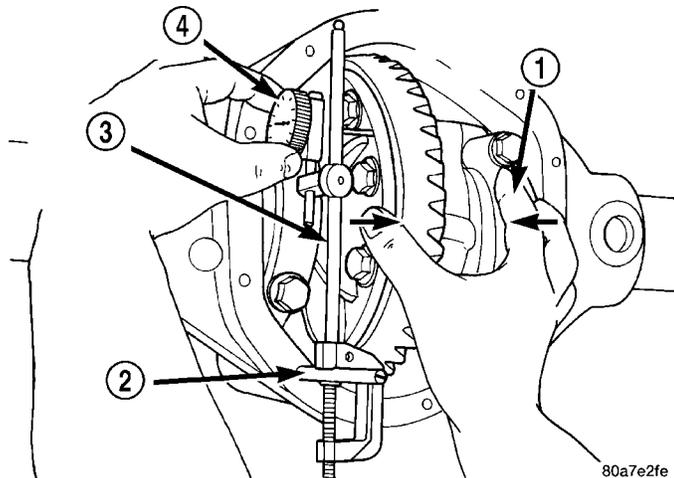
REAR AXLE - 194RBI (Continued)



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Fig. 11 DIFFERENTIAL SIDE PLAY MEASUREMENT

- 1 - DIFFERENTIAL CASE
- 2 - DIFFERENTIAL HOUSING
- 3 - PILOT STUD
- 4 - DIAL INDICATOR



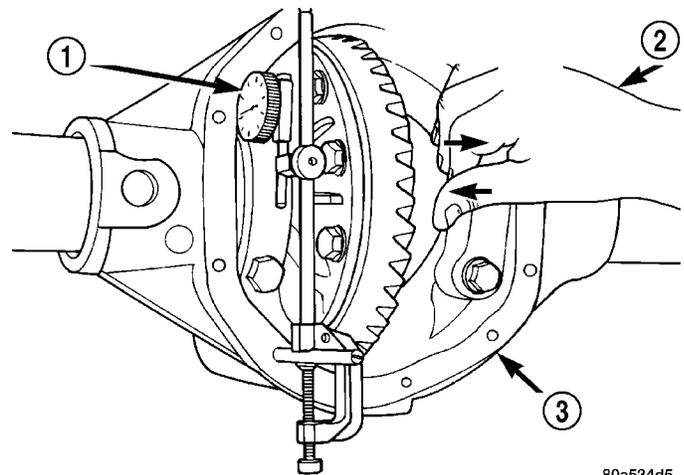
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Fig. 12 ZERO DIAL INDICATOR

- 1 - DIFFERENTIAL CASE TO PINION GEAR SIDE
- 2 - PILOT STUD
- 3 - DIAL INDICATOR EXTENSION
- 4 - ZERO DIAL INDICATOR FACE

(22) Subtract 0.002 in. (0.05 mm) from the dial indicator reading to compensate for backlash between ring and pinion gears. This total is the thickness of shim required to achieve proper backlash.

(23) Subtract the backlash shim thickness from the total preload shim thickness. The remainder is the shim thickness required on the pinion side of the housing.



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Fig. 13 RECORD DIAL INDICATOR READING

- 1 - READ DIAL INDICATOR
- 2 - DIFFERENTIAL CASE TO RING GEAR SIDE
- 3 - DIFFERENTIAL HOUSING

(24) Rotate dial indicator out of the way on pilot stud.

(25) Remove differential case and dummy bearings from the housing.

(26) Install new side bearing cones and cups on differential case.

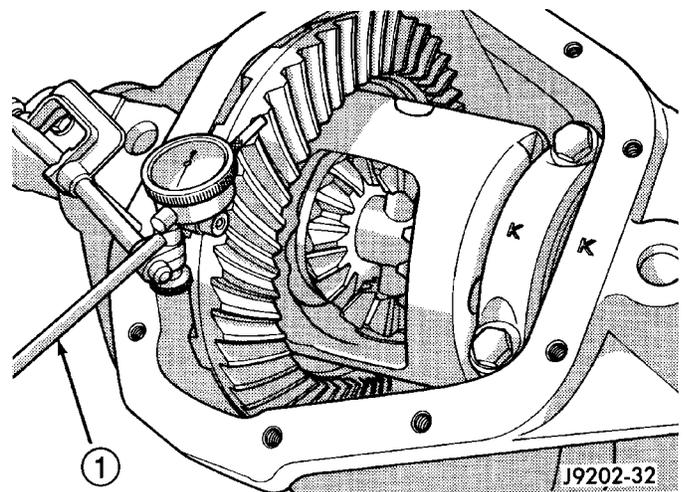
(27) Install spreader W-129-B and some components of Adapter Set 6987 on differential housing and spread axle opening enough to receive differential case.

(28) Place side bearing shims into the housing against the differential bearing bore.

(29) Install differential case in the housing.

(30) Rotate the differential case several times to seat the side bearings.

(31) Position the indicator plunger against a ring gear tooth (Fig. 14).



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Fig. 14 RING GEAR BACKLASH

- 1 - DIAL INDICATOR

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(32) Push and hold ring gear upward while not allowing the pinion gear to rotate.

(33) Zero dial indicator face to pointer.

(34) Push and hold ring gear downward while not allowing the pinion gear to rotate. Dial indicator reading should be between 0.12 mm (0.005 in.) and 0.20 mm (0.008 in.). If backlash is not within specifications transfer the necessary amount of shim thickness from one side of the differential housing to the other (Fig. 15).

(35) Verify differential case and ring gear runout by measuring ring to pinion gear backlash at eight locations around the ring gear. Readings should not vary more than 0.05 mm (0.002 in.). If readings vary more than specified, the ring gear or the differential case is defective.

After the proper backlash is achieved, perform the Gear Contact Pattern Analysis procedure.

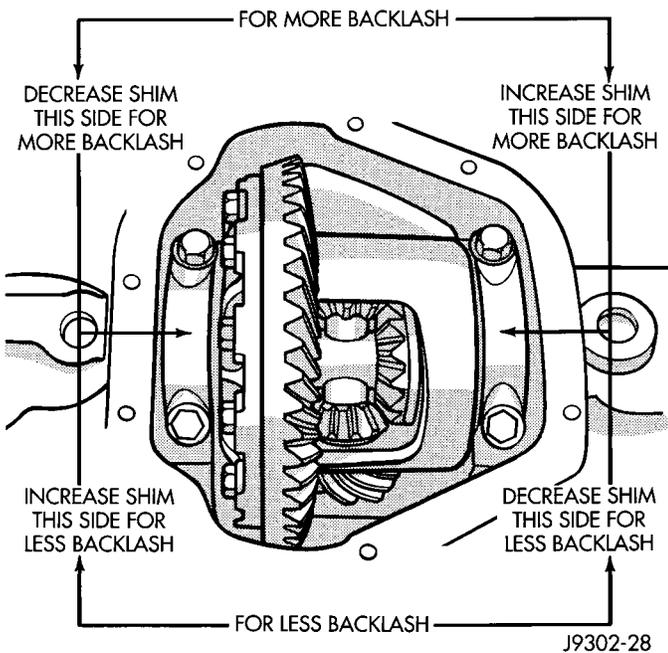


Fig. 15 BACKLASH SHIM ADJUSTMENT

GEAR CONTACT PATTERN

The ring gear and pinion teeth contact patterns will show if the pinion depth is correct in the housing. It will also show if the ring gear backlash has been adjusted correctly. The backlash can be adjusted within specifications to achieve desired tooth contact patterns.

(1) Apply a thin coat of hydrated ferric oxide or equivalent to the drive and coast side of the ring gear teeth.

(2) Wrap, twist, and hold a shop towel around the pinion yoke to increase the turning resistance of the pinion. This will provide a more distinct contact pattern.

(3) With a boxed end wrench on a ring gear bolt, rotate the differential case one complete revolution in both directions while a load is being applied from shop towel.

The areas on the ring gear teeth with the greatest degree of contact against the pinion teeth will squeeze the compound to the areas with the least amount of contact. Note and compare patterns on the ring gear teeth to Gear Tooth Contact Patterns chart (Fig. 16) and adjust pinion depth and gear backlash as necessary.

REAR AXLE - 194RBI (Continued)

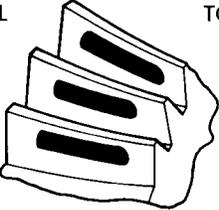
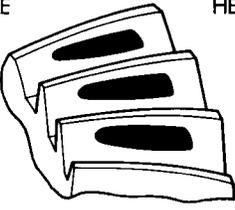
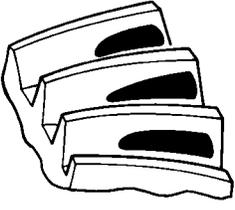
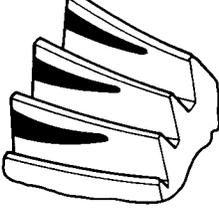
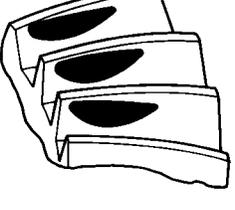
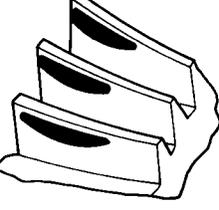
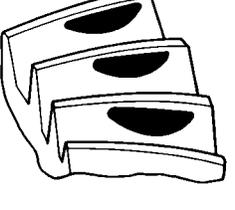
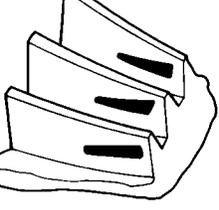
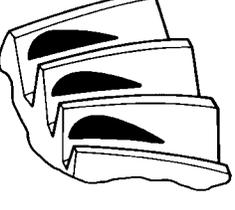
<p>DRIVE SIDE OF RING GEAR TEETH</p> <p>HEEL TOE</p> 	<p>COAST SIDE OF RING GEAR TEETH</p> <p>TOE HEEL</p> 	<p>DESIRABLE CONTACT PATTERN. PATTERN SHOULD BE CENTERED ON THE DRIVE SIDE OF TOOTH. PATTERN SHOULD BE CENTERED ON THE COAST SIDE OF TOOTH, BUT MAY BE SLIGHTLY TOWARD THE TOE. THERE SHOULD ALWAYS BE SOME CLEARANCE BETWEEN CONTACT PATTERN AND TOP OF THE TOOTH.</p>
		<p>RING GEAR BACKLASH CORRECT. THINNER PINION GEAR DEPTH SHIM REQUIRED.</p>
		<p>RING GEAR BACKLASH CORRECT. THICKER PINION GEAR DEPTH SHIM REQUIRED.</p>
		<p>PINION GEAR DEPTH SHIM CORRECT. DECREASE RING GEAR BACKLASH.</p>
		<p>PINION GEAR DEPTH SHIM CORRECT. INCREASE RING GEAR BACKLASH.</p>

Fig. 16 GEAR TOOTH CONTACT PATTERNS

REAR AXLE - 194RBI (Continued)

DIFFERENTIAL BEARING PRELOAD CHECK

The final check on the differential assembly before installing the axles is torque to rotate pinion and differential combined. This will verify the correct differential bearing preload.

Torque to rotate the differential and pinion should be the torque to rotate the pinion plus 0.79-1.24 N-m (7-11 in. lbs.).

SPECIFICATIONS

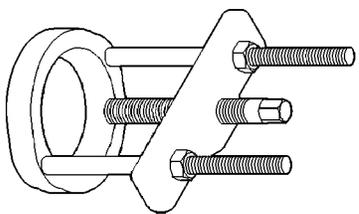
AXLE SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratio	3.07, 3.73, 4.11, 4.56
Differential Bearing Preload	0.2 mm (0.008 in.)
Differential Side Gear Clearance	0.0-0.15 mm (0.0-0.006 in.)
Ring Gear Diameter	194 mm (7.6 in.)
Ring Gear Backlash	0.12-0.20 mm (0.005-0.008 in.)
Pinion Bearing Preload - Original Bearings	1-2 N-m (10-20 in. lbs.)
Pinion Bearing Preload - New Bearings	2-4 N-m (20-35 in. lbs.)

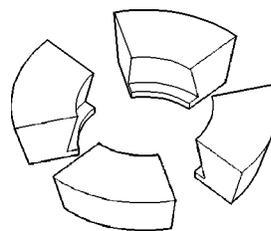
TORQUE SPECIFICATIONS

DESCRIPTION	N-m	Ft. Lbs.	In. Lbs.
Differential Cover Bolts	41	30	-
Bearing Cap Bolts	77	57	-
Ring Gear Bolts	136	100	-
Pinion Nut Min / Max	271-475	200-350	-
Pinion Mate Shaft Screw	16.25	12	-

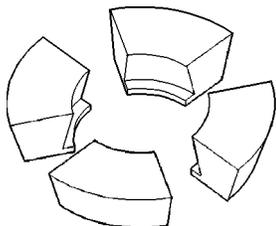
SPECIAL TOOLS



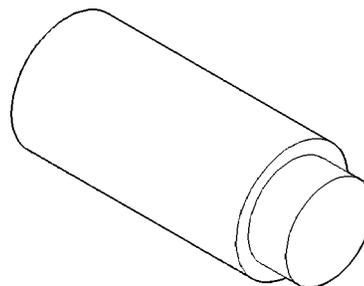
PULLER C-293-PA



ADAPTER C-293-40

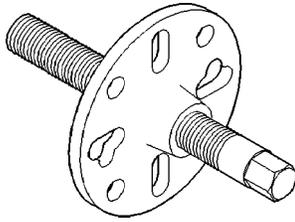


ADAPTER C-293-39

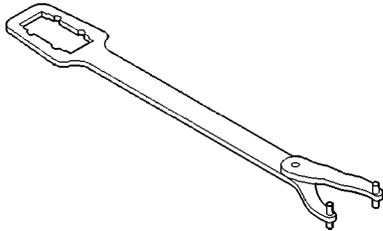


ADAPTER PLUG SP-3289

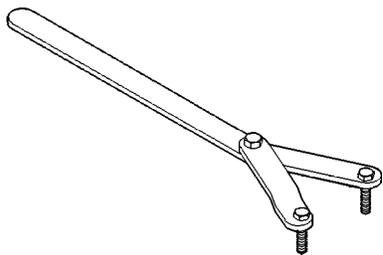
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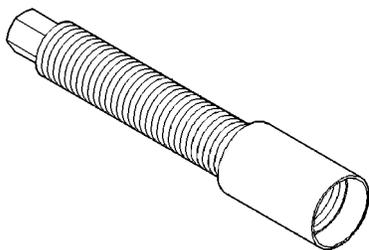
PULLER C-452



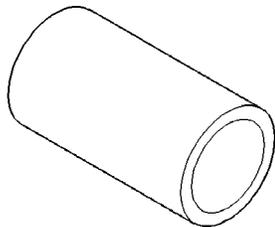
WRENCH C-3281



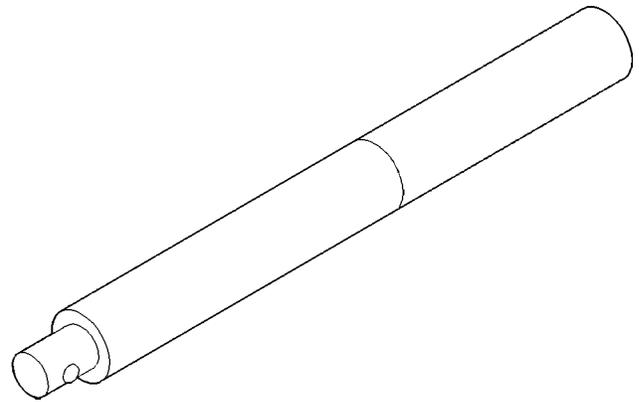
WRENCH SPANNER 6958



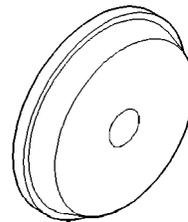
INSTALLER SCREW 8112



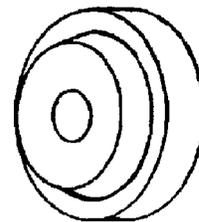
CUP 8109



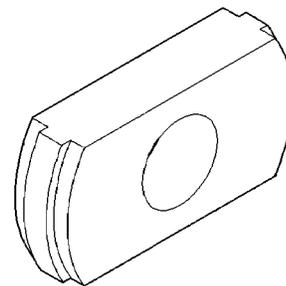
HANDLE C-4171



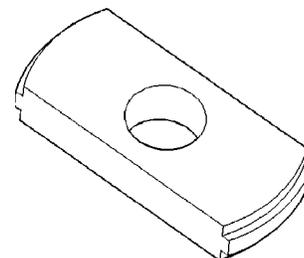
INSTALLER D-130



INSTALLER D-146

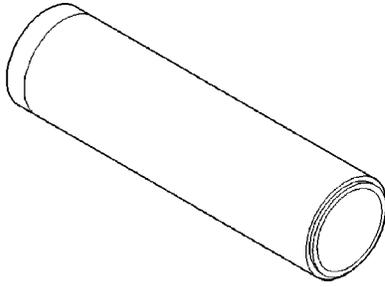


REMOVER C-4345

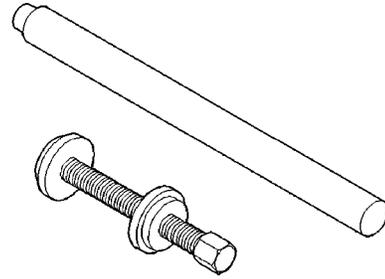


REMOVER D-149

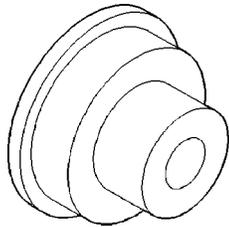
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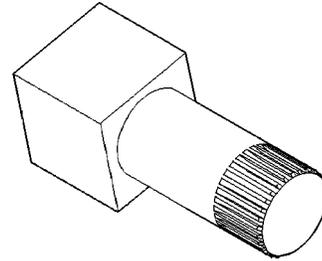
INSTALLER W-262



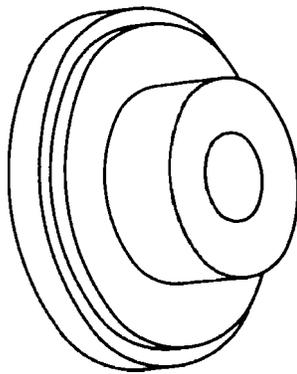
Trac-lok Tools 6960



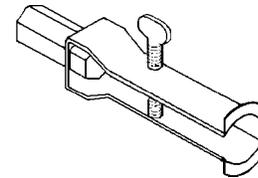
INSTALLER 6436



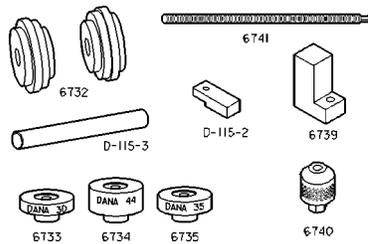
Holder Fixture 6965



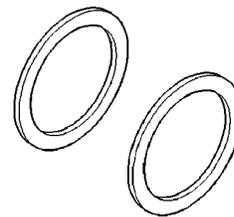
INSTALLER 6437



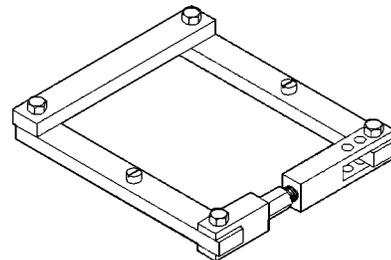
Puller 7794-A



Pinion Depth 6774

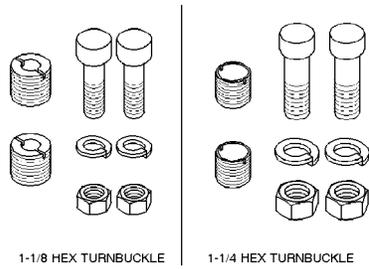


Shim Dummy 8107

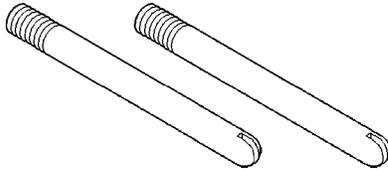


Spreader W-129-B

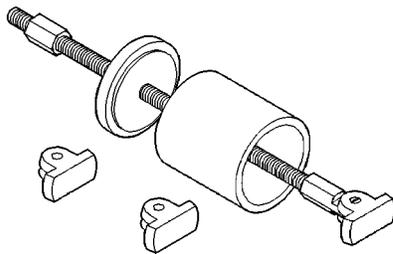
REAR AXLE - 194RBI (Continued)



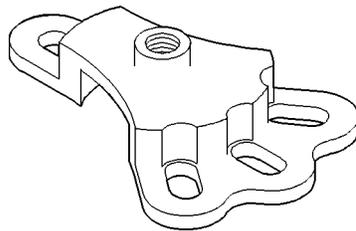
Adapter Kit 6987



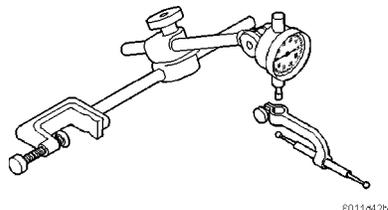
Pilot Studs C-3288-B



Bearing Remover 6310



Hub Puller 6790



Dial Indicator C-3339

AXLE SHAFTS

REMOVAL

- (1) Place transmission in neutral.
- (2) Raise and support vehicle.
- (3) Remove wheel and tire assembly.
- (4) Remove brake drum.
- (5) Remove differential housing cover and drain fluid.

(6) Rotate differential case to access pinion mate gear shaft lock screw. Remove lock screw and shaft from differential case (Fig. 17).

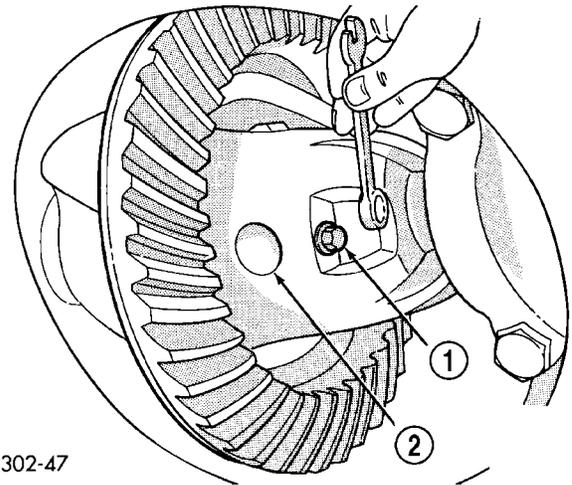


Fig. 17 MATE SHAFT LOCK SCREW

- 1 - LOCK SCREW
- 2 - PINION GEAR MATE SHAFT

(7) Push axle shaft inward and remove axle C-clip lock (Fig. 18).

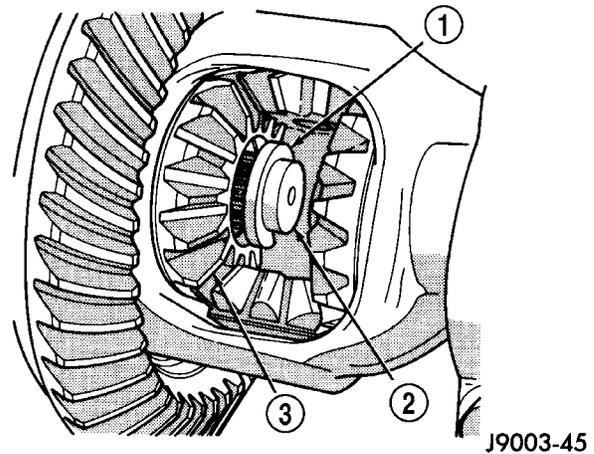


Fig. 18 AXLE SHAFT C-CLIP

- 1 - C-CLIP LOCK
- 2 - AXLE SHAFT
- 3 - SIDE GEAR

(8) Remove axle shaft.

CAUTION: Use care to prevent shaft splines from damaging axle bearing and wheel speed sensor on vehicles if equipped.

(9) Inspect roller bearing contact surface on axle shaft for signs of brinelling, galling and pitting. If any of these conditions exist, the axle shaft/bearing must be replaced.

AXLE SHAFTS (Continued)

INSTALLATION

(1) Lubricate bearing bore and seal lip with gear lubricant. Insert axle shaft through seal, bearing, and engage it into side gear splines.

CAUTION: Use care to prevent shaft splines from damaging axle shaft seal and wheel speed sensor on vehicles if equipped.

(2) Install C-clip lock on the axle shaft, then push axle outward to seat C-clip lock in side gear.

(3) Insert pinion mate shaft into differential case and through thrust washers and pinion gears.

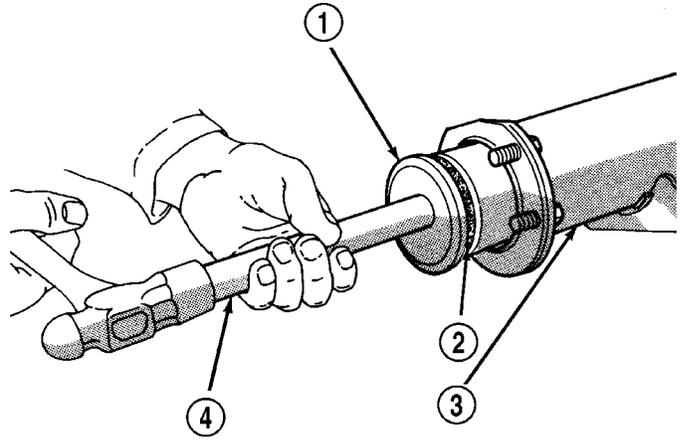
(4) Align hole in shaft with hole in the differential case and install lock screw with Loctite® on the threads. Tighten lock screw to 19 N·m (14 ft. lbs.).

(5) Install cover and add fluid to the bottom of the fill plug hole.

(6) Install brake drum.

(7) Install wheel and tire.

(8) Lower vehicle.



J9103-8

Fig. 19 AXLE SHAFT SEAL

- 1 - INSTALLER
- 2 - SEAL
- 3 - AXLE SHAFT TUBE
- 4 - HANDLE

AXLE SHAFT SEALS

REMOVAL

(1) Remove the axle shaft.

(2) Remove axle shaft seal from the end of the axle shaft tube with a small pry bar.

(3) Inspect the axle shaft tube bore for roughness and burrs and remove as necessary.

INSTALLATION

(1) Wipe the axle shaft tube bore clean.

(2) Install **new** axle shaft seal with Installer 6437 and Handle C-4171 (Fig. 19).

(3) Install the axle shaft.

AXLE BEARINGS

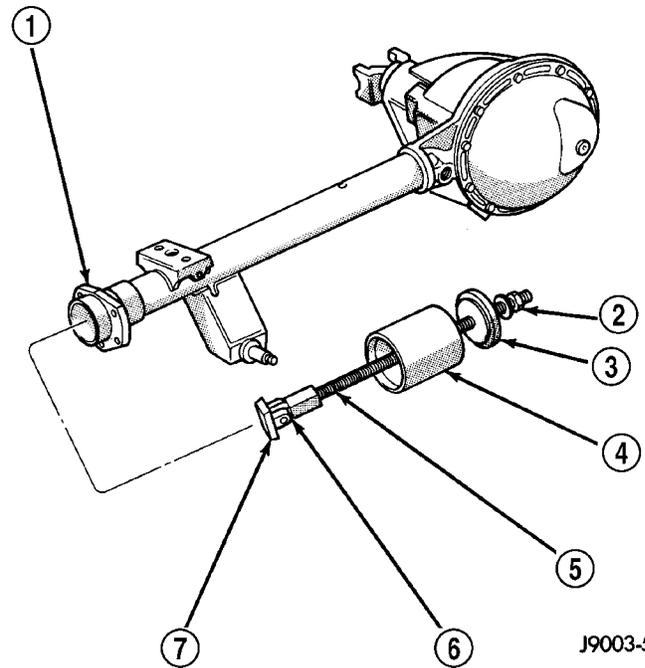
REMOVAL

(1) Remove the axle shaft.

(2) Remove axle shaft seal from the end of the axle shaft tube with a small pry bar.

(3) Remove axle shaft bearing from the axle tube with Bearing Removal Tool Set 6310 and Adapter Foot 6310-5 (Fig. 20).

(4) Inspect the axle shaft tube bore for roughness and burrs and remove as necessary.



J9003-51

Fig. 20 AXLE SHAFT BEARING TOOLS

- 1 - AXLE SHAFT TUBE
- 2 - NUT
- 3 - GUIDE PLATE
- 4 - GUIDE
- 5 - THREADED ROD
- 6 - ADAPTER
- 7 - FOOT

AXLE BEARINGS (Continued)

INSTALLATION

- (1) Wipe the axle shaft tube bore clean.
- (2) Install axle shaft bearing with Installer 6436 and Handle C-4171.

NOTE: Part number on the bearing must be against the installer.

- (3) Install **new** axle shaft seal with Installer 6437 and Handle C-4171 (Fig. 21).

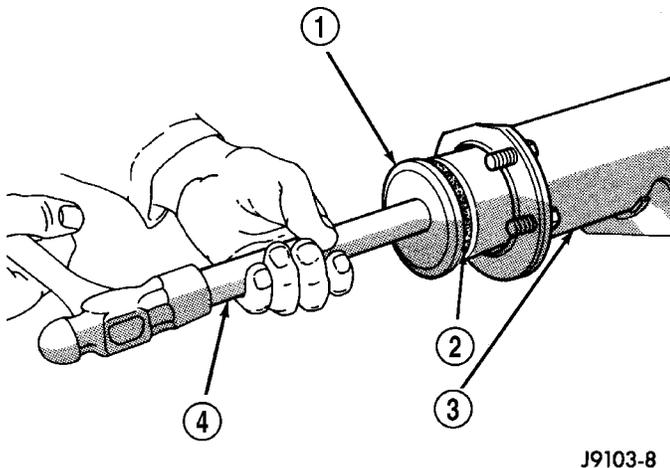


Fig. 21 AXLE SHAFT SEAL INSTALLER

- 1 - INSTALLER
- 2 - SEAL
- 3 - AXLE SHAFT TUBE
- 4 - HANDLE

- (4) Install the axle shaft.

PINION SEAL**REMOVAL**

- (1) Raise and support the vehicle.
- (2) Remove wheel and tire assemblies.
- (3) Remove the brake drums (Refer to 5 - BRAKES/HYDRAULIC/MECHANICAL/DRUM - REMOVAL).
- (4) Mark propeller shaft and pinion yoke for installation reference.
- (5) Remove the propeller shaft from the yoke.
- (6) Rotate the pinion gear three or four times.
- (7) Record torque necessary to rotate the pinion gear with an inch pound dial-type torque wrench.
- (8) Hold the yoke with Wrench 6958 and remove the pinion nut and washer.

- (9) Remove pinion yoke with Remover C-452 and Wrench C-3281 (Fig. 22).

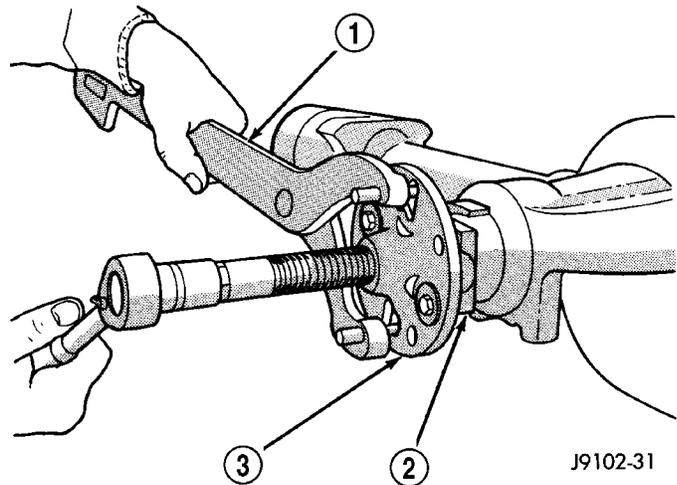


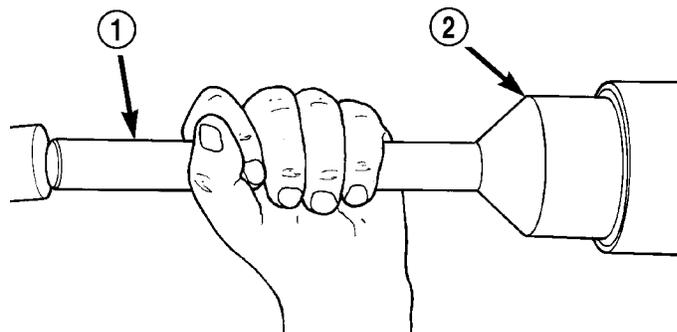
Fig. 22 PINION YOKE REMOVER

- 1 - WRENCH
- 2 - YOKE
- 3 - REMOVER

- (10) Remove pinion seal with a pry tool or slide hammer mounted screw.

INSTALLATION

- (1) Apply a light coating of gear lubricant on the lip of pinion seal and install seal with an appropriate installer (Fig. 23).



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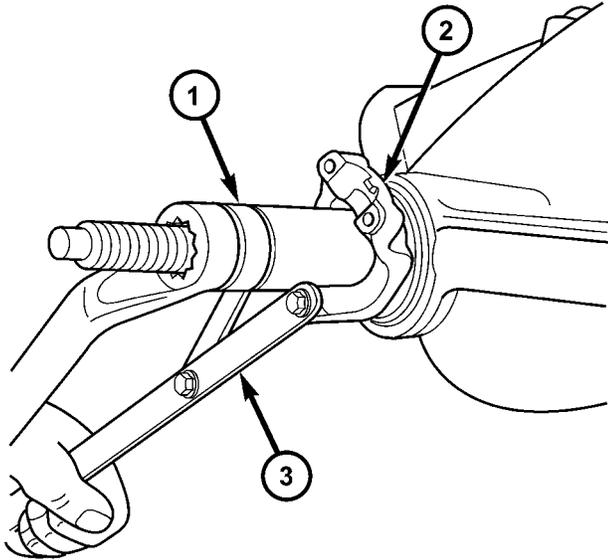
Fig. 23 PINION SEAL INSTALLER

- 1 - HANDLE
- 2 - INSTALLER

PINION SEAL (Continued)

(2) Install yoke on the pinion gear with Screw 8112, Cup 8109 and Spanner Wrench 6958 (Fig. 24).

CAUTION: Do not exceed the minimum tightening torque 271 N·m (200 ft. lbs.) when installing the pinion yoke at this point. Damage to the collapsible spacer or bearings may result.



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Fig. 24 PINION YOKE INSTALLER

- 1 - INSTALLER
- 2 - PINION YOKE
- 3 - SPANNER WRENCH

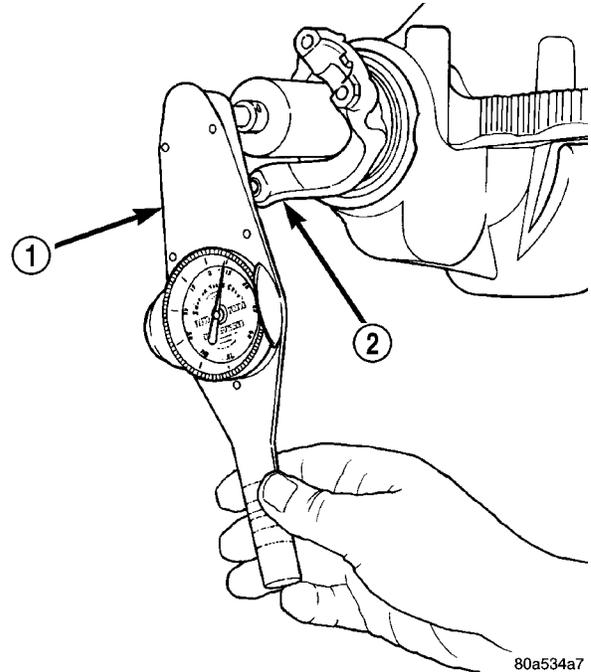
(3) Install yoke washer and **new** nut on the pinion gear and tighten nut until there is zero bearing end-play.

(4) Tighten the nut to 271 N·m (200 ft. lbs.).

CAUTION: Never loosen pinion gear nut to decrease pinion gear bearing rotating torque and never exceed specified preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed.

(5) Rotate the pinion shaft using an inch pound torque wrench. Rotating torque should be equal to the reading recorded during removal plus an additional 0.56 N·m (5 in. lbs.) (Fig. 25).

(6) If the rotating torque is low, use Wrench 6958 to hold the pinion yoke (Fig. 26), and tighten the pinion shaft nut in 6.8 N·m (5 ft. lbs.) increments until the proper rotating torque is achieved.

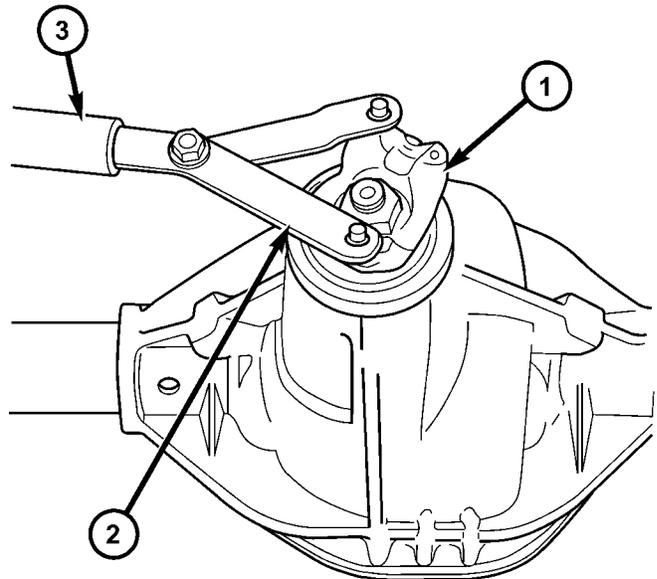


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Fig. 25 PINION ROTATING TORQUE

- 1 - TORQUE WRENCH
- 2 - PINION YOKE

CAUTION: If the maximum tightening torque 475 N·m (350 ft. lbs.) is reached prior to reaching the required rotating torque, the collapsible spacer may have been damaged. Replace the collapsible spacer.



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Fig. 26 YOKE HOLDER

- 1 - PINION YOKE
- 2 - SPANNER WRENCH
- 3 - PIPE

PINION SEAL (Continued)

- (7) Install the propeller shaft with the reference marks aligned.
- (8) Add gear lubricant to the differential housing, if necessary.
- (9) Install the brake drums, refer to Group 5 Brakes for procedures.
- (10) Install wheel and tire assemblies.
- (11) Lower the vehicle.

COLLAPSIBLE SPACER

REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove wheel and tire assemblies.
- (3) Remove rear brake drums.
- (4) Mark propeller shaft and pinion yoke for installation reference.
- (5) Remove propeller shaft from the yoke.
- (6) Rotate pinion gear three or four times.
- (7) Record torque necessary to rotate the pinion gear with an inch pound dial-type torque wrench.
- (8) Hold pinion yoke with Spanner Wrench 6958 and remove pinion nut and washer.
- (9) Remove pinion yoke with Remover C-452 and Flange Wrench C-3281 (Fig. 27).

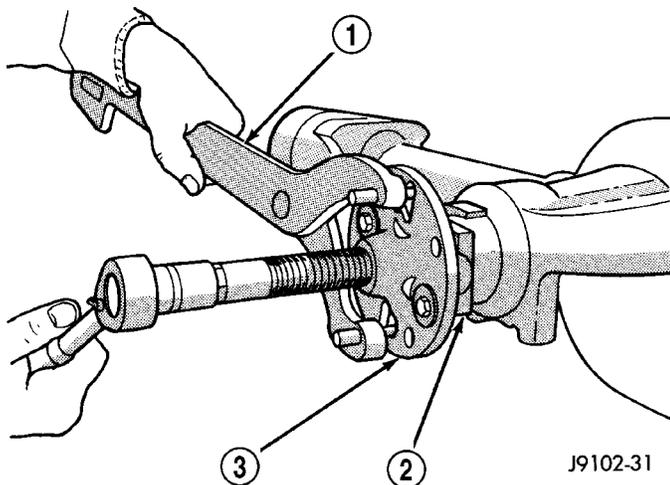


Fig. 27 PINION YOKE REMOVER

- 1 - WRENCH
- 2 - YOKE
- 3 - REMOVER

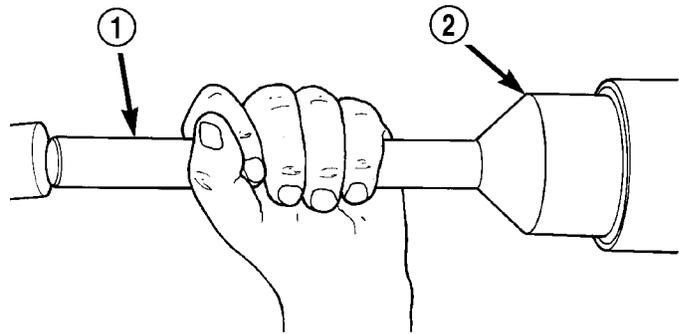
- (10) Remove pinion shaft seal with a pry tool or a slide hammer mounted screw.
- (11) Remove front pinion bearing using a pair of pick tools to pull the bearing straight off the pinion gear shaft.

NOTE: If bearing becomes bound on pinion shaft, lightly tap the pinion shaft with a rawhide/rubber hammer.

- (12) Remove the collapsible spacer.

INSTALLATION

- (1) Install a **new** collapsible preload spacer on pinion shaft.
- (2) Install pinion front bearing.
- (3) Apply a light coating of gear lubricant on the lip of pinion seal and install seal with an appropriate installer (Fig. 28).

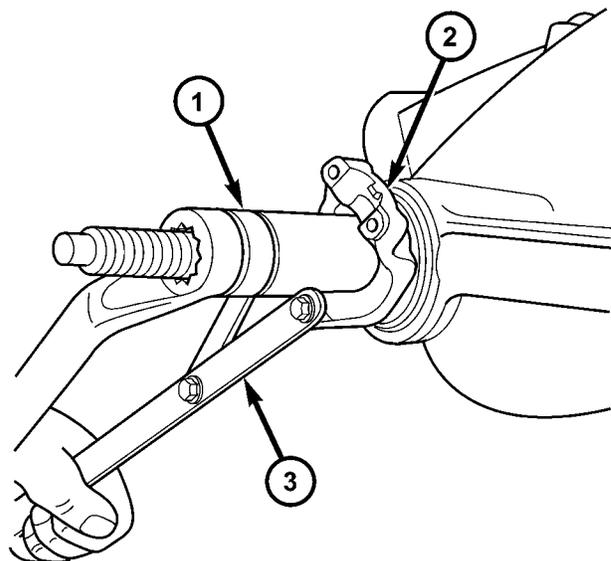


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Fig. 28 PINION SEAL INSTALLER

- 1 - HANDLE
- 2 - INSTALLER

- (4) Install yoke with Screw 8112, Cup 8109 and Spanner Wrench 6958 (Fig. 29).



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Fig. 29 PINION YOKE INSTALLER

- 1 - INSTALLER
- 2 - PINION YOKE
- 3 - SPANNER WRENCH

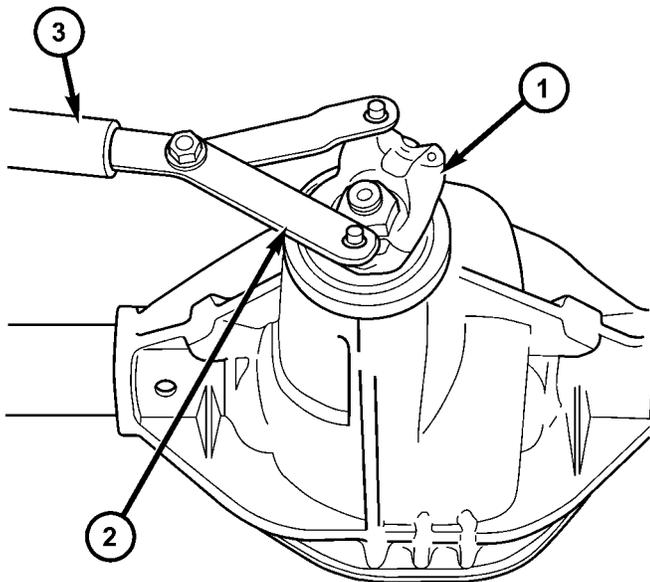
- (5) Install yoke washer and **new** nut on the pinion gear. Tighten the nut to 271 N·m (200 ft. lbs.).

COLLAPSIBLE SPACER (Continued)

CAUTION: Never loosen pinion gear nut to decrease pinion gear bearing rotating torque and never exceed specified preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed.

(6) Using yoke with Spanner Wrench 6958 and a torque wrench set at 475 N·m (350 ft. lbs.), (Fig. 30) slowly tighten the nut in 6.8 N·m (5 ft. lbs.) increments until the rotating torque is achieved. Measure the rotating torque frequently to avoid over crushing the collapsible spacer (Fig. 31).

NOTE: If more than 475 N·m (350 ft. lbs.) torque is required to crush the collapsible spacer, the spacer is defective and must be replaced.



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Fig. 30 YOKE HOLDER

- 1 - PINION YOKE
- 2 - SPANNER WRENCH
- 3 - PIPE

(7) Check rotating torque with an inch pound torque wrench (Fig. 31). The rotating torque of the pinion gear should be, the reading recorded during removal plus an additional 0.56 N·m (5 in. lbs.).

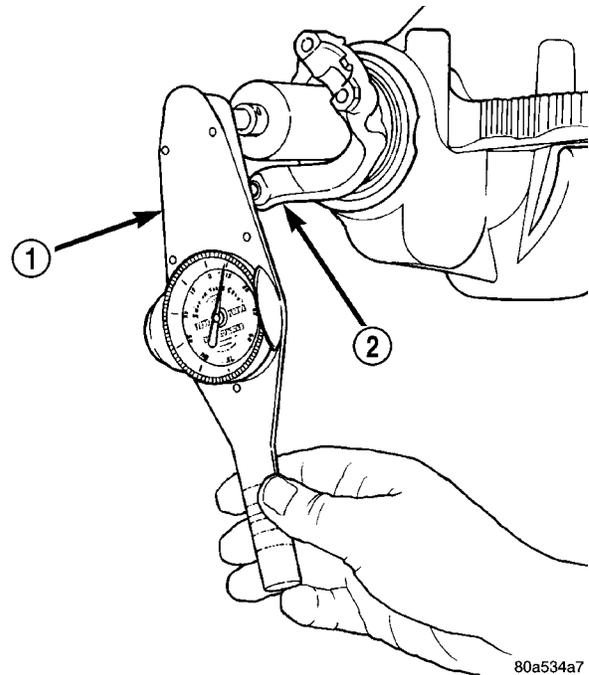
(8) Install propeller shaft with reference marks aligned.

(9) Install rear brake drums.

(10) Add gear lubricant, if necessary.

(11) Install wheel and tire assemblies.

(12) Remove supports and lower vehicle.



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Fig. 31 PINION ROTATING TORQUE

- 1 - TORQUE WRENCH
- 2 - PINION YOKE

DIFFERENTIAL

DESCRIPTION

The differential case is a one-piece design. The differential pinion mate shaft is retained with a lock screw. Differential bearing preload and ring gear backlash is adjusted by the use of selective shims. Pinion bearing preload is set and maintained by the use of a collapsible spacer. The cover provides a means for servicing the differential without removing the axle. The axle has a vent hose to relieve internal pressure caused by lubricant vaporization and internal expansion.

OPERATION

During straight-ahead driving, the differential pinion gears do not rotate on the pinion mate shaft. This occurs because input torque applied to the gears is divided and distributed equally between the two side gears. As a result, the pinion gears revolve with the pinion mate shaft but do not rotate around it (Fig. 32).

DIFFERENTIAL (Continued)

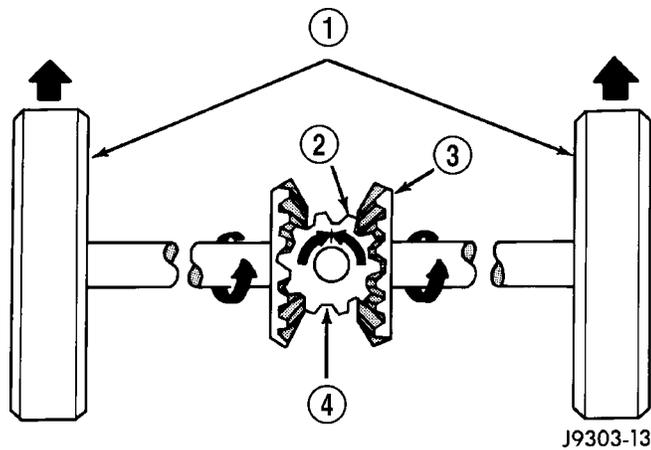


Fig. 32 STRAIGHT AHEAD DRIVING

- 1 - WHEELS ROTATE AT CASE SPEED
- 2 - PINION GEAR
- 3 - SIDE GEAR
- 4 - PINION GEARS ROTATE WITH CASE

When turning corners, the outside wheel must travel a greater distance than the inside wheel to complete a turn. The difference must be compensated for to prevent the tires from scuffing and skidding through turns. To accomplish this, the differential allows the axle shafts to turn at unequal speeds (Fig. 33). In this instance, the input torque applied to the pinion gears is not divided equally. The pinion gears now rotate around the pinion mate shaft in opposite directions. This allows the side gear and axle shaft attached to the outside wheel to rotate at a faster speed.

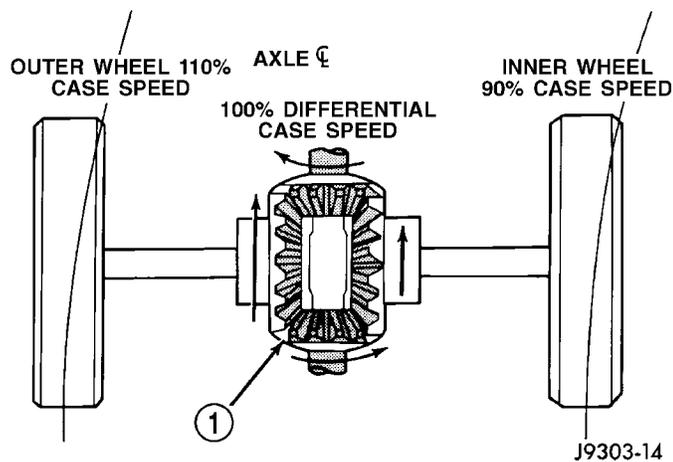


Fig. 33 DIFFERENTIAL ON TURNS

- 1 - PINION GEARS ROTATE ON PINION SHAFT

REMOVAL

- (1) Remove fill hole plug from the differential housing cover.
- (2) Remove differential housing cover and drain fluid.
- (3) Remove axle shafts.

(4) Note the reference letters stamped on the bearing caps and housing machined sealing surface (Fig. 34).

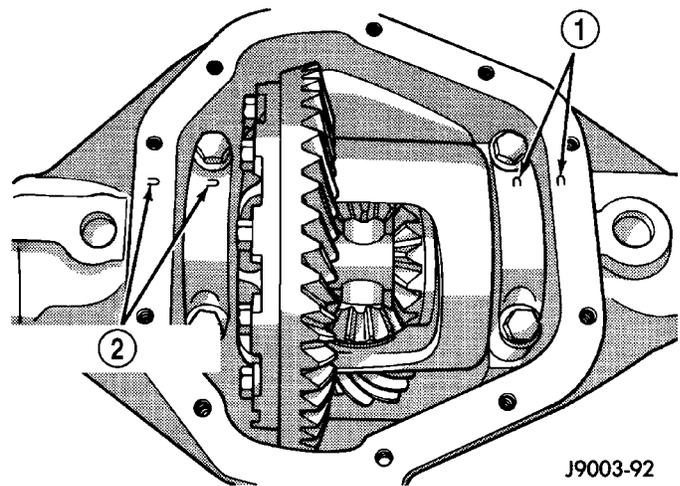


Fig. 34 BEARING CAP REFERENCE

- 1 - REFERENCE LETTERS
- 2 - REFERENCE LETTERS

(5) Loosen the differential bearing cap bolts.
 (6) Position Spreader W-129-B with Adapter Kit 6987B on differential locating holes (Fig. 35). Install holddown clamps and tighten the turnbuckle finger-tight.

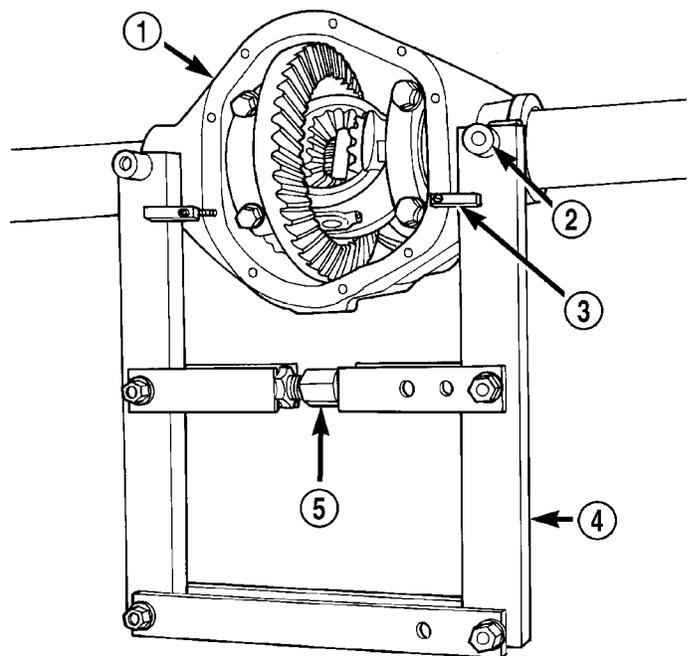


Fig. 35 SPREADER LOCATION

- 1 - DIFFERENTIAL HOUSING
- 2 - DOWEL
- 3 - SAFETY HOLD DOWN
- 4 - SPREADER
- 5 - TURNBUCKLE

DIFFERENTIAL (Continued)

(7) Install a Pilot Stud C-3288-B at the left side of the differential housing. Attach Dial Indicator C-3339 to pilot stud. Load the indicator plunger against the opposite side of the housing (Fig. 36) and zero the indicator.

CAUTION: Never spread the housing over 0.38 mm (0.015 in). If housing is over-spread, it could distort and damage the housing.

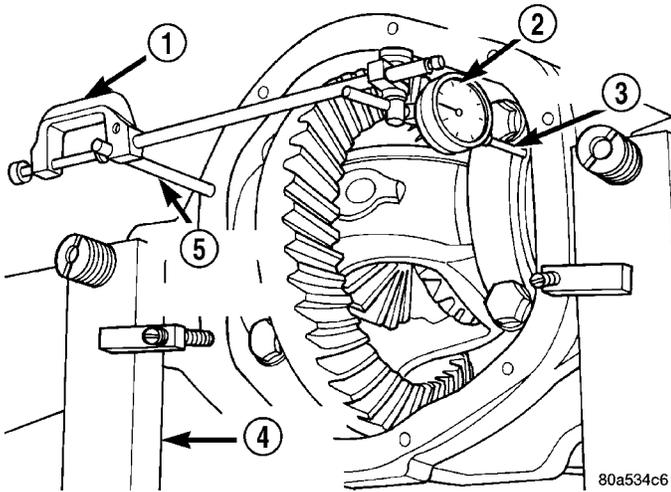


Fig. 36 DIAL INDICATOR LOCATION

- 1 - CLAMP
- 2 - DIAL INDICATOR
- 3 - LEVER ADAPTER
- 4 - SPREADER
- 5 - PILOT STUD

(8) Spread housing enough to remove the differential case from the housing. Measure the distance with the dial indicator (Fig. 37).

(9) Remove the dial indicator.

(10) While holding the differential case in position, remove the differential bearing cap bolts and caps.

(11) Remove differential from the housing and tag differential bearing cups to indicate location (Fig. 38).

(12) Remove spreader from housing.

(13) Clean the housing cavity with flushing oil, light engine oil or lint free cloth.

NOTE: Do not use water, steam, kerosene or gasoline for cleaning.

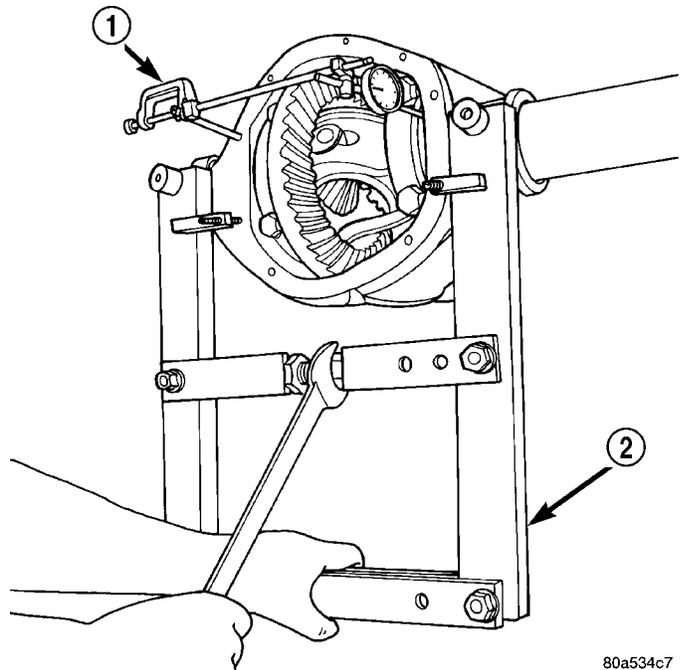


Fig. 37 SPREAD DIFFERENTIAL HOUSING

- 1 - DIAL INDICATOR
- 2 - SPREADER

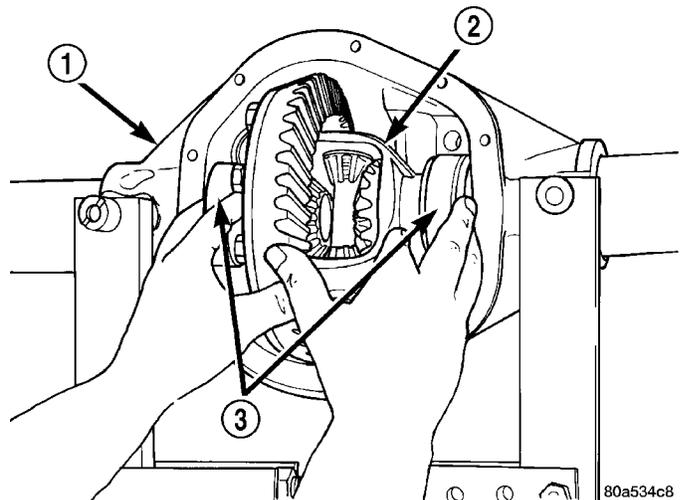


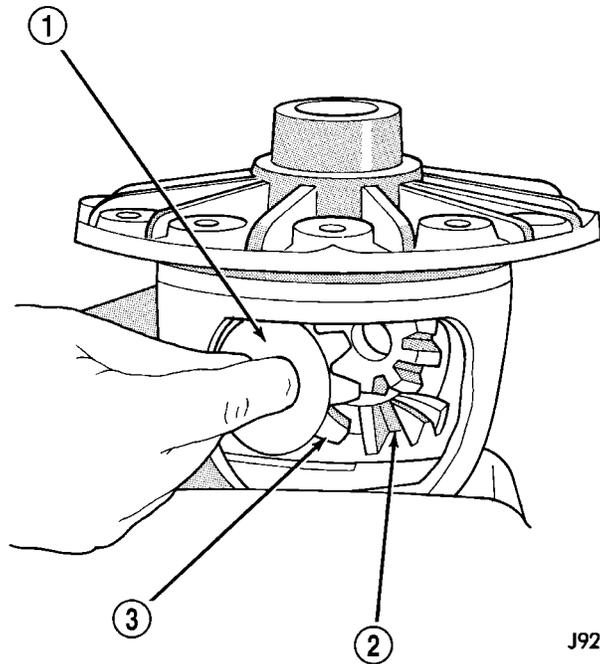
Fig. 38 DIFFERENTIAL CASE REMOVAL

- 1 - DIFFERENTIAL HOUSING
- 2 - DIFFERENTIAL CASE
- 3 - BEARING CUPS

DIFFERENTIAL (Continued)

DISASSEMBLY

- (1) Remove pinion shaft.
- (2) Rotate differential side gears and remove the differential pinions and thrust washers (Fig. 39).



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Fig. 39 DIFFERENTIAL GEARS

- 1 - THRUST WASHER
- 2 - SIDE GEAR
- 3 - DIFFERENTIAL PINION

- (3) Remove the differential side gears and thrust washers.

ASSEMBLY

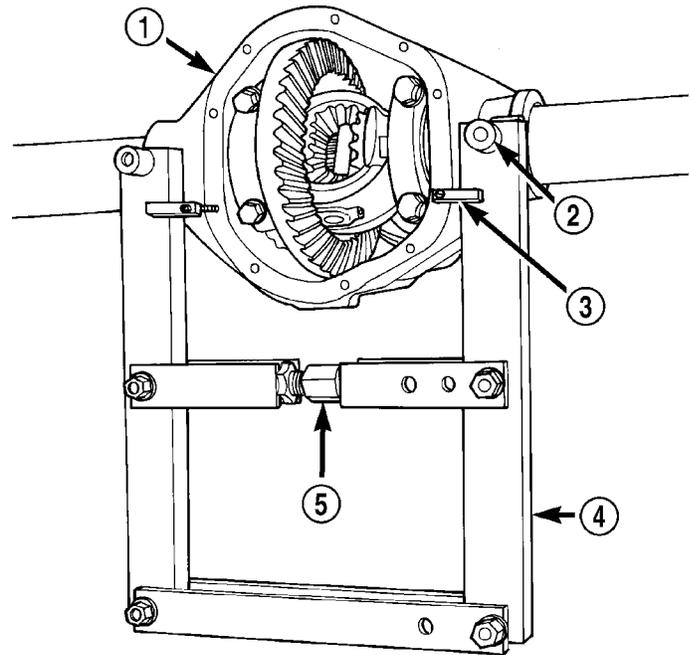
- (1) Lubricate all differential components with hypoid gear lubricant.
- (2) Install the differential side gears and thrust washers.
- (3) Install the differential pinion gears and thrust washers.
- (4) Install the pinion mate shaft.
- (5) Align the hole in the pinion mate shaft with the hole in the differential case and install the pinion mate shaft lock screw finger tight.

INSTALLATION

NOTE: If replacement differential bearings or differential case are being installed, differential side bearing shim requirements may change. Refer Adjustments (Differential Bearing Preload and Gear Backlash) to determine the proper shim selection.

- (1) Position Spreader W-129-B and adapters from Adapter set 6987, with the tool dowel pins seated in

the locating holes (Fig. 40). Install holddown clamps and tighten the tool turnbuckle finger-tight.



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Fig. 40 SPREADER LOCATION

- 1 - DIFFERENTIAL HOUSING
- 2 - DOWEL
- 3 - SAFETY HOLD DOWN
- 4 - SPREADER
- 5 - TURNBUCKLE

- (2) Install Pilot Stud C-3288-B at the left side of the differential housing. Attach Dial Indicator C-3339 to pilot stud. Load the indicator plunger against the opposite side of the housing and zero the indicator.

CAUTION: Never spread over 0.38 mm (0.015 in). If the housing is over-spread, it could be distorted or damaged.

- (3) Spread the housing enough to install the case in the housing. Measure the distance with the dial indicator.
- (4) Remove the dial indicator.
- (5) Install differential case in the housing. Ensure that the differential bearing cups remain in position on the differential bearings. Tap the differential case to ensure the bearing cups are seated in the housing.
- (6) Install bearing caps in their original locations (Fig. 41).
- (7) Loosely install differential bearing cap bolts.
- (8) Remove axle housing spreader.
- (9) Tighten the bearing cap bolts to 77 N·m (57 ft. lbs.).
- (10) Install the axle shafts.

DIFFERENTIAL (Continued)

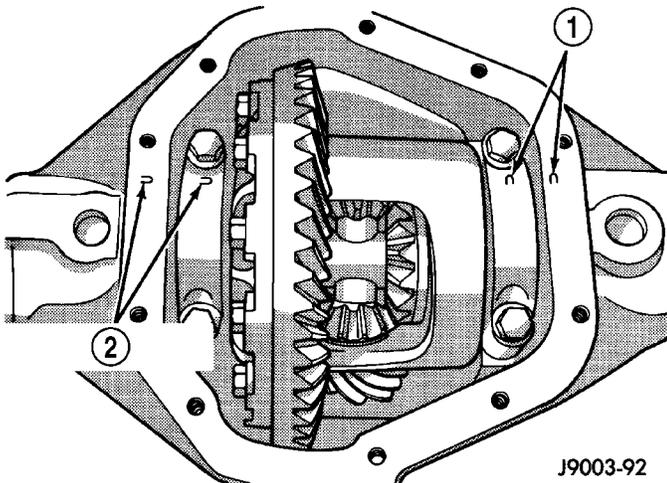


Fig. 41 BEARING CAP REFERENCE

- 1 - REFERENCE LETTERS
2 - REFERENCE LETTERS

(11) Apply a 6.35mm (1/4 in.) bead of red Mopar Silicone Rubber Sealant or equivalent to the housing cover (Fig. 42).

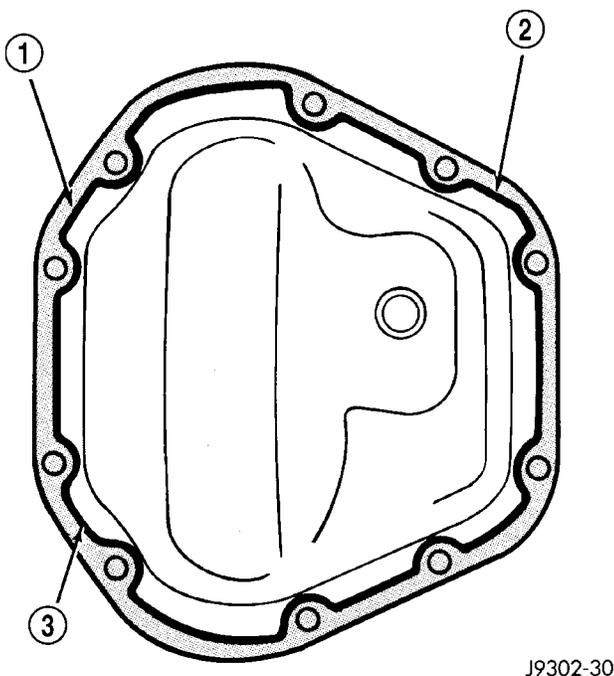


Fig. 42 DIFFERENTIAL COVER

- 1 - SEALANT SURFACE
2 - SEALANT
3 - SEALANT THICKNESS

CAUTION: If housing cover is not installed within 3 to 5 minutes, the cover must be cleaned and new RTV applied or adhesion quality will be compromised.

(12) Install the cover and any identification tag. Tighten the cover bolts in a criss-cross pattern to 41 N·m (30 ft. lbs.).

(13) Refill the differential with Mopar Hypoid Gear Lubricant or equivalent to bottom of the fill plug hole.

(14) Install the fill hole plug.

DIFFERENTIAL - TRAC-LOK

DESCRIPTION

The Trac-Lok® differential has a one-piece differential case, and similar internal components as a standard differential, plus two clutch disc packs. Differential bearing preload and ring gear backlash are adjusted with shims located between the differential case bearing cups and housing. Pinion bearing preload is set and maintained by the use of a collapsible spacer.

OPERATION

This differentials clutches are engaged by two concurrent forces. The first being the preload force exerted through Belleville spring washers within the clutch packs. The second is the separating forces generated by the side gears as torque is applied through the ring gear (Fig. 43).

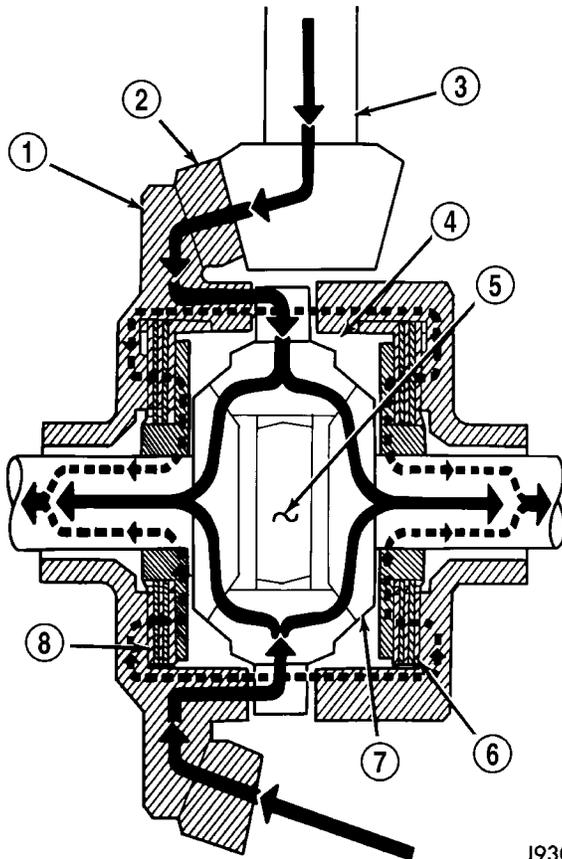
This design provides the differential action needed for turning corners and for driving straight ahead during periods of unequal traction. When one wheel loses traction, the clutch packs transfer additional torque to the wheel having the most traction. This differential resist wheel spin on bumpy roads and provide more pulling power when one wheel loses traction. Pulling power is provided continuously until both wheels loose traction. If both wheels slip due to unequal traction, Trac-lok® operation is normal. In extreme cases of differences of traction, the wheel with the least traction may spin.

DIAGNOSIS AND TESTING

The most common problem is a chatter noise when turning corners. Before removing the unit for repair, drain, flush and refill the axle with the specified lubricant. A container of Mopar Trac-lok® Lubricant (friction modifier) should be added after repair service or during a lubricant change.

After changing the lubricant, drive the vehicle and make 10 to 12 slow, figure-eight turns. This maneuver will pump lubricant through the clutches. This will correct the condition in most instances. If the chatter persists, clutch damage could have occurred.

DIFFERENTIAL - TRAC-LOK (Continued)



J9303-15

Fig. 43 TRAC-LOK LIMITED SLIP DIFFERENTIAL

- 1 - CASE
- 2 - RING GEAR
- 3 - DRIVE PINION
- 4 - PINION GEAR
- 5 - MATE SHAFT
- 6 - CLUTCH PACK
- 7 - SIDE GEAR
- 8 - CLUTCH PACK

DIFFERENTIAL TEST

The differential can be tested without removing the differential case by measuring rotating torque. Make sure brakes are not dragging during this measurement.

(1) Place blocks in front and rear of both front wheels.

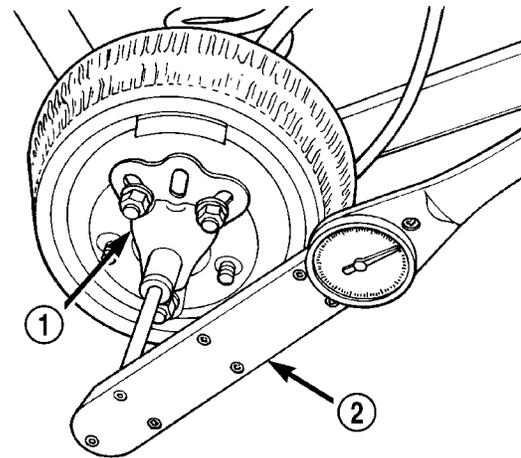
(2) Raise one rear wheel until it is completely off the ground.

(3) Engine off, transmission in neutral, and parking brake off.

(4) Remove wheel and bolt Special Tool 6790 or equivalent tool to studs.

(5) Use torque wrench on special tool to rotate wheel and read rotating torque (Fig. 44).

(6) If rotating torque is less than 41 N·m (30 ft. lbs.) or more than 271 N·m (200 ft. lbs.) on either wheel the unit should be serviced.



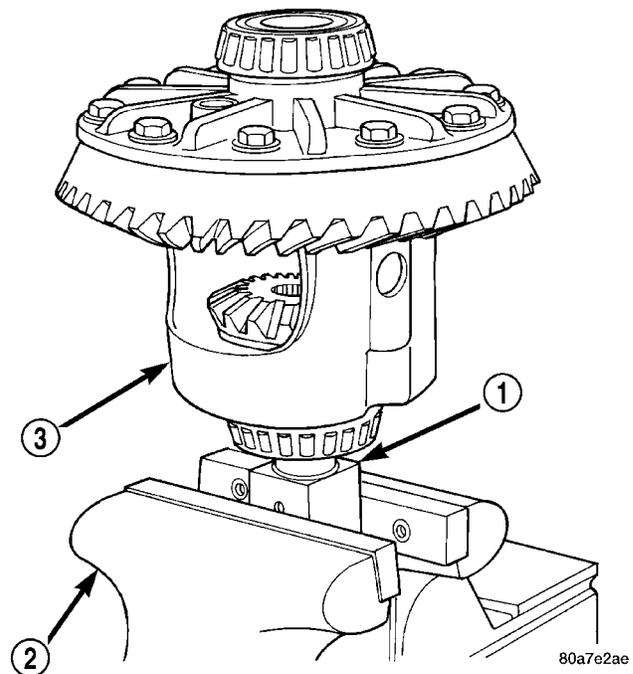
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Fig. 44 ROTATING TORQUE TEST

- 1 - SPECIAL TOOL WITH BOLT IN CENTER HOLE
- 2 - TORQUE WRENCH

DISASSEMBLY

(1) Clamp side gear Fixture 6965 in a vise and set differential case on the fixture (Fig. 45).



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Fig. 45 DIFFERENTIAL CASE FIXTURE

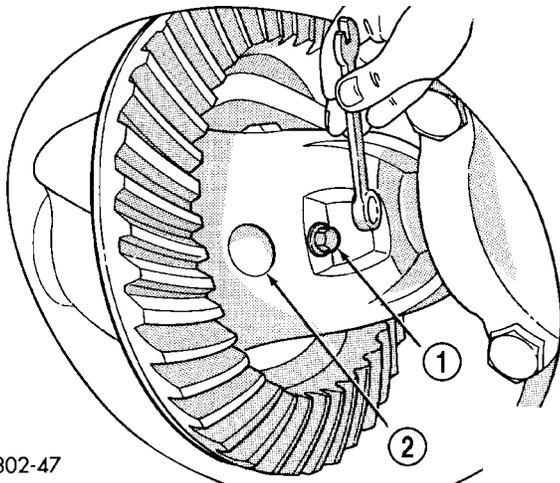
- 1 - HOLDING FIXTURE
- 2 - VISE
- 3 - DIFFERENTIAL

(2) Remove ring gear if the ring gear is to be replaced. The Trac-loc® differential can be serviced with the ring gear installed.

(3) Remove pinion gear mate shaft lock screw (Fig. 46).

(4) Remove pinion gear mate shaft with a drift and hammer.

DIFFERENTIAL - TRAC-LOK (Continued)

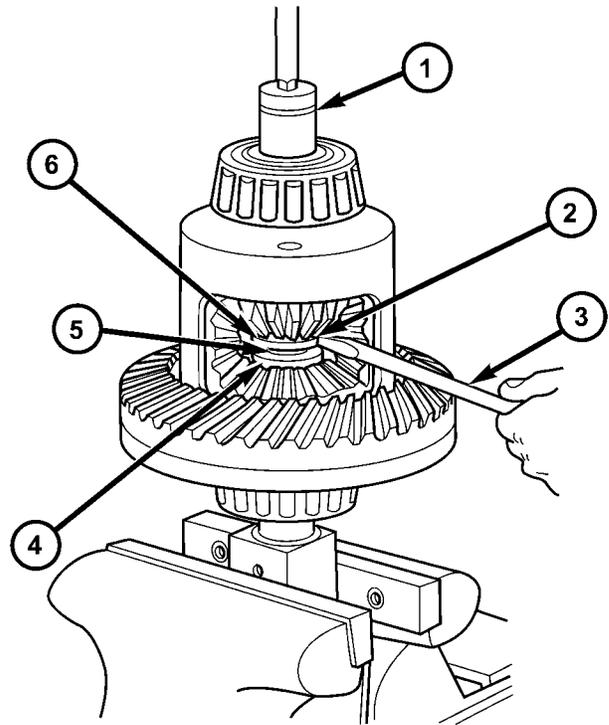


J9302-47

Fig. 46 MATE SHAFT LOCK SCREW

- 1 - LOCK SCREW
- 2 - PINION GEAR MATE SHAFT

(5) Install and lubricate Step Plate C-6960-3 (Fig. 47).

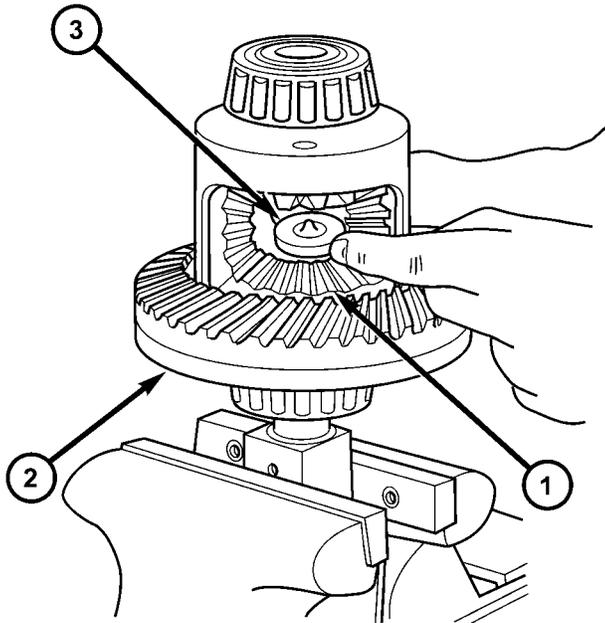


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Fig. 48 THREAD ADAPTER DISC

- 1 - SOCKET
- 2 - SLOT IN ADAPTER
- 3 - SCREWDRIVER
- 4 - STEP PLATE
- 5 - THREADED ROD
- 6 - ADAPTER DISC

(8) Install Forcing Screw C-6960-4 and tighten screw to 122 N·m (90 ft. lbs.) maximum to compress Belleville springs in clutch packs (Fig. 49).



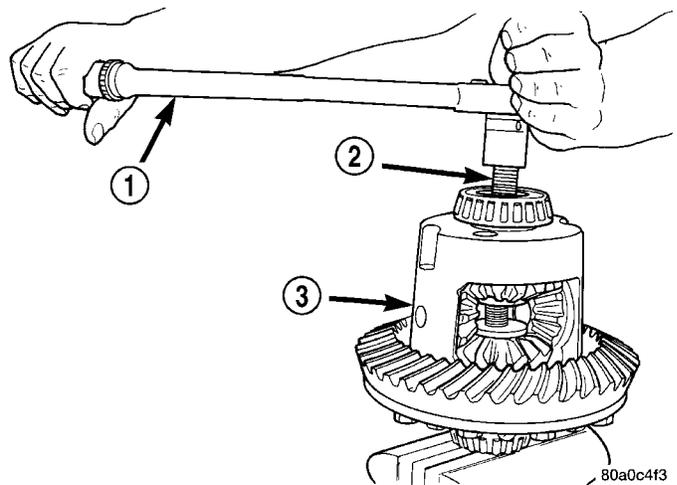
80bd202b

Fig. 47 Step Plate

- 1 - LOWER SIDE GEAR
- 2 - DIFFERENTIAL CASE
- 3 - STEP PLATE

(6) Assemble Threaded Adapter C-6960-1 into top side gear. Thread Forcing Screw C-6960-4 into adapter until it becomes centered in adapter plate.

(7) Position a small screw driver in slot of Threaded Adapter Disc C-6960-3 (Fig. 48) to prevent adapter from turning.



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Fig. 49 COMPRESS BELLEVILLE SPRING

- 1 - TORQUE WRENCH
- 2 - FORCING SCREW
- 3 - DIFFERENTIAL CASE

DIFFERENTIAL - TRAC-LOK (Continued)

(9) With a feeler gauge remove thrust washers from behind the pinion gears (Fig. 50).

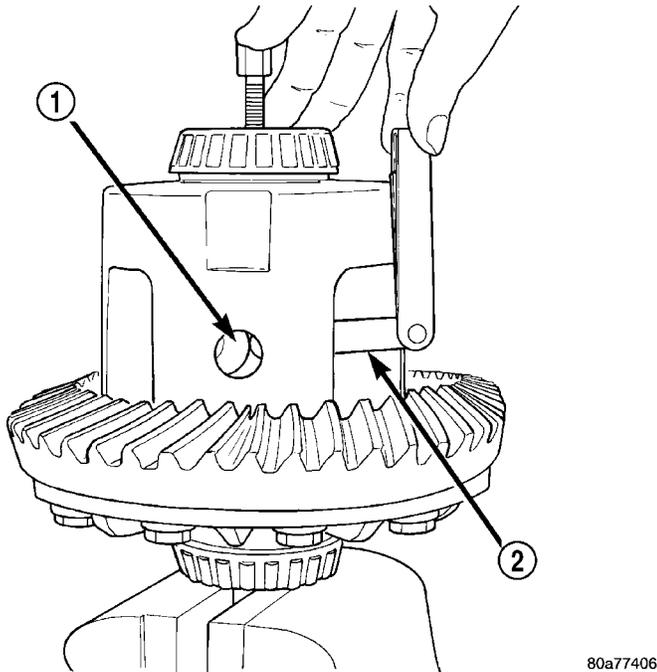


Fig. 50 PINION GEAR THRUST WASHER

- 1 - THRUST WASHER
2 - FEELER GAUGE

(10) Insert Turning Bar C-6960-2 into the pinion mate shaft hole in the case (Fig. 51).

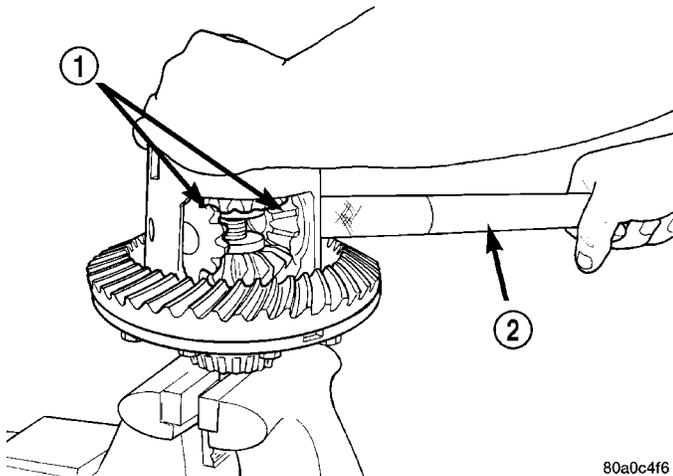


Fig. 51 PINION GEARS

- 1 - PINION GEARS
2 - TURNING BAR

(11) Loosen the Forcing Screw in small increments until the clutch pack tension is relieved and the differential case can be turned using Turning Bar.

(12) Rotate differential case until the pinion gears can be removed.

(13) Remove pinion gears from differential case.

(14) Remove Forcing Screw, Step Plate and Threaded Adapter.

(15) Remove top side gear, clutch pack retainer and clutch pack. Keep plates in order during removal (Fig. 52).

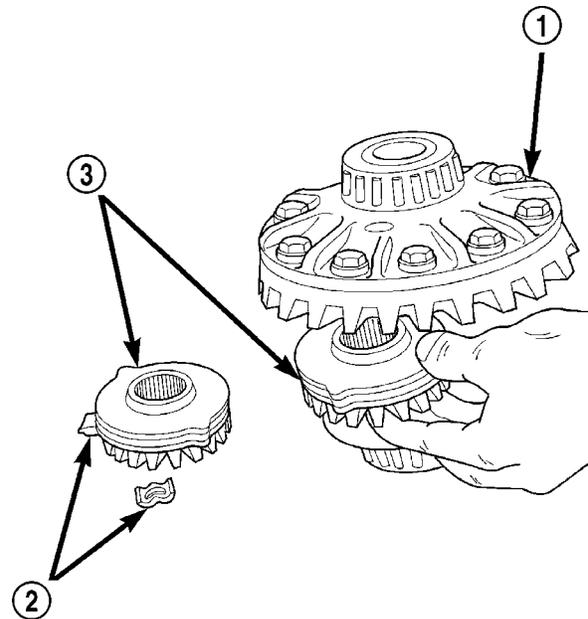


Fig. 52 SIDE GEARS AND CLUTCH DISCS

- 1 - DIFFERENTIAL CASE
2 - RETAINER
3 - SIDE GEAR AND CLUTCH DISC PACK

(16) Remove differential case from the Holding Fixture. Remove side gear, clutch pack retainer and clutch pack. Keep plates in order during removal.

ASSEMBLY

NOTE: New Plates and discs with fiber coating (no grooves or lines) must be presoaked in Friction Modifier before assembly. Soak plates and discs for a minimum of 20 minutes.

(1) Lubricate components with gear lubricant.

(2) Assemble clutch discs into packs and secure disc packs with retaining clips (Fig. 53).

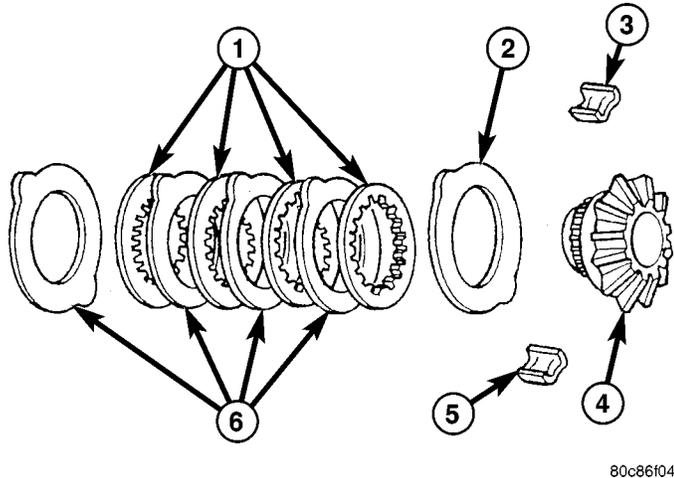
NOTE: Dished plate is position with the convex side against the side gear.

(3) Position assembled clutch disc packs on the side gear hubs.

(4) Install clutch pack and side gear in the ring gear side of the differential case (Fig. 54). **Verify clutch pack retaining clips are in position and seated in the case pockets.**

(5) Position the differential case on the Holding Fixture 6965.

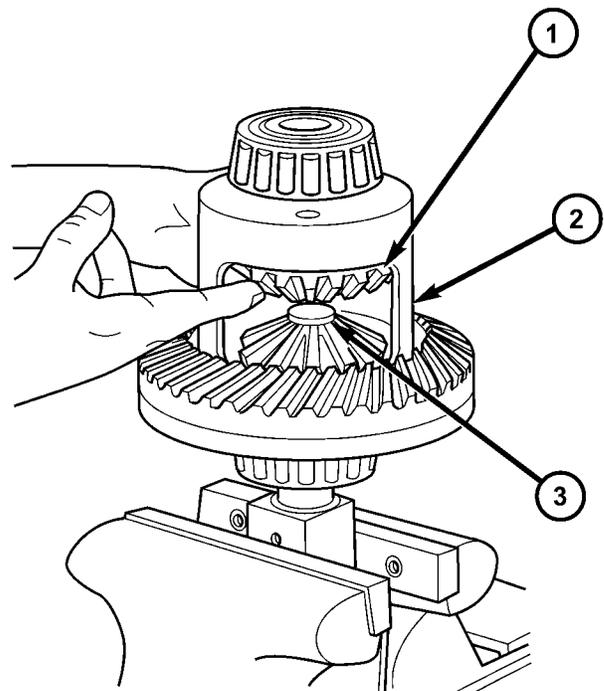
DIFFERENTIAL - TRAC-LOK (Continued)



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Fig. 53 CLUTCH PACK

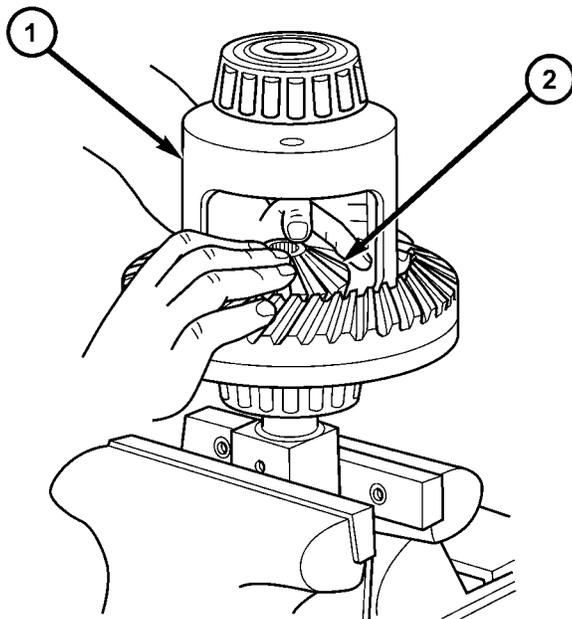
- 1 - DISCS
- 2 - DISHED PLATE
- 3 - RETAINER
- 4 - SIDE GEAR
- 5 - RETAINER
- 6 - PLATES



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Fig. 55 CLUTCH PACK AND UPPER SIDE GEAR

- 1 - SIDE GEAR AND CLUTCH PACK
- 2 - DIFFERENTIAL CASE
- 3 - STEP PLATE



80bd270c

Fig. 54 CLUTCH PACK AND LOWER SIDE GEAR

- 1 - DIFFERENTIAL CASE
- 2 - SIDE GEAR AND CLUTCH PACK

(6) Install lubricated Step Plate C-6960-3 in lower side gear (Fig. 55).

(7) Install the upper side gear and clutch disc pack (Fig. 55).

(8) Hold assembly in position. Insert Threaded Adapter C-6960-1 into top side gear.

(9) Install Forcing Screw C-6960-4 and tighten screw to slightly compress clutch disc.

(10) Place pinion gears in position in side gears and verify that the pinion mate shaft hole is aligned.

(11) Rotate case with Turning Bar C-6960-2 until the pinion mate shaft holes in pinion gears align with holes in case. It may be necessary to slightly tighten the forcing screw in order to install the pinion gears.

(12) Tighten forcing screw to 122 N·m (90 ft. lbs.) maximum to compress the Belleville springs.

(13) Lubricate and install thrust washers behind pinion gears and align washers with a small screw driver. Insert mate shaft into each pinion gear to verify alignment.

(14) Remove Forcing Screw, Step Plate and Threaded Adapter.

(15) Install pinion gear mate shaft and align holes in shaft and case.

(16) Install pinion mate shaft lock screw finger tight to hold shaft during differential installation.

(17) Lubricate all differential components with hypoid gear lubricant.

DIFFERENTIAL CASE BEARINGS

REMOVAL

- (1) Remove differential from the housing.
- (2) Remove bearings from the differential case with Puller/Press C-293-PA , C-293-39 Blocks and Plug SP-3289 (Fig. 56).

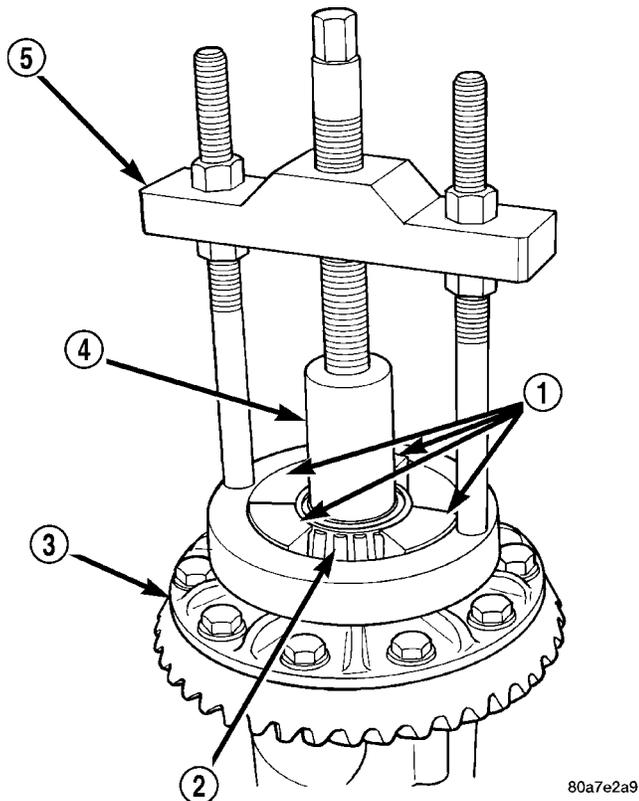


Fig. 56 BEARING REMOVAL

- 1 - ADAPTERS
- 2 - BEARING
- 3 - DIFFERENTIAL
- 4 - PLUG
- 5 - PULLER

INSTALLATION

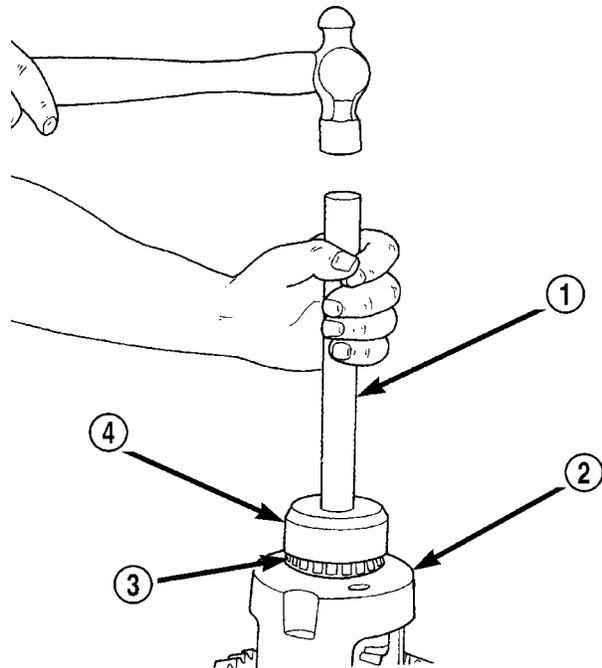
- (1) Install differential side bearings with Installer C-3716-A with Handle C-4171 (Fig. 57).
- (2) Install differential in the housing.

PINION GEAR/RING GEAR

REMOVAL

NOTE: The ring and pinion gears are serviced in a matched set. Never replace one gear without replacing the other gear.

- (1) Remove differential from axle housing.



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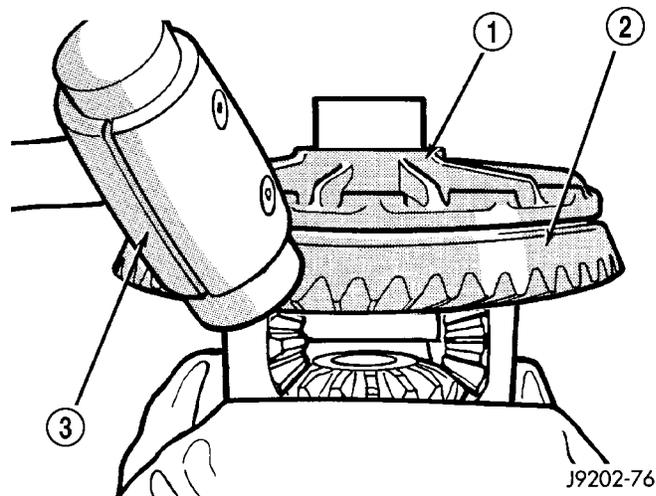
Fig. 57 DIFFERENTIAL CASE BEARINGS

- 1 - HANDLE C-4171
- 2 - DIFFERENTIAL
- 3 - BEARING
- 4 - TOOL C-3716-A

- (2) Place differential case in a vise with soft metal jaw.

- (3) Remove ring gear bolts from the differential case.

- (4) Drive ring gear from the differential case with a dead-blow hammer (Fig. 58).



J9202-76

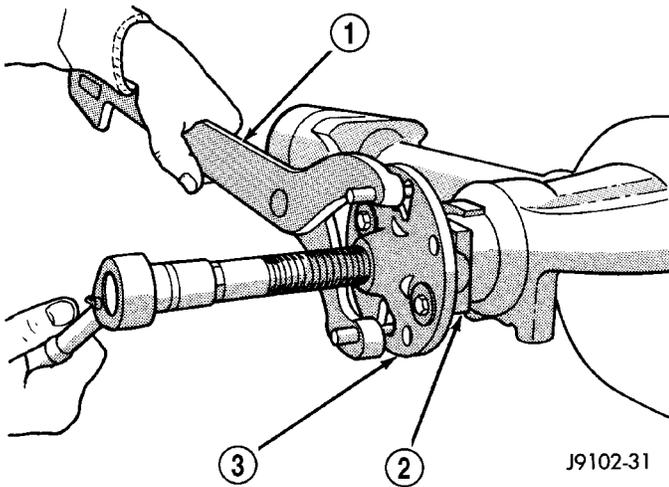
Fig. 58 RING GEAR

- 1 - CASE
- 2 - RING GEAR
- 3 - DEAD-BLOW HAMMER

- (5) Hold pinion yoke with Wrench 6958 and remove pinion yoke nut and washer.

PINION GEAR/RING GEAR (Continued)

(6) Remove pinion yoke from pinion shaft with Remover C-452 and Wrench C-3281 (Fig. 59).

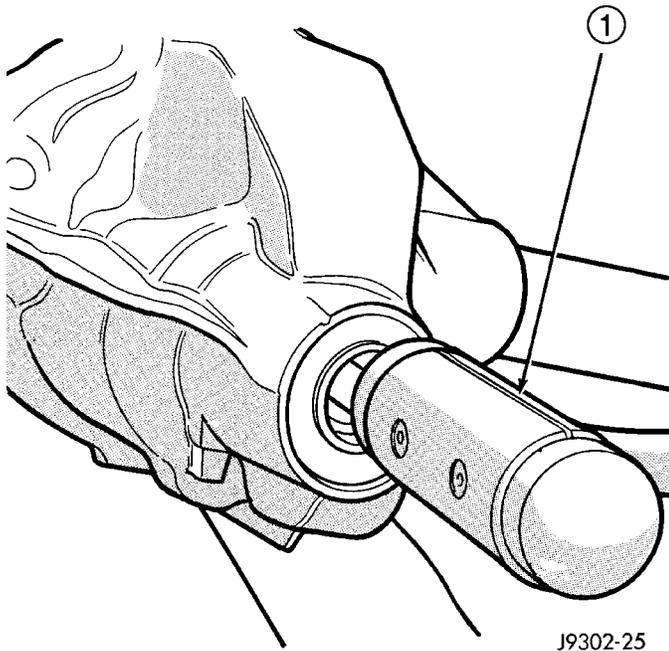


J9102-31

Fig. 59 PINION YOKE REMOVER

- 1 - WRENCH
- 2 - YOKE
- 3 - PULLER

(7) Remove the pinion gear from housing with a dead-blow hammer (Fig. 60).



J9302-25

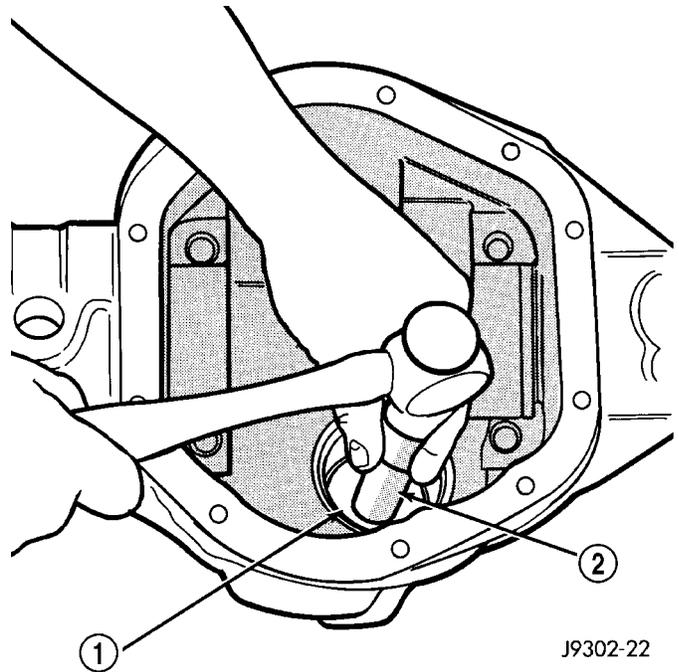
Fig. 60 REMOVE PINION GEAR

- 1 - DEAD-BLOW HAMMER

(8) Remove pinion shaft seal with a pry tool or a slide hammer mounted screw.

(9) Remove oil slinger, if equipped, and front pinion bearing.

(10) Remove front pinion bearing cup with Remover C-4345 and Handle C-4171 (Fig. 61).

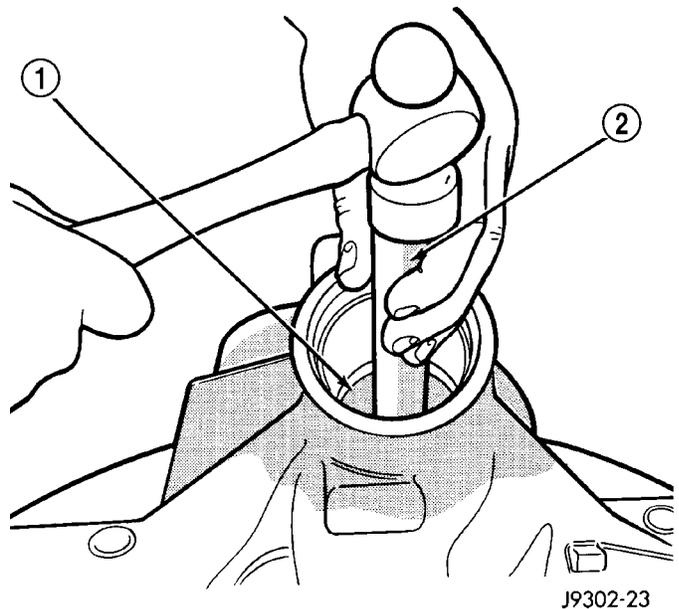


J9302-22

Fig. 61 FRONT PINION BEARING CUP

- 1 - REMOVER
- 2 - HANDLE

(11) Remove rear bearing cup from housing (Fig. 62) with Remover D-149 and Handle C-4171.



J9302-23

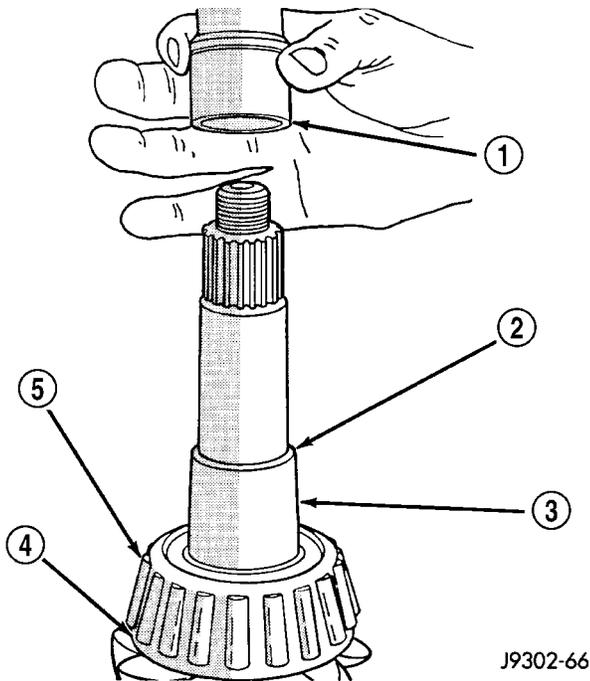
Fig. 62 REAR PINION BEARING CUP

- 1 - DRIVER
- 2 - HANDLE

(12) Remove collapsible preload spacer (Fig. 63).

(13) Remove rear bearing from the pinion shaft with Puller/Press C-293-PA and Adapters C-293-40 (Fig. 64).

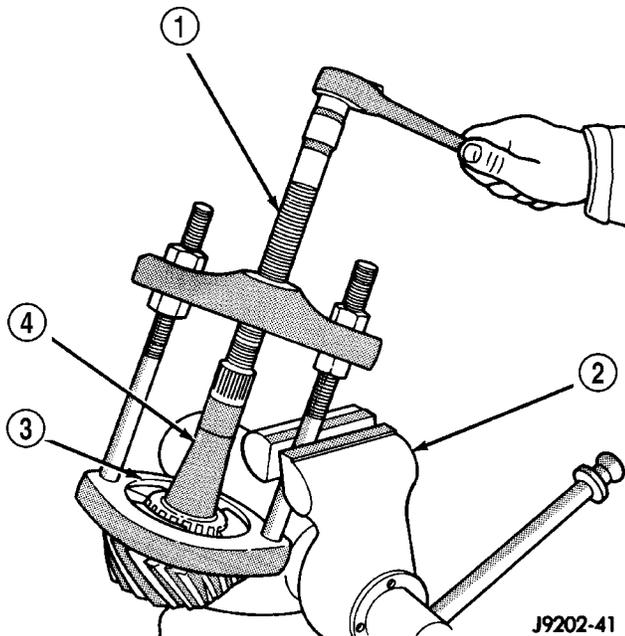
PINION GEAR/RING GEAR (Continued)



J9302-66

Fig. 63 COLLAPSIBLE SPACER

- 1 - COLLAPSIBLE SPACER
- 2 - SHOULDER
- 3 - PINION GEAR
- 4 - SHIM
- 5 - REAR BEARING



J9202-41

Fig. 64 REAR PINION BEARING

- 1 - PULLER
- 2 - VISE
- 3 - ADAPTERS
- 4 - DRIVE PINION GEAR SHAFT

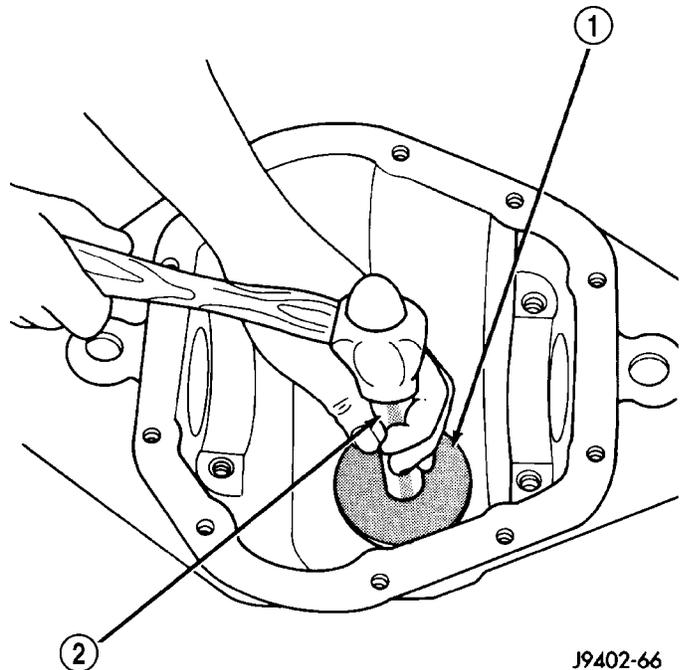
(14) Remove depth shims from the pinion shaft and record the shims thickness.

INSTALLATION

NOTE: A pinion depth shim/oil slinger is placed between the rear pinion bearing cone and the pinion head to achieve proper ring gear and pinion mesh. If ring gear and pinion are reused, the pinion depth shim/oil slinger should not require replacement. Refer to Adjustment (Pinion Gear Depth) to select the proper thickness shim/oil slinger if ring and pinion gears are replaced.

(1) Apply Mopar Door Ease or equivalent lubricant to outside surface of bearing cups.

(2) Install pinion rear bearing cup with Installer D-146 and Driver Handle C-4171 (Fig. 65) and verify cup is seated.



J9402-66

Fig. 65 REAR PINION BEARING CUP

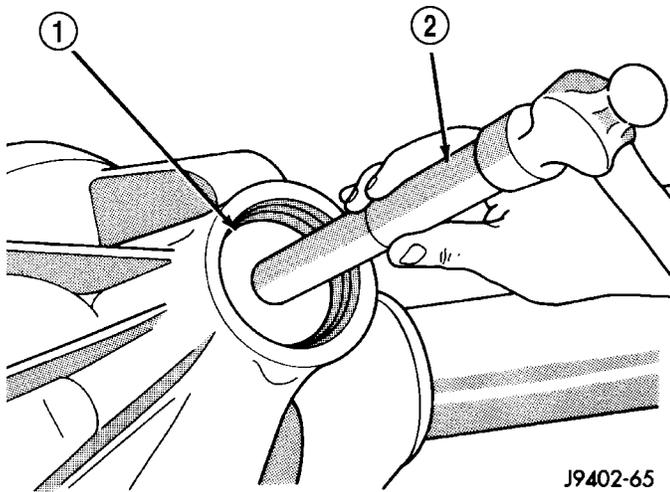
- 1 - INSTALLER
- 2 - HANDLE

(3) Install pinion front bearing cup with Installer D-130 and Handle C-4171 (Fig. 66) and verify cup is seated.

(4) Install pinion front bearing and shim.

(5) Apply a light coating of gear lubricant on the lip of pinion seal and install seal with an appropriate installer (Fig. 67).

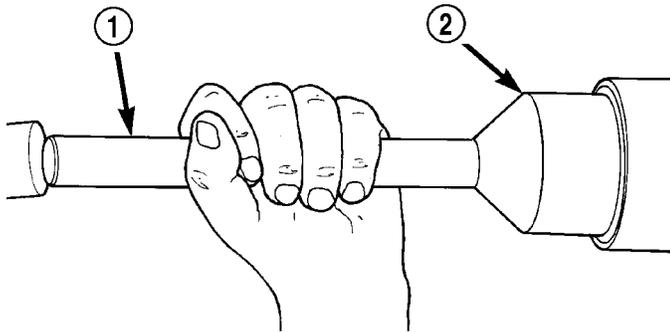
PINION GEAR/RING GEAR (Continued)



J9402-65

Fig. 66 FRONT PINION BEARING CUP

- 1 - INSTALLER
- 2 - HANDLE

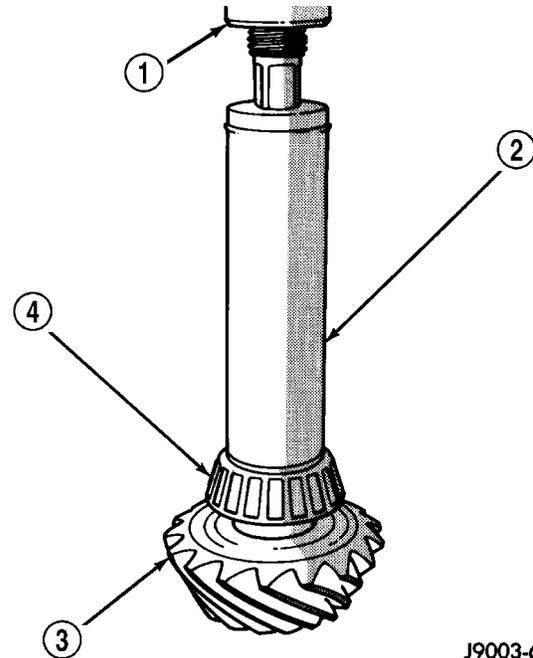


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Fig. 67 PINION SEAL INSTALLER

- 1 - HANDLE
- 2 - INSTALLER

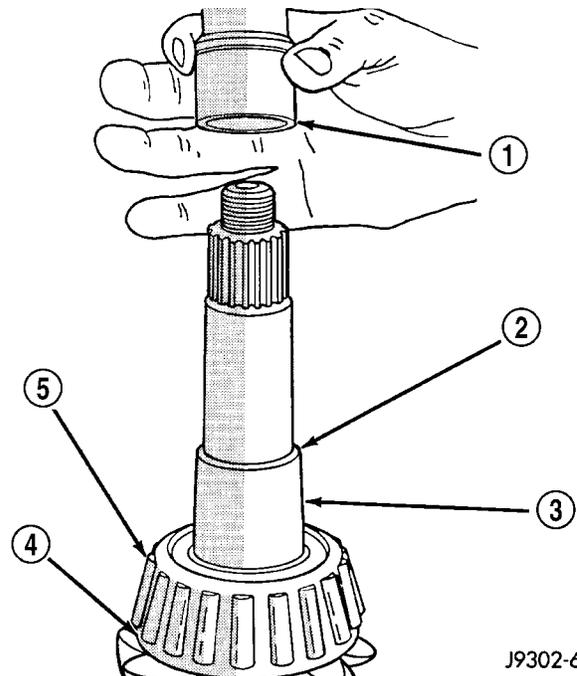
- (6) Install depth shim on the pinion gear.
- (7) Install rear bearing and shim on the pinion gear with Installer W-262 and a press (Fig. 68).
- (8) Install a **new** collapsible preload spacer on pinion shaft and install pinion gear in the housing (Fig. 69).



J9003-67

Fig. 68 REAR PINION BEARING

- 1 - PRESS
- 2 - INSTALLER
- 3 - DRIVE PINION GEAR
- 4 - REAR PINION BEARING



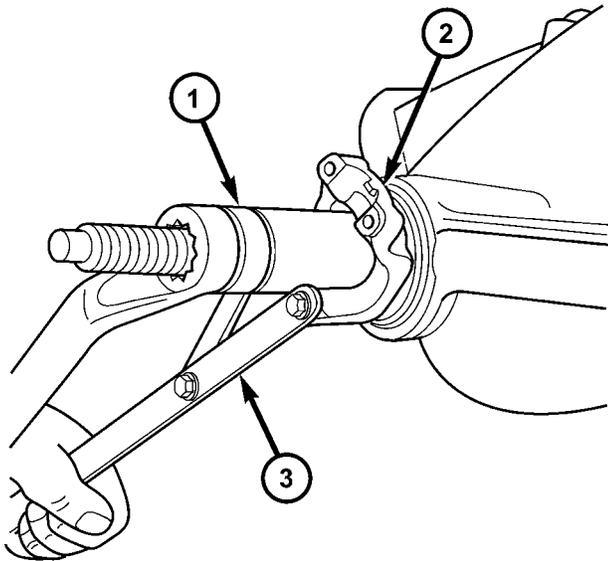
J9302-66

Fig. 69 COLLAPSIBLE SPACER

- 1 - COLLAPSIBLE SPACER
- 2 - SHOULDER
- 3 - PINION GEAR
- 4 - SHIM
- 5 - REAR BEARING

PINION GEAR/RING GEAR (Continued)

(9) Install yoke with Installer Screw 8112, Cup 8109 and Wrench 6958 (Fig. 70).



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Fig. 70 PINION YOKE INSTALLER

- 1 - INSTALLER
2 - PINION YOKE
3 - SPANNER WRENCH

(10) Install yoke washer and a **new** nut on the pinion gear and tighten the pinion nut until there is zero bearing end-play.

(11) Tighten the nut to 271 N·m (200 ft. lbs.).

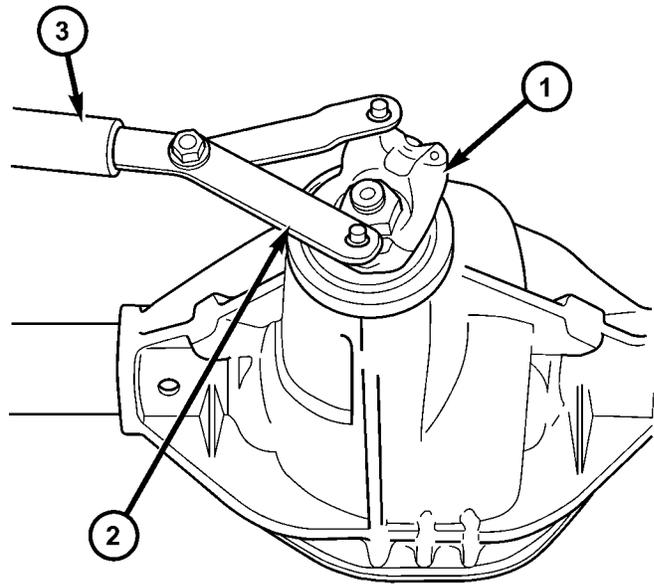
CAUTION: Never loosen pinion gear nut to decrease pinion gear bearing rotating torque and never exceed specified preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed.

(12) Using Spanner Wrench 6958 and a torque wrench set at 475 N·m (350 ft. lbs.), (Fig. 71) slowly tighten the nut in 6.8 N·m (5 ft. lbs.) increments until the rotating torque is achieved. Measure the rotating torque frequently to avoid over crushing the collapsible spacer (Fig. 72).

NOTE: If more than 475 N·m (350 ft. lbs.) torque is required to crush the collapsible spacer, the spacer is defective and must be replaced.

(13) Check bearing rotating torque with a inch pound torque wrench (Fig. 72). The pinion gear rotating torque should be:

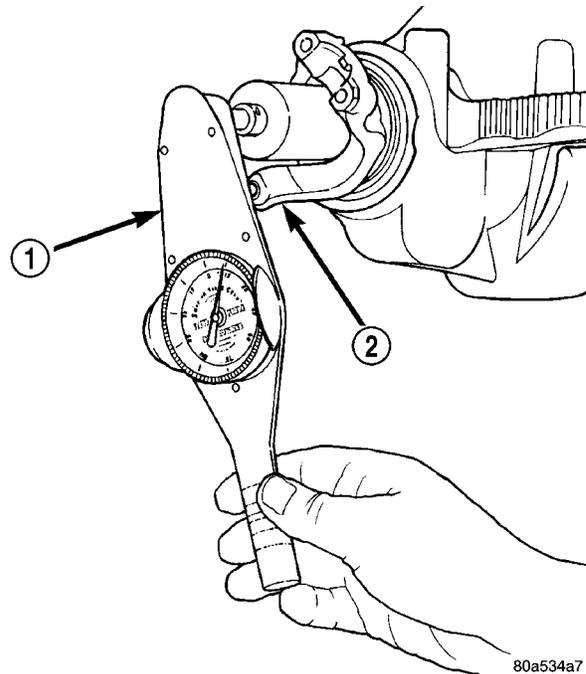
- Original Bearings: 1 to 2 N·m (10 to 20 in. lbs.).
- New Bearings: 2 to 4 N·m (20 to 35 in. lbs.).



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Fig. 71 PINION YOKE WRENCH

- 1 - PINION YOKE
2 - SPANNER WRENCH
3 - PIPE



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Fig. 72 PINION ROTATING TORQUE

- 1 - TORQUE WRENCH
2 - PINION YOKE

PINION GEAR/RING GEAR (Continued)

(14) Invert the differential case and start two ring gear bolts. This will provide case-to-ring gear bolt hole alignment.

(15) Invert the differential case in the vise.

(16) Install new ring gear bolts and alternately tighten to 136 N-m (100 ft. lbs.) (Fig. 73).

CAUTION: Do not reuse ring gear bolts, the bolts can fracture causing extensive damage.

(17) Install differential in axle housing and verify gear mesh and contact pattern. Refer to Adjustment (Gear Contact Pattern) for procedure.

(18) Install differential cover and fill with gear lubricant.

(19) Install the propeller shaft with the reference marks aligned.

(20) Remove supports and lower vehicle.

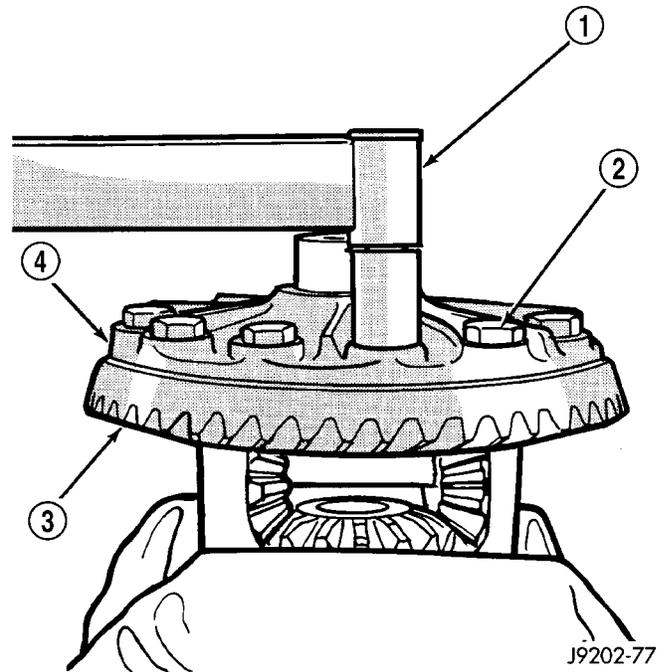


Fig. 73 RING GEAR BOLTS

- 1 - TORQUE WRENCH
- 2 - RING GEAR BOLT
- 3 - RING GEAR
- 4 - CASE